



MARITIME Series

MONOGRAPHS

Maurice Beaudin

Towards Greater Value: Enhancing Eastern Canada's Seafood Industry



INSTITUT CANADIEN DE RECHERCHE SUR LE DÉVELOPPEMENT RÉGIONAL
THE CANADIAN INSTITUTE FOR RESEARCH ON REGIONAL DEVELOPMENT

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*A*bout the Monograph

The fishery is one of the most frequently studied sectors in Canada, particularly on the Atlantic coast, where the industry seems to be mired in perpetual crisis. There are many reasons for this situation, such as pronounced resource cycles, changes in the international demand for seafood products, fragmented and geographically scattered production capacities, joint ownership of the resource, shared jurisdictions, the inherent traditionalism of coastal regions, and the dependence of heavy industry on transfer payments. This has led to numerous government studies, including the memorable Kirby (1982) and Cashin (1993) Royal Commissions, in an attempt to find ways to counter the destabilizing effects of the various crises — which invites the question, is another study really necessary?

We should state at the outset that this report is a departure from earlier studies. Our aim, of course, is to present a clear picture of the overall dynamics of this industry, which is so vital to Atlantic Canada's maritime regions, and to do so in an industry-wide context, something few studies have been willing to do. Two of the sectors we emphasize are seafood processing and marketing. Indeed, the entire problem of value-added processing of seafood products is central to our concerns. We also examine the challenges and issues relating to the fishery in eastern Canada as well as its prospects, taking into account the industry-wide changes currently taking place around the world. We also offer some tentative suggestions for strengthening the strategic links that are essential to the development of this industry within a context of increasing globalization.

About the Author

Maurice Beaudin is a regional economist and an assistant director of the Canadian Institute for Research on Regional Development at the Université de Moncton. As a researcher at the institute, he is responsible for coordinating research programs and activities, particularly for the Maritime Series of publications. Mr. Beaudin was awarded his Ph.D. in human geography (marine sciences) by the Université de Nantes in 1997. The title of his thesis was “L’adaptation économique des régions maritimes de pêche: le cas des communautés du golfe du Saint-Laurent” (Economic adjustment of maritime fisheries regions: Communities in the Gulf of St. Lawrence).

Mr. Beaudin has directed and participated in numerous projects conducted for a variety of provincial and national agencies. His primary areas of interest are the economic adjustment of resource-based communities and regional and industry studies. He is actively involved in the series of studies entitled Maritime Series: The State of the Regions, which are published annually and report on development in each of the eleven economic regions in the Maritime provinces. He has published articles in national and international journals and has written a number of works, including *Les défis de l’industrie des pêches au Nouveau-Brunswick* (1992), which earned him the Prix France-Acadie, and *La lutte pour le développement: le cas du Nord-Est*, published by the Université du Québec. His recent works include “L’industrie des pêches dans la Péninsule acadienne: son profil, sa dynamique et sa capacité à soutenir l’économie régionale,” as well as “The Viability of the Lobster Processing Industry in New Brunswick” and “Regional Labour Market Dynamics in Atlantic Canada.”

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I would also like to thank Wade Aucoin of the Atlantic Canada Opportunities Agency (ACOA) for his revisions and astute advice, as well as economists Michel Audet and Hilaire Chiasson at DFO (Moncton) for their keen interest in this subject and their generous support. I am also indebted to Gilberte Nowlan, again at DFO (Moncton), who unfailingly responded to my many requests for statistical information, and to Bruno Lévesque and Pierre Gauthier at DFO (Quebec), who provided me with relevant data and documents on the seafood industry in Quebec and with an assessment of the aquaculture sector in eastern Canada. Sincere thanks are also due to Mike Howley, an economist at ACOA (St. John's), and to Pat MacDonald at Newfoundland's Department of Fisheries and Aquaculture for their assistance during visits to processing plants in the area. I am similarly grateful for the comments and advice of resource people such as Gerry Donovan (Newfoundland Seafood Market Council), Peter Dysart (New Brunswick Fish Packers' Association), Kevin Elworthy (Enterprise Cape Breton), and a number of anonymous readers. In addition to the above, there are many others whose

help I must acknowledge, in particular the industry players who provided me with information on many aspects of their trade.

Finally, I would be remiss if I did not thank Colette Allain and Ginette Benoit (CIRRD) for their painstaking editing and logistical support.

Having thanked all those concerned for their information and support, I must nevertheless accept full responsibility for the views expressed in this document and for its content and analysis.

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Preface

Few studies have really taken stock of the entire dynamics of Canada's East Coast fisheries since the widely acclaimed report *Charting a New Course: Towards the Fishery of the Future* was tabled by the Task Force on Incomes and Adjustment in the Atlantic Fishery in November 1993. That commission of inquiry, it will be recalled, was established immediately after the moratorium on the northern cod fishery was announced, a moratorium that signalled the beginning of a crisis unprecedented in the history of the East Coast fisheries. The collapse of cod stocks described by the commission meant a loss of approximately 80 percent of the groundfish industry's primary resource and led to massive layoffs and numerous plant closures that directly affected an estimated forty thousand fishers and processing plant workers, one-third of the fishing industry's entire East Coast labour force.

Today, we are entering a new decade and a new millennium, and we have to ask ourselves what has happened since then? have groundfish stocks recovered? has the surplus capacity that has long plagued the core segments of the industry been reduced? what has happened to the thousands of fishers and plant workers affected by the moratorium? how well has the processing sector survived the crisis? what are companies doing to reposition themselves and take advantage of the greater global demand for seafood products? what are the implications of new international quality regulations, and how have small- and medium-sized businesses adjusted to tighter export controls? what role have governments played during this transitional period, which is characterized by changes that are radically altering the dynamics of the agri-food industry in general and the seafood segment in particular?

These are just some of the many questions that the author, Maurice Beaudin, raises and attempts to answer in this report. In it, he presents the results of comprehensive research based on numerous analyses and factual observations that he examined objectively. To this end, Mr. Beaudin has drawn on various sectoral reports and

studies published both by official agencies and by private consulting firms. In preparing this study, he received the unconditional support of federal and provincial agencies, having obtained statistical series of all kinds as well as qualitative information on the fisheries. As well, he has been given the invaluable support of a host of players and leaders in the important seafood industry.

I would like to join Mr. Beaudin in thanking all the industry players and stakeholders, who, without exception, gave so generously of their time. Our thanks are also due to the Atlantic Canada Opportunity Agency for its financial support of this important research, which is part of the institute's Maritime Series. In submitting the report, we are proud to point out that it is not only highly detailed, but also concise and objective and presents a profile of the industry, its regional and sectoral characteristics, and the changes occurring in the industry as a whole. All those directly or indirectly affected by current developments in the seafood industry are bound to find this report both instructive and extremely useful.

Donald J. Savoie
Executive Director

A **analytical Framework**

The seafood industry occupies a special place in the world of “primary” processing industries. In fact, seafood products are perceived less and less as raw materials because of their wide variety, numerous existing and potential markets, and major differences in the value added at all levels of the industry. Some products that until recently were thought to have little value are now being developed commercially for use in nontraditional industries, such as the fine chemicals, pharmaceutical, and biomedical sectors (seaweed, fish waste, and new species).

Seafood products stand out within the vast agri-food industry, covering an impressive number of products, markets, and commercial and industrial players. It is a complex sector, and often its statistical importance internationally is still not fully understood. Gathering economic and statistical information is thus a difficult proposition, especially because of the varying degrees of industrial standardization and classification of seafood products in each country or continent. That is why it is still difficult to accurately quantify this sector of the economy.

Nonetheless, for the last ten years or so, the member states of the OECD (Organization for Economic Co-operation and Development) have been attempting to include standardization within measures introduced by the WTO (World Trade Organization). The strengthening of industrial controls (quality control and marketing tools) as well as the development of international industrial standardization and its expansion to new producing countries have led to improvements in the quality of statistical surveys.

These considerations provide a framework for and circumscribe this study, which draws on international, national, and provincial data and official databases containing numerical assessments of both exports and imports of products and services. To take into account the multiplicity of products, the variety of stakeholders, and the diverse strategies worked out by the players involved in the geographic area studied (eastern Canada), we use a progressive, six-step approach.

In chapter I, we look at the socio-economic profile of the seafood industry in eastern Canada, examining in detail the scope of the fisheries sector, from downstream to upstream operations, and its relative importance to regional and provincial economies. We analyse the provincial economic impact of the fisheries as a whole, including the following four sectors: primary production, processing, tertiary or related activities, and the quaternary sector (public sector programs that provide the industry with coaching and support).

In chapter II, we profile the core segments of the seafood industry internationally and describe the relative position of Canada and the region studied. The aquaculture sector is dealt with separately because of its rapid expansion and, above all, its strong involvement in the international seafood trade.

Chapter III describes the major characteristics of international trade in seafood products, focusing on import-export flows in the major trading blocs (United States, Europe, and Asia) and the main products traded. We also underscore the position of eastern Canadian producers within those major trade flows and pay special attention to the region's leading products.

In chapter IV, we look at the characteristics and prospects of the main end markets for Atlantic Canada's processors, providing a summary of major trading blocs and an analysis of the principal seafood products that are performing exceptionally well on international markets. We specifically examine the US market and its various regional components, as well as the European and Asian trading blocs, particularly Japan. To conclude the assessment of end markets, we turn to Canada, describing the eastern and central Canadian markets, which despite their proximity have so far been ignored by most producers in Atlantic Canada, in spite of their attractive potential, particularly for small businesses interested in export opportunities.

Chapter V focuses on industrial organization, i.e., the entrepreneurial, industrial, technological, and commercial management approach used by businesses in the seafood industry. We assess the economic health of the processing industry, by sector and by province, using comparative productivity and profitability indicators. A number of other factors are also addressed, including current and expected changes in demand, industrial standardization, product innovation, re-engineering of supply-production-sales processes, the advent of partnerships and strategic alliances, the need for qualified

administration-management and marketing personnel, and closer industry ties to institutional research and development centres.

Finally, chapter VI is the core of this study; its ultimate aim is to establish a typology or, at the very least, a useful and practical classification of all secondary production in the seafood industry. We systematically classify all seafood products shipped from eastern Canada, using recognized industrial codes and taking into account the level of processing. A system of this kind should make it easier in future to interpret data on innovation and value-added processing, two subjects still characterized by large grey areas, particularly with regard to seafood products. We also provide background profiles of several businesses that have become industry leaders because of their know-how, management style, organizational structure, or simply the energy they devote to innovation. Those businesses are capable of influencing the entire processing sector by paving the way for other players who up to now have relied too heavily on homogeneous mass production.

Methodology

There are three fundamental stages, or levels of processing, used to add value to seafood products. These levels, referred to as primary, secondary, and tertiary, are recognized internationally and are accepted by most industry monitoring and consulting firms (they are described below). Fish and seafood production generally includes four types of products: *fresh*; *frozen and chilled*; *dried, salted, smoked*, and *pickled*; and *canned*. These four major product families do not necessarily follow a value-added hierarchy. In other words, some products in each of the major groups are classified as primary and secondary or secondary and tertiary. Consequently, we have harmonized that classification with the seafood products coding system used by Industry Canada (which incorporates the international Harmonized System (HS) codes in its own database).¹ We can thus establish a production typology based on the level of value-added processing.

In analysing the profiles of industrial production and the seafood products trade, we use, in the interests of simplicity, the International Standard of Industrial Classification (ISIC) developed by the FAO (United Nations Food and Agriculture Organization), which is harmonized with the World Customs Organization's classification of goods in customs tariffs. The categories concerned cover products derived from fish, crustaceans, molluscs, and other animals and plants (including aquatic residues) caught or harvested for commercial and industrial purposes by all types of industry participants. They also include products derived from raw materials supplied by specific breeding and harvesting operations.

1. The Harmonized Commodity Description and Coding System (HS) used in this study was actually developed by the Customs Co-operation Council. Canada adopted the system to replace the lists in the Customs Tariffs, which were considered too complex and not very convenient, as well as the Canadian International Trade Classification (CITC) and the Export Commodity Classification (ECC), now the Trade of Canada Commodity Classification. It should be noted that the basic principle of the HS is the classification of products by nature instead of by manufacturing stage, use, and volume. The coding is logically organized by economic activity or by the components that make up a product. In view of that and the purpose of this study, the author has created aggregates of the relevant products based on the HS product database, which gives information according to the classifications associated with the stages of processing.

We were thus able to draw up a list of eastern Canadian seafood products based on three categories relevant to the entire region. Products were divided among those three major aggregates, which correspond to the three classes of industrial processing determined by the level of product processing. The three levels of processing were defined according to current industry practice and are recognized by national and international standardization bodies. Thus, primary processing refers to the initial operation (basic packaging of a fresh product). This segment comprises products marketed at the first stage, i.e., fresh, frozen, and, in some cases, separated, dried, and salted. At least sixty-nine codes for import-export products were deemed relevant to eastern Canada in this category. The list of aggregates is shown in Appendix A.

The second defined level applies to a class of products that have undergone further processing — i.e., the raw material itself has undergone significant processing for the purposes of preservation and/or presentation. However, most of the time these are raw products that have not been mixed with or incorporated into other food substances. They include products that are commonly salted (varying degrees of salting), dried, minced (fine or coarse), cut (strips, steaks, and slices), smoked (basic or flavoured smoking), semiprocessed (crushed, thick juices, meals, and pellets), and semipreserved (pickled). This group comprises approximately seventeen specialties that commercially are highly relevant to eastern Canada because they are most often used in tertiary processing.

Tertiary processing comprises products that undergo further industrial processing by means of various technical and technological processes that are more elaborate than those used in the first two phases. Some of these products must be marketed in compliance with strict industrial requirements and so are included in high value-added product families (prepared, pre-cooked dishes; ready-to-serve foods, such as those served at seafood delicatessens; and prepared chilled products). As we will see, these processes can be extremely different in every way from other types of processing (fine chemicals and pharmaceuticals). Thus, with nearly twenty-two products relevant to Quebec and the Atlantic provinces, the industries involved in tertiary processing employ all the preservation, preparation, refining, and extraction methods in use today.

The value of this type of classification is that it uses an industrial approach to creating a greater awareness of the levels and development of seafood product imports and exports. This is something that

is often overlooked, and yet it is an important source of information about the actual participation of the seafood products industry in the industrial development of eastern Canada as a whole.

We therefore present developments in the three levels of processing, comparing Canada, eastern Canada, and the provinces with respect to both imports and exports. We also describe developments in the primary processing of fresh and frozen products as well as trends by product category in secondary and tertiary processing. As well, we examine in detail the trade flows for the products in the three categories, whether fresh, chilled, salted, smoked, in-brine, canned, or in any frozen form.

Information Sources

All the research is based on several types of information obtained from various agencies specializing in this area, including data from the Department of Foreign Affairs and International Trade contained in the RADAR system, which was incorporated in 1996–97 in the STRATEGIS database. Much of the information came from those databases and supplements information about small and large companies specializing in the processing of seafood products and by-products. The databases routinely use terms taken from the SIC (Standard Industry Classification) and, for the purposes of this study, from the SIC 0310 group (fishing industries), which covers fresh-landed products and services incidental to fishing, and the SIC 1020 group (fish products industry), which covers all products and services related to the processing of seafood products. We also searched specialized US databases (National Marine Fisheries Service, Seafood Market Analyst), and European databases (DATAFISH), as well as some specialized FAO databases, including GLOBEFISH, which essentially provides trade data and analyses. The analysis of plant production is based on annual production reports provided by either the Department of Fisheries and Oceans (DFO) or provincial government departments and on reports from some large companies. DFO is the only source of data on both the volumes and values of regional and provincial landings and aquaculture production. Our analyses of the productivity and profitability of the processing industry are based on data taken from Statistics Canada's *Annual Survey of Manufactures*. For the socio-economic profiles, including industry impact analyses, we used information from the last census, which provides regional data on the number of fishers and workers in the fishing industry.

However detailed those databases may be, though, they are still inadequate for gaining an understanding of the industrial relationships at play (trade networks and development agreements). We therefore used a number of other sources, i.e., information gathered or distributed by the following:

▶ *Consultants, processing businesses, and private companies in eastern Canada and elsewhere:* Accord International Canada; American Seafood Company; Aqua Jem Farms; L'Association coopérative des pêcheurs de l'Île; Atlanta Provision Co.; Atlantic Herring Fishermen's Marketing Co-operative; Atlantic Queen Seafoods; Barry Group; Bay Shore Group; Canadian International Traders; Cape Bald Packers; Cape Breeze Seafoods; Chicago Fish House; Clearwater Fine Foods; Comeau's Sea Foods; Connors Brothers; Continental Seafood; Cooke Aquaculture; La coopérative des pêcheurs de Baie-Sainte-Marie; Crown Seafood; E. J. Green and Company; Enterprise PEI; Ernst and Young Canada; Fishery Products International; Fortune Seas; Les fruits de mer Landry; High Liner Foods; Ichiboshi L.P.C.; Innovative Fishery Products; Island Marine Products; K and N Seafoods; KPMG Canada; Maisonnnette Seafoods; McGraw Seafood; Melrose International Trading; Mersey Point Fish Products; Neos Seafoods; New Found Foods; Ocean Fresh Seafood; Ocean Pier; Paturel Seafood; Pêcheries Cap-Lumière; Les pêcheries GEM; P. Janes and Sons; Produits Belle Baie; Les produits de mer de Le Goulet; Purdel-Coopérative agroalimentaire; Quin-Sea Fisheries; Raymond O'Neill and Son Fisheries; Rio Import and Export; Seabright Smokehouses; The Seafood Merchants; Sea Star Seafoods; Sogelco International; Union Seafood International; Westmorland Fisheries; Woodhouse Marketing International; X-Sea-LNT International

▶ *Specialized institutes and professional associations:* Association québécoise de commercialisation du poisson et des fruits de mer; Association québécoise de l'industrie de la pêche; Canada Market Research; Canadian Association of Fish Exporters; Canadian Exporters' Association; Canadian Fisheries Council; Export Development Corporation; Fisheries Association of Newfoundland and Labrador; Independent Seafood Processors Association of Nova Scotia; National Food Brokers Association; National Food Processors Association; Natural Resources Institute; New Brunswick Fish Packers' Association; Newfoundland and Labrador Shellfish Growers Association; Newfoundland Seafood Market Council; Prince Edward Island Seafood Processors Association

▶ *Canadian and foreign public sector:* Agriculture and Agri-Food Canada; Atlantic Canada Opportunities Agency; Canadian Consulate General (Atlanta, Boston, Chicago); Department of Commerce, Washington; Department of Foreign Affairs and International Trade; FAO, Rome; Fisheries and Oceans Canada;

Industry Canada (marine products division); Marine Institute of Memorial University of Newfoundland; Marine Products Research and Development Centre and the Food Research Centre of the Université de Moncton; National Marine Fisheries Service, Washington; National Research Council of Canada; OECD, Paris



Trade databases and print and electronic references: Canada Newswire; Business, BioCommerce Data; EBSCOhost; Food Science and Technology Abstracts; GLOBEFISH Commodity Update; Kompas Canada; SeaFood Business online

Introduction

Considered by many as belonging in the first rank of fishing nations, Canada seems at first glance to be a major supplier of various seafood products. Such a view is not without foundation, as for several years during the 1980s, Canada was the world's top exporter of seafood products. Its advantageous geography and industrial and commercial structure (among the richest fisheries resources in the world, dock-side industrial processing facilities, and almost exclusive control of commercially viable species) contributed greatly to Canada's position among the world's top fishing powers. The fishing industry is particularly strong on Canada's East Coast, including the Gulf of St. Lawrence, where more than a thousand communities along the region's jagged coastlines depend on the fishing industry for their livelihood.

In 1977, when the Canadian government officially established the 200-mile exclusive economic zone (EEZ), the fisheries seemed to enter a period of unprecedented cyclical instability, a situation that led to two Royal Commissions in the space of ten years. In the euphoria following the creation of the EEZ, the five eastern provinces quickly began modernizing and increasing their production capacity to derive maximum benefit from a fishery that was now regarded as exclusively Canadian. But the severe worldwide recession in the early 1980s put an end to the provinces' unrealistic expectations, especially those of large processing companies, several of which were forced into bankruptcy. The situation was so serious that a commission of inquiry was appointed to explain the slump plaguing the industry and to recommend how to avoid such crises in the future. As we know, the commission's report, *Navigating Troubled Waters*, recommended restructuring the Atlantic fisheries: the cost to Canadian taxpayers was estimated at several hundred million dollars.²

2. *Navigating Troubled Waters: A New Policy for the Atlantic Fisheries*, report of the Task Force on the Atlantic Fisheries, under the direction of Michael J. L. Kirby (Ottawa, December 1982).

The recession was followed by a boom lasting from 1983 until the early 1990s, when the East Coast fishing industry was buoyed by a new optimism created by the global economic recovery and a growing demand for fish products. Also, new and lucrative markets were opening up for products such as snow crab, herring roe, shrimp, and lobster, all relatively abundant on the Atlantic coast. The economic climate was so positive that the number of fishers in the region increased from 40,000 to 46,000 between 1983 and 1990, and the number of processing plants grew even more rapidly, from 670 to 1,063.³ Although harvesting and processing capacity was growing steadily, the resource as a whole was static, with several major stocks being fished to capacity.

By the early 1990s, these problems converged to plunge the industry into a new crisis. Beginning in 1991, Atlantic Canada's fisheries plummeted in the wake of moratoriums on the fishing of several species of groundfish, particularly cod. After reaching a record 1,341,000 tonnes in 1998, landings in eastern Canada fell to 609,000 tonnes in 1995, a drop of over 730,000 tonnes or 55 percent in seven years. Catches have risen slightly since then, but in the meantime they have been overtaken by shellfish landings. The result has been profound changes in the processing industry, which to that point was based essentially on mass production and relied primarily on vast supplies of groundfish. Of the numerous species marketed in eastern Canada, groundfish are generally the easiest to process.

The socio-economic impact of the moratorium on the northern cod fishery in the summer of 1992, together with severe moratoriums and restrictions on other major groundfish stocks, led to the worst crisis in the history of the eastern Canadian fisheries. Within a few months, 14,000 fishers and 26,000 plant workers in over 400 communities were out of work. The federal government responded with another Royal Commission, this one strongly recommending "charting a new course." In addition to observations that were mostly familiar to the numerous industry players and stakeholders, the Cashin Commission urged immediate massive aid to maintain the income levels of the many communities affected. The commission also recommended that various levels of government restructure programs to downsize an industry that could not be supported by the available resources, a recommendation which led to the introduction of

3. According to *Charting a New Course: Towards the Fishery of the Future*, report of the Task Force on Incomes and Adjustment in the Atlantic Fishery, table 8, p. 168.

bold licence-buyback programs, the professionalization of fishers and plant workers, and a redefinition of processing businesses. Training and retraining programs for laid-off workers would, according to the commission, remove a third of the workforce from the industry, mainly in Newfoundland. The cost was \$1.9 billion over five years (1993–98), with an additional \$730 million at the end of that five-year period to ensure a complete transition, because groundfish stocks were recovering more slowly than anticipated.⁴

During that time, the profiles of world fish and shellfish catches changed enormously, and aquaculture took a leading role in the international trade of seafood products. In 1998 aquaculture production (aquatic plants excluded) amounted to nearly 30 million tonnes or 28 percent of world fisheries production, having grown 10 percent per year, on average, since 1986. Furthermore, aquaculture supplies 30 percent of the seafood products intended for human consumption. Another area of major change is the expansion of import-export channels for seafood products, a change clearly reflected in today's figures: world trade in seafood products now accounts for 38 percent of total fisheries production compared to 30 percent in 1985. The approximately 23 million tonnes of products exported in 1997 is three times the volume exported in 1976. From US\$35 billion in 1990, the value of world exports of seafood products rose to over US\$50 billion in 1995 and has continued to rise slightly since then. Although over 180 countries import and export seafood products, 51 percent of world seafood exports come from only eleven countries, and no less than 75 percent come from the top twenty-two exporters.⁵

In the international list of maritime catches, Canada slipped from thirteenth place in 1990 to twenty-first in 1997, but it held onto thirteenth place in production volume (plant outputs) because of its imports of raw or semiprocessed products, which put Canada sixth in value of exports. Canadian producers can still count on large stocks of crustaceans (shrimp, lobster, and snow crab) and molluscs (scallops and mussels) and on high salmon production (capture salmon from the Pacific coast and farmed salmon from New Brunswick). They are also turning more and more to imports for their raw materials. In eastern Canada, imports of seafood products rose from 58,000 tonnes

4. For more information on these programs and an assessment of their success, see Maurice Beaudin, "TAGS: Une stratégie de transitions ou d'assistance?" [TAGS: A strategy for transition or assistance?], *Policy Options* (January–February 1999): 45–48.

5. Information from various FAO databases.

(\$174 million) in 1990 to 225,000 tonnes (\$703 million) in 1996.⁶ However, with US\$2.3 billion in exports in 1996, Canada was eclipsed by China (\$4.7 billion), Norway (\$3.4 billion), the United States (\$2.9 billion), Denmark (\$2.7 billion), and Thailand (\$2.4 billion). A dozen other countries have exports of at least \$1 billion per year.

In all, the value of seafood imports worldwide is today over US\$52 billion. Although more than 90 percent of the products traded have undergone some type of processing, the demand for fresh or natural products is on the rise: one-third of the products traded are fresh, an increase of 70 percent in ten years. Most world exports of fishery and aquaculture products (i.e., 80 percent of total export value) are shipped to industrialized countries.⁷ The major trading bloc for seafood products in 1997 was the European Union, with imports totalling US\$18 billion in 1997, followed by Japan (US\$16 billion) and the United States (US\$8 billion). It should be noted that a large percentage of European Union trade was between member countries. The relative importance of international trade with the United States is limited by its huge domestic market, which consumed \$49 billion in seafood products in 1998. Domestic production in the US is also high (landings of over 4 million tonnes and processed production of over \$7 billion).

The fact that Canada's fisheries are in a period of transition, a consequence of major upheavals within its important groundfish industry, is certainly not the only thing undermining its relative position internationally. There has also been increased competition from other fisheries, particularly in Asia, where aquacultural production is expanding. Asian countries, excluding Japan, increased their seafood product exports from US\$10 billion to US\$16 billion between 1990 and 1996; their imports also rose, from US\$3.9 billion to US\$7.8 billion during the same period. The increase in trade is the result of both growing world demand for seafood products and increased liberalization of international trade (abolition or reduction of tariff barriers within major trading blocs, such as NAFTA, the European Union, the South Asian Association for Regional Cooperation, and the Latin American Economic System).

6. Fisheries and Oceans Canada, *Domestic Imports of Selected Commodities, by Province*; based on data compiled by Statistics Canada.

7. FAO Fisheries Division, *Global Overview of Production and Production Trends*, Circular no. 920 (Rome, 1997).

Finally, there is general agreement that a mass production-based harvesting strategy is threatening the vitality of fish and invertebrate stocks on the Atlantic coast, and some are urging that all government programs supporting the industry be rethought. They are suggesting instead that priority should be given to an approach based on responsible management and more effective processing and that it emphasize not only volume but also the differentiated production of higher value-added products that make use of all species, particularly those that are nontraditional and underutilized.

In spite of such laudable goals, however, Canada's fishing industry, particularly in the eastern provinces, is languishing in a period of uncertainty. Some segments of the industry, it is true, have been able to reposition themselves by moving into diversified, higher value-added production, supported by a three-fold strategy focusing on management (re-engineering internal business management), supply (developing import-export channels), and distribution-marketing (sustained wide-scale marketing with strong international promotion). But they are the exception rather than the rule. For most companies, except perhaps those with exclusive markets, such as for snow crab and shrimp, production is mainly a function of seasonal resource cycles and relies on volume (mass production) at the expense of differentiated production. Moreover, most production undergoes primary processing only. Generally speaking, therefore, value-added processing of seafood products consists of relatively simple industrial processes that have not been adequately modernized and, above all, are often limited to the initial stages of processing. Why is this still the case?

For the answer, we must first look to the constraint influence of the US market. The main buyers of Atlantic Canada's seafood products are American importers supplying the demand for fresh product from restaurants, fish markets, and retail food chains and providing their processing sector with a variety of products that have undergone primary processing only (frozen fish blocks and fillets, and shellfish meat blocks). The dependence on American brokers and the lack of real outlets in Canada have also led to Canadian manufacturers acting as suppliers.

Also, the second-largest importer of Canadian products, Japan, clearly prefers seafood in its natural state (fresh, chilled, or frozen, not shelled). Furthermore, the third-largest importer of products from Atlantic Canada, the European Community, maintains particularly

high tariff barriers (approximately 20 percent) on imports of processed seafood products.

The continuing social role the fisheries are called upon to play is also problematic. During the postwar years, the industry acquired greater socio-economic stature in most coastal regions, growing into an extremely complex sector that now encompasses social as well as purely economic issues. The result was excess production capacity and increased dependence of industry workers on income-support programs, all of which led to structural problems that weakened the industry. In addition to excess technical capacity ("too many boats chasing too few fish") the industry is burdened with superfluous socio-economic capacity (more workers than the resource can support), a problem frequently cited in studies on this issue.

Why then have attempts to reduce production capacity been unsuccessful? The reason is that the industry was designed with mass production in mind, and very little attention was paid to stock conservation, a situation that was reinforced by the creation of the EEZ. Furthermore, because of social and political factors, the industry was always eager to increase production capacity when the resource was abundant, but when stocks declined, it failed to make the necessary adjustments. Exacerbating the problem was the fact that most of the time the federal and provincial governments encouraged and supported industry expansion. Why? — because the fishery is clearly distinct from other areas of activity. Not only are fish a jointly owned resource, but fishing is an economic activity that has always been woven into the social fabric of communities. It is also the only industry where the federal government has such extensive jurisdiction over almost all aspects of primary production, leading many industry players to constantly angle for their "fair share" of the resource. Political pressure is thus enormous when quotas go down, and even greater when plants close. The recent formation of co-management partnerships by fishers' groups may help relieve those pressures somewhat, but resource management is still a challenge because of the large number of stakeholders and interest groups involved.⁸

8. Within the federal government, 23 agencies and departments have programs that relate to the oceans. In eastern Canada, five provinces share the coastal and Gulf of St. Lawrence fisheries resources. Fisheries management is also handled by four major administrative regions (Maritimes or Scotia-Fundy, Gulf, Laurentian region, and Newfoundland). No fewer than 43,800 fishers and deckhands operating on 23,000 vessels, hold a total of nearly 100,000 licences (30,300 are for basic species). As well, approximately 800 processing plants employ 38,500 fish workers. The economies of 1,200 communities are based largely on the fishing industry.

Beyond those constraints, there are many other factors to consider before one can truly understand the dynamics of the industry, in particular the lack of organization and coordination by regional stakeholders; the fragmentation of economic units and sectoral associations; the lack of research and development (R & D); the reliance on exclusive product markets; a lack of business networking, particularly in distribution-marketing and primary supply; price wars over local resources; and the lack of cooperation among various groups of fishers and entrepreneurs-processors.

In the final analysis, however, it is the processors themselves who must accept responsibility for creating higher value-added products from their raw material. When processors are serious about investing in the medium and long term, the result is products that use end-stage processing in surprising ways. Processors like these, and there are not many, have and use financial and business savvy (access to international purchasing pools, in-depth marketing studies, advertising budgets, access to a network of manufacturing subcontractors that are operational at all times, cost controls, quality control with the development of industrial standardization, etc.) that is miles ahead of other stakeholders.

Aside from a few obvious cases, the fact remains that producers, like governments, have been slow to respond to the signs of growing trade globalization, particularly the emergence of new producing-exporting countries and the advent of wide-scale distribution, which today accounts for 60 percent of retail and semi-wholesale marketing of seafood products. Over the last ten years, the number of departments selling fish and seafood (all types combined) at major distribution outlets has doubled, and they dictate demand not only in Canada but also in other countries that export seafood products.

Reflected in these issues are the numerous parameters that characterize the economic world of the seafood industry and its social and industrial practices. And a common concern that underlies them all is the growing imbalance between the interests of processing plants (all stages of processing combined) and the fishery sector itself. Beyond the major problem of value-added processing, which fundamentally affects producers and their future, the two worlds risk further alienation — i.e., regional fisheries and their management, on the one hand, and the industrialization and marketing of seafood products, on the other.

The growing reliance on imports of a variety of seafood products (live, fresh, and frozen) and even on low value-added products (from Southeast Asia and Northern Europe) is a sign of the times, a fact rarely mentioned in studies on the seafood products industry in eastern Canada. That fact must now be taken into account. In eastern Canada, fish and seafood imports amount to nearly 200,000 tonnes (approximately \$200 million). Of course, most of those imports go to the processing industry. We should also point out that there have been numerous attempts at partnerships in the industry, particularly between processing companies and aquaculture producers, as well as strategic alliances and takeovers.

Those developments are not, *a priori*, in any way harmful. On the contrary, they indicate a gradual adjustment by many producers who want to upgrade their equipment while maintaining and developing their businesses. But they also mean that Canadian producers may have lost the exclusive right to make decisions about Canada's fisheries, particularly in Atlantic Canada. They need to be aware of this fact to avoid remaining a captive of industrial models from the past, which are based on a close association between the regional fishery and its local processing facilities.

If that is a part of the past, the future lies in recognizing that processing and value-added processing of seafood products in Canada must adapt to the new economy and to the standardization of its structure. In order to survive and thrive, seafood processing must become a commercial and industrial activity like any other. In other words, if it becomes less dependent on local primary resources, the processing and value-added processing industry can refocus on creating wealth and adding value to seafood products of all types — i.e., both food and nonfood products, for which there is a growing demand.

Eastern Canada has an opportunity to take up this challenge, perhaps by using certain specific strategies (promoting R & D, improved knowledge of the industrial patents available, new agri-food systems, biotechnology strategies, and the development of domestic and foreign markets). Regional fisheries will only succeed by developing new manufacturing and quality-control processes and by creating more differentiated production with a focus on high value-added products. The creation of regional leadership within a number of industry segments (prepared foods and semi-fresh and ready-to-serve products, etc.) must undoubtedly be part of a long-term strategy for value-added processing of fishery resources.

As we know, the vast majority of seafood products processed in eastern Canada undergo primary processing, while only a portion undergo further primary processing that could increase their value added, whether for foreign or domestic markets. This is something that must be acknowledged in eastern Canada — that up to now, the region has not been able to break out of its role as a primary supplier.

Apart from certain continental constraints (a domestic market that is neither well-developed nor lucrative and a US market that is fairly speculative and volatile but has recently shown some encouraging signs), the entire industry in eastern Canada must now adapt to new requirements that will determine its very survival. Those requirements are technical (the gradual, wide-scale adoption of just-in-time and industrial computer technologies, a resolve not to depend solely on local supply, the modernization of canning and freezing/deep-freezing equipment, and the need to standardize at all levels as part of the “quality” process), technological (the growing importance of biotechnology in food industries and the increased development of aquaculture production), and commercial (a greater demand for high value-added prepared products and ready-to-cook, ready-to-reheat, and ready-to-serve seafood products as well as major changes in packaging and containers). The new requirements will also affect the entire distribution system (the reorganization of purchasing pools in eastern Canada and the development of group brands) and all components of industrial and marketing strategies that require adjustments.

The dilemma now facing producers is which overall strategy to adopt. Should they be conservative and continue to act as suppliers of basic products with a limited potential for marketing and technical development (given that competition from Third World countries for low value-added products has been stronger than ever in recent years), or should they assume a more aggressive posture and make the most of new developments in distribution channels in Canada, the United States, Japan, and the European Union, while at the same time betting on the success of standardization among the largest players in eastern Canada, recent though it is.

The new economy confirms this change in course. For a long time, fish blocks could be produced in huge quantities and still turn a profit: per-kilo profit margins were low, but they were largely offset by volume. Then fish stocks began to decline, and Canadian processors grew cautious. Designed and structured at a time of steady growth,

the processing industry is now facing stagnating production, constant and steadily growing disadvantages compared to other manufacturers, the restructuring of consumer markets, and the use of advanced technology in manufacturing and control processes. The impact is being felt across the board. Today, all producers in eastern Canada openly acknowledge the R & D constraints associated with value-added products, but they also concede that the profit ratio for value-added products is considerably higher than for no-value-added or low-value-added products. Consequently, they are finding it worthwhile to make the necessary investment in an overall medium- and long-term strategy to increase value-added production. And indeed there are value-added success stories in Quebec, Newfoundland, Nova Scotia, New Brunswick, and Prince Edward Island.

I

Socio-Economic Profiles of the Fishing and Processing Industry

It is estimated that in over a thousand communities on Canada's East Coast, fishing and fish processing are an important part of the economic base, although far fewer now depend exclusively on fishing than in the past; those communities are located mainly in Newfoundland, the northern gulf, and some remote rural areas of the Maritimes (the southwestern coast of Nova Scotia and islands off the southwestern and eastern coasts of New Brunswick). Overall, though, the region's profile is much more varied. Many fishing communities have developed other activities alongside fishing, i.e., peat harvesting and processing, agriculture, mining, and forestry. And tourism, which has been a natural addition to the economy of coastal regions, offers some interesting potential in the long term. There are, however, a number of maritime areas that have never been able to create a comprehensive fishing industry, and they continue to benefit from only a small percentage of the value of their fisheries resource.⁹

Generally speaking, communities close to the sea, and not just those that rely on the fishery, maintain strong ties to their region and demonstrate fierce independence in the face of adversity. And even though fishing activities and processing operations are highly modernized, these occupations have always been seen as a way of life. It is only recently, for example, that there has been any talk of professionalizing the trade.¹⁰

The fishing industry on Canada's East Coast is distinct in many ways from other resource industries not just because of geography or for its variety of industrial activities but also for the number of stakeholders and interest groups it comprises. It should come as no

9. See M. Beaudin, "L'adaptation économique des régions maritimes de pêche: Le cas des communautés du golfe du Saint-Laurent" [Economic adjustment of maritime fishery regions: communities in the Gulf of St. Lawrence] (Doctoral thesis, Université de Nantes, 1997), chapter 7.

10. Provincial legislation on professionalizing the fishing trade has been or is about to be enacted in Newfoundland, Quebec, and New Brunswick; processing workers will also be professionalized.

surprise, therefore, that the fishery, more than any other industry, is highly fragmented. The region has approximately eight hundred businesses of all sizes and types (half or more of which are exporters) that are spread along a narrow strip of coastline ten thousand kilometres long. One of the features of the industry is that it needs a large labour force, although it has been significantly reduced in the past decade by the groundfish crisis and the increased use of technology. Another is that the entire industry is subject to major cycles in primary supply, with bottlenecks often occurring in a number of industry segments during peak season, i.e., mid-April to mid-June. However, the expansion of aquaculture and the increasing use of imports by processors are helping to offset seasonal resource cycles.

Perhaps the main forces to have shaped the fishery are geography and climate and the nature of the resource on which it depends. But there are other influences that have helped create its unique character, such as its traditional nature, government intervention in resource management, and the fragmentation of its sectoral bases.

Above all, however, it is the seasonal nature of work in the fishery that governs life in maritime fishing regions. And that is something that is no longer driven simply by weather. It has increasingly become a function of management measures aimed at protecting various stocks — there are at least thirty main commercial species — and of efforts to accommodate as much as possible the industry's many competing interest groups, starting with the fishers. There is also a traditional aspect to economic activities among rural populations, and it is generally well-entrenched, even more so perhaps in maritime fishing areas not only because of their relatively easy access to a shared and varied resource but mainly because of the existence of income support programs, particularly employment insurance. Employment insurance benefits collected by fisheries workers in the coastal areas of Newfoundland and the Gulf of St. Lawrence represent approximately two-thirds of the income derived from industry activities; that compares to less than half in the rest of the Atlantic provinces.¹¹

11. See Beaudin, "L'adaptation économique des régions maritimes de pêche," chapter 7.

■ A Seasonal Industry in a Seasonal Economy

The highly seasonal nature of the fisheries in several subregions of eastern Canada is a major feature not only of the industry itself but of the region's entire socio-economic structure. Not that the seasonal problem is unique to maritime areas — in fact, to varying degrees, agriculture, some mining sectors (e.g., peat harvesting), transportation, forestry, construction, and many service industries (tourism, personnel services, and education) also make extensive use of seasonal workers. Nevertheless, one fact remains: the problem of seasonal employment in the fisheries, as in the coastal areas that depend on the industry, is specific in many ways to the entire social and economic structure of those areas and even seems to shape it.

To get an idea of the full extent of seasonal employment in the Maritimes, we need only look at the numbers: 17 percent of Canada's labour force is seasonally employed. And among employment insurance recipients, 40 percent are considered seasonal workers. There is thus an obvious link between the frequency of benefits and seasonal work.¹² In fact, two-thirds (65.8 percent) of frequent employment insurance recipients work seasonally. One might expect that regions with more resource-dependent economies would be more at risk of unemployment, and this is the case in the Atlantic provinces and eastern Quebec, where unemployment rates are consistently well above the national average. With more resource-based economies, those regions have a higher percentage of frequent recipients of employment insurance among their unemployed populations. In Newfoundland and Prince Edward Island 68 percent of recipients are considered frequent. The figures are 59 percent in New Brunswick and 45 percent in Quebec, still high compared to the national average of 38 percent. These figures are important to the extent that they reveal the dependency of fisheries and processing workers or employment insurance and that they shed some light on a competitive edge enjoyed by the processing industry, which has a captive workforce and at the same time is indirectly subsidized.¹³

12. According to the Department of Human Resources Development publication *From Unemployment Insurance to Employment Insurance* (Ottawa: Supply and Services Canada, 1994), 42–43.

13. This observation applies more to companies that operated on a highly seasonal basis, both in the fishing and fish-processing industries and elsewhere.

■ The Fishery: An Industry or a Network?

In eastern Canada more than anywhere else, fishing and processing are major components of the agri-food industry. As we know, the food industry is one of the foundations of the regional economy, particularly in the Atlantic provinces, where it employs 8.5 percent of the total workforce and one-third of manufacturing workers. The food industry also accounts for 19 percent of the total value of regional exports, which gives some indication of its importance. The seafood sector is the leader in the food industry, accounting for 58 percent of agri-food workers and over 77 percent of the value of food exports.¹⁴ With only 8 percent of the Canadian population, the Atlantic region accounts for 20 percent of national agri-food exports and approximately 70 percent of seafood exports.¹⁵

Although impressive, those figures only partly reflect the scope of the seafood industry in eastern Canada. We know that the fisheries extend well beyond the area between the dock and the plant, tying into several other economic sectors relating to goods and equipment and services. Although suppliers of those goods and services are most often located outside coastal communities, they are never far away and are generally active in the region. The result is that the more activity there is in the fishing and processing industry, the more the effects are felt by downstream activities (marketing, specialized services, industry consulting, and support services), and vice versa. For example, in Atlantic Canada's agri-food industry, approximately 50 percent of jobs are concentrated in the primary sector, 30 percent are in processing, and a substantial percentage (20 percent) are in various tertiary sector activities, including management, handling, transportation, and so on.¹⁶

Strictly speaking, should the fisheries really be considered an industry? Using a flexible definition of the word, the answer is yes, although in truth the fisheries are really part of a larger industry, the agri-food industry. Both are characterized by significant export potential, resulting in high employment and income multipliers, and local, regional, and foreign suppliers provide them with components, raw

14. This segment of the seafood industry was even larger before the crisis that shook the ground-fish sector. Data from Statistics Canada, *Annual Survey of Manufactures* (1997), cat. 31-203.

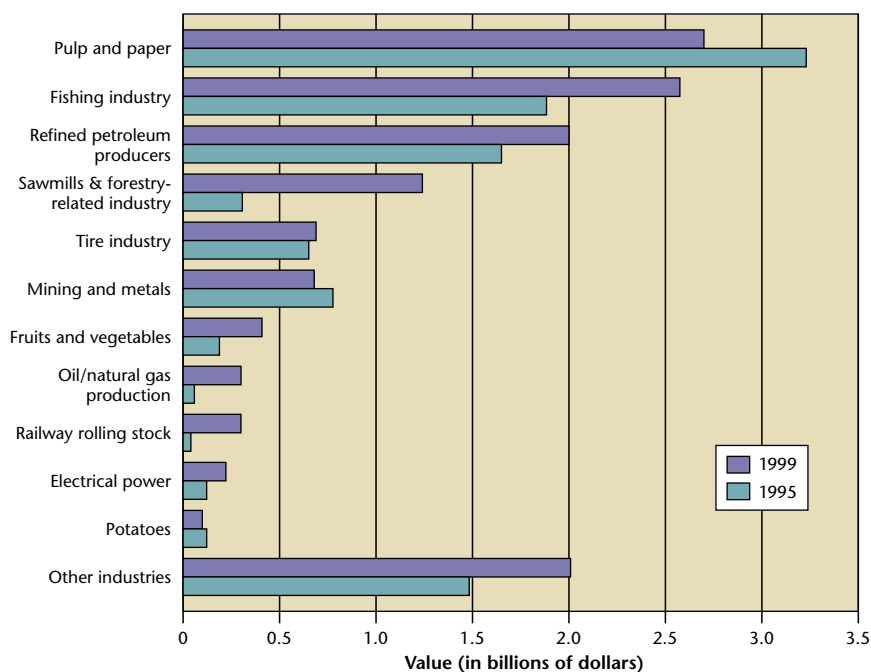
15. Based on exports data from STRATEGIS, Industry Canada.

16. DRI Canada, *Atlantic Canada: Facing the Challenge of Change*, study produced by the Atlantic Provinces Economic Council and Canmac Economics for ACOA (Moncton, September 1999), 3–17.

materials, and services. On the one hand, industry businesses are connected vertically by links between buyers and suppliers of products and services (i.e., production and marketing inputs), and on the other hand, they are connected horizontally through transfers of technology, skills and expertise, financing, and trade agreements. Finally, services to the industry — the seafood-shipping and distribution network, support services, and public management and monitoring mechanisms — play a strategic role that is essential to the industry's development, while contributing to employment and income multipliers in the region.

Seafood exports accounted for 19 percent of the value of all exports from the Atlantic region in 1999, ranking second behind pulp and paper exports. In fact, the fisheries contribute more to exports than the following six industries combined: tires, mining and metals, fruits and vegetables, oil and natural gas production, electrical power, and potatoes (see figure 1).

Figure 1
Value of Exports by Industry, Atlantic Canada, 1995 and 1999



Source: STRATEGIS, Industry Canada; compiled by the author.

To simplify, the seafood industry can be separated into four main sectors. The first, the *primary sector*, is harvesting, in this case fishing. The *secondary sector* covers the preparation, packaging, and processing of fisheries resources. These activities are generally grouped together under the processing industry. The *tertiary sector* is essentially made up of distribution-marketing services as well as the supply of goods and services to the industry, and includes the services of seafood wholesalers and retailers as well as related services (transportation, warehousing, insurance, financial services, protection, inspection, consultation, vessel maintenance and repair, and shipbuilding). The *quaternary sector* covers public services in support of the industry. Public and parapublic guidance provides logistical support to all sectors of the industry: resource and habitat management, fishing regulations, technical support for R & D, sectoral organizations, workforce training, and so on.¹⁷

Government plays an essential role in the quaternary sector, particularly federal agencies, which in recent years have provided by far the most support to the industry in a long time. The fisheries industry, according to subsection 91 (12) of the Constitution Act, is under the jurisdiction of both the federal and provincial governments. The federal government has jurisdiction over the resource (fish), from its natural habitat to the landing dock, and is also responsible for the management and regulation of fishing licences and leases, boating safety, surveillance in fishing areas, setting quotas, establishing fishing areas and seasons, monitoring fishing gear and vessels, handling (landing, loading, and transporting catches), and fish inspection and marketing standards.¹⁸ The provincial government has authority over land activities, such as fish processing (issuing processing licences, setting licence conditions, training fishers and industry workers, union organization, etc.). It goes without saying that both levels of government not only are key players but are essential to the smooth functioning of the industry.

17. This terminology is borrowed from researcher Raymond Dupuis, who uses it aptly in his study *The Quebec Seafood Industry Network*, prepared for Fisheries and Oceans Canada (Quebec, 1997).

18. This is the primary function of the Department of Fisheries and Oceans. One of the largest federal departments, it has a workforce in Canada of 9,566 (1,053 of them in Ottawa) and a budget of \$1.4 billion for 2000–2001 (Public Accounts). Its mandate is not only to manage the resource but to promote understanding, conservation, and the optimal use of the resource and the aquatic environment for current and future generations, while ensuring safety at sea, environmental protection, and support for industry clients.

Furthermore, both levels of government have contributed to the implementation of an entire network of facilities and infrastructures for specialized services, research, and technology transfers, most often in partnership with universities, specialized colleges, and government centres and agencies whose mandates specifically include the seafood industry. Public monitoring of and support for the industry are crucial to the forging of close links with all sectors of the industry and with each regional base. A good example of institutional support is the aquaculture industry in southwestern New Brunswick. The impetus for this initiative came from both the federal and provincial governments, who combined forces with the private sector to ensure a solid base for the emerging industry. Intensive partnership initiatives and strategic support are also being provided by other provinces, particularly in the aquaculture sector, where, as in the traditional fisheries sector, government involvement is fundamental and often essential — from the product design stage through to wholesale and retail sales.

Beyond the strategic support they provide, the tertiary and quaternary sectors of the fishing industry are essential to the communities concerned, which benefit from government presence because their low population densities would otherwise allow for only a strict minimum of public infrastructure and services. Whether a fisheries interpretative centre, a training school for fishers, a regional management office or an industry research centre, a government's presence in a community is a source of enrichment and support. And besides its direct economic impact, that presence also contributes to employment diversification.

The Economic Impact of the Industry

Taking into account all four sectors, primary to quaternary, of the fishing industry, what is its overall economic impact both in eastern Canada as a whole and in each of its five provinces? Data from the 1996 census provide a fairly accurate picture of the importance of the industry's primary and secondary sectors in the region. With respect to primary production, the census reported 37,481 fishers and deckhands who derive most of their income from fishing. The census also reported that 38,525 people in eastern Canada work in fish processing. This number can vary because of the cyclical nature of the resource and according to the time of year, given that the industry

as a whole is highly seasonal.¹⁹ In 1996 a total of 76,006 workers earned most of their income from fishing and fish processing. The data for each province are presented in table 1 and show that in Newfoundland and Prince Edward Island, the industry employs the highest percentage of workers, i.e., almost 10 percent of the provincial labour force.

Unlike the industry's primary and secondary sectors, the contribution of its tertiary and quaternary sectors is harder to identify. DFO Economic Services, Quebec Region, in cooperation with the Bureau de la statistique du Québec (BSQ) and using its intersectoral model, estimated that the number of jobs generated by tertiary activities in the Quebec seafood industry is equal to approximately 60 percent of all jobs in the industry's primary and secondary sectors combined.²⁰ This percentage seems high to us but can be explained, first, by the fact that Quebec's regional/provincial (retail) market is more highly developed and, second, by the presence of a seafood-processing sector in metropolitan areas. Although it is risky to extrapolate for each province, we believe that a 40 percent ratio is realistic for the Atlantic provinces given the fisheries' dominant position in the economy. Using that 40 percent estimate, we can assume that 30,402 tertiary sector jobs²¹ are related to the fishing industry in the five eastern Canadian provinces.

The quaternary sector is a strategic link in the industry. Providing support, management, and industry regulation structures (capture, transportation, processing, industrial standards, marketing, harbour and industrial infrastructures, R & D, and professional associations), the public and parapublic services providing support to the fisheries constitute the backbone of the various segments of the industry.²²

19. The moratorium on the groundfish fishery, for example, reduced the labour force in the Newfoundland fisheries from approximately 44,000 in 1990 to 17,500 in 1995. The expansion of the shrimp and snow crab fisheries led to some rehiring, which brought the number of people directly employed in the fishing industry in Newfoundland in 1998 to 27,000 (according to *The 1998 Newfoundland and Labrador Seafood Industry — Year in Review*).

20. This is an estimate for the province as a whole. The fisheries are much more extensive in Quebec because of the size of the internal market for seafood products. See Fisheries and Oceans, *The Quebec Seafood Industry Network* (Quebec, 1997).

21. Tertiary jobs include jobs in related activities (construction, vessel and plant repair and maintenance, transportation of fishery products, manufacturing and sales of fishing equipment and gear, consulting services, accounting, etc.).

22. Fisheries and Oceans, *The Quebec Seafood Industry Network*.

Table 1
Employment and Income from Fishing and Fish Processing, by Province, 1996

	Newfound- land	Prince Edward Island	Nova Scotia	New Brunswick	Quebec	Eastern Canada	Canada
Number of Jobs							
Total labour force	252,545	74,080	450,760	376,895	3,378,040	4,532,320	15,048,000
Manufacturing industries	25,525	7,410	47,700	49,055	582,750	712,440	2,127,715
Fishing and trapping	11,710	4,255	10,575	6,640	4,301	37,481	52,775
Fish processing	12,160	2,830	8,895	9,840	4,800	38,525	47,765
Fishing and fish processing	23,870	7,085	19,470	16,480	9,101	76,006	100,540
% of total labour force	9.45	9.56	4.32	4.37	0.27	1.68	0.67
Income (in millions of dollars)							
Total labour force	5,362	1,423	10,035	8,128	84,843	109,791	404,851
Manufacturing industries	486	126	1,230	1,252	13,902	16,996	68,263
Fishing and trapping	208	99	260	158	95	820	1,124
Fish processing	131	28	154	105	59	477	673
Fishing and fish processing	339	127	414	263	154	1,297	1,797
% of total labour force	6.32	8.87	4.12	3.23	0.18	1.18	4.44

Source: Statistics Canada, 1996 census; compiled by the author.

In the federal government, 5,261 people are employed by the Department of Fisheries and Oceans in the four administrative regions in eastern Canada, i.e., 55 percent of the department's staff across the country. Staff in other federal departments and agencies may also be involved in projects and duties specifically involving the fisheries. Each of the five provinces has a department (sometimes responsible for another industry as well) and regional infrastructures to meet industry needs (research centres, interpretative centres, and industry training facilities). Sectoral agencies and various associations are especially numerous in the fisheries, whether involved in harvesting, processing, or marketing.

Our aim here is not to provide a breakdown of the kinds and numbers of jobs or the revenues and expenditures specific to the fisheries. The study conducted in Quebec estimates that quaternary sector employment accounts for 13 percent of jobs in the base industry (fishing and processing). Applied across eastern Canada, that percentage translates into 9,881 "quaternary" jobs. That figure does not seem at all excessive, considering that DFO alone employs 5,261 people in the region.²³ The number of quaternary jobs in the fisheries represents 50 percent or more of all government jobs in the region related to industries associated with the oceans.²⁴ Table 2 summarizes the distribution of fisheries-related jobs by sector.

Our definitive estimate is that there are 116,288 jobs directly related to the fisheries industry in eastern Canada, 76,006 (65 percent) of which are involved in the industry's core activities. Those jobs, which should be considered direct jobs — meaning that they are fundamentally dependent on fishing and processing — in turn help create other jobs in the economy, and those we estimate using an employment multiplier. The multiplier used was 1.15, the same as in Quebec, and based on it, we calculate that there are 17,443 additional jobs in eastern Canada that depend indirectly on the fisheries. In total, therefore, 133,731 people are employed in the fishing industry and related activities in the Atlantic provinces and eastern Quebec.

The importance of the fisheries is even more obvious when we look at the income it generates, either directly or in the form of transfer payments. We estimate the direct income from fishing and

23. Figures were obtained from the regional offices of the Department of Fisheries and Oceans.

24. On this topic, see Department of Fisheries and Oceans, *National Oceans Industries* (Quebec); Internet site.

Table 2
Estimated Impact of the Fisheries in Eastern Canada, 1996

	Number of Jobs	Income (in millions of dollars)
Primary sector — fishing	37,480	818
Fish processing	38,525	477
Total, fishing and processing	76,005	1,297
Tertiary sector ^a	30,402	692
Quaternary sector ^b	9,881	276
Direct impact of the industry	116,288	2,265
Indirect spin-offs from multipliers ^c	17,433	340
Industry impact	133,731	2,605

Source: Calculated and compiled by the author.

^a We estimate that 40 percent of jobs in the base industry (fishing and processing) are tertiary sector jobs directly related to the industry. In Quebec, analysts use a ratio of 60 percent. Estimated income from tertiary employment is the same as the average salary in the Atlantic provinces, i.e., \$22,745 in 1996.

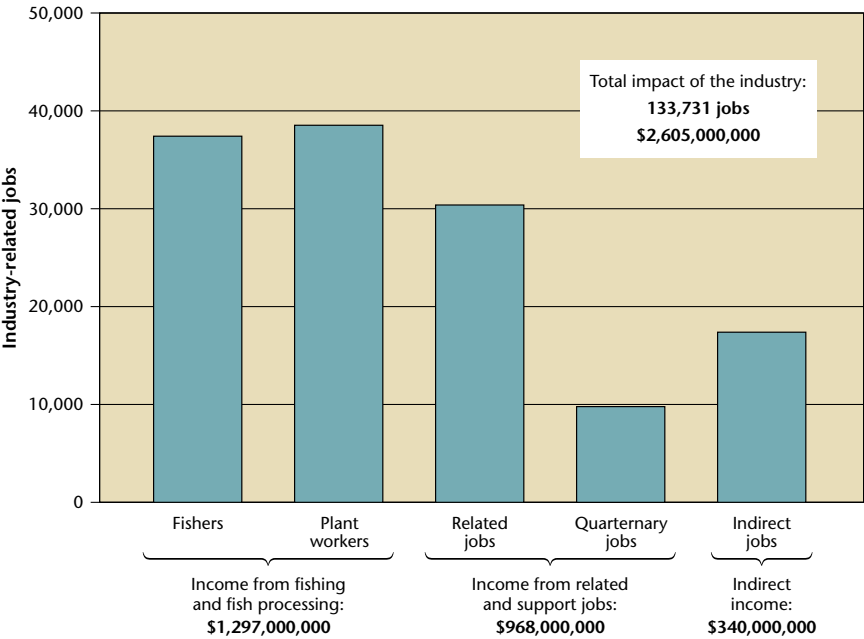
^b Basically includes industry-support services (jobs in provincial departments and Fisheries and Oceans, as well as agencies and organizations directly involved in the industry). The estimated income from quaternary jobs is based on the average salary of public sector employees in the Atlantic provinces, i.e., \$27,930 in 1996.

^c The employment multiplier is 1.15, which means that for every 100 direct jobs in the industry, there are 15 other jobs, particularly among suppliers. We use an income multiplier of 1.30. Both multipliers were used by DFO analysts (Quebec) to assess the impact of the seafood industry in Quebec.

processing activities on Canada's East Coast at \$1.3 billion, which combined with a direct income from the tertiary and quaternary sectors of \$968 million totalled \$2.3 billion in 1996. If we include indirect income, a total of \$2.6 billion is injected into the eastern Canadian economy through the fisheries and the seafood industry (see figure 2).

This brief impact analysis easily demonstrates that the seafood industry, including upstream and downstream services, involves many players and provides a strong link among various regional bases. Although there are nonmaritime occupations within maritime fishing areas, the region as a whole is largely grounded on the sectoral bases of the fishery. The coast is home to a number of centres with an industrial function (Corner Brook, Summerside, Sydney, Miramichi, Shippagan, Sept-Îles, etc.), an administrative and commercial function (Bonavista, Antigonish, Yarmouth, Digby, Moncton, Caraquet, Matane, Gaspé, etc.), or a combination of functions, as in the case of urban areas such as Halifax, St. John's, Truro, Charlottetown, and Bathurst. Although at first glance those centres have little interaction

Figure 2
Overall Economic Impact of the Fisheries in Eastern Canada, 1996



Source: Compiled and calculated by the author.

with the fisheries, as a whole they provide the main administrative, scientific, and commercial services that supply and support the entire industry.²⁵ To various degrees, they also meet the needs for goods and services in neighbouring rural areas, in this case maritime fishing areas, which is how these centres developed and grew in the first place. In fact, servicing rural areas is partly responsible for their continuing growth.

25. For example, government agencies such as Fisheries and Oceans (head offices in St. John's, Halifax, Moncton, and Quebec City, with local offices in several coastal centres), government departments and agencies, maritime research centres (St. John's, Halifax, Truro, Charlottetown, St. Andrews, Moncton, Shippagan, and Matane), sector agencies and regional associations, training centres (Pictou, Caraquet, and Grande-Rivière), and so on.

II

Seafood Products in Canada and Abroad: Industry Structure and Recent Developments

Despite the overharvesting of numerous fish stocks in various regions of the world, the fisheries and the seafood industry are experiencing a period of sustained commercial expansion. One only has to attend any international trade fair to realize the surprising vitality of this industry and the host of products from around the world. According to the United Nations Food and Agriculture Organization (FAO) world catches of fish and shellfish (aquaculture included) set an unprecedented record of 100 million tonnes in 1992. Production rose to 122 million tonnes in 1997, mainly as a result of increased aquaculture production, but dropped to 117 million tonnes in 1998. Growth in fish supply will probably continue to slow down for some years, mainly because of the levelling off or reduction in maritime fish landings and a slowdown in the growth of aquaculture production compared to the early 1990s.²⁶ However, demand for seafood products should continue to keep pace not only as a result of the rise in the standard of living and the population growth but also because of other factors relating to industrial organization and technological applications. As Jean Chaussade explains in his book *La mer nourricière: enjeu du XXI^e siècle*, demand mirrors supply as much as supply mirrors demand.²⁷

■ The Origin and Use of Primary Supply

We should first clearly identify the various types of supply and their origins. The capture fisheries include maritime and inland (or fresh-water) fisheries, while aquaculture fisheries produce fish that are farmed or raised in marine environments (salt water) or inland waterways (fresh water, rivers, and brackish water). Table 3 illustrates these

26. The slowdown was caused by the overharvesting of a number of large fish stocks in Nordic countries, particularly northern cod stocks, and the negative effects of El Niño on Peruvian and Chilean fisheries, and by the collapse of the Soviet Union, which had the world's largest capture fishery.

27. See Jean Chaussade, *La mer nourricière: enjeu du XXI^e siècle* [Nourishment from the sea: 21st century issues] (Institut de géographie de l'Université de Nantes, 1994).

Table 3
World Fisheries Production by Source of Supply,
1990–97

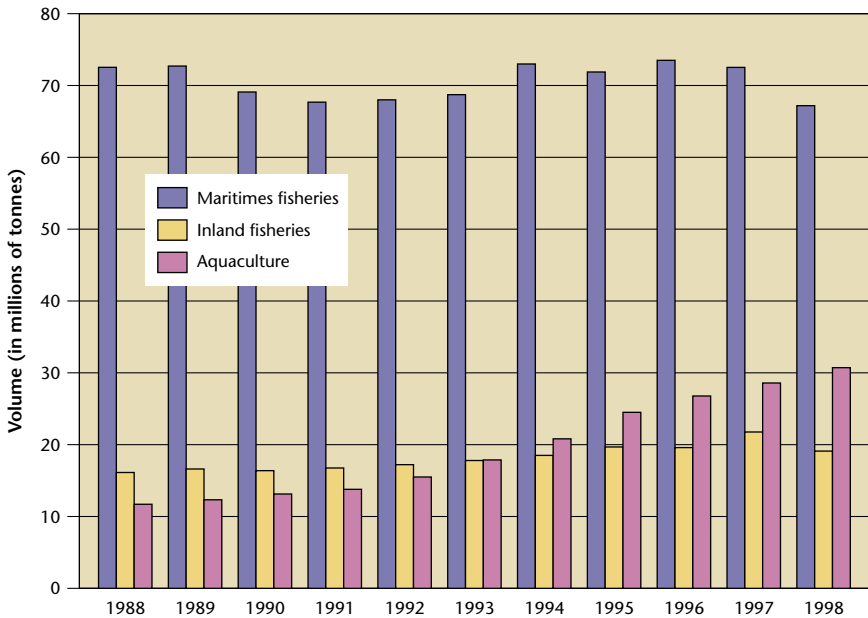
	Production (in millions of tonnes)					
	1990	1992	1994	1995	1996	1997
Inland fisheries						
Aquaculture	8.17	9.39	12.11	13.86	15.61	17.13
Capture	6.59	6.25	6.91	7.38	7.55	7.70
Total inland fisheries	14.76	15.64	19.02	21.24	23.16	24.83
Maritime fisheries						
Aquaculture	4.96	6.13	8.67	10.42	10.78	11.14
Capture	79.29	79.95	85.77	85.62	87.07	86.03
Total maritime fisheries	84.25	86.08	94.44	96.04	97.85	97.17
Total aquaculture	13.13	15.52	20.77	24.28	26.38	28.27
Total capture	85.88	86.20	92.68	93.00	94.63	93.73
World total	99.01	101.72	113.45	117.28	121.01	122.00

Source: FAO, World Review of Fisheries and Aquaculture, 1998.

distinctions and shows an assessment of the various sources of supply for most of the 1990s.

As we can see, primary fish supplies come mainly from the capture, or wild, fisheries. The maritime capture fisheries reached a record production of 87 million tonnes in 1996, but by then the rate of growth in fisheries production was in decline. In the 1950s and 1960s, world production in the maritime fisheries increased 6 percent per year, on average, and doubled between 1950 and 1961 from 17 million to 35 million tonnes. It doubled again over the next two decades, reaching 68 million tonnes in 1983. During the next ten years, however, the average rate of growth fell to 1.5 percent and then to 0.6 percent in 1995–96. But by then aquaculture production was on the rise and buoying the level of primary supply, as shown in figure 3. With the exception of China, where aquaculture production is replacing the capture fisheries (maritime and inland), the capture fisheries dominate, with 87 percent of primary fisheries production in 1998. This is illustrated in table 4, which combines traditional supply (the capture fisheries) with aquaculture production and shows that

Figure 3
Change in World Supply — the Capture Fisheries and Aquaculture, 1988–98



Source: FAO, FISH DATABASE; compiled by the author.

the thirty-five top fish and seafood-producing countries account for 90 percent of world fisheries and aquaculture production.

Half of world fish and seafood production in 1998 came from five countries: China (38.0 million tonnes), Japan (5.9 million tonnes), India (5.5 million tonnes), the United States (5.2 million tonnes), and the Russian Federation (4.5 million tonnes). Indonesia, Peru, Chile, Thailand, and Norway each produced between 3.3 million and 4.4 million tonnes. In total, those top-ten producers accounted for two-thirds (66.8 percent) of total world fisheries production in 1998. Twenty-three countries recorded primary production of at least one million tonnes, with Canada ranking twenty-third.

In recent years, the volume of fisheries products sold fresh increased not only in absolute value but also as a percentage of fish sold in all forms (see table 5). In 1997, approximately 35 percent of all fish was sold fresh, compared to 20 percent in 1986 and 25 percent in 1993. The volume of frozen fish also went up, both in developed and developing countries, as did the supply of fish fillets, frozen shrimp,

Table 4
Main Producing Countries — Fish and Seafood, 1998
(Production over 500,000 Tonnes)

Rank	Country	Capture	Aquaculture	Total Production		Cumulative Total (%)
				(tonnes)	(%)	
1	China (mainland)	17,235,086	20,795,367	38,030,453	32.5	32.5
2	Japan	5,139,000	765,000	5,904,000	5.0	37.6
3	India	3,700,000	1,800,000	5,500,000	4.7	42.3
4	United States	4,713,303	438,331	5,151,634	4.4	46.7
5	Russian Federation	4,454,759	63,195	4,517,954	3.9	50.5
6	Indonesia	3,698,850	696,880	4,395,730	3.8	54.3
7	Peru	4,338,437	7,732	4,346,169	3.7	58.0
8	Chile	3,265,306	293,044	3,558,350	3.0	61.0
9	Thailand	2,912,203	575,901	3,488,104	3.0	64.0
10	Norway	2,850,445	408,862	3,259,307	2.8	66.8
11	South Korea	2,026,934	327,462	2,354,396	2.0	68.8
12	Philippines	1,827,971	311,933	2,139,904	1.8	70.6
13	Iceland	1,681,951	3,868	1,685,819	1.4	72.1
14	Viet Nam	1,130,660	537,870	1,668,530	1.4	73.5
15	Denmark	1,557,335	42,368	1,599,703	1.4	74.9
16	Bangladesh	839,141	665,000	1,504,141	1.3	76.2
17	Spain	1,102,075	315,477	1,417,552	1.2	77.4

18	China (Taiwan)	1,076,288	240,435	1,316,723	1.1	78.5
19	Malaysia	1,172,922	103,360	1,276,282	1.1	79.6
20	Mexico	1,181,402	40,989	1,222,391	1.0	80.6
21	Argentina	1,128,823	1,334	1,130,157	1.0	81.6
22	Great Britain	919,905	137,421	1,057,326	0.9	82.5
23	Canada	957,737	90,626	1,048,363	0.9	83.4
24	Myanmar	850,000	100,000	950,000	0.8	84.2
25	Brazil	760,000	80,000	840,000	0.7	84.9
26	France	535,653	300,000	835,653	0.7	85.6
27	Morocco	708,332	2,101	710,433	0.6	86.2
28	New Zealand	599,856	73,250	673,106	0.6	86.8
29	Netherlands	536,626	120,024	656,650	0.6	87.4
30	Pakistan	596,980	24,079	621,059	0.5	87.9
31	South Africa	560,000	5,301	565,301	0.5	88.4
32	Italy	315,593	246,625	562,218	0.5	88.9
33	Turkey	487,200	56,700	543,900	0.5	89.3
34	Venezuela	506,177	10,670	516,847	0.4	89.8
35	Egypt	365,580	139,389	504,969	0.4	90.2
Subtotal (35 countries)		75,732,530	29,820,594	105,553,124	90.2	90.2
Other countries		10,577,321	870,830	11,448,151	9.8	–
World total		86,309,851	30,691,424	117,001,275	100.0	100.0

Source: FAO, products database; compiled by the author.

Table 5
World Utilization of Fisheries and Aquaculture Products,
1993–97

Utilization	1993 (%)	1994 (%)	1995 (%)	1996 (%)	1997 (%)
Sold fresh	25.3	25.8	29.5	32.2	35.1
Frozen	24.8	23.6	23.3	22.8	22.2
Canned	12.2	11.1	10.9	10.3	9.2
In-brine, salted, dried	9.8	9.8	10.0	9.6	10.0
Processed into meal or oil	26.1	27.9	24.7	23.5	22.0
Miscellaneous	2.0	2.0	2.0	2.0	2.0
Total	100.0	100.0	100.0	100.0	100.0

Source: FAO, *The State of World Fisheries and Aquaculture*, 1999.

and ready-to-serve fish and fish in other convenience foods. Canned and frozen products, on the other hand, seem to be losing their share. We should point out that the distinction between fresh-chilled products and frozen products is often difficult to draw. It is clear, however, that new processing and preservation technologies are resulting in a wider range of fresh and chilled products. Also, the supply of in-brine, salted, and dried products is increasing. Again, there is some interesting diversification taking place involving products that increasingly contain farmed products and shellfish meat. It is interesting to note in passing that approximately one-quarter of total world fish production is used in animal feed.

The Growing Importance of Aquaculture

Aquaculture has exploded in the last two decades, to the extent that it is now radically altering the international seafood trade. This has not happened by chance. Greater access to new technology, particularly in the area of marine biology, has resulted in faster and more effectively controlled breeding; that and the expansion of markets for seafood products are primary factors in the industry's vitality. There are also many other reasons for these developments. With the stagnation and, in some cases, the decline of the capture fisheries, attractive markets are opening up for the aquaculture industry. Also, storage and distribution methods have improved, which have not only boosted import-export flow but also spurred retail sales. As well, the

integration and modernization of distribution-marketing channels and the globalization of quality standards give consumers access to a growing variety of quality products at affordable prices.

Stimulated by new technologies and supported by numerous governments who see it as a “natural” addition to traditional and declining fisheries (or, in the case of developing countries, as a way to attract foreign currency), aquaculture has become one of the most prolific segments of the food industries, so much so that for fifteen years, aquaculture products have literally sustained the growth of the world seafood trade. A number of farmed products, in particular shrimp, Atlantic salmon, whitefish such as tilapia, as well as some molluscs (oysters, scallops, and soft-shell clams), have rapidly taken their place on the international seafood market; their volume reached 23 million tonnes in 1997, i.e., three times the volume sold in 1976.²⁸

Equally significant is the change in the percentage of world fisheries production entering import-export channels, from 30 percent in 1986 to 38 percent in 1997, a significant proportion given that only 10 percent of global beef production reaches international markets.²⁹ The potential of aquaculture has been amply demonstrated by the rapid expansion of the sector, which has increased annually by 10 percent since 1984. By comparison, the rate of growth in animal meat production was only 3 percent per year on average, and capture fisheries production has increased by only 1.6 percent per year.

Aquaculture production more than doubled from 1990 to 1997, increasing from 13 to 28 million tonnes and driving up its market value from US\$25 billion to over US\$45 billion. And that does not include farmed seaweed (7.2 million tonnes, with a value of US\$5 billion); a growing percentage of that production is being used to manufacture industrial, pharmaceutical, and cosmetic products. Overall, the volume of aquaculture products rose from 12 percent of total production in 1988 to 26 percent in 1998. Remarkably, over one-quarter of seafood products intended for human consumption are now produced by the aquaculture industry.³⁰

Asian countries continue to dominate world aquaculture production, including China, which produced two-thirds (67 percent) of the world volume in 1997 (see table 6). However, given the relatively low

28. FAO, GLOBEFISH, *Fishery Products, Production, and Trade* (1999).

29. Ibid.

30. FAO, *News and Highlights: International Aquaculture Meeting Plans for the Future* (April 2000).

Table 6
Aquaculture Production by Country, 1988-97

Country	1988	1990	1992	1994	1996	1997
Volume (in tonnes)						
Mainland China	5,630,454	6,482,402	8,256,487	12,966,795	17,714,570	19,315,623
India	893,330	1,012,121	1,388,644	1,527,796	1,783,482	1,776,450
Japan	806,754	804,293	818,330	781,027	829,354	806,534
Indonesia	414,597	499,824	550,368	597,522	733,088	754,610
Thailand	220,416	291,719	370,974	509,800	551,431	575,901
Bangladesh	175,261	194,278	257,395	319,820	449,648	512,738
Viet Nam	152,617	160,076	167,899	217,056	402,500	480,000
United States	357,614	315,448	413,531	390,781	393,331	438,331
South Korea	457,057	376,683	375,507	342,785	358,003	392,427
Norway	89,987	150,028	137,387	218,457	321,542	366,281
Philippines	343,059	379,940	386,876	387,588	349,442	330,443
France	227,534	256,647	250,202	280,867	285,659	287,547
Chile	9,240	32,447	68,474	117,960	217,903	272,346
Taiwan	294,345	333,514	250,286	281,686	262,403	257,530
Canada	21,461	36,462	46,885	53,582	71,191	82,000
Other countries	1,606,504	1,758,260	1,738,105	1,797,326	2,041,328	2,159,653
World total	11,700,230	13,084,142	15,477,350	20,790,848	26,746,875	28,808,414

Value (in thousands of US\$)						
Mainland China	7,277,932	8,217,345	9,921,877	13,394,364	18,412,032	20,509,595
India	1,023,411	1,600,284	1,597,459	2,078,217	2,057,442	1,975,418
Japan	3,102,173	2,885,464	3,347,587	4,105,608	3,894,477	3,525,432
Indonesia	946,107	1,477,273	1,812,355	1,823,180	2,164,986	2,224,782
Thailand	507,538	775,801	1,169,849	1,852,667	1,812,243	1,783,038
Bangladesh	366,402	467,064	569,498	831,681	1,223,371	1,370,199
Viet Nam	290,997	389,614	461,598	589,017	936,100	1,112,400
United States	525,344	535,227	629,454	701,350	736,423	771,183
South Korea	318,548	398,311	619,311	602,612	678,231	913,141
Norway	516,878	773,205	655,761	848,912	994,635	1,043,824
Philippines	695,982	812,974	952,094	1,284,922	1,205,544	898,324
France	480,326	527,594	563,357	640,546	604,315	634,097
Chile	48,911	152,705	268,258	453,424	787,102	918,652
Taiwan	1,195,668	1,248,505	1,160,998	1,262,379	1,178,113	945,523
Canada	85,635	167,961	215,214	217,266	259,149	278,646
Other countries	3,833,259	4,319,931	4,924,703	5,377,437	5,998,466	6,564,213
World total	21,215,111	24,749,258	28,869,373	36,063,582	42,942,629	45,468,467

Source: FAO, aquaculture production database; compiled by the author.

Table 7
Main Aquatic Species Farmed Worldwide, 1988–97

Species	1988	1990	1995	1997
Volume (in tonnes)				
Carp, barbel, and other cyprinoids	5,306,759	5,740,879	10,518,668	13,272,968
Shrimp	576,453	671,997	951,593	941,814
Salmon, trout, smelt	436,390	586,195	944,683	1,222,255
Including Atlantic salmon	112,377	225,492	465,286	638,951
Oysters	1,331,402	1,251,982	3,049,373	3,085,118
Clams, softshell, ark	531,423	629,766	1,766,284	1,948,979
Misc. freshwater fish	758,651	1,009,641	1,685,829	1,994,039
Scorpionfish, redfish, conger eel	55,314	72,111	182,742	250,952
Sea scallops	305,444	340,698	1,153,428	1,269,033
Horse mackerel, mullet, saury	193,711	189,776	213,812	183,210
Tilapia and other cichlids	308,234	396,366	711,048	945,723
Eels	98,109	171,923	187,943	233,073
Other species	1,798,340	2,022,808	3,118,729	3,461,250
Including blue mussels	415,846	365,665	357,650	401,147
Grand total	11,700,230	13,084,142	24,484,132	28,808,414

Value (in thousands of US\$)				
Carp, barbel, and other cyprinoids	6,726,473	7,879,579	11,247,465	14,281,091
Shrimp	3,849,758	4,208,247	6,272,285	6,074,984
Salmon, trout, smelt	2,010,951	2,626,140	3,677,126	4,198,416
Including Atlantic salmon	694,478	1,195,104	1,782,584	2,113,288
Oysters	1,491,105	1,582,118	3,370,691	3,290,957
Clams, softshell, ark	741,277	906,059	2,327,234	2,536,770
Misc. freshwater fish	1,078,645	1,482,076	2,102,129	2,484,045
Scorpionfish, redfish, conger eel	587,840	724,472	1,840,708	2,134,928
Sea Scallops	531,450	547,169	1,646,392	1,766,676
Horse mackerel, mullet, saury	1,118,532	989,751	1,418,204	1,337,453
Tilapia and other cichlids	383,356	558,654	1,016,725	1,299,772
Eels	1,043,883	1,030,843	1,366,184	1,108,035
Other species	1,651,841	2,214,150	3,795,646	4,955,340
Including blue mussels	280,014	298,863	224,396	25, 420
Grand total	21,215,111	24,749,258	40,080,789	45,468,467

Source: FAO, aquaculture production database; compiled by the author.

value of carp and seaweed, which form the bulk of its aquaculture production, China accounts for only 45 percent of the value of the industry's world production. On the other hand, Japan contributes only 3 percent to world aquaculture production, but that amount represents 7.8 percent of its value, the reason being that it farms large volumes of species that have a high commercial value, such as young male salmon, oysters, and sea scallops. As a result, the value of Japan's aquaculture production ranks it second in the world. The same is true for Indonesia and Thailand, where shrimp production predominates, and Norway, where salmonid production, particularly Atlantic salmon, helps raise the value of its aquaculture production.

Two of the ten main aquatic species farmed are plants. Apart from seaweed and other aquatic plants, various types of carp (silver, weed, common, marbled, and mrigal) dominate by far in tonnage and value. Shrimp, salmon, and oysters are the other three main species because of their high unit value (see table 7).

Among farmed products, shrimp and salmon are probably the most actively traded seafood internationally. Raised mainly in a tropical environment, shrimp, which is exported to developed countries, makes a significant contribution to the economies of some Asian and Latin American countries. The other high-value species, Atlantic salmon, which is not among the top ten in aquaculture production, is farmed in cold climates, where much of what is produced is consumed. Although a few industrialized countries, such as Japan, Norway, and the United States, are among the main producers, aquaculture is most intense in low-income, food-deficient countries. Some farmed whitefish, such as tilapia and catfish, and some types of carp are increasingly common in import-export channels. In the United States, those species have the potential to replace capture groundfish, including cod, which has become more rare and thus more expensive. In Europe, hoki, catfish, and tilapia have not been completely accepted as substitutes for groundfish, which has resulted in higher prices on the continent for other fish such as cod.

As we have seen, Canada rates as a secondary player in the capture fisheries (ranking twenty-first globally) and accounts for only a tiny percentage of world aquaculture production. Canada's share of world primary fish and seafood production fell from 1.7 percent in 1990, before moratoriums on some groundfish stocks were imposed, to 0.9 percent in 1997, dropping from twelfth place in 1990 to twenty-third place in 1998. That decline can be partly explained by sharp drops in groundfish supply and by the strong expansion of world

aquaculture, particularly in Asian countries. Nevertheless, Canada has managed to stay among the top exporting countries, although it has dropped in rank — from third in 1990 to sixth in 1997. We will see how the Canadian fishery has been able to maintain its position in a more open and increasingly competitive international market. First, however, let us look at changes in primary supply, which in large part shapes the industry as a whole.

■ Primary Supply in Eastern Canada: Development and Structure

The Traditional Fisheries Sector

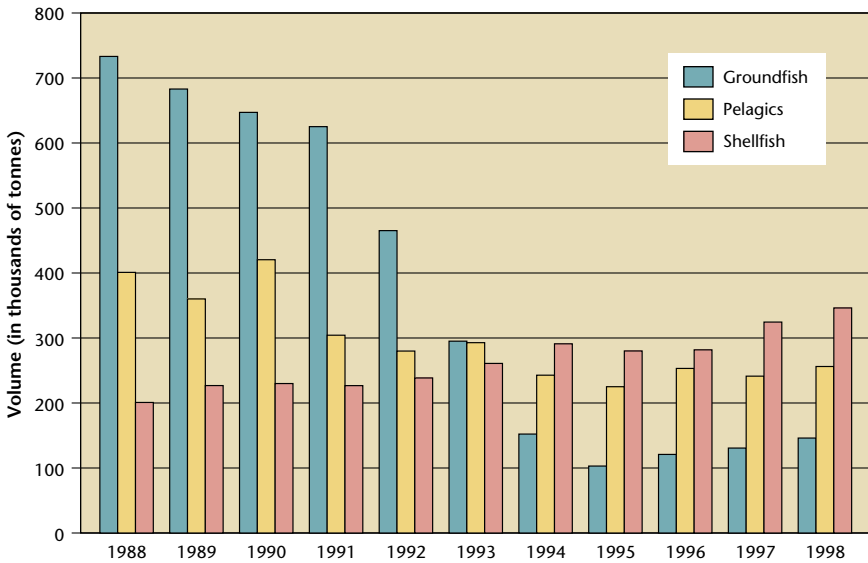
In eastern Canada, the supply of seafood comes primarily from the capture, or wild, fisheries. Canadian catches, particularly groundfish, gradually increased after the implementation of the 200-mile EEZ, peaking at 1,334,000 tonnes in 1988 (i.e., 55 percent of landings in eastern Canada), but the value of landings came mostly from shellfish, i.e., approximately 68 percent. The situation has changed considerably since then, however, as shown in figures 4 and 5.

From 733,300 tonnes in 1988, groundfish landings had fell to only 103,600 tonnes in 1995, depriving producers in the Atlantic regions of the raw material essential to their operations. There was some recovery beginning in 1996, but groundfish landings reached only 146,700 tonnes in 1998, i.e., only 20 percent of their 1988 volume.

During that time, production of molluscs and crustaceans (mainly lobster, snow crab, Northern shrimp, and, to a lesser extent, scallops) was rising steadily. Dockside volumes for molluscs and crustaceans rose from 200,400 tonnes in 1988 to over 346,000 tonnes in 1998. This growth is all the more important because it involves mainly species with a high market value. However, their value-added processing poses a problem because of the strong demand for fresh seafood and the complex and, above all, costly nature of processing these types of species from an industrial standpoint. Capture levels for pelagic fish fluctuate from year to year as a result of weather conditions and economic factors. Herring, capelin, and squid are the main species marketed in this group. The problem, however, is that the average unit value of pelagic fish is relatively low; in fact its actual value has fallen over the last ten years. As we will see later, only herring roe, destined mainly for the lucrative Japanese market, has a high market value.

Figure 4

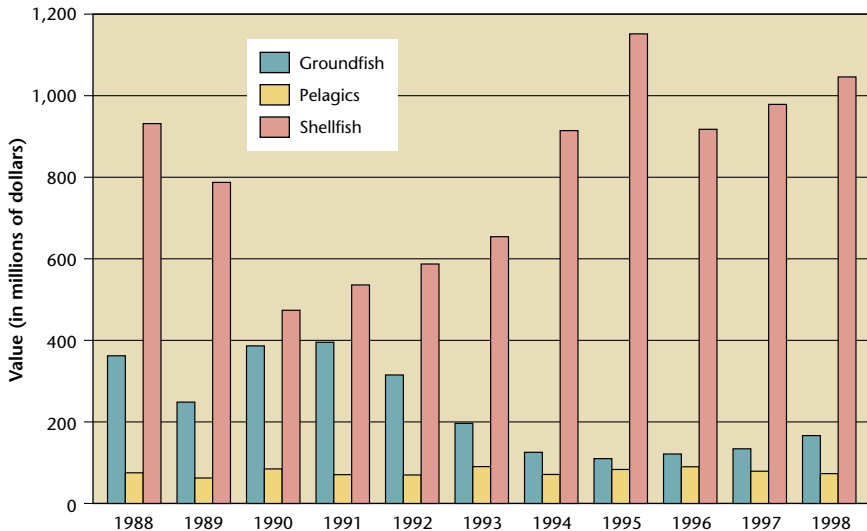
**Change in Volume of Fish and Seafood Landings,
by Species Group, Eastern Canada, 1988–98**



Source: Department of Fisheries and Oceans Canada, annual statistics on commercial fisheries and aquaculture; compiled by the author.

Figure 5

**Change in Value of Fish and Seafood Landings,
by Species Group, Eastern Canada, 1988–98**



Source: Department of Fisheries and Oceans Canada, annual statistics on commercial fisheries and aquaculture; compiled by the author.

To varying degrees, each of the five provinces bordering on the Atlantic and the Gulf of St. Lawrence has been tested by changes in eastern Canada's maritime fisheries over the past ten years. Without going into detail, we will discuss two basic points. First, the groundfish crisis has affected not just Newfoundland and Labrador, although that province has been hardest hit because it depended much more than the other provinces on groundfish stocks from the continental shelf. The drop in Newfoundland landings was greater in absolute and relative terms than anywhere else (see table 8).

Outside Newfoundland, the groundfish-processing industry in the other four provinces of eastern Canada has also suffered and continues to be deprived of an essential resource. Processors in Nova Scotia watched their local groundfish supply plummet from 260,000 tonnes in 1988 to under 78,000 tonnes in 1995; in Quebec, from 55,700 to 3,400 tonnes; in New Brunswick from 20,000 to approximately 1,300 tonnes; and in Prince Edward Island (redfish in particular), from 14,400 to 1,300 tonnes. Nevertheless, the fishing industry in those provinces was less affected by the groundfish crisis than in Newfoundland. In the Maritimes and to a lesser degree in Quebec, the industry could still count on a supply of other fairly lucrative species, such as lobster, snow crab, and scallops.

The other important point to be discussed is the restructuring of the primary fishing industry, particularly in Newfoundland but elsewhere as well. Table 9 shows that restructuring had a major impact on shellfish harvesting and that one species, lobster, accounts for one-third of the value of landings on the East Coast. From 24 percent of total landings in 1990, the value of lobster catches rose to 33.7 percent in 1998. This increase is remarkable given that lobster catches fell by approximately 16 percent during the same period; however, firm lobster prices were mainly responsible for its steady performance. The average price paid to lobster fishers increased from \$4.85/kilogram in 1990 to \$10.25/kilogram in 1995, and for the most part has continued to rise since. Northern shrimp production has also risen sharply in recent years. Dockside volumes in eastern Canada soared from 37,000 tonnes in 1990 to over 115,000 tonnes in 1998. The increase was strongest in Newfoundland, where volumes were up 52,000 tonnes, and in Nova Scotia, where they grew by 20,000 tonnes. The result is that Northern shrimp production accounted for 7.8 to 21.1 percent of the total value of landings during that period.

One species that made an important contribution to maintaining a firm foundation for the Atlantic Canadian fisheries is snow crab.

Table 8

Fish and Seafood Landings in Eastern Canada, by Province and by Species Group, 1988, 1995, and 1998

Species	Volume (in tonnes)			Value (in thousands of dollars)		
	1988	1995	1998	1988	1995	1998
Newfoundland						
Groundfish	383,200	19,590	52,575	167,200	16,671	57,710
Pelagic fish	135,400	24,943	62,172	37,000	5,532	16,596
Molluscs & crustaceans	39,700	91,384	150,748	82,800	313,680	336,424
All species	558,300	135,917	265,495	287,000	335,883	410,730
Nova Scotia						
Groundfish	259,900	77,753	85,445	164,300	85,452	98,515
Pelagic fish	136,600	77,217	85,222	34,500	48,332	32,602
Molluscs & crustaceans	97,100	100,326	111,705	237,100	376,638	408,147
All species	493,600	255,296	282,372	435,900	510,422	539,264
New Brunswick						
Groundfish	20,100	1,563	1,688	9,200	1,882	2,124
Pelagic fish	105,900	97,327	76,045	19,700	20,365	14,002
Molluscs & crustaceans	25,400	33,290	26,087	89,200	185,848	113,048
All species	151,400	132,180	103,820	118,100	208,095	129,174

Prince Edward Island						
Groundfish	14,400	1,297	818	4,900	877	786
Pelagic fish	13,000	15,604	24,171	3,500	4,824	7,280
Molluscs & crustaceans	15,400	20,953	23,506	57,900	108,116	102,217
All species	42,800	37,854	48,495	66,300	113,817	110,283
Quebec						
Groundfish	55,700	3,391	6,177	26,900	5,315	8,570
Pelagic fish	9,700	10,359	9,181	4,900	4,294	2,878
Molluscs & crustaceans	22,800	33,997	33,999	67,300	167,640	87,071
All species	88,200	47,747	49,357	99,100	177,249	98,519
Eastern Canada						
Groundfish	733,300	103,594	146,703	362,786	110,197	167,705
Pelagic fish	400,600	225,450	256,791	75,772	83,347	73,358
Molluscs & crustaceans	200,400	279,950	346,045	930,963	1,151,922	1,046,907
All species	1,334,300	608,994	749,539	1,369,521	1,345,466	1,287,970

Source: Department of Fisheries and Oceans Canada, annual statistics on commercial fisheries and aquaculture; compiled by the author.

Table 9
Value and Volume of Fish and Seafood Landings,
by Species, Eastern Canada, 1990 and 1998

Species	Volume of Landings (in tonnes)		Value of Landings (in thousands of dollars)		Percentage of Total Landing Value	
	1990	1998	1990	1998	1990	1998
Cod	395,266	36,806	242,919	55,928	25.5	4.3
Redfish	81,450	27,142	22,701	14,424	2.4	1.1
Flatfish	63,665	13,619	36,254	15,656	3.8	1.2
Pollock	38,386	15,092	20,219	13,149	2.1	1.0
Haddock	22,148	11,721	24,216	20,686	2.5	1.6
Turbot	19,602	13,091	16,552	19,446	1.7	1.5
Hake	15,185	19,992	7,607	15,596	0.8	1.2
Halibut	2,415	1,268	10,820	8,346	1.1	0.6
Other groundfish	9,556	7,972	5,391	4,474	0.6	0.3
Groundfish	647,673	146,703	386,679	167,705	40.5	13.0
Herring	260,272	187,723	37,503	28,666	3.9	2.2
Capelin	126,917	40,784	17,379	12,032	1.8	0.9
Mackerel	21,790	17,157	6,210	8,747	0.7	0.7
Alewife	7,912	6,771	2,093	1,840	0.2	0.1
Smelt	1,081	813	843	880	0.1	0.1
Salmon	688	2	3,077	8	0.3	0.0

Tuna	471	690	7,158	9,824	0.8	0.8
Other pelagic fish	2,638	2,851	10,364	11,361	1.1	0.9
Pelagic fish	421,769	256,791	84,627	73,358	8.9	5.7
Scallops	83,277	61,728	86,950	92,832	9.1	7.2
Clams, quahogs	22,666	28,730	18,265	37,827	1.9	2.9
Squid	5,589	1,314	2,769	1,298	0.3	0.1
Mussels	2,912	8,238	4,375	10,090	0.5	0.8
Oysters	2,639	1,471	4,987	3,327	0.5	0.3
Molluscs	117,083	101,481	117,346	145,374	12.3	11.2
Lobster	47,857	40,085	232,217	435,686	24.3	33.7
Shrimp	37,279	115,630	74,174	273,753	7.8	21.1
Snow crab	26,177	75,194	49,469	174,184	5.2	13.5
Crab (other)	864	8,615	321	6,282	0.0	0.5
Crustaceans	112,177	239,524	356,181	889,905	37.3	68.7
Various ^a	42,940	28,911	8,560	6,466	0.9	0.5
Other molluscs and crustaceans	786	1,738	507	4,685	0.1	0.4
Sea urchin	–	3,302	–	6,943	0.0	0.5
Grand total	1,342,428	778,450	953,900	1,294,436	100.0	100.0

Source: Department of Fisheries and Oceans Canada, annual statistics on commercial fisheries and aquaculture; compiled by the author.

^a Marine plants (seaweed) and seal (value only).

Although cyclically more unstable and subject to the volatile Japanese market, snow crab production has grown steadily in eastern Canada since 1990, from 26,000 to 75,000 tonnes in 1998. Like shrimp, the snow crab fishery has benefited Newfoundland more than the rest of eastern Canada: its fishers have captured 85 percent of additional crab volumes on the Atlantic coast. This rather lucrative fishery, and the Northern shrimp fishery, has contributed extensively to revitalizing the fishing industry in Newfoundland. No fewer than 3,300 fishers granted licenses under the Enterprise Allocation program have turned to snow crab fishing in Newfoundland, and they operate approximately forty crabbing grounds, most located in the eastern areas (3K and 3L), but also in northern (2J) and southern areas (3Ps) and even on the narrow west coast shelf (4R).³¹ According to scientists, the decline in cod stocks hastened the revival of crab stocks because cod prey on crab.

An important aspect of this new fishery in Newfoundland is that this type of crab lends itself to processing and thus has led to more processing plant jobs. Unlike neighbouring provinces, which rely primarily on the Japanese market to sell crab sections, the principal market for Newfoundland crab is the United States (\$281 million in 1999, which represents 74 percent of provincial crab exports), followed by China (\$45 million), Japan (\$39 million), Thailand (\$10 million), and a few other countries in Asia and Europe. The value of Newfoundland snow crab exports in 1999 (\$379 million) was one and a half times higher than snow crab exports from the other four Atlantic provinces combined (\$222 million),³² an impressive achievement in a province hit hard by the depletion of groundfish stocks.

In summary, the expansion of the shrimp and in particular the snow crab fisheries together with firm lobster prices, alone have supported the East Coast fishing industry for the last ten years. Also important are regional supplies of scallops (southwestern Nova Scotia), herring (sardines in southwestern New Brunswick, herring roe in a number of areas, particularly in northeastern New Brunswick, and smoked herring in southeastern New Brunswick), groundfish (approximately 146,000 tonnes landed in eastern Canada in 1998, including 85,000 tonnes in Nova Scotia, a significant amount), and growing supplies of other species including mussels (close to 10,000 tonnes), clams and other shellfish (30,500 tonnes), and more recently

31. According to *The 1999 Newfoundland and Labrador Seafood Industry — Year in Review*.

32. Compiled by the author from Industry Canada's STRATEGIS database.

rock crab (8,600 tonnes) and sea urchin (3,300 tonnes). The harvesting of species which until now have been underutilized or ignored, such as rock crab and sea urchin, show a change in attitude by fishers and processors, who must now make use of all available species. Of course aquaculture has also contributed to the regional fishery, as the following section explains.

The Aquaculture Sector: Expansion and Diversification

Although Canada is one of the world's top fish exporters (sixth in 1998), it ranks only twenty-third in fisheries production (the capture fisheries). Canada's estimated aquaculture production in 1998 was 92,000 tonnes: i.e., 0.3 percent of world volume and 0.6 percent of world value — far behind Asian countries, which dominate in both areas. Although Canada ranks twenty-second in aquaculture production, the average unit value of its aquaculture products is particularly high, placing it fourth in that category behind Japan, Chile, and Thailand.

Canada has only recently established a viable aquaculture industry. Progress has been rapid, however, particularly in salmon and mussel farming, and there is intense activity in the commercial production of a growing number of species. Canada's aquaculture production rose from 21,500 tonnes to over 113,000 tonnes between 1988 and 1999 and from Can.\$105 million to Can.\$558 million in value. The percentage of aquaculture products has continued to rise, and today they account for 9.5 percent of the tonnage of fish and seafood landings, but 27 percent of the value of traditional fisheries production. This increase is particularly evident for farmed fish, e.g., Atlantic salmon, production of which increased from 3,400 tonnes in 1988 to 72,300 tonnes in 1999 (\$34 million to \$452 million). Diversification is also underway, particularly in the area of shellfish farming.

Despite these encouraging signs, the true value of the aquaculture industry's contribution to the economy of coastal areas is not always recognized. This is the case with Canada's East Coast, although events in recent years have led to a greater recognition of the industry's potential. It is true that aquaculture is only in the embryonic stage in several coastal areas, and interindustry links have not been clearly established. Nevertheless, its contribution is extremely significant, all the more so given that the industry is an answer to the decline of traditional resources at the same time as it helps to diversify regional employment.

Although Canada's eastern provinces account for 70 to 80 percent of the value of the traditional fisheries in Canada, they represent a more modest percentage of aquaculture production, i.e., between 40 and 50 percent. Production is growing steadily, however, rising from 9,000 tonnes in 1988 to 16,000 tonnes in 1990, and reaching 51,800 tonnes in 1999 for a value of \$230.5 million (see table 10).

Farmed salmon alone represents 70 percent of the value of aquaculture production. However, the industry is relatively diversified, both sectorally and geographically. Trout, mussel, and oyster farming are already well established in eastern Canada, and a growing number of licences are being issued for farming new species, such as clams, green sea urchin, scallops, cod, haddock, turbot, halibut, Arctic char, and so on.³³

Aquaculture production of bivalves rose from 6,400 tonnes in 1990 to 17,700 tonnes in 1998, and their market value increased from \$10.4 million to \$25.7 million. Such growth is remarkable, especially considering that production of this kind is still affected by the traditionalism of the fisheries. This is particularly true in the oyster sector, where most licence holders limit themselves to harvesting, and many leases remain effectively nonproductive. In Prince Edward Island, for example, only one hundred of five hundred leaseholders are commercially active.³⁴ That ratio is even lower in New Brunswick, where no more than thirty of the nearly four hundred licence holders operate commercially.³⁵ According to scientists, there are approximately eighteen hundred oyster leases in the Maritimes covering nearly 5,000 hectares; if all leases were harvested to capacity and if all viable, unused sites were farmed, annual oyster production would be in the order of 125,000 tonnes,³⁶ a long way from the 2,600 tonnes reported in 1998 by oyster producers in the Maritimes.

The rapid development of the aquaculture sector is even more evident when compared to the traditional fisheries. Aquaculture production in eastern Canada represents a growing percentage of the total volume of fisheries production, rising from 1.2 percent in 1990

33. For complete and detailed coverage of aquaculture in eastern Canada, see Andrew Boghen, ed., *Cold-Water Aquaculture in Atlantic Canada* (Moncton: Canadian Institute for Research on Regional Development, 1995).

34. According to *Aquaculture Industry Profile and Labour Market Analysis*, report prepared for the Canadian Aquaculture Industry Alliance, p. 17.

35. Information obtained from discussions with various industry stakeholders.

36. According to R. E. Lavoie, "Culture of the American Oyster," in Boghen, ed. *Cold-Water Aquaculture in Atlantic Canada*, 192.

Table 10
Aquaculture Production in Eastern Canada, by Species Group and by Province, 1999

	Newfound- land	Nova Scotia	Prince Edward Island	New Brunswick	Quebec	Eastern Canada	
						1999	1990
Volume (in tonnes)							
Fish	2,487	4,715	82	22,550	1,084	30,918	9,798
Seafood	1,700	1,762	16,313	951	142	20,868	6,405
• Atlantic salmon	399	791	–	22,000	–	23,190	7,835
• Mussels	1,700	945	13,890	665	139	17,339	3,598
• Trout	2,088	3,924	–	550	1,084	7,646	1,873
• Oysters	–	776	2,423	286	1	3,486	2,698
• Other	–	41	82	–	2	125	199
Total	4,187	6,477	16,395	23,501	1,226	51,786	16,203
Value (in thousands of dollars)							
Fish	13,944	24,374	786	156,100	4,303	199,507	88,059
Seafood	3,800	3,509	21,920	1,586	174	30,989	10,362
• Atlantic salmon	2,462	7,022	–	150,000	–	159,484	74,641
• Mussels	3,800	1,485	16,845	798	167	23,095	13,418
• Trout	11,482	17,352	–	6,100	–	34,934	3,964
• Oysters	–	1,815	5,075	788	3	7,681	5,262
• Other	–	209	786	–	4,307	5,302	1,626
Total	17,744	27,883	22,706	157,686	4,477	230,496	98,911

Sources: Department of Fisheries and Oceans Canada, annual statistics on commercial fisheries and aquaculture; for Quebec figures, P. Lauzier, *Cahier sur la production aquicole* (Spring 2000).

to over 5 percent in recent years (see table 11). Not an impressive figure, it is true. Worldwide, the percentage of aquaculture products across the industry has grown steadily, and today it accounts for 12 percent of the capture fisheries production. Nevertheless, in terms of value rather than volume, Atlantic Canada performs very well, with aquaculture representing 13 to 15 percent of the value of traditional fishery landings.

Table 11
**Aquaculture vs. Traditional Production – Fish and Seafood,
Eastern Canada, 1990–98**

	Aquaculture Production as a % of Traditional Landings			Value of Aquaculture Production as a % of Traditional Landings		
	Fish	Seafood	All Species	Fish	Seafood	All Species
1990	0.9	2.8	1.2	18.8	2.2	10.5
1992	1.7	2.7	1.9	25.9	1.4	11.1
1994	3.7	3.3	3.5	56.1	1.3	11.1
1996	5.3	4.4	4.9	66.6	1.9	14.0
1997	6.2	4.2	5.2	76.7	1.9	15.3
1998	5.1	5.1	5.1	60.1	2.4	13.2

Source: Compiled by the author using data from the Department of Fisheries and Oceans Canada.

III

Atlantic Canada's Position in the International Fish and Seafood Trade

Seafood products in general and shellfish in particular have become increasingly popular with a growing number of consumers. These products now account for 16 percent of the animal protein consumed worldwide, and demand per person is growing, a trend that recent studies say should continue. According to the National Marine Fisheries Service, world demand for seafood products will increase by 50 percent in the next fifteen years and reach 120 million tonnes.³⁷ Globally, three-quarters of fisheries production is destined for human consumption, one-third of which is sold as frozen products, while the rest is canned, salted, dried, or smoked. Given the characteristics of fish and especially the problems preparing it, demand for it is higher in its processed forms and as items on restaurant menus. It should be noted that the real price of fish is rising more quickly than the price of other foodstuffs, particularly meat and grains.³⁸ In the short term, this is the result of limited supply — supply being the determinant of market prices. In the long term, however, the price of fish is influenced mainly by demand and generally fluctuates more than the price of other food products.

Of all the major food categories, fish, crustaceans, and molluscs (both fresh and processed) are the most marketed worldwide. No fewer than 195 countries export a percentage of their production, and 180 countries import fisheries and aquaculture products in varying volumes. Exports reached 23 million tonnes in 1997, close to three times the volume sold in 1976, while in the same year the percentage of world production destined for import-export rose to 38 percent.³⁹ Since 1995, exports have brought in over US\$50 billion per year, which is approximately 10 percent of the value of agricultural

37. National Marine Fisheries Service, *News Release* (Washington, DC, June 2000).

38. In real terms, the price of beef in the United States has decreased by 11 percent since 1982; pork, 23 percent; and chicken, 7 percent, while the price of fish, all categories combined, has increased by 52 percent: according to "Fish Price Index Prices," *Fulton Fish Market News* (March 2000).

39. FAO, *World Review of Fisheries and Aquaculture* (August 1999), 16–18

exports. In terms of value, almost all fish exports (95 percent) are in the form of edible products, although in volume, fishmeal and fish oil account for a substantial percentage (28 percent in 1997) of world fisheries production. Over 90 percent of traded products have undergone fairly substantial processing.

Growth in the seafood products trade has kept pace with growth in production, a trend that has accelerated in recent years. The upsurge in imports and exports is linked to worldwide economic growth and is supported by the expanding supply of a variety of seafood products from around the world. The increase in supply can also be attributed to aquaculture, particularly the farming of popular species such as shrimp, whitefish, salmon, and shellfish. However, a percentage of the increase in world seafood trade is only nominal, the result of trade among countries that belong to a single political entity.

What are the factors behind the demand for seafood? There are several, including a higher standard of living, urbanization, demographic and social changes, the health benefits of eating fish, the growth in tourism, and so on. All these factors affect not only the level of demand but the nature and type of products consumed. Consumers are increasingly turning to fresh and ready-to-serve processed products, take-out and delivery, and restaurants.⁴⁰

As we have seen, the world supply of seafood products is not only demand-driven; it is also stimulated by innovation and mass-marketing strategies. In fact, the distribution and marketing sectors are undergoing strategic restructuring, forcing suppliers and buyers-distributors of fish products to cooperate with each other more effectively. The entry of major agri-food producers into the fisheries is also resulting in a more consistent supply as well as in quality standardization. Wide-scale distribution, both of fresh and prepackaged, preserved products, means that large volumes of extremely fresh basic products have to be supplied upstream. At the same time, there is a push to develop aquaculture products so as to exercise greater control over both the supply and the quality of fish and seafood, especially since local supply is still too often vulnerable to the vagaries of the fishery and to price wars that push up the price of basic products.

40. We might mention in this regard the proliferation in the United States of the all-you-can-eat seafood buffet restaurants. See Seafood.com "Buffet Restaurants Increasing Factor in Seafood Sales" (July 1999).

Industrializing countries are increasingly active in the international trade in food products, both as buyers and suppliers, thereby contributing to the steady and increasing globalization of production and trade. More directly, however, it is the growing array of new products available on the markets, quality standardization, and more effective international networking by suppliers of raw materials, processors, and intermediaries that are increasingly stimulating the world market.

That said, Western countries dominate seafood product importing/exporting, accounting for half of all exports and 90 percent of imports. Nevertheless, developing countries, Asian countries in particular, are also making an important contribution to the seafood trade, given that close to half the supply finding its way onto world markets (46 percent of the volume and 49 percent of the value of world exports) is shipped by Asian countries. Half the world's seafood exports come from developing countries and are imported mainly by developed countries.

The geographical flow of the seafood trade has changed markedly since the early 1990s, particularly with respect to imports (see table 12). For example, the European Union's share of world imports fell from 38 percent in 1990 to 32 percent in 1997, although the total value of its imports increased from US\$15 billion to US\$18 billion. The same is true for Africa, which saw its share of fish and seafood imports fall from 2.2 to 1.7 percent. Imports rose in Asia (Japan excluded) from US\$3.9 billion in 1990 to US\$7.7 billion in 1997, increasing Asia's percentage of total imports from 9.8 to 13.6 percent. Japan, the world's third-largest trading bloc and top importer of seafood products, has also been importing more to meet its huge demand: the value of Japanese fish and seafood imports went from US\$10.7 billion in 1990 to US\$17.1 billion in 1996, but fell again to US\$15.6 billion in 1997 because of the country's financial crisis. Japan has also maintained its share of the import market, i.e., approximately 27 percent, as has the United States, whose market share is still hovering around 14 percent.

There have also been major changes in exports, although less than in imports. Asia (excluding Japan) has increased its percentage of world seafood exports from 25.7 to 26.6 percent. Although this may seem minor at first glance, the result is an increase of approximately US\$5 billion, *twice* the value of Canadian exports. Exports from the

Table 12
Imports-Exports of Seafood Products,
by Trading Bloc, 1990–97

Trading Bloc	1990	1992	1994	1996	1997
Imports (in millions of US\$)					
European Union	14,975	16,500	16,211	18,471	18,056
Japan	10,668	12,832	16,202	17,098	15,588
United States	5,568	6,024	7,043	7,080	8,150
Rest of Asia	3,867	5,394	6,465	7,752	7,647
Rest of Europe	1,714	1,928	2,305	3,141	3,167
Canada	620	687	922	1,168	1,137
Africa	883	845	877	903	934
South America	269	280	504	782	791
Common. Ind. States	–	70	287	500	513
Central America and the Caribbean	283	277	396	351	346
Exports (in millions of US\$)					
Rest of Asia	10,166	12,245	15,925	16,596	15,016
European Union	7,795	8,390	8,970	10,680	10,574
Rest of Europe	4,135	5,635	6,848	8,102	7,521
South America	2,550	3,493	4,397	5,168	5,974
United States	3,020	3,251	3,007	3,148	2,875
Africa	1,504	1,623	2,078	2,542	2,528
Canada	2,271	2,087	2,189	2,300	2,278
Central America and the Caribbean	750	780	1,105	1,531	1,655
Common. Ind. States	–	976	1,847	1,877	1,432
Japan	808	792	758	725	902

Source: FAO, annual statistics on world trade in seafood products; compiled by the author.

European Union, the second-largest exporter, are down from 19.7 to 18.7 percent, while the United States dropped from 7.6 to 5.1 percent, Canada from 5.8 to 4.0 percent, and Japan from 2.0 to 1.6 percent. Exports are up in the rest of Europe (10.5 to 13.3 percent), South America (6.5 to 10.6 percent), and Central America (1.9 to 2.9 percent).

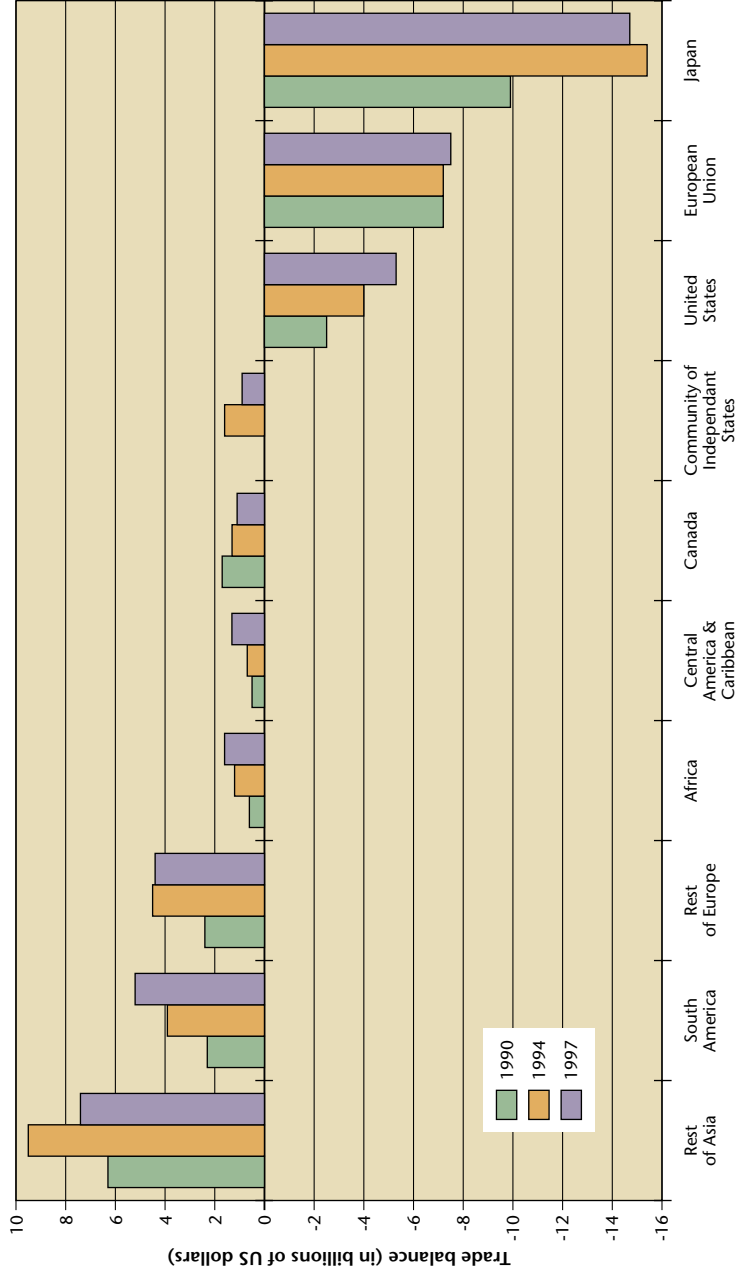
The trade balance in the seafood sector is increasingly in the Third World's favour, as shown in figure 6. From US\$6.3 billion in 1990, the fish trade surplus in Asia (excluding Japan) rose to US\$9.5 billion in 1994 and fell to US\$7.4 billion in 1997. These data show a clear trend toward the globalization of trade in fish and seafood products.

China (including Taiwan), Norway, Thailand, and the United States are the world's top four exporters of seafood products. Thailand's exports doubled between 1985 and 1990 and again between 1990 and 1995 (see figure 7), mainly the result of its phenomenal aquaculture development, especially its shrimp farming. However, major problems (uncontrolled disease and pollution) have hit the aquaculture industry in recent years, relegating Thailand to fifth place in 1997. Exports from Norway have soared since 1994, largely because of salmon farming, so that it now ranks second overall behind China. It should be noted that Taiwanese (US\$1.78 billion in 1997) and Hong Kong exports are included with those from mainland China. The United States exports a wider variety of products in various forms. We should also point out that the United States, itself a major importer, is a leader in the marketing of seafood products. Many of the primary products it imports are processed further and then exported internationally. In Europe, Denmark is also a hub for the marketing of seafood products. The majority of its imports are re-exported to EU countries, particularly Germany. Denmark's processing firms are highly capitalized, and their clients include the major food distribution chains that resell products under their own brand names.⁴¹

The list of main seafood exporters includes some producers farther down the list who, in recent years, have demonstrated remarkable staying power (see table 13). They include, for example, Canada, whose exports seem to have been only partially weakened by groundfish moratoriums; Chile, a growing force in aquaculture, particularly in salmon farming; Indonesia, which has modernized its fisheries and expanded its aquaculture industry to include shrimp farming, thus gradually strengthening its position on international markets; Spain, a major fisheries power that is currently restructuring its supply but still has major production capacity, particularly in canned products; and the Commonwealth of Independent States (CIS), which is slowly recovering from the dismantling of the Soviet empire and is adapting

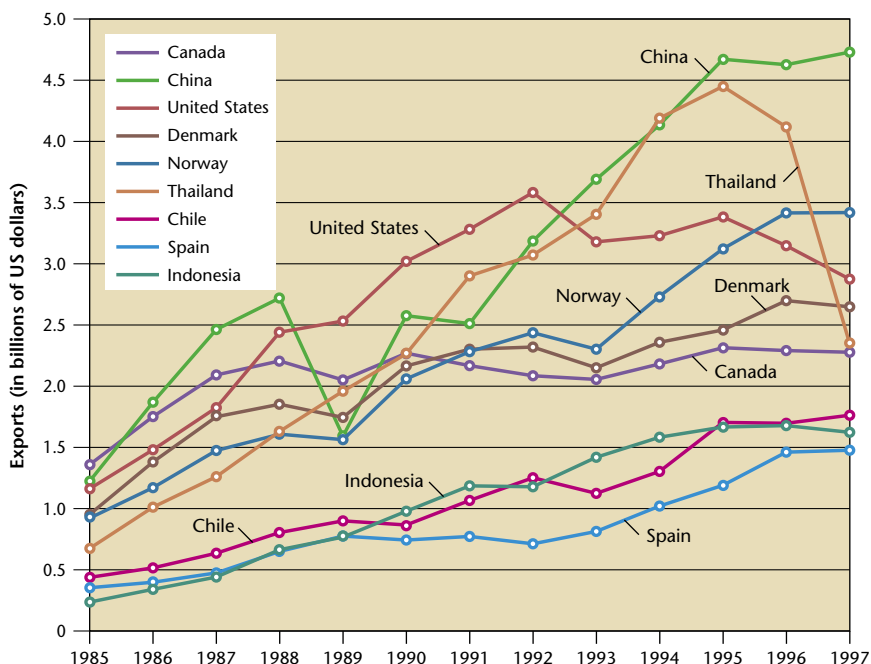
41. Information obtained from the FAO, FISHERY COUNTRY PROFILE/PROFIL DES PECHES PAR PAYS.

Figure 6
Trade Balance in Seafood Products, by Trading Bloc, 1990, 1994, and 1997



Source: FAO, annual statistics on world trade in seafood products; compiled by the author.

Figure 7
Main Exporters of Seafood Products, 1985–97



Source: FAO, annual statistics on world trade in seafood products; compiled by the author.

fairly well to the new rules of international trade. Although mostly obsolete, the production capacity of the CIS is still impressive, and large segments of the industry are positioning themselves to take advantage of growing international trade.

That list is far from complete, however, given that in 1997 those nine countries accounted for a total of US\$24.6 billion in exports, just under 48 percent of the total value of exports worldwide. At least eight other countries recorded exports of at least \$1 billion: in order of importance they are the Netherlands, South Korea, Iceland, Peru, the United Kingdom, India, France, and Argentina. Other countries with significant potential, both in resource supply and in production expertise and capacity, are also a presence on international markets: Germany, Australia, Mexico, New Zealand, and Viet Nam.

Japan tops the list for imports, although financial difficulties in recent years have somewhat reduced its consumer spending. Japanese consumers buy between 12 million and 13 million tonnes of seafood

Table 13
Main Countries Importing and Exporting Seafood Products, 1990–97

Country	1990	1991	1992	1993	1994	1995	1996	1997
Imports (in millions of US\$)								
Japan	10,668	12,085	12,832	14,187	16,202	17,940	17,098	15,588
United States	5,568	6,000	6,024	6,290	7,043	7,141	7,080	8,150
Spain	2,361	2,748	2,898	2,630	2,643	3,111	3,140	3,089
France	2,809	2,926	2,935	2,556	2,797	3,221	3,194	3,077
Italy	2,458	2,690	2,643	2,138	2,275	2,301	2,612	2,590
Germany	1,900	2,115	2,191	1,866	2,324	2,486	2,549	2,374
United Kingdom	1,911	1,912	1,907	1,629	1,889	1,920	2,068	2,153
China (Hong Kong)	1,112	1,232	1,398	1,379	1,649	1,832	1,928	2,104
Mainland China	633	897	1,172	1,120	1,434	1,553	1,821	1,863
Denmark	1,116	1,148	1,197	1,094	1,415	1,574	1,619	1,521
Canada	620	675	687	821	922	1,044	1,168	1,137
Netherlands	770	868	889	792	1,019	1,196	1,145	1,111
South Korea	365	568	498	537	731	839	1,068	1,029
World	39,482	43,483	45,294	44,585	51,516	56,446	57,392	56,422

Exports (in millions of US\$)											
Norway	2,060	2,282	2,437	2,302	2,727	3,137	3,431	3,419			
Mainland China	1,182	1,560	1,592	2,320	2,835	2,857	2,937				
United States	3,020	3,282	3,251	3,008	3,007	3,384	3,148	2,875			
Denmark	2,088	2,175	2,320	2,151	2,359	2,460	2,699	2,649			
Thailand	2,265	2,901	3,072	3,404	4,192	4,452	4,119	2,351			
Canada	2,271	2,168	2,087	2,055	2,189	2,322	2,300	2,278			
Taiwan	1,525	1,802	2,369	1,804	1,809	1,762	1,782				
Chile	866	1,067	1,252	1,125	1,302	1,698	1,686	1,763			
Indonesia	979	1,186	1,179	1,419	1,579	1,673	1,682	1,624			
Spain	744	773	713	814	1,023	1,190	1,467	1,477			
Netherlands	1,306	1,352	1,396	1,283	1,434	1,455	1,481	1,425			
South Korea	1,363	1,491	1,359	1,333	1,416	1,571	1,515	1,382			
Iceland	1,240	1,280	1,253	1,138	1,265	1,342	1,426	1,360			
Russian Federation	–	–	826	1,471	1,720	1,635	1,686	1,356			
Peru	400	499	517	685	980	870	1,120	1,342			
United Kingdom	962	1,122	1,147	1,037	1,190	1,207	1,315	1,278			
India	421	648	673	836	1,125	1,041	1,116	1,236			
France	931	926	955	858	910	993	1,003	1,101			
World	35,366	38,560	40,018	41,118	47,060	51,734	52,813	51,437			

Source: FAO, annual statistics on world trade in seafood products; compiled by the author.

Note: The value of imports is always higher than product value, because certain shipping-related expenses are included in imports, such as insurance, transportation, and other similar expenditures.

products each year, approximately 3.5 million tonnes of which are imported (US\$15.6 billion in 1997). Japan imports mainly high-value products, such as shrimp, salmon, tuna, snow crab, and lobster, which make a major contribution to the country's high trade deficit. The European Union, the second-largest trading bloc in terms of imports, consumes 13 million tonnes of seafood products each year, 7 million tonnes of which are imported (US\$18.1 billion in 1997). We should point out that a large percentage of the European Union's trade is among member countries. Denmark and the Netherlands are European hubs for the marketing of seafood products.

In Europe as a whole, France and Spain dominate in imports of seafood products, each valued at US\$3 billion in imports in recent years. Their markets are fairly different: Spain is also a major exporter of seafood products (ninth worldwide in 1997), and Spanish consumers prefer traditional, medium-value products, such as salted, smoked, and canned fish, while French consumers enjoy fresh and chilled seafood and precooked foods. Italian consumers are increasingly buying prepared and ready-to-serve products, and German consumers, although they have strong purchasing power, traditionally have little interest in high-end seafood products, preferring less-processed primary products for the time being, i.e., pelagic fish to supply Germany's large canning industry. Imports to the United Kingdom have remained steady at approximately 900,000 tonnes (US\$2 billion). The Netherlands, on the other hand, has a fairly modest domestic market but is a European trading hub for seafood products.

Leading Products on International Markets

In international trade, the level and nature of imports and exports depend in large part on the characteristics of the exporting and importing countries. For example, China has by far the highest level of aquaculture production in the world, but almost all of its production is consumed domestically. Iceland, on the other hand, exports almost all of its fisheries production, as does Canada, which benefits from its proximity to the United States, the world's largest market for fish. Products such as tilapia are traditionally consumed locally, but markets for imitation products are emerging, particularly in the United States, in response to the relative scarcity of groundfish such as cod. Furthermore, some countries with traditionally high food production have, with the help of foreign capital, turned to the intensive farming of species that only countries with strong economies and a high standard of living can generally afford. This is the case

with Thailand, Indonesia, Viet Nam, and Ecuador, countries that are putting all their efforts into large-scale shrimp farming. Others have adapted their management style and developed their technological expertise to produce a consistent, quality, affordable product for international markets, as Norway, Chile, and Canada have done with farmed salmon.

Because of all these factors, the structure of the world seafood industry has changed dramatically in the last ten years. Canned, salted, and other traditional products that once reigned supreme have been replaced on certain key markets by fish and fish products, molluscs, and crustaceans. It is no exaggeration to say that when we talk about a world market, we are basically talking about the market for shrimp, groundfish, tuna, salmon, small pelagic fish (sardines), and industrial products (fishmeal and fish oil). In terms of volume, the main product groups traded (with world-trade percentages in parentheses) are groundfish, particularly fillets (18 percent), shrimp (17 percent), tuna (9 percent), salmon (6.7 percent), cephalopods, mostly squid (4 percent), and small pelagic fish in-brine, smoked, or canned (4 percent). In 1997 nonfood products (fishmeal and fish oil mainly) represented 4.6 percent of the volume of seafood products traded internationally (see table 14).

The world trade structure takes on a different look when we examine product value instead of volume. For example, frozen crustacean products and by-products account for 38 percent of international trade. The expansion of markets for seafood such as lobster, crab, shrimp, and bivalves is particularly significant for eastern Canada, which has large and varied stocks of marine invertebrates and a recognized expertise in processing those species. Let us look then at which seafood product groups are the most heavily traded internationally and Canada's, more specifically eastern Canada's, position in that market.

Groundfish: More Substitutes for Traditional Products

Until recently, groundfish had long dominated international trade in seafood products. The reason for the change is in part the depletion of groundfish stocks but also the growing trade in molluscs and crustaceans as well as the increase in aquaculture, which produces mainly carp and other cichlids, shrimp, salmon, trout, and shellfish (mussels and oysters). Also important in this regard is the high unit value of processed fish products, which in the minds of consumers are still mass-produced. Markets are nervous about any increase in

Table 14
International Trade, Main Seafood Product Groups, 1999

Species and Products	Estimated Share of World Trade (%)
Groundfish	18.2
Fresh and frozen fillets	10.1
Fresh and frozen blocks	3.2
Flatfish, fresh and frozen	2.4
Other fresh fish	2.5
Shrimp (all types)	17.0
Tuna (all types)	9.2
Fresh and frozen tuna (including loin)	6.3
Canned tuna	2.9
Salmon	6.7
Fresh and frozen salmon	5.8
Canned salmon	0.9
Industrial marine products	4.6
Fishmeal	4.0
Fish oil	0.6
Cephalopods	4.0
Pelagic fish	4.0
Herring, anchovy, sardine, mackerel	2.8
Canned	1.5
Fresh and frozen	1.3
Fresh and frozen mackerel	1.2
Canned mackerel	0.4

Source: FAO, GLOBEFISH, "World Exports Fishery Product," 1999 (industrial estimates).

the price of groundfish fillets, for example, although an increase in the retail price of some seafood is not necessarily seen as negative. Today, groundfish account for 12 percent of seafood products traded internationally.⁴²

42. According to a presentation by Trond Sjøholt (GLOBEFISH) at the fisheries conference held in Copenhagen, 25 November 1998.

World groundfish catches fell from 11.5 million to 8.0 million tonnes between 1990 and 1996, with the sharpest drops being recorded for Pacific cod and Alaskan pollock. The trends are similar for flatfish (1.0 million tonnes landed in 1996 compared to 1.2 million tonnes in 1990). Despite moratoriums on Canada's East Coast, Atlantic cod catches have remained steady because of greater stock productivity in the Barents Sea. Exports of fresh and frozen cod fillets fell from 307,600 tonnes in 1990 to 231,600 tonnes in 1996, and groundfish exports from Iceland dropped from 121,000 tonnes in 1990 to 66,000 tonnes in 1997, the result of a decline in that country's landings. During that time, exports of salted and pickled groundfish increased, and in Norway alone, exports rose from 45,000 to 70,500 tonnes between 1990 and 1997.⁴³

Naturally, Canadian exports of fresh and frozen fish fillets decreased as a result of the moratoriums, from 91,500 tonnes in 1990 to 40,400 tonnes in 1995. And shipments of fish blocks plummeted even further, from 56,000 tonnes to 4,200 tonnes.⁴⁴ Exports did begin to recover in the mid-1990s, but it was due to imports of primary products. During that time, a large part of the world cod trade consisted of Russian exports of dressed and trimmed fish to Canada, Iceland, and Norway for further processing.⁴⁵

High-priced whitefish fillets are beginning to be replaced by less costly hoki fillets from New Zealand, which are gradually winning acceptance in Europe and the United States. Since 1995, hoki exports from New Zealand have benefited from the European Union's reduction in customs duties for a growing number of products exported to Europe. In the US market, farmed whitefish, mainly catfish but also tilapia, is increasingly replacing capture groundfish.

Shrimp

Of the many fish species sold internationally, shrimp has the highest value. World shrimp production has continued to grow, from 2.7 million tonnes in 1990 to 3.5 million tonnes in 1997. At 829,000 tonnes, China alone accounts for one-quarter (24 percent) of global

43. According to FAO, GLOBEFISH, *The World Market for Groundfish* 57 (November 1998).

44. Fisheries and Oceans Canada, international trade database: <http://www.ncr.dfo.ca/communic/statistics/trade/trade.htm>

45. We note the increased use of basic groundfish products by processors, which has resulted in a rise in imports of fully dressed fish (fresh and frozen) from 45,000 tonnes in 1990 to 127,000 tonnes in 1996 (from \$128 million to \$381 million): according to Department of Fisheries and Oceans statistics.

production, while Indonesia, Thailand, and India each report production varying from 300,000 to 350,000 tonnes. Intensive aquaculture is the main reason behind this expansion: today, 25 to 30 percent of world shrimp production comes from aquaculture. In 1997 production of tiger prawns, mainly from aquaculture farms, reached 608,000 tonnes, i.e., 17 percent of total shrimp production (both fisheries and aquaculture). Small Japanese shrimp (akiami) ranks second at 500,000 tonnes. Shrimp exports are relatively stable at approximately 1.2 million tonnes. Exports of prepared shrimp rose steadily from 1990 (115,300 tonnes with a value of US\$901 million) to 1996 (189,000 tonnes, with a value of US\$1.7 billion), and then fell sharply in 1997 (171,000 tonnes, with a value of US\$1.4 billion). The drop was caused by production declines in Thailand, where infections ravaged aquaculture farms. The recent rise of Ecuador — to third place in the world in 1997 — is worthy of mention: 56 percent of Ecuador's production, estimated at 110,000 tonnes in 1997, is sold to the United States. India also increased its production substantially, with exports climbing from 62,000 tonnes in 1990 to 105,500 tonnes in 1997.⁴⁶

Some northern countries, including Canada, are making an impact on international markets with exports of coldwater shrimp, mostly in the form of prepared products. Other such countries are Iceland (26,650 tonnes, with a value of US\$172 million), Denmark (19,300 tonnes, with a value of US\$170 million), and Norway (15,500 tonnes, with a value of US\$96 million). Canada exported just over 32,000 tonnes of shrimp in 1997, valued at US\$120 million. Shrimp exports passed the 40,000-tonne mark in 1990.

Herring Products

Herring belongs to the family of small pelagic fish, which also includes mackerel, pilchard, and anchovy — the top three species. Hovering around 20 million tonnes, world captures of small pelagic fish are relatively stable. Herring catches tend to fluctuate, increasing from 2.0 million to 3.3 million tonnes between 1990 and 1997. Norway is the top producer of herring, followed by the former USSR, Iceland, and Canada. Sardine catches, however, are falling off, particularly in Peru and Japan, where ocean warming caused by El Niño has had a disastrous impact on the sardine and anchovy fisheries. As a result, world production of canned sardines and pilchards fell

46. Information from FAO, GLOBEFISH, "Production and Trade, Shrimp Analysis — 1999" among other sources.

from 560,000 to 340,000 tonnes between 1990 and 1997. Morocco is the top sardine producer (56,000 tonnes), followed by Peru (55,000 tonnes). The main markets for canned sardines and herring are the European Union (42,000 tonnes were imported in 1997) and the United States (20,000 tonnes).⁴⁷

There is what amounts to a tradition in New Brunswick of processing herring and sardines. The industry focuses mainly on three types of products: dried and smoked herring in the southeastern part of the province, canned herring and sardines in the Bay of Fundy area, and herring roe, produced mainly in the northeast from fall herring. These three segments are export-oriented. The canned sardine and small herring industry has steadily increased its sales to the United States, rising from \$15 million in 1990 to nearly \$30 million in 1999. The same is true for exports of small herring to the US market, which have jumped from \$9 million to \$17 million over the last ten years.⁴⁸

The main target of the herring roe industry is Japan, the only major buyer. Volumes vary according to the quality of the herring and the roe, and the price Japanese consumers are willing to pay. Exports rose from \$30 million to \$37.6 million between 1995 and 1996, fell back to approximately \$15 million in 1998, and rose again to \$17 million in 1999. Over 90 percent of Canadian exports of herring roe go to Japan.

Exports of smoked herring, a speciality of producers in southeastern New Brunswick, were valued at \$33 million in 1999, an 18 percent increase over 1995. The main markets are the Dominican Republic and Haiti, as well as the United States, where there are large Latin American communities.

Salmon

Salmon, particularly farmed salmon, is a popular commodity in international trade. World salmon production (both the fisheries and aquaculture) reached 1.1 million tonnes in 1990 and rose to 1.6 million tonnes in 1997 — a result of aquacultural production, particularly that of Atlantic salmon, which accounted for 561,000 tonnes or 38 percent of world salmon production. Although third in 1990, Atlantic salmon subsequently rose to first place among salmon species, ahead of chum salmon (348,000 tonnes), pink salmon (319,000 tonnes), and sockeye salmon (132,000 tonnes).

47. See FAO, GLOBEFISH, *The World Market for Herring* 63 (March 2000).

48. Based on data from STRATEGIS, Industry Canada.

The farming of Atlantic salmon has continued to grow in recent years, with world production reaching 865,000 tonnes in 2000. A list of the main producing countries is provided in table 15.

With over seven hundred aquaculture sites, Norway is by far the world's top salmon producer: 330,000 tonnes in 1997, a 78 percent increase over 1990. That growth has continued, with an estimated production for 2000 of 445,000 tonnes.⁴⁹ After Norway, where almost all (96 percent) of the salmon comes from aquaculture, Japan ranks second with 312,000 tonnes, mainly from fishing. Fishing also accounts for most of the salmon produced in the former USSR — 220,000 tonnes. The United States is also a major producer of salmon, mainly from the Pacific coast fisheries, although its production fell 22 percent between 1990 and 1997 to 220,000 tonnes. Other major producers include Chile (175,000 tonnes, mostly from salmon farms) and Great Britain (120,000 tonnes). Chilean producers who have the lowest production costs, have increased their exports to Japan. Canada is a major supplier of both wild (capture) and farmed salmon (68,000 tonnes). In British Columbia, however, there has been a marked decline in the landings of capture salmon, from 96,000 tonnes in 1990 to 30,000 tonnes in 1998.

Salmon is marketed in four forms: fresh and chilled, frozen, canned, and smoked. As well, of course, there are various products that consist partially or entirely of salmon. Fresh salmon shipments are made up mainly of Atlantic salmon, world exports of which rose from 172,000 tonnes (US\$988 million) in 1990 to 463,000 tonnes (US\$1.8 billion) in 1997. At 205,000 tonnes (US\$764 million) or 44 percent of world exports of fresh salmon, Norway is becoming a leading supplier of the product. In fact, Norway's potential for salmon production is enormous. Generally speaking, the only real constraint on the expansion of salmon production is market price. In 1992 Canada climbed to second place among world salmon producers, and in 1997 Canadian exports of fresh salmon approached 46,000 tonnes (US\$248 million) or 10 percent of world exports, most of it going to the United States. Denmark exports more fresh salmon than Canada, over 68,000 tonnes in 1997, but mostly to other European Union countries. Fresh salmon exports from two other suppliers, Chile and the United Kingdom, have risen dramatically, from 8,000 to 25,000 tonnes each between 1990 and 1997.⁵⁰

49. FIS-Market Reports, *Farmed Atlantic Salmon Production and Market Report* (June 2000).

50. FAO, GLOBEFISH, "Production and Trade, Salmon Analysis — 1999" and Commodity Update, Salmon, September 2000.

Table 15
Estimated Production of Farmed Atlantic Salmon,
by Country, 1998–2000

Country	Production (in thousands of tonnes)			Change, 1998–2000	
	1998	1999	2000	(in thousands of tonnes)	Percentage Change
Norway	343	410	445	102	29.7
United Kingdom	112	120	120	8	7.0
Chile	102	104	130	28	27.5
Canada	58	62	68	10	17.2
Faroe Islands	19	36	40	21	110.5
United States	21	23	24	3	14.3
Ireland	17	19	20	3	17.6
Other	19	18	18	-1	-5.3
Total world	691	792	865	174	25.2

Source: FIS-Market Reports, Farmed Atlantic Salmon Production and Market Report (June 2000).

Exports of frozen salmon have declined by 10 percent since 1990, falling to 211,000 tonnes (US\$690 million) as a result of the overharvesting of capture stocks. The United States is still the main supplier of frozen salmon, accounting for one-third of world exports down from 59 percent in 1990. Chile, on the other hand, exports just over 50,000 tonnes (US\$176 million) of frozen salmon, although we should point out that it exported only 11,000 tonnes of the product in 1990. Chilean producers are increasingly targeting the US market, where they have built a solid reputation. The third-largest supplier of frozen salmon is Norway; however, that country's exports have fallen by 36 percent since 1990. Most of its 28,000 tonnes is exported to the European market, mainly to Denmark and France.

International trade in canned salmon fluctuated significantly during the 1990s, a reflection of the ups and downs in the harvesting of wild salmon, which is the product of choice for canning. World production is approximately 100,000 tonnes, 70,000 tonnes of which is produced in the United States. The former USSR is still the second-largest supplier, although its production fell from 34,000 to 13,600 tonnes between 1990 and 1997. The situation is similar in Canada, which produced 30,000 tonnes in 1998 compared to 97,000 tonnes in 1990.

World exports of smoked salmon have shot up in recent years, more than doubling since 1990, from 13,000 tonnes to almost 29,000 tonnes, and with a commercial value of US\$324 million in 1997. Denmark is by far the leading supplier, producing approximately 17,000 tonnes or 58 percent of world smoked salmon exports. The United Kingdom, Norway, Chile, and France are also major exporters.

Lobster

World landings of all species of lobster experienced strong growth during the 1980s and remained fairly stable in the 1990s, totalling 162,000 tonnes in 1997. *Homarus americanus* is the most abundant lobster species, with world catches totalling 77,600 tonnes, a drop of 3 percent since 1990, while spiny or rock lobster ranks second with 70,000 tonnes. European lobster is also harvested.⁵¹

Canada has long been the top producer-supplier of lobster, exclusively of the *americanus* species. Landings increased markedly in all areas of the Maritimes until the early 1990s, when supply began gradually falling off (from 48,500 tonnes in 1991 to 39,300 tonnes in 1997). Nevertheless, Canada is still the world's top lobster supplier, followed by the United States, where Maine and Massachusetts account for most of the catch. Lobster catches in the United States have increased substantially in recent years, and in 1997 the US surpassed Canada in the volume of lobster landings.

Australia and New Zealand are also major lobster producers, serving mainly the Japanese market. The species they harvest are all similar to the spiny or rock lobster family. Australian producers were the first to crack the US market with frozen lobster tails.

On world markets, Canadian producers compete mainly with producers of spiny or rock lobster in the Caribbean, the Baja-California coast, and South America's Atlantic coast; the principal countries concerned are Cuba, Brazil, the Bahamas, and some Central American countries. US landings are steady at approximately 3,000 tonnes annually. The value of catches of the European lobster, *Homarus gammarus*, has been relatively low in recent years. France, England (Scottish lobster is particularly popular in England), Ireland, and Denmark are the main producers. However, because the supplies of this species fall far short of the demand, its price is high. Consumers

51. FAO, GLOBEFISH, *The World Market for Lobster* 36 (June 1995).

in the European Union prefer the taste and quality of its meat, although *americanus* lobster is gaining acceptance.

Many people may be surprised to learn that eastern Canada does not have a monopoly on international lobster markets. In fact, numerous other suppliers also ship to the most lucrative markets, offering various kinds of lobster, as well as processed, chilled, and frozen products aimed at a variety of market niches (from midrange to high-end). Despite the increasing competition with Canadian lobster, however, most European imports of live and chilled lobster (including whole frozen lobster) come first from Canada and then from the United States. US producers are beginning to increase their shipments to the European market.

World lobster exports consist of two product families: lobster shipped fresh (live or cooked and chilled whole) and various frozen products, such as lobster cold pack, lobster pieces (tails and claws), and frozen lobster meat. Exports of live and chilled lobster have soared in recent years, increasing from 37,500 tonnes (US\$380 million) in 1990 to 72,300 tonnes (US\$900 million) in 1997. Canada is the top exporter of fresh/live lobster with shipments of 20,600 tonnes (US\$215 million), followed by the United States, which exported 19,700 tonnes in 1997, valued at US\$182 million.⁵² American dealers are increasingly shipping lobster abroad, particularly to Europe.

In the other category, processed lobster products, international exports remained stable during the 1990s at approximately 52,000 tonnes. The total value of exports was US\$707 million in 1997. Again, Canada was the main exporter with 9,800 tonnes (US\$140 million) and even succeeded in increasing its market share. Producers in New Brunswick and more recently Prince Edward Island are mainly responsible for Canada's performance, although they have had to rely on substantial imports of lobster from the US to supply the main plants, which were suffering from a shortage of supply. Because of the high price of spiny or rock lobster, however, Australia recorded the highest value of exports for processed lobster products, i.e., US\$145 million.

The fact remains that international trade in lobster and lobster products is largely dominated by the United States. The second-largest consumer market for Canadian producers is the European Union, led by France (which imported two-thirds of Canadian live/chilled lobster shipments in 1998) and followed by Germany, Belgium, the

52. FAO, GLOBEFISH, "Production and Trade, Lobster Analysis — 1999" and Commodity Update, Lobster, November 1999.

United Kingdom, and the Netherlands. At present, Japan is not a major market for Canadian producers, who ship equal volumes to the Japanese and Belgian markets, i.e., approximately \$25 million. Japan is a major market for spiny or rock lobster and buys between 70 and 75 percent of Australian and New Zealand production (22,000 tonnes in 1997).

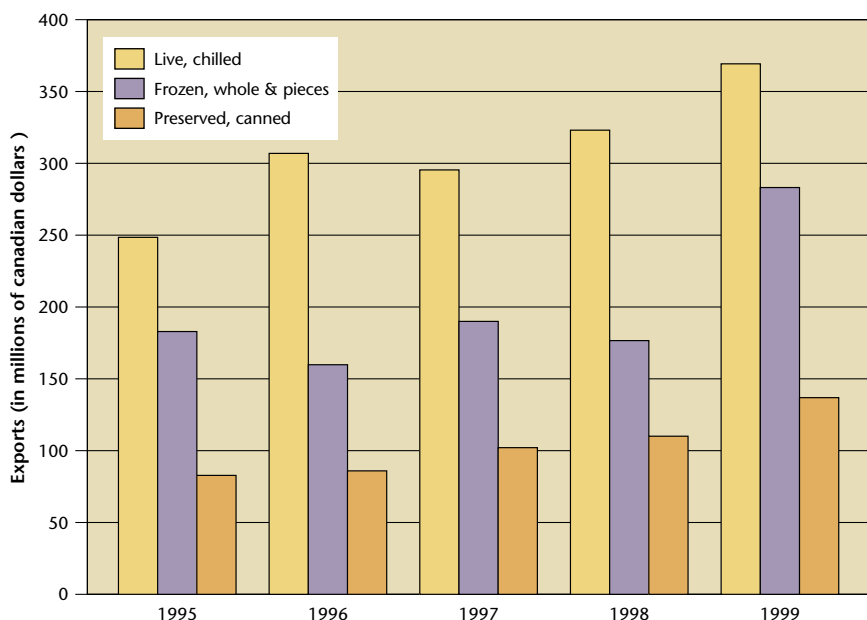
Some Asian countries, such as Hong Kong and Singapore, import varying quantities of lobster. In 1997 the value of Hong Kong's imports of live and chilled lobster (US\$158 million) ranked it second overall behind the United States. Nova Scotia's lobster producers recently entered this market, and in 1995 and 1996 their sales amounted to Can.\$15 million. Attempts have also been made to diversify products sold on the US market, specifically targeting the southern states. As a result, live lobster exports from Nova Scotia to Florida and California climbed from \$5.5 million in 1990 to \$12.6 million in 1998. A new market has also opened up in Nevada, which bought \$4 million worth of products from the area in 1999.⁵³

Another interesting aspect of the lobster market is consumer interest in prepared and canned lobster products. Internationally, the supply of these products has grown steadily for several years, from only 700 tonnes in 1988 to 8,800 tonnes in 1997. Since the mid-1990s demand has been particularly high in the United States. Canadian exports of prepared lobster rose from \$83 million in 1995 to \$137 million in 1999, an increase of 65 percent. This product category has outstripped other lobster products in sales growth: for fresh and live lobster, sales increased by 48 percent, for frozen lobster by 55 percent. Figure 8 illustrates these trends.

Although Canada appears to be mainly a major producer-exporter, it is also a major importer. Canadian imports of lobster reached \$190 million in 1998, \$180 million of which was for live lobster. Almost all those imports, which were from New England, went to New Brunswick to supply the lobster-processing industry. The Canadian consumer market for seafood products is fairly disorganized, and wholesale buyers in central Canada often buy from US brokers, who sometimes resell products from Atlantic Canada. We will look at this feature of the Canadian market later.

53. Figures from STRATEGIS, Industry Canada.

Figure 8
Changes in Lobster Exports from Eastern Canada,
by Product Type, 1995–99



Source: STRATEGIS, Industry Canada; compiled by the author.

Crab

Another lucrative species that undoubtedly helps maintain the vitality of Canada's fisheries is crab. There are several types of crab, the most important in terms of production being swimming crab, rock crab, blue crab, king crab, and snow crab. Canada produces king crab and snow crab, the production cycles of which tend to alternate: declines in catches on the Pacific coast, where king crab is fished, often correspond to an increase in catches in Atlantic Canada, where snow crab is the dominant species, and vice versa. This phenomenon is important and has a direct impact on markets, particularly in Japan, where all types of crab are popular.

World crab production, all types combined, grew considerably in the last decade, from 850,000 tonnes in the early 1990s to 1,200,000 tonnes in 1997. With 86,800 tonnes harvested in 1998, Canada is only a modest supplier, although landings have more than doubled since 1992. China alone produces 340,000 tonnes of crab (160,000 from aquaculture), four times Canada's production. The United States

produces 195,000 tonnes and Viet Nam 187,000 tonnes. The top crab importer is Japan, with 124,000 tonnes (US\$901 million) in 1997. The US market also imports increasing volumes (32,000 tonnes in 1997, with an estimated commercial value of US\$246 million).⁵⁴

Nonetheless, Canada is the top supplier of crab to world markets, with shipments of almost 36,000 tonnes in 1997 (US\$224 million). Canadian production has increased with the expansion of the snow crab fishery in Newfoundland, where landings rose from 11,000 tonnes in 1990 to close to 70,000 tonnes in 1999.⁵⁵ The United States exports just over 20,000 tonnes of crab (US\$114 million). World exports of processed and canned crab fell from 30,000 to 23,000 tonnes between 1993 and 1997, mainly because of a drop in production in Thailand, which was replaced by Canada as the top exporter of canned crab. However, Canada's exports of canned crab are only modest (4,400 tonnes in 1997, with a value of US\$47 million). The former USSR is also a major supplier, especially to the European market, where the Chatka brand is popular with consumers.

Bivalves

Bivalves, or shellfish, include various species of invertebrates, the best known of which are sea scallops, oysters, mussels, and clams. These products are generally consumed fresh and near the producing areas. However, a number of other products such as mussels are becoming increasingly popular internationally. Fifteen percent of world mussel production is traded on international seafood markets, i.e., 200,000 tonnes or twenty-five times Canada's production, which was 8,200 tonnes in 1998. Over three-quarters or 1.3 million tonnes of world mussel production is farmed. China produces 400,000 tonnes of farmed bivalves, Spain 190,000 tonnes, and Italy 124,000 tonnes. The European Union is still the largest mussel market, with imports of 161,000 tonnes in 1997 (the main buyers are France, Italy, and Belgium) supplied by the Netherlands (53,000 tonnes), New Zealand (25,000 tonnes), and Spain (23,000 tonnes). Canada's exports have held steady at between 5,000 and 6,000 tonnes, for a value of \$13 million to \$15 million. The main source of Canadian production is Prince Edward Island and a large share of its production is sold in the Maritimes and central Canada.

54. FAO, GLOBEFISH, "Production and Trade, Crab Analysis — 1999" and Commodity Update, Crab, November 2000.

55. Government of Newfoundland and Labrador, *The 1999 Newfoundland and Labrador Seafood Industry — Year in Review*, 2000.

Clams have only recently been marketed internationally, with just 140,000 tonnes (5 percent) of the 2.8 million tonnes produced finding their way onto world markets. China dominates this sector with over 60 percent of world production, followed by the United States (13 percent), Japan, Thailand, and Malaysia. Malaysia's clam production increased from 40,000 tonnes in 1990 to 84,000 tonnes in 1997. Of Canada's production of 32,000 tonnes, which is harvested mainly in Newfoundland and Nova Scotia, producers have been exporting approximately 7,500 tonnes annually in recent years, for a value of \$60 million or more. China, South Korea, and North Korea are the main suppliers of international markets, which accounted for 140,000 tonnes in 1997.⁵⁶

Another seafood product that is in high demand on international markets is oysters. From 1991 to 1997, world oyster production rose from 1.4 million to 3.3 million tonnes. China is mainly responsible for this increase and alone accounts for 71 percent of world production. South Korea and Japan are also major suppliers, each producing approximately 220,000 tonnes. Officially, Canada produces only about 7,000 tonnes of oysters and sells 1,200 to 1,500 tonnes abroad, which generates revenues of approximately \$6 million. World exports are approximately 24,000 tonnes, with South Korea exporting 6,800 tonnes (US\$45 million) and France 4,800 tonnes (\$14 million). The Netherlands and New Zealand are becoming more active in international trade, while Canada is fairly static. Japan is the largest market for oysters, followed by Italy, Korea, and the United States.

Although scallops top the list of shellfish exports in eastern Canada, Canada as a whole accounts for only 3 percent of world scallop production, which was estimated at 1.7 million tonnes in 1997. While Canada produced only 147,000 tonnes of scallops in 1990, China increased its production to 1 million tonnes in 1997; in so doing it moved ahead of Japan (500,000 tonnes), the United States (65,000 tonnes), and Canada (51,000 tonnes). World demand for scallops continues to grow: exports have risen from 40,000 tonnes in 1991 to 75,000 tonnes in 1997, with a commercial value of US\$558 million. The main market for scallops is the United States, where demand was particularly strong during the 1990s. The United States imports over 27,000 tonnes (US\$243 million) of scallops, followed by France, which imports close to 14,000 tonnes (\$121 million). Canada

56. FAO, GLOBEFISH, "Production and Trade, Bivalves Analysis — 1999" and Commodity Update, Bivalves, July 1999.

exports a steady 6,000 to 7,000 tonnes of scallops per year, with a commercial value of approximately Can.\$130 million. Those exports could easily rise, were it not for the higher demand in Canada together with a drop in stock productivity in Nova Scotia's Bay of Fundy.

This brief overview of global imports and exports of seafood products shows that Canada is both a major producer and a secondary supplier in this sector and is proof of the increasing globalization of the seafood products trade. The data also show the growing market for seafood products, two of which, tiger prawns and Atlantic salmon, had a major impact on the direction of the international trade in seafood products during the 1990s.

Changes in Import-Export Flow in Canada and Eastern Canada

Canadian fisheries production in recent years is estimated at between \$3.5 billion and \$4.0 billion, and some 88 to 90 percent of that is exported to approximately one hundred countries. In 1998 Canada exported 497,500 tonnes of fish products, valued at \$3.2 billion, and \$3.8 billion worth of products in 1999, a 22 percent increase over 1995. On the other hand, the Canadian market (including processing plants) imported nearly 450,000 tonnes of fish and other seafood products in 1998, valued at approximately \$1.8 billion. Imports of seafood products for domestic consumption and industrial purposes also rose sharply, and their value increased by almost 40 percent between 1995 and 1999.

The three main markets for exports of Canadian seafood products are the United States (68.6 percent), Japan (12.8 percent), and the European Union (9.4 percent). Canada also shipped seafood products to newly industrialized countries in Southeast Asia (Taiwan, South Korea, Hong Kong, and Singapore) (2.7 percent in 1999) and to the Caribbean (1.7 percent).

Eastern Canada has the largest commercial fishery in the country and accounted for 78 percent of Canadian landings in 1998. That percentage fluctuated wildly throughout the 1990s, mainly as a result of the groundfish moratorium. As well, the value of production is highest in eastern Canada, a lead that is strengthening. The region accounted for two-thirds (66.7 percent) of the value of commercial fisheries production in Canada in 1990, 77 percent in 1995 (despite the groundfish crisis), and 82 percent in 1998. Following the major

decline in groundfish stocks, the region's main processing plants restructured and diversified their supply, relying more extensively on imports of basic products. They also sought to diversify their production (focusing on a wider product range and using underutilized species) while targeting further value-added processing.

Canada's industrial sector as a whole has taken a number of innovative approaches to competing on world markets. On the East Coast in particular, the fisheries were fairly successful in adapting to the new realities of the 1990s by, for example, forming joint ventures, developing technology exchanges, and signing marketing agreements with companies in Japan, the United States, and Europe. Those agreements are proof of the sector's efforts to adjust to the rules of the new economy. In the area of product technology, processing, and postprocessing, cooperative initiatives were implemented to enhance the competitiveness of businesses and to ensure resource conservation. For example, Newfoundland and Nova Scotia obtained 100,000 tonnes of raw materials from foreign suppliers and then successfully marketed them. Indeed, the use of new, selective import strategies to make regional production facilities more cost-effective is enhancing the image of the Canadian industry and resulting in the development of new expertise.

Processing: Diversification on Canada's East Coast

The seafood industry, like the agri-food industry, is noted for having a particularly wide range of products available on the market. That diversity is in part a result of changing demand and in part due to the large number of aquatic species, several of which are suitable for processing into various products and by-products. We should also point out that suppliers of basic products (e.g., fresh and frozen fish, whole or slightly processed products, and crustacean meat) deal with secondary and tertiary processors. Consequently, a product on a supermarket shelf may have begun life by being sold by a fisher to a dealer, who may then have sold it to a processing plant for basic trimming or meat extraction, after which it may have been bought by a wholesaler or processing plant for use in a product that was further processed.

Regionally, the industry's sources of supply fall into three categories: local supply (landings) provided by fishers and chartered vessels, regional and interprovincial supply, and foreign imports. Given the scarcity of resources, a growing number of processors are increasingly

buying from foreign supplies, a trend that is confirmed by import data. Processors are also turning more to the aquaculture industry, which is growing by leaps and bounds in many maritime areas. In a number of instances, processors have taken over certain segments of the aquaculture industry (e.g., Connors Brothers in the case of farmed salmon) or formed partnerships with growers to ensure a supply of raw materials (crustaceans and shellfish).

In eastern Canada, DFO lists eight hundred operations that produce over three hundred different products and by-products, and at least half of them export their products (see the list in Appendix C).⁵⁷ Most companies specialize in the industrial processing of seafood products, mainly trimming and freezing/deep-freezing. Secondary processing operations are less common, to say nothing of tertiary processing and beyond, i.e., value-added processing in nonfood sectors.

Determining the structural profile of Atlantic Canada's processing sector as a whole is a difficult proposition. Even DFO has trouble producing a comprehensive list of products the plants are producing. At best, such a list can often be provided only every few years.⁵⁸ Why? No doubt because the industry is fragmented and geographically scattered, and even more because it covers an incredible variety of activities. It is also a seasonal sector, where the accuracy of some information (number of workers, resource purchase price, product selling price, investment, etc.) is often doubtful. Apart from a private survey,⁵⁹ there are only two official sources of plant-production information: Statistics Canada's *Annual Survey of Manufactures* and annual plant production reports prepared by Fisheries and Oceans Canada. And they each present the data on this industry differently: Statistics Canada looks at financial data on production (number of employees, hours worked, wages, costs of raw materials, value of shipments, value

57. The Department of Foreign Affairs reports 402 businesses in western Canada that export fish and seafood products: 216 of them are in Nova Scotia, 56 in New Brunswick, 53 in Newfoundland, 46 in Quebec, and 30 in Prince Edward Island. See the Directory of Canadian Fish and Shellfish Exporters, Market Intelligence Division, InfoCentre Data Base, Ottawa, 1997.

58. The most recent production reports available from DFO, dated the summer of 2000, were for the Gulf region (1998) and Scotia-Fundy (1996), which are part of the Maritimes administrative region. Reports for Quebec are available for 1998. It was impossible, however, to obtain a similar profile for Newfoundland from either the Department of Fisheries and Aquaculture or the Department of Fisheries and Oceans.

59. Such as the study conducted in 1992-93 by the firm Coopers and Lybrand for the Cashin Commission. See Supply and Services Canada, *The Fish Processing Sector in Atlantic Canada: Industry Trends and Dynamics* (Ottawa, June 1993).

added, etc.), while DFO provides detailed data on production volumes and value by species and by product category. Using both sources, together with Industry Canada import-export data, we can establish a relatively complete overall provincial profile, which is what we present in the following pages.

Statistics Canada defines the seafood products industry (SIC 1020) as establishments primarily engaged in eviscerating, skinning, filleting, breaching, precooking, blanching, or otherwise processing fish, including molluscs, crustaceans, fish roe, or other marine animals and plants, as well as establishments primarily engaged in producing fish oil and fishmeal.⁶⁰ That definition is inadequate, however, as it fails to take into account the extremely diverse nature of the processing sector on Canada's East Coast. As we pointed out, there are at least eight hundred businesses involved in buying/selling, preparing, packaging, processing, and canning fish and seafood, half of which are exporters. And not all of them necessarily process fish (see Appendix C).

Although in some areas the industry is dominated by large vertically integrated producers — as is the case in Newfoundland, Nova Scotia, and southwestern New Brunswick — there are many medium-sized and small producers of various types. From ordinary buyer-wholesalers, cottage-industry producers of dried and smoked fish, and producers of prepared foods to processors-retailers, what is referred to as the industry's secondary segment covers a full range of operations. These processors use approximately forty commercial species to make several hundred products and by-products, a number that will inevitably grow not only because previously ignored species are being harvested but mainly because the aquaculture industry is growing.

With that in mind, we can prepare a production profile by examining the numerous products from two perspectives: first, major product categories (fresh and chilled, frozen, salted, in-brine, and canned products) and, second, main species groups (groundfish, pelagic fish, molluscs, and crustaceans) and dominant groups by species. We allow for a more detailed description of the status of regional production. Table 16 provides an overall profile based on product category and arranged by DFO administrative region. The data we use are detailed and relatively current — except for Newfoundland, which provides data by major species group only. We also examine the production

60. Statistics Canada and Industry Canada, *Industry Overview, Fish Products Industry (SIC 1021)*; strategis.ic.gc.ca/.

Table 16
Industry Profile of Fish and Seafood Production in Eastern Canada,
by Product Category and by Administrative Region

Type of Products	Scotia-Fundy ^a	Gulf ^b	Quebec ^c
Fresh and chilled	\$282,000,000	\$138,000,000	\$80,000,000
Number of species listed (number of products)	47 species (128 prod.)	36 species (60 prod.)	16 species (28 prod.)
Frozen	\$216,000,000	\$332,000,000	\$122,000,000
Number of species listed (number of products)	35 species (144 prod.)	34 species (118 prod.)	15 species (24 prod.)
Salted, dried, and in-brine	\$41,000,000	\$24,000,000	\$10,000,000
Number of species listed (number of products)	10 species (26 prod.)	8 species (32 prod.)	1 species (3 prod.)
Canned	\$62,000,000	\$1,000,000	–
Number of species listed (number of products)	1 species (10 prod.)	4 species (5 prod.)	–
Other	\$10,000,000	\$2,000,000	\$49,000,000
Number of species listed (number of products)	–	6 species (3 prod.)	12 species (>12 prod.)
Total production	\$611,000,000	\$497,000,000	\$261,000,000
Number of species listed (number of products)	Approx. 50 species (> 300 prod.)	Approx. 40 species (>200 prod.)	Approx. 20 species (< 100 prod.)

Sources: Compiled by the author from the following sources: plant production reports; Department of Fisheries and Oceans (Moncton, Halifax); *Annual Statistical Review: Marine Fisheries in Québec*, various years; Government of Newfoundland and Labrador, *The 1998 Newfoundland & Labrador Seafood Industry — Year in Review*, 1999.

Note: We were unable to obtain a similar product list for Newfoundland. We know, however, that in 1998 production in that province was as follows: groundfish (\$296 million), pelagic fish (\$42 million), molluscs and crustaceans (\$392 million), and seals (estimated at \$25 million), for a total production of \$755 million.

^a Scotia-Fundy, 1996 (southern and southwestern Nova Scotia and southern New Brunswick).

^b Gulf Region, 1998 (the east coast of New Brunswick, Prince Edward Island, and northern Nova Scotia).

^c Laurentian Region, 1998 (Quebec).

in those regions, taking into account the types of products and the species group to which they belong.

In addition to shedding light on specific regional characteristics, these data indicate a particularly wide range of products in each region, with half or more of the production value being made up of frozen products that in most cases have undergone some degree of processing. However, Nova Scotia, specifically the Scotia-Fundy sector, departs somewhat from the general model: fresh and chilled products predominate there and represent nearly half the value of plant production. Except for some occasional minor preparation (evisceration, washing, and cooking) these products are unprocessed; they include live lobster, whole fish, farmed salmon, mussels, and oysters, among others. Approximately 30 percent of production is sold fresh in the Gulf and Quebec regions. We have no Newfoundland data for this category, but there is every reason to believe that fresh products account for a much smaller percentage of production in Newfoundland because of the province's remote geographic location and the limited size of its domestic market, a hypothesis that is confirmed by an examination of export data.

In Scotia-Fundy, although frozen products rank second, there is substantial production of canned and other types of products, particularly salted and in-brine products. Production is less diversified in the other regions, although the number of species harvested and the number of products and by-products made from those species are particularly high. Scotia-Fundy places first in product diversification, followed by the Gulf region, Newfoundland (based on the number of species harvested and the list of import-export products), and finally Quebec, which has a less-diversified profile.

Overall, half of plant production, both volume and value, is made up of frozen products that are astonishingly diverse for most of the species. Frozen products include products in their original state (whole, not shelled), packaged and slightly processed products, and higher value-added products. The category comprising salted, smoked, and in-brine products represents a modest percentage of production (5 to 7 percent), but it is still fairly high in the Scotia-Fundy, Quebec, and Gulf regions. These are traditional regional products, found mainly in Nova Scotia (groundfish), the east coast of New Brunswick (pelagic fish, including herring and some groundfish production), and Quebec (salted and dried groundfish). A large number of small dealers/producers in several other regions used to produce traditional dried fish, but it is now left to established producers in the

sectors mentioned. Production of canned goods is even more concentrated, mostly in southwestern New Brunswick. A single company, Connors Brothers, produces canned sardines and is a world leader in that sector. Processing plants prepare other kinds of products such as fish oil, fishmeal, and some nonfood products. We will look at those products in more detail in our analysis of import-export flows using complementary and more recent data.

According to DFO, regional production in Scotia-Fundy consists of over 300 products: 128 fresh, 144 frozen, 26 salted and in-brine, and approximately 10 canned. The wide variety of products can be explained by the unusually large number of producers in the region and by the availability of so many species (approximately fifty). In the Gulf region, DFO lists over 200 products made from approximately 40 species: approximately 60 fresh, 118 frozen, 32 salted and in-brine, and 5 canned, as well as fish oil and fishmeal.⁶¹ Production is just as diversified in Newfoundland, but in Quebec there are fewer products because raw materials are limited.

Each of the five categories uses different species from three main groups: groundfish, pelagic fish, and crustaceans and shellfish (molluscs). In Scotia-Fundy, for example, those three groups generate 155, 94, and 49 products and by-products respectively. Gulf region producers generate approximately 50 products from groundfish and 80 products from each of the other two species groups.

As we might guess, most production, regardless of the province, is from a small number of key species; the same is true for products and by-products. In the Gulf region, those key species are lobster (\$310 million in products in 1998, including \$90 million in fresh products), snow crab (\$60 million, mostly in frozen products), herring (\$31 million, two-thirds of which are pickled products, as well as \$9 million in herring roe and \$2 million in fishmeal), mussels (\$20 million in fresh products), rock crab (\$16 million), peeled shrimp (\$11 million), groundfish products (\$9 million), clams and quahogs (\$8 million), mackerel (\$6 million), smelt (\$5 million), and scallop meat (\$4 million).⁶² There is greater diversity in the Scotia-Fundy region, where the main production for 1996 was as follows: groundfish (\$204 million, half of that in frozen products, mainly fillets, \$73 million in fresh

61. According to DFO annual reports on plant production.

62. We note that the value of export products exceeds the production value as reported by processing companies to Fisheries and Oceans (annual DFO plant production reports). Since it appears that data reported by processors are underestimated overall, it is more appropriate to use the export figures.

and chilled products, and \$24 million in salted and pickled products), lobster (\$140 million, mainly fresh), herring (\$95 million, two-thirds of it canned), scallop meat (\$80 million, half fresh and half frozen), shrimp (\$37 million), and so on. It should be noted that salmon production amounted to only \$5 million in 1996 because of contamination problems, but it exceeded \$100 million in subsequent years.

In Quebec, the industry profile is a bit different because of the proximity of large urban markets and access to the southern Ontario market. Some companies with good market connections have tried to create a niche market for seafood products, and as a result there are a number of processing plants in urban areas, several of which have turned to value-added production. Those plants do not necessarily buy from regional suppliers (fishers or suppliers in the area) but import from abroad through trade channels they have established.

In terms of leading products, Quebec processors have the highest snow crab production (\$61 million in 1998), mainly frozen sections (claws and legs, not shelled) and fresh and chilled products. Shrimp products rank second with \$48 million in production, followed by lobster products (\$35 million, shipped mainly fresh or live) and groundfish products (\$22 million), half of which is traditional Gaspé-cured salt cod. As well, some additional products are made from pelagic fish (\$9 million), scallops (\$6 million), and various shellfish (\$11 million).

Trade Flow in Eastern Canada

Eastern Canada's fish industry is mostly an export industry. In the four Atlantic provinces, fisheries exports are second only to exports of refined petroleum products. The percentage of production (from the fisheries, aquaculture, and the processing plants) that is exported varies from province to province and from year to year, based on the type of product. We do know, however, that between 90 and 95 percent of the value of production is shipped to international markets. The percentage of production exported is highest in Newfoundland and the Maritimes as a result of their limited provincial markets and their fairly restricted access to the central Canadian market. In Quebec, the fishing and seafood-processing industry successfully exports a substantial percentage (between 20 and 30 percent) of their production.

An interesting aspect of the trade flow in Atlantic Canada is without a doubt the sharp increase in imports in recent years. As we

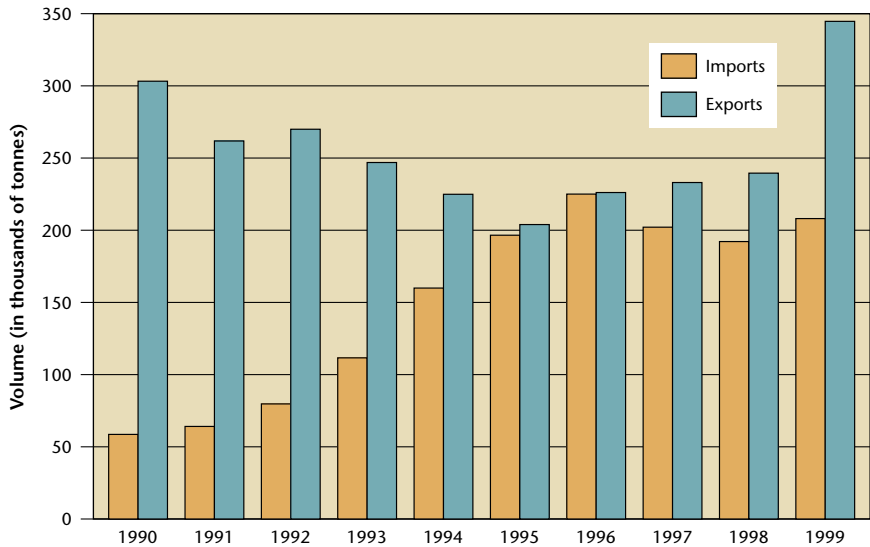
pointed out earlier, because of the impact of the groundfish moratorium, processors have had to turn to other species or obtain their supply from abroad. Imports of groundfish, particularly cod and pollock, rose from approximately 25,000 tonnes before the moratorium to over 82,000 tonnes in 1998. Import and export trends for all species and products are clearly illustrated in figures 9 and 10.

Although the volumes imported in 1990 represented only one-fifth of exported volumes, imports and exports were almost identical in 1996. Imports have fallen slightly since then but have remained very high. In 1990 the value of imports was only 10 percent of the total value of exports, compared to 36 percent in 1996 and 31 percent in 1999. The main products imported are, of course, groundfish (Atlantic cod from the Barents Sea as well as Pacific cod and Alaskan pollock), followed by shrimp (Thailand), mollusc meat (Asia), meal and other feed for farmed fish (South America), and lobster (Maine and Massachusetts).

The main supplier to processors in the region is the United States, which in recent years has accounted for between 35 and 38 percent of the value of imports. The largest volume of imports from the US goes to lobster producers in New Brunswick, who spend over \$100 million each year on lobster from Maine and the neighbouring states. Shipments of groundfish from Alaska also contribute to the high level of US imports to eastern Canadian provinces. After the US, the maritime countries of Eastern Europe (the former USSR and Baltic countries) are the main sources of imports for processors in Atlantic Canada and Quebec and are the top suppliers of groundfish products imported for further processing and resale on the US market.

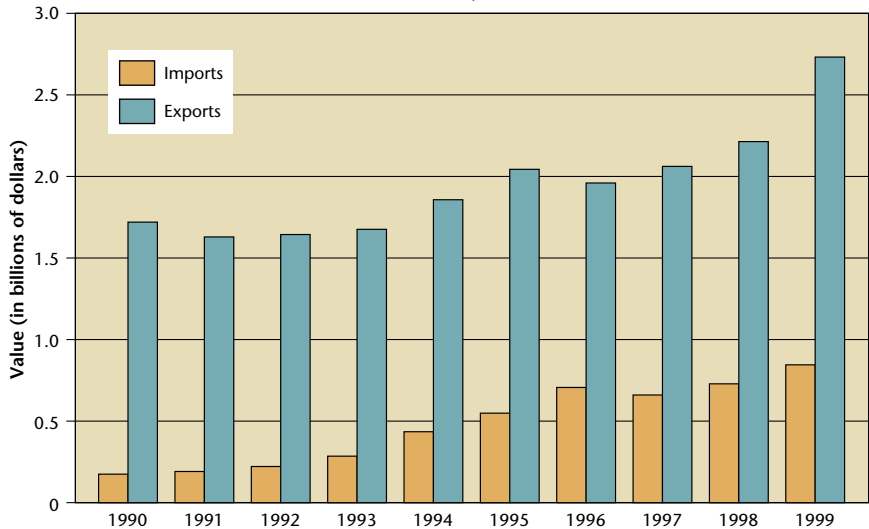
In terms of value, approximately 20 percent of seafood products imported to eastern Canada are from Eastern Europe, 14 percent from Western European countries that are not members of the European Union (Iceland, Norway and Denmark), and 8 percent are from the European Union. Eastern Canada also imports from South America, particularly fishmeal from Peru, and from Asian countries (Thailand and China). Table 17 shows the top eight blocs that traded with eastern Canada in 1995 and 1999 (imports and exports of seafood products). Apart from the United States, four countries supply \$50 million or more in seafood products to the regional market: Russia (\$85 million), Iceland (\$69 million), Denmark (\$62 million), and Norway (\$49 million), with Thailand, Estonia, and China not far behind.

Figure 9
Volume of Seafood Product Imports and Exports,
Eastern Canada, 1990–99



Source: Department of Fisheries and Oceans Canada, annual statistics on commercial fisheries and aquaculture; compiled by the author.

Figure 10
Value of Seafood Product Imports and Exports,
Eastern Canada, 1990–99



Source: Department of Fisheries and Oceans Canada, annual statistics on commercial fisheries and aquaculture; compiled by the author.

Table 17

**Sources of Supply for Eastern Canada, the Fisheries (SIC 0310)
and the Fish Products Industry (SIC 1020), 1995 and 1999**

Trading Bloc	Import Value (in thousands of Can.\$)		(%)	
	1995	1999	1995	1999
United States	203,565	324,332	36.7	38.4
Eastern Europe	113,832	162,946	20.5	19.3
Western Europe, except European Union	72,803	118,342	13.1	14.0
European Union	37,853	73,846	6.8	8.7
South America	18,794	27,654	3.4	3.3
Southeast Asia, NIC (total)	3,572	8,491	0.6	1.0
Japan	2,495	6,705	0.5	0.8
Central America, except Mexico	13,608	5,714	2.5	0.7
Subtotal	466,522	728,030	84.2	86.2
Others	87,672	116,656	15.8	13.8
Total (all countries)	554,194	844,686	100.0	100.0

Source: STRATEGIS, Industry Canada; compiled by the author.

An interesting characteristic of Canada's East Coast fishery is its great diversity, a strength that enables it to weather the hard times: a decline in one species is offset by price increases for, or expanded production of, another species; a new market replaces a failing market; or an active segment of the industry compensates for problems in another segment. The groundfish crisis is a good example of the industry's ability to adjust. Once the moratorium was imposed, it completely paralyzed the groundfish industry not only in Newfoundland but also in several other maritime areas (Cape Breton, northeastern New Brunswick, and the Gaspé Peninsula). However, each of these regions and even Newfoundland, which depended heavily on groundfish, recovered within a few years and are now among the most active export areas. Credit for a recovery of that kind must go to local businesses; the expansion of some lucrative fisheries, particularly snow crab and shrimp, have been of great assistance. That is why, all things considered, the industry as a whole has continued to post positive results — results that have concealed the magnitude of the groundfish crisis, if only from a statistical standpoint. It should also

be noted that in terms of trade, the vitality of the US market has compensated for the relative weakness of the Japanese market.

Based on plant production reports compiled by DFO, the foregoing analysis of the structural profile of the fish and seafood-processing industry in eastern Canada reveals an astonishing variety of products in each region. Table 18 reflects the overall profile by providing a list of exports of leading products and product groups.

The table shows that in 1999 and 1995, lobster products represented the largest category of fisheries industry exports from eastern Canada, with a value of \$789 million. Snow crab products ranked second, with total exports of \$604 million. Together, lobster and snow crab products account for approximately half of regional fish and seafood exports. We should point out that over thirty products are derived from these two species. The firm price for lobster, not larger catches, helped push up its export value. Processors in New Brunswick recently began importing lobster from Maine and the neighbouring states to supply their raw material and thus extend their period of activity. We should also point out that Nova Scotia producers and traders have developed particularly lucrative niches in the United States (Florida) and Asia (Hong Kong).

The snow crab sector is vulnerable because of its heavy dependence on the Japanese market for frozen crab sections and on the US market for crabmeat. Moreover, there are wild fluctuations in production caused by resource cycles: landings can drop or rise rapidly within a few years, as was the case in the Gulf of St. Lawrence and, more recently, on the east coast of Newfoundland. In the past few years, this sector has been affected by the weak Japanese market pushing down prices. However, with the expansion of the crab fishery in Newfoundland and the popularity of crabmeat on the US market, this industry has been able to weather the vagaries of supply and demand.

Another important category is groundfish products — exports rose from \$368 million to \$508 million between 1995 and 1999. Given the current crisis in the availability of this resource, such an increase is surprising, especially because it is not attributable to a single leading product, but rather to an upturn in various segments of the industry. By importing basic products, the groundfish industry not only has been able to maintain its vitality but has probably been able to strengthen it (see table 18).

Table 18

Exports of Principal Seafood Products and Product Groups, Eastern Canada, 1995 and 1999

Product	Exports (in millions of dollars)		Change, 1995-99 (in millions of dollars)		Total Fish Exports (%)	
	1995	1999	(%)		1995	1999
Lobster products						
• live, fresh	549.9	789.3	239.4	43.5	26.5	28.8
• frozen, not shelled	284.5	369.0	84.5	29.7	13.7	13.5
• prepared, canned	182.8	283.3	100.5	55.0	8.8	10.3
Crab products						
• frozen, sections	82.6	137.0	54.4	65.9	4.0	5.0
• prepared, canned	506.9	603.9	97.0	19.1	24.4	22.0
• frozen, sections	446.2	515.0	68.8	15.4	21.5	18.8
• prepared, canned	52.5	86.2	33.7	64.2	2.5	3.1
• not frozen	8.2	2.7	-5.5	-67.1	0.4	0.1
Groundfish products						
• frozen fillets and blocks	368.4	507.8	139.4	37.8	17.7	18.5
• salted, dried, and pickled	122.2	199.8	77.6	63.5	5.9	7.3
• fresh and chilled fillets	126.8	144.3	17.5	13.8	6.1	5.3
• Flatfish (fresh, chilled, and frozen)	97.2	135.6	38.4	39.5	4.7	5.0
• prepared and canned	22.3	28.1	5.8	26.0	1.1	1.0
Shrimp						
• frozen	138.3	244.1	105.8	76.5	6.7	8.9
• prepared and canned	121.4	145.6	24.2	19.9	5.8	5.3
• prepared and canned	16.9	98.5	81.6	482.8	0.8	3.6

Scallops	134.8	124.1	-10.7	-7.9	6.5	4.5
• fresh and chilled	88.3	66.5	-21.8	-24.7	4.3	2.4
• other	46.5	57.6	11.1	23.9	2.2	2.1
Salmon (fresh and chilled)	76.1	123.4	47.3	62.2	3.7	4.5
Herring products	95.5	108.6	13.1	13.7	4.6	4.0
• Sardine and herring (canned)	24.3	46.6	22.3	91.8	1.2	1.7
• Liver, eggs, milt (frozen and in-brine)	43.3	28.2	-15.1	-34.9	2.1	1.0
• Herring and fish (salted, smoked, and pickled)	22.1	28.1	6.0	27.1	1.1	1.0
• Herring and mackerel (frozen)	5.8	5.7	-0.1	-1.7	0.3	0.2
Molluscs and shellfish	90.6	102.9	12.3	13.6	4.4	3.8
• Molluscs (fresh and chilled)	78.2	71.7	-6.5	-8.3	3.8	2.6
• Mussels and oysters (fresh)	9.0	21.4	12.4	137.8	0.4	0.8
• Shellfish (prepared and canned)	3.4	9.8	6.4	188.2	0.2	0.4
Other products	115.3	134.8	19.5	16.9	5.6	4.9
Total (seafood product exports)	2,075.8	2,738.9	663.1	31.9	100.0	100.0

Source: STRATEGIS, Industry Canada; compiled by the author.

Shrimp is another example that clearly illustrates the characteristics of the fishing industry on Canada's East Coast. When cod stocks were relatively stable, the Northern shrimp catch was at its lowest. With the collapse of groundfish stocks, however, the shrimp grounds were able to recover — according to scientists because cod is a predator of shrimp. Expansion of the shrimp fishery off Newfoundland and Labrador, in the northern part of the Gulf of St. Lawrence, and on the edge of the Scotian Shelf has once again revived an industry in need of raw material. Exports of shrimp from eastern Canada climbed from \$138 million to \$244 million from 1995 to 1999. The growth in prepared shrimp exports is noteworthy and effectively illustrates the effort made by the industry to produce higher value-added products, even when it means importing supplies from other countries.

Scallops have long provided relative stability for the Nova Scotia fisheries in particular. The province benefits from its proximity to several major beds in the Bay of Fundy and on the continental shelf further south. However, most of these beds are being fished to capacity, and fishing fleets have been forced to redouble their efforts to maintain catch levels. In 1999 the value of scallop exports was \$124 million, an 8 percent drop from 1995.

Salmon shipped fresh is another major species exported from Atlantic Canada. The value of those exports reached \$123 million in 1999, an increase of 62 percent from 1995. To deal with increasing competition, especially from Norway and Chile, producers in New Brunswick's Bay of Fundy, where the salmon are farmed, must innovate both technically (controlling disease and accelerating salmon growth) and in order to limit costs. One of the principal advantages of the fishery is its proximity to its main market, the United States. Another is its solid reputation for quality among US consumers and traders.

IV

*M*arkets for Atlantic Canada's Seafood Products: Characteristics and Prospects

Changes in export markets for producers in eastern Canada's fisheries are driven first by concerns about resource cycles and the economic climate in importing countries. Afterwards, other factors increasingly come into play, such as international supply and demand, customs tariffs, the relative value of the Canadian dollar, and the degree of industry and trade organization and networking.

The United States, as we have seen, is by far Atlantic Canada's most important market for its seafood products, a market that has continued to grow in recent years. As an indication of its dominance, the percentage of regional exports to the US rose from 52.7 percent in 1995 to 69.1 percent in 1999, and in only four years, those same exports increased in value by \$800 million (73 percent). The strong economic recovery in the United States and the financial crisis in Japan largely explain the growth of the US market. In contrast, the value of Japanese imports of seafood products from Atlantic Canada plummeted from \$559 million to \$306 million between 1995 and 1999, while at the same time the percentage of exports from eastern Canada to Japan decreased from 26.9 to 11.2 percent (see table 19). Exports to the European market have held steady and even increased despite the sagging French market, one of the primary outlets in Europe. Exports to mainland China also increased appreciably, from \$39.6 million to \$75.6 million, as did exports to Thailand, from \$15.8 million to \$23.3 million. Shipments to newly industrialized countries (NIC) in Asia (Taiwan, South Korea, Singapore, and Hong Kong) decreased slightly from \$42.1 million to \$35.4 million, while the value of exports to Central America increased from \$49.2 million to \$64.2 million.

Canada benefits from preferred access to United States markets under the North American Free Trade Agreement (NAFTA), which provides for and coordinates the gradual elimination of all customs duties between the two countries. US inspection practices at the border, considered by Canada to be somewhat arbitrary, are still a

Table 19
Exports from Eastern Canada, the Fisheries (SIC 0310)
and the Fish Products Industry (SIC 1020),
1995 and 1999

Trading Bloc	Exports			
	(in thousands of Can.\$)		(%)	
	1995	1999	1995	1999
United States	1,093,769	1,893,763	52.7	69.1
Japan	555,214	306,368	26.9	11.2
European Union	227,392	294,5765	11.0	10.8
Central America, except Mexico	49,249	64,212	2.4	2.3
Southeast Asia, NIC (Total)	42,115	35,395	2.0	1.3
Western Europe, except European Union	28,738	25,450	1.4	0.9
South America	2,897	2,658	0.1	0.2
Eastern Europe	2,191	2,658	0.1	0.1
Subtotal	2,005,565	2,626,753	96.6	96.0
Other	70,282	112,101	3.4	4.1
Total (all countries)	2,075,847	2,738,854	100.0	100.0

Source: STRATEGIS, Industry Canada; compiled by the author.

barrier to the marketing of seafood products shipped to the United States, particularly exports of fresh fish, and create obstacles to distribution. Discussions are currently under way to resolve this situation, and a group has been created to provide cross-border training for inspection staff. A system is also being established to link electronic inspection databases with the aim of determining equivalencies for the fresh, frozen, and canned product sectors.

In Canada, all federally regulated establishments have implemented the Quality Management Program (QMP), based on the HACCP, which provides an additional guarantee that Canadian exports will meet regulatory requirements for access to the United States market.⁶³ Customs duties have already been eliminated for a

63. National Sea Products (now High Liner Foods Inc.) in Lunenburg, Nova Scotia, was one of the first companies in Atlantic Canada to incorporate this system's standards specifically to facilitate trade with the United States. On the ideas and concepts of the Quality Management

number of species, particularly Atlantic salmon, Pacific salmon, crab, hake, herring, mackerel, haddock, and smoked and dried fish. For some products, it is more difficult to eliminate customs duties under NAFTA; this is the case for lobster, scallops, mussels, oysters, halibut, and prepared and processed fish. The case of frozen fish fillets is still far from being resolved; however, Mexican licences to import lobster from Canada are no longer necessary. In addition, World Trade Organization agreements (January 1995) have improved Canada's access to markets in many countries, particularly Japan, which has reduced customs tariffs by 30 percent for some categories of seafood products. South Korea lowered its customs tariffs by 45 percent; (they currently range from 10 to 20 percent). The European Union has rolled back customs tariffs to between 7.5 and 12 percent on numerous groundfish products, a decision that has been applauded by Canadian exporters. However, tariffs on most processed products, particularly seafood, remain high at 20 percent.

Nevertheless, Canadian fish-processing companies have benefited from greater access to European Union markets since 1993, when the equivalency of the Canadian fish inspection system based on the QMP was recognized. In fact, since the mid-1990s, member countries of the European Union have greatly reduced their inspections. Still, there are some live molluscs and live farmed products that do not currently benefit from this change because of concerns about fish health and communicable diseases. And import tariffs on seafood products from other countries, including Canadian import duties, remain prohibitive, i.e., approximately 20 percent on processed products. In the case of shrimp, for example, tariffs were reduced from 20 to 6 percent, but the reduction applies only to the first 4,000 tonnes. In addition, because the "exemption" is open to everyone, Canada benefits only marginally. The same logic applies to cod.

We will now look at the characteristics of the principal markets for producers in eastern Canada and the opportunities they present.

Program (QMP), see K. Sophonphong and C. dos Santos, *Fish Inspection and HACCP: An Overview*, FAO, AGR/FI(98)10 or the *ISO 9000* series of the Standards Council of Canada, Industry Canada.

■ The United States: A Fragmented Market⁶⁴

The “fish and seafood” category is not only the top performer in Canadian agri-food production; it is also far and away the number one food product group exported to the United States. Besides being the world's largest market, the United States is also the most complex market for product distribution because of its marked geographic and cultural differences, which translate into major differences among markets.

Consumption of seafood products in the United States is not all that high (approximately 7.5 kg per capita annually). This is the net weight of fish meat consumed. If we use the live weight, as the FAO does, the figure rises to 21 kg per capita. Given population growth in the United States, however, the slightest increase in the consumption of seafood products means significant market expansion. Thus, from 1980 to 2000, per capita consumption of seafood products only rose from 12.5 to 15 lb, but the population increased by 45 million, which generated additional consumption of 62.5 million lb of fish and seafood. Apart from the population factor, the market is stimulated by the arrival of new products, such as surimi, catfish, tilapia, and prepared, precooked foods that have a healthy, natural image. At the same time, meat consumption is decreasing. Some species make up the bulk of the market, i.e., lobster, shrimp, cod, salmon, tuna, and shellfish. The restaurant industry accounts for two-thirds of consumption, and consumers buy mainly from speciality stores. Nevertheless, the trend is towards a balance between restaurant and home consumption. In the final analysis, the industry and production are not highly structured and, overall, not very active.

As we have already pointed out, the United States is the world's third-ranked trading bloc for imports of seafood products, after Japan and the European Union. The US market annually takes in approximately 7 million tonnes of fish products, 83 percent of which are intended for human consumption. Domestic production reached 5.4 million tonnes in 1997, of which 1.5 million tonnes was exported, resulting in a shortfall of approximately 3.9 million tonnes to be

64. This analysis of US markets is based in part on information collected from export-import databases (STRATEGIS for Canada and the United States) and the Seafood Market Analyst, *U.S. Seafood Trade Report*, 4th ed. (Narragansett, RI, 1999). The analysis also draws on reports prepared by the Market Research Centre and the Canadian Trade Commissioners Service of the Canadian Department of Foreign Affairs and International Trade. See the bibliography for a list of documents on regional markets in the United States.

made up by imports.⁶⁵ Import volume is 44 percent of total national production, lower than in Japan (51 percent), Canada (87 percent), and the European Union (113 percent).

Although the United States is one of the world's top fish producers, it has to import enormous quantities of seafood products to satisfy domestic demand, especially since demand increased by 26 percent between 1992 and 1997.⁶⁶ The consumption of seafood products in the United States amounts to nearly \$50 billion, according to the National Fisheries Institute. Approximately one-third (\$17 billion worth) of those products are sold through numerous retail supermarket chains and fish markets; however, the lion's share goes to the food services industry, which reports sales of \$32 billion. We are presently seeing sustained growth in this sector, and according to the National Restaurant Association,⁶⁷ it should increase its share of sales from the current 44 to 53 percent in 2007. The institutional sector (schools, hospitals, universities, etc.) and the restaurant sector are the main distribution channels for seafood products in the food services sector.⁶⁸

Internationally, the United States is one of the largest importers (second after Japan) and a major exporter (third after Norway and China). It goes without saying, therefore, that the US market is a trading hub for fish and seafood. Over seven hundred different products are listed by trade agencies, evidence of the great diversity of this market.⁶⁹

As a major fish-producing country with a small population, Canada is well-placed to serve the US market, particularly with fresh and chilled fish and seafood. Canada is also a signatory of NAFTA, which, together with its proximity to the largest consumer market in the world, has served to strengthen its trade position. At present, the US market absorbs most of Canada's fish and seafood production, and in eastern Canada the percentage value of the region's exports to the United States has increased significantly in recent years, growing from 53 percent in 1995 to 69 percent in 1999. As well, the lengthy period of economic expansion in the United States has fostered demand for Canadian food products, especially since the US dollar has

65. According to data from *ibid.*

66. According to "Seafood Marketing," *Frozen Food Age* (April 1997).

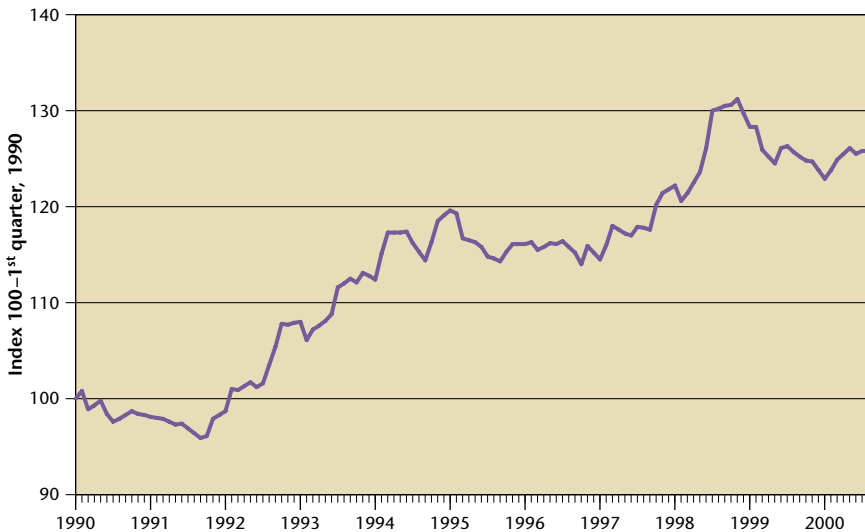
67. According to the National Restaurant Association, *Seafood News* (July 2000).

68. The National Fisheries Institute, *About Our Industry* (February 2000); www.nfi.org.

69. See Barry's Seafood Price Current and the National Marine Fisheries Service, the official agency for the fishing and fish-processing sector in the United States.

appreciated by 20 to 30 percent over the last decade. Without doubt, the relative weakness of the Canadian dollar constitutes a comparative advantage for producers in eastern Canada and a major incentive for US wholesalers and purchasing pools to import seafood products from Atlantic Canada. Figure 11 shows the marked increase in the value of the US over the Canadian dollar during the 1990s.

Figure 11
Comparative Change in Value of the US and Canadian Dollars,
1990–2000



Source: Bank of Canada, Financial Markets Department, monthly average exchange rates; compiled by the author.

Canada, particularly eastern Canada, is the primary source of US imports of low value-added fresh and frozen products. The main export products are crustaceans, groundfish, and, recently, high-end value-added products (farmed salmon and lobster in particular), which are shipped to consumer markets in New York and Boston. In recent years, however, Canada has only had a 17 or 18 percent share of the US market. Although it has long been the primary supplier for the US market, it is closely followed by Thailand, with exports of US\$1.39 billion in 1998 compared to US\$1.41 billion for Canada. Ecuador and Chile together shipped US\$1.1 billion in seafood products to the United States, while exports by China, including Taiwan, were valued at US\$533 million. The US market is not only huge, but

it is also extremely varied, and approximately seven hundred internationally traded seafood products are listed there.⁷⁰

Table 20 shows the 1998 market shares, in volume and value, of the main suppliers of three major product groups to the United States. Frozen products (including products that are dried, smoked, and pickled) dominate imports with a volume of over 1 million tonnes and a value of US\$5.75 billion. In this category, frozen fish, which comprises 151 products, accounts for 528,000 tonnes (US\$1.5 billion), and seafood (37 products) accounts for 459,000 tonnes (US\$4.1 billion).

With 10.9 percent of imports in this category, Canada is the United States' second-largest supplier of frozen products, after mainland China (11.1 percent) and ahead of Taiwan (10.7 percent). Thailand supplies 10.1 percent of frozen products imported by the US. In terms of value, Thailand ranks first (because of imports of giant tiger prawns), with 19.6 percent of imports, followed by Canada (10.6 percent) and Ecuador (10.1 percent). Ecuador is also one of the major suppliers of shrimp to the US market. Canada ranks fourth in frozen seafood (8.6 percent of the value) and first in frozen fish (14.6 percent).

Fresh and chilled seafood products, the second major category, include 104 products (both species and products). Because of its proximity, Canada, of course, is the primary supplier to the United States, particularly on the seafood market, with 81.4 percent of value and 78.5 percent of volume. Its share of the fresh and chilled fish market is 44.4 percent of volume and 39.5 percent of value. Overall, Canada has nearly half (49 percent of volume and 48 percent of value) of the US market for fresh and chilled seafood products.

The third seafood category comprises canned and processed products. The United States imports 289,000 tonnes of seafood in this category, with a value of US\$1.35 billion. Half of this volume but only 29 percent of its value is represented by canned tuna. Canada has virtually no share of this market, which is dominated mainly by a few Asian countries (Thailand, the Philippines, and Indonesia) and Ecuador; they supply 92 percent of US imports of canned tuna. Overall, Canada ranks third in volume among the United States' suppliers of canned products, with shipments of nearly 30,000 tonnes (10.2 percent of the market), valued at US\$202 million. That makes Canada the second-largest US supplier (15.0 percent) in terms of value, after Thailand (45.9 percent).

70. According to Seafood Market Analyst, *U.S. Seafood Trade Report*.

Table 20
Share of US Import Market for Seafood Products,
by Country and by Major Product Group, 1998

Exporting Country	Volume of Imports (in tonnes)	Market Share (%)	Value of Imports (in millions of US\$)	Market Share (%)
Processed and Canned Products (98 products)				
Thailand	108,467	37.5	619	45.9
Philippines	40,195	13.9	98	7.3
Canada	29,709	10.3	202	15.0
Ecuador	23,167	8.0	56	4.1
Indonesia	17,402	6.0	70	5.2
Chile	10,760	3.7	16	1.2
South Korea	9,272	3.2	34	2.5
Mexico	7,793	2.7	26	1.9
Mainland China	5,952	2.1	27	2.0
Other	36,430	12.6	202	15.0
Total	289,146	100.0	1,350	100.0
Fresh and Chilled Products (104 products)				
Canada	153,048	49.2	713	48.4
Chile	56,016	18.0	301	20.4
Mexico	15,319	4.9	52	3.5

Ecuador	14,687	4.7	60	4.1
Costa Rica	7,975	2.6	44	3.0
Panama	6,293	2.0	22	1.5
Trinidad	6,279	2.0	37	2.5
Iceland	5,572	1.8	33	2.2
United Kingdom	4,591	1.5	21	1.4
Other	41,103	13.2	188	12.8
Total	320,883	100.0	1,472	100.0
Frozen, Smoked, and Pickled Products (215 products)				
Mainland China	113,233	11.1	299	5.2
Canada	110,784	10.9	611	10.6
Taiwan	108,576	10.7	195	3.4
Thailand	102,873	10.1	1,125	19.6
Ecuador	68,705	6.8	583	10.1
Russia	50,533	5.0	241	4.2
Japan	44,664	4.4	149	2.6
Mexico	40,311	4.0	400	7.0
India	32,189	3.2	175	3.0
Other	345,577	34.0	1,969	34.3
Total	1,017,445	100.0	5,747	100.0

Source: Seafood Market Analyst, US Seafood Trade Report, 1999; compiled by the author.

Note: This list of 417 products is not necessarily comprehensive, as several products are counted within major product groups.

These figures help clarify Canada's position on the US market for seafood products and show that although Canada is still a leading supplier, other producing countries, particularly countries that practise intensive aquaculture, are making inroads into the huge American market for fish, shellfish, and fish-based products (for human and animal consumption). Competition is lively between traditional suppliers of groundfish such as Canada and new producers of medium-quality fish products, which may more effectively meet processors' needs (harmonization and lower cost of basic products) and mass consumption criteria.

US imports of seafood products are distributed as follows: 5 percent to fishery companies, 76 percent to wholesalers, and 19 percent to processors. Although overall industrial production is sufficient to meet most of the demand, the United States must import to satisfy its domestic needs. Distribution chains play a major role in import growth, but wholesale clubs and retailers appear to be gaining ground in the industry. In recent years, wholesale clubs have accounted for sales of over \$15 billion, making them the number one buyers from processors in Atlantic Canada. The percentage of seafood products sold by distribution giants in the United States went from 4 percent in the mid-1980s to 6 percent in 1996, which is remarkable for this less-popular sector. There are 9,700 seafood departments in US supermarkets that sell seafood products fresh (98 percent), frozen (86 percent), smoked (23 percent), and canned (18 percent).⁷¹ It is worth noting that many fresh products are in fact previously frozen. The products most in demand are shrimp (42 percent), fresh fillets (26 percent), salmon (13 percent), and catfish (7 percent).

Distribution Networks in the United States⁷²

In the United States, food products are generally sold by food brokers, who resell to supermarkets. Brokers provide after-sales service; wholesalers coordinate storage, handle distribution and shipping, and deliver the goods. There are exceptions to the rule, however. For example, some medium-sized and most large food retailers have their own warehouses and buy directly from brokers and, at times, manufacturers. As a general rule, exporters of processed food can market

71. Figures for 1997 are based on data from Canadian consular services.

72. Much of the information in this section comes from analyses prepared by the Canadian Trade Commissioners Service, Team Canada Market Research Centre, Department of Foreign Affairs, and discussions with trade and industry representatives and wholesalers; see also GLOBEFISH, "Metropolitan Market Series," *Greater Miami*, vol. 8; *New York*, vol. 5; *Los Angeles*, vol. 4.

their products through the following three distribution channels: brokers, wholesalers, and retailers. Profit margins in the distribution system vary by product; however, on average, broker commissions are 7 percent, while wholesaler margins are 10 percent and retailer margins are 35 percent.

Geographically, there is a huge disparity in the US market between distribution networks and regional variations in consumption habits. New England is the main port of entry and the largest market for Canadian seafood products, with the city of Boston alone accounting for approximately 50 to 60 percent of the regional market. Certain trends can be seen in the Boston market, including a marked increase in aquaculture products and a greater consumer preference for Alaska pollock and pelagic fish from South America, which are generally less expensive.

In New England as a whole, farmed species such as shrimp, freshwater brook trout, and crayfish have a share of the market, which nevertheless remains generally tied to the traditional fisheries. Consequently, production has increased and marketing systems have been improved for established products such as oysters and mussels. These trends reflect the more sophisticated tastes of regional consumers and a public demand for greater variety. The demand for lobster is currently firm on the regional market, according to Atlantic Canada exporters. On the other hand, inventories of cod blocks in refrigerated warehouses are falling, as is demand. The block price varied between US\$1.60 and US\$2.10 in 1998, rising slightly as a result of the shortage, which is becoming a concern. In the shrimp sector, demand is high, but the market is loaded with the product, and that has led to lower prices. The market is looking mainly for quantity rather than quality, according to processors' associations in New Brunswick and Nova Scotia. In the New York region, market preferences have changed recently; for one thing, the recession in the early 1990s went some way towards modifying consumer habits, and for another, fierce competition in the market has obliged Canadian exporters to develop their marketing techniques and focus on competitive pricing.

The northeastern United States (the New England states) absorbs 85 to 90 percent of Atlantic Canada's exports of seafood products. In 1999, for example, Massachusetts imported \$1.1 billion worth of the region's seafood products or 39.5 percent of all shipments to the United States (see table 21). Next was Maine (\$192 million or 7.0 percent) and then New Hampshire (\$98 million or 3.6 percent) and New York State (\$96 million or 3.5 percent). Exports from Atlantic

Table 21

**United States' Export Markets for Seafood Products
from Eastern Canada, 1995 and 1999**

	Export Value			
	(in thousands of Can.\$)		(%)	
	1995	1999	1995	1999
Destination/state				
Massachusetts	689,420	1,081,709	63.0	57.1
Maine	136,317	191,675	12.5	10.1
New Hampshire	22,230	98,286	2.0	5.2
New York	63,855	96,116	5.8	5.1
Florida	14,185	60,381	1.3	3.2
California	24,434	55,170	2.2	2.9
New Jersey	18,065	54,756	1.7	2.9
Rhode Island	24,182	41,056	2.2	2.2
Washington	14,827	34,504	1.4	1.8
Connecticut	12,264	21,096	1.1	1.1
Subtotal (10 states)	1,019,780	1,734,750	92.2	91.6
Other	73,989	159,013	6.8	8.4
Total (United States)	1,093,769	1,893,763	100.0	100.0
Destination/region				
Northeast	978,480	1,622,262	89.5	85.7
Southeast	24,118	96,076	2.2	5.1
Southwest	26,254	64,596	2.4	3.4
Midwest	22,396	53,869	2.0	2.8
Northwest	16,922	42,993	1.5	2.3
Other Regions	25,660	13,967	2.3	0.7
Total (United States)	1,093,770	1,893,763	100.0	100.0

Source: STRATEGIS, Industry Canada; compiled by the author.

Canada to the ten main buyers in the northeastern states increased by 70 percent in five years (from \$1.02 billion to \$1.74 billion between 1995 and 1999), proof of the vitality of this large consumer market, which has the best segments of the national and international seafood products brokerage and distribution network.

The northeastern United States is home to large wholesaler-producer-distributors, such as Stavis Seafoods of Boston (12,000 tonnes of products traded annually, with lists of six hundred products and suppliers in twenty-five countries), StarKist Seafood Co. of Newport, Kentucky (sales of \$1.25 billion, with nearly half the canned tuna market in the United States), and Gorton's Seafood of Gloucester, Massachusetts (with \$350 million in sales and control of 20 percent of the sales of fillets and frozen fish products to supermarkets). The Fulton Fish Market is the largest wholesale fish market in the New York region with seventy dealers. These giants attest to the region's dynamic market for seafood products. That does not mean, however, that other regions of the United States are of no consequence. In fact, seven of the ten-largest producer-distributors of fish products in the United States are located outside New England,⁷³ which partially explains the gradual expansion of markets for seafood products in various subregions. For example, exports of fish and seafood from Atlantic Canada to Florida increased from \$14 million to \$60 million between 1995 and 1999, while exports to California increased from \$24 million to \$55 million. Overall, the value of exports to the southeastern United States has tripled since 1995, rising by 154 percent in the northwest and by 146 percent in the southwest.

There are several reasons why the northeastern United States is a major export market for seafood products from eastern Canada. First, New England has a shortage of some species of fish and has to obtain supplies outside the region. In addition, the price of processed products is higher there than elsewhere, and high-end and ready-to-serve products are certain to find buyers if presented attractively and as part of the current shift to "healthy" products.

A review of the products found on this regional market reveals some interesting trends that are of particular interest to manufacturers and exporters in eastern Canada. Beginning with cod, which has been replaced by pollock or hake because of its high price, it continues to be a highly popular fish, but the market should remain static. Alaskan and Pacific species (products also processed in Atlantic Canada for the New York market) are increasingly common on the New England

73. Including Sysco Corp. of Houston (\$1.06 billion in sales — serves over 300,000 restaurants, hotels, schools, etc.); Bumble Bee Seafoods Inc. of San Diego (\$750 million in sales — a leader in sales of canned goods and surimi); Trident Seafoods Corp. of Seattle (\$600 million in sales — a major producer on the West Coast, with a fleet of thirty vessels and nine processing plants); ConAgra Seafood Co. of Tampa (\$410 million in sales of processed fish products, especially seafood). Information from "The Big Get Bigger," *SeaFood Business* (February 2000).

market, which is very encouraging because stocks are abundant and prices advantageous. Sales of Alaska cod, also sold on this market, increase when quantities of Canadian cod are limited. The main crab products consumed by the US market are whole crab (distributed on a wide scale as "combo" cans) and assortments. Shelled crabmeat is the hardest to obtain. Consumption of surimi (crab-flavoured fish paste) has increased at the expense of crabmeat, but the authentic product will always be valued. The future of crab from eastern Canada seems promising on this market, particularly, according to Canadian producer associations, if producers focus on value-added processing. Flatfish species are declining in the region, and the industry is concerned about the future of this product. Finally, the scallop market is strong, but Canadian products appear to have lost ground. Scallop catches seem to be satisfactory on the US side (76,600 tonnes landed in 1997), and the US product appears to be less expensive: however, the difference can often be up to 75¢ a pound. The quality of the scallops is not the same, however, and many US suppliers are suspected of adding sodium tripolyphosphate to the product to increase weight, although apparently such reports are not deterring consumers.

The central US eastern seaboard includes Pennsylvania, Delaware, Maryland, Virginia, and the District of Columbia (Washington). This region has three main markets: the Delaware Valley (Philadelphia-Wilmington), the Baltimore-Washington corridor, and the Richmond-Norfolk corridor. It is a wealthy, developed region — with 6 percent of the US population and 9 percent of national income, i.e., \$350 billion — and a major target for producers in eastern Canada.

Producers in eastern Canada know that consumer trends in this market indicate that fresh and deep-frozen products, including prepared dishes, are growing in popularity, while canned goods are in decline. They maintain that the strong consumer trend toward a nutritious diet will continue in the long term and is likely to favour products prepared in Atlantic Canada. Products in the region with some of the highest levels of consumption are shrimp and salmon. Although Boston and New York are still the largest distribution centres for seafood products destined for the central states on the eastern seaboard, markets in Philadelphia and Baltimore-Washington, because of their proximity, offer considerable potential for export businesses in Nova Scotia and New Brunswick. Some New Brunswick manufacturers are developing market niches in the Baltimore region.

The southeastern United States, with Atlanta at its centre, has a population of 43 million, over 16 percent of the national population and a rate of growth in the past decade that is almost double the national rate. The market for this region is estimated at \$73.4 billion or 21 percent of the entire US market and includes 53,000 food stores and 7,990 supermarkets. According to producers in Quebec and Newfoundland, consumption of seafood products is much higher in this region than in the rest of the country because of easy access to fresh catches and a healthy tourism industry. The region is also the main market for fresh products, particularly seafood (lobster)⁷⁴ from some Nova Scotia producers.

Although a large part of the fish and seafood (both domestic and imported) sold on this consumer market comes from Boston and New York, local processing plants and other buyers have recently begun dealing directly with source suppliers in Nova Scotia, Newfoundland, and New Brunswick. Apart from hake, the market is open to all species of fish. Producers in Atlantic Canada and Canadian retailers have found outlets in the region for fresh fish, especially wild and farmed salmon (deep-frozen by the unit, whole, with head on and eviscerated) from New Brunswick. There is also a market for halibut. As well, redfish (in cellophane and packed in layers), mainly large pieces, is in great demand as a replacement for redfish caught in the Gulf of Mexico, which is subject to quotas. Quality is the determining factor on this market, whatever the species.

In the Midwest, which has a population of twenty-three million, target markets are Illinois, Missouri, and Wisconsin. Chicago is the most populous centre with twenty million people, and perhaps because it has the highest ethnic diversity in the region it ranks third among US cities in sales of seafood products. According to Nova Scotia producers, this metropolitan centre offers a favourable climate for new, competitively priced products, particularly products that focus on quality, convenience, and nutrition. The city's importance as a distribution centre with rapid access to the entire world via a vast transportation infrastructure strengthens its position as a trade hub. In fact, Chicago has one of the best trade infrastructures in the United States, particularly its system of highway, maritime, and air transportation. Another of its strength is food services market, which is estimated at approximately \$50 billion. According to producers in

74. For example, Clearwater Fine Foods Inc., a company that ships various products, including lobster, to this region.

eastern Canada, deep-frozen products and other ready-to-serve dishes have the best prospects in this area. Although consumption of seafood products was limited a few years ago to species native to the region, Canadian producer associations are now saying that Chicago is fast becoming the seafood capital of the United States.

Until recently, sales of Canadian products in the Chicago market were hindered mainly by inadequate supply, not demand or price. That is the opinion of US intermediaries (distributors of ready-to-serve dishes and fresh and deep-frozen fish brokers), who are quick to add that this market still has a great deal of potential. This is confirmed by exporters in eastern Canada, who report that their sales to the region are increasing by nearly 5 percent each year. It should be noted that food services (hotels, restaurants, schools, and hospitals) have an increasing need for high-quality products, not just health-conscious products. The Chicago Fish House company alone ships 35 million pounds of fish and seafood to these establishments in thirty-eight US states. The most sought-after products in this market are cod, shrimp, salmon, and surimi.

The Cleveland region is also considered fairly important by producers in eastern Canada. Cleveland is located at the centre of the US industrial and financial belt, which includes Ohio, Pennsylvania, Kentucky, and West Virginia, an area approximately one-third the size of Ontario and with a population of over twenty million. The region has six main distribution centres, i.e., the six metropolitan areas, and its numerous dealers service wholesalers in addition to their usual clients. Canada exports a wide variety of seafood products to the area, particularly fresh and deep-frozen fish and shellfish, which are shipped to wholesalers directly or indirectly. And although those exports have been modest up to now, approximately thirty wholesalers there do business with producers in New Brunswick, Nova Scotia, and Newfoundland, many of them buying salmon, cod, farmed mussels, and crustaceans (95 percent lobster). Regional consumer preference for seafood products is significant and appears well established. Today, the majority of the seafood products consumed in Cleveland are purchased in Boston or Detroit; however, local wholesalers repeatedly express their interest in products from eastern Canada and in trading directly with producers. The species currently most in demand are salmon, lobster, pollock, clams, mussels, scallops, and crab.

The Detroit market has fifteen million consumers. In recent years, Canadian exports of fish and crustaceans to the city have reached \$200 million annually. Prospects in this region are excellent, particu-

larly for value-added prepared dishes, including ready-to-serve products prepared in portions. Food distribution is most active in urban population centres in northern and west-central Michigan, where there are four wholesale distributors, three of which are among the ten largest in the United States. The market for seafood products in the region is estimated at over \$800 million. Some processors say that the area's practices are similar to those in Canada; others report that it has highly developed marketing techniques, quality control, and sales. In fact, 60 percent of seafood products are sold retail and 40 percent to food services. The retail-sales sector should increase considerably in this area, particularly for fish-based products.

Another attractive market for Canadian producers is California, which has some of the largest metropolitan population centres in the United States, in particular Los Angeles and San Francisco. The market for food products exceeds \$40 billion in those two cities alone, where there are more than ten thousand food stores and fourteen hundred supermarkets. Given the boundless opportunities presented by such a huge market, competition among Canadian producers is fierce. The business potential it represents is considerable, because a number of factors have conspired to cause the region's consumers to develop a keen interest in nutrition and health. Their habits have changed accordingly, and as a result fish sales have shot up, while the consumption of red meat has declined.

Northern California is one of the major regions in the seafood product trade because it has an immense distribution centre with over one hundred brokers dealing in these products. It is also the number two export destination, after the northeastern United States, for some Nova Scotia producers.

The Pacific Northwest is also an attractive market for producers in Atlantic Canada. Seattle, in particular, offers a market with numerous opportunities because of the active and varied lifestyles of its inhabitants. In addition, their high incomes foster a taste for luxury imported and ready-to-serve food products. The penchant of the region's consumers for imported products is reflected in purchases of imported food products of around \$532 million in 1996, \$305 million of that from Canada. Although the region is a major fish producer, the Pacific Northwest annually imports \$198 million in seafood products, with 48 percent of that being supplied by Canada. This market is mainly interested in fresh and deep-frozen products, but smoked fish, farmed salmon, shrimp, scallops, lobster, and mussels also have a share of the market. Lobster is especially in demand, particularly Atlantic

lobster, which is lighter than Australian lobster. New Brunswick and Newfoundland are increasing their penetration of this market. Distribution is handled by processing plants that also sell wholesale as well as through brokers (mainly for canned goods) and wholesalers. We should point out that the demand for salmon from institutional food services and retail trade has increased since the drop in the price of farmed products. Canadian businesses have also succeeded in penetrating this market because of the excellent quality of their products, their competitive prices, and Canada's strict sanitary regulations.

Overall, the consumer market in the United States remains crucial for seafood products processed and prepared in eastern Canada. There as elsewhere, however, numerous competitors are trying to get a piece of the pie. The advantage Canadian products have is that they are in demand, they enjoy a reputation for quality, and they benefit from trade liberalization under NAFTA. The US consumer market for seafood products, including high-end products, continues to grow and looks certain to long remain as the principal market for exporters in eastern Canada. Although some regions are traditional markets (New York, Boston, and Detroit), others warrant further investigation. Producers in Atlantic Canada could look at developing new markets in the coming years in the central and south-central United States, for example, while continuing to deal actively with purchasing pools and wholesalers. There is every reason to believe that they can add to their share of the vast US market with increased presence and visibility. The success of some businesses in Nova Scotia — the province with the best connections in the US market — proves that well-developed strategies that target market niches for value-added products can be very profitable. To sum up then, it is clear that the US consumer market, although fragmented, must remain the primary trade target of producers in eastern Canada.

■ The European Market for Seafood Products

Almost all of the industrialized European countries have some type of fish-processing industry, i.e., canning, smoking, freezing, and other processing plants. Production of ready-to-serve dishes is the fastest-growing sector, and major distributors in the market are actively involved in introducing new products.

In several European countries, annual average per capita fish consumption (equivalent to live weight) is relatively high: 29 kg in France, 25 kg in Greece, 40 kg in Spain, 28 kg in Sweden, 32 kg in

Finland, and 48 kg in Norway. In others, however, it is more moderate: 20 kg in the United Kingdom, 20 kg in Belgium and Luxembourg, 15 kg in the Netherlands, and 13 kg in Germany. Fish consumption in Italy is comparable to that in North America — an average of 22 kg per person per year.⁷⁵ Anglo-Saxon countries register a lower average consumption, but their high population density and purchasing power make them potentially lucrative markets for fish products, particularly for seafood.

The European Union is a huge market for seafood products — the second-largest trading bloc, after Japan, for fish and seafood imports. Its member countries consume over 12 million tonnes of seafood products annually, and the volume of these imports is twice as high as domestic production (i.e., within the EU). This market is distinctive in that it encompasses a dozen countries, some of which are relatively heavily populated (Germany, France, England, Spain, and Italy), while others are less so. Per capita fish consumption varies greatly from one country to another, but it is generally above the North American average. These countries are also major tourist destinations — over one hundred million tourists visit France, Italy, and Spain combined every year — which drives up restaurant sales of high-end food products.

In 1996 the European Union imported seafood products valued at US\$19.3 billion, i.e., 34 percent of world imports. However, a substantial percentage of those imports were arranged between member countries of the EU itself. Nevertheless, each year it also imports between \$300 million and \$350 million worth of seafood products from Canada, 75 to 80 percent of which come from eastern Canadian provinces (see table 22). For several years France was the principal destination for these products. Since then it has been overtaken by the United Kingdom, Denmark, and Germany. In these three countries, the value of imports from eastern Canada almost doubled between 1995 and 1999. Exports to Belgium and Sweden have also increased substantially.

Europeans show a clear preference for fresh products. In France, for example, fresh fish and seafood still represent more than half the value of all seafood products consumed. In France, as in several other EU countries, the arrival of major wholesale and retail distribution chains has fostered greater access to seafood products at competitive prices. This is true for both consumers and processors. As elsewhere,

75. FAO, annual consumption of fish, molluscs, and crustaceans per capita — average for the years 1995–97.

Table 22

**Value of Seafood Product Exports from Eastern Canada
to the European Union, by Country, 1995, 1997, and 1999**

Country	Export Value (in millions of Can.\$)		
	1995	1997	1999
United Kingdom	35.8	36.6	62.5
Denmark (including the Faroe Islands)	34.5	60.2	60.3
Germany	27.7	23.7	45.8
France	53.6	34.3	34.8
Belgium	24.1	25.5	32.5
Sweden	15.9	12.3	20.6
Netherlands	17.2	14.9	11.9
Italy	11.8	11.5	10.4
Portugal	1.6	1.7	6.6
Spain	2.4	2.2	6.6
Other European Union countries	28.0	16.0	26.0
Total (European Union)	227.4	224.5	294.6

Source: STRATEGIS, Industry Canada; compiled by the author.

there is increasing integration within the retail distribution sector. In fact, the percentage of seafood products shipped and sold by super-markets increased from 35 percent in 1988 to 51 percent in 1993.⁷⁶

The concentration of points of sale and the elimination of trade barriers within the European Union have resulted in downward pressure on the prices of local raw materials, the elimination of a number of intermediaries in sales and distribution channels, and a concentration of wholesalers. It should also be noted that many first-class restaurants have recently been offering their patrons new, high-end seafood products such as Canadian lobster, and several New Brunswick producers have penetrated the restaurant market in France with a product called "new lobster."

The European Union is seen by lobster producers from Canada and elsewhere as having great potential, a view based on the EU's annual imports of \$200 million in lobster and lobster products,

76. FAO, Department of Fisheries, FISHERY COUNTRY PROFILE (France, 1996) and GLOBEFISH, Metropolitan Market Series, *The Market for Seafood in Paris and Île de France*, vol. 1.

mainly from Canada (\$100 million in 1996) but also from the United States (\$85 million in 1997) and a few other suppliers. Imports of live Canadian lobster hover at around 4,000 tonnes, which is in addition to 3,000 tonnes of frozen lobster (cold pack). In total, approximately 8,000 tonnes of Canadian lobster products enter the European market each year. US producers and exporters supply an increasing percentage of the volume of live lobster shipped to this market, with exports climbing from 3,400 tonnes in 1990 to 5,400 tonnes in 1996, an increase of 60 percent.

The main markets for Canadian lobster in Europe are France (\$25 million in 1998) and Belgium (\$23 million). There are also secondary markets in the United Kingdom (\$13 million), Germany (\$11 million), the Netherlands (\$9 million), and Italy (\$4 million). Overall, lobster imports to the European Union, all products combined, amount to approximately 20,000 tonnes, a volume that has remained fairly stable since 1990. From a value standpoint, however, imports rose from \$149 million in 1993 to \$210 million in 1995, levelling off at around \$200 million. Live lobster, of course, is the most in demand, representing between 75 and 80 percent of the total value of imports. In recent years (1995–98), demand for frozen lobster from Canada dropped significantly on the French market (from \$26.4 million to \$14.1 million) and on the Belgian market (from \$7.5 million to \$4.2 million). Europeans are increasingly turning to fresh or live lobster, particularly in Belgium, where imports of fresh Canadian lobster increased from \$11.0 million to \$18.5 million between 1994 and 1998; in the United Kingdom the increase was from \$9.2 million to \$11.5 million, in the Netherlands from \$7.9 million to \$8.6 million, in Germany from \$6.8 million to \$7.6 million, and in Sweden from \$0.5 million to \$2.4 million.

Canada also exports groundfish products to the European market, which saw the value of fillets and frozen blocks fall from \$61 million to \$20 million between 1990 and 1998 (see table 23). There was also a sharp drop in exports of salted and dried fish, two product groups particularly affected by the groundfish crisis. In addition to higher lobster exports, Northern shrimp exports to the European Union are also gaining, increasing from \$28.6 million in 1990 to \$74.3 million in 1998.

To summarize, Europe offers real opportunities to producers from eastern Canada, particularly in the ready-to-serve segment and in natural prepared products. Lobster and Northern shrimp are the most in demand, but there are still market niches for frozen fish fillets,

Table 23
Exports of Canadian Seafood Products, to the European Union,
by Product Category, 1990, 1996, and 1998

Product Category	Volume (in tonnes)			Value (in thousands of dollars)		
	1990	1996	1998	1990	1996	1998
Frozen fillets	16,392	12,066	10,118	47,591	22,220	18,037
• Herring	8,911	10,328	8,744	8,125	11,189	8,756
• Cod	4,810	98	29	21,083	768	219
• Cod fillets, block	0	9	90	0	62	730
• Freshwater fish	1,870	1,079	893	13,733	7,662	6,760
• Other forms	801	552	362	4,650	2,539	1,572
Frozen blocks	4,145	513	825	13,202	1,587	2,278
• Cod	3,378	0	9	10,547	0	22
• Freshwater fish	564	494	563	1,953	1,545	1,671
• Other forms	203	19	253	702	42	585
Fish, salted, dried, pickled	25,085	825	1,682	111,516	6,000	12,590
• Cod	23,468	641	1,554	108,845	5,290	12,224
• Other	1,617	184	128	2,671	710	366
Lobster	7,650	7,580	8,006	81,763	100,861	95,173
• Live	4,067	4,236	3,969	45,924	66,760	63,732
• Cold pack	2,788	2,031	2,974	27,289	21,125	22,326
• Other, frozen	422	987	811	2,726	8,961	5,461
• Extracted meat, frozen	314	226	184	5,189	3,209	3,240
• Other forms	59	100	68	635	806	414
Shrimp	6,754	5,388	15,000	28,571	30,189	74,349
• Frozen	6,336	4,146	13,087	24,894	23,328	56,666
• Cooked, peeled	418	899	1,913	3,677	4,930	17,683
• Other forms	–	343	–	–	1,931	–
Crab	511	1,184	254	7,661	16,504	3,706
• Frozen (sect. and meat)	428	1,180	254	6,149	16,453	3,706
• Other forms	83	4	–	1,512	51	–
Salmon, canned	15,075	11,474	6,053	115,817	80,346	51,287
Other prod. categ.	23,483	12,440	12,018	103,743	54,512	59,287
Total	99,095	51,470	53,956	509,864	312,219	316,707

Source: Canadian Fisheries Council, with the cooperation of Industry Canada.

salmon, and some herring products. The main stumbling block is proving to be overly high customs tariffs on imports of seafood products that have undergone secondary and tertiary processing.

■ Japanese and Asian Markets for Seafood Products⁷⁷

Japan is one of the largest markets in the world for products from the sea, a consequence of the population's high consumption of seafood products, particularly fresh seafood. Average per capita consumption exceeds 70 kg per year. It is also very high in other Asian countries with high population densities, such as Thailand (31 kg), Malaysia (55 kg), Taiwan (36 kg), Singapore (31 kg), Hong Kong (57 kg), and South Korea (52 kg). Among major industrialized countries, however, Japan is by far the leader in this area.⁷⁸

Japanese consumers are not only fond of fish, but they also appear to be among the most discriminating and demanding with respect to product quality, safety, appearance, size, packaging, and sensory appeal. To their credit, though, many are also willing to pay a high price to satisfy their exacting tastes. However, Japan's lengthy economic recession in the 1990s combined with an aging population and the different consumer habits of young people have changed the profile of Japanese consumers. As a result, many are adopting the North American approach to food buying, i.e., looking for convenient food products that are healthy and competitively priced. Nevertheless, the Japanese market remains lucrative for seafood processors and exporters in Atlantic Canada, many of whom have been active in Japan for years with products such as snow crab (Japan imports 120,000 tonnes annually) and herring roe.

The Japanese market annually takes in approximately 13 million tonnes of seafood products, double the volume consumed by the American market, which is twice the size. In 1997, Japan imported seafood products worth US\$15.6 billion, making it the top importing country and far ahead of the United States (\$8.1 billion). Unlike the United States and Europe, however, Japan consumes almost all of its domestic catch, with barely 5 percent going to outside markets. Although Canada supplies only 3.5 to 4 percent of the seafood

77. This section on Japanese and Asian markets is based on several reports including one report prepared by the Canadian Trade Commissioners Service, *The Agri-Food Market in Japan*. Other sources were FAO, FISHERY COUNTRY PROFILE on Japan, Korea, Viet Nam, Thailand, India, and Indonesia.

78. Information was obtained from the FAO; this is an average for the period 1994–96.

products sold on the Japanese market, Canadian producers are in a strong position in three sectors: snow crab, herring roe, and coldwater shrimp. It should also be noted that there is a growing interest in Japan in farmed salmon, a market supplied mostly by producers in British Columbia.

Snow crab from Canada's East Coast has carved out a choice position for itself on the Japanese market. The snow crab market in Japan relies heavily on hotels, inns, restaurants, and souvenir shops located in tourist areas in regions where Japanese snow crab is caught, i.e., Hokuriku, Tohoku, and Kinki on the Sea of Japan. And because of the superior quality of snow crab from the Gulf of St. Lawrence compared to what is available from other parts of the world as well as its greater similarity to the Japanese product, snow crab from eastern Canada is highly favoured. Action is being taken to expand the market for gulf snow crab to other tourist regions and to major urban centres such as Osaka. However, because snow crab consumption depends on the tourist trade, the volume of sales dropped with the decline in the number of tourists as a result of the economic slowdown.

It was in 1995 that Japan first imported large volumes of snow crab from Newfoundland, mainly to replace Alaska snow crab. Since then, Newfoundland snow crab has been holding its own against Alaska snow crab, which was very abundant in 1998. A large percentage of Newfoundland snow crab is also sent to China, where the product is processed and re-exported to the Japanese market. As a result, these products are thought of as being Chinese rather than Canadian. Russia has also become a major competitor on this market, which makes the emphasis on a quality product all the more important in order to maintain the competitiveness of Canadian snow crab.⁷⁹

The Japanese market is also an attractive and lucrative outlet for processors in Atlantic Canada. Canadian exports of salted and frozen herring roe dominate Japanese imports of this product. Salted herring roe is usually sold in expensive gift boxes, which are presented by the Japanese at the end of the year. However, the recent recession has also had an impact on this market; exports of all types of herring roe have decreased in recent years. In 1998, very competitively priced imports of Russian herring roe processed into spiced roe created some competition for spiced herring products manufactured from frozen roe imported from Canada and Ireland. To maintain the Japanese

79. See Department of Foreign Affairs and International Trade, *The Agri-Food Market in Japan* (August 1999).

market for frozen herring roe, it has become essential to offer the product at reasonably stable prices.

Shrimp is one of the few seafood products exported by Canada to Japan for which sales have risen in recent years. In fact, Canadian shrimp exports have enjoyed a steady increase (6,244 tonnes in 1993 compared to 10,278 tonnes in 1998). Canada is now the largest exporter of shrimp to Japan, ahead of Greenland and Iceland. Shrimp imported from Canada is used mainly to make sashimi and is sold in take-out sushi bars. And although the recent economic recession meant that fewer Japanese ate out in restaurants, shrimp sales in less expensive restaurants, bars, and stores increased. Given the supply of Canadian shrimp, exports of this product, particularly large shrimp, should continue to rise.

Apart from snow crab, shrimp, and herring roe, the Japanese are particularly fond of farmed salmon, lobster, and sea urchin roe. That invests these products in eastern Canada with a definite trade potential. Beginning in 1992, after the moratorium, Newfoundland's Pioneer Seafoods of Trinity Bay was one of the first companies to export sea urchins (roe) to Japan.

The live and frozen lobster market in Japan has fallen off substantially because of the economic recession. Lobster was traditionally served at weddings, receptions, birthdays, and other social gatherings. Not only has the number of such gatherings decreased in recent years, but also the amount of money spent on them has dropped to the point where lobster no longer even appears on the menu. On the Japanese market, lobster competes with the very popular spiny or rock lobster and is used mainly as an ingredient in French cuisine in extremely expensive restaurants. In 1998, Canada exported 1,593 tonnes of live and frozen Atlantic lobster to the Japanese market. The United States was the only other supplier of this product.

Of the 15,000 to 17,000 tonnes of lobster Japan imports each year, approximately 3,500 tonnes is the *americanus* species that comes mainly from Canada (60 percent in 1994 and 1995) but also from the United States. While the value of Japanese lobster imports ranges between \$450 million and \$500 million, Atlantic Canada's exports of lobster to Japan are valued at between \$20 million and \$25 million (in Canadian funds). New Brunswick producers export only frozen lobster to Japan; the total export value has fluctuated between \$5 million and \$8 million in recent years.

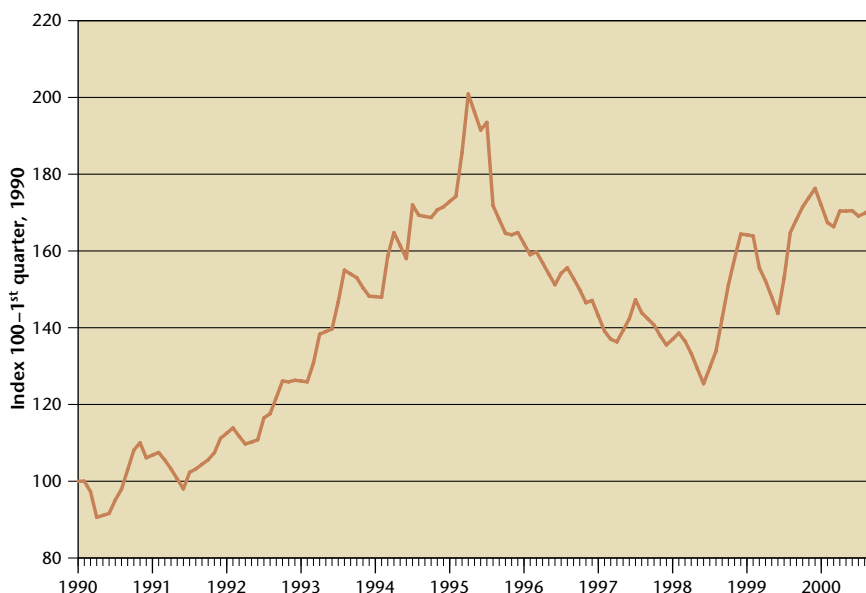
In Japan, there is a firm demand for sea urchin roe from Canadian producers, who shipped 478 tonnes (\$29 million) of the product to Japan in 1998. Because sea urchin stocks have been seriously depleted in the United States, US producers buy large quantities of live sea urchins from Canada, which they then process into products for re-export to Japan. This situation should provide Canadian producers with attractive export opportunities to Japan and the United States.

To conclude this description of the prospects of fish and seafood products on the Japanese market, let us simply say that Canadian producers must continue to offer quality products that suit the various segments of the market. It should be noted that Japan is not a homogeneous consumer market. In fact, the country is marked by regional differences — differences that are especially characterized by food preferences, which vary according to the regional availability of fish products. For producers in Atlantic Canada to increase their share of the Japanese market, they must be able to count on selected companies to manufacture quality products adapted to the Japanese market. In addition, more Canadian businesses must get involved in the export market and begin offering a greater variety of value-added products to enhance Canada's reputation as an agri-food supplier. Canada enjoys a good reputation with dealers and consumers; however, Japanese observers report that Canadian industry is falling short of satisfying local requirements in the areas of products, pricing, and client relations.

Increased production of fish products by suppliers other than Canada and price resistance to high-end fish and seafood are the most significant issues currently facing Canadian exporters in this sector. If Canadian exporters expect to maintain and increase their share of the Japanese market, they must deal with the competition from Norwegian, Chilean, and Russian exporters by effectively managing Canadian fisheries to ensure a stable, high-quality supply of seafood.

Until 1995, Canadian exports of lobster and other seafood to Japan were greatly stimulated by the strong rise in the value of the yen. In fact, from 1990 to 1995 Japanese currency rose by 100 percent in relation to the Canadian dollar (see figure 12). In other words, in 1995 Japanese importers could buy twice the quantity of a product that was imported in 1990 for roughly the same amount. Soon afterwards, however, the economic situation rapidly deteriorated, and the crisis in the financial markets and the ensuing sharp drop in the yen became a significant constraint for lobster exporters to Japan.

Figure 12
Change in Value of the Yen Compared to the Canadian Dollar,
1990–2000



Source: Bank of Canada, Financial Markets Department, monthly average exchange rates; compiled by the author.

In addition to the Japanese market, some Asian countries offer attractive trade prospects for Atlantic Canada producers (see table 24). Mainland China and Taiwan are promising markets, with imports of more than \$90 million in 1999, i.e., nearly double 1995 imports. Thailand, Hong Kong, and South Korea also imported fresh and chilled products such as lobster and shrimp.

■ The Canadian Market

Although Canada is recognized primarily as a major producer-exporter of seafood products, its domestic market consumes nearly a million tonnes of these products, i.e., almost as much as its domestic production. Canadian fish and seafood imports came to \$2.02 billion in 1999, compared to \$3.76 billion in exports, while according to the Canadian Fisheries Council,⁸⁰ apparent consumption of fish

80. Canadian Fisheries Council, *Canada's Trade Objectives for Seafood in World Trade Organizations*, submission to the Standing Committee on Foreign Affairs and International Trade, House of Commons (22 April 1999).

Table 24
Asian Markets for Eastern Canadian Seafood Products,
by Country, 1995 and 1999

Country	Imports (in millions of Can.\$)		Exports (in millions of Can.\$)	
	1995	1999	1995	1999
Japan	2.5	6.7	559.2	306.4
Mainland China	18.4	37.1	39.6	75.6
Thailand	45.8	47.9	15.8	23.3
Taiwan	0.2	3.8	11.1	15.8
Hong Kong	0.2	1.3	17.9	10.1
South Korea	2.9	3.5	12.3	7.9
Singapore	0.3	–	0.1	1.6

Source: STRATEGIS, Industry Canada; compiled by the author.

and seafood amounted to approximately \$3.5 billion. Canada, like its neighbour to the south, is thus both a major producer-exporter and importer. The difference, of course, is in the volumes traded, which naturally are more modest on the Canadian side, and also in the relative volume of basic products imported for further processing.

In the 1980s, numerous businesses in Canada's agri-food industry developed extensive trade and distribution networks, knowing, however, that the Canadian market was a secondary market. When the situation changed and these networks no longer met the needs of processors, it was clear that other solutions had to be found. Competitive pressure on prices, the concentration of business, the emergence of distribution as a full player in the industry, and massive work-force reductions, all in a context of consumer habits that were changing significantly, were (and still are) some of the problems. To a large extent, this situation explains the serious efforts that have been made to promote brand and quality images. What the industry has to do now is clearly identify and secure the upstream industry (producers for supply and the just-in-time production chain), intermediaries (transportation-distribution), and end users (individual or semi-industrial consumers).

Since the early 1970s, food consumption (i.e., at home, not counting eating in restaurants and fast-food outlets) in Canada has been growing at a rate of 1.6 percent per year. That growth is considered moderate and has been accompanied by major changes in eating

habits and consumer behaviour. In twenty years, Canadian households have in fact modified the structure of their food spending, turning to animal-protein-based products at the expense of high-energy foods and abandoning traditional products that require a certain amount of work to prepare in favour of prepared products with significant postprocessing value added. Despite an overall drop in the percentage of the household budget spent on food, these behaviours have stimulated relative growth in some food categories such as dairy products (cheese and yoghurt).

Just as fresh vegetables are often replaced by canned goods and deep-frozen ready-to-serve products, so fresh seafood products are losing ground to prepared products and deep-frozen and frozen seafood dishes. This change in behaviour is due in part to the profound change in the pace of life, the economic climate, and a clear consumer trend toward comparing prices. That does not mean that households have limited the amount of food they eat, but that they buy more basic food products and top-price products sold by discount stores. That is the other result of the change in the sector's pattern of food consumption. At the end of the 1970s, when some Canadian distribution groups introduced the now-famous no-name products (products without a brand name), they started a minor revolution among product manufacturers.⁸¹ Of course, brand names associated with a distributor already existed, but never had anyone explicitly used the lack of a brand name to promote price and quality criteria. Since then, given the success of that venture, numerous distributors have joined the trend.

In addition to demand that is now based on price, there are two new factors at play: the growing pressure of wide-scale distribution, which serves a highly competitive market, and the improved quality of products sold under the distributor's brand name. Such products, which have often carved out a majority share of markets for minimally prepared products, are increasingly directed toward the midrange segment. Value-added processing of individual brands of seafood products may thus prove more difficult, because their innovative character, in many cases, does not go beyond simply changing the packaging. In this context, large groups (High Liner Foods, Fishery Products International, Connors Brothers, and Sogelco International) must review the factors that enabled them to improve or maintain

81. For example, no-name product lines sold under the President's Choice brand by Atlantic Superstores.

their profit margins in the 1980s. In fact, for a decade, the industrial sector has been sustained by three elements:

- ▶ Relatively strong growth, at times double-digit growth, in volumes, based on the development of highly buoyant new segments (quick preparation, precooked foods, and new fresh products such as mousse and pâté)
- ▶ An increase in value added, mainly attributable to the introduction of new preparation methods such as microwave cooking, sophisticated deep-frozen products, and light cuisine
- ▶ A decrease in production costs (raw materials, labour costs, site concentration, and delocalization) not built into the selling price but used to support an increase in promotional and advertising costs

Despite changes in eating habits and purchasing power, the market for seafood products in Canada has been more than holding its own up to now. In addition to quality and marketing efforts, the evidence indicating the superior nutritional value of seafood products, which are rich in trace elements and lower in fat than meat, has helped to sustain demand on the Canadian market. Apparent consumption of all types of seafood products in Canada amounts to nearly 10 kg per capita per year (see table 25) and shows major growth in some centres (Montreal and Toronto) and in some provinces (British Columbia), largely because of Asian immigration. Overall, consumers are developing a growing taste for seafood.

■ **The Market in Eastern Canada: Realities, Problems, and Potential**

With just under three million inhabitants, the geographic area of eastern Canada does not look as though it would constitute a major market for the seafood industry. And yet it does offer attractive prospects to producers, and because of its proximity it is being tapped by more and more of them at the same time as they move into exporting. In spite of what one might think, it is not just lobster, mussels, and oysters that are sold locally. In fact, a whole range of products is available to consumers and tourists in the region.

Outside the distribution network of fresh-product retailers (approximately fifty individual fish markets in eastern Canada), the main market for seafood products is structured around purchasing-pool networks of major Canadian distributors, such as Sobey's and Atlantic

Table 25
Apparent Consumption of Seafood Products in Canada,
by Product Category, 1988–98

Product Category	1988	1990	1992	1994	1996	1998
Total Consumption (in tonnes)						
Sea fish, fresh and frozen	114,528	118,588	137,399	175,712	131,875	137,103
Sea fish, processed	79,474	81,823	53,826	64,370	91,571	83,230
Seafood	35,054	43,123	45,611	42,043	48,601	68,400
Freshwater fish	5,352	5,805	6,233	5,509	5,631	5,750
All products	234,408	249,339	243,069	287,634	277,677	294,484
Per Capita Consumption (in kilograms)						
Sea fish, fresh and frozen	4.28	4.29	4.85	6.06	4.45	4.53
Sea fish, processed	2.97	2.96	1.90	2.22	3.09	2.75
Seafood	1.31	1.56	1.61	1.45	1.64	2.26
Freshwater fish	0.20	0.21	0.22	0.19	0.19	0.19
All products	8.76	9.02	8.58	9.92	9.37	9.73

Source: Department of Fisheries and Oceans Canada, annual statistics on commercial fisheries and aquaculture.

Superstore. In recent years, they have developed large spaces in their supermarkets entirely devoted to fish and seafood products.⁸² The increase in sales of fresh products, like sales of processed products (stimulated by innovations in flavour, packaging, and preparation), has encouraged distributors to maintain fairly wide product lines. Although these types of products are certainly more expensive for the final consumer (because of multiple industry requirements), in absolute terms they earn the highest profit margins.

That is also one of the reasons that more attention is being given to developing the fish departments in grocery stores. The only real problem is stock turnover and the capacity of supply centres, which are always complaining about product variations in composition, nature, and quantity, to provide just-in-time supply. Fluidity of supply has interfered with distributors' plans to promote a domestic fish

82. Various Canadian media campaigns on the nutritional value and taste of fish and the gradual consumer shift away from meat, beef in particular.

and seafood market. In fact as we will see later, the rules of the new economy require consistency at all distribution levels. To ignore that is to risk failure or major marketing problems. Specifically, that is why the policy of wide-scale distribution in eastern Canada (e.g., the Atlantic Superstore group) and the policy of subsidiaries have always revolved around maintaining a basic supply of clearly defined product lines that are fully guaranteed by suppliers.

Given current conditions, the only viable market that can ensure a return on investment from marketing a line of processed products is the Toronto and Montreal area. The distributors' policy, which is perfectly consistent, is understandable. Even if profit ratios in the seafood industry are good, supply management (quantitative and qualitative controls, supply flow, lack of product visibility, are modest size of markets) requires a marketing policy based on a three-year cycle, the same as was used in the past for such products as yoghurt and precooked, meat-based dishes.

For the same reasons, the role of institutional food services (e.g., Marriott) is particularly limited, because they manage a continuous-cycle manufacturing process. To date, practically none of the players in this industry segment in eastern Canada have wanted or been able to get involved in promoting seafood products, an attitude that will prevail among industry groups in the institutional food services until the situation proves otherwise. Moreover, a large percentage of the processed products marketed in major eastern Canadian distribution networks come from establishments in the Toronto and Montreal area.

Another factor we should point out that increases marketing problems is the prevailing lack of interest in seafood products among the population of eastern Canada. Furthermore, markets in eastern Canada have no distinctive character because the standardization of product lines has caused them to slavishly follow trends in other parts of Canada and the US. Nonetheless, the urbanization of the region, combined with some ambitious promotional campaigns, has transformed the market in a number of centres. In addition, the effect of the new US-influenced marketing approach, which involves selling the products of various manufacturers under the distributor's trademark, has often been to establish buyer loyalty either to a product line (commonly the case for various types of fish cakes) or to a specific product (salmon loaf and various fish pies). In Quebec, for example, several techniques have facilitated market improvement: increased

visibility of Quebec products outside metropolitan areas (mainly in the Lower St. Lawrence and Gaspé Peninsula and involving new pickled products), campaigns that convey a positive image, and innovative foods (mousse and pâté, convenient packaging, and the appeal of ethnic seafood dishes).

In the Atlantic provinces, distributors are betting on the success of (1) expanding commercial store space (stimulated by a slight increase in urban population) in the Halifax-Dartmouth, Saint John, and Moncton areas and (2) a strategy of rediscovering local products. In both cases, say distributors, the result has been a noticeable increase in sales of seafood products, although it has been sporadic and confined to specific product lines. As a consumer market, the Atlantic provinces offer only four or five population centres large enough for manufacturers to earn a return on their investments: the urban areas of Halifax-Dartmouth, Saint John, Fredericton, Moncton, and St. John's. In total, this target market amounts to 1.6 million people at most, making it a narrow market segment, especially given that processed and value-added seafood products are not part of the eating habits of residents of the region.

For processors in eastern Canada, the Atlantic market serves more as a testing ground for marketing new product lines. In the best-case scenario and for specific products, the Atlantic provinces represent a maximum of 8 percent of overall sales for established regional distributors with longstanding networks. It is a support market, fairly steady and easy to control from a marketing standpoint, and with fairly predictable market behaviour. Furthermore, this market has benefited greatly from modern management and distribution techniques used in central Canada, which was not the case even ten years ago.

The Quebec market, of course, is the top internal market in eastern Canada. On average, deep-frozen seafood products represent nearly 60 percent of purchases, fish and seafood 20 percent, canned goods 20 percent, and salted, smoked, and pickled products nearly 1 percent.⁸³ Successive promotional campaigns in Quebec and improvements in packaging and products (taste, smell, and special mixtures) appear to have stimulated sales of seafood products. In fact, as in the Atlantic provinces, some Quebec distributors are earning healthy returns on fresh and seafood delicatessen products (mousse, pâté, and spreads).

83. Estimates based on import flow.

In recent years, retail sales of seafood products and revenue from institutional food services in Quebec are estimated at over \$1.5 billion. Seafood products supplied to the Quebec market have a wholesale value of over \$500 million per year. Nearly a quarter (24 percent) of that demand is filled by Quebec production as a whole, only 10 percent of which is attributable to the maritime area. According to recent studies, retail food-sector sales of seafood products amount to approximately \$430 million, while institutional food services within businesses report revenues of \$970 million. In 1995, sales of seafood products accounted for 18 percent of the revenue of institutional food services. In fact, seafood products play an active part in Quebec's industrial food services network, which accounts for just under half the fish and seafood meals consumed by Quebecers. Some surveys conducted by the government of Quebec revealed that on the whole, Quebec products represent a very small part of the institutional market (hotels, institutions, and restaurants).⁸⁴

On the retail market in Quebec, seafood products are sold mainly to fish markets, grocery stores, warehouse stores, and supermarkets. In urban centres, because of the more diversified clientele, there is a greater demand for fresh seafood products (met by purchases from other provinces and imports) and precooked fish and seafood dishes. Quebec secondary and tertiary processing companies have profited from this segment of the market by expending considerable effort on marketing prepared products such as seafood mousse, crêpes, and pizza. A very small percentage of the production of processing companies (approximately 1 percent) is sold directly to consumers, generally by fish markets and factory outlets.

Quebec companies supply the provincial market through a network of brokers, wholesaler-distributors, and retailers. There is also a group of several companies (Gastro-Mer) dedicated to marketing secondary- and tertiary-processed products. As well, the Aristo-crabe group actively promotes snow crab in Quebec. There is also a trend toward product lines with moderate value added, such as canned products. Most canned products only experienced real growth in the 1980s because of new canning techniques. Improvements led to the creation of varied product lines that performed well. Canned products have also benefited from recent changes in consumer habits brought

84. See *Le diagnostic des pêches maritimes du Québec* [Quebec marine fisheries analysis], discussion paper from the marine fisheries forum secretariat of Quebec's ministère de l'Agriculture, des Pêcheries et de l'Alimentation (December 1994).

on by the drop in real purchasing power. Under these conditions, quality canned herring may prove an attractive product, because it is rich in protein and the price is highly competitive. Two solid markets for the time being are precooked canned foods (special sauces, sardines, and herring), salmon blocks, and canned tuna.

To summarize, the consumption of processed seafood products in Canada falls into two major market categories: consumption at home and outside the home. In recent years, the restaurant industry has accounted for approximately 27 percent of the total consumption of seafood products and over 30 percent of the consumption of processed seafood products. This market category comprises two segments: the restaurant industry (40 percent) and the immense institutional food services sector (governments, hospitals, universities, businesses, etc.). The restaurant industry exhibits a preference for whole fresh fish, while institutional food services buy mainly fresh and deep-frozen fillets. Experts predict an increase in the consumption of seafood products in Canada, with a preference for foods that are processed and prepared over those that are raw or fresh. From a qualitative standpoint, we also note that marketing strategies for seafood products will no longer be based on consumer characteristics (social and occupational categories, etc.) but on the circumstances surrounding their consumption (in the workplace, etc.). There also appears to be a shift toward hypernatural products, i.e., products that are "reconstituted" to taste as much as possible like natural products.

V

Diversification and Value-Added Production: Implications and Challenges

As in any other agri-food sector, the seafood product industry must constantly innovate to maintain its base and market share. Fish processors must deal with a reduced supply of many traditionally important species and, at the same time, adjust to the ever-shorter seasons resulting from quotas and higher fleet yields. To help make up the difference processing companies are turning more and more to the expanding aquaculture industry. A growing number are even acquiring fish-farming operations or arranging partnerships with small aquaculture operators to obtain basic products, while others are establishing strategic and trade links with businesses that have research and development and marketing divisions, companies with good international networks and a foothold in the major fish and seafood markets.

In addition to its ability to innovate in the areas of product content and presentation, the fish-processing sector depends on many other variables to be competitive in the marketplace. We have already mentioned the issue of establishing the right conditions for gaining access to raw materials. At the other end of the chain, however, is the question of a product's consumer appeal, which is not just a function of price but is based on many other factors including format, presentation, convenience, and so on. The availability of an increasing variety of seafood products from around the world is contributing to the internationalization of tastes and consumer habits, a process that is amplified by new standards of quality. Because of this trend toward uniform tastes and standards, offering products that are differentiated in content but presented in attractive and convenient sizes and packaging has become essential. Examples of such products are small vacuum-packs of smoked salmon slices and ready-to-serve seafood spreads (crab, salmon, and shrimp). The introduction of resealable packages, which keep contents fresh longer, has also been well received by consumers in recent years.

These examples show the importance of investing not only in industrial logistics (infrastructure and equipment) but also in

specialized human resources to design new products in various sizes and packaging to suit a specific market niche. In this respect, it is essential that a business be in sound financial health. A business with a positive bottom line is in a better position to innovate and to invest in design and marketing than one that is struggling just to survive. Businesses that fail to generate healthy earnings can hardly reinvest in innovative management practices, launch new products, or tackle new markets.

In both Atlantic Canada and the rest of the world, the seafood industry is going through a crucial transition phase. The factors underlying these changes are multifaceted: overfishing of stocks and pressure on the marine and coastal environment, resulting in new agreements on resource-harvesting conditions (moratoriums and codes of conduct for fisheries);⁸⁵ industrial standardization and the introduction of international criteria of quality for seafood products (HACCP); the advent of trading blocs (NAFTA, the European Union, etc.) and the gradual reduction of customs tariffs on seafood products as a result of the Uruguay Round of GATT negotiations;⁸⁶ the upsurge in technologies that facilitate and accelerate the flow of trade information and trade itself (tools to track suppliers, points of sale, and Internet sales) and contribute to expanding the range of available products while reducing costs (the cases of farmed salmon and shrimp are typical); reorganizing the internal management of companies to adjust to the changes and the resulting need to network;⁸⁷ and,

85. The *International Code of Conduct for Responsible Fisheries*, for example, defines international principles and standards of behaviour to ensure responsible practices and thus the conservation, management, and development of bioaquatic resources through respect for ecosystems and biodiversity. The international code recognizes the nutritional, economic, social, environmental, and cultural importance of fisheries and the interests of all those involved in the fisheries sector. Jointly with 300 fisheries organizations, Canada has also developed a code of conduct for sustainable fisheries. For further information, see *Canada's Oceans Strategy: Challenges and Opportunities for the Commercial Fishing Industry*, a report prepared for the Canadian Fisheries Council (Ottawa: Pro Limited, n.d.).

86. Note that average customs duties on imported seafood products in industrialized countries decreased from 6.6 percent in 1993 to 4.8 percent in 1997, a significant reduction of 2.7 percent (FAO, International Trade, 1998); however, serious obstacles remain involving nontariff barriers.

87. The trend towards strategic alliances, mergers, and takeovers has dominated all sectors of the economy for a number of years; the phenomenon seems to have become commonplace in the agri-food sector in recent years and has now extended to the seafood industry. We are also seeing a number of examples of vertical and horizontal integration, in particular the purchase of Clouston Foods (Montreal) by FPI of Newfoundland; the Sogelco-Pêcheries Cap Lumière partnership; the takeover of Paturel (New Brunswick) by Eastcoast Seafoods of Maine; major lobster-processing businesses in Prince Edward Island merging to form a new entity, Polar Foods International; and the takeover by Newfoundland's Barry Group of New Brunswick (Blue Cove Group) and Nova Scotia (Seafreeze Foods) plants.

finally, the progressive review of government involvement in the operations and management of the fisheries as a whole.⁸⁸

In short, the new approach is to fish less and better, to produce more intelligently and at lower cost, to offer a diverse line of products to maintain market share, to comply with established quality standards at all stages of production and distribution, to monitor competition on an ongoing basis in order to adjust to changes in supply and demand (entry of new producers and appearance of substitute products), and thus to plan production more effectively for the medium term. The challenges are many and the implications may be various, depending on the sector, the products being produced, and the type of business operation. Let us look then at some of the challenges where we think that by using their imagination producers in eastern Canada could make their operations profitable and maintain their market share.

Primary Supply Challenges

Although dependent on the primary sector, the processing industry must be able to respond to the demands of competition. This means that not only must price be competitive but so too must quality and consistency of supply. In view of the prevailing uncertainty surrounding local primary supply, the industry is trying to diversify its sources by buying raw materials from neighbouring regions and provinces and by increasingly turning to imports and aquacultural production.

Current uncertainty over resource supply (quantity and cost of raw materials) is contributing to the general instability that is preventing medium- and long-term planning by producers, including fisher-owner groups. In some industry segments, particularly snow crab, losing a few vessels to a competitor may be crucial as regards overall costs and therefore gross profit margins. This is particularly true in the most lucrative sectors, where price wars mark the beginning of every season.

Uncertainty over primary supply is the producer's worst nightmare because it could leave a well-conceived management plan in complete disarray. By ensuring an adequate primary supply on realistic terms, however, a producer can organize work schedules, plan equipment and infrastructure investment, and arrange for the many products

88. In Canada, these changes take the form of participative management and are part of the reform of income support programs (employment insurance).

and services required for production, packaging, transportation, distribution, marketing, and so on. With a secure, consistent supply, businesses can also maintain operations and keep work teams active, thus improving economies of scale and maintaining the bottom line. Finally, secure supply ensures consistent output, which helps retain markets that not only are sensitive to fluctuations in both price and supply but also demand consistent product quality and supply.

In each province, the factors limiting value-added processing depend in large part on conditions affecting primary supply (the type of resource available, resource cost, and security of long-term supply). That is why producers of seafood products are gradually incorporating in their plans an import-export strategy to deal with questions about local supply. It also explains the increase in the intraregional flow of basic products as part of interprovincial competition in this area. Although major groundfish companies, such as Fishery Products International and High Liner Foods, have made imports-exports a part of their management strategy for several years, a considerable number of small businesses and large corporations in all sectors are now importing their basic products. As we have seen, imports of seafood products in eastern Canada went from 50,000 tonnes in the late 1980s to approximately 200,000 tonnes at the end of the following decade. Moreover, the variety of products imported has increased and now includes various fish products from the capture fisheries and aquaculture, an assortment of crustaceans, and mollusc meat.

As shown in table 26, the use of imported products primarily involves producers in the provinces of New Brunswick, Newfoundland, and Nova Scotia, where imports increased from 34,400 tonnes in 1990 to 175,000 tonnes in 1999. We should point out that imports of seafood products to the three provinces peaked in 1996 at 199,000 tonnes: the majority, of course, were destined for secondary and tertiary processing. Another interesting fact is that in some cases the volumes imported are close to and even exceed the volumes exported. For comparison purposes, a column has been included in the table to show the ratio of imports to exports. That ratio has changed considerably in each province, with the average for eastern Canada ranging from 13.5 to 60.4 percent. It should be noted that at this time Prince Edward Island does not make use of imports and that processors in Quebec import large quantities of unprocessed and primary-processed products for further value-added processing. In addition, the fisheries in Quebec differ from the fisheries in the Atlantic provinces in that the Quebec market absorbs a significant amount of the provincial

Table 26
Change in Imports of Seafood Products to Eastern Canada,
by Province, 1990 and 1999

Province	Imports				Ratio of Import Volume Compared to Export Volume (%)	
	Volume (in tonnes)		Value (in millions of dollars)			
	1990	1999	1990	1999	1990	1999
Newfoundland	2,589	48,959	0.7	218.4	1.8	50.6
Nova Scotia	7,753	38,477	21.7	133.4	4.4	29.7
New Brunswick	24,057	87,575	52.1	310.3	29.4	100.1
Subtotal	34,399	175,011	74.5	662.1	8.6	57.0
Quebec	25,528	33,315	99.6	176.7	92.8	164.4
Prince Edward Island	–	–	0.2	0.2	–	–
Eastern Canada	59,928	208,326	174.1	839.0	13.5	60.4

Source: Department of Fisheries and Oceans Canada, annual statistics on commercial fisheries and aquaculture; compiled by the author.

production and must therefore rely more on imports. Finally, it is important to note that Quebec's processing sector has a dual profile: first, the industry in maritime regions obtains its supplies locally and essentially for export markets, and, second, the processing and value-added processing industry in metropolitan areas is supplied by imports and sells a large part of its production on the Canadian market.

New Brunswick is a special case. There we see a sustained level of imports of chilled and frozen products and marginally processed products. Moreover, New Brunswick processors are importing increasingly diverse products, three-quarters or more of which are used as raw material for processing plants. The list is fairly impressive. In 1997, for example, the province imported fresh lobster (valued at \$115 million) from Maine and neighbouring states; various groundfish products including frozen cod (\$8.5 million) from Alaska, Russia, and Norway; frozen fish meat (\$13.4 million) from Russia, Alaska, China, and European countries; and hake, pollock, and other species of groundfish. Additional imports include shrimp, mainly frozen (\$10 million) and primarily from Cuba but also from the United States; Alaska crab (\$5 million), scallops (\$2.3 million), and other fresh and chilled molluscs (\$4.8 million); and even fresh herring (\$1 mil-

lion). Apart from those products, which are intended for primary and secondary processing, the province imports fishmeal and fish food (\$20 million) from Chile, the United States, and Peru, mainly for the salmon-farming industry, and fish oils and fats (\$9.3 million) from the United States, Peru, and Iceland.⁸⁹

Based on the evidence of this list, there is no doubt that a large number of processing companies, both in New Brunswick and the other provinces, have adopted an import-export strategy to supplement local supply shortages. The list attests to the extensive expansion of the seafood industry on the East Coast and, even more important, its large export capacity. In Newfoundland, New Brunswick, and Nova Scotia, the value of seafood products imported for processing increased eightfold from 1990 to 1999 (from \$74.4 million to \$662.1 million), while exports rose by 56 percent (from \$1.51 billion to \$2.36 billion). The \$845 million increase in exports is eloquent proof of the adjustment made by these three provinces, especially considering that they are still feeling the effects of the groundfish moratorium.

■ Cost Control

Any business that wants to undertake, or has undertaken, value-added processing is faced with the dual requirement of controlling the supply cycles for basic products and costs. In this regard, businesses active in tertiary seafood processing are not immune to the problems of companies in related fields (processing vegetables, fruit, meat, etc.). Value-added processing of seafood products basically requires complete control of primary supply (simply put, avoiding, as much as possible, fluctuations in the manufacturing cycle that generate major management problems) and beyond that of costs.

Long dependent on conditions of regional supply, most small- and medium-sized businesses in eastern Canada have stagnated in low value-added activities. Accustomed to producing traditional product lines (smoked fillets, single frozen pieces and traditional cures), they have not been able to establish medium- and long-term cost planning, which would enable them to expand upward by producing new products and adding more value to traditional products. Some larger groups, because of their greater knowledge of, and inclusion in, international marketing networks, have been able to introduce just-in-time management to minimize industrial losses and to facilitate amortiza-

89. The figures for imports and exports of seafood products are from Industry Canada's trade database STRATEGIS.

tion. Vertically and horizontally integrated businesses have begun to use more aggressive cost-accounting strategies to maximize their production facilities. The use of imports, new packaging materials, and new value-added strategies (precooked, semipreserved, ready-to-serve dishes) can all be seen as parts of the producer's plan to achieve better cost control. Although costs appear to be increasingly well-adjusted in large groups, there are significant differences based on the type of industrial processing involved, whether deep-frozen, precooked foods (often complex to develop and distribute), canned seafood (simpler but with a low unit value), or products referred to as deli, or semifresh, products (high value added but with extreme variations in depreciation depending on the technology employed).

In general, costs vary considerably, depending on the price of the fresh products to be processed. Obviously, the weighting of different costs changes for an expensive product such as lobster, salmon, or fish roe; a medium-range product such as haddock or pollock; and an inexpensive product such as sardines or herring. In all three cases, processing and packaging costs are practically equivalent in absolute value, but their weight expressed as a percentage of production cost is not comparable. Furthermore, the gap between the prices of fresh foods and value-added processed foods tends to widen for staple convenience goods, which require strict cost control.

Few costs other than manufacturing costs can be reduced by any action taken by the producer. We note that the percentage of overhead and depreciation is moderate. In some industries, such as the canned foods sector, the profit margin is approximately 3 percent, which is relatively low. In that case, it is the volume, not the unit product, which counts. In the semi-preserved and deep-frozen, precooked foods sectors, if manufacturing is the main cost component, the profit margins are higher.

Another important area of cost control is the purchase of raw materials, always one of the central costs for secondary and tertiary processing of seafood products. Processors and fishers have always been at loggerheads over the price of landed fish and seafood, and for good reason. The fact is that raw materials account for over 80 percent of a plant's overall direct production costs, as we will see later, and partly for that reason forming dealer groups to import products in a continuous cycle has become the rule. Also, since costs cannot sustain major fluctuations in prices of local supply, producers for a number of years have had no hesitation in using seafood from China, Thailand, and Mexico or fish from Lithuania, Russia, and Eastern Europe for

value-added processing. With controlled imports, easier access to the international market for basic products, and the increasing use of farmed supply, the general effect has been to "insulate" production prices from any fluctuation in the cost of local products.

Packaging materials for canned goods are another important cost component. For a company like Connors Brothers, a canning industry leader that produces 160 million cans per year, it became imperative not only to manufacture its own metal cans but also to set up a labelling system. In addition to keeping production costs as low as possible, the company can now respond quickly and effectively to the requirements of various markets.⁹⁰ In the case of certain products such as canned mackerel (e.g., Qualimer in Quebec), the price of tin cans is somewhat high compared to the price of the fish, which limits value-added processing. In other sectors such as fresh, value-added, semipreserved foods (fish and seafood spread, shrimp pâté, mousse, etc.), packaging that posed numerous problems a few years ago is no longer an issue, so that processors are now able to focus mainly on the illustrations and convenience of the product (ready to serve, etc.). In general, however, manufacturers complain that they have to pay too much for their cans; ways must be found, therefore, to make substantial savings on the cost of containers, particularly new plastic materials and reinforced cartons.

Beyond the cost of buying basic products, our analysis of costs shows that the processing of value-added seafood products is, first, a marketing issue and, second, a technical issue. Knowledge of the needs and requirements of markets, in-depth marketing studies, excellent advertising campaigns, standardization constraints, and ongoing control of the supply chain are all components that only big companies can handle. That largely explains why real value-added strategies are rarely used by small- and medium-sized regional businesses. It is not that they are not interested, but rather that they cannot reasonably use these techniques because they lack the flexibility to play with medium- and long-term costs. For them, any value-added processing is prohibitive because it reduces profit margins, at least in the first

90. Many factors now come into play in this area. In fact, packaging changes (preservation of sensory appeal, development of individual portions, etc.) have made this cost item particularly important in terms of direct costs (price of materials, consumption of stickers, and labels) and indirect costs (utilization, transportation, and storage processes). Enhanced marketing that can give a product new value by adapting it to a variety of demands from distribution channels and consumers has made packaging highly strategic. It has become a major component of products, because fierce price competition is still being waged, particularly as a result of the concentration of manufacturers in Canada and the globalization of packaging markets.

few years. Most companies do not have the financial reserves to consider taking this risk, and borrowing is out of the question. As well, companies with limited lines are generally very dependent and balk at value-added processing. This state of affairs basically explains why only well-established industry groups are involved in value-added processing in the three main activity sectors (precooked, canned, and semipreserved foods).

This does not mean that SMEs, or even small businesses, are necessarily excluded from value-added processing. In fact, specialized SMEs that are technically, financially, and commercially capable of producing new, high value-added products are entering the sector. In many cases, however, they are connected with more powerful groups and develop targeted production agreements with them, which keep costs realistic and make value-added processing possible.

Apart from these technical and marketing considerations, it goes without saying that the financial profitability of existing businesses is an important factor in value-added processing in Atlantic Canada. In any case, our aim is not to assess the profitability of the region's fish-processing businesses on a case-by-case basis. Instead, we provide an analysis of the entire seafood product processing sector in each province. To do so, we have established various indicators by year (1985–97) and have presented the results, which are from Statistics Canada's *Annual Survey of Manufactures*,⁹¹ in the tables and figures that follow.

A number of conclusions can be drawn from table 27. First, we can see that the processing industry in eastern Canada reached a low in 1994, when the effects of the moratorium were at their height and the groundfish sector had almost finished rationalizing. The number of hours worked that year (27.7 million hours) was only 62.5 percent of the number of hours reported in 1988 (44.3 million hours). Also, acquisition costs for raw materials were very high throughout and increased substantially for a number of years. Resource depletion not only contributed to reducing work time but also exerted additional constraints on the productivity and profitability of production lines. The cost of raw materials as a percentage of production costs increased

91. The *Annual Survey of Manufactures* (cat. 31-203) is based on a representative sample of businesses by activity sector and region. For 1997 the survey selected 337 establishments (plants) and 15,332 production workers (according to the number of person-years): it is well known that there are more than twice that number of processing companies, and the number of employees selected is also much lower than the Statistics Canada (census) estimate, which for 1996 places it closer to 38,500. However, the *Annual Survey of Manufactures* data provide more information on production factors and sector productivity and profitability.

Table 27
Change in Performance Indicators for the Seafood Industry
in Eastern Canada, 1985–97

Year	Number of Plants (sample)	Number of Workers (prod. only)	Number of Hours Worked (in thousands)	Performance Indicators						
				Avg. Hourly Wage (\$)	Raw Material/ Total Costs (%)	Total Costs/ Shipments (%)	Value Added/ Shipments (%)	Value Added/ Wages (%)	Value Added/ Hour Worked (\$)	GPM ^a / Shipments (%)
Fish Products Industry (SIC 1020)										
1985	324	19,976	39,928	6.89	72.3	83.0	36.8	1.82	12.54	17.01
1988	371	22,042	44,326	7.98	74.9	81.9	35.9	1.93	15.43	18.10
1989	383	21,582	42,992	8.46	73.5	85.6	35.4	1.71	14.48	14.42
1990	377	19,284	39,288	8.54	74.3	82.1	36.8	1.93	16.50	17.93
1991	355	18,029	36,225	8.91	75.7	83.7	35.8	1.97	17.57	16.35
1992	345	17,562	34,712	9.97	75.6	85.3	33.5	1.80	16.35	14.72
1993	349	15,176	28,914	8.84	80.6	86.2	30.2	2.05	18.16	13.81
1994	333	14,902	27,714	9.06	82.4	85.3	27.5	2.08	18.85	14.74
1995	320	14,589	28,429	8.73	84.5	89.4	25.2	2.06	18.03	10.63
1996	325	13,899	26,778	9.09	83.8	84.7	27.5	2.29	20.81	15.32
1997	337	15,332	29,106	9.18	83.6	85.8	26.4	2.13	19.54	14.24

All Manufacturing Industries										
1985	12,600	432,617	886,036	10.44	77.3	73.6	39.4	3.03	31.65	26.36
1988	14,147	485,881	1,007,308	11.61	76.0	69.7	44.3	3.26	37.88	30.33
1989	13,478	471,224	977,438	12.32	76.0	69.8	44.2	3.25	40.11	30.15
1990	15,318	450,555	924,711	13.00	75.6	70.6	43.9	3.17	41.25	29.43
1991	13,630	394,573	817,936	13.61	75.8	71.0	42.3	3.14	42.69	29.04
1992	12,903	382,136	789,736	14.05	75.6	70.9	42.9	3.17	44.47	29.14
1993	12,269	377,121	779,146	14.34	76.9	70.4	42.6	3.36	48.21	29.62
1994	11,838	389,066	803,630	14.46	77.9	67.9	44.1	3.78	54.61	32.06
1995	11,773	397,528	825,505	14.76	78.9	67.6	44.2	4.01	59.27	32.44
1996	11,902	396,050	823,133	14.78	79.1	67.9	43.6	3.99	58.90	32.09
1997	12,067	430,649	874,167	15.15	79.1	68.5	43.2	3.92	59.40	31.53

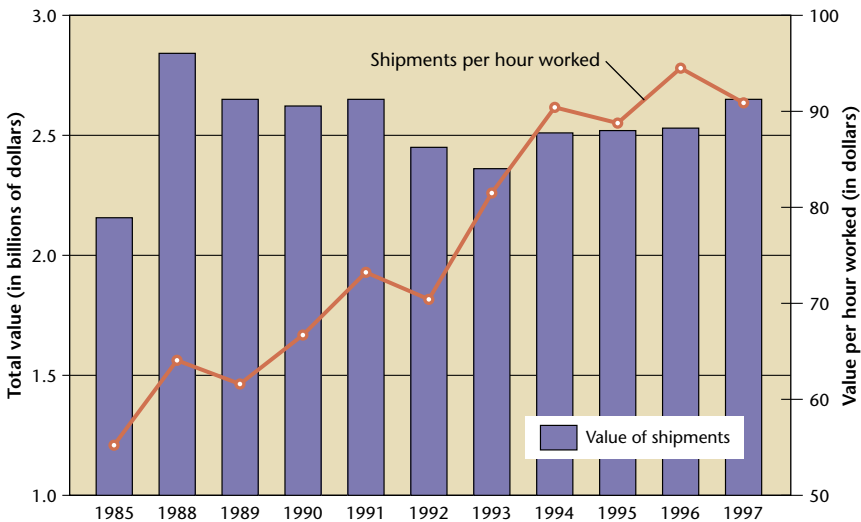
Source: Statistics Canada, *Annual Survey of Manufactures in Canada*, cat. 31-203; compiled by the author.

^a GPM (gross profit margin) is the difference between the value of shipments and total production costs.

from 74.3 percent in 1990 to approximately 84 percent at the end of the decade, directly affecting plant profitability, which is expressed as gross profit margin (GPM). As a percentage of shipments, it dropped from 18.1 percent in 1988 to 10.6 percent in 1995 and subsequently recovered.

Contrary to popular belief, it is not wages that have the greatest impact on the profitability of fish processors: wages represented only 14.5 percent of total production costs in 1997. We can also see that hourly wages were relatively static in this sector in the 1990s (increasing by only 7.5 percent), which, with the increased use of new technologies, largely explains the improvement in productivity indicators. For example, the value of shipments per hour worked increased considerably from \$62 in 1989 to nearly \$95 in 1996, an increase of over 50 percent (see figure 13).

Figure 13
Value of Shipments in the Seafood Industry (SIC 1020)
in Eastern Canada, 1985–97



Source: Statistics Canada, *Annual Survey of Manufactures in Canada*, cat. 31-203; compiled by the author.

Within the region, the industry shows a number of differences according to the province. Although the cost of raw materials is high everywhere, it was lowest in Newfoundland, at least for 1997. This difference is partially explained by the increase in the supply of shrimp and snow crab, two products that now account for a very large percentage of the output of the Newfoundland fisheries. In addition, wages represent a higher percentage of production costs in

Newfoundland, reducing the percentage for raw materials. In fact, the average hourly wage is 15 percent higher than the regional average. The industry also shows greater productivity in Quebec, Nova Scotia, and Newfoundland, as judged by the value added per hour worked (see table 28). The presence of an integrated sector dominated by a few large companies with large fish and seafood quotas contributes significantly to improving performance in these provinces. In the case of Quebec, it is more the location of large segments of the industry (large processors in urban centres) and the focus on secondary and tertiary processing that foster higher value added and, as a result, better performance indicators.

Table 28
Comparative Performance of the Fishing Industry,
by Province, 1997

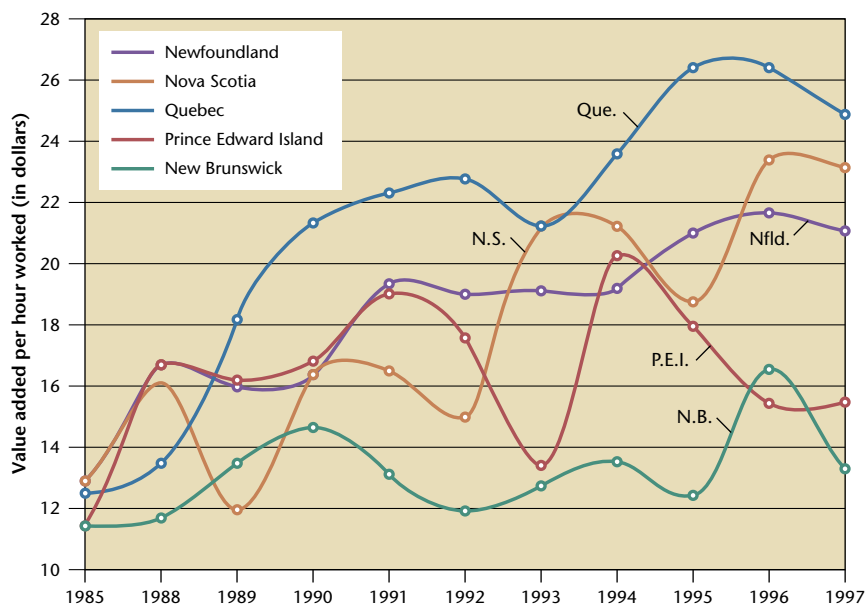
Province	Average Wage/ Hour Worked (\$)	Share of Production Costs (%)		Performance Indicators for the Production Sector			
		Wages	Raw Materials	Value Added/ Wages (%)	Value Added/ Shipments (%)	Value Added/ Hour Worked (%)	GPM/ Sales (%)
Newfoundland	10.58	19.2	78.2	1.99	32.3	21.08	15.8
Prince Edward Island	7.74	11.4	87.1	2.00	21.0	15.48	7.4
Nova Scotia	9.43	12.6	85.7	2.45	26.0	23.15	15.9
New Brunswick	8.38	14.0	84.4	1.59	20.5	13.30	7.9
Quebec	8.45	14.6	83.1	2.95	32.8	24.89	23.9
Eastern Canada	9.18	14.5	83.6	2.13	26.4	19.54	14.2
British Columbia	15.22	16.3	82.2	2.26	30.4	34.43	17.4

Source: Statistics Canada, *Annual Survey of Manufactures in Canada*, cat. 31-203; compiled by the author.

The positioning of the provinces varies, of course, from year to year, but overall, the trends are steady and the gaps may even widen. The value added per hour worked has thus fluctuated significantly in each province depending on the year, but the hierarchical order has not changed and the differences among the provinces have increased, as is shown in figure 14.

Figure 14

Productivity of the Fish-Processing Industry in Eastern Canada, by Province, 1985–97



Source: Statistics Canada, *Annual Survey of Manufactures*, cat. 31-203; compiled by the author.

The Technology Challenge

Barriers to innovation are not just conceptual; they are also social, institutional, and political, particularly in the seafood industry. There, the technology challenge is to improve the capacity for innovation in the areas of new products and services, production (preparation and packaging), and distribution and management. This does not necessarily involve developing new tools and processes within the sector or a company something that often requires major investments in research and development, but rather adopting current techniques and innovations and adapting them to suit a company's needs. In fact, it is well known that the performance of most manufacturing and service industries is based largely on using ideas and products developed by others. That explains the sense of urgency felt by government everywhere to implement mechanisms to support the adoption and dissemination of technology, particularly in small- and medium-sized businesses. Improved technological capacity is

intended to position a company so it can make more effective use of its human and material resources, which generally, though not always, involves the adoption of new tools and procedures.

Too often in maritime fishing communities, technology challenges are associated with capture efficiency, i.e., speed and quantity of catches. Generally, the fisheries have tried to increase productivity by replacing fishing fleets and gear, with the aim of catching greater volumes of fish in a shorter time. As we have seen, however, catching a predetermined quota of a species in record time does not necessarily improve competitiveness. It may even be harmful to it, and in the end investment may be killing investment.⁹²

As in every other activity sectors, a better way to meet the technology challenge in the fisheries is to approach it from a global perspective. The focus of attention then becomes such issues as product innovation,⁹³ the reorganization of work, an overhaul in vocational training, even the adaptation of economic, institutional, and regulatory frameworks. For the fisheries, the concerns appear to be mainly with production organization (supply strategies and technology input and expertise, particularly in presentation and packaging and product quality) and with distribution-marketing (industrial and trade strategies).

Rapid globalization of the market for seafood products is making the marketing of these products more complex. Companies must be flexible, effective, and innovative to be competitive, which is why it is important to focus on listening and responding to demand, meeting quality requirements, and incorporating technical innovation across the industry. Although these strategies are an inherent part of increased market globalization and industry reorganization, they are dictated by the expansion of supply and the growing specialization in the demand for seafood products.

92. Generally speaking, fishing beyond a certain level causes production to stagnate and profits to decline. It is a classic illustration of the law of diminishing returns, a case where it can be said that investment is killing investment. The lobster and crab fisheries provide typical examples: modernization of vessels and equipment constantly pushes the profitability threshold upward. The phenomenon of overinvestment is particularly evident in the crab fishery, where the profitability threshold reaches significant levels given the type of fishery (midshore with traps) and the relative proximity of the resource.

93. Product innovation should mean differentiated production and not necessarily the designing of new products. Clearly, this means better-adapted presentation (packaging and format), an improved recipe (the addition of new ingredients such as spices and sauces), and new ways to attract consumers (targeted marketing strategies and orchestrated advertising campaigns).

It must be remembered that more than a steady supply of natural resources, technological expertise and innovation are determining factors in competitiveness. The consensus is that in the new economy, innovation in the use of human resources (competencies), capital (technology), and ideas (knowledge and expertise) is the key to long-term growth. It is a principle that applies equally to industries that produce both goods, traditional or modern, and services, which is why investment in R & D, education and training, and new work organization structures are so important to productivity and growth.

It has also been established that a company's market orientation is closely linked to its size, which also determines its technological capacity. In other words, the larger the company in terms of employment, the more extended its export area is, and the more open it is to incorporating new technology. It is not so much the intrinsic capacity for technological development that should be the focus of local companies as their ability to absorb and integrate new technology and procedures to improve their competitive position. Technological capacity, in fact, depends on a whole set of factors, including the presence of specialized infrastructures and services in the technical and financial areas of management and marketing and an effective educational and training system. It goes without saying that a highly trained workforce is a primary asset, because in most cases it is the skilled workers in a company who incorporate new practices and technology. All the factors involved in integrating new technologies combine to create what is called an "innovative environment," i.e., an environment open to entrepreneurship and new ideas.

It is clear, however, that the dissemination of technology is mainly dependent on the company itself, i.e., its access to and participation in information networks, contacts with other firms, strategic monitoring of the competition (technical analysis of competitors' products is an important source of information), client-supplier relations, and even subcontracting. In outlying regions, where most Atlantic coast fish processors are located, manufacturing SMEs generally turn to their suppliers to improve their technological capacity. Clients, who determine the requirements, particularly for subcontracting, are also of great importance, as are consulting firms, research institutes, and industry partners. A study conducted in Quebec reports that six out of ten SMEs are subcontractors, and 29 percent of SMEs delegate some tasks to subcontractors.⁹⁴ It is not surprising then that they cooperate

94. "La tournée des régions" [tour of the regions], the 8 March 1997 issue of the Montreal publication *Les Affaires*, devoted to the Gaspé Peninsula and the Magdalen Islands.

with their contract givers, who are increasingly imposing recognized quality standards, the standards in question being ISO certification.

The ISO 9000 series of international standards is a set of concepts and guidelines applicable to quality management and assurance. Besides instilling confidence in a product because it meets a set of rigorous standards that are recognized around the world, they also contribute to improved control over internal manufacturing, management, and marketing processes. Sixty countries, including Canada, the United States, and Japan, have made the ISO 9000 series their national standards, and it has increasingly become a fact of life in the global market; ISO 9000 certification is now virtually essential in exporting and is on the list of requirements of major contract givers. Because it is well known that proportionately more SMEs that meet ISO standards export their products, there is mounting pressure on subcontractors to obtain their ISO certification.

■ Industrial Standardization: Issues and Constraints

The more aware consumers are of issues of safety and quality concerning foods, the greater the pressure to strengthen regulations in this area. The recent increase in diseases transmitted by food products (Creutzfeldt-Jakob syndrome, or mad cow disease, salmonellosis, and listeriosis) has only heightened consumer fears. Although seafood products have enjoyed public favour for some time, mainly because of their healthy image and nutritional benefits, they are not exempt from incidents that periodically undermine consumer confidence.

That does not mean, however, that the purpose of industrial standardization is simply to bolster consumer confidence. Despite the additional constraints it imposes on a business, particularly on an SME, standardization has a number of real advantages, both inside and outside a business. Inside a business, ISO standards encourage all staff to meet a common quality objective. It helps improve productivity by reducing the incidence of malfunctions, which are sometimes numerous, especially in food processing, and it gives the manufacturer increased confidence in the product, manufacturing method, and organization. The benefits of certification are even more evident externally: it allows the manufacturer or supplier to respond more effectively to the demands and concerns of industry clients and consumers regarding product quality, because the manufacturer now has a legal responsibility to comply with established standards. Certification also facilitates trade by helping a company avoid delays

that may hamper the competition. Finally, and this is a definite asset, ISO certification reduces the frequency and intensity of audits by buyers and eliminates burdensome procedures between suppliers and clients, thereby contributing to the creation of group and industry synergy. This is extremely important to major seafood product processors with an integrated network of various suppliers of basic products (seafood, molluscs, and fish), products added (vegetables and various additives), and packaging (tracking the quality of biocompatible plastics and metals for preserving). Although few processing companies in Atlantic Canada fall into this category, the list is likely to grow when industrial certification is introduced throughout the fisheries industry. The forty members of the New Brunswick Fish Packers' Association that are exporters now have to incorporate the QMP quality control plan, which includes the main components of the HACCP system. Some lobster processing plants in particular have had to make major investments, of up to \$250,000, to meet QMP standards. Investments of that magnitude are probably a heavy burden for small processors engaged in value-added processing.⁹⁵

Industrial standardization thus requires some streamlining of production, management, distribution, and marketing activities. However, when prices are competitive and approved standards of quality are in place, it is the companies and consumers who will stand to gain. Producers will also gain when their products are identified with publicly sanctioned standards, because they will find it easier to win client loyalty and to target market strategies.

Among the major industrial sectors, the agri-food sector generally lags behind when it comes to standardization. So far, the demand by the Canadian agri-food industry for actual standardization has been lukewarm, except perhaps in testing and analysis. Clearly, this is a major task that will require considerable effort before it is completed, particularly in the Atlantic provinces. Until now, only Quebec has truly introduced a standardization process in the seafood products sector to supplement the national regime in effect in Canada. Those initiatives are still inadequate, however, and limited to too few products and services. Overall, we are still far from having a wide range of value-added products that are certified and recognized as such by major US and European purchasing pools. Nor is the problem confined to exports. There is also a relative lack of standardization in the

95. Discussion with Peter Dysart, executive director of the New Brunswick Fish Packers' Association.

development of Canada's domestic market, which prefers to import the majority of its tertiary-processed seafood products. For example, restaurant chains (Marriott and McDonalds Restaurants of Canada) have had to stop serving lines of seafood products from Atlantic Canada for the simple but compelling reason that the level of standardization is too low. This calls into question not only the ability of regional businesses to aggressively promote a product but even local expertise.

Aware of the problem and the need to solve it quickly, the provincial and federal governments have taken a number of measures in recent years to enhance the image and to guarantee the quality of Canadian products, particularly seafood products. For example, recent improvements in plant inspections and sanitary management have resulted in a drop in product rejection. As well, DFO has undertaken numerous quality management initiatives to bring producers, particularly SMEs, closer to ISO compliance. In launching a new triple-barrelled program, i.e., product, quality, and safety identification, DFO is supporting common promotional efforts of the agri-food industry as a whole.

The QMP, jointly developed by the fish-processing industry and DFO and introduced in February 1992, is an important step toward consistent quality standards. To begin with, the QMP is an improved inspection program that requires all registered processing plants to develop and implement in-plant quality-management programs. It ensures that fish products in Canada comply with regulatory requirements. The program offers some benefits for producers, including a streamlined certification process for finished products destined for export (thus facilitating market access), the privilege of displaying the "Official Inspection — Canada" logo on products, and reduced government intervention in ongoing operations. Since the QMP is increasingly recognized internationally, particularly by the EEC and the United States,⁹⁶ Canada also gains a competitive advantage over other countries.

The QMP is based on five of the seven HACCP principles. The initials HACCP have become synonymous with safety in the food

96. Since its implementation, the QMP has undergone a number of reviews and analyses to determine its effectiveness, including regular internal reviews by DFO; it was reviewed by the Food and Drug Administration and the National Marine Fisheries Service in the United States. In September 1995 it was also reviewed by an international committee of fish-processing and quality assurance specialists.

industry throughout the world; no other system or method can provide the same degree of safety and ensure the same quality. Using this method, companies can identify potential problems more easily and solve them quickly during processing before the product gets to market. Many countries have already incorporated, or are in the process of incorporating, HACCP principles in their food inspection programs. Largely based on standardization in high-tech industries (new materials and genetic engineering), the HACCP system is now required by the US Department of Agriculture in all meat-processing plants. HACCP standards have also been applied in the seafood products sector in the United States since December 1997.⁹⁷ The European Union has adopted some measures to harmonize HACCP implementation within its member countries, measures that go as far as recognizing the equivalency of inspection systems based on HACCP principles in use in nonmember countries. The new requirements will have an impact not only on the local food-processing industry in this country but also on food processors that export products to the US and EU markets.

Standardization developments of this kind could have a harmful effect on exporters of Canadian fish and fish products if a redesigned management program is not established to bring them even closer in line with international quality standards.⁹⁸ Efforts are also underway to incorporate all seven of the HACCP principles, instead of just the five in the QMP.

Industrial standardization is thus an extremely topical issue among all players in the agri-food industry. The fact that Maritime processors are increasingly using official certification bureaus and recent ISO 9000 certification procedures undertaken by various research centres in eastern Canada are proof of changing attitudes within the industry.

97. The Seafood HACCP Regulations of the Food and Drug Administration came into effect on 18 December 1997. In compliance with these regulations, all sectors of the seafood-processing industry, including processors, packers, warehouse managers, and importers, are required to implement systems that incorporate the seven HACCP principles.

98. "Latest News on QMP Re-engineering," *QMP Newsletter* (5 May 1997); published by the Canadian Food Inspection Agency.

VI

Approaches to Greater Diversification and Value-Added Processing

It is generally acknowledged that the fishing industry in Atlantic Canada is being hampered by its failure to add sufficient value to its basic resources. For a long time, mass production was the guiding principle of the processing sector, which is to say that profit margins were based more on volume than on anything else. In the wake of the groundfish crisis, however, that strategy has proven to be unfeasible, since processors now have to deal with resource scarcity, which makes them more vulnerable to price wars. Today, the markets for seafood products are more segmented than ever before, and the shelf life of these products has never been as short. Overall, consumers clearly prefer natural products that retain as much of their original appearance and taste as possible, which explains their preference for fresh and chilled shellfish that has not been shelled. The market for shellfish meat, particularly value-added products, tends to become rapidly glutted following a rise in prices, thus opening the door to similar products and substitutes such as imitation products, which are essentially made of minced fish.

That does not mean there is no place on the market for high value-added fresh and chilled products, precooked dishes, and combinations of products that include ingredients other than fish and seafood. What we know about production on the East Coast is that it must move away from specializing in a limited number of products that are aimed at mass consumption and toward a more extensive product line, if possible with added value. In a sector that has become extremely competitive, innovation is more important than specialization. With major improvements in industrial techniques and increased food safety, new avenues for innovation in the industry are gradually opening up. Without going into detail on the array of techniques now available for canning and freezing or about other methods of preparing dishes and value-added products in eastern Canada (cooking, dehydration, ionization, analytical biotechnology, etc.), the main innovations by processors involve the following strategies:

- ▶ Product composition: new ingredients, new recipes, and combinations, with new names sometimes being given to existing products so that they can be repositioned in the market
- ▶ Manufacturing processes and techniques: improved profitability, quality (in terms of standardization), and sometimes industrialization of a product manufactured on a small or large scale
- ▶ Packaging and services incorporated in the product: marketing tools designed to improve product image among distributors and consumers (colour codes, legibility, and ease of handling either singly or in batches)
- ▶ New industrial uses of seafood products for nonfood purposes, which so far is not part of diversification (i.e., fine chemicals, pharmaceuticals, biomedicines, and water treatment)

As we can see, innovation does not necessarily mean designing new products, but it does require a better-orchestrated and in particular a more effectively targeted marketing approach. Clearly, this involves a better presentation (packaging and size), an improved recipe (addition of new ingredients such as spices and sauces), and new ways of attracting consumers (targeted marketing strategies and effective advertising campaigns).

This is how Fishery Products International (FPI) in Newfoundland was able to rebuild its markets after the cod moratorium. By adopting an import-export strategy and focusing on marketing new, mainly high value-added products, the company repositioned itself as a world leader in processed fish and seafood products. Now, FPI is processing double the volume it processed prior to the moratorium, using products imported primarily from Russia, Alaska, the Nordic countries, China, and Thailand. Although the FPI case is unique, other companies and many industry segments have been exploring more value-added processing for several years.

In light of the above facts, this section describes the status of the products themselves throughout the processing phases. The following data are from a previous statistical study based on product classification by industrial-processing stage. The classification uses the equivalent of sixty-nine product codes contained in Industry Canada's product classification database under the seafood products category. We list three import-export groups classified according to three industrial-processing stages, ranging from the simplest (fresh and chilled, frozen, and lightly prepared) to value-added preparations (extracted, precooked, and canned foods). In each of the three phases

described, we distinguish between fish and fish products; seafood, crustaceans, and their products; and various seafood products.

In reviewing provincial exports of seafood products from eastern Canada in 1999, we note that primary-processed products dominated at approximately 75 percent, secondary-processed products represented 8.5 percent, and tertiary-processed products totalled 16 percent (see table 29). Provincial differences are clearly more evident in the case of secondary- and tertiary-processed products. In exports of secondary-processed products, Nova Scotia dominated with 16 percent, Quebec and New Brunswick followed with 10 and 5 percent respectively, Newfoundland was fourth with a mere 3 percent, and Prince Edward Island was last with negligible exports in this category. Nova Scotia is clearly behind the other provinces when it comes

Table 29
Value of Exports of Seafood Products from Eastern Canada,
by Level of Processing, and by Province, 1999

Province	Export Value					
	Primary Processing ^a		Secondary Processing ^b		Tertiary Processing ^c	
	Value (in millions of dollars)	Proportion (%)	Value (in millions of dollars)	Proportion (%)	Value (in millions of dollars)	Proportion (%)
Newfound- land	531	78.9	20	3.0	122	18.1
Prince Edward Island	142	75.7	–	0.2	45	24.0
Nova Scotia	799	79.9	160	16.1	40	4.0
New Brunswick	479	70.3	33	4.8	169	24.9
Quebec	90	54.5	17	10.2	58	35.3
Total (Eastern Canada)	2,041	75.4	230	8.5	434	16.1
Canada	2,876	77.1	348	9.3	507	13.6

Source: STRATEGIS, Industry Canada; compiled by the author.

^a Primary processing means initial processing (basic packaging); products are marketed fresh, chilled, frozen, and in some cases separated, dried, and salted.

^b Secondary processing involves further preparation; the raw material itself undergoes significant handling, with the ultimate objective of product preservation and/or presentation. Often these are raw products that have not been mixed with, or incorporated into, other food substances. They include products that are routinely salted (different degrees of seasoning), dried, minced (fine or coarse), cut up (steaks, slices, or strips), smoked (basic smoking or flavoured), semiprocessed (milt, meal, or feed pellets), and semipreserved.

^c Tertiary processing involves further processing using various technical and technological processes that are more elaborate than those used in the previous stages. Some of these products must be marketed in compliance with strict industry requirements and included in families of high value-added products (prepared, precooked dishes and food served by caterers, such as seafood delicatessens).

to additional processing, i.e., tertiary-processed products. Tertiary processing is naturally very important regionally, because it generates products with high value added, which, moreover, involve a more extensive network of interindustry links. In fact, this type of production requires a much greater variety of products and services and thus raises income and employment multipliers. That does not mean, however, that the processors' profit margins are necessarily higher.

Approximately 16 percent of the seafood products exported from eastern Canada in 1999 had undergone tertiary processing. The dominant player was Quebec, having exported 35 percent of its products in this form. We should make special mention here of the contribution of companies located in the metropolitan areas of Quebec City and Montreal that concentrate on specialized food products: most of their supply is obtained externally and often consists of already-prepared products that are resold for export via their distribution channels. Prince Edward Island and New Brunswick also do well with tertiary-processed products, having exported 24 and 25 percent respectively of the production in this form in 1999. It is rather curious to note that the two provinces bordering the Atlantic, Newfoundland and Nova Scotia, lag behind in high value-added products; only approximately 18 percent of the seafood products exported from Newfoundland underwent tertiary processing in 1999, while Nova Scotia at 4 percent was hardly even a player.

These results are all the more astonishing because the two largest fish-processing companies in the Atlantic region, Fishery Products International and National Sea Products, are based in Newfoundland and Nova Scotia respectively. The reason for the small proportion of tertiary-processed products exported by these provinces is that the dominant, vertically integrated companies there benefit from large quotas for groundfish and other lucrative species such as shrimp and scallops. To some extent, the supply justifies mass production (products not processed significantly and intended for secondary and especially tertiary processing in the United States) and the production of fresh and chilled products for high-end markets. In the case of Nova Scotia, the situation can also be explained by its large supply of seafood, particularly lobster and scallops, and its proximity to the US market. Most of the time, products in their natural state or slightly processed, generally those that are fresh or chilled, are shipped to the Boston market. That is why the lobster-processing industry has never really become established in southwestern Nova Scotia.

Nevertheless, some progress has been made in this area, particularly in Newfoundland, where the industry is trying to adjust to the effects of the cod moratorium and changes in the structure of its primary supply.⁹⁹ Although value-added products (tertiary processing) in the province accounted for only 7 or 8 percent of total export value in the early 1990s, they climbed to 10 percent in the mid-1990s and to more than 18 percent in 1999.

Among the eastern Canadian provinces, New Brunswick has produced good results, second only to Quebec for the highest percentage of value-added seafood products. In fact, although 70 percent of the seafood products exported from New Brunswick in 1999 did not go beyond the primary-processing stage, the value of exports of secondary- and tertiary-processed products in that same year amounted to \$202 million (30 percent of total export value). The province also exported the highest absolute value of tertiary-processed products, surpassing the value for the provinces of Prince Edward Island, Nova Scotia, and Quebec combined. New Brunswick owes its excellent performance to canned and seafood products, particularly products intended for high-end markets such as pâtés and other shellfish-based products.

Throughout eastern Canada, the trend is toward greater value-added production in all of the provinces (see table 30). Note that the growth in tertiary processing appears to be at the expense of secondary processing.

We have tried to understand the reason for the shift toward tertiary processing at the expense of secondary processing, and we conclude that in all likelihood it is not the result of deliberate decisions by companies. First of all, it was changes in the primary-supply structure that forced (if we can use that word) processors to import raw materials and, subsequently, to process them beyond the secondary-processing stage. Initially, the abrupt drop in the groundfish supply, cod in particular, considerably reduced production of processed-fish products, such as salted fish, pickled fish, and fish fillets. As a consequence, processors began using fish that in most cases had already undergone primary processing, which obliged them to undertake further value-added processing.

99. "Atlantic Canada's Fishery: An Industry Reviving or Regressing?" *Atlantic Business Magazine* 10, no. 6 (1999). Precisely the same observation on the fisheries industry in Newfoundland is made in this article.

Table 30
Percentage of Seafood Exports from Eastern Canada,
by Level of Processing, and by Province, 1995–99

Province	Primary Processing			Secondary Processing			Tertiary Processing		
	1995	1997	1999	1995	1997	1999	1995	1997	1999
Newfound-land	80.1	76.1	78.9	10.3	7.6	3.0	9.6	16.3	18.1
Prince Edward Island	81.2	73.3	75.7	1.3	1.1	0.2	17.6	25.5	24.0
Nova Scotia	83.3	81.1	79.9	15.4	16.0	16.1	1.3	2.9	4.0
New Brunswick	77.2	72.3	70.3	5.4	6.3	4.8	17.5	21.4	24.9
Quebec	62.9	59.7	54.5	14.3	7.5	10.2	22.8	32.8	35.3
Eastern Canada	79.0	75.5	75.4	10.8	10.3	8.5	10.2	14.2	16.1
Canada	77.2	76.5	77.1	13.5	11.3	9.3	9.2	12.2	13.6

Source: STRATEGIS, Industry Canada; compiled by the author.

We also note the continuous growth (from \$444 million to \$711 million between 1995 and 1999) in the value of primary-processed seafood products imported into eastern Canada, particularly frozen fish and fresh and frozen seafood (see table 31). As well, there has been a constant supply of approximately \$55 million to \$60 million worth of imports of secondary-processed products, the majority of which are not intended for the domestic consumer market as such, but go to plants for further processing. The situation for imports of tertiary-processed products (approximately \$70 million) is somewhat different; they are mainly prepared and canned products sold on the regional market.

These data help refute the general perception that fish plants in the Atlantic region only export raw materials, which is utterly false. In fact, more than three hundred products and by-products from fifty or more species are produced on the Atlantic coast. The frozen products category alone includes fifteen species of groundfish and forty products, ten species of pelagic fish and thirty products, fifteen lobster products and approximately the same number of snow crab products, ten herring products, and so on. The category of in-brine products includes thirty products, mainly based on herring and other pelagic

fish and groundfish. The fresh and chilled products category covers over fifty different products. And a few canned and nonedible products complete a product list that is nothing less than impressive.¹⁰⁰

Some products have high market value (e.g., crab sections and peeled shrimp) but are basically primary-processed products. A large percentage of products undergo some processing, such as snow crab, lobster, and shrimp products; however, they are most often shipped whole, in the shell (cooked and frozen), or sectioned but not shelled (crab sections and lobster tails and claws). They thus fall into the moderate value-added processing category (primary and secondary processing). It is much more profitable for a processor to produce, for example, crab sections at \$5.82 per pound or whole cooked and frozen crab at \$4.37 per pound than frozen crabmeat at \$11.90 per pound (DFO 1996 price estimates for eastern New Brunswick).

There is a big difference in the production costs of these two types of products. The preparation of crab sections requires only a few steps, such as splitting (separating the crab in two), cleaning, washing, cooking, and then chilling/freezing. In general, this is done quickly by a small team of nonspecialized workers. Crabmeat requires further, much more complex steps (numerous meat extraction processes, candling and sorting, preparation of crab salad, washing, brining, pressing, packaging, and freezing), during which sanitary and technical standards are strictly applied; this adds considerably to production costs. The price difference between these products is also a result of packaging and marketing costs, especially because they are often intended for different consumer markets; shipping frozen crab sections to the Japanese market is not at all the same as selling frozen lobster or crabmeat to the US market or frozen shrimp to the European market. Finally, quality assurance is increasingly affecting the price difference, because the industrial standards in effect (ISO standards) represent an additional constraint for secondary and tertiary processors. This is particularly the case for lobster processors and for companies that produce precooked dishes and any other value-added products.

Naturally, there is a great temptation for companies to turn as much as possible to producing crab sections and whole crab that are simply cooked and frozen for export to the lucrative Japanese market. These are the types of products Japanese consumers love. The same

100. Review based on plant production statements provided by DFO regional offices in Moncton, Halifax, St. John's, and Quebec City in the winter of 1999.

Table 31

**Value of Imports and Exports of Seafood Products from Eastern Canada,
by Level of Processing and by Product Group (HS Code), 1995–99**

	Import Value (in thousands of dollars)					Export Value (in thousands of dollars)				
	1995	1996	1997	1998	1999	1995	1996	1997	1998	1999
Primary Processing										
Fresh products	41,227	44,680	46,871	48,362	60,164	210,480	239,083	268,804	278,900	295,659
Frozen products	206,228	191,239	193,422	239,586	207,346	178,428	229,154	211,952	250,362	241,295
Fresh seafood	123,073	116,186	152,958	125,511	212,072	463,995	473,091	473,705	502,420	546,936
Frozen seafood	63,956	210,846	132,277	166,657	220,809	750,647	572,909	589,645	622,315	943,943
Other (seaweed)	578	705	522	385	550	6,884	7,573	2,934	5,107	7,759
Various products	9,040	7,451	5,350	8,524	9,974	3,678	4,266	4,730	5,197	4,988
Secondary Processing										
Fish	47,023	39,928	41,023	54,520	44,873	162,638	164,907	158,747	177,272	181,930
Seafood	1,084	1,009	491	452	731	54,891	39,450	47,704	39,917	43,380
Other products	9,040	7,451	5,350	8,524	9,974	3,678	4,266	4,730	5,197	4,988
Tertiary Processing										
Fish	31,785	28,554	29,473	25,541	23,366	49,479	70,626	73,395	88,241	99,458
Seafood	36,357	32,864	30,060	34,462	36,586	155,394	151,304	212,687	247,002	331,526
Other products	6,497	9,916	10,535	11,517	10,210	2,623	2,482	5,836	3,725	3,362

Total										
Primary processing	444,102	571,107	531,430	589,025	710,915	1,614,112	1,526,076	1,555,770	1,664,391	2,040,580
Secondary processing	57,147	43,388	46,864	63,496	55,578	221,207	208,623	211,181	222,386	230,298
Tertiary processing	74,639	71,334	70,068	71,520	70,162	207,496	224,412	291,918	338,968	434,346
Total – all seafood products	575,888	690,829	648,362	724,041	836,655	2,042,815	1,959,111	2,054,869	2,225,745	2,705,224
Share of Total Import Value (%)										
	1995	1996	1997	1998	1999	1995	1996	1997	1998	1999
Primary processing	77.1	82.7	82.0	81.4	85.0	79.0	77.9	75.5	74.8	75.4
Secondary processing	9.9	7.0	7.2	8.8	6.6	10.8	10.6	10.3	10.0	8.5
Tertiary processing	13.0	10.3	10.8	9.9	8.4	10.2	11.5	14.2	15.2	16.1

Sources: Compiled by the author and based on HS industrial codes, STRATEGIS, Industry Canada; see also a detailed list in Appendix A.

logic applies to lobster, where production is largely oriented toward products that involve little preparation, generally lobster pieces, such as tails, shelled or not shelled, rather than extracted lobster meat or claw and joint meat.

Whether producers are involved in cold-pack canning, semifresh products, or fresh or deep-frozen precooked dishes, they face two major constraints: the pressure of large-scale distribution and the level of automation of the production processes, constraints that are fully correlated. With no choice of distribution channel for staple seafood convenience foods manufactured in eastern Canada, the volume/price dilemma, a quandary facing many of the region's producers, invariably presents itself. In this regard, processors in eastern Canada have two choices:

- ▶ To create new products to overcome the dilemma, knowing, however, that production will make only limited use of basic products
- ▶ To lower costs by automating as much of the production as possible and by increasing industrial concentration

In the final analysis, processing species that are considered lucrative is not necessarily a good business decision for processors, who see their profit margins decrease because of price ceilings for labour-intensive products, especially when there appears to be declining demand for this type of product. It should also be remembered that the purchase price for raw materials is particularly high in the case of seafood. As we have seen, raw materials represent 85 percent of the direct production costs of plants in many industry segments, particularly in the case of lobster. Consequently, the reluctance of processors to offer an extensive range of labour-intensive and prepared products is thus understandable. They prefer to concentrate instead on a few key products that are of more interest to wholesalers in the hopes of increasing profits by maximizing volume.

■ **Value-Added Processing and Product Innovation: The Players**

The industrial concerns involved in processing and value-added processing of seafood products in eastern Canada relate not only to the financial and commercial importance of those products but also to their diversity. Rooted until recently in the regional economy, the fish and seafood processing sector must now turn its attention

to world markets. In the face of this change, some segments of the industry, or at least a number of the companies that make it up, will have to shake themselves free of obsolete traditional structures. At the same time, a growing number of others are already adapting themselves to new supply, management, and distribution strategies. The nature of these new strategies is determined, of course, by the kinds of business activities involved as well as by product niches, trade relations, degree of expertise, impact of new technology and innovation, and new marketing concepts being introduced for specific product lines. Overall, however, the processing sector must begin to shift the focus of the industrial facilities and maximize their potential by implementing continuous cycles, establishing more sophisticated contracts with suppliers, looking for lucrative market niches, introducing research and development units and a variety of specialized staff, diversifying their sources of supply so they no longer depend on local resources, and introducing real provincial strategies for promoting the seafood industry. In short, the regional sector is an increasingly important player in the economy of eastern Canada and can no longer afford to content itself with shipping low value-added products to captive markets.

The players in the value-added processing of seafood products are as varied in their geographic location as in their size, status, and the type of products they offer. In order to impose some order on this variety, we think a classification typology would be useful both to facilitate an initial analysis of what is happening in the industry and to readily identify

- ▶ Regional giants in the value-added processing industry
- ▶ Specialized groups that focus on basic processing (fresh, chilled, and frozen)
- ▶ New players from the agri-food industry who are incorporating seafood products in their manufacturing cycles
- ▶ Single-territory firms operating almost exclusively in eastern Canada (small businesses)

Clearly, the basic typology must be adapted to the overall context. In the seafood products sector, the large number of firms and their wide variety, etc., make it somewhat difficult to divide them into strategic groups, as is customary in other agri-food sectors in Canada. In spite of that, however, we can still identify some of their specific characteristics:

- ▶ Companies can be differentiated by their degree of horizontal specialization. Some specialize in value-added processing of seafood products, while others also manufacture other types of agri-food products.
- ▶ The degree of integration also varies. Some companies have included fishing or, more frequently, were originally fishers; others have preferential trade relationships and subsidiaries; and still others have their own distribution companies.
- ▶ Marketing policy is another variable in the company breakdown. Some companies market their own brands; others supply distributors' brands (i.e., Provigo, Atlantic Superstore, Sobey's, and GP) or function as subcontractors; and still others manage all components at the same time. The type of client base can also be very diverse; however, this criterion is only used infrequently in this study, because it appears less important than others.
- ▶ Given the current trend toward mergers, the companies' corporate status and their relationships with their parent companies are undoubtedly the most important criteria.

As mentioned before, there are over eight hundred fish-processing companies in eastern Canada, and at least half are exporters. Of these, only approximately sixty companies record sales of \$10 million or more, including around fifteen that post over \$50 million in annual sales: Fishery Products International, High Liner Foods, Clearwater Fine Foods, Madelipêche, the Barry Group, Connors Brothers, Polar Foods International, Sogelco, Seafreeze Foods, Paturel Seafoods, and Mersey Seafoods. Although we will not provide individual descriptions of all the players, we should point out that many medium-sized and even small businesses that have recently entered the value-added processing industry are leaders among companies of the same size and examples worthy of mention. First, however, let us examine some of the key players, the real builders of value-added processing in the region.

Fishery Products International Ltd., which has nine plants (seven in Newfoundland, one in Nova Scotia, and one in Massachusetts), is a multifaceted group. The company employs 2,600 people (a third of its pre-moratorium workforce), has total sales of \$700 million, and ranks number one in seafood products in Canada. Ten years ago, FPI was the world's top producer of flatfish and cod products in North America. Since then, however, it has had to close twelve of its nineteen plants and reduce its staff from 8,600 to 2,600. It has kept only

fourteen of its forty-eight vessels, and its landings have fallen from 140,000 tonnes to approximately 8,000 tonnes.

Today, FPI imports nearly 30,000 tonnes of raw materials for basic and further processing while developing trade in other products. In fact, its activities are so diversified that it is now referred to as the FPI galaxy. This vertically and horizontally integrated company produces over two hundred products, which are distributed through numerous trade offices around the world.

The FPI group has succeeded in increasing its sales considerably with an expansion and diversification strategy. Its biggest coup was the 1989 buyout of Clouston Foods of Montreal, Canada's top seafood company, at which time it gained a particular advantage in the area of prepared foods (salmon pâté, fish fillets stuffed with scallops and crab, etc.), thereby making the company part of a group whose size and trade networks resulted in a tenfold increase in its activities.¹⁰¹

Strong growth in the FPI deep-frozen precooked foods division in the United States and the development of shrimp products (the popular Treasure Isle brand) have also boosted sales. With the buyout of Clouston Foods, FPI diversified its supply sources by including Alaska snow crab, scallops and oysters from China, salmon from British Columbia, and shrimp from Thailand, Indonesia, and Ecuador.

The FPI group also produces value-added products under the Sea Wonders brand name, designed for the children's market (portions of honey-flavoured fish moulded in the shape of starfish, anchors, seahorses, fish, and sharks); Healthy Bake 28 (113-gram portions, in which only 28 percent of calories come from fat); and high-end prepared foods, i.e., Seafood Elite and Stuffed Seafood (fish stuffed with a mixture of vegetables and seafood), marketed under the trade name Maripac or Mirabel.

While the United States is the company's primary export market, it also exports to Japan, where demand is greater for fresh and raw products, but more to Western Europe. France, for example, which has become one of the major trading partners of FPI, accounts for over 40 percent of its sales in Europe, particularly for prepared foods and products.

Among the products most in demand are sea scallops and canned crabmeat (approximately 700 tonnes annually), for which Clouston Foods has nearly 85 percent of the market in France. We should also

101. FPI Limited — 1999 Annual Information Form; internal document.

mention that FPI is the sole supplier of fish fillets to the McDonalds chain in Canada.¹⁰²

High Liner Foods Inc. (HLF), formerly National Sea Products Ltd., with its head office in Lunenburg, Nova Scotia, is also one of the largest producers in the region. Once a world leader, HLF has fallen to the status of a secondary player and has watched its workforce drop from 8,000 to approximately 1,600 in the space of a few years. With sales ranging from \$250 million to \$300 million, HLF has chosen to concentrate its activities in the United States and Canada, carrying out a major restructuring of its foreign subsidiaries in France, Argentina, Portugal, and Australia. By focusing on higher value-added products (entrées, appetizers, and measured portions) and the retail market (fresh fish), HLF is trying to maintain the market shares of its Fisher Boy and Booth brands as well as a line of prepared products from its subsidiary Italian Village (United States) and High Liner (in Canada), supplementing its supply of Canadian cod with imports of Alaska pollock, frozen at sea, from South Korea, Russia, Lithuania, and the United States. The company has also recently implemented a bona fide import strategy with countries that are major suppliers of fresh products but where the processing infrastructure is unstable or inadequate, particularly producing countries in the former Soviet bloc (Baltic countries and Russia).

With expertise in breaded and coated products (65 percent of the Canadian market) that is unique in North America, the company is currently working to reposition its brands as high-end with the launch of new products made from fillets in blocks and high-quality minced meat. Based on the market's taste criteria, extruded products prepared from minced meat can be adapted to the demand of each client (individual or group).

HLF was also a pioneer in eastern Canada in seafood processing quality, using the HACCP system for total real-time control of production lines. The company is also experimenting with new species both to add to production and for new product lines, mainly black turbot and Stimpson's surf clam, a mollusc in the clam family. Apparently, this type of clam is valued for its composition, industrial processing, and price, which is more competitive than the price of other clams. In addition to processing squid, HLF is also trying to reestablish a market in Europe for smoked pollock (Germany, United Kingdom, and France), while diversifying into deep-frozen scallops.

102. According to Mark Higgins, "Waste Not, Want Not: Atlantic Canada's Fish Industry Squeezes Every Ounce Out of Its Precious Resource," *Food in Canada* (November–December 1999): 23.

HLF is also very interested in aquaculture, for both technical and commercial reasons. Responding to the dual need to secure supply and to facilitate quality control, the company is providing strong encouragement to the aquaculture sector by developing external farming networks and large internal structures for experimental methods and species. For example, experiments in scallop production have led to a development time that is twice as fast as the five or six years it takes in the wild. Farming cycles remain a problem for producers, and HLF has not hesitated to lend its support to the search for a solution in anticipation of what will be the source of a good part of the processors' supply in the not too distant future.¹⁰³

Clearwater Fine Foods Inc. (CFF) of Bedford, Nova Scotia, can be described as a world leader in high-quality crustaceans. With some ten plants and 2,000 employees, the company posts sales of approximately \$200 million. CFF is developing different strategies by focusing on the seafood trade (mainly lobster but also shrimp and scallops). Although the group is moving into new species, such as redfish, silver hake, and mackerel, it is first and foremost one of the world leaders in exports of live lobster, which is shipped by air from Halifax to Europe and Japan and by truck to the United States.

Creator of the Hardshellfresh trademark, Clearwater Fine Foods Inc. has designed a patented lobster holding-tank system, a quality management system that incorporates biotechnology programs. Using this system, which was introduced just a few years ago, the company has been able to develop sales of fresh seafood that maintain its sensory quality.

Through its group of subsidiaries, Atlantic Champion and Pêches Nordiques, CFF also has one of the largest quotas for Canadian Northern shrimp, which is marketed raw, whole, cooked, and frozen at sea. Another of its subsidiaries, Pierce Fisheries, has the largest fishery quota for scallops, which are marketed under the Clearwater and Locket trademarks. And Alder Point Fisheries, a subsidiary dedicated to harvesting Stimpson's surf clams, supplies CFF with this new product. Alder Point Fisheries was established to compete with the other major producer of fresh seafood, Grand Bank Seafood, to date the largest processor of sea scallops in the North Atlantic: it has built a lucrative market on its almost exclusive trade in this mollusc.

CFF is increasingly seen as a leader in product innovation. One of its subsidiaries, Ocean Nutrition Canada, was transformed into a

103. Information from HLF annual reports.

kind of experimental industrial kitchen; another in Arichat, where the company has invested \$9 million, specializes in preserving live lobster by recycling seawater.¹⁰⁴

Madelipêche International Inc. has proven to be another leader in eastern Canada. The company, with its head office in Verdun, is among the major Quebec players who have had to build new value-added niche strategies, often around traditional products. Bolstered by a network in Quebec and Ontario, the company has overall sales of nearly \$15 million. It completed its restructuring ten years ago and now has 400 employees.

Madelipêche is unique in that it is developing not only traditional basic products found throughout the Atlantic but also fish oil and a canned mackerel industry targeting the Quebec market. Upward development has been its motto in recent years, especially because 95 percent of its products are exported. Both a producer of canned goods and oils and an exporter of lobster, cod, and mackerel, the company developed its market by creating three popular leading brands, Madeli-Mer, Quali-Mer, and Marco, that are carried by all the distribution giants in Quebec and Ontario.

Its research on deep-frozen, precooked foods (its largest trade item) is a credit to company executives, who turned a traditional, basically not very modernized company into a real producer of value-added seafood products in Quebec. After years of developing its production departments, Madelipêche is now Canada's uncontested leader (with High Liner Foods) in deep-frozen, ready-to-serve seafood. The success of its product lines in the Toronto area and in the eastern United States is proof that industrial and marketing successes are possible in a highly competitive sector. Madelipêche is also one of Canada's top specialized suppliers to the institutional food services industries.

This list is not intended to be in any way restrictive. Our aim is simply to present a few cases to give some idea of the approach and characteristics that distinguish the major players in value-added processing. We could also mention many other companies: Connors Brothers in New Brunswick, a canning specialist, but diversifying into farmed salmon processing; Comeau's Seafood in southwestern Nova Scotia, known for its innovative products such as seafood sauces and pickles; Sogelco of Montreal, which, through its strategic alliance with plants in the Maritime provinces, has secured its sources of supply so

104. See Al Scott, "Clearwater Fine Foods Uses R&D to Redefine the Seafood Industry," in *Nova Scotia Open to the World* (Fall 2000), 20–25.

that it can diversify its production of essentially value-added products; the Barry Group of Corner Brook with twenty plants, whose acquisition strategy (plants recently acquired from the Blue Cove Group in northern New Brunswick and the modern multispecies plant in Canso acquired from Seafreeze Foods Inc.) is giving it a high profile in the region and is allowing it to offer a broad range of processed products; and so on.

Despite their dominance, these companies do not have a monopoly on the processing of value-added seafood products. Scattered around the most remote locations on Newfoundland peninsulas, along the Maritime coastline, and all the way to the Gaspé Peninsula are small family businesses and new businesses that are focusing on differentiated production using either nontraditional species (skate, sea urchin, cocktail oyster, lumpfish, and rock crab) or combinations of value-added products such as herring-based imitation crab and seafood pizza and spreads. Dips, tarama, fish and seafood creams, canned pickled herring, diced salmon, smoked salmon fillets (linguettes), real and imitation crab sticks, fish mousse of all types, seafood and vegetable pâtés, surimi, seasoned crustacean meat, and prepared, ready-to-eat fish pieces, all the so-called deli products, are made by regional producers and processors and found in the display cases of major distributors in Ontario, Quebec, and the Atlantic provinces.

■ From the Sea to the Supermarket

The consumption of seafood products has doubled in twenty years and is still growing, stimulated by the creation of an impressive range of new products capable of satisfying the most discriminating consumer tastes — products that have been promoted using mass-marketing strategies. This change in demand (quantitative and qualitative), together with the fact that a growing number of producers and intermediaries, particularly in Third World countries, have joined the international network of buyers and suppliers, obviously complicates the marketing strategies of producers in Atlantic Canada. In fact, what we are witnessing is a strategic distribution and marketing reorganization in which suppliers, buyers, and distributors of seafood products are working together more effectively.

As well as the need to automate production in order to meet volume requirements and ensure a supply of basic products, the processors of seafood products are confronted with the challenge of developing a distribution and marketing strategy. Before doing that,

however, and even before fishing a species, the question has to be answered as to whether there is in fact a market for the product and under what conditions demand can most effectively be met. As well, processors must clearly understand what is driving the market demand for each of the products and by-products offered and carefully track any changes so that they can rapidly adjust production to meet that demand.

Adjusting to market demand means internal flexibility in production management and organization. Demand is shaped not only by demographic and social factors (urbanization, entry of women into the labour force, increased tourism, higher standard of living, etc.) but also by refining the logistical and technical procedures set in motion to market a product (targeted advertising campaigns, integrated distribution networks, development of product lines, multiple points of sale involving big box retailers, a wider range of products and packaging, etc.). We must concentrate more on niche markets and target products rather than on a mass market, and on product lines rather than on homogeneous production. Also, because there are many substitutes for fish, the level of fish consumption is determined by the price of other foods, particularly meat and poultry.

The seafood sector in eastern Canada has long been content to rely on traditional production: frozen products (groundfish blocks and fillets), salted and dried fish products, and various minimally processed seafoods. These products still account for the lion's share of plant production today; however, in recent years the industry has tried to innovate the areas of technology and new product development. This change in the attitude of processors is due to the fact that markets are becoming increasingly demanding, particularly regarding quality standards, packaging, and product presentation. European buyers (lobster and shrimp) and Japanese buyers (snow crab and herring roe) are especially particular about quality and have no hesitation in sending their own agents to their suppliers' facilities to ensure compliance with standards at all stages of production. The opening of new, more demanding markets and the implementation of industrial standardization in the agri-food industry as a whole are giving businesses the incentive to improve quality management and production techniques.

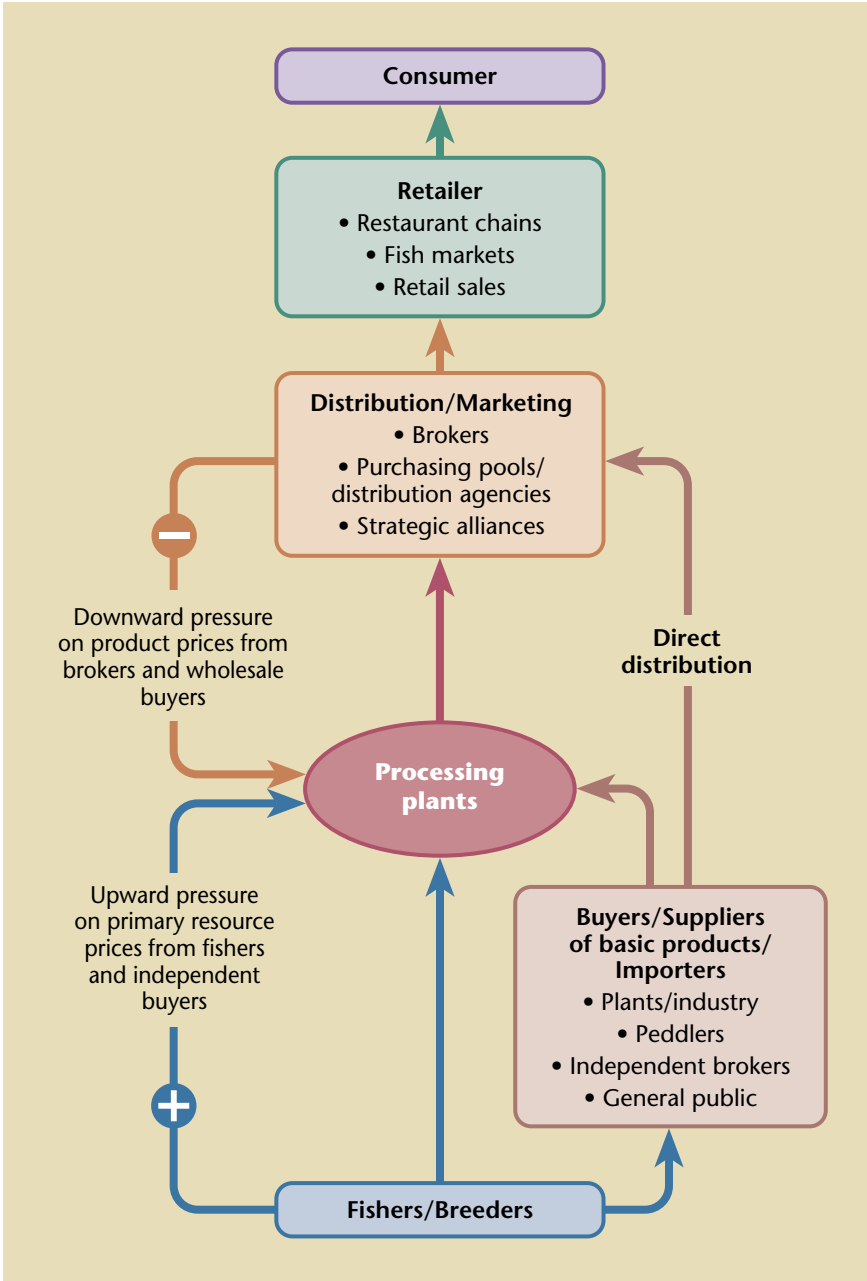
Until now, processors' attempts at diversification were usually in response to cyclical crises in the industry, and the reflex action of the industry was to redirect businesses into areas for which they were rather poorly prepared or toward opportunities with uncertain potential, such as the use of underutilized species. Despite numerous

government programs intended to foster technological change, innovation has been slow in coming, no doubt a result of the traditionalism that still persists in many segments of the industry. The fact that programs have generally been conceived in a period of crisis, not at the instigation of business, partly explains their limited results. Nevertheless, improvements in industrial techniques will gradually open new avenues of innovation in the industry. Processors already have at their disposal an array of techniques (cooking, dehydration, ionization, analytical biotechnology, vacuum deep-freezing, etc.), and their main efforts at innovation involve product composition (new ingredients, new recipes, and combinations), manufacturing processes and techniques (quality improvement), and product marketing (improved image among distributors and consumers, attractive colour and flavour, and convenience).

The entry of major agri-food producers into the fisheries contributes to greater consistency of supply and standardization of quality. Major distributors of both fresh and canned seafood products require the upstream industry to supply large volumes of basic products of superior freshness. At the same time, the push is on to develop farmed products to gain greater control over both the supply and the quality of fish and seafood, especially because local supplies are still too vulnerable to price wars and to the vagaries of the fisheries.

The direct clients of regional producers are wholesalers, retailers, brokers, purchasing pools, and other food industries that redistribute and sometimes reprocess products en route to the point of sale and the end consumer. Purchasing pools have carved out a place for themselves on North American markets — fairly recently in Canada and to a lesser extent in the United States, which for the most part still uses the broker system. Still, purchasing pools play an important role in the US because of the large quantities of products involved. The dual policy of large buyers is very important from the perspective of markets for value-added seafood products, the reason being that purchasing pools require abundant, consistent supplies that are satisfactory in both quality and price, which is why they award supply contracts that in a sense turn producers into subcontractors. Purchasing pools are therefore important players in the industrial and commercial promotion of value-added seafood products. To get a better idea of the various stakeholders and their interaction in the marketing system for seafood products, see figure 15 for an organization chart that gives an overview of the suppliers, sellers, and other intermediaries in eastern Canada.

Figure 15
Purchase/Sale, Marketing, and Distribution Channels
for Seafood Products in Eastern Canada



Wholesalers-dealers-brokers, the usual intermediaries between manufacturers and retailers, facilitate the producers' task by keeping orders streamlined and by underwriting part of the storage both physically and financially. Wholesalers-dealers also provide retailers with a full range of products and delivery schedules that the processors are not generally able to do themselves. However, in the new business environment, characterized by the explosion of new products and in particular by low profit margins, retailers have a tendency to bypass the wholesaler-dealer and buy directly from the producers. According to estimates, producers directly supply retailers with between 20 and 30 percent of the products they sell.¹⁰⁵ Still, the fact remains that the vast majority of processors and manufacturers in eastern Canada — with the exception of large groups such as National Sea Products, Fishery Products International, Sogelco International, Connors Brothers, Comeau's Sea Foods, and Clearwater Fine Foods — are not big enough to set up their own independent marketing department, which is why using the services of commercial agents is still the rule.

In the United States, with its much larger population, the food-marketing system is distributed more effectively. Brokers are essential there, particularly for value-added products (cold-pack and canned products); however, they are facing increasing competition from purchasing pools that work directly with manufacturers in the fresh and semifresh product sectors.

East Coast processors face a double challenge: strengthening their position in terms of industrial standardization and streamlining product distribution and marketing. In this respect, public and private undertakings appear to be the most effectively structured in Nova Scotia. There, international quality standards are a primary concern of the leading processors of food products. They were introduced to this facet of the business by the early attempts of National Sea Products, the largest manufacturer in the Atlantic provinces, to install a fully integrated computerized system capable of managing all standardization in real time. NSP introduced just-in-time seafood products in the region when it implemented the HACCP system and is the leader in this area in eastern Canada. The company underwent a fundamental restructuring in recent years and completely re-engineered its processes.

105. CIRRD survey of the National Seafood Sector Council, Agriculture and Agri-Food Canada, the Canadian Association of Fish Exporters, New Brunswick Fish Packers' Association, and some processors in the Atlantic provinces and Quebec.

Following in the wake of National Sea Products, a number of specialized, medium-sized producers are emerging, such as Arisaig Fisheries, Comeau's Sea Foods, Intervest Trading Company, IMO Foods, Innovative Fishery Products, Kenney and Ross, Clearwater Fine Foods, Inland Fisheries, and Seabright Smokehouses, who are making industrial standardization a strategic issue. It appears, however, that most Nova Scotia processors are still not concerned.

In the other Maritime provinces, there are plans among manufacturers' groups to embrace standardization, but they are not as developed as in Nova Scotia. The truth is that these provinces, which can always rely on certain exclusive markets, still lack a realistic strategy. Provincially granted quality certification would give their products greater visibility and above all greater consumer confidence. Newfoundland is unique in the sense that its fisheries sector was completely disrupted by the cod moratorium. However, the major producers and a growing number of medium-sized players are successfully producing a line of value-added products by incorporating new quality standards and rethinking their supply, management, and distribution strategy. A number of them have moved into diversified production, and to supplement traditional production, some are offering new products that combine a variety of inputs, either underutilized species, such as sea urchin, skate, and herring (e.g., herring-based imitation crab), or farmed products.

With the exception of a few players, however, it is obvious that until now the region as a whole has failed to develop a realistic overall strategy for seafood products, particularly those that are value-added. Just in terms of promotion, the systematic use of advertising opportunities is difficult due to the fragmentation of the processing sector, the diverse types of production, and especially the fact of companies being in different provinces, with each jurisdiction competing with the other. Only big businesses have the consistent volume and quality monitoring that can gain them a foothold in foreign markets and allow them to benefit from a major advertising strategy.¹⁰⁶ Clearly, most fish-processing companies on the East Coast are not big enough to ensure the profitability of value-added processing (secondary and tertiary processing). That is why it is in the interests of producers to form alliances and groups to increase the visibility of regional prod-

106. Given that a Canada-wide promotional campaign costs approximately \$2 million, a company that spends 1 percent of sales on advertising should realize sales of \$200 million to finance a campaign of that kind. The \$200 million threshold was thus chosen by sector associations as the objective for manufacturers' groups.

ucts by creating a common brand or developing a particular niche market. A number of efforts in this direction in Nova Scotia, Quebec, and New Brunswick have produced convincing results, and producers in Prince Edward Island have come in from the sidelines with the emergence of the Polar Foods International consortium.

When we consider the range of new products developed in eastern Canada, we can see that there are regional differences, mostly related to the status of value-added processing among producers. Although processors in the Atlantic provinces are trying to distinguish themselves with product composition and processing, little effort has gone into their manufacturing processes and services. In Quebec, however, there is a greater commitment to new product creation. There, new products are much more advanced (e.g., fish and seafood mousses, which require extrusion techniques, from Aliments Prolimer and Culimer Inc.). Furthermore, Quebec demonstrated the earliest awareness of the seafood standardization issue. Companies that participated in establishing a universal set of standards for manufacturing processes include Sogelco International, Gaspé Cured Enr., Conserveries Notre Dame, Les Pêcheries Gros Cap, Madelipêche International, Pêcheries Norpro, Assels Seafoods, Bacalao Del Castillo, Les pêcheries Marinard, and the Montreal Fish Company. We should also mention the efforts of producer associations (Association québécoise de commercialisation de poissons et de fruits de mer) and export cooperatives (Club Export Agro-alimentaire du Québec), which are recognized in the industry for their assistance with US and European standardization requirements.

These kinds of groups are an excellent way to encourage participation by governments, whose institutional guidance role is the way of the future. Governments are being asked to play a primary role in promoting regional expertise in the area of value-added processing of seafood products and in the financial, regulatory, and logistical aspects of the business. It is often through associations and sectoral groups that governments can best fulfill their support role. The Gourmandises marines program, developed in the mid-1990s in the Gaspé Peninsula to promote fish products in the local restaurant market, is a good example. Bringing together producers, distributors, and restaurants, this promotional campaign, one of the first of its kind, is still a benchmark for experiments in providing support for the marketing of value-added seafood products.

Apart from those few examples, the various stakeholders have yet to achieve the desired promotional and marketing synergy to market

regional products. An obstacle to the effectiveness of groups of companies, for example, is an apparent dichotomy between industrial activity (fishing and processing) and the distribution and marketing sectors. A report resulting from a forum organized by Quebec's ministère de l'Agriculture, des Pêcheries, et de l'Alimentation points out numerous weaknesses in the various stages of the production chain from catch to consumer's plate: production and distribution costs that are too high; transportation problems; poorly defined products and discount sales, resulting in a loss of revenue and value added; lack of synchronization of product shipments with ideal reception times on the domestic market; insufficient effort devoted to new product research and new market prospects; and an absence of marketing agreements and contracts, particularly for prepared products.¹⁰⁷

In concluding the discussion on changes underway in the seafood industry, we should reiterate that over and above the technological change and globalization of markets there are basic demographic and social trends. In advanced economies (Europe and Japan in particular), the consumption of seafood products will be affected by aging populations, smaller families, and the increased presence of women in the workforce. These changes could encourage consumers to turn to processed, ready-to-eat products, take-out and delivery services, and restaurants. In developing countries, sustained demographic growth, urbanization, and rising standards of living will be dominant factors in the volume and especially the type of food products consumed. These countries should become even more active on the world market for food products, both as buyers and suppliers, thus helping to increase the globalization of production and trade. In China, according to projections, demand for meat should increase by 85 percent in the next twenty years.¹⁰⁸ This country of more than a billion people has also made enormous efforts in recent years to develop and especially to market its aquaculture products, which already represent 60 percent of its aquatic production as a whole.¹⁰⁹ We should point out

107. See *Le diagnostic des pêches maritimes au Québec*, discussion paper from the marine fisheries forum secretariat of Quebec's ministère de l'Agriculture, des Pêcheries et de l'Alimentation (Quebec City, December 1994), 11.

108. According to the proceedings of the OECD conference entitled "The Agri-Food Sector on the Threshold of the 21st Century," in *The Future of Food: Long-Term Prospects for the Agri-Food Sector* (OECD Publications, 1998).

109. With 17.6 million tonnes of aquaculture products in 1995 (63 percent of world production), China remains the undisputed leader in this area. Chinese production, which until recently was geared mainly to its enormous domestic market, is increasingly becoming oriented toward external markets. Consult FAO. INFO/PECHES (www.fao.org), "Review of Production: A Statistical Perspective" (May 1995).

in passing that because of remarkable technical and organizational progress, aquaculture now supplies a constantly growing percentage of food products from aquatic sources. In 1995, according to FAO data, more than a quarter of the world production of edible seafood products came from aquaculture,¹¹⁰ and it continues to grow. For processors in Atlantic Canada, however, the ever-increasing competition on the international market and the introduction of aquaculture products pose a threat to their prosperity.

Added to these trends are new scientific applications of biotechnology, a field with enormous potential over the next twenty years, particularly in the food industry. Indeed, biotechnology (molecular biology, genetic engineering, and enzymology) can be credited with the huge strides that have been made in developing techniques for processing and value-added processing of animal proteins and fish and seafood by-products. We only have to think of the success of surimi, for example, a natural fish paste, artificially flavoured, that is in increasing use in contemporary cuisine. In the past ten years, biotechnology has opened up new worlds of possibility, such as the industrial use of bacteria and more generally of molecules that could be used in a broad range of high value-added sectors, particularly sectors integrated into the new economy (pharmaceuticals, fine chemistry, new materials, and bioinformatics). Today, marine biotechnologies appear to be a focus of important technical, scientific, and commercial development in such countries as Japan, South Korea, the United States, Germany, the United Kingdom, and France.

What we have offered in this study is an overview of the fisheries in Atlantic Canada at the turn of the century. During course of our inquiry, we have explored some of the important issues and challenges of concern to the industry and at the same time shed some light on its current structure, which, we have suggested, offers encouraging signs for the future of fisheries-based maritime regions.

110. For fish and shellfish farming (excluding aquatic plants), the contribution of aquaculture rose from 11.7 percent in 1989 to 18.5 percent in 1995. Including marine plants, the percentage for aquaculture increased from 14.4 to 23.0 percent. *Ibid.*, 1.

Conclusion

This study covers various aspects of the development of the fisheries resources in eastern Canada. We have drawn a relatively complex picture of an economic sector in transition, a sector in which traditional practices like mass production coexist with modern techniques that focus on innovation and the search for greater profitability. Obviously, the breakdown is not clear, given that there are over one thousand producers-processors-marketers based in five provinces, operating eight hundred processing plants, and exploiting approximately fifty commercial species.

It soon becomes evident that the very nature of the fish-processing industry is complex because it is part of a much broader industry with ramifications far beyond the strictly maritime environment. We have identified the various segments of the industry, from downstream to upstream, and assessed their contribution to the economy in each province. And the bottom line is clear: this essentially export-based industry provides nearly 134,000 jobs in the region, 38,500 of which are in processing, and generates \$2.6 billion annually. The export value of seafood products continues to rise (from \$1.23 billion in 1990 to \$2.72 billion in 1999), despite moratoriums that still deprive the industry of its main basic resource — groundfish.

It is not true, as many people believe, that the industry as a whole is in a crisis, even though the moratoriums are still in effect. Our analyses reveal instead a sector that is adjusting successfully to changes in the industry, a sector still based on solid regional foundations and on diversity, regional expertise, active entrepreneurship, unexpected networks and institutions, the public and private sectors, and business networks in Canada and other countries. It is evident from the industry's product shipments that processors and producers have profited from new developments at various levels: from a technological standpoint, they have profited from the adoption of high-performance methods and tools designed to process, shell, vacuum-pack, can, and package products differentiated by content, format, and presentation; from a management standpoint, they have profited from the advent

of international quality-control standards and the search for security of supply requiring integrated management of operations; from a distribution-marketing standpoint, they have profited from the restructuring of the roles of brokers and wholesale distributors, from the gradual lowering of customs tariffs, and from the massive entry of Third World countries into the market, particularly countries that focus on intensive farming of seafood species; and from a research and development standpoint, neglected until now but catching up, they have profited from the successes of aquaculture. Technology is transferred by contracts, by contacts among companies, and through training and the ever-essential cooperation of government centres of expertise, which have become increasingly accessible to regional producers and small processors.

With regard to value-added processing itself, the subject of this study, some agreement is needed on a definition of *value added*, or at the very least we need to agree on what we mean by *value-added production*. Our analyses and interviews with industry players have led us to the conclusion that the term *value added* has been and still is overused, and no specific definition has yet been advanced by the trade, government agencies, or scientists. That is why we decided to prepare a typology of regional seafood products based on established and internationally recognized industrial codes, knowing, however, that significant grey areas remain and that the very concept of value-added processing will change as products change.

We believe that with the typology and the various industry profiles presented, we have gone some way toward demystifying a concept that is still poorly understood in the sector and could result in biased assessments. In the final analysis, whether we talk about value added, value-added products, differentiated production, or product innovation, the process is the same, and the results are a more effective use of seafood resources. The challenge remains unchanged and requires various industry players to look beyond their own field of endeavour and to think in terms of the industry as a whole, of an integrated management of the entire production-marketing process, and of improved cost control.

Our analyses show that Canada's East Coast fisheries and the fish-processing industry as a whole have indeed survived the unprecedented groundfish crisis that paralyzed those segments of the industry with the greatest value-added potential. Some may say that the expansion of the snow crab and Northern shrimp fisheries contributed extensively to the unexpected turnaround. Although there is no

doubt that their commercial success helped the industry, particularly in Newfoundland, to overcome the devastating effects of the moratoriums, that alone does not explain the renewed activity in the seafood industry as a whole over the last ten years.

We have seen the major changes that have taken place on the demand side, particularly the demand for ready-to-eat prepared products. New processing, preservation, and packaging technology has also helped some industry sectors to reduce costs and to remain competitive. Elsewhere, developments in aquaculture have helped local processors to extend production cycles and to maintain consistent quality. With the implementation of quality-control and management programs (under the umbrella of international HACCP standards), processors have had to modernize both their management styles and their production systems. The advent of international trading blocs, trade liberalization, and the subsequent downward pressure on customs tariffs (the Uruguay Round of GATT) have cleared the way for intensified trade in seafood products. In many cases, the creation of groups of companies and partnerships as well as mergers and other forms of alliances have renewed activity in the sector. By importing basic products to counter the effects of the moratorium, producers were able to maintain a certain level of processing, but had to increase the level of value-added processing in secondary production. The development of research centres and their ties with industry have helped producers not only to apply new regulatory standards but also to develop the so-called value-added product sector.

In short, all of these factors and many others have contributed significantly to changing the thinking of a sector that is still too dependent on traditional structures. One factor that has to be weighed is the psychological effect of the moratoriums, which have deeply affected the outlook and behaviour of people in the industry. Other changes besides the ones arising from the moratoriums are the new attitudes of workers towards employment in the fisheries: no longer is a job seen as merely a way to qualify for unemployment insurance. This climate of change has also caused producers to think less in terms of volume and mass production and more in terms of differentiated, value-added production. Producers are also concentrating more on targeting specific market niches than they did before. And instead of confining their attention to their own sphere of activity, they are now looking beyond to the needs and requirements of players upstream in the industry. In general, whereas technology and innovation were once viewed as a threat to employment, as perceived as limiting and

as replacing human workers, technology and innovation are more essential tools for progress in the industry as a whole.

These then are some of the changes that have transformed the fishing and fish-processing industries in the space of barely a decade. As a result of these changes as well as the expansion of some lucrative fisheries, the entire industry in each of the provinces has been able not only to maintain what it has built but also to position itself favourably on the international scene.

This profile of a changing industry is confirmed by our analyses. They show that its export base has expanded to include new products, particularly tertiary-processed products, which now represent over 16 percent of total export value compared to approximately 10 percent in 1990. At the same time, the data indicate that between 1995 and 1999 imports of basic seafood products grew from \$444 million to \$711 million, a clear sign that processors want to maintain their market share and most of all to upgrade their production facilities.

We have also seen that marketing prospects for seafood products are constantly expanding. However, because of the limited shelf life of more value-added products, the product-innovation option was introduced, which involves changes in manufacturing, content, format, appearance, and type of packaging. That is why there are so many different fish products on the market — at least seven hundred in the US, while producers in eastern Canada are offering three hundred products, by-products, and derived products. Considerable effort has been made by some processors to minimize losses by recycling industrial waste (shells, seafood juice, fish oil, shell-based chitosan, and seaweed for therapeutic purposes) and by using nontraditional species as much as possible, such as small inshore crab and rock crab (over 8,600 tonnes landed in 1998 compared to 864 tonnes in 1990), green sea urchin (3,700 tonnes in 1998, a conservative figure according to many), and lumpfish to name only a few.

An exciting aspect of the changing structure of the fisheries on Canada's East Coast is the expansion of the aquaculture sector, where production went from 16,000 to 39,000 tonnes (from \$99 million to \$178 million) between 1990 and 1999. Just as significant is the relative change in the percentage share of the aquaculture sector compared to the traditional fisheries: it increased from 1.2 to 5.1 percent in volume and from 10.5 to 15.1 percent in value over the same period. The aquaculture industry is interesting for a number of rea-

sons. One is its increasing product diversification together with its role as a complement to traditional fish products. Another is the fact that the sector has become resolutely high-tech and contributes to technology transfers across the processing industry. It is also a sector in which management is less traditional and patterned more on the model of new economy companies. The integration (vertical and horizontal) of leaders in this sector and its many interindustry links — a typical salmon-farming company does business with over two hundred suppliers — reflect the highly strategic profile of this industry. The proliferation of companies that offer products and services to the aquaculture industry attests to its many and often complex needs. Logistical support ranges from scientific and technical assessment of production sites to disease control, equipment supply, and other specialized services such as genetic improvement, reproduction, incubation, hatchery, and nutrition. Almost a thousand companies in Canada supply goods and services to the aquaculture industry, and there are nearly one hundred training groups and agencies, most linked to public post-secondary institutions (universities and community colleges), and 172 research groups and units entirely or partially dedicated to the development of the industry.¹¹¹ The many specialized centres for marine and aquaculture studies, working mainly within universities, attest to the close ties that can exist between the aquaculture industry and the institutions. And partnerships between governments, institutions, and companies are becoming more common in the various provinces, evidence of their firm commitment to developing the aquaculture industry as a whole and to maximizing its social and economic spin-offs.

The opening of new, more demanding markets and the implementation of industrial standardization in the agri-food industry as a whole are giving fish and seafood processors the incentive to improve quality management standards and production management techniques. Industrial processes will also improve, and as they do, new avenues of innovation in the industry will gradually emerge. Armed with an array of techniques (cooking, dehydration, ionization, analytical biotechnology, vacuum deep-freezing, etc.), processors are focusing on innovative approaches to product composition (new ingredients, new recipes, and combinations), manufacturing processes and techniques (quality improvement), and packaging and services

111. According to *Canadian Aquaculture 2000 Directory* (Georgetown, ON: Contact Canada, 2000).

incorporated in products (improved image among distributors and consumers, particularly with respect to colour, legibility, and convenience).

As regards value-added processing, in spite of the considerable effort the industry has devoted to this area of the fisheries (product development and modernization of production facilities), there are still serious weaknesses in distribution and marketing. Although the industry as a whole is exporting the majority of its products and doing its best to organize a domestic marketing network, it is still too focused on primary-processed products, most of which are destined for traditional niche markets in Boston and Tokyo.

Developing market segments individually still puts at risk the very survival of too many processors. We have seen, in fact, that the industry as a whole is not as productive as it should be, which is largely reflected in profit margins and other performance indicators. The situation varies from one subsector to another, but in general the ratio of GPM to sales barely manages to stay at 15 percent (it was 17 to 18 percent in the mid-1980s) as compared to 30 percent or more in manufacturing industries as a whole. The problem, though, is not with salary costs: they are not eating into processors' profit margins. In fact, they represented only 14.5 percent of total production costs in 1997, and average hourly wages in this sector were relatively static in the 1990s. Furthermore, worker productivity actually improved during this period: the value of shipments per hour worked increased over 50 percent, from \$62 in 1989 to nearly \$95 in 1996. Static labour-force costs, the adoption of new technology, and sound management all contributed to gains in productivity.

In the final analysis, the real problem for the industry is the supply of raw materials: their relative costs have increased everywhere. In 1997 raw materials represented an average of 83.6 percent of direct production costs in Atlantic Canada as compared to 75 percent in the mid-1980s.

Strategic groups, whether formed on the basis of product family (precooked foods) or type of trade (canneries and deep-freezing plants), have had good results, although they imply a gradual change of attitude in the industry. We might add that cooperative alliances of this kind are increasingly on the agenda of industry associations as they implement their strategy for the new economy.

In this regard, there is an important role to be played by the two senior levels of government. Although some efforts have been made

in recent years to create a vision for the development of value-added seafood products in eastern Canada, there is still a great deal to be done. Providing support and strategic guidance for the industry, particularly in nontraditional activities, is proving to be an essential element in the development of the seafood industry, and to this end the role of some agencies in the Atlantic provinces, such as ACOA, is particularly important. Their support for the promotion of regional industry-related products and expertise must be part of a long-term strategy.

A number of challenges and issues have been raised during the course of this study. As we have shown, the future prospects of the industry are bright. New products and value-added processes are being developed all the time, some particularly suited for technology transfer. Although expectations are high in many of these new fields, we believe they must not only be realistic but also be part of an approach that has sustainable development as its goal.

Undeniable progress has been made in eastern Canada over the past ten to twenty years in the processing and value-added seafood sector. Elsewhere in the world, similar signs of progress are evident. One only has to look at the numerous international fairs each year that present a host of new products and innovations from an impressive array of maritime nations. Although Canada has established a reputation as a supplier of basic seafood products, efforts aimed at increasing diversification and especially value-added processing have only just begun. Ultimately, our goals in this study have been to contribute to a fair and reasoned assessment of the place of the fisheries in the regional economy, to help bring some of the issues that are central to the industry more clearly into focus, and, most important, to convey a sense of the huge potential of a sector that is vital to the Atlantic provinces and eastern Quebec. If our efforts have met with success in any of these areas, we have been suitably rewarded.

*A*ppendixes

Appendix A: Reference Aggregates for Seafood Products Based on the Degree of Processing

Primary Processing

(fresh, chilled, and frozen products, in some cases shucked, dried, and salted)

Category 1-A: Fish and Fish Products

Fresh and Chilled

- 030266 – Eels, fresh or chilled (including livers and roe)
- 030262 – Haddock
- 030221 – Halibut
- 030270 – Livers and roe
- 030240 – Herring
- 030263 – Coalfish
- 030233 – Skipjack or stripe-bellied bonito
- 030250 – Cod
- 030222 – Plaice
- 030269 – Fish nes
- 030264 – Mackerel
- 030229 – Flatfish nes
- 030199 – Fish nes, live
- 030219 – Salmonidae nes
- 030261 – Sardines, sardinella, brisling or sprats
- 030212 – Salmon (Pacific, Atlantic, or Danube)
- 030223 – Sole
- 030265 – Dogfish
- 030239 – Tuna nes
- 030232 – Tuna, yellowfin
- 030231 – Tuna, albacore or longfinned
- 030211 – Trout
- 030191 – Trout, live
- 030410 – Fish fillets and other fish meat, fresh or chilled
- 050400 – Guts, bladders, and stomachs of animals (including fish)

Frozen

- 030376 – Eels (including livers, roe, and milt)
- 030377 – Sea bass, frozen
- 030490 – Fish meat nes (including minced), frozen
- 030372 – Haddock (including livers, roe, and milt), frozen

030420 – Fish fillets, frozen
030331 – Halibut (including livers, roe, and milt), frozen
030380 – Livers and roe, frozen
030350 – Herring (including livers, roe, and milt), frozen
030373 – Coal fish, frozen
030343 – Skipjack or stripe-bellied bonito (except livers and roe), frozen
030374 – Mackerel, frozen
030378 – Hake, frozen
030360 – Cod, frozen
030332 – Plaice, frozen
030379 – Fish nes, frozen
030339 – Flatfish nes, frozen
030329 – Salmonidae nes, frozen
030371 – Sardines, sardinella, brisling or sprats, frozen
030322 – Salmon (Atlantic or Danube), frozen
030310 – Pacific salmon, frozen
030333 – Sole, frozen
030375 – Dogfish, frozen
030342 – Tuna, yellowfin — frozen
030341 – Tuna, albacore or longfinned — frozen
030349 – Tuna nes, frozen
030321 – Trout, frozen

Category 1-B: Seafood, Shellfish, and Shellfish Products

Fresh and Chilled

030731 – Mussels (including shucked) — live, fresh, or chilled
030791 – Molluscs nes, invertebrates nes, and pellets
030721 – Scallops (including shucked)
030710 – Oysters (including shucked, frozen, salted, and dried)
030623 – Shrimp and prawns — nonfrozen (peeled or unpeeled, including boiled and unpeeled)
030622 – Lobster nes — nonfrozen (unshelled, including boiled and unshelled)

Frozen

030614 – Crab — frozen (shelled or unshelled, including boiled and unshelled)
030624 – Crab — frozen (also shelled, including boiled and unshelled)
030613 – Shrimp and prawns — frozen (peeled or unpeeled, including boiled and unpeeled)

- 030629 – Crustaceans nes (also frozen and peeled, including boiled and unpeeled)
- 030619 – Crustaceans nes — frozen (also peeled, including boiled and unpeeled)
- 030612 – Lobster — (*Homarus* PP.) — frozen (shelled, including boiled and unshelled)
- 030611 – Rock lobster and other sea crawfish — frozen (also shelled, including boiled and unshelled)
- 030621 – Rock lobster and other sea crawfish — (also frozen and shelled, including boiled and unshelled)
- 030729 – Scallops — frozen, salted, dried, or in-brine (including shucked)

Category 1-C: Other Marine or Multiclassified Products

- 121220 – Seaweed and other algae, fresh or dried (ground or unground)
-

Secondary Processing

(cut, minced, smoked, dried, salted, in-brine or semiprocessed, in-meal, and pellets)

Category 2-A: Fish and Fish Products

- 030563 – Anchovies, salted or in-brine (not dried or smoked)
 - 030510 – Fish meal, fit for human consumption
 - 030530 – Fish fillets — dried, salted, or in-brine, but not smoked
 - 030520 – Livers and roe — dried, smoked, salted, or in-brine
 - 030542 – Smoked herring, including fillets
 - 030561 – Herring, salted or in-brine — not dried or smoked
 - 030562 – Cod, salted or in-brine — not dried or smoked
 - 030551 – Dried cod, including salted — not smoked
 - 030549 – Other smoked fish nes, including fillets
 - 030559 – Dried fish, including cod — not smoked, may be salted
 - 030569 – Other fish nes, salted or in-brine — not dried or smoked
 - 030541 – Smoked salmon (Atlantic, Pacific, or Danube), including fillets
-

Category 2-B: Seafood, Crustaceans and Derived Products

- 030799 – Molluscs nes, invertebrates nes — frozen, salted, dried, or in-brine
-

Category 2-C: Other Marine or Multiclassified Products

- 051191 – Products of fish, crustaceans, molluscs, and other aquatic invertebrates
-

Tertiary Processing

(preserved, prepared, refined, and extracted products)

Category 3-A: Fish and Derived Products

- 160416 – Anchovies — prepared or preserved, whole or in pieces, not minced
- 160430 – Caviar and caviar substitutes
- 150420 – Fish fats and oils (excluding those from liver) and their fractions, not chemically modified
- 160300 – Extracts and juices of meat, fish, crustaceans, molluscs, or other aquatic invertebrates
- 160412 – Herring — prepared or preserved, whole or in pieces, but not minced
- 150410 – Fish — liver oils and their fractions, not chemically modified
- 160415 – Mackerel — prepared or preserved, whole or in pieces, not minced
- 160419 – Fish nes — prepared or preserved, whole or in pieces, not minced
- 160411 – Salmon — prepared or preserved, whole or in pieces, not minced
- 160414 – Tuna, skipjack and Atlantic bonito — prepared or preserved, whole or in pieces, not minced
- 150430 – Marine animal fats and oils and their fractions, not chemically modified

Category 3-B: Seafood, Crustaceans and Derived Products

- 160590 – Molluscs and other aquatic invertebrates, prepared or preserved
- 160530 – Lobster, prepared or preserved
- 160540 – Other crustaceans nes, prepared or preserved
- 160520 – Shrimp and prawns, prepared or preserved
- 160510 – Crab, prepared or preserved

Sources: Product list prepared by the author from the Industry Canada STRATEGIS databank; Foreign Affairs and International Trade Canada, 1999.

Appendix B: Commercial Fisheries and Aquaculture in Eastern Canada, 1990–98

Commercial Fisheries and Aquaculture in Eastern Canada, 1990

	Volume Landed (in tonnes)					Landed Value (in thousands of dollars)						
	Nfld.	PEI	NS	NB	QC	Eastern Canada	Nfld.	PEI	NS	NB	QC	Eastern Canada
Groundfish												
Cod	245,896	4,103	112,612	10,371	22,284	395,266	133,698	2,283	87,127	6,596	13,215	242,919
Haddock	1,938	1	20,193	15	1	22,148	875	1	23,319	20	1	24,216
Pollock	1,819	8	35,648	910	1	38,386	607	2	19,005	605	0	20,219
Cusk	601	2,067	11,434	768	315	15,185	154	670	6,333	344	106	7,607
Redfish	26,752	14,013	25,960	2,465	12,260	81,450	7,346	3,707	8,073	615	2,960	22,701
Flatfish	58,740	1,486	17,774	2,531	5,151	85,682	31,079	836	24,462	1,978	5,271	63,626
Other groundfish	842	300	8,209	46	159	9,556	259	54	4,999	17	61	5,391
Total	336,588	21,978	231,830	17,106	40,171	647,673	174,018	7,553	173,318	10,175	21,614	386,679
Pelagics												
Herring	27,988	14,131	111,868	100,018	6,267	260,272	3,381	1,948	16,026	14,733	1,415	37,503
Mackerel	4,250	2,551	9,195	3,823	1,971	21,790	856	702	2,934	1,116	602	6,210
Alewives	0	83	2,802	5,027	0	7,912	0	27	1,142	924	0	2,093
Capelin	126,600	0	0	0	317	126,917	17,165	0	0	0	214	17,379
Other pelagics	1,086	303	1,564	1,163	762	4,878	5,452	607	10,929	1,619	2,835	21,442
Total	159,924	17,068	125,429	110,031	9,317	421,769	26,854	3,284	31,031	18,392	5,066	84,627

Shellfish													
Clams/quahogs	7,931	1,269	10,628	2,132	706	22,666	3,115	1,708	9,924	2,638	880	18,265	
Oysters	1	1,774	72	792	0	2,639	2	3,489	114	1,382	0	4,987	
Scallops	959	799	69,622	8,325	3,572	83,277	612	926	71,960	9,616	3,836	86,950	
Squid	4,450	0	1,139	0	0	5,589	1,085	0	1,684	0	0	2,769	
Lobster	2,926	10,246	22,467	8,907	3,311	47,857	12,713	36,230	134,711	35,217	13,346	232,217	
Shrimp	19,998	0	3,996	3,649	9,636	37,279	45,748	0	12,503	4,274	11,649	74,174	
Crab, queen	11,054	560	3,259	4,328	6,976	26,177	13,051	1,018	7,619	10,538	17,243	49,469	
Total	47,495	17,751	111,240	28,724	24,836	230,046	76,370	47,608	238,545	64,061	47,450	474,034	
Subtotal	544,007	56,797	468,499	155,861	74,324	1,299,488	277,242	58,445	442,894	92,628	74,130	945,340	
Miscellaneous	1,416	14,707	24,883	1,928	6	42,940	2,232	3,648	1,967	706	7	8,560	
Grand total	545,423	71,504	493,382	157,789	74,330	1,342,428	279,474	62,093	444,861	93,334	74,137	953,900	
Cultured fish production	Volume Landed (in tonnes)						Landed Value (in thousands of dollars)						
	Nfld.	PEI	NS	NB	QC	Eastern Canada	Nfld.	PEI	NS	NB	QC	Eastern Canada	
Fish	180	52	716	7,500	1,350	9,798	1,250	365	4,759	71,775	10,400	88,549	
Shellfish	365	4,542	480	905	113	6,405	620	7,312	674	1,530	226	10,362	
Total	545	4,594	1,196	8,405	1,463	16,203	1,870	7,677	5,433	73,305	10,626	98,911	

Source: Fisheries and Oceans Canada, Statistical Services, information on landings and aquaculture production; available on-line at www.dfo-mpo.gc.ca. Compiled by the author.

Commercial Fisheries and Aquaculture in Eastern Canada, 1991

	Volume Landed (in tonnes)					Landed Value (in thousands of dollars)						
	Nfld.	PEI	NS	NB	QC	Eastern Canada	Nfld.	PEI	NS	NB	QC	Eastern Canada
Groundfish												
Cod	178,687	3,100	101,412	6,738	19,094	309,031	110,501	2,423	93,782	5,299	15,008	227,013
Haddock	1,091	0	20,854	10	2	21,957	481	0	30,214	14	2	30,711
Pollock	1,919	1	37,576	1,285	4	40,785	626	0	22,345	1,058	1	24,030
Hake	1,416	1,550	59,902	633	425	63,926	559	613	20,462	328	166	22,128
Redfish	28,721	12,441	31,499	3,743	16,166	92,570	7,314	3,567	8,944	988	4,076	24,889
Flatfish	56,837	2,115	20,936	1,937	4,671	86,496	28,438	1,129	25,770	1,502	4,969	61,808
Other groundfish	1,433	12	9,236	46	215	10,942	293	6	5,819	18	73	6,209
Total	270,104	19,219	281,415	14,392	40,577	625,707	148,212	7,738	207,336	9,207	24,295	396,788
Pelagics												
Herring	44,888	7,529	91,315	67,873	3,940	215,545	6,645	925	11,850	9,063	833	29,316
Mackerel	8,363	3,917	8,118	2,222	3,256	25,876	2,054	1,068	2,644	739	1,043	7,548
Alewives	0	87	2,149	5,316	0	7,552	0	28	875	1,036	0	1,939
Capelin	49,587	0	0	64	241	49,892	7,181	0	0	7	55	7,243
Other pelagics	860	455	2,297	1,100	795	5,507	4,107	770	15,333	1,493	2,973	24,676
Total	103,698	11,988	103,879	76,575	8,232	304,372	19,987	2,791	30,702	12,338	4,904	70,722

Shellfish													
Clams/quahogs	4,522	1,279	4,932	1,418	580	12,731	1,969	1,671	5,608	1,963	640	11,851	
Oysters	0	1,182	33	685	0	1,900	0	1,832	58	1,426	0	3,316	
Scallops	1,349	822	69,929	4,916	2,522	79,538	1,034	960	70,353	6,158	2,854	81,359	
Squid	1,724	0	893	0	0	2,617	519	0	266	0	0	785	
Lobster	3,040	10,310	23,587	8,062	3,493	48,492	15,741	46,455	154,653	43,655	18,502	279,006	
Shrimp	21,729	0	5,899	3,348	9,514	40,490	49,032	0	18,433	4,589	13,782	85,836	
Crab, queen	16,149	1,049	3,794	6,186	7,982	35,160	19,836	2,201	9,378	17,022	20,535	68,972	
Other shellfish	85	4,074	85	884	940	6,068	58	4,821	79	567	519	6,044	
Total	48,598	18,716	109,152	25,499	25,031	226,996	88,189	57,940	258,828	75,380	56,832	537,169	
Subtotal	422,400	49,923	494,446	116,466	73,840	1,157,075	256,388	68,469	496,866	96,925	86,031	1,004,679	
Miscellaneous	2,408	9,722	22,889	319	32	35,370	5,584	2,143	1,373	228	11	9,339	
Grand total	424,808	59,645	517,335	116,785	73,872	1,192,445	261,972	70,612	498,239	97,153	86,042	1,014,018	
<div> <div>Volume Landed (in tonnes)</div> <div>Landed Value (in thousands of dollars)</div> </div>													
	Nfld.	PEI	NS	NB	QC	Eastern Canada	Nfld.	PEI	NS	NB	QC	Eastern Canada	
Cultured fish production													
Fish	152	38	1,010	9,272	1,501	11,973	540	316	6,095	81,700	9,650	98,301	
Shellfish	322	5,104	232	191	90	5,939	568	6,664	302	570	106	8,210	
Total	474	5,142	1,242	9,463	1,591	17,912	1,108	6,980	6,397	82,270	9,756	106,511	

Source: Ibid.

Commercial Fisheries and Aquaculture in Eastern Canada, 1992

	Volume Landed (in tonnes)					Landed Value (in thousands of dollars)						
	Nfld.	PEI	NS	NB	QC	Eastern Canada	Nfld.	PEI	NS	NB	QC	Eastern Canada
Groundfish												
Cod	75,138	2,342	90,321	3,868	16,135	187,804	50,632	2,038	83,516	3,417	13,659	153,262
Haddock	998	0	20,968	8	1	21,975	443	0	29,785	17	1	30,246
Pollock	784	0	32,359	926	0	34,069	192	0	22,950	883	0	24,025
Hake	1,505	1,073	35,007	379	458	38,422	653	550	16,150	228	229	17,810
Redfish	34,867	13,378	31,828	4,797	14,486	99,356	9,184	3,857	9,833	1,441	3,749	28,064
Flatfish	40,845	1,861	22,050	1,780	5,544	72,080	23,470	1,149	23,589	1,387	5,600	55,195
Other groundfish	2,084	4	8,965	59	182	11,294	489	0	5,962	31	56	6,538
Total	156,221	18,658	241,498	11,817	36,806	465,000	85,063	7,594	191,785	7,404	23,294	315,140
Pelagics												
Herring	28,155	7,863	96,613	80,461	3,846	216,938	3,557	1,110	11,598	10,928	819	28,012
Mackerel	9,919	2,343	8,845	1,798	3,480	26,385	1,887	792	2,748	522	1,226	7,175
Alewives	0	318	1,574	4,909	0	6,801	0	93	685	1,826	0	2,604
Capelin	31,155	0	0	0	912	32,067	4,873	0	0	0	125	4,998
Other pelagics	546	318	3,174	976	739	5,753	2,504	442	20,476	1,308	2,483	27,213
Total	69,775	10,842	110,206	88,144	8,977	287,944	12,821	2,437	35,507	14,584	4,653	70,002

Shellfish													
Clams/quahogs	7,676	1,622	5,933	1,811	573	17,615	3,314	1,821	8,163	2,389	634	16,321	
Oysters	0	1,179	30	530	0	1,739	0	2,062	41	1,048	0	3,151	
Scallops	6,912	796	76,620	5,171	2,692	92,191	4,760	1,076	84,334	7,509	3,063	100,742	
Squid	924	0	428	0	0	1,352	279	0	87	0	0	366	
Lobster	3,232	8,834	18,016	7,940	3,835	41,857	21,355	58,018	159,761	51,641	26,396	317,171	
Shrimp	22,031	0	6,232	2,786	8,273	39,322	51,175	0	14,524	3,683	12,007	81,389	
Crab, queen	16,441	747	4,814	7,012	8,262	37,276	12,973	1,586	13,189	15,427	18,182	61,357	
Other shellfish	107	4,694	308	1,097	992	7,198	70	5,121	400	883	609	7,083	
Total	57,323	17,872	112,381	26,347	24,627	238,550	93,926	69,684	280,499	82,580	60,891	587,580	
Subtotal	283,319	47,372	464,085	126,308	70,410	991,494	191,810	79,715	507,791	104,568	88,838	972,722	
Miscellaneous	2,276	0	28,845	184	16	31,321	7,367	0	3,781	282	43	11,473	
Grand total	285,595	47,372	492,930	126,492	70,426	1,022,815	199,177	79,715	511,572	104,850	88,881	984,195	
Cultured fish production	Volume Landed (in tonnes)							Landed Value (in thousands of dollars)					
	Nfld.	PEI	NS	NB	QC	Eastern Canada	Nfld.	PEI	NS	NB	QC	Eastern Canada	
Fish	175	56	744	10,375	1,425	12,775	1,248	364	6,048	84,800	7,224	99,684	
Shellfish	162	5,364	473	239	87	6,325	147	7,021	585	430	164	8,347	
Total	337	5,420	1,217	10,614	1,512	19,100	1,395	7,385	6,633	85,230	7,388	108,031	

Source: Ibid.

Commercial Fisheries and Aquaculture in Eastern Canada, 1993

	Volume Landed (in tonnes)					Landed Value (in thousands of dollars)						
	Nfld.	PEI	NS	NB	QC	Eastern Canada	Nfld.	PEI	NS	NB	QC	Eastern Canada
Groundfish												
Cod	37,068	817	33,793	878	4,088	76,644	24,670	678	36,365	1,031	3,582	66,326
Haddock	787	0	12,190	5	0	12,982	270	0	20,750	13	0	21,033
Pollock	548	0	20,474	556	0	21,578	124	0	11,825	469	0	12,418
Hake	1,051	568	33,875	117	327	35,938	333	275	21,328	85	172	22,193
Redfish	26,278	5,243	38,180	3,011	11,975	84,687	7,252	1,450	11,311	705	3,006	23,724
Flatfish	30,275	934	17,755	1,080	3,849	53,893	17,865	594	21,700	931	5,041	46,131
Other groundfish	1,643	349	6,975	303	270	9,540	369	80	3,786	86	93	4,414
Total	97,650	7,911	163,242	5,950	20,509	295,262	50,883	3,077	127,065	3,320	11,894	196,239
Pelagics												
Herring	21,688	5,508	89,392	80,717	5,489	202,794	3,049	735	10,298	10,497	1,290	25,869
Mackerel	9,683	4,577	7,157	2,046	3,175	26,638	1,824	1,459	2,089	694	1,090	7,156
Alewives	0	198	2,031	4,541	0	6,770	0	68	897	855	0	1,820
Capelin	48,221	0	0	0	1,499	49,720	19,192	0	0	0	239	19,431
Other pelagics	519	357	4,513	988	678	7,055	2,348	755	29,322	1,679	2,088	36,192
Total	80,111	10,640	103,093	88,292	10,841	292,977	26,413	3,017	42,606	13,725	4,707	90,468

Shellfish													
Clams/quahogs	13,491	1,422	8,002	1,404	418	24,737	10,155	2,019	10,517	2,127	347	25,165	
Oysters	0	1,204	23	363	0	1,590	0	2,227	29	828	0	3,084	
Scallops	4,523	1,250	77,731	5,016	2,445	90,965	6,091	2,450	99,582	8,931	3,703	120,757	
Squid	287	0	2,515	0	0	2,802	97	0	510	0	0	607	
Lobster	2,608	8,856	18,042	7,822	3,588	40,916	18,234	51,452	157,539	46,131	25,030	298,386	
Shrimp	23,135	0	7,734	2,500	9,572	42,941	52,036	0	17,894	3,309	14,515	87,754	
Crab, queen	22,922	905	5,132	8,810	10,330	48,099	31,729	2,994	18,690	26,078	30,805	110,296	
Other shellfish	98	6,120	633	1,656	824	9,331	93	5,468	608	1,855	474	8,498	
Total	67,064	19,757	119,812	27,571	27,177	261,381	118,435	66,610	305,369	89,259	74,874	654,547	
Subtotal	244,825	38,308	386,147	121,813	58,527	849,620	195,731	72,704	475,040	106,304	91,475	941,254	
Miscellaneous	2,777	5,062	16,271	227	26	24,363	13,381	1,004	3,215	321	85	18,006	
Grand total	247,602	43,370	402,418	122,040	58,553	873,983	209,112	73,708	478,255	106,625	91,560	959,260	
Volume Landed (in tonnes)							Landed Value (in thousands of dollars)						
	Nfld.	PEI	NS	NB	QC	Eastern Canada	Nfld.	PEI	NS	NB	QC	Eastern Canada	
Cultured fish production													
Fish	235	50	1,135	10,525	1,425	13,370	1,954	412	7,400	91,680	7,234	108,680	
Shellfish	227	5,646	280	270	34	6,457	201	7,000	530	600	75	8,406	
Total	462	5,696	1,415	10,795	1,459	19,827	2,155	7,412	7,930	92,280	7,309	117,086	

Source: Ibid.

Commercial Fisheries and Aquaculture in Eastern Canada, 1994

	Volume Landed (in tonnes)					Landed Value (in thousands of dollars)						
	Nfld.	PEI	NS	NB	QC	Eastern Canada	Nfld.	PEI	NS	NB	QC	Eastern Canada
Groundfish												
Cod	2,292	473	19,015	576	364	22,720	1,618	408	26,320	872	387	29,605
Haddock	22	0	6,912	21	0	6,955	15	0	13,888	62	0	13,965
Pollock	219	0	14,930	435	0	15,584	71	0	10,381	432	0	10,884
Hake	534	266	13,639	98	120	14,657	215	177	8,500	85	71	9,048
Redfish	17,500	0	27,392	1,208	4,673	50,773	5,208	0	8,969	294	1,245	15,716
Flatfish	9,960	798	12,330	723	3,689	27,500	10,072	621	22,790	801	6,092	40,376
Other groundfish	4,817	866	8,359	86	185	14,313	1,612	212	4,738	28	66	6,656
Total	35,344	2,403	102,577	3,147	9,031	152,502	18,811	1,418	95,586	2,574	7,861	126,250
Pelagics												
Herring	17,526	8,907	76,970	97,926	5,448	206,777	2,981	1,385	8,745	13,372	1,194	27,677
Mackerel	2,583	4,498	8,053	1,933	3,546	20,613	498	1,797	2,912	750	1,022	6,979
Alewives	0	115	1,726	3,984	0	5,825	0	36	866	722	0	1,624
Capelin	1,875	0	0	47	327	2,249	524	0	0	6	44	574
Other pelagics	588	852	4,780	1,186	661	8,067	2,159	879	27,498	1,997	2,069	34,602
Total	22,572	14,372	91,529	105,076	9,982	243,531	6,162	4,097	40,021	16,847	4,329	71,456

Shellfish													
Clams/quahogs	12,634	1,477	9,700	1,756	916	26,483	10,363	2,372	10,911	2,810	766	27,222	
Oysters	0	2,039	113	576	0	2,728	0	3,275	199	1,305	0	4,779	
Scallops	7,402	1,385	75,769	4,634	2,436	91,626	12,592	3,026	109,159	9,791	4,423	138,991	
Squid	1,953	0	3,825	0	0	5,778	749	0	2,223	0	0	2,972	
Lobster	2,639	8,507	19,420	7,823	3,151	41,540	20,766	65,425	183,108	60,456	25,491	355,246	
Shrimp	25,709	0	9,609	2,986	10,357	48,661	58,990	0	22,132	3,764	14,319	99,205	
Crab, queen	27,901	1,078	4,329	12,432	14,660	60,400	87,118	5,021	32,959	72,640	72,452	270,190	
Other shellfish	136	7,868	2,140	3,173	691	14,008	126	7,215	4,581	3,939	362	16,223	
Total	78,374	22,354	124,905	33,380	32,211	291,224	190,704	86,334	365,272	154,705	117,813	914,828	
Subtotal	136,290	39,129	319,011	141,603	51,224	687,257	215,677	91,849	500,879	174,126	130,003	1,112,534	
Miscellaneous	1,947	8,506	21,144	567	6	32,170	9,666	1,504	3,676	416	23	15,285	
Grand total	138,237	47,635	340,155	142,170	51,230	719,427	225,343	93,353	504,555	174,542	130,026	1,127,819	
Volume Landed (in tonnes)						Landed Value (in thousands of dollars)							
	Nfld.	PEI	NS	NB	QC	Eastern Canada	Nfld.	PEI	NS	NB	QC	Eastern Canada	
Cultured fish production													
Fish	395	54	734	12,161	1,500	14,844	2,311	440	4,728	94,500	9,000	110,979	
Shellfish	412	7,986	548	491	33	9,470	373	9,795	961	1,082	83	12,294	
Total	807	8,040	1,282	12,652	1,533	24,314	2,684	10,235	5,689	95,582	9,083	123,273	

Source: Ibid.

Commercial Fisheries and Aquaculture in Eastern Canada, 1995

	Volume Landed (in tonnes)					Landed Value (in thousands of dollars)						
	Nfld.	PEI	NS	NB	QC	Eastern Canada	Nfld.	PEI	NS	NB	QC	Eastern Canada
Groundfish												
Cod	863	109	10,329	649	488	12,438	846	96	15,654	821	655	18,072
Haddock	74	0	7,841	18	0	7,933	91	0	14,904	43	0	15,038
Pollock	351	0	9,633	237	0	10,221	284	0	8,687	334	0	9,305
Hake	594	22	20,916	39	9	21,580	573	15	14,301	50	6	14,945
Redfish	5,646	0	12,282	11	15	17,954	1,900	0	6,138	3	7	8,048
Flatfish	6,984	714	9,594	20	2,719	20,031	10,891	663	20,292	582	4,581	37,009
Other groundfish	5,078	452	7,158	589	160	13,437	2,086	103	5,476	49	66	7,780
Total	19,590	1,297	77,753	1,563	3,391	103,594	16,671	877	85,452	1,882	5,315	110,197
Pelagics												
Herring	21,388	11,923	64,045	89,908	6,426	193,690	3,355	2,157	10,457	16,786	1,301	34,056
Mackerel	2,965	3,048	6,698	2,206	3,382	18,299	647	1,431	2,942	807	1,042	6,869
Alewives	0	59	1,936	4,218	0	6,213	0	19	697	842	0	1,558
Capelin	156	0	0	0	137	293	45	0	0	0	17	62
Other pelagics	434	574	4,538	995	414	6,955	1,485	1,217	34,236	1,930	1,934	40,802
Total	24,943	15,604	77,217	97,327	10,359	225,450	5,532	4,824	48,332	20,365	4,294	83,347

Shellfish													
Clams/quahogs	15,320	1,139	9,800	2,104	1,376	29,739	17,531	2,044	10,408	4,046	1,745	35,774	
Oysters	0	1,620	89	603	0	2,312	0	3,097	203	1,264	0	4,564	
Scallops	10,342	1,427	50,397	4,007	2,496	68,669	14,238	2,795	74,062	8,206	3,943	103,244	
Squid	67	0	933	0	0	1,000	26	0	494	0	0	520	
Lobster	2,545	8,543	18,310	7,699	3,411	40,508	24,602	79,656	206,590	69,179	35,350	415,377	
Shrimp	29,157	0	11,974	3,381	10,070	54,582	79,283	0	35,190	4,763	17,247	136,483	
Crab, queen	32,375	1,760	4,800	11,720	14,717	65,372	176,371	14,343	38,784	93,693	107,984	431,175	
Other shellfish	1,578	6,464	4,023	3,776	1,927	17,768	1,629	6,181	10,907	4,697	1,371	24,785	
Total	91,384	20,953	100,326	33,290	33,997	279,950	313,680	108,116	376,638	185,848	167,640	1,151,922	
Subtotal	135,917	37,854	255,296	132,180	47,747	608,994	335,883	113,817	510,422	208,095	177,249	1,345,466	
Miscellaneous	2,689	9,647	15,768	1,256	25	29,385	9,935	1,728	1,735	344	25	13,767	
Grand total	138,606	47,501	271,064	133,436	47,772	638,379	345,818	115,545	512,157	208,439	177,274	1,359,233	
Volume Landed (in tonnes)						Landed Value (in thousands of dollars)							
	Nfld.	PEI	NS	NB	QC	Eastern Canada	Nfld.	PEI	NS	NB	QC	Eastern Canada	
Cultured fish production													
Fish	580	59	1,120	15,040	883	17,682	3,083	532	6,282	117,573	3,652	131,122	
Shellfish	426	9,261	688	751	116	11,242	365	11,666	1,336	1,338	93	14,798	
Total	1,006	9,320	1,808	15,791	999	28,924	3,448	12,198	7,618	118,911	3,745	145,920	

Source: Ibid.

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	Volume Landed (in tonnes)					Landed Value (in thousands of dollars)						
	Nfld.	PEI	NS	NB	QC	Eastern Canada	Nfld.	PEI	NS	NB	QC	Eastern Canada
Groundfish												
Cod	1,147	110	12,706	1,073	503	15,539	1,096	100	18,209	1,389	567	21,361
Haddock	146	0	10,011	154	0	10,311	142	0	16,003	290	0	16,435
Pollock	438	0	9,007	294	0	9,739	252	0	6,998	324	0	7,574
Hake	373	20	29,145	49	27	29,614	235	16	18,299	53	16	18,619
Redfish	9,810	0	11,715	1	45	21,571	3,134	0	5,199	0	24	8,357
Flatfish	13,286	602	8,052	31	2,515	24,486	21,214	518	16,708	661	4,746	43,847
Other groundfish	2,342	160	5,902	646	223	9,273	1,111	45	4,225	51	123	5,555
Total	27,542	892	86,538	2,248	3,313	120,533	27,184	679	85,641	2,768	5,476	121,748
Pelagics												
Herring	17,290	18,097	79,306	66,235	7,915	188,843	2,909	5,244	16,517	15,273	2,388	42,331
Mackerel	3,869	4,585	5,571	2,684	4,317	21,026	1,349	2,386	2,996	1,278	1,683	9,692
Alewives	0	70	1,914	3,315	0	5,299	0	28	628	768	0	1,424
Capelin	31,970	0	0	0	658	32,628	6,302	0	0	0	76	6,378
Other pelagics	361	389	3,041	921	474	5,186	2,779	1,372	22,114	1,775	2,065	30,105
Total	53,490	23,141	89,832	73,155	13,364	252,982	13,339	9,030	42,255	19,094	6,212	89,930

Shellfish												
Clams/quahogs	16,789	1,258	10,424	919	876	30,266	18,271	2,305	9,432	1,629	954	32,591
Oysters	0	1,468	65	599	0	2,132	0	2,664	135	1,222	0	4,021
Scallops	12,188	2,021	40,305	2,988	2,485	59,987	18,161	4,353	57,983	6,284	3,896	90,677
Squid	8,314	0	508	0	0	8,822	4,200	0	659	0	0	4,859
Lobster	2,382	8,154	17,694	7,637	3,502	39,369	21,297	64,975	199,935	61,843	33,335	381,385
Shrimp	29,966	0	10,918	3,503	11,929	56,316	86,573	0	30,911	5,654	22,289	145,427
Crab, queen	37,979	1,176	4,041	9,544	13,084	65,824	83,876	5,336	27,551	53,794	60,205	230,762
Other shellfish	944	9,670	3,805	3,568	1,986	19,973	1,161	10,560	10,278	5,227	1,540	28,766
Total	108,562	23,747	87,760	28,758	33,862	282,689	233,539	90,193	336,884	135,653	122,219	918,488
Subtotal	189,594	47,780	264,130	104,161	50,539	656,204	274,062	99,902	464,780	157,515	133,907	1,130,166
Miscellaneous	5,752	5,946	15,201	3,185	152	30,236	15,696	1,054	1,447	391	129	18,717
Grand total	195,346	53,726	279,331	107,346	50,691	686,440	289,758	100,956	466,227	157,906	134,036	1,148,883
Cultured fish production	Volume Landed (in tonnes)						Landed Value (in thousands of dollars)					
	Nfld.	PEI	NS	NB	QC	Eastern Canada	Nfld.	PEI	NS	NB	QC	Eastern Canada
Fish	1,053	64	1,511	16,380	917	19,295	5,029	806	8,337	122,522	4,200	140,894
Shellfish	397	10,493	773	733	78	12,474	456	13,638	2,084	1,296	100	17,574
Total	1,450	10,557	2,284	17,113	995	32,399	5,485	14,444	10,421	123,818	4,300	158,468

Source: Ibid.

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	Volume Landed (in tonnes)					Landed Value (in thousands of dollars)						
	Nfld.	PEI	NS	NB	QC	Eastern Canada	Nfld.	PEI	NS	NB	QC	Eastern Canada
Groundfish												
Cod	12,286	264	14,775	961	1,581	29,867	10,866	240	21,248	1,311	1,557	35,222
Haddock	260	0	9,407	110	0	9,777	245	0	14,687	218	0	15,150
Pollock	623	0	11,518	463	0	12,604	318	0	9,694	491	0	10,503
Hake	319	42	19,234	1,203	10	20,808	200	35	13,138	770	6	14,149
Redfish	6,444	0	12,292	22	28	18,786	2,836	0	7,439	5	14	10,294
Flatfish	15,382	809	8,275	516	3,593	28,575	17,574	737	19,019	561	5,150	43,041
Other groundfish	4,024	38	6,122	97	59	10,340	1,539	11	4,070	31	21	5,672
Total	39,338	1,153	81,623	3,372	5,271	130,757	33,578	1,023	89,295	3,387	6,748	134,031
Pelagics												
Herring	20,753	15,855	77,083	66,807	5,750	186,248	3,157	2,799	10,216	11,411	975	28,558
Mackerel	1,188	6,693	5,666	2,014	5,769	21,330	207	3,898	3,022	1,107	2,621	10,855
Alewives	0	107	1,319	4,237	0	5,663	0	43	549	1,455	0	2,047
Capelin	21,310	0	0	7	484	21,801	6,379	0	0	1	59	6,439
Other pelagics	320	326	4,018	898	574	6,136	868	1,013	26,181	2,012	1,600	31,674
Total	43,571	22,981	88,086	73,963	12,577	241,178	10,611	7,753	39,968	15,986	5,255	79,573

Shellfish													
Clams/quahogs	15,361	1,596	10,450	1,004	1,270	29,681	20,408	3,112	9,167	2,010	1,358	36,055	
Oysters	0	1,285	82	350	0	1,717	0	3,093	173	783	0	4,049	
Scallops	12,154	1,773	47,034	2,712	2,331	66,004	19,156	4,209	66,706	5,885	4,368	100,324	
Squid	12,720	2	2,576	448	0	15,746	3,283	0	2,653	463	0	6,399	
Lobster	2,175	8,096	18,931	7,281	2,827	39,310	22,616	73,823	211,341	65,145	29,232	402,157	
Shrimp	39,174	0	20,853	3,903	12,980	76,910	108,228	0	58,957	5,637	23,159	195,981	
Crab, queen	45,743	1,115	4,117	8,956	11,436	71,367	91,794	5,419	21,152	41,771	41,833	201,969	
Other shellfish	1,233	11,763	4,926	3,681	2,262	23,865	1,385	12,776	10,695	5,453	1,696	32,005	
Total	128,560	25,630	108,969	28,335	33,106	324,600	266,870	102,432	380,844	127,147	101,646	978,939	
Subtotal	211,469	49,764	278,678	105,670	50,954	696,535	311,059	111,208	510,107	146,520	113,649	1,192,543	
Miscellaneous	3,998	8,152	21,162	5,271	202	38,785	17,678	1,457	1,710	634	547	22,026	
Grand total	215,467	57,916	299,840	110,941	51,156	735,320	328,737	112,665	511,817	147,154	114,196	1,214,569	
Cultured fish production	Volume Landed (in tonnes)						Landed Value (in thousands of dollars)						
	Nfld.	PEI	NS	NB	QC	Eastern Canada	Nfld.	PEI	NS	NB	QC	Eastern Canada	
Fish	982	94	1,736	19,135	981	22,928	4,282	851	9,203	145,016	4,500	163,852	
Shellfish	768	11,402	895	402	82	13,549	729	15,277	1,924	675	130	18,735	
Total	1,750	11,496	2,631	19,537	1,063	36,477	5,011	16,128	11,127	145,691	4,630	182,587	

Source: Ibid.

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	Volume Landed (in tonnes)					Landed Value (in thousands of dollars)						
	Nfld.	PEI	NS	NB	QC	Eastern Canada	Nfld.	PEI	NS	NB	QC	Eastern Canada
Groundfish												
Cod	21,936	259	11,872	812	1,927	36,806	34,255	307	18,502	1,054	1,810	55,928
Haddock	198	0	11,438	85	0	11,721	189	0	20,325	172	0	20,686
Pollock	637	0	14,057	398	0	15,092	411	0	12,270	468	0	13,149
Hake	455	40	19,437	35	25	19,992	252	42	15,253	36	13	15,596
Redfish	11,624	0	15,349	0	169	27,142	5,009	0	9,269	0	146	14,424
Flatfish	14,782	482	8,515	238	3,961	27,978	16,435	425	19,655	360	6,573	43,448
Other groundfish	2,943	37	4,777	120	95	7,972	1,159	12	3,241	34	28	4,474
Total	52,575	818	85,445	1,688	6,177	146,703	57,710	786	98,515	2,124	8,570	167,705
Pelagics												
Herring	20,937	16,911	76,361	68,244	5,270	187,723	3,232	2,802	10,754	10,948	930	28,666
Mackerel	1,044	6,754	4,476	1,145	3,738	17,157	267	3,964	2,023	612	1,881	8,747
Alewives	0	52	1,523	5,196	0	6,771	0	34	571	1,235	0	1,840
Capelin	39,878	0	23	757	126	40,784	11,937	0	5	75	15	12,032
Other pelagics	313	454	2,839	703	47	4,356	1,160	480	19,249	1,132	52	22,073
Total	62,172	24,171	85,222	76,045	9,181	256,791	16,596	7,280	32,602	14,002	2,878	73,358

Shellfish												
Clams/quahogs	16,606	882	9,542	805	895	28,730	24,884	2,013	8,564	1,520	846	37,827
Oysters	0	1,095	186	190	0	1,471	0	2,471	359	497	0	3,327
Scallops	6,382	1,237	48,738	2,721	2,650	61,728	10,180	2,826	68,742	6,330	4,754	92,832
Squid	191	0	1,123	0	0	1,314	65	0	1,233	0	0	1,298
Lobster	2,265	8,504	18,964	7,391	2,961	40,085	23,519	80,553	232,536	70,462	28,616	435,686
Shrimp	71,880	0	23,946	4,703	15,101	115,630	170,669	0	72,478	6,906	23,700	273,753
Crab, queen	52,645	608	4,912	6,718	10,311	75,194	106,122	2,412	15,837	22,070	27,743	174,184
Other shellfish	779	11,180	4,294	3,559	2,081	21,893	985	11,942	8,398	5,263	1,412	28,000
Total	150,748	23,506	111,705	26,087	33,999	346,045	336,424	102,217	408,147	113,048	87,071	1,046,907
Subtotal	265,495	48,495	282,372	103,820	49,357	749,539	410,730	110,283	539,264	129,174	98,519	1,287,970
Miscellaneous	1,455	5,602	15,023	6,810	21	28,911	3,207	1,031	1,238	732	258	6,466
Grand total	266,950	54,097	297,395	110,630	49,378	778,450	413,937	111,314	540,502	129,906	98,777	1,294,436
<div> <div>Volume Landed (in tonnes)</div> <div>Landed Value (in thousands of dollars)</div> </div>												
	Nfld.	PEI	NS	NB	QC	Eastern Canada	Nfld.	PEI	NS	NB	QC	Eastern Canada
Cultured fish production												
Fish	1,765	99	2,823	14,782	1,000	20,469	10,041	882	16,635	112,778	4,590	144,926
Shellfish	962	14,433	1,243	966	85	17,689	900	19,557	2,802	2,243	135	25,637
Total	2,727	14,532	4,066	15,748	1,085	38,158	10,941	20,439	19,437	115,021	4,725	170,563

Source: Ibid.

Appendix C: List of Processors-Exporters of Seafood Products

Company Name	Location	Prov.	Main Products	Annual Sales (millions of dollars)	Number of Employees	Type of Business
A & C Quinlan Fisheries Ltd.	Shelburne County	NS	Groundfish — salted/dried	2.5 to 10	20	Processor
A. C. Covert Ltd.	Halifax	NS	Groundfish, herring, mackerel, scallops, mussels, shrimp, eels, swordfish, salmon	N/A	25	Processor, distributor/wholesaler
A. Jones Fishing Products	Ste-Cécile	NB	Lobster, herring, roe	2.5 to 10	140	Processor, exporter
Abegweit Seafoods Inc.	Charlottetown	PEI	Crab, lobster, scallops, mackerel, roe, salmon	10 to 20	180	Processor, exporter
Abriel Fisheries Limited	Tangier	NS	Groundfish, halibut, haddock, mackerel, shark, porbeagle, lobster, pollock, cusk	1 to 5	15	N/A
Acadia Seafood Ltd.	Robichaud	NB	Herring, roe, alewives, dogfish	0.5 to 2.5	1 to 50	Processor, exporter
Acadian Fish Processors	Lower West Pubnico	NS	N/A	N/A	40	N/A
Acadian Fishermen's Co-op	Wellington	PEI	Crab, flounder, herring, lobster, mackerel, scallops, canned quahogs	8 to 10	>150	N/A
Acadian Seaplants Ltd.	Dartmouth	NS	Irish moss, rockweed, cultivated sea vegetables	N/A	N/A	N/A
Accord International Canada	Montreal	QC	Cod, lobster, crab, shrimp, crawfish, tilapia, skate, snails	< 0.5	N/A	Trader, distributor/wholesaler
Adams and Knickle Ltd.	Lunenburg	NS	Scallops	2.5 to 10	70	Distributor/wholesaler

Adrice Cormier Ltd.	Cap-Pelé	NB	Pelagics	0.5 to 2.5	10	Processor
Ajy Fisheries Limited	Shelburne County	NS	Herring, sea urchin, roe, tuna, lobster	N/A	N/A	N/A
Aliments Prolimer	Vanier	QC	Precooked fresh and frozen meals, spreads, seafood lasagnas and pizzas	1 to 5	45	N/A
Allen's Fisheries Ltd.	Benoit's Cove	Nfld.	Capelin, cod, flounder, herring, lobster, roe, scallops, crab, smelt, mackerel	2.5 to 10	40	Processor, exporter
Alpheus Halliday Fisheries Ltd.	Shelburne County	NS	Cod, pollock, whiting, cusk	< 0.5	20	Processor
Alvin & Rufin Boudreau Ltée	Cap-Pelé	NB	Herring, alewives	0.5 to 2.5	35	Processor
Amco Fisheries Ltd.	Cap-Pelé	NB	Herring, bloaters	0.5 to 2.5	20 to 25	Processor, exporter
Aqua Fish Farms Ltd.	St. George	NB	Atlantic salmon, eggs	2.5 to 10	25 to 30	Aquaculture
Aqua Fisheries Ltd.	Ferryland	Nfld.	Cod, turbot, pelagics, crab, scallops, roe, shrimp, sea urchin, mussels, lobster	2.5 to 10	120 to 150	Processor, trader
Aqua Gem Seafoods Inc.	Meteghan	NS	Groundfish, scallops, lobster, crab	N/A	N/A	N/A
Aqua Prime Mussel Ranch Ltd.	Ship Harbour	NS	Scallops, mussels	N/A	N/A	N/A
Aquadelights Seafoods Limited	Halifax	NS	Sea urchin, clams, oysters	0.5 to 2.5	4	Aquaculture
Arisaig Fisheries Ltd.	Antigonish County	NS	Groundfish, scallops, lobster, herring, roe	2.5 to 10	125	Processor, exporter

Company Name	Location	Prov.	Main Products	Annual Sales (millions of dollars)	Number of Employees	Type of Business
Aspy Bay Fisheries Limited	Dingwall	NS	Groundfish, pelagics, lobster, crab	N/A	N/A	N/A
Assels Seafood Inc.	Shigawake	QC	Lobster, herring, roe, mackerel	0.5 to 2.5	75	Processor, distributor/wholesaler
L'Association coopérative des pêcheurs de l'Île Itée	Lamèque	NB	Groundfish, shrimp, crab, roe, lobster	10 to 30	400	Processor, importer
Atlantic Aqua Farms Ltd.	Orwell Cove	PEI	Mussels, quahogs, clams, oysters	2.5 to 10	33	Processor, aquaculture, exporter
Atlantic Fish Specialties Ltd.	Charlottetown	PEI	Seafood, pelagics, smoked salmon, trout	5	35	Smoked-fish processor
Atlantic Fisheries Ltd.	Goulds	Nfld.	Groundfish, capelin, herring, squid	N/A	N/A	Processor
Atlantic Herring Cooperative	Yarmouth	NS	Herring, roe, alewives, dogfish	0.5 to 2.5	N/A	Exporter, trader
Atlantic Lobster Corporation	Osborne Harbour Road	NS	Groundfish, halibut, lobster, shark, clams	N/A	30	Exporter
Atlantic Mariculture Ltd.	Fredericton	NB	Dulse	< 0.5	N/A	Processor, exporter
Atlantic Mussel Growers Corp. Ltd.	Murray River	PEI	Mussels, quahogs, clams, oysters	2.5 to 10	22	Processor
Atlantic Pride Fisheries Ltd.	Shelburne County	NS	Groundfish, lobster	2.5 to 10	15	Processor, exporter, distributor/wholesaler
Atlantic Quality Shellfish Ltd.	Pubnico	NS	Oysters, scallops, mussels	N/A	N/A	Aquaculture

Atlantic Seafood Sauce Co. Ltd.	St. Mary's	Nfld.	Seafood, fish sauce	< 0.5	4	Processor, exporter
Atlantic Silver Inc.	St. George	NB	Atlantic salmon	10 to 50	60	Processor
Atlantic Traders Limited	Dartmouth	NS	Groundfish, herring, mackerel, alewives	50	30	Trader, exporter, food wholesaler
Atlantic Treasure Seafoods Limited	Bay Roberts	Nfld.	Capelin, herring, roe, mackerel, salmon	N/A	N/A	Processor
The Austrian Smokehaus	Truro	NS	Atlantic salmon, lobster	N/A	N/A	N/A
B. A. Richard Ltd.	Ste-Anne-de-Kent	NB	Lobster, scallops	2.5 to 10	100	Processor
Babineau Fisheries Ltd.	Morell	PEI	Lobster, groundfish, herring, roe	10	300	Processor, distributor/ wholesaler
Baccaro Fisheries Ltd.	Shelburne County	NS	Hake, pollock, cod, cusk	0.5 to 2.5	8	Processor, exporter
Bakers Point Fisheries Ltd.	Halifax County	NS	Groundfish, pelagics, seafoods	2.5 to 10	30	Processor, distributor/ wholesaler
Barry Group of Companies	Corner Brook	Nfld.	Groundfish, pelagics, shellfish, pickled and value-added products	N/A	3,000	Conglomerate, processor, wholesaler
Bay of Fundy Fisheries Ltd.	Annapolis County	NS	Pollock, haddock, plaice, scallops	2.5 to 10	25	Processor, distributor/ wholesaler
Belle River Enterprises Ltd.	Belle River	PEI	Crab	0.5 to 2.5	50	Processor
Belleisle Foods	Kings County	NB	Salmon and seafood pies	2.5 to 10	N/A	Processor
Beothic Fish Processors Limited	Valleyfield	Nfld.	Groundfish, pelagics, roe, squid	10 to 50	900	Processor
Beru Inc.	Montreal	QC	Lobster, mussels, cod	0.5 to 2.5	3	Aquaculture, wholesaler

Company Name	Location	Prov.	Main Products	Annual Sales (millions of dollars)	Number of Employees	Type of Business
Bethune Import-Export Itée	Montreal	QC	Fish, roe, lobster	2.4 to 10	6	Exporter, trader
Bickerton Industries Ltd.	Bickerton West	NS	Filletts and fish blocks, fish meal	N/A	150	N/A
Birch Street Seafoods Ltd.	Digby	NS	Groundfish	0.5 to 2.5	40 to 50	Processor
Blue Cove Packing	Anse-Bleue	NB	Herring, roe, lobster	8 to 15	90	Processor, importer
Blue Jay Fisheries Ltd.	Digby County	NS	Groundfish, scallops, lobster	N/A	N/A	N/A
Blue Wave Seafoods Inc.	Port Mouton	NS	Herring, roe, groundfish, shark, sea urchin, lobster, surimi	0.5 to 2.5	150	Processor
Botsford Fisheries Ltd.	Cap-Pelé	NB	Herring, alewives	0.5 to 2.5	2 to 45	Processor
Bras d'Or Arctic Char Co-op Ltd.	St. Peter's	NS	Atlantic salmon	N/A	N/A	N/A
Breakwater Fisheries Limited	St. John's	Nfld.	Capelin, crab, herring, mackerel	10 to 50	N/A	Processor, exporter, trader
Broad Island Fisheries Ltd.	Shelburne County	NS	Groundfish	N/A	N/A	Importer
Burleigh Bros. Seafoods	Ellerslie	PEI	Mussels, oysters, quahogs	>3	17	Processor, exporter
C. B. Seafoods Ltd.	Inverness	NS	Pelagics, herring roe, lobster, clams, crab, sea urchin	3 to 5	80	Processor

C. L. Deveau & Son Ltd.	Digby County	NS	Salted fish	0.5 to 2.5	100	Processor, exporter
Calvert Fish Industries Ltd.	Calvert	Nfld.	Cod, capelin	2.5 to 10	100	Processor, exporter
Cana Foods Inc.	Dartmouth	NS	Groundfish, herring, fillets, roe, mackerel, salmon, crab, shrimp	N/A	N/A	N/A
Canadian Gold Seafood Limited	Enfield	NS	Crab, lobster, mussels, scallops, sea urchin	7	10	Wholesaler
Canadian International Traders	Montreal	QC	Cod, lobster, seal meat, pollock, crab, mussels, sardine	2.5 to 10	6	Trading house, importer
Canadian Silver Herring Ltd.	Cap-Pelé	NB	Bloaters, herring fillets	0.5 to 2.5	2 to 35	Processor
Canadian Smoked Fish (1994) Inc.	Charlottetown	PEI	Seafoods, Atlantic salmon, caviar, eels, mackerel, trout, mussels	0.5	3 to 5	Processor, exporter
Canjam Trading Ltd.	Dartmouth	NS	Dogfish, squid, capelin, herring, lobster, mackerel, groundfish	13 to 20	9	Trader, importer
Cansov Marine Products Ltd.	Dartmouth	NS	Herring, capelin, redfish, mackerel	10 to 50	5	Trader, importer
Canstock Ltd.	Eastport	Nfld.	Cod, herring, roe, squid, mackerel, scallops, capelin, salmon, shrimp	0.5 to 2.5	Variable	Trader, importer
Canus Fisheries Ltd.	Clark's Harbour	NS	Groundfish, herring, mackerel, gaspareau, porbeagle/mako, swordfish, lobster	15 to 20	N/A	Processor, exporter, importer
Cape Bald Packers Ltd.	Cap-Pelé	NB	Lobster, crab	10 to 50	250 to 300	Processor
Cape Breeze Seafoods Ltd.	Barrington	NS	Herring, roe, groundfish, mackerel, porbeagle/mako, lobster	0.5 to 2.5	42	Processor

Company Name	Location	Prov.	Main Products	Annual Sales (millions of dollars)	Number of Employees	Type of Business
Cape Fisheries	Cape Breton County	NS	Groundfish, herring, trout, lobster, mussels, hake, shrimp	N/A	N/A	Importer
Cape John Seafoods Ltd.	Pictou County	NS	Lobster, crab, herring, roe, eels	2.3	70	Processor, exporter
Cape Negro Fish & Lobster Limited	Clyde River	NS	Groundfish, mackerel, dogfish, shark, porbeagle/mako, swordfish, lobster	N/A	N/A	Importer
Capstick Fisheries Ltd.	Sydney Mines	NS	Groundfish, cod, halibut, mackerel, crab, lobster, scallops, eels	N/A	N/A	N/A
Carapro ltée	Caraquet	NB	Crab, shrimp, groundfish, marinated herring	N/A	200	N/A
Caraquet Ice Co. Ltd.	Caraquet	NB	Herring, roe, milt, mackerel, lobster, groundfish, crab	0.5 to 2.5	150	Processor
Carrs Lobster Pound Ltd.	Stanley Bridge	PEI	Oysters, clams, quahogs, lobster	0.5 to 2.5	6	Exporter, distributor/wholesaler
Casey Fisheries Limited	Digby	NS	Cod, scallops, haddock, pollock, plaice	2.5 to 10	100	Processor, exporter, wholesaler
Cata Brands Inc.	Brossard	QC	Tuna, sardine	0.5 to 2.5	8	Trader, distributor/wholesaler, importer
Ceilidh Fishermen's Co-op Ltd.	Inverness County	NS	Lobster, groundfish, pelagics, scallops, sea urchin, clams, crab, tuna	2.5 to 10	40	Processor
Charles & Robert Blades Ltd.	Clark's Harbour	NS	Lobster, groundfish	2.5 to 10	10	Processor, wholesaler, importer
Chase's Lobster Pound Ltd.	Port Howe	NS	Lobster, crab	0.5 to 2.5	12	Processor, distributor/wholesaler

Cheбоque Fisheries Ltd.	Yarmouth	NS	Haddock, cod, pollock, halibut, plaice, swordfish, tuna, lobster	2.5 to 10	35	Processor, distributor/ wholesaler
Chianti Food Processors Inc.	St. Anthony	Nfld.	Prepared meals, miscellaneous products	N/A	N/A	Processor
Choice Atlantic Seafood Inc.	Canso	NS	Groundfish	N/A	N/A	N/A
Christensen Seafoods Inc.	Bedford	NS	Shrimp	0.5 to 2.5	3	Exporter, trader
Clam Island Seafood	Halifax County	NS	Lobster	< 0.5	2	Exporter
Clare Fisheries Limited	Saulnierville	NS	Groundfish, mackerel, dogfish, porbeagle/mako, sea urchin, roe, mussels	1 to 5	45	N/A
Classic Seafoods	Jeddore	NS	Groundfish, pelagics, roe, lobster, crab	N/A	40	Exporter
Clearwater Fine Foods Inc.	Bedford	NS	Lobster, scallops, clams, shrimp, groundfish, dogfish, porbeagle/mako, swordfish	>50	2,000	Processor, distributor/ wholesaler
Clouston Foods Group	Lachine	QC	Crab, lobster, shrimp, salmon	>50	180	Exporter, trader
Cold Ocean Inc.	Corner Brook	Nfld.	Herring, capelin, mackerel, redfish, eels, halibut, shrimp, crab, seals	>50	250	Processor
Cold-Water Sea Products	Tantallon	NS	Mussels, oysters, quahogs	< 0.5	4	N/A
Comeau's Sea Foods Ltd.	Saulnierville	NS	Groundfish, scallops, herring, lobster, salmon, seafood spreads, flour/oil	10 to 50	750	Processor, distributor/ wholesaler
Conception Bay Ocean Products Ltd.	St. John's	Nfld.	Groundfish, lumpfish	0.5 to 2.5	30	Processor

Company Name	Location	Prov.	Main Products	Annual Sales (millions of dollars)	Number of Employees	Type of Business
Connors Bros. Ltd.	Blacks Harbour	NB	Sardine, herring, roe, Atlantic salmon	>50	250 to 1,700	Processor, aquaculture, exporter
Conpak Seafoods Inc.	St. John's	Nfld.	Groundfish, pelagics, crab, roe, scallops, ocean catfish, skate, squid	>15	1,500	Processor, exporter
Conserverie Notre-Dame Inc.	Charette	QC	Sea urchin	2.5 to 10	50	Processor
Continental Seafoods	Shelburne County	NS	Crab	2.5 to 10	150	Processor, distributor/wholesaler
Cooke Aquaculture	St. George	NB	Atlantic salmon	32	485	Processor, distributor/wholesaler
Coquillages Nordiques Inc.	Forestville	QC	Clam and sea urchin meat, scallops	0.5 to 2.5	80	Processor
Cormier's Five Island Clams	Colchester County	NS	Quahogs	0.5 to 2.5	60	Exporter, distributor/wholesaler
Country Harbour Sea Farms Limited	Dartmouth	NS	Mussels	< 0.5	6	Processor
Crevettes du Nord Inc.	Gaspé	QC	Shrimp	2.5 to 10	60	Processor, distributor/wholesaler
Crustacés de Malbaie Inc.	Gaspé	QC	Lobster	0.5 to 2.5	20	Processor, distributor/wholesaler
D. Waybret & Sons Fisheries	Shelburne County	NS	Groundfish, cusk, pollock	< 0.5	100	Processor
D. B. Kenney Fisheries Ltd.	Westport	NS	Groundfish, pelagics, scallops, lobster, roe, salmon, flour, herring oil	N/A	300	Processor, distributor/wholesaler

D. E. & Sons Fisheries Ltd.	Wood's Harbour	NS	Groundfish, pelagics, lobster, crab, eels	N/A	N/A	N/A
Daley Brothers Ltd.	Mount Pearl	Nfld.	Groundfish, pelagics, crab, scallops, seals, shrimp, skate, squid, tuna	N/A	N/A	Processor
Davis Strait Fisheries Limited	Halifax	NS	Shrimp, groundfish, scallops	10 to 50	10	Processor, trader, importer
Deer Island Salmon Ltd.	Deer Island	NB	Atlantic salmon	2.5 to 10	25	Aquaculture
D'Eon Fisheries Limited	Yarmouth	NS	Hake, herring, groundfish, lobster	2.5 to 10	6	Processor, distributor/wholesaler
Dockside Fisheries (1988) Ltd.	Wood's Harbour	NS	Swordfish, tuna, herring roe, lobster	N/A	N/A	N/A
Dorset Fisheries Limited	St. John's	Nfld.	Groundfish, pelagics, crab, lobster, roe, skate, squid, turbot, sea urchin, herring filets	0.5 to 2.5	120	Processor
Doucet Fisheries Ltd.	Weymouth	NS	Groundfish	2.5 to 10	25	Processor, distributor/wholesaler
Dover Fish Hatchery Ltd.	Murray River	PEI	Trout, Arctic char	< 0.5	5	Aquaculture
Duguay Fish Packers Ltd.	Cap-Pelé	NB	Herring	< 0.5	15	Processor
Dunphy's Oysters	Dingwall	NS	Oysters	N/A	N/A	N/A
E & P Donaldson's Fisheries Ltd.	Yarmouth County	NS	Groundfish, herring, mackerel, lobster	N/A	N/A	Importer
E. Gagnon & Fils ltée	Ste-Thérèse-de-Gaspé	QC	Crab	15 to 30	325	Processor
E. J. Green and Company Ltd.	Winterton	Nfld.	Capelin, cod, flounder, herring, roe, mackerel, sea urchin, squid, turbot	2.5 to 10	100	Processor

Company Name	Location	Prov.	Main Products	Annual Sales (millions of dollars)	Number of Employees	Type of Business
Earle Brothers Fisheries Ltd.	Carbonear	Nfld.	Capelin, cod, crab, fish meal, oil, flounder, herring, roe, mackerel, squid	2.5 to 10	250 to 300	Processor, distributor/ wholesaler
East Coast Seafood Inc.	Wood's Harbour	NS	Swordfish, lobster	N/A	N/A	N/A
East Point Fisheries Limited	North East Harbour	NS	Groundfish, pelagics, sea urchin, Atlantic salmon, scallops, lobster, crab, eels	N/A	N/A	N/A
East Pubnico Fisheries	Yarmouth County	NS	Groundfish, cod, pollock, hake, cusk	N/A	N/A	N/A
East Side Fisheries Ltd.	Yarmouth County	NS	Lobster, groundfish	0.5 to 2.5	25	Processor, distributor/ wholesaler
Eastern Sea Products Ltd.	Shediac	NB	Mackerel, herring, salmon, shad	0.5 to 2.5	12	Processor
Edmond Gagnon Ltd.	Robichaud	NB	Crab	20 to 30	100 to 150	Processor
Emery Smith Fisheries Limited	Shag Harbour	NS	Groundfish, halibut	N/A	N/A	Exporter, importer
Émile C. LeBlanc & Fils Itée	Cap-Pelé	NB	Herring, alewives	< 0.5	50	Processor, distributor/ wholesaler
Entreprises LaBranche Itée	Baie-Ste-Anne	NB	Mussels, oysters, quahogss	0.5	10 to 20	Processor, aquaculture, exporter
Eric King Fisheries Ltd.	Burnt Islands	Nfld.	Groundfish, lobster, lumpfish roe	2.5 to 10	250 to 400	Processor, distributor/ wholesaler
Eskasoni Fisheries Limited	New Waterford	NS	Atlantic salmon	3	55	N/A

F. Pierce Atlantic Seafoods Limited	Shelburne County	NS	Hake, cusk, haddock, halibut, swordfish	2.5 to 10	45	Processor, distributor/wholesaler
F. Thibault Seafoods	Pointe-de-l'Église	NS	Lobster, crab, edible crab, tuna, saltfish	3 to 5	8	Processor, distributor/wholesaler
Fairmount Clark Inc.	St. Léonard	QC	Salmon	2.5 to 10	10	Processor, distributor, exporter
Family Fisheries Limited	Wilson's Beach	NB	Scallops, groundfish, salmon, sea urchin, lobster	2.5 to 10	N/A	Processor, aquaculture
Ferguson's Lobster Pound Ltd.	Tangier	NS	Lobster	2.5 to 10	16	Exporter
La ferme ostréicole Chiasson Itée	Lamèque	NB	Mussels, oysters	< 0.5	4 to 15	Processor, aquaculture
Ferme ostréicole Dugas Itée	Caraquet	NB	Oysters, spats	< 0.5	6 to 8	Farming, processor
The Fish Basket Ltd.	Eastern Passage	NS	Haddock, cod, pollock, hake, herring, mackerel, lobster	2.5 to 10	22 to 40	Processor, exporter
Fish Reduction Limited	Wood's Harbour	NS	Fish meal	0.5 to 2.5	10 to 12	Processor, distributor/wholesaler
Fisherman's Co-op Association Ltd.	Murray River	PEI	Lobster, groundfish, pelagics, scallops, surf clams	0.5 to 2.5	80	Processor
Fisherman's Market International Inc.	Halifax	NS	Groundfish, pelagics, oysters, lobster, shrimp, crab, mussels, sea urchin	10 to 20	100	Processor, distributor/wholesaler
Fisherman's Pride Inc.	Ellerslie	PEI	Herring, mackerel, oysters, flounder, pollock	1 to 5	15	Processor, distributor/wholesaler
Fishery Products International Ltd.	St. John's	Nfld.	Groundfish, shellfish, tilapia, value-added products	700	2,500	Processor, distributor/wholesaler

Company Name	Location	Prov.	Main Products	Annual Sales (millions of dollars)	Number of Employees	Type of Business
Fogo Island Co-op Society Ltd.	Seldom	Nfld.	Capelin, crab, herring, lumpfish roe, turbot	10 to 50	500	Processor, distributor/wholesaler
Ford Fisheries Limited	Weymouth	NS	Quahogs meat	N/A	N/A	N/A
Fort Point Fisheries Ltd.	Shelburne County	NS	Groundfish, swordfish, lobster	2.5 to 5	15	Processor, distributor/wholesaler
Fortune Seas Canada	Tantallon	NS	Groundfish, pelagics, Atlantic salmon, swordfish, shark, scallops, crab, shrimp	N/A	N/A	Seafood brokerage, importer
Fresh Wave Seafoods	Yarmouth	NS	Groundfish, haddock	< 0.5	4 to 6	Processor, distributor/wholesaler
Les Fruits de mer Côte-Nord	Baie-Trinité	QC	Crab, shrimp, turbot	10 to 50	150	Processor
Les Fruits de mer l'Est du Québec Itée	Matane	QC	Shrimp	10 to 50	200	Processor, distributor/wholesaler
Les Fruits de Mer Imperial Seafoods Inc.	St-Hyacinthe	QC	Eels, sturgeon, freshwater perch, carp, trout	N/A	25	Processor, exporter, importer
Les Fruits de Mer Landry Itée	Grande-Anse	NB	Lobster, roe, herring, crab	2.5 to 10	125	Processor, distributor/wholesaler
Fumoir Grizzly Inc.	Sainte-Foy	QC	Salmon, trout, turbot, Arctic char	2.5	23	Processor
Fundy Lobster Ltd.	Fredericton	NB	Lobster	2.5 to 10	10	Processor, distributor/wholesaler
G. J. Shortall Ltd.	St. John's	Nfld.	Squid, capelin	0.5 to 2.5	20	Processor, exporter, trader
Gaspé Cured Enr.	Sillery	QC	Pollock, haddock, hake	>10	2	Exporter, importer

Gaudet & Ouellette Ltd.	Cap-Pelé	NB	Herring, alewives	0.5 to 2.5	5 to 20	Processor
Gelpex Import & Export Inc.	Montreal	QC	Cod, dogfish, redfish, shad, lobster	0.5 to 2.5	1	Exporter, importer, trader, distributor
Gesco Enr.	Gaspé	QC	Shrimp, lobster	2.5 to 10	65	Processor, distributor/wholesaler
Gidney Wholesale Distribution Centre	Pointe-Claire	QC	Lobster, roe, fresh and frozen fish, shellfish and seafood	10 to 50	15 to 20	Processor, distributor/wholesaler
Glance Bay Fisheries Limited	Glance Bay	NS	Groundfish, pelagics, scallops, crab, lobster, shrimp, eels	N/A	N/A	N/A
Gorman Fisheries Ltd.	Conception Bay	Nfld.	Capelin, squid, mackerel, herring, roe, lobster	< 0.5	120	Processor, distributor/wholesaler
Granville Gates & Sons Ltd.	Lunenburg County	NS	Groundfish	3.5 to 5	26	Processor, distributor/wholesaler
Great Maritime Scallops	Chester	NS	Scallops, mussels — cultivated	N/A	3	N/A
H & H Fisheries Ltd.	Eastern Passage	NS	Groundfish, herring, mackerel, dogfish	5	35	Processor, distributor/wholesaler
H. Anderson Lobster Sales Ltd.	Auld's Cove	NS	Lobster, groundfish, pelagics, roe, oysters, shark, porbeagle/mako, sea urchin, salmon, scallops	2.5 to 10	N/A	Distributor/wholesaler
H. B. Dawe Ltd.	Cupids	Nfld.	Groundfish, pelagics	2.5 to 10	400	Processor
H. Hopkins Ltd.	Port Morien	NS	Cod, lobster, groundfish filets	10 to 50	100	Processor
H. Hopkins Ltd.	Glance Bay	NS	Groundfish, pelagics, scallops, crab	10	25	Processor, distributor/wholesaler
Happy Adventure Sea Products 1991 Ltd.	Eastport	Nfld.	Capelin, herring, mackerel, squid	0.5 to 2.5	70	Processor

Company Name	Location	Prov.	Main Products	Annual Sales (millions of dollars)	Number of Employees	Type of Business
Har-Wen Farms Limited	Port Medway	NS	Oysters	N/A	N/A	N/A
Harbour Deloutre Products Ltd.	Campobello	NB	Atlantic salmon	0.5 to 2.5	N/A	Processor, aquaculture
Harbour Grace Fishing Company Ltd.	Harbour Grace	Nfld.	Cod	N/A	250	Processor, wholesaler
Harbour Lobster Ltd.	Shelburne County	NS	Lobster	10 to 50	10	Processor, distributor/wholesaler
Harbour View Seafoods Ltd.	Halifax	NS	Cod, haddock, pollock, redfish, scallops, shrimp	10	2	Importer, exporter, trader, packer
Helshiron Fisheries Ltd.	Grand Manan	NB	Pollock, haddock, hake, herring, sea urchin, scallops	0.5 to 2.5	35 to 38	Processor, distributor/wholesaler
Hervic Enterprises Limited	Yarmouth County	NS	Groundfish, mackerel, lobster, crab	N/A	N/A	N/A
Hickey & Sons Fisheries Limited	St. Mary's Bay	Nfld.	Pelagics, scallops, lobster, tuna, groundfish	>2	50 to 200	Processor, distributor/wholesaler
Higdon's Seafoods Ltd.	New Harbour	Nfld.	Cod, squid, mackerel, herring, capelin	2.5 to 10	250 to 300	Processor, distributor/wholesaler
High Liner Foods Inc.	Lunenburg	NS	Groundfish, herring, mackerel, salmon, scallops, clams, seafood appetizers	300	1,400	Processor, distributor/wholesaler
High Sea Foods Ltd.	Glovertown	Nfld.	Herring, capelin, eels, smelt	0.5 to 2.5	26 to 56	Processor, distributor/wholesaler
Highland Fisheries Ltd.	Glace Bay	NS	Cod, pollock, redfish	2.5 to 10	150 to 175	Processor

Hillsburn Basin Scallops Group Limited	Granville Ferry	NS	Scallops	< 1	5 to 10	Aquaculture
Homards F. Taker Inc.	Îles-de- la-Madeleine	QC	Lobster, mackerel, herring, scallops, sea urchin	2.5 to 10	40	Processor, distributor/ wholesaler
Howard Turner & Son Ltd.	Marie Joseph	NS	Lobster, haddock, halibut, cod, pollock	2.5 to 10	10 to 25	Processor
Howard's Cove Seafoods Ltd.	Bloomfield	PEI	Clams, quahogs, oysters, cod, crab, mackerel, scallops	N/A	N/A	N/A
I. Deveau Fisheries Ltd.	Digby County	NS	Groundfish, lobster, tuna, mackerel, herring, quahogs, scallops	25 to 30	200	Processor, distributor/ wholesaler
Ichiboshi L.P.C. Itée	Caraquet	NB	Crab, lobster	10 to 25	215	Exporter
IMO Foods Ltd.	Halifax	NS	Herring, mackerel, herring roe, hake, scallops, sea urchin, appetizers	2.5 to 10	125	Processor, distributor/ wholesaler
Indian Bay Frozen Foods Inc.	Centreville	Nfld.	Seals, capelin	2	30	Processor
Indian Point Marine Farms Ltd.	Mahone Bay	NS	Mussels, scallops	< 0.5	5	Processor, aquaculture (mussels)
Inland Fisheries Ltd.	Lunenburg County	NS	Herring	< 0.5	3	Processor, exporter
Innovative Fishery Products Inc.	Digby County	NS	Groundfish, herring, Atlantic salmon, scallops, lobster, mussels, quahogs, crab	0.5 to 2.5	25	Processor, exporter, importer
Inshore Fisheries Ltd.	Yarmouth County	NS	Groundfish	2.5 to 10	45	Processor
International Enterprises Limited	Herring Neck	Nfld.	Mussels, lobster	0.5 to 2.5	25	Processor, aquaculture, distributor/wholesaler
Intervest Trading Company Inc.	Halifax	NS	Groundfish, herring flour/oil, crab, lobster, mackerel, tuna	2.5 to 10	5	Processor, trader, importer

Company Name	Location	Prov.	Main Products	Annual Sales (millions of dollars)	Number of Employees	Type of Business
Inventive Marine Products Ltd.	Dartmouth	NS	Fish-processing equipment	0.5 to 2.5	6	Manufacturer, distributor
Ishiwata Trading Company Ltd.	St. John's	Nfld.	Pelagics, turbot, surf clams, crab, shrimp	20 to 40	4	Exporter
Island Marine Products Ltd.	Clark's Harbour	NS	Groundfish, pelagics, shark, swordfish, sea urchin, tuna, herring oil	10 to 50	150	Processor, distributor/wholesaler
Island Treasures Mussel Processing Ltd.	Notre Dame Bay	Nfld.	Mussels	N/A	12	Processor
J. Petite & Sons Ltd.	English Harbour West	Nfld.	Lobster, groundfish	0.5 to 2.5	20 to 30	Exporter, distributor/wholesaler
J. W. Hiscock Sons Ltd.	Brigus	Nfld.	Cod, groundfish, capelin, squid, lobster, crab products, seals	0.5 to 2.5	40 to 135	Processor
J. W. Windsor (Canada) Itée	Laval	QC	Salmon, mackerel, canned seafood	15	40	Exporter, importer, distributor
J. Willy Krauch & Sons Ltd.	Tangier	NS	Mackerel, Atlantic salmon, trout, eels	N/A	N/A	N/A
Jack's Lobster Limited	Jeddore	NS	Lobster	N/A	12	Processor, distributor/wholesaler
Jacob Trading Ltd.	Cap-Pelé	NB	Herring, hake, pollock, alewives, mackerel	1.5 to 3	N/A	Exporter
James L. Mood Fisheries	Wood's Harbour	NS	Groundfish, shark, tuna, lobster, crab	5 to 10	10	Processor, distributor/wholesaler
Joel Smith Fisheries Ltd.	Yarmouth	NS	Lobster, groundfish	0.5 to 2.5	3	Processor, exporter

John L. Ingersoll & Sons	Grand Manan	NB	Herring, cod, pollock, hake, scallops, salmon	0.5 to 2.5	3 to 25	Processor, exporter
John's Cove Fisheries Limited	Yarmouth	NS	Groundfish, cod, herring, dogfish, shark, porbeagle/mako, swordfish, lobster, crab	N/A	19	Processor, distributor
K & N Fisheries Ltd.	Shelburne County	NS	Groundfish, mackerel, dogfish, porbeagle/mako, swordfish, scallops, lobster	0.5 to 2.5	12	Processor, exporter
K. MacLeod Marine Farming Ltd.	English Town	NS	Mussels	N/A	N/A	N/A
Keeping & MacKay Ltd.	Beach Point	PEI	Lobster, scallops, herring, cod	5 to 10	150	Processor, exporter
Kenney & Ross Ltd.	Shelburne	NS	Fish gelatin, fish glue, fish meal	2.5 to 5	55	Processor, exporter, importer
Kennie MacWilliams Seafoods	Bunbury	PEI	Quahogs, oysters	1.5	1 to 10	N/A
Kent Fish Products Ltd.	Bouctouche	NB	Cod, pollock, hake, cusk, herring	2.5 to 10	Variable	Processor, exporter
L & C Fisheries	Kensington	PEI	Mussels, lobster, oysters, smelt	0.5 to 2.5	10	Processor, aquaculture, exporter
L. Walker Seafoods Ltd.	Wood's Harbour	NS	Lobster, groundfish, tuna, swordfish	0.5	2	Exporter, distributor/wholesaler
Labrador Fishermens' Union Shrimp Co. Ltd.	L'Anse-au-Loup	Nfld.	Cod, scallops, turbot, salmon, capelin	2.5 to 10	500	Processor, distributor/wholesaler
LaHave Seafoods Ltd.	LaHave	NS	Groundfish, pelagics, scallops, lobster	2.5 to 10	15 to 35	Processor, distributor/wholesaler

Company Name	Location	Prov.	Main Products	Annual Sales (millions of dollars)	Number of Employees	Type of Business
Lelièvre, Lelièvre et Lemoignan Itée	Sillery	QC	Cod, hake, turbot, red fish, herring	2.5 to 10	55 to 60	Processor, distributor/wholesaler
Leo G. Atkinson Fisheries Ltd.	Shelburne County	NS	Groundfish, halibut, mackerel, lobster	2.5 to 10	28	Processor
Leslie Leger & Sons Ltd.	Cap-Pelé	NB	Herring, alewives	2.5 to 10	N/A	Processor
Linco Fisheries Ltd.	Shelburne County	NS	Groundfish, lobster	2.5 to 10	30	Processor
Little River Seafood Packers Ltd.	Digby	NS	Groundfish, oysters, shark, salmon, rockweed, swordfish, sea urchin, lobster, clams, quahogs	2 to 5	75	Processor, distributor/wholesaler
Loch Bras D'Or Salmon Farms Ltd.	Whycocomagh	NS	Trout, Atlantic salmon, Arctic char	< 0.5	N/A	Aquaculture
Louisbourg Seafoods Ltd.	Louisbourg	NS	Groundfish, lobster, crab, eels, oysters, shrimp	N/A	92	Importer
M & M Fisheries Ltd.	Wood's Harbour	NS	Lobster, shark, porbeagle/mako, swordfish	0.5 to 2.5	35	Processor, importer
M. G. Fisheries Ltd.	Grand Manan	NB	Pollock, cod, hake, lobster, sea urchin	2.5 to 10	12	Processor
M. V. Osprey Ltd.	North Sydney	NS	Shrimp, black turbot	N/A	110	N/A
Madelipêche	Cap-aux-Meules	QC	Groundfish filets, pelagics, value-added products	10 to 25	375	N/A
Maisonnette Seafoods	Anse-Bleue	NB	Herring, roe, alewives	2.5 to 10	N/A	Processor, importer

Manomet Bay (Canada) Inc.	Yarmouth	NS	Scallops, silver hake, lobster	2.5 to 10	3	Trader, importer
Marché transatlantique	Montreal	QC	Smoked fish, roe, caviar, snails, smoked trout and eels	2.5	5	Processor, distributor/wholesaler
Marimex Limited	Halifax	NS	Shrimp, lobster, dogfish, herring, tuna	< 0.5	6	Trader
Mariner Seafoods Inc.	Montague	PEI	Lobster, herring, sole, scallops, rock crab, snow crab	2.5 to 10	150	Processor
Maritime Marketing Services Inc.	Charlottetown	PEI	Lobster, scallops, groundfish, herring, mackerel, haddock, groundfish filets	N/A	N/A	Exporter
Marseafoods Inc.	Montreal	QC	Shrimp, lobster, crab, groundfish	10 to 50	N/A	Exporter, trader, distributor/wholesaler
Martine Marie Fisheries Limited	Middle West Pubnico	NS	Groundfish, pelagics, Atlantic salmon, lobster	N/A	N/A	N/A
McGraw Seafood (1995) Inc.	Tracadie-Sheila	NB	Crab, lobster, herring, mackerel, cod, smelt, scallops	5 to 10	125	Processor, distributor/wholesaler
Meadowbank Fine Foods Ltd.	Crapaud	PEI	Fish cakes, salmon croquettes	0.5	10	Processor
Medinex Group	St-Laurent	QC	All species (seasonal)	N/A	N/A	Trader, distributor/wholesaler
Melrose International Trading Ltd.	Montreal	QC	Fish — all species and treatments	>50	15	Trader
Merex Inc.	Halifax	NS	Groundfish, pelagics, clams, lobster, scallops	N/A	N/A	N/A
Mersey Point Fish Products Ltd.	Liverpool	NS	Herring, mackerel, dogfish, eels, salmon	< 0.5	8	Processor, distributor/wholesaler
Mersey Seafoods Limited	Liverpool	NS	Groundfish, scallops, shrimp	>50	300	Processor, distributor/wholesaler

Company Name	Location	Prov.	Main Products	Annual Sales (millions of dollars)	Number of Employees	Type of Business
Meteghan Lobster Co-op	Meteghan	NS	Lobster	0.5	12	Processor
Mike N. Boudreau Seafood Ltd.	Robichaud	NB	Lobster	2.5 to 10	8	Exporter, importer, distributor/wholesaler
Mills Seafood Ltd.	Boucouthie	NB	Quahogs, scallops, oysters, sea urchin, gonads, eels, smelt	2.5 to 10	125	Processor, distributor/wholesaler
Montreal Fish Co. Ltd.	Montreal	QC	Groundfish, lobster, crab, edible crab, herring, mackerel, smelt, salmon, trout, sea urchin	1 to 5	3	Broker, importer, exporter
Moorfish Limited	Bay Roberts	Nfld.	Cod, turbot, snow crab	2.5 to 10	200	Processor
Morning Star Fisheries Ltd.	Crapaud	PEI	Lobster, scallops	1.5 to 3	4	Exporter, distributor/wholesaler
Murphy's Seafoods Ltd.	Placentia Bay	Nfld.	Lobster, scallops, roe	0.5 to 2.5	11	Processor, distributor/wholesaler
N. LeBlanc Enterprises Limited	Wedgeport	NS	Groundfish, porbeagle/mako, swordfish, lobster	N/A	N/A	N/A
Neptune Canada	St-Hubert	QC	Small eels, lobster	< 0.5	5	Processor, distributor/wholesaler
Newell Lobsters Ltd.	Yarmouth	NS	Lobster, groundfish, herring, flour	2.5 to 10	N/A	Processor
Newfound Resources Limited	St. John's	Nfld.	Shrimp	2.5 to 10	30	Processor
Newfound Trading Ltd.	Dartmouth	NS	Shrimp	N/A	N/A	N/A
Nippon Suisan (Halifax) Ltd.	Halifax	NS	Crab, turbot, smelt, herring, sea urchin, roe	10 to 50	5	Exporter

North Atlantic Packaging Ltd.	St. John's	Nfld.	Lumpfish, roe, mussels, shrimp	0.5 to 2.5	6	Processor, distributor/wholesaler
North Bay Fisherman's Co-op Ltd.	Ballantyne's Cove	NS	Pelagics, lobster, rock crab, snow crab	1 to 1.5	8	Processor, buyer
North Lake Fish Co-op Limited	Elmira	PEI	Lobster, herring, mackerel, cod, crab, dogfish	2.5 to 10	100	Processor
North Nova Seafoods Limited	Pictou	NS	Herring, lobster, rock crab	N/A	N/A	N/A
Northern Wind (Canada) Inc.	Flower's Cove	Nfld.	Capelin, snow crab, flounder, herring, lobster, lumpfish roe, scallops, squid	0.5 to 2.5	10 to 30	Processor, distributor/wholesaler
Northwest Fisheries Ltd.	Hubbards	NS	Groundfish, pelagics, roe, oysters, sea urchin, salmon, scallops, lobster, shrimp, crab	1	6	Processor, importer
Nova Pisces Seafoods Limited	Hubbards	NS	Groundfish, herring, mackerel, squid, skate, sea urchin, monkfish, lobster	N/A	N/A	N/A
Nuit Noire Pêcherie Itée	Yarmouth	NS	Groundfish, herring, mackerel, lobster, roe	N/A	N/A	N/A
Ocean Enterprises Limited	Belliveau Cove	NS	Lobster	0.5 to 2.5	4	Exporter, distributor/wholesaler
Ocean Organic Limited	Tusket	NS	Groundfish, shark, mackerel, smoked salmon, fish cakes, croquettes	0.5 to 3	3 to 15	Processor, aquaculture, exporter
Ocean Pride Fisheries Ltd.	Lower Wedgeport	NS	Dogfish, herring	0.5 to 2.5	30 to 75	Processor, exporter
Ocean's Best Seafood Ltd.	Meteghan	NS	Shrimp	0.5 to 2.5	8	Processor, exporter
O'Neil Fisheries Ltd.	Digby	NS	Groundfish, scallops, lobster, periwinkles	N/A	N/A	N/A

Company Name	Location	Prov.	Main Products	Annual Sales (millions of dollars)	Number of Employees	Type of Business
Oven Head Salmon Smokers Ltd.	St. George	NB	Atlantic salmon, smoked salmon	< 0.5	4	Processor
P.E.I. Mussel Farms Inc.	Morell	PEI	Mussels, oysters	3.5 to 4.5	40	Processor
P. Jones & Sons Ltd.	Hant's Harbour	Nfld.	Capelin, groundfish, crab, herring, lobster, lumpfish roe, mackerel, scallops, skate	10 to 50	500 to 1,000	Processor
Paturel Seafood Ltd.	Shediac	NB	Lobster, crab, herring, mackerel	> 50	650	Processor, distributor/wholesaler
Pêcheries Cap-Lumière Fisheries Itée	Richibouctou	NB	Lobster, snow crab, smelt	14 to 18	250	Processor
Pêcheries F.N. Fisheries	Shippagan	NB	Crab, herring, fish meal	1 to 5	N/A	N/A
Les Pêcheries GEM	St-Simon	NB	Groundfish, marinated herring and roe	<1	127	N/A
Les Pêcheries Gros-Cap Inc.	Îles-de-la-Madeleine	QC	Lobster, scallops, mackerel, mussels, clams, crab, herring	2.5 to 10	80	Processor, exporter
Les Pêcheries Marinard Itée	Outremont	QC	Shrimp, crab, lobster, herring, capelin, periwinkles, crawfish	20 to 40	200	Processor, distributor/wholesaler
Pêcheries Norpro Itée	Îles-de-la-Madeleine	QC	Lobster, crab, cod, flounder, herring	10 to 50	150 to 250	Processor
Les Pêcheries Roma Fisheries	Anse-Bleue	NB	Herring, alewives	2.5 to 10	N/A	Processor, importer
Pêcheries St-Paul Itée	Caraquet	NB	Crab products and by-products, lobster, herring filets and roe	10 to 25	240	N/A

Peter A. Mullins Provision Merchants Ltd.	Main-à-Dieu	NS	Lobster	< 0.5	N/A	Distributor/wholesaler
Petlee Fisheries Inc.	Bonavista Bay	Nfld.	Tuna, cod, lobster, swordfish, sea urchin, salmon, pelagics, lumpfish roe, seals	N/A	N/A	N/A
Pier 99 Products Ltd.	Cap-Pelé	NB	Lobster, mackerel	10 to 50	N/A	Exporter, importer
Piscicultures Alleghany/ Alleghany's Fish Farm Inc.	St-Philémon	QC	Trout	0.5 to 2.5	15	Processor, aquaculture, exporter
Poisson Raymond Itée	Bouctouche	NB	Lobster, scallops	2.5 to 10	50	Processor, distributor/ wholesaler
Poissonnerie Cowie (1985) Inc.	Granby	QC	N/A	2.5 to 10	20	Processor, distributor/ wholesaler
Poissonnerie de Cloridorme Inc.	Cloridorme	QC	Mackerel, cod fillets, redfish, halibut, turbot	3	41	Processor
Poissonnerie G.M.S. Inc.	Laniel	QC	Whitefish caviar	< 0.5	1	Exporter
Polar Foods International Ltd.	Summerside	PEI	Lobster, pelagics, roe, rock crab	110	1,200	Processor, distributor/ wholesaler
Polaris Marine Services Limited	Halifax	NS	Sea urchin, roe	N/A	N/A	N/A
Port Enterprises Ltd.	Placentia Bay	Nfld.	Cod, capelin, mackerel, herring, lobster, lumpfish roe	2.5 to 10	150 to 300	Processor, distributor/ wholesaler
Poseidon Impex Inc.	Halifax	NS	Lobster	0.5 to 2.5	3	Exporter, importer

Company Name	Location	Prov.	Main Products	Annual Sales (millions of dollars)	Number of Employees	Type of Business
Poseidon Ocean Products Corp.	Montreal	QC	Lobster, squid	2.5 to 10	5	Exporter
Poséidon «Poissons & Crustacés» Inc.	Longue-Pointe-de-Mingan	QC	Snow crab, roe, surf clams	5 to 7	105	Processor
Premium Seafoods Ltd.	Arichat	NS	Groundfish, pelagics, shrimp, oysters, sea urchin, roe, quahogs, rock crab, snow crab, lobster	2.5 to 10	42	Processor, distributor/wholesaler
Prince Edward Aqua Farms Ltd.	Kensington	PEI	Mussels, oysters, quahogs, clams	2.5 to 10	25	Processor, aquaculture
Produits Belle Baie Itée	Caraquet	NB	Shrimp, snow crab, groundfish, herring, roe	10 to 50	>300	Processor, distributor/wholesaler
Produits Marins St-Codefroir Inc.	St-Codefroir	QC	Fish, lobster, herring, rock crab, sea urchin, roe	1.5 to 3.0	65	Processor
Pubnico Trawlers Ltd.	Yarmouth	NS	Groundfish, herring, mackerel, alewives	0.5 to 2.5	5 to 8	Processor
Quality Seafoods Ltd.	Yarmouth	NS	Groundfish, halibut, herring, roe, mackerel, scallops, lobster, swordfish	2.5 to 10	100 to 150	Processor, distributor/wholesaler
Quin-Sea Fisheries Ltd.	Old Perlican	Nfld.	Capelin, crab, groundfish, herring, mackerel	N/A	N/A	N/A
Quinlan Brothers Ltd.	Bay de Verde	Nfld.	Capelin, cod, crab, herring, lobster, lumpfish roe, mackerel, squid, skate	10 to 50	600	Processor, distributor/wholesaler
R & D Nickerson Fish Products Ltd.	Shag Harbour	NS	Groundfish, lobster	N/A	N/A	N/A
R & K Murphy Enterprises Ltd.	Lower Wedgeport	NS	Herring, lobster, groundfish, mackerel, shark, tuna, porbeagle/mako, swordfish, crab	12	20 to 100	Processor, distributor/wholesaler

R & R Shellfish Incorporated	Annapolis County	NS	Scallops, lobster	N/A	N/A	Importer
R. Baker Fisheries Limited	Lockeport	NS	Lobster, clams	0.5 to 2.5	6	Processor, exporter
R. Crowell Eel Processor & Smokery Limited	Glenwood	NS	Eels, mackerel, alewives, salmon	< 0.5	5	Processor
R. I. Smith Co. Limited	Shag Harbour	NS	Cod, pollock, hake, cusk, lobster	10 to 50	35 to 40	Processor, distributor/wholesaler
R. Royle & Co. Limited	Halifax	NS	Shrimp, halibut, Arctic char, herring, dogfish, cod, haddock	2.5 to 10	2	Exporter
Ralimpex International Inc.	Montreal	QC	Herring, mackerel, hake, eels, roe	2.5 to 10	7	Exporter, trader
Raymond O'Neill & Son Fisheries Ltd.	Baie-Ste-Anne	NB	Lobster, herring, roe, quahogs, scallops	2.5 to 10	175	Processor, distributor/wholesaler
Rio Import & Export Ltd.	Dartmouth	NS	Pelagics, turbot, eels, shad, scallops, crab, Stimpson's clam, clams, cod, pollock	10 to 20	5	Trader
Rissers Lobster Pound Ltd.	Lunenburg	NS	Lobster, mussels	0.5 to 2.5	4	Aquaculture, exporter, wholesaler
Robinson Charter Co. Ltd.	Granville Ferry	NS	Scallops, groundfish	0.5 to 2.5	20 to 30	Processor
Roger Breaux Fish Exporter Inc.	Moncton	NB	Alewives, herring, hake, pollock, cod	0.5 to 2.5	N/A	Exporter
Royal Star Foods Limited	Tignish	PEI	Lobster, crab, herring, roe, mackerel	10 to 50	300	Processor, distributor/wholesaler
Ryer & Ryer Lobsters Ltd.	Tantallon	NS	Lobster	2.5 to 10	5 to 12	Processor, distributor/wholesaler

Company Name	Location	Prov.	Main Products	Annual Sales (millions of dollars)	Number of Employees	Type of Business
SCB Fisheries Ltd.	Bay d'Espoir	Nfld.	Atlantic salmon	7 to 10	120	Aquaculture
SFT Venture	Hubbards	NS	Oysters, scallops, lobster, mussels, clams, ocean clam, bay clam, periwinkles, sea urchin	0.5 to 1	2 to 8	Aquaculture, processor
S.P.A. Co-op Ltd.	St. Peter's	NS	Salmon, Arctic char, trout	< 0.5	5	Aquaculture
Sable Fish Packers (1988) Limited	Shelburne County	NS	Groundfish, pelagics, herring roe, lobster, fish silage, crab	10 to 50	300	Processor, distributor/wholesaler
St. Mary's Bay Fisheries Ltd.	Meteghan	NS	Groundfish, lobster, herring, scallops, shrimp	2.5 to 10	75 to 100	Processor, exporter
Salt Water Fisheries Ltd.	Yarmouth County	NS	Herring, tuna, mackerel	N/A	10 to 70	Processor, exporter
Sambro Fisheries Limited	Halifax County	NS	Haddock, cod, hake, pollock, swordfish, lobster	2.5 to 10	16	Processor
Sandeel Trading Inc.	Mont-St-Hilaire	QC	Freshwater fish, groundfish, lobster, salmon	0.5 to 2.5	1	Exporter, trader
Sans Souci Seafoods Ltd.	Tusket	NS	Cod, hake, cusk, pollock	10 to 50	140	Processor, distributor/wholesaler
Scallops Unlimited Incorporated	Annapolis County	NS	Scallops, lobster	N/A	N/A	N/A
Schooner Seafoods Ltd.	Wedgeport	NS	Herring, mackerel, silver hake	2.5 to 10	160	Processor, distributor/wholesaler
Scotia Fisheries Limited	Little River	NS	Groundfish	N/A	N/A	N/A

Scotia Garden Seafood Inc.	Yarmouth	NS	Groundfish, herring, roe, mackerel, hake, dogfish, sea urchin, scallops	5	150	Processor, exporter
Sea Crest Fisheries Ltd.	Saulnierville	NS	Herring	2 to 5	50 to 125	Processor
Sea Gem Enterprises Limited	Port Hawkesbury	NS	Pelagics, shark, swordfish, sea urchin, salmon, flour, lobster, mussels, quahogs, shrimp, crab	N/A	N/A	N/A
Sea Life Fisheries Inc.	Lower East Pubnico	NS	Herring, mackerel, fish silage	N/A	N/A	N/A
Sea Ray Seafoods Inc.	Dorval	QC	Shrimp, snow crab, pollock, hake, cod, herring, mackerel, lobster, salmon	2.5 to 10	4	Exporter, importer, trader
Sea Smokers Ltd.	Yarmouth County	NS	Cod, haddock, striped bass, monkfish, pollock, hake, cusk	0.5 to 2.5	8	Processor, distributor/wholesaler
Sea Star Seafoods Ltd.	Clark's Harbour	NS	Groundfish, mackerel, swordfish, squid	10 to 15	45	Processor, distributor/wholesaler
Sea Winds Fisheries Inc.	Granville Ferry	NS	Scallops, groundfish	0.5 to 2.5	25	Processor
Seabright Fisheries Limited	Pictou	NS	Scallops, lobster, crab	N/A	N/A	N/A
Seabright Smokehouses Ltd.	Tantallon	NS	Groundfish, pelagics, scallops, shrimp, mussels, halibut, trout, haddock, eels	2 to 3.5	7	Seafood processor
Seafood Hub (The) Inc.	Ste-Julie	QC	Lobster, snow crab, halibut, shrimp, mackerel, Stimpson's clam, razor clams	N/A	N/A	Broker, trading house
Seafood 2000 Limited	Georgetown	PEI	Lobster, surf clams, herring	10 to 50	135	Processor
Seafreez Foods Inc.	Corner Brook	Nfld.	Groundfish, pelagics, snow crab, eels, imitation crab, imitation lobster, roe, surimi	>50	1,300	Processor

Company Name	Location	Prov.	Main Products	Annual Sales (millions of dollars)	Number of Employees	Type of Business
Seaside Fisheries Ltd.	Shag Harbour	NS	Lobster, groundfish	5 to 10	6	Processor, distributor/wholesaler
Seaxx Incorporated	Bay Roberts	Nfld.	Groundfish, capelin, squid, lumpfish roe	0.5 to 2.5	110	Processor, distributor/wholesaler
Seldon Miller Fisheries Ltd.	Hubbards	NS	Groundfish, pelagics, shark, tuna, lobster	0.5 to 2.5	7	Processor, distributor/wholesaler
Shag Harbour Fisheries Ltd.	Shag Harbour	NS	Lobster, groundfish, swordfish	2.5 to 10	7 to 25	Processor, distributor/wholesaler
Shediac Lobster Shop Ltd.	Shediac	NB	Lobster, crab	2.5 to 10	125	Processor, distributor/wholesaler
Ship's Lobster Pound Limited	Wood's Harbour	NS	Lobster	N/A	N/A	N/A
Shoal Water Seafoods Ltd.	Digby	NS	Groundfish, scallops, quahogs	N/A	8	N/A
Shoreline Fisheries Ltd.	Wood's Harbour	NS	Groundfish, lobster	0.5 to 2.5	5	Processor
Silver Roe Seafoods Limited	Pubnico	NS	Groundfish, herring, mackerel, roe, dogfish, lobster, rock crab	2.5 to 10	10 to 90	Processor
Skipper Fisheries Limited	West Pubnico	NS	Groundfish, herring, lobster	N/A	N/A	N/A
Skyfish Ltd.	Truro	NS	Fillet, herring, mackerel, dogfish, porbeagle/mako	N/A	5	Processor, exporter
Sogelco International Inc.	Montreal	QC	Groundfish, shellfish and crustaceans, prepared meals, value-added products	25 to 50	500	Processor, distributor/wholesaler
South Coast Fisheries	Hubbards	NS	Mackerel, dogfish, salmon, tuna, lobster	N/A	N/A	N/A

Stan W. Elliott Ltd.	Cook's Harbour	Nfld.	Lumpfish roe	< 0.5	6	Processor, exporter
Stoney Island Fisheries Limited	Barrington Passage	NS	Cod, cusk, hake, pollock, lobster	N/A	N/A	N/A
Surf Seafoods Limited	Barrington Passage	NS	Groundfish, lobster	N/A	N/A	N/A
Swims Canada Inc.	Halifax	NS	Lobster, crab, mussels, sea urchin, periwinkles, scallops, oysters, lobster, crab	>25	40	Processor, distributor/wholesaler
Swims Canada Inc.	Halifax	NS	Groundfish, pelagics, oysters, Atlantic salmon, trout, fish meal and oil, rockweed, sea urchin, quahogs	15 to 25	35	Processor, distributor/wholesaler
T. Ito Trading (N.S.) Ltd.	Halifax	NS	Lobster, herring, sea urchin	5 to 12	5	Trader, exporter
Tai-Pan Lobster Inc.	Meteghan	NS	Lobster	2.5 to 10	5	Exporter
Terra Nova Fishery Company Ltd.	St. John's	Nfld.	Capelin, cod, crab, herring, squid, seals, imitation crab, imitation lobster, lumpfish roe	2.5 to 10	40 to 200	Processor, distributor/wholesaler
Terra Vista Limited	Glovertown	Nfld.	Capelin, eels, herring, mackerel, squid, groundfish, lobster, lumpfish	0.5 to 4.5	100	Processor, exporter
Thico Enterprises Ltd.	Saulnierville	NS	Scallops, salted fish	N/A	N/A	N/A
Third Generation Shellfish	Ellerslie	PEI	Oysters, quahogs, clams, scallops, lobster	0.5 to 2.5	5	Processor, exporter, wholesaler
Tornsgat Fish Producers' Co-operative Society Ltd.	Happy Valley	Nfld.	Arctic char, salmon, cod, turbot, scallops, trout, sea urchin	3.5	100 to 300	Processor

Company Name	Location	Prov.	Main Products	Annual Sales (millions of dollars)	Number of Employees	Type of Business
Tracadie Bay Aqua Farms Inc.	Little York	PEI	Quahogs, cultured mussels, Pacific littleneck	N/A	N/A	N/A
Trico Marketing Services Inc.	Riverview	NB	Lobster, groundfish, crab, herring, mackerel	5 to 8	3	Seafood marketer
Trillium Specialty Products	Meteghan	NS	Groundfish, scallops	N/A	N/A	N/A
True North Salmon Company	St. George	NB	Salmon, Atlantic salmon	10 to 16	75	Processor, aquaculture, exporter
Tusket Seafoods Limited	Tusket	NS	Groundfish, scallops, lobster, quahogs, shrimp	N/A	N/A	N/A
Us Four Fisheries Ltd.	Meteghan	NS	Groundfish, herring, porbeagle/mako, scallops, lobster	2.5 to 10	50	Processor, distributor/wholesaler
Victoria Co-operative Fisheries Ltd.	Neil's Harbour	NS	Groundfish, mackerel, swordfish, lobster, crab	2.5 to 10	125	Processor, distributor/wholesaler
W. C. Nickerson Fisheries Limited	Sherose Island	NS	Cod, pollock, haddock	2.5 to 10	10	Processor, distributor/wholesaler
W. H. Atkinson Seafood Limited	Clark's Harbour	NS	Cod, hake, cusk, pollock	2.5 to 10	30	Processor, distributor/wholesaler
W. S. Fisheries	Lower West Pubnico	NS	Groundfish, herring, lobster	N/A	N/A	N/A
W. Sears Seafoods Ltd.	Shag Harbour	NS	Groundfish, lobster	2.5 to 10	12 to 15	Processor
Weekend Fisheries Ltd.	Meteghan	NS	Scallops, lobster	N/A	N/A	Importer

Wendall Graham (1981) Limited	Montague	PEI	Lobster, snow crab, rock crab, groundfish, herring, scallops	10 to 20	200	Processor, distributor/wholesaler
West Bay Seafoods Ltd.	Clark's Harbour	NS	Lobster, cod, pollock, haddock, swordfish, halibut, mackerel, herring	0.5 to 2.5	4	Processor, distributor/wholesaler
West Isles Seafoods Ltd.	Deer Island	NB	Atlantic salmon, lobster	2.5 to 10	20	Exporter, aquaculture
Western Coordinators Inc.	Corner Brook	Nfld.	Herring, capelin, halibut, cod, redfish	>50	300	Processor
Westmorland Fisheries Ltd.	Cap-Pelé	NB	Lobster, snow crab	10 to 50	400	Processor, distributor/wholesaler
Whole Family Fishery	Grand Manan	NB	Lobster, scallops, pollock, cod, rock crab, sea urchin, salmon	0.5 to 2.5	1 to 5	Processor, distributor/wholesaler
Wilbur-Ellis Company of Canada Ltd.	Bedford	NS	Groundfish, lobster, crab, fish oil and flour	2.5 to 10	N/A	Exporter, trader
William Jackson Seafoods Inc.	Campobello	NB	Salmon, scallops, cod, lobster	2.5 to 10	15	Processor, aquaculture, distributor/wholesaler
Wm. R. Murphy Fisheries Ltd.	Little River Harbour	NS	Groundfish, pelagics, sea urchin, scallops, lobster	N/A	N/A	N/A
Woodman's Sea Products Ltd.	New Harbour	Nfld.	Capelin, cod, redfish, herring, squid, lumpfish roe, mackerel	2.5 to 10	N/A	Processor
Wood's Harbour Lobster Co. Ltd.	Wood's Harbour	NS	Lobster	N/A	N/A	N/A
Wright's Lobster Company	Meteghan River	NS	Groundfish, pelagics, scallops, rock crab, lobster	5 to 10	10	Distributor, importer

Source: Fisheries and Oceans Canada, *Canadian Fish and Seafood Exporters Sourcing Guide* (1997); compiled by the author. The guide is prepared by the Market Intelligence Division (TBS) of the Department of Foreign Affairs and International Trade in consultation with the Department of Fisheries and Oceans (Fisheries Management Directorate) and Agriculture and Agri-food Canada (Seafood and Marine Products Directorate).

Note: A number of names has been added to this list to make it more complete. Of those that are missing some have merged with businesses on the list (e.g., Anse-à-Leu Packing with the Barry Group and Clouston with FPI), while others include some snow-crab-processing firms that export to Japan but are not on the Industry Canada list.

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