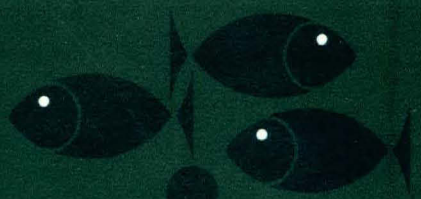
Canadian special publication of fisheries and aquatic sciences 52

Canada's Fishing Industry: A Sectoral Analysis

C. L. Mitchell



Government of Canada
Fisheries and Oceans

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CANADIAN SPECIAL PUBLICATION OF FISHERIES AND AQUATIC SCIENCES 52

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DEPARTMENT OF FISHERIES AND OCEANS
Ottawa 1980

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Canadian Government Publishing Centre
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A deposit copy of this publication is also available
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Canada: $2.95
Other countries: $3.55

Cat. No. Fs 41-31/52E
ISBN 0-660-10730-9
ISSN 0706-6481

Price subject to change without notice
Ottawa

(*version française disponible*)

Printed in Canada
by
LOMOR PRINTERS LTD.

Published by

Government of Canada
Fisheries and Oceans

Scientific Information
and Publications Branch

Publié par

Gouvernement du Canada
Pêches et Océans

Direction de l'information
et des publications scientifiques

Ottawa K1A 0E6

Correct citation for this publication:

MITCHELL, C. L. 1980. Canada's fishing industry:
a sectoral analysis. Can. Spec. Publ. Fish.
Aquat. Sci. 52: 49 p.

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Foreword

This study is a sectoral analysis of Canada's fishing industry which was prepared originally as a Department of Fisheries and Oceans report for the Ministry of State for Economic Development Working Group charged with the development of an economic policy framework for all industry sectors. The study presents the state of the industry in 1978 and gives medium-term projections to 1985 based on resource forecasts for that period.

The study was coordinated and prepared by Dr C. L. Mitchell of the Economic Policy Branch, but many economists at Headquarters and in the regions contributed. Although too numerous to mention, the main contributors were A. L. W. Tuomi who was responsible for the recreational sector of the industry; T. Peart, P. Chung, and K. Brickley from Headquarters; and D. Reid and Dr D. Cauvin from Pacific and Western regions, respectively.

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Ottawa 1980

Abstract

MITCHELL, C. L. 1980. Canada's fishing industry: a sectoral analysis. Can. Spec. Publ. Fish. Aquat. Sci. 52: 49 p.

The study analyses the recent performance, state, and structure in 1978, of Canada's commercial and recreational fishing industries. The combined effects of both industries indicate that Canada's fishing industry on the whole is important in Canada's economy. Medium-term projections from 1978 to 1985 are based on biological (resource projections) and economic factors (costs of production, marketing). The projections suggest that with proper management the industry can make a significant contribution to Canada's economic development, particularly in a regional context.

Key words: commercial fisheries, recreational fisheries, economic development, structure, performance, projections

Introduction

In terms of contribution to the Gross National Product (GNP), Canada's commercial fishing industry is relatively small, contributing less than half of 1%. However, the industry is important in a regional context, particularly on the Atlantic coast, where it provides employment and a way of life to thousands of Canadians. More importantly, with the 200-mile limit, Canada's commercial fishing industry has considerable potential for growth and development that can transform the industry from a lagging to a leading sector during the 1980s.

Canada's fisheries are also important from a recreational or sport fishery standpoint. The sport fisheries make a substantial contribution to the Canadian economy through expenditures made mainly in the service sectors of the economy. In 1975, it was estimated that expenditures wholly attributable to the sport fisheries amounted to $1 billion. The combined effects of both the commercial and sport or recreational fisheries indicate that the industry on the whole is important, and if properly managed, can make a significant impact on Canada's economic development.

This study will present a sectoral analysis of the two major economic elements in Canada's fisheries: commercial fisheries and sport fisheries. The first three chapters will deal with commercial fisheries and the fourth with recreational fisheries.

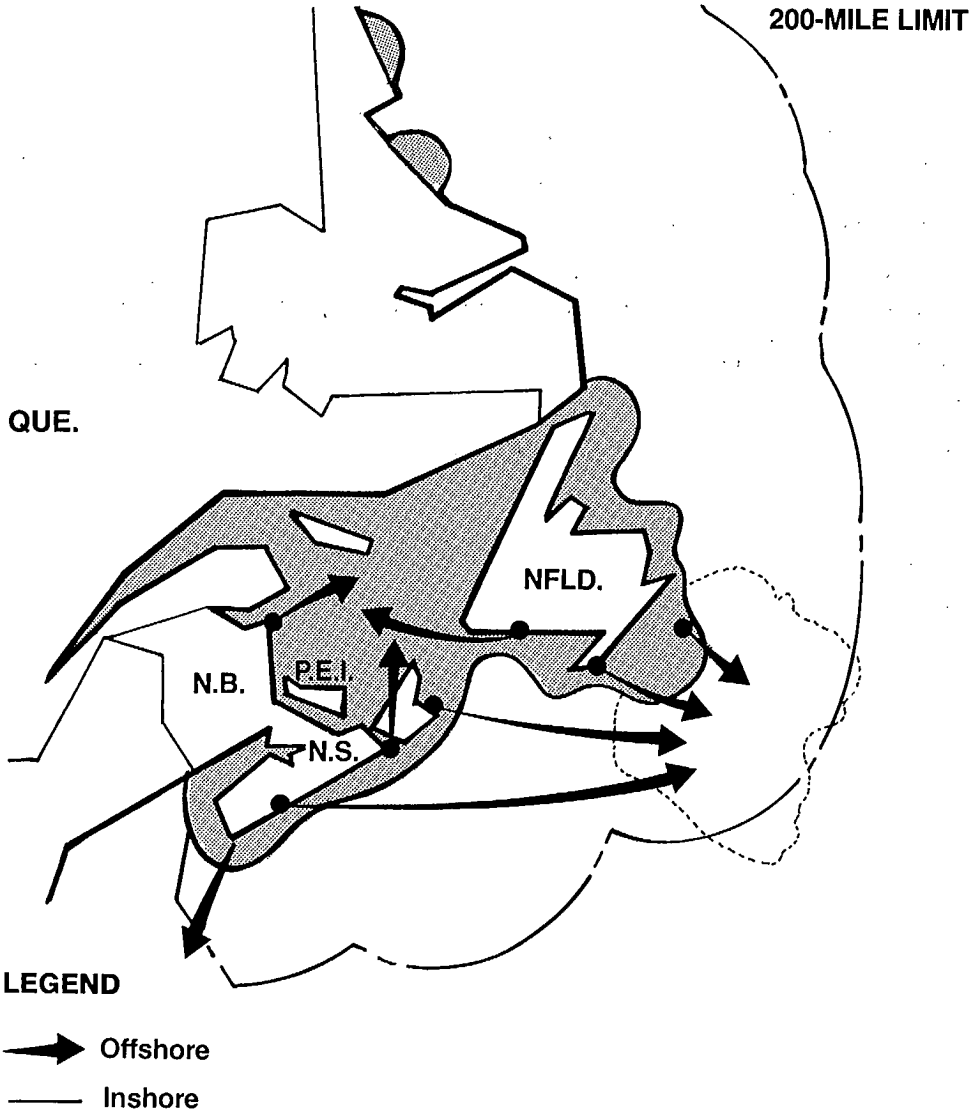

FIG. 1. Major sectors, Canada's Atlantic fisheries.

CHAPTER 1

Profile of Canada's Commercial Fishing Industry

This chapter profiles the recent historical development and 1978 state of Canada's fishing industry. The chapter will be divided into three major sections: the Atlantic coast industry, the inland fishing industry, and the Pacific coast fishing industry.

Canada's Atlantic Coast Fishing Industry

Canada's Atlantic sea fisheries are conducted mainly within the 200-mile limit off Canada's coast, which stretches from the Bay of Fundy to Hudson Strait including Newfoundland and other islands (Fig. 1). This area, particularly the banks, is extremely rich in marine resources consisting of many groundfish, pelagic, molluscs, and crustacean species. There are great differences in the primary fisheries caused by factors such as: location of resources and technology employed, which determine the basic structure of the primary industry, and the secondary manufacturing or processing sector associated with it.

Structure and performance, primary fisheries

The primary fisheries sector on Canada's Atlantic coast has traditionally been divided into two major sectors: an offshore sector and an inshore sector, but there is now developing a third sector — the middle distance or near offshore sector as some larger inshore vessels are venturing into offshore waters in certain areas. For ease of analysis, however, this study will be confined to the traditional subdivisions.

THE OFFSHORE SECTOR

The offshore sector is international with the resources exploited by the fleets of 18 nations in 1978. Canadian offshore fishing operations are mainly for groundfish, utilizing wet fish trawlers (stern and side), draggers, and longliners. These vessels preserve their catch in ice without freezing equipment. There are operations for pelagic species, utilizing seiners and midwater (stern) trawlers; and also for molluscs and crustaceans (scallops, lobster, crab, and shrimp). These vessels, generally over 50 gross tons, are capital intensive, require skilled crews and operate out of large ports in the Atlantic provinces and Quebec. In 1978 there were over 600 vessels in the offshore fleet valued at over $333 million[1] and crewed by about 6000 fishermen. Because of the large vessels used (60% over 100 gross tons (and the availability of groundfish and other species on the banks, offshore operations are carried out on a year-round basis (Table 1).

[1]This is the market and therefore depreciated value of the fleet.

TABLE 1. Fleet composition, 1978 (DFO 1980).

	Offshore			Inshore	
	No.	Value $'000		No.	Value $'000
50–99.9 tons	271	39,717	Under 10 tons	25 472	71,383
100–149.9 tons	72	20,895	10–24.9 tons	4 090	56,603
150 tons and over	264	272,240	25–49.9 tons	559	34,668
Total	607	332,852	Total	30 121	162,654

THE INSHORE SECTOR

Inshore operations are usually conducted within territorial limits along Canada's east coast. The major characteristics of this fishery are labor intensity, seasonality, and the predominance of two fisheries (a) lobster and (b) cod. Inshore fishermen have been and remain the mainstay of Canada's east coast fisheries, many live in tiny settlements scattered along the coast. They operate from small vessels and boats, many of which utilize fixed gears such as traps and nets. In 1978 there were about 30 000 small vessels and boats valued at about $163 million and crewed by about 43 000 fishermen.

Inshore operations are seasonal, primarily from May to September. This is because the small vessels and boats used by inshore fishermen make winter operations hazardous and impossible in ice-covered areas like the Gulf of St. Lawrence; and also because of resource availability. Groundfish and pelagic resources such as cod, herring, and capelin migrate from offshore into inshore waters during late spring and early summer and move out during the fall and winter. The inshore lobster fisheries is also seasonal, but this is due to both resource availability and fishing area restrictions.

MANAGEMENT REGIME

Since extending jurisdiction to 200 miles in 1977, Canada has managed the east coast fisheries by means of quota regulations and licensing. Quotas or total allowable catches (TACs), are established for particular stocks in the area based on biological considerations (principally the $F_{0.1}$ or F_{opt}, ICNAF (1972)) that endeavor to protect the stocks and ensure relatively rapid rates of stock recovery after overexploitation. Quotas are most pertinent to the Northwest Atlantic fisheries, where over 60 stocks are under control. The TACs surplus to Canada's fleet requirements and capabilities are then allocated to foreign fleets.

In virtually all the fisheries there has been restriction on fishing effort. This is exercised through licensing (no net additions permitted) which, combined with quotas, closed seasons, and restrictions on gear, provides effective barriers to entry into the fisheries. The exception has been the inshore ground fisheries. Even these fisheries are restricted by a moratorium on licenses except for a few growth areas in northeastern Newfoundland.

ATLANTIC COAST LANDINGS

Canada's Atlantic coast landings declined from a peak of 1268 thousands metric tonnes(t) in 1968 to a low of 781 thousand t in 1974 but have been increasing since then (Table 2). In 1978, landings amounted to 1153 thousands t valued at $416 million

(Table 3). Of this, groundfish landings of 612 thousand t valued at $162.3 million accounted for 53% of the total volume and 39% of the total value of landings. In comparison, pelagic species landings accounted for 27 and 16% and molluscs and crustacean landings 20 and 43% of the total volume and value of landings, respectively.

TABLE 2. Total Canadian Atlantic coast fisheries landings, 1968–78 (DFO 1980). Quantity (Q) in '000 t, value (V) in $ million.

		V	
	Q	Current	Constant (1978 dollars)
1968	1 267.5	115.7	225.2
1969	1 207.5	120.7	224.7
1970	1 174.0	131.4	236.8
1971	1 094.7	133.3	233.5
1972	931.2	145.1	242.6
1973	888.5	171.1	266.0
1974	781.0	171.6	240.5
1975	805.3	190.8	241.4
1976	880.9	224.1	263.7
1977	1 003.1	288.3	314.1
1978	1 153.2	416.0	416.0

TABLE 3. Canada's Atlantic coast inshore and offshore catches by main species, 1978 (DFO 1980). Quantity (Q) in t round weight, value (V) in $'000.

	Inshore		Offshore		Total	
Species	Q	V	Q	V	Q	V
Groundfish	237 906	70,516	373 950	91,750	611 856	162,266
Cod	173 929	52,539	122 734	33,843	296 663	86,382
Haddock	6 951	3,317	36 083	15,295	43 034	18,612
Redfish	2 029	503	75 036	12,563	77 065	13,066
Small flatfish	16 518	4,394	92 658	19,923	109 176	24,317
Pollock	4 957	1,397	22 577	3,738	27 534	5,135
Hake	6 893	1,322	4 286	827	11 179	2,149
Other groundfish	25 629	7,044	20 576	5,561	47 205	12,605
Pelagic	78 445	93,327	149 326	85,374	227 771	178,701
Herring	106 905	17,060	139 227	26,219	246 132	43,279
Mackerel	25 412	3,878	20	4	25 432	3,882
Tuna	9 367	1,810	12 966	3,523	22 333	5,333
Other pelagics	13 805	8,877	5 706	6,128	19 511	15,005
Molluscs and Crustaceans	78 445	93,327	149 326	85,374	227 771	178,701
Scallop	3 521	1,982	105 883	61,500	109 404	63,482
Lobster	18 516	73,365	663	2,226	19 179	75,591
Shrimp	2 153	1,675	7 905	7,725	10 058	9,400
Queen crab	12 017	6,554	9 006	5,369	21 023	11,923
Other shellfish	42 238	9,751	25 869	8,554	68 107	18,305
Miscellaneous	–	6,834	–	699	–	7,533
Total sea fisheries	471 840	202,302	681 195	213,697	1 153 035	415,999

Each major fishery is dominated by one or two species. Cod accounts for 48% of the total volume of groundfish landings, herring account for 76% of pelagics, and scallops for 53% of molluscs and crustaceans. In terms of landings by the major fleet segments (inshore and offshore fleets), offshore fleet landings amounted to 681 000 t valued at $214 million in comparison with landings of 472 000 t valued at $202 million by the inshore fleet.

In the offshore fisheries, groundfish landings dominate in both volume and value, followed by pelagics in volume and molluscs and crustaceans (mainly scallops) in value. In the inshore fisheries, groundfish landings dominate in volume with cod the major groundfish species landed (most other groundfish species are taken by the offshore fleet). Molluscs and crustacean species, however, dominated by the lobster fisheries, were the most important species in terms of value. A characteristic of offshore, in comparison with inshore operations, is that the former tend to be specialized by major species, whereas the latter generally exploit as all the species available during the season. Another important comparison is the quality of fish landed. Inshore landings, with trips on a day-by-day basis, should be of better quality than offshore landings, where trips last about 1 wk. This is not generally the case, however, because of poor handling and because most inshore groundfish landings, particularly in Newfoundland, are made in the trap fishery. This method of fishing produces relatively small and poor-quality fish with limited scope for processing and often create, due to the seasonal nature of this fishery, glut problems for processing plants (MacKenzie 1979). The primary market structure in the industry, however, does not base price on quality with the result that poor and good quality fish are priced the same.

Factor Inputs and Returns, Atlantic Coast Fisheries

Excluding capital for equipment, gear, wharves etc., there is about $495 million worth of capital equipment in the fisheries, 67% in the offshore fleet and 33% in the inshore fleet. Capital–output ratios, based on capital inputs of the fleet for a 5-year period 1974–78, are: 1.7:1 offshore fleet, 0.7:1 inshore fleet, 1.3:1 total. It takes $1.3 in capital to produce $1 in fisheries output at the primary level. As expected, the capital–output ratio is much higher for the offshore fleet where $1.7 of capital is required to produce $1 in output in comparison with $.7 in the inshore fleet.

Both the federal and provincial governments have contributed to capital formation in Canada's Atlantic coast fishing fleet through subsidy programs. There are two federal government programs, one by the Department of Industry, Trade and Commerce (ITC) to shipyards for large vessels over 75 ft in length; and the other by the Department of Fisheries and Oceans (DFO), the Fishing Vessel Assistance Program, to fishermen for vessels and boats up to 75 ft in length. The DFO subsidy is 35% of the approved cost of vessel and the ITC subsidy to shipyards, though based on an annual reducing rate to 9% by 1983, was at 20% in 1978.

Fishing operations on Canada's Atlantic coast fisheries provide primarily part-time and occasional employment (less than 10 months (mo)) as the majority of the 48 496 fishermen registered in 1978 were in seasonal inshore fisheries. Consistent data on the number of inshore–offshore fishermen are not available. However, because offshore fishing operations are year round, full-time fishermen (those fishing for 10 mo and over) are used to represent offshore fishermen and part-time and occasional to represent inshore fishermen. This representation is widely accepted although it is

known that many fishermen engage in both inshore and offshore fishing. During the winter months, some inshore fishermen find employment in the offshore fisheries. On this basis, it is estimated that 43 000 or nearly 88% of the total number of registered fishermen are inshore fishermen, and 6000 are offshore fishermen. About 50% of the total number of fishermen engage in groundfish operations.

The capital–labor ratios in the offshore and inshore fisheries sectors have affected returns to both labor and capital in these two sectors. As a general statement, returns to capital are low for the capital-intensive offshore and higher for the more labor-intensive inshore fleet. Wages to fishermen, or returns to labor, are, however, considerably higher in the offshore than in the inshore fleet. Estimated per capita incomes in the offshore and inshore fisheries in 1978 were $15,000 and $4,000, respectively (Table 4).

TABLE 4. Estimated per capita incomes, offshore and inshore fleets 1976 and 1978.

	1976		1978	
	Inshore	Offshore	Inshore	Offshore
No. of fishermen	35 810	4 948	42 786[a]	5 710[a]
Avg value of output per fisherman ($)	2,879	24,494	4,728	37,425
Estimated per capita income (fisheries) ($)	2,158	9,797	3,546	14,920
Full-time equivalent[b] ($)	3,699	9,797	6,078	14,920

[a]Estimated.

[b]This was estimated on the basis that inshore fishermen operated for 7 months of the year.

These incomes increased substantially, 52% in the offshore and 64% in the inshore, between 1976 and 1978. However, because offshore incomes are based virtually on year-round operations in comparison with seasonal inshore, average inshore incomes were converted to a full-time equivalent to make the comparisons between both sectors more meaningful. By this yardstick, offshore incomes were about two and a half times inshore per capita incomes in 1978. Low incomes and seasonality have been responsible for a high dependence of the predominant inshore fishermen on government welfare payments, mainly Unemployment Insurance Commission (UIC) benefits to supplement their incomes. In 1978, gross UIC expenditure to Atlantic coast fishermen totaled $49 million. However, many inshore fishermen also engage in other activities such as farming, forestry, and construction during the fishing offseason.

An analysis of the economics of vessel operations in 1976 indicated that returns to capital in excess of 10% could be considered adequate returns, i.e. returns commensurate with alternative returns in other sectors of the economy (Department of Fisheries and Oceans 1979a). Returns of this nature to the resource, i.e. excess profits, are called rents in natural resource economics. On the basis of this criterion, it was found that for the offshore fleet:

1) the groundfish fleet did not gain adequate returns. Most larger company-owned vessels of over 100 gross tons operated at a financial loss in 1976 and 1977 (they probably just broke even or experienced returns of less than 5% in 1978); returns were higher for the groundfish vessels from 50 to 100 gross tons, 80% of which are fishermen owned, but these returns were less than 10% in 1976;

2) vessel returns in the herring fleet were less than 10% but since 1977, with the increased value of the herring catch and limited entry, vessels in this fleet could be experiencing returns of 10% and over;

3) vessel returns were highest for the scallop and lobster fleets. For scallop vessels, returns on capital of the order of 20% are now realized, and returns in excess of 10% are realized by the lobster fleet. There were no recent studies on costs and earnings for shrimp and crab vessels.

The Atlantic coast fish-processing industry

The Atlantic coast fish-processing industry consists of a large number of widely distributed plants along the coast. In 1978, there were 601 plants in operation, employing about 24 000 workers. Of these, 269 were freezing plants, 58 were canneries, and 268 were curing plants[2] that vary in size, diversity of operations, and types of ownership ranging from single ownership to large corporations. Many plants are integrated horizontally, i.e. as branch plants of large companies, or vertically, i.e. owning vessels and boats that service them. Twelve vertically integrated companies (excluding producer's cooperatives) own about 50 plants and 90% of the large (over 100 gross tons) offshore vessels which service about half of these plants. There is one crown corporation, The Canadian Saltfish Corporation, which is responsible for the marketing of salt fish produced mainly by small inshore fisheries dependent plants.

Groundfish species, accounting for 53% of the total volume of landings in 1978, have been the mainstay of the secondary manufacturing sector of the industry on the east coast. However, many plants engage in multispecies operations and process groundfish, pelagic, molluscs, and crustacean species for food products for human consumption and reduce the offal or waste into fish meal and oil. The total value of the products from Canada's Atlantic coast industry was $973 million in 1978 (Table 5). Seafish products accounted for 85% of the volume and 66% of the value of products produced in comparison with 14% of the volume and 33% of the value for shellfish products. The majority of Canada's Atlantic coast fish food products are exported mainly to markets on the eastern seaboard of the United States, and also to Western Europe, the Caribbean, and Japan.

INDUSTRY STRUCTURE AND PERFORMANCE (Peart 1977)

About 300 plants process mainly groundfish of which some 250 are sole proprietorships, followed by partnerships, private companies, cooperatives, and stock companies. There are now three major stock companies or complexes, National Sea Products–Nickerson, the Lake Group, and Fisheries Products. Although the degree of concentration in the industry varies by region, the large companies predominate, accounting for a sizeable proportion (over 40%) of the Atlantic region groundfish product output.

In terms of groundfish, the industry can be divided into the following types of plants:

1) Large vertically integrated trawler-dependent plants with over 2.3 million kg of rated annual capacity;

[2]Based on data from the Intelligence Branch, Department of Fisheries and Oceans. Because some plants are involved in more than one processing operation, the total number of operations therefore exceeds the total number of plants.

TABLE 5. Fishery products and values by main product groups and species, Atlantic coast (DFO 1980). Quantity (Q) in '000 t product weight, value (V) in $'000.

	1976		1977		1978	
	Q	V	Q	V	Q	V
Sea fish						
Fresh and frozen, whole or dressed	66.5	33.5	70.2	37.5	62.2	42.2
Fresh and frozen, fillets and blocks	142.8	225.5	162.2	302.5	184.3	375.2
Fresh and frozen, sticks and portions	8.7	17.8	9.3	24.6	11.1	31.1
Smoked	5.3	6.3	4.1	5.4	5.3	10.0
Salted	25.5	43.5	24.1	54.0	24.9	60.6
Cured or pickled	24.4	18.3	22.5	19.1	28.4	29.7
Canned	15.7	33.1	17.8	48.8	20.5	44.2
Meal and oil	60.5	19.5	55.0	21.0	75.4	29.3
Roe	.4	.7	.6	2.7	1.2	3.6
Other sea fish products	17.4	9.6	9.1	26.5	7.7	24.9
Shellfish						
Fresh and frozen in shell	17.9	47.3	19.5	54.2	50.3	88.4
Fresh, frozen, shucked	24.0	127.7	29.2	129.5	34.9	203.6
Canned	1.3	12.7	2.1	19.1	2.5	21.9
Other	3.8	1.8	4.8	3.1	5.2	4.5
Miscellaneous	127.1	3.0	8.8	2.2	8.2	3.9
Total sea fisheries	414.8	600.9	493.3	750.2	522.1	973.1

2) Medium-sized plants, i.e. plants with 0.9–2.3 million kg of rated annual capacity, and;

3) Small-sized plants with a rated annual capacity of less than 0.9 million kg.

The larger vertically integrated plants are characterized by:
- lower levels of dispersion of landings and processing facilities
- higher degrees of product specialization
- higher degree of species specialization with an emphasis on frozen products
- high level of year-round operations
- more sophisticated industrial organization structures, and an "apparent" more technically competent plant management (Dunne et al. 1974).

The year-round integrated catching, processing, and marketing operations of trawler-dependent plants have been conducive to the achievement of scale economies through unit cost reductions from better scheduling, inventory control, and tied sales. Medium-sized plants, dependent on independent inshore and near offshore fishermen, are characterized by species diversification, often engaging in nonfish (mainly agricultural) processing activities. They compete with small plants for a share of the landings and with the larger companies in respect to wage and salary levels. The small plants, which are largely dependent on inshore trap operations, have a high incidence of smaller-sized fish, specialize in frozen block production, and engage in nonfish processing activities. The relatively short inshore groundfish season has made it necessary for the medium and smaller plants to engage in multiple and nonfish activities for their economic survival.

There are high annual rates of entry and exit in the fishing industry, particularly for the medium and small plants because of (a) low legal requirements and costs for entry or exit, and (b) low capital costs for salting and filleting operations. In the critical area of freezing capacity, the technology and unit cost of capital works were not vastly different between small, medium, and large processing plants. In recent years, there have been some administrative restraints on entry because of the unwillingness of the Federal Government to grant financial incentives to firms (through Department of Regional Economic Expansion (DREE) and other grants) and because of higher quality health and safety regulations for plants.

Capital Stock and Investment Flows

Depreciated capital stock in Canada's Atlantic coast fish-processing plants is estimated to be arount $315 million in 1978[3]. Investment flows into the industry for capital, maintenance, and repair, indicate an annual investment of around $28 million, assuming that the Atlantic region's share of annual investment was in line with its share of the value of shipments.

There was an overcapacity problem in the industry that adversely affected its economic performance. This led to an economic crisis during the period 1974–76 that required a government assistance and rehabilitation program which commenced in 1975. In 1978, TAP was terminated. Although excess capacity is to be expected in a seasonal industry and its effects difficult to assess, it was estimated in 1976 that east coast plants could probably increase their output by 50% without the necessity for extra investment (Research and Productivity Council 1977). A study done by the Department of Supply and Services, Audit Services Bureau (1975) on a sample of six large firms indicated that these firms earned profits of $10 million in 1973 when operating at 40% rated capacity and lost $7.5 million when operating at 28% rated capacity in 1974, suggesting that a break-even point could have been achieved at operating levels of one-third rated capacity. With landings on the Atlantic coast increasing by 48% since 1974 and assuming no great increase in capacity, these plants probably operated at about 50% capacity in 1978. If this is representative of the industry, it is likely that east coast fish-processing plants are now realizing good returns.

The Inland Fisheries Industry of Canada[4]

Management responsibility for the inland (nontidal) fisheries of Canada, the most important being in Ontario and the Prairie Provinces are shared by the federal and respective provincial administrations. In the Northwest Territories, the management of the fish resources is vested in the Crown and as a result, the federal government is the only responsible management authority. The federal government may legislate with respect to fishing seasons, quotas, size limits, and gear control; the provincial governments are responsible for access rights and access fees. The provincial governments generally administer the federal government legislative authority.

Despite the delegation of administrative authority to the provinces, the federal government is, nevertheless, constitutionally responsible for the regulation and

[3]How this estimate and those for the inland and Pacific coast fisheries were obtained will be explained in Chapter 2.

[4]Based on a Report of Department of Fisheries and the Environment (1978c).

protection of all fisheries in Canada. It is also responsible for the regulation of the interprovincial and export trade in fish. However, because of the diffuse nature of federal–provincial responsibilities and the inability of the federal government to exercise proprietary rights, the federal government is constrained in its involvement in the management of the inland fisheries.

Structure and performance, primary fisheries

Production from the inland fisheries has fluctuated in recent years from a high of 55 000 t in 1969 to a low of 40 000 t in 1976 (Department of Fisheries and the Environment 1977; Department of Fisheries and Oceans 1979b). The 1978 production was about 47 000 t of numerous species valued at $32.9 million. The major species are shown in Table 6. It was harvested from over 800 lakes dispersed over an area in excess of 3 million square kilometres. Lakes harvested range in size from a few square kilometres to the over 82 000 square kilometre (Lake Superior). The annual production ranges from a few hundred kilograms in remote northern fisheries to over 17 000 t (Lake Erie).

There are approximately 8000 fishermen engaged in the inland fisheries. Most operate from small, open boats (15–24-ft skiffs) powered by outboard engines during open-water seasons. In the winter, fishermen engage in ice-fishing operations utilizing

TABLE 6. Inland fisheries production by major species and areas, 1976–78 (DFO 1980). Quantity (Q) in t product weight, value (V) in $'000.

	1976			1977			1978		
	Catches	Landed value	Market value	Catches	Landed value	Market value	Catches	Landed value	Market value
New Brunswick	2 191	244	244	2 541	298	298	2 280	359	359
Quebec	643	755	755	703	819	819	648	979	979
Ontario	18 645	12,513	25,026	23 529	14,555	29,110	25 413	17,161	34,322
Manitoba	10 832	7,062	15,174	12 540	10,231	19,334	12 830	9,644	15,242
Saskatchewan	5 104	2,277	5,211	5 214	3,145	6,936	3 748	2,629	4,521
Alberta	1 020	579	1,298	1 131	729	1,384	997	646	1,154
Northwest Territories and Yukon	1 232	716	1,580	1 631	1,314	2,059	1 655	1,541	2,333
Total	39 667	24,146	49,288	47 289	31,091	59,940	47 571	32,959	58,910

	1976		1977		1978	
Major species	Q	V	Q	V	Q	V
Smelt	8 276	1,356	10 680	1,636	12 399	2,215
Whitefish	7 852	5,140	9 214	6,735	8 550	7,799
Perch	3 322	5,141	4 794	5,785	4 936	6,877
Yellow pickerel	4 572	5,491	5 697	8,933	4 339	6,994
Pike	3 383	876	3 888	1,109	3 920	1,588
Tullibee	2 073	1,678	1 923	1,419	1 972	1,537
Sauger	1 689	1,456	1 595	1,793	1 335	1,079
Trout	840	494	968	692	693	679
Carp	293	138	911	159	711	106
Other	7 367	2,376	7 619	2,830	8 716	4,085
Total	39 667	24,146	47 289	31,091	47 571	32,959

snowmobiles and power toboggans. There are, however, larger vessel (40–75 ft) operations in areas such as Lakes Erie, Huron, Superior, Winnipeg, Winnipegosis, and Great Slave Lake. In 1978, about 320 large vessels operated with about 800 fishermen as crews.

The structure and performance of the primary level of the inland commercial fishing industry are as variable as the dispersed nature of the lakes and the range in production. It is difficult, therefore, to generalize concerning economic performance. There is a high level of various federal and provincial incentive programs in the industry. The federal government provides vessel subsidy and price support schemes; the provincial governments, with the exception of Alberta, provide transportation subsidies that can be as high as 20 ¢/lb; and Northwest Territories with price support schemes to both fishermen and plants. Low financial returns to commercial fisheries production and the high incidence of various federal and provincial assistance and incentive programs are regarded as evidence of the marginal economic viability of the primary level of production and the industry in general.

The commercial fisheries in Canada's inland fisheries can be classified with respect to economic viability and development as follows: (1) economically accessible, (2) marginally accessible, and (3) economically inaccessible fisheries. In 1977 about 44% of production came from (1), 27% from (2), and 29% from (3).

Economically accessible fisheries — These fisheries have a relatively long history of commercial fishing due to a comparative advantage in the transportation of fisheries production to markets. They are often characterized by an excess of labor and capital relative to the production potential of the resource. In such circumstances, profit margins have been eroded and the cost of production equals or exceeds the value of production. This situation may be compounded by regulations which, although designed to protect fish stocks, constrain production efficiency.

Marginally accessible fisheries — These fisheries occur where the distance of fisheries resources from markets and existing transportation networks increases and the comparative advantage in commercial fisheries production declines. Transportation is a major constraint to development or maintenance of an economically healthy industry. Generally, an excess of labor and capital, as in accessible fisheries, is not an issue. That is, fish stocks are not usually overexploited. Consequently, physical and economic conditions, not resources, are the limiting factors in fish production.

Economically inaccessible fisheries — These fisheries, because of poor location, are beyond the margin of economic viability. They are characterized by poor returns to labor and capital and are maintained through perpetual government subsidy programs mainly for reasons related to social objectives. Given the cost of transportation, it is currently impossible to obtain a long run return to capital and pay minimum wages to labor. To the extent that capital and labor do not receive a return commensurate with alternative opportunities, it can be argued that economically inaccessible fisheries also suffer from excess labor and capital.

The inland fish-processing industry

In general two basic structures, based on productive potential of the resource, the fishing technology employed, and the distribution and marketing systems that are used, can be identified:

1) In northwestern Ontario, Manitoba, Saskatchewan, Alberta, and Northwest Territories, the structure of the industry is characterized by numerous small producers (approximately 3000 fishing enterprises) selling their catch to a single buyer, the Freshwater Fish Marketing Corporation. This marketing structure resembles that of a monopsony. Individual contributions of these enterprises represent an insignificant part of the total production.

2) Outside the Freshwater Fish Marketing Corporation's area of operation, the industry has a more competitive structure. While numerous small fishing enterprises exist, fisheries such as Lake Erie support fleets or large, highly sophisticated and productive fishing enterprises. In terms of the sale of their production, fishermen have access to a greater number of buyers and processors and some fishing enterprises are sufficiently large to perform their own marketing functions.

There are over 400 establishments, i.e. processing and packaging plants, in operation in the inland fisheries that produced products valued at over $60 million in 1978. Of these, 133 are fish-processing plants that employed 1149 plant workers in 1978 and operated an average 7 mo. The provincial distribution of these plants were as follows:

	Registered plants[a]	Avg operating period (mo)
Ontario	54	9
Manitoba	46	6.8
Saskatchewan	19	n.a.
Alberta	8	8.3
Northwest Territories	6	4.2
Total	133	7.2

[a] Derived from the list of registered plants Inspection Branch, Department of Fisheries and Oceans.

Because of the broad geographical region and the number of political jurisdictions involved in the inland fisheries, the structure and performance of the secondary level of the commercial fishing industry (e.g. fish handling, transportation, and processing) are not clearly understood. However, the performance of this sector is greatly affected by location, since transportation costs are a major constraint, and by scale of plant and operating period. For the area under the Freshwater Fish Marketing Corporation (northern Ontario, the Prairie Provinces and the Northwest Territories) a Department of Fisheries and Oceans study (Topolniski 1976) revealed the following costs as a percentage of gross sales in the industry for the period 1976–77:

	Summer sales	Winter sales	Total
Gross sales	100	100	100
Complete and sell	11	9	10
Processing	17	14	15
Packing	12	14	13
Transportation	9	8	9
Raw materials	53	55	53

The study also indicated there were low and negative economic returns to plant processing operations in this region which are not indicative of a healthy industry. Over 70% of inland fisheries production is marketed in the United States with the balance marketed in the domestic market, Europe, and Japan.

Canada's Pacific Coast Fishing Industry

Canada's Pacific coast fisheries are conducted within the 200-mile limit, except for a small area under United States jurisdiction off Alaska. Because of a narrow continental shelf, fishing operations take place within a 50-mile zone (Fig. 2). The structure of the west coast fishing industry, which is considerably different from that on the east coast, is again the result of factors such as resource availability, location, and management strategy. For example, the fishery is an inshore or near shore fishery with no distinct inshore–offshore structure, and the plant structure is also different with fewer plants and greater concentration.

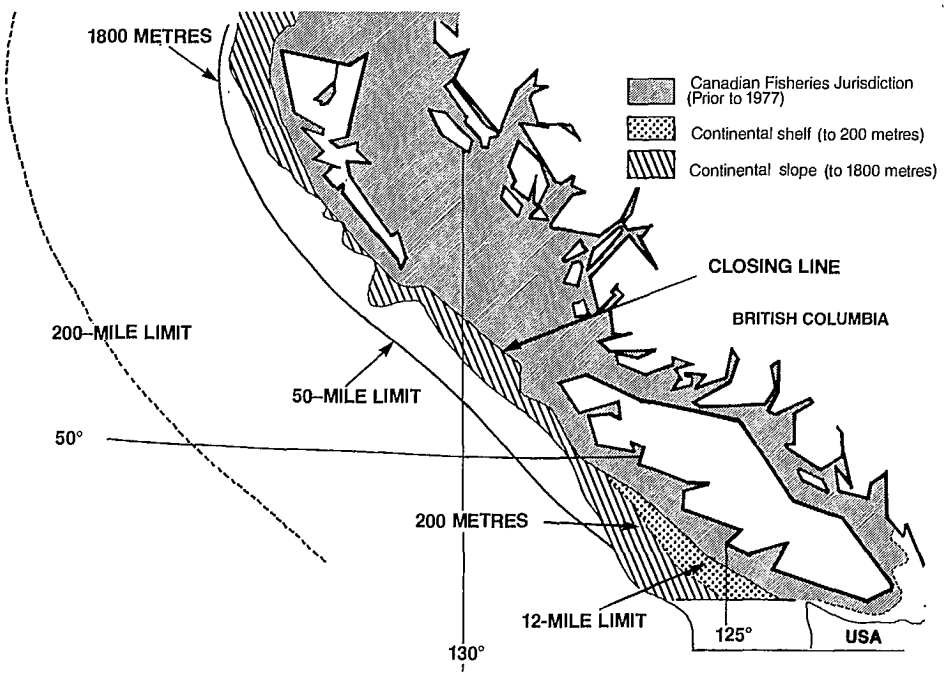

FIG. 2. Limits of Canadian fishing zone, Pacific coast.

Structure and performance, primary fisheries

The Pacific coast primary fisheries is dominated by three major species, salmon, herring, and halibut (fished off Alaska), but there are also a large number of other species, mainly groundfish, molluscs, and crustaceans. Landings in this fishery have fluctuated somewhat since 1968 from a low of 88 000 t in 1969 to a high of 184 000 t in 1973 (Department of Fisheries and the Environment 1977). In 1978, fish landings of 193 000 t valued at $252 million were made on the Pacific coast (Table 7). Salmon, herring, and halibut represented 63, 23, and 7%, respectively, or 93% of the total landed value.

TABLE 7. Canada's Pacific coast landings by major species 1976–78 (DFO 1980). Quantity (Q) in '000 t, value (V) in $ million.

	Q			V		
Species	1976	1977	1978	1976	1977	1978
Pelagic	140.5	166.0	158.1	116.1	141.6	215.7
Salmon	57.5	65.5	70.5	91.9	108.6	158.1
Herring	81.1	97.2	81.4	23.4	32.5	56.8
Groundfish	31.3	29.7	32.1	21.1	18.3	25.9
Halibut	7.3	5.3	5.2	15.0	11.2	16.8
Cod	12.2	10.1	8.7	3.6	3.9	4.5
Molluscs and Crustaceans	9.0	8.7	8.5	4.7	6.3	8.0
Shrimp	3.5	2.8	1.6	1.5	1.7	1.9
Crab	1.0	1.0	1.2	1.0	1.2	1.8
All commercial species	180.9	204.4	198.7	141.9	167.9	252.2

The relative proportion of the quantity of three major species fished vary considerably from year to year and there are marked annual variations in the catch levels of all species as well as prices. Prices have, however, been rising in all fisheries in recent years with the most spectacular increases for species such as halibut, which showed a sustained decline in the quantity of landings.

MANAGEMENT REGIME

The major fisheries of the Pacific coast are intensively managed and regulated with limited entry programs in effect. The salmon fishery is regulated by licenses on boats (A and B licenses depending on volume of catch[5], closed seasons, areas, and gear restrictions. The now lucrative herring roe fishery is regulated by quotas (expected yields), licenses on fishermen, closed seasons, and gear restrictions. For groundfish, there is limited entry for trawling as well as quotas (TACs). For shellfish species, there are a complex of management measures but no limited entry programs are in effect, except for abalone where a handful of people have permits.

FACTOR INPUTS AND RETURNS, PACIFIC COAST FISHERIES

Labor and capital combinations in the Pacific coast fisheries have, to a large extent, been affected by resource availability and the management regime. With the imposition of restricted entry measures and better market and prices for fish products, there has been a significant increase in incomes and returns from these fisheries.

In 1978, there were 7264 vessels and boats operating in the Pacific coast fisheries valued at $368.5 million. The size structure of this fleet is shown in Table 8.

[5]The salmon fishery licensing control program introduced in 1968 classified vessels as "A," "B," or "C" on the basis of landing categories. "A" vessels have the highest landings. "C" vessels, those with lowest landings, were excluded from the salmon fishery and allowed to exploit other fisheries. "B" vessels were to be withdrawn after a period of 10 yr of operations.

TABLE 8. Size structure of the Pacific fleet, 1978 (DFO 1980).

	No.	Value $'000
Under 10 gross tons	4305	72,246
10–24.9 tons	2224	134,435
25–49.9 tons	423	63,970
50–99.9 tons	209	56,244
100 tons and over	103	41,594
Total	7264	368,489

There has been a tendency to use larger, more technologically sophisticated and costly vessels. This has resulted in a situation where pressures on the available fishing resources continue at high levels, despite efforts by the federal government to limit entry, and the discontinuation of the Department of Fisheries and Oceans Fishing Vessel Assistance (subsidy) Program in 1975. Table 9 shows the average market value per vessel category in 1972 and 1977.

TABLE 9. Average market value per vessel category, Pacific coast fisheries, selected years.

	1972 (Current $)	1977	% Change
All licensed salmon seiners	50,900	175,000	244
Single gear salmon seiners	44,900	117,300	161
Combination gear salmon seiners	61,000	218,300	258
All licensed salmon gillnetters	11,000	30,000	173
Single gear	9,000	23,800	164
Combination gear	15,300	37,300	144
All trollers	19,200	51,700	169
Single gear	18,400	50,100	172
Combination gear	30,000	60,000	100

The value of all 1977 fishing craft was roughly three times that of the 1972 value. The increase in the average unit prices of vessels from $17,000 in 1972 to $49,600 in 1977, reflects a higher proportion of the larger combination vessels, higher costs for shipbuilding, the increased value of landings, as well as the capitalization of access rights under a policy of restricted entry through licensing. The market value of licenses now range from 31 to 39% of the total value of a vessel.

Employment in primary fishing in the Canadian Pacific coast totaled around 14 000 in 1976 and increased to 16 785 in 1978 due to high prices in the herring roe and salmon fisheries. Roughly 1 in 8 of the employed was an Indian compared to 1 in 5 in the early 1960s. Since mid-1960s, the decline in Indian employment is strongly associated with limited entry licensing and "buy-back" policies of the federal government. However, the Indian Fishermen's Assistance Program instituted in 1969, which provided both grants and loans to Indian fishermen to purchase or upgrade vessels, helped to maintain Indian participation.

Data on the duration of fishing activity indicate that during the post-license limitation period (1967–78) there has been only minor changes in the average number of days fished per boat category. All licensed vessels' duration of activity ranged between 45 and 52 d, single gear vessels ranged from 33 to 48 d, and combination gear vessels from 48 to 66 d. Data on the average crew size and average weeks fished for boat category in 1976 were:

Boat category	Avg crew size	Avg weeks fished
Salmon seine/roe herring combination	5.4	19
Salmon seine, single	4.9	14
Roe herring	5.9	3
Salmon gillnet/troll combination	1.2	18
Salmon gillnet, single	1.0	13
Troll, single	1.4	16
Gillnet/roe herring punts	2.3	2–3
Abalone vessel	2.8	11

Returns and Income Levels

Compared to other fishing regions of Canada, the Pacific coast fishery generally has higher gross and net incomes, and fishermen are less dependent on supplementary sources of income. Time series data are not available on net returns and incomes, therefore, these have to be judged by trends in gross returns to vessels (Table 10).

TABLE 10. Gross income in $'000 by vessel category, 1973 and 1977.

	1973	1977
All licensed vessels	22.8	25.8
"A" vessel license	26.0	30.0
"B" vessel license	3.4	6.5
"C" vessel license	14.9	18.0
All combination vessels	22.8	41.4
Salmon seiners	124.9	146.3
Herring seiners	175.0	181.9
Salmon gillnet	19.1	18.7
Troll	17.5	29.7
All single gear vessels	16.9	18.3
Salmon seiners	67.9	50.2
Herring seiners	12.0	69.4
Trawl	76.0	62.3

In general, there has been a trend towards higher average income levels of all vessels but especially among "A" licensed vessels. In 1973, 33% of all licensed vessels showed gross incomes of $20,000 or more, and this increased to 36% in 1977. A study on the economic performance of various vessels in the fleet in 1976 indicated net returns to capital of 10% for single salmon seine vessels and 11% for combination salmon–roe vessels (Gislason 1976).

The significant aspect of the gross revenues for Pacific coast fishing vessels is that they are attained within a relatively short fishing period. The herring roe fishery is perhaps a classic example of a "bonanza" operation in that most of the gross incomes for herring seiners were realized in a 3-wk operation. Based on net returns in 1976 mentioned above, there is no doubt that fishermen are attaining high profits from their operations and, therefore, capturing considerable rents. Some rents are capitalized in improvements to their vessels and boats which has led to concerns that there is considerable excess capital tied up in the fleet[6]. This is to some extent supported by the data on the value of the fleet, which indicates that the Pacific coast fleet is the most highly capitalized fleet in Canada's fisheries.

The Pacific coast fish-processing industry

In 1978, there were 114 plants in operation on the Pacific coast. These plants, employed about 4000 workers, and produced 126 000 t of products valued at $517.6 million (Table 11).

TABLE 11. Pacific coast fishery products and values by main product groups, 1977–78 (DFO 1980). Quantity (Q) in t, value (V) in $'000.

	1977		1978	
	Q	V	Q	V
Sea fish				
Fresh frozen, whole or dressed	46 718	113,002	51 967	185,023
(Salmon)	(19 855)	(86,411)	(27 011)	(148,993)
Fresh and frozen, fillets and blocks	4 766	10,080	7 423	17,755
Fresh and frozen, sticks and portions	2 666	5,444	1 328	3,650
Smoked	1 004	4,026	541	3,881
(Salmon)	(326)	(2,629)	(330)	(3,127)
Salted	186	69	895	623
Cured or pickled	446	1,923	912	6,023
Canned	29 339	123,021	24 670	115,921
(Salmon)	(29 326)	(122,987)	(24 535)	(115,914)
Meal and Oil	11 678	5,016	13 887	6,083
Other sea fish products	11 830	92,834	17 339	164,677
(Herring roe)	(8 106)	74,938)	(7 271)	(133,264)
Shellfish				
Fresh and frozen, in shell	1 952	4,259	2 841	5,799
Fresh and frozen, shucked	927	4,448	828	5,426
Canned	581	456	675	706
Other	51	132	53	109
Miscellaneous	–	–	–	–
Total sea fisheries	112 289	364,801	125 924	517,557

[6]Concerns over the overcapitalization question were discussed in the Powell River Symposium "Economic Rationalization of Canada's Commercial Fisheries," Powell River, B.C., 1978.

Comparative 1972–77 data show that the dominant position of salmon products has weakened from a percentage contribution to total output of 75% for the period 1972–74 to 52% in 1978. A strong growth activity was herring roe, included in other seafish products, with an average annual marketed value of $24 million (1973–75) compared to $52 million in 1976 and $133 million in 1978, thereby accounting for 26% of product sales in that year.

Industry Structure and Performance

In 1978, there were 120 fish-processing plants in operation employing about 4200 workers. These plants, which ranged from big multipurpose plants involved in all fish processing to small single ones, can be divided into five main categories:

1) Canneries — operating mainly on salmon, but also canning tunas, herring, clams, crab, and shrimp.
2) Salt fish establishments — curing plants.
3) Fresh and frozen establishments — processing groundfish, dressing and freezing salmon, halibut, and other species, and also engaging in herring operations.
4) Frozen fish storages — freezing and holding fisheries products for further processing or for marketing.
5) Reduction plants — processing offal from fish-processing plants into fish meal and oil.

During 1977, when 117 fish-processing plants were operational, Department of Fisheries and Oceans data show 56 plants (inclusive of 31 freezing plants and 10 reduction plants) engaged in the highly lucrative roe-herring processing compared to 52 plants in 1976. There were also 17 commercial canneries and 4 sport canneries processing salmon, and 35 cold storage establishments for salmon and other species. A total of 50 plants processed shellfish, of which 19 are registered to shuck and pack oysters, 17 plants engaged in canning and freezing shrimp and crab. There were also 11 plants in the groundfish industry producing mainly frozen fillets and blocks.

The number of salmon canners have, however, been decreasing and new entrants are predominantly into fresh and frozen products. The capital requirements for entry into the fresh and frozen activity are far below that of canning operations and consequently the level of competition tends to be higher in this activity than in canning. Comparative data on concentration in seafood processing activity show that the largest 4 canners accounted for 81% of output (largest 2 for 68%) in 1976 compared to 65% for fresh and frozen activity. Most fresh and frozen salmon-processing firms, while strongly dependent on salmon, carry a diversified product portfolio, with an increasing dependence on herring roe, groundfish products in round and dressed forms, and as fillets and blocks.

Capital Stock, Capacity Utilization, and Investment Flows

Net capital stock in the Pacific coast fish-processing industry was estimated to be around $166 million with the annual investment in capital and repairs of about $15 million. However, there is ample evidence of surplus capacity in the industry. Given the seasonal nature of the fisheries, available processing capacity is utilized for 20–26 wk at maximum levels and more frequently for 15 wk. Overall, rated capacity for

firms engaged predominantly in salmon-processing activity is estimated to be double that of recent throughput levels. Specific to rated capacity in canning firms, weekly rated capacity (1 shift, 5-d week) was adequate to process the 1973 peak production and is more than capable of handling recent production levels. Freezer capacity is roughly three times that of normal inventory levels. However, there is a shortage of reduction capacity in the herring roe industry as the herring, after the roe has been extracted, is usually fit only for reduction purposes because of being held in a brine solution. This is not a serious problem as there is a trend away from utilizing brine and toward freezing herring, which enables it to be used for food production.

Overinvestment and surplus capacity, especially as it relates to canning facilities, would curtail the flow of new entrants to the industry because of decreasing returns. However, for a number of processing firms specialized in groundfish species (with the exception of halibut), herring roe fisheries and the molluscan and crustacean group, rates of entry are and will be relatively high. This is because developmental prospects are good and, capital, technological, and managerial requirements for entry are relatively low.

Markets, Pacific Coast Fisheries Products

The main export markets for Canada's Pacific coast salmon products are European Economic Community member countries, the United States, Japan, Australia, and New Zealand. The domestic market accounts for around 43% of the products produced. The major competitors to west coast products in export markets are products from Japan, USA, and USSR. The quantity of landings in major producing countries has been declining and as a result Canada has been gaining an increasing share of the market. The combination of an overall declining supply and increasing demand, has resulted in a sustained upward movement in domestic and export prices.

Since 1972, the Pacific coast fishery has become a sizeable exporter of herring roe to Japan, and in 1975 became the primary supplier, with the major competitors China and the USA. In 1977, Canada's exports of herring roe amounted to 12 224 t valued at $87 million (accounting for roughly 89% of Japanese imports of herring roe) and in 1978, 9295 t valued at $116 million. Market prices of herring roe in Japan are high, as this is a gourmet item associated with religious festivals and/or celebrations, but are very responsive to movements in supply.

The market for groundfish products is largely local, but Eastern Canada is a growing market for semiprepared and fully prepared products. Exports, in the form of fillets as well as blocks, account for roughly 25% of shipments in recent years. Japan offers market prospects for black cod, ocean perch, and other rockfish.

Most products in the shellfish group are processed for a local market, but increasing quantities are being exported to Japan and the U.S. Japan is a growing market for abalone, shrimp, and prawn, while midwestern U.S. is a growing market for oysters, clams, shrimp, and prawn.

CHAPTER 2

The Medium-Term Outlook to 1985, Canada's Commercial Fishing Industry

This chapter will examine Canada's fisheries in a national context based on the 1978 state of the industry; and will also make projections for the industry to 1985 to indicate the role this industry can play in Canada's economic development.

The Commercial Fisheries of Canada: and Overview

In 1978, Canada's primary fisheries produced 1358 thousand t of fish valued at $653 million (Table 12).

TABLE 12. Landings and production, Canada's fishing industry by major areas 1978 (DFO 1980). Quantity (Q) in '000 t, value (V) in $.

	Atlantic		Pacific		Inland		Canada total	
	Q	V	Q	V	Q	V	Q	V
Landings	1 153.2	416.0	198.7	252.2	47.6	33.0	1 399.5	701.2
Production	522.1	973.1	125.9	517.6	41	63.1	689.0	1,553.8
Value added[a]		557.1		265.4		33.0		852.6
Value added as (% of production)		(57%)		(51%)		(52%)		(55%)
Ratio of raw material to finished products	2.2:1		1.6:1		1.1:1		2.1:1	

[a]This is not "value added" in the strict sense since the costs of materials and supplies, fuel, and electricity have to be deducted from gross sales.

Of the total Canadian fisheries landings in 1978, 1153 thousand t valued at $416 million were landed on the Atlantic coast; 199 000 t valued at $252 million were landed on the Pacific coast; and 48 000 t valued at $33 million were landed in the inland fisheries. In terms of value, Atlantic coast landings accounted for 59% of the value, the Pacific coast for 36%, and the inland fisheries for 5%. The changes in the volume and value of landings in these fisheries from 1968 to 1978 are shown in Fig. 3.

The secondary manufacturing sector of the industry produced from the landings a total of 689 000 t of fish products, valued at $1,554 thousand, consisting mainly of food products for human consumption (87% by volume and 97% by value) and some reduction and industrial products. Of this, 522 000 t valued at $973 million were

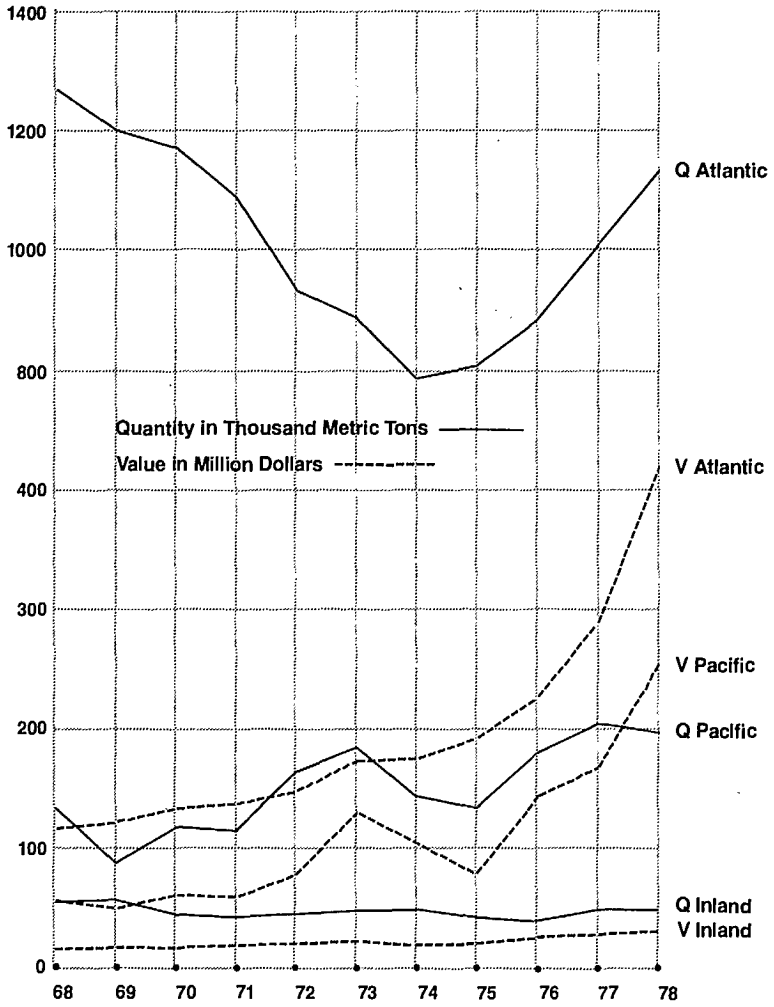

FIG. 3. Volume and value of Canada's fisheries landings by major areas, 1968–78.

produced by the Atlantic coast industry, 126 000 t valued at $518 million were produced by the Pacific coast industry, and 41 000 t valued at $63 million were produced by the inland fishing industry. Thus, the Atlantic coast industry accounted for 76% of the volume and 63% of the value of fisheries products produced, and the Pacific coast industry for 18% of the volume and 33% of the value.

The value added by processing fish in 1978 was $853 million or 55% of the total value of fish produced. The value added and ratios of raw materials to finished products substantiate the wide differences between the fishing industries by major regions arising from differences in the resource mix, structure of the industry, location, and market conditions. In general, because of fishing operations, location, and market conditions (market forms), more processing was required in the Atlantic coast industry than in the Pacific and inland industries.

Factor inputs and returns

Because of the common property nature and free entry, primary fisheries activities are usually associated with excessive inputs of capital and labor (Gordon 1953). In the secondary manufacturing sector there is also a tendency for this to occur because the capital costs associated with entry are not high. For these reasons, Canada's fishing industry during the 1960s and early 70s, when free entry conditions were prevalent, was characterized by surplus capacity in the fleet and processing plants leading to relatively low returns in both. Factor inputs, i.e. labor and capital, in the industry for 1976 and 1978 are shown in Table 13.

TABLE 13. Factor inputs, Canada's fishing industry 1976 and 1978.

	1976				1978			
	Atl	Pac	Inl	Total	Atl	Pac	Inl	Total
Primary industry								
No. of fishermen	40 785	14 018	8 582	63 385	48 496	16 785	8 291	73 572
Gross value of output per Fisherman ($)	5,494	10,119	2,813	5,773	8,578	15,025	3,975	9,530
No. of vessels and boats[a]	28 618	7 494	1 769	37 881	30 728	7 264	1 759	39 751
Value of vessels and boats ($'000)[b]	240,970	305,150	9,541	555,611	495,506	368,489	12,480	876,475
Secondary industry								
No. of plants	611	135	n.a.	1 146	601	120	133	854
Large plants[c]	241	50	26	317	n.a.	n.a.	n.a.	n.a.
Est. value of plants ($'000)	243,932	128,511	24,195	396,638	315,016	165,959	31,245	512,220
No. of workers	14 738	3 830	1 000	19 586	24 000	4 200	1 149	29 349
Avg income per worker ($)	11,846	16,160	13,480	13,665	13,872	18,621	15,785	16,000[d]

[a]No. of vessels and boats estimate based on the proportion of fishermen to number of boats in 1976.
[b]Value of vessels and boats–based on average increase of value per boat 1974–76.
[c]These are plants with a value of shipment of goods of their own manufacture to $50,000 and over (Statistics Canada 1978).
[d]Estimate based on the increase in wage rates between 1976 and 1978.

Since the mid-1970s however, there has been more stringent control on entry. As a result, most fisheries are now under license limitation which, with other measures, e.g. quotas, closed seasons etc., effectively prevent free entry. As a result of this policy, improving resources and market conditions, primary fisheries activities, particularly on the Atlantic and Pacific coasts, are beginning to show signs of increasing economic returns. There are now some fisheries on both coasts where incomes and returns are high, e.g. the salmon and herring fisheries on the Pacific, the scallop, lobster, and herring (Bay of Fundy) fisheries on the Atlantic.

In 1978, about 73 000 fishermen were engaged in Canada's primary fisheries of which 48 000 were in the Atlantic fisheries, 17 000 in the Pacific, and 8 000 in the inland fisheries. These fishermen operated from about 40 000 vessels and boats with an estimated value of $876 million. The average gross value of output per fisherman ranged from $4,000 in the inland fisheries to $9,600 in the Atlantic and $15,000 in the Pacific. From these, the following estimates of net incomes to fishermen are made, based on Department of Fisheries and Oceans estimates of returns to labor as 75% of

the value of landings in the inshore fisheries and 40% in the offshore fisheries of the Atlantic coast. It was assumed that 75% of the value of landings would apply for the inland fisheries and a composite 58% for the Pacific coast fisheries.

	$	Index
Atlantic coast fisheries	4,800	87
Pacific coast fisheries	8,800	160
Inland fisheries	3,000	54
Canada total	5,500	100

The average net income per fisherman was estimated at about $6,000 in 1978 with the highest income about $8,800 realized on the Pacific coast in comparison with $4,800 on the Atlantic coast and only $3,000 in the inland fisheries. These net incomes are lower than wage rates per person working, which averaged nearly $16 thousand for Canada in 1977, based on personal income per labor force member (Department of Finance 1979) and was probably close to $17.5 thousand in 1978. It is interesting to note, however, that average incomes in the offshore fleet in the Atlantic coast are of the same order of magnitude as the wage rates per person working for Canada, indicating that the crews are attaining their alternative incomes. There are, however, great ranges in incomes from fishing depending on resources exploited, time spent fishing, and skill required. Some incomes are in the $30,000–40,000 range in both the Atlantic and Pacific coast fisheries. However, the incomes from fisheries are realized from operations that generally last for less than 6 mo during the year (only about 8% of Canada's fishermen are engaged in the industry on a full time basis); and in many remote communities, fishing provides the only means of livelihood, i.e. alternative incomes are zero. As a result of the employment situation, fishermen have had to depend to a great extent on Unemployment Insurance benefits to supplement their income. Actual UIC gross expenditures to fishermen amounted to $63.1 million for 1978 and were distributed as follows:

	Total ($'000)	Per capita ($)
Atlantic fisheries	47,800	986
Pacific fisheries	13,400	798
Inland	2,100	253
Canada total	63,100	857

Based on the capital value of the fleet, capital–output ratios for Canada's fisheries in 1978 were:

	Capital in fleet $'000	Value of landings $'000	Capital:output
Atlantic fisheries	495	416	1:.8
Pacific fisheries	368	252	1:.7
Inland fisheries	n.a.	n.a.	n.a.
Total Canada	876	701	1:.8

For Canada's fisheries on the whole $1 of capital value in the fleet produces 80¢ of output. In the Atlantic fleet $1 of fixed capital in this fleet produced 80¢ in output whereas on the Pacific coast this produced 70¢ worth of output. Although

capital–output ratios are not indicative of profitability in an industry, the ratios suggest higher levels of overcapitalization in the Pacific coast than the Atlantic coast fisheries.

In the secondary or manufacturing sector of the industry, there are about 900 plants in operation employing about 29 000 workers. Of these, fixed capital in plants and equipment are estimated to be around $512 million, with an annual investment of $46 million in 1978. This is based on a midyear net capital stock of $434 million in the Fish Products Industry (which does not cover all plants) in 1977 (Statistics Canada 1978). Estimates of capital stock by major region indicate that $315 million or 61% was in Atlantic coast plants, $165 million or 32% in Pacific coast plants, and $31 million or 6% in inland plants. The average income per worker was estimated at $16,000 in 1978 based on increases in wage rates between 1976 and 1978. The highest incomes were from Pacific coast plants followed by the Atlantic coast and inland plants.

The economic performance of Canada's fish-processing industry is dependent on a number of factors, the most important are its structure (including vertical integration) location in terms of resources and markets, ease of entry and exit, as well as government measures to aid the industry. Virtually all these differ between regions. In general, however, the industry is characterized by vertically integrated companies, and largely nonvertically integrated medium-sized and small plants, although there seems to be considerable horizontal integration throughout the industry. The operations of medium and small plants tend to be more affected by seasonal variations in fish availability than large plants with usually more diversified operations and a fleet to take care of some of their needs. Seasonality and ease of entry (small plants in particular are not costly and fish-processing operations are labor intensive) have been responsible for surplus capacity in the industry. This overcapacity is more pronounced on the Atlantic coast and inland fishing industries than on the Pacific coast.

Marketing Canada's fisheries products

Canada's fisheries products are mainly export markets (Table 14). In 1978, exports accounted for 72% of the volume and 73% of the total value of production from Canada's industry. Most of the products produced were exported to the United States, where they compete with similar products of other countries, followed by exports to Western Europe, Japan, and the Caribbean. Because of the dominance of exports, particularly the United States, prices of domestic fisheries products are generally established in the United States market.

The domestic market for fish products has been increasing in importance. The domestic disappearance of fisheries products in Canada increased from 208 000 t valued at $200 million in 1970 to 299 000 t valued at $665 million in 1978. Of this, 107 000 t valued at $249 million were imported fisheries products. These accounted for 36% of the volume and 37% of the value of domestic consumption of fish products in 1978 in comparison with 28% of the volume and 27% of the value in 1970. Thus, imported fish products have been increasing their share of the domestic market. These imports consist mainly of high-valued fish products such as spiny lobsters, shrimp, crab, and tropical fish species not found in Canadian waters. However, many of these imports were items such as assorted herring products, which are produced by Canada's fishing industry. The market, in fact, seems to be characterized by exports of lower priced and probably lower quality Canadian products and imports of better quality and higher priced foreign products.

TABLE 14. Production, imports, and domestic disappearance selected years 1970–78 (includes inland fisheries).

	1970	1976	1977	1978
Total landings				
Quantity in t, round weight	1 333 913	1 101 461	1 254 713	1 399 505
Value in $'000	204,899	390,087	487,248	701,150
Total production				
Quantity in t, product weight	570 901	555 901	598 834	695 564
Value in $'000	426,019	950,980	1,174,981	1,549,521
Total exports				
Quantity in t, product weight	422 159	365 992	448 225	503 042
Value in $'000	280,022	600,516	815,721	1,134,233
Total imports				
Quantity in t, product weight	59 331	91 118	106 401	106 819[a]
Value in $'000	54,458	183,331	220,789	249,472
Domestic disappearance				
Quantity in t, product weight	208 073	281 027	257 010	299 341
Value in $'000	200,455	533,795	580,049	664,780
Per capita consumption in kg edible weight[b]	5.6	7.3	7.6	7.9

[a]Quantities in 1978 exclude canned anchovy and canned sardine that are reported in number of boxes and are not comparable with 1977 quantities.

[b]All other production data are in terms of product not edible weight which explain the anomaly between per capita consumption and domestic disappearance data for 1977.

The fisheries and regional development

The fishing industry is a relatively small industry in a national context accounting for only 0.6% of Canada's GNP in 1977 and 1.0% of employment. However, it is important in terms of its contribution to the Atlantic regional economy; and to regional areas on both coasts. The fisheries contribution to the Gross Provincial Product (GPP) and labor force employment in 1977 and 1978, respectively, was as follows:

	GPP 1977	Labor force employment 1978
Newfoundland	10.9	18.2
Maritimes	6.1	4.6
Quebec	0.1	0.2
British Columbia	1.9	1.9
Canada	0.6	1.0

In the Atlantic regional economy, excluding Quebec, the fishing industry contributed about 11% to Newfoundland's GPP and 18% to its labor force; and 6% of the Maritimes GPP and 5% to their labor force. The industry makes an even greater contribution to the Atlantic regional economy than these figures indicate, because of

its exertion of linkage effects on other sectors of the economy. This can be realized from input–output studies of the Atlantic provinces (Levitt 1975). These studies revealed that although incomes, particularly from primary fishing activity, were low, the fishing industry, both primary and secondary sectors, exerted the largest amount of employment per dollar value of output in the Atlantic regional economy. Of this, the secondary processing sector exerted about twice the effect on employment as the primary fishing sector.

Medium-Term Outlook to 1985

With the 200-mile zone established, Canada's fishing industry has considerable potential for expansion. Under Canadian management, the Canadian share of resources will be determined by the capacity of her fishing fleet and needs of her coastal communities, while other countries will be allowed access to fish stocks surplus to Canadian needs. To allow for proper planning, biological projections of resource availability particularly for Canada's Atlantic coast fisheries have been made. These projections are based only on the last 4– or 5–yr trends in stock productivity and are therefore subject to considerable revision year by year (Department of Fisheries and the Environment 1978b). For the Pacific coast, the projections have been based on the effects of a Salmon Enhancement Program (SEP), launched in 1977 with the objective of doubling salmon landings by the year 2000. Projections give indications of the magnitudes of resources available not what Canada's industry will take, as this will depend essentially on economic conditions in the industry. Projections for the domestic catch will, therefore, be made on the basis of a combination of the following factors:

1) the biological resource projections;
2) Canada's present fishing and processing capacity, technology, and utilization;
3) market projections of the main products produced.

The biological projections as indicated set the upper limits of resource availability, whereas market projections give some idea of market demands for products that can or should be produced. Canada's present capacity at both primary fishing and the secondary manufacturing levels is indicative also of the increases in output that are possible if this capacity is effectively utilized, and whether any increases in capacity will be necessary to take and process the resources that become available. The answers to all these questions depend, to a great extent, on the management regime in effect for Canada's fisheries and the strategy for development of the whole industry. These aspects will not be addressed directly in this section, but will concentrate on medium-term projections to 1985 for (1) production, (2) employment, (3) investment and, (4) fish product sales.

Production performance

The estimated production performance of Canada's fish industry to 1985 is shown in Table 15. The Table gives high, medium, and low projections. The high projections are based on Canada's fleet taking in the sea fisheries all the resources available to it, while the medium and low are based on taking 90 and 80%, respectively, indicating various degrees of foreign fleet activities in the 200-mile Economic Zone. Of these scenarios's, the medium performance is considered the most likely because (1) by 1985, the Canadian fleet on the Atlantic coast, in particular, might not have the

TABLE 15. Estimated production performance of Canada's fishing industry to 1985.

	Canada total	Atl	Pac	Inl
Landings ('000t)				
high	2 422.0	1 989.0	386.0	47.0
medium	2 179.8	1 790.1	347.4	42.3
low	1 937.6	1 591.2	308.8	37.6
Landed values ($ million)[a]				
high	1,554.7	947.8	551.0	55.9
medium	1,399.2	853.0	495.9	50.3
low	1,243.7	758.2	440.8	44.7
Production ('000t)				
high	1 156.7	935.9	185.8	35.0
medium	1 041.0	842.3	167.2	31.5
low	925.4	748.7	148.7	28.0
Product values ($ million)				
high	4,013.0	2,465.5	1,433.2	114.3
medium	3,611.7	2,218.9	1,289.9	102.9
low	3,210.4	1,972.4	1,146.6	91.4
No. fishermen[b]				
high	84 100	56 700	18 800	8 600
medium	75 600	51 000	16 900	7 700
low	67 300	45 400	15 000	6 900
No. persons in processing plants[b]				
high	41 000	35 000	5 000	1 000
medium	36 900	31 500	4 500	900
low	32 800	28 000	4 000	800

[a] Estimates in current dollars.
[b] Figures rounded to nearest hundred.

technological capability to exploit fully all areas or species and; (2) that even if it did it might not be economically feasible to do so — greater economic benefits might accrue if the foreign fleet could exploit the more inaccessible species at lower costs and land these for processing in Canada.

Table 15 shows that the volume of landings from Canada's fisheries by 1985 should be about 2.2 million t with a landed value of $1.4 billion (this is based on the average price of fish increasing at 8.5%, the latest fish price increase)[7]. Of these, 1800 thousand t or 82% would be landed from the East coast fisheries, 350 000 t on the Pacific coast or 16%, and 42 000 t from the inland fisheries or 2%. With the magnitude of landings, product volumes were estimated based on the assumption that the ratio of landings to production of major species in the late 1970s would remain the same to 1985. The estimated value of production was then based on an average annual rate of price increase of 8.5%. The growth rates for Canada's fishing industry, based on the value of products, could average out to 14.6% a year for the high, 12.8% a year for the

[7] This rate of increase is not considered high since the average rate of increase in the fish price index was 9.3% for the period 1973-77 in comparison with 7.3% for all food items in Canada. The average of these two rates is 8.3% which is close to the 8.5% used.

medium, and 11.0% a year for the low for the period up to 1985. These rates, which do not take into account inflationary pressures, are close to the average rate of increase in the industry of 13.4% for the period 1968–77, which supports the medium-term growth rate chosen as the most likely.

Employment

The number of fishermen in the primary industry is not expected to increase significantly during the period to 1985. The main reasons for this are: (1) the existing limited entry programs and their extensions should result in virtually all of Canada's fisheries being under this type of control[8]; (2) the expansion projected for the Atlantic coast fisheries can be brought about by a better combination of factor inputs, rather than by any great increases in labor inputs; (3) the Pacific coast fishery is characterized more by capital than labor intensive operations; and (4) pursuing policy options to increase the period of employment and, therefore, incomes rather than to encourage new additions to the fishing labor force. These factors, and assuming that alternative opportunities in other sectors of the Canadian economy (a major constraint) would improve occupational mobility, indicate that control over the number of fishermen would not only be possible but desirable up to 1985.

Therefore, projections of the number of fishermen by major areas were made on the basis that this is very much a variable and can be controlled to attain socioeconomic objectives in fisheries. As a result, the projections are based on assuming a rate of increase in the gross value of output per fisherman of 10% a year for the Pacific and Atlantic fishing industry and from this indicating high, medium, and low numbers of fishermen. This approach was not used for the inland fisheries. Table 15 shows, based on the medium projection, that the number of fishermen in Canada could increase by 0.5% a year to around 75 000 by 1985, of which 51 000 would be in the Atlantic coast fisheries, 17 000 in the Pacific coast, and 8000 in the inland fisheries. Assuming that the ratio of net incomes to the gross value of output remains the same during the period to 1985, per capita incomes from the fisheries could be as follows:[9]

	Gross output per fisherman	Estimated net incomes
	($ 1978)	
Atlantic coast	16,716	9,400
Pacific coast	29,279	17,000
Inland	6,498	4,900
Canada	19,439	11,274

Thus by 1985, per capita incomes from Canada's fisheries could double their 1978 levels. It is important to stress that strategies for controlling entry to increase incomes would vary by region. For example, on the Atlantic coast, where per capita incomes

[8]As is apparent from the Pacific coast fisheries experience, fishermen who are usually vociferous in their opposition to the introduction of limited entry measures become firm adherents of them once their economic benefits become apparent.

[9]Income estimates remained relatively stable between the high, medium, and low scenarios with a consistent matching, i.e. high levels of production with high number of fishermen. However, if this is changed, say if the high level of output could be attained with the low level number of fishermen, substantial increases in incomes could result or vice versa.

are lower than on the Pacific coast, there might be the objective of increasing incomes as rapidly as possible; whereas on the Pacific coast emphasis could be on increasing employment, thereby narrowing the gap between incomes on both coasts.

The number of plant workers to 1985 were projected on the basis of expected production levels and the rate of expansion of output per worker of 3% a year to 1985. On this basis, the medium-term projections indicate that the number of plant workers could increase by 3.7% a year to around 37 000 by 1985, 31 000 of which would be employed in the Atlantic coast industry, 5000 in the Pacific and nearly 1000 in the inland industry. Because of excess capacity in processing, particularly in the Atlantic coast industry, increased production from the fish-processing industry can be attained without a substantial expansion in processing capacity. The significant change in the employment picture, again particularly in the Atlantic coast, is that the industry will provide employment for longer periods during the year and, therefore, higher incomes to its labor force.

Investment

Attainment of the outputs projected for Canada's primary fisheries and secondary manufacturing will require substantial capital inputs, but these will be due to the needs for replacement and repair rather than for extensive new additions to fishing and processing capacities. The magnitude and extent of these inputs will be dependent on a number of factors such as the economic performance of the industry, government policies in respect to resource management, fleet development, and financing of development, i.e. subsidies to vessels or plants. Notwithstanding these problems, some idea of the capital inputs to the industry can be obtained in a strict development context regardless of whether government contributes to capital formation or not.

On the basis of expected production performance in the industry to 1985, capital–output ratios in respect to the fleet, present investment levels in processing plants, estimates of investments for the fleet and processing plants have been made (Table 16). The Table shows that annual investment should increase from $178 million in 1979 to $318 million by 1985. Of this, 65% would be invested in the fleet and 35% in processing plants. The breakdown of fleet investment by major regions indicated that 70% of this investment would be for the development of the Atlantic coast fleet, 28% for the Pacific coast fleet, and 2% for the inland fleet.

Fish product sales

The magnitude of fish product sales to 1985 is dependent on market prospects for that period stemming from demands for these products in foreign and domestic markets. The major characteristic of the market is that market prices for most of Canada's fish products are established in foreign markets, mainly the United States, rather than in the domestic market. However, the sales potential of the domestic market is significant, particularly since this market imports considerable quantities of fish.

Export markets — There is considerable potential for expansion in export markets, particularly if product quality improves, over the period. This potential is based on:

1) many of the large sea fish producing countries that compete with Canada in major markets are experiencing resource availability difficulties because of

TABLE 16. Capital inputs in vessels and plants 1979–85.

	Fleet				Plants[a]		
					All regions		
	Atl[b]	Pac[c]	Inl	Total	Low (10%)	High (15%)	Total capital investment[d]
				($ million)			
1979	89	34	2	125	51	53	178
1980	96	37	2	135	56	61	196
1981	103	40	3	146	61	70	216
1982	111	43	4	157	67	81	238
1983	118	47	3	168	74	93	261
1984	127	50	3	180	82	107	287
1985	136	55	4	195	90	123	318
Total	780	306	21	1,107	481	588	1,695

[a]The high and low estimates were based on a 15 and 10% rate of increase in capital investment for construction and repair (the rate of increase for the period 1976–78 was 17.8%).
[b]DFO (1979a).
[c]The capital investment was based on a 10% of the capital stocks estimates for the period that should allow for both replacement (about 7%) and net additions to the fleet as required.
[d]Based on the high level for investment.

extension of national jurisdictions. The large European market in particular will become more accessible to Canadian fish food products if resource difficulties in the Northeast Atlantic continue, and if these products can compete in quality with European fish food products;

2) Japan, which has a large market for a wide variety of fish food products, has been particularly hard hit by extended jurisdictions with the result that this country will have to rely on products from other countries to satisfy its large domestic demands. Specialized Canadian products are already being marketed in Japan.

A number of measures have already been taken to encourage Canadian fish products exports. One is the establishment, on a voluntary basis by the industry, of two export agencies, the Canadian Association of Fish Exporters (CAFE), and the British Columbia Sea Food Exporters Association. Secondly, to assess the export possibilities for Canadian seafoods in 1985, the Department of Fisheries and Oceans launched a worldwide marketing study in collaboration with the Department of Industry, Trade and Commerce in the early part of 1979. Preliminary results of this study indicate that, although long-term market prospects are good, there would most likely be short-term fluctuations in market prices due to increasing competition of United States Alaskan fisheries products in the United States market. Quality improvements would be required for Canadian products to compete and gain inroads in other mainly European markets.

Based on favorable market prospects, Canadian fisheries products exports may grow from 503 000 t valued at $1.1 billion in 1978 to 687 000 t valued at $2.4 billion in 1985 (Table 17).

The domestic market — According to population projections developed by Statistics Canada, the country's population is expected to grow from 23 257 000 in

TABLE 17. Production and marketing of Canada's fish products in 1985. Value (V) in 1978 $ million, quantity (Q) in '000 t.

		Actual 1978	Projections			Annual rate of increase 1978–85 (%)		
			High	Medium	Low	High	Medium	Low
Product values	V	1,549.5	4,013.0	3,611.7	3,210.4	14.6	12.8	11.0
	Q	695.6	1 157	1 041	926	7.5	6.0	4.2
Exports	V	1,134.2	2,648.6	2,383.6	2,118.9	12.9	11.2	9.4
	Q	503.0	764	687	611	6.2	4.6	2.8
Domestic retention	V	415.3	1,364.5	1,288.0	1,091.6	18.5	16.8	14.8
	Q	192.6	393	354	315	10.7	9.1	7.3
Imports	V	249.5	481.5	433.3	385.4	9.9	8.2	6.4
	Q	106.8	139	125	111	3.8	2.3	0.6
Domestic market	V	664.8	1,864.0	1,661.3	1,476.7	15.7	14.0	12.1
	Q	299.3	532	479	426	8.5	6.9	5.2

1977 to 25 443 000 in 1985, an increase of 9.4%. Canadian per capita fish consumption of 7.9 kg (edible weight) in 1978 is estimated to grow by a compound rate of over 5% annually between 1978 and 1985. This means that the 1985 per capita consumption should reach 12 kg. On this basis, the size of the Canadian home market, in terms of product weight, is expected to grow from 299 000 t in 1978 to about 479 000 t in 1985 at an average rate of 6.9% a year.

In 1978, Canada imported 112 000 t of fisheries products, representing a value of $253 million. It can be expected that, as a consequence of population growth and rising incomes, Canada's imports of fisheries products may grow to 125 000 t by 1985. As pointed out earlier, although Canada's seafood imports consist of relatively high-priced species not available from Canada's fishing industry, there are also a large number of products produced in Canada. The main reason for this has been quality and tastes as there is a marketing pattern that indicates Canada exports lower priced and imports higher priced similar products. As a result, there is some potential for import substitution if Canada's fish food product industry can produce the higher quality products or cater to the taste of Canadian consumers.

CHAPTER 3

Major Issues in Canada's Commercial Fishing Industry

During the past several years, the condition of Canada's fishery resources has been steadily improving, the result of more effective management made possible by the extension of the fisheries zones to 200 miles. Assuming there will be continuing success in rebuilding fish stocks, the basic challenge for Canada's fisheries in the 1980s will be to implement a policy for managing fish resources to optimize socioeconomic benefits to Canadian society. This will involve decisions with respect to the allocation of access privileges, including subissues relating to transferability of such privileges, vessel replacements, and new technology, and how to strike an appropriate balance between larger incomes, more employment, lower prices to consumers, or greater public revenues. These are general issues, the magnitude and extent of which also vary by major fishing regions due to the differences in their fisheries, which have been outlined earlier. In this Chapter, therefore, these issues will be treated first in a general context and then regionally.

General Issues

The general issues of fisheries revolve around measures to ensure that the fishery resources will provide optimum socioeconomic benefits. This will require (1) inducing fishing enterprises (primary and secondary) to minimize production costs, (2) more effective public sector involvement, and (3) generation of returns from the industry. Affecting these are (4) international and trading aspects.

Minimizing production costs — Competition among fisheries enterprises differs entirely from that in other industries where competition among producers is usually a creative force resulting in better products or lower costs. This is not the case in fisheries. Because the resource is common property, fishermen must get to the fish first with the biggest, most sophisticated equipment they can acquire, or else the resource will be taken by someone else. Since no one holds tenure over the resource, each individual enterprise is compelled to act in this way. In the context of existing approaches to fisheries management, this competition is a destructive force inexorably forcing costs up and incomes and profits down.

This destructive competition among fishing leads inevitably to overcrowding and economic distress. Although the economic recovery in the past 2 years has masked these features, the underlying problems and tendencies remain. This problem is called "the tragedy of the commons." However, while the need to impel fishing enterprises toward lower-cost production has been recognized for some time, there remain uncertainties of the means by which this might best be achieved.

More effective public sector involvement — The costs of managing Canada's fisheries are high. The Department of Fisheries and Oceans budget for the fiscal year 1978–79 was $305 million of which $240 million was for activities directly associated with fisheries management. In addition, there is considerable involvement by other federal government departments, such as the Department of Employment and Immigration (UIC benefits) and DREE (grants to the industry); and by provincial and territorial governments. New or more efficient ways must, therefore, be found to manage the resource; encourage a greater reliance on self-regulating market forces as an alternative to more stringent and widespread government regulations and control; and to improve inter-departmental, federal–provincial, and federal–territorial co-operation and interaction.

Generating returns — License fees are payable in most of Canada's commercial fisheries but there is some dispute as to the appropriate level of such fees. In addition, the decision to embark on the Salmonid Enhancement Program on the Pacific coast was conditional on the program being cost recoverable. However, a much disputed area is whether fishermen should pay more substantial license or access fees. Moreover, it is the view of many fisheries economists that landings charges should be levied as a means of (1) controlling effort and (2) generating revenues, although their effectiveness for the former is subject to debate. The following questions arise with respect to landing charges: (a) are the fisheries generating sufficient returns or revenues to support them, (b) who will bear the ultimate burden of these fees (fishermen, processors, retailers, consumers), and (c) even if they are possible, what magnitude of revenues should society obtain from them?

International issues — Canada has succeeded in establishing its 200-mile fisheries zones, and in obtaining agreement from foreign nations on the terms and conditions under which foreign vessels may fish in Canadian waters. However, there are a number of problems remaining. The Canada–United States Atlantic coast agreement has still not been ratified by the U.S. senate and other bilateral agreements with other countries are coming up for renegotiation or renewal. Maritime boundaries with our neighbors have not been settled although the treaty now before the U.S. senate provides for adjudication or arbitration of the Georges Bank boundary. Attempts are being made for greater cooperation and less friction in other outstanding fisheries and issues with the United States, e.g. tuna and salmon on the Pacific coast. However, the fundamental economic issue is that Canada's international efforts must create opportunities for Canada's fishing industry and for the Canadian economy as a whole.

Market demand for fish products is an important factor in decision making in the fishing industry. Since most of Canada's fish products are exported, export markets and international trading relationships are important issues. The main problems faced by Canada's industry pertain to market concentration (as the main export markets are in the United States, Europe, and Japan), quality considerations with some Canadian fish products receiving lower prices than similar products from other countries, and to trade barriers in the form of tariffs or nontariff discrimination.

These general issues in fisheries set the stage for more specific regional problems, which will be outlined in the sections to follow.

Atlantic Coast Fisheries Issues and Strategies

In virtually all sectors of the fishing industry, the economic problems devolve from excess inputs of labor and capital relative to resource availability. The 200-mile fisheries zone provides the opportunity with proper management to solve many of the problems faced, the most important are:

1) offshore–inshore conflicts in respect to resource allocation and development;
2) fleet modernization and expansion, particularly in respect to the introduction of new technology such as freezer and factory-freezer-trawlers;
3) the modernization and utilization of plant processing capacity including the processing of new products;
4) fluctuations in market demands and prices for fisheries products.

These four problems will be discussed in terms of primary fisheries and the fish-processing sector.

The primary fisheries

Solutions to the main problems mentioned above require a clear-cut, comprehensive, and well-integrated development strategy as most of the problems are interrelated. Decisions as to development measures involving both the offshore and inshore fisheries are not easy, especially since the inshore sector is important in terms of employment, although most of these fishermen earn low incomes and can operate for only a short period during the year. The offshore sector on the other hand is capital intensive, yields higher returns to labor, and provides year-round employment. The different duration of operations between the sectors affects the efficiency of the plant operations dependent on them. Smaller inshore dependent plants operate for shorter periods than larger plants, which are supplied by both offshore and inshore operations. Another important aspect is the generally poorer quality of the raw material from the inshore trap fisheries, which limits their product forms and results in lower prices for these products.

The recent emphasis has been mainly on the inshore fisheries, in which the majority of fishermen participate, with the long-term objective of increasing incomes in this sector. To accomplish this, offshore exploitation and development is controlled so that it does not adversely affect inshore resource availability. In addition, given the level of existing effort and the finite capacity of resource, consideration must be given to control factor inputs, particularly labor, into the inshore fisheries.

The experience of fisheries in a regional development context indicates that the effective management of primary fisheries is dependent on economic conditions in the regional economy. Because of ease of entry, particularly in the inshore fisheries, the fisheries sector has traditionally been a sponge for the unemployed in the Atlantic regional economy. The success or failure of government's ability to rationalize the fishery through a reduction in labor inputs depends essentially on whether or not alternative employment opportunities exist in the region or could be generated by regional development policies. Thus, regional development strategies would play an important role in aiding fisheries management and development in the future.

Fleet Development

Fleet capacity in relation to traditional areas and/or species is already high for both the inshore and offshore fleets. However, for the inshore fleet vessels of greater mobility and versatility are needed, with less reliance and emphasis on the trap fishery, particularly in the inshore fisheries of Newfoundland. For the offshore fleet, the strategy developed has been to encourage the surplus capacity to move into either nontraditional areas or fish for nontraditional species. This requires new technology, i.e. the freezer-trawler, and possibly the factory-freezer-trawler. The latter, however, could compete with onshore processing capacity, already excessive in many areas, and, to be viable, would require access to some fisheries capable of full exploitation with existing vessel capacity. Furthermore, the plants that would be most adversely affected by the factory-trawler would be the smaller-and medium-sized ones, which depend mainly on the inshore fleet. The introduction of new vessel types, however, could be primarily in terms of replacing old and outmoded vessels in the existing fleet. The objective with respect to new vessels types, therefore, would be to make the fleet more efficient, flexible, and mobile rather than adding to catching capacity.

The capital costs for fleet development to 1985 are substantial, estimated at $100 million (1978 dollars) a year. Governments, both federal and provincial, have played a major role in fleet development through their respective assistance and loan programs. Government support has been responsible, in part, for overcapacity and over-capitalization in the fleet. These programs must be reviewed, as increased incomes and returns could be realized by fishermen and fish companies with effort controls. In this event, the industry on the whole may be able to rely on existing sources of capital, such as banks and loan agencies, to meet investment needs.

The processing sector

Fish-processing activity is resource intensive, with an observed tendency for more than 50% of the final product to be raw fish costs. Consequently, the cost considerations that directly arise from abundance, species mix, size, and quality are critical elements to the operational viability of catching and processing operations. Thus, the greatest improvements in the industry are likely to be from improvements in these factors rather than from plant management variables and final market structures.

There are marked variations in operational efficiencies of fish-processing plants because of a diversity in raw material available, levels of capitalization, management activities, length of fishing season, etc. Significant characteristics of inshore ground-fish plant operations, virtually all of which are small or medium sized, are:

1) plant ownership–management tends to show a high degree of flexibility in coping with a variable fish resource such as speedy adjustments to change and activity that lead to increased stability in income and employment;

2) production techniques are relatively labor intensive. Consequently, fixed capital cost is relatively low, and the crucial element to plant operations is working capital to finance raw fish material purchases, labor, supplies, and inventories;

3) producers tend to concentrate on fresh and frozen product forms because of the size and quality of inshore landed fish.

Pertinent aspects relative to the larger integrated companies are:

1) plants based on trawler catches tend to be more specialized with respect to processing groundfish species, with some plants dependent on one or two species. In general, they have lower degrees of operational flexibility than nontrawler based plants;

2) the existence of relatively high levels of unutilized capacity in plants, together with a low capital intensity and rate of technological obsolescence suggest that the demand for new capital for these plants will be relatively low. The major capital requirement would be in cold-storage facilities in existing plants where resource recovery and landings of nontraditional species demonstrate this need. It is also applicable to the small- and medium-sized plants where cold-storage facilities could aid in extending their operational periods during the year.

There is considerable excess capacity in the fish-processing industry. However, this situation is more pronounced for the smaller mainly inshore fleet-dependent plants as the large vertically integrated plants operated economically for a long time and now seem to be enjoying high returns. The overcapacity problem in the industry can be solved if capacity does not increase appreciably during the period to 1985. As a result, further expansion in this sector should not be encouraged through government assistance programs. Moreover, the industry, with improved raw material availability due to the 200-mile fisheries zone and increased returns, should be in a position to finance its own development. This would probably result in a change in the plant structure, leading to greater consolidation and larger plants and to the dropping out of marginal ones. The overall effect would be greater competition and a more efficient industry.

The Atlantic coast fishing industry has been extremely susceptible to market fluctuations. This susceptibility has largely been due to its structure (the interrelatedness between primary ex-vessel prices, product and market prices), and to relative low returns or profit levels in the industry. Although market conditions seem to be improving, it is likely that the characteristic feature of market fluctuations will occur from time to time. The most effective means to combat this are through (a) greater efficiencies in production, thereby reducing unit costs, and (b) better quality products, thereby ensuring better prices.

Inland Fisheries Issues and Strategy for Development

The major problems in the inland region include:

1) low returns to labor and capital at primary industry level (fish harvesting);

2) the difficulties encountered by the secondary or processing industry with pulsating flows of production and a requirement to carry large inventories from seasons of high production and poor markets to seasons of strong markets, as well as with developing products and markets for certain species (coarse fish such as suckers), and competition between inland fisheries producers in major markets;

3) declining fish stocks in certain fisheries, a difficulty in controlling fishing effort, and escalating management costs exacerbated by the lack of clearly defined federal and provincial responsibilities.

In the inland fishery, economic objectives are constrained by biological and social objectives (eg. preservation of fish stocks, increased incomes, increased employment, regional growth and development) that are often in conflict with each other. Economically accessible fisheries, however, have the potential to support a viable fishing industry and to yield adequate economic returns. In fact, an economically healthy industry is consistent with increasing incomes to fishermen and provides the basis for regional growth, the stabilization of communities, and viable employment opportunities.

The best management strategy for the inland fisheries is to provide the direction to alleviate industry problems and rehabilitate the fishery. This requires considerable federal–provincial cooperation and program coordination to succeed. With this management option, the selective application of government programs will create adjustments in the industry to ensure the highest efficiency in management of public fisheries resources and in the deployment of labor and capital.

Pacific Coast Fisheries Issues and Strategies

The operational problems of Pacific coast fisheries management are to achieve workable balances among economic, social, and conservation variables. With swiftly changing but lucrative markets for salmon, herring roe, etc., the issues are complicated and require accurate and timely information to support improved private and public sector decision making. The matters relating to the selection of appropriate policy instruments, as well as the improved operational efficiency and effectiveness in the Pacific coast fisheries, pertain to:

1) allocation of limited resources among competing groups, exacerbated by overcapacity in the primary fisheries sector;
2) overcapacity in the secondary sector of the industry.

Allocation in primary fisheries

At present, limited entry applies to most fisheries on the Pacific coast. Limited entry benefits holders of licenses (vividly demonstrated in the highly lucrative herring roe fishery) and results in the capitalization of these benefits in vessel or license values. This regime leads to substantial administrative and policing costs and raises distributional questions.

The license limitation program initiated in the salmon fishery in 1969 was intended to reduce the level of overcapacity in this dominant fishery. The program has reduced the number of vessels, but the size, technological sophistication, and mobility of vessels have risen markedly, resulting in increased competition for the limited resource. This has created pressures in the allocation system and gear conflicts in the salmon fishery and other limited entry fisheries on the Pacific coast.

Various options have been proposed for minimizing some of the undesirable features of limited entry. These include varied license fees, depending on vessel characteristics, landings fees, fishermen's quotas, and specific user fees. These would (partially or fully) defray administrative, surveillance, and developmental expenditures, as well as penalize overcapitalization. A characteristic feature of these policy options is that each would be highly differentiated in structure to satisfy equity, infant

industry, and native rights considerations. In general, there appears to be a strong fishery sector resistance to these approaches. Nevertheless, the comparative effectiveness and efficiency of these options have to be continuously assessed.

Overcapacity, fish-processing industry

The structure of the Pacific coast processing industry is such that operations involving the primary and secondary sectors are more integrated than on the Atlantic coast. Despite this, there are still problems of plant capacity, utilization, and marketing. Changes in export market demand for more fresh and frozen salmon and less canned salmon, for example, are manifested in lower utilization of salmon cannery capacity. This, in turn, has resulted in lower returns to canners. The herring roe industry in 1979 experienced a situation where increased competition from buyers of roe for Japanese companies pushed the prices to extremely high levels at the primary fishing level. Canadian companies competing with these buyers found themselves with reduced raw material supplies, adversely affecting their capacity utilization. To combat the increasing overcapacity situation, which is developing into a serious problem, the British Columbia government has introduced a moratorium on processing licenses.

Conclusion

The common origins of the wide variety of problems encountered in Canada's fisheries are due, regardless of region, to excessive inputs of capital and labor relative to resource availability. This has been the traditional characteristic of free entry and the common property nature of the resource base. Free entry is rapidly becoming an aspect of the past as limited entry is now the rule rather than the exception in Canada. However, experience with such programs indicates that these measures alone will not solve the problem of overinvestment. New approaches must also be devised to overcome the destructive tendencies that are the unavoidable consequence of treating fish stocks as a common property. That is, there still are, and will continue to be, major problems to resolve pertaining to (1) the allocation of Canada's fisheries resources between different components of the industry, and (2) bringing about a more efficient combination of factor inputs, capital, and labor, in both the primary and secondary sectors of the industry.

CHAPTER 4

Canada's Recreational Fishing Industry[10]

In 1975 a nationally coordinated survey was carried out through the joint planning and cooperative efforts of all provincial and federal sport fisheries agencies. The results of this survey of sportfishing in Canada provided Canadians for the first time with a comprehensive picture of the size, value, and importance of Canada's recreational fisheries industry.

The sport fisheries make a substantial contribution to the Canadian economy through expenditures made mainly in the service sectors of the economy. In 1975, when about 6 million anglers engaged in sportfishing activities, it was estimated that expenditures wholly attributable to these activities amounted to $1.0 billion in Canada.

Profile of Canada's Recreational Fishing Industry

In this section, a profile of Canada's recreational fishing industry will be given. It will commence with a description of the characteristics of the recreational fisheries, followed by the size and distribution of recreational fisheries, and an analysis of their economic importance.

Characteristics of recreational fisheries

Recreational fisheries is different from commercial fisheries, particularly in terms of product and structure, and management regime.

The product and structure — "Fishing" not fish is the product of recreational fisheries. The value of this product is what anglers are willing to pay for the right to fish. Generally speaking, the commercial fisheries product is a tangible commodity that is perishable, but one which can be sold, inspected, graded, processed, packaged, stored, and distributed to market outlets. By contrast, sport fishing is an "intangible" that cannot be "stored," processed, or transported but is time, site, and circumstance specific. The consumer has to come to the site, where, if the angler is a resident, the economic activity generated is likely to be counted as outdoor recreation or domestic travel. Similarly, such activities represent an onsite "export" of sportfishing if the angler is a non-Canadian and tends to be labeled as "tourist industry" income.

[10]This chapter is based on an economic analysis and policy review of Canada's recreational fisheries by A. L. W. Tuomi (1979). The data for this analysis and review are from K. W. Brickley's 1975 unpublished *Survey of the Sportfishing in Canada* unless otherwise indicated. For highlights see Department of Fisheries and the Environment (1978a).

The angler both produces and consumes, once the right to fish is bought. As a "producer," the angler actually performs an upgrading, value-adding function, which varies by angler. Some anglers buy all-inclusive finished "products" put together by the private sector (e.g. a charter boat trip, a far northern fly-in trip). Most anglers, however, put their own "package" together. For some local anglers, the cost (or value-added) may be little. Many, however, invest heavily in such things as travel, boats, gear, and time, and so add very substantially to what they have "produced."

The management regime — The evolution of fisheries jurisdiction in Canada has been complex and contentious and can be traced back to the fisheries provisions in the BNA Act, under which the federal Department of Marine and Fisheries presumed complete authority to manage both commercial and sport fisheries and routinely proceeded to do so. The federal leasing of certain previously granted inland fishing waters was successfully challenged by the provinces in 1883. In 1898 the Privy Council confirmed the present situation whereby parliament has exclusive legislative authority over fisheries per se throughout Canada, while the provinces own and can make laws respecting property rights in their respective fresh waters. The federal Department of Marine and Fisheries, after losing revenues from sportfishing mainly through leases, withdrew from freshwater sport fisheries and concentrated its attentions on ocean fisheries.

Two provinces, New Brunswick and Quebec, picked up where the federal government left off, and continued the riparian leasing of fisheries. Having no similarly lucrative, revenue producing, freshwater sport fisheries at that juncture, all other provinces, over time, chose to change their laws and convert their fisheries from private property to common property. The fact remains, however, that neither level of government, federal or provincial, has an exclusive jurisdictional hand in shaping the freshwater fisheries future. This has severely affected management of the recreational fisheries and their capabilities to provide maximum benefits to Canadian society.

Size and distribution of the sport fisheries and its catch

About 95% of Canada's sport fishery takes place in Canada's inland waters so the area, productivity, and distribution of fresh water is an important determinant of the size and potential of the sport fishery. The key point is that Canada's freshwater area is almost double the size of Canada's 200-mile Pacific zone and comparably close to half the area of the 200-mile Atlantic zone. In all, inland waters cover 7.6% of Canada, i.e. an area greater, for example, than any one of the three Prairie Provinces or the Maritimes and Newfoundland–Labrador combined. A significant component of

TABLE 18. Percentage distribution of Canada's inland waters (Statistics Canada 1971).

Jurisdiction	%	Jurisdiction	%
Nfld.	4.5	Man.	13.5
P.E.I.	—	Sask.	10.8
N.S.	0.3	Alta.	2.2
N.B.	0.2	B.C.	2.4
Que.	24.3	N.W.T.	17.7
Ont.	23.5	Y.T.	0.6

Canada's total freshwater area is the Great Lakes (12.3% of the total), but, as shown in Table 18, fresh waters are, with a few exceptions, surprisingly well distributed.

With respect to productivity, Ricker (1969) pointed out that the average yield per unit area is greater in inland waters than in the sea. However, the scale of Canada's fresh waters is so vast that the frontier "fringe" of intensive sport fishery has not yet been pushed back to the stage where productivity per se has emerged as a problem (largely because of costs and means of mass access). This is not to say that some trophy fish species, e.g. lake trout, have not been "creamed" off or that problems due to overfishing or other factors (e.g. acid rain) do not abound within the settled areas of Canada.

In 1975, Canadian anglers caught 77 035 t of fish or 8.1% of the total Canadian fisheries catch (exclusive of molluscs, crustaceans, and "other items") of 947 878 t. Regional distribution of the finfish catch between the commercial and recreational fisheries is shown in Table 19. It shows that, in terms of volume of landings, only in Alberta and Ontario did the recreational fisheries provide greater landings than commerical fisheries. In all the other provinces commercial fisheries clearly dominated.

TABLE 19. Commercial recreational percentage breakdown of the total provincial finfish catch — 1975 (DFE 1977 and K. W. Brickley unpublished data).

Jurisdiction	Commercial (%)	Recreational (%)	Total[a] ('000 t)
Nfld.	98	2	254 000
N.S.	100	—	284 000
P.E.I.	98	2	10 000
N.B.	99	1	112 000
Que.	74	26	69 000
Ont.	36	63	56 000
Man.	89	11	14 000
Sask.	63	36	8 000
Alta.	27	73	3 000
B.C.	94	6	136 000
N.W.T. and Y.T.	83	17	2 000
Total			948 000

[a]These figures are rounded off and are exclusive of molluscs, crustaceans, and "other items" (e.g. seals).

Economic importance

Published reports on the net economic yield of any major fishery (in annual or capitalized measures of the social surpluses generated) are practically nonexistent in Canada with the exception of New Brunswick and British Columbia where studies have been done on the Atlantic salmon sport fishery and some of the Pacific fisheries. The lack of such basic information, however, means that cruder measures of the sport-fisheries performance have to be employed using the commercial fisheries as a yardstick. These will be: national income, employment, investment, and exports.

National income — Economic impact can be estimated by comparing the marketed value of the commercial fishery with angler expenditures and wholly attributable investment. In 1975 the marketed value of the commercial fishery was $694.3 million. In the same year the expenditures and wholly attributable investment of anglers totalled $1,021.6 million. Figure 4 illustrates the percentage composition and distribution by province and territory.

With expenditures of $562.9 million, the Ontario sport fishery dominated both recreational and total fisheries in terms of the gross economic activity generated in any one province. In fact, the Ontario total exceeds the total commercial fisheries marketed value ($503.0 million) of the entire Atlantic fisheries. The gross of the combined inland and ocean sport fishery in British Columbia also exceeds the marketed value of the Pacific commercial fishery.

Employment — Employment generated is another measure of importance. Considering the primary and secondary level, the recreational fishery produces approximately 26 000 jobs[11], in comparison with the 78 000 jobs in the commercial fishery. However, the crucial dimension lies in the divergent sport/commercial fisheries job trends. For 30 years jobs have been opening up in the service-producing sector and declining relatively in the goods-producing sector: in percentage terms, services now account for 46% of the labor force compared with only 28% 29 years ago. Conversely, the goods-producing sector now accounts for 32% compared with 57% in

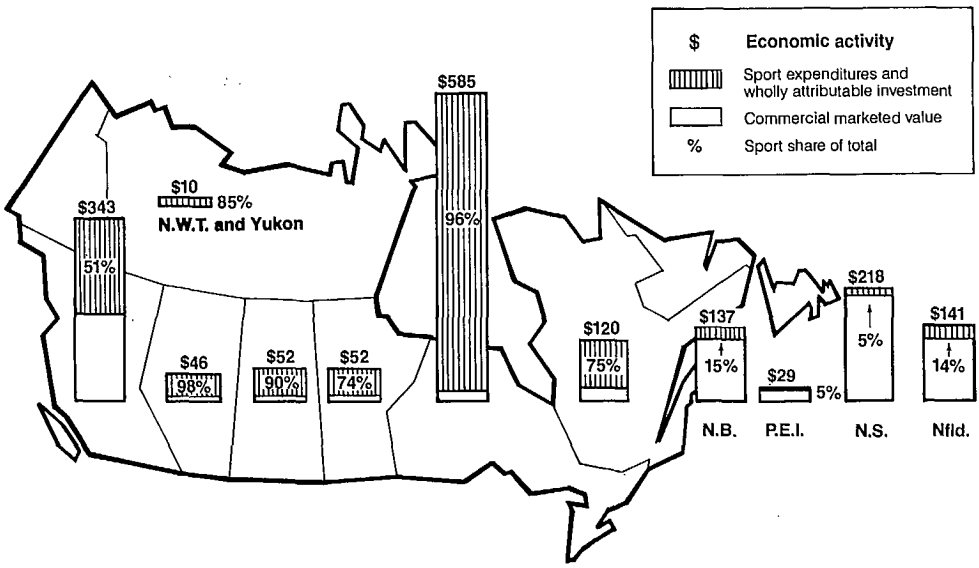

FIG. 4. Sport fisheries percentage of economic activity generated by sport and commercial fisheries by province and territory in 1975 (millions of dollars). (Department of Fisheries and the Environment 1977, p. 49–54 [Note: corrections not made for duplication between provinces in marketed area]; K. W. Brickley's 1975 unpublished *Survey of Sportfishing in Canada*).

[11]That is about one job per $40,000 of expenditure. If the Ontario Ministry of Natural Resources estimate of an expenditure of $30,000 for each job and another 1.5 of indirect and induced employment are used, the number of jobs in Canada from sport fishery would rise to between 34 900 and 86 000.

1948. Sport fisheries fit directly into the service sector mold where the industry is characteristically labor intensive, local initiative, and small enterprise oriented.

Investment — Anglers in 1975 reported owning 1 644 000 boats, valued on the market at $1.8 billion, and used about half the time for sportfishing. Correspondingly, there were 40 000 commercial fishing boats valued at $377 million. Using the Ontario component of the 1975 sportfishing survey as a guide, the value of other gear owned by anglers is $500 million compared with $40 million for the commercial fishery.

Exports — For decades Canada has been a world leader in the onsite "export" of sportfishing. A million foreign anglers visit every year, representing one out of every six anglers in Canada. In dollar terms, these tourist anglers spent $241.6 million in Canada in 1975, or 12.4% of Canada's total foreign tourism receipts for that year. The extent to which fishing actually brings tourist anglers to Canada has been examined. Over two-thirds of nonresident anglers sampled in Ontario in 1975 gave sportfishing as one of the main reasons for visiting Ontario. Similar surveys showed fishing was the main, or one of the main reasons, for 86% of nonresident Atlantic salmon angler trips to Newfoundland in 1974, and for 99% for those in New Brunswick in 1970.

The Medium-Term Outlook to 1985, Canada's Recreational Fishing Industry

Growth trends are difficult to determine because the 1975 survey results are the first and only comprehensive benchmark data available. The only previous national data compiled for 1961, for example, lumped the results for some provinces together and, by covering only resident anglers, omitted the whole tourism sector. However, by making extensive use of 1975 data, plus various regional studies and extrapolations of license statistics, estimates were made of annual growth rates in some key variables up to 1985 (Table 20).

The Table shows that angler numbers will increase to 6.7 million or by 50% between 1975 and 1985 and gross expenditures to $4.6 billion in current dollars or by

TABLE 20. Growth trends in key sport fisheries variables (in current dollars).

	1975	1978	1985	Annual rate (%)
Angler numbers[a]				
Resident	3 520 300	4 049 900	5 616 300	4.78
Nonresident	948 000	978 700	1 054 200	1.07
Total	4 468 300	5 028 600	6 670 500	4.09
Days fished				
Resident	64 046 600	77 543 300	121 150 000	6.58
Nonresident	8 493 600	9 391 400	11 873 000	3.41
Total	72 540 200	86 934 700	133 023 000	6.25
Expenditures ($)				
Direct	799,886,800	1,152,758,000	2,704,334,900	12.95
Investment	951,100,200	1,214,528,300	2,148,642,200	8.49
Total	1,750,987,000	2,367,286,300	4,582,977,100	10.73

[a]Sixteen years of age and over.

160%. Based on employment trends Canada's recreational fishery will produce approximately 66 900 jobs by 1985. Concerning the export of sportfishing, the average days fished by nonresidents is expected to increase by slightly more than 25%. Clearly this table demonstrates that sportfishing is and will continue to be a sector of growing economic importance.

It is important to look at these projections from a regional perspective (Table 21). In the five regions, the percentage increases of resident adult anglers (1975–85) are all projected to be over 50%, with an 81% increase in British Columbia and 73% in Quebec, slightly lower at 66% in the Western Provinces, and 60% in the Atlantic Region. The smallest projected rise is 51% in Ontario. However, as of 1975, that province already accounted for over half of Canada's anglers.

TABLE 21. Resident adult angler numbers in '000.

	Actual 1975	Projected 1985
Atlantic	246.9	394.6
Quebec	484.6	835.7
Ontario	1 967.4	2 968.8
Western provinces	459.2	762.4
British Columbia	362.1	654.8
Canada	3 520.2	5 616.3

Because sportfishing plays a significant role in northern development, estimates of expenditures and investment for the Yukon and Northwest Territories were made to 1985 (Table 22). These indicate that a total expenditure of $31 million could be realized by 1985. In the absence of specific, earlier benchmarks, Canada-wide trends were used to develop these projections.

Sportfishing has historically been a leading sector in the economic development of the north. It provides both entrepreneurial opportunities (e.g. guide and charter services) and employment compatible with the traditional life style of native people in the north. It also affects infrastructural development, particularly in transportation, throughout Canada's northern areas.

TABLE 22. Northwest Territories and Yukon 1985 sportfishing projections.

		Projections to 1985		
Variables	1975 survey totals	Residents	Nonresidents	Total
No. of active anglers	22 100	15 300	14 000	29 300
Angler days	240 900	289 000	107 000	396 000
Per day expenditures ($)		21.03	156.06	–
Direct expenses ($)	7,276,400	6,077,700	16,838,900	22,916,600
Investment average ($)		501.21	21.26	–
Investment total ($)	3,597,200	7,668,500	171,600	7,840,100
Total expenditure ($)	10,873,600	13,746,200	17,010,500	30,756,700

The projections to 1985 indicate that considerable potential exists for the development of Canada's recreational fisheries. There are, however, many issues and challenges that could affect this development.

Major Issues in Canada's Recreational Fishing Industry

Two of the three basic requirements to capitalize on development opportunities in Canada's sport fisheries have already been identified: (1) an established and growing multibillion dollar market, both domestic and international, and (2) a relatively underdeveloped supply base of fish and wilderness fishing opportunity within a few hours of the world's richest consumer market (there are, for example, 100 000 lakes in each of Saskatchewan and Manitoba and over 250 000 in Ontario — a good percentage have seldom, if ever, been fished by anglers). The third requirement is management, i.e. a coordinated management regime that would attempt to maximize the socioeconomic benefits of the industry.

Major obstacles to the development of this type of management have been economic and jurisdictional.

The economic issues

The economic issues in the recreational fisheries stem from diversity in the management system, problems of conflicting uses of the resource between commercial and recreational users, and the generation of revenues. Since the first of these will be addressed later, the last two aspects only will be treated here.

Conflicting Use of the Resource

The Atlantic salmon is a good example of the conflicting use of the resource. This is a high-priced, highly prized species from both the sport fisherman's and commercial fisherman's point of view. Thus, there are demands from both the commercial and recreational fisheries for a greater share of the catch. Curtailment of the commercial fishery to the benefit of the sport fishery can cause social and political unrest and redundancy of fishing equipment. On the other hand, policies favoring the commercial fishery will create economic inefficiency, as economic returns to Canadian society may be higher from the sport fishery than from the commercial fishery.

Generation of Revenues

The revenues generated from the recreational fisheries are low in terms of the demand for these fisheries based on users' "willingness to pay." The Atlantic salmon sport fishery can provide some useful insights. In 1975, Atlantic salmon anglers paid $354,747 in license fees to the New Brunswick government and caught 44 735 salmon, i.e. they paid about $8 a salmon in what almost amounts to a "royalty." This, however, was only a small portion of the salmon angler's willingness to pay. Salmon angling leaseholders also paid the New Brunswick government another $127,800 in lease fees (raising the "royalty" to about $11 a salmon). Going well beyond even this is an estimated $5.6 million in resource rents that were received in one form or another by the owners of New Brunswick salmon angling properties, worth about $70 million in 1975 (raising the imputed "royalty" per salmon to well over $100). Some of these

"precise" figures are of course subject to revision and/or correction, but not the basic magnitudes or implications of these value estimates.

Estimates of the potential of common-property sport fisheries to generate net benefits can of course be derived through shadow pricing (whether public monies should be invested to provide unpriced benefits is of course an entirely separate question). Suffice to say, the capacity of many of Canada's sport fisheries to generate benefits net of all costs is essentially beyond dispute.

The jurisdictional situation

The salmon sport fishery is a classic example of the jurisdictional problems in that salmon are equally notorious for the jurisdictional and international problems they can cause. The life cycle of salmon starts in and is crucially dependent, not only on freshwater spawning grounds, but also on the protection given the whole freshwater environment — including specifically, the often conflicting habitat development interests, and differing alternatives and priorities in the six separate provinces involved.

Attempting to protect and develop the salmon resource's natural production base in provincial inland waters is a national concern as much as it is for the high seas. There can also be conflicts between the commercial fisheries for salmon in ocean waters under federal government management and the freshwater sport fisheries under provincial management. This is particularly acute in the case of Atlantic salmon and less so in British Columbia because the bulk of the salmon sport fishery is in ocean waters, thus "internalizing" the Pacific Region's management problems relating to the tidal sport fisheries. Nevertheless, there is freshwater sportfishing under provincial license for certain species, e.g. chinook, coho, and steelhead, which cannot be ignored.

The wealth and enjoyment generating capabilities of both Atlantic and Pacific salmons have made them ideal candidates for economic development. By the nature of the salmon's life cycle and linkages, however, any developmental agreement has to be national in intent and application. This problem is resolvable as the route that can be followed has already been laid out. The British Columbia Salmon Enhancement Program, (SEP) agreement indicates that, given a mutually developed consensus on what is wanted, new agreements can be reached to supersede past arrangements which for one reason or another are no longer adequate. The same opportunity exists with other provinces, preferably of course, on a consistent overall basis.

Conclusion

The analysis in this Chapter attempted to place Canada's recreational fisheries in economic perspective by making some comparisons with the commercial fisheries. It has been shown that these industries, though dependant essentially on the same resource base, differ considerably. In general, the commercial fisheries hold sway in the sea areas of the Pacific and Atlantic coast while the sport fisheries are important throughout Canada's considerable inland water areas. However, in terms of economic importance, the recreational fisheries make a greater contribution to Canada's GNP than the commercial fisheries. It also generates employment and incomes in the economy, particularly in service industries; and, by its impact on tourism, is an important export industry.

The medium-term outlook for the recreational fisheries to 1985 indicated that sportfishing will remain a sector of growing economic importance both nationally and regionally. The economic development aspects of sportfishing in both frontier areas and in the mature parts of the country are underscored by the projected 50% rise in the number of anglers, resulting in an estimated 160% increase in expenditures in current dollar terms. The latter represents an average annual rate of growth in expenditures of about 11% for the period up to 1985.

The major issues in Canada's recreational fishery are jurisdictional and economic. Perhaps the most difficult economic problems stem from the conflicting uses of fisheries resources between recreational and commercial industries. However, in view of the potential for development and the revenue generating capabilities of the recreational industry, greater attention will have to be given to allocating resources between both industries to optimize socioeconomic returns to Canada. This would require addressing the jurisdictional problems, due to federal and provincial governments involvement and differences in approaches to management, which have hampered optimum development in the industry. The British Columbia SEP agreement illustrates how most of these jurisdictional problems can be solved.

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