CANADA'S OCEAN INDUSTRIES: CONTRIBUTION TO THE ECONOMY 1988 - 2000

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Executive Summary

The objective of this report has been to estimate the direct impact of each industry segment of the ocean sector on the national, Atlantic, Pacific, and Arctic regional gross domestic product (GDP). Two earlier reports, one published by DFO in 1998, provided ocean industry data for the period between 1988 and 1998. The present report extends this period to the year 2000, the last year for which reliable data are available for all segments of the oceans sector. This report excludes the Arctic region because it was found that the oil and gas data included in the earlier reports were mainly for land, not sea, production. Without marine oil and gas, the contribution of the ocean sector to the Arctic regional economy is small and is negligible in a national context. Hence the contribution of the ocean sector to the national economy given here is based on the ocean sector in the Atlantic and Pacific regions. In accordance with national accounting methodology, this contribution is measured by value-added.

The National Economy

In current dollars, the value of output in the ocean sector increased from $16.6 billion in 1988 to $20.7 billion in 1995, then decreased to $17.5 billion in 1997 but grew to $22.7 billion by 2000. The average rate of growth for the period on the whole was 2.6% in current terms and 0.7% in real terms (constant 1992 dollars). The downturn in the ocean sector from 1995 to 1997 was brought about by the fisheries resources situation that affected the fishing, marine tourism industries and ancillary industries, and changes in government policy that resulted in significant declines in government expenditures in the ocean sector.

The value-added by the ocean sector increased in real terms from $8.9 billion to $11.7 billion, at an average rate of 2.2 % a year. Consequently, the contribution of the ocean sector increased from 1.49% of GDP in 1988 to a peak of 1.56% in 1991-1993, then declined to a low of 1.16% in 1997 but increased to 1.48% of GDP in 2000. The decline in the contribution of the ocean sector to GDP from 1993 to 1997 was the result of declines in government services, the fishing industry (because of resource problems), and marine transportation. The growth in the contribution of the ocean sector to GDP since 1997 was largely influenced by the oil and gas industry, which impacted favourably on marine construction, manufacturing and services, and ocean transport, particularly shipbuilding. In 1988, the industries that contributed most to GDP in order of importance were government services, fisheries, and marine transport. In 2000, marine oil and gas, fisheries, and government were the most significant contributors.

Total employment (on a full-time equivalent basis) in the ocean sector declined from 159.7 thousand in 1988 to 152.0 thousand in 2000, at an average rate of 0.4% per year, mainly as a result of declines in the fishing industry, government services, and transport. Employment increased in the remaining segments, led by oil and gas (a capital rather than labour intensive industry) with an average growth of 20.7% per year during the period, followed by the marine construction industry with an average growth rate of 9.9% a year, manufacturing and services, 2.8% a year, and marine tourism, 0.5% a year.

The ocean sector experienced significant structural changes during the period 1988-2000. These changes were characterised by the decline in the government and ocean transport segments of the ocean sector and the increase in the oil and gas, marine construction, manufacturing and services, marine tourism, and fisheries segments. With respect to the declining industries, the government share of output declined from 47.7% to 20.6%, and its share of employment decreased from 26.7% to 18.5%. The value of output from ocean transport declined from 19.4% to 13.5% and employment from 17.9% to 16.6%.

With respect to the growth segments, oil and gas increased its contribution to the value of output from 1.5 % to 23.2% and to employment from 0.3% to 4% during the period. The value of output from manufacturing and services increased from 6.5% to 10.5% and employment from 9.8% to 14.4%. In marine construction, the value of output increased from 2.9% to 9.9% and from 2.3% to 8.0% for employment. In ocean tourism, the value of output decreased from 4.7% to 4.5%, but employment increased from 6.2% to 6.9%. The fishing industry was the largest employer, increasing its contribution to the value of output from 17.3% to 17.8% and decreasing its contribution to employment from 36.8% to 31.7%. A significant aspect was the contribution of the ocean resource industries of fisheries, oil and gas, and tourism to the ocean sector. This contribution increased from 23.5% of the value of output in 1998 to 45.5% in 2000, while employment decreased from 43.3% to 42.5%.

Excluding the government, the private sector component increased from 52.3% to 79.4% of the value of output from the ocean sector and the share of employment from 73.4% to 81.5%. The value of output from the private sector component increased in real terms from $9.6 billion to $15.9 billion during this period at an average rate of 4.2% per year, and its contribution to GDP increased from 0.81% to 1.27%. This increased contribution to GDP indicates that, excluding government, the ocean sector was a dynamic growth sector in the Canadian economy during the period 1988-2000, with the resource industries leading the way. These industries increased their contribution to Canada's GDP at an average rate of growth of 7.7 % a year during the period 1988-2000 in comparison with 3.4% a year for agriculture, 1.7% a year for mining, oil and gas, -1.1% a year for forestry and 2.3% a year for the Canadian economy.

The Atlantic Region

The Atlantic regional economy consists of the economies of the Atlantic Provinces and Quebec. The gross value of output from the ocean sector increased from $11.1 billion in 1988 to $16.8 billion in 2000, at an average rate of growth of 3.5% a year in current terms and 1.5% in real terms. This growth was brought about by growth in the oil and gas industry, which averaged 25.4% a year in current terms. Marine construction averaged 14.4% a year, manufacturing and services averaged 7.0% a year, fisheries averaged 3.9% a year, and tourism averaged 3% a year. The government sub-sector declined at an average rate of 4.4% a year, and ocean transport declined at an average rate of 2.6% a year.

The value-added by the ocean sector increased in real terms from $6.0 billion to $9.3 billion at an average rate of 3.7%. As a result, the contribution of the ocean sector to the Atlantic regional economy increased from 3.47% of the regional GDP in 1988 to 4.40 % in 2000, with a low of 3.00% in 1997. Employment in the ocean sector in the Atlantic Coast regional economy declined from 103.9 thousand in 1988 to 102.6 thousand in 2000, with a low of 89.9 thousand in 1997, at an average rate of 0.1% a year for the period. Employment decreased in the fishing, ocean transport (mainly ship building and repair), and government services but increased in oil and gas, marine construction, manufacturing and services, and tourism.

The ocean sector experienced significant structural changes during the period 1899-2000, characterized by declines in the government and ocean transport segments and increases in the oil and gas, marine construction, marine tourism, and manufacturing and services segments. The government share of output from the ocean sector declined from 53.7% to 20.9%, and its share of employment decreased from 30.3% to 20.7% during the period. The value of output from ocean transport declined from 16.1% to 7.7% and employment declined from 12.9% to 11.9%.

With respect to the growth segments, oil and gas increased its contribution to the value of output from about 2.3% to 31.4% and its contribution to employment from 0.5% to 5.8% during the period. Marine construction increased from 3.2% to 12.0% of the value of output and from 2.5% to 10.3% for employment. Manufacturing and services increased from 4.3% to 6.7% of the value of output and employment increased from 8.5% to 10.0%. Marine tourism decreased from 1.8% to 1.7% of the value of output but employment increased from 2.4% to 2.8%. The fishing industry increased from 18.6% to 19.6% of the value of output but employment declined from 42.9% to 38.5% during the period.

The value of output from the private sector component increased in current terms from $5.1 billion to $13.3 billion during the period 1988-2000, at an average rate of 7.9% per year and 6% a year in real terms. Its contribution to the region's GDP increased from 1.69% in 1988 to 3.81% in 2000. Employment in the private sector increased from 71.8 thousand to 81.4 thousand during this period, at an average rate of 1.0% a year. The

increased contribution to GDP indicates that the private sector component of the ocean industries was a major growth sector in the Atlantic regional economy during the period. This economy grew at an average rate of 1.6% a year in comparison with 8.6% for the marine resource industries and 6% for the private sector.

The Pacific Region

In current dollars, the value of output in the ocean sector increased from $5.5 billion in 1988 to $6.0 billion in 2000, with a peak of $6.4 billion in 1995, at an average rate of growth of 0.6% a year for the period. However, in real terms (constant 1992 dollars) the value of output declined at an average rate of 1.3% per year for the period. The poor growth rate for the ocean sector was due to declines in average growth rates in government (6.2% a year), fisheries (2.4% a year) and marine transport (0.2% a year). All the other ocean industry segments experienced positive growth during the period, led by manufacturing and services (4.3% a year), marine construction (3.0% a year) and tourism (0.3% a year).

The value-added by the ocean sector declined in real terms from $2.9 billion to $2.4 billion at an average rate of 1.9%. Consequently, the contribution of the ocean sector to the Pacific Region economy decreased from 4.21% in 1988 to 2.52% in 2000. The government sector decreased its contribution to the regional GDP from 1.48% to 0.42% and fisheries from 1.14 % to 0.60% during the period. All the other ocean sectors, with the exception of manufacturing and services, decreased their contributions to the regional GDP. Overall employment in the ocean sector declined from 55,900 in 1988 to 49,300 in 2000, at an average rate of growth of 1.0% a year. Employment decreased in fisheries, ocean transport and government services and increased in marine construction, manufacturing and services, and tourism.

The structural changes that took place in the ocean sector during the period have been characterized by the decreasing importance of government and the fishing industry and the increasing importance of ocean manufacturing and services, tourism and construction. The value of output from government decreased from 35.4% to 19.8% and employment decreased from 19.0% to 14.1%; and the value of output from the fishing industry declined from 14.9% to 12.9% and employment decreased from 23.9% to 17.4%. The value of output from ocean transport increased from 26.1% to 29.5% and employment increased from 26.1% to 26.2%

With respect to the growth segments, ocean manufacturing and services increased its contribution to value of output from 10.9% to 21.3% and its contribution to employment from 15.2% to 21.5%; the marine tourism contribution went from 10.4% to 12.6% of the value of output and from 13.2% to 15.6% for employment; and the marine construction contribution went from 2.3% to 3.9% of the value of output and from 1.8% to 3.2% for employment. The resource industries of fisheries and tourism increased their contribution to the value of output from 25.3% in 1988 to 25.5% in 2000, but decreased their contribution to employment from 37.1% to 33.0%.

The value of output from the private sector increased in current terms from $3.6 billion in 1988 to $4.8 billion in 2000, at an average rate of growth of 2.4% a year and 0.5% a year in real terms. Based on the value-added, the private sector component's contribution to the regional GDP decreased from 2.74% in 1988 to 2.10% in 2000. Employment in this component declined from 45.3 thousand to 42.4 thousand during the period, at an average rate of 0.5% a year.

THE CONTRIBUTION OF OCEAN INDUSTRIES TO CANADA'S ECONOMY 1988 - 2000

1.0 INTRODUCTION

The *Oceans Act* was passed by Parliament in 1997, conferring on the Minister of Fisheries and Oceans the responsibility of leading and facilitating the development of a national strategy for the management of estuarine, coastal and marine ecosystems in waters that form part of Canada or in which Canada has sovereign rights under International Law.[1] With the passage of the Act, the Department of Fisheries and Oceans (DFO) has expanded their mandate and responsibility for oceans to manage the oceans through an integrated planning approach.

The Government of Canada consulted extensively with experts in the oceans field and Canadians in developing a strategy to guide the use of oceans space. Canada's Ocean Strategy (COS) was released July 2002, representing the Government of Canada's policy for modernizing the direction of oceans management in Canada.[2] COS recognizes that the oceans are a unique resource possessing critical habitat *and* opportunities for economic growth in Canada. Under COS, an ecosystem approach and the sustainable use of oceans are central to the management of highly connected oceans environments. Implementation of these values is vital for healthy eco-systems and economic benefits from our oceans.

As a result of COS, implementation is expected to proceed with governments, Aboriginal groups, industries, communities and other ocean resource users and decision-makers adopting the precautionary approach and cooperating in the management of the oceans. This approach is visionary in scope and practical in application. On the one hand, development is encouraged to proceed as knowledge of its impact becomes better understood. On the other, integrating management of the oceans promotes balance and reduced conflict among the varied interest of multiple ocean users.

Overall, COS aims to:

- Replace the current, fragmented approach to oceans management with a collaborative, integrated approach;

[1] In 2002, the Minister announced the ocean strategy. At the heart of this strategy is a commitment to adopt an integrated approach to oceans management. See DFO (2002), *Canada's Oceans Strategy*, Ottawa.

[2] A modern approach to oceans governance entails a commitment to work collaboratively within the federal government, with all levels of government, Aboriginal groups and stakeholders; share responsibility for common objectives and engage Canadians in Oceans-related decisions. *Canada's Oceans Strategy: Our Oceans, Our Future. July 2002*, DFO.

- Conserve and protect our oceans and coastal resources for future generations;
- Ensure that Canada can continue to capitalize on the social, economic, and cultural benefits the oceans offer;
- Expand working partnerships among oceans stakeholders; and,
- Position Canada as a world leader in ocean management.

COS seeks to address the challenge of balancing the current growth in oceans industries, while maintaining and enhancing the well-being of the marine environment. COS recognizes that the ocean sector includes activities related to recreation, commerce, trade and development, such as fishing and aquaculture, shipping and ship building, marine defence industries, boating, tourism and recreation, the oil and gas industries, seabed minerals, environmental industries, oceans-related manufacturing and services, and the various economic sectors that depend on these industries. The challenge in implementing COS is to build our understanding and protection of the marine environment, support sustainable economic opportunities and demonstrate international leadership in oceans management. What an integrated approach holds for economic growth in Canada and the well-being of all Canadians is a key question. This report is a step forward in looking at the unique role of the oceans and the benefit that the oceans provide.

1.1.1 METHODOLOGY

This report builds on previous efforts in exploring the part ocean industries play in Canada's economic growth. Using 2000 data, this report updates an earlier report, which was published in 1998 by DFO. The earlier report captured ocean industry data for the period between 1988 and 1996. It was updated previously to account for 1998 ocean industry data and the constant dollar base year from 1986 to 1992 was adjusted in accordance with Statistics Canada practice. These earlier reports estimated the direct impact of each industry segment of the ocean sector on the national, Atlantic, Pacific, and Arctic regional gross domestic product (GDP). To keep abreast of changes, this report extends the study period to the year 2000.

In studying Canada's ocean economy, this report deals with the ocean sector in a holistic manner. It corrects for an error in the previous reports whereby the data given for the oil and gas industry in the Arctic was attributed to marine activities when it instead pertained to land-based operations. Without oil and gas, the contribution of the ocean sector to the Arctic economy, and certainly to the national economy, is incomplete. As a result, the Arctic Ocean segment is omitted here. The opportunity was also taken to correct and update data where ever data errors were found.

This report outlines time-series data-sets and national and regional trends in the ocean sector. The content lends food for thought into continued discussions and the implementation of Canada's Ocean Strategy by offering some facts regarding the economic contribution of Oceans Industries to the Canadian economy and quantitative evidence of structural changes in the ocean sector between 1988 and 2000. With this report, the public, government and industry stakeholders are equipped to analyse the impact of policies and programs over the course of those years.

1.1.2 GENERAL FINDINGS

Structural changes are evident as well as changes in government policies and less government intervention in the ocean sector. Resource strains in fisheries, accompanied by a reduction in output and employment in this industry, are being offset by the emergence of a dynamic offshore oil and gas industry. For instance, government spending on oceans to Canada's GDP declined from 0.69% in 1988 to 0.20% in 2000, the fishing industry's contribution declined from 0.39% to 0.33% and the contribution of the oil and gas industry increased from 0.3% to 0.53% during the period. By the year 2000, the marine oil and gas industry became the most important ocean industry followed by fisheries, government, manufacturing and services, marine construction, ocean transport, and marine tourism. Overall, the ocean sector contributed 1.49% to Canada's GDP in 1988 and 1.48% in 2000.

There are other interesting changes. The volume of landings and employment decreased in the primary fishing industry, but the value of the fish products increased during the period. Mariculture within the fishing industry has been increasing in importance; the shipbuilding industry has experienced significant decline, while the boat building industry has expanded. The findings of this report may have important implications for the effective management and development of the ocean sector. This sector, excluding government, has been a growth sector in Canada's economy despite a temporary set back since the mid 1990s in fisheries.

2.0 THE ANALYTICAL FRAMEWORK FOR CANADA'S OCEAN INDUSTRIES

This chapter establishes the analytical basis for the study. To do so, it will examine:

- ? the economic framework for ocean industries;
- ? the economic theories applicable to ocean industries; and
- ? the methodology for the economic analysis of Canada's ocean industries.

2.1 The Economic Framework for Oceans

In recent years it has been internationally recognized that the oceans should be developed on a sustainable basis, and the Government of Canada is firmly committed to this concept (Mitchell, 1998). However, agencies responsible for the management of ocean resources in a sustainable manner face a number of challenges:

- Fisheries, oil and gas, and tourism are all based on the exploitation of common property resources (Howe, 1979). Sea lanes, in as much as they can be used by ships of all nations, can also be considered international common property;

- Industries based on the exploitation of common property resources can be highly competitive. For instance, there can be competition for both space (fisheries, oil and gas, ocean transportation) and for the available resources (amongst recreational, artisanal and commercial fisheries, and between inshore and offshore operations); and

- The uncontrolled exploitation of ocean resources can cause environmental problems. For instance, operations ranging from overexploitation of the living resources to pollution of the environment can result in changes to the ocean ecosystem. In regard to Canada, remoteness and lack of knowledge regarding baseline environmental conditions can exacerbate some of these problems.

Ocean industries can also have widespread economic impacts through the exertion of linkage effects on the other sectors, especially in a regional, East and West Coast, context. These linkages (Hirschman, 1965) are as follows:

> ***Backward***, where growth and development in ocean industries induce investment and employment in other sectors, providing inputs to ocean industries, e.g., ship and oil rig construction, port facilities, manufacturing, construction and service industries;

Forward, where ocean industries exert an influence on industries using ocean products as an input, e.g., fish for food production and crude oil for energy; and

Demand, where incomes generated by ocean industries stimulate increased demands for consumer goods and services.

Some segments of the ocean industry sector are able to exert strong growth linkages on each other because they are complementary. For example, fisheries, marine oil and gas, and ocean transportation are complementary with respect to shipbuilding and port development through demands for port facilities. They also exert high linkages on other sectors because they all require extensive land-based infrastructure and support and management services.

2.2 Economic Theories Applicable to Ocean Industries

The economic theories relevant to ocean industries are those that apply to replenishable resources (fisheries) and exhaustible resources (oil and gas, ocean minerals) under common or public property ownership, as well as the conventional theories that apply to shipping, tourism, and economic development.

Since 1953 (Gordon, 1953), economic theory developed for *living resources*, such as fisheries, has been fully cognizant of exploitation under biological and ecological constraints. It explains that under common property conditions, uncontrolled exploitation of renewable resources can lead to the overexploitation of these resources. This overexploitation can be economic (low and decreasing returns resulting from over capitalization in the race for the resources) and biological (by affecting the ability of stocks to replenish themselves and therefore provide yields on a sustainable basis). The theory indicates that if biological resources are exploited at levels below their maximum sustainable yields, these resources can provide benefits on a sustainable basis and can attain an economic optimum, i.e., where marginal revenues equal marginal costs. Thus, this theory of renewable resources is consistent with the criteria for sustainable development.

The economic theory of the exploitation of *non-living, exhaustible resources* has difficulty conforming to sustainable development because, being pool resources, they can be permanently depleted, thereby denying their use by future generations. Being exhaustible, the theory indicates that primarily revenue, costs and profit considerations will affect resource exploitation. The ultimate level of extraction exploitation of mineral and hydrocarbon resources is a function of the available recovery technology, and production at a given site may be curtailed several times over a period of many years when its costs begin to exceed its revenues. Also, because the improper exploitation of pool resources can produce environmental degradation, the impact of their exploitation

on the environment has to be taken into consideration by regulatory agencies (Dasgupta and Heal, 1979)[3].

These economic theories are relevant to this study because special problems arise from the dependence of the secondary and tertiary sub-sectors of ocean industries on a primary resource sub-sector, which consists of industries that are involved in the extraction and first-stage processing of natural resources of the ocean, i.e., harvesting of fish, oil and gas exploitation, and ocean mining. Secondary industries are those that are involved with the transformation of raw materials, by means of processing, into semi-finished or finished goods, i.e., fish processing plants, oil and gas refining. Tertiary industries are those that are involved in the production of services to ocean industries such as governmental, financial, research and development, educational and marketing services. The characteristics of primary ocean industries mentioned earlier (specifically, resource constraints and seasonality in fisheries, and higher production costs for oil and gas and ocean minerals in the sea compared to the land) influence the structure and performance of ocean industries, and, in turn, the impact of the ocean sector on national economic development. These aspects will be dealt with in the following section on the methodology of the study.

2.3 Methodology for the Economic Analysis of Canada's Ocean Industries

The economic analysis will establish (as far the data permit) the contribution that the ocean sector made to Canada's national and regional economies during the period 1988-2000. The ocean sector affects economic development in two ways:

- growth in the sector itself; and
- the impact that this growth has on growth in other sectors of the economy.

The first aspect (the *direct* effect) is affected by the industrial structure and by the performance of industry segments (e.g., fisheries, ship building) within the oceans sector. The second (the induced or *indirect* effect) is dependent on the exertion of linkage effects of the ocean sector on other sectors of the economy. These linkages are measured by means of multiplier analysis of the effects of expenditures by ocean industries on other sectors of the economy. The *direct* and *indirect* effects determine the overall economic impact of the ocean sector.

This study focuses on the *direct* effect because the major objective is to assess the economic contribution of the ocean sector to Canada's economy. Therefore, the economic analysis has to be conducted within the framework of Canada's *National Accounting System*. Specifically, the relevant component of the *National Accounting*

[3] Another consideration is that of inter-generational equity due to the fact that when resources are used they are lost to future generations. The response of economic theory to the latter is to discount the future; and to the former, to impose user fees and establish a conservation fund that conceivably will provide alternatives and compensate future generations for their loss.

System is that of *Gross Domestic Product (GDP) at factor cost by industry* which measures the goods and services produced within Canada by industrial classification.

Value-added is an important concept for measuring GDP and the economic contribution of industries. Value-added is defined as the value of outputs minus the value of material inputs. It is the difference between the cost of production inputs (i.e., raw materials and supplies, fuel and electricity, but excluding wages[4]), and the value of sales of the products produced. In a national accounts context, GDP consists of the sum of value-added by all industries. Value-added also pertains to differences between the value of production at primary, secondary, and tertiary industry levels. Value-added is closely associated with the operational efficiency of both *backward* and *forward* linkage effects in that the higher the value-added, the higher the operational efficiency. Value-added is also one of the basic concepts behind input-output analysis, which measures the inter-relationships among different industries in the national economy. In this study, the contribution of ocean industries is measured by their value-added as a percentage of GDP in real terms.

The methodology for the analysis of Canada's ocean industries provides DFO with a consistent approach for future assessments of the contribution of the ocean sector to Canada's economy, in both national and regional contexts. It will be possible to refine the analysis as data sources improve, and as new ocean industries maybe established (such as the exploitation of ocean minerals or the development of tidal power).

In accordance with Statistics Canada's Standard Industrial Classification (CSIC) and its successor, the North American Industrial Classification (NAIC), industries are classified into primary, secondary and tertiary categories for national accounts. The ocean-related industries that comprise the business and non-business sectors and their CSIS are identified in Figure 2.1. Their NAIC equivalents are given in Appendix 1. Statistics Canada and other governmental statistical publications provide time-series data for all these industries, and provide the primary source of data for the trend analysis of the ocean sector for the period 1988-2000. Because the data are consistent with the GDP system, their contribution to GDP can be measured in an additive manner without suffering from the problem of double counting. Unless otherwise specified, monetary values throughout the report are in current dollars.

There are a number of generic problems throughout the study:

- Statistics Canada data on industries are based on tax information and frame surveys. Under the CSIC, the number of enterprises by industrial classification was based on enterprises with a value of shipment of goods of own

[4] This applies to manufacturing industries. For service industries, such as government, salaries are deducted from gross expenditures to arrive at value-added for these industries.

manufacture of $30,000 and over[5]. This has been increased under the NAIC to $ 50,000 and over.

? The aggregation of data in the industrial classification system makes it difficult to identify and quantify the ocean component in some of the industries that have significant "land-related" operations (e.g., how to isolate the coastal component of tourism). The approach to each of these cases is described under the relevant industry segment in the following Sections of the report.

? It is not possible, because of confidentiality, to obtain detailed, provincial-level information for industries with only a small number of firms per province. In general, this has not been a problem because the smaller, eastern Canada provinces have been linked together as Atlantic Canada, and B.C. generally has a diverse economy with several firms in any given segment of the ocean industry sector.

? In accordance with DFO's management regions, Quebec was included in the Atlantic regional analysis. However, Quebec's economy is large compared with the sum of the economies of the other provinces and it was found that this obscures the importance of ocean industries to the Atlantic provinces.

? Employment has been reported as full time equivalent (FTE) person years in accordance with Statistics Canada practice. The exception is the primary fishery where employment statistics are based on the number of licensed fishermen (who may work year round, part time or only occasionally). Consequently, estimates were made (see Section 3.1) of the number of FTE employees for this activity.

Figure 2.1
Ocean Industry Sector Segments and the Relevant GDP and CSIC Codes

Business Sector	Notes	CSIC
Primary Industry		
Fisheries	Marine fishing, tidal water fisheries, marine aquaculture	0311, 0321
Crude Petroleum & Natural Gas	Oil and gas exploration and production	0711, 0911, 0919
Quarry & Sand Pit Industries	Ocean mining	0821

[5] Personal communication (14 October, 1998): Peter Zylstra, Statistics Canada.

Secondary Industries		
Fish Products Industry	Fish processing	1021, 1053, 1099
Ship Building and Repair	Ship building and repair	3271, 3281
Electronic Equipment Industries	Communications, navigation and oceanographic and other equipment	3359
Refined Petroleum and Coal Products	Refineries dependent on marine transportation	3611
Construction Industries	Port & harbour construction, shoreline engineering works	4021, 4112, 4113, 4129
Tertiary Industries		
Water Transport and Related Services	Vessel operations, ports & harbours, navigation services, marine tourism vessels	4541, 4542, 4543, 4544, 4549, 4551, 4552, 4553, 4554, 4555, 4559
Pipeline Transportation Industries		4611, 4612
Storage and Warehousing Industries	Warehousing and grain handling	4711, 4791, 4799
Communications Industries		4821
Wholesale Trade Industries		5111, 5212, 5215, 5219, 5799
Retail Trade Industries		6019, 6322, 6541
Business Service Industries		7721
Professional Business Service Industries	Engineering, environmental, surveying, biological and physical sciences consulting services	7752, 7759, 7771, 7794
Educational Service Industries	Education and training	8521
Accommodation and Food Service Industries	Marine-related tourism services	9141
Amusement and Recreational Services	Eco-tourism package tours, marinas	9654, 9659
Non-Business Sector		
Government Service Industries	Military activities	8111
- Defence Services	Regulatory & resource management, marine services, R&D	8171, 8172, 8173, 8176
- Other Federal Govt. Services	Regulatory & resource management, ferry services,	8263, 8272, 8275
- Provincial Govt. Services		
Educational Service Industries	Universities and technical colleges	8531

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3.0 THE PERFORMANCE OF OCEAN INDUSTRIES, 1988-2000: NATIONAL LEVEL

This chapter examines, in a national, macro-economic context, the performance of the ocean sector in Canada's economy during the period 1988 to 2000. This sector consists of the following segments[6]:

- *commercial fishing*: including catching operations, mariculture and fish processing, but not recreational fishing;
- *offshore oil and gas*: including exploration, development and production, but not refinery operations;
- *ocean transport*: including port operations, vessel operations, ship and boat building and repair;
- *ocean tourism:* including recreational fishing, coastal tourism and cruise ships;
- *marine construction*: including buildings, offshore platforms, and general marine works;
- *ocean manufacturing and services*: including communications and electronic equipment, marine technology and consulting services; and
- *government services*: including defence, resource management and R&D.

A final section summarizes our findings for each of these segments and provides an estimate of the overall impact of ocean sector activities on the national economy.

3.1 The Commercial Fishing Industry

3.1.1 The Sea Fishery

Canada's commercial sea (or capture) fisheries experienced a decline in production during the period 1988-2000 (Table 3.1). The volume of Canada's sea fish landings decreased from 1.7 million tonnes, valued at $1.5 billion in 1988 to 1.0 billion tonnes, valued at $2.1 billion in 2000, with a low of 860.7 thousand tonnes, valued at $1.8 billion in 1995. The volume of production declined at an average rate of 4.0% per year as a result of resource availability problems caused by overexploitation of some major species. This overexploitation led, on the East Coast, to the closure of the fishery for northern cod in 1992, and, on the West Coast, to a reduction in the size of the salmon fleet. It also led to extensive government intervention in the fishing industry on both coasts.

6 The GDP and CSIC codes for the sub-industries under these major industry classifications have been given in Figure 2.1

Table 3.1
Commercial Fisheries Production
in Primary Fisheries and Mariculture, Canada, 1988-2000

	Primary Fisheries		Employment		Mariculture		Employment
	Volume of Landings	Value of Landings			Volume	Value	
	'000 tonnes	($ million)	Fishermen	FTE	'000 tonnes	($ million)	FTE
1988	1,651.1	1,550.0	87,087	37,447	19.5	95.2	1,240
1989	1,605.1	1,413.4	85,079	36,584	28.3	130.0	1,780
1990	1,645.9	1,433.7	81,930	35,230	33.9	183.8	2,150
1991	1,509.0	1,393.9	78,143	33,601	42.0	245.5	2,660
1992	1,322.2	1,400.3	80,074	34,432	43.7	244.4	2,770
1993	1,163.2	1,422.5	80,296	34,527	47.0	272.4	2,980
1994	1,034.2	1,699.4	77,809	33,458	50.1	279.0	3,170
1995	860.7	1,782.9	75,863	32,621	62.5	326.1	3,950
1996	927.1	1,577.0	64,121	27,572	66.7	329.6	4,240
1997	986.1	1,621.1	57,890	24,893	82.2	361.2	5,230
1998	1,002.5	1,578.1	53,483	22,998	86.5	408.5	5,550
1999	1,010.2	1,887.6	52,167	22,243	107.7	533.2	6,620
2000	1,015.9	2,134.1	48,837	21,000	121.7	573.2	6,950
A.R.G*	-4.0	2.7	-4.8	-4.8	15.3	15.0	14.4

* A.R.G refers throughout this document to the annual average rate of growth for the period covered.
Source: Statistical Services, DFO, Ottawa, and Statistics Canada, *Canadian Aquaculture Production Statistics.*

Although there was declining production at the primary level of the industry, there were increases in fish prices and a switch to non-traditional species that more than compensated for the decline in production. The value of production increased at an average rate of 2.0% a year for the period. The number of licensed fishermen decreased from 87,100 in 1988 to 48,800 in 2000. However, on a full time equivalent (FTE) basis, the number declined from 37,400 to 21,000 during the period[7]. The closure of the northern cod fishery resulted in increased levels of unemployment in the Atlantic region.

3.1.2 Mariculture Industry

The aquaculture industry has been a growth industry in Canada and in the world because of the overexploitation of many natural fish stocks and the increased demands for fish products due to population and income growth. The industry is also a highly integrated one where there is little distinction between primary and manufacturing activities. Mariculture is more pertinent to this study than is aquaculture, since mariculture refers to aquaculture conducted in the ocean environment, and also to the culturing of marine and

[7] The Task Force on Atlantic Fisheries (*Navigating Troubled Waters*, 1982) found that 57% of licensed fishermen could be considered *bona fide* fishermen in that they were engaged in fishing operations for a large part of the year. Assuming this period averaged 9 months of the year, the full time equivalent (FTE) is 43%. This percentage was also assumed to apply to the West Coast fisheries.

anadromous species (e.g., salmon). Both finfish and shellfish are cultured, with finfish being the predominant species in terms of volume and value. The aquaculture sector or industry in the Atlantic Provinces, Quebec and British Columbia is used to assess the mariculture contribution to fish production. Maricultural production, increased from 19,500 tonnes valued at $95.2 million in 1988, to 121,700 tonnes valued at $573.2 million in 2000, at an average rate of growth of 15.3% a year in volume and 15.0 % a year in value. Employment in the industry increased from 1,240 FTE in 1988 to 6,950 in 2000, at an average rate of 14.4% a year for the period[8]. Since there is little processing done for most mariculture products, this activity has been combined with that of the primary fishery for the purposes of this study. In 2000, mariculture production accounted for 10.91% of the volume and 21.2% of the value of primary sea fish production in Canada, in comparison with 1.2% of the volume and 5.8% of the value in 1988.

3.1.3 Fish Processing Industry

Canada's fish processing and trade industry produces and markets a wide diversity of fisheries products. The value of shipment of goods of own manufacture[9] from the fish products industry (Table 3.2) increased from $2.8 billion 1988 to $3.5 billion in 2000, at an average rate of 1.8% a year during this period[10]. The number of plants and employment declined during the period from 453 establishments employing 20,000 FTE workers to about 370 plants employing about the same number of workers[11]. These declines were the result of the resource situation at the primary level (including the closure of the northern cod fishery on the Atlantic Coast in 1992, which affected over 5,000 plant workers).

Table 3.2

8 Apart from creating jobs, the mariculture industry has also resulted in the establishment of many supply-type industries, ranging from boat manufacturers to feed and cage suppliers (DFO, 1992, *Aquaculture Industry: An Overview*, p. 6.). These ancillary industries will be dealt with in Section 3.6.

9 The value of shipments of goods of own manufacture does not represent the total output of the industry, but is directly relatable to ocean resource inputs and is, therefore, the relevant measure of the contribution of these inputs to production. Utilising total production and total employment would lead to an over estimation of the contribution of ocean industries to the economy.

10 Annual estimates produced by DFO are based on data from departmental regional offices and provincial agencies, and are consistently $400 to $500 million higher (*Canadian Fisheries Annual Statistical Review*, DFO, 1988 onwards).

11 The number of operational fish processing plants (as opposed to the number of licence holders which is over 1,300) is based on those that meet the CSIS and NAIC value of shipment of goods of own manufacture criteria. Employment is on a full time equivalent (FTE) basis. The actual number of people employed during the year is approximately twice the FTE estimate (*The Fish Processing Sector in Atlantic Canada: Industry Trends and Dynamics*. Coopers and Lybrand, 1993).

The Fish Products Industry, 1988-2000

	Number of Establishments	Employment	Wages	Cost of Raw Materials	Value of Shipment of Goods of Own Manufacture	Value-added
		FTE	($ million)			
1988	453	20,046	458.5	1,785.7	2,783.8	964.5
1989	472	26,377	477.2	1,732.5	2,616.1	870.7
1990	460	23,679	446.6	1,680.6	2,647.1	923.4
1991	434	22,051	425.1	1,610.9	2,596.4	916.4
1992	426	21,474	416.2	1,579.8	2,453.2	800.4
1993	428	18,994	360.0	1,735.7	2,564.5	817.9
1994	409	18,635	346.5	1,926.0	2,900.2	919.6
1995	400	18,524	348.7	2,066.4	2,974.3	916.1
1996	397	18,152	330.2	1,883.7	2,722.5	822.2
1997	407	18,368	346.2	1,941.3	2,739.1	739.5
1998	396	18,772	362.8	1,982.9	2,873.3	862.5
1999	362	19,754	380.5	2,201.4	3,205.7	1,014.1
2000	369*	20,160	450.3	2,390.2	3,464.0	1,086.8
A.R.G		0.0	-0.2	2.4	1.8	1.0

*Estimates.

Source: Statistics Canada, *Manufacturing Industries of Canada: National and Provincial Areas.* Cat. No. 31-203.

3.1.4 The Contribution of the Commercial Fishing Industry to GDP

The gross revenues from the commercial fishing industry, represented by the value of shipment of goods of own manufacture and the value of output from mariculture, and the value-added and employment in the industry for the period 1988-2000 are shown in Table 3.3. The value of output from the industry increased from $2.9 billion in 1988 to $4.0 billion in 2000, at an average rate of 2.8% a year. This growth rate was due mainly to the expansion in the mariculture segment of the industry. Total employment in the industry declined from 58,733 in 1988 to 48,110 in 2000, at an average rate of 1.7% a year.

The contribution of the fishing industry to Canada's GDP is given in Table 3.4. It shows that in real terms (i.e., constant 1992 dollars), gross revenues increased at an average rate of 0.9% a year during the period. Based on the value-added, the industry decreased its contribution from 0.39% of GDP in 1988 to a low of 0.28% in 1997, but its contribution increased to 0.33% in 2000. In 2000, the contribution of the primary sector and mariculture was 0.21%, the same as in 1988, and the secondary manufacturing sector's contribution was 0.12%, a substantial reduction from its contribution of 0.18% in 1988. These findings reflect significant changes in the structure of Canada's fishing industry during the period.

Table 3.3
Gross Revenues and Employment, Coastal Fishing Industry of Canada, 1988-2000

	Value of Primary Fisheries & Mariculture	Value-added, Primary Fisheries & Mariculture	Value of Fish Products & Mariculture*	Value-added by Processing	Total Value-added, Fishing Industry	Employment
	($ million)					FTE
1988	1,645.2	1,117.1	2,879.0	964.5	2,081.6	58,733
1989	1,543.4	1,032.5	2,746.1	870.7	1,903.2	64,741
1990	1,617.5	1,099.9	2,830.9	923.4	2,023.3	61,059
1991	1,639.4	1,114.8	2,841.9	916.4	2,031.2	58,312
1992	1,644.7	1,146.4	2,697.6	800.4	1,946.8	58,676
1993	1,694.9	1,182.9	2,836.9	817.9	2,000.8	56,501
1994	1,978.4	1,304.8	3,179.2	919.6	2,224.4	55,263
1995	2,109.0	1,487.6	3,300.4	916.1	2,403.7	55,095
1996	1,906.6	1,290.8	3,052.1	822.2	2,113.0	49,964
1997	1,982.3	1,415.4	3,100.3	739.5	2,154.9	48,491
1998	1,986.1	1,459.5	3,281.8	862.5	2,322.0	47,320
1999	2,420.8	1,721.3	3,738.9	1,014.1	2,735.4	48,617
2000	2,707.3	1,949.3	4,037.2	1,086.8	3,036.1	48,100
A.R.G	4.2	4.7	2.8	1.0	3.1	-1.7

* Includes the value of output from mariculture and the value of shipment of goods of own manufacture.
Source: Tables 3.1 and 3.2.

Table 3.4
The Contribution of the Commercial Fisheries to Canada's GDP, 1988-2000

	Value-added				Contribution to GDP		
	Gross Value of Output, Fishing Industry	Commercial Fisheries & Mariculture	Processing	Total	Commercial Fisheries & Mariculture	Processing	Total
	($ million constant 1992)				%		
1988	3,181.3	1,234.4	1,065.8	2,300.2	0.21	0.18	0.39
1989	2,908.1	1,093.4	922.1	2,015.5	0.18	0.15	0.33
1990	2,913.0	1,131.8	950.2	2,082.0	0.18	0.16	0.34
1991	2,870.3	1,125.9	925.6	2,051.5	0.19	0.15	0.34
1992	2,697.6	1,146.4	800.4	1,946.8	0.19	0.13	0.32
1993	2,802.9	1,168.7	808.1	1,976.8	0.19	0.13	0.32
1994	3,090.2	1,268.3	893.8	2,162.1	0.20	0.13	0.33
1995	3,125.5	1,408.7	867.5	2,276.3	0.21	0.13	0.34
1996	2,841.5	1,201.7	765.5	1,967.2	0.18	0.11	0.29
1997	2,853.3	1,302.2	680.3	1,982.5	0.18	0.10	0.28
1998	3,022.5	1,344.2	794.4	2,138.6	0.19	0.11	0.30
1999	3,406.1	1,568.1	923.9	2,492.0	0.21	0.12	0.33
2000	3,548.6	1,713.4	955.3	2,668.7	0.21	0.12	0.33
A.R.G	0.9	2.7	-0.9	1.2			

* All constant values are derived from the GDP implicit price deflator.
Source: Statistics Canada, *Provincial GDP by Industry 1984-1998*, (Annuals) Cat. No. 15-203-XPB.

3.2 Offshore Oil Industry

Development activities in offshore oil and gas began in the 1980's as a result of two major finds on the East Coast: the Venture gas field off Nova Scotia and the Hibernia field 315 km east of St. John's, Newfoundland. In 1984, there was a major find in the Arctic, the Amanligak oil field, 65 km north of Tuktoyaktuk in the Beaufort Sea. Although there are oil and gas resources on the Pacific Coast, there has been a moratorium on exploration and development activities since 1977. Consequently, Canada's offshore oil and gas industry is located off its Atlantic and Arctic Oceans, including the Arctic islands. Since these finds, activities have been essentially exploratory and developmental, concentrating on the Atlantic Coast. Production of oil and gas did not commence until 1992 on this Coast, and production levels were relatively low until production commenced from Hibernia in 1997 (Table3.5).[12]

Table 3.5
Oil and Gas Production, Atlantic Coast of Canada, 1988-2000

	Production				Net Cash Expenditures (inc. Exploration & Development	Total Labour Force (inc. Exploration & Development)	Total Value of Output*	Value-added
	No. of Establish-ments	Labour Force	Value of Marketable Production	Value-added				
		FTE	($ million)		($ million)	FTE	($ million)	
1988	20	-	-	-	249.7	495	249.7	153.1
1989	14	-	-	-	148.0	252	148.0	102.0
1990	16	-	-	-	200.5	361	200.5	151.6
1991	16	-	-	-	660.7	1,060	660.7	571.5
1992	13	144	96.1	94.9	851.3	1,406	947.4	781.9
1993	9	170	160.7	158.6	1,219.3	2,050	1,380.0	1,160.9
1994	8	109	206.1	193.2	1,511.4	2,369	1,717.5	1,447.6
1995	14	106	197.1	194.3	1,499.1	2,129	1,696.2	1,482.0
1996	16	106	201.2	198.8	1,046.4	1,386	1,247.6	1,056.8
1997	17	75	126.7	124.1	1,109.8	1,681	1,236.5	1,086.3
1998	16	300	591.0	573.3	2,282.7	3,540	2,873.7	2,442.8
1999	18	524	1,052.1	1,010.0	2,992.0	4,490	4,044.1	3,463.4
2000	18	1,310	3,103.3	2,948.1	2,161.8	5,910	5,265.1	4,720.8
A.R.G		27.6	43.4	43.0	18.0	20.7	25.4	28.6

*Value of marketable production from processing and net cash expenditures on exploration, development, operating costs and royalties.
Source: Statistics Canada, *The Crude Petroleum and Natural Gas Industry* (Annuals), Cat. No. 26-213.

During the period 1988-2000, the value of output from activities of Canada's offshore oil and gas industry increased from $249.7 million to $5.3 billion, at an average rate of growth of 25.4% a year. The labour force employed by the industry increased from about 500 to 5,900, at an average rate of growth of 20.7% a year. The major economic impact

12 It was realised that offshore production costs of oil and gas would be higher than those associated with land operations, and therefore the pace of development would be affected by world market prices. These prices remained relatively stable during the 1990s. The price situation has resulted in little exploratory activity in the Arctic during the period covered.

of the offshore oil and gas industry during the period was due to exploration and development. Net cash expenditures for marine oil and gas, for exploration, development and other purposes, increased from $249.7 million in 1988 to $2.2 billion in 2000, at an average rate of 18% a year. The value of oil and gas production increased from $94.9 million in 1992 to $3.1 billion in 2000, at an average rate of 43.4% a year.

3.2.1 The Contribution of Marine Oil and Gas to GDP

The total contribution of the marine oil and gas industry is given in Table 3.6. It shows that the real growth rate for the marine oil and gas industry averaged 23.5 % a year for the period 1988-2000. Based on its value-added, the contribution of marine oil and gas to Canada's GDP increased from 0.03% in 1988 to 0.53% in 2000. Employment in the industry increased from 500 to 6,000 on an FTE basis, at an average rate of 20.7% a year.

Table 3.6
Contribution of Marine Oil and Gas to Canada's GDP, 1988-2000

	Total Value of Output	Value-added	Employment	Contribution to GDP
	($ million constant 1992)		FTE	%
1988	275.9	169.2	495	.03
1989	156.7	108.0	252	.02
1990	206.3	156.0	361	.03
1991	667.3	577.2	1,060	.10
1992	947.4	781.9	1,406	.13
1993	1,363.4	1,147.0	2,050	.18
1994	1,669.4	1,407.1	2,369	.21
1995	1,606.3	1,403.5	2,129	.21
1996	1,161.5	983.9	1,386	.15
1997	1,137.6	999.4	1,681	.14
1998	2,646.7	2,249.8	3,540	.31
1999	3,684.2	3,155.2	4,490	.42
2000	4,628.0	4,149.6	5,910	.53
A.R.G	23.5	26.7	20.7	

Source: Table 3.5.

The marine oil and gas industry experienced phenomenal growth during the period 1988-2000, surpassing fisheries as the predominant natural resource industry in the ocean sector in terms of its contribution to Canada's GDP.

3.3 Ocean Transport Industry

The ocean transport industry sector consists, as pointed out earlier, of three industries:

- the marine transport industry;
- Canada's marine shipping industry; and
- ship and boat building and repair industry.

3.3.1 Ocean Transport Industry, Ports

Shipping, one of the most economical modes of transport, accounts for most of the volume of Canada's trade. The total tonnage of cargo loaded and unloaded (landed) in Canada decreased from 390.0 million tonnes in 1988 to a low of 324.9 million tonnes in 1993 but increased to 404.5 million tonnes in 2000 (Table 3.7). Most of the cargoes landed are made by international shipping, rather than domestic. In 2000, domestic shipping accounted for 32% of the cargoes loaded and unloaded in Canada. In comparison, international (ocean) shipping accounted for 64% of cargoes loaded and unloaded in 1988 and for 68% in 2000. Ocean cargoes increased from 166.2 million tonnes in 1988 to 188.1 million tonnes in 2000, at an average rate of growth of 1.9% a year during the period.

Table 3.7
Ocean Cargoes, International and Domestic Shipping, 1988-2000

	Canada Total			Ocean Cargoes**	
	Domestic	International*	Canada		
	(million tonnes)				% of Total
1988	140.0	250.0	390.0	166.2	42.6
1989	124.0	239.4	363.4	156.7	43.1
1990	120.8	232.3	353.1	156.1	44.2
1991	115.8	234.2	350.0	167.2	47.8
1992	104.6	223.2	327.8	155.3	47.4
1993	100.8	224.1	324.9	154.2	47.5
1994	104.4	246.9	351.3	168.1	47.8
1995	100.8	259.7	360.5	174.5	48.4
1996	97.6	259.9	357.5	171.4	47.9
1997	93.4	282.7	376.1	188.4	50.1
1998	96.6	279.5	376.1	179.4	47.7
1999	104.4	281.2	385.6	179.2	46.3
2000	110.9	293.6	404.5	188.1	46.5
A.R.G	-1.9	1.3	0.3	1.9	

* These include transboundary and overseas cargoes.
*These include cargoes from the Atlantic, Pacific and the St. Lawrence.
Source: Statistics Canada, *Shipping in Canada*. (Annuals) Cat. No. 54-205; Transport Canada, *Transportation in Canada, Annual Reports.*

The marine transport industry is served by a number of ports that are owned and/or operated by Transport Canada, Ports Canada, the Department of Fisheries and Oceans, and a number of private corporations, each with their own regulatory regime (DFO, Industry Profile). Canada Ports Corporation (CPC), a federal Crown Corporation, administers the largest ports in the country through local port corporations (Vancouver, Prince Rupert, Montreal, Quebec City, Halifax, St. John and St. John's) or as divisional ports (Churchill, Port Colborne, Prescott, Trois-Rivières, Port-Saguenay, Sept-Isles and Belledune). These ports are large multi-purpose ones that provide a full range of marine services. There are also Harbour Commissions, which operate semi-autonomously in nine ports in Canada. The maintenance and administration of 316 public ports and 298

public harbours at 526 sites across Canada fall under the purview of the Canadian Coast Guard's Public Harbours, Small Craft Harbours, and Ports Directorate of DFO (Industry Canada, *Strategis*). These ports cater to international shipping and to the fishing and tourism industries.

Ports Canada accounted for about 50% of cargoes handled (loaded and unloaded) during the period 1988-2000. Cargoes handled by major and coastal ports accounted for 74% of all cargoes handled in Canada during the period. Based on this and on Ports Canada market share, revenues and costs, the economic performance of ocean marine ports for the period 1988-2000 is given in Table 3.8.

Table 3.8
Ocean Marine Ports, 1988-2000

	Employment	Wages*	Total Operating Costs	Total Revenues	Value-added
	FTE	($ million)			
1988	2,870	94.1	220.5	265.7	139.3
1989	2,680	90.3	228.3	262.4	124.4
1990	2,650	92.3	223.6	265.8	134.5
1991	2,590	92.7	249.7	293.8	136.8
1992	2,250	83.4	210.0	267.1	140.5
1993	2,310	87.8	266.8	313.9	135.0
1994	2,200	86.2	254.4	326.2	158.0
1995	2,080	87.6	273.8	346.6	160.4
1996	2,060	88.4	294.8	347.9	141.5
1997	2,090	91.7	305.7	359.8	145.8
1998	2,070	92.2	309.0	358.4	141.6
1999	2,220	100.6	337.1	367.0	144.9
2000	2,260	104.2	349.3	373.7	147.5
A.R.G	-2.0	0.8	3.8	2.8	0.5

*Based on weekly incomes in transport service industries.
Source: Statistics Canada, *Shipping in Canada*, Cat. No. 54-205. Canada Ports Corporation, *Annual Reports*. Transport Canada, *Transportation in Canada, Annual Reports.*

Port revenues increased from $265.7 million in 1988 to $373.7 in 2000, at an average rate of growth of 2.8% a year, and port costs increased from $220.5 million to $349.3 million, at an average rate of 3.8% a year.

3.3.2 Canadian Marine Shipping Industry

Canadian-owned or domiciled shipping companies operated 1,907 vessels crewed by 14,978 (FTE employees) in 1988, but this deceased to 1,800 crewed by 10,150 in 2000 (Table 3.9). The Canadian merchant fleet, defined as self-propelled Canadian flag vessels of 1,000 gross tons and over (Transport Canada), had decreased its capacity from 2.5 million Gross Registered Tons (GRT) in 1998 to 2.3 million GRT in 1997, but started a recovery process in 1988 reaching 2.9 million GRT in 2000 (*Shipping in Canada,* 2000,

Table 11-9). In 2000, there were 182 vessels in the merchant fleet, of which 22 were tankers, 72 dry bulk carriers, 24 general cargo, 56 ferries and 8 other types. The majority of these vessels was company or privately owned, but government-owned vessels were predominant in the ferry industry.

Canadian vessels operate in coastal, inland (the St. Lawrence Seaway and the Great Lakes) and international waters. They predominate in the coastal trade where they account for nearly 100% of this trade and account for over 50% of the inland trade. The revenues, costs and employment from these vessel operations are given in Table 3.9

Table 3.9
Canadian Marine Shipping Vessel Operations, 1988-2000

	Canada Total				Coastal & Ocean Shipping		
	Number of Companies*	No. of Vessels	Vessel Crews*	Vessel Revenues	Vessel Crews*	Vessel Operating Costs	Vessel Revenues
			FTE	$ million	FTE	($ million)	
1988	241	1,907	14,978	1,906.0	9,550	1,290.9	1,214.1
1989	189	1,907	14,633	2,031.5	10,140	1,420.3	1,407.8
1990	199	2,028	14,721	2,654.7	10,460	1,539.9	1,884.8
1991	206	1,903	14,643	2,470.9	9,690	1,526.1	1,635.7
1992	204	1,646	14,227	2,318.0	9,860	1,999.5	1,606.4
1993	195	1,773	13,756	2,377.0	9,750	1,610.5	1,682.9
1994	204	1,796	13,154	2,523.8	9,250	1,690.7	1,766.7
1995	208	1,771	13,523	2,778.7	9,760	1,946.7	2,017.3
1996	200	1,750	13,260	2,767.0	9,280	1,925.8	1,997.8
1997	210	1,760	12,.710	2,622.7	8,890	1,860.4	1,947.9
1998	210	1,740	13,100	2,510.0	9,170	1,778.4	1,856.4
1999	213	1,770	13,330	2,600.0	9,330	1,820.0	1,923.0
2000	216	1,800	13,560	2,650.0	9,490	1,855.0	1,960.0
A.R.G		-0.5	-0.8	2.7	-0.1	3.0	4.0

* From 1996, only companies that fell under the NAICS-483 were included, leading to a 30% reduction in the number of companies and vessel crews listed by Statistics Canada between 1965 and 1966. As a result and to maintain consistency for the period, estimates were made of the number of companies and vessel crews from 1996-2000.

Source: Statistics Canada, *Shipping in Canada* (annuals), Cat. No. 54-205; Transport Canada, *Transportation in Canada, Annual Reports.*

The revenues from their coastal and international operations (i.e., excluding inland) account for over 60% of their total revenues. These revenues increased from $1.2 billion in 1988 to $2.0 billion in 2000, at an average rate of growth of 4.0% a year. Vessel operating costs increased from $1.3 million to $1.9 million during this period, at an average rate of 3.0% a year.

Total revenues from coastal and international operations, (i.e., vessel revenues and revenues from warehousing and other services), increased from $1.4 billion in 1988 to $1.9 billion in 2000 with a peak of $2.2 billion in 1995, but total costs, which exceeded revenues for

most of the period, increased from $1.7 billion in 1998 to $1.9 billion in 2000 with a high of $2.6 billion in 1995 (Table 3.10). The industry made a significant contribution to value-added, which increased from $268.7 million (18.5% of revenues) in 1988 to $376.1 million (20% of revenues) in 2000. Employment in the industry decreased from 15,184 FTE in 1988 to14,898 in 2000, at an average rate of 1.6 % a year during the period, with ship crews accounting for 60% of this employment, and warehousing, administration and part-time employment accounting for 40%.

Table 3.10
Canada's Marine Shipping Industry, 1988-2000

	Employment	Salaries & Wages	Total Costs	Total Revenues*	Value-added
	FTE	($ million)			
1988	15,184	588.8	1,722.3	1,452.4	268.7
1989	16,433	680.3	2,245.5	1,799.4	273.4
1990	17,035	746.7	2,380.0	1,884.8	250.6
1991	15,570	719.6	2,202.2	1,824.3	341.1
1992	15,695	734.9	2,243.4	1,775.5	262.8
1993	16,217	755.2	2,303.4	1,922.4	224.9
1994	15,545	758.2	2,361.9	1,965.9	365.7
1995	15,900	783.2	2,567.7	2,192.0	425.2
1996	14,623	764.1	2,152.1	1,997.8	383.6
1997	13,486	766.1	1,975.0	2,003.4	390.6
1998	12,883	680.0	1,726.8	1,789.7	347.2
1999	13,633	697.1	1,813.4	1,834.4	366.9
2000	14,898	714.5	1,858.7	1,880.3	376.1
A.R.G	-1.6	1.6	0.6	2.1	2.8

*Total revenues and costs are derived from the vessel revenues for coastal and international operations and include other sources of revenues, such as shipping services and warehousing.
Source: Statistics Canada, *Shipping in Canada* (Annuals), Cat. No. 54-205.

3.3.3 Ship and Boat Building and Repair Industry

Over 90% of Canada's shipbuilding industry is situated in the coastal provinces and in Quebec. During the period 1988-2000, this industry, whose establishments are engaged in manufacturing all types of ships of more than five tons displacement, declined significantly. The value of shipment of manufactured goods from the coastal provinces and Quebec declined from $1,143.0 million in 1988 to $274.2 million in 2000, at an average rate of decline of 11.9% a year (Table 3.11). Employment in the industry declined from 6,588 to 2,700 during this period, at an average rate of 7.4% a year. The decline in this industry was due to decreased demands for ships in Canada's shipping, national defence (Government) and fishing industries. However, developments in the marine oil and gas industry resulted in demands for supply vessels and in the participation of the shipbuilding industry in oilrig construction.

In the boat building industry, where establishments are engaged in manufacturing and repairing all types of boats and ships of five tons or less displacement, demands emanate

from shipping, fisheries, and tourism. The value of manufacturing shipments from this industry in the coastal provinces and in Quebec declined from $356.1 million in 1988 to $189.7 million in 1992, but increased to $544.7 million in 2000 (Table 3.12).

Table 3.11
The Shipbuilding and Repair Industry, 1988-2000

	Number of Establishments	Labour Force	Salaries and Wages	Value of Mftg Shipments	Manufacturing Value-added
		FTE		$ million	
1988	39	6,588	215.9	1,143.0	439.7
1989	42	7,905	263.1	1,455.3	632.3
1990	44	7,585	279.9	1,502.6	619.4
1991	41	6,959	261.7	1,291.3	581.3
1992	41	8,050	322.6	1,096.5	558.5
1993	38	6,224	275.7	1,088.3	716.7
1994	33	5,203	237.4	910.9	566.9
1995	38	4,588	205.7	903.4	650.4
1996	33	3,572	151.5	612.3	474.2
1997	36	3,113	131.1	388.2	292.2
1998	32	3,205	123.3	311.3	174.1
1999	37	4,081	169.9	454.2	263.2
2000*	30	2,700	109.7	274.4	164.6
A.R.G		-7.4	-5.6	-11.9	-8.2

* Estimates.
Source: Statistics Canada, *Manufacturing Industries of Canada: National and Provincial Areas*, Cat. No. 31-203; Monthly Survey of Manufacturing, Cat. No. 31-001.

Table 3.12
The Boat Building and Repair Industry, 1988-2000

	Number of Establishments	Labour Force	Salaries And Wages	Value of Manufacturing Shipments	Manufacturing Value-added
		FTE		$ million	
1988	263	3,937	72.8	356.1	145.8
1989	231	3,604	74.6	340.0	136.0
1990	225	2,680	61.4	258.7	119.2
1991	179	1,872	48.5	198.7	106.3
1992	170	1,920	47.8	189.7	108.4
1993	146	1,886	50.1	194.5	112.7
1994	141	2,426	62.2	260.6	145.6
1995	160	3,068	77.4	375.9	196.6
1996	183	3,371	87.4	423.9	211.0
1997	173	3,927	91.7	426.9	219.1
1998	158	4,327	101.6	444.4	225.9
1999	140	4,110	109.2	438.4	240.9
2000*	158	5,300	125.3	544.7	294.2
A.R.G		2.5	4.5	3.5	5.8

* Estimates.
** Estimated on the basis of the average growth rate for the period 1988-1997.
Source: Statistics *Canada, Manufacturing Industries of Canada: National and Provincial Area*, Cat. No. 31-203; *Monthly Survey of Manufacturing*, Cat. No. 31-001

The average rate of growth in production was 3.5% a year in current terms for the period on the whole. Employment in the boat building industry dropped from 3,937 to 1,890 in 1993, but increased to 5,300 in 2000, at an average rate of growth of 2.5% a year for the period. A decline in the demand for fishing boats and increasing demand for recreatio nal-purpose boats (and the increasing use of fibreglass as a construction material) have been responsible for the decline and subsequent resurgence in the boat building industry.

3.3.4 The Contribution of the Ocean Transport Industry to Canada's GDP

The total contribution of the ocean transport industry to Canada's GDP is given in Table 3.13. This industry decreased its contribution to Canada's GDP from 0.18% in 1988 to 0.11% in 2000. During that period, employment in the industry declined from 28,600 to 25,200, at an average rate of decline of 1.1% a year.

Table 3.13
Contribution of the Ocean transport Industry to Canada's GDP, 1988-2000

	Value-added Ports	Value – added Marine Shipping	Value-added Boat, Ship Building & Repair	Total Value–added Ocean Transport		Employment, Ocean transport	% of GDP
	($ million)				($ million constant 1992)	FTE	
1988	139.3	268.7	585.5	993.5	1,097.8	28,579	0.18
1989	124.4	273.4	768.3	1,166.1	1,234.9	30,622	0.20
1990	134.5	250.6	738.6	1,123.7	1,156.3	29,950	0.19
1991	136.8	341.1	687.6	1,165.5	1,187.3	26,991	0.20
1992	140.5	262.8	666.9	1,070.2	1,070.2	28,185	0.18
1993	135.0	224.9	829.4	1,189.3	1,175.0	26,637	0.19
1994	158.0	365.7	712.5	1,236.2	1,201.6	25,374	0.19
1995	160.4	425.2	856.8	1,442.4	1,366.0	25,636	0.21
1996	141.5	383.6	707.2	1,232.3	1,147.3	23,626	0.17
1997	145.8	390.6	527.4	1,063.8	978.7	22,616	0.14
1998	141.6	347.2	510.2	999.0	920.1	22,485	0.12
1999	144.9	370.8	581.5	1,079.9	983.0	24,044	0.13
2000	147.5	378.9	472.2	987.9	868.4	25,158	0.11
A.R.G	4.7	2.9	-1.8	-0.0	-1.9	-1.1	-4.1

Source: Tables 3.8,3.10, 3.11&3.12.

3.4 Ocean Tourism Industry

Canada is one of the world's major tourism destinations, ranking ninth internationally in the number of tourist visitors during the period 1988-2000. The marine environment has been a factor that influences tourists to visit Canada's coastal communities and has contributed to the growth of eco-tourism. Ocean tourism's contribution to Canada's tourism industry is assessed in terms of the contribution of three sub-industries: recreational fisheries; coastal tourism; and the cruise ship industry. Eco-tourism, in which the ocean and coastal environment are key attractions, is captured by these sub-industries. Statistics Canada does not provide data on marine- specific tourism, with the result that there is a

reliance on estimates from survey data and studies on this aspect. These estimates, based on the interpolation of data and value judgement assumptions, provide some measure of the relative magnitude of the ocean tourism sector.

3.4.1 Recreational Fisheries

DFO conducted quintennial surveys of recreational fisheries, the findings of which are relevant to the period covered in this analysis (DFO, *Survey of Recreational Fishing in Canada*, 1985, 1990, 1995 and 2000). These surveys provide data on direct and indirect expenditures attributable to recreational fisheries on a national and provincial basis, as well as angling effort in saltwater and freshwater fisheries. The surveys indicated that saltwater angling fishing effort accounted for 7.2% in 1990, 6.4% in 1995 and 6.2% in 2000. However, average expenditure per angler was greater in saltwater than in freshwater fisheries. Interpolating on the survey results, the recreational sea fisheries contributions of direct expenditures and investments are given in Table 3.14.

Table 3.14
Marine and Coastal Tourism Estimates, 1988 – 2000

	Sport Fisheries*		**Coastal Tourism**	**Cruise Ship Tourism**		**Total Marine Tourism**
	Number of Anglers	**Direct** Expenditures and Investments**	**Revenues and Investments**	**Number of Visitors**	**Visitor*** Expenditures**	
	'000	**($ million)**		**'000**	**($ million)**	
1988	533.4	607.9	151.9	489.7	11.6	771.4
1989	534.8	641.9	160.5	475.4	12.9	815.3
1990	535.8	748.2	187.1	480.1	14.7	950.0
1991	524.2	753.9	201.9	569.2	18.5	974.3
1992	513.2	754.2	217.8	560.8	19.1	991.1
1993	502.7	760.1	235.0	632.5	22.6	1,017.7
1994	492.8	764.8	253.6	723.1	35.7	1,054.1
1995	483.4	768.3	273.7	705.5	38.0	1,080.0
1996	463.6	728.2	294.8	787.2	44.9	1,067.9
1997	441.8	682.2	318.6	946.5	53.4	1,054.2
1998	421.1	639.2	343.8	1,025.9	59.2	1,042.2
1999	401.3	599.0	365.2	1,148.4	68.8	1,033.0
2000	382.4	561.5	388.5	1,354.8	83.0	1,033.0
A.R.G	-2.8	-0.7	7.8	8.5	16.4	2.4

*Estimates are interpolated from survey data for the years 1985, 1990, 1995 and 2000.

** Direct expenditures relate to food and lodging, transportation, fishing services, fishing supplies, packages, and other; investments relate to fishing equipment, boating equipment, camping equipment, special vehicles, land-buildings, and other purchases directly related to recreational fishing.

*** Estimates based on average spending per trip (same-day visitors to Canada).

Source: DFO, *Survey of Recreational Fishing in Canada (1985, 1990, 1995,2000)*, Ottawa; Transport Canada, *Cruise Industry Statistics*. Statistics Canada, *Tourism Scope, International Travel*, Cat. No. 66-201. B.C. Government *Annual Tourism Monitor.*

These expenditures and investments increased from $607.9 million in 1988 to $768.3 million in 1995 but decreased to $561.5 million in 2000. The average growth rate for the period 1988-2000 was -0.7% a year. The number of saltwater anglers decreased from 533.4 thousand to 382.4 thousand during this period, at an average rate of decline of 2.8% a year. The decline since 1995 can be attributed in part to the resource situation in the sea fisheries, as well as to economic conditions in Canada and the United States that resulted in low growth in incomes during the 1990s.

3.4.2. Coastal Tourism

Coastal tourism is an important component of marine tourism. This type of tourism refers to the coastal experience of power cruising, sail cruising, wildlife viewing, scuba diving, kayaking and other water-based recreational activities. There are no assessments of coastal tourism on a national basis, but based on the findings of a study of marine tourism in B.C. (ARA Consulting Group (1991), *Marine Tourism in British Columbia: Opportunity Analysis*), [13] coastal tourism accounted for about 25%, and recreational fisheries for 75%, of revenues and investment in marine tourism in 1989. This ratio was applied to direct expenditures and investments reported in the DFO reports, but differences between the Atlantic and Pacific were taken into consideration to arrive at the data given for coastal tourism in Table 3.14. The data show that expenditures and investments in coastal tourism increased from $151.9 million in 1988 to $388.5 million in 2000, at an average rate of 7.8% a year.

3.4.3 Cruise Ship Tourism

Cruise ship tourism is one of the fastest growing segments of the world tourism industry. Cruise lines are internationally owned and are based mainly in the United States, but they utilize Canadian ports, particularly on the West Coast, as ports-of-call or stopover ports. For this reason, direct employment in the cruise ship industry is not provided here, but this employment is already accounted for in the shipping section (3.3.2). However, it is possible to estimate expenditures by passengers during Canadian ports of call based on average expenditures of same-day visitors to Canada during the period 1988-2000. The number of cruise ship visitors increased from 490 thousand in 1988 to 1.4 million in 2000, at an average rate of 8.5% a year; and their expenditures increased from $11.6 million to $83.0 million, at an average rate of 16.4% a year (Table 3.14).

3.4.4 The Contribution of Marine Tourism to GDP

Marine tourism expenditures increased from $771.4 million in 1988 to $1.03 billion in 2000, at an average rate of 2.4% a year (Table 3.14). The contribution of tourism to Canada's GDP indicates a value-added in the tourism sector of 40% of tourism expenditures (Canadian Tourism Commission, *Tourism Performance Highlights*). This value-added applied to direct tourism expenditures in recreational fisheries, coastal tourism, and cruise ship tourism suggests that the contribution of marine tourism to

[13] Cruise ship tourism was not included in the study.

Canada's GDP declined from 0.06% to 0.05% during the period 1988-2000 (Table 3.15). Direct employment increased from 9,990 person-years to 10,560 person-years during the period, at an average rate of 0.5% a year.

Table 3.15
Contribution of Marine Tourism to Canada's GDP, 1988-2000

	Total		Value-added	Employment*	Contribution to GDP
	Current	Constant 1992	Constant 1992	FTE	%
	($ million)				
1988	771.4	852.4	341.0	9,990	0.06
1989	815.3	863.4	345.4	10,000	0.06
1990	950.0	977.6	391.0	11,370	0.06
1991	974.3	984.0	393.6	11,440	0.06
1992	991.1	991.1	396.4	11,520	0.06
1993	1,017.7	1,005.5	402.2	11,690	0.06
1994	1,054.1	1,024.6	409.8	11,910	0.06
1995	1,080.0	1,022.0	408.8	11,880	0.06
1996	1,067.9	994.2	397.7	11,560	0.06
1997	1,054.2	969.9	389.0	11,280	0/06
1998	1,042.2	959.9	384.0	11,160	0.05
1999	1,033.0	941.1	376.4	10,940	0.05
2000	1,033.0	908.0	363.2	10,560	0.05
A.R.G	2.4	0.5	0.5	0.5	

* Based on an average expenditure of $86,000 per job created in Canada's tourism industry in 1996. It was assumed that this average remained constant in real terms during the period covered by the study.
Source: Canadian Tourism Commission, *Tourism Highlights* (Annual reports 1996 to 2000).

3.5 Marine Construction Industry

Two segments of Canada's construction and repair industry are pertinent to ocean industries:

- non-residential construction; and
- marine construction works.

The demands for non-residential construction emanate from the fishing industry (for the construction of fish processing plants), from marine oil and gas (for ocean rigs, gas plants, oil tanks and storage facilities), from tourism (for the construction of marinas and buildings such as hotels and lodges, etc.), from the shipping industry (for the construction of marine works and buildings), and from government (for the construction of ports, harbours, wharves, breakwaters). Based on capital (investment) expenditures from these industries, the expenditures in the marine construction industry increased from $487.2 million in 1988 to $2.2 billion in 2000, at an average rate of growth of 12.7% a year (Table 3.16).

Table 3.16
Investments in Construction Ocean Industries, 1988-2000

	Buildings*	Oil & Gas Rigs	Marine Works	TOTAL		Value-added**	Employ-ment***	Contribution to GDP
				Current	Constant 1992	Constant 1992	No	%
	($ million)							
1988	165.5	40.4	281.3	487.2	538.4	258.4	3,720	0.05
1989	236.8	32.7	343.2	612.7	648.8	311.4	4,540	0.05
1990	360.2	125.5	326.1	811.8	835.3	401.0	5,760	0.07
1991	314.0	567.6	311.7	1,193.3	1,205.2	578.5	8,340	0.10
1992	321.5	785.3	258.4	1,365.2	1,365.2	655.3	9,220	0.11
1993	201.9	1,113.4	184.9	1,500.2	1,482.2	711.4	9,870	0.12
1994	188.4	1,425.9	467.6	2,081.9	2,023.6	971.3	13,260	0.15
1995	205.6	1,376.9	355.3	1,937.8	1,840.3	880.8	11,480	0.13
1996	226.1	881.4	273.2	1,380.7	1,285.4	617.0	8,300	0.09
1997	213.8	824.0	259.8	1,297.6	1,193.8	573.0	7,350	0.08
1998	229.0	2,013.6	302.1	2,544.7	2,343.7	1,125.0	11,580	0.15
1999	231.9	2,651.5	332.3	3,215.7	2,929.5	1,406.2	17,400	0.19
2000	227.2	1,678.1	342.2	2,247.5	1,975.6	948.3	12,200	0.12
A.R.G	2.6	31.0	1.6	12.7	10.8	10.8	9.9	

*Investments in construction and repair for the fish products industry and from recreational fisheries. The latter were estimated from 1985, 1990 and 1995 survey data on direct investment in buildings, with the marine contribution being based on its proportion to total recreational fishing effort.
**Based on an average value-added of 48% for the construction industry.
***Based on average expenditure per worker, construction industry.
Source: Statistics Canada, *Capital Expenditures by Type of Asset*, (Annuals from 1992), Cat. No. 61-223. Statistics Canada, *Public and Private Investment in Canada*, Cat. No. 61-205.

This rate of growth was due mainly to the demands from the marine oil and gas industry: oil and gas platform construction increased from $40.4 million in 1988 to $1.7 billion in 2000, with a peak of $ 2.7 billion in 1999, at an average rate of growth of 31.0% a year. In 2000, oil and gas construction accounted for 75% of the expenditures in marine construction industries. The marine construction industry increased its contribution to Canada's GDP from 0.05% to 0.12% during the period 1988-2000; and employment in this industry increased from about 3,720 to 12,200, at an average rate of 9.9% a year.

3.6 Ocean Manufacturing and Services Industry

The ocean manufacturing and services industry consists of:

- marine communications and electronic equipment industry;
- marine technology industry; and
- professional consulting and research services[14].

[14] These sub-industries are consistent with a DFO study based on a survey of the sector in 1989 that subdivided the sector into the three sub-industries for manufacturing and three for services. The manufacturing included: (1) manufacturing other; (2) marine electronics; and (3) aquaculture and fisheries equipment. The service sector included: contracts, professional consulting services, and marine surveys. DFO (1990), *Canada's Oceanic Manufacturing and Services Sector, a Report to the National Marine Council and DFO*.

This industry is dependent on demands emanating not only from the traditional ocean industries, such as fisheries, oil and gas, shipping, and defence (governmental), but also from environmental concerns (i.e., coastal zone management, protection, and enhancement of the marine habitat). The data for the industry are not available on a land versus sea basis. As a result, it is assumed that there have been no major shifts in the ocean- versus land-related ratios in the manufacturing and services segment as reported by DFO (1990), and these have been applied throughout the time period given.

3.6.1. Marine Communication and Electronic Equipment Industry

Oceans industries exert considerable demands for marine communication and electronic equipment in terms of the need for electronic navigational aids and related devices, marine radio communication equipment, and radar and sonar equipment. The share of marine equipment in the Other Communication and Electronics Industry (CSIC 3359) of Canada is estimated based on the findings of the DFO survey (*ibid*) that indicated that 20% of the value of output came from the inland provinces and 80% from the ocean provinces in 1989. This proportion has been assumed constant for the time period covered by this study.

The value of goods produced in the marine communications and electronic industries increased from $153.8 million in 1988 to $253.3 million in 2000, at an average rate of 4.1% a year (Table 3.17). Employment declined from 1,720 to 1,510, at an average rate of 1.1 % a year during the period.

Table 3.17
The Marine Communications and Electronic Industry, 1988 – 2000

	Number of Establishments	Employment	Salaries	Manufacturing Shipments	Value-added*
		FTE	($ million)		
1988	62	1,720	50.8	153.8	86.1
1989	62	1,910	58.3	176.8	99.0
1900	62	2,100	65.9	199.7	113.6
1991	57	1,770	62.6	170.2	97.6
1992	54	1,840	68.3	167.9	97.7
1993	43	1,640	61.0	158.1	92.0
1994	35	1,440	58.1	167.0	97.2
1995	54	1,350	54.9	166.7	103.2
1996	57	1,470	58.1	183.9	113.8
1997	63	1,530	62.3	214.4	122.2
1998	64	1,490	63.9	226.6	129.7
1999	62**	1,520	66.6	243.2	143.9
2000	61**	1,510	68.4	253.3	150.0
A.R.G		-1.1	2.4	4.1	4.6

*Based on value-added to manufacturing shipments in the Other Communication and Electronic Equipment Industry, SIC 3359.
** Estimates based on average employment per establishment for the period 1995-1998.
Source: Statistics *Canada/Industry Canada Business Integrated Databases*, SIC E. 3359, Other Communication and Electronic Equipment Industries, Statistics Canada, *Manufacturing Industries of Canada: National and Provincial Areas*, Cat. No. 31-203.

3.6.2 Marine Technology Industry

The marine equipment and technology industry provides equipment and technology such as: marine robotics and sub-sea vehicles, navigation, imaging and communication equipment; marine acoustic and electronic instrumentation; oceanic sensors (chemical, physical and biological); marine applications programming and information systems; and related products and services. The DFO survey (op. cit.) found that 64% of its production came from the inland provinces and 36% from the coastal provinces. Based on this proportion, and on the value of output of this industry from the survey, the performance of this industry for the period 1988-2000 is given in Table 3.18.

Table 3.18
The Marine Technology Industry,* 1988-2000

	Number of Workers	Wages	Value of Shipment of Goods of Own Manufacture	Value-added
	FTE	($ million)		
1988	5,880	107.8	400.9	229.7
1989	6,270	120.7	416.3	236.9
1990	6,380	126.8	409.2	236.1
1991	5,720	115.8	399.2	231.5
1992	4,820	103.0	391.7	240.5
1993	4,620	103.9	402.9	248.9
1994	4,970	113.5	454.2	282.9
1995	5,000	117.9	483.3	301.6
1996	5,030	122.2	494.9	308.8
1997	5,300	131.5	532.5	323.2
1998	5,430	137.4	549.5	340.7
1999	5,510	143.6	574.5	356.2
2000	5,600	146.1	584.1	362.1
A.R.G	-0.4	2.5	3.1	3.8

* Estimates from data on Other Manufacturing Industries, SIC-E 3999.
Source: Statistics Canada, *Other Manufacturing Industries*, Cat. No. 47-250 XPB.

The value of shipment of goods of own manufacture increased from $400.9 million in 1988 to $584.1 million in 2000, at an average rate of 3.1% a year. Employment in this industry declined from 5,880 to 5,600, at an average rate of decline of 0.4%, during the period.

3.6.3 Mariculture Equipment Industry

The aquaculture equipment and supply industry experienced high rates of growth during the period 1988-2000. Growth in sales (domestic and international) from this industry increased from $95.7 million to $775.2 million during the period 1988-2000, at an average rate of 17.4% a year (Table 3.19). Employment in this industry increased from 1,240 in 1988 to 6,100 in 2000, at an average rate of 13.3% a year.

Table 3.19
Aquaculture Suppliers Industry, 1988-2000

	Employment*	Wages	Sales*	Value-added**
	FTE	($ million)		
1988	1,240	18.6	95.7	48.9
1989	1,850	28.6	140.2	70.8
1990	2,300	36.6	169.7	89.6
1991	2,630	43.2	203.6	108.5
1992	2,840	47.9	244.4	135.4
1993	3,150	54.8	293.2	165.9
1994	3,400	60.9	351.9	198.9
1995	3,830	70.6	422.3	241.8
1996	4,540	86.2	506.7	294.9
1997	4,710	92.1	541.8	303.4
1998	4,760	95.9	563.2	315.8
1999	5,550	112.0	694.0	389.1
2000	6,100	130.4	775.2	414.0
A.R.G	13.3	16.2	17.4	17.8

*Based on growth in employment and sales for 1989 and 1995. Growth rates from 1977 are based on DFO data on the value-added account for the aquaculture industry.
**Based on value-added for Other Manufacturing Industries.
Source: DFO (1992), *Suppliers to the Aquaculture Industry: An Overview*, Ottawa.
Canadian Aquaculture Industry Alliance (1998), *Canadian Aquaculture Industry Profile and Labour Market Analysis*, Ottawa.

3.6.4 The Ocean Services Industry

The services industry consists of consulting, research, professional, and marketing services. Excluded are services incidental to water transport such as pilotage, catering, insurance etc., that have been covered in Ocean Transport (Section 3.3). The DFO survey (1990) revealed that this industry had sales of $638 million in 1989 and employed nearly 10,000 people. Roughly 70% of service companies were situated in the coastal provinces. Based on this and on trends in the service sector, the value of sales from these companies was estimated to have increased from $430.9 million in 1988 to $767.7 million in 2000, at an average rate of 4.8% a year (Table 3.20). Assuming the same land-versus ocean-related distribution, employment in the ocean services industry increased from 6,750 to 8,670 during the period, at an average rate of 2.1% per year.

3.6.5 The Contribution of the Ocean Manufacturing and Services Industry to GDP

The total contribution of the ocean manufacturing and services industry to GDP is given in Table 3.21. The value of output from the ocean manufacturing and services industry increased from $1.1 billion in 1988 to $2.4 billion in 2000, at an average rate of 6.6% a year. During this period, employment also increased from 15,590 to 21,880, at an average rate of 2.8% a year. This industry increased its contribution to Canada's GDP from 0.10% in 1988 to 0.14% in 2000.

Table 3.20
The Ocean Services Industry, 1988-2000

	Employment FTE	Wages	Sales ($ million)	Value-added
1988	6,750	142.2	430.9	189.6
1989	6,790	147.3	446.6	196.6
1990	6,590	147.3	446.2	196.4
1991	6,890	158.5	480.1	211.3
1992	6,700	158.9	481.4	211.8
1993	7,050	172.3	522.1	229.7
1994	7,850	197.6	598.8	263.5
1995	7,930	205.4	622.6	274.0
1996	7,970	210.3	637.3	279.8
1997	8,300	223.5	676.8	298.0
1998	8,390	230.7	698.4	307.6
1999	8,520	241.9	732.2	322.2
2000	8,670	253.6	767.7	337.8
A.R.G	2.1	4.8	4.8	4.8

Source: DFO (1990), *Canada's Oceanic Manufacturing and Services Sector*, Ottawa.

Table 3.21
The Contribution of the Ocean Manufacturing and Services Industry, 1988-2000

	Gross Revenue Marine Communications & Electronic Equipment	Gross Revenue Marine Technology	Gross Revenue Mariculture Equipment	Gross Revenue Services	Total Revenue	Value-added, Ocean Manufacturing & Services		Employment	Contribution to GDP
						Current	Constant 1992	FTE	
	($ million)							Number	%
1988	153.8	400.9	95.7	430.9	1,081.3	554.3	612.5	15,590	0.10
1989	176.8	416.3	140.2	446.6	1,179.9	603.3	638.9	16,820	0.11
1990	199.7	409.2	169.7	446.2	1,224.8	635.7	654.1	17,370	0.11
1991	170.2	399.2	203.6	480.1	1,253.1	648.9	656.0	17,010	0.11
1992	167.9	391.7	244.4	481.4	1,285.4	685.4	685.4	16,200	0.12
1993	158.1	402.9	293.2	522.1	1,376.3	736.5	727.7	16,460	0.13
1994	167.0	452.2	351.9	598.8	1,571.9	842.5	818.9	17,660	0.13
1995	166.7	483.3	422.3	622.6	1,694.9	916.6	868.0	18,110	0.14
1996	183.9	494.9	506.7	637.3	1,822.8	997.3	928.5	19,010	0.14
1997	214.4	532.5	541.8	676.8	1,965.5	1,046.8	963.1	19,840	0.14
1998	226.6	549.5	563.2	698.4	2,037.7	1,093.8	1,007.4	20,070	0.14
1999	242.3	574.5	694.0	732.2	2,243.0	1,211.4	1,103.5	21,100	0.15
2000	253.3	584.1	775.2	767.7	2,380.3	1,263.9	1,111.0	21,880	0.14
A.R.G	4.1	3.1	17.4	4.8	6.6	6.9	5.0	2.8	

Source: Tables 3.17,3.18 and 3.19.

3.7 Government Services Industry in Oceans

Since Confederation in 1867, the federal government has had jurisdictional responsibility for the oceans, but this responsibility is also shared with the provinces by means of

federal-provincial accords. In 1979, as a result of the *Government Organization Act*, the Department of Fisheries and Oceans (DFO) became the lead federal department with respect to oceans policies and programs; and more recently, the 1997 *Oceans Act* required that this department would lead the development of a national oceans management strategy [DFO (1997), *The Role of the Federal Government in the Oceans Sector*, Ottawa]. In 1985, the *Newfoundland Accord Implementation Act*, followed in 1986 by the *Offshore Petroleum Resources Accord Implementation Act*, provided for federal-provincial sharing of regulatory responsibility for the exploration and exploitation of offshore oil and gas, as well as for revenue generation from this exploitation. These and other federal Acts pertaining to shipping and the ocean environment are indicative of the leading role the federal government plays in the oceans.

3.7.1 Federal Government Services

The major federal departments with oceans' responsibilities are the Department of Fisheries and Oceans (DFO), Transport Canada (TC), and the Department of National Defence (DND). Other departments having an interest in specific areas of oceans and coastal management include: National Resources Canada (NRCan), Environment Canada (EC), the Department of Foreign Affairs and International Trade (DFAIT), Industry Canada, the Canadian International Development Agency (CIDA), and Public Works and Government Services (PWGSC). Still other departments that are involved peripherally in marine issues include Human Resource Development Canada (HRDC); Indian and Northern Affairs Canada; the National Research Council (NRC); Pilotage Authorities; and Revenue Canada (Customs).

The three major departments of DFO, TC and DND account for 75% of the federal government's expenditures for oceans [DFO (1997) op.cit]. Based on this percentage and the budgetary expenditures of the three departments, total government expenditures for marine activities are given in Table 3.23. These expenditures increased from $7.7 billion in 1988/89 to a peak of $8.3 billion in 1991/92, but declined to $4.5 billion in 2000/01. For the period on the whole, expenditures declined at an average rate of 4.4% a year; and the person-years associated with marine activities declined from 39,450 to 27,070 at an average rate of 3.1% a year.

The declines in budgetary allocations and in person-years were due to federal government policies that reduced defence spending and controlled other government expenditures by downsizing the public service. There was also some restructuring that resulted in the Canadian Coast Guard's from Transport Canada to DFO. In 1988/89, DND accounted for 65% of the budget for marine activities, followed by Transport Canada at 23%, and DFO at 12%. In 2000/01, DND accounted for 41.3%, and DFO for 31.7% of the budget for marine activities.

Table 3.22
Federal Government Budgetary Expenditures and Person-Years (FTE), Oceans by Main Departments, 1988-2000

	DFO		TC*		DND		Other Govt Depts		Total	
	Budget	Person Years	Budget	Person Years	Budget	Person Years	Budget	Person Years	Budget	Person Years
	($ million)	FTE	($ million)	FTE	($ million)	FTE	($ million)	FTE	($ million)	FTE
1988/89	679.3	6,011	1,325.3	7,010	3,742.1	19,770	1,915.6	6,659	7,662.3	39,450
1989/90	720.1	5,994	1,324.5	6,810	3,780.1	19,110	1,941.5	6,506	7,766.2	38,420
1990/91	724.7	5,939	1,332.1	6,590	4,100.0	17,640	2,052.3	6,241	8,209.1	36,410
1991/92	760.6	6,069	1,282.7	6,680	4,148.3	18,110	2,063.9	6,371	8,255.5	37,230
1992/93	790.7	6,192	1,251.9	6,670	4,113.2	18,180	2,051.9	6,418	8,207.7	37,460
1993/94	955.8	6,010	1,310.5	6,380	3,422.6	18,730	1,896.3	6,430	7,585.2	37,550
1994/95	775.1	5,740	1,138.9	5,860	3,284.3	17,570	1,732.8	6,060	6,931.1	35,230
1995/96	896.5	5,785	1,171.9	5,930	3,149.3	16,000	1,739.3	5,985	6,957.0	33,700
1996/97	1,323.5	10,273	331.4**	540	2,915.5	17,160	1,523.4	5,817	6,093.8	33,790
1997/98	1,076.7	8,720	173.2**	280	2,769.7	14,430	1,339.9	5,360	5,359.5	28,790
1998/99	1,051.8	8,570	127.1**	210	2,477.0	14,290	1,218.6	4,880	4,874.5	27,950
1999/00	1,479.3	8,614	-	-	2,037.4	13,906	1,160.5	4,640	4,677.2	27,160
2000/01	1,429.3	8,797	-	-	1,955.2	13,863	1,116.9	4,410	4,501.4	27,070
A.R.G	6.2	3.2			-5.4	-3.0	-4.5	-3.4	-4.4	-3.1

* TC's expenditures and FTEs for the Canadian Coast Guard and for marine policy up to 1995/96.

** Expenditures for marine services, including the contribution to Marine Atlantic, a Crown Corporation for ferry services on the Atlantic Coast. For the last two years, transport marine expenditures are covered by other government Departments.

Source: *Government of Canada Estimates Part III* (Annuals), Supply and Services, Ottawa.

Table 3.23
Provincial Governments' Expenditures and Employment, Ocean Industries, 1988-2000

	Fisheries & Aquaculture Administration & Development	Marine Transportation	Oil and Gas	Total	Employment
	($ million)				FTE
1988/89	79.1	167.4	3.7	250.2	3,180
1989/90	90.1	225.5	4.0	319.6	2,750
1990/91	91.2	116.1	4.3	211.6	2,940
1991/92	76.1	95.2	4.1	175.4	2,360
1992/93	82.4	189.0	11.6	283.0	1,900
1993/94	70.5	131.0	10.0	211.5	1,290
1994/95	67.5	126.0	8.9	202.4	1,250
1995/96	60.0	122.6	9.5	192.1	1,150
1996/97	57.4	112.9	6.9	177.2	1,120
1997/98	53.5	124.9	11.2	189.9	1,120
1998/99	65.0	185.4	12.1	262.5	1,400
1999/00	77.0	124.3	8.9	210.2	1,180
2000/01	77.2	98.7	8.3	184.2	1,080
A.R.G	-0.2	-4.4	6.7	-2.6	-9.6

Source: *Provincial Government Estimates* (Annuals).

3.7.2 Provincial Governments' Ocean Services

A DFO study on the role of the provinces in oceans (1997) identified nearly 50 provincial ministries and departments that had some association with the ocean sector. However, the major provincial activities concentrated on fisheries and aquaculture, marine transportation (ferries) and offshore oil and gas[15]. As a result, the provincial budgetary expenditures given here are directly associated with these industries. During the period 1988/89 to 2000/01, total provincial expenditures fluctuated extensively but decreased from $250 million in 1988/89 to $184.2 million in 2000/01, at an average rate of 2.6 % a year. Employment decreased from 3,180 to 1,080 during this period, at an average rate of 9.6% a year (Table 3.23). In 2000, marine transportation accounted for the largest share of provincial governments' expenditures (53.6%) in comparison with 41.9% for fisheries and 3.6% for oil and gas. However, federal-provincial agreements for marine transportation and oil and gas resulted in shared financing in these two sectors.

3.7.3 The Contribution of Government Services to Canada's GDP

The federal and provincial government services contribution to Canada's GDP is given in Table 3.24.

Table 3.24
Government Services Contribution to Canada's GDP, 1988-2000

	Government Expenditures (Federal and Provincial)	Value-added*		Employment	Contribution to GDP
		(Current)	(Constant 1992)		
	($ million)			FTE	%
1988/89	7,912.5	3,703.1	4,091.9	42,630	0.69
1989/90	8,085.8	3,792.2	4,015.9	41,170	0.66
1990/91	8,420.7	3,915.6	4,029.1	39,350	0.66
1991/92	8,430.9	3,869.7	3,908.4	39,590	0.65
1992/93	8,490.7	3,863.3	3,863.3	39,360	0.64
1993/94	7,796.7	3,524.1	3,481.8	38,840	0.56
1994/95	7,133.5	3,202.9	3,113.2	36,480	0.48
1995/96	7,149.1	3,131.3	2,965.3	34,850	0.45
1996/97	6,271.0	2,740.4	2,551.3	34,910	0.38
1997/98	5,549.4	2,402.8	2,210.6	29,910	0.32
1998/99	5,137.0	2,029.6	1,869.3	29,350	0.28
1999/00	4,887.4	1,940.3	1,767.6	28,340	0.23
2000/01	4,685.6	1,813.3	1,593.8	28,150	0.20
A.R.G	-4.4	-6.0	-7.9	-3.5	

* Salaries are deducted from Government Expenditures to estimate the value-added in accordance with Statistics Canada national accounts methodology.

15 The other expenditures that are oceans-related are for tourism and the environment. However, it was not possible to identify these consistently on a cross-provincial basis, or to determine their extent and magnitude.

Government expenditures (federal and provincial) decreased from $7.9 billion in 1988 to $4.7 billion in 2000, at an average rate of 4.4% a year; and employment decreased from 42,630 to 28,150 during this period, at an average rate of 3.5% a year. The contribution of government services to GDP decreased from 0.69% in 1988 to 0.20% in 2000.

3.8 The Economic Importance of Ocean Industries 1988-2000: National

In current dollars, the value of output in the ocean sector increased from $16.6 billion in 1988 to $20.7 billion in 1995, then decreased to $17.5 billion in 1997 but grew to $22.7 billion by 2000[Table 3.25(a)]. The average rate of growth for the period on the whole was 2.6% in current terms and 0.7% in real terms ($million1992) [Table 3.25(b)]. The downturn in growth in the ocean sector from 1995 to 1997 was brought about by the fisheries resources situation that affected the fishing, marine tourism industries and ancillary industries but there were declines in marine oil and gas, and government expenditures as well.

The value added by the ocean sector increased in real terms from $8.9 billion to $11.6 billion, at an average rate of 2.2 % a year [Table 3.25(c)]. Based on the value added, the contribution of the ocean sector increased from 1.49% of GDP in 1988 to a peak of 1.56% from 1991 to 1993, then declined to a low of 1.16% in 1997 but increased to 1.48% of GDP in 2000 [Table 3.25(d)]. In 1988, the industries that contributed most to value-added in order of importance were government services, fisheries, and marine transport. In 2000, marine oil and gas, fisheries and government services were the most significant contributors.

Total employment in the ocean sector declined from 159.7 thousand in 1988 to 152.0 thousand in 2000, at an average rate of 0.4% per year, mainly as a result of declines in the fishing industry, government services and transport (Table 3.26). Employment increased in the remaining segments, led by oil and gas (a capital rather than labour intensive industry) with an average growth of 20.7% per year during the period, followed by the marine construction industry with an average growth rate of 9.9% a year, manufacturing and services, 2.8% a year, and marine tourism, 0.5% a year.

3.8.1. Structural Changes, Canada's Ocean Economy, 1988-2000

The percentage contributions of the various ocean industry segments to the value of output and employment and the changes in their relative importance for the years 1988 and 2000 are provided in Table 3.27. The table shows that the ocean sector experienced significant structural change during this period. These changes were characterised by the decline in the government and ocean transport segments of the ocean sector and the increase in the oil and gas, marine construction, manufacturing and services, marine tourism, and fisheries segments. With respect to the declining industries, the government share of output declined from 47.7% to 18.5%, and its share of employment decreased

Table 3.25
Contribution of Ocean Industry Segments to National GDP, 1988-2000

(a) Gross Value of Output of Ocean Industry Segments, Current Dollars.

	Comm. Fisheries	Oil & Gas	Ocean Transport	Tourism	Marine Const.	Mnfg & Services	Govt. Federal & Provincial	Total
	($ million)							
1988	2,879.0	249.7	3,217.2	771.4	487.2	1,081.3	7,912.5	16,598.3
1989	2,746.1	148.0	3,857.1	815.3	612.7	1,179.9	8,085.8	17,444.9
1990	2,830.9	200.5	3,911.9	950.0	811.8	1,224.8	8,420.7	18,350.6
1991	2,841.9	660.7	3,608.1	974.3	1,193.3	1,253.1	8,430.9	18,962.3
1992	2,697.6	947.4	3,328.8	991.1	1,365.2	1,285.4	8,490.7	19,106.2
1993	2,836.9	1,380.0	3,519.1	1,017.7	1,500.2	1,376.3	7,796.7	19,426.9
1994	3,179.2	1,717.5	3,463.6	1,054.1	2,081.9	1,571.9	7,133.5	20,201.7
1995	3,300.4	1,696.2	3,823.5	1,080.0	1,937.8	1,694.9	7,149.1	20,681.9
1996	3,052.1	1,247.6	3,387.6	1,067.9	1,380.7	1,822.8	6,271.0	18,229.7
1997	3,100.3	1,236.5	3,184.1	1,054.2	1,297.6	1,965.5	5,549.4	17,387.6
1998	3,281.8	2,873.7	2,968.8	1,042.2	2,544.7	2,037.7	5,137.0	19,885.9
1999	3,738.9	4,044.1	3,127.5	1,033.0	3,215.7	2,243.0	4,887.4	22,289.6
2000	4,037.2	5,265.1	3,073.1	1,033.0	2,247.5	2,380.3	4,685.6	22,721.8
A.R.G	2.8	25.4	-0.4	2.4	12.7	6.6	-4.4	2.6

Source: Tables 3.4, 3.6, 3.13,3 .15, 3.16, 3.21 and 3.24.

b) Gross Value of Output of Ocean Industry Segments, Constant 1992 Dollars.

	Comm. Fisheries	Oil & Gas	Ocean Transport	Tourism	Marine Const.	Mnfg & Services	Govt. Federal & Provincial	Total
	($ million 1992)							
1988	3,181.3	275.9	3,555.0	852.4	538.4	1,194.8	8,743.3	18,341.1
1989	2,908.1	156.7	4,084.7	863.4	648.9	1,249.5	8,562.9	18,474.2
1990	2,913.0	206.3	4,025.3	977.6	835.3	1,260.3	8,664.9	18,882.7
1991	2,870.3	667.3	3,644.2	984.0	1,205.2	1,265.6	8,515.2	19,151.8
1992	2,697.6	947.4	3,328.8	991.0	1,365.2	1,285.4	8,490.7	19,106.1
1993	2,802.9	1,363.4	3,476.9	1,005.5	1,482.2	1,359.8	7,703.1	19,193.8
1994	3,090.2	1,669.4	3,366.6	1,024.6	2,023.6	1,527.9	6,933.8	19,636.1
1995	3,125.4	1,606.3	3,620.8	1,022.8	1,835.1	1,605.1	6,770.1	19,585.8
1996	2,841.5	1,161.5	3,153.8	994.2	1,285.4	1,697.0	5,838.3	16,971.7
1997	2,852.3	1,137.6	2,929.4	969.9	1,193.8	1,808.3	5,105.4	15,996.7
1998	3,022.5	2,646.7	2,734.3	959.8	2,343.7	1,876.7	4,731.2	18,314.9
1999	3,406.1	3,684.2	2,849.1	941.1	2,929.5	2,043.3	4,452.4	20,305.7
2000	3,548.7	4,628.0	2,701.3	908.0	1,975.5	2,092.3	4,118.6	19,972.4
A.R.G	0.9	23.5	-2.3	0.5	10.8	4.7	-6.3	0.7

Source: Tables 3.4, 3.6, 3.13, 3.15, 3.16, 3.21 and 3.24.

Table 3.25 (continued)

(c) Value-added to GDP by Ocean Industry Segment, Constant 1992 Dollars.

	Comm. Fisheries	Oil & Gas	Ocean Transport	Tourism	Marine Const.	Mnfg & Services	Govt. Federal & Provincial	Total
	($ million 1992)							
1988	2,300.2	169.2	1,097.8	341.0	258.4	612.5	4,091.9	8,871.0
1989	2,015.5	108.0	1,234.9	345.4	311.4	638.9	4,015.9	8,670.0
1990	2,082.0	156.0	1,156.3	391.0	401.0	654.1	4,029.1	8,869.5
1991	2,051.5	577.2	1,187.3	393.6	578.5	656.0	3,908.4	9,352.5
1992	1,946.8	781.9	1,070.2	396.4	655.3	685.4	3,863.3	9,399.3
1993	1,976.8	1,147.0	1,175.0	402.2	711.4	727.7	3,481.8	9,621.9
1994	2,162.1	1,407.1	1,201.6	409.8	971.3	818.9	3,113.2	10,084.0
1995	2,276.3	1,403.5	1,366.0	408.8	883.3	868.0	2,965.3	10,171.2
1996	1,967.2	983.9	1,147.3	397.7	617.0	928.5	2,551.3	8,592.9
1997	1,982.5	999.4	978.7	387.9	573.0	963.1	2,210.6	8,095.2
1998	2,138.6	2,249.8	920.1	384.0	1,125.0	1,007.4	1,869.3	9,694.2
1999	2,491.9	3,155.2	983.0	376.4	1,406.2	1,103.5	1,767.6	11,283.8
2000	2,668.7	4,149.6	868.4	363.2	948.3	1,111.0	1,593.8	11,703.0
A.R.G	0.9	26.7	-1.9	0.5	10.8	5.0	-7.9	2.2

Source: Tables 3.4, 3.6, 3.13, 3.15, 3.16, 3.21 and 3.24.

(d) The Contribution of each Ocean Industry Segment to the National GDP, 1988-2000

	Comm. Fisheries	Oil & Gas	Ocean Transport	Tourism	Marine Const.	Mnfg & Services	Govt. Federal & Provincial	Total
	%							
1988	.39	.03	.18	.06	.04	.10	.69	1.49
1989	.33	.02	.20	.06	.05	.11	.66	1.43
1990	.34	.03	.19	.06	.07	.11	.66	1.46
1991	.34	.10	.20	.06	.10	.11	.65	1.56
1992	.32	.13	.18	.06	.11	.12	.64	1.56
1993	.32	.18	.19	.06	.12	.13	.56	1.56
1994	.33	.21	.19	.06	.15	.13	.48	1.55
1995	.34	.21	.21	.06	.13	.14	.45	1.54
1996	.29	.15	.17	.06	.09	.14	.38	1.28
1997	.28	.14	.14	.06	.08	.14	.32	1.16
1998	.30	.31	.12	.05	.15	.14	.28	1.35
1999	.33	.42	.13	.05	.19	.15	.23	1.50
2000	.33	.53	.11	.05	.12	.14	.20	1.48

Table 3.26
National Ocean Industry Employment by Segment, 1988-2000

	Comm. Fisheries	Oil &Gas	Ocean Transport	Tourism	Marine Const.	Mnfg & Services	Govt. Federal & Provincial	Total
	FTE							
1988	58,733	495	28,579	9,990	3,720	15,590	42,630	159,737
1989	64,741	252	30,622	10,000	4,540	16,820	41,170	168,145
1990	61,059	361	29,950	11,370	5,760	17,370	39,350	165,200
1991	58,312	1,060	26,991	11,440	8,340	17,010	39,590	162,743
1992	58,676	1,406	27,915	11,520	9,220	16,200	39,360	164,297
1993	56,501	2,050	26,637	11,690	9,870	16,460	38,840	162,048
1994	55,263	2,369	25,374	11,910	13,260	17,660	36,480	162,316
1995	55,095	2,129	25,636	11,880	11,480	18,110	34,850	159,180
1996	49,964	1,386	23,626	11,560	8,300	19,010	34,910	147,763
1997	48,491	1,681	22,616	11,280	7,350	19,840	29,910	141,168
1998	47,320	3,540	22,485	11,160	11,580	20,070	29,350	145,505
1999	48,617	4,490	24,044	10,940	17,400	21,100	28,340	154,931
2000	48,110	5,910	25,158	10,560	12,200	21,880	28,150	151,968
A.R.G	-1.7	20.7	-1.1	0.5	9.9	2.8	-3.5	-0.4

Source: Tables 3.4, 3.6, 3.13, 3.15, 3.16, 3.21 and 3.24.

Table 3.27
Gross Output and Employment by Ocean Industry Sector, 1988 and 2000

	1988		2000	
	Value of Output	Employment (FTE)	Value of Output	Employment (FTE)
	%			
Commercial Fishing	17.3	36.8	17.8	31.7
Offshore Oil and Gas	1.5	0.3	23.2	3.9
Ocean Transportation	19.4	17.9	13.5	16.6
Ocean Tourism	4.7	6.2	4.5	6.9
Marine Construction	2.9	2.3	9.9	8.0
Ocean Manufacturing & Services	6.5	9.8	10.5	14.4
Government Services	47.7	26.7	20.6	18.5
Total	100.0	100.0	100.0	100.0

from 26.7% to 18.5%. The value of output from ocean transport declined from 19.4% to 13.5%, and employment declined from 17.9% to 16.6%.

With respect to the growth segments, oil and gas increased its contribution to the value of output from 1.5 % to 23.2% and to employment from 0.3% to 3.9% during the period. The value of output from manufacturing and services increased from 6.5% to 10.5% and employment from 9.8% to 14.4%. In marine construction, the value of output increased from 2.9% to 9.9% and from 2.3% to 8.0% for employment. In ocean tourism, the value

of output decreased from 4.7% to 4.5% but employment increased from 6.2% to 6.9%. The fishing industry increased its contribution to the value of output from 17.3% to 17.8% but decreased its contribution to employment from 36.8% to 31.7%.

It is evident from Tables 3.25, 3.26 and 3.27 that the decline in the overall contribution of the ocean sector to GDP since 1991 was the result of declines in government services, the fishing industry, and marine transportation. The growth rates in the remaining ocean industry segments were positive for the period 1988-2000. These were largely influenced by the oil and gas industry, which impacted favourably on marine construction, manufacturing and services, and ocean transport, particularly shipbuilding. The contribution of the ocean resource industries of fisheries, oil and gas and tourism resources to the ocean sector is significant. This contribution increased from 23.5% of the value of output in 1998 to 46.2% in 2000 while employment remained at 43.3% for both years. The resource industries combined grew at an average rate of 8.1% in current terms and 6.2% in real terms during this period. Excluding the government, the private sector component increased from 52.3% to 79.4% of the value of output from the ocean sector and the share of employment from 73.4% to 81.5%.

Table 3.28 summarizes the changes in the output and contribution to GDP for the private sector for the period 1988-2000.

Table 3.28
Private Enterprise Ocean Industries, 1988 - 2000

	Gross Value of Output		Value-added	Employment	Contribution to GDP
	($ million)	($ million 1992)	($ million 1992)	Number	%
1988	8,685.8	9,597.8	4,779.1	117,107	0.81
1989	9,359.1	9,911.2	4,654.1	126,885	0.77
1990	9,929.9	10,217.8	4,840.4	125,863	0.80
1991	10,531.4	10,636.6	5,444.1	123,153	0.91
1992	10,615.5	10,615.5	5,536.0	124,937	0.92
1993	11,630.2	11,490.7	6,140.1	123,208	1.00
1994	13,068.2	12,702.3	6,970.8	125,836	1.07
1995	13,532.8	12,815.7	7,205.9	124,503	1.09
1996	11,958.7	11,133.5	6,041.6	112,773	0.90
1997	11,838.2	10,891.3	5,885.7	112,419	0.84
1998	14,748.9	13,583.8	7,824.9	115,730	1.08
1999	17,477.5	15,922.1	9,537.6	126,263	1.27
2000	18,047.4	15,863.6	10,017.1	121,280	1.27
A.R.G	6.1	4.2	6.2	2.9	

Source: Tables 3.25 a, b and c.

The value of output from the private sector component increased in real terms from $9.6 billion to $15.9 billion during this period at an average rate of 4.2% per year, and its contribution to GDP increased from 0.81% to 1.27%. The increased contribution to GDP indicates that, excluding government, the ocean sector was a dynamic growth sector in the Canadian economy during the period 1988-2000 with the resource industries leading

the way. The historically dominant position of government in the ocean sector has tended to disguise this situation.

In Table 3.29, the ocean sector (despite its "horizontal" nature involving several other industry sectors) is placed in a national context by comparing its performance with other resource sectors in the economy. For greater compatibility with the other resources sectors, the ocean sector is represented by the resource industries, which unlike agriculture, forestry and mining, oil and gas includes secondary processing.

Table 3.29
The Contribution of the Ocean and other Resource Sectors to Canada's GDP

	Agriculture	Forestry	Mining, Oil and Gas	Ocean Resource Industries	Canada's GDP
	($ million 1992)				
1988	8,827.2	5,359.9	22,646.8	2,810.4	594,892.9
1989	9,887.0	5,126.9	21,500.9	2,468.9	607,565.3
1990	11,383.2	4,533.1	21,481.1	2,629.0	609,232.4
1991	11,442.6	3,959.0	22,406.9	3,022.3	600,005.8
1992	10,259.6	4,029.9	23,053.8	3,125.1	604,279.0
1993	11,126.7	4,242.7	23,941.5	3,526.0	618,427.2
1994	11,390.7	4,441.2	25,065.7	3,979.0	645,953.9
1995	11,681.4	4,644.4	25,933.4	4,088.6	663,082.9
1996	12,318.7	4,281.9	26,244.2	3,348.8	673,506.4
1997	11,738.2	4,316.0	27,062.1	3,370.9	701,220.1
1998	12,390.0	4,221.0	26,590.0	4,772.4	721,876.1
1999	13,401.0	4,608.0	25,700.0	6,044.9	753,047.1
2000	13,305.6	4,695.1	27,752.7	7,089.4	786,896.1
A.R.G	3.4	-1.1	1.7	7.7	2.3

Source: Statistics Canada, *Provincial Gross Domestic Product by Industry, 1984-1999*, Cat No. 15-203.

The table shows that the ocean resource sector's contribution to Canada's GDP increased at an average rate of 7.7 % a year during the period 1988-2000 in comparison with 3.4% a year for agriculture, and 1.7% a year for mining, oil and gas. Forestry declined at an average rate of 1.1%. The rate of growth for the Canadian economy was 2.3% during this period.

4.0 THE PERFORMANCE OF OCEAN INDUSTRIES 1988-2000: ATLANTIC AND QUEBEC REGION

The major issues relating to the ocean industries of Canada's Atlantic Coast, which has the country's second longest coastline (56,000 km) and a continental shelf area that extends beyond the 200-nautical-mile limit, involve problems with fisheries development, oil and gas exploration, and marine transportation. The fishing industry has been the most problematic oceans industry, and this has exerted a significant impact on the Atlantic Coast regional economy, consisting of the Atlantic Provinces and Quebec.

4.1 The Fishing Industry

During the period 1988-2000, fisheries landings in the Atlantic regional economy declined from 1.4 million tonnes, valued at $1,016 million, to 872.5 thousand tonnes, valued at $1.8 million. The volume of landings declined at an average rate of 3.8% a year but the value of landings increased at an average rate of 4.7% a year because of increased prices (Table 4.1).

Table 4.1
The Primary Fishing Industry, Atlantic Region, 1988-2000

	Primary			Mariculture			Total		
	Volume of Landings ('000 tonnes)	Value of Landings ($ million)	Employ-ment (FTE)	Volume '000 tonnes	Value $ million	Employ-ment (FTE)	Volume ('000 tonnes)	Value $ million	Employ-ment (FTE)
1988	1,385.1	1,016.4	28,290	9.1	53.0	690	1,394.2	1,069.4	28,980
1989	1,317.9	959.8	27,501	12.6	66.8	920	1,330.5	1,026.6	28,421
1990	1,342.4	953.9	26,601	16.2	98.9	1,160	1,358.6	1,025.8	27,761
1991	1,192.4	1,013.8	25,315	17.9	106.5	1,150	1,210.3	1,120.3	26,465
1992	1,022.8	984.2	26,428	19.1	108.0	1,220	1,039.5	1,092.2	27,648
1993	874.0	959.3	26,076	19.8	117.0	1,280	893.8	1,076.3	27,356
1994	719.4	1,127.8	25,215	24.4	123.3	1,400	743.8	1,250.8	26,615
1995	638.4	1,359.2	24,529	28.9	145.8	1,840	667.3	1,505.0	26,369
1996	686.4	1,148.9	21,481	32.4	158.5	2,040	718.8	1,307.4	23,521
1997	735.3	1,214.6	18,847	35.9	176.6	2,250	771.2	1,391.2	21,097
1998	785.4	1,294.4	19,005	38.2	170.6	2,390	823.6	1,465.0	21,395
1999	792.4	1,571.0	18,353	51.8	230.5	3,130	844.2	1,801.5	21,483
2000	872.5	1,789.5	18,500	66.0	280.8	3,530	938.5	2,070.3	22,030
A.R.G	-3.8	4.7	-3.5	16.5	13.9	13.6	-3.3	5.5	-2.2

Source: DFO Statistical Services web Site.

Mariculture production, however, increased substantially from 9,100 tonnes, valued at $53 million, to 66,000 tonnes, valued at $280.8 million, during the period, at average rates of growth of 16.5% in volume and 13.9% in value.

The decrease in sea fish landings was attributable to declines in both groundfish and pelagic species (i.e., finfish species) owing to reduced Total Allowable Catches (TAC's) as well as to the collapse of the northern cod fishery and its subsequent closure in 1992. This closure, imposed as an initial two-year moratorium on the fishery that has since been extended, affected over 25,000 fishermen and plant workers in Newfoundland and brought about a virtual re-alignment of the whole Atlantic region fishing industry. As a result, employment (FTE) in the industry in the Atlantic region declined from 45,400 fishermen and plant workers in 1988 to about 39,530 in 2000, at an average growth rate of 1.1% a year (Table 4.2).

Table 4.2
The Fishing Industry, Atlantic Region, 1988-2000

	Primary Fisheries & Mariculture		Secondary Manufacturing				Total		
	No. of Fisher-men*	Value of Landings	No. of Establish-ments	No. of Workers	Value of Shipment of Goods from Manufacture	Value-added	Employ-ment	Value of Output **	Value-added
	FTE	($ million)		FTE	($ million)		FTE	($ million)	
1988	28,980	1,069.4	394	16,421	2,007.7	712.3	45,401	2,060.7	1,376.5
1989	28,421	1,026.6	410	22,757	1,871.7	652.6	51,178	1,938.5	1,445.1
1990	27,552	1,025.8	403	20,209	1,862.6	673.3	47,761	1,961.5	1,608.2
1991	26,465	1,120.3	381	18,795	1,886.7	669.8	45,260	1,993.2	1,635.5
1992	27,648	1,092.2	372	18,324	1,818.6	614.0	45,972	1,926.6	1,554.3
1993	27,356	1,076.3	375	15,935	1,874.7	578.8	43,291	1,991.7	1,529.7
1994	26,615	1,250.8	358	15,686	2,037.4	565.6	42,301	2,160.7	1,429.8
1995	26,369	1,505.0	344	15,312	2,180.6	671.6	41,681	2,326.4	1,736.5
1996	23,521	1,307.4	329	15,100	2,006.4	605.9	38,621	2,164.9	1,491.0
1997	21,097	1,391.2	337	15,332	2,152.0	568.8	36,429	2,328.6	1,562.0
1998	21,395	1,465.0	334	15,861	2,367.9	673.4	37,256	2,538.5	1,745.8
1999	21,483	1,801.5	301	16,612	2,606.1	769.7	38,095	2,836.6	2,050.6
2000	22,030	2,070.3	N.A	17,500	2,988.0	896.4	39,530	3,268.8	2,378.0
A.R.G	-2.2	5.5	-1.6	0.5	3.3	1.9	-1.1	3.9	4.4

* Includes mariculture workers.

** Includes the value of output from mariculture and the value of shipment of goods of own manufacture.

Source: DFO Statistical Services Web site; Statistics Canada, *Manufacturing Industries of Canada: National and Provincial Areas*, Cat. No. 31-203.

The fish processing industry was severely affected by the resource situation. The value of production declined from $2.0 billion in 1988 to $1.8 billion in 1992, but increased to $3.0 billion in 2000 mainly as a result of increased prices for fish products. Employment in the secondary manufacturing industry declined from a high of 22,757 FTEs in 1989 to a low of 15,100 in 1996, but increased to 17,500 FTEs for the period 1988-2000, at an average rate of 0.5% a year. Despite the changes in primary fisheries and in secondary manufacturing, the value of output from the Atlantic region's fishing industry increased from $2.1 billion in 1988 to $3.3 billion in 2000, at an average rate of 3.8% a year.

The state of the industry during the period 1988-2000 necessitated massive intervention, and in 1990 the government introduced a $584 million, five-year Atlantic Fisheries Adjustment Program (AFAP) to help rebuild declining fish stocks and restructure the industry. Only $222 million was spent under this program when, with the closure of the northern cod fishery in 1992, the government undertook to assist the most seriously affected fishermen and plant workers through a Northern Cod Adjustment and Recovery Program (NCARP). This included a $484 million income replacement program--a program for restructuring the industry by means of retraining and the retirement of licences--and a $14.3 million vessel support program to assist vessel owners in maintaining and storing their vessels and gear during the moratorium period (DFO, 1994-95 Estimates). In 1993, NCARP was replaced by The Atlantic Groundfish Strategy (TAGS), a five-year $1.9 billion program that was in turn replaced by the Canadian Fisheries Adjustment and Restructuring Program (CFAR) in 1998, a $730 million program with east and west coast components.

4.2 The Offshore Oil and Gas Industry

Statistics on this industry have already been provided in Section 3.2.

In the offshore oil and gas industry, extensive oil and gas exploration activity has been taking place on George's Bank and Sable Island off Nova Scotia, and on the Grand Banks off Newfoundland. Crude oil recoverable reserves from these areas are estimated to be about one billion barrels, or about 14% of Canada's crude oil reserves (Energy Statistics Handbook, *op.cit.*). Most of the expenditures were on facilities for exploration and development activities. Commercial production began in 1992 from a rig located in the Chasset-Penule oil field, 256 km south of Halifax, and in 1997 production commenced from Hibernia off Newfoundland.

The development problems associated with oil and gas activity stem from the fact that sea-based production costs are higher than land-based ones, due to technological requirements and the need to establish an adequate onshore infrastructure. Thus, the major obstacle to development is the market price for crude petroleum. Indications are that the world market price of $15US a barrel ($95US per cubic metre) and higher would be required for viable economic operations. World oil prices have been relatively low since the oil crisis of the early 1980s and have fluctuated between $15US a barrel to $28US a barrel during the period 1990-2000.

4.3 The Ocean Transport Industry

Revenues from the ocean transport industry, consisting of the ports, domestic shipping, ship and boat building, and repair sub-industries, decreased from $1.8 billion in 1988 to $1.3 billion in 2000, at an average rate of 2.5 % a year for the period. Employment in this

sector declined from 13,635 to 12,227 during the period, at an average rate of 0.9% a year (Table 4.3). These changes were the result of a decline in the ship and boat building and repair industry because of decreased demands for vessels from the fishing, domestic shipping and defence (government) industries. Ship and boat building revenues decreased from $1.3 billion to $426.7 million during the period, at an average rate of 9.0% a year. There was growth in the other ocean transport industries during the period. Domestic shipping revenues increased from $389.2 million to $705.1 million at an average rate of 4.9% a year, and port revenues increased from $127.3 million to $179.3 million, at an average rate of 2.9% a year.

Table 4.3
The Marine Transport Industry, Atlantic Region, 1988-2000

	Ports			Marine Shipping		Ship & Boat Building		Total Industry		
	Cargoes Handled	Employ-ment*	Port Revenues	Employ-ment**	Revenues	Employ-ment	Revenues	Employ-ment	Revenues	Value-added
	(million tonnes)	FTE	$ million	FTE	$ million	FTE	$ million	FTE	$ million	
1988	80.1	1,380	127.3	4,205	389.2	8,050	1,260.2	13,635	1,776.7	603.9
1989	79.3	1,310	125.7	5,192	576.1	8,864	1,514.6	15,366	2,216.4	775.3
1990	78.3	1,285	127.3	6,285	695.5	7,775	1,505.0	15,343	2,327.8	754.1
1991	77.5	1,290	142.8	5,745	673.2	6,945	1,260.2	13,980	2,076.2	722.8
1992	71.9	1,060	122.1	5,671	653.4	7,484	1,064.6	14,215	1,840.1	687.9
1993	79.2	1,180	157.6	5,189	615.2	5,659	1,053.3	12,028	1,826.1	824.2
1994	84.5	1,015	146.5	4,850	613.4	5,557	971.7	11,422	1,731.6	777.2
1995	93.6	985	160.1	6.089	839.5	5,349	1,057.6	12,423	2,057.2	947.7
1996	91.1	990	157.0	6,480	751.2	4,759	810.4	12,229	1,718.6	764.3
1997	103.6	1,020	170.9	5,932	803.4	4,155	529.9	11,107	1,504.2	565.3
1998	101.1	1,030	171.8	6,214	726.6	4,199	504.5	11,443	1,402.9	522.3
1999	108.2	1,140	173.5	6,704	697.1	4,377	549.4	12,221	1,420.0	541.5
2000	110.7	1,140	179.3	7,457	705.1	3,630	426.7	12,227	1,311.1	428.7
A.R.G	2.7	-1.6	2.9	4.8	4.9	-6.6	-9.0	-0.9	-2.5	-2.9

*Based on the proportion of ocean cargoes handled in the Atlantic region to total ocean cargoes.
**Vessel crews, warehousing, services and management.
Source: Statistics Canada, *Shipping in Canada* (Annuals), Cat. No. 54-205; Transport Canada, *Transportation in Canada, Annual Reports.*

4.4 Ocean Tourism Industry

The ocean tourism industry experienced growth during the period 1988-2000. Total direct expenditures in ocean tourism increased from $195.2 million to $281.2 million, at an average rate of growth of 3.0% a year (Table 4.4). Direct employment increased from 2,520 to 2,880 during the period, at an average rate of 1.1% a year. The growth in the ocean tourism industry was due to growth in coastal and cruise ship tourism. Direct revenues and investment from coastal tourism increased from $38.2 million to $167.3 million, at an average rate of 12.3% a year. The number of cruise ship visitors increased from 165.4 thousand to 300.8 thousand, at an average rate of 5% a year, and their

expenditures increased from $3.9 million to $18.4 million during the period, at an average rate of 12.9% a year. The recreational fisheries declined, particularly after 1995. The number of anglers decreased from 154.2 thousand in 1988 to 139.2 thousand in 2000, at an average rate of decline of 0.9% a year, and direct expenditures and investments decreased from $153.1 million to $95.5 million, at an average rate of decline of 4.2% a year.

Table 4.4
Ocean Tourism Industry, Atlantic Region, 1988-2000

	Saltwater Sport Fisheries		Coastal Tourism	Cruise Ship Tourism		Total			Employ-ment
	Anglers	Direct Expenditures & Investments	Revenues & Investment	Visitors	Expendi-tures	Anglers and Cruise Visitors	Expendi-tures	Value-added	FTE*
	'000	($ million)		'000	($ million)	'000	($ million)		
1988	154.2	153.1	38.2	165.4	3.9	348.1	195.2	78.1	2,520
1989	156.7	168.6	42.2	142.2	3.9	326.2	214.7	85.9	2,630
1990	158.9	187.0	46.8	91.8	2.8	278.4	236.6	94.6	2,830
1991	165.0	198.2	51.7	145.3	4.7	362.6	254.6	101.8	2,990
1992	170.6	204.5	64.9	111.6	3.8	312.2	273.2	109.3	3,180
1993	176.3	216.6	76.8	112.6	4.0	320.3	297.4	119.0	3,420
1994	181.4	227.4	85.0	131.7	6.5	328.6	318.9	127.6	3,600
1995	186.1	234.5	91.3	108.8	6.5	321.0	332.3	132.9	3,650
1996	180.9	210.3	100.4	85.7	6.0	266.6	316.7	126.7	3,430
1997	171.2	177.2	111.8	130.0	7.3	301.2	296.3	118.5	3,180
1998	162.5	146.3	133.3	152.8	8.8	315.3	288.4	115.4	3,080
1999	154.3	118.8	149.5	200.8	12.0	355.1	280.3	112.1	2,970
2000	139.2	95.5	167.3	300.8	18.4	440.0	281.2	112.5	2,880
A.R.G	-0.9	-4.2	12.3	5.0	12.9	2.0	3.0	3.0	1.1

*This was the residual between total direct employment (see Table 3.15) and direct employment in B.C. (see Table 5.4).
Source: DFO, *Survey of Recreational Fishing in Canada (1985, 1990, 1995,2000)*. Ottawa; Transport Canada, *Cruise Industry Statistics*.

4.5 The Marine Construction Industry

Developments in the offshore oil and gas industry were responsible for investments in the marine construction industry increasing from $358.2 million in 1988 to $2.0 billion in 2000, at an average rate of growth of 14.4% a year (Table 4.5). Employment in the industry during the period increased from 2,700 to 10,600 with a peak of 15,800, at an average rate of 11.4% year. Investments in oil and gas rigs and equipment increased from $40.4 million to $1.7 billion, at an average rate of growth of 31% a year. These investments were associated with the construction of the Hibernia oil production platform in Newfoundland from the early 1990's up to 1996 and subsequently with the construction of offshore oil and gas facilities in Nova Scotia. Investments in marine works, which are primarily government-funded, increased from $214.4 million to $261.3million, at an average rate of 1.6% a year.

Investments in business construction, which was largely dependent on the fishing industry (commercial and recreational), declined from $103.4 million to $75.3 million, at an average rate of 2.6% a year.

Table 4.5
Investments in Construction, Ocean Industries, Atlantic Region, 1988-2000

	Building Construction	Oil & Gas Rigs	Marine Works	Total	Value-added	Employ-ment
	($ million)					FTE
1988	103.4	40.4	214.4	358.2	171.9	2,700
1989	177.3	32.7	181.3	391.3	187.8	2,810
1990	297.4	125.5	232.8	655.7	314.7	4,540
1991	256.2	567.6	247.8	1,071.6	514.4	7,400
1992	237.8	785.3	188.2	1,211.3	581.4	8,090
1993	66.1	1,113.4	126.7	1,306.2	626.9	8,800
1994	48.2	1,425.9	377.8	1,851.9	888.9	11,540
1995	60.9	1,376.9	236.9	1,674.7	801.5	9,640
1996	68.1	881.4	156.0	1,105.5	530.6	6,390
1997	65.6	824.0	204.9	1,094.5	525.3	5,810
1998	71.9	2,013.6	226.6	2,312.1	1,109.8	9,960
1999	76.2	2,651.5	255.4	2,983.1	1,431.9	15,800
2000	75.3	1,678.1	261.3	2,014.7	967.1	10,600
A.R.G	-2.6	31.0	1.6	14.4	14.4	11.4

Source: Statistics Canada, *Capital Expenditures by Type of Asset*, 1992-1996, Cat. No. 61-223; *Public and Private Investment in Canada*, Cat. No. 61-205.

4.6 Ocean Manufacturing and Services

The value of output from the ocean manufacturing and services industry increased from $477.6 million in 1988 to $1.1 billion in 2000, at an average rate of 7.0% a year (Table 4.6). Employment in this industry increased from 7,090 to 10,300 at an average rate of 3.1% a year. Marine services constituted the largest segment of this industry, accounting for 30% of the value of output in 2000. The value of output in marine services increased from $205.6 million to $328.8 million, at an average rate of 3.9% per year. Growth was greatest for the aquaculture supplies segment, which increased from $48.8 million to $292.6 million, at an average rate of growth of 14.9% a year for the period. Marine technology increased from $130.9 million to $304.1 million, at an average rate of 7.0% a year; and marine communications and electronics increased from $92.3 million to $186.3 million, at an average rate of growth of 5.8% per year.

Table 4.6
The Ocean Manufacturing and Services Industry,
Atlantic Region, 1988-2000

	Marine Communication & Electronics	Marine Technology	Aquaculture Supplies	Marine Services	Total		
					Employ-ment	Value of Output	Value-added
	($ million)				FTE	($ million)	
1988	92.3	130.9	48.8	205.6	7,090	477.6	245.3
1989	113.6	132.8	55.4	210.2	7,570	512.0	262.1
1990	145.0	158.1	62.9	198.5	8,230	564.5	294.2
1991	123.5	165.5	71.3	221.0	7,960	581.3	311.1
1992	125.5	127.1	85.6	210.1	7,480	548.3	305.2
1993	118.7	151.8	102.7	238.0	8,080	611.2	364.9
1994	128.9	211.2	123.3	301.4	9,280	764.8	413.0
1995	118.8	224.1	147.8	311.3	9,190	802.0	442.8
1996	135.9	234.9	177.5	311.3	9,210	859.6	462.0
1997	158.8	269.4	189.8	298.2	9,320	916.2	493.7
1998	168.1	278.0	191.7	304.8	9,370	942.6	510.3
1999	179.7	298.8	268.4	316.6	9,920	1,063.5	580.9
2000	186.3	304.1	292.6	328.8	10,300	1,111.8	598.2
A.R.G	5.8	7.0	14.9	3.9	3.1	7.0	7.4

Source: Statistics Canada, *Manufacturing Industries of Canada: National and Provincial Areas*, Cat. No. 31-203. Canadian Aquaculture Industry Alliance (1998), *Canadian Aquaculture Industry Profile and labour Market Analysis*, Ottawa.

4.7 Government Services Industry

Federal and provincial government expenditures in oceans in the Atlantic region increased from $6.0 billion in 1988/89 to a peak of $6.4 billion in 1991/92, but declined to $3.5 billion in 2000/01. The rate of decline for the period on the whole averaged 4.4% a year (Table 4.7). Government employees declined from 32,030 to 21,180 during this period, at an average rate of 3.4% a year. The federal government accounted for about 98% of the combined government expenditures during the period and for about 94% of the employment in the region.

Federal and provincial government expenditures decreased considerably during the period. The expenditures from the federal government declined from $5.8 billion in 1988/89 to $3.4 billion in 2000/01, at an average rate of 4.5% a year. This decline occurred, despite government financial intervention in fisheries via assistance programs, as a result of the federal government's policy for expenditure control and public service restructuring. The expenditures of the provincial governments declined from $166.1 million to $130.9 million, at an average rate of 2% a year. This decline was the result of reduced expenditures for fisheries and for marine transportation.

Table 4.7
Federal and Provincial Governments' Expenditures and Person Years, Atlantic Region, 1988-2000

	Federal Government*		Provincial Governments		Total Federal & Provincial		
	Employ-ment	Expenditures	Employ-ment	Expenditures	Employ-ment	Expenditures	Value-added
	FTE	($ million)	FTE	($ million)	FTE	($ million)	
1988/89	29,510	5,784.9	2,520	166.1	32,030	5,951.0	2,785.1
1989/90	29,140	5,881.6	1,680	181.0	30,820	6,062.6	2,843.4
1990/91	28,220	6,197.9	1,630	188.4	29,850	6,386.3	2,969.6
1991/92	28,780	6,232.8	1,210	156.8	29,990	6,389.6	2,932.8
1992/93	28,070	6,155.7	1,270	173.7	29,340	6,329.4	2,879.9
1993/94	28,040	5,688.9	960	133.4	29,000	5,822.3	2,631.7
1994/95	26,320	5,198.3	960	137.4	27,280	5,335.7	2,395.7
1995/96	25,200	5,217.7	870	129.9	26,070	5,347.6	2,342.3
1996/97	25,240	4,570.3	840	115.2	26,080	4,685.5	2,047.5
1997/98	21,460	4,019.2	870	123.1	22,330	4,142.3	1,793.6
1998/99	20,720	3,655.9	920	131.6	21,640	3,787.5	1,496.4
1999/00	20,360	3,507.9	930	135.7	21,290	3,643.6	1,446.5
2000/01	20,300	3,376.1	880	130.9	21,180	3,507.0	1,353.7
A.R.G	-3.1	-4.5	-8.8	-2.0	-3.4	-4.4	-6.0

*The distribution of federal expenditures and employment by region was based on the proportion of federal government administrative remuneration and employment by region.
Source: Statistics Canada, *Public Sector Employment and Remuneration*, Cat. No. 72-209.

4.8 The Contribution of the Ocean Sector to the Atlantic Regional Economy

The Atlantic regional economy consists of the economies of the Atlantic Provinces and Quebec. The gross value of output from the ocean sector is shown in Tables 4.8(a) and (b). The gross value of output from the ocean sector increased from $11.1 billion in 1988 to $16.8 billion in 2000, at an average rate of growth of 3.5% a year in current terms and 1.6% in real terms. This growth was brought about by growth in the oil and gas industry, which averaged 25.4% a year in current terms, marine construction, 14.4% a year, manufacturing and services 7.0% a year, fisheries 3.9% a year and tourism 3% a year. The government sub-sector declined at an average rate of 4.4% a year, and ocean transport declined at an average rate of 2.5% a year.

The value added by the ocean sector increased in real terms from $6.0 billion to $9.3 billion at an average rate of 3.7% (Table 4.8(c)). Based on the value added, the contribution of the ocean sector to the Atlantic regional economy increased from 3.47% of the regional GDP in 1988 to of 4.40 % in 2000, with a low of 3.00% in 1997 (Table 4.8(d). Employment in the ocean sector in the Atlantic Coast regional economy declined from 103.9 thousand in 1988 to 102.6 thousand in 2000, with a low of 89.9 thousand in 1997, at an average rate of 0.1% a year for the period (Table 4.9). Employment decreased in the fishing, ocean transport (mainly ship building and repair), and government services but increased in oil and gas, marine construction, manufacturing and services, and tourism.

Table 4.8
Contribution of the Ocean Industry Sector to GDP, Atlantic Region, 1988-1998

(a) Gross Value of Output of Ocean Industry Segments, Current Dollars, Atlantic Region

	Comm. Fisheries	Oil & Gas	Ocean Transport	Tourism	Marine Const.	Mnfg & Services	Govt. Federal & Provincial	Total
	($ million)							
1988	2,060.7	249.7	1,776.7	195.2	358.2	477.6	5,951.0	11,069.1
1989	1,938.5	148.0	2,216.4	214.7	391.3	512.0	6,062.6	11,483.5
1990	1,961.5	200.5	2,327.8	236.6	655.7	564.5	6,386.3	12,332.9
1991	1,993.2	660.7	2,076.2	254.6	1,071.6	581.3	6,389.6	13,027.2
1992	1,926.6	947.4	1,840.1	273.2	1,211.3	548.3	6,329.4	13,076.3
1993	1,991.7	1,380.0	1,826.1	297.4	1,306.2	611.2	5,822.3	13,234.9
1994	2,160.7	1,717.5	1,731.6	318.9	1,851.9	764.8	5,335.7	13,881.1
1995	2,326.4	1,696.2	2,057.2	332.3	1,674.7	802.0	5,347.6	14,236.4
1996	2,164.9	1,247.6	1,718.6	316.7	1,105.5	859.6	4,685.5	12,098.4
1997	2,328.6	1,236.5	1,504.2	296.3	1,094.5	916.2	4,142.3	11,518.6
1998	2,538.5	2,873.7	1,402.9	288.4	2,312.1	942.6	3,787.5	14,145.7
1999	2,836.6	4,044.1	1,420.0	280.3	2,983.1	1,063.5	3,643.6	16,271.2
2000	3,268.8	5,265.1	1,311.1	281.2	2,014.7	1,111.8	3,507.0	16,759.7
A.R.G	3.8	25.4	-2.5	3.0	14.4	7.0	-4.4	3.5

Source: Tables 4.2, 4.3, 4.4, 4.5, 4.6 and 4.7.

(b) Gross Value of Output of Ocean Industry Segments, Constant Dollars, Atlantic Region

	Comm. Fisheries	Oil & Gas	Ocean Transport	Tourism	Marine Const.	Mnfg & Services	Govt. Federal & Provincial	Total
	($ million 1992)							
1988	2,277.1	275.9	1,963.2	215.7	395.8	527.7	6,575.9	12,231.3
1989	2,052.9	156.7	2,347.2	227.4	414.4	542.2	6,420.3	12,161.1
1990	2,018.4	206.3	2,395.3	243.5	674.7	580.9	6,571.5	12,690.6
1991	2,013.1	667.3	2,097.0	257.1	1,082.3	587.1	6,453.5	13,157.4
1992	1,926.6	947.4	1,840.1	273.2	1,211.3	548.3	6,329.4	13,076.3
1993	1,967.8	1,363.4	1,804.2	293.8	1,290.5	603.9	5,752.4	13,076.0
1994	2,100.2	1,669.4	1,683.1	310.0	1,800.0	743.4	5,186.3	13,492.4
1995	2,203.1	1,606.3	1,948.2	314.7	1,585.9	759.5	5,064.2	13,481.9
1996	2,015.5	1,161.5	1,600.0	294.8	1,029.2	800.3	4,362.2	11,263.5
1997	2,142.3	1,137.6	1,383.9	272.6	1,006.9	842.9	3,810.9	10,597.1
1998	2,338.0	2,646.7	1,292.1	265.6	2,129.4	868.1	3,488.3	13,028.2
1999	2,584.1	3,684.2	1,293.6	255.4	2,717.6	968.8	3,319.3	14,823.0
2000	2,873.3	4,628.0	1,152.5	247.2	1,770.9	977.3	3,082.6	14,731.8
A.R.G	2.0	23.5	-4.4	1.1	12.5	5.1	-6.3	1.6

Source: Derived from Table 4.8(a).

Table 4.8 (continued)

(c) Value-added to GDP by Ocean Industry Segment, Constant Dollars, Atlantic Region

	Comm. Fisheries	Oil & Gas	Ocean Transport	Tourism	Marine Const.	Mnfg & Services	Govt. Federal & Provincial	Total
	($ million 1992)							
1988	1,521.0	169.2	667.3	86.3	190.0	271.1	3,077.5	5,982.4
1989	1,530.4	108.0	821.0	91.0	198.9	277.6	3,011.2	6,038.0
1990	1,654.8	156.0	776.0	97.3	323.8	302.7	3,055.7	6,366.3
1991	1,651.9	577.2	730.0	102.8	519.5	314.2	2,962.1	6,857.7
1992	1,554.3	781.9	687.9	109.3	578.6	305.2	2,879.9	6,987.1
1993	1,511.3	1,147.0	814.3	117.6	645.6	360.5	2,600.1	7,196.4
1994	1,389.8	1,407.1	755.4	124.0	864.0	401.4	2,328.6	7,270.3
1995	1,644.5	1,403.5	897.5	125.9	762.1	419.3	2,218.2	7,471.0
1996	1,388.1	983.9	711.6	118.0	490.4	430.1	1,906.2	6,028.3
1997	1,437.0	999.4	520.1	109.0	483.3	454.2	1,650.1	5,653.1
1998	1,607.8	2,249.8	481.1	106.3	1,022.2	470.0	1,378.2	7,315.4
1999	1,868.1	3,155.2	493.3	102.1	1,304.5	529.2	1,317.8	8,770.2
2000	2,098.1	4,149.6	376.8	98.9	850.1	525.8	1,189.9	9,289.2
A.R.G	2.7	26.7	-4.8	1.1	12.5	5.5	-7.9	3.7

Source: Tables 4.2, 4.3, 4.4, 4.5, 4.6 and 4.7.

(d) Percent Contribution of each Ocean Industry Segment to GDP, Atlantic Region

	Comm. Fisheries	Oil & Gas	Ocean Transport	Tourism	Marine Const.	Mnfg & Services	Govt. Federal & Provincial	Total
	%							
1988	0.88	0.10	0.39	0.05	0.11	0.16	1.78	3.47
1989	0.88	0.06	0.47	0.05	0.11	0.16	1.73	3.46
1990	0.95	0.09	0.44	0.06	0.18	0.17	1.75	3.64
1991	0.97	0.34	0.43	0.06	0.30	0.18	1.73	4.01
1992	0.91	0.51	0.40	0.06	0.34	0.18	1.68	4.07
1993	0.86	0.66	0.47	0.07	0.36	0.21	1.49	4.12
1994	0.77	0.78	0.42	0.07	0.48	0.22	1.29	4.03
1995	0.90	0.77	0.49	0.07	0.42	0.23	1.21	4.09
1996	0.76	0.54	0.39	0.06	0.27	0.23	1.04	3.29
1997	0.76	0.53	0.28	0.06	0.25	0.24	0.88	3.00
1998	0.83	1.16	0.25	0.05	0.41	0.24	0.71	3.78
1999	0.92	1.56	0.24	0.05	0.64	0.26	0.65	4.32
2000	0.98	1.97	0.18	0.05	0.40	0.25	0.57	4.40

Table 4.9
Ocean Industry Employment, Atlantic Region, 1988-2000

	Comm. Fisheries	Oil & Gas	Ocean Transport	Tourism	Marine Const.	Mnfg & Services	Govt. Federal & Provincial	Total
	FTE							
1988	45,401	495	13,635	2,520	2,700	7,090	32,030	103,871
1989	51,178	252	15,366	2,630	2,810	7,570	30,820	110,626
1990	47,761	361	15,343	2,830	4,540	8,230	29,850	108,915
1991	45,260	1,060	13,980	2,990	7,400	7,960	29,990	108,640
1992	45,972	1,406	14,215	3,180	8,090	7,480	29,340	109,683
1993	43,291	2,050	12,028	3,420	8,800	8,080	29,000	106,669
1994	42,301	2,369	11,422	3,600	11,540	9,280	27,280	107,792
1995	41,681	2,129	12,423	3,650	9,640	9,190	26,070	104,783
1996	38,621	1,386	12,229	3,430	6,390	9,210	26,080	97,346
1997	36,429	1,681	11,107	3,180	5,810	9,320	22,330	89,857
1998	37,256	3,540	11,443	3,080	9,960	9,370	21,640	96,289
1999	38,095	4,490	12,221	2,970	15,800	9,920	21,290	104,786
2000	39,530	5,910	12,227	2,880	10,600	10,300	21,180	102,627
A.R.G	-1.2	20.7	-0.9	1.1	11.4	3.1	-3.4	-0.1

Source: Tables 4.2, 4.3, 4.4, 4.5, 4.6 and 4.7.

The percentage contributions of the various ocean industry segments to the value of output and employment and the changes in their relative importance in the ocean sector for the years 1988 and 2000 are provided in Table 4.10.

Table 4.10
Gross Output and Employment by Ocean Industry Sector, 1988 & 2000
Atlantic Region

	1988		2000	
	Value of Output	Employment (FTE)	Value of Output	Employment (FTE)
	%			
Commercial Fishing	18.6	42.9	19.6	38.5
Offshore Oil and Gas	2.3	0.5	31.4	5.8
Ocean Transportation	16.1	12.9	7.7	11.9
Ocean Tourism	1.8	2.4	1.7	2.8
Marine Construction	3.2	2.5	12.0	10.3
Ocean Manufacturing & Services	4.3	8.5	6.7	10.0
Government Services	53.7	30.3	20.9	20.7
Total	100.0	100.0	100.0	100.0

Source: Derived from Tables 4.7(a) and 4.9.

Table 4.10 shows that the ocean sector experienced significant structural changes during this period characterized by declines in the government and ocean transport segments and increases in the oil and gas, marine construction, marine tourism, and in manufacturing

and services segments. The government share of output from the ocean sector declined from 53.7% to 20.9% and its share of employment decreased from 30.3% to 20.7% during the period. The value of output from ocean transport declined from 16.1% to 7.7% and employment declined from 12.9% to 11.9%.

With respect to the growth segments, oil and gas increased its contribution to the value of output from about 2.3% to 31.4% and its contribution to employment from less than 1% to 5.8% during the period. Marine construction increased from 3.2% to 12.0% of the value of output and from 2.5% to 10.3% for employment. Manufacturing and services increased from 4.3% to 6.7% of the value of output and from 8.5% to 10.0% for employment. Marine tourism decreased from 1.8% to 1.7% of the value of output but increased from 2.4% to 2.8% for employment. The fishing industry increased from 18.6% to 19.6% of the value of output but employment declined from 42.9% to 38.5% during the period.

Table 4.11 summarizes the changes in the output and contribution to GDP for the private sector i.e., excluding government, in the Atlantic Coast regional economy.

Table 4.11
Private Enterprise Ocean Industries, Atlantic Region, 1988 - 2000

	Gross Value of Output		Value-added	Contribution to GDP	Employment
	($ million)	($ million 1992)	($ million 1992)	%	FTE
1988	5,118.1	5,655.4	2,904.9	1.69	71,841
1989	5,420.9	5,740.8	3,026.8	1.73	79,806
1990	5,946.6	6,119.1	3,310.6	1.89	79,065
1991	6,637.6	6,703.9	3,895.6	2.28	79,750
1992	6,746.9	6,746.9	4,107.2	2.39	80,343
1993	7,412.6	7,323.6	4,596.3	2.63	77,669
1994	8,545.4	8,306.1	4,941.8	2.74	80,512
1995	8,888.8	8,417.7	5,252.7	2.87	78,713
1996	7,412.9	6,901.3	4,122.1	2.25	71,266
1997	7,376.3	6,786.2	4,003.0	2.12	67,527
1998	10,358.2	9,539.9	5,937.2	2.95	74,649
1999	12,627.6	11,503.7	7,452.4	3.56	83,496
2000	13,252.7	11,649.1	8,099.3	3.81	81,447
A.R.G	7.9	6.0	8.5		1.0

Source: Tables 4.8(a), (b), (c) and 4.9.

The value of output from the private sector component increased in current terms from $5.1 billion to $13.3 billion during the period 1988-2000, at an average rate of 7.9% per year and 6% a year in real terms. Its contribution to the region's GDP increased from 1.69% in 1988 to 3.81% in 2000. Employment in the private sector increased from 71.8 thousand to 81.4 thousand during this period, at an average rate of 1.0% a year. The increased contribution to GDP indicates that the private sector component of the ocean industries was a major growth sector in the Atlantic regional economy during the period. This economy grew at an average rate of 1.6% a year in comparison with 8.6% for the marine resource industries and 6% for the private sector.

5.0 THE PERFORMANCE OF OCEAN INDUSTRIES 1988-2000: PACIFIC REGION

Canada's Pacific Coast has a coastline of 27,000 km and more than 6,500 coastal islands. It has a relatively small continental shelf and EEZ area in comparison with the Atlantic and Arctic Coasts. However, the area is well endowed with living marine resources and with oil and gas and mineral resources. These latter resources have not been exploited because of federal and provincial governments' moratoria since 1972 banning exploitation in order to prevent crude oil tankers from travelling through Dixon Entrance, Hecate Strait and Queen Charlotte Sound en route to Valdez, Alaska. The most important marine industries on the Pacific Coast are therefore fisheries, marine transportation, and tourism. Their major problems are economic and environmental in nature, since the Pacific region is an area where the land/sea interface is at its most crucial in terms of economic impact.

5.1 Commercial Fishing Industry

The Pacific fishery is characterised by degrees of over capacity in harvesting leading to extensive pressure on fish stocks, particularly in the traditional salmon, halibut and herring roe fisheries. Capital investment in the fleet increased continuously after limited entry programs were first introduced in 1969, and in the late 1980s fishermen in British Columbia (B.C.) used high earnings levels to invest heavily in the fleet which was already over capitalised. As a result, this left them very vulnerable when the global markets changed dramatically as prices and gross returns in the salmon fishery dropped in the 1990's. This led in 1996 to government intervention in the industry through the implementation of the Pacific Salmon Revitalisation Program (the Mifflin Plan) that aimed, by means of an $80 million buy-back program, to reduce the number of vessels in the salmon fleet by 50%. These factors caused severe repercussions in the British Columbia fishing and seafood industry in the period under review.

Landings in capture fisheries declined from 265.9 thousand tonnes, valued at $533.6 million in 1988, to 143.4 thousand tonnes, valued at $344.6 million in 2000, with a peak of 314.7 thousand tonnes, valued at $314.7 million in 1994 (Table 5.1). For the period on the whole, landings declined at an average rate of 5.1% a year in volume and 3.6% a year in value. The number of fishermen (FTE) declined from 9,000 in 1988 to 2,500 in 2000, at an average rate of 10.8% a year.

Mariculture production expanded steadily from 10.4 thousand tonnes, valued at $42.2 million in 1988 to 55.7 thousand tonnes, valued at $292.4 million in 2000, at average rates of growth of 13.9 % a year in volume and 16.1 % in value. As a result of this growth and the

Table 5.1
The Primary Fishing Industry, Pacific Region, 1988-2000

	Primary			Mariculture			Total		
	Volume of Landings	Value of Landings	No. of Fishermen	Volume	Value	Employ-ment	Volume	Value	Employ-ment
	'000 tonnes	($ million)	FTE	'000 tonnes	($ million)	FTE	'000 tonnes	($ million)	FTE
1988	265.9	533.6	9,157	10.4	42.2	550	276.3	575.8	9,707
1989	287.2	453.6	9,083	15.7	63.2	860	302.9	516.8	9,943
1990	303.5	479.8	8,838	17.7	84.9	990	321.2	564.7	9,828
1991	316.6	380.2	8,286	24.1	139.0	1,510	340.7	519.2	9,796
1992	299.4	416.1	8,004	24.6	136.4	1,550	324.0	552.5	9,554
1993	290.9	464.8	8,451	27.2	155.4	1,700	318.1	620.2	10,151
1994	314.7	571.6	8,243	25.7	155.7	1,770	340.4	727.3	10,013
1995	222.3	423.7	8,092	33.6	180.3	2,110	255.9	604.0	10,202
1996	240.7	428.1	6,091	34.3	171.1	2,200	275.0	599.2	8,291
1997	250.8	406.5	6,046	46.2	184.6	2,980	297.0	591.1	9,026
1998	217.1	290.9	3,993	48.3	237.9	3,160	265.4	528.8	7,153
1999	217.8	316.6	3,890	55.9	302.7	3,490	273.7	619.3	7,380
2000	143.4	344.6	2,500*	55.7	292.4	3,420	199.1	637.0	5,920
A.R.G	-5.1	-3.6	-10.8	13.9	16.1	15.2	-2.7	0.8	-4.1

* Estimates.
Source: DFO Statistical Services web Site.

Table 5.2
The Fishing Industry, Pacific Region, 1988-2000

	Primary Fisheries & Mariculture		Secondary Manufacturing				Total		
	No. of Fisher-men*	Value of Landings	No. of Establish-ments	No. of Workers	Value of Shipment of Goods of Own Manufacture	Value-added	Employ-ment	Value of Output**	Value-added
	FTE	($ million)		FTE	($ million)		FTE	($ million)	
1988	9,707	575.8	59	3,625	776.1	252.2	13,332	818.3	705.1
1989	9,943	516.8	62	3,620	744.4	218.1	13,563	807.6	458.1
1990	9,626	564.7	57	3,470	784.5	250.1	13,298	869.4	415.0
1991	9,796	519.2	53	3,256	709.7	246.6	13,052	848.7	395.7
1992	9,554	552.5	54	3,150	634.6	186.4	12,704	771.0	392.5
1993	10,151	620.2	53	3,059	689.8	239.1	13,210	845.2	471.1
1994	10,013	727.3	51	2,949	862.8	354.0	12,962	1,018.5	794.6
1995	10,202	604.0	56	3,212	793.7	244.5	13,414	974.0	667.2
1996	8,291	599.2	68	3,052	716.1	216.3	11,343	887.2	622.0
1997	9,026	591.1	70	3,036	587.1	170.7	12,062	771.7	592.9
1998	7,153	528.8	62	2,911	505.4	189.1	10,064	743.3	576.2
1999	7,380	619.3	61	3,142	599.6	244.4	10,522	902.3	684.8
2000	5,920	637.0	55***	2,660	476.0	190.4	8,580	768.4	649.1
A.R.G	-4.1	0.8		-2.6	-4.1	-2.3	-3.7	-0.5	-0.7

*Includes mariculture workers.
** Includes the value of output from mariculture and value of shipment of goods of own manufacture.
*** Estimate.
Source: DFO Statistical Services web Site; Statistics Canada, *Manufacturing Industries of Canada: National and Provincial Areas*, Cat. No. 31-203.

decline in the capture fisheries, mariculture increased from 7.3% of the value of primary fish production in 1988 to 45.9% in 2000.

In the secondary manufacturing sector of the fishing industry the value of products produced declined from $776.1 million in 1988 to $476.0 million in 2000, at an average rate of 4.1% a year (Table 5.2). Employment (FTE) also declined from 3,625 persons in 1988 to 2,660 in 2000, at an average rate of 2.6% a year.

The Pacific coast fishing industry was a lagging sector during the period 1988-2000. The total value of output, which had increased from $818.3 million in 1988 to $1.0 billion in 1994, decreased to $768.4 million in 2000, at an average rate of decline of 0.5% a year for the period on the whole. Employment in the industry declined from 13,300 to under 8,600 FTE during this period, at an average rate of 3.7% per year.

5.2 The Offshore Oil Industry

The latest moratorium on offshore oil and gas exploration was imposed by the B.C. government in 1989 shortly after the Exxon Valdez ran aground off the Alaskan coast, spilling 11 million gallons of crude oil into Prince William Sound. However, there is considerable developmental potential for oil and gas: existing estimates of oil potential range from 300 to 500 million barrels in the offshore (Science Council of British Columbia, 1993, p. 105). The Geological Survey of Canada has estimated the coastal region near Prince Rupert could hold 10 billion barrels of oil and 43 trillion cubic feet of gas--more than 10 times the reserves contained in Newfoundland's Hibernia oil project. As well, Pacific Coast offshore reserves can be exploited more economically due to shallow water conditions in the Queen Charlotte basin.

5.3 The Ocean Transport Industry

The ocean transport industry is an important one in the Pacific region. The total tonnage of cargo loaded and unloaded increased from 92.1 million tonnes in 1988 to 97 million tonnes in 2000, with a peak of 99 million tonnes in 1997 (Table 5.3). Port revenues increased from $138.4 million to $194.4 million during the period 1988-2000, at an average rate of growth of 2.8% a year. The domestic marine shipping industry increased from $1.0 billion in 1988 to $1.2 billion in 2000, with a peak of $1.3 billion in 1994/95. Employment in this industry decreased from 11,000 to 7,400 during the period, at an average rate of 3.2% a year. Revenues from the ship and boat building and repair industries combined increased from $238.9 million in 1988 to $392.4 million in 2000, at an average rate of 4.1 % a year. As a result of changes in these three industries, revenues from the ocean transportation sector increased from $1.4 billion to $1.8 billion during the period, at an average rate of growth of 1.7% a year. Employment in the industry, however, decreased from 15,000 to 12,900, at an average rate of 1.2% a year.

Table 5.3
The Marine Transport Industry, Pacific Region, 1988-2000

	Ports			Marine Shipping		Ship & Boat Building		Total Industry		
	Cargoes Handled	Employ-ment	Port Revenues	Employ-ment	Revenues	Employ-ment	Revenues	Employ-Ment	Revenues	Value-added
	(million tonnes)	FTE	($ million)	FTE	($ million)	FTE	($ million)	FTE	($ million)	
1988	92.1	1,490	138.4	10,979	1,063.2	2,475	238.9	14,944	1,440.5	389.6
1989	84.9	1,370	136.7	11,241	1,223.3	2,645	280.7	15,256	1,640.7	390.8
1990	85.5	1,365	138.5	10,750	1,189.3	2,490	256.3	14,605	1,584.1	369.6
1991	91.7	1,300	151.0	9,825	1,151.1	1,886	229.8	13,011	1,531.9	452.7
1992	85.2	1,200	145.0	10,014	1,122.1	2,486	221.6	13,700	1,488.7	382.3
1993	82.1	1,130	156.3	11,028	1,307.2	2,451	229.5	14,609	1,693.0	365.1
1994	91.0	1,185	179.7	10,695	1,352.5	2,072	199.8	13,952	1,732.0	459.0
1995	93.6	1,095	186.5	9,811	1,352.5	2,307	227.3	13,213	1,766.3	494.7
1996	93.6	1,140	190.9	8,073	1,246.6	2,184	231.5	11,397	1,669.0	468.0
1997	98.9	1,070	188.9	7,554	1,200.0	2,885	291.0	11,509	1,679.9	498.4
1998	91.9	1,060	186.6	6,669	1,063.1	3,333	316.2	11,040	1,565.9	476.7
1999	94.5	1,080	193.5	6,929	1,137.3	3,814	376.7	11,823	1,707.5	537.5
2000	97.0	1,120	194.4	7,441	1,175.2	4,370	392.4	12,931	1,762.0	559.2
A.R.G	0.4	-2.4	2.8	-3.2	0.8	4.4	4.1	-1.2	1.7	3.0

Source: Statistics Canada, *Shipping in Canada* (Annuals), Cat. No. 54-205; Transport Canada, *Transportation in Canada, Annual Reports.*

5.4 The Ocean Tourism Industry

The Pacific region's ocean tourism industry's expenditures increased from $576.2 million in 1988 to $751.8 million in 2000, at an average rate of growth of 2.2% a year (Table 5.4). This growth was brought about by growth in coastal tourism and cruise ship visitors. In coastal tourism, revenues and investment increased from $113.7 million to $221.2 million during the period, at an average rate of growth of 5.5% a year. The number of cruise ship visitors increased from 324.3 thousand to 1.1 million, at an average rate of growth of 9.8% a year and their expenditures increased at an average rate of 17.7% a year. In the saltwater sport fisheries, direct expenditures increased from $454.8 million to $466 million, at an average rate of growth of 0.2% a year, and the number of anglers declined from 379.2 thousand to 243.2 thousand, at an average rate of 3.7% a year.

Table 5.4
The Ocean Tourism Industry, Pacific Region, 1988-2000

	Saltwater Sport Fisheries		Coastal Tourism*	Cruise Ship Tourism		Total			Employment
	Anglers	Direct Expenditures & Investments	Revenues & Investment	Visitors	Expenditures	Anglers and Cruise visitors	Expenditures	Value-added	FTE
	'000	($ million)		'000	($ million)	'000	($ million)		
1988	379.2	454.8	113.7	324.3	7.7	703.5	576.2	230.5	7,470
1989	378.1	473.3	118.3	333.2	9.0	711.3	600.6	240.2	7,370
1990	376.9	561.2	140.3	388.3	11.9	765.2	713.4	285.4	8,540
1991	359.2	555.7	150.2	423.9	13.8	783.1	719.7	287.9	8,450
1992	342.6	549.7	152.9	449.2	15.2	791.8	717.8	287.1	8,340
1993	326.4	543.5	158.2	519.9	18.6	846.3	720.3	288.1	8,270
1994	311.3	537.4	168.6	591.4	29.2	902.7	735.2	294.1	8,310
1995	297.2	533.8	182.4	596.7	31.5	893.9	747.7	299.1	8,230
1996	282.7	517.9	194.4	701.5	38.9	984.2	751.2	300.5	8,130
1997	270.6	505.5	206.3	816.5	46.1	995.4	757.9	303.2	8,100
1998	258.6	492.9	210.5	873.1	50.4	1,020.6	753.8	301.5	8,080
1999	247.0	480.2	215.7	947.6	56.8	1,194.6	752.7	301.1	7,970
2000	243.2	466.0	221.2	1,054.0	64.6	1,297.2	751.8	300.7	7,680
	-3.7	0.2	5.5	9.8	17.7	5.1	2.2	2.2	2.3

* This is based on 25% of the recreational fisheries direct expenditures and investment as reported by ARA *Marine* for the period up to 1991 and on the growth rate thereafter of tourism contribution to the GDP of B.C. from the *Tourism Monitor*. *Tourism in British Columbia: Opportunity Analysis*, Exhibit 2.5 (1991)
Source: DFO, *Survey of Recreational Fishing in Canada (1985, 1990, 1995, 2000)*, Ottawa; Transport Canada, *Cruise Industry Statistics*.

Table 5.5
Investments in Construction, Ocean Industries, Pacific Region, 1988-2000

	Building Construction	Marine Works	Total		
			Investments	Value-added	Employment
	($ million)				FTE
1988	62.1	66.9	129.0	61.9	1,020
1989	59.5	161.9	221.4	106.3	1,730
1999	62.8	93.3	156.1	74.9	1,220
1991	57.8	63.9	121.7	58.4	940
1992	83.7	70.2	153.9	76.7	1,130
1993	135.8	58.2	194.0	66.6	1,070
1994	140.2	89.8	230.0	110.4	1,720
1995	144.7	118.4	263.1	127.9	1,840
1996	158.0	117.2	275.2	132.1	1,910
1997	148.2	54.9	203.1	97.5	1,540
1998	157.1	75.5	232.6	111.7	1,620
1999	155.7	76.9	232.6	111.6	1,600
2000	151.9	80.9	232.8	111.7	1,600
A.R.G	7.4	1.6	4.9	4.9	3.7

Source: Statistics Canada, *Capital Expenditures by Type of Asset*, 1992-1996, Cat. No. 61-223; *Public and Private Investment in Canada*, Cat. No. 61-205.

5.5 The Marine Construction Industry

Investments in the marine construction industry on the Pacific Coast fluctuated during the period 1988-2000. These investments increased from $129 million in 1988 to $232.8 million in 2000,with a peak of $275.2 million in 1996, at an average rate of 4.9% a year (Table 5.5). Employment in this industry increased from 1,000 to 1,600, at an average rate of growth of 3.7% a year. The changes in investments and employment were due to increases in building construction and in marine works during the period. Investments in building construction increased from $62.1 million to $151.9 million, at an average rate of 7.4% a year; and in marine works from $66.9 million to $80.9 million, at an average rate of 1.6% a year.

5.6 Ocean Manufacturing and Services

The value of output from the ocean manufacturing and services industry on the Pacific Coast increased from $603.7 million in 1988 to $1.3 billion in 2000, at an average rate of growth of 6.1% a year; and employment in this industry increased from 8,500 to 11,600 workers, at an average rate of growth of 2.6% a year (Table 5.6).

Table 5.6
The Ocean Manufacturing and Services Industry, Pacific Region, 1988-2000

	Marine Communications and Electronics	Marine Technology	Aquaculture Supplies	Marine Services	Total		
					Employ-ment	Value of Output	Value-added
	($ million)				FTE	($ million)	
1988	61.5	270.0	46.9	225.3	8,500	603.7	309.0
1989	63.2	283.5	84.8	236.4	9,250	667.9	341.2
1990	54.7	251.2	106.8	2476	9,140	660.3	341.5
1991	46.7	233.7	132.3	259.1	9,050	671.8	337.8
1992	42.4	264.6	158.8	271.3	8,720	737.1	380.2
1993	39.4	251.1	190.5	284.1	8,380	765.1	371.6
1994	38.1	243.0	228.6	297.4	8,380	807.1	429.5
1995	47.9	259.2	274.5	311.3	8,920	892.9	472.8
1996	48.0	260.0	329.2	326.0	9,800	963.2	535.3
1997	55.6	263.1	346.5	378.6	10,520	1,049.3	553.1
1998	58.5	271.5	371.5	393.6	10,700	1,095.1	583.5
1999	62.6	275.7	425.6	415.6	11,180	1,179.5	630.5
2000	67.0	280.0	482.6	438.9	11,580	1,268.5	665.7
A.R.G	0.7	0.3	19.4	5.6	2.6	6.1	6.4

Source: Statistics Canada, *Manufacturing Industries of Canada: National and Provincial Areas*, Cat. No. 31-203; Canadian Aquaculture Industry Alliance (1998), *Canadian Aquaculture Industry Profile and labour Market Analysis,* Ottawa.

This expansion was due to the aquaculture supplies and marine services segments. The aquaculture supplies segment experienced extensive growth, averaging 19.4% a year, and

the marine services expanded at a rate of growth averaging 5.6% for the period. The marine technology and marine communications and electronic segments were relatively stable during the period, with rates of growth of 0.7% and 0.3% a year respectively.

5.7 Government Services Industry

Federal and provincial governments' expenditures in the Pacific region (including the Yukon and Northwest Territories) decreased from $2.0 billion in 1988/89 to $1.2 billion in 2000/01, at an average rate of 4.2% a year (Table 5.7). Government employment in the region declined from 10,600 to 6,970 during this period, at an average rate of 3.5 % a year.

Table 5.7
Federal and Provincial Governments' Expenditures and Person Years, Pacific Region, 1988-2000

	Federal Government*		Provincial Government		Total Federal & Provincial		
	Employ-ment.	Expenditures	Employ-ment	Expenditures **	Employment (Person-Years)	Expenditures	Value-added
	FTE	($ million)	FTE	($ million)	FTE	($ million)	
1988/89	9,940	1,877.4	660	84.1	10,600	1,961.5	918.0
1989/90	9,280	1,884.6	1,070	138.6	10,350	2,023.2	948.8
1990/91	8,190	2,011.2	1,310	23.2	9,500	2,034.4	946.0
1991/92	8,450	2,022.7	1,150	18.6	9,600	2,041.3	936.9
1992/93	9,390	2,052.0	630	109.3	10,020	2,161.3	983.4
1993/94	9,510	1,896.3	330	78.1	9,840	1,974.4	892.4
1994/95	8,910	1,732.8	290	64.3	9,200	1,797.1	807.2
1995/96	8,500	1,739.2	280	62.3	8,780	1,801.5	789.0
1996/97	8,550	1,523.5	280	62.0	8,830	1,585.5	691.2
1997/98	7,330	1,340.3	250	66.8	7,580	1,407.1	609.2
1998/99	7,230	1,218.6	480	130.9	7,710	1,349.5	533.2
1999/00	6,800	1,169.3	250	74.5	7,050	1,243.8	493.8
2000/01	6,770	1,125.3	200	53.3	6,970	1,178.6	459.6
A.R.G	-3.2	-4.3	-9.9	-3.8	-3.5	-4.2	-5.8

*Includes expenditures for the Yukon and N.W.T.

** Expenditures for fisheries, the contribution to B.C ferry Corporation and for ferry maintenance. Fluctuations in the expenditures were due to changes in the B.C. government's contribution to its ferry services.

Source: Statistics Canada, *Public Sector Employment and Remuneration*, Cat. No. 72-209.

The B.C. provincial government's expenditures for fisheries management and marine transportation fluctuated extensively during the period, primarily because government contributions to the operations of the B.C. ferries vary from year to year depending on the costs and revenue situation of the ferry services. Expenditures, however, decreased from $84.1 million in 1988 to $53.3 million in 2000, at an average rate of 3.8% a year. In 1998, there was a significant increase in provincial government expenditures as a result of the creation of a Ministry of Fisheries.

5.8 The Contribution of the Ocean Sector to the Pacific Regional Economy

In current dollars, the value of output in ocean sector increased from $5.5 billion in 1988 to $6.0 billion in 2000, with a peak of $6.4 billion in 1995, at an average rate of growth of only 0.6% a year for the period [(Table 5.8(a)]. However, in real terms (constant 1992 dollars) the value of output declined at an average rate of 1.3% per year for the period [(Table 5.8(b)]. The poor growth rate for the ocean sector was due to declines and negative real growth rates in government (6.2% a year), fisheries (2.4% a year) and marine transport (0.2% a year). All the other ocean industry segments experienced positive growth during the period led by manufacturing and services (4.3% a year), marine construction (3.0% a year) and tourism (0.3% a year).

The value added by the ocean sector declined in real terms from $2.9 billion to $2.4 billion at an average rate of decline of 1.5% [(Table 5.8(c)]. Based on the value added, the contribution of the ocean sector to the Pacific Region economy decreased from 4.21% in 1988 to 2.52% in 2000 [(Table 5.8(d)]. The government sector decreased its contribution to the regional GDP from 1.48% to .42% and fisheries from 1.14 % to .60% during the period. All the other ocean sectors decreased their contributions to the regional GDP except for manufacturing and services.

Overall employment in the ocean sector declined from 55,900 in 1988 to 49,300 in 2000, at an average rate of decline of 1.0% a year (Table 5.9). Employment decreased in fisheries, ocean transport and government services and increased in marine construction, manufacturing and services, and tourism.

The percentage contributions of the various ocean industry segments to the value of output and employment in the ocean sector of the Pacific Region for the years 1988 and 2000 are provided in Table 5.10. The table shows the structural changes that took place in the ocean sector during the period. These changes have been characterized by the decreasing importance of government and the fishing industry and the increasing importance of ocean manufacturing and services, tourism and construction. The value of output from government decreased from 35.4% to 19.8% and employment from 19.0% to 14.1%; and the value of output from the fishing industry declined from 14.9% to 12.9% and from 23.9% to 17.4% of employment. The value of output from ocean transport increased from 26.1% to 29.5% and employment from 26.1% to 26.2%

With respect to the growth segments, Ocean manufacturing and services increased its contribution to value of output from 10.9% to 21.3% and to employment from 15.2% to 21.5%; marine tourism from 10.4% to 12.6% of the value of output and from 13.2% to 15.6% for employment; and marine construction from 2.3% to 3.9% of the value of output and from 1.8% to 3.2% for employment. The resource industries of fisheries and tourism increased their contribution to the value of output from 25.3% in 1988 to 25.5% in 2000, but decreased their contribution to employment from 37.1% to 33.0%.

Table 5.8
Contribution of Ocean Industry Segments to Pacific Region GDP

(a) Gross Value of Output by the Ocean Industry Sector, Current Dollars, Pacific Region

	Comm. Fisheries	Oil & Gas	Ocean Transport	Tourism	Marine Const.	Mnfg & Services	Govt. Federal & Provincial	Total
	($ million)							
1988	818.3		1,440.5	576.2	129.0	603.7	1,961.5	5,529.2
1989	807.6		1,640.7	600.6	221.4	667.9	2,023.2	5,961.4
1990	869.4		1,584.1	713.4	156.1	660.3	2,034.4	6,017.7
1991	848.7		1,531.9	719.7	121.7	671.8	2,041.3	5,935.1
1992	771.0		1,488.7	717.8	153.9	737.1	2,161.3	6,029.8
1993	845.2		1,693.0	720.3	194.0	765.1	1,974.4	6,192.0
1994	1,018.5		1,732.0	735.2	230.0	807.1	1,797.8	6,320.6
1995	974.0		1,766.3	747.7	263.1	892.9	1,801.5	6,445.5
1996	887.2		1,669.0	751.2	275.2	963.2	1,585.5	6,131.3
1997	771.7		1,679.9	757.9	203.1	1,049.3	1,407.1	5,869.0
1998	743.3		1,565.9	753.8	232.6	1,095.1	1,349.5	5,740.2
1999	902.3		1,707.5	752.7	232.6	1,179.5	1,243.8	6,018.4
2000	768.4		1,762.0	751.8	232.8	1,268.5	1,178.6	5,962.1
A.R.G	-0.5		1.7	2.2	4.9	6.1	-4.2	0.6

Source: Tables 5.2, 5.3, 5.4, 5.5, 5.6 and 5.7.

(b) Gross Value of Output of Ocean Industry Segments, Constant Dollars, Pacific Region

	Comm. Fisheries	Oil & Gas	Ocean Transport	Tourism	Marine Const.	Mnfg & Services	Govt. Federal & Provincial	Total
	($ million 1992)							
1988	904.2		1,591.8	636.7	142.5	667.1	2,167.5	6,109.8
1989	855.2		1,737.5	636.0	234.5	707.3	2,142.6	6,313.1
1990	894.6		1,630.0	734.1	160.6	679.4	2,093.4	6,192.1
1991	857.2		1,547.2	726.9	122.9	678.5	2,061.7	5,994.4
1992	771.0		1,488.7	717.8	153.9	737.1	2,161.3	6,029.8
1993	835.1		1,672.7	711.7	191.7	755.9	1,950.7	6,117.8
1994	990.0		1,683.5	714.6	223.6	784.5	1,747.5	6,143.7
1995	922.4		1,672.6	708.1	249.2	845.6	1,706.0	6,103.9
1996	826.0		1,553.8	699.4	256.2	896.7	1,476.1	5,708.2
1997	710.0		1,545.5	697.3	186.9	965.4	1,294.5	5,399.6
1998	684.6		1,442.2	694.2	214.2	1,008.6	1,242.9	5,286.7
1999	822.0		1,555.5	685.7	211.9	1,074.5	1,133.1	5,482.7
2000	675.4		1,548.8	660.8	204.6	1,115.0	1,036.0	5,240.6
A.R.G	-2.4		-0.2	0.3	3.0	4.3	-6.2	-1.3

Source: Derived from Table 5.8(a).

Table 5.8 (continued)

(c) Value-added to GDP by Ocean Industry Segment, Constant Dollars, Pacific Region

	Comm. Fisheries	Oil & Gas	Ocean Transport	Tourism	Marine Const.	Mnfg & Services	Govt. Federal & Provincial	Total
	($ million 1992)							
1988	779.1		430.5	254.7	68.4	341.4	1,014.4	2,888.6
1989	485.1		413.9	254.4	112.5	361.3	1,004.7	2,631.9
1990	427.0		380.3	293.7	77.2	351.4	973.4	2,503.2
1991	399.6		457.3	290.8	59.0	341.8	946.3	2,494.8
1992	392.5		382.3	287.1	76.7	380.2	983.4	2,502.2
1993	465.5		360.7	284.6	65.8	367.2	881.7	2,425.5
1994	772.3		446.2	285.8	107.3	417.5	784.6	2,813.7
1995	631.8		468.5	282.9	121.2	448.7	747.1	2,700.2
1996	579.1		435.7	279.7	123.0	498.4	645.1	2,564.6
1997	545.5		458.6	278.9	89.7	508.9	560.5	2,442.1
1998	530.8		439.0	277.7	102.8	537.4	491.1	2,378.8
1999	623.8		489.7	274.3	101.7	574.3	449.8	2,513.6
2000	570.6		491.6	264.3	98.2	585.2	403.9	2,413.8
A.R.G	-2.6		1.1	0.3	3.0	4.5	-7.7	-1.5

Source: Tables 5.2, 5.3, 5.4, 5.5, 5.6 and 5.7.

(d) Percentage Contribution of each Ocean Industry Segment to the Pacific Region GDP

	Comm. Fisheries	Oil & Gas	Ocean Transport	Tourism	Marine Const.	Mnfg & Services	Govt. Federal & Provincial	Total
	%							
1988	1.14		.62	.37	.10	.50	1.48	4.21
1989	.68		.58	.36	.16	.51	1.41	3.70
1990	.59		.53	.41	.11	.49	1.35	3.48
1991	.56		.61	.40	.08	.48	1.29	3.42
1992	.52		.50	.38	.10	.52	1.31	3.33
1993	.59		.46	.36	.08	.47	1.12	3.08
1994	.93		.54	.35	.13	.51	.95	3.41
1995	.74		.55	.33	.14	.53	.88	3.17
1996	.67		.50	.32	.14	.57	.75	2.95
1997	.61		.51	.31	.10	.57	.63	2.73
1998	.59		.49	.31	.11	.60	.55	2.65
1999	.68		.53	.30	.11	.62	.49	2.73
2000	.60		.51	.28	.10	.61	.42	2.52

Table 5.9
Ocean Industry Employment, Pacific Region, 1988-2000

	Comm. Fisheries	Oil & Gas	Ocean Transport	Tourism	Marine Const.	Mnfg & Services	Govt. Federal & Provincial	Total
	Number of FTE							
1988	13,332		14,944	7,470	1,020	8,500	10,600	55,866
1989	13,563		15,256	7,370	1,730	9,250	10,350	57,519
1990	13,298		14,607	8,540	1,220	9,140	9,500	56,305
1991	13,052		13,011	8,450	940	9,050	9,600	54,103
1992	12,704		13,700	8,340	1,130	8,720	10,020	54,614
1993	13,210		14,609	8,270	1,070	8,380	9,840	55,379
1994	12,962		13,952	8,310	1,720	8,380	9,200	54,524
1995	13,414		13,213	8,230	1,840	8,920	8,780	54,397
1996	11,343		11,397	8,130	1,910	9,800	8,830	51,410
1997	12,062		11,509	8,100	1,540	10,520	7,580	51,311
1998	10,064		11,040	8,080	1,620	10,700	7,710	49,214
1999	10,522		11,823	7,970	1,600	11,180	7,050	50,145
2000	8,580		12,931	7,680	1,600	11,580	6,970	49,341
A.R.G	-3.7		-1.2	0.2	3.7	2.6	-3.5	-1.0

Source: Tables 5.2, 5.3, 5.4, 5.5, 5.6 and 5.7.

Table 5.10
Gross Output and Employment by Ocean Industry Sector, Pacific Region, 1988&2000

	1988		2000	
	Value of Output	Employment (FTE)	Value of Output	Employment (FTE)
	Percent			
Commercial Fishing	14.9	23.9	12.9	17.4
Offshore Oil and Gas	Nil	Nil	Nil	Nil
Ocean Transportation	26.1	26.8	29.5	26.2
Ocean Tourism	10.4	13.2	12.6	15.6
Marine Construction	2.3	1.8	3.9	3.2
Ocean Manufacturing & Services	10.9	15.2	21.3	23.5
Government Services	35.4	19.0	19.8	14.1
Total	100.0	100.0	100.0	100.0

Source: Derived from Table 5.8(a) and 5.9.

Table 5.11 summarizes the changes in the output and contribution to GDP for the private sector in the Pacific Region. The value of output from the private sector increased in current terms from $3.6 billion in 1988 to $4.8 billion in 2000, at an average rate of growth of 2.4% a year and 0.5% a year in real terms. The value added increased at an average rate of growth of 0.6%. Based on the value added, the private sector component's contribution to the regional GDP decreased from 2.74% in 1988 to 2.10% in 2000. Employment in this

component declined from 45.3 thousand to 42.4 thousand during the period, at an average rate of 0.5% a year.

Table 5.11
Private Enterprise Ocean Industries, Pacific Region, 1988 – 2000

	Gross Value of Output		Value-added	Contribution to GDP	Employment
	($ million)	($ million 1992)	($ million 1992)	%	FTE
1988	3,567.7	3,942.3	1,874.2	2.74	45,266
1989	3,938.2	4,170.5	1,627.2	2.29	47,169
1990	3,983.3	4,098.7	1,529.8	2.12	46,805
1991	3,893.8	3,932.7	1,548.5	2.12	44,503
1992	3,868.5	3,868.5	1,518.8	2.02	44,594
1993	4,217.6	4,167.1	1,543.8	1.96	45,539
1994	4,522.8	4,396.2	2,027.3	2.45	45,324
1995	4,644.0	4,397.9	1,953.1	2.30	45,617
1996	4,545.8	4,232.1	1,919.5	2.21	42,580
1997	4,461.9	4,105.1	1,881.5	2.11	43,731
1998	4,390.7	4,043.8	1,887.7	2.11	41,504
1999	4,774.6	4,349.6	2,063.8	2.24	43,095
2000	4,783.5	4,204.6	2,009.9	2.10	42,371
A.R.G	2.4	0.5	0.6		-0.5

Source: Tables 5.8(a), (b), (c) and 5.9.

The performance of the private sector component indicates that the ocean sector has been a lagging growth sector in the Pacific regional economy, that is to British Columbia, and this can be attributed mainly to the primary fisheries in the region.

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APPENDIX A
Concordance of the 1980 SIC to NAICS Canada (lowest level of detail)

The industry segments (e.g. fishing, transportation, ship building) that make up the Ocean Industry Sector were defined in Table 2 of RASCL, 1998. The 1980 Canadian SIC for these segments has been used throughout both the 1998 and the 2001 RASCL reports on the economic contribution of the ocean industries to Canada's economy. The Concordance Table below relates the 1980 Canadian SIC's to the recently introduced North American Industrial Classification System (NAICS) codes. The table has been taken from the Statistics Canada Internet site (February, 2001):

http://www.statcan.ca/english/Subjects/Standard/cosin1.htm

Only part of NAICS codes marked with an * relate to the original SIC. In general, the explanatory notes indicate the relevant area of "overlap" within the new code. However, a detailed comparison of the definitions of the two codes (see the above web site) is the only way being sure that a given operation is being correctly classified. Such a task was well beyond the scope of the February 2001 contract, the objective of which was to extend the time 1988 to 1996 series developed in the 1998 RASCL report to include the latest available data from Statistics Canada and other sources.

1980 SIC	NAICS Canada	Explanatory Notes
B0311 Salt Water Fishing Industry	112510* Animal Aquaculture 114113 Salt Water Fishing	Salt water aquaculture
B0321 Services Incidental to Fishing	112510* Animal Aquaculture 418990* All Other Wholesaler-Distributors 541710* Research and Development in the Physical, Engineering and Life Sciences 811310* Commercial and Industrial Machinery and Equipment (except Automotive and Electronic) Repair and Maintenance 911290* Other Federal Protective Services	Fish hatchery, operating Bait, preparing and supplying services Fishery research and development services Fishing gear, repairing services Fishery patrol and protection services
D0711 Conventional Oil & Natural Gas Industry	211113 Conventional Oil and Gas Extraction	
D0821 Sand and Gravel Pits	212323 Sand and Gravel Mining and Quarrying	

D0911 Contract Drilling, Oil and Gas Industry	213111 Oil and Gas Contract Drilling 213118* Services to Oil and Gas Extraction	Oil wells fire-fighting services
D0919 Other Services Incidental to Oil and Gas E1021 Fish Products Industry	213118 Services to Oil and Gas Extraction 311710 Seafood Product Preparation and Packaging	
E1053 Feed Industry	311111 Dog and Cat Food Manufacturing 311119 Other Animal Food Manufacturing 311611* Animal (except Poultry) Slaughtering	Animal slaughtering, for animal feed
E1099 Other Food Products Industries n.e.c.	311410* Frozen Food Manufacturing	Frozen prepared foods, manufacturing
E3271 Shipbuilding and Repair Industry	332319* Other Plate Work and Fabricated Structural Product Manufacturing 336611 Ship Building and Repairing 488390* Other Support Activities for Water Transportation	Prefabricated-metal ship and barge sections, not made in shipyards Ship repair and maintenance (not in shipyards)
E3281 Boat Building and Repair Industry	336612 Boat Building	
E3299 Other Transportation Equipment Inds.	336990* Other Transportation Equipment Manufacturing	All except bicycles and adult tricycles, manufacturing
E3359 Other Electronic Equipment Industries	334511* Navigational and Guidance Instruments Manufacturing	Radar and sonar equipment, manufacturing
E3611 Petroleum Products (exc Lub Oil, Grease)	324110 Petroleum Refineries	
F4021 Manufacturing & Light Industrial Bldg	231220* Non-residential Building Construction	All except: commercial and institutional buildings and heavy industrial plant, construction
F4112 Gas, Oil, Energy Related Struct (exc. Pipelines)	231330* Oil and Gas Pipelines and Related Industrial Complexes Construction	Petroleum refineries, oilfield structures, pumping stations and related structures, construction
F4113 Gas & Oil Pipelines	231330* Oil and Gas Pipelines and Related Industrial Complexes Construction	Natural gas and oil transmission pipelines, construction
F4129 Other Heavy Construction	231390* Other Engineering Construction 232110* Site Preparation Work Land draining and reclamation	All except land draining and reclamation
G4541 Freight & Passenger Water Transport Ind	483115* Deep Sea, Coastal and Great Lakes Water Transportation (except by Ferries)	All except marine towing and ship chartering
G4542 Ferry Industry	483116* Deep Sea, Coastal and Great Lakes Water Transportation by Ferries	Ferry service (except railway)
G4543 Marine	483115* Deep Sea, Coastal and Great Lakes	Barge transportation (except

Towing Industry	Water Transportation (except by Ferries) 488339 Other Navigational Services to Shipping 488390* Other Support Activities for Water Transportation	inland) Lighter operation, water transport
G4544 Ship Chartering Industry	483115* Deep Sea, Coastal and Great Lakes Water Transportation (except by Ferries) 532410* Construction, Transportation, Mining, and Forestry Machinery and Equipment Rental and Leasing	Sea, coastal and Great Lakes vessels, chartering with operators Ship (without crew), rental service
G4549 Other Water Transport Industries	487210* Scenic and Sightseeing Transportation, Water	Harbour; dinner; sightseeing, cruises
G4551 Marine Cargo Handling Industry	488320 Marine Cargo Handling	
G4552 Harbour & Port Operation Industry	488310* Port and Harbour Operations	Port facilities operation (e.g. waterfront terminals)
G4553 Marine Salvage Industry	488331 Marine Salvage Services	
G4554 Piloting Service, Water Transport Ind	488332 Ship Piloting Services	
G4555 Marine Shipping Agencies Industry	488511 Marine Shipping Agencies	
G4559 Other Service Inc. to Water Transport	488310* Port and Harbour Operations 488390* Other Support Activities for Water Transportation	Lighthouse, and canal, operations and maintenance Boat cleaning; marine cargo checking and surveying
G4611 Natural Gas Pipeline Transport Industry	486210 Pipeline Transportation of Natural Gas 488990* Other Support Activities for Transportation	 Liquification and regasification of natural gas for purposes of transport
G4612 Crude Oil Pipeline Transport Industry	486110 Pipeline Transportation of Crude Oil	
G4711 Grain Elevator Industry	493130* Farm Product Warehousing and Storage	Grain elevators, storage only
G4791 Refrigerated Warehousing Industry	493120 Refrigerated Warehousing and Storage	
G4799 Other Storage & Warehousing Inds n.e.c.	493110 General Warehousing and Storage	
H4821 Telecommunication Carriers Industry	513340* Satellite Telecommunications 513390* Other Telecommunications	Telecommunication services n.e.c. (e.g. satellite tracking, communications telemetry, radar station operation)

I5111 Petroleum Products, Wholesale	412110 Petroleum Product Wholesaler-Distributors	
I5212 Frozen Foods (Packaged), Wholesale I5215 Fish & Seafood, Wholesale	413190* Other Specialty-Line Food Wholesaler-Distributors 413140 Fish and Seafood Product Wholesaler-Distributors	Frozen foods (packaged), wholesaling
I5219 Other Foods, Wholesale	413110 General-Line Food Wholesaler-Distributors	
I5799 Other Mach., Equip. & Supp. n.e.c., Whlse	417990 All Other Machinery, Equipment and Supplies Wholesaler-Distributors 811310* Commercial and Industrial Machinery and Equipment (except Automotive and Electronic) Repair and Maintenance	Service station pumps, repairing
J6019 Other Food (Specialty) Stores	445220 Fish and Seafood Markets	
J6322 Boats, Outboard Motors & Boating Acc Dealers J6541 Sporting Goods Stores	441220* Motorcycle, Boat and Other Motor Vehicle Dealers 451110* Sporting Goods Stores	Watercraft, outboard motors and boating accessories dealers All except bicycle shops and tack shops