

Economic Impact of the New Brunswick Ocean Sector 2003-2008



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Prepared for



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**Department of Agriculture,
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Study Team

***Michael Gardner and Gregor MacAskill,
Gardner Pinfold Consulting Economists Ltd., Nova Scotia, New Brunswick***

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Steering Committee:

- ❑ Edward Olale (Chair), Policy and Planning, NB Department of Agriculture, Aquaculture and Fisheries.
- ❑ Jason Naug, Oceans and Coastal Management Division, Fisheries and Oceans Canada.
- ❑ Mathew Hardy, Oceans and Habitat Division, Fisheries and Oceans Canada.
- ❑ Pierre Mallet, Oceans and Habitat Division, Fisheries and Oceans Canada.
- ❑ Ray MacIsaac, Oceans and Habitat Division, Fisheries and Oceans Canada.
- ❑ Russell Henry, Policy and Planning, NB Department of Agriculture, Aquaculture and Fisheries.
- ❑ Suzanne Leger, Policy & Economics Branch, Fisheries and Oceans Canada.
- ❑ Tony Gaudet, Policy & Economics Branch, Fisheries and Oceans Canada.

Any errors and omissions are, of course, the responsibility of the consultants.

TABLE OF CONTENTS

| | Page |
|---|------------|
| Summary | iii |
| 1. Introduction | iii |
| 2. Economic impacts..... | iii |
| 3. Contributions to New Brunswick economy | iii |
| 4. Comparing 2008 with 1995-97 expenditures | iv |
| 5. Atlantic region context..... | iv |
| 6. Looking ahead | v |
| I Overview | 1 |
| 1. Why this update | 1 |
| 2. The ocean economy..... | 1 |
| 3. Methodology | 2 |
| II New Brunswick Ocean Activities | 5 |
| 1. Overview..... | 5 |
| 2. Commercial fisheries..... | 7 |
| 3. Aquaculture..... | 9 |
| 4. Seafood processing | 11 |
| 5. Water transportation..... | 13 |
| 6. Ocean tourism & recreation..... | 15 |
| 7. Marine construction..... | 17 |
| 8. Shipbuilding & boat building | 19 |
| 9. Government and non-government organizations..... | 20 |
| III Economic Impacts 2008 | 23 |
| 1. Economic impacts by ocean activity..... | 23 |
| 2. Ocean activity and the New Brunswick economy | 25 |
| 3. Impacts by activity..... | 27 |
| 4. How output value compares: 2008 vs. 1995-97 avg..... | 28 |
| 5. Atlantic region context..... | 30 |
| IV Looking Ahead | 33 |
| 1. Commercial fisheries..... | 33 |
| 2. Aquaculture..... | 33 |
| 3. Seafood processing | 34 |
| 4. Water transportation..... | 34 |
| 5. Tourism and recreation | 34 |
| 6. Marine construction..... | 34 |
| 7. Shipbuilding and boat building | 35 |
| 8. Federal departments..... | 35 |
| 9. Provincial departments..... | 35 |
| 10. Others..... | 35 |
| Bibliography | 37 |

| | |
|---|-------|
| Appendix A: Marine activity definitions | A - 1 |
| Appendix B: Data and sources | B - 1 |
| Appendix C: Impacts by activity, 2003 - 2008..... | C - 1 |
| Appendix D: Economic multipliers | D - 1 |
| Appendix E: Glossary..... | E - 1 |

Tables

| | |
|--|----|
| Table 1: Economic output by marine industry/activity - New Brunswick coasts and total, 2003-2008..... | 6 |
| Table 2: Commercial fisheries economic impacts (2008)..... | 23 |
| Table 3: Aquaculture economic impacts (2008)..... | 23 |
| Table 4: Seafood processing economic impacts (2008) | 23 |
| Table 5: Water transportation economic impacts (2008 estimate) | 23 |
| Table 6: Tourism and recreation economic impacts (2008) | 24 |
| Table 7: Marine construction economic impacts (2008)..... | 24 |
| Table 8: Shipbuilding and boat building economic impacts (2008 estimate) | 24 |
| Table 9: Government and non-government economic impacts (2007/08)..... | 24 |
| Table 10: New Brunswick total economic impacts (2008)..... | 24 |
| Table 11: Economic impact of ocean activities in New Brunswick 2008 | 25 |
| Table 12: Marine activity output values – 2000 Report vs. 2010 Report | 28 |
| Table 13: Atlantic provinces ocean activity economic impact values | 31 |
| Table 14: Atlantic provinces ocean activity economic impact percentages | 31 |
| Table 15: New Brunswick percentages of Atlantic activity when oil and gas extraction is excluded | 32 |

Figures

| | |
|---|----|
| Figure 1: Map of New Brunswick showing Gulf of St. Lawrence and Bay of Fundy coasts | 5 |
| Figure 2: GDP impact..... | 26 |
| Figure 3: Employment impact..... | 26 |
| Figure 4: Income impact..... | 26 |
| Figure 5: Ocean sector impact as percent of New Brunswick economy: 1995–97 vs. 2008.. | 30 |

Acronyms

- **DFO:** Department of Fisheries and Oceans (Canada)
- **DHON:** Dressed Head-On (fish)
- **DOM REP:** Dominican Republic
- **ENGO:** Environmental Non-Governmental Organization
- **EU:** European Union
- **FTE:** Full-Time Equivalent (employment)
- **GDP:** Gross Domestic Product
- **I-O (Model):** Input-Output Model
- **ISA:** Infectious Salmon Anemia
- **LFA:** Lobster Fishing Area
- **LNG:** Liquefied Natural Gas
- **NAICS:** North American Industry Classification System
- **U.S.:** United States

SUMMARY

1. Introduction

Activities dependent on the oceans make a substantial contribution to the New Brunswick economy and particularly to its coastal regions. This report provides estimates of economic impacts for 2003-2008 using conventional indicators: GDP, employment and labour income.

The last detailed estimates of the overall value and impact of marine activities in the New Brunswick economy was prepared in 2000, based on 1995-1997 data. A decade has elapsed, with considerable change in several sectors. Economic impacts are presented for the following:

Ocean activities

- ❑ Commercial fishing
- ❑ Aquaculture
- ❑ Seafood processing
- ❑ Water transportation and support services
- ❑ Tourism and recreation
- ❑ Marine construction
- ❑ Shipbuilding and boat building
- ❑ Government and non-government organizations

2. Economic impacts

Economic impacts across the eight sectors are presented for 2008 according to the Bay of Fundy coast, the Gulf of St. Lawrence coast, and New Brunswick as a whole.

"The New Brunswick ocean sector generates \$1.1 billion in direct and spinoff gross domestic product (GDP), along with 25,500 full-time equivalent jobs, and \$950 million in earned income."

The Fundy coast share of economic activity ranges from two-thirds to three-quarters of provincial totals for direct and spinoff GDP, employment, and income, while the Gulf coast represents the balance.

| | Fundy | | | Gulf | | | Total | | |
|-------------------------|---------|----------|---------|---------|----------|---------|---------|----------|-----------|
| | Direct | Spin-off | Total | Direct | Spin-off | Total | Direct | Spin-off | Total |
| GDP (\$000s) | 475,019 | 328,618 | 802,489 | 214,266 | 109,236 | 323,502 | 689,285 | 437,854 | 1,125,991 |
| Employment (FTE) | 9,044 | 9,881 | 18,925 | 4,287 | 2,329 | 6,617 | 13,331 | 12,210 | 25,541 |
| Income (\$000s) | 338,286 | 370,748 | 709,035 | 157,176 | 87,353 | 244,529 | 495,462 | 458,101 | 953,563 |

3. Contributions to New Brunswick economy

In the context of the New Brunswick economy, ocean activities represent 4.1% of total GDP, 7.4% of total employment, and 7.6% of total income.

"About one in fourteen New Brunswick jobs is directly or indirectly dependent on the oceans."

- ❑ **GDP:** The seafood industry (fishing, aquaculture and seafood processing) makes the greatest contribution with 44% of ocean related GDP. Marine construction is second at 24%, followed by tourism and recreation at 16%. Water transportation including associated support services contributes 9%, then all remaining sectors add 7% (shipbuilding and boat building, government, and non-government research, education, and advocacy organizations).
- ❑ **Employment:** The seafood industry (fishing, aquaculture and seafood processing) makes the greatest contribution with 36% of ocean related employment. Marine construction is tied for second with tourism and recreation both at 27%. Water transportation including associated support services contributes 7%, then all remaining sectors add 3% including: shipbuilding and boat building, government, and non-government research, education, and advocacy organizations.
- ❑ **Income:** The seafood industry (fishing, aquaculture and seafood processing) ranks first with 32% of ocean related income. Marine construction is second with 29%, followed by tourism and recreation at 22%. Water transportation including associated support services contributes 11%, then all remaining sectors add 6% including: shipbuilding and boat building, government, and non-government research, education, and advocacy organizations.

4. Comparing 2008 with 1995-97 expenditures

After adjusting for inflation, the findings for 2008 in this report are compared with the previous report covering 1995-1997 average activity.

"The New Brunswick ocean sector output (expenditures) increased by about 11% from 1997 to 2008 (after accounting for inflation)."

Some economic impact methodology has changed, but the overall ocean-related industry output increase of 11% was largely due to the liquified natural gas (LNG) terminal construction near Saint John. Changes in all sectors are as follows:

Ocean activity output (expenditure) changes from 1995/07 to 2008

- | | |
|------------------------------------|-------------------------------------|
| ❑ Commercial fishing (down 21%) | ❑ Marine construction (up 1,569%) |
| ❑ Aquaculture (up 22%) | ❑ Ship and boat building (down 98%) |
| ❑ Seafood processing (up 8%) | ❑ Federal departments (up 30%) |
| ❑ Water transportation (down 30%) | ❑ Provincial departments (down 26%) |
| ❑ Tourism and recreation (up 678%) | ❑ Universities (down 56%) |

5. Atlantic region context

New Brunswick represents about 7% of total Atlantic region ocean-related GDP, a relatively larger share of total employment at 20%, and a similarly large share for total income at 17%. The greater shares of employment and income reflect New Brunswick's absence from the offshore oil and gas production sector that dominates in NL and to a lesser extent in NS.

When oil and gas exploration and extraction is removed from NS and NL, and ocean sector activity is set in the context of each provincial economy, it represents 4%, 8%, 11%, and 8% of GDP for NB, PEI, NS, and NL respectively. In terms of provincial employment, ocean activities represent 7%, 3%, 15, and 16% of the provincial totals in NB, PEI, NS, and NL respectively. Finally, ocean activities represent about 7%, 12%, 16%, and 15% of the total provincial earned income in NB, PEI, NS, and NL respectively

6. *Looking ahead*

Considering the short-term (1-2 years), medium-term (3-5 years), and long-term (beyond 5 years), an assessment of trends and key factors is used to develop an outlook for each of the key ocean activities.

- ❑ **Seafood industry:** Commercial fisheries, aquaculture, and seafood processing are currently facing the greatest challenges experienced in over a decade. Weakened demand amidst recession in the U.S. and other key markets, a rising dollar and rising costs are all undermining viability. As economies begin to emerge from the recession demand should pick up but there is little optimism that the industry will return to the strong performance of a decade ago. Some attrition may occur leaving a more viable position for those who remain in the medium to long-term.
- ❑ **Water transportation and support services:** Increases in activity tied to the Canaport LNG terminal are expected in the short-term. Medium-term recovery of mining and forestry will support more shipping, and Atlantic Gateway investment is expected to stimulate growth.
- ❑ **Marine construction:** Minor additions to capacity and maintenance for the LNG terminal, and new investment in small craft harbours will augment activity in the short and medium-terms.
- ❑ **Other:** All other sectors are stable, and are not expected to change substantially.

I OVERVIEW

1. Why this update

The last detailed estimate of the overall value and impact of marine activities in the New Brunswick economy was prepared in 2000, based on 1995-1997 data. A decade has elapsed, with considerable change in several sectors. The fishing industry has had to adjust to shifting resource and market conditions, with corresponding effects on fish processing. Shipbuilding has declined with the closure of the Irving shipyard in Saint John. The aquaculture industry has experienced major upheavals, resulting in industry consolidation against a backdrop of increased production. Improved data provides the basis for a more informed estimate of the economic value of tourism.

Reliable data is essential for policy development and planning, serving a wide range of needs. These include spatial planning for coastal use; industry planning to identify opportunities and possible adjustments at the regional and community level; identifying the nature and extent of possible labour market adjustments (changing skill requirements); and planning for possible social adjustments as some industries gain strength and others lose ground.

2. The ocean economy

The analysis covers private and public sector marine activities. Deciding what activities to include is determined by the relationship of the activity to the ocean. The activities are tied to the ocean in a primary sense; i.e., the ocean provides the direct basis for the activity, whether extractive (fishing, offshore oil & gas or aquaculture) or non-extractive (tourism, ship-building and transportation). Government departments and agencies with responsibilities for regulating or managing ocean activities are also included, as are universities and marine research. Descriptions of each activity, including key statistics, are contained in the industry Fact Sheets in Section II.

The table below sets out the specific activities included in this study, with the corresponding activity titles from the 2000 study. Some of the names have changed to conform to the titles contained in the 2002 North American Industrial Classification System (NAICS). Definitions of each activity are set out in Appendix A.

| Sector | NAICS# | Ocean activity in 2009 report | Ocean activity in 2000 report |
|-----------------------|--------|-------------------------------|-------------------------------|
| Seafood | 114 | Commercial fisheries | Traditional fishing |
| | 1125 | Aquaculture | Aquaculture |
| | 3117 | Fish processing | Fish processing |
| Transportation | 4831 | Water transportation | Shipping/ferries |
| | 4883 | Support services | Ports |
| Tourism | | Marine tourism | Marine recreation |
| | 4831 | Cruise ship travel | Cruise ship travel |
| | 4872 | Coastal recreation | |
| Construction | 23799 | Marine construction | Marine construction |
| Manufacturing | 3366 | Ship and boat building | Ship and boat building |
| | | | Marine technology |
| Public sector | | Federal government | Federal government |
| | | Provincial government | Provincial government |
| | | Universities/research | Research |
| | | ENGOS | |

3. *Methodology*

Impacts are quantified using conventional economic indicators consistent with the national income accounting framework. Economic impact is measured with three indicators:

- **GDP:** an industry's contribution to Gross Domestic Product represents its broadest measure of economic impact. The domestic product of an industry captures the value it adds to purchased inputs through the application of labour and capital. GDP represents the sum of the value added by each industry. Value added should not be confused with sales value, since the latter would include the value of purchased inputs.
- **Employment:** industry employment is important politically because of the significance generally attached to jobs, but from an economic impact perspective, the significance lies in the economic impact generated through the spending of employment income. The greater the employment and higher the average income, the more significant the industry in terms of economic impact.
- **Labour income:** this captures the payments in the form of wages and salaries earned by those employed in the marine industries. Returns to labour in the form of wages and salaries form a key component of GDP. Industries paying relatively high average wages and salaries generate a correspondingly higher economic impact than industries paying lower average wages. Labour income is only earned income and does not include employment insurance (EI) or transfer payments of any sort.

Economic impacts are generated through direct, indirect and induced demand in the economy expressed in terms of industry and consumer purchases of goods and services. The sum of indirect and induced impacts is often referred to as the “spin-off” impact.

- **Direct impact:** refers to the GDP, employment and income created by the marine industries themselves. For example, in commercial fisheries, GDP represents the value added in the production of fish, those working on boats represent direct employment, and the income earned by those directly employed represents direct labour income.
- **Spin-off impact:** the sum of indirect and induced impacts. Indirect impact refers to the impacts generated as direct demand triggers a range of inter-industry purchases. For example, spending by the fishing industry on nets triggers spending by net makers to buy monofilament line from manufacturers; refineries buy crude oil and services from maintenance contractors; catering companies buy basic food products. These industries in turn buy more basic goods and services, and so on. Induced impact refers to the demand created in the broader economy through spending of incomes earned by those employed in direct and indirect activities. It may take a year or more for these rounds of consumer spending to work their way through an economy.

The sum of impacts flowing from each level of demand gives the overall economic impact of New Brunswick's marine sectors. Generally, the greater the domestic supply capability at each level, the greater will be the economic impact. Conversely, the higher the import content, the weaker the domestic industry response (multipliers) and the lower the impact.

Quantifying economic impacts begins with comprehensive data on the gross value of output for each of the marine industries and activities selected for analysis. As the expenditures made to produce this output work their way through the economy, they generate the GDP, employment and household income that this study aims to quantify.

Economists rely on economic models to quantify impacts at a national, regional or provincial level. Models provide a simplified view of the economy, expressing the complex web of demand and supply transactions in the productive process as a set of coefficients or quantitative relationships. These coefficients are based on the measurement of the actual flow of goods and services in the real economy.

For this study, economic impacts are estimated using the Statistics Canada Interprovincial Input-Output Model – 2006 version (I-O Model). The impact of the industry is determined by “shocking” the Model with a change in output equal to the value of output of the industry. Similarly, for a government department, the model would be “shocked” by the level of marine spending. "Shocking the model" simply means the output (spending) estimates are inserted into calculations within the model where these will be multiplied by industry specific coefficients for generating the associated employment, incomes, and GDP measures.

For most industries, the I-O Model is structured to reflect the pattern of inter-industry transactions, so all that is required to run the model is the gross value of output for the industry in question. For some activities (e.g., government departments), expenditures would first have to be allocated to specific commodities in order to trigger the right transactions in the model. This requires fine expenditure detail for those activities, which would have to be provided by the department or estimated by the consultant.

The data used to drive the model are obtained either from Statistics Canada (through published reports or through special tabulations), or in the case of government departments, obtained directly from officials or estimated using departmental reports. The data and impacts cover the years 2003 to 2008. Impacts are reported in current dollars. The data are set out in the Fact Sheets in Section II. A discussion of data and sources is contained in Appendix B.

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II NEW BRUNSWICK OCEAN ACTIVITIES

1. Overview

New Brunswick's marine activities occur on two coasts: the Gulf of St. Lawrence (Gulf) and in the Bay of Fundy (Fundy). The two coasts are depicted along with key communities where this report identifies ocean-related activities and associated economic impacts (Figure 1).

In response to the needs of data users, this report provides estimates of the value of output for each activity along each coast (see Table 1). The quality of the estimates depends on data availability; in the absence of location-specific information, the nature of the activity allows an estimate to be developed. For example, fisheries data are reported by coast. Aquaculture data are reported by species, so reliable estimates can be derived by knowing what is grown where.

Figure 1: Map of New Brunswick showing Gulf of St. Lawrence and Bay of Fundy coasts



Table 1: Economic output by marine industry/activity – New Brunswick coasts and total, 2003-2008 (\$millions)

| Industry/Activity | Fundy | | | | | | Gulf | | | | | | Total | | | | | |
|------------------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 |
| 1. Fishing | 50.1 | 48.2 | 55.6 | 45.9 | 43.3 | 47.5 | 125.8 | 145.3 | 149.3 | 106.9 | 133.9 | 113.5 | 175.9 | 193.5 | 205.0 | 152.9 | 177.2 | 161.1 |
| 2. Aquaculture | 185.1 | 179.0 | 228.0 | NA | 184.6 | 197.1 | 3.1 | 2.0 | 2.5 | NA | 1.2 | 1.2 | 188.2 | 181.0 | 230.5 | NA | 185.8 | 198.3 |
| 3. Seafood processing | 444.0 | 387.1 | 452.1 | 479.0 | 361.4 | 426.6 | 498.9 | 456.5 | 407.6 | 400.3 | 369.6 | 398.2 | 942.9 | 843.6 | 859.7 | 879.3 | 731.0 | 824.8 |
| 4. Water transportation | 56.0 | 58.8 | 61.1 | 53.8 | 57.2 | 57.4e | 6.0 | 6.2 | 6.9 | 6.2 | 6.8 | 6.4e | 62.0 | 65.0 | 68.0 | 60.0 | 64.0 | 63.8e |
| Support activities | 61.6 | 64.7 | 67.2 | 59.2 | 62.9 | 63.1e | 6.6 | 6.8 | 7.6 | 6.8 | 7.5 | 7.1e | 68.2 | 71.5 | 74.8 | 66.0 | 70.4 | 70.2e |
| 5. Tourism & recreation | | | | | | | | | | | | | | | | | | |
| Tourism (excl. cruise) | 129.6 | 128.5 | 126.7 | 125.3 | 125.1 | 125.0 | 38.3 | 37.9 | 37.4 | 37.0 | 37.0 | 36.9 | 167.9 | 166.4 | 164.1 | 162.3 | 162.1 | 161.9 |
| Cruise travel | 7.8 | 12.1 | 7.3 | 6.5 | 9.0 | 12.3 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 7.8 | 12.1 | 7.3 | 6.5 | 9.0 | 12.3 |
| Recreational fishing | 3.9 | 3.9 | 3.9 | 3.9 | 3.9 | 3.9 | 3.2 | 3.1 | 3.1 | 3.1 | 3.0 | 3.0 | 7.1 | 7.0 | 7.0 | 7.0 | 6.9 | 6.9 |
| Recreational boating | 41.6 | 39.2 | 36.9 | 34.5 | 32.2 | 29.9 | 33.3 | 31.4 | 29.5 | 27.6 | 25.6 | 23.7 | 74.9 | 70.6 | 66.4 | 62.1 | 57.9 | 53.6 |
| Swim and paddle | 8.3 | 8.4 | 8.4 | 8.5 | 8.5 | 8.5 | 6.7 | 6.7 | 6.7 | 6.7 | 6.7 | 6.8 | 15.0 | 15.1 | 15.1 | 15.2 | 15.2 | 15.3 |
| 6. Construction | 7.4 | 12.1 | 4.5 | 205.1 | 311.4 | 367.2 | 3.9 | 1.1 | 5.2 | 2.8 | 1.2 | 1.0 | 11.3 | 13.2 | 9.7 | 207.9 | 312.6 | 368.3 |
| 7. Shipbuilding and repair | 3.0 | 1.4 | 3.7 | 3.1 | NA | 2.8e | 0.0 | 0.0 | 0.0 | 0.0 | NA | 0.0e | 3.0 | 1.4 | 3.7 | 3.1 | NA | 2.8e |
| Boat building and repair | 8.0 | 5.0 | 1.0 | 2.2 | 3.3 | 2.1 | 8.0 | 5.0 | 1.0 | 2.2 | 3.3 | 2.1 | 16.0 | 10.0 | 2.0 | 4.3 | 6.6 | 4.1 |
| 8. Govt, Research, ENGO | | | | | | | | | | | | | | | | | | |
| Fisheries & Oceans Canada | NA | 24.3 | 22.8 | 25.4 | 25.9 | 26.4 | NA | 60.6 | 64.5 | 55.1 | 72.9 | 48.4 | NA | 84.9 | 87.3 | 80.5 | 98.8 | 74.7 |
| Other federal departments | 2.0 | 2.1 | 2.2 | 2.2 | 2.3 | 2.4 | 1.7 | 1.8 | 1.8 | 1.9 | 2.0 | 2.0 | 3.8 | 3.9 | 4.0 | 4.1 | 4.2 | 4.4 |
| NB DOF and DAA | NA | 3.5 | 3.4 | 3.4 | 3.6 | 4.2 | NA | 1.7 | 1.6 | 1.6 | 1.7 | 2.0 | NA | 5.2 | 5.0 | 5.0 | 5.2 | 6.2 |
| NB DNR | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 |
| NB enterprise network | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 |
| NB tourism and parks | NA | 1.2 | 1.2 | 1.2 | 1.2 | 1.2 | NA | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | NA | 1.6 | 1.7 | 1.7 | 1.6 | 1.7 |
| Business NB | NA | 5.5 | 2.6 | 5.9 | 5.6 | 4.8 | NA | 2.6 | 1.2 | 2.8 | 2.6 | 2.3 | NA | 8.1 | 3.8 | 8.7 | 8.2 | 7.1 |
| NB environment | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 |
| Universities, research | 0.7 | 0.7 | 0.8 | 0.7 | 0.8 | 0.9 | 0.3 | 0.3 | 0.4 | 0.3 | 0.4 | 0.4 | 1.0 | 1.0 | 1.1 | 1.0 | 1.2 | 1.3 |
| ENGOS | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 |

Sources: Statistics Canada, DFO, primary data collection from private sector and government departments, Gardner Pinfold.

Notes: Values of 0.0 are not zero; zero is represented by 0 (e.g., see Gulf Shipbuilding and repair '03-'06). 2008 values marked "e" represent estimates for missing data based on averages from the other years of available data.

2. Commercial fisheries

Fundy

Overview

The Bay of Fundy fishing industry includes just over 600 mainly independent fishing vessels employing over 1,500 (skippers and crew) in primarily seasonal fisheries. Fishing represents a key source of income and employment along the Fundy coast.

Lobster is the main fishery, accounting for about 80% of landed value. Herring, scallop and sea urchin are the other main species fished. The value of recent lobster landings up to 2008 fluctuated between \$28 and \$41 million. Lobster stocks are considered to be stable, however, the industry must contend with a strong Canadian dollar and weak U.S. markets.

Performance (all fisheries)

| Year | Landings | | Vessels | Core licence-holders | Employment (persons) |
|------|----------|----------|---------|----------------------|----------------------|
| | (Tonnes) | (\$000s) | | | |
| 2004 | 60,789 | 48,167 | 715 | 350 | 1,790 |
| 2005 | 46,830 | 55,644 | 680 | 350 | 1,700 |
| 2006 | 47,103 | 45,932 | 669 | 342 | 1,670 |
| 2007 | 59,161 | 43,250 | 614 | 340 | 1,540 |
| 2008 | 40,485 | 47,529 | 600 | 337 | 1,500 |

See Appendix B for sources.

Key Factors

Primary markets

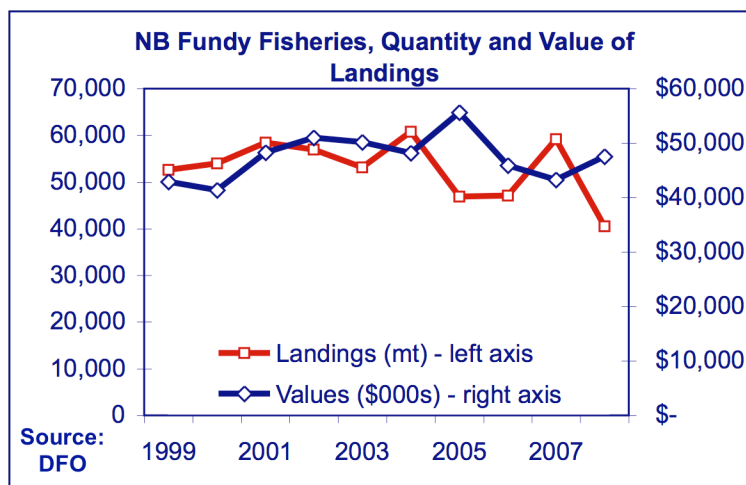
- U.S. (both live and processed product); EU is a secondary market.

Resource

- Lobsters are fished at moderate exploitation rates, stock status indicators have generally been stable or positive in recent years.

Key issues

- Strong Canadian dollar coupled with weak market conditions have contributed to the declines in revenues since 2003.
- Current North American recession undermines the viability of key segments of the industry.
- Out-migration from coastal areas makes it a challenge to recruit crews.



Gulf

Overview

The Gulf fishing industry includes just over 1,800 mainly independent fishing vessels employing over 4,500 (skippers and crew) in primarily seasonal fisheries. Shellfish account for about 91% of landed value, and this is split equally between lobster and crab with some year to year variation. Herring represent the largest share of other landings. The value of recent lobster landings up to 2008 fluctuated between \$46 and \$54 million, while crab landed value fluctuated from \$33 to \$78 million. Lobster stocks are under pressure, especially in the Northumberland Strait, while crab stocks have declined to a cyclical low point in 2010. The drop in landed value in 2006 was attributable to a sharp drop in crab prices. All fishers must contend with a strong Canadian dollar, weak U.S. markets, operating cost pressures and an aging labour force.

Performance (all fisheries)

| Year | Landings | | Vessels | Core licence-holders | Employment (persons) |
|------|----------|----------|---------|----------------------|----------------------|
| | (Tonnes) | (\$000s) | | | |
| 2004 | 57,227 | 145,328 | 1,984 | 1,280 | 4,960 |
| 2005 | 72,431 | 149,307 | 1,983 | 1,273 | 4,960 |
| 2006 | 63,517 | 106,929 | 1,960 | 1,263 | 4,900 |
| 2007 | 59,976 | 133,935 | 1,913 | 1,260 | 4,780 |
| 2008 | 53,423 | 113,543 | 1,801 | 1,251 | 4,500 |

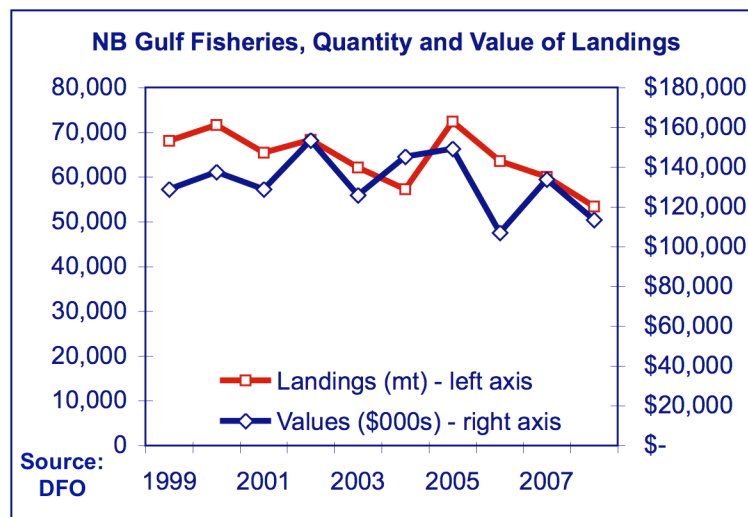
See Appendix B for sources.

Key Factors

Primary markets ■ U.S. (lobster/crab); EU (lobster/herring); Japan (crab).

Resource ■ Lobster fishing pressure is considered high, especially in LFA 25.
 ■ The density of 1-2 year olds in LFA 23 appears to have increased and may strengthen stocks there.

Key issues ■ Strong Canadian dollar coupled with weak market conditions have contributed to the declines in revenues since 2003.
 ■ Current North American recession undermines the viability of key segments of the industry.
 ■ Pressure on stocks continues to be an issue.
 ■ Out-migration from coastal areas makes it a challenge to recruit crews.



3. Aquaculture

Fundy

Overview

Although several aquaculture companies in NB are highly vertically integrated, aquaculture here encompasses only the growout farms or "primary aquaculture" portions of the operations. Since 2000, the industry has consolidated from 41 to 8 farm companies holding about 95 licenced sites. The Bay of Fundy industry is focussed almost exclusively on salmon. There are up to 1,745 employees on a full or part-time basis totaling 1,475 FTEs. Aquaculture production generates nearly \$200 million in revenues. Most of the production goes to the local processing industry and onward to Canada and export markets (mainly the U.S.).

Performance

| Year | Production (farm gate) | | Exports (\$000s) | Employment (FTE) | Issued aquaculture sites* |
|------|------------------------|----------|------------------|------------------|---------------------------|
| | (Tonnes) | (\$000s) | | | |
| 2003 | 33,650 | 185,100 | 147,000 | 1,289 | 98 |
| 2004 | 35,400 | 179,000 | 158,000 | 1,289 | 99 |
| 2005 | 35,300 | 228,000 | 174,000 | 1,960 | 96 |
| 2006 | NA | NA | 170,000 | 1,960 | 92 |
| 2007 | 24,875 | 184,609 | 200,000 | 1,380 | 95 |
| 2008 | 26,500 | 197,140 | 268,300 | 1,475 | 95 |

See Appendix B for sources. *Some sites may be inactive at times due to fallowing and other factors.

Key Factors

Primary markets

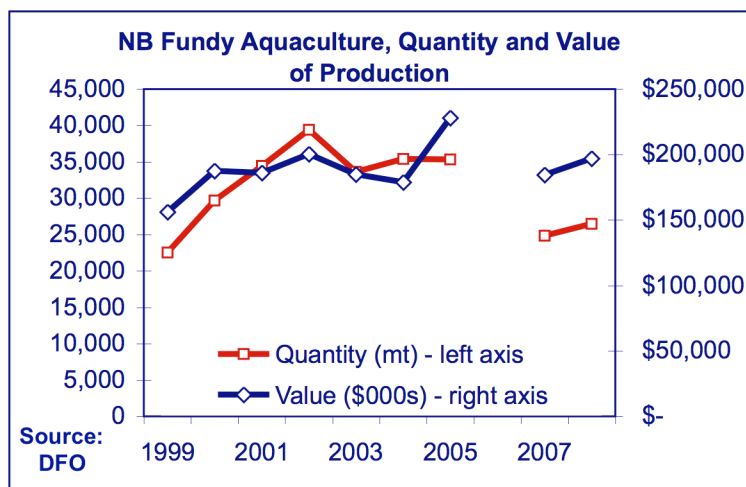
- 60% goes to fresh DHON markets, while 40% is value added product. Shipments go to Eastern Canada, and in the U.S. to areas east of Chicago and north of the Carolinas.

Resource

- Coastal waters are considered very good for growth, although expansion is limited since most space has been allocated.

Key issues

- ISA disease in NB prompted introduction of bay management areas and other biosecurity measures in 2006 which temporarily impacted stocking levels. Lower stocking in 2006 resulted in a decrease in production in 2008. ISA in Chile has reduced world supply and improved prices for New Brunswick producers.



Gulf

Overview

There are about 550 licenced sites of which more than 500 are for American Oyster production and the rest are for Blue Mussels. About 50-60 businesses hold the oyster sites and two companies operate the mussel farms, currently generating over \$600,000 and \$500,000 respectively. American Oyster production rose to a peak of \$2.5 million in 2003, and has dropped since then. The decline has been attributed to several factors including low prices, corporate debt, and production challenges. Most of the product goes to local markets in the Atlantic region and Québec. Several hundred persons participate in site management and harvesting, although these are part-time seasonal positions.

Performance

| Year | Production | | Exports* | Employment (FTE) | Issued aquaculture sites** |
|------|------------|----------|----------|------------------|----------------------------|
| | (Tonnes) | (\$000s) | | | |
| 2003 | 2,803 | 3,100 | 0 | NA | 525 |
| 2004 | 1,884 | 2,005 | 0 | NA | 526 |
| 2005 | 2,357 | 2,500 | 0 | NA | 526 |
| 2006 | 1,050 | 1,124 | 0 | NA | 535 |
| 2007 | 1,121 | 1,200 | 0 | NA | 522 |
| 2008 | 1,098 | 1,173 | 0 | NA | 546 |

See Appendix B for sources.

*Zeros are shown because exports are considered negligible, although it is recognized that very small quantities may be exported in some years.

**Many sites are inactive due to economic conditions and other operator circumstances.

Key Factors

Primary markets

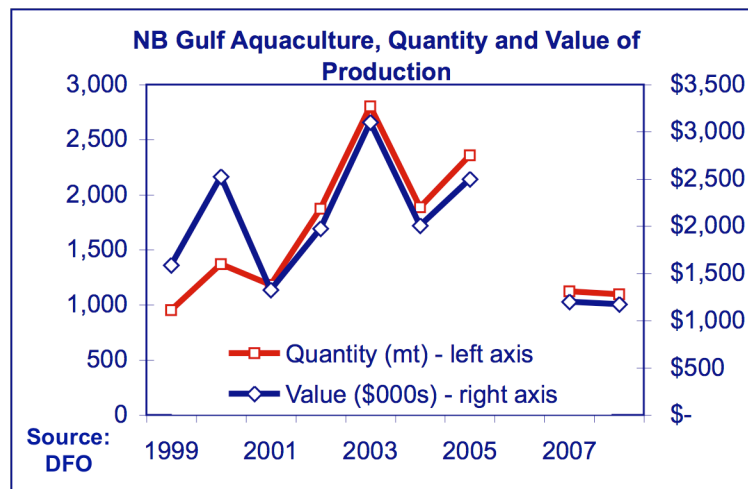
- Most shellfish are shipped to local markets in the Atlantic region and Québec.

Resource

- The resource is considered stable, the main threats are from diseases present elsewhere that may arrive in NB.

Key issues

- Many producers engage in shellfish aquaculture on a part-time basis; the introduction of best management practices is a challenge.
- Close competition from PEI mussel and oyster producers.



4. Seafood processing

Fundy

Overview

The Bay of Fundy seafood processing industry consists of about 35 licenced plants, not all of which are active each year. Some of these are part of vertically integrated salmon farming companies. Salmon is the dominant species processed, mainly into whole DHON form, while about 40% is processed into other value-added forms. Plants also process herring/sardines, and shellfish from the commercial fishery. The U.S. and Canada are the dominant markets for salmon, with smaller amounts going to Japan and the EU. Production is estimated at \$427 million (2008). Provincial data indicate 4,520 people hold mainly seasonal jobs in the industry, though the salmon plants offer more or less year-round employment.

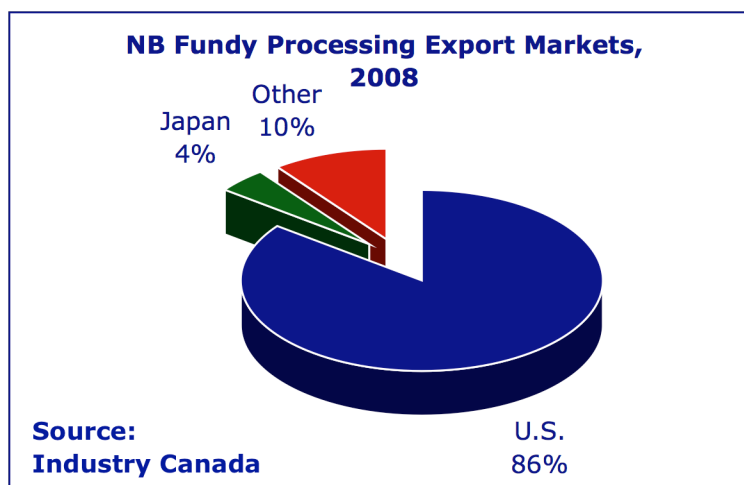
Performance

| Year | Production (\$000s) | Exports* (\$000s) | Number of Plants (Licences) | Employment (FTE) |
|------|---------------------|-------------------|-----------------------------|------------------|
| 2003 | 444 | 282 | 34 | 1,980 |
| 2004 | 387 | 259 | 36 | 1,730 |
| 2005 | 452 | 287 | 40 | 1,920 |
| 2006 | 479 | 298 | 39 | 2,100 |
| 2007 | 361 | 204 | 38 | 1,670 |
| 2008 | 427 | 285 | 35 | 1,720 |

See Appendix B for sources. *These exports include shipments directly from fisheries and aquaculture.

Key Factors

- Primary markets**
 - U.S. & Canada (salmon/lobster); EU (herring).
- Resource**
 - The industry relies heavily on farmed salmon and sardines.
 - Failure of groundfish recovery has contributed to decline in number of active plants.
- Key issues**
 - Strong Canadian dollar has put pressure on revenues, though this has been offset by rising salmon prices since 2008 and some advantages in acquiring raw material from U.S.
 - Out-migration from coastal communities makes it difficult to recruit workers.



Gulf

Overview

The Gulf coast seafood processing industry consists of over 90 licenced plants. These are mainly independent firms in strong competition for available supply. Lobster and crab are the key species, with plants also dependent on shrimp and herring. Fresh, frozen and value-added forms are mainly destined to the U.S., Canada, and important overseas markets in Japan, China and the EU. The industry relies heavily on lobster from Maine to extend the processing season into the fall. Production is estimated at about \$400 million, with some 10,000 people gaining seasonal employment in the industry.

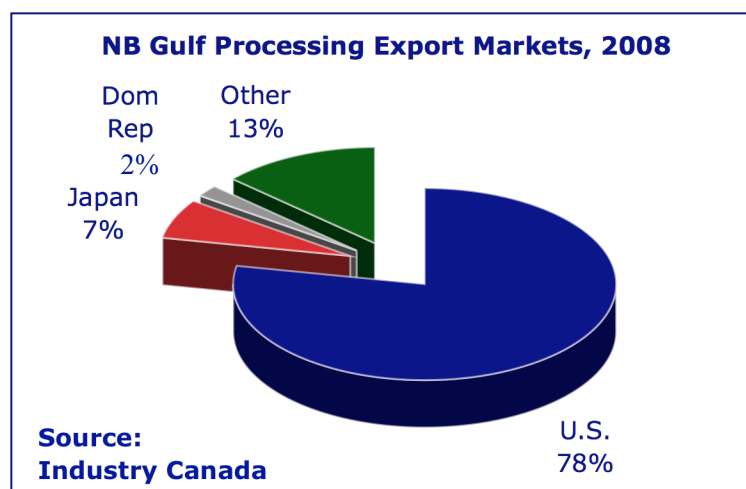
Performance

| Year | Production (\$000s) | Exports* (\$000s) | Number of Plants (Licences) | Employment (FTE) |
|------|------------------------|----------------------|--------------------------------|---------------------|
| 2003 | 499 | 512 | 88 | 3,590 |
| 2004 | 457 | 565 | 93 | 3,770 |
| 2005 | 408 | 545 | 103 | 3,660 |
| 2006 | 400 | 497 | 100 | 3,500 |
| 2007 | 370 | 462 | 96 | 3,780 |
| 2008 | 398 | 472 | 91 | 2,860 |

See Appendix B for sources. *These exports include shipments directly from fisheries and aquaculture.

Key Factors

- Primary markets**
 - U.S. & Canada (lobster/crab/shrimp); Japan & China (crab); Dominican Republic (frozen shellfish); EU (lobster/shrimp); Caribbean (smoked herring).
- Resource**
 - Industry relies heavily on shellfish.
 - Resource health varies with some species exploited at high rates in certain areas of the Gulf.
- Key issues**
 - Strong competition among plants for available supply.
 - Weak U.S. markets have contributed to a decline in revenues in recent years.
 - A strong Canadian dollar reduces revenues but offers some advantages in acquiring raw material from the U.S.
 - The number of licenced and active plants has declined due to difficulty securing raw material and consolidation of the industry.
 - Out-migration from coastal communities makes it difficult to recruit workers.



5. Water transportation

Fundy

Overview

The marine transport industry includes all activities of shipping companies, cruise ships and ferry operators (NAICS 4831). The Bay of Fundy's major ports are Saint John, Black's Harbour, and Bayside. Over 80% of all shipments by tonnage are crude oil and other petroleum based products at the port of Saint John. There is a ferry service between Saint John and Digby, Nova Scotia, and shorter distance ferry operations to Grand Manan, White Head Island, and Deer Island. Cruise ship business is growing in Saint John, taking up to 183,000 passengers in 2008. The water transport industry also includes many support services (NAICS 4881) including cargo handling, pilotage, marine navigation services and others. Water transport and support services together generate direct revenues estimated at \$120 million (2007).

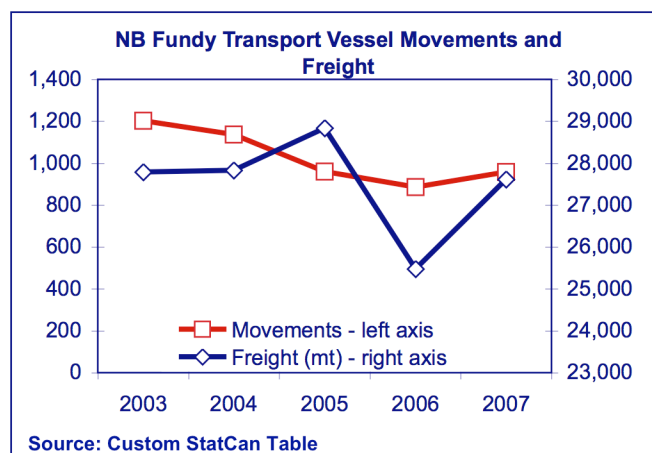
Performance

| Freight | | | Water transportation value of output (\$000s) | | | |
|---------|-------------------|------------------------|---|----------|------------------|---------|
| Year | Vessel Movement # | Tonnes of Cargo (000s) | Year | Shipping | Support Services | Total |
| 2003 | 1,203 | 27,786 | 2003 | 56,000 | 61,600 | 117,600 |
| 2004 | 1,137 | 27,827 | 2004 | 58,800 | 64,700 | 123,500 |
| 2005 | 960 | 28,835 | 2005 | 61,100 | 67,200 | 128,300 |
| 2006 | 887 | 25,474 | 2006 | 53,800 | 59,200 | 113,000 |
| 2007 | 957 | 27,617 | 2007 | 57,100 | 62,900 | 120,000 |

See Appendix B for sources.

Key Factors

- Primary markets**
 - U.S. & eastern Canada (petroleum); U.S. & EU (forest & fish products).
- Main Cargo/Service**
 - Imported crude oil and petroleum products, consumer goods, and exports of fuels, aggregates, fish and forestry products.
- Key issues**
 - Strong Canadian dollar and weak U.S. markets.
 - Capital investment in port infrastructure required to meet security and efficiency of modern shipping industry.



Gulf

Overview

The Gulf coast major ports are Belledune, Dalhousie, Caraquet and Miramichi. Over 70% of all shipments by tonnage are through Belledune and these consist of coal, coal and petroleum coke, and other metallic minerals and ores. The shipping industry and support services industry together generate direct revenues estimated at \$14.3 million (2007).

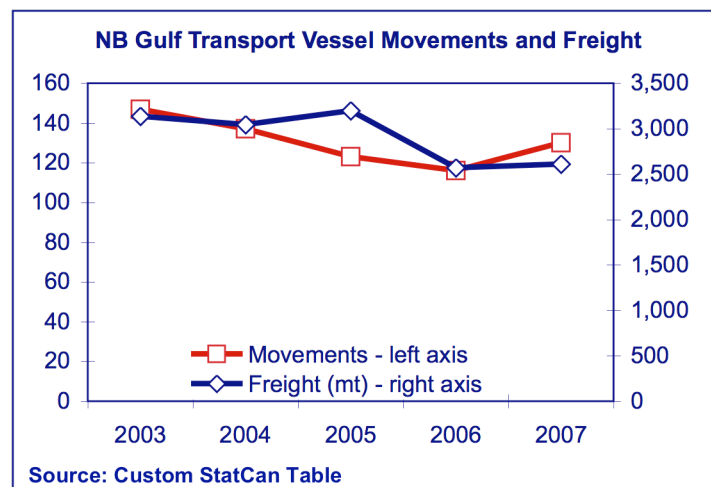
Performance

| Year | Freight | | Water transportation value of output (\$000s) | | | |
|------|-------------------|------------------------|---|----------------|------------------|--------|
| | Vessel Movement # | Tonnes of Cargo (000s) | Year | Transportation | Support Services | Total |
| 2003 | 147 | 3,135 | 2003 | 6,000 | 6,600 | 12,600 |
| 2004 | 137 | 3,046 | 2004 | 6,300 | 6,800 | 13,100 |
| 2005 | 123 | 3,199 | 2005 | 6,900 | 7,500 | 14,400 |
| 2006 | 116 | 2,569 | 2006 | 6,200 | 6,800 | 13,000 |
| 2007 | 130 | 2,610 | 2007 | 6,800 | 7,500 | 14,300 |

See Appendix B for sources.

Key Factors

- Primary markets*
 - Most cargo is from international sources for local clients.
- Main Cargo/Service*
 - By tonnage – coal and petroleum coke, metallic minerals and ores, aggregates.
- Key issues*
 - Very strong competition between ports for shipping business.
 - Increasing size of modern shipping vessels demands port improvements and high capital investment.
 - Loss of key exporting businesses in forestry, mining, and energy sectors.



6. Ocean tourism & recreation

Fundy

Overview

Ocean tourism is broken down into five expenditure-driven areas: cruise ship activity, marine recreational fishing, and coastal tourism in the form of three water-based recreational activities.

- Cruise ships: this generates \$6-12 million in passenger/crew expenditures annually. Saint John is the main port attracting up to 183,000 passengers from key markets primarily in the U.S. and Europe.
- Recreational fishing for sea-run brook-trout, mackerel, cod, and groundfish: this includes salt-water and estuarial fishing using charter vessels, as well as vessels and facilities owned by the fisher. Overall, the activity generates \$3.9 million in annual expenditures.
- Coastal tourism and recreation: this includes ocean touring (whale watching, sightseeing, coastal hiking, diving, kayaking), as well as sailing, cruising and visiting beaches and other marine locations. It generates an estimated \$125-129 million in annual expenditures.

Performance

| Year | Cruise Travel | | Local Recreation | | | Marine Tourism | |
|------|-----------------------------|----------------|------------------|------------------|------------------------|------------------------|----------------|
| | Number of Passengers (000s) | Spend (\$000s) | Fishing (\$000s) | Boating (\$000s) | Swim & Paddle (\$000s) | Number of Trips (000s) | Spend (\$000s) |
| 2003 | 83,300 | 7,800 | 3,900 | 41,600 | 8,300 | 870 | 129,600 |
| 2004 | 138,703 | 12,100 | 3,900 | 39,200 | 8,400 | 782 | 128,500 |
| 2005 | 90,203 | 7,300 | 3,900 | 36,900 | 8,400 | 781 | 126,700 |
| 2006 | 87,759 | 6,500 | 3,900 | 34,500 | 8,500 | 782 | 125,300 |
| 2007 | 133,676 | 9,000 | 3,900 | 32,200 | 8,500 | 799 | 125,100 |
| 2008 | 183,000 | 12,300 | 3,900 | 29,900 | 8,500 | 815 | 125,600 |

See Appendix B for sources.

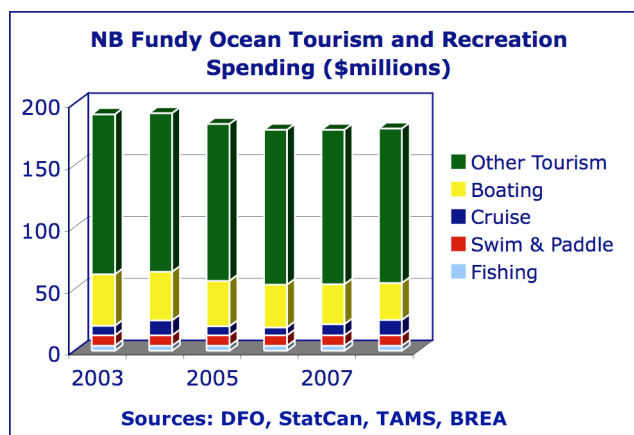
Key Factors

Primary markets

- U.S., Canada and Europe.

Key issues

- **Cruise:** Decline in U.S. travel to Canada and reduced passenger spending.
- **Fishing:** Decline in active anglers and fishing days per angler, maintaining fish stocks.
- **Tourism:** Promoting domestic travel and interest in natural heritage.



Gulf

Overview

Ocean tourism in the Gulf is comprised of two expenditure-driven areas: marine recreational fishing, and coastal tourism in the form of water-based recreational activities. Cruise activity is not included, although this is an area of active development in Miramichi.

- Recreational fishing for sea-run brook-trout, mackerel, cod, and groundfish: this includes salt-water and estuarial fishing using charter vessels, as well as vessels and facilities owned by the fisher. Overall, the activity generates approximately \$3.1 million in expenditures.
- Coastal tourism and recreation: this includes ocean touring (whale watching, sightseeing, coastal hiking, diving, kayaking), as well as sailing, cruising and visiting beaches and other marine locations. It generates an estimated \$37 million in annual expenditures.

Performance

| Year | Cruise Ships | | Recreation | | | Coastal Tourism | |
|------|-----------------------------|----------------|------------------|------------------|---|------------------------|----------------|
| | Number of Passengers (000s) | Spend (\$000s) | Fishing (\$000s) | Boating (\$000s) | Swim & Paddle (\$000s) | Number of Trips (000s) | Spend (\$000s) |
| 2003 | 0 | 0 | 3,200 | 33,300 | 6,700 | 257 | 38,200 |
| 2004 | 0 | 0 | 3,100 | 31,400 | 6,700 | 231 | 37,900 |
| 2005 | 0 | 0 | 3,100 | 29,500 | 6,700 | 231 | 37,400 |
| 2006 | 0 | 0 | 3,100 | 27,600 | 6,700 | 231 | 37,400 |
| 2007 | 0 | 0 | 3,000 | 25,600 | 6,700 | 236 | 37,000 |
| 2008 | 0 | 0 | 3,000 | 23,700 | 6,700 </td <td>241</td> <td>36,900</td> | 241 | 36,900 |

See Appendix B for sources.

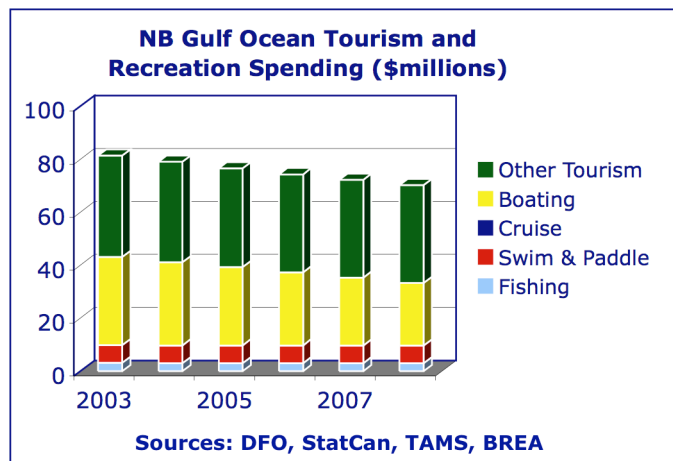
Key Factors

Primary markets

- U.S., Canada, and Europe.

Key issues

- **Cruise:** Decline in U.S. travel to Canada and reduced passenger spending.
- **Fishing:** Decline in active anglers and fishing days per angler, maintaining fish stocks.
- **Tourism:** Promoting domestic travel and interest in natural heritage.



7. Marine construction

Fundy

Overview

Marine construction includes building and maintaining fixed installations to facilitate marine transportation and the emerging energy sector. Such installations include wharves, jetties, piers and loading facilities to serve commercial shipping, ferry service, fishing and aquaculture, and recreational boating. The energy sector involves the new LNG terminal near Saint John. Here we flow 20% and 30% of the estimated terminal construction costs in 2006 and 2007 respectively, and the balance would be spent by completion in 2009. Marine construction is conducted by various private and public sector entities including private companies, port authorities, DFO (Small Craft Harbours) and local harbour authorities. Private construction data is not readily available, therefore, estimates are conservative. The value of construction work ranged from \$2.5 to about \$308 million between 2003 and 2007.

Performance

| Year | Expenditures (\$000s) | | | Total |
|------|-----------------------|-------------------|----------------------|---------|
| | Shipping Ports | Canaport Terminal | Small Craft Harbours | |
| 2003 | 3,400 | 0 | 4,000 | 7,400 |
| 2004 | 9,700 | 0 | 2,400 | 12,100 |
| 2005 | 1,500 | 0 | 1,000 | 2,500 |
| 2006 | 1,200 | 200,000 | 3,100 | 204,300 |
| 2007 | 3,500 | 300,000 | 4,400 | 307,900 |

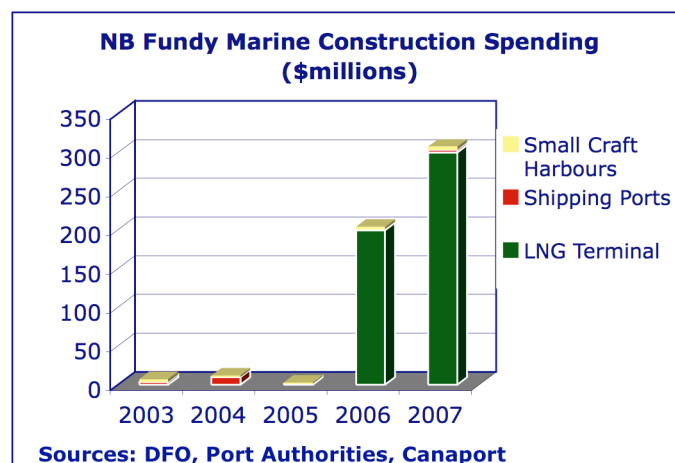
See Appendix B for sources.

Key Factors

Primary markets ■ New Brunswick.

Clientele ■ Supports the transportation and energy industries.
 ■ Secondary ports serve fisheries, mining and forestry.

Key issues ■ Developing the natural gas resources.
 ■ Developing infrastructure for Atlantic Gateway Initiative.
 ■ Managing multiple resource users in growth mode – energy, cruise tourism, and aquaculture.



Gulf

Overview

The main port on the Gulf of St. Lawrence coast, Belledune, has reported up to \$900,000 in capital maintenance and repairs. Dalhousie, Caraquet, and facilities in Miramichi have had minor repairs and maintenance. The DFO Small Craft Harbours program annually invests between \$200,000 and \$4 million in marine works along this coast. Private construction data is not readily available therefore estimates are conservative. The value of construction work ranged from \$1.1 to 5.2 million between 2003 and 2007.

Performance

| Year | Expenditures (\$000s) | | |
|------|-----------------------|----------------------|-------|
| | Shipping Ports | Small Craft Harbours | Total |
| 2003 | 300 | 3,600 | 3,900 |
| 2004 | 900 | 200 | 1,100 |
| 2005 | 2,300 | 2,900 | 5,200 |
| 2006 | 700 | 1,900 | 2,800 |
| 2007 | 600 | 600 | 1,200 |

See Appendix B for sources.

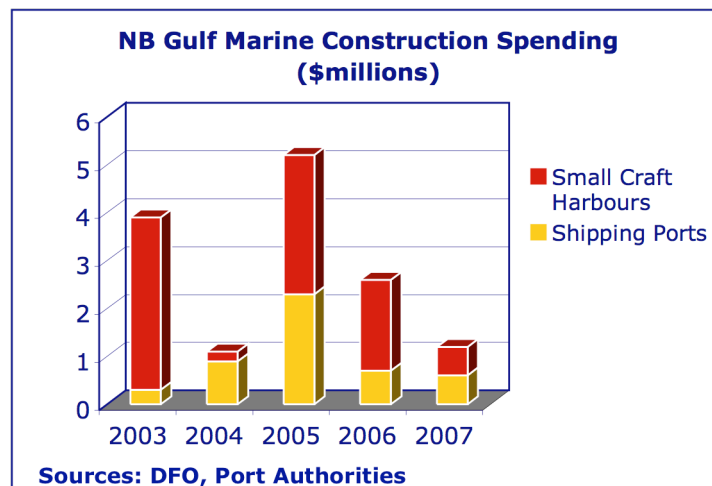
Key Factors

Primary markets ▪ New Brunswick.

Clientele ▪ NB Power, transportation and construction, fisheries, and forestry.

Key issues

- Loss of key clients in forestry sector.
- Identifying opportunities for short-sea shipping within the Atlantic region.
- Capital investment required to keep pace with modern shipping needs.



8. Shipbuilding & boat building

Overview

This industry is comprised of a concentration of private firms, making it necessary to report statistics for the province as a whole. There has been very little shipbuilding or repairing activity since Saint John Shipbuilding constructed its last vessel in 2000, with the permanent closure of the yard in 2003. Boat builders cater mainly to the fisheries and aquaculture industries in Caraquet, Miramichi, Cap Pelé, St. Stephen and St. George. Some boat building is completed for clients elsewhere in eastern Canada and up to \$3 million has been exported to the U.S in recent years.

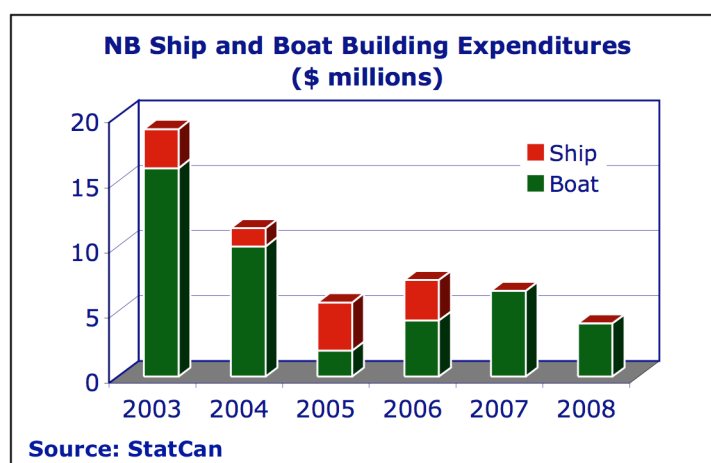
Performance

| Year | Number of Enterprises | Boat Building Output | Shipbuilding Output |
|------|-----------------------|----------------------|---------------------|
| | | (\$000s) | (\$000s) |
| 2003 | 26 | 16,000 | 3,000 |
| 2004 | 26 | 10,000 | 1,400 |
| 2005 | 25 | 2,000 | 3,700 |
| 2006 | 21 | 4,300 | 3,100 |
| 2007 | 26 | 6,600 | NA |
| 2008 | 26 | 4,100 | 2,800 |

See Appendix B for sources.

Key Factors

- Primary markets**
 - Eastern Canada and U.S.
- Operation & clientele**
 - Boat building and repair for fishing vessels, tugs, barges, pilot boats, and other small or medium craft.
- Key issues**
 - Highly dependent on the conditions in the fishing and aquaculture sectors.
 - Strong Canadian dollar coupled with weak U.S./Cdn economies present challenges.



9. Government and non-government organizations

Fundy

Overview

Federal and provincial government departments and agencies contribute to the value of the oceans sector in New Brunswick through management, conservation, protection, research and support of ocean activities. The economic impact occurs through the expenditures to implement these activities and carry out these functions. For the Bay of Fundy coast, the public sector spends over \$24 million on ocean-related activities, employing 352 personnel, scientists, managers, academics and officials.

Performance (2007/08)

| | Expenditures (000s) | | FTE |
|--|---------------------|--------------------|------------|
| | Salaries | Total Expenditures | |
| Federal Departments | | | |
| Fisheries and Oceans (DFO) | 15,856 | 26,364 | 240 |
| Transport Canada (TC) | 464 | 485 | 6 |
| Canadian Food Inspection Agency (CFIA) | 1,904 | 2,128 | 25 |
| Environment Canada (EC)* | 0 | 0 | 0 |
| Ocean research/universities | 225 | 832 | 3 |
| Provincial Departments | | | |
| Fisheries, Agriculture and Aquaculture (FAA) | 3,253 | 4,246 | 54 |
| Tourism and Parks (TAP) | 856 | 1,189 | 11 |
| Natural Resources (NR) / Environment (E) | 112 | 135 | 2 |
| Business NB / Regional Development (BNB) | 440 | 4,991 | 7 |
| ENGOS | 150 | 220 | 4 |
| Total | 23,260 | 24,713 | 352 |

*Although there may be some minor EC activity on Fundy these were not available and considered very small. Note: Parks Canada Agency (PCA) undertakes research at Fundy National Park related to the Inner Bay of Fundy Salmon population, but specific estimates of expenditures were not available and are considered to be relatively small.

Key Factors

Primary Activities

- Federal Public Sector - responsible for overseeing activities related to: resource management; economic, trade and industrial development; transportation and safety; health and environment, research and development.
- Provincial Public Sector - responsible for overseeing activities related to: transportation; economic development; and environmental monitoring.
- ENGOS - activities include advocacy and education that may be local or regional in scope.

Observations

- Departments of Fisheries and Oceans, and the Canadian Food Inspection Agency comprise the bulk of federal activities.
- Departments of Fisheries, Agriculture and Aquaculture, and Business New Brunswick represent the majority of marine related activities for the provincial government.

Gulf

Overview

Federal and provincial government departments and agencies contribute to the value of the oceans sector in New Brunswick through management, conservation, protection, research and support of ocean activities. The economic impact occurs through the expenditures to implement these activities and carry out these functions. For the Gulf of St Lawrence coast, the public sector spends over \$31 million on ocean-related activities, employing 416 personnel, scientists, managers, academics and officials.

Performance (2007/08)

| | Expenditures (\$000s) | | FTE |
|--|-----------------------|--------------------|------------|
| | Salaries | Total Expenditures | |
| Federal Departments | | | |
| Fisheries and Oceans (DFO) | 24,515 | 48,375 | 349 |
| Transport Canada (TC) | 386 | 405 | 5 |
| Canadian Food Inspection Agency (CFIA) | 1,496 | 1,672 | 20 |
| Environment Canada (EC) | 130 | 150 | 2 |
| Ocean research/universities | 150 | 390 | 2 |
| Provincial Departments | | | |
| Fisheries (DOF), Agriculture and Aquaculture (DAA) | 1,525 | 1,991 | 26 |
| Tourism and Parks (TAP) | 335 | 466 | 4 |
| Natural Resources (DNR) / Environment (DOE) | 112 | 135 | 2 |
| Business & Regional Development (BNB) | 143 | 2,270 | 2 |
| ENGOS | 150 | 220 | 4 |
| Total | 28,942 | 31,539 | 416 |

Note: Parks Canada Agency (PCA) performs research at Kougibouquac National Park related to Species At Risk Act (SARA) listed marine fish, but specific estimates of expenditures were not available and are considered to be relatively small.

Key Factors

Primary Activities

- Federal Public Sector – responsible for overseeing activities related to: resource management; sovereignty and defence; economic, trade and industrial development; transportation and safety; health and environment; research and development.
- Provincial Public Sector – responsible for overseeing activities related to: transportation; economic development; and environmental monitoring.
- ENGOS – activities include advocacy and education that may be local or regional in scope.

Observations

- Departments of Fisheries and Oceans, and the Canadian Food Inspection Agency comprise the bulk of federal activities.
- Departments of Fisheries, Agriculture and Aquaculture, and Business New Brunswick represent the majority of marine related activities for the provincial government.

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III ECONOMIC IMPACTS 2008

Economic impacts are generated using the Statistics Canada input-output model with the 2008 output data developed for each ocean activity in this report. Economic impacts are presented below by ocean activity showing New Brunswick totals and the breakdowns for each coast (Tables 2-9). Combining all sectors produces New Brunswick total impacts for the province as a whole and each coast (Table 10). The total impacts are set in the context of the New Brunswick economy (Table 11), followed by commentary for the key economic indicators and for each ocean activity. Comparisons are made between the findings in this report versus the last one completed in 2000 (Table 12). Finally, the New Brunswick results are set in the context of Atlantic region ocean activity.

1. Economic impacts by ocean activity

Table 2: Commercial fisheries economic impacts (2008)

| | Fundy | | | Gulf | | | Total | | |
|-------------------------|--------|----------|--------|--------|----------|---------|---------|----------|---------|
| | Direct | Spin-off | Total | Direct | Spin-off | Total | Direct | Spin-off | Total |
| GDP (\$000s) | 32,795 | 12,804 | 45,599 | 78,345 | 30,588 | 108,933 | 111,140 | 43,393 | 154,532 |
| Employment (FTE) | 496 | 207 | 703 | 1,185 | 494 | 1,680 | 1,682 | 701 | 2,383 |
| Income (\$000s) | 20,913 | 8,289 | 29,202 | 49,959 | 19,802 | 69,761 | 70,872 | 28,091 | 98,963 |

Source: Statistics Canada input-output model.

Table 3: Aquaculture economic impacts (2008)

| | Fundy | | | Gulf | | | Total | | |
|-------------------------|--------|----------|---------|--------|----------|-------|--------|----------|---------|
| | Direct | Spin-off | Total | Direct | Spin-off | Total | Direct | Spin-off | Total |
| GDP (\$000s) | 61,113 | 52,853 | 113,967 | 364 | 314 | 678 | 61,477 | 53,168 | 114,645 |
| Employment (FTE) | 911 | 907 | 1,818 | 5 | 5 | 11 | 916 | 913 | 1,829 |
| Income (\$000s) | 25,628 | 27,363 | 52,991 | 152 | 163 | 315 | 25,781 | 27,526 | 53,307 |

Source: Statistics Canada input-output model.

Note: Although several hundred individuals participate in Gulf aquaculture, it is only for a limited duration resulting in a small direct employment estimate from the input-output model.

Table 4: Seafood processing economic impacts (2008)

| | Fundy | | | Gulf | | | Total | | |
|-------------------------|--------|----------|---------|--------|----------|---------|---------|----------|---------|
| | Direct | Spin-off | Total | Direct | Spin-off | Total | Direct | Spin-off | Total |
| GDP (\$000s) | 85,400 | 30,966 | 116,366 | 79,600 | 28,863 | 108,463 | 165,000 | 59,829 | 224,829 |
| Employment (FTE) | 1,900 | 609 | 2,509 | 1,771 | 567 | 2,338 | 3,671 | 1,176 | 4,847 |
| Income (\$000s) | 59,780 | 19,813 | 79,593 | 55,720 | 18,467 | 74,187 | 115,500 | 38,280 | 153,780 |

Source: Statistics Canada input-output model.

Notes: Spin-off values avoid double-counting impacts related to fisheries and aquaculture. The input-output model direct employment estimate is slightly higher than the 2008 employment figure from province since the model is only based on estimated industry average salaries.

Table 5: Water transportation economic impacts (2008 estimate)

| | Fundy | | | Gulf | | | Total | | |
|-------------------------|--------|----------|--------|--------|----------|--------|--------|----------|---------|
| | Direct | Spin-off | Total | Direct | Spin-off | Total | Direct | Spin-off | Total |
| GDP (\$000s) | 57,034 | 31,820 | 88,854 | 6,394 | 3,568 | 9,962 | 63,428 | 35,388 | 98,816 |
| Employment (FTE) | 968 | 624 | 1,592 | 109 | 70 | 179 | 1,077 | 694 | 1,770 |
| Income (\$000s) | 58,174 | 39,571 | 97,745 | 6,534 | 4,439 | 10,973 | 64,708 | 44,010 | 108,718 |

Source: Statistics Canada input-output model.

Note: The 2008 output estimate is an average of the previous years of available data.

Table 6: Tourism and recreation economic impacts (2008)

| | Fundy | | | Gulf | | | Total | | |
|-------------------------|--------|----------|---------|--------|----------|--------|---------|----------|---------|
| | Direct | Spin-off | Total | Direct | Spin-off | Total | Direct | Spin-off | Total |
| GDP (\$000s) | 71,840 | 60,705 | 132,545 | 28,120 | 23,761 | 51,881 | 100,000 | 84,500 | 184,500 |
| Employment (FTE) | 2,335 | 2,644 | 4,979 | 914 | 1,035 | 1,949 | 3,250 | 3,680 | 6,930 |
| Income (\$000s) | 59,268 | 90,159 | 149,427 | 23,199 | 35,291 | 58,490 | 82,500 | 125,500 | 208,000 |

Source: Statistics Canada input-output model.

Table 7: Marine construction economic impacts (2008)

| | Fundy | | | Gulf | | | Total | | |
|-------------------------|---------|----------|---------|--------|----------|-------|---------|----------|---------|
| | Direct | Spin-off | Total | Direct | Spin-off | Total | Direct | Spin-off | Total |
| GDP (\$000s) | 146,880 | 124,114 | 270,994 | 400 | 338 | 738 | 147,280 | 124,452 | 271,732 |
| Employment (FTE) | 2,203 | 4,737 | 6,940 | 6 | 13 | 19 | 2,209 | 4,750 | 6,959 |
| Income (\$000s) | 95,472 | 177,137 | 272,609 | 260 | 482 | 742 | 95,732 | 177,620 | 273,352 |

Source: Statistics Canada input-output model.

Table 8: Shipbuilding and boat building economic impacts (2008 estimate)

| | Fundy | | | Gulf | | | Total | | |
|-------------------------|--------|----------|-------|--------|----------|-------|--------|----------|-------|
| | Direct | Spin-off | Total | Direct | Spin-off | Total | Direct | Spin-off | Total |
| GDP (\$000s) | 1,989 | 1,166 | 3,155 | 841 | 420 | 1,261 | 2,829 | 1,587 | 4,416 |
| Employment (FTE) | 40 | 19 | 59 | 21 | 8 | 29 | 60 | 27 | 88 |
| Income (\$000s) | 1,783 | 793 | 2,575 | 1,251 | 429 | 1,679 | 3,033 | 1,222 | 4,255 |

Source: Statistics Canada input-output model.

Note: The 2008 output estimate is an average of the previous years of available data.

Table 9: Government and non-government economic impacts (2007/08)

| | Fundy | | | Gulf | | | Total | | |
|-------------------------|--------|----------|--------|--------|----------|--------|--------|----------|--------|
| | Direct | Spin-off | Total | Direct | Spin-off | Total | Direct | Spin-off | Total |
| GDP (\$000s) | 17,968 | 14,936 | 32,904 | 20,413 | 21,467 | 41,880 | 38,131 | 36,284 | 74,416 |
| Employment (FTE) | 210 | 145 | 356 | 278 | 137 | 415 | 485 | 281 | 766 |
| Income (\$000s) | 17,801 | 7,987 | 25,788 | 20,317 | 8,331 | 28,648 | 37,869 | 16,217 | 54,086 |

Source: Statistics Canada input-output model.

Table 10: New Brunswick total economic impacts (2008)

| | Fundy | | | Gulf | | | Total | | |
|-------------------------|---------|----------|---------|---------|----------|---------|---------|----------|-----------|
| | Direct | Spin-off | Total | Direct | Spin-off | Total | Direct | Spin-off | Total |
| GDP (\$000s) | 475,019 | 328,618 | 802,489 | 214,266 | 109,236 | 323,502 | 689,285 | 437,854 | 1,125,991 |
| Employment (FTE) | 9,044 | 9,881 | 18,925 | 4,287 | 2,329 | 6,617 | 13,331 | 12,210 | 25,541 |
| Income (\$000s) | 338,286 | 370,748 | 709,035 | 157,176 | 87,353 | 244,529 | 495,462 | 458,101 | 953,563 |

Source: Statistics Canada input-output model.

2. Ocean activity and the New Brunswick economy

The direct GDP impact of the ocean sector in the New Brunswick economy is estimated at \$689 million in 2008. The direct impact accounts for about 2.5% of provincial GDP. When spin-off impacts in the broader economy are considered, the GDP impact rises to \$1.1 billion, 4.1% of the New Brunswick total (Table 11).

Table 11: Economic impact of ocean activities in New Brunswick 2008

| Indicator | Direct Impact | | | Total Impact | | |
|-----------------------------|---------------|----------|---------------------|--------------|----------|---------------------|
| | Ocean impact | NB Total | Ocean % of NB Total | Ocean impact | NB Total | Ocean % of NB Total |
| GDP (\$ millions) | 689 | 27,372 | 2.5% | 1,126 | 27,372 | 4.1% |
| Employment | 13,331 | 344,770 | 3.9% | 25,541 | 344,770 | 7.4% |
| Income (\$ millions) | 495 | 12,623 | 3.9% | 954 | 12,623 | 7.6% |

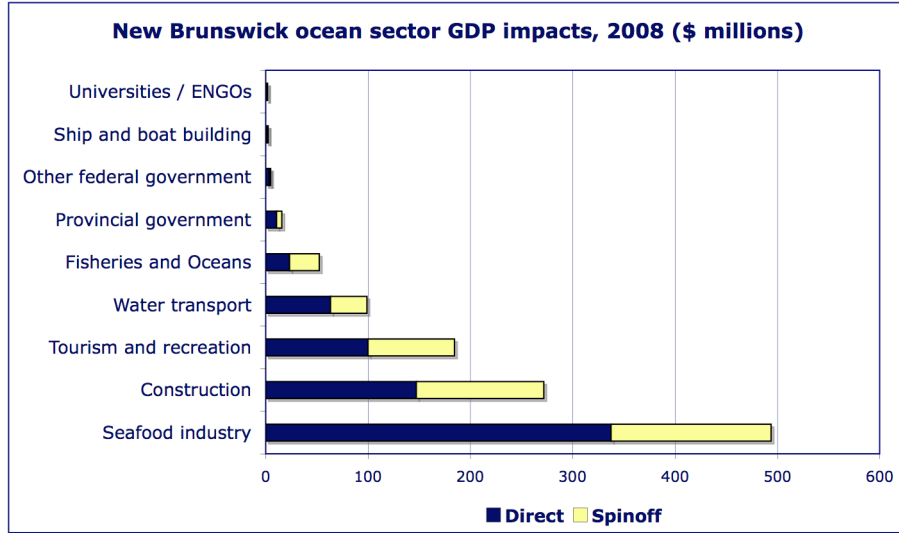
Sources: Impact results by sector; Statistics Canada, CANSIM 384-0002; Census of Canada, 2006.

Ocean activity also makes a major contribution to labour income, a major component of GDP. Ocean activities generated \$495 million in income in 2008, about 3.9% of the provincial total. This rises to 7.6% of the total when spin-off impacts are included.

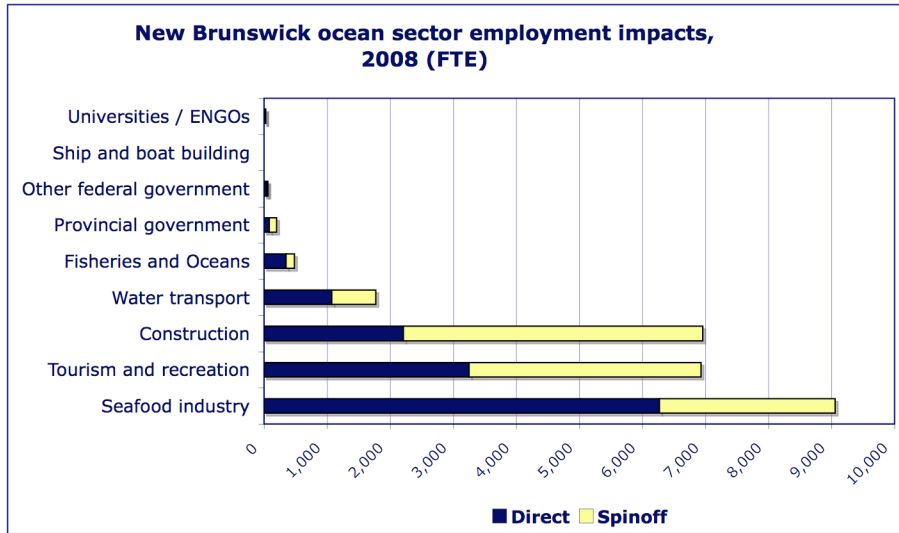
Employment impacts are comparable in relative scale to GDP. Ocean activities created just over 13,300 direct jobs (full-time equivalent) in 2008, a figure that is 3.9% of the provincial total employment. The spin-off impact increases this to just over 25,500 jobs, or 7.4% of total provincial employment. One in fourteen New Brunswick jobs is in some way dependent on the oceans.

- **GDP:** The seafood industry (fishing, aquaculture and seafood processing) ranks first with 44% of ocean related GDP. Ports and harbours construction is second with 24%, followed by tourism and recreation at 16%. Water transportation including associated support services contributes 9%, then all remaining sectors add 7% including: shipbuilding and boat building, government, and non-government research, education, and advocacy organizations.
- **Employment:** The seafood industry (fishing, aquaculture and seafood processing) ranks first with 36% of ocean related employment. Ports and harbours construction is tied for second with tourism and recreation both at 27%. Water transportation, including associated support services, contributes 7%, then all remaining sectors add 3% including: shipbuilding and boat building, government, and non-government research, education, and advocacy organizations.
- **Income:** The seafood industry (fishing, aquaculture and seafood processing) ranks first with 32% of ocean related income. Ports and harbours construction is second with 29%, followed by tourism and recreation at 22%. Water transportation including associated support services contributes 11%, then all remaining sectors add 6% including: shipbuilding and boat building, government, and non-government research, education, and advocacy organizations.

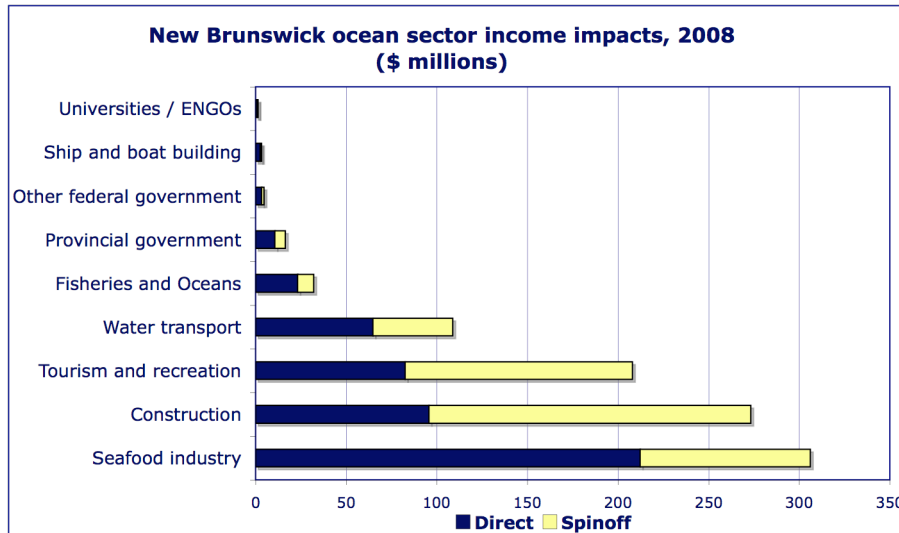
**Figure 2:
GDP
impact**



**Figure 3:
Employment
impact**



**Figure 4:
Income
impact**



3. *Impacts by activity*

Impacts for each marine activity, 2003-2008, are set out in detail in Appendix C. In brief:

- **Seafood industry:** includes the commercial fishery, aquaculture and seafood processing, with the overall impact adjusted for double counting.* It ranks first in terms of its contribution to GDP, employment and income. Impacts in 2007 and 2008 are slightly down from those in 2003 and 2004 and down about 20% since the late 1990s, mainly in the commercial fishery and seafood processing industries due to weakening seafood markets. The industry generates a substantial direct impact, while also creating considerable economic activity in supporting industries. This is key to the economic health of many coastal communities.
- **Water transportation and support services:** captures both shipping (cargo and passenger) and support activities (port services, cargo handling, navigation support). This sector ranks third in terms of its contribution to GDP, employment, and income. The relatively large indirect impacts (GDP, employment and income) reflect the strong linkages in the broader economy, including the dependence on trucking, warehousing and various agency services. This industry's impact (in absolute and relative terms) has been steady over the period from 2003 to 2007, with the decline in some ports offset by expansion of activities in others.
- **Tourism and recreation:** is composed of recreational fishing (marine), cruise ship traveler and crew spending, coastal tourism (including whale watching), marine paddling and swimming. This sector ranks second overall, although it provides proportionally more jobs than its GDP. This reflects the labour intensiveness of the industry, and also the relatively low wages paid and margins earned. It also has a very high ratio of indirect and induced impacts (spinoffs), demonstrating its interconnectedness with many other sectors. The decline in this sector is driven mainly by reductions in recreational boating and coastal tourism, while cruise industry activity is up and other components are steady.
- **Construction:** marine construction includes major ports and small-craft harbours. These support the construction industry and, although activity is highly variable from year to year, it has been up substantially in recent years mainly due to the LNG project at the port of Saint John. Construction is an industry that is well integrated into the economy as evidenced by the relatively large spin-off impacts.
- **Shipbuilding/repair and boat building:** two traditional activities in New Brunswick have suffered steep declines. The closure of the shipyard in Saint John signaled the end of shipbuilding as a major industry. The fortunes of the boat building industry are tied closely to the health of the fishing industry and increasingly to the recreational market.
- **Fisheries and Oceans:** leads the public sector by a narrow margin over the sum of the provincial government departments involved in marine sector activities. The broad mandate of the department, including fisheries management, Integrated Oceans Management, Coast Guard, and ocean science account for its substantial presence and impact in the provincial economy. The GDP spinoff effect is larger than direct impact, however the reverse is true for its employment and income impacts. This likely reflects the substantial amount of grants and contributions provided by the department which go to capital intensive projects.

* Double counting occurs if the impacts of fishing, aquaculture and fish processing are simply added to give an overall impact of the fishing industry. This is because the total would count the *direct* impacts of fishing and aquaculture in their own right, and also as *indirect* impacts of fish processing (because fishing and aquaculture supply inputs to the fish processing industry). Giving zero value to purchases from the fishing and aquaculture industries when running the I-O model for fish processing, eliminates double counting.

- **Other federal departments:** two other federal departments (Transport Canada and Environment Canada) and one agency (Canadian Food Inspection Agency), combine to generate about \$2.5 million in direct and spinoff GDP. The roles of staff are critical to managing, regulating and supporting human safety and health, as well as environmental protection related to marine resources.
- **Provincial departments:** are led by Fisheries, Agriculture and Aquaculture, followed by Tourism and Parks, Natural Resources, Environment, Business New Brunswick, and Economic Development. Taken together, these departments generate comparable impacts to those of Fisheries and Oceans Canada. Their activities in aggregate have remained steady over the period 2003-2008.
- **Universities/research and ENGOs:** these activities make a significant contribution to the ocean economy. The impact of universities, research institutes, and environmental non-government organizations can be measured by their contribution to GDP and employment, but their real impact occurs through the development and transfer of knowledge about the ocean and its various functions.

4. **How output value compares: 2008 vs. 1995-97 avg.**

The absolute value of the marine economy increased in current dollar terms, rising from \$1,479 (in the 2000 report) to 2,039 million (Table 12). When the 1995-97 values are expressed in 2008 dollars (adjusted for inflation), the data indicate that the *real value* of the marine economy increased from \$1,835 to \$2,039 million (an increase of 11%).

Table 12: Marine activity output values – 2000 Report vs. 2010 Report

| | Output (\$000s current dollars) | | 1995-97 values | (3) - (2) |
|-----------------------------------|---------------------------------|-----------|---------------------|-----------|
| | 2000 (1) | 2010 (2) | in 2008 dollars (3) | % change |
| Commercial fishing | 165,000 | 161,000 | 204,600 | -21% |
| Aquaculture | 131,300 | 198,300 | 162,812 | 22% |
| Seafood processing | 616,400 | 824,800 | 764,336 | 8% |
| Water transportation (4) | 153,300 | 134,000 | 190,092 | -30% |
| Tourism (5) | 25,900 | 250,000 | 32,116 | 678% |
| Marine construction | 17,800 | 368,300 | 22,072 | 1569% |
| Shipbuilding/Boat building | 301,700 | 6,900 | 374,108 | -98% |
| Federal departments | 49,100 | 79,100 | 60,884 | 30% |
| Provincial departments | 16,800 | 15,400 | 20,832 | -26% |
| Universities | 2,400 | 1,300 | 2,976 | -56% |
| ENGOs | n.a. | 400 | NA | NA |
| Total (6) | 1,479,700 | 2,039,500 | 1,834,828 | 11% |

1. Based on average for 1995-97.

2. Based on 2008 data.

3. 1995-97 average adjusted for inflation.

4. GDP converted to value of output by Gardner Pinfold.

5. Methodology for estimating tourism output changed substantially between reports.

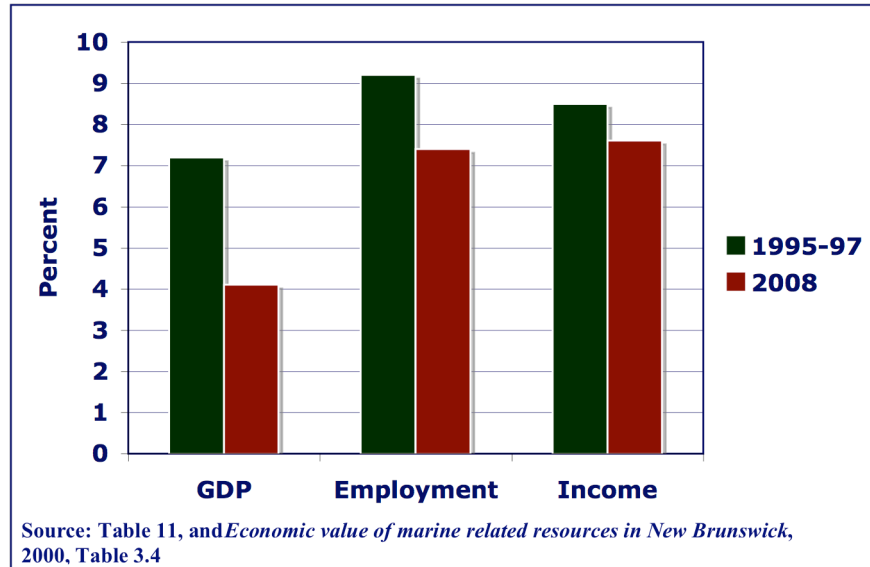
6. Total nets out aquaculture and fishing from seafood processing.

To gain some insight into the relatively small increase in marine industry value over the years, it is essential to look at the individual sectors, where major increases in some have been offset by major declines in others. Taking each in turn:

- **Commercial fishing:** the value of output has remained stable in current dollar terms over the past decade (at about \$160-170 million). While there have been some shifts in the quantity landed among species, essentially the fishery is fully exploited and any gains in value of output would come mainly from improvements in market conditions – prices and exchange rates. But during this period, the shifts tended to work against the industry. After rising for several years, prices in major export markets (mainly the U.S.) declined after 2005, particularly for crab and lobster. To make matters worse, the value of the U.S. dollar dropped by about 40% in Canadian dollar terms between 2002 and 2007. In short, the industry has stood still in current dollar terms. When 2-3% annual inflation is taken into consideration, the real value of the industry has declined. Table 12 shows that when 1995-97 avg. is expressed in 2008 dollars, it is higher by about \$40 million than the 2008 value.
- **Shipbuilding and boat building:** this industry has declined substantially from its position in the 1990s when Saint John Shipbuilding was one of the lead yards in the Canadian Frigate Program. The industry in 2008 was about 2.5% of its size in the 1995-1997 period (\$7.0 vs. \$300.0 million). Not only has this decline affected direct impacts, but shipbuilding had strong backward linkages into the economy generating extensive spinoff impacts.
- **Aquaculture:** though performance has been adversely affected by disease and weak economics leading to consolidations, the industry is stronger than it was in the late 1990s. The value of output and contribution to economic impacts have increased in real terms, despite the adverse exchange rate impact. So, from a relative impact perspective, aquaculture is a good news story.
- **Seafood processing:** the value of output and contribution to economic impacts have increased relative to the late 1990s (the value of output has increased by about 35% in current dollar terms). Part of this is due to increases in salmon aquaculture throughput, but much of this is due to increases in lobster processing based on imported lobster from Maine. So, despite a weaker U.S. dollar, seafood processing has been able to increase its *relative* position in constant dollar terms (up by about 7%).
- **Marine construction:** the construction of the LNG terminal in Saint John accounts for the almost 20-fold increase in output value in this sector. Such projects are rare, with the industry typically characterized by routine upgrades and maintenance at established ports.
- **Water transportation:** this sector, one of the largest in the 2000 report (output value of \$153 million), has declined by about 40% in current dollar terms (to GDP of about \$100 million). The decline in natural resource industries (forestry in particular) accounts for much of this shift.
- **Marine tourism:** the impact estimates in this report are not directly comparable to those appearing in the 2000 report. This is because different approaches were taken to estimating tourism activity. The availability of more extensive survey data allowed the authors of this report to generate a more comprehensive estimate of marine tourism.

The full extent of the shift is evident when the indicators are expressed relative to the change in the value of activity in the New Brunswick economy as a whole. For example, provincial GDP (current dollar terms) nearly doubled from a 1995-97 average of \$14.3 billion to \$27.4 billion in 2008. Figure 5 shows that marine sector contribution to provincial GDP decreased from 7.2 to 4.1%. This drop in relative importance should not be surprising, given the respective changes in provincial GDP (doubling) and marine activity GDP (up by just 14%). The share of provincial employment declined from 9.2 to 7.4%, and the share of provincial labour income slipped from 8.5 to 7.6%.

Figure 5: Ocean sector impact as percent of New Brunswick economy: 1995–97 vs. 2008 (current dollars)



5. Atlantic region context

Each of the four Atlantic provinces have completed ocean sector studies covering different years and employing small variations in methodology. The recent national report on *Economic impacts of marine activities in Canada* (Gardner Pinfold, 2009) provides a basis for comparing ocean activity across the Atlantic provinces including the findings for New Brunswick in this report.

The national study reports impacts for 2006 so these are inflated for comparison with the 2008 New Brunswick values. The national report also includes Québec and Ontario in the Atlantic region therefore values for NB, PEI, NS, and NL have been extracted from the national report and total impacts for the key economic indicators are shown in Table 13.

Comparing the adjusted national report findings with findings in this report, New Brunswick total GDP, employment, and income values have risen by about 4%, 17%, and 18% respectively from 2006-2008. The increase is largely attributable to the LNG terminal construction in Saint John, although some changes in other sectors have also contributed to the shift.

Table 13: Atlantic provinces ocean activity economic impact values

| | NB '08 | NB '06* | PEI '06* | NS '06* | NL '06* | Atlantic '06* |
|-------------------------|-----------|-----------|----------|-----------|------------|---------------|
| GDP (\$000s) | | | | | | |
| Direct | 689,285 | 634,899 | 216,606 | 2,941,940 | 8,361,952 | 12,155,396 |
| Spinoff | 437,854 | 446,832 | 144,393 | 1,534,051 | 2,218,354 | 4,343,630 |
| Total | 1,125,991 | 1,081,731 | 360,999 | 4,475,991 | 10,580,306 | 16,499,027 |
| Employment (FTE) | | | | | | |
| Direct | 13,331 | 12,545 | 4,882 | 39,021 | 21,318 | 77,767 |
| Spinoff | 12,210 | 9,268 | 3,169 | 26,132 | 14,834 | 53,402 |
| Total | 25,541 | 21,813 | 8,051 | 65,153 | 36,152 | 131,169 |
| Income (\$000s) | | | | | | |
| Direct | 495,462 | 457,053 | 163,722 | 1,746,824 | 1,018,048 | 3,385,647 |
| Spinoff | 458,101 | 347,553 | 95,707 | 1,083,705 | 577,525 | 2,104,490 |
| Total | 953,563 | 804,606 | 259,429 | 2,830,529 | 1,595,573 | 5,490,137 |

Source: Gardner Pinfold, 2009. Economic impact of marine activities in Canada.

*Adjusted for inflation to compare with 2008 NB values.

New Brunswick's share of overall ocean activity in Atlantic Canada is about 7%, 20%, and 17% for GDP, employment, and income respectively. When the dominant offshore oil and gas activity in NS and NL are removed, New Brunswick's shares of GDP, employment, and income fall in the 15-20% range.

To compare the relative scale of ocean activities within each of the Atlantic provinces, the total economic impact of ocean activities is expressed as a percentage of the respective provincial economy totals (Table 14).

Table 14: Relative economic impacts of ocean activities in the Atlantic provinces

| Indicator | Ocean total | Province Total | Ocean % of Total |
|-------------------------|-------------|----------------|------------------|
| GDP (\$000s) | | | |
| NB 08 | 1,125,991 | 27,372,000 | 4.1% |
| NB 06* | 1,081,731 | 25,884,000 | 4.2% |
| PEI 06* | 360,999 | 4,249,000 | 8.5% |
| NS 06* | 4,475,991 | 31,743,000 | 14.1% |
| NL 06* | 10,580,306 | 26,052,000 | 40.6% |
| Employment (FTE) | | | |
| NB 08 | 25,541 | 364,171 | 7.0% |
| NB 06* | 20,864 | 364,171 | 5.7% |
| PEI 06* | 8,051 | 289,604 | 2.8% |
| NS 06* | 65,153 | 391,762 | 16.6% |
| NL 06* | 36,152 | 186,183 | 19.4% |
| Income (\$000s) | | | |
| NB 08 | 953,563 | 13,227,700 | 7.2% |
| NB 06* | 804,606 | 12,315,900 | 6.5% |
| PEI 06* | 259,429 | 2,223,800 | 11.7% |
| NS 06* | 2,830,529 | 16,568,300 | 17.1% |
| NL 06* | 1,595,573 | 8,093,600 | 19.7% |

Sources: Impact results by sector; Statistics Canada, CANSIM 202-0107; Census of Canada, 2006.

*Adjusted for inflation to compare with 2008 NB values.

- ❑ **GDP:** Ocean activities represent about 4%, 8%, 14%, and 41% of the total provincial GDP in NB, PEI, NS, and NL respectively.
- ❑ **Employment:** Ocean activities represent about 7%, 3%, 17, and 19% of the total provincial employment in NB, PEI, NS, and NL respectively.
- ❑ **Income:** Ocean activities represent about 7%, 12%, 17%, and 20% of the total provincial earned income in NB, PEI, NS, and NL respectively.

The larger ocean sectors in NS and NL are primarily a reflection of the offshore oil and gas exploration and extraction occurring there. This affects all three indicators but especially GDP. When offshore oil and gas extraction and exploration activity is removed from NS and NL totals, the resulting shares are more comparable across the region (Table 15).

Table 15: Relative economic impacts of ocean activities in the Atlantic provinces when oil and gas exploration and extraction is removed from NS and NL

| Indicator | Ocean total | Province Total | Ocean % of Total |
|-------------------------|-------------|----------------|------------------|
| GDP (\$000s) | | | |
| NB 08 | 1,125,991 | 27,372,000 | 4.1% |
| NB 06* | 1,081,731 | 25,884,000 | 4.2% |
| PEI 06* | 360,999 | 4,249,000 | 8.5% |
| NS 06* | 3,463,138 | 31,743,000 | 10.9% |
| NL 06* | 2,035,527 | 26,052,000 | 7.8% |
| Employment (FTE) | | | |
| NB 08 | 25,541 | 364,171 | 7.0% |
| NB 06* | 20,864 | 364,171 | 5.7% |
| PEI 06* | 8,051 | 289,604 | 2.8% |
| NS 06* | 59,921 | 391,762 | 15.3% |
| NL 06* | 29,476 | 186,183 | 15.8% |
| Income (\$000s) | | | |
| NB 08 | 953,563 | 13,227,700 | 7.2% |
| NB 06* | 804,606 | 12,315,900 | 6.5% |
| PEI 06* | 259,429 | 2,223,800 | 11.7% |
| NS 06* | 2,590,530 | 16,568,300 | 15.6% |
| NL 06* | 1,237,075 | 8,093,600 | 15.3% |

Sources: Impact results by sector; Statistics Canada, CANSIM 202-0107; Census of Canada, 2006.

- ❑ **GDP:** When oil and gas exploration and extraction is removed, ocean activities represent about 4%, 8%, 11%, and 8% of the total provincial GDP in NB, PEI, NS, and NL respectively.
- ❑ **Employment:** When oil and gas exploration and extraction is removed, ocean activities represent about 7%, 3%, 15, and 16% of the total provincial employment in NB, PEI, NS, and NL respectively.
- ❑ **Income:** When oil and gas exploration and extraction is removed, ocean activities represent about 7%, 12%, 16%, and 15% of the total provincial earned income in NB, PEI, NS, and NL respectively.

IV LOOKING AHEAD

1. Commercial fisheries

The fisheries in the Gulf and Bay of Fundy are fully utilized. Any change in production and economic impact would depend primarily on resource and market conditions (including conditions in foreign exchange markets). The slight decline in the economic impact over the past decade (in constant dollar terms) is attributable to the shifts in these factors. Lobster landings have generally been favourable, with some areas stable or rising, while others have declined. Crab landings were strong for much of the decade, but began a cyclical downturn starting 2-3 years ago and hit a low point in 2010. Shrimp and herring landings have been stable, though markets have been weak. The fishery generally has been hit by the strength of the Canadian dollar, resulting in lower shore prices since 2003.

The fishery is currently facing challenges. The global recession has caused demand to weaken and prices to drop to levels not seen for over a decade. To make matters worse, operating costs have risen significantly over the past five years, resulting in negative incomes for many in the industry. In the short term – the next 2-3 years – conditions should improve moderately as our major trading partners emerge from the recession and demand for seafood increases. In the long term, markets will recover, but there is little optimism that the industry will return to the position of strong economic performance that it experienced a decade ago. This is mainly due to the strength of the Canadian dollar. As economies begin to recover from the recession, we can expect demand for commodities to grow, adding further strength to the dollar. This is not good news for the fishery. Some attrition may occur and this could improve viability for those remaining.

2. Aquaculture

The aquaculture industry is dominated by salmon, a sector that faced several challenges over the past decade, including weak markets, disease and the need to adjust to a new management system. It has emerged from the decade with renewed strength, partly the result of industry consolidation, and partly due to a more stringent bay management regime. Though the industry has little or no room for expansion in the Fundy Isles area, it has been able to strengthen its position by expanding into Nova Scotia and Newfoundland and Labrador. And despite facing the same adverse exchange rate shifts as the commercial fishery, these have not had as great an impact partly because the industry markets a higher proportion of production in Canada, but also because higher prices, particularly since 2008 (due to the sharp drop in production in Chile), have offset the strengthening dollar.

The salmon industry appears to have reached the limits of physical growth. It will continue to play an important role in the economy of Charlotte County, but the scope for expansion in inshore areas is constrained by biophysical conditions and sound management. There is the possibility of expansion into offshore areas as technology develops. Also, there is the possibility of diversification into other species (e.g., cod, halibut, haddock); but technology, costs of production and market conditions would have to improve before these become commercially viable. Shellfish aquaculture on the Gulf shore is currently underutilizing the available resource and could grow in the long term (beyond 5 years) with improved market conditions.

3. Seafood processing

The seafood processing industry is dependent mainly on the health of the commercial fishery in the Maritimes region, though for the past 10-15 years has grown increasingly dependent on lobster imported from Maine. The latter is important from an economic impact perspective because it allows plants to utilize their capital more effectively, and by extending the season, also to provide more attractive employment opportunities. Short seasons are a problem not only because of the investment needed to meet peak supply, but also because it sets up a highly competitive environment for raw material. This results in narrow margins for processing companies. Short seasons are also a problem for plants because, with changing demographics, it is becoming increasingly difficult to find workers.

Generally, the processing industry is unlikely to grow from its current size. The number and capacity of plants is tied to the local harvest and whatever the industry can import from the other Maritime Provinces and Maine. No significant increases in the resource and landings are expected in any of the key species. Industry impact as measured in terms of output, GDP, jobs and income, is likely to be lower in the short run, until the crab resource recovers. In the long run, industry revenues will increase from current levels as economies emerge from the recession. Whether revenues (and impacts) will return to the billion dollar range as they were in 2002-03 is more difficult to say. Since then, the value of the Canadian dollar has strengthened against most currencies, dropping the value of exports in Canadian dollar terms.

4. Water transportation

The level of activity in water transportation (shipping and ports) is tied to the levels of imports and exports. These have been fairly stable over the past decade, with two ports, Saint John and Belledune accounting for most of the traffic. The industries behind the shipping data, oil refining and electrical generation, are themselves fairly stable, tied as they are to the capacity of the production facilities.

Water transportation is expected to show increased economic activity in the future as a result of the start-up in 2009 of the LNG facility at Canaport outside Saint John. Further LNG shipping activity will occur as holding and processing capacity increases at the site. Other factors that could affect shipping are a recovery of export industries as the recession ends (forestry and mining). Developments tied to the Atlantic Gateway could also provide a stimulus to shipping traffic through New Brunswick ports.

5. Tourism and recreation

Most of the tourism activity in the Atlantic Provinces is generated from within the region, and primarily from within each province. The tourism statistics reflect this, with fairly stable travel and expenditure patterns over time. This is not expected to change in the foreseeable future.

6. Marine construction

The major marine construction project – the LNG terminal at Canaport – was completed over a 2006-2009 schedule. This project accounts for most of the impact in this sector. Other projects consisted of routine construction and maintenance at major ports (Saint John and Belledune) and small craft harbours.

Looking ahead, there are no major projects on the horizon but there will be stimulus from Canada's Economic Action Plan. The Action Plan will direct investment in small craft harbours and other marine infrastructure. Impacts in this sector will also continue to flow from routine construction and maintenance.

7. Shipbuilding and boat building

Activity in this sector has dropped significantly since the closure of Saint John Shipbuilding, the province's only shipyard, in 2003. Activity in the few boatyards is derived mainly from the fishing and aquaculture industries. With relative stability forecast for these industries for the next several years, we can expect output and impacts for boatbuilding at the same level as in recent years.

8. Federal departments

Departmental activity and spending have been stable over the past several years. Their primary roles are expected to continue including responsibilities for: resource management, sovereignty and defence, economic, trade and industrial development, transportation and safety, health and environment, research and development. There are no indications that departmental budgets or staff numbers are likely to change substantially in the near future.

9. Provincial departments

Like their federal counterparts, activity and spending have been stable over the past several years. Their primary roles are expected to continue including responsibilities for: transportation, economic development, and environmental monitoring. Likewise there are no indications that departmental budgets or staff numbers are likely to change substantially in the near future.

10. Others

Some additions may appear in future updates including: marine-based energy, marine technology and high-tech manufacturing, marine related-professional services, and ecosystem services. Marine-based energy developments including oil and gas, tidal, wave, and wind may grow in the future. With natural gas production in New Brunswick, an energy sector will emerge in the next update to this report. Marine technology including navigation equipment, data collection devices, and biotechnology already exist in New Brunswick but they are difficult to distinguish from land or air technology research and development. The same problem exists for professional services such as marine architects, marine insurance, marine law and others. It may be possible to track these more clearly in the future. Finally, ecosystem services are widely considered to be critical and efforts are underway to determine measures and indicators suitable for reporting.

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Appendix A: Marine Activity Definitions

These are the formal definitions of the marine industries under NAICS

- ❑ **Commercial fishing:** NAICS #11411 – harvesting fish from natural habitat using specialized vessels and gear. Vessels include trawlers, seiners, trollers, long-liners and various open-decked boats used for lobster, crab and dive fisheries. Gear includes, trawl, long-line, purse seine, hook and line, and various traps and pots.
- ❑ **Aquaculture:** NAICS #11251 – establishments engaged in farm raising and production of aquatic animals in controlled environments and using various forms of intervention (e.g., net pens, cages, various suspension systems) to enhance production including stocking, feeding and protecting from predators and disease.
- ❑ **Seafood product preparation and packaging:** NAICS #31171 – establishments engaged in dressing, filleting, canning, smoking, salting and freezing fish, and shucking and packing shellfish. Factory ships are included in this industry.
- ❑ **Water transportation:** NAICS #48311 – this industry consists of establishments primarily engaged in deep sea, coastal, Great Lakes and St. Lawrence Seaway shipping services for freight and passengers (including ferries and cruise ships). Only the impacts arising from deep sea and coastal shipping (including ferries and cruise ships) are included in this study.
- ❑ **Support Activities for Water Transportation:** NAICS #4883 – this industry consists of four sub-components: port and harbour operations, marine cargo handling, navigational services (piloting, tugboat, docking, salvage) and other services to water transportation (cargo surveyors/checkers, vessel supply services, floating drydock for maintenance).
- ❑ **Recreational fishing:** this includes salt-water and estuarial fishing using charter vessels and guides, as well as own vessels and facilities.
- ❑ **Cruise ship travel:** NAICS #4331 – this sector has emerged over the past decade as a major seasonal source of tourism activity. On the east coast, cruise lines offer return trips between northeast U.S. and ports on the St. Lawrence, with various ports of call in the Atlantic Provinces. On the west coast, Vancouver is a home-port, with several ports of call en route to Alaska.
- ❑ **Coastal tourism and recreation:** this includes ocean touring (whale watching, sightseeing, coastal hiking, diving, kayaking), as well as sailing, cruising and visiting beaches and other marine locations.
- ❑ **Marine construction:** NAICS #2379 – establishments primarily engaged in constructing heavy and civil engineering works involving specialized trade activities such as pile driving and dredging, including development of marine facilities.
- ❑ **Ship building and repairing:** NAICS #336611 – this industry consists of establishments primarily engaged in operating a shipyard with fixed facilities including drydock and fabrication equipment capable of building and repairing ships (vessels not intended for personal use).
- ❑ **Boat building:** NAICS #336612 – establishments primarily engaged in the manufacture of boats (vessels intended for personal use, including fishing boats).

Appendix B: Data and Sources

The analysis draws on data from several sources:

- ❑ **Commercial fisheries:** Two sources of data are available for value of output data. DFO publishes value of landings data for the commercial fisheries by province with about a one-year lag. These data are available on the DFO website: (<http://www.dfo-mpo.gc.ca/index-eng.htm>). Statistics Canada uses these data for its commercial fisheries data at the provincial level, though with a 3-4 year lag (CANSIM 381-0016). Statistics Canada relies on these data, its own surveys and also administrative (taxation) data to calibrate its input-output model and to develop annual GDP estimates.

Employment estimates for the fisheries represent one area of weakness. It is possible to estimate the level of participation from employment insurance data (number of claims), but at best this gives a lower bound on the numbers because not all participants claim. DFO fisher registration data would provide an upper bound, but not all those who register to fish actually do so. There are no official data on full-time equivalents, and no reliable way to estimate this. In part this reflects the status of crewmembers – they are classified as independent contractors, not employees – and in part the seasonal nature of the fisheries. Work is not confined to the time spent fishing, but also extends to preparation time before and maintenance time at the end of the season. The employment estimates contained in the impact analysis are derived from the results of the input-output model runs. The model calculates the level of employment needed to reach a given output level based on income levels derived from administrative and survey data.

- ❑ **Aquaculture:** There is good reporting of aquaculture statistics (including production and value by species, number of sites and numbers employed) by the New Brunswick Department of Fisheries and the Department of Agriculture and Aquaculture. DFO also publishes volume and value statistics online (<http://www.dfo-mpo.gc.ca/stats/aquaculture-eng.htm>), with value added accounts for the industry in each province published by DFO (<http://www.dfo-mpo.gc.ca/stats/aqua/aqua-val-eng.htm>) and Statistics Canada (CANSIM 381-0016). There is about a one-year lag in reporting by the province and DFO. Statistics Canada relies on production data, its own surveys and also administrative (taxation) data to calibrate its input-output model and to develop annual GDP estimates.
- ❑ **Seafood processing:** Annual output value and other key manufacturing statistics from Statistics Canada is available for 2004-2006 online through CANSIM 301-0006, and for earlier years from CANSIM 301-0003 and 301-0005. Export statistics are available online from the Industry Canada Strategis website (<http://strategis.gc.ca>). One issue with the output data is inclusion of imported raw material in the production and export statistics. This is a concern if the rationale for including seafood processing is its linkage with *domestic* fisheries. Otherwise it is not an issue (this study does not consider this an issue). The contribution to output of imported raw material can be substantial, e.g., one major seafood producer in New Brunswick relies almost exclusively on imported raw material for its production.

- ❑ **Marine transportation:** GDP data for marine transportation (NAICS #48311) are available at the national level, but are suppressed by Statistics Canada for New Brunswick in some years due to confidentiality restrictions. The output data used for this report were obtained by special request to Statistics Canada. These data cover the “for-hire” segment of the industry, not the marine transportation activity of companies that ship using their own vessels (referred to as “own-account” shipping). This is not believed to represent a significant component of the industry in New Brunswick. Marine transportation is divided into two distinct industries under NAICS: #4831 covers shipping and #4883 covers support services (port activities). Neither GDP nor value of output data are available for support services because Statistics Canada incorporates this activity in the broader grouping, Support Services for Transportation (NAICS 488). If a complete picture of the water transportation sector is to be developed, then it is necessary to estimate the contribution of support activities using indirect methods. The estimate contained in this report is based on historical data at the national level (1997-2000) that distinguished NAICS 48311 and 4883 and allows the relative contribution to GDP of the activities to be determined (the ratio of 4883/48311 is 1.5:1.0). This ratio is confirmed by current U.S. data for these industries.

- ❑ **Tourism and recreation:** Comprehensive data on the tourism sector are not systematically compiled in Canada. This study relies on three secondary sources. Two are focused on specific marine related tourism activities, cruise ship travel and recreational fishing, with expenditure data available on a provincial basis. Data on cruise ship travel is available from BREA, 2008, *The Economic Contribution of the International Cruise Ship Travel in Canada, 2007*. Data on recreational fishing is available from DFO, *Survey of Recreational Fishing in Canada, 2000 and 2005*. The third source – Statistics Canada provides the *Travel Survey of Residents of Canada (TSRC)* and the *Travel Activities Motivation Survey (TAMS)*. These address tourism and recreation generally, but also allow the analyst to extract participation data (days and expenditures) on specific activities including several with an oceans focus (coastal hiking, diving, kayaking, sailing, visiting beaches). Access to the electronic files of the recreational fishing, TSRC, and TAMS survey data from DFO and Statistics Canada greatly facilitates the analysis.

Taken together, these sources provide a good approximation of the economic impact of ocean tourism and recreation. Results should be regarded as conservative because the criteria for what constitutes a “trip” in the TSRC survey lead to an under-estimation of local residents’ participation in ocean activities, and also because non-residents are not included in the survey.

With the data, the next step is to run the expenditures through the input-output model. But tourism is not one of the industries for which input and output vectors have been developed. This means expenditures have to be sorted by commodity (the surveys provide a breakdown of expenditures by category) before running the model.

- ❑ **Marine construction:** This is not an exclusively marine activity, and consequently output and GDP data are not available from published sources. For purposes of running the input-output model, marine construction would fall under a broad construction category: “Other heavy and civil engineering construction (NAICS #2379). Expenditure data were compiled from several sources including port authorities (not just for their own data, but for construction expenditures generally in each port), DFO for small craft harbours, and DND for naval base capital expenditures. These sources would exclude capital spending at private marine facilities and hence would underestimate overall construction impacts.
- ❑ **Shipbuilding and boat building:** Output value is published by Statistics Canada, though data are suppressed in some years due to confidentiality restrictions. Output value and a range of other key statistics including employment are available online through CANSIM 301-0006 (for 2004-2006) and for earlier years from CANSIM 301-0003 and 301-0005 (subject to confidentiality). Output data were obtained from Statistics Canada by special request.

Beyond ships and boats, navigation and research equipment is also manufactured for ocean uses. But the manufacturers do not fall into a unique NAICS marine manufacturing industry. They fall under a broader industry grouping that includes mainly companies producing for aeronautical applications. Consequently, output value, the key statistic that would allow industry impacts to be determined, is unavailable.

- ❑ **Government services:** The expenditure data needed to run the I-O model was obtained by request from each of the departments, with spending broken down into salary costs and operations and maintenance (O&M).
- ❑ **Universities/research & NGOs:** Expenditure data must be obtained directly from each institution or organization. Isolating marine activity expenditures can be a laborious exercise because financial systems are not set up to respond to this kind of data request.

Appendix C: Impacts by Activity, 2003 - 2008

| Impacts | Commercial Fisheries | | | Aquaculture | | | Seafood Processing Excl Inputs* | | | Water Transport | | |
|-----------------------|----------------------|---------|---------|-------------|---------|---------|------------------------------------|---------|---------|-----------------|---------|---------|
| | Direct | Spinoff | Total | Direct | Spinoff | Total | Direct | Spinoff | Total | Direct | Spinoff | Total |
| GDP \$000s | | | | | | | | | | | | |
| 2003 | 121,375 | 47,389 | 168,763 | 58,346 | 50,460 | 108,806 | 188,626 | 68,396 | 257,021 | 61,628 | 34,383 | 96,011 |
| 2004 | 133,512 | 52,128 | 185,639 | 56,114 | 48,529 | 104,643 | 168,761 | 61,193 | 229,954 | 64,610 | 36,047 | 100,657 |
| 2005 | 141,417 | 55,214 | 196,631 | 71,460 | 61,801 | 133,261 | 171,982 | 62,361 | 234,342 | 67,592 | 37,711 | 105,303 |
| 2006 | 105,474 | 41,181 | 146,655 | NA | NA | NA | 175,903 | 63,782 | 239,685 | 59,640 | 33,274 | 92,914 |
| 2007 | 122,258 | 47,734 | 169,992 | 57,602 | 49,816 | 107,418 | 146,235 | 53,025 | 199,260 | 63,616 | 35,492 | 99,108 |
| 2008 | 111,140 | 43,393 | 154,532 | 61,477 | 53,168 | 114,645 | 165,000 | 59,829 | 224,829 | 63,428 | 35,388 | 98,816 |
| Employment FTE | | | | | | | | | | | | |
| 2003 | 1,836 | 766 | 2,602 | 864 | 861 | 1,725 | 4,197 | 1,344 | 5,541 | 1,046 | 674 | 1,720 |
| 2004 | 2,020 | 842 | 2,862 | 831 | 828 | 1,659 | 3,755 | 1,203 | 4,958 | 1,097 | 707 | 1,803 |
| 2005 | 2,140 | 892 | 3,032 | 1,059 | 1,055 | 2,113 | 3,827 | 1,226 | 5,052 | 1,147 | 739 | 1,886 |
| 2006 | 1,596 | 665 | 2,261 | NA | NA | NA | 3,914 | 1,254 | 5,168 | 1,012 | 652 | 1,664 |
| 2007 | 1,850 | 771 | 2,621 | 853 | 850 | 1,703 | 3,254 | 1,042 | 4,296 | 1,080 | 696 | 1,775 |
| 2008 | 1,682 | 701 | 2,383 | 916 | 913 | 1,829 | 3,671 | 1,176 | 4,847 | 1,077 | 694 | 1,770 |
| Income \$000s | | | | | | | | | | | | |
| 2003 | 77,398 | 30,678 | 108,076 | 24,320 | 25,967 | 50,287 | 132,038 | 43,761 | 175,799 | 62,868 | 42,760 | 105,628 |
| 2004 | 85,138 | 33,746 | 118,884 | 23,390 | 24,973 | 48,363 | 118,133 | 39,153 | 157,285 | 65,910 | 44,829 | 110,739 |
| 2005 | 90,179 | 35,744 | 125,922 | 29,787 | 31,803 | 61,590 | 120,387 | 39,900 | 160,287 | 68,952 | 46,898 | 115,850 |
| 2006 | 67,259 | 26,659 | 93,918 | NA | NA | NA | 123,132 | 40,809 | 163,941 | 60,840 | 41,381 | 102,221 |
| 2007 | 77,962 | 30,901 | 108,863 | 24,010 | 25,636 | 49,646 | 102,365 | 33,927 | 136,291 | 64,896 | 44,140 | 109,036 |
| 2008 | 70,872 | 28,091 | 98,963 | 25,781 | 27,526 | 53,307 | 115,500 | 38,280 | 153,780 | 64,708 | 44,010 | 108,718 |

Source: StatCan I-O model. *Seafood processing spinoffs and totals avoid double counting fisheries and aquaculture inputs.

| Impacts | Tourism and Recreation | | | Construction | | | Ship and Boat Building | | | Fisheries and Oceans | | |
|-----------------------|------------------------|---------|---------|--------------|---------|---------|------------------------|---------|--------|----------------------|---------|--------|
| | Direct | Spinoff | Total | Direct | Spinoff | Total | Direct | Spinoff | Total | Direct | Spinoff | Total |
| GDP \$000s | | | | | | | | | | | | |
| 2003 | 109,080 | 92,173 | 201,253 | 4,519 | 3,818 | 8,337 | 7,790 | 4,080 | 11,870 | NA | NA | NA |
| 2004 | 108,480 | 91,666 | 200,146 | 5,279 | 4,460 | 9,739 | 4,674 | 2,423 | 7,097 | 26,310 | 33,193 | 59,503 |
| 2005 | 103,960 | 87,846 | 191,806 | 3,859 | 3,261 | 7,120 | 2,337 | 1,396 | 3,733 | 27,060 | 34,139 | 61,198 |
| 2006 | 101,240 | 85,548 | 186,788 | 82,018 | 69,305 | 151,323 | 3,034 | 1,708 | 4,742 | 24,955 | 31,483 | 56,438 |
| 2007 | 100,440 | 84,872 | 185,312 | 124,526 | 105,225 | 229,751 | 2,706 | 1,353 | 4,059 | 30,633 | 38,647 | 69,280 |
| 2008 | 100,000 | 84,500 | 184,500 | 147,280 | 124,452 | 271,732 | 2,829 | 1,587 | 4,416 | 23,169 | 29,230 | 52,400 |
| Employment FTE | | | | | | | | | | | | |
| 2003 | 3,545 | 4,014 | 7,559 | 4,519 | 3,818 | 8,337 | 7,790 | 4,080 | 11,870 | NA | NA | NA |
| 2004 | 3,526 | 3,992 | 7,518 | 5,279 | 4,460 | 9,739 | 4,674 | 2,423 | 7,097 | 399 | 150 | 549 |
| 2005 | 3,379 | 3,826 | 7,204 | 3,859 | 3,261 | 7,120 | 2,337 | 1,396 | 3,733 | 410 | 154 | 564 |
| 2006 | 3,290 | 3,726 | 7,016 | 82,018 | 69,305 | 151,323 | 3,034 | 1,708 | 4,742 | 378 | 142 | 520 |
| 2007 | 3,264 | 3,696 | 6,960 | 124,526 | 105,225 | 229,751 | 2,706 | 1,353 | 4,059 | 464 | 174 | 639 |
| 2008 | 3,250 | 3,680 | 6,930 | 2,209 | 4,750 | 6,959 | 60 | 27 | 88 | 351 | 132 | 483 |
| Income \$000s | | | | | | | | | | | | |
| 2003 | 89,991 | 136,895 | 226,886 | 4,519 | 3,818 | 8,337 | 7,790 | 4,080 | 11,870 | NA | NA | NA |
| 2004 | 89,496 | 136,142 | 225,638 | 5,279 | 4,460 | 9,739 | 4,674 | 2,423 | 7,097 | 26,310 | 10,083 | 36,393 |
| 2005 | 85,767 | 130,470 | 216,237 | 3,859 | 3,261 | 7,120 | 2,337 | 1,396 | 3,733 | 27,060 | 10,370 | 37,429 |
| 2006 | 83,523 | 127,056 | 210,579 | 82,018 | 69,305 | 151,323 | 3,034 | 1,708 | 4,742 | 24,955 | 9,563 | 34,518 |
| 2007 | 82,863 | 126,052 | 208,915 | 124,526 | 105,225 | 229,751 | 2,706 | 1,353 | 4,059 | 30,633 | 11,739 | 42,372 |
| 2008 | 82,500 | 125,500 | 208,000 | 95,732 | 177,620 | 273,352 | 3,033 | 1,222 | 4,255 | 23,169 | 8,879 | 32,048 |

Source: StatCan I-O model.

| Impacts | Other Federal Departments | | | Provincial Departments | | | Research and ENGOS | | | New Brunswick Total | | |
|-----------------------|---------------------------|---------|-------|------------------------|---------|--------|--------------------|---------|-------|---------------------|---------|-----------|
| | Direct | Spinoff | Total | Direct | Spinoff | Total | Direct | Spinoff | Total | Direct | Spinoff | Total |
| GDP \$000s | | | | | | | | | | | | |
| 2003 | 2,633 | 1,253 | 3,886 | NA | NA | NA | 920 | 386 | 1,306 | 554,916 | 302,338 | 857,253 |
| 2004 | 2,714 | 1,292 | 4,006 | 10,308 | 4,906 | 15,214 | 960 | 403 | 1,362 | 581,721 | 336,240 | 917,961 |
| 2005 | 2,798 | 1,332 | 4,130 | 7,247 | 3,450 | 10,697 | 1,059 | 445 | 1,504 | 600,770 | 348,955 | 949,725 |
| 2006 | 2,885 | 1,373 | 4,258 | 10,659 | 5,074 | 15,733 | 1,015 | 424 | 1,439 | 566,823 | 333,152 | 899,974 |
| 2007 | 2,974 | 1,416 | 4,390 | 10,416 | 4,958 | 15,374 | 1,161 | 488 | 1,649 | 662,567 | 423,026 | 1,085,593 |
| 2008 | 3,066 | 1,459 | 4,525 | 10,658 | 5,073 | 15,732 | 1,238 | 521 | 1,759 | 689,285 | 438,600 | 1,127,885 |
| Employment FTE | | | | | | | | | | | | |
| 2003 | 29 | 19 | 48 | NA | NA | NA | 13 | 7 | 20 | 16,230 | 11,579 | 27,809 |
| 2004 | 30 | 20 | 49 | 80 | 113 | 194 | 14 | 7 | 21 | 17,139 | 12,367 | 29,507 |
| 2005 | 31 | 20 | 51 | 57 | 80 | 136 | 15 | 8 | 23 | 15,968 | 11,283 | 27,251 |
| 2006 | 32 | 21 | 53 | 83 | 117 | 200 | 15 | 8 | 22 | 92,402 | 75,919 | 168,321 |
| 2007 | 33 | 22 | 54 | 81 | 114 | 196 | 16 | 9 | 25 | 135,488 | 112,625 | 248,113 |
| 2008 | 34 | 22 | 56 | 83 | 117 | 200 | 18 | 9 | 27 | 13,351 | 12,221 | 25,572 |
| Income \$000s | | | | | | | | | | | | |
| 2003 | 2,633 | 1,074 | 3,707 | NA | NA | NA | 725 | 278 | 1,002 | 404,822 | 288,969 | 693,791 |
| 2004 | 2,714 | 1,107 | 3,822 | 10,308 | 5,525 | 15,833 | 756 | 289 | 1,046 | 433,799 | 302,582 | 736,381 |
| 2005 | 2,798 | 1,142 | 3,940 | 7,247 | 3,885 | 11,132 | 834 | 320 | 1,154 | 438,793 | 304,690 | 743,483 |
| 2006 | 2,885 | 1,177 | 4,062 | 10,659 | 5,713 | 16,373 | 800 | 306 | 1,106 | 459,282 | 323,272 | 782,555 |
| 2007 | 2,974 | 1,213 | 4,187 | 10,416 | 5,583 | 15,999 | 915 | 350 | 1,265 | 525,586 | 386,147 | 911,732 |
| 2008 | 3,066 | 1,251 | 4,317 | 10,658 | 5,713 | 16,371 | 976 | 374 | 1,350 | 495,994 | 458,465 | 954,459 |

Source: StatCan I-O model.

Appendix D: Economic Multipliers

New Brunswick Input-Output Multipliers by Sector

| Marine activity | GDP | | | Employment | | | Income | | |
|---------------------------------------|--------|----------|---------|------------|----------|---------|--------|----------|---------|
| | Direct | Indirect | Induced | Direct | Indirect | Induced | Direct | Indirect | Induced |
| Fishing | 0.69 | 0.09 | 0.18 | 10.44 | 1.30 | 3.05 | 0.44 | 0.04 | 0.13 |
| Aquaculture | 0.31 | 0.16 | 0.11 | 4.62 | 2.70 | 1.90 | 0.13 | 0.08 | 0.06 |
| Seafood processing | 0.20 | 0.11 | 0.07 | 4.45 | 1.91 | 1.65 | 0.14 | 0.06 | 0.06 |
| Water transportation | 0.40 | 0.10 | 0.12 | 4.00 | 2.54 | 1.70 | 0.20 | 0.13 | 0.09 |
| Support activities for transportation | 0.54 | 0.15 | 0.16 | 11.70 | 2.37 | 3.66 | 0.74 | 0.17 | 0.25 |
| Tourism & recreation | 0.40 | 0.20 | 0.14 | 13.00 | 9.00 | 5.72 | 0.33 | 0.32 | 0.18 |
| Ports and harbours construction | 0.40 | 0.20 | 0.14 | 6.00 | 9.00 | 3.90 | 0.26 | 0.32 | 0.16 |
| Shipbuilding | 0.41 | 0.14 | 0.13 | 6.93 | 1.76 | 2.26 | 0.19 | 0.06 | 0.07 |
| Boat building | 0.41 | 0.09 | 0.12 | 10.00 | 1.07 | 2.88 | 0.61 | 0.03 | 0.18 |
| Fisheries & Oceans | 0.31 | 0.26 | 0.13 | 4.70 | 0.43 | 1.33 | 0.31 | 0.03 | 0.09 |
| Other federal departments | 0.70 | 0.14 | 0.19 | 7.65 | 2.47 | 2.63 | 0.70 | 0.07 | 0.22 |
| Provincial departments | 0.70 | 0.14 | 0.19 | 5.46 | 4.97 | 2.71 | 0.70 | 0.14 | 0.24 |
| Universities | 0.71 | 0.13 | 0.19 | 9.00 | 2.52 | 3.00 | 0.56 | 0.05 | 0.17 |
| ENGOS | 0.70 | 0.05 | 0.17 | 13.00 | 1.37 | 3.74 | 0.55 | 0.03 | 0.16 |

Note: GDP and income multipliers per 1\$ of output, employment multipliers per \$1million of output.

Source: Statistics Canada

Appendix E: Glossary

- ❑ **DHON: Dressed Head-On** refers to fully cleaned fish with the head left on.
- ❑ **ENGO: Environmental Non-Governmental Organization** is typically a registered charitable organization created for the purpose of protecting, advocating, or providing education pertaining to the natural environment.
- ❑ **FTE: Full-Time Equivalent** is a measure of employment where one FTE represents one worker on a full-time basis for a full year. FTEs are also used to represent the term "person-years" throughout this report.
- ❑ **GDP: Gross Domestic Product** is an industry's contribution to Gross Domestic Product represents its broadest measure of economic impact. The domestic product of an industry captures the value it adds to purchased inputs through the application of labour and capital. GDP represents the sum of the value added by each industry. Value added should not be confused with sales value, since the latter would include the value of purchased inputs.
- ❑ **I-O (Model): Input-Output Model** is a mathematical construct containing a matrix array of operators and coefficients representing the structure of the economy and the relationships between industry sectors that result in flows of inputs and outputs from one to another. The model can be used to simulate how flows through one or more industry sectors will affect others and the economy as a whole.
- ❑ **ISA: Infectious Salmon Anemia** is a disease of farmed and wild Atlantic Salmon (*Salmo salar*) and some other wild fish, caused by a virus that has the ability to mutate and evolve much like the flu virus.
- ❑ **LFA: Lobster Fishing Area** is a geographical area designated by Fisheries and Oceans Canada for the purpose of managing where lobsters may be harvested by certain individuals and vessels according to prescribed methods and times of year.
- ❑ **LNG: Liquefied Natural Gas** is the liquid form of natural gas created by cooling the gas to minus 162 degrees Celsius and yielding a clear, colorless, odourless liquid composed mainly of methane.
- ❑ **NAICS: North American Industry Classification System** is the standard used by Statistics Canada in classifying business establishments for the purpose of collecting, analyzing, and publishing statistical information.