

**Marine Industry Benefits Study**  
**Economic Impact of the Canadian Marine Transportation Industry**

**Report Prepared for Transport Canada by**

**LECG**

**EXECUTIVE SUMMARY**

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## INTRODUCTION

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From published statistics, it is clear that marine transportation is an important industry whose activities significantly benefit Canadians. Canada is a comparatively small economy that is highly dependent - much more so than other OECD countries - on the access that trade provides to foreign markets and foreign-produced goods and services. Exports of goods and services account for more than 40% of economic activity. Almost 75 percent of the value of Canada's trade is with the U.S. and this trade has grown rapidly since the signing of the Canada-US free trade agreement and the successor agreement on North American Free Trade (NAFTA) in 1994. Trade provides Canadian consumers with access to low-priced foreign manufactured products, spurs innovation, promotes competitiveness and contributes to the productivity gains that underlie improvements in Canadians' standard of living. It is estimated that foreign trade sustains one out of every four Canadian jobs.

The marine sector provides one of the vital transport links that enable Canadian consumers and producers to overcome the limitations of Canada's small domestic economy. Marine transportation accounted for almost a fifth of the volume of Canada's exports to the U.S. and over 95 percent of the approximately 162 million tonnes of commodities and processed goods Canada exported to other countries in 2003. Table 1 highlights the importance of marine carriage as measured by the total volume of imports and exports transported by this mode.

*Table 1*  
*Modal Shares of Canadian Trade by Volume, 2003*

	<i>Trade with U.S.</i>		<i>Trade with Other Countries</i>	
	<i>Exports</i>	<i>Imports</i>	<i>Exports</i>	<i>Imports</i>
Trade Volume (millions of metric tonnes)	348.7	127.2	161.7	98.2
Share – Road	19.4%	51.4%	1.8%	10.3%
Share – Rail	19.8%	15.2%	0.5%	1.2%
Share – Air	0.2	1.5%	0.7%	1.9%

Share – Other	42.4%	5.4%	0.0	14.1%
<b><i>Share - Marine</i></b>	<b><i>18.1%</i></b>	<b><i>26.4%</i></b>	<b><i>97.1%</i></b>	<b><i>72.5%</i></b>

Marine also plays an important role in Canada’s domestic trade and is the mode of choice for many important bulk commodity movements, including the grain, iron ore and coal transported between Great Lake ports, the crude oil shipped from the Terra Nova oil field off Newfoundland’s coast, and the forest products shipped along the B.C. coast. In 2002, domestic flows amounted to 62.6 million tonnes and accounted for 18% of total marine traffic. Most domestic traffic is handled by Canada’s merchant fleet, which consists of dry bulk carriers along with tankers, general cargo vessels, tugs, barges and ferries. In addition, the marine sector is a significant provider of passenger transportation services. The economy benefits from the activities of the private firms, provincial governments and federal Crown corporations operating passenger ferry services and the firms and workers that provide services to cruise vessels calling at Canadian ports.

While published data convey the general importance of marine transport, they do not specify its contribution to output and employment in the Canadian economy.

Expenditures on marine transport generate activity in marine industries, in firms that supply goods and services to marine industries, and in a broad range of other related and unrelated industries that benefit from the resulting income flows within the Canadian economy. This study addresses this gap in knowledge; it investigates the sector’s contribution by drawing on economic models that show the economic links between marine transport and other sectors of the economy.

Economic impacts were estimated for the transport industries and the related service industries that Statistics Canada groups together under its definition of “water transport industries”. Along with freight and water passenger transport, this sector includes services such as harbour and port operation, cargo handling and marine salvage. But the data exclude a number of potentially significant marine-related activities including ship repair, rail and truck transport related to port activity, warehousing and storage, and the operations of companies that have their own terminals such as Lafarge, Redpath, Methanex, Weyerhaeuser and Alcoa. Where, as in the case of these firms, terminal activities are integrated with manufacturing, they are not counted by Statistics Canada as part of the GDP attributable to marine transport. Moreover, since the focus is on the

contribution to GDP, the study only takes account of activities originating within Canada and by firms and workers domiciled in Canada. It largely excludes the contribution of the foreign flag carriers that serve most of Canada's international shipping needs - including CP Ships (registered in the UK) and Kent Lines, part of the Irving Group (registered in the Bahamas). Still, this study based on Statistics Canada's definitions and protocols provides a useful additional perspective on the important economic contribution of marine transport. It demonstrates that the marine sector makes a significant contribution to the output of the economy and to federal and provincial government revenues and is a major generator of jobs. While the largest absolute impacts are in British Columbia, followed by Ontario and Quebec, the positive economic effects of marine transport activities extend to all regions.

### **Estimating Economic Impacts**

The estimates in the study were made by investigating each of the three major channels through which marine activities impact on the economy:

- through the *direct impact* on the wages of workers and the profits of firms in the marine transport sector;
- through the *indirect impact* on firms that supply materials and services to marine transport industries, and subsequently on their suppliers, as the demands from water transport providers percolate down in the production chain; and
- through the *induced impact* of the income flows and expenditures that result as the direct and indirect impacts ripple through the economy.

The direct impact of marine activities can be measured by assembling data on employment and the value of services provided by industries that comprise the marine sector (which are identified in Figure 1). Estimation of the indirect impact, however, requires detailed information on inter-industry transactions. Researchers must understand the links by which spending on marine services results in spending that benefits suppliers to the sector, such as providers of ship repair and maintenance services, and by which the spending on ship repair then impacts on others, such as raw material producers and

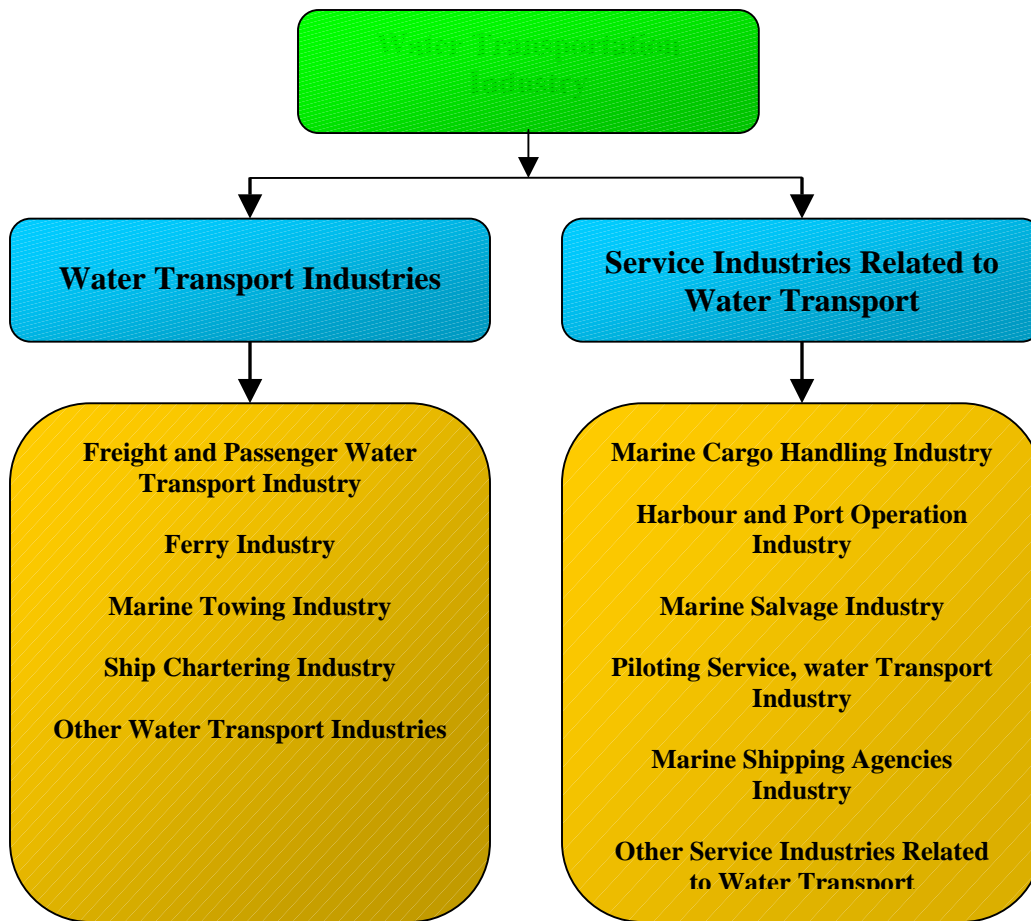
trucking firms. For the estimation of indirect impacts, the study relied on data produced by Statistics Canada's Input-Output model.

To estimate the induced impact of marine activity, it is necessary to utilize a broad economic model that is capable of tracing the effects of spending on marine goods and services, along with its associated employment and income effects, throughout the economy. For this purpose, researchers employed the FOCUS macro-econometric model of the Canadian economy built and maintained by the University of Toronto's Institute for Policy Analysis. The results of the simulations are sensitive to the features of the FOCUS model. Induced impact would be somewhat different if simulations were instead run with an alternative model with different features and incorporating different representations of the way in which economic developments affect spending and investment and influence activities in various sectors.

All calculations were carried out for the year 2000 and the results were then projected forward to 2003. Adding together the direct, indirect and induced effects, provides a measure of the overall impact of marine activities on GDP and employment for these years. The result, to be sure, is a measure of impacts, not a measure of benefits. Clearly, Canada's development and growth would have followed a very different path without the availability of water transport. An understanding of the contribution of the marine sector in this broader context, however, is well beyond the scope and capability of an economic impact study.

*Figure 1*

*Industries Included in Statistics Canada's Definition of the Marine Sector*



## FINDINGS

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### *Marine Activities Make a Significant Contribution to the Total Output of the Economy*

It is estimated that marine transportation contributed to \$9.1 billion (at market prices) in Canadian production in 2003. This amounts to three-quarters of 1% of 2003 GDP. As shown in Table 2 below, almost one-third of the total represents the direct effect of marine production; 12%, the indirect effect; and the remaining 55%, the induced impact from the associated growth in income and spending in the overall economy. Hence, even with the confines of Statistics Canada's restricted definition of marine activities and of an approach that focuses on output generated by marine production, as opposed to the much

broader concept of the output facilitated by the availability of water transport, the sector makes a significant contribution to Canadian economic output.

***The Marine Sector is an Important Generator of Jobs***

Marine sector activities generated an estimated 93,000 jobs in 2003. As indicated in Table 2 (column 3), 36,000 jobs were created through direct spending, but this number increases by over 250% as a result of the indirect and induced effects of marine activity.

***Table 2  
Output and Employment Impacts of Marine Activity, 2003***

	<b><i>Contribution to GDP</i></b>		<b><i>Contribution to Employment</i></b>	
	<i>\$ millions</i>	<i>% of total</i>	<i>Number</i>	<i>% of total</i>
Direct Impact	3,000	32.8	36,000	38.7
Indirect Impact	1,078	11.8	24,000	25.8
Induced Impact	5,056	55.4	33,000	35.5
<b><i>Total Impact</i></b>	<b><i>\$9,134</i></b>	<b><i>100%</i></b>	<b><i>93,000</i></b>	<b><i>100%</i></b>

***The Marine Sector Generates High Paying Jobs***

The wages paid by firms in the marine sector tend to be well above the Canadian industrial average. From Table 3, it can be seen that in both components of the marine sector (water transport and services incidental to water transport), average weekly earnings exceed the average for all industries as well as for all transportation industries. In the case of water transport, average weekly earnings in 2000 were 136% of those for all industries and 178% of earnings in the Canadian trade sector. While there are no data available on the jobs created through the indirect and induced impacts of marine activity, it is noteworthy that for a number of the main suppliers of services to water transport providers, including railways, truck carriers and storage and warehousing firms, average week earnings are also significantly above the industrial average.

**Table 3**  
***Average Weekly Earnings in Marine and Other Industries, 2000***

<b><i>Industry</i></b>	<b><i>Average Weekly Earnings (including overtime)</i></b>	
	<b><i>Dollars</i></b>	<b><i>Index (all industries =100)</i></b>
Water transport	849.04	135.5
Services incidental to water transport	754.77	120.5
All Transportation	743.06	118.6
Railway transport & related services	1012.56	161.6
Truck transport	683.32	109.1
Storage & warehousing	683.93	109.2
Trade	476.48	76.1
All industries	626.45	100

The high earnings reflect the relatively high productivity of workers in the marine sector. Operating revenue per employee in marine transportation is high in relation to other sectors, including other transport industries. In recent years, labour productivity may have benefited from developments such as the mergers and consolidations in the industry, improved operating efficiencies and logistics for ports and marine carriers, advances in marine navigational technology and the trend towards the use of larger vessels.

***The Marine Sector Makes a Significant Contribution to Government Revenues***

The income generated by the marine sector gives rise to income and corporate tax payments that significantly boost government revenues. Taking account of the sector's impact on both taxes and benefit payments, it is estimated the result of marine activities was to increase federal government revenues in 2003 by up to \$2.5 billion and provincial government revenues by up to \$2.6 billion – as shown in Table 4. Under an alternative and especially conservative estimate, which adjusts for any inflation the model simulations build into the results, it is found that revenue increases by a smaller but still significant \$1.7 billion at each level. The sector's effect on government balances is to make the federal budget surplus \$2.9 billion higher than it otherwise would have been in 2003, and to raise provincial balances in total by \$2.4 billion.



**Table 4**  
**Contribution of Marine Activities to Federal and Provincial Government Finances, 2003**

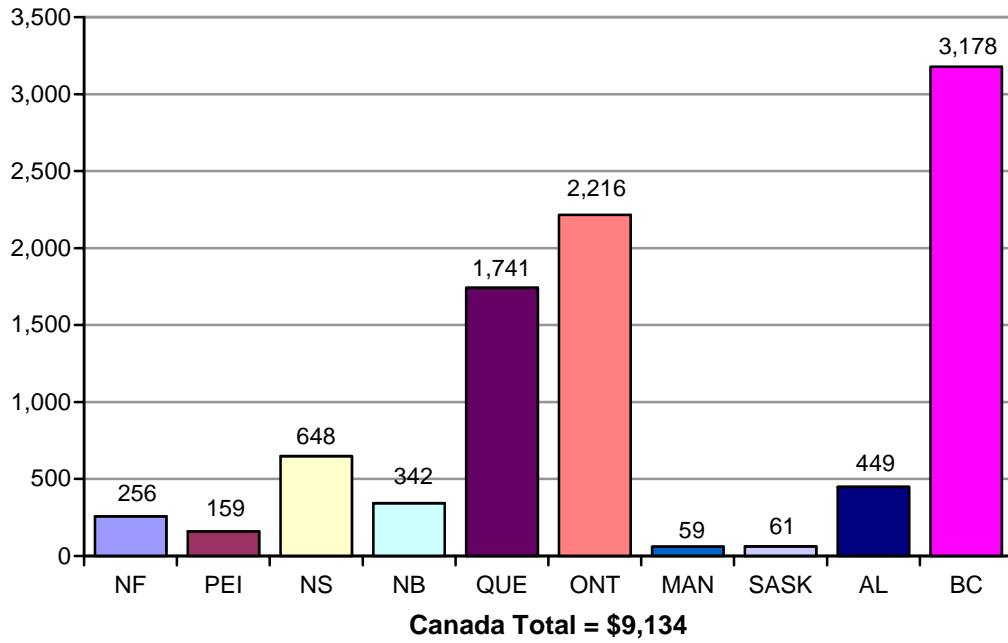
	<b>Impact on Government Revenues</b> <i>(\$ millions)</i>	<b>Impact on Government Balances</b> <i>(\$ millions)</i>
Federal	1,683 to 2,409	2,860
Provincial	1,695 to 2,550	2,386
Total (including local gov. & pension plans)	3,681 to 5,437	5,435

***The Economic Impacts of Marine Activities Extend into all Regions***

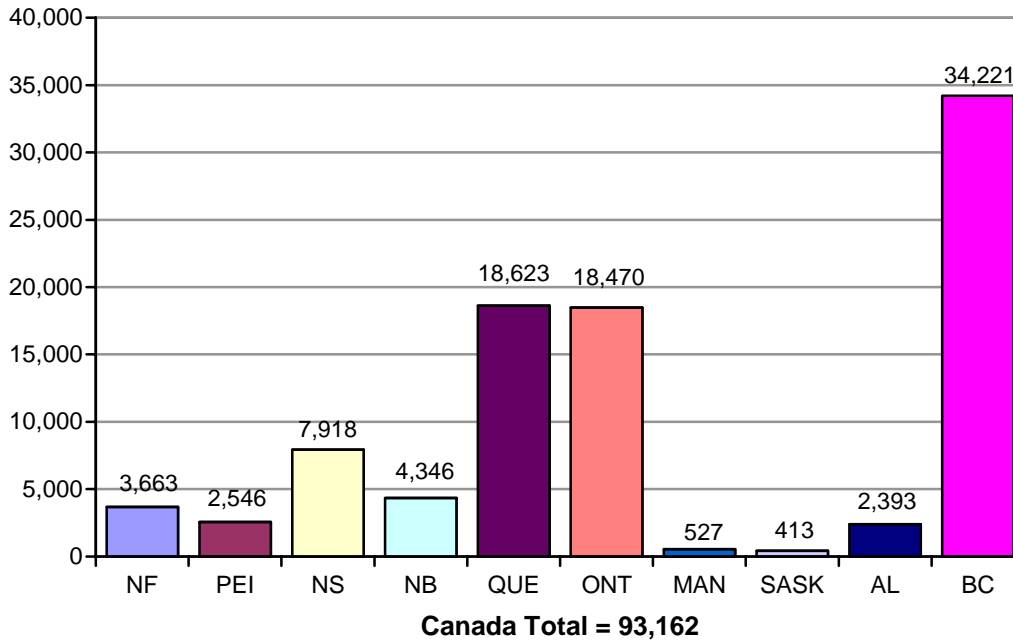
All parts of the country benefit from the production and employment generated by the marine sector. As can be seen in Figures 2 and 3, marine activities have their largest absolute impact on output and employment in B.C., which is home to Port Vancouver, the country's busiest port, a large ferry industry and a well developed intra-costal shipping industry. Over a third of all the jobs generated by the marine sector are in B.C. The next largest impacts are in Ontario and Quebec, which have large marine sectors serving transport needs over the Great Lakes - St. Lawrence Waterway and are also the location for many of the goods and service-producing firms that are the prime beneficiaries of the general spending generated by marine activities.

Economic impacts in the Atlantic Provinces reflect the influence of the region's diversified marine base, which includes a number of major ports (Halifax, Saint John, the Strait of Canso, Sydney and St. John's), ferry services, and industries to service offshore oil exploration and production. Measured relative to provincial GDP, the impact of the marine sector is greatest in PEI and greater in both PEI and Nova Scotia than in BC. The modest estimates in Figures 2 and 3 for the three Prairie Provinces are based solely on indirect and induced impacts, since the researchers were unable to obtain data on marine activities in the region. Still, significantly, the study finds that the impact of marine activities extends even into the Prairies Provinces.

**Figure 2**  
**Impacts on GDP at Market Prices by Province, 2003**  
(Millions of 2003 dollars)



**Figure 3**  
**Impacts on Employment by Province, 2003**  
(Persons employed, full-time or part-time)



***Economic Impacts are Likely to Increase over Time as the Marine Transportation Sector Continues to Grow***

Marine transportation is a growing sector of the economy. From 1961 to 2000 the output of the water transport industries tracked by Statistics Canada grew in real terms at annual rate of about 2.7%. The sector's growth has continued over the recent period and, over the last decade, there has been a healthy increase in both real GDP and employment. In coming years, as the marine sector continues to grow, the direct, indirect and induced impacts of its activities will increase and it can be expected to make a greater contribution to output and employment and government revenues.

**CONCLUSION**

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Marine transportation provides one of the key transport links that is integral to Canada's role and performance as a trading nation. This study does not attempt to assess the contribution of the marine sector to Canadian economic prosperity, but rather takes on the smaller and more manageable task of measuring the economic impact of marine activities. Results based on Statistics Canada data and the application of an input-output model and the FOCUS macro-econometric show that the marine sector makes a significant contribution to the output of the economy, is a creator of high paying jobs and a significant generator of federal and provincial government revenues. While the largest absolute impacts are in British Columbia and the greatest proportional impacts are in PEI and Nova Scotia, the positive economic effects of marine transport activities extend to all regions.