

A stylized map of the Great Lakes and St. Lawrence Seaway System is shown in a light blue color against a dark blue background. The map includes the five Great Lakes (Superior, Michigan, Huron, Erie, and Ontario) and the St. Lawrence River connecting them to the Atlantic Ocean. The surrounding landmasses are outlined in a light grey color. A large, curved white border separates the map from the text on the right.

*The*  
***ECONOMIC***  
***IMPACTS*** *of the*  
***GREAT LAKES -***  
***ST. LAWRENCE***  
***SEAWAY SYSTEM***

*October 18, 2011*

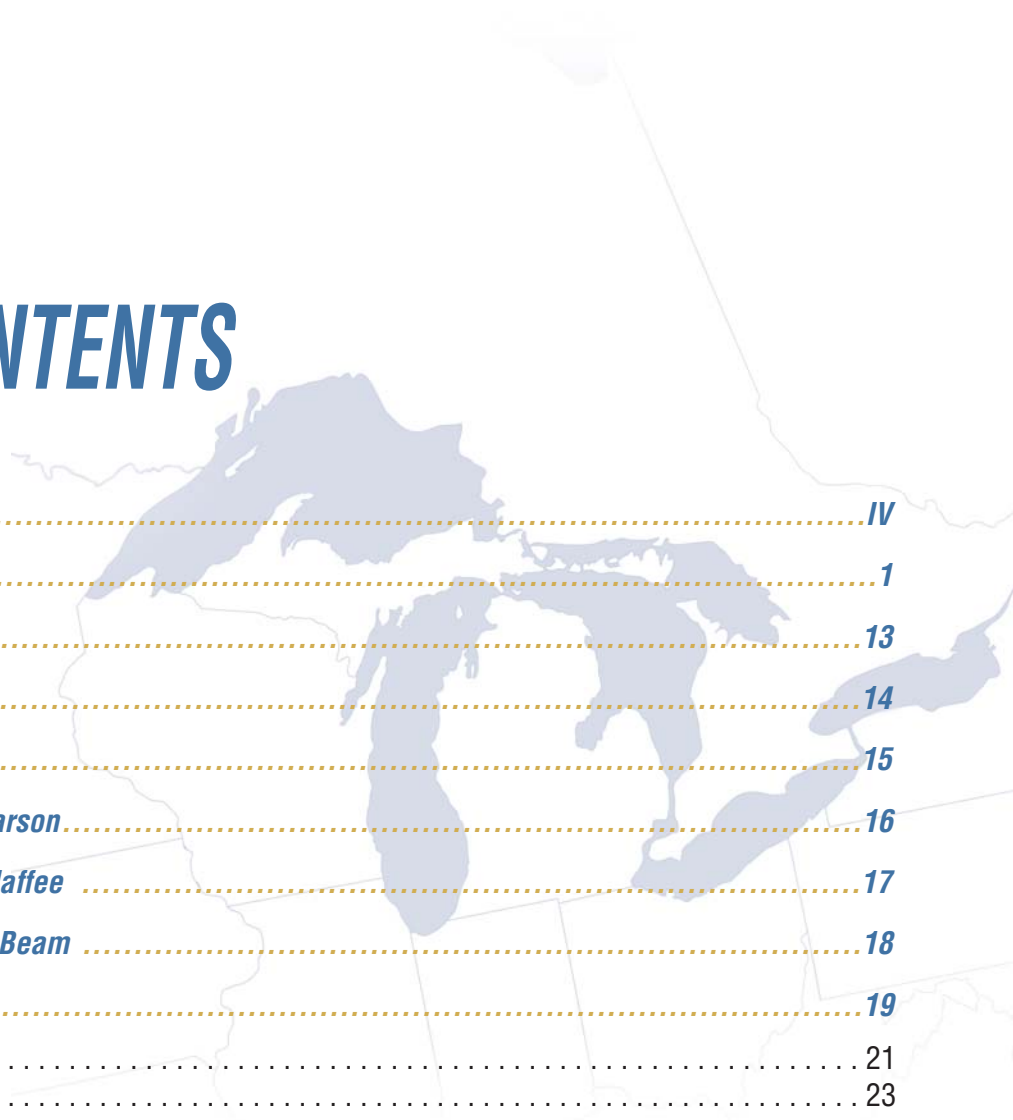
*Martin Associates  
Lancaster, PA*



A stylized map of the Great Lakes and St. Lawrence Seaway System. The Great Lakes (Superior, Michigan, Huron, Erie, and Ontario) are highlighted in a dark blue color. The St. Lawrence River and the Gulf of St. Lawrence are also highlighted in dark blue. The rest of the map, including the surrounding landmasses and other water bodies, is shown in a lighter blue color. The map is set against a dark blue background that transitions to white on the left side.

*The*  
***ECONOMIC  
IMPACTS*** *of the*  
***GREAT LAKES -  
ST. LAWRENCE  
SEAWAY SYSTEM***

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# ***EXECUTIVE SUMMARY***

# EXECUTIVE SUMMARY

## INTRODUCTION

From the earliest days of European settlement, the Great Lakes and St. Lawrence River have been utilized as a means of transportation. Great Lakes cities were founded as trading posts along a vast marine highway that facilitated commerce in an era pre-dating railroads and highways. This relationship to the water has enabled the region to thrive and today, the Great Lakes-St. Lawrence region is the industrial and agricultural heartland of both the United States and Canada.

Over the last 200 years, navigation improvements in both the United States and Canada have enhanced the waterway. The Welland Canal has connected Lake Ontario and Lake Erie, enabling vessels to bypass Niagara Falls. The Soo Locks have made the St. Mary's River navigable, connecting Lake Superior with Lake Huron. The St. Lawrence Seaway has tamed the St. Lawrence River, enabling ships to sail from Lake Ontario to the Atlantic Ocean.

The resulting deep draft navigation system is the longest in the world, extending 3,700 kilometers (2,300 miles) into the North American heartland. This waterway complements the region's rail and highway network and offers customers a cost-effective, safe and environmentally smart means of moving raw materials, agricultural commodities and manufactured products. Every year more than 160 million metric tons of cargo is moved on the Great Lakes-St. Lawrence Seaway System. Dominant cargoes include iron ore for steel production, coal for power generation, limestone and cement for construction, and grain for both domestic consumption and export.

Three distinct vessel-operator communities serve the waterway. These include U.S. domestic carriers ("U.S. Lakers") transporting cargo between ports on the system, Canadian domestic carriers ("Canadian Lakers") operating between ports on the system, and ocean-going vessel operators ("Salties"), which operate between system ports and overseas destinations. These carriers serve more than 110 system ports located in each of the eight Great Lakes states and the provinces of Ontario and Quebec.

In addition to locks, ships and ports, a host of maritime service providers work to ensure the safe and efficient transport of cargo. These include stevedores, warehousemen, freight forwarders, dockworkers, crane operators, vessel agents, dredging contractors, marine pilots, truck drivers, tugboat operators and shipyard workers.

## PURPOSE

This report is designed to provide the navigation community, transportation planners, government policy makers and the general public with a realistic assessment of the contributions made by the Great Lakes-Seaway system to the state, provincial, regional and national economies. This is the first-ever study that measures the economic impacts of the Great Lakes-Seaway system to both nations, at the same time, using the same methodology.

To accomplish this goal, a bi-national consortium of public and private sector Great Lakes-Seaway system stakeholders retained Martin Associates of Lancaster, Pennsylvania — a global leader in transportation economic analysis and strategic planning. Martin Associates completed Great Lakes-Seaway system economic impact studies on U.S.-specific data in 1992, 1995 and 2000, and has completed more than 250 economic impact studies for ports and port systems throughout the U.S., Canada, South America, Europe, and Asia.

## **METHODOLOGY**

This analysis estimates the combined U.S. and Canadian economic impacts of all marine cargo moving on the bi-national Great Lakes-Seaway system, including domestic cargo moving between U.S. ports; domestic cargo moving between Canadian ports; cross-lake cargo moving between the U.S. and Canada; and international cargo moving between system ports and overseas ports.

Specifically, the study measures the impacts of 2010 cargo movements at 32 U.S. and Canadian Great Lakes-Seaway system ports. The analysis was developed from a comprehensive telephone interview program of more than 900 individual firms providing maritime services at these ports. Models were then developed to expand the 32-port impacts to the state-wide and province-wide levels. It is important to note that the direct impacts generated at the 32 individual ports accounted for 71 percent of the total system-wide impacts. The 16 Canadian ports accounted for 75 percent of the total estimated Canadian impacts, while the 16 U.S. ports accounted for 66 percent of the total estimated U.S. impacts.

This analysis measures the impacts of cargo “handled” at Great Lakes-Seaway system ports. “Handled” refers to both the shipping (exporting) of the cargo from a system port, and to the receipt (importing) of that cargo in a system port. Because economic activity is created every time cargo is handled, for the purposes of this study, cargo moved between ports within the system has been handled twice. By contrast, cargo moved between system

ports and overseas ports has been handled once (in the region). For example, one ton of cargo moved to or from Europe is counted as one ton handled by a Great Lakes-Seaway system port, while one ton of cargo moved from Duluth, Minn., to Cleveland, Ohio, is counted as two tons (one ton exported in Duluth and one ton imported in Cleveland). For 2010, the 322 million metric tons of cargo identified as “handled” is based on approximately 164 million metric tons of cargo “moved.”

It is also important to note that the study does not address the economic impacts derived from international traffic originating from or destined for those ports and terminals on the St. Lawrence River east of and including Montreal. For example, the economic benefits of container movements to and from the Port of Montreal to overseas markets are not included in this analysis, as this trade does not enter or leave the Great Lakes-Seaway system. However, grain export shipments leaving the Port of Duluth, Minn., destined for overseas markets that are temporarily off-loaded at the Port of Sept-Îles, Quebec for re-loading onto a larger ocean-going vessel, are included.

Impacts are presented at the regional level, country level, state/provincial level, by commodity, by carrier flag, by employment sector and by waterway segment. Throughout the study, all values are expressed in both U.S. and Canadian dollars (using a 2010 average exchange rate of 1.03).

In order to ensure defensibility and accuracy, the study methodology and results of the analysis have been peer reviewed by leading U.S. and Canadian economists in academia and private industry. The peer review process was jointly managed by the U.S. Department of Transportation and Transport Canada.

## CATEGORIES OF IMPACTS

**Employment:** These impacts consist of four levels:

- **Direct Employment** – jobs directly generated by maritime and port activity. Direct jobs include those of dockworkers, crane operators, ships' crew, steamship agents, freight forwarders and stevedores, as well as workers with railroad and trucking companies moving the cargo handled at system ports. These jobs would experience dislocation if the activity at ports and marine terminals were to be discontinued.
- **Induced Employment** – jobs created when individuals spend their wages locally on goods and services such as food, housing and clothing.
- **Indirect Employment** – jobs created due to purchases of goods and services by businesses. These include jobs with office supply firms, maintenance and repair companies, parts and equipment suppliers, etc.
- **Related User Employment** – jobs with firms using the port to ship and receive cargo. While the facilities and services provided at the ports and marine terminals are a crucial part of the infrastructure allowing these jobs to exist, these jobs would not necessarily be immediately displaced if marine activity were to cease. For this reason, related user impacts are a separate non-additive employment category.

**Personal Income:** These impacts are a measure of the employee wages and salaries (excluding benefits) received by individuals directly employed due to port activity.

**Business Revenue:** These impacts represent the revenue generated by firms providing services at each port.

**Local Purchases:** These impacts include the value of goods and services purchased by the firms providing services at each port. Examples are office supplies, communications, utilities, fuel, maintenance and repair, goods/parts, contracted services, insurance, etc.

**Taxes:** These impacts include payments to federal, state/provincial, and local governments by companies and individuals whose jobs are directly dependent on port activity.

## RESULTS

In 2010, 322.1 million metric tons of cargo were handled by all U.S. and Canadian ports and marine terminals on the Great Lakes-Seaway system. The movement of this cargo generated the following economic impacts:

## System-wide Impacts (Chapter II)

**Employment** – Maritime commerce on the Great Lakes-Seaway system in 2010 generated **226,833 U.S. and Canadian jobs**, including **92,923 direct jobs**. As a result of local and regional purchases made by those 92,923 individuals, an additional **66,005 induced jobs** were supported in the regional economy. Finally, **67,905 indirect jobs** were supported by US\$6.4 billion (Cdn\$6.6 billion) in regional purchases by businesses supplying services at the marine terminals and ports.

**Personal Income** – Maritime activity in 2010 supported **US\$14.1 billion (Cdn\$14.5 billion) in total personal wage and salary income and local consumption expenditures** in the regional economies of the U.S. and Canada. The 92,923 direct job holders received US\$4.4 billion (Cdn\$4.5 billion) in wage income; this equates to an **average annual salary of US\$47,000 (Cdn\$48,400)**.

**Business Revenue** – As a result of maritime activity on the Great Lakes-Seaway system, **US\$33.6 billion (Cdn\$34.6 billion) in business revenue** was received by firms supplying cargo handling and vessel services, and inland transportation services. This amount of revenue is split almost evenly between the United States and Canada.

**Local Purchases** – Businesses involved in maritime activity in the Great Lakes-Seaway system spent **US\$6.4 billion (Cdn\$6.6 billion) on purchases in their respective local economies**.

**Taxes** – A total of **US\$4.6 billion (Cdn\$4.7 billion) in federal, state/provincial and local tax revenue** was generated by maritime activity on the Great Lakes-Seaway system in 2010.

**Exhibit II-2 Total System Impacts by Country**

	Canada		United States		Total	
<b>Jobs</b>						
Direct Jobs	48,288		44,634		92,923	
Induced	21,947		44,057		66,005	
Indirect	28,320		39,585		67,905	
<b>Total</b>	<b>98,556</b>		<b>128,227</b>		<b>226,833</b>	
<b>Personal Income (1,000)</b>	<b>US \$</b>	<b>Cdn \$</b>	<b>US \$</b>	<b>Cdn \$</b>	<b>US \$</b>	<b>Cdn \$</b>
Direct	\$2,310,209	\$2,379,515	\$2,052,776	\$2,114,360	\$4,362,985	\$4,493,875
Re-Spending/ Local Consumption	\$878,987	\$905,357	\$5,974,194	\$6,153,420	\$6,853,182	\$7,058,777
Indirect	\$1,274,072	\$1,312,294	\$1,623,988	\$1,672,707	\$2,898,060	\$2,985,002
<b>Total</b>	<b>\$4,463,268</b>	<b>\$4,597,166</b>	<b>\$9,650,959</b>	<b>\$9,940,487</b>	<b>\$14,114,227</b>	<b>\$14,537,654</b>
<b>Business Revenue (1,000)</b>	\$15,425,317	\$15,888,076	\$18,135,715	\$18,679,787	\$33,561,032	\$34,567,863
<b>Local Purchases (1,000)</b>	\$3,373,601	\$3,474,809	\$3,040,143	\$3,131,347	\$6,413,744	\$6,606,156
<b>State/Provincial and Local Taxes (1,000)</b>	\$584,966	\$602,515	\$945,668	\$974,038	\$1,530,634	\$1,576,553
<b>Federal Taxes (1,000)</b>	\$1,315,681	\$1,355,151	\$1,737,173	\$1,789,288	\$3,052,853	\$3,144,439

Note: Totals may not add due to rounding

**Exhibit II-9 Economic Impacts by State — Cargo Moving via U.S. Ports and Marine Terminals on the Great Lakes-St. Lawrence Seaway System**

<b>Tonnage (1,000)</b>	<b>Indiana 28,360</b>		<b>Ohio 40,222</b>		<b>Michigan 61,302</b>	
<b>Jobs</b>						
Direct Jobs	15,516		8,504		10,603	
Induced	17,852		9,222		8,061	
Indirect	14,964		10,355		8,155	
<b>Total</b>	<b>48,332</b>		<b>28,081</b>		<b>26,819</b>	
<b>Personal Income (1,000)</b>	<b>US \$</b>	<b>Cdn \$</b>	<b>US \$</b>	<b>Cdn \$</b>	<b>US \$</b>	<b>Cdn \$</b>
Direct	\$726,283	\$748,072	\$378,968	\$390,337	\$484,116	\$498,640
Re-Spending/ Local Consumption	\$2,468,927	\$2,542,995	\$1,278,750	\$1,317,113	\$1,058,956	\$1,090,725
Indirect	\$587,445	\$605,069	\$436,985	\$450,094	\$334,688	\$344,728
<b>Total</b>	<b>\$3,782,656</b>	<b>\$3,896,135</b>	<b>\$2,094,703</b>	<b>\$2,157,544</b>	<b>\$1,877,761</b>	<b>\$1,934,093</b>
<b>Business Revenue (1,000)</b>	<b>\$7,894,646</b>	<b>\$8,131,486</b>	<b>\$3,032,330</b>	<b>\$3,123,300</b>	<b>\$3,799,899</b>	<b>\$3,913,896</b>
<b>Local Purchases (1,000)</b>	<b>\$1,133,209</b>	<b>\$1,167,206</b>	<b>\$772,802</b>	<b>\$795,986</b>	<b>\$637,553</b>	<b>\$656,680</b>
<b>State and Local Taxes (1,000)</b>	<b>\$359,352</b>	<b>\$370,133</b>	<b>\$203,186</b>	<b>\$209,282</b>	<b>\$182,143</b>	<b>\$187,607</b>
<b>Federal Taxes (1,000)</b>	<b>\$680,878</b>	<b>\$701,304</b>	<b>\$377,047</b>	<b>\$388,358</b>	<b>\$337,997</b>	<b>\$348,137</b>

**Exhibit II-9 continued**

<b>Tonnage (1,000)</b>	<b>Minnesota 30,160</b>		<b>Illinois 7,219</b>		<b>Wisconsin 33,241</b>	
<b>Jobs</b>						
Direct Jobs	2,516		2,813		3,466	
Induced	2,258		2,521		3,071	
Indirect	1,496		1,842		2,240	
<b>Total</b>	<b>6,271</b>		<b>7,177</b>		<b>8,777</b>	
<b>Personal Income (1,000)</b>	<b>US \$</b>	<b>Cdn \$</b>	<b>US \$</b>	<b>Cdn \$</b>	<b>US \$</b>	<b>Cdn \$</b>
Direct	\$115,464	\$118,928	\$121,942	\$125,600	\$163,789	\$168,703
Re-Spending/ Local Consumption	\$263,731	\$271,643	\$384,763	\$396,306	\$367,057	\$378,069
Indirect	\$60,381	\$62,193	\$87,490	\$90,115	\$91,566	\$94,313
<b>Total</b>	<b>\$439,576</b>	<b>\$452,763</b>	<b>\$594,196</b>	<b>\$612,022</b>	<b>\$622,412</b>	<b>\$641,085</b>
<b>Business Revenue (1,000)</b>	<b>\$1,343,705</b>	<b>\$1,384,016</b>	<b>\$438,795</b>	<b>\$451,959</b>	<b>\$1,405,293</b>	<b>\$1,447,451</b>
<b>Local Purchases (1,000)</b>	<b>\$114,433</b>	<b>\$117,866</b>	<b>\$152,694</b>	<b>\$157,275</b>	<b>\$175,955</b>	<b>\$181,234</b>
<b>State and Local Taxes (1,000)</b>	<b>\$46,815</b>	<b>\$48,219</b>	<b>\$59,420</b>	<b>\$61,202</b>	<b>\$67,073</b>	<b>\$69,085</b>
<b>Federal Taxes (1,000)</b>	<b>\$79,124</b>	<b>\$81,497</b>	<b>\$106,955</b>	<b>\$110,164</b>	<b>\$112,034</b>	<b>\$115,395</b>

**Exhibit II-9** continued

<b>Tonnage (1,000)</b>	<b>New York 2,216</b>		<b>Pennsylvania 605</b>		<b>Total US 203,325</b>	
<b>Jobs</b>						
Direct Jobs	924		291		44,634	
Induced	763		310		44,057	
Indirect	280		252		39,585	
<b>Total</b>	<b>1,967</b>		<b>854</b>		<b>128,277</b>	
<b>Personal Income (1,000)</b>						
	<b>US \$</b>	<b>Cdn \$</b>	<b>US \$</b>	<b>Cdn \$</b>	<b>US \$</b>	<b>Cdn \$</b>
Direct	\$49,646	\$51,136	\$12,568	\$12,945	\$2,052,776	\$2,114,360
Re-Spending/ Local Consumption	\$109,291	\$112,570	\$42,718	\$43,999	\$5,974,194	\$6,153,420
Indirect	\$14,770	\$15,213	\$10,662	\$10,982	\$1,623,988	\$1,672,707
<b>Total</b>	<b>\$173,708</b>	<b>\$178,919</b>	<b>\$65,948</b>	<b>\$67,926</b>	<b>\$9,650,959</b>	<b>\$9,940,487</b>
<b>Business Revenue (1,000)</b>	\$167,397	\$172,419	\$53,650	\$55,260	\$18,135,715	\$18,679,787
<b>Local Purchases (1,000)</b>	\$34,070	\$35,092	\$19,426	\$20,009	\$3,040,143	\$3,131,347
<b>State and Local Taxes (1,000)</b>	\$21,019	\$21,649	\$6,661	\$6,861	\$945,668	\$974,038
<b>Federal Taxes (1,000)</b>	\$31,267	\$32,205	\$11,871	\$12,227	\$1,737,173	\$1,789,288

**Exhibit II-10 Economic Impacts by Province — Cargo Moving via Canadian Ports and Marine Terminals on the Great Lakes-St. Lawrence Seaway System**

<b>Tonnage (1,000)</b>	<b>Ontario 62,293</b>		<b>Quebec 56,511</b>		<b>Total 118,804</b>	
<b>Jobs</b>						
Direct Jobs	28,894		19,394		48,288	
Induced	12,743		9,205		21,947	
Indirect	21,906		6,414		28,320	
<b>Total</b>	<b>63,542</b>		<b>35,013</b>		<b>98,556</b>	
<b>Personal Income (1,000)</b>						
	<b>US \$</b>	<b>Cdn \$</b>	<b>US \$</b>	<b>Cdn \$</b>	<b>US \$</b>	<b>Cdn \$</b>
Direct	\$1,288,019	\$1,326,659	\$1,022,190	\$1,052,856	\$2,310,209	\$2,379,515
Re-Spending/ Local Consumption	\$515,208	\$530,664	\$363,780	\$374,693	\$878,987	\$905,357
Indirect	\$940,245	\$968,452	\$333,827	\$343,842	\$1,274,072	\$1,312,294
<b>Total</b>	<b>\$2,743,471</b>	<b>\$2,825,775</b>	<b>\$1,719,797</b>	<b>\$1,771,391</b>	<b>\$4,463,268</b>	<b>\$4,597,166</b>
<b>Business Revenue (1,000)</b>	\$9,360,290	\$9,641,098	\$6,065,027	\$6,246,978	\$15,425,317	\$15,888,076
<b>Local Purchases (1,000)</b>	\$2,419,844	\$2,492,439	\$953,757	\$982,370	\$3,373,601	\$3,474,809
<b>Provincial Taxes (1,000)</b>	\$236,076	\$243,158	\$348,890	\$359,357	\$584,966	\$602,515
<b>Federal Taxes (1,000)</b>	\$908,089	\$935,332	\$407,592	\$419,820	\$1,315,681	\$1,355,151

### Impacts by Flag of Carriage (Chapter III)

Three distinct vessel operator communities serve the Great Lakes-Seaway system. U.S. flag operators are those companies whose vessels are documented under the laws of the United States; generally, these carriers operate between U.S. ports within the Great Lakes. Canadian flag operators are those companies whose vessels are documented under Canadian law. These carriers generally operate between lower St. Lawrence River ports and Great Lakes ports, carrying both domestic and bi-national commerce. Finally, foreign flag operators are those carriers whose vessels are documented under the laws of a country other than the United States or Canada. These carriers typically operate between system ports and overseas destinations.

**Employment** – Of the 226,833 jobs supported by activity on the Great Lakes-Seaway system, cargo moving on the **Canadian flag fleet supported 101,568 jobs (45 percent)**, while cargo moving on **U.S. flag vessels supported 107,612 jobs (47 percent)**. The remaining **17,653 jobs (8 percent) were supported by cargo moving on foreign flag vessels**.

**Personal Income** — For the system-wide personal income total of US\$14.1 billion (Cdn\$14.5 billion), cargo moving on **Canadian flag vessels supported 35 percent** of that income; cargo moving on **U.S. flag vessels supported 55 percent**; and cargo moving on **foreign flag vessels supported 10 percent**.

**Exhibit III-1 Economic Impacts by Flag of Carriage — Regional Level**

	Canadian Flag		U.S. Flag		Foreign Flag		Total	
<b>Jobs</b>								
Direct Jobs	48,660		37,220		7,043			92,923
Induced	24,189		35,772		6,044			66,005
Indirect	28,719		34,621		4,566			67,905
<b>Total</b>	<b>101,568</b>		<b>107,612</b>		<b>17,653</b>			<b>226,833</b>
<b>Personal Income (1,000)</b>	<b>US \$</b>	<b>Cdn \$</b>	<b>US \$</b>	<b>Cdn \$</b>	<b>US \$</b>	<b>Cdn \$</b>	<b>US \$</b>	<b>Cdn \$</b>
Direct	\$2,288,326	\$2,356,976	\$1,696,677	\$1,747,577	\$377,983	\$389,322	\$4,362,985	\$4,493,875
Re-Spending/ Local Consumption	\$1,309,804	\$1,349,098	\$4,750,354	\$4,892,864	\$793,025	\$816,815	\$6,853,182	\$7,058,777
Indirect	\$1,286,225	\$1,324,811	\$1,419,128	\$1,461,702	\$192,707	\$198,488	\$2,898,060	\$2,985,002
<b>Total</b>	<b>\$4,884,354</b>	<b>\$5,030,885</b>	<b>\$7,866,158</b>	<b>\$8,102,143</b>	<b>\$1,363,714</b>	<b>\$1,404,626</b>	<b>\$14,114,227</b>	<b>\$14,537,654</b>
<b>Business Revenue (1,000)</b>	<b>\$15,678,458</b>	<b>\$16,148,812</b>	<b>\$15,537,600</b>	<b>\$16,003,728</b>	<b>\$2,344,974</b>	<b>\$2,415,323</b>	<b>\$33,561,032</b>	<b>\$34,567,863</b>
<b>Local Purchases (1,000)</b>	<b>\$3,323,626</b>	<b>\$3,423,335</b>	<b>\$2,685,125</b>	<b>\$2,765,679</b>	<b>\$404,992</b>	<b>\$417,142</b>	<b>\$6,413,744</b>	<b>\$6,606,156</b>
<b>State/Provincial and Local Taxes (1,000)</b>	<b>\$617,015</b>	<b>\$635,525</b>	<b>\$763,841</b>	<b>\$786,757</b>	<b>\$149,777</b>	<b>\$154,271</b>	<b>\$1,530,634</b>	<b>\$1,576,553</b>
<b>Federal Taxes (1,000)</b>	<b>\$1,343,664</b>	<b>\$1,383,974</b>	<b>\$1,445,719</b>	<b>\$1,489,090</b>	<b>\$263,470</b>	<b>\$271,374</b>	<b>\$3,052,853</b>	<b>\$3,144,439</b>

Note: Totals may not add due to rounding

**Business Revenue** — Cargo moving via **Canadian flag vessels** supported US\$15.7 billion (Cdn\$16.1 billion) in direct business revenue, **47 percent of the total**, while cargo moving on **U.S.-flag vessels** supported US\$15.5 billion (Cdn\$16.0 billion), **accounting for 46 percent of the business revenue**. The cargo moving on foreign flag vessels accounted for the balance.

**Local Purchases** — Cargo moving on **Canadian flag vessels supported 52 percent of the total local purchases** made system-wide in 2010. Cargo moving on the **U.S. flag fleet supported 42 percent**, while foreign flag vessel activity supported the balance.

**Taxes** — Cargo moving on **Canadian flag vessels supported 44 percent of the total tax impact** and cargo moving on the **U.S. flag vessels accounted for 47 percent of the impact**, while the cargo moving on foreign flag vessels supported the balance of the tax impact.

#### ***St. Lawrence Seaway Impacts (Chapter IV)***

The St. Lawrence Seaway extends from Montreal to Lake Erie and is composed of a series of 15 locks that connect the Great Lakes to the lower St. Lawrence River and the Atlantic Ocean. The Welland Canal section consists of eight Canadian locks that enable ships to pass between Lakes Erie and Ontario. The Montreal-Lake Ontario (MLO) section of the Seaway consists of seven locks — five located in Canada and two in the United States. These locks enable ships to pass between Lake Ontario and the lower St. Lawrence River. During 2010, more than 35 million metric tons of cargo passed through the Seaway's infrastructure. This chapter describes the economic impacts of system traffic utilizing any segment of the Seaway. This data is intended to better inform public policy decisions regarding infrastructure investment, system management, vessel regulation, etc.

**Employment** — Maritime commerce on the St. Lawrence Seaway portion of the Great Lakes-Seaway system in 2010 impacted **86,006 U.S. and Canadian jobs**, including **37,344 direct jobs**. As a result of local and regional purchases made by those 37,344 individuals, an additional **21,830 induced jobs** were supported in the regional economy. Finally, **26,832 indirect jobs** were supported by US\$2.8 billion (Cdn\$2.9 billion) in regional purchases by businesses supplying services at the marine terminals and ports.

**Personal Income** — Maritime commerce utilizing the St. Lawrence Seaway in 2010 supported **US\$4.6 billion (Cdn\$4.7 billion) in total personal wages and local consumption expenditures**. The 37,344 direct job holders received US\$1.78 billion (Cdn\$1.83 billion) in wage income.

**Business Revenue** — In 2010, the marine cargo and vessel activity using the St. Lawrence Seaway generated **US\$12.3 billion (Cdn\$12.7 billion) in direct business revenue**.

**Local Purchases** — Businesses involved in maritime activity on the St. Lawrence Seaway spent **US\$2.8 billion (Cdn\$2.9 billion) on purchases in their respective local economies**.

**Taxes** — St. Lawrence Seaway commercial maritime activity generated **US\$1.7 billion (Cdn\$1.7 billion) in local, state/provincial and federal tax revenues**.

**Exhibit IV-2 Economic Impacts of the St. Lawrence Seaway — Country Level**

Impacts	Canada		United States		Total	
<b>Jobs</b>						
Direct Jobs	29,512		7,832		37,344	
Induced	13,310		8,520		21,830	
Indirect	20,220		6,613		26,832	
Total	63,041		22,965		86,006	
<b>Personal Income (1,000)</b>	<b>US \$</b>	<b>Cdn \$</b>	<b>US \$</b>	<b>Cdn \$</b>	<b>US \$</b>	<b>Cdn \$</b>
Direct	\$1,387,919	\$1,429,557	\$385,809	\$397,383	\$1,773,728	\$1,826,940
Re-Spending/ Local Consumption	\$522,014	\$537,675	\$1,125,765	\$1,159,538	\$1,647,780	\$1,697,213
Indirect	\$888,709	\$915,370	\$274,725	\$282,967	\$1,163,434	\$1,198,337
Total	\$2,798,643	\$2,882,602	\$1,786,299	\$1,839,888	\$4,584,942	\$4,722,490
<b>Business Revenue (1,000)</b>	\$9,522,050	\$9,807,711	\$2,797,763	\$2,881,696	\$12,319,813	\$12,689,407
<b>Local Purchases (1,000)</b>	\$2,321,135	\$2,390,769	\$524,495	\$540,230	\$2,845,629	\$2,930,998
<b>State/Provincial and Local Taxes (1,000)</b>	\$323,447	\$333,150	\$177,427	\$182,749	\$500,873	\$515,899
<b>Federal Taxes (1,000)</b>	\$862,260	\$888,128	\$321,534	\$331,180	\$1,183,794	\$1,219,308

Note: Totals may not add due to rounding

**Impacts of New York Ballast Water Regulations (Chapter V)**

This chapter describes the economic impact of all commercial cargo moving through New York waters of the Great Lakes-Seaway system. This traffic includes the cargo moving on New York sections of the St. Lawrence River through the Montreal-Lake Ontario (MLO) section of the St. Lawrence Seaway, as well as cargo moving to and from Buffalo, N.Y. (intra-lake commerce) and not transiting any Seaway locks.

This analysis is meant to inform the public policy debate surrounding New York State ballast water regulations on vessels transiting New York waters. In December 2008, New York established state regulations governing the discharge of ballast water from commercial vessels operating in New York's jurisdiction. The regulations seek to address the problem of aquatic nuisance species being introduced into New York waters via ships' ballast water.

Under New York's rules, by 2013, all vessels operating in New York waters will be required to install environmental technology that can clean or treat ballast water to meet a specific water quality standard. The State of New York's water quality standard is 100 times more stringent than international standards. The regulations apply to vessels that call on New York ports and vessels that transit New York waters destined for ports in other states.

A July 2011 evaluation by the U.S. Environmental Protection Agency (EPA) determined that technology does not exist to meet the water quality level stipulated by New York. For this reason, the maritime industry believes these regulations to be unworkable and, if left unchanged, will cause economic harm when they come into effect, resulting in complete cessation of commercial maritime commerce in New York waters. The economic impacts presented in this chapter demonstrate the economic-opportunity cost of the proposed regulations on the U.S. and Canadian economies.

**Employment** — In 2010, Great Lakes-Seaway system maritime commerce that transited New York waters impacted **72,061 U.S. and Canadian jobs**, including **31,314 direct jobs**. As a result of local and regional purchases made by those 31,314 individuals, an additional **18,306 induced jobs** were supported in the regional economy. Finally, **22,442 indirect jobs** were supported by US\$2.4 billion (Cdn\$2.5 billion) in regional purchases by businesses supplying services at the marine terminals and ports.

**Personal Income** — Cargo moving via New York waters of the Great Lakes-Seaway system supported **US\$3.8 billion (Cdn\$3.9 billion) in total personal wages and local consumption expenditures** in the regional economies of the U.S. and Canada. The 31,314 direct jobholders received US\$1.5 billion (Cdn\$1.6 billion) in direct wage and salary income.

**Business Revenue** — In 2010, the marine cargo and vessel activity on the New York waters of the Great Lakes-Seaway system generated a total of **US\$10.5 billion (Cdn\$10.8 billion) in direct business revenue** in Canada and the United States.

**Local Purchases** — Businesses involved in Great Lakes-Seaway system maritime activity transiting New York waters spent **US\$2.4 billion (Cdn\$2.5 billion) on purchases in their respective local economies**.

**Taxes** — Great Lakes-Seaway system commercial maritime activity moving on New York waters generated **US\$1.4 billion (Cdn\$1.5 billion) in local, state/provincial and federal tax revenues**.

**Exhibit V-2 Economic Impacts of the Commerce Transiting New York Waters of the Great Lakes-Seaway System — Country Level**

Impacts	Canada		United States		Total	
<b>Jobs</b>						
Direct Jobs		25,360		5,954		31,314
Induced		11,477		6,829		18,306
Indirect		18,117		4,324		22,442
Total		54,954		17,108		72,061
<b>Personal Income (1,000)</b>	<b>US \$</b>	<b>Cdn \$</b>	<b>US \$</b>	<b>Cdn \$</b>	<b>US \$</b>	<b>Cdn \$</b>
Direct	\$1,202,427	\$1,238,500	\$301,286	\$310,325	\$1,503,713	\$1,548,824
Re-Spending/ Local Consumption	\$448,315	\$461,765	\$898,078	\$925,021	\$1,346,393	\$1,386,785
Indirect	\$797,643	\$821,573	\$179,162	\$184,537	\$976,806	\$1,006,110
Total	\$2,448,385	\$2,521,837	\$1,378,526	\$1,419,882	\$3,826,912	\$3,941,719
<b>Business Revenue (1,000)</b>	\$8,404,342	\$8,656,472	\$2,081,001	\$2,143,431	\$10,485,343	\$10,799,904
<b>Local Purchases (1,000)</b>	\$2,090,243	\$2,152,950	\$349,540	\$360,026	\$2,439,782	\$2,512,976
<b>State/Provincial and Local Taxes (1,000)</b>	\$289,027	\$297,697	\$137,400	\$141,522	\$426,427	\$439,219
<b>Federal Taxes (1,000)</b>	\$749,856	\$772,351	\$248,135	\$255,579	\$997,991	\$1,027,930

Note: Totals may not add due to rounding

## Related User Impacts (Chapter VI)

This chapter presents information on related user impacts, which measure jobs, income, output and tax impacts with shippers/consignees and supporting industries that move cargo through the ports and marine terminals on the Great Lakes-Seaway system. These impacts are classified as “related” because the firms using system ports and marine terminals to move cargo can — and, in some cases, do — use other ports and marine terminals outside the Great Lakes-Seaway System. As a result, these impacts cannot be counted as exclusively dependent upon the marine terminals in the system.

**Employment** — In addition to the 226,833 U.S. and Canadian jobs impacted by Great Lakes-Seaway system maritime commerce, there are **an additional 477,593 related user jobs**, including *393,262 in the*

*United States and 84,331 in Canada.* The majority of the related user impacts occur in the U.S. as a result of the iron ore and coal movements on the Great Lakes.

**Personal Income** — In 2010, individuals employed by related users accounted for **US\$22.7 billion (Cdn\$23.4 billion) in total personal wages and local consumption expenditures.**

**Business Revenue** — Related user business revenue totaled **US\$115.5 billion (Cdn\$119.0 billion)** in Canada and the United States in 2010.

**Taxes** — The activity created in the related user sector in 2010 generated **US\$7.1 billion (Cdn\$7.4 billion) in tax revenue** for federal, state/provincial, and local governments.

**Exhibit VI-1 Related User Impacts**

User Impacts	Canada		United States		Total	
	US \$	Cdn \$	US \$	Cdn \$	US \$	Cdn \$
<b>Jobs</b>		84,331		393,262		477,593
<b>Personal Income (1,000)</b>	\$4,552,340	\$4,688,910	\$18,179,620	\$18,725,008	\$22,731,960	\$23,413,919
<b>Business Revenue (1,000)</b>	\$31,608,507	\$32,556,763	\$83,906,441	\$86,423,634	\$115,514,949	\$118,980,397
<b>State/Provincial and Local Taxes (1,000)</b>	\$543,053	\$559,345	\$1,853,928	\$1,909,546	\$2,396,981	\$2,468,891
<b>Federal Taxes (1,000)</b>	\$1,382,022	\$1,423,482	\$3,272,332	\$3,370,501	\$4,654,353	\$4,793,984

Note: Totals may not add due to rounding

*These summary findings, and the balance of the following report, highlight the significant contribution of maritime commerce on the Great Lakes-St. Lawrence Seaway System to the bi-national regional economy of the Great Lakes and through it, to the economy of North America as a whole.*

# ***ABOUT THE STUDY SPONSORS***

*Martin Associates was retained to perform this analysis by a coalition of U.S. and Canadian Great Lakes-Seaway marine industry stakeholders. Study sponsors include: the St. Lawrence Seaway Management Corporation, the Saint Lawrence Seaway Development Corporation, the Chamber of Marine Commerce, the American Great Lakes Ports Association, the Lake Carriers' Association, the Great Lakes Maritime Task Force, Algoma Central Corporation, Canada Steamship Lines, and Fednav Limited. Technical and project management assistance was provided by Transport Canada. The American Great Lakes Ports Association served as the contracting agent.*



# ABOUT MARTIN ASSOCIATES

*Martin Associates of Lancaster, Pennsylvania, is a leading provider of economic analysis and consulting services to the maritime industry. The company has developed more than 250 economic impact and strategic planning studies for major ports and waterways systems throughout the United States and Canada, including the Port of Seattle, Port of Vancouver, Port of Los Angeles, Port of Houston, Port of New Orleans, Port of Miami, and Port of Halifax. Martin Associates has also provided analysis for maritime trade associations such as the World Shipping Council and American Association of Port Authorities, and government agencies such as the U.S. Army Corps of Engineers and Canadian Coast Guard.*

**CONTACT INFORMATION:**  
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# STUDY PEER REVIEW

## INTRODUCTION

*A draft final version of all six chapters of this analysis was sent to several recognized U.S. and Canadian economists for peer review in August 2011. The review was intended to ensure that the methodology used by Martin Associates to calculate the benefits was sound and met the generally accepted precepts of economic theory. Martin Associates responded in writing to all peer review comments to the satisfaction of all three reviewers. Based on these comments, several minor adjustments were made to the analysis prior to final printing. Letters from the three peer reviewers follow.*

## PEER REVIEWERS

**Dr. John Lawson** — Dr. Lawson is a recognized transport economist with nearly 40 years' experience, initially with the UK Department of Transport in the early 1970s, then from the mid-1970s to 2005 at Transport Canada. As Transport Canada's Director for Economic Analysis and Research, Dr. Lawson was responsible for analysis of policy issues, development of analytical methods and data. Retired from Transport Canada in 2005, Dr. Lawson is now an independent transport economics researcher and consultant, and Research Associate of the University of British Columbia Centre for Transport Studies. He consults for public and private sectors, in Canada and internationally, particularly on transport energy and emissions.

**Dr. Bruce L. Jaffee** — Dr. Jaffee currently serves as the Executive Director and Professor at the Institute for International Business at the Kelley School of Business at the University of Indiana. From 1989 to 1997, he was chairperson of the Department of Business Economics and Public Policy. From 1980 to 1984, he was chairperson of the doctoral programs in business. His research interests include public utility regulation, taxation, exclusive distribution territories, the economic development aspects of sports, energy policy and industry regulation. Dr. Jaffee has had international teaching experience in China, Poland, Hungary and the Czech Republic. After receiving his bachelor's degree from Brown University, Dr. Jaffee earned his master's and doctoral degrees from Johns Hopkins University.

**Dr. Robert D. Beam** — Dr. Beam currently serves as Professor Emeritus at the School of Business and Economics, University of Wisconsin-Superior. He retired from the school in May 2011 after 30 years. In addition to his teaching duties, Dr. Beam has authored and contributed to numerous economic studies and papers, including several related to Great Lakes trade and transportation. Currently, Dr. Beam also provides consultation services on economic issues. He received his bachelor's, master's, and doctoral economics degrees from the University of Cincinnati, and is a member of the International Atlantic Economic Society.

## **LAWSON ECONOMICS RESEARCH INC.**

Independent Transport and Economics Research, Ottawa, Canada

Kevin P. O'Malley  
Director, Office of Budget and Programs  
Saint Lawrence Seaway Development Corporation  
1200 New Jersey Avenue, S.E., Suite W32-300  
Washington, D.C. 20590

Dear Mr O'Malley:

### **Re: Review of "The Economic Impacts of the Great Lakes St. Lawrence Seaway System 2010", by Martin Associates, review draft August 5, 2011**

As requested by Transport Canada, I undertook and reported on my "Peer Review" of the above report, interpreting my task as primarily to comment on the validity of the methods and results based on my experience as a transport economist and my knowledge of North American transportation, and also to make editorial suggestions about the clarity and accuracy of the text.

The study's input data included the system traffic, the results of a survey of system participants and various multipliers and rates obtained from the US BLS and Statistics Canada, all of which are confidential or proprietary to the consultant. I was therefore unable to duplicate and validate the calculations, so my review was based on the descriptions of the study methodology and findings.

My overall assessment is that the analysis was very thorough and extensive. It is unusual among "economic impact analyses" in its "bottom-up" approach of producing estimates for 32 separate ports, expanding to all traffic, aggregating to States and Provinces, and producing estimates for the Seaway and separately for traffic using New York waters, as well as by type of service and commodity. It is also particularly unusual among impact analyses in obtaining much of its base data through an extensive survey of the firms providing services in the system, to obtain estimates of their employment and finances relating to the system, rather than simply applying inaccurate average rates from Input-Output tables.

In my review I provided a number of comments and questions for clarification, and raised some of the uncertainties in the assumptions and methods of such economic impact analyses, arising e.g. in the distinctions between "direct" and "indirect" activities, in the inferences of the extent to which such activities are at risk of elimination in the absence of the facilities, and in the instability of multipliers used to estimate "induced" output and employment.

Sincerely,



John Lawson  
President and Principal of Lawson Economics Research,  
Previously Director, Economic Analysis & Research, Transport Canada

September 13, 2011



**KELLEY**  
School of Business

Mr. Kevin P. O'Malley  
Director, Office of Budget and Programs  
Saint Lawrence Seaway Development Corporation  
U.S. Department of Transportation  
1200 New Jersey Ave., SE, Suite W32-300  
Washington, DC 20590

RE: Binational Economic Impact Study

Dear Mr. O'Malley:

As you requested, I have reviewed the Martin Associates' August 5, 2011 report, *The Economic Impact Study of the Great Lakes St. Lawrence Seaway System 2010*. Overall, I find the study to be conceptually sound, comprehensive, based on appropriate data, and generally well written. Although no detailed information is provided about their survey data or the models that they use, the overall results seem reasonable.

I am very impressed that Martin Associates was able to get such a high response rate from the firms that they interviewed. The location specific data provided by phone interviews coupled with Martin Associates' knowledge of the maritime industry enhance the accuracy of these results.

During my review the study, I provided comments and suggestions on a few specific areas including the explanations of economic models used in the analysis, types of data collected for the study, RIMS II modeling considerations, evaluation of related user jobs, and sensitivity analysis. I received adequate responses and explanations from Martin Associates.

I personally have conducted economic impact studies of various individual events (e.g., the Indianapolis 500 and the Final Four basketball tournament) and industries. As a result, I feel qualified to recognize methodologically appropriate studies such as this one.

Sincerely,

A handwritten signature in black ink, appearing to read "Bruce L. Jaffee".

Bruce L. Jaffee  
Professor and Executive Director  
Institute for International Business

BLJ:rg

DEPARTMENT OF  
BUSINESS ECONOMICS  
AND PUBLIC POLICY

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Bloomington, Indiana  
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**Economics**

September 15, 2011

Mr. Kevin P. O'Malley  
Director, Office of Budget and Programs  
U.S. Department of Transportation  
1200 New Jersey Avenue, S.E.  
Suite W32-300  
Washington, D.C. 20590  
Kevin.o'Malley@sls.dot.gov  
Re: The Economic Impacts of the Great Lakes St. Lawrence Seaway System 2010  
Peer Review Letter of Endorsement

Dear Mr. O'Malley:

I would like to thank you and The Saint Lawrence Seaway Development Corporation for the opportunity to review this study prepared by Martin Associates of Lancaster, PA titled, *The Economic Impacts of the Great Lakes St. Lawrence Seaway System 2010*. Overall, I found the contents of this study to be well organized and clearly presented. Throughout each chapter, I found the impact calculations to be accurate and internally consistent. The impacts are derived using standard economic impact methods, summarized and explained in an easy to understand tabular format. I support the study's findings and methodology. I also feel that detailed telephone and personal interviews with terminal operators and port tenants are the best way to gather primary source data for this type of seaway cargo impact study. They are more expensive than electronic mail surveys, but they have a better chance of capturing higher response rates (83% in this case).

In my peer review, I asked for further clarification of how the Bureau of Economic Analysis and Statistics Canada define and develop the state/province personal earnings multipliers and job/sales multipliers for the relevant ports. I also asked Martin Associates to explain in greater detail how these multipliers were used to calculate state/province induced jobs and income impacts. I am satisfied with the clarifications Martin Associates provided in response to the points I raised.

Therefore, based on the evidence presented to me in this study and my prior experience serving as Principal Investigator for a university economic impact study I completed for UW-Superior in 2008, as well as my examination of scores of other impact studies during the course of my tenure as Professor of Economics at the University of Wisconsin - Superior, I would conclude that this study was completed in a professional and detailed manner, and I support its methods and findings as carried out by Martin Associates.

Sincerely,

Robert D. Beam, Ph.D.  
Professor Emeritus of Economics  
8499 S. Oliphant Rd.  
South Range, WI  
rbeam@uwsuper.edu

# METHODOLOGY

- 1.** *Flow of Impacts*
- 2.** *Impact Structure*
- 3.** *Summary of Methodology*
- 4.** *Commodities Included in the Analysis*
- 5.** *Estimate of Tonnage*
- 6.** *Expansion of the 32 Port Impact Models to Measure System-Wide Impacts*

## METHODOLOGY

*Martin Associates of Lancaster, Pennsylvania, was retained by a consortium of U.S. and Canadian Great Lakes-St. Lawrence Seaway System stakeholders<sup>1</sup> to analyze the economic impacts generated by marine cargo activity on the Great Lakes-Seaway system. The analysis includes the economic impacts of all marine cargo moving on the waterway, including U.S. domestic commerce, Canadian domestic commerce, bi-national commerce between the two countries, and international traffic moving between the Great Lakes-Seaway region and overseas destinations. The impacts are measured for the year 2010 and are presented in terms of total economic impacts at the bi-national regional level, the state/provincial level and the country level.*

The Great Lakes-Seaway system extends from its western-most point in Duluth, Minnesota, to eastern Quebec. The waterway includes the five Great Lakes, their connecting channels and the St. Lawrence River. This analysis examines the economic impacts created by cargo and vessel activity at all marine terminals located along the system — in the states of Minnesota, Wisconsin, Illinois, Indiana, Michigan, Ohio, Pennsylvania and New York, and the provinces of Ontario and Quebec. Included are terminals owned by public port authorities such as municipalities, counties and independent port agencies, as well as those owned and operated by private companies.

It is important to note that the purpose of the study is to quantify the economic benefits of the Great Lakes-Seaway system; therefore, the scope does not include measurement of the net impacts of the system. To ensure the most accurate measurement of Great Lakes-Seaway system impacts, the study excludes impacts created by international maritime commerce

through St. Lawrence River ports in Quebec, where cargo does not transit the St. Lawrence Seaway lock system to and from the upper lakes. For example, trade between European ports and the Port of Montreal is not included in the impact analysis.

The study methodology is based on analysis of a core group of 32 Canadian and U.S. Great Lakes-Seaway system ports. The 32 individual ports are listed in Exhibit I-1.

The study team conducted detailed interviews with marine terminal operators, service providers, railroads, port tenants and other stakeholders at each port. The firms included in the interview process were identified from the following sources:

- *Greenwood's Guide to Great Lakes Shipping*
- Port directories
- Interviews with port authorities associated with the 32 individual ports
- Supplemental lists provided by stakeholders

<sup>1</sup> The consortium includes the American Great Lakes Ports Association (AGLPA), the Chamber of Marine Commerce (CMC), the St. Lawrence Seaway Management Corporation (SLSMC), the Saint Lawrence Seaway Development Corporation (SLSDC), the Lake Carriers' Association, the Great Lakes Maritime Task Force, Fednav Limited, Algoma Central Corporation, and Canada Steamship Lines. Technical and project management assistance was provided by Transport Canada.

### Exhibit I-1 Individual Ports Included in the Study

US Ports (16)	Canadian Ports (16)
Ashtabula	Becancour
Buffalo	Goderich
Burns Harbor	Hamilton
Chicago	Meldrum Bay
Cleveland	Montreal/Contrecoeur
Conneaut	Nanticoke
Detroit	Oshawa
Duluth	Port-Cartier
Erie	Quebec/Levis
Green Bay	Sarnia
Milwaukee	Sept Iles/Pointe-Noire
Monroe	Sorel
Oswego	Thunder Bay
Saginaw	Toronto
Superior	Trois-Rivieres
Toledo	Windsor

In total, 1,095 firms were identified. All firms were contacted by telephone and interviewed to collect the data required to assess direct impacts and develop the individual port models. Of the 1,095 firms contacted, 907 (83 percent) provided data in the following categories:

- Jobs
- Income
- Revenue
- Local purchases
- Terminal operational specifics:
  - Modal splits
  - Hinterland distribution patterns
  - Rail and truck rates
  - Rail yard specifics

To measure the impacts of marine cargo moving via individual ports and private terminals not included in the core group of 32 ports, Martin Associates developed prototype economic impact models. These models were used to expand the impacts to a state/provincial level, thus incorporating the Great Lakes-Seaway tonnage moving to and from all marine terminals located within a specific state or province.

## 1. FLOW OF IMPACTS

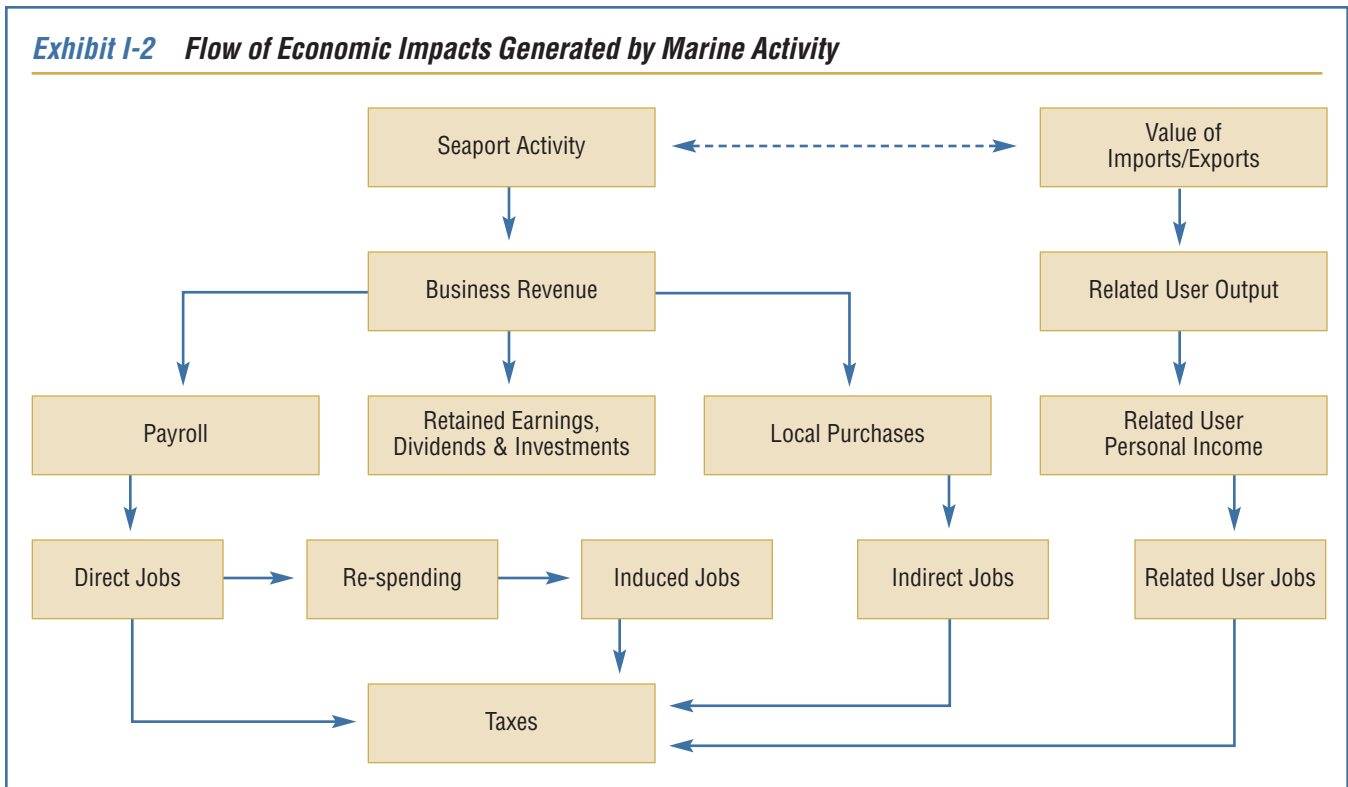
Waterborne cargo activity at a marine terminal on the Great Lakes-Seaway system contributes to the local, regional, state/provincial and national economies by generating business revenue for firms that provide vessel and cargo-handling services at the terminal. These companies, in turn, provide employment and income to individuals, and pay taxes to federal, state/provincial and local governments. Exhibit I-2 shows how activity at marine terminals generates impacts throughout the local, regional, state/provincial and national economies. As this exhibit illustrates, the economic impact of a port cannot be reduced to a single number, as the port activity creates several impacts — the **revenue impact**, **employment impact**, **personal income impact**, and **tax impact**. These impacts are non-additive. For example, the income impact is part of the revenue impact, and adding together these impacts would result in double-counting.

### 1.1 Business Revenue Impact

At the outset, activity at the port generates **business revenue** for firms that provide services. This business revenue impact is dispersed throughout the economy in several ways; it is used to hire people, purchase goods and services, and pay federal, state and local taxes. The remainder may be used to pay stockholders, retire debt or make investments, or may be held as retained earnings. Note that the only components of the revenue impact that can definitely be identified as remaining in the local economy are those portions dispersed in the following ways: salaries to local employees; local purchases by individuals and businesses directly dependent on the seaport; contributions to federal, state/provincial and local taxes; tenant lease payments to the port authorities; and wharfage and dockage fees paid by the steamship lines to the individual port authorities.

The related users output (described in Chapter VI) is the **value of the marine cargo moving via the marine terminals**. This output covers two categories of items moving through the terminals: the value added at each stage of production for exported (shipped) items, as well as the value added at each stage of use of imported (received) products. This total value of

**Exhibit I-2 Flow of Economic Impacts Generated by Marine Activity**



output represents the economic value of the marine terminals on the Great Lakes-Seaway system. In the steel sector, for example, related users include mines producing the coal and ore tonnage moving on the Great Lakes-Seaway system; the mills producing steel from that ore tonnage; and all suppliers and support operations required to produce the steel associated with that iron ore tonnage transported on the system. Similarly, grain farmers producing the grain exported (shipped) from system ports are included in the related user category, as are the supporting industries and their output required to deliver a ton of grain for export.

### 1.2 Employment Impact

The employment impact of the Great Lakes-Seaway port activity consists of four levels of job impacts:

- **Direct employment impact** — jobs directly generated by seaport activity. Direct jobs generated by marine cargo include jobs with railroads and trucking companies moving cargo between inland origins and destinations, and the marine terminals, as well as the jobs of longshoremen and dockworkers, steamship agents, freight forwarders, stevedores, and others. It should be noted that

jobs classified as “directly generated” are those that would experience near-term dislocation if the activity at the marine terminals were discontinued.

- **Induced employment impact** — jobs created throughout the local, regional and national economies because **individuals** directly employed due to port activity spend their wages locally on goods and services such as food, housing and clothing. These jobs are held by residents located throughout the region, since they are estimated based on local and regional purchases.
- **Indirect employment impact** — jobs created within the region due to purchases of goods and services **by firms, not individuals**. These jobs are estimated directly from local purchases data supplied by the 907 companies interviewed as part of this study. They include jobs with office supply firms, maintenance and repair firms, parts and equipment suppliers, and others.
- **Related user employment impact** — jobs with firms using the seaport to ship and receive cargo. While the facilities and services provided at the ports and marine terminals are a crucial part of the infrastructure that allows these jobs to exist, they would not necessarily be displaced immediately if

marine activity were to cease. The related users include the shippers/consignees who do not have operations on port property, and therefore could — and often do — use other modes to ship and receive cargo and raw materials. For the purposes of this analysis, shippers/consignees that have on-dock facilities or marine terminals associated with the production site are counted as directly dependent. Related user impacts are presented in Chapter VI of this report.

### 1.3 Personal Earnings Impact

The **personal earnings impact** is the measure of employee wages and salaries (excluding benefits) received by individuals directly employed due to port activity. Re-spending of these earnings on goods and services throughout the regional economy is also estimated using a state or provincial personal-earnings multiplier, which reflects the percentage of purchases by individuals that are made within the state/province in which the port is located. This re-spending generates additional jobs or the “induced” employment impact. The re-spending effect varies by region — a larger effect occurs in regions that produce a relatively large proportion of the goods and services consumed by residents, while lower re-spending effects are associated with regions that import a relatively large share of consumer goods and services (since personal earnings “leak out” of the region for these out-of-region purchases). The direct earnings are a measure of the local impact since they are received by those directly employed by port activity.

### 1.4 Tax Impact

**Tax impacts** are tax payments to federal, state/provincial and local governments by firms and by individuals whose jobs are directly dependent upon and supported (induced and indirect jobs) by activity at the marine terminals.

## 2. IMPACT STRUCTURE

The four types of economic impacts are created throughout various business sectors of the local, regional, state/provincial and national economies. Four distinct sectors are impacted as a result of activity at the marine terminals. These are:

- Surface transportation sector
- Maritime services sector
- Shippers/consignees using the port
- Port authorities/Seaway authorities

Within each business sector, various participants are involved. This study estimates separate impacts for each of the participants. Below is a discussion of the four sectors analyzed for economic impacts — including a description of the major participants in each.

### 2.1 Surface Transportation Sector

The surface transportation sector consists of both the railroad and trucking industries. The trucking firms and railroads are responsible for moving the various cargoes between the marine terminals, and the inland origins and destinations.

### 2.2 Maritime Services Sector

Waterborne cargoes handled by each Great Lakes-Seaway port/marine terminal generate economic activity in various business sectors of the local economy. Specifically, these impacts occur in the following categories:

**Terminal Operations** — includes those companies that hire labor to load/off-load ships, transfer cargo to truck or rail, sort cargo, stage cargo, and provide short- and long-term storage of cargo

**Dockworkers** — include members of the International Longshoremen’s Association, International Union of Operating Engineers, International Brotherhood of Teamsters and the United Steelworkers, as well as those dockworkers with no union affiliation that are involved in the loading/unloading of cargo

**Tug Assist** — includes those companies that provide tug boats to assist vessels with docking and undocking

**Pilots** — include those companies and organizations that provide navigation-assistance services to vessels as required under U.S. and Canadian law

**Agents** — include those companies that provide vessel and crew-related services, including documentation required to enter and clear the ship, arrangement of pay for crews, and provision of food and supplies

*Marine Services* — include a variety of service providers such as chandlers that supply ships with food, supplies and equipment; marine surveyors that inspect vessels and cargo, and provide valuations for insurance purposes; launch operators that provide ferry services for crew to move from ship to shore; and fuel-supply companies that provide vessels with bunker fuel

*Freight Forwarders* — include those companies that provide transportation logistics and management services, and that coordinate both marine and land transportation for cargo

*Government* — includes those federal and local government agencies that perform services related to cargo handling and vessel operations, such as the U.S. Army Corps of Engineers, Department of Homeland Security, U.S. Customs and Border Protection, the Canadian and U.S. Coast Guards, and the Canada Border Services Agency.

*Ship Repair* — includes those companies that provide ship construction and repair services on both a scheduled and emergency basis

*Laker Operators* — include the crew and headquarters-based management employees of U.S. and Canadian domestic Great Lakes vessel operators that transport cargo

*Barge Operators* — include the crew and headquarters-based management employees of U.S. and Canadian domestic Great Lakes barge operators that transport cargo

### **2.3 Shippers/Consignees Sector**

This sector includes those firms that ship or receive cargo via a specific port. For the purpose of this analysis, shippers/consignees are divided into two categories. The first category consists of those dependent upon the port and usually located within the port's immediate vicinity.

The second category of shippers/consignees consists of those that could easily use competing ports. For example, if the port were not available, members of the first category would likely be driven out of business in the near term, while members of the second category would shift to another port. These non-dependent users are classified as “related port users” and are

addressed in Chapter VI of this report. These related users include farmers producing grain for export, mines producing iron ore, limestone, gypsum and salt, and the construction industry, which uses sand, gravel and cement.

### **2.4 Port Authorities/Seaway Authorities**

This sector includes the various port authorities operating in the Great Lakes-Seaway system. Also included in this category are the employees of the U.S. Saint Lawrence Seaway Development Corporation (SLSDC) and the Canadian St. Lawrence Seaway Management Corporation (SLSMC), as well as the lock operators at each of the lock systems on the Great Lakes-Seaway system — including the Soo Locks, which connect Lake Superior and Lake Huron.

## **3. SUMMARY OF METHODOLOGY**

This section provides a summary of the methodological approach used to analyze the economic impacts of the vessel and cargo activity on the Great Lakes-Seaway system.

### **3.1 Data Collection**

The cornerstone of Martin Associates' approach is the collection of detailed baseline impact data from firms providing services at the ports and terminals. To ensure accuracy and defensibility, the baseline impact data were collected from interviews with 907 firms that provide services on the Great Lakes-Seaway system. These firms represent more than 80 percent of the 1,095 firms identified in the Great Lakes-Seaway port community. In most cases, multiple interviews were conducted with several persons in each firm.

The baseline survey data collected from the 907 firms were used to develop operational impact models for each of the 32 ports. These data were also used to develop a model to expand the impact calculations beyond the 32 ports and therefore, to estimate state-wide/province-wide impacts.

### **3.2 Direct Jobs, Income, Revenue and Tax Impacts**

The results of these interviews were then used to develop the baseline direct job, revenue and income impacts for the business sectors and job categories

associated with the cargo activity at the marine terminals in the 32 individual port districts for which specific impact models were developed.

The direct tax impacts are estimated at a federal, state/provincial and local level based on actual per capita income levels as published by the Tax Foundation (for the U.S.) and Revenue Canada.

### 3.3 Induced Impacts

Induced impacts are those generated by the purchases of **individuals** directly employed as a result of port and terminal activity. For example, a portion of the personal earnings received by those directly employed due to activity at the marine terminals is used for purchases of goods and services, both regionally, as well as out-of-region. These purchases, in turn, create additional jobs in the region; these jobs are classified as “induced”.

To estimate these induced jobs for the 16 U.S. Great Lakes ports, the study team developed a state personal-earnings multiplier (for each state in which a port was located) from data provided by the U.S. Bureau of Economic Analysis, Regional Income Division. This personal-earnings multiplier was used to estimate the total personal earnings generated in the state as a result of the activity at the specific Great Lakes port within that state. A portion of this total personal-earnings impact was next allocated to specific local purchases (as determined from consumption data for the relevant state residents), as developed from the U.S. Bureau of Labor Statistics, Consumer Expenditure Survey, 2009. These purchases were next converted into retail and wholesale induced jobs in the state economy — by combining the purchases with the jobs-to-sales ratios in the supplying industries. A portion of the retail purchases was allocated to wholesale purchases, based on industry-specific data developed from the U.S. Bureau of Census, 2007 Economic Census. These wholesale purchases were combined with the relevant jobs-to-sales ratios for the wholesale industries associated with the local purchases. These ratios were developed at the state level in which the specific port was located.

To estimate the induced impacts associated with the cargo moving via the Canadian ports, personal-income multipliers for the waterborne transportation sector in Ontario and Quebec were developed by Statistics Canada, Industry Accounts Division, and provided to

Martin Associates. Martin Associates developed the distribution of purchases by type of purchase (food at home, food in restaurants, housing, apparel, home furnishings, transportation, medical care, etc.) for each province — using data provided by Statistics Canada (2009 base data). The associated supplying industry jobs-to-sales ratios on a provincial level were also supplied to Martin Associates by Statistics Canada (Provincial Input-Output Models). These ratios included the retail and wholesale re-spending impacts. The personal consumption expenditures from the port activity were then combined with these job multipliers to estimate the “consumption” induced impacts by the province in which each of the 16 Canadian ports are located.

To estimate the “non-consumption” induced impacts with such sectors as state/provincial governments, education, and other social services, a ratio of state/provincial employment in these key service industries to total state/provincial employment was developed. This ratio was then multiplied by the direct and consumption induced jobs to estimate the total direct and induced job impact.

The re-spending impact includes not only the wage and salary income received by people employed to provide goods and services to the direct job holders, but also the value of the purchases. Therefore, the re-spending/local consumption impact cannot be divided by the induced jobs to estimate the induced income — as this would overestimate the induced personal wage/salary impact per induced job.

A separate induced impacts model was developed for each of the 32 ports.

### 3.4 Indirect Jobs

Indirect jobs are generated in the local economy as the result of purchases by **companies** that are directly dependent upon cargo and vessel activity at ports and marine terminals, including shippers/consignees. These purchases are for goods such as office supplies and equipment, as well as for services including maintenance and repair, communications and utilities, transportation and professional services. To estimate the indirect economic impact, data on local purchases — by type of purchase — were collected from each of the 907 firms interviewed. These local purchases were then combined with employment-to-

sales ratios in local supplying industries, developed from the U.S. Bureau of Economic Analysis, Regional Input-Output Modeling System for the U.S. ports and from Statistics Canada, Industry Accounts Division, for Canadian ports. The indirect job ratios also account for the in-state/in-province spin-off effects from multiple rounds of supply chains that are required to provide the purchased goods and services. Indirect income, local purchases and taxes are also estimated.

A separate indirect impacts model was developed for each of the 32 ports.

### 3.5 Related User Impacts

Related user impacts measure the jobs, income, output and tax impacts with shippers and consignees and supporting industries that move cargo through the marine terminals located at each of the 32 ports. These impacts are classified as “related” because these firms can and do use other ports and marine terminals not necessarily on the Great Lakes-Seaway system. As a result, jobs with these exporters and importers cannot be counted as dependent upon the ports and marine terminals on the system.

The related user jobs are estimated based on the value-per-ton of the commodities exported and imported via each of the 32 ports, and the associated jobs to value-of-output ratios for the respective producing and consuming industries located in the state or province. The value-per-ton of each key commodity moving through each port was developed from the U.S. Census Bureau, USA Trade Online, and also converted into Canadian dollars for the Canadian ports. The average value-per-ton for each commodity moving through each port was then multiplied by the respective tonnage moved in 2010. Ratios of jobs to value-of-output for the corresponding consuming and producing industries were developed by Martin Associates from the U.S. Bureau of Economic Analysis, Regional Input-Output Modeling System, for the United States — for each of the Great Lakes states in which the 16 ports are located. For the 16 Canadian ports, the ratios were developed using data from Statistics Canada, Industry Accounts Division. These jobs-to-value coefficients include the spin-off impacts that would occur at the national level in order to produce the export commodity or use the import

commodity in production. The ratios of jobs to value-of-export or import cargo were then combined with the national value of the respective commodities moving via each of the 32 ports; this allowed for the estimation of related jobs and spin-off jobs in the national economies that support the export and import industries using the Great Lakes-Seaway system. Similarly, the respective income and output multipliers were used to estimate the related personal income impacts, as well as the total value of economic output and taxes generated by each port. It is important to note that care was taken to control for double counting of the direct, induced and indirect impacts.

Examples of related user impacts include the following: iron ore mining associated with iron ore shipped via Great Lakes-Seaway ports; the steel industries consuming the iron ore for use in the production of steel; coal mining associated with coal moved through each port; the utilities consuming coal received by water at each of the ports; and farming associated with the volume of grain moving via the ports.

Note that the related user impacts include only the impacts created by the volume of the cargo moving via each specific port. The related impacts include the impacts with the shipper/consignee of the cargo, and also include the impacts with the support industries necessary to deliver that volume of cargo to a port for shipment.

For raw materials and intermediate products received at a port — iron ore, for example — the value of the volume of ore received at the specific port is converted into a “value of steel produced.” This value of the steel produced (based on the volume and value of the ore received) is then used to develop the related user jobs, income, inter-industry purchases, value of output, and the taxes paid resulting from the volume and value of the iron ore received at the specific port and resulting steel production.

For example, for a steel mill located in proximity to a port — but receiving a portion of raw materials by rail — the related impact is based only on the volume of the raw materials received via the port **by water**. Therefore, the total employment at the mill is not included in the related jobs, only that share specifically related to the volume of the raw material moving through the marine terminals.

The respective income and output multipliers associated with the industries for which the employment coefficients were developed, were used to estimate the related user personal income impacts, as well as the total value of economic output and taxes generated by cargo activity at each of the 32 ports, and for the total system. Once again, care was taken to control for double counting of the direct, induced and indirect impacts.

Note that related user impacts are counted only once for the shipment or receipt of cargo by a port/marine terminal, in contrast to the calculations used for the other types of impacts. For example — for grain shipped via Thunder Bay, received at a St. Lawrence River port such as Quebec and then reloaded onto a foreign-flag vessel for export — direct, induced and indirect impacts are created at the port of shipment (Thunder Bay), the port of discharge (Quebec) and the port where the grain was loaded for international export (Quebec). Therefore, the same ton of grain created direct, induced and indirect impacts at each of the three points of handling. This is not the case for related user impacts, as the user impacts with the grain (the farm jobs, income, revenue, taxes and supporting industries required to deliver a ton of grain to the port for shipment) are counted only for the initial shipment of the grain from Thunder Bay. The related user impacts of the same ton of grain are not counted for the St. Lawrence River ports.

A related user model was developed for each of the 32 ports and then used in each prototype model for “non-port specific” cargo and vessel activity, to estimate the total related user impacts for each state/province and the system as a whole.

The related user impacts are presented in Chapter VI of this report.

#### **4. COMMODITIES INCLUDED IN THE ANALYSIS**

Economic impacts were estimated for the following commodities handled at the marine terminals on the Great Lakes-Seaway system:

- Steel products
- General cargo (excluding steel)
- Iron ore

- Grain
- Stone/aggregates
- Cement
- Salt
- Other dry bulk
- Other liquid bulk
- Coal
- Petroleum products
- Wind energy components/equipment

#### **5. ESTIMATE OF TONNAGE**

Currently, there is no single data source for the marine cargo moving on the Great Lakes-Seaway system. The U.S. Army Corps of Engineers’ (USACE) “Waterborne Commerce Statistics” provides data on total international and domestic shipments by U.S. port district, but does not have information for the Canadian ports. Furthermore, the year 2009 is the latest year for which USACE data is available, and due to the recession, that year’s tonnage levels were abnormally low. The Lake Carriers’ Association provides tonnage data for vessel activity on the Great Lakes. This tonnage is for bulk cargo moving on U.S. and Canadian flag carriers — by port of loading and broad bulk commodity groups — and this data is available for the year 2010. The Lake Carriers’ Association also provides data on U.S. flag vessels moving cross-lake to Canadian ports. Statistics Canada provides port-to-port data flows by commodity, both international and domestic, for the Canadian ports operating on the Great Lakes-Seaway system, but this data is for 2009. Finally, the Canadian St. Lawrence Seaway Management Corporation (SLSMC) publishes data for traffic moving via the St. Lawrence Seaway and for traffic movements by lock system on the Great Lakes-Seaway system. However, this database does not include traffic moving within the upper four Great Lakes (and not transiting one of the Seaway locks). All of these sources were used to formulate estimates regarding tonnage by commodity moving on the Great Lakes-Seaway system.

The tonnage estimates used in each of the 32 individual port models were developed from individual port authority tonnage data and through interviews with the terminal operators located in each of the 32 port

districts. This data was then cross-checked with the Lake Carriers' Association database for U.S. and Canadian flag carriers — by key commodity group — with specific focus on identifying cargo moving on the U.S. and Canadian flag fleets. The St. Lawrence Seaway Traffic Statistics database was also used to check and modify the tonnage — by commodity — identified for each port as international tonnage, as well as U.S. and Canadian flag tonnage moving via the St. Lawrence Seaway lock system.

The 322.1 million metric tons of cargo handled via the U.S. and Canadian ports and marine terminals located on the Great Lakes-Seaway system include domestic cargo shipped via the ports, as well as that same cargo received through ports in the system. Therefore, this tonnage represents shipment and receipts of domestic cargo and trans-lake cargo, and will be significantly greater than the domestic cargo identified as moving on the vessels by the Lake Carriers' Association and the St. Lawrence Seaway Traffic Statistics.

The tonnage estimates developed for each of the 32 ports were then used as inputs into the port-specific models, which consist of the direct, induced, indirect and related users sub-modules. Impacts were then estimated for each of the 32 ports.

## **6. EXPANSION OF THE 32-PORT IMPACT MODELS TO MEASURE SYSTEM-WIDE IMPACTS**

A prototype model was developed for each state and province, to measure the cargo that moves through private terminals and ports not located in one of the 32 port districts for which the individual models were developed. These prototype models also consist of direct, induced, indirect and related sub-modules, and were developed based on revenue-per-ton ratios and jobs-per-ton ratios by commodity and category, estimated from the port-specific models for the ports located in each relevant state or province.

The “other Great Lakes-Seaway tonnage” (outside the 32 port districts) was calculated based on the following methodology. For the United States, total state tonnage by commodity moving on the Great

Lakes was developed from data provided by the U.S. Army Corps of Engineers. This data is for the year 2009, and was expanded based on the growth in tonnage between 2009 and 2010, as reported by the Lake Carriers' Association. The individual port-district tonnage used in the port-specific models for each state was then subtracted from each state's total Great Lakes tonnage — by commodity — to estimate “other Great Lakes-Seaway tonnage,” by commodity, for each state.

For Canada, total provincial tonnage for all Great Lakes-Seaway ports was developed from Statistics Canada data. The most recent year for which this data is available is 2009; therefore, the data were adjusted by the rate of growth in Canadian Laker tonnage between 2009 and 2010. The individual port-district tonnage used in the port-specific models for each province was then subtracted from each province's total Great Lakes-Seaway tonnage to estimate “other Great Lakes-Seaway tonnage” for Ontario and Quebec.

Using the 32 port-specific models, and the state and provincial models for “other tonnage”, the economic impacts at the level of the 32 port districts and the “other impacts” were then combined to estimate total impacts in the following categories:

- System-wide
- By state and province
- By commodity
- By carrier flag
- By employment sector

It is worth emphasizing that the direct impacts generated at the 32 individual ports accounted for 71 percent of the total impacts. The 16 U.S. ports accounted for 66 percent of the estimated total U.S. impacts, while the 16 Canadian ports accounted for 75 percent of the estimated total Canadian impacts.

# SYSTEM-WIDE IMPACTS

- 1. Total Economic Impacts**
- 2. Job Impacts**
- 3. Revenue Impacts**
- 4. Personal Income and Local Consumption Impacts**
- 5. Federal, State/Provincial and Local Tax Impacts**
- 6. Impacts by State and Province**

## SYSTEM-WIDE IMPACTS

*This chapter presents the results of the economic impact analysis of the Great Lakes-St. Lawrence Seaway System, including the economic impacts generated by traffic from all sources: U.S. domestic commerce; Canadian domestic commerce; bi-national commerce between the two countries; and international traffic moving between the Great Lakes-Seaway region and overseas destinations. The impacts are measured for the year 2010 and are presented in terms of total economic impacts at the bi-national regional level, the country level and the state/provincial level. The results of the 32 individual port studies are not presented due to confidentiality issues.*

### 1. TOTAL ECONOMIC IMPACTS

In 2010, 322.1 million metric tons of cargo were handled by the ports and marine terminals located on the Great Lakes-Seaway system. This activity created a range of economic impacts (described below) in the region — defined as the Canadian provinces of Ontario and Quebec, and the states of New York, Pennsylvania, Ohio, Indiana, Illinois, Wisconsin, Michigan and Minnesota.

Exhibit II-1 summarizes the economic impacts of all traffic moving via the ports on the Great Lakes-Seaway system. The monetary impacts are expressed in both U.S. and Canadian dollars (shown as US\$ or Cdn\$). The exchange rate used throughout the report is \$1.00 U.S. dollar = \$1.03 Canadian dollars. The exchange rate reflects the annual average for 2010, as of December 31, 2010, and is sourced from “The Board of Governors of the Federal Reserve System Data Download Program.”

Additional impacts known as “related user impacts” are presented in a separate chapter (Chapter VI). These impacts are segregated because the shippers and consignees in the “related users” category are economically less dependent on Great Lakes-Seaway ports than the users that create the direct, induced and indirect economic impacts.

**Exhibit II-1 Economic Impacts of the Great Lakes-St. Lawrence Seaway System**

	Total	
<b>Jobs</b>		
Direct Jobs	92,923	
Induced	66,005	
Indirect	67,905	
<b>Total</b>	<b>226,833</b>	
<b>Personal Income (1,000)</b>	<b>US \$</b>	<b>Cdn \$</b>
Direct	\$4,362,985	\$4,493,875
Re-Spending/Local Consumption	\$6,853,182	\$7,058,777
Indirect	\$2,898,060	\$2,985,002
<b>Total</b>	<b>\$14,114,227</b>	<b>\$14,537,654</b>
<b>Business Revenue (1,000)</b>	<b>\$33,561,032</b>	<b>\$34,567,863</b>
<b>Local Purchases (1,000)</b>	<b>\$6,413,744</b>	<b>\$6,606,156</b>
<b>State/Provincial and Local Taxes (1,000)</b>	<b>\$1,530,634</b>	<b>\$1,576,553</b>
<b>Federal Taxes (1,000)</b>	<b>\$3,052,853</b>	<b>\$3,144,439</b>

Note: Totals may not add due to rounding

The 322.1 million metric tons of cargo handled at U.S. and Canadian ports and marine terminals located on the Great Lakes-Seaway system include domestic cargo shipped via the ports within the system, as well as that **same cargo** received by the ports in the system. Therefore, this tonnage represents shipment and receipt of both domestic and trans-lake cargo, and will be significantly greater than the domestic cargo identified as moving on the vessels by the Lake Carriers' Association and the St. Lawrence Seaway Traffic Statistics. The handling of this cargo generated the following economic impacts in the United States and Canada:

***226,833 jobs in Canada and the United States are in some way related to the cargo handled at the marine terminals located on Great Lakes-Seaway system.***

- Of the 226,833 jobs, **92,923 direct jobs** were generated by the marine cargo and vessel activity at the marine terminals on the Great Lakes-Seaway system.
- As the result of the local and regional purchases by those 92,923 individuals holding the direct jobs, an additional **66,005 induced jobs** were supported in the regional economy.
- **67,905 indirect jobs** were supported by US\$6.4 billion (Cdn\$6.6 billion) in regional purchases by businesses supplying services at the marine terminals and ports.

***In 2010, the marine cargo and vessel activity at the marine terminals on the Great Lakes-Seaway system generated a total of US\$33.6 billion (Cdn\$34.6 billion) in total economic activity in the United States and Canada.***

- Marine activity supported US\$33.6 billion (Cdn\$34.6 billion) in total personal wage and salary income, and local consumption expenditures for regional residents of the U.S. and Canada. This includes US\$14.1 billion (Cdn\$14.5 billion) indirect, indirect, induced and local consumption expenditures. The 92,923 direct job holders received US\$4.4 billion (Cdn\$4.5 billion) in direct wage and salary income. This equates to an average salary of nearly US\$47,000 (Cdn\$48,400).

***A total of US\$4.6 billion (Cdn\$4.7 billion) in direct, induced and indirect federal, state/provincial and local tax revenue was generated by maritime activity at the marine terminals located on the Great Lakes-Seaway system.***

- Of the US\$4.6 billion (Cdn\$4.7 billion), US\$1.5 billion (Cdn\$1.6 billion) was paid to local and state/provincial governments, while US\$3.1 billion (Cdn\$3.14 billion) was paid in federal taxes.

Exhibit II-2 shows the breakdown of the total impacts by country.

As shown in Exhibit II-2, direct jobs generated by the cargo and vessel activity on the Great Lakes-Seaway system were nearly equally distributed between the U.S. and Canada. Of the 92,923 direct jobs generated, 48,288 were created in Canada, while 44,634 direct jobs were created in the U.S. However, the majority of induced and indirect jobs were created in the U.S. The difference in induced jobs reflects the fact that the savings rate in Canada was more than three times the level in the United States in 2007 — the year in which the income multipliers were developed by the U.S. Bureau of Economic Analysis and by Statistics Canada, Industry Accounts Division.<sup>1</sup> As a result of the lower savings rate in the U.S., the income multipliers are more than triple the multipliers for Canada. Therefore, the re-spending impact is significantly lower in Canada than in the U.S., which results in fewer induced jobs. In addition, two different input/output models were used in the analysis — the Statistics Canada, Industry Accounts Division model for Canada and the U.S. Bureau of Economic Analysis, RIMSII model for the United States. The differences in these two models may also explain some portion of the differences between the re-spending/induced job impact for Canada and the United States. However, it appears that the differences in the savings rate are the major underlying explanatory factor.

<sup>1</sup> The Organisation of Economic Co-operation and Development (OECD) reports that the share of household disposable income saved in 2007 was 1.5 percent in Canada and 0.4 percent in the United States. In 2006, the savings as a percentage of household disposable income were 2.5 percent in Canada compared to 0.4 percent in the U.S., a more than five times differential, which would result in a significantly higher re-spending impact in the U.S. than in Canada, and thus personal-income multipliers are significantly greater in the U.S. than in Canada.

### Exhibit II-2 Total System Impacts by Country

	Canada		United States		Total	
<b>Jobs</b>						
Direct Jobs		48,288		44,634		92,923
Induced		21,947		44,057		66,005
Indirect		28,320		39,585		67,905
Total		98,556		128,227		226,833
<b>Personal Income (1,000)</b>						
	<b>US \$</b>	<b>Cdn \$</b>	<b>US \$</b>	<b>Cdn \$</b>	<b>US \$</b>	<b>Cdn \$</b>
Direct	\$2,310,209	\$2,379,515	\$2,052,776	\$2,114,360	\$4,362,985	\$4,493,875
Re-Spending/ Local Consumption	\$878,987	\$905,357	\$5,974,194	\$6,153,420	\$6,853,182	\$7,058,777
Indirect	\$1,274,072	\$1,312,294	\$1,623,988	\$1,672,707	\$2,898,060	\$2,985,002
Total	\$4,463,268	\$4,597,166	\$9,650,959	\$9,940,487	\$14,114,227	\$14,537,654
<b>Business Revenue (1,000)</b>	\$15,425,317	\$15,888,076	\$18,135,715	\$18,679,787	\$33,561,032	\$34,567,863
<b>Local Purchases (1,000)</b>	\$3,373,601	\$3,474,809	\$3,040,143	\$3,131,347	\$6,413,744	\$6,606,156
<b>State/Provincial and Local Taxes (1,000)</b>	\$584,966	\$602,515	\$945,668	\$974,038	\$1,530,634	\$1,576,553
<b>Federal Taxes (1,000)</b>	\$1,315,681	\$1,355,151	\$1,737,173	\$1,789,288	\$3,052,853	\$3,144,439

Note: Totals may not add due to rounding

Indirect jobs generated per dollar of local purchases are lower in Canada than in the U.S., reflecting the fact that in Canada, there are greater leakages of purchases out of the region. As a result, the jobs-to-sales multipliers used in estimating the indirect jobs ratios are lower in Canada than in the United States.

## 2. JOB IMPACTS

This section focuses on the 92,923 direct jobs created by the 322.1 million tons of cargo handled at the ports and marine terminals on the Great Lakes-Seaway system. Exhibit II-3 shows the direct jobs impact by commodity moving on the system. As this exhibit shows, the movement of iron ore, which represents the largest tonnage handled at the ports and marine terminals, created the largest number of direct jobs — 37,210. The majority of these jobs are with directly dependent shippers/consignees (steel mills) located at the ports that are directly dependent on the receipt of iron ore by vessels. About 17,000 of these direct jobs are with mills located in Canada and about 12,000 are with steel mills in the United States. The movement of other dry bulk cargoes generates the second-largest direct jobs impacts. These

### Exhibit II-3 Direct Jobs by Commodity — Regional Level

	Total	
	1,000 tons	Direct Jobs
<b>Steel</b>	3,165	5,080
<b>General Cargo</b>	2,390	681
<b>Iron Ore</b>	120,866	37,210
<b>Grain</b>	21,287	3,150
<b>Stone/Aggregate</b>	40,590	4,234
<b>Cement</b>	12,497	3,085
<b>Salt</b>	17,267	3,065
<b>Other Dry Bulk</b>	26,289	12,831
<b>Liquid Bulk</b>	17,606	6,440
<b>Coal</b>	59,612	5,591
<b>Wind Energy</b>	560	290
<b>Not Allocated</b>		11,265
<b>Total</b>	<b>322,129</b>	<b>92,923</b>

Note: Totals may not add due to rounding

**Exhibit II-4 Direct Jobs by Commodity — Country Level**

	Canada		United States		Total	
	1,000 tons	Direct Jobs	1,000 tons	Direct Jobs	1,000 tons	Direct Jobs
<b>Steel</b>	1,246	416	1,920	4,664	3,165	5,080
<b>General Cargo</b>	1,945	471	444	210	2,390	681
<b>Iron Ore</b>	31,303	19,888	89,562	17,321	120,866	37,210
<b>Grain</b>	16,536	2,107	4,751	1,043	21,287	3,150
<b>Stone/Aggregate</b>	6,030	738	34,560	3,496	40,590	4,234
<b>Cement</b>	4,972	1,452	7,525	1,633	12,497	3,085
<b>Salt</b>	11,712	1,479	5,555	1,587	17,267	3,065
<b>Other Dry Bulk</b>	19,362	10,008	6,927	2,824	26,289	12,831
<b>Liquid Bulk</b>	15,139	4,052	2,467	2,389	17,606	6,440
<b>Coal</b>	10,306	1,331	49,306	4,260	59,612	5,591
<b>Wind Energy</b>	252	93	308	196	560	290
<b>Not Allocated</b>		6,253		5,012		11,265
<b>Total</b>	<b>118,804</b>	<b>48,288</b>	<b>203,325</b>	<b>44,634</b>	<b>322,129</b>	<b>92,923</b>

Note: Totals may not add due to rounding

impacts are concentrated with the operations of tenants located at the individual ports, as well as private terminals located on the Great Lakes handling and processing dry bulk cargoes such as alumina and other ores, fertilizers and potash. The majority of these direct jobs were created in Canada.

Exhibit II-4 shows the direct jobs by commodity for each country.

The majority of the tonnage shipped and received at the U.S. ports and terminals consists of iron ore, stone/aggregates and coal. Iron ore, other dry bulk, grain, petroleum products and coal are the major commodities shipped and received at the Canadian ports and terminals located on the Great Lakes-Seaway system.<sup>2</sup> Iron ore creates the largest number of direct jobs in both countries, followed by the shipment and receipt of other dry bulk cargo at Canadian ports. Steel products moving on the Great Lakes create larger impacts in the United States, due to the location of major steel fabrication tenants at several of the U.S. Great Lakes ports.

The direct jobs generated by category are presented in Exhibit II-5. This exhibit shows that nearly 50 percent of the direct jobs impact is with shippers/consignees that are directly dependent upon the shipment and receipt of cargo by vessel. As noted, the location of steel mills, alumina smelters and dependent iron ore, salt and alumina mines in proximity to the ports and marine terminals on the Great Lakes-Seaway system underscores the importance of the transportation system in providing raw materials to the region's steel mills and industrial economy. The second-largest number of direct jobs is created with the trucking firms serving the ports and marine terminals, followed by the terminal workers, which include jobs with marine terminals located within the port districts and throughout the system, as well as with warehousing operations associated with the terminal operations. In some cases these terminal workers are associated with the dependent shippers/consignees. About 7,600 direct jobs are with the Canadian and U.S. flag vessel operators, and tug and barge operators moving cargo

<sup>2</sup> It is important to emphasize that of the 89.6 million tons of iron ore moving via the U.S. ports and terminals on the Great Lakes, most of the ore is shipped from U.S. ports, both to Canadian and U.S. steel mills. Therefore, the 89.6 million tons of iron ore include both shipments and receipts of iron ore at U.S. ports, while the iron ore moving via the Canadian ports is more representative of iron ore receipts. However, iron ore does move from the St. Lawrence River to Great Lakes ports. The actual amount of iron ore shipped by vessel from U.S. Great Lakes ports (not including receipts) on the Great Lakes-Seaway system was about 43.8 million metric tons in 2010, as estimated by the Lake Carriers' Association.

on the system<sup>3</sup>; 3,373 jobs are with freight forwarders and customs brokers arranging for the handling of the cargo; and another nearly 2,000 jobs are with firms providing maritime services such as ship chandlery, vessel cargo and hull surveys, ship repair and marine equipment sales, and servicing.

Exhibit II-6 shows the direct job impacts by category, by country, for the cargo activity at all ports and terminals on the Great Lakes-Seaway system.

As presented in Exhibit II-6, the number of direct jobs with dependent shippers/consignees is greater in Canada than in the United States, reflecting the location of alumina smelters at port facilities, as well as fertilizer operations in addition to steel mills and steel fabrication complexes both in Canada and the United States. Direct jobs with rail are also significantly higher in the U.S. due to the greater use of rail to move coal and iron ore to the ports for shipment.

**Exhibit II-5 Direct Jobs Impacts by Category — Regional Level**

	Direct Jobs
<b>Surface Transportation</b>	
Rail	2,355
Truck	13,686
<b>Maritime Service</b>	
Terminal Employees	10,369
Dockworkers	1,604
Tug Assists	903
Pilots	240
Agents	162
Maritime Services	1,959
Forwarders	3,373
Government	2,066
Marine Equipment/Ship Repair	4,900
Laker	6,512
Barge	1,117
Dependent Shippers/Consignees	42,488
Port Authority	1,188
<b>Total</b>	<b>92,923</b>

Note: Totals may not add due to rounding

**Exhibit II-6 Direct Jobs Impacts by Category — Country Level**

	Canada Direct Jobs	United States Direct Jobs	Total
<b>Surface Transportation</b>			
Rail	565	1,790	2,355
Truck	6,741	6,945	13,686
<b>Maritime Service</b>			
Terminal Employees	4,191	6,178	10,369
Dockworkers	979	625	1,604
Tug Assists	391	513	903
Pilots	73	166	240
Agents	92	71	162
Maritime Services	656	1,302	1,959
Forwarders	1,244	2,129	3,373
Government	659	1,407	2,066
Marine Equipment/Ship Repair	3,506	1,394	4,900
Laker	2,331	4,181	6,512
Barge	536	581	1,117
Dependent Shippers/Consignees	25,434	17,054	42,488
Port Authority	890	298	1,188
<b>Total</b>	<b>48,288</b>	<b>44,634</b>	<b>92,923</b>

Note: Totals may not add due to rounding

<sup>3</sup> Note that the barge-operator impacts consist primarily of U.S. flag operations on tug-barge combinations, but also include shoreside jobs with bunker (fueling) operations.

### 3. REVENUE IMPACTS

In 2010, the direct business revenue received by the firms directly dependent upon the cargo handled at the marine terminals in the Great Lakes Seaway system was US\$33.6 billion (Cdn\$34.6 billion). These firms provide maritime services and inland transportation services for the cargo handled at the marine terminals and the vessels calling at the terminals.

Exhibit II-7 shows the distribution of this direct revenue impact by category and economic sector in both U.S. and Canadian dollars.

Similar to the direct jobs impacts by category, the majority of the direct business revenue is received by the dependent shippers/consignees located at the ports and marine terminals operating on the Great Lakes-Seaway system.

The revenue impacts by category, by country, are presented in Exhibit II-8.

**Exhibit II-7 Revenue Impact by Category — Regional Level**

	Revenue Million US	Revenue Million Cdn
<b>Surface Transportation</b>		
Rail	\$5,081	\$5,233
Truck	\$1,361	\$1,402
<b>Maritime Service</b>		
Terminal Employees	\$1,661	\$1,711
Tug Assists	\$92	\$95
Pilots	\$92	\$94
Agents	\$38	\$40
Maritime Services	\$483	\$497
Forwarders	\$602	\$620
Marine Equipment/Ship Repair	\$895	\$922
Laker	\$2,929	\$3,017
Barge	\$196	\$202
<b>Dependent Shippers/Consignees</b>	<b>\$19,836</b>	<b>\$20,431</b>
<b>Port Authority</b>	<b>\$294</b>	<b>\$303</b>
<b>Total</b>	<b>\$33,561</b>	<b>\$34,568</b>

Note: Totals may not add due to rounding

**Exhibit II-8 Revenue Impact by Category — Country Level**

	Canada		United States	
	Million US	Million Cdn	Million US	Million Cdn
<b>Surface Transportation</b>				
Rail	\$1,180	\$1,215	\$3,901	\$4,018
Truck	\$695	\$716	\$666	\$686
<b>Maritime Service</b>				
Terminal Employees	\$802	\$826	\$859	\$885
Tug Assists	\$40	\$41	\$52	\$54
Pilots	\$28	\$29	\$64	\$66
Agents	\$12	\$12	\$27	\$28
Maritime Services	\$155	\$160	\$328	\$338
Forwarders	\$222	\$229	\$380	\$392
Marine Equipment/Ship Repair	\$569	\$586	\$326	\$336
Laker	\$1,041	\$1,073	\$1,888	\$1,944
Barge	\$96	\$99	\$100	\$103
<b>Dependent Shippers/Consignees</b>	<b>\$10,390</b>	<b>\$10,701</b>	<b>\$9,447</b>	<b>\$9,730</b>
<b>Port Authority</b>	<b>\$196</b>	<b>\$202</b>	<b>\$98</b>	<b>\$101</b>
<b>Total</b>	<b>\$15,425</b>	<b>\$15,888</b>	<b>\$18,136</b>	<b>\$18,680</b>

Note: Totals may not add due to rounding

Consistent with the distribution of direct jobs by category, the largest revenue impacts are with the dependent shippers/consignees. The revenue from rail operations is greater in the U.S. than in Canada, reflecting the longer haul of the rail moved to and from U.S. ports, particularly the movement of coal from Ohio, West Virginia and the Powder River Basin area. Similarly, pilotage revenue is higher in the United States, due to the longer length of vessel transits to the majority of the U.S. ports on which pilots are required — primarily to the Duluth, MN/Superior, WI marine terminals. The laker revenue for cargo moved to and from the U.S. is nearly double the Canadian laker revenue, primarily due to the higher volume of cargo moving on lakers to U.S. ports compared to Canadian Great Lakes and St. Lawrence River ports, as well as the distance traveled by U.S. lakers — particularly in the iron ore trade.

#### **4. PERSONAL INCOME AND LOCAL CONSUMPTION IMPACTS**

The 92,923 individuals directly employed as a result of the cargo handled at the ports and marine terminals received US\$4.4 billion (Cdn\$4.5 billion) in wages and salaries, for an average annual salary of US\$47,000 (Cdn\$48,400). These individuals, in turn, used these earnings to purchase goods and services, to pay taxes, and for savings. The purchase of goods and services from regional sources creates a re-spending effect known as the personal-earnings multiplier effect. For the U.S. Great Lakes ports, this re-spending, or multiplier effect, was estimated using a personal-earnings multiplier for the maritime sector, by state, from the U.S. Bureau of Economic Analysis, RIMSII. The income multipliers by province were developed from Statistics Canada, Industry Accounts Division, for the maritime sectors of Ontario and Quebec. Using the local personal-earnings multipliers by state and province for the relevant ports, an additional US\$6.9 billion (Cdn\$7.1 billion) in income and consumption were created in the Great Lakes regional economy. In addition, the 67,905 indirectly employed workers received indirect wages and salaries totaling US\$2.9 billion (Cdn\$3.0 billion). Combining the direct, induced and indirect income impacts, the 322.1 million tons of cargo handled at the ports and

terminals located on the Great Lakes-Seaway system created US\$14.1 billion (Cdn\$14.5 billion) in wages and salaries, and local consumption expenditures in the regional economy.

The 48,288 direct job holders at the Canadian ports and terminals received US\$2.3 billion (Cdn\$2.4 billion), for an average salary of US\$47,900 (Cdn\$49,300). The 44,634 direct job holders at the U.S. ports received US\$2.0 billion (Cdn\$2.1 billion) in direct personal income, for an average salary of US\$46,000 (Cdn\$47,400). As noted, the re-spending impact is much lower for the Canadian ports than for the U.S. ports, reflecting the much higher savings rate for Canadian households compared to those in the U.S. — thus reducing the income-multiplier impact. The Organisation of Economic Co-operation and Development (OECD) reported that in 2007 (the time period for which the income multipliers were derived for the U.S. and Canada), the percentage of household income saved by Canadians was more than three times greater than for U.S. households. This difference in the propensity to save has a significant impact on the level of personal-income multipliers, as reflected by the actual multiplier levels. In addition, to the extent that Statistics Canada and the U.S. Bureau of Economic Analysis develop and define personal-income multipliers differently, the income multipliers will differ. However, in developing the personal-income multiplier impacts, Martin Associates used the national government agencies in each country to provide the income multipliers, based on our definitions. Note that the re-spending impact also includes the local consumption impact.

In addition to the direct income impact and the re-spending and consumption impacts, the division of the re-spending impact/local consumption impact by the induced jobs will overstate the actual salary of the induced job holders.

The 67,905 indirect job holders received US\$2.9 billion (Cdn\$3.0 billion) in personal income, of which the 28,320 Canadian indirect job holders received US\$1.3 billion (Cdn\$1.3 billion), while the 39,585 indirect job holders in the U.S. received US\$1.6 billion (Cdn\$1.7 billion).

## **5. FEDERAL, STATE/PROVINCIAL AND LOCAL TAX IMPACTS**

Total state and local tax impacts generated by the cargo activity on the Great Lakes-Seaway system were estimated from several sources. The U.S. tax impacts were estimated from income indices developed by the Tax Foundation, while the Canadian tax impacts were estimated based on data provided to Martin Associates by Revenue Canada. In addition, adjustments were made to reflect the different tax relationships in Quebec at the federal level. The cargo activity at the U.S. ports and marine terminals created US\$945.7 million (Cdn\$974.0 million) in state and local taxes, and US\$1.7 billion (Cdn\$1.8 billion) in federal taxes. The cargo activity at the Canadian ports created US\$585.0 million (Cdn\$602.5 million) in provincial taxes, and US\$1.3 billion (Cdn\$1.4 billion) in federal taxes. The ratio of state, local and federal taxes to total direct, induced (including local consumption expenditures) and indirect income is about 43 percent in Canada and about 28 percent in the U.S.

## **6. IMPACTS BY STATE AND PROVINCE**

The economic impacts were estimated at the port level for the 32 U.S. and Canadian Great Lakes and St. Lawrence River ports. The models developed for these 32 individual ports were then used to develop prototype models for each Great Lakes state and province — in order to capture the impacts of cargo activity moving through ports and marine terminals for which specific models were not developed. This process provided a model for each state and province to estimate the total impacts at the state and provincial level. It is important to note that the direct impacts generated at the 32 individual ports accounted for 71 percent of the total impacts. The 16 U.S. ports accounted for 66 percent of the total estimated U.S. impacts, while the 16 Canadian ports accounted for 75 percent of the total estimated Canadian impacts.

Exhibit II-9 presents the U.S. impacts of total cargo moving via U.S. ports and marine terminals located on the Great Lakes-Seaway system. As this exhibit shows, in terms of direct, induced and indirect jobs, the impacts of the total traffic handled at U.S. ports and terminals are greatest for the state of Indiana, followed by Michigan and Ohio.

Exhibit II-10 shows the impacts of the cargo moving on the Great Lakes-Seaway system for the provinces of Ontario and Quebec. As noted earlier, these impacts do not include the impacts of the international cargo handled at St. Lawrence River ports in Quebec. As this exhibit indicates, the ports in Ontario account for about 60 percent of the direct job impacts for Canada.

**Exhibit II-9 Economic Impacts by State — Cargo Moving via U.S. Ports and Marine Terminals on the Great Lakes-St. Lawrence Seaway System**

<b>Tonnage (1,000)</b>	<b>Indiana 28,360</b>		<b>Ohio 40,222</b>		<b>Michigan 61,302</b>	
<b>Jobs</b>						
Direct Jobs	15,516		8,504		10,603	
Induced	17,852		9,222		8,061	
Indirect	14,964		10,355		8,155	
<b>Total</b>	<b>48,332</b>		<b>28,081</b>		<b>26,819</b>	
<b>Personal Income (1,000)</b>	<b>US \$</b>	<b>Cdn \$</b>	<b>US \$</b>	<b>Cdn \$</b>	<b>US \$</b>	<b>Cdn \$</b>
Direct	\$726,283	\$748,072	\$378,968	\$390,337	\$484,116	\$498,640
Re-Spending/ Local Consumption	\$2,468,927	\$2,542,995	\$1,278,750	\$1,317,113	\$1,058,956	\$1,090,725
Indirect	\$587,445	\$605,069	\$436,985	\$450,094	\$334,688	\$344,728
<b>Total</b>	<b>\$3,782,656</b>	<b>\$3,896,135</b>	<b>\$2,094,703</b>	<b>\$2,157,544</b>	<b>\$1,877,761</b>	<b>\$1,934,093</b>
<b>Business Revenue (1,000)</b>	<b>\$7,894,646</b>	<b>\$8,131,486</b>	<b>\$3,032,330</b>	<b>\$3,123,300</b>	<b>\$3,799,899</b>	<b>\$3,913,896</b>
<b>Local Purchases (1,000)</b>	<b>\$1,133,209</b>	<b>\$1,167,206</b>	<b>\$772,802</b>	<b>\$795,986</b>	<b>\$637,553</b>	<b>\$656,680</b>
<b>State and Local Taxes (1,000)</b>	<b>\$359,352</b>	<b>\$370,133</b>	<b>\$203,186</b>	<b>\$209,282</b>	<b>\$182,143</b>	<b>\$187,607</b>
<b>Federal Taxes (1,000)</b>	<b>\$680,878</b>	<b>\$701,304</b>	<b>\$377,047</b>	<b>\$388,358</b>	<b>\$337,997</b>	<b>\$348,137</b>

**Exhibit II-9 continued**

<b>Tonnage (1,000)</b>	<b>Minnesota 30,160</b>		<b>Illinois 7,219</b>		<b>Wisconsin 33,241</b>	
<b>Jobs</b>						
Direct Jobs	2,516		2,813		3,466	
Induced	2,258		2,521		3,071	
Indirect	1,496		1,842		2,240	
<b>Total</b>	<b>6,271</b>		<b>7,177</b>		<b>8,777</b>	
<b>Personal Income (1,000)</b>	<b>US \$</b>	<b>Cdn \$</b>	<b>US \$</b>	<b>Cdn \$</b>	<b>US \$</b>	<b>Cdn \$</b>
Direct	\$115,464	\$118,928	\$121,942	\$125,600	\$163,789	\$168,703
Re-Spending/ Local Consumption	\$263,731	\$271,643	\$384,763	\$396,306	\$367,057	\$378,069
Indirect	\$60,381	\$62,193	\$87,490	\$90,115	\$91,566	\$94,313
<b>Total</b>	<b>\$439,576</b>	<b>\$452,763</b>	<b>\$594,196</b>	<b>\$612,022</b>	<b>\$622,412</b>	<b>\$641,085</b>
<b>Business Revenue (1,000)</b>	<b>\$1,343,705</b>	<b>\$1,384,016</b>	<b>\$438,795</b>	<b>\$451,959</b>	<b>\$1,405,293</b>	<b>\$1,447,451</b>
<b>Local Purchases (1,000)</b>	<b>\$114,433</b>	<b>\$117,866</b>	<b>\$152,694</b>	<b>\$157,275</b>	<b>\$175,955</b>	<b>\$181,234</b>
<b>State and Local Taxes (1,000)</b>	<b>\$46,815</b>	<b>\$48,219</b>	<b>\$59,420</b>	<b>\$61,202</b>	<b>\$67,073</b>	<b>\$69,085</b>
<b>Federal Taxes (1,000)</b>	<b>\$79,124</b>	<b>\$81,497</b>	<b>\$106,955</b>	<b>\$110,164</b>	<b>\$112,034</b>	<b>\$115,395</b>

**Exhibit II-9** continued

<b>Tonnage (1,000)</b>	<b>New York 2,216</b>		<b>Pennsylvania 605</b>		<b>Total US 203,325</b>	
<b>Jobs</b>						
Direct Jobs	924		291		44,634	
Induced	763		310		44,057	
Indirect	280		252		39,585	
<b>Total</b>	<b>1,967</b>		<b>854</b>		<b>128,277</b>	
<b>Personal Income (1,000)</b>	<b>US \$</b>	<b>Cdn \$</b>	<b>US \$</b>	<b>Cdn \$</b>	<b>US \$</b>	<b>Cdn \$</b>
Direct	\$49,646	\$51,136	\$12,568	\$12,945	\$2,052,776	\$2,114,360
Re-Spending/ Local Consumption	\$109,291	\$112,570	\$42,718	\$43,999	\$5,974,194	\$6,153,420
Indirect	\$14,770	\$15,213	\$10,662	\$10,982	\$1,623,988	\$1,672,707
<b>Total</b>	<b>\$173,708</b>	<b>\$178,919</b>	<b>\$65,948</b>	<b>\$67,926</b>	<b>\$9,650,959</b>	<b>\$9,940,487</b>
<b>Business Revenue (1,000)</b>	\$167,397	\$172,419	\$53,650	\$55,260	\$18,135,715	\$18,679,787
<b>Local Purchases (1,000)</b>	\$34,070	\$35,092	\$19,426	\$20,009	\$3,040,143	\$3,131,347
<b>State and Local Taxes (1,000)</b>	\$21,019	\$21,649	\$6,661	\$6,861	\$945,668	\$974,038
<b>Federal Taxes (1,000)</b>	\$31,267	\$32,205	\$11,871	\$12,227	\$1,737,173	\$1,789,288

**Exhibit II-10** Economic Impacts by Province — Cargo Moving via Canadian Ports and Marine Terminals on the Great Lakes-St. Lawrence Seaway System

<b>Tonnage (1,000)</b>	<b>Ontario 62,293</b>		<b>Quebec 56,511</b>		<b>Total 118,804</b>	
<b>Jobs</b>						
Direct Jobs	28,894		19,394		48,288	
Induced	12,743		9,205		21,947	
Indirect	21,906		6,414		28,320	
<b>Total</b>	<b>63,542</b>		<b>35,013</b>		<b>98,556</b>	
<b>Personal Income (1,000)</b>	<b>US \$</b>	<b>Cdn \$</b>	<b>US \$</b>	<b>Cdn \$</b>	<b>US \$</b>	<b>Cdn \$</b>
Direct	\$1,288,019	\$1,326,659	\$1,022,190	\$1,052,856	\$2,310,209	\$2,379,515
Re-Spending/ Local Consumption	\$515,208	\$530,664	\$363,780	\$374,693	\$878,987	\$905,357
Indirect	\$940,245	\$968,452	\$333,827	\$343,842	\$1,274,072	\$1,312,294
<b>Total</b>	<b>\$2,743,471</b>	<b>\$2,825,775</b>	<b>\$1,719,797</b>	<b>\$1,771,391</b>	<b>\$4,463,268</b>	<b>\$4,597,166</b>
<b>Business Revenue (1,000)</b>	\$9,360,290	\$9,641,098	\$6,065,027	\$6,246,978	\$15,425,317	\$15,888,076
<b>Local Purchases (1,000)</b>	\$2,419,844	\$2,492,439	\$953,757	\$982,370	\$3,373,601	\$3,474,809
<b>Provincial Taxes (1,000)</b>	\$236,076	\$243,158	\$348,890	\$359,357	\$584,966	\$602,515
<b>Federal Taxes (1,000)</b>	\$908,089	\$935,332	\$407,592	\$419,820	\$1,315,681	\$1,355,151



# SYSTEM-WIDE IMPACTS BY FLAG OF CARRIAGE

- 
- 1. Total Economic Impacts**
  - 2. Job Impacts**
  - 3. Revenue Impacts**
  - 4. Personal Income and Local Consumption Impacts**
  - 5. Federal, State/Provincial and Local Tax Impacts**
  - 6. Impacts by State and Province**

# SYSTEM-WIDE IMPACTS BY FLAG OF CARRIAGE

*This chapter presents impacts by vessel operator category. Cargo moves to and from the U.S. and Canadian Great Lakes ports/marine terminals on Canadian flag vessels, U.S. flag vessels and foreign flag vessels. For the most part, the Canadian flag vessels move cargo to and from Canadian ports, while U.S. flag vessels move cargo to and from U.S. ports, according to the carriage laws in place in each country. In a more limited scope, the Canadian flag and U.S. flag vessels move cargo between the U.S. and Canadian ports in cross-lake operations. Canadian flag vessels often move cargo from points within the Great Lakes to ports on the St. Lawrence River, whereas U.S. flag carriers typically operate exclusively within the Great Lakes and seldom transit the Montreal-Lake Ontario Section of the St. Lawrence Seaway.*

Using a combination of data sources from the Lake Carriers' Association; Statistics Canada; the U.S. Army Corps of Engineers Waterborne Commerce Statistics for the Great Lakes; data provided by the individual port authorities; and estimates of the U.S. flag share and Canadian share of laker traffic by port and commodity provided by the Lake Carriers' Association, Martin Associates developed 2010 tonnage estimates of cargo moving by commodity, port and U.S. flag, Canadian flag and international flag. This tonnage was entered into the 32 individual port economic-impact models and "other state/province prototype models," to estimate the impacts of cargo activity on the Great Lakes-St. Lawrence Seaway System by flag of carriage.

Based on this methodology, it is estimated that in 2010, Canadian flag vessels handled 142.5 million metric tons of cargo to and from ports on the Great Lakes-Seaway system, and U.S. flag carriers handled 164.2 million tons. Since this estimate includes shipments and receipts, it represents about two times the actual level of tonnage moving on vessels. Therefore, an estimate of the actual tonnage moving on U.S. and Canadian flag vessels is developed based on dividing the U.S. and Canadian flag tonnage

handled by two — about 153.4 million metric tons ( $142.5 + 164.2 = 306.7 / 2 = 153.4$ ). This compares to a five-year average of 140.2 million metric tons of dry bulk-only tonnage reported by the Lake Carriers' Association. It is important to note that the 153.4 million metric tons of cargo include liquid bulk cargo, as well as general cargo moving on the system (a combined total estimated at 8.2 million metric tons). Combining the 8.2 million metric tons of liquid bulk and general cargo moving on the domestic fleets increases the five-year average reported by the Lake Carriers' Association to 148.4 million metric tons — a value within 4% of the domestic tonnage estimated by Martin Associates.

The international tonnage (non-U.S. flag / non-Canadian flag) is estimated by taking the total cargo tonnage moving on the Great Lakes-Seaway system and subtracting the tonnage moving via the Canadian and U.S. flag vessels. Using this methodology, it is estimated that about 7.6 million metric tons moved on foreign flag vessels in 2010. This compares to the 7.2 million metric tons of cargo moved on foreign flag vessels reported by the St. Lawrence Seaway Traffic Report, 2010. This difference can be attributed to time of

reporting, as some sources report on an annual basis, while others report on a shipping-season or fiscal-year basis.

It is important to note that there is no single database reflecting port to port moves, by commodity and by flag. In lieu of such a database, the above methodology provides a useful tool to estimate tonnage for each vessel operator category. Nevertheless, because of anomalies in shipping patterns, simple addition of estimated tonnage will not sum to the 322.1 million total tons handled on the Great Lakes-Seaway system. Such anomalies include cargo handled more than two times (such as iron ore moved into the Port of Cleveland and transhipped to a river vessel for delivery to the end user), or cargo handled in the region only one time (such as steel moving between a Great Lakes port in southern Lake Michigan to an inland river port).

This chapter presents the results of the economic impact analysis of the cargo moving by flag of carriage. The impacts are presented in terms of total economic impacts at the regional level, the country level and the state/provincial level. The results of the 32 individual port studies are not presented due to confidentiality issues.<sup>1</sup>

## 1. TOTAL ECONOMIC IMPACTS

Exhibit III-1 summarizes the economic impacts of cargo moving by flag on the Great Lakes-Seaway system. The monetary impacts are expressed in both U.S. and Canadian dollars.

**Exhibit III-1 Economic Impacts by Flag of Carriage — Regional Level**

	Canadian Flag		U.S. Flag		Foreign Flag		Total	
<b>Jobs</b>								
Direct Jobs	48,660		37,220		7,043		92,923	
Induced	24,189		35,772		6,044		66,005	
Indirect	28,719		34,621		4,566		67,905	
<b>Total</b>	<b>101,568</b>		<b>107,612</b>		<b>17,653</b>		<b>226,833</b>	
<b>Personal Income (1,000)</b>	<b>US \$</b>	<b>Cdn \$</b>	<b>US \$</b>	<b>Cdn \$</b>	<b>US \$</b>	<b>Cdn \$</b>	<b>US \$</b>	<b>Cdn \$</b>
Direct	\$2,288,326	\$2,356,976	\$1,696,677	\$1,747,577	\$377,983	\$389,322	\$4,362,985	\$4,493,875
Re-Spending/ Local Consumption	\$1,309,804	\$1,349,098	\$4,750,354	\$4,892,864	\$793,025	\$816,815	\$6,853,182	\$7,058,777
Indirect	\$1,286,225	\$1,324,811	\$1,419,128	\$1,461,702	\$192,707	\$198,488	\$2,898,060	\$2,985,002
<b>Total</b>	<b>\$4,884,354</b>	<b>\$5,030,885</b>	<b>\$7,866,158</b>	<b>\$8,102,143</b>	<b>\$1,363,714</b>	<b>\$1,404,626</b>	<b>\$14,114,227</b>	<b>\$14,537,654</b>
<b>Business Revenue (1,000)</b>	<b>\$15,678,458</b>	<b>\$16,148,812</b>	<b>\$15,537,600</b>	<b>\$16,003,728</b>	<b>\$2,344,974</b>	<b>\$2,415,323</b>	<b>\$33,561,032</b>	<b>\$34,567,863</b>
<b>Local Purchases (1,000)</b>	<b>\$3,323,626</b>	<b>\$3,423,335</b>	<b>\$2,685,125</b>	<b>\$2,765,679</b>	<b>\$404,992</b>	<b>\$417,142</b>	<b>\$6,413,744</b>	<b>\$6,606,156</b>
<b>State/Provincial and Local Taxes (1,000)</b>	<b>\$617,015</b>	<b>\$635,525</b>	<b>\$763,841</b>	<b>\$786,757</b>	<b>\$149,777</b>	<b>\$154,271</b>	<b>\$1,530,634</b>	<b>\$1,576,553</b>
<b>Federal Taxes (1,000)</b>	<b>\$1,343,664</b>	<b>\$1,383,974</b>	<b>\$1,445,719</b>	<b>\$1,489,090</b>	<b>\$263,470</b>	<b>\$271,374</b>	<b>\$3,052,853</b>	<b>\$3,144,439</b>

Note: Totals may not add due to rounding

<sup>1</sup> It is important to emphasize that only St. Lawrence Seaway traffic originating or destined at the St. Lawrence River ports are included in the analysis. The total impacts of the St. Lawrence River ports were also estimated but not included in the analysis. Also included is the cargo moving along the St. Lawrence River on Canadian flag vessels.

The movement of this cargo generated the following economic impacts:

***Of the 226,833 direct, induced and indirect jobs created by activity on the Great Lakes-Seaway system, cargo moving on the Canadian flag fleet supported 101,568 jobs, while cargo moving on the U.S. flag fleet supported 107,612 jobs. The balance — 17,653 jobs — was supported by cargo moving on foreign flag vessels.***

- Of the 92,923 direct jobs, 48,660 were generated by the marine cargo moving on Canadian flag vessels and 37,220 direct jobs were created by cargo moving to and from ports on U.S. flag vessels. Cargo moving on foreign flag vessels created 7,043 direct jobs.
- As a result of the regional purchases by those individuals holding the direct jobs, an additional 24,189 induced jobs were supported by cargo moving on Canadian flag vessels; 35,772 induced jobs were supported by the cargo moving on U.S. flag vessels; and 6,044 induced jobs were supported by cargo moving on foreign flag vessels.
- Of the 67,905 indirect jobs, 28,719 were supported by direct purchases made by the firms handling cargo moving on the Canadian flag vessels; 34,621 indirect jobs were supported by purchases by the firms handling cargo moving on the U.S. flag vessels; and the balance was supported by purchases by the firms handling cargo moving on foreign flag vessels.

***In 2010, the marine cargo moving on the Great Lakes-Seaway system (on all vessels) supported US\$14.1 billion (Cdn\$14.5 billion) in total personal income and consumption impacts, of which the cargo moving on Canadian flag vessels supported US\$4.9 billion (Cdn\$5.1 billion); the cargo moving on U.S. flag vessels created US\$7.9 billion (Cdn\$8.1 billion); and the cargo moving on foreign flag vessels supported US\$1.36 billion (Cdn\$1.4 billion).***

***Businesses providing services to the cargo moving on the system and dependent shippers/consignees received US\$33.6 billion (Cdn\$34.6 billion) in direct business revenue. Of that total, the revenue generated by cargo moving via Canadian flag vessels accounted for 47 percent, while cargo moving on the U.S. flag vessels accounted for 46 percent of the business revenue. Cargo moving on the foreign flag vessels accounted for the balance.***

***A total of US\$4.6 billion (Cdn\$4.7 billion) in direct, induced and indirect federal, state/provincial and local tax revenue was generated by maritime activity at the marine terminals located on the Great Lakes-Seaway system. Cargo moving on Canadian flag vessels supported 43 percent of the tax impact; cargo moving on U.S. flag vessels accounted for 48 percent of the tax impact; and cargo moving on foreign flag vessels supported the balance of the tax impact.***

Exhibits III-2, III-3 and III-4 show the breakdown of the total impacts by country and by flag of carriage.

**Exhibit III-2 Economic Impacts by Canadian Flag — Country Level**

	Canada		United States		Total	
<b>Jobs</b>						
Direct Jobs		44,226		4,434		48,660
Induced		20,020		4,168		24,189
Indirect		25,828		2,891		28,719
Total		90,074		11,494		101,568
<b>Personal Income (1,000)</b>						
	<b>US \$</b>	<b>Cdn \$</b>	<b>US \$</b>	<b>Cdn \$</b>	<b>US \$</b>	<b>Cdn \$</b>
Direct	\$2,095,842	\$2,158,718	\$192,484	\$198,258	\$2,288,326	\$2,356,976
Re-Spending/ Local Consumption	\$799,550	\$823,536	\$510,254	\$525,561	\$1,309,804	\$1,349,098
Indirect	\$1,164,273	\$1,199,201	\$121,952	\$125,611	\$1,286,225	\$1,324,811
Total	\$4,059,664	\$4,181,454	\$824,690	\$849,430	\$4,884,354	\$5,030,885
<b>Business Revenue (1,000)</b>	\$14,100,278	\$14,523,287	\$1,578,180	\$1,625,525	\$15,678,458	\$16,148,812
<b>Local Purchases (1,000)</b>	\$3,084,533	\$3,177,069	\$239,093	\$246,266	\$3,323,626	\$3,423,335
<b>State/Provincial and Local Taxes (1,000)</b>	\$533,418	\$549,420	\$83,597	\$86,105	\$617,015	\$635,525
<b>Federal Taxes (1,000)</b>	\$1,195,220	\$1,231,077	\$148,444	\$152,897	\$1,343,664	\$1,383,974

Note: Totals may not add due to rounding

**Exhibit III-3 Economic Impacts by U.S. Flag — Country Level**

	Canada		United States		Total	
<b>Jobs</b>						
Direct Jobs		1,948		35,272		37,220
Induced		858		34,913		35,772
Indirect		1,764		32,857		34,621
Total		4,570		103,043		107,612
<b>Personal Income (1,000)</b>						
	<b>US \$</b>	<b>Cdn \$</b>	<b>US \$</b>	<b>Cdn \$</b>	<b>US \$</b>	<b>Cdn \$</b>
Direct	\$86,615	\$89,214	\$1,610,061	\$1,658,363	\$1,696,677	\$1,747,577
Re-Spending/ Local Consumption	\$34,646	\$35,685	\$4,715,708	\$4,857,179	\$4,750,354	\$4,892,864
Indirect	\$76,158	\$78,442	\$1,342,970	\$1,383,259	\$1,419,128	\$1,461,702
Total	\$197,419	\$203,342	\$7,668,739	\$7,898,801	\$7,866,158	\$8,102,143
<b>Business Revenue (1,000)</b>	\$747,349	\$769,769	\$14,790,251	\$15,233,959	\$15,537,600	\$16,003,728
<b>Local Purchases (1,000)</b>	\$194,394	\$200,226	\$2,490,731	\$2,565,452	\$2,685,125	\$2,765,679
<b>State/Provincial and Local Taxes (1,000)</b>	\$16,988	\$17,498	\$746,853	\$769,259	\$763,841	\$786,757
<b>Federal Taxes (1,000)</b>	\$65,346	\$67,306	\$1,380,373	\$1,421,784	\$1,445,719	\$1,489,090

Note: Totals may not add due to rounding

### Exhibit III-4 Economic Impacts by Foreign Flag — Country Level

	Canada		United States		Total	
<b>Jobs</b>						
Direct Jobs		2,114		4,928		7,043
Induced		1,069		4,976		6,044
Indirect		729		3,837		4,566
Total		3,912		13,741		17,653
<b>Personal Income (1,000)</b>						
	<b>US \$</b>	<b>Cdn \$</b>	<b>US \$</b>	<b>Cdn \$</b>	<b>US \$</b>	<b>Cdn \$</b>
Direct	\$127,751	\$131,584	\$250,232	\$257,738	\$377,983	\$389,322
Re-Spending/ Local Consumption	\$44,791	\$46,135	\$748,233	\$770,680	\$793,025	\$816,815
Indirect	\$33,642	\$34,651	\$159,065	\$163,837	\$192,707	\$198,488
Total	\$206,185	\$212,370	\$1,157,530	\$1,192,256	\$1,363,714	\$1,404,626
<b>Business Revenue (1,000)</b>	\$577,690	\$595,021	\$1,767,284	\$1,820,302	\$2,344,974	\$2,415,323
<b>Local Purchases (1,000)</b>	\$94,673	\$97,513	\$310,319	\$319,629	\$404,992	\$417,142
<b>State/Provincial and Local Taxes (1,000)</b>	\$34,560	\$35,597	\$115,217	\$118,674	\$149,777	\$154,271
<b>Federal Taxes (1,000)</b>	\$55,115	\$56,768	\$208,355	\$214,606	\$263,470	\$271,374

Note: Totals may not add due to rounding

It is estimated that 142.5 million metric tons of cargo were handled at Great Lakes-Seaway ports and marine terminals associated with transportation by Canadian flag vessels. As noted earlier, this number represents handling of cargo upon loading and unloading.

Of the 101,568 direct, induced and indirect jobs supported by cargo movement by Canadian flag vessels, 90,074 are created by cargo moving on Canadian flag vessels at **Canadian ports**, while cargo carried by Canadian flag vessels to and from **U.S. ports** created 11,494 direct, induced and indirect jobs. Similarly, the majority of the personal-income impacts, local purchases and state/provincial, local and federal tax impacts is created by cargo moving on Canadian flag vessels via Canadian ports.

It is estimated that 164.2 million metric tons of cargo were handled at Great Lakes ports and marine terminals associated with transportation by U.S. flag vessels. As noted earlier, this number represents handling of cargo upon loading and unloading.

The vast majority of the impacts associated with U.S. flag vessels are in the United States. This reflects the fact that the majority of cargo moving on U.S. flag vessels is moving between U.S. ports.

It is estimated that 7.6 million metric tons of cargo were handled at Great Lakes ports and marine terminals associated with transportation by foreign flag vessels. Of the 17,653 direct, induced and indirect jobs supported by cargo moving on foreign flag vessels, the majority — 13,741 jobs — was supported by cargo moving via U.S. Great Lakes ports.

## 2. JOB IMPACTS

This section focuses on the distribution of the 92,923 direct jobs by flag. Exhibit III-5 shows the direct job impacts by commodity moving on the Great Lakes-Seaway system by Canadian, U.S. and foreign flag vessels. Iron ore moving on Canadian and U.S. flag vessels creates the majority of the direct impacts. As this exhibit shows, the movement of iron ore, which represents the largest tonnage handled at the ports and marine terminals, created the largest number of direct jobs — 37,210 jobs. The majority of these jobs was with directly dependent shippers/consignees (steel mills) located at the ports that are directly dependent on the receipt of iron ore by U.S. and Canadian flag vessels. “Other dry bulk cargo” moving on Canadian flag vessels created the second-largest direct job impact, followed by the movement of petroleum and liquid bulk cargoes.

The carriage of steel imports on foreign flag vessels created the largest impact for cargo moving internationally, followed by the export of grain from both Canadian and U.S. Great Lakes ports.

Exhibit III-6 shows the direct jobs by commodity, flag of registry and country.

**Exhibit III-5 Direct Jobs by Commodity — Regional Level**

	Direct Jobs Canadian Flag	Direct Jobs U.S. Flag	Direct Jobs Foreign Flag	Total
Steel	82	1,987	3,010	5,080
General Cargo	466	117	98	681
Iron Ore	19,148	17,562	499	37,210
Grain	2,291	68	790	3,150
Stone/Aggregate	950	3,258	25	4,234
Cement	2,333	576	176	3,085
Salt	2,163	888	15	3,065
Other Dry Bulk	9,776	2,689	366	12,831
Liquid Bulk	4,052	2,388	0	6,440
Coal	1,602	3,945	44	5,591
Wind Energy	NA	NA	290	290
Not Allocated	5,797	3,740	1,728	11,265
<b>Total</b>	<b>48,660</b>	<b>37,220</b>	<b>7,043</b>	<b>92,923</b>

Note: Totals may not add due to rounding

**Exhibit III-6 Direct Jobs by Commodity — Country Level**

	Canada				United States			
	Canadian Flag	U.S. Flag	Foreign Flag	Total	Canadian Flag	U.S. Flag	Foreign Flag	Total
Steel	52	0	364	416	30	1,987	2,646	4,664
General Cargo	465	0	6	471	0	117	92	210
Iron Ore	18,284	1,507	97	19,888	864	16,055	402	17,321
Grain	1,995	0	112	2,107	296	68	679	1,043
Stone/Aggregate	640	98	0	738	310	3,160	25	3,496
Cement	1,452	0	0	1,452	881	576	177	1,633
Salt	1,464	0	15	1,479	699	888	0	1,587
Other Dry Bulk	9,684	0	324	10,008	92	2,689	43	2,824
Liquid Bulk	4,052	0	0	4,052	0	2,388	0	2,389
Coal	1,024	295	12	1,331	578	3,650	32	4,260
Wind Energy	0	0	93	93	0	0	196	196
Not Allocated	5,113	47	1,093	6,253	684	3,693	635	5,012
<b>Total</b>	<b>44,226</b>	<b>1,948</b>	<b>2,114</b>	<b>48,288</b>	<b>4,434</b>	<b>35,272</b>	<b>4,928</b>	<b>44,634</b>

Note: Totals may not add due to rounding

With respect to the country impacts by flag of carriage, the Canadian flag carriers accounted for 91 percent of the economic impact at the Canadian ports. The impacts generated by this cargo were greatest for iron ore moving on Canadian flag vessels, followed by the impacts created by the movement of “other dry bulk” by Canadian flag. The majority of the jobs generated by iron ore moving on Canadian flag vessels was with steel facilities located at the Canadian ports, while the impacts created by dry bulk cargo moving on the Canadian flag vessels are with fertilizer, aluminum smelters and chemical manufacturing facilities located at the Canadian marine terminals. Iron ore moving from the United States created the largest economic impact for U.S. flag vessels serving Canadian ports. The majority of the impacts created by the foreign flag vessels is associated with the movement of imported/exported steel from Canadian ports.

With respect to the U.S. port impacts by flag of carriage, 79 percent of these economic impacts were generated by cargo moving on U.S. flag vessels, reflecting domestic cargo movements, particularly for iron ore moving between U.S. ports. The movement of coal on U.S. flag vessels created the next-largest economic impact at the U.S. ports. Cargo moving on foreign flag vessels calling at the U.S. ports created nearly 5,000 direct jobs in the United States, and more than 50 percent of those direct jobs were associated with steel moving on foreign flag vessels. The impacts generated by Canadian flag vessels calling at U.S. ports were greatest for iron ore shipped from U.S. ports to Canadian ports on Canadian flag vessels, followed by the shipment and receipt of cement and aggregates on Canadian flag vessels moving these cargoes between U.S. and Canadian ports.

The direct jobs generated by category are presented in Exhibit III-7.

**Exhibit III-7 Direct Jobs Impacts by Category — Regional Level**

	Canadian Flag	U.S. Flag	Foreign Flag	Total
<b>Surface Transportation</b>				
<b>Rail</b>	787	1,272	295	2,355
<b>Truck</b>	7,499	5,098	1,089	13,686
<b>Maritime Service</b>				
<b>Terminal Employees</b>	4,870	4,800	639	10,309
<b>Dockworkers</b>	867	307	431	1,604
<b>Tug Assists</b>	438	370	95	903
<b>Pilots</b>	0	0	240	240
<b>Maritime Services</b>	792	1,082	306	2,181
<b>Forwarders</b>	1,497	1,720	157	3,373
<b>Government</b>	809	1,157	99	2,066
<b>Marine Equipment/Ship Repair</b>	3,283	919	699	4,900
<b>Laker</b>	2,942	3,570	0	6,512
<b>Barge</b>	561	442	113	1,117
<b>Dependent Shippers/Consignees</b>	23,969	16,329	2,190	42,488
<b>Port Authority</b>	345	153	690	1,188
<b>Total</b>	<b>48,660</b>	<b>37,220</b>	<b>7,043</b>	<b>92,923</b>

Note: Totals may not add due to rounding. The 113 jobs with barge operations include the landside jobs with bunkering operations, not the line-haul carriage by U.S. or Canadian flag tug/barge operations. “Port authority jobs” reported for the foreign flag vessels reflect the lock operators and administrative operations of the St. Lawrence Seaway Authority and the St. Lawrence Seaway Development Corp., since without these operations, the foreign flag vessels could not transit to and from the Great Lakes ports.

Exhibit III-8 shows the direct job impacts by category, by flag. As described previously, the direct jobs created by the movement of cargo on Canadian flag vessels created 52.4 percent of the total direct job impacts, followed by 40.1 percent created by movement of cargo on U.S. flag vessels, and the balance — 7.6 percent — by the movement of cargo on foreign flag vessels.

For all flags of carriage, the greatest impact is with the dependent shippers/consignees, followed by jobs with the trucking firms moving cargo to and from the ports. It is estimated that general cargo such as steel, wind energy equipment and project cargo (such as oversized boilers, locomotives, factory pieces, etc.) account for about 17 percent of all cargo moving on the Great Lakes-Seaway system on foreign flag ships. In contrast, general cargo accounts for about 1 percent of the cargo moving on the Canadian and U.S. flag vessels.

As presented in Exhibit III-8, the level of direct jobs with dependent shippers/consignees is significant for the Canadian and U.S. flag operations in both countries, reflecting the location of alumina smelters at port facilities, as well as fertilizer operations, in addition to the steel mills and steel-fabrication complexes both in Canada and the United States. Direct jobs with rail are higher in the U.S. than in Canada, due to the greater use of rail to move grain, iron ore and coal to the port terminals for shipment.

### 3. REVENUE IMPACT

In 2010, US\$33.6 billion (Cdn\$34.6 billion), in direct revenue was generated for businesses involved in providing services to cargo and vessel operations on the Great Lakes-Seaway system, as well as companies directly dependent upon the use of the ports/marine terminals for shipment and receipt of cargo. The revenue impact created by flag of carriage is almost

**Exhibit III-8 Direct Jobs Impacts by Category — Country Level**

	Canada				United States			
	Canadian Flag	U.S. Flag	Foreign Flag	Total	Canadian Flag	U.S. Flag	Foreign Flag	Total
<b>Surface Transportation</b>								
<b>Rail</b>	493	19	52	565	294	1,253	243	1,790
<b>Truck</b>	6,254	315	171	6,741	1,245	4,783	917	6,945
<b>Maritime Service</b>								
<b>Terminal Employees</b>	3,989	55	145	4,189	881	4,745	494	6,120
<b>Dockworkers</b>	817	3	159	979	50	304	272	625
<b>Tug Assists</b>	345	13	33	391	93	357	62	513
<b>Pilots</b>	0	0	73	73	0	0	166	166
<b>Maritime Services</b>	598	10	142	750	194	1,073	164	1,431
<b>Forwarders</b>	1,149	45	50	1,244	348	1,675	107	2,129
<b>Government</b>	603	25	32	659	207	1,133	68	1,407
<b>Marine Equipment/Ship Repair</b>	3,137	6	364	3,506	146	913	335	1,394
<b>Laker</b>	2,251	80	0	2,331	691	3,490	0	4,181
<b>Barge</b>	458	7	70	536	103	435	43	581
<b>Dependent Shippers/Consignees</b>	23,817	1,370	247	25,434	152	14,959	1,943	17,054
<b>Port Authority</b>	315	0	575	890	31	153	115	298
<b>Total</b>	<b>44,226</b>	<b>1,948</b>	<b>2,114</b>	<b>48,288</b>	<b>4,434</b>	<b>35,272</b>	<b>4,928</b>	<b>44,634</b>

Note: Totals may not add due to rounding

equal between the cargo moving on Canadian and U.S. flag vessels. In 2010, the cargo moving on Canadian flag vessels supported US\$15.7 billion (Cdn\$16.1 billion) while the cargo moving on U.S. flag vessels created US\$15.5 billion (Cdn\$16.0 billion). In contrast, the direct revenue impact of the cargo moving on foreign flag vessels was estimated at US\$2.3 billion (Cdn\$2.4 billion).

Exhibit III-9 shows the distribution of this direct revenue impact by category and economic sector by flag of carriage.

The majority of the direct business revenue is received by the dependent shippers/consignees located at the ports and marine terminals operating on the Great Lakes-Seaway system.

The revenue impacts by category and flag are presented for Canada in Exhibit III-10 and for the United States in Exhibit III-11.

**Exhibit III-9 Revenue Impact by Category and Flag — Regional Level**

	Canadian Flag		US Flag		Foreign Flag		Total	
	Millions US	Millions Cdn	Millions US	Millions Cdn	Millions US	Millions Cdn	Millions US	Millions Cdn
<b>Surface Transportation</b>								
<b>Rail</b>	\$1,759.1	\$1,811.9	\$2,934.2	\$3,022.2	\$387.3	\$398.9	\$5,080.6	\$5,233.0
<b>Truck</b>	\$761.0	\$783.8	\$489.6	\$504.3	\$110.7	\$114.1	\$1,361.4	\$1,402.2
<b>Maritime Service</b>								
<b>Terminal Employees</b>	\$891.9	\$918.6	\$652.2	\$671.8	\$117.4	\$120.9	\$1,661.5	\$1,711.3
<b>Tug Assists</b>	\$45.1	\$46.4	\$39.8	\$41.0	\$7.4	\$7.6	\$92.3	\$95.1
<b>Pilots</b>	\$0.0	\$0.0	\$0.0	\$0.0	\$91.7	\$94.4	\$91.7	\$94.4
<b>Maritime Services</b>	\$186.6	\$192.2	\$264.9	\$272.9	\$69.8	\$71.9	\$521.4	\$537.0
<b>Forwarders</b>	\$266.5	\$274.5	\$307.1	\$316.3	\$28.8	\$29.7	\$602.4	\$620.5
<b>Marine Equipment/ Ship Repair</b>	\$525.8	\$541.5	\$244.3	\$251.6	\$124.8	\$128.5	\$894.8	\$921.7
<b>Laker</b>	\$1,309.7	\$1,349.0	\$1,619.1	\$1,667.7	\$0.0	\$0.0	\$2,928.9	\$3,016.7
<b>Barge</b>	\$100.7	\$103.7	\$71.9	\$74.0	\$23.5	\$24.2	\$196.0	\$201.9
<b>Dependent Shippers/ Consignees</b>	\$9,715.1	\$10,006.6	\$8,808.0	\$9,072.2	\$1,313.3	\$1,352.6	\$19,836.4	\$20,431.5
<b>Port Authority</b>	\$117.0	\$120.5	\$106.5	\$109.7	\$70.3	\$72.4	\$293.8	\$302.7
<b>Total</b>	<b>\$15,678.5</b>	<b>\$16,148.8</b>	<b>\$15,537.6</b>	<b>\$16,003.7</b>	<b>\$2,345.0</b>	<b>\$2,415.3</b>	<b>\$33,561.0</b>	<b>\$34,567.9</b>

Note: Totals may not add due to rounding

**Exhibit III-10 Revenue Impact by Category and Flag — Canada**

	Canadian Flag		US Flag		Foreign Flag		Total Canada	
	Millions U.S.	Millions Cdn	Millions U.S.	Millions Cdn	Millions U.S.	Millions Cdn	Millions U.S.	Millions Cdn
<b>Surface Transportation</b>								
<b>Rail</b>	\$1,020.8	\$1,051.5	\$57.5	\$59.2	\$101.3	\$104.4	\$1,179.6	\$1,215.0
<b>Truck</b>	\$643.8	\$663.2	\$29.9	\$30.8	\$21.1	\$21.8	\$694.9	\$715.8
<b>Maritime Service</b>		\$0.0						\$0.0
<b>Terminal Employees</b>	\$742.2	\$764.4	\$16.7	\$17.2	\$43.4	\$44.7	\$802.3	\$826.3
<b>Tug Assists</b>	\$35.8	\$36.9	\$1.4	\$1.5	\$2.5	\$2.6	\$39.8	\$41.0
<b>Pilots</b>	\$0.0	\$0.0	\$0.0	\$0.0	\$28.1	\$28.9	\$28.1	\$28.9
<b>Maritime Services</b>	\$139.1	\$143.3	\$2.2	\$2.2	\$25.3	\$26.0	\$166.6	\$171.6
<b>Forwarders</b>	\$204.4	\$210.6	\$8.0	\$8.3	\$9.7	\$10.0	\$222.2	\$228.8
<b>Marine Equipment/Ship Repair</b>	\$490.7	\$505.4	\$1.1	\$1.1	\$76.9	\$79.2	\$568.7	\$585.7
<b>Laker</b>	\$1,002.8	\$1,032.9	\$38.5	\$39.7	\$0.0	\$0.0	\$1,041.3	\$1,072.6
<b>Barge</b>	\$82.4	\$84.9	\$1.3	\$1.4	\$12.6	\$13.0	\$96.4	\$99.3
<b>Dependent Shippers/Consignees</b>	\$9,626.5	\$9,915.3	\$538.0	\$554.2	\$225.2	\$231.9	\$10,389.7	\$10,701.4
<b>Port Authority</b>	\$111.6	\$115.0	\$52.6	\$54.2	\$31.5	\$32.4	\$195.7	\$201.6
<b>Total</b>	<b>\$14,100.3</b>	<b>\$14,523.3</b>	<b>\$747.3</b>	<b>\$769.8</b>	<b>\$577.7</b>	<b>\$595.0</b>	<b>\$15,425.3</b>	<b>\$15,888.1</b>

Note: Totals may not add due to rounding

**Exhibit III-11 Revenue Impact by Category and Flag — United States**

	Canadian Flag		US Flag		Foreign Flag		Total U.S.	
	Millions U.S.	Millions Cdn	Millions U.S.	Millions Cdn	Millions U.S.	Millions Cdn	Millions U.S.	Millions Cdn
<b>Surface Transportation</b>								
<b>Rail</b>	\$738.3	\$760.4	\$2,876.7	\$2,963.0	\$286.0	\$294.6	\$3,901.0	\$4,017.99
<b>Truck</b>	\$117.1	\$120.7	\$459.7	\$473.5	\$89.6	\$92.3	\$666.4	\$686.43
<b>Maritime Service</b>				\$0.0	\$0.0	\$0.0		\$0.00
<b>Terminal Employees</b>	\$149.7	\$154.2	\$635.5	\$654.6	\$74.0	\$76.2	\$859.2	\$884.98
<b>Tug Assists</b>	\$9.2	\$9.5	\$38.4	\$39.5	\$4.9	\$5.0	\$52.5	\$54.04
<b>Pilots</b>	\$0.0	\$0.0	\$0.0	\$0.0	\$63.6	\$65.5	\$63.6	\$65.52
<b>Maritime Services</b>	\$47.5	\$48.9	\$262.8	\$270.7	\$44.5	\$45.9	\$354.8	\$365.43
<b>Forwarders</b>	\$62.1	\$64.0	\$299.0	\$308.0	\$19.1	\$19.7	\$380.2	\$391.62
<b>Marine Equipment/Ship Repair</b>	\$35.1	\$36.2	\$243.2	\$250.5	\$47.9	\$49.3	\$326.1	\$335.92
<b>Laker</b>	\$307.0	\$316.2	\$1,580.6	\$1,628.0	\$0.0	\$0.0	\$1,887.5	\$1,944.16
<b>Barge</b>	\$18.2	\$18.8	\$70.5	\$72.7	\$10.8	\$11.2	\$99.6	\$102.59
<b>Dependent Shippers/Consignees</b>	\$88.6	\$91.3	\$8,269.9	\$8,518.0	\$1,088.1	\$1,120.7	\$9,446.6	\$9,730.04
<b>Port Authority</b>	\$5.4	\$5.5	\$53.9	\$55.5	\$38.8	\$40.0	\$98.1	\$101.06
<b>Total</b>	<b>\$1,578.2</b>	<b>\$1,625.5</b>	<b>\$14,790.3</b>	<b>\$15,234.0</b>	<b>\$1,767.3</b>	<b>\$1,820.3</b>	<b>\$18,135.7</b>	<b>\$18,679.79</b>

Note: Totals may not add due to rounding

#### **4. PERSONAL INCOME AND LOCAL CONSUMPTION IMPACTS**

The 92,923 individuals directly employed as a result of cargo moving via the ports and marine terminals on the Great Lakes-Seaway system received US\$4.3 billion (Cdn\$4.5 billion) in wages and salaries. These individuals, in turn, used these earnings to purchase goods and services, to pay taxes, and for savings. The purchase of goods and services from regional sources creates a re-spending effect known as the personal-earnings multiplier effect. For the U.S. Great Lakes ports, this re-spending, or multiplier effect, was estimated using a personal-earnings multiplier for the maritime sector, by state, from the U.S. Bureau of Economic Analysis, RIMSII. The income multipliers by province were developed from Statistics Canada, Industry Accounts Division, for the maritime sectors of Ontario and Quebec. Using the local personal-earnings multipliers by state and province for the relevant ports, an additional US\$6.9 billion (Cdn\$7.1 billion) of income and consumption were created in the Great Lakes regional economy due to the cargo moving via Canadian, U.S. and foreign flag vessels. In addition, the 67,905 indirectly employed workers received indirect wages and salaries totaling US\$2.9 billion (Cdn\$3.0 billion).

The Canadian flag operations created 52.4 percent of the direct income impact, but only 34.6 percent of the total direct, induced and indirect income impact. In contrast, the U.S. flag operations accounted for 38.9 percent of the direct personal income impact but 55.7 percent of the total direct, induced and indirect income impact. The higher share of the total income impact attributed to cargo moving on U.S. flag vessels is due to the fact that a larger share of the U.S. traffic moves via the U.S. ports, and as noted, the re-spending impact of personal income is significantly higher in the United States compared to Canada.

#### **5. FEDERAL, STATE/PROVINCIAL AND LOCAL TAX IMPACT**

Federal, state/provincial and local tax impacts generated by the cargo moving by each flag of carriage were estimated from several sources. The U.S. tax impacts were estimated from income indices developed by the Tax Foundation, while the Canadian tax impacts were estimated based on data provided to Martin Associates by Revenue Canada. In addition, adjustments were made to reflect the different tax relationships in Quebec at the federal level. Cargo moving on Canadian flag vessels created 42.8 percent of the US\$4.6 billion (Cdn\$4.7 billion) total tax impact, while the cargo moving on U.S. flag vessels supported 48.2 percent of the total local, state/provincial and federal tax impacts.

#### **6. IMPACTS BY STATE AND PROVINCE**

As explained earlier, economic impacts were estimated at the port level for 32 U.S. and Canadian Great Lakes and St. Lawrence River ports. The models developed for these 32 individual ports were then used to develop prototype models for each state and province. This process provided a means to estimate impacts at the state and provincial level by flag of carriage.

Exhibits III-12, III-13, III-14, III-15, III-16 , III-17 present the impacts — by state and province — of cargo moving on Canadian flag vessels, U.S. flag vessels and foreign flag vessels on the Great Lakes-Seaway system.

**Exhibit III-12 Economic Impacts by State — Cargo Moving on Canadian Flag Vessels via U.S. Ports and Marine Terminals on the Great Lakes-St. Lawrence Seaway System**

Canadian Flag Tonnage (1,000)	Indiana 451		Ohio 7,611		Michigan 6,618	
<b>Jobs</b>						
Direct Jobs		195		924		1,218
Induced		219		1,274		896
Indirect		336		995		361
<b>Total</b>		<b>750</b>		<b>3,194</b>		<b>2,476</b>
<b>Personal Income (1,000)</b>	<b>US \$</b>	<b>Cdn \$</b>	<b>US \$</b>	<b>Cdn \$</b>	<b>US \$</b>	<b>Cdn \$</b>
Direct	\$8,872	\$9,138	\$40,584	\$41,802	\$50,336	\$51,846
Re-Spending/ Local Consumption	\$30,158	\$31,063	\$136,943	\$141,051	\$119,749	\$123,341
Indirect	\$13,175	\$13,570	\$43,433	\$44,736	\$14,451	\$14,885
<b>Total</b>	<b>\$52,204</b>	<b>\$53,770</b>	<b>\$220,960</b>	<b>\$227,589</b>	<b>\$184,536</b>	<b>\$190,072</b>
<b>Business Revenue (1,000)</b>	\$183,716	\$189,227	\$366,291	\$377,280	\$233,062	\$240,054
<b>Local Purchases (1,000)</b>	\$25,415	\$26,177	\$88,769	\$91,432	\$28,361	\$29,211
<b>State and Local Taxes (1,000)</b>	\$4,959	\$5,108	\$21,433	\$22,076	\$17,900	\$18,437
<b>Federal Taxes (1,000)</b>	\$9,397	\$9,679	\$39,773	\$40,966	\$33,216	\$34,213

Note: Totals may not add due to rounding

**Exhibit III-12 continued**

Canadian Flag Tonnage (1,000)	Minnesota 7,753		Illinois 899		Wisconsin 8,714	
<b>Jobs</b>						
Direct Jobs		642		347		823
Induced		568		302		696
Indirect		385		225		500
<b>Total</b>		<b>1,595</b>		<b>875</b>		<b>2,020</b>
<b>Personal Income (1,000)</b>	<b>US \$</b>	<b>Cdn \$</b>	<b>US \$</b>	<b>Cdn \$</b>	<b>US \$</b>	<b>Cdn \$</b>
Direct	\$28,946	\$29,815	\$14,516	\$14,951	\$36,816	\$37,921
Re-Spending/ Local Consumption	\$66,116	\$68,100	\$45,802	\$47,176	\$82,620	\$85,099
Indirect	\$15,539	\$16,005	\$10,693	\$11,013	\$20,275	\$20,884
<b>Total</b>	<b>\$110,602</b>	<b>\$113,920</b>	<b>\$71,010</b>	<b>\$73,141</b>	<b>\$139,712</b>	<b>\$143,903</b>
<b>Business Revenue (1,000)</b>	\$348,038	\$358,479	\$53,518	\$55,123	\$350,083	\$360,585
<b>Local Purchases (1,000)</b>	\$29,449	\$30,333	\$18,662	\$19,221	\$38,872	\$40,038
<b>State and Local Taxes (1,000)</b>	\$11,779	\$12,132	\$7,101	\$7,314	\$15,036	\$15,487
<b>Federal Taxes (1,000)</b>	\$19,908	\$20,506	\$12,782	\$13,165	\$25,148	\$25,903

Note: Totals may not add due to rounding

**Exhibit III-12** continued

<b>Canadian Flag Tonnage (1,000)</b>	<b>New York 1,087</b>		<b>Pennsylvania 71</b>		<b>Total U.S. 33,204</b>	
<b>Jobs</b>						
Direct Jobs	253		31		4,434	
Induced	181		32		4,168	
Indirect	61		28		2,891	
<b>Total</b>	<b>494</b>		<b>91</b>		<b>11,494</b>	
<b>Personal Income (1,000)</b>	<b>US \$</b>	<b>Cdn \$</b>	<b>US \$</b>	<b>Cdn \$</b>	<b>US \$</b>	<b>Cdn \$</b>
Direct	\$11,130	\$11,464	\$1,284	\$1,323	\$192,484	\$198,258
Re-Spending/ Local Consumption	\$24,501	\$25,236	\$4,365	\$4,496	\$510,254	\$525,561
Indirect	\$3,210	\$3,306	\$1,176	\$1,211	\$121,952	\$125,611
<b>Total</b>	<b>\$38,841</b>	<b>\$40,006</b>	<b>\$6,825</b>	<b>\$7,030</b>	<b>\$824,690</b>	<b>\$849,430</b>
<b>Business Revenue (1,000)</b>	<b>\$37,556</b>	<b>\$38,683</b>	<b>\$5,917</b>	<b>\$6,095</b>	<b>\$1,578,180</b>	<b>\$1,625,525</b>
<b>Local Purchases (1,000)</b>	<b>\$7,423</b>	<b>\$7,646</b>	<b>\$2,142</b>	<b>\$2,207</b>	<b>\$239,093</b>	<b>\$246,266</b>
<b>State and Local Taxes (1,000)</b>	<b>\$4,700</b>	<b>\$4,841</b>	<b>\$689</b>	<b>\$710</b>	<b>\$83,597</b>	<b>\$86,105</b>
<b>Federal Taxes (1,000)</b>	<b>\$6,991</b>	<b>\$7,201</b>	<b>\$1,229</b>	<b>\$1,265</b>	<b>\$148,444</b>	<b>\$152,897</b>

Note: Totals may not add due to rounding

**Exhibit III-13** Economic Impacts by Province — Cargo Moving on Canadian Flag Vessels via Canadian Ports and Marine Terminals on the Great Lakes-St. Lawrence Seaway System

<b>Canadian Flag Tonnage (1,000)</b>	<b>Ontario 56,198</b>		<b>Quebec 53,128</b>		<b>Total 109,326</b>	
<b>Jobs</b>						
Direct Jobs	26,320		17,906		44,226	
Induced	11,574		8,446		20,020	
Indirect	19,778		6,050		25,828	
<b>Total</b>	<b>57,673</b>		<b>32,401</b>		<b>90,074</b>	
<b>Personal Income (1,000)</b>	<b>US \$</b>	<b>Cdn \$</b>	<b>US \$</b>	<b>Cdn \$</b>	<b>US \$</b>	<b>Cdn \$</b>
Direct	\$1,164,480	\$1,199,414	\$931,362	\$959,303	\$2,095,842	\$2,158,718
Re-Spending/ Local Consumption	\$465,792	\$479,766	\$333,758	\$343,770	\$799,550	\$823,536
Indirect	\$849,300	\$874,779	\$314,973	\$324,422	\$1,164,273	\$1,199,201
<b>Total</b>	<b>\$2,479,572</b>	<b>\$2,553,959</b>	<b>\$1,580,092</b>	<b>\$1,627,495</b>	<b>\$4,059,664</b>	<b>\$4,181,454</b>
<b>Business Revenue (1,000)</b>	<b>\$8,381,488</b>	<b>\$8,632,932</b>	<b>\$5,718,790</b>	<b>\$5,890,354</b>	<b>\$14,100,278</b>	<b>\$14,523,287</b>
<b>Local Purchases (1,000)</b>	<b>\$2,184,431</b>	<b>\$2,249,964</b>	<b>\$900,102</b>	<b>\$927,105</b>	<b>\$3,084,533</b>	<b>\$3,177,069</b>
<b>Provincial Taxes (1,000)</b>	<b>\$213,367</b>	<b>\$219,768</b>	<b>\$320,050</b>	<b>\$329,652</b>	<b>\$533,418</b>	<b>\$549,420</b>
<b>Federal Taxes (1,000)</b>	<b>\$820,738</b>	<b>\$845,361</b>	<b>\$374,482</b>	<b>\$385,716</b>	<b>\$1,195,220</b>	<b>\$1,231,077</b>

Note: Totals may not add due to rounding

**Exhibit III-14 Economic Impacts by State — Cargo Moving on U.S. Flag Vessels via U.S. Ports and Marine Terminals on the Great Lakes-St. Lawrence Seaway System**

U.S. Flag Tonnage (1,000)	Indiana 27,345		Ohio 29,335		Michigan 54,061	
<b>Jobs</b>						
Direct Jobs	12,723		7,042		9,094	
Induced	14,615		7,739		6,914	
Indirect	12,566		8,553		7,478	
Total	39,903		23,334		23,485	
<b>Personal Income (1,000)</b>	<b>US \$</b>	<b>Cdn \$</b>	<b>US \$</b>	<b>Cdn \$</b>	<b>US \$</b>	<b>Cdn \$</b>
Direct	\$594,457	\$612,290	\$312,009	\$321,370	\$418,274	\$430,822
Re-Spending/ Local Consumption	\$2,020,796	\$2,081,420	\$1,052,813	\$1,084,397	\$905,255	\$932,413
Indirect	\$493,303	\$508,102	\$358,591	\$369,349	\$307,087	\$316,299
Total	\$3,108,556	\$3,201,812	\$1,723,414	\$1,775,116	\$1,630,616	\$1,679,534
<b>Business Revenue (1,000)</b>	\$6,562,975	\$6,759,865	\$2,488,105	\$2,562,748	\$3,470,086	\$3,574,189
<b>Local Purchases (1,000)</b>	\$951,604	\$980,152	\$613,445	\$631,848	\$584,647	\$602,187
<b>State and Local Taxes (1,000)</b>	\$295,313	\$304,172	\$167,171	\$172,186	\$158,170	\$162,915
<b>Federal Taxes (1,000)</b>	\$559,540	\$576,326	\$310,214	\$319,521	\$293,511	\$302,316

Note: Totals may not add due to rounding

**Exhibit III-14 continued**

U.S. Flag Tonnage (1,000)	Minnesota 20,930		Illinois 5,277		Wisconsin 21,741	
<b>Jobs</b>						
Direct Jobs	1,728		2,102		2,177	
Induced	1,538		1,861		1,861	
Indirect	1,043		1,393		1,551	
Total	4,309		5,356		5,589	
<b>Personal Income (1,000)</b>	<b>US \$</b>	<b>Cdn \$</b>	<b>US \$</b>	<b>Cdn \$</b>	<b>US \$</b>	<b>Cdn \$</b>
Direct	\$78,501	\$80,856	\$89,766	\$92,459	\$99,122	\$102,095
Re-Spending/ Local Consumption	\$179,303	\$184,682	\$283,238	\$291,735	\$221,352	\$227,992
Indirect	\$42,080	\$43,343	\$66,136	\$68,120	\$63,625	\$65,533
Total	\$299,884	\$308,880	\$439,140	\$452,314	\$384,098	\$395,621
<b>Business Revenue (1,000)</b>	\$935,276	\$963,334	\$331,915	\$341,873	\$920,596	\$948,214
<b>Local Purchases (1,000)</b>	\$79,749	\$82,142	\$115,425	\$118,888	\$122,394	\$126,066
<b>State and Local Taxes (1,000)</b>	\$31,938	\$32,896	\$43,914	\$45,231	\$41,480	\$42,725
<b>Federal Taxes (1,000)</b>	\$53,979	\$55,598	\$79,045	\$81,417	\$69,138	\$71,212

Note: Totals may not add due to rounding

**Exhibit III-14** continued

<b>U.S. Flag Tonnage (1,000)</b>	<b>New York 693</b>		<b>Pennsylvania 532</b>		<b>Total U.S. 159,913</b>	
<b>Jobs</b>						
Direct Jobs	108		277		34,913	
Induced	108		277		34,913	
Indirect	51		224		32,857	
<b>Total</b>	<b>305</b>		<b>761</b>		<b>103,043</b>	
<b>Personal Income (1,000)</b>	<b>US \$</b>	<b>Cdn \$</b>	<b>US \$</b>	<b>Cdn \$</b>	<b>US \$</b>	<b>Cdn \$</b>
Direct	\$6,684	\$6,885	\$11,249	\$11,587	\$1,610,061	\$1,658,363
Re-Spending/ Local Consumption	\$14,714	\$15,156	\$38,236	\$39,383	\$4,715,708	\$4,857,179
Indirect	\$2,693	\$2,774	\$9,456	\$9,740	\$1,342,970	\$1,383,259
<b>Total</b>	<b>\$24,092</b>	<b>\$24,814</b>	<b>\$58,941</b>	<b>\$60,709</b>	<b>\$7,668,739</b>	<b>\$7,898,801</b>
<b>Business Revenue (1,000)</b>	<b>\$33,717</b>	<b>\$34,728</b>	<b>\$47,580</b>	<b>\$49,008</b>	<b>\$14,790,251</b>	<b>\$15,233,959</b>
<b>Local Purchases (1,000)</b>	<b>\$6,237</b>	<b>\$6,425</b>	<b>\$17,228</b>	<b>\$17,745</b>	<b>\$2,490,731</b>	<b>\$2,565,452</b>
<b>State and Local Taxes (1,000)</b>	<b>\$2,915</b>	<b>\$3,003</b>	<b>\$5,953</b>	<b>\$6,132</b>	<b>\$746,853</b>	<b>\$769,259</b>
<b>Federal Taxes (1,000)</b>	<b>\$4,336</b>	<b>\$4,467</b>	<b>\$10,609</b>	<b>\$10,928</b>	<b>\$1,380,373</b>	<b>\$1,421,784</b>

Note: Totals may not add due to rounding

**Exhibit III-15** *Economic Impacts by Province — Cargo Moving on U.S. Flag Vessels via Canadian Ports and Marine Terminals on the Great Lakes-St. Lawrence Seaway System*

<b>U.S. Flag Tonnage (1,000)</b>	<b>Ontario 4,292</b>		<b>Total 4,292</b>	
<b>Jobs</b>				
Direct Jobs	1,948		1,948	
Induced	858		858	
Indirect	1,764		1,764	
<b>Total</b>	<b>4,570</b>		<b>4,570</b>	
<b>Personal Income (1,000)</b>	<b>US \$</b>	<b>Cdn \$</b>	<b>US \$</b>	<b>Cdn \$</b>
Direct	\$86,615	\$89,214	\$86,615	\$89,214
Re-Spending/ Local Consumption	\$34,646	\$35,685	\$34,646	\$35,685
Indirect	\$76,158	\$78,442	\$76,158	\$78,442
<b>Total</b>	<b>\$197,419</b>	<b>\$203,342</b>	<b>\$197,419</b>	<b>\$203,342</b>
<b>Business Revenue (1,000)</b>	<b>\$747,349</b>	<b>\$769,769</b>	<b>\$747,349</b>	<b>\$769,769</b>
<b>Local Purchases (1,000)</b>	<b>\$194,394</b>	<b>\$200,226</b>	<b>\$194,394</b>	<b>\$200,226</b>
<b>Provincial Taxes (1,000)</b>	<b>\$16,988</b>	<b>\$17,498</b>	<b>\$16,988</b>	<b>\$17,498</b>
<b>Federal Taxes (1,000)</b>	<b>\$65,346</b>	<b>\$67,306</b>	<b>\$65,346</b>	<b>\$67,306</b>

Note: Totals may not add due to rounding. There was no significant traffic moving on U.S. Flag vessels between U.S. ports and Canadian ports in Quebec.

**Exhibit III-16 Economic Impacts by State — Cargo Moving on Foreign Flag Vessels via U.S. Ports and Marine Terminals on the Great Lakes-St. Lawrence Seaway System**

Foreign Flag Tonnage (1,000)	Indiana 282		Ohio 1,638		Michigan 312	
<b>Jobs</b>						
Direct Jobs	2,598		538		291	
Induced	3,018		208		251	
Indirect	2,062		806		316	
Total	7,678		1,553		859	
<b>Personal Income (1,000)</b>	<b>US \$</b>	<b>Cdn \$</b>	<b>US \$</b>	<b>Cdn \$</b>	<b>US \$</b>	<b>Cdn \$</b>
Direct	\$122,955	\$126,644	\$26,374	\$27,165	\$15,507	\$15,972
Re-Spending/ Local Consumption	\$417,973	\$430,512	\$88,995	\$91,664	\$33,953	\$34,971
Indirect	\$80,968	\$83,397	\$34,961	\$36,010	\$13,149	\$13,544
Total	\$621,896	\$640,553	\$150,330	\$154,839	\$62,609	\$64,487
<b>Business Revenue (1,000)</b>	\$1,147,955	\$1,182,394	\$177,934	\$183,272	\$96,751	\$99,653
<b>Local Purchases (1,000)</b>	\$156,190	\$160,876	\$70,588	\$72,706	\$24,546	\$25,282
<b>State and Local Taxes (1,000)</b>	\$59,080	\$60,853	\$14,582	\$15,019	\$6,073	\$6,255
<b>Federal Taxes (1,000)</b>	\$111,941	\$115,299	\$27,059	\$27,871	\$11,270	\$11,608

Note: Totals may not add due to rounding

**Exhibit III-16 continued**

Foreign Flag Tonnage (1,000)	Minnesota 739		Illinois 522		Wisconsin 1,393	
<b>Jobs</b>						
Direct Jobs	146		364		466	
Induced	152		358		513	
Indirect	68		225		189	
Total	367		946		1,168	
<b>Personal Income (1,000)</b>	<b>US \$</b>	<b>Cdn \$</b>	<b>US \$</b>	<b>Cdn \$</b>	<b>US \$</b>	<b>Cdn \$</b>
Direct	\$8,017	\$8,258	\$17,660	\$18,190	\$27,851	\$28,687
Re-Spending/ Local Consumption	\$18,312	\$18,861	\$55,724	\$57,395	\$63,085	\$64,977
Indirect	\$2,762	\$2,845	\$10,662	\$10,981	\$7,666	\$7,896
Total	\$29,091	\$29,964	\$84,046	\$86,567	\$98,602	\$101,560
<b>Business Revenue (1,000)</b>	\$60,392	\$62,204	\$53,362	\$54,963	\$134,614	\$138,652
<b>Local Purchases (1,000)</b>	\$5,234	\$5,391	\$18,607	\$19,166	\$14,689	\$15,130
<b>State and Local Taxes (1,000)</b>	\$3,098	\$3,191	\$8,405	\$8,657	\$10,557	\$10,874
<b>Federal Taxes (1,000)</b>	\$5,236	\$5,393	\$15,128	\$15,582	\$17,748	\$18,281

Note: Totals may not add due to rounding

**Exhibit III-16** continued

<b>Foreign Flag Tonnage (1,000)</b>	<b>New York 218</b>		<b>Pennsylvania 1</b>		<b>Total U.S. 5,104</b>	
<b>Jobs</b>						
Direct Jobs	524		1		4,928	
Induced	474		1		4,976	
Indirect	169		1		3,837	
<b>Total</b>	<b>1,168</b>		<b>2</b>		<b>13,741</b>	
<b>Personal Income (1,000)</b>	<b>US \$</b>	<b>Cdn \$</b>	<b>US \$</b>	<b>Cdn \$</b>	<b>US \$</b>	<b>Cdn \$</b>
Direct	\$31,832	\$32,787	\$34	\$35	\$250,232	\$257,738
Re-Spending/ Local Consumption	\$70,076	\$72,178	\$117	\$120	\$748,233	\$770,680
Indirect	\$8,867	\$9,133	\$30	\$31	\$159,065	\$163,837
<b>Total</b>	<b>\$110,775</b>	<b>\$114,099</b>	<b>\$182</b>	<b>\$187</b>	<b>\$1,157,530</b>	<b>\$1,192,256</b>
<b>Business Revenue (1,000)</b>	<b>\$96,124</b>	<b>\$99,008</b>	<b>\$153</b>	<b>\$157</b>	<b>\$1,767,284</b>	<b>\$1,820,302</b>
<b>Local Purchases (1,000)</b>	<b>\$20,409</b>	<b>\$21,022</b>	<b>\$55</b>	<b>\$57</b>	<b>\$310,319</b>	<b>\$319,629</b>
<b>State and Local Taxes (1,000)</b>	<b>\$13,404</b>	<b>\$13,806</b>	<b>\$18</b>	<b>\$19</b>	<b>\$115,217</b>	<b>\$118,674</b>
<b>Federal Taxes (1,000)</b>	<b>\$19,940</b>	<b>\$20,538</b>	<b>\$33</b>	<b>\$34</b>	<b>\$208,355</b>	<b>\$214,606</b>

Note: Totals may not add due to rounding

**Exhibit III-17 Economic Impacts by Province — Cargo Moving on Foreign Flag Vessels via Canadian Ports and Marine Terminals on the Great Lakes-St. Lawrence Seaway System**

<b>Foreign Flag Tonnage (1,000)</b>	<b>Ontario 902</b>		<b>Quebec 1,691</b>		<b>Total 2,593</b>	
<b>Jobs</b>						
Direct Jobs	626		1,489		2,114	
Induced	310		759		1,069	
Indirect	364		365		729	
<b>Total</b>	<b>1,300</b>		<b>2,612</b>		<b>3,912</b>	
<b>Personal Income (1,000)</b>	<b>US \$</b>	<b>Cdn \$</b>	<b>US \$</b>	<b>Cdn \$</b>	<b>US \$</b>	<b>Cdn \$</b>
Direct	\$36,923	\$38,031	\$90,828	\$93,553	\$127,751	\$131,584
Re-Spending/ Local Consumption	\$14,769	\$15,212	\$30,022	\$30,923	\$44,791	\$46,135
Indirect	\$14,787	\$15,231	\$18,855	\$19,421	\$33,642	\$34,651
<b>Total</b>	<b>\$66,480</b>	<b>\$68,474</b>	<b>\$139,705</b>	<b>\$143,896</b>	<b>\$206,185</b>	<b>\$212,370</b>
<b>Business Revenue (1,000)</b>	<b>\$231,453</b>	<b>\$238,397</b>	<b>\$346,237</b>	<b>\$356,624</b>	<b>\$577,690</b>	<b>\$595,021</b>
<b>Local Purchases (1,000)</b>	<b>\$41,018</b>	<b>\$42,249</b>	<b>\$53,655</b>	<b>\$55,265</b>	<b>\$94,673</b>	<b>\$97,513</b>
<b>Provincial Taxes (1,000)</b>	<b>\$5,721</b>	<b>\$5,892</b>	<b>\$28,839</b>	<b>\$29,705</b>	<b>\$34,560</b>	<b>\$35,597</b>
<b>Federal Taxes (1,000)</b>	<b>\$22,005</b>	<b>\$22,665</b>	<b>\$33,110</b>	<b>\$34,103</b>	<b>\$55,115</b>	<b>\$56,768</b>

Note: Totals may not add due to rounding

# ***ECONOMIC IMPACTS OF THE ST. LAWRENCE SEAWAY***

- 1. Total Economic Impacts***
- 2. Job Impacts***
- 3. Revenue Impacts***
- 4. Personal Income and Local Consumption Impacts***
- 5. Federal, State/Provincial and Local Tax Impacts***
- 6. Impacts by State and Province***

## Chapter IV

# ECONOMIC IMPACTS OF THE ST. LAWRENCE SEAWAY

*This chapter presents the results of the economic impact analysis exclusively for cargo moving through the St. Lawrence Seaway. Vessel traffic that does not utilize the St. Lawrence Seaway is traffic that trades exclusively in the upper four Great Lakes (Superior, Huron, Michigan and Erie) and does not utilize U.S. or Canadian Seaway infrastructure.*

Opened to vessel traffic in 1959, the Seaway connects the Great Lakes to the lower St. Lawrence River and Atlantic Ocean. Its infrastructure includes the following segments.

### **Welland Canal Section**

Linking Lake Erie to Lake Ontario, the Welland Canal cuts 42 km (27 miles) across Canada's Niagara Peninsula from Port Colborne, Ontario, to Port Weller, Ontario. A series of eight locks lifts or lowers vessels 99.5 m (326 feet) and enables maritime commerce to bypass Niagara Falls. Each of the eight locks on the Welland Canal measures 233.5 m (766 feet) long x 24 m (80 feet) wide x 9.14 m (30 feet) deep. The Welland Canal is owned by the Government of Canada and managed by the St. Lawrence Seaway Management Corporation (SLSMC).

### **Montreal-Lake Ontario Section**

Located on the St. Lawrence River between Iroquois, Ontario, and Montreal, Quebec, a series of seven locks lifts or lowers vessels 74 m (243 feet) and enables maritime commerce to navigate between

Lake Ontario and the lower St. Lawrence — effectively connecting the Great Lakes to the Atlantic Ocean. Of the seven locks, the Iroquois, Upper Beauharnois, Lower Beauharnois, Cote Ste. Catherine and St. Lambert locks are on the Canadian side of the waterway. These locks are owned by the Government of Canada and managed by the SLSMC. The Eisenhower and Snell locks are located on the American side. They are owned by the U.S. Department of Transportation and managed by the Saint Lawrence Seaway Development Corporation (SLSDC). Each of the seven locks measures 233.5 m (766 feet) long x 24 m (80 feet) wide x 9.14 m (30 feet) deep.

This analysis includes cargo moving through one or both of the sections described above. Impacts are presented in terms of total economic impacts at the regional level, the country level and the state/provincial level.

## 1. TOTAL ECONOMIC IMPACTS

In 2010, it is estimated that 68.1 million metric tons of “Seaway cargo” (cargo that passed through some portion of the St. Lawrence Seaway as defined above) were handled at ports and marine terminals located on the Great Lakes-St. Lawrence Seaway System. This estimate of tonnage is based on the interviews conducted by Martin Associates and the databases developed from the St. Lawrence Seaway Traffic Report, 2010. It is important to note that this tonnage level includes both shipments and receipts of cargo moving through the St. Lawrence Seaway System, and therefore counts traffic twice for cargo originating and terminating at a port or marine terminal on the system.

Exhibit IV-1 summarizes the economic impacts of cargo handled via ports on the Great Lakes-Seaway system and moving through the St. Lawrence Seaway.

***In 2010, 86,006 jobs in Canada and the United States were in some way related to the cargo moving via the St. Lawrence Seaway to and from ports and marine terminals located on the Great Lakes-Seaway system.***

- Of the 86,006 jobs, **37,344 direct jobs** were generated by the marine cargo moving through the St. Lawrence Seaway.
- As the result of the regional purchases by those 37,344 individuals holding direct jobs, an additional **21,830 induced jobs** were supported in the regional economy.
- **26,832 indirect jobs** were supported by US\$2.8 billion (Cdn\$2.9 billion) in regional purchases by businesses supplying services at the ports and marine terminals.

**Exhibit IV-1 Economic Impacts of the St. Lawrence Seaway — Regional Level**

	Total	
<b>Jobs</b>		
Direct Jobs		37,344
Induced		21,830
Indirect		26,832
Total		86,006
<b>Personal Income (1,000)</b>	<b>US \$</b>	<b>Cdn \$</b>
Direct	\$1,773,728	\$1,826,940
Re-Spending/Local Consumption	\$1,647,780	\$1,697,213
Indirect	\$1,163,434	\$1,198,337
Total	\$4,584,942	\$4,722,490
<b>Business Revenue (1,000)</b>	\$12,319,813	\$12,689,407
<b>Local Purchases (1,000)</b>	\$2,845,629	\$2,930,998
<b>State/Provincial and Local Taxes (1,000)</b>	\$500,873	\$515,899
<b>Federal Taxes (1,000)</b>	\$1,183,794	\$1,219,308
Note: Totals may not add due to rounding		

***In 2010, cargo moving through the St. Lawrence Seaway to and from ports and marine terminals on the Great Lakes-Seaway system generated US\$12.3 billion (Cdn\$12.7 billion) in business revenue.***

***US\$4.6 billion (Cdn\$4.7 billion) in direct, indirect, induced and local consumption expenditures were also generated by the cargo and vessels activity moving through the St. Lawrence Seaway. The 37,344 direct job holders received US\$1.77 billion (Cdn\$1.83 billion) in direct wage and salary income. This equates to an average salary of nearly US\$47,000 (Cdn\$48,400.)***

***US\$1.68 billion (Cdn\$1.73 billion), was paid in taxes to local, state/provincial governments and federal governments.***

Exhibit IV-2 shows the breakdown of the total impacts by country.

As shown in Exhibit IV-2, direct jobs generated by cargo moving on the St. Lawrence Seaway to and from ports on the Great Lakes-Seaway system were concentrated in Canada. Of the 37,344 direct jobs generated in the region, 79 percent were created in Canada, while 21 percent are created in the U.S.

Indirect jobs generated per dollar of local purchases are lower in Canada than in the U.S., reflecting the fact that there are greater leakages of purchases out of the region in Canada than in the U.S.; as a result, the jobs-to-sales multipliers used in estimating the indirect jobs ratios are lower in Canada than in the United States.

## 2. JOB IMPACTS

This section focuses on the 37,344 direct jobs created by cargo handled at the ports and marine terminals on the Great Lakes-Seaway system that moved via the St. Lawrence Seaway. Exhibit IV-3 shows the direct jobs impact by commodity. As this exhibit shows, the movement of iron ore, which represents the largest tonnage handled at the ports and marine terminals, created the largest number of direct jobs — 18,957 jobs. The majority of these jobs were with directly dependent shippers/consignees (steel mills) located at the ports that are directly dependent on the receipt of iron ore moving via the St. Lawrence Seaway. The movement of steel products via the St. Lawrence Seaway, particularly imported steel products, generated the second-largest direct jobs impact, and these impacts are concentrated with the operations of tenants located at the individual ports, as well as private terminals and steel fabrication centers located on the Great Lakes, handling imported steel products. Jobs generated by “other dry bulk” consisted of jobs with firms processing dry bulk cargoes such as alumina and other ores, fertilizers and potash.

**Exhibit IV-2 Economic Impacts of the St. Lawrence Seaway — Country Level**

Impacts	Canada		United States		Total	
<b>Jobs</b>						
Direct Jobs	29,512		7,832		37,344	
Induced	13,310		8,520		21,830	
Indirect	20,220		6,613		26,832	
Total	63,041		22,965		86,006	
<b>Personal Income (1,000)</b>						
	<b>US \$</b>	<b>Cdn \$</b>	<b>US \$</b>	<b>Cdn \$</b>	<b>US \$</b>	<b>Cdn \$</b>
Direct	\$1,387,919	\$1,429,557	\$385,809	\$397,383	\$1,773,728	\$1,826,940
Re-Spending/ Local Consumption	\$522,014	\$537,675	\$1,125,765	\$1,159,538	\$1,647,780	\$1,697,213
Indirect	\$888,709	\$915,370	\$274,725	\$282,967	\$1,163,434	\$1,198,337
Total	\$2,798,643	\$2,882,602	\$1,786,299	\$1,839,888	\$4,584,942	\$4,722,490
<b>Business Revenue (1,000)</b>	\$9,522,050	\$9,807,711	\$2,797,763	\$2,881,696	\$12,319,813	\$12,689,407
<b>Local Purchases (1,000)</b>	\$2,321,135	\$2,390,769	\$524,495	\$540,230	\$2,845,629	\$2,930,998
<b>State/Provincial and Local Taxes (1,000)</b>	\$323,447	\$333,150	\$177,427	\$182,749	\$500,873	\$515,899
<b>Federal Taxes (1,000)</b>	\$862,260	\$888,128	\$321,534	\$331,180	\$1,183,794	\$1,219,308

Note: Totals may not add due to rounding

**Exhibit IV-3 Direct Jobs by Commodity — Regional Level**

	Total	
	1,000 tons	Direct Jobs
Steel	2,003	3,227
General Cargo	153	108
Iron Ore	23,979	18,957
Grain	16,051	2,469
Stone/Aggregate	3,318	441
Cement	3,446	918
Salt	6,392	1,353
Other Dry Bulk	5,107	3,076
Liquid Bulk	368	179
Coal	6,728	554
Wind Energy	560	290
Not Allocated		5,769
<b>Total</b>	<b>68,106</b>	<b>37,344</b>

Note: Totals may not add due to rounding

Exhibit IV-4 shows the direct jobs by commodity for each country for cargo moving through the St. Lawrence Seaway.

The majority of the tonnage shipped and received at U.S. ports and terminals on vessels moving via the St. Lawrence Seaway consists of iron ore and grain. Iron ore from the eastern Canadian provinces moving into the Great Lakes creates the largest number of direct jobs in Canada, followed by the shipment and receipt of other dry bulk at Canadian ports. Steel and general cargo moving via the St. Lawrence Seaway create larger impacts in the United States due to the location of major steel fabrication tenants at several of the U.S. Great Lakes ports. These tenants are completely dependent upon the ability to receive products by water.

**Exhibit IV-4 Direct Jobs by Commodity — Country Level**

	Canada		United States		Total	
	1,000 tons	Direct Jobs	1,000 tons	Direct Jobs	1,000 tons	Direct Jobs
Steel	1,181	443	823	2,784	2,003	3,227
General Cargo	13	6	140	102	153	108
Iron Ore	14,699	17,149	9,280	1,809	23,979	18,957
Grain	12,714	1,764	3,337	706	16,051	2,469
Stone/Aggregate	2,264	331	1,054	110	3,318	441
Cement	2,355	683	1,091	235	3,446	918
Salt	5,572	947	820	406	6,392	1,353
Other Dry Bulk	4,959	2,981	148	95	5,107	3,076
Liquid Bulk	300	175	68	4	368	179
Coal	3,446	347	3,282	207	6,728	554
Wind Energy	252	93	308	198	560	290
Not Allocated		4,593		1,177		5,769
<b>Total</b>	<b>47,755</b>	<b>29,512</b>	<b>20,350</b>	<b>7,832</b>	<b>68,106</b>	<b>37,344</b>

Note: Totals may not add due to rounding. Liquid bulk is combined with petroleum.

The direct jobs generated by category are presented in Exhibit IV-5. This exhibit shows that more than 50 percent of the direct jobs impact was with shippers/consignees that are directly dependent upon the shipment and receipt of cargo moving via the St. Lawrence Seaway. As noted, the location of steel mills, alumina smelters and dependent iron ore, salt and alumina mines in proximity to the ports and marine terminals on the Great Lakes-Seaway system underscores the importance of the transportation system in providing raw materials to the region's industrial economy. The second-largest number of direct jobs was created with the trucking firms serving the ports and marine terminals, followed by the terminal workers.

Exhibit IV-6 shows the direct job impacts by category, by country.

As shown in Exhibit IV-6, the level of direct jobs with dependent shippers/consignees is significantly greater in Canada than in the United States, reflecting the location of alumina smelters, steel mills and steel fabrication facilities at Canadian ports — many of which are dependent on Seaway commerce.

### 3. REVENUE IMPACTS

In 2010, the 68.1 million tons of marine cargo handled by ports along the system and moving via the St. Lawrence Seaway generated US\$12.3 billion (Cdn\$12.7 billion) in business revenue at firms directly dependent upon the cargo. These firms provide maritime services and inland transportation services for the cargo handled at the marine terminals and the vessels calling at the terminals.

**Exhibit IV-5 Direct Jobs Impacts by Category — Regional Level**

	Direct Jobs
<b>Surface Transportation</b>	
Rail	988
Truck	4,003
<b>Maritime Service</b>	
Terminal Employees	2,531
ILA/Dockworkers	796
Tug Assists	276
Pilots	223
Agents	146
Maritime Services	489
Forwarders	713
Marine Equipment/Ship Repair	396
Laker	3,234
Barge	457
Dependent Shippers/Consignees	20,858
Port Authority	1,188
<b>Total</b>	<b>37,344</b>

Note: Totals may not add due to rounding

**Exhibit IV-6 Direct Jobs Impacts by Category — Country Level**

	Canada Direct Jobs	United States Direct Jobs	Total
<b>Surface Transportation</b>			
Rail	383	606	988
Truck	2,702	1,301	4,003
<b>Maritime Service</b>			
Terminal Employees	1,854	677	2,531
ILA/Dockworkers	518	278	796
Tug Assists	189	87	276
Pilots	57	166	223
Agents	92	55	146
Maritime Services	304	186	489
Forwarders	500	213	713
Government	273	123	396
Marine Equipment/Ship Repair	2,850	384	3,234
Laker	792	254	1,046
Barge	274	183	457
Dependent Shippers/Consignees	17,836	3,022	20,858
Port Authority	890	298	1,188
<b>Total</b>	<b>29,512</b>	<b>7,832</b>	<b>37,344</b>

Note: Totals may not add due to rounding

Exhibit IV-7 shows the distribution of this direct revenue impact by category and economic sector in both U.S. and Canadian dollars.

The majority of the direct business revenue is received by the dependent shippers/consignees located at the ports and marine terminals operating on the Great Lakes-Seaway system.

The revenue impacts by category, by country, are presented in Exhibit IV-8.

**Exhibit IV-7 Revenue Impact by Category — Regional Level**

	Revenue (\$1,000) US	Revenue (\$1,000) Cdn
<b>Surface Transportation</b>		
Rail	\$997,186	\$1,027,101
Truck	\$398,653	\$410,612
<b>Maritime Service</b>		
Terminal Employees	\$477,046	\$491,358
Tug Assists	\$25,807	\$26,581
Pilots	\$85,456	\$88,020
Agents	\$34,543	\$35,580
Maritime Services	\$105,360	\$108,521
Forwarders	\$127,358	\$131,178
Marine Equipment/ Ship Repair	\$478,750	\$493,112
Laker	\$524,256	\$539,983
Barge	\$67,904	\$69,941
Dependent Shippers/ Consignees	\$8,703,652	\$8,964,761
Port Authority	\$293,843	\$302,658
<b>Total</b>	<b>\$12,319,813</b>	<b>\$12,689,407</b>

**Exhibit IV-8 Revenue Impact by Category — Country Level**

	Canada		United States	
	(\$1,000) US	(\$1,000) Cdn	(\$1,000) US	(\$1,000) Cdn
<b>Surface Transportation</b>				
Rail	\$525,802	\$541,576	\$471,383	\$485,525
Truck	\$270,358	\$278,469	\$128,295	\$132,144
<b>Maritime Service</b>				
Terminal Employees	\$364,509	\$375,444	\$112,537	\$115,913
Tug Assists	\$17,540	\$18,066	\$8,268	\$8,516
Pilots	\$21,848	\$22,504	\$63,608	\$65,516
Agents	\$11,617	\$11,965	\$22,927	\$23,615
Maritime Services	\$63,542	\$65,448	\$41,818	\$43,073
Forwarders	\$89,302	\$91,981	\$38,055	\$39,197
Marine Equipment/Ship Repair	\$419,254	\$431,831	\$59,496	\$61,281
Laker	\$420,589	\$433,207	\$103,667	\$106,777
Barge	\$49,334	\$50,814	\$18,570	\$19,127
Dependent Shippers/Consignees	\$7,072,627	\$7,284,805	\$1,631,025	\$1,679,956
Port Authority	\$195,729	\$201,601	\$98,114	\$101,057
<b>Total</b>	<b>\$9,522,050</b>	<b>\$9,807,711</b>	<b>\$2,797,763</b>	<b>\$2,881,696</b>

#### **4. PERSONAL INCOME AND LOCAL CONSUMPTION IMPACTS**

The 37,344 individuals directly employed as a result of the cargo moving through the St. Lawrence Seaway received US\$1.77 billion (Cdn\$1.83 billion) in direct wages and salaries. These individuals, in turn, used these earnings to purchase goods and services, to pay taxes, and for savings. The purchase of goods and services from regional sources creates a re-spending effect known as the personal-earnings multiplier effect. For the U.S., this re-spending, or multiplier effect, was estimated using a personal-earnings multiplier for the maritime sector, by state, from the U.S. Bureau of Economic Analysis, RIMSII. For Canada, the income multipliers were developed from Statistics Canada, Industry Accounts Division, for the maritime sectors of Ontario and Quebec. Using the local personal-earnings multipliers by state and province for the relevant ports, an additional US\$1.6 billion (Cdn\$1.7 billion) of income and consumption expenditures were created in the Great Lakes regional economy due to the cargo moving via the St. Lawrence Seaway. In addition, the 26,832 indirectly employed workers received indirect wages and salaries totaling US\$1.16 billion (Cdn\$1.20 billion). Combining the direct, induced and indirect income impacts, the 68.1 million tons of cargo moving through the St. Lawrence Seaway created US\$4.6 billion (Cdn\$4.7 billion) in wages and salaries, and local consumption expenditures in the regional economy.

The 29,512 direct job holders at the Canadian ports and terminals received 78.3 percent of the total direct income impact, for an average salary of US\$47,100 (Cdn\$48,500). The 7,832 direct job holders at the U.S. ports received 21.7 percent of the total direct income impact, for an average salary of US\$49,300 (Cdn\$50,700). As noted, the re-spending impact is much lower for the Canadian ports than for the U.S. ports, reflecting the much higher savings rate for Canadian households compared to those in the U.S. — thus reducing the income-multiplier impact. The Organisation of Economic Co-operation

and Development (OECD) reported that in 2006 and 2007 (the time period for which the income multipliers were derived for the United States and Canada), the percentage of household income saved by Canadians was about three times greater than for U.S. households. This difference in the propensity to save has a significant impact on the level of personal-income multipliers, as reflected by the actual multiplier levels. In addition, to the extent that Statistics Canada and the U.S. Bureau of Economic Analysis develop and define personal income multipliers differently, the income multipliers will differ. However, in developing the personal-income multiplier impacts, Martin Associates used the national government agencies in each country to provide the income multipliers, based on our definitions. It is important to note that the re-spending impact also includes the local consumption impact.

In addition to the direct income impact and the re-spending and consumption impacts, the division of the re-spending impact/local consumption impact by the induced jobs will overstate the actual salary of the induced job holders.

The 26,832 indirect job holders received US\$1.16 billion in personal income (Cdn\$1.20 billion), of which the 20,220 Canadian indirect job holders received US\$888.7 million (Cdn\$915.4 million), while the 6,613 indirect job holders in the U.S. received US\$274.7 million (Cdn\$283.0 million).

#### **5. FEDERAL, STATE/PROVINCIAL AND LOCAL TAX IMPACTS**

Total federal, state/provincial and local tax impacts generated by the cargo moving through the St. Lawrence Seaway were estimated from several sources. The U.S. tax impacts were estimated from income indices developed by the Tax Foundation, while the Canadian tax impacts were estimated based on data provided to Martin Associates by Revenue Canada. In addition, adjustments were made to reflect the different tax relationships in Quebec at the federal level. The St. Lawrence Seaway traffic handled

at the U.S. Great Lakes ports and marine terminals created US\$177.4 million (Cdn\$182.8 million) in state and local taxes, and US\$321.5 million (Cdn\$331.2 million) in federal taxes. The cargo activity at the Canadian ports created US\$307.4 million (Cdn\$316.6 million) in provincial taxes, and US\$862.3 million (Cdn\$888.1 million) in federal taxes. The ratio of state and local taxes and federal taxes to total direct, induced (including local consumption expenditures) and indirect income is about 43 percent in Canada and about 28 percent in the U.S.

## 6. IMPACTS BY STATE AND PROVINCE

The economic impacts were estimated at the port level for the 32 U.S. and Canadian Great Lakes and St. Lawrence River ports. The models developed for these 32 individual ports were then used to develop prototype models for each Great Lakes state and

province, in order to capture the impacts of the cargo activity moving through ports and marine terminals for which specific models were not developed. This process provided a model for each state and province to estimate the total impacts at the state and provincial level. It is important to note that the direct impacts generated at the 32 modeled ports accounted for 88.2 percent of the total expanded direct job impacts created by cargo moving via the St. Lawrence Seaway. The 16 U.S. ports accounted for 90.5 percent of the total estimated U.S. direct job impacts, while the 16 Canadian ports accounted for 87.5 percent of the total estimated Canadian impacts.

Exhibit IV-9 presents the state-by-state impacts of the cargo handled via U.S. ports and marine terminals located on the Great Lakes-Seaway system and moved through the St. Lawrence Seaway.

**Exhibit IV-9 Economic Impacts by State — Cargo Moving through the St. Lawrence Seaway**

St. Lawrence Seaway Tonnage (1,000)	Indiana 1,649		Ohio 8,051		Michigan 1,812	
<b>Jobs</b>						
Direct Jobs		3,055		1,392		1,153
Induced		3,551		1,890		921
Indirect		2,468		1,780		1,449
<b>Total</b>		9,074		5,063		3,524
<b>Personal Income (1,000)</b>	<b>US \$</b>	<b>Cdn \$</b>	<b>US \$</b>	<b>Cdn \$</b>	<b>US \$</b>	<b>Cdn \$</b>
Direct	\$144,684	\$149,025	\$64,411	\$66,344	\$55,953	\$57,632
Re-Spending/ Local Consumption	\$491,839	\$506,595	\$217,343	\$223,864	\$122,604	\$126,282
Indirect	\$96,903	\$99,810	\$76,134	\$78,418	\$60,237	\$62,044
<b>Total</b>	<b>\$733,427</b>	<b>\$755,430</b>	<b>\$357,889</b>	<b>\$368,625</b>	<b>\$238,794</b>	<b>\$245,958</b>
<b>Business Revenue (1,000)</b>	\$1,365,223	\$1,406,180	\$493,734	\$508,546	\$429,446	\$442,330
<b>Local Purchases (1,000)</b>	\$186,931	\$192,539	\$143,648	\$147,957	\$112,576	\$115,953
<b>State and Local Taxes (1,000)</b>	\$69,676	\$71,766	\$34,715	\$35,757	\$23,163	\$23,858
<b>Federal Taxes (1,000)</b>	\$132,017	\$135,977	\$64,420	\$66,353	\$42,983	\$44,272

**Exhibit IV-9** *continued*

<b>St. Lawrence Seaway Tonnage (1,000)</b>	<b>Minnesota 3,070</b>		<b>Illinois 1,247</b>		<b>Wisconsin 3,656</b>	
<b>Jobs</b>						
Direct Jobs	298		524		748	
Induced	294		506		764	
Indirect	167		268		256	
<b>Total</b>	<b>759</b>		<b>1,298</b>		<b>1,767</b>	
<b>Personal Income (1,000)</b>	<b>US \$</b>	<b>Cdn \$</b>	<b>US \$</b>	<b>Cdn \$</b>	<b>US \$</b>	<b>Cdn \$</b>
Direct	\$15,322	\$15,782	\$24,895	\$25,642	\$41,735	\$42,987
Re-Spending/ Local Consumption	\$34,997	\$36,047	\$78,552	\$80,908	\$93,732	\$96,544
Indirect	\$6,747	\$6,949	\$12,715	\$13,097	\$10,351	\$10,662
<b>Total</b>	<b>\$57,066</b>	<b>\$58,778</b>	<b>\$116,162</b>	<b>\$119,647</b>	<b>\$145,819</b>	<b>\$150,194</b>
<b>Business Revenue (1,000)</b>	<b>\$137,723</b>	<b>\$141,854</b>	<b>\$63,642</b>	<b>\$65,551</b>	<b>\$183,941</b>	<b>\$189,459</b>
<b>Local Purchases (1,000)</b>	<b>\$12,786</b>	<b>\$13,170</b>	<b>\$22,192</b>	<b>\$22,858</b>	<b>\$19,800</b>	<b>\$20,394</b>
<b>State and Local Taxes (1,000)</b>	<b>\$6,078</b>	<b>\$6,260</b>	<b>\$11,616</b>	<b>\$11,965</b>	<b>\$15,687</b>	<b>\$16,158</b>
<b>Federal Taxes (1,000)</b>	<b>\$10,272</b>	<b>\$10,580</b>	<b>\$20,909</b>	<b>\$21,537</b>	<b>\$26,247</b>	<b>\$27,035</b>

**Exhibit IV-9** *continued*

<b>St. Lawrence Seaway Tonnage (1,000)</b>	<b>New York 863</b>		<b>Pennsylvania 2</b>		<b>Total US 47,755</b>	
<b>Jobs</b>						
Direct Jobs	646		16		7,832	
Induced	568		25		8,520	
Indirect	212		11		6,613	
<b>Total</b>	<b>1,427</b>		<b>52</b>		<b>22,965</b>	
<b>Personal Income (1,000)</b>	<b>US \$</b>	<b>Cdn \$</b>	<b>US \$</b>	<b>Cdn \$</b>	<b>US \$</b>	<b>Cdn \$</b>
Direct	\$37,751	\$38,884	\$1,057	\$1,088	\$385,809	\$397,383.12
Re-Spending/ Local Consumption	\$83,105	\$85,599	\$3,592	\$3,700	\$1,125,765	\$1,159,538.46
Indirect	\$11,153	\$11,487	\$484	\$499	\$274,725	\$282,966.84
<b>Total</b>	<b>\$132,009</b>	<b>\$135,970</b>	<b>\$5,133</b>	<b>\$5,287</b>	<b>\$1,786,299</b>	<b>\$1,839,888.42</b>
<b>Business Revenue (1,000)</b>	<b>\$121,619</b>	<b>\$125,268</b>	<b>\$2,436</b>	<b>\$2,509</b>	<b>\$2,797,763</b>	<b>\$2,881,696.25</b>
<b>Local Purchases (1,000)</b>	<b>\$25,680</b>	<b>\$26,450</b>	<b>\$882</b>	<b>\$908</b>	<b>\$524,495</b>	<b>\$540,229.60</b>
<b>State and Local Taxes (1,000)</b>	<b>\$15,973</b>	<b>\$16,452</b>	<b>\$518</b>	<b>\$534</b>	<b>\$177,427</b>	<b>\$182,749.40</b>
<b>Federal Taxes (1,000)</b>	<b>\$23,762</b>	<b>\$24,475</b>	<b>\$924</b>	<b>\$952</b>	<b>\$321,534</b>	<b>\$331,179.92</b>

Exhibit IV-10 shows the impacts of cargo moving via the St. Lawrence Seaway to and from ports in the provinces of Ontario and Quebec. Note that these impacts do not include the impacts of the international (non-Seaway) cargo handled at the St. Lawrence River ports.

**Exhibit IV-10 Economic Impacts by Province — Cargo Moving through the St. Lawrence Seaway**

<b>St. Lawrence Seaway Tonnage (1,000)</b>	<b>Ontario 26,984</b>		<b>Quebec 20,771</b>		<b>Total 20,350</b>	
<b>Jobs</b>						
Direct Jobs		21,355		8,157		29,512
Induced		9,459		3,851		13,310
Indirect		17,909		2,311		20,220
<b>Total</b>		<b>48,723</b>		<b>14,318</b>		<b>63,041</b>
<b>Personal Income (1,000)</b>	<b>US \$</b>	<b>Cdn \$</b>	<b>US \$</b>	<b>Cdn \$</b>	<b>US \$</b>	<b>Cdn \$</b>
Direct	\$962,875	\$991,761	\$425,045	\$437,796	\$1,387,919	\$1,429,557
Re-Spending/ Local Consumption	\$385,150	\$396,704	\$136,864	\$140,970	\$522,014	\$537,675
Indirect	\$768,803	\$791,867	\$119,906	\$123,503	\$888,709	\$915,370
<b>Total</b>	<b>\$2,116,827</b>	<b>\$2,180,332</b>	<b>\$681,815</b>	<b>\$702,270</b>	<b>\$2,798,643</b>	<b>\$2,882,602</b>
<b>Business Revenue (1,000)</b>	<b>\$7,489,598</b>	<b>\$7,714,286</b>	<b>\$2,032,452</b>	<b>\$2,093,425</b>	<b>\$9,522,050</b>	<b>\$9,807,711</b>
<b>Local Purchases (1,000)</b>	<b>\$1,979,454</b>	<b>\$2,038,837</b>	<b>\$341,681</b>	<b>\$351,932</b>	<b>\$2,321,135</b>	<b>\$2,390,769</b>
<b>Provincial Taxes (1,000)</b>	<b>\$182,153</b>	<b>\$187,618</b>	<b>\$141,294</b>	<b>\$145,532</b>	<b>\$323,447</b>	<b>\$333,150</b>
<b>Federal Taxes (1,000)</b>	<b>\$700,670</b>	<b>\$721,690</b>	<b>\$161,590</b>	<b>\$166,438</b>	<b>\$862,260</b>	<b>\$888,128</b>



# ***ECONOMIC IMPACTS OF COMMERCE TRANSITING NEW YORK WATERS OF THE GREAT LAKES- SEAWAY SYSTEM***

- 1. Total Economic Impacts***
- 2. Job Impacts***
- 3. Revenue Impacts***
- 4. Personal Income and Local Consumption Impacts***
- 5. Federal, State/Provincial and Local Tax Impacts***
- 6. Impacts by State and Province***

## Chapter V

# ECONOMIC IMPACTS OF COMMERCE TRANSITING NEW YORK WATERS OF THE GREAT LAKES-SEAWAY SYSTEM

*This chapter describes the economic impacts of the commercial cargo handled at ports in the Great Lakes-St. Lawrence Seaway System and which moved through New York waters. This traffic includes the cargo moving through the Montreal-Lake Ontario (MLO) section of the St. Lawrence Seaway to and from ports and marine terminals located on the system, as well as cargo moving to and from Buffalo, N.Y. (intra-lake commerce) and not transiting any Seaway locks. The impacts are presented in terms of total economic impacts at the regional level, the country level and the state/provincial level.*

This analysis is meant to inform the public policy debate surrounding New York State Department of Environmental Conservation (NYDEC) ballast water regulations on vessels transiting New York waters. In December 2008, the NYDEC issued state regulations governing the discharge of ballast water from commercial vessels. The regulations seek to address the problem of aquatic nuisance species being introduced into New York waters via ships' ballast water.

Under these rules, by August 1, 2013, all vessels operating in New York waters will be required to install environmental technology that can clean or treat ballast water to meet a specific water quality standard. The State of New York's ballast water quality standard is 100 times stronger than the standards established by the International Maritime Organization (IMO), an agency of the United Nations. By January 1, 2013, any new vessels (constructed after that date) that

operate in New York waters must install environmental technology that can clean or treat ballast water to a level 1000 times stronger than the international standards. The maritime industry indicates that no technology exists to meet these requirements.

These regulations are the most stringent in North America and the topic of considerable controversy. The maritime industry believes the regulations to be unworkable and, if left unchanged, will result in economic harm when they come into effect — resulting in complete cessation of commercial maritime commerce in New York waters. The economic impacts presented in this document demonstrate the potential loss of benefits to the U.S. and Canadian economies should the regulations take effect and negatively impact commerce.

## 1. TOTAL ECONOMIC IMPACTS

In 2010, 47.1 million metric tons of cargo handled by ports on the Great Lakes-Seaway system moved through New York waters. This estimate of tonnage is based on the interviews conducted by Martin Associates and the databases developed from the 2010 St. Lawrence Seaway Traffic Report and the Canadian St. Lawrence Seaway Management Corporation (SLSMC). This activity created a range of economic impacts (described below) to the region, defined as the Canadian provinces of Ontario and Quebec, and the States of New York, Pennsylvania, Ohio, Indiana, Illinois, Wisconsin, Michigan and Minnesota.

Exhibit V-1 summarizes the economic impacts of cargo handled at Great Lakes-Seaway ports and moving through New York waters. The related user impacts (Chapter VI) are not included in the analysis, in order to present the most conservative estimate of the economic impacts.

In 2010, 47.1 million metric tons of cargo handled at marine terminals located on the Great Lakes-Seaway system transited New York waters.<sup>1</sup> The movement of this cargo generated the following economic impacts in the United States and Canada:

**72,601 jobs in Canada and the United States were in some way related to the cargo moving via New York waters of the Great Lakes-Seaway system.**

- Of the 72,061 jobs, **31,314 direct jobs** were generated by Great Lakes-Seaway commerce transiting New York waters.
- As the result of the regional purchases by those 31,314 individuals holding the direct jobs, an additional **18,306 induced jobs** were supported in the regional economy.
- **22,442 indirect jobs** were supported by US\$2.4 billion (Cdn\$2.5 billion) in regional purchases by businesses supplying services at the marine terminals and ports.

**In 2010, the marine cargo and vessel activity at system ports that moved through New York waters generated a total of US\$10.5 billion (Cdn\$10.8 billion) in direct business revenue in the United States and Canada.**

**Exhibit V-1 Economic Impacts of the Commerce Transiting New York Waters of the Great Lakes-Seaway System — Regional Level**

Impacts	Total	
<b>Jobs</b>		
Direct Jobs	31,314	
Induced	18,306	
Indirect	22,442	
<b>Total</b>	<b>72,061</b>	
<b>Personal Income (1,000)</b>	<b>US \$</b>	<b>Cdn \$</b>
Direct	\$1,503,713	\$1,548,824
Re-Spending/Local Consumption	\$1,346,393	\$1,386,785
Indirect	\$976,806	\$1,006,110
<b>Total</b>	<b>\$3,826,912</b>	<b>\$3,941,719</b>
<b>Business Revenue (1,000)</b>	<b>\$10,485,343</b>	<b>\$10,799,904</b>
<b>Local Purchases (1,000)</b>	<b>\$2,439,782</b>	<b>\$2,512,976</b>
<b>State/Provincial and Local Taxes (1,000)</b>	<b>\$426,427</b>	<b>\$439,219</b>
<b>Federal Taxes (1,000)</b>	<b>\$997,991</b>	<b>\$1,027,930</b>

<sup>1</sup> The 47.1 million metric tons of cargo moving via New York waters to and from U.S. and Canadian ports and marine terminals located on the Great Lakes-Seaway system include cargo shipped via the ports within the system, as well as that same cargo received by the ports in the system.

Cargo moving via New York waters on the Great Lakes-Seaway system supported US\$3.8 billion (Cdn\$3.9 billion) in total personal wage and salary income and local consumption expenditures for residents of the U.S. and Canada. The 31,314 direct job holders received US\$1.5 billion (Cdn\$1.6 billion) in direct wage and salary income. This equates to an average salary of US\$48,100 (Cdn\$49,500).

***A total of US\$1.4 billion (Cdn\$1.5 billion) in direct, induced and indirect federal, state/provincial and local tax revenue was generated by cargo handled at the ports and terminals located on the Great Lakes-Seaway system and transiting New York waters.***

- Of the US\$1.4 billion (Cdn\$1.5 billion), US\$426.5 million (Cdn\$439.2 million) was paid in taxes to local and state/provincial governments, while US\$998.0 million (Cdn\$1,027.9 million) was paid in federal taxes.

Exhibit V-2 shows the breakdown of the total impacts by country.

As shown in Exhibit V-2, direct jobs generated by the cargo moving on New York waters to and from ports on the Great Lakes-Seaway system were concentrated in Canada. Of the 31,314 direct jobs generated in the region, 81.0 percent were created in Canada.

Indirect jobs generated per dollar of local purchases were lower in Canada than in the U.S., reflecting the fact that there are greater leakages of purchases out of the region in Canada than is the case for the U.S.; as result, the jobs-to-sales multipliers used in estimating the indirect jobs ratios are lower in Canada than in the United States.

## 2. JOB IMPACTS

This section focuses on the 31,314 direct jobs created by cargo handled at the ports and marine terminals on the Great Lakes-Seaway system that moved via New York waters. Exhibit V-3 presents the direct jobs impact by commodity. As this exhibit shows, the movement of iron ore, which represents the largest tonnage handled at the ports and marine terminals, created the largest number of direct jobs — 16,288 jobs. The majority of these jobs was with directly dependent shippers/consignees (for example, steel mills) located at the ports that are directly dependent on the receipt of iron ore moving via New York waters. The movement of steel, particularly imported steel, generates the second-largest direct job impacts, and these impacts are concentrated with the operations of tenants located at the individual ports as well as private terminals and steel fabrication

***Exhibit V-2 Economic Impacts of the Commerce Transiting New York Waters of the Great Lakes-Seaway System — Country Level***

Impacts	Canada		United States		Total	
<b>Jobs</b>						
Direct Jobs	25,360		5,954		31,314	
Induced	11,477		6,829		18,306	
Indirect	18,117		4,324		22,442	
<b>Total</b>	<b>54,954</b>		<b>17,108</b>		<b>72,061</b>	
<b>Personal Income (1,000)</b>	<b>US \$</b>	<b>Cdn \$</b>	<b>US \$</b>	<b>Cdn \$</b>	<b>US \$</b>	<b>Cdn \$</b>
Direct	\$1,202,427	\$1,238,500	\$301,286	\$310,325	\$1,503,713	\$1,548,824
Re-Spending/ Local Consumption	\$448,315	\$461,765	\$898,078	\$925,021	\$1,346,393	\$1,386,785
Indirect	\$797,643	\$821,573	\$179,162	\$184,537	\$976,806	\$1,006,110
<b>Total</b>	<b>\$2,448,385</b>	<b>\$2,521,837</b>	<b>\$1,378,526</b>	<b>\$1,419,882</b>	<b>\$3,826,912</b>	<b>\$3,941,719</b>
<b>Business Revenue (1,000)</b>	<b>\$8,404,342</b>	<b>\$8,656,472</b>	<b>\$2,081,001</b>	<b>\$2,143,431</b>	<b>\$10,485,343</b>	<b>\$10,799,904</b>
<b>Local Purchases (1,000)</b>	<b>\$2,090,243</b>	<b>\$2,152,950</b>	<b>\$349,540</b>	<b>\$360,026</b>	<b>\$2,439,782</b>	<b>\$2,512,976</b>
<b>State/Provincial and Local Taxes (1,000)</b>	<b>\$289,027</b>	<b>\$297,697</b>	<b>\$137,400</b>	<b>\$141,522</b>	<b>\$426,427</b>	<b>\$439,219</b>
<b>Federal Taxes (1,000)</b>	<b>\$749,856</b>	<b>\$772,351</b>	<b>\$248,135</b>	<b>\$255,579</b>	<b>\$997,991</b>	<b>\$1,027,930</b>

Note: Totals may not add due to rounding

centers located on the Great Lakes, handling imported steel products. Jobs generated by other dry bulk consist of jobs with firms/port tenants processing dry bulk cargoes such as alumina and other ores, fertilizers and potash.

Exhibit V-4 shows the direct jobs by commodity for each country for cargo moving through the New York waters of the Great Lakes-Seaway system.

The majority of the tonnage shipped and received at the U.S. ports and terminals on vessels moving via the New York waters of the Great Lakes-Seaway system consists of iron ore and grain. Iron ore from the eastern Canadian provinces moving into the Great Lakes created the largest number of direct jobs in Canada, followed by the shipment and receipt of other dry and liquid bulk at Canadian ports. Steel and general cargo moving via the system's New York waters created larger impacts in the United States, due to the location of major steel fabrication tenants at several of the U.S. Great Lakes ports; these tenants are completely dependent upon the ability to receive products by water.

**Exhibit V-3 Direct Jobs by Commodity — Regional Level**

	Total	
	1,000 tons	Direct Jobs
<b>Steel</b>	2,003	3,227
<b>General Cargo</b>	153	108
<b>Iron Ore</b>	18,739	16,288
<b>Grain</b>	15,698	2,407
<b>Stone/Aggregate</b>	2,245	302
<b>Salt</b>	2,474	668
<b>Other Dry Bulk</b>	3,856	2,665
<b>Liquid Bulk</b>	209	148
<b>Coal</b>	1,193	60
<b>Wind Energy</b>	560	290
<b>Not Allocated</b>		5,150
<b>Total</b>	<b>47,131</b>	<b>31,314</b>

**Exhibit V-4 Direct Jobs by Commodity — Country Level**

	Canada		United States		Total	
	1,000 tons	Direct Jobs	1,000 tons	Direct Jobs	1,000 tons	Direct Jobs
<b>Steel</b>	1,181	443	823	2,784	2,003	3,227
<b>General Cargo</b>	13	6	140	102	153	108
<b>Iron Ore</b>	13,074	15,499	5,665	789	18,739	16,288
<b>Grain</b>	12,399	1,714	3,299	692	15,698	2,407
<b>Stone/Aggregate</b>	850	61	1,396	241	2,245	302
<b>Salt</b>	2,414	659	60	9	2,474	668
<b>Other Dry Bulk</b>	3,708	2,570	148	95	3,856	2,665
<b>Liquid Bulk</b>	142	143	68	4	209	148
<b>Coal</b>	308	16	884	44	1,193	60
<b>Wind Energy</b>	252	93	308	198	560	290
<b>Not Allocated</b>		4,154		997		5,150
<b>Total</b>	<b>34,340</b>	<b>25,360</b>	<b>12,791</b>	<b>5,954</b>	<b>47,131</b>	<b>31,314</b>

The direct jobs generated by category are presented in Exhibit V-5. This exhibit shows that more than 50 percent of the direct jobs impact is with shippers/consignees that are directly dependent upon the shipment and receipt of cargo moving via New York waters on the Great Lakes-Seaway system. As noted, the location of steel mills, alumina smelters and dependent iron ore, salt and alumina mines in proximity to the ports and marine terminals on the system underscores the importance of the transportation system in providing raw materials to the region's steel mills and industrial economy. The second-largest number of direct jobs was created with marine repair and ship and boat yards. Trucking firms serving the ports and marine terminals received the third-largest job impacts.

Exhibit V-6 shows the direct job impacts by category, by country, for cargo handled at all ports and terminals on the Great Lakes-Seaway system that transited the New York waters of the system.

As shown in Exhibit V-6, the level of direct jobs with dependent shippers/consignees is greater in Canada than in the United States, reflecting the location of alumina smelters on port facilities, as well as fertilizer operations, in addition to the steel mills and steel fabrication complexes both in Canada and the United States.

**Exhibit V-5 Direct Jobs Impacts by Category — Regional Level**

	Direct Jobs
<b>Surface Transportation</b>	
Rail	882
Truck	2,468
<b>Maritime Service</b>	
Terminal Employees	1,970
ILA/Dockworkers	549
Tug Assists	207
Pilots	223
Agents	146
Maritime Services	370
Forwarders	494
Government	268
Marine Equipment/Ship Repair	2,951
Laker	538
Barge	369
Dependent Shippers/Consignees	18,690
Port Authority	1,188
<b>Total</b>	<b>31,314</b>

**Exhibit V-6 Direct Jobs Impacts by Category — Country Level**

	Canada Direct Jobs	United States Direct Jobs	Total
<b>Surface Transportation</b>			
Rail	350	533	882
Truck	1,530	938	2,468
<b>Maritime Service</b>			
Terminal Employees	1,414	556	1,970
ILA/Dockworkers	277	272	549
Tug Assists	140	67	207
Pilots	57	166	223
Agents	92	55	146
Maritime Services	248	122	370
Forwarders	360	134	494
Government	193	75	268
Marine Equipment/Ship Repair	2,608	343	2,951
Laker	506	32	538
Barge	212	157	369
Dependent Shippers/Consignees	16,484	2,206	18,690
Port Authority	890	298	1,188
<b>Total</b>	<b>25,360</b>	<b>5,954</b>	<b>31,314</b>

### 3. REVENUE IMPACTS

In 2010, the 47.1 million tons of marine cargo moving via New York waters on the Great Lakes-Seaway system generated a total of US\$10.5 billion (Cdn\$10.8 billion). The firms receiving this revenue provide maritime services and inland transportation services for the cargo handled at the marine terminals and the vessels calling at the terminals.

Exhibit V-7 shows the distribution of this direct revenue impact by category and economic sector in both U.S. and Canadian dollars.

The majority of the direct business revenue is received by the dependent shippers/consignees located at the ports and marine terminals.

The revenue impacts by category, by country are presented in Exhibit V-8.

Consistent with the distribution of direct jobs by category, the largest revenue impacts are with the dependent shippers/consignees.

**Exhibit V-7 Revenue Impact by Category — Regional Level**

	Revenue (\$1,000) US	Revenue (\$1,000) Cdn
<b>Surface Transportation</b>		
Rail	\$771,494	\$794,639
Truck	\$246,795	\$254,199
<b>Maritime Service</b>		
Terminal Employees	\$392,379	\$404,151
Tug Assists	\$17,016	\$17,526
Pilots	\$85,453	\$88,017
Agents	\$34,543	\$35,580
Maritime Services	\$74,681	\$76,922
Forwarders	\$88,135	\$90,779
Marine Equipment/ Ship Repair	\$419,708	\$432,299
Laker	\$337,255	\$347,373
Barge	\$51,941	\$53,500
Dependent Shippers/ Consignees	\$7,672,099	\$7,902,262
Port Authority	\$293,843	\$302,658
<b>Total</b>	<b>\$10,485,343</b>	<b>\$10,799,904</b>

**Exhibit V-8 Revenue Impact by Category — Country Level**

	Canada		United States	
	(\$1,000) US	(\$1,000) Cdn	(\$1,000) US	(\$1,000) Cdn
<b>Surface Transportation</b>				
Rail	\$435,891	\$448,967	\$335,604	\$345,672
Truck	\$155,114	\$159,768	\$91,681	\$94,431
<b>Maritime Service</b>				
Terminal Employees	\$308,010	\$317,250	\$84,369	\$86,900
Tug Assists	\$11,788	\$12,142	\$5,227	\$5,384
Pilots	\$21,845	\$22,500	\$63,608	\$65,516
Agents	\$11,617	\$11,965	\$22,927	\$23,615
Maritime Services	\$49,303	\$50,782	\$25,378	\$26,140
Forwarders	\$64,216	\$66,142	\$23,919	\$24,637
Marine Equipment/Ship Repair	\$369,794	\$380,888	\$49,913	\$51,411
Laker	\$308,217	\$317,463	\$29,038	\$29,909
Barge	\$38,196	\$39,342	\$13,746	\$14,158
Dependent Shippers/Consignees	\$6,434,623	\$6,627,661	\$1,237,476	\$1,274,601
Port Authority	\$195,729	\$201,601	\$98,114	\$101,057
<b>Total</b>	<b>\$8,404,342</b>	<b>\$8,656,472</b>	<b>\$2,081,001</b>	<b>\$2,143,431</b>

#### **4. PERSONAL INCOME AND LOCAL CONSUMPTION IMPACTS**

The 31,314 individuals directly employed as a result of the cargo moving via the New York waters of the Great Lakes-St. Lawrence Seaway system received US\$1.5 billion (Cdn\$1.6 billion) in direct wages and salaries. These individuals, in turn, used these earnings to purchase goods and services, to pay taxes, and for savings. The purchase of goods and services from regional sources creates a re-spending effect known as the personal-earnings multiplier effect. For the U.S. Great Lakes ports, this re-spending, or multiplier effect, was estimated using a personal-earnings multiplier for the maritime sector, by state, from the U.S. Bureau of Economic Analysis, RIMSII. The income multipliers by province were developed from Statistics Canada, Industry Accounts Division, for the maritime sectors of Ontario and Quebec. Using the local personal-earnings multipliers by state and province for the relevant ports, an additional US\$1.3 billion (Cdn\$1.4 billion) of income and consumption expenditures were created in the regional economy due to the cargo moving via the New York waters of the Great Lakes-Seaway system. In addition, the 22,442 indirectly employed workers received indirect wages and salaries totaling US\$976.8 million (Cdn\$1.0 billion). Combining the direct, induced and indirect income impacts, the 47.1 million tons of cargo moving on the New York waters of the Great Lakes-Seaway system created US\$3.8 billion (Cdn\$3.9 billion) in wages and salaries and local consumption expenditures in the regional economy.

The 25,360 direct job holders at the Canadian ports and terminals received 80 percent of the total direct income impact, for an average salary of US\$48,100 (Cdn\$49,600). The 5,954 direct job holders at the U.S. ports received the remaining 20 percent of the total direct income impact, for an average salary of US\$50,600 (Cdn\$52,100). As noted, the re-spending impact is much lower for the Canadian ports than for the U.S. ports, reflecting the much higher savings

rate for Canadian households compared to those in the U.S. — thus reducing the income-multiplier impact. The Organisation of Economic Co-operation and Development (OECD) reported that in 2006 and 2007 (the time period for which the income multipliers were derived for the United States and Canada), the percentage of household income saved by Canadians was more than three times greater than for U.S. households. This difference in the propensity to save has a significant impact on the level of personal-income multipliers, as reflected by the actual multiplier levels. In addition, to the extent that Statistics Canada and the U.S. Bureau of Economic Analysis develop and define personal income multipliers differently, the income multipliers will differ. However, in developing the personal-income multiplier impacts, Martin Associates used the national government agencies in each country to provide the income multipliers, based on our definitions. Note that the re-spending impact also includes the local consumption impact.

In addition to the direct income impact and the re-spending and consumption impacts, the division of the re-spending impact/local consumption impact by the induced jobs will overstate the actual salary of the induced job holders.

The 22,442 indirect job holders received US\$976.8 million in personal income (Cdn\$1.0 billion), of which the 18,117 Canadian indirect job holders received US\$797.6 million (Cdn\$821.6 million), while the 4,324 indirect job holders in the U.S. received US\$179.1 million (Cdn\$184.5 million).

## **5. FEDERAL, STATE/PROVINCIAL AND LOCAL TAX IMPACTS**

Total federal, state/provincial and local tax impacts were estimated from several sources. The U.S. tax impacts were estimated from income indices developed by the Tax Foundation, while the Canadian tax impacts were estimated based on data provided to Martin Associates by Revenue Canada. In addition, adjustments were made to reflect the different tax relationships in Quebec at the federal level. The cargo handled at U.S. ports and terminals and moving on the New York waters of the system created US\$137.4 million (Cdn\$141.5 million) in state and local taxes, and US\$248.1 million (Cdn\$255.6 million) in federal taxes. The cargo activity at the Canadian ports created US\$289.0 million (Cdn\$297.7 million) in provincial taxes, and US\$749.9 million (Cdn\$772.4 million) in federal taxes. The ratio of state, local and federal taxes to total direct, induced (including local consumption expenditures) and indirect income is about 43 percent in Canada and about 28 percent in the U.S.

## **6. IMPACTS BY STATE AND PROVINCE**

The economic impacts of the cargo and vessel activity moving via New York waters on the Great Lakes-Seaway system were estimated at the port level for the 32 U.S. and Canadian Great Lakes and St. Lawrence River ports. The models developed for these 32 individual ports were then used to develop prototype models for each Great Lakes state and province, in order to capture the impacts of the cargo activity moving through ports and marine terminals for which specific models were not developed. This process provided a model for each state and province to estimate the total impacts at the state and provincial level. It is important to note that the direct impacts generated at the 32 individual ports accounted for 89 percent of the total expanded direct job impacts created by cargo moving on the New York waters of the Great Lakes-Seaway System. The 16 U.S. ports accounted for 93.1 percent of the total estimated U.S. direct job impacts, while the 16 Canadian ports accounted for 88.3 percent of the total estimated Canadian impacts.

Exhibit V-9 presents the impacts of the cargo and vessel activity moving via the New York waters of the Great Lakes-Seaway system for each of the eight Great Lakes states.

**Exhibit V-9 Economic Impacts by State — Commerce Transiting New York Waters of the Great Lakes-Seaway System**

<b>Tonnage (1,000)</b>	<b>Indiana 1,417</b>		<b>Ohio 4,681</b>		<b>Michigan 624</b>	
<b>Jobs</b>						
Direct Jobs		2,969		711		341
Induced		3,452		1,184		292
Indirect		2,385		859		342
<b>Total</b>		<b>8,806</b>		<b>2,754</b>		<b>975</b>
<b>Personal Income (1,000)</b>	<b>US \$</b>	<b>Cdn \$</b>	<b>US \$</b>	<b>Cdn \$</b>	<b>US \$</b>	<b>Cdn \$</b>
Direct	\$140,649	\$144,869	\$35,082	\$36,134	\$17,973	\$18,512
Re-Spending/ Local Consumption	\$478,123	\$492,466	\$118,376	\$121,927	\$39,526	\$40,712
Indirect	\$93,645	\$96,454	\$37,278	\$38,396	\$14,185	\$14,611
<b>Total</b>	<b>\$712,417</b>	<b>\$733,789</b>	<b>\$190,735</b>	<b>\$196,457</b>	<b>\$71,684</b>	<b>\$73,834</b>
<b>Business Revenue (1,000)</b>	\$1,322,509	\$1,362,184	\$264,091	\$272,014	\$106,695	\$109,896
<b>Local Purchases (1,000)</b>	\$180,646	\$186,065	\$74,979	\$77,228	\$26,640	\$27,440
<b>State and Local Taxes (1,000)</b>	\$67,680	\$69,710	\$18,501	\$19,056	\$6,953	\$7,162
<b>Federal Taxes (1,000)</b>	\$128,235	\$132,082	\$34,332	\$35,362	\$12,903	\$13,290

**Exhibit V-9 continued**

<b>Tonnage (1,000)</b>	<b>Minnesota 1,477</b>		<b>Illinois 1,043</b>		<b>Wisconsin 2,786</b>	
<b>Jobs</b>						
Direct Jobs		165		469		675
Induced		176		459		699
Indirect		75		244		205
<b>Total</b>		<b>417</b>		<b>1,173</b>		<b>1,579</b>
<b>Personal Income (1,000)</b>	<b>US \$</b>	<b>Cdn \$</b>	<b>US \$</b>	<b>Cdn \$</b>	<b>US \$</b>	<b>Cdn \$</b>
Direct	\$9,322	\$9,602	\$22,643	\$23,322	\$38,448	\$39,602
Re-Spending/ Local Consumption	\$21,293	\$21,931	\$71,445	\$73,588	\$86,226	\$88,813
Indirect	\$3,037	\$3,128	\$11,610	\$11,958	\$8,311	\$8,561
<b>Total</b>	<b>\$33,651</b>	<b>\$34,661</b>	<b>\$105,698</b>	<b>\$108,869</b>	<b>\$132,986</b>	<b>\$136,976</b>
<b>Business Revenue (1,000)</b>	\$65,695	\$67,666	\$58,109	\$59,852	\$144,589	\$148,926
<b>Local Purchases (1,000)</b>	\$5,755	\$5,928	\$20,263	\$20,870	\$15,934	\$16,412
<b>State and Local Taxes (1,000)</b>	\$3,584	\$3,691	\$10,570	\$10,887	\$14,321	\$14,750
<b>Federal Taxes (1,000)</b>	\$6,057	\$6,239	\$19,026	\$19,596	\$23,937	\$24,656

**Exhibit V-9** *continued*

<b>Tonnage (1,000)</b>	<b>New York 761</b>		<b>Pennsylvania 2</b>		<b>Total US 12,791</b>	
<b>Jobs</b>						
Direct Jobs	608		16		5,954	
Induced	541		25		6,829	
Indirect	202		11		4,324	
<b>Total</b>	<b>1,351</b>		<b>52</b>		<b>17,108</b>	
<b>Personal Income (1,000)</b>	<b>US \$</b>	<b>Cdn \$</b>	<b>US \$</b>	<b>Cdn \$</b>	<b>US \$</b>	<b>Cdn \$</b>
Direct	\$36,113	\$37,196	\$1,057	\$1,088	\$301,286	\$310,324.62
Re-Spending/ Local Consumption	\$79,498	\$81,883	\$3,592	\$3,700	\$898,078	\$925,020.54
Indirect	\$10,612	\$10,931	\$484	\$499	\$179,162	\$184,537.00
<b>Total</b>	<b>\$126,223</b>	<b>\$130,010</b>	<b>\$5,133</b>	<b>\$5,287</b>	<b>\$1,378,526</b>	<b>\$1,419,882.16</b>
<b>Business Revenue (1,000)</b>	\$116,878	\$120,384	\$2,436	\$2,509	\$2,081,001	\$2,143,431.25
<b>Local Purchases (1,000)</b>	\$24,441	\$25,175	\$882	\$908	\$349,540	\$360,025.77
<b>State and Local Taxes (1,000)</b>	\$15,273	\$15,731	\$518	\$534	\$137,400	\$141,521.92
<b>Federal Taxes (1,000)</b>	\$22,720	\$23,402	\$924	\$952	\$248,135	\$255,578.79

Exhibit V-10 shows the impacts of the cargo and vessel activity moving via the New York waters of the system for the provinces of Ontario and Quebec.

**Exhibit V-10 Economic Impacts by Province — Commerce Transiting New York Waters of the Great Lakes-Seaway System**

<b>Tonnage (1,000)</b>	<b>Ontario 14,638</b>		<b>Quebec 19,701</b>		<b>Total 34,339</b>	
<b>Jobs</b>						
Direct Jobs	17,719		7,641		25,360	
Induced	7,861		3,616		11,477	
Indirect	15,869		2,248		18,117	
<b>Total</b>	<b>41,449</b>		<b>13,504</b>		<b>54,954</b>	
<b>Personal Income (1,000)</b>	<b>US \$</b>	<b>Cdn \$</b>	<b>US \$</b>	<b>Cdn \$</b>	<b>US \$</b>	<b>Cdn \$</b>
Direct	\$802,269	\$826,337	\$400,158	\$412,163	\$1,202,427	\$1,238,500
Re-Spending/ Local Consumption	\$320,908	\$330,535	\$127,407	\$131,230	\$448,315	\$461,765
Indirect	\$680,956	\$701,384	\$116,688	\$120,188	\$797,643	\$821,573
<b>Total</b>	<b>\$1,804,132</b>	<b>\$1,858,256</b>	<b>\$644,253</b>	<b>\$663,581</b>	<b>\$2,448,385</b>	<b>\$2,521,837</b>
<b>Business Revenue (1,000)</b>	\$6,452,834	\$6,646,419	\$1,951,508	\$2,010,054	\$8,404,342	\$8,656,472
<b>Local Purchases (1,000)</b>	\$1,757,584	\$1,810,311	\$332,659	\$342,639	\$2,090,243	\$2,152,950
<b>Provincial Taxes (1,000)</b>	\$155,246	\$159,903	\$133,781	\$137,795	\$289,027	\$297,697
<b>Federal Taxes (1,000)</b>	\$597,168	\$615,083	\$152,688	\$157,269	\$749,856	\$772,351

# RELATED USER IMPACTS

1. *Total Economic Impacts*
2. *Job Impacts*
3. *Revenue Impacts*
4. *Personal Income Impacts*
5. *Federal, State/Provincial and Local Tax Impacts*
6. *Impacts by State and Province*

# RELATED USER IMPACTS

*This chapter presents information on related user impacts, which measure jobs, income, output and tax impacts with shippers/consignees and supporting industries that move cargo through the marine terminals at each of the 32 ports modeled for this study. These impacts are classified as “related” because the firms using system ports and marine terminals to move cargo can — and, in some cases, do — use other ports and marine terminals outside the Great Lakes-St. Lawrence Seaway System. For example, exporters of breakbulk cargo often use freight forwarders, who might choose any of a number of ports of export. Importers of breakbulk cargo often use several ports, based on market locations. Because of the proximity of other ports and the associated steamship services at these ports — particularly coastal ports such as New York, Baltimore, Montreal and Halifax — both importers and exporters of breakbulk and bulk cargo have some flexibility in port choice. As a result, the impacts with these exporters and importers cannot be counted as dependent upon the marine terminals in the Great Lakes-Seaway system.*

The related user jobs are estimated based on the value-per-ton of the commodities exported and imported through each of the 32 ports and the associated jobs to value-of-output ratios for the respective producing and consuming industries located in the state. The value-per-ton of each key commodity moving via each port was developed from the U.S. Census Bureau, USA Trade Online, and also converted into Canadian dollars for the Canadian ports. The average value-per-ton for each commodity moving through each port was then multiplied by the respective tonnage moved in 2010. Martin Associates developed ratios of jobs to value-of-output for the corresponding consuming and producing industries, using data from the U.S. Bureau of Economic Analysis, Regional Input-Output Modeling System for the United States, and from Statistics Canada Industry Accounts for Canada. These jobs-to-value coefficients include the national spin-off impacts that would occur to produce the export commodity or use the import commodity in production. The ratios of jobs to value-of-export or import cargo were then combined with the national value of the respective commodities moving through each of the 32 ports;

this allowed for the estimation of related jobs and spin-off jobs in the national economies to support the export and import industries using the Great Lakes-Seaway system.

The related user impacts include the following: iron ore mining associated with the volume of iron ore shipped via Great Lakes-Seaway ports; the steel industries consuming the iron ore for use in the production of steel; the utilities consuming the coal received by water at each of the ports; the coal mining impacts created by the volume of coal moving through each port; and the impact on grain farming resulting from the volume of grain moving through each port.

Note that the related user impacts include only the impacts created by the volume of the cargo moving via each specific port. The related impacts include the impacts with the shipper/consignee of the cargo, and also include the impacts with the support industries necessary to deliver that volume of cargo to a port for shipment.

For raw materials and intermediate products received at a port — iron ore, for example — the value of the volume of ore received at the specific port is converted into a “value of steel produced.” This value of the steel produced (based on the volume and value of the ore received) is then used to develop the related user jobs, income, inter-industry purchases, value of output, and the taxes paid resulting from the volume and value of the iron ore received at the specific port and resulting steel production.

For example, for a steel mill located in proximity to a port — but receiving a portion of raw materials by rail — the related impact is based only on the volume of the raw materials received via the port **by water**. Therefore, the total employment at the mill is not included in the related jobs, only that share specifically related to the volume of the raw material moving through the marine terminals.

The respective income and output multipliers associated with the industries for which the employment coefficients were developed were used to estimate the related personal-income impacts, as well as the total value of economic output and taxes generated by each of the 32 ports, and for the total system. Note that care was taken to control for double counting of the direct, induced and indirect impacts.

Furthermore, the related user impacts are counted only once for the shipment or receipt of cargo by port/marine terminal, in contrast to the calculations used for the other types of impacts. For example — for grain shipped via Thunder Bay, Ontario, then

received at a St. Lawrence River port such as Quebec City, and then reloaded onto a foreign-flag vessel for export — direct, induced and indirect impacts are created at each of the three ports of handling. Therefore, the same ton of grain creates direct, induced and indirect impacts at each point of handling. This is not the case for the related impacts, as the user impacts with the grain — primarily the farm jobs, income, revenue, taxes and supporting industries required to deliver a ton of grain to the port for shipment (excluding direct, induced and indirect impacts created at the port) — are counted only for the initial shipment of the grain from Thunder Bay.

A related user model was developed for each of the 32 ports and then used in each prototype model for “non port specific” cargo and vessel activity, to estimate the total related user impacts for the system as a whole.

## 1. TOTAL ECONOMIC IMPACTS

In 2010, the 322.1 million tons of cargo handled at Great Lakes-Seaway system ports and terminals created the following related user impacts, presented in Exhibit VI-1.

As shown in Exhibit VI-1, the majority of the related user impacts occur in the U.S. as the result of iron ore and coal moving on the Great Lakes-Seaway system.

**Exhibit VI-1 Related User Impacts**

User Impacts	Canada		United States		Total	
	US \$	Cdn \$	US \$	Cdn \$	US \$	Cdn \$
<b>Jobs</b>		84,331		393,262		477,593
<b>Personal Income (1,000)</b>	\$4,552,340	\$4,688,910	\$18,179,620	\$18,725,008	\$22,731,960	\$23,413,919
<b>Business Revenue (1,000)</b>	\$31,608,507	\$32,556,763	\$83,906,441	\$86,423,634	\$115,514,949	\$118,980,397
<b>State/Provincial and Local Taxes (1,000)</b>	\$543,053	\$559,345	\$1,853,928	\$1,909,546	\$2,396,981	\$2,468,891
<b>Federal Taxes (1,000)</b>	\$1,382,022	\$1,423,482	\$3,272,332	\$3,370,501	\$4,654,353	\$4,793,984

Note: Totals may not add due to rounding

## 2. JOB IMPACTS

It is important to note that the 477,593 related user jobs include the impact not only with the actual producer of the raw material, but also with the industries involved in supporting the production of a ton of material for export. This includes not only farm jobs associated with harvesting one ton of grain for export, but also the impacts created in supporting industries to produce that one ton of grain.

These industries include the providers of the following: equipment to farm the grain, fuel, fertilizers, insurance, financial services, and inland elevator services prior to moving the grain to the port. These related user jobs also include the induced jobs created by purchases by those directly employed in the user industries and supporting industries.

Exhibit VI-2 shows the distribution of the related user jobs associated with the various types of cargo moving on the Great Lakes-Seaway system. The impact of iron ore on related users, both in mining and steel production, is evident in this exhibit. The largest impact with related users in Canada is with the production of grain moving via the navigation system. Note that the related user jobs with the movement of steel are in construction, auto and appliance manufacturing, and in the actual production of steel products, which is also associated with iron ore and limestone moving on the system.

**Exhibit VI-2 Distribution of Related User Jobs by Commodity**

Commodity	Canada	United States	Total
Steel	4,535	43,048	47,584
General Cargo	12,508	21,465	33,972
Iron Ore	9,851	153,218	163,069
Grain	31,773	24,742	56,515
Stone Aggregates/Cement	2,190	31,061	33,251
Other Dry Bulk	2,086	21,646	23,732
Other Liquid Bulk	2,732	13,019	15,752
Coal	12,903	82,952	95,855
Petroleum Products	5,753	2,111	7,865
<b>Total</b>	<b>84,331</b>	<b>393,262</b>	<b>477,593</b>

Note: Totals may not add due to rounding

## 3. REVENUE IMPACTS

Related user business revenue impact is a measure of the total value of economic activity in the national economies that is supported by the cargo moving via the Great Lakes-Seaway system. US\$115.5 billion (Cdn\$119.0 billion) represents the value of the output to the national economies that is created by cargo moving through the ports and marine terminals. This includes the value added at each stage of producing an export cargo, as well as the value added at each stage of production for the firms using imported raw materials and intermediate products that flow via the ports and marine terminals.

## 4. PERSONAL INCOME IMPACTS

A portion of the related user business revenue impact is used to pay the 477,593 related user job holders. In 2010, these 477,593 job holders received US\$22.7 billion (Cdn\$23.4 billion) in income.

## 5. FEDERAL, STATE/PROVINCIAL AND LOCAL TAX IMPACTS

As the result of the activity created in the related user sector due to the 322.1 million tons of cargo handled on the Great Lakes-Seaway system, a total of US\$7.1 billion (Cdn\$7.4 billion) in local, state/provincial and federal taxes was generated. Of this total, US\$4.7 billion (Cdn\$4.8 billion) was received at the federal level.

## 6. IMPACTS BY STATE AND PROVINCE

Exhibits VI-3 and VI-4 show the related user impacts by state and province.

**Exhibit VI-3 Related User Impacts by State**

User Impacts	Indiana		Ohio		Michigan	
<b>Tonnage (1,000)</b>	<b>28,360</b>		<b>40,222</b>		<b>61,302</b>	
<b>Jobs</b>	46,172		88,527		91,748	
	<b>US \$</b>	<b>Cdn \$</b>	<b>US \$</b>	<b>Cdn \$</b>	<b>US \$</b>	<b>Cdn \$</b>
<b>Personal Income (1,000)</b>	\$1,904,943	\$1,962,091	\$4,333,948	\$4,463,966	\$4,322,275	\$4,451,943
<b>Business Revenue (1,000)</b>	\$11,825,024	\$12,179,775	\$20,740,308	\$21,362,517	\$18,703,335	\$19,264,435
<b>State and Local Taxes (1,000)</b>	\$180,970	\$186,399	\$421,359	\$434,000	\$444,506	\$457,841
<b>Federal Taxes (1,000)</b>	\$342,890	\$353,176	\$780,111	\$803,514	\$778,009	\$801,350

**Exhibit VI-3 continued**

User Impacts	Minnesota		Illinois		Wisconsin	
<b>Tonnage (1,000)</b>	<b>30,160</b>		<b>7,219</b>		<b>33,241</b>	
<b>Jobs</b>	54,429		43,298		58,722	
	<b>US \$</b>	<b>Cdn \$</b>	<b>US \$</b>	<b>Cdn \$</b>	<b>US \$</b>	<b>Cdn \$</b>
<b>Personal Income (1,000)</b>	\$2,598,600	\$2,676,558	\$1,987,469	\$2,047,094	\$2,573,961	\$2,651,180
<b>Business Revenue (1,000)</b>	\$9,701,717	\$9,992,768	\$9,868,027	\$10,164,068	\$10,958,419	\$11,287,172
<b>State and Local Taxes (1,000)</b>	\$276,751	\$285,053	\$198,747	\$204,709	\$276,397	\$284,689
<b>Federal Taxes (1,000)</b>	\$467,748	\$481,780	\$357,745	\$368,477	\$463,313	\$477,212

**Exhibit VI-3 continued**

User Impacts	New York		Pennsylvania		Total US	
<b>Tonnage (1,000)</b>	<b>2,216</b>		<b>605</b>		<b>203,325</b>	
<b>Jobs</b>	9,881		486		393,262	
	<b>US \$</b>	<b>Cdn \$</b>	<b>US \$</b>	<b>Cdn \$</b>	<b>US \$</b>	<b>Cdn \$</b>
<b>Personal Income (1,000)</b>	\$444,861	\$458,207	\$13,563	\$13,970	\$18,179,620	\$18,725,008
<b>Business Revenue (1,000)</b>	\$2,014,326	\$2,074,756	\$95,286	\$98,145	\$83,906,441	\$86,423,634
<b>State and Local Taxes (1,000)</b>	\$53,828	\$55,443	\$1,370	\$1,411	\$1,853,928	\$1,909,546
<b>Federal Taxes (1,000)</b>	\$80,075	\$82,477	\$2,441	\$2,515	\$3,272,332	\$3,370,501

**Exhibit VI-4 Related User Impacts by Province**

<b>User Impacts</b>	<b>Ontario</b>		<b>Quebec</b>		<b>Total</b>	
<b>Tonnage (1,000)</b>	<b>62,293</b>		<b>56,511</b>		<b>118,804</b>	
<b>Jobs</b>	68,123		16,209		84,331	
	<b>US \$</b>	<b>Cdn \$</b>	<b>US \$</b>	<b>Cdn \$</b>	<b>US \$</b>	<b>Cdn \$</b>
<b>Personal Income (1,000)</b>	\$3,224,648	\$3,321,388	\$1,327,692	\$1,367,523	\$4,552,340	\$4,688,910
<b>Business Revenue (1,000)</b>	\$19,617,884	\$20,206,421	\$11,990,623	\$12,350,342	\$31,608,507	\$32,556,763
<b>Provincial Taxes (1,000)</b>	\$277,515	\$285,841	\$265,538	\$273,505	\$543,053	\$559,345
<b>Federal Taxes (1,000)</b>	\$1,067,359	\$1,099,379	\$314,663	\$324,103	\$1,382,022	\$1,423,482





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