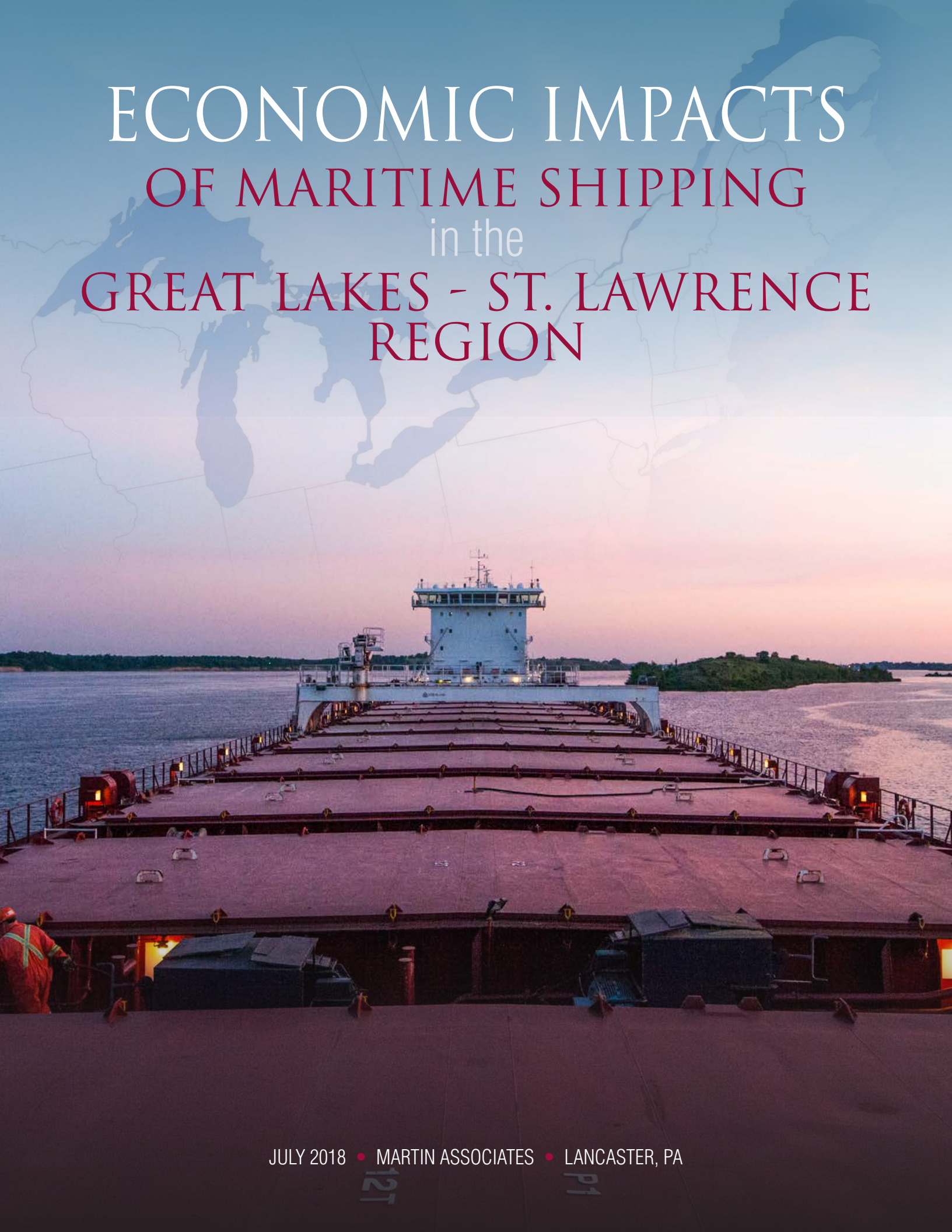
ECONOMIC IMPACTS OF MARITIME SHIPPING in the GREAT LAKES - ST. LAWRENCE REGION



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ORGANIZATION OF STUDY RESULTS

Maritime commerce on the Great Lakes and St. Lawrence River is critical to the economies of the United States and Canada. This study seeks to measure and evaluate that commerce and present a description of its economic impacts. Because of the geographic scope of the study area and the diverse stakeholders who might make use of this data, the study presents its results in numerous ways and from many perspectives. The following descriptions are meant to help the reader determine which data set is most appropriate for use.

Great Lakes-St. Lawrence Seaway System Impacts (Chapter II)

This chapter organizes the study results from the perspective of a traditional definition of the Great Lakes-St. Lawrence Seaway System. This includes impacts of domestic and international cargo that has travelled at some point through the Great Lakes, its connecting rivers and the St. Lawrence Seaway (ending in Montreal). It only includes tonnage at lower St. Lawrence River Quebec ports if destined or originating from the Great Lakes-Seaway system. For example, the economic benefits of container movements to and from the Port of Montreal to overseas markets are not included in this chapter, 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 Quebec for re-loading onto a larger ocean-going vessel, are included.

This perspective is most relevant to American stakeholders in that it excludes Quebec commerce that moves exclusively between Canadian ports on the lower St. Lawrence River. It also excludes commerce between these Canadian lower St. Lawrence River ports and overseas ports.

Great Lakes-St. Lawrence River Waterway Impacts (Chapter III)

This chapter organizes the study results with a broader perspective that includes the impacts of all domestic and international cargo moving on the Great Lakes, its connecting rivers, the St. Lawrence Seaway and the Lower St. Lawrence River. For example, it includes the domestic movements of commodities like petroleum products between lower St. Lawrence River ports and container movements to and from Quebec ports to overseas markets.

This perspective is particularly relevant to Canadian stakeholders in that all Quebec impacts along the St. Lawrence are included in this chapter.

St. Lawrence Seaway Impacts (Chapter IV)

This chapter measures the economic impacts of commerce that passes through and is dependent on the St. Lawrence Seaway. The St. Lawrence Seaway extends from St. Lambert Lock (Montreal) to Lake Erie and is composed of a series of 15 consecutive locks (seven locks in the Montreal-Lake Ontario section and eight locks in the Welland Canal section). This data is particularly relevant to those stakeholders who move cargo through the waterway and to policy makers who manage and fund waterway infrastructure.

Soo Locks Impacts (Chapter V)

This chapter measures the economic impacts of maritime commerce that passes through and is dependent on the Soo Locks located in Sault Ste. Marie, Michigan. This data is particularly relevant to those stakeholders who move cargo through the locks and to policy makers who manage and fund lock infrastructure.

ABOUT THE STUDY SPONSORS

Martin Associates was retained to perform this analysis by a coalition of U.S. and Canadian Great Lakes and St. Lawrence marine industry stakeholders. Study sponsors include: the Saint Lawrence Seaway Development Corporation (U.S.), the St. Lawrence Seaway Management Corporation (Canada), the American Great Lakes Ports Association, the Chamber of Marine Commerce, the Lake Carriers' Association, and the Shipping Federation of Canada.

The following organizations served as members of the project steering committee and provided confidential data, guidance and oversight for this study:

American Great Lakes Ports Association
Chamber of Marine Commerce
Innovation Maritime (Maritime Information Bureau)
Lake Carriers' Association
Saint Lawrence Seaway Development Corporation
Shipping Federation of Canada
St. Lawrence Economic Development Council (SODES)
St. Lawrence Seaway Management Corporation
St. Lawrence Shipoperators Association
Transport Canada (Transportation and Economic Analysis Group)

ABOUT MARTIN ASSOCIATES

Martin Associates of Lancaster, Pennsylvania, is a leading provider of economic analysis and consulting services to the maritime industry. Since 1986, the company has developed more than 1,000 economic impact, strategic planning, financial feasibility and market studies for major ports and waterway systems throughout the United States and Canada, as well as for ports in Europe, Asia and the Caribbean. Martin Associates' clients include port authorities, marine terminal operators, private investment groups, ocean carriers and federal, provincial and state governments, as well as maritime trade organizations.

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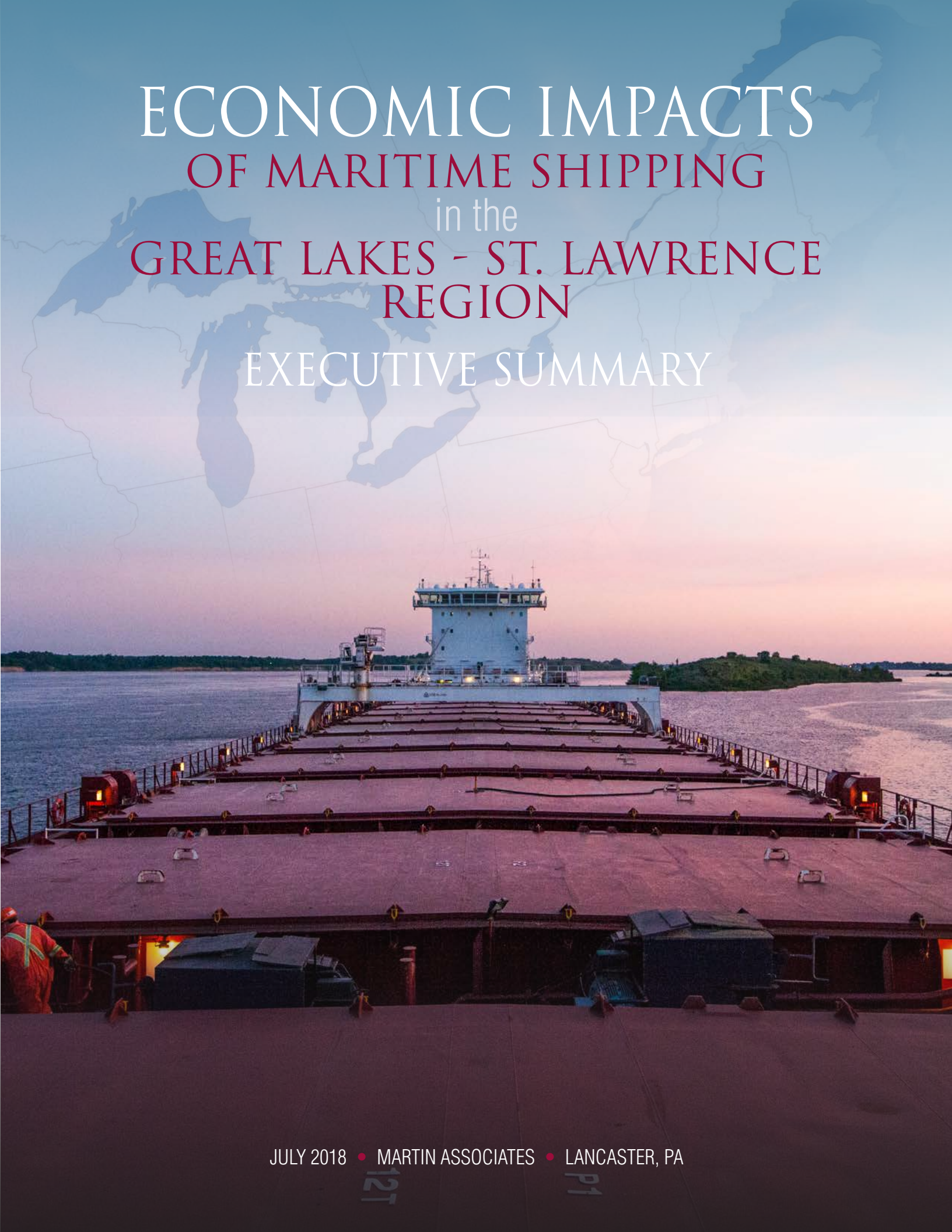
ECONOMIC IMPACTS
OF MARITIME SHIPPING
in the
GREAT LAKES - ST. LAWRENCE REGION

EXECUTIVE SUMMARY



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EXECUTIVE SUMMARY

AT A GLANCE – STUDY HIGHLIGHTS

- Cargo moved on the Great Lakes-St. Lawrence Seaway System totaled 143.5 million metric tons (158.3 million short tons) valued at $15.2 billion (Cdn$19.8 billion). This commerce supported 237,868 jobs and $35 billion (Cdn$45.4 billion) in economic activity
- Cargo moved on the Great Lakes-St. Lawrence River Waterway totaled 230.9 million metric tons (254.6 million short tons) valued at US$77.4 billion (Cdn$100.5 billion). This commerce supported 328,543 jobs and $45.6 billion (Cdn$59.3 billion) in economic activity
- Commerce transiting the St. Lawrence Seaway supported 92,661 jobs and $12.9 billion (Cdn$ 16.8 billion) in economic activity
- The Soo Locks supported 123,172 jobs in the U.S. and Canada and $22.6 billion (Cdn$ 29.3 billion) in economic activity

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 – with a combined GDP of more than $6 trillion U.S. dollars. This output would represent the third-largest economy in the world – behind the U.S. and China – if it were a country.

Over the last 200 years, navigation improvements in both the United States and Canada have enhanced the waterway. The Welland Canal first connected Lake Ontario and Lake Erie in 1829, enabling vessels to bypass Niagara Falls. The Soo Locks have made the St. Marys River navigable, connecting Lake Superior to the lower four Great Lakes and the St. Lawrence Seaway. The St. Lawrence Seaway has tamed the St. Lawrence River, enabling ships to sail from Lake Ontario to the Atlantic Ocean since 1959.

The resulting deep-draft inland navigation system is the longest in the world, extending 3,700 kilometers (2,300 miles) into the North American heartland. This bi-national trade corridor complements the region's rail and highway network and offers customers a cost-effective, safe, reliable and environmentally smart means of moving raw materials, agricultural commodities and manufactured products to and from domestic and global markets. Cargoes include iron ore, coal, steel, aluminum, machinery, stone, cement, grain, sugar, fertilizers, road salt, petroleum products and containerized goods. These cargoes become the staples of everyday life — food and other household items; buildings, factories, roads and bridges; vehicles and planes; and the energy that powers cities and towns.

Three distinct vessel-operator communities serve the waterway. These include U.S. domestic carriers ("U.S. Lakers") transporting cargo between ports on the Great Lakes, Canadian domestic carriers ("Canadian Lakers") operating between ports on the Great Lakes and the St. Lawrence River and Canadian coastal waters, and ocean-going vessel operators ("Salties"), which operate between the region's 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, reliable and efficient transport of cargo. These include stevedores, warehouse employees, freight forwarders, dockworkers, crane operators, vessel agents, dredging contractors, marine pilots, truck drivers and port rail operators, 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 commercial maritime shipping in the Great Lakes and St. Lawrence region to the bi-national, national, state and provincial economies.

To accomplish this goal, a bi-national consortium of public and private sector stakeholders retained Martin Associates of Lancaster, Pennsylvania — a global leader in transportation economic analysis and strategic planning.[1] Martin Associates has completed more than 1000 economic impact, strategic planning, financial feasibility and market studies for major ports and waterway systems throughout the United States and Canada, as well as for ports in Europe, Asia and the Caribbean.

ORGANIZATION OF STUDY RESULTS

The study provides an assessment of the economic impacts of maritime shipping from four perspectives, as described below:

Chapter II – Great Lakes-St. Lawrence Seaway System: Includes impacts of domestic and international cargo that has travelled at some point through the Great Lakes, its connecting rivers and the St. Lawrence Seaway (ending in Montreal). This chapter only includes the impacts of tonnage at lower St. Lawrence River Quebec ports if destined to or originating from the Great Lakes-St. Lawrence Seaway System. For example, the economic benefits of container movements to and from the Port of Montreal to overseas markets are not included in this chapter, as this trade does not enter or leave the Great Lakes-St. Lawrence 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 Quebec for re-loading onto a larger ocean-going vessel, are included. This perspective is most relevant to American stakeholders in that it excludes Quebec commerce that moves exclusively between Canadian ports on the lower St. Lawrence River. It also excludes commerce between these Canadian lower St. Lawrence River ports and overseas ports.

Chapter III – Great Lakes-St. Lawrence River Waterway: Includes impacts of all domestic and international cargo moving on the Great Lakes, its connecting rivers, the St. Lawrence Seaway and the Lower St. Lawrence River. This analysis captures the fullest extent of the economic benefits of the entire waterway. For example, it includes the domestic movements of commodities like petroleum products between lower St. Lawrence river ports and container movements to and from Quebec ports to overseas markets. This perspective is particularly relevant to Canadian stakeholders in that all Quebec impacts along the St. Lawrence are included in this chapter.

Chapter IV – St. Lawrence Seaway: Includes impacts of domestic and international cargo that has travelled through the St. Lawrence Seaway, a system of canals and locks, which connects the Great Lakes to the lower St. Lawrence River. The St. Lawrence Seaway extends from St. Lambert Lock in Montreal to Lake Erie and is composed of a series of 15 consecutive locks (seven locks in the Montreal-Lake Ontario section and eight locks in the Welland Canal section). This data is particularly relevant to those stakeholders who move cargo through the waterway and to policy makers who manage and fund waterway infrastructure.

Chapter V – Soo Locks: Includes impacts of domestic and international cargo moving through the Soo Locks, which connect ports on Lake Superior with the lower Great Lakes, the St. Lawrence Seaway, and international markets. The Soo Locks are located on the St. Marys River in Sault Ste. Marie, Michigan. This data is particularly relevant to those stakeholders who move cargo through the locks and to policy makers who manage and fund lock infrastructure.

1 Study sponsors include: the Saint Lawrence Seaway Development Corporation, The St. Lawrence Seaway Management Corporation, the American Great Lakes Ports Association, the Chamber of Marine Commerce, the Lake Carriers' Association, and the Shipping Federation of Canada.

METHODOLOGY

This analysis estimates the combined U.S. and Canadian economic impacts of all marine cargo moving in the bi-national Great Lakes-St. Lawrence region, 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 2017 cargo movements at 40 U.S. and Canadian ports. The analysis was developed from a comprehensive telephone interview program of more than 770 individual firms with 1,105 operations throughout the region. Models were then developed to expand the 40-port impacts to the state-wide and province-wide levels.

The report estimates tonnage volume (and its dollar value) moved for each of the geographic segments detailed in the Organization of Study Results. This is the recorded tonnage transported by vessels.

For the purpose of determining economic impacts, however, the report uses the tonnage "handled" at the Great Lakes-St. Lawrence region's 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 region 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 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).

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 2017 average exchange rate of US$1.00 = Cdn$1.2984). Cargo volumes are expressed in both metric tons and short tons (1 metric ton = 1.102 short tons).

EXHIBIT I-2
Individual Ports Modelled

US Ports (19)	Canadian Ports (21)
Ashtabula	Baie Comeau
Burns Harbor	Becancour
Calcite	Goderich
Chicago	Hamilton
Cleveland	Havre-Saint-Pierre
Conneaut	Johnstown
Detroit	Meldrum Bay
Duluth	Montreal
Erie	Nanticoke
Green Bay	Oshawa
Lorain	Port Alfred
Milwaukee	Port-Cartier
Monroe	Quebec
Muskegon	Sarnia
Oswego	Sept Iles
Saginaw River	Sorel
Superior	Thunder Bay
Toledo	Toronto
Two Harbors	Trois-Rivieres
	Valleyfield
	Windsor

CATEGORIES OF IMPACTS

Economic Activity: Total economic activity consists of the direct business revenue received by the businesses supplying the cargo and vessel handling services, plus the re-spending of direct employees' earnings on goods and services in the province/state.

Employment: Employment is measured in terms of full-time equivalent jobs, as defined by 2,080 hours per year per full-time worker. These impacts consist of three 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 also include shippers/consignees that have facilities situated close to ports or marine terminals associated with the production site. These jobs would experience dislocation (likely wouldn't exist) 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.

Personal Income: These impacts are a measure of the employee wages and salaries (excluding benefits) received by individuals directly employed due to port activity and the respending of those earnings on goods and services in the province/state.

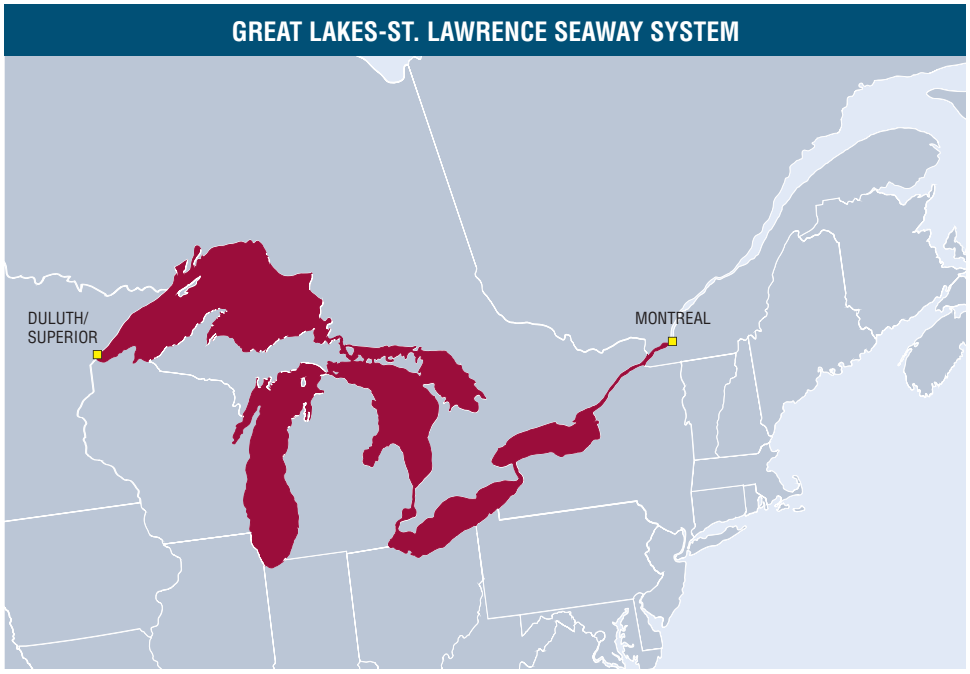
Business Revenue: These impacts represent the revenue generated by firms providing services at each port.

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

Chapter II – Great Lakes-St. Lawrence Seaway System Impacts



This chapter presents the study results from the perspective of the Great Lakes-St. Lawrence Seaway System, which includes the five Great Lakes, their connecting rivers, and the St. Lawrence Seaway (ending in Montreal). This analysis only includes the impacts of cargo tonnage at lower St. Lawrence River Quebec ports if that cargo was destined to or originating from the Great Lakes-Seaway system.

In 2017, a total of **143.5 million metric tons (158.3 million short tons) of cargo valued at US$15.2 billion (Cdn$19.8 billion)** moved through the Great Lakes-Seaway system. As noted, a majority of the domestic cargo moving on Canadian and U.S. flag vessels remains in the Great Lakes-Seaway system, creating economic impacts at the loading port as well as the port of discharge. With this accounted for, the actual tons handled at the ports on the Great Lakes-Seaway system is **284.8 million metric tons (314.0 million short tons)**. This cargo generated the following economic impacts:

Economic Activity — The marine cargo and vessel activity in the Great Lakes-Seaway system generated a total of **US$35.0 billion (Cdn$45.4 billion)** in economic activity in the United States and Canada.

Employment — Maritime commerce on the Great Lakes-Seaway system supported **237,868 U.S. and Canadian jobs**, including 78,400 direct jobs. As a result of local and regional purchases made by those 78,400 individuals, an additional 80,343 induced jobs were supported in the regional economy. Finally, 79,126 indirect jobs were supported by US$8.0 billion (Cdn$10.4 billion) in regional purchases by businesses supplying services at the marine terminals and ports.

Personal Income — Maritime activity supported **US$14.2 billion (Cdn$18.5 billion) in total personal wage and salary income and local consumption expenditures** in the regional economies of the U.S. and Canada. The 78,400 direct job holders received US$3.8 billion (Cdn$4.9 billion) in wage income.

Local Purchases — Businesses involved in maritime activity in the Great Lakes-Seaway system spent **US$8 billion (Cdn$10.3 billion) on purchases** in their respective local economies.

Taxes — A total of **US$6.6 billion (Cdn$8.6 billion)** in federal, state/provincial and local tax revenue was generated by maritime activity in the Great Lakes-Seaway system.

EXHIBIT II-3
Great Lakes-St. Lawrence Seaway System Impacts – Country Level

	Canada		United States		Total	
Jobs						
Direct Jobs	29,004		49,395		78,400	
Induced	36,475		43,868		80,343	
Indirect	24,925		54,201		79,126	
Total	90,404		147,464		237,868	
	US $	**Cdn $**	**US $**	**Cdn $**	**US $**	**Cdn $**
Economic Activity (1,000)	$9,386,930	$12,187,990	$25,610,903	$33,253,196	$34,997,833	$45,441,187
Personal Income (1,000)						
Direct	$1,154,563	$1,499,084	$2,641,743	$3,430,039	$3,796,306	$4,929,124
Re-Spending/Local Consumption	$1,550,700	$2,013,429	$5,327,418	$6,917,119	$6,878,118	$8,930,548
Indirect	$1,069,500	$1,388,639	$2,485,486	$3,227,156	$3,554,986	$4,615,794
Total	$3,774,762	$4,901,151	$10,454,648	$13,574,315	$14,229,410	$18,475,466
Business Revenue (1,000)	$7,836,230	$10,174,561	$20,283,485	$26,336,077	$28,119,715	$36,510,639
Local Purchases (1,000)	$2,693,951	$3,497,827	$5,276,709	$6,851,280	$7,970,661	$10,349,106
Taxes (1,000)						
Federal	$1,156,702	$1,501,862	$3,371,918	$4,378,099	$4,528,620	$5,879,961
State/Provincial and Local	$803,823	$1,043,684	$1,272,166	$1,651,781	$2,075,989	$2,695,464
Total	$1,960,525	$2,545,546	$4,644,084	$6,029,880	$6,604,609	$8,575,425

EXHIBIT II-10
Great Lakes-St. Lawrence Seaway System Impacts – by State

	Indiana		Ohio		Michigan	
Tonnage Handled (1,000): Metric Tons (Short Tons)	**26,986 (29,747)**		**39,599 (43,650)**		**59,014 (65,051)**	
Jobs						
Direct Jobs	19,518		9,398		11,180	
Induced	19,432		8,549		8,294	
Indirect	27,208		15,221		6,436	
Total	66,158		33,168		25,910	
	US $	**Cdn $**	**US $**	**Cdn $**	**US $**	**Cdn $**
Economic Activity (1,000)	$13,726,685	$17,822,728	$3,745,199	$4,862,766	$4,160,713	$5,402,270
Personal Income (1,000)						
Direct	$1,201,907	$1,560,556	$475,029	$616,777	$536,631	$696,762
Re-Spending/Local Consumption	$2,441,194	$3,169,646	$1,025,207	$1,331,128	$966,365	$1,254,728
Indirect	$1,252,811	$1,626,649	$710,600	$922,643	$272,287	$353,538
Total	$4,895,912	$6,356,852	$2,210,835	$2,870,549	$1,775,283	$2,305,028
Business Revenue (1,000)	$11,285,492	$14,653,083	$2,719,992	$3,531,638	$3,194,348	$4,147,541
Local Purchases (1,000)	$2,604,640	$3,381,865	$1,411,723	$1,832,981	$692,167	$898,709
Taxes (1,000)						
Federal	$1,682,700	$2,184,818	$622,035	$807,650	$558,082	$724,613
State and Local	$623,108	$809,044	$216,662	$281,314	$205,209	$266,443
Total	$2,305,808	$2,993,862	$838,697	$1,088,964	$763,290	$991,056

EXHIBIT II-10 Continued

	Minnesota		Illinois		Wisconsin	
Tonnage Handled (1,000): Metric Tons (Short Tons)	**31,231 (34,425)**		**10,289 (11,341)**		**27,086 (29,856)**	
Jobs						
Direct Jobs	2,176		2,943		3,198	
Induced	1,852		2,654		2,316	
Indirect	2,134		880		1,970	
Total	6,161		6,476		7,484	
	US $	**Cdn $**	**US $**	**Cdn $**	**US $**	**Cdn $**
Economic Activity (1,000)	$1,483,766	$1,926,522	$830,908	$1,078,851	$1,430,900	$1,857,881
Personal Income (1,000)						
Direct	$99,333	$128,974	$130,780	$169,805	$147,229	$191,162
Re-Spending/Local Consumption	$213,546	$277,269	$345,169	$448,167	$245,180	$318,341
Indirect	$100,528	$130,526	$46,015	$59,745	$87,653	$113,809
Total	$413,408	$536,769	$521,964	$677,718	$480,061	$623,312
Business Revenue (1,000)	$1,270,220	$1,649,254	$485,739	$630,684	$1,185,721	$1,539,540
Local Purchases (1,000)	$222,048	$288,308	$89,032	$115,599	$210,833	$273,745
Taxes (1,000)						
Federal	$160,488	$208,378	$137,785	$178,900	$169,585	$220,189
State and Local	$69,544	$90,296	$64,945	$84,325	$71,541	$92,889
Total	$230,033	$298,674	$202,730	$263,225	$241,126	$313,078

EXHIBIT II-10 Continued

	New York		Pennsylvania		Total US	
Tonnage Handled (1,000): Metric Tons (Short Tons)	**960 (1,058)**		**603 (665)**		**195,768 (215,795)**	
Jobs						
Direct Jobs	691		291		49,395	
Induced	542		229		43,868	
Indirect	116		237		54,201	
Total	1,349		757		147,464	
	US $	**Cdn $**	**US $**	**Cdn $**	**US $**	**Cdn $**
Economic Activity (1,000)	$141,866	$184,199	$90,864	$117,978	$25,610,903	$33,253,197
Personal Income (1,000)						
Direct	$38,128	$49,505	$12,707	$16,498	$2,641,743	$3,430,039
Re-Spending/Local Consumption	$63,536	$82,495	$27,222	$35,345	$5,327,418	$6,917,119
Indirect	$5,954	$7,731	$9,638	$12,514	$2,485,486	$3,227,156
Total	$107,618	$139,731	$49,566	$64,357	$10,454,648	$13,574,315
Business Revenue (1,000)	**$78,331**	**$101,704**	**$63,643**	**$82,633**	**$20,283,485**	**$26,336,077**
Local Purchases (1,000)	**$17,207**	**$22,342**	**$29,060**	**$37,731**	**$5,276,709**	**$6,851,280**
Taxes (1,000)						
Federal	$27,143	$35,242	$14,100	$18,308	$3,371,918	$4,378,099
State and Local	$14,780	$19,190	$6,377	$8,280	$1,272,166	$1,651,781
Total	$41,923	$54,432	$20,477	$26,588	$4,644,084	$6,029,879

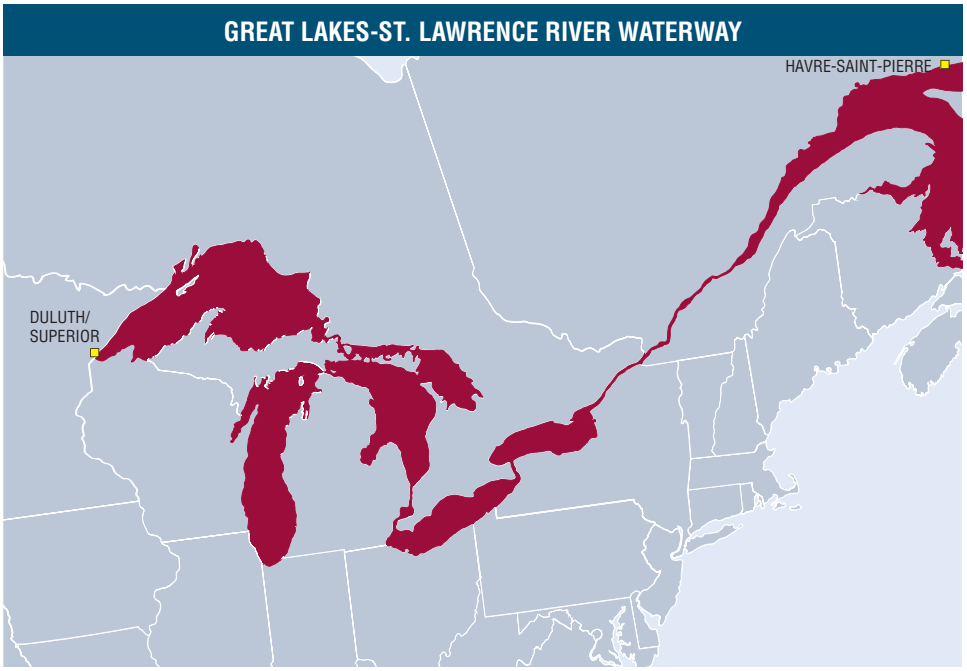
EXHIBIT II-11
Great Lakes-St. Lawrence Seaway System Impacts – by Province

	Ontario		Quebec		Total	
Tonnage Handled (1,000): Metric Tons (Short Tons)	**61,378 (67,657)**		**27,686 (30,519)**		**89,064 (98,176)**	
Jobs						
Direct Jobs	21,561		7,443		29,004	
Induced	28,904		7,571		36,475	
Indirect	20,182		4,743		24,925	
Total	70,647		19,757		90,404	
	US $	**Cdn $**	**US $**	**Cdn $**	**US $**	**Cdn $**
Economic Activity (1,000)	$7,700,224	$9,997,970	$1,686,706	$2,190,019	$9,386,930	$12,187,990
Personal Income (1,000)						
Direct	$842,378	$1,093,744	$312,184	$405,340	$1,154,563	$1,499,084
Re-Spending/Local Consumption	$1,276,372	$1,657,241	$274,328	$356,187	$1,550,700	$2,013,429
Indirect	$877,836	$1,139,782	$191,664	$248,856	$1,069,500	$1,388,639
Total	$2,996,586	$3,890,768	$778,176	$1,010,384	$3,774,762	$4,901,151
Business Revenue (1,000)	$6,423,852	$8,340,729	$1,412,378	$1,833,832	$7,836,230	$10,174,561
Local Purchases (1,000)	$2,181,105	$2,831,947	$512,846	$665,880	$2,693,951	$3,497,827
Taxes (1,000)						
Federal	$924,744	$1,200,688	$231,958	$301,175	$1,156,702	$1,501,862
Provincial and Local	$564,274	$732,653	$239,549	$311,030	$803,823	$1,043,684
Total	$1,489,018	$1,933,341	$471,507	$612,205	$1,960,525	$2,545,546

EXHIBIT II-12
Great Lakes-St. Lawrence Seaway System Impacts by Flag of Carriage – Regional Level

	Canadian Flag		U.S. Flag		Foreign Flag		Total	
Jobs								
Direct Jobs	28,498		39,522		10,380		78,400	
Induced	33,530		35,746		11,066		80,343	
Indirect	27,264		42,838		9,024		79,126	
Total	89,292		118,106		30,471		237,868	
	US $	**Cdn $**	**US $**	**Cdn $**	**US $**	**Cdn $**	**US $**	**Cdn $**
Economic Activity (1,000)	$11,052,311	$14,350,321	$20,892,882	$27,127,318	$3,052,640	$3,963,548	$34,997,833	$45,441,186
Personal Income (1,000)								
Direct	$1,192,780	$1,548,706	$2,137,528	$2,775,366	$465,998	$605,052	$3,796,306	$4,929,124
Re-Spending/ Local Consumption	$1,843,133	$2,393,124	$4,294,015	$5,575,349	$740,970	$962,076	$6,878,118	$8,930,548
Indirect	$1,196,511	$1,553,549	$1,960,454	$2,545,453	$398,022	$516,792	$3,554,986	$4,615,794
Total	$4,232,424	$5,495,379	$8,391,996	$10,896,168	$1,604,990	$2,083,919	$14,229,410	$18,475,466
Business Revenue (1,000)	$9,209,179	$11,957,197	$16,598,867	$21,551,969	$2,311,670	$3,001,472	$28,119,715	$36,510,639
Local Purchases (1,000)	$2,863,736	$3,718,275	$4,184,789	$5,433,530	$922,136	$1,197,302	$7,970,661	$10,349,106
Taxes (1,000)								
Federal	$1,338,302	$1,737,652	$2,722,903	$3,535,417	$467,415	$606,892	$4,528,620	$5,879,961
State/Provincial and Local	$776,507	$1,008,217	$1,028,410	$1,335,288	$271,071	$351,959	$2,075,989	$2,695,464
Total	$2,114,810	$2,745,869	$3,751,313	$4,870,705	$738,487	$958,851	$6,604,610	$8,575,425

Chapter III – Great Lakes-St. Lawrence River Waterway Impacts



This chapter measures the impacts of maritime shipping on the Great Lakes-St. Lawrence River Waterway. All domestic and international cargo moving on the waterway is included in the analysis, including Great Lakes, St. Lawrence Seaway and lower St. Lawrence River cargo.

In 2017, a total of **230.9 million metric tons (254.6 million short tons) of cargo valued at $77.4 billion U.S. (Cdn$100.5 billion)** moved through the Great Lakes-St. Lawrence River waterway. As noted, a majority of the domestic cargo moving on Canadian and U.S. flag vessels remains in the waterway, creating economic impacts at the loading port as well as the port of discharge. With this accounted for, the actual tons handled at the ports on the Great Lakes-St. Lawrence River waterway is **381 million metric tons (420 million short tons)**. This cargo generated the following economic impacts:

Economic Activity — The marine cargo and vessel activity generated a total of **US$45.6 billion (Cdn$59.2 billion)** in economic activity in the United States and Canada.

Employment — Maritime commerce supported **328,543 U.S. and Canadian jobs**, including 105,885 direct jobs. As a result of local and regional purchases made by those 105,885 individuals, an additional 108,712 induced jobs were supported in the regional economy. Finally, 113,946 indirect jobs were supported by US$12.3 billion (Cdn$16.0 billion) in regional purchases by businesses supplying services at the marine terminals and ports.

Personal Income — Maritime activity supported **U.S.$17.9 billion (Cdn$23.3 billion) in total personal wage and salary income and local consumption expenditures** in the regional economies of the U.S. and Canada. The 105,885 direct job holders received US$5.0 billion (Cdn$6.5 billion) in wage income.

Local Purchases — Businesses involved in maritime activity spent **US$12.3 billion (Cdn$16 billion) on purchases** in their respective local economies.

Taxes — A total of **US$9.0 billion (Cdn$11.7 billion) in federal, state/provincial and local tax revenue** was generated by maritime activity.

EXHIBIT III-3
Great Lakes-St. Lawrence River Waterway Impacts – Country Level

	Canada		United States		Total	
Jobs						
Direct Jobs	56,490		49,395		105,885	
Induced	64,844		43,868		108,712	
Indirect	59,745		54,201		113,946	
Total	181,079		147,464		328,543	
	US $	**Cdn $**	**US $**	**Cdn $**	**US $**	**Cdn $**
Economic Activity (1,000)	$20,003,296	$25,972,279	$25,610,903	$33,253,197	$45,614,199	$59,225,476
Personal Income (1,000)						
Direct	$2,330,505	$3,025,927	$2,641,743	$3,430,039	$4,972,248	$6,455,967
Re-Spending/Local Purchases	$2,570,100	$3,337,018	$5,327,418	$6,917,119	$7,897,518	$10,254,137
Indirect	$2,578,709	$3,348,196	$2,485,486	$3,227,156	$5,064,196	$6,575,352
Total	$7,479,314	$9,711,141	$10,454,648	$13,574,315	$17,933,961	$23,285,455
Business Revenue (1,000)	$17,433,196	$22,635,261	$20,283,485	$26,336,077	$37,716,681	$48,971,339
Local Purchases (1,000)	$7,044,726	$9,146,872	$5,276,709	$6,851,280	$12,321,436	$15,998,152
Taxes (1,000)						
Federal	$2,352,898	$3,055,002	$3,371,918	$4,378,099	$5,724,816	$7,433,101
State/Provincial and Local	$2,012,017	$2,612,403	$1,272,166	$1,651,781	$3,284,184	$4,264,184
Total	$4,364,915	$5,667,405	$4,644,084	$6,029,879	$9,008,999	$11,697,285

EXHIBIT III-10
Great Lakes-St. Lawrence River Waterway Impacts – by State

	Indiana		Ohio		Michigan	
Tonnage Handled (1,000): Metric Tons (Short Tons)	**26,986 (29,747)**		**39,599 (43,650)**		**59,014 (65,051)**	
Jobs						
Direct Jobs	19,518		9,398		11,180	
Induced	19,432		8,549		8,294	
Indirect	27,208		15,221		6,436	
Total	66,158		33,168		25,910	
	US $	**Cdn $**	**US $**	**Cdn $**	**US $**	**Cdn $**
Economic Activity (1,000)	$13,726,685	$17,822,728	$3,745,199	$4,862,766	$4,160,713	$5,402,270
Personal Income (1,000)						
Direct	$1,201,907	$1,560,556	$475,029	$616,777	$536,631	$696,762
Re-Spending/Local Consumption	$2,441,194	$3,169,646	$1,025,207	$1,331,128	$966,365	$1,254,728
Indirect	$1,252,811	$1,626,649	$710,600	$922,643	$272,287	$353,538
Total	$4,895,912	$6,356,852	$2,210,835	$2,870,549	$1,775,283	$2,305,028
Business Revenue (1,000)	$11,285,492	$14,653,083	$2,719,992	$3,531,638	$3,194,348	$4,147,541
Local Purchases (1,000)	$2,604,640	$3,381,865	$1,411,723	$1,832,981	$692,167	$898,709
Taxes (1,000)						
Federal	$1,682,700	$2,184,818	$622,035	$807,650	$558,082	$724,613
State and Local	$623,108	$809,044	$216,662	$281,314	$205,209	$266,443
Total	$2,305,808	$2,993,862	$838,697	$1,088,964	$763,290	$991,056

EXHIBIT III-10 Continued

	Minnesota		Illinois		Wisconsin	
Tonnage Handled (1,000): Metric Tons (Short Tons)	**31,231 (34,425)**		**10,289 (11,341)**		**27,086 (29,856)**	
Jobs						
Direct Jobs		2,176		2,943		3,198
Induced		1,852		2,654		2,316
Indirect		2,134		880		1,970
Total		6,161		6,476		7,484
	US $	**Cdn $**	**US $**	**Cdn $**	**US $**	**Cdn $**
Economic Activity (1,000)	$1,483,766	$1,926,522	$830,908	$1,078,851	$1,430,900	$1,857,881
Personal Income (1,000)						
Direct	$99,333	$128,974	$130,780	$169,805	$147,229	$191,162
Re-Spending/Local Consumption	$213,546	$277,269	$345,169	$448,167	$245,180	$318,341
Indirect	$100,528	$130,526	$46,015	$59,745	$87,653	$113,809
Total	$413,408	$536,769	$521,964	$677,718	$480,061	$623,312
Business Revenue (1,000)	$1,270,220	$1,649,254	$485,739	$630,684	$1,185,721	$1,539,540
Local Purchases (1,000)	$222,048	$288,308	$89,032	$115,599	$210,833	$273,745
Taxes (1,000)						
Federal	$160,488	$208,378	$137,785	$178,900	$169,585	$220,189
State and Local	$69,544	$90,296	$64,945	$84,325	$71,541	$92,889
Total	$230,033	$298,674	$202,730	$263,225	$241,126	$313,078

EXHIBIT III-10 Continued

	New York		Pennsylvania		Total US	
Tonnage Handled (1,000): Metric Tons (Short Tons)	**960 (1,058)**		**603 (665)**		**195,768 (215,795)**	
Jobs						
Direct Jobs		691		291		49,395
Induced		542		229		43,868
Indirect		116		237		54,201
Total		1,349		757		147,464
	US $	**Cdn $**	**US $**	**Cdn $**	**US $**	**Cdn $**
Economic Activity (1,000)	$141,866	$184,199	$90,864	$117,978	$25,610,903	$33,253,197
Personal Income (1,000)						
Direct	$38,128	$49,505	$12,707	$16,498	$2,641,743	$3,430,039
Re-Spending/Local Consumption	$63,536	$82,495	$27,222	$35,345	$5,327,418	$6,917,119
Indirect	$5,954	$7,731	$9,638	$12,514	$2,485,486	$3,227,156
Total	$107,618	$139,731	$49,566	$64,357	$10,454,648	$13,574,315
Business Revenue (1,000)	$78,331	$101,704	$63,643	$82,633	$20,283,485	$26,336,077
Local Purchases (1,000)	$17,207	$22,342	$29,060	$37,731	$5,276,709	$6,851,280
Taxes (1,000)						
Federal	$27,143	$35,242	$14,100	$18,308	$3,371,918	$4,378,099
State and Local	$14,780	$19,190	$6,377	$8,280	$1,272,166	$1,651,781
Total	$41,923	$54,432	$20,477	$26,588	$4,644,084	$6,029,879

EXHIBIT III-11
Great Lakes-St. Lawrence River Waterway Impacts – by Province

	Ontario		Quebec		Total	
Tonnage Handled (1,000): Metric Tons (Short Tons)	**61,378 (67,657)**		**123,856 (136,527)**		**185,234 (204,184)**	
Jobs						
Direct Jobs	21,561		34,929		56,490	
Induced	28,904		35,940		64,844	
Indirect	20,182		39,563		59,745	
Total	70,647		110,433		181,079	
	US $	**Cdn $**	**US $**	**Cdn $**	**US $**	**Cdn $**
Economic Activity (1,000)	$7,700,224	$9,997,970	$12,303,072	$15,974,309	$20,003,296	$25,972,279
Personal Income (1,000)						
Direct	$842,378	$1,093,744	$1,488,126	$1,932,183	$2,330,505	$3,025,927
Re-Spending/Local Consumption	$1,276,372	$1,657,241	$1,293,728	$1,679,777	$2,570,100	$3,337,018
Indirect	$877,836	$1,139,782	$1,700,873	$2,208,414	$2,578,709	$3,348,196
Total	$2,996,586	$3,890,768	$4,482,727	$5,820,373	$7,479,314	$9,711,141
Business Revenue (1,000)	$6,423,852	$8,340,729	$11,009,344	$14,294,532	$17,433,196	$22,635,261
Local Purchases (1,000)	$2,181,105	$2,831,947	$4,863,621	$6,314,925	$7,044,726	$9,146,872
Taxes (1,000)						
Federal	$924,744	$1,200,688	$1,428,154	$1,854,315	$2,352,898	$3,055,002
Provincial and Local	$564,274	$732,653	$1,447,743	$1,879,750	$2,012,017	$2,612,403
Total	$1,489,018	$1,933,341	$2,875,897	$3,734,064	$4,364,915	$5,667,405

EXHIBIT III-12
Great Lakes-St. Lawrence River Waterway Impacts by Flag of Carriage – Regional Level

	Canadian Flag		U.S. Flag		Foreign Flag		Total	
Jobs								
Direct Jobs	35,171		39,522		31,192		105,885	
Induced	39,870		35,746		33,095		108,712	
Indirect	30,951		42,838		40,157		113,946	
Total	105,993		118,106		104,445		328,543	
	US $	**Cdn $**	**US $**	**Cdn $**	**US $**	**Cdn $**	**US $**	**Cdn $**
Economic Activity (1,000)	$12,842,890	$16,675,208	$20,892,882	$27,127,318	$11,878,427	$15,422,950	$45,614,199	$59,225,476
Personal Income (1,000)								
Direct	$1,447,512	$1,879,450	$2,137,528	$2,775,366	$1,387,208	$1,801,151	$4,972,248	$6,455,967
Re-Spending/ Local Consumption	$2,075,353	$2,694,638	$4,294,015	$5,575,349	$1,528,151	$1,984,151	$7,897,518	$10,254,137
Indirect	$1,344,635	$1,745,874	$1,960,454	$2,545,453	$1,759,107	$2,284,024	$5,064,196	$6,575,352
Total	$4,867,500	$6,319,962	$8,391,996	$10,896,168	$4,674,465	$6,069,325	$17,933,961	$23,285,455
Business Revenue (1,000)	$10,767,537	$13,980,570	$16,598,867	$21,551,969	$10,350,277	$13,438,800	$37,716,681	$48,971,339
Local Purchases (1,000)	$3,246,603	$4,215,389	$4,184,789	$5,433,530	$4,890,043	$6,349,232	$12,321,436	$15,998,152
Taxes (1,000)								
Federal	$1,540,588	$2,000,300	$2,722,903	$3,535,417	$1,461,325	$1,897,384	$5,724,816	$7,433,101
State/Provincial and Local	$981,580	$1,274,483	$1,028,410	$1,335,288	$1,274,193	$1,654,413	$3,284,184	$4,264,184
Total	$2,522,168	$3,274,783	$3,751,313	$4,870,705	$2,735,518	$3,551,797	$9,008,999	$11,697,285

Chapter IV – St. Lawrence Seaway Impacts

This chapter presents the economic impacts of cargo that specifically transits the St. Lawrence Seaway. The Seaway extends from Montreal to Lake Erie and is composed of a series of 15 consecutive 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, bypassing the Niagara Falls. 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. This chapter describes the economic impacts of all domestic and international traffic moving through the lock system.

During 2017, more than **38.1 million metric tons (41.9 million short tons)** of cargo valued at US$7.7 billion (Cdn$10.0 billion) passed through the St. Lawrence Seaway's infrastructure. A total of **64 million metric tons (70.5 million short tons)** of cargo transiting the St. Lawrence Seaway was handled at the region's ports generating the following economic impacts:

Economic Activity — Marine cargo and vessel activity generated a total of **US$12.9 billion (Cdn$16.8 billion)** economic activity in the United States and Canada.

Employment — Maritime commerce supported **92,661 U.S. and Canadian jobs**, including 29,624 direct jobs. As a result of local and regional purchases made by those 29,624 individuals, an additional 34,539 induced jobs were supported in the regional economy. Finally, 28,498 indirect jobs were supported by US$2.9 billion (Cdn$3.7 billion) in regional purchases by businesses supplying services at the marine terminals and ports.

Personal Income — Maritime commerce supported **US$4.9 billion (Cdn$6.3 billion) in total personal wages and local consumption expenditures**. The 29,624 direct job holders received U.S.$1.4 billion (Cdn$1.8 billion) in wage income.

Local Purchases — Businesses involved in maritime activity on the St. Lawrence Seaway spent **US$2.9 billion (Cdn$3.8 billion) on purchases** in their respective local economies.

Taxes — St. Lawrence Seaway commercial maritime activity generated **US$ 2.4 billion (Cdn$3.1 billion) in local, state/provincial and federal tax revenues**.

EXHIBIT IV-3
St. Lawrence Seaway Impacts – Country Level

	Canada		United States		Total	
Jobs						
Direct Jobs	19,451		10,173		29,624	
Induced	24,966		9,572		34,539	
Indirect	15,390		13,109		28,498	
Total	59,806		32,855		92,661	
	US $	**Cdn $**	**US $**	**Cdn $**	**US $**	**Cdn $**
Economic Activity (1,000)	$7,076,236	$9,187,784	$5,872,312	$7,624,610	$12,948,548	$16,812,394
Personal Income (1,000)						
Direct	$773,169	$1,003,883	$577,694	$750,078	$1,350,863	$1,753,960
Re-Spending/Local Consumption	$1,068,180	$1,386,925	$1,181,409	$1,533,941	$2,249,589	$2,920,866
Indirect	$662,617	$860,342	$605,598	$786,309	$1,268,215	$1,646,650
Total	$2,503,966	$3,251,150	$2,364,701	$3,070,327	$4,868,667	$6,321,477
Business Revenue (1,000)	$6,008,055	$7,800,859	$4,690,903	$6,090,669	$10,698,959	$13,891,528
Local Purchases (1,000)	$1,660,900	$2,156,513	$1,255,824	$1,630,563	$2,916,725	$3,787,076
Taxes (1,000)						
Federal	$793,210	$1,029,903	$768,660	$998,028	$1,561,869	$2,027,931
State/Provincial and Local	$536,124	$696,103	$291,707	$378,753	$827,831	$1,074,856
Total	$1,329,334	$1,726,007	$1,060,367	$1,376,780	$2,389,700	$3,102,787

EXHIBIT IV-10
St. Lawrence Seaway Impacts – by State

	Indiana		Ohio		Michigan	
Tonnage Handled (1,000): Metric Tons (Short Tons)	**1,451 (1,599)**		**6,126 (6,753)**		**1,523 (1,678)**	
Jobs						
Direct Jobs	6,175		2,015		482	
Induced	6,218		1,702		340	
Indirect	8,608		3,350		337	
Total	21,002		7,067		1,159	
	US $	**Cdn $**	**US $**	**Cdn $**	**US $**	**Cdn $**
Economic Activity (1,000)	$4,610,939	$5,986,843	$616,554	$800,534	$81,506	$105,828
Personal Income (1,000)						
Direct	$385,752	$500,861	$92,281	$119,818	$21,497	$27,912
Re-Spending/Local Consumption	$783,502	$1,017,299	$199,161	$258,590	$38,713	$50,264
Indirect	$396,371	$514,649	$156,633	$203,373	$14,036	$18,224
Total	$1,565,625	$2,032,808	$448,075	$581,781	$74,246	$96,400
Business Revenue (1,000)	$3,827,437	$4,969,545	$417,393	$541,943	$42,794	$55,564
Local Purchases (1,000)	$824,071	$1,069,974	$308,434	$400,471	$36,592	$47,511
Taxes (1,000)						
Federal Taxes (1,000)	$550,773	$715,123	$118,305	$153,607	$18,074	$23,467
State and Local	$202,319	$262,690	$43,911	$57,015	$7,493	$9,728
Total	$753,091	$977,814	$162,216	$210,621	$25,566	$33,195

EXHIBIT IV-10 Continued

	Minnesota		Illinois		Wisconsin	
Tonnage Handled (1,000): Metric Tons (Short Tons)	**3,356 (3,699)**		**786 (866)**		**3,415 (3,764)**	
Jobs						
Direct Jobs	284		501		460	
Induced	251		476		351	
Indirect	351		148		271	
Total	886		1,125		1,082	
	US $	**Cdn $**	**US $**	**Cdn $**	**US $**	**Cdn $**
Economic Activity (1,000)	$165,468	$214,844	$139,051	$180,544	$195,722	$254,125
Personal Income (1,000)						
Direct	$13,641	$17,711	$23,859	$30,978	$22,786	$29,586
Re-Spending/Local Consumption	$29,325	$38,076	$62,970	$81,760	$37,946	$49,269
Indirect	$16,534	$21,468	$7,750	$10,062	$12,061	$15,660
Total	$59,500	$77,255	$94,578	$122,801	$72,794	$94,515
Business Revenue (1,000)	$136,143	$176,768	$76,081	$98,783	$157,776	$204,856
Local Purchases (1,000)	$36,380	$47,235	$14,970	$19,437	$28,982	$37,630
Taxes (1,000)						
Federal	$20,391	$26,476	$24,274	$31,518	$24,438	$31,730
State and Local	$9,094	$11,808	$11,583	$15,039	$10,500	$13,633
Total	$29,486	$38,284	$35,857	$46,557	$34,938	$45,363

EXHIBIT IV-10 Continued

	New York		Pennsylvania		Total US	
Tonnage Handled (1,000): Metric Tons (Short Tons)	**230 (253)**		**0 (0)***		**16,886 (18,614)**	
Jobs						
Direct Jobs	255		0		10,173	
Induced	234		0		9,572	
Indirect	43		0		13,109	
Total	533		0		32,855	
	US $	**Cdn $**	**US $**	**Cdn $**	**US $**	**Cdn $**
Economic Activity (1,000)	$63,042	$81,854	$29	$38	$5,872,312	$7,624,610
Personal Income (1,000)						
Direct	$17,873	$23,206	$4	$5	$577,694	$750,078
Re-Spending/Local Consumption	$29,783	$38,671	$9	$11	$1,181,409	$1,533,941
Indirect	$2,210	$2,870	$3	$4	$605,598	$786,309
Total	$49,866	$64,747	$16	$20	$2,364,701	$3,070,327
Business Revenue (1,000)	$33,259	$43,184	$20	$26	$4,690,903	$6,090,669
Local Purchases (1,000)	$6,387	$8,294	$9	$12	$1,255,824	$1,630,563
Taxes (1,000)						
Federal	$12,401	$16,101	$4	$6	$768,660	$998,028
State and Local	$6,805	$8,836	$2	$3	$291,707	$378,753
Total	$19,206	$24,937	$7	$8	$1,060,367	$1,376,780

* Pennsylvania tonnage appears as 0 as it is less than 1,000 metric tons

EXHIBIT IV-11
St. Lawrence Seaway Impacts – by Province

	Ontario		Quebec		Total	
Tonnage Handled (1,000): Metric Tons (Short Tons)	**29,916 (32,977)**		**17,154 (18,908)**		**47,070 (51,885)**	
Jobs						
Direct Jobs	15,689		3,762		19,451	
Induced	21,219		3,747		24,966	
Indirect	12,747		2,642		15,390	
Total	49,655		10,152		59,806	
	US $	**Cdn $**	**US $**	**Cdn $**	**US $**	**Cdn $**
Economic Activity (1,000)	$6,064,386	$7,873,999	$1,011,850	$1,313,785	$7,076,236	$9,187,784
Personal Income (1,000)						
Direct	$619,825	$804,781	$153,344	$199,102	$773,169	$1,003,883
Re-Spending/Local Consumption	$939,159	$1,219,404	$129,022	$167,522	$1,068,180	$1,386,925
Indirect	$553,255	$718,347	$109,362	$141,995	$662,617	$860,342
Total	$2,112,239	$2,742,531	$391,727	$508,619	$2,503,966	$3,251,150
Business Revenue (1,000)	$5,125,227	$6,654,595	$882,828	$1,146,264	$6,008,055	$7,800,859
Local Purchases (1,000)	$1,379,579	$1,791,246	$281,321	$365,268	$1,660,900	$2,156,513
Taxes (1,000)						
Federal	$670,945	$871,154	$122,265	$158,749	$793,210	$1,029,903
Provincial and Local	$411,481	$534,267	$124,643	$161,836	$536,124	$696,103
Total	$1,082,426	$1,405,422	$246,908	$320,585	$1,329,334	$1,726,007

EXHIBIT IV-12
St. Lawrence Seaway Impacts by Flag of Carriage – Regional Level

	Canadian Flag		U.S. Flag		Foreign Flag		Total	
Jobs								
Direct Jobs	21,936		317		7,371		29,624	
Induced	26,083		354		8,101		34,539	
Indirect	20,851		252		7,396		28,498	
Total	68,870		923		22,868		92,661	
	US $	**Cdn $**	**US $**	**Cdn $**	**US $**	**Cdn $**	**US $**	**Cdn $**
Economic Activity (1,000)	$10,471,829	$13,596,623	$130,405	$169,317	$2,346,314	$3,046,454	$12,948,548	$16,812,394
Personal Income (1,000)								
Direct	$992,206	$1,288,281	$12,977	$16,849	$345,679	$448,830	$1,350,863	$1,753,960
Re-Spending/ Local Consumption	$1,597,005	$2,073,552	$19,528	$25,355	$633,056	$821,960	$2,249,589	$2,920,866
Indirect	$922,719	$1,198,059	$11,016	$14,304	$334,479	$434,288	$1,268,215	$1,646,650
Total	$3,511,931	$4,559,892	$43,521	$56,508	$1,313,214	$1,705,078	$4,868,667	$6,321,477
Business Revenue (1,000)	$8,874,824	$11,523,071	$110,877	$143,963	$1,713,258	$2,224,494	$10,698,959	$13,891,528
Local Purchases (1,000)	$2,149,435	$2,790,826	$26,736	$34,714	$740,555	$961,536	$2,916,725	$3,787,076
Taxes (1,000)								
Federal	$1,173,826	$1,524,096	$14,236	$18,484	$373,807	$485,351	$1,561,869	$2,027,931
State/Provincial and Local	$639,766	$830,672	$8,647	$11,227	$179,419	$232,958	$827,831	$1,074,856
Total	$1,813,592	$2,354,768	$22,883	$29,711	$553,226	$718,309	$2,389,700	$3,102,787

Chapter V – Soo Locks Impacts

This chapter describes the economic impacts of all domestic and international cargo moving through the Soo Locks, which connect ports on Lake Superior to the lower Lakes, the St. Lawrence Seaway and international markets. The Soo Locks are located on the St. Marys River in Sault Ste. Marie, Michigan.

In 2017, a total of **69.1 million metric tons of cargo (76.2 million short tons) valued at US$5.8 billion (Cdn$7.5 billion)** passed through the Soo Locks. The actual tons handled at system ports that also moved through the Soo Locks is **134.8 million metric tons (148.6 million short tons)**, creating the following economic impacts:

Economic Activity — The marine cargo and vessel activity moving through the Soo Locks generated a total of **US$22.6 billion (Cdn$29.3 billion)** in total economic activity in the United States and Canada.

Employment — Maritime commerce that transited the Soo Locks supported **123,172 U.S. and Canadian jobs**, including 39,765 direct jobs. As a result of local and regional purchases made by those 39,765 individuals, an additional 41,828 induced jobs were supported in the regional economy. Finally, 41,579 indirect jobs were supported by US$4.2 billion (Cdn$5.4 billion) in regional purchases by businesses supplying services at the marine terminals and ports.

Personal Income — Cargo moving via the Soo Locks supported **US$7.9 billion (Cdn$10.3 billion) in total personal wages and local consumption expenditures** in the regional economies of the U.S. and Canada. The 39,765 direct jobholders received US$2.1 billion (Cdn$2.7 billion) in direct wage and salary income.

Local Purchases — Businesses involved in maritime activity transiting the Soo Locks spent **US$4.2 billion (Cdn$5.4 billion) on purchases** in their respective local economies.

Taxes — Commercial maritime activity moving via the Soo Locks generated **US$3.8 billion (Cdn$4.9 billion) in local, state/provincial and federal tax revenues**.

EXHIBIT V-3
Soo Locks Impacts – Country Level

	Canada		United States		Total	
Jobs						
Direct Jobs	11,668		28,097		39,765	
Induced	15,100		26,728		41,828	
Indirect	9,246		32,332		41,579	
Total	36,014		87,158		123,172	
	US $	**Cdn $**	**US $**	**Cdn $**	**US $**	**Cdn $**
Economic Activity (1,000)	$5,187,870	$6,735,930	$17,407,618	$22,602,051	$22,595,488	$29,337,981
Personal Income (1,000)						
Direct	$452,477	$587,496	$1,655,669	$2,149,720	$2,108,146	$2,737,216
Re-Spending/Local Consumption	$651,124	$845,419	$3,301,561	$4,286,747	$3,952,685	$5,132,166
Indirect	$401,147	$520,849	$1,480,902	$1,922,803	$1,882,048	$2,443,652
Total	$1,504,747	$1,953,763	$6,438,132	$8,359,271	$7,942,879	$10,313,034
Business Revenue (1,000)	$4,536,746	$5,890,512	$14,106,056	$18,315,303	$18,642,803	$24,205,815
Local Purchases (1,000)	$1,006,529	$1,306,877	$3,152,483	$4,093,184	$4,159,011	$5,400,060
Taxes (1,000)						
Federal	$506,315	$657,400	$2,170,159	$2,817,734	$2,676,474	$3,475,134
State/Provincial and Local	$328,161	$426,084	$804,489	$1,044,549	$1,132,650	$1,470,633
Total	$834,476	$1,083,484	$2,974,648	$3,862,283	$3,809,124	$4,945,767

EXHIBIT V-10
Soo Locks Impacts – by State

	Indiana		Ohio		Michigan	
Tonnage Handled (1,000): Metric Tons (Short Tons)	**19,272 (21,244)**		**11,813 (13,021)**		**23,676 (26,098)**	
Jobs						
Direct Jobs	15,046		3,024		5,677	
Induced	15,706		3,163		4,405	
Indirect	20,973		4,436		3,495	
Total	51,725		10,623		13,577	
	US $	**Cdn $**	**US $**	**Cdn $**	**US $**	**Cdn $**
Economic Activity (1,000)	$10,379,603	$13,476,876	$1,931,952	$2,508,446	$2,522,921	$3,275,761
Personal Income (1,000)						
Direct	$983,114	$1,276,476	$182,988	$237,592	$289,994	$376,529
Re-Spending/Local Consumption	$1,996,804	$2,592,650	$394,925	$512,770	$522,222	$678,053
Indirect	$965,748	$1,253,927	$209,006	$271,374	$147,610	$191,657
Total	$3,945,666	$5,123,053	$786,919	$1,021,736	$959,826	$1,246,238
Business Revenue (1,000)	$8,382,799	$10,884,226	$1,537,027	$1,995,676	$2,000,700	$2,597,708
Local Purchases (1,000)	$2,007,826	$2,606,961	$405,561	$526,580	$379,549	$492,807
Taxes (1,000)						
Federal	$1,314,792	$1,707,126	$254,401	$330,314	$317,604	$412,377
State and Local	$492,197	$639,069	$77,118	$100,130	$114,232	$148,319
Total	$1,806,990	$2,346,195	$331,519	$430,444	$431,836	$560,696

EXHIBIT V-10 Continued

	Minnesota		Illinois		Wisconsin	
Tonnage Handled (1,000): Metric Tons (Short Tons)	**30,924 (34,088)**		**910 (1,003)**		**20,605 (22,713)**	
Jobs						
Direct Jobs	2,155		175		1,817	
Induced	1,834		158		1,318	
Indirect	2,111		52		1,235	
Total	6,101		385		4,369	
	US $	**Cdn $**	**US $**	**Cdn $**	**US $**	**Cdn $**
Economic Activity (1,000)	$1,469,832	$1,908,430	$55,740	$72,372	$1,012,298	$1,314,368
Personal Income (1,000)						
Direct	$98,393	$127,753	$7,784	$10,107	$83,833	$108,849
Re-Spending/Local Consumption	$211,524	$274,643	$20,545	$26,676	$139,607	$181,265
Indirect	$99,488	$129,175	$2,712	$3,521	$54,799	$71,150
Total	$409,405	$531,571	$31,041	$40,304	$278,238	$361,265
Business Revenue (1,000)	$1,258,308	$1,633,787	$35,194	$45,696	$872,691	$1,133,102
Local Purchases (1,000)	$219,776	$285,357	$5,238	$6,801	$130,086	$168,903
Taxes (1,000)						
Federal	$158,957	$206,390	$8,560	$11,114	$109,046	$141,585
State and Local	$68,879	$89,432	$3,960	$5,142	$44,395	$57,642
Total	$227,835	$295,822	$12,520	$16,256	$153,441	$199,228

EXHIBIT V-10 Continued

	New York		Pennsylvania		Total US	
Tonnage Handled (1,000): Metric Tons (Short Tons)	**325 (358)**		**0 (0)**		**107,525 (118,525)**	
Jobs						
Direct Jobs	203		0		28,097	
Induced	144		0		26,728	
Indirect	30		0		32,332	
Total	377		0		87,158	
	US $	**Cdn $**	**US $**	**Cdn $**	**US $**	**Cdn $**
Economic Activity (1,000)	$35,272	$45,797	$0	$0	$17,407,618	$22,602,051
Personal Income (1,000)						
Direct	$9,562	$12,416	$0	$0	$1,655,669	$2,149,720
Re-Spending/Local Consumption	$15,935	$20,690	$0	$0	$3,301,561	$4,286,747
Indirect	$1,539	$1,998	$0	$0	$1,480,902	$1,922,803
Total	$27,036	$35,103	$0	$0	$6,438,132	$8,359,271
Business Revenue (1,000)	$19,337	$25,108	$0	$0	$14,106,056	$18,315,303
Local Purchases (1,000)	$4,447	$5,774	$0	$0	$3,152,483	$4,093,184
Taxes (1,000)						
Federal	$6,799	$8,828	$0	$0	$2,170,159	$2,817,734
State and Local	$3,708	$4,815	$0	$0	$804,489	$1,044,549
Total	$10,507	$13,643	$0	$0	$2,974,648	$3,862,283

EXHIBIT V-11
Soo Locks Impacts – by Province

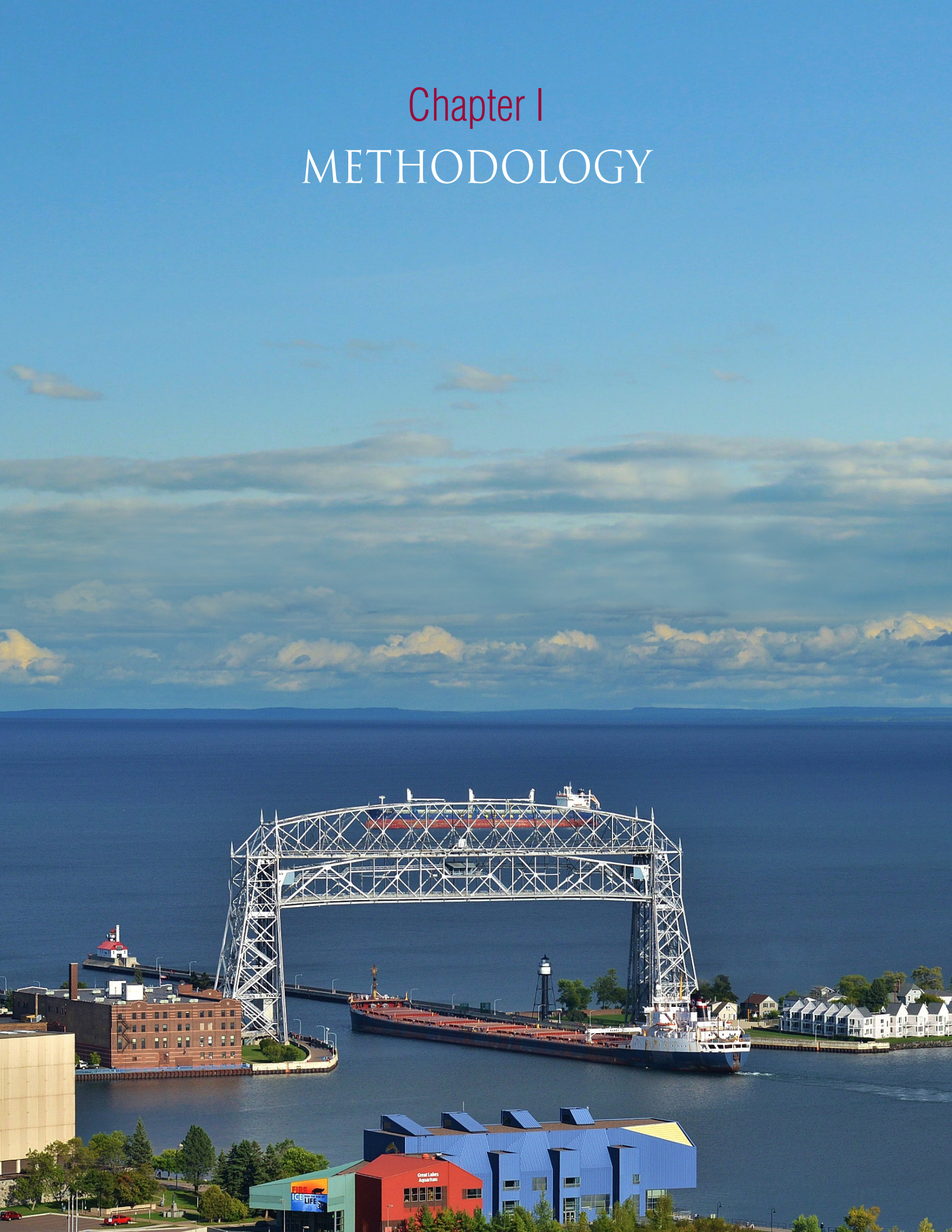
	Ontario		Quebec		Total	
Tonnage Handled (1,000): Metric Tons (Short Tons)	**19,257 (21,227)**		**7,990 (8,807)**		**27,247 (30,034)**	
Jobs						
Direct Jobs	10,479		1,189		11,668	
Induced	13,943		1,157		15,100	
Indirect	8,476		770		9,246	
Total	32,898		3,116		36,014	
	US $	**Cdn $**	**US $**	**Cdn $**	**US $**	**Cdn $**
Economic Activity (1,000)	$4,783,280	$6,210,611	$404,590	$525,319	$5,187,870	$6,735,930
Personal Income (1,000)						
Direct	$405,559	$526,578	$46,917	$60,917	$452,477	$587,496
Re-Spending/Local Consumption	$614,504	$797,871	$36,620	$47,548	$651,124	$845,419
Indirect	$370,117	$480,560	$31,029	$40,289	$401,147	$520,849
Total	$1,390,180	$1,805,010	$114,567	$148,754	$1,504,747	$1,953,763
Business Revenue (1,000)	$4,168,777	$5,412,740	$367,970	$477,772	$4,536,746	$5,890,512
Local Purchases (1,000)	$918,514	$1,192,599	$88,014	$114,278	$1,006,529	$1,306,877
Taxes (1,000)						
Federal	$467,044	$606,410	$39,271	$50,990	$506,315	$657,400
Provincial and Local	$289,117	$375,389	$39,044	$50,695	$328,161	$426,084
Total	$756,161	$981,799	$78,315	$101,685	$834,476	$1,083,484

EXHIBIT V-12
Soo Locks Impacts by Flag of Carriage – Regional Level

	Canadian Flag		U.S. Flag		Foreign Flag		Total	
Jobs								
Direct Jobs	14,451		24,805		508		39,765	
Induced	17,229		23,969		631		41,828	
Indirect	12,559		28,446		573		41,579	
Total	44,240		77,220		1,712		123,172	
	US $	**Cdn $**	**US $**	**Cdn $**	**US $**	**Cdn $**	**US $**	**Cdn $**
Economic Activity (1,000)	$7,073,549	$9,184,296	$15,363,551	$19,948,035	$158,387	$205,650	$22,595,488	$29,337,981
Personal Income (1,000)								
Direct	$616,639	$800,645	$1,467,132	$1,904,925	$24,374	$31,647	$2,108,146	$2,737,216
Re-Spending/ Local Consumption	$993,524	$1,289,992	$2,918,801	$3,789,771	$40,360	$52,403	$3,952,685	$5,132,1667
Indirect	$554,671	$720,185	$1,301,761	$1,690,207	$25,616	$33,259	$1,882,048	$2,443,652
Total	$2,164,835	$2,810,822	$5,687,694	$7,384,902	$90,350	$117,310	$7,942,879	$10,313,034
Business Revenue (1,000)	$6,080,025	$7,894,304	$12,444,751	$16,158,264	$118,027	$153,246	$18,642,803	$24,205,815
Local Purchases (1,000)	$1,321,680	$1,716,070	$2,775,337	$3,603,497	$61,994	$80,493	$4,159,011	$5,400,060
Taxes (1,000)								
Federal	$737,942	$958,144	$1,913,289	$2,484,214	$25,243	$32,776	$2,676,474	$3,475,134
State/Provincial and Local	$407,047	$528,510	$711,723	$924,101	$13,880	$18,021	$1,132,650	$1,470,633
Total	$1,144,989	$1,486,654	$2,625,012	$3,408,316	$39,123	$50,797	$3,809,124	$4,945,767

Chapter I

METHODOLOGY



Chapter I
METHODOLOGY

Martin Associates of Lancaster, Pennsylvania, was retained by a consortium of U.S. and Canadian Great Lakes-St. Lawrence River stakeholders[1] to analyze the economic impacts generated by marine cargo activity on the Great Lakes-Seaway System and the St. Lawrence River. The analysis includes the economic impacts of all marine cargo moving on the waterways, including U.S. domestic commerce, Canadian domestic commerce, bi-national commerce between the two countries, and international traffic moving between the Great Lakes-St. Lawrence region and overseas destinations. The impacts are measured for the year 2017 and are presented in terms of total economic impacts at the bi-national regional level, the country level, and the state/provincial level. The impacts are also presented by flag of vessel carriage.

The Great Lakes, their connecting channels and the St. Lawrence River extends from the western-most point in Duluth, Minnesota, to eastern Quebec. This analysis examines the economic impacts created by cargo and vessel activity at all marine terminals located along this transportation corridor — 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.

The study methodology is based on analysis of a core group of 40 Canadian and U.S. Great Lakes-St. Lawrence River ports. The 40 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 40 individual ports
- Supplemental lists provided by stakeholders

EXHIBIT I-1
Individual Ports Modelled

US Ports (19)	Canadian Ports (21)
Ashtabula	Baie Comeau
Burns Harbor	Becancour
Calcite	Goderich
Chicago	Hamilton
Cleveland	Havre-Saint-Pierre
Conneaut	Johnstown
Detroit	Meldrum Bay
Duluth	Montreal
Erie	Nanticoke
Green Bay	Oshawa
Lorain	Port Alfred
Milwaukee	Port-Cartier
Monroe	Quebec
Muskegon	Sarnia
Oswego	Sept Iles
Saginaw River	Sorel
Superior	Thunder Bay
Toledo	Toronto
Two Harbors	Trois-Rivieres
	Valleyfield
	Windsor

1 The consortium includes the Saint Lawrence Seaway Development Corporation (SLSDC), The St. Lawrence Seaway Management Corporation (SLSMC), the American Great Lakes Ports Association (AGLPA), the Chamber of Marine Commerce (CMC), the Lake Carriers' Association (LCA), and the Shipping Federation of Canada.

In total, 770 firms with 1,105 operations throughout the region were identified. All firms were contacted by telephone to collect the data required to assess direct impacts and develop the individual port models. These firms 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 40 ports, Martin Associates developed prototype economic impact models.

These models were used to expand the individual port impacts to a state/provincial level, thus incorporating the cargo tonnage at all marine terminals located within a specific state or province.

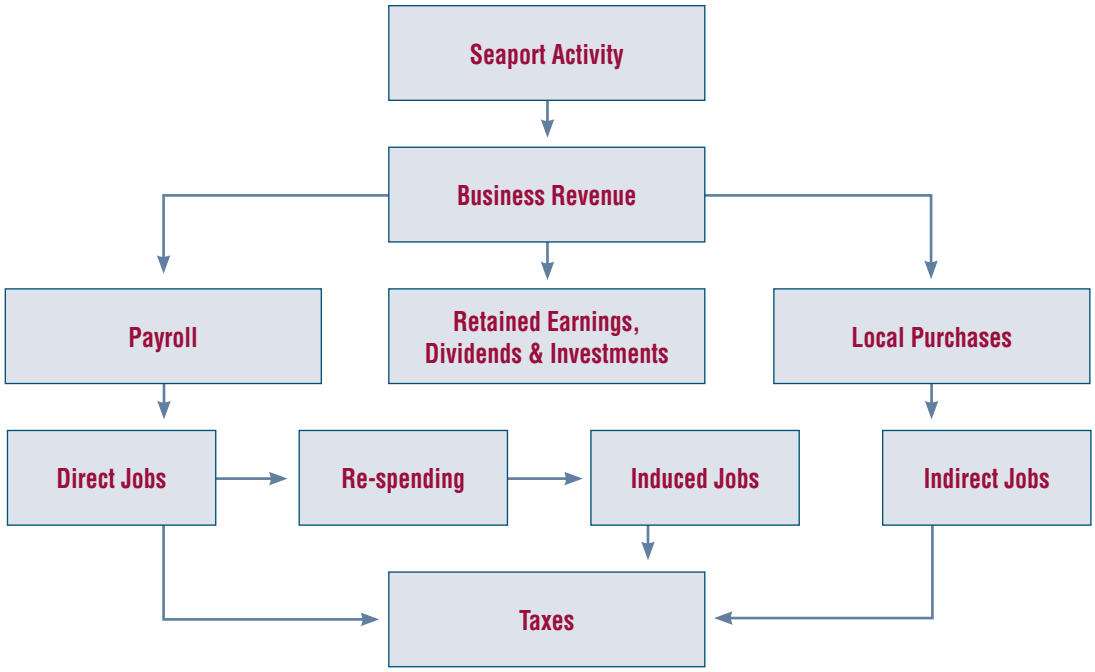
For the purpose of determining economic impacts, the report uses a tonnage handled figure. "Handled" refers to both the shipping (exporting) of the cargo from a system port, and to the receipt (importing) of that cargo in a system port. Because economic activity is created every time cargo is handled, for the purposes of this study, cargo moved between ports within the region has been handled twice. By contrast, cargo moved between the region's ports and overseas ports has been handled once (in the region).

1. FLOW OF IMPACTS

Waterborne cargo activity at a marine terminal 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

EXHIBIT I-2
Flow of Economic Impacts Generated by Marine Activity



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.

The report also provides a total economic activity value, which is explained later in this chapter.

1.1 Business Revenue Impact

At the outset, activity at a 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.

1.2 Employment Impact

Employment is measured in terms of full-time equivalent jobs, as defined by 2,080 hours per year per full-time worker. The employment impact of the port activity consists of three 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 was 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 770 companies interviewed as part of this study. They include jobs with office supply firms, maintenance and repair firms, parts and equipment suppliers, and others.

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.

1.5 Total Economic Activity

The total economic activity value calculated in this report consists of the direct business revenue received by the businesses supplying the cargo and vessel handling services, and the re-spending of direct income and consumption expenditures. These two monetary measures of economic impact are additive, since the re-spending impact is in addition to the direct income impact and the business revenue is independent of

other dollar value impacts. The direct personal income, business purchases and taxes are paid from business revenue, and to include these in the total economic impact measure would result in double counting.

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

Agents — includes 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 — includes 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 — includes 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 — includes the crew and headquarters-based management employees of U.S. and Canadian domestic Great Lakes vessel operators that transport cargo

Barge Operators — includes 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 cargo owners that ship or receive cargo via a specific port. These companies are dependent upon the port and usually located within the port's immediate vicinity.

2.4 Port Authorities/Seaway Authorities

This sector includes the various port authorities operating in the Great Lakes-Seaway and St. Lawrence River. 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 and St. Lawrence River.

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 770 firms that provide services on the Great Lakes and St. Lawrence River. In most cases, multiple interviews were conducted with several persons in each firm.

The baseline survey data collected from the 770 firms was used to develop operational impact models for each of the 40 ports. This data was also used to develop models to expand the impact calculations beyond the 40 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 40 individual port districts for which specific impact models were developed.

Total state and local tax impacts generated by the cargo activity on the St. Lawrence were estimated from several sources. The U.S. tax impacts were estimated from income indices developed by the Tax Foundation and the US Bureau of Census, "State and Local Government Finances," 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.

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 19 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, 2015. 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, 2012 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 21 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 (2015 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 21 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 40 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 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 (RIMS II) 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 40 ports, as well as for the province-wide and state-wide models.

4. COMMODITIES INCLUDED IN THE ANALYSIS

Economic impacts were estimated for the following commodities handled at the marine terminals on the Great Lakes-Seaway and St. Lawrence River.

- Containers
- Steel products
- General cargo (excluding steel)
- Iron ore
- Grain
- Stone/aggregates
- Cement
- Salt
- Other dry bulk
- Other liquid bulk
- Coal
- Petroleum products

Impacts that are related to cargo or activity outside of the listed commodity groups are categorized as Not Allocated. This category includes employees such as the St. Lawrence Seaway Management Corp. and the St. Lawrence Seaway Development Corporation, Customs and Border Protection, Canadian and U.S. Coast Guard, U.S. Army Corps of Engineers assigned to the Great Lakes Districts, shiprepair and boatbuilding, portions of marine construction activity, to name a few.

Impacts of cruise passenger activity were not included in the analysis, but the impacts generated by passenger ferry operations were included.

5. ESTIMATE OF TONNAGE

Currently, there is no single data source for the marine cargo moving on the Great Lakes and St. Lawrence River. In order to accurately capture the tonnage moving on the Great Lakes-St. Lawrence waterway an extensive data collection effort was undertaken. The Chamber of Marine Commerce provided detailed port to port cargo movements by commodity carried on Canadian-flag vessels. International tonnage by commodity and port was provided by The St. Lawrence Seaway Management Corporation and the Maritime Information Bureau of the St. Lawrence Economic Development Council. The Lake Carriers' Association provided port to port movements by commodity for tonnage moved on U.S.-flag carriers.

This proprietary data base of tonnage represents the only comprehensive data base describing port to port cargo flows, by commodity and by flag, for cargo operations on the waterway.

The report estimates tonnage volume (and its dollar value) *moved* for each of the geographic segments detailed in the Organization of Study Results. This is the recorded tonnage transported by vessels.

Tonnage value was calculated for 2017 by using the US Bureau of Census, USA Trade On-Line, which publishes the value per ton of waterborne cargo at a 7 digit commodity code classification, for both containerized and non-containerized commodities. This value per ton at the commodity level excludes the ocean or laker shipping rates as well as the terminal charges and inland transportation costs. The value per ton by commodity was then multiplied by the specific commodities moving on the Great Lakes and St. Lawrence River. The dollar value of the cargo was then expressed in both U.S. as well as Canadian dollars.

For the purpose of determining economic impacts, the report uses a *tonnage handled* figure. "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 region has been handled twice. By contrast, cargo moved between the region's 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 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).

The tonnage *handled* at each of the 40 ports was then used as inputs into the port-specific models, which consist of the direct, induced, indirect sub-modules. Impacts were then estimated for each of the 40 ports.

6. EXPANSION OF THE 40-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 40 port districts for which the individual models were developed. These prototype models also consist of direct, induced and indirect 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 tonnage handled at ports that was not among the 40 ports was grouped by state and province and used in the other state and province models to develop a comprehensive measure of the economic impact on the bi-national economies.

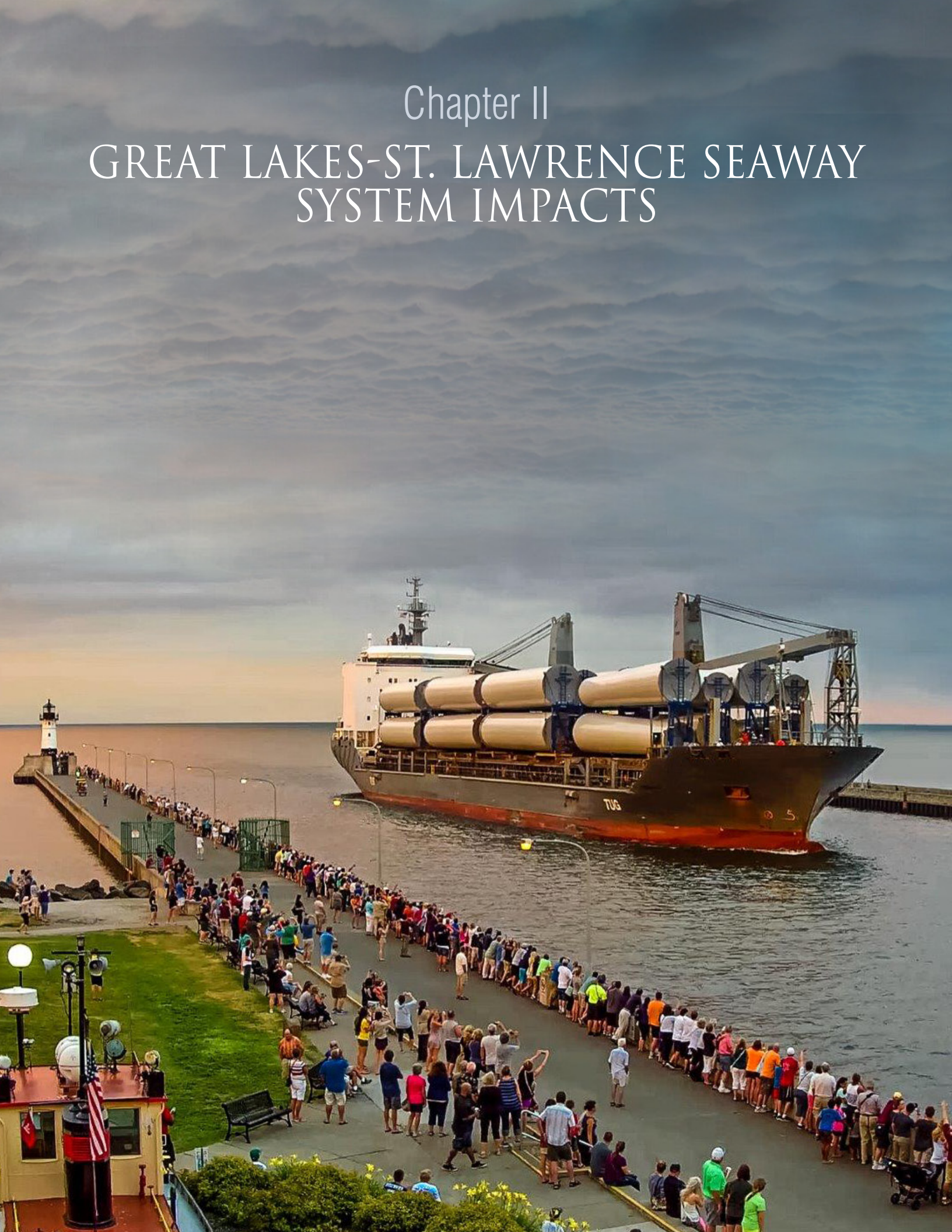
Using the 40 port-specific models, and the state and provincial models, the economic impacts at the level of the 40 port districts and the "other state and provincial ports" were then combined to estimate total impacts in the following categories:

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

Note: Total figures on all tables and charts may not add up due to rounding.

Chapter II

GREAT LAKES-ST. LAWRENCE SEAWAY SYSTEM IMPACTS



Chapter II

GREAT LAKES-ST. LAWRENCE SEAWAY SYSTEM IMPACTS

This chapter organizes the study results from the perspective of a traditional definition of the Great Lakes-St. Lawrence Seaway System. These results include the impacts of domestic and international cargo that has travelled at some point through the Great Lakes, its connecting rivers and/or the St. Lawrence Seaway (ending in Montreal).

This perspective excludes Quebec commerce that moves exclusively between ports on the St. Lawrence River. It also excludes commerce between St. Lawrence River ports in Quebec and overseas ports.

The impacts are measured for the year 2017 and are presented in terms of total economic impacts at the bi-national regional level, the country level, and the state/provincial level. The impacts are also presented by flag of vessel carriage.

GREAT LAKES-ST. LAWRENCE SEAWAY SYSTEM

TOTAL CARGO VOLUMES

In 2017, a total of **143.5 million metric tons of cargo (158.3 million short tons)** moved through the Great Lakes-St. Lawrence Seaway System. This tonnage volume represents **US$15.2 billion (Cdn$19.8 billion)** of cargo value.

A majority of the domestic cargo moving on Canadian and U.S. flag vessels remains in the Great Lakes-St. Lawrence Seaway System. This cargo is loaded and unloaded at ports within the system creating economic impacts at the loading port as well as the port of discharge. This tonnage "handled" represents shipment and receipt of domestic cargo and trans-lake cargo, and is significantly greater than the tonnage of cargo "moving" on the waterway. The actual tons handled at the ports on the Great Lakes-St.Lawrence Seaway System is **284.8 million metric tons (314.0 million short tons)**.

This activity created a range of economic impacts in the region — defined as the states of Minnesota, Wisconsin, Illinois, Indiana, Michigan, Ohio, Pennsylvania and New York, and the Canadian provinces of Ontario and Quebec.

EXHIBIT II-1
Great Lakes-St. Lawrence Seaway System

2017	Tonnage Moved (1,000 metric tons)	Cargo Value Millions US	Cargo Value Millions Cdn
Steel	3,906	$2,561	$3,326
General Cargo	790	$747	$970
Iron Ore	50,628	$2,271	$2,949
Grain	11,830	$3,254	$4,225
Stone/Aggregate	27,358	$245	$318
Cement	6,179	$667	$866
Salt	7,905	$222	$288
Other Dry Bulk	7,871	$157	$204
Coal	17,349	$1,245	$1,617
Other Liquid Bulk	810	$322	$417
Petroleum Products	8,938	$3,547	$4,605
Total	**143,564**	**$15,239**	**$19,786**

Note: Containerized cargo is included in General Cargo category.

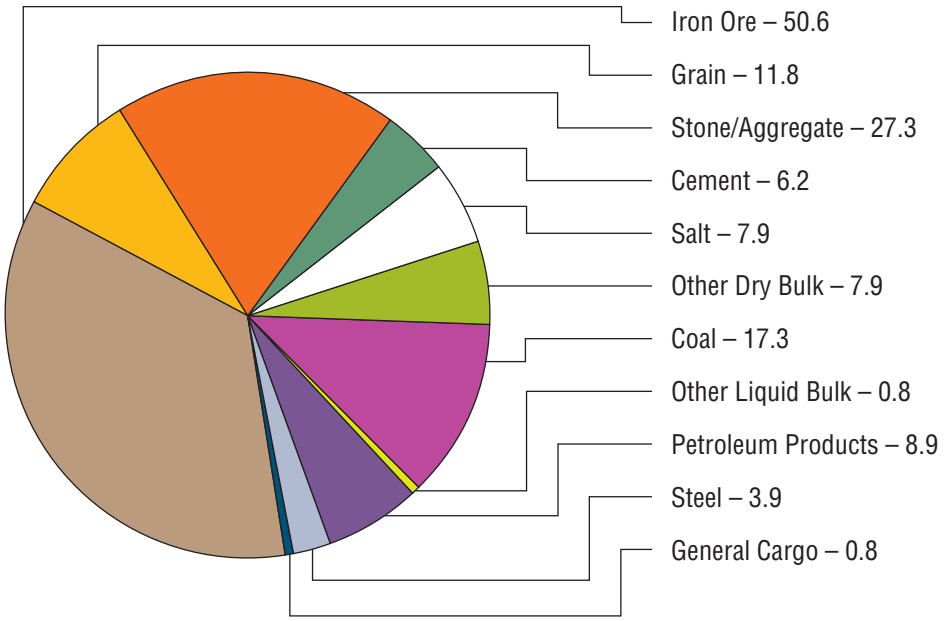
Great Lakes-St. Lawrence Seaway System

Total Value of Cargo Moved

=

US$15 billion (Cdn$19 billion)

Breakdown of Cargo Type Moved (million metric tons, 2017)



1. TOTAL ECONOMIC IMPACTS

Exhibit II-2 summarizes the economic impacts of all cargo handled by 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 US$1.00 = Cdn $1.2984. The exchange rate reflects the annual average for 2017, as of December 31, 2017, and is sourced from "The Board of Governors of the Federal Reserve System Data Download Program."

237,868 jobs in Canada and the United States are in some way related to the cargo handled at the marine terminals located on the Great Lakes-Seaway system.

Of the 237,868 jobs, 78,400 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 78,400 individuals holding the direct jobs, an additional 80,343 induced jobs were supported in the regional economy.

79,126 indirect jobs were supported by US$8.0 billion (Cdn$10.4 billion) in regional purchases by businesses supplying services at the marine terminals and ports.

In 2017, the marine cargo and vessel activity at the marine terminals on the Great Lakes-Seaway generated a total of US$35.0 billion (Cdn$45.4 billion) of economic activity in the United States and Canada.

The total economic activity consists of the direct business revenue received by the businesses supplying the cargo and vessel handling services (US$28.1 billion (Cdn$36.5 billion), and the re-spending of direct income and consumption impact of US$6.9 billion (Cdn$8.9 billion).

Marine activity supported US$14.2 billion (Cdn$18.5 billion) in total personal wage and salary income, and local consumption expenditures for regional residents of the U.S. and Canada.

EXHIBIT II-2
Economic Impacts – Regional Level

Jobs		
Direct Jobs	78,400	
Induced	80,343	
Indirect	79,126	
Total	237,868	
	US $	**Cdn $**
Economic Activity (1,000)	$34,997,833	$45,441,187
Personal Income (1,000)		
Direct	$3,796,306	$4,929,124
Re-Spending/Local Purchases	$6,878,118	$8,930,548
Indirect	$3,554,986	$4,615,794
Total	$14,229,410	$18,475,466
Business Revenue (1,000)	$28,119,715	$36,510,639
Local Purchases (1,000)	$7,970,661	$10,349,106
Taxes (1,000)		
Federal	$4,528,620	$5,879,961
State/Provincial and Local	$2,075,989	$2,695,464
Total	$6,604,610	$8,575,425

The 78,400 direct job holders received US$3.8 billion (Cdn$4.9 billion) in direct wage and salary income. This equates to an average salary of nearly US$48,420 (Cdn$62,870). The 79,126 indirect job holders received US$3.6 billion (Cdn$4.6 billion) in indirect personal income.

A total of US$6.6 billion (Cdn$8.6 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$6.6 billion (Cdn$8.6 billion), US$2.1 billion (Cdn$2.7 billion) was paid to local and state/provincial governments, while US$4.5 billion (Cdn$5.9 billion) was paid in federal taxes.

Exhibit II-3 shows the breakdown of the total impacts by country. As shown in this exhibit, 29,004 direct jobs were created in Canada, while 49,395 direct jobs were created in the U.S.

This larger concentration of direct jobs generated at the U.S. ports reflects the presence of steel mills and supporting value-added operations that are located at several of the U.S. port facilities, such as Burns Harbor, Cleveland, and Chicago.

When the induced and indirect jobs are considered, each direct job supports a total of about three jobs in both countries.

The re-spending multiplier in Canada is slightly less than in the U.S., due to a higher Canadian savings rate compared to the U.S. In contrast, the induced jobs supported by a dollar of re-spending by individuals in Canada's two provinces is nearly three times as great as in the U.S. Great Lakes regional economy. This reflects the fact that less out-of-region spending occurs in Ontario and Quebec. This is consistent with a larger concentration of national population and employment in those two major eastern provinces, compared to the U.S. Great Lakes states.

EXHIBIT II-3
Economic Impacts – Country Level

	Canada		United States		Total	
Jobs						
Direct Jobs	29,004		49,395		78,400	
Induced	36,475		43,868		80,343	
Indirect	24,925		54,201		79,126	
Total	90,404		147,464		237,868	
	US $	**Cdn $**	**US $**	**Cdn $**	**US $**	**Cdn $**
Economic Activity (1,000)	$9,386,930	$12,187,990	$25,610,903	$33,253,196	$34,997,833	$45,441,187
Personal Income (1,000)						
Direct	$1,154,563	$1,499,084	$2,641,743	$3,430,039	$3,796,306	$4,929,124
Re-Spending/Local Consumption	$1,550,700	$2,013,429	$5,327,418	$6,917,119	$6,878,118	$8,930,548
Indirect	$1,069,500	$1,388,639	$2,485,486	$3,227,156	$3,554,986	$4,615,794
Total	$3,774,762	$4,901,151	$10,454,648	$13,574,315	$14,229,410	$18,475,466
Business Revenue (1,000)	$7,836,230	$10,174,561	$20,283,485	$26,336,077	$28,119,715	$36,510,639
Local Purchases (1,000)	$2,693,951	$3,497,827	$5,276,709	$6,851,280	$7,970,661	$10,349,106
Taxes (1,000)						
Federal	$1,156,702	$1,501,862	$3,371,918	$4,378,099	$4,528,620	$5,879,961
State/Provincial and Local	$803,823	$1,043,684	$1,272,166	$1,651,781	$2,075,989	$2,695,464
Total	$1,960,525	$2,545,546	$4,644,084	$6,029,880	$6,604,609	$8,575,425

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 business 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 78,400 direct jobs created by the 284.8 million tons of cargo handled at the ports and marine terminals on the Great Lakes-Seaway system. **Exhibit II-4** 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 — 28,605. The majority of these jobs are with shippers/consignees (steel mills) located at the ports that are directly dependent on the receipt of iron ore by vessels, as well as terminal jobs and jobs associated with the movement of ore to the loading ports, such as those in Minnesota and Wisconsin. The movement of steel products generates the second-largest direct jobs impacts, and this is concentrated at ports with steel fabrication tenants dependent upon steel imports such as Hamilton, Cleveland, and Chicago.

The majority of 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 of dry bulk cargoes such as alumina and other ores, fertilizers and potash. The majority of these direct jobs were created in Canada.

Exhibit II-5 shows the direct jobs by commodity for each country.

The majority of the tonnage shipped and received at the U.S. ports and terminals consist of iron ore, stone/aggregates and coal. These cargoes typically move within the Great Lakes on U.S. flag or Canadian Lakers. Grain, iron ore and aggregates are the major commodities shipped and received at the Canadian ports and terminals located on the Great Lakes-Seaway system. The majority of the iron ore handled at Canadian ports is a domestic move, while grain handled at Canadian ports is exported, either directly via international carriers or transshipped by Canadian Lakers to St. Lawrence River ports. Under a transshipment operation, the grain moves from Great Lakes ports such as Thunder Bay and Duluth/Superior by a Canadian Laker to a St. Lawrence River port, and then is reloaded onto an international vessel for shipment to an overseas destination.

EXHIBIT II-4
Direct Jobs by Commodity – Regional Level

	1,000 Metric Tons	1,000 Short Tons	Direct Jobs
Steel	4,438	4,892	9,535
General Cargo	1,319	1,454	487
Iron Ore	112,931	124,483	28,605
Grain	25,220	27,800	3,184
Stone/Aggregate	54,708	60,304	6,010
Cement	11,308	12,465	2,653
Salt	15,493	17,078	3,497
Other Dry Bulk	11,370	12,534	4,108
Liquid Bulk	14,589	16,081	5,403
Coal	33,456	36,878	3,820
Ferry			942
Not Allocated			10,154
Total	**284,832**	**313,970**	**78,400**

Note: Containerized cargo is included in General Cargo category.

The direct jobs generated by category are presented in **Exhibit II-6**. This exhibit shows that 40 percent of the direct job 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, dependent iron ore, salt and alumina mines in proximity to the ports and marine terminals in the Great Lakes-St. Lawrence region underscores the importance of the transportation system in providing raw materials to the region's 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.

EXHIBIT II-5
Direct Jobs by Commodity – Country Level

	Canada			United States			Total		
	1,000 Metric Tons	1,000 Short Tons	Direct Jobs	1,000 Metric Tons	1,000 Short Tons	Direct Jobs	1,000 Metric Tons	1,000 Short Tons	Direct Jobs
Steel	1,819	2,005	1,536	2,620	2,888	7,999	4,438	4,892	9,535
General Cargo	855	943	304	464	511	184	1,319	1,454	487
Iron Ore	19,135	21,093	9,741	93,795	103,390	18,864	112,931	124,483	28,605
Grain	22,548	24,854	2,549	2,672	2,945	635	25,220	27,800	3,184
Stone/Aggregate	12,498	13,776	1,491	42,210	46,528	4,519	54,708	60,304	6,010
Cement	3,097	3,414	735	8,211	9,051	1,918	11,308	12,465	2,653
Salt	9,931	10,947	1,847	5,563	6,132	1,650	15,493	17,078	3,497
Other Dry Bulk	5,290	5,831	1,738	6,080	6,702	2,371	11,370	12,534	4,108
Liquid Bulk	8,916	9,828	2,964	5,673	6,253	2,439	14,589	16,081	5,403
Coal	4,976	5,485	459	28,480	31,393	3,361	33,456	36,878	3,820
Ferry	NA		699	NA		243	NA		942
Not Allocated			4,942			5,212			10,154
Total	**89,064**	**98,176**	**29,004**	**195,768**	**215,795**	**49,395**	**284,832**	**313,970**	**78,400**

Note: Containerized cargo is included in General Cargo category.

EXHIBIT II-6
Direct Jobs Impacts by Category – Regional Level

	Total
Surface Transportation	
Rail	2,103
Truck	13,984
Maritime Service	
Terminal Employees	9,748
Dockworkers	1,402
Tug Assists	829
Pilots	185
Agents	250
Maritime Services	1,452
Forwarders	2,983
Government	1,859
Marine Equipment/Ship Repair	4,471
Laker	5,000
Barge	1,274
Dependent Shippers/Consignees	31,843
Port Authority	1,017
Total	**78,400**

In some cases, these terminal workers are associated with the dependent shippers/consignees. About 6,280 direct jobs are with the Canadian and U.S. flag vessel operators, and tug and barge operators moving cargo on the system; 2,983 jobs are with freight forwarders and customs brokers arranging for the handling of the cargo; and another 1,452 jobs are with firms providing maritime services such as ship chandlering, vessel cargo and hull surveys, ship repair and marine equipment sales, and servicing.

Exhibit II-7 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-7**, the number of direct jobs with dependent shippers/consignees is greater in the United States, reflecting the dependency of steel mills and steel fabrication complexes located in the U.S. 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-7 **Direct Jobs Impacts by Category – Country Level**			
	Canada Direct Jobs	**United States Direct Jobs**	**Total**
Surface Transportation			
Rail	445	1,658	2,103
Truck	5,446	8,538	13,984
Maritime Service			
Terminal Employees	2,773	6,975	9,748
Dockworkers	699	703	1,402
Tug Assists	336	493	829
Pilots	147	38	185
Agents	162	88	250
Maritime Services	259	1,193	1,452
Forwarders	933	2,050	2,983
Government	530	1,330	1,859
Marine Equipment/Ship Repair	2,914	1,557	4,471
Laker	1,233	3,767	5,000
Barge	468	807	1,274
Dependent Shippers/Consignees	11,915	19,927	31,843
Port Authority	745	272	1,017
Total	**29,004**	**49,395**	**78,400**

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. Pilotage revenue is higher in the United States, due to higher pilotage charges imposed by the U.S. Coast Guard in recent years in an effort to increase overall U.S. pilot compensation and workforce numbers. 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 ports.

3. REVENUE IMPACTS

In 2017, 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$28.1 billion (Cdn$36.5 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-8** 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-St. Lawrence Seaway System.

The revenue impacts by category, by country, are presented in **Exhibit II-9**.

4. PERSONAL INCOME AND LOCAL CONSUMPTION IMPACTS

The 78,400 individuals directly employed as a result of the cargo handled at the ports and marine terminals received US$3.8 billion (Cdn$4.9 billion) in wages and salaries. The 29,004 direct job holders at the Canadian ports and terminals received US$1.2 billion (Cdn$1.5 billion), for an average salary of US$39,810 (Cdn$51,680). The 49,395 direct job holders at the U.S. ports received US$2.6 billion (Cdn$3.4 billion) in direct personal income, for an average salary of US$53,480 (Cdn$69,440). The higher average salary received in the U.S. reflects a higher concentration of jobs with terminal operators, dependent shippers/consignees, lakers, and trucking jobs in moving the cargo at U.S. ports.

EXHIBIT II-8 **Revenue Impact by Category – Regional Level**		
	Revenue Million US	**Revenue Million Cdn**
Surface Transportation		
Rail	$3,671	$4,766
Truck	$1,261	$1,638
Maritime Service		
Terminal Employees	$1,221	$1,585
Tug Assists	$76	$98
Pilots	$58	$75
Agents	$45	$58
Maritime Services	$447	$580
Forwarders	$494	$642
Marine Equipment/Ship Repair	$620	$806
Laker	$2,435	$3,162
Barge	$198	$257
Dependent Shippers/Consignees	$17,412	$22,607
Port Authority	$182	$236
Total	**$28,120**	**$36,511**

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, RIMS II. 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$8.9 billion) in income and consumption were created in the Great Lakes regional economy.

EXHIBIT II-9 **Revenue Impact by Category – Country Level**						
	Canada		**United States**		**Total**	
	Million US	**Million Cdn**	**Million US**	**Million Cdn**	**Million US**	**Million Cdn**
Surface Transportation						
Rail	$687	$892	$2,984	$3,875	$3,671	$4,766
Truck	$421	$546	$841	$1,091	$1,261	$1,638
Maritime Service						
Terminal Employees	$419	$544	$802	$1,042	$1,221	$1,585
Tug Assists	$25	$32	$51	$66	$76	$98
Pilots	$43	$56	$15	$19	$58	$75
Agents	$31	$40	$14	$18	$45	$58
Maritime Services	$126	$164	$321	$416	$447	$580
Forwarders	$128	$167	$366	$475	$494	$642
Marine Equipment/Ship Repair	$307	$399	$314	$407	$620	$806
Laker	$524	$681	$1,911	$2,481	$2,435	$3,162
Barge	$67	$86	$131	$170	$198	$257
Dependent Shippers/Consignees	$4,940	$6,415	$12,471	$16,193	$17,412	$22,607
Port Authority	$118	$154	$63	$82	$182	$236
Total	**$7,836**	**$10,175**	**$20,283**	**$26,336**	**$28,120**	**$36,511**

The re-spending impact and consumption impacts should not be divided by induced jobs to estimate induced income, since the division of the re-spending impact/local consumption impact by the induced jobs will overstate the actual salary of the induced job holders, as this includes the value of the consumption purchases.

The 79,126 indirect job holders received US$3.6 billion (Cdn$4.6 billion) in personal income, of which the 24,925 Canadian indirect job holders received US$1.1 billion (Cdn$1.4 billion), while the 54,201 indirect job holders in the U.S. received US$2.5 billion (Cdn$3.2 billion).

5. FEDERAL, STATE/PROVINCIAL AND LOCAL TAX IMPACTS

The cargo activity at the U.S. ports and marine terminals created US$1.3 billion (Cdn$1.7 billion) in state and local taxes, and US$3.4 billion (Cdn$4.4 billion) in federal taxes. The cargo activity at the Canadian ports created US$803.8 million (Cdn$1.0 billion) in provincial taxes, and US$1.2 billion (Cdn$1.5 billion) in federal taxes.

6. IMPACTS BY STATE AND PROVINCE

The economic impacts were estimated at the port level for 40 U.S. and Canadian Great Lakes and St. Lawrence River ports. The models developed for these 40 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.

Exhibit II-10 presents the impacts by state for cargo handled by 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 are greatest for the state of Indiana, followed by Ohio and Michigan, reflecting the location of the key steel mills and fabrication facilities at ports in these states.

Exhibit II-11 shows the impacts of the cargo handled 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, nor domestic cargo moving between ports on the St. Lawrence River. The ports in Ontario account for about 80 percent of the direct job impacts for Canada.

EXHIBIT II-10
Economic Impacts by State

	Indiana		Ohio		Michigan	
Tonnage Handled (1,000): Metric Tons (Short Tons)	**26,986 (29,747)**		**39,599 (43,650)**		**59,014 (65,051)**	
Jobs						
Direct Jobs	19,518		9,398		11,180	
Induced	19,432		8,549		8,294	
Indirect	27,208		15,221		6,436	
Total	66,158		33,168		25,910	
	US $	**Cdn $**	**US $**	**Cdn $**	**US $**	**Cdn $**
Economic Activity (1,000)	$13,726,685	$17,822,728	$3,745,199	$4,862,766	$4,160,713	$5,402,270
Personal Income (1,000)						
Direct	$1,201,907	$1,560,556	$475,029	$616,777	$536,631	$696,762
Re-Spending/Local Consumption	$2,441,194	$3,169,646	$1,025,207	$1,331,128	$966,365	$1,254,728
Indirect	$1,252,811	$1,626,649	$710,600	$922,643	$272,287	$353,538
Total	$4,895,912	$6,356,852	$2,210,835	$2,870,549	$1,775,283	$2,305,028
Business Revenue (1,000)	$11,285,492	$14,653,083	$2,719,992	$3,531,638	$3,194,348	$4,147,541
Local Purchases (1,000)	$2,604,640	$3,381,865	$1,411,723	$1,832,981	$692,167	$898,709
Taxes (1,000)						
Federal	$1,682,700	$2,184,818	$622,035	$807,650	$558,082	$724,613
State and Local	$623,108	$809,044	$216,662	$281,314	$205,209	$266,443
Total	$2,305,808	$2,993,862	$838,697	$1,088,964	$763,290	$991,056

EXHIBIT II-10 Continued

	Minnesota		Illinois		Wisconsin	
Tonnage Handled (1,000): Metric Tons (Short Tons)	**31,231 (34,425)**		**10,289 (11,341)**		**27,086 (29,856)**	
Jobs						
Direct Jobs	2,176		2,943		3,198	
Induced	1,852		2,654		2,316	
Indirect	2,134		880		1,970	
Total	6,161		6,476		7,484	
	US $	**Cdn $**	**US $**	**Cdn $**	**US $**	**Cdn $**
Economic Activity (1,000)	$1,483,766	$1,926,522	$830,908	$1,078,851	$1,430,900	$1,857,881
Personal Income (1,000)						
Direct	$99,333	$128,974	$130,780	$169,805	$147,229	$191,162
Re-Spending/Local Consumption	$213,546	$277,269	$345,169	$448,167	$245,180	$318,341
Indirect	$100,528	$130,526	$46,015	$59,745	$87,653	$113,809
Total	$413,408	$536,769	$521,964	$677,718	$480,061	$623,312
Business Revenue (1,000)	$1,270,220	$1,649,254	$485,739	$630,684	$1,185,721	$1,539,540
Local Purchases (1,000)	$222,048	$288,308	$89,032	$115,599	$210,833	$273,745
Taxes (1,000)						
Federal	$160,488	$208,378	$137,785	$178,900	$169,585	$220,189
State and Local	$69,544	$90,296	$64,945	$84,325	$71,541	$92,889
Total	$230,033	$298,674	$202,730	$263,225	$241,126	$313,078

EXHIBIT II-10 Continued

	New York		Pennsylvania		Total US	
Tonnage Handled (1,000): Metric Tons (Short Tons)	**960 (1,058)**		**603 (665)**		**195,768 (215,795)**	
Jobs						
Direct Jobs	691		291		49,395	
Induced	542		229		43,868	
Indirect	116		237		54,201	
Total	1,349		757		147,464	
	US $	**Cdn $**	**US $**	**Cdn $**	**US $**	**Cdn $**
Economic Activity (1,000)	$141,866	$184,199	$90,864	$117,978	$25,610,903	$33,253,197
Personal Income (1,000)						
Direct	$38,128	$49,505	$12,707	$16,498	$2,641,743	$3,430,039
Re-Spending/Local Consumption	$63,536	$82,495	$27,222	$35,345	$5,327,418	$6,917,119
Indirect	$5,954	$7,731	$9,638	$12,514	$2,485,486	$3,227,156
Total	$107,618	$139,731	$49,566	$64,357	$10,454,648	$13,574,315
Business Revenue (1,000)	**$78,331**	**$101,704**	**$63,643**	**$82,633**	**$20,283,485**	**$26,336,077**
Local Purchases (1,000)	**$17,207**	**$22,342**	**$29,060**	**$37,731**	**$5,276,709**	**$6,851,280**
Taxes (1,000)						
Federal	$27,143	$35,242	$14,100	$18,308	$3,371,918	$4,378,099
State and Local	$14,780	$19,190	$6,377	$8,280	$1,272,166	$1,651,781
Total	$41,923	$54,432	$20,477	$26,588	$4,644,084	$6,029,879

EXHIBIT II-11
Economic Impacts by Province

	Ontario		Quebec		Total	
Tonnage Handled (1,000): Metric Tons (Short Tons)	**61,378 (67,657)**		**27,686 (30,519)**		**89,064 (98,176)**	
Jobs						
Direct Jobs	21,561		7,443		29,004	
Induced	28,904		7,571		36,475	
Indirect	20,182		4,743		24,925	
Total	70,647		19,757		90,404	
Economic Activity (1,000)	**US $**	**Cdn $**	**US $**	**Cdn $**	**US $**	**Cdn $**
	$7,700,224	$9,997,970	$1,686,706	$2,190,019	$9,386,930	$12,187,990
Personal Income (1,000)						
Direct	$842,378	$1,093,744	$312,184	$405,340	$1,154,563	$1,499,084
Re-Spending/Local Consumption	$1,276,372	$1,657,241	$274,328	$356,187	$1,550,700	$2,013,429
Indirect	$877,836	$1,139,782	$191,664	$248,856	$1,069,500	$1,388,639
Total	$2,996,586	$3,890,768	$778,176	$1,010,384	$3,774,762	$4,901,151
Business Revenue (1,000)	$6,423,852	$8,340,729	$1,412,378	$1,833,832	$7,836,230	$10,174,561
Local Purchases (1,000)	$2,181,105	$2,831,947	$512,846	$665,880	$2,693,951	$3,497,827
Taxes (1,000)						
Federal	$924,744	$1,200,688	$231,958	$301,175	$1,156,702	$1,501,862
Provincial and Local	$564,274	$732,653	$239,549	$311,030	$803,823	$1,043,684
Total	$1,489,018	$1,933,341	$471,507	$612,205	$1,960,525	$2,545,546

7. IMPACTS BY VESSEL FLAG

This section presents economic impacts by vessel operator category. Cargo moves to and from U.S. and Canadian Great Lakes-Seaway system ports/marine terminals on Canadian flag vessels, U.S. flag vessels and foreign flag vessels. Due to the carriage laws in place for each country, Canadian flag vessels move cargo to and from Canadian ports, while U.S. flag vessels move cargo to and from U.S. ports.

The Canadian flag and U.S. flag vessels also 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.

Based on the detailed commodity flow data collected for this study, 83.5 million metric tons (92.1 million short tons) were moved on U.S. flag vessels; 48.5 million metric tons (53.4 million short tons) moved on Canadian flag vessels. 11.5 metric tons (12.7 million short tons) were moved on foreign flag vessels.

In terms of value of cargo moved by flag, U.S. Flag carriers moved US$5.3 billion (Cdn$6.9 billion), Canadian flag carriers moved US$5.9 billion (Cdn$7.6 billion), and foreign flag carriers US$5.8 billion (Cdn$7.4 billion).

It is estimated that 167.5 million metric tons (184.7 million short tons) of cargo were handled at Great Lakes-Seaway ports and marine terminals associated with transportation by U.S.-flag vessels, and 95.4 million metric tons (105.1 million short tons) of cargo were handled at Great Lakes-Seaway ports and marine terminals associated with transportation by Canadian-flag vessels. Additionally, it is estimated that 21.5 million metric tons (23.6 million short tons) of cargo were handled at Great Lakes ports and marine terminals associated with transportation by foreign flag vessels.

Exhibits II-12 through **II-28** summarize the economic impacts of cargo handled by flag on the Great Lakes-St. Lawrence Seaway System. These tables show impacts at the bi-national regional level, by country, by state/province, by commodity and by job category.

EXHIBIT II-12
Economic Impacts by Flag of Carriage – Regional Level

	Canadian Flag		U.S. Flag		Foreign Flag		Total	
Jobs								
Direct Jobs	28,498		39,522		10,380		78,400	
Induced	33,530		35,746		11,066		80,343	
Indirect	27,264		42,838		9,024		79,126	
Total	89,292		118,106		30,471		237,868	
	US $	**Cdn $**	**US $**	**Cdn $**	**US $**	**Cdn $**	**US $**	**Cdn $**
Economic Activity (1,000)	$11,052,311	$14,350,321	$20,892,882	$27,127,318	$3,052,640	$3,963,548	$34,997,833	$45,441,186
Personal Income (1,000)								
Direct	$1,192,780	$1,548,706	$2,137,528	$2,775,366	$465,998	$605,052	$3,796,306	$4,929,124
Re-Spending/ Local Consumption	$1,843,133	$2,393,124	$4,294,015	$5,575,349	$740,970	$962,076	$6,878,118	$8,930,548
Indirect	$1,196,511	$1,553,549	$1,960,454	$2,545,453	$398,022	$516,792	$3,554,986	$4,615,794
Total	$4,232,424	$5,495,379	$8,391,996	$10,896,168	$1,604,990	$2,083,919	$14,229,410	$18,475,466
Business Revenue (1,000)	$9,209,179	$11,957,197	$16,598,867	$21,551,969	$2,311,670	$3,001,472	$28,119,715	$36,510,639
Local Purchases (1,000)	$2,863,736	$3,718,275	$4,184,789	$5,433,530	$922,136	$1,197,302	$7,970,661	$10,349,106
Taxes (1,000)								
Federal	$1,338,302	$1,737,652	$2,722,903	$3,535,417	$467,415	$606,892	$4,528,620	$5,879,961
State/Provincial and Local	$776,507	$1,008,217	$1,028,410	$1,335,288	$271,071	$351,959	$2,075,989	$2,695,464
Total	$2,114,810	$2,745,869	$3,751,313	$4,870,705	$738,487	$958,851	$6,604,610	$8,575,425

EXHIBIT II-13
Economic Impacts by Canadian Flag – Country Level

Impacts	Canada		United States		Total	
Jobs						
Direct Jobs	21,939		6,559		28,498	
Induced	28,102		5,428		33,530	
Indirect	19,817		7,446		27,264	
Total	69,858		19,434		89,292	
	US $	**Cdn $**	**US $**	**Cdn $**	**US $**	**Cdn $**
Economic Activity (1,000)	$7,837,232	$10,175,862	$3,215,079	$4,174,459	$11,052,311	$14,350,321
Personal Income (1,000)						
Direct	$869,349	$1,128,762	$323,432	$419,944	$1,192,780	$1,548,706
Re-Spending/Local Consumption	$1,203,089	$1,562,091	$640,043	$831,032	$1,843,133	$2,393,124
Indirect	$855,856	$1,111,244	$340,654	$442,306	$1,196,511	$1,553,549
Total	$2,928,294	$3,802,097	$1,304,130	$1,693,282	$4,232,424	$5,495,379
Business Revenue (1,000)	$6,634,143	$8,613,771	$2,575,036	$3,343,427	$9,209,179	$11,957,197
Local Purchases (1,000)	$2,135,517	$2,772,756	$728,218	$945,519	$2,863,736	$3,718,275
Taxes (1,000)						
Federal	$915,083	$1,188,144	$423,219	$549,508	$1,338,302	$1,737,652
State/Provincial and Local	$614,996	$798,511	$161,511	$209,707	$776,507	$1,008,217
Total	$1,530,079	$1,986,655	$584,731	$759,214	$2,114,810	$2,745,869

EXHIBIT II-14
Economic Impacts by U.S. Flag – Country Level

Impacts	Canada		United States		Total	
Jobs						
Direct Jobs	652		38,870		39,522	
Induced	832		34,914		35,746	
Indirect	728		42,110		42,838	
Total	2,212		115,894		118,106	
	US $	**Cdn $**	**US $**	**Cdn $**	**US $**	**Cdn $**
Economic Activity (1,000)	$225,623	$292,949	$20,667,259	$26,834,369	$20,892,882	$27,127,318
Personal Income (1,000)						
Direct	$24,875	$32,298	$2,112,652	$2,743,068	$2,137,528	$2,775,366
Re-Spending/Local Consumption	$36,108	$46,882	$4,257,907	$5,528,466	$4,294,015	$5,575,349
Indirect	$31,570	$40,991	$1,928,883	$2,504,462	$1,960,454	$2,545,453
Total	$92,553	$120,171	$8,299,443	$10,775,996	$8,391,996	$10,896,168
Business Revenue (1,000)	$189,516	$246,067	$16,409,352	$21,305,902	$16,598,867	$21,551,969
Local Purchases (1,000)	$78,651	$102,121	$4,106,138	$5,331,409	$4,184,789	$5,433,530
Taxes (1,000)						
Federal Taxes (1,000)	$28,277	$36,715	$2,694,625	$3,498,702	$2,722,903	$3,535,417
State/Provincial and Local	$18,050	$23,436	$1,010,361	$1,311,852	$1,028,410	$1,335,288
Total	$46,327	$60,151	$3,704,986	$4,810,554	$3,751,313	$4,870,705

EXHIBIT II-15
Economic Impacts by Foreign Flag – Country Level

Impacts	Canada		United States		Total	
Jobs						
Direct Jobs	6,414		3,966		10,380	
Induced	7,541		3,525		11,066	
Indirect	4,380		4,645		9,024	
Total	18,335		12,136		30,471	
	US $	**Cdn $**	**US $**	**Cdn $**	**US $**	**Cdn $**
Economic Activity (1,000)	$1,324,075	$1,719,179	$1,728,565	$2,244,369	$3,052,640	$3,963,548
Personal Income (1,000)						
Direct	$260,339	$338,024	$205,659	$267,028	$465,998	$605,052
Re-Spending/Local Consumption	$311,503	$404,455	$429,467	$557,620	$740,970	$962,076
Indirect	$182,073	$236,404	$215,949	$280,388	$398,022	$516,792
Total	$753,915	$978,883	$851,075	$1,105,036	$1,604,990	$2,083,919
Business Revenue (1,000)	$1,012,572	$1,314,724	$1,299,098	$1,686,748	$2,311,670	$3,001,472
Local Purchases (1,000)	$479,783	$622,950	$442,353	$574,352	$922,136	$1,197,302
Taxes (1,000)						
Federal Taxes (1,000)	$213,342	$277,003	$254,073	$329,889	$467,415	$606,892
State/Provincial and Local	$170,777	$221,737	$100,294	$130,222	$271,071	$351,959
Total	$384,119	$498,740	$354,368	$460,111	$738,487	$958,851

EXHIBIT II-16
Direct Jobs by Commodity and Flag – Regional Level

	Direct Jobs Canadian Flag	Direct Jobs US Flag	Direct Jobs Foreign Flag	Total
Steel	1,128	3,850	4,935	9,913
General Cargo	411	NA	76	487
Iron Ore	10,216	18,216	174	28,605
Grain	1,880	89	1,215	3,184
Stone/Aggregate	1,830	4,179	1	6,010
Cement	1,032	1,569	53	2,653
Salt	2,765	725	8	3,497
Other Dry Bulk	2,039	1,503	567	4,108
Liquid Bulk	2,311	2,278	814	5,403
Coal	990	2,829	1	3,820
Ferry	699	243	NA	942
Not Allocated	3,197	4,042	2,914	10,154
Total	**28,498**	**39,522**	**10,380**	**78,400**

Note: Containerized cargo is included in General Cargo category.

EXHIBIT II-17
Direct Jobs by Commodity and Flag – Country Level

	Canada				United States				
	Canadian Flag	US Flag	Foreign Flag	Total	Canadian Flag	US Flag	Foreign Flag	Total	Total
Steel	189	NA	1,347	1,536	940	3,850	3,210	7,999	9,913
General Cargo	291	NA	13	304	120	NA	63	184	487
Iron Ore	9,296	271	174	9,741	919	17,945	NA	18,864	28,605
Grain	1,657	NA	891	2,549	223	89	323	635	3,184
Stone/Aggregate	1,405	85	1	1,491	425	4,094	NA	4,519	6,010
Cement	671	28	36	735	361	1,540	17	1,918	2,653
Salt	1,820	23	4	1,847	945	701	4	1,650	3,497
Other Dry Bulk	1,251	31	456	1,738	788	1,471	111	2,371	4,108
Other Liquid Bulk	2,072	80	813	2,964	240	2,198	1	2,439	5,403
Coal	393	64	1	459	596	2,765	NA	3,361	3,820
Ferry	699	NA	NA	699	NA	243	NA	243	942
Not Allocated	2,195	70	2,677	4,942	1,002	3,973	237	5,212	10,154
Total	**21,939**	**652**	**6,414**	**29,004**	**6,559**	**38,870**	**3,966**	**49,395**	**78,400**

Note: Containerized cargo is included in General Cargo category.

EXHIBIT II-18
Direct Jobs by Category and Flag – Regional Level

	Canadian Flag	US Flag	Foreign Flag	Total
Surface Transportation				
Rail	648	1,212	244	2,103
Truck	5,310	5,498	3,176	13,984
Maritime Service				
Terminal Employees	3,048	5,426	1,274	9,748
Dockworkers	679	294	429	1,402
Tug Assists	324	387	118	829
Pilots*	NA	NA	185	185
Maritime Services/Agents	384	994	323	1,701
Forwarders	999	1,755	230	2,983
Government	588	1,144	128	1,859
Marine Equipment/Ship Repair	1,112	1,171	2,188	4,471
Laker	1,905	3,095	NA	5,000
Barge	452	656	167	1,274
Dependent Shippers/Consignees	12,401	17,781	1,661	31,843
Port Authority	649	109	258	1,017
Total	**28,498**	**39,522**	**10,380**	**78,400**

* All pilotage jobs have been allocated to foreign flag vessels. Canadian flag vessels, however, are also subject to compulsory pilotage requirements in the St. Lawrence and Great Lakes region. It was not possible to accurately allocate Canadian-flag pilotage impacts due to lack of information as to duration of time pilots spend on these transits versus foreign-flag transits.

EXHIBIT II-19
Direct Jobs Impacts by Category and Flag – Country Level

	Canada				United States				
	Canadian Flag	US Flag	Foreign Flag	Total	Canadian Flag	US Flag	Foreign Flag	Total	Total
Surface Transportation									
Rail	349	8	88	445	299	1,204	156	1,658	2,103
Truck	3,704	110	1,632	5,446	1,606	5,388	1,544	8,538	13,984
Maritime Service									
Terminal Employees	1,888	92	793	2,773	1,160	5,334	481	6,975	9,748
Dockworkers	517	13	169	699	163	280	260	703	1,402
Tug Assists	241	8	87	336	83	379	31	493	829
Pilots*	NA	NA	147	147	NA	NA	38	38	185
Maritime Services/Agents	195	5	221	421	189	989	102	1,280	1,701
Forwarders	717	27	188	933	281	1,728	41	2,050	2,983
Government	412	15	103	530	175	1,129	25	1,330	1,859
Marine Equipment/Ship Repair	735	30	2,149	2,914	377	1,141	39	1,557	4,471
Laker	1,188	45	6	1,238	717	3,050	NA	3,767	5,006
Barge	332	9	126	468	120	647	40	807	1,274
Dependent Shippers/Consignees	11,140	279	497	11,915	1,261	17,503	1,164	19,927	31,843
Port Authority	520	11	208	740	129	98	44	272	1,011
Total	**21,939**	**652**	**6,414**	**29,004**	**6,559**	**38,870**	**3,966**	**49,395**	**78,400**

* All pilotage jobs have been allocated to foreign flag vessels. Canadian flag vessels, however, are also subject to compulsory pilotage requirements in the St. Lawrence and Great Lakes region. It was not possible to accurately allocate Canadian-flag pilotage impacts due to lack of information as to duration of time pilots spend on these transits versus foreign-flag transits.

EXHIBIT II-20
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
Surface Transportation								
Rail	$1,039.2	$1,349.3	$2,308.8	$2,997.8	$322.9	$419.3	$3,671.0	$4,766.4
Truck	$455.5	$591.4	$499.7	$648.8	$306.2	$397.5	$1,261.4	$1,637.8
Maritime Service								
Terminal Employees	$442.1	$574.0	$654.3	$849.6	$124.7	$161.9	$1,221.1	$1,585.4
Tug Assists	$28.3	$36.8	$38.8	$50.4	$8.7	$11.3	$75.8	$98.4
Pilots*	$0.0	$0.0	$0.0	$0.0	$58.0	$75.3	$58.0	$75.3
Maritime Services/Agents	$133.4	$173.3	$265.9	$345.3	$92.0	$119.4	$491.3	$638.0
Forwarders	$148.9	$193.3	$312.2	$405.4	$33.3	$43.2	$494.4	$641.9
Marine Equipment/Ship Repair	$174.8	$227.0	$260.9	$338.7	$184.8	$239.9	$620.5	$805.6
Laker	$770.0	$999.7	$1,663.8	$2,160.3	$0.0	$0.0	$2,433.8	$3,160.1
Barge	$66.9	$86.9	$106.4	$138.1	$25.8	$33.5	$199.1	$258.5
Dependent Shippers/Consignees	$5,838.4	$7,580.6	$10,456.9	$13,577.2	$1,116.5	$1,449.7	$17,411.8	$22,607.5
Port Authority	$111.7	$145.0	$31.1	$40.4	$38.8	$50.4	$181.7	$235.9
Total	**$9,209.2**	**$11,957.2**	**$16,598.9**	**$21,552.0**	**$2,311.7**	**$3,001.5**	**$28,119.7**	**$36,510.6**

* All pilotage revenue impacts have been allocated to foreign flag vessels. Canadian flag vessels, however, are also subject to compulsory pilotage requirements in the St. Lawrence and Great Lakes region. It was not possible to accurately allocate Canadian-flag pilotage impacts due to lack of information as to duration of time pilots spend on these transits versus foreign-flag transits.

EXHIBIT II-21
Revenue Impact by Category and Flag – Canada

	Canadian Flag		US Flag		Foreign Flag		Total Canada	
	Millions US	Millions Cdn	Millions US	Millions Cdn	Millions US	Millions Cdn	Millions US	Millions Cdn
Surface Transportation								
Rail	$477.8	$620.3	$23.1	$30.0	$186.0	$241.4	$686.8	$891.8
Truck	$292.9	$380.3	$8.8	$11.5	$119.1	$154.6	$420.8	$546.4
Maritime Service								
Terminal Employees	$323.0	$419.3	$10.0	$12.9	$86.0	$111.6	$418.9	$543.9
Tug Assists	$18.3	$23.8	$0.7	$0.9	$5.8	$7.5	$24.8	$32.2
Pilots*	$0.0	$0.0	$0.0	$0.0	$43.4	$56.3	$43.4	$56.3
Maritime Services/Agents	$80.2	$104.1	$2.7	$3.5	$73.8	$95.8	$156.7	$203.4
Forwarders	$98.6	$128.1	$3.7	$4.8	$25.9	$33.7	$128.3	$166.6
Marine Equipment/Ship Repair	$123.0	$159.8	$6.1	$7.9	$177.8	$230.9	$306.9	$398.5
Laker	$505.0	$655.6	$17.9	$23.2	$1.5	$2.0	$524.3	$680.8
Barge	$47.6	$61.9	$1.3	$1.7	$17.6	$22.8	$66.5	$86.4
Dependent Shippers/Consignees	$4,582.7	$5,950.1	$113.5	$147.3	$244.3	$317.2	$4,940.4	$6,414.7
Port Authority	$85.1	$110.5	$1.8	$2.3	$31.5	$40.9	$118.4	$153.7
Total	**$6,634.1**	**$8,613.8**	**$189.5**	**$246.1**	**$1,012.6**	**$1,314.7**	**$7,836.2**	**$10,174.6**

* All pilotage revenue impacts have been allocated to foreign flag vessels. Canadian flag vessels, however, are also subject to compulsory pilotage requirements in the St. Lawrence and Great Lakes region. It was not possible to accurately allocate Canadian-flag pilotage impacts due to lack of information as to duration of time pilots spend on these transits versus foreign-flag transits.

EXHIBIT II-22
Revenue Impact by Category and Flag – United States

	Canadian Flag		US Flag		Foreign Flag		Total US	
	Millions US	Millions Cdn	Millions US	Millions Cdn	Millions US	Millions Cdn	Millions US	Millions Cdn
Surface Transportation								
Rail	$561.4	$728.9	$2,285.7	$2,967.8	$137.0	$177.9	$2,984.1	$3,874.56
Truck	$162.6	$211.1	$490.8	$637.3	$187.1	$242.9	$840.5	$1,091.35
Maritime Service								
Terminal Employees	$119.2	$154.7	$644.3	$836.6	$38.7	$50.2	$802.2	$1,041.56
Tug Assists	$10.0	$13.0	$38.1	$49.5	$2.9	$3.7	$51.0	$66.28
Pilots*	$0.0	$0.0	$0.0	$0.0	$14.6	$19.0	$14.6	$18.95
Maritime Services/Agents	$53.3	$69.2	$263.2	$341.7	$18.2	$23.6	$334.7	$434.54
Forwarders	$50.2	$65.2	$308.5	$400.6	$7.4	$9.5	$366.1	$475.33
Marine Equipment/Ship Repair	$51.8	$67.2	$254.8	$330.9	$7.0	$9.0	$313.6	$407.12
Laker	$265.0	$344.1	$1,646.0	$2,137.1	$0.0	$0.0	$1,911.0	$2,481.21
Barge	$19.3	$25.0	$105.1	$136.4	$6.7	$8.7	$131.1	$170.20
Dependent Shippers/Consignees	$1,255.7	$1,630.5	$10,343.4	$13,429.9	$872.2	$1,132.5	$12,471.3	$16,192.80
Port Authority	$26.6	$34.5	$29.4	$38.1	$7.4	$9.6	$63.3	$82.17
Total	**$2,575.0**	**$3,343.4**	**$16,409.4**	**$21,305.9**	**$1,299.1**	**$1,686.7**	**$20,283.5**	**$26,336.08**

* All pilotage revenue impacts have been allocated to foreign flag vessels. Canadian flag vessels, however, are also subject to compulsory pilotage requirements in the St. Lawrence and Great Lakes region. It was not possible to accurately allocate Canadian-flag pilotage impacts due to lack of information as to duration of time pilots spend on these transits versus foreign-flag transits.

EXHIBIT II-23
Economic Impacts by State – Cargo on Canadian Flag Vessels

	Indiana		Ohio		Michigan	
Tonnage Handled (1,000): Metric Tons (Short Tons)	**1,287 (1,419)**		**8,046 (8,869)**		**5,987 (6,600)**	
Jobs						
Direct Jobs	1,698		1,767		1,339	
Induced	1,631		1,494		934	
Indirect	2,367		3,209		904	
Total	5,696		6,470		3,177	
	US $	**Cdn $**	**US $**	**Cdn $**	**US $**	**Cdn $**
Economic Activity (1,000)	$1,628,285	$2,114,165	$582,795	$756,701	$312,256	$405,434
Personal Income (1,000)						
Direct	$99,881	$129,686	$81,027	$105,205	$58,900	$76,476
Re-Spending/Local Consumption	$202,869	$263,405	$174,872	$227,053	$106,067	$137,718
Indirect	$109,015	$141,545	$148,812	$193,218	$38,042	$49,394
Total	$411,765	$534,635	$404,711	$525,476	$203,009	$263,588
Business Revenue (1,000)	$1,425,416	$1,850,760	$407,923	$529,647	$206,189	$267,716
Local Purchases (1,000)	$226,646	$294,277	$298,656	$387,775	$97,468	$126,552
Taxes (1,000)						
Federal	$169,145	$219,618	$108,649	$141,070	$54,591	$70,881
State and Local	$59,073	$76,701	$39,662	$51,497	$21,557	$27,990
Total	$228,218	$296,319	$148,310	$192,566	$76,148	$98,871

EXHIBIT II-23 Continued

	Minnesota		Illinois		Wisconsin	
Tonnage Handled (1,000): Metric Tons (Short Tons)	**3,577 (3,943)**		**728 (803)**		**6,599 (7,275)**	
Jobs						
Direct Jobs	282		237		801	
Induced	242		212		571	
Indirect	321		70		479	
Total	845		519		1,851	
	US $	**Cdn $**	**US $**	**Cdn $**	**US $**	**Cdn $**
Economic Activity (1,000)	$171,426	$222,579	$61,276	$79,560	$361,421	$469,269
Personal Income (1,000)						
Direct	$13,007	$16,888	$10,421	$13,530	$36,056	$46,814
Re-Spending/Local Consumption	$27,962	$36,306	$27,503	$35,710	$60,043	$77,960
Indirect	$15,122	$19,634	$3,664	$4,757	$21,320	$27,682
Total	$56,091	$72,829	$41,587	$53,997	$117,419	$152,456
Business Revenue (1,000)	$143,463	$186,273	$33,773	$43,850	$301,378	$391,309
Local Purchases (1,000)	$33,341	$43,290	$7,078	$9,190	$51,407	$66,747
Taxes (1,000)						
Federal	$20,100	$26,098	$10,692	$13,883	$42,138	$54,712
State and Local	$8,870	$11,516	$5,098	$6,619	$17,678	$22,953
Total	$28,970	$37,614	$15,790	$20,502	$59,816	$77,665

EXHIBIT II-23 Continued

	New York		Pennsylvania		Total US	
Tonnage Handled (1,000): Metric Tons (Short Tons)	**586 (646)**		**52 (57)**		**26,864 (29,612)**	
Jobs						
Direct Jobs	412		24		6,559	
Induced	326		19		5,428	
Indirect	76		20		7,446	
Total	814		63		19,434	
	US $	**Cdn $**	**US $**	**Cdn $**	**US $**	**Cdn $**
Economic Activity (1,000)	$89,956	$116,799	$7,665	$9,952	$3,215,079	$4,174,459
Personal Income (1,000)						
Direct	$23,093	$29,984	$1,048	$1,361	$323,432	$419,944
Re-Spending/Local Consumption	$38,482	$49,965	$2,246	$2,916	$640,043	$831,032
Indirect	$3,882	$5,041	$797	$1,035	$340,654	$442,306
Total	$65,457	$84,989	$4,091	$5,312	$1,304,130	$1,693,282
Business Revenue (1,000)	$51,474	$66,834	$5,419	$7,037	$2,575,036	$3,343,427
Local Purchases (1,000)	$11,219	$14,567	$2,404	$3,121	$728,218	$945,519
Taxes (1,000)						
Federal	$16,731	$21,724	$1,173	$1,524	$423,219	$549,508
State and Local	$9,044	$11,743	$530	$688	$161,511	$209,707
Total	$25,775	$33,467	$1,703	$2,211	$584,731	$759,214

EXHIBIT II-24
Economic Impacts by Province – Cargo on Canadian Flag Vessels

	Ontario		Quebec		Total	
Tonnage Handled (1,000): Metric Tons (Short Tons)	**52,311 (57,663)**		**16,176 (17,831)**		**68,487 (75,494)**	
Jobs						
Direct Jobs	17,913		4,026		21,939	
Induced	23,960		4,141		28,102	
Indirect	16,951		2,866		19,817	
Total	58,825		11,033		69,858	
	US $	**Cdn $**	**US $**	**Cdn $**	**US $**	**Cdn $**
Economic Activity (1,000)	$6,786,850	$8,812,046	$1,050,382	$1,363,816	$7,837,232	$10,175,862
Personal Income (1,000)						
Direct	$697,897	$906,150	$171,452	$222,613	$869,349	$1,128,762
Re-Spending/Local Consumption	$1,057,454	$1,372,998	$145,636	$189,093	$1,203,089	$1,562,091
Indirect	$737,746	$957,889	$118,111	$153,355	$855,856	$1,111,244
Total	$2,493,096	$3,237,036	$435,198	$565,061	$2,928,294	$3,802,097
Business Revenue (1,000)	$5,729,396	$7,439,048	$904,747	$1,174,723	$6,634,143	$8,613,771
Local Purchases (1,000)	$1,831,120	$2,377,526	$304,397	$395,229	$2,135,517	$2,772,756
Taxes (1,000)						
Federal	$781,684	$1,014,938	$133,399	$173,206	$915,083	$1,188,144
Provincial and Local	$478,316	$621,046	$136,679	$177,465	$614,996	$798,511
Total	$1,260,000	$1,635,984	$270,079	$350,670	$1,530,079	$1,986,655

EXHIBIT II-25
Economic Impacts by State – Cargo on U.S. Flag Vessels

	Indiana		Ohio		Michigan	
Tonnage Handled (1,000): Metric Tons (Short Tons)	**25,307 (27,896)**		**30,373 (33,481)**		**52,627 (58,011)**	
Jobs						
Direct Jobs	15,817		6,688		9,657	
Induced	15,969		6,268		7,224	
Indirect	22,048		10,595		5,499	
Total	53,834		23,551		22,380	
	US $	**Cdn $**	**US $**	**Cdn $**	**US $**	**Cdn $**
Economic Activity (1,000)	$10,866,634	$14,109,238	$2,923,291	$3,795,601	$3,820,280	$4,960,252
Personal Income (1,000)						
Direct	$991,240	$1,287,026	$351,502	$456,390	$468,955	$608,892
Re-Spending/Local Consumption	$2,013,307	$2,614,078	$758,612	$984,982	$844,495	$1,096,492
Indirect	$1,015,242	$1,318,190	$494,917	$642,600	$233,143	$302,713
Total	$4,019,789	$5,219,294	$1,605,031	$2,083,972	$1,546,593	$2,008,096
Business Revenue (1,000)	$8,853,327	$11,495,160	$2,164,679	$2,810,619	$2,975,785	$3,863,760
Local Purchases (1,000)	$2,110,726	$2,740,567	$983,835	$1,277,411	$590,964	$767,308
Taxes (1,000)						
Federal	$1,357,649	$1,762,771	$462,608	$600,650	$497,380	$645,798
State and Local	$505,827	$656,765	$157,293	$204,229	$181,089	$235,126
Total	$1,863,475	$2,419,536	$619,901	$804,879	$678,469	$880,924

EXHIBIT II-25 Continued

	Minnesota		Illinois		Wisconsin	
Tonnage Handled (1,000): Metric Tons (Short Tons)	**27,429 (30,235)**		**8,834 (9,737)**		**19,476 (21,468)**	
Jobs						
Direct Jobs	1,822		2,225		2,153	
Induced	1,539		1,983		1,547	
Indirect	1,682		667		1,365	
Total	5,044		4,876		5,064	
	US $	**Cdn $**	**US $**	**Cdn $**	**US $**	**Cdn $**
Economic Activity (1,000)	$1,295,250	$1,681,753	$635,859	$825,599	$1,001,861	$1,300,816
Personal Income (1,000)						
Direct	$82,373	$106,953	$97,363	$126,416	$98,009	$127,255
Re-Spending/Local Consumption	$177,086	$229,928	$256,969	$333,649	$163,215	$211,918
Indirect	$79,308	$102,974	$34,908	$45,325	$60,728	$78,849
Total	$338,767	$439,855	$389,240	$505,390	$321,952	$418,022
Business Revenue (1,000)	$1,118,164	$1,451,825	$378,890	$491,950	$838,646	$1,088,898
Local Purchases (1,000)	$175,387	$227,722	$67,579	$87,744	$145,799	$189,305
Taxes (1,000)						
Federal	$135,995	$176,575	$103,716	$134,665	$116,251	$150,941
State and Local	$58,503	$75,960	$48,689	$63,218	$48,665	$63,187
Total	$194,497	$252,536	$152,405	$197,883	$164,917	$214,128

EXHIBIT II-25 Continued

	New York		Pennsylvania		Total US	
Tonnage Handled (1,000): Metric Tons (Short Tons)	**374 (412)**		**551 (608)**		**164,971 (181,848)**	
Jobs						
Direct Jobs	242		267		38,870	
Induced	174		210		34,914	
Indirect	35		217		42,110	
Total	451		694		115,894	
	US $	**Cdn $**	**US $**	**Cdn $**	**US $**	**Cdn $**
Economic Activity (1,000)	$40,914	$53,123	$83,170	$107,988	$20,667,259	$26,834,369
Personal Income (1,000)						
Direct	$11,556	$15,004	$11,654	$15,132	$2,112,652	$2,743,068
Re-Spending/Local Consumption	$19,256	$25,002	$24,967	$32,418	$4,257,907	$5,528,466
Indirect	$1,800	$2,337	$8,838	$11,475	$1,928,883	$2,504,462
Total	$32,612	$42,343	$45,460	$59,025	$8,299,443	$10,775,996
Business Revenue (1,000)	$21,658	$28,120	$58,203	$75,570	$16,409,352	$21,305,902
Local Purchases (1,000)	$5,201	$6,753	$26,647	$34,598	$4,106,138	$5,331,409
Taxes (1,000)						
Federal	$8,105	$10,523	$12,922	$16,778	$2,694,625	$3,498,702
State and Local	$4,449	$5,777	$5,845	$7,589	$1,010,361	$1,311,852
Total	$12,554	$16,300	$18,768	$24,368	$3,704,986	$4,810,554

EXHIBIT II-26
Economic Impacts by Province – Cargo on U.S. Flag Vessels

	Ontario		Quebec		Total	
Tonnage Handled (1,000): Metric Tons (Short Tons)	**2,124 (2,341)**		**453 (499)**		**2,577 (2,840)**	
Jobs						
Direct Jobs	583		69		652	
Induced	767		66		832	
Indirect	692		35		728	
Total	2,042		170		2,212	
	US $	**Cdn $**	**US $**	**Cdn $**	**US $**	**Cdn $**
Economic Activity (1,000)	$198,331	$257,513	$27,292	$35,436	$225,623	$292,949
Personal Income (1,000)						
Direct	$22,238	$28,874	$2,637	$3,424	$24,875	$32,298
Re-Spending/Local Consumption	$33,695	$43,749	$2,413	$3,133	$36,108	$46,882
Indirect	$30,183	$39,189	$1,388	$1,802	$31,570	$40,991
Total	$86,115	$111,812	$6,438	$8,359	$92,553	$120,171
Business Revenue (1,000)	$164,637	$213,764	$24,879	$32,303	$189,516	$246,067
Local Purchases (1,000)	$74,707	$97,000	$3,944	$5,121	$78,651	$102,121
Taxes (1,000)						
Federal	$25,936	$33,675	$2,341	$3,040	$28,277	$36,715
Provincial and Local	$15,757	$20,458	$2,293	$2,977	$18,050	$23,436
Total	$41,693	$54,134	$4,634	$6,017	$46,327	$60,151

EXHIBIT II-27
Economic Impacts by State – Cargo on Foreign Flag Vessels

	Indiana		Ohio		Michigan	
Tonnage Handled (1,000): Metric Tons (Short Tons)	**392 (432)**		**1,180 (1,300)**		**399 (440)**	
Jobs						
Direct Jobs	2,003		943		185	
Induced	1,833		787		136	
Indirect	2,792		1,417		32	
Total	6,628		3,148		353	
	US $	**Cdn $**	**US $**	**Cdn $**	**US $**	**Cdn $**
Economic Activity (1,000)	$1,231,767	$1,599,326	$239,113	$310,465	$28,177	$36,584
Personal Income (1,000)						
Direct	$110,786	$143,845	$42,500	$55,182	$8,776	$11,394
Re-Spending/Local Consumption	$225,018	$292,163	$91,723	$119,093	$15,803	$20,519
Indirect	$128,554	$166,914	$66,871	$86,825	$1,102	$1,431
Total	$464,358	$602,922	$201,094	$261,100	$25,681	$33,344
Business Revenue (1,000)	$1,006,749	$1,307,163	$147,390	$191,372	$12,374	$16,066
Local Purchases (1,000)	$267,268	$347,021	$129,232	$167,795	$3,735	$4,849
Taxes (1,000)						
Federal	$155,907	$202,429	$50,778	$65,931	$6,111	$7,934
State and Local	$58,208	$75,578	$19,707	$25,588	$2,562	$3,327
Total	$214,115	$278,007	$70,485	$91,518	$8,673	$11,261

EXHIBIT II-27 Continued

	Minnesota		Illinois		Wisconsin	
Tonnage Handled (1,000): Metric Tons (Short Tons)	**224 (247)**		**727 (802)**		**1,011 (1,114)**	
Jobs						
Direct Jobs	72		481		245	
Induced	70		458		198	
Indirect	130		142		126	
Total	272		1,082		569	
	US $	**Cdn $**	**US $**	**Cdn $**	**US $**	**Cdn $**
Economic Activity (1,000)	$17,091	$22,191	$133,774	$173,692	$67,619	$87,796
Personal Income (1,000)						
Direct	$3,953	$5,133	$22,997	$29,860	$13,164	$17,092
Re-Spending/Local Consumption	$8,498	$11,034	$60,697	$78,809	$21,922	$28,463
Indirect	$6,098	$7,918	$7,442	$9,663	$5,606	$7,278
Total	$18,550	$24,085	$91,136	$118,331	$40,691	$52,834
Business Revenue (1,000)	$8,592	$11,156	$73,077	$94,883	$45,697	$59,333
Local Purchases (1,000)	$13,321	$17,295	$14,376	$18,665	$13,627	$17,693
Taxes (1,000)						
Federal	$4,394	$5,705	$23,377	$30,353	$11,196	$14,536
State and Local	$2,172	$2,820	$11,158	$14,487	$5,198	$6,749
Total	$6,566	$8,525	$34,535	$44,840	$16,394	$21,285

EXHIBIT II-27 Continued

	New York		Pennsylvania		Total US	
Tonnage Handled (1,000): Metric Tons (Short Tons)	**0 (0)***		**0 (0)****		**3,933 (4,335)**	
Jobs						
Direct Jobs	37		0		3,966	
Induced	42		0		3,525	
Indirect	5		0		4,645	
Total	84		0		12,136	
	US $	**Cdn $**	**US $**	**Cdn $**	**US $**	**Cdn $**
Economic Activity (1,000)	$10,996	$14,278	$29	$38	$1,728,565	$2,244,369
Personal Income (1,000)						
Direct	$3,479	$4,518	$4	$5	$205,659	$267,028
Re-Spending/Local Consumption	$5,798	$7,528	$9	$11	$429,467	$557,620
Indirect	$272	$354	$3	$4	$215,949	$280,388
Total	$9,550	$12,399	$16	$20	$851,075	$1,105,036
Business Revenue (1,000)	$5,198	$6,750	$20	$26	$1,299,098	$1,686,748
Local Purchases (1,000)	$787	$1,022	$9	$12	$442,353	$574,352
Taxes (1,000)						
Federal	$2,307	$2,995	$4	$6	$254,073	$329,889
State and Local	$1,287	$1,671	$2	$3	$100,294	$130,222
Total	$3,594	$4,666	$7	$8	$354,368	$460,111

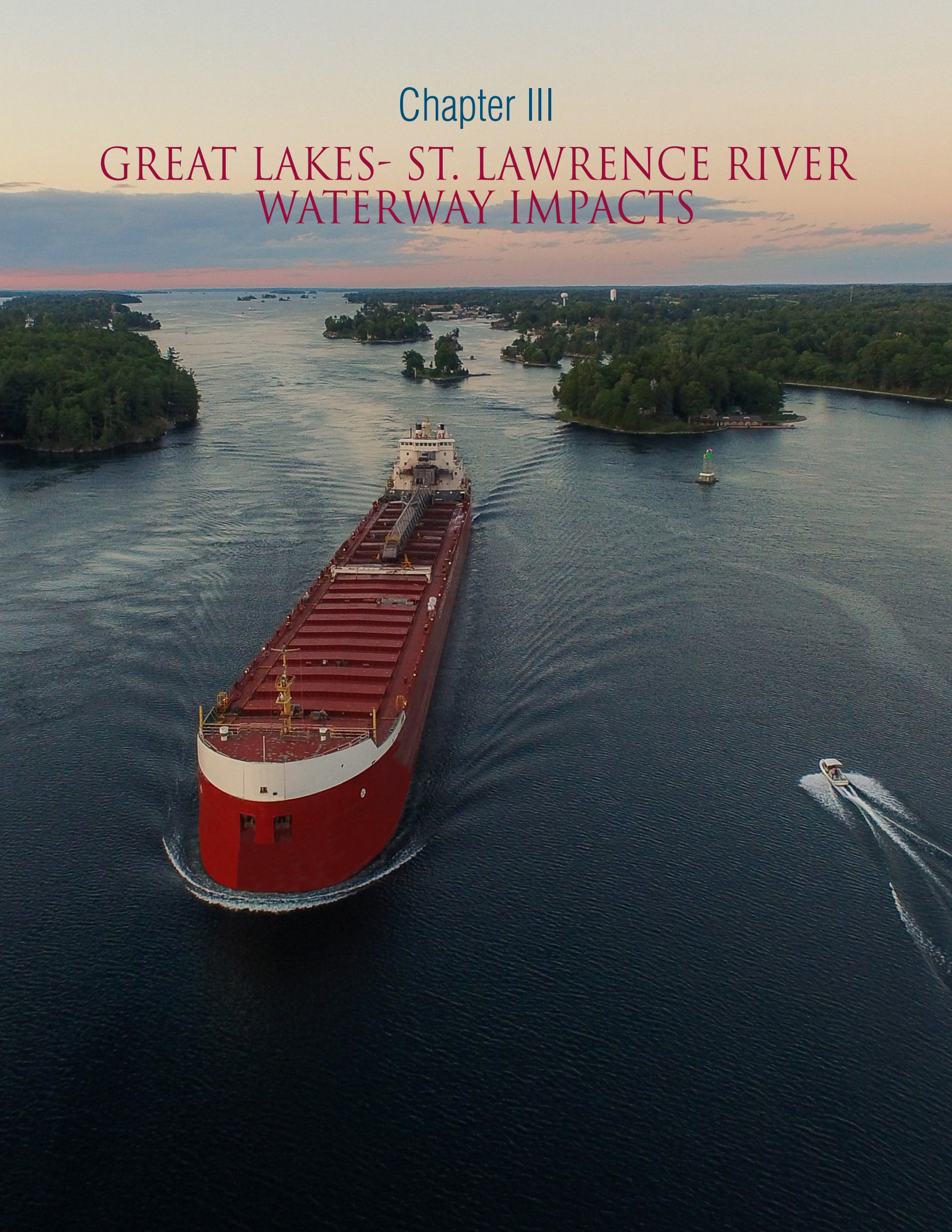
* New York state jobs and other economic impacts are related to St. Lawrence Seaway management and lock maintenance.
** Pennsylvania tonnage appears as 0 because it is less than 1,000 metric tons.

EXHIBIT II-28
Economic Impacts by Province – Cargo on Foreign Flag Vessels

	Ontario		Quebec		Total	
Tonnage Handled (1,000): Metric Tons (Short Tons)	**6,943 (7,653)**		**11,057 (12,188)**		**18,000 (19,842)**	
Jobs						
Direct Jobs	3,065		3,349		6,414	
Induced	4,177		3,368		7,545	
Indirect	2,538		1,842		4,380	
Total	9,780		8,559		18,339	
	US $	**Cdn $**	**US $**	**Cdn $**	**US $**	**Cdn $**
Economic Activity (1,000)	$715,043	$928,412	$609,230	$791,025	$1,324,273	$1,719,436
Personal Income (1,000)						
Direct	$122,244	$158,721	$138,312	$179,584	$260,555	$338,305
Re-Spending/Local Consumption	$185,223	$240,494	$126,478	$164,218	$311,701	$404,713
Indirect	$109,908	$142,704	$72,166	$93,700	$182,073	$236,404
Total	$417,374	$541,919	$336,955	$437,502	$754,330	$979,421
Business Revenue (1,000)	$529,819	$687,917	$482,753	$626,806	$1,012,572	$1,314,724
Local Purchases (1,000)	$275,278	$357,421	$204,505	$265,529	$479,783	$622,950
Taxes (1,000)						
Federal	$117,124	$152,074	$96,317	$125,058	$213,441	$277,132
Provincial and Local	$70,201	$91,149	$100,686	$130,731	$170,887	$221,880
Total	$187,325	$243,223	$197,003	$255,789	$384,328	$499,012

Chapter III

GREAT LAKES- ST. LAWRENCE RIVER WATERWAY IMPACTS



Chapter III

GREAT LAKES-ST. LAWRENCE RIVER WATERWAY IMPACTS

This chapter organizes the study results with a broader perspective that includes impacts of all domestic and international cargo moving on the Great Lakes, its connecting rivers, the St. Lawrence Seaway and the Lower St. Lawrence River.

This perspective is particularly relevant to Canadian stakeholders in that all Quebec impacts along the St. Lawrence are included in this chapter.

The impacts are measured for the year 2017 and are presented in terms of total economic impacts at the bi-national regional level, the country level, and the state/provincial level. The impacts are also presented by flag of vessel carriage.

GREAT LAKES-ST. LAWRENCE RIVER WATERWAY

TOTAL CARGO VOLUMES

In 2017, a total of **230.9 million metric tons of cargo (254.6 million short tons)** moved through the Great Lakes-St. Lawrence River Waterway. This tonnage volume represents **US$77.4 billion (Cdn$100.5 billion)** of cargo value.

A majority of the domestic cargo moving on Canadian and U.S. flag vessels remains in the Great Lakes-St. Lawrence waterway. This cargo is loaded and unloaded at ports within the system, creating economic impacts at the loading port as well as the port of discharge. This tonnage "handled" represents shipment and receipts of domestic cargo and trans-lake cargo, and is significantly greater than the tonnage of cargo "moving" on the waterway. The actual tons handled at the ports were **381 million metric tons (420 million short tons)**.

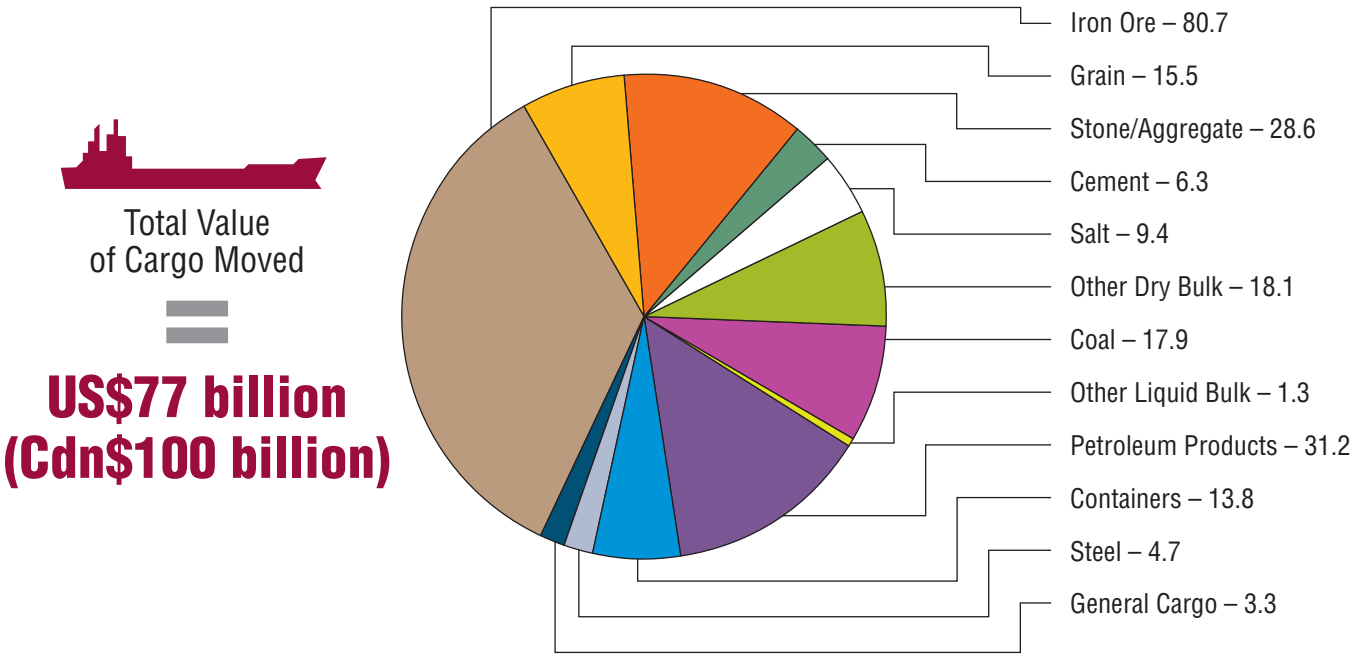
This activity created a range of economic impacts (described below) in the region — defined as the states of Minnesota, Wisconsin, Illinois, Indiana, Michigan, Ohio, Pennsylvania, and New York, and the Canadian provinces of Ontario and Quebec.

EXHIBIT III-1
Great Lakes-St. Lawrence River Waterway

2017	Tonnage Moved (1,000 metric tons)	Cargo Value Millions US	Cargo Value Millions Cdn
Containers	13,819	$47,563	$61,756
Steel	4,716	$3,092	$4,015
General Cargo	3,297	$3,118	$4,049
Iron Ore	80,734	$3,622	$4,702
Grain	15,531	$4,272	$5,546
Stone/Aggregate	28,568	$256	$332
Cement	6,287	$679	$882
Salt	9,416	$265	$343
Other Dry Bulk	18,110	$362	$470
Coal	17,923	$1,286	$1,670
Other Liquid Bulk	1,315	$522	$678
Petroleum Products	31,225	$12,391	$16,089
Total	**230,940**	**$77,429**	**$100,534**

Great Lakes-St. Lawrence River Waterway

Breakdown of Cargo Type Moved (million metric tons, 2017)



1. TOTAL ECONOMIC IMPACTS

Exhibit III-2 summarizes the economic impacts of all cargo handled by the ports on the Great Lakes-St. Lawrence River waterway. 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 US$1.00 = Cdn$1.2984. The exchange rate reflects the annual average for 2017, as of December 31, 2017, and is sourced from "The Board of Governors of the Federal Reserve System Data Download Program."

328,543 jobs in Canada and the United States are generated by the cargo handled at the marine terminals located on the Great Lakes-St. Lawrence River Waterway.

Of the 328,543 jobs, 105,885 direct jobs were generated by the marine cargo and vessel activity at the marine terminals.

As the result of the local and regional purchases by those 105,885 individuals holding the direct jobs, an additional 108,712 induced jobs were supported in the regional economy.

113,946 indirect jobs were supported by US$12.3 billion (Cdn$16.0 billion) in regional purchases by businesses supplying services at the marine terminals and ports.

In 2017, the marine cargo and vessel activity at the marine terminals on the Great Lakes-St. Lawrence River Waterway generated a total of US$45.6 billion (Cdn$59.3 billion) of economic activity in the United States and Canada.

The total economic activity consists of the direct business revenue received by the businesses supplying the cargo and vessel handling services (US$37.7 billion (Cdn$49.0 billion), and the re-spending of direct income and consumption impact of US$7.9 billion (Cdn$10.3 billion).

Marine activity supported US$17.9 billion (Cdn$23.3 billion) in total personal wage and salary income, and local consumption expenditures for regional residents of the U.S. and Canada.

EXHIBIT III-2
Economic Impacts – Regional Level

Jobs		
Direct Jobs	105,885	
Induced	108,712	
Indirect	113,946	
Total	328,543	
	US $	**Cdn $**
Economic Activity (1,000)	$45,614,199	$59,225,476
Personal Income (1,000)		
Direct	$4,972,248	$6,455,967
Re-Spending/Local Purchases	$7,897,518	$10,254,137
Indirect	$5,064,196	$6,575,352
Total	$17,933,961	$23,285,455
Business Revenue (1,000)	$37,716,681	$48,971,339
Local Purchases (1,000)	$12,321,436	$15,998,152
Taxes (1,000)		
Federal	$5,724,816	$7,433,101
State/Provincial and Local	$3,284,184	$4,264,184
Total	$9,008,999	$11,697,285

The 105,885 direct job holders received US$5.0 billion (Cdn$6.5 billion) in direct wage and salary income. This equates to an average salary of nearly US$46,960 (Cdn$60,970). The 113,946 indirect jobs holders received US$5.1 billion (Cdn$6.5 billion) in indirect personal income.

A total of US$9.0 billion (Cdn$11.7 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-St. Lawrence River Waterway.

Of the US$9.0 billion (Cdn$11.7 billion), US$3.3 billion (Cdn$4.3 billion) was paid to local and state/provincial governments, while US$5.7 billion (Cdn$7.4 billion) was paid in federal taxes.

Exhibit III-3 shows the breakdown of the total impacts by country.

As shown in **Exhibit III-3**, direct jobs generated by the cargo and vessel activity were nearly equally distributed between the U.S. and Canada.

56,490 direct jobs or 55 percent were generated in Canada, while 49,395 direct jobs were created in the U.S. When the induced and indirect jobs are considered, each direct job supports a total of about three jobs in both countries.

The re-spending multiplier in Canada is slightly less than in the U.S., reflecting a higher Canadian savings rate compared to the U.S. In contrast, the induced jobs supported by a dollar of re-spending by individuals in Canada's two provinces is nearly three times as great as in the U.S. Great Lakes regional economy. This reflects the fact that less out-of-region spending occurs in Ontario and Quebec. This is consistent with a larger concentration of national population and employment in those two major eastern provinces, compared to the U.S. Great Lakes states.

EXHIBIT III-3
Economic Impacts – Country Level

	Canada		United States		Total	
Jobs						
Direct Jobs	56,490		49,395		105,885	
Induced	64,844		43,868		108,712	
Indirect	59,745		54,201		113,946	
Total	181,079		147,464		328,543	
	US $	**Cdn $**	**US $**	**Cdn $**	**US $**	**Cdn $**
Economic Activity (1,000)	$20,003,296	$25,972,279	$25,610,903	$33,253,197	$45,614,199	$59,225,476
Personal Income (1,000)						
Direct	$2,330,505	$3,025,927	$2,641,743	$3,430,039	$4,972,248	$6,455,967
Re-Spending/Local Purchases	$2,570,100	$3,337,018	$5,327,418	$6,917,119	$7,897,518	$10,254,137
Indirect	$2,578,709	$3,348,196	$2,485,486	$3,227,156	$5,064,196	$6,575,352
Total	$7,479,314	$9,711,141	$10,454,648	$13,574,315	$17,933,961	$23,285,455
Business Revenue (1,000)	$17,433,196	$22,635,261	$20,283,485	$26,336,077	$37,716,681	$48,971,339
Local Purchases (1,000)	$7,044,726	$9,146,872	$5,276,709	$6,851,280	$12,321,436	$15,998,152
Taxes (1,000)						
Federal	$2,352,898	$3,055,002	$3,371,918	$4,378,099	$5,724,816	$7,433,101
State/Provincial and Local	$2,012,017	$2,612,403	$1,272,166	$1,651,781	$3,284,184	$4,264,184
Total	$4,364,915	$5,667,405	$4,644,084	$6,029,879	$9,008,999	$11,697,285

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 business purchases out of the region in Canada than in the U.S.

2. JOB IMPACTS

This section focuses on the 105,885 direct jobs created by the 381 million metric tons (420 million short tons) of cargo handled at the ports and marine terminals on the Great Lakes-St. Lawrence River Waterway. **Exhibit III-4** shows the direct jobs impact by commodity moving on the system. The movement of iron ore, which represents the largest tonnage handled at the ports and marine terminals, created the largest number of direct jobs — 34,617. The majority of these jobs are with shippers/consignees (steel mills) located at the ports that are directly dependent on the receipt of iron ore by vessels. About 15,753 of these direct jobs are with mills located in Canada and about 18,864 are with steel mills in the United States. The movement of Other dry bulk cargoes generates the second-largest direct jobs impacts. These 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 cargoes such as alumina and other ores, fertilizers and potash. The majority of these direct jobs were created in Canada. The handling of containerized cargo, primarily at the Port of Montreal, supported 2,673 direct jobs in 2017.

EXHIBIT III-4
Direct Jobs by Commodity – Regional Level

	1,000 Metric Tons	1,000 Short Tons	Direct Jobs
Containers	13,819	15,233	2,673
Steel	5,248	5,785	9,913
General Cargo	3,798	4,186	1,894
Iron Ore	146,667	161,671	34,617
Grain	28,947	31,908	3,616
Stone/Aggregate	55,843	61,556	6,091
Cement	11,416	12,584	2,663
Salt	16,366	18,040	3,753
Other Dry Bulk	21,609	23,819	12,881
Liquid Bulk	43,259	47,684	8,956
Coal	34,029	37,510	3,844
Ferry	NA		942
Not Allocated			14,043
Total	**381,002**	**419,976**	**105,885**

Exhibit III-5 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-St. Lawrence River Waterway. 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, which reflects the bauxite activity at the St. Lawrence River 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 III-6**. 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-St. Lawrence River Waterway underscores the importance of the transportation system in providing raw materials to the region's 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.

EXHIBIT III-5
Direct Jobs by Commodity – Country Level

	Canada			United States			Total		
	1,000 Metric Tons	1,000 Short Tons	Direct Jobs	1,000 Metric Tons	1,000 Short Tons	Direct Jobs	1,000 Metric Tons	1,000 Short Tons	Direct Jobs
Containers	13,819	15,233	2,673		0		13,819	15,233	2,673
Steel	2,629	2,898	1,914	2,620	2,888	7,999	5,248	5,785	9,913
General Cargo	3,334	3,675	1,710	464	511	184	3,798	4,186	1,894
Iron Ore	52,872	58,281	15,753	93,795	103,390	18,864	146,667	161,671	34,617
Grain	26,275	28,963	2,982	2,672	2,945	635	28,947	31,908	3,616
Stone/Aggregate	13,633	15,027	1,572	42,210	46,528	4,519	55,843	61,556	6,091
Cement	3,205	3,533	744	8,211	9,051	1,918	11,416	12,584	2,663
Salt	10,803	11,908	2,103	5,563	6,132	1,650	16,366	18,040	3,753
Other Dry Bulk	15,528	17,117	10,510	6,080	6,702	2,371	21,609	23,819	12,881
Liquid Bulk	37,586	41,431	6,517	5,673	6,253	2,439	43,259	47,684	8,956
Coal	5,549	6,117	483	28,480	31,393	3,361	34,029	37,510	3,844
Ferry	NA		699	NA		243	NA		942
Not Allocated			8,831			5,212			14,043
Total	**185,234**	**204,184**	**56,490**	**195,768**	**215,795**	**49,395**	**381,002**	**419,978**	**105,885**

EXHIBIT III-6
Direct Jobs by Category – Regional Level

	Total
Surface Transportation	
Rail	2,977
Truck	16,532
Maritime Service	
Terminal Employees	11,694
Dockworkers	1,957
Tug Assists	1,555
Pilots	389
Agents	1,677
Maritime Services	1,747
Forwarders	4,203
Government	2,315
Marine Equipment/Ship Repair	6,662
Laker	5,597
Barge	1,860
Dependent Shippers/Consignees	45,423
Port Authority	1,297
Total	**105,885**

In some cases, these terminal workers are associated with the dependent shippers/consignees. About 7,500 direct jobs are with the Canadian and U.S. flag vessel operators, and tug and barge operators moving cargo on the system[1]; 4,203 jobs are with freight forwarders and customs brokers arranging for the handling of the cargo; and another 1,747 jobs are with firms providing maritime services such as ship chandlering, vessel cargo and hull surveys, ship repair and marine equipment sales, and servicing.

1 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.

Exhibit III-7 shows the direct job impacts by category, by country, for the cargo activity at all ports and terminals on the Great Lakes-St. Lawrence River Waterway.

As presented in **Exhibit III-7**, 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.

EXHIBIT III-7
Direct Jobs by Category – Country Level

	Canada Direct Jobs	United States Direct Jobs	Total
Surface Transportation			
Rail	1,318	1,658	2,977
Truck	7,994	8,538	16,532
Maritime Service			
Terminal Employees	4,719	6,975	11,694
Dockworkers	1,255	703	1,957
Tug Assists	1,062	493	1,555
Pilots	351	38	389
Agents	1,589	88	1,677
Maritime Services	554	1,193	1,747
Forwarders	2,153	2,050	4,203
Government	985	1,330	2,315
Marine Equipment/Ship Repair	5,105	1,557	6,662
Laker	1,830	3,767	5,597
Barge	1,054	807	1,860
Dependent Shippers/Consignees	25,496	19,927	45,423
Port Authority	1,025	272	1,297
Total	**56,490**	**49,395**	**105,885**

3. REVENUE IMPACTS

In 2017, the direct business revenue received by the firms directly dependent upon the cargo handled at the marine terminals in the Great Lakes-St. Lawrence River Waterway was U.S.$37.7 billion (Cdn$49.0 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 III-8** 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 system.

The revenue impacts by category, by country, are presented in **Exhibit III-9**.

EXHIBIT III-8
Revenue Impact by Category – Regional Level

	Revenue Million US	Revenue Million Cdn
Surface Transportation		
Rail	$4,777	$6,202
Truck	$1,454	$1,888
Maritime Service		
Terminal Employees	$2,107	$2,736
Tug Assists	$120	$156
Pilots	$118	$153
Agents	$149	$193
Maritime Services	$671	$871
Forwarders	$662	$860
Marine Equipment/Ship Repair	$1,001	$1,299
Laker	$2,583	$3,354
Barge	$279	$362
Dependent Shippers/Consignees	$23,514	$30,530
Port Authority	$282	$366
Total	**$37,717**	**$48,971**

EXHIBIT III-9 **Revenue Impact by Category – Country Level**						
	Canada		**United States**		**Total**	
	Million US	**Million Cdn**	**Million US**	**Million Cdn**	**Million US**	**Million Cdn**
Surface Transportation						
Rail	$1,792	$2,327	$2,984	$3,875	$4,777	$6,202
Truck	$614	$797	$841	$1,091	$1,454	$1,888
Maritime Service						
Terminal Employees	$1,305	$1,694	$802	$1,042	$2,107	$2,736
Tug Assists	$69	$90	$51	$66	$120	$156
Pilots	$103	$134	$15	$19	$118	$153
Agents	$135	$175	$14	$18	$149	$193
Maritime Services	$350	$455	$321	$416	$671	$871
Forwarders	$296	$384	$366	$475	$662	$860
Marine Equipment/Ship Repair	$687	$892	$314	$407	$1,001	$1,299
Laker	$672	$873	$1,911	$2,481	$2,583	$3,354
Barge	$148	$192	$131	$170	$279	$362
Dependent Shippers/Consignees	$11,042	$14,337	$12,471	$16,193	$23,514	$30,530
Port Authority	$218	$284	$63	$82	$282	$366
Total	**$17,433**	**$22,635**	**$20,283**	**$26,336**	**$37,717**	**$48,971**

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. Pilotage revenue is higher in the United States, due to higher pilotage charges imposed by the U.S. Coast Guard in recent years in an effort to increase overall U.S. pilot compensation and workforce numbers.

4. PERSONAL INCOME AND LOCAL CONSUMPTION IMPACTS

The 105,885 individuals directly employed as a result of the cargo handled at the ports and marine terminals received US$5.0 billion (Cdn$6.5 billion) in wages and salaries.

The 56,490 direct job holders at the Canadian ports and terminals received US$2.3 billion (Cdn$3.0 billion), for an average salary of US$41,260 (Cdn$53,570).

The 49,395 direct job holders at the U.S. ports received US$2.6 billion (Cdn$3.4 billion) in direct personal income, for an average salary of US$53,480 (Cdn$69,444).

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, RIMS II. 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$7.9 billion (Cdn$10.3 billion) in income and consumption were created in the Great Lakes regional economy.

The re-spending impact and consumption impacts should not be divided by induced jobs to estimate induced income, since the division of the re-spending impact/local consumption impact by the induced jobs will overstate the actual salary of the induced job holders, as this includes the value of the consumption purchases.

The 113,946 indirect job holders received US$5.1 billion (Cdn$6.6 billion) in personal income, of which the 59,745 Canadian indirect job holders received US$2.6 billion (Cdn$3.4 billion), while the 54,201 indirect job holders in the U.S. received US$2.5 billion (Cdn$3.2 billion).

The higher average salary received in the U.S. reflects a higher concentration of jobs with terminal operators, dependent shippers/consignees, lakers, and trucking jobs in moving the cargo at U.S. ports.

5. FEDERAL, STATE/PROVINCIAL AND LOCAL TAX IMPACTS

The cargo activity at the U.S. ports and marine terminals created US$1.3 billion (Cdn$1.7 billion) in state and local taxes, and US$3.4 billion (Cdn$4.3 billion) in federal taxes. The cargo activity at the Canadian ports created US$2.0 billion (Cdn$2.6 billion) in provincial taxes, and US$2.4 billion (Cdn$3.1 billion) in federal taxes.

6. IMPACTS BY STATE AND PROVINCE

The economic impacts were estimated at the port level for 40 U.S. and Canadian Great Lakes and St. Lawrence River ports. The models developed for these 40 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.

Exhibit III-10 presents the U.S. impacts of total cargo handled by U.S. ports and marine terminals located on the Great Lakes-St. Lawrence River Waterway. As this exhibit shows, in terms of direct, induced and indirect jobs, the impacts are greatest for the state of Indiana, followed by Ohio and Michigan.

Exhibit III-11 shows the impacts of the cargo handled on the Great Lakes-St. Lawrence River Waterway for the provinces of Ontario and Quebec.

The ports in Quebec account for 110,433 direct, induced and indirect jobs, or about 61 percent of the direct job impacts for Canada. The direct business revenue generated by cargo activity in Quebec created US$11.0 billion (Cdn$14.3 billion) of direct business revenue, or about 63 percent of total direct business revenue generated in Canada.

EXHIBIT III-10
Economic Impacts by State

	Indiana		Ohio		Michigan	
Tonnage Handled (1,000): Metric Tons (Short Tons)	**26,986 (29,747)**		**39,599 (43,650)**		**59,014 (65,051)**	
Jobs						
Direct Jobs		19,518		9,398		11,180
Induced		19,432		8,549		8,294
Indirect		27,208		15,221		6,436
Total		66,158		33,168		25,910
	US $	**Cdn $**	**US $**	**Cdn $**	**US $**	**Cdn $**
Economic Activity (1,000)	$13,726,685	$17,822,728	$3,745,199	$4,862,766	$4,160,713	$5,402,270
Personal Income (1,000)						
Direct	$1,201,907	$1,560,556	$475,029	$616,777	$536,631	$696,762
Re-Spending/Local Consumption	$2,441,194	$3,169,646	$1,025,207	$1,331,128	$966,365	$1,254,728
Indirect	$1,252,811	$1,626,649	$710,600	$922,643	$272,287	$353,538
Total	$4,895,912	$6,356,852	$2,210,835	$2,870,549	$1,775,283	$2,305,028
Business Revenue (1,000)	$11,285,492	$14,653,083	$2,719,992	$3,531,638	$3,194,348	$4,147,541
Local Purchases (1,000)	$2,604,640	$3,381,865	$1,411,723	$1,832,981	$692,167	$898,709
Taxes (1,000)						
Federal	$1,682,700	$2,184,818	$622,035	$807,650	$558,082	$724,613
State and Local	$623,108	$809,044	$216,662	$281,314	$205,209	$266,443
Total	$2,305,808	$2,993,862	$838,697	$1,088,964	$763,290	$991,056

EXHIBIT III-10 Continued

	Minnesota		Illinois		Wisconsin	
Tonnage Handled (1,000): Metric Tons (Short Tons)	**31,231 (34,425)**		**10,289 (11,341)**		**27,086 (29,856)**	
Jobs						
Direct Jobs		2,176		2,943		3,198
Induced		1,852		2,654		2,316
Indirect		2,134		880		1,970
Total		6,161		6,476		7,484
	US $	**Cdn $**	**US $**	**Cdn $**	**US $**	**Cdn $**
Economic Activity (1,000)	$1,483,766	$1,926,522	$830,908	$1,078,851	$1,430,900	$1,857,881
Personal Income (1,000)						
Direct	$99,333	$128,974	$130,780	$169,805	$147,229	$191,162
Re-Spending/Local Consumption	$213,546	$277,269	$345,169	$448,167	$245,180	$318,341
Indirect	$100,528	$130,526	$46,015	$59,745	$87,653	$113,809
Total	$413,408	$536,769	$521,964	$677,718	$480,061	$623,312
Business Revenue (1,000)	$1,270,220	$1,649,254	$485,739	$630,684	$1,185,721	$1,539,540
Local Purchases (1,000)	$222,048	$288,308	$89,032	$115,599	$210,833	$273,745
Taxes (1,000)						
Federal	$160,488	$208,378	$137,785	$178,900	$169,585	$220,189
State and Local	$69,544	$90,296	$64,945	$84,325	$71,541	$92,889
Total	$230,033	$298,674	$202,730	$263,225	$241,126	$313,078

EXHIBIT III-10 Continued

	New York		Pennsylvania		Total US	
Tonnage Handled (1,000): Metric Tons (Short Tons)	**960 (1,058)**		**603 (665)**		**195,768 (215,795)**	
Jobs						
Direct Jobs		691		291		49,395
Induced		542		229)		43,868
Indirect		116		237		54,201
Total		1,349		757		147,464
	US $	**Cdn $**	**US $**	**Cdn $**	**US $**	**Cdn $**
Economic Activity (1,000)	$141,866	$184,199	$90,864	$117,978	$25,610,903	$33,253,197
Personal Income (1,000)						
Direct	$38,128	$49,505	$12,707	$16,498	$2,641,743	$3,430,039
Re-Spending/Local Consumption	$63,536	$82,495	$27,222	$35,345	$5,327,418	$6,917,119
Indirect	$5,954	$7,731	$9,638	$12,514	$2,485,486	$3,227,156
Total	$107,618	$139,731	$49,566	$64,357	$10,454,648	$13,574,315
Business Revenue (1,000)	$78,331	$101,704	$63,643	$82,633	$20,283,485	$26,336,077
Local Purchases (1,000)	$17,207	$22,342	$29,060	$37,731	$5,276,709	$6,851,280
Taxes (1,000)						
Federal	$27,143	$35,242	$14,100	$18,308	$3,371,918	$4,378,099
State and Local	$14,780	$19,190	$6,377	$8,280	$1,272,166	$1,651,781
Total	$41,923	$54,432	$20,477	$26,588	$4,644,084	$6,029,879

EXHIBIT III-11
Economic Impacts by Province

	Ontario		Quebec		Total	
Tonnage Handled (1,000): Metric Tons (Short Tons)	**61,378 (67,657)**		**123,856 (136,527)**		**185,234 (204,184)**	
Jobs						
Direct Jobs		21,561		34,929		56,490
Induced		28,904		35,940		64,844
Indirect		20,182		39,563		59,745
Total		70,647		110,433		181,079
	US $	**Cdn $**	**US $**	**Cdn $**	**US $**	**Cdn $**
Economic Activity (1,000)	$7,700,224	$9,997,970	$12,303,072	$15,974,309	$20,003,296	$25,972,279
Personal Income (1,000)						
Direct	$842,378	$1,093,744	$1,488,126	$1,932,183	$2,330,505	$3,025,927
Re-Spending/Local Consumption	$1,276,372	$1,657,241	$1,293,728	$1,679,777	$2,570,100	$3,337,018
Indirect	$877,836	$1,139,782	$1,700,873	$2,208,414	$2,578,709	$3,348,196
Total	$2,996,586	$3,890,768	$4,482,727	$5,820,373	$7,479,314	$9,711,141
Business Revenue (1,000)	$6,423,852	$8,340,729	$11,009,344	$14,294,532	$17,433,196	$22,635,261
Local Purchases (1,000)	$2,181,105	$2,831,947	$4,863,621	$6,314,925	$7,044,726	$9,146,872
Taxes (1,000)						
Federal	$924,744	$1,200,688	$1,428,154	$1,854,315	$2,352,898	$3,055,002
Provincial and Local	$564,274	$732,653	$1,447,743	$1,879,750	$2,012,017	$2,612,403
Total	$1,489,018	$1,933,341	$2,875,897	$3,734,064	$4,364,915	$5,667,405

7. IMPACTS BY VESSEL FLAG

This section 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. Due to the carriage laws in each country, Canadian flag vessels move cargo to and from Canadian ports, while U.S. flag vessels move cargo to and from U.S ports.

Canadian flag and U.S. flag vessels also 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. Foreign flag vessels move international cargo to and from both St. Lawrence River and Great Lakes ports to overseas destinations.

A total of 230.9 million metric tons of cargo (254.6 million short tons) moved through the Great Lakes-St. Lawrence River Waterway in 2017. This cargo represents US$77.4 billion (Cdn$100.5 billion) of cargo value.

Based on detailed commodity flow data collected for this study, 83.5 million metric tons (92.1 million short tons) were moved on U.S. Flag vessels; 62.0 million metric tons (68.3 million short tons) moved on Canadian flag vessels. The balance of 85.4 million metric tons (94.2 million short tons) was moved on foreign flag vessels.

In terms of value of cargo moved by flag, U.S. Flag carriers moved US$5.3 billion (Cdn$6.9 billion), Canadian flag carriers moved US$9.4 billion (Cdn$12.1 billion), and foreign flag carriers moved US$62.8 billion (Cdn$81.5 billion).

It is estimated that 381 million metric tons ($420 million short tons) of cargo were handled at Great Lakes-St. Lawrence ports and marine terminals. Canadian flag vessels handled 118.4 million metric tons (130.5 million short tons), U.S. flag vessels handled 167.6 million metric tons (184.7 million short tons), and foreign flag vessels handled 95 million metric tons (104.8 million short tons).

Exhibit III-12 through **III-28** summarize the economic impacts of cargo handled by flag on the Great Lakes-St. Lawrence River Waterway. These tables show impacts at the bi-national regional level, by country, by state/province, by commodity, and by job category. The monetary impacts are expressed in both U.S. and Canadian dollars.

EXHIBIT III-12

Economic Impacts by Flag of Carriage – Regional Level

	Canadian Flag		U.S. Flag		Foreign Flag		Total	
Jobs								
Direct Jobs	35,171		39,522		31,192		105,885	
Induced	39,870		35,746		33,095		108,712	
Indirect	30,951		42,838		40,157		113,946	
Total	105,993		118,106		104,445		328,543	
	US $	Cdn $	US $	Cdn $	US $	Cdn $	US $	Cdn $
Economic Activity (1,000)	$12,842,890	$16,675,208	$20,892,882	$27,127,318	$11,878,427	$15,422,950	$45,614,199	$59,225,476
Personal Income (1,000)								
Direct	$1,447,512	$1,879,450	$2,137,528	$2,775,366	$1,387,208	$1,801,151	$4,972,248	$6,455,967
Re-Spending/ Local Consumption	$2,075,353	$2,694,638	$4,294,015	$5,575,349	$1,528,151	$1,984,151	$7,897,518	$10,254,137
Indirect	$1,344,635	$1,745,874	$1,960,454	$2,545,453	$1,759,107	$2,284,024	$5,064,196	$6,575,352
Total	$4,867,500	$6,319,962	$8,391,996	$10,896,168	$4,674,465	$6,069,325	$17,933,961	$23,285,455
Business Revenue (1,000)	$10,767,537	$13,980,570	$16,598,867	$21,551,969	$10,350,277	$13,438,800	$37,716,681	$48,971,339
Local Purchases (1,000)	$3,246,603	$4,215,389	$4,184,789	$5,433,530	$4,890,043	$6,349,232	$12,321,436	$15,998,152
Taxes (1,000)								
Federal	$1,540,588	$2,000,300	$2,722,903	$3,535,417	$1,461,325	$1,897,384	$5,724,816	$7,433,101
State/Provincial and Local	$981,580	$1,274,483	$1,028,410	$1,335,288	$1,274,193	$1,654,413	$3,284,184	$4,264,184
Total	$2,522,168	$3,274,783	$3,751,313	$4,870,705	$2,735,518	$3,551,797	$9,008,999	$11,697,285

EXHIBIT III-13
Economic Impacts by Canadian Flag – Country Level

Impacts	Canada		United States		Total	
Jobs						
Direct Jobs	28,612		6,559		35,171	
Induced	34,442		5,428		39,870	
Indirect	23,505		7,446		30,951	
Total	86,559		19,434		105,993	
	US $	**Cdn $**	**US $**	**Cdn $**	**US $**	**Cdn $**
Economic Activity (1,000)	$9,627,810	$12,500,749	$3,215,079	$4,174,459	$12,842,890	$16,675,208
Personal Income (1,000)						
Direct	$1,124,081	$1,459,506	$323,432	$419,944	$1,447,512	$1,879,450
Re-Spending/Local Consumption	$1,435,309	$1,863,606	$640,043	$831,032	$2,075,353	$2,694,638
Indirect	$1,003,981	$1,303,569	$340,654	$442,306	$1,344,635	$1,745,874
Total	$3,563,371	$4,626,681	$1,304,130	$1,693,282	$4,867,500	$6,319,962
Business Revenue (1,000)	$8,192,501	$10,637,143	$2,575,036	$3,343,427	$10,767,537	$13,980,570
Local Purchases (1,000)	$2,518,385	$3,269,871	$728,218	$945,519	$3,246,603	$4,215,389
Taxes (1,000)						
Federal	$1,117,369	$1,450,792	$423,219	$549,508	$1,540,588	$2,000,300
State/Provincial and Local	$820,068	$1,064,777	$161,511	$209,707	$981,580	$1,274,483
Total	$1,937,437	$2,515,569	$584,731	$759,214	$2,522,168	$3,274,783

EXHIBIT III-14
Economic Impacts by U.S. Flag – Country Level

Impacts	Canada		United States		Total	
Jobs						
Direct Jobs	652		38,870		39,522	
Induced	832		34,914		35,746	
Indirect	728		42,110		42,838	
Total	2,212		115,894		118,106	
	US $	**Cdn $**	**US $**	**Cdn $**	**US $**	**Cdn $**
Economic Activity (1,000)	$225,623	$292,949	$20,667,259	$26,834,369	$20,892,882	$27,127,318
Personal Income (1,000)						
Direct	$24,875	$32,298	$2,112,652	$2,743,068	$2,137,528	$2,775,366
Re-Spending/Local Consumption	$36,108	$46,882	$4,257,907	$5,528,466	$4,294,015	$5,575,349
Indirect	$31,570	$40,991	$1,928,883	$2,504,462	$1,960,454	$2,545,453
Total	$92,553	$120,171	$8,299,443	$10,775,996	$8,391,996	$10,896,168
Business Revenue (1,000)	$189,516	$246,067	$16,409,352	$21,305,902	$16,598,867	$21,551,969
Local Purchases (1,000)	$78,651	$102,121	$4,106,138	$5,331,409	$4,184,789	$5,433,530
Taxes (1,000)						
Federal	$28,277	$36,715	$2,694,625	$3,498,702	$2,722,903	$3,535,417
State/Provincial and Local	$18,050	$23,436	$1,010,361	$1,311,852	$1,028,410	$1,335,288
Total	$46,327	$60,151	$3,704,986	$4,810,554	$3,751,313	$4,870,705

EXHIBIT III-15
Economic Impacts by Foreign Flag – Country Level

Impacts	Canada		United States		Total	
Jobs						
Direct Jobs	27,226		3,966		31,192	
Induced	29,570		3,525		33,095	
Indirect	35,512		4,645		40,157	
Total	92,309		12,136		104,445	
	US $	**Cdn $**	**US $**	**Cdn $**	**US $**	**Cdn $**
Economic Activity (1,000)	$10,149,862	$13,178,581	$1,728,565	$2,244,369	$11,878,427	$15,422,950
Personal Income (1,000)						
Direct	$1,181,549	$1,534,123	$205,659	$267,028	$1,387,208	$1,801,151
Re-Spending/Local Consumption	$1,098,683	$1,426,530	$429,467	$557,620	$1,528,151	$1,984,151
Indirect	$1,543,158	$2,003,636	$215,949	$280,388	$1,759,107	$2,284,024
Total	$3,823,390	$4,964,289	$851,075	$1,105,036	$4,674,465	$6,069,325
Business Revenue (1,000)	$9,051,179	$11,752,051	$1,299,098	$1,686,748	$10,350,277	$13,438,800
Local Purchases (1,000)	$4,447,690	$5,774,881	$442,353	$574,352	$4,890,043	$6,349,232
Taxes (1,000)						
Federal	$1,207,251	$1,567,495	$254,073	$329,889	$1,461,325	$1,897,384
State/Provincial and Local	$1,173,899	$1,524,190	$100,294	$130,222	$1,274,193	$1,654,413
Total	$2,381,150	$3,091,686	$354,368	$460,111	$2,735,518	$3,551,797

EXHIBIT III-16
Direct Jobs by Commodity and by Flag – Regional Level

	Direct Jobs Canadian Flag	Direct Jobs US Flag	Direct Jobs Foreign Flag	Total
Containers	NA	NA	2,673	2,673
Steel	1,128	3,850	4,935	9,913
General Cargo	559	NA	1,335	1,894
Iron Ore	12,486	18,216	3,915	34,617
Grain	1,884	89	1,643	3,616
Stone/Aggregate	1,841	4,179	71	6,091
Cement	1,040	1,569	54	2,663
Salt	2,900	725	129	3,753
Other Dry Bulk	2,139	1,503	9,240	12,881
Liquid Bulk	3,996	2,278	2,681	8,956
Coal	990	2,829	26	3,844
Ferry	699	243	NA	942
Not Allocated	5,510	4,042	4,491	14,043
Total	**35,171**	**39,522**	**31,192**	**105,885**

EXHIBIT III-17
Direct Jobs by Commodity and by Flag – Country Level

	Canada				United States				
	Canadian Flag	US Flag	Foreign Flag	Total	Canadian Flag	US Flag	Foreign Flag	Total	Total
Containers	NA	NA	2,673	2,673	NA	NA	NA	NA	2,673
Steel	189	NA	1,725	1,914	940	3,850	3,210	7,999	9,913
General Cargo	438	NA	1,272	1,710	120	NA	63	184	1,894
Iron Ore	11,566	271	3,915	15,753	919	17,945	NA	18,864	34,617
Grain	1,661	NA	1,320	2,982	223	89	323	635	3,616
Stone/Aggregate	1,416	85	71	1,572	425	4,094	NA	4,519	6,091
Cement	679	28	37	744	361	1,540	17	1,918	2,663
Salt	1,955	23	125	2,103	945	701	4	1,650	3,753
Other Dry Bulk	1,351	31	9,128	10,510	788	1,471	111	2,371	12,881
Liquid Bulk	3,757	80	2,681	6,517	240	2,198	1	2,439	8,956
Coal	393	64	25	483	596	2,765	NA	3,361	3,844
Ferry	699	NA	NA	699	NA	243	NA	243	942
Not Allocated	4,507	70	4,254	8,831	1,002	3,973	237	5,212	14,043
Total	**28,612**	**652**	**27,226**	**56,490**	**6,559**	**38,870**	**3,966**	**49,395**	**105,885**

EXHIBIT III-18
Direct Jobs Impacts by Category and by Flag – Regional Level

	Canadian Flag	US Flag	Foreign Flag	Total
Surface Transportation				
Rail	846	1,212	918	2,977
Truck	6,196	5,498	4,838	16,532
Maritime Service				
Terminal Employees	3,353	5,426	2,916	11,694
Dockworkers	799	294	865	1,957
Tug Assists	409	387	759	1,555
Pilots*	NA	NA	389	389
Maritime Services/Agents	490	994	1,939	3,423
Forwarders	1,240	1,755	1,209	4,203
Government	709	1,144	462	2,315
Marine Equipment/Ship Repair	2,905	1,171	2,586	6,662
Laker	2,501	3,095	NA	5,597
Barge	629	656	575	1,860
Dependent Shippers/Consignees	14,330	17,781	13,312	45,423
Port Authority	763	109	425	1,297
Total	**35,171**	**39,522**	**31,192**	**105,885**

* All pilotage jobs have been allocated to foreign flag vessels. Canadian flag vessels, however, are also subject to compulsory pilotage requirements in the St. Lawrence and Great Lakes region. It was not possible to accurately allocate Canadian-flag pilotage impacts due to lack of information as to duration of time pilots spend on these transits versus foreign-flag transits.

EXHIBIT III-19
Direct Jobs by Category and by Flag – Country Level

	Canada				United States				
	Canadian Flag	US Flag	Foreign Flag	Total	Canadian Flag	US Flag	Foreign Flag	Total	Total
Surface Transportation									
Rail	547	8	763	1,318	299	1,204	156	1,658	2,977
Truck	4,590	110	3,294	7,994	1,606	5,388	1,544	8,538	16,532
Maritime Service									
Terminal Employees	2,192	92	2,435	4,719	1,160	5,334	481	6,975	11,694
Dockworkers	636	13	605	1,255	163	280	260	703	1,957
Tug Assists	326	8	728	1,062	83	379	31	493	1,555
Pilots*	NA	NA	351	351	NA	NA	38	38	389
Maritime Services/Agents	301	5	1,837	2,143	189	989	102	1,280	3,423
Forwarders	959	27	1,167	2,153	281	1,728	41	2,050	4,203
Government	534	15	437	985	175	1,129	25	1,330	2,315
Marine Equipment/Ship Repair	2,529	30	2,547	5,105	377	1,141	39	1,557	6,662
Laker	1,785	45	NA	1,830	717	3,050	NA	3,767	5,597
Barge	510	9	535	1,054	120	647	40	807	1,860
Dependent Shippers/Consignees	13,069	279	12,148	25,496	1,261	17,503	1,164	19,927	45,423
Port Authority	634	11	380	1,025	129	98	44	272	1,297
Total	**28,612**	**652**	**27,226**	**56,490**	**6,559**	**38,870**	**3,966**	**49,395**	**105,885**

* All pilotage jobs have been allocated to foreign flag vessels. Canadian flag vessels, however, are also subject to compulsory pilotage requirements in the St. Lawrence and Great Lakes region. It was not possible to accurately allocate Canadian-flag pilotage impacts due to lack of information as to duration of time pilots spend on these transits versus foreign-flag transits.

EXHIBIT III-20
Revenue Impact by Category and by 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
Surface Transportation								
Rail	$1,228.0	$1,594.4	$2,308.8	$2,997.8	$1,239.7	$1,609.7	$4,776.6	$6,201.9
Truck	$524.2	$680.6	$499.7	$648.8	$430.5	$558.9	$1,454.3	$1,888.3
Maritime Service								
Terminal Employees	$545.6	$708.4	$654.3	$849.6	$907.1	$1,177.8	$2,107.0	$2,735.7
Tug Assists	$36.1	$46.9	$38.8	$50.4	$45.4	$59.0	$120.4	$156.3
Pilots*	$0.0	$0.0	$0.0	$0.0	$118.0	$153.1	$118.0	$153.1
Maritime Services/Agents	$219.7	$285.3	$265.9	$345.3	$334.3	$434.0	$819.9	$1,064.6
Forwarders	$182.1	$236.5	$312.2	$405.4	$167.9	$218.0	$662.2	$859.8
Marine Equipment/Ship Repair	$374.1	$485.7	$260.9	$338.7	$365.8	$475.0	$1,000.8	$1,299.5
Laker	$919.6	$1,194.0	$1,663.8	$2,160.3	$0.0	$0.0	$2,583.4	$3,354.3
Barge	$91.5	$118.8	$106.4	$138.1	$80.9	$105.1	$278.8	$362.0
Dependent Shippers/Consignees	$6,498.3	$8,437.4	$10,456.9	$13,577.2	$6,558.5	$8,515.5	$23,513.6	$30,530.1
Port Authority	$148.4	$192.7	$31.1	$40.4	$102.1	$132.6	$281.6	$365.7
Total	**$10,767.5**	**$13,980.6**	**$16,598.9**	**$21,552.0**	**$10,350.3**	**$13,438.8**	**$37,716.7**	**$48,971.3**

* All pilotage revenue impacts have been allocated to foreign flag vessels. Canadian flag vessels, however, are also subject to compulsory pilotage requirements in the St. Lawrence and Great Lakes region. It was not possible to accurately allocate Canadian-flag pilotage impacts due to lack of information as to duration of time pilots spend on these transits versus foreign-flag transits.

EXHIBIT III-21
Revenue Impact by Category and Flag – Canada

	Canadian Flag		US Flag		Foreign Flag		Total Canada	
	Millions US	Millions Cdn	Millions US	Millions Cdn	Millions US	Millions Cdn	Millions US	Millions Cdn
Surface Transportation								
Rail	$666.6	$865.5	$23.1	$30.0	$1,102.8	$1,431.8	$1,792.5	$2,327.3
Truck	$361.6	$469.5	$8.8	$11.5	$243.4	$316.0	$613.8	$797.0
Maritime Service								
Terminal Employees	$426.4	$553.6	$10.0	$12.9	$868.4	$1,127.6	$1,304.8	$1,694.2
Tug Assists	$26.1	$33.9	$0.7	$0.9	$42.5	$55.2	$69.3	$90.0
Pilots*	$0.0	$0.0	$0.0	$0.0	$103.4	$134.2	$103.4	$134.2
Maritime Services/Agents	$166.5	$216.1	$2.7	$3.5	$316.1	$410.4	$485.3	$630.1
Forwarders	$131.9	$171.2	$3.7	$4.8	$160.5	$208.5	$296.1	$384.5
Marine Equipment/Ship Repair	$322.3	$418.5	$6.1	$7.9	$358.9	$466.0	$687.3	$892.4
Laker	$654.6	$849.9	$17.9	$23.2	$0.0	$0.0	$672.4	$873.1
Barge	$72.2	$93.8	$1.3	$1.7	$74.2	$96.4	$147.7	$191.8
Dependent Shippers/Consignees	$5,242.5	$6,806.9	$113.5	$147.3	$5,686.2	$7,383.0	$11,042.2	$14,337.3
Port Authority	$121.9	$158.2	$1.8	$2.3	$94.7	$123.0	$218.4	$283.5
Total	**$8,192.5**	**$10,637.1**	**$189.5**	**$246.1**	**$9,051.2**	**$11,752.1**	**$17,433.2**	**$22,635.3**

* All pilotage revenue impacts have been allocated to foreign flag vessels. Canadian flag vessels, however, are also subject to compulsory pilotage requirements in the St. Lawrence and Great Lakes region. It was not possible to accurately allocate Canadian-flag pilotage impacts due to lack of information as to duration of time pilots spend on these transits versus foreign-flag transits.

EXHIBIT III-22
Revenue Impact by Category and Flag – United States

	Canadian Flag		US Flag		Foreign Flag		Total US	
	Millions US	Millions Cdn	Millions US	Millions Cdn	Millions US	Millions Cdn	Millions US	Millions Cdn
Surface Transportation								
Rail	$561.4	$728.9	$2,285.7	$2,967.8	$137.0	$177.9	$2,984.1	$3,874.56
Truck	$162.6	$211.1	$490.8	$637.3	$187.1	$242.9	$840.5	$1,091.35
Maritime Service								
Terminal Employees	$119.2	$154.7	$644.3	$836.6	$38.7	$50.2	$802.2	$1,041.56
Tug Assists	$10.0	$13.0	$38.1	$49.5	$2.9	$3.7	$51.0	$66.28
Pilots*	$0.0	$0.0	$0.0	$0.0	$14.6	$19.0	$14.6	$18.95
Maritime Services/Agents	$53.3	$69.2	$263.2	$341.7	$18.2	$23.6	$334.7	$434.54
Forwarders	$50.2	$65.2	$308.5	$400.6	$7.4	$9.5	$366.1	$475.33
Marine Equipment/Ship Repair	$51.8	$67.2	$254.8	$330.9	$7.0	$9.0	$313.6	$407.12
Laker	$265.0	$344.1	$1,646.0	$2,137.1	$0.0	$0.0	$1,911.0	$2,481.21
Barge	$19.3	$25.0	$105.1	$136.4	$6.7	$8.7	$131.1	$170.20
Dependent Shippers/Consignees	$1,255.7	$1,630.5	$10,343.4	$13,429.9	$872.2	$1,132.5	$12,471.3	$16,192.80
Port Authority	$26.6	$34.5	$29.4	$38.1	$7.4	$9.6	$63.3	$82.17
Total	**$2,575.0**	**$3,343.4**	**$16,409.4**	**$21,305.9**	**$1,299.1**	**$1,686.7**	**$20,283.5**	**$26,336.08**

* All pilotage revenue impacts have been allocated to foreign flag vessels. Canadian flag vessels, however, are also subject to compulsory pilotage requirements in the St. Lawrence and Great Lakes region. It was not possible to accurately allocate Canadian-flag pilotage impacts due to lack of information as to duration of time pilots spend on these transits versus foreign-flag transits.

EXHIBIT III-23
Economic Impacts by State – Canadian Flag Vessels

	Indiana		Ohio		Michigan	
Tonnage Handled (1,000): Metric Tons (Short Tons)	**1,287 (1,419)**		**8,046 (8,869)**		**5,987 (6,600)**	
Jobs						
Direct Jobs	1,698		1,767		1,339	
Induced	1,631		1,494		934	
Indirect	2,367		3,209		904	
Total	5,696		6,470		3,177	
	US $	**Cdn $**	**US $**	**Cdn $**	**US $**	**Cdn $**
Economic Activity (1,000)	$1,628,285	$2,114,165	$582,795	$756,701	$312,256	$405,434
Personal Income (1,000)						
Direct	$99,881	$129,686	$81,027	$105,205	$58,900	$76,476
Re-Spending/Local Consumption	$202,869	$263,405	$174,872	$227,053	$106,067	$137,718
Indirect	$109,015	$141,545	$148,812	$193,218	$38,042	$49,394
Total	$411,765	$534,635	$404,711	$525,476	$203,009	$263,588
Business Revenue (1,000)	$1,425,416	$1,850,760	$407,923	$529,647	$206,189	$267,716
Local Purchases (1,000)	$226,646	$294,277	$298,656	$387,775	$97,468	$126,552
Taxes (1,000)						
Federal	$169,145	$219,618	$108,649	$141,070	$54,591	$70,881
State and Local	$59,073	$76,701	$39,662	$51,497	$21,557	$27,990
Total	$228,218	$296,319	$148,310	$192,566	$76,148	$98,871

EXHIBIT III-23 Continued

	Minnesota		Illinois		Wisconsin	
Tonnage Handled (1,000): Metric Tons (Short Tons)	**3,577 (3,943)**		**728 (803)**		**6,599 (7,275)**	
Jobs						
Direct Jobs	282		237		801	
Induced	242		212		571	
Indirect	321		70		479	
Total	845		519		1,851	
	US $	**Cdn $**	**US $**	**Cdn $**	**US $**	**Cdn $**
Economic Activity (1,000)	$171,426	$222,579	$61,276	$79,560	$361,421	$469,269
Personal Income (1,000)						
Direct	$13,007	$16,888	$10,421	$13,530	$36,056	$46,814
Re-Spending/Local Consumption	$27,962	$36,306	$27,503	$35,710	$60,043	$77,960
Indirect	$15,122	$19,634	$3,664	$4,757	$21,320	$27,682
Total	$56,091	$72,829	$41,587	$53,997	$117,419	$152,456
Business Revenue (1,000)	$143,463	$186,273	$33,773	$43,850	$301,378	$391,309
Local Purchases (1,000)	$33,341	$43,290	$7,078	$9,190	$51,407	$66,747
Taxes (1,000)						
Federal	$20,100	$26,098	$10,692	$13,883	$42,138	$54,712
State and Local	$8,870	$11,516	$5,098	$6,619	$17,678	$22,953
Total	$28,970	$37,614	$15,790	$20,502	$59,816	$77,665

EXHIBIT III-23 Continued

	New York		Pennsylvania		Total US	
Tonnage Handled (1,000): Metric Tons (Short Tons)	**586 (646)**		**52 (57)**		**26,864 (29,612)**	
Jobs						
Direct Jobs	412		24		6,559	
Induced	326		19		5,428	
Indirect	76		20		7,446	
Total	814		63		19,434	
	US $	**Cdn $**	**US $**	**Cdn $**	**US $**	**Cdn $**
Economic Activity (1,000)	$89,956	$116,799	$7,665	$9,952	$3,215,079	$4,174,459
Personal Income (1,000)						
Direct	$23,093	$29,984	$1,048	$1,361	$323,432	$419,944
Re-Spending/Local Consumption	$38,482	$49,965	$2,246	$2,916	$640,043	$831,032
Indirect	$3,882	$5,041	$797	$1,035	$340,654	$442,306
Total	$65,457	$84,989	$4,091	$5,312	$1,304,130	$1,693,282
Business Revenue (1,000)	$51,474	$66,834	$5,419	$7,037	$2,575,036	$3,343,427
Local Purchases (1,000)	$11,219	$14,567	$2,404	$3,121	$728,218	$945,519
Taxes (1,000)						
Federal	$16,731	$21,724	$1,173	$1,524	$423,219	$549,508
State and Local	$9,044	$11,743	$530	$688	$161,511	$209,707
Total	$25,775	$33,467	$1,703	$2,211	$584,731	$759,214

EXHIBIT III-24
Economic Impacts by Province – Canadian Flag Vessels

	Ontario		Quebec		Total	
Tonnage Handled (1,000): Metric Tons (Short Tons)	**52,311 (57,663)**		**39,253 (43,269)**		**91,565 (100,932)**	
Jobs						
Direct Jobs	17,913		10,699		28,612	
Induced	23,960		10,481		34,442	
Indirect	16,951		6,554		23,505	
Total	58,825		27,734		86,559	
	US $	**Cdn $**	**US $**	**Cdn $**	**US $**	**Cdn $**
Economic Activity (1,000)	$6,786,850	$8,812,046	$2,840,961	$3,688,703	$9,627,810	$12,500,749
Personal Income (1,000)						
Direct	$697,897	$906,150	$426,183	$553,357	$1,124,081	$1,459,506
Re-Spending/Local Consumption	$1,057,454	$1,372,998	$377,856	$490,608	$1,435,309	$1,863,606
Indirect	$737,746	$957,889	$266,235	$345,680	$1,003,981	$1,303,569
Total	$2,493,096	$3,237,036	$1,070,274	$1,389,644	$3,563,371	$4,626,681
Business Revenue (1,000)	$5,729,396	$7,439,048	$2,463,105	$3,198,096	$8,192,501	$10,637,143
Local Purchases (1,000)	$1,831,120	$2,377,526	$687,265	$892,344	$2,518,385	$3,269,871
Taxes (1,000)						
Federal	$781,684	$1,014,938	$335,685	$435,854	$1,117,369	$1,450,792
Provincial and Local	$478,316	$621,046	$341,752	$443,731	$820,068	$1,064,777
Total	$1,260,000	$1,635,984	$677,437	$879,584	$1,937,437	$2,515,569

EXHIBIT III-25
Economic Impacts by State – U.S. Flag Vessels

	Indiana		Ohio		Michigan	
Tonnage Handled (1,000): Metric Tons (Short Tons)	**25,307 (27,896)**		**30,373 (33,481)**		**52,627 (58,011)**	
Jobs						
Direct Jobs	15,817		6,688		9,657	
Induced	15,969		6,268		7,224	
Indirect	22,048		10,595		5,499	
Total	53,834		23,551		22,380	
	US $	**Cdn $**	**US $**	**Cdn $**	**US $**	**Cdn $**
Economic Activity (1,000)	$10,866,634	$14,109,238	$2,923,291	$3,795,601	$3,820,280	$4,960,252
Personal Income (1,000)						
Direct	$991,240	$1,287,026	$351,502	$456,390	$468,955	$608,892
Re-Spending/Local Consumption	$2,013,307	$2,614,078	$758,612	$984,982	$844,495	$1,096,492
Indirect	$1,015,242	$1,318,190	$494,917	$642,600	$233,143	$302,713
Total	$4,019,789	$5,219,294	$1,605,031	$2,083,972	$1,546,593	$2,008,096
Business Revenue (1,000)	$8,853,327	$11,495,160	$2,164,679	$2,810,619	$2,975,785	$3,863,760
Local Purchases (1,000)	$2,110,726	$2,740,567	$983,835	$1,277,411	$590,964	$767,308
Taxes (1,000)						
Federal	$1,357,649	$1,762,771	$462,608	$600,650	$497,380	$645,798
State and Local	$505,827	$656,765	$157,293	$204,229	$181,089	$235,126
Total	$1,863,475	$2,419,536	$619,901	$804,879	$678,469	$880,924

EXHIBIT III-25 Continued

	Minnesota		Illinois		Wisconsin	
Tonnage Handled (1,000): Metric Tons (Short Tons)	**27,429 (30,235)**		**8,834 (9,737)**		**19,476 (21,468)**	
Jobs						
Direct Jobs	1,822		2,225		2,153	
Induced	1,539		1,983		1,547	
Indirect	1,682		667		1,365	
Total	5,044		4,876		5,064	
	US $	**Cdn $**	**US $**	**Cdn $**	**US $**	**Cdn $**
Economic Activity (1,000)	$1,295,250	$1,681,753	$635,859	$825,599	$1,001,861	$1,300,816
Personal Income (1,000)						
Direct	$82,373	$106,953	$97,363	$126,416	$98,009	$127,255
Re-Spending/Local Consumption	$177,086	$229,928	$256,969	$333,649	$163,215	$211,918
Indirect	$79,308	$102,974	$34,908	$45,325	$60,728	$78,849
Total	$338,767	$439,855	$389,240	$505,390	$321,952	$418,022
Business Revenue (1,000)	$1,118,164	$1,451,825	$378,890	$491,950	$838,646	$1,088,898
Local Purchases (1,000)	$175,387	$227,722	$67,579	$87,744	$145,799	$189,305
Taxes (1,000)						
Federal	$135,995	$176,575	$103,716	$134,665	$116,251	$150,941
State and Local	$58,503	$75,960	$48,689	$63,218	$48,665	$63,187
Total	$194,497	$252,536	$152,405	$197,883	$164,917	$214,128

EXHIBIT III-25 Continued

	New York		Pennsylvania		Total US	
Tonnage Handled (1,000): Metric Tons (Short Tons)	**374 (412)**		**551 (608)**		**164,971 (181,848)**	
Jobs						
Direct Jobs	242		267		38,870	
Induced	174		210		34,914	
Indirect	35		217		42,110	
Total	451		694		115,894	
	US $	**Cdn $**	**US $**	**Cdn $**	**US $**	**Cdn $**
Economic Activity (1,000)	$40,914	$53,123	$83,170	$107,988	$20,667,259	$26,834,369
Personal Income (1,000)						
Direct	$11,556	$15,004	$11,654	$15,132	$2,112,652	$2,743,068
Re-Spending/Local Consumption	$19,256	$25,002	$24,967	$32,418	$4,257,907	$5,528,466
Indirect	$1,800	$2,337	$8,838	$11,475	$1,928,883	$2,504,462
Total	$32,612	$42,343	$45,460	$59,025	$8,299,443	$10,775,996
Business Revenue (1,000)	$21,658	$28,120	$58,203	$75,570	$16,409,352	$21,305,902
Local Purchases (1,000)	$5,201	$6,753	$26,647	$34,598	$4,106,138	$5,331,409
Taxes (1,000)						
Federal	$8,105	$10,523	$12,922	$16,778	$2,694,625	$3,498,702
State and Local	$4,449	$5,777	$5,845	$7,589	$1,010,361	$1,311,852
Total	$12,554	$16,300	$18,768	$24,368	$3,704,986	$4,810,554

EXHIBIT III-26
Economic Impacts by Province – U.S. Flag Vessels

	Ontario		Quebec		Total	
Tonnage Handled (1,000): Metric Tons (Short Tons)	**2,124 (2,341)**		**453 (499)**		**2,577 (2,840)**	
Jobs						
Direct Jobs	583		69		652	
Induced	767		66		832	
Indirect	692		35		728	
Total	2,042		170		2,212	
	US $	**Cdn $**	**US $**	**Cdn $**	**US $**	**Cdn $**
Economic Activity (1,000)	$198,331	$257,513	$27,292	$35,436	$225,623	$292,949
Personal Income (1,000)						
Direct	$22,238	$28,874	$2,637	$3,424	$24,875	$32,298
Re-Spending/Local Consumption	$33,695	$43,749	$2,413	$3,133	$36,108	$46,882
Indirect	$30,183	$39,189	$1,388	$1,802	$31,570	$40,991
Total	$86,115	$111,812	$6,438	$8,359	$92,553	$120,171
Business Revenue (1,000)	$164,637	$213,764	$24,879	$32,303	$189,516	$246,067
Local Purchases (1,000)	$74,707	$97,000	$3,944	$5,121	$78,651	$102,121
Taxes (1,000)						
Federal	$25,936	$33,675	$2,341	$3,040	$28,277	$36,715
Provincial and Local	$15,757	$20,458	$2,293	$2,977	$18,050	$23,436
Total	$41,693	$54,134	$4,634	$6,017	$46,327	$60,151

EXHIBIT III-27
Economic Impacts by State – Foreign-Flag Vessels

	Indiana		Ohio		Michigan	
Tonnage Handled (1,000): Metric Tons (Short Tons)	**392 (432)**		**1,180 (1,300)**		**399 (440)**	
Jobs						
Direct Jobs	2,003		943		185	
Induced	1,833		787		136	
Indirect	2,792		1,417		32	
Total	6,628		3,148		353	
	US $	**Cdn $**	**US $**	**Cdn $**	**US $**	**Cdn $**
Economic Activity (1,000)	$1,231,767	$1,599,326	$239,113	$310,465	$28,177	$36,584
Personal Income (1,000)						
Direct	$110,786	$143,845	$42,500	$55,182	$8,776	$11,394
Re-Spending/Local Consumption	$225,018	$292,163	$91,723	$119,093	$15,803	$20,519
Indirect	$128,554	$166,914	$66,871	$86,825	$1,102	$1,431
Total	$464,358	$602,922	$201,094	$261,100	$25,681	$33,344
Business Revenue (1,000)	$1,006,749	$1,307,163	$147,390	$191,372	$12,374	$16,066
Local Purchases (1,000)	$267,268	$347,021	$129,232	$167,795	$3,735	$4,849
Taxes (1,000)						
Federal	$155,907	$202,429	$50,778	$65,931	$6,111	$7,934
State and Local	$58,208	$75,578	$19,707	$25,588	$2,562	$3,327
Total	$214,115	$278,007	$70,485	$91,518	$8,673	$11,261

EXHIBIT III-27 Continued

	Minnesota		Illinois		Wisconsin	
Tonnage Handled (1,000): Metric Tons (Short Tons)	**224 (247)**		**727 (802)**		**1,011 (1,114)**	
Jobs						
Direct Jobs	72		481		245	
Induced	70		458		198	
Indirect	130		142		126	
Total	272		1,082		569	
	US $	**Cdn $**	**US $**	**Cdn $**	**US $**	**Cdn $**
Economic Activity (1,000)	$17,091	$22,191	$133,774	$173,692	$67,619	$87,796
Personal Income (1,000)						
Direct	$3,953	$5,133	$22,997	$29,860	$13,164	$17,092
Re-Spending/Local Consumption	$8,498	$11,034	$60,697	$78,809	$21,922	$28,463
Indirect	$6,098	$7,918	$7,442	$9,663	$5,606	$7,278
Total	$18,550	$24,085	$91,136	$118,331	$40,691	$52,834
Business Revenue (1,000)	$8,592	$11,156	$73,077	$94,883	$45,697	$59,333
Local Purchases (1,000)	$13,321	$17,295	$14,376	$18,665	$13,627	$17,693
Taxes (1,000)						
Federal	$4,394	$5,705	$23,377	$30,353	$11,196	$14,536
State and Local	$2,172	$2,820	$11,158	$14,487	$5,198	$6,749
Total	$6,566	$8,525	$34,535	$44,840	$16,394	$21,285

EXHIBIT III-27 Continued

	New York		Pennsylvania		Total US	
Tonnage Handled (1,000): Metric Tons (Short Tons)	**0 (0)***		**0 (0)****		**3,933 (4,335)**	
Jobs						
Direct Jobs	37		0		3,966	
Induced	42		0		3,525	
Indirect	5		0		4,645	
Total	84		0		12,136	
	US $	**Cdn $**	**US $**	**Cdn $**	**US $**	**Cdn $**
Economic Activity (1,000)	$10,996	$14,278	$29	$38	$1,728,565	$2,244,369
Personal Income (1,000)						
Direct	$3,479	$4,518	$4	$5	$205,659	$267,028
Re-Spending/Local Consumption	$5,798	$7,528	$9	$11	$429,467	$557,620
Indirect	$272	$354	$3	$4	$215,949	$280,388
Total	$9,550	$12,399	$16	$20	$851,075	$1,105,036
Business Revenue (1,000)	$5,198	$6,750	$20	$26	$1,299,098	$1,686,748
Local Purchases (1,000)	$787	$1,022	$9	$12	$442,353	$574,352
Taxes (1,000)						
Federal	$2,307	$2,995	$4	$6	$254,073	$329,889
State and Local	$1,287	$1,671	$2	$3	$100,294	$130,222
Total	$3,594	$4,666	$7	$8	$354,368	$460,111

* New York state jobs and other economic impacts are related to St. Lawrence Seaway management and lock maintenance.
** Pennsylvania tonnage appears as 0 because it is less than 1,000 metric tons.

EXHIBIT III-28
Economic Impacts by Province – Foreign Flag Vessels

	Ontario		Quebec		Total	
Tonnage Handled (1,000): Metric Tons (Short Tons)	**6,943 (7,653)**		**84,150 (92,759)**		**91,093 (100,412)**	
Jobs						
Direct Jobs	3,065		24,161		27,226	
Induced	4,177		25,393		29,570	
Indirect	2,538		32,974		35,512	
Total	9,780		82,529		92,309	
	US $	**Cdn $**	**US $**	**Cdn $**	**US $**	**Cdn $**
Economic Activity (1,000)	$715,043	$928,412	$9,434,819	$12,250,170	$10,149,862	$13,178,581
Personal Income (1,000)						
Direct	$122,244	$158,721	$1,059,305	$1,375,402	$1,181,549	$1,534,123
Re-Spending/Local Consumption	$185,223	$240,494	$913,460	$1,186,036	$1,098,683	$1,426,530
Indirect	$109,908	$142,704	$1,433,250	$1,860,932	$1,543,158	$2,003,636
Total	$417,374	$541,919	$3,406,015	$4,422,370	$3,823,390	$4,964,289
Business Revenue (1,000)	$529,819	$687,917	$8,521,360	$11,064,134	$9,051,179	$11,752,051
Local Purchases (1,000)	$275,278	$357,421	$4,172,412	$5,417,460	$4,447,690	$5,774,881
Taxes (1,000)						
Federal	$117,124	$152,074	$1,090,127	$1,415,421	$1,207,251	$1,567,495
Provincial and Local	$70,201	$91,149	$1,103,698	$1,433,042	$1,173,899	$1,524,190
Total	$187,325	$243,223	$2,193,825	$2,848,463	$2,381,150	$3,091,686

Chapter IV

ST. LAWRENCE SEAWAY IMPACTS

Chapter IV
ST. LAWRENCE SEAWAY IMPACTS

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) or exclusively in the Lower St. Lawrence River and does not utilize U.S. or Canadian Seaway infrastructure.

The impacts are measured for the year 2017 and are presented in terms of total economic impacts at the bi-national regional level, the country level, and the state/provincial level. The impacts are also presented by flag of vessel carriage.

ST. LAWRENCE SEAWAY

Opened to vessel traffic in 1959, the St. Lawrence 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 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 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 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.

TOTAL CARGO VOLUMES

In 2017, a total of **38.1 million metric tons of cargo (41.9 million short tons)** moved through the St. Lawrence Seaway. This tonnage volume represents **US$7.7 billion (Cdn$10.0 billion)** of cargo value.

A majority of the domestic cargo moving on Canadian and U.S. flag vessels remains in the Great Lakes-St. Lawrence Seaway System. This cargo is loaded and unloaded at Great Lakes and St. Lawrence River ports, creating economic impacts at the loading port as well as the port of discharge. This tonnage "handled" represents shipment and receipts of domestic cargo and trans-lake cargo. The actual tons transiting the Seaway lock system and handled at Great Lakes -Seaway system ports is **64 million metric tons (70.5 million short tons).**

This activity created a range of economic impacts in the region — defined as the states of Minnesota, Wisconsin, Illinois, Indiana, Michigan, Ohio, Pennsylvania and New York, and the Canadian provinces of Ontario and Quebec.

EXHIBIT IV-1
St. Lawrence Seaway

2017	Tonnage Moved (1,000 metric tons)	Cargo Value Millions US	Cargo Value Millions Cdn
Steel	2,931	$1,922	$2,496
General Cargo	589	$557	$724
Iron Ore	8,273	$371	$482
Grain	10,230	$2,814	$3,653
Stone/Aggregate	428	$4	$5
Cement	1,580	$171	$222
Salt	3,286	$92	$120
Other Dry Bulk	4,105	$82	$107
Coal	2,923	$210	$272
Other Liquid Bulk	713	$283	$367
Petroleum Products	2,987	$1,186	$1,539
Total	**38,045**	**$7,691**	**$9,986**

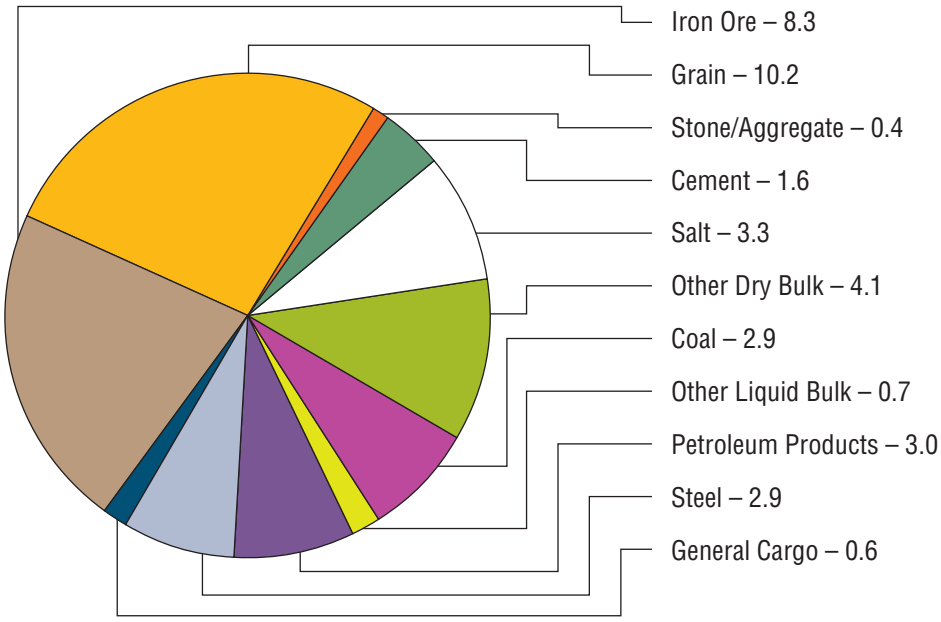
Note: Containerized cargo is included in General Cargo category.

St. Lawrence Seaway

Total Value
of Cargo Moved

US$8 billion
(Cdn$10 billion)

Breakdown of Cargo Type Moved (million metric tons, 2017)



1. TOTAL ECONOMIC IMPACTS

Exhibit IV-2 summarizes the economic impacts of all cargo transiting the St. Lawrence Seaway and handled at the region's ports. 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 US$1.00 = Cdn $1.2984. The exchange rate reflects the annual average for 2017, as of December 31, 2017, and is sourced from "The Board of Governors of the Federal Reserve System Data Download Program."

92,661 jobs in Canada and the United States are generated by the cargo transiting the St. Lawrence Seaway.

Of the 92,661 jobs, 29,624 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 29,624 individuals holding the direct jobs, an additional 34,539 induced jobs were supported in the regional economy.

EXHIBIT IV-2
Economic Impacts – Regional Level

	US $	Cdn $
Jobs		
Direct Jobs	29,624	
Induced	34,539	
Indirect	28,498	
Total	92,661	
Economic Activity (1,000)	$12,948,548	$16,812,394
Personal Income (1,000)		
Direct	$1,350,863	$1,753,960
Re-Spending/Local Purchases	$2,249,589	$2,920,866
Indirect	$1,268,215	$1,646,650
Total	$4,868,667	$6,321,477
Business Revenue (1,000)	$10,698,959	$13,891,528
Local Purchases (1,000)	$2,916,725	$3,787,076
Taxes (1,000)		
Federal	$1,561,869	$2,027,931
State/Provincial and Local	$827,831	$1,074,856
Total	$2,389,700	$3,102,787

28,498 indirect jobs were supported by US$2.9 billion (Cdn$3.8 billion) in regional purchases by businesses supplying services at the marine terminals and ports.

In 2017, the St. Lawrence Seaway marine cargo and vessel activity generated a total of US$12.9 billion (Cdn$16.8 billion) in total economic activity in the United States and Canada.

The total economic activity consists of the direct business revenue received by the businesses supplying the cargo and vessel handling services US$10.7 billion (Cdn$13.9 billion), and the re-spending of direct income and consumption impact of US$2.3 billion (Cdn$2.9 billion).

Marine activity supported US$4.9 billion (Cdn$6.3 billion) in total personal wage and salary income, and local consumption expenditures for regional residents of the U.S. and Canada.

The 29,624 direct job holders received US$1.4 billion (Cdn$1.8 billion) in direct wage and salary income. This equates to an average salary of nearly US$45,600 (Cdn$59,210). The 28,498 indirect jobs holders received US$1.3 billion (Cdn$1.7 billion) in indirect personal income.

A total of US$2.4 billion (Cdn$3.1 billion) in direct, induced and indirect federal, state/provincial and local tax revenue was generated by maritime activity transiting the St. Lawrence Seaway system.

Of the US$2.4 billion (Cdn$1.3 billion), US$800 million (Cdn$1.1 billion) was paid to local and state/provincial governments, while US$1.6 billion (Cdn$2.0 billion) was paid in federal taxes.

Exhibit IV-3 shows the breakdown of the total impacts by country. 19,451 direct jobs or 66 percent were generated in Canada, while 10,173 direct jobs were created in the U.S. When the induced and indirect jobs are considered, each direct job supports a total of about three jobs in both countries.

EXHIBIT IV-3
Economic Impacts – Country Level

	Canada		United States		Total	
Jobs						
Direct Jobs	19,451		10,173		29,624	
Induced	24,966		9,572		34,539	
Indirect	15,390		13,109		28,498	
Total	59,806		32,855		92,661	
	US $	**Cdn $**	**US $**	**Cdn $**	**US $**	**Cdn $**
Economic Activity (1,000)	$7,076,236	$9,187,784	$5,872,312	$7,624,610	$12,948,548	$16,812,394
Personal Income (1,000)						
Direct	$773,169	$1,003,883	$577,694	$750,078	$1,350,863	$1,753,960
Re-Spending/Local Consumption	$1,068,180	$1,386,925	$1,181,409	$1,533,941	$2,249,589	$2,920,866
Indirect	$662,617	$860,342	$605,598	$786,309	$1,268,215	$1,646,650
Total	$2,503,966	$3,251,150	$2,364,701	$3,070,327	$4,868,667	$6,321,477
Business Revenue (1,000)	$6,008,055	$7,800,859	$4,690,903	$6,090,669	$10,698,959	$13,891,528
Local Purchases (1,000)	$1,660,900	$2,156,513	$1,255,824	$1,630,563	$2,916,725	$3,787,076
Taxes (1,000)						
Federal	$793,210	$1,029,903	$768,660	$998,028	$1,561,869	$2,027,931
State/Provincial and Local	$536,124	$696,103	$291,707	$378,753	$827,831	$1,074,856
Total	$1,329,334	$1,726,007	$1,060,367	$1,376,780	$2,389,700	$3,102,787

The re-spending multiplier in Canada is slightly less than in the U.S., reflecting a higher savings rate compared to the U.S. In contrast, the induced jobs supported by a dollar of re-spending by individuals in Canada's two provinces is nearly three times as great as in the U.S. Great Lakes regional economy. This reflects the fact that less out-of-region spending occurs in Ontario and Quebec. This is consistent with a larger concentration of national population and employment in those two major eastern provinces, compared to the U.S. Great Lakes states.

2. JOB IMPACTS

This section focuses on the **29,624 direct jobs** created by the **64 million metric tons (70.5 million short tons)** of cargo that transited the St. Lawrence Seaway and was handled at system ports and marine terminals. **Exhibit IV-4** shows the direct jobs impact by commodity. The movement of iron ore, which represents the largest tonnage handled at the ports and marine terminals, created the largest number of direct jobs — 9,713. The majority of these jobs are with shippers/consignees (steel mills) located at the ports that are directly dependent on the receipt of iron ore by vessels. The movement of steel products through the Seaway created the second largest direct job impact, despite the fact that tonnage of steel products is smaller than other commodities. This represents the fact that break bulk cargoes such as iron and steel products support more jobs on a per ton basis than bulk cargoes, as the break bulk cargoes are more labor intensive in the ship discharge, and use truck transportation to a much greater extent than bulk cargoes, such as grain, which are more dependent on rail to move the grain from inland farms to export elevators at the Great Lakes ports. The movement of steel products, iron ore and grain account for 65 percent of the total direct jobs generated by cargo moving through the Seaway lock system.

EXHIBIT IV-4
Direct Jobs by Commodity – Regional Level

	1,000 Metric Tons	1,000 Short Tons	Direct Jobs
Steel	2,938	3,239	7,393
General Cargo	903	996	403
Iron Ore	16,533	18,224	9,713
Grain	16,431	18,112	2,203
Stone/Aggregate	774	854	456
Cement	2,965	3,268	754
Salt	6,519	7,186	1,408
Other Dry Bulk	5,531	6,096	2,046
Liquid Bulk	5,914	6,519	1,800
Coal	5,448	6,006	553
Not Allocated			2,894
Total	**63,956**	**70,499**	**29,624**

Note: Containerized cargo is included in General Cargo category.

Exhibit IV-5 shows the direct jobs by commodity for each country.

Canadian ports handle 74 percent of the cargo transiting the St. Lawrence Seaway lock system, and 66 percent of the direct jobs are generated in Canada. There is a higher concentration of steel-related direct jobs in the U.S. because of the location of a large steel processing campus at one U.S. port. Iron ore transiting the Seaway lock system created the largest job impact in Canada, reflecting the consumption of ore at the steel mills located in the Hamilton, Ontario area.

EXHIBIT IV-5
Direct Jobs by Commodity – Country Level

	Canada			United States			Total		
	1,000 Metric Tons	1,000 Short Tons	Direct Jobs	1,000 Metric Tons	1,000 Short Tons	Direct Jobs	1,000 Metric Tons	1,000 Short Tons	Direct Jobs
Steel	1,254	1,382	1,350	1,684	1,857	6,042	2,938	3,239	7,393
General Cargo	505	557	222	398	439	181	903	996	403
Iron Ore	10,150	11,188	9,084	6,383	7,036	628	16,533	18,224	9,713
Grain	14,626	16,122	1,759	1,805	1,989	444	16,431	18,112	2,203
Stone/Aggregate	635	700	86	139	153	370	774	854	456
Cement	1,515	1,670	437	1,450	1,599	317	2,965	3,268	754
Salt	5,736	6,322	1,091	783	863	318	6,519	7,186	1,408
Other Dry Bulk	4,130	4,553	1,302	1,401	1,544	744	5,531	6,096	2,046
Liquid Bulk	5,621	6,196	1,677	293	323	124	5,914	6,519	1,800
Coal	2,898	3,195	286	2,550	2,811	267	5,448	6,006	553
Not Allocated			2,156			738			2,894
Total	**47,070**	**51,885**	**19,451**	**16,886**	**18,614**	**10,173**	**63,956**	**70,499**	**29,624**

Note: Containerized cargo is included in General Cargo category.

The direct jobs generated by category are presented in **Exhibit IV-6**. 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. The St. Lawrence Seaway is an important transportation corridor for ships to deliver iron ore to Ontario steel mills. In addition, large steel fabrication facilities located in such ports as Burns Harbor, Chicago and Cleveland receive imported iron and steel products via the Seaway lock system. 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.

EXHIBIT IV-6
Direct Jobs by Category – Regional Level

	Total
Surface Transportation	
Rail	616
Truck	5,828
Maritime Service	
Terminal Employees	2,373
Dockworkers	803
Tug Assists	274
Pilots	113
Agents	168
Maritime Services	279
Forwarders	670
Government	414
Marine Equipment/Ship Repair	954
Laker	1,115
Barge	341
Dependent Shippers/Consignees	14,849
Port Authority	829
Total	**29,624**

Exhibit IV-7 shows the direct job impacts by category, by country. The number of direct jobs with dependent shippers/consignees is greater in Canada than in the United States, reflecting the location of steel mills in Ontario that receive iron ore moving through the Seaway lock system, as well as dependent shippers/consignees shipping and receiving fertilizer, petroleum products and salt.

EXHIBIT IV-7
Direct Jobs by Category – Country Level

	Canada Direct Jobs	United States Direct Jobs	Total
Surface Transportation			
Rail	319	297	616
Truck	3,742	2,086	5,828
Maritime Service			
Terminal Employees	1,500	872	2,373
Dockworkers	471	332	803
Tug Assists	206	68	274
Pilots	75	38	113
Agents	96	71	168
Maritime Services	148	130	279
Forwarders	493	177	670
Government	307	107	414
Marine Equipment/Ship Repair	733	221	954
Laker	749	366	1,115
Barge	267	74	341
Dependent Shippers/Consignees	9,663	5,186	14,849
Port Authority	683	146	829
Total	**19,451**	**10,173**	**29,624**

3. REVENUE IMPACTS

In 2017, the direct business revenue received by firms dependent upon Seaway cargo handled at the marine terminals located in the Great Lakes-Seaway system was US$10.7 billion (Cdn$13.9 billion). These firms provide maritime services and inland transportation services for the cargo. **Exhibit IV-8** shows the distribution of this direct revenue impact by category and economic sector in both U.S. and Canadian dollars.

EXHIBIT IV-8
Revenue Impact by Category – Regional Level

	Revenue Million US	Revenue Million Cdn
Surface Transportation		
Rail	$898	$1,166
Truck	$526	$683
Maritime Service		
Terminal Employees	$324	$421
Tug Assists	$23	$30
Pilots	$37	$48
Agents	$22	$29
Maritime Services	$106	$138
Forwarders	$99	$129
Marine Equipment/Ship Repair	$151	$195
Laker	$418	$543
Barge	$50	$65
Dependent Shippers/Consignees	$7,921	$10,285
Port Authority	$123	$160
Total	**$10,699**	**$13,892**

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 system.

The revenue impacts by category, by country, are presented in **Exhibit IV-9**.

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 goods to and from U.S. ports, particularly the movement of coal from Ohio, West Virginia and the Powder River Basin area that then moves through the Seaway lock system to ports in Ontario.

EXHIBIT IV-9 **Revenue Impact by Category – Country Level**						
	Canada		**United States**		**Total**	
	Million US	**Million Cdn**	**Million US**	**Million Cdn**	**Million US**	**Million Cdn**
Surface Transportation						
Rail	$409	$531	$489	$635	$898	$1,166
Truck	$283	$368	$243	$315	$526	$683
Maritime Service						
Terminal Employees	$225	$292	$99	$129	$324	$421
Tug Assists	$15	$20	$8	$10	$23	$30
Pilots	$22	$29	$15	$19	$37	$48
Agents	$13	$17	$9	$12	$22	$29
Maritime Services	$72	$93	$34	$45	$106	$138
Forwarders	$68	$88	$32	$41	$99	$129
Marine Equipment/Ship Repair	$119	$155	$31	$41	$151	$195
Laker	$292	$379	$126	$164	$418	$543
Barge	$38	$49	$13	$16	$50	$65
Dependent Shippers/Consignees	$4,354	$5,653	$3,568	$4,632	$7,921	$10,285
Port Authority	$98	$128	$25	$32	$123	$160
Total	**$6,008**	**$7,801**	**$4,691**	**$6,091**	**$10,699**	**$13,892**

4. PERSONAL INCOME AND LOCAL CONSUMPTION IMPACTS

The 29,624 individuals directly employed as a result of the Seaway cargo handled at the ports and marine terminals received US$1.4 billion (Cdn$1.8 billion) in wages and salaries.

The 19,451 direct job holders at the Canadian ports and terminals received US$800 million (Cdn$1.0 billion), for an average salary of US$39,750 (Cdn$51,610).

The 10,173 direct job holders at the U.S. ports received US$600 million (Cdn$800 million) in direct personal income, for an average salary of US$56,750 (Cdn$73,730). This higher salary in the U.S. reflects the concentration of jobs in the U.S. that are dependent on Seaway system traffic at steel fabrication facilities, as well as with terminal operators.

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, RIMS II. 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$2.3 billion (Cdn$2.9 billion) in income and consumption were created in the Great Lakes regional economy.

The re-spending impact and consumption impacts should not be divided by induced jobs to estimate induced income, since the division of the re-spending impact/local consumption impact by the induced jobs will overstate the actual salary of the induced job holders, as this includes the value of the consumption purchases.

The 28,498 indirect job holders received US$1.3 billion (Cdn$1.8 billion) in personal income, of which the 15,390 Canadian indirect job holders received US$700 million (Cdn$900 million), while the 13,109 indirect job holders in the U.S. received US$600 million (Cdn$800 million).

5. FEDERAL, STATE/PROVINCIAL AND LOCAL TAX IMPACTS

The cargo activity at the U.S. ports and marine terminals created US$300 million (Cdn$400 million) in state and local taxes, and US$800 million (Cdn$1.0 billion) in federal taxes. The cargo activity at the Canadian ports created US$500 million (Cdn$700 million) in provincial taxes, and US$800 million (Cdn$1.0 billion) in federal taxes.

6. IMPACTS BY STATE AND PROVINCE

The economic impacts were estimated at the port level for the 40 U.S. and Canadian Great Lakes and St. Lawrence River ports. The models developed for these 40 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.

Exhibit IV-10 presents the U.S. impacts of total Seaway cargo handled at U.S. ports and marine terminals located on the Great Lakes-St. Lawrence Seaway system. In terms of direct, induced and indirect jobs, the impacts are greatest for the state of Indiana, followed by Ohio reflecting ore movements into steel mills located in these states as well as iron and steel imports.

Exhibit IV-11 shows the impacts of cargo transiting the St. Lawrence Seaway for the provinces of Ontario and Quebec.

As this exhibit indicates, the ports in Ontario account for 49,655 direct, induced and indirect jobs, or about 83 percent of the job impacts for Canada. This reflects the movement of iron ore from the upper lakes to the steel mills in Ontario, as well as grain exports from Thunder Bay.

EXHIBIT IV-10
Economic Impacts by State

	Indiana		Ohio		Michigan	
Tonnage Handled (1,000): Metric Tons (Short Tons)	**1,451 (1,599)**		**6,126 (6,753)**		**1,523 (1,678)**	
Jobs						
Direct Jobs	6,175		2,015		482	
Induced	6,218		1,702		340	
Indirect	8,608		3,350		337	
Total	21,002		7,067		1,159	
	US $	**Cdn $**	**US $**	**Cdn $**	**US $**	**Cdn $**
Economic Activity (1,000)	$4,610,939	$5,986,843	$616,554	$800,534	$81,506	$105,828
Personal Income (1,000)						
Direct	$385,752	$500,861	$92,281	$119,818	$21,497	$27,912
Re-Spending/Local Consumption	$783,502	$1,017,299	$199,161	$258,590	$38,713	$50,264
Indirect	$396,371	$514,649	$156,633	$203,373	$14,036	$18,224
Total	$1,565,625	$2,032,808	$448,075	$581,781	$74,246	$96,400
Business Revenue (1,000)	$3,827,437	$4,969,545	$417,393	$541,943	$42,794	$55,564
Local Purchases (1,000)	$824,071	$1,069,974	$308,434	$400,471	$36,592	$47,511
Taxes (1,000)						
Federal	$550,773	$715,123	$118,305	$153,607	$18,074	$23,467
State and Local	$202,319	$262,690	$43,911	$57,015	$7,493	$9,728
Total	$753,091	$977,814	$162,216	$210,621	$25,566	$33,195

EXHIBIT IV-10 Continued

	Minnesota		Illinois		Wisconsin	
Tonnage Handled (1,000): Metric Tons (Short Tons)	**3,356 (3,699)**		**786 (866)**		**3,415 (3,764)**	
Jobs						
Direct Jobs	284		501		460	
Induced	251		476		351	
Indirect	351		148		271	
Total	886		1,125		1,082	
	US $	**Cdn $**	**US $**	**Cdn $**	**US $**	**Cdn $**
Economic Activity (1,000)	$165,468	$214,844	$139,051	$180,544	$195,722	$254,125
Personal Income (1,000)						
Direct	$13,641	$17,711	$23,859	$30,978	$22,786	$29,586
Re-Spending/Local Consumption	$29,325	$38,076	$62,970	$81,760	$37,946	$49,269
Indirect	$16,534	$21,468	$7,750	$10,062	$12,061	$15,660
Total	$59,500	$77,255	$94,578	$122,801	$72,794	$94,515
Business Revenue (1,000)	$136,143	$176,768	$76,081	$98,783	$157,776	$204,856
Local Purchases (1,000)	$36,380	$47,235	$14,970	$19,437	$28,982	$37,630
Taxes (1,000)						
Federal	$20,391	$26,476	$24,274	$31,518	$24,438	$31,730
State and Local	$9,094	$11,808	$11,583	$15,039	$10,500	$13,633
Total	$29,486	$38,284	$35,857	$46,557	$34,938	$45,363

EXHIBIT IV-10 Continued

	New York		Pennsylvania		Total US	
Tonnage Handled (1,000): Metric Tons (Short Tons)	**230 (253)**		**0 (0)***		**16,886 (18,614)**	
Jobs						
Direct Jobs	255		0		10,173	
Induced	234		0		9,572	
Indirect	43		0		13,109	
Total	533		0		32,855	
	US $	**Cdn $**	**US $**	**Cdn $**	**US $**	**Cdn $**
Economic Activity (1,000)	$63,042	$81,854	$29	$38	$5,872,312	$7,624,610
Personal Income (1,000)						
Direct	$17,873	$23,206	$4	$5	$577,694	$750,078
Re-Spending/Local Consumption	$29,783	$38,671	$9	$11	$1,181,409	$1,533,941
Indirect	$2,210	$2,870	$3	$4	$605,598	$786,309
Total	$49,866	$64,747	$16	$20	$2,364,701	$3,070,327
Business Revenue (1,000)	$33,259	$43,184	$20	$26	$4,690,903	$6,090,669
Local Purchases (1,000)	$6,387	$8,294	$9	$12	$1,255,824	$1,630,563
Taxes (1,000)						
Federal	$12,401	$16,101	$4	$6	$768,660	$998,028
State and Local	$6,805	$8,836	$2	$3	$291,707	$378,753
Total	$19,206	$24,937	$7	$8	$1,060,367	$1,376,780

* Pennsylvania tonnage appears as 0 because it is less than 1,000 metric tons.

EXHIBIT IV-11
Economic Impacts by Province

	Ontario		Quebec		Total	
Tonnage Handled (1,000): Metric Tons (Short Tons)	**29,916 (32,977)**		**17,154 (18,908)**		**47,070 (51,885)**	
Jobs						
Direct Jobs	15,689		3,762		19,451	
Induced	21,219		3,747		24,966	
Indirect	12,747		2,642		15,390	
Total	49,655		10,152		59,806	
	US $	**Cdn $**	**US $**	**Cdn $**	**US $**	**Cdn $**
Economic Activity (1,000)	$6,064,386	$7,873,999	$1,011,850	$1,313,785	$7,076,236	$9,187,784
Personal Income (1,000)						
Direct	$619,825	$804,781	$153,344	$199,102	$773,169	$1,003,883
Re-Spending/Local Consumption	$939,159	$1,219,404	$129,022	$167,522	$1,068,180	$1,386,925
Indirect	$553,255	$718,347	$109,362	$141,995	$662,617	$860,342
Total	$2,112,239	$2,742,531	$391,727	$508,619	$2,503,966	$3,251,150
Business Revenue (1,000)	$5,125,227	$6,654,595	$882,828	$1,146,264	$6,008,055	$7,800,859
Local Purchases (1,000)	$1,379,579	$1,791,246	$281,321	$365,268	$1,660,900	$2,156,513
Taxes (1,000)						
Federal	$670,945	$871,154	$122,265	$158,749	$793,210	$1,029,903
Provincial and Local	$411,481	$534,267	$124,643	$161,836	$536,124	$696,103
Total	$1,082,426	$1,405,422	$246,908	$320,585	$1,329,334	$1,726,007

7. IMPACTS BY VESSEL FLAG

This section presents the impacts of cargo transiting the St. Lawrence Seaway 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. Due to the carriage laws in each country, Canadian flag vessels move cargo to and from Canadian ports, while U.S. flag vessels move cargo to and from U.S ports. Canadian flag and U.S. flag vessels also move cargo between U.S. and Canadian ports in cross-lake operations. Canadian flag vessels often move cargo from ports 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. Foreign flag vessels move international cargo to and from both St. Lawrence River ports and Great Lakes ports and overseas destinations.

Based on the detailed commodity flow data collected for this study, 38.1 million metric tons of cargo (41.9 million short tons) moved through the St. Lawrence Seaway Locks in 2017. This cargo represents US$7.7 billion (Cdn$10.0 billion) of cargo value.

Of this total, 26.3 million metric tons (29.0 million short tons) were moved on Canadian Flag vessels; 600,000 metric tons (700 million short tons) moved on U.S. flag vessels. The balance, 11.2 million metric tons (12.3 million short tons) moved on foreign flag vessels.

In terms of value of cargo moved by flag, Canadian flag carriers moved US$3.7 billion (Cdn$4.8 billion), U.S. flag carriers moved US$68 million (Cdn$89 million), and foreign flag carriers moved US$3.9 billion (Cdn$5.1 billion).

Exhibits IV-12 through **IV-28** summarize the economic impacts of cargo transiting the Seaway locks by flag of vessel carriage. These tables show impacts at the bi-national regional level, by country, by state/province, by commodity and by job category.

EXHIBIT IV-12
Economic Impacts by Flag of Carriage – Regional Level

	Canadian Flag		U.S. Flag		Foreign Flag		Total	
Jobs								
Direct Jobs	21,936		317		7,371		29,624	
Induced	26,083		354		8,101		34,539	
Indirect	20,851		252		7,396		28,498	
Total	68,870		923		22,868		92,661	
	US $	**Cdn $**	**US $**	**Cdn $**	**US $**	**Cdn $**	**US $**	**Cdn $**
Economic Activity (1,000)	$10,471,829	$13,596,623	$130,405	$169,317	$2,346,314	$3,046,454	$12,948,548	$16,812,394
Personal Income (1,000)								
Direct	$992,206	$1,288,281	$12,977	$16,849	$345,679	$448,830	$1,350,863	$1,753,960
Re-Spending/ Local Consumption	$1,597,005	$2,073,552	$19,528	$25,355	$633,056	$821,960	$2,249,589	$2,920,866
Indirect	$922,719	$1,198,059	$11,016	$14,304	$334,479	$434,288	$1,268,215	$1,646,650
Total	$3,511,931	$4,559,892	$43,521	$56,508	$1,313,214	$1,705,078	$4,868,667	$6,321,477
Business Revenue (1,000)	$8,874,824	$11,523,071	$110,877	$143,963	$1,713,258	$2,224,494	$10,698,959	$13,891,528
Local Purchases (1,000)	$2,149,435	$2,790,826	$26,736	$34,714	$740,555	$961,536	$2,916,725	$3,787,076
Taxes (1,000)								
Federal	$1,173,826	$1,524,096	$14,236	$18,484	$373,807	$485,351	$1,561,869	$2,027,931
State/Provincial and Local	$639,766	$830,672	$8,647	$11,227	$179,419	$232,958	$827,831	$1,074,856
Total	$1,813,592	$2,354,768	$22,883	$29,711	$553,226	$718,309	$2,389,700	$3,102,787

EXHIBIT IV-13
Economic Impacts Canadian Flag – Country Level

Impacts	Canada		United States		Total	
Jobs						
Direct Jobs	15,809		6,127		21,936	
Induced	20,123		5,960		26,083	
Indirect	12,561		8,290		20,851	
Total	48,493		20,377		68,870	
	US $	**Cdn $**	**US $**	**Cdn $**	**US $**	**Cdn $**
Economic Activity (1,000)	$6,206,225	$8,058,163	$4,265,604	$5,538,460	$10,471,829	$13,596,623
Personal Income (1,000)						
Direct	$625,837	$812,587	$366,369	$475,694	$992,206	$1,288,281
Re-Spending/Local Consumption	$856,086	$1,111,542	$740,920	$962,010	$1,597,005	$2,073,552
Indirect	$540,888	$702,289	$381,831	$495,770	$922,719	$1,198,059
Total	$2,022,811	$2,626,418	$1,489,120	$1,933,474	$3,511,931	$4,559,892
Business Revenue (1,000)	$5,350,140	$6,946,621	$3,524,684	$4,576,450	$8,874,824	$11,523,071
Local Purchases (1,000)	$1,354,004	$1,758,039	$795,431	$1,032,787	$2,149,435	$2,790,826
Taxes (1,000)						
Federal	$656,679	$852,632	$517,147	$671,464	$1,173,826	$1,524,096
State/Provincial and Local	$448,902	$582,854	$190,864	$247,818	$639,766	$830,672
Total	$1,105,581	$1,435,486	$708,011	$919,281	$1,813,592	$2,354,768

EXHIBIT IV-14
Economic Impacts by U.S. Flag – Country Level

Impacts	Canada		United States		Total	
Jobs						
Direct Jobs	237		80		317	
Induced	292		63		354	
Indirect	176		76		252	
Total	704		219		923	
	US $	**Cdn $**	**US $**	**Cdn $**	**US $**	**Cdn $**
Economic Activity (1,000)	$97,371	$126,427	$33,034	$42,891	$130,405	$169,317
Personal Income (1,000)						
Direct	$9,230	$11,984	$3,748	$4,866	$12,977	$16,849
Re-Spending/Local Consumption	$12,401	$16,102	$7,127	$9,253	$19,528	$25,355
Indirect	$7,537	$9,786	$3,480	$4,518	$11,016	$14,304
Total	$29,167	$37,871	$14,354	$18,637	$43,521	$56,508
Business Revenue (1,000)	$84,970	$110,325	$25,907	$33,638	$110,877	$143,963
Local Purchases (1,000)	$19,190	$24,917	$7,545	$9,797	$26,736	$34,714
Taxes (1,000)						
Federal	$9,719	$12,619	$4,517	$5,865	$14,236	$18,484
State/Provincial and Local	$6,835	$8,874	$1,812	$2,353	$8,647	$11,227
Total	$16,554	$21,494	$6,329	$8,217	$22,883	$29,711

EXHIBIT IV-15
Economic Impacts by Foreign Flag – Country Level

Impacts	Canada		United States		Total	
Jobs						
Direct Jobs	3,405		3,966		7,371	
Induced	4,551		3,550		8,101	
Indirect	2,652		4,743		7,396	
Total	10,609		12,259		22,868	
	US $	**Cdn $**	**US $**	**Cdn $**	**US $**	**Cdn $**
Economic Activity (1,000)	$772,639	$1,003,195	$1,573,675	$2,043,259	$2,346,314	$3,046,454
Personal Income (1,000)						
Direct	$138,103	$179,312	207,577	269,518	$345,679	$448,830
Re-Spending/Local Consumption	$199,694	$259,282	433,362	562,678	$633,056	$821,960
Indirect	$114,192	$148,267	220,287	286,021	$334,479	$434,288
Total	$451,988	$586,861	$861,227	$1,118,217	$1,313,214	$1,705,078
Business Revenue (1,000)	$572,946	$743,913	$1,140,312	$1,480,581	$1,713,258	$2,224,494
Local Purchases (1,000)	$287,706	$373,558	$452,849	$587,979	$740,555	$961,536
Taxes (1,000)						
Federal	$126,811	$164,652	$246,996	$320,699	$373,807	$485,351
State/Provincial and Local	$80,388	$104,375	$99,031	$128,582	$179,419	$232,958
Total	$207,199	$269,027	$346,027	$449,282	$553,226	$718,309

EXHIBIT IV-16
Direct Jobs by Commodity and Flag – Regional Level

	Direct Jobs Canadian Flag	Direct Jobs US Flag	Direct Jobs Foreign Flag	Total
Steel	2,931	NA	4,462	7,393
General Cargo	332	NA	72	403
Iron Ore	9,527	185	NA	9,713
Grain	1,503	NA	701	2,203
Stone/Aggregate	361	NA	95	456
Cement	701	NA	53	754
Salt	1,387	18	4	1,408
Other Dry Bulk	1,479	NA	567	2,046
Liquid Bulk	959	51	790	1,800
Coal	552	NA	1	553
Not Allocated	2,204	62	628	2,894
Total	**21,936**	**317**	**7,371**	**29,624**

Note: Containerized cargo is included in General Cargo category.

EXHIBIT IV-17
Direct Jobs by Commodity and Flag – Regional Level

	Canada				United States				
	Canadian Flag	US Flag	Foreign Flag	Total	Canadian Flag	US Flag	Foreign Flag	Total	Total
Steel	4	NA	1,347	1,350	2,927	NA	3,115	6,042	7,393
General Cargo	214	NA	8	222	118	NA	63	181	403
Iron Ore	8,925	159	NA	9,084	602	26	NA	628	9,713
Grain	1,382	NA	378	1,759	121	NA	323	444	2,203
Stone/Aggregate	86	NA	NA	86	276	NA	95	370	456
Cement	401	NA	36	437	300	NA	17	317	754
Salt	1,086	NA	NA	1,091	301	13	4	318	1,408
Other Dry Bulk	846	NA	456	1,302	633	NA	111	744	2,046
Other Liquid Bulk	864	23	789	1,677	95	28	1	124	1,800
Coal	285	NA	1	286	267	NA	NA	267	553
Not Allocated	1,717	49	390	2,156	488	13	237	738	2,894
Total	**15,809**	**237**	**3,405**	**19,451**	**6,127**	**80**	**3,966**	**10,173**	**29,624**

Note: Containerized cargo is included in General Cargo category.

EXHIBIT IV-18
Direct Jobs by Category and Flag – Regional Level

	Canadian Flag	US Flag	Foreign Flag	Total
Surface Transportation				
Rail	401	9	206	616
Truck	2,668	44	3,116	5,828
Maritime Service				
Terminal Employees	1,398	27	948	2,373
Dockworkers	398	2	403	803
Tug Assists	186	4	83	274
Pilots*	NA	NA	113	113
Maritime Services/Agents	219	5	222	446
Forwarders	535	13	122	670
Government	336	7	71	414
Marine Equipment/Ship Repair	808	28	118	954
Laker	1,086	29	NA	1,115
Barge	253	7	81	341
Dependent Shippers/Consignees	13,060	128	1,660	14,849
Port Authority	589	14	227	829
Total	**21,936**	**317**	**7,371**	**29,624**

* All pilotage jobs have been allocated to foreign flag vessels. Canadian flag vessels, however, are also subject to compulsory pilotage requirements in the St. Lawrence and Great Lakes region. It was not possible to accurately allocate Canadian-flag pilotage impacts due to lack of information as to duration of time pilots spend on these transits versus foreign-flag transits.

EXHIBIT IV-19
Direct Jobs by Category – Country Level

	Canada				United States				
	Canadian Flag	US Flag	Foreign Flag	Total	Canadian Flag	US Flag	Foreign Flag	Total	Total
Surface Transportation									
Rail	265	3	51	319	135	6	156	297	616
Truck	2,144	26	1,572	3,742	524	18	1,544	2,086	5,828
Maritime Service									
Terminal Employees	1,021	12	467	1,500	376	15	481	872	2,373
Dockworkers	326	2	143	471	72	1	260	332	803
Tug Assists	151	2	52	206	35	2	31	68	274
Pilots*	NA	NA	75	75	NA	NA	38	38	113
Maritime Services/Agents	123	2	120	245	97	3	102	201	446
Forwarders	405	6	81	493	129	6	41	177	670
Government	257	4	46	307	79	3	25	107	414
Marine Equipment/Ship Repair	628	26	79	733	180	2	39	221	954
Laker	735	14	NA	749	351	15	NA	366	1,115
Barge	220	6	41	267	33	1	40	74	341
Dependent Shippers/Consignees	9,044	122	497	9,663	4,016	6	1,164	5,186	14,849
Port Authority	489	11	182	683	99	3	44	146	829
Total	**15,809**	**237**	**3,405**	**19,451**	**6,127**	**80**	**3,966**	**10,173**	**29,624**

* All pilotage jobs have been allocated to foreign flag vessels. Canadian flag vessels, however, are also subject to compulsory pilotage requirements in the St. Lawrence and Great Lakes region. It was not possible to accurately allocate Canadian-flag pilotage impacts due to lack of information as to duration of time pilots spend on these transits versus foreign-flag transits.

EXHIBIT IV-20
Revenue Impact by Category – 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
Surface Transportation								
Rail	$658.3	$854.7	$17.4	$22.6	$222.5	$288.9	$898.2	$1,166.2
Truck	$221.4	$287.5	$3.8	$5.0	$300.4	$390.1	$525.7	$682.5
Maritime Service								
Terminal Employees	$246.0	$319.3	$4.2	$5.4	$74.1	$96.2	$324.3	$421.0
Tug Assists	$15.9	$20.7	$0.4	$0.5	$6.7	$8.7	$23.0	$29.8
Pilots*	$0.0	$0.0	$0.0	$0.0	$36.7	$47.6	$36.7	$47.6
Maritime Services/Agents	$85.5	$111.0	$2.8	$3.7	$40.0	$51.9	$128.3	$166.6
Forwarders	$78.9	$102.4	$2.0	$2.6	$18.5	$24.0	$99.4	$129.0
Marine Equipment/Ship Repair	$129.2	$167.8	$6.1	$7.9	$15.2	$19.7	$150.5	$195.4
Laker	$406.6	$527.9	$11.7	$15.2	$0.0	$0.0	$418.3	$543.2
Barge	$36.9	$48.0	$0.9	$1.2	$12.4	$16.1	$50.3	$65.3
Dependent Shippers/Consignees	$6,905.1	$8,965.5	$59.5	$77.3	$956.9	$1,242.4	$7,921.5	$10,285.2
Port Authority	$91.0	$118.2	$2.0	$2.6	$29.9	$38.9	$123.0	$159.7
Total	**$8,874.8**	**$11,523.1**	**$110.9**	**$144.0**	**$1,713.3**	**$2,224.5**	**$10,699.0**	**$13,891.5**

* All pilotage revenue impacts have been allocated to foreign flag vessels. Canadian flag vessels, however, are also subject to compulsory pilotage requirements in the St. Lawrence and Great Lakes region. It was not possible to accurately allocate Canadian-flag pilotage impacts due to lack of information as to duration of time pilots spend on these transits versus foreign-flag transits.

EXHIBIT IV-21
Revenue Impact by Category and Flag – Canada

	Canadian Flag		US Flag		Foreign Flag		Total Canada	
	Millions US	Millions Cdn	Millions US	Millions Cdn	Millions US	Millions Cdn	Millions US	Millions Cdn
Surface Transportation								
Rail	$314.6	$408.4	$9.1	$11.8	$85.5	$111.0	$409.1	$531.2
Truck	$167.9	$218.0	$1.9	$2.5	$113.3	$147.1	$283.1	$367.6
Maritime Service								
Terminal Employees	$187.6	$243.6	$1.9	$2.5	$35.4	$46.0	$224.9	$292.0
Tug Assists	$11.3	$14.7	$0.2	$0.2	$3.8	$4.9	$15.2	$19.8
Pilots*	$0.0	$0.0	$0.0	$0.0	$22.1	$28.7	$22.1	$28.7
Maritime Services/Agents	$61.0	$79.2	$2.1	$2.8	$21.8	$28.3	$84.9	$110.3
Forwarders	$55.8	$72.4	$0.9	$1.1	$11.2	$14.5	$67.8	$88.0
Marine Equipment/Ship Repair	$105.3	$136.7	$5.5	$7.2	$8.2	$10.7	$119.0	$154.5
Laker	$287.2	$372.9	$5.1	$6.6	$0.0	$0.0	$292.3	$379.5
Barge	$31.0	$40.3	$0.9	$1.1	$5.7	$7.4	$37.6	$48.8
Dependent Shippers/Consignees	$4,054.5	$5,264.4	$55.7	$72.4	$243.5	$316.1	$4,353.7	$5,652.8
Port Authority	$74.0	$96.1	$1.7	$2.2	$22.6	$29.3	$98.3	$127.6
Total	**$5,350.1**	**$6,946.6**	**$85.0**	**$110.3**	**$572.9**	**$743.9**	**$6,008.1**	**$7,800.9**

* All pilotage revenue impacts have been allocated to foreign flag vessels. Canadian flag vessels, however, are also subject to compulsory pilotage requirements in the St. Lawrence and Great Lakes region. It was not possible to accurately allocate Canadian-flag pilotage impacts due to lack of information as to duration of time pilots spend on these transits versus foreign-flag transits.

EXHIBIT IV-22
Revenue Impact by Category and Flag – United States

	Canadian Flag		US Flag		Foreign Flag		Total US	
	Millions US	Millions Cdn	Millions US	Millions Cdn	Millions US	Millions Cdn	Millions US	Millions Cdn
Surface Transportation								
Rail	$343.8	$446.3	$8.3	$10.8	$137.0	$177.9	$489.0	$634.96
Truck	$53.5	$69.5	$1.9	$2.5	$187.1	$242.9	$242.5	$314.92
Maritime Service								
Terminal Employees	$58.4	$75.8	$2.3	$3.0	$38.7	$50.2	$99.3	$128.99
Tug Assists	$4.6	$6.0	$0.2	$0.3	$2.9	$3.7	$7.7	$10.04
Pilots*	$0.0	$0.0	$0.0	$0.0	$14.6	$19.0	$14.6	$18.95
Maritime Services/Agents	$24.5	$31.8	$0.7	$0.9	$18.2	$23.6	$43.4	$56.30
Forwarders	$23.1	$30.0	$1.1	$1.5	$7.4	$9.5	$31.6	$41.00
Marine Equipment/Ship Repair	$24.0	$31.1	$0.6	$0.7	$7.0	$9.0	$31.5	$40.87
Laker	$119.4	$155.1	$6.6	$8.6	$0.0	$0.0	$126.1	$163.67
Barge	$5.9	$7.7	$0.0	$0.1	$6.7	$8.7	$12.7	$16.49
Dependent Shippers/Consignees	$2,850.6	$3,701.2	$3.8	$4.9	$713.4	$926.3	$3,567.8	$4,632.42
Port Authority	$17.0	$22.0	$0.4	$0.5	$7.4	$9.6	$24.7	$32.06
Total	**$3,524.7**	**$4,576.4**	**$25.9**	**$33.6**	**$1,140.3**	**$1,480.6**	**$4,690.9**	**$6,090.67**

* All pilotage revenue impacts have been allocated to foreign flag vessels. Canadian flag vessels, however, are also subject to compulsory pilotage requirements in the St. Lawrence and Great Lakes region. It was not possible to accurately allocate Canadian-flag pilotage impacts due to lack of information as to duration of time pilots spend on these transits versus foreign-flag transits.

EXHIBIT IV-23
Economic Impacts by State – Cargo on Canadian Flag Vessels

	Indiana		Ohio		Michigan	
Tonnage Handled (1,000): Metric Tons (Short Tons)	**1,059 (1,168)**		**4,778 (5,267)**		**1,040 (1,146)**	
Jobs						
Direct Jobs	4,173		1,051		286	
Induced	4,361		896		196	
Indirect	5,816		1,906		200	
Total	14,350		3,853		682	
	US $	**Cdn $**	**US $**	**Cdn $**	**US $**	**Cdn $**
Economic Activity (1,000)	$3,534,063	$4,588,627	$367,465	$477,116	$51,276	$66,577
Personal Income (1,000)						
Direct	$273,048	$354,526	$48,758	$63,307	$12,248	$15,903
Re-Spending/Local Consumption	$554,589	$720,078	$105,230	$136,630	$22,057	$28,639
Indirect	$267,818	$347,735	$88,490	$114,895	$8,314	$10,795
Total	$1,095,455	$1,422,339	$242,478	$314,833	$42,619	$55,337
Business Revenue (1,000)	$2,979,474	$3,868,549	$262,235	$340,486	$29,219	$37,938
Local Purchases (1,000)	$556,804	$722,955	$176,768	$229,515	$21,657	$28,120
Taxes (1,000)						
Federal	$402,855	$523,067	$66,130	$85,863	$10,645	$13,821
State and Local	$145,781	$189,282	$23,763	$30,854	$4,357	$5,657
Total	$548,636	$712,349	$89,893	$116,717	$15,002	$19,478

EXHIBIT IV-23 Continued

	Minnesota		Illinois		Wisconsin	
Tonnage Handled (1,000): Metric Tons (Short Tons)	**2,961 (3,264)**		**59 (65)**		**2,228 (2,456)**	
Jobs						
Direct Jobs	198		20		183	
Induced	168		18		130	
Indirect	199		6		126	
Total	566		43		438	
	US $	**Cdn $**	**US $**	**Cdn $**	**US $**	**Cdn $**
Economic Activity (1,000)	$139,478	$181,098	$5,277	$6,852	$116,599	$151,393
Personal Income (1,000)						
Direct	$9,034	$11,729	$861	$1,118	$8,216	$10,667
Re-Spending/Local Consumption	$19,421	$25,216	$2,273	$2,952	$13,682	$17,764
Indirect	$9,392	$12,194	$308	$399	$5,587	$7,254
Total	$37,846	$49,139	$3,442	$4,469	$27,484	$35,685
Business Revenue (1,000)	$120,057	$155,882	$3,004	$3,900	$102,918	$133,628
Local Purchases (1,000)	$20,774	$26,973	$594	$771	$13,275	$17,237
Taxes (1,000)						
Federal	$14,911	$19,360	$897	$1,165	$11,741	$15,244
State and Local	$6,441	$8,362	$425	$552	$4,649	$6,037
Total	$21,352	$27,723	$1,322	$1,717	$16,390	$21,281

EXHIBIT IV-23 Continued

	New York		Pennsylvania		Total US	
Tonnage Handled (1,000): Metric Tons (Short Tons)	**230 (253)**		**0 (0)**		**12,355 (13,619)**	
Jobs						
Direct Jobs	217		0		6,127	
Induced	190		0		5,960	
Indirect	38		0		8,290	
Total	445		0		20,377	
	US $	**Cdn $**	**US $**	**Cdn $**	**US $**	**Cdn $**
Economic Activity (1,000)	$51,446	$66,797	$0	$0	$4,265,604	$5,538,460
Personal Income (1,000)						
Direct	$14,203	$18,442	$0	$0	$366,369	$475,694
Re-Spending/Local Consumption	$23,669	$30,731	$0	$0	$740,920	$962,010
Indirect	$1,923	$2,497	$0	$0	$381,831	$495,770
Total	$39,795	$51,670	$0	$0	$1,489,120	$1,933,474
Business Revenue (1,000)	$27,777	$36,065	$0	$0	$3,524,684	$4,576,450
Local Purchases (1,000)	$5,557	$7,216	$0	$0	$795,431	$1,032,787
Taxes (1,000)						
Federal	$9,968	$12,943	$0	$0	$517,147	$671,464
State and Local	$5,448	$7,074	$0	$0	$190,864	$247,818
Total	$15,416	$20,017	$0	$0	$708,011	$919,281

EXHIBIT IV-24
Economic Impacts by Province – Cargo on Canadian Flag Vessels

	Ontario		Quebec		Total	
Tonnage Handled (1,000): Metric Tons (Short Tons)	**22,828 (25,163)**		**15,894 (17,519)**		**38,721 (42,683)**	
Jobs						
Direct Jobs	12,456		3,353		15,809	
Induced	16,815		3,308		20,123	
Indirect	10,068		2,492		12,561	
Total	39,340		9,153		48,493	
	US $	**Cdn $**	**US $**	**Cdn $**	**US $**	**Cdn $**
Economic Activity (1,000)	$5,280,098	$6,855,680	$926,127	$1,202,483	$6,206,225	$8,058,163
Personal Income (1,000)						
Direct	$490,970	$637,476	$134,867	$175,111	$625,837	$812,587
Re-Spending/Local Consumption	$743,918	$965,903	$112,167	$145,638	$856,086	$1,111,542
Indirect	$437,213	$567,677	$103,675	$134,612	$540,888	$702,289
Total	$1,672,101	$2,171,057	$350,710	$455,361	$2,022,811	$2,626,418
Business Revenue (1,000)	$4,536,180	$5,889,776	$813,959	$1,056,845	$5,350,140	$6,946,621
Local Purchases (1,000)	$1,089,091	$1,414,076	$264,913	$343,963	$1,354,004	$1,758,039
Taxes (1,000)						
Federal	$546,462	$709,526	$110,217	$143,106	$656,679	$852,632
Provincial and Local	$336,754	$437,242	$112,148	$145,612	$448,902	$582,854
Total	$883,216	$1,146,768	$222,365	$288,718	$1,105,581	$1,435,486

EXHIBIT IV-25
Economic Impacts by State – Cargo on U.S. Flag Vessels

	Indiana		Ohio		Michigan	
Tonnage Handled (1,000): Metric Tons (Short Tons)	**0 (0)**		**168 (185)**		**84 (92)**	
Jobs						
Direct Jobs	0		21		11	
Induced	0		19		8	
Indirect	0		27		7	
Total	0		67		25	
	US $	**Cdn $**	**US $**	**Cdn $**	**US $**	**Cdn $**
Economic Activity (1,000)	$0	$0	$9,976	$12,953	$2,054	$2,667
Personal Income (1,000)						
Direct	$0	$0	$1,023	$1,329	$473	$615
Re-Spending/Local Consumption	$0	$0	$2,208	$2,867	$853	$1,107
Indirect	$0	$0	$1,272	$1,652	$280	$363
Total	$0	$0	$4,504	$5,848	$1,606	$2,085
Business Revenue (1,000)	$0	$0	$7,768	$10,085	$1,202	$1,560
Local Purchases (1,000)	$0	$0	$2,434	$3,161	$704	$914
Taxes (1,000)						
Federal	$0	$0	$1,396	$1,813	$407	$528
State and Local	$0	$0	$441	$573	$165	$215
Total	$0	$0	$1,838	$2,386	$572	$743

EXHIBIT IV-25 Continued

	Minnesota		Illinois		Wisconsin	
Tonnage Handled (1,000): Metric Tons (Short Tons)	**170 (188)**		**0 (0)**		**176 (194)**	
Jobs						
Direct Jobs	14		0		32	
Induced	12		0		22	
Indirect	22		0		19	
Total	48		0		74	
	US $	**Cdn $**	**US $**	**Cdn $**	**US $**	**Cdn $**
Economic Activity (1,000)	$8,899	$11,555	$0	$0	$11,504	$14,936
Personal Income (1,000)						
Direct	$654	$849	$0	$0	$1,407	$1,827
Re-Spending/Local Consumption	$1,406	$1,826	$0	$0	$2,343	$3,042
Indirect	$1,044	$1,356	$0	$0	$868	$1,128
Total	$3,104	$4,031	$0	$0	$4,618	$5,996
Business Revenue (1,000)	$7,493	$9,729	$0	$0	$9,161	$11,894
Local Purchases (1,000)	$2,285	$2,967	$0	$0	$2,080	$2,700
Taxes (1,000)						
Federal	$1,087	$1,411	$0	$0	$1,501	$1,949
State and Local	$482	$626	$0	$0	$653	$848
Total	$1,569	$2,037	$0	$0	$2,154	$2,797

EXHIBIT IV-25 Continued

	New York		Pennsylvania		Total US	
Tonnage Handled (1,000): Metric Tons (Short Tons)	**0 (0)***		**0 (0)**		**598 (659)**	
Jobs						
Direct Jobs	2		0		80	
Induced	2		0		63	
Indirect	0		0		76	
Total	5		0		219	
	US $	**Cdn $**	**US $**	**Cdn $**	**US $**	**Cdn $**
Economic Activity (1,000)	$600	$780	$0	$0	$33,034	$42,891
Personal Income (1,000)						
Direct	$190	$247	$0	$0	$3,748	$4,866
Re-Spending/Local Consumption	$317	$411	$0	$0	$7,127	$9,253
Indirect	$15	$19	$0	$0	$3,480	$4,518
Total	$521	$677	$0	$0	$14,354	$18,637
Business Revenue (1,000)	$284	$369	$0	$0	$25,907	$33,638
Local Purchases (1,000)	$43	$56	$0	$0	$7,545	$9,797
Taxes (1,000)						
Federal	$126	$164	$0	$0	$4,517	$5,865
State and Local	$70	$91	$0	$0	$1,812	$2,353
Total	$196	$255	$0	$0	$6,329	$8,217

* New York jobs and other economic impacts are related to St. Lawrence Seaway management and lock maintenance

EXHIBIT IV-26
Economic Impacts by Province – Cargo on U.S. Flag Vessels

	Ontario		Quebec		Total	
Tonnage Handled (1,000): Metric Tons (Short Tons)	**145 (160)**		**453 (499)**		**598 (659)**	
Jobs						
Direct Jobs	168		69		237	
Induced	226		66		292	
Indirect	141		35		176	
Total	535		170		704	
	US $	**Cdn $**	**US $**	**Cdn $**	**US $**	**Cdn $**
Economic Activity (1,000)	$70,079	$90,991	$27,292	$35,436	$97,371	$126,427
Personal Income (1,000)						
Direct	$6,592	$8,559	$2,637	$3,424	$9,230	$11,984
Re-Spending/Local Consumption	$9,988	$12,969	$2,413	$3,133	$12,401	$16,102
Indirect	$6,149	$7,984	$1,388	$1,802	$7,537	$9,786
Total	$22,730	$29,512	$6,438	$8,359	$29,167	$37,871
Business Revenue (1,000)	$60,091	$78,022	$24,879	$32,303	$84,970	$110,325
Local Purchases (1,000)	$15,246	$19,795	$3,944	$5,121	$19,190	$24,917
Taxes (1,000)						
Federal	$7,378	$9,580	$2,341	$3,040	$9,719	$12,619
Provincial and Local	$4,542	$5,897	$2,293	$2,977	$6,835	$8,874
Total	$11,920	$15,476	$4,634	$6,017	$16,554	$21,494

EXHIBIT IV-27
Economic Impacts by State – Cargo on Foreign Flag Vessels

	Indiana		Ohio		Michigan	
Tonnage Handled (1,000): Metric Tons (Short Tons)	**392 (432)**		**1,180 (1,300)**		**399 (440)**	
Jobs						
Direct Jobs	2,003		943		185	
Induced	1,858		787		136	
Indirect	2,792		1,417		131	
Total	6,652		3,148		452	
	US $	**Cdn $**	**US $**	**Cdn $**	**US $**	**Cdn $**
Economic Activity (1,000)	$1,076,876	$1,398,216	$239,113	$310,465	$28,177	$36,584
Personal Income (1,000)						
Direct	$112,704	$146,335	$42,500	$55,182	$8,776	$11,394
Re-Spending/Local Consumption	$228,913	$297,221	$91,723	$119,093	$15,803	$20,519
Indirect	$128,553	$166,913	$66,871	$86,825	$5,442	$7,066
Total	$470,170	$610,469	$201,094	$261,100	$30,020	$38,978
Business Revenue (1,000)	$847,963	$1,100,995	$147,390	$191,372	$12,374	$16,066
Local Purchases (1,000)	$267,266	$347,019	$129,232	$167,795	$14,231	$18,478
Taxes (1,000)						
Federal	$147,918	$192,056	$50,778	$65,931	$7,022	$9,117
State and Local	$56,538	$73,408	$19,707	$25,588	$2,970	$3,857
Total	$204,455	$265,465	$70,485	$91,518	$9,992	$12,974

EXHIBIT IV-27 Continued

	Minnesota		Illinois		Wisconsin	
Tonnage Handled (1,000): Metric Tons (Short Tons)	**224 (247)**		**727 (802)**		**1,011 (1,114)**	
Jobs						
Direct Jobs	72		481		245	
Induced	70		458		198	
Indirect	130		142		126	
Total	272		1,082		569	
	US $	**Cdn $**	**US $**	**Cdn $**	**US $**	**Cdn $**
Economic Activity (1,000)	$17,091	$22,191	$133,774	$173,692	$67,619	$87,796
Personal Income (1,000)						
Direct	$3,953	$5,133	$22,997	$29,860	$13,164	$17,092
Re-Spending/Local Consumption	$8,498	$11,034	$60,697	$78,809	$21,922	$28,463
Indirect	$6,098	$7,918	$7,442	$9,663	$5,606	$7,278
Total	$18,550	$24,085	$91,136	$118,331	$40,691	$52,834
Business Revenue (1,000)	$8,592	$11,156	$73,077	$94,883	$45,697	$59,333
Local Purchases (1,000)	$13,321	$17,295	$14,376	$18,665	$13,627	$17,693
Taxes (1,000)						
Federal	$4,394	$5,705	$23,377	$30,353	$11,196	$14,536
State and Local	$2,172	$2,820	$11,158	$14,487	$5,198	$6,749
Total	$6,566	$8,525	$34,535	$44,840	$16,394	$21,285

EXHIBIT IV-27 Continued

	New York		Pennsylvania		Total US	
Tonnage Handled (1,000): Metric Tons (Short Tons)	**0 (0)***		**0 (0)****		**3,933 (4,335)**	
Jobs						
Direct Jobs	37		0		3,966	
Induced	42		0		3,550	
Indirect	5		0		4,743	
Total	84		0		12,259	
	US $	**Cdn $**	**US $**	**Cdn $**	**US $**	**Cdn $**
Economic Activity (1,000)	$10,996	$14,278	$29	$38	$1,573,675	$2,043,259
Personal Income (1,000)						
Direct	$3,479	$4,518	$4	$5	$207,577	$269,518
Re-Spending/Local Consumption	$5,798	$7,528	$9	$11	$433,362	$562,678
Indirect	$272	$354	$3	$4	$220,287	$286,021
Total	$9,550	$12,399	$16	$20	$861,227	$1,118,217
Business Revenue (1,000)	$5,198	$6,750	$20	$26	$1,140,312	$1,480,581
Local Purchases (1,000)	$787	$1,022	$9	$12	$452,849	$587,979
Taxes (1,000)						
Federal	$2,307	$2,995	$4	$6	$246,996	$320,699
State and Local	$1,287	$1,671	$2	$3	$99,031	$128,582
Total	$3,594	$4,666	$7	$8	$346,027	$449,282

* New York state jobs and other economic impacts are related to St Lawrence Seaway management and lock maintenance
** Pennsylvania tonnage appears as 0 because it is less than 1,000 metric tons.

EXHIBIT IV-28
Economic Impacts by Province – Cargo on Foreign Flag Vessels

	Ontario		Quebec		Total	
Tonnage Handled (1,000): Metric Tons (Short Tons)	**6,943 (7,653)**		**807 (890)**		**7,750 (8,543)**	
Jobs						
Direct Jobs	3,065		340		3,405	
Induced	4,177		374		4,551	
Indirect	2,538		115		2,652	
Total	9,780		829		10,609	
	US $	**Cdn $**	**US $**	**Cdn $**	**US $**	**Cdn $**
Economic Activity (1,000)	$714,208	$927,328	$58,431	$75,867	$772,639	$1,003,195
Personal Income (1,000)						
Direct	$122,263	$158,746	$15,840	$20,567	$138,103	$179,312
Re-Spending/Local Consumption	$185,252	$240,531	$14,441	$18,751	$199,694	$259,282
Indirect	$109,893	$142,685	$4,299	$5,581	$114,192	$148,267
Total	$417,408	$541,962	$34,580	$44,899	$451,988	$586,861
Business Revenue (1,000)	$528,956	$686,797	$43,990	$57,116	$572,946	$743,913
Local Purchases (1,000)	$275,242	$357,374	$12,464	$16,184	$287,706	$373,558
Taxes (1,000)						
Federal	$117,104	$152,048	$9,707	$12,603	$126,811	$164,652
Provincial and Local	$70,186	$91,129	$10,202	$13,246	$80,388	$104,375
Total	$187,290	$243,178	$19,909	$25,849	$207,199	$269,027

Chapter V
SOO LOCKS IMPACTS

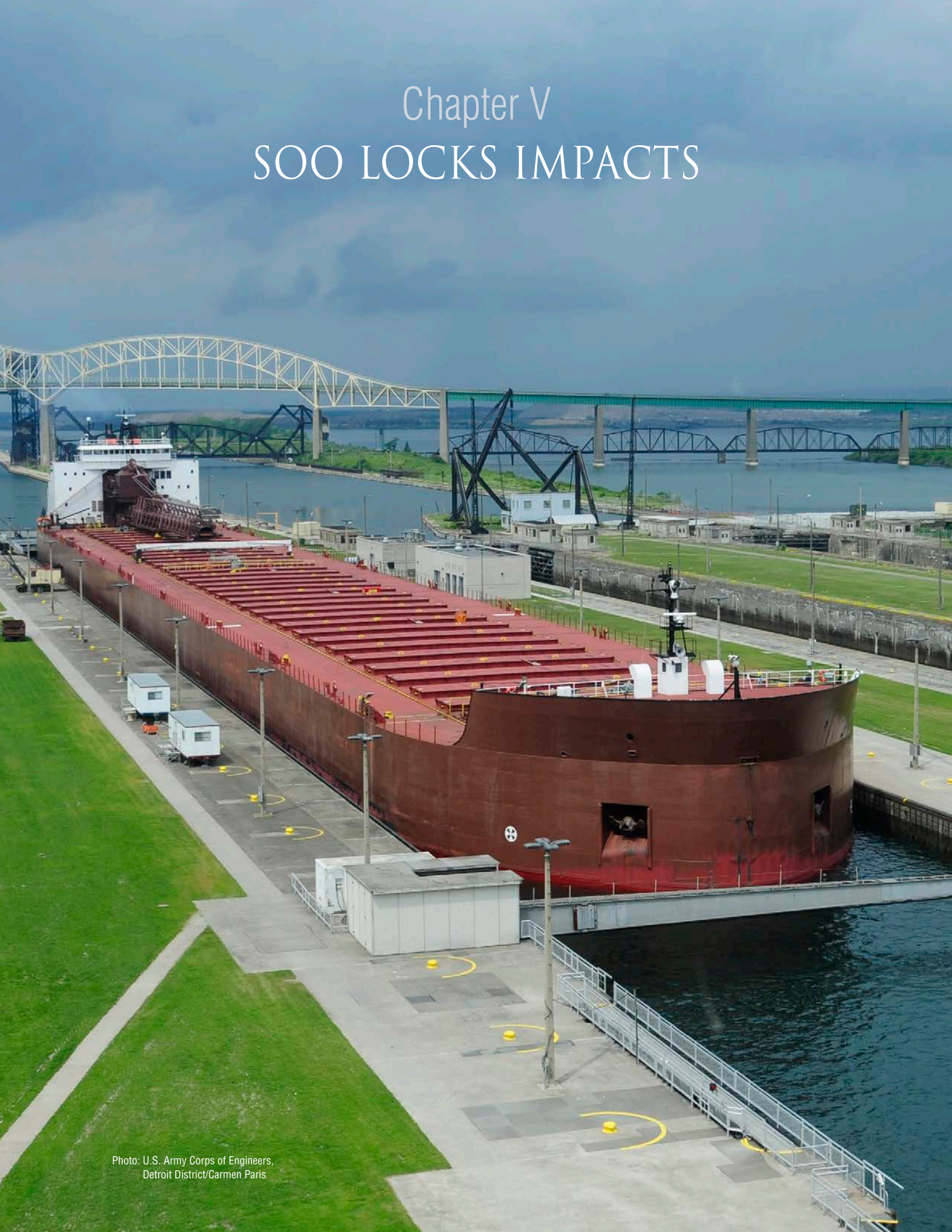


Photo: U.S. Army Corps of Engineers, Detroit District/Carmen Paris

Chapter V
SOO LOCKS IMPACTS

This chapter measures the economic impacts of maritime commerce that passes through and is dependent on the Soo Locks located in Sault Ste. Marie, Michigan. This data is particularly relevant to those stakeholders who move cargo through the locks and to policy makers who manage and fund lock infrastructure. These impacts are 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 Great Lakes ports and overseas destinations through the Soo Locks. The impacts are measured for the year 2017 and are presented in terms of total economic impacts at the bi-national regional level, the country level and the state/provincial level. The impacts are also presented by flag of vessel carriage.

SOO LOCKS

Located on the St. Marys River in Sault Ste. Marie, Michigan, and operated by the U.S. Army Corps of Engineers, the Soo Locks enable commercial vessels to transit between Lake Superior and the lower four Great Lakes, the St. Lawrence Seaway and international markets. Although a number of navigation locks have been constructed on the St. Marys River since the 1800s, today the Corps of Engineers maintains two operating locks that lift or lower ships a total of 21 feet (7 m).

Opened in 1943, the MacArthur Lock measures 800 feet long (244 m), 80 feet wide (24 m), and 29.5 feet deep (9 m).

Opened in 1968, the Poe Lock measures 1200 feet long (366 m) x 110 feet wide (34 m) x 32 feet deep (10 m).

TOTAL CARGO VOLUMES

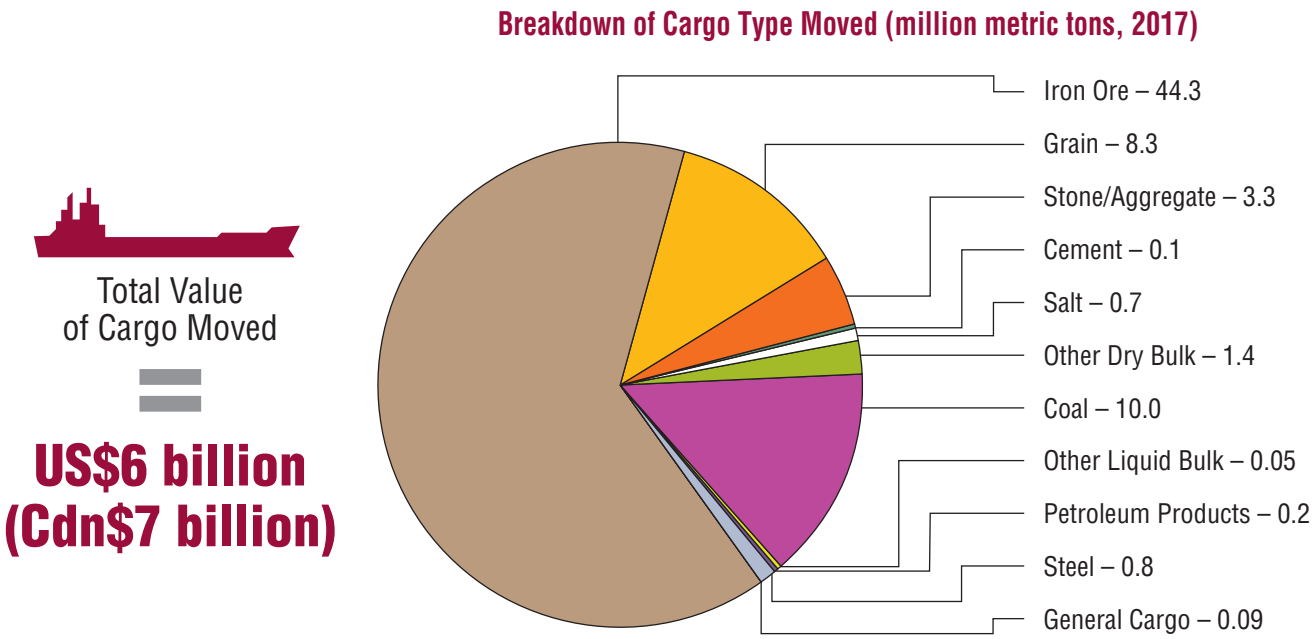
In 2017, a total of **69.1 million metric tons of cargo (76.2 million short tons)** moved through the Soo Locks. This tonnage volume represents **US$5.8 billion (Cdn$7.5 billion)** of cargo value.

A majority of the domestic cargo moving on Canadian and U.S. flag vessels remains in the Great Lakes-St. Lawrence Seaway System. This cargo is loaded and unloaded at ports within the system, creating economic impacts at

EXHIBIT V-1
Soo Locks

2017	Tonnage Moved (1,000 metric tons)	Tonnage Moved (1,000 short tons)	Cargo Value Millions US	Cargo Value Millions Cdn
Steel	786	886	$515	$669
General Cargo	88	97	$84	$109
Iron Ore	44,266	48,795	$1,986	$2,578
Grain	8,290	9,138	$2,280	$2,960
Stone/Aggregate	3,294	3,631	$29	$38
Cement	137	151	$15	$19
Salt	698	769	$20	$25
Other Dry Bulk	1,377	1,518	$28	$36
Coal	9,960	10,979	$715	$928
Other Liquid Bulk	44	49	$18	$23
Petroleum Products	166	183	$66	$86
Total	**69,108**	**76,179**	**$5,755**	**$7,472**

Soo Locks



the loading port as well as the port of discharge. This tonnage "handled" represents shipment and receipts of domestic cargo and trans-lake cargo, and is significantly greater than the tonnage of cargo "moving" through the locks. The actual tons handled at system ports that transited the Soo Locks is **134.8 million metric tons (148.6 million short tons)**.

This activity created a range of economic impacts in the region — defined as the states of Minnesota, Wisconsin, Illinois, Indiana, Michigan, Ohio, Pennsylvania, New York, and the Canadian provinces of Ontario and Quebec.

1. TOTAL ECONOMIC IMPACTS

Exhibit V-2 summarizes the economic impacts of all cargo transiting the Soo Locks that is handled at the region's ports. 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 US$1.00 = Cdn$1.2984. The exchange rate reflects the annual average for 2017, as of December 31, 2017, and is sourced from "The Board of Governors of the Federal Reserve System Data Download Program."

123,172 jobs in Canada and the United States are dependent on the Soo Locks.

Of the 123,172 jobs, 39,765 direct jobs were generated by the marine cargo and vessel activity transiting the Soo Locks.

As the result of the local and regional purchases by those 39,765 individuals holding the direct jobs, an additional 41,828 induced jobs were supported in the regional economy.

41,579 indirect jobs were supported by US$4.2 billion (Cdn$5.4 billion) in regional purchases by businesses supplying services at the marine terminals and ports.

In 2017, the marine cargo and vessel activity transiting through the Soo Locks generated a total of US$22.6 billion (Cdn$29.3 billion) of economic activity in the United States and Canada.

The total economic activity consists of the direct business revenue received by the businesses supplying the cargo and vessel handling services (US$18.6 billion (Cdn$24.2 billion), and the re-spending of direct income and consumption impact of US$4.0 billion (Cdn$5.1 billion).

Marine activity supported US$7.9 billion (Cdn$10.3 billion) in total personal wage and salary income, and local consumption expenditures for regional residents of the U.S. and Canada.

EXHIBIT V-2
Economic Impacts – Regional Level

	US $	Cdn $
Jobs		
Direct Jobs	39,765	
Induced	41,828	
Indirect	41,579	
Total	123,172	
Economic Activity (1,000)	$22,595,488	$29,337,981
Personal Income (1,000)		
Direct	$2,108,146	$2,737,216
Re-Spending/Local Purchases	$3,952,685	$5,132,166
Indirect	$1,882,048	$2,443,652
Total	$7,942,879	$10,313,034
Business Revenue (1,000)	$18,642,803	$24,205,815
Local Purchases (1,000)	$4,159,011	$5,400,060
Taxes (1,000)		
Federal	$2,676,474	$3,475,134
State/Provincial and Local	$1,132,650	$1,470,633
Total	$3,809,124	$4,945,767

The 39,765 direct job holders received US$2.1 billion (Cdn$2.7 billion) in direct wage and salary income. This equates to an average salary of nearly US$46,960 (Cdn$60,970). The 41,579 indirect jobs holders received US$1.9 billion (Cdn$2.4 billion) in indirect personal income.

A total of US$3.8 billion (Cdn$4.9 billion) indirect, induced and indirect federal, state/provincial and local tax revenue was generated by maritime activity transiting the Soo Locks.

Of the US$3.8 billion (Cdn$4.9 billion), US$1.1 billion (Cdn$1.5 billion) was paid to local and state/provincial governments, while US$2.7 billion (Cdn$3.5 billion) was paid in federal taxes.

Exhibit V-3 shows the breakdown of the total impacts by country. 11,668 direct jobs or 29.3 percent were generated in Canada, while 28,097 direct jobs or 70.7 percent were created in the U.S. When the induced and indirect jobs are considered, each direct job supports a total of about three jobs in both countries.

The re-spending multiplier in Canada is slightly less than in the U.S., reflecting a higher Canadian savings rate compared to the U.S. In contrast, the induced jobs supported by a dollar of re-spending by individuals in Canada's two provinces is nearly three times as great as in the U.S. Great Lakes regional economy. This reflects the fact that less out-of-region spending occurs in Ontario and Quebec. This is consistent with a larger concentration of national population and employment in those two major eastern provinces, compared to the U.S. Great Lakes states.

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 business purchases out of the region in Canada than in the U.S.

EXHIBIT V-3
Economic Impacts – Country Level

	Canada		United States		Total	
Jobs						
Direct Jobs	11,668		28,097		39,765	
Induced	15,100		26,728		41,828	
Indirect	9,246		32,332		41,579	
Total	36,014		87,158		123,172	
	US $	**Cdn $**	**US $**	**Cdn $**	**US $**	**Cdn $**
Economic Activity (1,000)	$5,187,870	$6,735,930	$17,407,618	$22,602,051	$22,595,488	$29,337,981
Personal Income (1,000)						
Direct	$452,477	$587,496	$1,655,669	$2,149,720	$2,108,146	$2,737,216
Re-Spending/Local Consumption	$651,124	$845,419	$3,301,561	$4,286,747	$3,952,685	$5,132,166
Indirect	$401,147	$520,849	$1,480,902	$1,922,803	$1,882,048	$2,443,652
Total	$1,504,747	$1,953,763	$6,438,132	$8,359,271	$7,942,879	$10,313,034
Business Revenue (1,000)	$4,536,746	$5,890,512	$14,106,056	$18,315,303	$18,642,803	$24,205,815
Local Purchases (1,000)	$1,006,529	$1,306,877	$3,152,483	$4,093,184	$4,159,011	$5,400,060
Taxes (1,000)						
Federal	$506,315	$657,400	$2,170,159	$2,817,734	$2,676,474	$3,475,134
State/Provincial and Local	$328,161	$426,084	$804,489	$1,044,549	$1,132,650	$1,470,633
Total	$834,476	$1,083,484	$2,974,648	$3,862,283	$3,809,124	$4,945,767

2. JOB IMPACTS

This section focuses on the 39,765 direct jobs created by the 134.8 million metric tons (148.6 million short tons) of Soo Locks-related cargo handled at the ports and marine terminals on the Great Lakes-Seaway system. **Exhibit V-4** 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 — 28,793. The majority of these jobs are with shippers/ consignees (steel mills) located at the ports that are directly dependent on the receipt of iron ore by vessels. The movement of steel products through the Soo Locks generates the second-largest direct jobs impacts, followed by the movement of coal and grain.

Exhibit V-5 shows the direct jobs by commodity for each country.

The majority of the Soo Locks tonnage shipped and received at the U.S. ports and terminals consists of iron ore, coal and stone/aggregate. Iron ore and grain are the key commodities moving via the Soo Locks and handled at Canadian ports.

The direct jobs generated by category are presented in **Exhibit V-6**. This exhibit shows that nearly 66 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 receiving the iron ore and the jobs at the ports loading the iron ore drive the impacts of iron ore moving through the Soo Locks at both U.S. and Canadian ports. The second-largest number of direct jobs is created with the marine terminals, 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.

EXHIBIT V-4
Direct Jobs by Commodity – Regional Level

	1,000 Metric Tons	1,000 Short Tons	Direct Jobs
Steel	1,302	1,435	2,535
General Cargo	155	171	50
Iron Ore	88,533	97,590	28,793
Grain	14,465	15,945	1,588
Stone/Aggregate	6,589	7,263	882
Cement	216	238	57
Salt	1,396	1,539	275
Other Dry Bulk	2,116	2,332	641
Liquid Bulk	421	464	142
Coal	19,580	21,583	1,914
Not Allocated			2,888
Total	**134,772**	**148,559**	**39,765**

The tonnage moving through the Soo Locks also generated 2,383 jobs with truckers, and 1,016 jobs with railways, reflecting the movement of iron ore from the mines to the docks. A total of 2,242 direct jobs are with the Canadian and U.S. flag vessel operators, and tug and barge operators moving cargo through the Soo Locks; 1,411 jobs are with freight forwarders and customs brokers arranging for the handling of the cargo; and another 1,093 jobs are with firms providing maritime services such as ship chandlering, vessel cargo and hull surveys, ship repair and marine equipment sales, and servicing.

EXHIBIT V-5
Direct Jobs by Commodity – Country Level

	Canada			United States			Total		
	1,000 Metric Tons	1,000 Short Tons	Direct Jobs	1,000 Metric Tons	1,000 Short Tons	Direct Jobs	1,000 Metric Tons	1,000 Short Tons	Direct Jobs
Steel	825	910	264	476	525	2,271	1,302	1,435	2,535
General Cargo	82	90	18	73	81	32	155	171	50
Iron Ore	8,031	8,852	8,261	80,502	88,737	20,533	88,533	97,590	28,793
Grain	13,064	14,400	1,318	1,401	1,544	270	14,465	15,945	1,588
Stone/Aggregate	670	738	90	5,919	6,525	792	6,589	7,263	882
Cement	15	16	4	201	222	52	216	238	57
Salt	889	980	135	507	559	140	1,396	1,539	275
Other Dry Bulk	1,597	1,760	491	519	572	150	2,116	2,332	641
Liquid Bulk	326	359	128	96	106	14	421	464	142
Coal	1,749	1,928	160	17,830	19,654	1,754	19,580	21,583	1,914
Not Allocated			797			2,091			2,888
Total	**27,247**	**30,034**	**11,668**	**107,525**	**118,525**	**28,097**	**134,772**	**148,559**	**39,765**

EXHIBIT V-6
Direct Jobs Impacts by Category – Regional Level

	Total
Surface Transportation	
Rail	1,016
Truck	2,383
Maritime Service	
Terminal Employees	2,829
Dockworkers	419
Tug Assists	355
Pilots	28
Agents	16
Maritime Services	586
Forwarders	1,411
Government	900
Marine Equipment/Ship Repair	1,093
Laker	2,242
Barge	231
Dependent Shippers/Consignees	26,177
Port Authority	77
Total	**39,765**

Exhibit V-7 shows the direct job impacts by category, by country, for the Soo Locks-related cargo activity at all ports and terminals.

As presented in **Exhibit V-7**, the number of direct jobs with dependent shippers/consignees is greater in the United States, reflecting the location of the steel mills in Indiana, Ohio and Michigan.

3. REVENUE IMPACTS

In 2017, the direct business revenue received by firms dependent upon cargo transiting the Soo Locks was US$18.6 billion (Cdn$24.2 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 V-8** 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 system.

The revenue impacts by category, by country, are presented in **Exhibit V-9**.

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

EXHIBIT V-7
Direct Jobs Impacts by Category – Country Level

	Canada Direct Jobs	United States Direct Jobs	Total
Surface Transportation			
Rail	182	834	1,016
Truck	832	1,551	2,383
Maritime Service			
Terminal Employees	901	1,928	2,829
Dockworkers	201	218	419
Tug Assists	113	242	355
Pilots	20	8	28
Agents	14	2	16
Maritime Services	89	497	586
Forwarders	285	1,126	1,411
Government	152	748	900
Marine Equipment/Ship Repair	383	710	1,093
Laker	432	1,810	2,242
Barge	131	101	231
Dependent Shippers/Consignees	7,889	18,288	26,177
Port Authority	43	34	77
Total	**11,668**	**28,097**	**39,765**

EXHIBIT V-8
Revenue Impact by Category – Regional Level

	Revenue Million US	Revenue Million Cdn
Surface Transportation		
Rail	$1,980	$2,570
Truck	$218	$283
Maritime Service		
Terminal Employees	$605	$786
Tug Assists	$27	$36
Pilots	$9	$12
Agents	$6	$7
Maritime Services	$156	$202
Forwarders	$240	$312
Marine Equipment/Ship Repair	$218	$283
Laker	$1,380	$1,791
Barge	$37	$48
Dependent Shippers/Consignees	$13,742	$17,843
Port Authority	$26	$33
Total	**$18,643**	**$24,206**

EXHIBIT V-9 **Revenue Impact by Category – Country Level**						
	Canada		**United States**		**Total**	
	Million US	**Million Cdn**	**Million US**	**Million Cdn**	**Million US**	**Million Cdn**
Surface Transportation						
Rail	$351	$456	$1,628	$2,114	$1,980	$2,570
Truck	$64	$83	$154	$200	$218	$283
Maritime Service						
Terminal Employees	$167	$216	$439	$569	$605	$786
Tug Assists	$7	$9	$20	$26	$27	$36
Pilots	$6	$8	$3	$4	$9	$12
Agents	$4	$5	$2	$3	$6	$7
Maritime Services	$34	$44	$122	$158	$156	$202
Forwarders	$39	$51	$201	$261	$240	$312
Marine Equipment/Ship Repair	$73	$95	$145	$189	$218	$283
Laker	$202	$262	$1,178	$1,530	$1,380	$1,791
Barge	$18	$24	$18	$24	$37	$48
Dependent Shippers/Consignees	$3,558	$4,620	$10,184	$13,223	$13,742	$17,843
Port Authority	$14	$19	$11	$15	$26	$33
Total	**$4,537**	**$5,891**	**$14,106**	**$18,315**	**$18,643**	**$24,206**

4. PERSONAL INCOME AND LOCAL CONSUMPTION IMPACTS

The 39,765 individuals directly employed as a result of the Soo Locks-related cargo handled at the ports and marine terminals received US$2.1 billion (Cdn$2.7 billion) in wages and salaries.

The 28,097 direct job holders at the U.S. ports received US$1.7 billion (Cdn$2.2 billion) in direct personal income, for an average salary of US$58,930 (Cdn$76,510). The 11,668 direct job holders at the Canadian ports received U.S.$ 452.5 million (CDN$587.5million), for an average salary of $US38,780 (Cdn$50,350). The higher average wage in the U.S ports reflects the concentration of direct jobs in the U.S. ports at steel mills.

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, RIMS II. 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$4.0 billion (Cdn$5.1 billion) in income and consumption were created in the Great Lakes regional economy as the result of cargo transiting the Soo Locks.

The re-spending impact and consumption impacts should not be divided by induced jobs to estimate induced income, since the division of the re-spending impact/local consumption impact by the induced jobs will overstate the actual salary of the induced job holders, as this includes the value of the consumption purchases.

The 41,579 indirect job holders received US$1.9 billion (Cdn$2.4 billion) in personal income, of which the 9,246 Canadian indirect job holders received US$401.1 million (Cdn$520.8 million), while the 32,332 indirect job holders in the U.S. received US$1.5 billion (Cdn$1.9 billion).

5. FEDERAL, STATE/PROVINCIAL AND LOCAL TAX IMPACTS

The Soo Locks-related cargo activity at the U.S. ports and marine terminals created US$804.5 million (Cdn$1.0 billion) in state and local taxes, and US$2.2 billion (Cdn$2.8 billion) in federal taxes. Soo Locks-related cargo activity at the Canadian ports created US$328.2 million (Cdn$426.1 million) in provincial taxes, and US$506.3 million (Cdn$657.1 million) in federal taxes.

6. IMPACTS BY STATE AND PROVINCE

The economic impacts were estimated at the port level for the 40 U.S. and Canadian Great Lakes and St. Lawrence River ports. The models developed for these 40 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.

Exhibit V-10 presents the U.S. impacts of total cargo moving via the Soo Locks and handled at U.S. ports and marine terminals located on the Great Lakes-St. Lawrence System. In terms of direct, induced and indirect jobs, the impacts are greatest for the state of Indiana, followed by Michigan and Ohio. The impacts are concentrated with the steel mill operations in Indiana, Michigan and Ohio that use the iron ore. Stone and aggregates mined and moved via Michigan ports also transit the Soo Locks system.

Exhibit V-11 shows the impacts of the cargo moving through the Soo Locks for the provinces of Ontario and Quebec.

The ports in Ontario account for 32,898 direct, induced and indirect jobs, or about 91 percent of the total job impacts for Canada. The direct business revenue generated by cargo activity in Ontario created US$4.1 billion (Cdn$5.4 billion), or about 92 percent of total business revenue generated in Canada by marine cargo activity transiting the Soo Locks.

EXHIBIT V-10
Economic Impacts by State

	Indiana		Ohio		Michigan	
Tonnage Handled (1,000): Metric Tons (Short Tons)	**19,272 (21,244)**		**11,813 (13,021)**		**23,676 (26,098)**	
Jobs						
Direct Jobs	15,046		3,024		5,677	
Induced	15,706		3,163		4,405	
Indirect	20,973		4,436		3,495	
Total	51,725		10,623		13,577	
	US $	**Cdn $**	**US $**	**Cdn $**	**US $**	**Cdn $**
Economic Activity (1,000)	$10,379,603	$13,476,876	$1,931,952	$2,508,446	$2,522,921	$3,275,761
Personal Income (1,000)						
Direct	$983,114	$1,276,476	$182,988	$237,592	$289,994	$376,529
Re-Spending/Local Consumption	$1,996,804	$2,592,650	$394,925	$512,770	$522,222	$678,053
Indirect	$965,748	$1,253,927	$209,006	$271,374	$147,610	$191,657
Total	$3,945,666	$5,123,053	$786,919	$1,021,736	$959,826	$1,246,238
Business Revenue (1,000)	$8,382,799	$10,884,226	$1,537,027	$1,995,676	$2,000,700	$2,597,708
Local Purchases (1,000)	$2,007,826	$2,606,961	$405,561	$526,580	$379,549	$492,807
Taxes (1,000)						
Federal	$1,314,792	$1,707,126	$254,401	$330,314	$317,604	$412,377
State and Local	$492,197	$639,069	$77,118	$100,130	$114,232	$148,319
Total	$1,806,990	$2,346,195	$331,519	$430,444	$431,836	$560,696

EXHIBIT V-10 Continued

	Minnesota		Illinois		Wisconsin	
Tonnage Handled (1,000): Metric Tons (Short Tons)	**30,924 (34,088)**		**910 (1,003)**		**20,605 (22,713)**	
Jobs						
Direct Jobs	2,155		175		1,817	
Induced	1,834		158		1,318	
Indirect	2,111		52		1,235	
Total	6,101		385		4,369	
	US $	**Cdn $**	**US $**	**Cdn $**	**US $**	**Cdn $**
Economic Activity (1,000)	$1,469,832	$1,908,430	$55,740	$72,372	$1,012,298	$1,314,368
Personal Income (1,000)						
Direct	$98,393	$127,753	$7,784	$10,107	$83,833	$108,849
Re-Spending/Local Consumption	$211,524	$274,643	$20,545	$26,676	$139,607	$181,265
Indirect	$99,488	$129,175	$2,712	$3,521	$54,799	$71,150
Total	$409,405	$531,571	$31,041	$40,304	$278,238	$361,265
Business Revenue (1,000)	$1,258,308	$1,633,787	$35,194	$45,696	$872,691	$1,133,102
Local Purchases (1,000)	$219,776	$285,357	$5,238	$6,801	$130,086	$168,903
Taxes (1,000)						
Federal	$158,957	$206,390	$8,560	$11,114	$109,046	$141,585
State and Local	$68,879	$89,432	$3,960	$5,142	$44,395	$57,642
Total	$227,835	$295,822	$12,520	$16,256	$153,441	$199,228

EXHIBIT V-10 Continued

	New York		Pennsylvania		Total US	
Tonnage Handled (1,000): Metric Tons (Short Tons),	**325 (358)**		**0 (0)**		**107,525 (118,525)**	
Jobs						
Direct Jobs	203		0		28,097	
Induced	144		0		26,728	
Indirect	30		0		32,332	
Total	377		0		87,158	
	US $	**Cdn $**	**US $**	**Cdn $**	**US $**	**Cdn $**
Economic Activity (1,000)	$35,272	$45,797	$0	$0	$17,407,618	$22,602,051
Personal Income (1,000)						
Direct	$9,562	$12,416	$0	$0	$1,655,669	$2,149,720
Re-Spending/Local Consumption	$15,935	$20,690	$0	$0	$3,301,561	$4,286,747
Indirect	$1,539	$1,998	$0	$0	$1,480,902	$1,922,803
Total	$27,036	$35,103	$0	$0	$6,438,132	$8,359,271
Business Revenue (1,000)	$19,337	$25,108	$0	$0	$14,106,056	$18,315,303
Local Purchases (1,000)	$4,447	$5,774	$0	$0	$3,152,483	$4,093,184
Taxes (1,000)						
Federal	$6,799	$8,828	$0	$0	$2,170,159	$2,817,734
State and Local	$3,708	$4,815	$0	$0	$804,489	$1,044,549
Total	$10,507	$13,643	$0	$0	$2,974,648	$3,862,283

EXHIBIT V-11
Economic Impacts by Province

	Ontario		Quebec		Total	
Tonnage Handled (1,000): Metric Tons (Short Tons)	**19,257 (21,227)**		**7,990 (8,807)**		**27,247 (30,034)**	
Jobs						
Direct Jobs	10,479		1,189		11,668	
Induced	13,943		1,157		15,100	
Indirect	8,476		770		9,246	
Total	32,898		3,116		36,014	
	US $	**Cdn $**	**US $**	**Cdn $**	**US $**	**Cdn $**
Economic Activity (1,000)	$4,783,280	$6,210,611	$404,590	$525,319	$5,187,870	$6,735,930
Personal Income (1,000)						
Direct	$405,559	$526,578	$46,917	$60,917	$452,477	$587,496
Re-Spending/Local Consumption	$614,504	$797,871	$36,620	$47,548	$651,124	$845,419
Indirect	$370,117	$480,560	$31,029	$40,289	$401,147	$520,849
Total	$1,390,180	$1,805,010	$114,567	$148,754	$1,504,747	$1,953,763
Business Revenue (1,000)	$4,168,777	$5,412,740	$367,970	$477,772	$4,536,746	$5,890,512
Local Purchases (1,000)	$918,514	$1,192,599	$88,014	$114,278	$1,006,529	$1,306,877
Taxes (1,000)						
Federal	$467,044	$606,410	$39,271	$50,990	$506,315	$657,400
Provincial and Local	$289,117	$375,389	$39,044	$50,695	$328,161	$426,084
Total	$756,161	$981,799	$78,315	$101,685	$834,476	$1,083,484

7. IMPACTS BY VESSEL FLAG

This section presents the impacts generated by the cargo transiting the Soo Locks by vessel operator category. Cargo transits the Soo Locks to and from U.S. and Canadian Great Lakes ports/marine terminals on Canadian flag vessels, U.S. flag vessels and foreign flag vessels. Due to the carriage laws in each country, the Canadian flag vessels move cargo to and from Canadian ports, while U.S. flag vessels move cargo to and from U.S. ports. Canadian flag and U.S. flag vessels also move cargo between the U.S. and Canadian ports in cross-lake operations. Canadian flag vessels often move cargo through the Soo Locks from ports on Lake Superior 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. Foreign flag vessels move international cargo through the Soo Locks to and from the Great Lakes ports in Lake Superior to overseas destinations.

A total of 69.1 million metric tons of cargo (76.2 million short tons) transited the Soo Locks in 2017. This cargo represents US$5.8 billion (Cdn$7.43 billion) of cargo value.

Of this total, 48.8 million metric tons (53.8 million short tons) were moved on U.S. flag vessels; 17.4 million metric tons (19.2 million short tons) moved on Canadian flag vessels. The balance, 2.9 million metric tons (3.2 million short tons) moved on foreign flag vessels.

In terms of value of cargo moved by flag, U.S. Flag carriers moved US$2.4 billion (Cdn$3.1 billion), Canadian flag carriers moved US$2.6 billion (Cdn$3.4 billion), and foreign flag carriers moved US$800 million (Cdn$1.0 billion).

These values reflect the fact that grain cargoes typically carried by Canadian operators from Lake Superior ports are of a higher value than ore cargoes typically carried by U.S. carriers from Lake Superior.

Exhibits V-12 through **V-28** present the results of the economic impact analysis of cargo transiting the Soo Locks by flag of carriage. These tables show impacts at the bi-national regional level, by country, by state/province, by commodity and by job category.

EXHIBIT V-12

Economic Impacts by Flag of Carriage – Regional Level

	Canadian Flag		U.S. Flag		Foreign Flag		Total	
Jobs								
Direct Jobs	14,451		24,805		508		39,765	
Induced	17,229		23,969		631		41,828	
Indirect	12,559		28,446		573		41,579	
Total	44,240		77,220		1,712		123,172	
	US $	**Cdn $**	**US $**	**Cdn $**	**US $**	**Cdn $**	**US $**	**Cdn $**
Economic Activity (1,000)	$7,073,549	$9,184,296	$15,363,551	$19,948,035	$158,387	$205,650	$22,595,488	$29,337,981
Personal Income (1,000)								
Direct	$616,639	$800,645	$1,467,132	$1,904,925	$24,374	$31,647	$2,108,146	$2,737,216
Re-Spending/ Local Consumption	$993,524	$1,289,992	$2,918,801	$3,789,771	$40,360	$52,403	$3,952,685	$5,132,1667
Indirect	$554,671	$720,185	$1,301,761	$1,690,207	$25,616	$33,259	$1,882,048	$2,443,652
Total	$2,164,835	$2,810,822	$5,687,694	$7,384,902	$90,350	$117,310	$7,942,879	$10,313,034
Business Revenue (1,000)	$6,080,025	$7,894,304	$12,444,751	$16,158,264	$118,027	$153,246	$18,642,803	$24,205,815
Local Purchases (1,000)	$1,321,680	$1,716,070	$2,775,337	$3,603,497	$61,994	$80,493	$4,159,011	$5,400,060
Taxes (1,000)								
Federal	$737,942	$958,144	$1,913,289	$2,484,214	$25,243	$32,776	$2,676,474	$3,475,134
State/Provincial and Local	$407,047	$528,510	$711,723	$924,101	$13,880	$18,021	$1,132,650	$1,470,633
Total	$1,144,989	$1,486,654	$2,625,012	$3,408,316	$39,123	$50,797	$3,809,124	$4,945,767

EXHIBIT V-13
Economic Impacts by Canadian Flag – Country Level

Impacts	Canada		United States		Total	
Jobs						
Direct Jobs	10,848		3,603		14,451	
Induced	14,000		3,229		17,229	
Indirect	8,378		4,181		12,559	
Total	33,227		11,013		44,240	
	US $	**Cdn $**	**US $**	**Cdn $**	**US $**	**Cdn $**
Economic Activity (1,000)	$4,867,643	$6,320,148	$2,205,906	$2,864,148	$7,073,549	$9,184,296
Personal Income (1,000)						
Direct	$419,961	$545,278	$196,678	$255,367	$616,639	$800,645
Re-Spending/Local Consumption	$602,639	$782,467	$390,885	$507,525	$993,524	$1,289,992
Indirect	$363,243	$471,635	$191,428	$248,550	$554,671	$720,185
Total	$1,385,844	$1,799,380	$778,991	$1,011,442	$2,164,835	$2,810,822
Business Revenue (1,000)	$4,265,004	$5,537,681	$1,815,021	$2,356,623	$6,080,025	$7,894,304
Local Purchases (1,000)	$911,743	$1,183,806	$409,938	$532,263	$1,321,680	$1,716,070
Taxes (1,000)						
Federal	$469,083	$609,057	$268,859	$349,087	$737,942	$958,144
State/Provincial and Local	$304,963	$395,964	$102,084	$132,546	$407,047	$528,510
Total	$774,046	$1,005,021	$370,943	$481,633	$1,144,989	$1,486,654

EXHIBIT V-14
Economic Impacts by U.S. Flag – Country Level

Impacts	Canada		United States		Total	
Jobs						
Direct Jobs	500		24,306		24,805	
Induced	638		23,330		23,969	
Indirect	504		27,942		28,446	
Total	1,642		75,578		77,220	
	US $	**Cdn $**	**US $**	**Cdn $**	**US $**	**Cdn $**
Economic Activity (1,000)	$219,108	$284,489	$15,144,444	$19,663,546	$15,363,551	$19,948,035
Personal Income (1,000)						
Direct	$18,774	$24,376	$1,448,359	$1,880,549	$1,467,132	$1,904,925
Re-Spending/Local Consumption	$27,745	$36,024	$2,891,056	$3,753,746	$2,918,801	$3,789,771
Indirect	$21,916	$28,456	$1,279,845	$1,661,751	$1,301,761	$1,690,207
Total	$68,435	$88,856	$5,619,259	$7,296,046	$5,687,694	$7,384,902
Business Revenue (1,000)	$191,363	$248,465	$12,253,388	$15,909,799	$12,444,751	$16,158,264
Local Purchases (1,000)	$54,492	$70,752	$2,720,845	$3,532,745	$2,775,337	$3,603,497
Taxes (1,000)						
Federal	$22,548	$29,276	$1,890,741	$2,454,938	$1,913,289	$2,484,214
State/Provincial and Local	$14,295	$18,561	$697,428	$905,540	$711,723	$924,101
Total	$36,843	$47,838	$2,588,169	$3,360,478	$2,625,012	$3,408,316

EXHIBIT V-15
Economic Impacts by Foreign Flag – Country Level

Impacts	Canada		United States		Total	
Jobs						
Direct Jobs	319		189		508	
Induced	461		169		631	
Indirect	364		209		573	
Total	1,144		567		1,712	
	US $	**Cdn $**	**US $**	**Cdn $**	**US $**	**Cdn $**
Economic Activity (1,000)	$101,119	$131,293	$57,268	$74,356	$158,387	$205,650
Personal Income (1,000)						
Direct	$13,742	$17,842	$10,632	$13,805	$24,374	$31,647
Re-Spending/Local Consumption	$20,739	$26,928	$19,621	$25,476	$40,360	$52,403
Indirect	$15,987	$20,757	$9,629	$12,502	$25,616	$33,259
Total	$50,468	$65,527	$39,882	$51,783	$90,350	$117,310
Business Revenue (1,000)	$80,380	$104,366	$37,647	$48,881	$118,027	$153,246
Local Purchases (1,000)	$40,294	$52,318	$21,700	$28,175	$61,994	$80,493
Taxes (1,000)						
Federal	$14,684	$19,066	$10,559	$13,709	$25,243	$32,776
State/Provincial and Local	$8,902	$11,559	$4,977	$6,463	$13,880	$18,021
Total	$23,587	$30,625	$15,536	$20,172	$39,123	$50,797

EXHIBIT V-16
Direct Jobs by Commodity and by Flag – Regional Level

	Direct Jobs Canadian Flag	Direct Jobs US Flag	Direct Jobs Foreign Flag	Total
Steel	2,448	NA	88	2,535
General Cargo	20	NA	31	50
Iron Ore	8,400	20,393	NA	28,793
Grain	1,270	82	237	1,588
Stone/Aggregate	62	819	NA	882
Cement	NA	41	16	57
Salt	246	29	NA	275
Other Dry Bulk	536	20	85	641
Liquid Bulk	139	3	NA	142
Coal	382	1,532	NA	1,914
Not Allocated	949	1,886	53	2,888
Total	**14,451**	**24,805**	**508**	**39,765**

EXHIBIT V-17
Direct Jobs by Commodity and by Flag – Regional Level

	Canada				United States				
	Canadian Flag	US Flag	Foreign Flag	Total	Canadian Flag	US Flag	Foreign Flag	Total	Total
Steel	177	NA	88	264	2,271	NA	NA	2,271	2,535
General Cargo	17	NA	1	18	3	NA	29	32	50
Iron Ore	7,913	348	NA	8,261	487	20,045	NA	20,533	28,793
Grain	1,202	NA	116	1,318	68	82	121	270	1,588
Stone/Aggregate	50	40	NA	90	12	779	NA	792	882
Cement	NA	4	NA	4	NA	37	16	52	57
Salt	132	3	NA	135	114	26	NA	140	275
Other Dry Bulk	403	12	76	491	133	8	8	150	641
Liquid Bulk	128	NA	NA	128	11	3	NA	14	142
Coal	101	59	NA	160	281	1,472	NA	1,754	1,914
Not Allocated	727	32	38	797	222	1,854	15	2,091	2,888
Total	**10,848**	**500**	**319**	**11,668**	**3,603**	**24,306**	**189**	**28,097**	**39,765**

EXHIBIT V-18
Direct Jobs by Category and by Flag – Regional Level

	Canadian Flag	US Flag	Foreign Flag	Total
Surface Transportation				
Rail	317	657	42	1,016
Truck	1,254	1,077	52	2,383
Maritime Service				
Terminal Employees	1,224	1,391	214	2,829
Dockworkers	237	128	54	419
Tug Assists	128	209	18	355
Pilots*	NA	NA	28	28
Maritime Services/Agents	117	458	27	602
Forwarders	358	1,023	31	1,411
Government	202	679	18	900
Marine Equipment/Ship Repair	453	626	14	1,093
Laker	639	1,603	NA	2,242
Barge	133	91	8	231
Dependent Shippers/Consignees	9,346	16,832	NA	26,177
Port Authority	45	31	2	77
Total	**14,451**	**24,805**	**508**	**39,765**

* All pilotage jobs have been allocated to foreign flag vessels. Canadian flag vessels, however, are also subject to compulsory pilotage requirements in the St. Lawrence and Great Lakes region. It was not possible to accurately allocate Canadian-flag pilotage impacts due to lack of information as to duration of time pilots spend on these transits versus foreign-flag transits.

EXHIBIT V-19
Direct Jobs by Category and by Flag – Country Level

	Canada				United States				
	Canadian Flag	US Flag	Foreign Flag	Total	Canadian Flag	US Flag	Foreign Flag	Total	Total
Surface Transportation									
Rail	151	5	26	182	166	652	16	834	1,016
Truck	729	61	42	832	524	1,017	10	1,551	2,383
Maritime Service									
Terminal Employees	765	35	101	901	459	1,355	113	1,928	2,829
Dockworkers	154	4	44	201	83	125	10	218	419
Tug Assists	96	4	13	113	32	205	5	242	355
Pilots*	NA	NA	20	20	NA	NA	8	8	28
Maritime Services/Agents	79	2	22	104	38	456	5	499	602
Forwarders	249	14	22	285	109	1,008	9	1,126	1,411
Government	132	8	12	152	70	672	6	748	900
Marine Equipment/Ship Repair	357	16	10	383	95	610	5	710	1,093
Laker	407	25	NA	432	232	1,578	NA	1,810	2,242
Barge	118	5	8	131	15	85	NA	101	231
Dependent Shippers/Consignees	7,570	319	NA	7,889	1,776	16,513	NA	18,288	26,177
Port Authority	40	1	1	43	4	30	NA	34	77
Total	**10,848**	**500**	**319**	**11,668**	**3,603**	**24,306**	**189**	**28,097**	**39,765**

* All pilotage jobs have been allocated to foreign flag vessels. Canadian flag vessels, however, are also subject to compulsory pilotage requirements in the St. Lawrence and Great Lakes region. It was not possible to accurately allocate Canadian-flag pilotage impacts due to lack of information as to duration of time pilots spend on these transits versus foreign-flag transits.

EXHIBIT V-20
Revenue Impact by Category and by 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
Surface Transportation								
Rail	$512.2	$665.1	$1,397.6	$1,814.7	$69.9	$90.7	$1,979.7	$2,570.5
Truck	$109.9	$142.7	$103.5	$134.3	$4.2	$5.4	$217.6	$282.5
Maritime Service								
Terminal Employees	$197.4	$256.3	$390.0	$506.4	$17.9	$23.2	$605.2	$785.8
Tug Assists	$8.9	$11.6	$17.3	$22.4	$1.2	$1.6	$27.4	$35.6
Pilots*	$0.0	$0.0	$0.0	$0.0	$9.1	$11.8	$9.1	$11.8
Maritime Services/Agents	$40.9	$53.1	$113.6	$147.5	$6.6	$8.5	$161.0	$209.1
Forwarders	$53.7	$69.8	$182.0	$236.3	$4.6	$5.9	$240.3	$312.0
Marine Equipment/Ship Repair	$84.0	$109.0	$131.2	$170.4	$3.1	$4.0	$218.3	$283.4
Laker	$311.2	$404.1	$1,068.4	$1,387.3	$0.0	$0.0	$1,379.6	$1,791.3
Barge	$19.2	$25.0	$16.3	$21.2	$1.1	$1.4	$36.7	$47.6
Dependent Shippers/Consignees	$4,727.7	$6,138.5	$9,014.5	$11,704.5	$0.0	$0.0	$13,742.3	$17,843.0
Port Authority	$14.8	$19.3	$10.2	$13.3	$0.5	$0.7	$25.6	$33.3
Total	**$6,080.0**	**$7,894.3**	**$12,444.8**	**$16,158.3**	**$118.0**	**$153.2**	**$18,642.8**	**$24,205.8**

* All pilotage revenue impacts have been allocated to foreign flag vessels. Canadian flag vessels, however, are also subject to compulsory pilotage requirements in the St. Lawrence and Great Lakes region. It was not possible to accurately allocate Canadian-flag pilotage impacts due to lack of information as to duration of time pilots spend on these transits versus foreign-flag transits.

EXHIBIT V-21
Revenue Impact by Category and Flag – Canada

	Canadian Flag		US Flag		Foreign Flag		Total Canada	
	Millions US	Millions Cdn	Millions US	Millions Cdn	Millions US	Millions Cdn	Millions US	Millions Cdn
Surface Transportation								
Rail	$289.4	$375.7	$15.2	$19.7	$46.9	$60.9	$351.5	$456.4
Truck	$55.2	$71.7	$4.9	$6.4	$3.4	$4.4	$63.5	$82.5
Maritime Service								
Terminal Employees	$148.9	$193.4	$4.6	$6.0	$13.1	$17.0	$166.7	$216.4
Tug Assists	$6.0	$7.8	$0.4	$0.5	$0.8	$1.1	$7.2	$9.4
Pilots*	$0.0	$0.0	$0.0	$0.0	$5.9	$7.7	$5.9	$7.7
Maritime Services/Agents	$31.9	$41.4	$1.5	$1.9	$4.0	$5.2	$37.4	$48.5
Forwarders	$34.3	$44.5	$2.0	$2.6	$3.0	$3.9	$39.2	$51.0
Marine Equipment/Ship Repair	$67.9	$88.2	$3.3	$4.3	$1.6	$2.1	$72.8	$94.6
Laker	$192.1	$249.5	$9.4	$12.2	$0.0	$0.0	$201.5	$261.7
Barge	$16.6	$21.5	$0.7	$0.9	$1.0	$1.4	$18.4	$23.8
Dependent Shippers/Consignees	$3,409.1	$4,426.4	$149.1	$193.5	$0.0	$0.0	$3,558.2	$4,619.9
Port Authority	$13.5	$17.6	$0.3	$0.4	$0.5	$0.6	$14.4	$18.7
Total	**$4,265.0**	**$5,537.7**	**$191.4**	**$248.5**	**$80.4**	**$104.4**	**$4,536.7**	**$5,890.5**

* All pilotage revenue impacts have been allocated to foreign flag vessels. Canadian flag vessels, however, are also subject to compulsory pilotage requirements in the St. Lawrence and Great Lakes region. It was not possible to accurately allocate Canadian-flag pilotage impacts due to lack of information as to duration of time pilots spend on these transits versus foreign-flag transits.

EXHIBIT V-22
Revenue Impact by Category and Flag – United States

	Canadian Flag		US Flag		Foreign Flag		Total US	
	Millions US	Millions Cdn	Millions US	Millions Cdn	Millions US	Millions Cdn	Millions US	Millions Cdn
Surface Transportation								
Rail	$222.9	$289.4	$1,382.4	$1,794.9	$22.9	$29.8	$1,628.2	$2,114.12
Truck	$54.7	$71.0	$98.6	$128.0	$0.8	$1.0	$154.0	$200.02
Maritime Service								
Terminal Employees	$48.4	$62.9	$385.3	$500.3	$4.8	$6.2	$438.6	$569.42
Tug Assists	$2.9	$3.7	$16.9	$21.9	$0.4	$0.5	$20.2	$26.17
Pilots*	$0.0	$0.0	$0.0	$0.0	$3.1	$4.1	$3.1	$4.05
Maritime Services/Agents	$9.0	$11.7	$112.1	$145.6	$2.5	$3.3	$123.7	$160.60
Forwarders	$19.4	$25.2	$180.1	$233.8	$1.6	$2.0	$201.1	$261.07
Marine Equipment/Ship Repair	$16.1	$20.9	$127.9	$166.1	$1.5	$1.9	$145.4	$188.84
Laker	$119.0	$154.6	$1,059.0	$1,375.1	$0.0	$0.0	$1,178.1	$1,529.63
Barge	$2.7	$3.4	$15.6	$20.3	$0.0	$0.1	$18.3	$23.77
Dependent Shippers/Consignees	$1,318.6	$1,712.1	$8,865.5	$11,510.9	$0.0	$0.0	$10,184.1	$13,223.04
Port Authority	$1.3	$1.7	$9.9	$12.9	$0.0	$0.0	$11.2	$14.58
Total	**$1,815.0**	**$2,356.6**	**$12,253.4**	**$15,909.8**	**$37.6**	**$48.9**	**$14,106.1**	**$18,315.30**

* All pilotage revenue impacts have been allocated to foreign flag vessels. Canadian flag vessels, however, are also subject to compulsory pilotage requirements in the St. Lawrence and Great Lakes region. It was not possible to accurately allocate Canadian-flag pilotage impacts due to lack of information as to duration of time pilots spend on these transits versus foreign-flag transits.

EXHIBIT V-23
Economic Impacts by State – Canadian Flag Vessels

	Indiana		Ohio		Michigan	
Tonnage Handled (1,000): Metric Tons (Short Tons)	**228 (251)**		**740 (816)**		**1,150 (1,268)**	
Jobs						
Direct Jobs	2,076		236		472	
Induced	2,067		196		332	
Indirect	2,894		363		302	
Total	7,037		795		1,106	
	US $	**Cdn $**	**US $**	**Cdn $**	**US $**	**Cdn $**
Economic Activity (1,000)	$1,631,583	$2,118,448	$67,036	$87,040	$71,269	$92,536
Personal Income (1,000)						
Direct	$127,864	$166,018	$10,540	$13,686	$21,047	$27,328
Re-Spending/Local Consumption	$259,704	$337,200	$22,748	$29,536	$37,902	$49,212
Indirect	$133,250	$173,012	$16,956	$22,015	$12,565	$16,314
Total	$520,818	$676,230	$50,244	$65,237	$71,514	$92,853
Business Revenue (1,000)	$1,371,879	$1,781,248	$44,288	$57,503	$33,367	$43,324
Local Purchases (1,000)	$277,032	$359,698	$34,368	$44,624	$33,060	$42,925
Taxes (1,000)						
Federal	$188,941	$245,321	$13,120	$17,035	$16,953	$22,012
State and Local	$68,684	$89,179	$4,924	$6,393	$7,123	$9,248
Total	$257,625	$334,500	$18,044	$23,428	$24,076	$31,260

EXHIBIT V-23 Continued

	Minnesota		Illinois		Wisconsin	
Tonnage Handled (1,000): Metric Tons (Short Tons)	**3,553 (3,917)**		**80 (88)**		**4,528 (4,991)**	
Jobs						
Direct Jobs	277		54		419	
Induced	238		49		298	
Indirect	313		16		282	
Total	829		118		999	
	US $	**Cdn $**	**US $**	**Cdn $**	**US $**	**Cdn $**
Economic Activity (1,000)	$169,752	$220,406	$16,184	$21,013	$237,735	$308,676
Personal Income (1,000)						
Direct	$12,786	$16,601	$2,401	$3,118	$18,793	$24,400
Re-Spending/Local Consumption	$27,487	$35,689	$6,337	$8,228	$31,295	$40,634
Indirect	$14,756	$19,159	$829	$1,076	$12,527	$16,266
Total	$55,028	$71,449	$9,567	$12,422	$62,615	$81,300
Business Revenue (1,000)	$142,265	$184,717	$9,847	$12,785	$206,440	$268,042
Local Purchases (1,000)	$32,542	$42,253	$1,601	$2,079	$29,758	$38,637
Taxes (1,000)						
Federal	$19,807	$25,718	$2,580	$3,350	$25,123	$32,619
State and Local	$8,731	$11,337	$1,205	$1,565	$10,149	$13,178
Total	$28,539	$37,055	$3,785	$4,915	$35,272	$45,797

EXHIBIT V-23 Continued

	New York		Pennsylvania		Total US	
Tonnage Handled (1,000): Metric Tons (Short Tons)	**115 (127)**		**0 (0)**		**10,394 (11,458)**	
Jobs						
Direct Jobs	69		0		3,603	
Induced	49		0		3,229	
Indirect	11		0		4,181	
Total	129		0		11,013	
	US $	**Cdn $**	**US $**	**Cdn $**	**US $**	**Cdn $**
Economic Activity (1,000)	$12,347	$16,031	$0	$0	$2,205,906	$2,864,148
Personal Income (1,000)						
Direct	$3,248	$4,217	$0	$0	$196,678	$255,367
Re-Spending/Local Consumption	$5,412	$7,027	$0	$0	$390,885	$507,525
Indirect	$545	$708	$0	$0	$191,428	$248,550
Total	$9,205	$11,952	$0	$0	$778,991	$1,011,442
Business Revenue (1,000)	$6,935	$9,004	$0	$0	$1,815,021	$2,356,623
Local Purchases (1,000)	$1,576	$2,047	$0	$0	$409,938	$532,263
Taxes (1,000)						
Federal	$2,335	$3,032	$0	$0	$268,859	$349,087
State and Local	$1,268	$1,646	$0	$0	$102,084	$132,546
Total	$3,603	$4,678	$0	$0	$370,943	$481,633

EXHIBIT V-24
Economic Impacts by Province – Canadian Flag Vessels

	Ontario		Quebec		Total	
Tonnage Handled (1,000): Metric Tons (Short Tons)	**16,053 (17,695)**		**7,753 (8,547)**		**23,806 (26,241)**	
Jobs						
Direct Jobs	9,695		1,154		10,848	
Induced	12,876		1,124		14,000	
Indirect	7,628		750		8,378	
Total	30,199		3,028		33,227	
	US $	**Cdn $**	**US $**	**Cdn $**	**US $**	**Cdn $**
Economic Activity (1,000)	$4,477,992	$5,814,225	$389,651	$505,923	$4,867,643	$6,320,148
Personal Income (1,000)						
Direct	$374,348	$486,054	$45,613	$59,224	$419,961	$545,278
Re-Spending/Local Consumption	$567,213	$736,469	$35,427	$45,998	$602,639	$782,467
Indirect	$332,986	$432,349	$30,258	$39,287	$363,243	$471,635
Total	$1,274,547	$1,654,871	$111,297	$144,508	$1,385,844	$1,799,380
Business Revenue (1,000)	$3,910,779	$5,077,756	$354,224	$459,925	$4,265,004	$5,537,681
Local Purchases (1,000)	$825,927	$1,072,383	$85,816	$111,423	$911,743	$1,183,806
Taxes (1,000)						
Federal	$431,036	$559,657	$38,047	$49,400	$469,083	$609,057
Provincial and Local	$267,110	$346,816	$37,853	$49,149	$304,963	$395,964
Total	$698,146	$906,473	$75,900	$98,549	$774,046	$1,005,021

EXHIBIT V-25
Economic Impacts by State – U.S. Flag Vessels

	Indiana		Ohio		Michigan	
Tonnage Handled (1,000): Metric Tons (Short Tons)	**19,044 (20,993)**		**11,073 (12,206)**		**22,526 (24,830)**	
Jobs						
Direct Jobs	12,970		2,788		5,205	
Induced	13,639		2,967		4,073	
Indirect	18,079		4,073		3,193	
Total	44,689		9,829		12,470	
	US $	**Cdn $**	**US $**	**Cdn $**	**US $**	**Cdn $**
Economic Activity (1,000)	$8,748,019	$11,358,428	$1,864,916	$2,421,406	$2,451,652	$3,183,225
Personal Income (1,000)						
Direct	$855,251	$1,110,458	$172,448	$223,906	$268,947	$349,201
Re-Spending/Local Consumption	$1,737,100	$2,255,450	$372,177	$483,234	$484,320	$628,841
Indirect	$832,498	$1,080,915	$192,051	$249,359	$135,046	$175,343
Total	$3,424,848	$4,446,823	$736,675	$956,499	$888,313	$1,153,385
Business Revenue (1,000)	$7,010,920	$9,102,978	$1,492,739	$1,938,172	$1,967,332	$2,554,384
Local Purchases (1,000)	$1,730,794	$2,247,263	$371,192	$481,956	$346,489	$449,881
Taxes (1,000)						
Federal	$1,125,852	$1,461,806	$241,281	$313,279	$300,651	$390,365
State and Local	$423,513	$549,890	$72,194	$93,737	$107,109	$139,071
Total	$1,549,365	$2,011,696	$313,475	$407,016	$407,760	$529,436

EXHIBIT V-25 Continued

	Minnesota		Illinois		Wisconsin	
Tonnage Handled (1,000): Metric Tons (Short Tons)	**27,147 (29,924)**		**830 (915)**		**15,460 (17,042)**	
Jobs						
Direct Jobs	1,806		122		1,281	
Induced	1,526		109		921	
Indirect	1,668		36		873	
Total	5,000		267		3,075	
	US $	**Cdn $**	**US $**	**Cdn $**	**US $**	**Cdn $**
Economic Activity (1,000)	$1,282,990	$1,665,834	$39,556	$51,359	$734,386	$953,526
Personal Income (1,000)						
Direct	$81,654	$106,019	$5,383	$6,990	$58,361	$75,776
Re-Spending/Local Consumption	$175,539	$227,920	$14,208	$18,448	$97,189	$126,190
Indirect	$78,634	$102,098	$1,883	$2,444	$38,740	$50,301
Total	$335,827	$436,038	$21,474	$27,882	$194,291	$252,267
Business Revenue (1,000)	$1,107,450	$1,437,914	$25,348	$32,911	$637,197	$827,336
Local Purchases (1,000)	$173,913	$225,809	$3,637	$4,722	$91,949	$119,386
Taxes (1,000)						
Federal	$134,756	$174,967	$5,980	$7,764	$77,758	$100,962
State and Local	$57,975	$75,275	$2,755	$3,577	$31,440	$40,821
Total	$192,731	$250,242	$8,735	$11,341	$109,198	$141,783

EXHIBIT V-25 Continued

	New York		Pennsylvania		Total US	
Tonnage Handled (1,000): Metric Tons (Short Tons)	**210 (231)**		**0 (0)**		**96,290 (106,140)**	
Jobs						
Direct Jobs	134		0		24,306	
Induced	95		0		23,330	
Indirect	19		0		27,942	
Total	248		0		75,578	
	US $	**Cdn $**	**US $**	**Cdn $**	**US $**	**Cdn $**
Economic Activity (1,000)	$22,925	$29,766	$0	$0	$15,144,444	$19,663,546
Personal Income (1,000)						
Direct	$6,315	$8,199	$0	$0	$1,448,359	$1,880,549
Re-Spending/Local Consumption	$10,523	$13,663	$0	$0	$2,891,056	$3,753,746
Indirect	$993	$1,290	$0	$0	$1,279,845	$1,661,751
Total	$17,831	$23,152	$0	$0	$5,619,259	$7,296,046
Business Revenue (1,000)	$12,403	$16,104	$0	$0	$12,253,388	$15,909,799
Local Purchases (1,000)	$2,871	$3,728	$0	$0	$2,720,845	$3,532,745
Taxes (1,000)						
Federal	$4,464	$5,796	$0	$0	$1,890,741	$2,454,938
State and Local	$2,441	$3,169	$0	$0	$697,428	$905,540
Total	$6,904	$8,965	$0	$0	$2,588,169	$3,360,478

EXHIBIT V-26
Economic Impacts by Province – U.S. Flag Vessels

	Ontario		Quebec		Total	
Tonnage Handled (1,000): Metric Tons (Short Tons)	**1,138 (1,255)**		**226 (249)**		**1,364 (1,504)**	
Jobs						
Direct Jobs	468		32		500	
Induced	609		29		638	
Indirect	486		18		504	
Total	1,563		80		1,642	
	US $	**Cdn $**	**US $**	**Cdn $**	**US $**	**Cdn $**
Economic Activity (1,000)	$204,697	$265,779	$14,410	$18,710	$219,108	$284,489
Personal Income (1,000)						
Direct	$17,606	$22,860	$1,167	$1,516	$18,774	$24,376
Re-Spending/Local Consumption	$26,677	$34,638	$1,068	$1,387	$27,745	$36,024
Indirect	$21,186	$27,509	$730	$948	$21,916	$28,456
Total	$65,470	$85,006	$2,965	$3,850	$68,435	$88,856
Business Revenue (1,000)	$178,020	$231,141	$13,342	$17,324	$191,363	$248,465
Local Purchases (1,000)	$52,417	$68,058	$2,075	$2,694	$54,492	$70,752
Taxes (1,000)						
Federal	$21,409	$27,798	$1,139	$1,478	$22,548	$29,276
Provincial and Local	$13,195	$17,132	$1,101	$1,429	$14,295	$18,561
Total	$34,604	$44,930	$2,239	$2,907	$36,843	$47,838

EXHIBIT V-27
Economic Impacts by State – Foreign Flag Vessels

	Indiana		Ohio		Michigan	
Tonnage Handled (1,000): Metric Tons (Short Tons)	**0 (0)**		**0 (0)**		**0 (0)**	
Jobs						
Direct Jobs	0		0		0	
Induced	0		0		0	
Indirect	0		0		0	
Total	0		0		0	
	US $	**Cdn $**	**US $**	**Cdn $**	**US $**	**Cdn $**
Economic Activity (1,000)	$0	$0	$0	$0	$0	$0
Personal Income (1,000)						
Direct	$0	$0	$0	$0	$0	$0
Re-Spending/Local Consumption	$0	$0	$0	$0	$0	$0
Indirect	$0	$0	$0	$0	$0	$0
Total	$0	$0	$0	$0	$0	$0
Business Revenue (1,000)	$0	$0	$0	$0	$0	$0
Local Purchases (1,000)	$0	$0	$0	$0	$0	$0
Taxes (1,000)						
Federal	$0	$0	$0	$0	$0	$0
State and Local	$0	$0	$0	$0	$0	$0
Total	$0	$0	$0	$0	$0	$0

EXHIBIT V-27 Continued

	Minnesota		Illinois		Wisconsin	
Tonnage Handled (1,000): Metric Tons (Short Tons)	**224 (247)**		**0 (0)**		**617 (680)**	
Jobs						
Direct Jobs	72		0		117	
Induced	70		0		99	
Indirect	130		0		80	
Total	272		0		295	
	US $	**Cdn $**	**US $**	**Cdn $**	**US $**	**Cdn $**
Economic Activity (1,000)	$17,091	$22,191	$0	$0	$40,177	$52,166
Personal Income (1,000)						
Direct	$3,953	$5,133	$0	$0	$6,679	$8,672
Re-Spending/Local Consumption	$8,498	$11,034	$0	$0	$11,122	$14,441
Indirect	$6,098	$7,918	$0	$0	$3,531	$4,584
Total	$18,550	$24,085	$0	$0	$21,332	$27,698
Business Revenue (1,000)	$8,592	$11,156	$0	$0	$29,055	$37,724
Local Purchases (1,000)	$13,321	$17,295	$0	$0	$8,379	$10,880
Taxes (1,000)						
Federal	$4,394	$5,705	$0	$0	$6,165	$8,005
State and Local	$2,172	$2,820	$0	$0	$2,806	$3,643
Total	$6,566	$8,525	$0	$0	$8,970	$11,647

EXHIBIT V-27 Continued

	New York		Pennsylvania		Total US	
Tonnage Handled (1,000): Metric Tons (Short Tons)	**0 (0)**		**0 (0)**		**841 (927)**	
Jobs						
Direct Jobs	0		0		189	
Induced	0		0		169	
Indirect	0		0		209	
Total	0		0		567	
	US $	**Cdn $**	**US $**	**Cdn $**	**US $**	**Cdn $**
Economic Activity (1,000)	$0	$0	$0	$0	$57,268	$74,356
Personal Income (1,000)						
Direct	$0	$0	$0	$0	$10,632	$13,805
Re-Spending/Local Consumption	$0	$0	$0	$0	$19,621	$25,476
Indirect	$0	$0	$0	$0	$9,629	$12,502
Total	$0	$0	$0	$0	$39,882	$51,783
Business Revenue (1,000)	$0	$0	$0	$0	$37,647	$48,881
Local Purchases (1,000)	$0	$0	$0	$0	$21,700	$28,175
Taxes (1,000)						
Federal	$0	$0	$0	$0	$10,559	$13,709
State and Local	$0	$0	$0	$0	$4,977	$6,463
Total	$0	$0	$0	$0	$15,536	$20,172

EXHIBIT V-28
Economic Impacts by Province – Foreign Flag Vessels

	Ontario		Quebec		Total	
Tonnage Handled (1,000): Metric Tons (Short Tons)	**2,066 (2,277)**		**11 (12)**		**2,077 (2,289)**	
Jobs						
Direct Jobs	316		3		319	
Induced	458		3		461	
Indirect	363		1		364	
Total	1,137		8		1,144	
	US $	**Cdn $**	**US $**	**Cdn $**	**US $**	**Cdn $**
Economic Activity (1,000)	$100,591	$130,607	$528	$686	$101,119	$131,293
Personal Income (1,000)						
Direct	$13,605	$17,664	$137	$178	$13,742	$17,842
Re-Spending/Local Consumption	$20,614	$26,765	$126	$163	$20,739	$26,928
Indirect	$15,945	$20,703	$42	$54	$15,987	$20,757
Total	$50,163	$65,132	$305	$395	$50,468	$65,527
Business Revenue (1,000)	$79,977	$103,843	$403	$523	$80,380	$104,366
Local Purchases (1,000)	$40,171	$52,157	$124	$161	$40,294	$52,318
Taxes (1,000)						
Federal	$14,598	$18,955	$86	$112	$14,684	$19,066
Provincial and Local	$8,812	$11,442	$90	$117	$8,902	$11,559
Total	$23,411	$30,396	$176	$229	$23,587	$30,625