

# **Infrastructure Investment Survey** of the **Great Lakes and St. Lawrence Seaway System**

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*Martin Associates*



# Table of Contents

<b>List of Tables and Figures</b> .....	<b>iii</b>
<b>About the Study Authors</b> .....	<b>iv</b>
<b>Survey Sponsors</b> .....	<b>iv</b>
<b>Executive Summary</b> .....	<b>1</b>
Introduction .....	1
Purpose .....	1
Methodology .....	1
Survey Results .....	2
Highlights of the Survey Findings .....	2
<b>1 Introduction</b> .....	<b>5</b>
<b>2 Methodology</b> .....	<b>6</b>
2.1 Stakeholder List .....	6
2.2 Geographic Scope .....	6
2.3 Past and Future Capital Expenditures .....	6
2.4 Survey Period .....	7
2.5 Adjustments for Inflation and Currency .....	7
2.6 Capital Investments vs. Maintenance Expenditures .....	7
2.7 Investments with a Maritime Nexus .....	8
2.8 Data Categories .....	8
2.9 Ports and Terminals .....	8
2.10 Waterway Infrastructure .....	9

2.11 Vessels .....	9
2.12 Public vs. Private Capital Investments.....	9
2.13 Canada vs. United States.....	10
2.14 Not Specified.....	10

**3 Survey Results ..... 11**

3.1 Actual and Committed Capital Investments.....	11
3.2 Private and Public Sector Investments.....	12
3.3 Vessel Capital Investments.....	12
3.4 Port, Terminal and Waterway Infrastructure Investments .....	13
3.5 Capital Investments by Type of Expenditure .....	14

**Appendix A – Detailed Survey Results in Canadian Dollars..... 15**

**Appendix B – Detailed Survey Results in U.S. Dollars..... 20**

# List of Tables and Figures

## List of Tables

Table ES-1.	Total Capital Investments by Sector.....	2
Table ES-2.	Total Capital Investments – Actual 2009-2013 and Committed Post-2013.....	2
Table ES-3.	Total Capital Investments by Private and Public Sectors .....	3
Table ES-4.	Vessel Capital Investments .....	4
Table 2-1.	Canadian Dollars per United States Dollar, Annual Averages .....	7
Table 2-2.	Expenditure Categories .....	8
Table 3-1.	Total Capital Investments – Actual 2009-2013 and Committed Post-2013.....	11
Table 3-2.	Capital Investments by Private and Public Sectors .....	12
Table 3-3.	Vessel Capital Investments .....	12
Table 3-4.	Port, Terminal and Waterway Infrastructure Investments – By State and Province .....	13
Table 3-5.	Capital Investments by Type of Expenditure .....	14
Table A-1.	Capital Investments by Private and Public Sectors .....	16
Table A-2.	Vessel Capital Investments by Flag of Registry .....	16
Table A-3.	Capital Investments by Type of Expenditure .....	17
Table A-4.	Port and Terminal Investments by State and Province .....	18
Table A-5.	Waterway Infrastructure Investments by State and Province .....	18
Table A-6.	Total Port, Terminal and Waterway Infrastructure Investments by State and Province .....	19
Table B-1.	Capital Investments by Private and Public Sectors .....	21
Table B-2.	Vessel Capital Investments by Flag of Registry .....	21
Table B-3.	Capital Investments by Type of Expenditure .....	22
Table B-4.	Port and Terminal Investments by State and Province .....	23
Table B-5.	Waterway Infrastructure Investments by State and Province .....	23
Table B-6.	Total Port, Terminal and Waterway Infrastructure Investments by State and Province .....	24

## List of Figures

Figure 1.	Port, Terminal and Waterway Infrastructure Investments – By State and Province .....	3
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## About the Study Authors

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

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## Survey Sponsors

Martin Associates was retained to perform this survey on behalf of a coalition of U.S. and Canadian Great Lakes-Seaway maritime industry stakeholders. A project steering committee was formed to provide guidance at the onset of the project. Steering committee members included representatives from the St. Lawrence Seaway Management Corporation, the Saint Lawrence Seaway Development Corporation, the Chamber of Marine Commerce, the American Great Lakes Ports Association, the Canadian Shipowners Association, the Lake Carriers' Association, the Port of Cleveland, the Port of Windsor, and Fednav Limited.

# Executive Summary

## Introduction

Martin Associates was retained by a coalition of Great Lakes-St. Lawrence Seaway maritime industry stakeholders to conduct a survey of vessel operators, ports, terminals, government agencies and other entities to quantify the level of investments made in the navigation system over the past five years. Additionally, we were asked to quantify the level of funds already committed for future investments.

The Great Lakes-St. Lawrence Seaway navigation system is critical to the economies of the United States and Canada. Every year, more than 160 million metric tons of raw materials, agricultural commodities and manufactured products are moved on the system. This marine highway supports the activities of more than 100 ports and commercial docks located in each of the eight Great Lakes states, and the provinces of Ontario and Quebec.



## Purpose

The purpose of this survey is to provide the maritime community, policy makers, and the general public with information on the level of investments being made in Great Lakes-St. Lawrence Seaway navigation system. By quantifying these investments, this survey helps illustrate confidence in the future viability of the navigation system and optimism regarding the region's economy.

## Methodology

To carry out the survey, Martin Associates developed a list of 628 individual companies and government agencies engaged in some aspect of Great Lakes-Seaway maritime commerce. Respondents were asked to report capital investments made between 2009-2013 as well as funds already committed for future expenditure. Because many companies engage in both maritime and non-maritime activities, the survey includes only those investments with a maritime nexus.

Landside investments included those made for locks, breakwaters, docks, warehouses, road and rail infrastructure, cranes, conveyers, yard equipment, lights, fencing, etc. Vessel investments were made in self-propelled deep draft vessels, ferries, barges, pilot boats, tugs, work boats, icebreakers, etc.

The geographic scope of the survey includes facilities from the western edge of the navigation system in Duluth, Minnesota, to the eastern-most reaches of the system in Sept-Îles, Quebec.

## Survey Results

Of the 628 stakeholders contacted, 454 were willing to participate in the survey and provide investment data. This represents a response rate of just over 72 percent.

The survey results are shown in aggregate, and also broken down by public vs. private sector. Landside investments are shown by geography – by country, and by state and province. Because vessel investments are mobile and not tied to a specific location, these investments were categorized by country of documentation of the vessel, for example: U.S.-flag, Canadian-flag, or third country international-flag.

All data is reported in both U.S. and Canadian dollars.

## Highlights of the Survey Findings

### *Total Capital Investments:*

A total of C\$ 7.1 billion (US\$ 6.9 billion) is being spent on asset renewal and modernization of vessels, ports and terminals and waterway infrastructure in the Great Lakes-St. Lawrence Seaway navigation system.

**Table ES-1. Total Capital Investments by Sector**

	CDN\$	US\$
Vessel	\$4,097,379,553	\$3,978,038,401
Ports & Terminals	\$1,754,323,598	\$1,703,226,794
Waterway Infrastructure	\$1,242,026,038	\$1,205,850,523
<b>Total</b>	<b>\$7,093,729,190</b>	<b>\$6,887,115,718</b>

Note: All figures are in 2013 dollars

### *Actual and Committed Investments:*

Between 2009-2013 more than C\$ 4.8 billion (US\$ 4.7 billion) has been invested in vessels, ports and terminals and waterway infrastructure in the Great Lakes-St. Lawrence Seaway navigation system. An additional C\$ 2.3 billion (US\$ 2.2 billion) in capital spending has been committed for infrastructure investments in the system by companies and governments.

**Table ES-2. Total Capital Investments – Actual 2009-2013 and Committed Post-2013**

	CDN\$	US\$
2009-2013	\$4,805,474,803	\$4,665,509,518
Committed post-2013	\$2,288,254,387	\$2,221,606,201
<b>Total</b>	<b>\$7,093,729,190</b>	<b>\$6,887,115,718</b>

Note: All figures are in 2013 dollars

### Private and Public Sector Investments:

Capital investments being made by the private sector total C\$ 4.7 billion (US\$ 4.6 billion) or 67 percent of the total amounts invested between 2009-2013 and committed for future investments. Public sector spending on infrastructure in the Great Lakes-St. Lawrence Seaway navigation system amounts to C\$ 2.4 billion (US\$ 2.3 billion) between 2009-2013 and committed for future investments.

**Table ES-3. Total Capital Investments by Private and Public Sectors**

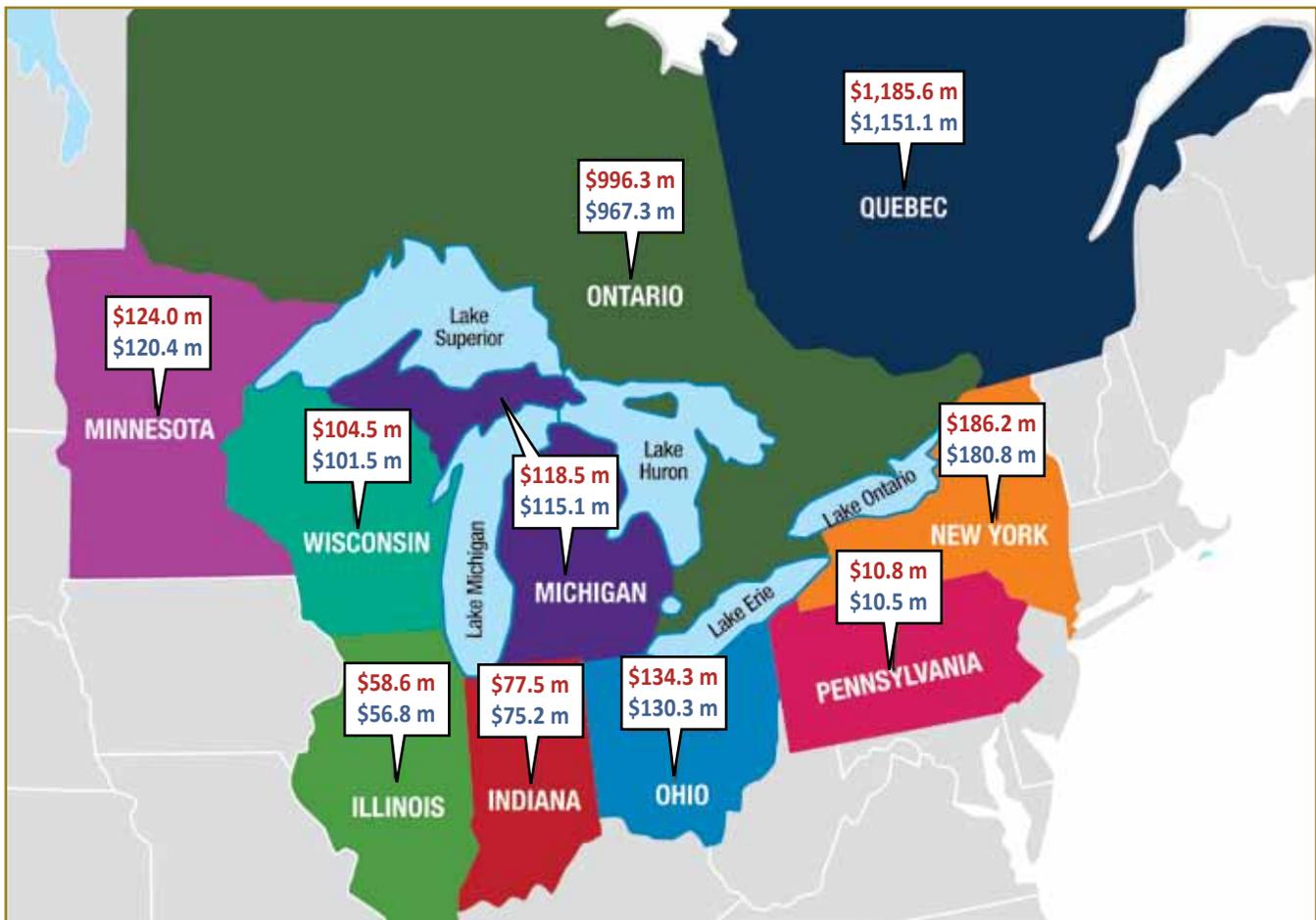
	CDN\$	US\$
Private Sector	\$4,718,510,370	\$4,581,078,029
Public Sector	\$2,375,218,820	\$2,306,037,689
<b>Total Private &amp; Public Sectors</b>	<b>\$7,093,729,190</b>	<b>\$6,887,115,718</b>

Note: All figures are in 2013 dollars

### Port, Terminal and Waterway Infrastructure Investments:

Capital investments being made in port and terminal facilities and waterway infrastructure total C\$ 3.0 billion (US\$ 2.9 billion). A breakdown of port, terminal and waterway infrastructure investments by state and province is presented in Figure 1.

**Figure 1. Port, Terminal and Waterway Infrastructure Investments – By State and Province**



CDN\$ in millions  
US\$ in millions

### ***Vessel Capital Investments:***

Canadian, American and international ship owners are spending more than C\$ 4.1 billion (US\$ 4.0 billion) on the biggest renewal of the Great Lakes fleets in 30 years.

**Table ES-4. Vessel Capital Investments**

	CDN\$	US\$
Canadian Flag	\$2,297,100,294	\$2,230,194,460
U.S. Flag	\$344,480,757	\$334,447,337
International	\$1,455,798,502	\$1,413,396,604
<b>Total Vessel Investments</b>	<b>\$4,097,379,553</b>	<b>\$3,978,038,401</b>

Note: All figures are in 2013 dollars

# 1 Introduction

The Great Lakes and St. Lawrence River have historically played a vital role in the Canadian and United States economies. Today there are approximately 226,833 jobs in the United States and Canada that depend, directly or indirectly, upon maritime activity in the region.<sup>1</sup> Vessels operating on these waters feed the steel mills of the Midwest, facilitate the export of grain from the North American prairies to overseas markets, move coal that supplies electricity to the region, stone used to build roads, and salt to keep them safe during winter. This survey quantifies the capital investments made by the firms that rely upon these waterways and the port authorities and government agencies that build and maintain the infrastructure that facilitate the movements of vessels and their cargoes.

The purpose of this survey is to provide the maritime community, policy makers, and the general public with information on the level of investments being made in Great Lakes-St. Lawrence Seaway navigation system. By quantifying these investments, this survey helps illustrate confidence in the future viability of the navigation system and optimism regarding the region's economy.

The survey also provides useful context for public sector spending. Both the U.S. and Canadian governments make annual investments in navigation infrastructure. These investments must be justified and shown as a responsible use of public funds. Data from this survey helps demonstrate that public investment in locks, aids to navigation and port infrastructure is being matched or exceeded by the private sector investments in vessels, terminals, and equipment.

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<sup>1</sup> *The Economic Impacts of the Great Lakes-St. Lawrence Seaway System*, Martin Associates, 2011.

# 2 Methodology

## 2.1 Stakeholder List

To quantify the amount of investment on the Great Lakes-St. Lawrence Seaway navigation system, Martin Associates identified 628 stakeholders consisting of United States and Canadian terminal operators, vessel operators, port authorities, and government agencies to be interviewed. This list was developed primarily from *Greenwood's Guide to Great Lakes Shipping, 2013*, and supplemented by Martin Associates' internal databases. Of the 628 stakeholders, 454 participated in the survey for a response rate of just over 72 percent. It should be noted that figures presented in this report only represent investments made by those firms who elected to participate. Figures were not extrapolated to the total population, thus the results represent a conservative estimate of investments made in the region's maritime infrastructure.

## 2.2 Geographic Scope

The geographic area covered by this survey includes investments in all of portions of the Great Lakes-St. Lawrence Seaway navigation system from Duluth, Minnesota in the west to Sept-Îles, Quebec in the east. Within this geography, there are two areas where the navigation system overlaps with neighboring navigation systems. In these locations investments were only counted if they related to Great Lakes commerce. For example, facility investments at the Port of Montreal and at St. Lawrence River ports east of Montreal were included in the survey only if they were used to facilitate the movement of commerce to/from the Great Lakes. Similarly, facilities at the Port of Chicago that primarily handle inland river barge shipments were not included in the survey unless they also serve Great Lakes deep-draft vessel cargo.

## 2.3 Past and Future Capital Expenditures

For the purposes of this survey, the term "capital investment" was defined and determined by each respondent and included those investments deemed as capital expenses under the organization's own accounting and financial reporting practices.

During the interviews, respondents were asked to identify two categories of investment: 1) past capital expenditures made between 2009 through 2013; and 2) funds committed for future capital expenditures post-2013.

Future capital expenditures were defined as those in which a respondent had money available and allocated in its budget for coming years. Thus, projects that were merely part of a strategic plan were not included in this analysis unless already contracted for with funds set aside for their completion. This was done to ensure that figures presented in this report represent a conservative estimate of what is likely to be invested in the region's maritime infrastructure in future years. It should be noted that there were many instances in which firms were willing to provide historical expenditure data (2009-2013), but were unwilling to share information related to future commitments.

## 2.4 Survey Period

The majority of the interviews were conducted between November 2013 and January 2014. A second round of interviews was conducted between June and August 2014. Since over 80 percent of respondents were surveyed in 2013 or the first few weeks of 2014, this survey treats all 2014 capital expenditures as future projects and classifies them in the “*Funds Committed*” category in the attached tables.

## 2.5 Adjustments for Inflation and Currency

Given the length of time covered by this survey and the fact that capital expenditures were reported in both United States and Canadian Dollars, the use of nominal dollar amounts (the face value amounts reported by the survey participant) would not provide sufficient accuracy. To more accurately combine investment amounts made during different years and in different currencies, a methodology was deployed to convert all amounts to the same currency and adjust for inflation.

Using annualized exchange rates, as shown in Table 2-1, United States Dollar-denominated nominal investment amounts were first converted to Canadian Dollars using the exchange rate from the year the investment was made. This converted figure was then inflated to 2013 Canadian Dollars with data from the Canadian Consumer Price Index. Canadian Dollar-denominated projects were simply inflated to 2013 Canadian Dollars. To obtain United States Dollars, these 2013 Canadian Dollar figures were converted using the 2013 exchange rate. With respect to funds committed for future projects, an assumed exchange rate of 1.0459 Canadian Dollars per 1.0000 United States Dollar was used. This rate was obtained by calculating the average exchange rate over the duration of the survey for which data was available, (January 2009 through October 2014).

**Table 2-1. Canadian Dollars per United States Dollar, Annual Averages<sup>2</sup>**

	1 US\$ =
2009	CDN 1.1412
2010	CDN 1.0298
2011	CDN 0.9887
2012	CDN 0.9995
2013	CDN 1.0300

## 2.6 Capital Investments vs. Maintenance Expenditures

It is to be emphasized that the focus of this survey is capitalized investments related to the region’s maritime infrastructure made by private firms and government agencies. The survey does not seek to quantify expenditures for routine maintenance and repairs. For example, the survey includes investments in new road and rail infrastructures that directly facilitate the movement of cargo to and from terminals such as a new rail spur into a port or improved pavement strength to accommodate heavier trucks. This would not include regular track maintenance by the railroads or repairs to port roads due to winter damage. Similarly, expenditures for maintenance dredging of existing navigation channels were not included in the survey.

<sup>2</sup> Annual averages were computed from data published by the Board of Governors of the Federal Reserve System. *Foreign Exchange Rates – H.10.*  
< [http://www.federalreserve.gov/releases/h10/hist/dat00\\_ca.htm](http://www.federalreserve.gov/releases/h10/hist/dat00_ca.htm) >

## 2.7 Investments with a Maritime Nexus

Respondents were asked to report investments that specifically relate to, and facilitate the movement of maritime commerce. This distinction is particularly important for large facilities such as steel mills, mines and processing plants where maritime operations are an ancillary function and a small part of their overall activity.

## 2.8 Data Categories

During the interview process, the categories presented in Table 2-2 were used to focus participants' responses on the maritime aspects of their operations:

**Table 2-2. Investment Categories**

Breakwaters, Locks, Navigation or Other Structures
Cranes, Conveyors, and Loading Equipment
Dock Walls and Wharves
Dredging*
Road and Rail Access Infrastructure, Paving
Lighting, Fencing, Security, Utilities
Warehouse or Administrative Buildings
Yard Equipment
New Vessels and Fleet Additions
Major Engine Work and Propulsion Rehabilitation
Other Upgrades to Existing Fleets**
Research and Development, Including Environmental
CDF/Spoils Disposal Sites
Other

\* Deepening dredging only, not maintenance dredging

\*\* Excludes Routine Dry-Docking

The categories from Table 2-2 were further refined into three broad sectors: Ports and Terminals, Vessels, and Waterway Infrastructure. Investments were evaluated on a case-by-case basis, rather than by company. For instance, a ferry operator could have performed major hull work on their fleet, (vessel sector,) or upgraded their shore-side terminal facilities, (ports and terminals sector). Similarly, many government agencies make investments in all three sectors.

## 2.9 Ports and Terminals

The types of investments included in the ports and terminals sector include major wharf and dockwall repairs, improvements to truck or rail access, upgrades to loading/unloading equipment such as cranes and conveyors as well as other yard equipment, upgrades to on-site buildings (whether administrative or storage warehouses), and other on-site work such as new or upgraded lighting, fencing, utilities, paving or security measures.

## 2.10 Waterway Infrastructure

As a rule of thumb, investments included in the waterway infrastructure sector typically benefit multiple system users rather than a single terminal. Examples of projects classified as waterway infrastructure would include upgrades to locks and breakwaters throughout the system, navigation aids, dredging (for deepening purposes only – not maintenance dredging), and new or expanded Confined Disposal Facilities (CDFs) for dredge material placement.

## 2.11 Vessels

The vessel sector consists of capital expenditures related to the various ship fleets operating on the Great Lakes-St. Lawrence Seaway System. The system is served by three distinct vessel operator groups:

- U.S. flag operators are those companies whose vessels are documented under the laws of the United States; generally, these carriers operate between U.S. ports within the Great Lakes.
- Canadian flag operators are those companies whose vessels are documented under Canadian law. These carriers generally operate between lower St. Lawrence River ports and Great Lakes ports, carrying both domestic and bi-national commerce.
- Foreign flag or international operators (also referred to as ocean-going vessels or salties) are those carriers whose vessels are documented under the laws of a country other than the United States or Canada. These vessels operate between system ports and overseas destinations.

No matter the vessel flag, investments quantified in this survey include those for self-propelled vessels, barges, tugs, ferries, pilot boats, and government vessels. The types of projects categorized in this sector include new vessel construction, existing vessel purchases, major engine or propulsion work, research and development, (including environmental research), and other major/capital upgrades to existing fleets. Expenditures related to routinely scheduled dry-docking work was excluded. It should be noted that the sub-category “New Vessels and Fleet Additions” includes both new builds and the purchase of existing vessels that may or may not have previously operated within the system. Even though such expenditures do not necessarily signify an expansion to the overall fleet, these second-hand vessel purchases still represent a large investment by firms to enhance their ability to operate in the region.

Most vessels operating in the Great Lakes-St. Lawrence Seaway system are dedicated to the navigation system year round. However, ocean-going vessels spend a portion of each year serving ports outside the system. The survey includes ocean-going vessel investments if made by an operator who is regular system user, and made for a vessel that serves the system some portion of the year. Similarly, federal investments in Coast Guard assets that provide service to the region for all or a portion of a year were included in the survey.

## 2.12 Public vs. Private Capital Investments

Data was collected in a manner that allows this survey to distinguish between public sector and private sector capital investments. In general, “public” investments were defined as anything funded by taxpayer dollars. This would include federally funded expenditures on locks or new vessel purchases by the Canadian or United States Coast Guards. Additionally, investments by public port authorities were treated as “public” expenditures, even though in many cases projects could theoretically be at least partially funded through operating revenues, derived from streams such as tenant rents, dockage, wharfage, etc. Finally, many past and planned investments were Public-Private Partnerships. In such cases, estimates of the shares of public versus private sources of funding were obtained so as to allocate the total value of the project into appropriate categories.

## 2.13 Canada vs. United States

Capital investments were grouped by the country in which the expenditures were made. Further, detail has been provided in the following tables breaking out capital investments by state and province. Due to the fact that many companies have multiple operations throughout the region, Martin Associates collected site-specific capital expenditure data. Thus, this survey can distinguish between a Canadian corporation's investments in a facility in Michigan versus those made at another facility in Ontario.

Capital investments in vessels were grouped by vessel flag community. By their very nature, these investments cannot be tied to a specific geography. By law, U.S.-flag vessel investments are made in the United States. Canadian-flag vessel investments may be made in Canada or another country. International-flag vessel investments may be made in any country. Whether a vessel investment is made in North America or overseas, it is relevant to this survey if it is made for the purposes of providing waterborne transportation services on the Great Lakes-Seaway system.

## 2.14 Not Specified

It should be noted that certain participants were unwilling or unable to share the precise nature of their investments but did provide aggregate figures. For example, there were instances in which participants provided the total cost of major projects that had been completed within the survey's timeframe but did not provide specifics on the allocation of costs, i.e., for lighting and fencing versus paving. Alternatively, there were firms that were simply unwilling to divulge how they had invested or intended to invest but did provide the total amount invested in their Great Lakes-St. Lawrence Seaway facility. This reluctance to provide detailed descriptions was a particular issue regarding future investments. Investments for which no project description was provided are classified as "Not Specified" in the results.

# 3 Survey Results

The results of the investment survey are summarized in this section of the report.

## 3.1 Actual and Committed Capital Investments:

- A total of C\$ 7.1 billion (US\$ 6.9 billion) is being spent on asset renewal and infrastructure improvements in the Great Lakes-St. Lawrence Seaway navigation system by both the public and private sectors.
- Between 2009-2013 more than C\$ 4.8 billion (US\$ 4.7 billion) has been invested in ships, ports and terminals and waterway infrastructure in the Great Lakes-St. Lawrence Seaway navigation system.
- An additional C\$ 2.3 billion (US\$ 2.2 billion) in capital spending has been committed for infrastructure investments in the system by companies and governments.

**Table 3-1. Total Capital Investments – Actual 2009-2013 and Committed Post-2013**

	CDN\$	US\$
<b>Actual 2009-2013</b>		
Vessel	\$2,936,016,385	\$2,850,501,345
Ports & Terminals	\$1,295,277,071	\$1,257,550,554
Waterway Infrastructure	\$574,181,347	\$557,457,618
<b>Total 2009-2013</b>	<b>\$4,805,474,803</b>	<b>\$4,665,509,518</b>
<b>Committed post-2013</b>		
Vessel	\$1,161,363,168	\$1,127,537,056
Ports & Terminals	\$459,046,527	\$445,676,240
Waterway Infrastructure	\$667,844,692	\$648,392,905
<b>Total Committed post-2013</b>	<b>\$2,288,254,387</b>	<b>\$2,221,606,201</b>
<b>Actual and Committed</b>		
Vessel	\$4,097,379,553	\$3,978,038,401
Ports & Terminals	\$1,754,323,598	\$1,703,226,794
Waterway Infrastructure	\$1,242,026,038	\$1,205,850,523
<b>Total</b>	<b>\$7,093,729,190</b>	<b>\$6,887,115,718</b>

Note: All figures are in 2013 dollars

## 3.2 Private and Public Sector Investments:

- Capital investments being made by the private sector total \$C 4.7 billion (US\$ 4.6 billion) or 67 percent of the total amounts invested between 2009-2013 and committed for future investments.
- Public sector spending on infrastructure in the Great Lakes-St. Lawrence Seaway navigation system amounts to C\$ 2.4 billion (US\$ 2.3 billion) between 2009-2013 and committed for future investments.

**Table 3-2. Capital Investments by Private and Public Sectors**

	CDN\$	US\$
<b>Private Sector</b>		
Vessel	\$3,842,039,296	\$3,730,135,239
Ports & Terminals	\$875,862,016	\$850,351,471
Waterway Infrastructure	\$609,058	\$591,319
<b>Total Private Sector</b>	<b>\$4,718,510,370</b>	<b>\$4,581,078,029</b>
<b>Public Sector</b>		
Vessel	\$255,340,258	\$247,903,163
Ports & Terminals	\$878,461,582	\$852,875,323
Waterway Infrastructure	\$1,241,416,980	\$1,205,259,204
<b>Total Public Sector</b>	<b>\$2,375,218,820</b>	<b>\$2,306,037,689</b>
<b>Private &amp; Public Sectors</b>		
Vessel	\$4,097,379,553	\$3,978,038,401
Ports & Terminals	\$1,754,323,598	\$1,703,226,794
Waterway Infrastructure	\$1,242,026,038	\$1,205,850,523
<b>Total Private &amp; Public Sectors</b>	<b>\$7,093,729,190</b>	<b>\$6,887,115,718</b>

Note: All figures are in 2013 dollars

## 3.3 Vessel Capital Investments

- Canadian, American and international ship owners are spending more than C\$ 4.1 billion (US\$ 4.0 billion) on the biggest renewal of the Great Lakes fleets in 30 years.
- Vessel operators have invested C\$ \$2.9 billion (US\$ 2.85 billion) in new ships and vessel upgrades between 2009-2013.
- A further C\$ 1.2 billion (US\$ 1.1 billion) has been committed for future capital investments in vessels.

**Table 3-3. Vessel Capital Investments**

	CDN\$	US\$
Canadian Flag	\$2,297,100,294	\$2,230,194,460
U.S. Flag	\$344,480,757	\$334,447,337
International	\$1,455,798,502	\$1,413,396,604
<b>Total Vessel Investments</b>	<b>\$4,097,379,553</b>	<b>\$3,978,038,401</b>

Note: All figures are in 2013 dollars

## 3.4 Port, Terminal and Waterway Infrastructure Investments

- Capital investments being made in port and terminal facilities and waterway infrastructure total C\$ 3.0 billion (US\$ 2.9 billion).
- Public sector investment in ports, terminals and waterway infrastructure total of C\$ 2.1 billion (US\$ 2.0 billion) or 71 percent of the total investments made between 2009-2013 and committed post-2013.
- Capital investments made in facilities and equipment at U.S. and Canadian ports and terminals totaled C\$ 1.3 billion (US\$ 1.2 billion) between 2009-2013. An additional C\$ 0.5 million (US\$ 0.5 million) has been committed for future capital spending.
- Capital investments in waterway infrastructure between 2009-2013 total C\$0.6 billion (US\$ 0.6 billion). An additional C\$ 0.6 billion (US\$ 0.6 billion) has been committed for future investments in waterway infrastructure.

**Table 3-4. Port, Terminal and Waterway Infrastructure Investments – By State and Province**

	CDN\$	US\$
Illinois	\$58,553,720	\$56,848,272
Indiana	\$77,493,795	\$75,236,694
Michigan	\$118,511,640	\$115,059,845
Minnesota	\$124,039,897	\$120,427,084
New York	\$186,205,583	\$180,782,119
Ohio	\$134,260,231	\$130,349,738
Pennsylvania	\$10,843,158	\$10,527,338
Wisconsin	\$104,534,250	\$101,489,563
<b>Total U.S.</b>	<b>\$814,442,273</b>	<b>\$790,720,653</b>
Ontario	\$996,286,826	\$967,268,763
Quebec	\$1,185,620,537	\$1,151,087,900
<b>Total Canada</b>	<b>\$2,181,907,363</b>	<b>\$2,118,356,664</b>
<b>Total Ports-Terminals &amp; Waterway Infrastructure</b>	<b>\$2,996,349,636</b>	<b>\$2,909,077,317</b>

Note: All figures are in 2013 dollars

## 3.5 Capital Investments by Type of Expenditure

- The following table shows the breakdown by type of expenditure for vessels, ports, terminals and waterway infrastructure.

**Table 3-5. Capital Investments by Type of Expenditure**

	CDN\$	US\$
<b>Vessel</b>		
Major Engine/Propulsion Rehab	\$126,430,502	\$122,748,060
New Vessel/Fleet Addition	\$3,177,616,963	\$3,085,065,013
Not Specified	\$270,160,403	\$262,291,653
Other Upgrade to Existing Fleet	\$463,501,498	\$450,001,454
R&D, including Environmental	\$59,670,188	\$57,932,221
<b>Total Vessel</b>	<b>\$4,097,379,553</b>	<b>\$3,978,038,401</b>
<b>Ports &amp; Terminals</b>		
Crane/Conveyor/Loading Equipment	\$37,448,083	\$36,357,362
Dock wall/wharf	\$526,262,725	\$510,934,684
Infrastructure – Rail	\$106,071,500	\$102,982,039
Infrastructure – Road	\$25,502,538	\$24,759,745
Lighting/Fencing/Paving/Utilities	\$14,812,398	\$14,380,969
Not Specified	\$761,698,115	\$739,512,733
Other	\$38,902,803	\$37,769,712
R&D, including Environmental	\$9,313,465	\$9,042,199
Security	\$7,919,952	\$7,689,274
Buildings (Warehouse/Admin)	\$170,505,679	\$165,539,494
Yard Equipment	\$55,886,340	\$54,258,583
<b>Total Ports &amp; Terminals</b>	<b>\$1,754,323,598</b>	<b>\$1,703,226,794</b>
<b>Waterway Infrastructure</b>		
Breakwater/Navigation/Other Structures	\$41,870,390	\$40,650,865
Dredging	\$639,188	\$620,570
Lock/Dockwall/Wharf Rehab	\$700,313,657	\$679,916,171
Other	\$434,017,460	\$421,376,174
Spoils Disposal Site	\$65,185,344	\$63,286,742
<b>Total Waterway Infrastructure</b>	<b>\$1,242,026,038</b>	<b>\$1,205,850,523</b>
<b>Grand Total</b>	<b>\$7,093,729,190</b>	<b>\$6,887,115,718</b>

Note: All figures are in 2013 dollars

The results of the investment survey are presented in further detail in the appendices to this report with the following breakdowns:

- Capital Investments by Private and Public Sectors
- Vessel Capital Investments by Flag of Registry
- Capital Investments by Type of Expenditure
- Port, Terminal and Waterway Infrastructure Investments by State and Province

Appendix A presents the survey findings in Canadian dollars. The survey findings are presented in U.S. dollars in Appendix B.

# Appendix **A**

## **Detailed Survey Results in Canadian Dollars**

All dollar amounts adjusted to 2013 dollar equivalents based on annualized Cdn/US dollar exchange rates and historical inflation rates.

- Table A-1.** Capital Investments by Private and Public Sectors
- Table A-2.** Vessel Capital Investments by Flag of Registry
- Table A-3.** Capital Investments by Type of Expenditure
- Table A-4.** Port and Terminal Investments by State and Province
- Table A-5.** Waterway Infrastructure Investments by State and Province
- Table A-6.** Total Port, Terminal and Waterway Infrastructure Investments by State and Province

**Table A-1. Capital Investments by Private and Public Sectors – In Canadian dollars**

	Actual 2009-2013	Committed Post-2013	Total
<b>Private Sector</b>			
Vessel	\$2,733,497,119	\$1,108,542,176	\$3,842,039,296
Ports & Terminals	\$688,694,198	\$187,167,817	\$875,862,016
Waterway Infrastructure	\$609,058	–	\$609,058
<b>Total Private Sector</b>	<b>\$3,422,800,376</b>	<b>\$1,295,709,994</b>	<b>\$4,718,510,370</b>
<b>Public Sector</b>			
Vessel	\$202,519,266	\$52,820,992	\$255,340,258
Ports & Terminals	\$606,582,873	\$271,878,710	\$878,461,582
Waterway Infrastructure	\$573,572,288	\$667,844,692	\$1,241,416,980
<b>Total Public Sector</b>	<b>\$1,382,674,427</b>	<b>\$992,544,393</b>	<b>\$2,375,218,820</b>
<b>Private &amp; Public Sectors</b>			
Vessel	\$2,936,016,385	\$1,161,363,168	\$4,097,379,553
Ports & Terminals	\$1,295,277,071	\$459,046,527	\$1,754,323,598
Waterway Infrastructure	\$574,181,347	\$667,844,692	\$1,242,026,038
<b>Total Private &amp; Public Sectors</b>	<b>\$4,805,474,803</b>	<b>\$2,288,254,387</b>	<b>\$7,093,729,190</b>

Note: All figures are in 2013 dollars

**Table A-2. Vessel Capital Investments by Flag of Registry – In Canadian dollars**

	Canadian Flag	U.S. Flag	International Flag	Total
<b>Private Sector Investments</b>				
Actual 2009-2013	\$1,422,750,771	\$278,467,928	\$1,032,278,421	\$2,733,497,119
Committed post-2013	\$674,000,000	\$11,022,095	\$423,520,082	\$1,108,542,176
<b>Total Private Sector</b>	<b>\$2,096,750,771</b>	<b>\$289,490,022</b>	<b>\$1,455,798,502</b>	<b>\$3,842,039,296</b>
<b>Public Sector Investments</b>				
Actual 2009-2013	\$157,238,412	\$45,280,854	–	\$202,519,266
Committed post-2013	\$43,111,111	\$9,709,881	–	\$52,820,992
<b>Total Public Sector</b>	<b>\$200,349,523</b>	<b>\$54,990,735</b>	<b>–</b>	<b>\$255,340,258</b>
<b>Combined Private and Public Sector Investments</b>				
Actual 2009-2013	\$1,579,989,183	\$323,748,782	\$1,032,278,421	\$2,936,016,385
Committed post-2013	\$717,111,111	\$20,731,975	\$423,520,082	\$1,161,363,168
<b>Total Private &amp; Public Sectors</b>	<b>\$2,297,100,294</b>	<b>\$344,480,757</b>	<b>\$1,455,798,502</b>	<b>\$4,097,379,553</b>

Note: All figures are in 2013 dollars

**Table A-3. Capital Investments by Type – In Canadian dollars**

	Actual 2009-2013	Committed Post-2013	Total
<b>Vessel</b>			
Major Engine/Propulsion Rehab	\$81,996,206	\$44,434,296	\$126,430,502
New Vessel/Fleet Addition	\$2,436,165,220	\$741,451,743	\$3,177,616,963
Not Specified	\$160,403	\$270,000,000	\$270,160,403
Other Upgrade to Existing Fleet	\$404,838,298	\$58,663,200	\$463,501,498
R&D, including Environmental	\$12,856,259	\$46,813,929	\$59,670,188
<b>Total Vessel</b>	<b>\$2,936,016,385</b>	<b>\$1,161,363,168</b>	<b>\$4,097,379,553</b>
<b>Ports &amp; Terminals</b>			
Crane/Conveyor/Loading Equipment	\$36,048,791	\$1,399,293	\$37,448,083
Dock wall/wharf	\$341,105,155	\$185,157,570	\$526,262,725
Infrastructure - Rail	\$91,660,474	\$14,411,026	\$106,071,500
Infrastructure - Road	\$22,887,813	\$2,614,725	\$25,502,538
Lighting/Fencing/Paving/Utilities	\$14,113,591	\$698,807	\$14,812,398
Not Specified	\$531,833,990	\$229,864,125	\$761,698,115
Other	\$38,072,753	\$830,050	\$38,902,803
R&D, including Environmental	\$8,333,817	\$979,648	\$9,313,465
Security	\$7,813,892	\$106,060	\$7,919,952
Buildings (Warehouse/Admin)	\$159,279,837	\$11,225,842	\$170,505,679
Yard Equipment	\$44,126,958	\$11,759,383	\$55,886,340
<b>Total Ports &amp; Terminals</b>	<b>\$1,295,277,071</b>	<b>\$459,046,527</b>	<b>\$1,754,323,598</b>
<b>Waterway Infrastructure</b>			
Breakwater/Navigation/Other Structures	\$22,074,687	\$19,795,704	\$41,870,390
Dredging	\$639,188	–	\$639,188
Lock/Dockwall/Wharf Rehab	\$421,996,654	\$278,317,002	\$700,313,657
Other	\$70,694,996	\$363,322,464	\$434,017,460
Spoils Disposal Site	\$58,775,822	\$6,409,522	\$65,185,344
<b>Total Waterway Infrastructure</b>	<b>\$574,181,347</b>	<b>\$667,844,692</b>	<b>\$1,242,026,038</b>
<b>Grand Total</b>	<b>\$4,805,474,803</b>	<b>\$2,288,254,387</b>	<b>\$7,093,729,190</b>

Note: All figures are in 2013 dollars

**Table A-4. Port and Terminal Investments by State and Province – In Canadian Dollars**

	Actual 2009-2013	Committed Post-2013	Total
Illinois	\$16,019,033	\$15,688,350	\$31,707,383
Indiana	\$42,391,594	\$2,057,674	\$44,449,268
Michigan	\$43,533,474	\$24,857,570	\$68,391,044
Minnesota	\$78,966,599	\$34,614,397	\$113,580,997
New York	\$4,600,812	\$7,717,545	\$12,318,357
Ohio	\$128,177,265	\$1,335,162	\$129,512,427
Pennsylvania	\$5,376,158	\$5,467,000	\$10,843,158
Wisconsin	\$42,875,353	\$10,025,393	\$52,900,746
<b>Total U.S.</b>	<b>\$361,940,289</b>	<b>\$101,763,091</b>	<b>\$463,703,380</b>
Ontario	\$368,109,690	\$119,044,962	\$487,154,653
Quebec	\$565,227,091	\$238,238,474	\$803,465,565
<b>Total Canada</b>	<b>\$933,336,782</b>	<b>\$357,283,436</b>	<b>\$1,290,620,218</b>
<b>Total Ports &amp; Terminals</b>	<b>\$1,295,277,071</b>	<b>\$459,046,527</b>	<b>\$1,754,323,598</b>

Note: All figures are in 2013 dollars

**Table A-5. Waterway Infrastructure Investments by State and Province – In Canadian Dollars**

	Actual 2009-2013	Committed Post-2013	Total
Illinois	\$25,913,667	\$932,670	\$26,846,337
Indiana	\$33,044,526	–	\$33,044,526
Michigan	\$37,655,836	\$12,464,760	\$50,120,596
Minnesota	–	\$10,458,900	\$10,458,900
New York	\$77,228,320	\$96,658,905	\$173,887,225
Ohio	\$415,741	\$4,332,062	\$4,747,803
Pennsylvania	–	–	–
Wisconsin	\$49,556,044	\$2,077,460	\$51,633,504
<b>Total U.S.</b>	<b>\$223,814,135</b>	<b>\$126,924,757</b>	<b>\$350,738,893</b>
Ontario	\$180,068,840	\$329,063,334	\$509,132,174
Quebec	\$170,298,372	\$211,856,600	\$382,154,972
<b>Total Canada</b>	<b>\$350,367,211</b>	<b>\$540,919,934</b>	<b>\$891,287,146</b>
<b>Total Waterway Infrastructure</b>	<b>\$574,181,347</b>	<b>\$667,844,692</b>	<b>\$1,242,026,038</b>

Note: All figures are in 2013 dollars

**Table A-6. Total Port, Terminal and Waterway Infrastructure Investments – In Canadian Dollars**

	<b>Actual 2009-2013</b>	<b>Committed Post-2013</b>	<b>Total</b>
Illinois	\$41,932,700	\$16,621,020	<b>\$58,553,720</b>
Indiana	\$75,436,120	\$2,057,674	<b>\$77,493,795</b>
Michigan	\$81,189,310	\$37,322,330	<b>\$118,511,640</b>
Minnesota	\$78,966,599	\$45,073,297	<b>\$124,039,897</b>
New York	\$81,829,133	\$104,376,450	<b>\$186,205,583</b>
Ohio	\$128,593,006	\$5,667,224	<b>\$134,260,231</b>
Pennsylvania	\$5,376,158	\$5,467,000	<b>\$10,843,158</b>
Wisconsin	\$92,431,398	\$12,102,853	<b>\$104,534,250</b>
<b>Total U.S.</b>	<b>\$585,754,425</b>	<b>\$228,687,848</b>	<b>\$814,442,273</b>
Ontario	\$548,178,530	\$448,108,296	<b>\$996,286,826</b>
Quebec	\$735,525,463	\$450,095,074	<b>\$1,185,620,537</b>
<b>Total Canada</b>	<b>\$1,283,703,993</b>	<b>\$898,203,370</b>	<b>\$2,181,907,363</b>
<b>Total Ports-Terminals &amp; Waterway Infrastructure</b>	<b>\$1,869,458,418</b>	<b>\$1,126,891,219</b>	<b>\$2,996,349,636</b>

Note: All figures are in 2013 dollars

# Appendix **B**

## **Detailed Survey Results in U.S. Dollars**

All dollar amounts adjusted to 2013 dollar equivalents based on annualized Cdn/US dollar exchange rates and historical inflation rates.

- Table B-1.** Capital Investments by Private and Public Sectors
- Table B-2.** Vessel Capital Investments by Flag of Registry
- Table B-3.** Capital Investments by Type of Expenditure
- Table B-4.** Port and Terminal Investments by State and Province
- Table B-5.** Waterway Infrastructure Investments by State and Province
- Table B-6.** Total Port, Terminal and Waterway Infrastructure Investments by State and Province

**Table B-1. Capital Investments by Private and Public Sectors – In U.S. dollars**

	Actual 2009-2013	Committed Post-2013	Total
<b>Private Sector</b>			
Vessel	\$2,653,880,699	\$1,076,254,540	<b>\$3,730,135,239</b>
Ports & Terminals	\$668,635,144	\$181,716,327	<b>\$850,351,471</b>
Waterway Infrastructure	\$591,319	–	<b>\$591,319</b>
<b>Total Private Sector</b>	<b>\$3,323,107,161</b>	<b>\$1,257,970,868</b>	<b>\$4,581,078,029</b>
<b>Public Sector</b>			
Vessel	\$196,620,647	\$51,282,516	<b>\$247,903,163</b>
Ports & Terminals	\$588,915,410	\$263,959,912	<b>\$852,875,323</b>
Waterway Infrastructure	\$556,866,299	\$648,392,905	<b>\$1,205,259,204</b>
<b>Total Public Sector</b>	<b>\$1,342,402,356</b>	<b>\$963,635,333</b>	<b>\$2,306,037,689</b>
<b>Private &amp; Public Sectors</b>			
Vessel	\$2,850,501,345	\$1,127,537,056	<b>\$3,978,038,401</b>
Ports & Terminals	\$1,257,550,554	\$445,676,240	<b>\$1,703,226,794</b>
Waterway Infrastructure	\$557,457,618	\$648,392,905	<b>\$1,205,850,523</b>
<b>Total Private &amp; Public Sectors</b>	<b>\$4,665,509,518</b>	<b>\$2,221,606,201</b>	<b>\$6,887,115,718</b>

Note: All figures are in 2013 dollars

**Table B-2. Vessel Capital Investments by Flag of Registry – In U.S. dollars**

	Canadian Flag	U.S. Flag	International Flag	Total
<b>Private Sector Investments</b>				
Actual 2009-2013	\$1,381,311,428	\$270,357,211	\$1,002,212,059	<b>\$2,653,880,699</b>
Committed post-2013	\$654,368,932	\$10,701,063	\$411,184,546	<b>\$1,076,254,540</b>
<b>Total Private Sector</b>	<b>\$2,035,680,361</b>	<b>\$281,058,274</b>	<b>\$1,413,396,604</b>	<b>\$3,730,135,239</b>
<b>Public Sector Investments</b>				
Actual 2009-2013	\$152,658,652	\$43,961,994	–	<b>\$196,620,647</b>
Committed post-2013	\$41,855,448	\$9,427,068	–	<b>\$51,282,516</b>
<b>Total Public Sector</b>	<b>\$194,514,100</b>	<b>\$53,389,063</b>	–	<b>\$247,903,163</b>
<b>Combined Private and Public Sector Investments</b>				
Actual 2009-2013	\$1,533,970,081	\$314,319,206	<b>\$1,002,212,059</b>	<b>\$2,850,501,345</b>
Committed post-2013	\$696,224,380	\$20,128,131	<b>\$411,184,546</b>	<b>\$1,127,537,056</b>
<b>Total Private &amp; Public Sectors</b>	<b>\$2,230,194,460</b>	<b>\$334,447,337</b>	<b>\$1,413,396,604</b>	<b>\$3,978,038,401</b>

Note: All figures are in 2013 dollars

**Table B-3. Capital Investments by Type – In U.S. dollars**

	Actual 2009-2013	Committed Post-2013	Total
<b>Vessel</b>			
Major Engine/Propulsion Rehab	\$79,607,967	\$43,140,093	\$122,748,060
New Vessel/Fleet Addition	\$2,365,208,952	\$719,856,061	\$3,085,065,013
Not Specified	\$155,731	\$262,135,922	\$262,291,653
Other Upgrade to Existing Fleet	\$393,046,891	\$56,954,563	\$450,001,454
R&D, including Environmental	\$12,481,804	\$45,450,417	\$57,932,221
<b>Total Vessel</b>	<b>\$2,850,501,345</b>	<b>\$1,127,537,056</b>	<b>\$3,978,038,401</b>
<b>Ports &amp; Terminals</b>			
Crane/Conveyor/Loading Equipment	\$34,998,826	\$1,358,537	\$36,357,362
Dock wall/wharf	\$331,170,054	\$179,764,631	\$510,934,684
Infrastructure - Rail	\$88,990,751	\$13,991,288	\$102,982,039
Infrastructure - Road	\$22,221,177	\$2,538,568	\$24,759,745
Lighting/Fencing/Paving/Utilities	\$13,702,516	\$678,453	\$14,380,969
Not Specified	\$516,343,680	\$223,169,053	\$739,512,733
Other	\$36,963,838	\$805,874	\$37,769,712
R&D, including Environmental	\$8,091,085	\$951,114	\$9,042,199
Security	\$7,586,303	\$102,971	\$7,689,274
Buildings (Warehouse/Admin)	\$154,640,618	\$10,898,876	\$165,539,494
Yard Equipment	\$42,841,706	\$11,416,877	\$54,258,583
<b>Total Ports &amp; Terminals</b>	<b>\$1,257,550,554</b>	<b>\$445,676,240</b>	<b>\$1,703,226,794</b>
<b>Waterway Infrastructure</b>			
Breakwater/Navigation/Other Structures	\$21,431,735	\$19,219,130	\$40,650,865
Dredging	\$620,570	–	\$620,570
Lock/Dockwall/Wharf Rehab	\$409,705,490	\$270,210,682	\$679,916,171
Other	\$68,635,918	\$352,740,256	\$421,376,174
Spoils Disposal Site	\$57,063,905	\$6,222,837	\$63,286,742
<b>Total Waterway Infrastructure</b>	<b>\$557,457,618</b>	<b>\$648,392,905</b>	<b>\$1,205,850,523</b>
<b>Grand Total</b>	<b>\$4,665,509,518</b>	<b>\$2,221,606,201</b>	<b>\$6,887,115,718</b>

Note: All figures are in 2013 dollars

**Table B-4. Port and Terminal Investments by State and Province – In U.S. Dollars**

	Actual 2009-2013	Committed Post-2013	Total
Illinois	\$15,552,460	\$15,231,408	\$30,783,867
Indiana	\$41,156,887	\$1,997,742	\$43,154,629
Michigan	\$42,265,509	\$24,133,563	\$66,399,072
Minnesota	\$76,666,601	\$33,606,211	\$110,272,812
New York	\$4,466,808	\$7,492,762	\$11,959,570
Ohio	\$124,443,947	\$1,296,274	\$125,740,220
Pennsylvania	\$5,219,571	\$5,307,767	\$10,527,338
Wisconsin	\$41,626,557	\$9,733,391	\$51,359,947
<b>Total U.S.</b>	<b>\$351,398,339</b>	<b>\$98,799,117</b>	<b>\$450,197,457</b>
Ontario	\$357,388,049	\$115,577,633	\$472,965,682
Quebec	\$548,764,166	\$231,299,489	\$780,063,655
<b>Total Canada</b>	<b>\$906,152,215</b>	<b>\$346,877,122</b>	<b>\$1,253,029,338</b>
<b>Total Ports &amp; Terminals</b>	<b>\$1,257,550,554</b>	<b>\$445,676,240</b>	<b>\$1,703,226,794</b>

Note: All figures are in 2013 dollars

**Table B-5. Waterway Infrastructure Investments by State and Province – In U.S. Dollars**

	Actual 2009-2013	Committed Post-2013	Total
Illinois	\$25,158,900	\$905,505	\$26,064,405
Indiana	\$32,082,065	–	\$32,082,065
Michigan	\$36,559,064	\$12,101,709	\$48,660,773
Minnesota	–	\$10,154,272	\$10,154,272
New York	\$74,978,952	\$93,843,597	\$168,822,549
Ohio	\$403,632	\$4,205,886	\$4,609,518
Pennsylvania	–	–	–
Wisconsin	\$48,112,664	\$2,016,951	\$50,129,616
<b>Total U.S.</b>	<b>\$217,295,277</b>	<b>\$123,227,920</b>	<b>\$340,523,197</b>
Ontario	\$174,824,116	\$319,478,965	\$494,303,081
Quebec	\$165,338,225	\$205,686,020	\$371,024,245
<b>Total Canada</b>	<b>\$340,162,341</b>	<b>\$525,164,985</b>	<b>\$865,327,326</b>
<b>Total Waterway Infrastructure</b>	<b>\$557,457,618</b>	<b>\$648,392,905</b>	<b>\$1,205,850,523</b>

Note: All figures are in 2013 dollars

**Table B-6. Total Port, Terminal and Waterway Infrastructure Investments – In U.S. Dollars**

	Actual 2009-2013	Committed Post-2013	Total
Illinois	\$40,711,359	\$16,136,913	\$56,848,272
Indiana	\$73,238,952	\$1,997,742	\$75,236,694
Michigan	\$78,824,573	\$36,235,272	\$115,059,845
Minnesota	\$76,666,601	\$43,760,483	\$120,427,084
New York	\$79,445,760	\$101,336,359	\$180,782,119
Ohio	\$124,847,579	\$5,502,159	\$130,349,738
Pennsylvania	\$5,219,571	\$5,307,767	\$10,527,338
Wisconsin	\$89,739,221	\$11,750,342	\$101,489,563
<b>Total U.S.</b>	<b>\$568,693,616</b>	<b>\$222,027,037</b>	<b>\$790,720,653</b>
Ontario	\$532,212,165	\$435,056,598	\$967,268,763
Quebec	\$714,102,391	\$436,985,509	\$1,151,087,900
<b>Total Canada</b>	<b>\$1,246,314,556</b>	<b>\$872,042,107</b>	<b>\$2,118,356,664</b>
<b>Total Ports-Terminals &amp; Waterway Infrastructure</b>	<b>\$1,815,008,172</b>	<b>\$1,094,069,145</b>	<b>\$2,909,077,317</b>

Note: All figures are in 2013 dollars



