Ontario Marine Transportation Study

Phase I Final Report
Industry Profile and Economic Impact

Prepared For
Ontario Ministry of Transportation
and
Ontario Marine Transportation Forum

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April 2009

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** ** **

Executive Summary

This report is Phase I of the Ontario Marine Transportation Study, awarded to MariNova Consulting Ltd. and partners in June 2008.

As a previous Research and Traffic Group report for Transport Canada described:

> The Ontario economy is the largest provincial economy in Canada, and the bulk of this economy is concentrated in eastern, central and southern Ontario near the GLSS. Notwithstanding the argument that Toronto is the nerve centre of the Canadian economy -- this may be so from a service, head office and market perspective – the manufacturing centre of Ontario extends from around Oshawa to the Niagara peninsula down to Windsor and to Sarnia. The importance of this should never be overlooked because Canada's economy is export driven (the U.S. being far and away the major market) and this is the major manufacturing exports region. For example, about 90% of vehicles assembled in Canada are exported to the United States. This region is the heart of the Canadian steel and automotive industries and is also the major petroleum and chemical producing region in Eastern Canada. Similarly, most of the major productive regions of the States bordering on the Lakes are either along the Lakes, within reasonable transport distance from the Lakes, or tied to the Mississippi River System.[1]

Ontario industries dependent upon the marine sector include steel production at Hamilton, Nanticoke and Sault Ste. Marie, salt production at Goderich and Windsor, and aggregates from the north shore of Lake Huron and Manitoulin Island. There are also significant movements of petroleum and chemical products from the St Clair River area to Ontario ports and to US lakes destinations, as well as cement from Ontario to US destinations. Coal used for power generation in Ontario is primarily shipped by water. Although diminished from the peak export moves of the 1970s and '80s, Ontario still possesses major transfer capability for Canadian grain exports (via Thunder Bay) and the movement of Ontario grain production from various locations on the Great Lakes.

This Phase I report is required to profile the marine transportation industry in Ontario and assess its economic impact. As of 2005, Ontario had 12 of the top 50 ports in Canada, by total tonnage handled. Domestic and international cargo handled at the top 20 Ontario ports is shown in the table on the following page.

The following ports are covered in this report:

- Prescott;
- Oshawa;
- Toronto;
- Hamilton;
- Port Colborne;
- Port Stanley;
- Nanticoke;
- Windsor;
- Sarnia;

[1] David Hackston, John MacDonald and Charles Schwier, Great Lakes – Seaway Overview, Research and Traffic Group for Transport Canada, Marine Policy and Programs, January 31, 2004, p.53.

- Goderich;
- Owen Sound;
- Meldrum Bay;
- Sault Ste. Marie; and
- Thunder Bay.

Table: Top 20 Ontario Ports (International And Domestic), in tonnes, 2005

Rank	Ports	Domestic	International	TOTAL
1	Nanticoke	1,562,445	12,577,038	14,139,483
2	Hamilton	5,564,510	6,630,785	12,195,295
3	Thunder Bay	5,254,636	2,870,386	8,125,022
4	Sault Ste Marie	831,764	4,949,360	5,781,124
5	Windsor Ontario	2,186,419	2,964,939	5,151,358
6	Goderich	1,520,898	3,175,009	4,695,907
7	Meldrum Bay	1,918,405	2,627,664	4,546,069
8	Sarnia	2,458,730	813,163	3,271,893
9	Courtright	76,367	3,012,814	3,089,181
10	Clarkson	2,356,793	512,865	2,869,658
11	Toronto	1,394,955	561,361	1,956,316
12	Colborne	1,942,105	-	1,942,105
13	Whitefish	541,019	1,396,042	1,937,061
14	Bowmanville	264,654	1,407,381	1,672,035
15	Picton	443,812	1,096,500	1,540,312
16	Port Colborne	100,452	861,142	961,594
17	Bath	254,269	536,549	790,818
18	Midland	536,070	-	536,070
19	Sombra	15,834	392,208	408,042
20	Spragge	116,901	288,837	405,738
Total Tonnage Top 20 Ports		**29,341,038**	**46,674,043**	**76,015,081**
Total of all Ontario Ports		**30,901,600**	**47,994,995**	**78,896,595**

Information on location, facilities in the port area, major industries using the port, and data on commodities handled at the port will provide insight into the types of carriers servicing the port.

The report includes a review of the St Lawrence Seaway, which is integral to the Ontario transportation system. It has 15 large international ports and 50 regional ports, as well as convenient road, rail and air connections. A third of North America's population lives around the system. Two Canadian provinces and eight American states border the system. Sixty percent (60%) of Canada's economic activity and 26 percent (26%) of American economic activity is based around the system.

Based on traffic carried by the Great Lakes Carriers Association plus Canadian domestic and international cargo, we estimate approximately 200 million tonnes annually move within the complete Great Lakes/Seaway system. The Seaway study estimates over 260 million tonnes of cargo was handled annually in recent years, and probably includes double counting of Canadian domestic traffic. Within the St Lawrence Seaway section approximately 43 million

tonnes annually are carried by approximately 3,600 vessel transits. In 2007, 43 million metric tonnes of cargo, mostly grain, iron ore, coal, steel and other bulk commodities, passed through the Seaway. Seaway infrastructure is currently only being utilized at about half its potential capacity at the current level of traffic of 12 to 15 ships a day.

The report also includes a summary of the system's primary users or customers. They are the major bulk shippers and receivers located along the lakes and rivers from Bath to Thunder Bay. In all, the companies can be grouped into six main groupings:

- Steel;
- Power Generation;
- Construction;
- Petroleum;
- Salt; and
- Grain.

In the first chapter, we list the major companies associated with each group, their locations, and major markets or sources of raw materials. Commodity flow information for the selected ports is contained in the sections on ports.

The next chapter of the report examines the carrier industry, including domestic, international, and ferry vessels. This section profiles a number of domestic carriers that have operations that impact the Ontario marine transportation industry.

For each company we provide a list of vessels, the year of build and their gross registered and deadweight tonnage, where known. We describe the type of business carried out by each carrier and the various sectors of the industry they are involved in, i.e. bulk, petroleum, general cargo, etc. We also briefly describe the Lake Carriers' Association, which represents US shipping interests in the Great Lakes.

The section also describes international carriers serving the province. The same type of information provided for domestic carriers is also provided here. Of particular interest is the age profile of the international fleet compared with domestic vessels. Finally, a summary of ferry and passenger (including cruise) service in the province is provided, including a summary of events surrounding the ill-fated Toronto-Rochester ferry service.

Another chapter discusses marine support industries, including shipbuilding and repair, stevedoring companies, ship supply and chandlery companies, as well as shipping agents and freight forwarders, which form an integral part of the provincial marine transportation industry.

The last chapter is a discussion of the Economic Impact of the marine transportation industry in Ontario. Statistics Canada reports that in Ontario, Water Transportation (NAICS #483) generates about $200 million in GDP. This represents the value added by shipping companies only; it does not include the value added in producing the various Support Activities for Water Transportation (NAICS #488). Data for the latter have to be derived because they are not reported by Statistics Canada either at the national or provincial level.

The Ontario marine transportation industry spends an estimated $1.5 billion on goods and services. As these expenditures work their way through the economy, they generate an estimated $2.6 billion in provincial GDP, and accounts for 19,800 jobs and over $1.0 billion in household income. These estimates are based on industry activity in 2005, the latest year for which data are available. The impact estimates likely understate actual impacts due to incomplete reporting of industry activity. Impact results are summarized in the following table.

Table: Economic impact – water transportation and support activities

	Water transportation NAICS #483			Support activities NAICS #488			Overall total		
Expenditures	**$880 million**			**$670 million**			**$1,550 million**		
Impacts									
	GDP $millions	Employment P-Y	Income $millions	GDP $millions	Employment P-Y	Income $millions	GDP $millions	Employment P-Y	Income $millions
Direct	200	1,949	160	300	3,758	192	500	5,707	352
Indirect	260	2,626	151	208	2,685	129	468	5,311	281
Direct+ Indirect	460	4,575	311	508	6,443	321	968	11,018	633
Induced	782	3,660	165	864	5,154	232	1,646	8,815	397
Total	1,242	8,236	476	1,372	11,597	553	2,614	19,833	1,029

The impacts in the table above are generated from expenditures made in Ontario. They exclude direct expenditures made in other provinces that result in indirect impacts in Ontario. These impacts arise because Ontario companies provide many of the services used by the marine transportation industry in other provinces. Other studies have estimated that supplying these services would add an additional $200 million in GDP, bringing the total *direct and indirect* impact attributable to marine transportation in Ontario to over $1.1 billion.[2]

Water transportation is a derived demand. It derives its rationale from the various economic activities dependent on the services it provides. Such services include the movement of industrial inputs to manufacturers, as well as the shipment of finished products to markets. Thus, in addition to its economic impact as an industry in its own right, water transportation also provides a service supporting the development and viability of various industries. By extension, this support function also applies to the many communities hosting the industries that water transportation serves.

The strength of this support role – and hence the magnitude of the economic importance – depends on the cost-effectiveness of the service and the options open to shippers. Generally, water transportation is of greatest economic importance to industries needing to move bulk commodities in high volumes. The industries in Ontario currently meeting these criteria are iron and steel, petroleum, chemicals and cement.

[2] LECG, *Marine Industry Benefits Study, Economic Impact of the Canadian Marine Transportation Industry*, 2004.

The ability of these industries to compete in an increasingly integrated global economy depends on their access to efficient modes of transportation. The *Great Lakes St. Lawrence Seaway Study* determined that overall, the GLSLS system offered shippers an average saving of $14.80/ton compared to the next-best all land alternative.[3] The greatest unit savings occurred on the Montreal-Lake Ontario segment of the system, with an estimated cost saving of $22.74/ton. The total savings was estimated to be $2.655 billion.

The steel industry is of strategic importance to Ontario as well as to the broader Canadian economy. The province's 60 or so steel manufacturers create direct employment for over 15,000 in Ontario, paying wages in excess of $1.1 billion annually. The industry generates over $3.0 billion in direct GDP, on revenues in the $9.4 billion range.[4] It spends over $5 billion annually on various materials and supplies, which it buys from thousands of suppliers in the province. In addition to these strong backward linkages, the steel industry is integral to the success of Canada's automobile industry.

It also notes that this volume simply could not be handled by an already overburdened land-based transportation system without compromising the competitiveness of these industries. This is most obviously the case for steel, where there is currently no practical alternative for transporting the substantial volumes of iron ore and coal essential to this industry.

Finally, while we have not examined the economics of transport directly in this report, it is worth considering:

- how many trucks or rail cars would be needed to replace the ships currently being used to transport the dry bulk commodities;
- whether such movements would be economic or practical given current rail and road capacity;
- what the cost to the shipper/receiver would be for such movements; and
- what the options would be for those locations only accessible by marine transport.

[3] The analysis was conducted using 2002 data on shipping movements and 2004 cost levels. See *Great Lakes St. Lawrence Seaway Study, pp 48-50.*

[4] Statistics Canada, Cat. No. 301-0006. Principal statistics for manufacturing industries.

1.0 Introduction

This report is Phase I of the Ontario Marine Transportation Study, awarded to MariNova Consulting Ltd. and partners in June 2008.

As a previous RTG report for Transport Canada described:

> Both the automotive and steel industries are… disproportionately located around the Lakes and are likely to remain so. This creates the demand for an economical supply of iron ore, coal, limestone and other inputs into the steelmaking process, including imports of raw steel from overseas. The economic supply of both iron ore and limestone in Canada and the United States is by water via the GLSS. Coal is also transported cross-lake from ports in Ohio to steel mills at Hamilton, Nanticoke and Sault Ste Marie.
>
> The Ontario economy is the largest provincial economy in Canada, and the bulk of this economy is concentrated in eastern, central and southern Ontario near the GLSS. Notwithstanding the argument that Toronto is the nerve centre of the Canadian economy—this may be so from a service, head office and market perspective—the manufacturing centre of Ontario extends from around Oshawa to the Niagara peninsula down to Windsor and to Sarnia. The importance of this should never be overlooked because Canada's economy is export driven (the US being far and away the major market) and this is the major manufacturing exports region. For example, about 90% of vehicles assembled in Canada are exported to the United State. This region is the heart of the Canadian steel and automotive industries and is also the major petroleum and chemical producing region in Eastern Canada. Similarly, most of the major productive regions of the States bordering on the Lakes are either along the Lakes, within reasonable transport distance from the Lakes, or tied to the Mississippi River System.[5]

Other Ontario industries dependent upon the marine sector include salt at Goderich and aggregates from the north shore of Lake Huron and from Manitoulin Island. There is also a significant movement of petroleum and chemical products from the St Clair River area to Ontario ports and to US lakes destinations.

This Phase I report is required to profile the marine transportation industry in Ontario and assess its economic impact.

Chapter 2 of this report is a description of public and private ports in Ontario. As of 2005, Ontario had 12 of the top 50 ports in Canada, by total tonnage handled. Domestic and international cargo handled at the top 20 Ontario ports is shown in Table 1 on the following page.

[5] David Hackston, John MacDonald and Charles Schwier, Great Lakes – Seaway Overview, Research and Traffic Group for Transport Canada, Marine Policy and Programs, January 31, 2004, p.53.

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- Oshawa;
- Toronto;
- Hamilton;
- Port Colborne;
- Port Stanley;
- Nanticoke;
- Windsor;
- Sarnia;
- Goderich;
- Owen Sound;
- Meldrum Bay;
- Sault Ste. Marie; and
- Thunder Bay.

Information on location, facilities in the port area, major industries using the port, and data on commodities handled at the port will provide insight into the types of carriers servicing the port.

Chapter 3 is a review of the St Lawrence Seaway, which is integral to the Ontario transportation system. It has 15 large international ports and 50 regional ports, as well as convenient road, rail and air connections. A third of North America's population lives around the system. Two Canadian provinces and eight American states border the system. Sixty percent (60%) of Canada's economic activity and 26 percent (26%) of American economic activity is based around the system. Since 1959, 2.3 billion tonnes of cargo valued at $350 billion has passed through the Seaway locks.[6]

Approximately 200 million tonnes annually move within the complete Great Lakes/Seaway system. Within the St Lawrence Seaway section approximately 43 million tonnes annually are carried by approximately 3,600 vessel transits. In 2007, 43 million metric tonnes of cargo, mostly grain, iron ore, coal, steel and other bulk commodities, passed through the Seaway with a cargo value of over $7 billion. Seaway infrastructure is currently only being utilized at about half its potential capacity at the current level of traffic of 12 to 15 ships a day.

Chapter 4 is a summary of the system's primary users or customers. They are the major bulk shippers and receivers located along the lakes and rivers from Bath to Thunder Bay. In all, the companies can be grouped into six main groupings:

- Steel;
- Power Generation;
- Construction;
- Petroleum;
- Salt; and
- Grain.

In this section, we list the major companies associated with each group, their locations, and major markets or sources of raw materials. Commodity flow information for the selected ports is contained in the sections on ports.

Chapter 5 examines the carrier industry, including domestic, international, and ferry vessels.

This chapter profiles a number of domestic carriers that have operations that impact the Ontario marine transportation industry. These companies include:

- Canada Steamship Lines;
- Algoma Central Corporation;
- Upper Lakes Shipping;
- Seaway Marine Transport;
- Groupe Desgagnes;
- McKeil Marine;
- Rand Logistics Inc;
- Voyageur Marine Transport;
- Purvis Marine Ltd.;
- Fettes Shipping Inc.;

[6] *Great Lakes St. Lawrence Seaway Study*, 2007, p. 20.

- Great Lakes feeder Line; and
- Oceanex.

For each company we provide a list of vessels, the year of build and their gross registered and deadweight tonnage, where known. We describe the type of business carried out by each carrier and the various sectors of the industry they are involved in, i.e. bulk, petroleum, general cargo, etc. We also briefly describe the Lake Carriers' Association, which represents US shipping interests in the Great Lakes.

The chapter also describes international carriers serving the province. These include CSL International, Fednav/Falline and Canfornav. The same type of information provided for domestic carriers is also provided here. Of particular interest is the age profile of the international fleet compared with domestic vessels.

Finally, a summary of ferry and passenger (including cruise) service in the province is provided, including a summary of events surrounding the ill-fated Toronto-Rochester ferry service.

Chapter 6 discusses marine support industries, including shipbuilding and repair, stevedoring companies and ship supply and chandlery companies.

Chapter 7 is a discussion of the Economic Impact of the marine transportation industry in Ontario.

The report concludes in **Chapter 8** with a discussion of the importance of the industry to the Ontario economy, and the viability and competitiveness of the industries it serves.

2.0 Description of Publicly-Owned and Private Ports in Ontario

For each port, we will provide information on its location, facilities in the port area, major industries using the port, and data on commodities handled at the port, which will also provide insight into the types of carriers servicing the port.[7] We have attempted to provide information that is comparable from port to port but not necessarily identical, as each port is subject to sensitivities such as competitiveness with other ports.

In 1998, the federal government commenced a major restructuring of the Canadian port system. At that time it was intended to roll former Harbour Commissions and CPC ports into new organizations called Canada Port Authorities (CPA). These are the major commercial ports in Canada. At the same time a major program was instituted to devolve many of the smaller operations from federal ownership and operation to ownership and operation by others – Goderich was devolved to the Town of Goderich and federal facilities at Sault Ste Marie were sold to Purvis Marine. The Canada Port Corporation was eliminated with the larger ports becoming CPA's and the smaller ports in Ontario (Prescott and Port Colborne) being devolved to the local municipality. The facilities at Meldrum Bay and Nanticoke are privately owned and operated.

The structure we have adopted in this chapter follows from the way in which port ownership and administration is structured. Most of the ports being reviewed fall within the purview of federal statutes either the *Canada Marine Act* or the *Harbour Commission Act* while others are either devolved federal (public harbour or Canada Ports Corporation) facilities or continuing private facilities. It should be noted that, even within federal ports, many of the facilities are privately owned and operated (e.g. steel company docks in the Port of Hamilton). Accordingly, the classification of ports is somewhat less than precise.

The 14 ports in this review fall into three categories:

- *Canada Port Authorities* – Toronto, Hamilton, Windsor and Thunder Bay;
- *Other Publicly Owned or Administered Ports* – Prescott, Oshawa, Port Colborne, Port Stanley, Sarnia, Goderich, Owen Sound; and
- *Non-publicly Owned or Administered* Ports – Nanticoke, Meldrum Bay and Sault Ste Marie.

2.1 Canada Port Authorities

The Canada Marine Act defines port as follows:

> "port" means the navigable waters under the jurisdiction of a port authority and the real property and immovables that the port authority manages, holds or occupies as set out in the letters patent.[8]

[7] This Report also contains a profile on carriers serving Ontario ports.

[8] *Canada Marine Act*, Section 5.

Canada Port Authorities comprise most of the diverse port operations in Ontario. These organizations are established pursuant to the *Canada Marine Act.* Each of these ports has its own letters patent and a Board of Directors appointed as follows:

> (f) the number of directors, between seven and eleven, to be appointed under section 14, to be chosen as follows:
>
> (i) one individual nominated by the Minister,
>
> (ii) one individual appointed by the municipalities mentioned in the letters patent,
>
> (iii) one individual appointed by the province in which the port is situated, and, in the case of the port wholly or partially located in Vancouver, another individual appointed by the Provinces of Alberta, Saskatchewan and Manitoba acting together, and
>
> (iv) the remaining individuals nominated by the Minister in consultation with the users selected by the Minister or the classes of users mentioned in the letters patent;

Source: Canada Marine Act, Section 14(1)(f)

A CPA is an agent of "*Her Majesty in right of Canada only for the purposes of engaging in the port activities referred to in paragraph 28(2)(a*)" but not for the purpose of borrowing money *(derived from CMA Sec 7).*

CPAs have the authority to engage staff in order to carry out their assigned functions. There are restrictions placed on the ability of a CPA to obtain federal funds (CMA Sec 25)

> 25. Even if the port authority or subsidiary is an agent of Her Majesty in right of Canada as provided under section 7, no payment to a port authority or a wholly-owned subsidiary of a port authority may be made under an appropriation by Parliament to enable the port authority or subsidiary to discharge an obligation or liability unless
>
> *(a) the payment*
>
> *(i) is made under the Emergencies Act or any other Act in respect of emergencies,*
> *(ii) is a contribution in respect of the capital costs of an infrastructure project,*
> *(iii) is a contribution in respect of envi- ronmental sustainability, or*
> *(iv) is a contribution in respect of security, or*
>
> *(b) the authority for the funding of Her Majesty's obligations is an agreement that was in existence before March 1, 1999.*
>
> *1998, c. 10, s. 25; 2008, c. 21, s. 14.*
>
> Contribution
>
> 25.1 *The Minister may, with the approval of the Governor in Council given on the recommendation of the Treasury Board and on any terms and conditions specified by the Governor in Council on the recommendation of the Treasury Board, make a contribution under subparagraph 25(a)(iv).*

It is notable for the purposes of this project that Section 25 would appear to allow federal infrastructure funding to flow to a Port Authority.

2.1.1 Toronto

The Port of Toronto is operated by the Toronto Port Authority pursuant to the *Canada Marine Act*. The Toronto Port Authority (TPA) has an extended mandate over a range of facilities and activities on and around the Toronto waterfront. Management reports to a President and CEO who reports to the Board of Directors. This brief discussion will be limited to the marine portion of its mandate. In 2007, The TPA had revenues of $15.2 million of which $6.1 million or 40 percent derived from Port Operations. Expenses were $4.9 million and $17.1 million respectively. In other words, revenues from port operations exceeded expenses from port operations by $1.2 million but other parts of the TPA's responsibility were not so successful. At the end of 2007, the TPA had an ongoing dispute with the City of Toronto with the City withholding payments of $7 million to the TPA.[9]

Website: www.torontoport.com

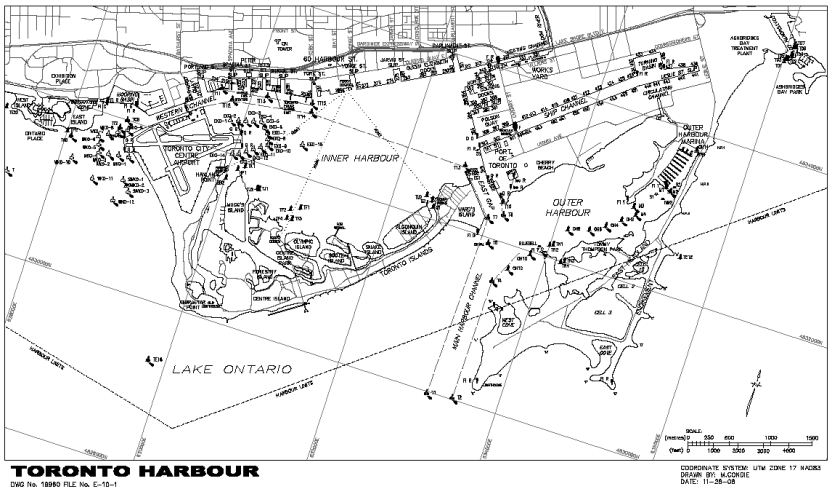
Location

Commercial operations at the Port of Toronto are located at the eastern end of the Inner Harbour adjacent to downtown Toronto (See Figure 1).

Facilities

The Port of Toronto is served by both major railways and has ready access to the major Ontario highway system via Queen's Quay East, the Lakeshore Boulevard East and then via the Gardiner Expressway or the Don Valley Parkway. Both of these latter roads carry large amounts of traffic and are frequently congested.

Figure 1. Port of Toronto



Source: Toronto Port Authority

[9] *Financial Statements of Toronto Port Authority*, December 31, 2007, p.9.

The commercial marine facilities at the Port of Toronto have been shrinking for many years due to the redevelopment of the waterfront and industrial relocation. In the 1980's, David Crombie headed a Commission looking into the future of the port and the lands along the waterfront. Since then, the commercial port has shrunk considerably and the traditional hub of the port is now tourist-friendly with floating restaurants, tour boats and urban redevelopment projects.

At present, the commercial part of the port is limited to a strip along Queen's Quay East as far east as the Don River, with several of the facilities being privately owned and operated (e.g. the sugar refinery at the foot of Jarvis Street). As with most other major port areas in Canada, the Port Authority operates a limited number of facilities within the overall port area.

The Toronto Port Authority (TPA) owns and operates Marine Terminal 51 and Warehouse 52 located at the foot of Cherry Street (see Figure 1). The TPA also owns the International Marine Passenger Terminal which currently services the cruise ship industry.[10] The terminal has six berths (512, 513, 514, 515 and 521/522 RORO), each with Seaway depths that vary in length from 256 metres to 408 metres. The latter berths are where the Toronto-Rochester ferry docked.

The terminals are serviced by rail line and there is a storage area for containers. We note that the Statistics Canada data do not indicate any container transport by marine into or out of Toronto so the storage area must be used by shippers and/or railways and/or truckers for temporary container storage.[11] In addition to the port-owned and operated facilities, several private docks operate nearby including:

- The sugar refinery with 157 metres of dockface and Seaway draft;
- Canadian Salt with 145 metres of dockface and Seaway draft;
- Cargill with 114 metres of dock and Seaway draft;
- ESSROC with 184 metres of dock and 6.4 metres of draft;
- Lafarge with two docks, one for stone and one for cement, with 213 metres of dock and Seaway draft for stone and 152 metres of dock and 6.1 metres of draft; and
- Sifto with 137 metres of dock and Seaway draft.[12]

It should be noted that the dockwall is continuous between the several salt facilities and Lafarge cement, Lafarge aggregate facilities allowing accommodation for larger vessels than the dock length would otherwise indicate. Facilities at Toronto are listed in Table 2. Storage capacity at this and other ports is stated in short tons unless otherwise noted.

[10] *Toronto Port Authority,* Management Discussion and Analysis – 2007, p.1.

[11] The TPA, in its Discussion and Analysis (p.2) indicates that is well positioned to handle marine containers with top loaders, power supply and an open area of 20 acres.

[12] *Greenwood's Guide to Great Lakes Shipping 2006.*

Table 2. Facilities at the Port of Toronto

Commodities Handled	Dock #	Terminal/Pier name	Length (m.)	Depth (m.)	Commodity stored	Storage capacity (tons)
Bulk	275	Redpath Refinery	157	8.23	Raw Sugar	90,000
Stone,Sand and Bulk	343	ESSROC	184	6.40	Cement	23,000
General Cargo	351	TEDCO - leased to recycling firm	385.58	8.23	NA	NA
	353		385.58	8.23	NA	NA
	354		236.22	8.23	NA	NA
	355		236.22	8.23	NA	NA
	356		385.58	8.23	NA	NA
	358		385.58	8.23	NA	NA
Stone,Sand and Bulk	361/2	Lafarge	152	6.10	Cement	20,000
Liquids	425	McAsphalt	91	8.23	Asphalt	40,000
Stone,Sand and Bulk	437	Lafarge	152	8.23	Stone	80,000
	455		152	8.23	Stone	NA
	461	Canadian Salt	145	8.23	Salt	16,000
	463	Cargill	114	8.23	Salt	12,000
	464	Sifto	137	8.23	Salt	140,000
General Cargo	512/3	Marine Terminal #51	354	8.23	NA	NA
	514/5		408	8.23	NA	NA
	522/3		256	8.23	NA	NA

Sources: Toronto Port Authority and Greenwood's Guide to Great Lakes Shipping 2006

Port traffic

Marine traffic has hovered in the range of 1.5 to 2.1 million tonnes per year from 2003 to 2007. Data obtained from the Port Authority, while showing fluctuations from year to year, consistently show that salt, cement, stone and aggregate comprise the major domestic commodities and sugar the major international commodity (Table 3).

The latest Statistics Canada data for the Port of Toronto are for the calendar year 2005 and were released in early 2008. These data indicate that Toronto is essentially a receiving port with salt, stone and aggregate, cement and agriculture products comprising most of the domestic trade.[13] The movement of coal (via berths 512/513 was probably a one-time Ontario Power Generation movement from either the Hearn Generating Station or the Lakeview Generating Station, both of which are closed, to the generating station at Nanticoke. Shipment data for the port include the goods moved to or from all of the facilities within the defined port area, not just from TPA-owned facilities. Details follow in Table 4. Most traffic was domestic Canadian movements. The major imported commodities were raw sugar (to the sugar refinery), and salt and asphalt from the US.

[13] Some of the latter would be sugar transhipped via St Lawrence River ports and held on board at Toronto to provide additional winter storage.

Table 3. Tonnage handled at the Port of Toronto, 2003-2007 (Actual)

	2003	2004	2005	2006	2007
Domestic Bulk					
Cement	422,826	418,256	407,420	433,175	428,468
Asphalt	54,058	10,726	37,315	30,599	17,402
Salt	516,813	531,065	459,460	587,101	495,964
Aggregates	74,841	194,929	232,814	153,342	77,446
Stone	-	-	120,000	107,511	92,760
Coal	-	-	69,066	-	-
Other	-	-	103,000	-	-
	1,068,538	**1,154,976**	**1,429,075**	**1,311,728**	**1,112,040**
Overseas Bulk					
Sugar	627,928	760,114	669,528	499,796	542,391
Other	-	-	-	-	-
	627,928	**760,114**	**669,528**	**499,796**	**542,391**
Total Bulk	**1,696,466**	**1,915,090**	**2,098,603**	**1,811,524**	**1,654,431**
General Cargo					
Project cargo				3,989	17,369
Steel Coils				15,438	-
Steel Pipe				8,727	18,494
Total General Cargo	-	**111,687**	**11,854**	**28,154**	**35,863**
Intermodal	**36,902**	**586,248**	**419,953**	**292,834**	**360,912**
Warehousing & Container Services	-	**24,668**	**30,190**	**22,402**	**17,459**
Total Port Tonnage	**1,733,368**	**2,637,693**	**2,560,600**	**2,154,913**	**2,068,665**

Note: The Intermodal category does not involve marine transport as the intermodal terminal was leased to Highland Transport which moved in 2008 to a suburban location. "Domestic" traffic in this table would appear to include cross lake traffic with the US (see Table 3 for salt and asphalt receipts from the US in 2005)

Source: Toronto Port Authority

The TPA currently does not handle any containers by marine. Previously, the TPA container terminal was used by Highland Transport but this company relocated to Markham in 2008.[14] On a recent visit, the container terminal appeared to be empty and unused.

[14] Information was obtained that suggests that Highland wanted to be close to the 401 and own its own land.

Table 4: Port of Toronto Domestic Marine Shipments, 2005

Commodity	Origin/Destination Port	Originated	Received
		Metric tonnes	
Agriculture and food products	Quebec Ports	0	250,564
Minerals	Ontario Ports	0	552,928
Coal	Nanticoke	69,550	0
Fuels and Basic Chemicals	Newfoundland, Quebec and Ontario Ports	3,750	87,129
Machinery and Manufactures and Miscellaneous	Out to Newfoundland in from Lake Ontario Ports	5,018	426,016
Total Domestic Traffic		**78,318**	**1,316,637**

Source: Statistics Canada

Table 5: Port of Toronto International Marine Shipments, 2005

Commodity	Origin	Unloaded
		Metric tonnes
Sugar	Brazil and Central America	321,952
Salt	US Great Lakes	188,339
Asphalt	US Great Lakes	32,641
Sub total		542,932
Total		**561,361**

Source: Statistics Canada

2.1.2 Hamilton

The Port of Hamilton was established as a Port Authority pursuant to the *Canada Marine Act.* Management reports to a President who reports to the Board of Directors. In 2007, the Hamilton Port Authority (HPA) had an excess of revenue over expenses of $1.9 million and an equity of almost $105 million.

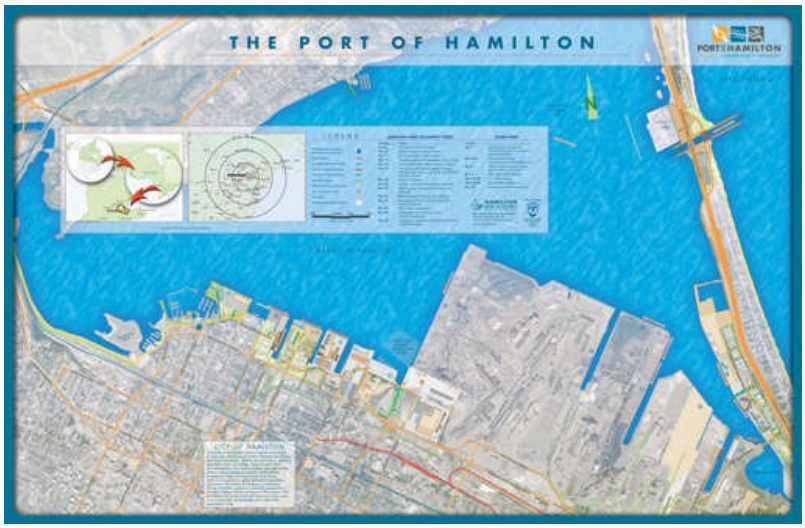
Website: www.hamiltonport.ca

Location

Hamilton, the largest fully commercial port on the Canadian Great Lakes based on tonnage,[15] is located on Burlington Bay and is thereby sheltered from Lake Ontario. Access to the harbour is via the Burlington Canal which is crossed by the Burlington Skyway It is home to two major steel mills, an oilseed crushing plant and many other industries. Figure 2 illustrates the extent of the Port of Hamilton.

[15] Nanticoke may handle more tonnage in a given year but it is comprised of private facilities that handle a limited range of commodities.

Figure 2. Port of Hamilton



Source: Hamilton Port Authority website

The Port area is reached by roads that lead from the QEW and Highway 403. The Eastport area (Piers 25–28) connects directly to the QEW via Eastport Drive. There is an extensive network of on-dock rail facilities serviced by the Southern Ontario Railway which connects with both mainline service providers (CN and CP).

Facilities and industries

The major facilities at the Port, especially the steel mills, are set up to receive raw materials by water and it is not know if there would be sufficient property to establish unit train unloading operations should the eventuality arise. At one time, Dofasco did receive iron ore by rail from northern Ontario and Stelco received by rail from western Quebec, but these were small operations and ceased long ago. With the steel mills receiving millions of tonnes of coal, iron ore and fluxing limestone by water each year, a shift in mode is most unlikely. Much of the outbound product is transported by rail and truck to North American destinations. Port facilities are listed in Table 6.

Table 6: Facilities at the Port of Hamilton

Commodities Handled	Dock #	Terminal/ Pier name	Length (m.)	Depth (m.)	Commodity stored	Storage Capacity
General Cargo	8	Centennial Docks {East Side}	153.62	8.23	NA	NA
	8	Centennial Docks {North Side}	513.29	8.23	NA	NA
	8	Centennial Docks {West Side}	182.88	8.23	NA	NA
	10	Wellington Terminal {East Side}	306.63	6.40	NA	NA
	10	Wellington Terminal {North Side}	397.46	8.23	NA	NA

Commodities Handled	Dock #	Terminal/ Pier name	Length (m.)	Depth (m.)	Commodity stored	Storage Capacity
	10	Wellington Terminal {Terminal 8}	188.37	8.23	NA	NA
Grain	11	Bunge	514.2	6.40	NA	90,500
Asphalt	11	IKO	800	8.23	Asphalt	18,000
Petroleum	11	Vopak	842	8.23	Gasoline, Jet Fuel, Asphalt	165,300cbm
Bulk Cargo	12	Federal Marine	579.12	8.23	Various bulk commodities	200,000
Potash	12	Sylvite	213.36	8.23	Potash	60,000
Bulk Cargo	14	Federal	609.6	8.23	Various bulk commodities	300,000
Ore Unloading	16	US Steel	1030	8.23	Iron Ore, Coal	5,000,000
	17	US Steel	1150	8.23	Iron Ore, Coal	
	18	US Steel	680	8.23	Iron Ore, Coal	
	NA	Arcelor Mittal and USSteel {Main Harbor, South}	1158.24	8.23	Iron ore, coal	2,750,000
	20	Arcelor Mittal and US Steel {North Face, Burlington Bay}	270	8.23	coke, sinter, slag	300,000
	21	Arcelor Mittal {North Face, Burlington Bay}	900	8.23	coke, sinter, slag	300,000
	22	New dock at north end	250	8.23		
Residual Oil	23	Columbian Chemicals and Arecelor Mittal	182.88	8.23	Residual Oil	36,706
Sand	23	Lakeshore Sand	123.44	8.23	Sand	100,000
Creosote/Coal Tar	23	VFT	346.24	8.23	Creosote, Coal Tar	26,786
Liquids	23	Westway	346.24	8.23	Petro-chemicals, Tallow Wax, Fertilizer, Edible Oils	20,000
Fuel	24	Provmar		8.23	Fuel	
Bulk Cargo	25	Agrico Canada	1219.2	8.23	Potash	50,000
Grain	25	James Richardson International	182.9	8.30	NA	29,300 tonnes
Asphalt	26	Bitumar Hamilton Inc	185	8.23	Asphalt	7,631
Salt Terminal	26	Canadian Salt Company	121.92	8.23	Salt	52,000

Commodities Handled	Dock #	Terminal/ Pier name	Length (m.)	Depth (m.)	Commodity stored	Storage Capacity
Slag	26	Lafarge Canada Inc	243.8	8.23	Slag	68,900
Edible/Inedible Oils	26	Toronto Tank	274.3	8.23	edible/inedible oils	3,471
	27	Future Dock				

Sources: Hamilton Port Authority, *Greenwood's Guide to Great Lakes Shipping 2006* and Canadian Grain Commission

The port is home to US Steel Canada and ArcelorMittal Dofasco, the two major producers of steel in Canada. It is also home to other important industries. Marine docks and industries using them are set out in Appendix 1. Port facilities have a minimum of Seaway draft and can be dredged as needed. The channel is dredged every three to five years. We were told there is excess capacity in the port and that port infrastructure is aging and will require upgrading or replacing over time. The Port Authority will plan this as needed. There is also an ongoing environmental project to remediate the Randle Reef located within the harbour.

Tugs are available from McKeil and Ocean Group. Mobile cranes can be provided by the stevedoring companies as needed.

The lift bridge over the Burlington Canal is owned by Public Works and Government Services Canada (PWGSC) and is on its divestiture list.

Port traffic

The Port of Hamilton website provides the above basic traffic data for the period 2005 to 2007. The website also indicated that over 700 vessels call at Hamilton each year, almost 600 of which are in domestic and US trades. From the volumes of traffic shown in the following tables, it is safe to say that most of these vessels are either carrying raw materials to the steel mills or finished and semi-finished product from them to markets around the world.

Table 7: Port of Hamilton Annual Cargo Statistics, 2005–2007

Commodity	2005	2006	2007
Overseas	1,582,375	1,474,401	924,491
Domestic & US	10,777,136	11,138,329	10,858,165
Total tonnes	**12,359,511**	**12,612,730**	**11,782,656**

Source: Hamilton Port Authority website

Table 8: Port of Hamilton Domestic Marine Shipments, 2005

Commodity	Origin/Destination	Originated	Received
Agriculture	St Lawrence Ports	112,042	0
Minerals	St Lawrence Ports, Ontario, Nova Scotia	68,573	4,019,497
Coal	Thunder Bay and Ontario Ports	63,368	452,636
Fuel and Chemicals	Ontario Ports, St Lawrence Ricer and New Brunswick	23,701	449,914
Manufactures and Miscellaneous	Ontario and Quebec Ports	369,067	0
Sub total		636,751	4,922,047
Total		**636,751**	**4,927,759**

Source: Statistics Canada

Major import/export movements are summarized in Table 9 below.

Hamilton is predominantly a receiving port for iron ore from Quebec-Labrador and the USA Lake Superior ports. There is also a large volume of imported primary steel.[16] Other commodities such as sand, gravel, potash – largely unloaded in the Eastport area – move beyond the port area, predominantly by truck although a pipeline takes jet fuel to Pearson International Airport.

Table 9: Port of Hamilton International Marine Shipments, 2005

Commodity	Origin/Destination	Originated	Received
		Metric Tonnes	
Wheat and soya beans	US Lakes (wheat) Europe (Soybeans)	174,478	
Silica sands & quartz sands, for construction use	US Lakes		212,340
Iron ores and concentrates	US Lake Superior	104,983	2,022,495
Non-agglomerated bituminous coal	US Lake Erie	28,763	2,037,844
Nitrogenous mineral or chemical fertilizers	Various offshore	0	155,156
Iron or steel in primary	Brazil and Western Europe	0	624,290
Flat-rolled products of iron or steel	Belgium, Spain and Western Europe	0	284,287
Bar, rod, angle, shape, wire, of iron or steel	Germany, Western Europe, South America	0	101,228
Other iron and steel	Belgium, South Africa, China	41	55,187
Slag, ash, and residues	US, Michigan and Ohio	351,669	
Subtotal		485,456	5,492,827
		353,007	298,834
Total International Shipments		**838,463**	**5,791,661**

Source: Statistics Canada

[16] We note that industry sources told us that primary steel shipment patterns have changed with the bulk of such movements now being received from affiliated companies located on the US side of the lakes.

Port status

While Hamilton has had some disagreements with the City in the past over the waterfront, it appears (from what we were told) that calm is the order of the day. Some of the waterfront has been converted to recreational and tourist uses leaving the major components of the port intact. After all, the port and its industries are the economic lifeblood of the city.

The port has a land use plan developed in 2002 which includes improving road access to the port areas. Currently, the Port Authority has land for development at Piers 22 and 27 (sandy coloured areas on the map in Figure 2). Hamilton is trying to develop Pier 22, which has 103 acres, Seaway draft and is ready for development.

2.1.3 Windsor

The Port of Windsor is a Port Authority pursuant to the *Canada Marine Act*. Management reports to a President who in turn reports to the Board of Directors.

Website: www.portwindsor.com

Location

The Port of Windsor is located on the Detroit River facing the City of Detroit. Port facilities are to the west of the Ambassador Bridge. Highway 401 ends (or begins) at Windsor connecting to the EC Row Parkway and other main routes such as Huron Church Road which leads onto the Ambassador Bridge. After many years of study, a new highway connection between Windsor and Detroit is planned.

The waterfront in the centre of the city has been redeveloped into an attractive waterfront park and promenade. The view is spectacular with the new skyline of Detroit across the river. This change, we were told, came about without the kind of problems encountered elsewhere concerning the interface of commercial port and city. The promenade area was once home to extensive railway lines and ferry services that carried rail freight cars between Windsor and Detroit. Figure 3 below shows the current port area and each of the facilities located there.

Facilities and industry

The Essex Terminal Railway provides direct rail service to terminal in the port area and connects at Windsor to CN and CP, and through them, to the US rail network. Highway 401 ends (or begins) at Windsor connecting to the EC Row Parkway and other main routes such as Huron Church Road, which leads onto the Ambassador Bridge. After many years of study, a new highway connection between Windsor and Detroit is planned.

Within the port, available existing property and potential additional property are the drivers behind expansion potential. There is excess capacity at all terminals.[17] The port has 50 acres left to be developed and may be looking at new industries for that location.

[17] The Windsor Grain Terminal has a CGC listed capacity of 110,410 tonnes.

Figure 3. Port of Windsor

Source: Windsor Port Authority website

On-dock production and processing facilities include a cement batching plant, the grain elevator, an oilseed crushing plant and the salt company. Aggregate and petroleum industries are transfer operations. Sterling Fuels has a ship bunkering facility which (until recent changes in procedures by US Customs) did considerable business bunkering US flag lakes vessels.

Channels and berthage have Seaway depth. No dredging is planned although two aggregate terminals have draft restrictions because of low water in recent years. See Table 11 for a listing of all terminals and operators at Windsor.

Port traffic

Like most of the main lake and river ports covered by this study, Windsor is primarily a receiving port with the exception of salt shipments. Windsor also has a unique distinction in that a truck ferry operates on a regular basis between Windsor and Detroit.

Like most other ports within major cities, the physical area of the port has declined over a period of time. Traffic handled at the port for 2006 and 2007 follows.

Table 10: Port of Windsor Commodity Statistics, 2006 and 2007

Commodity	2006	2007
	Metric Tonnes	
Aggregates	2,042,205	2,329,677
Petroleum	270,509	238,533
General Cargo	250,735	437,502
Other Dry Bulk	2,080,521	2,299,673
Grain	481,472	473,019
Total	**5,125,442**	**5,778,404**

Source: Windsor Port Authority

Table 11: Facilities at the Port of Windsor

Commodities Handled	Terminal/Pier name	Length (m.)	Depth (m.)	Commodity stored	Storage capacity (tons)
Grain	ADM	396.2	9.10	grain	110,410 tonnes
Inactive	Hiram Walker	676.1	7.00	NA	NA
Liquids	Sterling Marine Fuels	304.8	8.23	Asphalt	84,154,645 litres
				Bunker Fuel	38,566,213 litres
Inactive	Canadian Salt-Sandwich	na	na	na	NA
Salt	Canadian Salt-Ojibway	261.2	7.9m	Salt	208,000
General Cargo	Morterm {Face}	228.6	7.92	steel	outside 350,000 tons steel
	Morterm {Slip}	731.52	7.92	steel	warehouse 14,000 sq meters
Bulk/Aggregates	Lafarge Canada	335	Seaway	stone, rock, asphalt	225,000
Sand/Stone	CBM St Mary's	231.6	Seaway	sand, stone	25,000
Cement	ESSROC Italicementi	304.8	7.90	cement	Two silos 8,000
Bulk/Aggregates	Dunn Paving (Essroc)	304.8	7.90	sand, stone	75,000
Flourspar	Hearn Group (Essroc)	304.8	7.90	none	NA
Bulk/Aggregates	Southwestern Sales - East Windsor		Seaway	sand, stone	50,000
	Southwestern Sales - West Windsor		Seaway	sand, stone	220,000
	Coco Aggregates	NA	NA	sand, stone	
Inactive	Ford Motor Canada		NA		
Inactive	Adam Cartage				

Sources: Windsor Port Authority, *Greenwood's Guide to Great Lakes Shipping 2006* and Canadian Grain Commission

Two additional commodities (lumber and other liquid bulk) were listed in the data provided but no traffic was recorded. In addition to the above, the truck ferry made 1,123 trips in 2007 and carried 95,599 tonnes. In 2006, ferry volumes were 1,169 trips and 90,381 tonnes. In 2007, 1,163 commercial and ocean vessels docked at Windsor, up from 997 the previous year. Also, five cruise vessels docked in 2007, up from four in 2006.

Table 12: Port of Windsor Domestic Marine Shipments, 2005

Commodity	Origin/Destination Port	Originated	Received
Grain	In from Thunder Bay Out to Quebec and Newfoundland		76,315
Minerals	In from Lake Superior Out to Ontario Lake and River ports	714,602	971,317
Fuels	In from Sarnia Out to Lakes Ontario and Erie	33,104	60,800
Sub Total		824,021	1,329,055
Total		**825,338**	**1,361,081**

Source: Statistics Canada

Table 13: Port of Windsor International Marine Shipments, 2005

Commodity	Origin/Destination Port	Originated	Received
		Metric Tonnes	
Limestone	Michigan and Ohio ports		1,641,674
Salt	US Lake Erie, Michigan and Superior ports	756,159	
Other Non metallic minerals	Mexico and China		139,976
Iron and steel	Western Europe, Mediterranean, South Africa and China	141,794	
Total		**851,860**	**2,113,079**

Source: Statistics Canada

2.1.4 Thunder Bay

The Port of Thunder Bay is operated by the Thunder Bay Port Authority (TBPA) pursuant to the Canada Marine Act. The TBPA has a CEO who is responsible for managing port operations and who reports to the Board of Directors. In 2007, the Authority experienced a loss on operations of just over $1 million after earning $276,716 in 2006. Accumulated equity as at December 31, 2007 was $34.8 million.[18]

Website: www.portofthunderbay.ca

Location

Thunder Bay is located at the Canadian head of Lake Superior. It has been a major port since the Canadian Pacific Railway was built in the late 19th century and is primarily a transfer point for goods moving between Eastern and Western Canada.

[18] *Thunder Bay Port Authority Annual Report 2007*, pp. 9, 10.

Figure 4. Port of Thunder Bay

Source: Thunder Bay Port Authority website

Facilities

The port is accessed by a major four-lane artery called the Harbour Expressway that connects with Highways 11 and 17 (TransCanada). Both CN and CP Rail have access to all major docks and elevators either directly or through interswitching. For example, the Keefer terminal, the major break-bulk handling facility, has both railways serving it with numerous tracks. The Port Authority has its own intermodal yard acquired from CP Rail.

Several highway carriers, such as Manitoulin and Gardewine Transport, are tenants of the Port Authority. Arnone Transport, a major regional carrier, is on-site at the Keefer Terminal. Other carriers include Bison, McKevitt, M.O. Bulk Carriers, Purolator and Consolidated Fastrate.

There are eight grain terminals, including Canada Malting, Cargill, Parrish & Heimbecker, Richardson International Limited, Viterra, Mission Terminals and Western Grain By-Products, handling all types of grain and grain by-products. The major terminals have Seaway draft except for P&H and Western Grain By-products which have 7.9 metres. Details of dock length and draft can be found in Table 14.

There are two bulk terminals: Thunder Bay Terminals and Valley Camp, handling coal, potash and salt. Keefer Terminal is a break bulk facility with over 550,000 square feet inside storage and about 16 acres open storage for handling forest products, steel, wind turbines, dimensional and heavy lift cargo, and bagged goods.

Additional facility information includes:

- Lakehead Marine and Industrial (northend of port) has a graving dock (750 feet) for all types ship repairs and inspections;
- Lafarge Inc. has a receiving dock for stone and salt by self-unloaders only with both CN and CP Rail connections; and
- Great West Timber has a loading dock for forest products using cranes and fork lifts with a CP connection.

Table 14: Facilities at the Port of Thunder Bay

Commodities Handled	Terminal/Pier name	Length (m.)	Depth (m.)	Commodity stored	Storage capacity (tons)
Grain	Canada Malting	305	8.20	NA	80.900 tonnes
	Cargill	518	8.20	NA	176,020 tonnes
	Mission Terminal	411	8.20	NA	121,240 tonnes
	P&H Elevator	350	5.20	NA	40,800 tonnes
	Richardson	396	8.20	NA	210,030 tonnes
	Viterra A	500	8.20	NA	362,000 tonnes
	Viterra B	510	8.20	NA	
	Viterra C	320	8.20	NA	235,000 tonnes
	Western Grain #10	160	7.00	NA	30,000 tonne
Coal Unloading	Ontario Power Generation	207	8.00	NA	2,000,000
Stone,Sand and Bulk	Bowater	243.84	6.10	Stone	25,000
	Empire State (Lafarge)	304.8	7.70	Stone & Salt	85,000
	Thunder Bay Terminals	223	8.20	coal, potash, salt, urea	40,000
	Valley Camp {Bulk Dock}	550	8.20	Various bulk commodities	100,000
	Valley Camp {Potash Dock}	201	8.23	NA	
General Cargo	Great West	122.5	5.80	lumber	25,000,000 board feet
	Keefer Terminal 1	196	8.2	NA	NA
	Keefer Terminal 2&3	573	8.2	NA	NA
Liquids	General Chemicals	91.44	7.31	Calcium chloride	26,632 litres
	Petro Canada	131	7.92	Gasoline, Clean Fuel Oil	54,000 litres
Forest Products	Great West Timber	121.9	5.79		25,000,000bdf
Pulp and Paper	Buchanan Group				

Sources: Thunder Bay Port Authority, *Greenwood's Guide to Great Lakes Shipping 2006* and Canadian Grain Commission

The port's infrastructure is said to be well-maintained and is currently of low priority but road infrastructure improvements in the region are considered a high priority. Thunder Bay Port Authority has over 300 acres, much available for development. The Port Authority recently signed an agreement to purchase 40 acres of waterfront property including the former Manitoba Pool 1 grain elevator which is still operational and could be used for grain storage related to biofuels production.

Port facilities also include 550,000 sq ft. of covered storage, a 200 car rail yard, intermodal yard and extensive areas for the staging and storage of oil sands project cargoes. The port authority is in the planning stages for its Keefer Terminal reconfiguration project. This will involve the demolition of one of its dockside warehouses and replacing it with new laydown

and storage areas, as well as the installation of a dock side shore crane to load project cargoes destined for western Canada.

It is our understanding that AbitibiBowater on the Kaministiquia River and Great West Timber did not use their marine facilities in 2008. The other existing (non-grain) dry bulk handling facilities currently operate well below their capacity.

Some required dredging was carried out in 2007 but no further dredging is required at this time.

Port traffic and industries

Thunder Bay is an important port for eastbound movements of grain and coal. Shipment data for the Thunder Bay Port Authority for 2005 to 2007 follow.

Table 15: Thunder Bay Port Authority Commodity Statistics, 2005–2007

Commodity	2005	2006	2007
		Metric Tonnes	
Grain	5,876,577	6,457,468	6,349,326
Coal	1,363,707	1,200,989	1,315,645
Potash	530,406	438,329	530,788
Dry Bulk	153,736	117,695	90,432
Liquid Bulk	209,604	195,601	155,554
General Cargo	66,644	56,378	51,023
Total Tonnes	**8,200,674**	**8,466,460**	**8,492,768**
Total Vessels	**418**	**426**	**431**

Source: Thunder Bay Port Authority website

From Table 16, it can be seen that grain remains the dominant commodity at Thunder Bay. While most grain is shown in the domestic table (agriculture), this traffic to ports such as Baie Comeau, Port Cartier, Quebec/Levis is export traffic into the transfer elevators at those locations pending overseas export. Most grain traffic to Montreal would also be export traffic.

Table 16: Thunder Bay Port Authority Domestic Marine Shipments, 2005

Commodity	Origin/Destination Port	Originated	Received
		Metric Tonnes	
Agriculture	St Lawrence, Ontario and Nova Scotia	4,168,982	360
Minerals	Ontario ports	0	141,359
Coal	Ontario ports	664,959	0
Fuels and chemicals	Ontario in and Ontario and St Lawrence out	88,418	190,558
Total		4,922,359	332,277

Source: Statistics Canada

International marine traffic, shown as going offshore in Table 17, would be in ocean going vessels, while shipments to the US lakes and the East Coast would be predominantly in Canadian registered vessels. The grain in Table 17 would be predominantly non-CWB grains.

Of particular interest, at the end of 2007, Thunder Bay had the largest storage for grain of any port in North America and is the largest grain port on the Great Lakes. In addition to grain forwarded by the marine mode, facilities at the port are also used for winter storage and for rail shipments to the east during the close of navigation. Bulk facilities for other than grain are also plentiful. For example, Valley Camp Inc has storage for 2 million tonnes of bulk cargo which is about the total annual port volume excluding grain. Grain and bulk cargoes can be handled at Thunder Bay Terminals and Valley Camp on a "direct hit" basis, with direct loading to ship from rail.

Table 17: Thunder Bay International Marine Shipments, 2005

Commodity	Origin/Destination Port	Originated	Received
		Metric Tonnes	
Wheat and barley	Western Europe and Mediterranean	361,503	0
Oats	Ohio, Puerto Rico	181,467	0
Other grain	Belgium, Colombia	21,756	0
Dried legumes	Spain, Mediterranean, Colombia	51,348	0
Linseed (flaxseed)	Belgium, Egypt, Spain	368,504	0
Canola seeds	Mexico	383,159	0
Other Agric	Belgium, Morocco	27,462	0
Animal products	Spain, Belgium, Colombia, Algeria	312,790	0
Coal	To Detroit, Lake Erie From Superior	545,779	80,778
Potassium chloride (potash)	Lakes Michigan and Erie, Belgium, Spain, Brazil, Italy	428,348	0
Pulpwood logs	Duluth/Superior	37,140	21,538
Subtotal		2,719,256	102,316
Total		**2,743,874**	**126,512**

Source: Statistics Canada

2.2 Other Publicly Owned or Administered Ports

2.2.1 Prescott

The Port of Prescott, a former Canada Ports Canada Division Port, is now owned by the Township of Edwardsburgh/Cardinal. In 2007, the port had operating revenues of $5.3 million, expenses of $3.4 million and Net Operating Income of $1.9 million. Of the revenues, over $4.1 million came from grain services (elevation, storage, cleaning, drying and miscellaneous). Just over $440,000 came from harbour services (wharfage and berthage).[19] The port has a Port Management Committee and is managed by a staff which is headed by a General Manager.

Figure 5. Port of Prescott

Source: Port of Prescott website

Website: www.portofprescott.com

Location

The Port of Prescott is located in the Township of Edwardsburgh/Cardinal just east of the Town of Prescott and west of the last lock (Iroquois) in the Montreal-Lake Ontario section (MLO) of the St Lawrence Seaway. As such, it has access to open water as far as the eastern entrance to the Welland Canal. Prior to the building of the MLO, Prescott was the easternmost port that could receive full Seaway size lakers. The port has excellent road and rail connections with eastern Ontario, Quebec and the United States via Highways 401 and 416 and the bridge to Ogdensburg, NY. Congestion is not an issue. Canadian National Railway provides service to the loading and unloading sheds at the grain elevator and is close to the other docks. Canadian Pacific Railway has access through interswitching at Brockville.

[19] *Port of Prescott Annual Report 2007,* "A Division of the Township of Edwardsburgh/Cardinal".

Facilities

The elevator at Prescott remains from the period before the opening of the MLO when fully laden lakers discharged cargo there to be transferred to smaller canallers that would carry grain to Montreal and Quebec, or to rail cars for winter shipment to the east. The elevator is licensed by the Canadian Grain Commission as a transfer elevator with a capacity of 154,020 tonnes.[20] The elevator has two wharves; a 398 metre long unloading wharf and a 282 metre long loading wharf. In addition, the port has 193 metre long "port dock" used for unloading salt with an adjacent salt pad, a 142 metre long "Riverfront" dock and a 442 metre long "Harbourfront" dock which are used for unloading salt and aggregate onto adjacent pads. Table 18 lists facilities at Prescott.

Table 18: Facilities at the Port of Prescott

Commodities Handled	Terminal/ Pier name	Length (m.)	Depth (m.)	Commodity stored	Storage capacity
Grain	Grain (West Side)	282	8.30	grain loading	154,020 tonnes
Grain	Grain (East Side}	390	8.30	grain unloading	
Stone,Sand and Bulk	Harbourfront	442	8.30	Bulk	100,000 tons
Salt	Port Dock	193	8.30	Salt	50,000 tons
Salt	Riverfront	142	8.30	Salt	Nil

Sources: Port of Prescott and Canadian Grain Commission

All docks at Prescott have full Seaway depth.[21] The figure below shows the port facilities' layout.

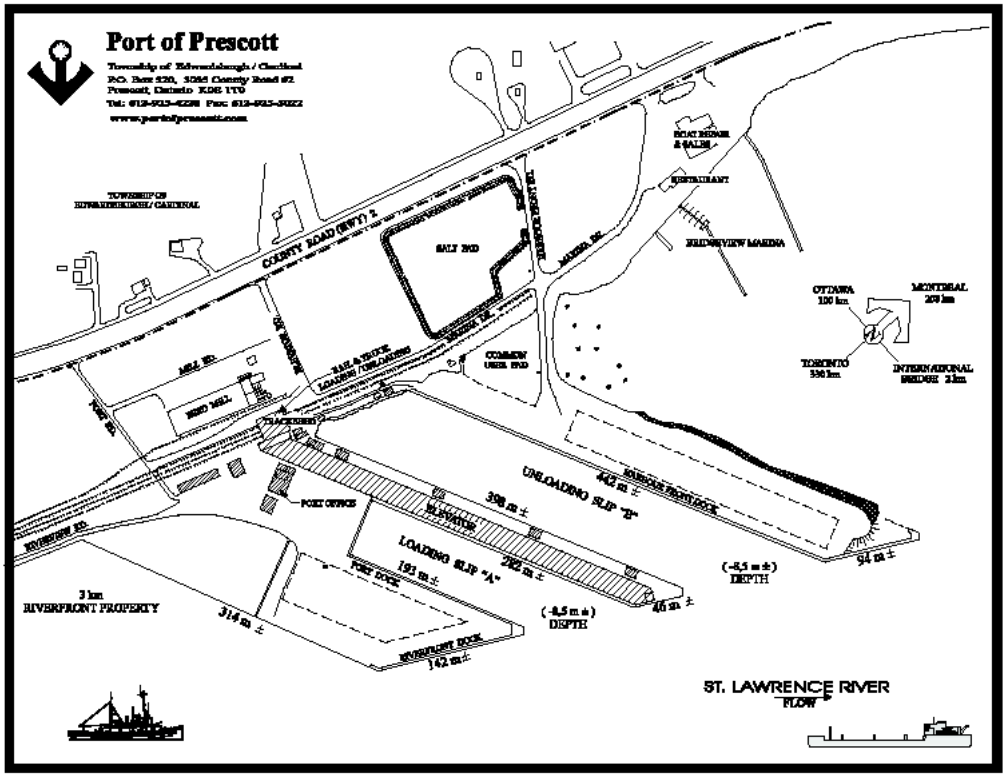
Port traffic

Prescott is primarily a receiving port with the major commodity being salt destined for the City of Ottawa and other road and highway users. Waterborne grain handlings have declined significantly over the years due to changes in grain markets and shipping patterns. Most grain handlings at the elevator are received from and loaded into trucks – the business is now domestic Ontario grain, mostly corn, rather than western grains. There is also a feedmill at the elevator that processes small amounts of grain each year (3,859 tonnes in 2008).

[20] *Licensed Transfer Elevators as at December 31, 2007,* Canadian Grain Commission Website.

[21] Port of Prescott website.

Figure 6. Port of Prescott Layout



Source: Port of Prescott website

Table 19 shows recent grain handling volumes by mode of transport at the Prescott elevator. The catchment area for the grain elevator encompasses Eastern Ontario from Lennox and Addington Counties to Prescott-Russell County and up as far as Renfrew. Salt is received for counties and municipalities in a similar area including the City of Ottawa. The salt dock (Harbourfront) is leased by Rideau Bulk Terminals, which handles all the salt received at Prescott.

Table 19: Prescott Grain Throughput 2005-2008 (tonnes)

Mode	2005	2006	2007	2008
Rail	7,916	13,165	30,138	57,160
Truck	220,294	282,561	291,560	390,284
Water	54,842	78,008	77,198	113,407
Mill	3,428	2,229	4,461	3,859
Total	**286,328**	**375,966**	**403,357**	**565,160**

Source: Port of Prescott website

Total waterborne traffic for the Port of Prescott for the same period follows below. It should be noted that there are minor variances in the grain volume totals from the previous table.

Table 20: Waterborne Tonnage at the Port of Prescott 2005-2008 (tonnes)

Commodity	2005	2006	2007	2008
Salt	302,339	391,259	275,426	505,798
Grain	54,843	78,059	77,198	117,507
Aggregate	79,702	67,916	34,719	32,378
Total	**436,884**	**537,234**	**387,343**	**655,683**

Source: Port of Prescott website

Marine traffic flows for the year 2005 follow from Statistics Canada data. It should be noted that these data do not correspond exactly with Port of Prescott data.

Table 21: Port of Prescott Domestic Marine Traffic

Commodity	Origin/Destination Port	Originated	Received
Minerals	Goderich, Windsor and Iles-de-la-Madelaine		301,736
Minerals	Lake Ontario	26,144	
Agriculture	Lower St Lawrence Ports	48,564	
Total		**74,708**	**301,736**

Source: Statistics Canada

International marine traffic in 2005 was limited to a shipment of 23,680 tonnes of aggregate to Lake Michigan. Aggregate is shipped out of Prescott from a quarry located in the Brockville area.

In 2008, 41 vessels called at Prescott to load or discharge cargo with the first arriving on March 28 and the last on December 17.

As can be seen from the foregoing, activity at the Port of Prescott has risen considerably during the past several years. Industrial development is ongoing in the industrial areas close to the port. Most notably, a new GreenField Ethanol plant was completed in early 2009 (Figure 7). It is expected to consume 20 million bushels of Ontario corn, and to produce 200 million litres of ethanol and 154,000 tonnes annually of distillers' grains to be used as feed.

The port has" tired" infrastructure. It consists of timber docks built many years ago and not maintained by Ports Canada or Transport Canada. While appropriate for the time, the construction is not suitable for today's business where ships unload faster and commodity piles on-dock are bigger than the docks were designed for.

The port has approximately 20 hectares available for development in the port area and the township has approx 80 hectares across County Road 2 from the port available for development.

Figure 7. GreenField Ethanol Plant with Port of Prescott in the Background

Source: Port of Prescott website

The port has applied to Build Canada for $35 million to add 20,000 tonnes capacity[22] to the elevator (approx $5 million) and for replacement of the "harbourfront" salt dock (approx $34 million).

2.2.2 Oshawa

Prior to the enactment of the CMA, most of the major ports in Canada were either Harbour Commissions (Toronto, Hamilton, Windsor, Thunder Bay, Fraser River) or Local Port Authorities under the CPC. One Harbour Commission remains – Oshawa. Interestingly, at one time Transport Canada issued a press release announcing that conversion of Oshawa to CPA status was underway.[23] The port's legal status is subject to change following the release of the *Crombie* report and subsequent discussions between Transport Canada (which actually owns the property), the City of Oshawa, the port users' group and other interested parties.

Oshawa has appointed commissioners who serve for specified terms and one permanent staff member.

[22] The elevator needs additional capacity to handle the increasing volumes of grain to be stored. Part of this is inbound corn from the U.S. for the ethanol plant, partly western grain bound for export, and partly corn and soybeans grown in Eastern Ontario that require storage at harvest time.

[23] *Port of Oshawa to Become a Canada Port Authority*, Transport Canada Press Release, March 9, 2000.

Website: www.portofoshawa.ca

Location

Latitude 43d 52m N
Longitude 78d 50m W

The Port of Oshawa is located on the north shore of Lake Ontario and can be easily accessed by road using Highway 401 and Harbour Road. The Port does not have any onsite rail facilities but discussions are being held with CN to extend a spur line to the East Dock.

Facilities

Current facilities include the East Wharf which is the main cargo facility and the West Wharf which is used for overflow traffic. Within the port, there is also a turning basin with a stated draft of 6.7 metres.[24] Oshawa Stevedoring has an exclusive contract to handle all cargoes on the East Wharf and to provide whatever unloading equipment is necessary. Tugs are available at the port, as required. Upon request, customs officials come from the Oshawa airport at no charge. Table 22 lists facilities at Oshawa.

Table 22: Facilities at the Port of Oshawa

Commodities Handled	Dock #	Terminal/Pier name	Length (m.)	Depth (m.)	Commodity stored	Storage capacity (tons)
Stone,Sand and Bulk	NA	Kalium	121.92	7.92	Potash	9,850
General Cargo	NA	Ministry of Transport Wharf	219.46	8.23	NA	NA
Liquids	NA	General	155.45	6.70	Calcium chloride	31,840
	NA	McAsphalt	121.92	7.92	Asphalt	31,500

Sources: Greenwood's Guide to Great Lakes Shipping 2006 and Port of Oshawa

Port-owned facilities include:

- four domes used for storing green salt (Cargill);
- one potash dome (Agrico);
- one tank terminal and one calcium chloride tank (Miller Paving and Morris Chemicals); and
- one 50,000 square foot warehouse.

Privately owned facilities comprise the McAsphalt industries' tank farm.

Also, the port is used by McNally Construction, CCC steel, and Mammoet, which handles project cargo such as windmills over the dock at Oshawa.

[24] Port of Oshawa website.

Port traffic

Oshawa is a receiving port with all (or almost all) cargo being unloaded at the port. Traffic levels have fluctuated in recent years between a high of over 393, 000 tonnes in 2006 to a low of just under 198,000 tonnes in 2003. The major cargo is steel landed at the port. The 2006 high traffic level included over 240,000 tonnes of steel which fell to 98,000 tonnes in 2007. Traffic volumes for 2005, 2006 and 2007 are shown Table 24.

Table 23: Port of Oshawa Cargo

Commodity	2005	2006	2007
		Metric Tonnes	
Asphalt	44,410	73,324	68,489
Calcium Chloride	21,671	42,125	27,548
Potash/Fertilizer	15,851	9,346	7,829
Steel	201,643	240,765	91,671
Project Cargo	2,563	945	2308
Barite	16,094	0	0
Salt	35,273	26,707	34,275
Total	**337,506**	**393,211**	**232,119**

Source: Port of Oshawa website

Table 24: Port of Oshawa Marine Traffic, 2005

Commodity	Origin	Received
		Metric Tonnes
	Domestic	
Fuels and basic chemicals	Ontario Ports	30,783
Total Domestic		**30,783**
	International (selected)	
Other Salt Inc Rock, Brine & Pure Sodium Chloride	Ohio	39,508
Natural and Petroleum Asphalt	US Lake Ports	30,490
Other Metal compounds	Michigan and Africa	22,046
Flat rolled iron or steel	Eastern Europe and Egypt	18,926
Steel bar, wire, etc	Turkey, Poland and other Europe	175,918
Total all imported Commodities		**309,793**

Source: Statistics Canada

Statistics Canada data[25] for 2005 come close to but do not quite match the Oshawa data for that year and indicate that 310,000 of the 343,000 tonnes handled were international including import/export overseas trade and trade with the US such as calcium chloride. Seaway data show that 32 shipments comprising 243,000 tonnes were inbound through the Seaway. The port data indicate a total of 48 vessels at Oshawa in 2005, 50 in 2006 and 32 in 2007. Of the 2007 vessels, 16 required tugs, two did not require tugs and 14 were tug/barge

[25] Statistics Canada, *Shipping in Canada 2005*, 2008.

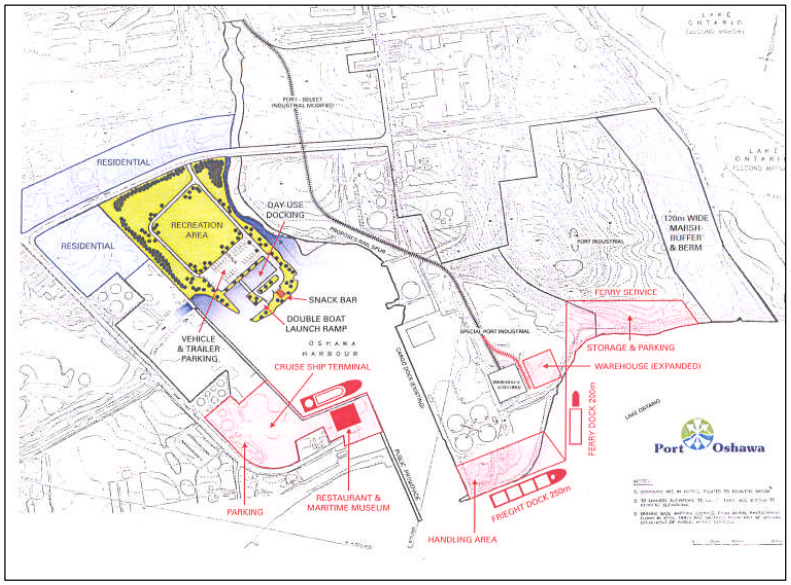
combinations. Domestic traffic in 2005 was restricted to receipts of almost 31,000 tonnes of fuel and basic chemicals as shown in Table 24. It should be noted that 2,319 tonnes of uranium or thorium were exported via Oshawa in 2005 to Western Europe.

In discussion with a port official, it was indicated that the current facilities are capable of handling up to 500,000 tonnes each season.

We were told that the Port of Oshawa is favoured for import steel unloading because of its proximity to Toronto and easy access from the port to Highway 401. At the time of the interview (August 2008), the port was anticipating an agreement with CN for the provision of a railway spur into the port area. This was seen as a necessary condition to attract an ethanol plant onto vacant land within the port. The existing status, opposition from the City of Oshawa to the spur, and concern about what the port might look like in the future (post *Crombie*) were all factors cited for the delay in obtaining the spur. We were told by a representative of the Port that an appeal to the Canadian Transportation Agency had been successful and that this could soon lead to an agreement with Canadian National for the installation of a spur line into the port (Figure 8). The spur is seen as being the catalyst for the attraction of an ethanol plant and a grain elevator into the port area.

In addition to the foregoing, the port has plans (Figure 8) to expand its ability to handle freight, develop a recreation area including a marina and develop a cruise ship terminal and a ferry service facility, expand indoor storage and relocate the freight berth from the west dock to the south end of the east dock. These plans have been developed over a number of years and are expected to take place over an extended period – the cruise ship terminal is probably at least 10 years away.

Figure 8. Port of Oshawa Expansion Plans



Source: Oshawa Port Commission

2.2.3 Port Colborne

The Port of Port Colborne is a former Ports Canada Divisional port on Lake Erie which has been devolved to the City of Port Colborne pursuant to the *Canada Marine Act.* In addition, port operations are also located at facilities owned by Transport Canada and operated by the St Lawrence Seaway Management Corporation along the Welland Canal including the Ramey's Bend area.

Location

This port is located at the western end of the Welland Canal.

Facilities

The west side of the Welland and the City-owned port is served by the Port Colborne Harbour Railway which is owned by the City and operated by Trillium Railway. This railway connects with CN at Merritton. CN has a line east of the Welland that does not appear to connect with industry along that waterway. Highway facilities are an issue with the City, which wants a limited access four-lane road extended to Port Colborne. At present, Highway 406 ends at East Main Street in Welland with Highway 140 continuing to meet Highway 3 at Port Colborne. Niagara Region has plans to expand a regional road to link with the QEW at or near Fort Erie. Maritime traffic on the Welland Canal can disrupt traffic in the city due to the need to open bridges to allow ships to transit the Canal.

Much of the "port" area is located along the Welland Canal. Industry uses Seaway dockfaces and draws and returns water to the Canal. This area, while counted in cargo data as part of Port Colborne (and some in Seaway data as Ramey's Bend), falls within the purview of the Seaway Authority. When visiting the facilities and industry along the Welland it is obvious that the area within the City of Port Colborne adjoins other industry and facilities along the Canal in nearby Welland.

Draft along the Seaway wall is to maximum Seaway level but draft in the City-owned harbour is listed at 6.7 metres in Greenwood's. In recent years, draft has been an issue due to lower water levels in Lake Erie. The canal wall is said to require some work and this is the responsibility of the Seaway. Table 25 lists port facilities at Port Colborne including along the Welland Canal.

Port Colborne has 800 acres of available along or near the Welland in the northern part of the City.

The City of Port Colborne is a very attractive tourist location, somewhat off the beaten track in Niagara. The City is very interested in developing a cruise business. In recent years several cruise ships have called but there is no suitable area to moor such a vessel. A Canadian Navy vessel was to visit in the fall of 2008 and be tied up at a stone dock along the Welland, with the area being cleaned up to handle those who would come to visit the ship. At present, there is no really suitable location to berth cruise ships.

Table 25: Facilities at Port Colborne

Commodities Handled	Dock #	Terminal/Pier name	Length (m.)	Depth (m.)	Commodity stored	Storage capacity (tons)
Grain	West Pier	ADM	259.1	6.70	Grain	61,728
	NA	Port Colborne Grain	213.4	6.70	Grain	81,000
Stone,Sand and Bulk	NA	Port Colborne Quarries	304.8	8.23	Stone	150,000
	NA	Snider {East Pier}	365.76	9.14	Bulk Commodities	250,000
	NA	Snider {West Pier}	365.76	9.14	Bulk Commodities	110,000
Liquids	NA	Shell	172	9.14	Marine Diesel, Diesel Fuel, Bunker "C", Blended Fuels	26,900

Source: Greenwood's Guide to Great Lakes Shipping 2006

Industry

The major marine-based industry at Port Colborne is grain handling and milling. Traditionally, this was the second largest flour milling centre in Canada after Montreal. Now, the Robin Hood mill (located at Ramey's Bend on the old Welland Canal) is closed and is for sale. ADM and Goderich Elevators (City-owned) have facilities in the City-owned port area (see Figure 9).

Figure 9. Port Colborne with Grain Elevators in Background

Source: Photo by David Hackston

The Seaway has extensive tie-up walls that are used for loading and unloading cargo and for winter tie-ups. Construction materials and petroleum products are transferred at points along

the canal and Casco receives corn from the US.[26] International Marine Salvage has a ship-dismantling operation at the mouth of the Canal and Fraser Marine provides ship repair services along the Canal. Tugs are available from McKeil and NorLake Marine.

Port traffic

Commercial marine facilities at Port Colborne would not appear to be at anywhere near capacity. Commercial traffic has declined in recent years due to the situation at Robin Hood. With the shift in overseas grain markets and the ending some years ago of federal subsidies on the rail transport of western grain brought in by water from Thunder Bay and then reshipped by rail from Ontario elevators (At and East program), the elevators here and at other Ontario lake and river ports were curtailed. Recent marine movements are listed in the following tables.

Table 26: Port Colborne Domestic Marine Shipments, 2005

Commodity	Origin/Destination	Originated	Received
Agriculture and food products	Thunder Bay	360	89,685
Minerals	Lake Huron	0	2,268
Fuels and basic chemicals	Quebec Ports	0	8,139
Total		**360**	**100,092**

Source: Statistics Canada

As can be seen, most of the international traffic at Port Colborne is with Ohio. Inbound Canadian traffic is mostly grain from Thunder Bay.

Table 27: Port Colborne International Marine Shipments, 2005

Commodity	Origin/Destination	Originated	Received
		Metric Tonnes	
Grain	Ohio	21,500	186,574
Gravel and stone	Ohio	371,686	0
Salt	Ohio	0	151,804
Gypsum	Ohio	0	121,568
Sub Total		393,186	459,946
Total International Shipments		**393,375**	**467,767**

Source: Statistics Canada

2.2.4 Port Stanley

Port Stanley remains a Transport Canada port and is managed by Transport Canada, Ontario Region pursuant to Part 2 of the *Canada Marine Act*.[27] Transport canada has listed Port Stanley to be devolved pursuant to provisions of the *Canada Marine Act.*

[26] Being off the main Welland channel, Casco can freeze a ship in each winter to provide additional storage but without impeding Seaway operations.

[27] *Canada Marine Act,* Section 65.

Location

Latitude 42d 39m N
Longitude 81d 13m W

Located at the mouth of Kettle Creek on the north shore of Lake Erie about 35 kilometres due south of London, Port Stanley has traditionally been the largest commercial port between Port Colborne and Windsor. It is also a fishing port.

Facilities

The commercial port has been in decline for many years starting with the shift away from coal as a heating source. This led to the abandonment of the London and Port Stanley (LPS) Railway which once handled large volumes of coal per year from ships from Ohio ports. The remaining part of the LPS is now operated as a tourist railway by the Port Stanley Terminal Railway and operates as far as St Thomas. There is no rail freight service at Port Stanley and road access is by county road Number 4 or county road Number 20. Access by county road Number 4 brings trucks through the main part of the village.

Port Stanley has always been used for summer beach-front recreation and in recent years there has been considerable residential development in the area. Port Stanley was also once a cross-lake ferry terminal and some would like to revive such an operation.

Even when fully operational, the port had limited draft of 21 feet at the commercial docks which meant that a large lake ship could not come in fully loaded or take on a full load. From discussions with several interested parties it now appears that the draft at Port Stanley is severely limited due to silting from Kettle Creek, such that one carrier which previously tied up at the port for the winter is now reported to be unable to enter the port in ballast. Table 28 lists facilities at Port Stanley assuming harbour has been dredged.

Table 28: Facilities at Port Stanley

Commodities Handled	Terminal/ Pier name	Length (m.)	Depth (m.)	Commodity stored	Storage capacity (tons)
Grain	Richardson	237.7	6.40	Ontario grain	13,500
Coal Unloading	Lakes Terminals {EAST}	274.32	6.40	Coal	110,000
Stone,Sand and Bulk	Lakes Terminals {WEST}	274.32	6.40	Potash, Bulk {Domed}	100,000
Liquids	McAsphalt	518.17	6.40	Asphalt	70,000

Sources: Greenwood's Guide to Great Lakes Shipping 2006, RTG

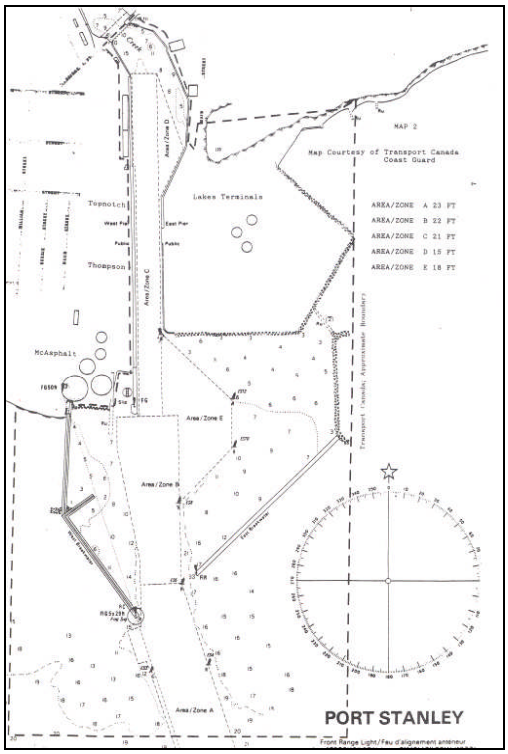
There are two piers (East and West) at Port Stanley effectively parallel to each other at the mouth of Kettle Creek. Transport Canada lists four piers at Port Stanley:

- West Pier 1 length 642.0 metres;
- West Pier 2 length 70.0 metres;
- East Pier 1 length 259.0 metres; and
- East Pier 2 length 300.0 metres.

Piers East 2 and West 2 were accessible only by shallow draft vessels such as fishing boats.

The East Pier 1 was mostly used for unloading coal. The West Pier 1 was used for unloading asphalt and potash and for loading corn and Ontario wheat.

Figure 10. The port looking north from Lake Erie



Source: Canadian Coast Guard

Port traffic

During the late 1980's, Port Stanley annually handled several hundred thousand tonnes of goods including potash, grain, coal, and asphalt.

Statistics Canada reported that volumes declined to 13.5 thousand tonnes of carbon black from US lakes ports and just over eight thousand tonnes of fuel and basic chemicals from Sarnia and Windsor – probably asphalt for McAsphalt in 2005. The new Transport Canada Information Sheet on Port Stanley states:

> With the virtual elimination of break bulk and the decline of bulk traffic, compounded by the suspension of TC's maintenance dredging program, the harbour is currently only accessible to Lake Erie Fishing Vessels and service craft to the Lake Erie natural gas exploration industry.

With the increasing gentrification of the village and demand for lake view properties, the commercial port may come under increased pressure.

2.2.5 Sarnia

The Port of Sarnia is a public port managed by Transport Canada, Ontario Region pursuant to the provisions of the *Canada Marine Act*. This port is not listed for devolution. The Port of Sarnia encompasses a large geographical area, which includes various communities and private facilities as well as the Public Port Facilities. The port provides seagoing access for lake freighters and deep sea ships carrying cargos of grain and petroleum products to national and international markets. In addition to both inbound and outbound "project" or purpose built cargoes, Transport Canada's marine facilities are utilized for year-round lay-up and repair by both Great Lakes and Deep Sea vessels.[28]

Sarnia is located where Lake Huron drains into the St Clair River. The port is located along the Canadian side of the St Clair River.

Figure 11. Transport Canada's Facilities at Sarnia

Source: Transport Canada

Facilities

While Transport Canada owns some shore property, most port facilities are private and located on private property. In addition to the Port of Sarnia, the strip downstream along the St Clair River is also home to other privately owned port facilities, mostly associated with the petrochemical industry.

A listing of port facilities and drafts is contained in Table 29. It is interesting to note that while the river channel is capable of handling 1,000 foot US lakers, most of the listed docks at Sarnia have less than Seaway draft. This is probably due to the limited size and draft of the lakes' tanker fleet.

[28] Transport Canada Information Sheet.

Table 29: Facilities at Sarnia

Commodities Handled	Terminal/ Pier name	Length (m.)	Depth (m.)	Commodity stored	Storage capacity (tons)
Grain	Cargill	274.3	8.00	Grain	151,000mt
	Lafarge	248.41	9.14	Stone	50,000
Stone,Sand and Bulk	Lafarge	176.78	7.92	Stone	75,000
	Sarnia Elevator	274.32	7.01	Potash	25,000
	Southwestern	128.02	8.23	Stone & Sand	500,000
General Cargo	Government Dock	318.82	7.92	NA	NA
Liquids	Dow Chemical	207.26	7.92	Chemicals	71,028
	Imperial { Fueling Dock}	180.44	6.71	Bunker "C", Interned Bunkers, Marine Diesel, Galley Fuel, Lube Oil Distillate	1,589,873
	Imperial {Lower Dock}	219.46	6.71	Gasoline, Furnace Oil, Bunkering facilities	
	Imperial { Special Products Dock}	86.56	6.71	Benzene, Toulene, Petro-chemicals	
	Nova	213.36	7.92	Styrene, Benzol, Coa Tar, Butadene, Latex	45,790
	Shell North Dock	530.35	8.23	Bunker "C", Solvents Diesel Oil	30,000
	Shell South Dock	530.35	8.23	Gasoline, Fuel Oil, Stove Oil, Diesel Oil, Bunker "C"	328,500
	Sunoco North Dock #2	128.02	8.23	Stove Oil, #2 Fuel Oil Bunker Oil, Aromatic Chemicals	471,138
	Sunoco South Dock #1	91.44	6.70	Gasoline	

Sources: *Greenwood's Guide to Great Lakes Shipping 2006*, Transport Canada and Canadian Grain Commission

Port traffic

Major port users include the Cargill elevator and the several petrochemical based industries in the area. Table 30 provides an indication of the complicated domestic flow of petroleum-related commodities into and out of Sarnia. It is worth noting that the agricultural flow to Baie Comeau is really an export movement that will go into the house there for transfer to an ocean going vessel.

Table 30: Port of Sarnia Domestic Marine Shipments, 2005

Commodity	Origin/Destination Port	Originated	Received
		Metric Tonnes	
Agriculture	Quebec and Nova Scotia		164,440
Minerals	Lake Superior	0	555,118
Fuels	Ontario and Quebec	1,123,764	614,091
Subtotal		1,288,204	1,169,209
Total		**1,288,204**	**1,170,526**

Source: Statistics Canada

The predominant traffic is related to the petrochemical industry and domestic shipments about double international movements of goods. The major destinations are ports around the lakes in both Canada and the United States. It is also interesting to note that there appears to be some intra-port movement of fuels and basic chemicals. Sarnia also has one of the most balanced inflows and outflows based on tonnage along the lakes. It is also tanker dominated traffic, which may explain why the draft at docks is frequently below Seaway maximum.

Table 31: Port of Sarnia International Marine Shipments, 2005

Commodity	Origin/Destination Port	Originated	Received
		Metric Tonnes	
Wheat and corn	US lake ports	40,954	45,535
Limestone	Michigan ports	0	154,376
Gasoline, Fuel oil, etc.	US Lake Erie and Lake Michigan ports	270,528	49,887
Asphalt	US Lake Michigan ports	111,910	0
Benzene, toluene, etc.	US Gulf ports and the Netherlands	49,750	7,784
Subtotal		473,142	257,582
Total		**520,939**	**292,067**

Source: Statistics Canada

2.2.6 Goderich

The Port of Goderich was devolved from Transport Canada to the City of Goderich. The port is managed by the Goderich Port Management Corporation (effectively managed by Sifto), a non-profit corporation set up by the port users. Current members are Sifto, Goderich Elevators and Da-Lee. The port has no direct employees and there are no employees of the port users dedicated solely to port activity.

Location

Latitude 43d 45m N
Longitude 81d 44m W

Goderich is located where the Maitland River flows into Lake Huron. The port is shown in the figure below.

Figure 12. Port of Goderich

Source: Transport Canada

Facilities

The picture in Figure 12 is about 20 years old, but the port facilities remain largely unchanged visually with the salt mine and docks on the left and the grain elevators on the right. The channel is listed at 8.2 metres with 7 metres in the harbour basin. Three berths are listed at Goderich with two at Goderich Elevators and one at Sifto Salt. The draft at the elevators is listed at 7.9 metres and at the salt mine as 8.23 metres, Seaway depth.[29] Goderich Elevators are CGC Licensed Transfer Elevators with a capacity of 140,020 tonnes. Overall, Goderich Elevators has storage capacity for over 5 million bushels of grain.[30] Table 32 provides data on the port facilities.

Table 32: Port Facilities at Goderich

Commodities Handled	Terminal/ Pier Name	Length (m.)	Depth (m.)	Commodity stored	Storage Capacity (tons)
Liquids	Da-lee	243.8	8.23	Calcium chloride	35,700
Grain	Goderich Elevator #1	353.6	7.90	Grain	140,020 tonnes
Grain	Goderich Elevator #2	317	7.90	Grain	
Stone, Sand and Bulk	Sifto	243.84	8.23	Salt	69,000

Sources: Greenwood's Guide to Great Lakes Shipping 2006 and Canadian Grain Commission

There is rail access from Goderich Exeter to both the salt mine and the grain elevators. Service is five times a week. Truck access to the mine and the northern area used by Da-Lee

[29] Greenwood's 2006.

[30] Goderich Elevators website.

is good, with a relatively steep grade paved road connecting to Highway 21 at the northern edge of the town. Truck access to the elevators is less ideal with trucks having to pass through the commercial town centre and a residential area to access the elevators on the south side of the port. This route also provides access to the recreational area and beaches.

There are three berths used for loading; one for salt, one for grain, and one used for both grain and calcium chloride. There are also two additional berths available for winter vessel storage. There is no bunkering facility. Any bunkering requirement would have to be met by trucking fuel direct to the vessel.

Tugs are available and used by some vessels based on the Master's decision.

There may be a future dredging requirement beyond the break wall to connect with deep water. The port property ends at the break wall. Attempts to identify dredging responsibility beyond that point have been unsuccessful. Port traffic and industries

Goderich is primarily a shipping port. Port users consist of the salt mine, Goderich Elevators and Da-Lee. Salt goes to communities throughout the Great Lakes and as far east as Quebec City. Grain is marine-dependent for access to export markets via the Lower St Lawrence. The port is almost exclusively used for outbound cargo, with Sifto Salt being the primary shipper and Goderich Elevators providing secondary volume. There is also a much smaller volume of calcium chloride shipped by Da-Lee, which is used for road dust control purposes and is shipped inland from the Port.

There is a small volume of inbound grain from western Canada and there is no current capability to handle general cargo.

Statistics commodity data for both domestic and international movements follow.

Table 33: Port of Goderich Domestic Marine Shipments, 2005

Commodity	Origin/Destination Port	Originated	Received
		Metric Tonnes	
Agriculture	In from Thunder Bay in and out to Nova Scotia	58,516	121,906
Minerals	Ontario and Quebec	1,340,476	0
Total		**1,398,992**	**121,906**

Source: Statistics Canada

Table 34: Port of Goderich International Marine Shipments, 2005

Commodity	Origin/Destination Port	Originated	Received
		Metric Tonnes	
Wheat and soya beans	UK, Finland, Belgium, US Lake Erie	75,001	0
Table Salt	Wisconsin and Ohio ports	37,000	0
Other salt	US Great Lakes and St Lawrence River ports	1,551,076	26,682
Subtotal		1,663,077	26,682
Total		**1,692,822**	**68,140**

Source: Statistics Canada

2.2.7 Owen Sound

Owen Sound is a public port managed by Transport Canada, Ontario Region pursuant to the *Canada Marine Act.* It is on the list for devolution pursuant to Part 2 of the *Canada Marine Act.*

Location

Located at the head of Owen Sound off Georgian Bay, the Port of Owen Sound is a Transport Canada port slated for divestiture.

Facilities and traffic

As with Port Stanley, Transport Canada (TC) investment is limited to expenditures related to maintaining safety standards. The TC dock facilities are home to a Parrish and Heimbecker (Great Lakes Elevator Company) grain elevator, a road salt pad, and Miller Terminals for cement facility. The grain elevator is a CGC licensed transfer elevator with a capacity of 106,420 tonnes. Water depth at the docks is in the range of 6.5 to 6.7 metres.[31] According to the RAC Atlas, there is no rail service at Owen Sound. Table 35 lists facilities at Owen Sound.

Table 35: Facilities at Owen Sound

Commodities Handled	Terminal/ Pier name	Length (m.)	Depth (m.)	Commodity stored	Storage capacity
Grain	Great Lakes Elevator Company	259.1	6.50	grain	106,420 tonnes
Stone, Sand and Bulk	Miller Paving	182.88	6.71	Cement	15,000
Liquids	General	182.88	6.70	Calcium chloride	4,450

Source: *Greenwood's Guide to Great Lakes Shipping 2006* and Canadian Grain Commission

[31] Draft data must be considered to be approximate subject to the need for dredging and current lake water levels.

Transport Canada lists the following facilities at Owen Sound:

- West Wharf Structure #7 length 150 metres;
- West Wharf Structure # 8 (private) length 125 metres ;
- West Wharf #9 length 220 metres;
- West Wharf, South length 135 metres;
- East Wharf, Central length 200 metres; and
- East Wharf, North length 230 metres.

Port traffic and industries

Commodity flows are very low, being primarily grain in from Thunder Bay and Goderich and wheat out to the United States (Table 36). Of particular interest is the unloading of 49 tonnes of turbines in containers (Table 37). Owen Sound is also used for winter lay up of Great Lakes vessels.

Table 36: Owen Sound Domestic Marine Shipments, 2005

Commodity	Origin/Destination Port	Received
		Metric Tonnes
Grain	Thunder Bay and Goderich	112,646

Source: Statistics Canada

Table 37: Owen Sound International Marine Shipments, 2005

Commodity	Origin/Destination Port	Bulk Loaded	Container Unloaded	Bulk Unloaded
			Metric Tonnes	
Wheat	US Lake Erie	36857	0	0
Salt	US Lake Erie	0	0	13,608
Turbines	Denmark	0	49	2,619
Total		**36,857**	**49**	**16,227**

Source: Statistics Canada

2.3 Non-publicly Owned or Administered Ports

2.3.1 Nanticoke

The Port of Nanticoke comprises wharf facilities owned and operated by US Steel Canada and Ontario Power Generation.

Location

Historically, Transport Canada owned a small harbour near the village of Nanticoke on the north shore of Lake Erie. This harbour has been devolved and now serves the needs of mostly recreational boaters.

Figure 13. US Steel Canada Unloading dock at Nanticoke

Source: Photo by David Hackston

Facilities and industry

The industrial facilities at Nanticoke are served by the Southern Ontario Railway which connects with CN at Brantford. Highway connections are by the county road network. The nearest provincial road is Highway 6 which leads to Jarvis and Highway 3.

A number of years ago, Ontario Hydro (now Ontario Power Generation) built a major coal-based power plant along the shore of Lake Erie in the Nanticoke area including docks for receiving coal. Later, Stelco (now US Steel Canada) bought land and built a steel mill and dock nearby. The US Steel Canada port facilities at Nanticoke are privately owned and consist of a pier with a conveyor system to move inbound raw material to the plant (Figure 13 above). There is also an outbound conveyor system operated by an external party, Waterford, to move slag. All material for the steel mill must come in by self-unloader as there are no unloading facilities. Table 38 provides basic dock length and draft data. In addition, US Steel owns substantial industrial park acreage (Lake Erie Industrial Park) around the steel mill complex with 2,500 acres. Access to the steel company dock is listed as a feature on the brochure advertising the industrial park.[32]

Imperial Oil built a refinery in the same area and a pipeline extends from the refinery to the OPG port facility which is used for receiving and shipping petroleum products via the OPG dock.

[32] Haldimand County website.

Table 38: Facilities at the Port of Nanticoke

Commodities Handled	Terminal/Pier name	Length (m.)	Depth (m.)	Commodity stored	Storage capacity (tons)
Ore Unloading	US Steel Canada	445.0	9.14	Ore, Coal	706,000
Coal Unloading	OPG {East Dock}	304.8	8.23	Coal	5,000,000
	OPG {West Dock}	304.8	8.23	Coal	
Liquids	Esso uses OPG dock	304.8	8.23	Gasoline, Stove Oil, Diesel Fuel, Furnace Oil, #6 Fuel Oil	795,000

Source: Greenwood's Guide to Great Lakes Shipping 2006 and OPG

Port traffic

All traffic at the above noted facilities are related to the three industries discussed. "Minerals" relates to the movement of stone and iron ore. It should be noted that, as with Sarnia, fuels and chemicals traffic sometimes involves flows in both directions between the same ports.

Table 39: Nanticoke Domestic Marine Shipments, 2005

Commodity	Origin/Destination Port	Originated	Received
		Metric Tonnes	
Minerals	St Lawrence, Lake Huron	0	310,177
Coal	Lake Ontario, Lake Superior	16,260	96,079
Fuels and Chemicals	In and out from/to Ontario, Quebec, Nova Scotia	549,605	590,324
Minerals	St Lawrence, Lake Huron	0	310,177
Total		**565,865**	**996,580**

Source: Statistics Canada

Table 40: Nanticoke International Marine Shipments, 2005

Commodity	Origin/Destination Port	Originated	Received
		Metric Tonnes	
Iron ore	In Lake Superior, Lake Erie Out Detroit	28,589	2,770,291
Coal	Lakes Superior, Erie	23,587	9,163,675
Gasoline and fuel oils	Ohio, Wisconsin	131,581	0
Slag, ash and residues	Michigan, Ohio, Maine	445,038	0
Subtotal		628,795	11,933,966
Total		**642,729**	**11,934,309**

Source: Statistics Canada

Statistics Canada data for 2005 show over 12 million tonnes of international cargo and about 1.5 million tonnes of domestic cargo being handled at Nanticoke. The vast majority of this traffic would be inbound iron ore (mostly from the Mesabi Range but some from Quebec/Labrador)[33] for the steel mill and inbound coal (from Pennsylvania and West Virginia mines) for the generating station and the steel mill via US Lake Erie ports. In addition, Imperial Oil shipped and received refined petroleum products via the OPG dock.

OPG is scheduled to phase out coal fired electricity generation by 2014 and such a phase-out would significantly reduce coal receipts at Nanticoke.

2.3.2 Meldrum Bay

The commercial port facilities used by Lafarge Canada are owned and operated by Lafarge and were not part of the former Transport Canada public port of Meldrum Bay.

Location

The Harbour of Meldrum Bay is located near the western end of Manitoulin Island in Lake Huron. It is strictly used for recreational purposes although at one time it was used for ferry services provided by Owen Sound Transportation. The Lafarge aggregate quarry and private port are located west of Meldrum Bay at the western end of Manitoulin Island on the Mississagi Strait, which separates Manitoulin Island from Cockburn Island (see Figure 14).

Figure 14. Harbour of Meldrum Bay

Source: google.ca

[33] Seaway data show 537,000 tonnes of inbound cargo to Nanticoke probably mostly iron ore from the North Shore there would also be some coke from offshore via the Port of Quebec. The same publication shows 222,362 tonnes of iron ore and 108,329 tonnes of coke upbound from Canada to Canada, presumably to Nanticoke. The data also show 69,550 tonnes of coal upbound through the Welland which could be left over coal from the former Lakeside generating station to Nanticoke power generation.

As we were unable to obtain an interview with responsible Lafarge officials, the information that follows was obtained from published sources and from information gathered in previous projects.

Facilities and industry

The quarry, which is reported to be the largest marine based quarry in Canada, is located a long way from markets by road and does not have rail facilities.

The Lafarge port facilities have the capability of loading at the rate of 2,500 tons per hour using a belt conveyor slewing system. No unloading facilities appear to exist. Storage capacity at the port is reported to be 280,000 short tons and the dock has a draft of about 9.14 metres.[34] The volume of stone-related shipments from this facility came to about 4.5 million tonnes in 2005, as shown in the following tables.

Port traffic

Table 41: Meldrum Bay Domestic Marine Shipments, 2005

Commodity	Destination Port	Loaded
		Metric Tonnes
Minerals	Ontario Ports	1,498,130
Minerals	Quebec Ports	393,035
Subtotal		1,891,165
Total		**1,918,405**

Source: Statistics Canada

Table 42: Meldrum Bay International Marine Shipments, 2005

Commodity	Destination Port	Loaded
		Metric Tonnes
Silica and quartz sands	Ohio	14,175
Limestone	Lakes Michigan and Erie	596,113
Gravel and stone	Lakes Michigan and Erie	1,945,821
Dolomite	Indiana	71,555
Total		**2,627,664**

Source: Statistics Canada

2.3.3 Sault Ste Marie

The former Transport Canada facilities at Sault Ste Marie have been devolved to Purvis Marine which now operates them.

Location

The Port of Sault Ste Marie is located on the St Mary's River and Lake Superior.

[34] Data from *Greenwood's Guide to Great lakes Shipping 2006*.

Figure 15. Port of Sault Ste Marie

Source: google.ca

Facilities

Commercial port infrastructure at Sault Ste Marie is privately owned and operated by Essar Algoma Steel and Purvis Marine. The former Transport Canada port facilities have been devolved to Purvis Marine and the major port facilities belong to Essar Algoma. Facilities are along the St Mary's River; some are below the locks and some are above the locks. Purvis is below the locks and can operate year round. Figure 15 shows Sault Ste Marie along with the international bridge, the US locks and the large Essar Algoma property which is distinguished by the extensive rail layout.

Information provided by Essar Steel Algoma indicates that all its docks had draft of between 21 and 23 feet except the export dock which has a draft of 27 feet (Seaway max).

Purvis Marine owns and operates the former TC dock at Pim Street. It has a draft of 23 feet and is equipped to handle bulk petroleum products (on behalf of Esso and Sunoco) from vessel to pipeline to bulk storage facilities located away from the docks. Purvis also has mobile cranes and heavy fork lifts. Land access is by road only. The facility can handle oversize cargoes and break bulk such as coil steel. Purvis also can provide stevedores and has a small dry-dock next to the Essar export dock. A full listing of docks at Sault Ste Marie is contained in Table 43.

In addition to marine transport, Sault Ste Marie also receives rail service from the Huron Central Railway and Canadian National. The Huron Central connects with CP at Sudbury. In addition, CN owns and operates the railway bridge to Michigan.

Table 43: Facilities at Sault Ste Marie

Commodities Handled	Terminal/ Pier name	Length (m.)	Depth (m.)	Commodity stored	Storage capacity (tons)
Ore Unloading	Essar Steel Algoma	564.18	7.01	Limestone	850,000
Coal Unloading		548.64	6.40	Coal	1,000,000
Stone,Sand and Bulk	Essar Steel Algoma Export {Barge Dock}	152.4	4.57	Sand and Gravel	100,000
	Essar Steel Algoma Export {Main Dock}	188.97	8.23	Bulk Commodities	400,000
	Algoma Street Dock	138.99	6.40	Steel	10,000
Liquids	Essar Steel Algoma	138.99	6.40	Bunker "C", Fuel Oil, Coal Tar	84,500
	Esso	106.68	6.09	Gasoline, Furnace Oil, Stove Oil, Diesel	53,444
	Sunoco			Gasoline, Furnace Oil, Diesel Fuel	37,818

Source: Greenwood's Guide to Great Lakes Shipping 2006 and Purvis Marine

Port traffic and industries

The steel company has recently announced an expansion that will increase inbound shipments of iron ore to about 4 million tonnes and coal to 1.7 million tonnes. The following tables show the volume of domestic and international marine shipments in 2005. Domestic traffic is much smaller than international traffic because of the reliance of the steel mill on iron ore and coal imported from the United States. Much of the outbound product goes by rail and truck.

Table 44: Sault Ste Marie Domestic Marine Shipments, 2005

Commodity	Origin/Destination Port	Originated	Received
		Metric Tonnes	
Minerals	Ontario and Quebec	0	82,313
Coal	Thunder Bay in	10,081	185,794
Fuels	Ontario and Quebec	29,220	165,886
Manufactures and Misc.	Ontario and Quebec	358,470	0
Total		**397,771**	**433,993**

Source: Statistics Canada

Table 45: Sault Ste Marie International Marine Shipments, 2005

Commodity	Origin/Destination Port	Originated	Received
		Metric Tonnes	
Limestone	Michigan		300,627
Iron ore	in from Michigan out to Indiana	57,490	2,504,807
Coal	Ohio, Michigan, Illinois, New York		1,329,564
Coke	US lakes (in and out) and out to the Netherlands	126,892	21,054
Iron and steel	Argentina, Mexico and US lakes	58,223	225,984
Slag, ash and residues	Michigan	245,570	
Subtotal		488,175	4,382,036
Total		**522,688**	**4,426,672**

Source: Statistics Canada

3.0 Review of St Lawrence Seaway

The Great Lakes/Seaway system stretches from the Gulf of St Lawrence to the Lakehead (Duluth/Thunder Bay), a distance of 3,840 kilometres. It includes the five Great Lakes as well as the St Lawrence River to the Gulf of St Lawrence. The Great Lakes/Seaway system is bi-national as the Canada/US Border bisects the St Lawrence from Cornwall to Lake Ontario as well as the Great Lakes. The only portion that is strictly Canadian is the Gulf of St Lawrence and the St Lawrence River from the Gulf to Cornwall. Lake Michigan is strictly American.

The Great Lakes/Seaway system serves the North American heartland. It has 15 large international ports and 50 regional ports and has convenient road, rail and air connections. A third of North America's population lives around the system. Two Canadian provinces and eight American states border the system. Sixty percent (60%) of Canada's economic activity and 26 percent (26%) of American economic activity is based around the system.

There are major differences in elevation (equivalent to a 60-floor building) which are overcome by three sets of locks:

- the seven Seaway locks between Montreal/Lake Ontario lift ships 68.8 metres;
- the eight locks of the Welland Canal between Lake Ontario/Lake Erie (Niagara Falls) lift ships 99.4 metres; and
- the Sault Ste Marie locks between Lake Superior/Lake Michigan/Lake Huron lift ships 9.2 metres.

The St Lawrence Seaway system is a subset of the entire system and is defined in Canadian law as a deep draft waterway between Montreal and Lake Erie. The creation of the current-day St Lawrence Seaway (the section between Montreal and Lake Ontario) dates from the 1950's pursuant to an agreement between Canada and the United States. The Welland Canal, which is built completely on Canadian soil, dates from the 1930's.

The Seaway locks of the Welland and Montreal/Lake Ontario section were built to common dimensions to accommodate ships measuring 225.5 metres long, 23.7 metres in beam, 8.08 metres in draft, and 35.5 metres in height above the water. These ships can transport up to 27,000 metric tonnes of cargo. The locks between Montreal and Lake Ontario that were opened to traffic in 1959 were built to the same dimensions as the locks of the Welland Canal locks that were completed in 1932. The locks at Sault Ste Marie have been built to accommodate ships carrying over 50,000 metric tonnes of cargo.

The Canadian St Lawrence Seaway Management Corporation is charged with operating the 13 Canadian locks of the deep-draft waterway from Montreal to Lake Erie. The American portion of the Seaway (two locks) has always been operated by the United States Saint Lawrence Seaway Development Corporation, which is an agency of the United States Department of Transportation. It is headed by an Administrator appointed by the Secretary of Transportation. The US Army Corps of Engineers operates the locks at Sault Ste Marie.

Seaway Commercialization pursuant to the *Canada Marine Act* led to the negotiation of a contract between the users of the Seaway and Transport Canada. The users formed a private sector, not-for-profit corporation, the St Lawrence Seaway Management Corporation (SLSMC), which became responsible for operating and maintaining the Seaway. The government continues to own all of the assets, with the exception of cars, trucks and computers. Sufficient funding to maintain the physical integrity of the Seaway infrastructure was a key part of the agreement that led to Seaway commercialization. From the perspective of the users of the system, this commitment to a consistent level of maintenance expenditures was one of the main benefits of commercialization as under the previous regime expenditures on maintenance tended to fluctuate with the level of traffic and revenues.

The SLSMC's operations are guided and measured by five-year Business Plans that set specific targets for operating costs and asset renewal costs. Limits on expenditures for maintenance are determined by negotiation with the government and established for a five-year period. For the first five-year period of the Seaway Commercialization agreement, the Asset Renewal Plan was set at $128 million ($25.6 million a year); for the second five-year period $170 million ($34 million a year), and for the third five-year period $270 million ($54 million a year).

In general terms tolls have been adjusted at cost of living rates. These targets are negotiated between the SLSMC and the government. Arbitration provisions are in place if an agreement cannot be reached. Setting of service standards are in the hands of the SLSMC as it was felt that users were best placed to make those decisions.

The SLSMC faces toll incentives or penalties depending on whether cost targets are met. This includes both manageable costs and asset renewal costs.

The SLSMC assumes risk strictly with whether it is able to control costs. All risk relative to traffic and revenue resides with the government. Thus if seaway tolls do not generate sufficient revenues to cover operating and asset renewal costs, the government will make a payment to the SLSMC to cover any deficit. The government also bears risk with respect to any catastrophic failure of the system.

The commercialization agreement is a 20-year agreement ending in 2018. There are no indications yet as to whether both parties to the agreement intend to extend it past 2018, but at the same time, there are no indications that it will not be renewed, either. Renewal of the agreement will be of critical importance given the studies that show a continuing long term requirement for maintenance expenditures equal to or greater than current levels.

Approximately 200 million tonnes annually moves within the complete Great Lakes/Seaway system. Within the St Lawrence Seaway section approximately 43 million tonnes annually is carried by approximately 3,600 vessel transits. In 2007, 43 million metric tonnes of cargo, mostly grain, iron ore, coal, steel and other bulk commodities passed through the Seaway with a cargo value of over $7 billion.

The system specializes in low-value bulk cargoes such as coal, iron ore, and construction materials which can be stockpiled and for which the three-month winter shutdown is not a

deterrent. It is an integral part of the supply chain for several major flows of bulk commodities. For example:

- Iron ore moves by rail from Labrador and is loaded onto lakers at Sept-Îles and moves to steel mills in Hamilton; and
- Metallurgical coal moves from Alberta to Thunder Bay and from there to Detroit, Sault Ste. Marie and Hamilton.

Other common cargoes on the Great Lakes are limestone, grain, salt, coal, cement, gypsum, sand, slag and potash. Much of the cargo goes to support the steel mills for the auto industry which was centered around the Great Lakes because of the ease of Lake transport while other destinations include coal-fired power plants and stone docks where limestone is unloaded for the construction industry.

There is a minimal amount of containerized cargo moving in the system. For example, the St Lawrence Seaway locks experienced an average of 16,000 tonnes of containerized cargoes over the years 2000 to 2005. Total volume of containerized cargo has never exceeded 20,000 tonnes.

The capacity of the Seaway is usually expressed in terms of how many ships can transit the system in a day. Simulations have determined that 28 ship-transits per day is the absolute theoretical maximum the system can handle. Given the vagaries of operating ships in the real world, it is believed that 24 ships per day may be a more realistic upper limit on capacity. Moving to the upper ranges of capacity and obtaining an optimal use of the infrastructure would require a move away from the present first-come/first-served rule to scheduling a time slot for each ship as is the practice at the Panama Canal.

Seaway infrastructure is currently only being utilized at about half its potential capacity at the current level of traffic of 12 to 15 ships a day. Even at this level of traffic some queuing is possible depending on the timing of ship arrivals. Certainly, as traffic moves closer to capacity limits, much more queuing would be a reality unless a scheduling system were implemented.

The conversion to express the capacity of the system for the movement of commodities requires a calculation that depends on several variables:

- The ratio of ships that are loaded to those that are in ballast;
- The number of days that the Seaway is open;
- The ratio of ocean ships to lakers; typically lakers have a much higher block coefficient and can carry more at Seaway draft; and
- The size and carrying capacity of the ships using the locks.

The annual capacity of the Seaway is a function of the daily throughput and the length of the Seaway season. The current season is about 9.5 months – in 2008, the Seaway was closed from January 1 to March 19. Given the existing footprint of the locks and channels, it is felt that the maximum achievable season is 10 months. The achievement of a 10-month season faces some challenges. Once ice starts to form in the Welland Canal there is nowhere for it to

go as there is no easy way to flush it through the flight locks. The Montreal/Lake Ontario section has flushing weirs but has problems with ice build-up on the lock walls, particularly as the walls have moved inward a few inches because of alkaline aggregate reaction (AAR) expansion issues.

The length of the season is also limited by the amount of time required for major maintenance which is virtually all done during the winter shutdown. Major maintenance could only be performed during the operating season if there were twin locks throughout the system. The work is currently performed over a 10-week period and could be squeezed into a shorter period but this may increase costs as contractors may have to work around the clock.

The emphasis is on maintaining the Seaway to be as efficient and reliable as possible within its existing footprint and within the existing season.

Reliability is measured in terms of availability or uptime during the navigation season. The current goal is 98 percent (98%). The Seaway is working hard to eliminate any breakdowns – which generally are a small part of any delays in the system. The recently completed hydraulic program is a good example of how the system is being gradually modernized to become more efficient and reliable. The original system of cables and gears was obsolete and becoming more and more difficult to maintain. The decision was made to replace them with state-of-the-art hydraulic equipment; a five-year, $40 million program that has reduced the risk of mechanical breakdown. It has also allowed the Seaway Corporation to move away from preventative, or time-based maintenance, such as replacing cables at specified intervals, towards preventative maintenance based on techniques such as oil analysis as indicators of wear.

Two new technological initiatives are currently being evaluated that would handle ships more efficiently and quickly and thus increase the effective capacity of the locks. These initiatives would also have other significant benefits. The first—self-spotting—uses a laser to indicate where the ship is while in a lock. It would replace the function of spotter currently carried out by lock-wall crew. The second—hands-free mooring—uses suction cups on the lock wall to position ships rather than using the present system of lines and winches. This technology would remove the requirement for Seaway specific fittings (which cost $75,000 to $100,000) for salt water ships – an investment that occasional visitors to the Great Lakes are reluctant to make. Many ship crews do not like going through the Seaway simply because of all the line handling required. Thus, this would increase the potential fleet able to come into the system.

The amount of line handling involved in going through the Welland Canal also means that lake vessel crews are required to work overtime hours. This is a particular issue for lakers going into Hamilton Harbour—they are required to go to anchor for a four-hour rest period after transiting the Welland.

Another approach to determining the capacity of the system is to examine record traffic levels of 1977–79 (years when there was significant queuing at the Welland Canal) and compare it with current tonnages. Current maximum capacity would be greater than in that time period due to increases in the average size of cargo ships using the system and an increase in the length of the season.

Tonnage that transits the Seaway is reported in a couple of different ways. One way is to report the tonnage through each section of the Seaway; that is, the tonnage through the Welland Canal section and the tonnage passing through the Montreal/Lake Ontario section. In each case the tonnage is counted if it passes through at least one lock of the section—very little of the tonnage originates or terminates at mid-points of the section.

Table 46: Major Seaway Cargoes (1960-2007) (millions of tonnes)

	TOTAL	WHEAT	OTHER GRAIN	IRON ORE	COAL	SALT	SAND and STONE	CEMENT	PETROLEUM	IRON and STEEL	OTHER PROCESSED	PACKAGE/CONTAINERS
TRAFFIC ON THE MLO SECTION												
1960	18 .43	3.5	4.28	3.91	0.93	0.11	0.02	0.02	0.14	0.78	2.23	0.46
1965	39.36	7.84	8.95	11.59	0.95	0.32	0.01	0.01	1.87	3.29	3.12	0.56
1980	49.45	13.74	13.01	11.06	0.23	0.78	0.22	0.00	1.79	2.29	3.31	0.02
1985	37.32	11.50	4.87	8.68	0.61	0.66	0.26	0.18	0.67	3.71	3.67	0.11
1990	36.66	9.28	2.95	11.53	0.49	1.18	0.72	0.03	1.37	3.68	2.54	0.02
2000	35.41	6.53	5.98	10.17	0.33	0.66	0.36	0.03	1.05	5.09	2.69	0.02
2005	31.27	5.86	3.68	8.97	0.73	1.220	0.40	0.07	1.45	3.27	2.81	0.02
2006	35.57	6.43	4.91	9.54	0.68	1.15	0.57	0.05	1.65	4.60	2.70	0.02
2007	31.95	6.9	3.10	9.74	0.42	1.13	-	1.20	1.96	2.67	1.77	n/a
TRAFFIC ON THE WELLAND CANAL												
1960	26.52	4.07	5.32	7.13	3.99	0.14	0.91	0.11	0.95	0.59	2.43	0.39
1965	48.62	7.96	9.88	14.64	6.51	0.57	0.94	0.15	1.19	2.80	2.92	0.44
1980	59.51	14.3	13.84	11.42	7.3	1.76	1.37	0.3	1.84	1.50	3.24	0.39
1985	41.85	11.68	5.35	6.79	5.81	1.52	0.99	0.31	0.77	3.18	3.24	0.08
1990	39.4	9.37	3.29	7.48	6.27	1.51	2.00	0.41	1.17	2.83	2.54	0.01
2000	36.57	6.66	6.21	6.13	4.35	1.73	1.10	1.26	0.46	3.66	2.98	0.001
2005	34.15	5.84	3.55	7.42	3.69	1.21	1.42	1.23	0.92	2.03	3.32	0.0004
2006	37.42	6.43	4.72	7.19	3.71	2.89	1.34	1.15	1.16	3.33	3.15	0.003
2007	34.93	6.86	6.02	8.28	3.15	2.47	.961	1.08	1.56	2.46	2.42	n/a

Note: Package/Container traffic is included in commodity data.
Source: St Lawrence Seaway, *Traffic Report*, various editions plus Historical Tables 1959-1992.

The other way to report Seaway tonnage is to report the combined tonnage. This is derived by eliminating duplication of vessel transits and cargo quantities that moved through more than one section of the system. Thus a cargo of grain moving from Thunder Bay to Quebec City passing through both the Welland Canal section and the Montreal/Lake Ontario section would only be counted once when determining combined tonnage.

Record combined tonnage of 74.3 million tonnes was achieved in 1979. This was also the point at which the highest tonnage on the Welland was recorded at 66.2 million tonnes.

Record tonnage on the Montreal/Lake Ontario section of 57.5 million tonnes was reached in 1977.

By way of comparison then the combined tonnage of 43.1 million tonnes in 2007 was only 58 percent (58%) of the 1979 record; the Welland tonnage of 34.9 million tonnes in 2007 was only 53 percent (53%) of the 1979 record; and the Montreal/Lake Ontario tonnage of 32.0 million tonnes in 2007 was only 56 percent (56%) of the 1977 record.

This second alternative method of examining capacity utilization thus leads to the same conclusion that only about half of the Seaway's capacity is being utilized.

4.0 Primary Customers

The primary customers of the marine transportation industry are the major bulk shippers and receivers located along the lakes and rivers from Bath to Thunder Bay. In all, the companies can be grouped into six main categories:

- Steel;
- Power Generation;
- Construction;
- Petroleum;
- Salt; and
- Grain.

In addition to the foregoing listing, raw sugar from Central and South American origins is unloaded at Tate and Lyle (formerly Redpath) Sugar at Toronto. With limited storage capacity (90,000 tonnes raw sugar according to Greenwood's), Tate and Lyle "freezes in" a loaded laker each fall to provide additional storage capacity. Others such as CASCO do the same.

In this section, we briefly review the major commodities carried to or from Ontario ports and list the major companies associated with each group, their location and major markets or sources of raw materials. Commodity flow information for the selected ports is contained in the sections on ports.

Table 47: Top Commodities handled by Ontario Ports (Domestic), in tonnes

	Ports	Total
1	Minerals	17,033,002
2	Agriculture and Food Products	5,670,598
3	Fuels and Basic Chemicals	4,337,162
4	Manufactured and Misc. Goods	2,199,449
5	Coal	1,620,769
6	Primary and Fabricated Metal Products	35,586
7	Machinery and Transportation Equipment	5,034
Total		**30,901,600**

Table 47 above and Table 48 below provide summary information on the top commodities handles at Ontario ports in 2005. We note that there will be some double counting in foregoing table for the domestic movement of commodities that both originated and terminated at Ontario ports. The prime example is minerals which include salt and aggregates much of which moves between two Ontario ports.

Table 48: Top Commodities handled by Ontario Ports (International), in tonnes

	Ports	Total
1	Non-agglomerated Bituminous Coal	16,635,766
2	Iron Ores And Concentrates	7,514,996
3	Other Salt Inc Rock, Brine & Pure Sodium Chloride	4,377,163
4	Other Limestone, Including Powdered, Chalk	3,577,653
5	Other Gravel And Crushed Stone	3,560,062
6	Hydraulic Cements	2,781,148
7	Slag, Ash, And Residues	1,069,873
8	Silica Sands & Quartz Sands, For Construction Use	668,414
9	Iron Or Steel In Primary Forms	627,592
10	Petroleum Coke Including Calcined	522,551
11	Wheat	507,239
12	Flat-rolled Products Of Iron Or Steel	471,387
13	Potassium Chloride (potash)	459,427
14	Fuel Oils	428,877
15	Colza (rape) Or Canola Seeds Including For Sowing	396,807
16	Bar, Rod, Angle, Shape, Wire, Of Iron Or Steel	392,268
17	Linseed (flaxseed) Including For Sowing	368,504
18	Raw Sugar (cane Or Beet), In Solid Form	321,952
19	Other Products Of Animal Origin N.E.C.	318,035
20	Corn	257,851
Total of Top 20 Commodities		**45,257,565**

The international movements are led by coal which moves from US ports, mostly on Lake Erie to the steel mills at Hamilton, Nanticoke and Sault Ste Marie and to the Ontario Power Generation (OPG) stations at Nanticoke and Lambton. Similarly, iron ore and concentrates moves in large volumes from US Great Lakes ports to the aforementioned steel mills. Salt moves in both directions across the lakes from Goderich and Sarnia in Ontario and from US salt mines to Ontario destinations. Limestone and Gravel also moves in both directions across the lakes. Iron or steel in primary forms is principally imported from offshore in ocean going vessels and originates mostly in South America, the Mediterranean and the Black Sea areas. Discussion of the major industries and the commodities they ship or receive follows.

4.1 Steel

There are three major Canadian integrated steel producers located along the lakes, which have four producing locations.

Table 49: Canadian Integrated Steel Producers

Company	Location	Other
ArcelorMittal Dofasco	Hamilton	Production 4.5 million tons of raw steel in 2006
US Steel Canada	Hamilton	Annual capacity 1.8 million tonnes of steel
	Nanticoke	Annual capacity 2.25 million tonnes of steel
Essar Algoma	Sault Ste Marie	Capacity 2.8 million tons raw steel

Source: Company web sites

Total Canadian steel shipments were 14.7 million tonnes in 2006 of which the four mills above produced or had capacity to produce 11.3 million tonnes. The Canadian steel industry employs 35,000 people and the three of the four mills listed above (excludes ArcelorMittal) directly employ almost 7,000 people. Of course, steel is further fabricated upon leaving the basic steel mills.[35]

The steel companies bring in millions of tonnes of iron ore and coal from producing mines in Canada and the United States. The mills at Hamilton mainly source iron ore from the Quebec/Labrador region while the mill at Nanticoke and the mill at Sault Ste Marie source mostly iron ore from within the lakes, primarily from the Mesabi area west of Superior, Wisconsin. Coal is primarily sourced from the Appalachian mines and loaded at US Lake Erie ports, although some Powder River Basin (PRB) coal is loaded at Duluth-Superior, Wisconsin for OPG in Nanticoke and Thunder Bay. The mills receive limestone for fluxing from quarries around the lakes, primarily Lake Huron.

In addition, some raw steel is imported from overseas direct by ocean going vessel – sources are predominantly Brazil, Mediterranean and Black Sea origins. Some iron ore is also imported from Brazil and transhipped at Quebec, although most of this probably goes to US destinations. Coke is imported from Brazil and China to meet needs not filled by local coke ovens.

With very high ore prices in recent years, U.S. iron ore has been loaded at U.S. Great Lakes ports for export via the Seaway. Seaway data for 2007 show 1.9 million tonnes of U.S. iron ore downbound to Canadian ports through the MLO. It is highly likely that most, if not all, of this traffic is for transhipment via St Lawrence River ports for export overseas. The MLO data also show 80,019 tonnes of direct export of U.S. lakes iron ore in 2007.

Outbound shipments of steel to North American markets are mostly by rail and truck although some export steel is loaded at steel company docks and other commercial docks and we have heard that recent movements of steel by barge have taken place between Canada and the US.

Looking at the massive amounts of coal, iron ore, fluxing limestone and other inputs to the steel making process, and the reliance on low cost water transportation, it is difficult to envisage these commodities moving by any other mode. Accordingly, the marine mode is

[35] Source: Canadian Steel Producers Association website and company websites.

essential for the continued movement of such commodities and for the continued contribution to the competitiveness of these mills. To highlight this dependence a simple comparison of rail car carrying capacity is illustrative. Large railway coal cars hold just over 100 tonnes when the track limits permit. To shift coal from marine to rail would require the steel mills and OPG to have facilities to unload over 166,000 cars of coal per annum. Then there is iron ore which must move from Quebec/Labrador by water because the iron ore railways do not connect with the mainline system.[36]

The steel mills at Hamilton are on rail and could receive coal by rail if bulk unloading facilities were to be installed. At one time they received iron ore by rail from Ontario and Quebec mines, but the mines were not competitive and were eventually closed. The consultants were told a few years ago that the steel mills had examined the potential for receiving coal by rail from Appalachia but decided not to pursue this option. It should also be noted that the rail unloading facilities on Lake Erie are owned by the delivering railways so there could be some flexibility to adjust their prices to keep the coal flowing through these ports, as it has for many years. In addition to this, there are no interline movements and revenue sharing with other railways (e.g. CN or CP).

4.2 Power generation

Ontario Power Generation (OPG) is a major user of coal for the production of electricity. In the past, OPG (and its predecessor Ontario Hydro) brought in coal by water for thermal electric plants at Bath, Toronto and Lakeview on Lake Ontario, at Nanticoke on Lake Erie, Lambton on the St Clair River, and at Thunder Bay. The Lake Ontario generating stations have been closed (Lakeview has been demolished, the Toronto station is idle, and Bath has been converted to another energy source). The major remaining stations receiving coal by water are at Nanticoke, Lambton, and Thunder Bay. OPG is under a mandate to phase out coal fired electrical generation.

The Port of Nanticoke received coal via US Lake Erie ports and from Superior, Wisconsin in 2005. However, it cannot be determined whether the coal was going to the generating station or the steel mill or to both since they both use bituminous coal, although one uses steam grade coal and the other uses coking grade coal.

OPG marine-based plants and electrical generating capacity follow:

Table 50: OPG Marine-based Plans and Electrical Generating Capacity

Plant	Location	Rating	Other
Nanticoke	Nanticoke	3,964 MW	Storage for 4.5 million tonnes of coal
Lambton	Courtright	1,976 MW	Storage for 3 million tonnes. Uses 640 tonnes of coal per hour at full power
Thunder Bay	Thunder Bay	306 MW	Storage for 2 million tonnes. Uses lignite and sub-bituminous coal

Source: OPG website and Greenwood's

[36] The iron ore railways bringing ore to Quebec North Shore ports do not connect with the mainline railway system in Canada.

It can be seen in Table 50 that the Nanticoke plant is by far the largest coal-fired plant on the Canadian lakes. If Lambton uses 640 tonnes per hour, Nanticoke would use just over double that amount, assuming the same quality of coal and efficiency of plant. On that basis the coal yard at Nanticoke would be large enough to hold enough coal for five months of full production. It should be noted that Nanticoke is used as a peak load generator and is not always in full production. This was certainly the case in the summer of 2008 as temperatures were cooler (and less air conditioning was used) and industrial activity was also starting to slow down.

In 2005, Nanticoke (OPG and Stelco) received almost 10 million tonnes of coal from the US and Courtright (Lambton) received about 3 million tonnes. These shipments represent significant portions of the lake carriers' revenue freight. There is also no other economical way to transport these volumes as OPG's plants are designed and located to receive by water—effectively across the lakes. With the announced cessation of coal-fired thermal electricity generation in Ontario it is likely (although not a total *fait accompli*) that these movements will cease in the future leaving the lake carriers with significantly less traffic. OPG is also examining the potential to use biomass as a fuel at its coal-fired plants, which could positively impact port and shipping tonnages.

4.3 Construction

As with the steel and power industries, millions of tonnes of construction materials move by water within the Lakes. Bulk construction materials are primarily aggregate and cement. Many of these materials move across the Lakes between Canada and the United States. Some of the companies, Lafarge and ESSROC Italicementi for example, are world-wide conglomerates operating at many locations with markets in many areas. Lafarge owns the quarry at Meldrum Bay and ships to its own docks around the lakes in Canada and the United States as well as into the St Lawrence. Total shipments from Meldrum Bay in 2005 were 4.5 million tonnes, of which 2.6 million went to US Great Lakes ports and 1.9 million tonnes went to Canadian Great Lakes and St Lawrence River ports. According to the Lake Carriers' Association, stone shipments from Canadian ports to the end of October were 5.9 million tons (5.35 million tonnes), while the average from 2003-07 has been 6.1 million tons (5.53 million tonnes).

Aggregate and other limestone is primarily shipped from three locations in Ontario: Port Colborne, Whitefish (Bruce Mines) and Meldrum Bay. Major shippers include Port Colborne Quarries, Lafarge, and Ontario Trap Rock respectively. Port Colborne Quarries is owned in the United States, Lafarge Canada is part of the worldwide Lafarge conglomerate and Ontario Trap Rock is part of the Tomlinson group of companies. Transport cost is a most important consideration in the stone business and this leads to the importance of water transport.

Port Colborne Quarries has a huge operation at the north-east end of Port Colborne. Stone is trucked to the east wall of the Welland Canal where it can be loaded onto ships. Greenwood's lists storage capacity on dock of 150,000 tonnes.

Ontario Trap Rock at Bruce Mines ships large quantities of trap rock to destinations on the lakes. Storage capacity at the dock is listed by Greenwood's at 100,000 tonnes for bulk commodities.

Lafarge Canada at Meldrum Bay and Thessalon is the largest of the operations. Storage capacity at Meldrum Bay is listed by Greenwood's at 280,000 tonnes and at Thessalon (Smelter Bay Aggregates) is listed at 120,000 tonnes.

Ontario-originated cement shipments are primarily from three locations: Bath, Picton and Bowmanville.

The Bath plant is owned by Lafarge Canada and is adjacent to a Lafarge quarry. Production capacity is listed by Lafarge as 3,300 tonnes per day. Storage capacity is not listed.

The Picton Plant is owned by ESSROC–Italicimenti, a large Italian organization. Stone and cement can be loaded at its dock. Greenwood's lists storage capacity as 16,000 tonnes for cement, 7,500 tonnes for stone and 40,000 tonnes for gypsum.

St Mary's Cement at Bowmanville, a subsidiary of Votorantim Cimentos of Brazil, has its own dock, rail link and trucking company. As with the other cement producers, it ships around the lakes by water (mostly to the US) to other company facilities and to independent customers. Bulk storage is listed in Greenwood's at 300,000 tonnes.

As with some of the other industries, the construction industry depends heavily upon marine transport to move large quantities of low valued commodities from mines and plants to essentially urban areas. The distance is not always great but the economics must be there. For some locations, Meldrum Bay for example, marine is the only option as it is far from markets without rail service and with a circuitous road network to market.

There are 2 million tonnes of aggregates that are shipped from St. Lawrence Cement in Port Colborne at the eastern end of Lake Erie, to Clarkson, in Mississauga. This is a relatively short haul, but if it all moved by road, on the basis of 25 tonnes per truckload, it would require a trip through the Greater Toronto Area (GTA) every 6.5 minutes, every hour, 365 days per year.

4.4 Petroleum

The Ontario petroleum industry is concentrated along the St Clair River although there is another refinery at Nanticoke. The largest marine shippers are major oil companies Imperial Oil, Shell, Petro Canada and Sunoco, which supply product along the lakes and rivers of Ontario, move product in both directions between the St Lawrence River and the Great Lakes, and ship and receive product to/from US Great Lakes ports. In addition, Dow Chemicals has a dock at Sarnia for loading chemicals and Nova has a liquid dock at Sarnia for loading styrene, etc.

PetroCanada has a refinery at Montreal and ships into Ontario ports from there.

Imperial Oil has refineries at Sarnia and Nanticoke and is Canada's largest refiner. It also has a refinery at Halifax and refineries in Western Canada. Its major shareholder is Exxon Mobil Corporation.

Shell Canada has refineries at Montreal, Sarnia and Fort Saskatchewan.

The foregoing companies, their dealers and third party marketers account for the bulk of the petroleum related goods shipped to and from Ontario ports.

This bulk traffic differs from the rest of the bulk shipments discussed in this section because it moves in tankers. The tankers are domestically registered and operated by companies such as Algoma Tankers Limited, a subsidiary of Algoma Central Corporation and Petronav, a subsidiary of Groupe Desgagnes (see below). The fact that the competing refineries are not all located at the same point probably accounts for some of the cross moves shown in Table 15, *Port of Sarnia International Marine Shipments, 2005*. Also, if detailed commodity data were available, they would probably indicate a wide variety of products and grades.

Bulk tanks are located at a number of Ontario ports to enable easy delivery by ship with large quantities of product on board.

Table 51: Refinery and Liquid Chemical Producing Plant Docks in Ontario

Location	Company	Commodities	Storage Capacity	Commodity stored
			Tonnes	
Nanticoke	Esso	Gasoline, Stove Oil, Diesel Fuel, Furnace Oil, #6 Fuel Oil	795,000	NA
Sarnia	Dow Chemical	Chemicals	71,028	71,028 Chemicals
Sarnia	Imperial {Fueling Dock}	Bunker "C", Interned Bunkers, Marine Diesel, Galley Fuel, Lube Oil Distillate	1,589,873	NA
Sarnia	Imperial {Lower Dock}	Gasoline, Furnace Oil, Bunkering facilities	1,589,873	NA
Sarnia	Imperial {Special Products Dock}	Benzene, Toulene, Petro-chemicals	1,589,873	NA
Sarnia	Nova	Styrene, Benzol, Coal Tar, Butadine, Latex	45,790	21,060 Styrene, 6,356 Benzol, 12,712 Coal Tar, 5,662 Butadine, Latex
Sarnia	Shell North Dock	Bunker "C", Solvents, Diesel Oil	30,000	30,000 Diesel Oil
Sarnia	Shell South Dock	Gasoline, Fuel Oil, Stove Oil, Diesel Oil, Bunker "C"	328,500	112,000 Gasoline, 79,500 Fuel Oil, 38,000 Stove Oil, 36,000 Diesel Oil, 63,000 Bunker "C"
Sarnia	Sunoco North Dock #2	Stove Oil, #2 Fuel Oil, Bunker Oil, Aromatic Chemicals	471,138	NA
Sarnia	Sunoco South Dock #1	Gasoline	471,138	NA

Source: Greenwood's

4.5 Salt

There are two producing salt mines in Ontario; one at Windsor and one at Goderich. Much of this salt is used for road de-icing and industrial purposes and moves by water to destinations along the lakes and into the St Lawrence River by water as well as by rail and road. For example, the City of Ottawa receives its road salt via the Port of Prescott. The port section of this Report contains data on marine shipments of salt for each of these ports. In, addition to marine shipments, salt also moves by rail and road depending on destination and time of year.

Salt is shipped from the above noted mines to US destinations on the lakes and along the St Lawrence River. Of course, salt also is shipped from US mines to Canadian destinations.

The mine at Windsor is owned by Canadian Salt (formerly Windsor Salt) and is located on the harbourfront in Ojibway where the company has its own dock.

The mine at Goderich is owned by Sifto Canada Corporation which is part of Compass Minerals. Both rock salt and evaporated salt are produced at Goderich. Storage capacity is listed at 69,000 tonnes by Greenwood's.

Both of these mines primarily use marine transport because of the volumes that can be moved at once. They also use rail to destinations not easily reached by water and for additional shipments during peak usage seasons—but water is the prime mode.

4.6 Grain

There are quite a few grain elevators along the Ontario portion of the Great Lakes and St Lawrence River although the number is significantly reduced from 20 years ago. Most of the marine based elevators remain from an earlier era of western grain shipments through the lakes to millers at Port Colborne and Montreal and to export position in the St Lawrence.

Western grain flows through Thunder Bay elevators onto ships for movement to transfer and process elevators to the east. Elevators handling western grain are licensed by the Canadian Grain Commission and their status and capacities are published by that organization. Western grain is sold either by the Canadian Wheat Board (wheat and barley) or by commercial grain companies such as Cargill. All eastbound movements of western grain move through facilities owned by commercial grain companies. Ontario-grown grain is primarily winter wheat (Ontario Wheat Producers Marketing Board), soybeans and corn. The major grain companies handle some of this grain but so too do companies such as CASCO which produces corn starch from corn.

Current lakes-based elevators are shown in Table 52 on the following page. It should be noted that not all the elevators included in Table 52 are licensed by the Canadian Grain Commission. Notwithstanding, we have used the general CGC descriptors (e.g. process) to describe all of the listed elevators.

Table 52: Lakes-based Elevators

Port	Elevator Type	Elevator	Cap./Tonne
Thunder Bay	Terminal Elevators	Cargill Limited	176,020
		James Richardson International Limited	210,030
		Mission Terminal Inc.	121,240
		Parrish & Heimbecker, Limited	40,800
		Saskatchewan Wheat Pool Inc. o/a Viterra 7	362,650
		Saskatchewan Wheat Pool Inc. o/a Viterra S	167,000
		Saskatchewan Wheat Pool Inc. o/a Viterra A	231,030
		Western Grain By-Products Storage Ltd.	30,000
		Total all terminal elevators	**1,338,770**
	Process Elevator	Canada Malting	62,800
Owen Sound	Transfer Elevator	The Great Lakes Elevator Company Limited	106,420
Goderich	Transfer Elevator	Goderich Elevators 2 elevators	140,020
Midland	Process Elevator	ADM Milling	82,743
Sarnia	Transfer Elevator	Cargill Limited	151,000
Windsor	Transfer and Process Elevator	ADM Windsor Grain Terminal	110,410
	Process Elevator	Hiram Walker	14,000
Port Stanley	Transfer elevator	Richardson (Topnotch)	13,500
Port Colborne	Transfer Elevator	Goderich Elevators (Port Colborne Grain)	82,304
	Process Elevator	Robin Hood (closed flour mill)	54,870
	Process Elevator	ADM Milling	61,728
	Process Elevator	CASCO	12,000
Hamilton	Transfer Elevator	James Richardson International Limited	29,300
	Process elevator	Bunge Canada (formerly CANAMERA FOODS)	90,500
Prescott	Transfer Elevator	Corp of Township of Edwardsburg/Cardinal	154,020
Cardinal	Process Elevator	CASCO	13,300

Source: Canadian Grain Commission, Greenwood's and company websites

As with other bulk industries, turnover is as important as storage capacity. At Thunder Bay, grain is forwarded by rail to St Lawrence River ports during the close of navigation which makes access to more than one mode of transport particularly significant for the continued movement of bulk products. Much of the grain destined for St Lawrence River transfer elevators goes to elevators that are not connected to the mainline rail system. For these elevators there is no alternative to marine transport.

Also, some facilities, CASCO and Bunge at Hamilton for example, are not based on the traditional western grains. CASCO processes corn brought in by water, mostly from US origins. Bunge at Hamilton processes canola and soybeans. The canola can be of western or Ontario origin while the soybeans can be of Ontario or US origin. The non-Ontario crops tend to be brought in by water.

As with the other industries listed above, marine transport is essential for the large volume of goods to be moved. Unlike other raw materials, grain is not low valued but it does sell and move on very low margins. Accordingly, the cost of transport is extremely important.

5.0 Carrier Industry

5.1 Domestic carrier industry

The domestic carrier industry which is active in the Great Lakes, comprises six companies that are members of the Canadian Shipowner's Association (CSA), as well as several others which provide niche services on the Lakes.

Domestic carriers that are active on the Great Lakes include:

- Algoma Central Corporation;
- Canada Steamship Lines;
- Groupe Desgagnes;
- Seaway Marine Transport;
- Upper Lakes Group;
- McKeil Marine;
- Purvis Marine Ltd.;
- Voyageur Marine Transport;
- Lower Lakes Shipping (Rand Logistics);
- Fettes Shipping Inc.;
- Great Lakes Feeder Line; and
- Detroit-Windsor Ferry.

The Canadian Shipowner's Association (CSA) is comprised of just six companies that carry on the vast majority of Canadian domestic shipping on the Great Lakes and St Lawrence Seaway. Some shipping operations are also carried out by its members in the St Lawrence River, the Gulf of St Lawrence and in Atlantic Canada.

Members include:

- Algoma Tankers;
- Canada Steamship Lines;
- Groupe Desgagnes;
- Rigel Shipping;
- Seaway Marine Transport; and
- Upper Lakes Group.

In terms of tonnages handled by CSA members, this amounted to 60.9 million tonnes in 2007, a decline of 3.7 million tonnes over the previous year. Main commodities carried included:

Table 53: CSA Tonnage Handled, 2007

Commodity	Tonnage (millions of tonnes)
Iron ore	16.570
Coal	12.070
Limestone	7.380
Salt	6.940
Grain	5.910
Tanker products	5.700
coke	1.150
Cement	0.977
General cargo	0.769
Potash	0.374
TOTAL	57.84

Source: Canadian Shipowner's Association

The CSA fleet has declined in the past 10 years, from 1.399 million grt and 89 vessels in 1998, to 1.097 million grt and 68 vessels in 2007, as follows:

Table 54: CSA Fleet, 1998-2007

Year	1998		2007	
Vessel type	**Number**	**Grt**	**Number**	**Grt**
Bulkers	34	571,709	18	330,383
Self-unloaders	34	685,931	31	628,654
Tankers	5	66,108	12	81,101
Other	5	75,846	8	87,527
TOTAL	89	1,399,594	68	1,097,477

Source: Canadian Shipowners' Association

The composition of the fleet by owners (or operators like Seaway Marine) as of 2007 was as follows:

Table 55: Canadian Shipowners' Association

Member	Bulkers	Self-unloaders	Tankers	Other	Total
Algoma			4		4
CSL	4	10			14
Desgagnes	2		4	5	11
Oceanex				3	3
Rigel			3		3
Seaway Marine	12	21			33
Total	**18**	**31**	**11**	**8**	**68**

Source: Canadian Shipowners' Association

Oceanex recently left the CSA, so its three vessels would be removed from an updated list.

Several carriers commented that their fleet had been reduced to eliminate obsolete, long-tied-up ships rather than changes in traffic levels. They also stated that they have on-going programs or plans to update the existing fleet.

The Chamber of Maritime Commerce encompasses domestic and international carriers, ports, shippers, terminal operators, the Seaway, marine services, and industry associations. It has several carriers in common with the CSA and Ontario Marine Transportation Forum.

5.1.1 Domestic carriers

Algoma Central Corporation

Algoma Central Corporation (www.algonet.com) is listed on the Toronto Stock Exchange (ALC) and is the largest Canadian shipowner on the Great Lakes – St Lawrence waterway. In 2007 the company had revenues of C$580 million and employs approximately 1,400 people.

Algoma Central has deep roots in Canada, having been incorporated as Algoma Central Railway Company in 1899. The company operates throughout the Great Lakes and the Gulf of St Lawrence. Its fleet consists of 29 vessels, including 14 self-unloaders, five bulkers and six tankers.

Figure 16. MV *Peter Cresswell*

Source: www.algonet.com

The Algoma Central Group owns Algoma Shipping Inc., Algoma Tankers, Algoma Tankers International Inc., Fraser Marine & Industrial, Algoma Central Properties and a share of Seaway Marine (with Upper Lakes) and Marbulk (with CSL).

Seaway Marine operates 33 vessels, including 12 bulkers and 21 self-unloaders. Algoma itself owns 19 Canadian-flag dry bulk vessels (see Table 56). Algoma also manages a fleet of six product tankers. At present, *Algobay* is undergoing and forebody replacement and complete refurbishment at a Chinese shipyard. *Algoport* is slated for a similar forebody replacement and refurbishment in 2009-10.

In March 2008, Algoma announced it had agreed to purchase three 1986- and 1987-built ocean-going, handy-sized bulk carriers from Viken Shipping of Bergen, Norway. They are of 34,000 tonnes capacity with four cranes and have been under long term charter with Fednav. After those charters expire, they will be re-flagged as Canadian vessels, assuming market conditions warrant.

Algoma's subsidiary, Algoma Tankers Limited owns and operates six Canadian flag tankers, including two new vessels, *Algonova* and *Algocanada,* built in 2008 in Turkey. The addition of these two vessels brings Algoma's total investment in domestic tanker modernization and fleet renewal to nearly $200 million. The fleet transports petroleum products throughout the Great Lakes/St Lawrence region.

The company has entered into an agreement to buy five double-hulled IMO II petroleum product tankers built in China which will be delivered between late 2010 and early 2011. These ships will trade in the Mediterranean, Middle East and Asian markets as part the Hanseatic Tankers pool, joining Algoma's existing international tanker, *Algoma Hansa.*

Figure 17. MV *Algosea* Tanker

Source: www.algonet.com

Vessels owned by Algoma Central Corporation include:

Table 56: Vessels owned by Algoma Central Corporation

Vessel	Built	Grt	Dwt
Domestic Self-Unloaders[1]			
Henry Jackman	1981	19,699	32,254
John B. Aird	1983	22,881	30,958
P.R. Cresswell	1982	19,853	32,600
Agawa Canyon	1970	16,290	25,045
Algoway	1972	16,167	25,146
Algolake	1977	22,852	33,600
Algomarine	1968	18,339	26,220
Algoport	1979	20,223	31,970
Algorail	1968	16,157	23,320
Algosoo	1974	21,716	31,574
Algosteel	1966	18,424	28,754
Algowood	1981	22,021	31,355
Algobay	1978/1995	7,731	35,028
Sauniere	1969/1976	16,522	24,993
Domestic Bulk Carriers[1]			
Algocape	1967	17,822	29,709
Algoisle	1963	18,127	27,199
Algonorth	1971/1977	18,496	28,481
Algontario	1959	18,883	28,591
Tim S. Dool	1967		31,737
Domestic Product Tankers			
Algoeast	1977	7,886	9,657
Algosar	1978	6,596	10,099
Algoscotia	2004	13,352	18,610
Algosea	1998	11,290	16,175
Algonova	2008		11,240
Algocanada	2008		11,240
International Product Tankers			
Algoma Hansa	1998		16,175
International Self-Unloaders			
Algoma vessels			
Bahama Spirit	1995		43,789
Hon H. Jackman	1981/2007		74,000
Marbulk Self-Unloaders[2]			
Pioneer	1981	24,113	37,448
Ambassador	1983	24,094	37,263
Nelvana	1983	44,340	74,974
Eastern Power	1989	36,540	68,433
Weser Stahl	1999	28,564	47,257
International Geared Bulkers			
Algoma Discovery	1987		35,542
Algoma Guardian	1987		35,542
Algoma Spirit	1986		35,500

[1] operated by SMT
[2] 50% owned by Algoma and 50% owned by CSL

Canada Steamship Lines

Canada Steamship Lines (CSL) (www.csl.ca) was founded in 1845. It is headquartered in Montreal and has offices in Halifax, Burlington (Ontario), and Winnipeg, as well as several locations worldwide. The company has a significant presence on the Great Lakes and internationally. It employs about 700 people, of whom 500 are involved in domestic operations. CSL annually handles 30 million tonnes of bulk cargo movements in both foreign and domestic operations.

CSL owns 10 self-unloaders, four gearless bulkers, and has an additional four ex-Fednav vessels that are being introduced into its fleet. It also has two full ocean class bulkers and five Nova Scotia-class vessels, of which two are bulkers and three are self-unloaders.

In the late 1990's and early part of this decade, CSL invested about $250 million in substantially rebuilding five vessels: CSL *Assiniboine*, CSL *Tadoussac*, CSL *Laurentian*, *Rt. Hon Paul J. Martin*, and CSL *Niagara.*

Figure 18. CSL *Laurentian*

Source: www.csl.ca

Domestically, CSL handles about 650,000 tonnes between Atlantic Canada and St Lawrence ports and a further 5.4 million tonnes to and from Ontario ports. Cargoes include iron ore, grain, limestone, cement, gypsum and salt.

Table 57: CSL Domestic Self-unloader Fleet

Vessel	Built	Grt	Dwt
Atlantic Erie	1985	24,300	38,960
Atlantic Huron	1984	22,748	36,920
CSL *Assiniboine*	1977/2005	23,445	33,309
CSL *Laurentian*	1977/2001	24,024	36,674
CSL *Niagara*	1977/2006	23,445	34,938
CSL *Tadoussac*	1969/2001	30,132	30,132
Frontenac	1968	17,808	26,326
Halifax	1963	20,646	29,283
Nanticoke	1980	21,870	35,686
Rt Hon Paul J. Martin	1973/2000	23,989	35,439

Table 58: CSL Domestic Bulk Ships

Vessel	Built	Grt	Dwt
Cedarglen	1959	18,531	28,591
Pineglen	1985	20,370	32,713
Spruceglen	1983	22,388	36,251
Birchglen	1983	22,388	36,249

Figure 19. MV *Spruceglan* at Beauharnois, Quebec

Source: www.csl.ca

Upper Lakes Shipping

Upper Lakes Group (www.upperlakes.com) includes three separate shipping operations: Upper Lakes Shipping (ULS), Seaway Marine Transport (SMT) and McAsphalt Marine Transportation (MMTL).

Its fleet of eight self-unloaders and eight gearless bulk ships operate in a pooling partnership with Algoma Central via SMT.

Figure 20. Canadian Enterprise

Source: www.seawaymarinetransport.com

ULS also operates, through a subsidiary, Provmar Fuels Inc., an 8,600 tonne tanker, MT *Hamilton*, providing bunker fuel to larger vessels in the Port of Hamilton.

In 2001, ULS took delivery of an 11,000 tonne tug-barge unit, operated by McAsphalt Marine Transportation, a joint venture between ULS and McAsphalt Industries Ltd. This vessel carries asphalt and black oils.

ULS has a short sea shipping subsidiary, MarineLink, which acquired a heavy lift barge in October 2008. It has been renamed *MarineLink Explorer* and will be utilized for over-sized and over-weight cargoes on the Great Lakes and east coast. The vessel is 3,000 Tonnes with 2x 219 tonne cranes, with 1,000 tonne bow ramp and 80 tonne capacity stern ramp. ULS has indicated an interest in pursuing short sea shipping opportunities through MarineLink and has developed a five-year plan for the sector.

The Upper Lakes Group has a number of other subsidiaries in the dry bulk logistics sector, marine and industrial services, liquid bulk logistics and real estate.

Canadian-flag bulk vessels owned by Upper Lakes Shipping and operated by SMT are shown in Table 59 on the following page.

Table 59: Upper Lakes Shipping Canadian-Flag Bulk Vessels

Vessel	Built	Grt	Dwt
Domestic Self-Unloaders [1]			
James Norris	1952	12,962	19,583
Canadian Transfer	1965	11,120	26,499
John D. Leitch	1967	22,080	31,091
Canadian Navigator	1967	18,788	32,279
Canadian Progress	1968	21,435	31,751
Canadian Olympic	1976	22,887	31,250
Canadian Transport	1979	23,399	34,066
Canadian Enterprise	1979	23,395	33,938
Domestic Gearless Bulkers [1]			
Montrealais	1962	17,647	27,840
Quebecois	1962	17,647	27,840
Canadian Provider	1963	17,873	27,362
Canadian Prospector	1964	18,527	30,627
Canadian Leader	1967	18,045	28,398
Canadian Ranger	1967	16,358	26,250
Gordon C. Leitch	1968	19,160	28,824
Canadian Miner	1968	17,831	28,094

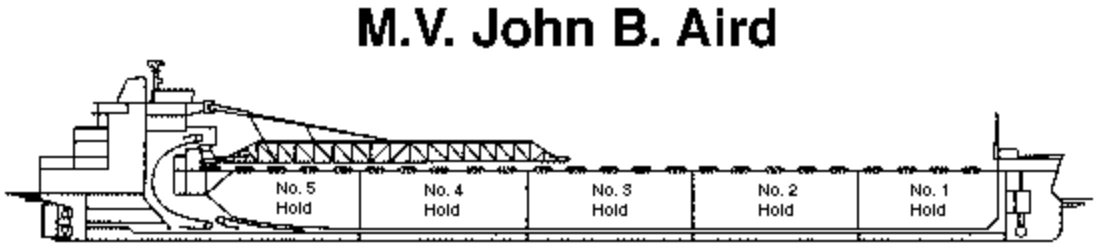
[1] Operated by Seaway Marine Transport (SMT)

Seaway Marine Transport

Seaway Marine Transport (SMT) is a partnership between Algoma Central Corporation and Upper Lakes Group Inc. After operating as Seaway Bulk Carriers and Seaway Self-Unloaders from 1990 and 1994 respectively, it became Seaway Marine Transport in 2000.

SMT manages the dry bulk fleets of Algoma and ULS, the largest fleet of self-unloading and gearless bulk ships in the Great Lakes/St Lawrence region. At the end of 2007, it was the operator and manager of 12 bulkers and 21 self-unloaders. The vessels operated by SMT are listed in Table 56 and Table 59.

Figure 21.



Source: www.seawaymarinetransport.com

SMT's fleet capacity ranges from 18,000 to 34,000 tonnes. The company also charters in vessels, including US flag ships.

Groupe Desgagnes

Groupes Desgagnes operates in the St Lawrence–Great Lakes and the Canadian Arctic with dry cargo vessels, carrying bulk products, heavy lift cargoes, containers and general cargo. It is privately-held, and operates 16 vessels, has 800 employees and (according to its web site) annual turnover of approximately $160 million.

The company operates seven subsidiary companies, including:

- Desgagnes Transarctik Inc.;
- PetroNav;
- Relais Nordik;
- Transport Desgages Inc.;
- Service Desgagnes Inc.;
- Navigation Desgagnes Inc.; and
- Tessier Ltee.

PetroNav Inc. operates petroleum/chemical tankers on the Great Lakes and in the Canadian Arctic. Its vessels carry crude oil, refined oil, petroleum, chemicals and asphalt. Vessels include:

Table 60: PetroNav Inc. Vessels

Vessel	Built	Grt	Dwt
Petrolia Desgagnes	1975	5,793	9,712
Thalassa Desgagnes	1976	5,746	9,748
Vega Desgagnes	1982	8,806	11,548
Maria Desgagnes	1998	8,848	14,335
McLeary's Spirit	n/a	n/a	n/a
Sarah Desgagnes	2007	11,711	

On 5 December 2008, it was announced that PetroNav had acquired three previously-chartered double-hulled tankers owned by Rigel Shipping of Shediac, New Brunswick. The vessels will continue to be managed by Rigel until April 2009. These vessels include:

Table 61: Rigel Shipping Tankers

Vessel	Built	Grt	Dwt
Diamond Star	1992	6262	10,511
Emerald Star	1992	6262	10,511
Jade Star	1993	6262	10,511

Figure 22. MV *Sarah Desgagnes*

Source: www.groupedesgagnes.com

Relais Nordik operates the *Nordik Express*, a passenger/cargo vessel from Rimouski on the south shore of the St Lawrence across to 12 communities on the north shore of the Gulf of St Lawrence and Straits of Belle Isle, as far as Blanc Sablon. The vessel is a converted offshore supply boat, of 1,619 dwt, 69.69 metre loa, and 200 passenger capacity, equipped to carry some autos and container/general cargo.

Figure 23. MV *Nordik Express*

Source: www.groupedesgagnes.com

Navigation Desgagnes both markets and charters vessels carrying dry goods and general cargo in the St Lawrence/Great Lakes and Seaway region. Cargoes include:

- grain, salt, cement;
- coal, steel, pig iron;
- containers, heavy machinery;
- project cargo;
- paper, pulp, lumber; and
- aluminum.

Desgagnes Transarctik operates from the St Lawrence/Great Lakes region into the eastern Arctic. Vessels, most of which were built overseas and re-flagged, include:

Table 62: Desgagnes Transarctik Vessels

Vessel	Built	Grt	Dwt
Nordik Express	1974	1,748	1,372
Amelia Desgagnes	1976	4,433	7,126
Anna Desgagnes	1986	15,893	17,850
Camilla Desgagnes	n/a	n/a	n/a
Catherine Desgagnes	1961	5,691	8,395
Cecilia Desgagnes	1971/1974	5,756	8,148
Melissa Desgagnes	1976	4,412	7,405
Rosaire Desgagnes	n/a	n/a	n/a
Zelada Desgagnes	n/a	n/a	n/a

Source: Groupe Desgagnes

Figure 24. MV *Melissa Desgagnes*

Source: www.groupedesgagnes.com

The vessels listed above and under the PetroNav brand are also used by Transport Desgagnes. In all, the Group has 12 vessels and one barge, with total deadweight tonnage ranging from 1,350 to 17,850 tonnes. Average annual volume shipped is 3.5 million tonnes, over a wide range of ports in eastern North America.

The company is in the process of renewing its fleet. In the past year, Groupe Desgagnes has taken delivery of three new vessels, two of which were newly-built in China. A third vessel, *Sarah Desgagnes,* was built in Turkey in 2007 and purchased by Desgagnes in June 2008.

McKeil Marine

McKeil Marine of Hamilton (www.mckeilmarine.com) is an industry leader in the transportation of project cargo on the Great Lakes. The company has a barge fleet of 60 units, ranging in size from 500-18,000 dwt. It has 25 tugs ranging in size from 1,000 bhp to 6,000 bhp. A number of tugs are ice-reinforced to provide ice-breaking and ice escort service.

Amongst other services, McKeil Marine operates a short sea service, carrying aluminum ingots for Alouette Aluminière, with a purpose-built tug-and-barge between Sept-Îles and Hamilton.

Figure 25. *Alouette Spirit*

Source: www.mckeil.com

Rand Logistics Inc.

In March 2006, the US publicly-traded Rand Logisttics acquired Lower Lakes Towing and affiliates Grand River and Lower Lakes Transportation. In the fiscal year which ended at 31 March 2008, it had revenues of US$94.7 million.

Rand specialises in dry bulk shipping in the Great Lakes/St Lawrence region. It has seven Canadian flag and five *Jones Act*-compliant US vessels. The fleet was augmented with three 1970's vintage vessels (*David Z Norton, Earl W Olgebay, Wolverine*), acquired from Wisconsin and Michigan Steamship Company in 2008. Rand's vessel sizes range from 17,000 tonnes to full Seaway-max.

Rand Logistic's Canadian-flag fleet consists of the vessels in Table 63 below.

Table 63: Rand Logistics Canadian-Flag Vessels

Vessel	Built	Grt	Dwt
Mississagi	1943	10,588	n/a
Cuyahoga	1943	10,532	15,850
Michipicoten	1952	15,366	n/a
Ojibway	1952	12,296	n/a
Saginaw	1953	14,066	19,390
Rob't Pierson	1974	12,792	n/a
Kaministiqua	1983	22,388	34,500

Source: Greenwood's & www.randlogistics.com

Voyageur Marine Transport Ltd

In 2007, Voyageur Marine sold two vessels, *Voyageur Pioneer* and *Voyageur Independent,* to Lower Lakes Towing, which had itself been acquired by Rand Logistics. The company founders retained an interest in the vessel *Maritime Trader* but the vessel is now marketed under a contract of affreightment by Rand Logistics.

Maritime Trader was built in 1967, is 10,901 grt and 17,893 dwt.

Figure 26. *Maritime Trader*

Source: www.voyageurtransport.com

Purvis Marine Ltd

Purvis Marine operates tug/barge and vessel movements of bulk goods (e.g. coiled and slab steel), liquid bulk (e.g. coal tar oil), project cargos (e.g. over-sized machinery) and scrap steel. It also provides marine towing, ship salvage and ship chartering on a demand basis.

Commodities and tonnage include:

- Coiled Steel – 272,000 tons (seven months to July 2008) total year est. to be 467,000 tons to ports of Detroit/Windsor, Cleveland and Chicago (Calumet River). About 18,000 tonnes to Thunder Bay during September;

- Slab Steel – 10-15,000 tons est. July/August 2008 to Detroit and Quebec City. No estimate available for remainder of 2008;
- Liquid Bulk (Black Oils) – 132,000 tons through July 2008 – estimate total for 2008 of 297,000 tons to/from ports such as Sault Ste. Marie, Sarnia, Hamilton, Detroit and Toledo; and
- Project Cargos – several in fall of 2008; no estimate of tonnage or destinations.

The firm purchased two used dredge barges in 2008, doing modifications to ice strengthen certain vessels and technology updates of largest tug to fully computerize the vessel. No estimates of costs were provided.

Purvis owns and operates the Pim Street Dock in Sault Ste Marie (a former federal government facility that has been in existence since the late 19th or early 20th centuries). It has a draft of 23 feet, lengths E/W 315 feet – N/S 600 feet and is equipped to handle and transfer bulk petroleum products from vessel to pipeline to bulk terminal storage facilities several kilometres away.

A subsidiary company, Soo Marine Services with about 50-60 staff on call, provides stevedoring services in the region. Purvis has a small dry-dock next to the Essar export dock and provides a full line of ship repairs.

Vessels owned by Purvis Marine include:

Table 64: Purvis Marine Vessels

Vessel	Built	Grt	Dwt	Type
Yancanuck	1963	3,280	4,753	General cargo
Johnson	1916/1961	1,141	n/a	barge
GLB 1	1953	1,870	n/a	barge
GLB 2	1953/1975	1,700	n/a	barge
PML 2501	1980	1,954	n/a	barge
PML 9000	1968	4,285	n/a	barge
PMS Salvager	1944	4,096	n/a	barge
Anglian Lady	1953	459	n/a	tug
Avenger IV	1962	290	n/a	tug
Reliance	1974	708	n/a	tug
Wilfred Cohen	1948	283	n/a	tug

Source: Greenwood's

Fettes Shipping Inc.

Fettes Shipping of Burlington, Ontario, manages and operates two barges, *Sea Eagle II* and *St Mary's Cement II,* on behalf of St Mary's Cement.

Sea Eagle II is 627 tonnes grt and 245 dwt. *St Mary's Cement II* is 11,446 grt and 19,513 tonnes.

Great Lakes Feeder Line

Great Lakes Feeder Line (GLFL) was established in 2007 by the former director of Business Development of the St Lawrence Seaway Management Corp. The company has purchased the *Dutch Runner*, a German-built 221 TEU feeder vessel, on which it has paid the required 25 percent duty. It is attempting to establish a "European-style" feeder service between Halifax and the Great Lakes.

Figure 27. MV *Dutch Runner*

Source: www.glfeederlines.com

Thus far, as of November 2008, it has made one voyage to carry a handful of containers and some project cargo. Immediately afterwards, the company accepted a spot charter to take some cargo to the Canadian north. As of early December, it was reported that the vessel is operating on a non-scheduled basis between Halifax and St Pierre, replacing a previous service operated by Sea Transit, with an identical vessel, *Fort Ross*.

Oceanex

The best and most successful example of short sea shipping in Canada is Oceanex (www.oceanex.com). The company is the product of several amalgamations over many years. After operating as an income trust from 1997, the company was sold in late 2007 to South Coast Partners Inc., led by Capt. Sid Hynes of St John's, NL. The sale value was $165 million, much of which was provided by three equity firms – South Coast Partners, OPTrust Private Markets Group, and Terma Capital Partners Ltd.

Oceanex presently operates three vessels: the 1,004-TEU *Avalon*, and 600-TEU *Cabot* between Montreal and St John's and the 1,200-TEU *Sanderling* between Halifax and St John's. According to its last public financial statements, it carried approximately one half the volume of commercial cargo into and out of Newfoundland.

The service carries a mix of cargo catering to a number of distinct markets. These include autos, trailers, intermodal containers, international transhipment containers and domestic cargo.

The *Avalon* is one of the most innovative vessels of its kind in the world. It is designed to carry a mix of 20 foot and 40 foot international marine containers and 53 foot domestic

containers, which many of its customers have been purchasing, which lends itself to full intermodality between sea, rail and road.

Figure 28. *Oceanex Avalon*

Source: www.marinetraffic.com

Since the purchase by Capt. Hynes, the service has been undergoing some tweaking and the company has invested in three new shore side cranes, two at St John's and one at Corner Brook. One change will see the *Sanderling* drop its return voyage to Halifax via Corner Brook in favour of providing 3x per two-week sailings to and from Halifax. Likewise, the Avalon will return to Montreal via Corner Brook.

As both the *Sanderling* and *Cabot* are aging, the company has been examining the potential to build new vessels. Whether these new vessels are lo-lo or ro-ro, remains to be determined. Its relevance to the Ontario market is the fact that it carries Ontario-origin cargo over the road to Montreal, where it is loaded onboard their vessels. About 40 percent of the cargo carried on the Montreal service is Ontario-origin, with the rest from Quebec and the US.

5.1.2 US carriers

Lake Carrier's Association

Another organization, the Lake Carrier's Association, represents the US fleet, comprising 16 member corporations and 63 US-flag vessels with operations exclusively on the Great Lakes. These vessels range in size from 383 to 1,013.5 feet. Major commodities carried include: iron ore, stone, coal, cement, sand, salt and grain. Most cargo is carried between US ports, in *Jones Act* trades.

Some vessels, at 1,000 feet long, are too large to negotiate the Seaway locks and are restricted to just the upper lakes. The Lake Carriers' fleet consists of the following vessels:

Table 65: Lake Carrier's Association Fleet, 2007

Member	Number of Vessels	Mid-Summer Capacity (net tons)
American Steamship Company	16	664,215
Andrie, Inc.	4	35,200
Armstrong Steamship Company	1	68,757
Bell Steamship Company	1	44,308
Central Marine Logistics, Inc.	4	109,200
Grand River Navigation Company, Inc.	6	97,578
Great Lakes Fleet/Key Lakes, Inc.	8	361,385
Inland Lakes Management, Inc	1	15,265
The Interlake Steamship Company	8	351,346
KK Integrated Logistics	4	50,325
Lake Michigan Carferry Service, Inc. (a)	1	N/A
Lakes Shipping Company, Inc.	2	61,892
Pere Marquette Shipping Company.	2	5,750
Soo Marine Supply, Inc. (b)	1	N/A
Upper Lakes Towing Company, Inc.	2	23,744
VanEnkevort Tug & Barge, Inc.	2	44,800
Totals	**63**	**1,933,765**

Source: www.lakecarriers.com

Total tonnage handled by the Association's vessels over the past six years is illustrated below:

Table 66: Lake Carriers' Association
US-Flag Dry-Bulk Cargo Carriage on the Great Lakes
Calendar Years 2002-2007 and Five-Year Average (net tons)

Commodity	2002	2003	2004	2005	2006	2007	Average 2002-2006
Iron Ore							
Direct Shipments	45,861,075	41,343,509	48,265,017	43,884,572	45,850,298	45,049,721	45,040,894
Transshipments*	2,334,252	1,672,776	2,936,493	2,687,547	3,121,814	2,156,662	2,550,576
Total - Iron Ore	**48,195,327**	**43,016,285**	**51,201,510**	**46,572,119**	**48,972,112**	**47,206,383**	**47,591,471**
Coal - Lake Of Loading							
Lake Superior	13,874,872	14,238,033	15,459,399	17,429,479	17,180,114	16,692,347	15,636,379
Lake Michigan	2,239,657	2,771,065	3,727,681	3,760,477	3,161,804	2,718,874	3,128,186
Lake Erie	5,629,302	4,870,328	5,448,625	6,017,394	5,018,195	5,759,408	5,351,448
Total - Coal	**21,743,831**	**21,879,426**	**24,635,705**	**27,207,350**	**25,360,113**	**25,170,629**	**24,116,014**
Limestone	26,554,243	24,239,110	29,523,489	27,935,513	29,489,410	25,966,057	27,615,883
Cement	3,817,911	3,851,487	3,965,401	3,892,822	3,997,703	3,602,488	3,910,465
Salt	587,090	945,355	1,032,109	1,187,777	1,126,862	1,241,297	975,839
Sand	230,950	500,456	389,355	461,813	429,411	449,474	422,397
Grain	329,471	312,316	367,785	403,055	356,143	404,873	353,954
Totals	**101,458,823**	**94,744,435**	**111,115,354**	**107,660,449**	**109,731,754**	**104,041,201**	**104,986,022**

Source: www.lakecarriers.com

SMT (USA)

SMT USA is a wholly owned subsidiary of SMT Canada. SMT USA owns 25 per cent of Laken Shipping, and charters its 10,200 barge and 5,000 bhp tug, *Cleveland Rocks*, to service a long term contract with Lafarge North America.

5.2 International Carriers

Fednav Limited

Fednav Limited is Canada's largest international flag shipping company. It is a private company owned by the Pathy family of Montreal.

It is primarily involved in transporting bulk and break bulk cargoes around the world. While based in Montreal, it also has offices in London, Tokyo, Antwerp, Hamburg, Brisbane and Rio de Janeiro.

Fednav International Ltd. transports over 25 million tonnes of dry bulk, steel and general cargo annually, averaging about 700 voyages. Two-thirds of its voyages are to and from the Great Lakes. About 6 million tonnes are carried to and from the Great Lakes, about 25 percent of which involve Ontario ports. Another 7-8 million tonnes are carried into and out of St Lawrence ports.

Figure 29. MV *Federal Margaree*

Source: *Fednav Current*, September 2008

Fednav operates eight subsidiary companies, including:

- Fednav Limited;
- Fednav International Ltd.;
- Falline;
- Federal Marine Terminals, Inc.;
- Fednav Direct;
- Canarctic;
- Enfotec; and

- Agro-Hall.

The company operates a combination of owned and chartered vessels, totalling about 85 ships. As of January 209, the company listed 21 owned vessels on its web site. Two vessels are Canadian-flag, while the balance are foreign registered. The two Canadian-flag vessels are also the oldest (1978) and youngest (2006) of the company-owned fleet. The average age of the owned fleet is 12 years and their average size is 34,389 dwt. Most of these vessels can transit the Seaway and all but three are ice class.

Fednav's chartered fleet consists of 64 vessels. Their average age is 11, and the average size is 38,220 dwt. A little more than one half of this fleet is ice class vessels. Many are not able to transit the Seaway, but most are handy sized and able to do so.

Fednav also operates a semi-liner service called Falline between ports in northern Europe and the St Lawrence–Great Lakes, carrying all types of steel inbound and either forest products or grain outbound. Ports in northern Europe include Antwerp, Bremen, and Gdansk. Great Lakes ports are Contrecoeur, Montreal, Milwaukee, Burns Harbor, Hamilton, Cleveland, and Detroit.

Fednav is able to offer door-door service, with its two subsidiaries, Federal Marine Terminals and Fednav Direct.

Fednav has another subsidiary, Canarctic Shipping, which mainly operates from St Lawrence ports to the Canadian arctic and Labrador. Vessels include MV *Umiak*, which carries nickel between Voisey's Bay and southern Canada, and MV *Arctic*.

CSL International

CSL International has offices in Montreal, Boston, Australia, and Singapore. The company owns 15 vessels, which are all self-unloaders; it also partly owns another 13 vessels. These vessels are a mix of Panamax (60,000-75,000 tonnes) and handy size (30,000-45,000 tonnes).

These vessels do not trade beyond Sorel. They basically transport coal and iron ore to and from the St Lawrence, and cargoes such as gypsum, stone and coal to and from Atlantic Canada.

The international division is increasingly on both east and west coasts of North America, the Caribbean, South America, the Far East and Australia.

In 2000, CSL acquired a 50 percent interest in Marbulk, which is now under the commercial management of CSL. (Vessels themselves are managed by V. Ships.)

Figure 30. CSL *Balder* Discharging at Sydney, NS

Source: CSL International, www.csl.com

CSL International operates ships with pool partners Oldendorff, Marbulk and Torvald Klaveness Group, with each providing vessels. Average size is 53,900 dwt tonnes, and average age is 16 years, with the oldest being built in 1971 and the youngest in 2007.

According to partner Algoma Central Corp., the CSL International commercial arrangement (CSLI) has experienced very strong demand for the past few years, particularly for shipments of gypsum, aggregates and coal.

Canfornav

Canfornav was established in 1975 as a division of Canadian Forest Navigation Ltd. It is one of the largest international carriers on the Great Lakes. Its main trading routes are as follows:

- Argentina/Brazil;
- Black Sea/Mediterranean;
- Chile/Peru;
- North Europe/Baltic;
- Far East;
- Mexico/Venezuela; and
- St Lawrence Seaway.

Figure 31. Canfornav Vessel Passing Windsor, ON

Source: canfornav.com

About 40 percent of Canfornav's voyages involve trades in and out of the St Lawrence/Great Lakes. Its vessels specialize in the pulp and paper trade, but also carry grain, fertilizers, minerals, steel, sugar, and metals. Its 30 vessels range in size from 15,000-40,000 dwt.

In 2002, Canfornav had negotiated an Ocean Shipping Partnership with Noranda Mines, to ship 300,000 tonnes of zinc and bulk concentrates from Eastern Canada to Europe and the Mediterranean. It also has a three year contract with Noranda in Peru to export 350,000 tonnes per year of concentrates from the new Antamina copper mine to Noranda smelters in Canada, as well as 200,000 tonnes per year with Chile's Collahuassi mine for delivery to Falconbridge smelters in Canada.

In the early part of the decade, Canfornav embarked on a new building program, which saw 4x 27,000 dwt lakers built in China. Another 4x 37,000 dwt lakes-suitable vessels were delivered in 2007. It entered long term charters on five other new builds, with German and Hong Kong partners. A total of 16x 31,000 dwt lakes-suitable bulk carriers were ordered from three different Chinese shipyards in 2006, for delivery in 2008/09/10. The vessels are all managed from Montreal.

The average age of Canfornav's 24-vessel fleet is 11 years and the average size is 31,838 dwt. The oldest vessel was built in 1984 and the youngest in 2008. All of Canfornav's vessels are capable of transiting the Seaway.

Cement Carriers

The following vessels are cement carriers that are owned directly by Canadian companies.

Table 67: Canadian Cement Carriers

Essroc Canada Inc., Mississauga, ON (managed by Upper Lakes Group, Inc.)				
Metis (barge)	331'00"	43'09"	26'00"	5,800 tons
Stephen B. Roman	488'09"	56'00"	35'06"	7,600 tons
Lafarge Canada Inc., Montreal, QC (managed & operated by Canada Steamship Lines, Inc.)				
English River	404'03"	60'00"	36'06"	7,450 tons
St. Marys Cement Inc., Toronto, ON				
Sea Eagle II (articulated tug mated with barge *St. Marys Cement II*)	132'00"	35'00"	19'00"	7,000 bhp.
St. Marys Cement II (barge)	496'06"	76'00"	35'00"	19,513 tons
St. Marys Cement III (barge)	335'00"	76'08"	17'09"	4,800 tons
Great Lakes & International Towing & Salvage Co. Inc., Burlington, ON (chartered to St. Marys Cement Inc.)				
Petite Forte (tug mated with barge *St. Marys Cement*)	127'00"	32'00"	14'06"	5,000 bhp.
St. Marys Cement (barge)	360'00"	60'00"	23'03"	9,400 tons

Source: www.boatnerd.com

5.3 Ferry and passenger services

5.3.1 Ferry services

There are a number of ferry and passenger services in Ontario:

- Detroit-Windsor truck ferry;
- Kingston area ferry services;
- Owen Sound Transportation Company (operating three services);
- Toronto-Rochester ferry service; and
- other ferry services.

Detroit-Windsor truck ferry

The Detroit-Windsor truck ferry crosses the St Clair River from 0700-1600 hours, Monday to Friday. The service specializes in carrying hazardous cargo, which is not allowed in the Detroit-Windsor Tunnel or on the Ambassador Bridge. This is the primary raison d'être for

the ferry service, although the company would like to expand service. In so doing, it would have to pay the full cost of extra Customs overhead.

Kingston area ferry services

In terms of overall passenger volume, the seven services in the Kingston area carry the most passengers and vehicles. These services receive financial support from Ministry of Transport Ontario.

Figure 32. Kingston Area Ferry Services

Source: Ministry of Transport Ontario

Data is available for 2002 and 2006:

Table 68: Kingston and Area Ferry Services

Year	Passengers	Vehicles
2002	1,392,855	832,282
2006	1,527,784	663,934

Source: Shippax Market Report, 2008

Figure 33. *Wolfe Islander III*

Source: www.mto.gov.on.ca

The *Wolfe Islander III* is 61 metres in length and carries 55 cars. The two Glenora ferries, *Quinte Loyalist* and *Glenora* have capacity for 21 cars each and are 38.7 metres in length.

A seasonal service, May-October, operates from Wolfe Island to Cape Vincent, New York.

Owen Sound Transportation Company

The Owen Sound Transportation Company was a wholly-owned subsidiary of Ontario Northland Transportation Commission from 1974-2002. In 2002, it was separated from Ontario Northland and is now a stand-alone Operational Enterprise Agency of the Province of Ontario. It operates three ferry services:

- South Baymouth-Tobermory;
- Leamington/Kingsville/Pelee Island-Sandusky, OH; and
- Walpole–Algonac ferry.

South Baymouth-Tobermory – This service, which sails from Tobermory on the Bruce Peninsula to South Baymouth on Manitoulin Island, is operated on a seasonal basis using the 1974-built *Chi-Cheemaun.* This vessel carries 638 passengers and the equivalent of 140 autos.

In 2003-04 the company received operational subsidies and capital of $650,000 and $500,000, respectively. In 2006-07, traffic carried on the service in amounted to the following:

Table 69: South Baymouth-Tobermory Ferry Traffic, 2006-07

Year	Passengers	Autos	Trucks
2007	221,710	68,566	1,862
2006	213,852	67,040	1,574

Source: Shippax Market Report, 2008

Leamington/Kingsville/Pelee Island-Sandusky, OH – Owen Sound Transportation Company also provides seasonal service between Leamington/Kingsville/Pelee Island and Sandusky, Ohio, using two vessels, the 1992-built MV *Jiimaan*, and the *Pelee Islander*. *Jiimaan* has capacity of 400 passengers and 40 autos. *Pelee Islander* was built in 1960 and carries 285 passengers and 16 vehicles.

Figure 34. MV *Jiimaan*

Source: Municipality of Pelee Island

From Leamington/Kingsville to Pelee Island, the sailing takes 1.5 hours, and from Pelee Island to Sandusky it takes 1.75 hours.

Total traffic carried on the service was as follows:

Table 70: Pelee Island Ferry Service Traffic, 2006-07

Year	Passengers	Autos	Trucks
2007	93,966	22,819	1,480
2006	90,167	22,548	2,071

Source: Shippax Market Report 2008

Walpole–Algonac Ferry – This ferry service operates across the St Clair River between Walpole Island, Ontario and Algonac, Michigan, using two vessels, with carrying capacity of 12 and six autos, respectively. The crossing takes six minutes and the service operates every 15 to 20 minutes.

Figure 35. Walpole–Algonac Ferry

Source: www.walpolealgonacferry.com

Toronto–Rochester ferry service

In 2004, an ambitious service was introduced by Canadian American Transportation Systems (CATS) using a fast ferry to link Toronto with Rochester, NY. A new USD $40 million, 774 passenger, 238 auto, 40 knot vessel was built by Austal Ships in Australia and introduced in the summer of 2005. It was expected to reduce travel time between the two cities to 2.5 hours compared with at least 268 km of driving and three hours to drive around.

In September 2004, the service was withdrawn after a mere 80 days, even though it had carried an impressive 140,000 passengers since its inauguration. The operator cited the cost of debts incurred by a delayed start-up, as well as costs for pilotage and customs services, and delays in terminal construction at Toronto. The vessel was eventually sold to the City of Rochester for US$32 million, and managed for them by Bay Ferries of PEI. After incurring

losses estimated at US$10 million, the service was finally withdrawn in September 2006 and the ship sold at auction to Euroferries for US$29.8 million.

Table 71: Toronto-Rochester Ferry Traffic, 2004-05

Year	Passengers
2006	72,721
2005	140,000

Source: Shippax Market Report, 2006

Figure 36. *Spirit of Ontario*

Source: Austal Ships

Other ferry services

Other ferry services operate across the Ottawa River from Lefaivre, Ontario to Montebello (Traverse Lefaivre/Montebello Ltée.) PQ, from Cumberland, Ontario to Masson, PQ and from Fitzroy Harbour (Ottawa) to Quyon, PQ, as well as from Sombra, Ontario to Marine City, Michigan (Blue Water Ferry Ltd.), and across the Abitibi River. These are very small services using very basic vessels.

5.3.2 Cruise shipping on the Great Lakes

Cruise vacations have been the fastest growing segment of the travel industry for about 20 years, and ships keep getting larger and larger. To illustrate this point, the largest passenger ship in the world, *Oasis of the Seas*, was launched in Turku, Finland in December 2008, and is 220,000 dwt, will carry 5,400 passengers and 3,400 crew members, and sits 16 storeys high.

Ports in eastern Canada have benefited from this boom, with record vessel and passenger visits in 2008. The region participates in five cruise markets:

- New York-Maritimes;
- Canada-New England;
- transatlantic;
- Arctic/expedition cruises; and
- Great Lakes/St Lawrence cruises.

The largest cruise port in the region is Halifax, which hosted 110 vessels and over 220,000 passengers in 2008. Quebec City had 86 calls and 100,000 passengers. Montreal has a modest cruise business, because the newest generation of vessels cannot sail under the Quebec Bridge. In 2008, it handled 25 ships and a modest 32,100 passengers.

Great Lakes/St Lawrence cruises

The Great Lakes/St Lawrence region offers many opportunities for interesting itineraries, and has a small niche in this industry. The largest vessel to cruise in the Lakes has been the 420-passenger *Columbus*, operated by Germany's Hapag Lloyd. It offered three cruises in 2006. This company does not offer a Great Lakes product for 2008-09.

Cruise lines offering Great Lakes/St Lawrence cruises in 2008-09 include:

- Pearl Seas Cruises;
- Great Lakes Cruise Company;
- American Canadian Caribbean Line;
- St Lawrence Cruise Lines Inc.; and
- Cruise Management.

Pearl Seas Cruises

Pearl Seas Cruises is a new company based in Connecticut, which is building two vessels at Halifax Shipyards. The vessels will have capacity for 210 passengers, 101.5 metre loa, 17 metre beam, and have 3.6 metre draft. In 2009, it will offer eight Great Lakes itineraries.

Figure 37. *Pearl Mist*

Source: www.pearlseascruises.com

Three itineraries will call at Ontario ports:

- St Lawrence Seaway and Thousand Islands;
- Great Lakes and Georgian Bay; and
- a third itinerary is one day longer and includes Chicago, Toronto, Windsor, Midland, Parry Sound, Little Current, and Mackinac Island.

Great Lakes Cruise Company

Another company, Great Lakes Cruise Company, will use a small yacht-like vessel, *Clelia II,* to offer 12 Great Lakes cruises, of one week in duration. Itineraries include Toronto, Port Weller, Lakes Erie and Huron, Little Current, Mackinac Island, Houghton, Thunder Bay and Duluth (Figure 38).

Figure 38. Great Lakes Cruise Company Ports of Call

Clelia II was built for Renaissance Cruises in 1990, and carries 100 passengers.

Figure 39. *Clelia II*

Source: www.greatlakescruising.com

American Canadian Caribbean Line

The American Canadian Caribbean Line (ACCL) operates small vessel cruises throughout the Great Lakes, St Lawrence River and Thousand Islands. In 2009, the company will offer six different itineraries, on 28 cruises, using three different vessels. Vessels range in size

from the 53 metre 78-passenger *Niagara Prince*, to the 55.5 metre 100-passenger sister ships, *Grande Mariner* and *Grand Caribe*.

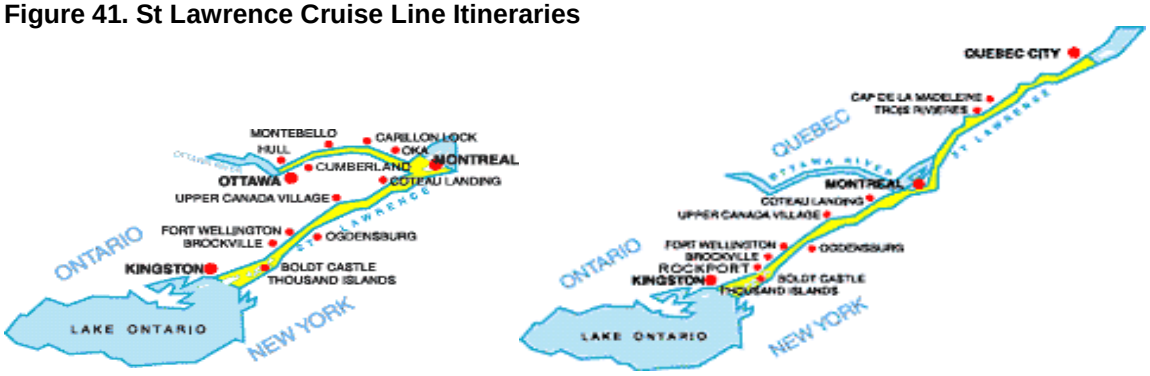
Figure 40. *Grande Mariner*

Source: www.accl-smallships.com

St Lawrence Cruise Lines Inc.

St Lawrence Cruise Lines Inc. operates the MV *Canadian Empress*, a 1981-built replica steamboat. The vessel carries 66 passengers and is 32.0 metres in length, with beam of 9.15 metres and draft of 1.49 metres. It sails three itineraries, which are of three or five nights' duration. In 2008, the company made 28 voyages. Typical itineraries are illustrated in Figure 41 below:

Figure 41. St Lawrence Cruise Line Itineraries



Cruise management

While they have no impact on Ontario ports, several expedition/adventure cruise operators manage their operations from Ontario, and thus have developed considerable expertise in this sector. Their itineraries include the North West Passage, Baffin Island, Greenland, Antarctica, and Labrador. The companies include Quark Expeditions and Adventure Canada.

6.0 Marine Service Industries

When a vessel comes into a port or river system (or indeed, the Seaway), a variety of activities take place related to that simple event. The vessel would have reported to vessel traffic as it made its way along the river or towards the harbour. A small pilot boat (arranged beforehand by the vessel's agent) meets the vessel at the fairway buoy at the entrance to the harbour. (If the vessel has transited a long river passage, it would have taken on a pilot at the beginning of that section.) The pilot guides the vessel into its berth. If it does not have stern or bow thrusters, or if the weather is inclement, the vessel may require tugs. Depending upon the size of vessel, this could be one to four tugs, each of which will have its own crew and requirements.

Depending upon the terms of the longshoring contract, the vessel is tied up by a gang of stevedores. The vessel is boarded by the ship's boarding agent (accompanied by customs inspectors if it was entering the port from a foreign destination). The crew may go ashore and spend money on either personal or ship's provisions. Documentation is handled by the ship's agent, customs broker or freight forwarder. The vessel has to be cleared in and out by the Canada Border Services Agency.

Many of these functions can apply to all types of vessels, including bulk ships (liquid or dry), forest product carriers, cruise ships, or container vessels. Shipping agents can specialize in containers, forest products, car carriers, or bulk shipping, or they can handle all types of vessels. If it needs repairs or supplies, this task can be arranged by the ship's crew or the agent and these purchases would have a local impact.

6.1 Pilotage services

Pilots are often required to guide large vessels (presently over 300 tonnes grt.) into rivers and ports. Pilotage is compulsory for foreign flag vessels in the Seaway and Great Lakes regions.

The Great Lakes Pilotage Authority (GLPA), provides compulsory pilotage services to:

1) Cornwall District (St Lambert lock in Montreal to Snell lock in New York);
2) International District No. 1 (Snell lock to Cape Vincent, New York);
3) Lake Ontario District;
4) International District No. 2 (Welland Canal through St Clair River); and
5) International District No. 3 (all waters above Sarnia-Port Huron).

The GLPA contracts two vessels and employs 62 Canadian pilots, 40 US pilots, seven managers, nine dispatchers and three clerical employees.

6.2 Harbour and port operations

The 19 Canadian Port Authorities created by the *Canada Marine Act* of 1998 include the Ontario ports of Thunder Bay, Hamilton, Windsor, and Toronto. The top 50 ports in Canada handled 447,234 million tonnes of cargo, or 95 ercent of the grand total of 470,109 million tonnes in 2005.

There are different kinds of port management structures, as discussed in Chapter 2.0. However, most of Canada's ports are landlord ports, where the port authority leases terminals or land to terminal operators and then collects rent. People working for port authorities are employed doing marketing, business development, operations, accounting, public relations and clerical functions. They do not generally get involved in actual cargo or vessel operations.

6.3 Cargo handling

Marine cargo handling takes many forms, according to the type of cargo handled: containers, autos, forest products, liquid and dry bulk, palletized cargo. Most cargo-handling in Canada is undertaken by speciality stevedoring companies in terminals specially designed for each commodity. Bulk-cargo terminals, such as those for grain, coal, petroleum, aluminum, etc., are also very specialized and capital-intensive. In the case of container terminals, they are highly capital-intensive and therefore only a very few ports are engaged in this activity. They presently include Vancouver, Montreal, Halifax, Saint John, St John's, and Prince Rupert.

Major stevedoring and marine cargo terminal operating firms in Ontario include:

- Great Lakes Stevedoring;
- Federal Marine Terminals;
- Logistec Inc.;
- Empire Stevedoring Ltd.;
- Thunder Bay Terminals;
- Valley Camp Inc.
- Canadian Grain Trimmers Ltd.; and
- Purvis Marine.

6.3.1 Great Lakes Stevedoring

Great Lakes Stevedoring has two operations in Ontario; one at Hamilton and the other in Thorold. The Hamilton facilities are located at Piers 12 and 14. Pier 26 is used for storing all surplus cargo. In addition to steel, the company handles the loading and unloading of special project cargo including very heavy and oversized pieces of equipment.

At Thorold, located near the Welland Canal, the main activity is to load special project cargo. Equipment used includes a 165-tonne capacity crane and a fleet of lift trucks that can handle payloads of 12,000 lb to 62,000 lb.

The parent company of Great Lakes Stevedoring, Quebec Stevedoring, also has a terminal in Oshawa, Oshawa Stevedoring Inc., which specializes in the transhipment of steel products. It also handles solid bulk and general cargo.

Figure 42 Great Lakes Stevedoring Hamilton Terminal

Source: www.qsl.com

6.3.2 Federal Marine Terminals

Federal Marine Terminals (FMT) is a division of the Fednav group. It leases facilities at the ports of Hamilton and Thorold, which are managed by Great Lakes Stevedoring.

6.3.3 Logistec Inc.

Logistec Inc. is a publicly traded stevedoring company based in Montreal. It has two Ontario facilities, in Toronto and Thunder Bay. The company employs 779 people, 349 in Canada and 430 in the US.

The Toronto terminal has two berths of 600 metres and 213 metres in length, both with shedded areas. It can handle containers, ro-ro, break bulk and project cargo, and has a 270 tonne capacity crane.

Logistec also provides stevedoring services at 13 piers in Thunder Bay, including four general cargo facilities and nine grain elevators.

Figure 43 Logistec Port of Toronto Terminal

Source: www.logistec.com

6.3.4 Empire Stevedoring Ltd.

Empire Stevedoring provides stevedoring service in Toronto and Thunder Bay. The Toronto facility handles plates, coils, beams and rebar, as well as chipboard, heavy lifts, vehicles and other heavy equipment. The company serves the grain industry in Thunder Bay.

6.3.5 Thunder Bay Terminals

Thunder Bay Terminals is a 262 metre berth which handles metallurgical coal for Ontario and international markets, as well as other dry-bulk commodities such as potash, urea and various agri-products. It provides a link between rail and vessel for the movement of low sulphur bituminous and lignite coal from mines in British Columbia, Alberta, and Saskatchewan, destined for Ontario Hydro's thermal generating stations. The site is serviced by road as well as both CP and CN.

6.3.6 Valley Camp Inc.

Valley Camp is a division of Synfuel Technologies LLC. The terminal has two cargo handling areas, with a free flowing dry-bulk transfer system and a dry-bulk handling facility. The facility can accommodate vessels up to 304 metres at its docks, which are 550 metres and 201 metres in length. Valley Camp has outside ground storage for over two million tonnes of cargo and is serviced by road and CN Rail, with CP access via CN switching.

6.3.7 Canadian Grain Trimmers Ltd.

Canadian Grain Trimmers provides stevedoring services to the grain industry in Thunder Bay. Logistec is a shareholder in this company.

6.3.8 Purvis Marine

As discussed in the previous chapter, Purvis Marine also provides stevedoring services in the Sault Ste Marie region.

6.4 Shipbuilding and ship repair

The major shipbuilding and ship repair firms are:

- Upper Lakes Marine and Industrial;
- Fraser Marine and Industrial;
- Heddle Marine Service Inc.; and
- Hike Metal Products.

6.4.1 Upper Lakes Marine and Industrial

Upper Lakes Marine and Industrial, is owned by the Upper Lakes Group. It comprises five separate operating companies:

- Seaway Marine and Industrial (formerly Port Weller Drydocks);
- Lakehead Marine and Industrial;
- Allied Marine and Industrial;
- Hamilton Marine and Industrial; and
- Canal Marine and Industrial.

Seaway Marine and Industrial, (formerly Port Weller Drydocks), has been marketed primarily as a shiprepair and facility with shipbuilding capability. The former company went into receivership in July 2006 while building a series of short sea vessels for a Dutch shipyard and a British shipping company. The assets were purchased out of bankruptcy by Upper Lakes Group and reorganized. The company is now concentrating on large scale steel fabricating and outfitting. The parent company has also called for the removal of the 25 percent duty on imported vessels and has two tankers and the forebodies for two lakers under construction at a Chinese shipyard.

Seaway Marine is located on the Welland Canal. Lakehead Marine is a full service dry-dock and industrial fabrication facility located in Thunder Bay. Allied Marine is a marine and industrial machining facility located in Port Colborne. It will be merged with Hamilton Marine which is a marine steel repair and fabrication yard. Canal Marine specializes in marine and industrial electrical contracting.

6.4.2 Fraser Marine and Industrial

Fraser Marine and Industrial was purchased by Algoma Central in 1973. It is located in Port Colborne, at the entrance to the Welland Canal. The company specializes in top-side ship repair, and is supported by steel fabrication and machine and electrical services.

6.4.3 Heddle Marine Service Inc.

Heddle Marine was established in 1987 and is located in Hamilton. It operates floating dry-docks. The company operates two dry-docks, one of 28.7 metres and 6,500 dwt capacity and the other of 121 metres and capable of handling vessels such as *Hamilton Trader* and *Algonova* (6,885 dwt).

6.4.4 Hike Metal Products

Hike Metal Products is located in Wheatley, Ontario, east of Leamington on Lake Erie. The company builds a variety of boats, including research vessels, crew boats, fireboats, patrol boats and small passenger/car ferries. It also provides naval architecture services, marine surveying and inspection, electronics installation, dry-docking and repairs, painting and general fabrication.

6.5 Shipping agencies

Shipping agents are located in port cities and towns as well as major consumer markets such as Montreal and Toronto. The Shipping Federation of Canada represents 85 (mostly eastern) Canadian companies that act as agents on behalf of 300 shipping lines throughout the world. The BC Chamber of Shipping fulfills much the same role in western Canada.

Boarding agents and documentation clerks will usually be located in the port, and "back office" functions can take place in either the port office or at a customer service centre away from the port. Often, the marketing function will take place from the major centre. Montreal and Vancouver probably have the densest concentration of shipping agent activity in the country, and it is related both to the marketing and shipping operation function. Many shipping agents or shipping lines have their Canadian head offices in Toronto, but the operations related to the ship itself are done at the port location from a satellite or branch office.

The shipping agency business in Ontario serves a variety of markets, relating to vessels transiting the Seaway and calling at ports in the province. However, they also provide service to the myriad of foreign shipping lines that call at Canadian ports on all coasts and that carry cargo originating in, or destined to, Ontario. This is an important segment of the industry and has a big impact on provincial imports and exports through Canada's gateway ports. A large percentage of the containerized cargo moving into and out of Vancouver, Montreal and Halifax originates or is destined to Ontario.

Shipping agents operating in Ontario are included in Table 72 below.

Table 72: Shipping Agents Operating in Ontario

Agent	Location	Representing (shipping line)	Trades
Admiral Marine	Mississauga	Compagnie Meridional, Canstar, EAC Line	Container, break bulk, heavy lift
ACRO Navigation Inc.	Cooksville	n/a	n/a
American President Lines	Toronto	APL	Container
Bermuda Container Line	Toronto	BCL	containers
China Shipping (Canada)	Etobicoke	China Shipping	Container
CMA/CGM	Toronto	CMA/CGM, Delmas	containers
Currie Maritime Group	Etobicoke	n/a	n/a
Evergreen America Corp	Etobicoke	Evergreen Line	Container
Hapag Lloyd AG	Mississauga	Hapag Lloyd	Container, cruise
Hyundai Merchant Marine	Mississauga	Hyundai	Container
Intership Canada	Toronto	CNAL	
K Line Canada	Mississauga	K Line	Container
Lakehead Shipping	Thunder Bay	n/a	n/a
Maersk Inc.	Mississauga	Maersk Line, Safmarine	Container
McAsphalt Industries	Scarborough	McAsphalt	Liquid bulk
McKeil Marine	Hamilton	McKeil Marine	General cargo, bulk
Mediterranean Shipping Co.	Toronto	MSC	container
Montship	Mississauga	Hamburg Sud, Great White Fleet, Hoegh Autoliners, Mitsui	Container, ro-ro, break bulk
Norton Lilly	Mississauga	n/a	n/a
NYK Line	Toronto	NYK Line	Container, bulk, autos
OOCL Canada	Etobicoke	OOCL	Container
Project Transport & Trading	Oakville	Various	Project cargoes, heavy lift
Protos Shipping	Toronto	Melfi Lines (Cuba)	Containers, break bulk
Seabridge International	Toronto	Yang Ming, NCSCS, BISL, Ecuadorian, WEC Line	Containers, break bulk
Seaboard Marine	Mississauga	Seaboard	Container, break bulk
Seanautic Marine	Toronto	Caribbean Express, Nile Dutch, Pacific Lloyd	Container, break bulk
Senator Lines	Toronto	Senator	Container
Zim Integrated	Toronto	Zim	Container

6.6 Marine towing industry

The marine towing industry takes three forms: typical harbour tug operations, tug and barge operations that involve commodities such as wood pulp, forest products and coal, and offshore oil and gas supply boats, which are also capable of towing offshore drilling platforms to location and doing marine salvage work. The Eastern Canadian Tug Operator's Association represents 15 member companies operating on the east coast and the Great Lakes/St Lawrence. Major operators in Ontario include:

- Great Lakes International Towing & Salvage, Burlington;
- Marine Salvage Limited, Port Colborne;
- McKeil Marine, Hamilton;
- Ocean Ontario Towing, Hamilton;
- Purvis Marine, Sault Ste Marie; and
- Thunder Bay Tug Services Limited, Thunder Bay.

6.7 Ship chandleries and ship supplies

Ship chandleries and ship supply companies provide an essential service in support of the Ontario marine transportation industry.

A number of firms provide this type of service. The major ones include:

6.7.1 WestPier Marine & Industrial Supply

WestPier is based in Port Colborne, and has other locations in the Great Lakes and along the St Lawrence River. The company was established in 1960 and has 16 employees. It maintains an inventory of 14,000 marine supplies from 1,000 vendors. Major products supplied include lubricants, engines, spares, ropes, wires, cable, provisions, hardware, rigging, moorings, seals, packings, tools, valves, filters, cranes, winches and cleaning supplies.

6.7.2 Bell Marine and Mill Supply Ltd.

Bell Marine was established in 1921 and is also based in Port Colborne. It supplies the shipping industry with lubricants, chemicals, rigging and maintenance supplies. It carries a wide variety of products supplied by well recognized brands. The company has four staff.

6.7.3 Seagulf Marine

Seagulf Marine was established in 1958 and is based in Montreal. It also has branches in Halifax and St Catharines. The company employs 9 people. It specializes in deck and engine spares, as well as catering and environmental requirements. Specifically relating to the Seaway, the company supplies Seaway certified wires and fittings, charts, fenders, anchor buoys and lines, as well as navigation equipment and lights, and radio communication equipment.

6.7.4 Latchum Marine Services

Latchum was established in 1925 and employs 25 people from its facility in St Catharines. The company is a full service chandlery, supplying food as well as ship supplies to the marine industry.

6.8 Ship brokers/charterers

Canada does not have a highly developed ship brokerage industry. Fairplay International lists 42 ship brokers across the country in St John's, Halifax, Montreal, Toronto and Vancouver. The sector is mostly related to fixing bulk cargoes and project cargoes in the Lakes.

6.9 Other services

Other functions associated with marine activity include customs brokers, freight forwarders and NVOCCs (non-vessel owning common carriers). In 2007, there were dozens of freight forwarding companies in Canada, employing 15,000 people in 1,000 offices. Of these, about the vast majority are located in Ontario. Most firms are members of the Canadian International Freight Forwarders Association.

An estimated 15 percent of Canada's international shipments are handled by a freight forwarder. They can handle both ocean and air freight and sometimes specialize in either one or the other. Sometimes the forwarder will act as a broker for the carrier and will be paid a commission. When acting as the carrier in contracts with exporters, performing freight consolidation work, forwarders are called non-vessel owning common carriers (NVOCCs).

There about 240 customs brokerage offices in Ontario. Some of this work would be related to marine shipments.

Canada also has a small ship management sector, mostly domiciled in Vancouver and Montreal. Tax laws were changed in the 1990's to permit owners of foreign flag vessels to manage them from certain Canadian cities, including Vancouver, Montreal and Halifax. Teekay Shipping is one such company. It "manages" a fleet of 156 vessels from its operational headquarters in Vancouver. These vessels operate on a worldwide basis. In Ontario, Seaway Marine (which manages vessels for Upper Lakes and Algoma Central), based in St Catharines, would most likely be the largest ship management operation in the province.

7.0 Economic Impact

7.1 Marine transportation

7.1.1 Industry structure

Marine transportation makes an important contribution to the Ontario economy in its own right as an industry generating wealth and creating employment, and also by facilitating and supporting other industrial activities whose inputs and production are shipped from/to markets within Ontario, other provinces and outside Canada.

This chapter provides a quantitative estimate of the economic impact of marine transportation in Ontario as an industry in its own right. To measure its impact, the industry is defined in a manner consistent with the North American Industrial Classification System (NAICS). This approach conforms to the basis upon which Statistics Canada compiles and reports key industry statistics including contribution to Gross Domestic Product and employment. These variables represent the main indicators used to measure economic impact.

NAICS divides the industry into two main components:

- **Water Transportation (NAICS #4831)**, consisting of companies providing deep sea, coastal, Great Lakes and St Lawrence Seaway shipping services for freight and passengers (including ferries). This industry captures expenditures made by shipping companies to run their fleets, including crew salaries, refit and maintenance and other operating expenses; and
- **Support Activities for Water Transportation (NAICS #4883)**, consisting of four sub-components: port and harbour operations, marine cargo handling, navigational services (piloting, tugboat, docking, salvage) and other services to water transportation (cargo surveyors/checkers, vessel supply services, floating drydock for maintenance).

Under the former Standard Industrial Classification (SIC) system, these components formed a single industry for statistical purposes (Water Transportation #449), though up until 2000 data for each component was reported separately by Statistics Canada. With the transition to NAICS, support activities for all transportation modes were grouped into a single industry (Support Activities for Transportation NAICS #488). Thus, support activities for water transportation were bundled with, and became indistinguishable from, corresponding services for rail, truck and air transportation.

Several activities ordinarily associated with water transportation and its supporting activities are not included in either of these industry categories. They either form industries in their own right with their own NAICS classification (e.g., ship building and repair, warehousing and storage, dredging, truck and rail transportation), or form part of wider industry groups whose services are not supplied uniquely to water transportation (e.g., ship chandlers, marine insurance, freight forwarders).

7.1.2 Data and data limitations

Estimating the economic impact of the marine transportation industry presents a formidable challenge because of two data issues: limited availability and lack of comprehensiveness.

- **Availability** is an issue not so much because the NAICS classification structure divides the industry into two components, but because data limitations prevent access to one of these components: NAICS #4883 – Support Activities. Statistics Canada does not report GDP or other data separately for any of the activities supporting water, rail, truck or air transportation. Without such separate reporting, it becomes necessary to estimate the overall size of the industry using indirect methods.
- **Comprehensiveness** is an issue for two reasons: because industry structure is such that not all shipping activity is picked up in the data, and even where these data should be captured, under-reporting has been a problem. The activity that may escape reporting is that associated with the shipping operations of vertically integrated companies (referred to as "own-account" shipping), e.g., mining and refining, and where shippers use private terminals for which data are not supplied to Statistics Canada. Under-reporting exists according to Transport Canada officials, though it is believed to less serious a problem than in earlier years as Statistics Canada relies increasingly on expenditure data derived from taxation returns.

Recognizing these limiting factors, our approach is to use available Canadian data and studies to establish a quantitative relationship between Water Transportation and Support Activities at the national level, and use this relationship to help determine the overall impact of the industry in Ontario. Establishing the respective direct contribution to GDP of these industries is the essential first step in estimating their broader economic impacts.

7.2 GDP – the size of the water transportation industry in Ontario

Statistics Canada reports that in Ontario, Water Transportation (NAICS #483) generates about $200 million in GDP. This represents the value added by shipping companies only; it does not include the value added in producing the various Support Activities for Water Transportation (NAICS #488). Data for the latter have to be derived because they are not reported by Statistics Canada either at the national or provincial level.

It is possible to estimate the size of the Support Activities industry by examining the period of overlap between SIC and NAICS in the years leading up to 2000. Table 73 shows that as a single industry under SIC, Water Transportation and Related Services generated $2,995 million in GDP ($2002) at the national level in 2000. The earliest NAICS data goes back to 1997, and shows that Water Transportation (NAICS #483) generated $1,147 million in 2000. The difference between the two represents Support Activities (NAICS #488), with a $1,848 million contribution to GDP. Table 73 indicates that the ratio of Support Activities to Water Transportation is about 1.5. In other words, for every $1.00 of GDP generated in Water Transportation, another $1.50 is generated in Support Activities.

Table 73: Contribution to GDP (Canada) – Water Transportation and Support Activities

	Water transportation & services (SIC)	Water Transportation NAICS 483	Support Activities NAICS 488	Ratio 488/483
		$2002 millions		
1997	2,470	982	1,488	1.52
1998	2,494	985	1,509	1.53
1999	2,608	1,086	1,522	1.40
2000	2,995	1,147	1,848	1.61

Source: CANSIM V328820; Statistics Canada, special tabulation

Support for this relationship may be found in the US marine transportation data. Table 74 shows a ratio for the two industries (NAICS 483 and 488) averaging just under 1.5 for the period 2000-2004 (the latest year for which data are available). The US Bureau of Census reports data for both industries, allowing the relative magnitudes of the industries to be readily observed.

Table 74: Contribution to GDP (US) – Water Transportation and Support Activities

	Water Transportation NAICS 483	Support Activities NAICS 488	Ratio 488/483
	$US millions		
2000	4,901	7,063	1.44
2001	4,934	7,240	1.47
2002	4,625	7,474	1.62
2003	6,036	8,139	1.35
2004	5,457	8,713	1.60

Source: U.S. Bureau of Census

It is worth noting that NAICS 488, while labeled “Support Activities”, includes primarily activities that are port-specific such as port administration, loading and unloading, navigational services and supply services. It excludes expenditures made by shipping companies on refit and other operational items that are vessel-specific. These are included as indirect impacts under NAICS 483.

Using this ratio to establish the contribution of Support Activities to Ontario GDP requires an assumption that Marine Transportation in Ontario is broadly similar to that in Canada and the US with respect to its requirements for support services. Though there are differences in the composition of the industries (e.g., Ontario would have a heavier weighting in bulk cargo than Canada with its substantial container traffic in Vancouver, Montreal and Halifax), this seems a reasonable assumption in light of the nature of the support activities.

Applying this ratio to the known value for Ontario Water Transportation GDP allows the GDP for the Support Activities to be derived. Table 75 shows that the industries combined

generated direct GDP in the $500 million range annually for the 2001-2005 period. It should be noted that GDP for Water Transportation is not reported for the years 2003-2005 (due to confidentiality), so had to be extrapolated from earlier years based on cargo tonnage and vessel movements.

Table 75: Contribution to Ontario GDP – Water Transportation and Support Services

	Water Transportation NAICS 483	Ratio 488/483	Support Activities NAICS 488	Total
	$ millions		$ millions	
2001	207.7	1.5	311.6	519.3
2002	195.4	1.5	293.1	488.5
2003	191.4	1.5	287.1	478.5
2004	198.1	1.5	297.2	495.3
2005	199.9	1.5	299.9	499.8

Source: Statistics Canada, special tabulation

7.3 Economic impact analysis: approach

7.3.1 Indicators and impacts

The economic impact of the Ontario marine transportation industry is measured with the three indicators ordinarily used in impact analysis:

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

Economic impacts are generated through direct, indirect and induced demand in the economy expressed in terms of industry and consumer purchases of goods and services.

- **Direct impact** refers to impact arising from the expenditures made by firms in the subject industries on the goods and services needed to produce industry outputs. For

example, the marine transportation industry pays port fees, engages pilot boats for guidance into port, and buys unloading services from stevedoring companies.

- **Indirect impact** refers to the inter-industry purchases triggered by the direct demand. These are backward linkages to the economy. For example, pilot boats buy fuel from suppliers and repair services from ship yards, while the stevedoring companies buy or lease vehicles. The vendors of these goods and services in turn purchase more basic goods and services, and so on.
- **Induced demand** refers to the demand created in the broader economy through consumer spending of incomes earned by those employed in direct and indirect activities. It may take a year or more for these rounds of consumer spending to work their way through an economy.

The sum of impacts flowing from each level of demand gives the overall economic impact of Ontario's marine transportation industry. As expenditures work their way through the economy, they generate the GDP, employment and household income the study aims to quantify. Generally, the greater the domestic supply capability at each level, the greater will be the economic impact. Conversely, the higher the import content, the weaker is the domestic industry response (multipliers) and the lower the impact.

7.3.2 Estimating the impacts

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

This study uses an input-output model, specifically, the Statistics Canada Inter-provincial Input-Output Model (2005 version) to generate the economic impacts. The use of an input-output (I-O) model is considered most appropriate for this study because it produces the desired outputs – direct, indirect and induced impacts for the key economic indicators. Moreover, it is driven by industry-specific expenditure data and produces results at the industry level, allowing impacts to be measured and reported at the highest resolution.

Running the model requires the analyst to "shock" it by raising expenditures in the industry for which impact results are sought (the direct demand). Ideally, total industry expenditures would be used so that total industry impact could be derived. But data on expenditures for Water Transportation and Support Activities are not available from published sources. Instead, the approach involves two steps: first, shocking the model with an arbitrary expenditure value to derive the impacts, and second, relating the results to a reported aggregate value for the industry such as GDP.

For this analysis, we asked Statistics Canada to shock the model with an arbitrary $10 million expenditure in both the Water Transportation and Support Activities industries. This shock triggers demands for output from industries supplying goods and services, and the industries that supply to them, and so on. This series of transactions produces the indirect demand that the model reports at the industry or commodity level. Finally, the model also calculates the

impact of household spending (the wages and salaries of employees in the subject industries and the industries supplying goods and services to them). The sum of these forms the impact for each industry arising from the initial $10 million shock.

The next step is to gross up the resulting impacts to the industries as a whole (effectively, asking what the impact would be if you shocked the model with total industry expenditures). This is accomplished by deriving an adjustment factor based on the relationship of the direct impact result for GDP to the total GDP generated by marine transportation in Ontario. The adjustment factor is then applied to each of the model impact results to obtain total values for each industry.

It is worth noting that the I-O impact analysis is carried out for separately for Water Transportation (NAICS #483) and Support Activities for Water Transportation (NAICS #488), with the results combined to give the overall impact. Because the industries are distinct with mutually exclusive expenditures, double counting does not arise.

7.4 Economic impact analysis: results

7.4.1 Industry impacts

The Ontario marine transportation industry spends an estimated $1.5 billion on goods and services. As these expenditures work their way through the economy, they generate an estimated $2.6 billion in provincial GDP, and accounts for 19,800 jobs and over $1.0 billion in household income. These estimates are based on industry activity in 2005, the latest year for which data are available. The impact estimates likely understate actual impacts due to incomplete reporting of industry activity. Impact results are summarized in Table 76.

Table 76: Economic impact – water transportation and support activities

	Water transportation NAICS #483			**Support activities NAICS #488**			**Overall total**		
Expenditures	**$880 million**			**$670 million**			**$1,550 million**		
Impacts	GDP $millions	Employment P-Y	Income $millions	GDP $millions	Employment P-Y	Income $millions	GDP $millions	Employment P-Y	Income $millions
Direct	200	1,949	160	300	3,758	192	500	5,707	352
Indirect	260	2,626	151	208	2,685	129	468	5,311	281
Direct+ Indirect	460	4,575	311	508	6,443	321	968	11,018	633
Induced	782	3,660	165	864	5,154	232	1,646	8,815	397
Total	1,242	8,236	476	1,372	11,597	553	2,614	19,833	1,029

The impacts in Table 76 are generated from expenditures made in Ontario. They exclude direct expenditures made in other provinces that result in indirect impacts in Ontario. These impacts arise because Ontario companies provide many of the services used by the marine transportation industry in other provinces. Other studies have estimated that supplying these

services would add an additional $200 million in GDP, bringing the total *direct and indirect* impact attributable to marine transportation in Ontario to over $1.1 billion.[*]

By reviewing the characteristics of each industry separately and examining how expenditures flow, it is possible to provide some insight into the economic geography of direct and indirect impacts.

- **Water transportation NAICS #483** – This industry is composed of the shipping companies and fleets described in the Industry Profile, Chapter 5. The estimated direct expenditures of $880 million shown in Table 76 are made to finance, operate and maintain the respective fleets within Ontario. The latter include fleet-specific inputs such as crews and fuel. The direct and indirect impacts flow from these expenditures. These expenditures and the resulting direct and indirect impacts would be divided between locations where the companies have their offices – which may or may not be ports – and any ports where their operations are concentrated. In short, the expenditures and their resulting impacts are widely distributed within Ontario.
- **Support activities NAICS #488 –** This industry is composed mainly of organizations providing port-specific services including port and harbour operations, cargo handling and navigational services. The estimated direct expenditures of $670 million shown in Table 76 cover administration and operations, including Port Authority fees, cargo handling costs, and vessel and crew costs for pilotage and tugs. The direct and indirect impacts shown in Table 76 arise from these expenditures. By their nature, these activities, the expenditures made to secure them and the resulting economic impacts are port-specific.

7.4.2 Port impacts

It is possible to provide a crude estimate of port-specific impacts by distributing the Ontario impacts according to port activity. Indicative impacts shown in Table 77 (on the following page) are derived by assigning direct and indirect impact results from Table 76 according to the number of vessel movements. This is a first approximation, with results subject to redistribution based on port-specific information. For example, employment and income in Nanticoke reflect the auto-unloading of cargoes there. Conversely, the employment levels at Hamilton, Sarnia and Thunder Bay reflect the more labour intensive operations at those ports.

[*] LECG, *Marine Industry Benefits Study, Economic Impact of the Canadian Marine Transportation Industry*, 2004.

Table 77: Distribution of Support Activities (NAICS #488) impacts by port

	Vessel movements	Domestic & international cargo	Expenditures	Impact - direct plus indirect		
	#	000 t	$000s	GDP	Employment	Income
Bath	69	537	9,373	7,107	101	4,491
Cardinal	25	270	3,396	2,575	36	1,627
Clarkson	41	536	5,570	4,223	60	2,668
Courtright	124	3,013	16,845	12,772	181	8,071
Goderich	301	5,532	40,890	31,003	439	19,591
Hamilton	497	8,573	67,516	51,191	725	32,347
Badgeley Island	11	76	1,494	1,133	16	716
Kingston	74	1,529	10,053	7,622	108	4,816
Kingsville	306	5,787	41,569	31,518	447	19,916
Leamington	25	402	3,396	2,575	36	1,627
Little Current	55	287	7,472	5,665	80	3,580
Marathon	20	161	2,717	2,060	29	1,302
Midland	32	536	4,347	3,296	47	2,083
Nanticoke	532	14,139	2,276	54,796	22	1,091
Oakville	33	309	4,483	3,399	48	2,148
Oshawa	49	343	6,657	5,047	72	3,189
Owen Sound	17	166	2,309	1,751	25	1,106
Picton	127	1,097	17,253	13,081	185	8,266
Port Colborne	145	1,305	19,698	14,935	212	9,437
Port Lambton	9	114	1,223	927	13	586
Port Stanley	7	22	951	721	10	456
Prescott	20	400	2,717	2,060	29	1,302
Sarnia	452	3,272	61,403	46,556	660	29,418
Sault-Ste-Marie	383	5,781	52,030	39,449	559	24,928
Sombra	23	408	3,124	2,369	34	1,497
Spragge	19	406	2,581	1,957	28	1,237
Thorold	15	238	2,038	1,545	22	976
Thunder Bay	431	8,125	58,550	44,393	629	28,052
Toronto	151	1,956	20,513	15,553	220	9,828
Whitefish	180	1,937	24,453	18,540	263	11,715
Windsor	355	5,151	48,226	36,565	518	23,105
Bowmanville	111	1,672	15,079	11,433	162	7,224
Meldrum Bay	293	4,546	39,803	30,179	428	19,070
Ontario total	4932	78,625	670,000	508,000	6,443	321,000

8.0 Conclusions

Water transportation is a derived demand. It derives its rationale from the various economic activities dependent on the services it provides. Such services include the movement of industrial inputs to manufacturers, as well as the shipment of finished products to markets. It also includes the movement of people to meet business and work obligations. Thus, in addition to its economic impact as an industry in its own right, water transportation also provides a service supporting the development and viability of various industries. By extension, this support function also applies to the many communities hosting the industries that water transportation serves.

The strength of this support role—and hence the magnitude of the economic importance – depends on the cost-effectiveness of the service and the options open to shippers. Generally, water transportation is of greatest economic importance to industries needing to move bulk commodities in high volumes. The industries in Ontario currently meeting these criteria are iron and steel, petroleum, chemicals and cement. An analysis of the role marine transportation plays in these industries may be found in, *Great Lakes St. Lawrence Seaway Study* (2007), conducted by Transport Canada and the US Department of Transportation. In brief:

- **Steel** – Three major inputs used in steel production – iron ore, coal and coke and limestone – are carried through the Great Lakes-St Lawrence Seaway system to plants in Ontario. Iron ore is the major cargo, with about 130 million tonnes carried annually. The Hamilton mills rely on iron ore from US sources in the mid-west (shipped by laker via the Soo Locks) and from the mines in Labrador (shipped via Montreal and Lake Ontario section (MLO) of the Seaway). Metallurgical coal and coke are shipped north from US ports, and also south through the St Lawrence from European sources.
- **Power generation** – Ontario imports over 20 million tonnes of coal annually, most of which is used to generate electricity (an increasing total, with the closure of nuclear plants in the late 1990's). Steam coal is nearly all loaded at Lake Erie ports in Ohio such as Conneaut and Astabula, and shipped across the lake by vessel.
- **Other industries** – The Great Lakes-St Lawrence Seaway is used to ship petroleum products originating from refineries in Sarnia, Nanticoke and Montreal to various destinations in Canada and the US. Ontario dominates Canada's cement industry, shipping product to the southern Great Lakes region via the Welland Canal. Sarnia and Windsor are the main ports of origin for chemical cargo, with shipments destined for US, Canadian and European markets.

The ability of these industries to compete in an increasingly integrated global economy depends on their access to efficient modes of transportation. In this respect, water transportation plays a key role, with the Great Lakes-St Lawrence Seaway system handling a significant (but declining) amount of cargo annually. The *Great Lakes St. Lawrence Seaway Study* notes that this volume simply could not be handled by an already overburdened land-based transportation system without compromising the competitiveness of these industries. This is most obviously the case for steel, where there is currently no practical alternative for transporting the substantial volumes of iron ore and coal essential to this industry.

Water transportation contributes to the competitiveness of these industries because it offers a competitive alternative to road and rail. A rate and traffic analysis conducted as part of the *Great Lakes St. Lawrence Seaway Study* determined that overall, the GLSLS system offered shippers an average saving of $14.80/ton compared to the next-best all land alternative. The greatest unit savings occurred on the Montreal-Lake Ontario segment of the system, with an estimated cost saving of $22.74/ton. The total savings was estimated to be $2.655 billion.[37]

The ability of the marine transportation system to continue to offer these cost advantages and support the competitiveness of client industries hinges on its reliability and relative efficiency. With respect to reliability, the system has demonstrated its ability to meet this test by operating at full capacity (i.e., without slowdown or closure) 98 percent of the time. The ability to maintain this level of reliability and its competitiveness, more generally, depends on the adequacy of on-going facilities maintenance and re-investment in infrastructure. While some industries could adjust to a short-term closure of the system (with difficulty and at higher cost), this would not be the case for steel given the lack of a suitable alternative for the massive quantities of inputs required.

The steel industry is of strategic importance to Ontario as well as to the broader Canadian economy. The province's 60 or so steel manufacturers create direct employment for over 15,000 in Ontario, paying wages in excess of $1.1 billion annually. The industry generates over $3.0 billion in direct GDP, on revenues in the $9.4 billion range.[38] It spends over $5 billion annually on various materials and supplies, which it buys from thousands of suppliers in the province. In addition to these strong backward linkages, the steel industry is integral to the success of Canada's automobile industry.

In addition to these quantified cost savings, water transportation also generates "green" benefits that are more difficult to quantify. These benefits arise from reduced greenhouse gas emissions from using ships rather than roads for bulk cargo transportation. The benefits also arise from effectively reducing the demand on an already congested land transportation system, thereby limiting congestion costs and related greenhouse gas emission costs.

While we have not examined the economics of transport directly in this Report, it is worth considering:

- how many trucks or rail cars would be needed to replace the ships currently being used to transport the dry bulk commodities;
- whether such movements would be economic or practical given current rail and road capacity;
- what the cost to the shipper/receiver would be for such movements; and
- what the options would be for those locations only accessible by marine transport.

[37] The analysis was conducted using 2002 data on shipping movements and 2004 cost levels. See *Great Lakes St. Lawrence Seaway Study, pp 48-50.*

[38] Statistics Canada, Cat. No. 301-0006, Principal statistics for manufacturing industries.