



Introducing the

Great Lakes/St. Lawrence Seaway System

An overview of
North America's
most dynamic
waterway





Photo by Thies Bagner, MPA, Bagner Photo Ltd.

A competitive water route to the heart of North America

The Great Lakes/St. Lawrence Seaway System links the world to the U.S. and Canadian midcontinent

Overview

Stretching more than 2,340 miles (3,700 kilometers) from the Atlantic Ocean to the heart of North America, the Great Lakes/St. Lawrence Seaway System is one of the world's greatest and most strategic commercial waterways.

It is also a highly competitive transportation route serving the U.S. and Canada's largest interior markets.

The Great Lakes alone comprise a one-of-a-kind, freshwater "Inland Sea." They cover 95,170 square miles of water surface, about 61,000 in the U.S. and 34,000 in Canada, and define a 10,000-mile coastline, which is longer than the entire U.S. Atlantic seaboard.

The system is used by a wide variety of vessel types including Seaway-size ocean ships from all over the world, self-unloading bulk carriers up to 1,000 feet (305-meters) trading exclusively within the Great Lakes, and tug/barge units linking the Great Lakes/Seaway System to the U.S. inland waterway reaching all the way to the Gulf of Mexico.

Opened to navigation in 1959, the St. Lawrence Seaway has moved more than 2 billion metric tons of cargo in its four-plus decades, with an estimated value of US\$400 billion. About 50 percent of this cargo travels to and from overseas ports, especially Europe, the Middle East, and Africa. The remainder is U.S. and Canadian coastal trade.

Construction of the 189-mile (306-kilometer) stretch of the Seaway between Montreal and Lake Ontario was recognized as one of the most challenging engineering feats in history, overshadowing the Suez Canal built in 1869, and even the Panama Canal built in 1914. Seven locks were built in the Montreal-Lake Ontario section of the Seaway, five Canadian and two U.S., lifting vessels to 246 feet (75 meters) above sea level.

The 28-mile (44 kilometer) Welland Canal is the fourth version of a waterway link between Lake Ontario and Lake Erie first built in 1829. The present canal was built in 1913, deepened in the 1950s as part of the Seaway project and further straightened in 1973. Today its eight locks, all Canadian, lift ships 326 feet (100



**The Great Lakes/
St. Lawrence
Seaway System**



meters) over the Niagara Escarpment.

Passage to Lake Superior, at 602 feet (183 meters) above sea level, is gained through the Soo Locks on the St. Mary's River.

Seaway cargoes are borne both by ocean vessels flying flags of maritime nations around the world, and by Canadian vessels specialized for the trade. The U.S.-flag Great Lakes fleet is almost exclusively employed in trades within the Lakes.

Prevalent Seaway trade patterns include:

- Upbound (westward) movements of general cargo, including semi-finished steel in the form of slabs, coils, beams and other products, from overseas producers.



LEGEND

- PORTS
- CANADIAN LOCKS
- UNITED STATES LOCKS

LOCKS

- 1 St. Lambert
- 2 Cote Ste. Catherine
- 3 Lower Beauharnois
- 4 Upper Beauharnois
- 5 Snell
- 6 Eisenhower
- 7 Iroquois
- 8 Welland Canal (8 locks)
- 9 Soo Locks

The Seaway is actually closer than you think:

Several Great Lakes ports are closer to European markets than East Coast or Gulf ports are, saving shippers time and money:

- Baltimore, Maryland to Liverpool, England:3,936 miles (6,334 km)
Via the Seaway, from Detroit, Michigan:3,673 miles (5,911 km)
- New York to Rotterdam:3,824 miles (6,154 km)
From Norfolk:4,032 miles (6,489 km)
From New Orleans:5,567 miles (8,959 km)
Via the Seaway, from Montreal:3,612 miles (5,813 km)

Transportation studies show that:

- The Seaway is especially cost-competitive for shipping steel, heavy lift and project cargoes to and from Europe
- Great Lakes ports have lower port costs than competing ocean ports for the handling, wharfage, dockage and stevedoring of grain, iron ore, steel coils and machinery
- Steel shippers save from \$3 (U.S.) to nearly \$50 (U.S.) a ton by routing through Great Lakes ports rather than through east coast or Gulf ports
- Stevedoring costs for steel products tend to average about \$2.20 (U.S.) a metric ton lower at Great Lakes ports



Photo by Thies Bogner, MPA, Bogner Photo Ltd.

- Upbound movement of iron ore from mines in eastern Canada.
- Downbound (eastward) shipments of export grain by Canadian bulkers to transshipment points on the lower St. Lawrence, and by ocean vessels for direct export overseas. The Seaway also handles project cargoes, containers, forest products, petroleum products, chemicals, edible oils, coal, salt, cement, fertilizers, ores, nonferrous metals and other bulk materials.

The Great Lakes/Seaway System is a true multimodal system. Seamless movements of goods and commodities flow from ship to rail

and truck, and from rail and truck to ship in well-synchronized trade patterns. It is no coincidence that the major rail and highway hubs of the midcontinent—such as Chicago, Toronto, Detroit and Toledo—are major Great Lakes/Seaway ports as well.

From Great Lakes/Seaway ports, road and rail networks fan out across the continent. More than 40 provincial and interstate highways and nearly 30 rail lines link the 15 major ports of the system and 50 regional ports with consumers, products and industries all over North America.

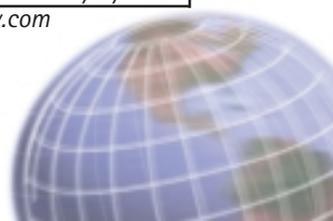
The Great Lakes/Seaway System is also the

most cost-efficient and environmentally responsible route to the midcontinent. Studies have shown that marine transport uses less fuel, has fewer emissions and is safer than either rail or truck for equivalent cargoes and distances.

Their large cargo capacity relative to engine size and their operating characteristics make Great Lakes and Seaway vessels models of fuel efficiency and cost competitiveness.

It is little wonder, then, that shippers worldwide choose the Great Lakes/Seaway System to move 40 million to 50 million tons of cargo a year to and from the U.S. and Canada.

Great Lakes/St. Lawrence Seaway System
www.greatlakes-seaway.com





North America's agricultural bounty, industrial might served by the Seaway

Many sectors of U.S. and Canadian commerce benefit from the Great Lakes/Seaway System's competitive advantages

Commodities

The North American midcontinent's economy is defined by both a heavy concentration of manufacturing, and some of the most productive cropland in the world. Both these economic sectors are well-served by the Great Lakes/St. Lawrence Seaway System.

Inbound trade on the Seaway, for instance, is currently dominated by semi-finished steel originating from such steel-producing markets as Europe, Russia, Japan, Brazil and Ukraine. Steel products moving through the Seaway come in a variety of forms including slabs, coils, billets, rods and structural beams. The Seaway has handled in the range of five million metric tons of steel annually in recent years.

The automotive industry is the leading user of Seaway-borne steel, but the fact that steel is being used in a number of new product areas has been significant in boosting the market. The use of steel in the construction industry, for instance, is growing by about five percent a year, as steel replaces other products such as wooden framing in houses.

Major steel handling ports in the system include Cleveland, Burns Harbor at Portage, Detroit, Chicago and Milwaukee in the U.S.; and Hamilton, Windsor and Toronto in Canada. Several of these ports have invested significantly in their steel-handling capabilities in recent years, as the Great Lakes/Seaway system has demonstrated its competitiveness as a trade route for imported steel.

The Great Lakes/Seaway's cost effectiveness as a steel route is enhanced by the fact that after discharging their steel cargos, bulk vessels routinely load a backhaul of grain for the cross-Atlantic return trip.

Export grain moving from central U.S. and Canada farms to markets around the world is, in fact, the highest volume cargo moved on the St. Lawrence Seaway.

Grain tonnage has averaged about 14 million metric tons annually on the Seaway in recent years, representing about 30 percent of the Seaway's total cargo activity.

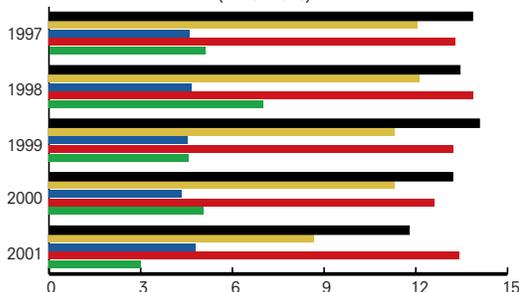
Wheat is the dominant product, accounting for about half of the total grain tonnage, followed by corn and soybeans. Other agriproducts



Foreign markets served by Seaway grain shipments include countries in Europe, North Africa, the Middle East, the Mediterranean, Russia, Central America and South America.

Grain
Iron Ore
Coal
Other Bulk
General

Five Year Review of Combined Traffic by Commodity (million tons)



in the mix include rye, oats, and barley; oilseeds such as canola, sunflower and flaxseed; beet pulp as a feed additive and beans and peas.

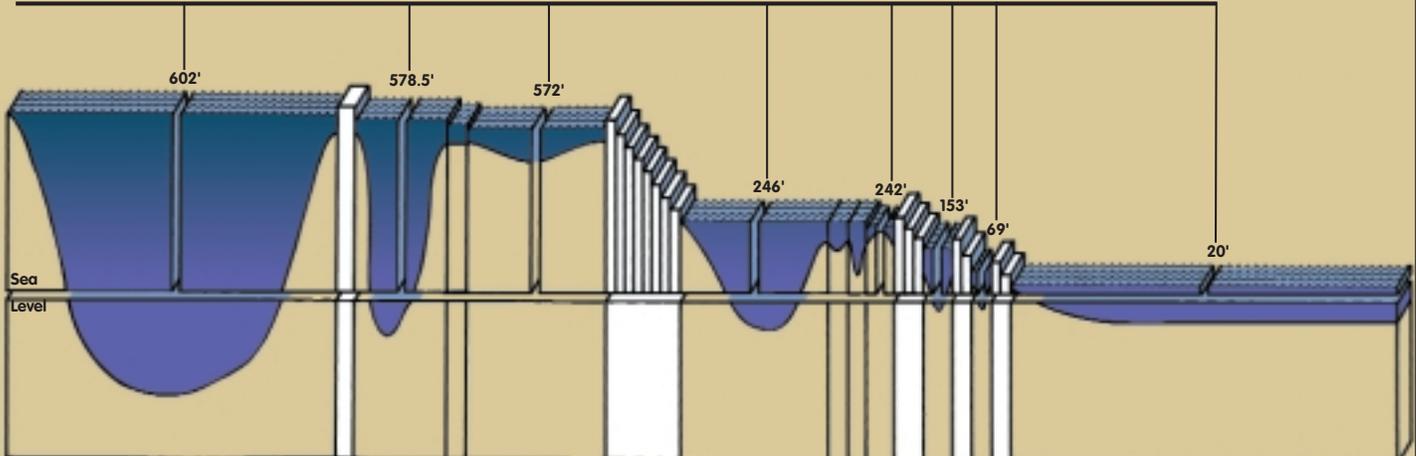
Historically, Canada has been the primary source of export grain moved on the Seaway. In the 1980s Canada's grain shipments through the system topped 17 million tons a year, while U.S. grain amounted to only about a million tons or less. In recent years, however, the two countries' shares of the trade have been close to even.

A large volume of Seaway grain exports are loaded directly onto Seaway-size ocean ships at the far west end of the Great Lakes at the U.S.



Total Mileage Duluth to Atlantic: 2342 Miles (3,700 kms)

FEET ABOVE SEA LEVEL



- Lake Superior: 383 Miles
- St. Mary's River: Soo Locks—70 Miles
- Lake Michigan: 345 Miles
- Lake Huron: 223 Miles
- St. Clair River-Lake St. Clair-Detroit River: 77 Miles
- Lake Erie: 236 Miles
- Welland Canal: Eight Locks—28 Miles
- Lake Ontario: 160 Miles
- Thousand Islands Section: 27 Ft. Channel—68 Miles
- Lake St. Lawrence: 44 Miles
- International Rapids Section: Three Locks and Dams, 27 Ft. Channel—44 Miles
- Lake St. Louis
- Lake St. Francis Section: 27 Ft. Channel—30 Miles
- Soulanges Section: Two Locks, 27 Ft. Channel—16 Miles
- Lachine Section: Two Locks, 27 Ft. Channel—31 Miles
- Tide Water Section: Deep Water from Montreal to Sea—1000 Miles



"Twin Ports" of Duluth/Superior and the Canadian port of Thunder Bay. These ports, fed by rail lines from the western states and provinces, have developed highly specialized infrastructures for efficient grain handling. Other significant grain loading ports in the system are Toledo on Lake Erie and Goderich on Lake Huron.

Export grain is also moved by Canadian bulk carriers to storage elevators on the lower St. Lawrence in Quebec, Montreal, Trois-Rivieres, Baie-Comeau and Port Cartier for loading onto larger ocean bulkers. Grain terminals at the ports of Quebec and Port Cartier,

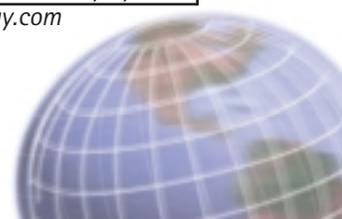
for instance, are capable of loading vessels with capacities up to 80,000 metric tons and 100,000 tons respectively.

Foreign markets served by Seaway grain shipments include countries in Europe, North Africa, the Middle East, the Mediterranean, Russia, Central America and South America.

Iron ore and coal are the other two highest volume bulk commodities moved on the Seaway, primarily in U.S. and Canadian coastal trade. There have been, however, successful movements in past years of low-sulphur coal mined in the western U.S., railed to the Great Lakes and loaded onto ocean bulkers for direct

shipment to European markets seeking to reduce toxic air emissions.

Since the Great Lakes/Seaway system serves most of the major manufacturing centers of the central U.S. and Canada, it has become a favored route for high value, heavy lift project cargo such as automotive presses, chemical reactors and electrical transformers.





Photography by Thies Bogner, MPA, Bogner Photo Ltd.

The Seaway is a pacesetter in cutting edge technology

AIS, E-Business applications and an interactive website make the Great Lakes/Seaway System safer and easier to use

Technology

Though its locks and channels are more than four decades old, the Great Lakes/Seaway system's infrastructure now includes a new tier of 21st century technology.

Beginning in 2003, vessels trading in the Great Lakes/St. Lawrence Seaway system will benefit from a traffic management system utilizing state-of-the-art Automatic Identification System (AIS) technology being phased into the commercial marine sector worldwide. Also now available is the Seaway's newly redesigned website at www.greatlakes-seaway.com offering a host of new services and interactive features.

The Seaway's AIS network replaces a traffic management system based on called-in reports at designated locations. With the advent of satellite-based global positioning technology, the system was developed that could not only track vessels' exact positions in real time, but also provide a comprehensive communications network.

By definition, AIS is "a shipboard broadcast transponder system, operating in the VHF radio band, that is capable of sending such information as identification, position, heading, speed, ship length, beam, type, draft and hazardous cargo information to other ships and to shore."

Seaway users will realize cost benefits in the form of reduced transit times and better scheduling of vessel meetings and lockages. Real-time ship to ship communication via AIS is designed to provide valuable navigation tool to the bridge crew, thus enhancing safety and improving fleet management. Savings to operators trading in the Seaway could range up to \$300,000 a year.

For ocean vessels entering the Seaway without AIS capability, a portable unit integrated into a laptop computer will be brought onto each ship by the pilot boarding at the St. Lambert Lock in Montreal. The Seaway's implementation of AIS mandate in 2003 comes two years before the International Maritime Organization (IMO) will require most Seaway-size cargo ships to install the technology.

AIS messaging makes possible a vastly improved system to disseminate environmental

information such as weather, wind speed, visibility and water levels and flow rates.

The upgraded system gathers data from such sources as weather satellites and remote monitoring stations, compiles it on a centralized weather observation table and distributes it to traffic controllers and AIS-equipped vessels through a master server.

The latest addition to Seaway's website is an E-Business Application Suite. Designed after extensive consultation with the marine industry, the suite provides subscribers with a range of applications aimed at reducing paperwork and streamlining communication within the system.

The suite includes:

- **Cost Calculator**, a resource enabling the user to input a few key elements outlining the planned voyage, and to receive an estimate of the resulting transit cost, incorporating published rates on Seaway tolls, pilotage fees, and government levies.
- **Cargo Matching**, an online marketplace providing a forum for ship owners, operators and agents seeking additional cargoes, and a forum for shippers and agents seeking to book cargo with a shipping company. Using the online forums, one party can identify a potential match and contact the other party, to establish a price and arrange shipment.
- **Vessel Transit Information** provides a vessel's owner, operator or authorized agent to view their vessel on the Seaway's web site, and to "drill down" on the vessel symbol to obtain detailed information (current position, estimated time of arrival to next destination, cargo, etc.)
- **Online Transactions/Account Information** provides the means to file pre-clearance requests and transit declarations online, and to view the status of one's account with the Seaway. This function is only available to users of the Seaway who pay commercial tolls.

Users may subscribe to the entire suite, or to individual applications. More information is available at the Seaway's web site at www.greatlakes-seaway.com.



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Complementing the new AIS technology is the system's recently redesigned website with such features as:

- Shipping and navigation information.
- Rules, regulations and official forms.
- Links to every organization, port, and government agency involved with the Great Lakes/Seaway System.



A binational commitment to safety, security

New focus on customer satisfaction has strengthened the U.S.-Canadian partnership, to the benefit of Seaway users

Customer Service

The Great Lakes/St. Lawrence Seaway was built as a binational partnership between the U.S. and Canada, and continues to operate as such.

Administration of the system is shared by two entities, the Saint Lawrence Seaway Development Corp. in the U.S., a federal agency within the U.S. Department of Transportation, and the St. Lawrence Seaway Management Corp. in Canada, a not-for-profit corporation

ment of commercial vessels in the waterway.

The two countries share the job of investigating commercial marine accidents, and maintain search and rescue capabilities covering all the Great Lakes.

One of the best examples of this cooperative spirit is the joint foreign flag vessel inspection program in Montreal that has dramatically streamlined St. Lawrence Seaway operations. The program involves both U.S. and Canadian Coast Guards, the U.S. St. Lawrence Seaway Development Corp., and the Canadian St. Lawrence Seaway Management Corp.

Since 1998, safety and environmental vessel inspections of foreign vessels have been conducted jointly by the U.S. and Canada to accomplish the port/state vessel inspections as well as ballast water tests.

By consolidating all required inspections and tests, the amount of time required by vessel operators to transit the waterway is greatly reduced.

Other services offered by the two Seaway agencies include:

- Assisting customers with detailed statistical information related to St. Lawrence Seaway cargo and vessel transits as well as vessel fleet characteristics.

- A review, free of charge, of ship drawings for new buildings or revisions, encouraging owners to fit vessels to Seaway dimensions during construction. In addition, advice and guidance is also available to developers, shipping companies or agents on modifications necessary to meet requirements for transiting the Seaway.

- To accommodate vessels without landing booms, tie-up services at Seaway locks are available at cost.

By meeting with and talking to customers to learn more about what they expect, U.S. and Canadian Seaway agencies have established system-wide performance measures for everything from transit times to how long it takes to respond to a request for information. ●

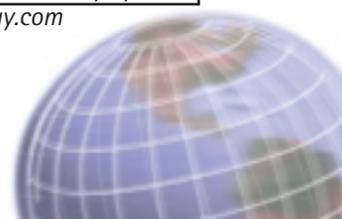


comprised of major Seaway users. (Ownership of the Canadian portion of the Seaway remains with the federal government.)

The two Seaway administrative entities have worked hard in recent years to eliminate duplication and coordinate operations as much as possible for the benefit of Seaway users.

U.S. and Canadian agencies share responsibility for maintaining aids to navigation (from buoys, lights and channel markers to sophisticated electronic positioning systems used by large commercial vessels) throughout the Lakes. They also operate marine communication and vessel traffic systems that coordinate the move-

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