

**SHORT SEA SHIPPING OPPORTUNITIES
ON THE GREAT LAKES**

Buzzword, or a genuine solution to gridlock

**26th Annual Interferry Conference
Grand Bahama Island
Nov 1-4, 2004**

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ABSTRACT

Short Sea Shipping, S3 for short, appears to have been discovered in North America as the marine panacea to gridlock ills. Although, just as with recent developments in Europe, the emphasis is more on getting trucks and containers onto ferries or barges rather than the traditional use of the term.

The paper will briefly outline the classic definition of S3, and what approaches are being taken on the Great Lakes, but will concentrate on specific developments in the region designed to ease cross-border traffic congestion. This brief survey will cover pure freight as well as passenger, passenger/vehicle and freight ferries. A potential new year-round service on Lake Ontario will be discussed in detail, as will some of the regulatory hurdles that need to be overcome before freight ferries on the Great Lakes can become a reality.

RESUME

Christopher Wright is the President of The Mariport Group Ltd, a specialized marine and port consulting company formed in 1989, and based in Cambridge, Ontario. He commenced his career in shipping with the Westinform Service in London (UK) in 1964, and after a stint with the Chamber of Shipping of the United Kingdom moved to the Bahamas where he was Senior Consultant and a Director of JBC in Nassau. A move to Canada in 1981 created new opportunities in passenger shipping consultancy, both in North America and internationally.

He is a member of the Chartered Institute of Logistics and Transport; The Society of Naval Architects and Marine Engineers and has been associated with IMTA/Interferry since 1988.

He has been involved in ferry projects from Shetland (UK) to South Korea, and is currently working on five ferry studies in North America. One of these services may be the first short sea service to be implemented on the Great Lakes.

BACKGROUND

Short Sea Shipping is, perhaps, an anachronistic term in today's multifaceted, multi-modal transportation world. Originally a charter party term used to define trade between the UK and Baltic and White Seas, by the 1960's it had become a generic term for all small vessel intra-European trade. It was also the well-established commercial opposite of the deep sea trades and some ports in the UK/Europe still have vestiges of the distinction in their port tariffs. Small ships on short voyages were charged much less than larger ships on long haul trades. The term still has commercial provenance in that the Scandinavian Shipping Gazette publishes a regular short sea market summary dedicated to dry cargo bulk ships and cargoes under 10,000 tonnes.

The European Union, in recognition of the true nature of short sea trade has, since 2001, used the term "motorways of the sea" as the type of activity they wish to develop. Essentially this is to try and control growth of truck traffic. The EU faces an increase in truck traffic of at least 60% in the next decade and needs to invest some €600bn just to meet capacity restraints in the system in Germany, Pyrenees and Swiss Alps.

The three main objectives for the Motorways of the Sea initiative are:

- Reducing road congestion through modal shift
- Increase cohesion (within the EU)
- Freight flow concentration on sea-based logistical routes.

This goal is exactly what is being targeted in North America. It is not an attempt to develop a broad shipping initiative for small ships on short trades, but to try and create intermodal maritime opportunities that will take some of the pressure off the overburdened interstate system in the USA, and the 400 series highways in Ontario. As in Europe, there are opportunities for at least four types of long and short haul ferry operations.

- A true intermodal system built around a 53' container, similar in concept to Geest NSL's 13.5m (45') container operation
- Drop trailer freight ferries, probably where runs are over about eight hours
- Full roll-on, roll-off freight ferries on shorter runs
- Ro-pax ferries, although these are possibly less likely, given the significant differences between North American and European passenger traffic.

THE GREAT LAKES

Lake Michigan – Freight Ferries

Great Lakes freight ferry activity was almost exclusively rail cars from the *Ann Arbor #1* in 1892 through to the *Incan Superior* in 1992. The locus of activity was Lake Michigan, with several cross-lake routes run by different railroads.



Eventually, the last ferries, *Badger* and *Spartan*, were withdrawn in 1982, although the *Badger* was resurrected as an auto ferry service between Ludington and Manitowoc in 1983. The ferry is now successfully operated by Lake Michigan Car Ferry on a seasonal basis and does take freight.

Ludington to Manitowoc Route Characteristics

Distance	60sm
Transit time	4hr
Round trips per day	2/peak season
Vessel	Badger
Speed	15kts
Capacity	120 autos, 620 pax

Another ferry operation across Lake Michigan was between Milwaukee and Muskegon and was run by the *Milwaukee Clipper* until the late 1970's. Initial studies for re-introducing this route considered freight, but the Harbor Maintenance Fee quickly put an end to such thoughts. Today, the route is the only fully commercial high-speed auto passenger ferry in North America. Should the HMF be removed, or an exclusion be granted for ferries, then it is very likely that this mid-lake interstate connection will incorporate a freight service.

Milwaukee to Muskegon Route Characteristics

Distance	85sm
Transit time	2hr 30m
Round trips per day	3
Vessel	Lake Express
Speed	34kts
Capacity	46 autos, 248 pax

Lake Erie



Moving down to Lake Erie, this is the lake around which the bulk of Ontario/US trade flows, with considerable truck movements.

Gateway	Truck Moves 2003
Niagara	2,321,020
Windsor/Detroit	3,420,022
Blue Water	1,725,603
Other	865,509

There are two freight routes being actively considered. One between Cleveland and Port Stanley has been promoted by the Port of Cleveland who have recently announced that Royal Wagenborg have been given the nod to develop the route. The proposal by Cleveland is to run a single ro-pax on this route, but there are some drawbacks to such a venture, and particularly to Port Stanley which has some considerable weather problems, is shallow drafted and has no turning basin inside the breakwaters for a large ship. However, the service could feasibly divert a good number of trucks away from the Windsor/Detroit crossing.

Cleveland to Port Stanley Route Characteristics

Distance	86sm
Transit time	3hr 30m
Round trips per day	2/peak season
Vessel	tbd
Speed	18kts
Capacity	3,600 lane feet, 1,200 pax

Another route that has been studied is Erie and Nanticoke, which again has some port issues on the Canadian side, as well as being somewhat remote from the 403. This route would not compete directly with the Cleveland service as most of its traffic would be diverted from Niagara.

Erie to Nanticoke Route Characteristics

Distance	48sm
Transit time	3hr 30m
Round trips per day	2 Vessel tbd
Speed	16kts
Capacity	5,900 lane feet, 0 pax

A route that has not been considered, but could offer interesting opportunities is Monroe (MI) to Kingsville (ON). This is a relatively short run and could offer up to four round trips per day with a single vessel.

Monroe to Kingsville Route Characteristics

Distance	35sm
Transit time	4hr 45m
Round trips per day	4
Vessel	tbd
Speed	18kts
Capacity	tbd

There is one existing cross-lake ferry service which connects Sandusky (OH), Pelee Island and Kingsville/Leamington. The service is primarily provided as a link between Pelee Island and the mainland. Although technically freight capable with the *Jiiman*, the service into the USA is largely to the benefit of Ohio cottagers who have properties on Pelee Island.

Sandusky to Leamington/Kingsville Route Characteristics

Distance	44sm
Transit time	3hr 15m
Round trips per day	1 in season
Vessel	Jiiman, Pelee Islander
Speed	na
Capacity	35 autos, 400 pax

Lake Ontario

Moving into Lake Ontario, ferry services could deliver directly into Canada's major urban manufacturing region – the Greater Toronto Area, or GTA. There are three routes that are feasible, and unlike Lake Erie, which has never had freight ferry service, one was tried for a time between Oshawa and Oswego.



The Lakespan service in the early 1980's failed, partly because a frequent schedule with a single vessel was not feasible. Other problems related to service, pricing and the use of Oshawa as the Ontario port which was not ideal from a truck route logistics perspective.

One service, that is highly speculative, is an hourly service using five double deck ro-ro ferries between the Niagara River and Toronto. Such a ferry system could reduce traffic volumes on the bridge crossings, moving as many as one million trucks per year off the overloaded QEW. Other benefits would be to avoid building the proposed Mid Peninsula Highway, a new Peace Bridge, as well as offering significant pollution and accident reduction. The ferries would cost about \$100m compared with \$3-4bn for road and bridge.

Niagara River to Toronto Route Characteristics

Distance	30sm
Transit time	1hr 45m
Round trips per day	hourly service
Vessel	5 nb
Speed	17kts
Capacity	7,000 lane feet

A possible service, which again would reduce traffic loadings, is a daily service between Hamilton and Prescott. Some initial work has been done on this route, but it has been shelved in favour of a more probable route between Hamilton and Oswego. The initial analysis of MTO data on truck movements at the Quebec border showed 250-300 moves/day into the Hamilton area with a potential market of 1,000 moves/day. The daily service could carry in the order of 100 trailers each way at a saving of around \$500/move. Prescott would permit truck operators to run at least two round trips/day out of the Montreal/Drummondville/Sorel area. This short turn benefit, coupled with local drays in the Hamilton area could offer further savings.

Hamilton to Prescott Route Characteristics

Distance	244sm
Transit time	15hrs
Round trips per day	.5
Vessel	2 nb
Speed	14kts
Capacity	3,200 lane feet, 0 pax

Considerable traffic research has been done on the Hamilton to Oswego route and two vessels would take about 3% of existing truck traffic. Increasing frequency of sailings as acceptance of the route builds could eventually shift more than 300,000 trucks each year from border flows. This operation is described in more detail later.

Hamilton to Oswego Route Characteristics

Distance	166sm
Transit time	12hrs
Round trips per day	.5
Vessel	2 Ro Ro
Speed	16kts +
Capacity	3,200 lane feet, 0 pax

PASSENGER AND/OR AUTO FERRIES

In addition to the freight ferry opportunities on the Great Lakes, there are several passenger-only and passenger auto ferries being considered.

Lake Michigan used to have a remarkable number of day excursion and overnight ferries, and we have described two of the operating services under freight ferries. Another ferry service, which would be passenger-only, is being considered between St. Joseph (MI) and Chicago (IL). This would likely be a T-Boat¹ service. There are other routes being talked about, but this one could feasibly be operating in 2005.

St. Joseph to Chicago Route Characteristics

Distance	60sm
Transit time	2hr 10m
Round trips per day	3
Vessel	tbd
Speed	30kts
Capacity	149 pax

In Lake Erie, the Cleveland-Port Stanley route is being looked at as a Ro Pax operation, although given the dynamics of the passenger market, this might be better served by a separate high speed craft similar in size to the *Lake Express* and a separate freight ferry. This is exactly what the Port of Erie is targeting with a high-speed service into Port Dover (ON) and freight into Nanticoke. Agreement has been reached recently between Erie and Port Dover on development of the high-speed service.

Erie to Port Dover Route Characteristics

Distance	52sm
Transit time	1hr 30m
Round trips per day	3
Vessel	tbd
Speed	34kts
Capacity	tbd

In Lake Ontario the *Breeze* recently died, and whether new life can be breathed back into the Toronto-Rochester service is moot.

Rochester to Toronto Route Characteristics

Distance	98sm
Transit time	2hr 15m
Round trips per day	2
Vessel	Spirit of Ontario
Speed	43kts
Capacity	238 autos, 774pax

¹ Under 100 GRT, max 149 passengers.

Another possible, but so far elusive, service is one between Toronto and Niagara, and with a potential market of two million travelers per year this route is definitely viable for the right kind of craft. As Lake Ontario, even in the summer, is well known for nasty short, steep seas, a craft with good seakeeping is definitely needed. Mariport has investigated a passenger-only service, with each vessel having a capacity for about 400 persons, in two classes, on a year round schedule. An integrated coach service in Niagara to get passengers to and from the ferry was incorporated into the analysis. In Toronto, ready access to the TTC is seen as being a major part of ground transportation at that end of the service.

Toronto to Niagara Route Characteristics

Distance 29sm
 Transit time 1hr 10m
 Round trips per day 8/peak season
 Vessel 2 nb
 Speed 32kts
 Capacity ~ 400 pax

THE HAMILTON-OSWEGO FERRY

In looking at development of the ferry route, it may be of interest to outline the data analysis and sources used for this service and also some of the institutional considerations that are going into the planning.

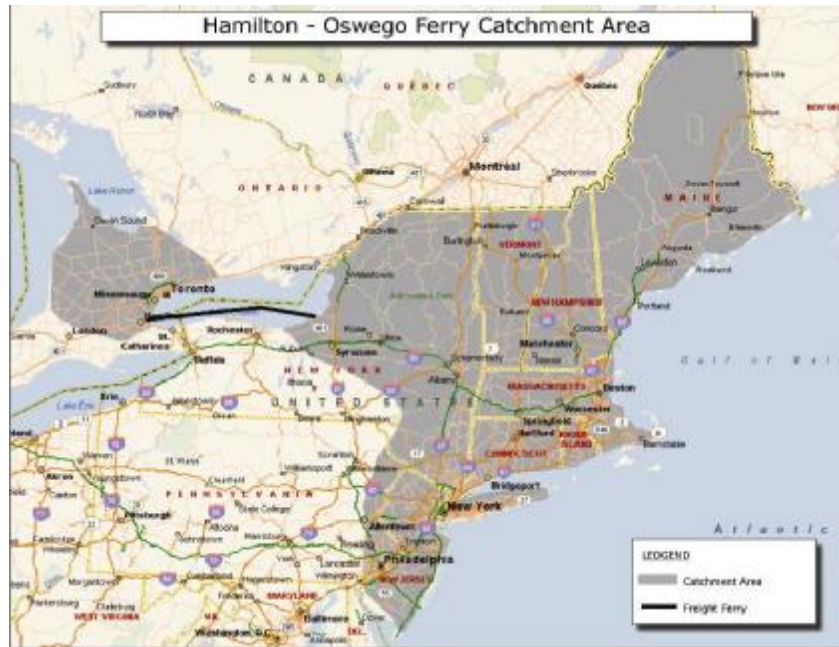
A key assumption has been that if the ferry is to be successful it must fit into current traffic patterns, with the minimum of changes and offer some real financial advantages. In order to assess the opportunities, a key consideration has been the routing of truck traffic direct between city pairs and via the ferry. To accomplish this we used a piece of software called P.C. Miler®, which plots truck legal minimum distance routes and enables costs to be input, generating a trucking cost for the route. This work was done by an experienced cross-border trucker who also looked at the routes from a real world perspective, and some were changed with his insight. Direct routes, and those via the ferry, were then compared and ranked according to the dollar difference. (At this stage no ferry costs were considered.)

**TYPICAL TRUCK MARGINS
 Excludes Border Surcharge & Bridge Fees**

	Boston	New York	Philadelphia	Norfolk	Syracuse
Hamilton	\$267	\$295	\$245	\$104	\$250.52
Kitchener	\$267	\$295	\$235	- nc -	\$260.52
North Bay	\$92	\$137	\$137	- nc -	- nc -

This route analysis showed very clearly from which states and regions the ferry would draw traffic. A cut off was presumed at \$200 which indicated that the primary markets were north and east of the N.Y. State Freeway, New England states, southern Pennsylvania and New Jersey. In general, the further south one went from Philadelphia, the less the benefit. The analysis also showed the area of influence of the ferry in Ontario.

We then started looking at traffic potential using a range of sources, including Statistics Canada, MTO truck movements and PIERS import/export data. This latter data set provided some interesting insights into traffic which would not be subject to the Harbor Maintenance Fee (HMF), of which more later.



The traffic analysis found that, based on 1999/2000 truck data from MTO, the target ferry market between primary origin/destination (O/D) city pairs was in the range 4-5,000/week through the Niagara border in each direction. This was for O/D pairs that exhibited the highest savings. Target traffic constituted about 20% of all cross border moves in the period. The uncertainty regarding total numbers came from lack of information on drop trailer operations at the border, and at terminals on either side of the border, for which there was very little data, but quite a bit of activity.

The initial capacity of the ferry system with two 1,600 lane metre ferries would be about 15% of the target market. Thus the start up capacity of the ferry would be in the order of 3% of all traffic. As acceptance of the service developed, adding additional ships reduces overall costs, but also makes the service of even more interest, as headway drops from 12 hours to 6, and less.

INSTITUTIONAL ISSUES

In working through the development of the system there are a number of institutional elements that have a material impact on operating costs.

PILOTAGE

The Great Lakes are a bi-national region; there are no international waters and as a result OPA 90 has created a Pilotage cost nightmare for ships that are neither US nor Canadian flag. A foreign flag operation of the service being considered would incur pilotage costs of a least US\$1,000/ship trip.

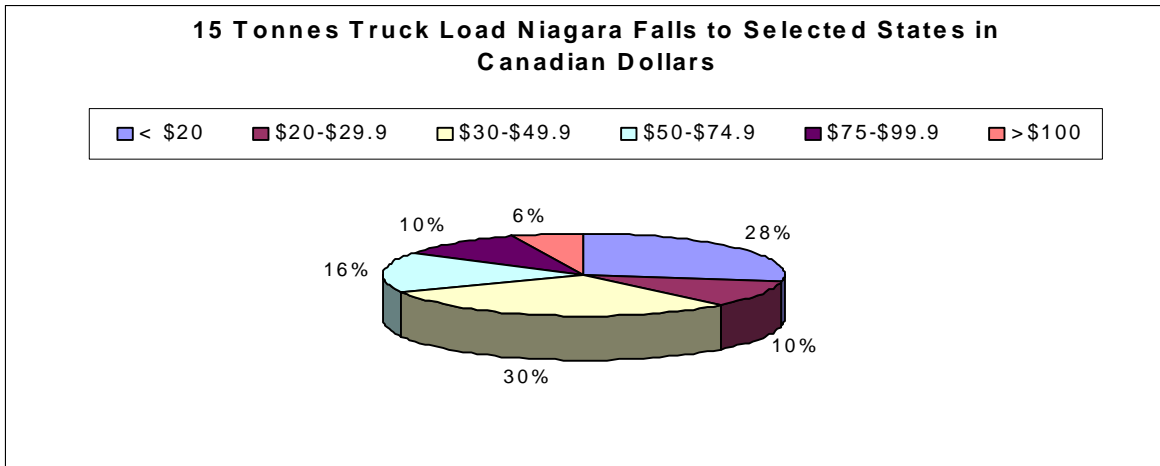
Putting the ship under Canadian flag is not necessarily a viable option as a non-NAFTA vessel incurs 25% duty plus full upgrades to current MARPOL and SOLAS. The alternative is US flag, which does not incur a duty provision, but does involve upgrade work. However, USCG will consider reasonable alternative and waivers where it can be demonstrated that ship safety will not be compromised.

CUSTOMS & IMMIGRATION

US and Canadian authorities take very different approaches. On the US side, service is provided without charge, but the operator must meet all the technical requirements as laid out by Customs and Immigration. The main problem is that getting the service in place can take 12-18 months, even with political assistance. In Canada, service will be provided promptly and there is some flexibility with regard to interim facilities. However, it has to be paid for. Canada has grandfathered existing border crossings and airports as well as some ports of entry for free service. For new operations, or enhanced activities at ports that have resident customs facilities, Canada is in full cost recovery mode. This can add significantly to operating expenses. The Windsor/Detroit ferry, for example, has to pay about \$50,000/year for a single customs officer 08:00-16:00, five days a week. This is more than a little limiting.

HARBOR MAINTENANCE FEE

As noted with the Milwaukee-Muskegon ferry, freight was excluded because of the HMF, which is value based at .125% on all imports into US ports (the export portion was struck down by the Supreme Court some years ago). The fee applies equally in domestic as in international trade and is supposed to support dredging programmes in the USA. There are some exclusions and ferries that carry some truck traffic are also excluded where “freight is a minor portion of the business”. We are not sure if anyone has tested the meaning of minor.



Until there is a broad exclusion for freight ferries (i.e. cargo on wheels) it will be difficult to convince shippers that a ferry route which is taxed is better than the traditional all-road route, which is not. The Hamilton-Oswego route is interesting because of the mix of traffic. An analysis done using Stats Canada data, and shown in the figure above, suggested that about 75% of all moves that would be taxed, could be contained at under U\$35/load. MTO traffic data showed that the average load across the border was only 13

tonnes, and the estimates undertaken were at both 15 and 20 tonnes. There are also a large number of international freight containers inbound through the US to/from Ontario which are exempted from the fee, as well as a significant number of empty trailers which would be zero rated. Thus the overall impact of accommodating the HMF might be manageable in the short term on this route, although it would certainly impact traffic levels. A similar analysis for other routes may not be so benign.

ENVIRONMENTAL & RELATED BENEFITS

The marine mode is well recognized as the most energy efficient, least polluting and safest transportation mode, as the following table shows. Thus moving cargo to the marine mode should enhance quality of life in urban areas, as well as helping reduce greenhouse gases and atmospheric pollution.

COMPARATIVE ENVIRONMENTAL INDEX OF TRANSPORTATION MODE²

	Marine	Rail	Road
Energy efficiency	1	2.2	9.7
Air emissions	1	1.4	7.6
Accidents	1	13.7	74.7
Spills	1	10.0	37.5
Noise	1	1.4	1.3

There are other, un-quantified benefits related to the congestion impact of accidents, particularly truck accidents on busy highways. Even a minor accident can close lanes or complete roads for 4-12 hours and in congested urban areas, the time cost of delays and atmospheric emission impact can be significant. A recent accident on the 401 highway in Toronto, which is one of North America’s busiest, closed the express lanes to all traffic for 12 hours because of a double truck collision and fire. Many vehicles were trapped until the debris could be cleared to permit their release. The highway at this point handles 357,000 vehicles/day, but this is an average over the 24 hour period and peak hourly traffic is significantly higher. As this incident occurred over a ravine, alternative routes, other than the 401 collector lanes, are very roundabout. It is reasonable to assume that over 300,000 vehicles took at least one hour longer to accomplish their trips. The time value of the delay would have exceeded US\$10m, and atmospheric emissions would have increased by at least 50% based on average commute times, much more based on transit times where a five minute transit through the area increased by twelve times.

WRAP UP

There are some very real marine opportunities on the Great Lakes to materially reduce border congestion, and mitigate highway traffic volumes. The three cross border freight routes under consideration could also generate profitable traffic levels, while offering savings to shippers and helping mitigate driver shortages. However, as is being found in Europe, the impact of institutional attitudes and costs that do not recognize the benefits that marine highways can generate may cause these ventures to be shelved indefinitely.

² Hamelin-CFORT- Gesco 11.2000 on behalf of SODES. Comparison based on Tonne Kilometres