Great Lakes-St. Lawrence Seaway

New Cargoes/New Vessels

Market Assessment Report

Executive Summary

January 2007

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Maritime Administration, U.S. Department of Transportation / Transport Canada

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INTRODUCTION

The Great Lakes-St. Lawrence Seaway (GLSLS) system of waterways have long played a key role in developing North America's economy. In the past century, the success and importance of these waterways in moving bulk and neobulk cargo has been critical in the development of the region's industrial base. Since May 2003, the U.S. Department of Transportation and Transport Canada have been involved in a comprehensive bi-national study to evaluate the infrastructure needs of the GLSLS System, including the engineering, economic, and environmental implications of those needs as they pertain to commercial navigation.

The New Cargoes / New Vessels (NCNV) Market Assessment has been a major investigation of the bi-national GLSLS Study. A primary objective of the Assessment has been to provide information and new insights into the role of the Great Lakes and Seaway as part of the bi-national region's integrated transportation network, particularly along major trade corridors. This assessment has investigated a diverse set of interrelated issues, including: infrastructure needs, economic vitality and efficiency, evolving and emerging markets, trade growth and changing trade patterns, short sea shipping, and modal integration.

Following an initial scoping study sponsored by Transport Canada, the U.S. Maritime Administration, an agency of the U.S. Department of Transportation, contracted with the team of Transportation Economics & Management Systems, Inc. (TEMS) and the RAND Corporation to assess opportunities for growth in emerging neobulk and potentially new container traffic in the GLSLS system that could help meet transportation needs generated by continuing expansion of the region's economy, focusing on three major areas of investigation –

- An evaluation of the economic significance and growth of industrial sectors and markets of the GLSLS region as a basis for projecting the transportation needs of its evolving economy.
- Market investigations and forecasts of emerging and potential cargo movements through 2050, focusing on potential growth in neobulk and containerized trade.
- An evaluation of the ability of water options and vessel technologies to address shippers' service requirements for both container and neobulk traffic.

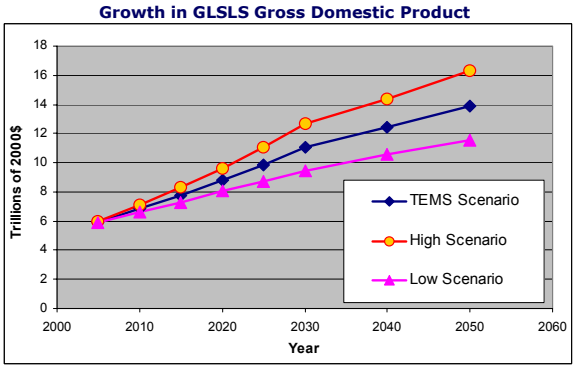
REGIONAL ECONOMY AND TRENDS

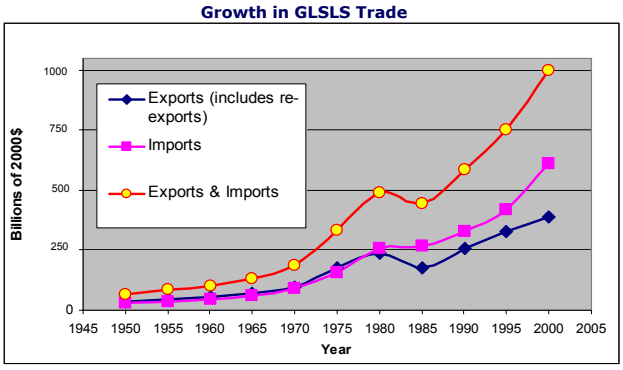
Analysis of trade flows indicates that the GLSLS serves a large region of North America including Atlantic and Central Canada and the U.S. Midwest and Northeast. This region encompasses Northeast Atlantic gateway ports, major agricultural and mining areas, and the largest and historically integrated, manufacturing, business, consumer, and market centers of Canada and the United States.

The GLSLS bi-national region has 156 million people (about half the population of the U.S. and Canada) who are settled on less than 20 percent of the land area of Canada and the United States. As a result, the region has North America's highest regional population density with around 60 percent of the urban population of both countries. It is one of the world's largest manufacturing and consumer markets.

With an employed workforce of 74 million in 2000, the region currently generates nearly half of U.S. and Canadian Gross Domestic Product (GDP) and dominates the continent's service and manufacturing industries. As a result, the region is a major focus of global trade flowing east through Atlantic ports as well as west through Pacific ports.

In terms of the region's growth, the demographic and economic trends that are projected through 2050 suggest that the economy will continue to grow and expand in line with historic rates. This means a doubling of the region's GDP by 2050 as the economy grows from US $6 trillion in 2005 to $14 trillion by 2050. This growth is anticipated to occur within an envelope of ± 20 percent reflecting the likely range of high- and low-growth outcomes.





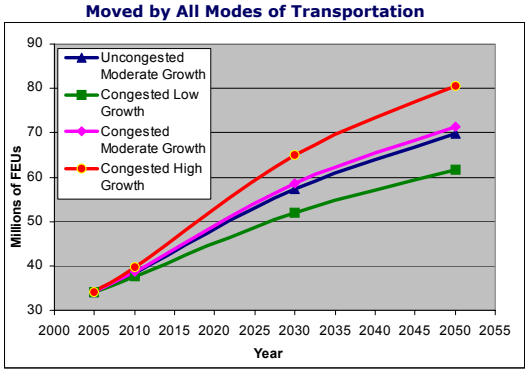
This growth however is dependent on the continued diversification of the region's economy and the development of "New Economy" businesses as older more traditional manufacturing activities move offshore. The implication of this industrial change and restructuring is that the growth of trade between the region and the rest of the world will continue at a very high rate. In the 1960's, total trade for the region was under US $50 billion (in 2000 dollars) but grew to over US $1 trillion by year 2000, a more than twenty-fold expansion in trade.

The region's emerging New Economy is heavily dependent on trade. In recent decades, the rapid expansion of trade with Asia has grown larger than traditional trade relationships like those with Europe. However, even trade between the United States and Canada, Europe, and Latin America have grown at very high rates. Mirroring developments in the larger Canadian and U.S. national economies, this explosion of trade with all parts of the world is changing the fundamental character of the GLSLS regional economy and its need for supporting transportation services.

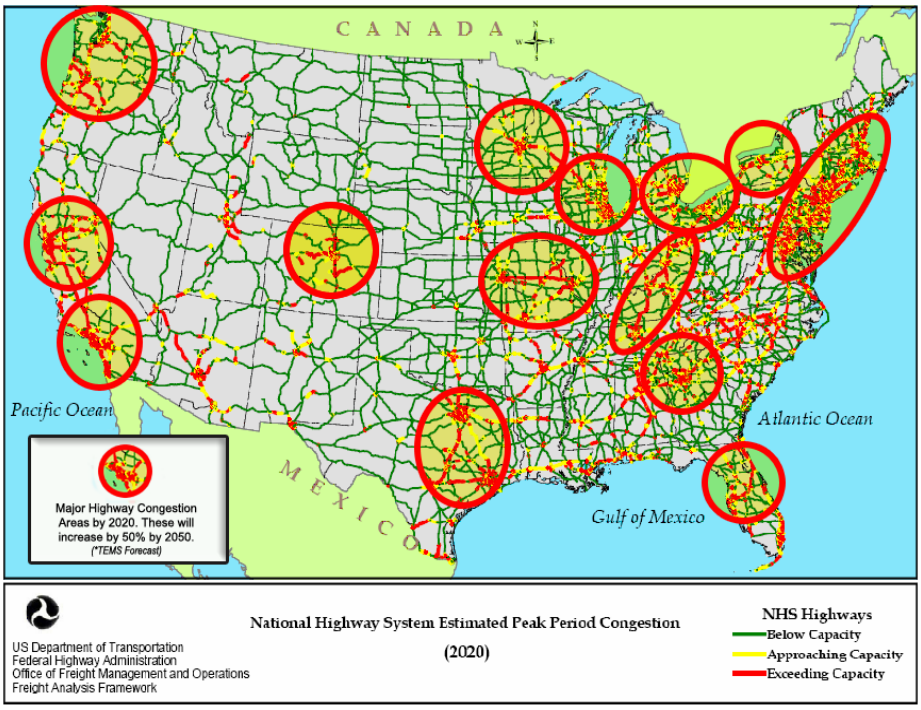
IMPACT ON TRANSPORTATION NETWORKS

As the region's population, employment, GDP, and trade are projected to grow significantly through 2050, the region's freight traffic is expected to expand at an even faster rate. Furthermore, it is anticipated that a growing share of traffic moved by all modes of transportation will be by containers (including truck trailers). The total market for containerized traffic (which includes raw materials, food, and semi-finished and finished products) to and from the region is expected to more than double by 2050, from 35 million to over 70 million forty-foot equivalent units (FEUs) annually. This growth creates a number of issues.

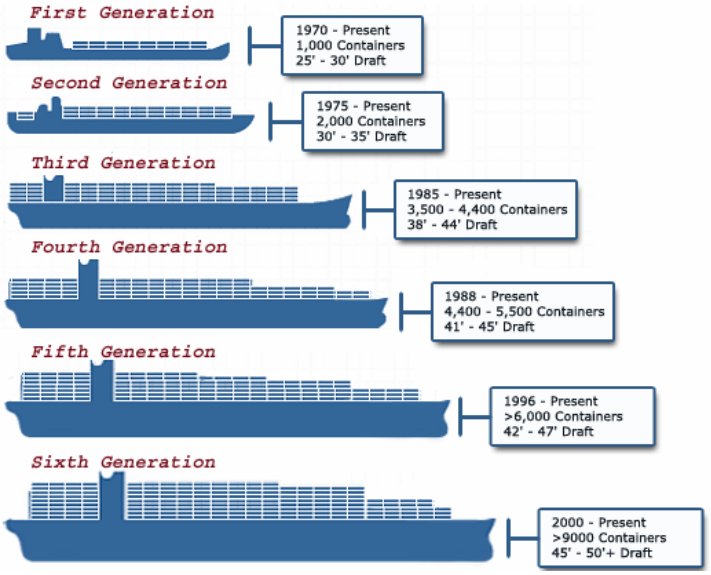
GLSLS Growth in Container Traffic Moved by All Modes of Transportation



- Today, as in the future, trucks will move the lion's share (over 98 percent in 2005) of containerizable freight tonnage, and rail is moving the remaining 2 percent. However, available highway and rail capacity is suffering from deteriorating levels of service. In the case of highways, the capacity crunch is largely due to the growth of automobile traffic, particularly around major cities. In the case of railroads, a move to increase productivity over the past two decades resulted in increased concentration, amalgamation, and abandonment of secondary lines. As a result, moving containers by truck and rail in the future will cost more and probably take longer, since traffic is expected to outgrow any improvements in capacity and congestion is expected to increase.

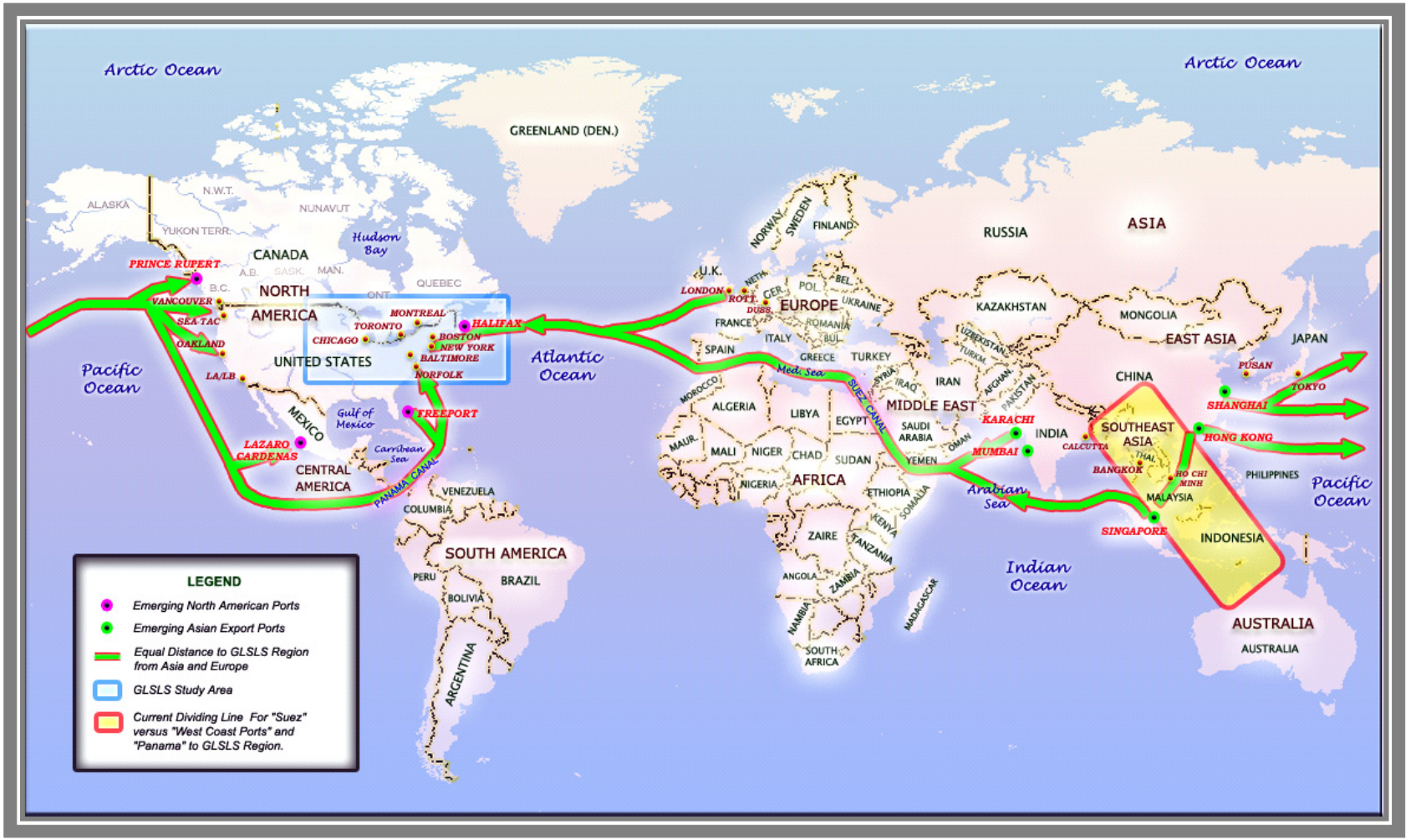


- In addition, port capacity is being reached in many "traditional" West and East Coast ports. This problem is exacerbated by the increasing size of container ships which cannot be accommodated at many of the shallower "traditional" East and West Coast ports. While new container port facilities are being developed on the West Coast (such as Prince Rupert in Canada and Lazaro Cardenas in Mexico), opportunities for expansion at existing West Coast ports are limited, and increased throughput will become increasingly dependent upon productivity gains. As such, it is anticipated that at least 30 percent of West Coast port growth will be diverted via the Panama Canal (15 percent) and by a round-the-world route via the Suez Canal (15 percent) to East Coast ports, such as: Halifax, Nova Scotia, Canada; Norfolk, Virginia, USA; and Freeport, Bahamas. In addition, the Suez Canal route appears to be an increasingly viable alternative due to, first, the expansion of trade south and west in Asia (to include countries like Malaysia, Thailand, Pakistan, and India) and to, second, the ability of the Suez Canal to handle the larger post-Panamax container ships. Both these trends could favor deployment of vessels to North America's East Coast ports.



- The net effect of continued economic growth, increased Asian trade, and capacity limitations on the GLSLS region's highways and railroads is an increased potential for water to play a role in the transportation of container and palletized (neobulk) traffic. Detailed analysis using very conservative assumptions on highway and rail capacity limitations suggests that –
  - As road freight traffic continues to grow by some 88 percent between 2005 and 2050 to accommodate trade growth, the highway market share moved by truck could decline slightly from 98 to 92 percent of total freight traffic from congestion-related diversion of traffic growth.
  - Railroad carryings could double from 2 to 4 percent for intermodal (container) traffic volume between 2005 and 2050, assuming that the railroads begin to bring back unused capacity in secondary lines and bypass routes.
  - An intermodal water option could also capture 4 percent of intermodal traffic by 2050, if it is competitive with rail and highway.
  - If highway infrastructure is not able to absorb the 88 percent increase in road freight traffic, due to an inability to mitigate bottlenecks, both water and rail traffic could increase beyond the combined 8 percent share of traffic currently forecast. In the case of water it could grow to as much as 8 percent without reaching GLSLS waterway capacity restrictions. In the case of rail capacity, restrictions may prevent it reaching a similar share of traffic.

Evolving Patterns of Asia – North American Trade



POTENTIAL FOR NEW WATER SERVICES

An in-depth market survey of the freight transportation needs of some 200 shippers in Canada and the U.S. found a willingness to use water container services if they were comparable and competitive to truck and rail in terms of time, cost, and reliability. In addition, the survey found that "seasonality" of service was not such a critical factor, because the freezing of the GLSLS system occurs during the low traffic period after Christmas when intermodal traffic volumes are reduced by 15 to 20 percent.

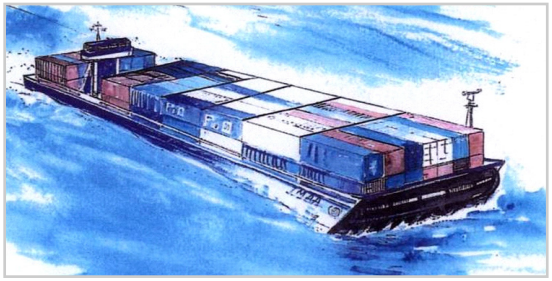
- To evaluate the potential for water transportation to offer service competitive with rail and truck, an analysis was made of the time, cost, and performance of four water technologies. These include –

Container on Barge (COB) -8-15 knots

High Speed Freighter -40 knots

GLSLS max Container Ship -20 knots

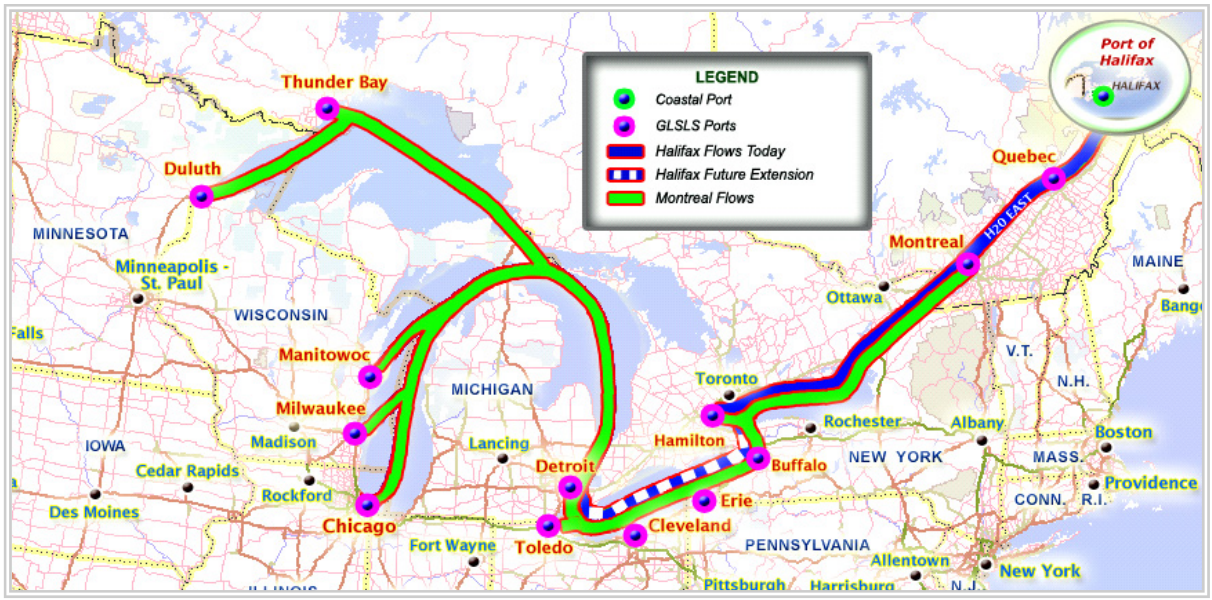
PACSCAT High Speed Freighter -25-35 knots



- A detailed analysis of vessel types indicates that Roll-On/Roll-Off (Ro/Ro) ships may be best suited for moving containerized traffic at start up, by offering competitive line-haul costs while minimizing port costs. As volumes increase over time, a modern GLSLS-max Lift-On/Lift-Off (Lo/Lo) containership operating up to 20 knots may become the most cost-effective water option for east-west movements through GLSLS waterways. To compete with rail and truck transportation, however, a vessel service would have to operate on a daily basis.

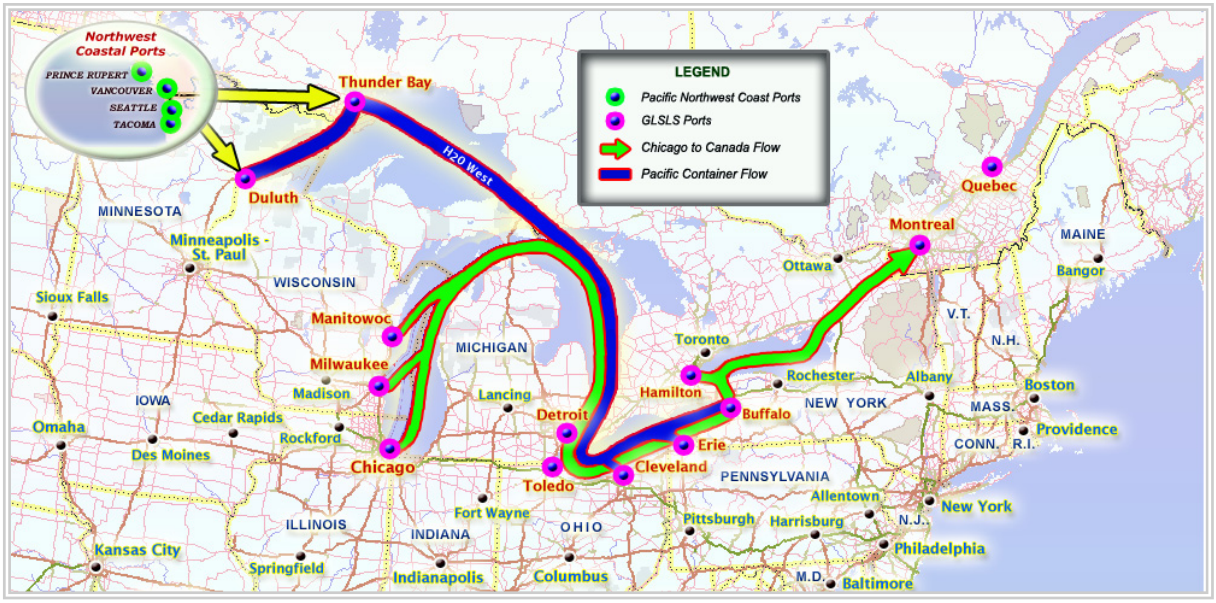
- The study develops a plan for the initial development of water-intermodal services using a 20-knot Ro/Ro or Lo/Lo containership. This plan addresses the competitive dynamics of three major intermodal markets: eastern (Duluth/Wisconsin/Chicago); Halifax/Montreal/Hamilton; and Chicago/Detroit-Lake Erie/Montreal. As traffic grows, however, the individual vessel services can be coordinated to operate as a single network, so that interconnecting business will then serve to boost the traffic volumes handled by all water services.
    - **I-H_20 East** - Inland distribution from the East Coast container ports of Halifax and Montreal to inland ports and Lake Ontario and Erie ports such as Hamilton and Cleveland. The eastern end of the Seaway is a traditional route for serving trans-Atlantic traffic. There is an immediate opportunity for GLSLS participation in domestic, cross border, and import/export traffic at Montreal. In addition, there is a longer-term opportunity for extending GLSLS vessel services through to Halifax, depending on the port's ability to attract more vessel calls from anticipated trade growth with South Asia through the Suez Canal. In coming decades, the ports of Halifax, Quebec, and Montreal are all expected to grow due to increased container traffic bound for both the U.S. Midwest and Central Canada.

Main Eastern GLSLS Flows: H_2O East



° **I-H_20 West** - There are substantial domestic and cross-border freight flows between Chicago and eastern Wisconsin and Lake Erie, Central Canada, and Montreal which can be served with water intermodal services. In addition, given increasing rail congestion in Chicago and the limited ability of railroads to expand terminal capacity there, the Great Lakes could provide a Chicago bypass for some West coast container traffic. From the ports of Tacoma, Seattle, Vancouver, and Prince Rupert, the Burlington Northern Santa Fe (BNSF), Canadian National (CN), and Canadian Pacific (CP) railroads can transfer containers at the Lake Superior ports of Duluth and Thunder Bay for vessel transport to Great Lakes ports further east and south.

Main Western GLSLS Flows: H_2O West



° **GLSLS Domestic Connector** - Services that provide an inter-lake/inter-seaway connection for domestic containers from Chicago to Montreal would bypass major rail and road congestion areas such as Chicago, Detroit/Cleveland, Buffalo/Toronto, and Northeast coastal cities.

- Initial volumes and service requirements suggest that 150-200 FEU capacity, 20-knot, Ro/Ro container vessels could meet market demand, while also keeping intermodal transfers to truck and rail services as simple and as fast and cheap as possible. As traffic builds, however, higher volume containerships (GLSLS-max with 300-400 FEU capacity) and new port container handling facilities should become cost-effective for moving both domestic and international freight.

- **Caveats on the Estimates:** The results of this analysis are subject to a number of caveats and contingencies.
  - The growth forecasts are largely an extrapolation of historic trends and projected GDP growth. It may be that growth of trade with Asia will slow. If this occurs, it would impact the volumes of traffic overflowing from West Coast ports into other trade routes.
  - The H_20 West forecast of Duluth land-bridge potential is dependent on congestion in Chicago growing as rail traffic doubles. Such congestion may well ease if the 'CREATE' project were accelerated or if the existing six major railroads merge to form two transcontinental railroads. Such mergers are anticipated by the rail industry, but probably not for at least another five years.
  - The H_20 East forecast is dependent on continued development of congestion at both East and West Coast U.S. ports as they struggle to meet increasing traffic volumes. Ports from Boston to New York to Philadelphia and Baltimore already find it difficult to serve Midwest and Great Plains markets. Expected congestion at the traditional east coast ports would require that Halifax and the Virginia Ports absorb significant traffic growth in the next twenty years and beyond. It would appear that they have the resources to do so.
  - To develop viable H_20 East and West shipping services, there is a need for a concerted effort by the shipping industry and its ports.
    - Clearly, Halifax, Quebec, Montreal, Hamilton, and Cleveland need to cooperate and work together with the railroads for developing H_20 East. In particular, rail cooperation is needed to develop a seasonal substitute rail shuttle for the winter months when the Welland Canal and Seaway locks are closed.
    - The ports of Duluth, Thunder Bay, Detroit, Windsor, Toledo, Cleveland and Hamilton need to work together with the railroads BNSF, CN and CP to develop H_20 West.

    In both cases, a required investment must be made in modern ships and port facilities. In both cases, a proactive private public partnership is needed to implement the opportunity.
- For north-south, cross lake shipping for both neobulk and container traffic, it was found that the use of either a small fast container (20 knot) Ro/Ro ship or a somewhat faster (25-35 knot) vessel known as a Partial Air Cushion Support CATamaran (PACSCAT) would be cost and time effective. These vessels are highly competitive when the only other option is congested U.S./Canadian bridge crossings.
- The critical determinants of success for such new ship services include the magnitude of –
  - Growth of the regional economy and its expanding trade with Asia;
  - Congestion in the rail network converging on Chicago, Kansas City, and St. Louis, in bottlenecked highway corridors, and at East and West Coast ports; and
  - Traffic overflows from West Coast ports through the Suez Canal.

  Each of these factors needs to be carefully monitored to check and evaluate its impact on GLSLS container and neobulk traffic.

CONCLUSIONS

The study shows that the GLSLS has the potential to play a significant part in helping to relieve anticipated capacity shortfalls in the movement of containers to U.S. and Canadian markets. Under very conservative assumptions about the future growth of the economy and trade and continuing difficulties in building new highway and rail capacity, a detailed analysis of shipper behavior shows that modern GLSLS-max container ships (20 knots) can be competitive with truck and rail, and attract significant container traffic. In this way the GLSLS can play a role as an intermodal reliever in helping to move containers to, from, and within the GLSLS market areas.

A potential 8 percent combined market share for both rail and water intermodal by 2050, however, will not mitigate the doubling in container traffic that's expected over the next 45 years and so 92 percent of the market will still be moved by truck. Other investments and measures will need to be developed to expand capacity for the 88 percent increase in highway traffic that is forecast by this study. If such measures are not taken, then the growth of water (and rail) traffic will be even more significant than suggested by this study as the congestion levels for highway will be higher than those initially assumed. In this more highly congested environment the water intermodal transport market share could grow to as much as 8 percent before reaching GLSLS waterway capacity.

In developing water intermodal services, the analysis suggests that by 2010 there are potential opportunities for –

- Ro/Ro container ship operation that requires only limited port infrastructure in coming years, although there may be a need to develop the cargo-handling infrastructure for Lo/Lo container ship service to accommodate potential traffic growth within a decade.
- Daily shipping services from the East Coast Ports of Halifax and Montreal (H_2O East) to Lake Ontario and Erie Ports, once Halifax reaches a traffic level exceeding 1 million TEUs.
- Daily shipping service from the Lake Superior ports of Duluth and Thunder Bay, (H_20 West) to Lake Michigan, Lake Huron, and Lake Erie ports can be developed with mini-landbridge, freight-railroad services to move containers from (as well as back to) West Coast ports.
- Daily interlake/Seaway port service from Chicago to Montreal also can be established to help offset highway and rail congestion.