



# **The Future for Canada-US Container Port Rivalries**

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### **Introduction**

*“It is well to keep in mind that the several agencies of transportation, carriers by water, rail, road and air, are or should be, inter-related parts of an integrated whole and while the waterways of Canada are in no way articulated with other transportation agencies except in the private development of harbours by the railroads at certain points, nevertheless there exists a certain natural co-operation, even if not of a regulatory nature, which has played a large part in the development of the international and domestic commerce of Canada.” – Excerpt from Waterways of Canada, 1935<sup>1</sup>*

Canada’s extensive geography and sparse population has necessitated the development of a strong transportation expertise. Canadians recognized the need for a national, modally integrated transportation system long before the invention of containers and the concept of intermodal transport and have spent years developing their system.

This system has well positioned Canada’s ports relevant to U.S. ports to capture a significant share of North America’s overseas container trade. In 1999, 20 Canadian ports handled 21.9 million tonnes (Mt.) of containerized freight exchanged with overseas countries or 14.1% of the North American (Canada & U.S.) total. In comparison, Canada had 9.9% of North America’s population, 6.6% of its retail sales and 7.6% of its manufacturer’s shipments<sup>2</sup>.

However, this position is far from secure. The ocean container shipping industry is undergoing changes that will impact on their relationships with ports. Competition among ports for container traffic has been fierce as demonstrated by the Maersk Sealand selection process for an East Coast North American container hub<sup>3</sup>.

This paper will attempt to explore how Canadian ports might fare in this increasingly competitive environment, based on their natural and man-made attributes, their competitive stance and their potential to meet the evolving ocean container industry environment. The assessment will include a review of the ocean container shipping industry, the North America container market and competing ports in the United States (U.S.).

This report uses data from two sources, Statistics Canada's marine international origin/destination (O/D) database and the U.S. Department of Transport Maritime Administration's (MARAD) Annual Import Export Waterborne Databank which is based on Journal of Commerce P.I.E.R.S. data. The units of measure are tonnes of containerized cargo and the Twenty-foot Equivalent Unit (TEU) for containers with cargo, that is the Laden TEU (i.e., no empty containers). The data cover a ten-year period from 1990 to 1999. There are some limitations with respect to the overall accuracy of the TEU data and the comparability of Statistics Canada and MARAD's data. These limitations might affect the reported totals but are not expected to significantly impact the comparative analysis. More detail is provided in the endnotes of this paper<sup>4</sup>.

### **Trends in the Ocean Container Shipping Industry**

Faced with chronic over-capacity on most trade routes and basement level freight rates, the ocean container industry responded by seeking economies of scale through mergers and alliances that produced larger companies and by building larger containerships.

The rate of mergers and alliances accelerated through the 1990s<sup>5</sup>, considerably increasing the industry's concentration. The 'Top 20' liner operators controlled 76% of the world's cellular containership fleet in 2000, up from 70% in 1998, 50% in 1995 and 40% in 1990<sup>6</sup>. This concentration is not always visible to the market place, as some companies have engaged in brand proliferation by using the established trading names of their new acquisition and allowing autonomy on trades where they compete with the parent company<sup>7</sup>.

The trend to larger containerships is more visible and dramatic. An analysis of the Fairplay Ship Register database for December 2000 (see Table 1) shows most of the world's active containership fleet had capacities of 200 to 3000 TEUs. These ships are generally older than ships over 3000 TEUs with the age increasing as capacity decreases. While the 200 to 3000 TEU containerships account for 83% of the world fleet they account for 57% of its total capacity. There were 540 containerships on order in December 2000 with 47 ships of 1000 TEUs or less, 383 with capacities of 1001 to 4,499 TEUs and 110 ships of 4500 TEUs or more. The largest ship on order had a capacity of 8700 TEUs. Since December 2000, the China Shipping Group announced intentions of ordering two 9800 TEU ships<sup>8</sup>

**Table 1: World Container Fleet by Size, Capacity and Age**

Size in TEUs	Share of Ships	Share of TEU Capacity	Average Age in Years
<501	19%	3%	16
501-1000	18%	8%	13
1001-2000	31%	26%	12
2001-3000	14%	20%	12
3001-4000	8%	17%	10
>4000	9%	26%	6

*Source: Fairplay Ship Register, December 2000*

The 4500 TEU threshold is significant as it roughly equates to a beam width of 32.32 metres, or the maximum size for the Panama canal.

The demand for larger ships can be attributed to 6 factors: economies of scale; competitive shipyard pricing for large tonnage ships; larger cargo volumes moved by carriers expanded by mergers/alliances<sup>9</sup>; growth expectations for containerized cargo; improvements in port infrastructure; and, the need to replace old tonnage<sup>10</sup>.

A key caveat to the economies of scale is that these economies apply while the ship is at sea. In port, there can be some small diseconomies related to ship size. These sea-based economies of scale suggest that

the larger ships will first be deployed on routes with the longest sea voyages and most efficient ports. Cullinane and Khanna concluded there will be economies of scale for ships of up to 8000 TEUs on the Europe-Far East and transpacific liner routes. For the transatlantic route they found an optimal size in the 5000 to 6000 TEU range. They suggest that the industry concentration and trend to larger ships indicate the continued adoption of the load centre concept and a trend to hub and spoke port systems in the short to medium term<sup>11</sup>.

The optimism of the ocean container shipping industry for the growth potential of container cargo has not been misplaced in recent years. Lloyd's Shipping Economist estimated that ocean container volumes increased 8-9% in 1999<sup>12</sup> and up to 10% in 2000 with freight rates up in most cases<sup>13</sup> as demand exceeded the available supply of container slots. This good news is tempered by significant directional imbalances in most trade routes that do not seem likely to change.

Drewy Shipping Consultants found that trade imbalances required the movement of 38 million TEUs (M TEUs) of empty containers in 1998 with associated direct/indirect costs of \$12 billion (U.S.) up from \$10.5 billion in 1997. While much of this imbalance involves intra-regional flows, there has been major growth in the imbalances on the 3 major east-west routes (Eastbound Asia/North America, Westbound Asia/North Europe and Westbound North Europe/North America). These 3 routes had gone from an estimated container imbalance of 1.4M TEUs in 1996 to 4.6M TEUs in 1998 despite more imports to Asia following their economic recovery. The expansion of this imbalance slowed in 1999 to an increase of 3.6%<sup>14</sup>.

The outlook for the ocean container industry is one of guarded optimism. The pending admission of the Peoples Republic of China to the World Trade Organization after 13 years of negotiations is expected to increase demand in the liner trade by 1.6M TEUs a year through to the year 2005<sup>15</sup>. Short-term rates are buoyant as carriers with rate increases on transpacific and transatlantic routes in 2001. Clouds on the industry's horizon are potential regulatory changes that could eliminate the carriers potential loss of immunity from antitrust

laws in the U.S. and Canada and increase their liability for cargo loss and damages<sup>16</sup>. The industry experienced more confidential contracts under the 1998 U.S. Ocean Shipping Reform Act (OSRA). Large ocean carriers had to reorganize to deal with major trading companies seeking global confidential contracts over multi-trade lanes with volume price discounts on all trade lanes<sup>17</sup>. Lastly, is the concern that new containership tonnage will cause excess capacity on trade lanes

These trends in the ocean container shipping industry may have significant impacts on the ports that compete for container traffic. Container lines using the larger ships may reduce the number of ports at which they call. A handful of super-ports could handle almost all of the international containers for North America. The remaining ports would either opt out of the business, become spoke ports, or develop niche markets. Ports that attract the super post-Panamex ships will need significant financial resources to fund deep draught terminals and cranes. They will need inter-modal partners capable of moving extreme peak container volumes from the docks to inland clients while peak volumes of outbound containers await loading. The fewer, more powerful liners may insist on port productivity improvements for the carriers to achieve the scale economies of the larger ships while the ports assume the productivity investment risks.

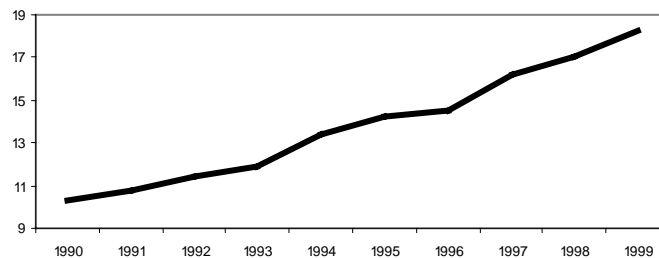
### **The North American Ocean Container Shipping Market**

In 1999, North American ports (excluding Mexico & Alaska) handled 18.3 million laden TEUs (i.e., containers with cargo) in trade with overseas ports. In the 1990s, this market grew at an average annual rate of 6.6%. Asia and Oceania was the dominant trade route with 57% of the laden TEUs in 1999, followed by Europe with 24%.

Ports on the Pacific coast, which handled 92.6% of the laden TEUs originating in or destined to Asia and Oceania, accounted for 56.9% of the total traffic. Atlantic coast ports handled 44.0% of the laden TEUs because they dominated the traffic to and from Europe and South and Central America. Ports on the Gulf Coast handled almost

all of the remaining TEUs as Great Lakes ports handled just 302 TEUs from/to overseas ports in 1998.

**Figure 1: Laden TEUs to/from Overseas Ports and Countries**  
(1990-1999, Millions of TEUs)



Source: MARAD Annual Import Export Waterborne Databank and Statistics Canada's International Marine Origin/Destination database

Growth rates for container traffic varied significantly among world regions in the 1990s. The South & Central America and the Middle East & Africa trade lanes led the world regions with average annual growth rates (A.A.G.R.) of 11.4% and 8.4%, respectively. Europe had the lowest A.A.G.R. at 4.1%, while the Asia & Oceania container traffic grew at an average annual rate of 6.6%.

**Table 2: Millions of Laden TEUs Handled at North American Ports by World Region of Origin/Destination in 1999**

World Region	North American Coast			Total
	Atlantic	Pacific	Gulf	
Asia & Oceania	1.94	8.41	0.04	10.39
Europe <sup>(1)</sup>	3.50	0.33	0.52	4.35
South & Central America <sup>(2)</sup>	2.08	0.28	0.52	2.88
Middle East & Africa	0.51	0.05	0.08	0.64
Total	8.03	9.08	1.16	18.27

(1) Include Greenland & Ste. Pierre

(2) Includes Mexico. Total may not add due to rounding.

Source: MARAD Annual Import Export Waterborne Databank and Statistics Canada's International Marine Origin/Destination database

Canadian ports handled 10.7% of the laden TEUs handled by North American ports in 1999. The share by world region varied from 2.4% of the rapidly growing South & Central American market to 23.1% of the European market. Canada's share of the Asia & Oceania and Middle East & Africa routes were 8.0% and 7.8%, respectively.

The combined Canada – U.S. TEU data confirm the imbalance in containers on routes discussed in the literature. In 1999, North America received 3.0 M TEUs more from overseas countries than it sent. This imbalance had risen 48.8% from 1998. Asia & Oceania had the worst imbalance with inbound containers exceeding outbound by 2.8M TEUs. Europe had an inbound surplus of 725 thousand TEUs (K TEUs). Containers bound for South & Central America and the Middle East & Africa exceeded inbound containers by 338K TEUs and 152K TEUs, respectively. These statistics suggest that 28.3% of the containers received in North America from foreign trades were sent back empty. For Asia & Oceania that number rises to 42.2%.

Surprisingly, the overseas container trade at Canadian ports was more balanced, and the imbalance that did exist was in the opposite direction from North America in general. Outbound laden containers from Canada's ports were just 2.7 K TEUs more than containers inbound from overseas for all routes except Europe. Outbound laden containers to Europe were less than inbound containers by 387 TEUs.

### **Competition with U.S. Ports**

In 1999, North America's top 20 container ports handled 95% of the laden TEUs exchanged with overseas ports. During the 1990s, these ports experienced average annual growth rates (A.A.G.R.) ranging from -2.3% for Halifax<sup>1</sup>, NS to 26.1% for Wilmington DE.

The southern California ports of Long Beach and Los Angeles were the busiest ports with 3.0M and 2.5 M TEUs respectively followed by

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<sup>1</sup> The tonnage of Halifax's containerized cargo posted an A.A.G.R. of 1.2% from 1990 to 1999. The 1990 TEUs may have been overstated.



New York/New Jersey (NY/NJ) with 2.0M TEUs in 1999. Three Canadian ports were among the top 20 North American container ports in 1999. Montreal, Vancouver and Halifax held positions 7, 9 and 15 with 883K, 779K, and 256K TEUs respectively. Vancouver experienced a strong A.A.G.R. of 14.0% while Montreal's 7.4% A.A.G.R. exceeded the North American rate (see Table 3).

The order of the ports change slightly when the data are expressed in terms of tonnes of containerized cargo. All 3 Canadian ports move up in the standing and Vancouver overtakes Montreal (see Table 4).

In 1999, Montreal was the leading port on the European trade route with 21.2% of the containerized tonnage on that route. Europe accounted for 96.3% of Montreal's containerized freight. In contrast, the Asia and Oceania trade route was the most important route for Vancouver with 96.7% of its overseas container tonnage. While Vancouver handled the 3<sup>rd</sup> highest quantity of containerized tonnage on the Asia & Oceania trade route, its share accounted for just 10.4% of that route's total containerized freight.

Europe and Asia & Oceania were important routes for Halifax with 56.2% and 28.2% respectively of its 1999 containerized tonnage. However, Halifax was not a major contender in either market with just 5.0% and 1.2% respectively of the tonnage on these trade lanes. Nonetheless, Halifax was the 6<sup>th</sup> placed North American port on the Europe trade route and 11<sup>th</sup> on the Asia & Oceania trade route.

Vancouver, Montreal and Halifax handled 97.6% of the overseas containerized tonnage handled by Canadian ports in 1999, or 13.8% of the North American total. Other notable Canadian container ports were Saint John, NB which handled 33.8% of Canada's containerized tonnage on the South & Central America route and the Fraser River which handled mainly containers on the Asia & Oceania route.

**Table 3: Top 20 North American Ports for Laden TEUs Exchanged  
With Overseas Ports 1999 Compared to 1990**

Port	TEUs 1990	TEUs 1999	Average Annual Growth Rate (%)
Long Beach, CA	1,223,633	3,045,575	10.7
Los Angeles, CA	1,453,291	2,540,053	6.4
New York/New Jersey	1,203,778	2,025,104	6.0
Charleston, SC	558,102	1,168,704	8.6
Seattle, WA	767,668	959,920	2.5
Oakland, CA	579,685	914,774	5.2
Montreal, PQ	464,829	883,182	7.4
Norfolk, VA	495,622	828,545	5.9
Vancouver, BC	239,771	777,843 <sup>2</sup>	14.0
Houston, TX	369,309	713,624	7.6
Savannah, GA	313,027	624,435	8.0
Miami, FL	295,087	615,694	8.5
Tacoma, WA	462,875	580,481	2.5
Port Everglades, FL	174,596	473,112	11.7
Halifax, NS	314,929	256,195	-2.3
Baltimore, MD	270,560	255,201	-0.6
New Orleans, LA	153,601	236,902	4.9
Portland, OR	111,588	210,217	7.3
Jacksonville, FL	106,776	148,054	3.7
Wilmington, DE	16,289	131,591	26.1
Other Canada	20,889	44,581	8.8
Other U.S.A.	701,632	834,768	2.0
Total	10,297,536	18,268,556	6.6

Source: MARAD Annual Import Export Waterborne Databank and Statistics Canada's International Marine Origin/Destination database

<sup>2</sup> Vancouver TEUs may be under-reported by as much as 15%.

**Table 4: Containerized Cargo Handled at North American Ports in 1999 by Region of Origin/Destination**

Port	Europe	Middle East & Africa	Asia & Oceania	Central & South America	Total*
Millions of Tonnes					
Long Beach, CA	1.02	0.19	19.50	0.92	21.63
Los Angeles, CA	0.80	0.06	16.54	0.99	18.40
New York/New Jersey	7.38	1.44	5.64	2.66	17.11
Charleston, SC	4.61	0.80	3.15	1.79	10.35
Vancouver, BC	0.04	0.04	8.70	0.21	8.99
Montreal, PQ	8.51	0.24	0.06	0.03	8.84
Seattle, WA	0.13	0.06	7.41	0.17	7.76
Oakland, CA	0.95	0.08	6.57	0.12	7.72
Norfolk, VA	3.65	0.56	2.13	0.78	7.13
Houston, TX	3.88	0.69	0.43	2.11	7.11
Savannah, GA	1.36	0.45	3.22	0.66	5.69
Miami, FL	1.04	0.10	0.62	3.28	5.04
Tacoma, WA	0.02	0.06	4.50	0.00	4.59
Halifax, NS	2.01	0.30	1.01	0.25	3.57
Port Everglades, FL	0.27	0.01	0.01	3.28	3.57
Other U.S.A.	4.31	0.72	3.87	8.53	17.43
Other Canada	0.16	0.00	0.05	0.32	0.54
Total*	40.14	5.82	83.40	26.10	155.47
<p>*Totals may not add up due to rounding and because they include Other North America (Ste. Pierre and Greenland) which accounts for about 10 kilotonnes.  Source: MARAD Annual Import Export Waterborne Databank and Statistics Canada's International Marine Origin/Destination database</p>					

### The Future for Canadian Ports

Canadian ports have competed successfully for North American container cargo in the past but the past is not always a good predictor of the future. However, developments in North America's intermodal transportation network hold promise for Canadian ports.

North America increasingly appears to be a single continental market tied together by ribbons of steel and asphalt. Inland markets that were once the exclusive territory of U.S. ports are becoming contestable markets for Canadian ports. While Canada's two railways, Canadian Pacific (CP) and Canadian National (CN), were built to unite this country's west with the east, they recognize that their true growth potential is along north-south corridors to U.S. markets. CP was the first to recognize the importance of U.S. markets and created an integrated rail-marine conglomerate to offer rapid service between Europe and the U.S. Midwest with Montreal as the sole North American port of call. In 1984, CP partnered with government-owned CN to buy the Detroit-Windsor rail tunnel from Conrail<sup>18</sup>.

Since privatization in 1995, CN has invested heavily in multimodal service to the U.S. including a high-cubed double-stack rail tunnel from Sarnia to Port Huron (1995) and a high-volume intermodal terminal just south of Chicago (1997). CN has pursued mergers and alliances including the purchase of all of the shares of the Illinois Central (IC) railway, the negotiation of haulage rights over U.S. rail track and a joint marketing and operating agreement with CSX Corporation. CN recently improved its access to the U.S. southwest through marketing deals with Burlington Northern and Sante Fe Railway (BNSF), despite a U.S. Surface Transportation Board imposed 15-month moratorium on rail mergers in the U.S. that was prompted by CN's proposed 1999 merger with BNSF<sup>19</sup>.

The outcome of this rail activity has been the development of direct, seamless service between Canada's main container ports of Halifax, Montreal and Vancouver and most U.S. markets. These ports can now access markets that total 9 times the size of Canada's population with 14 times the retail sales and 12 times the manufacturers shipments (Table 5).

**Table 5: Comparison of Canada to US Economic Regions<sup>20</sup>**

	Resident Population (millions)	Retail sales (\$billion)	Value of shipments (\$billion)
United States	280	3,344	5,249
Northwest	21	274	320
Northeast	71	852	1,211
Midwest	39	499	1,035
Southwest	85	966	1,548
Southeast	63	753	1,136
Canada	31	238	435

Source: US Bureau of Census and Statistics Canada. Population statistics are for 2000, economic statistics are 1997 Canadian dollars at July 2, 1997 exchange rate (\$0.7307).

The concept that Canadian ports might be able to offer service in all North American markets may seem a little far-fetched. The traditional wisdom is that a container port should be sited near a strong traffic-generating hinterland (centrality) or along the path between two pairs of distantly located traffic-generating regions (intermediacy). Canada's ports have trouble meeting the first criteria, but can meet the second criteria for most North American trades on the Pacific and Atlantic oceans. Already the concept of intermediacy seems at work. Table 6 shows North American inland markets for laden containers by coast for U.S. gateway ports. These data are based on the state of the shipper or consignee. Inland origin/destination states have been reported for about 80% of the database's records.

**Table 6: Inland Region of Origin/Destination for Laden Containers by Coast of the US Gateway Port, 1999 ('000 TEUs)**

Inland Region	Atlantic	Pacific	Gulf	Total
Northwest	176	652	25	853
Northeast	2,389	1,146	248	3,783
Midwest	377	765	56	1,198
Southwest	527	3,522	416	4,465
Southeast	2,056	526	193	2,775
Total	5,525	6,610	938	13,073

Source: MARAD 1999 Import Export Waterborne Databank

As might be expected, the U.S. Southwest and Northwest regions had most of their containers (78%) entered or cleared through centrally located Pacific ports in 1999. Similarly most containers (68%) for the U.S. Northeast and Southeast regions were cleared through Atlantic ports. Containers for the US Midwest market were handled at ports on the Pacific (64%), Atlantic (32%) and Gulf (5%) coasts. This suggests that in addition to the inland Midwest market, 24% to 32% of the containers the ports moved in 1999 were to markets beyond their hinterlands. The shaded portions of table 6 could represent potentially contestable markets that total 3.8 M TEUs or double the total volume for Canadian ports in 1999.

A further analysis of these data by world region for North America's leading container port, Long Beach, CA, revealed that just 61% of the containers handled in 1999 were for the U.S. Southwest region. The Northeast, Midwest, Southeast and Southwest markets accounted for 17%, 10%, 8% and 3% respectively or the equivalent of roughly 900K TEUs of the port's traffic with a known inland origin or destination. This distribution holds for containers from/to Asia & Oceania, which accounts for 93% of the containers. Containers from Europe account for 4% of the port's traffic with a known inland origin/destination or almost 96 K TEUs.

Canadian ports are well positioned to compete for this business based on their locations, deep-water facilities, intermodal connections and low cost. In terms of location, Halifax is the closest North American port to Northern European ports such as Rotterdam, with an ocean-distance (Great Circle) advantage of 1,081 kilometres (Kms) over NY/NJ the closest of its U.S. competitors. Even Montreal, which is approximately 1,600 Kms inland, is 167 Kms closer to Rotterdam than NY/NJ. On the Pacific coast, Vancouver is 1,092 Kms closer to Hong Kong than Long Beach<sup>21</sup>.

Vancouver and Halifax are 2 of only a handful of North American ports with natural deep channel entrances and berth depths of 50 feet that can accommodate the super-post-panamax container ships (ships with over 6000 TEU capacity). The other ports are Long Beach,

Seattle, and Tacoma on the Pacific and Baltimore and Virginia on the Atlantic. Terminal operators in Vancouver and Halifax have built on this depth advantage by purchasing super-post-panamax cranes. Montreal does not have such deep draft but is a niche market, serving carriers that have designed ships specifically for the port<sup>22</sup>.

Vancouver, Montreal and Halifax are well served by CN's Sarnia tunnel to the US Midwest market. CP provides direct service from the Montreal gateway to the U.S. heartland. BNSF links Vancouver's Deltaport to the US Northwest, Southwest and Midwest. All 3 major Canadian container ports have dockside links to the railways that service them. Vancouver and Montreal are also well served by major highways that directly access U.S. markets. These connections are crucial as Canadian ports have smaller local economies that cannot generate the large container volumes of their U.S. neighbors and must therefore rely on intermediacy for significant container volumes.

Canadian ports have traditionally been seen as low-cost alternatives to U.S. ports. The main cost advantage has likely been the Canadian dollar, which trended downward in the 1990s from a high of US\$0.8873 on November 1, 1991 to a low of US\$0.6326 on August 27, 1998<sup>23</sup>. This exchange rate gave the ports and their intermodal partners a 25% to 30% cost advantage for most of the decade.

Canadian ports seem to have less ability than their U.S. counterparts to finance expensive terminals and intermodal connections. Many U.S. port authorities are large organizations that own and manage other transportation infrastructure such as airports, toll bridges and tunnels. A study of U.S. ports' funding of intermodal facilities by Luberoff and Wider of Harvard's Kennedy School of Government found that they often pledge assets and revenues from those facilities to support investments. The study states that some ports raise funds through property taxes, tax-exempt revenue bonds and assistance from municipal, state and federal governments. This prompted them to conclude that U.S. port administrations often did not exercise sound business practice in funding such facilities by routinely shifting the risk of such investments to tax payers<sup>24</sup>.

In contrast, Canada's philosophy appears to be that ports should be more commercially oriented. The 1998 Canada Marine Act (CMA) governs major ports with an objective of "...making the system of Canadian ports competitive, efficient and commercially oriented". Ports are prohibited from using parliamentary appropriations to discharge liabilities and from pledging port lands that are vested in the federal government. However, they may be eligible for grants under other federal statutes such as regional development funds. Canadian ports are also required to pay an annual stipend to the Federal Government based on gross revenues and payments in lieu of property taxes to local municipalities.

The CMA's impact on a port's ability to raise project funds was demonstrated when Halifax Port Authority (HPA) arranged \$550 M to build a new container terminal in its Maersk Sealand proposal. HPA secured lines of credit from banks based on its own revenue together with financial support from provincial and municipal governments and from federal economic development agencies<sup>25</sup>.

### **Conclusion**

Canadian container ports have successfully competed with U.S. container ports in the past for North American container traffic. The keys to their success have been a combination of natural endowments such as superior locations and deepwater ports, investments in intermodal facilities including good rail access to all U.S. markets and competitive pricing due to a favorable currency exchange. These factors are likely to continue into the future, however, the competition among container ports is likely to intensify in the future as industry consolidation continues and publicly funded U.S. intermodal terminal and corridor projects come to fruition.

Canadians should benefit from the success of our container ports. These gateways export transportation services to U.S. markets and in the process provide employment not only for port workers but also for Canadian railway employees and truckers.



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- <sup>1</sup> Canada, Department of Trade and Commerce, Dominion Bureau of Statistics, Transportation & Public Facilities Branch (1935). Waterways of Canada, (Federal Expenditures on Canals, Harbours, Lakes, Rivers, Aids to Navigation, Etc., Port Facilities, Traffic)
- <sup>2</sup> Statistics Canada and U.S. Bureau of Census (USBC) population statistics for 2000. USBC 1997 US Economic Census and Statistics Canada's Monthly Retail Sales and Monthly Survey of Manufactures. All financial data expressed in Canadian dollars at the July 2, 1997 exchange rate of \$0.7307 Can per \$1.00 US.
- <sup>3</sup> Cottrill, K. NY&NJ Bets \$733 Million. *Traffic World* 25, January, 1999
- <sup>4</sup> Statistics Canada derives TEU statistics from container counts by size of container reported on Custom's A6 General Declarations. These data are not reconciled with manifest data. MARAD's TEU statistics are derived from the weights of container cargo reported on ships' manifests. TEU origin/destination are the country of export/ import for P.I.E.R.S. while the Statistics Canada data use country of port of loading/ unloading. TEUs by world region for Statistics Canada data were derived by apportioning reported TEUs based on the weight of containerized freight by region.
- <sup>5</sup> Tirschwell, P. Mergers reshape shipping. *Journal of Commerce*. 5 January 1998. P8.
- <sup>6</sup> Fossey, John. Packing a punch. *Containerisation International*. Nov. 2000. P54.
- <sup>7</sup> *Lloyd's Shipping Economist*. Consolidation in the container trades. Feb. 2000. P21.
- <sup>8</sup> *Canadian Sailings*. Jan. 29, 2001. P40.
- <sup>9</sup> Fossey, John. Post-Panamax power. *Containerisation International*. Feb 2000, P50.
- <sup>10</sup> Cullinane, K and Khanna, M. Economies of Scale in Large Container Ships. *Journal of Transport Economics and Policy*. V33, Part 2. May 1999. P185-207.
- <sup>11</sup> *Ibid.*, P200, P203 and P206.
- <sup>12</sup> *Lloyd's Shipping Economist*. Demand grows, but for how long. June 2000. P15-16.
- <sup>13</sup> *Lloyd's Shipping Economist*. Liners hit purple patch. Dec. 2000. P25-26.
- <sup>14</sup> *Lloyd's Shipping Economist*. No way out for carriers? Jan. 2000. P16-18.
- <sup>15</sup> Daniels, Alan . COSCO Group executive gives wide-ranging speech in Vancouver. *Canadian Sailings* Oct. 16, 2000. P40.
- <sup>16</sup> Knee, Richard . 2001 Shipping Forecast. *Marine Digest*. Jan. 2001, P10-11.
- <sup>17</sup> Beddow, Mathew. Going Global. *Containerisation International*. Mar 2000, P43-47.
- <sup>18</sup> Wilner, Frank. Tunnel to Competition. *TrafficWORLD*. Sept. 4, 2000. P17-18.
- <sup>19</sup> Railway Association of Canada. *Interchange* V14, Jan. 2001. P8-9.
- <sup>20</sup> US Regions are defined as **Northwest** - Washington, Oregon, Montana, Wyoming, Nevada, Colorado, Idaho, Utah, South Dakota; **Northeast** - New York, Vermont, Massachusetts, New Jersey, Maine, Pennsylvania, Maryland, New Hampshire, Rhode Island, Connecticut, Delaware, Ohio; **Midwest**- Michigan, Minnesota, Illinois, North Dakota, Wisconsin, Indiana; **Southwest** - California, Arizona, New Mexico, Kansas, Nebraska, Iowa, Oklahoma, Arkansas, Missouri, Louisiana, Texas; **Southeast** -Florida, Georgia, Virginia, West Virginia, South Carolina, North Carolina, Kentucky, Alabama, Mississippi, Tennessee, District of Columbia.
- <sup>21</sup> All ocean distances are from the Fairplay World Ports Guide Distance Tables.
- <sup>22</sup> Davison, D. A niche business. *Containerisation International*. Jan 2000, P47
- <sup>23</sup> Bank of Canada, Daily Currency Exchange Rate for Canadian Dollars.
- <sup>24</sup> Luberoff, D and Walder, J. U.S. Ports and the Funding of Intermodal Facilities: An Overview of Key Issues. *Transportation Quarterly*. V54, No 4 Fall 2000 p23-45.
- <sup>25</sup> Towers, C. Halifax secures funds for terminal. *Journal of Commerce*. Sept 28, 1998