The Great Lakes St. Lawrence Seaway System: Transportation Cost Savings from Ocean Shipping in the Great Lakes

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Objective and Conclusion of the Research

Objective: Determine transportation savings to shippers associated with ocean vessel service into the Great Lakes

Conclusion: Ocean vessels save shippers $55 million annually compared to the use of alternative modes

Research Approach

- Examine the level and type of ocean vessel traffic in the GL/SLS
- Develop estimates of door to door transportation and handling costs for 2002 ocean vessel traffic
- Determine alternative modes and routings to accommodate the traffic
- Calculate costs associated with alternative modes
- Assess the difference between alternative mode costs and ocean vessel costs

Introduction

- Compares cost of “ocean direct” into the Lakes vs. use of laker, rail, barge, or truck alternatives from an ocean or St. Lawrence River port
- Study based on MLO ocean vessel tonnages
- Based on 2002 traffic and 2004 charges to shippers/receivers
  - 2002 ocean traffic is more representative than 2003 and 2004
  - 2004 rates more representative
- Based on savings/costs for all U.S. and Canadian ocean borne tonnages in metric tons and US$
- 100 page report with over 100 references – dozens of interviews

Great Lakes-St. Lawrence Seaway System

Perspective

- 180 million tons of cargo were handled on the GL/SLS in 2002
- Ocean vessels carried about 7% of all tonnage (12.3 MMT)
- Vast majority of GL traffic is handled by laker vessels

- In 2002, there were about two ocean vessels each way per day coming thru the MLO in the 275 day season
- 1137 ocean vessels handled 12.3 MMT

MLO Section Tonnage History (000's of metric tons)

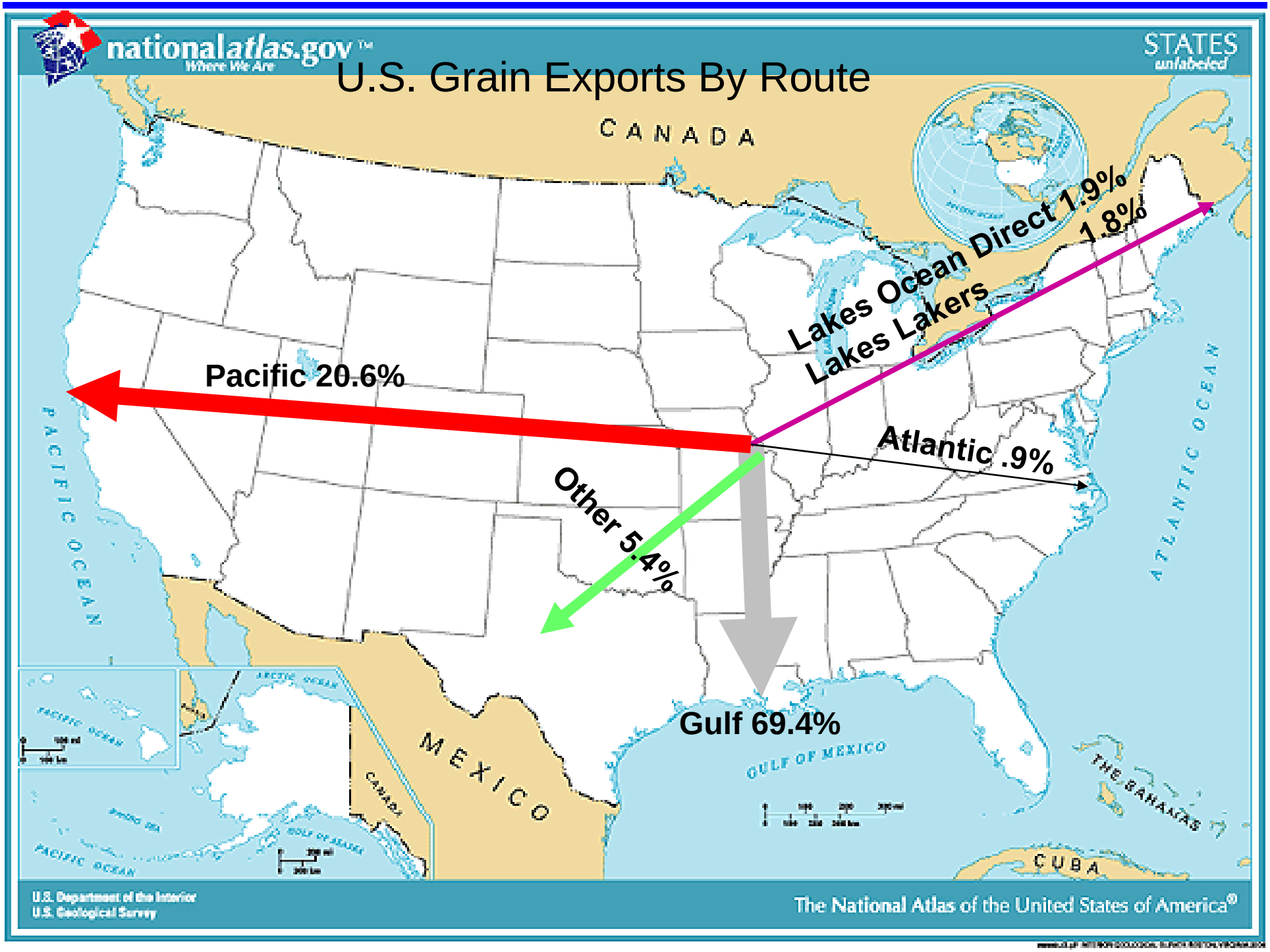
Year	Total Tonnage	Ocean Tonnage	Laker Tonnage
2005	31273	10464	20809
2004	30800	11017	19783
2003	28900	9562	19338
2002	30002	12285	17718
2001	30278	11702	18576
2000	35406	14987	20419
1999	36412	13887	22524
1990	36656	11295	25361
1980	49454	14717	34737
1978	56943	23077	33866
1970	46422	13559	32863
1960	18426	7206	11220

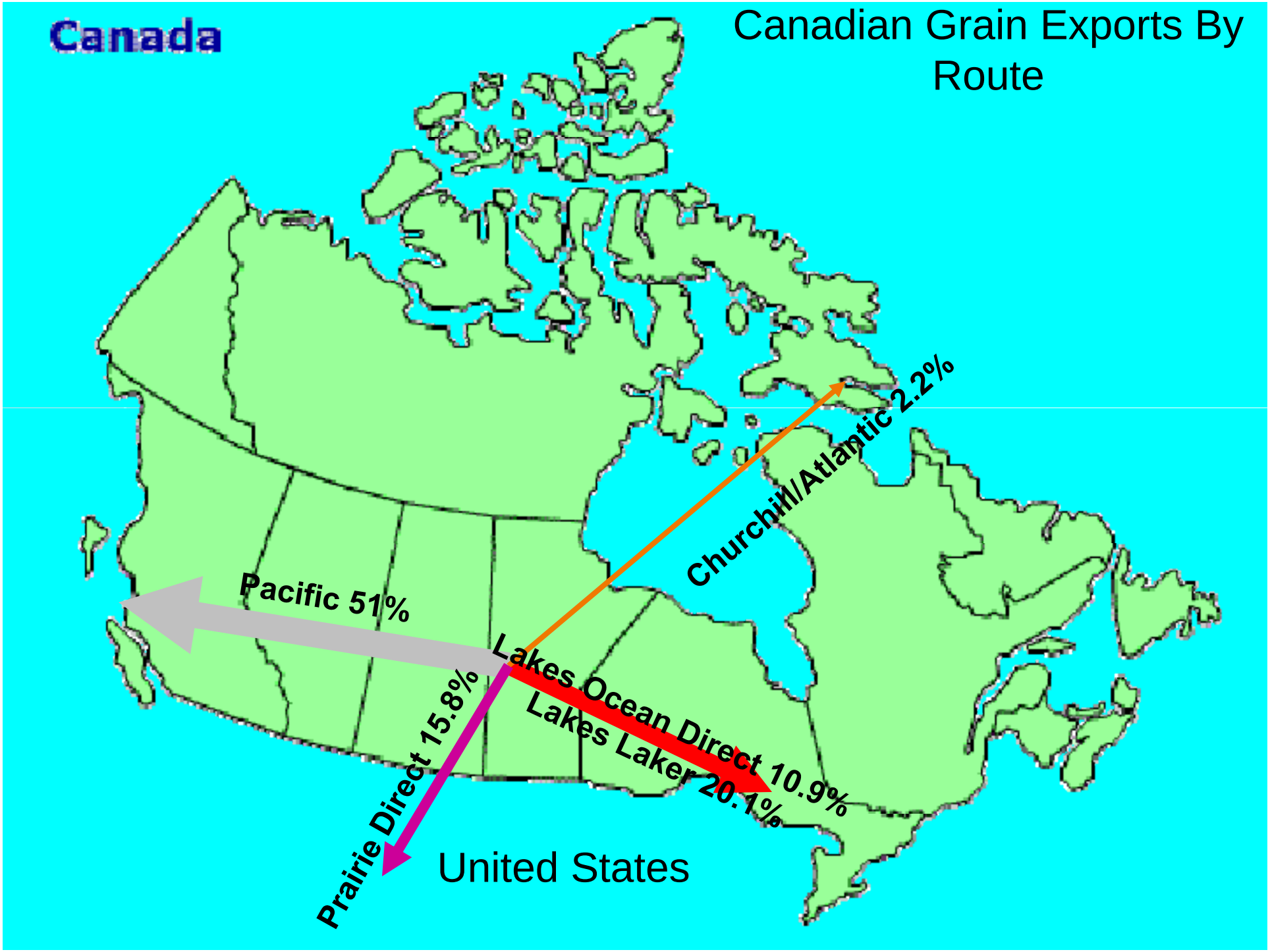
Ocean Vessel Traffic

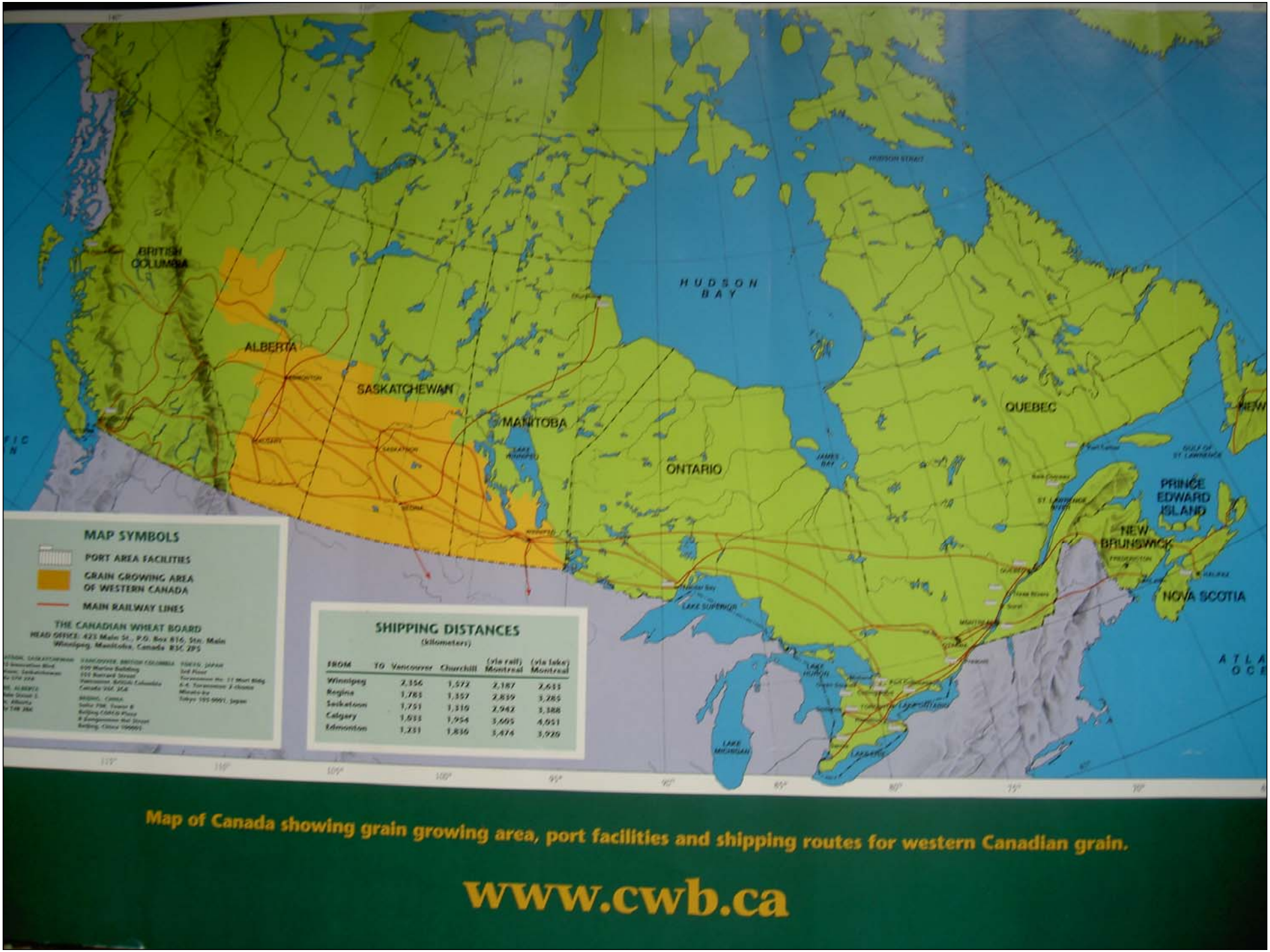
- Steel into the GL & grain out represents ¾ of traffic
- Typical movement may be:
  - Ship from Europe inbound with steel for Hamilton, Detroit or Chicago
  - Empty move from Detroit to Lake Superior
  - Outbound move with grain to the St. Lawrence for top-off & return to Europe

2002 MLO Ocean Vessel Port/Commodity Mix

- Thunder Bay Lakes Grain Shipments
  - 5.1 million metric tons all vessel types
  - 2.1 million metric tons ocean vessels (41.2% of tonnage)
- Duluth Lakes Grain Shipments
  - 3.3 million metric tons all vessels
  - 2.1 million metric tons ocean vessels (63.6% of tonnage)
- Iron and Steel Imports
  - 4.6 million metric tons ocean vessels (steel cannot move on most Lakers)
- Other Commodities (Chemicals, Sugar, Mine, Pulp, Coke)
  - 3.5 million metric tons ocean vessels
- Total Ocean Vessel Tonnages
  - 12.3 million metric tons
  - 50.4% Canadian O/D and 49.6% U.S. O/D


nationalatlas.gov
Where We Are
STATES
unlabeled
U.S. Grain Exports By Route
CANADA
Lakes Ocean Direct 1.9%
1.8%
Lakes Lakers
Pacific 20.6%
Atlantic .9%
Other 5.4%
Gulf 69.4%
PACIFIC OCEAN
ATLANTIC OCEAN
MEXICO
GULF OF MEXICO
THE BAHAMAS
CUBA
U.S. Department of the Interior
U.S. Geological Survey
The National Atlas of the United States of America®


Canada
Canadian Grain Exports By Route
Churchill/Atlantic 2.2%
Pacific 51%
Lakes Ocean Direct 10.9%
Lakes Laker 20.1%
Prairie Direct 15.8%
United States



Map of Canada showing grain growing area, port facilities and shipping routes for western Canadian grain.

www.cwb.ca


North America
CANADA
QUÉBEC
ONTARIO
BRITISH COLUMBIA
ALBERTA
SASKATCHEWAN
Edmonton
Calgary
Regina
Winnipeg
Vancouver
Seattle
Portland
WASH.
OREGON
IDAHO
MONTANA
Helena
Boise
Sheridan
WYOMING
N. DAK.
SOUTH DAKOTA
Duluth
Minneapolis
Sioux Falls
WIS.
Milwaukee
Chicago
MICHIGAN
Toronto
Ottawa
Thunder Bay
Montreal
Charlottetown
N.B.
N.S.
Halifax
MAINE
Augusta
N.H.
Boston
N.Y.
Syracuse
Hartford
New York
Philadelphia
P.A.
UNITED STATES
Reno
NEVADA
Salt Lake City
UTAH
Cheyenne
Denver
NEBR.
Omaha
IOWA
COLORADO
KANSAS
MO.
St. Louis
Wichita
St. George
CALIFORNIA
Las Vegas
Santa Fe
ARIZONA
Phoenix
NEW MEXICO
OKLA.
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San Diego
Indianapolis
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KENTUCKY
VA.
N.C.
Atlantic Ocean
Memphis
Huntsville
Charlotte
ARKANSAS
MISS.
S.C.
Atlanta
G A.
Savannah
Dallas
ALABAMA
Jacksonville
TEXAS
Hermosillo
San Antonio
Austin
LOUISIANA
Tallahassee
Houston
New Orleans
FLORIDA
Ciudad Obregón
Chihuahua
Gulf of Mexico
Miami
Nassau
MEXICO
Monclova
Monterrey
Culiacán
Saltillo
Linares
Mazatlán
Ciudad Victoria
THE BAHAMAS
Havana
Santa Clara

Appendix A-1
Canadian Grain Movement From The Prairie Through Thunder Bay To Europe

		2004 Costs per Metric Ton (US $'s)			
	Salty	Laker to St. Lawr.	Rail to St. Lawr.		
Rail (Yorkton SK to Thunder Bay)	21.39	21.39			$26.74 Cdn. Rate From Canadian National and Canadian Pacific
Rail (Yorkton SK to Quebec City)			41.17		$51.46 Cdn. Rate from Canadian National and Canadian Pacific
Elevation in Thunder Bay	6.27	6.49			$8.11 Cdn. From CWB, Table 20; and Transport Caanda - see foot.
Weighing, Inspection*	0.69	0.69			$.86 Cdn. From CWB, Table 20.
Lake Shippers Clearance Assoc. Charges	0.04	0.04			$.045 Cdn. From CWB, Table 20.
Lake Freight (including bunker fuel) TB-StL		11.88			$14.85 Cdn. From CWB, Table 20.
Other Lakes Charges (Tolls, Service Fees, etc.)	***	1.35			$1.69 Cdn. From CWB, Table 20.
Rail Switching at Port			0.59		$.74/ton Cdn. From Port of Montreal (POM) Tariff
Eastern Transfer Elevators Inward Elevation		2.14	2.63		$2.68 Cdn. From CWB, Table 20. Rail From POM Inward Tariff
Total Yorkton to St. Lawrence		**43.98**	**44.39**		
Storage @ 15 days		0.67	0.67		$.056/ton/day Cdn. at Port of Montreal
Out Elev. Est.(incldes stevedoring, wharfage, etc.)		2.00	2.00		$2.66 Cdn at POM = $2.13 US Rounded to $2
Ocean Rate St. Lawr. to Europe (mid-2004)**		35.00	35.00		International Grain Council. Also USDA ,Table 17, 6-17-04; Park
Ocean Rate TB to Europe (mid-2004)**	50.00				and Koo; Verified by shippers and brokers as a reasonable
Total Cost Yorkton SK-Europe	**78.39**	**81.65**	**82.06**		assumption given volatility of rates. See note below.
Additional Cost Compared To Ocean Vessel		3.26	3.67		
Summary Tons	100%	100%	100%		
2002 Grain Traffic From TB (000's Tons 2098	2098	2098	2098		
Cost Via Alt. Modes (000's $)	**164462**	171302	172162		
Additnl. Cost Via Alt. Modes (000's $)		**6839**	**7700**		
Most Likely Scenario - 50% laker/50% rail	0%	50%	50%		
Tons Via Mode (000's)	0	1049	1049		Cost/Ton
Total Costs (000's $)		85651	86081	**171732**	**81.86**
Add'l Costs For Most Likely Scenario (000's $)				**7270**	**3.46**

* This cost component includes sampling and grading of grain by an inspector and issuing an inspection certificate. It also includes cancellation by Cdn. Grain Commission of registration of Terminal Warehouse Receipts.

**Reflects typical rates in mid-2004. Ocean rates increased from $18/ton in January 2003 to $36/ton in December 2003 to $63/ton in April 2004. They declined to $35/ton in mid-2004.

***Tolls and fees included in salty rates per several individuals.

Notes: CWB estimated ocean vessel rate is about $15/ton more for TB-Europe compared to StL-Europe rate which was estimated at $50/ton. This fits with above rates and estimates.

Canadian currency values converted to US at $1.00Cdn=$.80US.

Source: Rail rates from CNR/CPR. Elevation and lake freight rates from CWB Table 20. Ocean rates from Int'l Grain Council and USDA, Grain Transportation Statistics. Park and Koo. Other cost information from Port of Montreal tariff, Transport Canada, and telephone calls and meetings with port officials, ship brokers and grain shippers..

7/20//2005

Estimates of Transportation Costs for Thunder Bay Grain Exports Via Alternative Modes (Total Costs in Millions of U.S Dollars, Metric Tons)

	Ocean Vessel	Laker Vessel	Rail	Most Likely
	100%	100%	100%	50%L/50%R
Tonnage (000,s)	2098	2098	2098	1049/1049
Cost per Ton	$78.39	$81.65	$82.06	$81.86
Total Cost	$164.5	$171.3	$172.2	$171.7
Additional costs over OV	-0-	$ 6.8	$ 7.7	$ 7.3

Estimates of Transportation Costs Resulting From Cessation of Ocean Shipping (Total Costs in Millions of U.S. Dollars, Metric Tons)

	Grain from Thunder Bay	Grain from Duluth	Steel	Other	Total
Tonnage	2098	2042	4556	3589	12285
% of Total	17.1	16.6	37.1	29.2	100.0
Ocean Vessel					
Cost per Ton	$78.39	$72.00	$74.56	$80.00	$76.38
Total Cost	$164.5	$147.0	$339.7	$287.1	$938.3
Most Likely Alt.					
Cost per Ton	$81.86	$73.61	$80.34	$85.00	$80.85
Total Cost	$171.7	$150.3	$366.1	$305.1	$993.2
Add'l Cost	**$ 7.3**	**$ 3.3**	**$ 26.4**	**$ 17.9**	**$ 54.9**
Cost/Ton	**$ 3.48/ton**	**$ 1.62/ton**	**$ 5.79/ton**	**$ 5.00/ton**	**$ 4.47/ton**

•Represents costs for total transportation move from product origin to destination. Ie. Steel from Europe to Detroit or grain from Plains to Europe.

Academic and Industry Reaction

- Academic Peer Review Panel - findings reasonable and possibly overstates benefits

- Industry reaction
  - Does not consider “job impact” benefit of ocean shipping
  - Use of rail and highway would overwhelm available capacity
  - Does not consider air pollution benefits of ocean

Ocean Freight Shift to Other Modes Estimated Domestic Job Impacts

- Elimination of 891 foreign crew jobs on ocean vessels
- Elimination of 904 domestic Lakes port handling, pilot, and SLSDC/SLSMC jobs
- Addition of 374 St. Lawrence River area port jobs
- Addition of 357 East Coast, Gulf and River port jobs
- Addition of 1492 domestic railroad, laker, barge, and truck jobs
- Net increase of 1319 domestic U.S. and Canadian transportation related jobs

Ocean Freight Shift to other Modes Modal Capacity Impacts

- Most Likely Modal Shift Scenario
  - Extra 7.4 Lakers/Tug Barges per year
    - Currently at least 4 laid up vessels
    - Other vessels not fully utilized
    - Potential for additional tug barges
  - Extra 1.6 loaded trains per day
    - Currently 100-150 trains/day on relevant tracks
    - Rail capacity limitations are in West and not East
  - Extra 1.2 million tons of river barge per year
    - Currently over 40 million tons moves
  - Extra 197 trucks per day
    - Spread over eastern U.S. and Canada
    - Currently hundreds of thousands of trucks/day

Ocean Freight Shift to Other Modes Air Pollution Impacts

- Total air pollutant tons are higher with ocean ships than with "most likely scenario" of other modes
- Ocean ships emit far more PM10, Sulfur Dioxide, VOX and Carbon Monoxide than rail on a per million ton miles basis
- Ocean ships are somewhat better on Nitrogen Oxides
- Ocean ships are better on CO2
- Direct ocean ships into Lakes bring high levels of these pollutants into the mid-continent area

- Train locomotives have made large gains in fuel and air pollution efficiency as compared to ocean vessels
- Ocean vessels are one of the biggest non-auto sources of pollution in the Los Angeles area

Conclusions

- This research focused on transportation cost issues. It determined that, based on 2002 traffic of 12.3 million tons, ocean vessels saved shippers $55 million.
- The research also concluded that perceived benefits associated with domestic employment, air quality or transportation capacity were quite small or non-existent.
- These transportation benefits must be weighed against the costs associated with these services. These include environmental costs such as those related to invasive species.

Epilogue

- Ocean vessel traffic has declined since the study was completed
- Primarily cause by loss of steel traffic
- 2007 traffic averaged 1.6 ocean vessels each way thru the MLO and 1.3 thru the Welland
- 2008 will be about 1/3 less if trends continue
- 2008 ocean vessel traffic may be the lowest since the 1960's

2002	12.3
2003	9.5
2004	11.0
2005	10.4
2006	14.9
2007	9.2
2008	6-7 est

Reports may be viewed at:

www.gvsu.edu/scblogistics

Click on: Supply Chain Logistics Research