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When Are Marine Highways Successful? Lessons from Experiences in Other Countries

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Nashville TN
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Agenda

- We will take a quick tour of the world, to uncover what causes short sea shipping (marine highways) business concepts to fail.
  - Europe (partly)
  - North America East Coast (West Coast,Gulf & inland)
  - Great Lakes (partly)
  - Australia
  - South America (the Chilean example)
- Where do they succeed?
  - Great Lakes (partly)
  - Europe (partly)
  - Inland waterways of the U.S. (mostly)
- The search for 'corridors of promise'.

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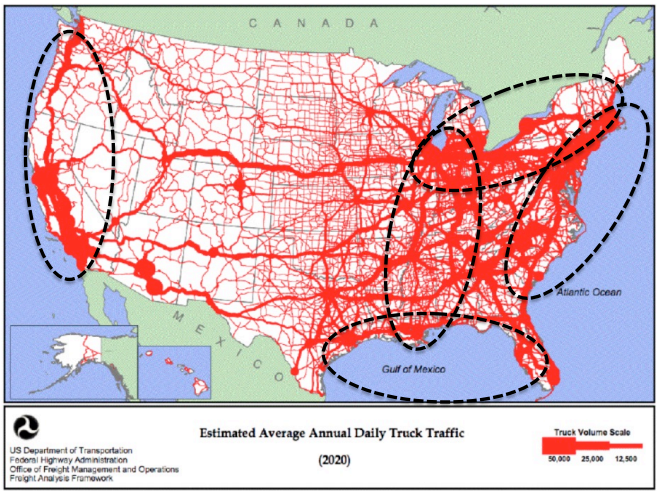
Fact: European Short Sea Shipping Works in Niche Markets

- Short sea is well-established (Feeder, ro-ro, regional barge services, passenger and cruise ferries)
- Some short sea hubs for freight have emerged (e.g. Hamburg with weekly feeder and short sea services to Scandinavia, Poland, Finland, Russia and the Baltic States as well as to Great Britain, Ireland and Iceland.)
- Geography is critical to success (Baltic, North Sea, English Channel and Mediterranean)
- Sea state also critical, e.g. Baltic open year round and more sheltered than Great Lakes between Canada and U.S. (winter access denied) and East Coast North Atlantic (high seas)
- The Marco Polo program is key; serious road congestion supports the development of short sea shipping, particularly when **citizens are prepared to financially support removing trucks from the road**.

Trade is the Driver: What Makes A Corridor of Promise for Short Sea?



Research says: Road congestion plus distance: the most promising corridors are more than 500-750 kms with no rail competition.

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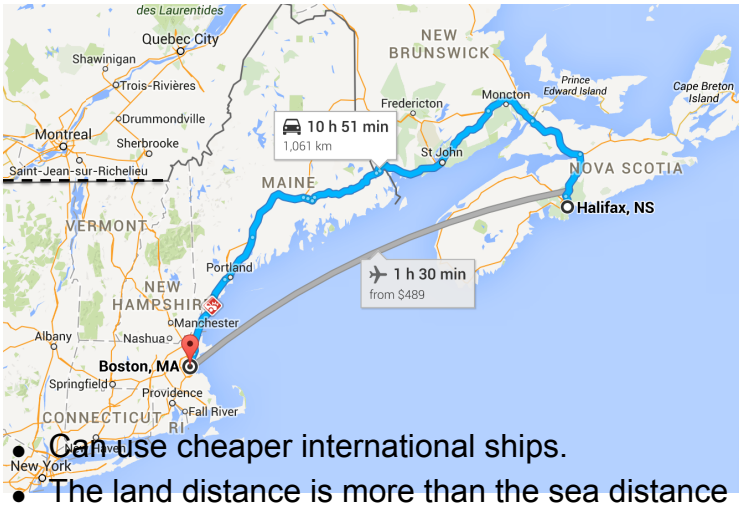
6 Failures: Why No Successful Service?

Canada

U.S.



- Can use cheaper international ships.
- The land distance is more than the sea distance by double?

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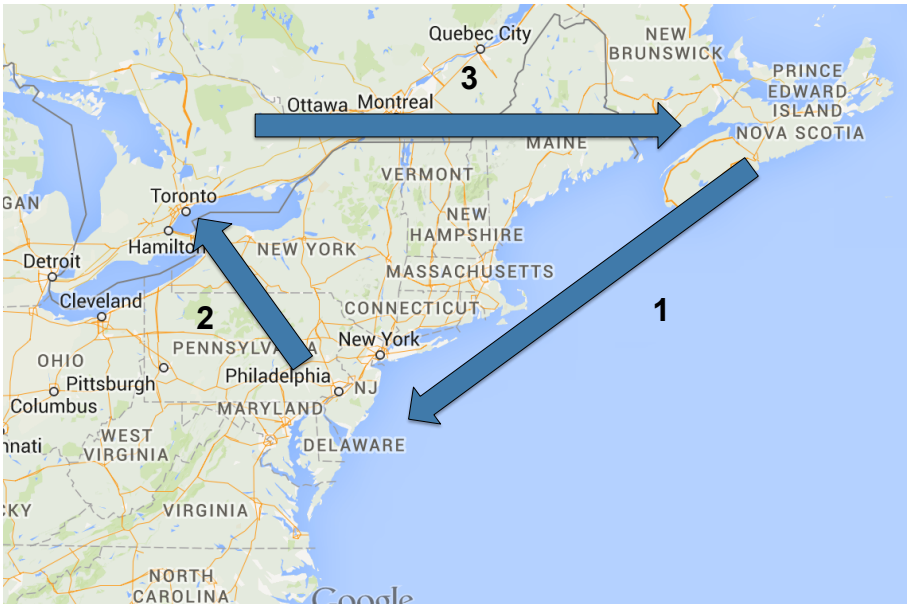
Trade Realities (1)

Answer: It isn't about only economics…

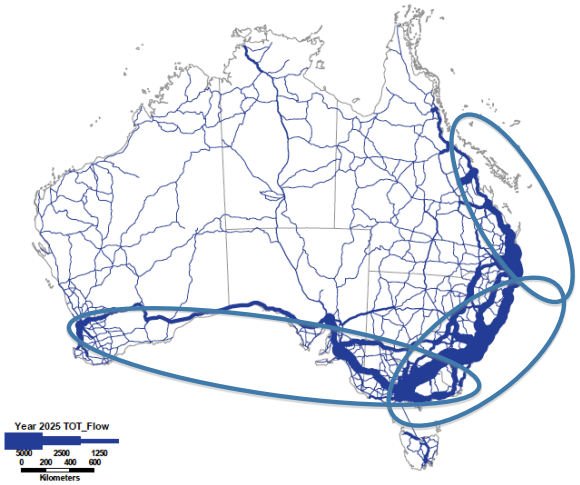
- Many companies preferred a single carriage document than multiple contracts. (e.g. potential short sea operators must retail an integrated transport package over one that is just an ocean move.)
- 25% of the shippers are unlikely to switch to short sea shipping unless trucking service deteriorates drastically (e.g. greater congestion in the New York part of the corridor).
- Service every two weeks unacceptable. More frequent departures critical.
- Most of the volume is southbound.
- Incentive pricing for an equivalent (to trucking) short sea service could induce trial. **Customer value is key.**

Trade Realities (2)



Remember Road Congestion as a Driver of Short Sea Development (Bendall & Brooks, 2011)

FIGURE 3.4 INTER-REGIONAL ROAD FREIGHT VEHICLE TRAFFIC ASSIGNMENT, 2025



Source: Commonwealth of Australia (2006)

Why these 3?

- Long enough (sufficient distance)
- Congested?
- May have enough truck volume

Research gaps

- Road counts
- Current DC investment
- Switching incentives

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Three Australian Studies

- Corridor identification (Bendall and Brooks, 2011)
- Mode switching characteristics and incentives (Brooks, Puckett, Hensher & Sammons, 2012)
- Can permit traffic be attracted from foreign flag vessels to top up volumes attracted from road? (Brooks, 2012)

Nine Corridors of Promise (Road versus Sea)

AusLink Corridor	2025 Traffic (000 t)	Road Distance (km)	Sea Distance NM (kms)	Comments
Sydney–Melbourne	17,243	832	582 (1,078)	Deemed too short to be truck competitive.
Melbourne–Adelaide	14,399	713	514 (952)	Deemed too short to be truck competitive.
Sydney–Brisbane	11,828	947 (inland)	515 (954)	Deemed too short to be truck competitive.
Melbourne–Brisbane	5,325	1,690 (inland)	1,080 (2,000)	Min. daily number of heavy vehicles projected in 2025 is 1012.

Source: Columns 1-3 and min. daily numbers from Table 2.16 of Commonwealth of Australia (2006), column 4 from www.portdistances.com (with nm converted to km).

Become Six Corridors of Promise

AusLink Corridor	2025 Traffic (000 t)	Road Distance (km)	Sea Distance NM (km)	Comments
Melbourne–Perth	3,728	3,423	1,681 (3,058)	Min. daily number of heavy vehicles projected in 2025 Melbourne–Adelaide is 1795.
Sydney–Adelaide	2,801	1,375	973 (1,802)	Min. daily number of heavy vehicles projected in 2025 is 1629.
Sydney–Perth	1,658	3,942	2,140 (3,963)	Min. daily number of heavy vehicles projected in 2025 is 1629 for Sydney–Adelaide.
Adelaide–Perth	1,530	2,692	1,343 (2,487)	The study concludes that traffic growth on this corridor will more likely accrue to rail.
Brisbane–Cairns	1,069	1,699	846 (1,567)	Min. daily number of heavy vehicles projected in 2025 is 718.

Source: Columns 1-3 and min. daily numbers from Table 2.16 of Commonwealth of Australia (2006), column 4 from www.portdistances.com (with nm converted to km).

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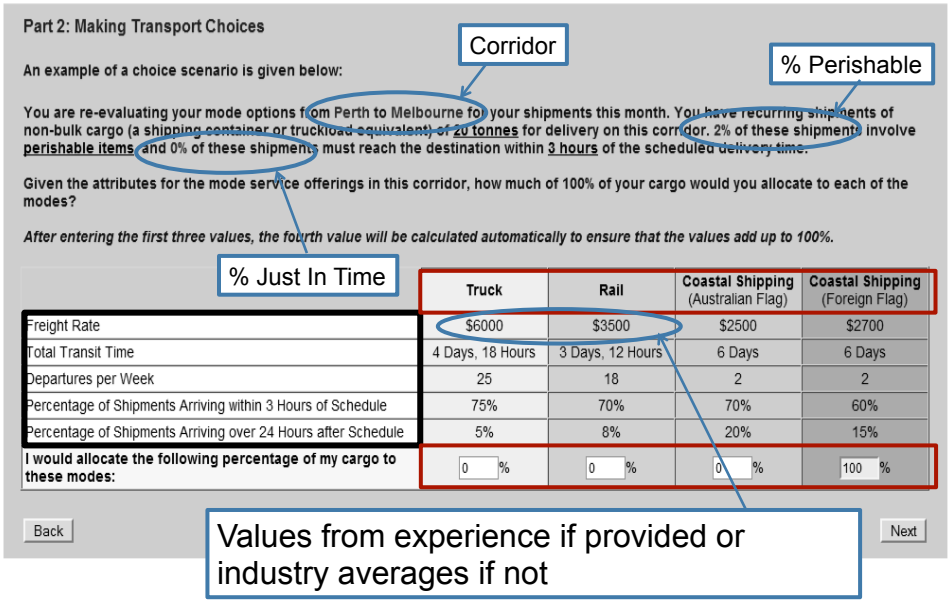
The Australian Research (Brooks, Puckett…, 2012)

- The research conducted in 2011 focused on three Australian corridors
  - Melbourne–Brisbane (congested)
  - Perth–Melbourne and Brisbane–Townsville (less congested with rail availability)
- With four proposed/existing services (truck, rail, foreign flag shipping and national flag shipping)
- Participants: Manufacturers, forwarders, retailers (only those of each who actually buy freight shipment services)
- Methodology: A discrete choice experiment with allocation of traffic to the four mode choices to assess willingness to pay/willingness to accept parameters

Example of Choice Scenario (There are 8)



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Results (n = 70)

- There was no evidence of corridor or decision-maker (retailer or forwarder or manufacturer) differences in preferences.
- All else equal, road is clearly preferred to rail and short sea.
- There was a stronger disutility for short sea in the Australian market.
- There was no distinct preference for national flag.
- Reliability: Road preferences are sensitive to delays of one day or more while rail and sea are sensitive to narrow delivery windows.
- **Inertia in demand patterns is a key factor in policy initiatives to induce modal switching**
- This study important because it allowed us to calculate carbon pricing impact on transport mode choice

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Can You Use Carbon Taxing to Adjust Modal Choice?

- In the **Australian** market we found for every 1% increase in the price paid for trucking on the head haul, there is a 0.12% loss in market share to truck (=> 0.08% increase in the rail market share and a 0.04% increase in the short sea share). Backhaul the split was more even between rail and sea.
- Melbourne – Brisbane expected to have 1012 trucks a day in 2025. To get about 200 trucks a day to support a very small coastal shipping service, you would need to get a rough market share of 20%.
- In other words, a 20% share needs about 20 x 25 = 500% increase in truck prices.
- If fuel cost is a third of the total cost of trucking, this means that, in this market, the carbon tax would have to add AUD15.00 to every AUD1.00 in the cost of diesel at the pump. **Realistic? Is there another way?**

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Regulatory Lessons from N. America and Australia

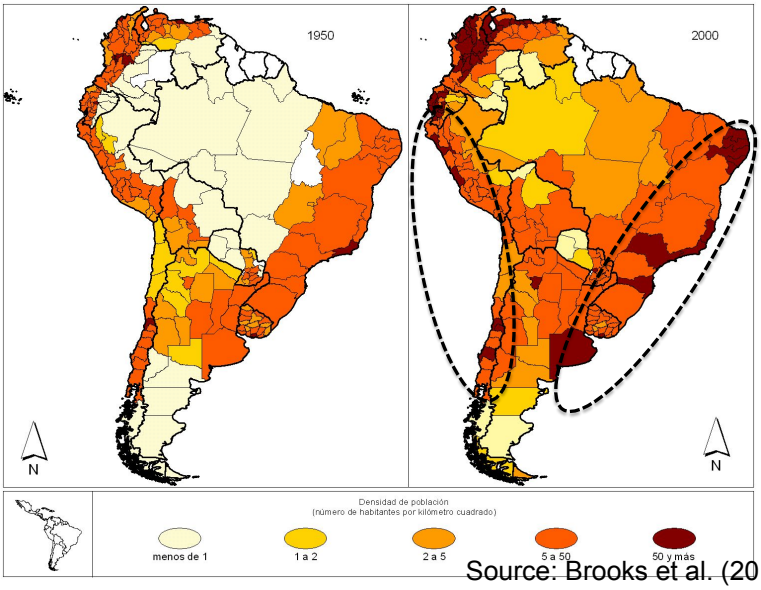
Lessons from North American research:

- Regulation can defeat the best of coastal shipping efforts (HMT, security rules, build requirements, etc; Brooks Hodgson & Frost, 2006)

Lessons from Australian research:

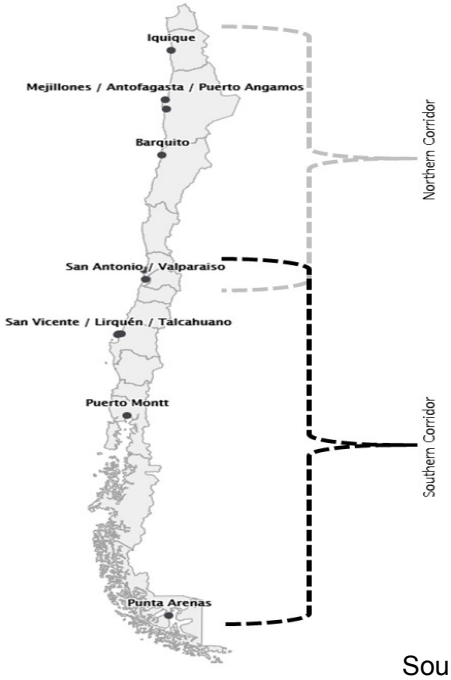
- The carbon tax imposed in 2011 resulted in no modal shift
- No incentive support programs exist in support of coastal shipping.
- The cost of providing the highway network is not incorporated into the price of trucking in Australia.

Population Density in Coastal Areas Drives the Promise of Short Sea Shipping



Source: Brooks et al. (2014)

The Study Corridors



Coastline (N-S)= 4300 kms.
Inland (E-W)= 180 kms.

Two corridors overlap with Valparaiso and San Antonio ports close to Santiago.

Northern Corridor = Iquique–S.Antonio

Southern Corridor = P. Montt–Valpariso.

No rail N-S. About 90% moves by truck.

Source: Brooks & Wilmsmeier (2017)

Northern Corridor Comparison

Shipping Route (O-D)		Distance (km)	Container Size & Type*	Freight Rate in USD **	Transit Time (hrs)***
San Antonio	Iquique	1520	40' DV	1600	48- 72

Road Route (O-D)		Distance (km)	Container Size & Type*	Freight Rate in USD**	Transit Time (hrs)***
San Antonio	Iquique	1810	40' DV/R full	3600	36

Source: Brooks & Wilmsmeier (2017)

Southern Corridor Comparison

Shipping Route (O-D)		Distance (km)	Container Size & Type*	Freight Rate in USD **	Transit Time (hrs)***
San Antonio	Talcahuano/ San Vicente	354	40' R	n/a	48
	Puerto Montt	1083	40' DV	2970	48- 72
	Punta Arenas	2667	40' DV	1971	72-96
			40' R	2816	72-96

Road Route (O-D)		Distance (km)	Container Size & Type*	Freight Rate in USD**	Transit Time (hrs)***
San Antonio	Talcahuano	518	40' DV/R full	845	9
	Puerto Montt	1048	40' DV/R full	1760	16

Source: Brooks & Wilmsmeier (2017)

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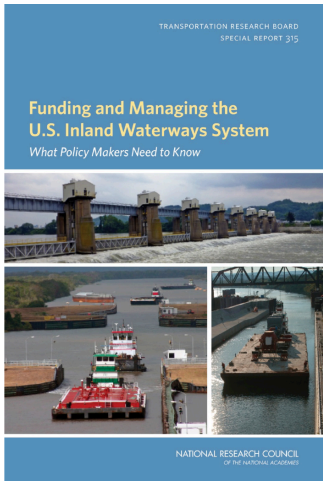
Now Closer to Home…

- The funding of the U.S. inland waterways is THE critical marine infrastructure question. [SR315, 2015]
- 22 percent of the total inland waterway miles account for 76 percent of the cargo ton-miles transported on waterways. [p. 21.]
- Investments in O&M rather than new, large capital projects are the need to improve reliability and performance of the system.



Inland Waterways

The high and moderate use segments are not always where you expect them to be.

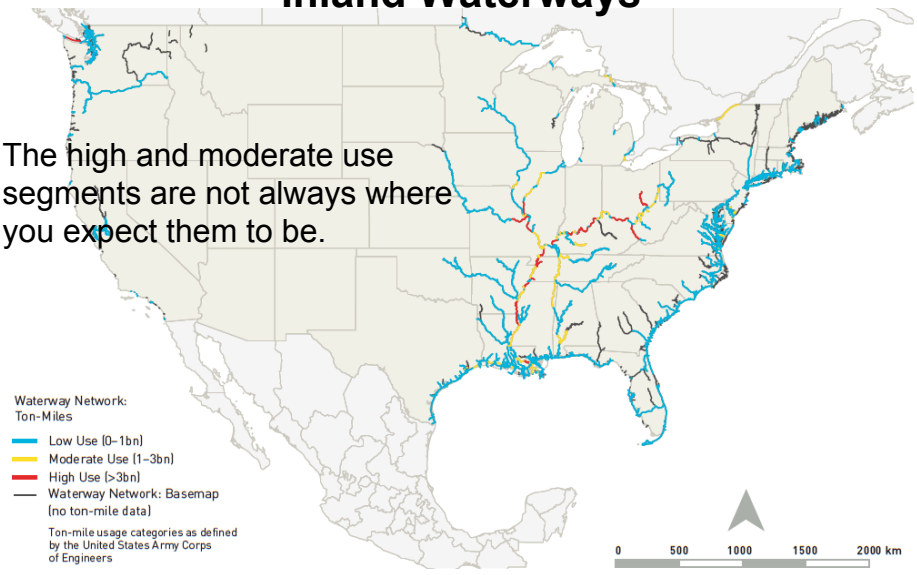


FIGURE 2-4 Inland waterways network with high-, moderate-, and low-use river segments in 2011.

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Example: Food & Farm Products

- Accounts for 10% of barge traffic (76 M tons of 738 M tons of total barge traffic in 2012).
- Largest commodity on four of six major waterway systems (Illinois River, Lower Mississippi, Upper Mississippi and Columbia River)
- 96% is barged.
- What if the system fails? How many trucks are now on the road? This is a national issue as the U.S. has a reputation for helping with world food security.
- Key: Appeal to the emotion of 'bread basket to the world' or ?

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