



Freight Transportation and the U.S. Economy

Mark Meitzen NCFRP 24 Workshop January 2011

Outline



- Supply chains and logistics
- Role of transportation
- Freight transportation cost, speed and reliability
 - Encroachment
- U.S. freight transportation system
- Foreign trade gateways and corridors

Supply Chain Logistics



Logistics

- The part of supply chain management that involves decisions about how and when to get raw materials, intermediate goods and finished goods from origin to destination
- Included are choices of
 - Location
 - Shipment modes and characteristics
 - Warehousing
 - Inventory levels
- Logistics costs are about 8% of U.S. GDP



Supply Chains are Geographically Dispersed

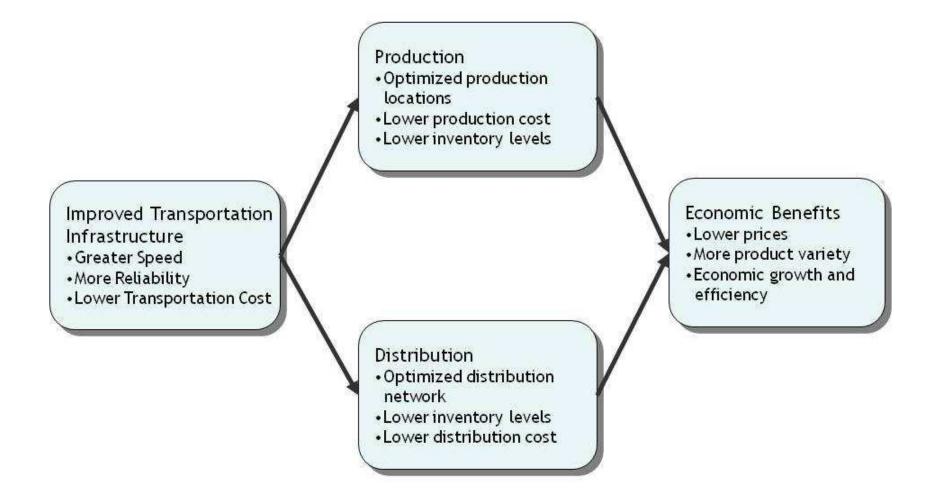


- Most supply chains have an important spatial or geographic dimension
 - Activity hubs and links between hubs
 - These links are corridors that span areas, not "blobs"
- Interconnected networks depend on links between diverse locations and functions
 - Raw materials
 - Production
 - Warehousing
 - Information technology
- Transportation provides the vital links between:
 - Locations
 - Levels of production and distribution



The Role of Freight Transportation in Production and Distribution





Transportation is a Key Factor in Supply Chain Efficiency



- Important goal of supply chain management is to minimize logistics costs
- Efficient transportation is a key to accomplishing this goal
 - In general, over half of logistics costs are related to transportation
- Freight transportation performance factors are interrelated, not independent. For example
 - Cost
 - Speed
 - Reliability



Factors Affecting Transportation Cost, Speed and Reliability



- Explicit costs
 - Labor, fuel, capital costs
- Transportation system congestion and capacity constraints
 - Physical constraints
 - Increased traffic volumes
- Land use conflicts between freight and other uses create barriers to efficient transportation
 - Noise, vibration, pollution
 - Congestion and capacity effects
 - Operational impacts



Conflicts and Barriers



Conflicts

- Recognized instances where use of one site for a particular purpose negatively affects use on adjacent site for a different purpose (externalities)
 - Encroachment
 - Noise and vibration
 - Safety
 - Congestion

Barriers

- Impediments to economically efficient transportation due to encroachment or other land use conflict
 - Production and distribution costs
 - Speed and reliability
 - Clearance and weight limitations
 - Hours of operation restrictions



Conflicts and Barriers – Stakeholder Concerns



Community Concerns Include	Freight Concerns Include
 Light pollution 	 Higher production & distribution costs
 Noise and vibration effects 	Speed restrictions
 Air and water quality 	 Hours of operation restrictions
Safety	 Clearance and weight limitations
Traffic congestion	Corridor design constraints

U.S. Freight Transportation System

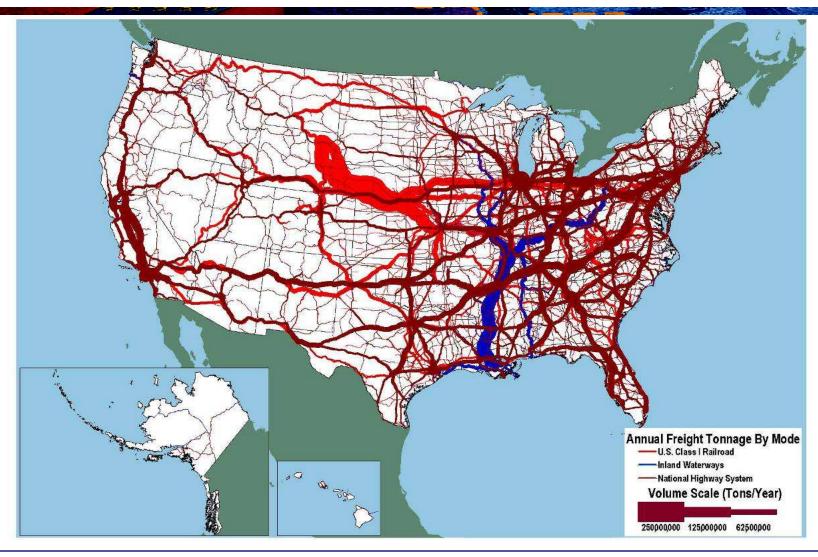


- 4.5 million employed by for-hire and transportation-related industries
 - Trucking: 1.4 million
 - Railroad: 230,000
 - Water: 65,000
 - Warehousing and storage: 673,000
- Transportation accounts for over half of U.S. logistics costs



Tonnage on U.S. Highways, Railroads and Inland Waterways

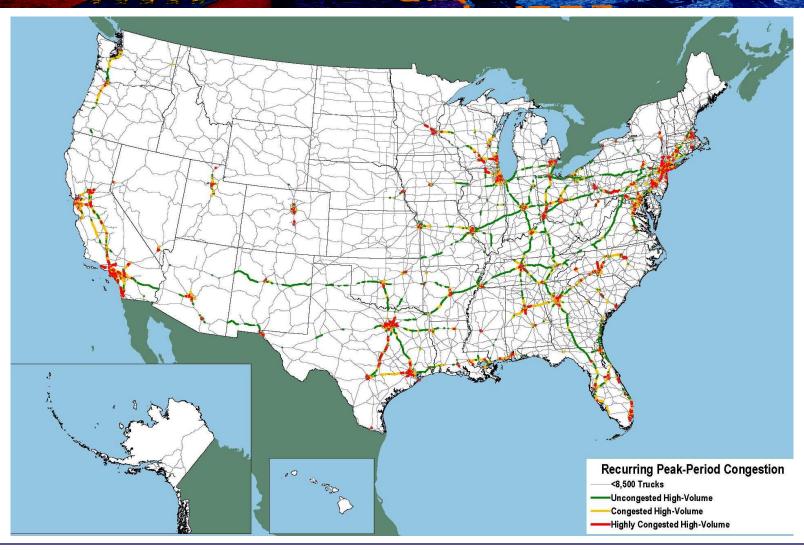






Congestion on High-Volume Portions of National Highway System







Tonnage on Domestic Waterway Network

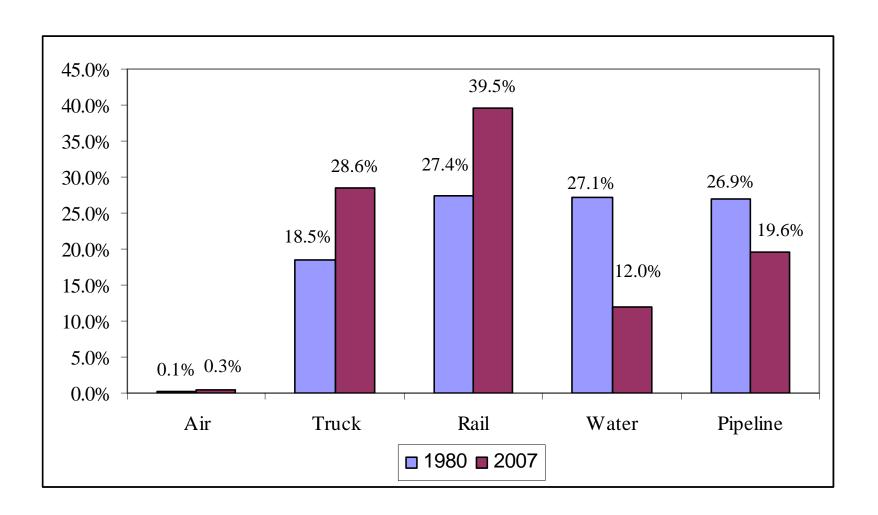






Shares of Domestic Ton-Miles by Mode, 1980 and 2007







Value of U.S. Freight Shipments (2007 Commodity Flow Statistics)



Mode	Value
Truck	71.3%
Rail	3.7%
Water	1.0%
Air	2.2%
Multiple Modes	
Parcel	13.4%
Truck/Rail	1.6%
Truck/Water	0.5%
Rail/Water	0.1%

Top U.S. Foreign Trade Gateways (by value)



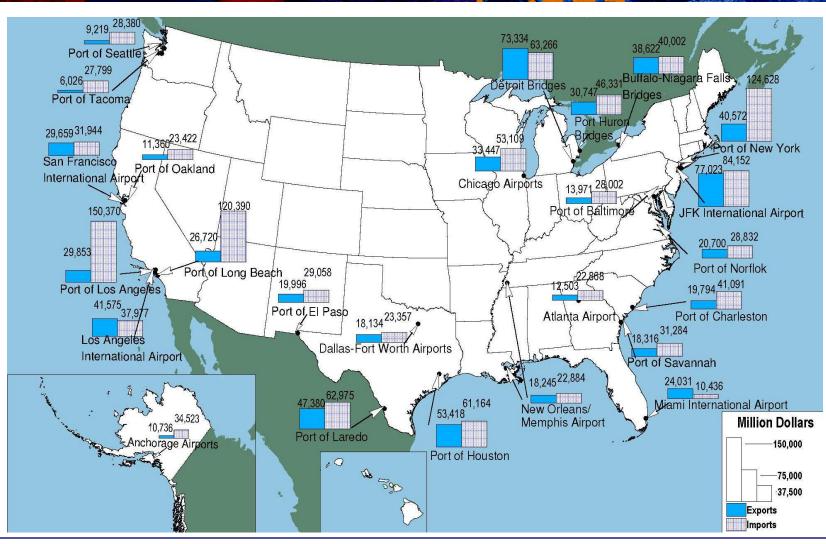
- Water
 - Los Angeles/Long Beach
 - New York/New Jersey
 - Houston
- Air
 - JFK
 - LAX
 - O'Hare
- Land
 - Detroit
 - Laredo
 - Port Huron



Major U.S. Foreign Trade Gateways

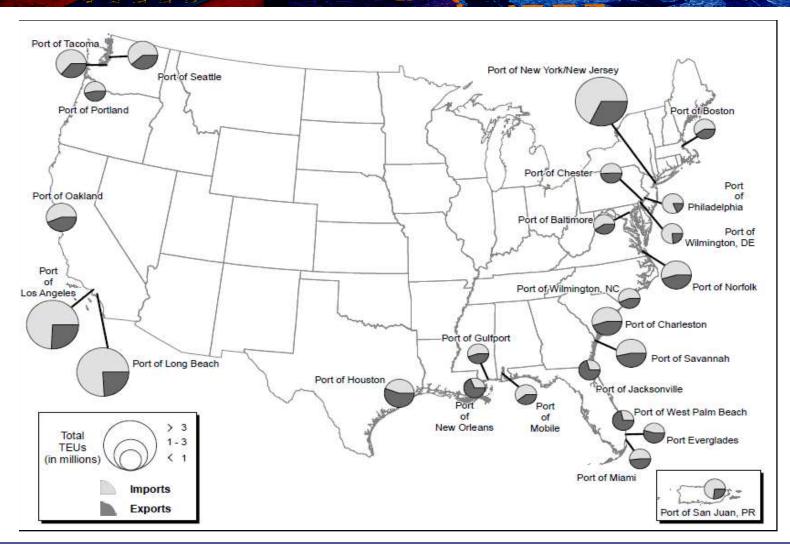
(by value)





Top 25 U.S. Container Ports, 2008

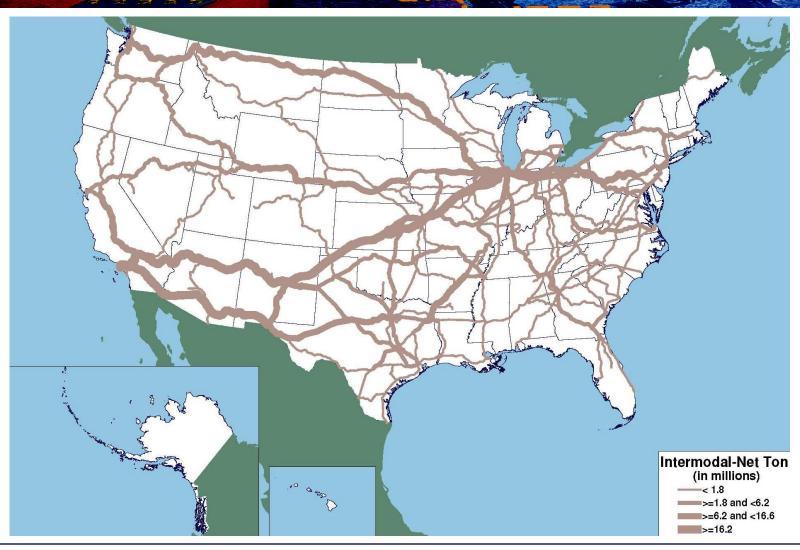






Tonnage of TOFC and COFC on Intermodal Moves, 2008

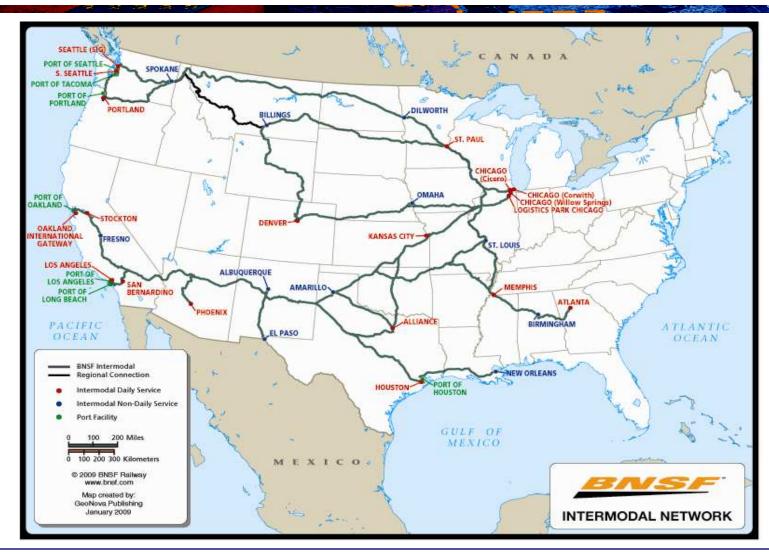






BNSF Intermodal Network

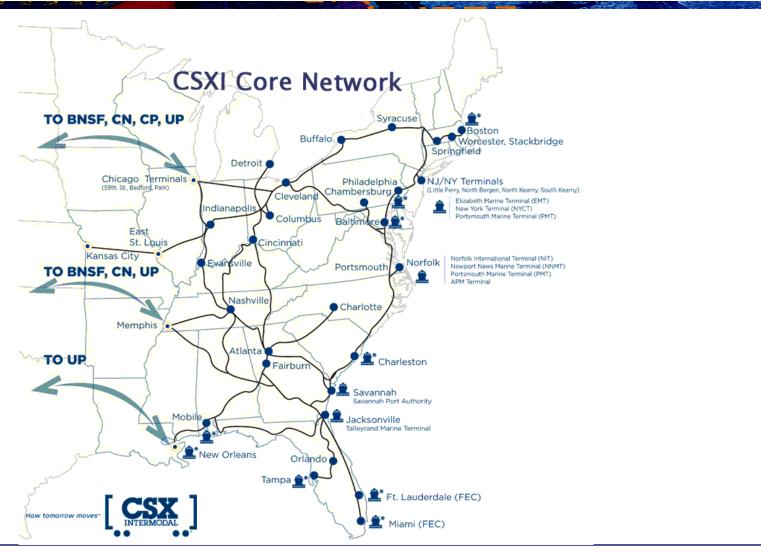






CSX Intermodal Network

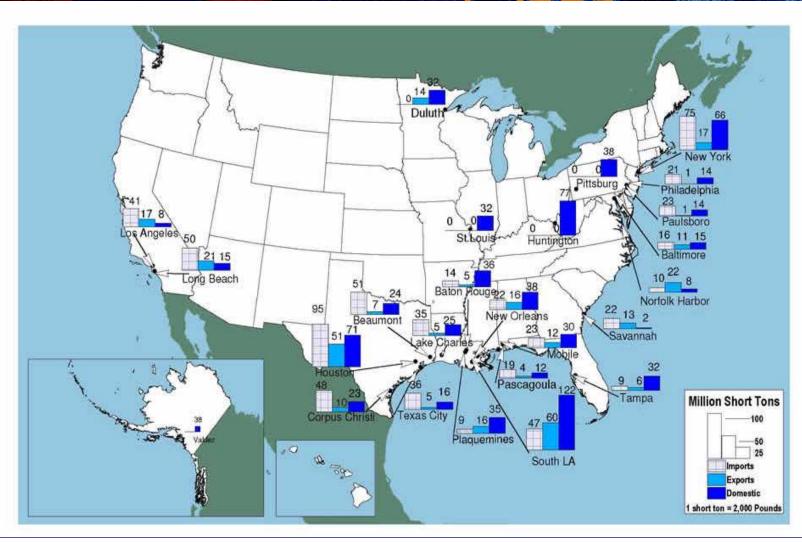






Top 25 U.S. Water Ports by Tonnage, 2007







Summary



- Supply chains typically have an important geographic dimension
- Transportation is a vital link between:
 - Locations
 - Levels of production and distribution
- Efficient transportation is a key to minimizing supply chain costs
- Encroachment creates barriers to efficient transportation and stifles economic performance
 - Congestion and capacity effects
 - Operational impacts

