

Understanding Transportation Supply Chains

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Supply Chain definition:

“A collection of activities and organizations involved in moving products from one point to another.” – FHWA Freight Office

Supply Chain Basics

- Supply chains have evolved from “push” chains (product shipment driven by maintaining inventory) to “pull” chains (product shipment driven by consumer demand) – **Just-In-Time Delivery**
- For most companies, their ultimate supply chain focus is on **reducing cost** and **increasing predictability** to highest degree possible



Understanding the Supply Chain

Freight Stakeholders



Product/Raw Material Sourcing – (Some) Key Considerations

- Location of raw materials
- Cost of raw materials (including labor, transportation, etc.)
- Supplier stability



Product Manufacturing – Key Consideration

- Cost of production (including labor, component parts, etc.) vs. cost of transportation



Off-Shoring vs. Near-Shoring

- Increased and unpredictable fuel costs driving up cost of transportation
- Some companies are considering relocating some or all of their production from overseas (especially East Asia) back to North America or United States



Off-Shoring vs. Near-Shoring

- If product transportation per unit costs low compared to production per unit costs (ex. computers) – Off-Shoring more likely
- If product transportation per unit costs high compared to production per unit costs (ex. furniture) – Near-Shoring more likely



Production Cost Considerations

- Companies with international supply chains also looking to reduce production costs by relocating to cheaper production (i.e. labor) locations
- For companies with East Asia (i.e. China, South Korea) production, looking to relocate to interior China or other parts of Asia (Vietnam, maybe India)



Consider Transportation Implications of Manufacturing Relocation

- Near-shore production – land transportation patterns altered; north-south connections probably become more important
- Off-shore production (move within Asia) – transport to U.S. East Coast via Suez Canal rather than Pacific Ocean and/or Panama Canal may become cheaper, quicker



Transportation Supply Chain Considerations

- Shipment Cost
- Shipment Speed
- Shipment Reliability



Transportation Service vs. Cost

Higher Service Cost Continuum Lower



\$10,000 - \$1/lb.

10¢-3¢/lb.

1¢-1/2¢/lb.

Fastest,
most reliable,
most visible

Fast,
reliable,
visible

Slower,
less reliable,
less visible

Lowest weight,
highest value,
most time-sensitive cargo

Range of weight
and value

Highest weight,
lowest value,
least time-sensitive cargo



Supply Chain Transportation Trends

- For most companies, their ultimate supply chain focus is on **reducing cost** and **increasing predictability** to highest degree possible
- In response to increased transportation costs and decreased service reliability, shippers are increasingly diversifying their transportation options

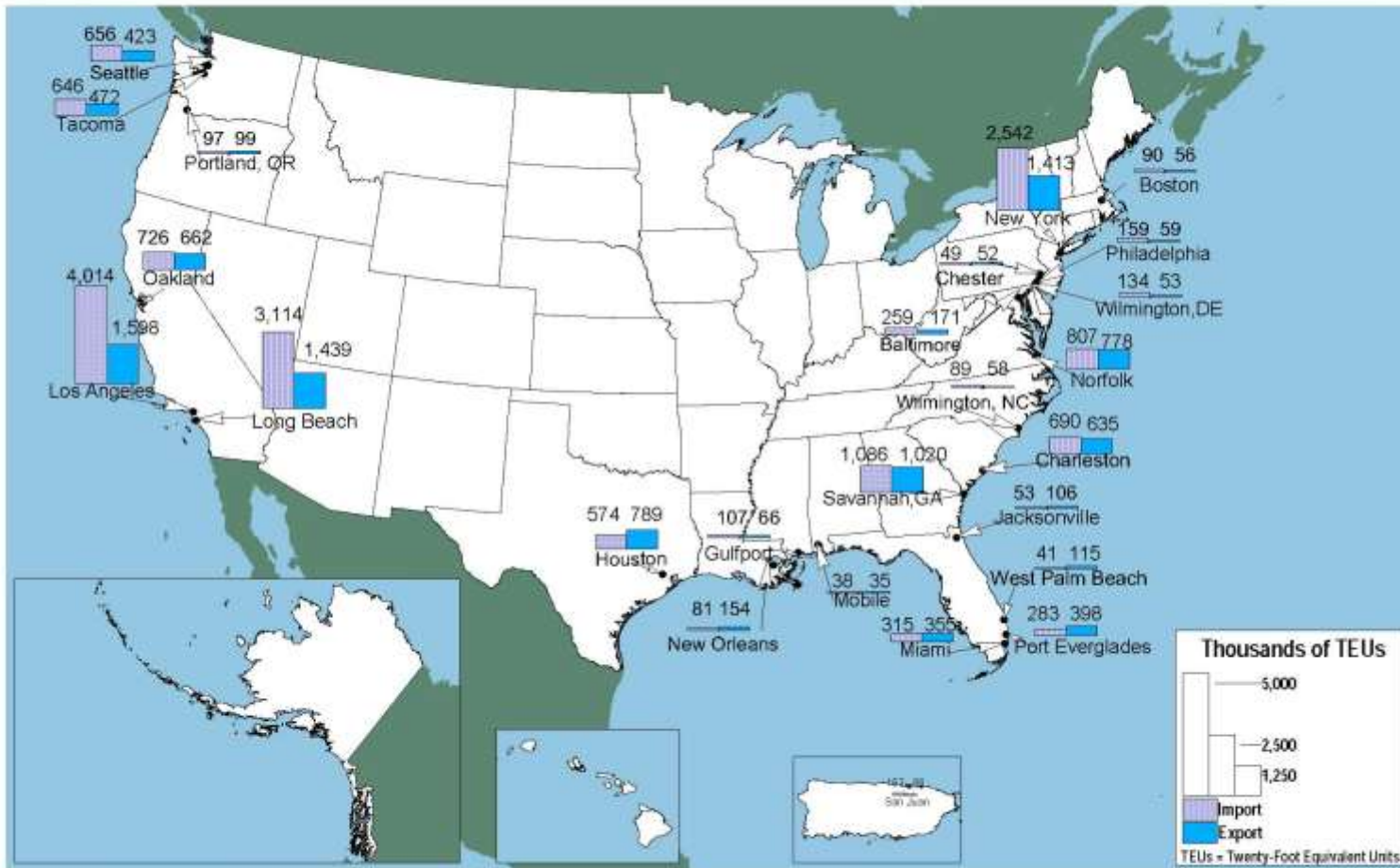


International Shipments – All-Water Routes vs. Water/Rail or Truck Intermodal

- Increasing push towards all-water transport via Panama Canal to East/Gulf Coast ports for Asia-Eastern U.S. shipments
- 2014 Panama Canal widening – canal will be able to handle larger container ships
- All-water transport saves on transportation (fuel) costs at expense of service speed

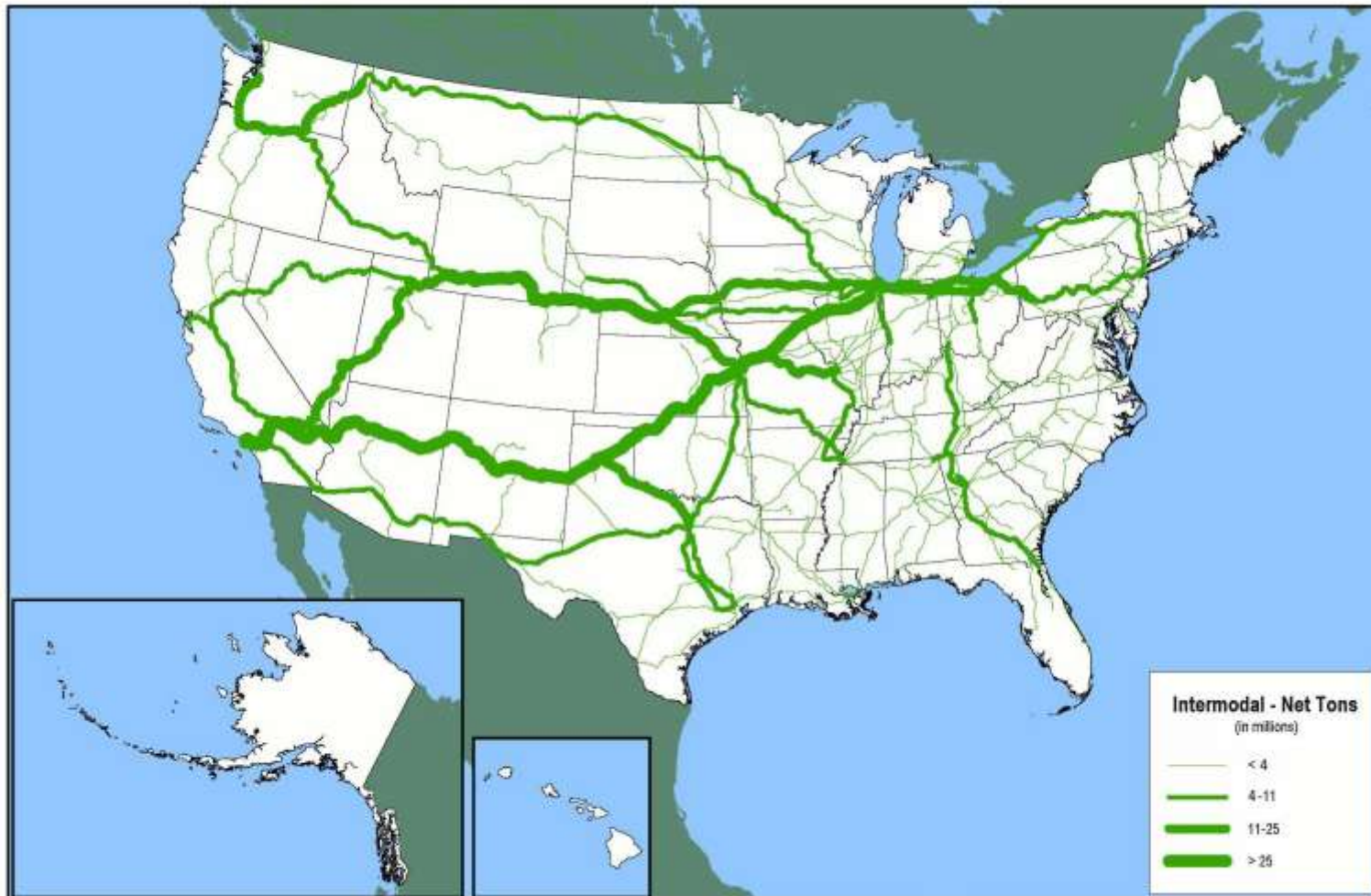


Top 25 Water Ports by Containerized Cargo: 2008



Source: U.S. Department of Transportation, Maritime Administration, U.S. Waterborne Container Trade by U.S. Custom Ports, 1997-2008, based on data provided by Port Import/Export Reporting Service, available at www.marad.dot.gov/library_landing_page/data_and_statistics/Data_and_Statistics.htm as of June 12, 2009.

Tonnage of Trailer-on-Flatcar and Container-on-Flatcar Rail Intermodal Moves: 2006



Source: U.S. Department of Transportation, Federal Railroad Administration, November, 2008.

International Shipments – U.S. West Coast Ports vs. Canada/Mexico West Coast Ports

- Increasing push towards some non-U.S. West Coast ports for inland U.S. shipments
- U.S. West Coast ports (especially LA & LB) more expensive, more congested
- Canadian ports (especially Prince Rupert) closer to Asia, Mexican ports closer to south central U.S.



Major Freight Corridors in the U.S., Canada, and Mexico



U.S. Domestic Shipments – Rail-Truck Intermodal vs. Long-Haul Truck

- Increasing push towards rail-truck intermodal for domestic shipments over 500 miles
- Railroads are becoming more reliable than they traditionally have been – able to capture more intermodal traffic
- Long-haul truck carriers now among railroads' biggest customers



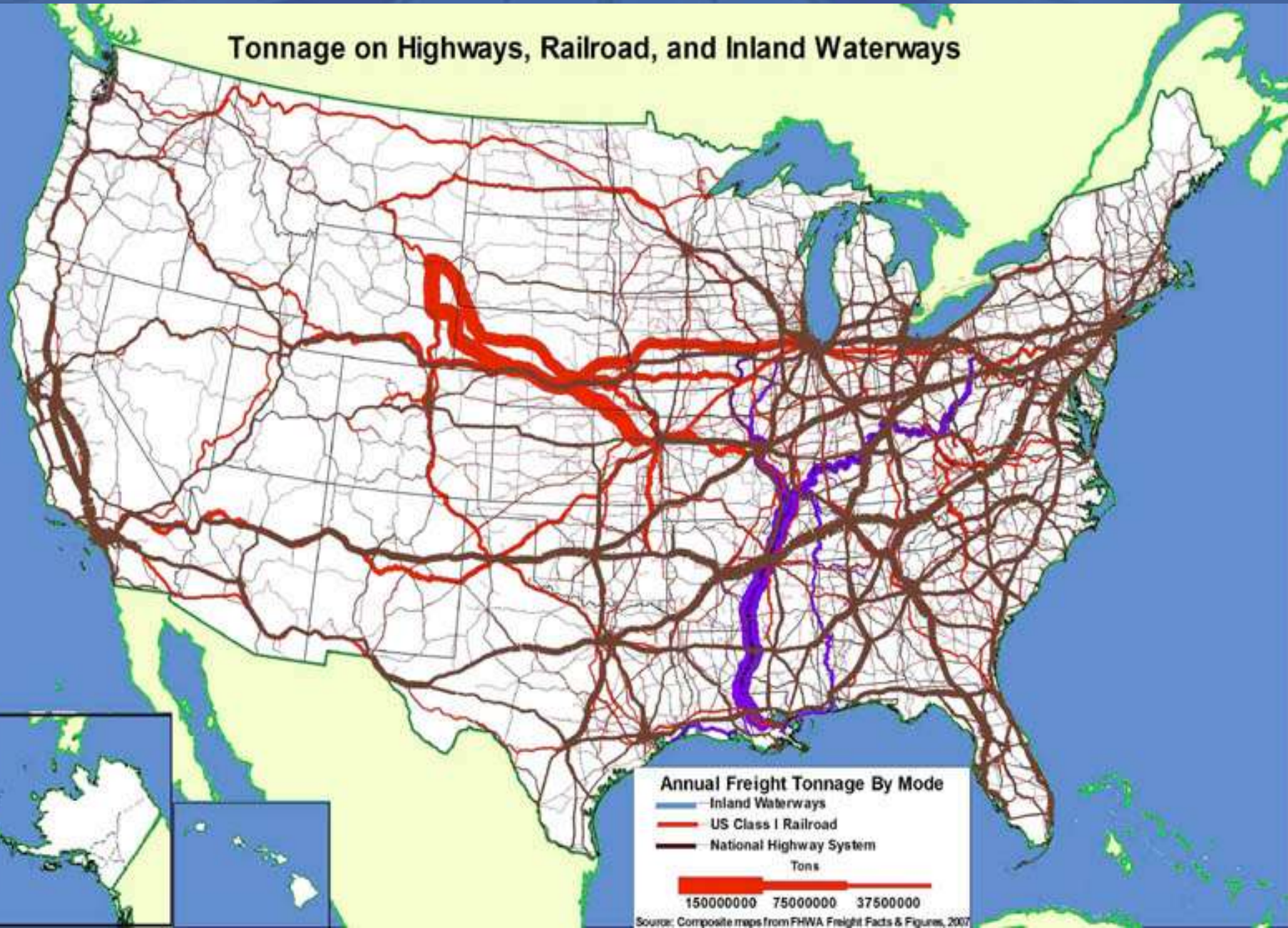
U.S. Distribution Center Networks

- Increasing and volatile fuel prices are forcing many companies to reevaluate their distribution networks
- There may be a push towards regional distribution centers in the future
- Locations with strong highway and/or railroad connectivity and proximity to large population centers will be most attractive

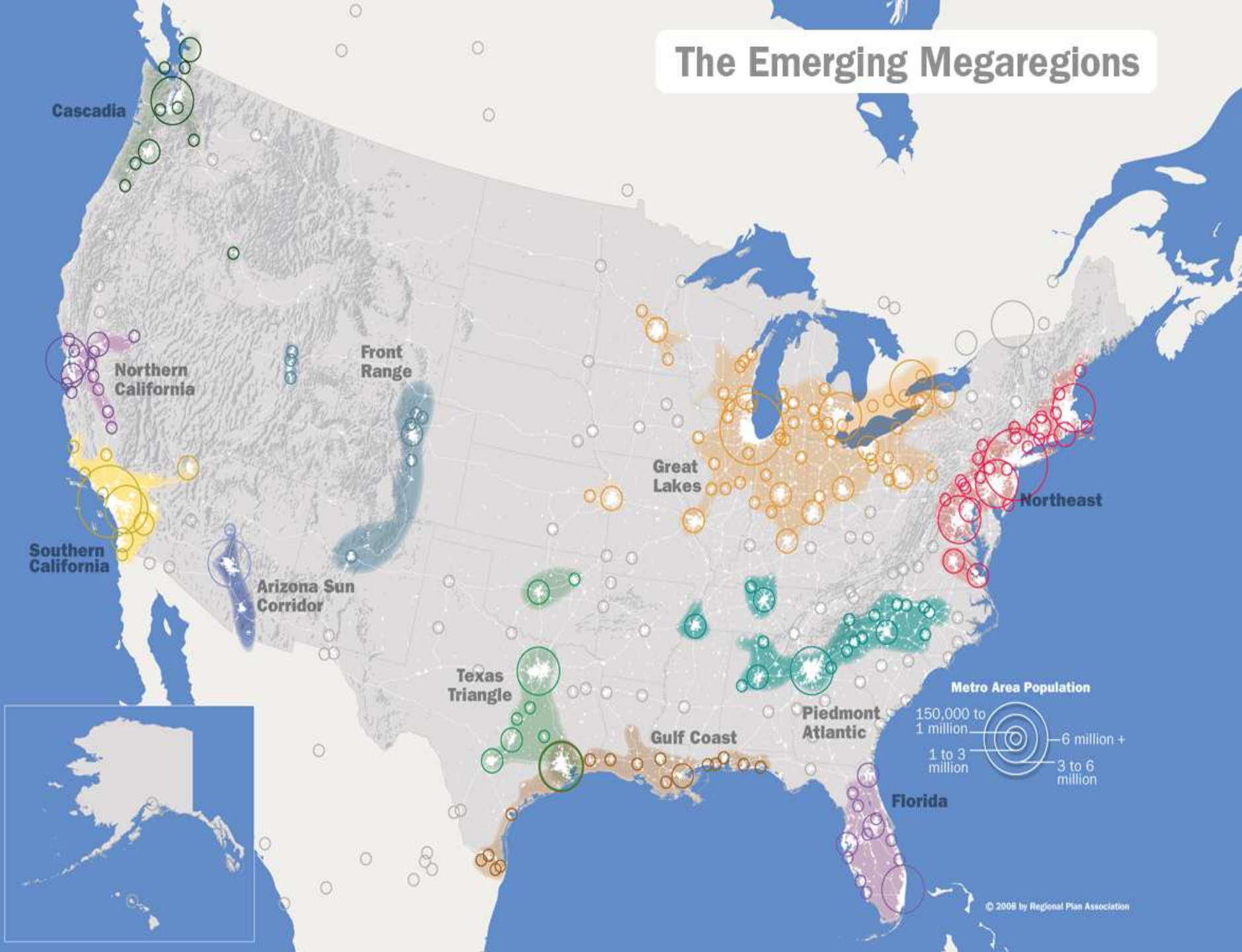


Freight Volumes: Truck, Rail, & Water

Tonnage on Highways, Railroad, and Inland Waterways



The Emerging Megaregions



Supply Chain Changes – Transportation System Implications

- Push towards all-water routes will increase East/Gulf Coast port volumes – more rail/truck traffic generated by those ports
- Push towards alternate West Coast ports of entry will increase rail traffic on some international corridors and truck traffic near some rail intermodal yards



Supply Chain Changes – Transportation System Implications

- Push towards domestic intermodal rail will increase truck traffic at transfer points
- Push towards regional distribution centers will increase industrial development in highly connected locations



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Freight Office website:

<http://www.ops.fhwa.dot.gov/freight/>

“Keeping the Global Supply Chain Moving” video:

[http://www.ops.fhwa.dot.gov/publications/fhwahop09035/captioned video/frt_sc.wmv](http://www.ops.fhwa.dot.gov/publications/fhwahop09035/captioned_video/frt_sc.wmv)

