EMERGENCY PREPAREDNESS COMMITTEE *for* CIVIL TRANSPORTATION

Prototype North American Highway and Railway Network

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Background

- The North American Transportation Statistics Interchange, established in 1991, is a trilateral forum of government officials from transportation and statistical agencies of the United States, Canada, and Mexico.
- The NATS Interchange shares best practices on how to collect, analyze, and publish transportation data and works together to address data gaps and improve comparability
- NATS has been actively working on building consistent digital maps of North American transport facilities

Roads	**Railways**
Waterways	**Marine ports**
Airports	**Border crossings**

Road and Rail Map Objectives

- Create a detailed cartographic representation of the North American road and railway networks with the following features
  - Develop a routable single-line planning network
  - Topologically correct at all border points
  - Include all highways, freeways, and major urban arterials
  - Include all railway networks regardless of railway class
  - Ensure networks have a consistent set of attributes (e.g. for roads name/number, number of lanes, functional classification, surface type, degree of access control)

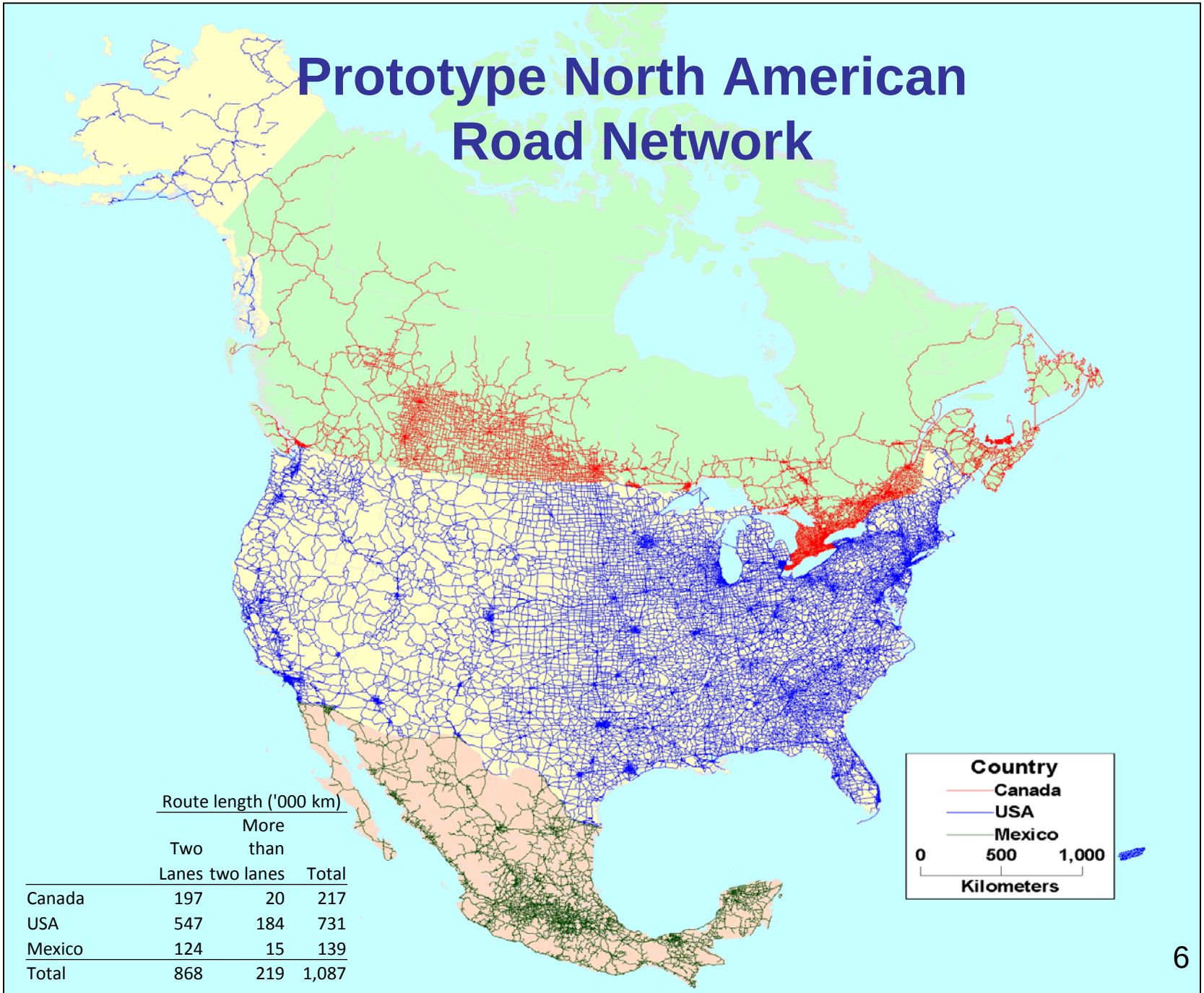
Road network sources

- **United States: National Highway Planning Network, version 11.03**
- **Canada: National Atlas of Canada, Frameworks data, 1:1M scale road network conflated to the latest National Road Network (NRN)**
- **Mexico: Planning file supplied by Mexican Transportation Institute (IMT)**

Railway network sources

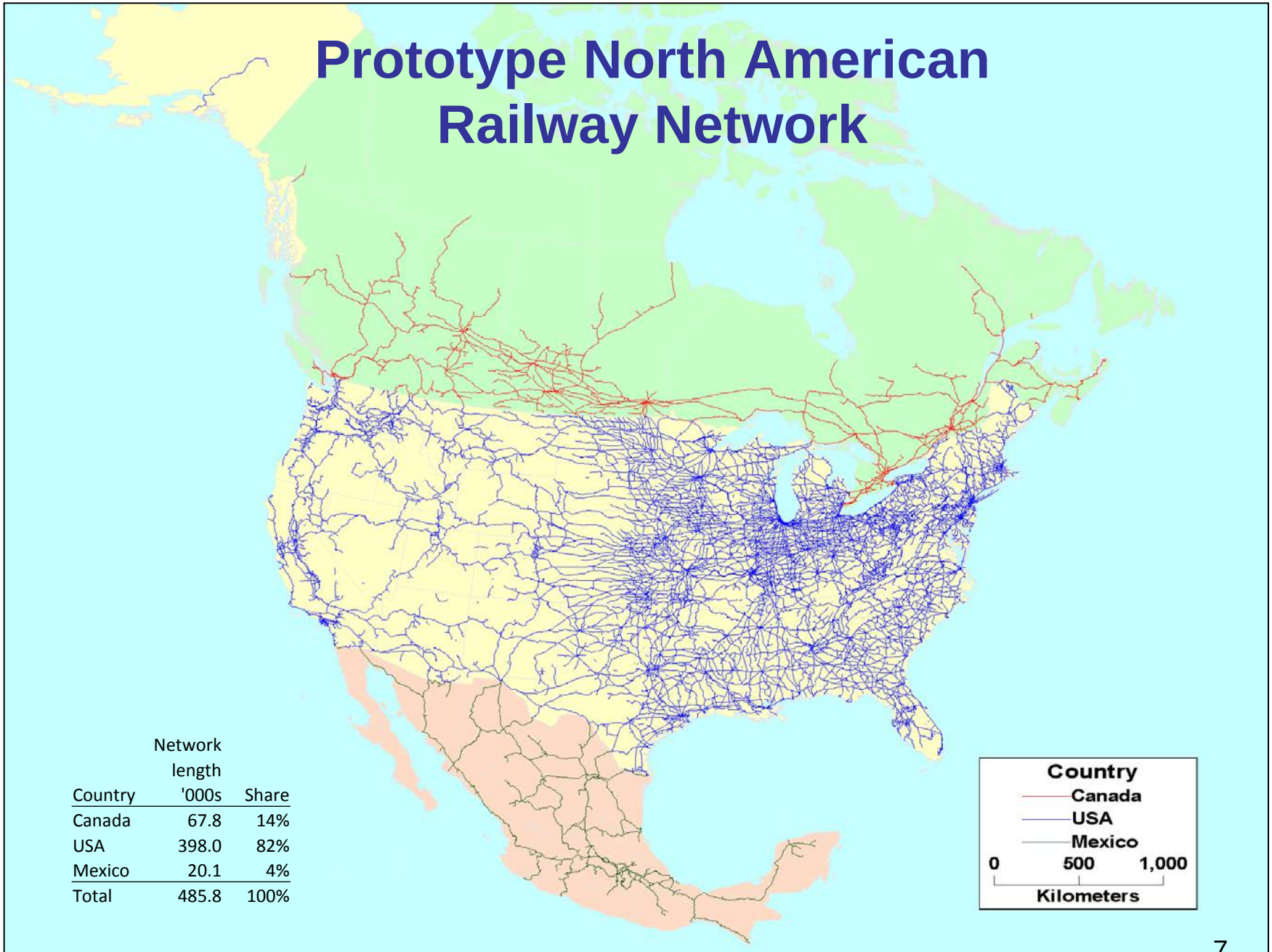
- U.S. network obtained from National Transportation Atlas Database
- Canadian network based on National Railway Network (NRWN) completed by Natural Resources Canada in January 2014.
- Mexican railway network obtained from the Secretaría de Comunicaciones y Transportes (SCT)

Prototype North American Road Network



	Route length ('000 km)		
	Two Lanes	More than two lanes	Total
Canada	197	20	217
USA	547	184	731
Mexico	124	15	139
Total	868	219	1,087

Prototype North American Railway Network

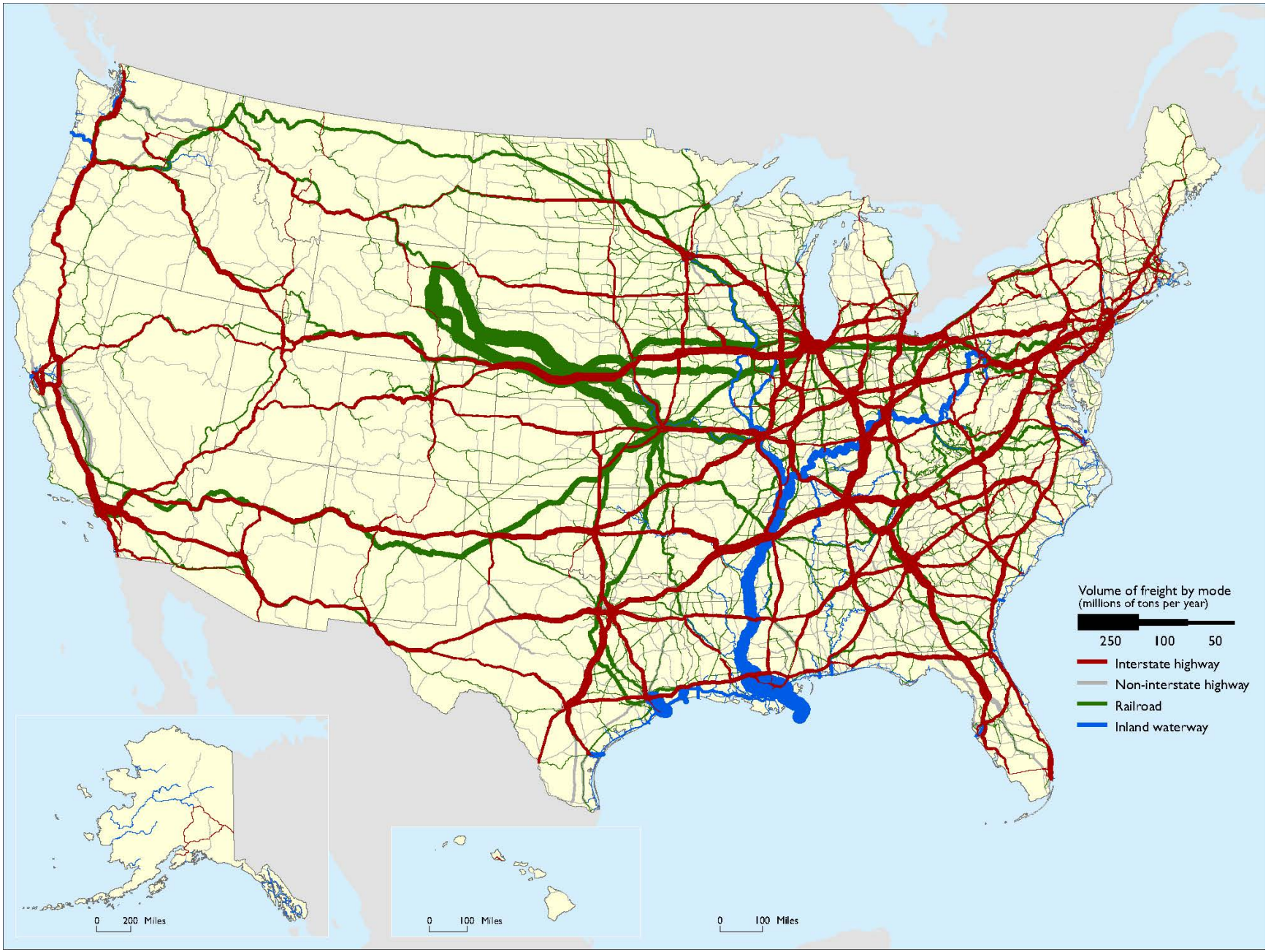


Country	Network length '000s	Share
Canada	67.8	14%
USA	398.0	82%
Mexico	20.1	4%
Total	485.8	100%

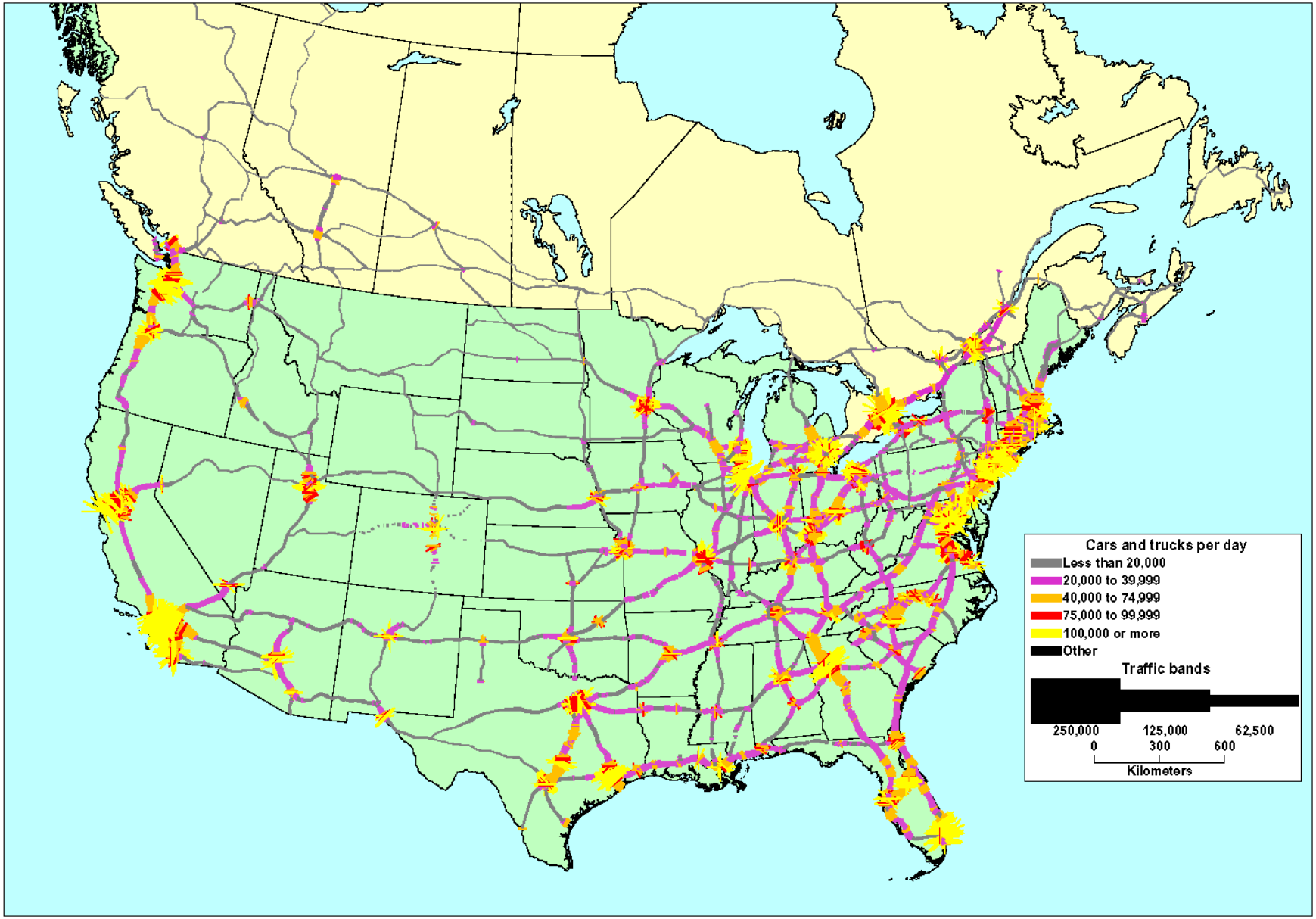
Uses and Benefits

- Visual/Cartographic display of freight/passenger activity and facility characteristics [Thematic Mapping]
  - Traffic flows
  - Infrastructure capacity and condition
- Ability to conduct “what if” simulations/analyses [Planning]
  - Operational diversion analyses
  - System vulnerabilities (critical links)
  - Resilience (ability to bounce back after a shock)
  - Safety/Environmental risk assessment (dangerous goods flows)
  - Corridor planning
- Forecasting future investment needs [Forecasting]
  - Anticipate future demands/pressures

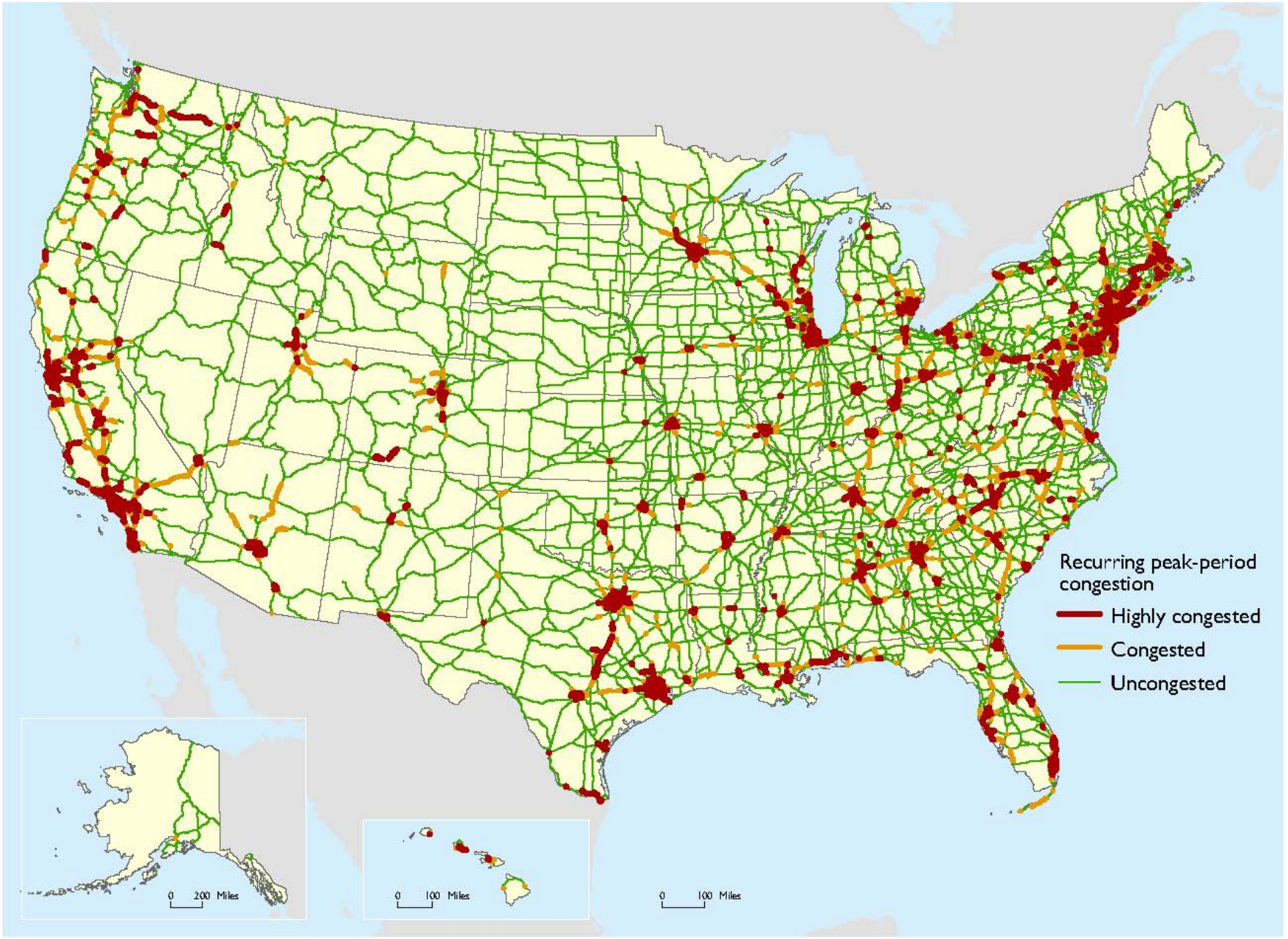
Freight Flows by Highway, Rail, and Water



Highway Traffic Flows



Highway Congestion

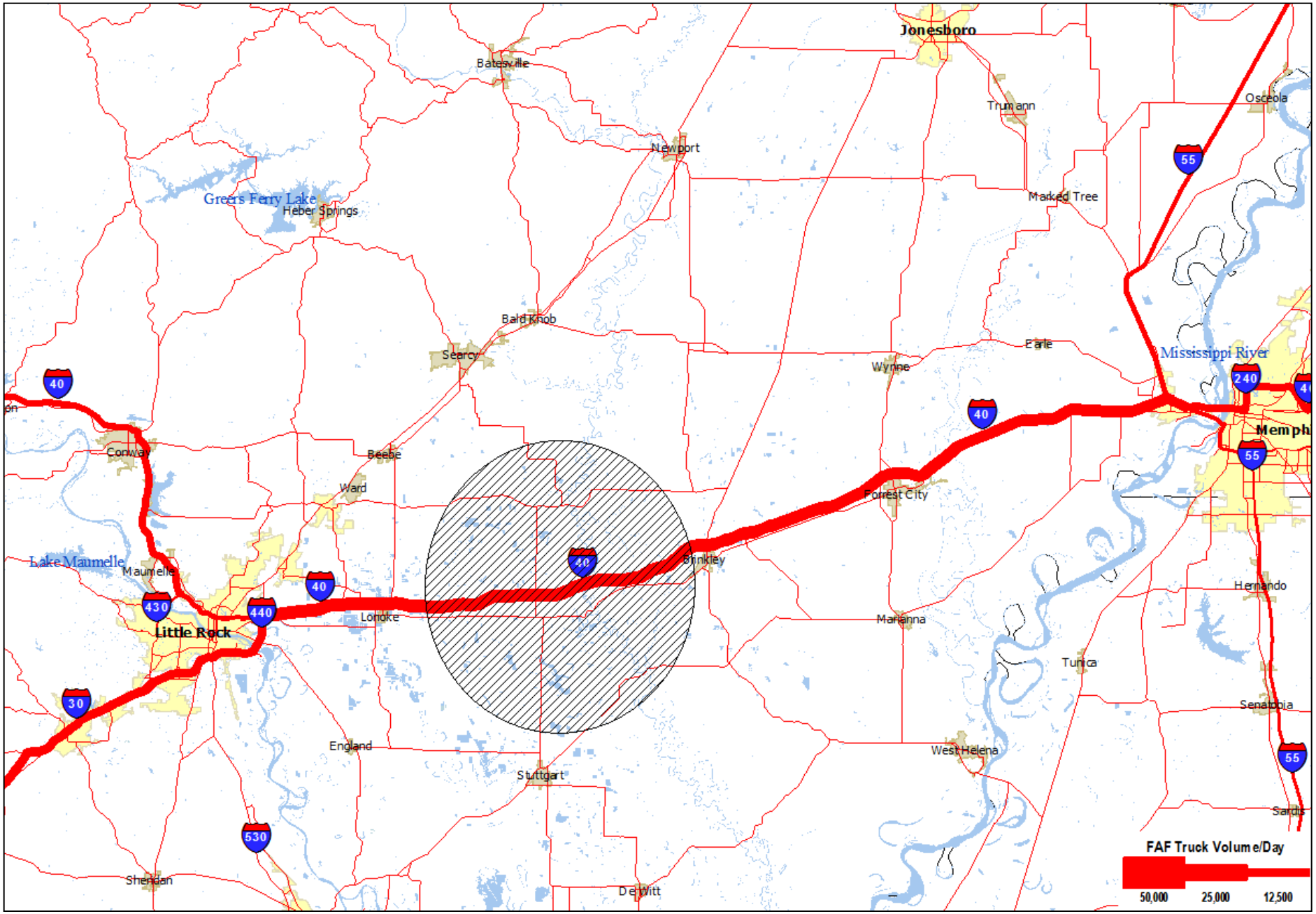


Crude Oil on Rail Movements

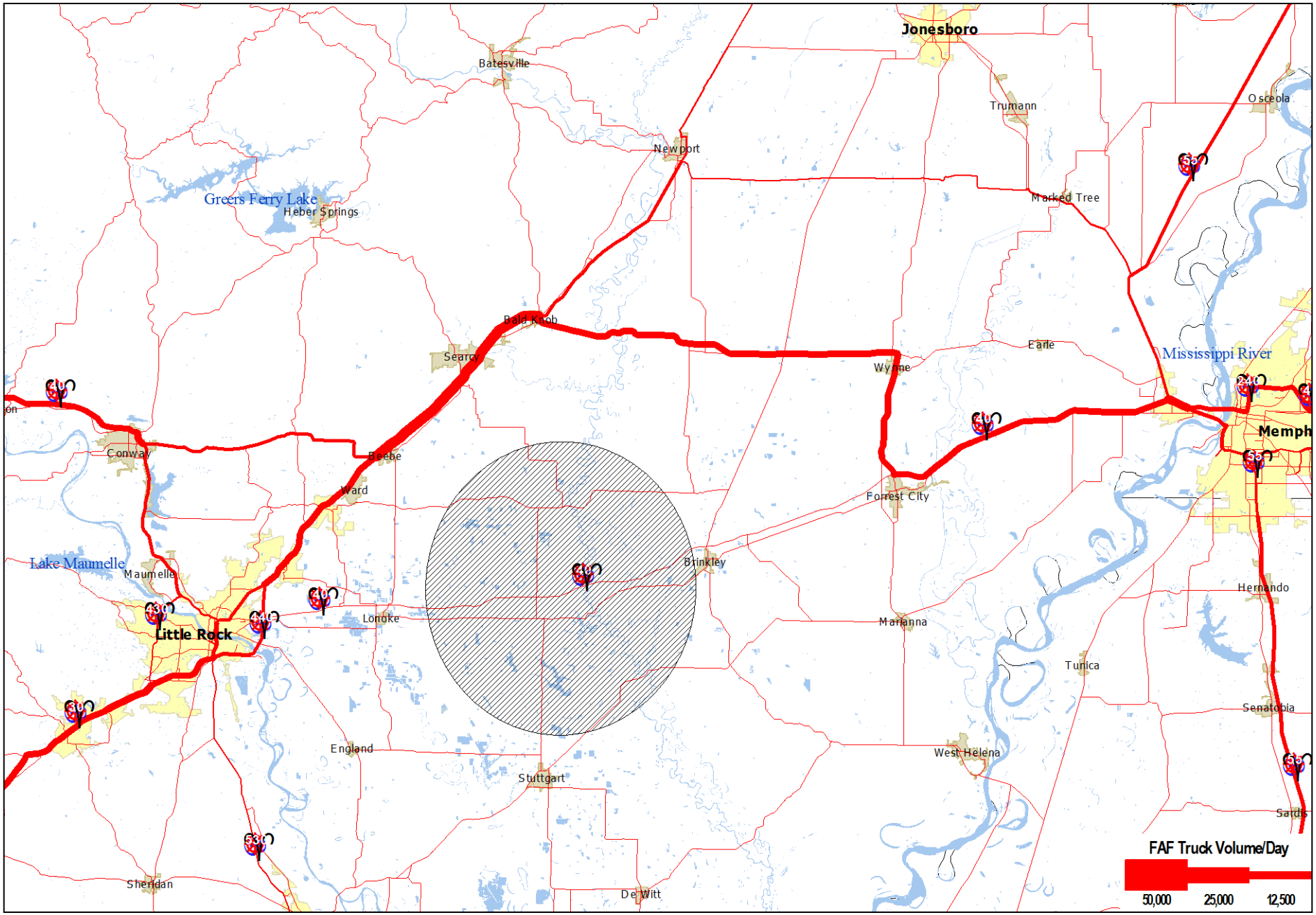
What-if Analysis Example – Traffic Diversion

- May 2011 - a section of I-40 in Arkansas was closed due to flooding from the White River
- Major non-interstate routes in the surrounding area were also flooded or closed because of the possibility for flooding
- Of the ~31,000 vehicles that cross the I-40 White River Bridge on an average day, an estimated 60% are large commercial vehicles

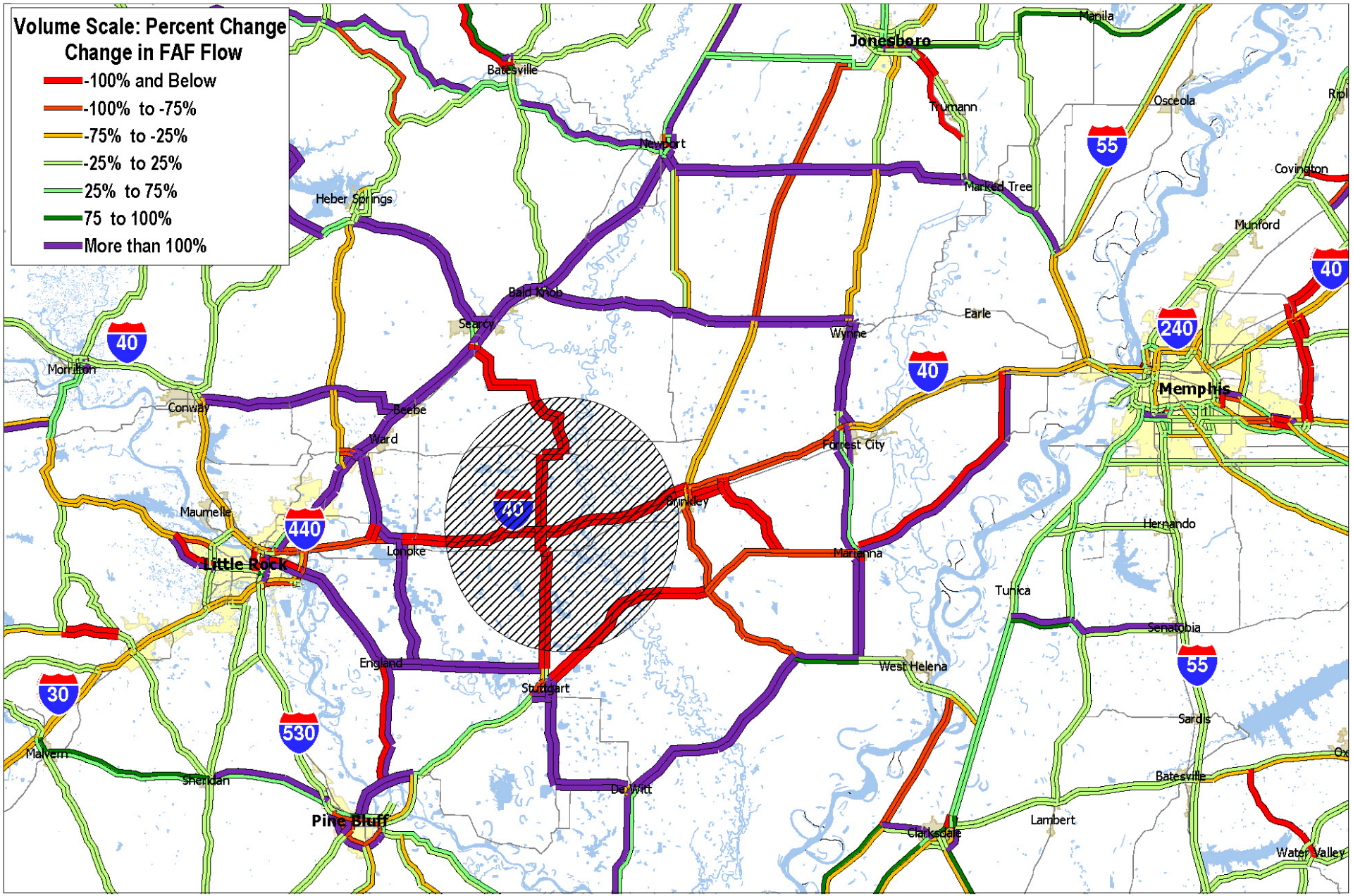
Pre-Scenario FAF Truck Flow (Local)



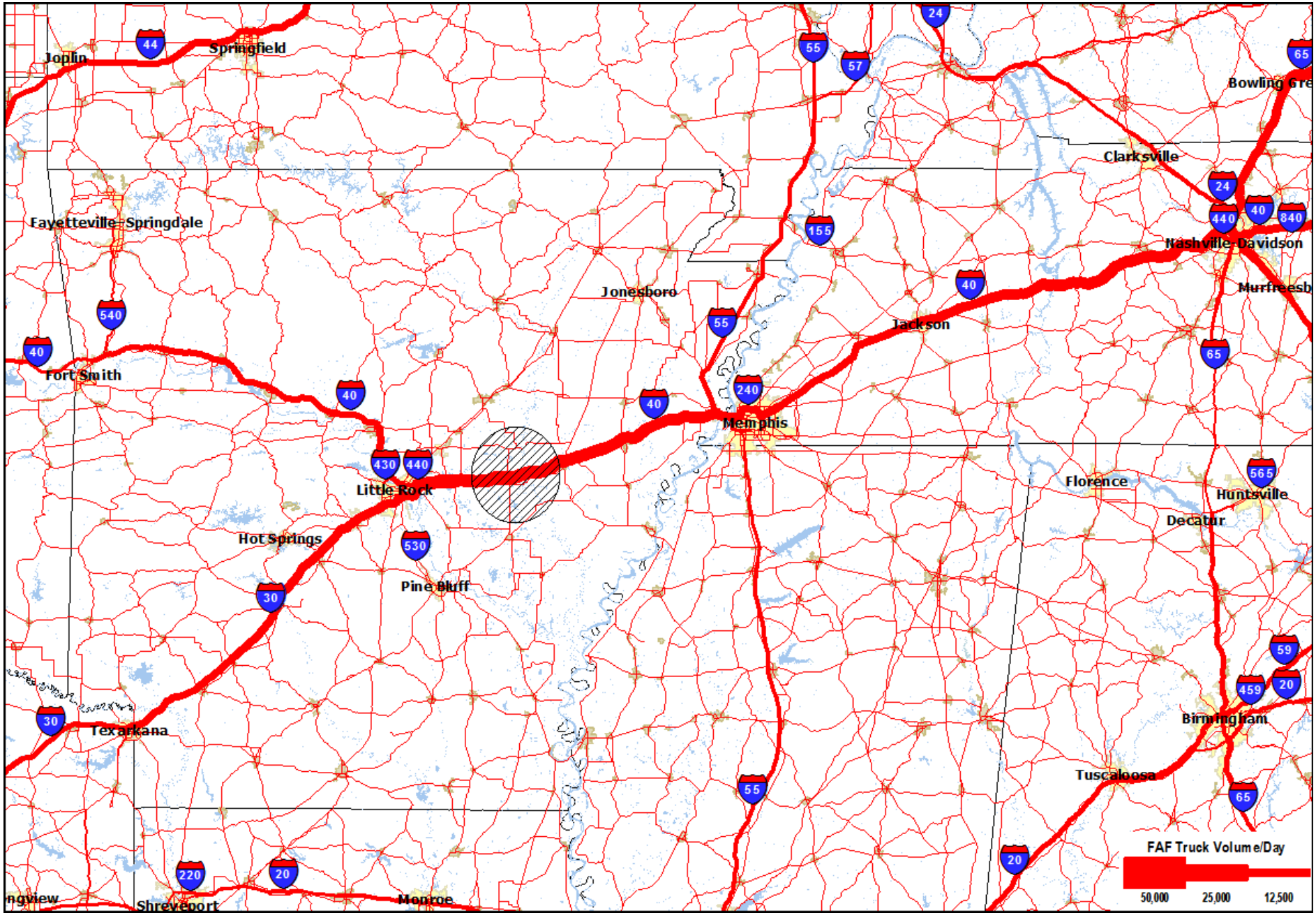
Post-Scenario FAF Truck Flow (Local)



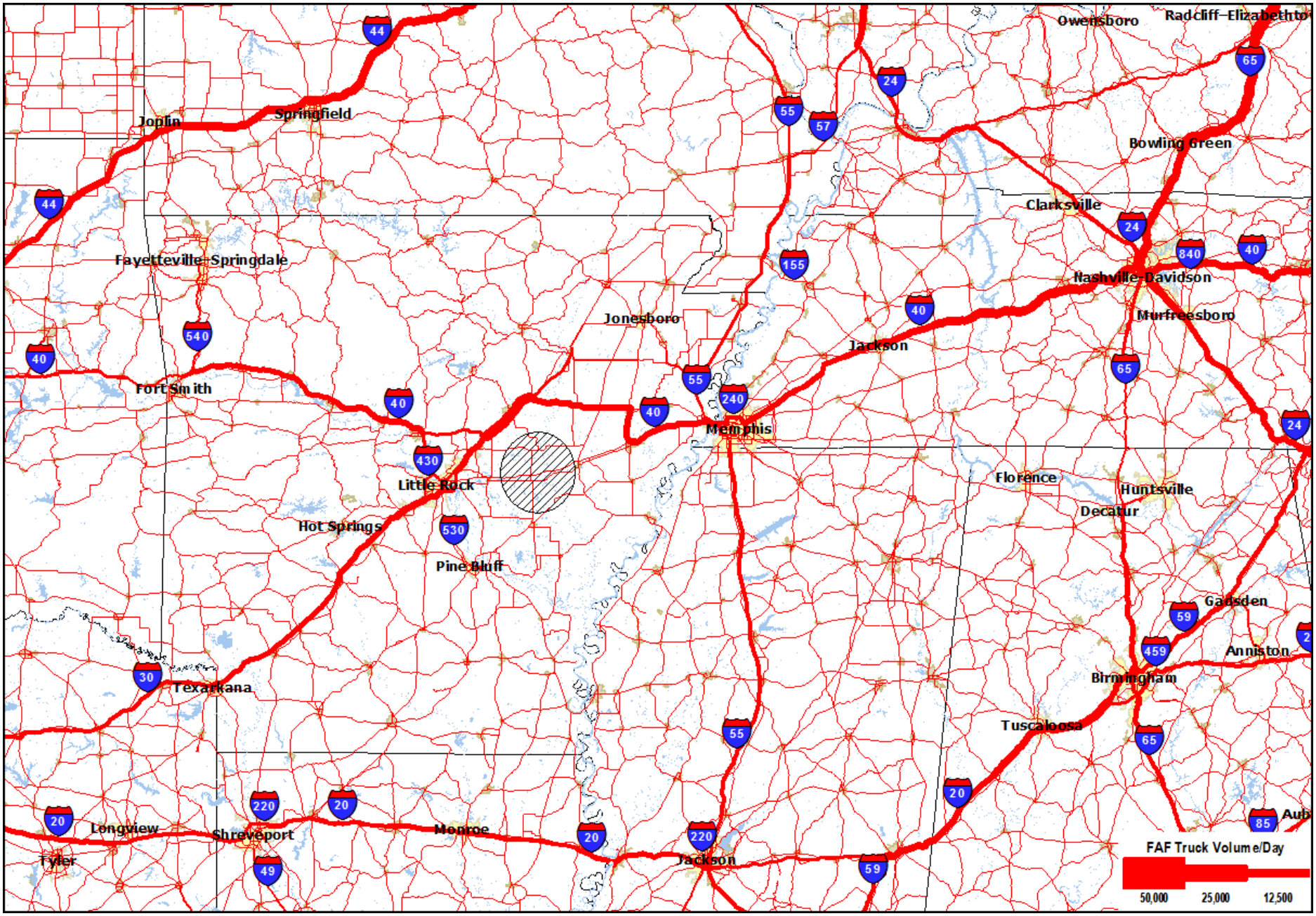
Percent Change in FAF Truck Flow (Local)



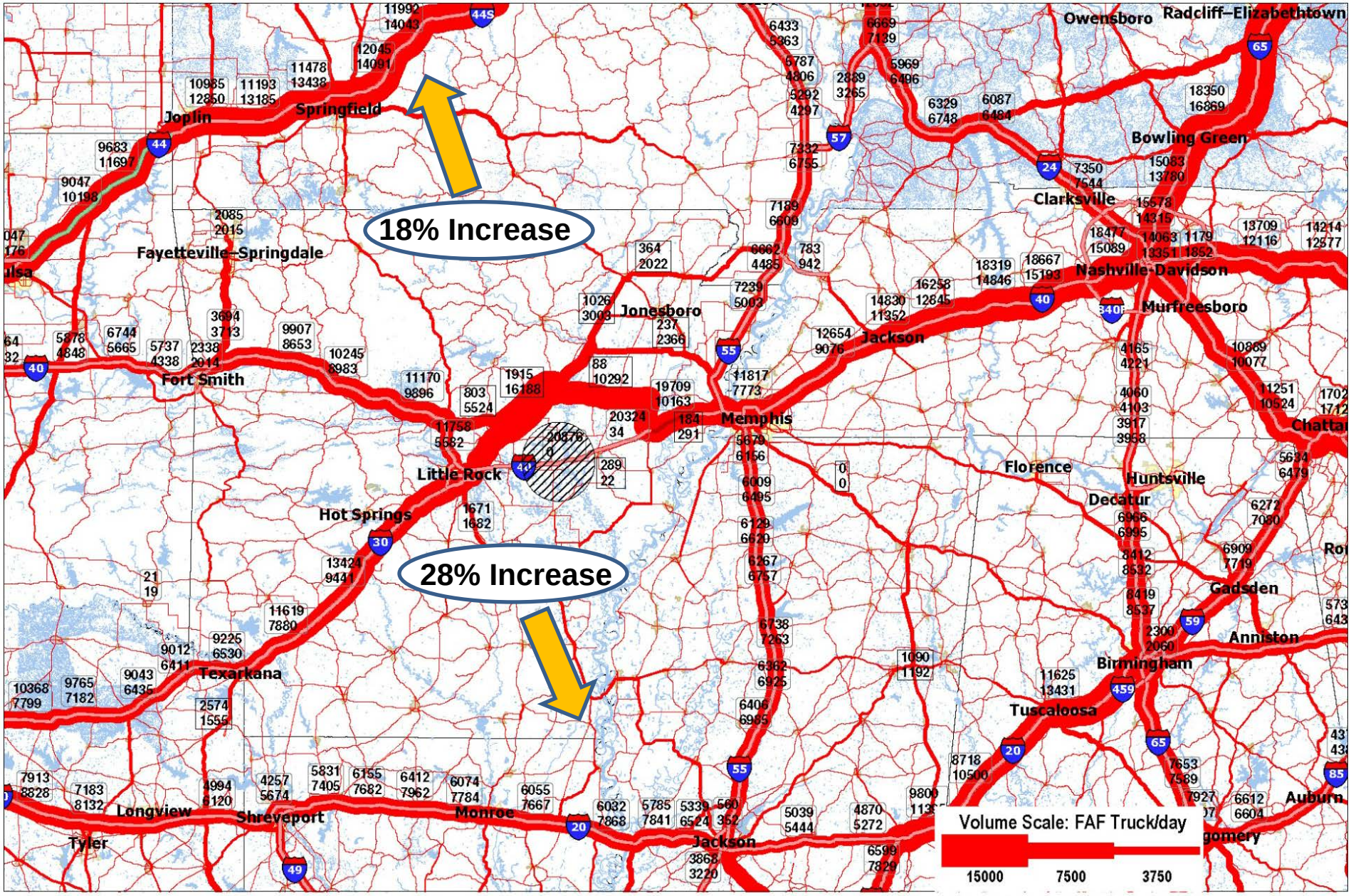
Pre-Scenario FAF Truck Flow (Regional)



Post-Scenario FAF Truck Flow (Regional)



Change in FAF Truck Flow (Regional)



Moving Forward

- Complete waterways network and seaports/airports
- Agree on a common set of characteristics
- Establish a process to incorporate updates
- Develop documentation and metadata
- Improve geospatial modelling tools (e.g. traffic assignment)
- Tools to download/view the transportation network data
- Develop consistent sources of traffic and infrastructure condition data
  - Mode-specific (traffic counts/waybill shipments)
  - Shipper/Passenger Perspectives (US CFS)

Thank you

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