

I-81 Corridor Coalition Conference



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Presentation Outline

- Background on ORNL Center for Transportation Analysis



- Why Take a Corridor Approach to I-81?

Center for Transportation Analysis

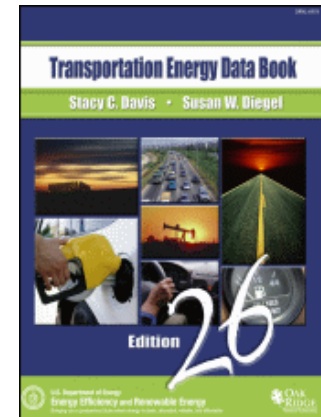
CTA develops integrated transportation solutions around six areas:

- Transportation and energy security;
- Transition to alternative fuels;
- Climate change, energy and environment;
- Advanced freight modeling and simulation;
- Congestion mitigation; and,
- Infrastructure pricing.



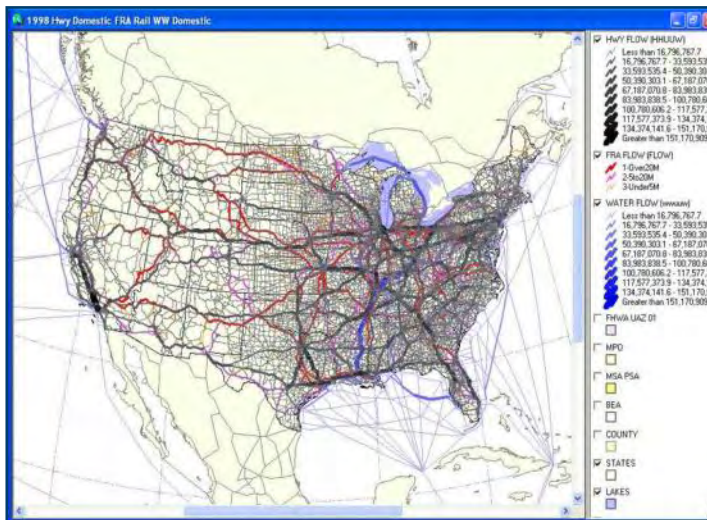
Analysis Capabilities

- Transportation Network Routing
- Geographic Information Systems
- Decision Support Systems & Simulation Analysis
- Supply Chain Analysis
- Infrastructure Asset Management
- Statistical Analysis
- Transportation Data Management



Freight Activities

- Freight flow analysis, forecast, and modeling
- Intermodal Bottleneck Tool
- RailReady –geo-spatial tool for TSA
- 2002 Freight Analysis Framework (FAF2)
- Beginning the FAF3



Heavy Vehicle Safety and Efficiency Research

- Single-Unit Truck Finite Element Crash Modeling
- Heavy Truck Duty Cycle
- Integrated Braking Systems Analysis and Modeling (TruckSim)
- Truck Rollover Characterization (Class-8 Tractor, Box-Trailer, Flatbed, Tanker, Wide-Single Tires, Electronic Stability Control, Torsional Stiffness [Michelin, Dana, Clemson, Western Michigan Univ., Battelle, Volvo])
- OEM and After-Market Brake Performance Characterization (1-, 2-, and 3-axle Dump Trucks & Refuse Hauler)
- High Speed Weigh-in-Motion
- After-Market Brake Performance Taxonomy
- Modeling of Trucks in Evacuation Scenarios
- Pulsed U-V Headlight
- Long-Persistent Phosphors for Highway Striping Visibility and Truck Conspicuity



National CMV Roadside Technology Corridor

Funded by Federal Motor Carrier Safety Administration to test and evaluate safety technologies in a real-world setting as a permanent research corridor.

- 80+ miles between the Greenville weigh station (I-81) and the Campbell Station weigh station (I-40)
- 3 technology testing projects are underway:
 - Wireless truck and bus inspections
 - Performance-based brake tester
 - Smart infrared inspection system
- No other VII test-bed is looking at fuel efficiencies.



Commercial Motor Vehicle Roadside Technology Corridor

A series of fixed and mobile state-of-the-art facilities for testing and evaluating CMV enforcement technologies in a real-world setting

FMCSA with its partners – TDOS, TDOT, ORNL, and UT – has established a CMV Technology Corridor at operational weigh and inspection stations as a long term collaboration aimed at developing and introducing advanced truck and bus inspection and enforcement technologies.

Benefits

- Provide Quantitative Assessments of Technology Benefits and Costs
- Provide Data and Test Results to Support Technology Deployment Decisions
- Expedite FMCSA's Technology Testing Process
- Flexibility to Address Multiple Technology Types
- Test-bed for Vehicle-Infrastructure Integration (VII) for Truck and Bus Safety

*Field Operational Testing
VII Test-bed for Truck
and Bus Safety*

**Greene County
Inspection Stations**

*Bench-top testing
Hardware-in-the-loop testing
Driving simulator testing
Test course testing*

**TDOT Region 1
Headquarters**

**Knox County
Inspection Stations**

*Active testing of
infrastructure-based
technologies at
Inspection Stations*

Technology Types

- Infrastructure-based safety technologies
- Passive vehicle-based technologies
- Driver-based safety technologies
- Control/drive assist technologies
- Information technologies for safety



Knoxville



I-81 Corridor

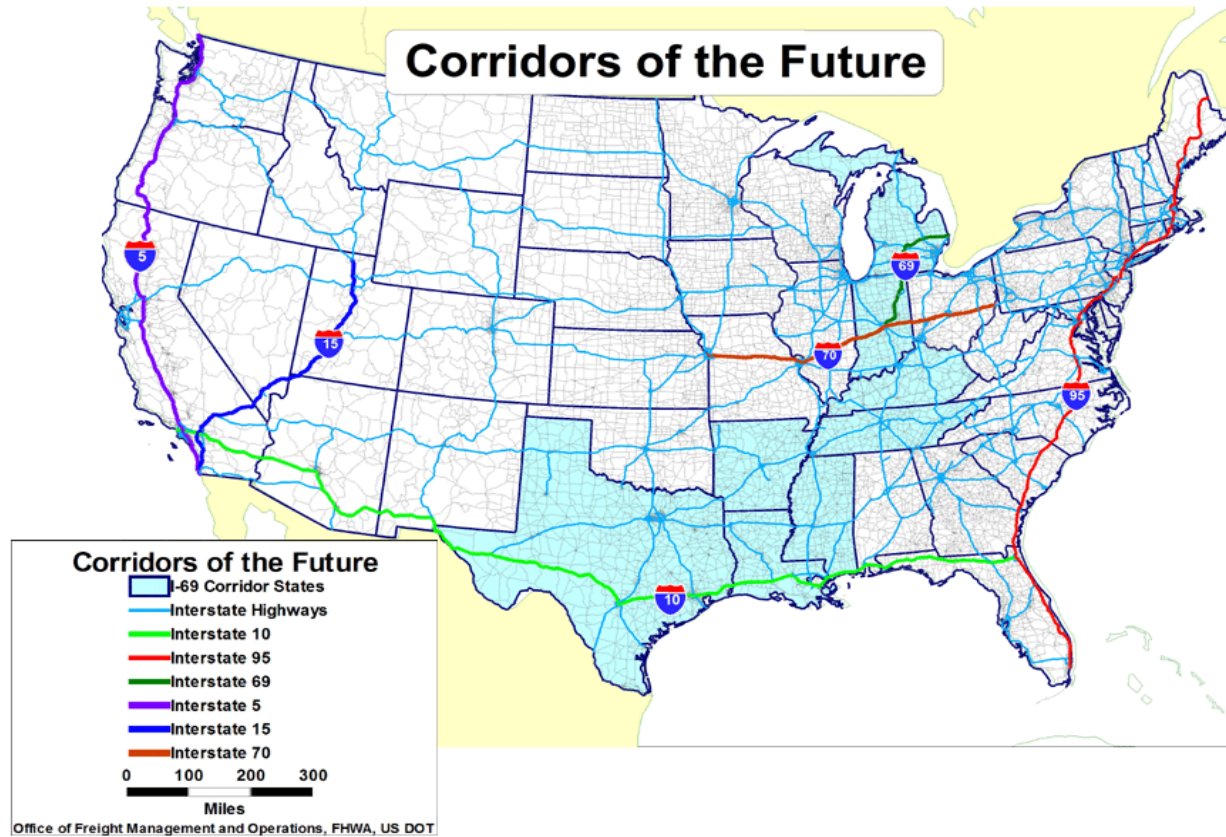
- North-south connection between the east-west routes of I-40, I-70, I-80 and I-90

- Corridor Issues and Problems
 - Congestion & capacity
 - Safety & security
 - Freight movement
 - Freight diversion
 - Economic access



Why Take a Corridor-Wide Approach?

Remain Competitive for Resources

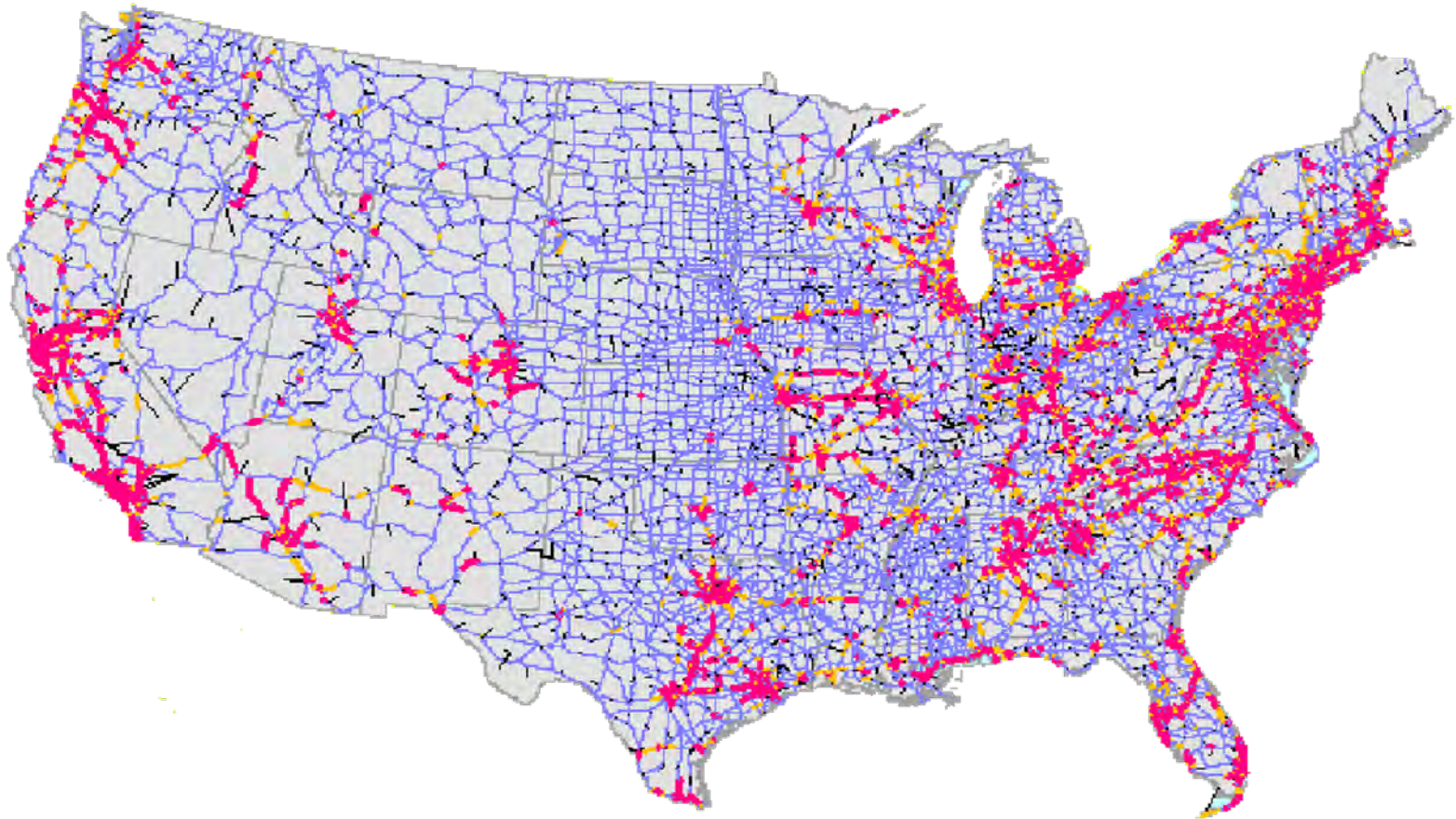


Why Take a Corridor-Wide Approach?

Growth of Highway Traffic along I-81

National Highway System estimated peak period congestion (2020)

- Below capacity
- Approaching capacity
- Over capacity



Why Take a Corridor-Wide Approach?

Maximize Individual State Plans (Resources)

Rail Concepts

- New rail
- Increasing the length of and adding sidings at various locations

Transportation System Management

- Truck-climbing lanes
- Intelligent Transportation Systems (ITS)
- Incident Management Programs

Transportation Demand Management

- Reduce demand for travel through telework, transit

Highway Concepts

- Construct additional general purpose travel lanes
- Construct 2 to 4-lane exclusive truck-way
- Operational solutions (interchange, ramp and bridge improvements)



Why Take a Corridor-Wide Approach?

Better Representation of Benefits

Performance Metric

Monetary Value

Recurrent Congestion for Autos	\$19.82/hour of delay
Recurrent Congestion for Trucks	\$36.05/hour of delay
Non-recurrent Congestion for Autos	\$39.64/ hour of delay
Non-recurrent Congestion for Trucks	\$72.10/hour of delay
Accidents	\$8,500 per accident*
Fatalities	\$4,300,000 per fatality
Auto Air Pollution Costs	\$0.011 per VMT
Truck Air Pollution Costs	\$0.039 per VMT

Source: FHWA HERS, the FHWA Technical Advisory on Motor Vehicle Accident Costs, and the IDAS software system.

I-81 Corridor Profile



I-81 Corridor
— I-81
0 50 100 150
Miles
100-Mile Within I-81

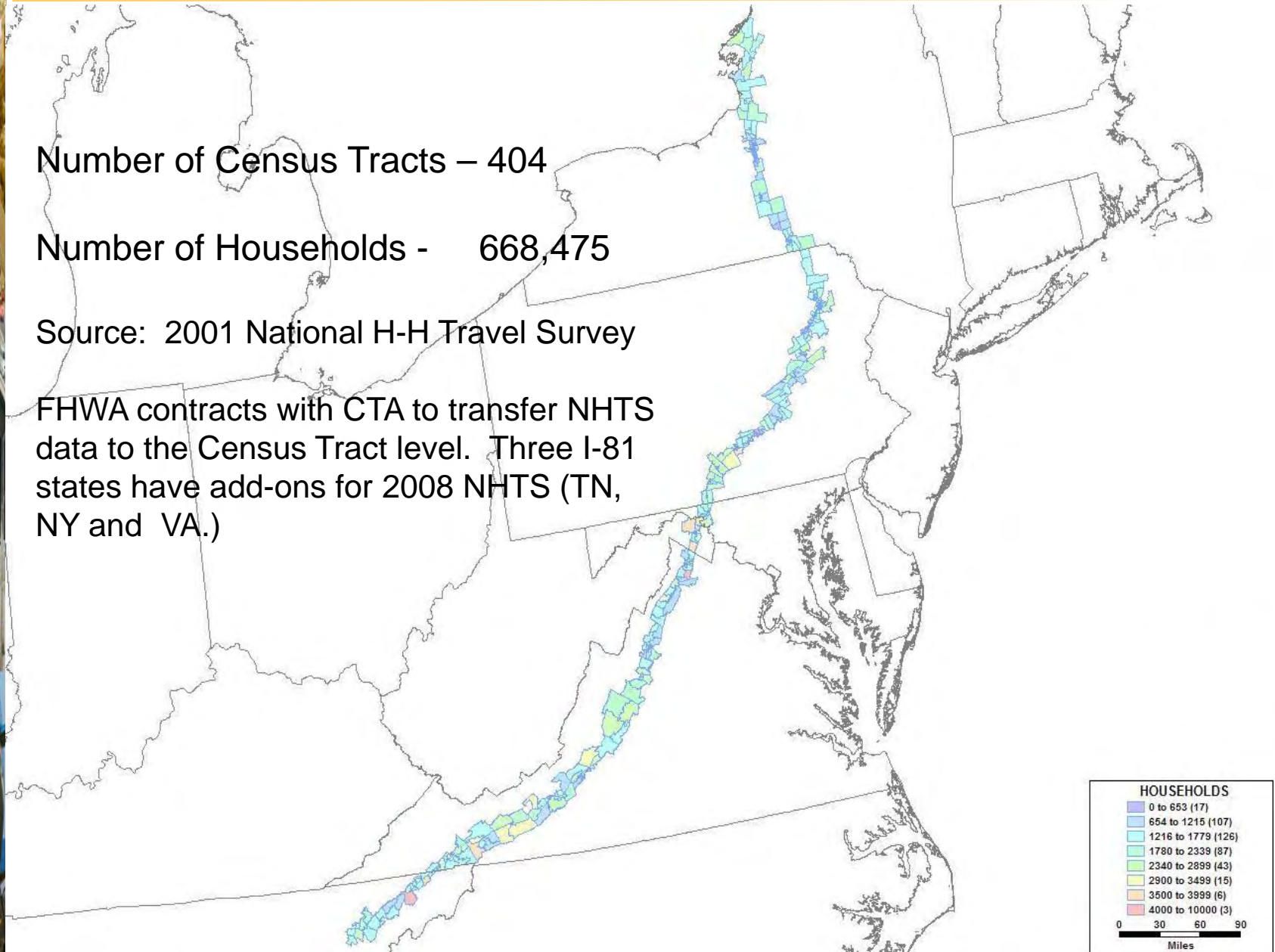
I-81 Corridor Profile, 2001

Number of Census Tracts – 404

Number of Households - 668,475

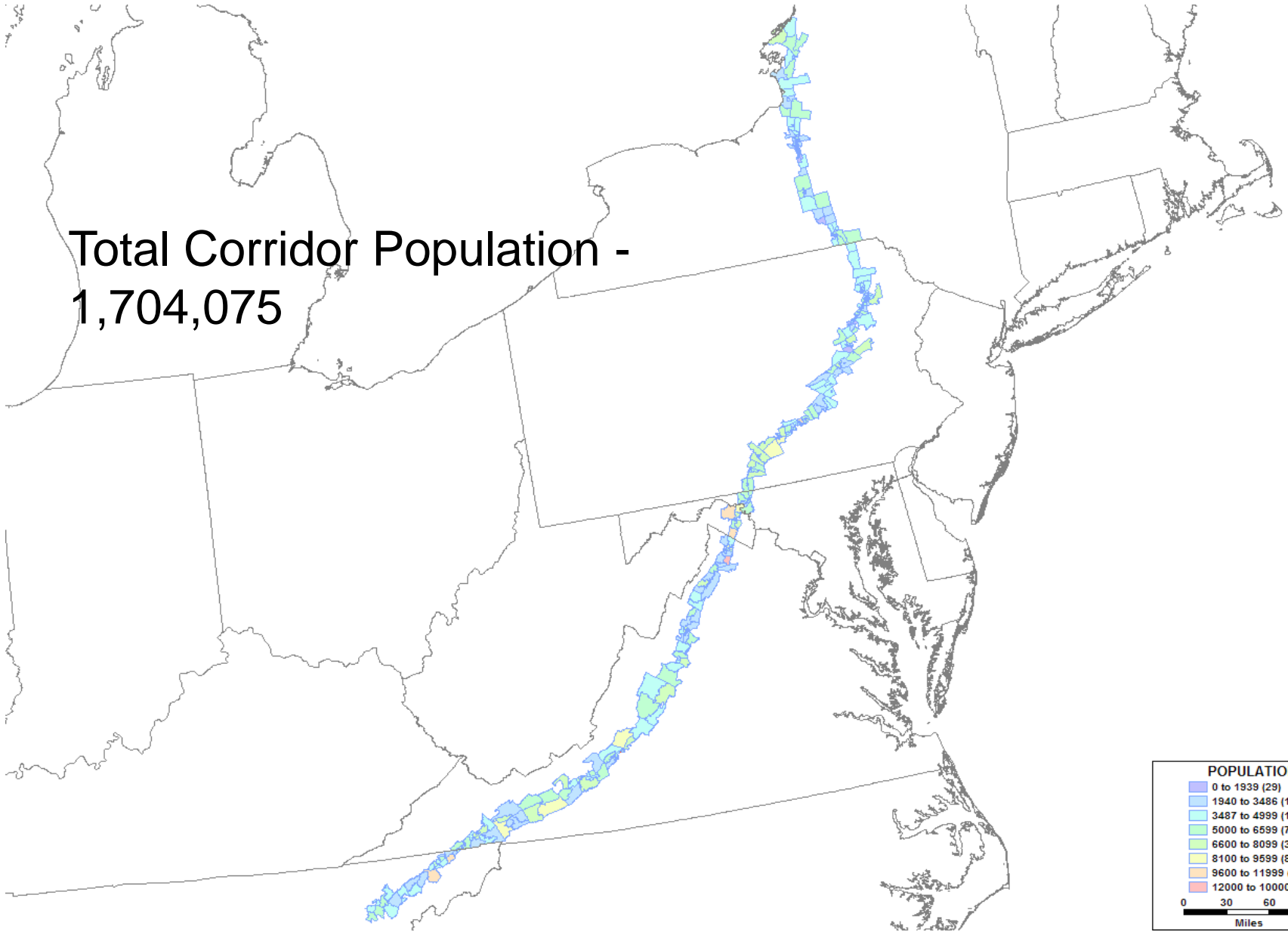
Source: 2001 National H-H Travel Survey

FHWA contracts with CTA to transfer NHTS data to the Census Tract level. Three I-81 states have add-ons for 2008 NHTS (TN, NY and VA.)



I-81 Corridor Population, 2001

Total Corridor Population -
1,704,075



I-81 Corridor Profile

Along the length of I-81:

- There are 60 active rail crossings. (BTS network refined by ORNL)
- There are 1,457 highway bridges (these are often tandem bridges but we usually count them as 1 bridge) (National Bridge Inventory)
 - **75% of the bridges (1,100 bridges) are over 40 years of age**
- There are 22 military bases within 20 miles of I-81

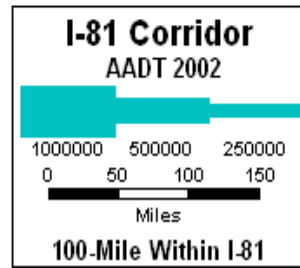


I-81 Corridor Profile

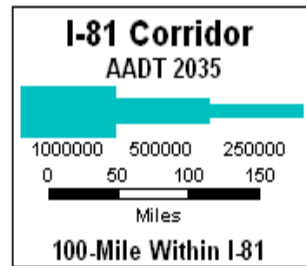
- Tandem bridge between Harrisburg and Carlisle PA on I-81. The bridge was built in 1963 and crosses a Norfolk Southern Rail line.



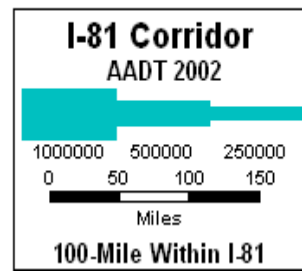
Annual Average Daily Traffic, 2002



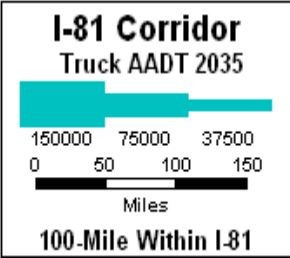
Annual Average Daily Traffic, 2035



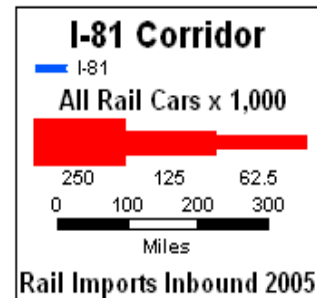
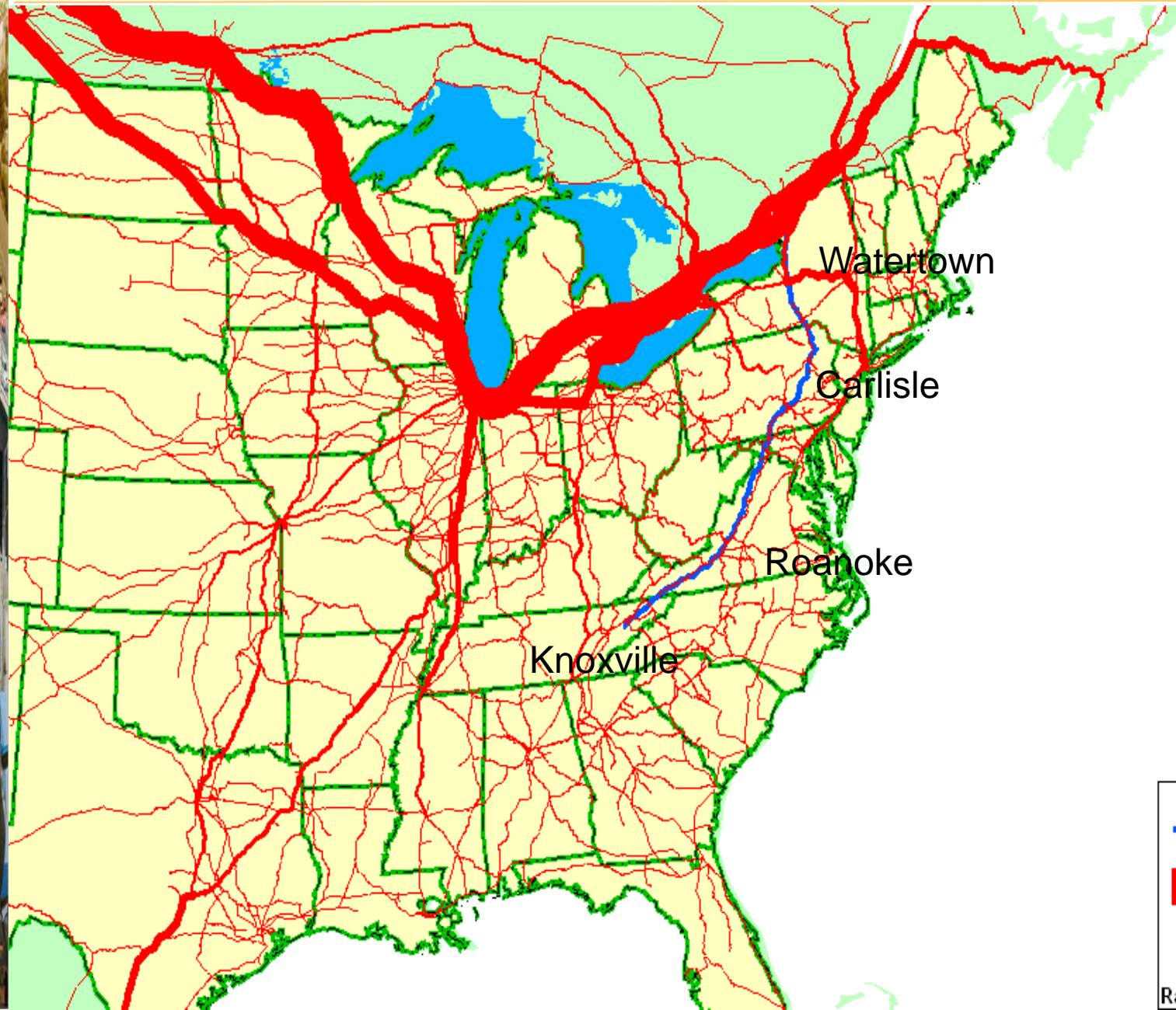
Average Daily Truck Traffic, 2002



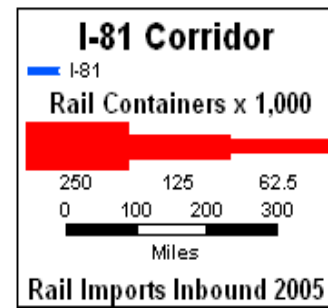
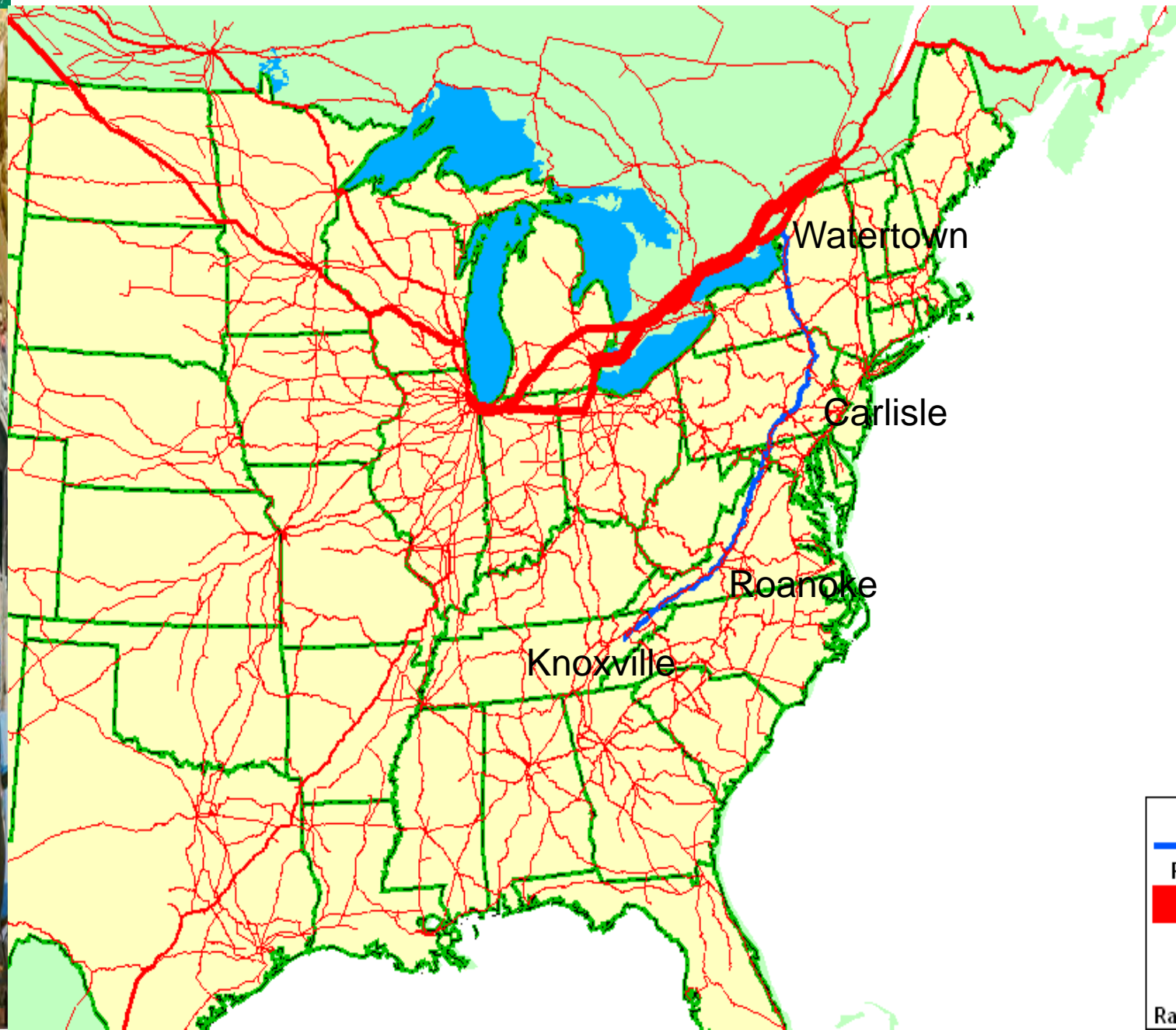
Average Daily Truck 2035



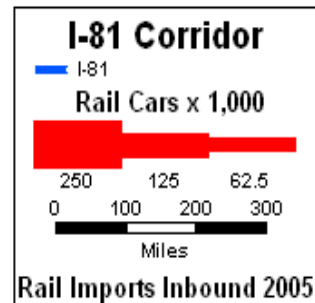
Rail Imports Inbound – All Traffic 2005



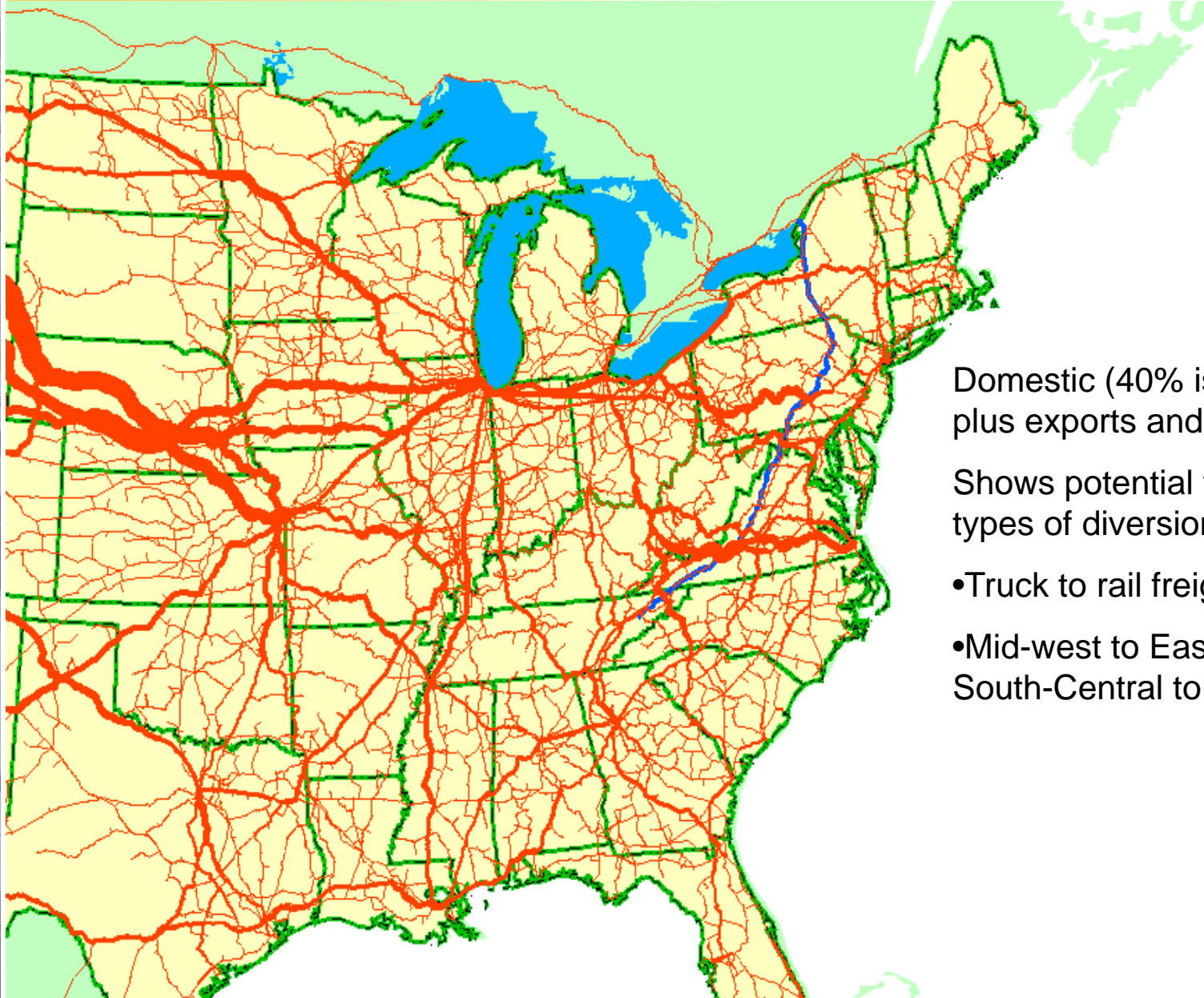
Rail Imports Inbound – Container Traffic



Rail Imports Inbound – Rail Car Traffic 2005



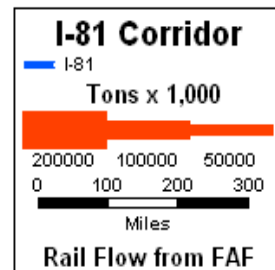
Rail Flow (FAF1, 2003), Projected to 2020



Domestic (40% is coal)
plus exports and imports.

Shows potential for two
types of diversion:

- Truck to rail freight
- Mid-west to East shift to
South-Central to NE



Future Diversion

Reebie I-81 Market analysis (Dec 2003) reported that if rail intermodal service companies offer:

- average speeds of 30-40 MPH
 - 95% reliability
 - more frequent service
 - more terminals,
-
- Diversion could amount to 500,000 trucks shifting to rail (a shift of about 10% of truck traffic)



Close

- Rail must be addressed as a corridor. Significant diversion is dependent on a multi-state approach.
 - Number of trains in 2005 was about 25. If one state make a rail investment, this could increase would be 24-50%. With a multi-state investment, could achieve a 250%+ train increase.
- Highway capacity measures are best addressed on a corridor-wide basis.
- Shifts in policy focus drive a corridor approach.
 - Environmental mitigation
 - Greenhouse Gas Emissions Reduction
 - Climate Change Analysis and Adaptation
 - New ways of financing projects

