



Using GIS to Analyze Crash Data in the I-95 Corridor

“A Work in Progress”



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Objectives for Today's Presentation

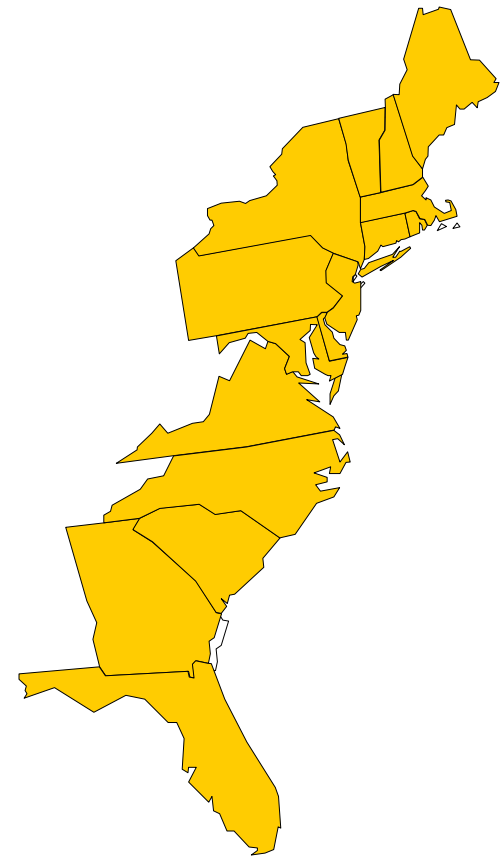
1. Describe Coalition organization and programs
2. Demonstrate how GIS (ICAT) can be used to enhance crash analysis capabilities in a multi-state region.
3. Identify challenges to multi-state data coordination and planning
4. Suggest “next steps” for ICAT development as a multi-state analysis and planning tool.



I-95 Corridor Coalition:

Who We Are

- An alliance of transportation agencies, toll authorities and related organizations from Maine to Florida
- A forum for key decision and policy makers to address transportation management issues of common interest
- Program focus on safety, incident management, traveler information, and intermodal passenger and freight
- Customer focus on long-distance travel





The I-95 Corridor Coalition: *The System*

- 1,919 miles of I-95
- 40,000 National Highway System miles
- 22,000 miles of Class I rail mileage
- 46 major seaports
- 103 commercial airports





What is GIS?

A Geographic Information System (GIS) is more than just an electronic map:

- Database management system for locationally referenced data
- Enables visualization of geographic information through thematic maps
- Facilitates data integration using location as common reference
- Provides platform for spatial and network analysis tools



What is ICAT?

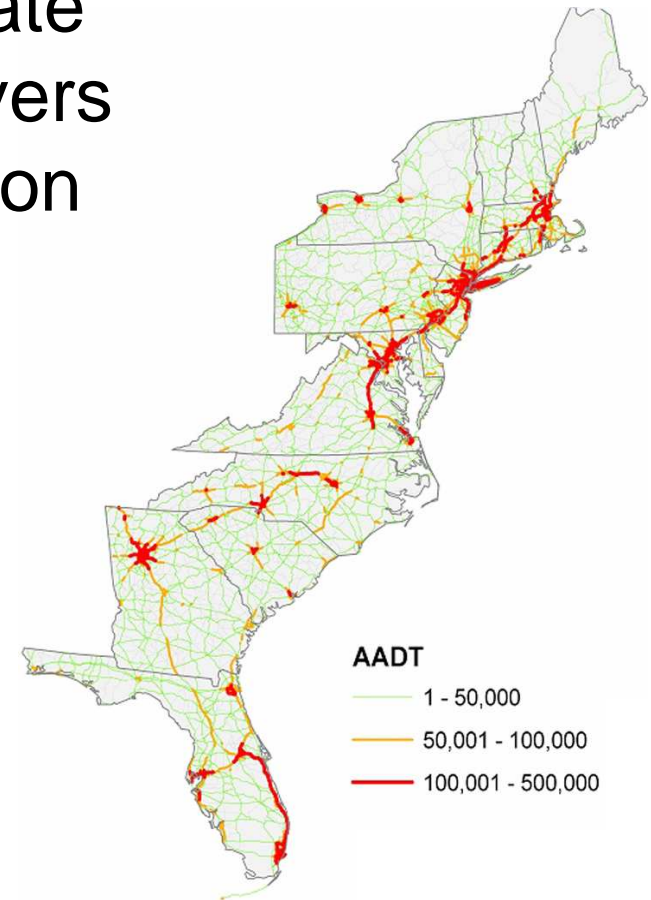
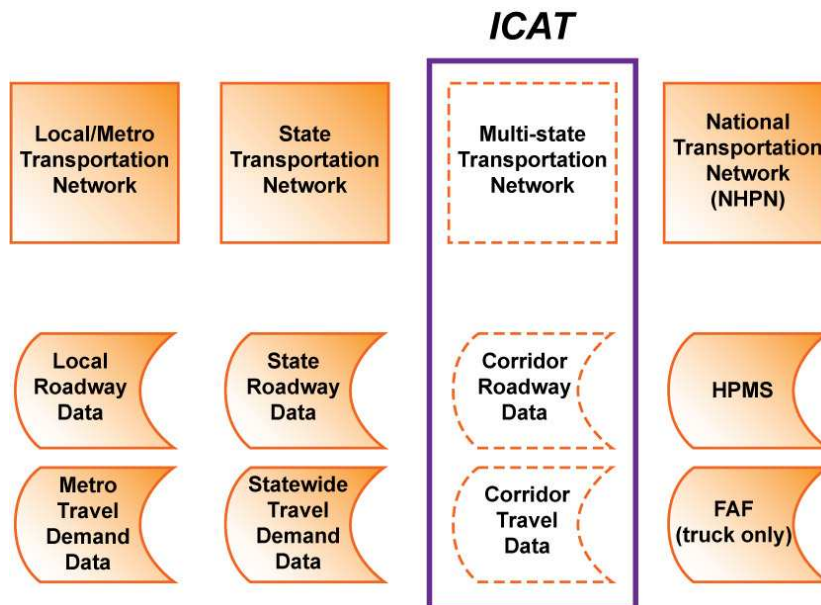
Integrated Corridor Analysis Tool (ICAT)

- GIS platform of transportation networks and locationally referenced data for the Coalition region.
- Designed to help coalition members coordinate multi-state transportation planning, investment and operations.



Integrated Corridor Analysis Tool

ICAT is a GIS-based, multi-state transportation network that covers the full 16-State Coalition region





Examples of State DOT Use of GIS for Crash Analysis

- **Iowa** – Developed a GIS-based crash analysis system and has incorporated it into their state-wide planning process.
- **North Carolina** – Developed a database and web-based GIS to display crashes involving trucks.
- **Massachusetts** – Developed a geo-referenced traffic safety data warehouse for crash and related data.



Analyzing Multi-State Crash Data Using FARS

Fatality Analysis Reporting System (FARS) –

- Compiled by NHTSA from state reports on every crash involving a fatality.
- Data includes characteristics of the crash, vehicles involved, and vehicle drivers.
- In 2005, NHTSA included geo-coded crash location on public release version of FARS.



Enhanced Analysis Capabilities Supported by GIS

1. Visualize geographic distribution of data
 - Find clusters of crash locations
 - Identify anomalies or geocoding errors
 - Detect patterns or trends in distribution of crashes
 - Display crash characteristics in thematic maps (e.g, driver- vs. vehicle-related causes)



Enhanced Analysis Capabilities Supported by GIS

2. Integrate databases using location as common identifier
 - Summarize crashes by area (e.g., urban vs. rural; along a specific highway)
 - Append highway characteristics to crash records (e.g., average daily traffic volumes)
 - Select crashes by sub-area for further analysis

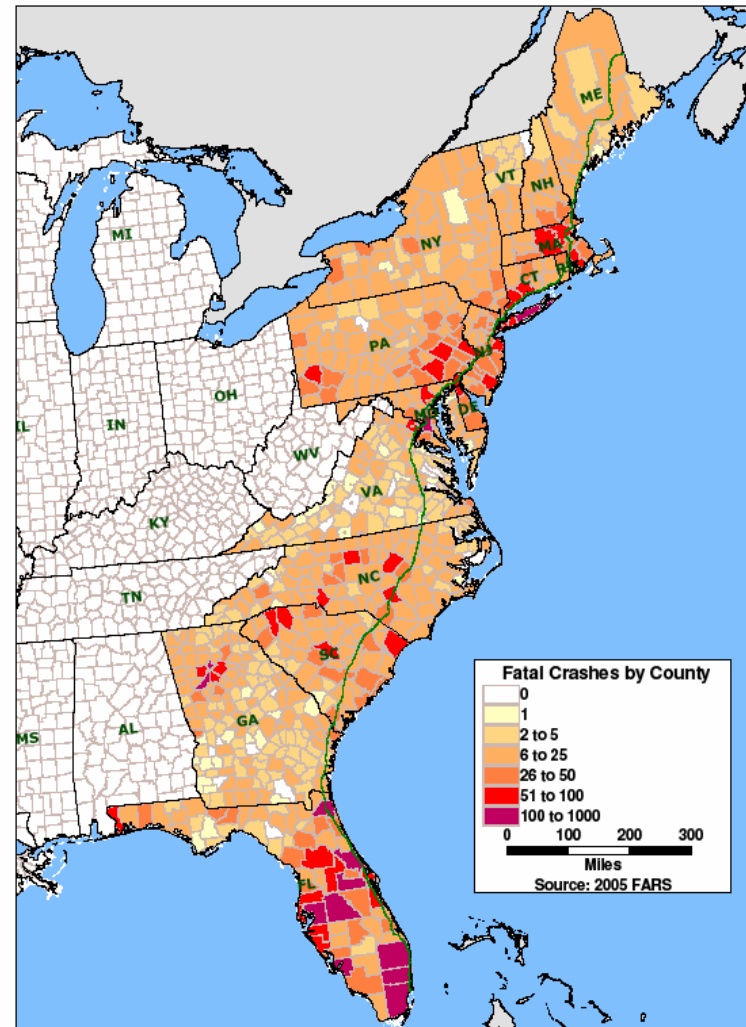
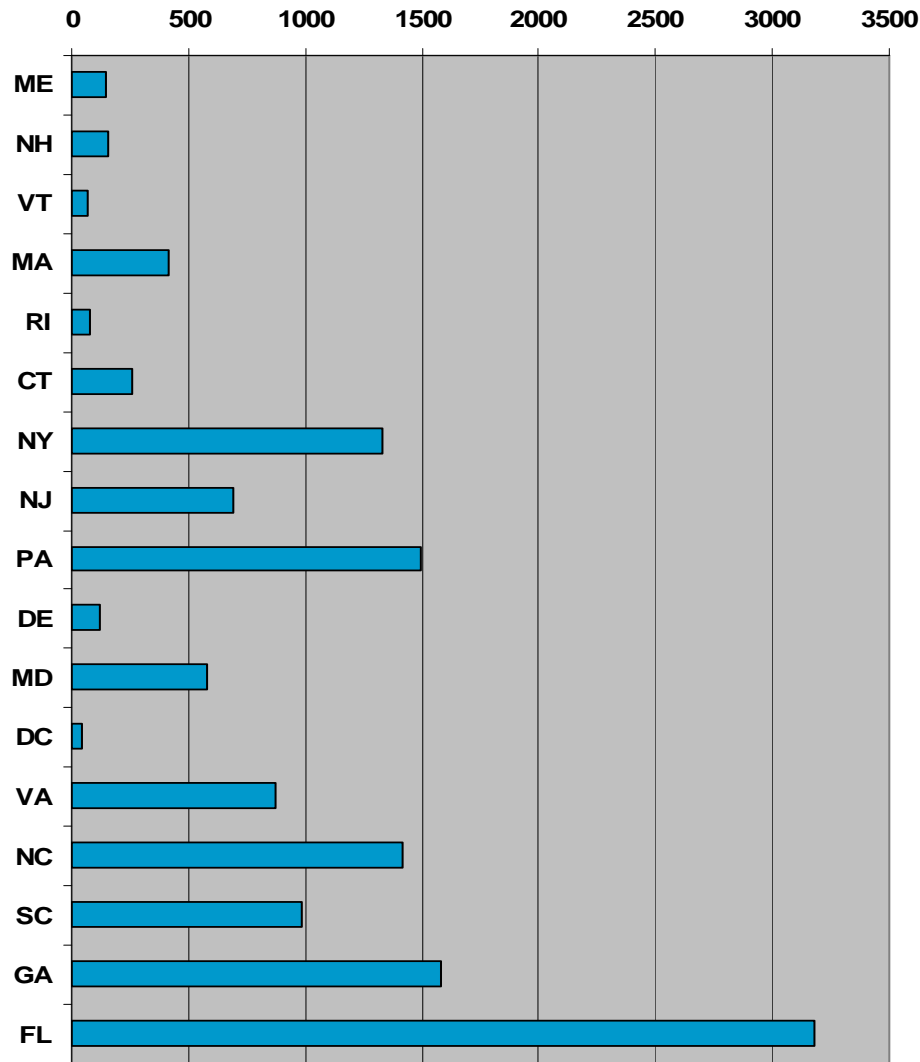


Enhanced Analysis Capabilities Supported by GIS

3. Calculate distances between features represented in databases
 - Locate crashes involving out-of-state vehicles or drivers
 - Identify crashes involving drivers that are more than 500 miles from home.

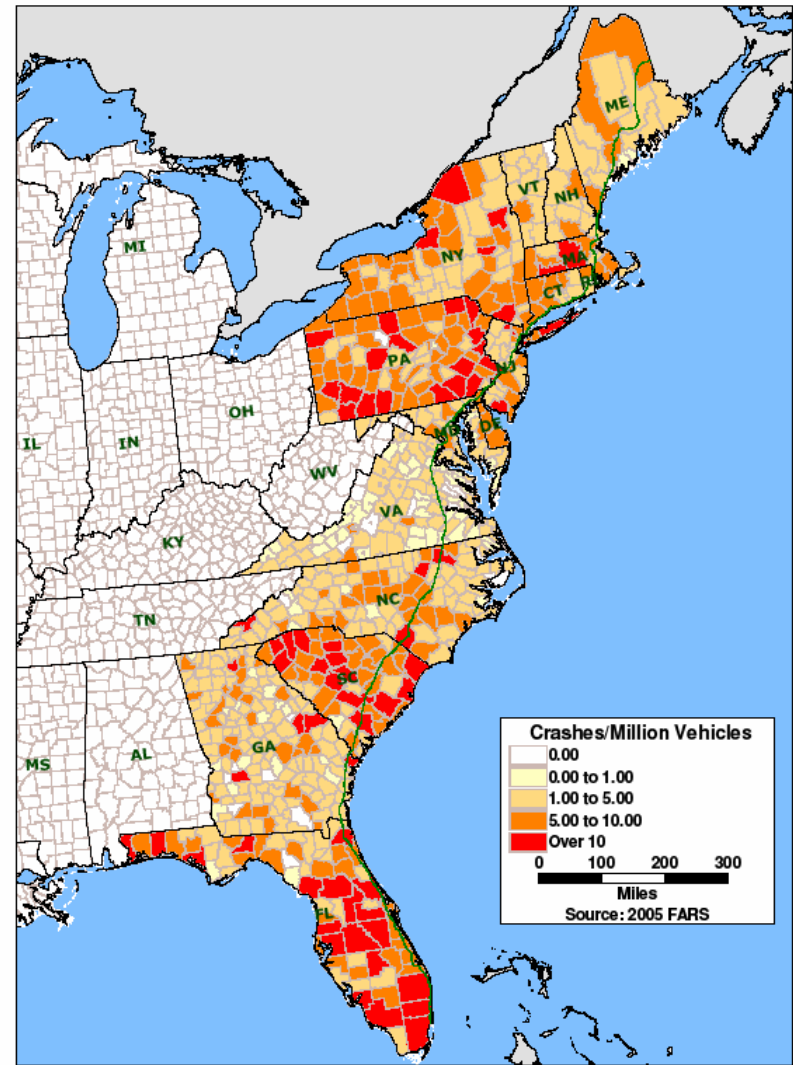
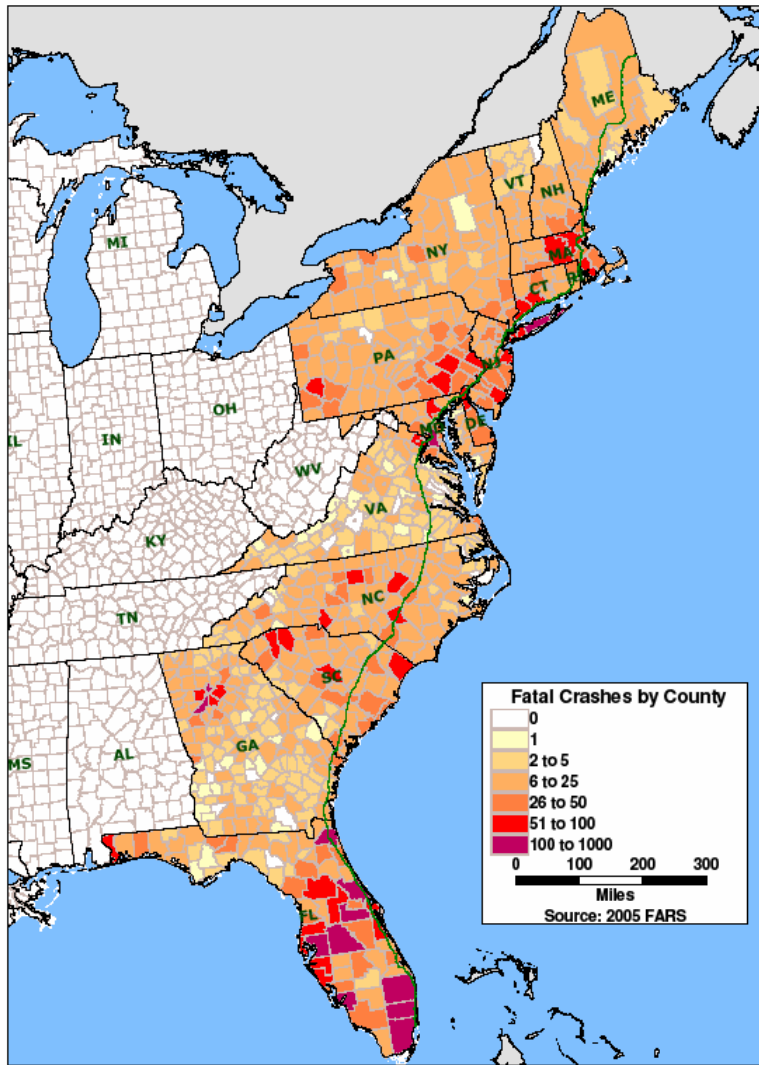


Fatal Crashes by State and County: I-95 Coalition



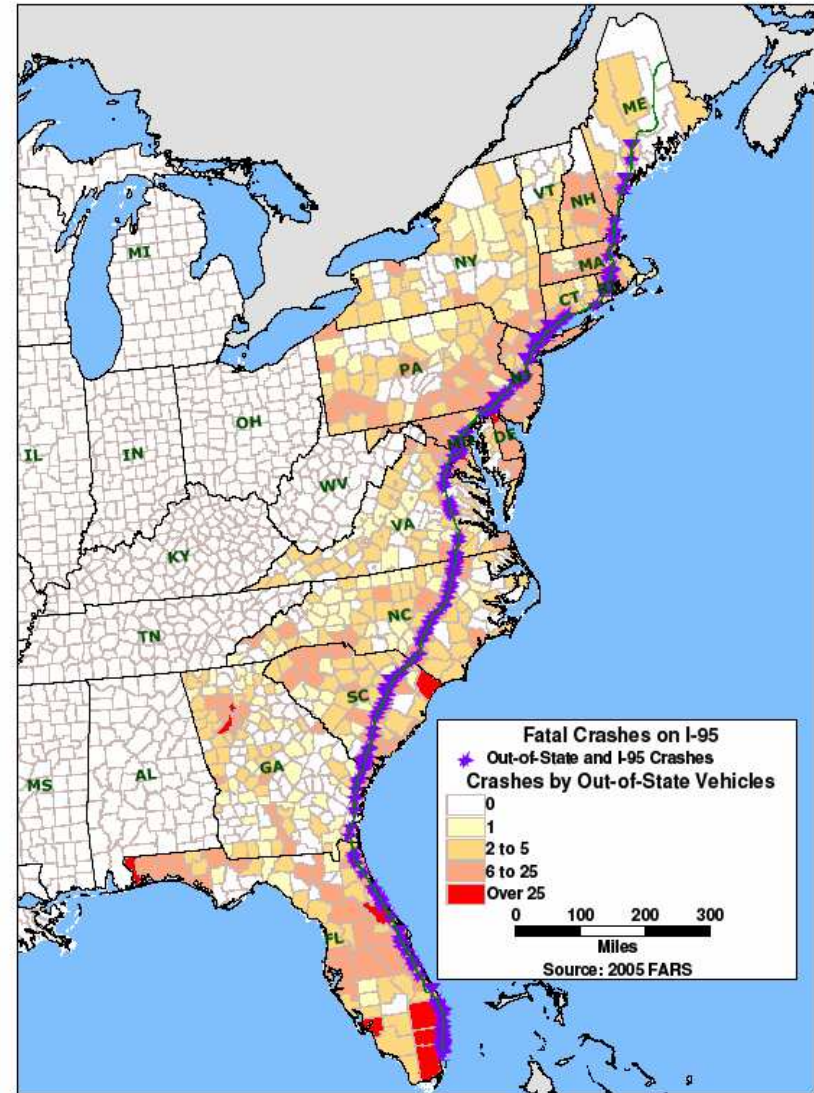
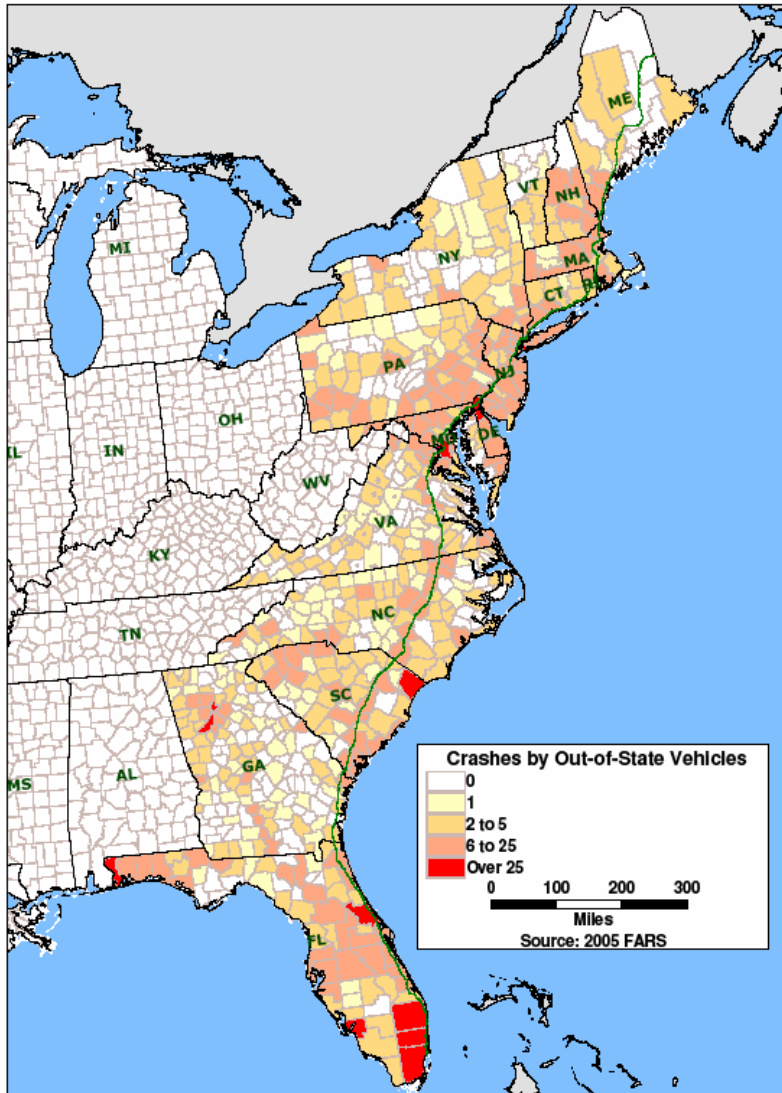


Fatal Crashes by County: Total and by Crash Rate



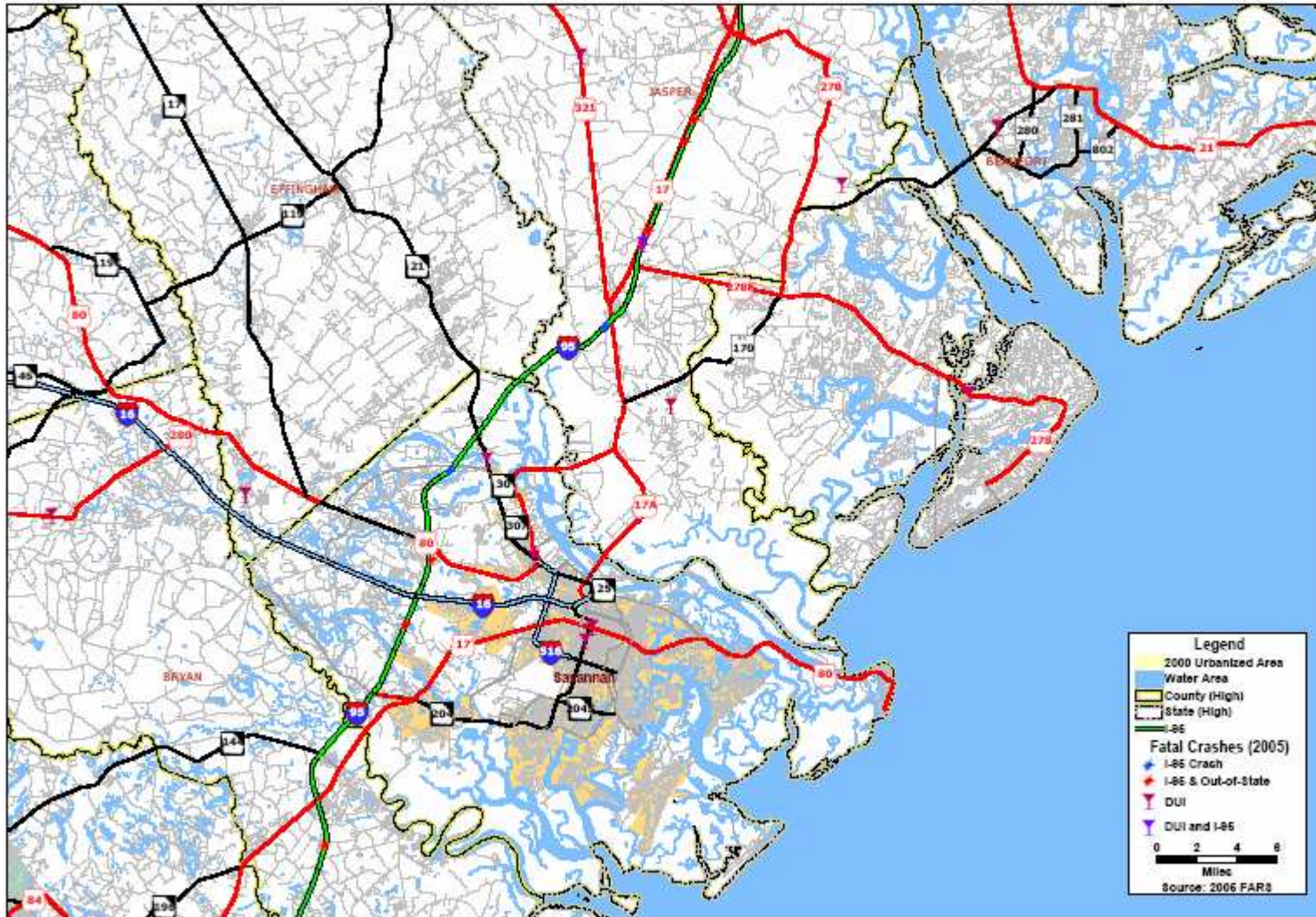


Fatal Crashes Involving Out-of-State Vehicles



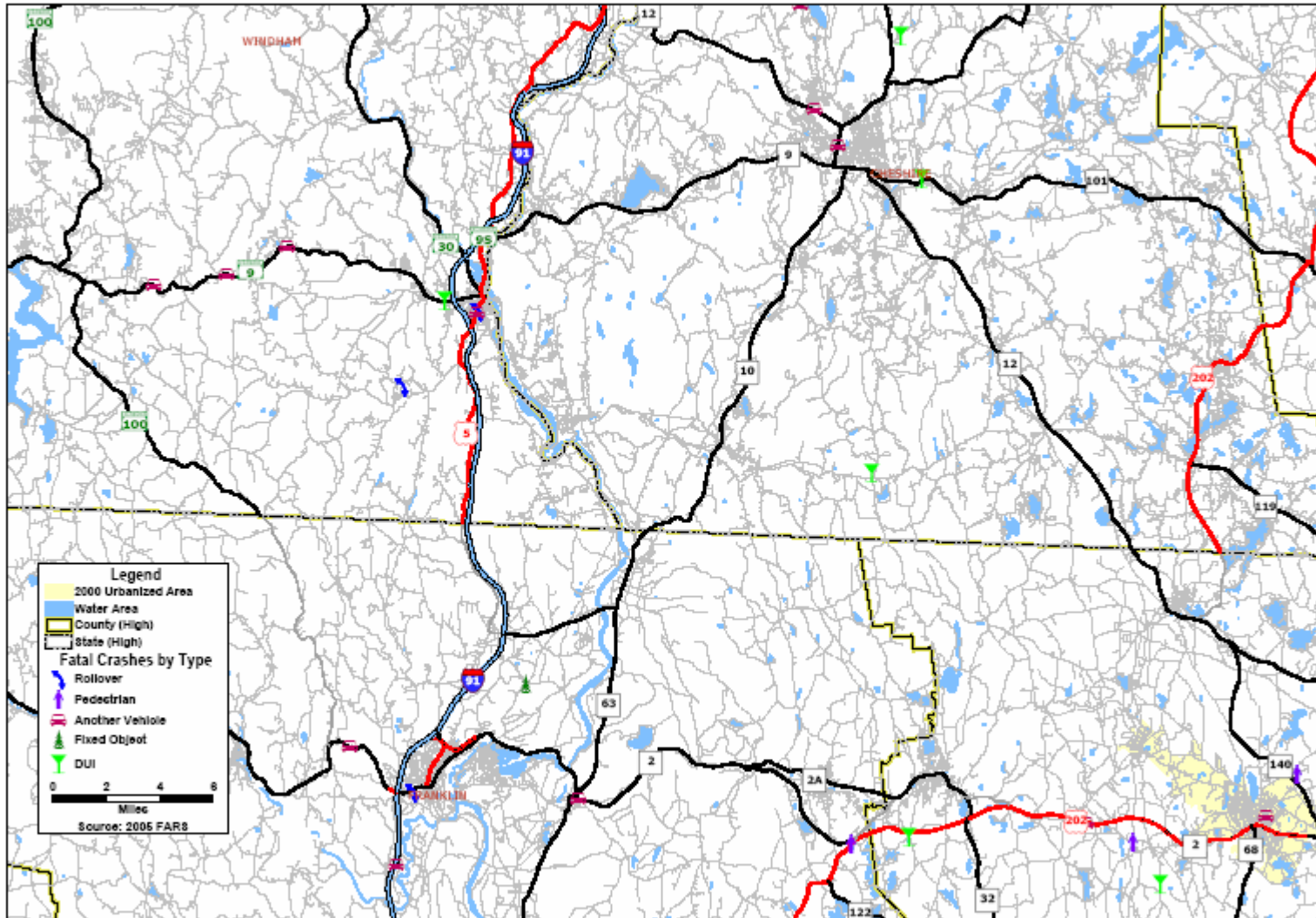


Savannah, GA-SC Region: Fatal Crashes



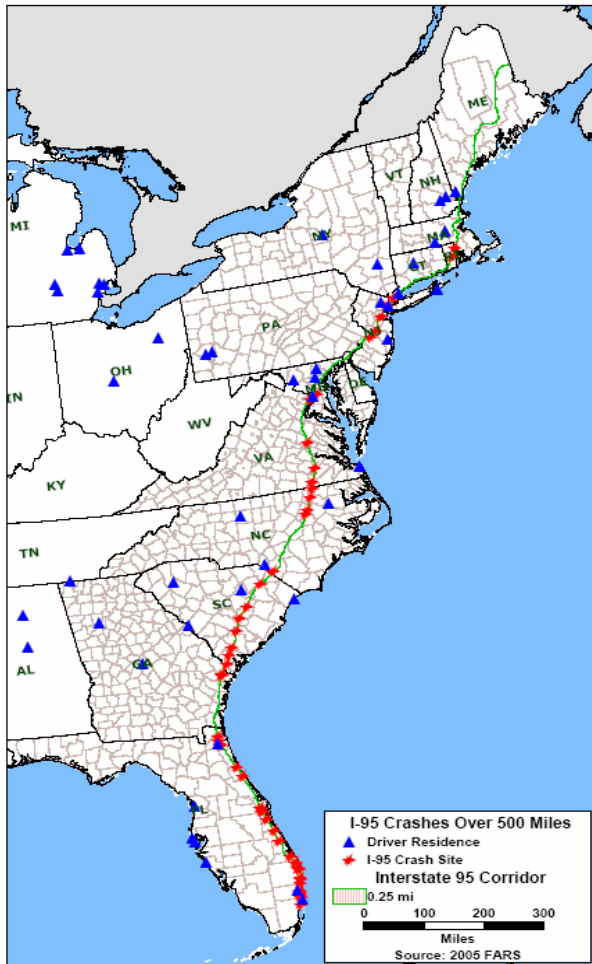


Interstate 91 Corridor: Fatal Crashes by Type





I-95 Crashes Over 500 Miles



- 65 percent of crashes still involve corridor state drivers.
- Crashes with driver-related factors include:
 - Failure to stay in Lane
 - Reckless driving
 - Inattention



In Summary

- GIS provides a powerful tool for analyzing crash data and presenting the results of these analyses to decision makers.
- Crash analyses provide insight on the causes of and potential strategies for reducing severe/fatal crashes.
- Analyses of multi-state data, through tools like ICAT, further enhances our understanding by allowing States to look beyond their borders for both causes and cooperative solutions.



Challenges to Multi-State Highway Safety Coordination

- Differences in State laws and procedures related to highway safety (e.g., motorcycle helmet requirements).
- Differences in crash data collection (e.g., data definitions, reporting requirements, etc.)
- Lack of common analysis tools, performance measures, and platform for reporting crash data.



Next Steps for ICAT

- Complete development of ICAT network and web-based data mapping platform.
- Demonstrate ICAT as a “proof-of-concept” safety analysis tool.
- Work with safety councils in coalition States:
 - identify common data sources
 - Coordinate data collection practices and data sharing among states
 - Develop multi-state safety performance measures