



ICAT Program Overview & Status of Projects

August 6, 2008

ICAT Project Team Meeting



What is ICAT?

Integrated Corridor Analysis Tool (ICAT)

- GIS-based system of transportation networks for the Coalition Region
 - Locational links to state and Federal data sources
 - Origin-destination tables of vehicle and freight flows within and between Coalition states
- Designed to help coalition members coordinate multi-state transportation planning, investment and operations.



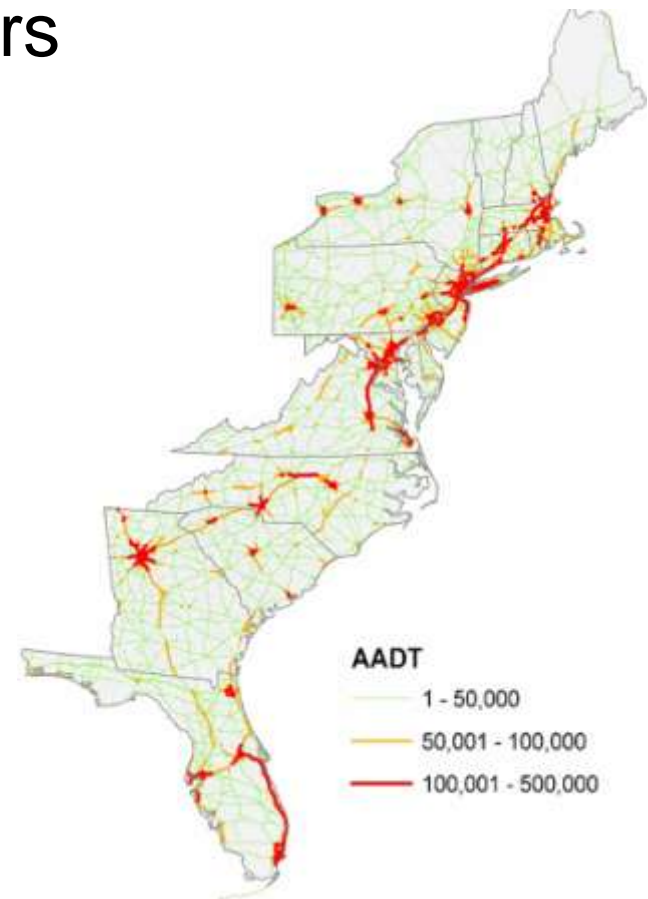
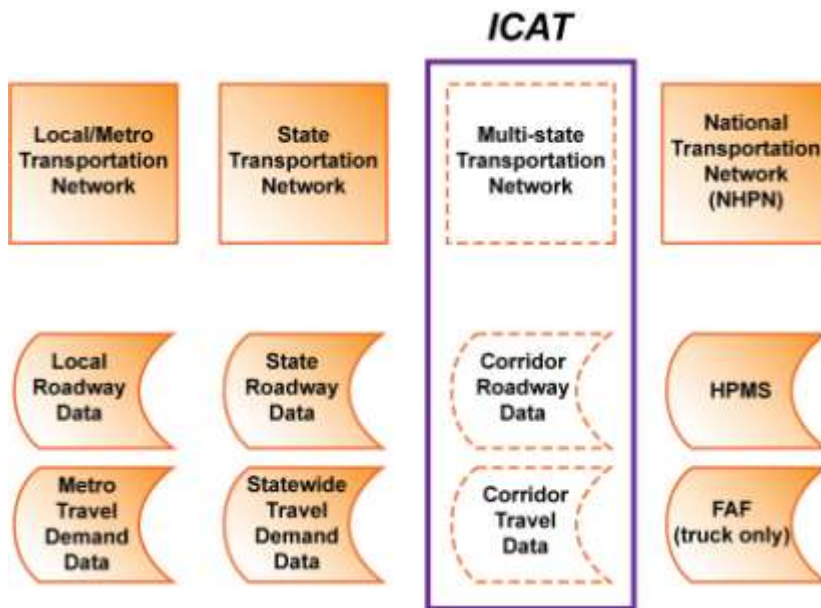
If the Corridor Were California ...





ICAT Highway Network

ICAT includes a GIS-based, multi-state highway network that covers the entire Coalition region





Role of the ICAT Project Team

- Monitor the status of projects
- Initiate new ideas for projects
- Pilot test ICAT web site and tools
- Serve as ICAT liaison to your agency's policy and planning staffs



Development of ICAT Components



ICAT Components

1. Corridor-wide highway network with links to state and national attribute databases.
2. Origin-destination (O-D) flows of highway passenger & freight traffic at the county and subcounty level.
3. Web-based GIS display system and data download site.
4. Prototype applications to demonstrate and test usefulness of ICAT



ICAT Roadmap

		Year 13	Year 14	Year 15	Year 16
		CY 2006	CY 2007	CY 2008	CY 2009
Network & Database Development	Highway Network	Data Integration \$250 K Status: Completed			Archived Data Management Design \$150K Status: Approved
	Rail Network			ICAT Rail Network Feasibility \$35K Status: 80%	
	Trip Table Development		General Vehicle Trip-Tables \$150K Status: 90%		
Data Display & Delivery System			Web-Based GIS Display & Delivery System \$200K Status: 80%		System Maintenance & User Support \$80K/yr Status: Placeholder
Applications	Planning/ Modeling		Evacuation Planning Tool \$75K Status 10%		
	Economic Analysis		Economic Impacts Analysis Tool \$75K Status: 10%		

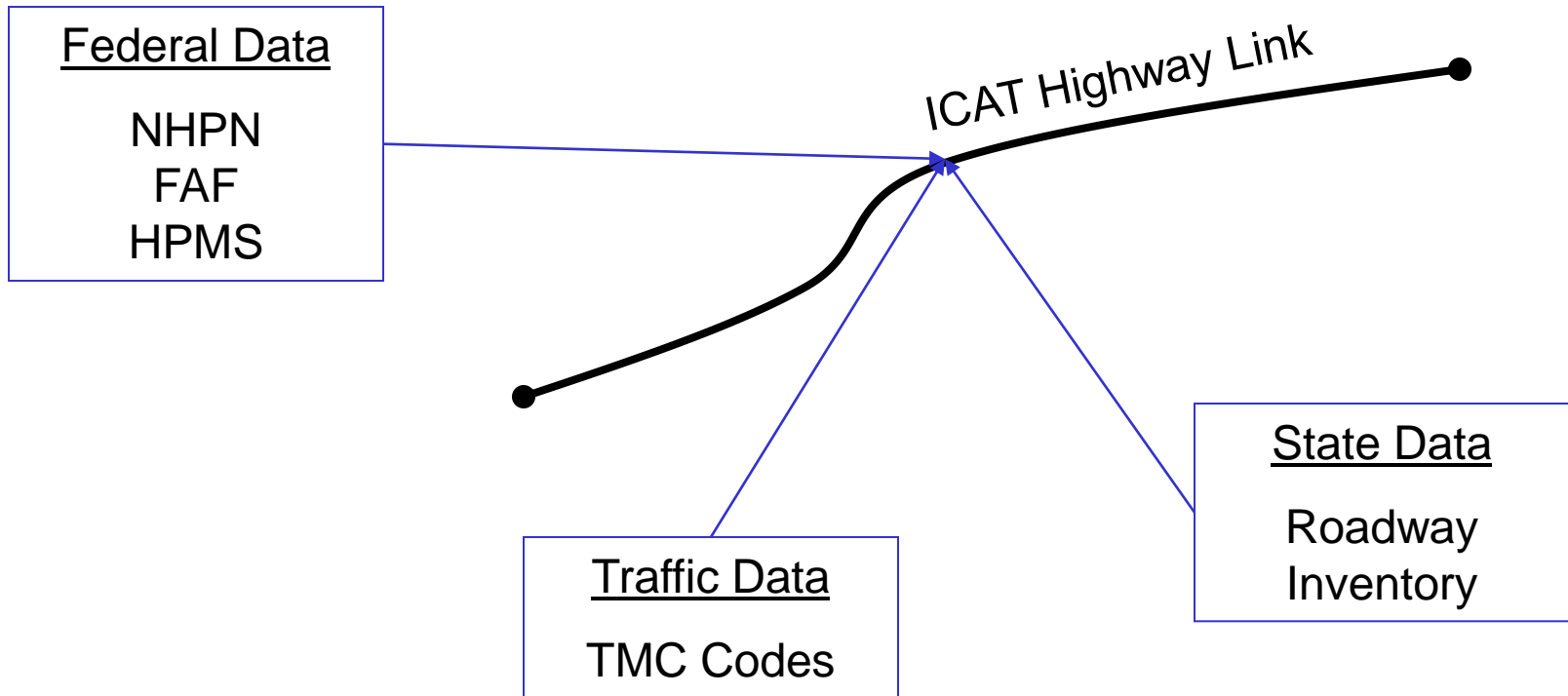


ICAT Highway Network

- ICAT highway segments consist of:
 - National Highway Planning Network (NHPN) segments (NHS, FAF, Intermodal Connectors)
 - All other state road segments functionally classified as principal or minor arterial
 - Additional segments may be added (e.g., evacuation routes)

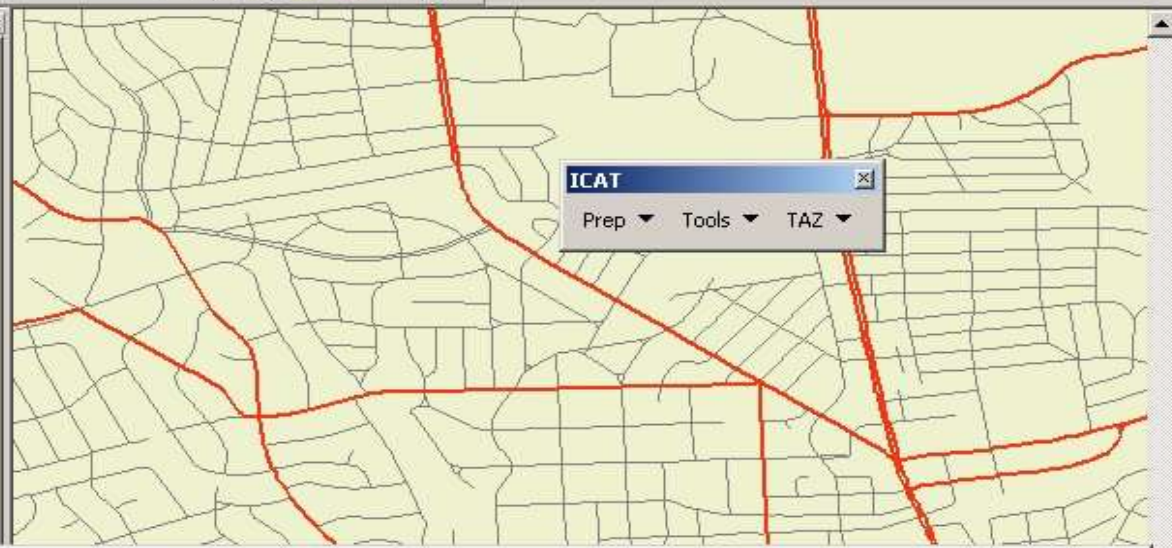


Linking Data to Highways



Layers

- ICAT
- Roads
- States



Attributes of ICAT

RoadName	Sign1Typ	Sign1	NHPNID *	FAFID *	USLRSKey *	USLRSFr	USLRSTo	TMC1	TMC2	FuncClass	NHS	S
ABERDEEN THWY	State	22	24002221	109165	242002200000	12.04060	12.0536	110P09638	110-09638	Principal Arterial - Other	NHS	Regu
FRANKLIN ST (WB	U.S.	40	24001322	108435	241004000000	35.716	35.803145	110+10556	110-10555	Principal Arterial - Other	Default - No	Not
RAMP 2 FR IS 495	None of t	495	24001877	108888	240049500000	7.956992	8.103343	110P04622	110N04622	<Null>	<Null>	<Null>
W LOMBARD ST	State	144	24000528	107837	242014400000	3.615643	3.64512	110+11764	110-11763	Principal Arterial - Other	Default - No	Not
I 695	Interstate	695	24000749	108024	240069500000	1.303402	1.365509	110P04560	110-04559	Interstate	NHS	Regu
BLUE STAR MEMO	U.S.	50	24000325	107687	241005000000	0.23157	2.726805	110+05583	110-05582	Principal Arterial - Other	NHS	Regu
PULASKI HWY	U.S.	40	24001182	108331	241004000000	17.80684	17.957004	110+06171	110-06170	Principal Arterial - Other	Default - No	Not
BELAIR RD	U.S.	1	24000941	108126	241000100000	10.98826	10.991887	110+05110	110-05109	Principal Arterial - Other	Default - No	Not
RAMP 4 FR US 1 T	None of t	895	24002437	107617	240089500000	0.010537	0.103685	110P04566	110N04566	<Null>	<Null>	<Null>
REISTERSTOWN R	State	140	24000603	107895	242014000000	2.311278	2.338768	110+04978	110-04977	Principal Arterial - Other	Default - No	Not
RAMP 7 FR RAMP	None of t	70	24000796	108071	240007000000	34.72982	34.73403	110P05552	110N05552	<Null>	<Null>	<Null>

Record: 3 Show: All Selected Records (0 out of *2000 Selected) Options

Display Source Selection **Arial** 10 B I U



ICAT Highway Network

- Outstanding Issues:
 - Missing some attribute data from states
 - Documentation from states is spotty
 - Need to verify most current state networks and attribute data
- Propose sending data request letter to state DOT GIS coordinators



ICAT Rail Network Feasibility

- Determine whether it is cost-effective for the Coalition to acquire or develop a rail network for use in ICAT
 - Display current and future rail freight traffic and potential bottlenecks.
 - Support multimodal analyses of freight flows



ICAT Rail Network

- Rail network created by merging FRA and ORNL national networks
 - Spatially less accurate than ICAT highway network, but generally acceptable
 - Includes current rail traffic density and trackage rights from FRA network with
 - ORNL data on number of tracks and signal system



General Vehicle-Trip Tables

Complete development of base- and future-year auto and truck-trip tables, approximating the origins and destinations of trips across the entire Coalition region

Approach

1. Estimate initial base & future year O-D tables using standard 4-step travel model methods for trip generation and trip distribution based on demographic data at the zonal level
2. Validate base year O-D tables using Origin Destination Matrix Estimation (ODME) techniques based on ground counts
3. Adjust initial future year O-D tables based on differences between initial and validated base year O-D tables



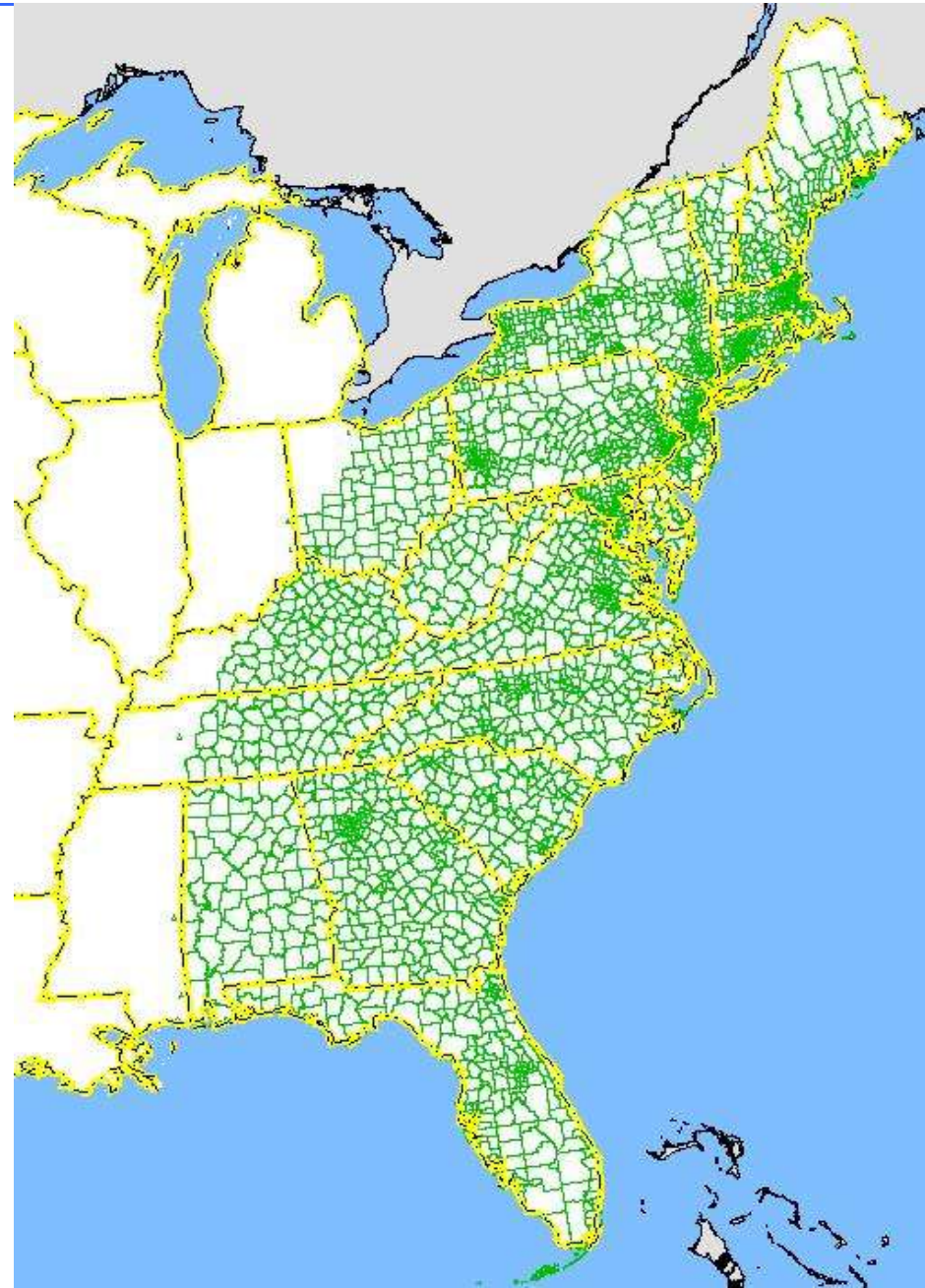
General Vehicle-Trip Tables

- Status
 - Traffic Analysis Zones (TAZs) developed
 - 3,200 internal TAZs
 - 24 external stations
 - HPMS and FAF data attached (inputs to ODME)
 - Demographic data assembled
 - US Census Bureau – Population & Households
 - US Census Bureau – County Business Patterns
 - Woods & Poole – Forecasts to 2030
 - Future forecasting procedures developed
 - Validation of base year O-D tables has begun



ICAT Traffic Analysis Zones

- 3,200 analysis zones
- Counties in rural areas
- Subcounty groups of Census Tracts in major urban areas
- Includes all Coalition states and next tier of border states.





Web-Based Map Display & Delivery System

- Develop a permanent delivery system that will provide ICAT data, applications, and support to all Coalition users
- Status
 - Prototype web-based GIS display nearing completion
 - ICAT server will initially be hosted at CS
 - Long-term host site to be determined

ICAT Data Viewer



Map Contents

- New York
- Massachusetts
 - MA - ICAT
 - MA - NHPN Ever
 - MA - NHPN Arcs
 - MA - Signage
 - MA - All Roads

Navigation



Overview

Results

- MA - All Roads
- MA - ICAT
 - MASSACHUSETTS TURNPIKE

OBJECTID	5606
RoadID	28934
Length	
StateFIPS	25
CountyFIPS	025
MCDFIPS	00000000
MPO	
RuralUrban	
UrbanArea	7
Jurisdic	6
RoadName	MASSACHUSETTS TURNPIKE
Sign1Type	2
Sign1	90
Sign1Qual	0
Sign2Type	
Sign2	
Sign2Qual	
Sign3Type	
Sign3	
Sign3Qual	
NHPNID	
FAFID	106536
USLRSKey	25000000009000025
USLRSFrMP	136.57468
USLRStoMP	137.796017
StLRSKey	
StLRSFrMP	





ICAT Applications

- Archived Vehicle Probe Data Display
- Highway Economic Impact Analysis Tool
- Emergency Planning Tool
- Crash Analysis



Archived Vehicle Probe Data

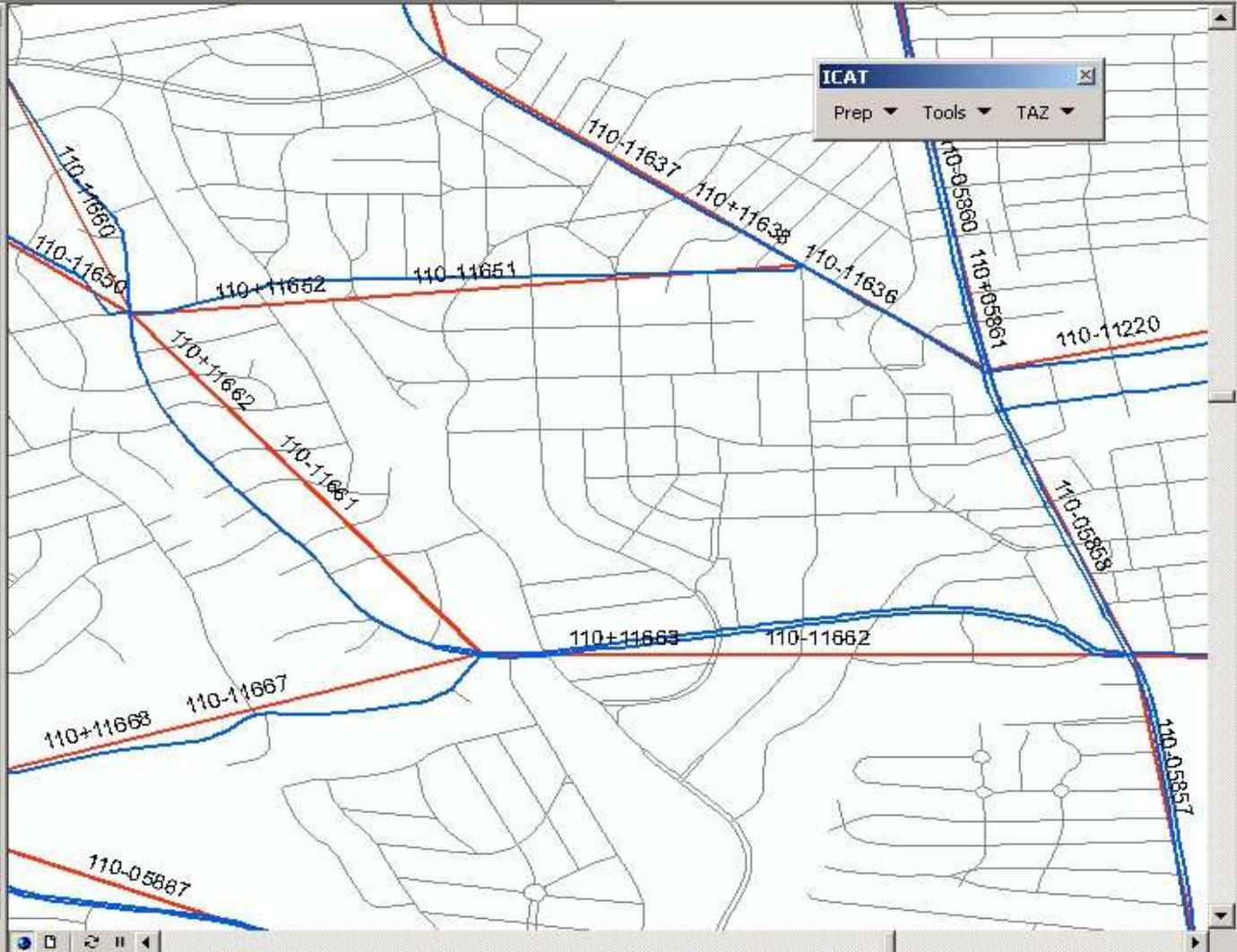
- To display **archived** INRIX vehicle probe data, Traffic Message Channel (TMC) codes need to be attached to ICAT Network
 - TMC Codes identify road sections located between well defined reference points (i.e., Interchanges, state borders)
 - TMC Codes must be appended to the ICAT road network to display archived vehicle probe data like travel times

Layers

- Traced ICAT TMC Paths
- TMC Paths
- Roads

ICAT

Prep Tools TAZ



Display Source Selection



Highway Economic Impact Analysis Tool

- Adapt FHWA HERS/State model to ICAT so that Coalition members can estimate the direct costs and benefits of multi-state improvements to highway users and to highway agencies
- Status
 - Detailed scope of work prepared
 - Model development on hold waiting completion of O-D trip tables

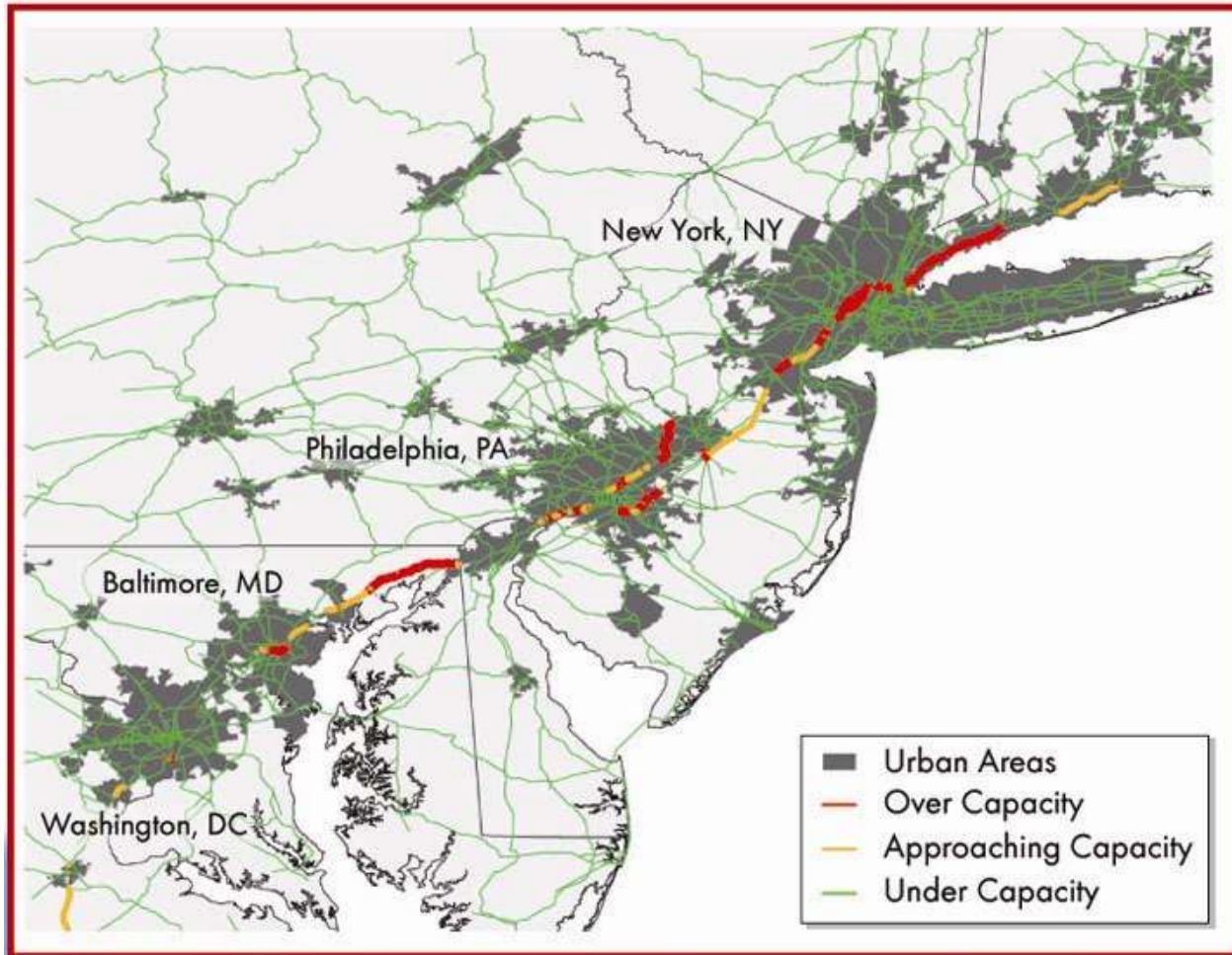


HERS - Typical Outputs

- Level of **investment** required for performing economically justified improvements reported by improvement type;
- Vehicle **miles** traveled;
- Average **speed**;
- Average **delay**;
- Average **pavement condition** measured in terms of Present Serviceability Rating (PSR) and International Roughness Index (IRI);
- **User costs**, including vehicle operating cost, travel time cost and crash cost;
- **Emissions** costs;
- **Crash rates**; and
- Percentage of VMT with **deficiencies** in pavement condition, volume/capacity ratio, shoulder width, and/or horizontal/vertical alignment.



Highway Impact Analysis Tool



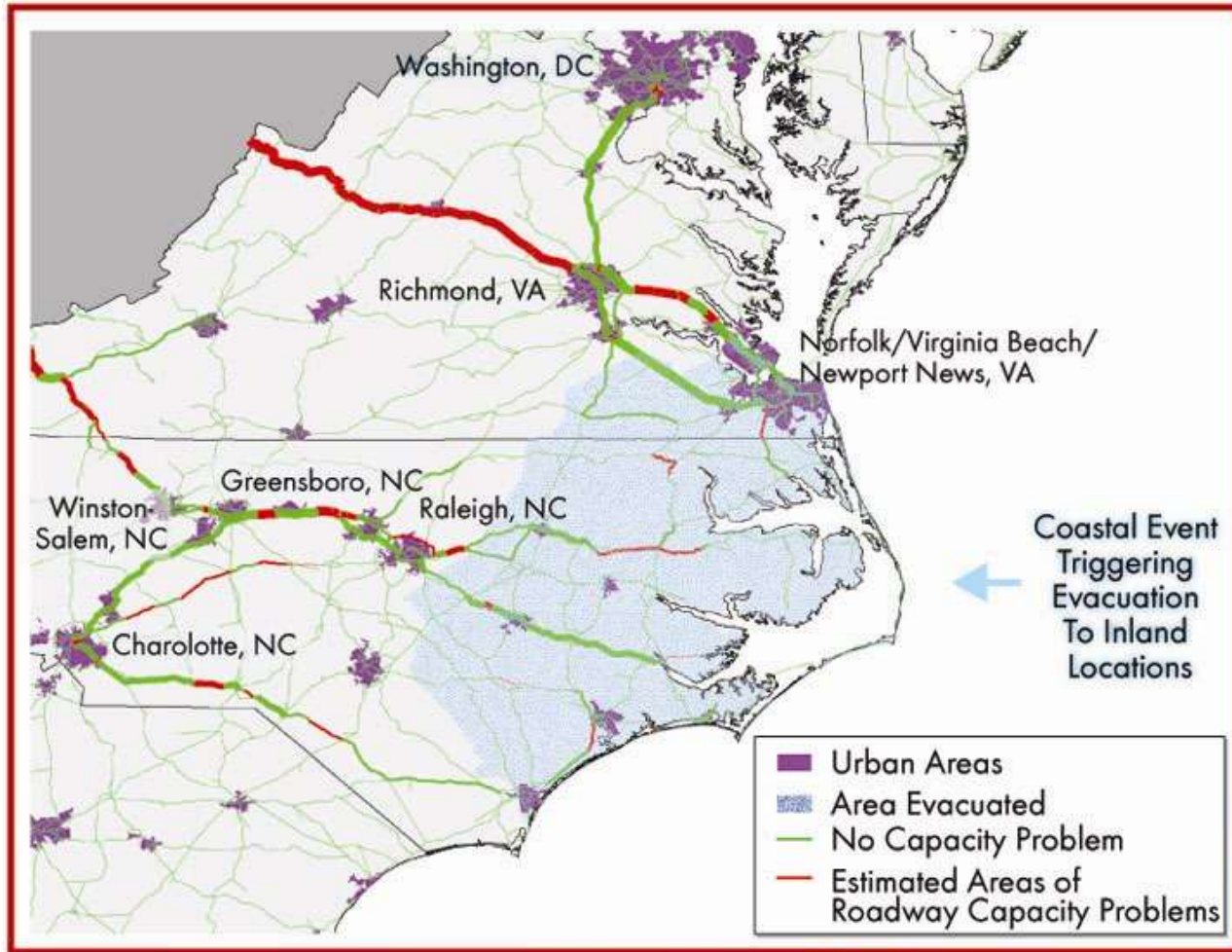


Emergency/Evacuation Tool

- Develop an ICAT evacuation/ emergency planning tool that Coalition members can use to test alternative multi-state evacuation routes and emergency transportation scenarios
- Status
 - Presentation made at I-95 CC Regional Evacuation Summit
 - Application Pilot on hold pending completion of updated ICAT network and trip tables



Emergency/Evacuation Tool



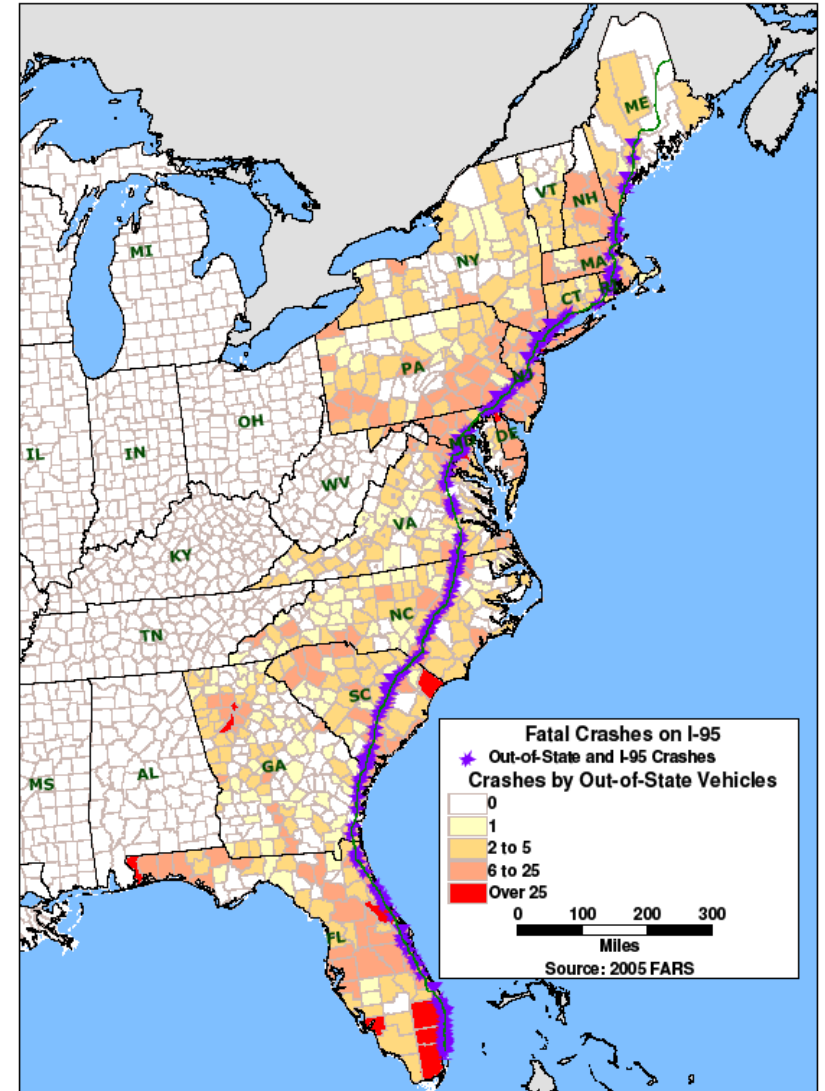
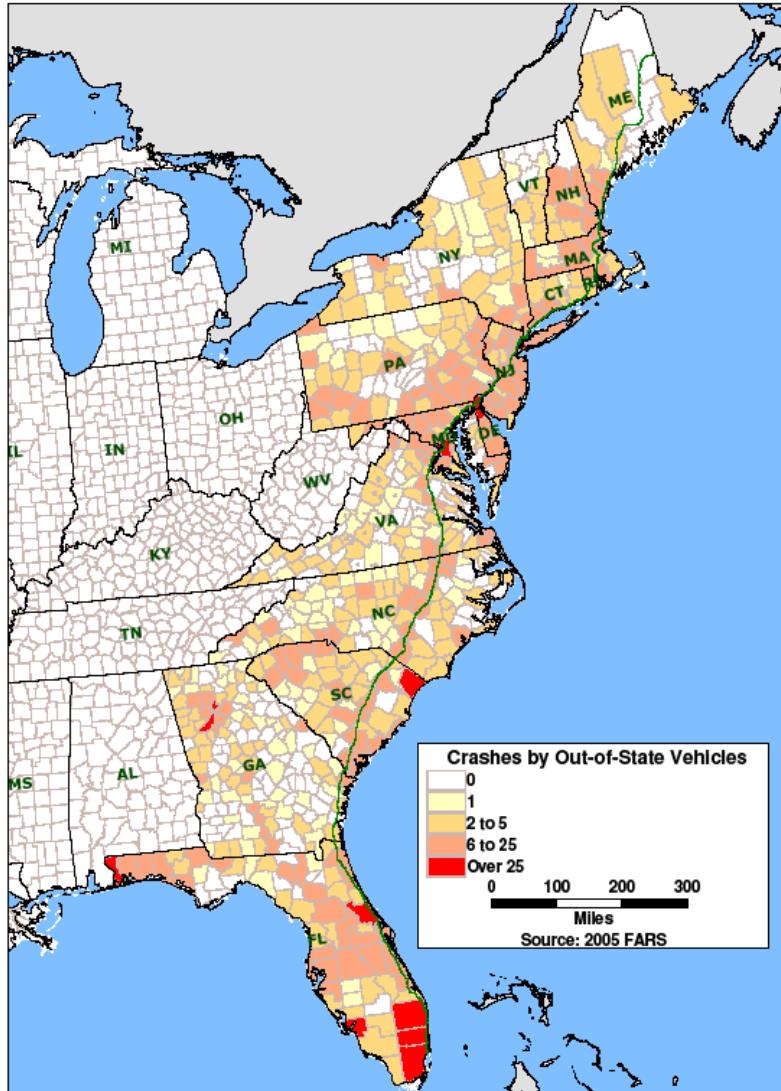


Crash Analysis

- Demonstrate the value of a multi-state highway network in analyzing crash data and coordinating regional highway safety policies
- Status
 - Presentations made at Rural Safety Institute and at AASHTO GIS-T Symposium linking FARS data to ICAT highway network
 - Further development on hold pending completion of updated ICAT network and trip tables



Fatal Crashes Involving Out-of-State Vehicles





Year 16 Approved Projects

1. ICAT Maintenance and User Support - \$80K

This project proposes an annual funding amount to maintain, update and provide user support for the ICAT data and delivery system.

Project elements include:

- Data acquisition, maintenance and enhancement
- Server operations and maintenance
- Software maintenance and upgrades
- Additional technical support



Year 16 Approved Projects

2. Archived Data Management System Design - \$150,000

This project will design, but not implement, an archived data management system, developing system requirements and recommending the approaches to be used for data formats, structure, etc. The project will estimate the cost to implement the system, providing the Coalition with options for funding and phasing its development.



New ICAT Project Ideas

- Archived Data Management System Implementation
- Disaggregate FAF2 Truck Trip Tables
- Highway Network Update



New ICAT Project Ideas

1. Archived Data Management System Implementation

This project will implement the archived data management system (ADMS) designed under the prior year project. It is anticipated that travel time data collected through the Coalition's vehicle probe data collection program would be an early target of the ADMS.



New ICAT Project Ideas

2. Disaggregated FAF2 Truck Trip Tables

This project will disaggregate publicly available FHWA FAF2 data to the county level, making it possible to map the origins, destinations, and routes of truck trips in the Coalition region by type of commodity being carried.



New ICAT Project Ideas

3. Highway Network Update

This project is a placeholder for the update of the current ICAT highway network. Several states are making major enhancements to their existing road networks and road inventory data, and these enhancements should be incorporated into the ICAT network.



New ICAT Project Ideas

Open Discussion