Household Travel Survey at TDOT

Tennessee Department of Transportation
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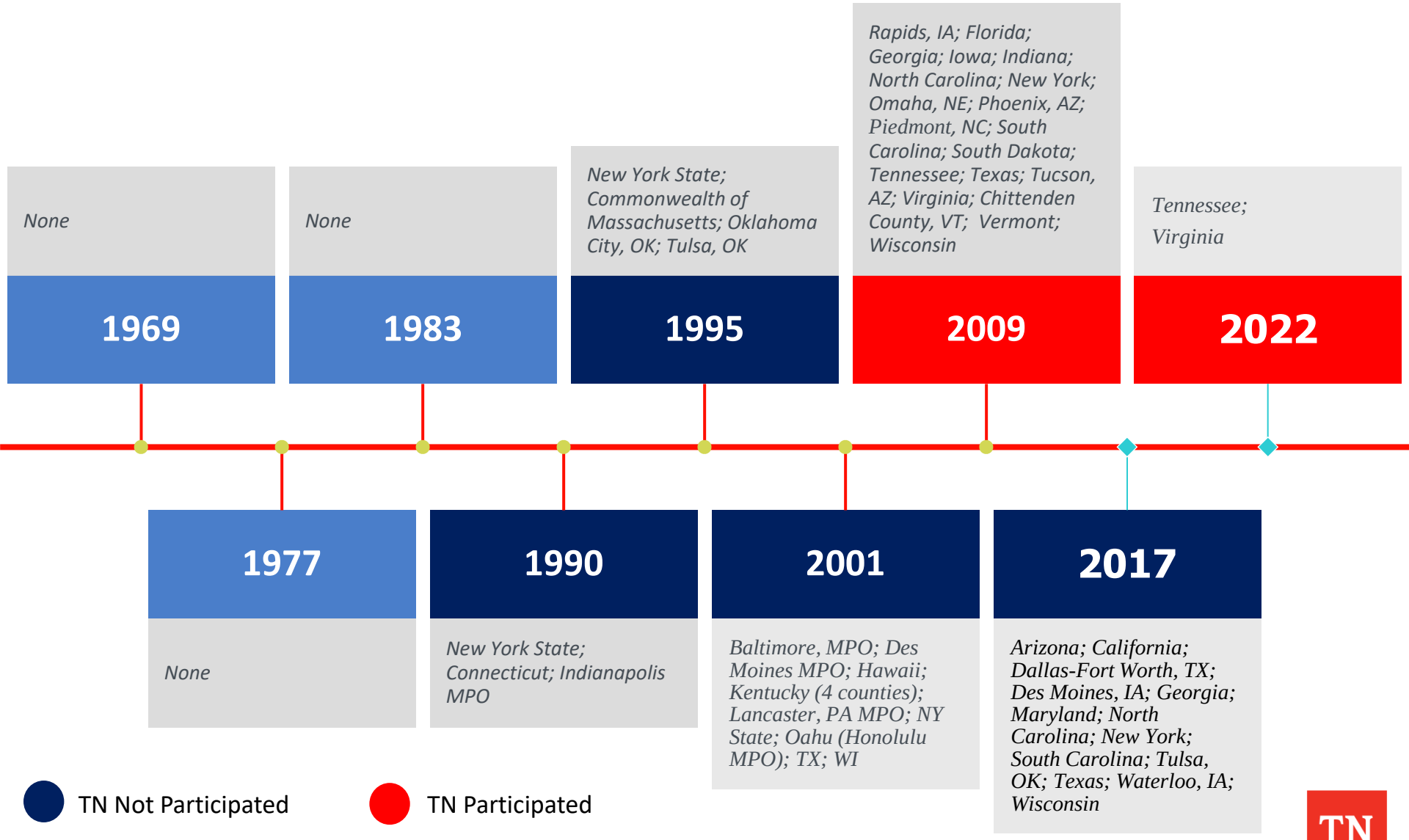
NHTS Add-On History



TDOT Add-on Q's

- Important Transportation Investments
- Willingness to Pay in Tolls (Work/School)
- Willingness to Pay in Tolls (Shopping/Recreation)
- Reasons for Not Walk or Bike
- Reasons for Public Transit
- Willingness to Participate in Follow-up Surveys

Potentials

- Bicycle and pedestrian travel
- Transit use
- Shared mobility
- Emerging transportation modes
- Special populations
- Telecommuting

Combined Survey

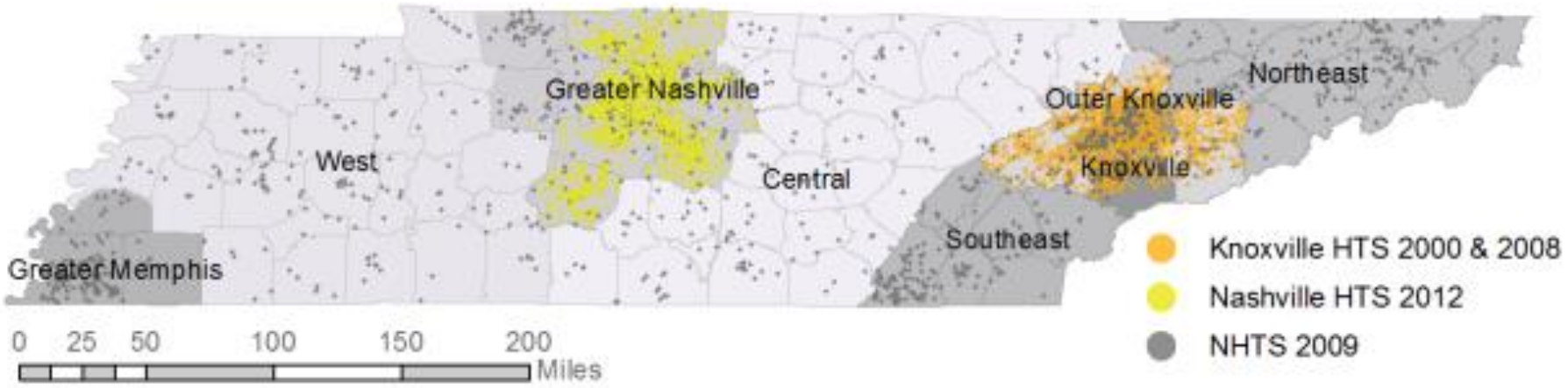


FIGURE 6: COMBINED SURVEY HOME LOCATIONS AND WEIGHTING REGIONS

NuStats (Knoxville)
Westat (Nashville)

Combined Survey

TABLE 18. HOUSEHOLD TRAVEL SURVEYS

DATASET	KNOXVILLE 2001 & 2008	NASHVILLE 2012	NHTS 2009
Sampling Frame	Address-Based Sample (ABS)	Address-Based Sample (ABS)	List-assisted random digit dialing (RDD)
Survey Instrument	Computer-Assisted Telephone Interviewing (CATI)	Web-based with phone-in option	Computer-Assisted Telephone Interviewing (CATI)
Season of Travel Dates	November-December 2000, and January-May 2008	April-May and August-November 2012	Full year 2009
Survey Geography	Knox[21], Blount, Anderson, Servier, Roane, Loudon, Jefferson and Union	Davidson, Rutherford, Williamson, Sumner, Wilson, Maury and Robertson	Entire state
Includes Weekends	No	No	Yes (Sat & Sun)

Combined Survey

TABLE 19. THE COMBINED HOUSEHOLD TRAVEL SURVEY DATASET

DATASET	HOUSEHOLDS	PERSONS	TRIPS
Knoxville	2,938	7,028	24,472
Nashville	5,164	11,114	39,828
NHTS	2,242	4,885	16,765
Total	**10,344**	**23,027**	**81,065**

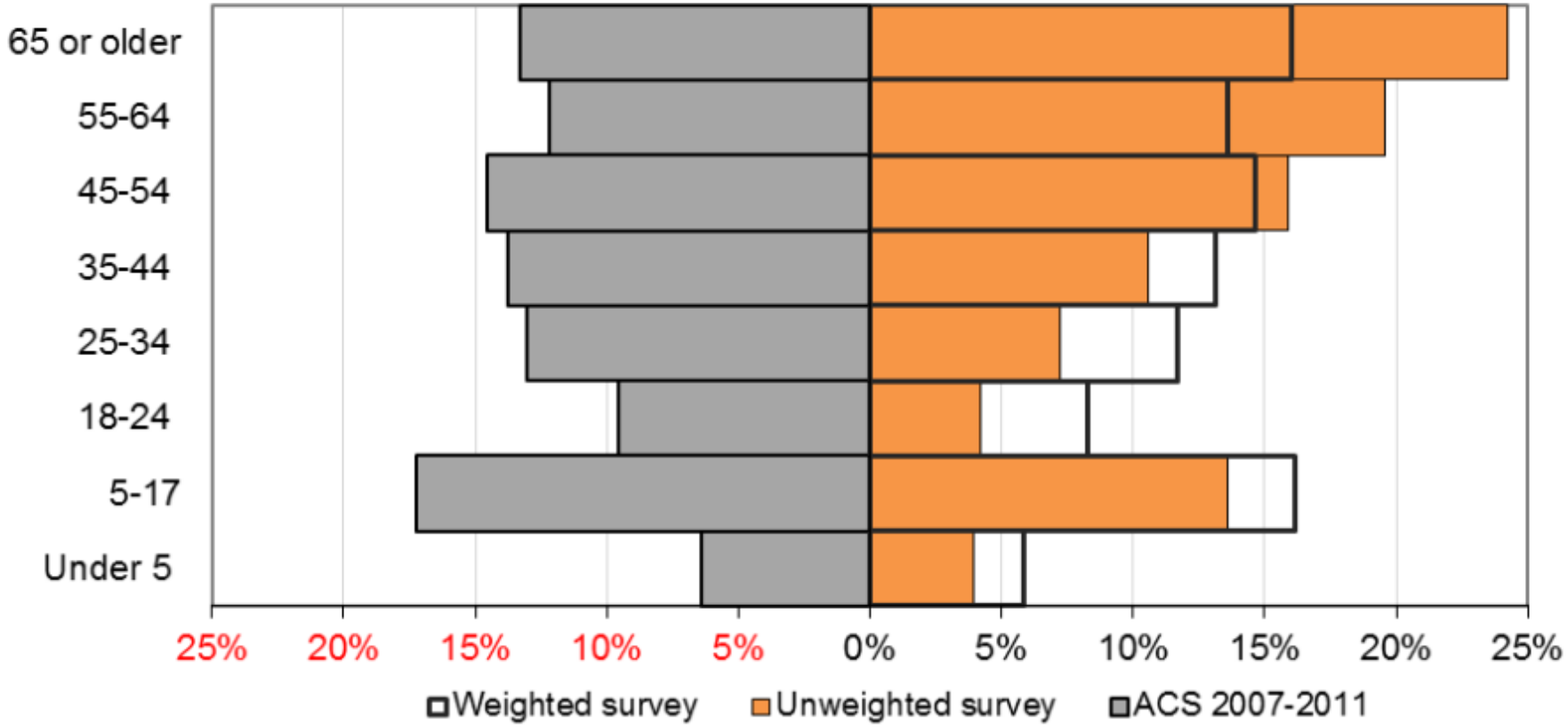
Re-Weighting

TABLE 22: TRIPS IN COMBINED HOUSEHOLD SURVEY

Type	Purpose	SOV	HOV	TRANSIT	ACTIVE	OTHER	ALL
Trip Counts	HBW	10,817	1,214	63	276	20	12,390
	HBO	15,817	19,252	187	2,270	1,383	38,909
	NHB	14,514	12,384	642	1,700	522	29,762
	All	41,148	32,850	892	4,246	1,925	81,061
Weighted Trips	HBW	10,554	1,292	67	289	17	12,219
	HBO	13,538	17,610	188	2,269	1,633	35,238
	NHB	13,134	11,040	648	1,687	588	27,097
	All	37,226	29,942	903	4,245	2,239	74,554

Re-Weighting

FIGURE 47. AGE GROUPS: ACS VS SURVEY



Where in Travel Demand Modeling

- Model Estimation
  - Trip Generation Model
  - Mode Choice Model
  - Destination Choice Model
  - Time of Day Model

- Model Validation
  - Trip generation was validated by applying the TSM V4.0 and comparing the resulting trip rates for Tennessee with those observed in the survey and with national defaults from NCHRP 716.
  - The applied mode choice models were validated against three data sources:
    - 2014 ACS (HBW model only),
    - The combined survey (both HBW and HBO models),
    - Ridership data from the National Transit Database (both models)

Regional HTS

- The survey collected information on travel behavior, mode choice, trip purpose, trip frequency, and other key travel factors.
- Nashville MPO conducted HTS in 1990, 1995, 2000, 2005, 2010, and 2016.
- Memphis MPO conducted HTS in 1991, 2001, 2010, 2014-2015 and 2018.
- Knoxville TPO conducted HTS in 1990, 2000, 2010, 2015, and 2020.
- Chattanooga TPO conducted a HTS in 1994, 2007, 2016. The survey was conducted in collaboration with the GDOT and the Walker County Chamber of Commerce in Georgia.

HTS vs. Big-Data

- Cellular (cell tower signaling and call data records)
- GPS (Global Positioning System)
- **Location-based services (LBS) or smartphone application data**
- Smartphone travel survey data (hybrid passive/active data)

- More Data Driven Approaches
- Supplement to Traditional Data Source
- Advantage:
  - ❑ Scale
  - ❑ Continuity
  - ❑ Cost
- Disadvantage:
  - ❑ Limited Scope
  - ❑ Representativeness
  - ❑ Privacy

HTS vs. Big-Data

The Transportation Data Marketplace includes six data categories that are critical for Coalition members' operations, planning and performance measures, traveler information, and their safe and efficient management of the inter-regional roadway system.

Travel Time & Speed	**Carto INRIX HERE Iteris Timmons Group**	**Speed & Travel Time are critical to the operations of transportation agencies to provide real-time data for use in operations for incident management and traveler information and historical data as a basis for various performance measures. Specifications for this data set are highly mature.**
Volumes Estimates	Future Mobility HERE INRIX Iteris iTrafiQ Streetlight	Ubiquitous volume data has long been a missing link in the tool box of transportation agencies. Volume estimates (not collected using hardware) would assist agencies by providing real-time traffic volumes network-wide including during inclement weather or special events, and enable more robust planning and PM tools. This is an emerging area, with Coalition research contributing to industry progress.
Conflation Services	**1Spatial INRIX iTrafiQ**	Conflation services provide support for translating from one mapping system to another or combining mapping systems, for example the TMC network and a state's own linear reference system (LRS). Translating data between vendor-provided and Coalition member base maps has proved time intensive and costly. Providers of these services will be able to translate from any base map to any other base map as needed by a Coalition member.
Waypoint Data	AirSage Future Mobility INRIX Stellar Wejo	Waypoint data reflects the path movement of vehicles and people and is based on 'bread-crumb trail' of GPS latitude longitude point data. Data is collected either through connected vehicle technology or location-based services. Data is provided in such a way to protect privacy (such as the obfuscation of home/work info and aggregated to census boundaries), and supports in-depth analysis such as traffic signal performance.
O-D Data	AirSage Future Mobility Geotab INRIX Streetlight	O-D data is closely associated with Waypoint Data, but includes only end points, and information related to the endpoints that reveal trip purpose. O-D data is derived from Waypoint data that is scalable, timely and statistically representative to provide trip data for various agency needs. Similar to Waypoint data, O-D data is provided in a manner to protect privacy, and is a great asset for planning, behavioral, and before & after studies.
Freight Data	Future Mobility Geotab INRIX Quetica Streetlight	A variety of freight related data is being provided including the following: Travel Time, Speed and Volume data (as well as reliability), Origin and Destination information for long-haul and regional fleets, and Parking data including availability and utilization. In addition, commodity movement is also being provided. This will enable broader understanding of freight movement.

Issues and Potentials

- Potential Duplication of Investment
  - Conventional: NHTS NextGen + Add-On
  - Passive Big-Data: RITIS-PDA
  - INRIX Trip Analytics (O-D) vs. RSG (e.g. ATRI; AirSage – V3; LBS or smartphone application data – V4)
  - TETC potential Big-Data

- Leverage NHTS vs. RHTS
  - Any National Repository/Warehouse
  - Survey Questionnaires
  - Actual Data

- Retain Collective Knowledge as a Community
  - Continuous turnovers
  - Continuation (Procurement/Contract Cycle)

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- AASHTO Special Committee on Research & Innovation (R&I)
- AASHTO Special Committee on Research Advisory Committee (RAC)
- TRB State Representative
- TRB Standing Committee
  - AT010: Freight Economics and Regulation
  - AED10: Statewide &National Transportation Data and Information Management