

NORTHEAST MEGAREGION TRAVEL DEMAND AND INVESTMENT MODEL

Status report

Mark S. Moran
TPB Transportation Engineer

TPB Technical Committee
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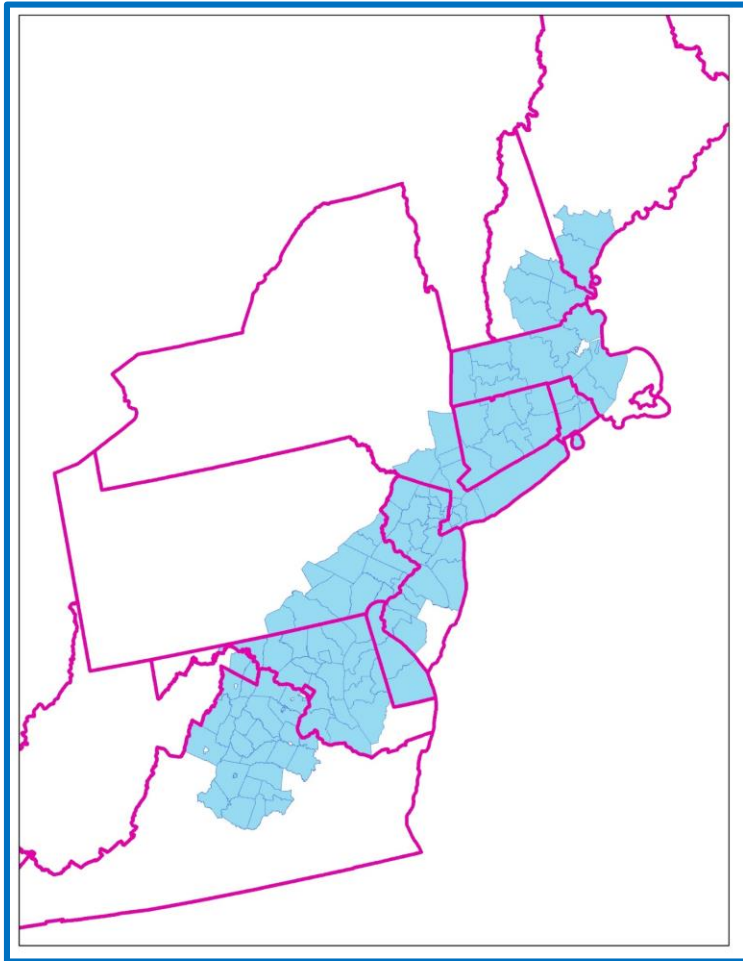


Background

- This presentation summarizes what I learned from attending a one-day workshop on November 9, 2018 at the University of Pennsylvania
- Much of the content of this presentation comes from the following:
 - Presentation, John Landis, University of Pennsylvania, “A Northeast Megaregion Travel Demand & Investment Model: Project Overview,” Nov. 9, 2018



Context: Northeast Megaregion



A Critical but Fragmented Transportation Planning Landscape

- 13 States
- 39 Metros
- 130 Counties
- 50 million residents (15% of US total in 2016)
- 25 million jobs (14% of US total)
- 38 MPOs (most with their own planning and travel demand models)

Source: Presentation slides, John Landis, University of Pennsylvania, “A Northeast Megaregion Travel Demand & Investment Model: Project Overview,” Nov. 9, 2018



Who is conducting the work?

- John Landis, professor, University of Pennsylvania, Philadelphia.
- Under the aegis of University Transportation Center for Cooperative Mobility for Competitive Megaregions (CM2), which includes



- Budget
 - CM2: \$600k/year
 - U. of Penn.: \$ 180k/year
 - U. of Penn., NE Megaregion travel model: \$50k/year



Purpose and scope

- Wanted: A behaviorally based, megaregional transportation planning, impact assessment, and financial model capable of
 - Analyzing and forecasting inter- and intra-metropolitan travel patterns and freight flows
 - Analyzing and comparing multi-modal and public-private investment alternatives
 - Incorporating freight and air transport modes
 - Running on a desktop computer, using regularly available data
 - Cumulative cost, benefit, impact, and equity assessment capabilities across neighboring MPOs and operating agencies
 - Exploring linkages between transportation investments and real estate and economic development.



Purpose and scope (2)

- **Facilitate Better Planning:** To be able to better model passenger travel AND freight flows across state and MPO borders:
 - **Forecasting:** To be able to consistently model the effects of differential population and job growth and change on travel behavior and traffic volumes.
 - **Simulation:** To be able to robustly simulate the travel implications of major facility and service investments (new modes technologies and systems, improved LOS and capacity investments, expanded link and node capacities).
- **Create Additional Knowledge:** To develop a consistent mega-regional or multi-metropolitan understanding of travel behavior patterns and preferences across the NEMR.
- **Build Joint Capacity:** To develop and share robust datasets and modeling procedures that are consistent and accurate across the different MPOs and agencies in the NEMR.
- **Improve Single- & Multi-agency Decision-making:** To develop procedures that facilitate more robust and transparent investment decisions.



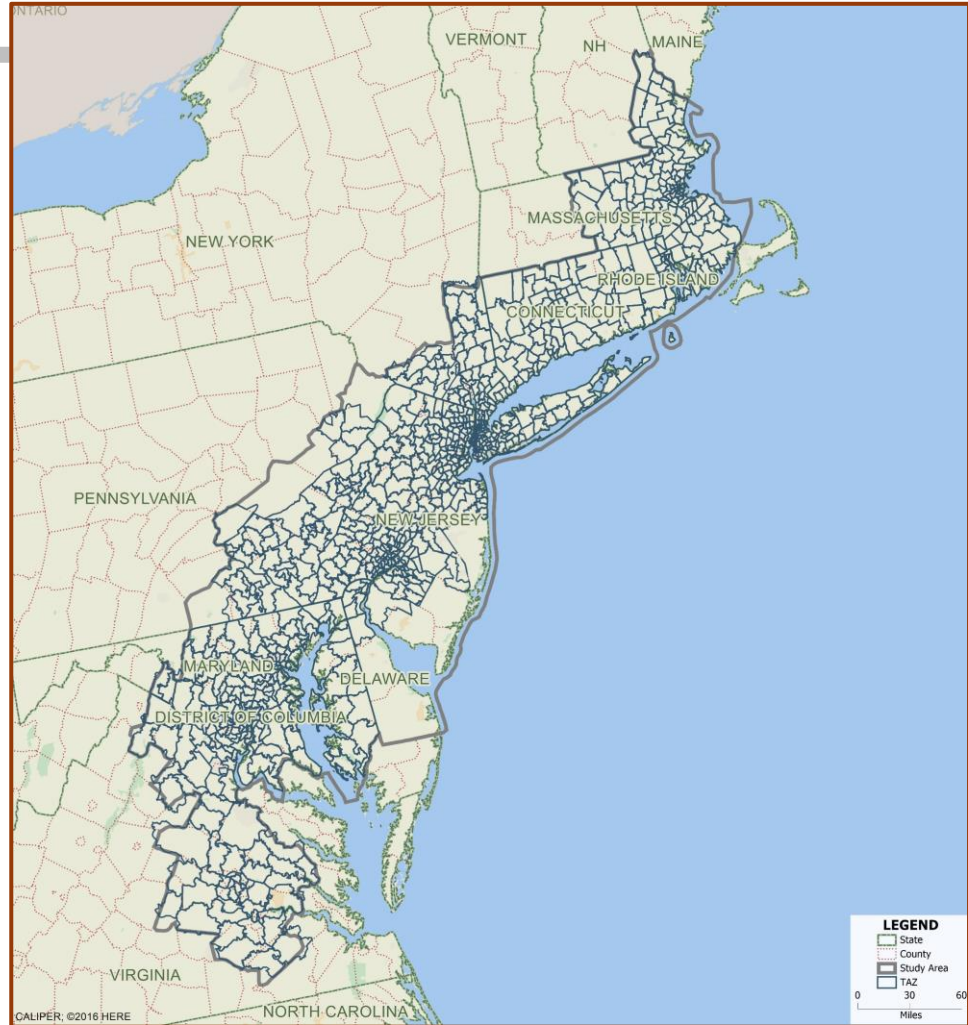
Three components

- ONE inter-metropolitan, multi-modal travel demand model for modeling passenger trips greater than 50 miles, considering automobile, rail, (bus?) and air travel modes. Based on National Household Travel Survey (NHTS) data.
- FOUR intra-metropolitan, travel demand models – 1) Boston-Providence-Worcester; 2) Greater New York City; 3) Greater Philadelphia; 4) Baltimore-Washington-Richmond – for modeling person travel greater than 5 miles (?) considering automobile, bus, subway and light rail, and commuter rail modes. Developed using a 4-step modeling procedures in TransCAD.
- ONE national-scale freight travel model for modeling truck, rail, and air freight flows in and out of major metropolitan areas in the Northeast Megaregion. Based on FHWA's Freight Analysis Framework (FAF) flow data.



Zone system

- 916 Tract- and Zip Code-based Analysis Zones

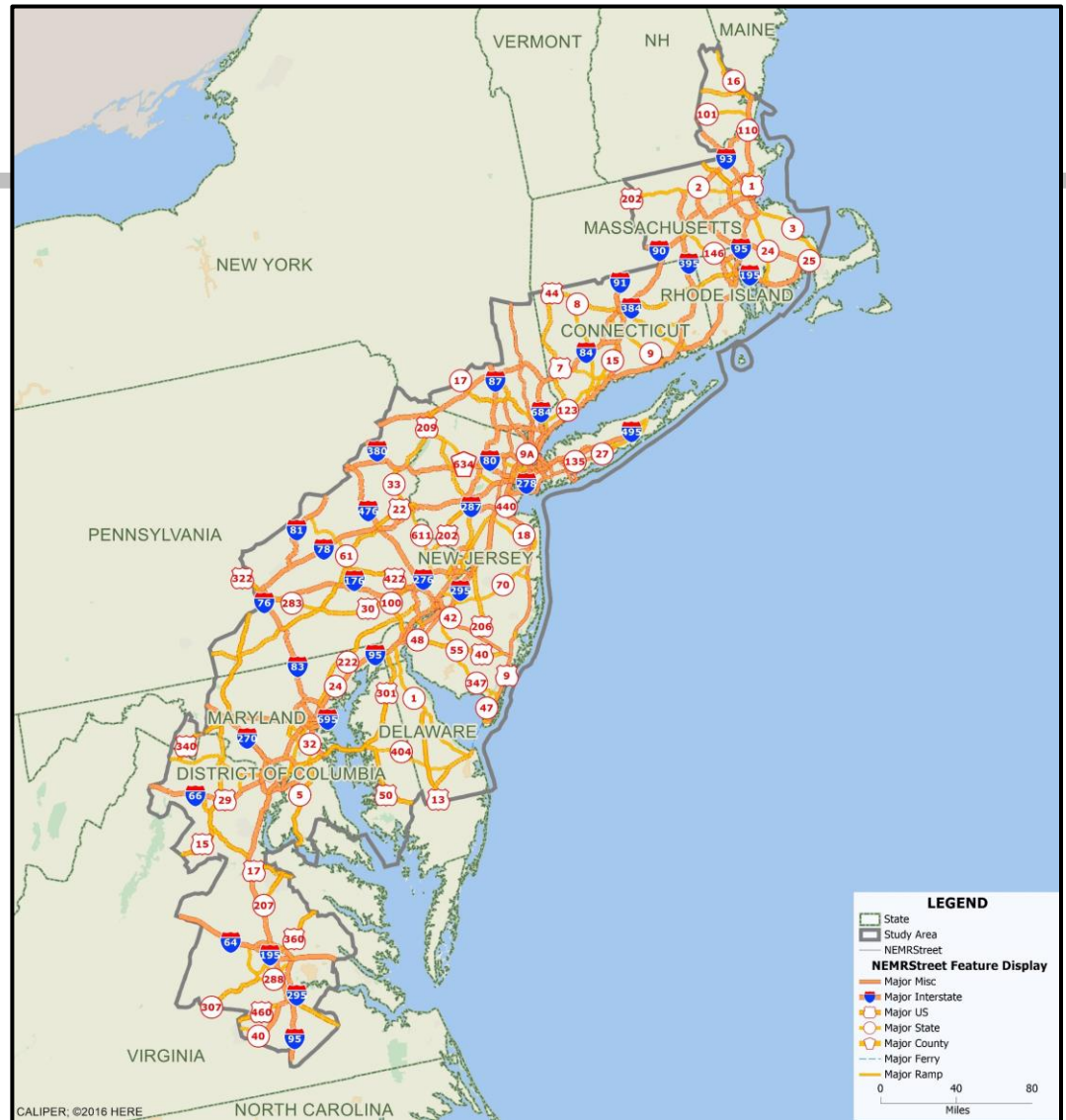


Source: Presentation slides, John Landis, University of Pennsylvania, “A Northeast Megaregion Travel Demand & Investment Model: Project Overview,” Nov. 9, 2018



Road network

- 3.3 Million Limited-Access, Arterial, & Major Street Road Links

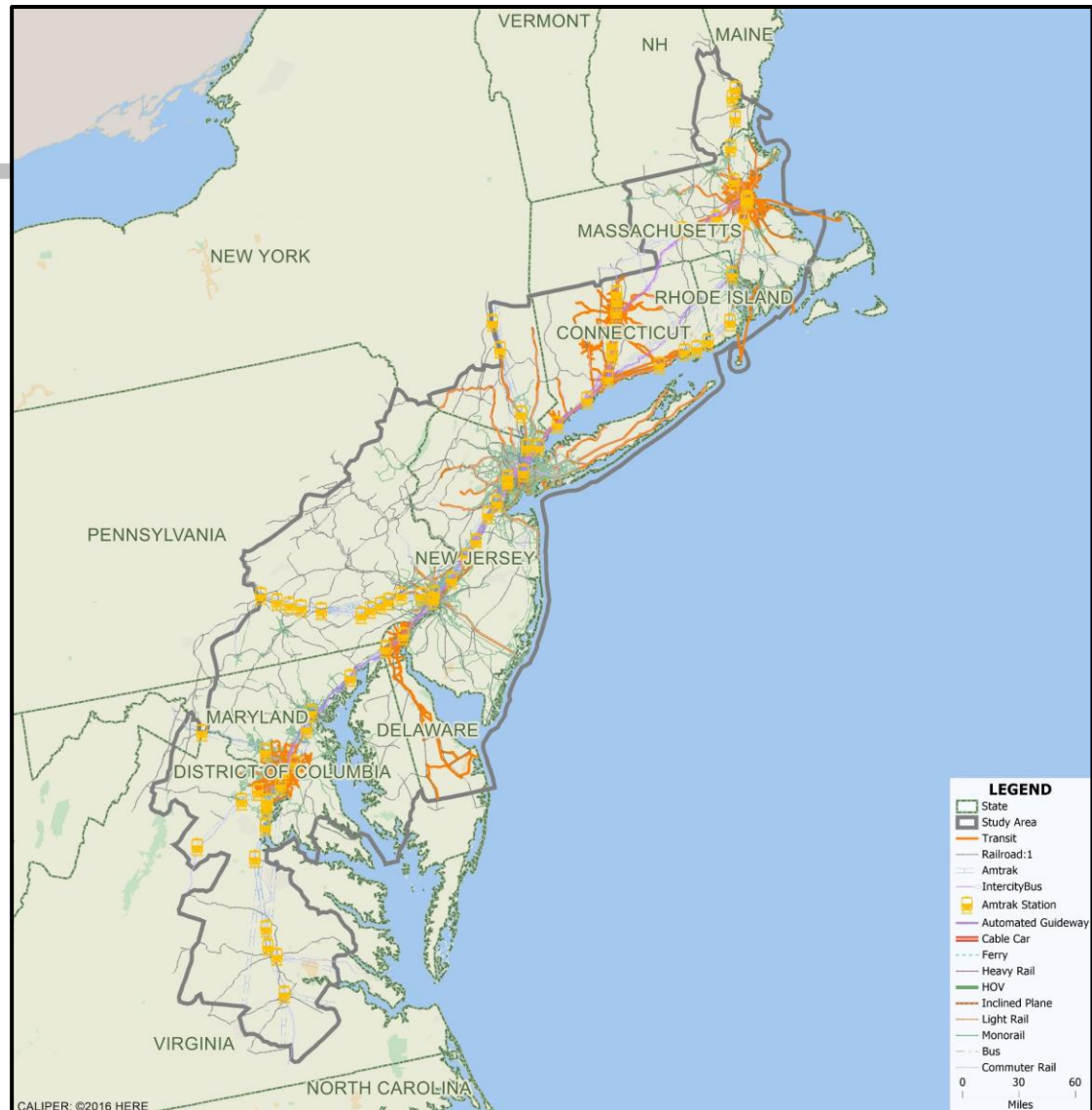


Source: Presentation slides, John Landis, University of Pennsylvania, “A Northeast Megaregion Travel Demand & Investment Model: Project Overview,” Nov. 9, 2018



Transit network

- 25+ Major Transit Systems; 6 Rail & Bus Transit Modes



Source: Presentation slides, John Landis, University of Pennsylvania, “A Northeast Megaregion Travel Demand & Investment Model: Project Overview,” Nov. 9, 2018



Status

MODELING MILESTONES & PROGRESS

Inter-metropolitan Travel Analysis and Modeling

- | | | |
|---|--|------------|
| 1 | Review and summarize NHTS data for NEMR | Done |
| 2 | Build inter-metropolitan highway, bus, and passenger rail networks | In process |
| 3 | Develop inter-metropolitan trip generation models | In process |
| 4 | Develop inter-metropolitan trip distribution model | No |
| 5 | Develop inter-metropolitan mode split model and compare to NHTS results | No |
| 6 | Identify days and times for inter-metropolitan route assignment | No |
| 7 | Assign inter-metropolitan trips to region-serving highway, rail, transit, and air routes | No |

4 Intra-metropolitan Travel Models (Boston, NYC, Philly, DC)

- | | | |
|---|---|------------|
| 1 | Create NEMR TAZ system | Done |
| 2 | Trip generation analysis in TransCAD (regression & TG rates) | Done |
| 3 | Build NEMR Highway network | Done |
| 4 | Trip distribution analysis in TransCAD (Gravity model based on skim trees times & dista | Done |
| 5 | Build local transit networks | In process |
| 6 | Local mode choice analysis | No |
| 7 | Assign local trips to region-serving highway, rail, and transit routes | No |

Freight Modeling

- | | | |
|---|---|------------|
| 1 | Modify FAF4 zone system for NEMR | Done |
| 2 | Generate freight flow O-D & mode tabulations by commodity | In process |
| 3 | Model freight trip generation & distribution by commodity | No |
| 4 | Develop mode split and routing models | No |
| 5 | Freight route/time/vehicle assignment | No |



Attendees at one-day conference

About 15 attendees, including

- Boston: Ed Bromage, Manager, Travel Model Development, CTPS
- Rhode Island: Benjamin Jacobs, Principal Research Technician, State of Rhode Island
- New York City: Karim Ahmed, ReThinkStudio.org (think tank), NYMTC was not there
- Philadelphia
 - City: Mike Carrol, Deputy Managing Director, City of Philadelphia
 - MPO: Fang Yuan and Greg Krykewycz, DVRPC
 - U. Penn:
 - John Landis, professor, and two graduate students (Yipeng Peng & Mengting Yu)
 - Vukan Vuchic, emeritus professor
- Baltimore: Brian Ryder, Transportation Planner, BMC/BRTB
- Washington: Mark Moran, Manager, Model Development, MWCOG/NCRTPB



TPB staff observations/questions

- Project is very ambitious, given its scope and limited budget/staffing
- How will the model/networks be maintained? Documentation?
- Thru-running commuter rail is a hot topic in a number of cities in the megaregion
- Modeled area is large, but number of TAZs is modest (ca. 900)
- Is coarseness/fineness rule followed for TAZs and road/transit network?
- Possible benefits from this model for our model
 - External and through travel
 - External transit
 - Airport passenger trips
- We will continue to monitor progress of this ambitious effort



Mark S. Moran

Manger, Model Development

(202) 962-3392

mmoran@mwkog.org

mwkog.org/TPB

Metropolitan Washington Council of Governments

777 North Capitol Street NE, Suite 300

Washington, DC 20002



National Capital Region
Transportation Planning Board