

# NORTHEAST MEGAREGION TRAVEL DEMAND AND INVESTMENT MODEL

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## Status report

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TPB Travel Forecasting Subcommittee  
November 30, 2018



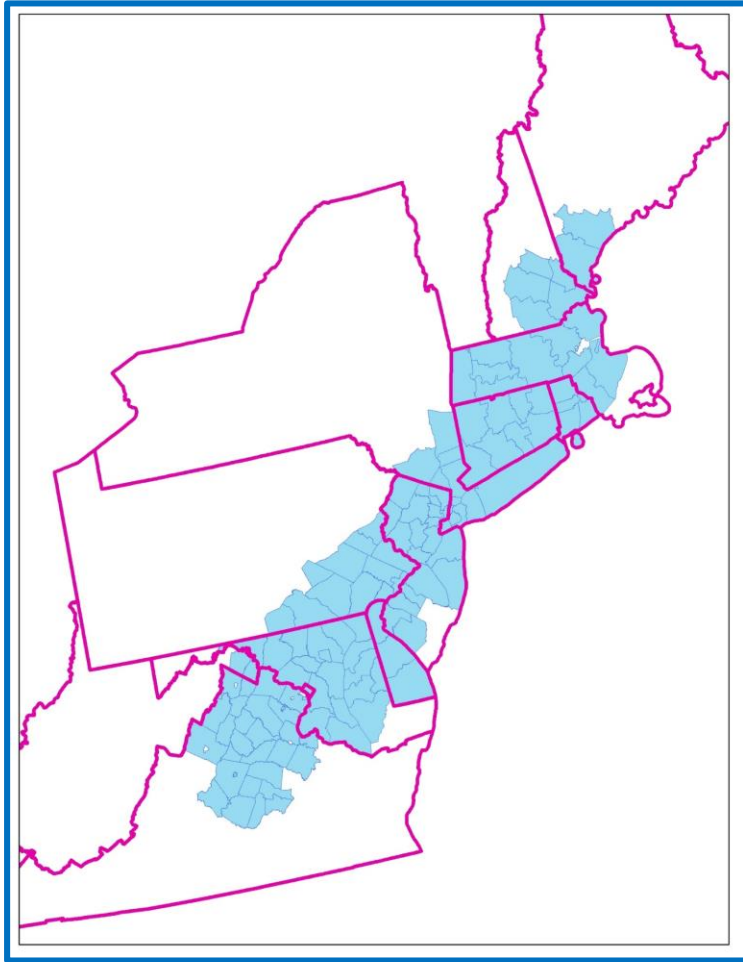
# Background

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- 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

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- 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.



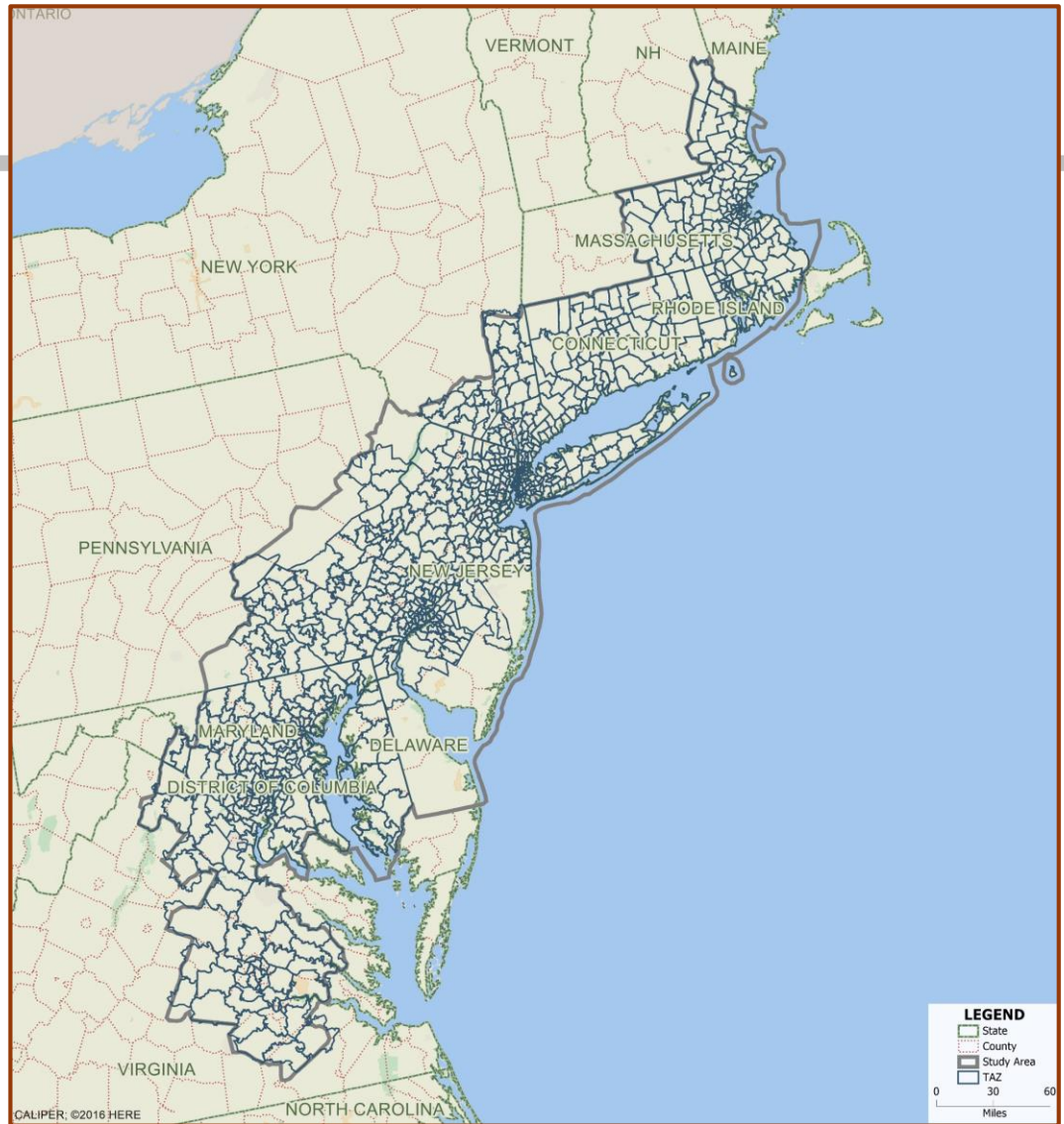
# Three components

- 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



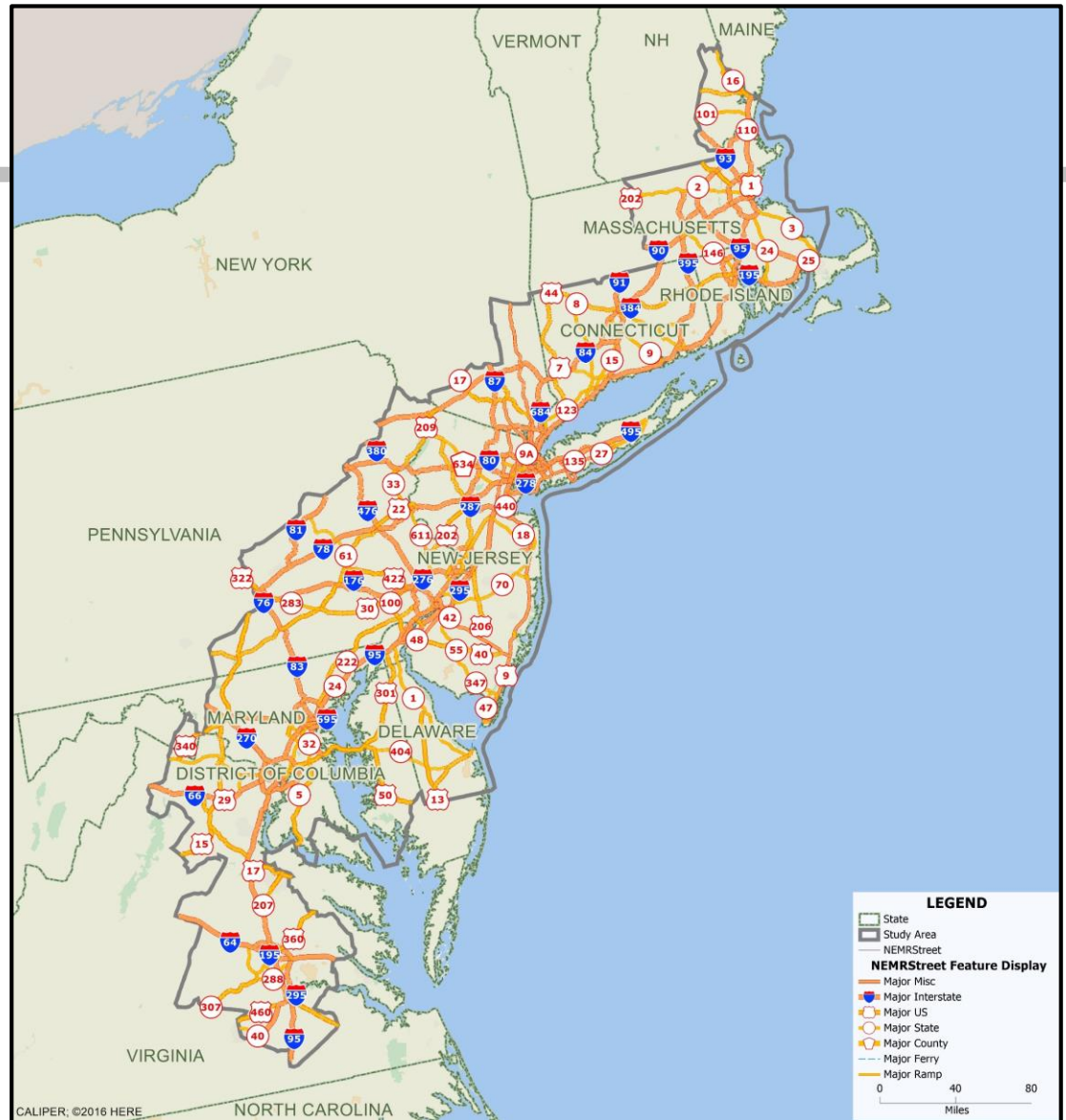
Source: Presentation slides, John Landis, University of Pennsylvania, “A Northeast Megaregion Travel Demand & Investment Model: Project Overview,” Nov. 9, 2018





# Road network

- 3.3 Million limited-access, arterial, & major street road links

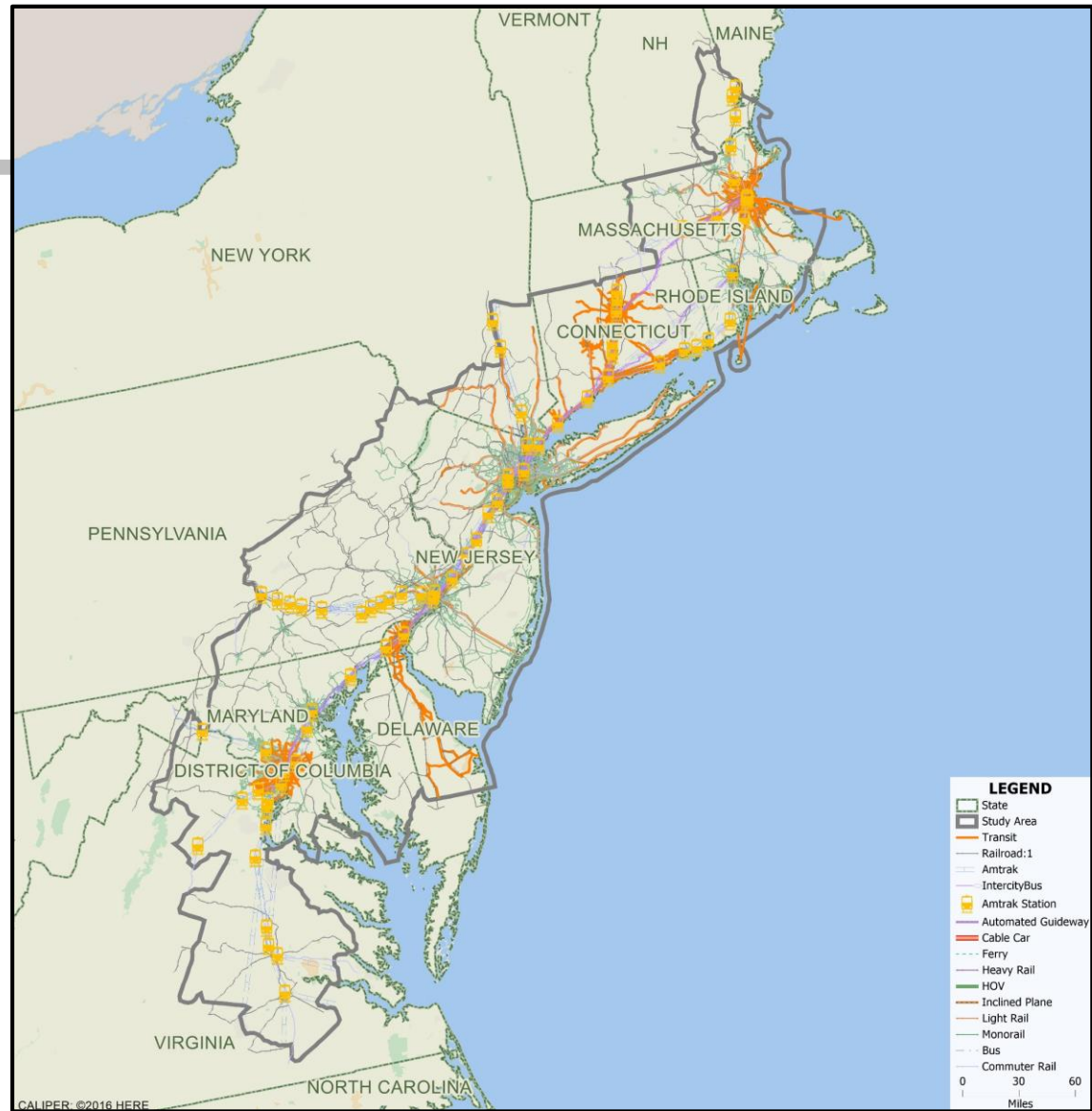


Source: Presentation slides, John Landis, University of Pennsylvania, “A Northeast Megaregion Travel Demand & Investment Model: Project Overview,” Nov. 9, 2018



# 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 mega model for our DC-area model
  - External and through travel
  - External transit
  - Airport passenger trips
- We will continue to monitor progress of this ambitious effort



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**Transportation Planning Board**