SUSTAINABILITY & MULTIMODAL PLANNING WORKSHOP

#APTAsmp19

Analyzing Changing Ridership:

Taking a Local Approach

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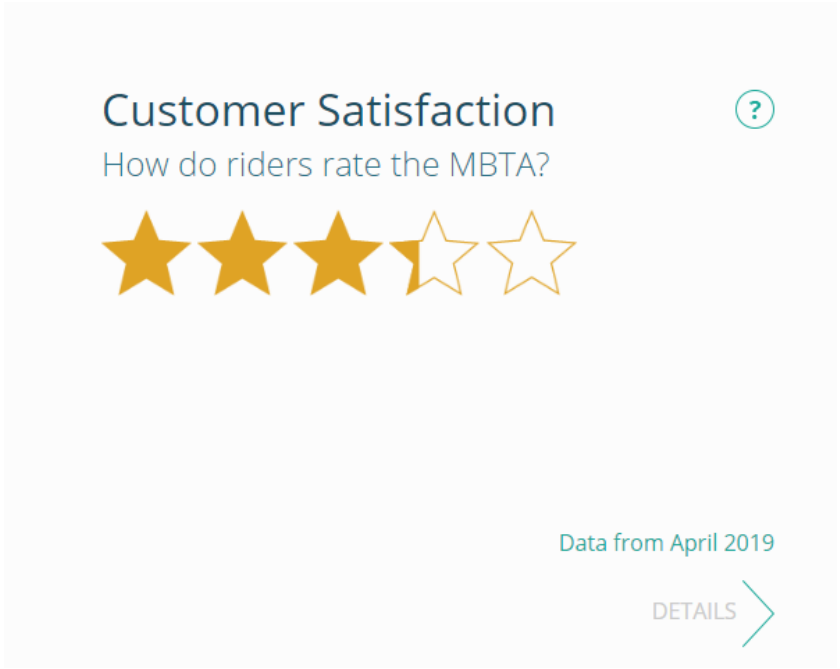
Introduction

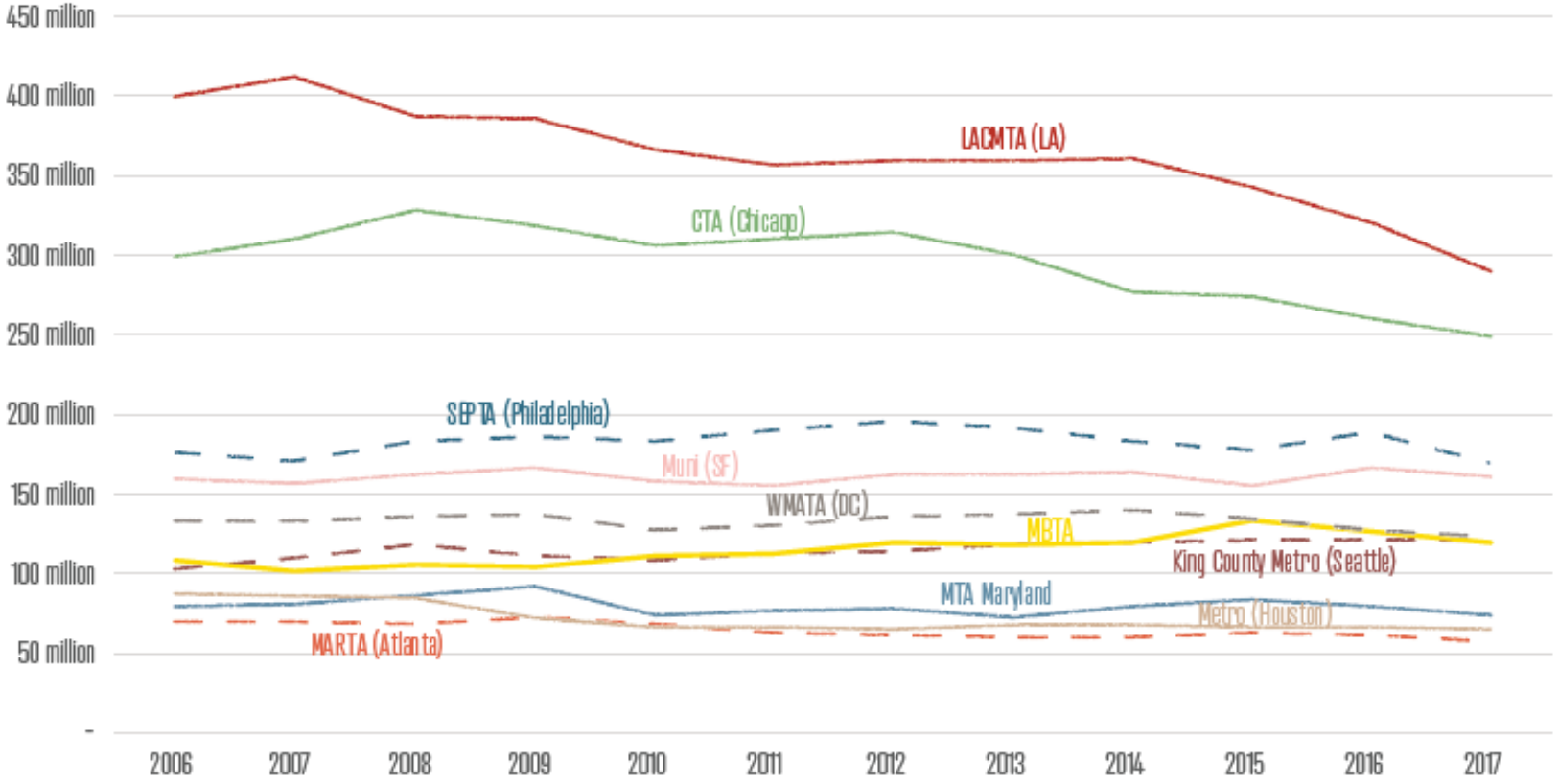
- What is OPMI?
  - We manage data strategy, analysis and performance reporting for MassDOT / MBTA. Some examples:
    - Tracker – www.massdottracker.com
    - Data Blog
    - www.mbtabackontrack.com
  - Lots of other things…

PERFORMANCE GOAL	PERFORMANCE MEASURE	TARGET MET?	JULY 1 2017 - JUNE 30 2018 (FY18)	CHANGE FROM FY17	2020 YEAR TARGET
	Subway reliability - Red Line		91.4%	–0.7%	90%
	Subway reliability - Blue Line		95.2%	+0.2%	90%
	Subway reliability - Orange Line		92.6%	–1.5%	90%
	Subway reliability - Green Line		77.6%	+1.1%	90%
	Bus reliability - Silver Line		79.3%	–0.9%	80%
	Bus reliability - Key bus routes	-	75.9%	no change	80%
	Bus reliability - Other routes		62.7%	–0.1%	75%
	Bus service operated		97.7%	–0.6%	99.5%
	Bus passenger comfort		93.8%	–0.4%	96%
	Commuter Rail reliability (adjusted)		93.7%	+0.5%	92%
	Commuter Rail service operated		99.7%	+0.1%	100%



Overview of the Project

Figure 7: Annual unlinked passenger trips (UPT) on bus by selected systems



Source: National Transit Database, Annual Reporting

- Full report available: http://www.mbtabackontrack.com/blog/100

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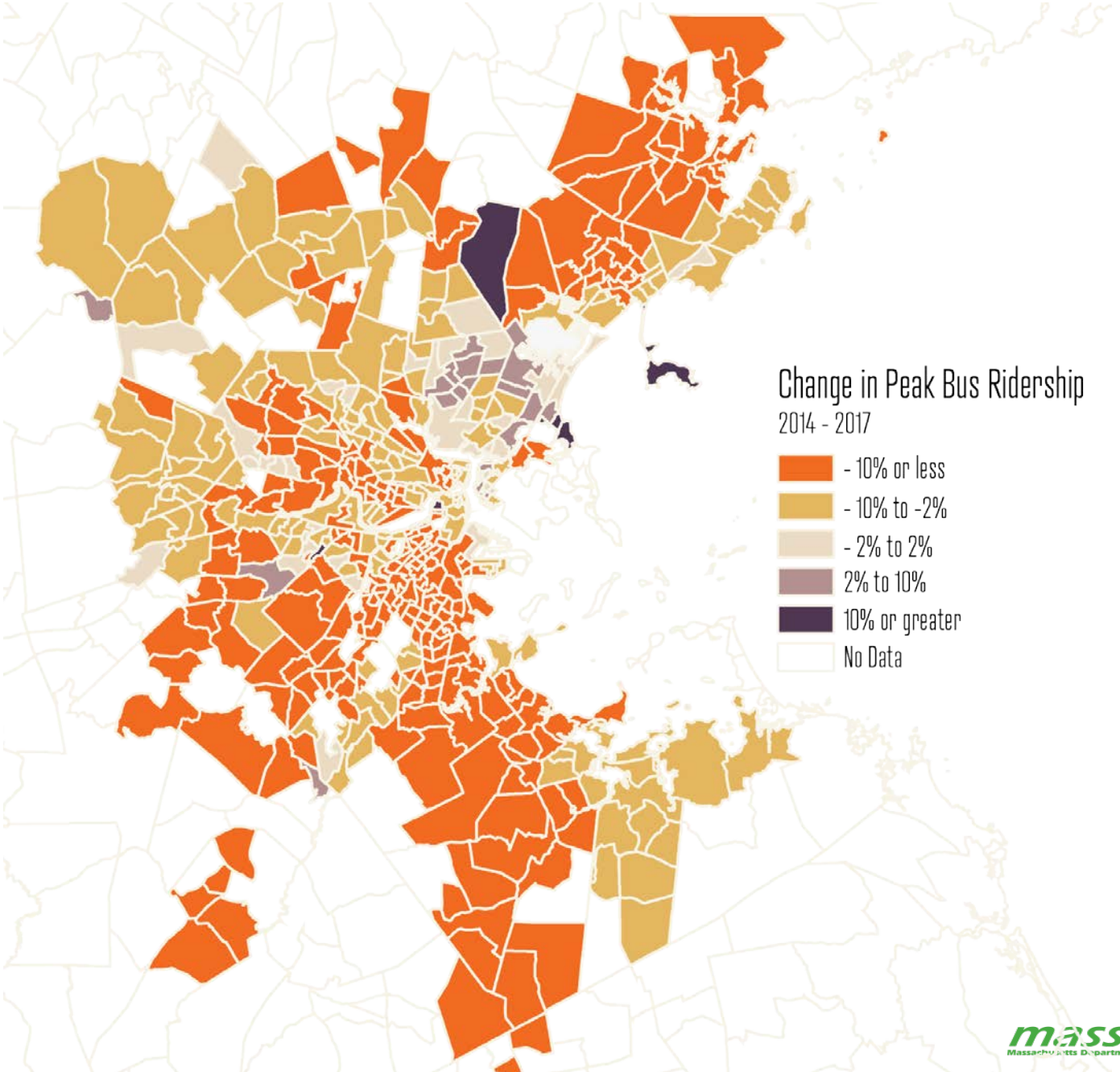
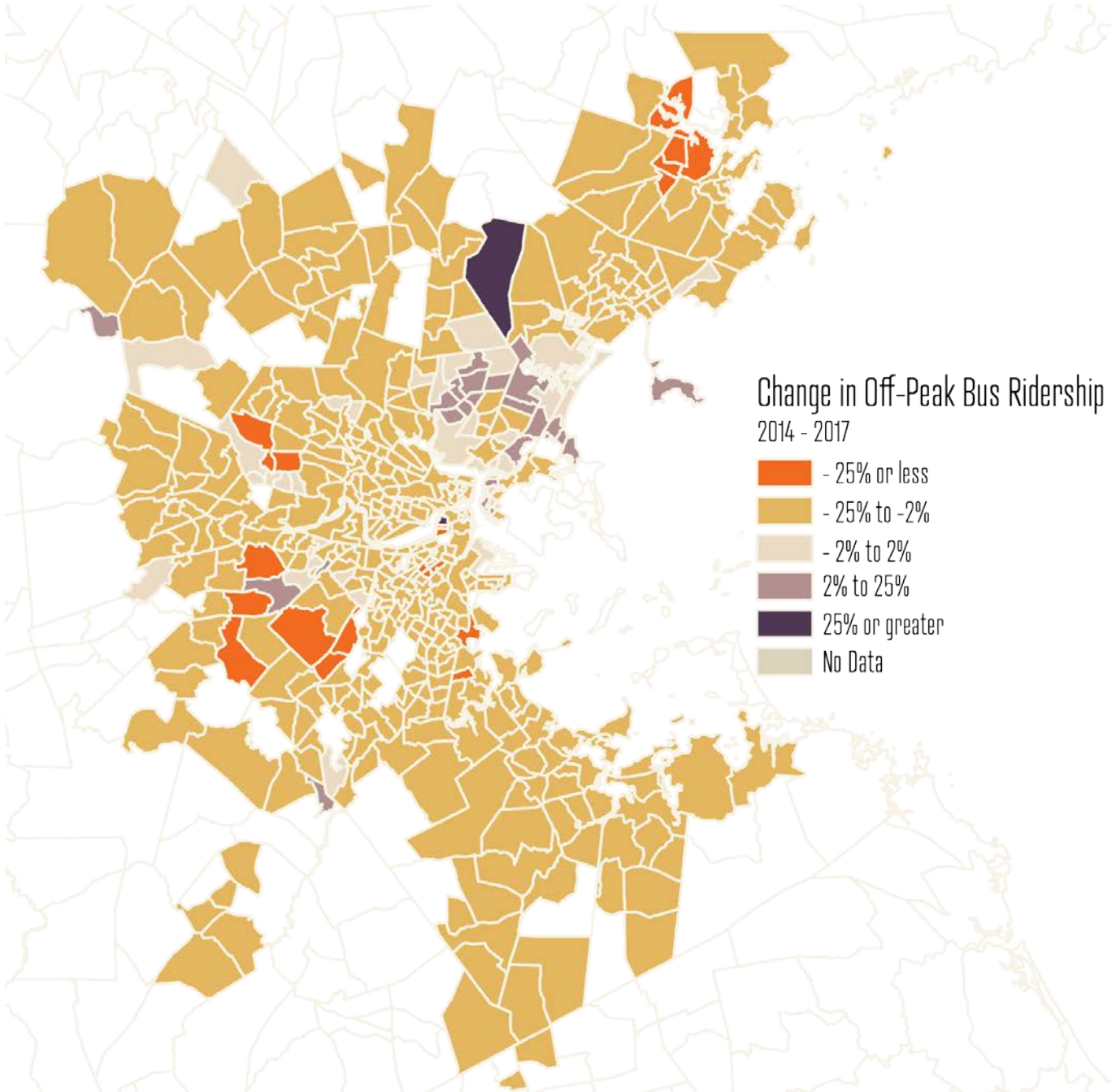
Zooming in…


Change in Peak Bus Ridership
2014 - 2017
- 10% or less
- 10% to -2%
- 2% to 2%
2% to 10%
10% or greater
No Data



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Overview of Research

What is affecting ridership at the regional level?

- Question typically answered by past research on transit system ridership
- Able to provide an overarching understanding of transit demand
- **Longitudinal Regression**

Unit of Analysis: Transit Agency (UZA)

What is affecting ridership within our region?

- Less research has been done on this question
- Able to identify unique factors between and within regions
- **Spatial Regression**

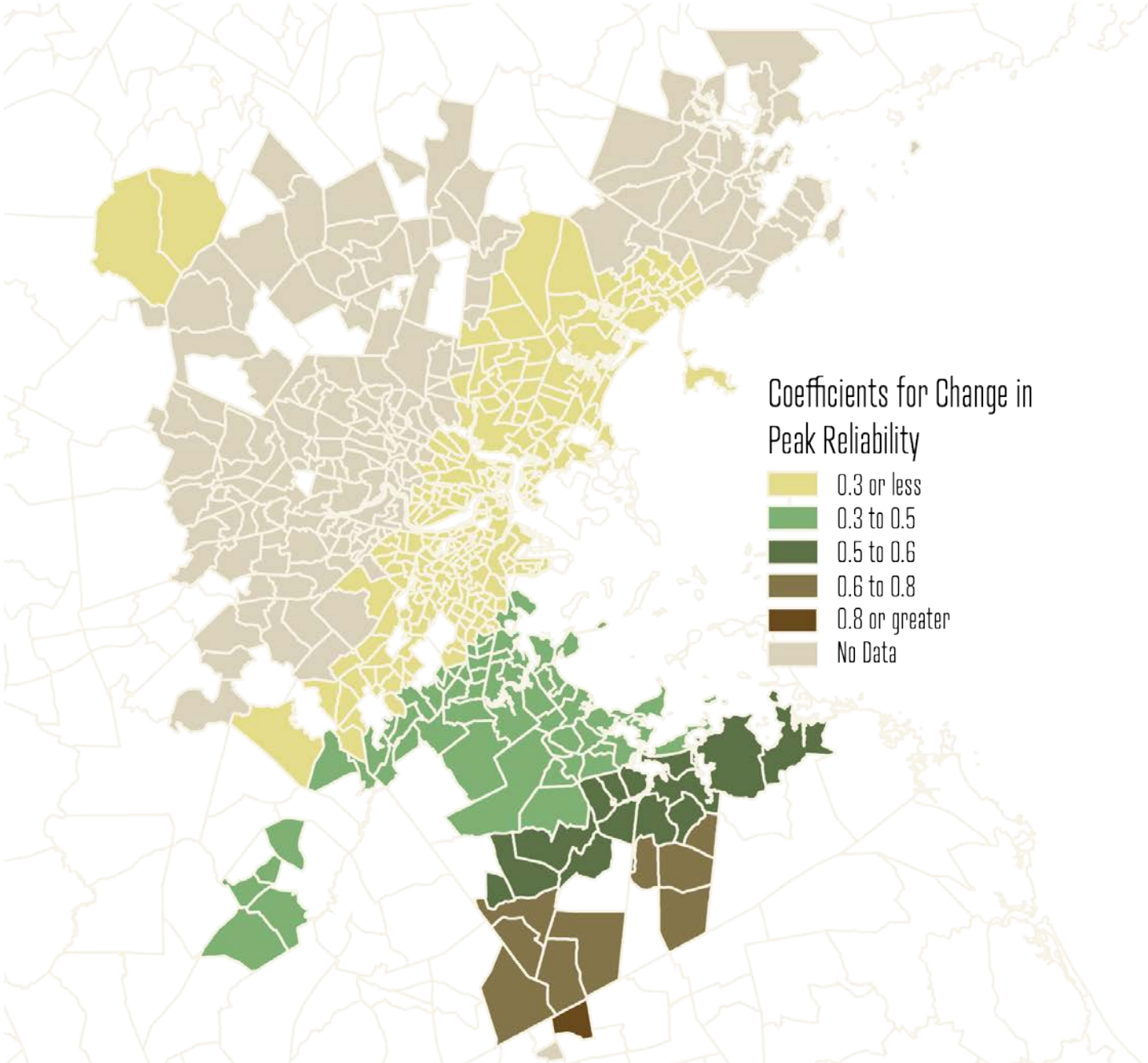
Unit of Analysis: Neighborhood (Tract)

What is affecting ridership within our region?

Geographically Weighted Regression

- What's different about this model?
  - Compared census tracts within one transit system
  - Tested the *change* in ridership
  - Models were developed for peak/off-peak time periods
  - Able to use detailed service quality data

Tested in Peak OLS Regression	Tested in Off Peak OLS Regression
Socioeconomic Status 2007-2011	Socioeconomic Status 2007-2011
Change in Socioeconomic Status	Change in Socioeconomic Status
% Commuting by Car 2007-2011	% Commuting by Car 2007-2011
Change in % Commuting by Car	Change in % Commuting by Car
% Owning 1+ Vehicles 2007-2011	% Owning 1+ Vehicles 2007-2011
Change in % Owning 1+ Vehicles	Change in % Owning 1+ Vehicles
Peak Speed 2014	Off Peak Speed 2014
Change in Peak Speed 2014 to 2017	Change in Off Peak Speed 2014 to 2017
Transfer Rate 2014	Transfer Rate 2014
Change in Transfer Rate 2014 to 2017	Change in Transfer Rate 2014 to 2017
Peak Trips per Hour 2014	Off Peak Trips per Hour 2014
Change in Peak Trips per Hour 2014 to 2017	Change in Off Peak Trips per Hour 2014 to 2017
Peak On-time Performance 2014	Off Peak On-time Performance 2014
Change in Peak On-time Performance 2014 to 2017	Change in Off Peak On-time Performance 2014 to 2017



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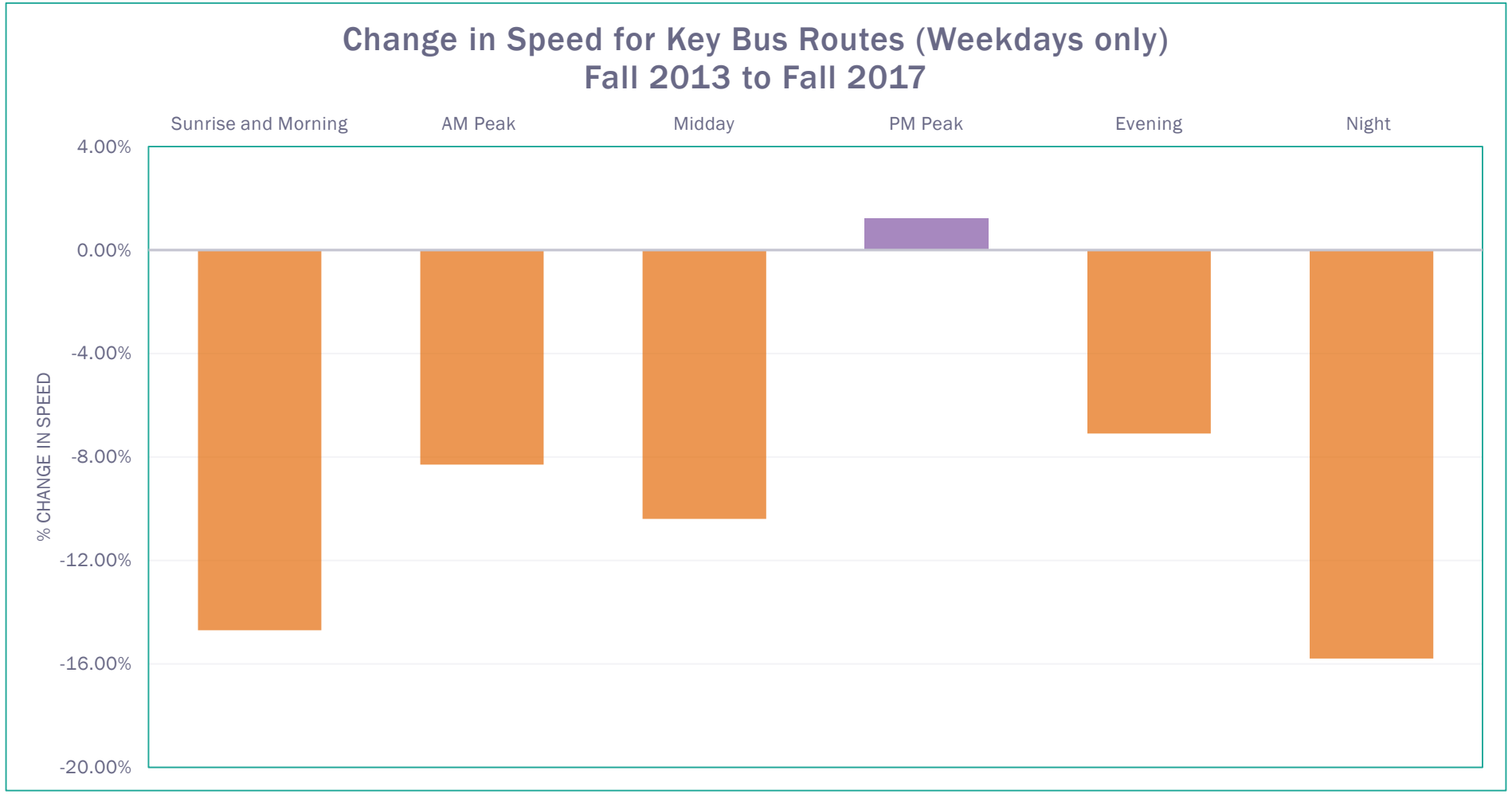
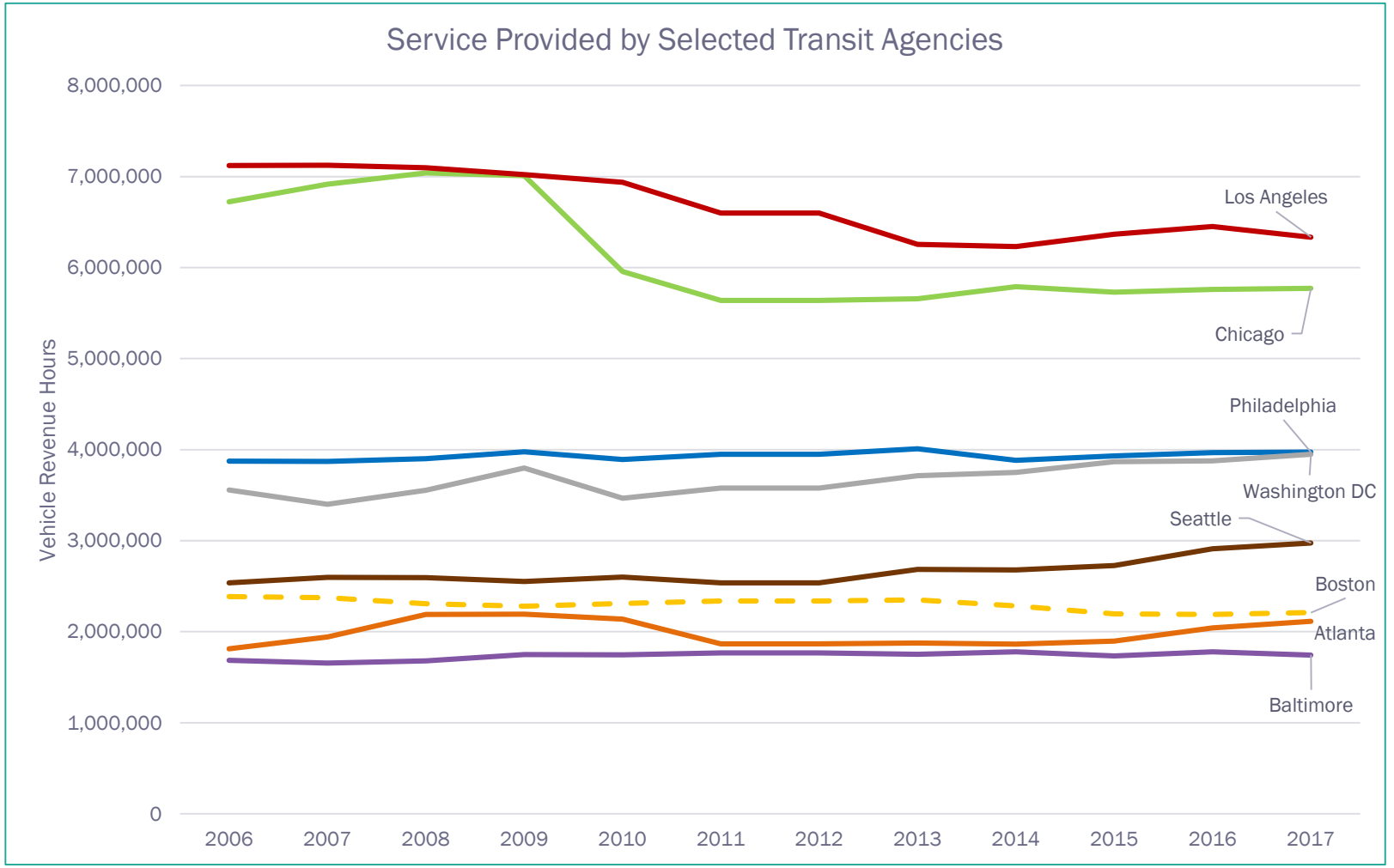
WHAT DID WE FIND?

Buses are slowing, which leads to less service delivered



Service levels were cut during the recession across the U.S. and very few agencies have gotten back to pre-recession levels



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What else?

- Our model revealed the primary determinants to changing ridership in the Boston region –
  - **Level of service and service quality matters for ridership**
  - **These and other factors influence ridership differently in different areas**

- And finally, we learned more fully what the gaps in our (data) understanding of our system are – a precursor to filling those gaps

What can you do?

1. Examine available data

2. Determine what combination of factors drive ridership within your service area
   - In many cases, this is speed and reliability, affected greatly by traffic. But not all!

3. Tailor solutions to local conditions
   - In Boston, we are focusing on transit priority because of congestion.

Questions?

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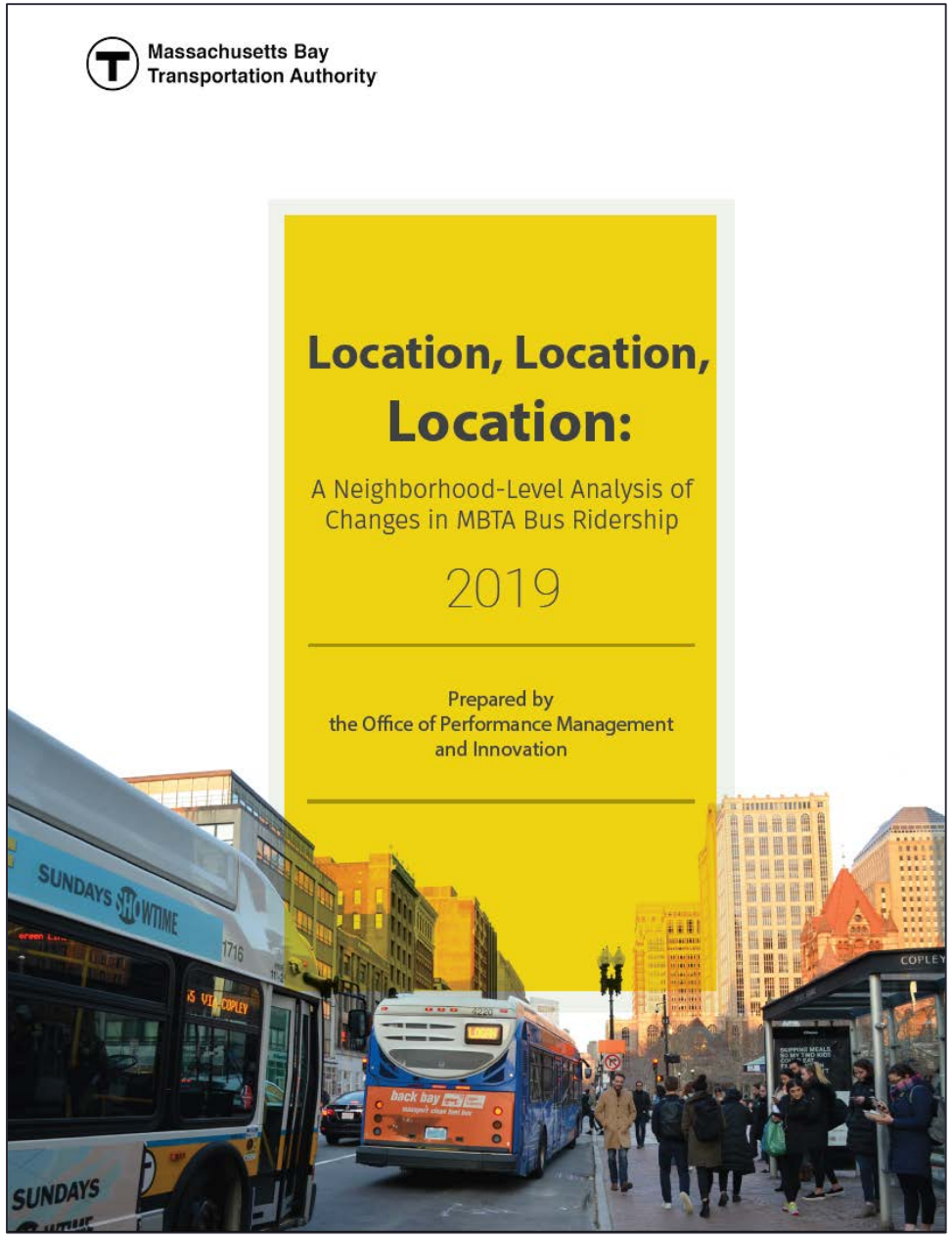
Read the full report at
mbtabackontrack.com/blog



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