

Long-Distance Commuting in the Boston Region: Necessity or “Strategic Mobility Choice”?



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Necessity or “Strategic Mobility Choice”?

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ABOUT THIS REPORT

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Abstract

This report examines the phenomenon of long-distance commuting—which overlaps with but is not entirely the same as what is popularly known as super-commuting, mega-commuting, or extreme commuting—and the role that the Boston Region MPO could play in planning for it as a segment of the region’s transportation market. Popular media has drawn significant attention to long commutes, but their precise number and characteristics are poorly defined in the planning literature and available data.

Through focusing on long-distance commutes into the core of the Boston region, this analysis finds that while the exact number of such trips is difficult to pin down, that amount likely approximates 50,000 every day. Using an extensive literature review as well as U.S. Census and survey data, we find that long-distance commuters are generally well-educated and of moderate-to-high household income. Motivations for undertaking an enterprise like a long-distance commute are mixed, but can include balancing a two-career household; rootedness in one place or another; affordability concerns; or attachment to a particular job. One important finding, though in need of further research, is that many long-distance commuters may make the trip only a few times per week, working remotely at other times. Geographically, long-distance commutes into Boston are spread across much of New England including Western Massachusetts and the Pioneer Valley; Cape Cod; southern New Hampshire; and southern Maine. Interestingly, international experience indicates that such trips may, provided that there are appropriate transportation options, re-cluster as core-to-core trips rather than continuing regional sprawl.

Pursuant to these findings, this report develops goals for serving the long-distance commuting population and presents a number of recommendations to meet those goals, including developing better data and information about long-distance commute trips; coordinating long-distance commutes between non-contiguous MPOs; and bridging the gap between “commuter” and “intercity” via more robust rail service. In addition, in light of heightened awareness of long commutes and new federal guidelines that emphasize measuring capacity by person-throughput rather than vehicle-throughput, we recommend reconsidering previous conclusions about the viability of priority lanes for buses and high-occupancy vehicles on regional freeways.

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Chapter 1 Introduction: Motivations for this Research

Super-commuting—which, according to the U.S. Census Bureau’s definition¹ comprises trips to work of 90 minutes or more—has been the subject of significant media attention over the last several years.² During the period of writing this report alone, the *New York Times* ran two lengthy articles on the topic, concerning workers in New York City³ and the San Francisco Bay Area.⁴ Stories of workers who wake up at 2:15 in the morning (as does the subject of one of the *Times* profiles), or who travel three hours each way every day abound.

Indeed, popular interest in the topic extends to the Boston Region MPO’s own area. A recent Pew Charitable Trusts report⁵ indicated that from 2010 to 2015, Massachusetts saw the third-fastest rate of growth in super-commuting, at 45.4 percent, and that 112,709 Massachusetts workers had commutes of 90 minutes or longer. The Pew report does not provide detailed data and might struggle to capture trips that begin in one state and end in another⁶—but it gives a sense that there is some market for these trips in Massachusetts. And as the biggest job hub in Massachusetts—and host to a concentration of the high-education, high-income jobs that have been identified as correlating with long-distance commuting—the Boston region is a destination for many of these trips.

Yet, despite media interest, the extent of the nationwide extreme-commuting population remains unclear. Most likely, long commutes remain a small segment of the overall travel market, albeit one that may be growing.⁷ Like the subject of the *Times*’ Bay Area profile, many people who choose such a commute do so less out of economic necessity than out of a complicated web of choices. The motivation for this

¹ In their 2012 study for the U. S Census Bureau, "Mega Commuting in the U.S.: Time and Distance in Defining Long Commutes using the 2006-2010 American Community Survey, Rapino and Fields define "extreme commuting" as traveling 90 or more minutes to work; "long-distance commuting" as traveling 50 or more miles, and "mega commuting" as 90 or more minutes AND 50 or more miles, but these terms do not appear to be used with any consistency in literature or popular media.

² See for example <https://www.curbed.com/2017/6/20/15834514/rent-transportation-commute-affordable-housing>.

³ <https://www.nytimes.com/2017/07/21/realestate/extreme-commuting.html>.

⁴ <https://www.nytimes.com/2017/08/17/business/economy/san-francisco-commute.html>.

⁵ <http://www.pewtrusts.org/en/research-and-analysis/blogs/stateline/2017/06/05/in-most-states-a-spike-in-super-commuters/>.

⁶ Although it is worth noting that according to Pew’s analysis, Rhode Island saw 61 percent growth in super-commuting during the same period, and New Hampshire had 37.8 percent growth.

⁷ For a roundup of media coverage and a skeptical take on the excitement, see <http://cityobservatory.org/super-long-commutes-a-non-big-non-growing-non-problem/>.

research, then, is to supplement popular media attention and the scarce planning and scholarly research by attempting to define and quantify the market for such long-distance commutes into the core of the MPO area—and to provide a jumping-off point for future in-depth research on the topic.

1.1 THE STATUS OF RESEARCH

Despite popular and media interest, the phenomenon of super/mega/long-distance commuting remains poorly understood and under-studied in planning literature. As one paper puts it, “studies on extreme commutes are noticeably scarce in the literature.”⁸ Searches for “super-commuter” and “super-commuting” in the Transportation Research Board’s (TRB) TRID database (<https://trid.trb.org/>) return only one identical result; and searches for these and related terms in other scholarly databases return few additional products. As a result, “without an existing knowledge base, policymakers lack the familiarity with this population that they need to prepare for this population’s increasing demands and impact on the nation’s transportation system.”⁹

Previous Central Transportation Planning Staff (CTPS) analysis has recognized the potential existence of a population making such trips. The recent CTPS report “Exploring the 2011 Massachusetts Travel Survey: Barriers and Opportunities Influencing Mode Shift” (the Mode Shift report) noted that some workers do not fit into CTPS’s regular methods of categorizing commuters:

There were 221,900 workers, referred to as “home-centered,” who were not included in the Boston region commuting market. These workers either claimed that their primary workplace was at home, or reported a workplace location so far away that the mode choice was more appropriately thought of as a long-distance travel decision rather than a conventional commuting decision. Workers in the building trades and sales representatives, for example, need to travel, but they were considered home-centered.

For this study, it was assumed that respondents could commute between the model region and any location within Massachusetts. Workers living in the model region who reported their primary workplace as outside of Massachusetts were classified as “commuting” if their workplace was within 100 miles of their home, and as “home-centered” if greater than 100 miles.

Because the trips made by these commuters are difficult to quantify, they played little further role in the above-cited report’s analysis. To twist that report’s language slightly, we may think of long-distance commuting as *both* a long-distance travel decision and (perhaps increasingly) a conventional commuting decision. The Mode

⁸ Maoh and Tang 2012, p. 50.

⁹ Marion and Horner 2013, p. 38.

Shift report’s decision to classify non-traditional commuters into just two categories is reasonable based on the available data. In reality, however, the phenomenon of super-commuting is highly nuanced, and is a product of the interactions of many qualitative factors, so cannot be limited to only two categories.

People with chronologically long commutes—as the Census defines “super” commuters—essentially can be divided into two categories: those whose home and workplace are separated by a significant geographic distance, and those whose commute may be physically shorter but congested, inconvenient, slow, or separated by multiple transfers on transit. As is true of all American major metropolitan areas, Boston has many commuters who fall into the latter category, and their needs are relatively well understood, if not fully met, so this report focuses primarily on the former category. To focus on the largest such submarket and reduce overall complexity, this analysis deals primarily with commuters from outside the Boston Region MPO area, especially those from beyond the limits of Massachusetts Bay Transportation Authority (MBTA) transit service who work in the geographic core of the Boston region.

1.2 SIZE OF THE LONG-DISTANCE COMMUTING MARKET

Estimates of the number of long-distance commuters into Boston’s core tend to vary depending on data source. (For an in-depth explanation of the different data sources used here and the variation between them, see Appendix A.) Table 1 below summarizes the estimates derived from various sources.

Table 1
Estimates of Long-Distance Commuting into the Boston Core

Source	LODES—County Estimates ¹	LODES—Distance Estimate (>50 miles) CTPP	Charting Progress to 2040 Modeling ²	
Estimate	96,011 Commuters	43,904	43,941 ³	52,00
Work geography	Four-mile radius from Boston City Hall Top 95 non-MPO counties	Four-mile radius from Boston City Hall Any	Suffolk County Top 95 non-MPO counties	Central area All non-MPO municipalities

CTPP = Census Transportation Planning Package. LEHD = Longitudinal Employer-Household Dynamics. LODES=LEHD Origin-Destination Employment Statistics. MPO = Boston Region Metropolitan Planning Organization.

¹ To generate this estimate, staff summed the top-100 counties that LODES records as sending commuters to the Boston area, then subtracted the five (Suffolk, Middlesex, Norfolk, Essex, and Plymouth) that are fully or partially in the Boston Region MPO area. (Southborough and Milford are in the MPO area and Worcester County, but are only a small percentage of the county.) ² Charting Progress to 2040, (the MPO’s most recent Long-Range Transportation Plan), CTPS, 2015, p. 3-5. ³ 12,828 commuters, or 26 percent, report a travel time of 90 or more minutes.

Further analysis using the LEHD Origin-Destination Employment Statistics (LODES) Distance/Direction Analysis tool¹⁰ shows that the number of people commuting into Boston from a long distance has remained relatively stable in overall proportion to the job market, but it has grown in absolute terms, along with the overall employment trend. The 25-mile limit is roughly the same as the extent of the Boston Region MPO, while the 50-mile limit coincides broadly with the end of MBTA commuter rail service.

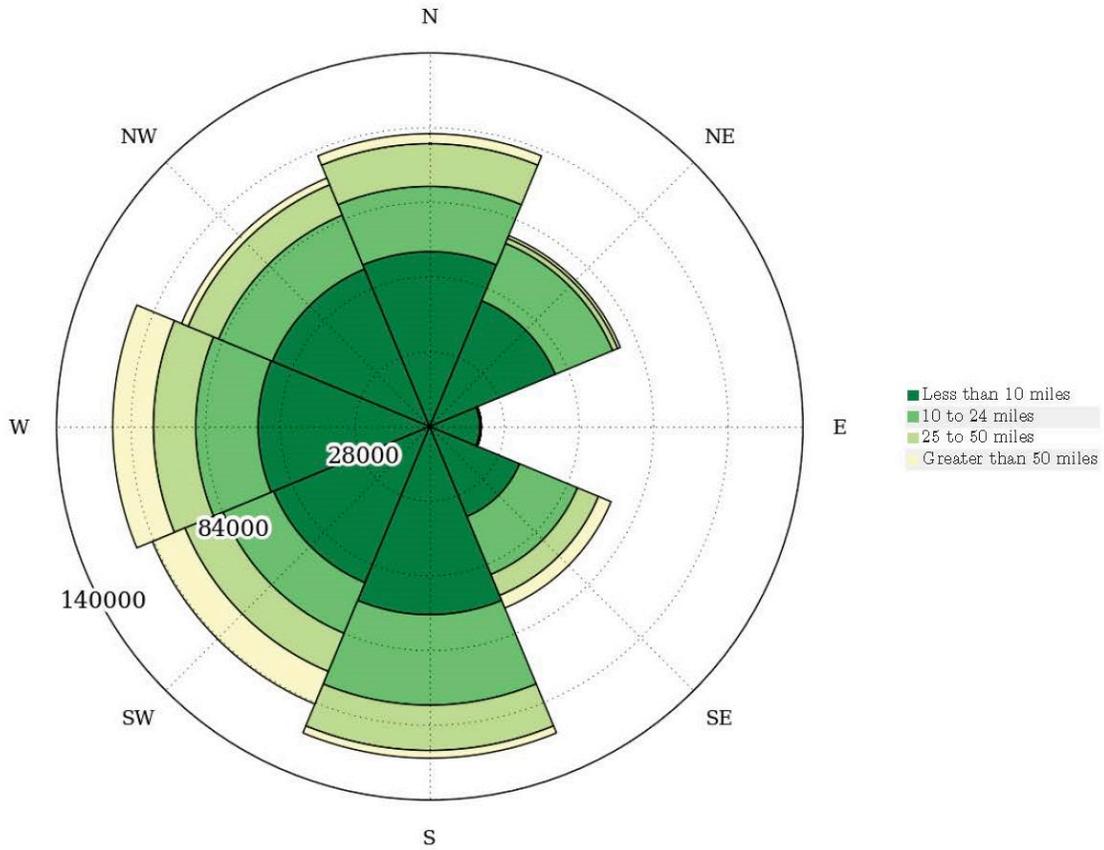
Table 2
Breakdown of Long-Distance Commuters into the Boston Core,
by Distance Traveled

	2014	2014	2013	2013	2012	2012	2011	2011
	Count	Share	Count	Share	Count	Share	Count	Share
Total all jobs	736,734	100.0%	713,928	100.0%	698,052	100.0%	667,942	100.0%
25 to 50 miles	87,295	11.8%	85,898	12.0%	83,279	11.9%	83,021	12.4%
Greater than 50 miles	43,904	6.0%	41,923	5.9%	38,678	5.5%	35,533	5.3%
Total 25 or more miles	131,199	17.8%	127,821	17.9%	121,957	17.5%	118,554	17.7%

A radar chart generated through the OnTheMap interface (Figure 1) shows the directions and distances from which commuters reached the Boston core in 2014. The directional geographic slices—“vectors” in the wording of previous CTPS reports—to Boston’s west and southwest generated the highest percentages of the long trips of interest in this report, while the vectors to the north and south generated many trips of intermediate length but relatively fewer very long ones.

¹⁰ Using the same work geography of a four-mile radius from Boston City Hall; LODES data for Massachusetts is only available from 2011 through 2014.

Figure 1
Visual Representation of Commuters into the Boston Core
(Four Miles from City Hall), by Distance and Direction



Source: U.S. Census Bureau.

A full breakdown of commuters into the Boston core by county of origin, with both CTPP and LODES data, may be found in Appendix A. Figure 2 breaks down commutes into the Boston core (four-mile radius from City Hall) by county-level LODES estimate.

Figure 2
Map of LEHD Estimates for People Employed in the Boston Core
by County, 2014

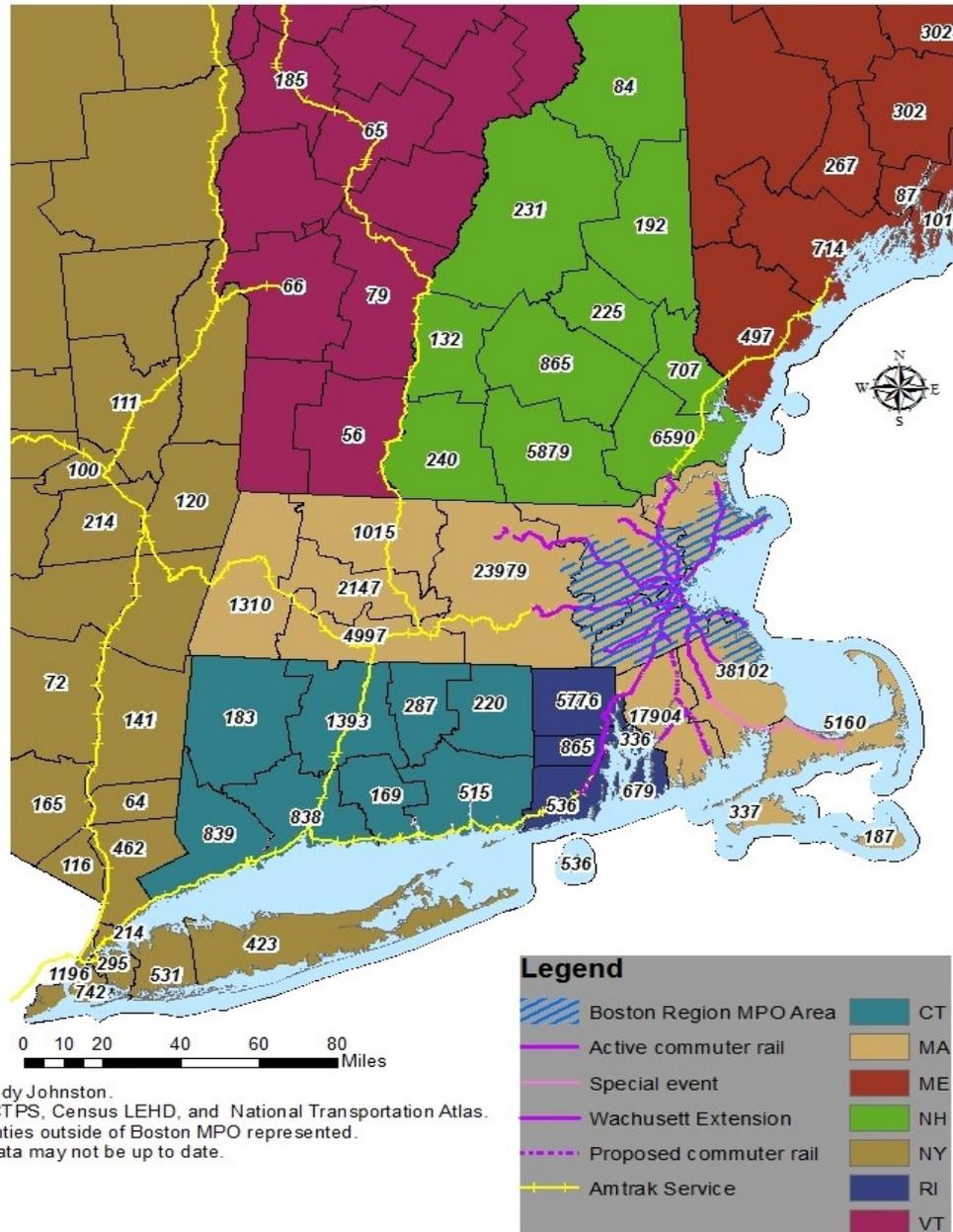


Table 3 below provides a detailed snapshot of the top-10 counties with commutes to Boston¹¹ that are outside both the Boston Region MPO and the MBTA service area

Table 3
Top-10 Counties with Long-Distance Commuting to the Boston Region

County	State	LODES Estimate	CTPP Estimate	Pct. 90+Minutes Estimate (CTPP)	CTPP-to-LODES Ratio
Rockingham	NH	6,590	4,060	27.2%	0.62
Hillsborough	NH	5,879	3,520	24.7%	0.60
Barnstable	MA	5,160	2,360	46.4%	0.46
Hampden	MA	4,997	380	52.6%	0.08
Hampshire	MA	2,147	205	70.7%	0.10
Hartford	CT	1,393	275	29.1%	0.20
Berkshire	MA	1,310	35	42.9%	0.03
New York	NY	1,196	170	11.8%	0.14
Franklin	MA	1,015	115	39.1%	0.11
Merrimack	NH	865	335	53.7%	0.39

CTPP = Census Transportation Planning Package. LODES = LEHD Origin-Destination Employment Statistics.

The counties cited in Table 3 here cover a wide geographic area, including Southern New Hampshire (including the metropolitan areas of Portsmouth, Nashua, Manchester, and Concord); Cape Cod; Springfield; the Pioneer Valley; Hartford; the Berkshires; and finally New York City.¹² The two primary Census data sources frequently disagree on the number of commuters from a specific county; generally speaking, CTPP estimates far fewer commuters from these counties into Boston than does LODES, despite the more restrictive geography employed in this analysis for LODES. However, the difference ranges from CTPP estimating three percent of the LODES total (Berkshire County, MA) to 62 percent (Rockingham County, NH).

Generally speaking, the CTPP-to-LODES ratio declines as the distance to Boston grows; in fact, Berkshire County shows the maximum discrepancy observed in the top-100 counties (see Appendix A). Later in this report, we offer an explanation for this discrepancy and discuss its potential significance in understanding the full extent and characteristics of long-distance commuting. (See subsection “May Commute Part Time” in section 2.2, CHARACTERISTICS OF SUPER-COMMUTERS.) However, the differences between the Census data sources reveal considerable uncertainty about the full size of the long-distance commute market, supporting one of this report’s primary goals: developing greater understanding of such trips.

¹¹ As measured by LODES, for CTPP, “Boston” was defined as Suffolk County; for LODES, where the OnTheMap interface and more robust data allow greater geographic discretion, it is a circle defined by a radius of four miles from Boston City Hall.

¹² The Boston-NYC commute dynamic was noted by Qing and Moss 2012.

1.3 IMPLICATIONS OF LONG-DISTANCE COMMUTING

In addition to being of research interest, the existence of these trips has implications for the MPO's policies and practice in transportation planning. The correlation between commute length and stress is well established,¹³ and stress can lead to inattention among drivers, and potentially more accidents. In addition, long commutes can contribute to a wide variety of social costs:

The increase of long-distance commuting has implications on a macro-level for planning and environmental policies (as more and longer journeys are undertaken), as well as on a micro-level for the individual and his/her household. Clearly there are both economic costs and benefits of long-distance commuting, but it is likely that there also are social consequences of spending long times away from one's home and family. A long duration of long-distance commuting may be trying and possibly destructive for a relationship. Transport planning and policies aiming at a sustainable transport system must therefore take into account economic, environmental as well as social consequences of commuting. Currently the social consequences of long-distance commuting are not fully understood. With the contemporary trend of increasing long-distance commuting, the question of the social sustainability of long-distance commuting is therefore something that can not be ignored by policy makers and should be put on the agenda and discussed in relation to the benefits. The key policy challenge is to achieve an enhanced understanding of social consequences of long-distance commuting in order to optimize transport and planning policies aiming to develop a sustainable transportation system.¹⁴

Anecdotal evidence suggests that employers are aware of the stress and costs of long-distance commuting and likely might try to avoid job candidates who would be making such a commute.¹⁵ As such, this report identifies mode shift as a primary goal, in accordance with both the Massachusetts Department of Transportation's (MassDOT) stated mode shift goal¹⁶ and the apparent interests of the commuters themselves.

¹³ See for example <http://www.businessinsider.com/long-commutes-have-an-impact-on-health-and-productivity-2017-5>.

¹⁴ Sandow and Westin 2010, p. 443.

¹⁵ <http://www.askamanager.org/2015/06/why-should-employers-care-about-my-long-commute.html> and see comments section on this post.

¹⁶ <http://www.massdot.state.ma.us/main/tabid/1085/ctl/detail/mid/2937/itemid/223/MassDOT-Announces-Mode-Shift-Goal-to-Triple-the-Share-of-Travel-in-Massachusetts-by-Bicycling--Transit-and-Walking-.aspx>.

Chapter 2 What is Long-Distance Commuting?

2.1 MOTIVATIONS FOR LONG-DISTANCE COMMUTING

Super- or long-distance commuting has been the subject of intermittent attention from academics and planners for the last several decades. Analysts have advanced a number of hypotheses as to the reasons that people choose or are forced into such a pattern, including:

2.1.1 Dynamics of two-career households

The desire to find ways to preserve and balance two careers is a consistent theme in the research on long-distance commuting; it was identified as early as 1974 in an MIT thesis.¹⁷ Sandow and Westin (2010, pp. 435-436) summarize research on this theme from a European perspective:

The diminishing importance and magnitude of work-related migration and the increase in longer commutes may be a sign of a transition from an industrial to a post-industrial mobility pattern. Dual-income households are more frequent, and the decision to commute is seldom a decision made by one of the income earners, but rather a joint decision (Plaut, 2006). The rise of dual-income households in addition to the regionalisation and specialisation of labour markets increases the complexity of the geography of home and working life. Combining family, work and residence is therefore more complicated in post-industrial societies...Green's (1997) study on location and mobility strategies in Great Britain showed that "dual-career" households chose residential locations so as to minimize the need for job-related migration. For many, preferred residential locations are accessible, semi-rural areas and long-distance commuting is viewed as a price worth paying. Long-distance commuting may also reflect a suitable residential solution to accommodate both employment careers. As the labour market becomes more diversified and the number of dual-career households increases, it becomes increasingly difficult for both partners to find employment in the same geographical area. An alternative for family migration may then be a lengthening of both commuting distance and time for one or both partners. Long-distance commuting can therefore be an alternative to the conventional solution where one partner sacrifices the career for the other (the "tied stayer"). (Green, 1997, 2004; Haskey, 2005).

¹⁷ Ngai 1974.

In a series of interviews, another research team found that extreme commuting is a “geographical compromise” that “allows couples to reconcile two careers that would be difficult to relocate. This is especially true for highly-educated individuals in our study for whom job opportunities are rare and unequally distributed within a given region.”¹⁸

2.1.2 Affordability concerns

As city centers and suburbs in popular regions become increasingly expensive, commuters on a budget can be pushed to the periphery or to smaller cities at a great remove from their jobs. In a local example, some media¹⁹ have speculated that displaced commuters from the Boston region are responsible for increasingly tight housing markets in the Worcester and Springfield metropolitan areas.

2.1.3 Rootedness or attachment to a particular place or community

When job markets are tight, or one or more partners in a household is in a specialized career, good jobs can be extremely valuable, and households may make the tough decision that a long commute is worth the ability to stay in a community, place, or home they value. In Sweden, most people who commute long distances do so for a significant number of years, indicating that “For some people, long-distance commuting can be a strategy to maintain social security and place-specific advantages accumulated over years that would be lost if they moved. Furthermore, many households have children of school age, which increases their place attachment.”²⁰ In their interviews with long-distance commuters, Vincent-Geslin and Ravalet found that,

Among anchors, the attachment to one's place of residence was found to be of great importance to long-distance commuters. This attachment may take several forms which are not mutually exclusive...For example, an attachment to aesthetic aspects, as extreme commuters strongly emphasize the emotional/qualitative dimensions (related to the home itself and its surroundings) of their residential location....Extreme commuters also become attached to their place of residence because of the activities they engage in there [some of which are not transferable]...attachment is also social: commuters are strongly attached to social/family networks close to their place of residence. These networks are key factors in the decision to stay in a particular location, especially in cases where the individual was born in the location.²¹

¹⁸ Vincent-Geslin and Ravalet 2016, p. 245.

¹⁹ See Fuhr 2017.

²⁰ Sandow and Westin 2010, p. 442.

²¹ Vincent-Geslin and Ravalet 2016, pp. 244-245.

2.1.4 Flexible work and scheduling

As one paper based on qualitative research and interviews puts it, “the nature of the work itself may facilitate the decision to become a long-duration commuter. Flexible working hours, telecommuting and the possibility of working on the move tend to favour individuals' propensity to accept commuting and willingness to organize their daily lives accordingly.”²² Massachusetts Travel Survey (MTS) 2011 (MTS-2011) data indicates that 34.8 percent of long-distance commuters into Boston said their employer gave them a telework option, well above the statewide average (26 percent in the MPO region and Martha's Vineyard, 29.5 percent on Nantucket), and well below that elsewhere.

2.2 CHARACTERISTICS OF SUPER-COMMUTERS

From the literature on super- or long-distance commuting, along with local survey data, we may posit a number of demographic and characteristic conclusions about long-distance commuters. They tend to have higher-than-average education levels, with middle-to-high incomes; they generally are male, and younger than the average worker. Finally, it may be said that in electing to commute long distance commute, they are making a “strategic mobility choice,” may commute only part of the time, and prefer commuting via public transit. We discuss these characteristics below.

2.1.2 Highly educated

American data on education levels tends to be poor, but European results indicate that long-distance commuters lean toward having higher-than-average levels of education. Sandow and Westin (2010, p. 437.) Vincent-Geslin and Ravalet acknowledge that, “The knowledge workers overrepresented in our sample have more flexibility in their schedule and possibilities of teleworking that create better conditions to extreme commuting.”²³ CTPS's analysis of Northern New England Passenger Rail Authority survey data (see Appendix B) from travelers who said they commute or make business trips on the *Downeaster* shows that 36 percent report holding a college degree and 43.5 percent have a graduate degree as their highest educational attainment. Staff analysis of the 2011 Massachusetts Travel Survey (MTS-2011) revealed that of workers who commute more than 25 miles and work in Boston, Cambridge, or Brookline, 36.4 percent hold a college degree and 37.6 percent have a graduate degree. The two survey-based data sources are in remarkable agreement that Boston-area long-distance commuters are more educated than the American populace at large; to compare, the Census Bureau reports that approximately 32.5 percent of the American population at large holds a college degree or higher.²⁴

²² Vincent-Geslin and Ravalet 2016, p. 244.

²³ Vincent-Geslin and Ravalet 2016, p. 246.

²⁴ <https://www.census.gov/content/dam/Census/library/publications/2016/demo/p20-578.pdf>.

2.1.3 Middle-to-high incomes

An operative assumption of much research into long-distance commuting is that “income has a positive and rather strong effect on the duration of long-distance commuting. A higher income makes the effort of long-distance commuting more attractive.”²⁵ Meanwhile, Moss and Qing (2012, p. 7) suggest that “while super-commuters are increasingly high-income in absolute terms, they have increasingly middle-class incomes when compared to the rest of the workforce. Thus, the super-commuting population should not be perceived as elite business travelers, but rather more representative of middle-income individuals who may opt for more affordable housing and transportation, such as driving or intercity buses.” Long-distance commuters may not be exclusively of high income—indeed, many are making affordability tradeoffs—but in general, they probably are not in the lowest economic stratum of American society. Indeed, this is a key difference between *long-distance* commuters and Census-defined super-commuters; as the latter concept is defined by time rather than distance, it tends to capture poor transit commuters forced into long commutes over a shorter distance.

The general association of long commutes with higher incomes is born out in the available survey data. Staff analysis of MTS-2011 data reveals that the incomes of long-distance commuters into the Boston core break down as shown in Table 4 below.

Table 4
Income of Long-Distance Commuters into the Boston Core, in MTS-2011

Income	Percentage of Commuters
Less than \$15,000	0%
\$15,000–\$24,999	1.7%
\$25,000–\$34,999	0.6%
\$35,000–\$49,999	3.5%
\$50,000–\$74,999	10.4%
\$75,000–\$99,999	19.3%
\$100,000–\$149,999	34.6%
Did not know or respond	23.3%

MTS = Massachusetts Travel Survey.

Although the *Downeaster* survey data asks about a slightly different income range, CTPS analysis of commute and business travelers reveals a similar income distribution, as seen in Table 5 below.

²⁵ Sandow and Westin 2010, p. 439.

Table 5
Income of *Downeaster* Passengers Identified as
Commuters or Business Travelers

Income	Percentage
Less than \$25,000	3.61%
\$25,000–\$49,999	7.67%
\$50,000–\$99,999	28.67%
\$100,000–\$124,999	17.16%
\$125,000 or more	42.89%

While incomes skew toward the higher end on the *Downeaster*, they show a broader range on regional bus services where passengers were surveyed as part of CTPS's 2013 Regional Bus Study.²⁶

2.1.4 Primarily male

Rapino and Fields (2012) find that almost 80 percent of U.S. mega-commuters are men. Locally, CTPS analysis of data from the MTS-2011²⁷ indicates that of commuters into the Boston-Cambridge-Brookline core with trips of 25 or more miles, 60.2 percent identified as male. Sandow and Westin cite several studies that reinforce this conclusion. From their own data, they conclude that 69 percent of Swedish long-distance commuters are men and that “while women receive greater economic benefits from long-distance commuting than men, they still maintain a lower average income.”²⁸ In addition, “there is a clear gender effect in commuting, as women lose more when their spouse is a long-distance commuter than vice versa. This may imply that gender imbalances are reinforced in households where the man is a long-distance commuter.”²⁹ In other words, in households where a male partner engages in a long commuter, an even more disproportionate than usual share of household responsibilities may fall on a female partner. Of travelers making commute or business trips on the *Downeaster* 52.8 percent identified as men on surveys, while 47.2 percent identified as women, despite the train's ridership overall being majority female.³⁰

2.1.5 Younger than average

Moss and Qing (2012, p. 6) concluded that, “In general, the super-commuter is younger than the average worker. In fact, in all ten major central commuting counties, the proportion of workers younger than 29 years old among super-

²⁶ CTPS 2013, pp. 165-166.

²⁷ With the limitation that the survey only covered travelers whose place of residence is in Massachusetts.

²⁸ Sandow and Westin 2010, p. 439.

²⁹ Sandow and Westin 2010, p. 442.

³⁰ CTPS analysis of survey data provided by Northern New England Passenger Rail Authority.

commuters was higher than the share of under-29s of the entire workforce, indicating that a super-commuter is more likely to be less than 29 years old than the average worker.”

2.1.6 A “strategic mobility choice”

Sandow and Westin use the appealing phrase “strategic mobility choice” to describe the dynamic observed in their research, and that theme appears to run through other literature on long-distance commutes as well. Vincent-Geslin and Ravalet (2016) label extreme commuting a “constrained choice,” explaining that “extreme commuting appears to be a strategy for mediating between occupational and private life because it mainly results from complex, often collective, trade-offs in the household.”³¹ In a recent commentary, Joe Cortright, of the website City Observatory, argues that “In the end, the super-commuting story tells us more about housing and personal preferences than it does about transportation and public policy.”³²

2.1.7 May commute only part-time

Moss and Qing (2012, p. 6) hypothesize one key characteristic of long-distance commuting in their study of super-commuting to New York City:

Because OnTheMap does not identify the travel patterns of individuals in the non-local labor shed, this study cannot ascertain whether all of these individuals can be considered “super-commuters” in the truest sense, since the study interpreted an actual super-commute as an occasional (clarify in parenthesis) long-distance trip, such as once or twice per week, made for work purposes by a variety of intercity travel modes. These figures and trends on “super-commuting” should be interpreted as *potential* or *likely* super-commuters, since the data only reflects residential location. What these figures do represent for certain is the expansion of city labor sheds (where workers live) beyond the exurbs of the metropolitan region, spilling into other regions that are hundreds of miles away.

If accurate, this conclusion—which is harmonious with the research literature in both North American and Europe—helps to explain the CTPP-versus-LODES statistical discrepancies seen both in Table 3 and in the larger table in Appendix A, and has important implications for the transportation-planning process.

Because American Community Survey (ACS) is survey-based, reaching only a small percentage of employed people, and asks interviewees only where they *last* worked, not where their *regular* place of employment is, it may fail to capture people who visit offices on a less-than-daily schedule. On the other hand—because it is based on

³¹ Vincent-Geslin and Ravalet 2016, p. 240.

³² <http://cityobservatory.org/pity-the-poor-super-commuter/>.

“administrative data,” anonymized government records of where offices are located and where employees live—LODES may swing too far in the other direction, assigning workers who rarely visit a home office to the location of the home office. However, the tension between them may help illuminate the dynamic of part-time commuting; perhaps LODES captures a broader spectrum of people who commute *sometimes*, while CTPP data captures a more realistic view of how many people commute *on any given day*. If so, the observed effect where CTPP estimates for commuters into Boston are much lower than those of LODES would seem to strongly support the Moss and Qing hypothesis about part time long-distance commuters.

We observed above that, generally speaking, the CTPP-to-LODES ratio falls in each county as distance from Boston increases. The hypothesis of the above paragraph would translate that into an observation that the closer to Boston a given county lies, the more frequently a part-time commuter will commute. A possible corollary to the idea that distance in part determines how frequently commutes occur is the idea that frequency of commuting³³ falls as commuting *options* decline. Southern New Hampshire, where the ratios are relatively high, has frequent commuter bus service to Boston, park-and-ride access to MBTA commuter rail, and (in Rockingham County) the Amtrak *Downeaster*. Cape Cod also has frequent bus service, and the seasonal, weekends-only *Cape Flyer*. The Pioneer Valley and Berkshires have only infrequent and slow intercity bus service to Boston.³⁴ Indeed, a day trip from Pittsfield to Boston on the bus is literally impossible according to MassDOT’s 2016 Regional Network Assessment, and thus commuters from there to Boston—who the research literature indicates would generally prefer to commute by transit—likely would be forced to use cars for much or all of their trip.

The implication of this analysis is that *commuting is a spectrum*, especially at the outer limits of geographic range, and many long-distance commuters are particularly inclined to commute only on a part-time basis. Some empirical data available to analysts backs this up: According to the MTS, 26.1 percent of workers in the Boston Region MPO area report being allowed to telework occasionally, which is the third-highest total in the Commonwealth behind only Nantucket and Martha’s Vineyard. This is a strong indication that Boston employers often grant flexibility to workers.³⁵ Staff analysis of rider survey data provided by Northern New England Passenger Rail Authority (NNEPRA) indicates that riders identifying as commuters or business travelers report making the relevant trip on average 134 times per year, or 2.58 times per week.³⁶

³³ As measured through CTPP-to-LODES ratio.

³⁴ Amtrak’s once-a-day *Lake Shore Limited* is not a reliable commute option.

³⁵ MassDOT 2012, Appendix A.

³⁶ When a single outlier reporting making the trip an implausible 2500 times per year is stripped out, this average falls to 124 days per year, or 2.38 days per week. However, a large number of respondents also answered that they make the trip zero times in an average year, which is

2.1.8 Prefer commuting by public transit

While mode choice for long-distance commuters, as for all travelers, is constrained by the options available, research has found that,

Extreme commuters tend to prefer public transportation because it allows them to do other things—such as working—during the commute, although it generally increases daily travel time. Reinvesting travel time in this way enables commuters to reconcile their private and occupational lives. Travel time tolerance, modal preferences and travel time uses, may encourage some individuals to put an extreme commuting idea into practice, and perhaps pursue it for a long time.³⁷

Despite the potential travel-time tradeoff, the existence of robust, reliable public transit options allows long-distance commuters to pursue an unusual pattern with a greater level of confidence and efficiency. Transit enjoyed a 35.2 percent mode share for long-distance commutes into the Boston-area core in MTS-2011, which is well higher than the statewide average. Presumably, that percentage would be even higher if greater geographic discretion relative to place of work were possible in the data. Indeed, the same anecdotal evidence that suggests employers would be less inclined to hire an applicant who makes a long commute also suggests that they would be more inclined to consider that applicant if the applicant were to travel by transit rather than driving.³⁸ In a recent CTPS survey, “Many riders on commuter-oriented regional buses listed ‘other public transportation’ as their first option” if they were unable to use their buses.³⁹ While the preference for commuting by transit is not absolute, it appears to be strong from the limited data available.

In addition to matching commuters’ own preferences and those of their employers, shifting these trips to transit can have important consequences for the region. The importance of creating new options for long-distance commuters is emphasized by the results of model runs conducted for the *Charting Progress to 2040 Needs Assessment*, which estimated that highway trips from non-MPO municipalities to the central area would increase by 16 percent, or 8,000, by 2040—and similar transit trips would increase not at all.⁴⁰ Certainly, those 8,000 trips per day are relatively inconsequential compared to the overall number of trips entering the central area, but any shift of these trips to transit is a potential positive for both the region and the long-distance commuters, with implications for increased safety, better air quality, and less congestion.

improbable considering that they were making the trip while filling out the survey. More data collection might be required.

³⁷ Vincent-Geslin and Ravalet 2016, p. 246.

³⁸ <http://www.askamanager.org/2015/06/why-should-employers-care-about-my-long-commute.html>.

³⁹ CTPS 2012, p. 92.

⁴⁰ CTPS 2015, pp. 3-6, 3-7.

Chapter 3 Long-Distance Commuting and MPO Governance

Super- or long-distance commuting poses a challenge to MPOs in that the trips involved generally have an origin or destination outside of the MPO's boundaries. Indeed, many trips may traverse two or more MPOs. Although the overall volume is small—ACS-driven estimates tend to cluster around 2 percent of all commutes—long-distance commute trips tend to fall into cracks in the transportation-planning process. Transit agencies have strict geographic borders and entities like Amtrak or bus companies that provide intercity transportation do not always fully grasp the dynamics of the commute market. This challenge may, in fact, be accelerating. Moss and Qing argue that economic geographies and relationships between cities, suburbs, and other metropolitan areas are rapidly changing:

As labor sheds expand and commuting patterns become increasingly interregional...the applicability of commuting patterns to define metropolitan geographies is less relevant today than a decade ago. Given these advances in telecommunications, the degree of “social and economic integration” between regional urban centers has increased dramatically over the past decade... This expansion of city labor sheds exemplifies how the economic geography of American cities has evolved in the information age, as cities begin to share labor/commuter sheds and social and economic activities become increasingly inter-regional.⁴¹

In other words, labor markets have moved beyond a city/suburb or even a regional model. Moss and Qing write that “Future planning decisions should consider metropolitan regions’ growth due to the increase of super-commuting and resultant inter-connectedness; while ‘twin cities’ of the past typically sat 40 miles apart, the new ‘twin cities’ stretch 100-200 miles away from one another, with ever-growing inter-commutes.”⁴²

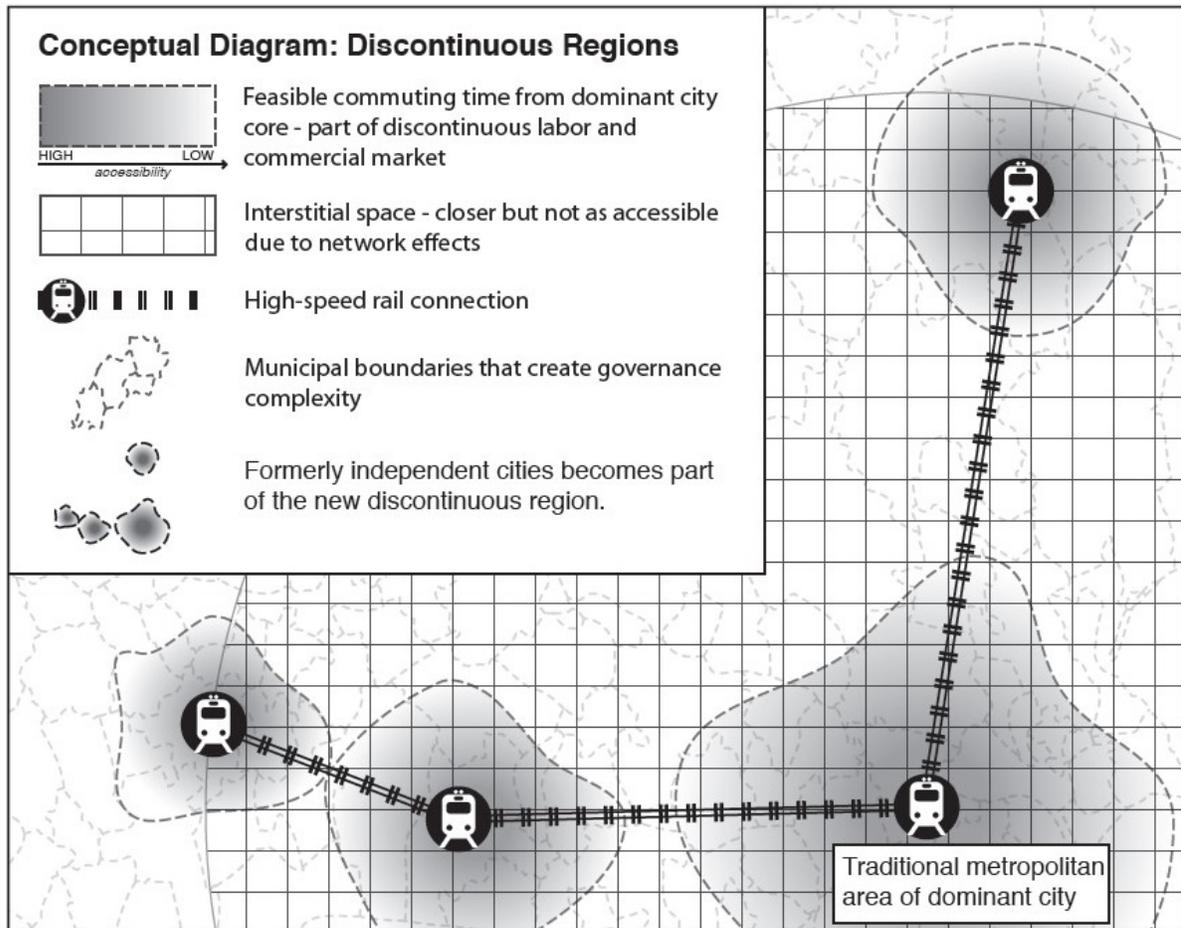
Although Moss and Qing may overstate their case as to the overall importance of super-commuting, it is true—as the next section of this report lays out—that Boston’s labor market has expanded beyond the suburbs and traditional collar cities (Worcester, Brockton, Lowell, Haverhill, and so forth) to reach deep into other states of New England. Planning must now begin to consider commuters who reach Boston from Springfield, Providence, Hartford, Manchester, and Portland, Maine—the longer-distance city pairs that Moss and Qing emphasize.

⁴¹ Moss and Qing 2012, pp. 7-8.

⁴² Moss and Qing 2012, p. 2.

In other areas, the accelerating trend of city-to-city commuting is sparking concern about new governance structures that may need to evolve. In Europe, where high-speed rail networks are a feature of life, city-to-city commuting has become not just a possibility, but rather commonplace; the high velocity of travel allows time budgets to remain constant even as distance expands.⁴³ Cities are thus more strongly linked than are the hinterlands in between, a phenomenon some have called “discontinuous regions.”⁴⁴ This concept is similar to, but not exactly the same as, the idea of “mega-regions” such as the BosWash corridor that has become popular in the United States, distinguished primarily by the idea that the linked nodes are highly concentrated rather than diffuse.

Figure 3
Model of a Discontinuous Region



Source: Stein and Sussman 2012.

⁴³ Stein 2013.

⁴⁴ Stein and Sussman 2012, p. 6.

Interestingly, the Moss and Qing report on super-commuting—as well as the Census data presented below—suggests that this creation of discontinuous regions where urban cores are linked to each other is in some form already happening in the Northeast United States, despite the *lack* of a modern high-speed rail system. This creates a challenge to the existing systems of governance in transportation and other fields, which tend to focus on each individual metropolitan area. The implications for MPOs are obvious—the future might involve transportation policy in Boston being made in collaboratively with Springfield as much as Boston’s own suburbs. Should this future pan out, the collaborative work required may go well beyond the recent federal proposition to require coordinated plans and documents between MPOs within the same urbanized area (UZA). Planning *across multiple UZAs* could present another challenge entirely.

Interestingly, in Portugal—where an high-speed rail network is planned but has not yet become reality—the mere promise of such core-to-core connections is already having an interesting effect on governance structures:

The expected changes in accessibility (and therefore in the competitive landscape) within Portugal may actually motivate cooperation between municipalities. The threat of losing out to Lisbon is beginning to alter expected outcomes of municipal collaboration within the central region of Portugal. In the same way that at the national level Lisbon is seeking to network with its surrounding cities and so become more competitive at an international scale, Leiria and particularly Coimbra are interested in networking at the more regional scale so as to not lose out within the national (and to a more limited degree, international) arena.⁴⁵

In other words, it seems plausible that in the future, more and more people will be commuting long-distance between urban cores. At the very least, as discussed above, the proportion of people making such trips has not fallen as the overall Boston employment market has grown, and is increasing in absolute terms. And while the percentages of long-distance commuters likely are small at present, the trend may be growing and could potentially have significant implications not just for those travelers and what planners can do to serve them, but quite possibly for the transportation-planning process as a whole.

Massachusetts elected officials are fond of noting the existing economic and social ties between Boston and Central and Western Massachusetts. Indeed, the data presented here illustrate some of those connections. Both data and literature reviews indicate that there is likely a small but existent corps of workers who commute between the different parts of the state, and across MPO and other

⁴⁵ Stein and Sussman 2012, pp. 6-7

jurisdictional boundaries. While recent initiatives to coordinate MPO work have come from the federal level, perhaps the more natural impetus for planning and transportation agencies to work together to serve these trips would come at the state level, both promoting stronger intra-Massachusetts links and easing existing trips. As such, this report makes understanding the implications of long commutes for transportation planning and governance a core goal.

Chapter 4 Possible Future Actions

To this point, this analysis has concluded that there is a proportionally small but existent segment of people—perhaps around 50,000 each day, but a larger overall total, since many commute part-time—commuting into the Boston urban core from long distances. As summarized earlier, other research indicates that many or most long-distance commuters are making a conscious choice to maintain their current pattern. Such choices may be “constrained,”⁴⁶ or suboptimal, but they often represent an attempt to make the best out of a complicated, rapidly evolving economy. As such, the public appears to believe that long-distance or mega-commuting likely would not decline, and indeed may even increase, if current geographic and technological trends hold. The portrait of long-distance commuting that emerges in this report does not bear out the most dramatic mass media portrayals, but its recommendations represent the basis for dealing both with mega-commuting as it exists and as it might exist in the future, should it grow to the extent that some stakeholders fear.

This report has derived three goals that the Boston Region MPO and other bodies can attempt to meet in planning for and accommodating the long-distance commute market; and which shape the practical recommendations for future actions cited below. These goals align with MassDOT’s overall mode shift goal and the MPO’s goals as stated in its long-range transportation plan of safety, transportation equity, and economic vitality (among others), which are:

- 1) Continue to develop understanding of the long-distance commute
- 2) Cooperative MPO governance
- 3) Mode shift

While research indicates that in extreme scenarios massive investments such as those made in China and planned in Portugal can fully transform commute patterns, “distance-warping” technologies such as high-speed rail do not currently exist in Massachusetts.⁴⁷ So, these recommendations focus on reliability and travel time improvements at a more modest level of investment.

⁴⁶ Marion and Horner 2013.

⁴⁷ With the possible exception of the Boston-to-Providence connection.

Table 6
Potential Actions and Entities in Response to Long-Distance Commuting

Action	Potentially Responsible Entities	Goal Met
Collect better data	CTPS, MassDOT	1
Coordinate with non-contiguous MPOs	CTPS, other New England MPOs	2
Strengthen “intercity” rail	MassDOT, Amtrak, NNEPRA	3
Ease and coordinate intercity and commuter buses	MassDOT, City of Boston, private bus companies	3

CTPS = Central Transportation Planning Staff. MassDOT = Massachusetts Department of Transportation. MPOs = Metropolitan planning organizations. NNEPRA = Northern New England Passenger Rail Authority.

4.1 COLLECT BETTER DATA

It is apparent from this analysis that the quality of data available on super- or long-distance commuting is less than ideal. While it may be possible to glean some insights from the CTPP and LODES data, the conflicts between the two datasets present a significant challenge for analysis. In particular, the Census data appear to do a poor job of capturing the phenomenon of part-time commuting, while literature and anecdotal evidence (as well as the hypothesis this analysis advances to explain the discrepancies between the CTPP and LODES data) suggest that many people who choose long-distance commutes do so on a less-than-daily basis.

In addition, the choice to make a long or long-distance commute is a complex one, incorporating a variety of factors such as family situation, rootedness in place, and housing affordability. Research following a more qualitative approach, such as that employed by Vincent-Geslin and Ravalet (2016) may be useful to understand these choices and illuminate some of the gaps in the Census’s quantitative journey-to-work data.

One potential approach to collecting such data would be to interview passengers on board the vehicles that likely would carry long-distance commuters. Such an approach has been employed on the *Downeaster* trains to Portland and Brunswick, Maine by NNEPRA (see Appendix B). Other potential targets for such data collection could be commuter buses, including those from Cape Cod, the South Shore, the Merrimack Valley, and southern NH; intercity buses, especially those from New Hampshire and Western Massachusetts; and Amtrak Northeast Corridor trains serving Providence and beyond. CTPS collected some survey data from regional bus commuters for its Massachusetts Regional Bus Study published in 2013; and future analysis could draw upon that data and on contacts with the bus companies made during its collection. Collecting qualitative data on long-distance automobile commuters may be more challenging and complex.

Another potentially fruitful avenue for study could be the extent to which transit options, employment opportunities, and household dynamics interact differently in generating long-distance commutes in different directional vectors from Boston. Different geographic regions may generate different types of commuters, or different proportions of people willing to make long treks, depending on numerous factors. Section 4.5, RECOMMENDATIONS CASE STUDY: WESTERN MASSACHUSETTS briefly explores one such vector.

4.2 CONSIDER OPPORTUNITIES TO COORDINATE PLANNING AND ACTIONS WITH NON-CONTIGUOUS MPOS

The growth of long-distance commuting, the expansion of major metropolitan areas, and phenomena such as the concept of “discontinuous regions” have profound implications for MPOs. MPOs typically have relationships with neighboring MPOs and agreements on various arrangements; an Obama-era federal proposal would have mandated joint planning to a greater extent within one metropolitan area, but was rolled back by Congress and the new administration this past spring.⁴⁸ Voluntary relationships, however, still remain possible.

If we accept the hypothesis explored here that there is a significant, although still indeterminate body of Boston-bound people commuting with some regularity from places like the Pioneer Valley, the Berkshires, Hartford, and southern New Hampshire—in other words, that the Boston workshed has expanded across much of New England—it seems to follow that the Boston Region MPO would consider joint planning with the immediately contiguous MPOs—not necessarily whose territory is geographically contiguous, but MPOs that generate regular Boston-bound trips. Building a relationship with these MPOs to jointly plan for regular commuting between them would follow the concept of “discontinuous regions” laid out in Stein and Sussman (2012) and explained briefly above. While some such trips may be adequately planned for at the state level, especially those falling entirely within Massachusetts, others may fall into cracks as they cross state or other jurisdictional boundaries. Working together with other MPOs, the Boston Region MPO can attempt to fill some of those gaps.

4.3 EXPLORE IMPROVED INTERCITY RAIL SERVICE

Improved intercity rail service into Boston has been the subject of numerous studies over the years.⁴⁹ Currently, in addition to MBTA Commuter Rail service connecting North and South Station to Boston’s collar cities, Amtrak’s Northeast Corridor

⁴⁸ <https://news.transportation.org/Pages/051917mpo.aspx>.

⁴⁹ See for example the NH Capitol Corridor <http://www.nhrta.org/nh-rail-projects/nh-capitol-corridor/> and Northern New England Intercity Rail Initiative <http://www.massdot.state.ma.us/northernnewenglandrail/Home.aspx>.

provides service to Providence, Connecticut, New York City, and points south; the *Downeaster* serves a slice of New Hampshire and Portland, Freeport, and Brunswick, Maine; and a single daily trip on the *Lake Shore Limited* traverses the length of the state, serving Worcester, Springfield, and Pittsfield. Roughly speaking, reliable rail service into Boston from beyond the limits of the MBTA commuter rail system exists in the “vectors” to Boston’s south and northeast, but not to the northwest or west; the last in particular represents a glaring gap. The radar chart in Figure 1 reminds us that, in fact, that vector generates the most long-distance trips into Boston.

To a certain extent, the question of improving rail service that can serve long-distance commutes might fall into the MPO’s area of interest because it does not fit neatly into the traditional paradigms that other entities envision for themselves. The concept of long-distance commuting, whether part- or full-time, exists on a continuum that, as Allen (2001) notes, appears adequately served by neither the “commuter rail” nor the “intercity rail” models. As such, neither commuter nor intercity operators seem inclined to optimize their planning, marketing, or scheduling around the existence of such commuters. It may be worth studying the extent to which MPOs or other entities can assist in the flow of information and awareness to plug some of those gaps. Public planning agencies can, perhaps, push operators to implement experimental schedules or frequencies that serve commute patterns especially well, or coordinate services in a way that gives a level of comfort, ease, and redundancy.

Conventional infrastructure can, of course, have major effects on long-distance commuting. As noted above, in international experience the existence of “distance-warping” high-speed rail has enabled core-to-core commutes between metropolitan areas. Improved rail service for long-distance commuters, however, is not solely a matter of capital-intensive investment strategies such as high-speed rail. Since its beginnings in the early 2000s, the *Downeaster* has served a number of both full- and part-time commuters, as indicated by consistent media coverage of those long trips.⁵⁰ The Northern New England Intercity Rail Initiative (NNEIRI) and New Hampshire Capitol Corridor studies have proposed less capital-intensive options along the lines of what Amtrak refers to as “corridor” services (very similar to the existing *Downeaster*) in the Boston-Springfield and Boston-Concord corridors, respectively. Interestingly, a Massachusetts Institute of Technology paper found that even the *promise* of improved rail service in the future influenced long-distance commuting patterns between urban cores in Portugal. People started making such commutes—between city pairs that strongly resemble Boston’s relationship with

⁵⁰ 2003: <http://www.seacoastonline.com/article/20031214/NEWS/312149954>. 2008: http://archive.boston.com/news/local/massachusetts/articles/2008/12/21/down_in_the_dumps_on_the_downeaster/.

smaller New England centers such as Springfield and Manchester—even though the promised high-speed rail system has not yet been built, relying on part-time commuting and slower services in the meantime.⁵¹

The NNEIRI plan recommends as many as 10 round-trips per day between Boston and Springfield. In this example corridor, however, a lower-cost initial alternative exists: extension of MBTA's new Heart to Hub Worcester-Boston express—and possibly other underutilized commuter rail trains—to Springfield or even beyond.⁵² Currently, the inbound Heart to Hub (train 552) leaves Worcester at 8:00 AM, arriving in Boston an hour later. Using the *Lake Shore Limited's* current travel time between Springfield and Worcester and assuming no additional speed improvements, to keep to that schedule, a train starting in Springfield would need to leave at roughly 6:45 AM—an early but eminently reasonable time to start a commute. The outbound schedule would not reach Springfield until 10:00 PM, a possible reason for concern. However, the possibility of extending the Heart to Hub schedule represents a relatively lightweight, experimental way of both easing commutes and collecting data on demand for long-distance commuting (as well as non-commute travel) between Boston and the Pioneer Valley. As such, it should arguably be of interest to both the Boston Region MPO and the Pioneer Valley Planning Commission. Given that little to no capital funding is needed for implementation, the MPOs might examine whether they can allocate funding toward operational costs for such an experiment.

Extending the Heart to Hub service and examining future service options between Boston and the Pioneer Valley is just one of numerous possibilities in and around the Boston Region that illustrate the type of low-cost intervention across geographic boundaries and bureaucratic siloes that may serve long-distance commuters well. There are numerous other possible research and funding topics of potential interest to the MPO, such as adjusting parking policies at outlying MBTA commuter rail stations to allow overnight parking for long-distance commuters; coordinating connecting transit schedules with commuter rail; and exploring the possibility of an extended bus network connecting to intercity and commuter rail services, as exists in California. This section, however, is more illustrative than specific. The point is that there exists a significant opportunity for understanding travel patterns and demand, and responding to them, that appears to fall through the cracks of some existing organizations. It is, arguably, precisely this kind of challenge that MPOs were designed to meet.

⁵¹ Stein and Sussman 2012.

⁵² For an analysis of a somewhat more ambitious schedule along these lines, see <http://amateurplanner.blogspot.com/2016/08/one-of-many-issues-with-allston-project.html>.

4.4 EASE AND SIMPLIFY BUS COMMUTES

While the possibility of rail service has attracted considerable political and media attention, a large number of commuters—especially those coming from long distances—today reach Boston on intercity and commuter buses operated by carriers both public and private. Though operating somewhat out of the public and media eye, the system of buses bringing commuters into Boston has been the subject of several studies. CTPS documented the reach and Boston-area infrastructure of these services in its 2013 Massachusetts Regional Bus Study,⁵³ while a contractor produced a report in 2016 for MassDOT entitled “Regional Bus Network Assessment.”⁵⁴ Together, these studies give a fairly comprehensive look into the commuter and regional bus network, a key piece of the infrastructure that connects Boston to outlying cities and regions.

Although the overall regional bus network has shrunk since the 1980s, with route abandonments primarily concentrated on those routes that do not use expressways or limited-access highways,⁵⁵ the overall system remains robust, although uncoordinated. A variety of private and public operators send commuter buses into Boston, with robust service from locales such as southern New Hampshire, the Merrimack Valley, and Cape Cod. Intercity buses—operated by private providers, although some routes receive subsidies from MassDOT—stretch further into New Hampshire, Maine, and Western Massachusetts, and operate intensively in the Boston-New York City market. Of course, as this report argues, the distinction between “commuter” and “intercity” buses is not as stark as the branding might imply. And it is likely that the bus system is to be a long-term fixture for travel into Boston, even if other options such as fast rail come online. The NYC-Boston bus market remains robust even since Amtrak’s modernization of service on its Northeast Corridor north of New Haven; and the Boston-Maine bus market has seen continued strength despite the introduction of the *Downeaster*.⁵⁶ It is possible that the rail and bus trips serve different segments of the market; this is another area in which the necessity of developing better data is apparent. Strengthening the bus system, then—perhaps seeking to organize it into a coordinated *network*—making it easier to understand, and easing the travel of buses along regional roadways, should be a priority for serving the needs of commuters from both long and short distances.

⁵³ http://www.ctps.org/2013_mass_bus_study.

⁵⁴ (MassDOT/KFH Group, 2016); see also <http://www.massdot.state.ma.us/transit/RegionalBusNetworkBuildout.aspx>.

⁵⁵ CTPS 2013, Ch.2.

⁵⁶ CTPS 2013, p. 50.

In addition to needing to develop better data, there are a number of physical and operational improvements to the regional bus system that might speed the trips of long-distance commuters and interest the MPO. Some of these might include the following:

4.4.1 Downtown Boston bus stop improvements

One of the barriers to greater use of the regional bus network appears to be its lack of “legibility,” or ease of comprehension. Buses are operated by a bewildering variety of companies. The South Station bus terminal is near or at capacity at peak hours,⁵⁷ while on-street bus stops often lack any kind of signage at all indicating that a commuter or intercity bus stops there, much less any kind of accommodations—a situation that may be observed today on Charles Street, in front of the State Transportation building, where Merrimack Valley Regional Transit Authority commuter buses stop at an MBTA stop without any signage indicating that they do.⁵⁸ Often, commuter or intercity buses compete with MBTA buses for space at stops, delaying one or both.⁵⁹ As no single entity is responsible for coordinating service, signage, or other amenities, it is possible that the MPO could take a leadership role in identifying these needs (as indeed the 2013 study began to do) and coordinating a response to them. Regional bus commuters—whether they ride “commuter” or “intercity” buses, or commute every day or only part time—are a population whose travels in many ways fall through the cracks, and the MPO has a chance to take on the challenge of meeting their needs.

4.4.2 (Re) consider preferential or exclusive lanes

Numerous metropolitan areas around the U.S. have implemented exclusive lanes for high-capacity vehicles of one sort or another on highways and freeways. Examples include the exclusive bus lane in New York’s Lincoln Tunnel, Pace’s growing bus-on-shoulder program in suburban Chicago, and extensive bus-on-shoulder networks in Minnesota⁶⁰ and Washington State.⁶¹ Numerous jurisdictions have implemented high-occupancy vehicle (HOV) lanes that also allow transit vehicles. Here in New England, Connecticut maintains HOV lanes in several places and has plans to extend CTfastrak BRT service along the HOV lanes on I-84 east of Hartford. MassDOT maintains a reversible “zipper” HOV lane on I-93 south of Boston and an inbound HOV lane on I-93 South near Somerville. Buses benefit from these lanes, but their impact is limited, as the distance they cover is not comprehensive, and they do not reach some of the region’s most congested areas.

⁵⁷CTPS 2013, Ch. 4.

⁵⁸ CTPS 2013, p. 111.

⁵⁹ Personal observation.

⁶⁰ <https://streets.mn/2014/04/03/chart-of-the-day-bus-only-shoulders/>.

⁶¹ <https://www.wsdot.wa.gov/congestion/bus-shoulder-lanes>.

CTPS has previously studied the potential for a more extensive system of HOV lanes—or, as the studies have termed them, “preferential” lanes—in the Boston region. A 2012 memorandum⁶² examined numerous locations across the region and identified several for possible future study. The 2014 follow-up study introduced a conceptual plan for a preferential lane on I-93 north of Boston.⁶³ Other areas identified in the 2012 memo include a section of I-95/MA-128 in Waltham and sections of I-93 south of Waltham.

We suggest **revisiting these conclusions** in light of awareness of the number of long-distance commuters into Boston that on bus service, and the growing congestion issues on the region’s freeway network. The 2012 memorandum assumed that *existing* general-purpose lanes could not be converted to preferential/HOV status, as “preferential lane eligibility rules would result in fewer vehicles in the preferential lane than in the general-purpose lanes, the result would be a reduction in total expressway capacity.”⁶⁴ However, in recent years there has been a strong trend within transportation planning—driven by organizations such as National Association of City Transportation Officials (NACTO)⁶⁵ and Transportation for America⁶⁶ to **consider capacity in terms of people moved per hour, and not vehicles moved per hour**. Analyzed under that metric, a preferential lane may well improve overall expressway capacity, since each bus can hold many times the typical number of people that can occupy a personal automobile. The Federal Highway Administration’s new National Highway Performance Program⁶⁷ guidance for state departments of transportation and MPOs, issued in its final form in spring 2017, redefines peak hour excessive delay from counting vehicle-hours of delay to counting person-hours, a major shift that recognizes the higher occupancy of transit vehicles and carpools, and supports the greater carrying capacity of an HOV/preferential lane. When studying the wider implementation of HOV or preferential lanes across the region, **using the goal of maximizing person (rather than vehicle) throughput** would speed the trips of numerous long-distance commuters as well as enhance overall transportation system capacity—and bring the MPO in closer alignment with these federally recommended best practices.

⁶² “Memorandum: Screening Regional Express Highways for Possible Preferential Lane Implementation,” CTPS, 2012,

http://www.ctps.org/data/pdf/studies/other/screen_for_preferential_lane.pdf.

⁶³ http://www.ctps.org/data/pdf/studies/highway/I93_Preferential_Lane.pdf.

⁶⁴ CTPS 2012, p. 6.

⁶⁵ <https://nacto.org/publication/transit-street-design-guide/introduction/why/designing-move-people/>.

⁶⁶ <http://t4america.org/2017/01/12/usdot-rewrites-congestion-rule-in-response-to-overwhelming-criticism/>.

⁶⁷ <https://www.gpo.gov/fdsys/pkg/FR-2017-01-18/pdf/2017-00681.pdf>.

4.4.3 Coordinating service between modes

While many of the opportunities for better coordinating regional bus service with rail service fall outside the geographic jurisdiction of the Boston Region MPO, encouraging efforts to create a fully connected regional *network* that crosses mode and operator boundaries could be a productive path forward for the MPO. Perhaps the most prominent opportunity for coordination is among intercity modes of travel. In other states, most notably California, Amtrak maintains a network of “Thruway”-branded buses that connect with trains to extend the service area. Thruway buses exist in New England as well, but perhaps there is an opportunity to expand the network in conjunction with a better understanding of travel and commute flows.

Coordinating regional bus services with MBTA commuter rail may have value as well. There are numerous opportunities for such synchronization, but one avenue involves schedule coordination in public information if not in operation, as suggested on the Boston-Worcester corridor in a 2012 CTPS study whose theoretical combined schedule is presented in Figure 4 below. While neither commuter rail nor buses provide especially frequent service between Boston and Worcester, the *combined* schedule is much more frequent. If, theoretically, joint fares or passes covered both modes, riders would have more options at more times of day.

Figure 4
Suggested Combined Bus/Rail Worcester-Boston Schedule

<u>Origin of Bus Service</u>	<u>Leave Worcester</u>	<u>Arrive Boston</u>	<u>Leave Boston</u>	<u>Arrive Worcester</u>	<u>Destination of Bus Service</u>
New York City	4:10	5:00	4:05	5:24	<i>Commuter rail</i>
<i>Commuter rail</i>	4:45	6:31	6:50	8:16	<i>Commuter rail</i>
<i>Commuter rail</i>	5:15	6:47	7:00	8:20	Hartford
Worcester	5:55	7:30	7:25	8:25	Albany
<i>Commuter rail</i>	5:55	7:36	8:00	9:00	Springfield
<i>Commuter rail</i>	6:35	8:16	9:05	10:31	<i>Commuter rail</i>
<i>Commuter rail</i>	7:00	8:28	9:30	10:25	Hartford
New York City	7:15	8:05	10:30	12:05	<i>Commuter rail</i>
<i>Commuter rail</i>	7:30	9:03	11:15	12:20	Hartford
<i>Commuter rail</i>	8:30	10:00	12:15	13:15	Albany
Hartford	9:20	10:20	12:22	13:53	<i>Commuter rail</i>
Hartford	10:25	11:45	13:00	14:10	Hartford
<i>Commuter rail</i>	10:50	12:25	13:15	14:48	<i>Commuter rail</i>
Springfield	11:15	12:20	13:30	14:20	Springfield
<i>Commuter rail</i>	12:20	13:55	14:45	16:18	<i>Commuter rail</i>
Albany	12:35	13:35	15:00	16:10	Hartford
Springfield	13:15	14:25	16:05	17:24	<i>Commuter rail</i>
<i>Commuter rail</i>	14:10	15:45	17:00	18:00	Hartford
Hartford	14:25	15:20	17:00	18:40	Worcester
<i>Commuter rail</i>	15:25	17:00	17:00	18:20	<i>Commuter rail</i>
Albany	16:25	17:25	17:35	18:56	<i>Commuter rail</i>
<i>Commuter rail</i>	16:55	18:31	17:55	19:36	<i>Commuter rail</i>
Springfield	17:30	18:30	19:18	20:55	<i>Commuter rail</i>
Hartford	17:45	18:55	19:30	20:35	Hartford
<i>Commuter rail</i>	18:12	19:53	19:40	20:40	Albany
Hartford	19:40	20:55	20:00	21:05	Springfield
<i>Commuter rail</i>	19:55	21:11	20:35	22:11	<i>Commuter rail</i>
<i>Commuter rail</i>	21:30	23:00	22:20	23:56	<i>Commuter rail</i>
Springfield	22:00	23:00	23:25	1:01	<i>Commuter rail</i>
Hartford	22:25	23:30			
<i>Commuter rail</i>	24:10	1:30			

Source: Public timetables as of October 29, 2012

Source: Central Transportation Planning Staff, 2012, p. 93.

4.5 RECOMMENDATIONS CASE STUDY: WESTERN MASSACHUSETTS

Previous CTPS reports have broken down travel within the Boston MPO region by vector, slicing the region into directional slivers for analysis. Extending these vectors beyond the borders of the MPO region and examining differences in the commutes into Boston that they generate can perhaps prove fruitful, or at least illustrative of the dynamics at hand. As shown in Figure 1, the vector to Boston's west—pointing beyond Worcester to Springfield, the Pioneer Valley, and the Berkshires—generates the highest proportion of commutes into the Boston-area core of more than 50 miles. As such, the perhaps unique demographic characteristics of this vector, and its transportation options, could serve to illustrate the potential of the remedies outlined here.

There are indications that despite the long distance, significant demand may exist for full- or part-time commutes between Boston and Western Massachusetts. LODES provides much higher estimates for commutes into Boston from these counties than does CTPP, which this report has hypothesized is indicative of a significant population of part-time commuters or business affiliates.

Table 7
Commutes to Boston from Western Massachusetts Counties

County	State	LODES Estimate	CTPP Estimate	Pct. 90+Minutes Estimate (CTPP)	CTPP-to-LODES Ratio
Hampden	Mass	4,997	380	52.6%	0.08
Hampshire	Mass	2,147	205	70.7%	0.10
Berkshire	Mass	1,310	35	42.9%	0.03
Franklin	Mass	1,015	115	39.1%	0.11

CTPP = Census Transportation Planning Package. LODES = LEHD Origin- Destination Employment Statistics.

Economic ties between Boston and these counties are strong. Presumably, much of the commute demand relates to the numerous institutions of higher education in Western Massachusetts. The literature indicates that academics—who have very little geographic discretion in their employment—and their household members are among the most probable long-distance commuters; and the demand for greater options for such travel is backed by a 2009 faculty report from the University of Massachusetts-Amherst.⁶⁸

Political stakeholders have frequently identified connections between Boston, Springfield, and the Pioneer Valley—and possibly the Berkshires—as a missing link in public transit service. Currently, the only intercity transit service that connects the

⁶⁸ Curtis, Lundquist, Templer, and Misra 2009.

Pioneer Valley to Boston is bus service run predominantly by Peter Pan⁶⁹ and Amtrak's once-a-day *Lake Shore Limited*. Such service, while useful to many, is subject to significant congestion on I-90, and travel times are unreliable. Service to the Berkshires is worse. The MassDOT 2016 Regional Bus Network assessment identified a gap in service between Boston and the Berkshires—there is no bus or train schedule that allows for a day trip to Boston from Pittsfield or anywhere else in the Berkshires, despite a LODES-estimated 1,310 full- or part-time commuters between Berkshire County and the Boston core.

The combination of potentially strong but poorly understood demand (including a significant discrepancy in Census data), poor transit options, and significant political interest⁷⁰ make the Boston-Western Massachusetts corridor an interesting analytic example as well as a potentially viable locus for policy experimentation with regard to long-distance commuting. Westrom and Sussman (2014) examine the possibility of high-speed rail that would enable commutes between university cities and major metropolitan centers in the context of Illinois (Chicago and Champaign-Urbana) and Portugal, a situation arguably roughly comparable to that of Amherst and the Pioneer Valley vis-à-vis Boston. While such a connection is not apparently in the offing for the time being, studying the possible effects that a high-speed connection to Western Massachusetts might have *specifically* on commute patterns—and therefore on the needs of MPO governance—as a form of preparing for possible future scenarios might well be a fruitful course of action. And lower-cost rail-based improvements such as the NNEIRI and Heart to Hub extension examined earlier may prove more viable than previously thought in the short term.

There is room for significant improvement in regional commuter bus service to Western Massachusetts, as well as the opportunity for leadership. Public support for schedules that allow day trips from the Berkshires to Boston; coordination of bus and commuter rail schedules; and potentially even priority, HOV, or dedicated lanes on the Mass Pike may all, with appropriate consideration, prove useful. With a variety of analysis, intervention, and investment options available, and demonstrated need, the Boston-Western Massachusetts corridor is a strong illustration of the dynamics illustrated throughout this report.

⁶⁹ Although with potential for competition from Greyhound given the recent breakup of the two companies' partnership <https://www.bostonglobe.com/business/2017/08/29/greyhound-peter-pan-will-split-and-rivals-again/NUe8YqNnDgxpsPjHhn2HWO/story.html>.

⁷⁰ See for example http://www.masslive.com/news/index.ssf/2017/07/drop_of_high-speed_rail_study.html.

Chapter 5 Conclusions

Popular media attention often frames the super/mega/long-distance commuter as a victim of economic happenstance, high housing prices, or both. The reality that emerges through the data and research presented here is considerably more nuanced. People who are making long-distance commutes into the core of the Boston region generally have high incomes and are very well educated. Although local qualitative data is lacking, we may understand through the research literature, that their decision to commute over such long distances is the product of navigating a complex set of options and incentives, often according to values that they set themselves. Certainly, some commuters undertake long commutes out of sheer necessity; but for others, calculations are more complicated, and if understanding their choices is of interest to planners and policymakers, then the need for more thorough data collection is acute.

That said, there are numerous interventions that can ease the daily lives of people making such commutes, and can affect the transportation system positively. Super-commuters both desire and would benefit from having comprehensive public transit options available to them, so recognizing the existence of such trips would help emphasize the need for such options to organizations that might not otherwise be cognizant of them. Transit investments that cater to the long-range commute market can often be lightweight and organizational rather than capital-intensive, and they require coordination and dialogue across geographic and institutional lines. Indeed, in its most extreme expression, long-distance commuting could force a thorough reconsideration of transportation-planning governance. Whether that extreme version of the future ever comes to pass will depend on much larger investment decisions than are discussed here. Understanding the dynamics that exist now and might emerge in the future, though, is a task that this MPO and other entities can embark on now.

Appendix A LODES and CTPP Census Data

There are two major Census products that planners use to determine home-to-work flows, and that thus can be used to analyze patterns in long-distance commuting. The first, and seemingly more commonly used, is the American Community Survey (ACS), especially as packaged in the Census Transportation Planning Package, or CTPP. The second is the Longitudinal Employer-Household Dynamics (LEHD) Origin-Destination Employment Statistics (LODES) dataset. There are a variety of differences between the datasets, but the core distinction is that ACS is a sampling of the overall population, while LODES is derived from anonymized administrative data—that is, tax records of business, employment, and residence locations. Notably, Massachusetts was the last state to provide data to the LEHD program, and its data was not added to the OnTheMap LODES interface until March 2016 (and still only covers the years 2011–2014). A comparative analysis focused on the Boston region such as this one, then, was not possible until very recently, indicating the potential for analysts to come to new conclusions.

These methodological differences can lead to significantly differing results. ACS is the broader dataset, containing information on origin, destination, mode of travel, length of commute by time and distance, and other categories. LODES contains detailed information on income, distance of commute, and origin and destination, but does not collect data on mode of travel or other personal details. However, being derived from administrative data, it seems to capture jobs more comprehensively and claims to portray workplaces at 97 percent precision at the sub-county level and residence at 96 percent precision at the county level. Because of the availability of mode share data, most transportation-planning analyses use ACS data, but Moss and Qing (2012) used LODES for their important paper on super-commuting.

Variance in collection methodology and measurement (a paper by Census Bureau staff⁷¹ lays out the differences between the datasets in detail well beyond the scope of this analysis) means that the results of the two datasets analyzed here can be somewhat different, as an examination of the New England region demonstrates. CTPP staff⁷² assembled both LODES and CTPP data into a comparative table for commuters into the Boston area⁷³ at the county level, for the five MPO-region counties and the top-100 beyond those (see Table A-1).

⁷¹ Graham, Kutzbach, and McKenzie 2014.

⁷² Primarily Paul Reim.

⁷³ For CTPP, this was defined as Suffolk County; for LODES, where the OnTheMap interface and more robust data allow greater geographic discretion, it is a circle defined by a radius of four miles from Boston City Hall.

**Table A-1
Commuters to Boston Core from the Top 100 Counties**

		CTPP 2010 Commuters to Suffolk County								
		LODES 2014 Commuters to Core (four-mile radius around City Hall)		All Workers		Travel Time >= 90 Minutes		Percent 90+ Minutes		CTPP to LODES Ratio
County Name	State	All Jobs	Primary Jobs	Estimate	MOE	Estimate	MOE	Estimate	MOE	
Middlesex County	MA	229,110	212,978	133,055	2,480	4,450	480	3.3%	0.4%	0.58
Suffolk County	MA	204,142	186,480	241,560	3,340	2,825	430	1.2%	0.2%	1.18
Norfolk County	MA	108,400	101,292	89,920	1,802	2,710	389	3.0%	0.4%	0.83
Essex County	MA	62,290	57,948	41,135	1,307	3,520	417	8.6%	1.0%	0.66
Plymouth County	MA	38,102	35,698	30,745	1,234	4,870	423	15.8%	1.2%	0.81
Worcester County	MA	23,979	22,280	9,215	486	2,800	436	30.4%	4.5%	0.38
Bristol County	MA	17,904	16,631	12,435	850	2,360	303	19.0%	2.1%	0.69
Rockingham County	NH	6,590	6,206	4,060	475	1,105	258	27.2%	5.5%	0.62
Hillsborough County	NH	5,879	5,521	3,520	444	870	211	24.7%	5.1%	0.60
Providence County	RI	5,776	5,302	4,535	514	1,240	244	27.3%	4.4%	0.79
Barnstable County	MA	5,160	4,686	2,360	303	1,095	211	46.4%	6.7%	0.46
Hampden County	MA	4,997	4,474	380	123	200	91	52.6%	16.9%	0.08
Hampshire County	MA	2,147	1,953	205	97	145	86	70.7%	25.4%	0.10
Hartford County	CT	1,393	1,258	275	95	80	45	29.1%	13.0%	0.20
Berkshire County	MA	1,310	1,181	35	37	15	26	42.9%	59.0%	0.03
New York County	NY	1,196	1,089	170	87	20	34	11.8%	19.1%	0.14
Franklin County	MA	1,015	916	115	63	45	29	39.1%	13.9%	0.11
Merrimack County	NH	865	808	335	104	180	104	53.7%	26.2%	0.39
Kent County	RI	865	784	520	158	310	128	59.6%	16.6%	0.60
Fairfield County	CT	839	735	155	79	40	31	25.8%	15.2%	0.18
New Haven County	CT	838	725	185	94	160	90	86.5%	21.5%	0.22
Kings County	NY	742	658	180	97	35	45	19.4%	22.7%	0.24
Cumberland County	ME	714	654	360	148	290	145	80.6%	23.2%	0.50
Strafford County	NH	707	662	410	129	280	119	68.3%	19.7%	0.58
Newport County	RI	679	629	185	86	90	57	48.7%	20.8%	0.27
Washington County	RI	536	493	300	132	180	109	60.0%	25.1%	0.56
Nassau County	NY	531	476	75	44	20	23	26.7%	26.4%	0.14
New London County	CT	515	466	175	78	110	67	62.9%	25.6%	0.34
York County	ME	497	450	460	114	295	93	64.1%	12.7%	0.93
Westchester County	NY	462	407	75	62	20	24	26.7%	22.3%	0.16
Bergen County	NJ	452	394	15	16	0	123	0.0%	820.7%	0.03
Suffolk County	NY	423	369	75	46	0	123	0.0%	164.1%	0.18
Dukes County	MA	337	310	4	127	0	127	0.0%	3185.5%	0.01
Bristol County	RI	336	314	260	108	145	90	55.8%	25.5%	0.77
Kennebec County	ME	302	281	50	45	0	104	0.0%	208.1%	0.17

		CTPP 2010 Commuters to Suffolk County								
		LODES 2014 Commuters to Core (four-mile radius around City Hall)		All Workers		Travel Time >= 90 Minutes		Percent 90+ Minutes		CTPP to LODES Ratio
County Name	State	All Jobs	Primary Jobs	Estimate	MOE	Estimate	MOE	Estimate	MOE	
Queens County	NY	295	251	135	103	0	123	0.0%	91.2%	0.46
Tolland County	CT	287	262	145	100	55	52	37.9%	24.7%	0.51
Androscoggin County	ME	267	241	10	25	10	25	100.0%	0.0%	0.04
Cheshire County	NH	240	211	80	41	25	22	31.3%	22.5%	0.33
Essex County	NJ	238	211	15	23	0	123	0.0%	820.7%	0.06
Grafton County	NH	231	216	105	77	55	66	52.4%	49.9%	0.45
Belknap County	NH	225	206	35	29	10	17	28.6%	44.0%	0.16
Windham County	CT	220	199	150	76	70	47	46.7%	20.3%	0.68
Albany County	NY	214	189	15	24	0	123	0.0%	820.7%	0.07
Bronx County	NY	214	183	55	53	0	123	0.0%	223.8%	0.26
Hudson County	NJ	194	177	10	21	0	123	0.0%	1231.0%	0.05
Carroll County	NH	192	183	95	55	90	55	94.7%	18.3%	0.49
Nantucket County	MA	187	169	25	29	0	127	0.0%	509.7%	0.13
Montgomery County	MD	185	168	55	47	0	127	0.0%	231.7%	0.30
Chittenden County	VT	185	164	70	45	15	20	21.4%	24.8%	0.38
Litchfield County	CT	183	168	55	46	15	26	27.3%	40.8%	0.30
Fairfax County	VA	181	167	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Middlesex County	CT	169	146	35	43	25	26	71.4%	116.0%	0.21
Orange County	NY	165	146	N/A	N/A	N/A	N/A	N/A	N/A	N/A
San Francisco County	CA	141	131	15	25	0	132	0.0%	877.3%	0.11
Dutchess County	NY	141	122	10	14	0	123	0.0%	1231.0%	0.07
Sullivan County	NH	132	121	4	10	0	114	0.0%	2849.2%	0.03
District of Columbia	DC	130	116	45	43	0	132	0.0%	292.4%	0.35
Philadelphia County	PA	123	115	105	81	0	109	0.0%	103.9%	0.85
Rensselaer County	NY	120	104	35	34	0	123	0.0%	351.7%	0.29
Los Angeles County	CA	116	108	95	58	4	19	4.2%	20.1%	0.82
Rockland County	NY	116	92	20	35	20	35	100.0%	0.0%	0.17
Bucks County	PA	113	94	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Cook County	IL	112	102	120	83	30	36	25.0%	24.2%	1.07
Allegheny County	PA	112	103	20	25	10	20	50.0%	77.4%	0.18
Saratoga County	NY	111	99	45	36	0	123	0.0%	273.6%	0.41
Palm Beach County	FL	107	103	250	110	60	64	24.0%	23.2%	2.34
Passaic County	NJ	103	91	15	30	0	123	0.0%	820.7%	0.15
Monmouth County	NJ	102	84	40	40	0	123	0.0%	307.8%	0.39
Lincoln County	ME	101	93	10	18	4	104	40.0%	1037.8%	0.10
Schenectady County	NY	100	83	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Montgomery County	PA	98	85	25	29	0	109	0.0%	436.5%	0.26
Sagadahoc County	ME	87	78	15	22	0	104	0.0%	693.6%	0.17

		CTPP 2010 Commuters to Suffolk County								
		LODES 2014 Commuters to Core (four-mile radius around City Hall)		All Workers		Travel Time >= 90 Minutes		Percent 90+ Minutes		CTPP to LODES
County Name	State	All Jobs	Primary Jobs	Estimate	MOE	Estimate	MOE	Estimate	MOE	Ratio
Oneida County	NY	87	81	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Middlesex County	NJ	86	78	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Coos County	NH	84	73	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Windsor County	VT	79	73	45	52	0	93	0.0%	206.8%	0.57
Arlington County	VA	77	69	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Monroe County	NY	75	68	35	32	0	123	0.0%	351.7%	0.47
Morris County	NJ	74	64	65	57	40	51	61.5%	57.0%	0.88
Erie County	NY	74	68	80	84	10	16	12.5%	15.3%	1.08
Onondaga County	NY	74	68	4	2	0	123	0.0%	3077.5%	0.05
Ulster County	NY	72	64	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Chester County	PA	70	63	20	34	0	109	0.0%	545.6%	0.29
Orange County	FL	69	63	60	62	20	26	33.3%	25.6%	0.87
Rutland County	VT	66	56	20	23	0	93	0.0%	465.3%	0.30
Washington County	VT	65	56	4	93	0	93	0.0%	2326.4%	0.06
Putnam County	NY	64	59	10	14	0	123	0.0%	1231.0%	0.16
Broward County	FL	63	55	70	52	25	26	35.7%	27.0%	1.11
Hillsborough County	FL	63	54	40	57	0	136	0.0%	339.1%	0.63
Mecklenburg County	NC	59	56	35	40	0	127	0.0%	364.1%	0.59
Miami-Dade County	FL	58	50	95	77	25	36	26.3%	31.9%	1.64
Somerset County	NJ	58	52	10	16	0	123	0.0%	1231.0%	0.17
Fulton County	GA	57	53	25	30	0	132	0.0%	526.4%	0.44
Windham County	VT	56	51	45	39	45	39	100.0%	122.8%	0.80
Union County	NJ	53	47	25	30	0	123	0.0%	492.4%	0.47
Penobscot County	ME	52	45	40	31	15	19	37.5%	36.7%	0.77
Mercer County	NJ	51	48	10	20	0	123	0.0%	1231.0%	0.20
Wake County	NC	51	48	80	97	0	127	0.0%	159.3%	1.57
Dallas County	TX	51	47	40	35	20	26	50.0%	48.7%	0.78

CTPP = LEHD = Longitudinal Employer-Household Dynamics. LODES = Longitudinal Origin-Destination Employment Statistics. MOE =
 Sources: U.S. Census Bureau, Longitudinal Employer-Household Dynamics Origin-Destination Employment Statistics (LODES), 2014. U.S. Census Bureau, American Community Survey 2006-2010 Five-year estimates. Special Tabulation: Census Transportation Planning.

Appendix B Survey Questions and Response Data

In addition to Census data, data collection and analysis for this report relied on two survey-based sources, one a CTPS staple and the other a more focused, though very in-depth, dataset derived from interviews on one particular mode of transportation.

MASSACHUSETTS TRANSPORTATION SURVEY 2011

One of the resources utilized in this study was developed based on the Massachusetts Travel Survey, completed in 2011 (MTS-2011). The survey obtained responses about travel activities from all members of 15,040 Massachusetts households. A summary of survey results is available at:

www.mass.gov/massdot/travelsurvey.

The responses of participants in the MTS-2011 were organized into several distinct tables:

- **Household Table**
Information obtained for the 15,040 participating households included home address, household income, and vehicle ownership.
- **Person Table**
The 37,023 individual members of the participating households reported whether they were employed or enrolled in school, the location of their job or school, their preferred commuting mode, and personal information, including age, educational attainment, and driver license status.
- **Place Table**
Each household was assigned a reporting day during which all household members would report their locations and activities throughout the day, and the means by which they reached each location. This table contains 190,215 records and can be organized by trip segments, entire trips between activities, or journeys representing chains of trips.

The MTS-2011 dataset used in this study is based on the Person Table augmented with key data—such as household income and vehicles owned—from the Household Table. Additional data for each respondent has also been developed, including:

- Straight-line distances between home and work and home and school
- Name of and distance to rail transit stations nearest to home, work and school

- Population and employment density in traffic analysis zones of home, work and school

This dataset built upon the MTS-2011 Person Table has served as the primary resource for several CTPS studies and the source of key explanatory data to a number of other investigations, such this one. A partial update of the MTS-2011 focusing on the Household and Person Tables could be a cost-effective method of expanding the sample and identifying trends.

DOWNEASTER INTERCEPT SURVEY 2016

The Northern New England Passenger Rail Authority (NNEPRA) administers periodic surveys of passengers on the *Downeaster*, which cover a variety of topics and generate rich data for analysis. NNEPRA staff kindly shared the data from the 2016 surveys with CTPS for the purposes of this analysis. Elements of staff analysis of the data are scattered throughout the text of this report, while an example of the text of the 2016 survey is presented below.

Figure B-1
2016 NNEPRA Intercept Survey for Downeaster Passengers

30. Which of the following announcements did you hear on today's trip? Please choose all that apply.
- | | |
|---|--|
| <input type="checkbox"/> 1 Next station stop | <input type="checkbox"/> 4 Safety and security information |
| <input type="checkbox"/> 2 A delay/service interruption | <input type="checkbox"/> 5 General information (bathrooms, WiFi, etc.) |
| <input type="checkbox"/> 3 Café information | <input type="checkbox"/> 6 None of the above |

	Not at all satisfied		Completely satisfied
31. Overall, how would you rate your trip experience today on the Downeaster?	○ ₁	○ ₂	○ ₃
		○ ₄	○ ₅

	Not at all likely		Extremely likely
32. How likely would you be to recommend the Downeaster to a friend?	○ ₁	○ ₂	○ ₃
		○ ₄	○ ₅

33. Including yourself, how many people live in your household?
 34. How many vehicles does your household own or lease?

35. What is your gender? ○₁ Male ○₂ Female
36. How old are you?
 ○₁ Under age 18 ○₅ 45-54
 ○₂ 18-24 ○₆ 55-61
 ○₃ 25-34 ○₇ 62 or older
 ○₄ 35-44

37. Do you have a medical card which states that you have a disability of any kind?
 ○₁ Yes ○₂ No
38. What is the language primarily spoken in your household?
 ○₁ English ○₂ Spanish ○₃ French ○₄ Other _____

39. Which one of the following best describes your current employment status?
 ○₁ Employed full-time ○₄ Student: _____
 ○₂ Employed part-time ○₅ Not currently employed
 ○₃ Retired ○₆ Other _____

40. Which of the following ranges includes your total household income for 2015?
 ○₁ Under \$25,000 ○₃ \$50,000-\$99,999 ○₅ \$125,000 or more
 ○₂ \$25,000 -\$49,999 ○₄ \$100,000-\$124,999

41. What is the highest level of education you've completed?
 ○₁ Some high school or less ○₄ 2-year associates or technical degree
 ○₂ High school diploma or GED ○₅ 4-year or bachelor's degree
 ○₃ Some college ○₆ Graduate degree

42. Which of the following best describes your ethnic background?
 ○₁ White/Caucasian ○₄ Asian/Asian-American
 ○₂ Black/African-American ○₅ Native American
 ○₃ Latino/Hispanic ○₆ Other _____

THANK YOU FOR YOUR PARTICIPATION! An onboard representative will collect completed surveys before you disembark. Alternately, leave the survey on your seat and it will be collected.



Welcome aboard the Downeaster
 The Northern New England Passenger Rail Authority appreciates your business and values your opinions. We are collecting information about our customers and their travel patterns so that we might better serve the needs of our passengers. Please take a moment to answer these questions, as it will help us continue to provide you with the highest quality rail service.

Office Use Only	Date	Train #
-----------------	------	---------

To begin, what is the 5-digit Zip Code where you live? _____
 If you are an International passenger, what is your country of residence? _____

1. Where did you get on the train you are on right now?
 ○₁ Brunswick ○₇ Dover
 ○₂ Freeport ○₈ Durham-UNH
 ○₃ Portland ○₉ Exeter
 ○₄ Old Orchard Beach ○₁₀ Haverhill
 ○₅ Saco ○₁₁ Woburn
 ○₆ Wells ○₁₂ Boston
2. Where will you get off the train you are on right now?
 ○₁ Brunswick ○₇ Dover
 ○₂ Freeport ○₈ Durham-UNH
 ○₃ Portland ○₉ Exeter
 ○₄ Old Orchard Beach ○₁₀ Haverhill
 ○₅ Saco ○₁₁ Woburn
 ○₆ Wells ○₁₂ Boston

3. Who are you traveling with today on the Downeaster? Please choose all that apply.
1 Only myself 4 Child(ren) under age 18
2 Friend(s) 5 Business colleague(s)
3 Partner / Spouse

4. How did you purchase the ticket for your trip today on the Downeaster?
 ○₁ Online ○₄ At station or at Quik-Trak kiosk
 ○₂ 1-800-USA-RAIL ○₅ Onboard the train
 ○₃ Amtrak mobile app ○₆ Some other way: _____

5. What type of ticket are you using for this trip today on the Downeaster?
 ○₁ Regular ticket
 ○₂ Multi-ride pass
 ○₃ Group ticket
 ○₄ Not sure
6. If you're traveling on a multi-ride pass today, what type of pass is it?
 ○₁ College Six Tix
 ○₂ 10 Ride pass
 ○₃ Monthly pass
 ○₄ Some other pass

7. Have you called 1-800-USA-RAIL about Downeaster travel?
 ○₁ Yes – within the last 12 months
 ○₂ Yes – within the last 6 months
 ○₃ Yes – for the trip I am on right now
 ○₄ No
8. If yes, what was the purpose of your call to 1-800-USA-RAIL?
 ○₁ To make reservations
 ○₂ To inquire about fares
 ○₃ To get other information

9. Is this train trip you're on right now...
 ○₁ Part of a same day round trip?
 ○₂ Part of a round trip in which you will return on a different day?
10. If this is part of a round trip on which you will be returning on a different day...
 ○₁ I will be staying in paid overnight accommodations
 ○₂ I will be staying with friends / family

11. Which one of the following best describes the overall purpose of your trip today on the Downeaster? Please choose only one response.

- 1 Commuting to or returning from work
- 2 Other business purpose (i.e. a meeting, conference, etc.)
- 3 Shopping, sightseeing or taking part in another leisure/recreation activity
- 4 Sporting, cultural, or entertainment event
- 5 Medical appointment
- 6 Visiting friends or relatives
- 7 Traveling to or from school or college
- 8 Some other reason: _____

12. Which one of the following reasons best describes why you chose to ride the Downeaster? Please choose only one response.

- 1 Avoid traffic/parking
- 2 Less expensive than driving
- 3 Convenient to destination
- 4 More comfortable than other options
- 5 Can't or do not drive
- 6 Opportunity to read, work, or sleep
- 7 No other form of travel available
- 8 More reliable than other options
- 9 Some other reason: _____

13. If the Amtrak Downeaster were not an available option, how would you most likely make this trip? Please choose only one response.

- 1 Car
- 2 Bus
- 3 Some other way: _____
- 4 Would not make trip otherwise

14. In an average year, how often do you make the trip you're on today, whether it is by train or some other mode of transportation?

_____ Total trips per year

15. How often do you use the Downeaster for these trips?

- 1 Always
- 2 Most of the time
- 3 Sometimes
- 4 Rarely

16. Including today's trip, how many total trips have you made on the Downeaster?

- 1 This is my first trip on the Downeaster
- 2 2-5 trips
- 3 6-10 trips
- 4 More than 10 trips

17. Why don't you ride the Downeaster more often? Please choose all that apply.

- 1 Don't have a need or occasion to do so
- 2 Too expensive
- 3 Inconvenient schedule or times
- 4 Takes longer than other options
- 5 Unreliable
- 6 Prefer other forms of transportation
- 7 Some other reason: _____

18. Are you aware of any deals, promotions, or discounts offered by the Downeaster?

- 1 Yes
- 2 Yes, and I am using one today: _____
- 3 No

19. If not, would special offers entice you to ride the Downeaster more often?

- 1 Yes
- 2 No
- 3 It would make no difference

20. Have you ever heard of DowneasterPackages.com? 1 Yes 2 No

21. From which of the following sources have you seen or heard anything about the Downeaster? Please choose all that apply.

- 1 AmtrakDowneaster.com
- 2 Newspaper or magazine ad
- 3 Radio ad
- 4 Television ad
- 5 Inside Track newsletter
- 6 Social media, such as Facebook or Twitter
- 7 Online ad
- 8 Word-of-mouth
- 9 Travel agent
- 10 Story/feature on TV or Internet
- 11 Some other way: _____

22. How often do you see or hear advertising about the Downeaster?

- 1 Often
- 2 Sometimes
- 3 Rarely
- 4 Never

23. Have you ever visited AmtrakDowneaster.com? (This is not the same as Amtrak.com)

- 1 Yes
- 2 No, but I have heard of it
- 3 No, I have never heard of it

24. If yes, what was your purpose in visiting AmtrakDowneaster.com? Please choose all that apply.

- 1 Checking schedules or times
- 2 Checking ticket prices
- 3 Purchasing tickets
- 4 Looking for station locations
- 5 Looking for special deals
- 6 Checking amenities
- 7 Viewing the café menu
- 8 Planning a group trip
- 9 Some other way: _____

25. Do you subscribe to our Inside Track email newsletter for updated information about the Downeaster?

- 1 Yes
- 2 I did, but unsubscribed
- 3 No
- 4 No, didn't know about it

26. What is your preferred method for receiving service communications from the Downeaster? Please choose only one response.

- 1 AmtrakDowneaster.com
- 2 Email
- 3 Facebook
- 4 Twitter
- 5 Signage at stations
- 6 Text alerts
- 7 Some other way: _____

27. Did you visit the Downeaster Café on today's trip? 1 Yes 2 No

Not at all satisfying
Completely satisfying

28. If you visited the Café today, how would you rate your experience? 1 2 3 4 5

29. If you did not visit the Café today, why not? Please choose all that apply.

- 1 Did not know about the café
- 2 Was not hungry or thirsty
- 3 Menu was unappealing
- 4 Concerned about leaving belongings
- 5 Uncomfortable walking on moving train
- 6 Too expensive
- 7 Some other reason: _____

COMPARISON AND LESSONS

While the two surveys targeted different populations—MTS surveyed only Massachusetts residents, while the NNEPRA survey was limited to a captive audience already riding the agency’s trains—they turn out to be in remarkable agreement on some demographic fundamentals. Not all categories are directly comparable between the two surveys—MTS asked for exact age, for example, while NNEPRA asked for ranges—but on a few important metrics there is close agreement (see Table B-1 below).

Table B-1
Areas of Agreement between MTS-2011 and NNEPRA 2016 Surveys

	MTS-2011	NNEPRA 2016
Male	60.2%	52.8%
Female	39.8%	47.2%
College	36.4%	36.1%
Graduate Degree	37.6%	43.5%
\$50k or more	87.6%	88.7%
\$100k or more	57.9%	60.0%

MTS = Massachusetts Travel Survey. NNEPRA = Northern New England Passenger Rail Authority.

There are also areas where the questions one survey asks are superior to the others. For example, NNEPRA asks travelers how often they make a specific trip, allowing analysis of the frequency of commuting, while MTS’s question about how often survey-takers work is ambiguously phrased and does not allow clear analysis of commute frequency. Taken together, though, the types of questions asked in these two surveys—and recognition of the gaps—can form the basis for any future inquiry that may arise from this analysis.

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