



## *MEMORANDUM*

**DATE** June 6, 2013  
**TO** David J. Mohler, Executive Director of Planning  
Office of Transportation Planning, MassDOT  
**FROM** Thomas J. Humphrey, Chief Planner, Transit Service Planning  
MPO Staff  
**RE** Major Findings from Comparisons of Results of 2008-09 MBTA  
Passenger Surveys with Results of Prior Surveys

### **1 INTRODUCTION**

During 2008 and 2009, the Central Transportation Planning Staff (CTPS) conducted surveys of passengers on all MBTA bus, rail rapid transit, light rail, commuter rail, and water transportation routes. The results were presented in 17 volumes that are available in PDF format on the Boston Region Metropolitan Planning Organization (MPO) website. Although these reports present summary tables based on analyses of a large number of variables, time and budget constraints did not allow for comparisons of the results of these surveys with the results of prior surveys of passengers on the same MBTA services. The purpose of the present project was to conduct such comparisons. The objective was to determine whether there had been significant changes in characteristics of MBTA riders and their use of the system since the 1990s. If there were not significant changes, this would suggest that the 2008-09 results could be relied on for planning purposes for many years. If there were significant changes, this would suggest that surveys should be conducted at more frequent intervals to allow the MBTA to make service changes consistent with changing needs of riders.

### **2 SURVEY COMPARISON METHODS**

For the 2008-09 survey project CTPS, in consultation with the MBTA, created a survey form with six variations reflecting differences in questions applicable to different transit modes. These forms were for rail rapid transit (including light rail), bus, commuter rail (excluding the Greenbush Line<sup>1</sup>), the Greenbush Line, commuter boat, and inner harbor ferry. Despite the differences in questions,

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<sup>1</sup> Because this was the first comprehensive survey of Greenbush Line passengers after the line opened in October 2007, the Greenbush survey form included several questions about prior travel modes that pertained only to that line.

similar standard reports were used to summarize the results of each of these surveys.

Prior to the 2008-09 survey project, surveys on most of the commuter rail system had been last done in 1993. The rail rapid transit and light rail lines had been surveyed in 1994, the bus system in 1995, the Old Colony commuter rail lines in 1998, and water transportation services in 2000. (The Greenbush commuter rail line, which opened in October 2007, was surveyed for the first time in 2009.)

The information needs that can best be met through conducting surveys change somewhat over time. Consequently, not all of the questions on the 2008-09 surveys were directly comparable to questions on prior surveys of passengers using the same modes. A review of the reports produced from the earlier survey efforts indicated that results could be compared with those of the following standard reports from the 2008-09 surveys:

- Trip purpose, reasons for using the MBTA, and alternate means of travel
- Origin locations
- Means of access to transit
- Means of egress from transit
- Destination locations
- Socioeconomic characteristics
- Usage rate and fare types
- Vehicle availability
- Service quality ratings

### 3 SUMMARY OF FINDINGS

Despite the length of time that had elapsed between the 2008-09 surveys and the prior surveys to which they were compared, there were relatively few large changes in the percentage distributions of responses to the questions included in the comparisons. Because only one set of earlier surveys was available for the comparisons for each service mode, it was not possible to determine whether changes that occurred took place gradually over time or were more rapid responses to changes in factors such as service levels, fare structure, or economic conditions. It was also impossible to determine the extent to which the distributions of responses to the survey questions might have fluctuated in the years between the old and new surveys.

For this project, it was necessary to make comparisons at fairly high levels of data aggregation. Survey results from rapid transit and light rail lines were

examined by line segment. Results from commuter rail and water transportation services were examined by route. Results from buses were examined for all routes combined at each bus garage. Comparisons at these levels could conceal changes occurring at individual rapid transit, light rail, or commuter rail stations or on individual bus routes. On the other hand, sample sizes become progressively smaller at finer levels of detail, the margins of error in the samples increases, and similarities or differences between old and new survey results become less meaningful. General trends observed in each of the nine standard reports used in the comparisons are summarized below. A detailed discussion of this study's methods and findings is provided in a separate memorandum.

### **3.1 Trip Purpose, Reasons for Using the MBTA, and Alternate Means of Travel**

In general, the survey comparisons showed that home-based work trips account for the largest shares of travel on all MBTA services and that the shares are not changing much over time. Passengers continue to cite convenience, rather than necessity, as the most common reason for using MBTA services. Environmental responsibility has increased significantly as a reason for using public transportation. If the services that passengers currently use were no longer available, most would continue to make the same trips either by driving alone or by switching to other transit services. The choice would depend both on the availability of alternate transit services and on the availability of private vehicles.

### **3.2 Origin Locations**

Each line segment, route, or group of routes included in the analysis attracted most of its riders from the same municipalities or neighborhoods in 2008-09 as it did in the prior surveys, although there were some changes in relative importance of trip origins. The largest changes occurred on lines that had been extended into new areas, such as the extension of the Framingham commuter rail line to Worcester, or had significant improvements in service frequency, such as on the Haverhill commuter rail line north of Reading.

### **3.3 Means of Access to or Egress from Transit**

Changes in the percentages of passengers using various modes of access to MBTA services depended largely on changes in the choices available. For example, increases in parking capacity resulted in higher rates of park-and-ride access, adding amenities for bicycle users increased bicycle access, and providing free transfers between modes increased use of feeder services.

Similar findings pertain to egress modes (that is, the means of continuing trips after exiting transit).

### 3.4 Destination Locations

Most of the survey respondents on each line segment, route, or group of routes included in the analysis were destined for the same municipalities or neighborhoods in 2008-09 as in prior surveys, although there were some changes in relative importance of trip destinations. One of the most consistent trends was a decrease in the percentages of riders on most services who were destined for the Financial/Retail area of downtown Boston. This was partly a reflection of reduced employment and shopping opportunities in that area as a result of the economy. In addition, new development in other sections of the city, including the South Boston industrial area and the Longwood Medical Area, was attracting more trips to those areas.

### 3.5 Socioeconomic Characteristics of Riders

The survey results showed a general trend of increasing average age of MBTA riders, or at least of those who respond to surveys. On most services examined (except those such as the surface B Line that serve large numbers of college students and recent graduates) the surveys showed that the largest age group had shifted from 25 through 34 to 45 through 64.

The 1993 commuter rail surveys did not include a question on gender, but all subsequent surveys have done so. On almost all services, the percent of female respondents is significantly higher than the percent of male respondents. This changed little between the old and new surveys, except that the relative proportion of male respondents on buses increased between 1995 and 2008-09. The Hingham commuter boat was the only service on which more than 50% of respondents were males in both sets of surveys. Without corroborating data, it is not possible to determine the extent to which the high proportions of female respondents depict actual ridership rather than a higher propensity of females to participate in surveys.

Comparisons of household incomes between older and newer surveys are of limited value because of the impact of inflation. Incomes were reported by range rather than by specific value, and it was not possible to determine the extent to which inflation shifted respondents from one range to another. All services showed decreased percentages of riders in most of the income ranges below \$60,000, and increased percentages in the ranges above that. On the 2008-09 survey forms the highest check-off range provided was \$100,000 or more, so it was not possible to determine at what level beyond \$100,000 there ceased to be significant numbers of passengers. Both sets of

surveys showed average incomes to be lowest for bus passengers and highest for commuter boat passengers.

### 3.6 Usage Rates and Fare Types

The surveys of rapid transit, light rail, and bus passengers showed declines in the percentages of riders using the service six or seven days a week, with most of the shift being into four-day or five-day use. Surveys have not been conducted on Saturdays or Sundays, but the percentages of riders going to or from work would be expected to be much lower on those days than on weekdays. Higher fares as well as economic conditions may have caused some weekday riders to reduce their weekend discretionary travel.

Changes in the percentages of passengers by fare payment type were generally consistent with changes in fare structure. On the rapid transit and light rail lines, the trend was a shift from single-ride full fares to monthly passes. In the 1990s, a passenger making 21 round-trips a month on the rapid transit system but not using the bus system would have saved \$8.70 by using a \$27.00 subway pass instead of paying \$0.85 per trip. Under the fares implemented in 2007 and still in effect during the 2008-09 survey, the same passenger would have saved \$12.40 using a \$59.00 monthly LinkPass instead of paying \$1.70 per month with a CharlieCard. On the bus system, there was a significant shift from monthly passes to seven-day passes. The latter were not offered in the 1990s. Under the 2007 fare structure, the cost of four seven-day passes (\$60.00) was \$1.00 more than the cost of one monthly LinkPass, but buying a seven-day pass allowed payments to be made in smaller increments and provided more flexibility for those whose travel needs might vary during a month. On the commuter rail system, elimination of the discount for 12-ride tickets resulted in a shift to monthly passes. Water transportation services also had large shifts from multi-ride tickets to monthly passes.

### 3.7 Vehicle Availability

In both sets of surveys, the majority of respondents were licensed drivers. The percentages of licensed drivers were highest among commuter rail and boat passengers, and lowest among bus passengers, with rapid transit passengers between. The percentages of riders with private vehicles available for the same trips were lower on all modes than the percentages with licenses, but the majority of rapid transit, commuter rail, and boat passengers indicated that they had vehicles available. However, a substantial majority of bus passengers did not have vehicles available. Overall, respondents were slightly less likely to have vehicles available and were likely to have somewhat lower per capita vehicle ownership in 2008-09 than in prior survey years.

### 3.8 Passenger Ratings of Service Quality

In general, the service quality ratings showed passengers to be less satisfied with most of the listed attributes in 2008-09 than they were in previous surveys. Reliability and service frequency in particular were rated lower. Station conditions were generally the least favorably rated attribute in the earlier surveys, and these were rated even lower in 2008-09. The only measure that generally showed improvement was announcement of stations. This reflected the transition from live announcements by vehicle operators to recorded announcements and electronic displays.

## 4 CONCLUSIONS

Of the questions that were directly comparable between the 2008-09 surveys and prior surveys, many did not show changes larger than could be attributed to expected variation in the survey samples. For the comparisons that did show statistically significant changes, the differences were relatively small in most cases. For these reasons, it does not appear to be necessary to undertake such comprehensive survey efforts at frequent intervals. Rather than spreading resources thinly and risking obtaining only marginally acceptable levels of survey responses on some services, it would be preferable to undertake more intensive surveying of more limited numbers of routes or stations on a rotating basis. These efforts should be targeted first to those services for which it appears that a better knowledge of the characteristics of passengers and their travel needs could lead to provision of better service.

TJH/tjh