

UTILITY OF RAIL TRANSIT IN THE BOSTON AREA

John Russell
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 Professor Laurie Baise

Data sources:
 MassGIS
 American Community Survey 2010
 Massachusetts Bay Transportation Authority

OVERVIEW

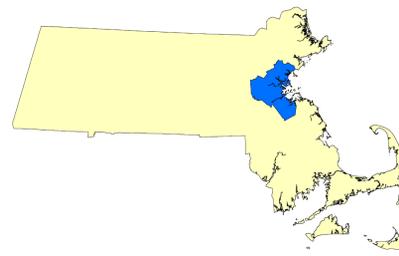
Boston has used public transit for more than a century as a means of decreasing congestion and increasing mobility. However, like many cities, Boston eliminated a number of light rail routes in the 1950s and 1960s and replaced them with bus service. This has continued to be an issue even since the 1960s, when bus service has supplanted proposed light rail service to Dudley Square and Forest Hills.

This project is an attempt to quantify the amount of public good created by the remaining network of light rail lines, subway lines, and commuter rail lines in the im-

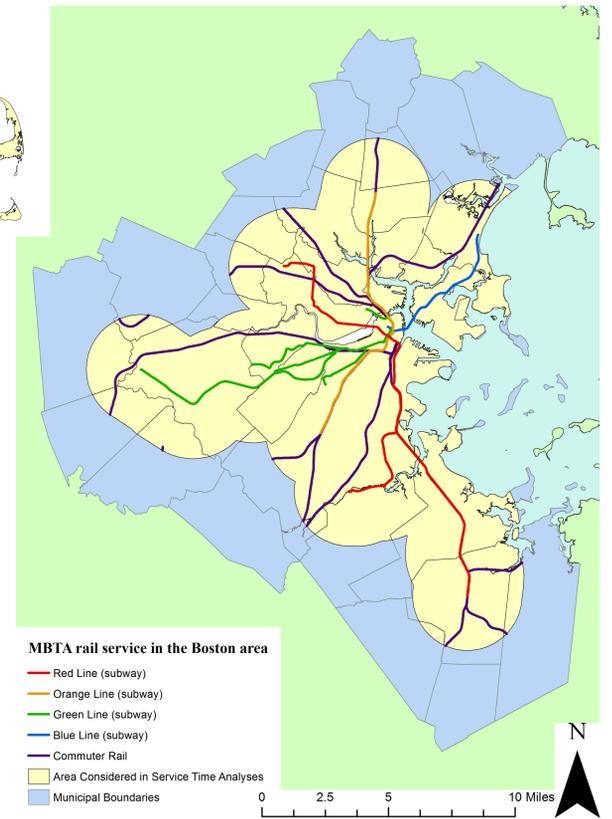
mediate area around the Boston city center. This is done by quantifying the amount of time travelers perceive when traveling from downtown Boston to the areas of the city within two miles of a subway stop.

What is perceived travel time?

This is the amount of time transit travelers perceive to have passed during a typical transit trip. This is different from the actual travel time of a trip because transit users value their time differently when transferring than they do when on board a train. For more information on perceived travel time, see "Methodology."



Map of the MBTA service considered for this analysis.



METHODOLOGY

Perceived travel time, defined

A commonly accepted figure is that passengers would rather spend two additional minutes on transit to avoid one additional minute waiting for transit or walking to transit, and research has suggested that travelers would rather spend five additional minutes on transit to avoid a transfer in the Boston system. This leads to a simple calculation for perceived travel time: where P is perceived travel time, T is time spent on transit, W is the time spent waiting for transit, and R is the number of transfers required to travel to a station,

$$P = T + 2W + 5R.$$

This project began by calculating the perceived travel time from downtown Boston (which was defined as the seven primary transfer stations in the system, North Station, Haymarket, Government Center, State, Park Street, Downtown Crossing, and South Station) to all outlying subway and light rail stations, as well as to commuter rail stations within two miles of a subway line. Then, using the network analyst tool on a network of roads, trails, paths, and bike paths within two miles of a subway line, the additional walking time from those stations to all locations within two miles of a subway line was calculated. To estimate the perceived travel times with the Fairmount line improvements, the perceived travel times for that line were recalculated with an average 7.5 minute wait for a train.

Perceived travel time Minutes from downtown

