Transportation touches almost every aspect of our lives and plays a pivotal role in shaping human interaction, economic mobility, and sustainability. Transportation provides access to opportunity and serves as a key component in addressing poverty, unemployment, and equal opportunity goals.\(^1\) - Robert Boudac

Transportation equity is concerned with ensuring that all people and communities have access to affordable and reliable transportation options. Environmental justice extends this idea to righting the wrongs of the past, and spreading the harms of environmental degradation equitably across all people. As the transportation infrastructure choices made by past policymakers have caused significant harm to certain communities, especially low-income communities and communities of color, transportation equity is needed to rectify those disparities, reduce environmental harm and enable all people to access work, school and recreational opportunities.

Boston has been working with transportation equity and environmental justice for decades. The history of the Orange and Silver Lines are fraught with controversy regarding which neighborhoods are gaining and losing the most access. This debate has included arguments about whether or not bus, or bus rapid transit (BRT), are equivalent to the subway in terms of service. BRT is supposed to combine the cost savings and flexibility of buses while providing the service frequency, limited stops and dedicated right-of-way found with subway or light rail lines. Given that ever Boston's much touted Silver Line BRT service falls short when considering these criteria, \(^2\) it would be hard to argue that traditional bus service in the Boston metro area could be considered “rapid transit.”

With this in mind, this project analyzes the mass transit options available to residents of six core, northern suburbs of Boston, in particular, I am concerned with determining the degree to which these cities’ residents have access to bus, subway and commuter rail service in comparison with each other, especially given that large swaths of all of these cities are home to environmental justice communities. This includes all of the Cities of Everett and Chelsea.

Methodology & Limitations

I created a map demonstrating the extent of environmental justice communities in Chelsea, Everett, Malden, Medford, Revere and Somerville, and these additional maps to show current service via bus, subway and commuter rail across those six cities. U.S. Census Bureau data were used in creating environmental justice block groups, while Massachusetts Bay Transportation Authority (MBTA) data was used in creating service territories for MBTA service.

For all three forms of transit, I used ArcMap’s network analyst tool to create quarter-mile and half-mile buffers around each transit stop or station. These buffers are not as the crow flies – they are true distances that citizens would travel to get to and from the stops and stations via the street network. I then calculated the population of all census blocks that contain each of the buffers to come up with a reasonable estimate of the number of people who are within a quarter-mile and half-mile walking distance of each stop.

This is admittedly an imprecise measure, as some of the residents of a given block group may actually live slightly outside a buffer zone. However, census blocks are the narrowest measurement available, providing the best possible estimate. The upshot is that my figures are, if anything, an overestimate of service levels for these cities, and should be considered an absolute ceiling in terms of how many people can reasonably walk to a transit stop or station.

Census Block Groups

Environmental Justice Criteria

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<th>Low Income</th>
<th>Minority</th>
<th>Language Isolation</th>
<th>Low Income + Minority</th>
<th>Low Income + Language Isolation</th>
<th>Low Income + Minority + Language Isolation</th>
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<tbody>
<tr>
<td>% Minority</td>
<td>% Minority + Language Isolation</td>
<td>% Minority + Low Income</td>
<td>% Minority + Low Income + Language Isolation</td>
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Distance to MBTA Stations

- Blue Line
- Orange Line
- Green Line
- Red Line

Distance to Commuter Rail Stop

- 1/4 Mile
- 1/2 Mile

Results

As the maps show, all six cities have excellent access to bus stops, but have a definite lack of access to both subway and commuter rail. Everett is in the worst position, having no access whatsoever to either form of rail service. Chelsea has no subway access, while Revere lacks commuter rail service. Of course, the cost of providing either form of rail service to all residents of these cities would be enormous; it would be hard to argue that traditional bus service is the same as access to trains, especially as far as the subway line is concerned.

Future analyses should consider the cost of each trip for a commuter via each transit mode, as well as time spent waiting for a bus or train to arrive. Combining these into a total cost of travel for residents could make further consideration of how to ensure all people have adequate access to public transportation.