

TRANSPORTATION EQUITY ANALYSES

As required by federal regulations, the MPO assesses the impacts of all Regional Target-funded projects, as a group, in each TIP on TE populations.³ These analyses help the MPO to better understand the extent to which investments help the MPO meet its TE goal. This information will inform future changes or updates to MPO work and decision-making. As new tools are identified and analyses are developed, they will be added to subsequent TIPs.

In the FFYs 2023–27 TIP, the MPO has left unprogrammed Regional Target funds for projects which have not yet been identified. As a standard practice, the MPO reserves funds for these programs with the expectation that they will be allocated when projects are ready to be funded. Specifically, \$6.7 million for the Community Connections and \$19.5 million for the Transit Modernization investment programs have been left unprogrammed. Except for the funding distribution analysis, the equity analyses in this chapter do not account for these funds. Additionally, the analyses in this chapter do not include roadway projects in the region that are funded by the Massachusetts Department of Transportation or public transit projects funded by regional transit authorities.

³ The following sources for the TE populations were used for the analyses in this section:

FFYs 2022–26 TIP and earlier:

- Minority population: US Census Bureau; 2010 Decennial Census Redistricting Data (P.L. 94-171), Table P2: Hispanic or Latino, and Not Hispanic or Latino by Race; generated by CTPS; using data.census.gov.
- Low-income population: US Census Bureau; 2010–14 American Community Survey, Table C17002: Ratio of Income to Poverty Level in the Past 12 Months; generated by CTPS; using data.census.gov.
- People with limited English proficiency: US Census Bureau; 2010–14 American Community Survey, Table B16004: Age by Language Spoken at Home by Ability to Speak English for the Population 5 Years and Older; generated by CTPS; using data.census.gov.
- People with disabilities: US Census Bureau; 2010–14 American Community Survey, Table B18101: Sex by Age by Disability Status; generated by CTPS; using data.census.gov.
- Older adults and youth population: US Census Bureau; 2010 Census, Table P12: Sex by Age; generated by CTPS; using data.census.gov.

FFYs 2023–27 TIP:

- Minority population: US Census Bureau; 2020 Decennial Census Redistricting Data (P.L. 94-171), Table P2: Hispanic or Latino, and Not Hispanic or Latino by Race; generated by CTPS; using data.census.gov.
- Low-income population: US Census Bureau; 2016–20 American Community Survey, Table C17002: Ratio of Income to Poverty Level in the Past 12 Months; generated by CTPS; using data.census.gov.
- People with limited English proficiency: US Census Bureau; 2016–20 American Community Survey, Table B16004: Age by Language Spoken at Home by Ability to Speak English for the Population 5 Years and Older; generated by CTPS; using data.census.gov.
- People with disabilities: US Census Bureau; 2016–20 American Community Survey, Table B18101: Sex by Age by Disability Status; generated by CTPS; using www.data.census.gov.
- Older adult and youth population: US Census Bureau; 2016–20 American Community Survey, Table B18101: Sex by Age; generated by CTPS; using data.census.gov.

Geographical Analyses

Transportation Equity Populations in the Boston Region

Table 6-5 shows the total number of people in the Boston region who belong to each TE population, as well as the percentage of each TE population relative to the Boston region's population. Values from the FFYs 2022–26 TIP are also shown as a comparison.

Table 6-5
Transportation Equity Populations in the Boston Region

TE Population Group	MPO Region Population		Percent of the Total Population	
	FFYs 2022–26 TIP	FFYs 2023–27 TIP	FFYs 2022–26 TIP	FFYs 2023–27 TIP
Minority population	870,459	1,223,835	28.2%	36.5%
Low-income population	683,548	674,215	23.0%	19.6%
People with LEP	308,770	375,848	10.6%	11.1%
People with disabilities	306,776	342,552	10.0%	10.2%
Older adult population	206,578	232,286	6.7%	6.8%
Youth population	636,761	634,550	20.6%	19.3%

Note: To calculate the TE population values, the population in each block group was controlled to the total 2020 census population count and then summed to get the total TE population in the Boston region.

FFY = federal fiscal year. LEP = limited English proficiency. TE = transportation equity. TIP = Transportation Improvement Program.

Source: US Census Bureau.

Figures 6-2 to 6-7 show the percent of each TE population throughout the Boston region. In general, the minority population, people with low incomes, and people with LEP tend to live closer to or in Boston. On the other hand, people aged 75 or older, people 17 or younger, and people with disabilities are dispersed throughout the region.

Figure 6-2
Percentage of the Minority Population in the Boston Region

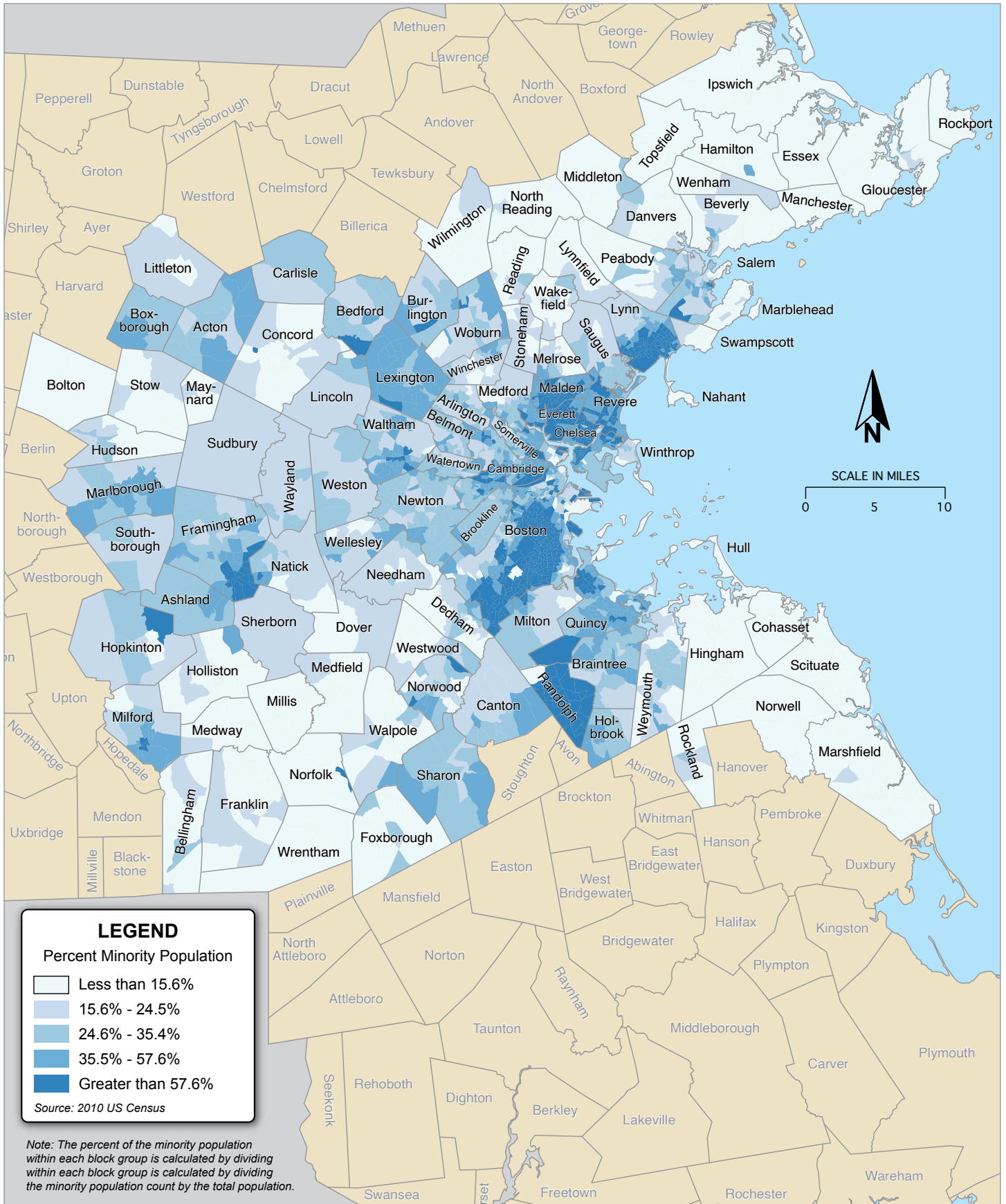


Figure 6-3
Percentage of the Low-income Population in the Boston Region

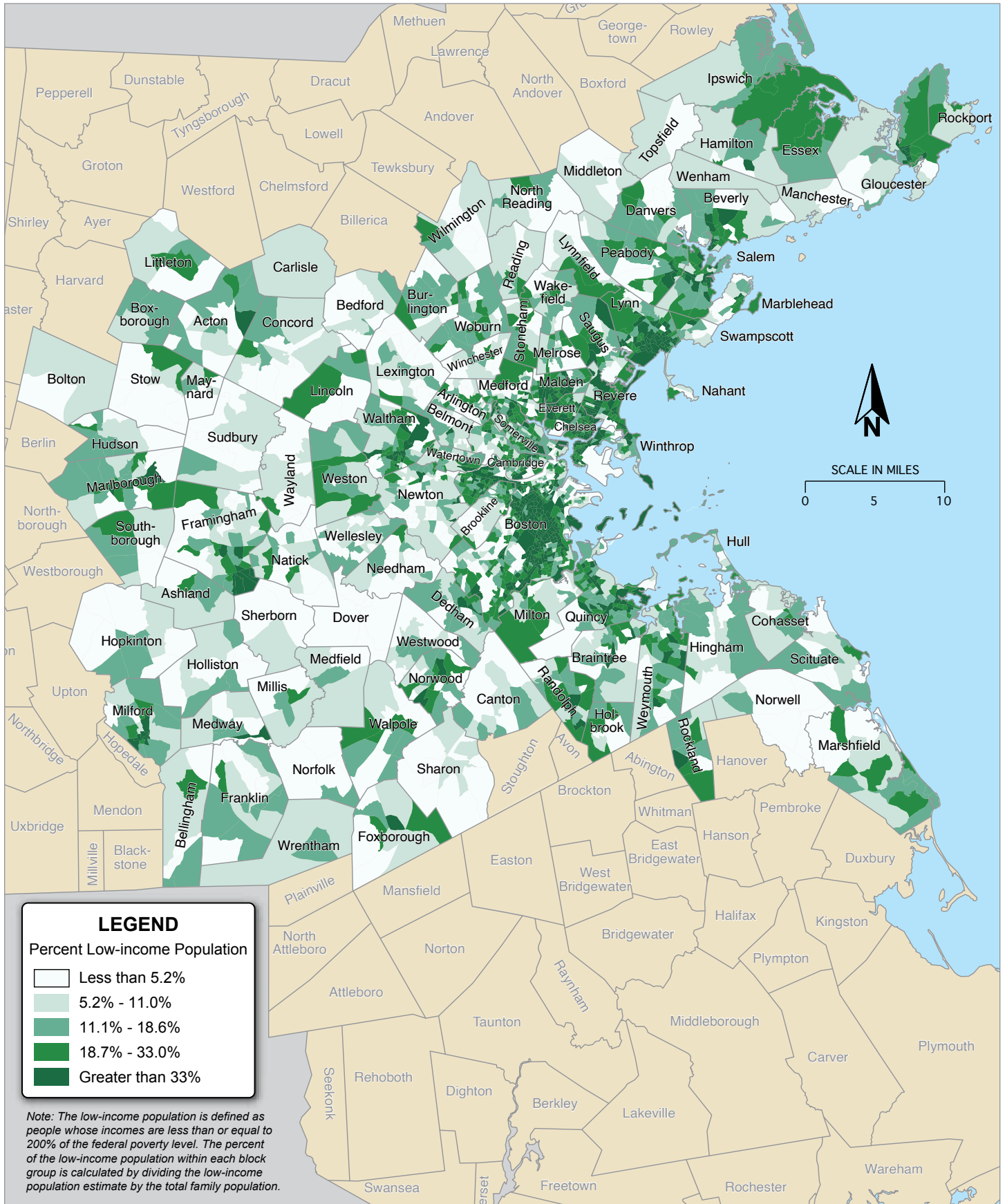


Figure 6-4
Percentage of People with Limited English Proficiency in the Boston Region

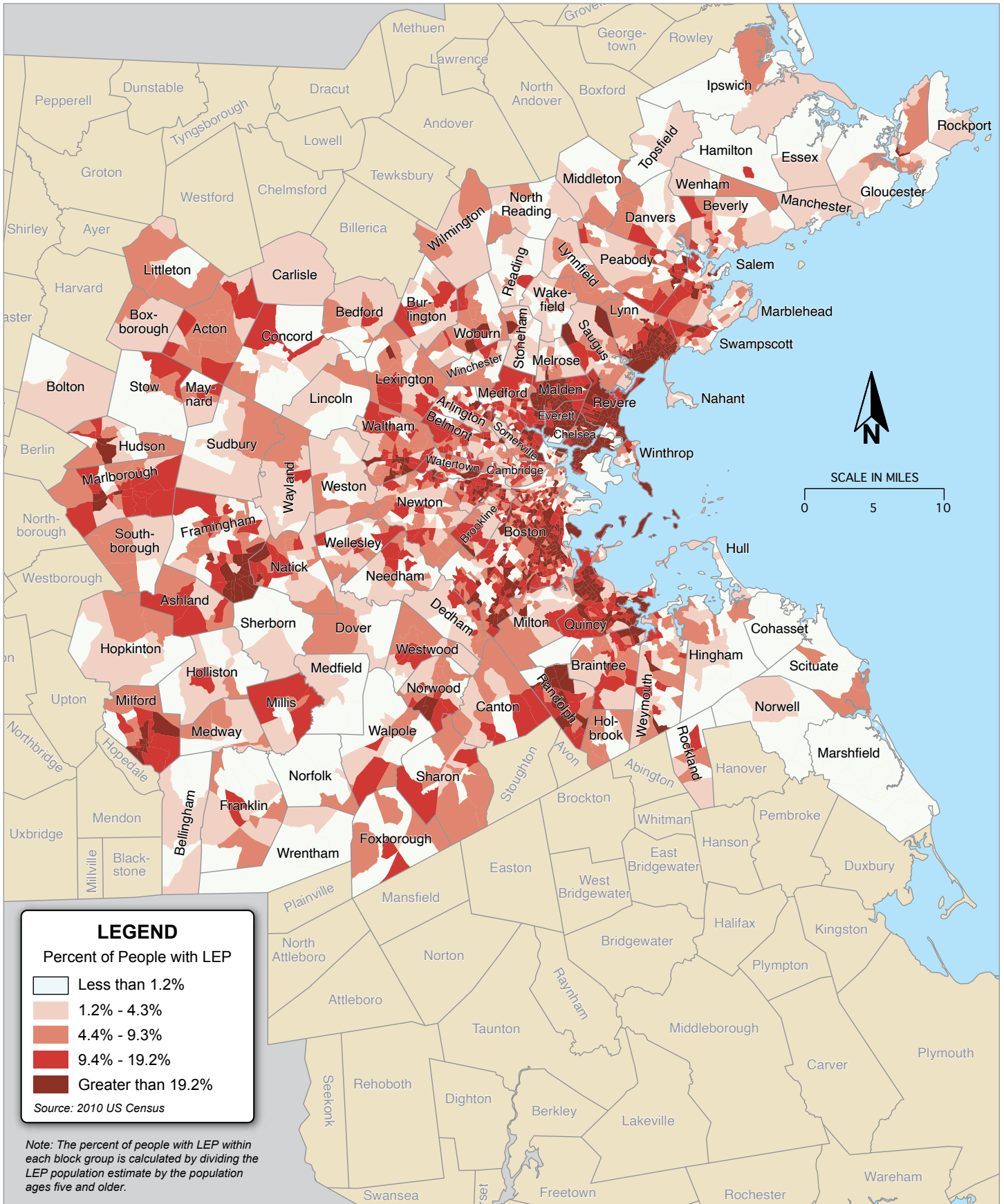


Figure 6-5
Percentage of People with Disabilities in the Boston Region

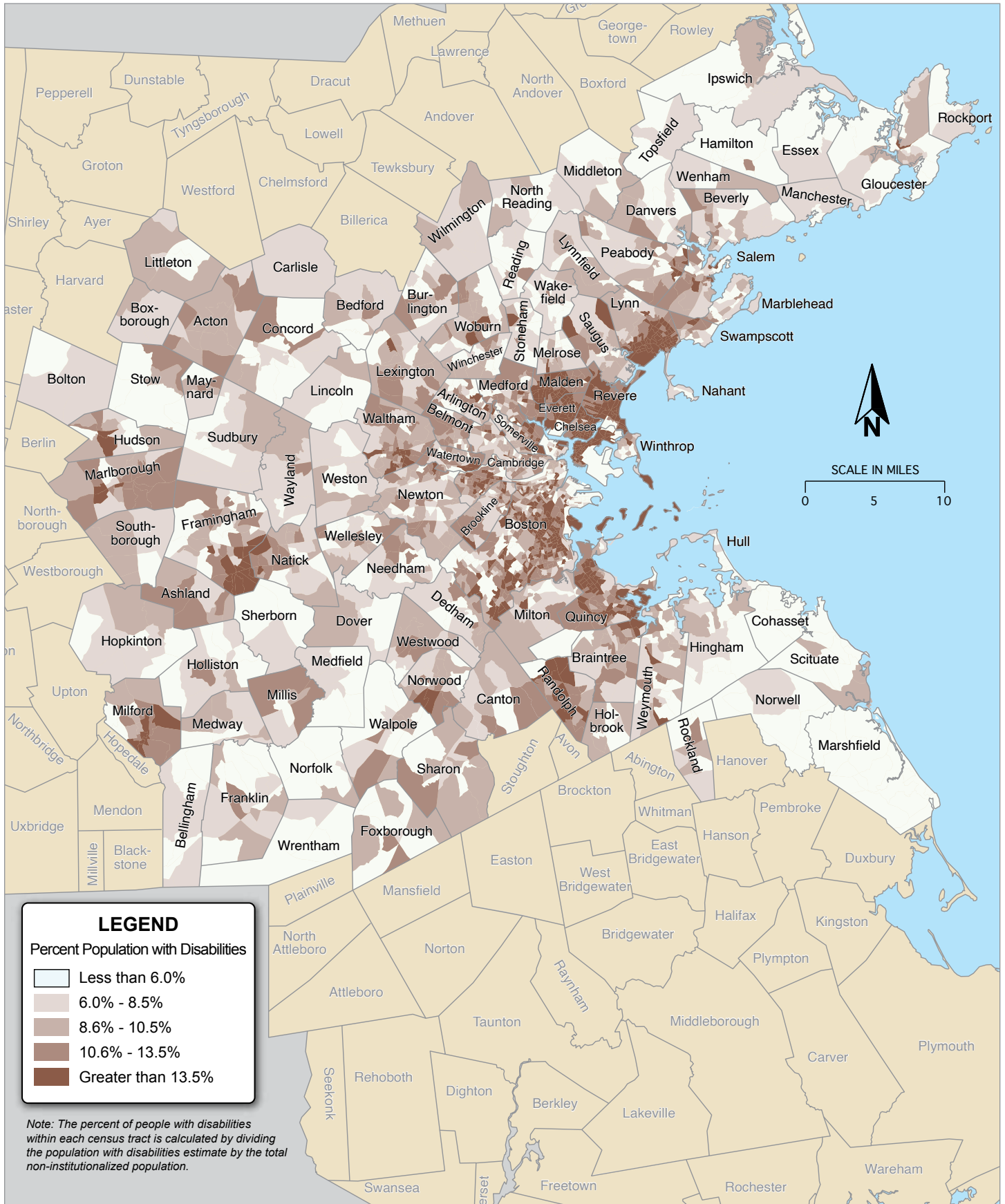


Figure 6-6
Percentage of Older Adults in the Boston Region

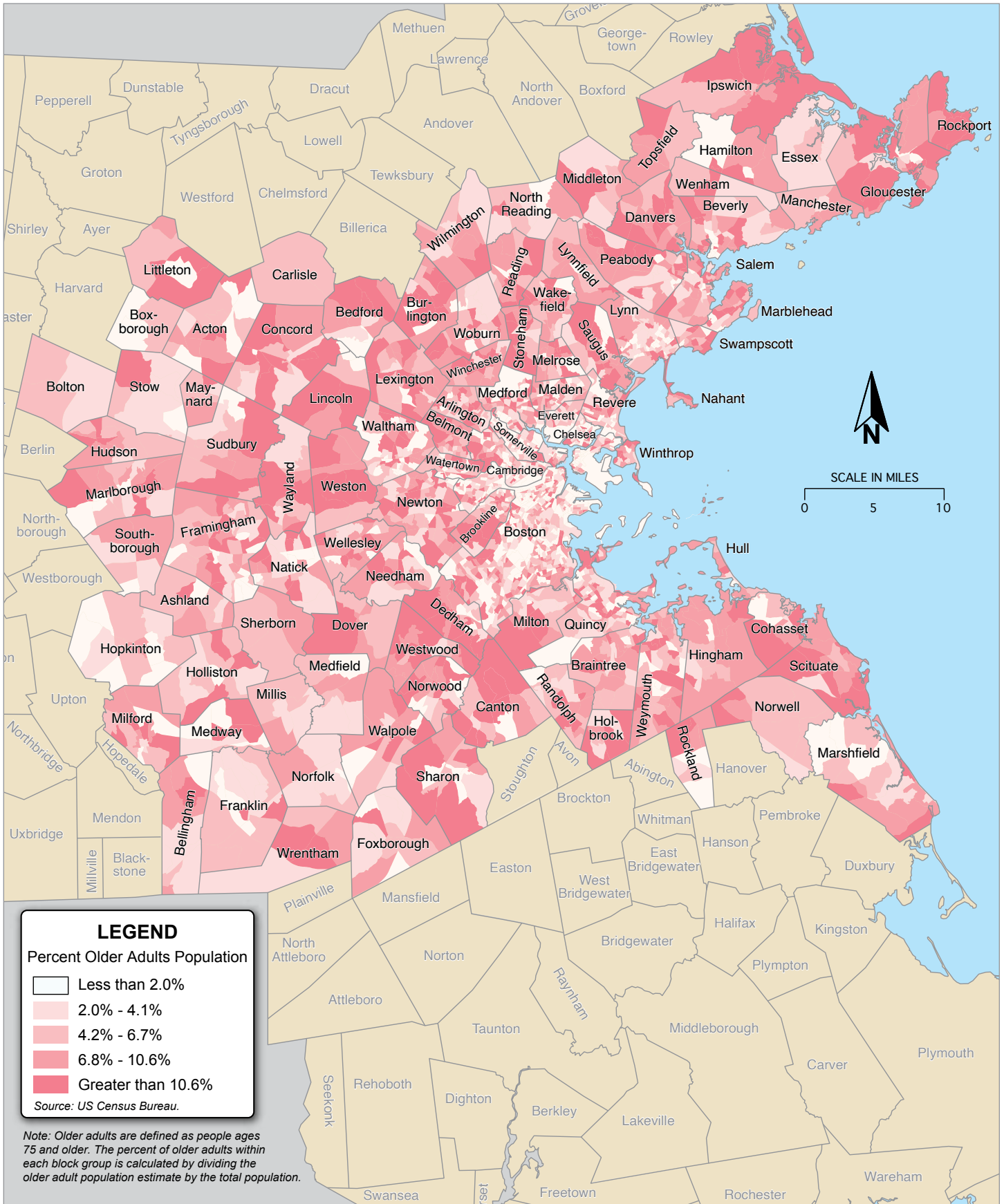
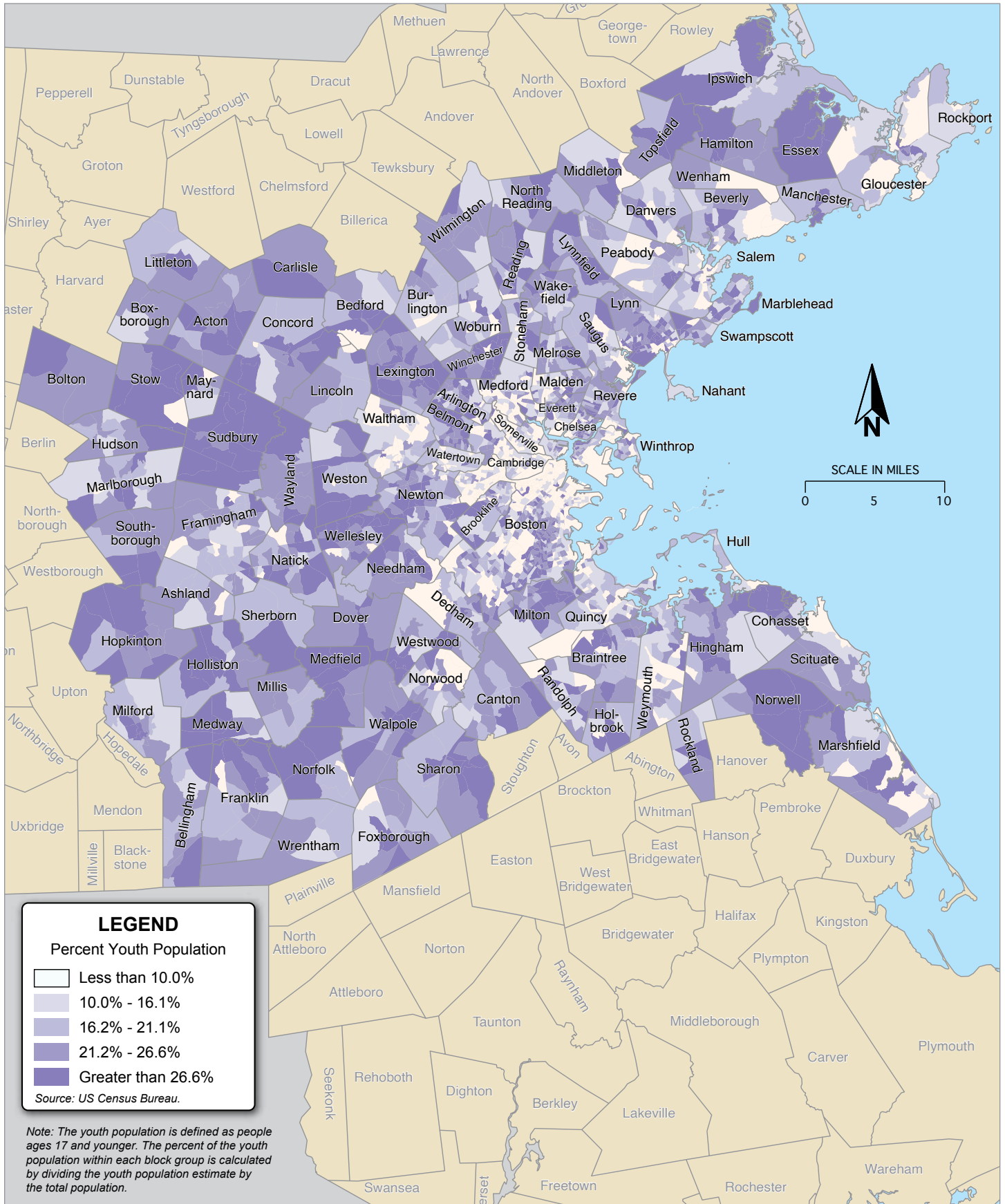


Figure 6-7
Percentage of Youth Population in the Boston Region



Transportation Equity Populations Served or Impacted by Regional Target-funded Projects

The analyses in this section assess which TE populations are likely served or impacted by Regional Target-funded projects. Affected populations are considered those who live in close proximity, defined as one-half mile, from project extents. Geographic proximity is an approximation that helps determine who is likely to use and be impacted by a project. For some projects, such as those in the Bicycle Network and Pedestrian Connections and Complete Streets Programs, this measure is a reasonable representation as these projects are often designed and located in such a way so as to serve local residents. For other projects, such as those in the Major Infrastructure Program, this may be a less accurate representation, given that many users of these types of roadways or public transit lines live outside of the half-mile boundary. Some impacts, however, are local regardless of investment program, such as pollution from carbon monoxide (CO) and other transportation-related emissions. Despite drawbacks, geographical analyses are a readily available approximation of who may be most served and affected by projects funded by the MPO.

Table 6-6
Transportation Equity Populations Served or Impacted by Regional Target Projects

TE Population Group	Regionwide Population	Population Served	Percentage of Total Population Served	Percentage of Regionwide Population
Minority population	1,223,835	278,341	39.4%	36.5%
Low-income population	674,215	147,568	21.4%	20.1%
People with LEP	375,848	79,880	11.5%	11.2%
People with disabilities	342,552	70,085	9.9%	10.2%
Older adult population	232,286	45,609	6.5%	6.9%
Youth population	634,550	132,508	18.8%	18.9%

Notes: As is its usual practice, the MPO has left some funds unallocated in the outer years of the TIP, and this analysis does not reflect those funds.

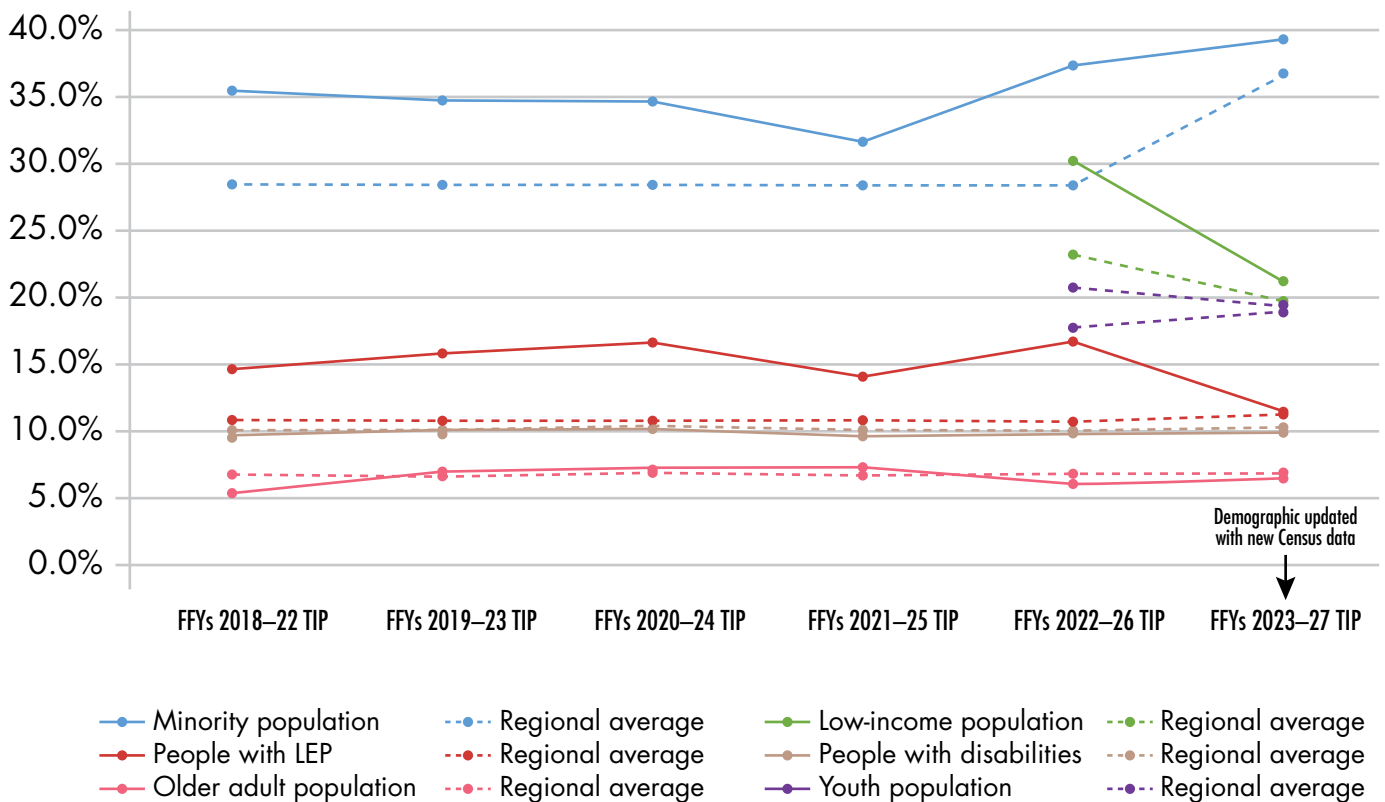
This table does not include the Bridge Rehabilitation of Commonwealth Avenue over the Charles River project as it was evaluated by MassDOT.

LEP = limited English proficiency. TE = transportation equity.

Sources: US Census Bureau, 2015–17 MBTA Systemwide Passenger Survey, and Boston Region MPO.

Figure 6-8 shows the percentage of TE populations served or impacted (out of the entire population served or impacted) by Regional Target projects in the FFYs 2018–22, 2019–23, 2020–24, 2021–25, 2022–26, and 2023–27 TIPs.⁴ (Note that the youth population was added and that the low-income definition changed to its current definition starting in the FFYs 2022–26 TIP; therefore data are shown for these populations starting with the FFYs 2022–26 TIP.) The results show that the percent of TE populations served or impacted have continued to be on par with their respective shares of the Boston region’s population. For the minority population in particular, the percentage has been several percentage points above the regionwide average in every TIP since FFYs 2018–22. For the youth population, the percentage was below its share of the region’s population in the FFYs 2022–26 TIP but is now on par in the FFYs 2023–27 TIP.

Figure 6-8
Change in the Percentage of Transportation Equity Populations Served or Impacted by Regional Target Projects



Notes: People aged 17 or younger were not considered among the TE population until the FFYs 2022–26 TIP. Additionally, starting in the FFYs 2022–26 TIP, the low-income population was defined based on poverty status. (Formerly it was based on household income; this is not shown in the figure as it cannot be compared with the current low-income definition. For information about the data for the FFYs 2018–22, 2019–23, 2020–24, and 2021–25 TIPs, [see the respective documents](#).

As is its usual practice, the MPO has left some funds unallocated in the outer years of each TIP, and this analysis does not reflect those funds. This figure also does not include the Bridge Rehabilitation of Commonwealth Avenue over the Charles River project (110980) as it was evaluated by MassDOT.

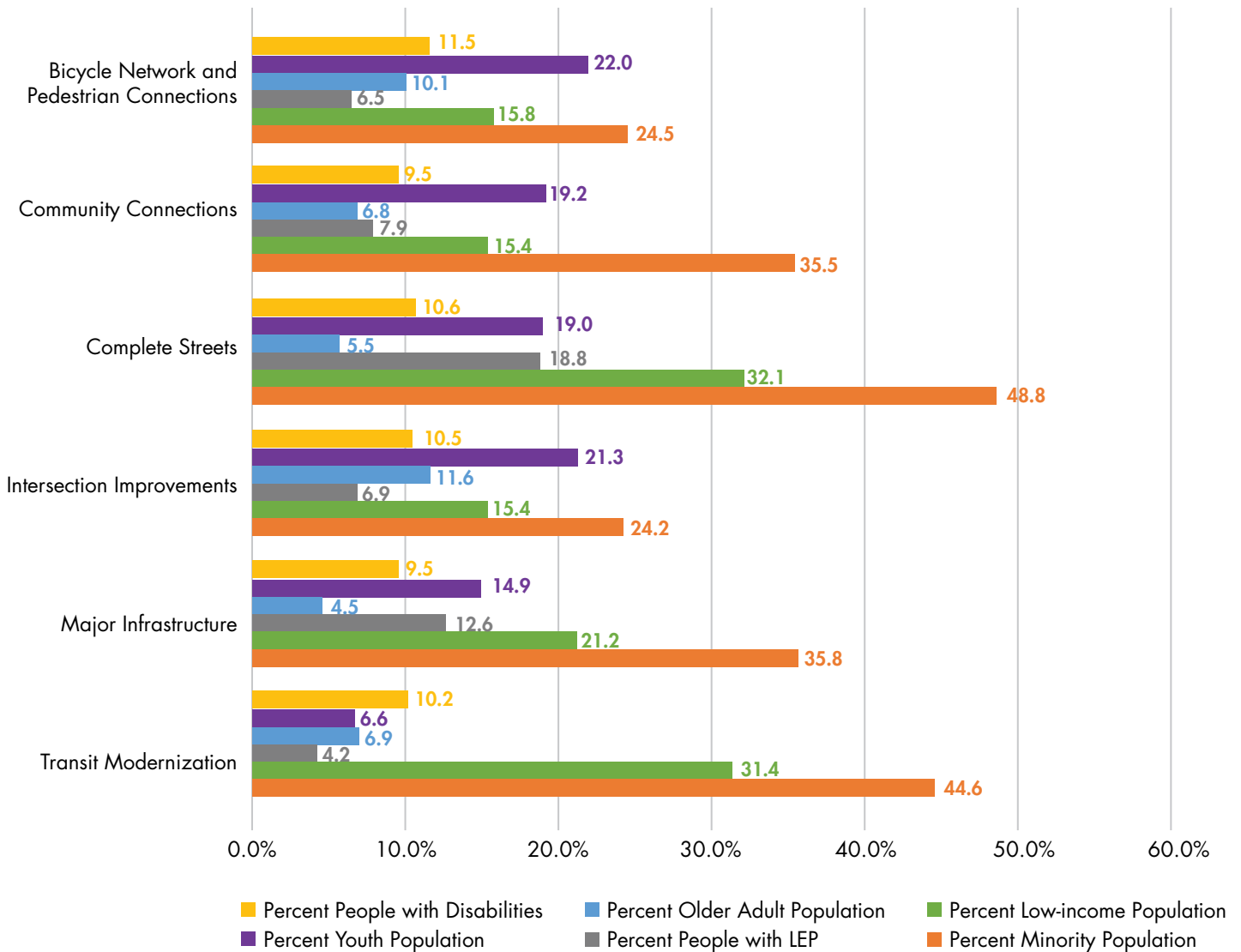
FFY = federal fiscal year. LEP = limited English proficiency. TE = transportation equity. TIP = Transportation Improvement Program.

Sources: US Census Bureau, 2015–17 MBTA Systemwide Passenger Survey, and Boston Region MPO.

⁴ Starting in the FFYs 2022–26 TIP, the methodology for determining the population within a half-mile of projects was updated. A half mile is now measured along the roadway network (excluding limited access highways) rather than as-the-crow-flies, as was done in previous TIPs.

Figure 6-9 shows the percentage of TE populations served or impacted (out of the entire population served or impacted) for each investment program in the FFYs 2023–27 TIP. Some TE populations are likely to benefit from or be impacted by projects in certain investment programs. For example, approximately 19 percent of the population served or impacted by Complete Streets projects are expected have LEP; this percentage is significantly higher than the LEP share of the Boston region’s population, which is 11.2 percent. However, people with LEP are underserved by projects in the Bicycle and Pedestrian Network Connections investments program, with only 6.5 percent of the total population served.

Figure 6-9
Percent of Transportation Equity Populations Served or Impacted by Regional Target Projects by Investment Program



Notes: As is its usual practice, the MPO has left some funds unallocated in the outer years of the TIP, and this analysis does not reflect those funds.

This figure does not include the Bridge Rehabilitation of Commonwealth Avenue over the Charles River project as it was evaluated by MassDOT.

LEP = limited English proficiency. TIP = Transportation Improvement Program.

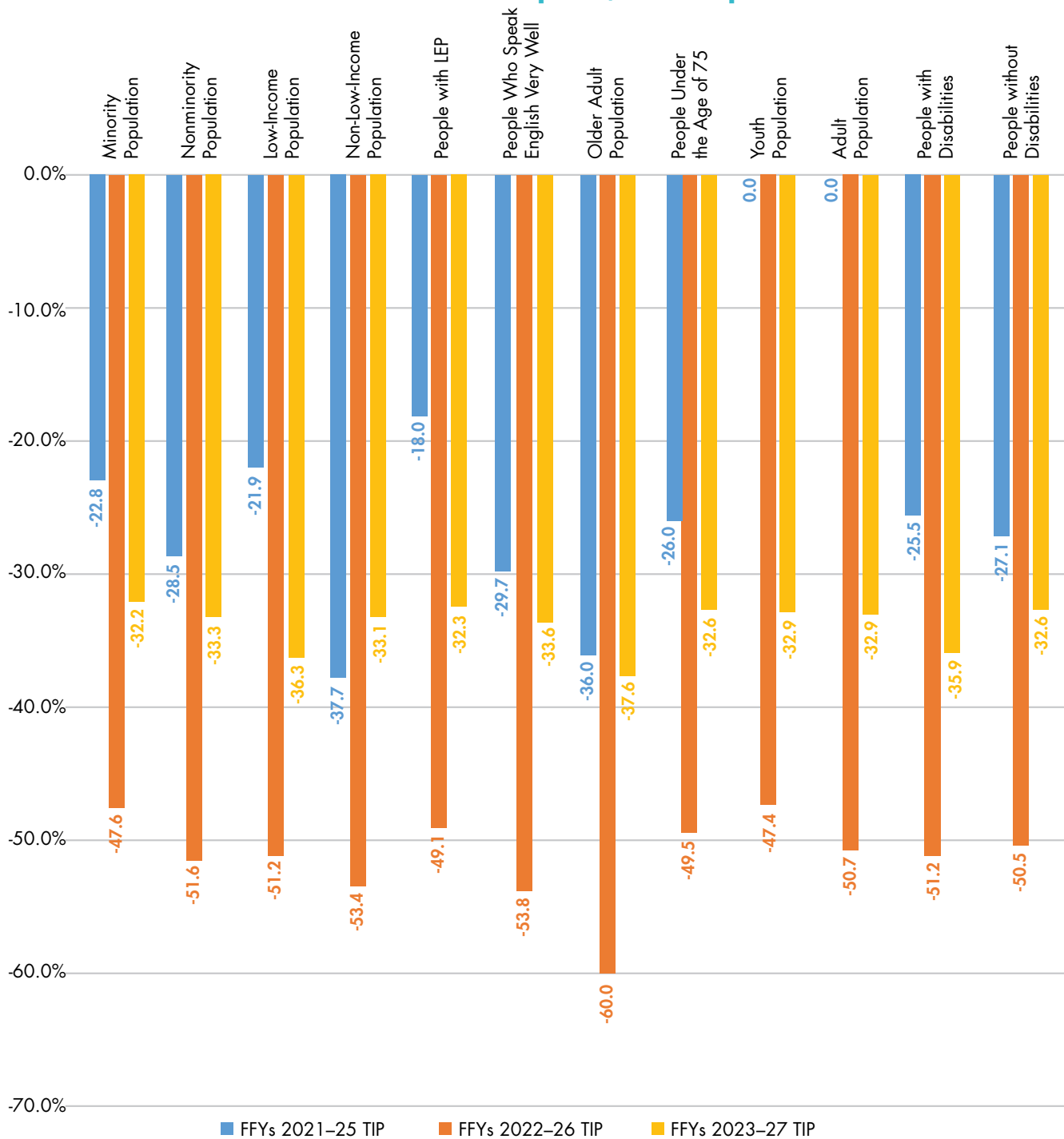
Sources: US Census Bureau, 2015–17 MBTA Systemwide Passenger Survey, and Boston Region MPO.

Transportation Emission Impacts Analysis

Figure 6-10 shows projected changes in emissions for CO, volatile organic compounds (VOC), and nitrogen oxides (NO_x) that would result from the implementation of Regional Target-funded projects and affect TE populations and their non-TE counterparts. Reductions are reported in kilograms per 1,000 people and are shown for the FFYs 2021–25, 2022–26, and 2023–27 TIPs. The changes shown are for each TIP and are not cumulative across all TIPs.

In the FFYs 2021–25 TIP, only the older adult population was likely to receive greater emission reductions than their non-TE counterpart, while in the FFYs 2022–26 TIP this was the case for only older adults and people with disabilities. However, in the FFYs 2023–27 TIP, reductions in emissions are likely to be greater for people with disabilities, the youth population, the older adult population, and the low-income population than for their non-TE counterparts. People with LEP and the minority population are likely to continue to receive less of a reduction of emissions compared their non-TE counterparts; however, that difference is likely to be less than it was in previous TIPs. These results show that the MPO is making progress toward reducing emissions disparities for some TE populations; however, future funding should ensure that the minority population and people with LEP in particular benefit at least as much or more from the emissions reductions resulting from Regional Target projects as their non-TE counterparts.

Figure 6-10
Reduction in Carbon Monoxide, Volatile Organic Compounds, and Nitrogen Oxide Emissions per 1,000 People



Notes: As is its usual practice, the MPO has left some funds unallocated in the outer years of the TIP, and this analysis does not reflect those funds. This table does not include the Bridge Rehabilitation of Commonwealth Avenue over the Charles River project as it was evaluated by MassDOT.

The youth population was not considered a TE population in the FFYs 2021-25 TIP.

CO = carbon monoxide. CMAQ = Congestion Mitigation and Air Quality. FFY = federal fiscal year. LEP = limited English proficiency. N/A = not applicable. NOx = nitrogen oxide. TIP = Transportation Improvement Program. TE = transportation equity. VOC = volatile organic compounds.

Source: US Census Bureau, 2015-17 MBTA Systemwide Passenger Survey, and Boston Region MPO's Congestion Mitigation and Air Quality analyses.

Funding Distribution Analysis

The results of the analyses reported in this section show how Regional Target funds are distributed to projects serving TE populations based on the percentage of the population served by the Regional Target-funded projects. The MPO has programmed approximately \$645 million in Regional Target funding in the FFYs 2023–27 TIP. Like the geographical analyses shown above, this funding distribution analysis assumes that funds allocated to TE populations indicate a benefit. While the MPO strives to ensure that projects selected for funding provide significant transportation improvements to and mitigate potential burdens on TE populations, the complexity of projects and their varied impacts limit the degree to which these outcomes can be ensured.

Table 6-7 shows the percent of funding allocated in the FFYs 2023–27 TIP to Regional Target projects, in the aggregate, that are expected to serve or impact TE populations compared to the share of each TE population within the Boston region. Except for the older adult population, all TE populations will receive a smaller share of funding relative to their share of the regionwide population. The share of TE populations served or impacted is on par or greater than their respective share of the Boston region population (see Table 6-6), which suggests that projects that are expected to serve or impact TE populations are generally smaller projects or projects that will receive a small amount of funding. This does not mean that projects are not providing significant benefits to TE populations, as more funding does not necessarily mean more benefits. While the MPO strives to ensure that projects selected for funding provide significant transportation improvements to and mitigate potential burdens on TE populations, the complexity of projects and their varied impacts limit the degree to which these outcomes can be ensured. More detailed analyses of specific impacts are required to better understand the benefits and burdens TE populations may experience from Regional Target projects, as well as the relationship between funding levels and project benefits.

Table 6-7
Percent of Funding Allocated to Transportation Equity Populations

TE Population	Percentage of Funding Allocated	Percentage of Regionwide Population
Minority population	30.9%	36.5%
Low-income population	18.8%	20.1%
People with LEP	10.0%	11.2%
People with disabilities	9.9%	10.2%
Older adult population	7.5%	6.9%
Youth population	18.2%	18.9%

Notes: As is its usual practice, the MPO has left some funds unallocated in the outer years of the TIP, and this analysis does not reflect those funds.

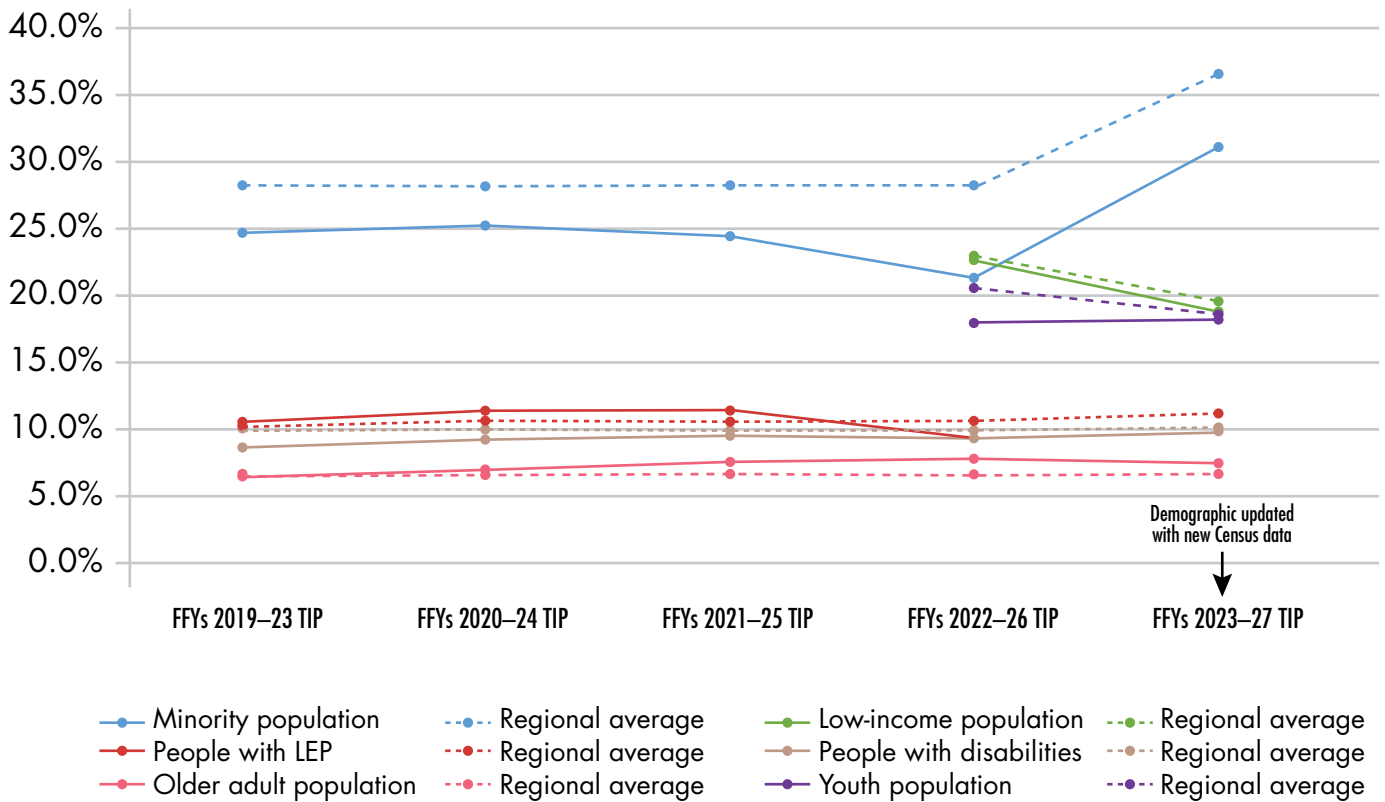
This table does not include the Bridge Rehabilitation of Commonwealth Avenue over the Charles River project as it was evaluated by MassDOT.

LEP = limited English proficiency. TE = transportation equity. TIP = Transportation Improvement Program.

Sources: US Census Bureau, 2015–17 MBTA Systemwide Passenger Survey, and Boston Region MPO.

Figure 6-11 shows the percentage of funding allocated to Regional Target projects that are expected to serve or impact TE populations for the FFYs 2019–23, 2020–24, 2021–25, 2022–26, and 2023–27 TIPs. These data are shown relative to each TE population’s share of their population in the Boston region. Over the past five TIPs, the share of funding allocated to TE populations is approximately level to their share of the Boston region population, except for the minority population. Funding for the minority population has consistently been several percentage points below their share of the region’s population. As described above, funding is only an approximate measure of whether Regional Target projects will likely serve or benefit TE populations, though in general the MPO strives to provide equal or greater funding to TE populations.

Figure 6-11
Change in the Percentage of Funding Allocated to
Transportation Equity Populations



Notes: People ages 17 or younger were not considered as a TE population until the FFYs 2022-26 TIP cycle. Additionally, starting in the FFYs 2022-26 TIP, people with low incomes were defined based on their poverty status for their family size. (Formerly, the definition was based on household income.) The decrease in percent of the low-income population served in the FFYs 2022-26 TIP is largely due to this change, as is the change in the regionwide average. For more information about the data for the FFYs 2019-23, 2020-24, and 2021-25 TIPs, [see the respective documents](#).

As is its usual practice, the MPO has left some funds unallocated in the outer years of the TIP, and this analysis does not reflect those funds.

This figure does not include the Bridge Rehabilitation of Commonwealth Avenue over the Charles River project as it was evaluated by MassDOT.

FFY = federal fiscal year. LEP = limited English proficiency. TE = transportation equity. TIP = Transportation Improvement Program.

Sources: US Census Bureau, 2015-17 MBTA Systemwide Passenger Survey, and Boston Region MPO.

FUTURE ACTIVITIES TO IMPROVE MONITORING OF TRANSPORTATION EQUITY PERFORMANCE

The MPO will continue to explore more sophisticated methods of identifying specific impacts of projects funded with Regional Target dollars and evaluating, as a group, their benefits and burdens on TE populations. MPO staff has developed a similar analysis for the MPO's LRTP and will continue to use it to inform updates and refinements to the equity analyses in the TIP. New analyses are also being developed for the LRTP Needs Assessment, which will involve expanding accessibility analyses and analyses of health and climate impacts. In addition, staff are working on a study, Identifying Transportation Inequities in the Boston Region, which will complement the LRTP work and contribute to the further development of future TIP equity analyses.