



## Percent of Workers Who Commute to Work by Public Transportation

This EnviroAtlas map estimates the percentage of workers residing within each U.S. Census block group who commute to work by public transportation.

### Why is public transportation important?

City planners use metrics that examine commuting modes of travel to evaluate the accessibility of workplaces, the diversity of land use, and the usage of alternative forms of transport. Three out of 4 people in the U.S. drive to work.<sup>1</sup> In 2014, urban Americans spent an extra 6.2 billion hours in traffic congestion at a cost of an extra 3.1 billion gallons of fuel (about \$160 billion).<sup>2</sup> Nationwide, just 5.3% of workers commute to work by public transit. However, 23% of workers with long commutes of 60 minutes or more choose public transit.<sup>3</sup> Though public transportation is a small segment of all commute modes, it has recently seen increased ridership. In 2014, the overall number of transit trips in the U.S. increased to the largest number (over 10 billion) in 58 years.<sup>4</sup>

When people can rely on transit service, they are more likely to choose transit as a preferred travel option. Transit use reduces household costs devoted to owning and maintaining one or more vehicles. Walking access to transit is influenced by the distance between transit stops, the proximity of residential and employment centers, and the design of the surrounding neighborhood (e.g., street grid pattern). While increasing the number of transit stops increases accessibility, it also increases transit trip time.<sup>5</sup> Transit planners must strike a balance between increasing accessibility to attract riders and retaining reasonable commuting trip durations.

Understanding pedestrian movement is an important element in planning transit-oriented development. Walkability is an issue at both the origin and the destination of a transit ride. Studies have shown a relationship between walkable environments and the amount of walking that actually occurs.<sup>6</sup> Two factors influencing the choice of walking or driving are proximity (distance) and connectivity. Two commonly accepted walking distances in transit-use analyses are 0.25 and 0.50 miles; the shorter distance is common for access to bus routes and the longer distance is an acceptable maximum walking distance to reach light rail transit.<sup>6</sup> Besides distance to transit, important factors for walking to be an acceptable option for residents include pedestrian-friendly routes, street grid design, traffic density and speed, sidewalk setback, presence of landscaping and street trees,



lighting, and security.<sup>6</sup> Straight line distance to a destination may be relatively short, but connectivity may be hampered by dead ends or wide arterials.

Transit availability has been associated with lower population-weighted concentrations of some air pollutants.<sup>7</sup> Though a number of studies have linked air pollutants with negative human respiratory health outcomes, fewer have connected increased use of mass transit, subsequent decreased auto emissions, and improved respiratory health. One such study, using data from the 17-day period of the Atlanta, Georgia, Olympic Games in July 1996, found that the traffic restrictions implemented during the Games resulted in a 217% increase in mass transit use, a 28% decrease in peak daily ozone levels, and a 42% decrease in Medicaid child asthma acute-care events.<sup>7</sup>

Communities that pursue compact growth patterns and mixed use development facilitate workplace accessibility by automobile, transit, biking, and walking. Research indicates that people who live in compact neighborhoods walk more, use transit more, and drive less than people living in lower density neighborhoods.<sup>1</sup> Continued progress in improving and extending transit networks into unserved metro areas, including suburbs, will help to reduce vehicle miles traveled and [greenhouse gas emissions](#).

### How can I use this information?

This map allows users to evaluate various census block groups by the percentage of workers who commute to work using public transportation. Federal, state, and local policymakers can use commuting information to understand

workers' transportation choices and make suggestions for improving future transportation infrastructure. Employers can use this information to help workers to adopt alternative transport options. Communities seeking to decrease vehicle miles traveled may encourage transit use in areas already supporting a large working age population. When overlaid with other EnviroAtlas community data layers, such as Percent Tree Cover along Walkable Roads, this map can help prioritize neighborhoods for improvements to shade and aesthetics based on where pedestrian activity is more likely.

This information may also be useful when marketing the availability of areas for development. Planners can use the information to help evaluate whether proposed commercial development may improve or exacerbate regional imbalances between the location of job centers and residential areas. New employment in areas with poor accessibility to residential neighborhoods would likely result in longer commutes and additional traffic on regional highways, particularly if public transportation were lacking. New employment in areas of high accessibility, on the other hand, can provide more residents with opportunities to live closer to jobs, shopping, and services and to take alternate means of travel to work.

### How were the data for this map created?

The metric, Percent of Workers Who Commute to Work, by Public Transportation, was compiled from U.S. Census [American Community Survey \(ACS\)](#) 5-year Summary Data for 2008–2012. ACS obtained the data (Table B08301) at the census block group scale through survey questions related to commuting mode. The data covered workers over 16 years of age and younger than 64 years who were employed during the week prior to the ACS reference week and did not work at home. Respondents answered questions about the means of transportation used to get to work as well as the number

of workers riding in a carpool. The percentage of workers using a specific travel mode was obtained by dividing the number of workers in that category by the total population of workers.

### What are the limitations of these data?

The accuracy of this data layer is limited by the accuracy of the ACS Survey, which could be limited by its multiple data collection agencies, methods, and calculations. Accuracy of ACS data increases with the use of multiple-year summary data and the use of *percentages* of household characteristics rather than *numbers*.

### How can I access these data?

EnviroAtlas data can be viewed in the interactive map, accessed through web services, or downloaded. American Community Survey [annual](#) and [summary file](#) data may be downloaded from the ACS websites. Commuting data may be found on the U.S. Census Bureau website [American Fact Finder](#); enter ID number B08301.

### Where can I get more information?

A selection of resources on the relationships among city planning, commuting modes, and environmental quality is listed below. For additional information on data creation, access the metadata for the data layer from the drop down menu on the interactive map table of contents and click again on metadata at the bottom of the metadata summary page for more details. To ask specific questions about this data layer, please contact the [EnviroAtlas Team](#).

### Acknowledgments

Yan Jiang, EPA Student Services Contractor, generated the data. The fact sheet was created by Yan Jiang, Yongping Yuan, and Anne Neale, U.S. EPA, and Sandra Bryce, Innovate!, Inc.

### Selected Publications

1. Kramer, M. 2013. [Our built and natural environments: A technical review of the interactions among land use, transportation, and environmental quality, Second edition](#). Environmental Protection Agency, Washington, D.C. 139 p.
2. Schrank, D., B. Eisele, T. Lomax, and J. Bak. 2015. [Urban mobility scorecard](#). Report published jointly by the Texas A&M Transportation Institute and Inrix, Inc. 47 p.
3. McKenzie, B. 2013. [Out-of-state and long commutes: 2011](#). American Community Survey Report 20. U.S. Census Bureau, Washington, D.C.
4. American Public Transportation Association. 2015. [Record 10.8 billion trips taken on U.S. public transportation in 2014](#). Accessed September 2015.
5. Murray, A.T., and X. Wu. 2003. [Accessibility tradeoffs in public transit planning](#). *Journal of Geographic Systems* 5:93–107.
6. Schlossberg, M., and N. Brown. 2004. [Comparing transit-oriented development sites by walkability indicators](#). *Transportation Research Record* 1887:34–42.
7. Friedman, M.S., K.E. Powell, L. Hutwagner, L.M. Graham, and W.G. Teague. 2001. [Impact of changes in transportation and commuting behaviors during the 1996 Summer Olympic Games in Atlanta on air quality and childhood asthma](#). *Journal of the American Medical Association* 285(7):897–905.