Number of Workers (Home Location)

This EnviroAtlas national demographics map layer estimates the total number of workers by home location within each 2010 U.S. Census block group.

Why is the number of workers important?

Number of workers is one of many measures or variables used by city planners to examine the proportions of residents, jobs, and services in urban areas and to guide development planning for efficient city design and transit networks. Number of workers gives an overall view of the working population within each block group, while other metrics for population density, wage class, or auto ownership give a more detailed picture. For example, to be cost-effective, light rail systems require about 30 people per acre residing within ½ mile of transit stations, and heavy rail needs about 50% more residents or 45 people per acre.[1]

From a city planning perspective, it is most efficient to have a large working age population near concentrations of jobs. Resident workers with easy accessibility to jobs in various wage classes can reduce not only vehicle miles traveled (VMT) but fuel consumption and greenhouse gas emissions (GHGs) associated with employee commuting trips. In addition to reducing fuel consumption and congestion, the local economy and standard of living benefit by having a large working age population with easy access to available jobs. A U.S. research study found that doubling the number of jobs accessible to workers living within 20 minutes driving time led to a 6.5% increase in real average wages.[2]

Knowing the distribution of working populations is prerequisite to planning for affordable housing centers that are accessible to jobs of all wage classes. The occurrence of affordable-accessible housing is a useful measure of equity in city planning. The development of affordable housing is an antidote to gentrification, which often replaces low- and middle-income housing with housing for more affluent residents. A common benchmark states that housing and transport should together total less than 45% of personal income.[3] Research has shown that the proportion of household budgets devoted to housing and transportation tends to be a larger proportion of the total at lower income levels. Low-income households have more difficulty affording housing in urban areas and transport costs in suburban areas. Transport costs alone can vary from about 10% of earnings in compact communities up to about 25% in automobile-dependent suburban communities.[3]

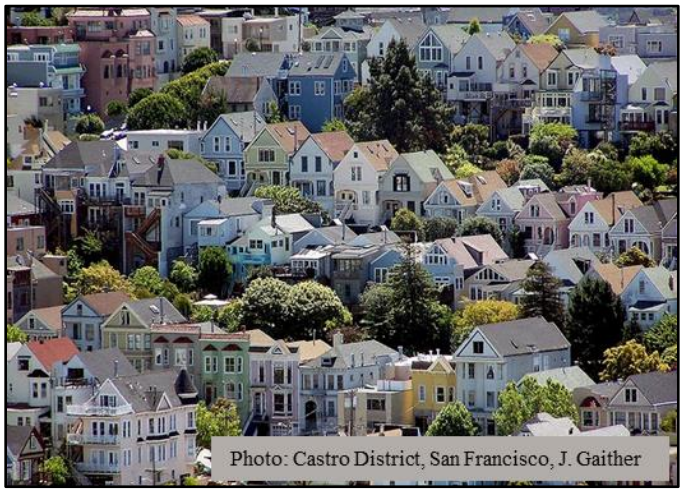
Photo: Castro District, San Francisco, J. Gaither

Dispersion of employment to the suburbs can create reduced worker accessibility from longer average trip distances, increased traffic, and lack of public transit in outlying areas. To counter this trend, Smart Growth planning programs promote the development of compact neighborhoods, with a diversity of residences, employment opportunities, and services. Research indicates that people who live in compact neighborhoods walk more, use transit more, and drive less than people living in lower density neighborhoods.[4]

Planning strategies for compact neighborhoods promote housing in job-rich areas and new employment centers in dense residential zones in addition to planning for walkable and bike-able neighborhoods and increased access to public transportation. Consistently reducing private auto usage through urban development design guidelines nationwide may help to improve air quality and public health through lower greenhouse gas emissions. Recent research indicates that doubling residential density across an urban area may reduce household vehicle miles traveled by 5–12%.[5]

How can I use this information?

This map, Number of Workers (Home Location), allows users to evaluate various block groups by the size of the resident working population relative to other characteristics. Using this map to identify the number of resident workers by census block group within an area of study can be useful in a number of urban planning contexts. Comparing this map to areas of relatively high job density may indicate the effectiveness of community design and road networks to link potential workers with job opportunities.

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Planners may want to promote increased housing in block groups with high employment density and a low resident working population. They may identify neighborhoods with optimal numbers of jobs and housing that can support new or enhanced transit service. Economic development agencies in regions with limited transit service may use this map to encourage the siting of new workplaces in areas that are highly accessible to the regional workforce. Localities may also consider numbers and age classes of residents when prioritizing neighborhood improvements.

This data layer may be compared to other EnviroAtlas demographic and Smart Location data layers, such as density and diversity measures. The aerial-image base map (seen by increasing the transparency of the map layers) can be used to show the spatial distribution of the built environment within the block groups. For select communities, users can overlay EnviroAtlas community land cover maps that show impervious surfaces, street trees, and other common land covers at 1-meter resolution.

How were the data for this map created?

The 2010 Census LEHD (Longitudinal Employer-Household Dynamics) database gave the total number of workers in their home location by U.S. Census block group. The number of workers was summarized from LEHD Residence Area Characteristics (RAC) tables that report employment based on worker residence. The metric, listed as "Workers," may be found in the Smart Location Database User Guide.

What are the limitations of these data?

A block-group is a collection of census blocks, the smallest area mapped by the U.S. Census Bureau. It is important to remember that jobs or residences are not distributed evenly throughout the area of a block-group. A diversity of land uses or activities may be sparsely distributed in large census block groups. On the other hand, a small block group may be uniform and low in diversity, but it may be located within easy access to a more diverse block group. Using the aerial-image base map will give an indication of the proportions of developed and undeveloped land in each census block group. The U.S. Census Bureau maintains a website on methodology and reliability of data.

How can I access these data?

EnviroAtlas data can be viewed in the interactive map, accessed through web services, or downloaded. Data from the 2010 U.S. Census may be viewed and downloaded from the census website.

Where can I get more information?

A selection of resources on the relationships among workers, city planning, and environmental quality is listed below. More details about this metric are available in the Smart Location Database User Guide. In addition, EPA's Smart Growth Program provides tools, resources, and technical assistance to communities seeking to pursue compact, mixed-use, walkable, and transit-oriented development strategies to protect public health and the environment. For information on how city planning strategies may affect human health, visit the Eco-Health Relationship Browser. For additional information on the data creation process, 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

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Selected Publications

1. Cervero, R., and E. Guerra. 2011. Urban densities and transit: A multi-dimensional perspective. Working Paper UCB-ITS-VWP-2011-6, Institute of Transportation Studies, University of California, Berkeley.

2. Melo, P.C., D.J. Graham, D. Levinson, and S. Aarabi. 2012. Agglomeration, accessibility, and productivity: Evidence for urbanized areas in the U.S. Paper submitted to the Transportation Research Board 92nd Annual Meeting, January 13–17, 2013, Washington, D.C. 20 p.

3. Litman, T. 2014. Affordable-accessible housing in a dynamic city: Why and how to increase affordable housing development in accessible locations. Victoria Transport Policy Institute, Victoria, B.C.

4. 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.

5. National Research Council. 2009. Driving and the built environment: The effects of compact development on motorized travel, energy use, and CO_2 emissions. Special Report 298, The National Academies Press, Washington, D.C. 240 p.

Ewing, R., M. Greenwald, M. Zhang, J. Walters, M. Feldman, R. Cervero, L. Frank, and J. Thomas. 2011. Traffic generated by mixed-use developments: Six-region study using consistent built environmental measures. *Journal of Urban Planning and Development* (September): 248–261.