

# Access Across America: Walking 2014

Final Report

*Prepared by:*

**Andrew Owen  
David Levinson  
Brendan Murphy**

Accessibility Observatory  
Department of Civil, Environmental,  
and Geo- Engineering  
University of Minnesota

CTS 15-03

**ACCESSIBILITY  
OBSERVATORY**

---

UNIVERSITY OF MINNESOTA

## Technical Report Documentation Page

1. Report No. CTS 15-03	2.	3. Recipients Accession No.	
4. Title and Subtitle Access Across America: Walking 2014		5. Report Date May 2015	
		6.	
7. Author(s) Andrew Owen, David Levinson, Brendan Murphy		8. Performing Organization Report No.	
9. Performing Organization Name and Address Accessibility Observatory Department of Civil, Environmental, and Geo- Engineering University of Minnesota 500 Pillsbury Drive SE Minneapolis, MN 55455		10. Project/Task/Work Unit No.	
		11. Contract (C) or Grant (G) No.	
12. Sponsoring Organization Name and Address Center for Transportation Studies University of Minnesota 200 Transportation and Safety Building 511 Washington Ave. SE Minneapolis, MN 55455		13. Type of Report and Period Covered Final Report	
		14. Sponsoring Agency Code	
15. Supplementary Notes <a href="http://ao.umn.edu/publications/">http://ao.umn.edu/publications/</a> <a href="http://www.cts.umn.edu/Publications/ResearchReports/">http://www.cts.umn.edu/Publications/ResearchReports/</a>			
16. Abstract (Limit: 250 words) <p>Accessibility is the ease of reaching valued destinations. It can be measured for various transportation modes, to different types of destinations, and at different times of day. There are a variety of ways to define accessibility, but the number of destinations reachable within a given travel time is the most comprehensible and transparent, as well as the most directly comparable across cities.</p> <p>This study estimates the accessibility to jobs by walking in the 50 largest (by population) metropolitan areas in the United States, and is a companion study to our <i>Access Across America: Transit 2014</i> report. Rankings are determined by a weighted average of accessibility, giving a higher weight to closer jobs. Jobs reachable within ten minutes are weighted most heavily, and jobs are given decreasing weights as travel time increases up to 60 minutes.</p> <p>This report presents detailed accessibility values for each metropolitan area, as well as block-level maps which illustrate the spatial patterns of accessibility within each area. A separate publication, <i>Access Across America: Walking 2014 Methodology</i>, describes the data and methodology used in this evaluation.</p>			
17. Document Analysis/Descriptors Accessibility; walking; pedestrian traffic; walkability; walking distance; land use; travel time; travel behavior; urban transportation; work trips; commuting		18. Availability Statement No restrictions. Document available from: National Technical Information Services, Alexandria, Virginia 22312	
19. Security Class (this report) Unclassified	20. Security Class (this page) Unclassified	21. No. of Pages 121	22. Price

# **Access Across America: Walking 2014**

Final Report

*Prepared by:*

Andrew Owen  
David Levinson  
Brendan Murphy

Accessibility Observatory  
Department of Civil, Environmental, and Geo- Engineering  
University of Minnesota

May 2015

*Published by:*

Center for Transportation Studies  
University of Minnesota  
200 Transportation and Safety Building  
511 Washington Ave. S.E.  
Minneapolis, Minnesota 55455

# Acknowledgments

This report was made possible by funding from the University of Minnesota's Center for Transportation Studies and Department of Civil, Environmental, and Geo- Engineering. The authors also acknowledge the assistance of Chelsey Palmateer, Eric Hauser, Morgan Kuehn, and Margot Kadziolka in data collection and preparation.

# Contents

- 1 Introduction** **1**
  
- 2 Accessibility to Jobs by Walking** **3**
  - 2.1 Accessibility Evaluation Results . . . . . 3
  - 2.2 Metropolitan Area Rankings . . . . . 3
  
- 3 Discussion** **6**
  - 3.1 Land Use Effects . . . . . 6
  - 3.2 Comparing Accessibility with Other Indicators . . . . . 7
  - 3.3 Conclusions . . . . . 12
  
- 4 Metropolitan Area Data and Maps** **13**

## Executive Summary

Accessibility is the ease of reaching valued destinations. Accessibility can be measured for various transportation modes, to different types of destinations, and at different times of day. There are a variety of ways to define accessibility, but the number of destinations reachable within a given travel time is the most comprehensible and transparent — as well as the most directly comparable across cities. This report focuses on accessibility to jobs by walking. Jobs are the most significant non-home destination, but it is also possible to measure accessibility to other types of destinations. While walking mode-share for commute trips nationally is around 2.8%, and 5.0% within large cities, walking has historically been one of the most important transportation modes in urban environments.

This study estimates the accessibility to jobs by walking in the 50 largest (by population) metropolitan areas in the United States, and is a companion study to our *Access Across America: Transit 2014* report<sup>1</sup>.

Rankings are determined by a weighted average of accessibility, giving a higher weight to closer jobs. Jobs reachable within ten minutes are weighted most heavily, and jobs are given decreasing weights as travel time increases up to 60 minutes. Based on this measure, the ten metro areas with the greatest accessibility to jobs by walking, and for which sufficient data are available, are:

1. New York
2. San Francisco
3. Los Angeles
4. Chicago
5. Washington
6. Seattle
7. Boston
8. Philadelphia
9. San Jose
10. Denver

This report presents detailed accessibility values for each metropolitan area, as well as block-level maps which illustrate the spatial patterns of accessibility within each area. A separate publication, *Access Across America: Walking 2014 Methodology*, describes the data and methodology used in this evaluation.

---

<sup>1</sup>[Owen and Levinson \(2014\)](#)

# 1 Introduction

Accessibility is the ease of reaching valued destinations. It combines the simpler metric of mobility with the understanding that travel is driven by a desire to reach destinations. Accessibility can be measured for various transportation modes, to different types of destinations, and at different times of day. There are a variety of ways to define accessibility, but the number of destinations reachable within a given travel time is the most comprehensible and transparent — as well as the most directly comparable across cities. This report focuses on accessibility to jobs by walking. Jobs are the most significant non-home destination, but it is also possible to measure accessibility to other types of destinations. Walking is used for an estimated 2.8% of commuting trips in the United States, making it the third most widely used commute mode after driving and transit<sup>2</sup>. The commute mode share of walking can be higher in individual metropolitan areas: 15.1% in Boston; 12.1% in Washington, DC; 11.3% in Pittsburgh<sup>3</sup>.

Accessibility is not a new idea<sup>4</sup>. Historically, however, implementations of accessibility evaluation have typically focused on individual cities or metropolitan areas. Recent work has demonstrated the feasibility and value of systematically evaluating accessibility across multiple metropolitan areas by auto<sup>5</sup> and by transit<sup>6</sup>. Work by Iacono et al. discussed details and methodology in evaluating walking-based accessibility<sup>7</sup>.

This study estimates the accessibility to jobs by walking in the 50 largest (by population) metropolitan areas in the United States. Some metropolitan areas were excluded in the companion report *Access Across America: Transit 2014* due to a lack of available transit schedule data, but are included in this walking report. These cities are Jacksonville, Memphis, Oklahoma City, and Richmond. [Table 1](#) lists all included included metropolitan areas, ordered by the total employment within each.

Travel times by walking are calculated using detailed pedestrian networks in all cities included in the study. Walking travel times were not modeled to vary throughout the day, in contrast to the travel time variances produced by transit schedules when calculating transit travel times.

[Section 2](#) presents the accessibility values for the included metropolitan areas and ranks metropolitan areas by accessibility. [Section 3](#) discusses these results and their implications. [Section 4](#) provides data and maps describing patterns of accessibility in individual metropolitan areas. A separate document, *Access Across America: Walking 2014 Methodology*, describes the data and methodology used in the evaluation.

---

<sup>2</sup>[McKenzie \(2014\)](#)

<sup>3</sup>American Community Survey 2012 5-year estimates

<sup>4</sup>See [Hansen \(1959\)](#) for its origins, and [Geurs and Van Eck \(2001\)](#) and [Handy and Niemeier \(1997\)](#) for reviews.

<sup>5</sup>[Levinson \(2013\)](#), [Levine et al. \(2012\)](#)

<sup>6</sup>[Ramsey and Bell \(2014\)](#), [Tomer et al. \(2011\)](#)

<sup>7</sup>[Iacono et al. \(2010\)](#)

Table 1: Metropolitan Areas Ranked by Total Employment

Rank	Area	Total Employment
1	New York	8,102,471
2	Los Angeles	5,239,396
3	Chicago	4,156,582
4	Boston*	3,402,940
5	Dallas	2,864,933
6	Philadelphia	2,690,018
7	Washington	2,647,658
8	Houston	2,543,501
9	Miami	2,194,802
10	Atlanta	2,180,785
11	San Francisco	1,900,319
12	Detroit	1,712,027
13	Phoenix	1,652,995
14	Minneapolis	1,652,044
15	Seattle	1,538,625
16	Riverside	1,470,777
17	San Diego	1,263,188
18	St. Louis	1,261,977
19	Baltimore	1,243,101
20	Denver	1,180,703
21	Tampa	1,108,850
22	Pittsburgh	1,083,900
23	Portland	982,307
24	Cincinnati	951,583
25	Kansas City	944,847
26	Orlando	930,605
27	Cleveland	925,055
28	San Antonio	862,085
29	Sacramento	839,857
30	Columbus	834,633
31	Providence	828,037
32	Indianapolis	813,598
33	Las Vegas	799,219
34	Austin	790,961
35	San Jose	789,455
36	Charlotte	771,127
37	Milwaukee	742,523
38	Nashville	701,990
39	Virginia Beach	684,496
40	Louisville	576,300
41	Richmond	567,115
42	Jacksonville	560,881
43	Hartford	560,748
44	Memphis	551,218
45	Oklahoma City	524,741
46	Buffalo	522,212
47	Raleigh	520,476
48	Salt Lake City	507,658
49	Birmingham	455,937
50	New Orleans	454,816

*Employment totals are based on LEHD estimates and may not match other sources.*

*\*LEHD data is not available for Massachusetts. Data for Boston are drawn from the EPA Smart Location Database.*



## 2 Accessibility to Jobs by Walking

### 2.1 Accessibility Evaluation Results

[Table 2](#) gives the accessibility values for each metropolitan area, in alphabetical order, based on pedestrian walking networks. The columns represent the number of jobs that a typical worker residing in the city can reach within 10, 20, 30, 40, 50 and 60 minutes of travel, by walking.

### 2.2 Metropolitan Area Rankings

The rankings of accessibility across U.S. cities for 2014 are shown in [Table 3](#). The first column provides a weighted average, where the jobs reachable within each threshold are given a decreasing weight as travel time increases. A job reachable within 10 minutes counts more towards the ranking than a job reachable within 20, and so on. The 10 metro areas whose workers can, on average, reach the most jobs are listed below. Within the specific time thresholds, the rankings vary.

1. New York
2. San Francisco
3. Los Angeles
4. Chicago
5. Washington
6. Seattle
7. Boston
8. Philadelphia
9. San Jose
10. Denver

Additional details about each metropolitan area, including block-level maps of accessibility, are presented in [Section 4](#).

Table 2: Cumulative Number of Jobs Reachable by Number of Minutes, 2014

Area	10 min	20 min	30 min	40 min	50 min	60 min
<b>Atlanta</b>	267	1,219	3,102	6,141	10,267	15,343
<b>Austin</b>	441	2,253	5,916	11,561	18,907	27,535
<b>Baltimore</b>	561	2,780	6,850	12,506	19,611	27,881
<b>Birmingham</b>	180	767	1,969	3,715	6,075	8,928
<b>Boston</b>	1,027	4,489	9,988	17,338	26,733	37,370
<b>Buffalo</b>	397	2,065	5,167	9,565	15,177	21,906
<b>Charlotte</b>	262	1,273	2,937	5,517	9,058	13,444
<b>Chicago</b>	1,240	6,008	13,965	24,047	35,947	50,065
<b>Cincinnati</b>	277	1,326	3,290	6,271	10,235	15,024
<b>Cleveland</b>	346	1,617	3,961	7,535	12,402	18,451
<b>Columbus</b>	374	1,706	4,280	8,306	13,702	20,340
<b>Dallas</b>	397	2,009	5,118	9,844	16,232	24,351
<b>Denver</b>	673	3,325	8,191	15,101	23,646	33,787
<b>Detroit</b>	295	1,493	3,824	7,326	12,065	18,109
<b>Hartford</b>	387	2,011	4,944	9,003	14,116	19,742
<b>Houston</b>	473	2,367	6,008	11,539	18,805	27,743
<b>Indianapolis</b>	287	1,373	3,431	6,618	11,080	16,555
<b>Jacksonville</b>	260	993	2,383	4,378	7,082	10,289
<b>Kansas City</b>	312	1,514	3,742	7,065	11,321	16,677
<b>Las Vegas</b>	265	1,618	4,721	10,010	17,312	26,930
<b>Los Angeles</b>	1,097	5,904	14,490	26,646	42,454	62,403
<b>Louisville</b>	262	1,275	3,236	6,200	10,442	15,932
<b>Memphis</b>	220	1,060	2,712	5,406	9,196	13,821
<b>Miami</b>	626	2,906	6,872	12,681	20,176	29,263
<b>Milwaukee</b>	756	3,203	7,444	13,564	21,470	31,148
<b>Minneapolis</b>	446	2,392	6,063	11,427	18,415	26,793
<b>Nashville</b>	320	1,187	2,989	5,730	9,302	13,588
<b>New Orleans</b>	441	2,166	5,274	9,683	15,355	21,736
<b>New York</b>	4,955	22,043	47,338	78,970	116,372	157,061
<b>Oklahoma City</b>	261	1,400	3,482	6,672	10,860	15,887
<b>Orlando</b>	251	1,174	3,030	5,823	9,730	14,585
<b>Philadelphia</b>	932	4,341	9,929	17,526	27,053	38,085
<b>Phoenix</b>	289	1,755	4,725	9,325	15,417	23,056
<b>Pittsburgh</b>	490	1,819	4,048	7,419	12,031	17,248
<b>Portland</b>	646	3,052	7,137	12,988	20,747	29,973
<b>Providence</b>	509	2,404	5,831	10,677	16,739	23,710
<b>Raleigh</b>	247	1,623	4,300	7,276	10,705	15,108
<b>Richmond</b>	318	1,436	3,615	6,780	10,873	15,842
<b>Riverside</b>	178	959	2,613	5,006	8,164	11,978
<b>Sacramento</b>	516	2,423	5,687	10,073	15,475	21,698
<b>Salt Lake City</b>	405	2,415	6,242	12,029	19,697	29,078
<b>San Antonio</b>	302	1,495	4,087	7,979	13,327	20,135
<b>San Diego</b>	600	2,781	6,202	10,979	17,197	24,849
<b>San Francisco</b>	1,896	9,944	23,428	38,783	55,603	73,492
<b>San Jose</b>	574	3,263	8,476	16,625	27,575	41,037
<b>Seattle</b>	1,103	5,017	11,028	18,295	26,621	35,812
<b>St. Louis</b>	334	1,553	3,784	7,113	11,506	17,029
<b>Tampa</b>	291	1,437	3,705	7,055	11,351	16,543
<b>Virginia Beach</b>	275	1,275	3,165	5,995	9,827	14,528
<b>Washington</b>	1,098	5,331	12,310	22,139	34,275	48,185

Table 3: Rank of Accessibility by Metropolitan Area, 2014

Rank	Weighted Average	10 min	20 min	30 min	40 min	50 min	60 min
1	<b>New York</b>	New York	New York	New York	New York	New York	New York
2	<b>San Francisco</b>	San Francisco	San Francisco	San Francisco	San Francisco	San Francisco	San Francisco
3	<b>Los Angeles</b>	Chicago	Chicago	Los Angeles	Los Angeles	Los Angeles	Los Angeles
4	<b>Chicago</b>	Seattle	Los Angeles	Chicago	Chicago	Chicago	Chicago
5	<b>Washington</b>	Washington	Washington	Washington	Washington	Washington	Washington
6	<b>Seattle</b>	Los Angeles	Seattle	Seattle	Seattle	San Jose	San Jose
7	<b>Boston</b>	Boston	Boston	Boston	Philadelphia	Philadelphia	Philadelphia
8	<b>Philadelphia</b>	Philadelphia	Philadelphia	Philadelphia	Boston	Boston	Boston
9	<b>San Jose</b>	Milwaukee	Denver	San Jose	San Jose	Seattle	Seattle
10	<b>Denver</b>	Denver	San Jose	Denver	Denver	Denver	Denver
11	<b>Milwaukee</b>	Portland	Milwaukee	Milwaukee	Milwaukee	Milwaukee	Milwaukee
12	<b>Portland</b>	Miami	Portland	Portland	Portland	Portland	Portland
13	<b>Miami</b>	San Diego	Miami	Miami	Miami	Miami	Miami
14	<b>Baltimore</b>	San Jose	San Diego	Baltimore	Baltimore	Salt Lake City	Salt Lake City
15	<b>San Diego</b>	Baltimore	Baltimore	Salt Lake City	Salt Lake City	Baltimore	Baltimore
16	<b>Salt Lake City</b>	Sacramento	Sacramento	San Diego	Austin	Austin	Houston
17	<b>Houston</b>	Providence	Salt Lake City	Minneapolis	Houston	Houston	Austin
18	<b>Minneapolis</b>	Pittsburgh	Providence	Houston	Minneapolis	Minneapolis	Las Vegas
19	<b>Austin</b>	Houston	Minneapolis	Austin	San Diego	Las Vegas	Minneapolis
20	<b>Providence</b>	Minneapolis	Houston	Providence	Providence	San Diego	San Diego
21	<b>Sacramento</b>	Austin	Austin	Sacramento	Sacramento	Providence	Dallas
22	<b>New Orleans</b>	New Orleans	New Orleans	New Orleans	Las Vegas	Dallas	Providence
23	<b>Dallas</b>	Salt Lake City	Buffalo	Buffalo	Dallas	Sacramento	Phoenix
24	<b>Buffalo</b>	Dallas	Hartford	Dallas	New Orleans	Phoenix	Buffalo
25	<b>Las Vegas</b>	Buffalo	Dallas	Hartford	Buffalo	New Orleans	New Orleans
26	<b>Hartford</b>	Hartford	Pittsburgh	Phoenix	Phoenix	Buffalo	Sacramento
27	<b>Phoenix</b>	Columbus	Phoenix	Las Vegas	Hartford	Hartford	Columbus
28	<b>Columbus</b>	Cleveland	Columbus	Raleigh	Columbus	Columbus	San Antonio
29	<b>Pittsburgh</b>	St. Louis	Raleigh	Columbus	San Antonio	San Antonio	Hartford
30	<b>San Antonio</b>	Nashville	Las Vegas	San Antonio	Cleveland	Cleveland	Cleveland
31	<b>Cleveland</b>	Richmond	Cleveland	Pittsburgh	Pittsburgh	Detroit	Detroit
32	<b>Detroit</b>	Kansas City	St. Louis	Cleveland	Detroit	Pittsburgh	Pittsburgh
33	<b>St. Louis</b>	San Antonio	Kansas City	Detroit	Raleigh	St. Louis	St. Louis
34	<b>Raleigh</b>	Detroit	San Antonio	St. Louis	St. Louis	Tampa	Kansas City
35	<b>Kansas City</b>	Tampa	Detroit	Kansas City	Kansas City	Kansas City	Indianapolis
36	<b>Tampa</b>	Phoenix	Tampa	Tampa	Tampa	Indianapolis	Tampa
37	<b>Richmond</b>	Indianapolis	Richmond	Richmond	Richmond	Richmond	Louisville
38	<b>Indianapolis</b>	Cincinnati	Oklahoma City	Oklahoma City	Oklahoma City	Oklahoma City	Oklahoma City
39	<b>Oklahoma City</b>	Virginia Beach	Indianapolis	Indianapolis	Indianapolis	Raleigh	Richmond
40	<b>Cincinnati</b>	Atlanta	Cincinnati	Cincinnati	Cincinnati	Louisville	Atlanta
41	<b>Louisville</b>	Las Vegas	Louisville	Louisville	Louisville	Atlanta	Raleigh
42	<b>Atlanta</b>	Charlotte	Virginia Beach	Virginia Beach	Atlanta	Cincinnati	Cincinnati
43	<b>Virginia Beach</b>	Louisville	Charlotte	Atlanta	Virginia Beach	Virginia Beach	Orlando
44	<b>Nashville</b>	Oklahoma City	Atlanta	Orlando	Orlando	Orlando	Virginia Beach
45	<b>Orlando</b>	Jacksonville	Nashville	Nashville	Nashville	Nashville	Memphis
46	<b>Charlotte</b>	Orlando	Orlando	Charlotte	Charlotte	Memphis	Nashville
47	<b>Memphis</b>	Raleigh	Memphis	Memphis	Memphis	Charlotte	Charlotte
48	<b>Riverside</b>	Memphis	Jacksonville	Riverside	Riverside	Riverside	Riverside
49	<b>Jacksonville</b>	Birmingham	Riverside	Jacksonville	Jacksonville	Jacksonville	Jacksonville
50	<b>Birmingham</b>	Riverside	Birmingham	Birmingham	Birmingham	Birmingham	Birmingham

## 3 Discussion

This research provides a new methodology and dataset to enable inter-metropolitan comparisons of accessibility by walking in a way that is clearly understood and explainable, tracks with our experience and the available evidence, and gives a snapshot look at how much economic opportunity exists within a reasonable walking distance in metropolitan areas.

Not all jobs are the same. Some are higher paying, some are lower skilled, and jobs exist in a variety of industries. Given sufficient data, one could differentiate accessibility by breaking down jobs by type and get different results. Accessibility to non-work locations (shopping, healthcare, education, etc.) is also important. Regardless of trip purpose, people who experience higher accessibility tend to travel shorter distances because origins and destinations are closer together.

But accessibility to jobs is not the only thing that people care about. If it were, cities would be situated on a minimum amount of space so people could live immediately adjacent to their jobs, or everyone would work from home. Measuring (and then valuing) accessibility to other opportunities and considering the trade-off between accessibility and living space are central problems of urban economics, regional science, and transportation and land use planning. While being more accessible is generally better, there are costs as well as benefits associated with accessibility. If land is more valuable its price is higher, and purchasers can afford less. Streets in places with more activities are inherently more crowded, and trips are less peaceful.

Accessibility is a function of both transportation and land use decisions, which has important policy implications. There are two broad avenues to increasing accessibility: improving transportation systems, and altering land-use patterns. Neither of these things can be easily shifted overnight, but over time they do change — both through direct plans and action, and through market forces. In regards to accessibility by walking, and moreover the walkability of a place, both transportation and land-use patterns have effects. Higher transit mode share typically correlates with lower automobile mode share, and the more walkable a place becomes. Land-use characteristics such as block size and density of development influence urban form, and a place's walkability.

It is important to recognize that aggregate metrics such as these are also affected simply by the size of the areas being studied. For example, residents of central Minneapolis enjoy greater accessibility than those of central Milwaukee, but the expansive Minneapolis-Saint Paul metropolitan area includes far more suburban and exurban areas (some lacking even in sidewalks) than does the Milwaukee area.

### 3.1 Land Use Effects

Land use-based approaches to improving walking accessibility revolve around proximity, density, and safety for both origins and destinations. Proximity to destinations is implicitly important in the mode of walking, due to its lower speeds. Density is the manifestation of the increasing value of more accessible locations, and dictates how many opportunities are reachable on a given destination parcel. As residential areas become denser, more residents experience the local accessibility; as employment areas become denser, more jobs can be accessed through the same pedestrian system.

Density is not determined solely by accessibility, however: land use policies can restrict density where it would otherwise be high, or encourage density where it might otherwise be low. Perhaps the most famous examples of such policies are Oregon's urban growth boundary laws, which encourage

density by restricting the amount of land available for urban development, and the Height of Buildings Act of 1910 which restricts density in the District of Columbia by limiting building heights. Between these most salient examples lie a range of density-focused urban policies, typically embedded in zoning codes, which help determine each city's walking accessibility performance. In general, areas with higher residential and employment density, and safer pedestrian connections between them, can achieve greater walking accessibility. Further, mixed-use development promotes a lower separation dichotomy between residential and employment centers, and provides even more walking accessibility.

At all accessibility thresholds, the job accessibility experienced by a typical worker is determined solely by local employment density, by definition in this study. Since the transit mode is ignored, it offers no direct contributions to accessibility, and thus the accessibility maps for walking show less prominent clustering of accessibility around transit stations. Some topology of transit stations can still be viewed in the walking-only maps, due to clustering of jobs around major transit hubs. However, the values of jobs at each time threshold were held constant between the transit-based companion study *Access Across America: Transit 2014*, and here. It is plausible that commuters would be willing to spend less time walking than riding a transit vehicle, which would further devalue job opportunities away from an origin.

## 3.2 Comparing Accessibility with Other Indicators

To test the validity of the accessibility ranking methodology used in determining which North American cities are friendliest to walking as a mode of economic access, we compared our weighted average accessibility metric with established metrics of walkability assessment, such as walk score, walk mode share, total employment, and employment density. Walk score data were taken from the Walk Score organization's 2014 data<sup>8</sup>, and walk mode share data were referenced from the 2008-2012 American Community Survey reports<sup>9</sup>. City labels are coded with 3-letter codes based in part on airport codes from the International Air Transport Association (IATA). Walk score figures are defined based on the geometry of city jurisdictions. [Figure 1](#) through [Figure 4](#) display the weighted average accessibility correlation plots with 2014 walk score, 2008-2012 walk mode share, total LEHD employment, and LEHD employment density, respectively. Exponential fitting functions are used to evaluate the strength of the correlations; in decreasing order of  $R^2$  correlation strength were 2014 walk score, employment density, total employment, and walk mode share.

It is expected that walk score would correlate well with economic accessibility (see [Figure 1](#)), as network distance to various types of destinations (ease of access) is a consideration among the many factors within the Walk Score meta-evaluation; other factors considered include population density, block length, and intersection density<sup>10</sup>. Intersection density and average block length are related metrics describing the local density and connectivity of a network; decreases in block length and increases in intersection density are correlated. Generally, as the network's local connectivity increases, the network-average circuitry (the ratio of network distance to Euclidean distance) decreases, and a pedestrian could thus reach more jobs within a given time threshold.

---

<sup>8</sup>Walk Score (2014)

<sup>9</sup>McKenzie (2014)

<sup>10</sup>Walk Score (2014)

Higher density and mixed-used development, often involving higher job densities, are known to create more pedestrian-friendly environments<sup>11</sup>. Thus, we would expect reasonably high correlations between both total employment and average employment density with walking accessibility. Figure 2 and Figure 3 show the average accessibility correlations with total employment and average employment density.

The plot of walking mode-share vs. our weighted average walking accessibility showed the lowest  $R^2$  of the four comparison metrics considered (see Figure 4). The concept of accessibility is by nature predictive; a given urban area may have relatively high walking accessibility due to the number of jobs, but the street environment may be suboptimal. There also may be environments in which walking mode share is lower than would otherwise be expected based on the built environment characteristics, e.g. inclement weather. Walk mode-share is neither a property of the economic or built environment as employment data are, nor a meta-score on various factors of walkability as the Walk Score index is; thus, its lower correlation with walking accessibility than the other metrics considered is reasonable.

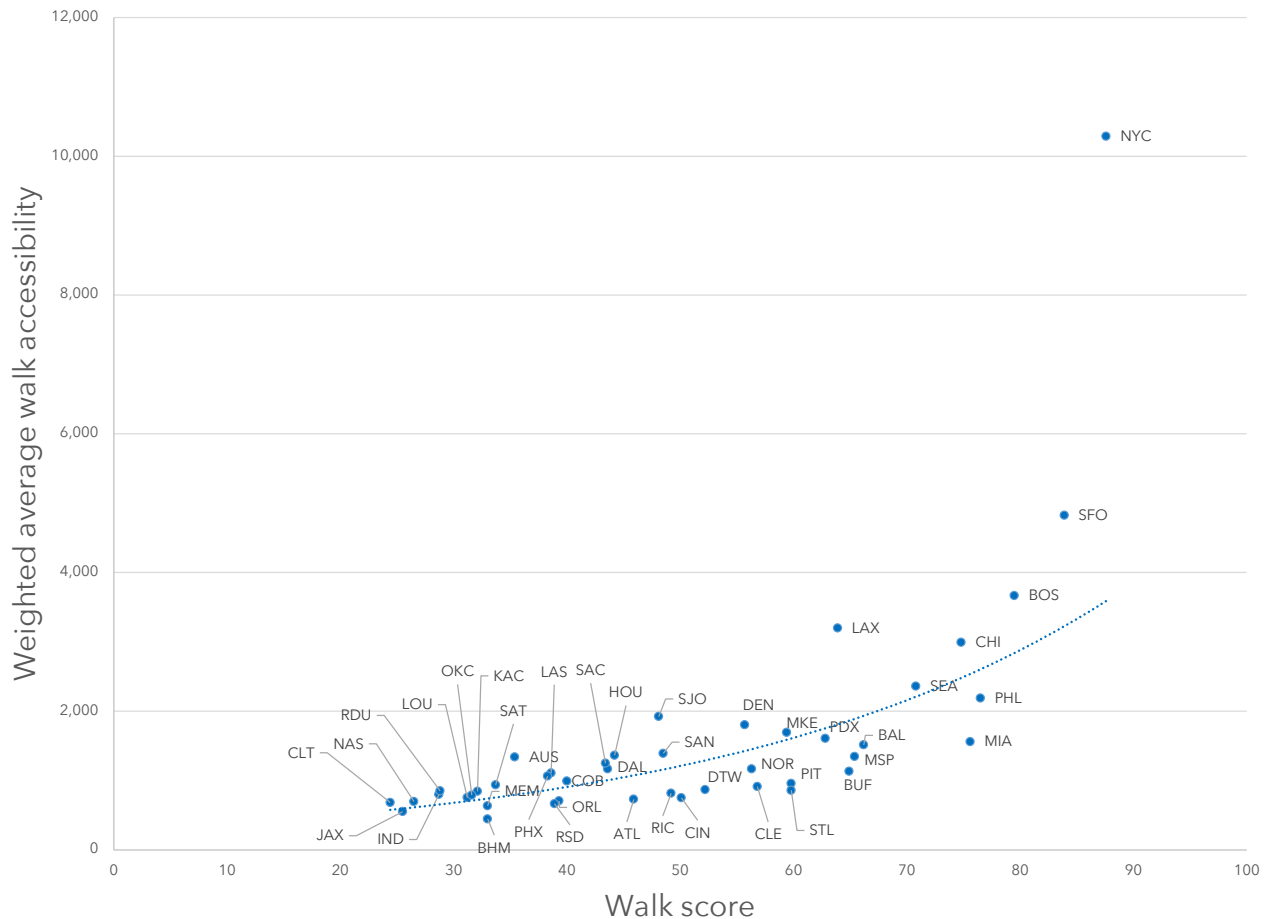


Figure 1: Weighted average accessibility vs. 2014 walk score; exponential fit.  $R^2 = 0.6589$ ,  $f(x) = 285.62e^{0.0289x}$ .

<sup>11</sup>Speck (2012), Tabeshian and Kattan (2014), Iacono et al. (2008)

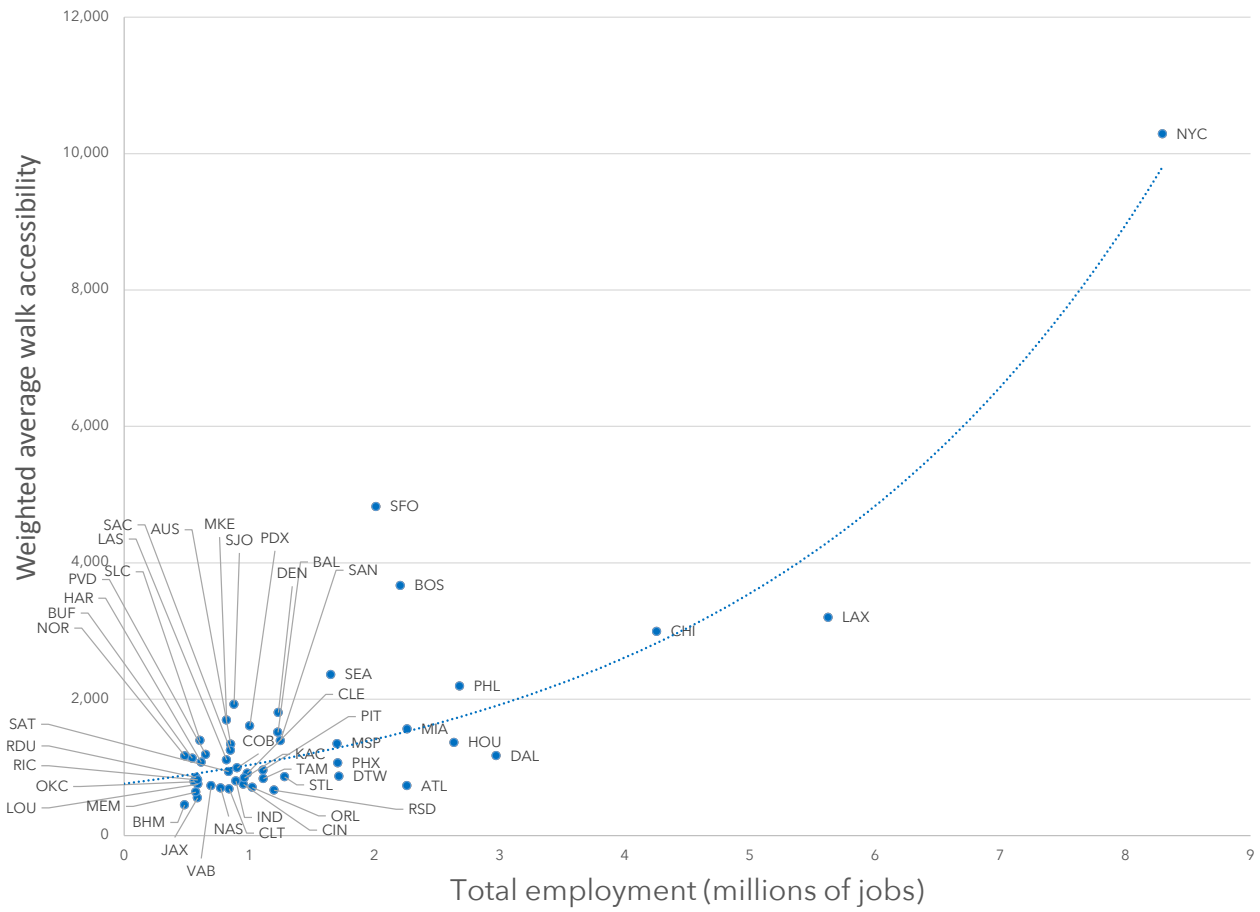


Figure 2: Weighted average accessibility vs. LEHD total employment; exponential fit.  $R^2 = 0.5396$ ,  $f(x) = 761.41e^{0.308x}$ .

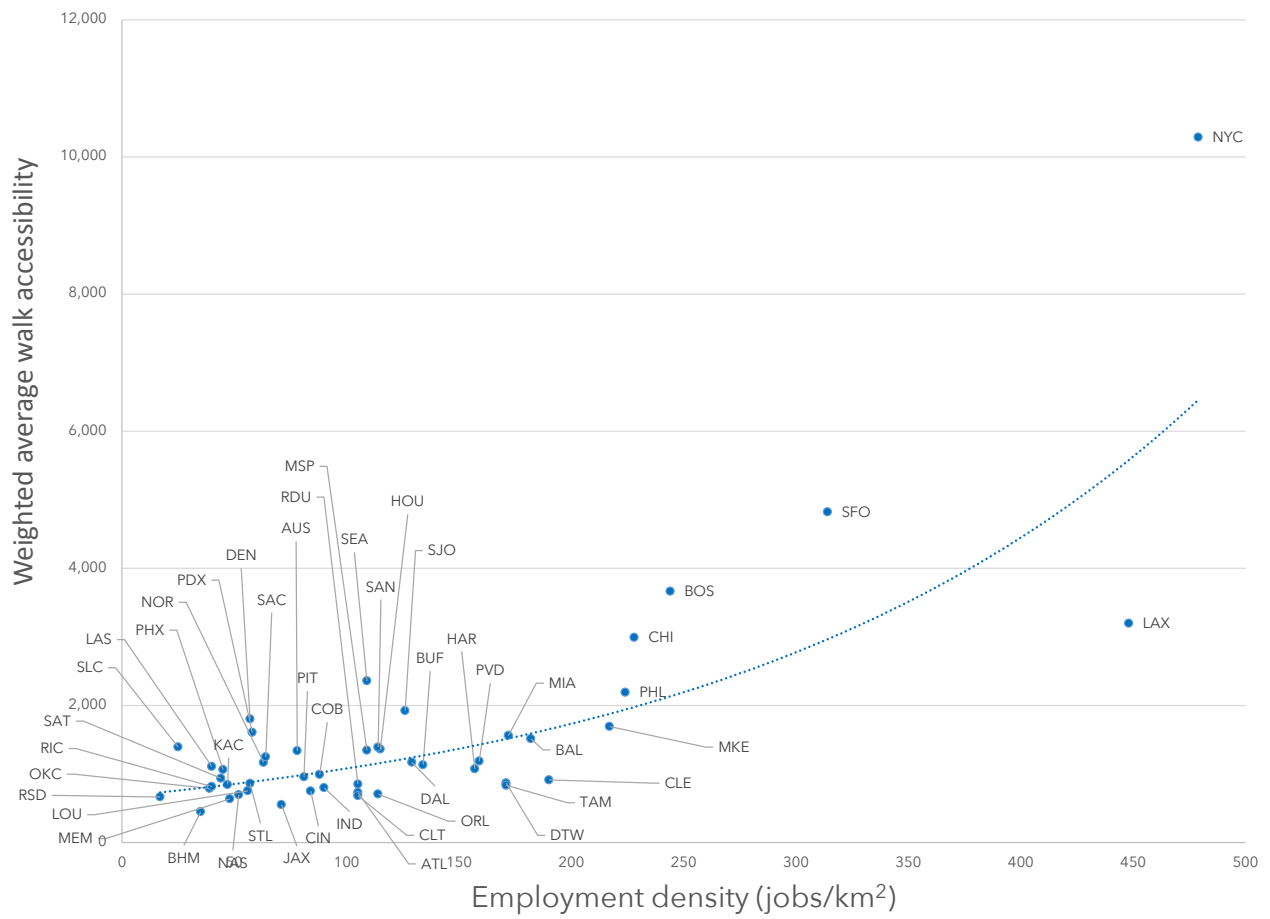


Figure 3: Weighted average accessibility vs. average LEHD employment density; exponential fit.  $R^2 = 0.6023$ ,  $f(x) = 674.83e^{0.0047x}$ .



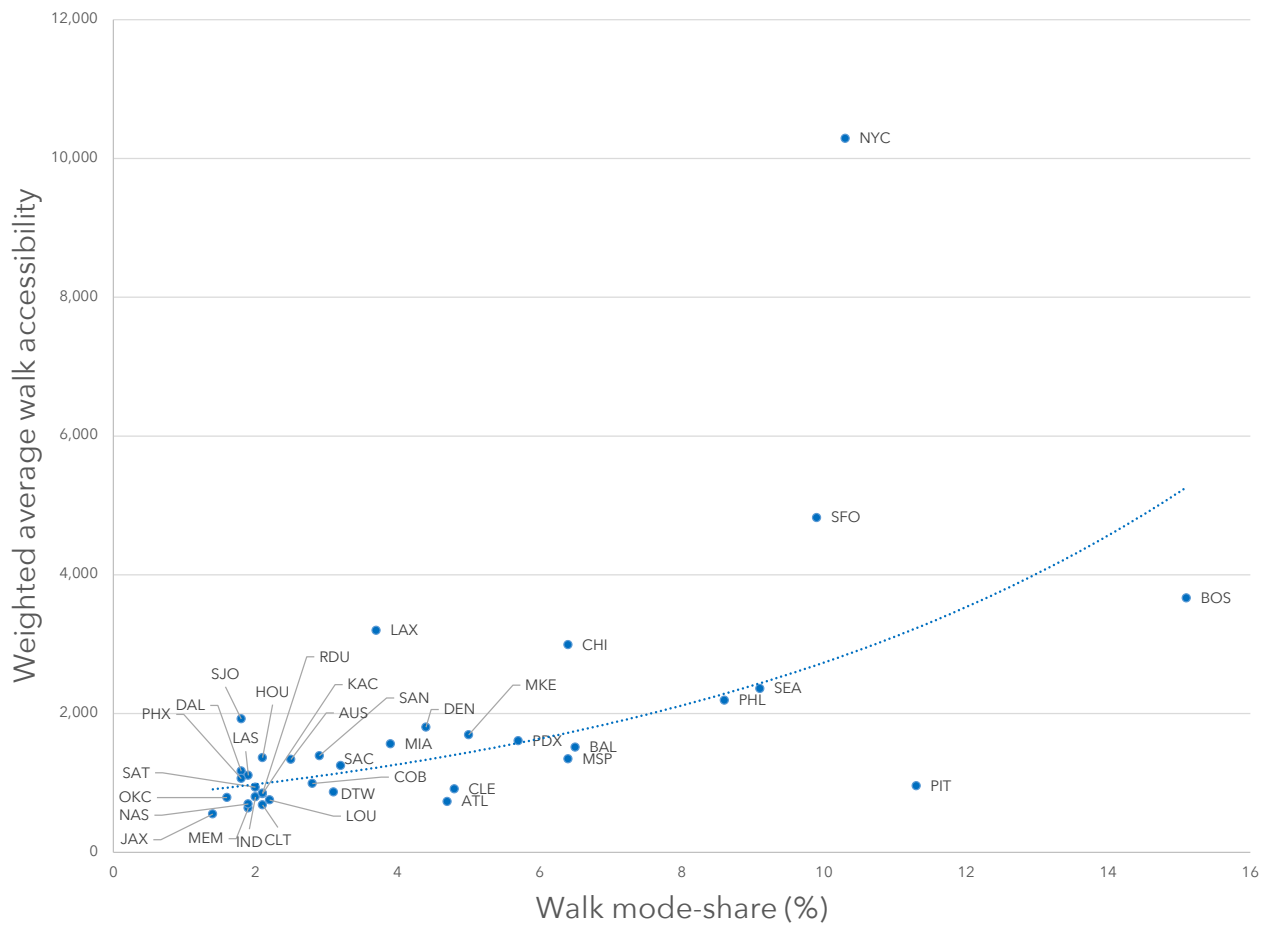


Figure 4: Weighted average accessibility vs. 2008-2012 walk mode share; exponential fit.  $R^2 = 0.4619$ ,  $f(x) = 759.18e^{0.1282x}$ .

### **3.3 Conclusions**

The cities that make up the top 10 walking accessibility ranks all exhibit a combination of density and the fast, frequent transit service which often accompanies higher density urban cores. However, there is still significant variation within this group. In New York, San Francisco, Washington, and Chicago, fast heavy rail systems connect both urban and suburban areas with a highly employment-dense core. It is instructive to compare these cities to Atlanta, which has a similar rail system but a much more decentralized job distribution, and lower accessibility. Employment density is a primary factor in whether an area is economically walkable or not, and employment densities are typically high in cities that employ heavy rail systems leading into a central core. In this way, transit systems promote walkability and walking accessibility, without requiring a user to board a transit vehicle to experience the positive effects.

Cities with low employment density and low transit mode share, such as Richmond and Memphis, experience the effects opposite of those for heavy-rail cities. Without high employment density, even areas with a large number of workers would have low average walking accessibility (and may be forced to compete more for local employment). And certainly if access to economic opportunities positively contributes to an area's walkability, then areas with little nearby economic opportunity are less walkable.

Land use systems and the non-motorized and pedestrian landscapes are dynamic, and this report presents only a single snapshot in time. In constantly-evolving systems like these, it is also critical to monitor changes over time. A city which adopts a goal of increasing walking accessibility and safety should be evaluated based on how effectively it advances that goal relative to a baseline. Using this data as a starting point, future reports in the Access Across America series will track the way that accessibility in these metropolitan areas evolves in response to transportation and safety investments and land use decisions.

## **4 Metropolitan Area Data and Maps**

The following pages present summary accessibility data and maps for each of the included metropolitan areas. Metropolitan areas are presented in alphabetical order. The maps show 30-minute accessibility values at the Census block level; grey areas indicate locations outside of the metropolitan area. On the data summary pages, three different chart scales are used to accommodate the wide range of accessibility values across metropolitan areas. All charts using the same scale are plotted in the same color.

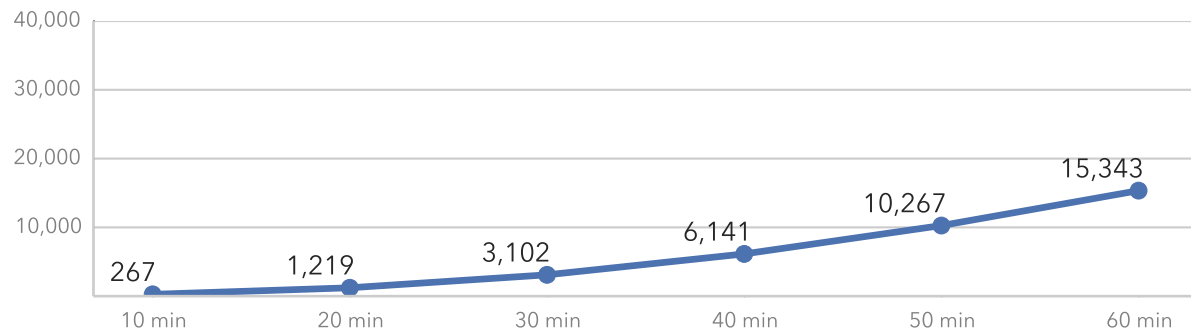
# Atlanta

Atlanta-Sandy Springs-Marietta, GA

Rank by Weighted Walking Accessibility	<b>42</b>
Rank by Total Employment	<b>9</b>
Total Jobs	<b>2,260,515</b>
Average Job Density (per km <sup>2</sup> )	<b>105</b>
Total Workers	<b>2,180,785</b>
Average Worker Density (per km <sup>2</sup> )	<b>101</b>

*Job and worker totals are based on LEHD estimates and may not match other sources.*

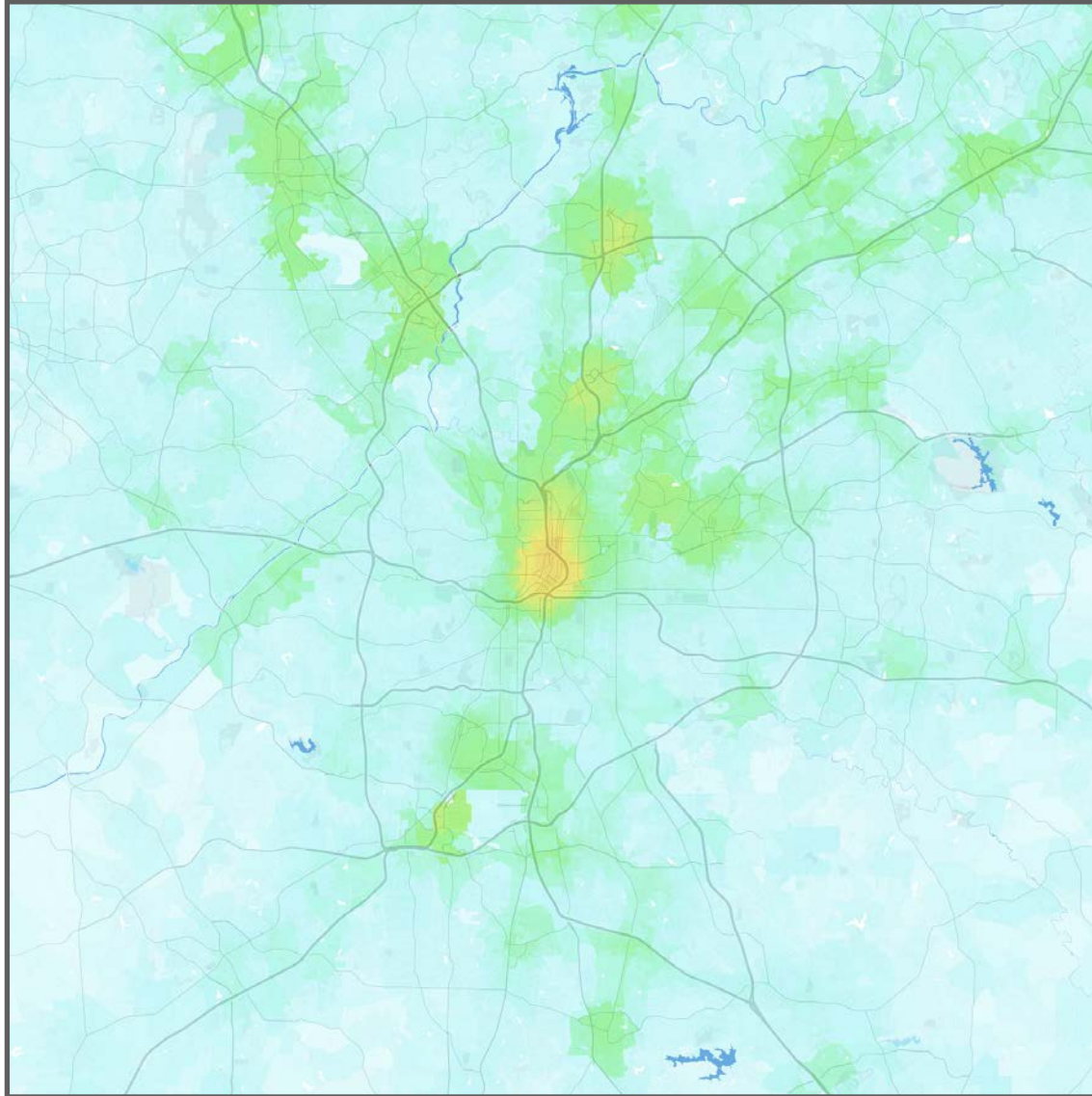
## Job Accessibility by Travel Time Threshold



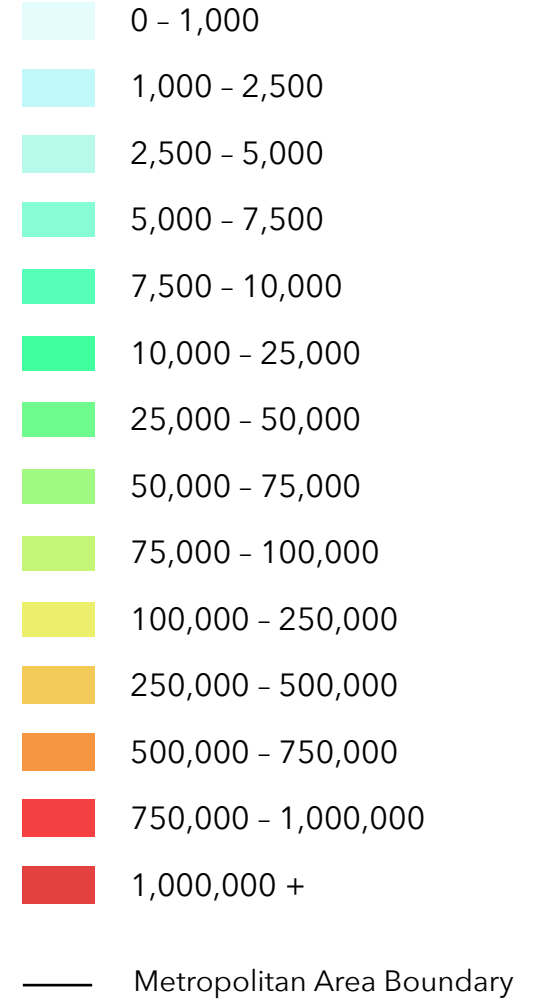
# Atlanta

Atlanta-Sandy Springs-Marietta, GA

15



## Jobs within 30 minutes by walking



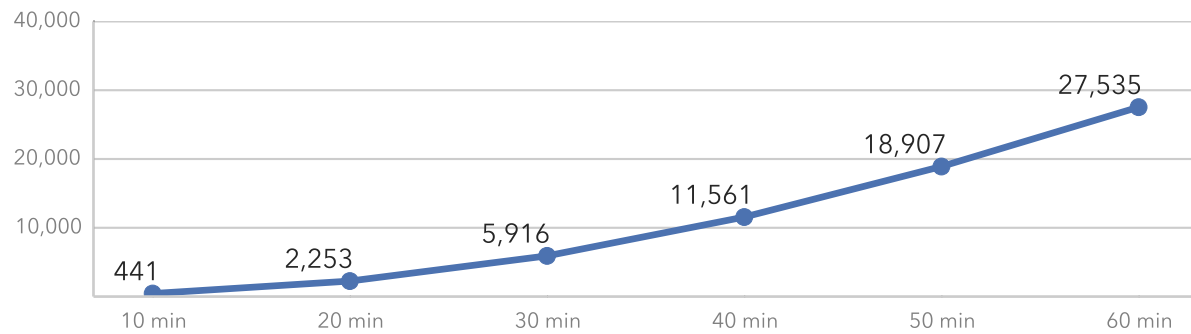
# Austin

Austin-Round Rock-San Marcos, TX

Rank by Weighted Walking Accessibility	<b>19</b>
Rank by Total Employment	<b>31</b>
Total Jobs	<b>851,758</b>
Average Job Density (per km <sup>2</sup> )	<b>78</b>
Total Workers	<b>790,961</b>
Average Worker Density (per km <sup>2</sup> )	<b>72</b>

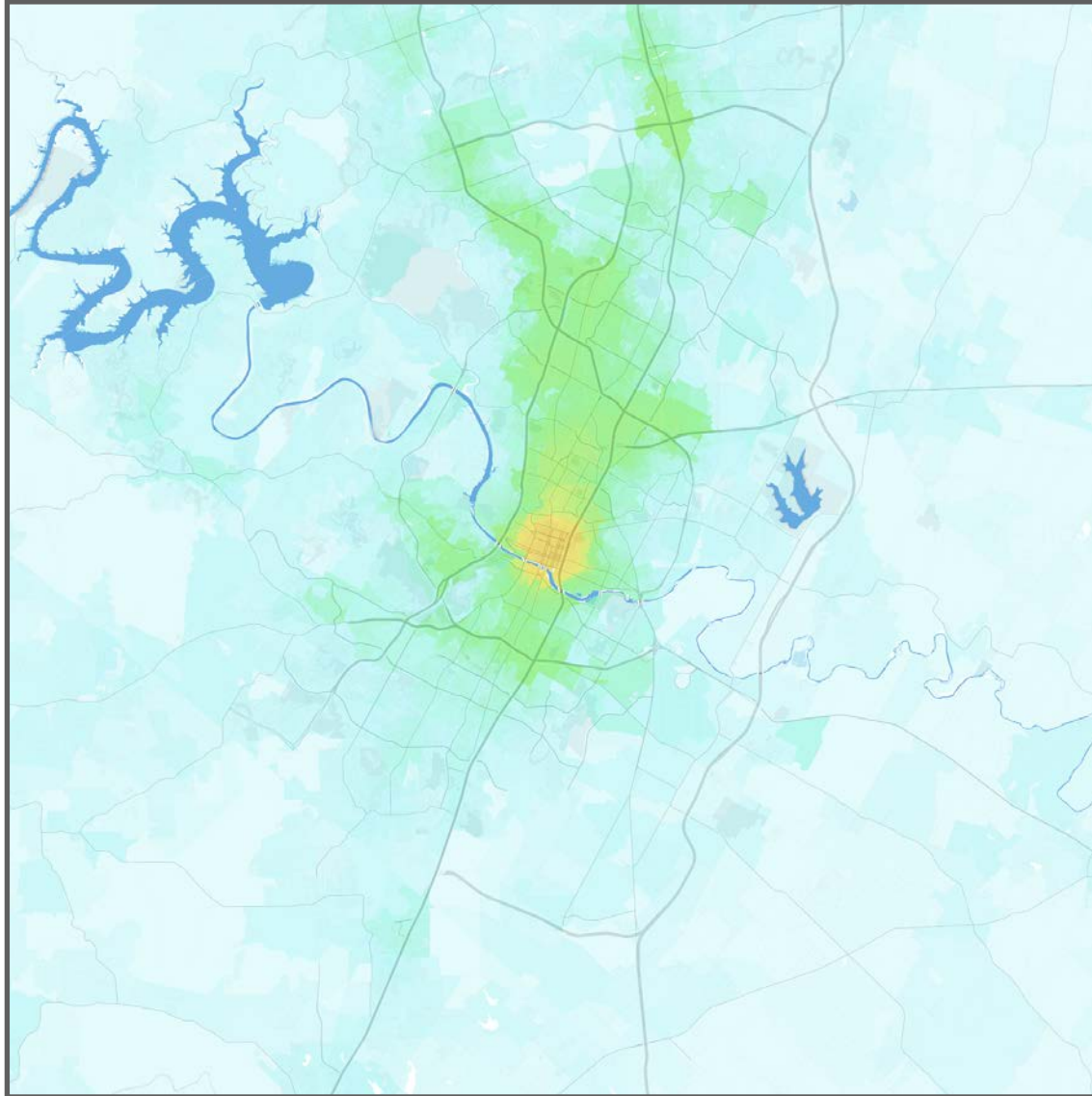
*Job and worker totals are based on LEHD estimates and may not match other sources.*

## Job Accessibility by Travel Time Threshold

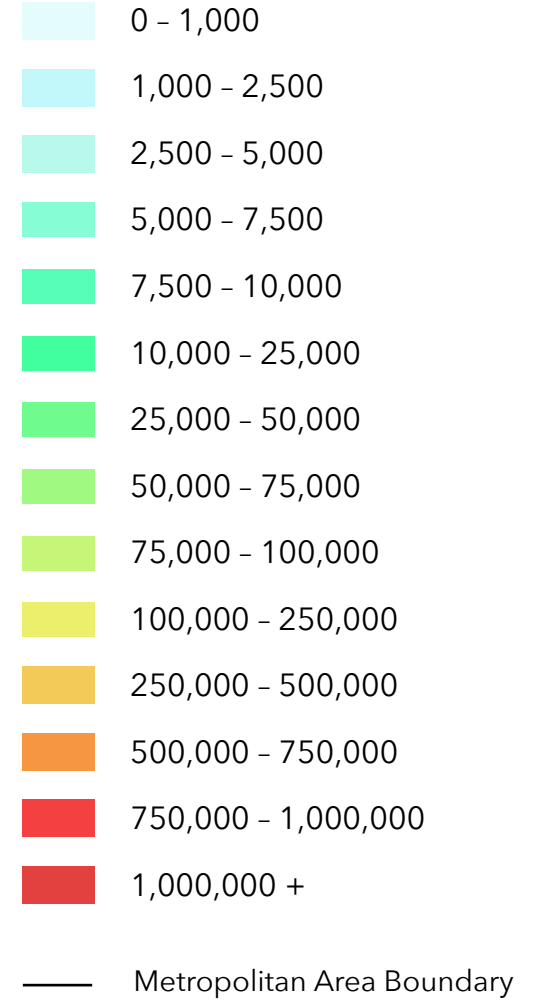


# Austin

Austin-Round Rock-San Marcos, TX



## Jobs within 30 minutes by walking



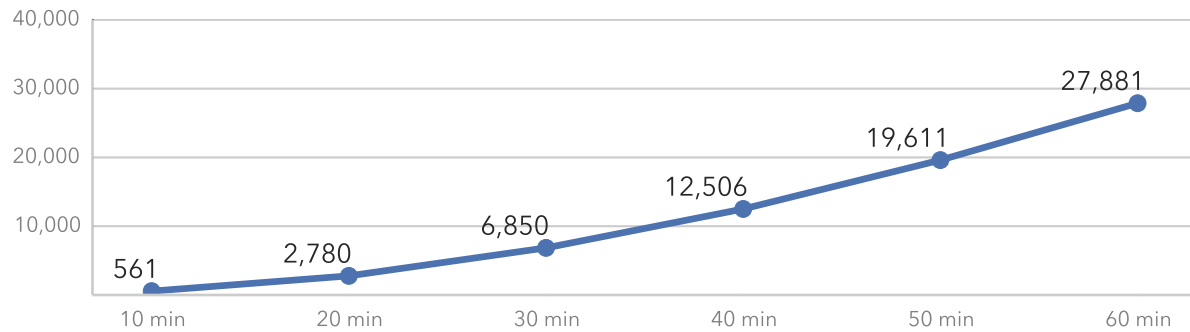
# Baltimore

Baltimore-Towson, MD

Rank by Weighted Walking Accessibility	<b>14</b>
Rank by Total Employment	<b>19</b>
Total Jobs	<b>1,229,454</b>
Average Job Density (per km <sup>2</sup> )	<b>182</b>
Total Workers	<b>1,243,101</b>
Average Worker Density (per km <sup>2</sup> )	<b>184</b>

*Job and worker totals are based on LEHD estimates and may not match other sources.*

## Job Accessibility by Travel Time Threshold

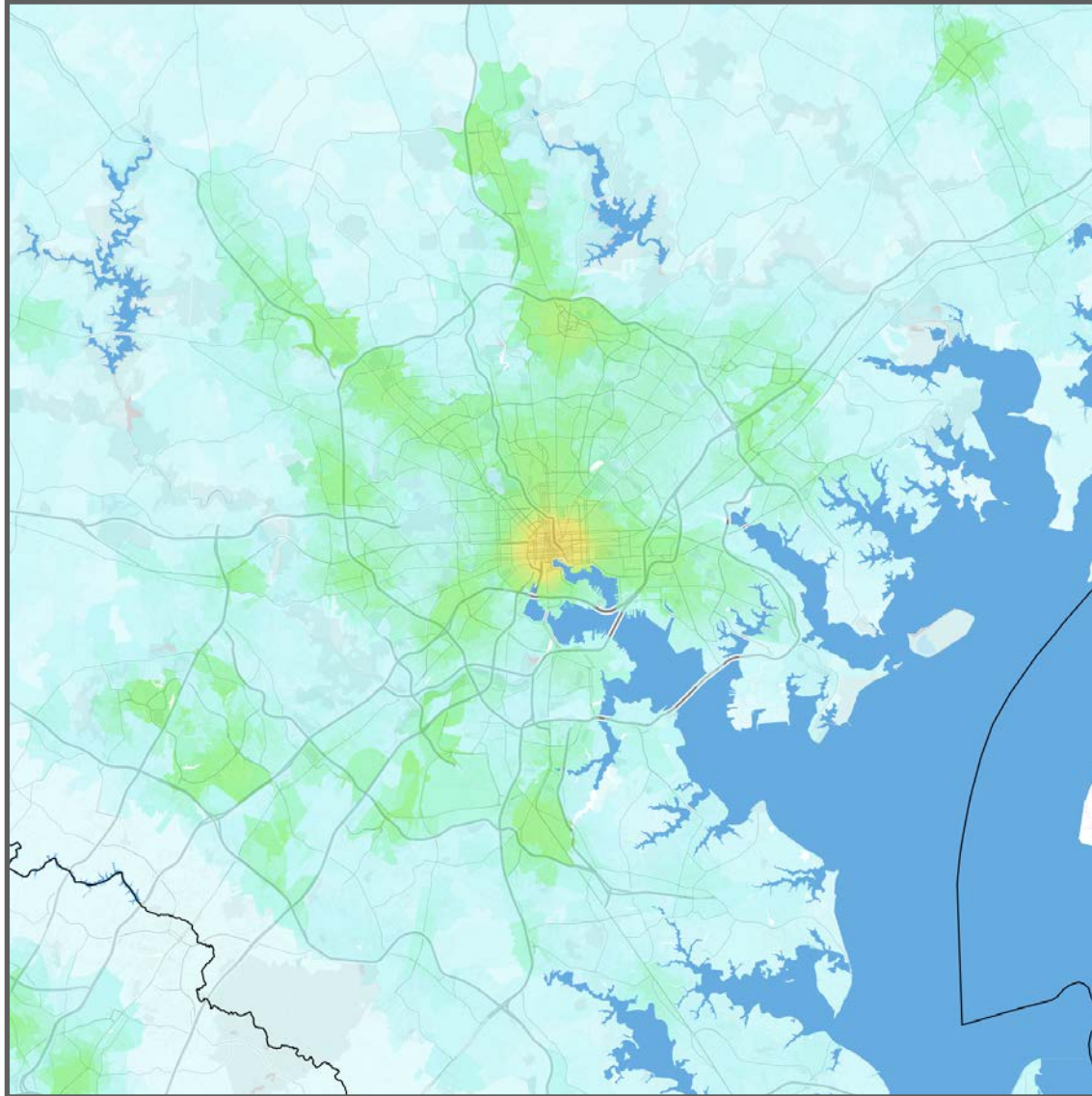




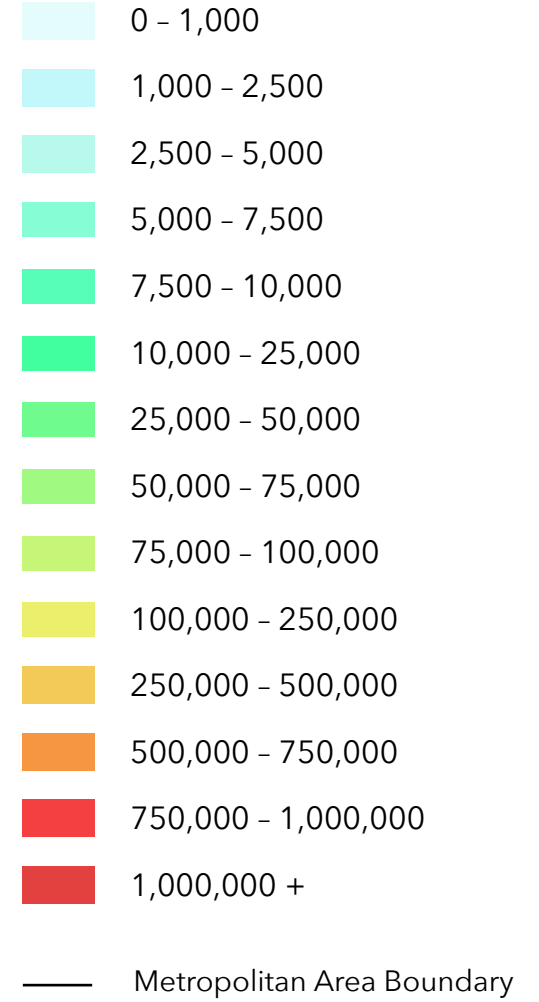
# Baltimore

Baltimore-Towson, MD

19



## Jobs within 30 minutes by walking



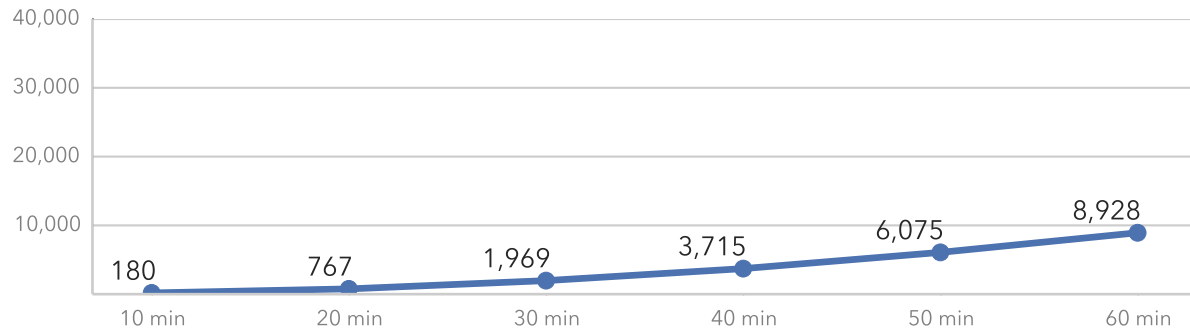
# Birmingham

Birmingham-Hoover, AL

Rank by Weighted Walking Accessibility	<b>50</b>
Rank by Total Employment	<b>50</b>
Total Jobs	<b>482,882</b>
Average Job Density (per km <sup>2</sup> )	<b>35</b>
Total Workers	<b>455,937</b>
Average Worker Density (per km <sup>2</sup> )	<b>33</b>

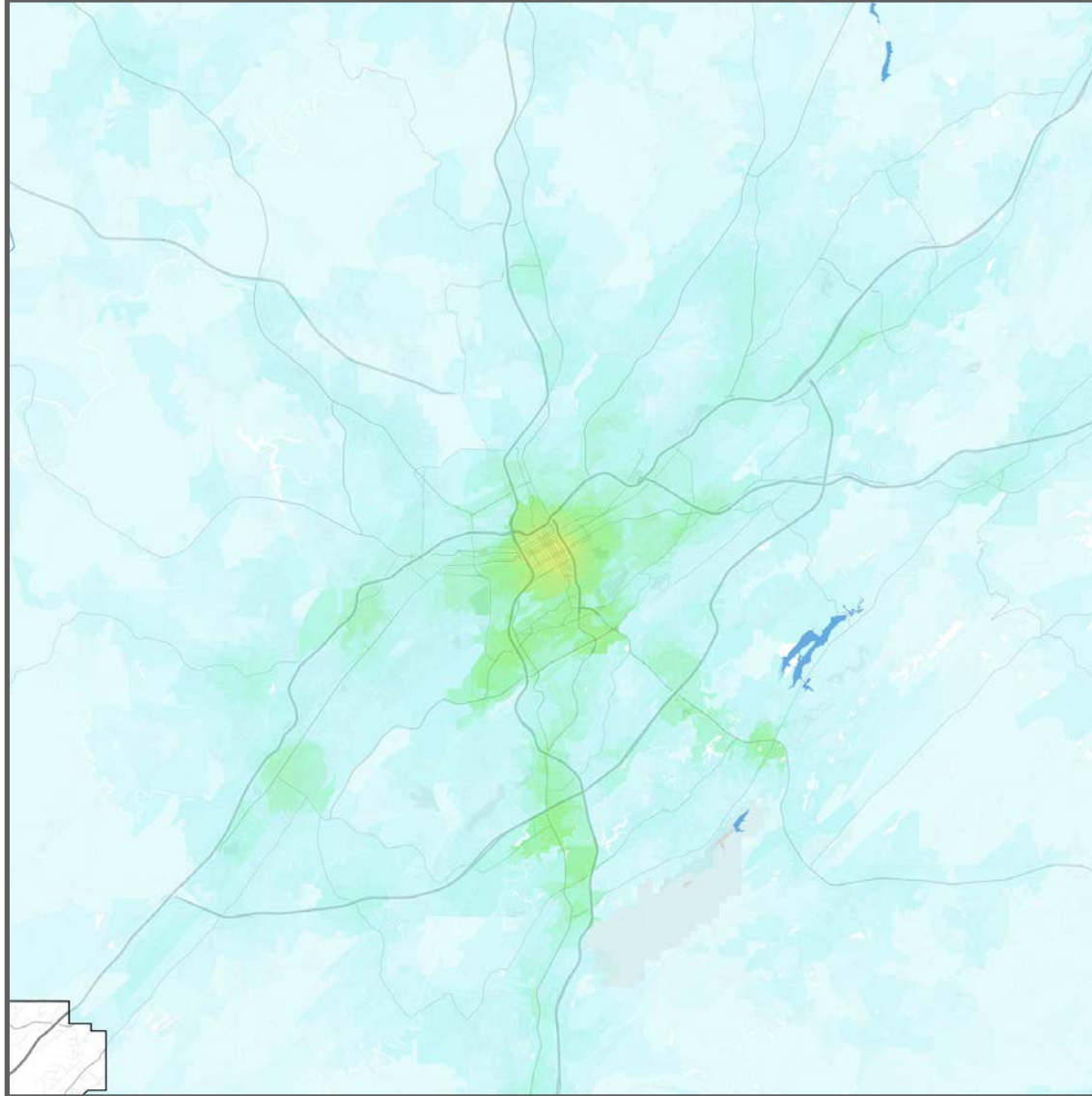
*Job and worker totals are based on LEHD estimates and may not match other sources.*

## Job Accessibility by Travel Time Threshold

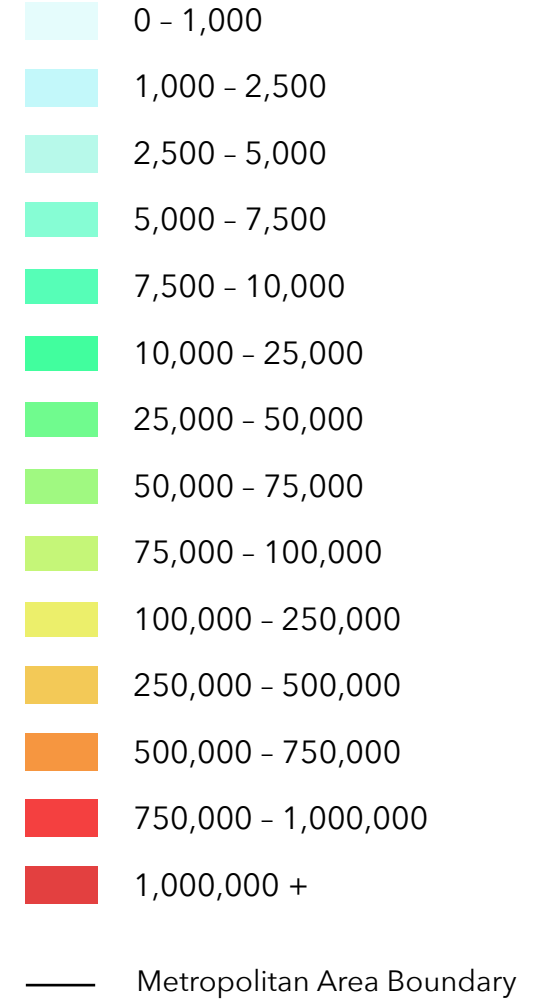


# Birmingham

Birmingham-Hoover, AL



## Jobs within 30 minutes by walking



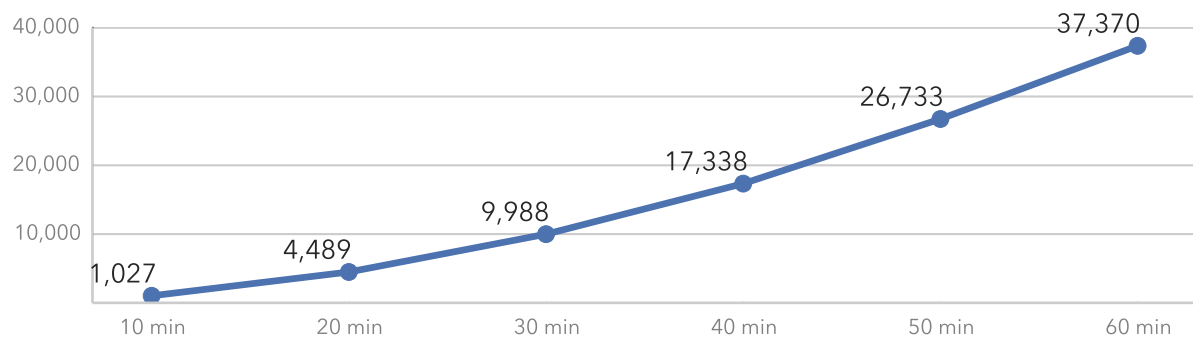
# Boston

Boston-Cambridge-Quincy, MA-NH

Rank by Weighted Walking Accessibility	<b>7</b>
Rank by Total Employment	<b>10</b>
Total Jobs	<b>2,207,906</b>
Average Job Density (per km <sup>2</sup> )	<b>244</b>
Total Workers	<b>3,402,940</b>
Average Worker Density (per km <sup>2</sup> )	<b>377</b>

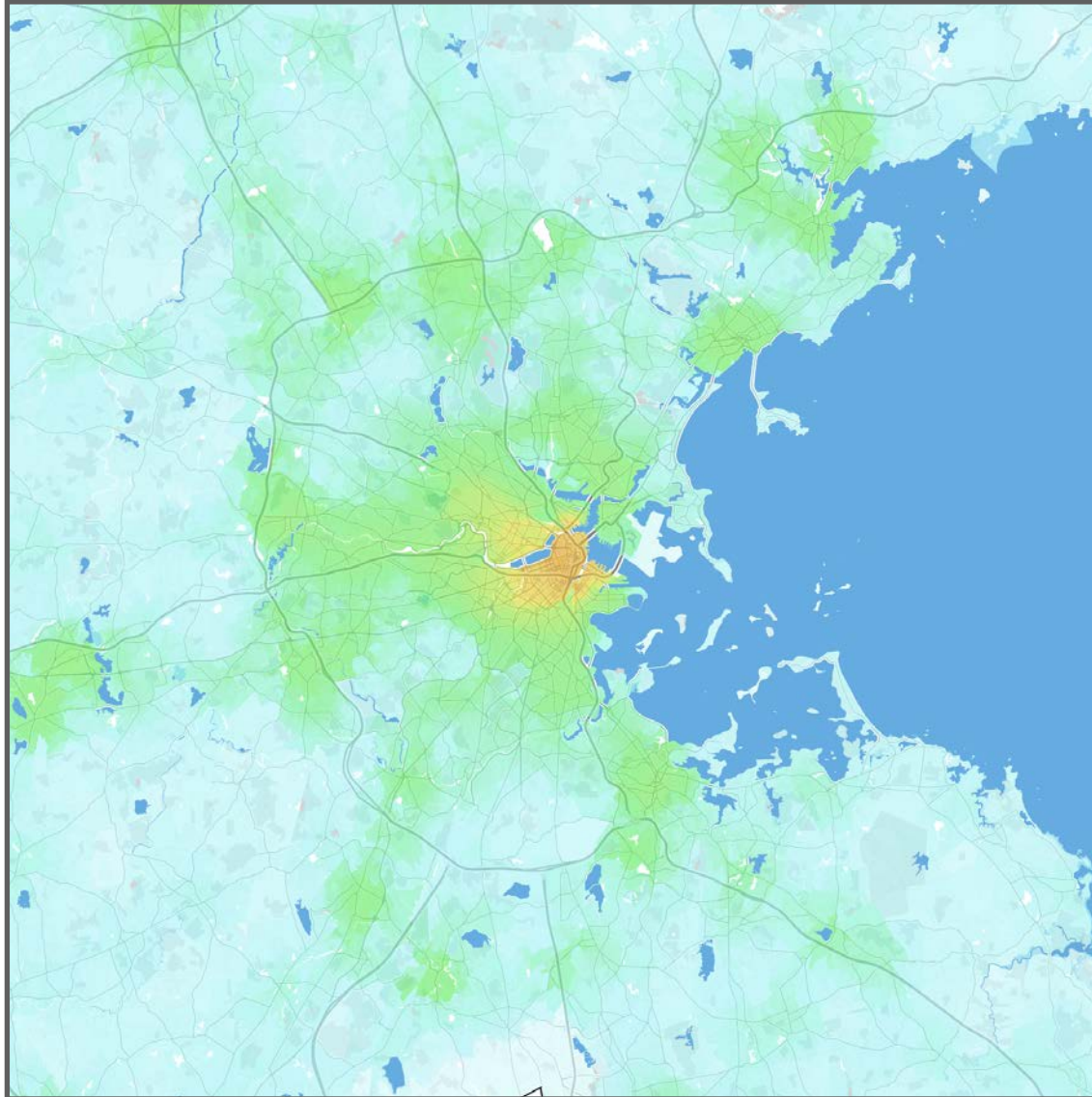
*Job and worker totals are based on LEHD estimates and may not match other sources.*

## Job Accessibility by Travel Time Threshold

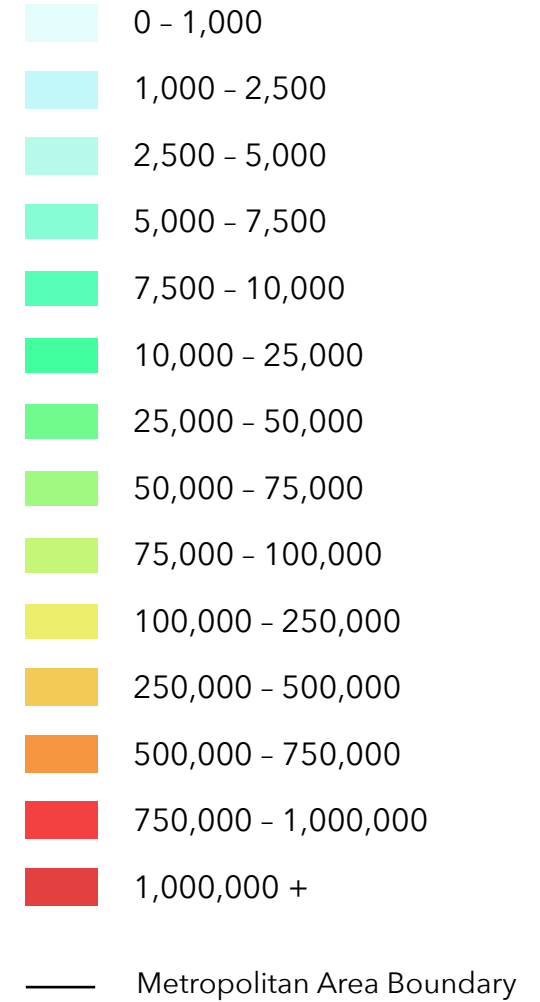


# Boston

Boston-Cambridge-Quincy, MA-NH



## Jobs within 30 minutes by walking





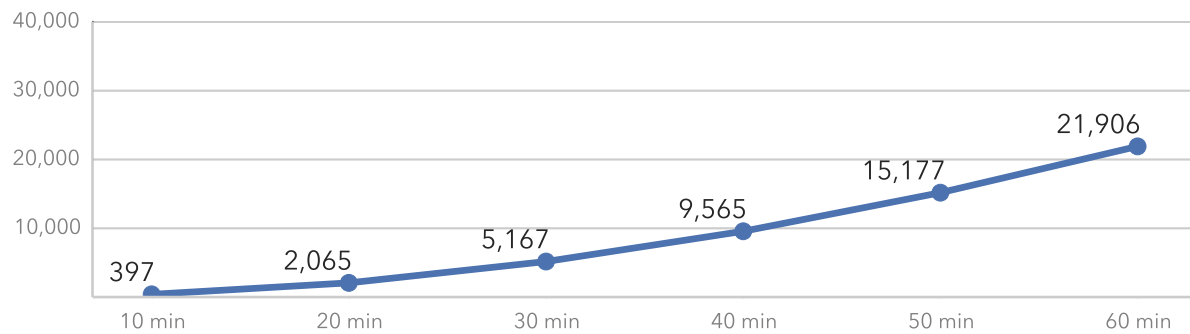
# Buffalo

Buffalo-Niagara Falls, NY

Rank by Weighted Walking Accessibility	<b>24</b>
Rank by Total Employment	<b>48</b>
Total Jobs	<b>544,584</b>
Average Job Density (per km <sup>2</sup> )	<b>134</b>
Total Workers	<b>522,212</b>
Average Worker Density (per km <sup>2</sup> )	<b>129</b>

*Job and worker totals are based on LEHD estimates and may not match other sources.*

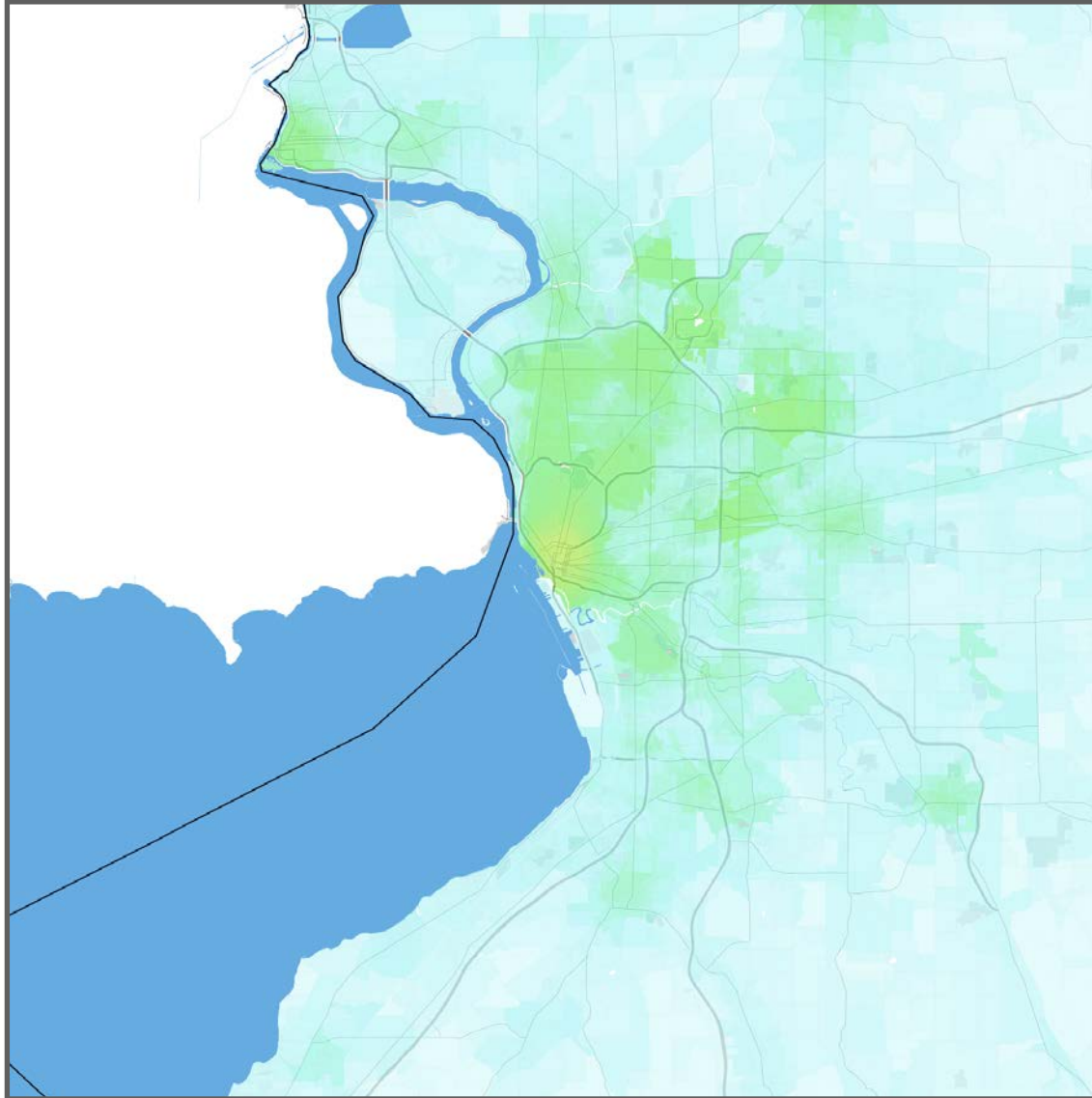
## Job Accessibility by Travel Time Threshold



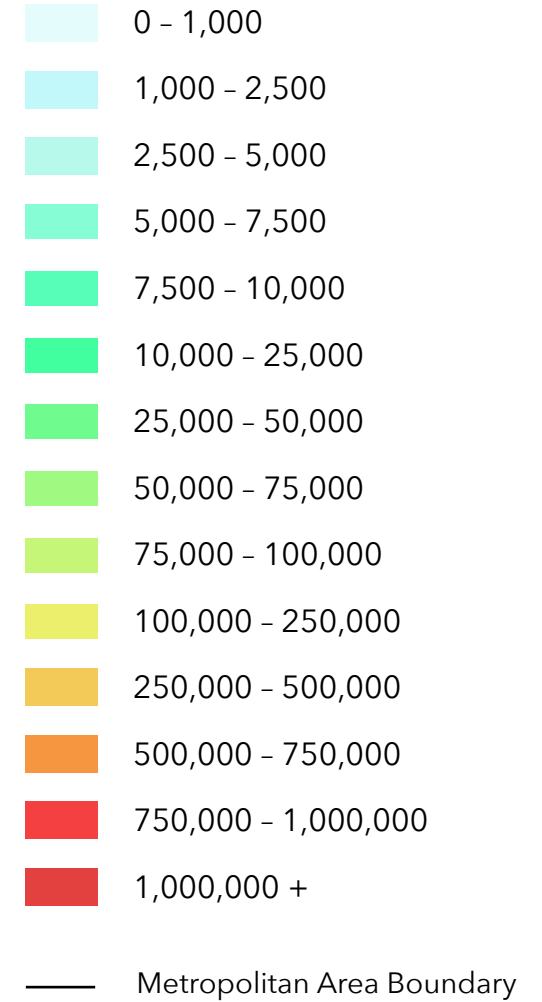
# Buffalo

Buffalo-Niagara Falls, NY

25



## Jobs within 30 minutes by walking



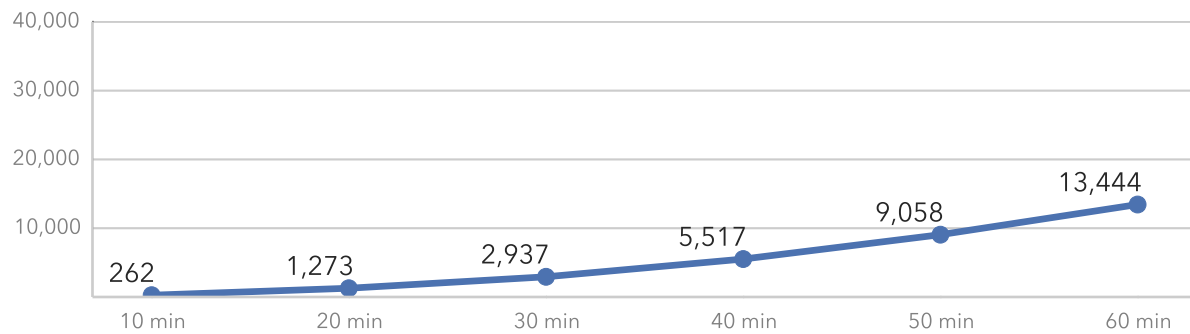
# Charlotte

Charlotte-Gastonia-Rock Hill, NC-SC

Rank by Weighted Walking Accessibility	<b>46</b>
Rank by Total Employment	<b>33</b>
Total Jobs	<b>839,916</b>
Average Job Density (per km <sup>2</sup> )	<b>105</b>
Total Workers	<b>771,127</b>
Average Worker Density (per km <sup>2</sup> )	<b>97</b>

*Job and worker totals are based on LEHD estimates and may not match other sources.*

## Job Accessibility by Travel Time Threshold

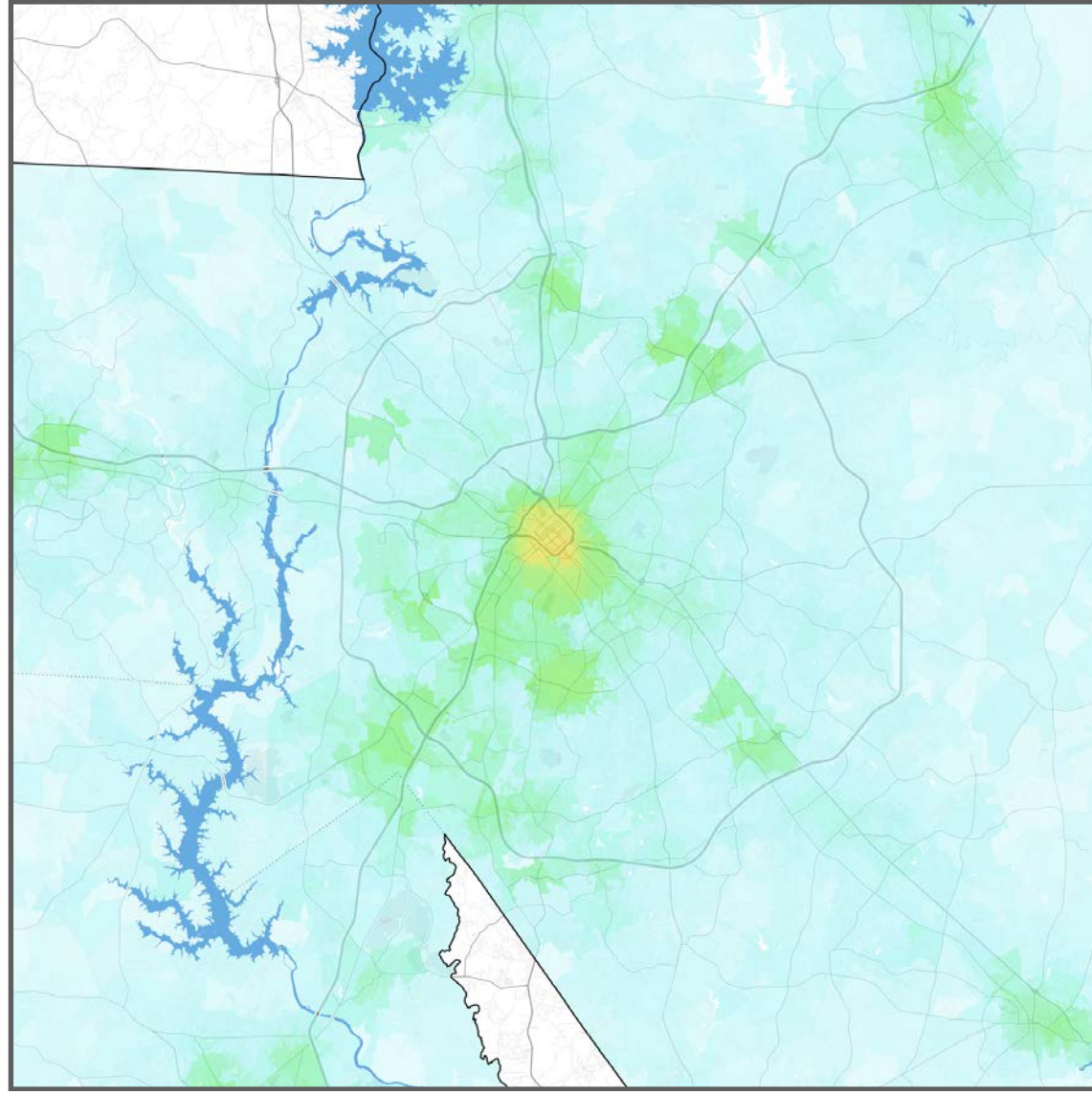




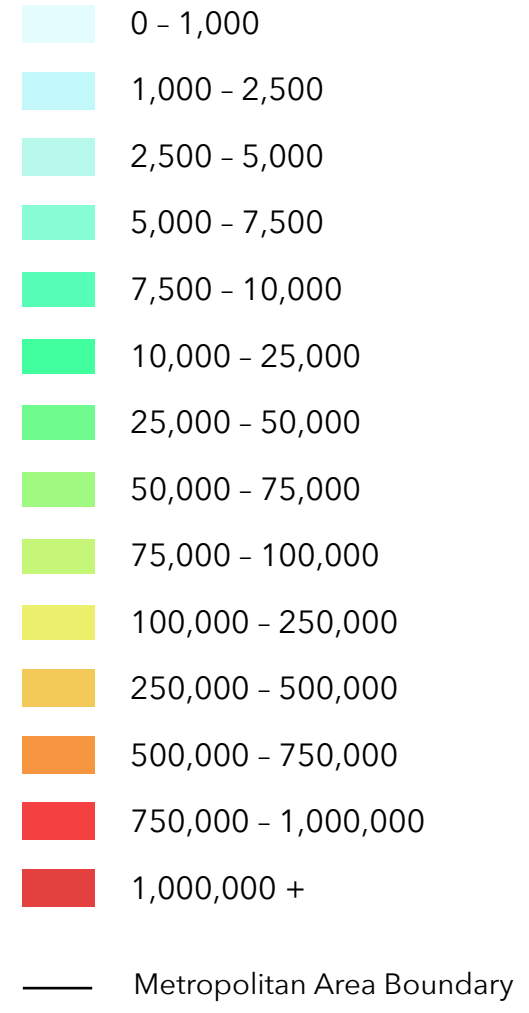
# Charlotte

Charlotte-Gastonia-Rock Hill, NC-SC

27



## Jobs within 30 minutes by walking



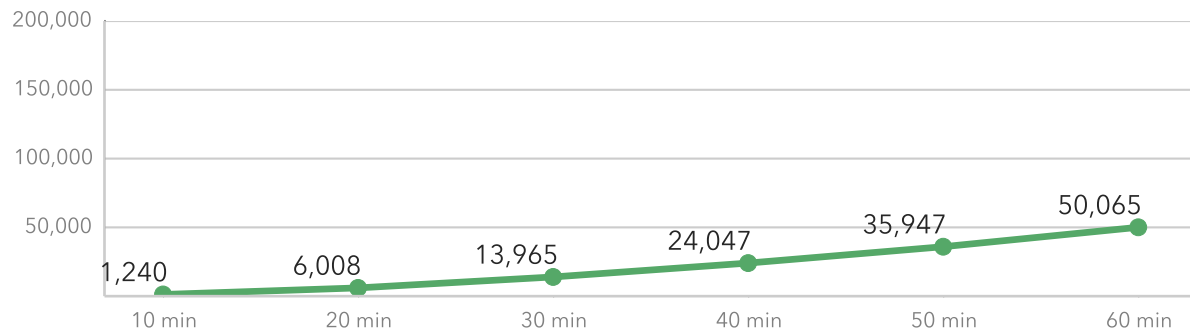
# Chicago

Chicago-Joliet-Naperville, IL-IN-WI

Rank by Weighted Walking Accessibility	<b>4</b>
Rank by Total Employment	<b>3</b>
Total Jobs	<b>4,255,555</b>
Average Job Density (per km <sup>2</sup> )	<b>228</b>
Total Workers	<b>4,156,582</b>
Average Worker Density (per km <sup>2</sup> )	<b>223</b>

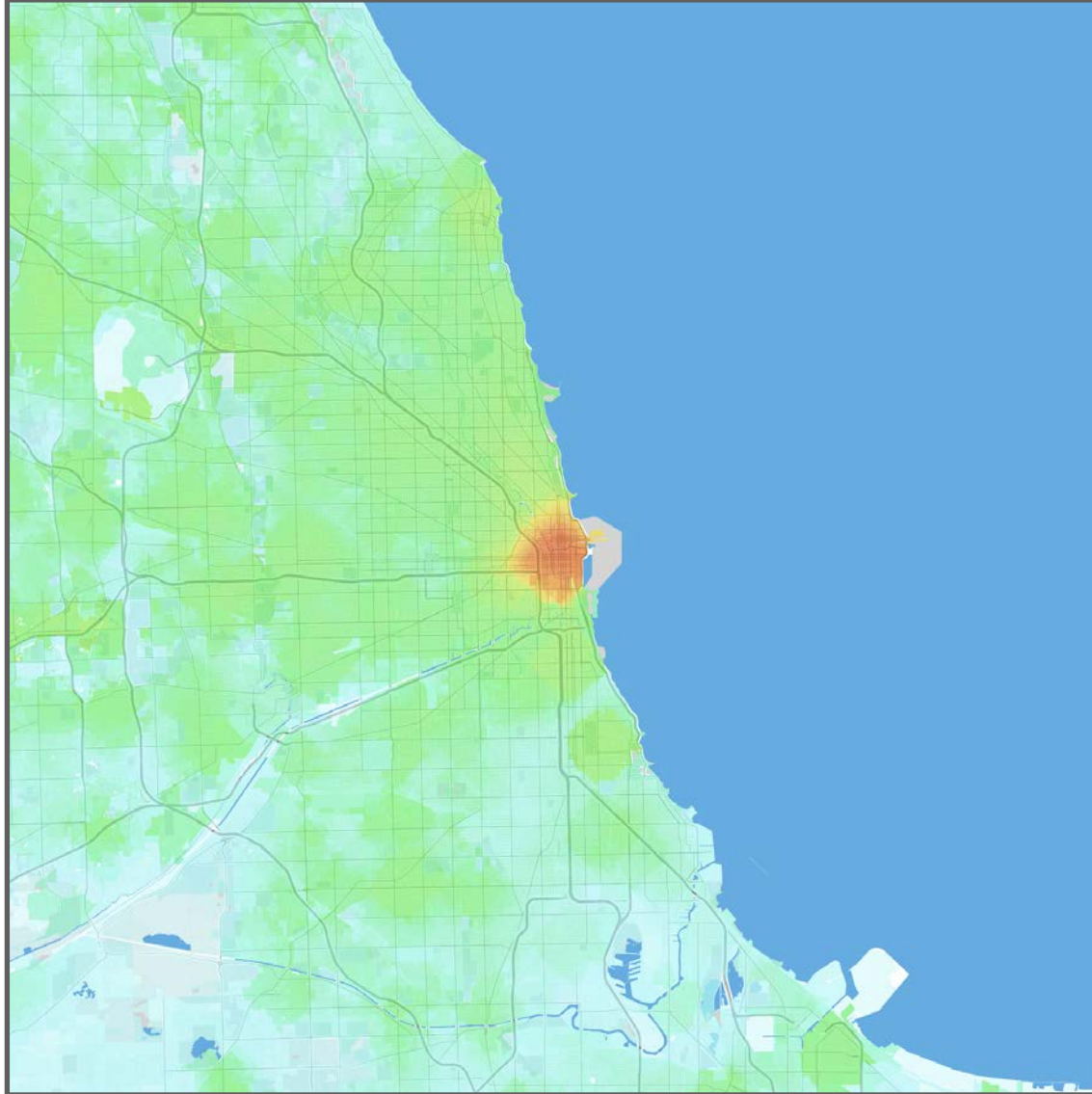
*Job and worker totals are based on LEHD estimates and may not match other sources.*

## Job Accessibility by Travel Time Threshold

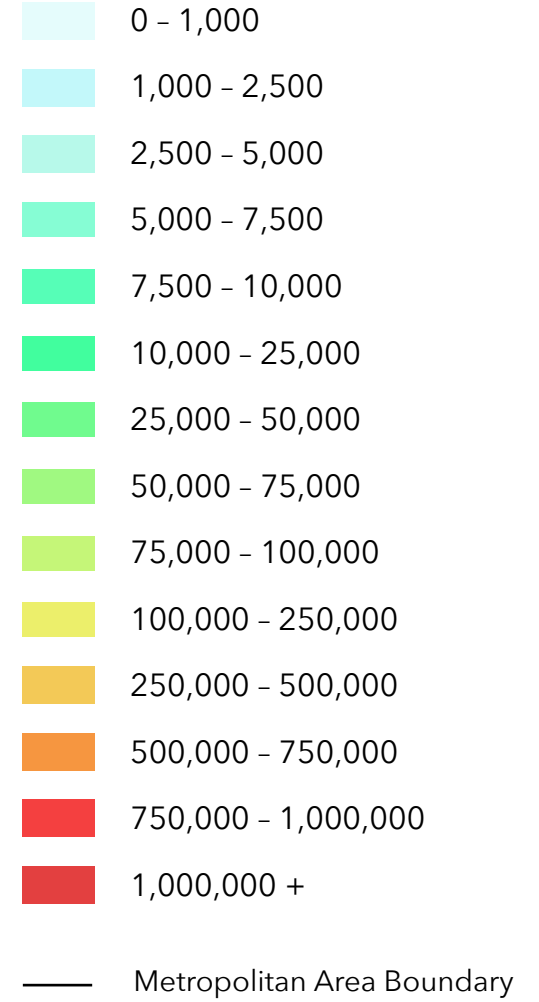


# Chicago

Chicago-Joliet-Naperville, IL-IN-WI



## Jobs within 30 minutes by walking



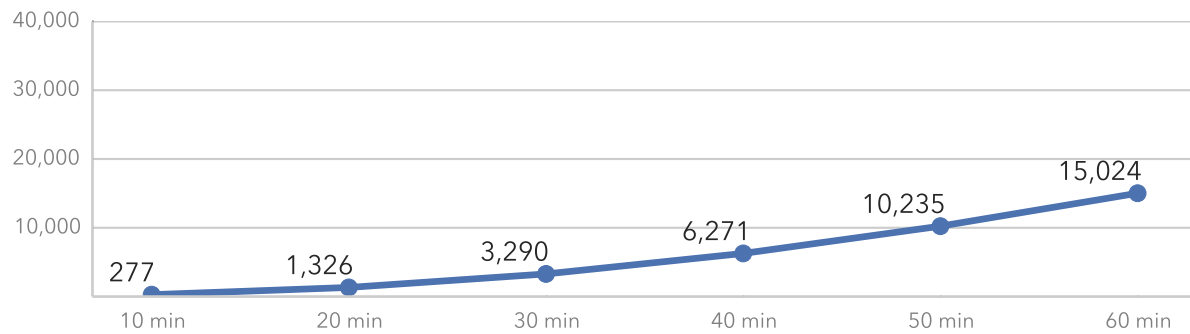
# Cincinnati

Cincinnati-Middletown, OH-KY-IN

Rank by Weighted Walking Accessibility	<b>40</b>
Rank by Total Employment	<b>27</b>
Total Jobs	<b>954,320</b>
Average Job Density (per km <sup>2</sup> )	<b>84</b>
Total Workers	<b>951,583</b>
Average Worker Density (per km <sup>2</sup> )	<b>84</b>

*Job and worker totals are based on LEHD estimates and may not match other sources.*

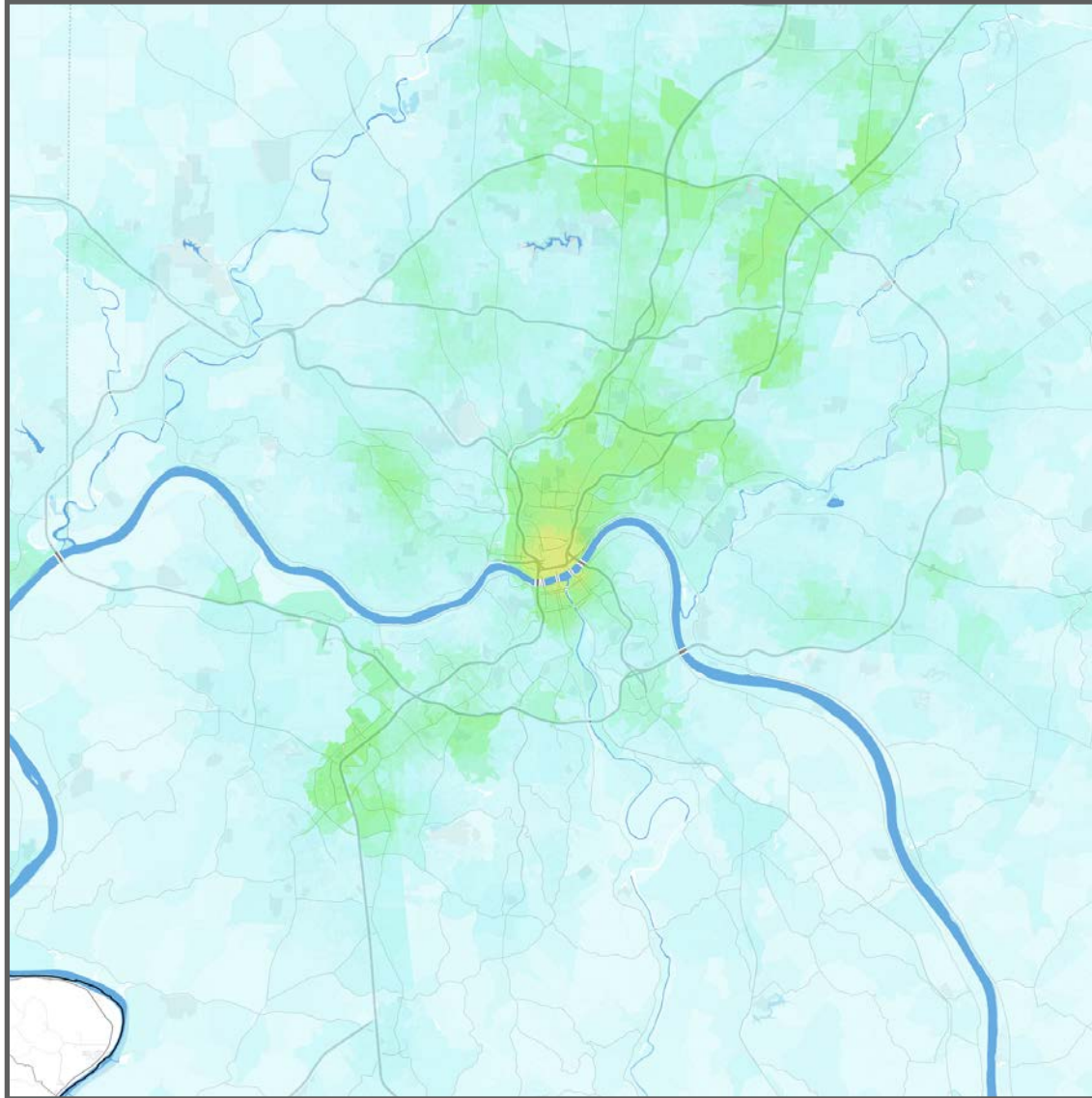
## Job Accessibility by Travel Time Threshold



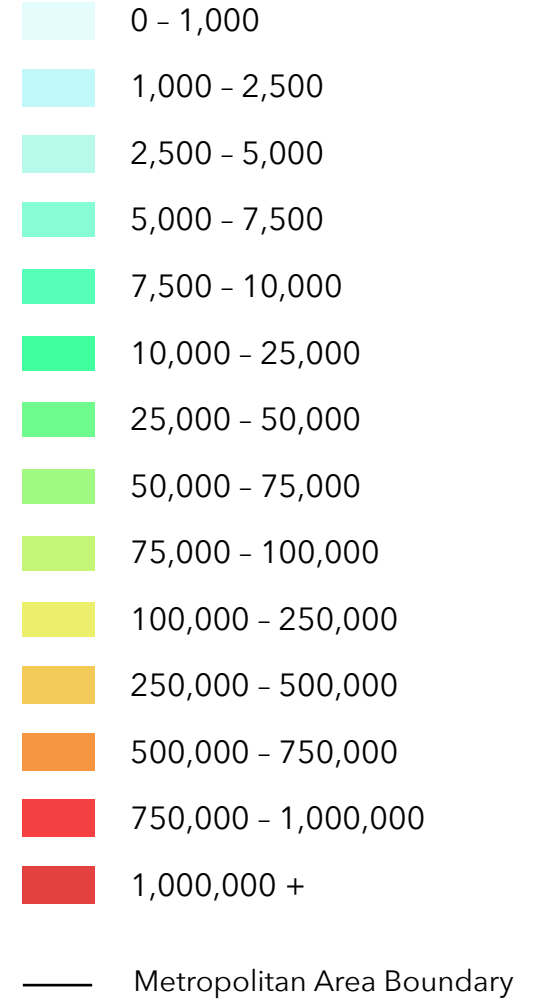
# Cincinnati

Cincinnati-Middletown, OH-KY-IN

31



## Jobs within 30 minutes by walking



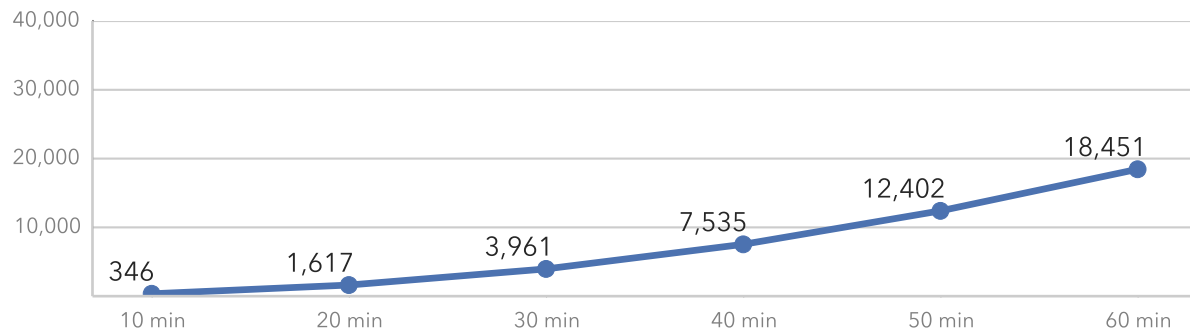
# Cleveland

Cleveland-Elyria-Mentor, OH

Rank by Weighted Walking Accessibility	<b>31</b>
Rank by Total Employment	<b>25</b>
Total Jobs	<b>984,589</b>
Average Job Density (per km <sup>2</sup> )	<b>190</b>
Total Workers	<b>925,055</b>
Average Worker Density (per km <sup>2</sup> )	<b>179</b>

*Job and worker totals are based on LEHD estimates and may not match other sources.*

## Job Accessibility by Travel Time Threshold

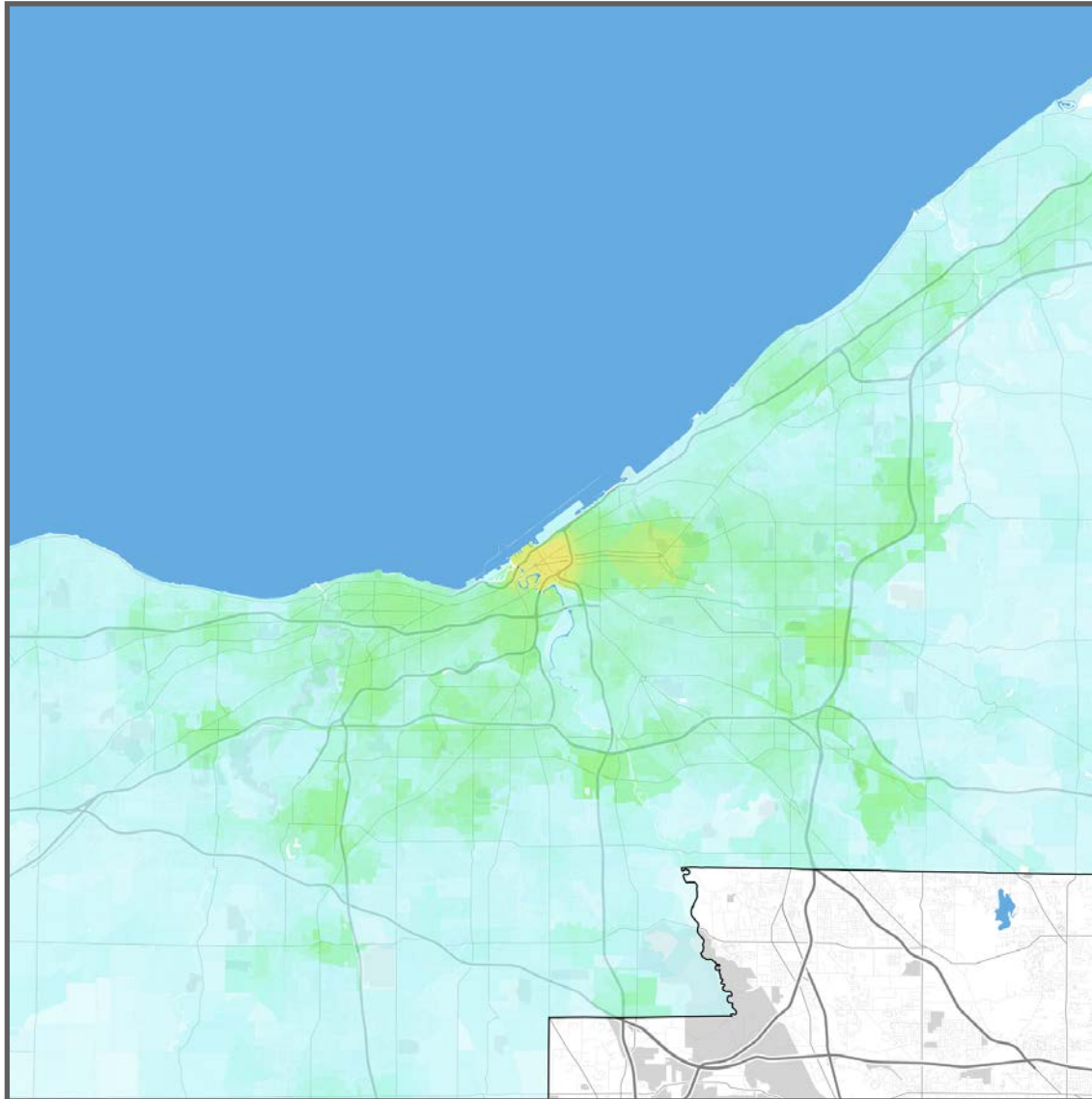




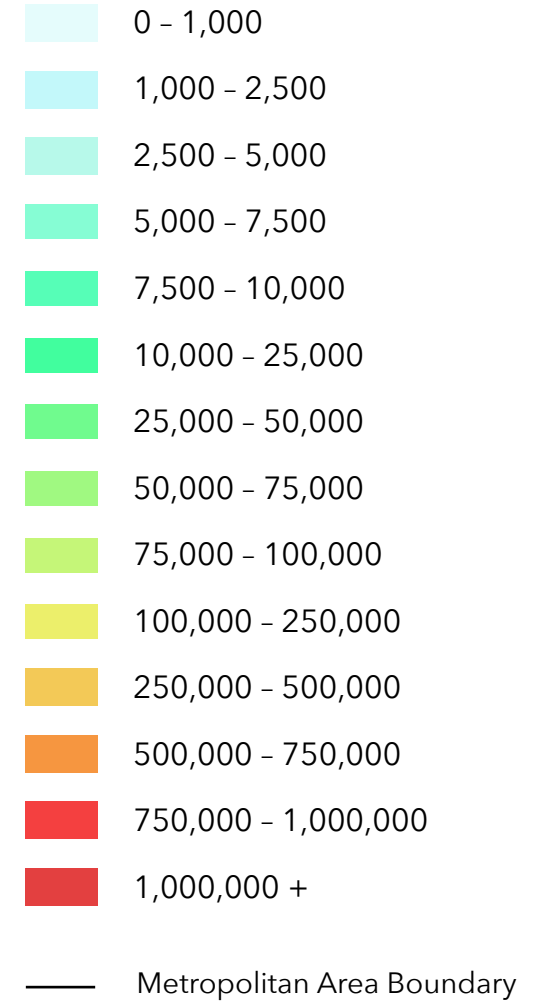
# Cleveland

Cleveland-Elyria-Mentor, OH

33



## Jobs within 30 minutes by walking



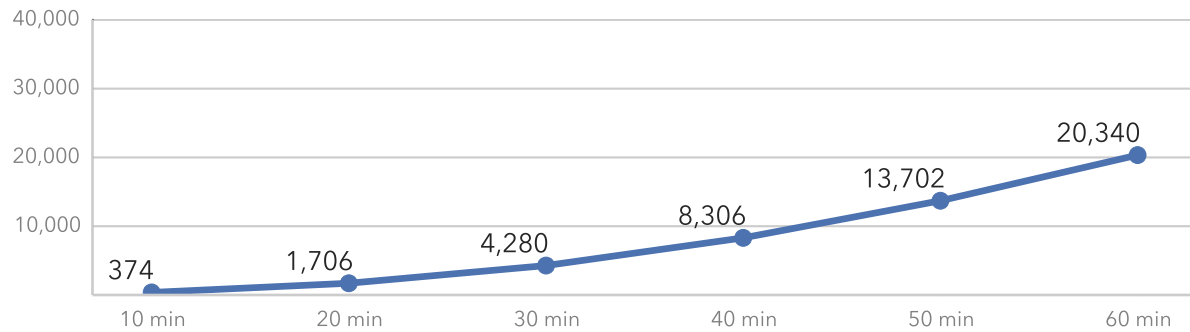
# Columbus

Columbus, OH

Rank by Weighted Walking Accessibility	<b>28</b>
Rank by Total Employment	<b>28</b>
Total Jobs	<b>902,579</b>
Average Job Density (per km <sup>2</sup> )	<b>88</b>
Total Workers	<b>834,633</b>
Average Worker Density (per km <sup>2</sup> )	<b>81</b>

*Job and worker totals are based on LEHD estimates and may not match other sources.*

## Job Accessibility by Travel Time Threshold

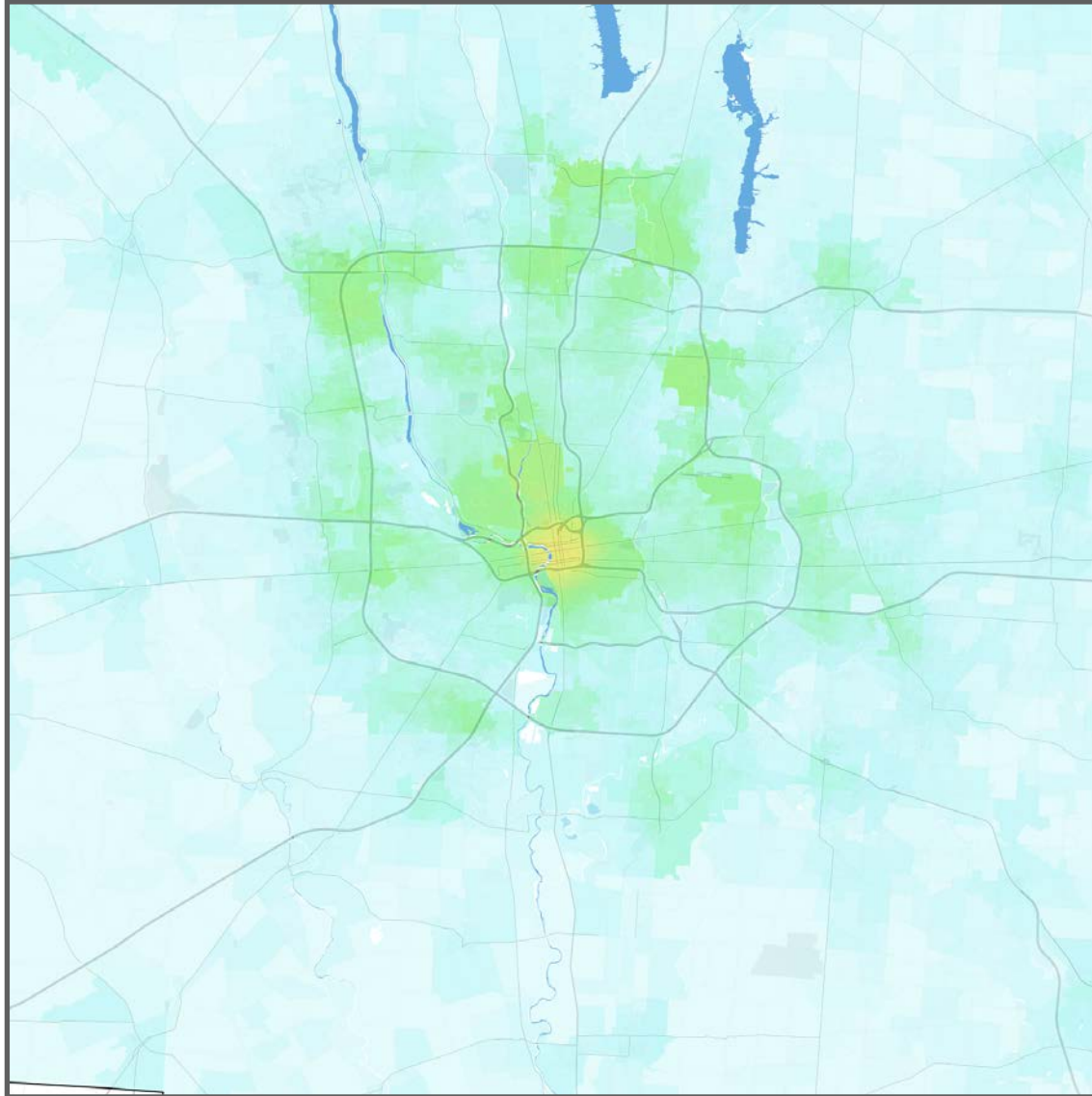




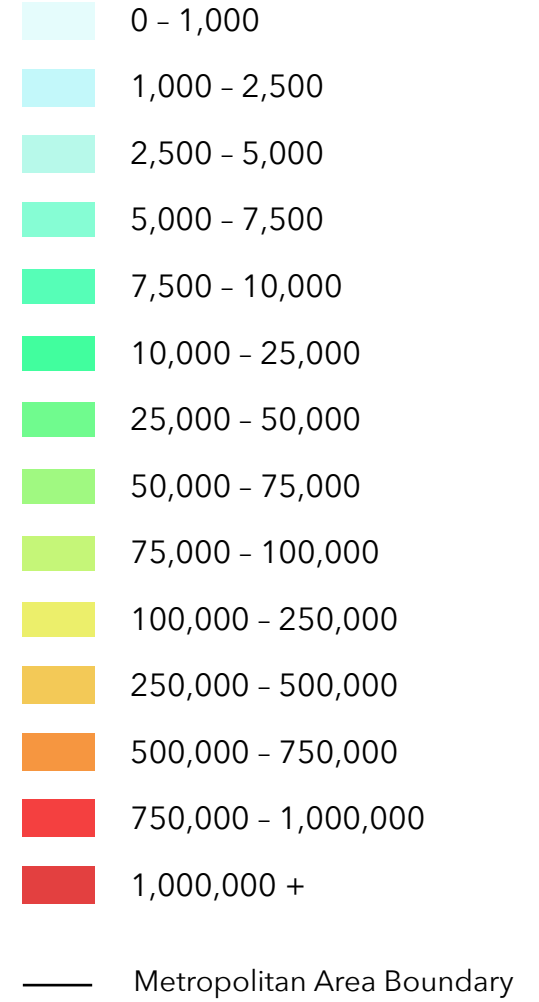
# Columbus

Columbus, OH

35



## Jobs within 30 minutes by walking



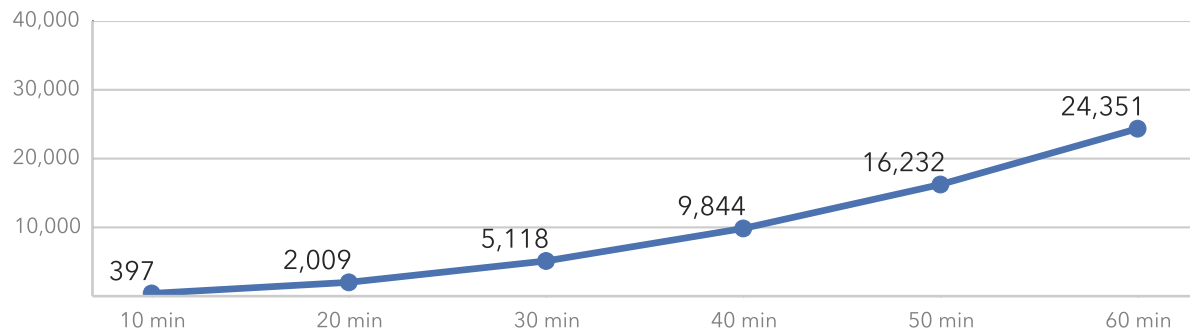
# Dallas

Dallas-Fort Worth-Arlington, TX

Rank by Weighted Walking Accessibility	<b>23</b>
Rank by Total Employment	<b>4</b>
Total Jobs	<b>2,974,327</b>
Average Job Density (per km <sup>2</sup> )	<b>129</b>
Total Workers	<b>2,864,933</b>
Average Worker Density (per km <sup>2</sup> )	<b>124</b>

*Job and worker totals are based on LEHD estimates and may not match other sources.*

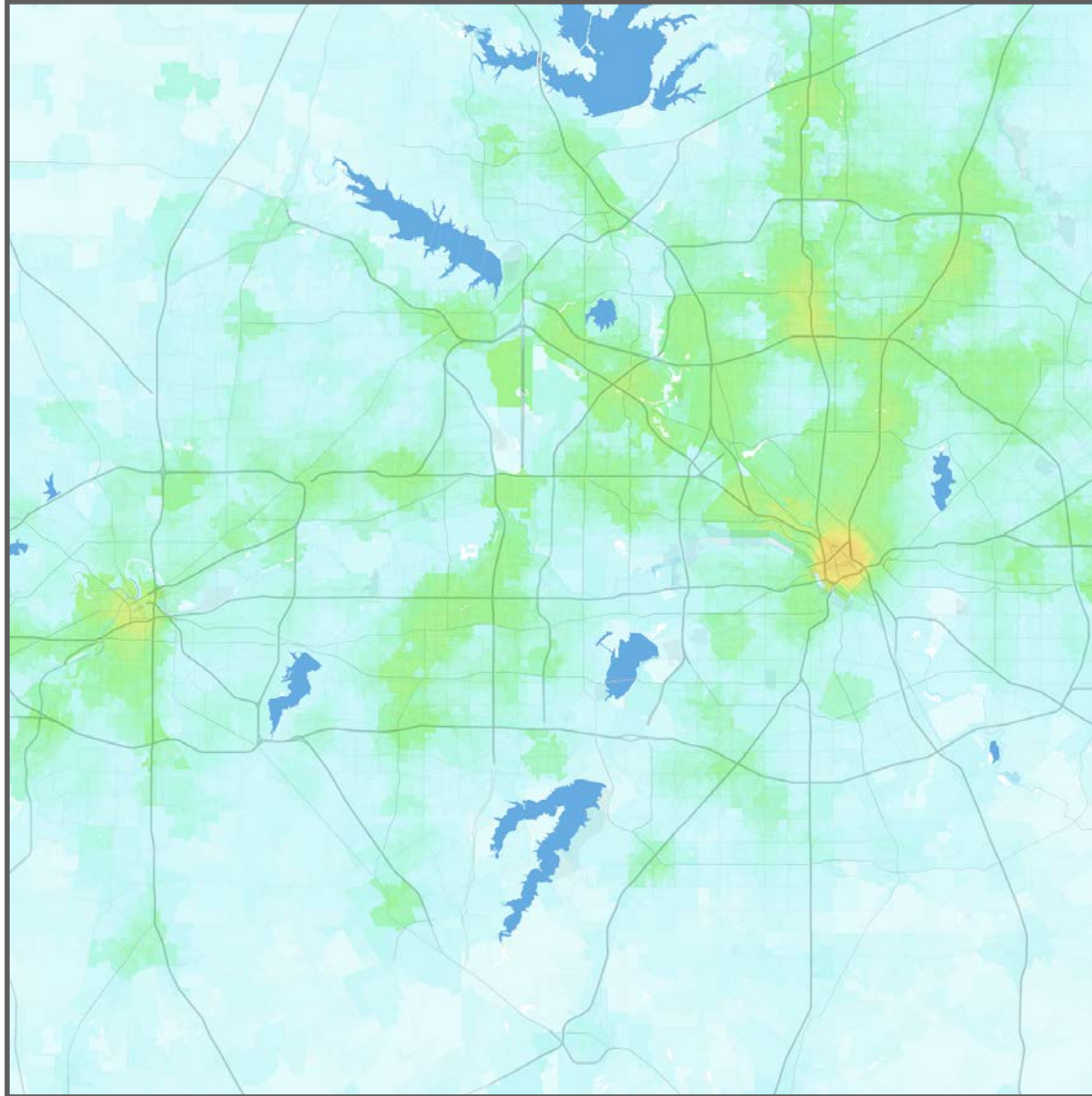
## Job Accessibility by Travel Time Threshold



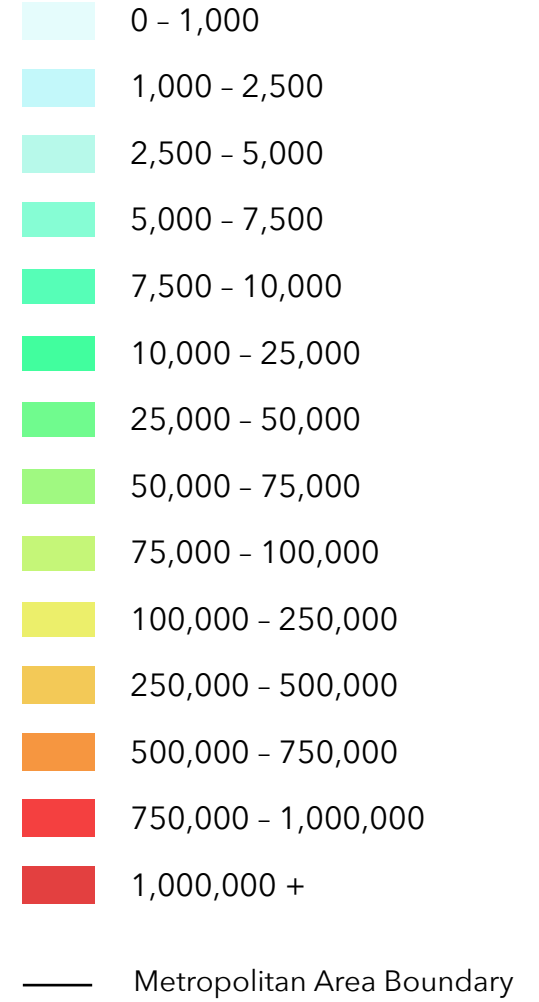
# Dallas

Dallas-Fort Worth-Arlington, TX

37



## Jobs within 30 minutes by walking



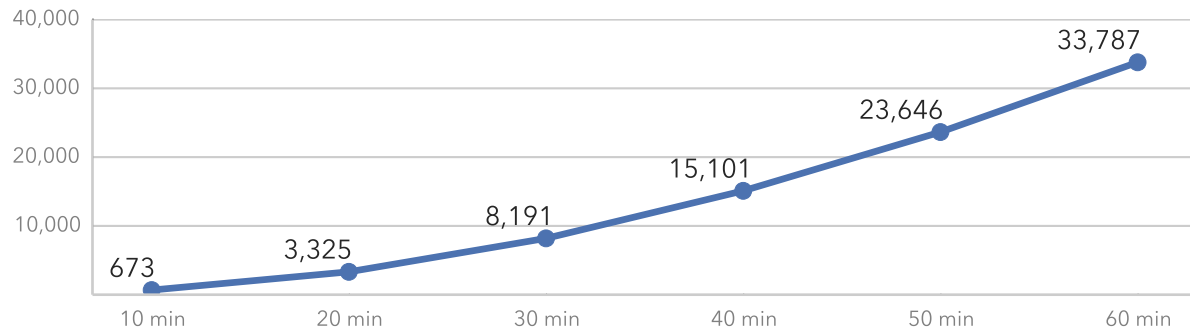
# Denver

Denver-Aurora-Broomfield, CO

Rank by Weighted Walking Accessibility	<b>10</b>
Rank by Total Employment	<b>18</b>
Total Jobs	<b>1,232,324</b>
Average Job Density (per km <sup>2</sup> )	<b>57</b>
Total Workers	<b>1,180,703</b>
Average Worker Density (per km <sup>2</sup> )	<b>55</b>

*Job and worker totals are based on LEHD estimates and may not match other sources.*

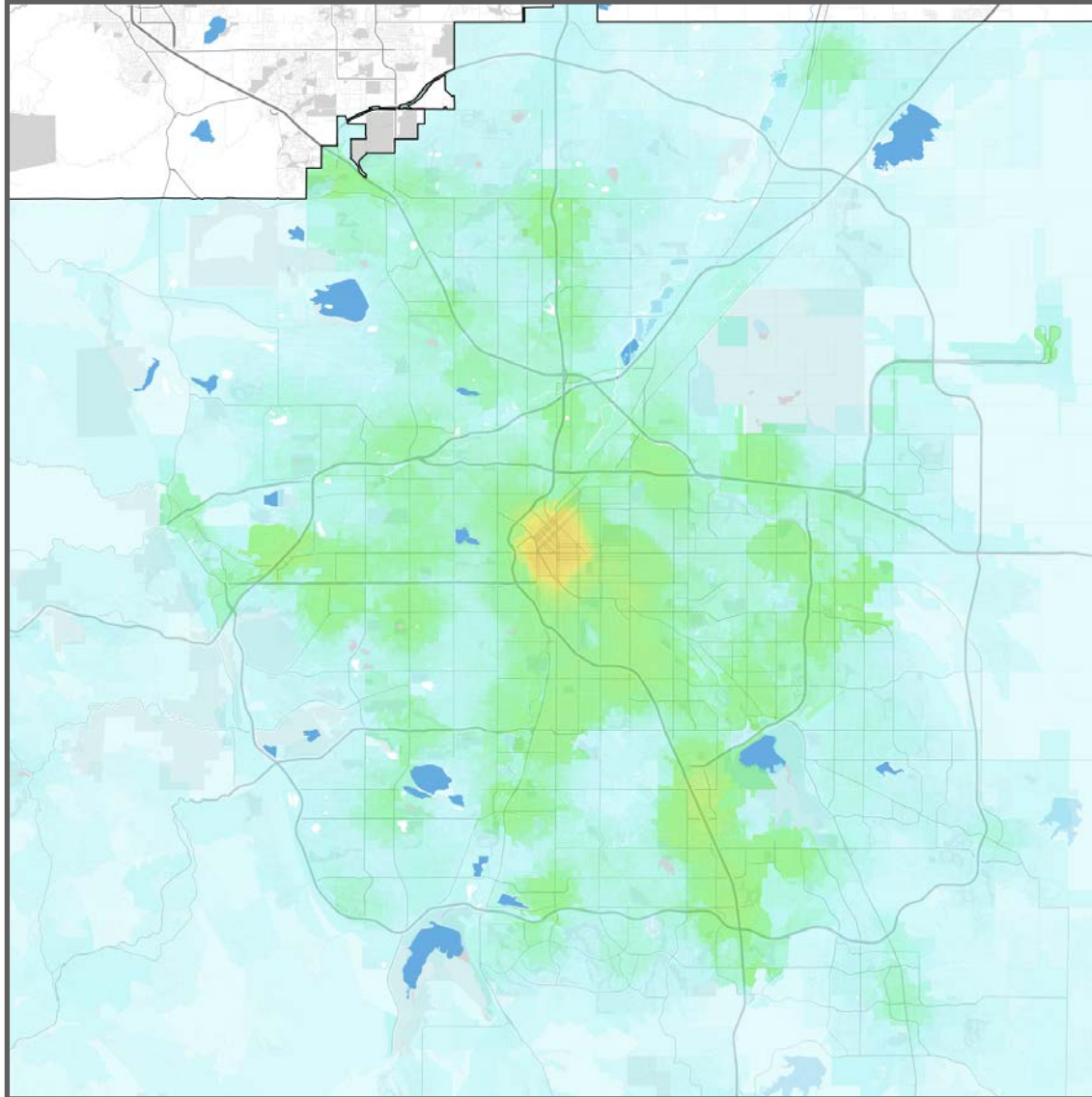
## Job Accessibility by Travel Time Threshold



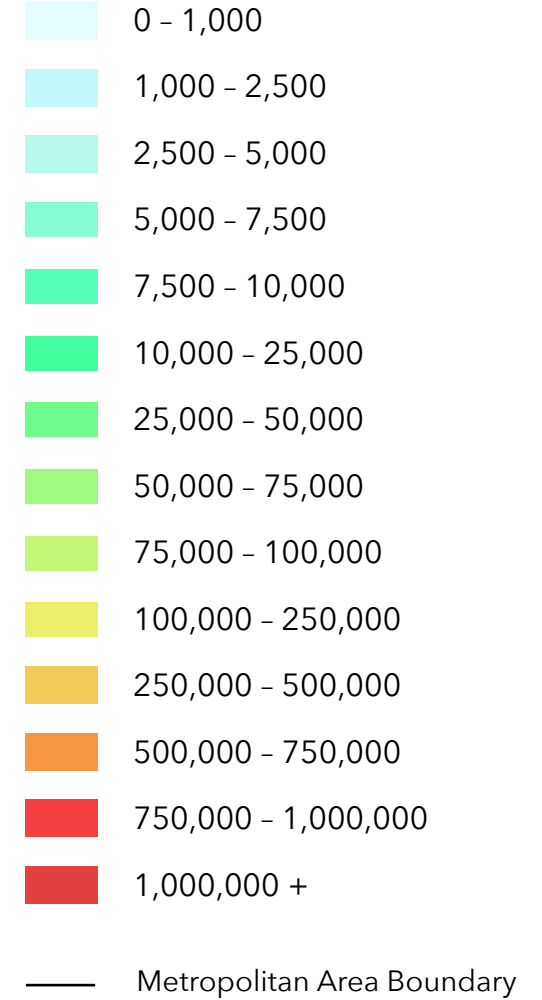
# Denver

Denver-Aurora-Broomfield, CO

39



## Jobs within 30 minutes by walking



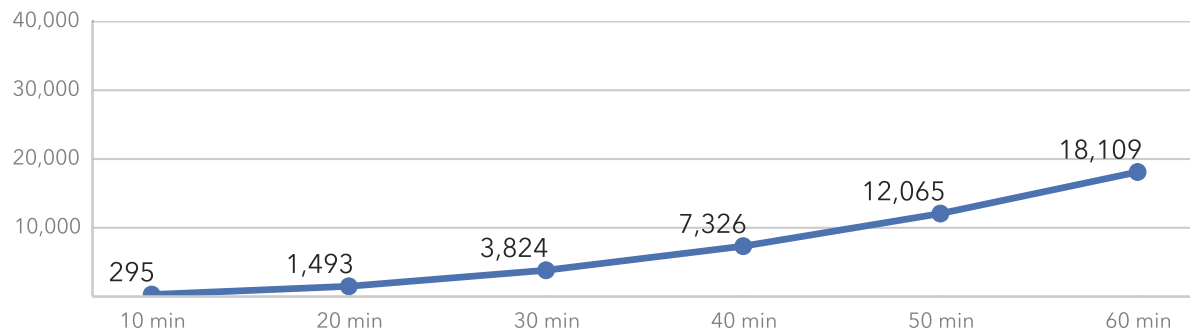
# Detroit

Detroit-Warren-Livonia, MI

Rank by Weighted Walking Accessibility	<b>32</b>
Rank by Total Employment	<b>12</b>
Total Jobs	<b>1,717,913</b>
Average Job Density (per km <sup>2</sup> )	<b>171</b>
Total Workers	<b>1,712,027</b>
Average Worker Density (per km <sup>2</sup> )	<b>170</b>

*Job and worker totals are based on LEHD estimates and may not match other sources.*

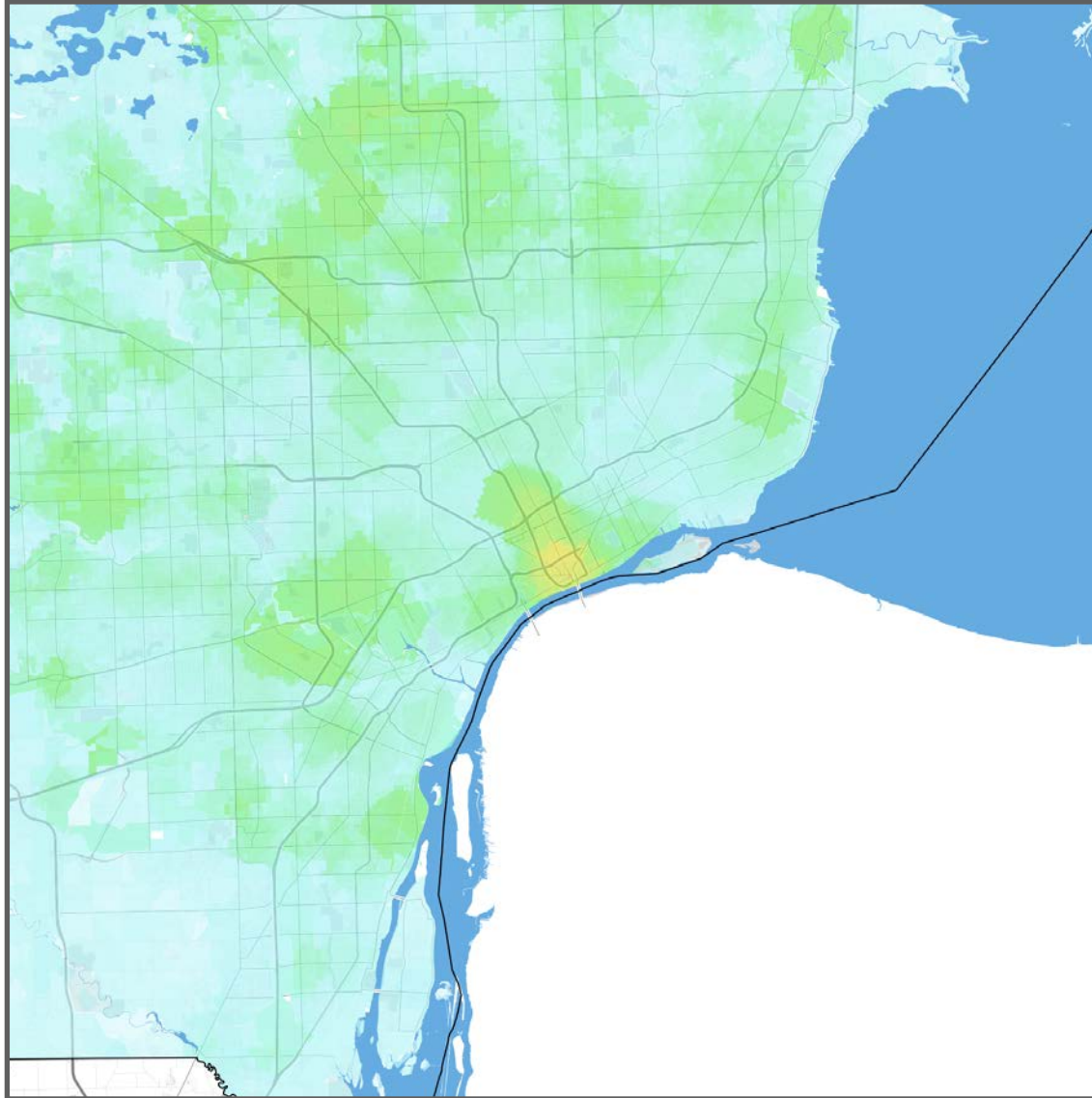
## Job Accessibility by Travel Time Threshold



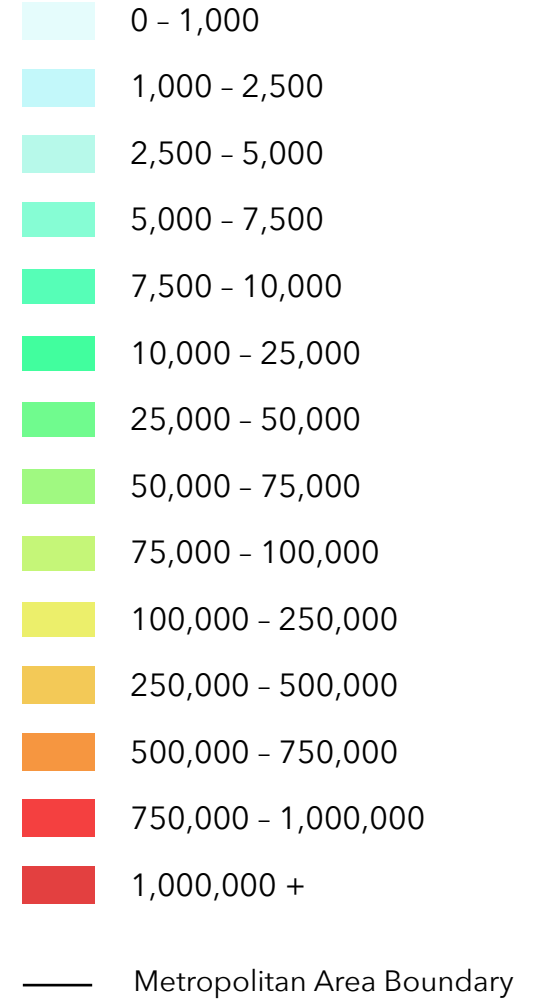


# Detroit

Detroit-Warren-Livonia, MI



## Jobs within 30 minutes by walking



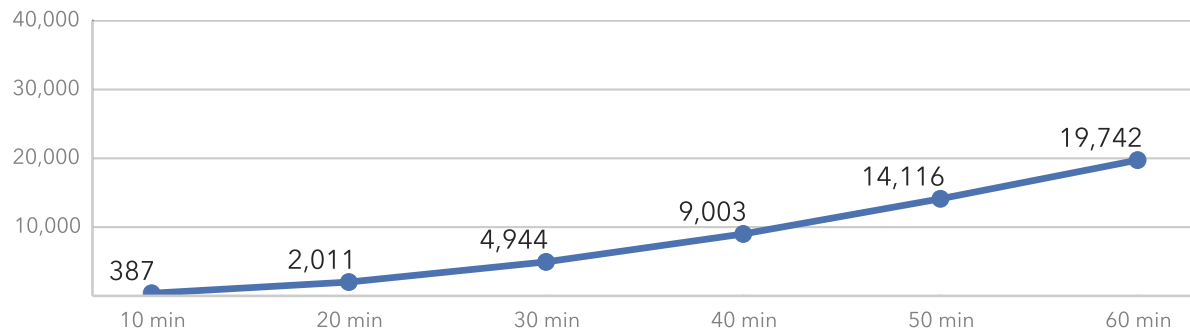
# Hartford

Hartford-West Hartford-East Hartford, CT

Rank by Weighted Walking Accessibility	<b>26</b>
Rank by Total Employment	<b>40</b>
Total Jobs	<b>616,469</b>
Average Job Density (per km <sup>2</sup> )	<b>157</b>
Total Workers	<b>560,748</b>
Average Worker Density (per km <sup>2</sup> )	<b>143</b>

*Job and worker totals are based on LEHD estimates and may not match other sources.*

## Job Accessibility by Travel Time Threshold

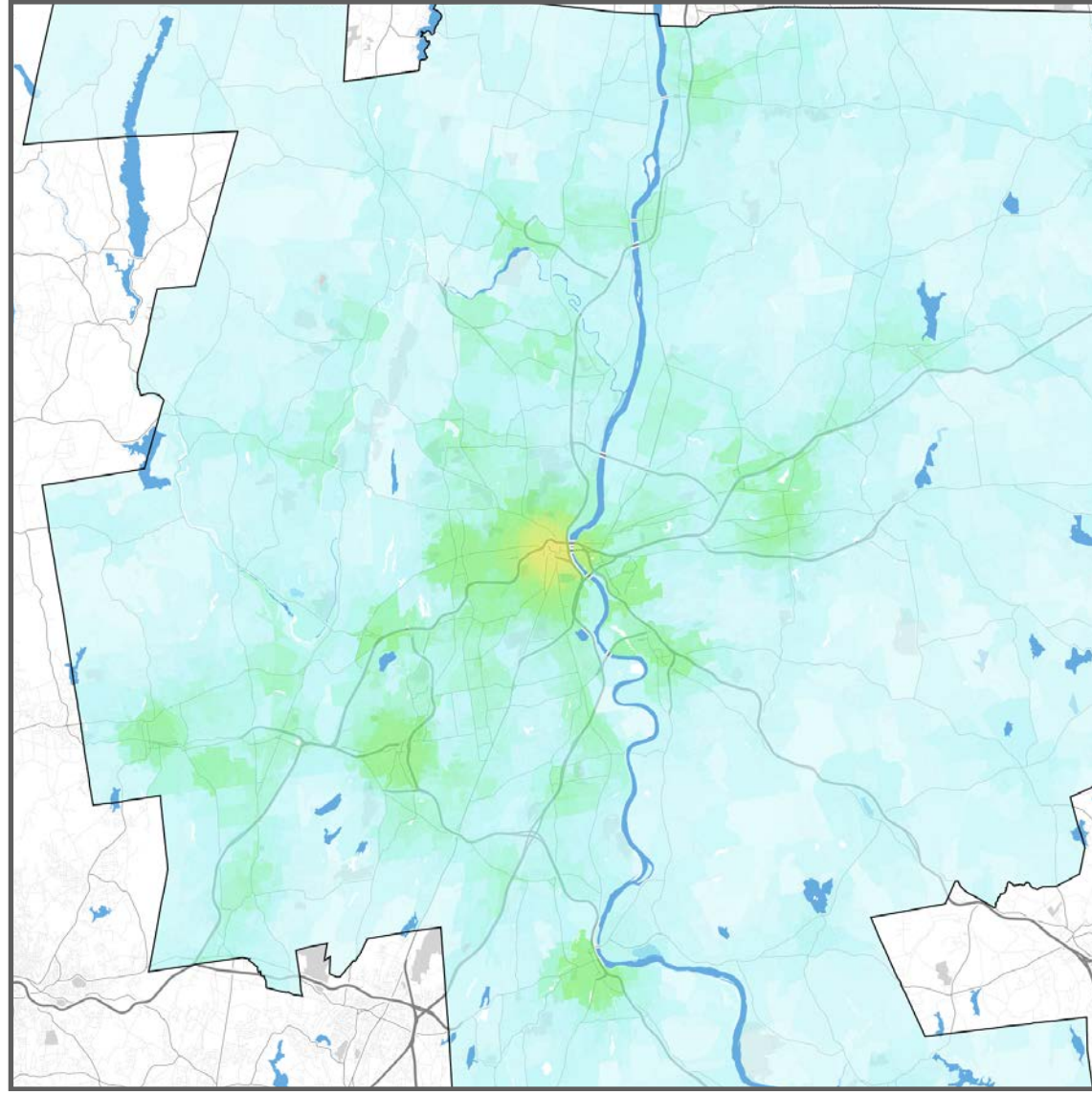




# Hartford

Hartford-West Hartford-East Hartford, CT

43



## Jobs within 30 minutes by walking

- 0 - 1,000
- 1,000 - 2,500
- 2,500 - 5,000
- 5,000 - 7,500
- 7,500 - 10,000
- 10,000 - 25,000
- 25,000 - 50,000
- 50,000 - 75,000
- 75,000 - 100,000
- 100,000 - 250,000
- 250,000 - 500,000
- 500,000 - 750,000
- 750,000 - 1,000,000
- 1,000,000 +
- Metropolitan Area Boundary

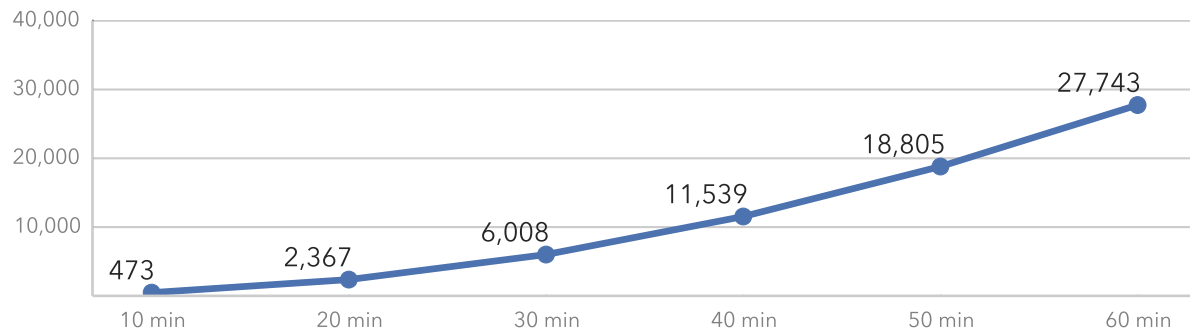
# Houston

Houston-Sugar Land-Baytown, TX

Rank by Weighted Walking Accessibility	<b>17</b>
Rank by Total Employment	<b>7</b>
Total Jobs	<b>2,636,575</b>
Average Job Density (per km <sup>2</sup> )	<b>115</b>
Total Workers	<b>2,543,501</b>
Average Worker Density (per km <sup>2</sup> )	<b>111</b>

*Job and worker totals are based on LEHD estimates and may not match other sources.*

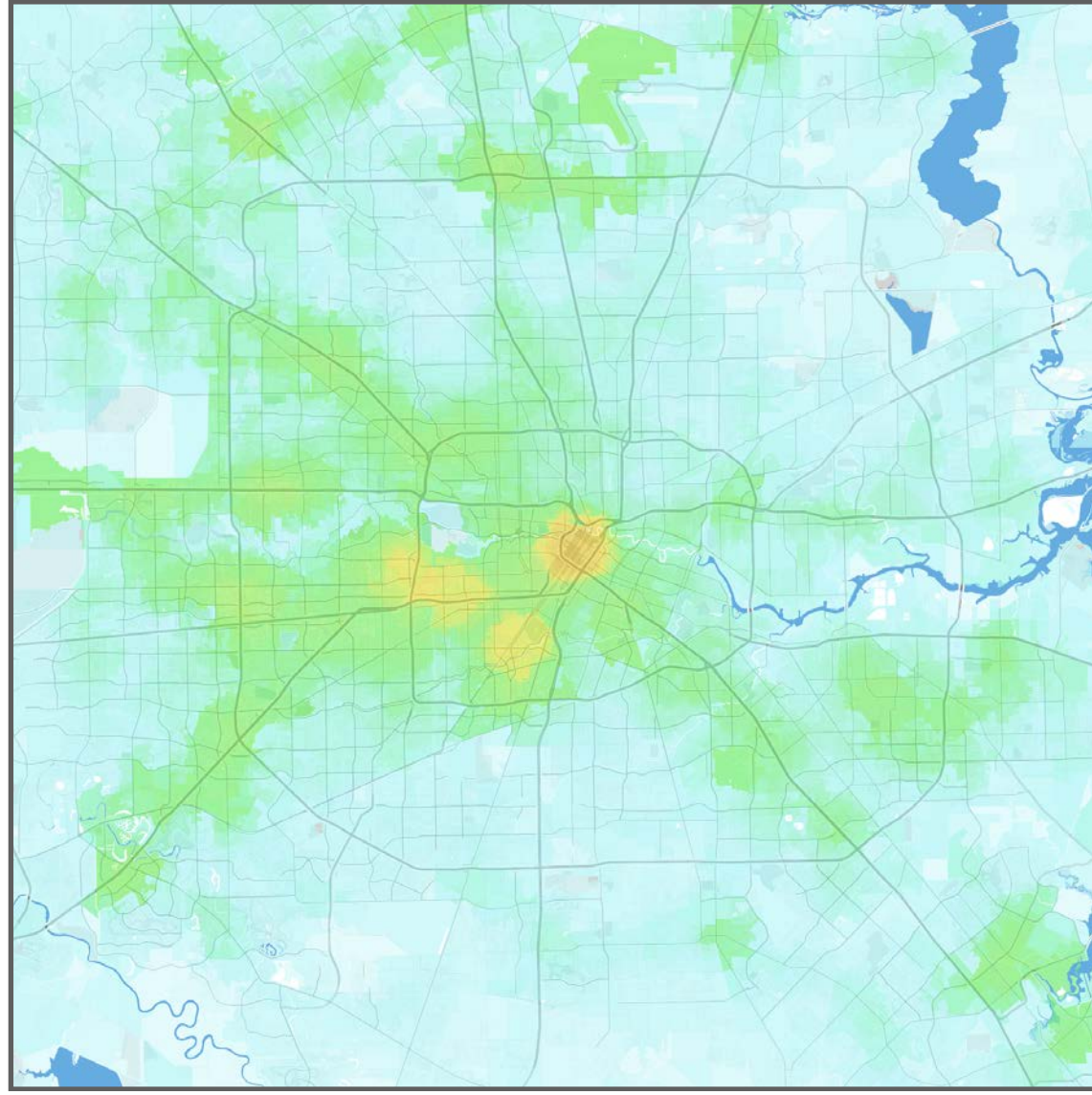
## Job Accessibility by Travel Time Threshold



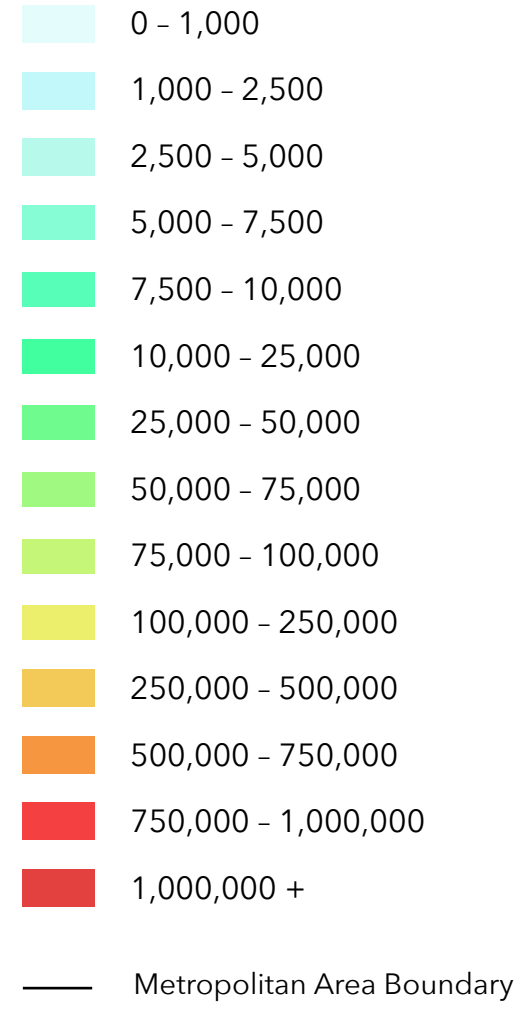
# Houston

Houston-Sugar Land-Baytown, TX

45



## Jobs within 30 minutes by walking



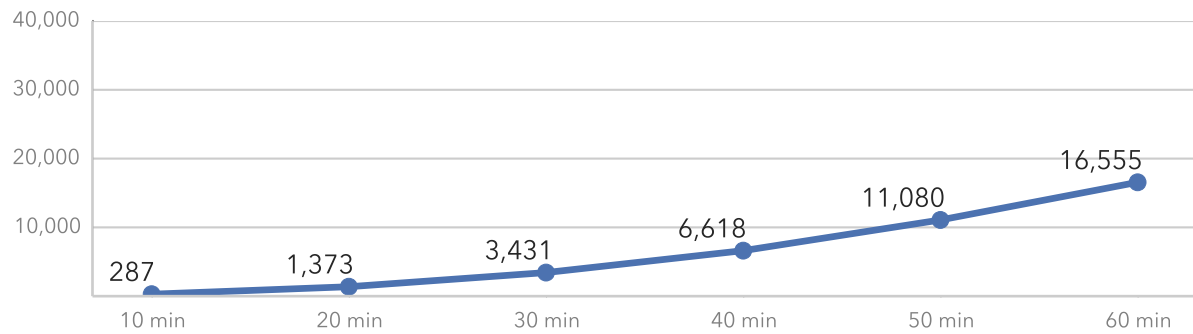
# Indianapolis

Indianapolis-Carmel, IN

Rank by Weighted Walking Accessibility	<b>38</b>
Rank by Total Employment	<b>29</b>
Total Jobs	<b>893,513</b>
Average Job Density (per km <sup>2</sup> )	<b>90</b>
Total Workers	<b>813,598</b>
Average Worker Density (per km <sup>2</sup> )	<b>81</b>

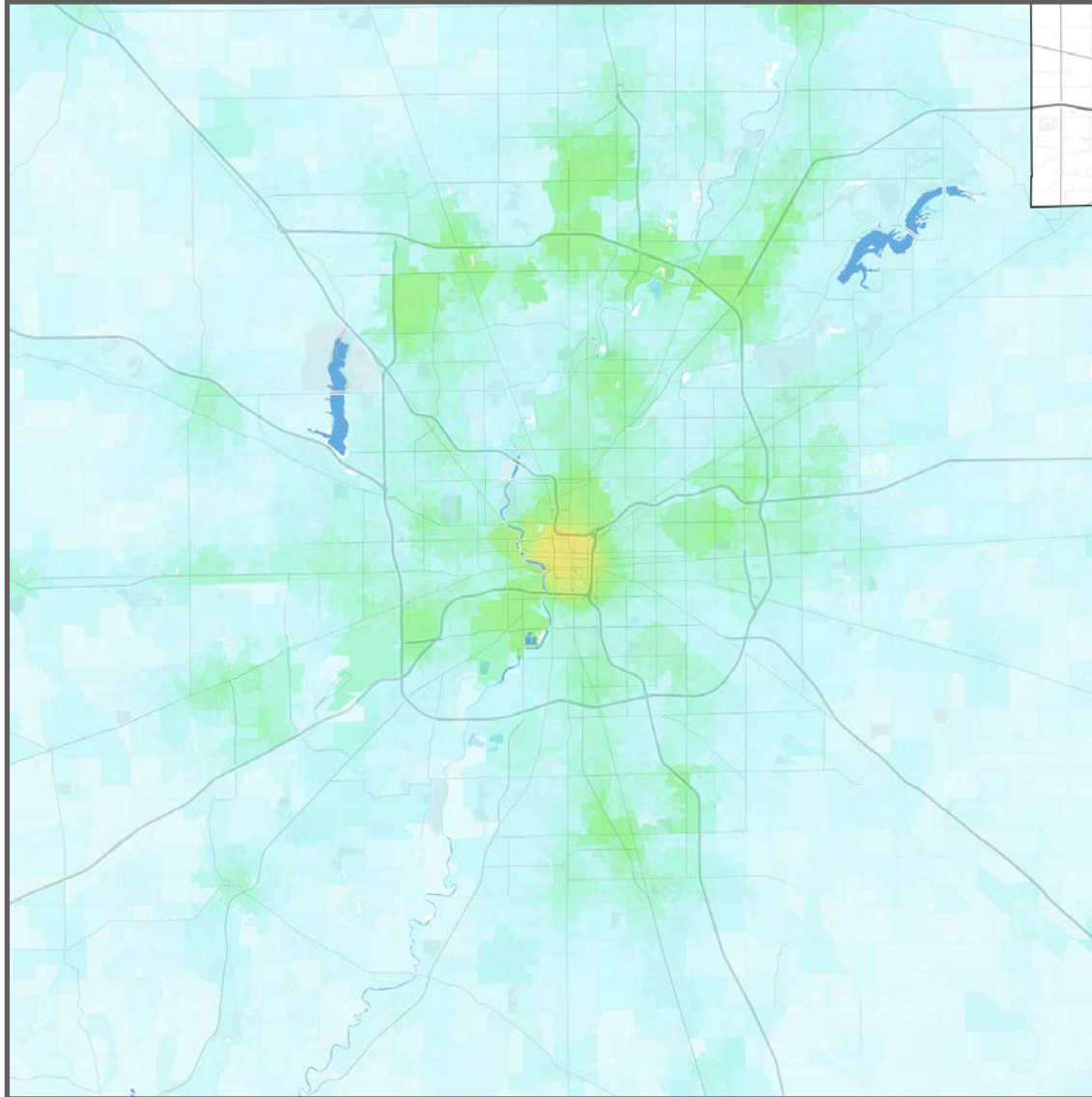
*Job and worker totals are based on LEHD estimates and may not match other sources.*

## Job Accessibility by Travel Time Threshold

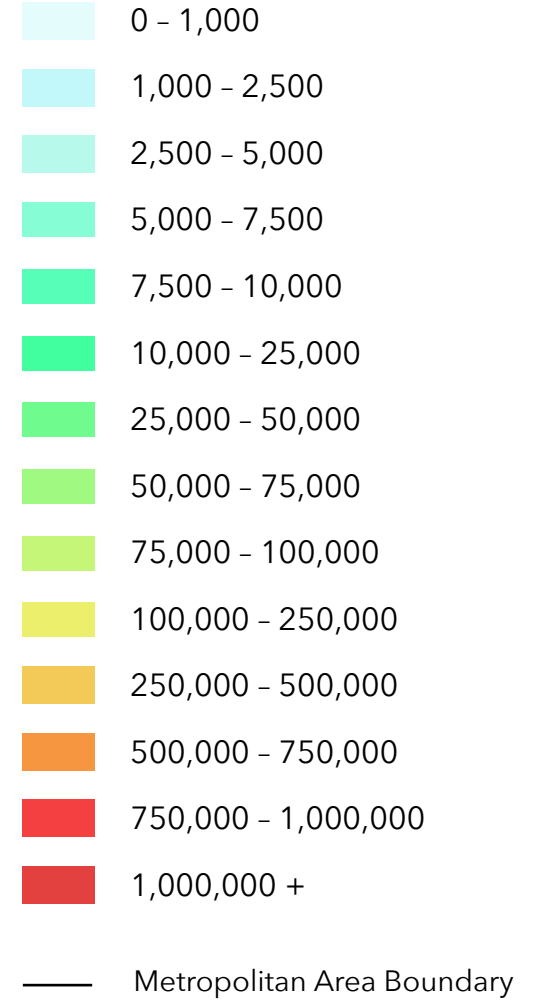


# Indianapolis

Indianapolis-Carmel, IN



## Jobs within 30 minutes by walking





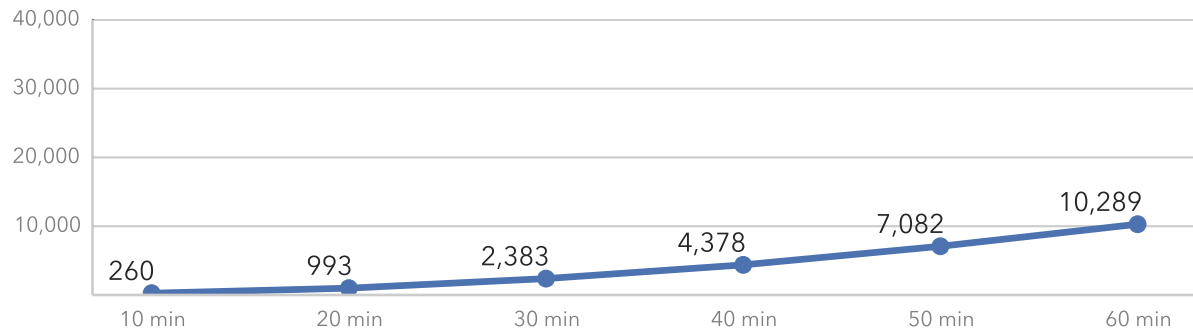
# Jacksonville

Jacksonville, FL

Rank by Weighted Walking Accessibility	<b>49</b>
Rank by Total Employment	<b>44</b>
Total Jobs	<b>587,464</b>
Average Job Density (per km <sup>2</sup> )	<b>71</b>
Total Workers	<b>560,881</b>
Average Worker Density (per km <sup>2</sup> )	<b>68</b>

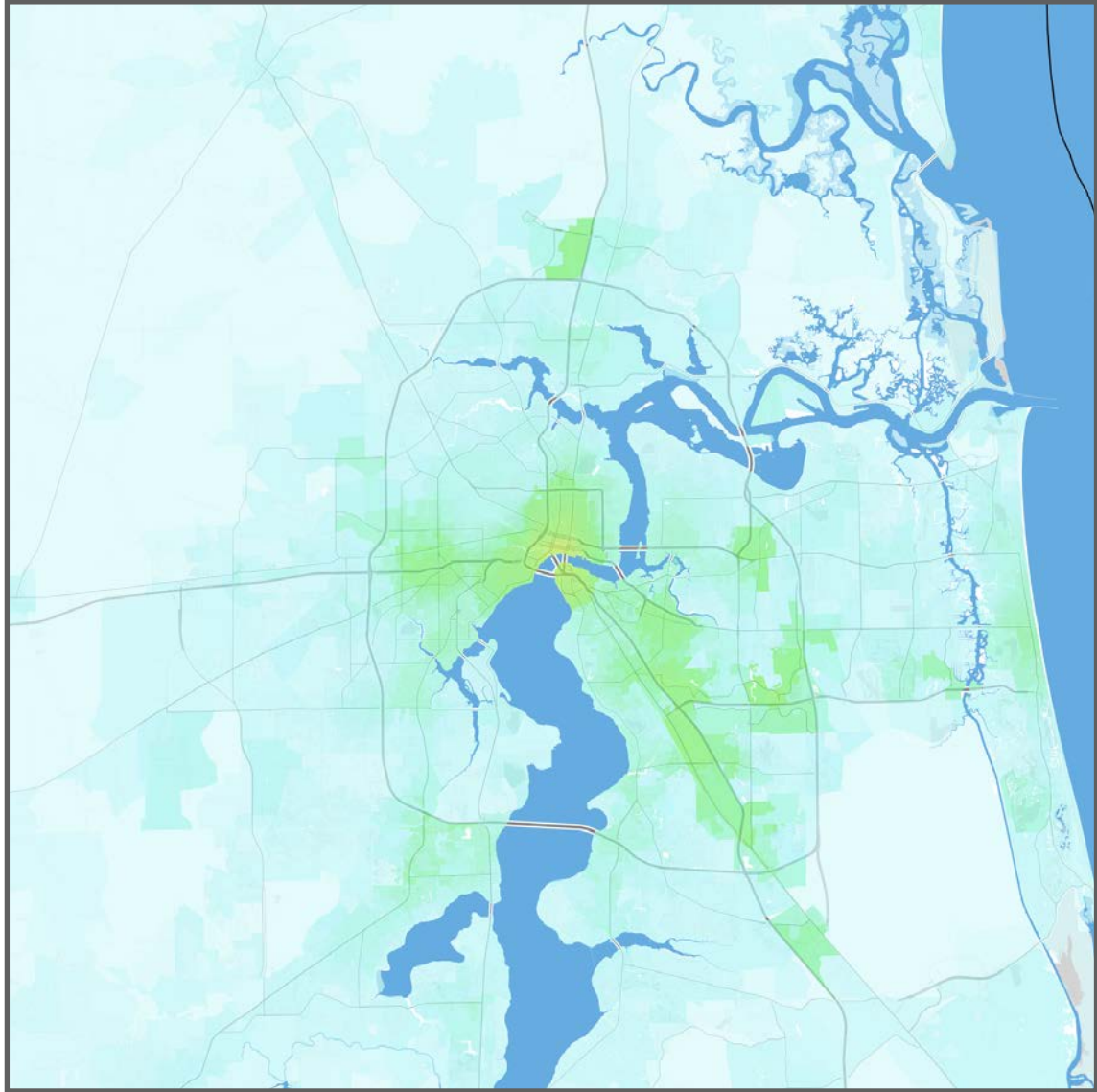
*Job and worker totals are based on LEHD estimates and may not match other sources.*

## Job Accessibility by Travel Time Threshold

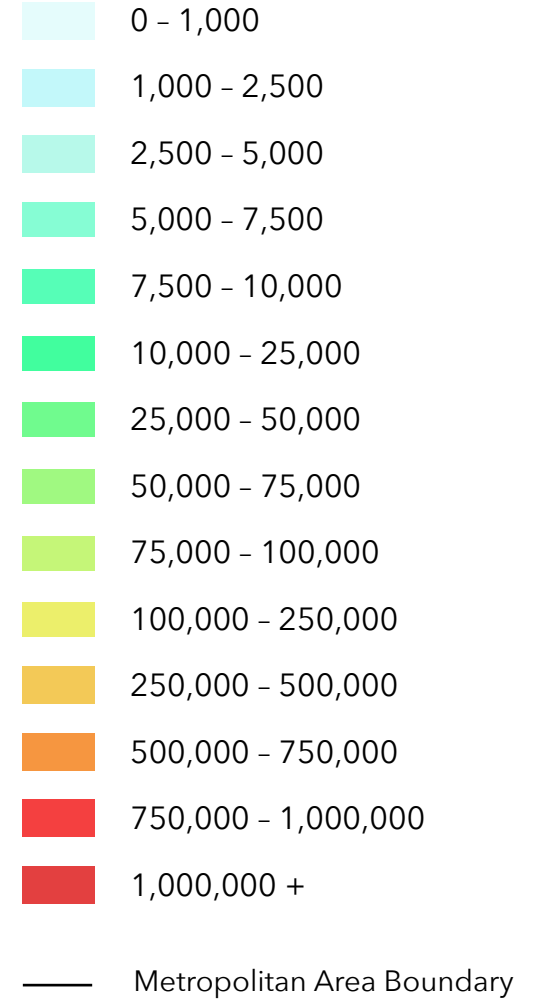


# Jacksonville

Jacksonville, FL



## Jobs within 30 minutes by walking



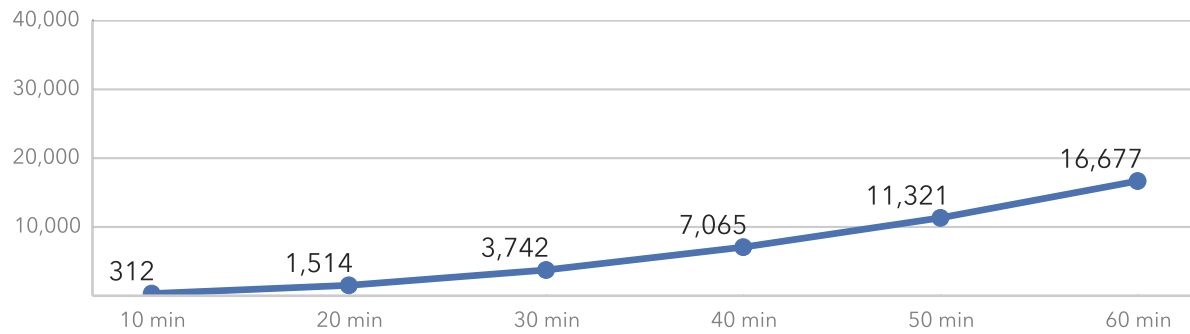
# Kansas City

Kansas City, MO-KS

Rank by Weighted Walking Accessibility	<b>35</b>
Rank by Total Employment	<b>26</b>
Total Jobs	<b>961,827</b>
Average Job Density (per km <sup>2</sup> )	<b>47</b>
Total Workers	<b>944,847</b>
Average Worker Density (per km <sup>2</sup> )	<b>47</b>

*Job and worker totals are based on LEHD estimates and may not match other sources.*

## Job Accessibility by Travel Time Threshold

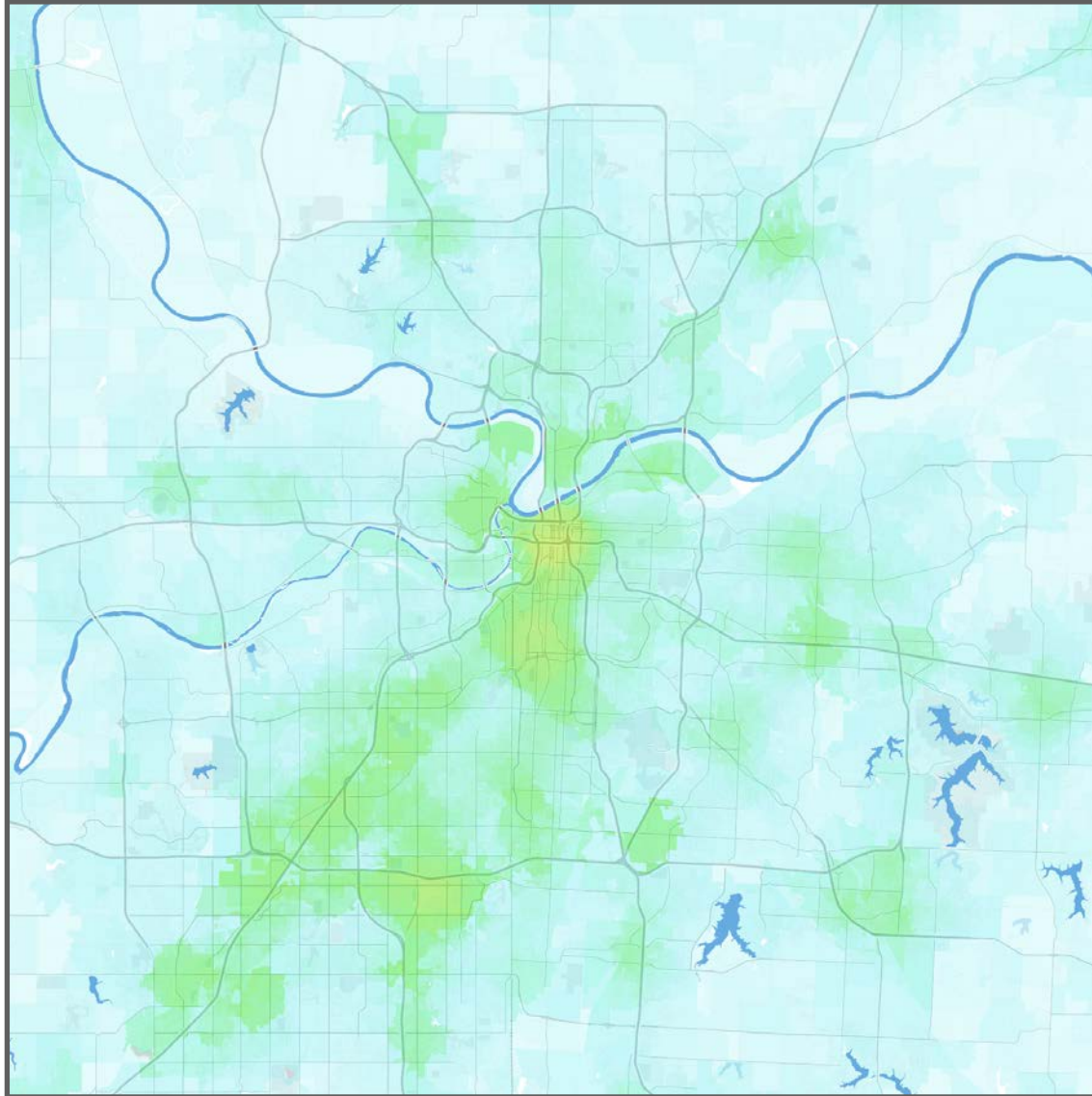




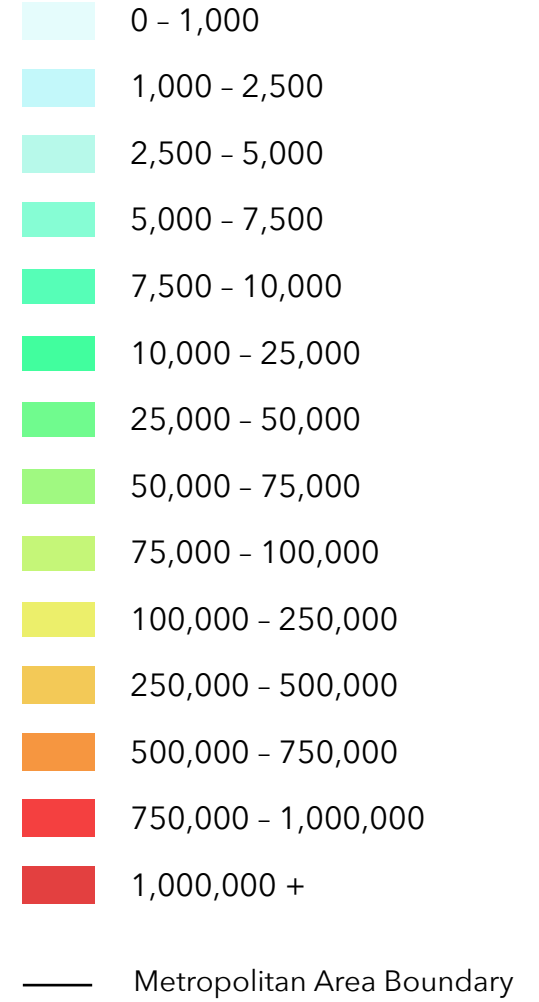
# Kansas City

Kansas City, MO-KS

51



## Jobs within 30 minutes by walking



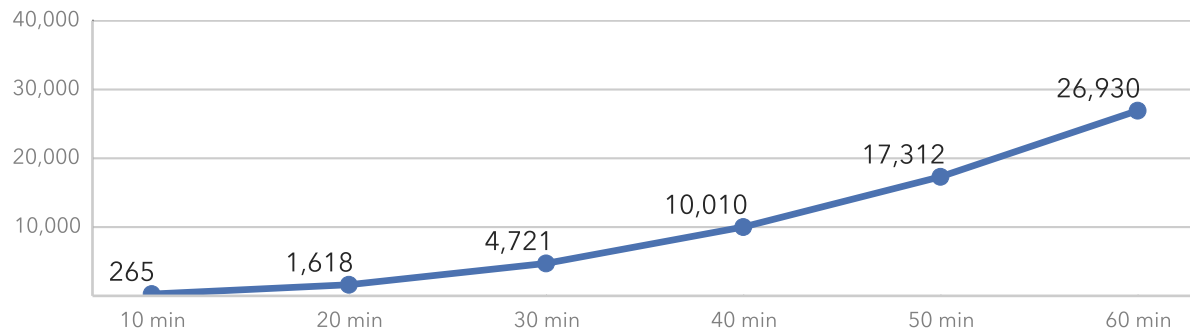
# Las Vegas

Las Vegas-Paradise, NV

Rank by Weighted Walking Accessibility	<b>25</b>
Rank by Total Employment	<b>36</b>
Total Jobs	<b>818,942</b>
Average Job Density (per km <sup>2</sup> )	<b>40</b>
Total Workers	<b>799,219</b>
Average Worker Density (per km <sup>2</sup> )	<b>39</b>

*Job and worker totals are based on LEHD estimates and may not match other sources.*

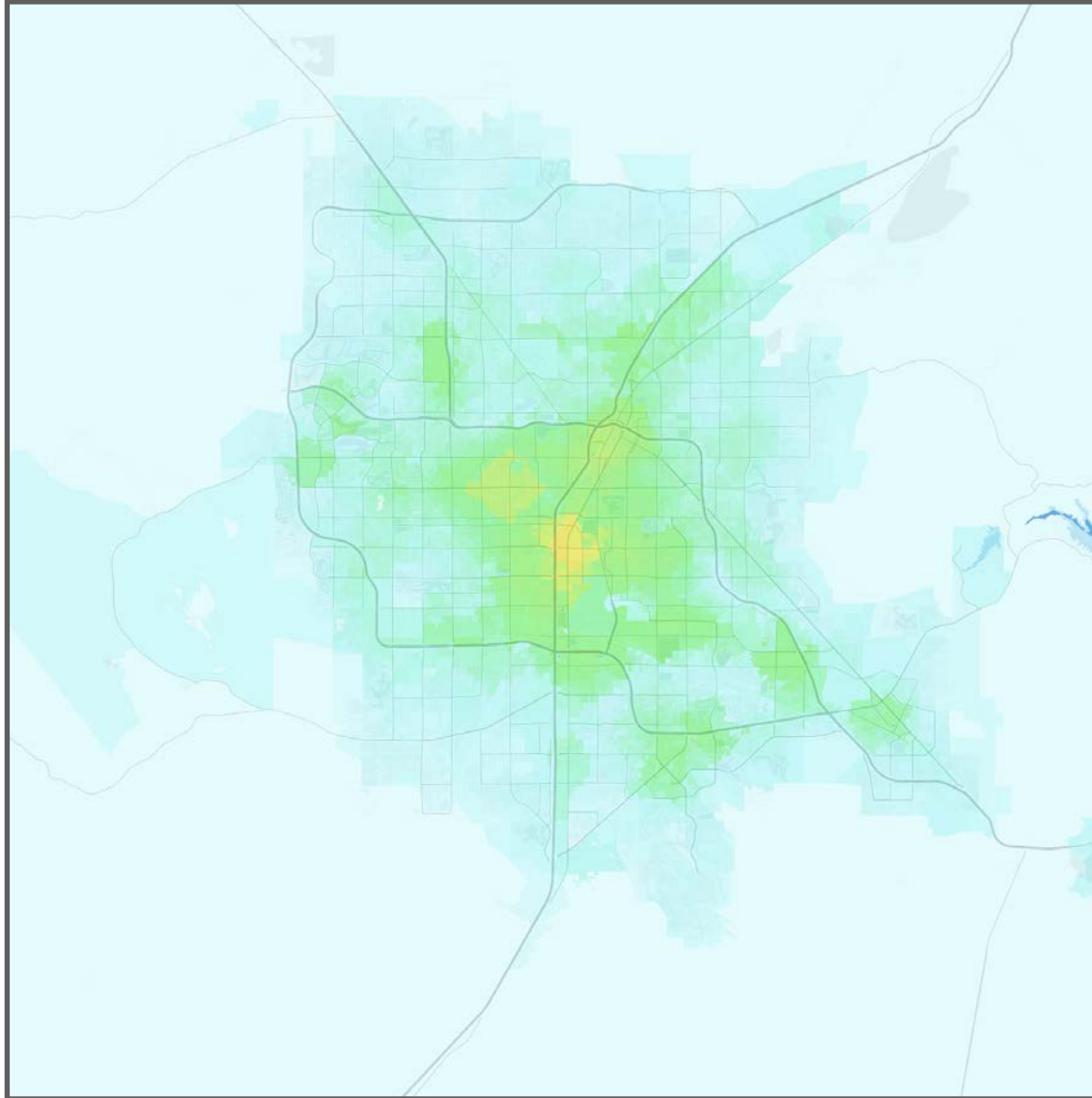
## Job Accessibility by Travel Time Threshold



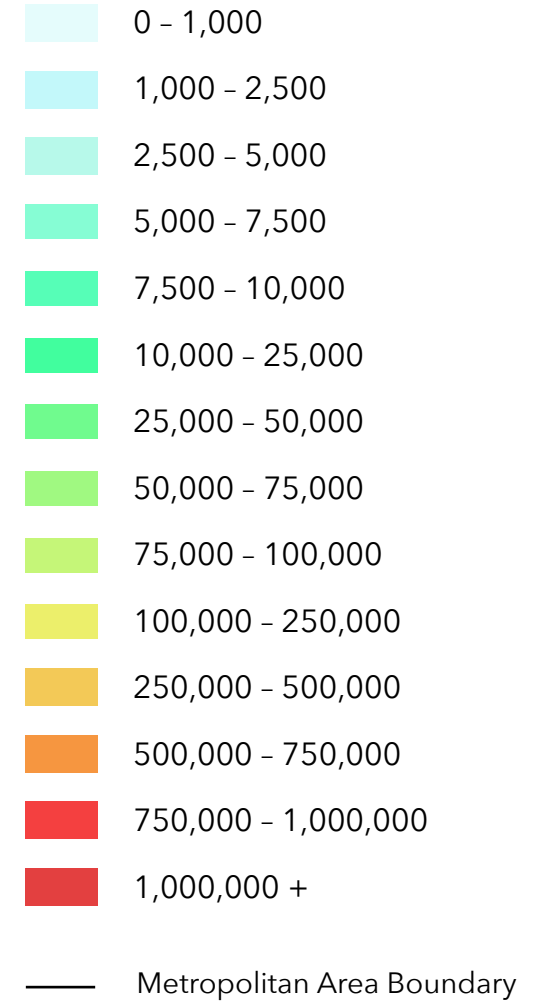
# Las Vegas

Las Vegas-Paradise, NV

53



## Jobs within 30 minutes by walking



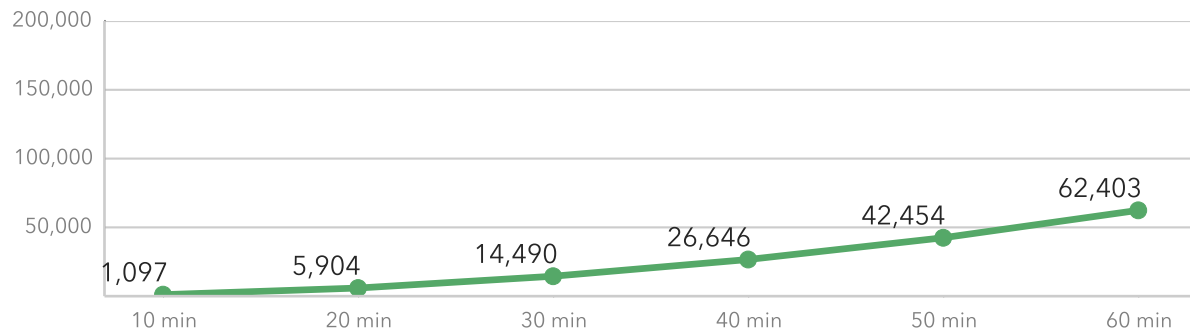
# Los Angeles

Los Angeles-Long Beach-Santa Ana, CA

Rank by Weighted Walking Accessibility	<b>3</b>
Rank by Total Employment	<b>2</b>
Total Jobs	<b>5,626,974</b>
Average Job Density (per km <sup>2</sup> )	<b>448</b>
Total Workers	<b>5,239,396</b>
Average Worker Density (per km <sup>2</sup> )	<b>417</b>

*Job and worker totals are based on LEHD estimates and may not match other sources.*

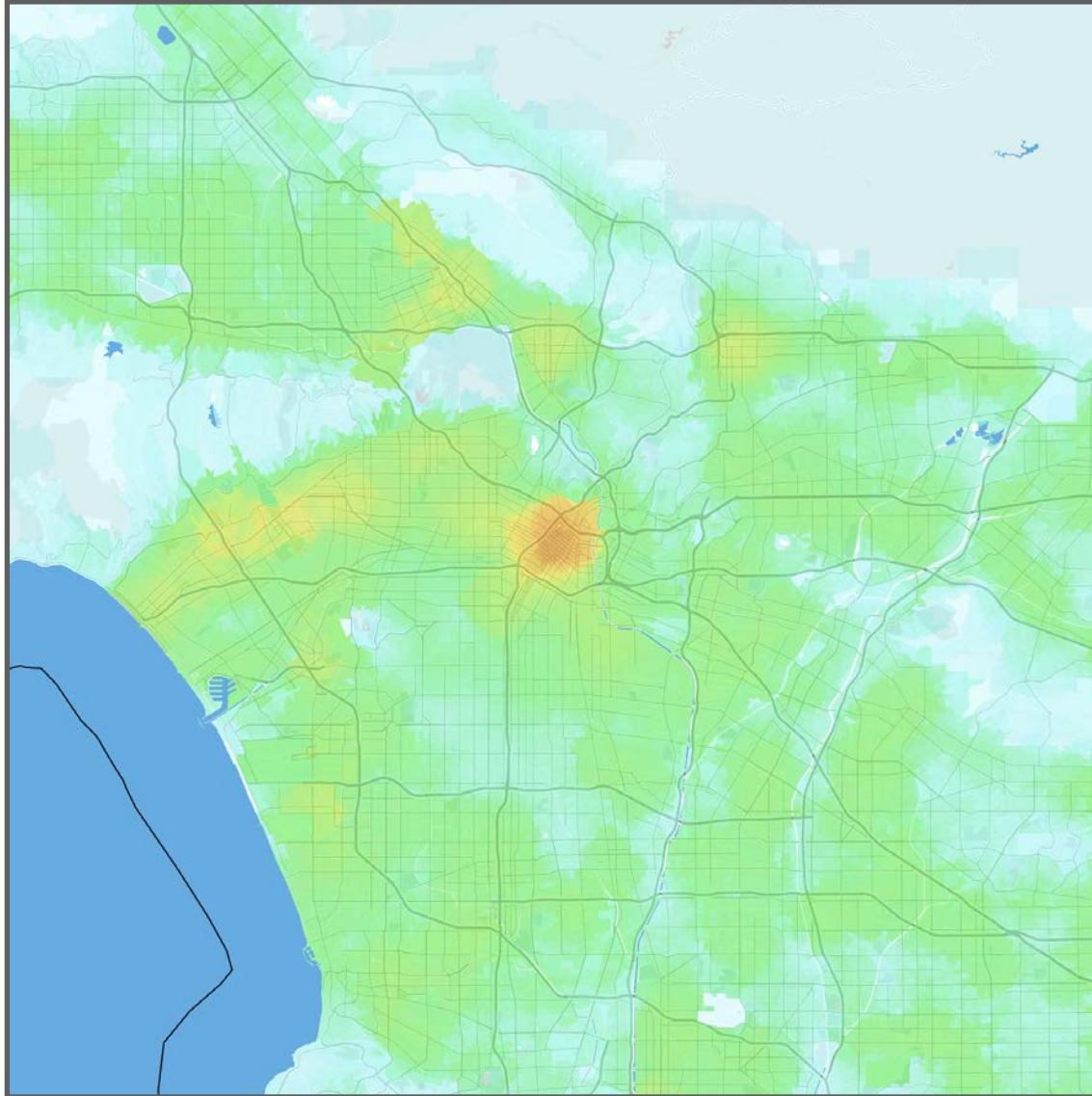
## Job Accessibility by Travel Time Threshold



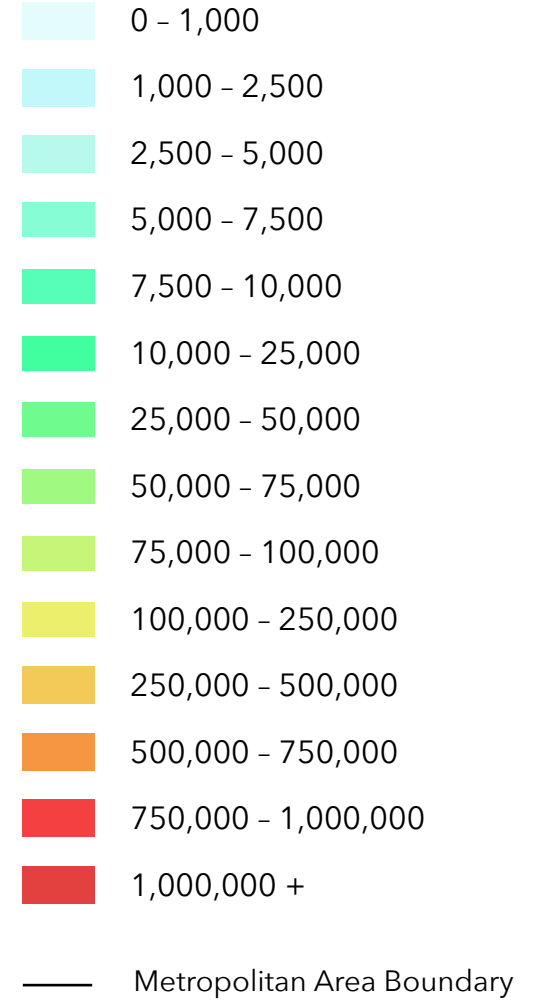
# Los Angeles

Los Angeles-Long Beach-Santa Ana, CA

55



## Jobs within 30 minutes by walking



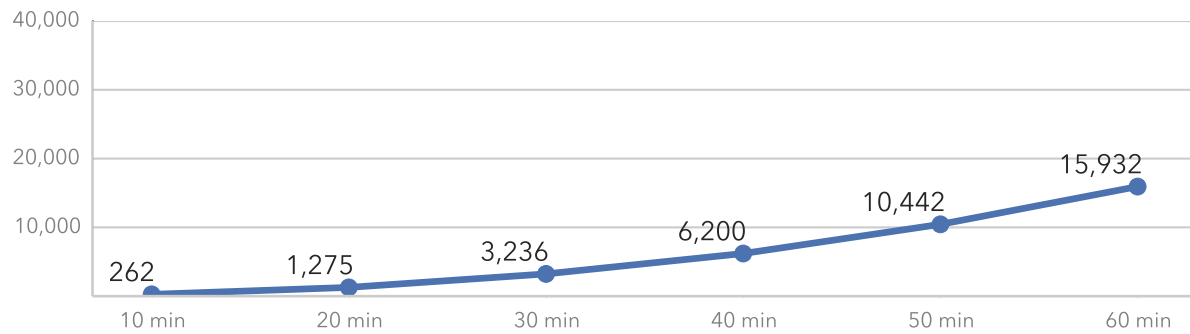
# Louisville

Louisville/Jefferson County, KY-IN

Rank by Weighted Walking Accessibility	<b>41</b>
Rank by Total Employment	<b>42</b>
Total Jobs	<b>591,128</b>
Average Job Density (per km <sup>2</sup> )	<b>56</b>
Total Workers	<b>576,300</b>
Average Worker Density (per km <sup>2</sup> )	<b>54</b>

*Job and worker totals are based on LEHD estimates and may not match other sources.*

## Job Accessibility by Travel Time Threshold

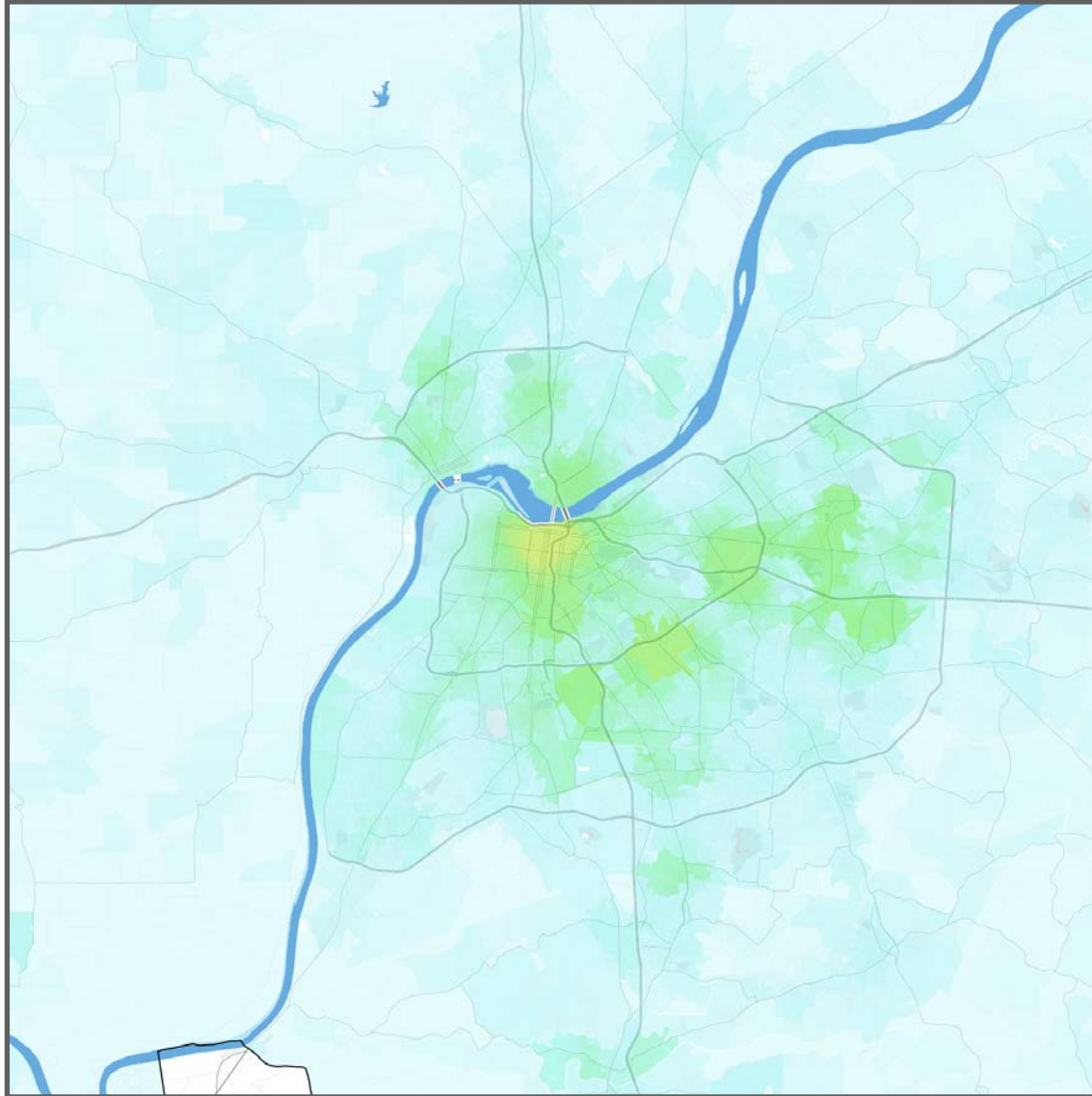




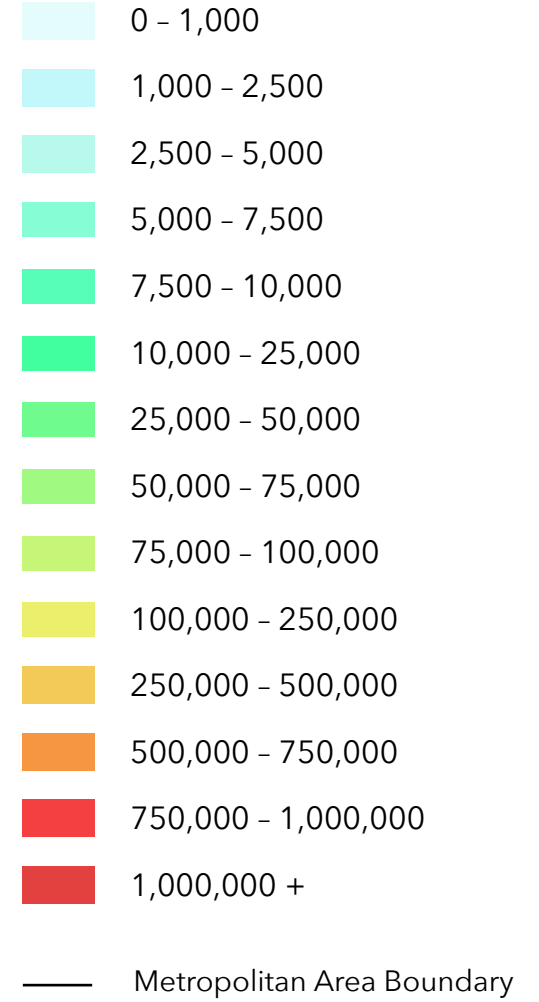
# Louisville

Louisville/Jefferson County, KY-IN

57



## Jobs within 30 minutes by walking



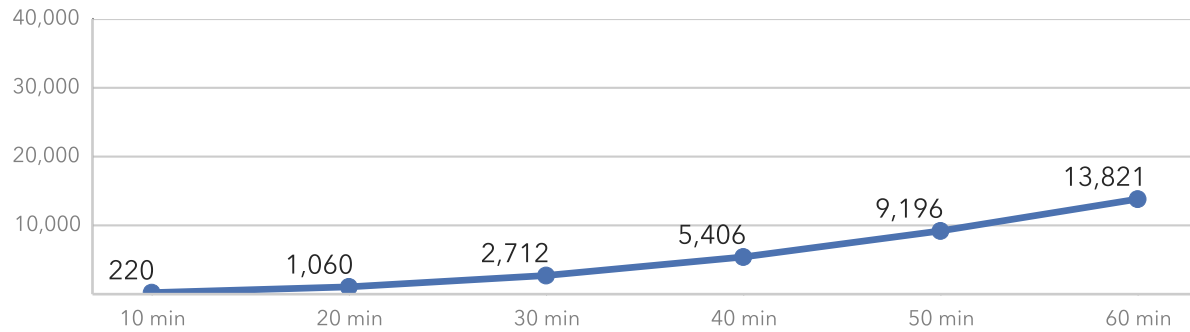
# Memphis

Memphis, TN-MS-AR

Rank by Weighted Walking Accessibility	<b>47</b>
Rank by Total Employment	<b>46</b>
Total Jobs	<b>573,048</b>
Average Job Density (per km <sup>2</sup> )	<b>48</b>
Total Workers	<b>551,218</b>
Average Worker Density (per km <sup>2</sup> )	<b>46</b>

*Job and worker totals are based on LEHD estimates and may not match other sources.*

## Job Accessibility by Travel Time Threshold

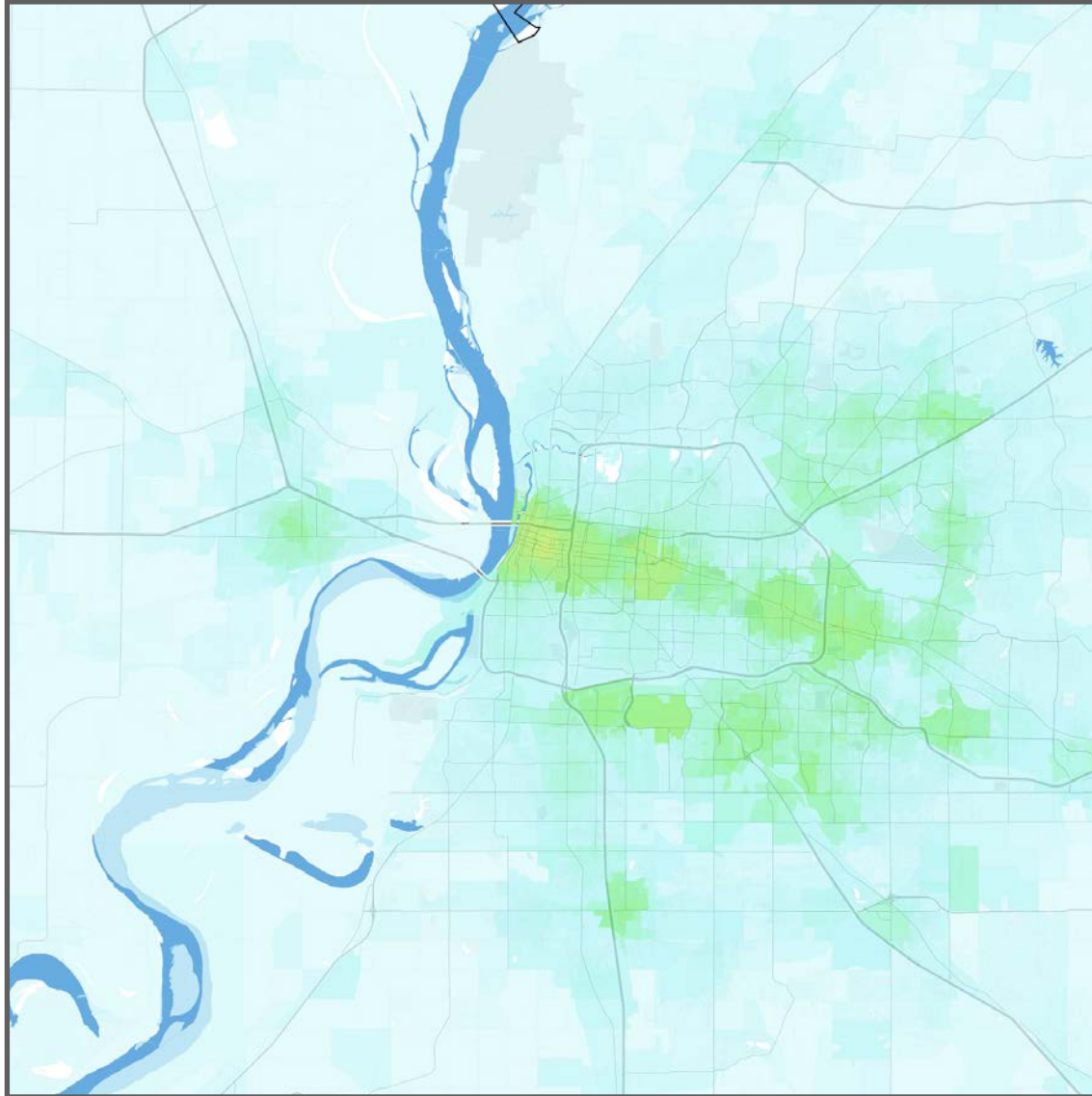




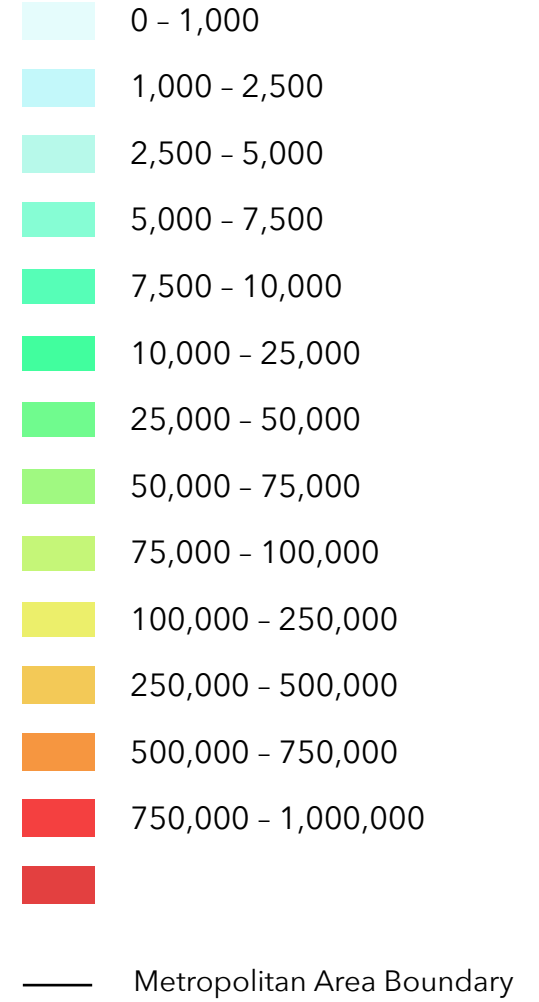
# Memphis

Memphis, TN-MS-AR

59



## Jobs within 30 minutes by walking



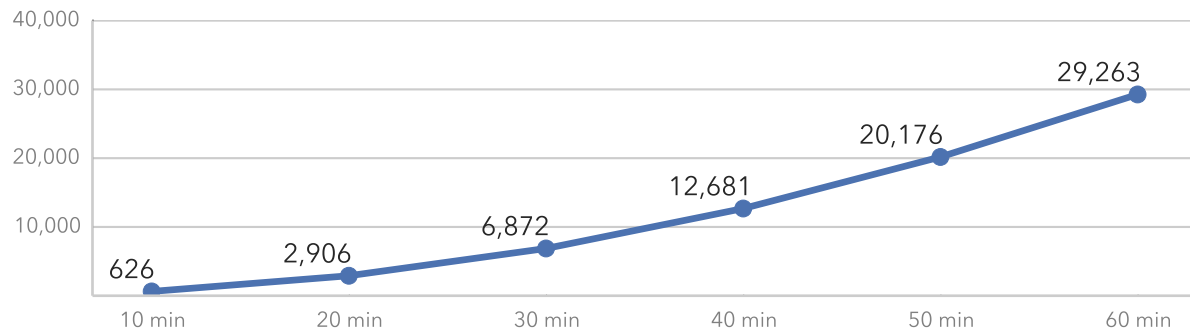
# Miami

Miami-Fort Lauderdale-Pompano Beach, FL

Rank by Weighted Walking Accessibility	<b>13</b>
Rank by Total Employment	<b>8</b>
Total Jobs	<b>2,261,356</b>
Average Job Density (per km <sup>2</sup> )	<b>172</b>
Total Workers	<b>2,194,802</b>
Average Worker Density (per km <sup>2</sup> )	<b>167</b>

*Job and worker totals are based on LEHD estimates and may not match other sources.*

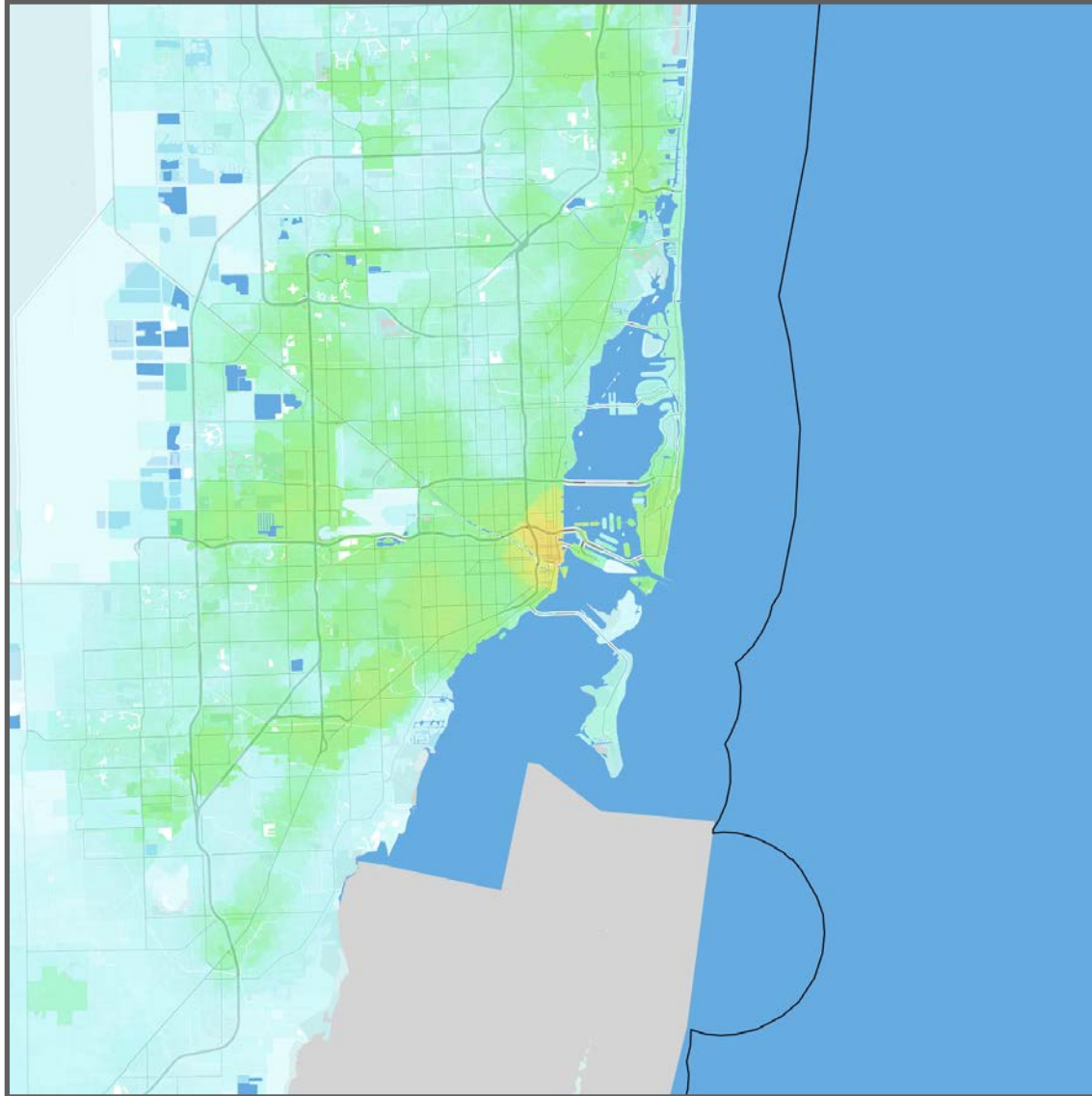
## Job Accessibility by Travel Time Threshold



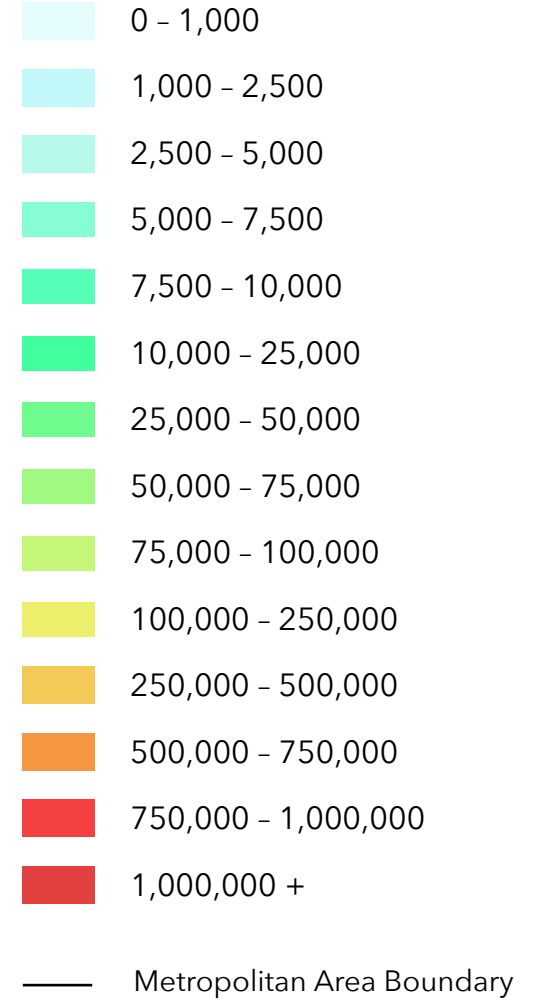
# Miami

Miami-Fort Lauderdale-Pompano Beach, FL

61



## Jobs within 30 minutes by walking



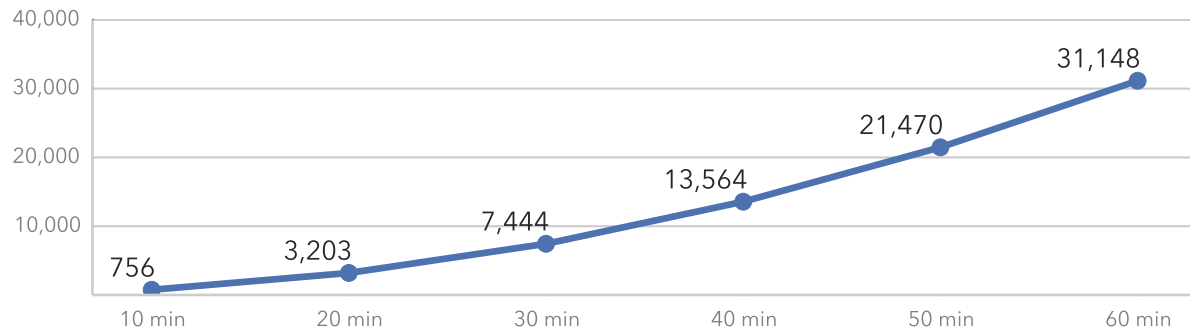
# Milwaukee

Milwaukee-Waukesha-West Allis, WI

Rank by Weighted Walking Accessibility	<b>11</b>
Rank by Total Employment	<b>35</b>
Total Jobs	<b>819,051</b>
Average Job Density (per km <sup>2</sup> )	<b>217</b>
Total Workers	<b>742,523</b>
Average Worker Density (per km <sup>2</sup> )	<b>197</b>

*Job and worker totals are based on LEHD estimates and may not match other sources.*

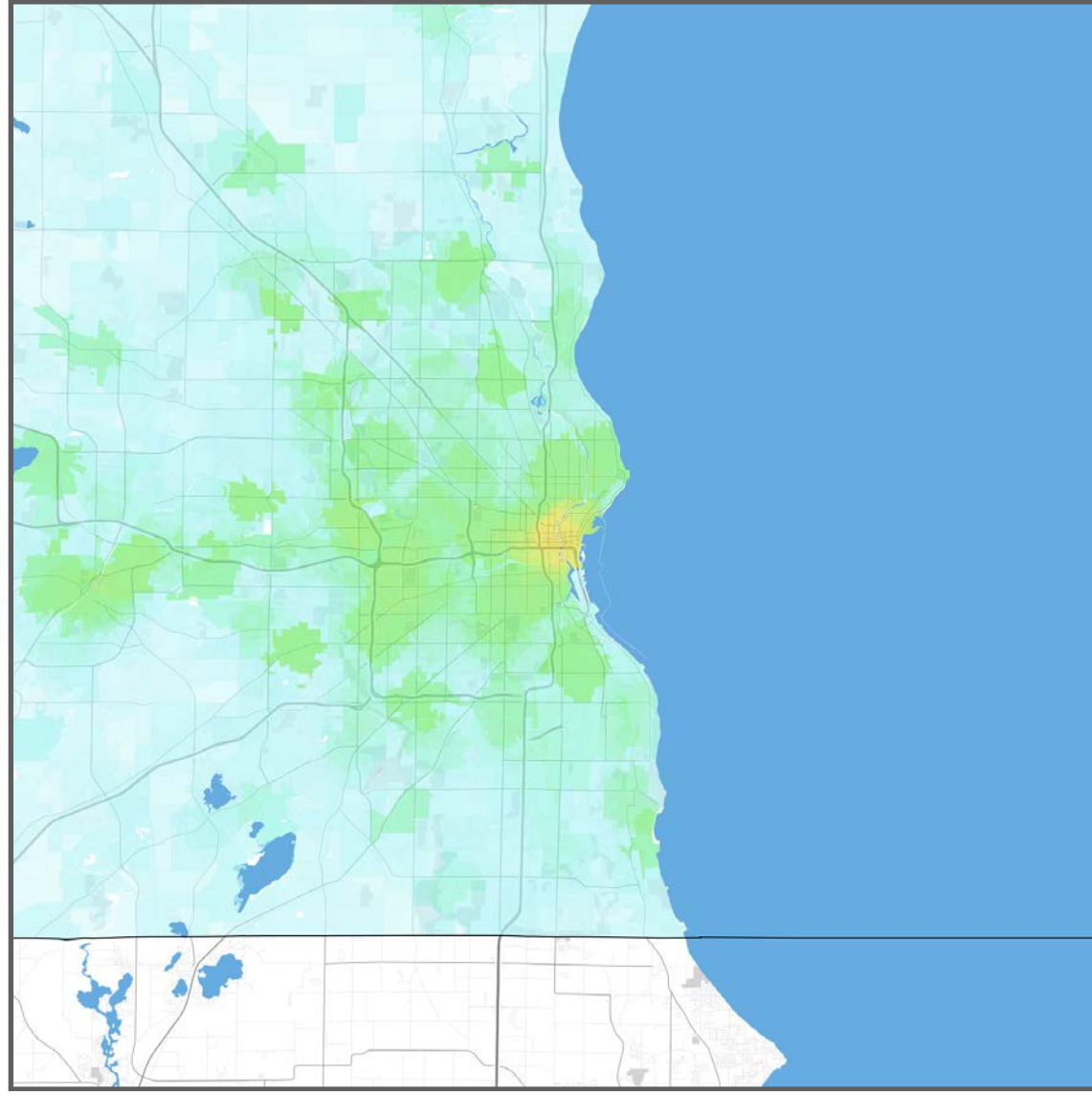
## Job Accessibility by Travel Time Threshold



# Milwaukee

Milwaukee-Waukesha-West Allis, WI

63



## Jobs within 30 minutes by walking

- 0 - 1,000
- 1,000 - 2,500
- 2,500 - 5,000
- 5,000 - 7,500
- 7,500 - 10,000
- 10,000 - 25,000
- 25,000 - 50,000
- 50,000 - 75,000
- 75,000 - 100,000
- 100,000 - 250,000
- 250,000 - 500,000
- 500,000 - 750,000
- 750,000 - 1,000,000
- 1,000,000 +
- Metropolitan Area Boundary

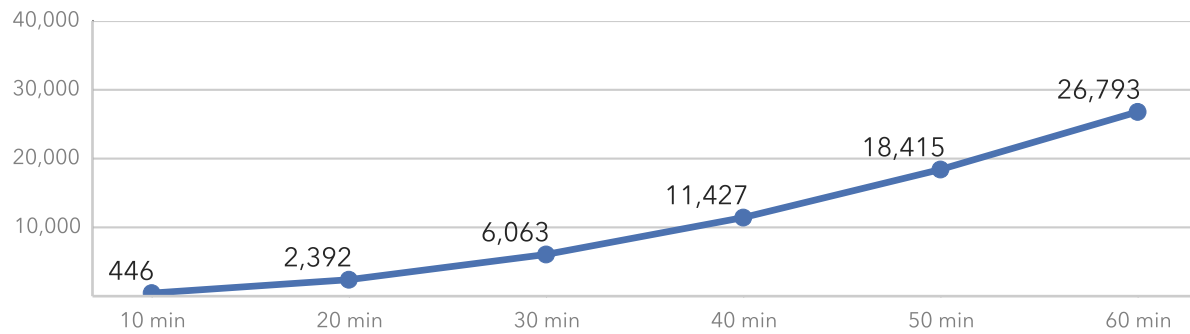
# Minneapolis

Minneapolis-St. Paul-Bloomington, MN-WI

Rank by Weighted Walking Accessibility	<b>18</b>
Rank by Total Employment	<b>14</b>
Total Jobs	<b>1,702,530</b>
Average Job Density (per km <sup>2</sup> )	<b>109</b>
Total Workers	<b>1,652,044</b>
Average Worker Density (per km <sup>2</sup> )	<b>106</b>

*Job and worker totals are based on LEHD estimates and may not match other sources.*

## Job Accessibility by Travel Time Threshold

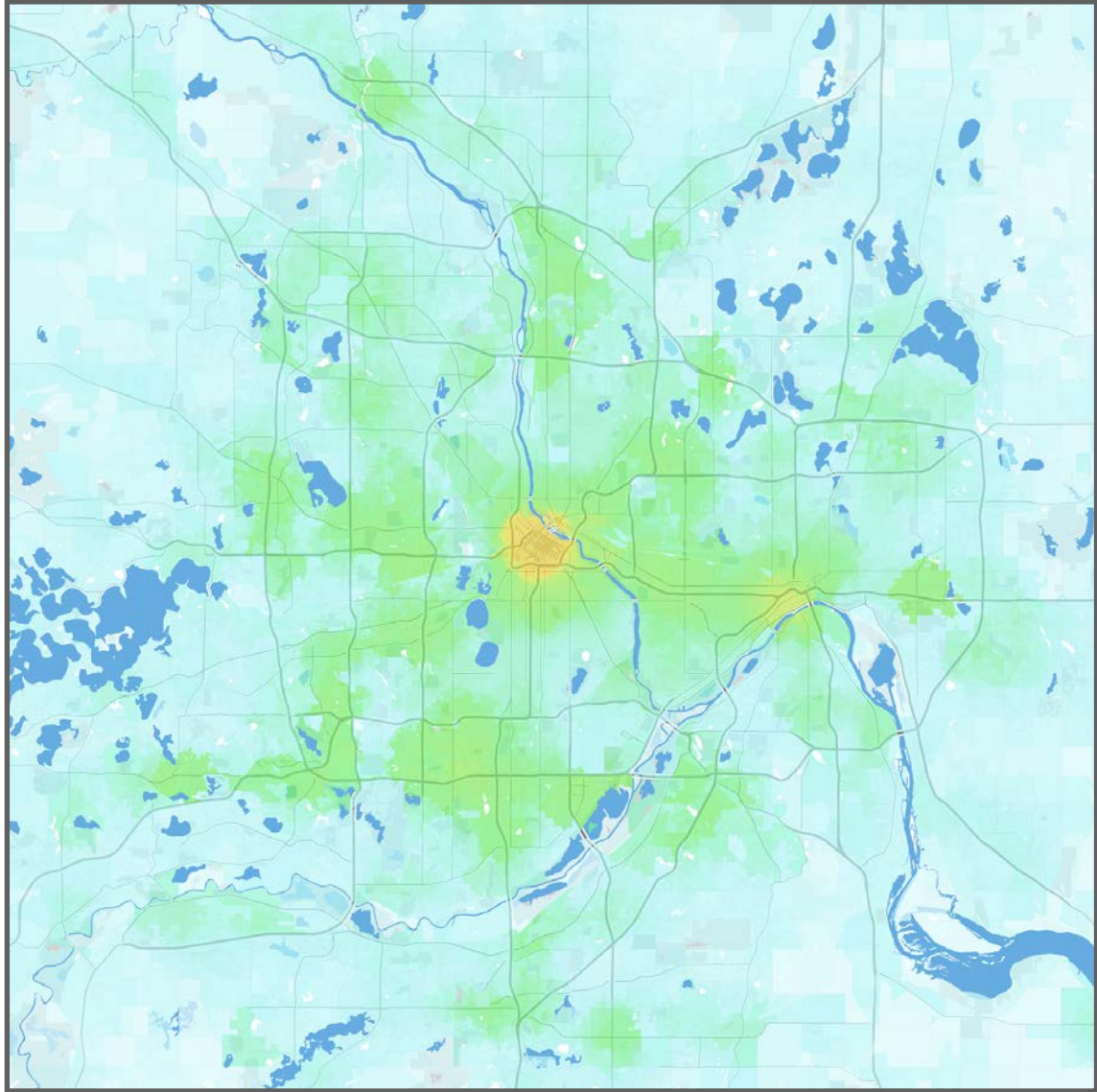




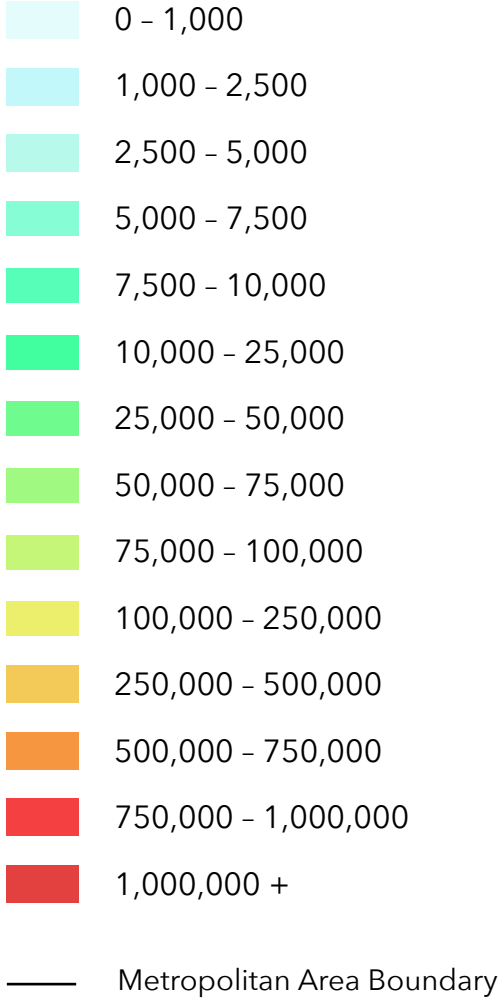
# Minneapolis

Minneapolis-St. Paul-Bloomington, MN-WI

65



## Jobs within 30 minutes by walking



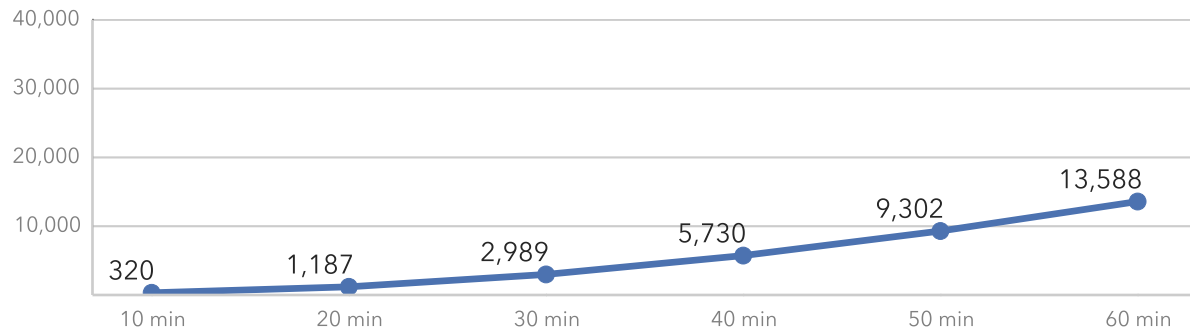
# Nashville

Nashville-Davidson-Murfreesboro-Franklin, TN

Rank by Weighted Walking Accessibility	<b>44</b>
Rank by Total Employment	<b>37</b>
Total Jobs	<b>771,508</b>
Average Job Density (per km <sup>2</sup> )	<b>52</b>
Total Workers	<b>701,990</b>
Average Worker Density (per km <sup>2</sup> )	<b>48</b>

*Job and worker totals are based on LEHD estimates and may not match other sources.*

## Job Accessibility by Travel Time Threshold

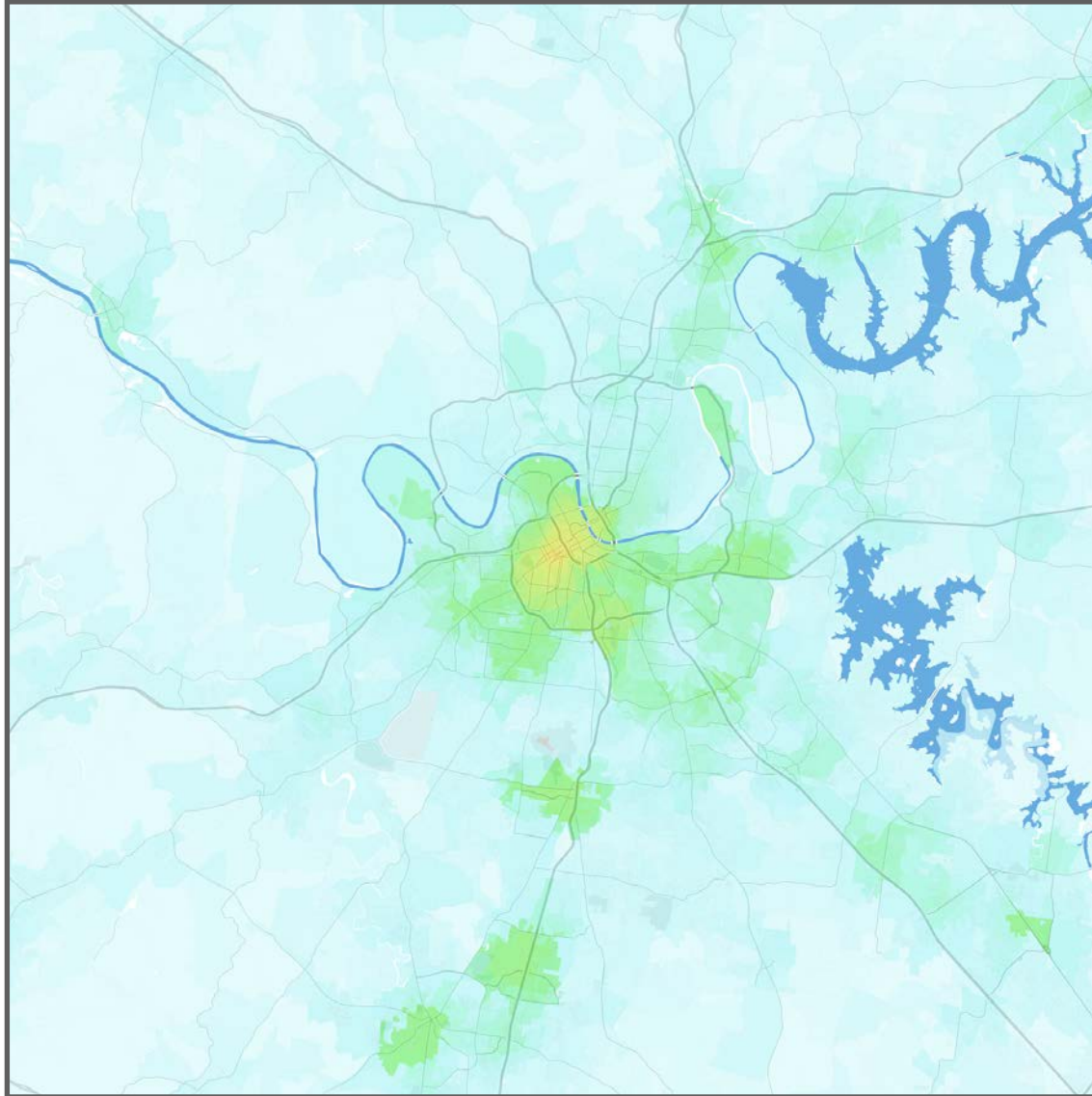




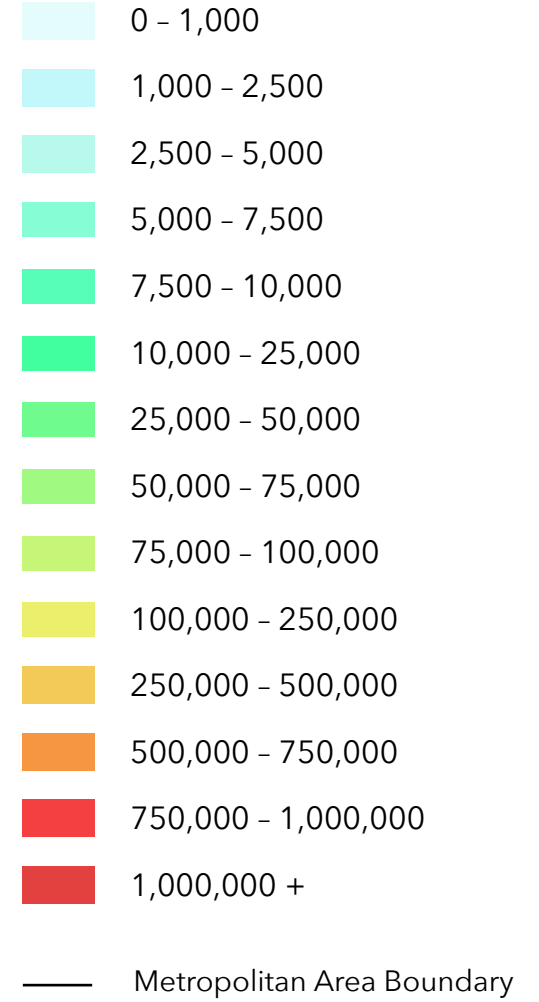
# Nashville

Nashville-Davidson--Murfreesboro--Franklin, TN

67



## Jobs within 30 minutes by walking



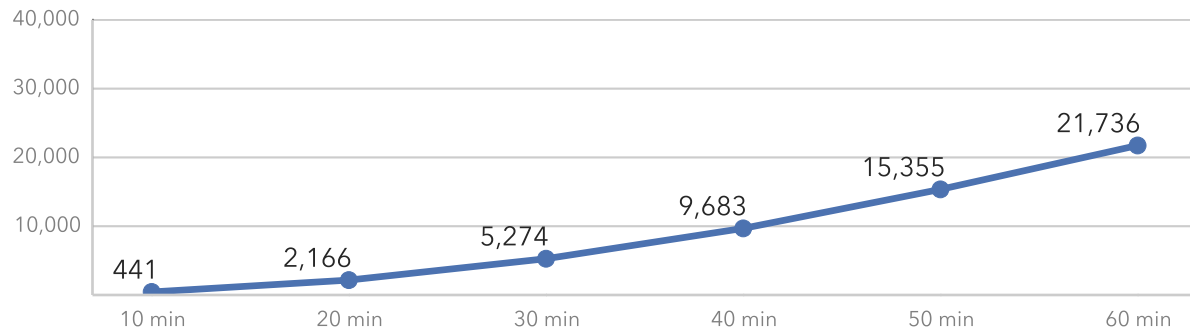
# New Orleans

New Orleans-Metairie-Kenner, LA

Rank by Weighted Walking Accessibility	<b>22</b>
Rank by Total Employment	<b>49</b>
Total Jobs	<b>484,686</b>
Average Job Density (per km <sup>2</sup> )	<b>63</b>
Total Workers	<b>454,816</b>
Average Worker Density (per km <sup>2</sup> )	<b>59</b>

*Job and worker totals are based on LEHD estimates and may not match other sources.*

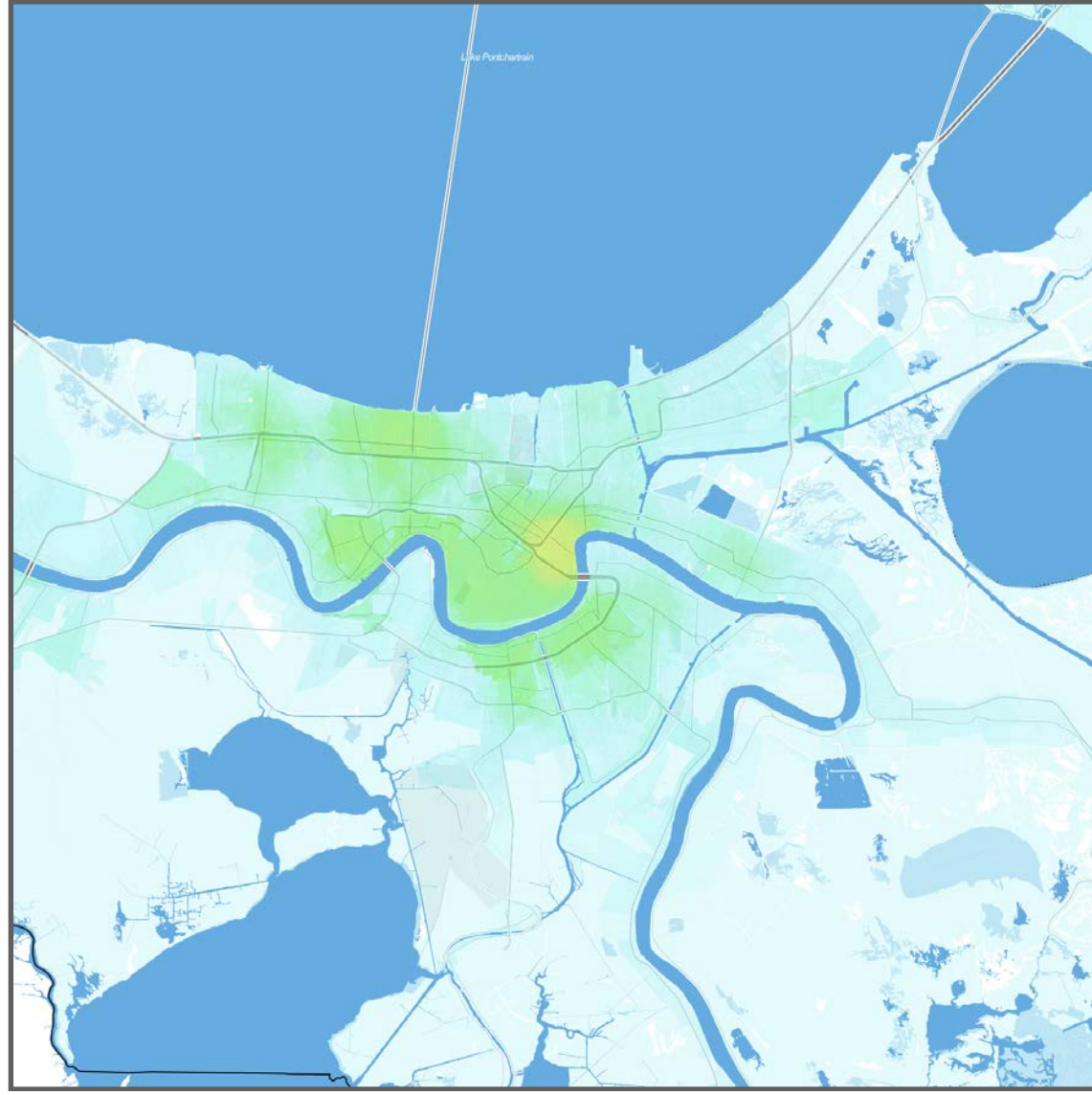
## Job Accessibility by Travel Time Threshold



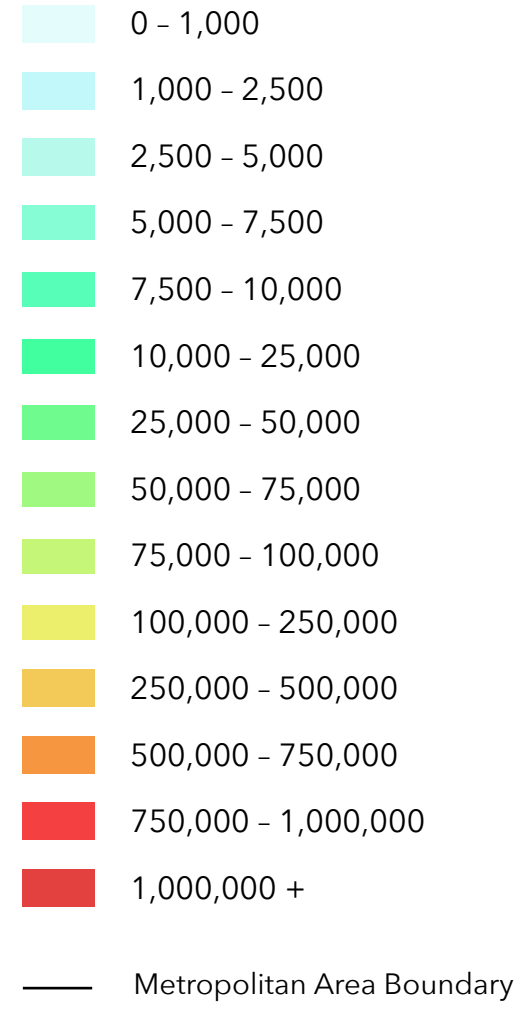
# New Orleans

New Orleans-Metairie-Kenner, LA

69



## Jobs within 30 minutes by walking



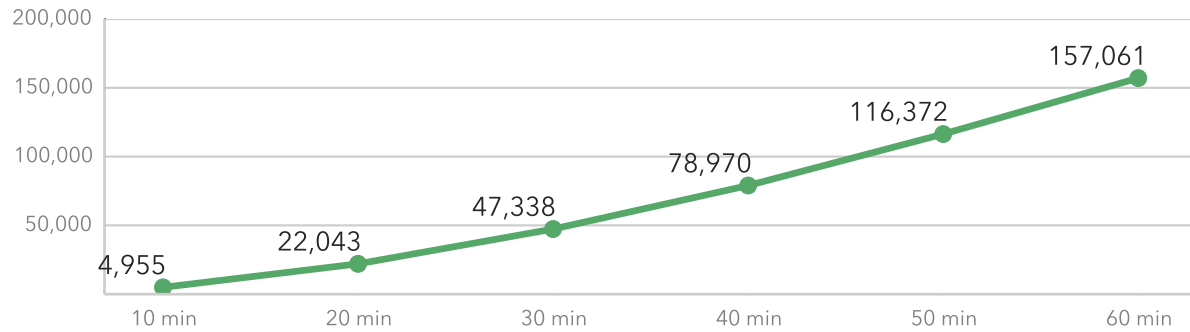
# New York

New York-Northern New Jersey-Long Island, NY-NJ-PA

Rank by Weighted Walking Accessibility	<b>1</b>
Rank by Total Employment	<b>1</b>
Total Jobs	<b>8,297,892</b>
Average Job Density (per km <sup>2</sup> )	<b>479</b>
Total Workers	<b>8,102,471</b>
Average Worker Density (per km <sup>2</sup> )	<b>468</b>

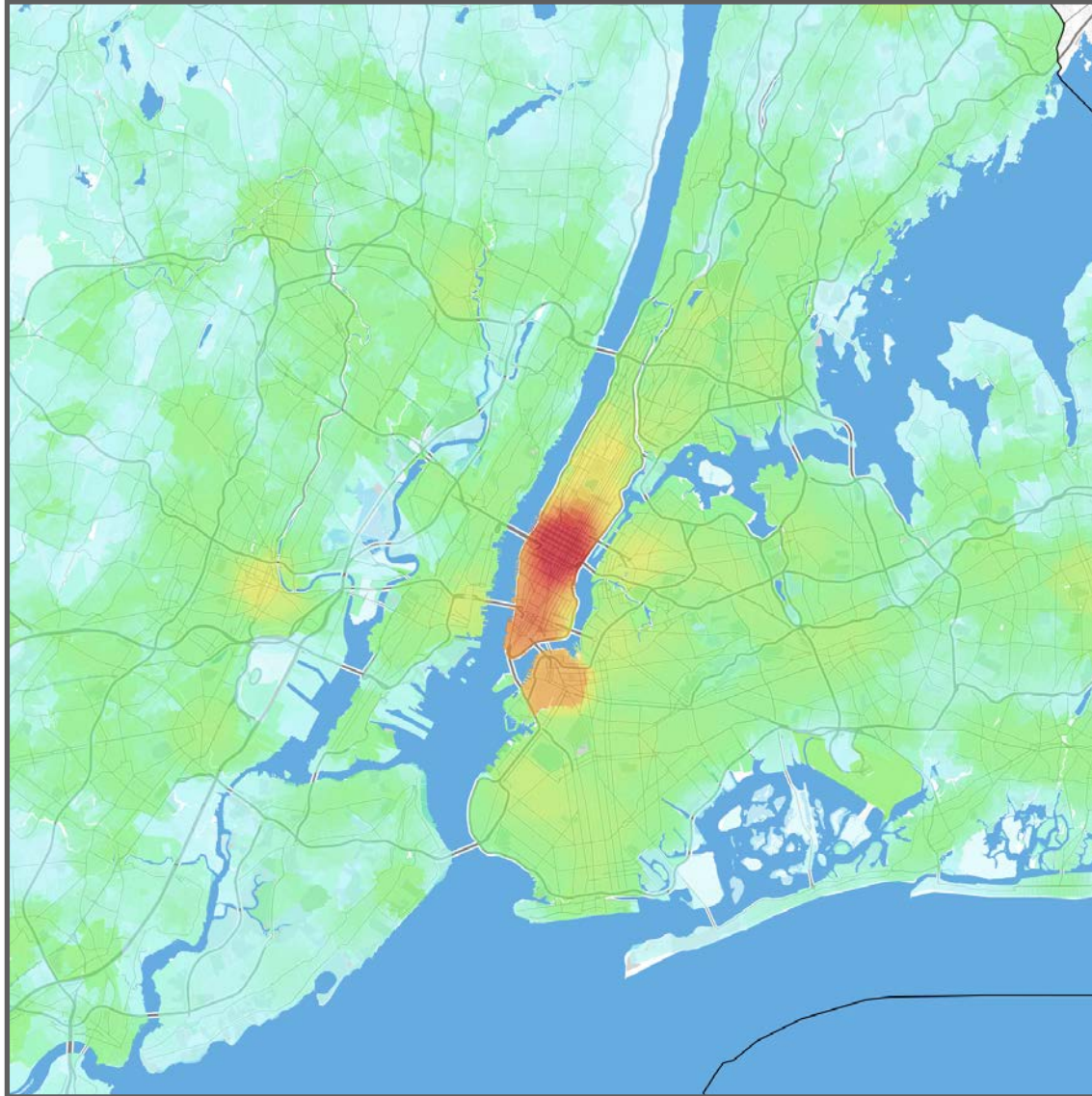
*Job and worker totals are based on LEHD estimates and may not match other sources.*

## Job Accessibility by Travel Time Threshold

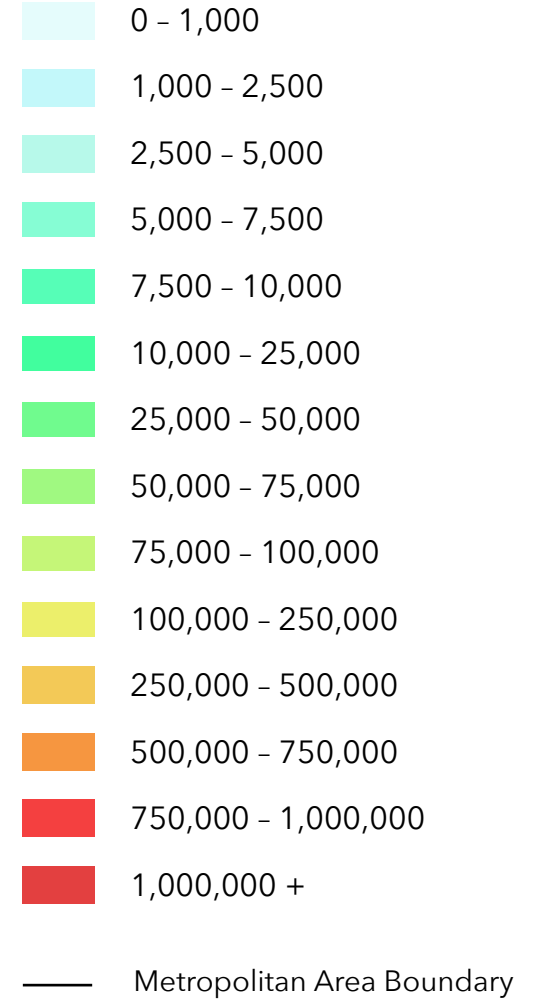


# New York

New York-Northern New Jersey-Long Island, NY-NJ-PA



## Jobs within 30 minutes by walking





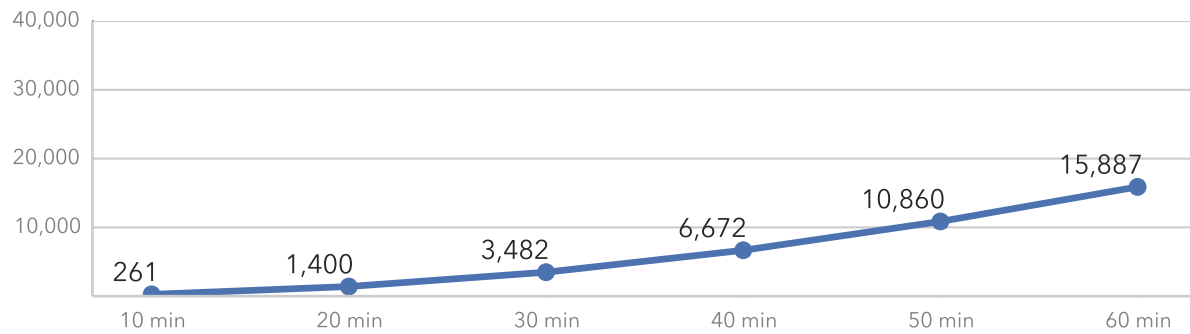
# Oklahoma City

Oklahoma City, OK

Rank by Weighted Walking Accessibility	<b>39</b>
Rank by Total Employment	<b>47</b>
Total Jobs	<b>560,957</b>
Average Job Density (per km <sup>2</sup> )	<b>39</b>
Total Workers	<b>524,741</b>
Average Worker Density (per km <sup>2</sup> )	<b>37</b>

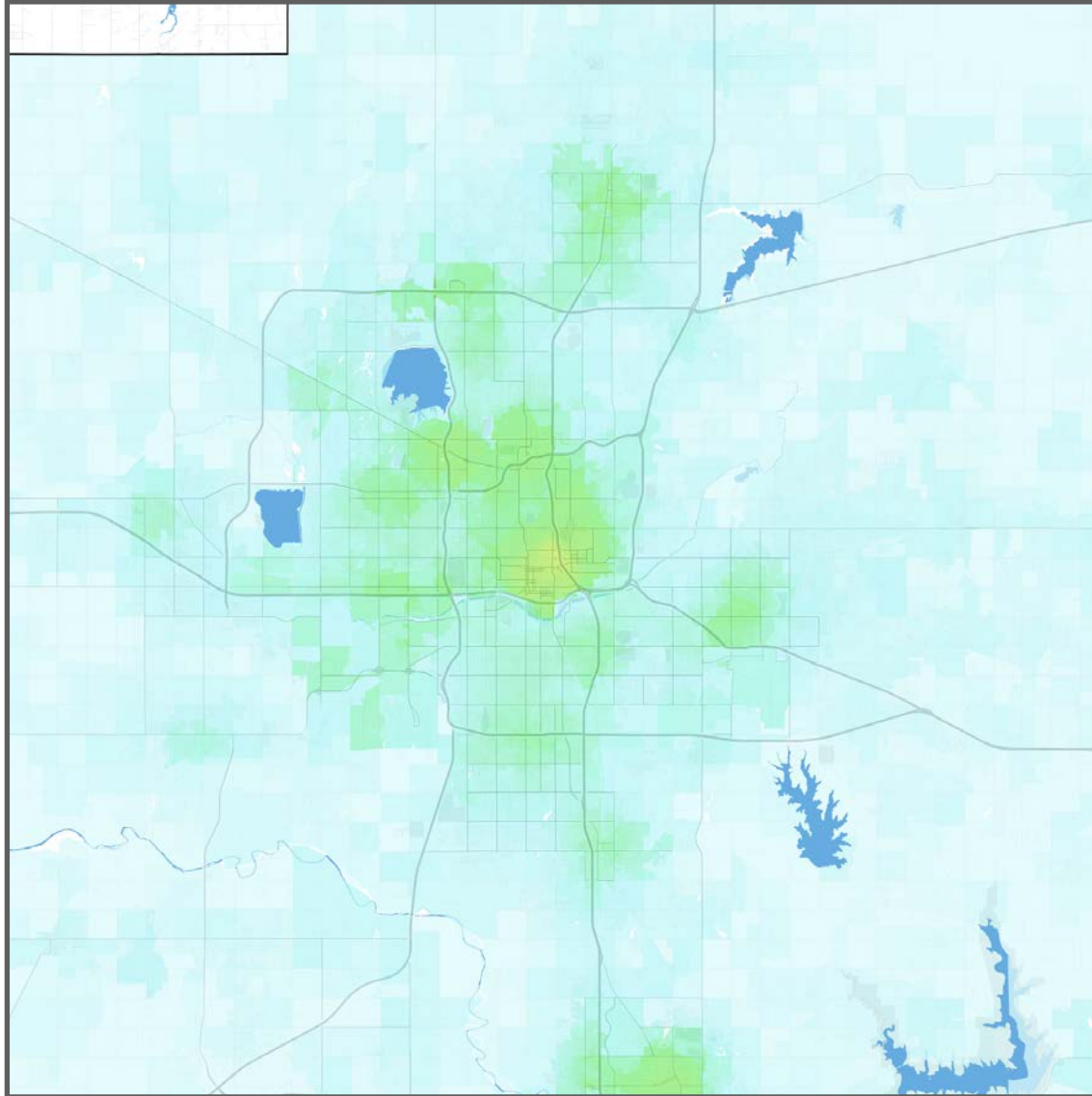
*Job and worker totals are based on LEHD estimates and may not match other sources.*

## Job Accessibility by Travel Time Threshold



# Oklahoma City

Oklahoma City, OK



## Jobs within 30 minutes by walking

- 0 - 1,000
- 1,000 - 2,500
- 2,500 - 5,000
- 5,000 - 7,500
- 7,500 - 10,000
- 10,000 - 25,000
- 25,000 - 50,000
- 50,000 - 75,000
- 75,000 - 100,000
- 100,000 - 250,000
- 250,000 - 500,000
- 500,000 - 750,000
- 750,000 - 1,000,000
- 1,000,000 +
- Metropolitan Area Boundary

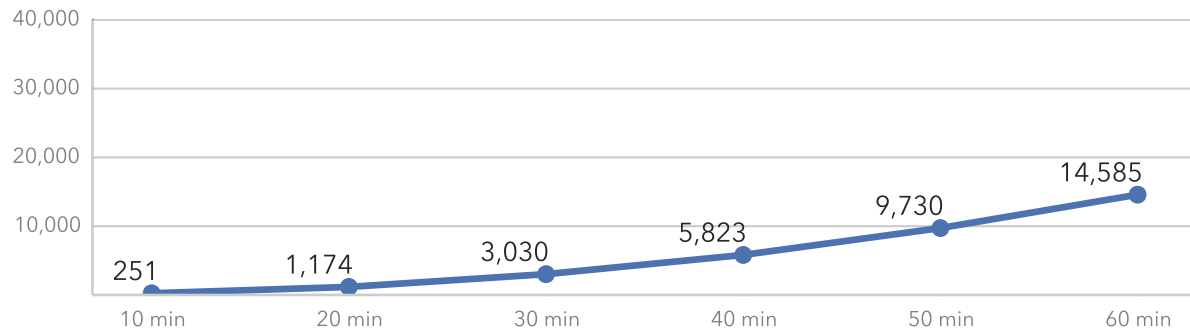
# Orlando

Orlando-Kissimmee-Sanford, FL

Rank by Weighted Walking Accessibility	<b>45</b>
Rank by Total Employment	<b>23</b>
Total Jobs	<b>1,024,046</b>
Average Job Density (per km <sup>2</sup> )	<b>114</b>
Total Workers	<b>930,605</b>
Average Worker Density (per km <sup>2</sup> )	<b>103</b>

*Job and worker totals are based on LEHD estimates and may not match other sources.*

## Job Accessibility by Travel Time Threshold

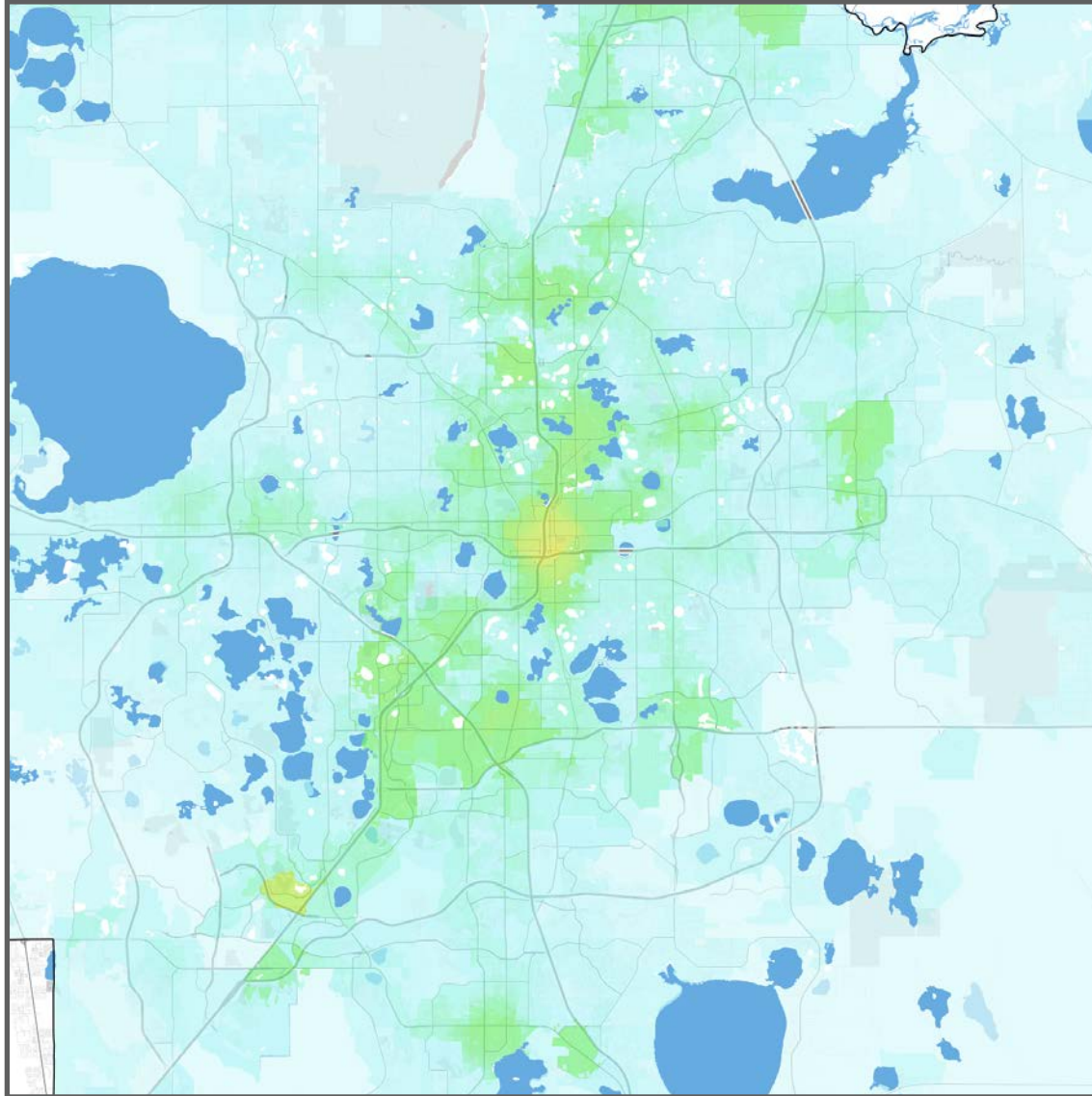




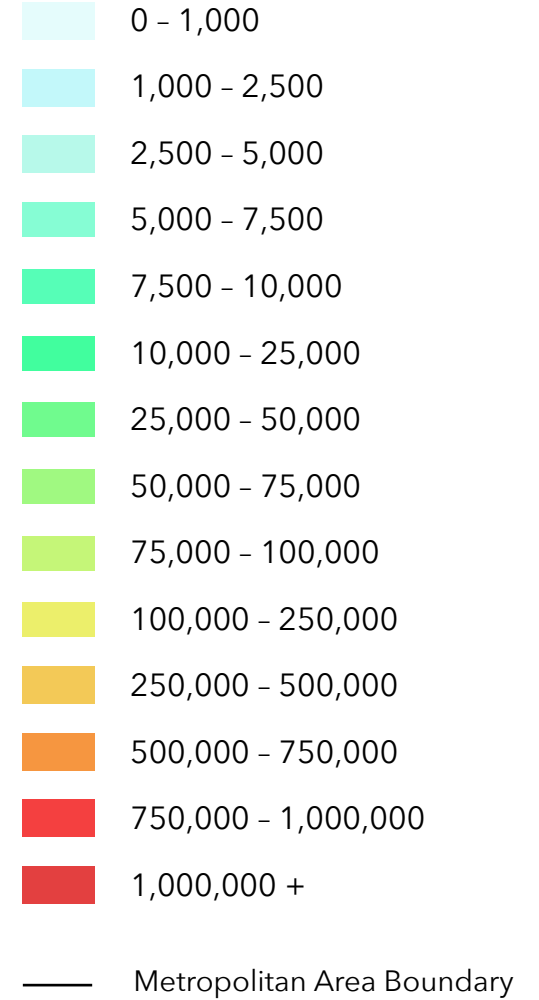
# Orlando

Orlando-Kissimmee-Sanford, FL

75



## Jobs within 30 minutes by walking



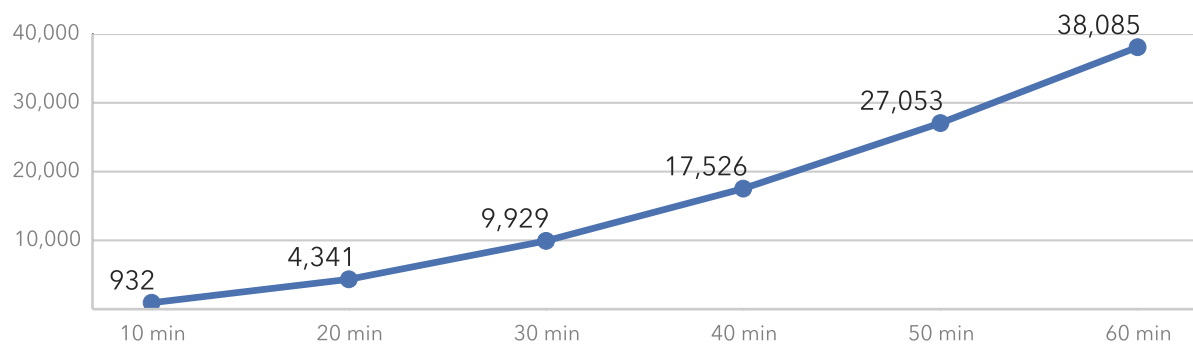
# Philadelphia

Philadelphia-Camden-Wilmington, PA-NJ-DE-MD

Rank by Weighted Walking Accessibility	<b>8</b>
Rank by Total Employment	<b>6</b>
Total Jobs	<b>2,681,835</b>
Average Job Density (per km <sup>2</sup> )	<b>225</b>
Total Workers	<b>2,690,018</b>
Average Worker Density (per km <sup>2</sup> )	<b>226</b>

*Job and worker totals are based on LEHD estimates and may not match other sources.*

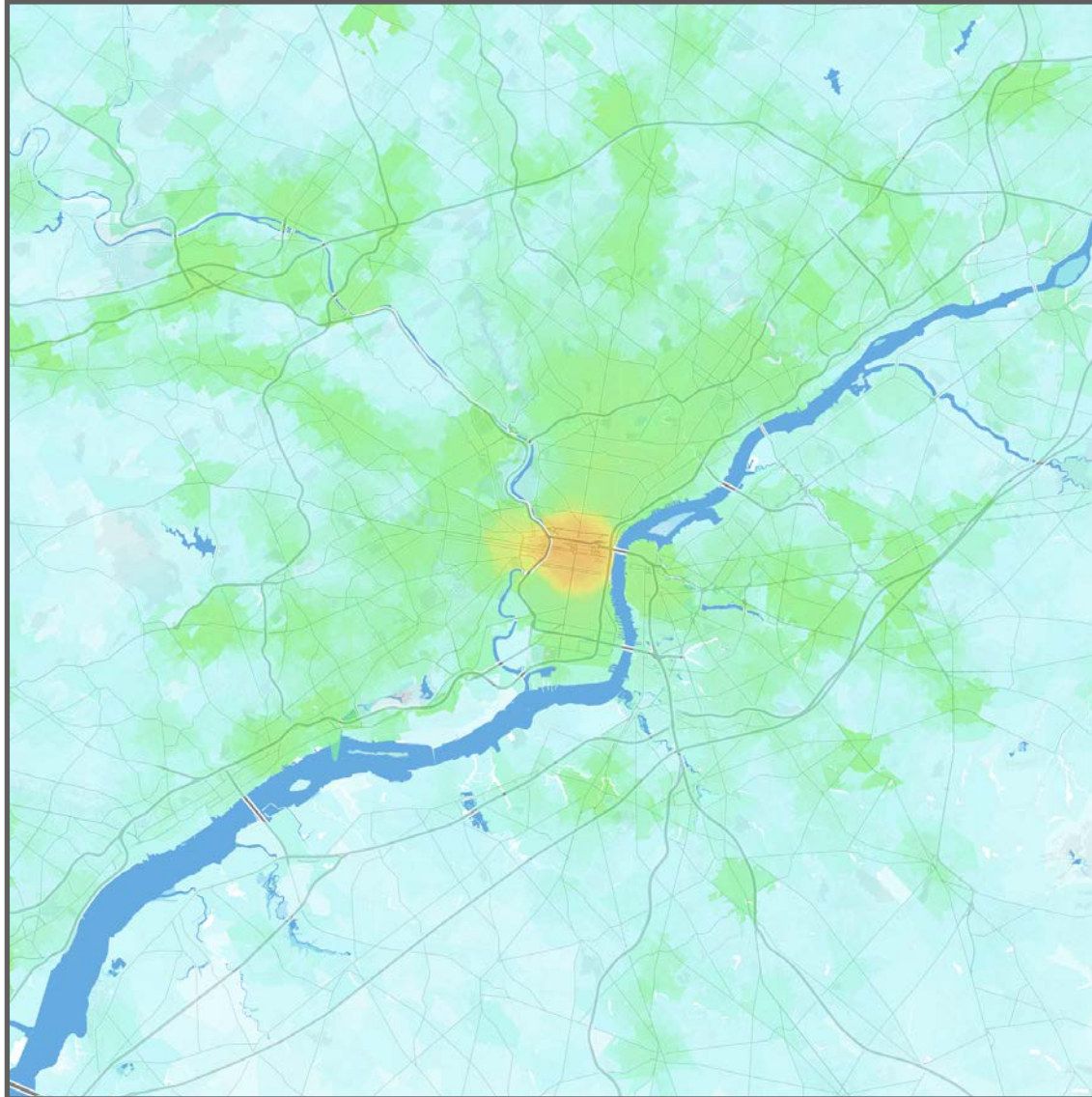
## Job Accessibility by Travel Time Threshold



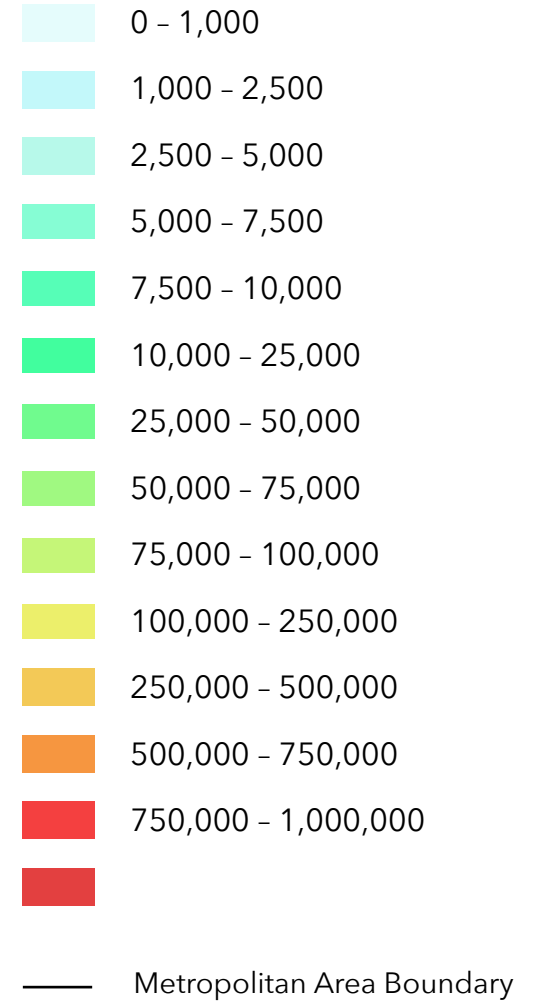
# Philadelphia

Philadelphia-Camden-Wilmington, PA-NJ-DE-MD

77



## Jobs within 30 minutes by walking



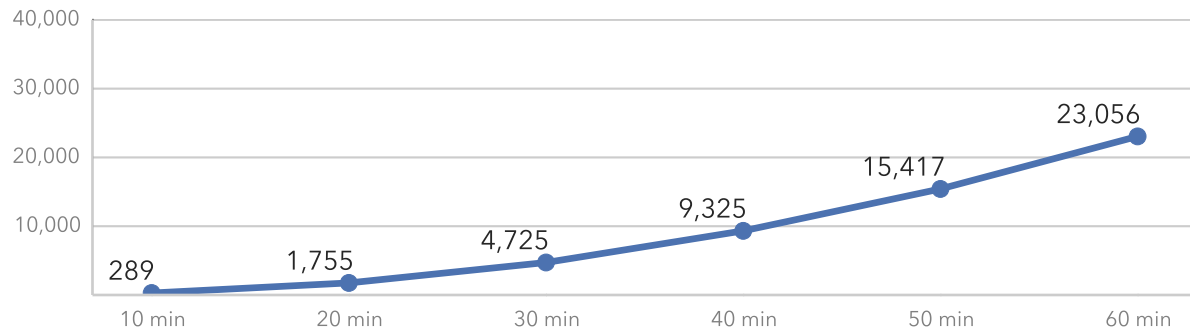
# Phoenix

Phoenix-Mesa-Glendale, AZ

Rank by Weighted Walking Accessibility	<b>27</b>
Rank by Total Employment	<b>13</b>
Total Jobs	<b>1,708,003</b>
Average Job Density (per km <sup>2</sup> )	<b>45</b>
Total Workers	<b>1,652,995</b>
Average Worker Density (per km <sup>2</sup> )	<b>44</b>

*Job and worker totals are based on LEHD estimates and may not match other sources.*

## Job Accessibility by Travel Time Threshold

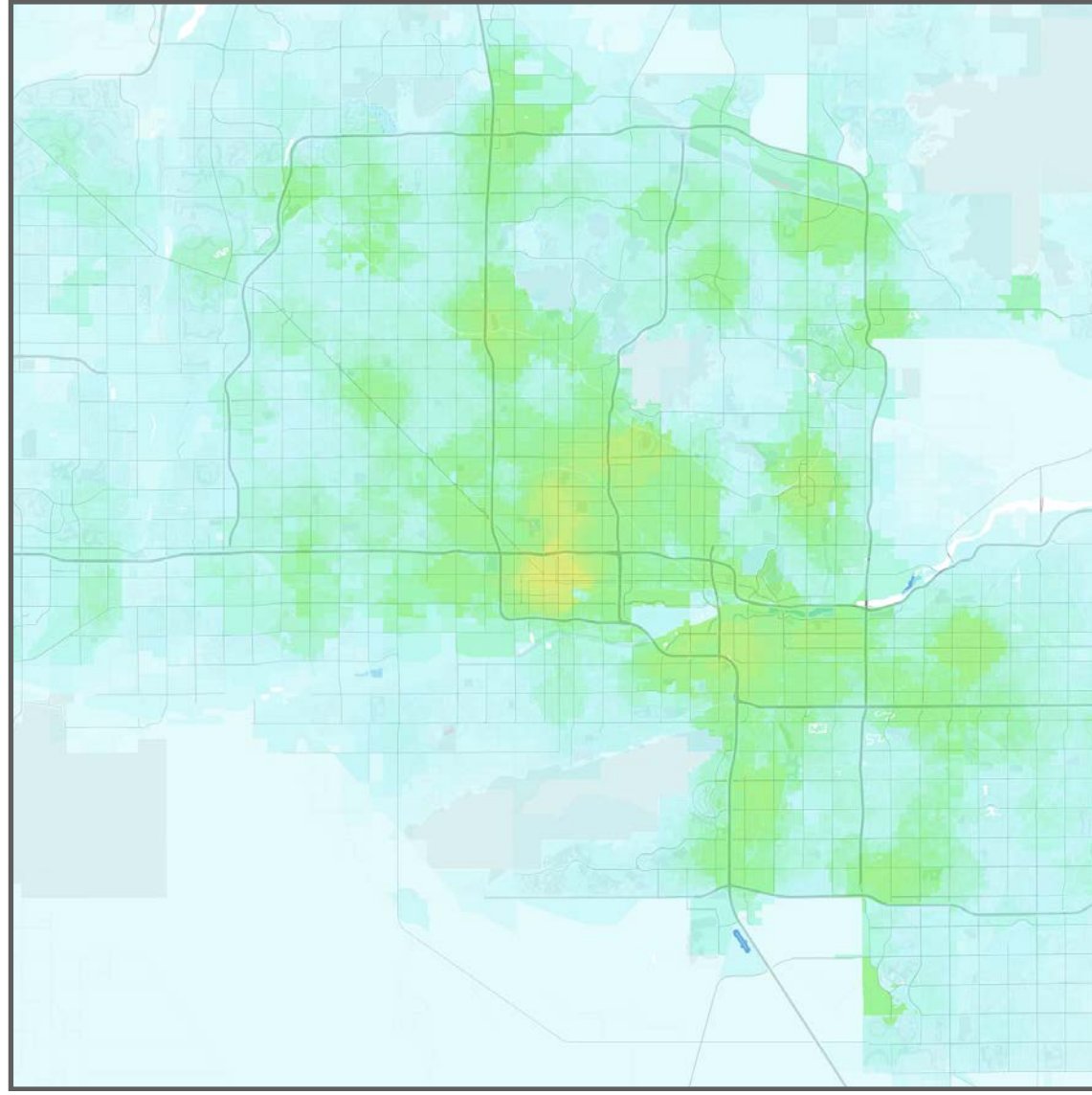




# Phoenix

Phoenix-Mesa-Glendale, AZ

79



## Jobs within 30 minutes by walking

- 0 - 1,000
- 1,000 - 2,500
- 2,500 - 5,000
- 5,000 - 7,500
- 7,500 - 10,000
- 10,000 - 25,000
- 25,000 - 50,000
- 50,000 - 75,000
- 75,000 - 100,000
- 100,000 - 250,000
- 250,000 - 500,000
- 500,000 - 750,000
- 750,000 - 1,000,000
- 1,000,000 +
- Metropolitan Area Boundary

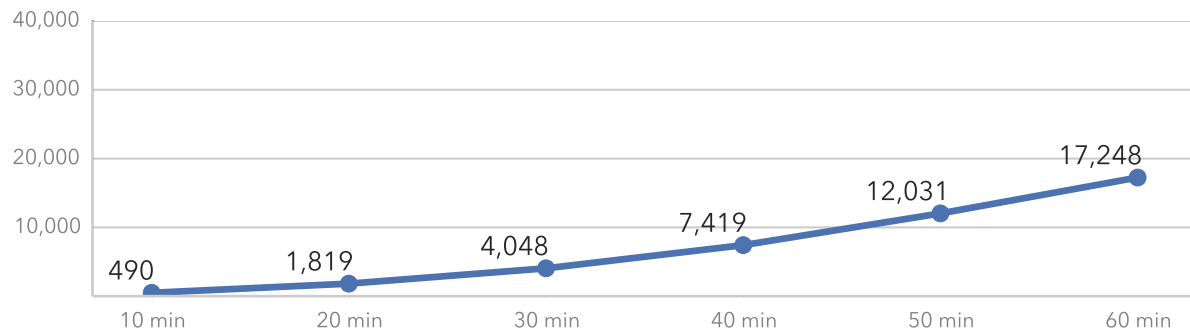
# Pittsburgh

Pittsburgh, PA

Rank by Weighted Walking Accessibility	<b>29</b>
Rank by Total Employment	<b>22</b>
Total Jobs	<b>1,110,788</b>
Average Job Density (per km <sup>2</sup> )	<b>81</b>
Total Workers	<b>1,083,900</b>
Average Worker Density (per km <sup>2</sup> )	<b>79</b>

*Job and worker totals are based on LEHD estimates and may not match other sources.*

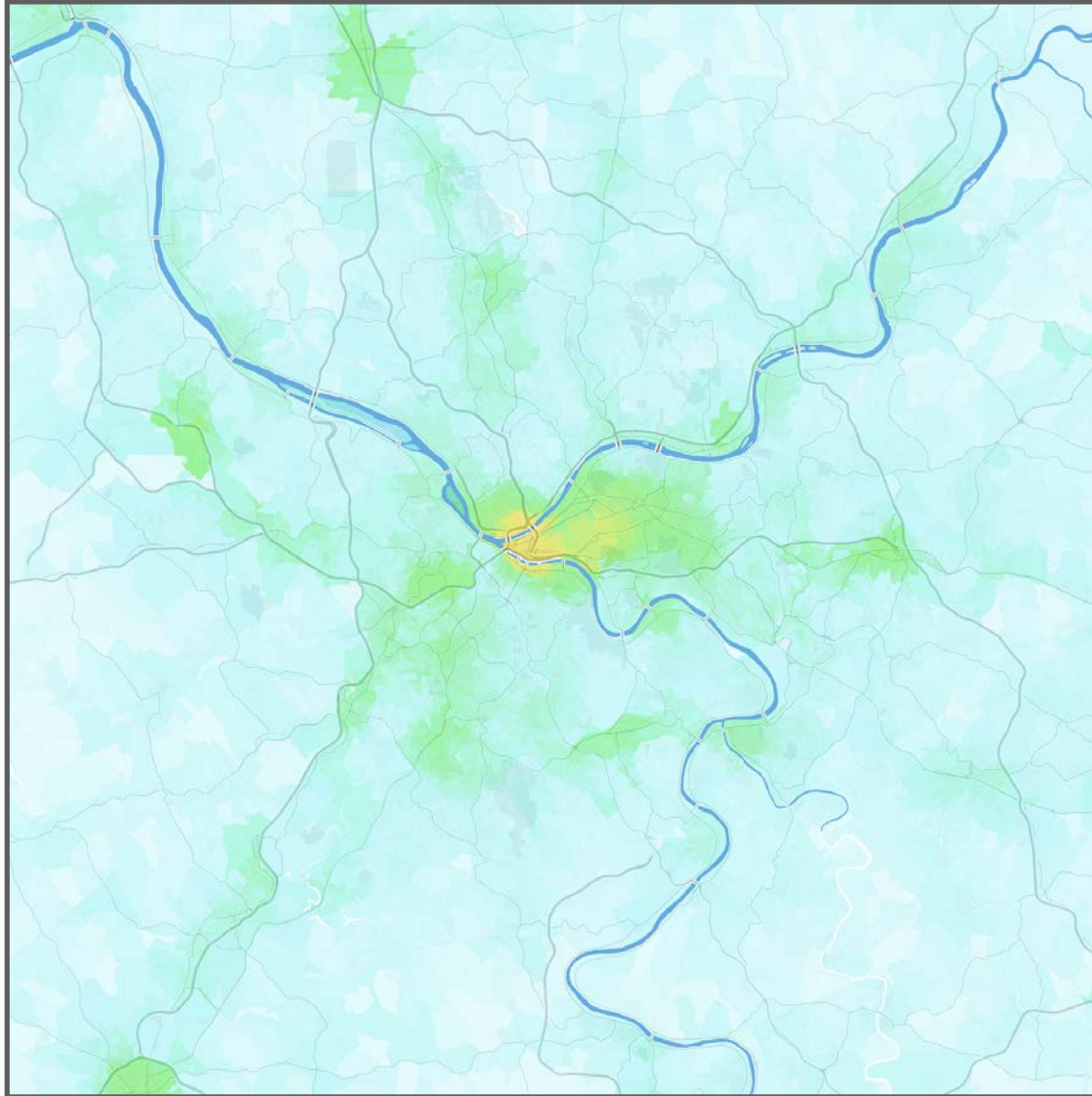
## Job Accessibility by Travel Time Threshold



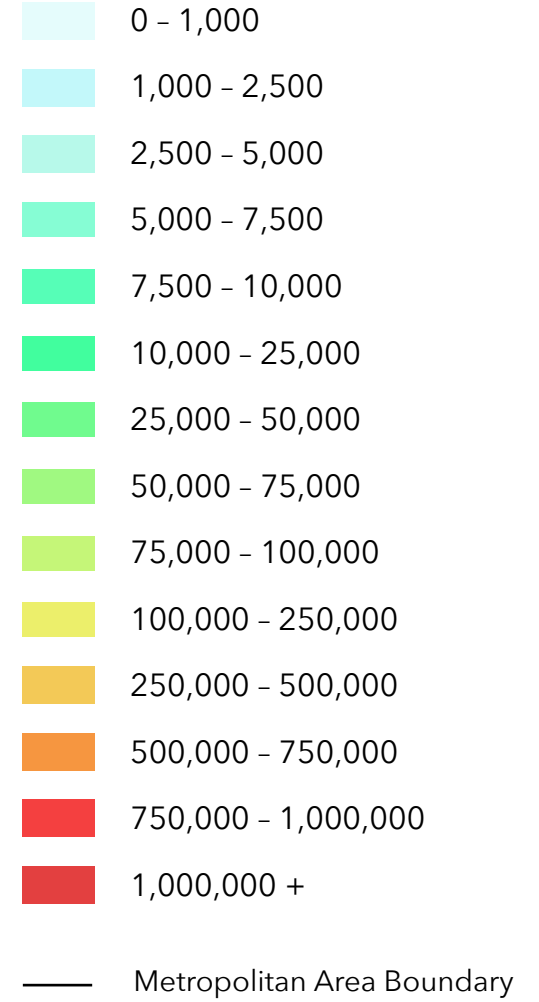
# Pittsburgh

Pittsburgh, PA

81



## Jobs within 30 minutes by walking



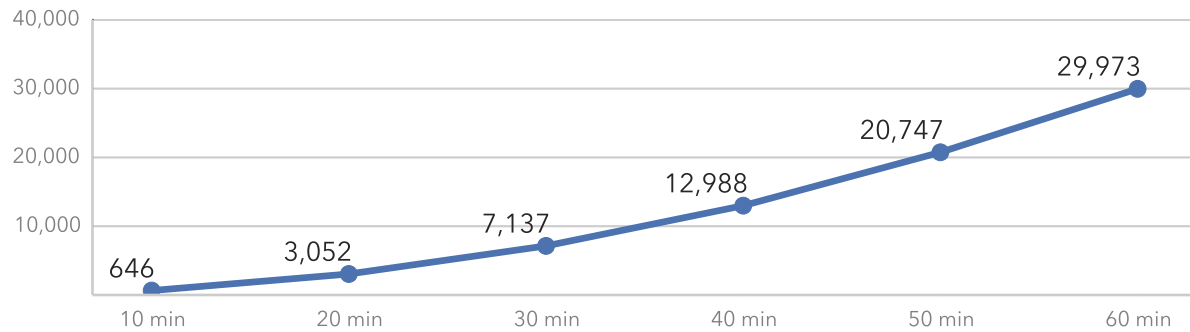
# Portland

Portland-Vancouver-Hillsboro, OR-WA

Rank by Weighted Walking Accessibility	<b>12</b>
Rank by Total Employment	<b>24</b>
Total Jobs	<b>1,004,182</b>
Average Job Density (per km <sup>2</sup> )	<b>58</b>
Total Workers	<b>982,307</b>
Average Worker Density (per km <sup>2</sup> )	<b>57</b>

*Job and worker totals are based on LEHD estimates and may not match other sources.*

## Job Accessibility by Travel Time Threshold

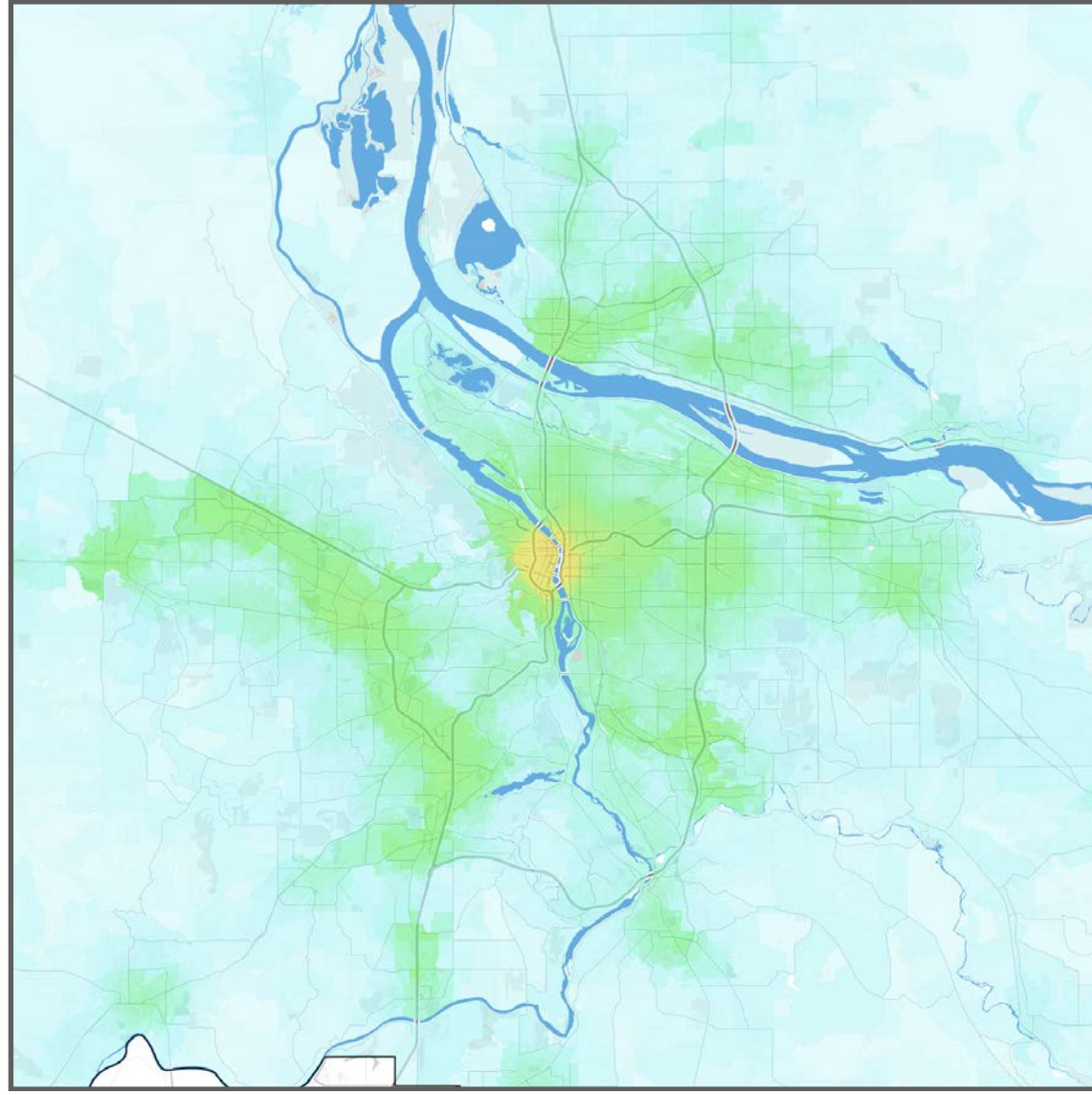




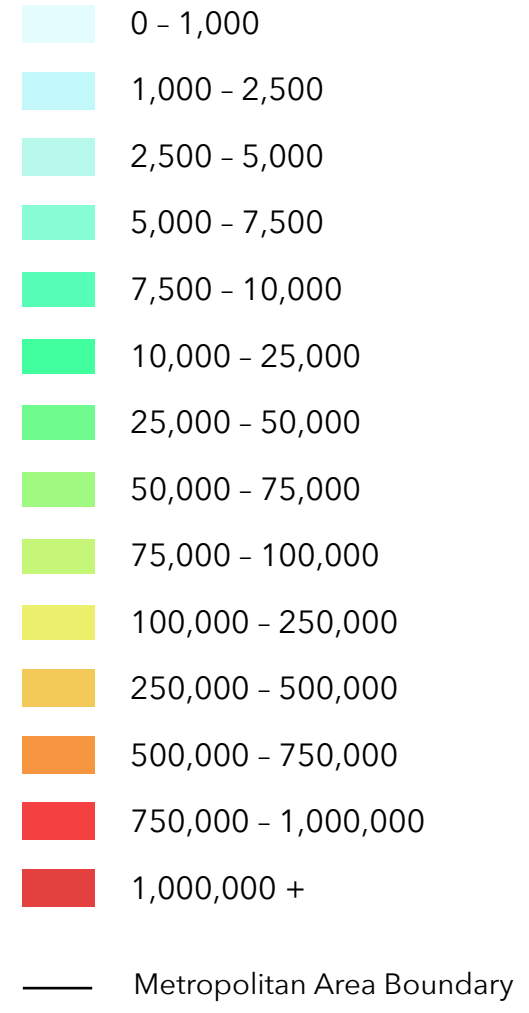
# Portland

Portland-Vancouver-Hillsboro, OR-WA

83



## Jobs within 30 minutes by walking



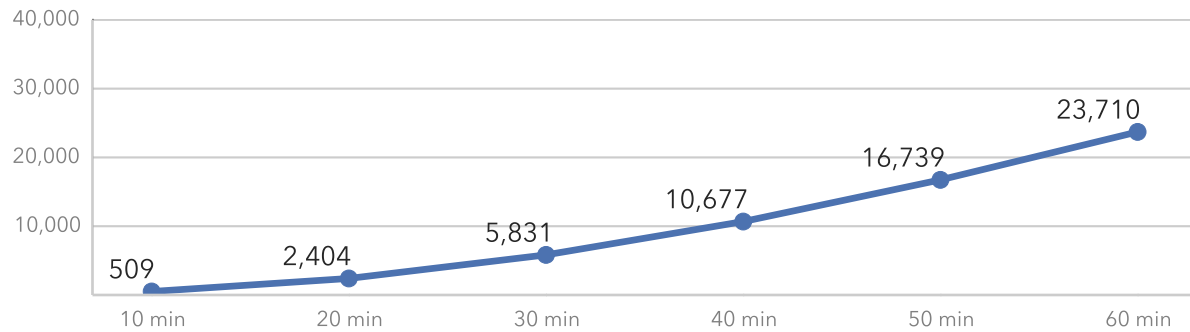
# Providence

Providence-New Bedford-Fall River, RI-MA

Rank by Weighted Walking Accessibility	<b>20</b>
Rank by Total Employment	<b>39</b>
Total Jobs	<b>652,831</b>
Average Job Density (per km <sup>2</sup> )	<b>159</b>
Total Workers	<b>828,037</b>
Average Worker Density (per km <sup>2</sup> )	<b>201</b>

*Job and worker totals are based on LEHD estimates and may not match other sources.*

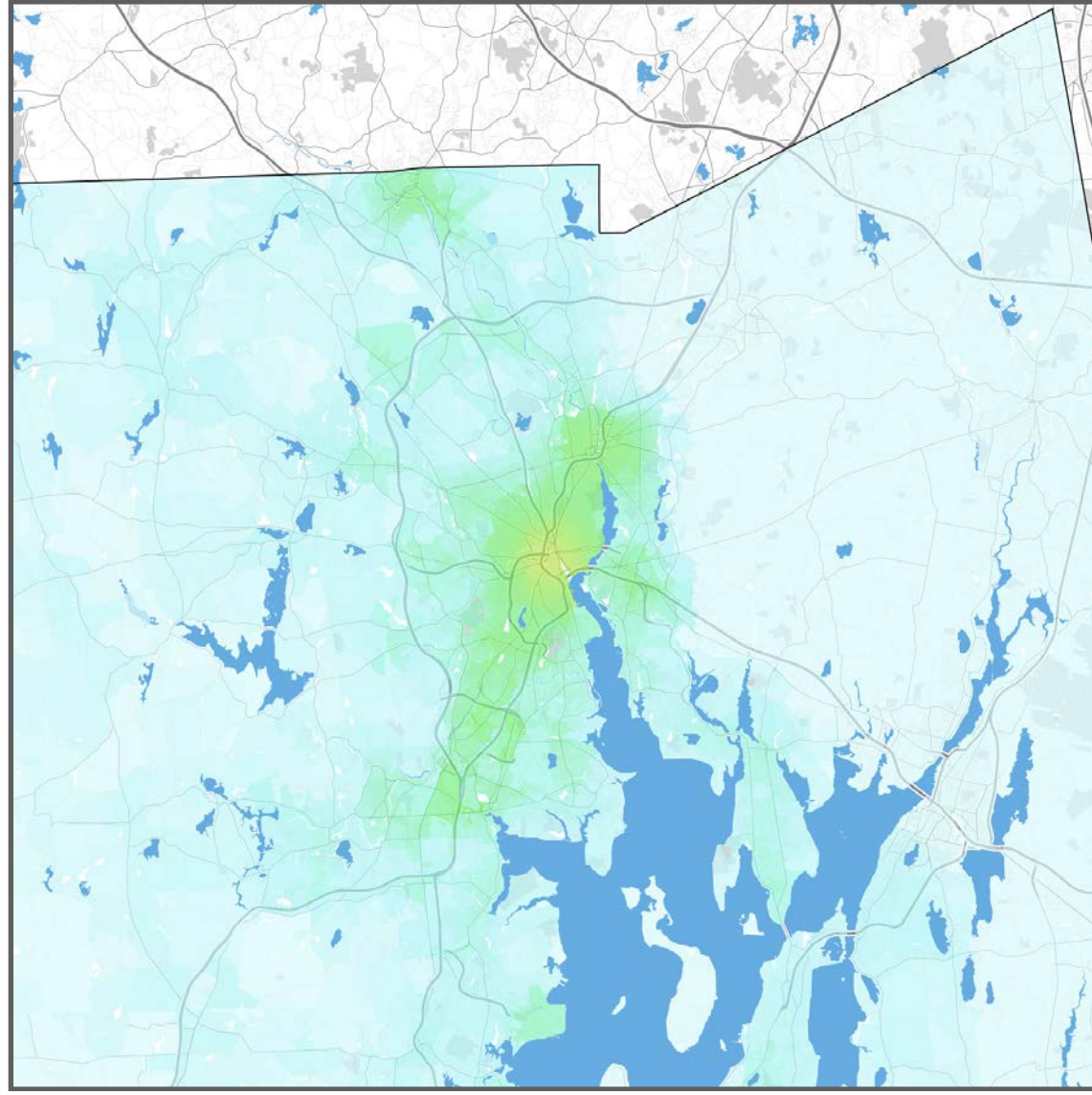
## Job Accessibility by Travel Time Threshold



# Providence

Providence-New Bedford-Fall River, RI-MA

85



## Jobs within 30 minutes by walking

- 0 - 1,000
- 1,000 - 2,500
- 2,500 - 5,000
- 5,000 - 7,500
- 7,500 - 10,000
- 10,000 - 25,000
- 25,000 - 50,000
- 50,000 - 75,000
- 75,000 - 100,000
- 100,000 - 250,000
- 250,000 - 500,000
- 500,000 - 750,000
- 750,000 - 1,000,000
- 1,000,000 +
- Metropolitan Area Boundary

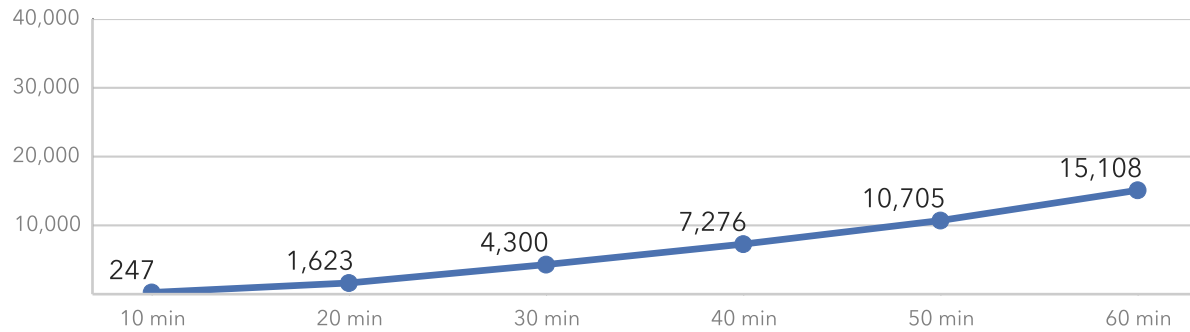
# Raleigh

Raleigh-Cary, NC

Rank by Weighted Walking Accessibility	<b>34</b>
Rank by Total Employment	<b>45</b>
Total Jobs	<b>574,859</b>
Average Job Density (per km <sup>2</sup> )	<b>105</b>
Total Workers	<b>520,476</b>
Average Worker Density (per km <sup>2</sup> )	<b>95</b>

*Job and worker totals are based on LEHD estimates and may not match other sources.*

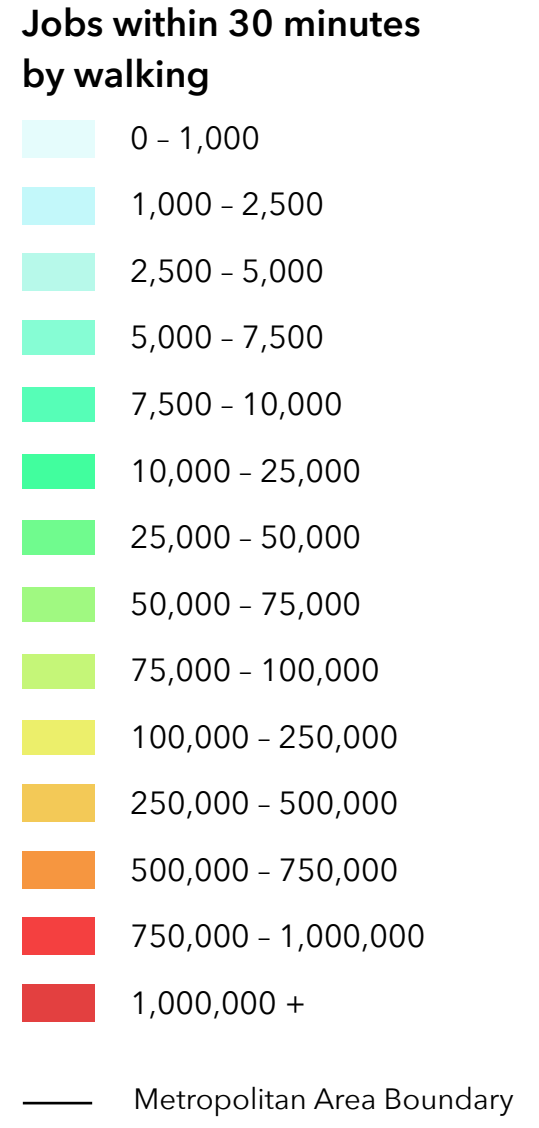
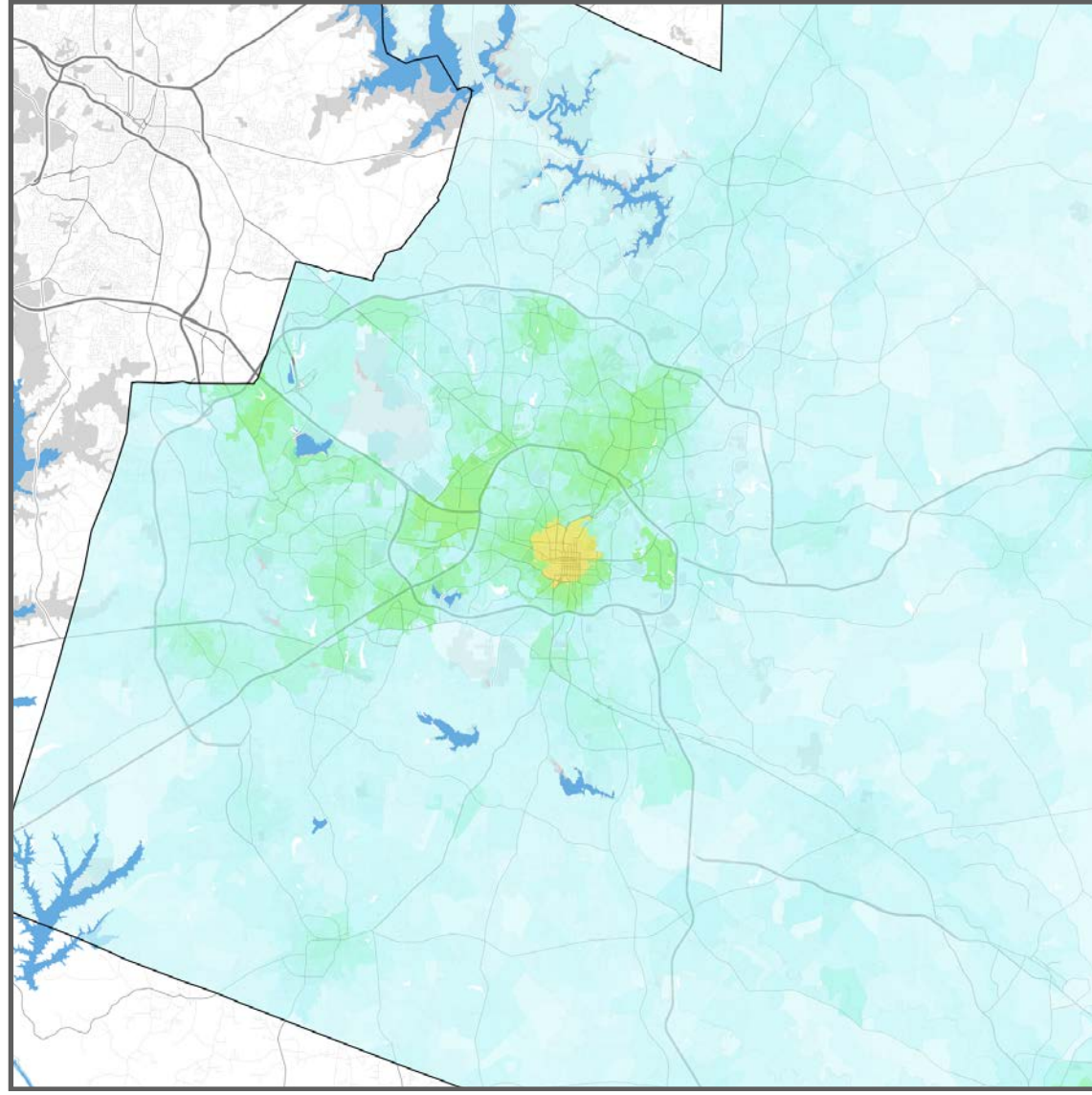
## Job Accessibility by Travel Time Threshold



# Raleigh

Raleigh-Cary, NC

87





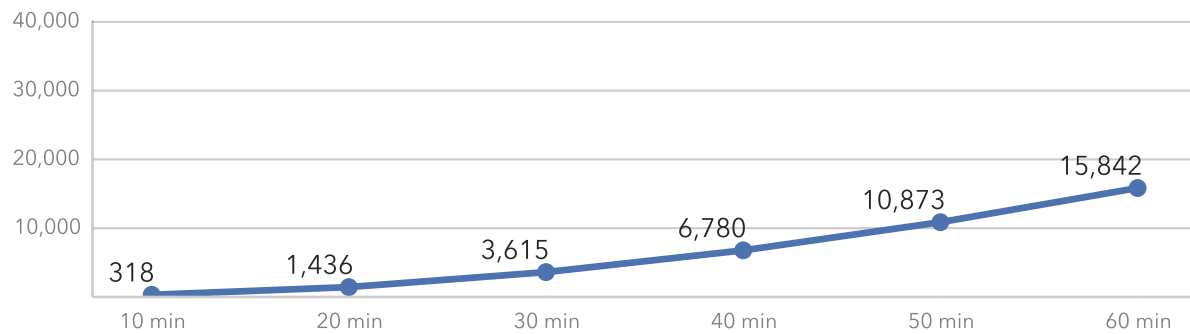
# Richmond

Richmond, VA

Rank by Weighted Walking Accessibility	<b>37</b>
Rank by Total Employment	<b>43</b>
Total Jobs	<b>588,393</b>
Average Job Density (per km <sup>2</sup> )	<b>40</b>
Total Workers	<b>567,115</b>
Average Worker Density (per km <sup>2</sup> )	<b>39</b>

*Job and worker totals are based on LEHD estimates and may not match other sources.*

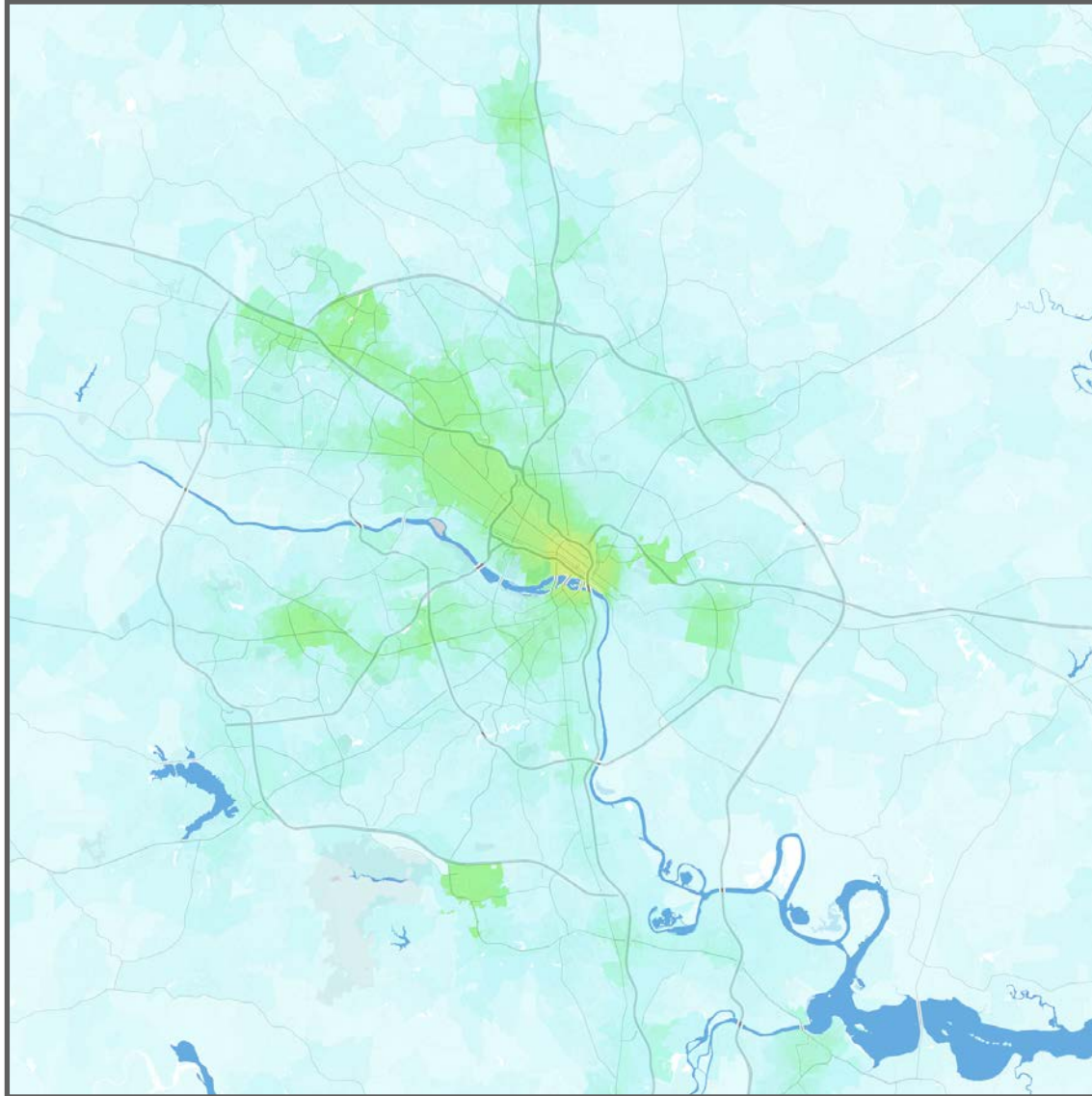
## Job Accessibility by Travel Time Threshold



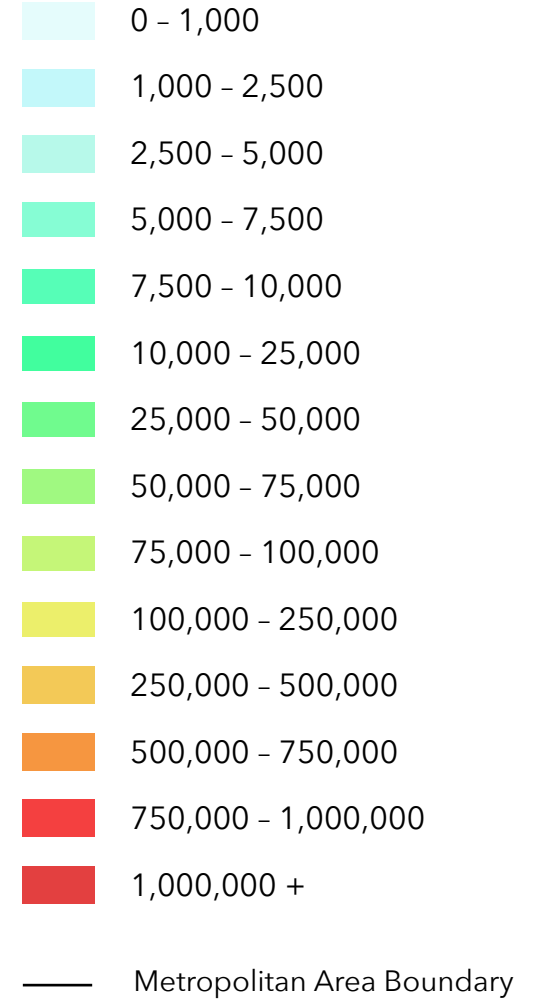
# Richmond

Richmond, VA

68



## Jobs within 30 minutes by walking



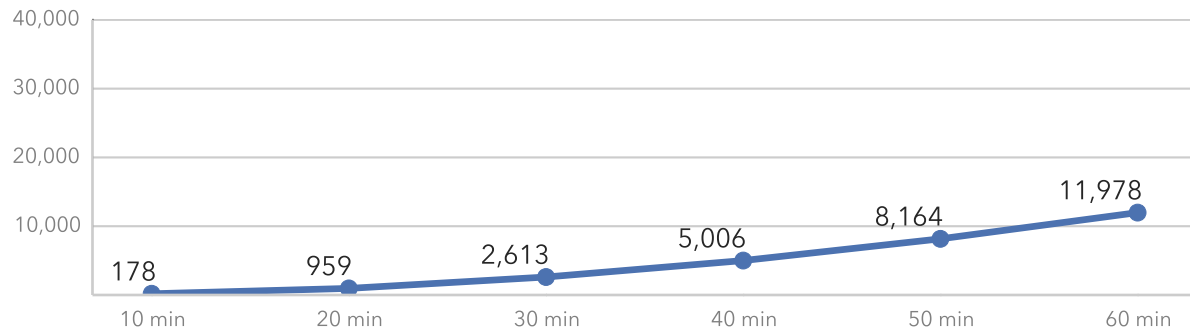
# Riverside

Riverside-San Bernardino-Ontario, CA

Rank by Weighted Walking Accessibility	<b>48</b>
Rank by Total Employment	<b>20</b>
Total Jobs	<b>1,198,157</b>
Average Job Density (per km <sup>2</sup> )	<b>17</b>
Total Workers	<b>1,470,777</b>
Average Worker Density (per km <sup>2</sup> )	<b>21</b>

*Job and worker totals are based on LEHD estimates and may not match other sources.*

## Job Accessibility by Travel Time Threshold

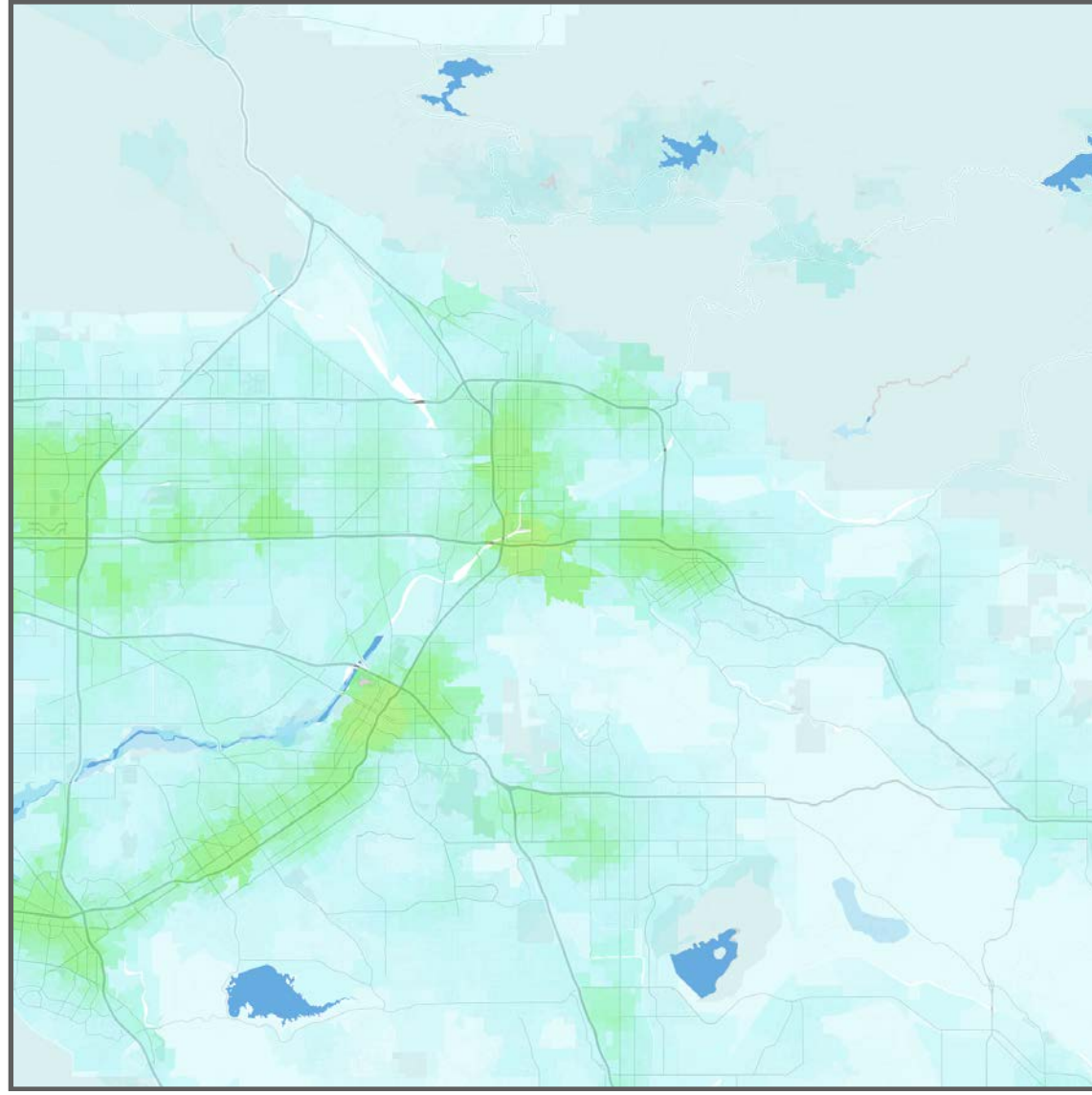




# Riverside

Riverside-San Bernardino-Ontario, CA

16



## Jobs within 30 minutes by walking

- 0 - 1,000
- 1,000 - 2,500
- 2,500 - 5,000
- 5,000 - 7,500
- 7,500 - 10,000
- 10,000 - 25,000
- 25,000 - 50,000
- 50,000 - 75,000
- 75,000 - 100,000
- 100,000 - 250,000
- 250,000 - 500,000
- 500,000 - 750,000
- 750,000 - 1,000,000
- 1,000,000 +
- Metropolitan Area Boundary

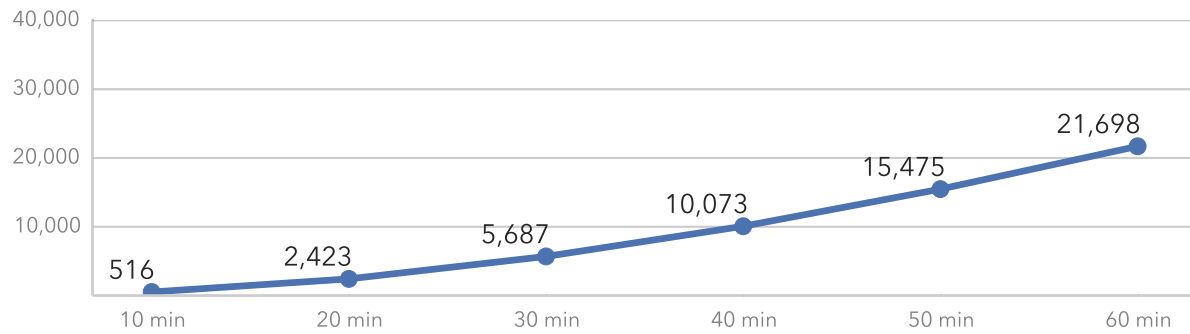
# Sacramento

Sacramento-Arden-Arcade-Roseville, CA

Rank by Weighted Walking Accessibility	<b>21</b>
Rank by Total Employment	<b>32</b>
Total Jobs	<b>849,840</b>
Average Job Density (per km <sup>2</sup> )	<b>64</b>
Total Workers	<b>839,857</b>
Average Worker Density (per km <sup>2</sup> )	<b>64</b>

*Job and worker totals are based on LEHD estimates and may not match other sources.*

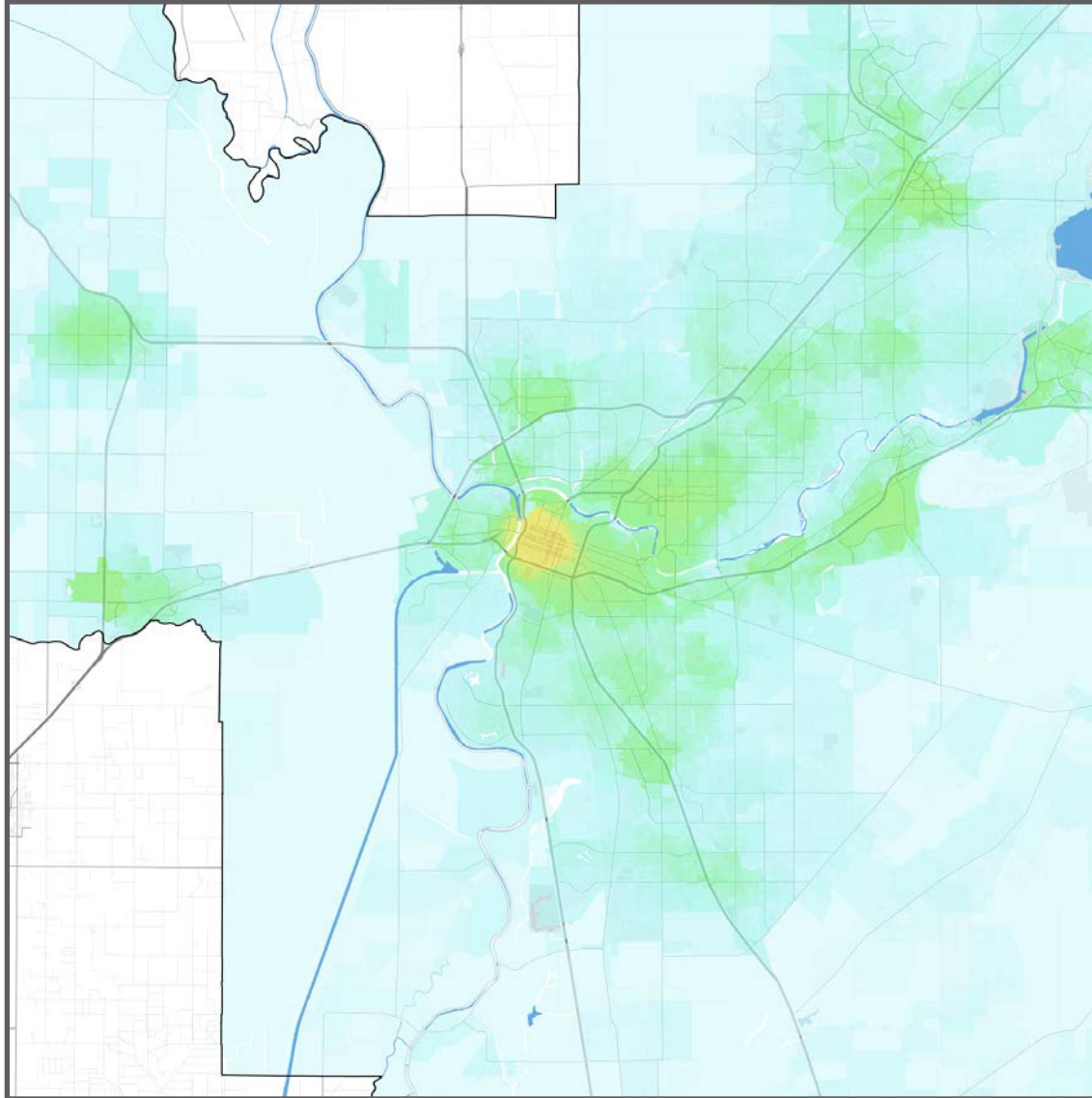
## Job Accessibility by Travel Time Threshold



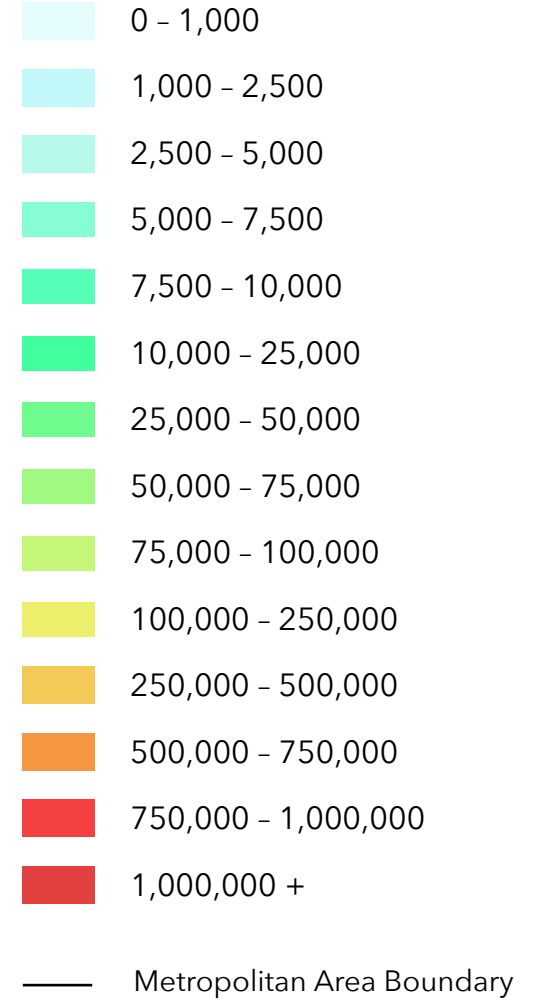
# Sacramento

Sacramento--Arden-Arcade--Roseville, CA

93



## Jobs within 30 minutes by walking



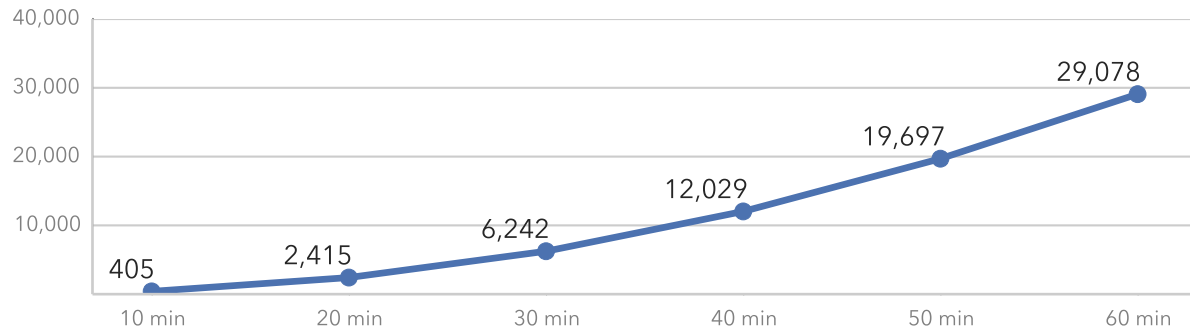
# Salt Lake City

Salt Lake City, UT

Rank by Weighted Walking Accessibility	<b>16</b>
Rank by Total Employment	<b>41</b>
Total Jobs	<b>607,239</b>
Average Job Density (per km <sup>2</sup> )	<b>25</b>
Total Workers	<b>507,658</b>
Average Worker Density (per km <sup>2</sup> )	<b>21</b>

*Job and worker totals are based on LEHD estimates and may not match other sources.*

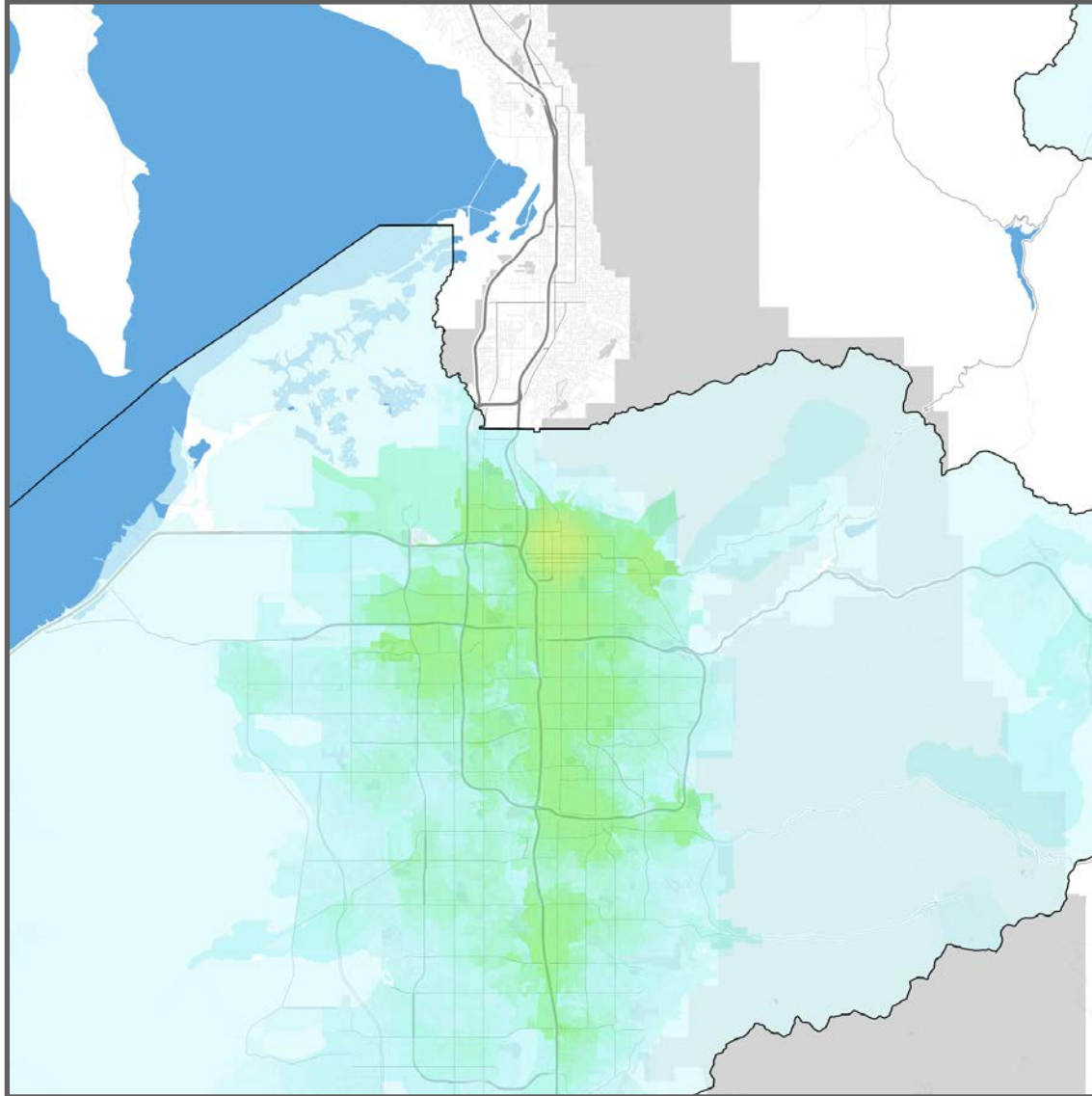
## Job Accessibility by Travel Time Threshold



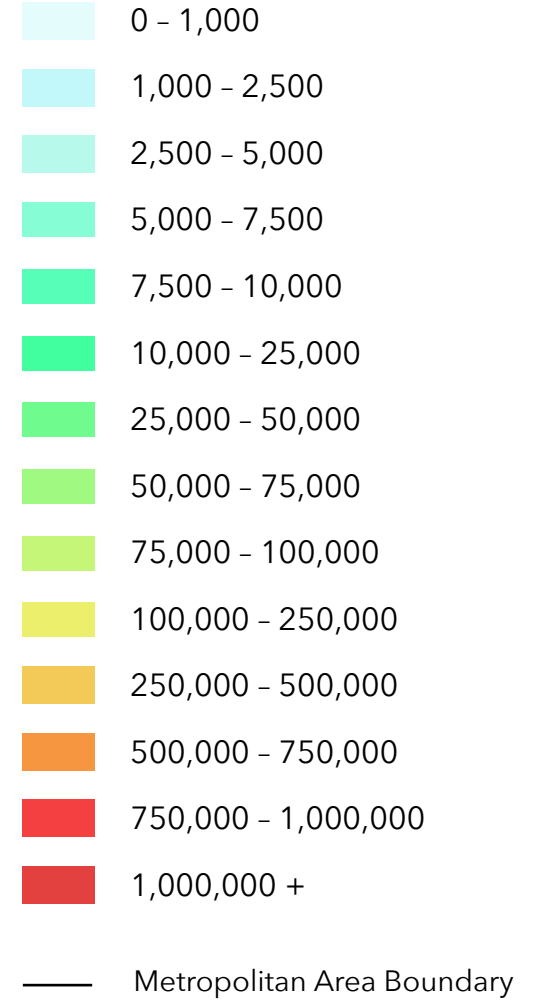
# Salt Lake City

Salt Lake City, UT

95



## Jobs within 30 minutes by walking



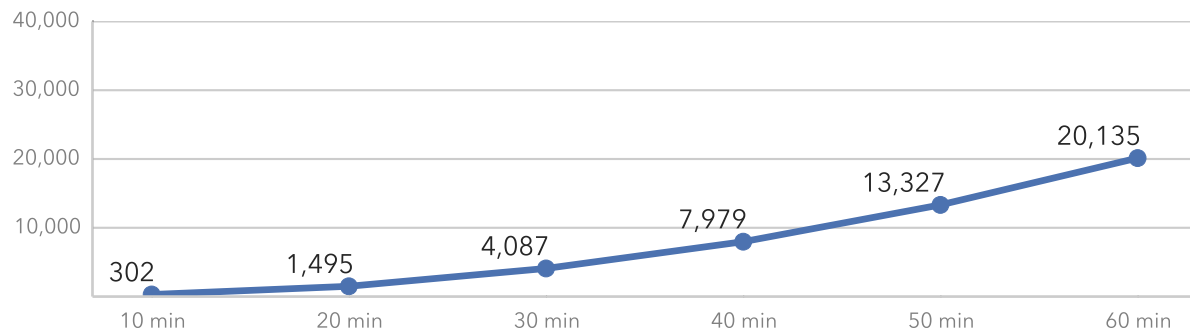
# San Antonio

San Antonio-New Braunfels, TX

Rank by Weighted Walking Accessibility	<b>30</b>
Rank by Total Employment	<b>34</b>
Total Jobs	<b>835,350</b>
Average Job Density (per km <sup>2</sup> )	<b>44</b>
Total Workers	<b>862,085</b>
Average Worker Density (per km <sup>2</sup> )	<b>46</b>

*Job and worker totals are based on LEHD estimates and may not match other sources.*

## Job Accessibility by Travel Time Threshold

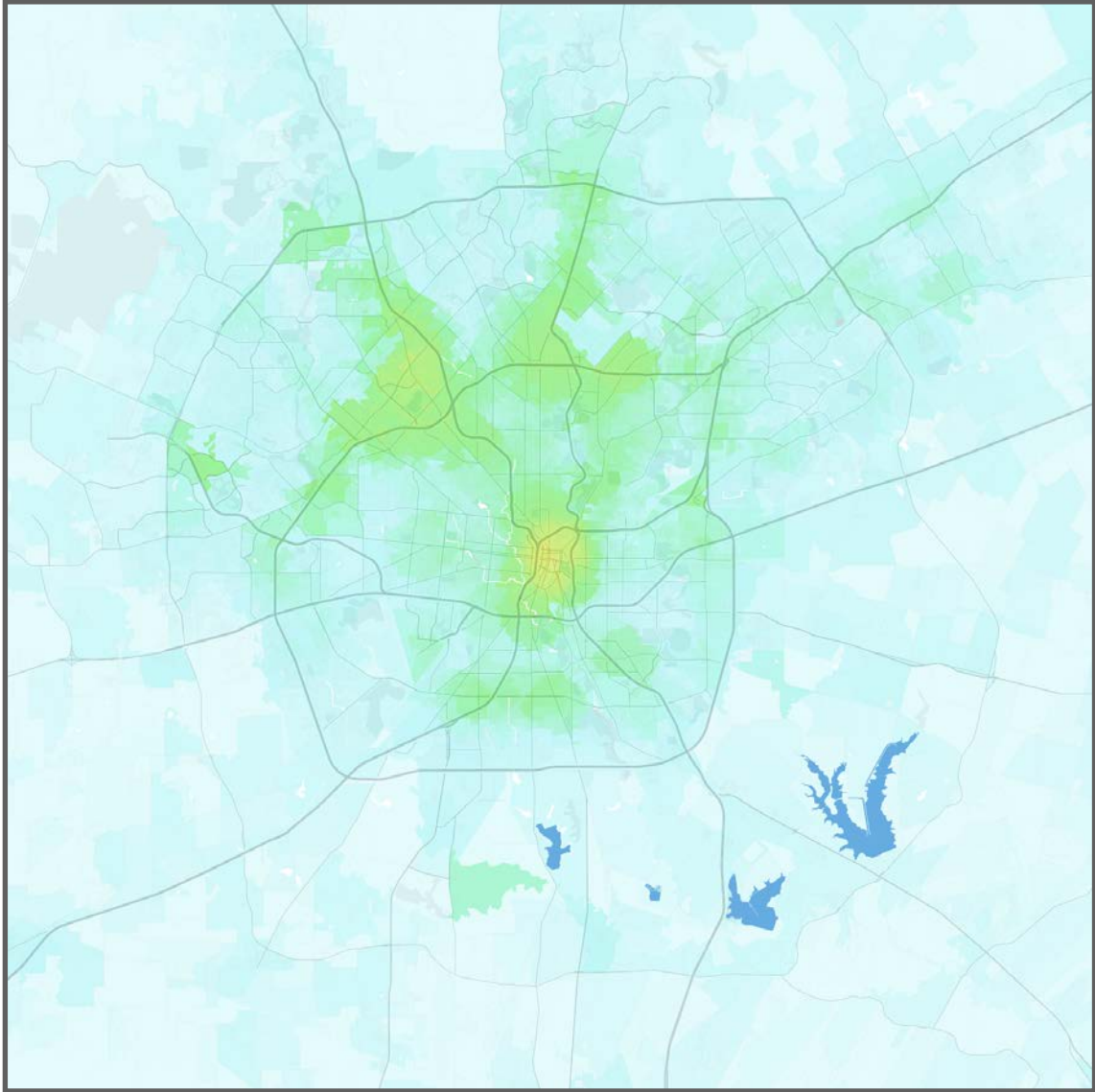




# San Antonio

San Antonio-New Braunfels, TX

97



## Jobs within 30 minutes by walking

- 0 - 1,000
- 1,000 - 2,500
- 2,500 - 5,000
- 5,000 - 7,500
- 7,500 - 10,000
- 10,000 - 25,000
- 25,000 - 50,000
- 50,000 - 75,000
- 75,000 - 100,000
- 100,000 - 250,000
- 250,000 - 500,000
- 500,000 - 750,000
- 750,000 - 1,000,000
- 1,000,000 +
- Metropolitan Area Boundary



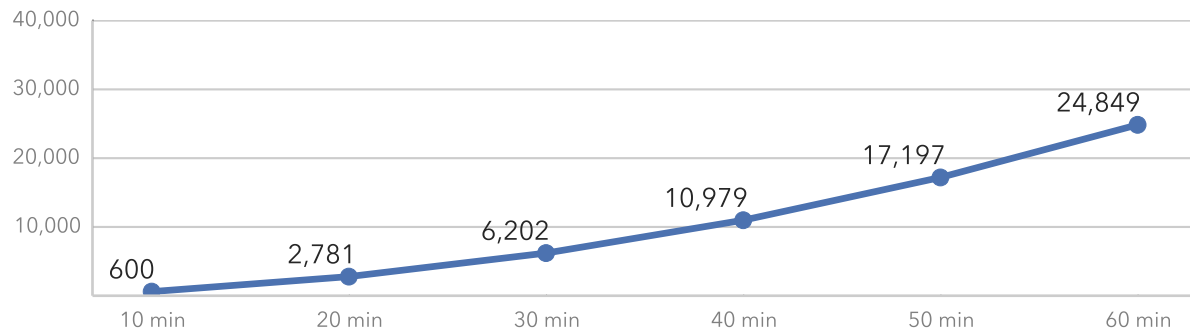
# San Diego

San Diego-Carlsbad-San Marcos, CA

Rank by Weighted Walking Accessibility	<b>15</b>
Rank by Total Employment	<b>17</b>
Total Jobs	<b>1,249,215</b>
Average Job Density (per km <sup>2</sup> )	<b>115</b>
Total Workers	<b>1,263,188</b>
Average Worker Density (per km <sup>2</sup> )	<b>116</b>

*Job and worker totals are based on LEHD estimates and may not match other sources.*

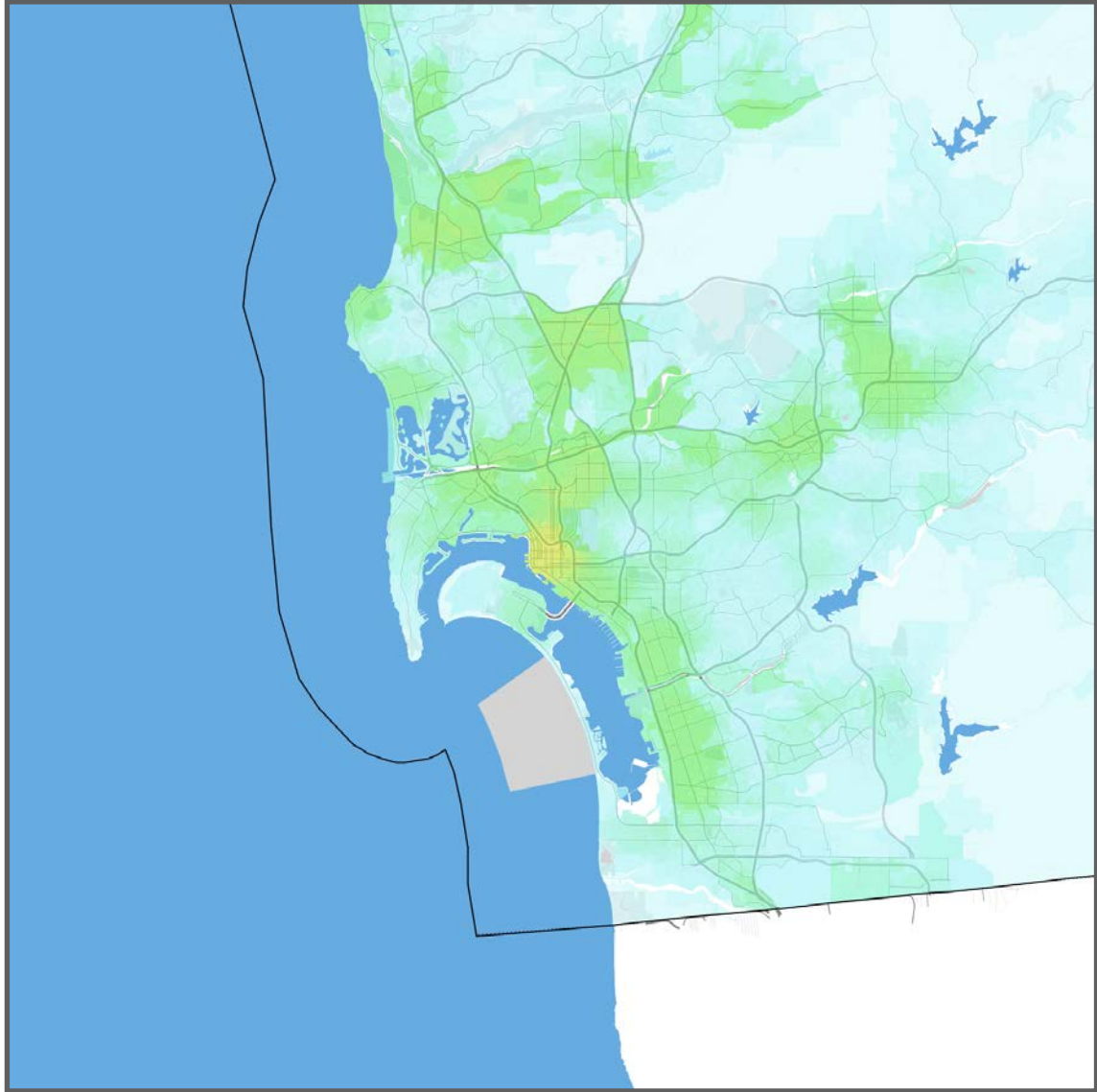
## Job Accessibility by Travel Time Threshold



# San Diego

San Diego-Carlsbad-San Marcos, CA

66



## Jobs within 30 minutes by walking

- 0 - 1,000
- 1,000 - 2,500
- 2,500 - 5,000
- 5,000 - 7,500
- 7,500 - 10,000
- 10,000 - 25,000
- 25,000 - 50,000
- 50,000 - 75,000
- 75,000 - 100,000
- 100,000 - 250,000
- 250,000 - 500,000
- 500,000 - 750,000
- 750,000 - 1,000,000
- 1,000,000 +
- Metropolitan Area Boundary

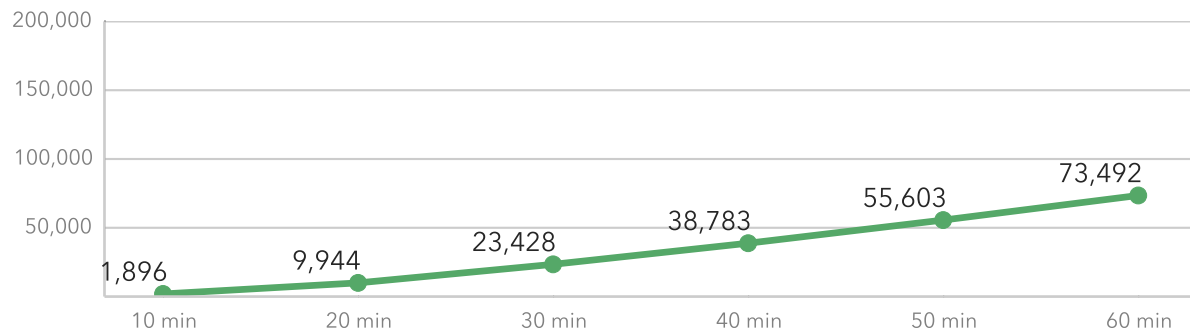
# San Francisco

San Francisco-Oakland-Fremont, CA

Rank by Weighted Walking Accessibility	<b>2</b>
Rank by Total Employment	<b>11</b>
Total Jobs	<b>2,013,749</b>
Average Job Density (per km <sup>2</sup> )	<b>315</b>
Total Workers	<b>1,900,319</b>
Average Worker Density (per km <sup>2</sup> )	<b>297</b>

*Job and worker totals are based on LEHD estimates and may not match other sources.*

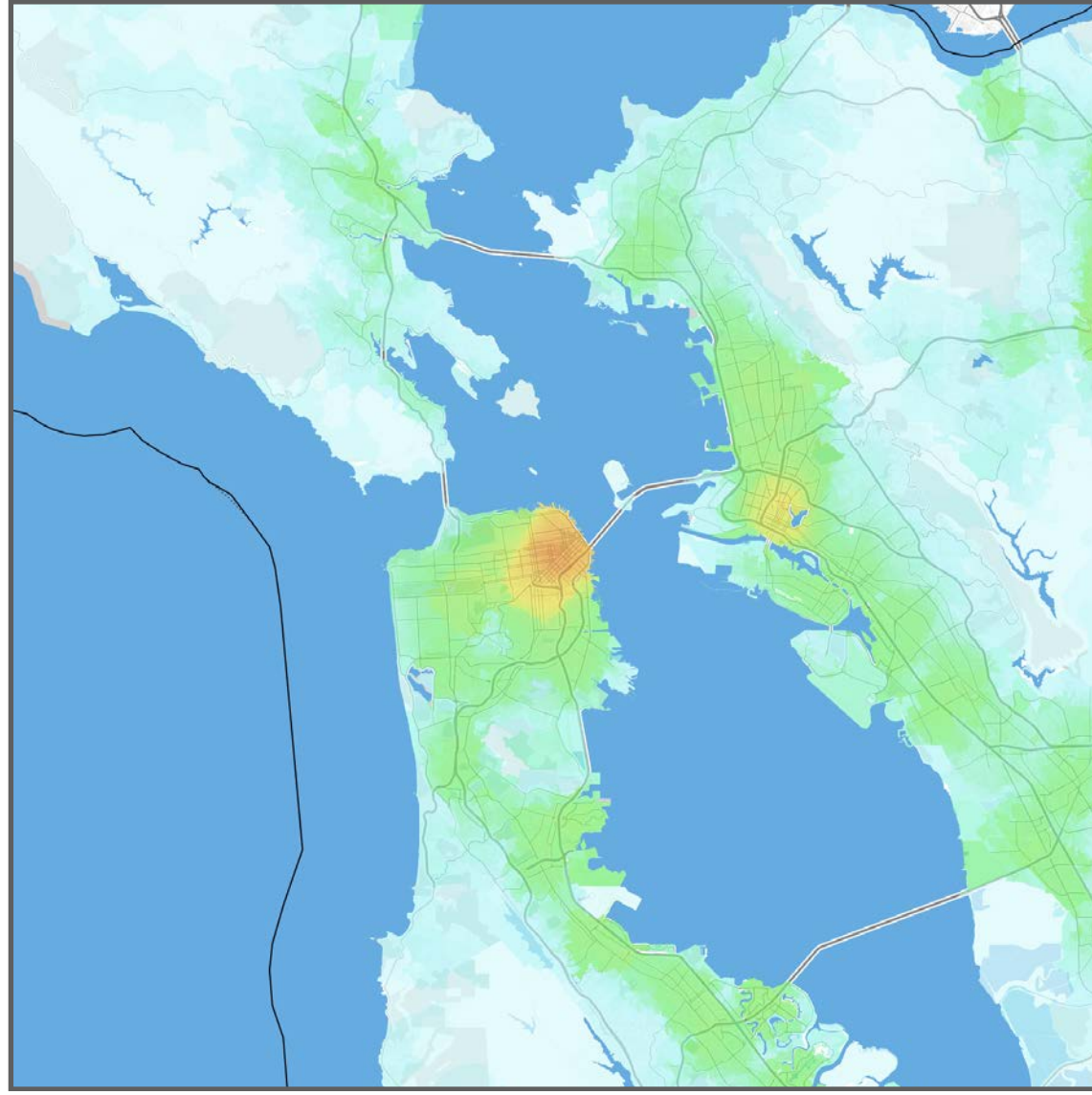
## Job Accessibility by Travel Time Threshold



# San Francisco

San Francisco-Oakland-Fremont, CA

101



## Jobs within 30 minutes by walking

- 0 - 1,000
- 1,000 - 2,500
- 2,500 - 5,000
- 5,000 - 7,500
- 7,500 - 10,000
- 10,000 - 25,000
- 25,000 - 50,000
- 50,000 - 75,000
- 75,000 - 100,000
- 100,000 - 250,000
- 250,000 - 500,000
- 500,000 - 750,000
- 750,000 - 1,000,000
- 1,000,000 +
- Metropolitan Area Boundary

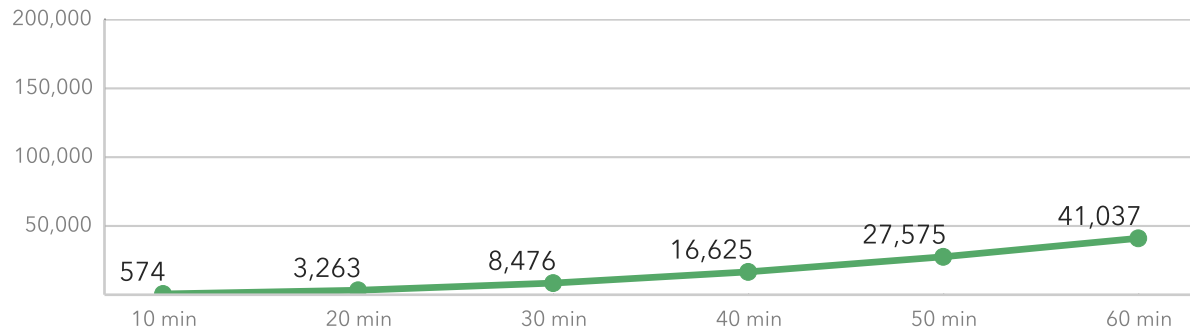
# San Jose

San Jose-Sunnyvale-Santa Clara, CA

Rank by Weighted Walking Accessibility	<b>9</b>
Rank by Total Employment	<b>30</b>
Total Jobs	<b>878,127</b>
Average Job Density (per km <sup>2</sup> )	<b>127</b>
Total Workers	<b>789,455</b>
Average Worker Density (per km <sup>2</sup> )	<b>114</b>

*Job and worker totals are based on LEHD estimates and may not match other sources.*

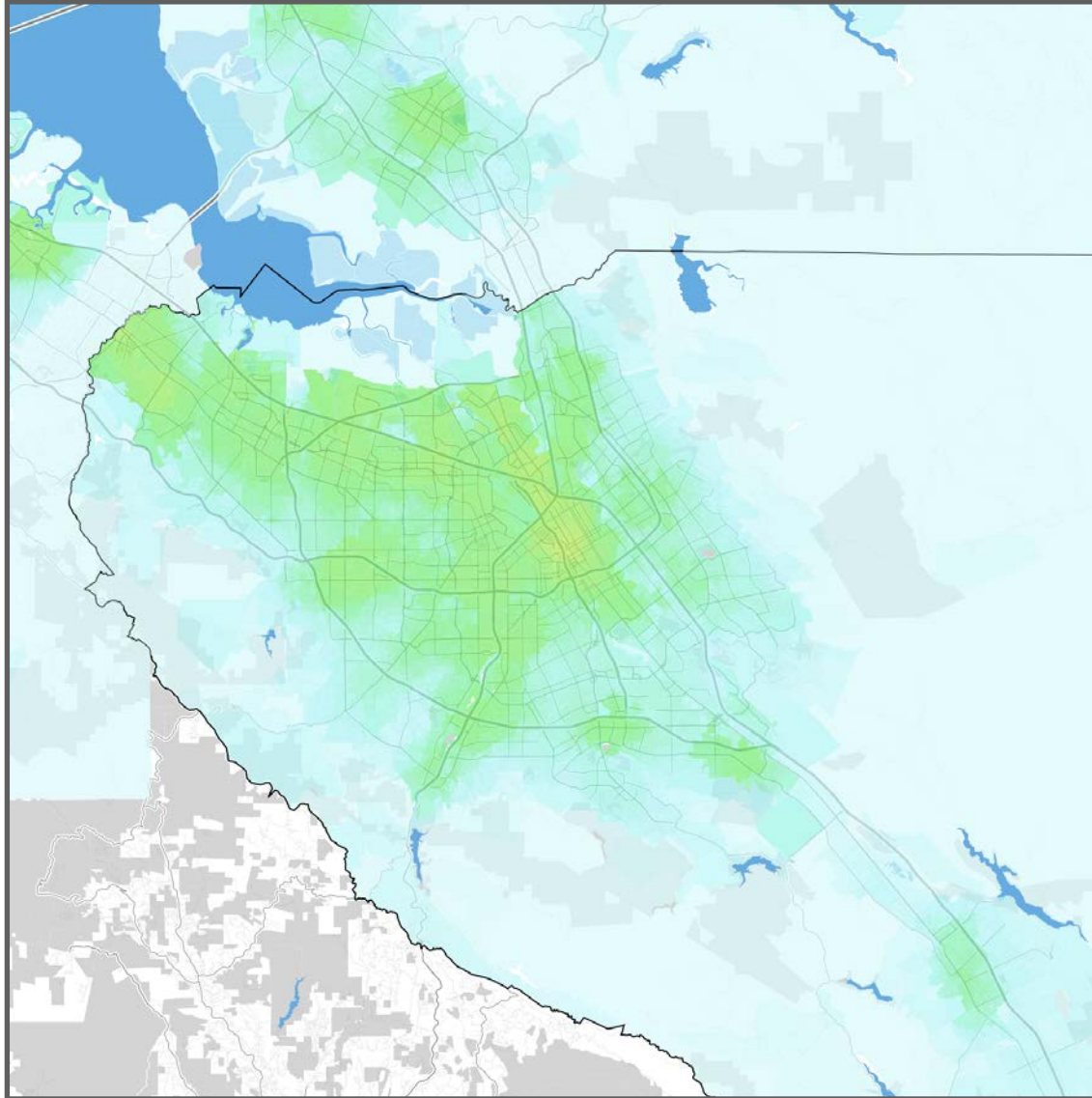
## Job Accessibility by Travel Time Threshold



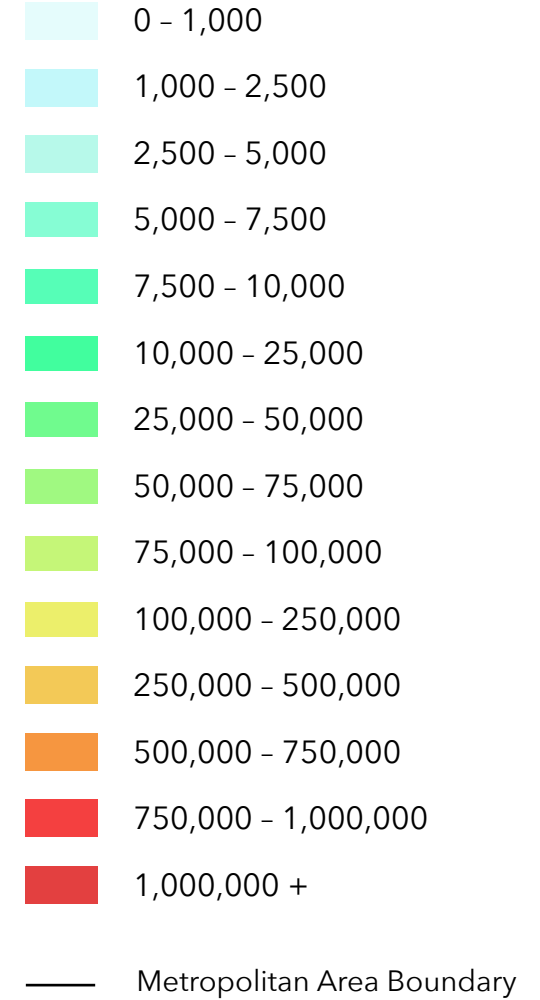
# San Jose

San Jose-Sunnyvale-Santa Clara, CA

103



## Jobs within 30 minutes by walking



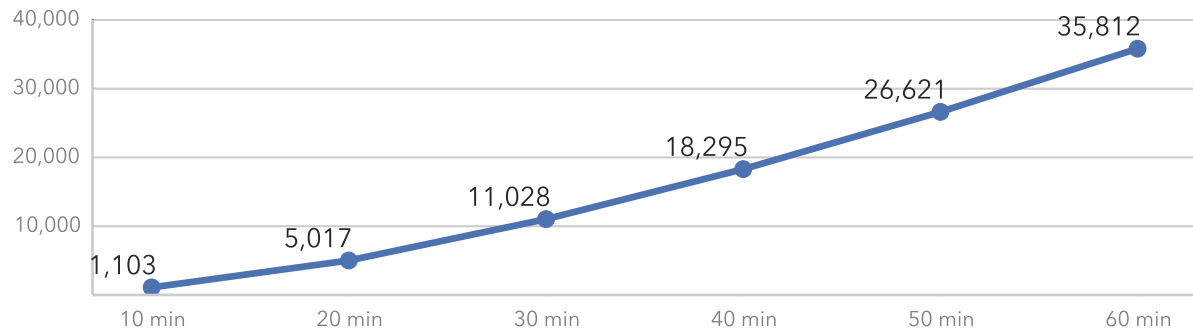
# Seattle

Seattle-Tacoma-Bellevue, WA

Rank by Weighted Walking Accessibility	<b>6</b>
Rank by Total Employment	<b>15</b>
Total Jobs	<b>1,651,547</b>
Average Job Density (per km <sup>2</sup> )	<b>109</b>
Total Workers	<b>1,538,625</b>
Average Worker Density (per km <sup>2</sup> )	<b>101</b>

*Job and worker totals are based on LEHD estimates and may not match other sources.*

## Job Accessibility by Travel Time Threshold

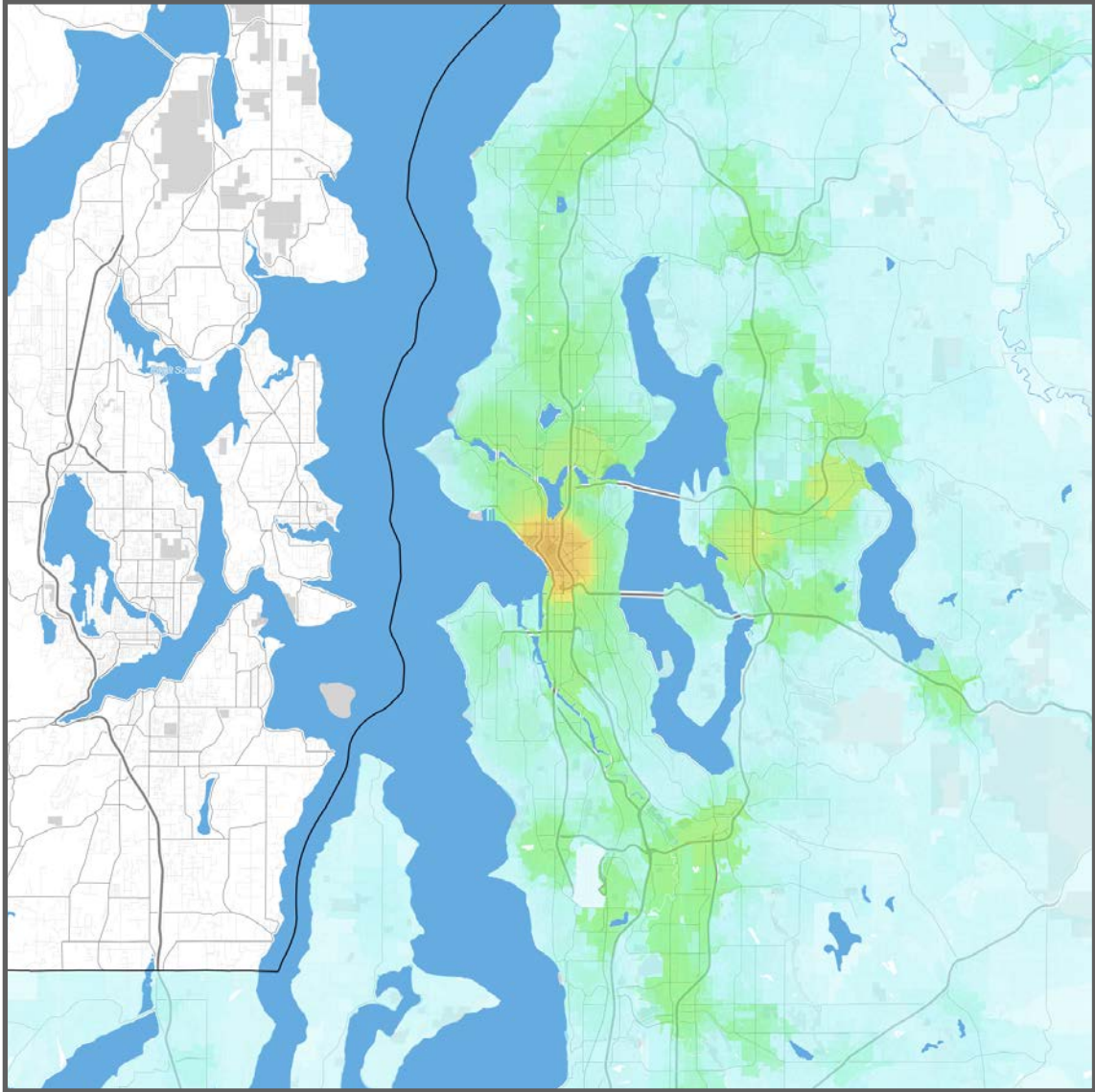




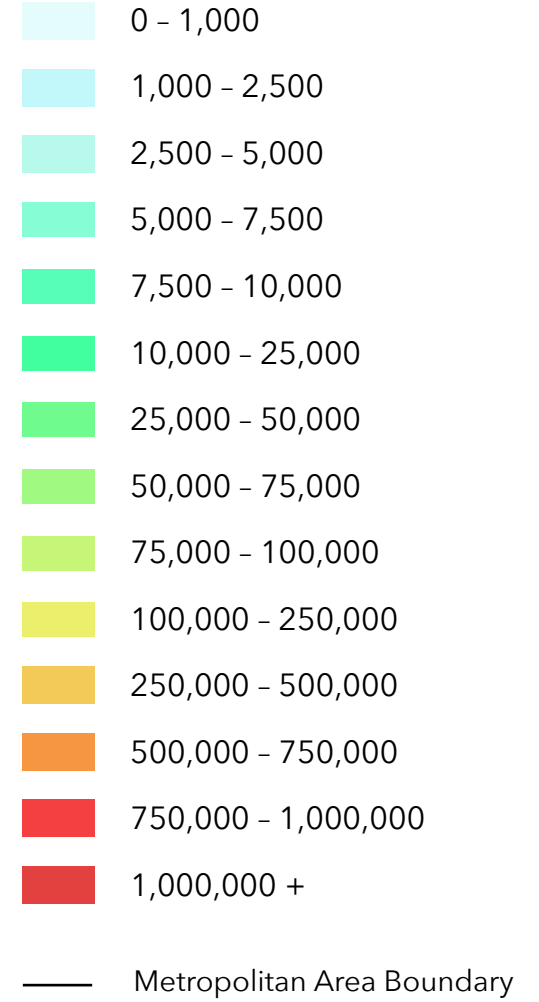
# Seattle

Seattle-Tacoma-Bellevue, WA

105



## Jobs within 30 minutes by walking



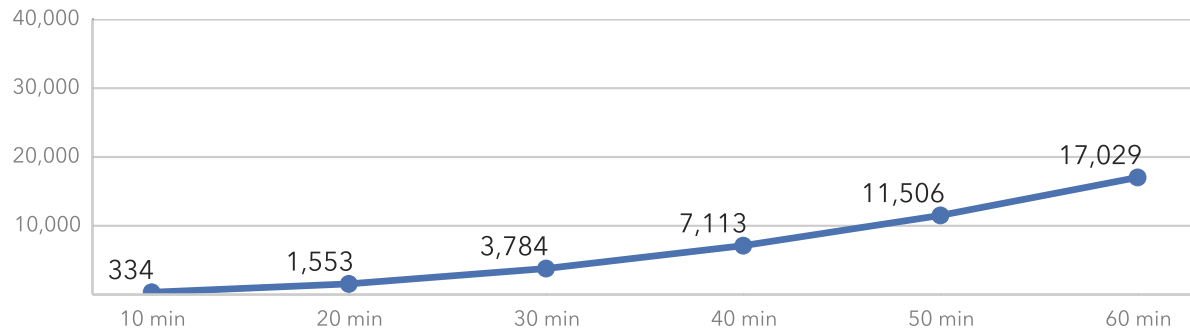
# St. Louis

St. Louis, MO-IL

Rank by Weighted Walking Accessibility	<b>33</b>
Rank by Total Employment	<b>16</b>
Total Jobs	<b>1,282,275</b>
Average Job Density (per km <sup>2</sup> )	<b>57</b>
Total Workers	<b>1,261,977</b>
Average Worker Density (per km <sup>2</sup> )	<b>57</b>

*Job and worker totals are based on LEHD estimates and may not match other sources.*

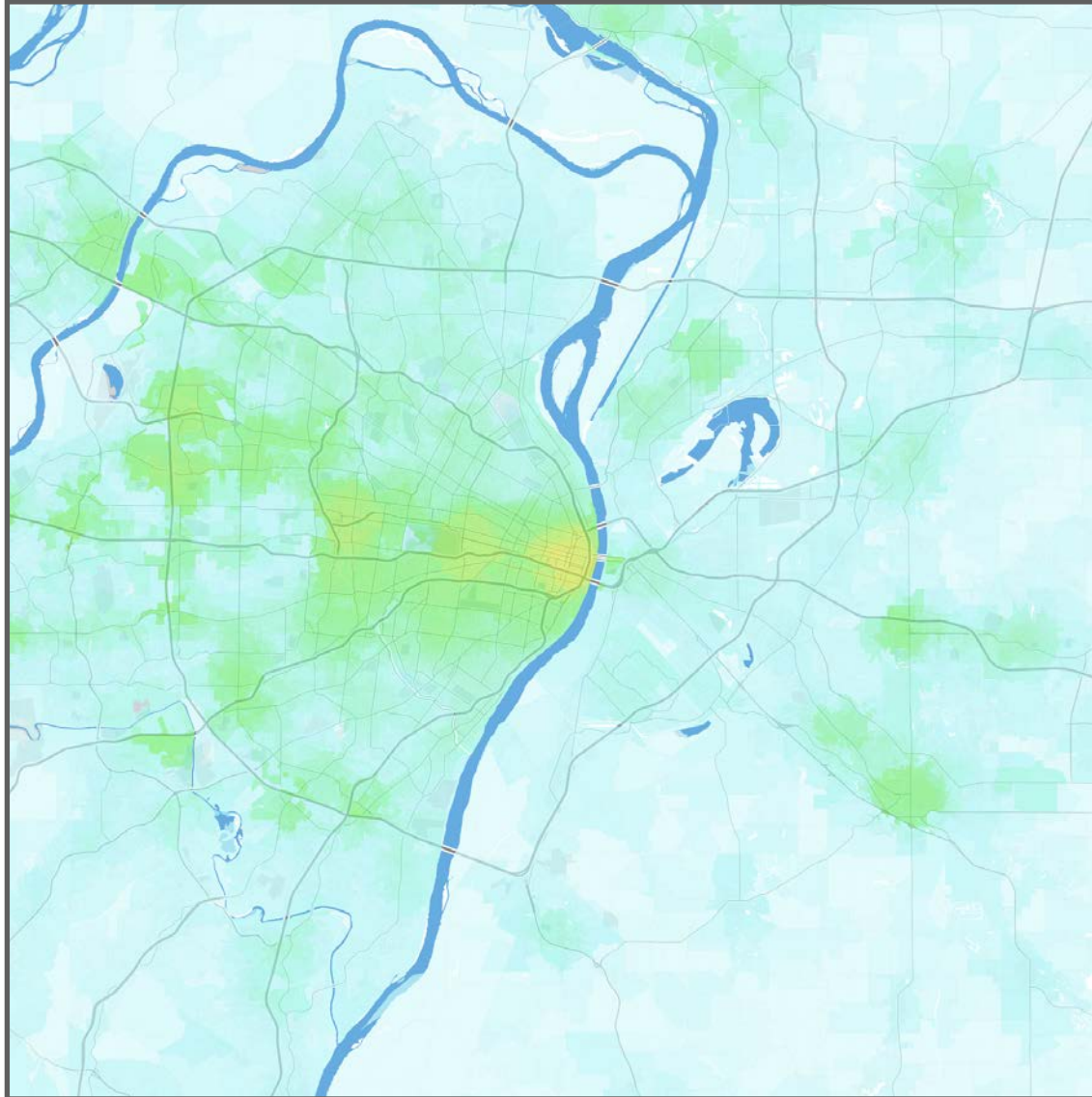
## Job Accessibility by Travel Time Threshold



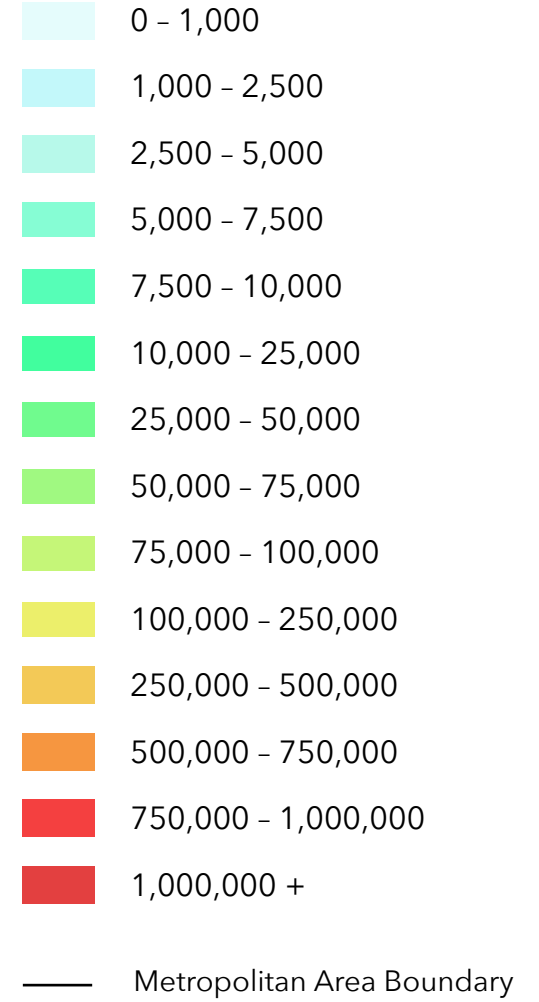
# St. Louis

St. Louis, MO-IL

107



## Jobs within 30 minutes by walking



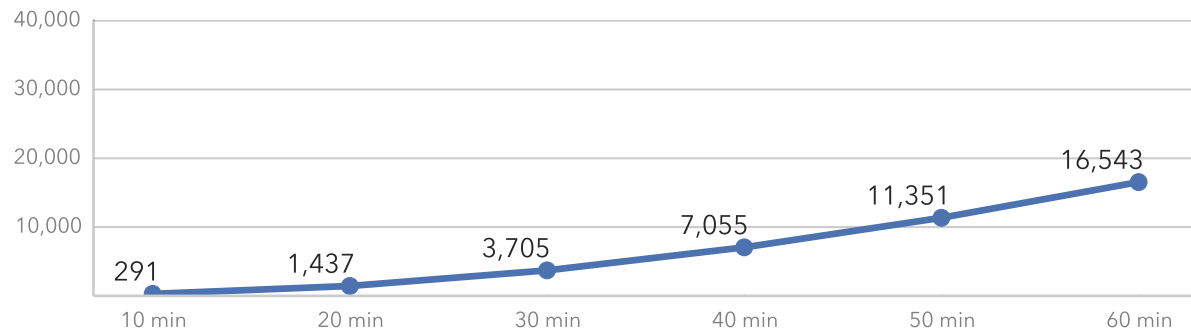
# Tampa

Tampa-St. Petersburg-Clearwater, FL

Rank by Weighted Walking Accessibility	<b>36</b>
Rank by Total Employment	<b>21</b>
Total Jobs	<b>1,112,664</b>
Average Job Density (per km <sup>2</sup> )	<b>171</b>
Total Workers	<b>1,108,850</b>
Average Worker Density (per km <sup>2</sup> )	<b>170</b>

*Job and worker totals are based on LEHD estimates and may not match other sources.*

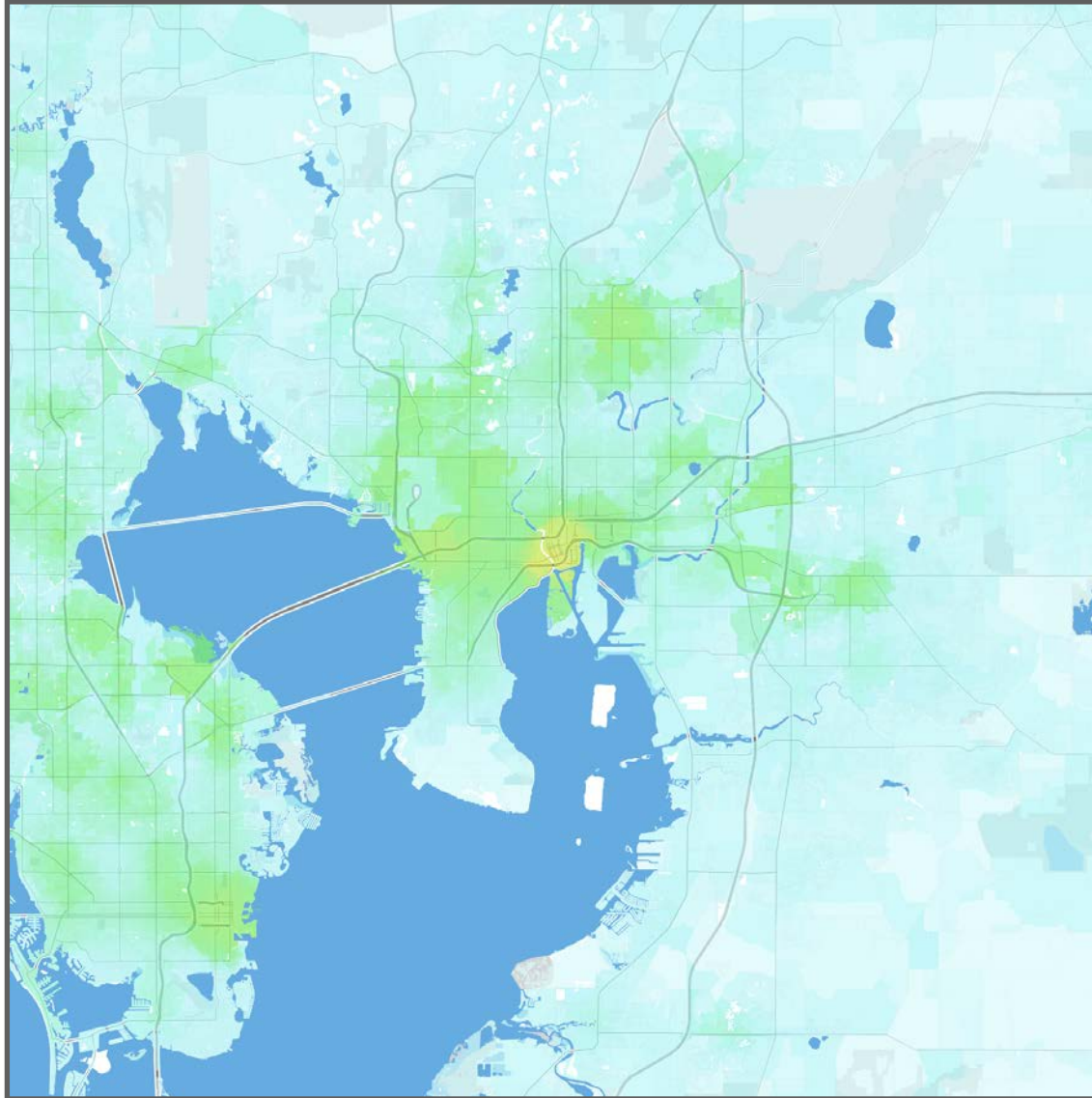
## Job Accessibility by Travel Time Threshold



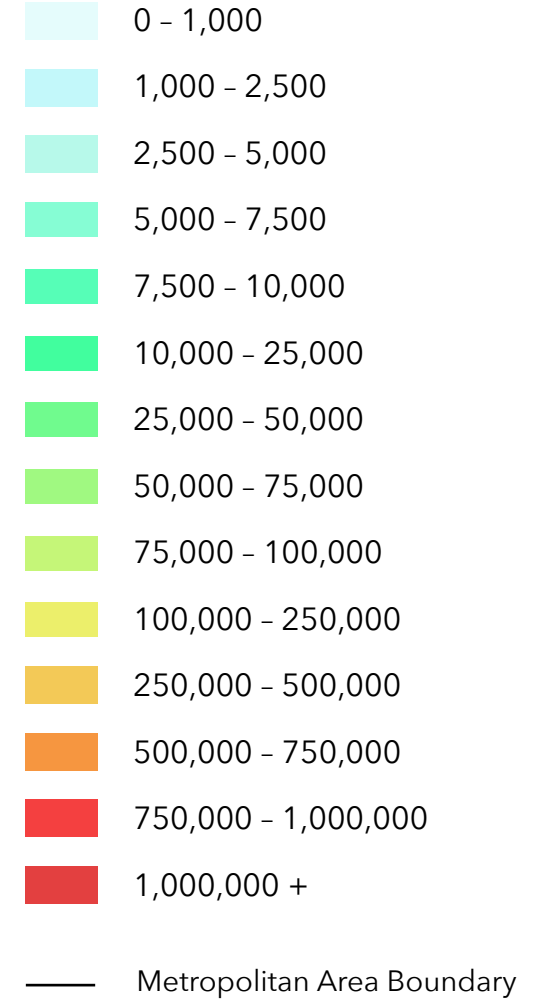
# Tampa

Tampa-St. Petersburg-Clearwater, FL

109



## Jobs within 30 minutes by walking





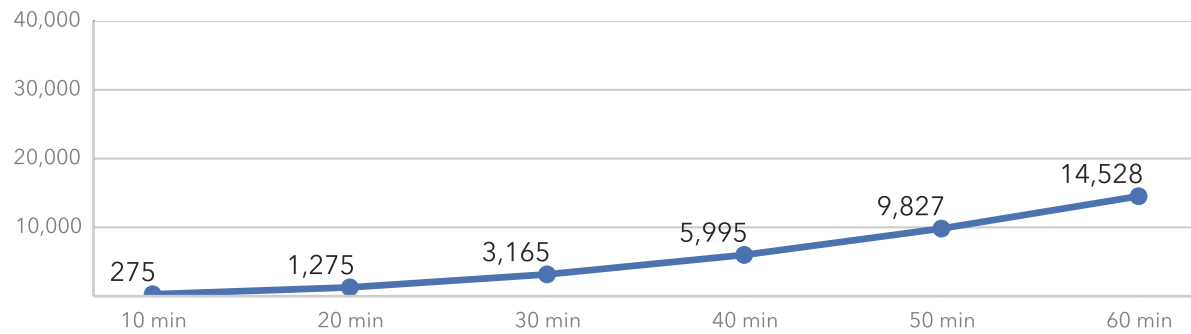
# Virginia Beach

Virginia Beach-Norfolk-Newport News, VA-NC

Rank by Weighted Walking Accessibility	<b>43</b>
Rank by Total Employment	<b>38</b>
Total Jobs	<b>695,288</b>
Average Job Density (per km <sup>2</sup> )	<b>102</b>
Total Workers	<b>684,496</b>
Average Worker Density (per km <sup>2</sup> )	<b>101</b>

*Job and worker totals are based on LEHD estimates and may not match other sources.*

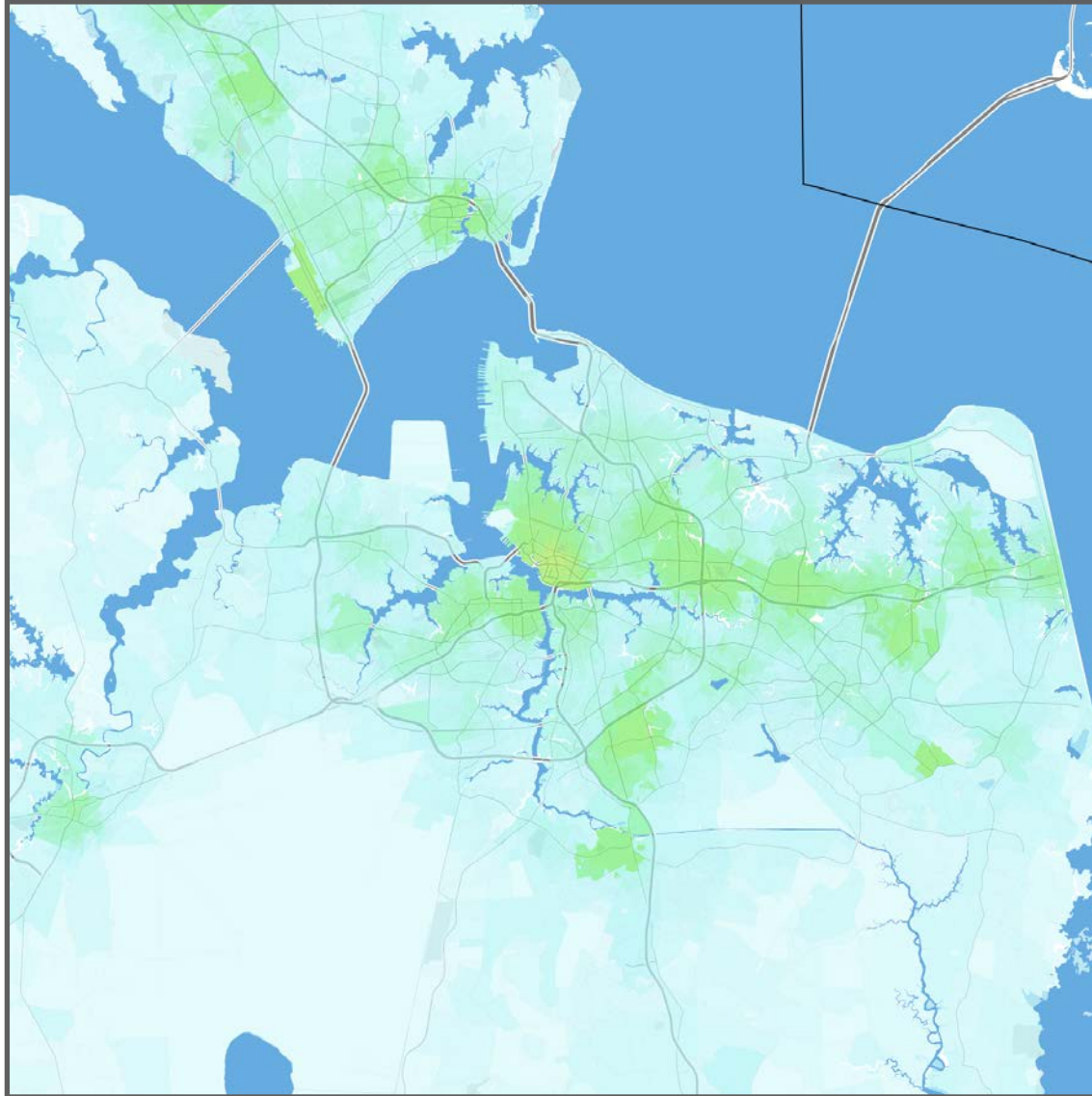
## Job Accessibility by Travel Time Threshold



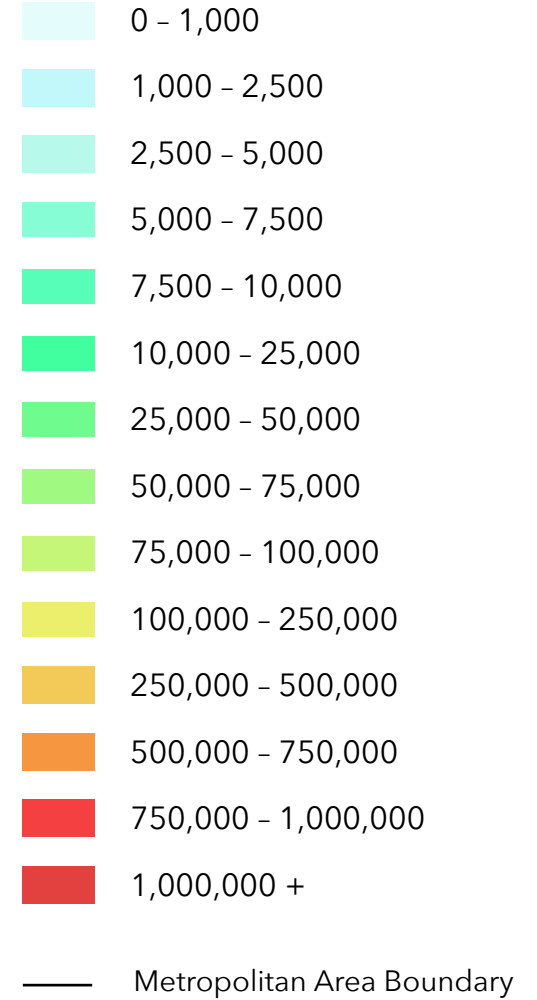
# Virginia Beach

Virginia Beach-Norfolk-Newport News, VA-NC

111



## Jobs within 30 minutes by walking





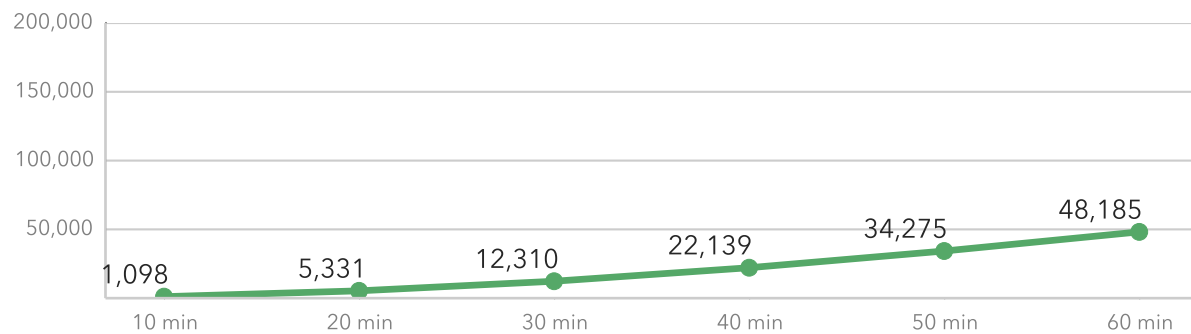
# Washington

Washington-Arlington-Alexandria, DC-VA-MD-WV

Rank by Weighted Walking Accessibility	5
Rank by Total Employment	5
Total Jobs	2,839,321
Average Job Density (per km <sup>2</sup> )	196
Total Workers	2,647,658
Average Worker Density (per km <sup>2</sup> )	183

*Job and worker totals are based on LEHD estimates and may not match other sources.*

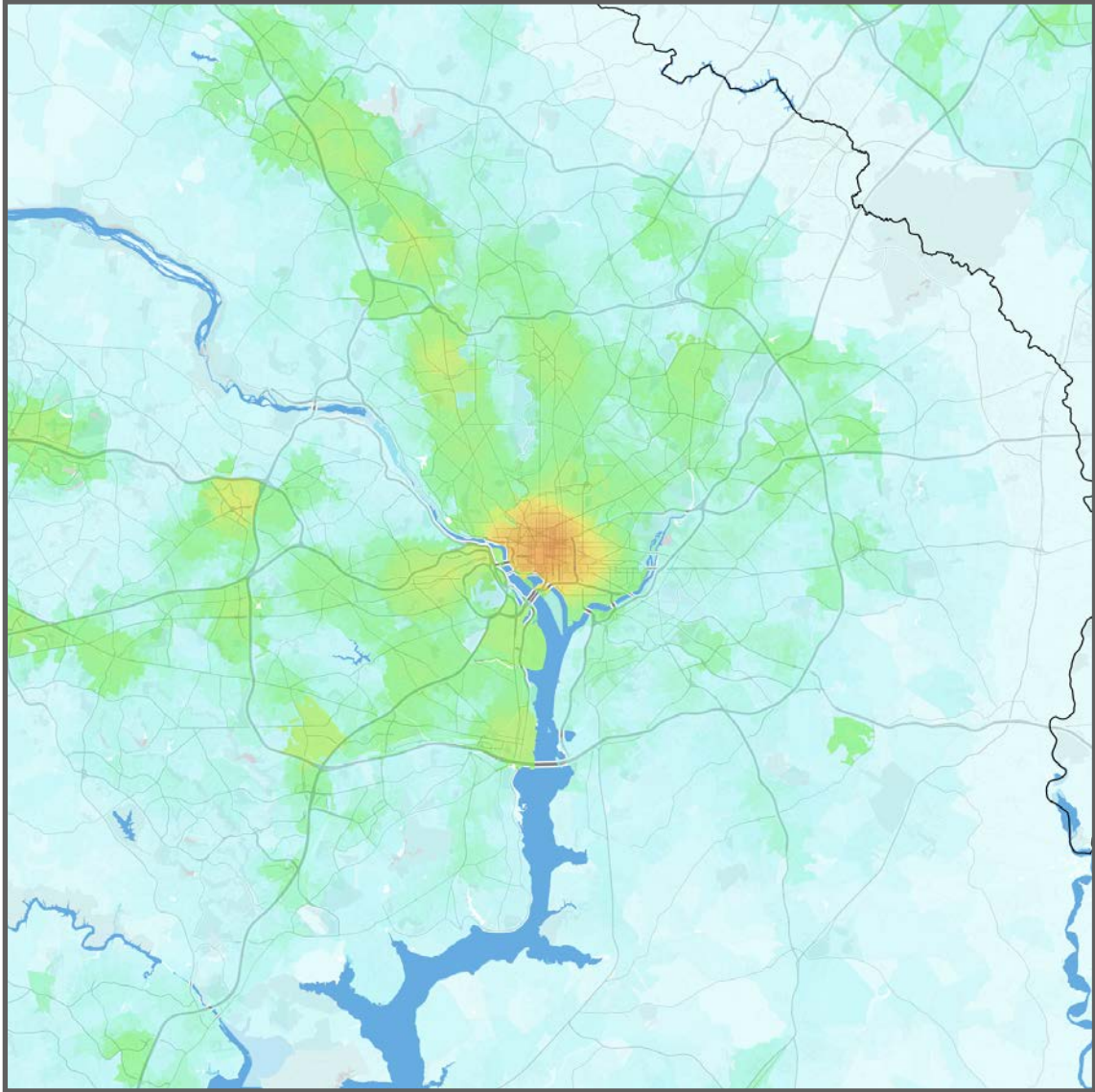
## Job Accessibility by Travel Time Threshold



# Washington

Washington-Arlington-Alexandria, DC-VA-MD-WV

113



## Jobs within 30 minutes by walking

- 0 - 1,000
- 1,000 - 2,500
- 2,500 - 5,000
- 5,000 - 7,500
- 7,500 - 10,000
- 10,000 - 25,000
- 25,000 - 50,000
- 50,000 - 75,000
- 75,000 - 100,000
- 100,000 - 250,000
- 250,000 - 500,000
- 500,000 - 750,000
- 750,000 - 1,000,000
- 1,000,000 +
- Metropolitan Area Boundary

## References

- Geurs, K. and Van Eck, J. (2001). Accessibility measures: Review and applications. Technical Report 408505 006, National Institute of Public Health and the Environment.
- Handy, S. L. and Niemeier, D. A. (1997). Measuring accessibility: An exploration of issues and alternatives. *Environment and planning A*, 29(7):1175–1194.
- Hansen, W. (1959). How accessibility shapes land use. *Journal of the American Institute of Planners*, 25(2):73–76.
- Iacono, M., Krizek, K., and El-Geneidy, A. (2008). Access to Destinations: How Close is Close Enough? Estimating Accurate Distance Decay Functions for Multiple Modes and Different Purposes. Technical report, University of Minnesota Center for Transportation Studies.
- Iacono, M., Krizek, K., and El-Geneidy, A. (2010). Measuring non-motorized accessibility: issues, alternatives, and execution. *Journal of Transport Geography*.
- Levine, J., Grengs, J., Shen, Q., and Shen, Q. (2012). Does accessibility require density or speed? A comparison of fast versus close in getting where you want to go in U.S. metropolitan regions. *Journal of the American Planning Association*, 78(2):157–172.
- Levinson, D. M. (2013). Access across America. Technical Report CTS 13-20, University of Minnesota Center for Transportation Studies, <http://www.cts.umn.edu/Publications/ResearchReports/pdfdownload.pl?id=2334>.
- McKenzie, B. (2014). Modes less traveled — bicycling and walking to work in the United States: 2008–2012. Technical Report ACS-25, U.S. Census Bureau.
- Owen, A. and Levinson, D. (2014). Access across america: Transit 2014. Technical Report CTS14-11, University of Minnesota Center for Transportation Studies, <http://www.its.umn.edu/Publications/ResearchReports/pdfdownload.pl?id=2506>.
- Ramsey, K. and Bell, A. (2014). The smart location database: A nationwide data resource characterizing the built environment and destination accessibility at the neighborhood scale and destination accessibility at the neighborhood scale. *Cityscape: A Journal of Policy Development and Research*, 16(2).
- Speck, J. (2012). *Walkable City*. North Point Press, New York.
- Tabeshian, M. and Kattan, L. (2014). Modeling Nonmotorized Travel Demand at Intersections Based on Traffic Counts and GIS Data in Calgary, Canada. *Transportation Research Record*, page 17p.
- Tomer, A., Kneebone, E., Puentes, R., and Berube, A. (2011). Missed opportunity: Transit and jobs in metropolitan america. Technical report, Brookings Institution, [http://www.brookings.edu/~media/research/files/reports/2011/5/12%20jobs%20and%20transit/0512\\_jobs\\_transit.pdf](http://www.brookings.edu/~media/research/files/reports/2011/5/12%20jobs%20and%20transit/0512_jobs_transit.pdf).

Walk Score (2014). Walk Score Methodology. <https://www.walkscore.com/methodology.shtml>.  
Accessed: 2015-03-23.