

Appendix 2: Regional Needs Assessment

Introduction

This document identifies and evaluates the Houston region's transportation needs, with particular focus on the needs of key populations including seniors (65+), persons with disabilities, youth, veterans, and persons with low incomes, among others. It evaluates transportation needs in several ways: first, it examines the region's demographics, and how those demographics have changed since the previous Regionally Coordinated Transportation Plan was completed in 2017. It then examines the availability of current transit service in the region, with a focus on where target populations live. It continues by looking at access to jobs and health care services for the region's transportation users. It then reviews existing (pre-COVID) commute travel flows, before examining projections for job and population growth over the coming decades. It concludes by noting the needs identified in Phase I Public Outreach and noting some key takeaways from these analyses.

The needs assessment serves as a building block for the gaps analysis. Developing an understanding of existing transportation needs in the region is a prerequisite for finding the gaps in the region's transportation network, as those gaps can be best understood as unmet transportation needs. The needs assessment ensures that this plan addresses the most important gaps in the region's transportation network by providing a strong foundational understanding of the strengths and opportunities for improvement for transportation options in the region.

Regional Demographics

The Gulf Coast region is both populous and growing rapidly. In 2019, the most recent year for which American Community Survey (ACS) data is available, the 13-county region had 7,056,034 persons. At the center of the region is the City of Houston, which lies within Harris County and has 4,646,630 people or 65% of the region's population. Harris County and the seven counties with which it shares a border (the eight-county region for which the Houston-Galveston Area Council serves as the Metropolitan Planning Organization) are home to 97% of the region's population. In addition to

Harris, these counties include Brazoria, Chambers, Fort Bend, Galveston, Liberty, Montgomery, and Waller. The remaining five counties in the region: Austin, Colorado, Matagorda, Walker, and Wharton, make up just 3% of the region's population, and are predominantly rural.

Total Population

Growth in the region is fastest in the counties surrounding Harris, as shown in Table 1. Chambers, Fort Bend, Montgomery, and Waller Counties all have experienced population growth of more than 6% since 2015¹. Brazoria, Galveston, and Liberty Counties have all grown substantially in population as well, posting growth rates between three and five percent. Harris County's population has increased as well, though not as quickly as the counties surrounding it. While none of the five rural counties have seen a loss of population, only two have seen population growth of more than 1% since 2015.

¹ 2015 ACS data was the data most recently available at the time of completion of the previous RCTP update. To allow a more direct comparison between versions of this plan, this data has been used here.

Table 1: 13-County Population Growth Rates by County

County	2019 Population	2015 Population	Population Growth
Fort Bend	765,394	716,087	6.9%
Waller	51,832	48,656	6.5%
Montgomery	571,949	537,559	6.4%
Chambers	41,305	38,863	6.3%
Liberty	83,702	79,654	5.0%
Brazoria	360,677	346,312	4.2%
Galveston	332,885	322,225	3.3%
Harris	4,646,630	4,538,028	2.4%
Walker	72,321	70,699	2.3%
Colorado	21,224	20,870	1.7%
Austin	29,764	29,563	0.7%
Wharton	41,577	41,486	0.2%
Matagorda	36,774	36,700	0.2%
13-County Total	7,056,034	6,826,702	3.4%

Seniors

Easy access to transportation resources is vital for senior citizens. The National Association of Area Agencies on Aging reports that 600,000 seniors in the US stop driving every year, forcing them to rely on others to get to medical appointments, shopping, and recreational opportunities². In the 13-county region, the percentage of the total population over the age of 65 has grown in 11 of the 13 counties, as shown in Table 2. It has remained flat in Chambers County and shrank by just one-tenth of one percent in Waller County. The counties in the Gulf Coast region with the largest percentage of seniors are Austin, Colorado, Matagorda, and Wharton, each of which has at least 16% of its population over the age of 65. Harris County and Fort Bend

² <https://www.aarp.org/caregiving/home-care/info-2020/transportation-services.html>. Accessed 10/25/2021.

County have the smallest concentrations of seniors, with people 65 or older making up less than 10% of each county’s population.

Table 2: 13-County Senior Citizen Population

County	2019 Population	Percent of Population 65 years or older, 2019	Percent of Population 65 years or older, 2015
Colorado	21,224	21.6%	20.8%
Austin	29,764	18.7%	18.0%
Wharton	41,577	16.6%	16.1%
Matagorda	36,774	16.3%	15.9%
Galveston	332,885	13.9%	13.1%
Liberty	83,702	13.0%	12.9%
Montgomery	571,949	12.8%	12.3%
Walker	72,321	12.7%	11.7%
Waller	51,832	11.6%	11.7%
Brazoria	360,677	11.6%	11.1%
Chambers	41,305	10.9%	10.9%
Fort Bend	765,394	10.6%	9.9%
Harris	4,646,630	10.2%	9.4%
13-County Total	7,056,034	10.9%	9.8%

Students

Student transportation is an important policy concern: access to reliable transportation can not only improve a student’s attendance record and academic achievement, it can also have a positive impact on their health and well-being as well³. For the purposes of this study, students are defined as all persons under 25: while this also includes some young adults not in school, this serves as the best possible proxy available through the ACS. In twelve of the thirteen counties, students make up between 32% and 37% of the

³ Urban Institute, “Student Transportation and Educational Access”. Published February 2017.

population. The sole outlier is Waller County, where 45% of residents are below the age of 25, as shown in Table 3.

Table 3: Persons Under the Age of 25, by County

County	Population	Population Under 25	Percentage of Population Under 25
Waller	51,832	23,252	45%
Chambers	41,305	15,188	37%
Harris	4,646,630	1,682,673	36%
Fort Bend	765,394	275,183	36%
Walker	72,321	25,724	36%
Liberty	83,702	29,438	35%
Wharton	41,577	14,587	35%
Brazoria	360,677	125,277	35%
Montgomery	571,949	198,575	35%
Matagorda	36,774	12,672	34%
Galveston	332,885	109,718	33%
Colorado	21,224	6,886	32%
Austin	29,764	9,529	32%
13-County Total	7,056,034	2,528,252	36%

Persons with Disabilities

Transportation can be a major barrier to medical care for individuals with disabilities. According to a 2021 report from the National Aging and Disability Transportation Center (NADTC), 5.8 million Americans delayed medical care in 2017 because of a lack of transportation access⁴. Transportation access is a social determinant of health, meaning that access to it can have a significant impact on an individual’s health and well-being. Adults with disabilities make up a growing proportion of residents in nine of

⁴ National Aging and Disability Transportation Center, “Trends Report 2020”. Published August 4, 2021.

the region's thirteen counties, as shown in Table 4. The exceptions to this are Fort Bend and Walker Counties, the two counties with the smallest shares of disabled adults, along with Chambers County and Liberty County, the latter of which has the largest share of its adult population reporting a disability. Four counties report at least 12% of their adult population being disabled, of which only one, Liberty County, is adjacent to Harris County. In general, the most rural counties in the Gulf Coast region are home to disproportionately high percentages of seniors and adults with disabilities, two groups particularly likely to need help getting around. With limited fixed-route transit in these areas, this indicates substantial need for human service transit aimed at seniors and persons with disabilities in these counties.

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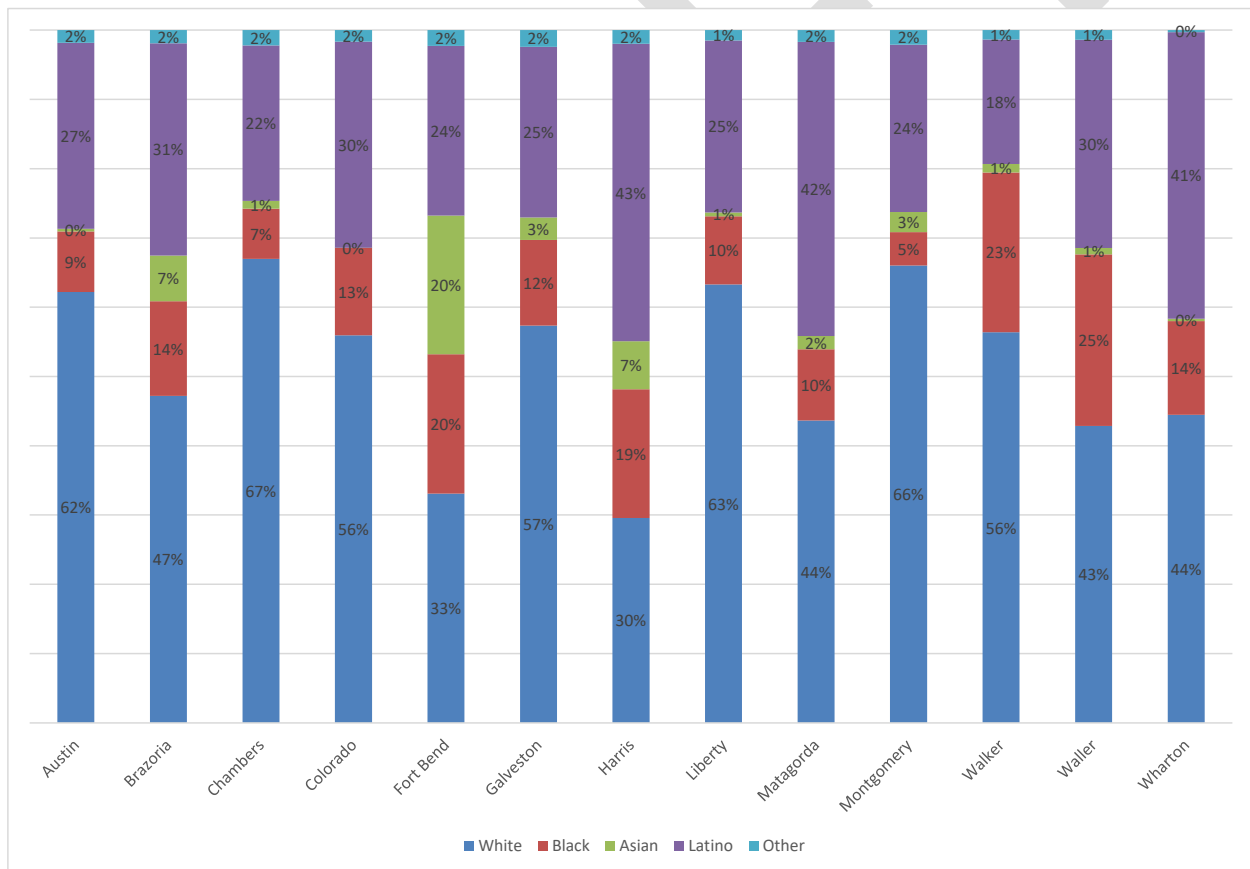
Table 4: Adults with Disabilities in the 13-County Region

County	2019 Population	Population, Aged 18- 64, 2019	Persons with Disabilities, Aged 18-64, 2019	Percent of Population, Aged 18 to 64, with a Disability, 2019	Percent of Population, Aged 18 to 64, with a Disability, 2015
Liberty	83,702	50,975	6,404	12.6%	12.8%
Matagorda	36,774	21,273	2,597	12.2%	10.2%
Austin	29,764	17,055	2,096	12.3%	8.6%
Wharton	41,577	23,856	2,889	12.1%	9.0%
Waller	51,832	33,288	3,521	10.6%	9.3%
Galveston	332,885	205,187	21,703	10.6%	9.5%
Colorado	21,224	11,639	1,183	10.2%	9.0%
Chambers	41,305	25,227	2,035	8.1%	10.2%
Harris	4,646,630	2,928,590	226,241	7.7%	6.6%
Montgomery	571,949	347,268	27,117	7.8%	7.3%
Brazoria	360,677	223,313	15,915	7.1%	6.4%
Fort Bend	765,394	472,379	25,850	5.5%	5.5%
Walker	72,321	52,333	2,254	4.3%	6.1%
13-County Total	7,056,034	4,412,383	339,805	7.7%	7.1%

Race and Ethnicity

Black and Latino Americans are less likely to have access to an automobile, and more likely to rely on public transportation, than their white counterparts. 34% of Black Americans and 27% of Latino Americans use public transportation at least once a week, while only 14% of white Americans do⁵. Figure 1 shows the racial and ethnic breakdown of the Gulf Coast region. Every single county in the region has at least two racial or ethnic groups comprising at least 20% of the county's population. The most diverse counties by this measure are Harris and Fort Bend. This image demonstrates the strong degree of diversity found throughout the region.

Figure 1: Racial and Ethnic Population Breakdown by County



⁵ Anderson, Monica. "Who Relies on Public Transit in the US?" Accessed at <https://www.pewresearch.org/fact-tank/2016/04/07/who-relies-on-public-transit-in-the-u-s/>, 10/26/2021.

Poverty

Multiple studies have found access to jobs to be a key factor in the ability of impoverished households to escape poverty⁶.

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⁶ White, Gillian B. "Stranded: How America's Failing Public Transportation Increases Inequality". Published in The Atlantic, May 16, 2015.

Table 5 shows the percentage of households in each county earning less than half the 13-county median household income. This is used here as a measure of poverty: it goes beyond the standard definition of poverty, to account for households above the poverty line where transportation costs are still a significant burden, while also ensuring for easy comparisons across county lines. In three counties, households earning less than 50% of the regional household median income make up more than 40% of all households, including Walker, Matagorda, and Wharton. The lowest share of these households can be found in Fort Bend County, where they make up just 18% of the county population.

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Table 5: Household Income Status by County

County	Number of Households	Number of Households earning less than 50% of the 13-county median	Percent of households earning less than 50% of the 13-county median
Walker	21,963	9,940	45%
Matagorda	13,848	5,771	42%
Wharton	15,199	6,317	42%
Liberty	26,873	10,253	38%
Colorado	7,450	2,803	38%
Waller	15,171	5,405	36%
Harris	1,605,368	524,406	33%
Austin	11,301	3,635	32%
Galveston	121,438	34,487	28%
Chambers	14,069	3,724	26%
Montgomery	198,649	46,643	23%
Brazoria	121,523	28,503	23%
Fort Bend	237,883	42,215	18%
13-County Total	2,410,735	724,102	30%

Vehicle Availability

Households without reliable vehicle access depend on transportation services to meet their daily needs. While most households in the Gulf Coast region report having access to an automobile, a small percentage of households in every county do not. The percentage of households without access to a car range from, at most, 6.7% in Wharton County, to just 2.2% in Fort Bend County. These figures are shown in Table 6.

Table 6: Households in 13-County Region Without Access to an Automobile

County	Number of Households	Number of Households Without Access to an Automobile	Percent of Households without Access to an Automobile
Wharton	15,199	1,020	6.7%
Liberty	26,873	1,616	6.0%
Harris	1,605,368	95,961	6.0%
Matagorda	13,848	763	5.5%
Colorado	7,450	401	5.4%
Galveston	121,438	6,231	5.1%
Austin	11,301	560	5.0%
Walker	21,963	1,022	4.7%
Waller	15,171	525	3.5%
Chambers	14,069	460	3.3%
Montgomery	198,649	6,375	3.2%
Brazoria	121,523	3,619	3.0%
Fort Bend	237,883	5,281	2.2%
13-County Total	2,410,735	123,834	5.1%

English-Language Proficiency

Language barriers can also be transportation barriers, particularly if vital information about transportation services is not available in a language the person can understand. The percentage of residents of each county that speak English “less than very well” is shown in Table 7. This percentage is highest in Harris County, where one in five residents speaks English less than very well. Waller and Fort Bend Counties each have just over one in ten of their residents speaking English less than very well. In every other county, this proportion stands between five and nine percent.

Table 7: English Language Ability of 13-County Area Residents, by County

County	Population	Number of Persons Speaking English Less than Very Well	Percentage of Persons Speaking English Less than Very Well.
Harris	4,646,630	871,980	19%
Fort Bend	765,394	92,774	12%
Waller	51,832	5,953	11%
Wharton	41,577	3,636	9%
Matagorda	36,774	3,193	9%
Austin	29,764	2,379	8%
Liberty	83,702	6,190	7%
Brazoria	360,677	26,639	7%
Montgomery	571,949	39,791	7%
Colorado	21,224	1,374	6%
Walker	72,321	4,471	6%
Galveston	332,885	19,740	6%
Chambers	41,305	2,185	5%
13-County Total	7,056,034	1,080,305	15%

Veterans

Access to transportation is an obstacle for many veterans in access to medical care and other vital services: in a 2020 survey of veterans by the Texas Veterans Commission, 39% of veterans cited transportation as a barrier to accessing services such as healthcare and housing support⁷. The percentage of the population that are veterans is relatively static across counties, as shown in Table 8. In each county, veterans make up between three and seven percent of the population.

⁷ Texas Veterans Needs Assessment 2020: Comprehensive Study Findings. Texas Veterans Commission and Texas A&M University Public Policy Research Institute. Published March 2021.

Table 8: Veterans as Percentage of Total Population

County	Total Population	Number of Veterans	Veteran Share of Population
Walker	72,321	4,939	7%
Matagorda	36,774	2,402	7%
Liberty	83,702	5,459	7%
Galveston	332,885	21,542	6%
Chambers	41,305	2,313	6%
Montgomery	571,949	31,634	6%
Brazoria	360,677	17,565	5%
Colorado	21,224	1,002	5%
Austin	29,764	1,319	4%
Wharton	41,577	1,836	4%
Waller	51,832	1,828	4%
Harris	4,646,630	159,618	3%
Fort Bend	765,394	25,993	3%
13-County Total	7,056,034	277,450	4%

Current Transit Availability

Within the 13-county region, there are areas in which frequent fixed-route transit is already provided, areas with limited fixed-route service, and areas with no fixed-route transit at all. For the purposes of this analysis, “fixed-route transit” includes local bus services, commuter bus services and other park-and-ride based bus services, as well as light rail services operated by Houston METRO. Analyzing the availability of fixed-route service, and in particular where fixed-route service is provided in relation to communities likely to need transportation service, can provide important information about the demand for transportation services in the 13-county region. In this section, these analyses are performed spatially. Demographic data comes from the American

Community Survey (ACS), using the most recent five-year data available, 2015-2019. Natural breaks are used to show areas where members of key communities of concern are concentrated.

Total Population

Figure 2 shows overall population per census tract, while Figure 3 shows the same metric with a focus on Harris County, where higher population density leads to tracts that are too small to be discernable at the regional scale. While there is substantial density throughout the urban core, where there is extensive fixed-route service, there are also notable high-population tracts outside the urban core, particularly to the northwest, west, and southwest of central Houston. Many of these tracts have limited fixed-route service. However, consider that some of these tracts southwest of Houston are located in Fort Bend County, which has a demand-response transit option covering the entire county.

Figure 2: Total Population by Census Tract

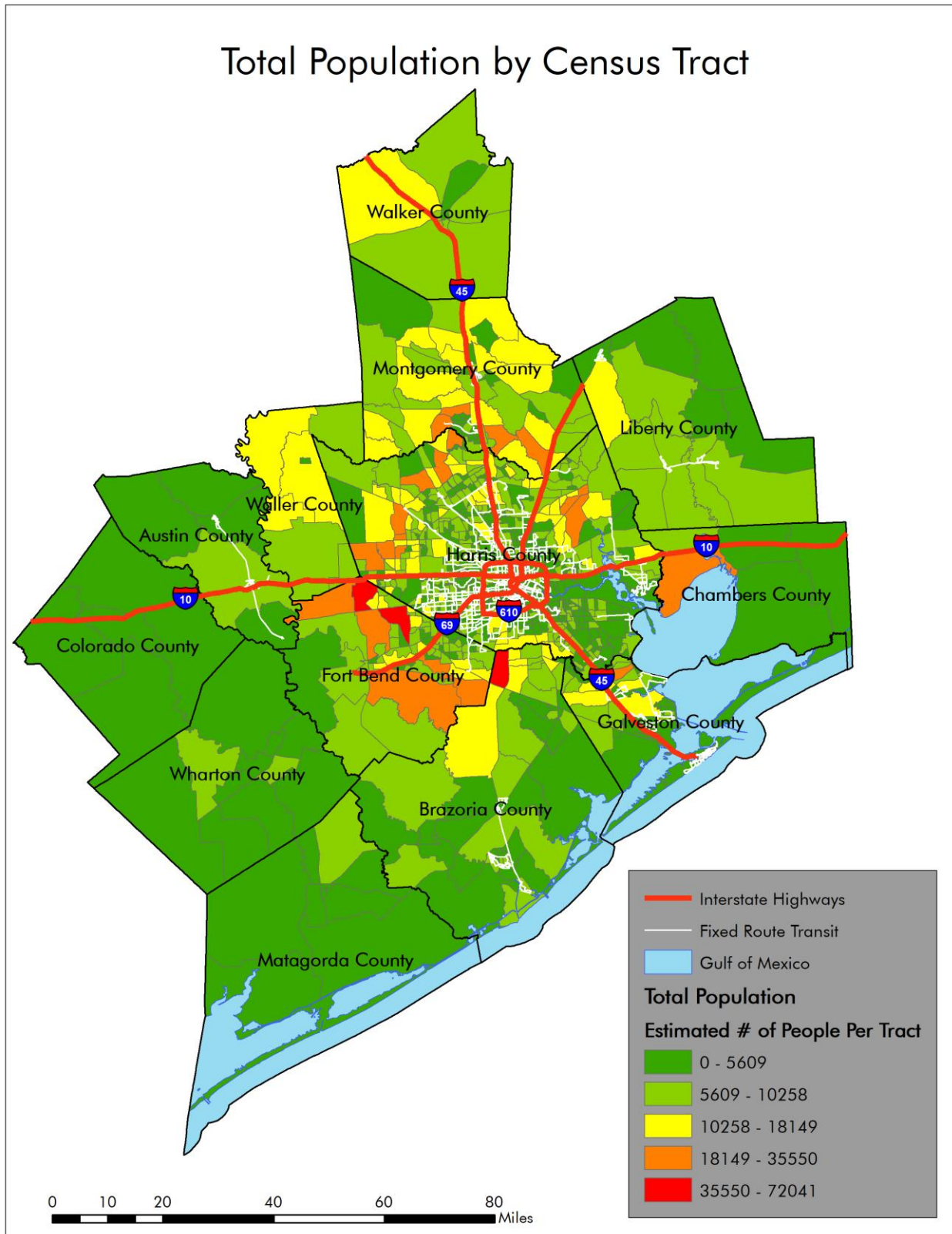
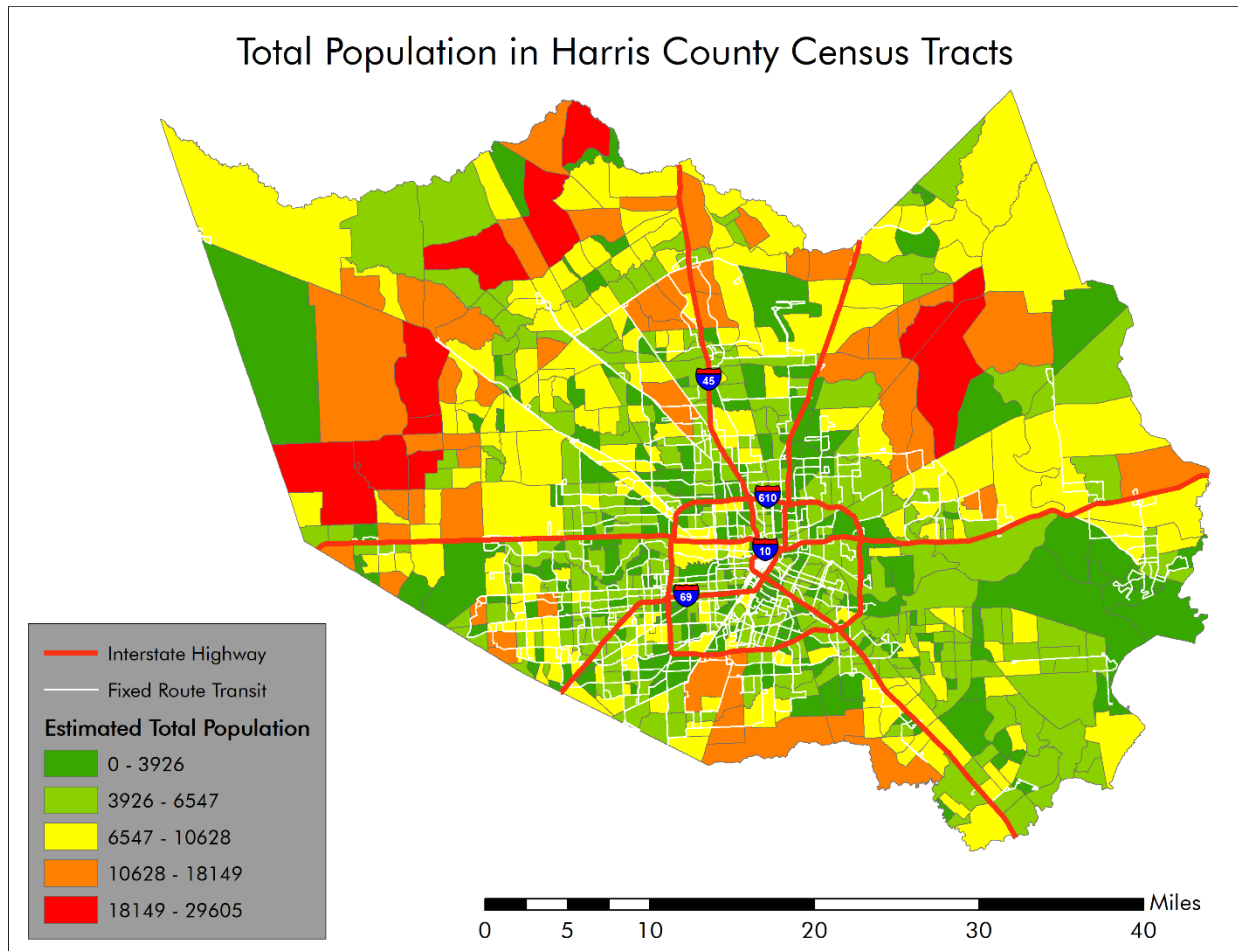


Figure 3: Total Population by Census Tract, Harris County



Seniors

Figure 4 shows the number of individuals over the age of 65 in each census tract in the 13-county region, while Figure 5 shows the same information for Harris County. Within Harris County, notable concentrations of seniors can be found in the northeast and northwest of the county. Elsewhere in the region, there are also large populations of seniors in the north of the region, in Walker and Montgomery Counties, as well as in areas of Fort Bend and Brazoria Counties near their borders with Harris County. Many of these areas have little or no fixed-route service.

Figure 4: Senior Population by Census Tract

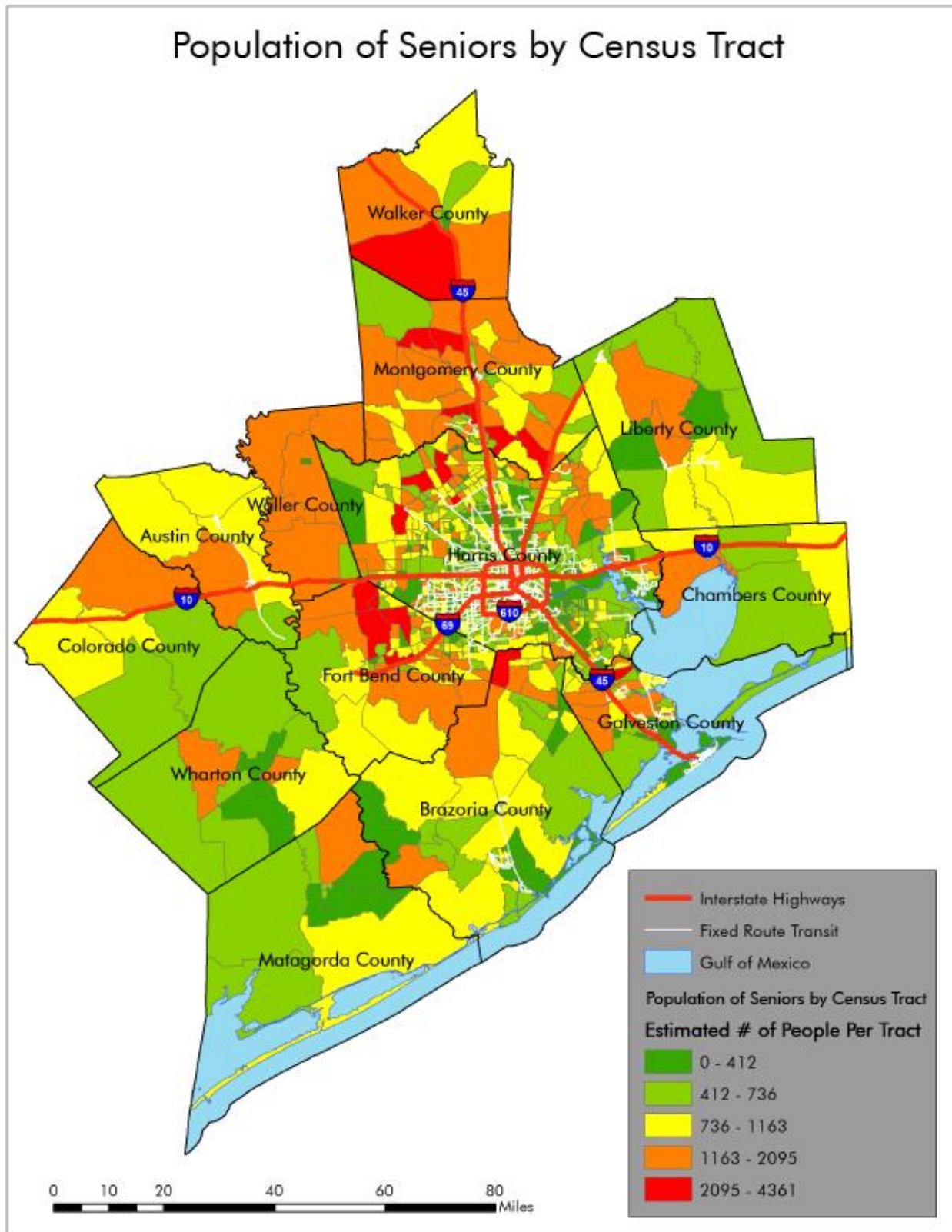
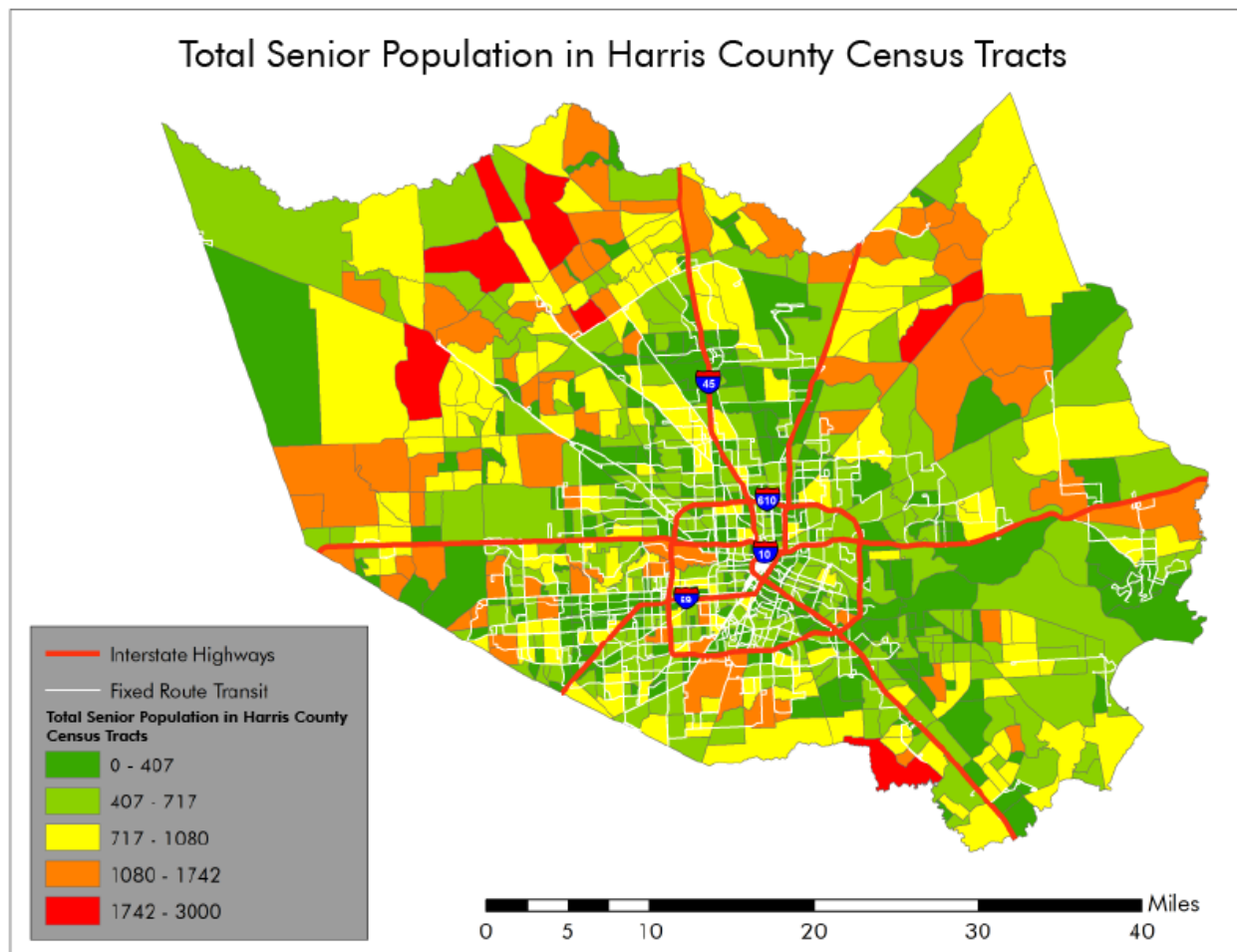


Figure 5: Senior Population by Census Tract, Harris County



Students

Figure 6 and Figure 7 shows the number of individuals under the age of 25 in the 13-county region and in Harris County, respectively. While not all of these people are students, the vast majority will be enrolled in an educational institution of some kind, whether that be a K-12 school, or an institute of higher education. Within Harris County, this population is concentrated at the county's fringes, particularly on the northwest, northeast, and south. Many of these areas have little or no fixed-route transit service. Outside of Harris County, young people are concentrated in rapidly suburbanizing parts of Fort Bend, Chambers, and Montgomery Counties. These areas also have little or no fixed-route transit service.

Figure 6: Youth Population by Census Tract

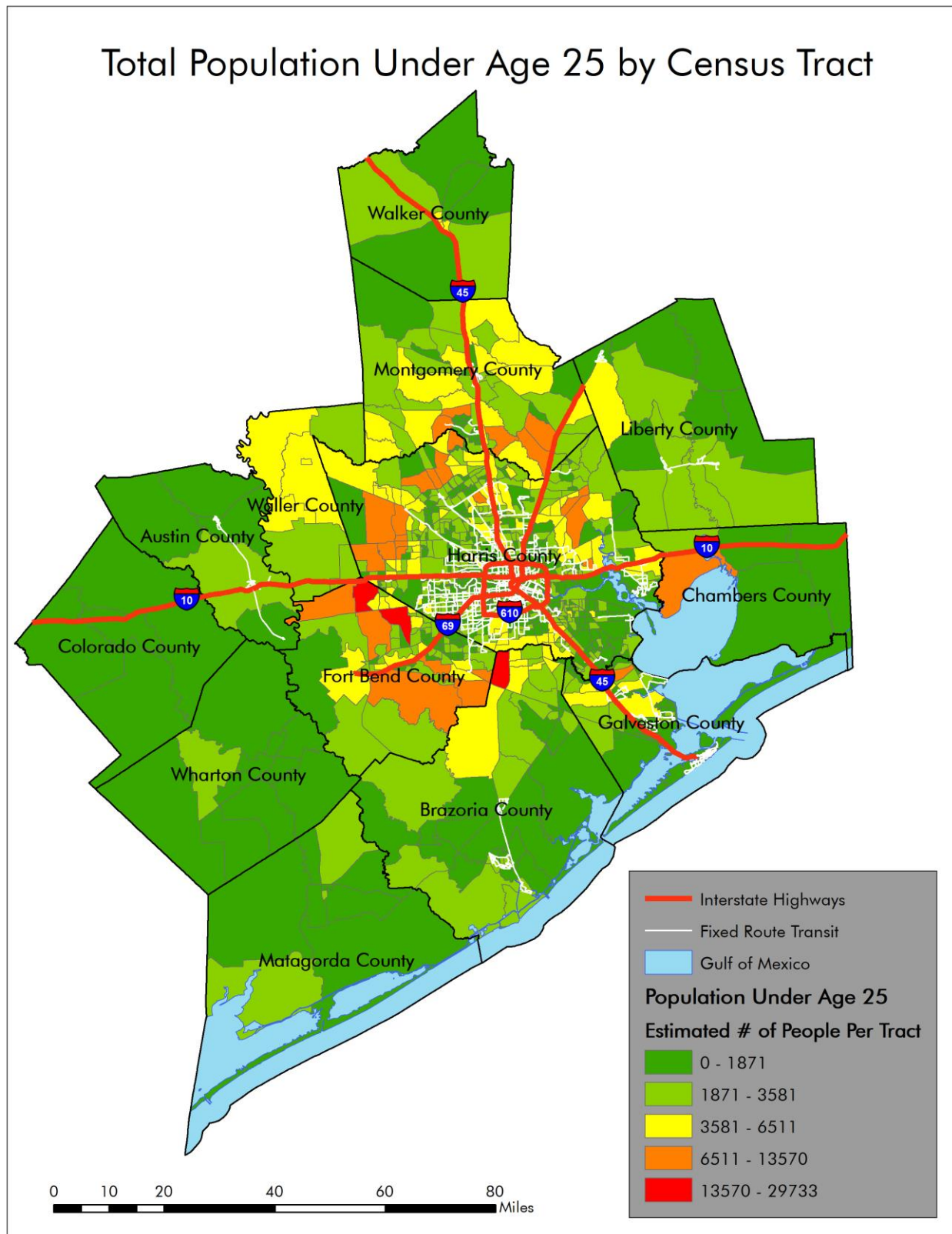
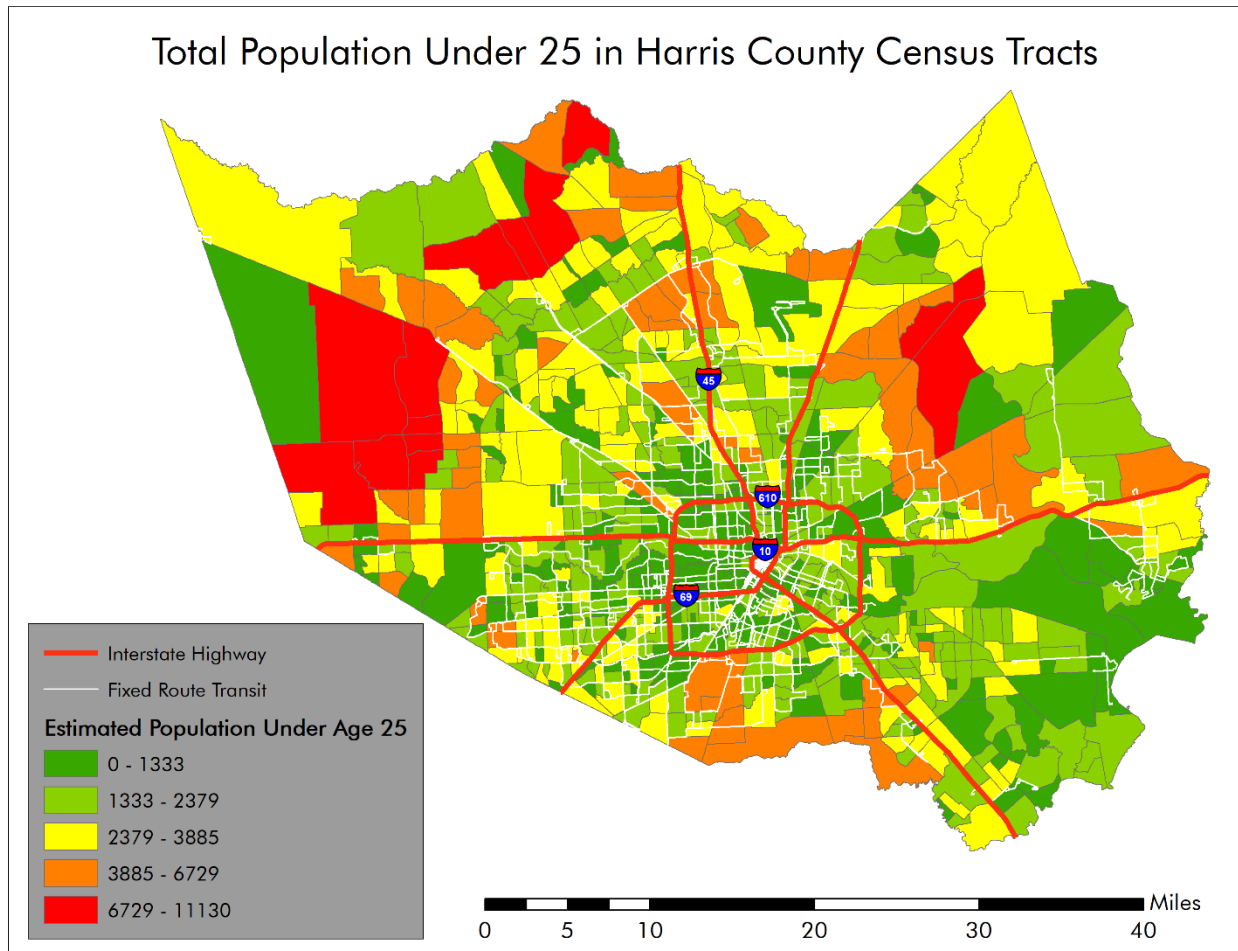


Figure 7: Youth Population by Census Tract, Harris County



Persons with Disabilities

Figure 8 and Figure 9 show populations of individuals with disabilities in the region as a whole and in Harris County, respectively. Persons with disabilities live throughout the region. Higher population concentrations live near the northern, eastern, and southern fringes of Harris County. Outside of Harris County, higher numbers of persons with disabilities live in Waller, Montgomery, and Liberty counties, though significant populations can be found in Fort Bend, Brazoria, and Matagorda as well. Both within and outside Harris County, these census tracts have little fixed-route service.

Figure 8: Disabled Population by Census Tract

Total Persons with Disabilities by Census Tract

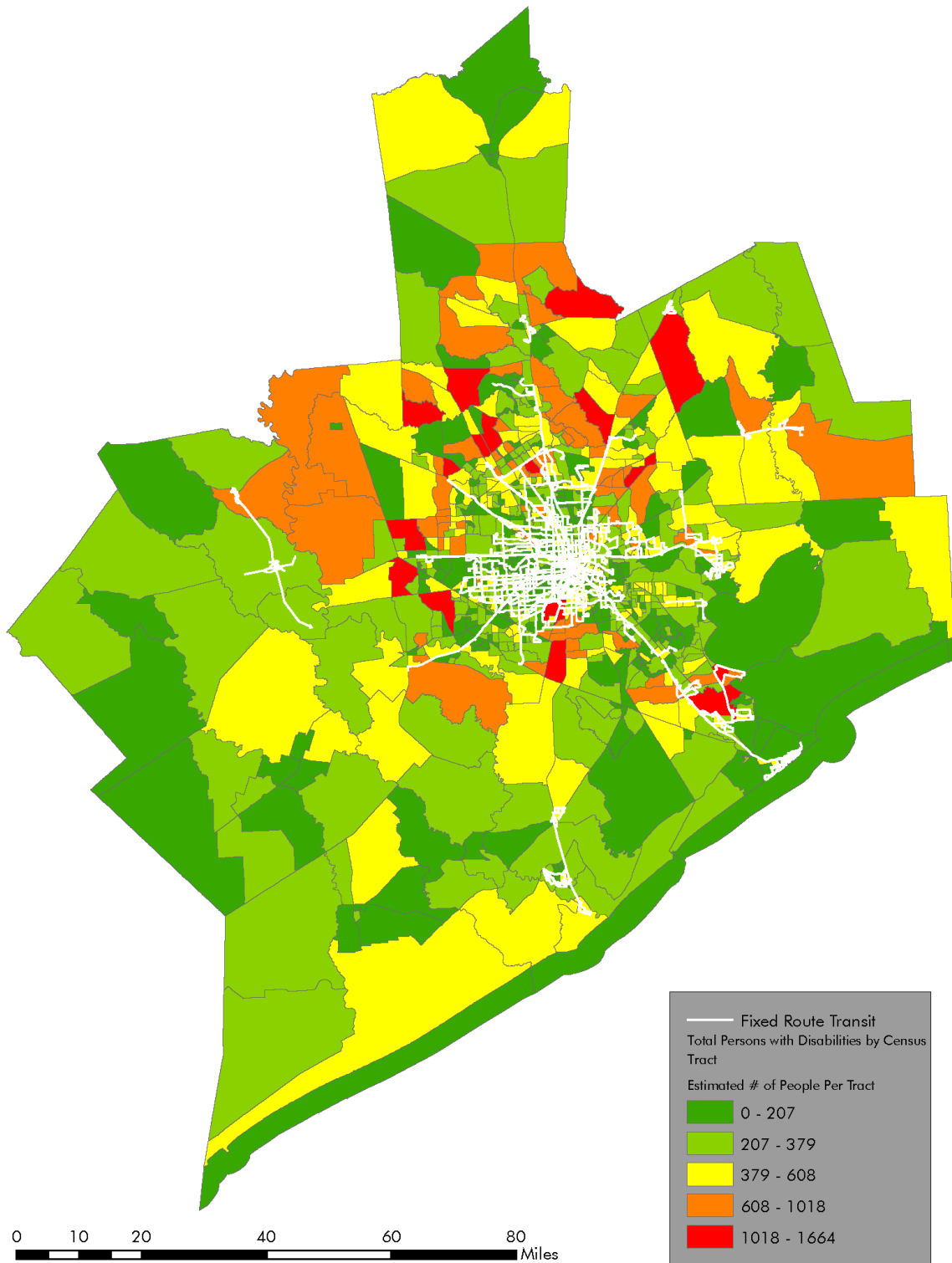
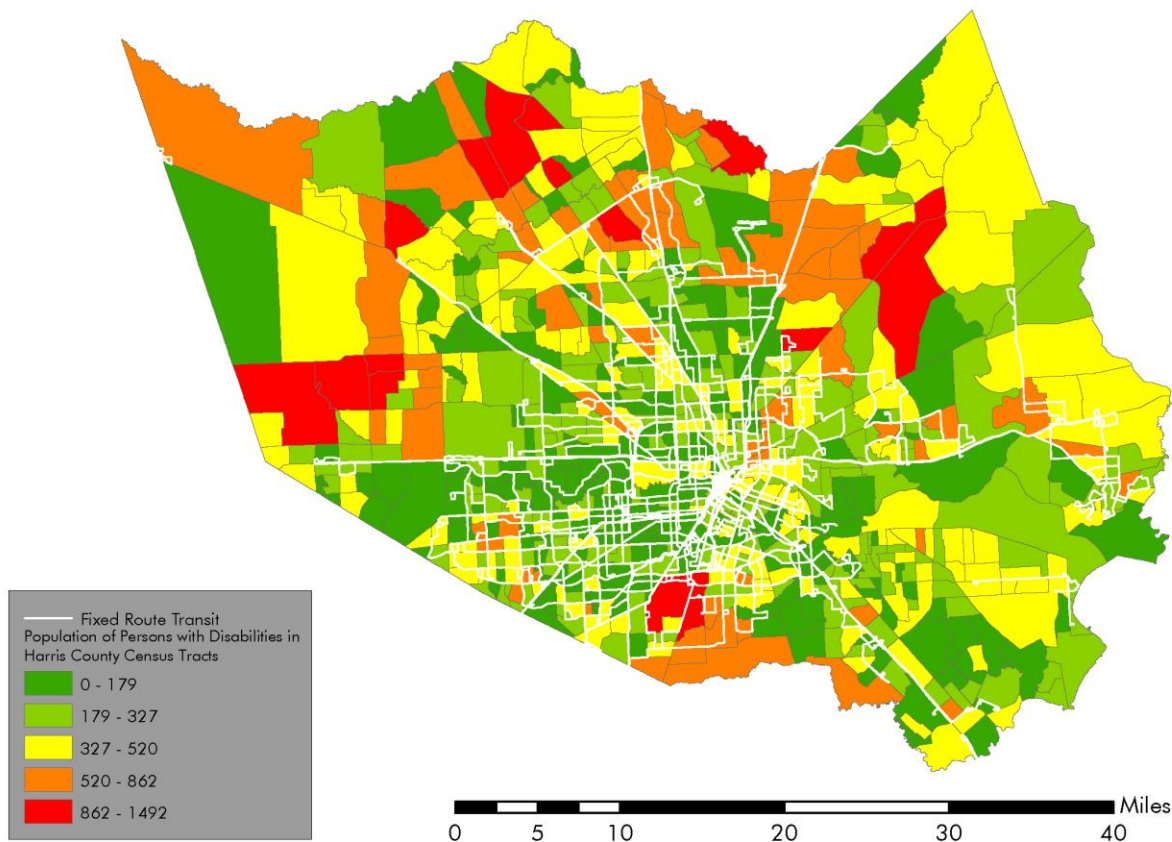


Figure 9: Disabled Population by Census Tract in Harris County

Population of Persons with Disabilities in Harris County Census Tracts



Race and Ethnicity

Figure 10 shows the location of Asian populations in the 13-county region, while Figure 11 provides the same data for Harris County alone. Within Harris County, Asian communities are concentrated in the northwest, west, and southwest, with additional pockets in the south and southeast. Outside of Harris County, Asian communities are heavily concentrated in Fort Bend County, particularly those parts of the county closest to Harris County. Very few are located in outlying communities, nor in areas to the north or east of central Houston. Many of the tracts with large concentrations of Asian communities, particularly those further from the region's core, offer little or no fixed-route transit service.

Figure 10: Asian Population by Census Tract

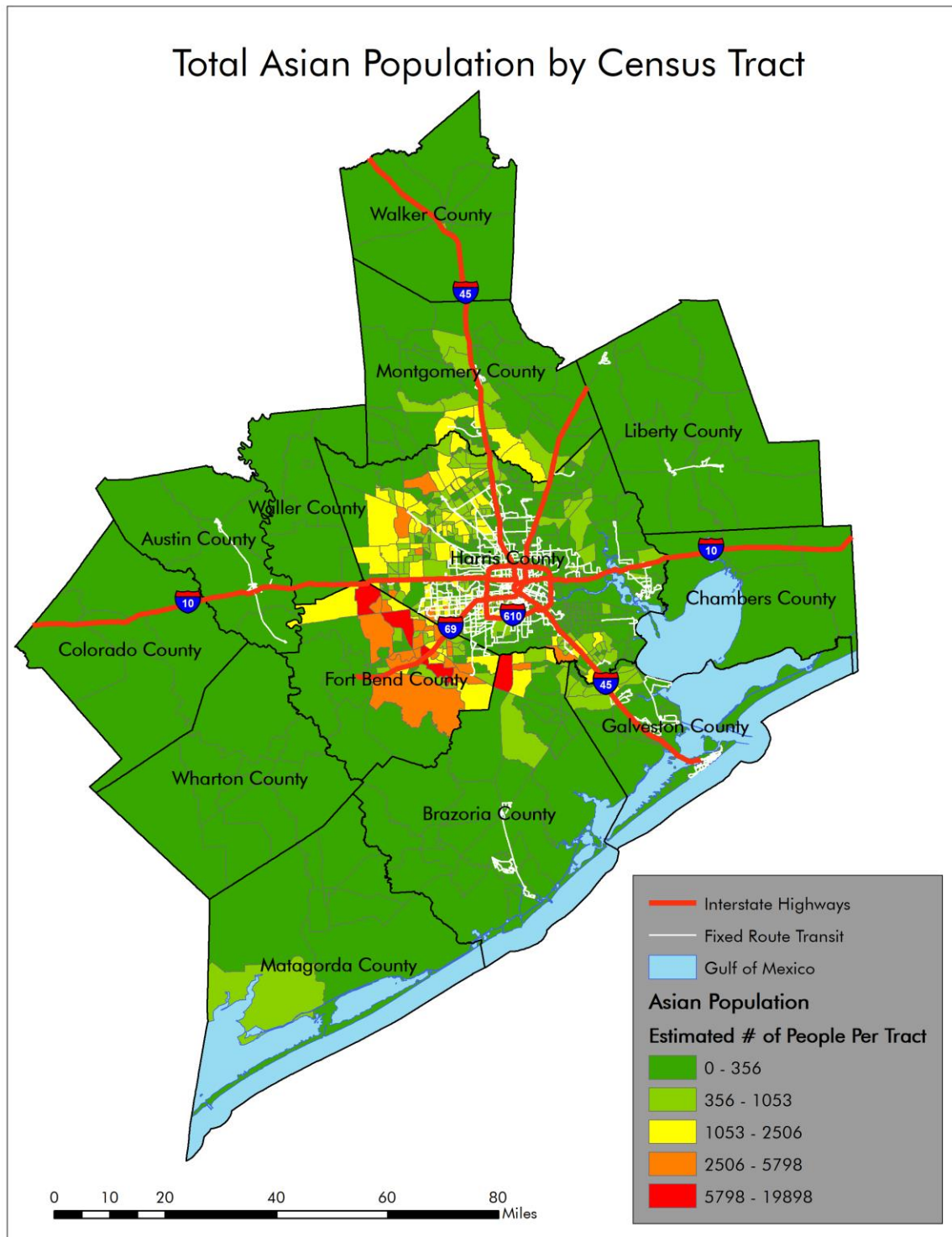


Figure 11: Asian Population by Census Tract, Harris County

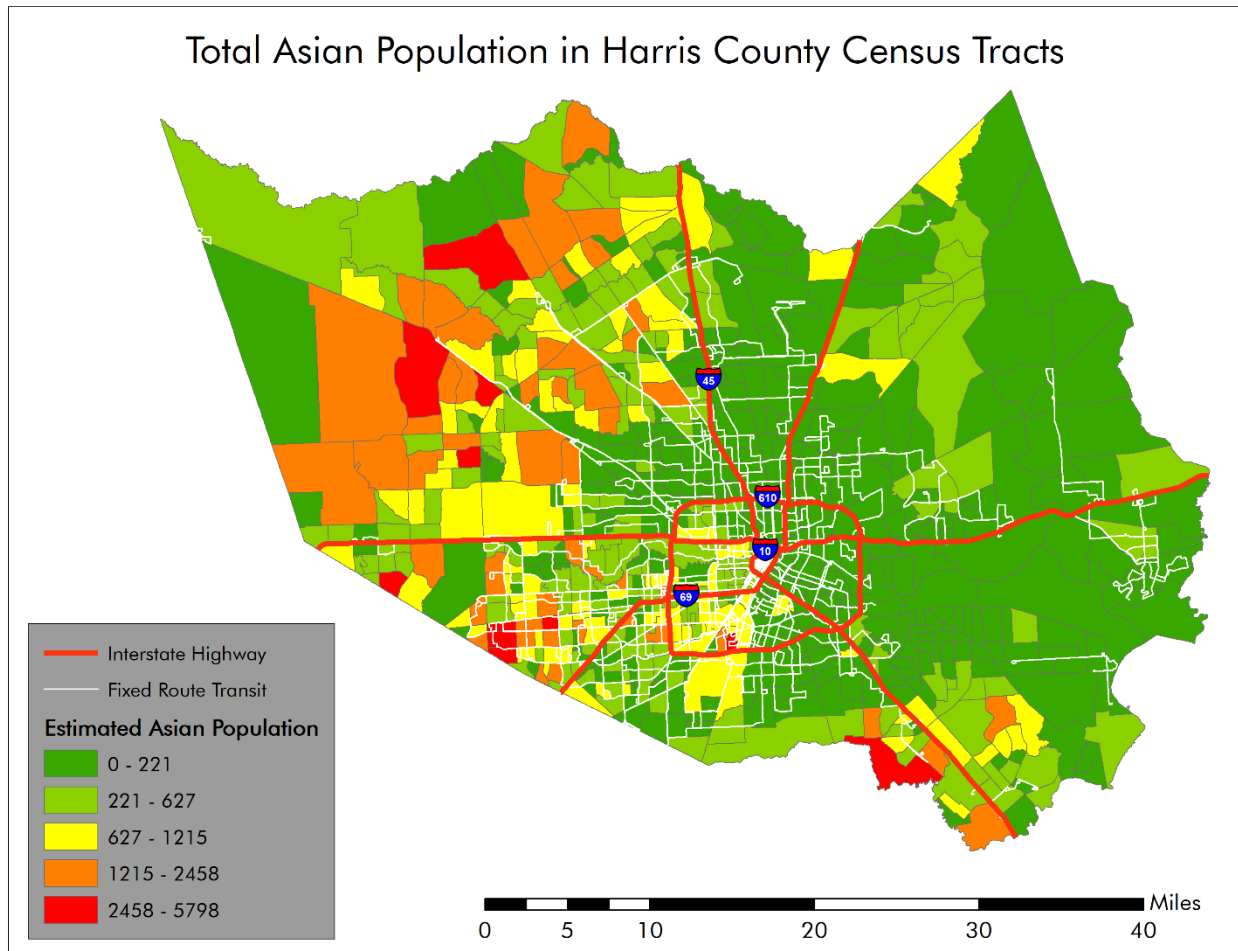


Figure 12 shows the concentrations of Black or African American people throughout the 13-county region, while Figure 13 shows the same data for Harris County tracts. Within Harris County, the largest populations of these residents can be found in areas north, northeast, and south of the urban core, with additional populations found in the western edge of the city. Outside of Harris County, substantial Black or African American populations are also found in the west and southwest suburbs, as well as in parts of outlying counties such as Waller in the west, Walker in the north, and Liberty in the northeast of the region. Many of these areas, particularly those further from the region's core, have little or no fixed-route transit.

Figure 12: Black Population by Census Tract

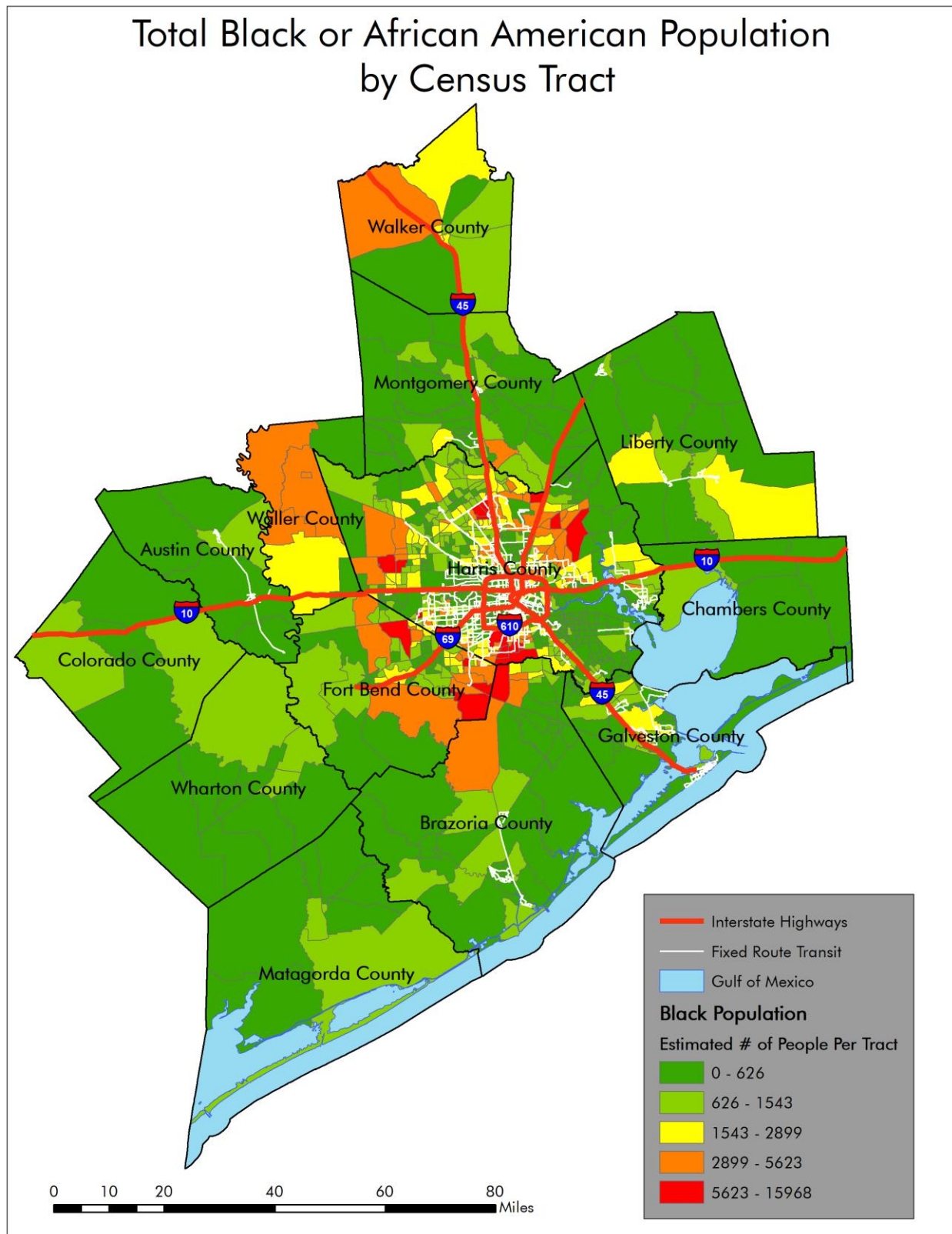


Figure 13: Black Population by Census Tract, Harris County

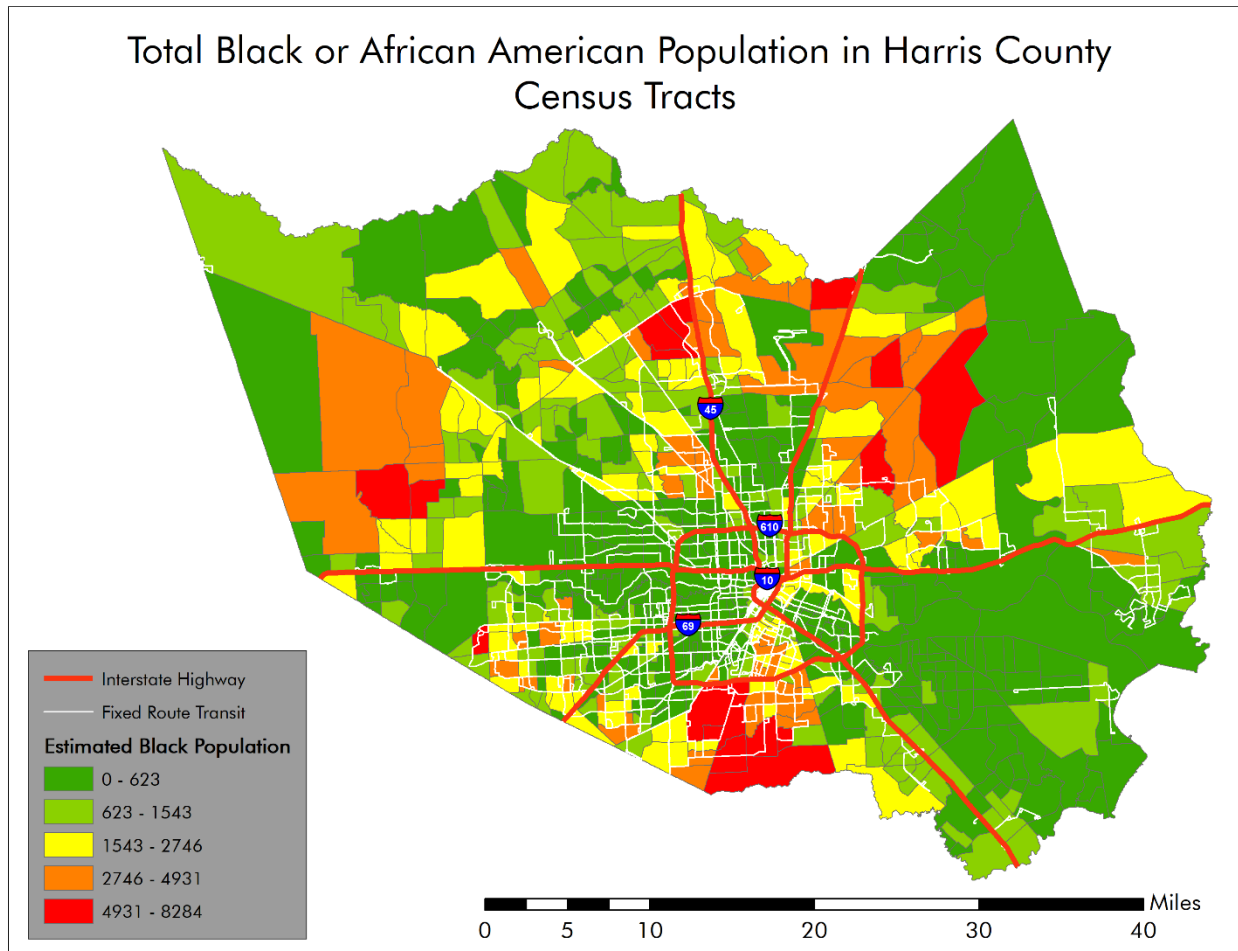


Figure 14 shows the concentrations of Latino individuals throughout the 13-county region, while Figure 15 shows the same figures for Harris County census tracts. Significant numbers of Latinos can be found throughout Harris County and the entire region: Within Harris County, concentrations can be found to the north, east, and southeast of downtown Houston, as well as in some outlying areas in the county's far west. Some, but not all, of these areas are served by existing fixed routes, with the areas in the northeast and far west of the county seeing the least service. Outside of Harris County, significant Latino populations can be found in some of the more rural parts of the region, in Montgomery, Liberty, and Chambers counties, as well as in suburban communities in the west and southwest. These communities have little or no access to fixed-route transit.

Figure 14: Latino Population by Census Tract

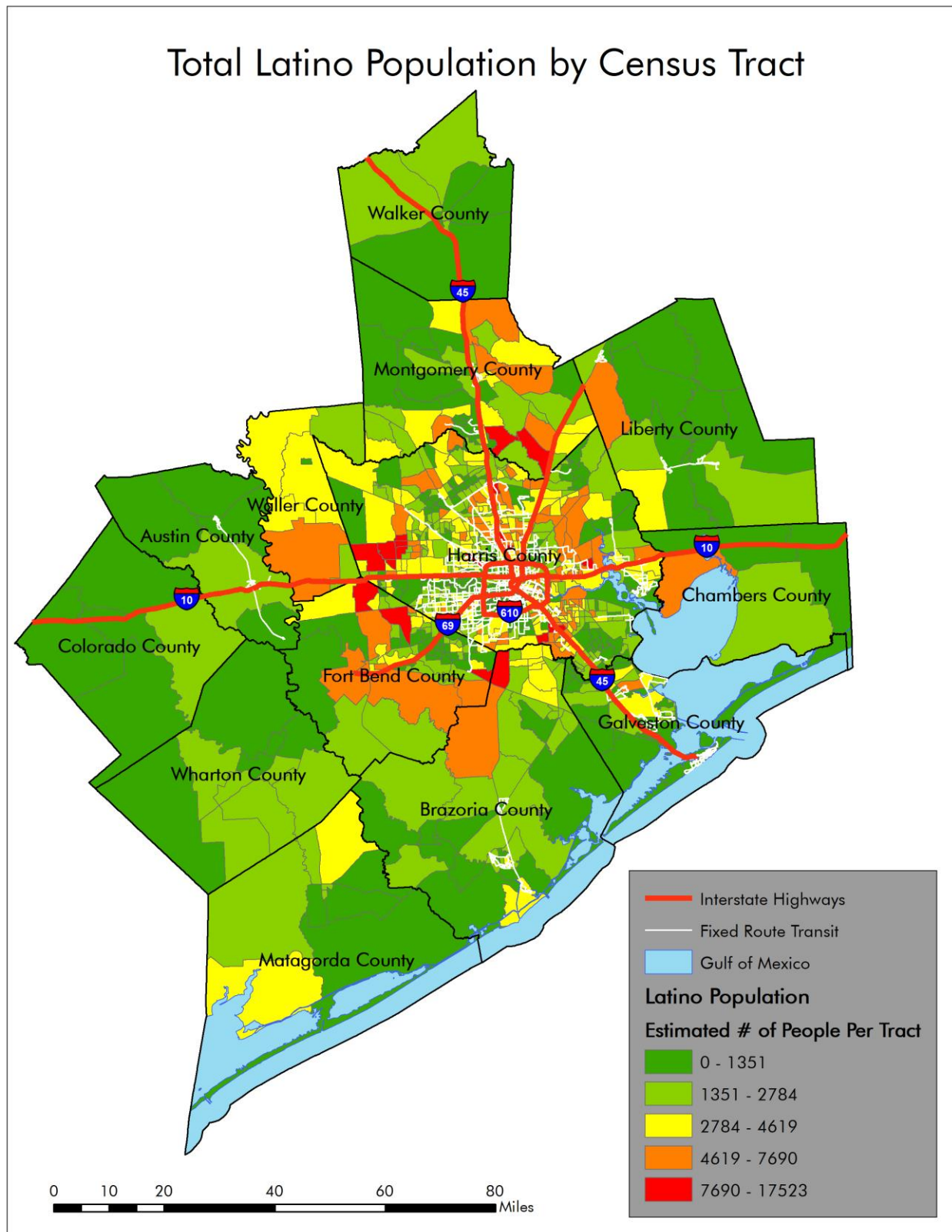
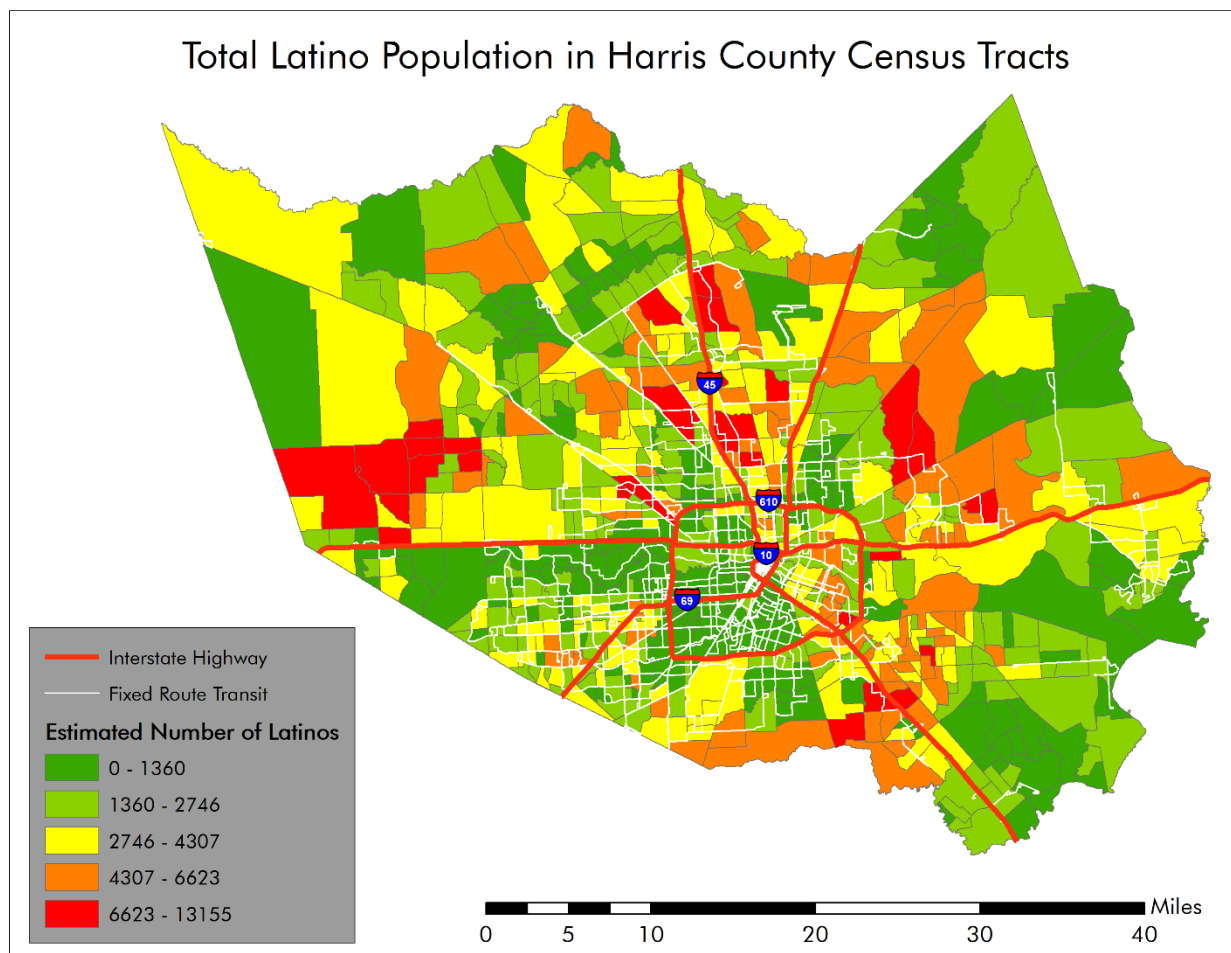


Figure 15: Latino Population by Census Tract, Harris County



Poverty

Figure 16 and Figure 17 show the number of households with low incomes for the 13-county region and Harris County, respectively. For the purposes of this analysis, “low-income” is defined as less than 50% of the 13-county median income. This measure is used to ensure a consistent definition of “low-income” that fits the entire 13-county region, in which some areas have much higher median incomes than others. According to the 2019 ACS, the median household income for the 13-county region is \$78,352 per year, meaning that households categorized as “low-income” here bring in less than \$39,176 annually. Within Harris County, households with lower income are concentrated in pockets throughout the south and southwest parts of the county, with larger swathes of lower-income areas covering much of the county’s north and northeast. Most of these areas have at least some fixed-route service, with the notable

exception of the northeast part of the county. Outside Harris County, households with lower income are most common in Waller, Montgomery, and Chambers counties, with additional pockets in Galveston, Brazoria, and Matagorda counties. Partially, because these areas are less urbanized, they have little or no fixed-route transit availability.

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Figure 16: Low-Income Population by Census Tract

Total Low-Income Households by Census Tract

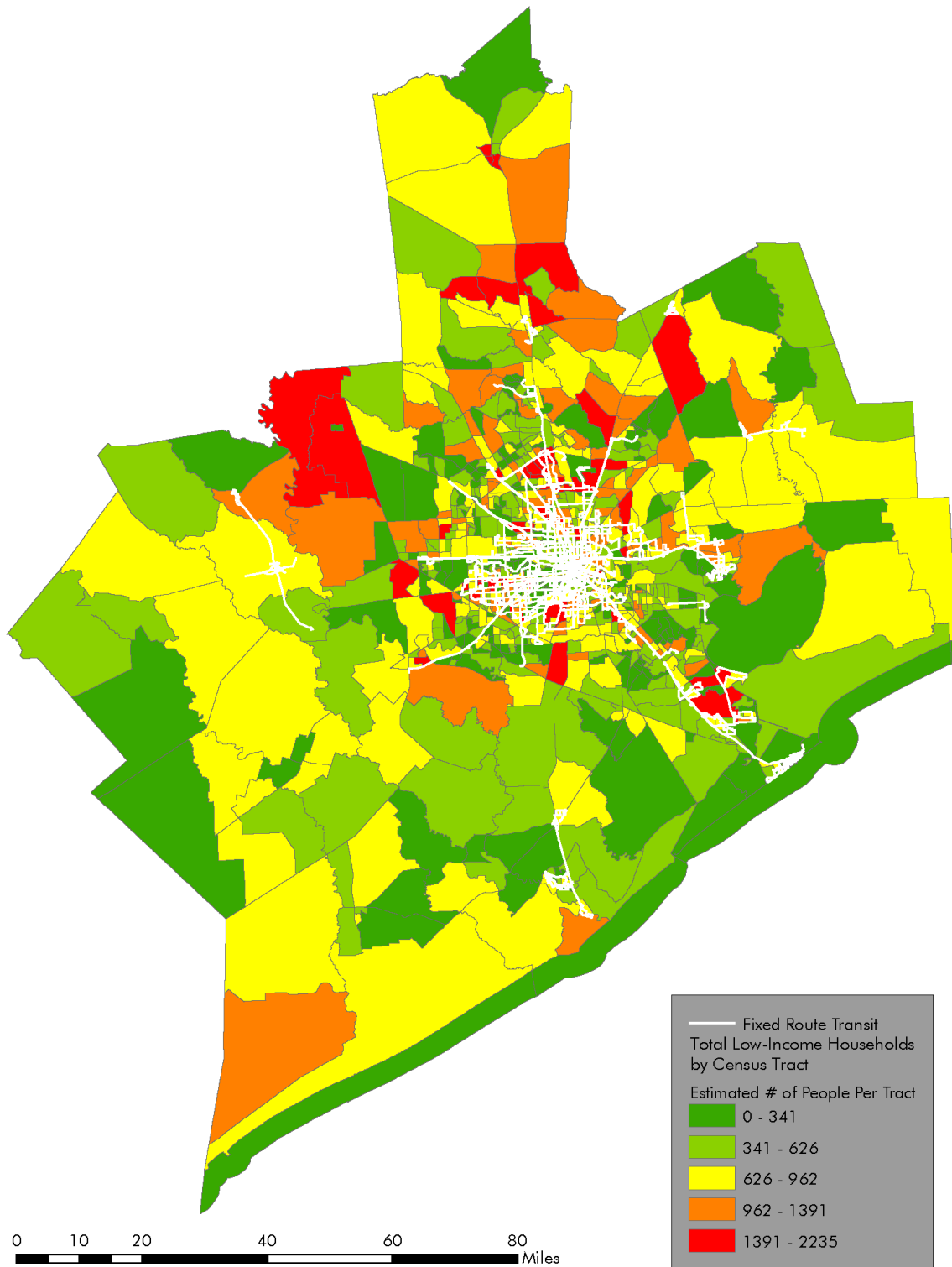
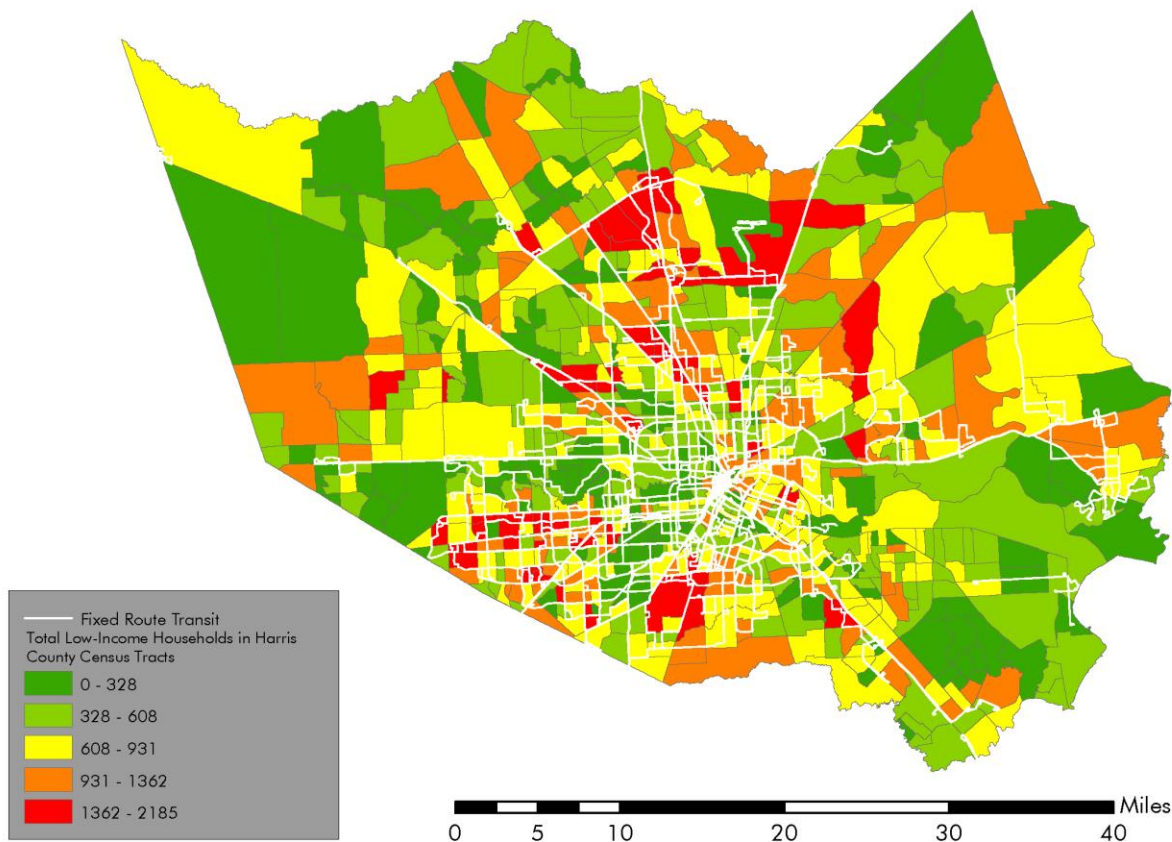


Figure 17: Low-Income Population by Census Tract, Harris County

Total Low-Income Households in Harris County Census Tracts



Vehicle Availability

Figure 18 shows the number of households without a car, by census tract, for the entire 13-county region, while the same metric for Harris County alone is shown in Figure 19. Within Harris County, concentrations of households without cars are found in pockets throughout the county, though many are in or near the urban core. Most of these pockets have at least some access to fixed-route transit, with the most notable exceptions being in the northern part of the county. Outside Harris County, areas with concentrations of zero-car households include the League City area in Galveston County, as well as rural parts of Waller and Liberty Counties. These areas have limited access to fixed-route transit services.

Figure 18: Households without Cars by Census Tract

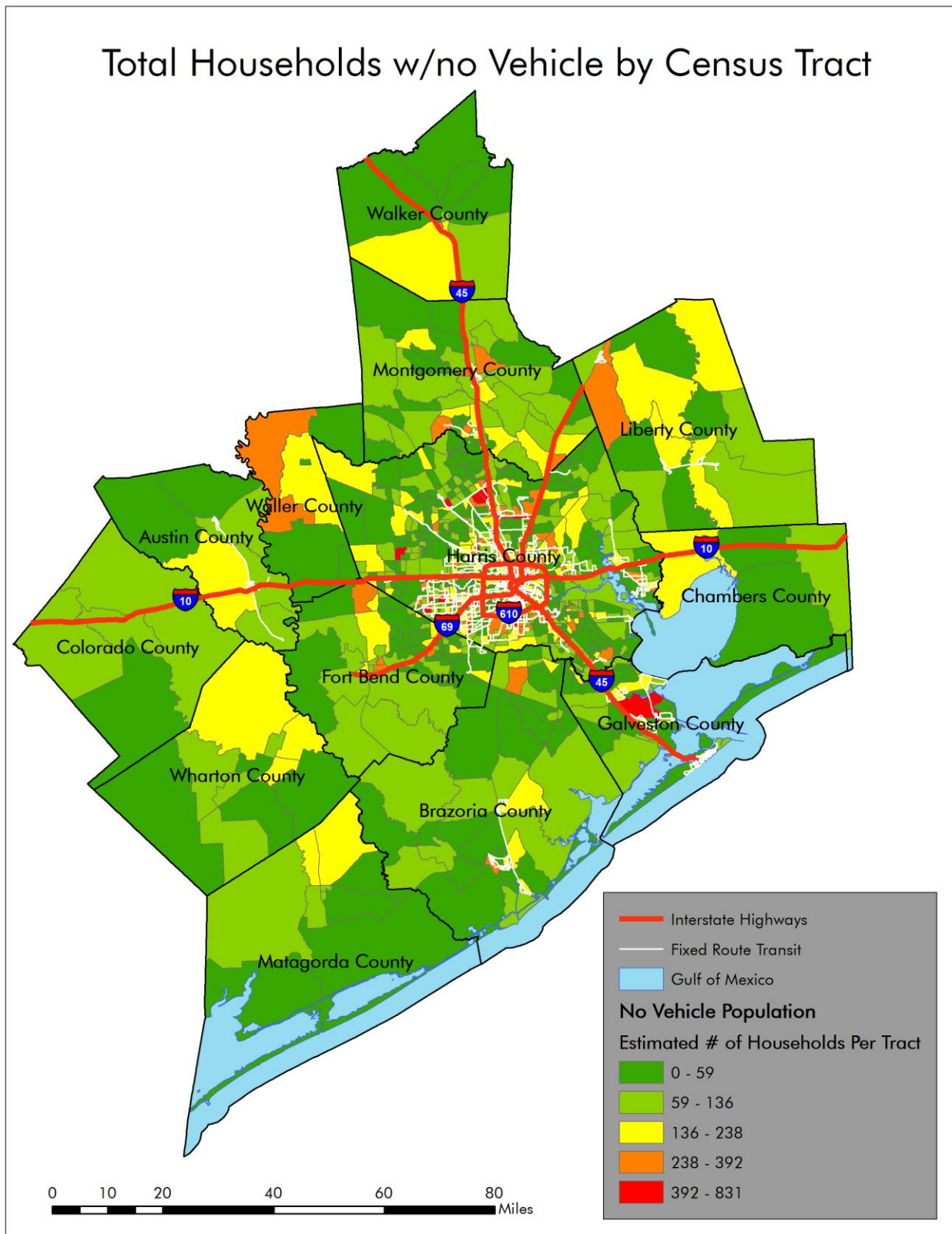
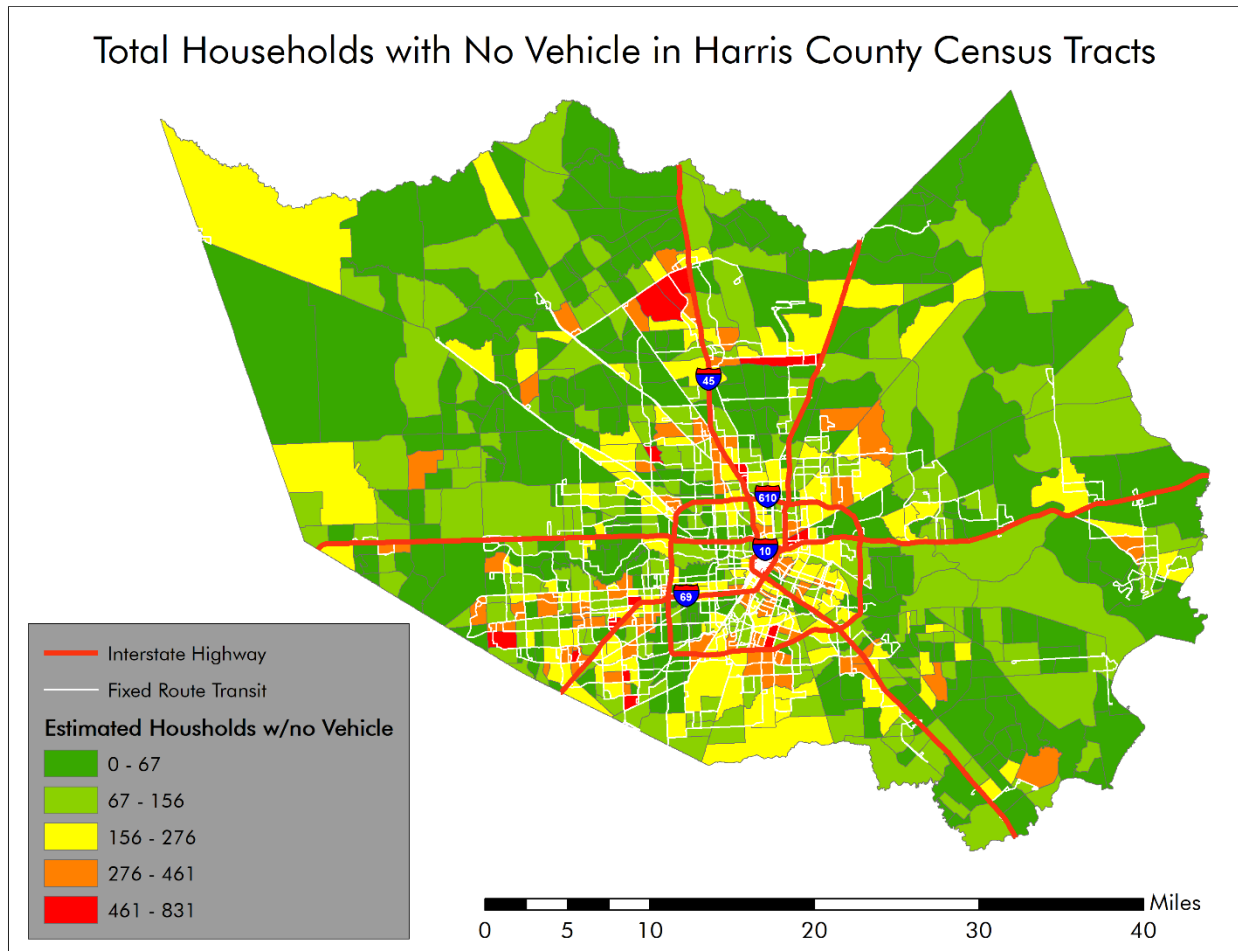


Figure 19: Households without Cars by Census Tract, Harris County



English-Language Proficiency

Figure 20 shows where concentrations of individuals not proficient in English can be found in the 13-county region, while Figure 21 shows the same data for Harris County. Within Harris County, these communities are concentrated north of downtown Houston, as well as in areas west and southwest of the city center. Outside of Harris County, these populations are concentrated in parts of Fort Bend and Montgomery Counties. Some of these areas, most notably north and southwest Houston, have access to fixed route service, the areas in the west of Harris County and in Montgomery County have much less access to fixed-route transit.

Figure 20: Limited English Proficiency Population by Census Tract

Individuals with Limited English Proficiency by Census Tract

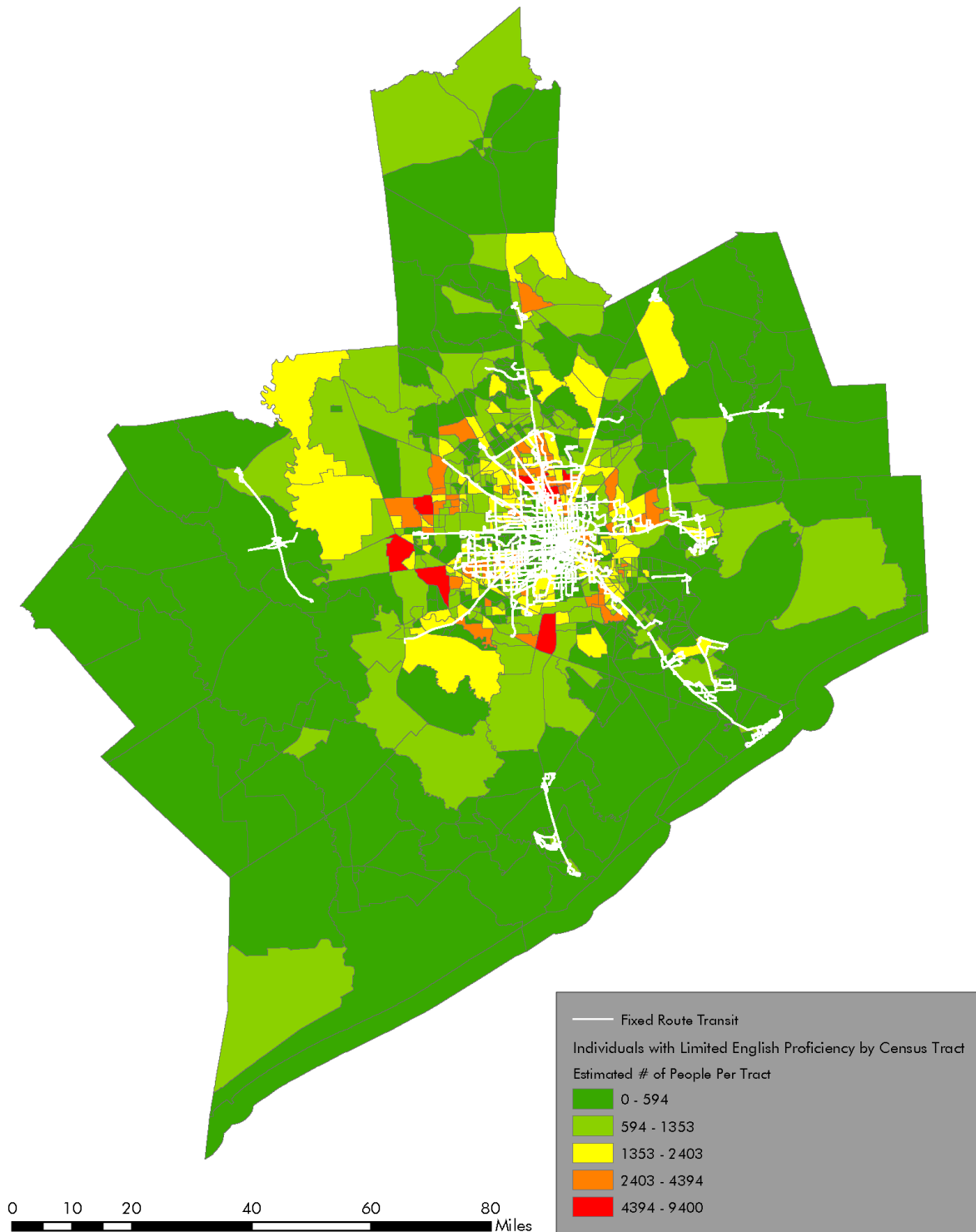
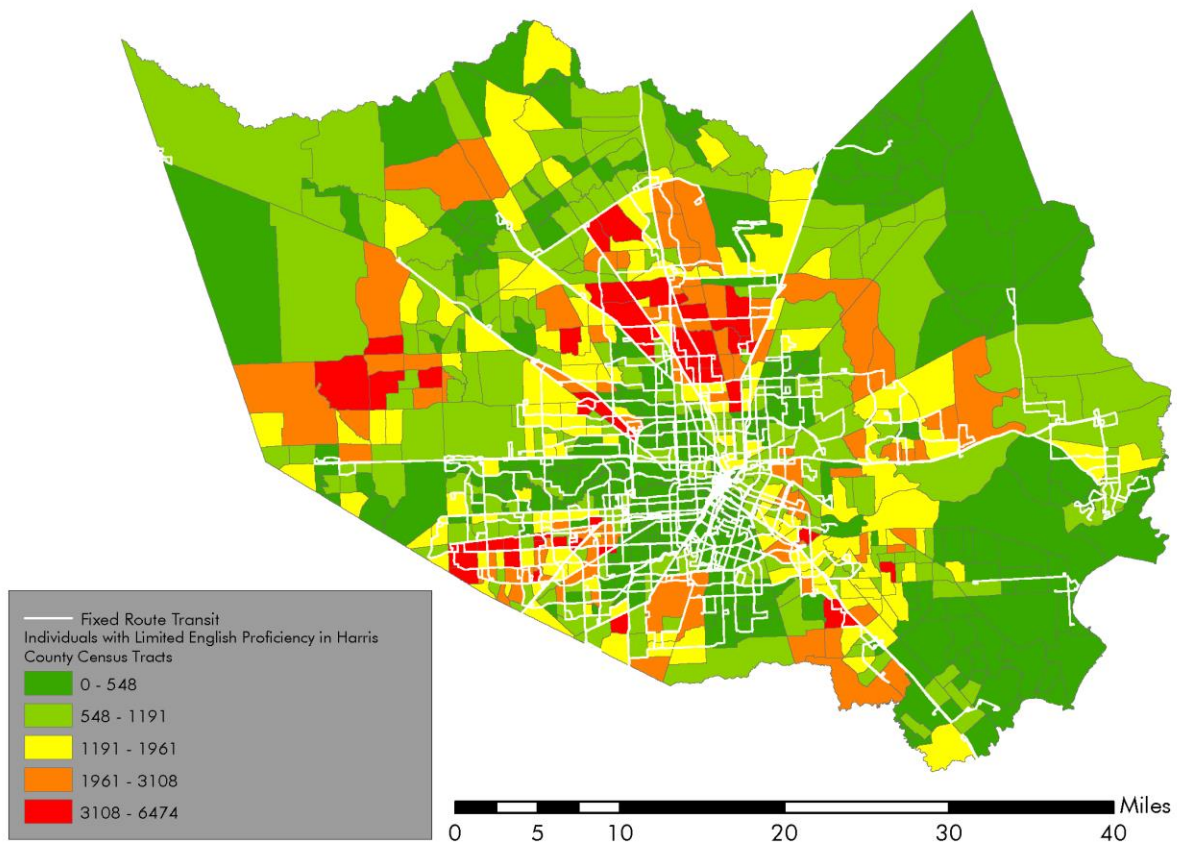


Figure 21: Limited English Proficiency Population by Census Tract, Harris County

Individuals with Limited English Proficiency in Harris County Census Tracts



Veterans

Figure 22 shows concentrations of veterans in the entire 13-county region, while Figure 23 shows the same metric for Harris County. There are notable concentrations of veterans in Montgomery, Chambers, Liberty, and Walker counties in the north and east of the region, while similar concentrations can also be found in Fort Bend and Matagorda counties to the south of Houston. Within Harris County, these concentrations are highest at the fringes of the county, most notably in the north, northeast, and northwest. Very little fixed-route service is available in these locations.

Figure 22: Veteran Population by Census Tract

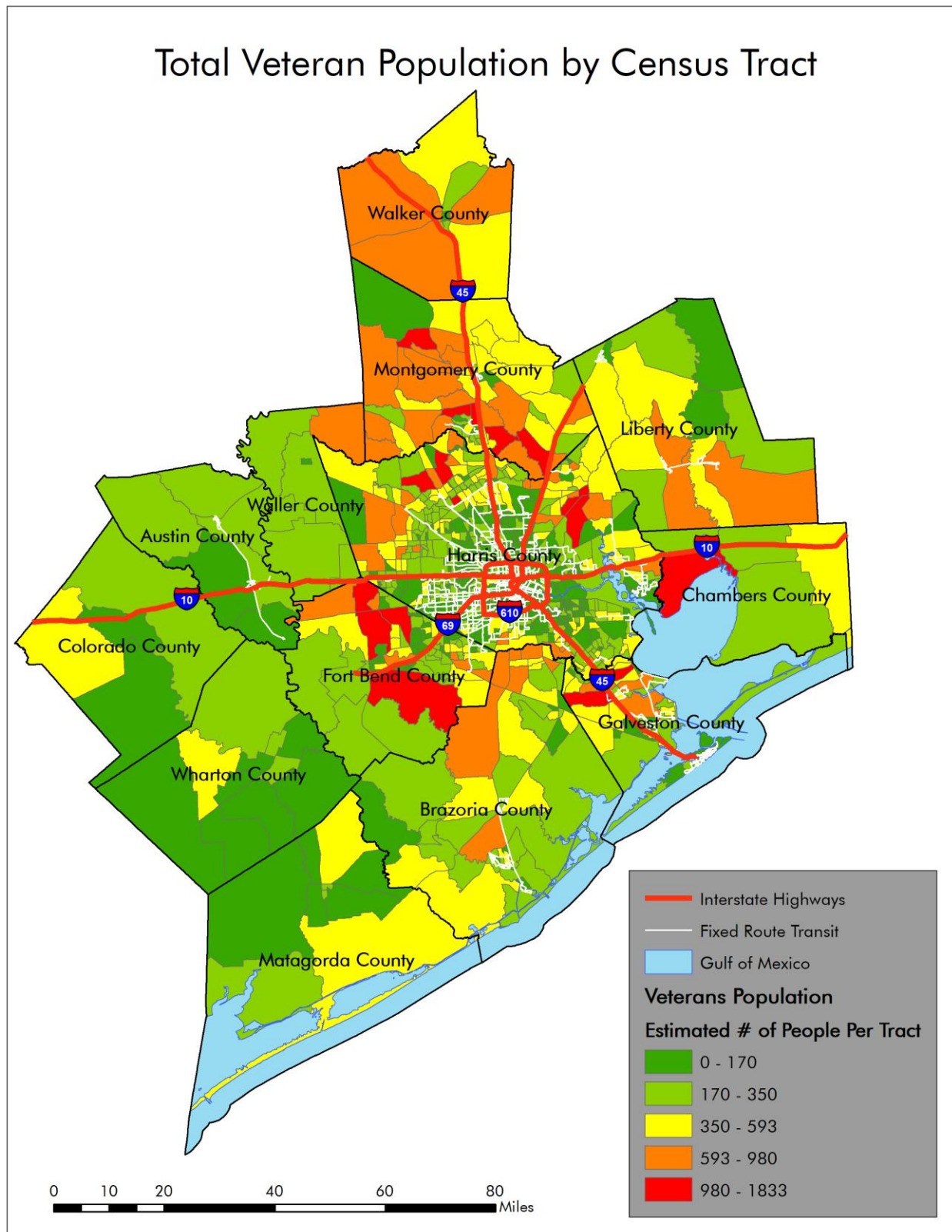
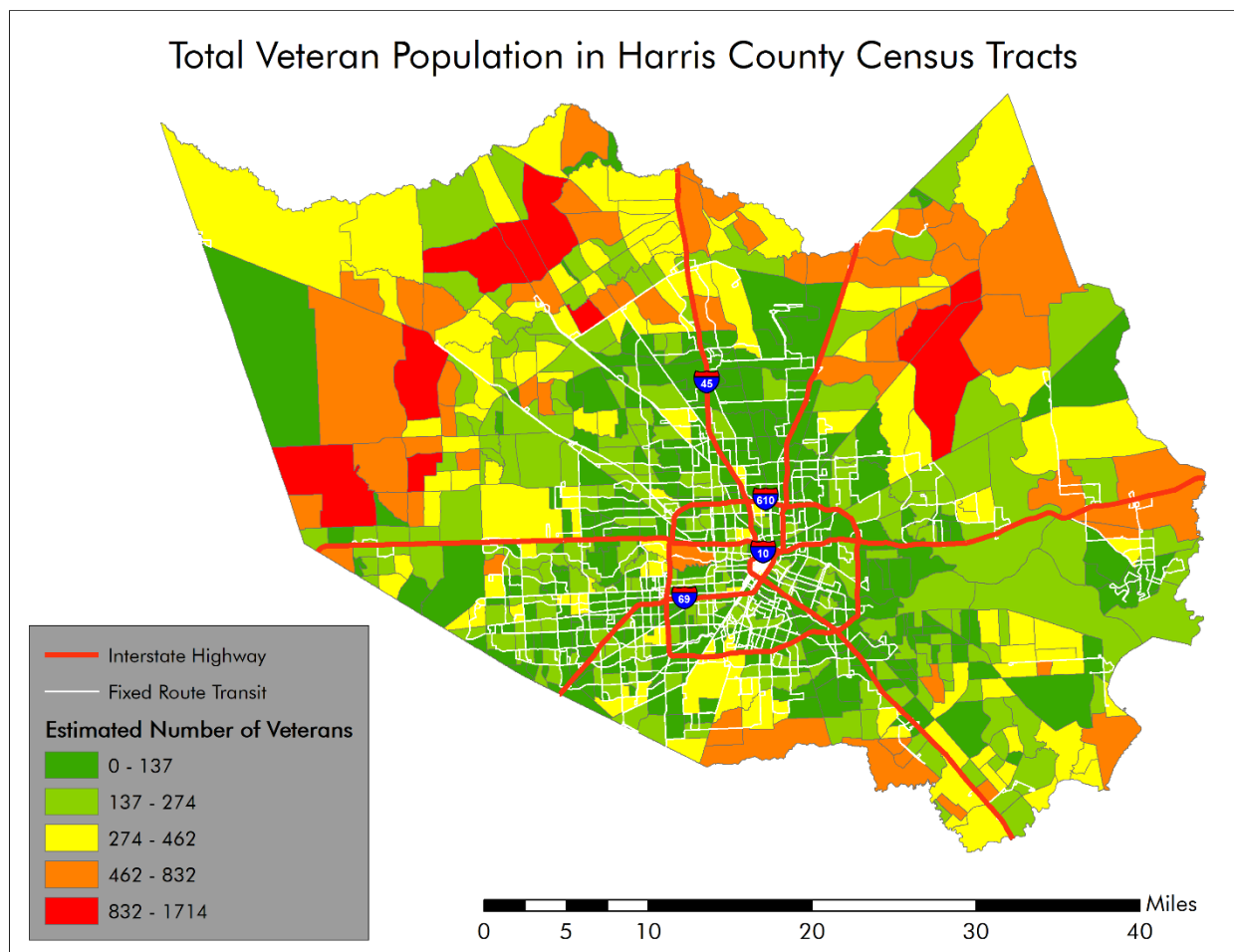


Figure 23: Veteran Population by Census Tract, Harris County



Access to Jobs and Services

Examining transportation need requires looking both at where the region's residents live (i.e., origins), as well as the jobs and services they need access to (i.e., their destinations). Using data from H-GAC's Regional Growth Model, areas of high job density can be analyzed spatially. Figure 24 shows the major employment centers in the eight-county region, defined as the areas in the top 30% by employment density in the region. Figure 25 shows these employment centers, with existing fixed route transit overlaid. These demonstrate that most of the region's major employment centers are located in Harris County, and that most have at least some access to fixed-route transit. Key exceptions are found in Montgomery County (The Woodlands), as well as in the northern parts of Harris and Fort Bend Counties.

Figure 24: Locations of Major Employment Centers

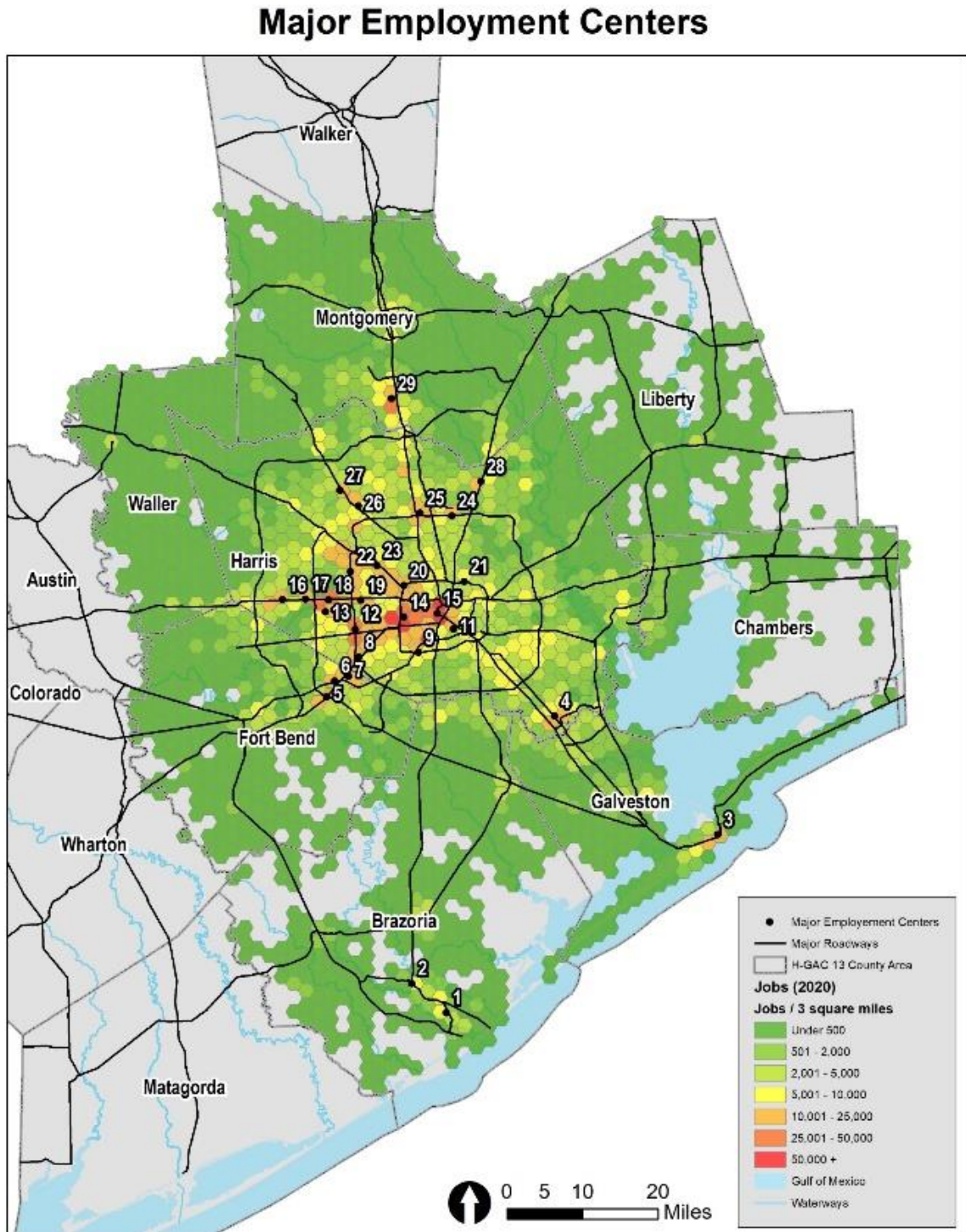


Figure 25: Locations of Major Employment Centers with Fixed-Route Transit Availability

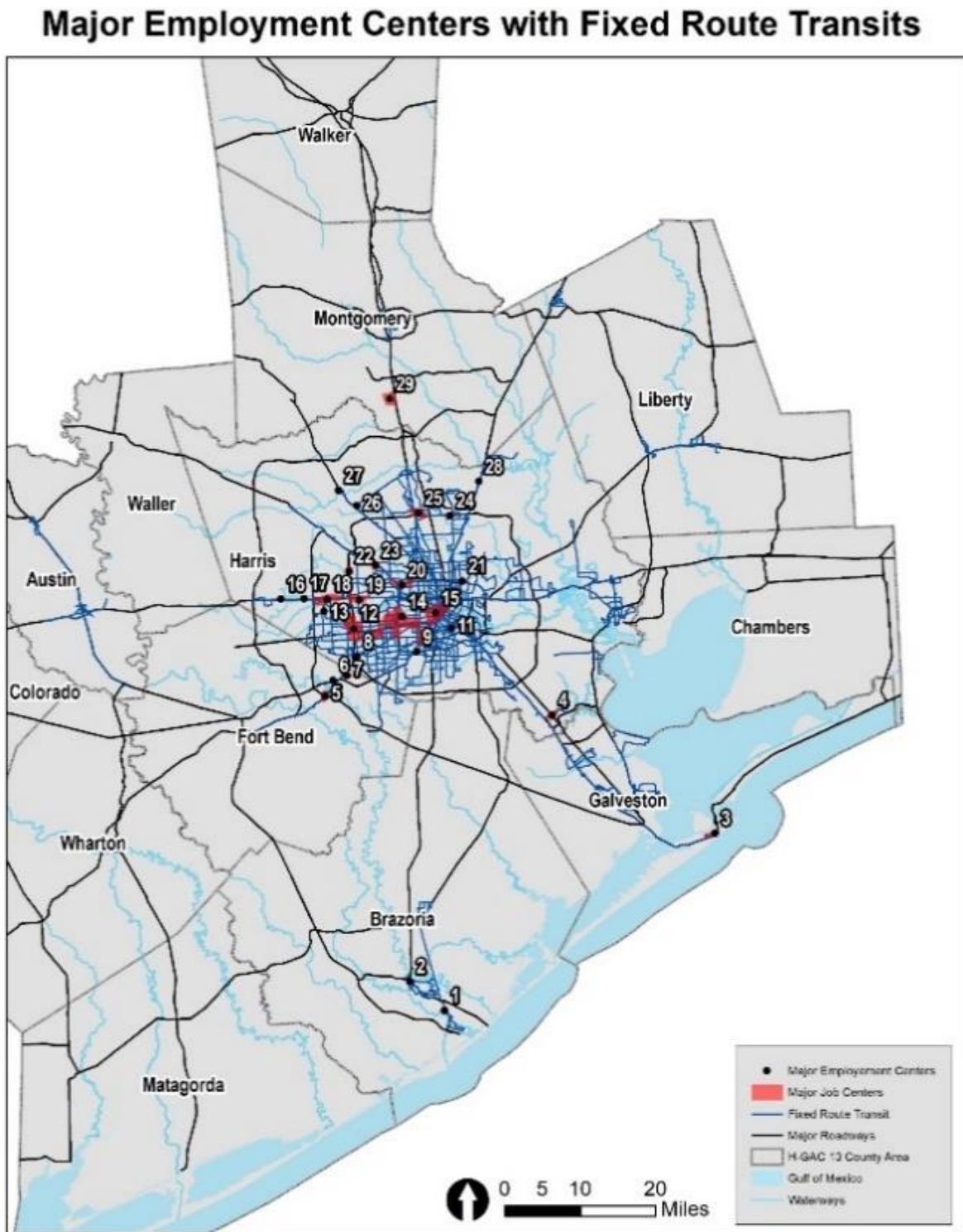


Figure 26 shows the major employers in the region in relation to the availability of fixed-route transit, with major employers classified as those that provide at least 1,000 jobs in a single location. The majority of major employers, especially those concentrated in the core of the region, have at least some fixed-route transit service to the work site. However, many major employers further from the region's core do not—notable large employment sites with no fixed-route transit can be found in Brazoria, Chambers, Fort Bend, Walker, and Waller Counties. Some of these work locations are isolated from densely populated areas, which may limit the opportunities to provide fixed-route service to these locations.

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Figure 26: Major Employers with Fixed-Route Transit Availability

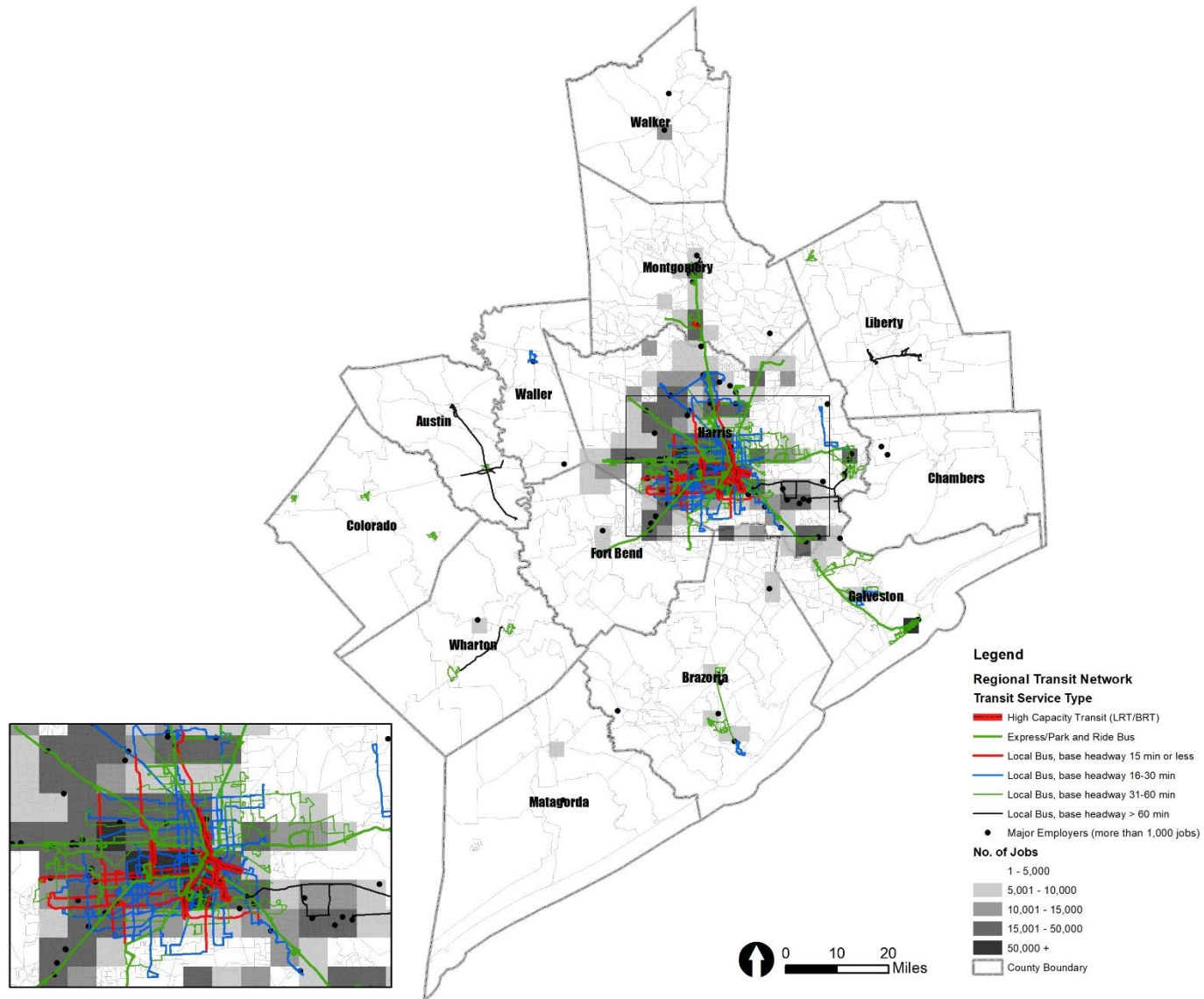


Figure 27 shows the region's colleges and universities in relation to fixed-route transit services. Almost all of the region's institutions of higher education have at least some fixed-route transit service, though there are a few notable exceptions. These include Sam Houston State University in Walker County, Alvin Community College in Brazoria County, and Lone Star College's CyFair campus in northwest Harris County. This indicates that at least some students and staff may have access to their college or university campus by transit, though there may still be many opportunities to improve transit access to institutions of higher education.

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Figure 27: Colleges and Universities with Fixed Route Transit Availability

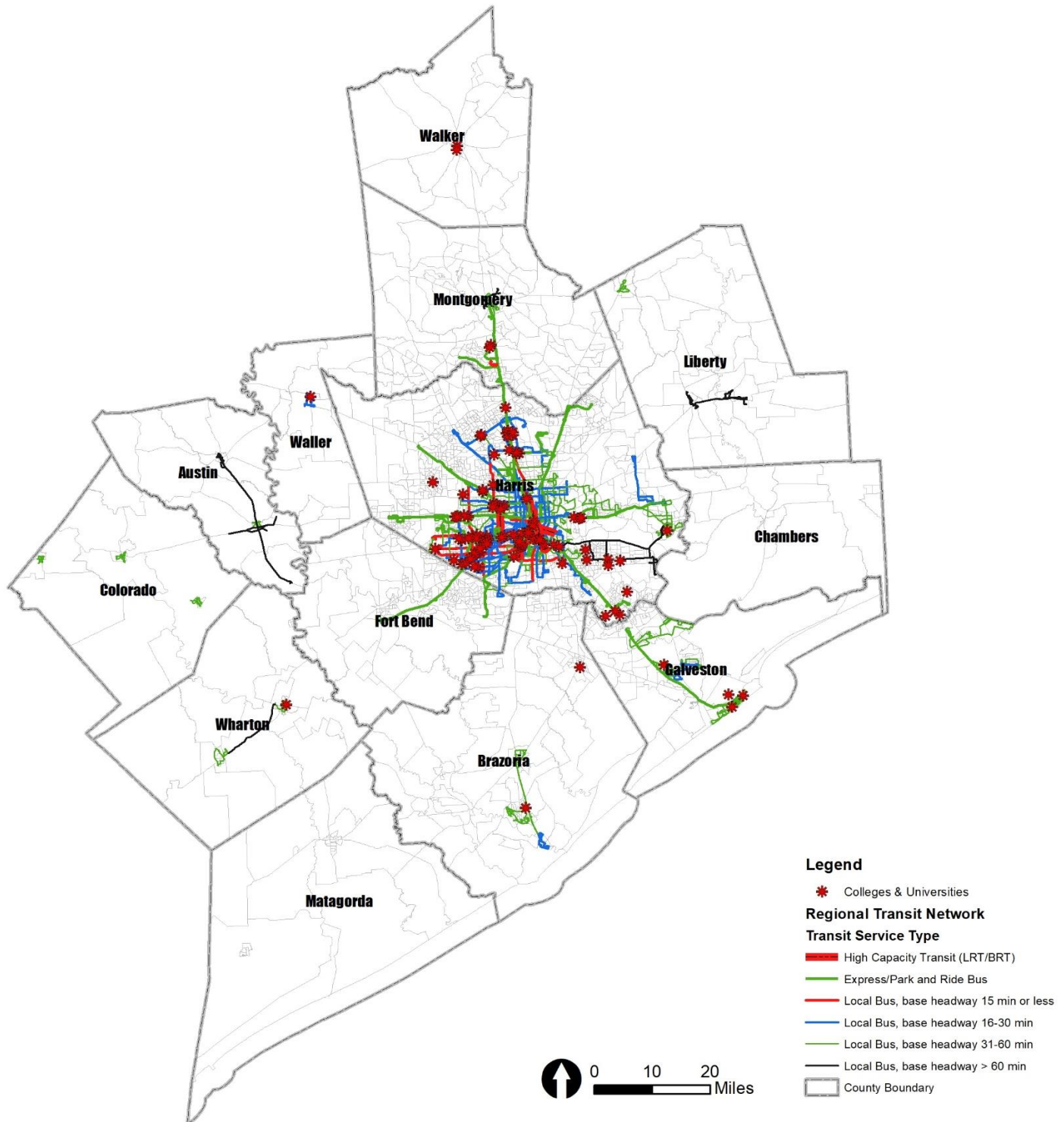


Figure 28 shows housing units built with HUD low-income housing tax credits overlaid with fixed-route transit. This is used here as a proxy for the region's housing supply that is affordable to low-income families. This map shows that there are concentrations of affordable housing in every county in the region with no access to fixed-route transit. As the residents of these apartments are disproportionately likely to need transportation services, this indicates that many who require low-income housing in the region may not have access to the transportation resources they need to meet their basic needs.

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Figure 28: Affordable Housing with Fixed Route Transit Availability

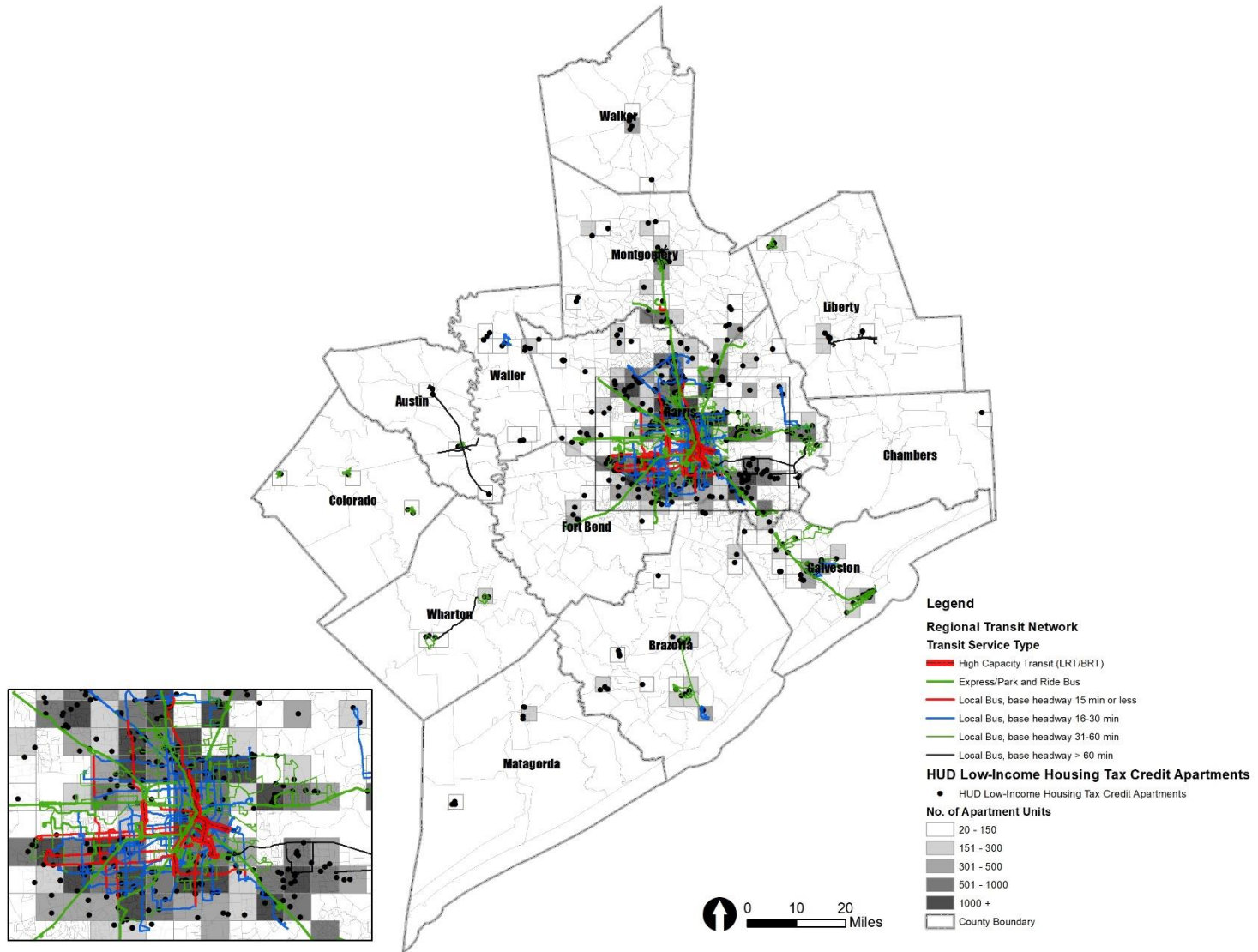


Figure 29 shows the distance to the nearest hospital from each census block group in the 13-county region. The distance is calculated from the geographic center of each census block group. Block groups in green are located close to hospitals (or contain hospitals), while block groups in red are located far from hospitals. Figure 30 shows the location of each hospital, overlaid with existing fixed-route transit. These maps show that the areas farthest from hospitals can generally be found at the edges of the region, including near the Gulf of Mexico in Matagorda County, at the eastern edge of Liberty County, and parts of Waller and Austin counties. However, this does not necessarily correlate perfectly with medical access, as many hospitals, even some within Harris County, lack fixed-route transit service of any kind.

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Figure 29: Distance to Nearest Hospital, by Census Tract

Distance to Nearest Hospitals

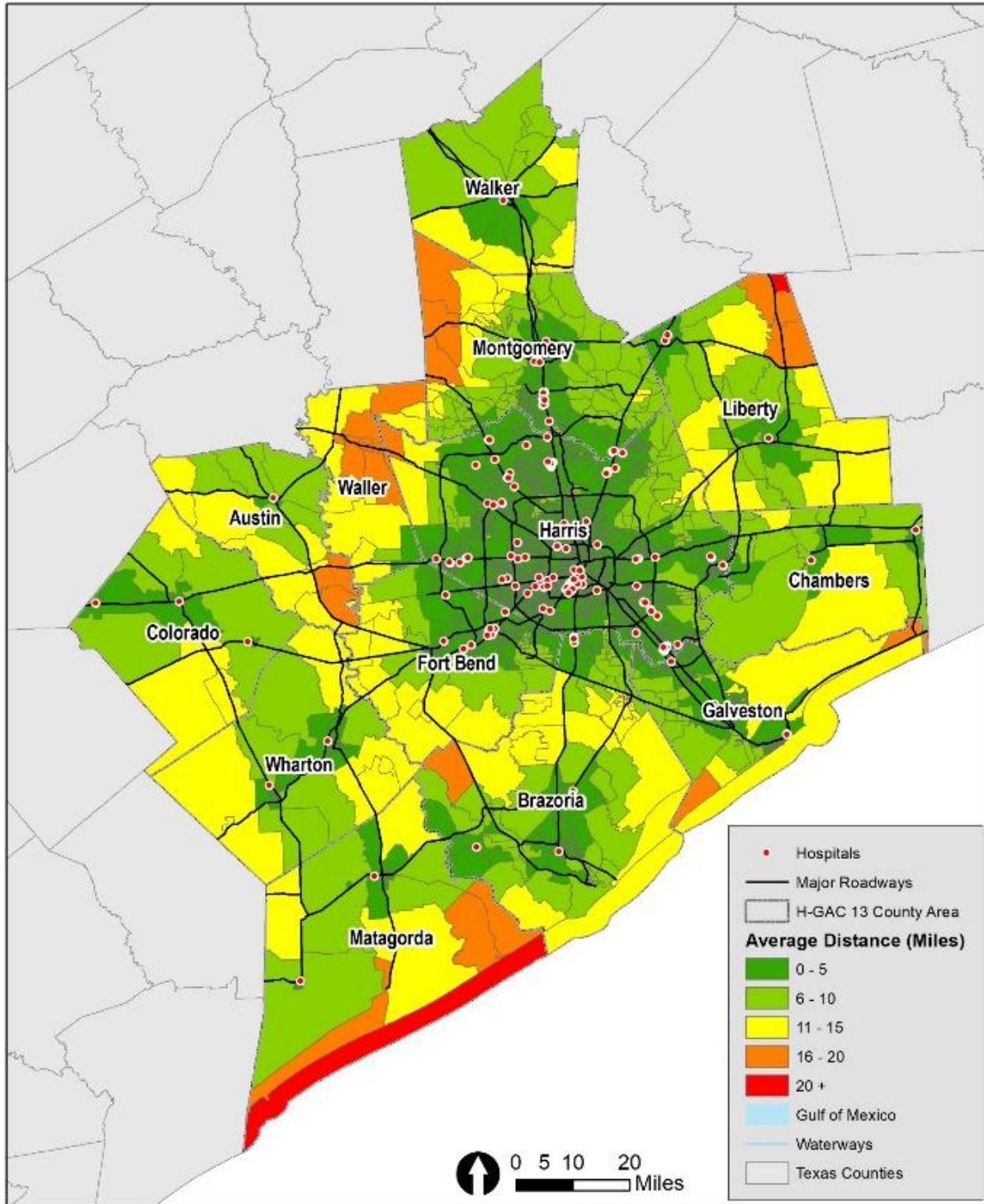


Figure 30: Hospitals with Fixed Route Transit Access

Hospitals with Fixed Route Transits

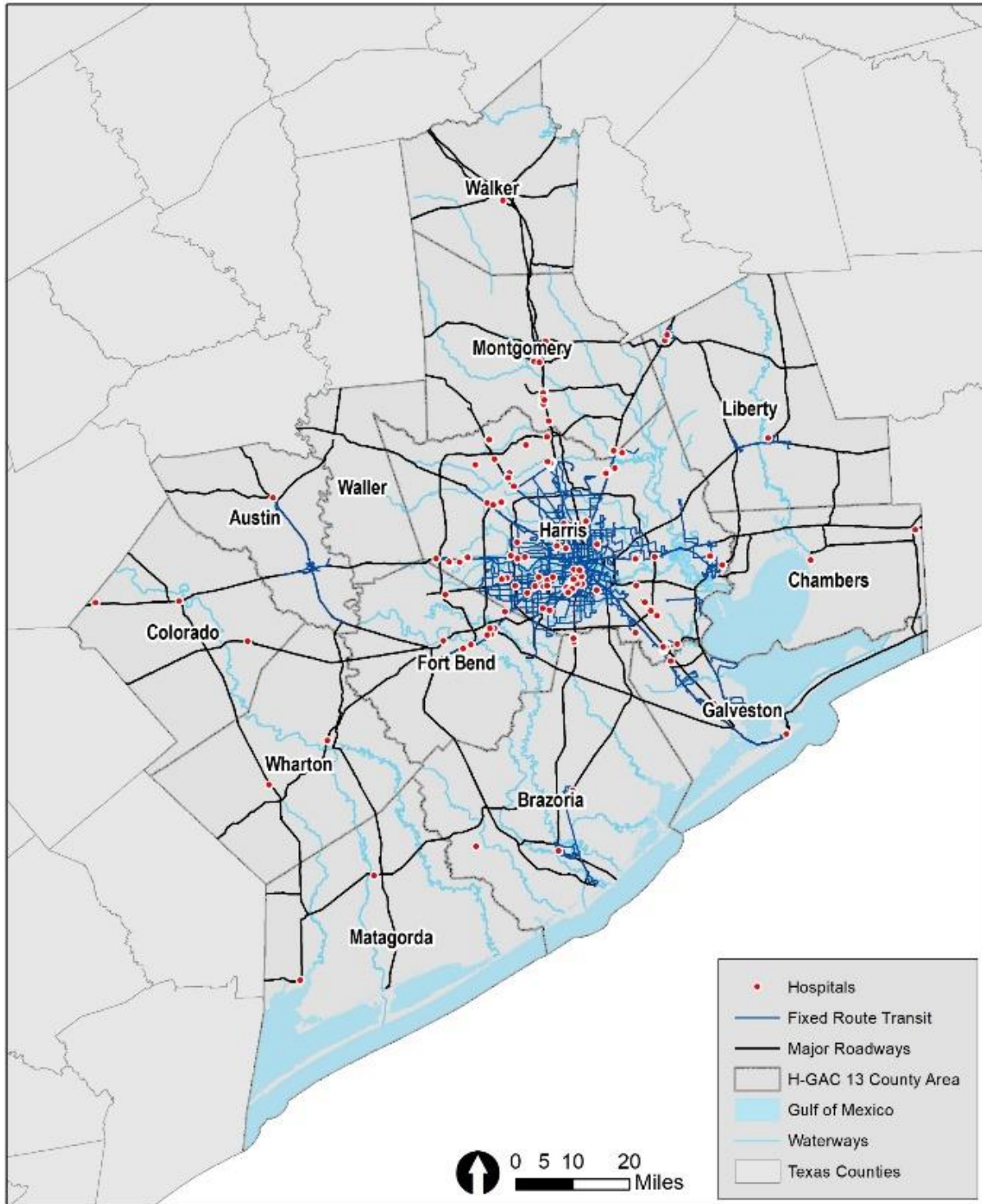


Table 9 shows the number of hospitals in each county, and the average distance of a resident of each county to the nearest hospital. Residents of Harris County have the best access to medical services by this metric, as the average Harris County resident lives just 2.2 miles from the nearest hospital. Austin and Waller Counties are outliers in the other direction, as the average resident must travel 9.7 and 14 miles, respectively, to get to a hospital. While none of these measures are a perfect indicator of access to health care, they do suggest that residents of more rural counties have more difficulty accessing medical care than residents of counties like Harris or Fort Bend that are closer to the center of the region.

Table 9: Average Distance to Hospitals by County

County	Population	Number of Hospitals	Residents per Hospital	Average Distance to Nearest Hospital, in miles
Austin	29,764	1	29,764	9.7
Brazoria	360,677	6	60,113	5.6
Chambers	41,305	2	20,653	6.4
Colorado	21,224	3	7,075	4.7
Fort Bend	765,394	13	58,876	3.5
Galveston	332,885	4	83,221	4
Harris	4,646,630	107	43,426	2.2
Liberty	83,702	3	27,901	7
Matagorda	36,774	2	18,387	5.4
Montgomery	571,949	17	33,644	5.3
Walker	72,321	1	72,321	4.9
Waller	51,832	0	0	14
Total	7,056,034	161	43,826	6

Current Travel Flows

Understanding where people are traveling is vital to understanding the public's transportation needs. In Figure 31, travel flows for commute trips are mapped using

Longitudinal Employer-Household Dynamics (LEHD) data from the U.S. Census. Arrows indicate the direction of travel, with darker and larger arrows indicating higher trip volumes. This map indicates that commute travel flows are centered on Harris County, which is home to the region's biggest job centers. While this data is from 2018, the most recent year for which data is available, and therefore does not reflect changes in commute patterns related to the COVID-19 pandemic, it should still be considered reflective of overall inter-county travel demand.

Table 10 lists the five inter-county travel patterns with the largest number of commuters. Of these, the top three, and four out of five, involve commuters traveling to a destination in Harris County, with the sole exception being travelers from Harris County to Fort Bend County. This reflects the extent to which the region's economic base centers on Harris County, and indicates the extent to which demand for travel within the region is focused on destinations within Harris County. Notably, the data shows that more than 1.5 million trips both start and end within Harris County. While this makes sense, given the fact that the majority of the region's population lives in Harris County, it also shows the extent to which regional travel demand centers on trips taking place entirely within Harris County.

Figure 31: Regional Travel Flow Map: Commute Trips

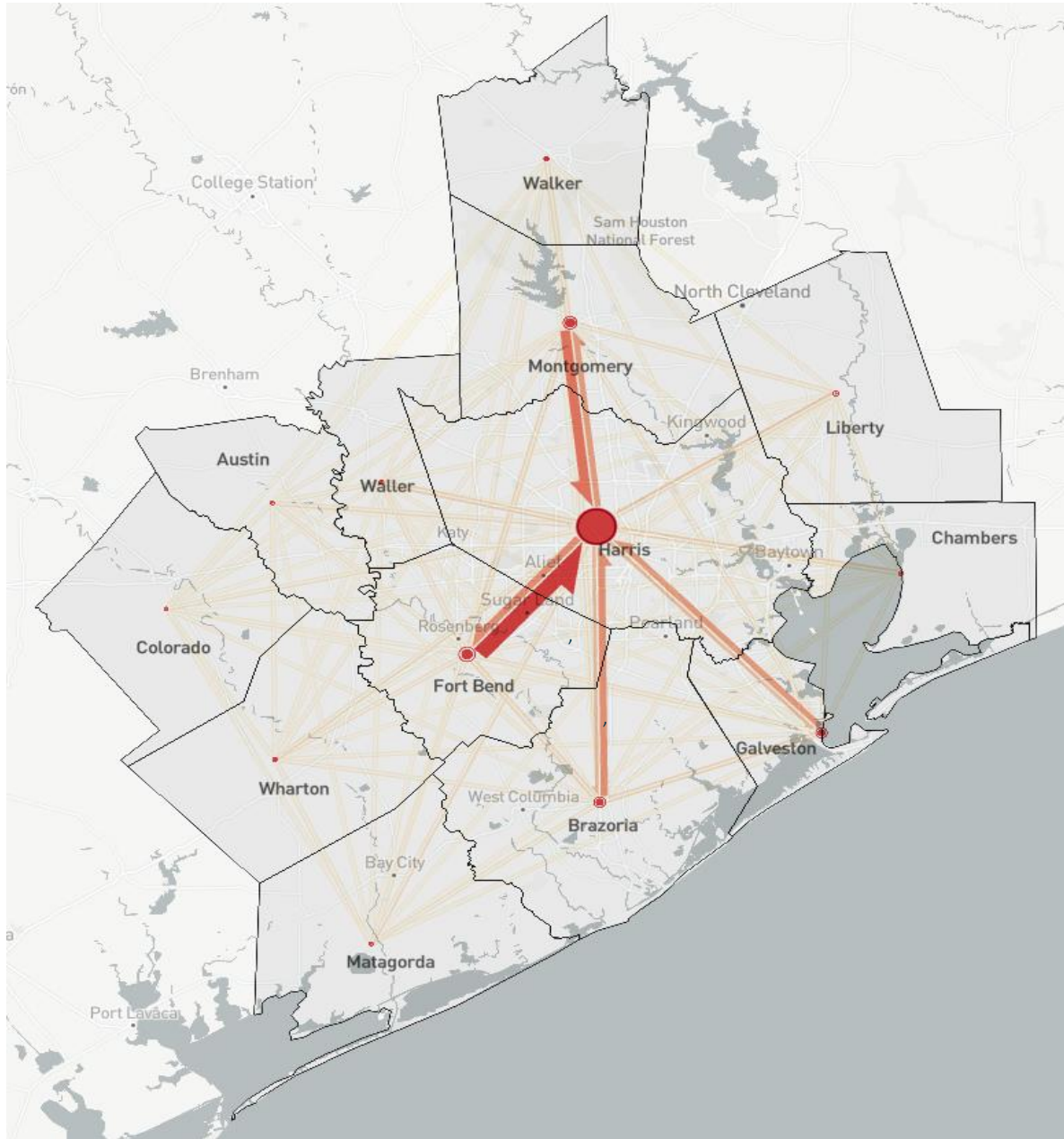


Table 10: Top Five Regional Travel Flows by Number of Travelers, Commute Trips

Rank	County of Residence	County of Employment	Total Uni-directional Travel Flow
1	Harris	Harris	1,547,161
2	Fort Bend	Harris	205,399
3	Montgomery	Harris	116,675
4	Harris	Fort Bend	81,006
5	Brazoria	Harris	76,734

Projected Population Growth

The Houston region has grown substantially in recent decades, and current projections suggest this growth will continue in the coming years. H-GAC develops regional growth forecasts in five-year increments. The most recent growth forecast, developed in 2018 by H-GAC’s Socioeconomic Modeling group, indicates how the region’s population may change between now and 2030. These forecasts model the region as a hexagonal grid, with each hexagon representing an area of three square miles. Growth forecasts are only available for H-GAC’s Metropolitan Planning Organization (MPO) area, which comprises eight of the thirteen counties in the region covered by this report, excluding Austin, Colorado, Matagorda, Walker, and Waller Counties. However, since these eight counties account for more than 95% of the 13-county region’s population, these forecasts should encompass the overwhelming majority of the growth expected for the 13-county region in this timeframe.

Figure 32 shows projected 2030 population in the eight-county region. It shows high population densities projected for Harris County, particularly areas west of I-45, as well as in parts of Montgomery, Fort Bend, Brazoria, and Galveston Counties. Figure 33 shows projected 2030 employment in the eight-county region. Employment is projected to be far more concentrated than population, with key jobs centers located in downtown Houston and west of downtown along the I-10 and I-69 corridors, with smaller job centers found in Montgomery and Galveston counties. These forecasts indicate that

future transportation need will likely be centered in the central and western parts of Harris County, as well as in the denser parts of adjacent counties.

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Figure 32: Projected Population Density, 8-County Region, 2030

Population Density (2030) in 8 Counties

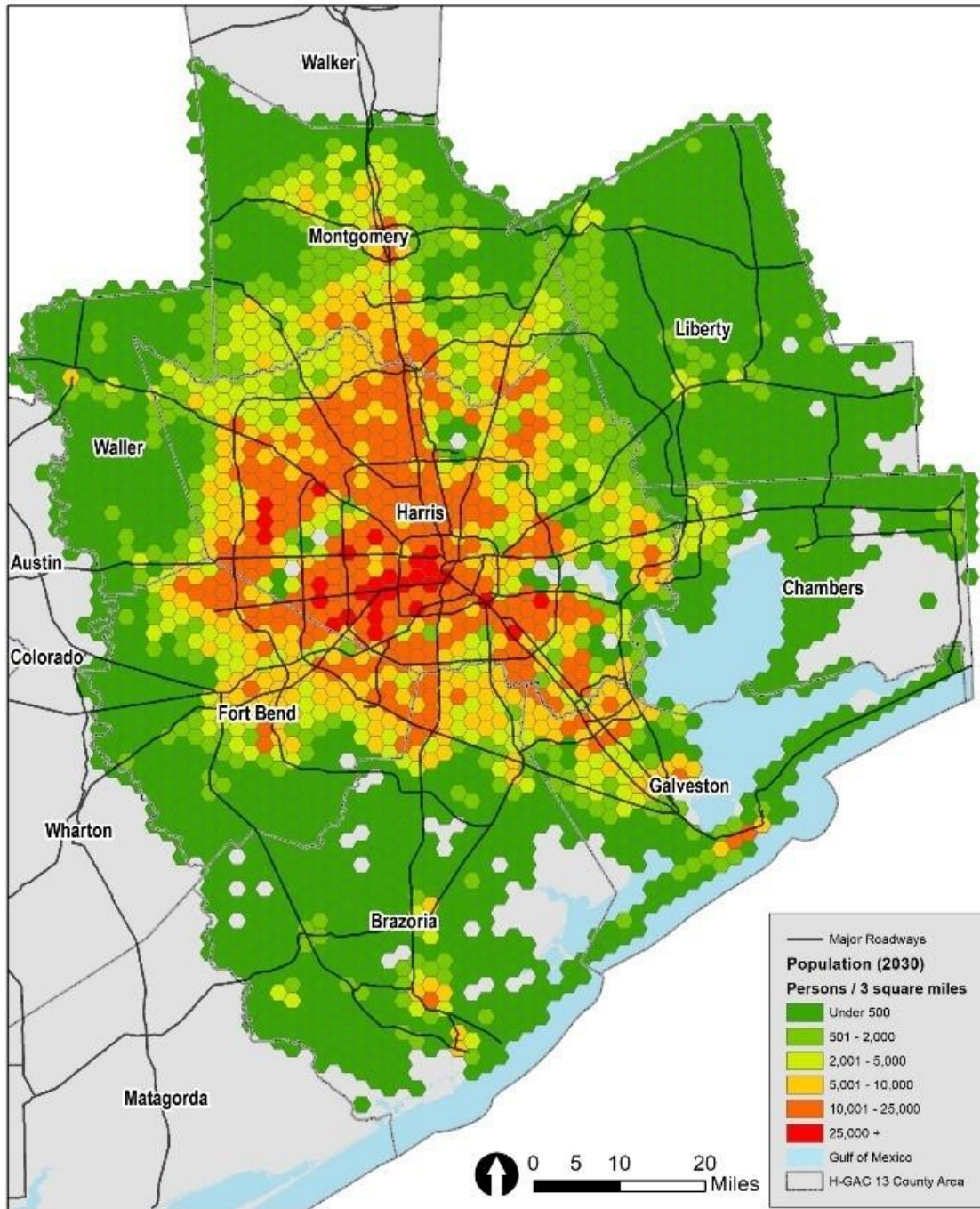
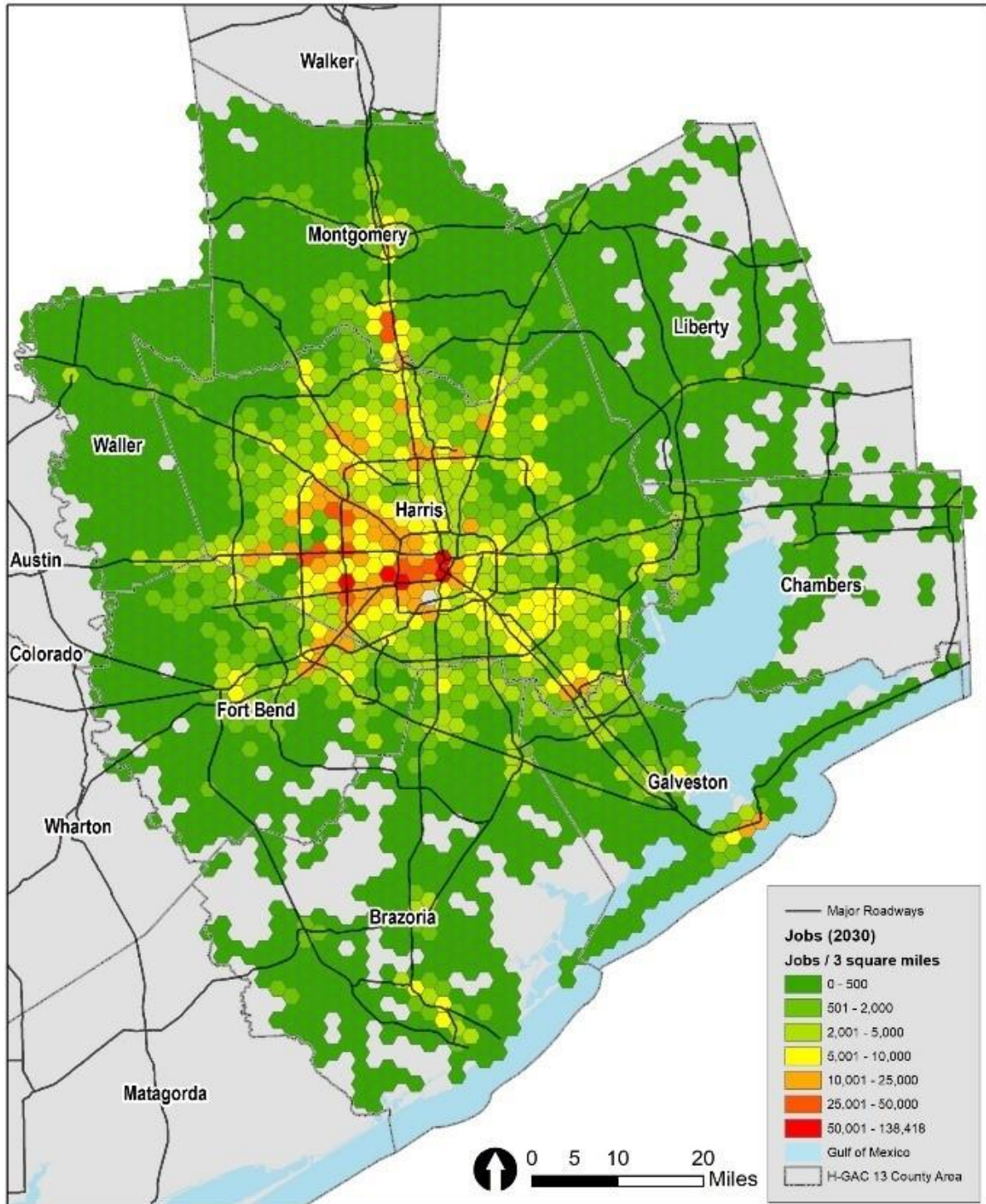


Figure 33: Projected Employment Density, 8-County Region, 2030

Employment Density (2030) in 8 Counties



Needs Identified in Public Outreach

The public outreach process demonstrated the regionwide need for more and better transportation services. Each of the activities included in Phase I public outreach—an online survey, a digital mapping activity, and a set of virtual interactive events—garnered feedback about missing or insufficient service in many parts of the region. In the virtual event focused on Harris County, one participant, who is employed providing social services for individuals with disabilities, noted that many of their clients in that county had no access to fixed-route public transportation. In several other virtual events, participants noted that existing fixed-route services are too infrequent to be useful for most people.

Survey respondents also noted a lack of transit service in their communities as a primary reason for not using transit: when respondents who never use transit were asked to explain why they don't use transit, the two most common responses were "There is no public transportation in my community", followed by "Public transportation does not serve my home and/or the destinations I'm trying to reach." Survey respondents indicated a desire to use public transit: when asked what would make them more likely to use public transportation in the future, by far the most common answer, selected by more than twice as many survey takers as any other answer, was "New routes that serve my community and/or the place I'm trying to go." Additionally, several respondents submitted comments that expressed frustration with the limited availability of demand-response or paratransit services in areas not currently served by fixed-route transit, suggesting that these are not providing effective alternatives for the residents of those areas.

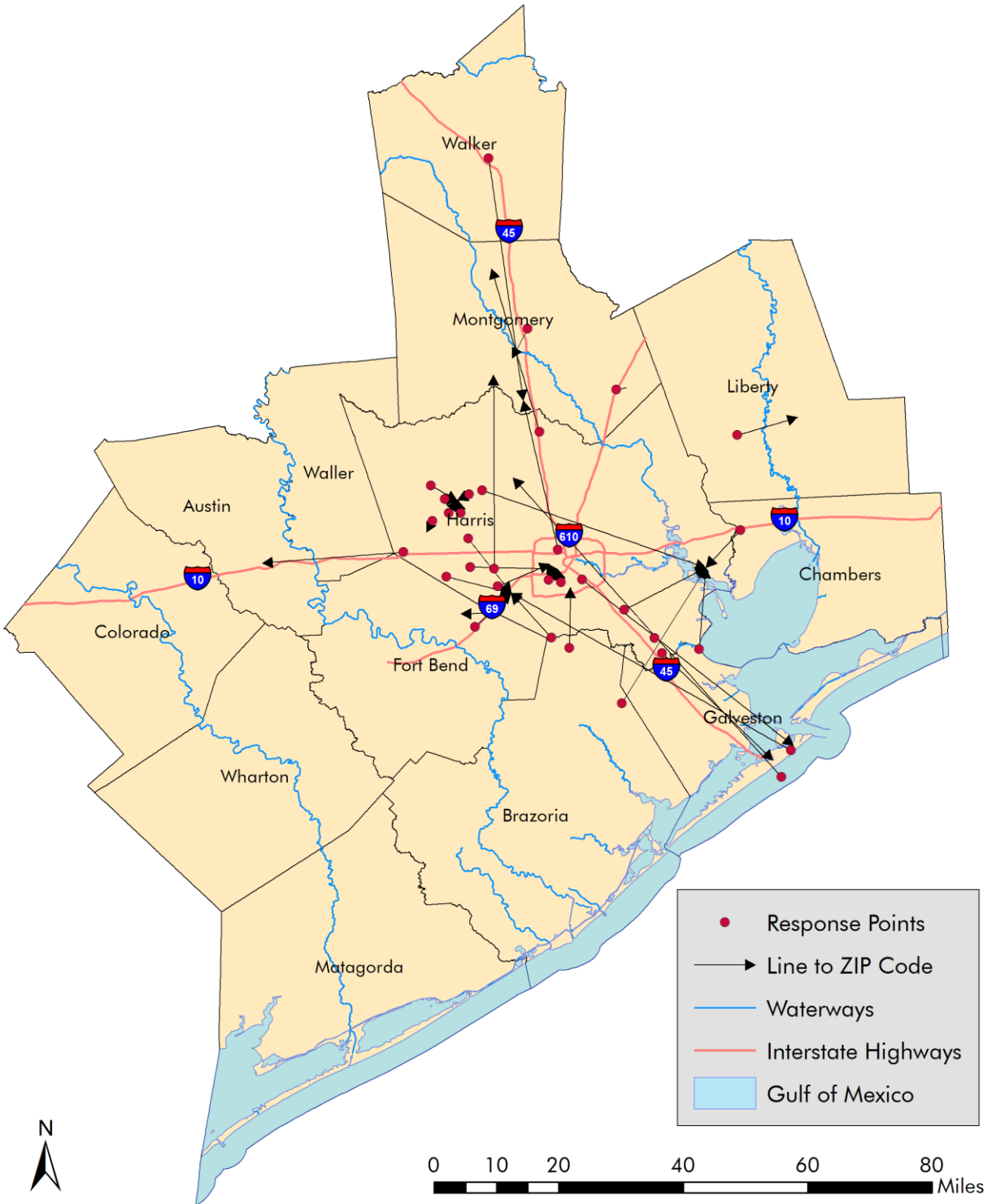
The mapping activity provided a snapshot of unmet transit need in the region. Results are shown in Figure 34. Of the 34 pins placed on the map, 25 were placed to indicate the complete absence of service between the respondent's community and that location. These submissions captured a concentration of unmet transportation demand in southwestern Harris and Fort Bend counties, as well as in northwestern Harris County and the Gulf Freeway corridor between Galveston and Houston.

Notably, these areas are cited previously in this Needs Assessment as areas of significant transportation need: they are projected to be among the most densely populated parts of the region by 2030 (see Projected Population Growth), and they are also home to large populations of veterans, individuals with limited English proficiency, and low-income households. This points to substantial opportunities for growth: expanding access to transportation services in places where need is significant, and growth is anticipated to be rapid, could have significant positive impacts on mobility in the region, with attendant reductions in congestion and emissions.

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Figure 34: Results of Public Outreach Mapping Activity

Comment Locations w/Lines to Zip Code of Respondent



Key Takeaways

- The region's population is growing rapidly, particularly in areas near Harris County, such as Montgomery and Fort Bend Counties.
- Potentially vulnerable populations, including households with lower incomes, persons with disabilities, and veterans, can be found in large numbers in areas outside the reach of existing fixed-route transit, especially in parts of Harris County, Fort Bend County, and Montgomery County.
- Existing employment centers are primarily located in Harris, Galveston, and Montgomery Counties, and job growth is projected to be centered on these existing employment areas.
- While residents of rural areas of Chambers and Matagorda Counties have the furthest to travel for medical care, lack of transportation availability at medical facilities is a regionwide problem, including in the region's core.
- Public outreach demonstrated a strong desire for more and better transit service, with a particular focus on Harris, Galveston, and Fort Bend Counties.