2045 Metropolitan Transportation Plan

Technical Report #2
Existing Conditions

Jackson Metropolitan Planning Organization

December 2020

PROMOTING REGIONAL EXCELLENCE SINCE 1968

CMPDD

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1.0 Introduction

This report identifies the conditions and characteristics of the existing transportation system in the Jackson Metropolitan Planning Area (MPA) for 2018 where possible. Where required by the Fixing America's Surface Transportation (FAST) Act, it provides the data for the most recent year available.

For each mode of transportation, the report focuses on the following information:

- Network facilities and assets
- Maintenance
- Safety and security
- Traffic and demand

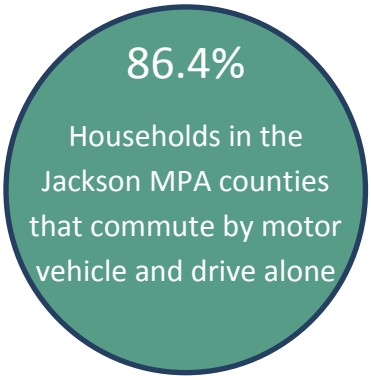
Detailed information for federally required performance measures and targets are discussed in *Technical Report #3: Transportation Performance Management Report*.

> Planning for the future transportation system and its improvements begins with evaluating the existing transportation system.

2.0 Roadways and Bridges

2.1 Introduction

The region's roadways and bridges are used by personal motor vehicles, public and private transportation providers, bicyclists, and freight trucks. These roadways can also be used to provide access to other transportation modes. This section discusses the general use of the MPA's roadways and bridges. The existing conditions for biking, walking, public transit, and freight will be further discussed in greater detail later in this report.



For households in urbanized areas, like Jackson, traveling by motor vehicle is the primary means of transportation. The most recent American Community Survey (ACS) 5-year estimates show that commuting by motor vehicle without carpooling is the most common method of commuting within the MPA counties. This means the overwhelming majority of household travel is affected by the condition of the MPA's roadways and bridges.

2.2 The Roadway Network

Several federal and state highways serve the study area and constitute its main roadway network. The most significant of these facilities are shown below.

- I-20 begins near Midland, TX at I-10 and travels east to Florence, SC. It goes through the study area from west to east.

- I-55 begins in LaPlace, LA at I-10 and travels north to Chicago, IL. It travels through the study area from south to north, overlapping I-20 for about 2 miles in an area known as the "The Stack".

- I-220 provides an additional connection between I-20 West and I-55 North, establishing a closed loop around the core urban area of Jackson.

- US 49 begins in Gulfport, MS and travels north to Piggot, AR. US 49 goes through the study area from the southeast to northwest.

- US 51 starts in LaPlace, LA and runs north to its intersection with MI 2 in Ironwood, MI. US 51 runs from the south west of the study area, through to the north east.

- US 80 begins in Dallas, TX and goes east to Savannah, GA. It runs east and west through the study area, usually along I-20. Outside of the study area, US 80 dual routes with I-20 at some sections.

Roadways by Functional Classification

Each type of roadway serves a function in the overall roadway network. Roadways are divided into functional classes based on their intended balance of mobility (speed) and access to adjacent land. Their designs vary in accordance with this functional classification. Table 2.1 summarizes this information by centerline miles and lane miles. Figure 2.1 illustrates the functional classification of the Jackson MPA's roadways.

Interstates

- Divided highways with full control of access and grade separations at all intersections.
- The controlled access character results in high lane capacities, three times greater than the individual lane capacities of urban arterials.

Expressways

- Provides for movement of large volumes of traffic at relatively high speed, and are primarily intended to serve long trips.
- Have some grade separated intersections, while the majority of the intersections are widely spaced and signalized.

Arterials

- Serve both as feeders to interstates and expressways, and as principal travel ways between major land use concentrations within the study area.
- Typically divided facilities (undivided where right-of-way limitations exist) with relatively high traffic volumes and traffic signals at major intersections.
- The primary function of arterials is to move traffic; they are the main means of local travel, with a secondary function of land access.

Collectors

- Provide both land service and traffic movement functions.
- Serve as intermediate feeders between arterials and local streets and primarily accommodate short distance trips.
- Generally not continuous for any great length since they serve few through trips.

Local Streets

- Provide access to immediately adjacent land.
- Within the local street classification, three subclasses are established to indicate the type of area served: residential, industrial, and commercial.

Within the arterial classification are principal and minor subclassifications. Within the collector classification are major and minor subclassifications within the rural areas. Principal arterials in both rural and urban areas serve as high volume traffic corridors. They provide access to the major centers of activity of a metropolitan area from its furthest points. Minor arterials connect the principal arterials and provide a lower level of travel mobility for shorter travel lengths. Rural major collectors are those

collectors in rural areas that carry low-medium traffic volumes and connect arterials and local streets. These roadways typically carry more volume than rural minor collectors. Rural minor collectors perform the same function as rural major collectors, but they carry less volume.

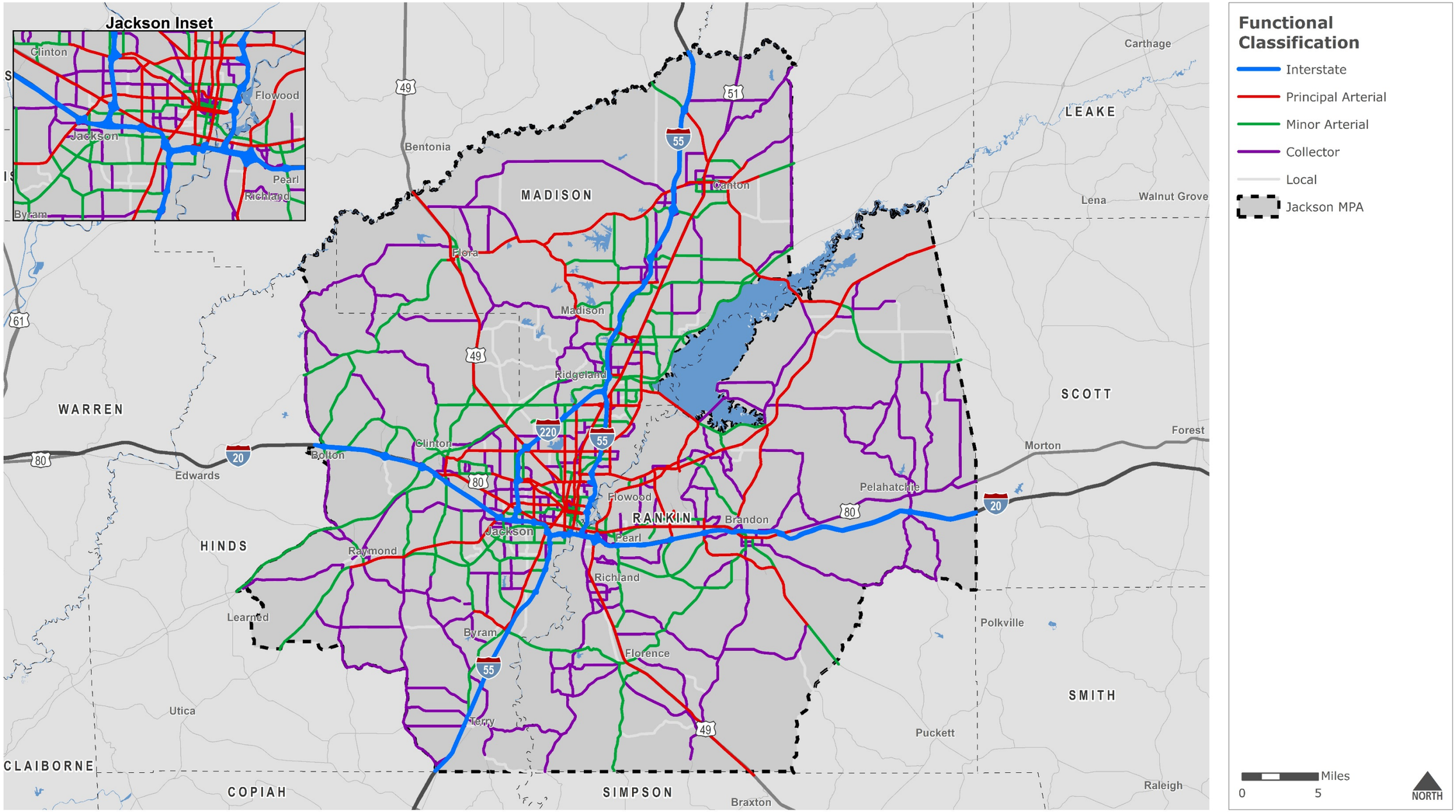
Table 2.1: 2018 Roadway Model Network Lane Mileage by Functional Class

Functional Class	Centerline Miles		Lane Miles	
	Miles	Percent	Miles	Percent
Interstate	111.9	6.7%	596.8	13.3%
Principal Arterial	320.9	19.4%	1,185.6	26.5%
Minor Arterial	388.2	23.4%	937.0	20.9%
Collector	699.0	42.2%	1,478.0	33.0%
Local	137.3	8.3%	279.0	6.2%
Total	1,657.1	100.0%	4,476.4	100.0%
Hinds County				
Interstate	55.5	8.1%	311.8	15.8%
Principal Arterial	121.7	17.7%	517.4	26.2%
Minor Arterial	180.3	26.2%	447.0	22.7%
Collector	270.7	39.4%	577.1	29.3%
Local	58.8	8.6%	118.7	6.0%
Total	686.9	100.0%	1,972.0	100.0%
Madison County				
Interstate	27.7	6.4%	141.3	12.8%
Principal Arterial	90.8	21.1%	253.1	22.9%
Minor Arterial	119.3	27.7%	296.8	26.9%
Collector	159.7	37.0%	344.2	31.2%
Local	33.7	7.8%	68.0	6.2%
Total	431.2	100.0%	1,103.4	100.0%
Rankin County				
Interstate	28.7	5.3%	143.7	10.3%
Principal Arterial	108.4	20.1%	415.1	29.6%
Minor Arterial	88.6	16.4%	193.1	13.8%
Collector	268.6	49.8%	556.7	39.7%
Local	44.8	8.3%	92.4	6.6%
Total	539.1	100.0%	1,401.0	100.0%

Note: Centerline miles exclude ramps

Source: Jackson Metropolitan Planning Organization (MPO) Travel Demand Model

Figure 2.1: 2018 Functional Classification of Roadways



Data Sources: MDOT

Disclaimer: This map is for planning purposes only.

2.3 Traffic and Congestion

The number of daily trips estimated by the Travel Demand Model, by trip purpose, in 2013 is summarized in the graph below. Approximately one (1) percent of vehicle trips pass through the MPA. Internal commercial and freight vehicle trips (e.g., truck, taxi, etc.) account for about one in ten vehicle trips. The majority of vehicle trips in the MPA (59 percent) begin or end at home.

2,052,316

Daily trips within the MPA

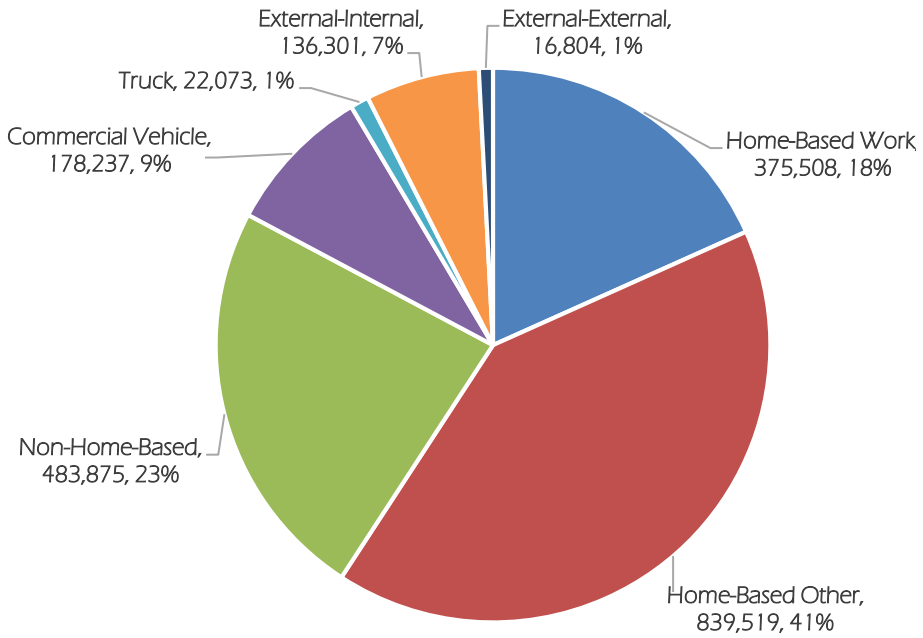


Table 2.2 displays how these trips are distributed onto the modeled transportation network. The Interstates within the MPA experience the most delay, nearly 47 percent. There is comparatively little delay estimated to occur on collectors. This is in large part due to travel on these roadways accounting for only about 11 percent of vehicle miles traveled and just over 12 percent of vehicle hours traveled.

Table 2.2: Roadway System Travel Characteristics, 2018

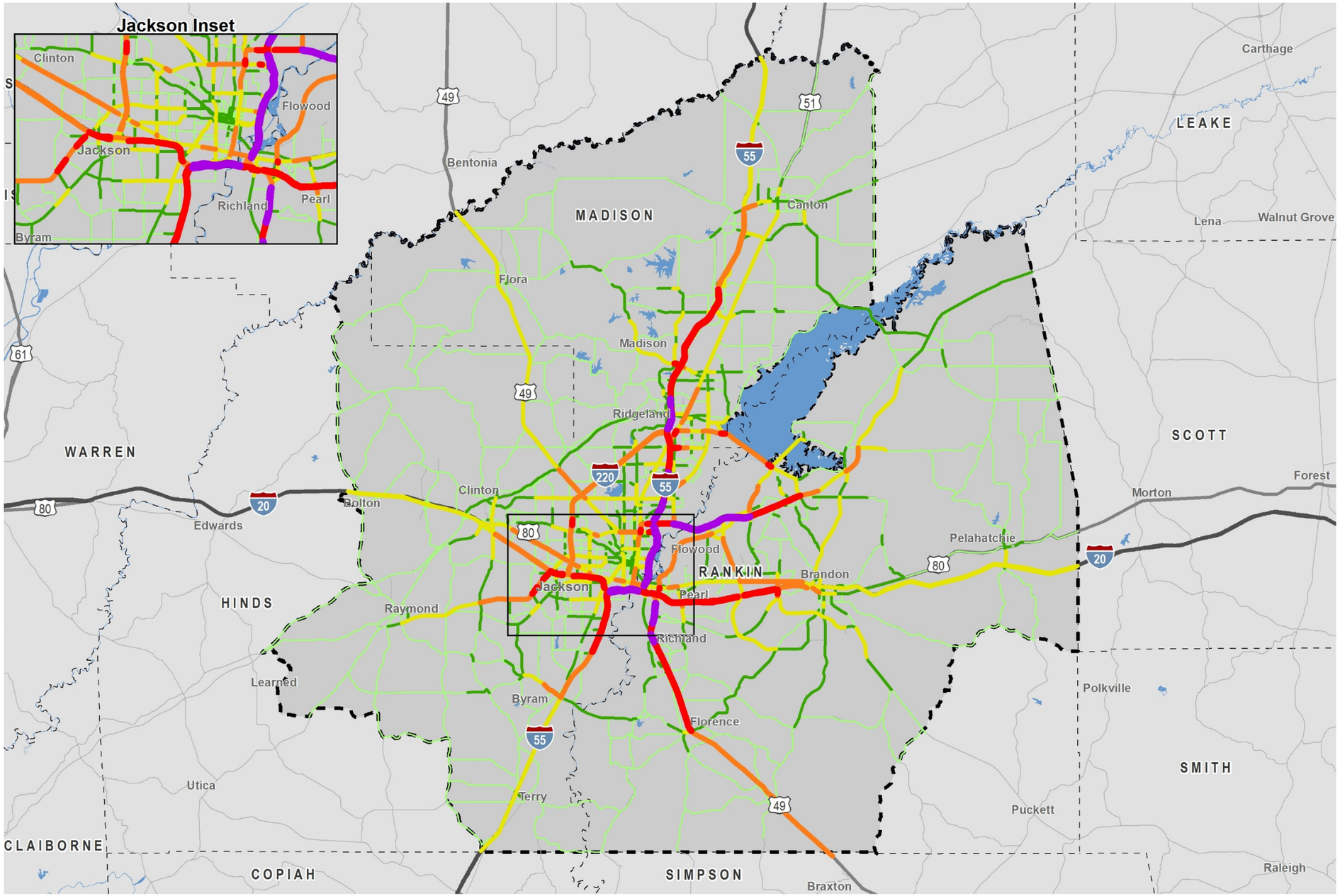
Functional Class	Daily Vehicle Miles Traveled (VMT)		Daily Vehicle Hours Traveled (VHT)		Daily Vehicle Hours of Delay (VHD)	
	Number	Percent	Number	Percent	Number	Percent
Interstate	5,998,510	41.1%	115,747	34.9%	17,051	46.6%
Principal Arterial	4,889,374	33.5%	119,557	36.0%	13,473	36.9%
Minor Arterial	1,963,323	13.5%	50,634	15.3%	3,498	9.6%
Collector	1,583,216	10.9%	41,660	12.6%	2,356	6.4%
Local	150,548	1.0%	4,292	1.3%	176	0.5%
Total	14,584,971	100.0%	331,889	100.0%	36,554	100.0%
Hinds County						
Interstate	3,229,891	49.6%	63,233	42.5%	9,242	61.0%
Principal Arterial	1,782,218	27.4%	46,314	31.1%	3,971	26.2%
Minor Arterial	834,194	12.8%	22,136	14.9%	1,165	7.7%
Collector	584,634	9.0%	14,984	10.1%	695	4.6%
Local	74,839	1.2%	2,124	1.4%	83	0.6%
Total	6,505,777	100.0%	148,790	100.0%	15,158	100.0%
Madison County						
Interstate	1,464,962	44.6%	28,944	38.9%	4,847	55.7%
Principal Arterial	915,877	27.9%	22,740	30.6%	2,441	28.0%
Minor Arterial	578,240	17.6%	14,461	19.4%	1,063	12.2%
Collector	293,609	8.9%	7,493	10.1%	334	3.8%
Local	32,100	1.0%	795	1.1%	20	0.2%
Total	3,284,788	100.0%	74,432	100.0%	8,705	100.0%
Rankin County						
Interstate	1,303,657	27.2%	23,570	21.7%	2,961	23.3%
Principal Arterial	2,191,278	45.7%	50,503	46.5%	7,061	55.6%
Minor Arterial	550,889	11.5%	14,038	12.9%	1,270	10.0%
Collector	704,972	14.7%	19,183	17.7%	1,326	10.4%
Local	43,609	0.9%	1,373	1.3%	73	0.6%
Total	4,794,405	100.0%	108,667	100.0%	12,691	100.0%

Source: Jackson MPO Travel Demand Model

Figure 2.2 displays the vehicular traffic in the MPA, which is greatest on I-55, I-20, I-220, and Lakeland Drive. These areas have estimated average daily volumes exceeding 50,000 vehicles.

Figure 2.3 displays the Volume to Capacity (V/C) ratios for the major roadways in the MPA. Currently, there are 11 roadway segments in the MPA (summarized in Table 2.3) that experience a V/C ratio of 1.0 or greater, representing congested segments. Almost all of these segments are near the intersections of roadways and/or at interstate interchanges with high traffic volumes. This suggests that peak period congestion is currently an issue in the Jackson MPA.

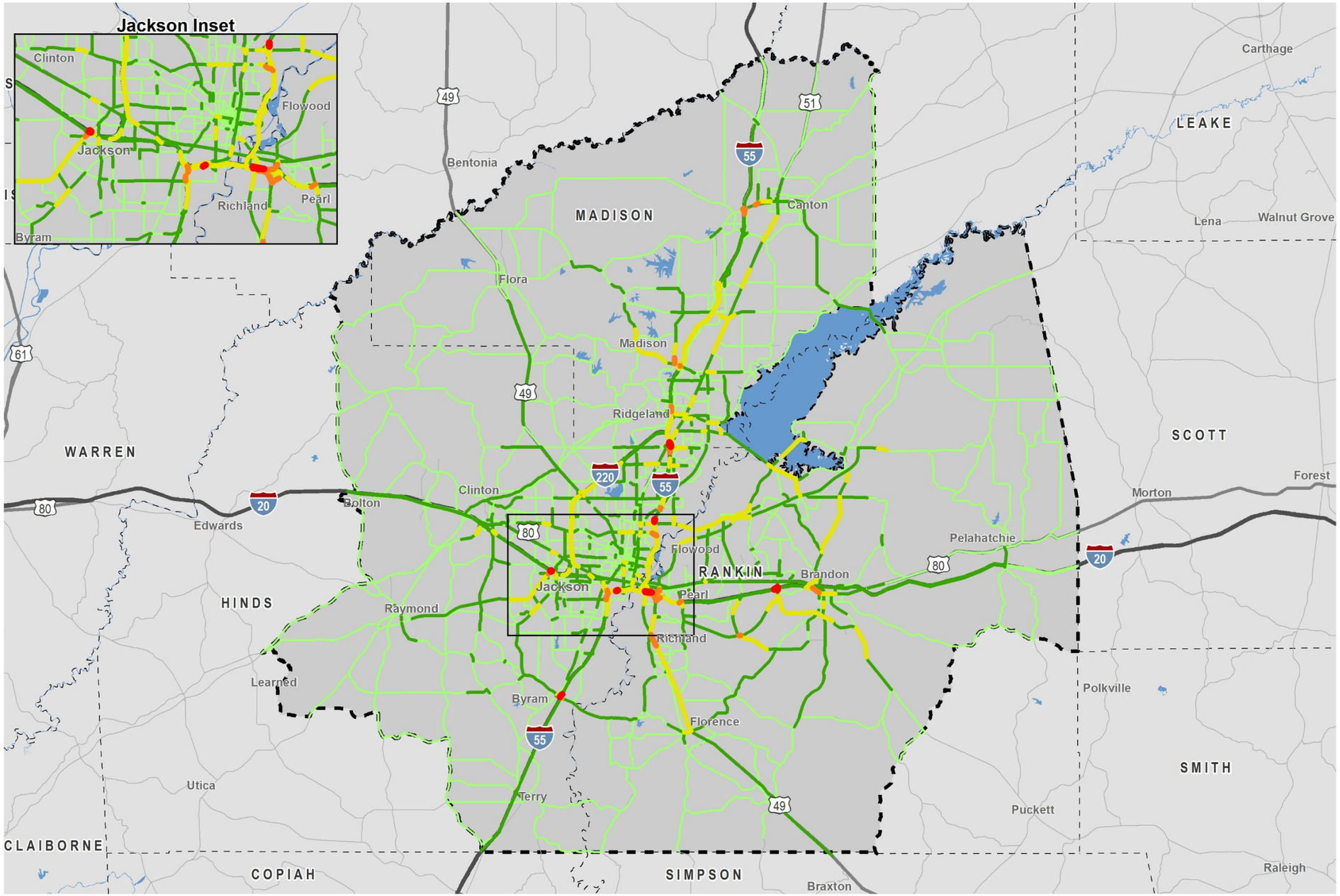
Figure 2.2: Average Daily Traffic on Roadways, 2018



Data Sources: Travel Demand Model

Disclaimer: This map is for planning purposes only.

Figure 2.3: Existing Roadway Congestion, 2018



Data Sources: Travel Demand Model

Disclaimer: This map is for planning purposes only.

Table 2.3: Roadway Corridors with Volumes Exceeding Capacity, 2018

Roadway	Location	Length (miles)
I-55 SB Off Ramp at Siwell Rd	I-55 SB to Siwell Rd	0.19
I-55 NB On Ramp at Lakeland Dr	East Service Road to I-55	0.13
I-55 NB On Ramp at E County Line Rd	East Service Road to I-55	0.20
I 55 SB Off Ramp at W County Line Rd	I-55 to West Service Road	0.13
I-20 WB Off Ramp at MS 18 W	I-20 to MS 18 W	0.16
I-20 EB On Ramp at MS 18 W	MS 18 W to I-20	0.25
I-20 Slip Ramp at US 51	I-20 to US 51	0.11
I-20 WB On Ramp between I-55 and Flowood Dr	Flowood Dr Slip Ramp to I-20 WB	0.37
I-55 NB On Ramp between I-55 and Flowood Dr	Flowood Dr Slip Ramp to I-55 NB	0.40
I-20 EB Off Ramp at MS 18 E	I-20 to MS 18 E	0.20
I-20 WB On Ramp at MS 18 E	MS 18 E to I-20	0.22

Source: Jackson MPO Travel Demand Model

2.4 Roadway Reliability

Most of the region's roadways do not have daily volumes that exceed their daily capacities. However, there may still be congestion issues at specific times, notably peak periods. Travel time reliability is a measure of how congested travel times compare to free-flow conditions. The Level of Travel Time Reliability (LOTTR) is defined as:

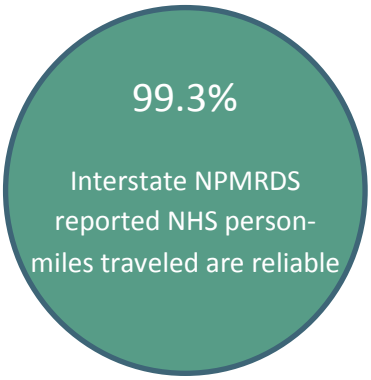
$$\text{Segment LOTTR} = \frac{\text{"Longer" 80th Percentile Travel Time}}{\text{"Normal" 50th Percentile Travel Time}}$$

The LOTTR of each roadway segment is calculated for four time periods (including AM and PM peaks), with the worst LOTTR being used to determine segment reliability. The most recent LOTTR data available, year 2018, was obtained from the Federal Highway Administration's (FHWA) National Performance Management Research Dataset (NPMRDS). Roadway segments with an LOTTR less than 1.5 are defined by the FHWA as reliable. Figure 2.4 displays the LOTTR of the monitored segments within the MPA.

It should be noted that the current NPMRDS for the Jackson MPA does not meet the full Enhanced National Highway System (NHS), which is reflected in this report. This is due to the reporting cycle of the NPMRDS data and recent updates to the Enhanced NHS by the FHWA. The Federal Register states that the Metropolitan Planning Organization (MPO) is only responsible for reporting what the NPMRDS displays.

Roadways and Bridges

The NPMRDS data shows that the Interstate system within the MPA is very reliable. While less reliable, the non-Interstate system within the MPA still meets the Mississippi Department of Transportation (MDOT) targets.



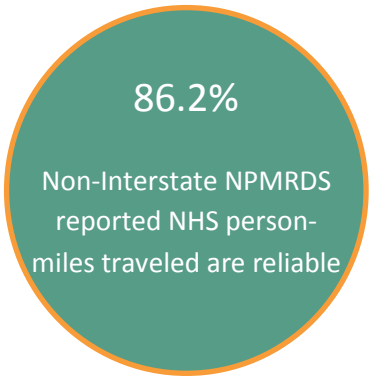
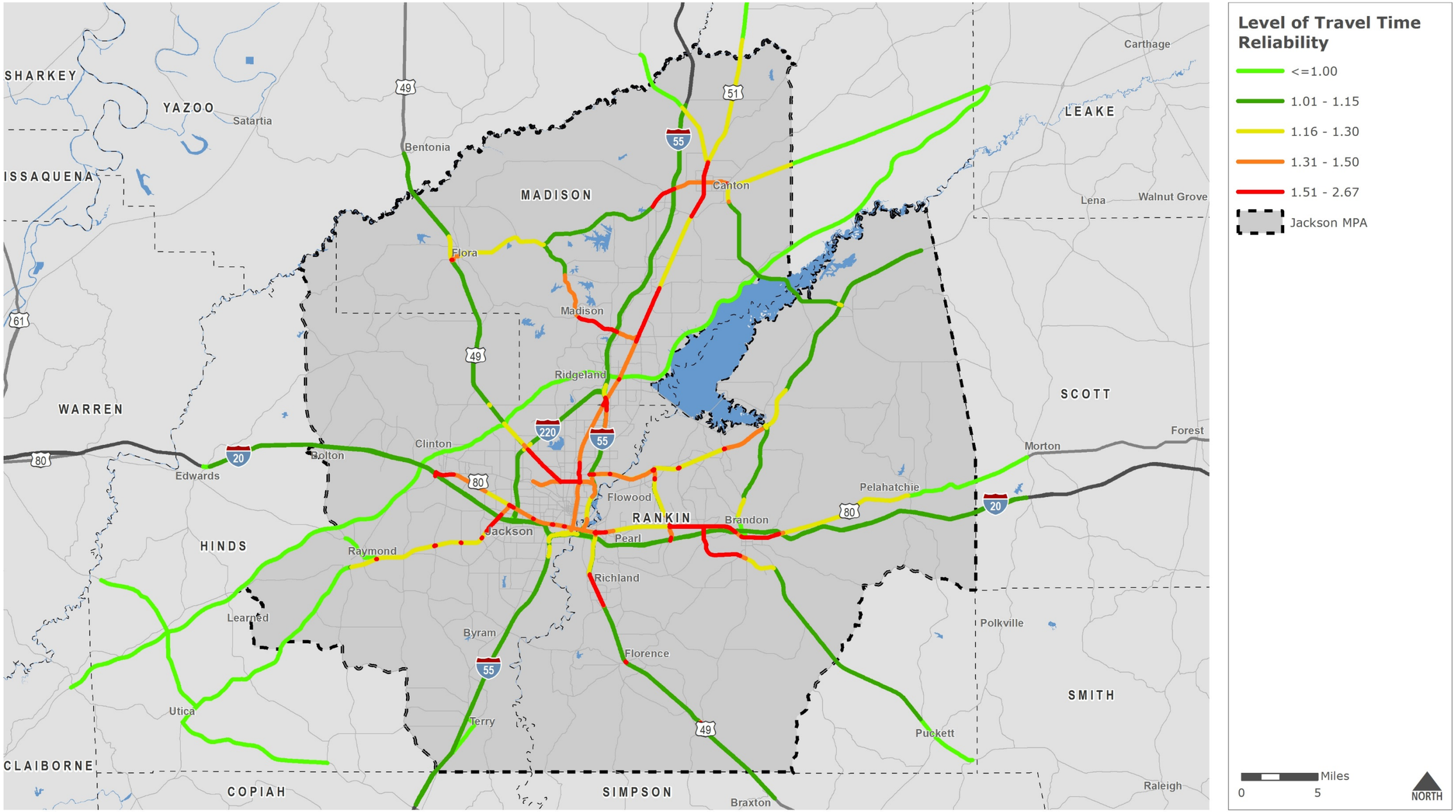


Figure 2.4: 2018 Level of Travel Time Reliability (LOTTR) on National Highway System (NHS) Routes



Data Sources: NPMRDS

Disclaimer: This map is for planning purposes only.

2.5 Pavement Conditions

Maintaining sufficient pavement conditions ensures that roadways operate at their full capacity. Good pavement conditions provide roadway users with safe, comfortable travel experiences, while minimizing vehicle wear and tear.

Results from the public participation survey showed that maintaining roadways and bridges were the public's top priority. In a funding allocation exercise where the public was asked to allocate future transportation dollars by improvement type, the public allocated nearly 22 percent of all funding to maintaining roads and bridges through regular maintenance or due to safety concerns with the current roadway surfaces.

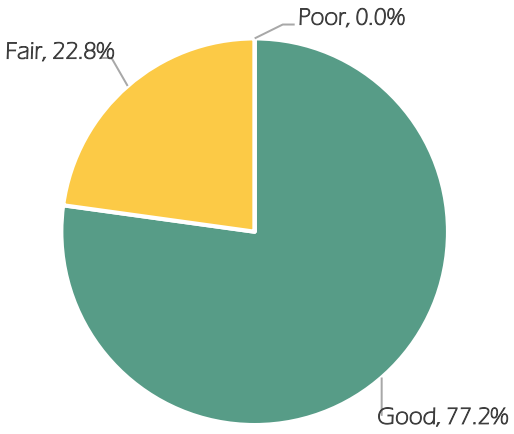
Pavement condition ratings for the MPA's roadways were obtained from data submitted by MDOT and found in the Highway Performance Monitoring System (HPMS). The HPMS is a national level highway information system that includes data on the:

- extent,
- condition,
- performance, and
- use and operating characteristics of the nation's highways.

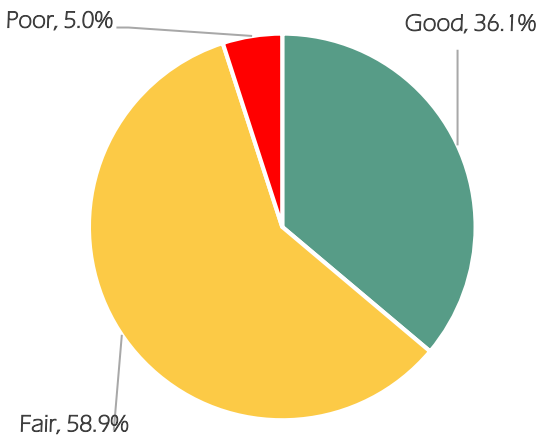
The HPMS data is a sample dataset collected across the entire federal-aid eligible system for interstate, arterial, and collector networks.

> The HPMS pavement condition is based on the International Roughness Index (IRI), cracking, rutting, and faulting.

Interstate Pavement Condition



Non-Interstate NHS Pavement Condition

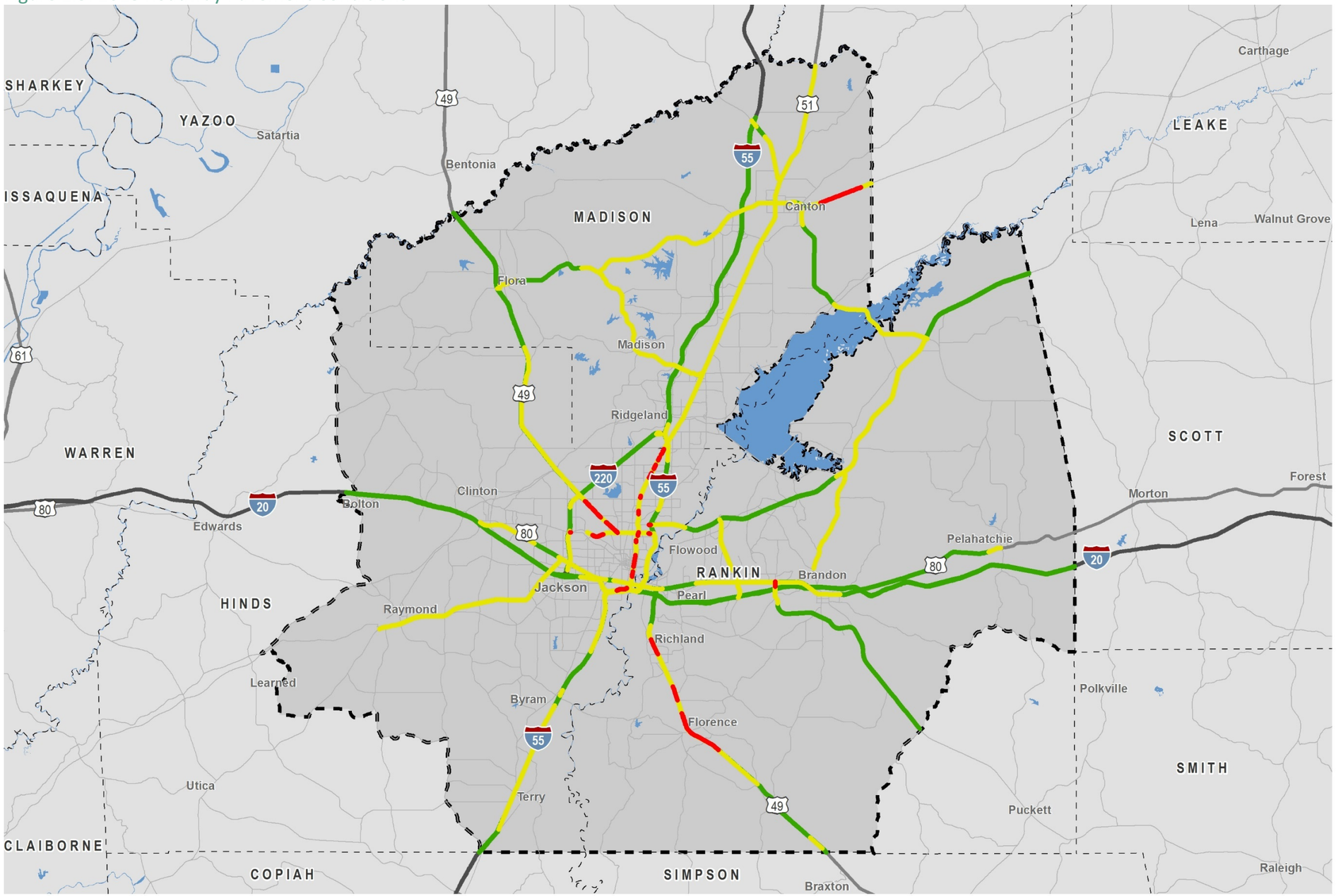


The data displayed in the above charts shows that there are no Interstate pavements within the MPA ranked as Poor, while five (5) percent of Non-Interstate NHS pavements in the MPA rank as Poor.

Figure 2.5 illustrates the most recent pavement condition data for the NPMRDS monitored roadways within the MPA. The locations of the Poor pavement within the MPA occur at various points along:

- US 49 between Old Hwy 49 and 2.0 miles south of MS 469
- MS 16 between 1.2 miles east of MS 43 and 0.7 miles west of Sharon Rd
- MS 18 E between US 80 and I-20
- Medgar Evers Blvd between I-220 and Woodrow Wilson Ave
- State St between I-20/I-55 and I-55
- Woodrow Wilson Ave between W Fortification St and I-55

Figure 2.5: 2018 Roadway Pavement Conditions



Pavement Condition

- Good
- Fair
- Poor
- Jackson MPA

Miles
0 5
NORTH

Data Sources: MDOT

Disclaimer: This map is for planning purposes only.

2.6 Bridge Conditions

Bridges are a critical part of the overall transportation network. They must be maintained and upgraded as needed to ensure that they are not safety or environmental hazards, bottlenecks, or limitations to freight movement

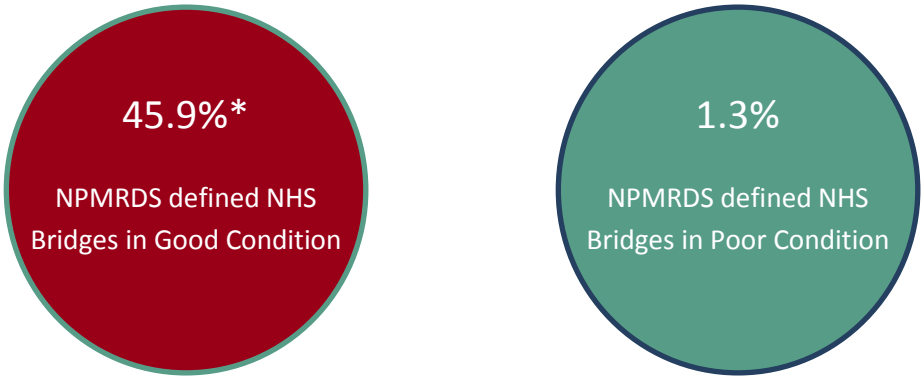
> Bridges serve as important connections over waterways, provide grade separation between roadways and other transportation facilities, and connect transportation facilities to each other.

As previously mentioned, results from the public outreach survey showed that the public places a high priority on maintaining the current transportation system and increasing its safety. The 22 percent of funding that the public wishes to allocate to maintaining roads also includes bridges.

There are over 1,000 bridges or bridge-like structures within, or in close proximity to, the Jackson MPA. Most of these cross waterways. However, bridges can also be structures that cross over other roadways and railroads.

Bridge Conditions and Scoring

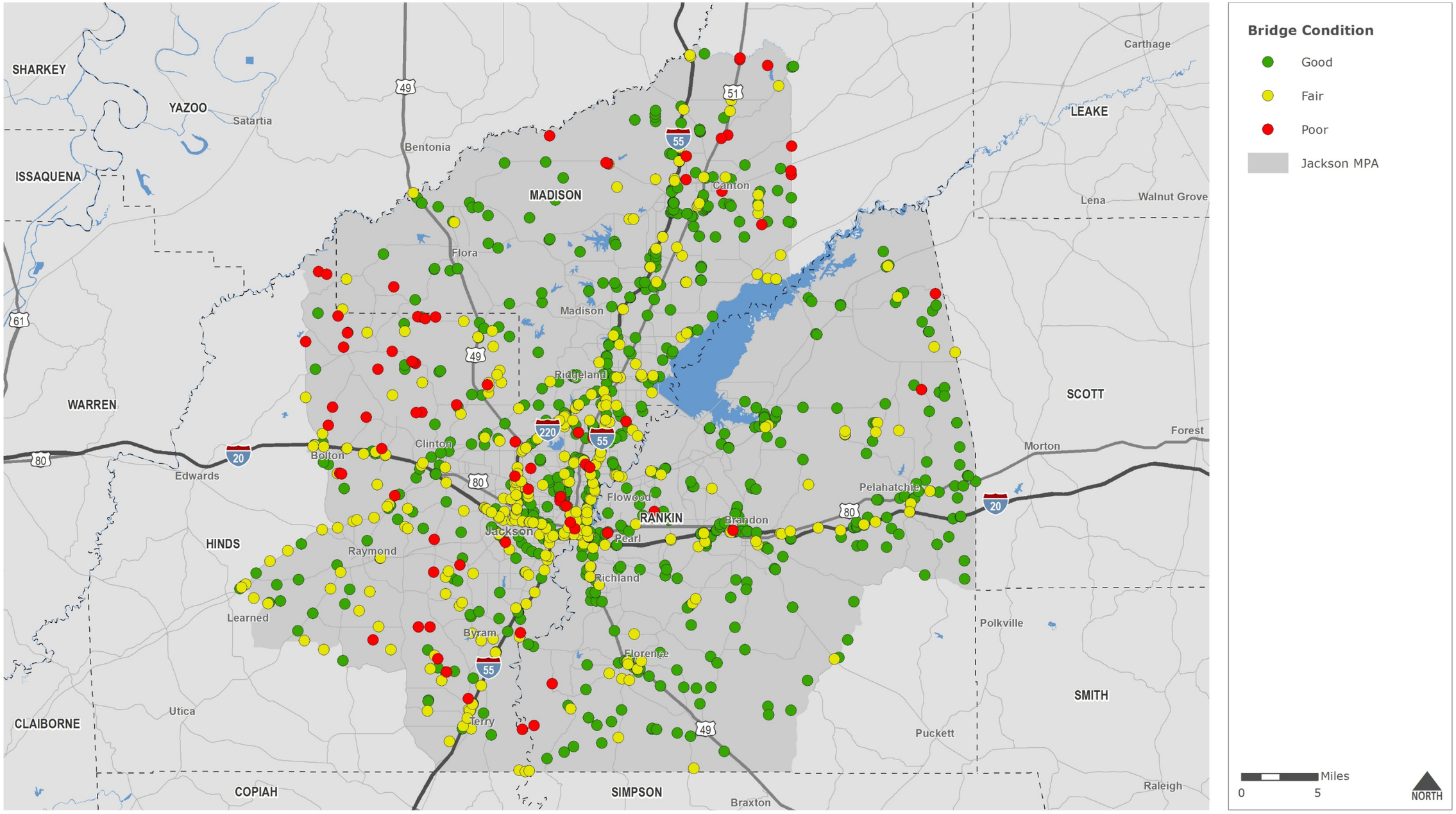
The National Bridge Inventory (NBI) provides bridge conditions for all bridges in the United States with public roads passing above or below them. The NBI also defines bridges to include bridge-length culverts. The condition of the bridge is determined by the lowest rating of deck, superstructure, substructure, or culvert. If the lowest rating of these categories is greater than or equal to seven (7), the bridge is classified as good. If the score of the bridge is less than or equal to four (4), the classification is poor. The MTP uses data from the 2018 NBI, the most recent year available.



***Falls outside of MDOT state target**

Figure 2.6 displays the condition of each bridge within the MPA.

Figure 2.6: 2018 Bridge Conditions in the Jackson MPA



Data Sources: NBI

Disclaimer: This map is for planning purposes only.

Structurally Deficient and Functionally Obsolete Bridges

All bridges in the nation are evaluated to determine if they are "structurally deficient". Structural deficiency is characterized by deteriorated conditions of significant bridge elements and potentially reduced load-carrying capacity. A structurally deficient bridge typically requires significant maintenance and repair to remain in service. These bridges would eventually require major rehabilitation or replacement to address the underlying deficiency. These bridges are those that are defined as having a score of four (4) or less on any of the scoring components described previously. There are 174 structurally deficient bridges in the MPA. Six (6) of those bridges are on the reported sections of the NHS.

2.7 Roadway Safety

The Metropolitan Transportation Plan (MTP) safety analysis focused on gathering and analyzing available safety data and identifying hazardous locations. Due to the limited scope of this study, location-specific recommendations for the identified hazardous locations have not been developed.

> "Disclaimer: This document and the information contained herein is prepared solely for the purpose of identifying, evaluating and planning safety improvements on public roads which may be implemented utilizing federal aid highway funds; and is therefore exempt from discovery or admission into evidence pursuant to 23 U.S.C. 409."

Supporting Documents

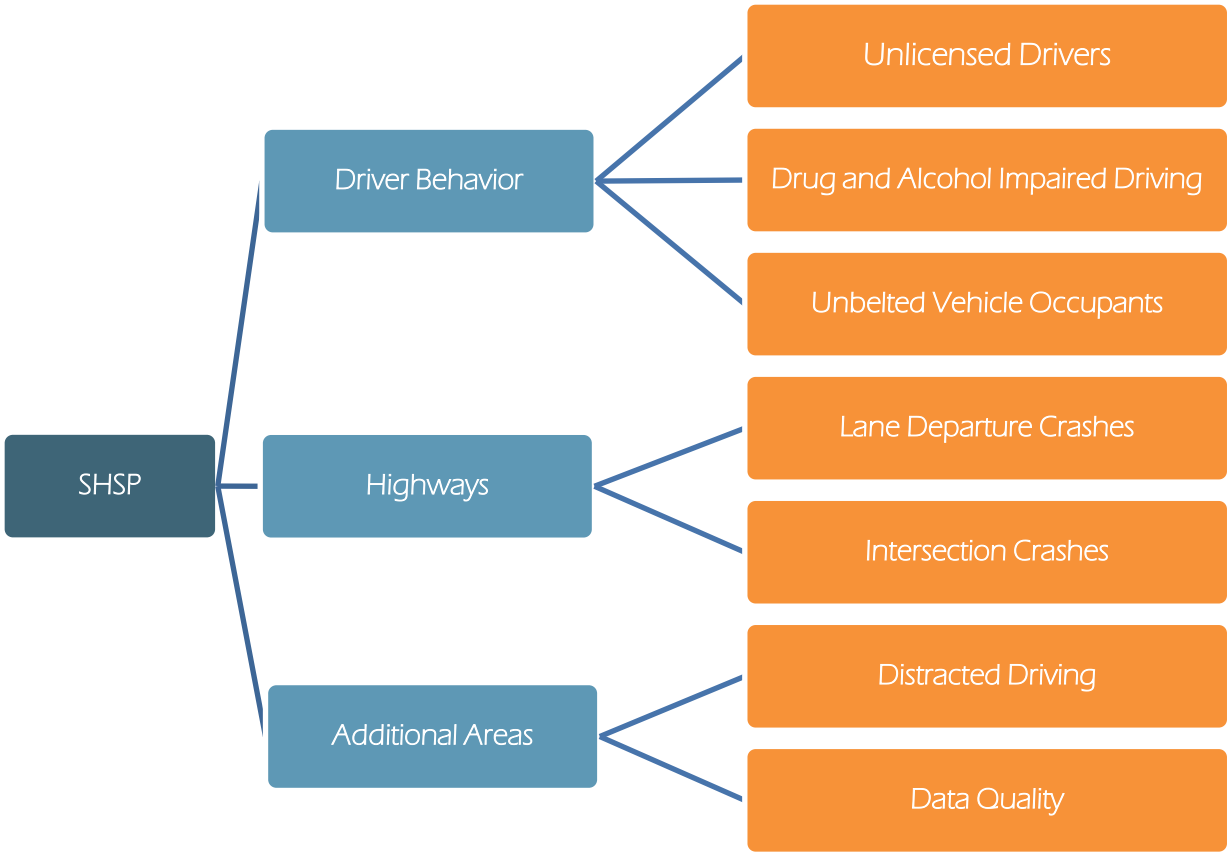
Highway Safety Improvement Program (HSIP)

The FAST Act requires each state to maintain an annually updated Highway Safety Improvement Program (HSIP). The HSIP must include the FHWA performance measures for roadway safety and the development of a Strategic Highway Safety Plan (SHSP). The required safety performance measures, state targets, and the MPO's existing performance are discussed in *Technical Report #3: Transportation Performance Management Report*.

Strategic Highway Safety Plan (SHSP)

A SHSP is a statewide coordinated safety plan developed and maintained by each state to reduce fatalities along all state highways and public roads. The SHSP[1], developed by MDOT and most recently updated in 2019, uses the 4Es of traffic safety: Engineering, Enforcement, Emergency Response, and Education. The SHSP also identifies strategies and emphasis areas for analysis and investment. The MDOT SHSP emphasis areas are shown in Figure 2.7.

Figure 2.7: 2019 SHSP Emphasis Areas



[1] http://mdot.ms.gov/documents/traffic%20engineering/plan/shsp.pdf

Crash Impacts

According to the most recent Fatal Accident Reporting System (FARS) data, an average of 35,212 people in the United States were killed annually from 2013 through 2017. Every crash, regardless of the severity, costs money and time in damages, emergency services, and delays. These costs affect both governments and taxpayers. One of the goals of the MTP process is to improve travel safety by reducing the risk of crashes on the roadways. This was accomplished by analyzing the data and determining the most hazardous locations in the MPA.

The crash records used in the analysis were obtained from MDOT's Safety Analysis Management System (SAMS) and cover all reported crashes from 2014 through 2018.

The crash records include the:

- severity
- location
- DUI involvement
- vehicle type
- time of day
- number of fatalities or severe injuries
- roadway surface condition
- collision type

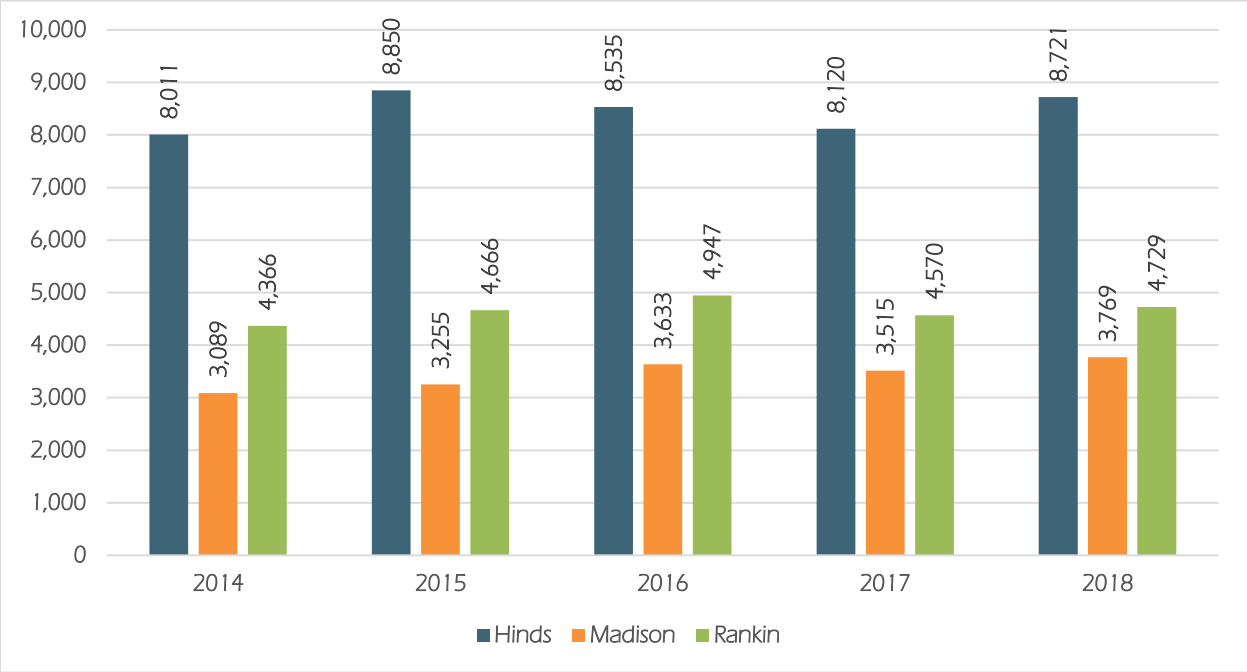
MPA Crash Trends

This section discusses the observed trends regarding all crashes that occurred within the MPA during the analysis period.

Crashes by Year

From 2014 through 2018, there were a total of 82,776 crashes within the MPA. Figure 2.8 displays the total number of crashes within the MPA by year and county.

Figure 2.8: MPA Crashes by Year and County; 2014-2018



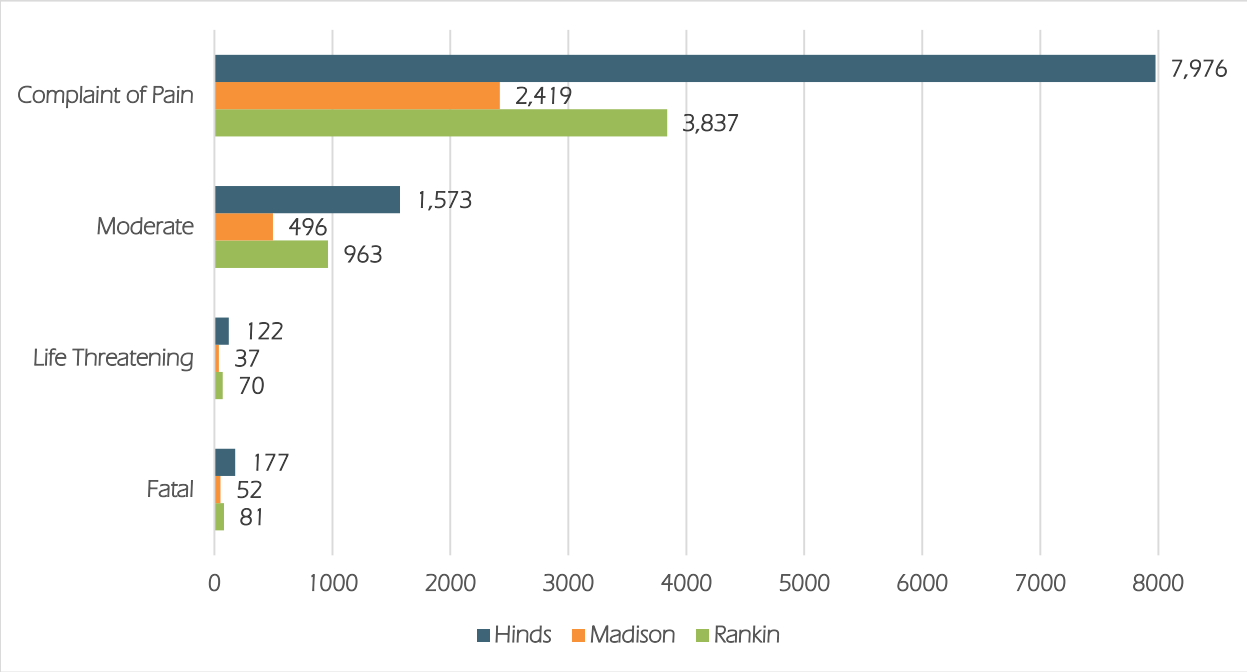
Crash Severity

Crash severity reveals the extent to which crashes in the MPA pose a safety risk to roadway users. Within the MPA there were 310 fatal crashes and 229 life-threatening (severe injury) crashes during the analysis period. Less than one (1) percent of the total crashes resulted in a fatality or severe injury. Figure 2.9 displays the severity of the fatal/injury crashes within the MPA by county.

78.5%

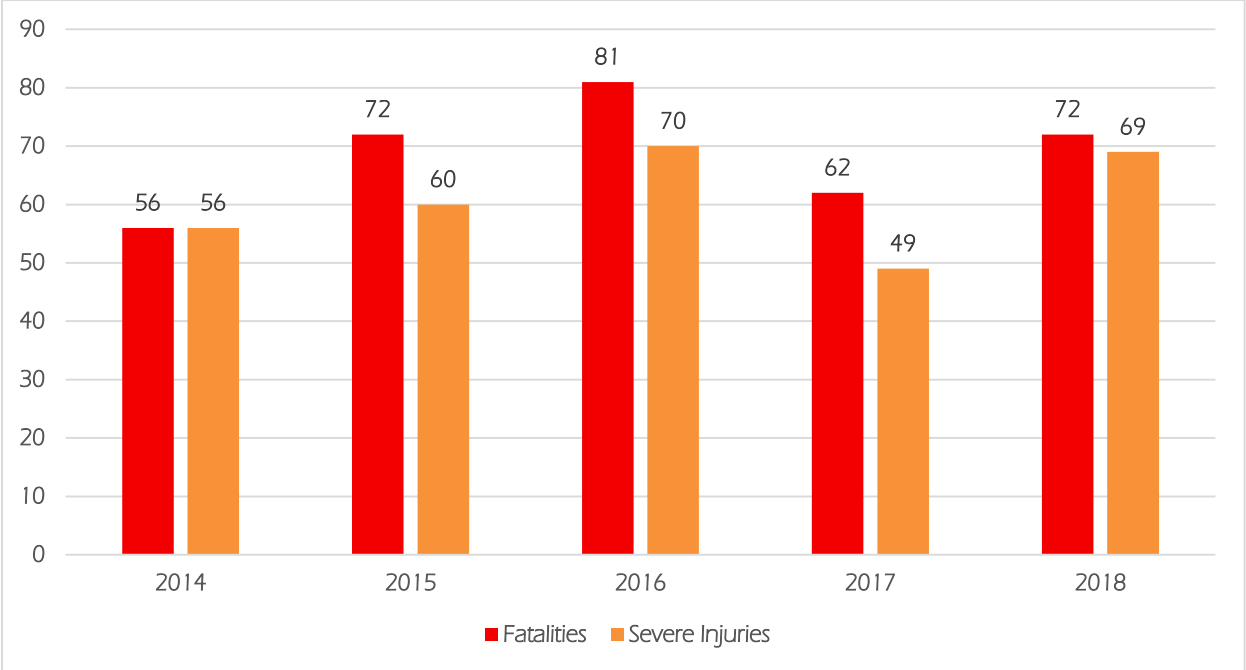
Crashes with Property Damage Only

Figure 2.9: Severity of Fatal/Injury Crashes; 2014-2018



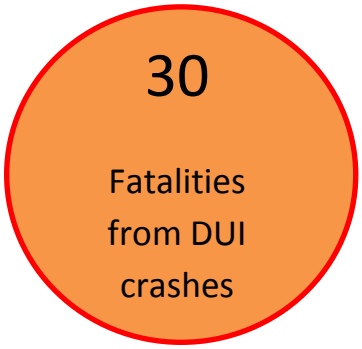
From 2014 through 2018, the fatal and life-threatening crashes resulted in 343 deaths and 304 severe injuries. The total fatalities and severe injuries, by year, during this time period are shown in Figure 2.10.

Figure 2.10: Fatalities and Severe Injuries; 2014-2018



Driving Under the Influence (DUI) Crashes

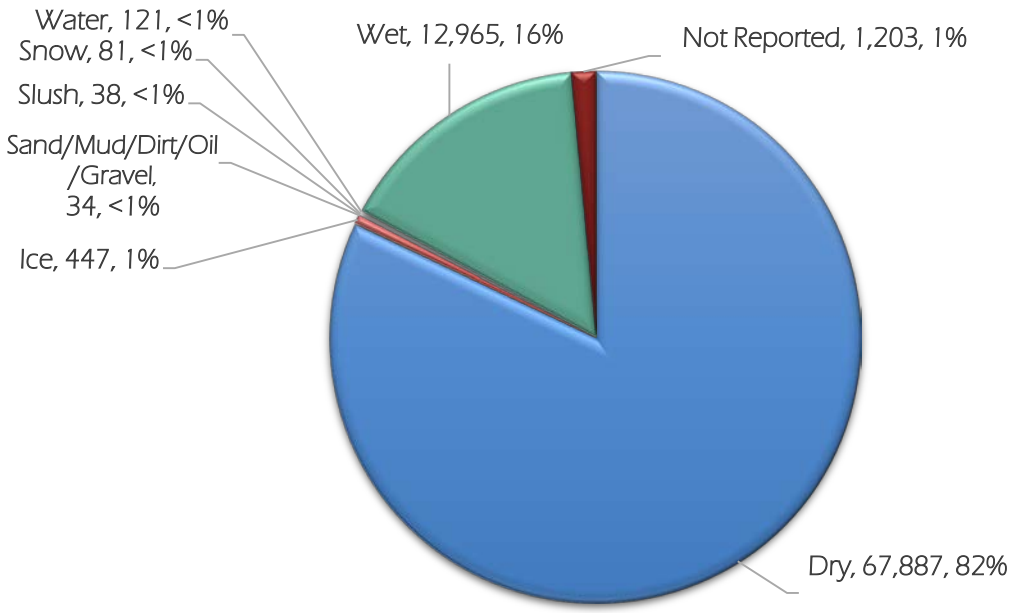
From 2014 through 2018, there were 1,693 crashes that involved drivers under the influence of a substance (alcohol, drugs, etc.) This means approximately two (2) percent of the crashes in the MPA were related to DUI. However, these crashes also resulted in nearly nine (9) percent of the fatalities within the area.



Crash Times

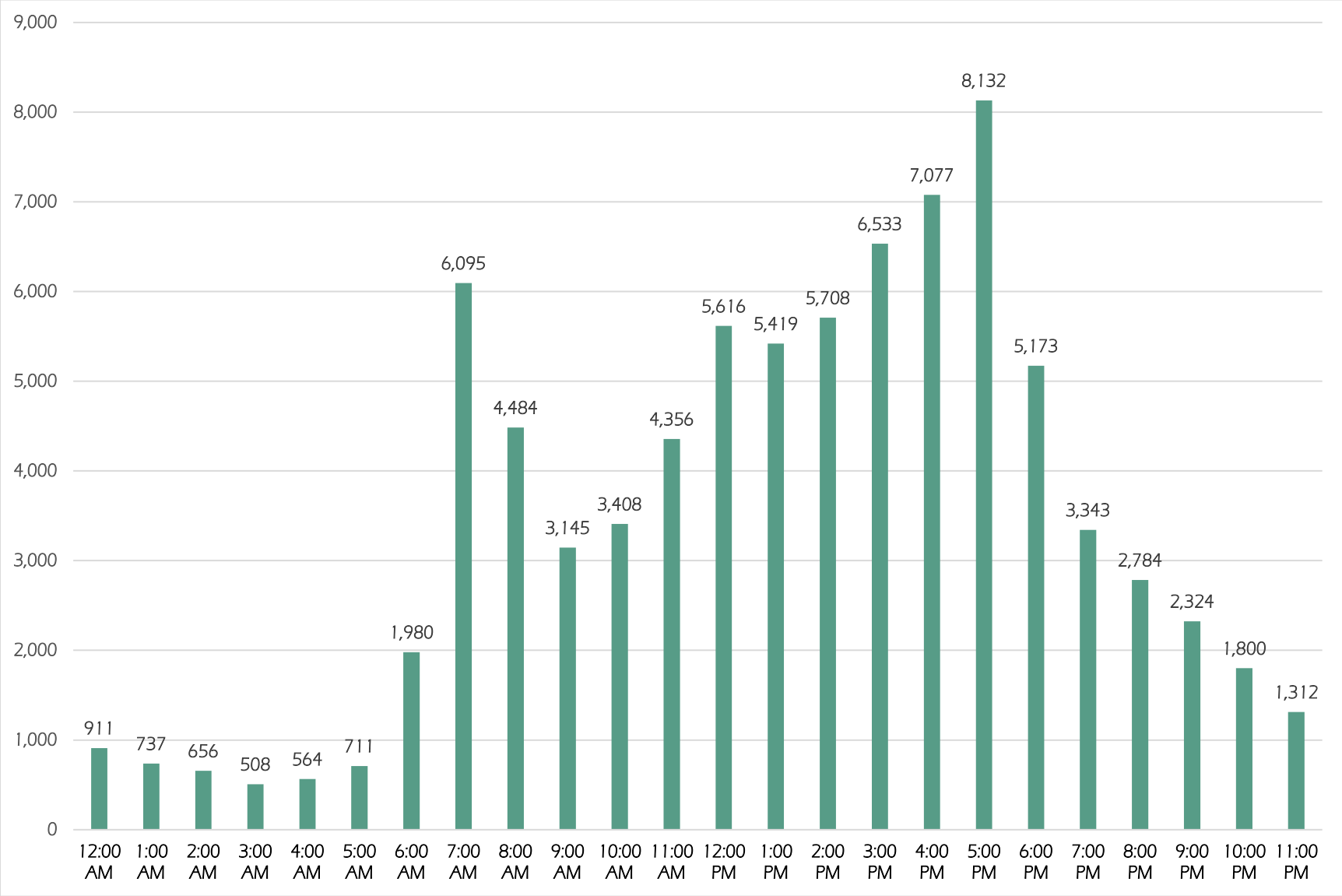
Identifying when crashes occur can assist with developing countermeasures for crashes affected by lighting, congestion, or other factors. Within the MPA, just under 25 percent of the crashes occurred during hours where there is little to zero daylight. Additionally, just over 26 percent of the MPA's crashes occur from 3 PM to 6 PM. This is likely the result of high traffic volumes when children are released from school or people return home from work. The hour in which the crashes occurred is displayed in Figure 2.11.

Roadway Surface Condition



The roadway surface can also contribute to a crash through adverse conditions such as rain, oil, debris, or other sources. These conditions temporarily reduce the safety of the roadway and can lead to a crash. However, more than 82-percent of the crashes occurred during dry conditions. This means the roadway surface condition is not a contributing factor in the vast majority of crashes.

Figure 2.11: Crashes by Hour, 2014-2018



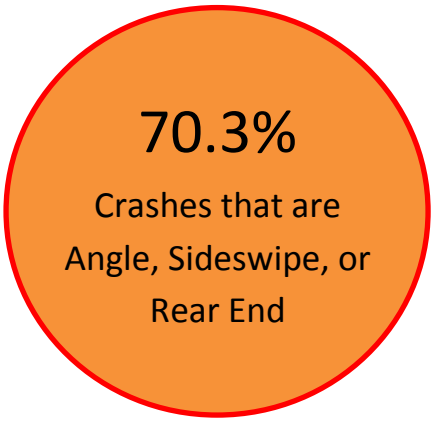
Collision Type

This study also considers collision types that occurred. Table 2.4 displays the crashes by collision type and county.

Table 2.4: Crashes by Collision Type, 2014-2018

Collision Type	Hinds County	Madison County	Rankin County	Total
Angle	6,546	3,110	3,761	13,417
Animal	97	39	56	192
Bicycle	58	27	17	102
Deer	856	1,130	533	2,519
Fell from Vehicle	136	52	138	326
Fixed Object	714	200	299	1,213
Head-on	385	92	147	624
Hit and Run	1,439	142	129	1,710
Jackknife	17	8	12	37
Left-turn Cross Traffic	307	111	137	555
Left-turn Same Roadway	1,867	625	1,289	3,781
Opposite Direction Sides	0	0	1	1
Other	56	73	126	255
Other in Road	420	72	117	609
Other Object	191	45	60	296
Overturn	88	35	54	177
Parked Vehicle	2,350	750	779	3,879
Pedestrian	379	62	62	503
Rear-end Slow or Stop	14,907	6,898	10,273	32,078
Rear-end Turn	499	292	338	1,129
Right-turn Cross Traffic	66	15	8	89
Run-off Road - Left	1,487	601	909	2,997
Run-off Road - Right	2,138	969	1,391	4,498
Run-off Road - Straight	79	30	54	163
Sideswipe	7,111	1,867	2,571	11,549
Train	16	1	7	24
Unknown	28	15	10	53

Source: SAMS, 2019; NSI, 2019



Crash Locations

The nature of this study is only to identify trends; thus, it did not attempt to analyze each hazardous location and corresponding crash records for specific solutions. However, it features an identification of locations that experience the highest crash frequencies or rates. Crash frequencies reflect how often crashes occur at a given location and are expressed in crashes per year. Crash rates reflect the amount of crashes compared to the traffic volumes a roadway experiences and are expressed as crashes per million vehicle miles traveled for roadway segments. Intersection crash rates are expressed as crashes per million vehicles entering the intersection.

The hazardous locations shown in this report are not a ranking of these locations, but merely a list developed for informational purposes.

Segment Crashes

For this study, roadway segments are defined in two ways:

- A roadway link between two significant roadways.
- A roadway link between a significant roadway and a specific distance from that point.

Crashes on segments can occur due to roadway design, pavement condition, lighting, or other factors. A segment identified in this analysis should be further analyzed in additional studies to determine what contributes to the high crash frequency and/or crash rate it experiences. These studies should also be used to develop site-specific countermeasures.

Crash Frequencies

The total crash frequency for a roadway segment is the number of reported crashes between 2014 and 2018 that were not within 150 feet of an intersection. Table 2.5 displays the roadway segments in the MPA that have the highest crash frequencies and a breakdown of the severity of the crashes. These locations are shown in Figure 2.12.

Crash Rates

Crash rates for the study area were based on the model network layer and existing (2018) volumes obtained from the Jackson MPO travel demand model. The length of each segment and the corresponding daily traffic volumes from the model are used in the crash rate equation.

The segment crash rate equation is:

$$Segment\ Crash\ Rate = \frac{N * 10^6}{365 * ADT * L}$$

Where: Segment Crash Rate = crashes per million vehicle miles traveled

N = average annual crash frequency of the segment

ADT = average daily traffic of the segment based on the 2018 Travel Demand Model

L = length of the model segment in miles

Table 2.6 displays the roadway segments in the MPA that have the highest crash rates. These locations are shown in Figure 2.13.

Table 2.5: Top 20 Crash Frequency Segments and Severity, 2014-2018

Route	Location	Total Crashes	Average Annual Crash Frequency[1]	Fatal	Life Threatening	Moderate Injury	Complaint of Pain	Property Damage Only
MS 25 (Lakeland Dr)	0.35 miles east of Ridgewood Rd to 0.23 miles west of Treetops Blvd	363	72.6	0	0	10	60	293
MS 25 (Lakeland Dr)	0.39 miles west of Old Fannin Rd to Old Fannin Rd	199	39.8	0	1	3	26	169
MS 25 (Lakeland Dr)	Old Fannin Rd to 0.42 miles east of Old Fannin Rd	152	30.4	0	1	5	31	115
I-20 WB	Gallatin St Off Ramp (Exit 45A) to S State St On Ramp	151	30.2	1	0	6	37	107
MS 18 (Crossgates Blvd)	US 80 to 0.19 miles south of US 80	151	30.2	0	0	7	19	125
E County Line Rd	I-55 Service Rd to 0.11 miles west of Ridgewood Rd	142	28.4	0	0	2	19	121
W Woodrow Wilson Ave	Livingston Rd to 0.16 miles east of Livingston Rd	131	26.2	0	1	4	27	99
I-55 SB	E Woodrow Wilson Ave On Ramp to 0.14 miles south of E Woodrow Wilson Ave On Ramp	130	26.0	0	0	2	20	108
I-55 SB	E Fortification St Off Ramp (Exit 96C) to E Fortification St On Ramp	122	24.4	1	0	2	22	97
Hwy 463	0.13 miles east of Grandview Blvd to 0.10 miles west of Crawford St	122	24.4	0	0	9	18	95
Grandview Blvd	Hwy 463 to 0.28 miles south of MS 463	121	24.2	0	0	3	13	105
US 80	0.16 miles east of MS 18 (Robinson Rd) to 0.05 miles west of I-220 SB on ramp	119	23.8	0	0	3	32	84
I-55 SB	I-20 EB Off Ramp (Exit 94) to Merge with I-20 WB	118	23.6	1	0	6	21	90
US 49	Cleary Rd / Richland Cir to Wilson Dr	117	23.4	0	1	2	28	86
US 80	Springridge Rd to 0.34 miles east of Springridge Rd	116	23.2	0	0	5	18	93
US 49	Wilson Dr to 0.27 miles north of Wilson Dr	114	22.8	0	0	1	24	89
I-55 NB	0.22 miles south of E Woodrow Wilson Ave Off Ramp (Exit 98A) to E Woodrow Wilson Ave Off Ramp (Exit 98A)	113	22.6	0	0	1	21	91
I-55 NB	E McDowell Rd On Ramp to S State St Off Ramp (Exit 92B)	108	21.6	0	0	1	23	84
US 49	E Main St to 0.63 miles north of E Main St	108	21.6	0	0	3	21	84
MS 25 (Lakeland Dr)	Museum Blvd to 0.30 miles east of Museum Blvd	107	21.4	0	0	1	16	90
Total		2,804	560.8	3	4	76	496	2,225

Source: SAMS, 2019; NSI, 2019

[1] The average annual crash frequency is the average number of reported crashes per year between 2014 and 2018.

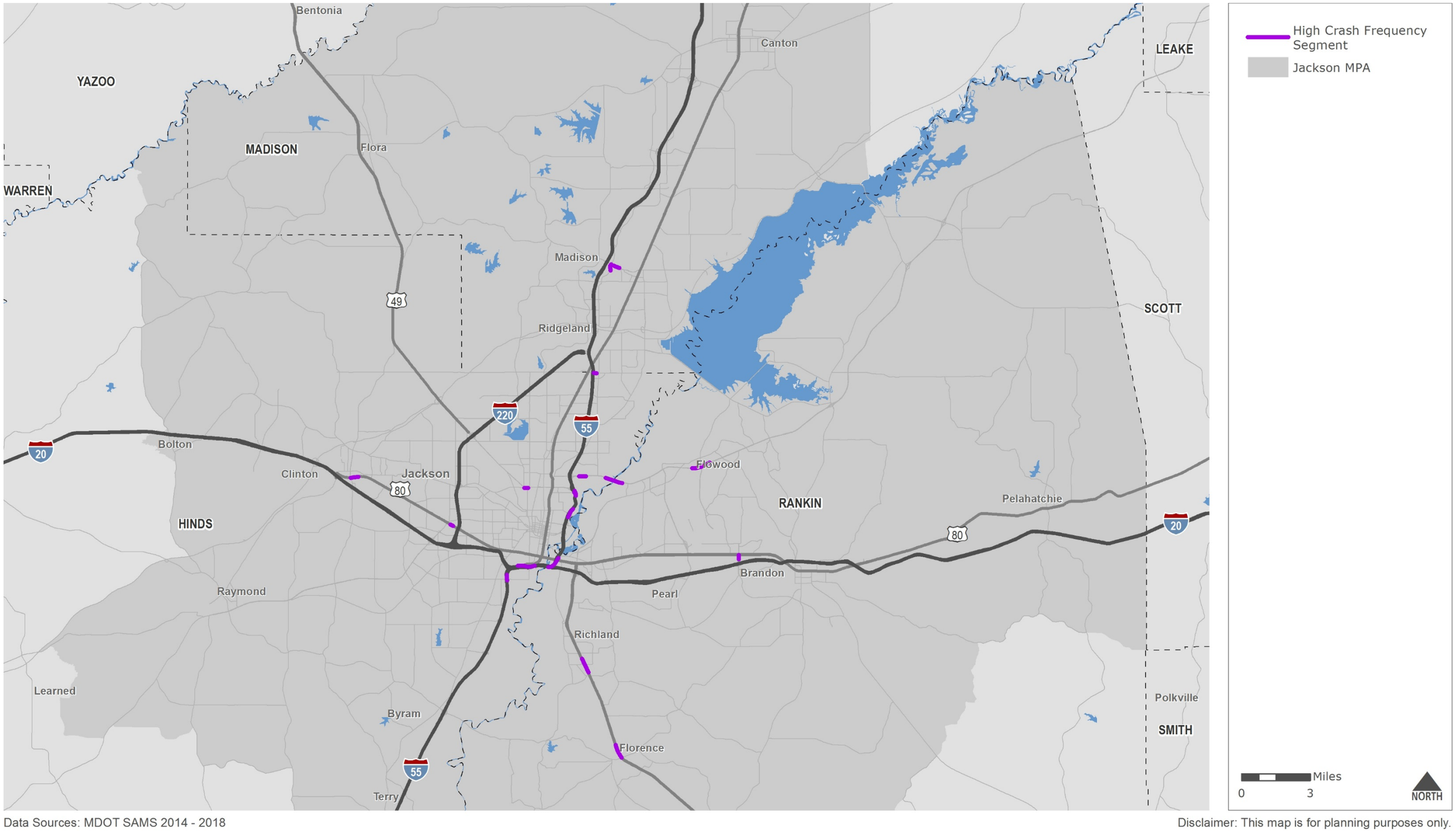
Table 2.6: Top 20 Crash Rate Segments, 2014-2018

Route	Location	Total Crashes	Average Annual Crash Frequency[1]	ADT	Length (mi)	Crash Rate
I-55 E Frontage Rd	0.08 miles north of Ridgewood Court Dr to I-55 Northbound Off-Ramp to E County Line Rd	56	11.2	1,740	0.12	152.75
Dalton St	W Pascagoula St to Dr. Robert Smith Sr. Pkwy	13	2.6	721	0.12	80.77
Monroe St	Leake St to Belmont St	12	2.4	536	0.20	62.35
Grandview Blvd	0.28 miles south of MS 463 to MS 463	121	24.2	4,252	0.28	54.91
E Harper St	US 49 to 0.30 miles east of of US 49	62	12.4	3,061	0.30	37.36
S Wheatley St	0.25 miles south of Towne Center Blvd to Towne Center Blvd	24	4.8	1,554	0.25	34.21
N Jefferson St	E Fortification St to Poplar Blvd	12	2.4	1,242	0.17	30.38
St Charles St	Ellis Ave to Fryant Ave	11	2.2	1,479	0.15	27.15
Peachtree St	Riverside Dr to 0.17 miles north of Riverside Dr	17	3.4	2,141	0.17	26.08
Williams Rd	MS 469 to Copper Ridge Way	15	3.0	528	0.60	25.99
Industrial Dr	Cleary Rd to Brandon Ave	9	1.8	505	0.38	25.76
I-220	NB Off Ramp to WB Clinton Blvd	3	0.6	537	0.13	23.86
Sedgwick Dr	Westbrook Rd to Parkway Dr	6	1.2	547	0.25	23.79
US 80	0.16 miles east of Robinson Rd to 0.14 miles west of I-220	119	23.8	23,585	0.12	23.21
Terry Rd SB	Raymond Rd to I-20	51	10.2	5,740	0.21	23.20
Florence Ave	Lincoln Ave to 0.11 miles east of Lincoln Ave	5	1.0	1,094	0.11	21.77
Ridgewood Ct Dr	Ridgewood Rd to 0.20 miles east of Ridgewood Rd	18	3.6	2,299	0.20	21.48
N Jefferson St	Poplar Blvd to Pinehurst St	4	0.8	581	0.18	21.20
I-20	Westbound On-Ramp from Southbound Ellis Ave	13	2.6	1,858	0.18	21.15
Madison Ave	I-55 W Frontage Rd to I-55 E Frontage Rd	28	5.6	6,287	0.12	20.69

Source: SAMS, 2019; NSI, 2019

[1] The average annual crash frequency is the average number of reported crashes per year between 2014 and 2018.

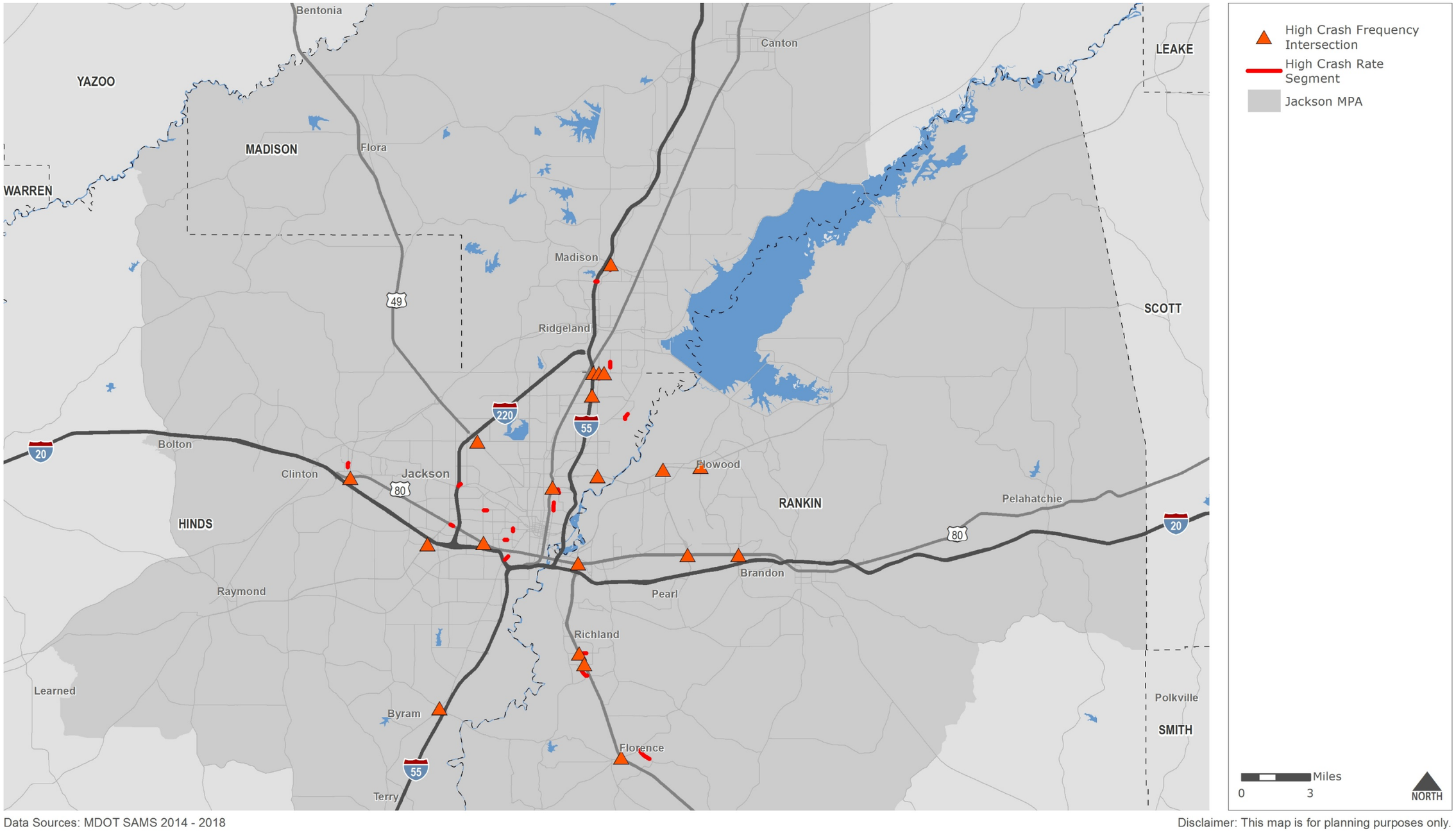
Figure 2.12: High Crash Frequency Areas, 2014-2018



Data Sources: MDOT SAMS 2014 - 2018

Disclaimer: This map is for planning purposes only.

Figure 2.13: High Crash Rate Areas, 2014-2018



Data Sources: MDOT SAMS 2014 - 2018

Disclaimer: This map is for planning purposes only.

Intersection Crashes

There were nearly 27,000 intersection crashes in the MPA from 2014 to 2018.

32.7%
of crashes in the MPA occur at intersections

Crash Frequencies

Table 2.7 shows the 20 intersections in the MPA with the highest crash frequency and their severity. Table 2.8 shows the collision types that occurred at these intersections. These locations are also displayed in Figure 2.12.

Additional studies should be conducted on these intersections to identify the cause of the crashes and how to reduce the severity and types of crashes they experience.

19.1%
of intersection crashes occur at the Top 20 crash frequency locations

Crash Rates

The intersection crash rate equation is:

$$Intersection\ Crash\ Rate = \frac{N * 10^6}{365 * ADT}$$

Where:

Intersection Crash Rate = crashes per million vehicles entering

N = average annual crash frequency of the intersection

ADT = average daily traffic entering the intersection based on the 2018 Travel Demand Model

Table 2.9 shows the ten (10) intersections with the highest crash frequencies in the study area and their corresponding crash rates.

Table 2.7: Top 20 Intersections with High Crash Frequency by Severity, 2014-2018

Intersection	Total Crashes	Average Annual Crash Frequency[1]	Fatal	Life-Threatening	Moderate Injury	Complaint of Pain	Property Damage Only
County Line Rd at I-55 E Frontage Rd	616	123.2	0	0	7	97	512
US 80 at Crossgates Blvd	351	70.2	0	0	3	47	301
MS 18 at Greenway Dr	307	61.4	0	0	11	66	230
US 80 at Springridge Rd / Clinton Pkwy	299	59.8	0	0	2	60	237
State St at Woodrow Wilson Ave	283	56.6	0	0	4	51	228
US 49 at MS 469	281	56.2	1	0	5	41	234
MS 25 (Lakeland Dr) at MS 475	254	50.8	0	0	6	35	213
Medgar Evers Blvd at Northside Dr	243	48.6	0	2	7	60	174
US 80 at MS 475	241	48.2	0	1	8	41	191
US 49 at Harper St	239	47.8	0	1	5	37	196
MS 25 (Lakeland Dr) at Old Fannin Rd	227	45.4	0	0	1	39	187
MS 463 at Grandview Blvd	212	42.4	0	0	2	22	188
US 49 at Scarbrough St / Wilson Dr	209	41.8	1	1	8	40	159
MS 25 (Lakeland Dr) at Ridgewood Rd	207	41.4	0	0	4	37	166
Siwell Rd at Terry Rd	205	41.0	0	0	5	32	168
County Line Rd at Ridgewood Rd	205	41.0	1	0		26	178
US 80 at Ellis Ave	204	40.8	2	0	7	52	143
US 80 at US 49	197	39.4	0	1	8	38	150
Beasley Rd / Adkins Blvd at I-55 E Frontage Rd	196	39.2	0	0	9	37	150
County Line Rd at Ridgewood Ct / Centre St	196	39.2	0	1	3	29	163
Total	5,172	1,034.4	5	7	105	887	4,168

Source: SAMS, 2019; NSI, 2019

[1] The average annual crash frequency is the average number of reported crashes per year between 2014 and 2018.

Table 2.8: Top 20 Intersections with High Crash Frequency by Collision Type, 2014-2018

Intersection	Total Crashes	Average Annual Crash Frequency[1]	Angle	Bicycle	Deer	Fell from Vehicle	Fixed Object	Head On	Hit and Run	Jackknife	Left Turn Cross Traffic	Left Turn Same Roadway	Other	Other in Road	Other Object	Overturn	Parked Vehicle	Pedestrian	Rear End Slow or Stop	Rear End Turn	Right Turn Cross Traffic	Run Off Road - Left	Run Off Road - Right	Run Off Road - Straight	Sideswipe	Unknown
County Line Rd at I-55 N. Frontage Rd	616	123.2	57	0	0	0	0	0	1	0	3	12	0	0	0	0	0	1	492	17	0	0	1	32	0	0
US 80 at Crossgates Blvd	351	70.2	22	0	1	0	0	0	3	0	1	12	0	0	0	0	1	0	265	19	0	1	1	25	0	0
MS 18 at Greenway Dr	307	61.4	20	0	0	1	0	0	2	0	2	34	0	0	0	0	0	0	210	3	2	1	2	29	0	1
US 80 at Springridge Rd / Clinton Pkwy.	299	59.8	26	0	1	0	0	0	0	0	2	48	0	0	1	0	0	0	201	1	0	0	0	19	0	0
State St. at Woodrow Wilson Ave	283	56.6	17	0	0	0	0	0	0	0	1	36	0	0	0	0	0	1	188	0	0	0	0	40	0	0
US 49 at MS 469	281	56.2	16	0	0	1	1	1	0	0	0	16	0	0	0	1	0	1	204	2	1	1	0	36	1	0
MS 25 (Lakeland Dr) at MS 475	254	50.8	15	0	0	0	2	0	0	0	1	20	0	0	0	0	0	0	173	3	0	2	6	32	0	0
Medgar Evers Blvd at Northside Dr	243	48.6	13	0	0	0	0	2	5	0	2	20	0	0	0	0	0	0	172	6	0	1	0	22	0	0
US 80 at MS 475	241	48.2	10	0	0	0	0	0	0	0	0	12	0	0	0	0	0	0	188	10	0	1	2	18	0	0
US 49 at Harper St.	239	47.8	25	0	0	0	1	0	2	0	0	12	0	0	0	0	3	0	146	4	0	2	1	43	0	0
MS 25 (Lakeland Dr) at Old Fannin Rd	227	45.4	11	0	0	0	0	0	0	0	1	12	0	0	0	0	0	1	172	5	0	0	0	25	0	0
MS 463 at Grandview Blvd	212	42.4	28	0	0	0	0	0	0	0	0	13	0	0	0	0	1	0	110	7	0	1	1	51	0	0
US 49 at Scarbrough St. / Wilson Dr	209	41.8	13	0	0	1	2	1	0	0	2	23	1	1	0	0	2	1	140	6	0	0	0	16	0	0
MS 25 (Lakeland Dr) at Ridgewood Rd	207	41.4	14	0	0	0	1	1	0	1	0	8	0	0	0	0	0	0	147	2	1	3	1	28	0	0
Siwell Rd at Terry Rd	205	41.0	38	0	0	0	0	0	0	0	3	26	0	0	0	0	0	1	117	4	0	0	1	15	0	0
County Line Rd at Ridgewood Rd	205	41.0	36	1	0	0	0	0	0	0	0	21	0	1	0	0	0	1	108	2	0	1	2	32	0	0
US 80 at Ellis Ave	204	40.8	36	0	0	0	1	1	5	0	6	22	0	1	0	0	0	0	95	1	0	0	1	35	0	0
US 80 at US 49	197	39.4	13	0	0	0	0	1	0	0	2	36	0	0	0	0	0	0	111	4	0	1	2	27	0	0
Beasley Rd / Adkins Blvd at I-55 N. Frontage Rd	196	39.2	51	0	0	0	1	0	0	0	3	3	0	0	0	0	0	0	84	4	0	0	0	50	0	0
County Line Rd at Ridgewood Ct. / Centre St.	196	39.2	11	0	0	0	0	0	0	0	1	5	0	0	0	0	0	1	144	1	0	0	0	33	0	0
Total	5,172	1,034.4	472	1	2	3	9	7	18	1	30	391	1	3	1	1	7	8	3,467	101	4	15	21	608	1	1

Source: SAMS, 2019; NSI, 2019

[1] The average annual crash frequency is the average number of reported crashes per year between 2014 and 2018.

Table 2.9: Top 10 High Crash Frequency Intersections and Crash Rates, 2014-2018

Intersection	Total Crashes	Average Annual Crash Frequency[1]	ADT	Crash Rate
County Line Rd at I-55 N. Frontage Rd	616	123.2	50,908	6.63
US 80 at Crossgates Blvd	351	70.2	47,127	4.08
MS 18 at Greenway Dr	307	61.4	40,100	4.19
US 80 at Springridge Rd / Clinton Pkwy	299	59.8	32,314	5.07
State St at Woodrow Wilson Ave	283	56.6	46,475	3.34
US 49 at MS 469	281	56.2	40,811	3.77
MS 25 (Lakeland Dr) at MS 475	254	50.8	62,610	2.22
Medgar Evers Blvd at Northside Dr	243	48.6	32,488	4.10
US 80 at MS 475	241	48.2	40,597	3.25
US 49 at Harper St	239	47.8	47,636	2.75

Source: SAMS, 2019; NSI, 2019

[1] The average annual crash frequency is the average number of reported crashes per year between 2014 and 2018.

2.8 Roadway Security

While safety and security are closely related, they are differentiated by the cause of the harm from which the transportation system and its users are being protected.

Safety encompasses the prevention of unintentional harm to system users or their property. This includes vehicular crashes, train derailments, slope failures, sudden destruction of roadways, or non-motorized user injuries. Security involves the prevention, management, and response to intentional harm to the transportation system or its users. This includes:

- theft or dismemberment of elements of the transportation infrastructure,
- assault on users of the system, or
- large-scale attacks intended to completely disrupt the movement of people and goods.

Security concerns can include natural disasters, acts of violence, and terrorism.

MPO Role in Security

The MPO's main role in planning for security is to coordinate with relevant agencies, such as:

- Emergency management officials
- Police and sheriff's departments
- Fire departments
- Other first responders

> MPOs can take certain measures to improve security prevention, protection, response, and recovery.

Prevention

When discussing security, prevention refers to efforts to limit access to resources that may be compromised or efforts to increase surveillance. Examples of prevention measures include:

- Access control systems
- Closed Circuit Television (CCTV) systems
- Security alarms
- Fencing
- Locks
- Architectural barriers

The design of facilities and public spaces can also incorporate features that deter security breaches.

Protection

High vulnerability risk facilities should have additional design measures considered. These measures would mitigate potential security risks, should they occur. Protection efforts could also include law enforcement where necessary.

Response

Redundancy of transportation facilities should be encouraged in capital project planning. This assists in emergency evacuations or detours should a particular segment of the transportation network become unavailable. The use of Intelligent Transportation Systems (ITS) to control traffic signals and other controls also assists in responding to security risks.

Recovery

Transportation decision-makers should be familiar with both short-term and long-term recovery plans for the MPA. This includes everything from evacuations to restoring local businesses and neighborhoods. MDOT has dedicated evacuation routes, and each county in the MPA has its own emergency management body and hazard mitigation plan. More information can be found on each county's website at:

Hinds County Department of Emergency Management-

http://www.hindscountyms.com/departments/emergency-management

Madison County Emergency Management Agency-

https://www.madisoncoema.org/

Rankin County Emergency Management Operations-

https://www.rankincounty.org/department/index.php?structureid=26

Key Security Participants

As stated previously, the MPO coordinates with relevant agencies and is in a support role when security issues arise. The MPO can serve as a medium of communication between the various agencies involved. Several key participants to the security management process have been identified below.

State and Local Governments

MDOT's Emergency Services Section is under the Office of Enforcement. The section oversees and administers MDOT's emergency services which include:

- Emergency plan development and maintenance,
- Coordination of emergency response operations,
- Coordination of state and federal emergency preparedness and response programs, and
- Coordination of Homeland Security initiatives.

Information on the MDOT's emergency services can be found at:

http://mdot.ms.gov/portal/emergency_services.aspx

Mississippi Emergency Management Agency (MEMA)

An additional provider for emergency management in the state is MEMA. MEMA defines its mission as:

> "…coordinate activities that will save lives, protect property and reduce suffering of Mississippi's citizens and their communities impacted by disasters through a comprehensive and integrated program of disaster preparedness, response, recovery and mitigation initiatives."

The MEMA website (http://www.msema.org/) provides information and planning to the public and the emergency management communities. This site focuses on continuous development and timely and accurate data.

Local Colleges and Universities

Security threats have necessitated documents and emergency plans for several types of emergencies, including hurricanes, tornadoes, earthquakes, and more.

The MPA is home to multiple college and universities and information about their emergency plans can be obtained from their websites or administrative staff.

Additional MPO Measures

Each MPO is ultimately responsible for crafting a security policy consistent with its goals, state guidance, and the FAST Act. Security must also be considered during the establishment of future MPO goals and the support for MPO funding priorities. The following presents potential areas of focus, recognizing that hurricane evacuation is a primary concern within the Jackson Urbanized Area.

Use of MPO Transportation Model to Assess Evacuation Plans

The TransCAD regional model can be modified to simulate evacuation events. This can be used to test the effectiveness of existing plans or to improve plans for routing traffic through the MPO region.

Use of Area Transit Systems to Support Evacuation Events

The MPO will work with local transit providers to investigate opportunities for the use of transit vehicles to provide for the evacuation of transit dependent populations.

Integration of Intelligent Transportation Systems (ITS) in Evacuation Planning

The MPO supports investment in ITS technologies. The MPO understands the need to study and assess how this technology can be used to assist evacuees in their decision-making and expedite their progress during evacuation events.

Integration of Hurricane Evacuation Purpose and Need in Planning for Future Roadway Improvements

As the MTP projects are refined within the context of the MDOT Construction Program, project features will be reviewed for consistency with a hurricane evacuation purpose and need. Every hurricane produces a unique evacuation event. Evacuees are influenced by the amount of notice provided in advance of the storm's landfall, as well as the projected storm path and intensity. Information on hurricane evacuation routes and procedures can be found at:

http://mdot.ms.gov/hurricanes/

Strategic Highway Network (STRAHNET)

The STRAHNET is a portion of the NHS considered vital to the nation's strategic defense. The current STRAHNET is about 61,000 miles long and links military installations with roadways that provide for the mobility of strategic military assets. All Interstate highways, including I-55, I-20, and I-220 within the MPA, are included as part of the STRAHNET. The MPA contains no other STRAHNET facilities.

The STRAHNET routes need additional considerations, which include maintenance of bridge capability, pavement conditions, and congestion management. The use of ITS along these corridors, particularly dynamic message signs, will allow for better management of the traffic related to military convoys.

3.0 Freight

3.1 Introduction

The movement of freight throughout the MPA affects both the regional and national economy. The region is a major generator of freight, as well as a distribution and processing center for many goods. It is home to many freight facilities including class I railroads and major highways.

3.2 Trucking

Inventory

The MPA contains several roadways that serve freight. It also contains active intermodal terminal facilities designated as intermodal connectors. Within the MPA, I-20 and the portion of I-55 that connects to the intermodal connector in downtown Jackson are part of the National Highway Freight Network (NHFN)[2]. Those roadway sections, as well as the remainder of I-55 and I-220 within the MPA, are part of the National Multimodal Freight Network (NMFN)[3]. In addition to the NHFN and NMFN, MDOT has identified US 49 and MS 25 as part of the Mississippi Freight Network (MFN) within the MPA.

2

Intermodal connectors in the MPA

The first intermodal connector (Facility ID: MS14R) in the MPA is from I-55 to downtown Jackson and provides access to the Canadian Northern Class I railroad. The second (Facility ID: MS13A) connects Jackson Evers International Airport to I-20. The detailed freight network can be found in Mississippi's freight plan[4]. The MDOT's identified freight network within the MPA is shown in Figure 3.1.

[2] https://ops.fhwa.dot.gov/freight/infrastructure/ismt/state_maps/states/mississippi.htm
[3] https://www.transportation.gov/sites/dot.gov/files/docs/State_interimMFN_portrait_Mississippi_alt_text.pdf
[4] http://mdot.ms.gov/documents/planning/freight/documents/MS%20Freight%20Plan.pdf

The following roadways in the MPA are part of the MFN:

Table 3.1 displays the intermodal terminal facilities in the MPA. The MPA also contains several trucking establishments which provide local and long-distance trucking services. The intermodal facilities and major trucking establishments in the MPA are shown in Figure 3.1.

Table 3.1: Intermodal Terminal Facilities for Trucks, 2018

Name	Modes Served	City
Emery Forwarding	Air & Truck	Jackson
Jackson International Airport	Air & Truck	Jackson
Kansas City Southern	Rail & Truck	Richland
Lefleur Paper Company, LLC	Rail & Truck	Richland
Miller Transporters, Inc.	Rail & Truck	Brandon
Warehouse Services, Inc.	Rail & Truck	Jackson
Yellow	Rail & Truck	Richland
USPS-PDC-PDF	Truck & Truck	Jackson

Source: Bureau of Transportation Statistics, 2015 National Transportation Atlas

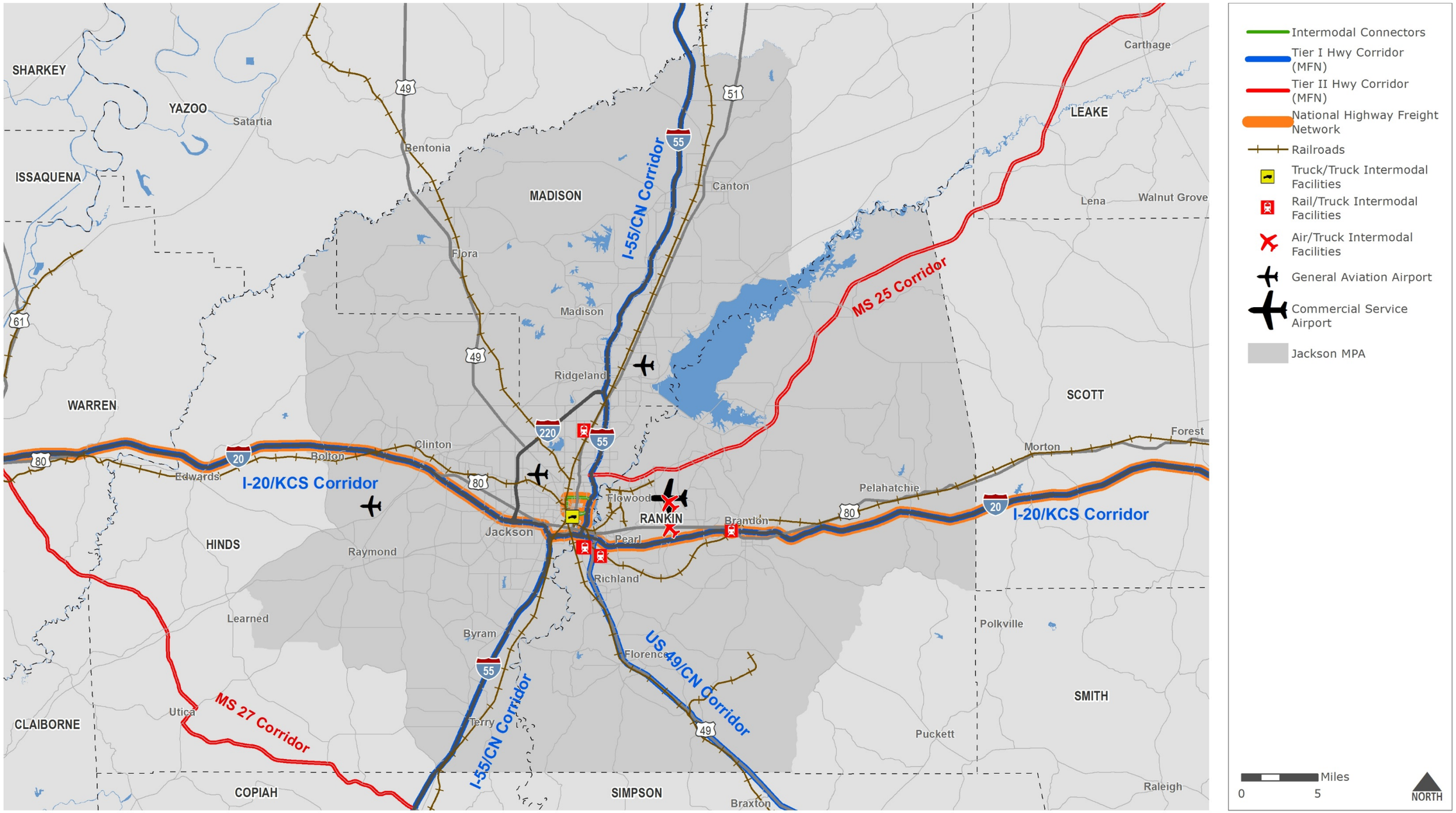
Volumes

To better understand the MPA's freight needs, the 2018 Travel Demand Model's daily truck volumes were used, and these estimated volumes are illustrated in Figure 3.2.

The estimated freight truck volumes suggest the following trends:

- Freight truck traffic is highest on I-20, I-55, US 49 between Richland and Braxton, and MS 25. These correspond to the roadways included in the MFN.
- Freight truck traffic is also relatively high on I-220, US 49 between Jackson and Bentonia, MS 18 between Jackson and Raymond, MS 468, and MS 475.

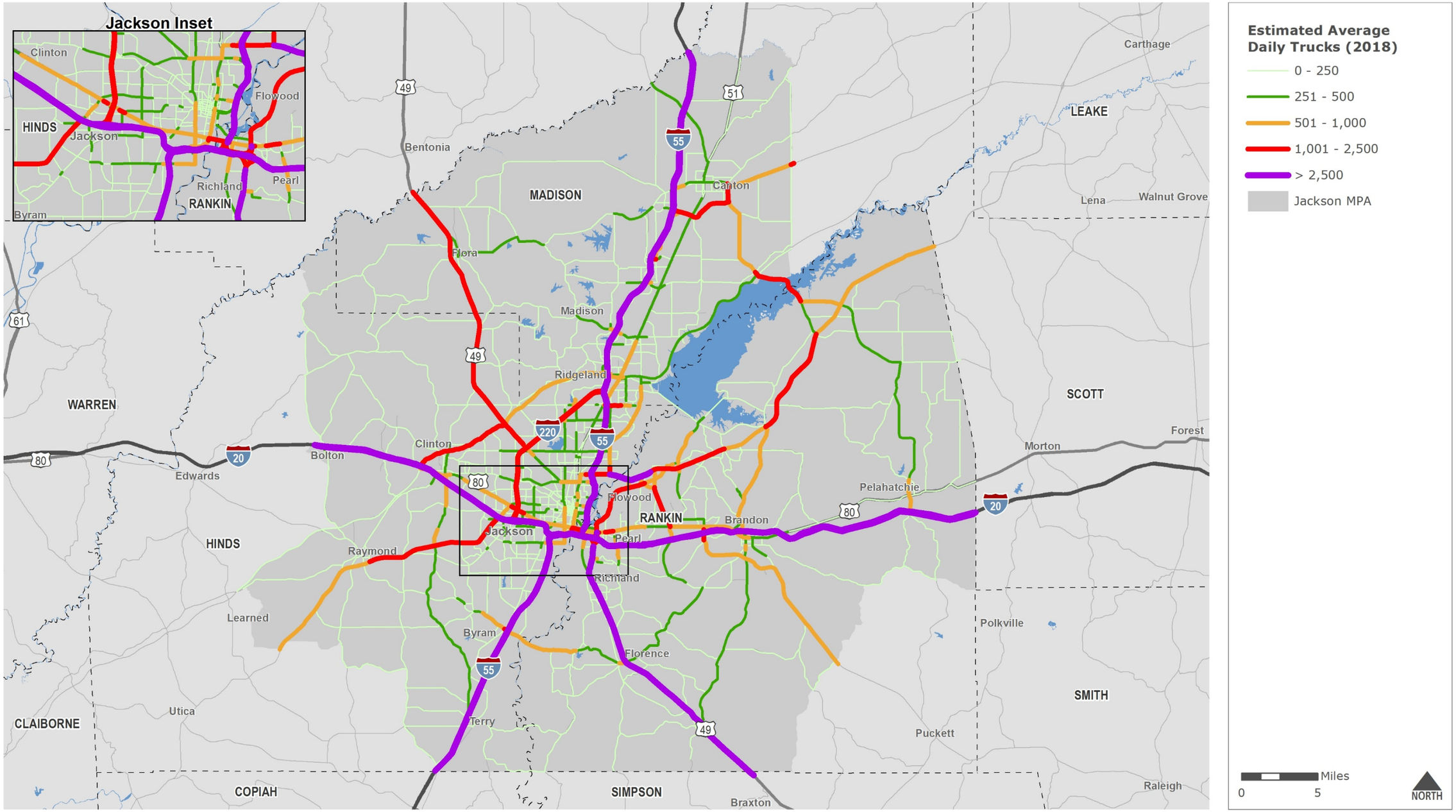
Figure 3.1: Regional Freight Network and Facilities - Trucking, 2018



Data Sources: 2015 National Transportation Atlas; USDOT; MDOT

Disclaimer: This map is for planning purposes only.

Figure 3.2: Modeled Regional Freight Truck Traffic, 2018



Data Sources: Travel Demand Model

Disclaimer: This map is for planning purposes only.

Commodity Flows

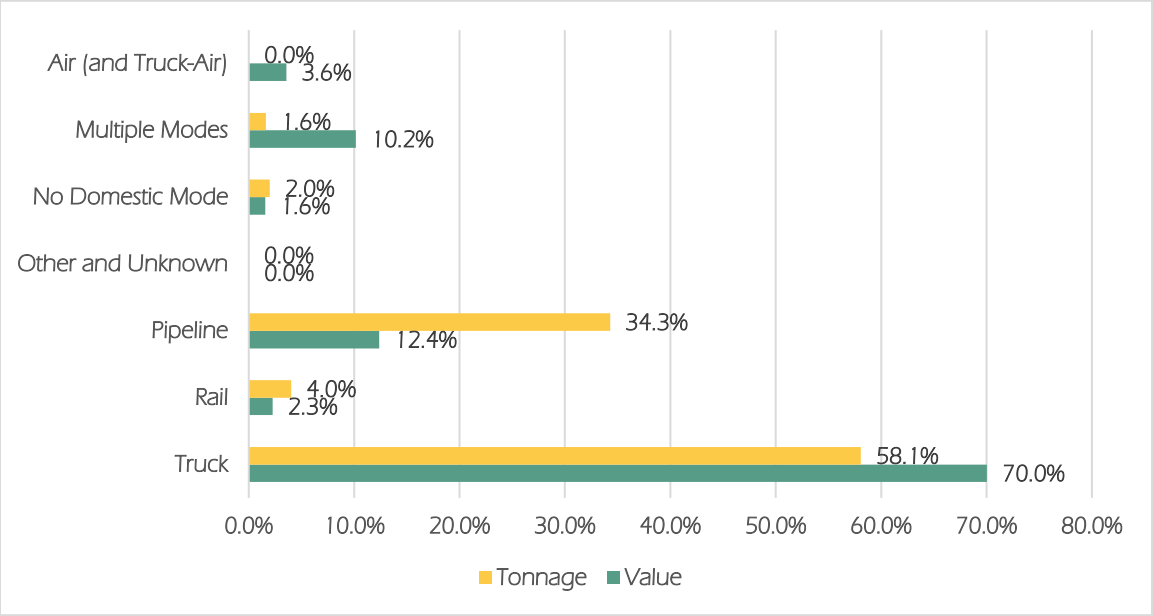
Using data obtained from the FHWA's Freight Analysis Framework (FAF), general trends in freight movement within the MPA can be observed. The freight truck movements for the MPA counties, and their statewide rankings, are summarized below.

In 2016:

- Hinds County ranked seventh in Mississippi by truck freight tonnage and fourth by truck freight value.
- Madison County ranked sixth in Mississippi by truck freight tonnage and sixth by truck freight value.
- Rankin County ranked 20th in Mississippi by truck freight tonnage and 13th by truck freight value.

Highways move the majority of goods in the MPA among all transportation modes. As shown in Figure 3.3, trucks account for 58 percent of total tonnage and 70 percent of total value moved into, out of, and within the MPA. Pipelines are second at 34 percent of total tonnage, though the total value of freight moved by pipeline is only 12 percent. The remaining modes account for approximately eight (8) percent of total tonnage and 18 percent of total value.

Figure 3.3: Percent of Total Tonnage and Value by Mode, 2016



Source: Freight Analysis Framework Version 4

As shown in Table 3.2, most of the truck freight in the MPA originates outside the MPA. By tonnage, approximately 61 percent originates outside the MPA ("inbound" movements) and 37 percent originates in the MPA ("outbound" movements). Only two (2) percent of freight tonnage stays within the MPA. Additionally, nearly 59 percent of the total truck freight tonnage is intrastate.

By value, inbound movements represent approximately 58 percent and outbound movements represent more than 40 percent. Slightly less than two (2) percent of freight, by value, stays within the MPA. Although 59 percent of truck freight tonnage within the MPA is intrastate, only 32 percent of truck freight value within the MPA is intrastate.

Table 3.2: Commodity Flows by Truck, 2016

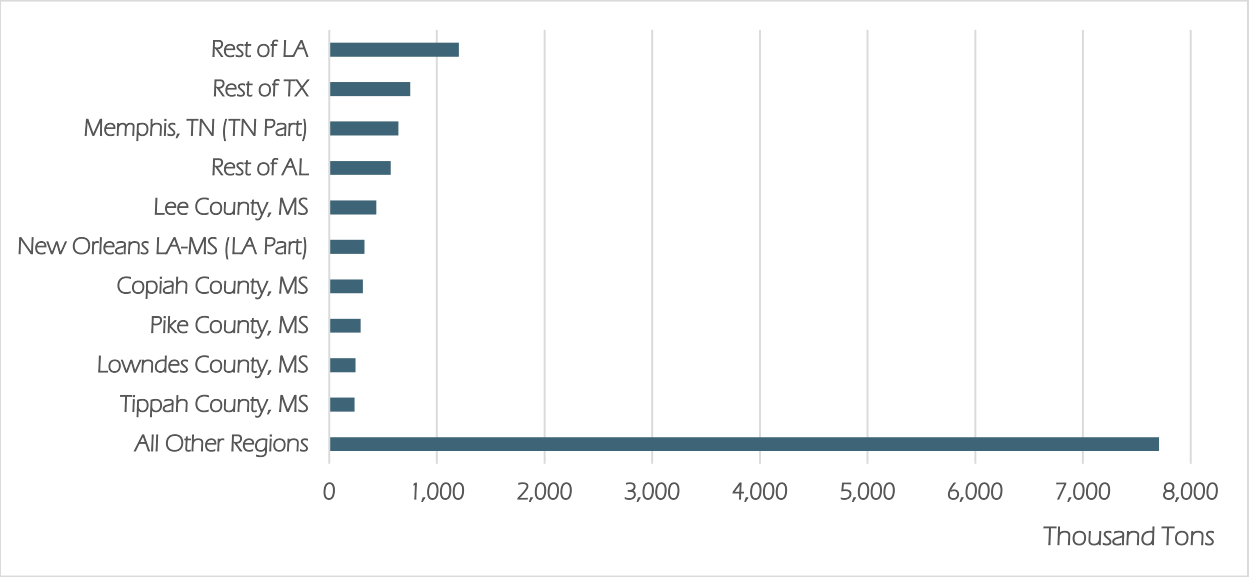
Direction	Tons (Thousands)	Percent of Total	Value ($ Million)	Percent of Total
Inbound (Interstate)	5,744	27.1%	$8,110	38.2%
Inbound (Intrastate)	7,186	33.9%	$4,215	19.8%
Outbound (Interstate)	2,638	12.4%	$5,879	27.7%
Outbound (Intrastate)	5,213	24.6%	$2,672	12.6%
Within MPA	423	2.0%	$369	1.7%
Total	21,205	100.0%	$21,245	100.0%

Source: Freight Analysis Framework 4

Figure 3.4 and Figure 3.5 show the top ten (10) inbound and outbound domestic trading partners for the MPA, respectively. The top ten (10) trading partners are located either within Mississippi or the southern United States. Mississippi counties outside of the MPA account for five (5) of the inbound trading partners and six (6) of the outbound trading partners. "Rest of Louisiana", the State of Louisiana except for the Baton Rouge, Lake Charles, and New Orleans areas, represents the largest trading partner for both inbound and outbound freight movements in the MPA. Other regions that are top ten trading partners for both inbound and outbound freight movements in the MPA are:

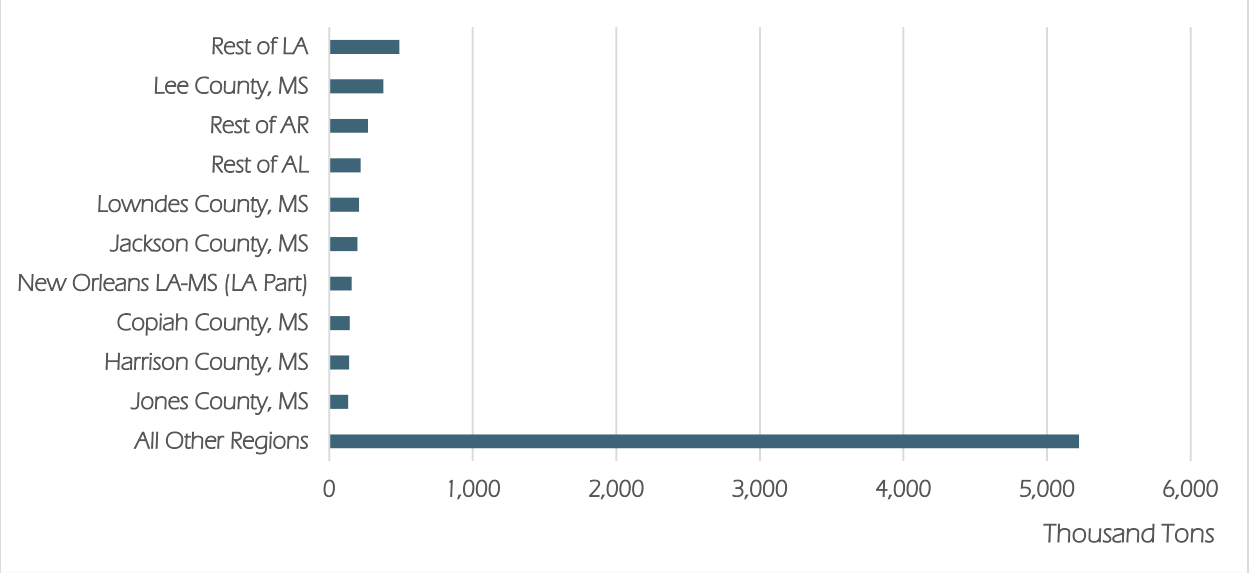
- Copiah County, Mississippi
- Lee County, Mississippi
- Lowndes County, Mississippi
- "Rest of Alabama"
- The Louisiana Portion of the New Orleans-Metairie-Hammond, Louisiana-Mississippi region

Figure 3.4: Top Inbound Trading Partners by Total Truck Tonnage



Source: Freight Analysis Framework version 4
NOTE: "Rest of LA", "Rest of AL", and "Rest of TX" refer to the areas of those states that are outside the FAF 4 designated metropolitan areas.

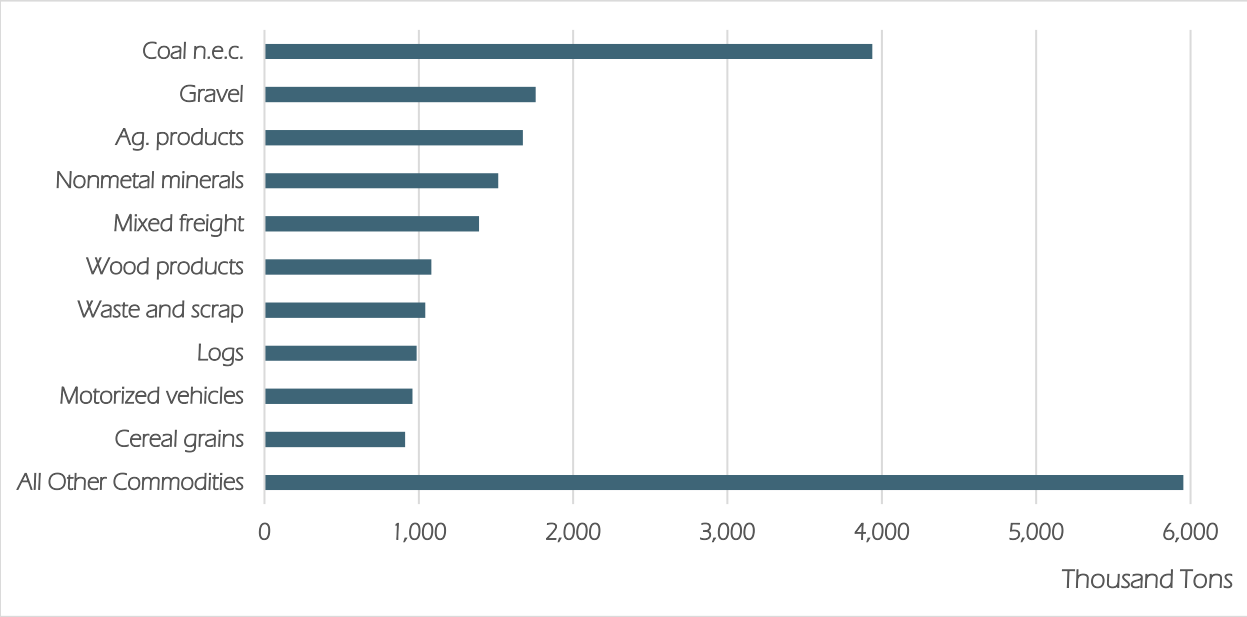
Figure 3.5: Top Outbound Trading Partners by Total Truck Tonnage



Source: Freight Analysis Framework version 4
NOTE: "Rest of LA", "Rest of AR", and "Rest of AL" refer to the areas of those states that are outside the FAF 4 designated metropolitan areas.

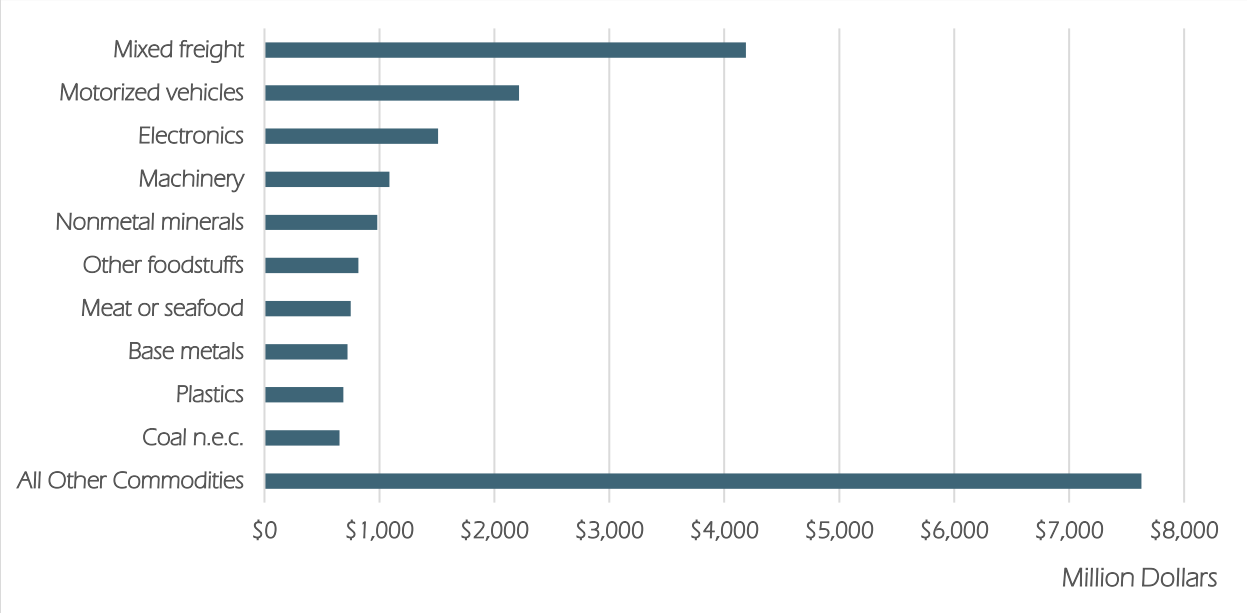
Figure 3.6 and Figure 3.7 show the top commodities shipped via truck by total tonnage and value, respectively. Coal and Petroleum Products, not elsewhere classified ("n.e.c.") is the top commodity by tonnage, and mixed freight is the top commodity by value. Together, the top ten (10) commodities account for 72 percent of total freight truck tonnage and approximately 64 percent of total freight truck value within the MPA.

Figure 3.6: Top Commodities by Truck Tonnage, 2016



Source: Freight Analysis Framework version 4

Figure 3.7: Top Truck Commodities by Value, 2016



Source: Freight Analysis Framework version 4

Truck Travel Time Reliability

The FHWA has established a freight performance measure to capture truck travel time reliability on the MPA's Interstate highway system: the Truck Travel Time Reliability (TTTR) index[5].

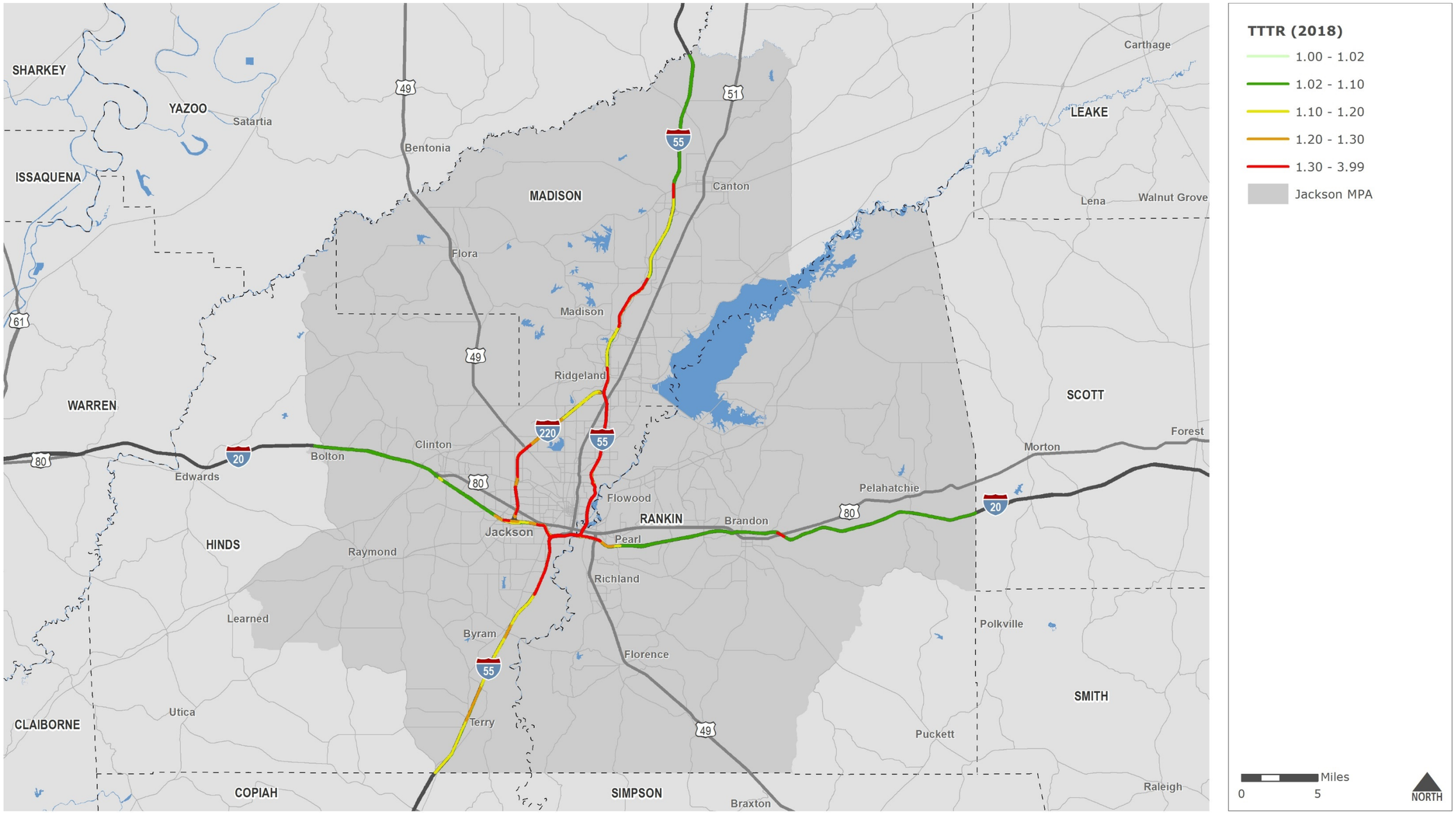
The 2018 NPMRDS data indicates the following about the Interstates in the Jackson MPA:

- I-20 has an overall TTTR of 1.13;
- I-55 has an overall TTTR of 1.39;
- The I-20/I-55 concurrency has an overall TTTR of 1.66; and
- I-220 has an overall TTTR of 1.25.

The 2018 TTTR of each Interstate segment is shown in Figure 3.8. The state's freight performance measures, and the MPO's progress towards them, are discussed in *Technical Report #3: Transportation Performance Management Report*.

[5] https://www.fhwa.dot.gov/tpm/rule/pm3/freight.pdf

Figure 3.8: Congested Freight Corridors (Truck Travel Time Reliability), 2018



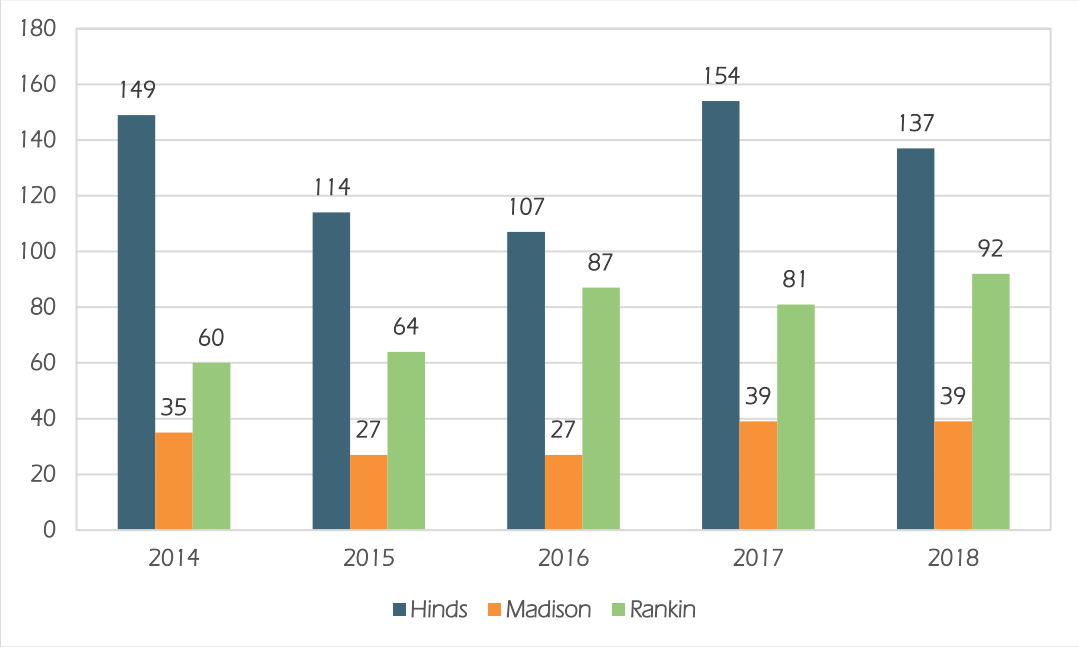
Data Sources: NPMRDS

Disclaimer: This map is for planning purposes only.

Safety

Crashes involving heavy vehicles were analyzed using crash records from 2014 to 2018 obtained from SAMS program. A total of 1,212 crashes involving heavy vehicles occurred within the Jackson MPA during the five-year study period. Figure 3.9 shows the number of heavy vehicle crashes by county during the study period.

Figure 3.9: Heavy Vehicle Crashes by Year by County, 2014 - 2018



Source: SAMS, 2019; NSI, 2019

Between 2014 and 2018, fatal crashes involving heavy vehicles comprised less than one (1) percent of heavy vehicle crashes. However, nearly two (2) percent of all fatal crashes in the study area involved a heavy vehicle.

6

Fatal crashes involving heavy vehicles

Since heavy vehicle crashes represented less than two (2) percent of the total crashes during the study period, many locations experienced little to no heavy vehicle crashes. However, several intersections in the study area experienced at least five heavy vehicle crashes between 2014 and 2018.

- US 49 at Wilson Dr
- US 49 at MS 469
- US 80 at Ellis Ave
- US 80 at MS 468 (Flowood Dr)
- US 49 at E Harper St
- I-55 East Frontage Rd at E County Line Rd
- I-55 Northbound at MS 22

There were also several roadway segments in the MPA that experienced at least five heavy vehicle crashes between 2014 and 2018:

- I-20/I-55 Eastbound between State St and S Gallatin St
- I-55 Northbound between Siwell Rd Eastbound On-Ramp and Siwell Rd Westbound On-Ramp
- I-55 Northbound between Riverside Dr and Woodrow Wilson Ave
- I-55 Southbound between Riverside Dr and Woodrow Wilson Ave

3.3 Railways

Inventory

The MPA has approximately 160 miles of railroads, most of which are Class I railroads that are Tier I corridors in the MFN. The NPFN does not include railroads; however, the railroads within the MPA are part of the NMFN. Figure 3.10 displays the MPA's railroads and MFN corridors. The following railroads in the MPA are part of the MFN:

- The Kansas City Southern Railroad, running alongside the I-20 corridor, is part of the Tier I Vicksburg-Jackson-Meridian Corridor
- The Canadian Northern Railroad, running alongside the I-55 corridor, is part of the Tier I Southaven-Jackson-McComb Corridor.
- The Canadian Northern Railroad, running alongside the US 49 corridor, is part of the Tier I Jackson-Hattiesburg-Gulfport Corridor.

The Canadian Northern railroad that connects Canton to Jackson is the only Class I railroad in the MPA that is not part of the MFN. However, it is a key connector for the Tier I Southaven-Jackson-McComb Corridor and a critical part of the MPA's rail freight network, with several key users, including the Nissan Plant near Canton. Figure 3.10 displays the MPA's railroads and MFN corridors.

Mississippi's only large-scale, carrier-owned, bulk-transload facility and intermodal facility, owned by KCS, are within the Jackson MPA, located in Richland.

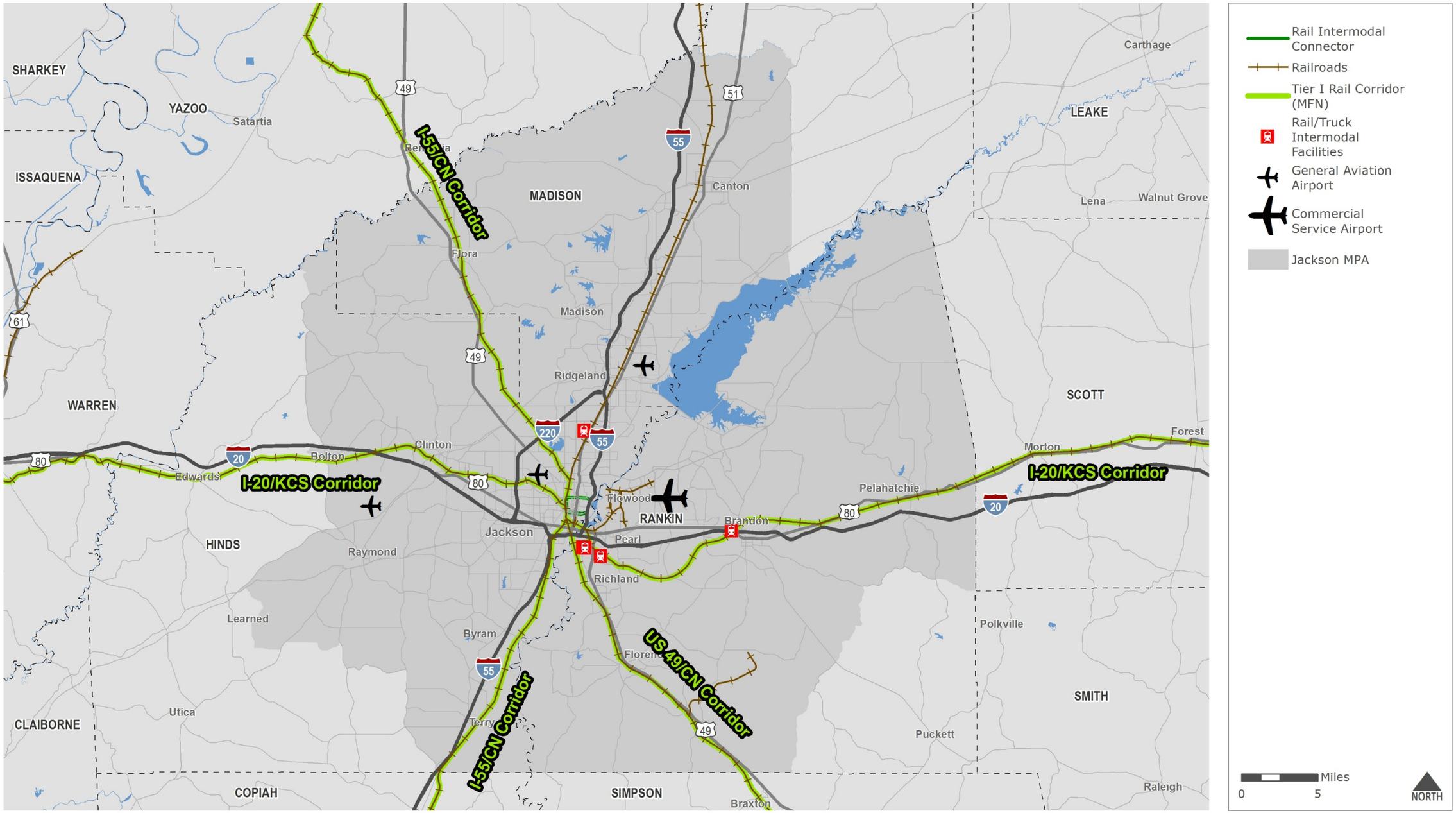
The intermodal facilities within the MPA that serve railroads are shown in Table 3.3. There are also several line-haul railroad establishments within the MPA. These establishments provide intercity movement of trains between the terminals and stations on main and branch lines of a long-distance rail network. Figure 3.10 shows the location of the intermodal facilities and line-haul establishments within the MPA.

Table 3.3: Intermodal Terminal Facilities for Rail, 2018

Name	Modes	City
Kansas City Southern	Rail & Truck	Richland
Lefleur Paper Company, LLC	Rail & Truck	Richland
Miller Transporters, Inc.	Rail & Truck	Brandon
Warehouse Services, Inc.	Rail & Truck	Jackson
Yellow	Rail & Truck	Richland

Source: Bureau of Transportation Statistics, 2015 National Transportation Atlas

Figure 3.10: Regional Freight Network and Facilities - Rail



Data Sources: 2015 National Transportation Atlas; USDOT; MDOT

Disclaimer: This map is for planning purposes only.

Commodity Flows

The freight rail movements for the MPA counties, and their statewide rankings, are summarized below.

In 2016:

- Hinds County ranked seventh in Mississippi by rail freight tonnage and sixth by rail freight value.
- Madison County ranked ninth in Mississippi by rail freight tonnage and eighth by rail freight value.
- Rankin County ranked 15th in Mississippi by rail freight tonnage and 16th by rail freight value.

As shown in Table 3.4, most of the rail freight in the MPA originates outside the MPA. By tonnage, approximately 72 percent originates outside the MPA ("Inbound" movements) and 28 percent originates in the MPA ("Outbound" movements). Less than one (1) percent of total rail freight tonnage remains in the MPA. Nearly 93 percent of the total rail freight tonnage is interstate.

By value, inbound movements represent approximately 57 percent and outbound movements represent nearly 43 percent. Less than one (1) percent of total rail freight value remains in the MPA. Nearly 95 percent of the total rail freight value is interstate.

Table 3.4: Commodity Flows by Rail, 2016

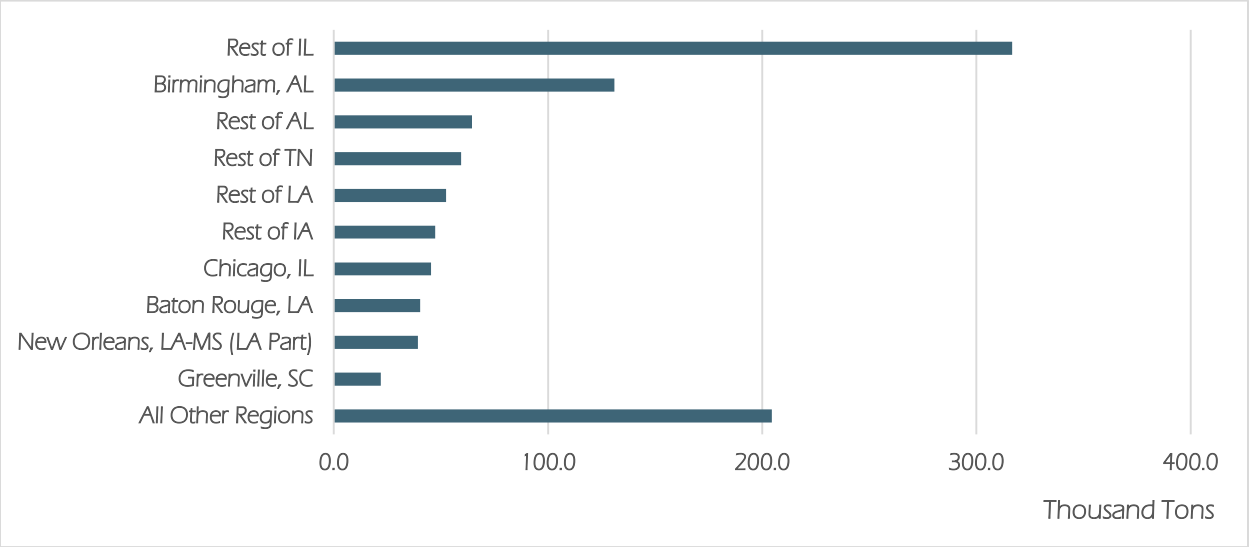
Direction	Tons (Thousands)	Percent of Total	Value ($ Million)	Percent of Total
Inbound (Interstate)	997	67.9%	$369	53.8%
Inbound (Intrastate)	52	3.5%	$22	3.2%
Outbound (Interstate)	388	26.4%	$282	41.1%
Outbound (Intrastate)	29	2.0%	$12	1.7%
Within MPA	3	0.2%	$1	0.2%
Total	1,470	100.0%	$686	100.0%

Source: Freight Analysis Framework 4

Figure 3.11 and Figure 3.12 show the top ten (10) inbound and outbound domestic trading partners for the MPA, respectively. Most of the MPA's top ten inbound or outbound domestic trading partners for rail freight are in the Southern or Midwestern United States. Regions that are top ten trading partners for both inbound and outbound freight movements in the MPA are:

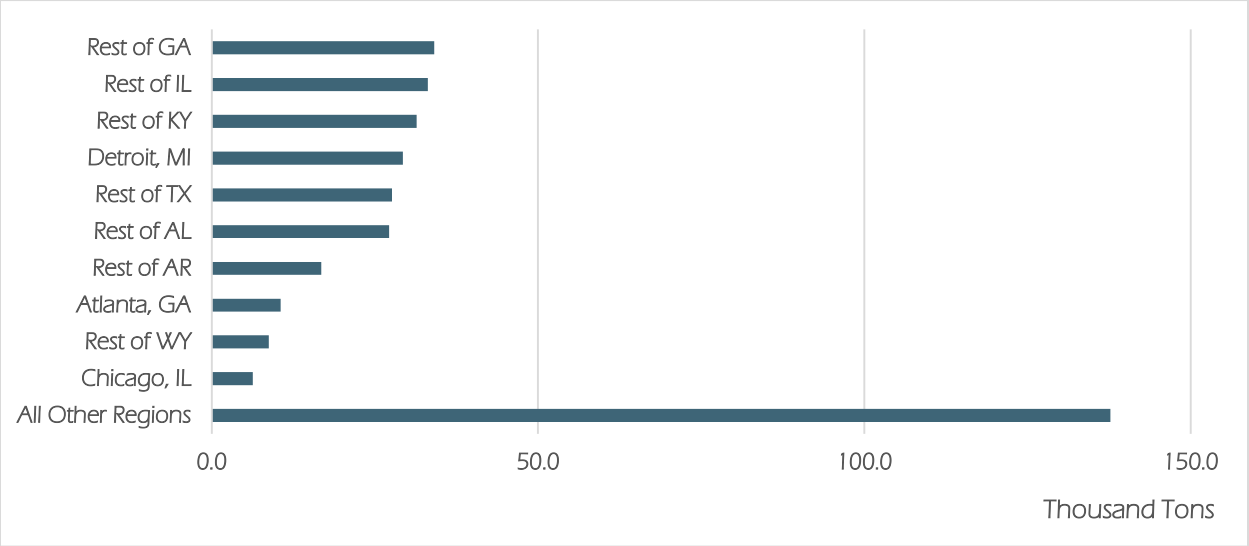
- Chicago, Illinois
- "Rest of Alabama"
- "Rest of Illinois"

Figure 3.11: Top Inbound Trading Partners by Rail Tonnage



Source: Freight Analysis Framework version 4
NOTE: "Rest of IL", "Rest of AL", "Rest of TN", "Rest of LA", and "Rest of IA" refer to the areas of those states that are outside the FAF 4 designated metropolitan areas.

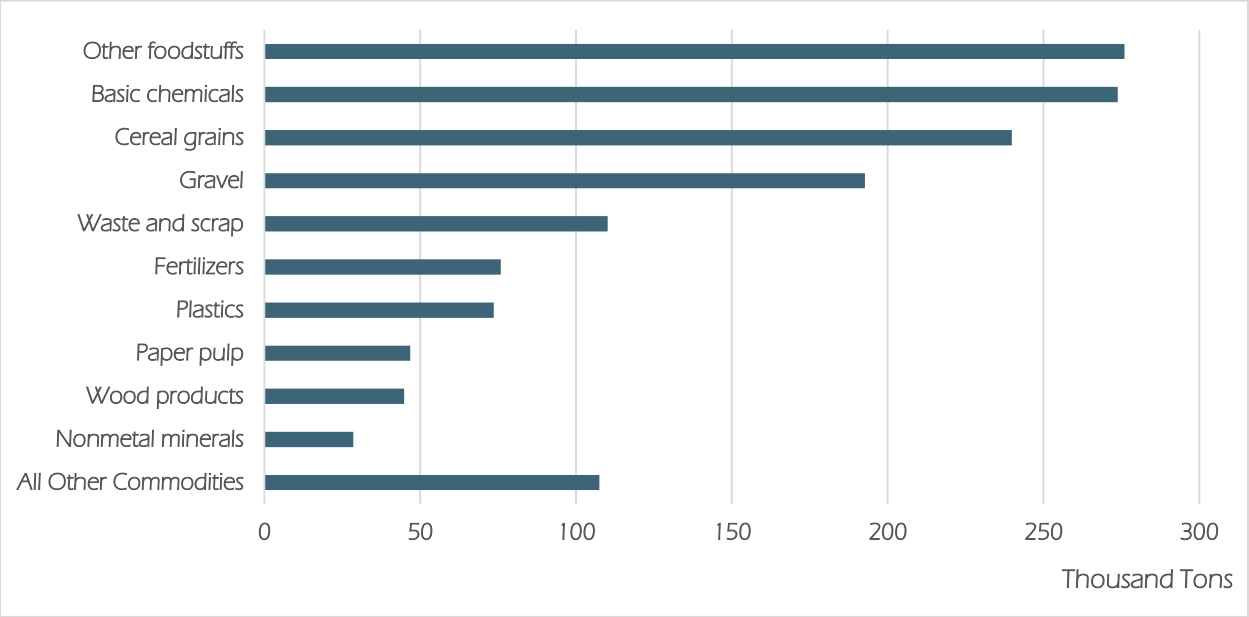
Figure 3.12: Top Outbound Trading Partners by Rail Tonnage



Source: Freight Analysis Framework version 4
NOTE: "Rest of GA", "Rest of IL", "Rest of KY", "Rest of TX", "Rest of AL", "Rest of AR", and "Rest of WY" refer to the areas of those states that are outside the FAF 4 designated metropolitan areas.

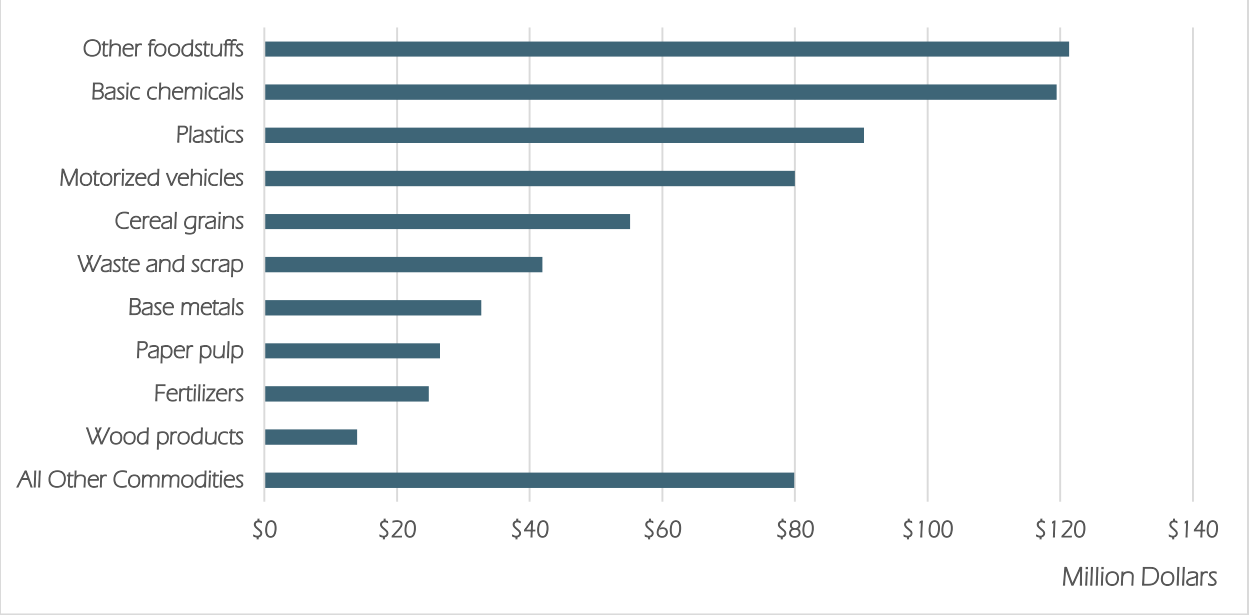
Figure 3.13 and Figure 3.14 show the top commodities by total tonnage and value, respectively, for rail. The top rail commodity by tonnage and by value is other foodstuffs. Together, the top ten (10) commodities account for 93 percent of total freight rail tonnage and approximately 88 percent of total freight rail value within the MPA.

Figure 3.13: Top Commodities by Freight Rail Tonnage, 2016



Source: Freight Analysis Framework version 4

Figure 3.14: Top Rail Commodities by Value, 2016

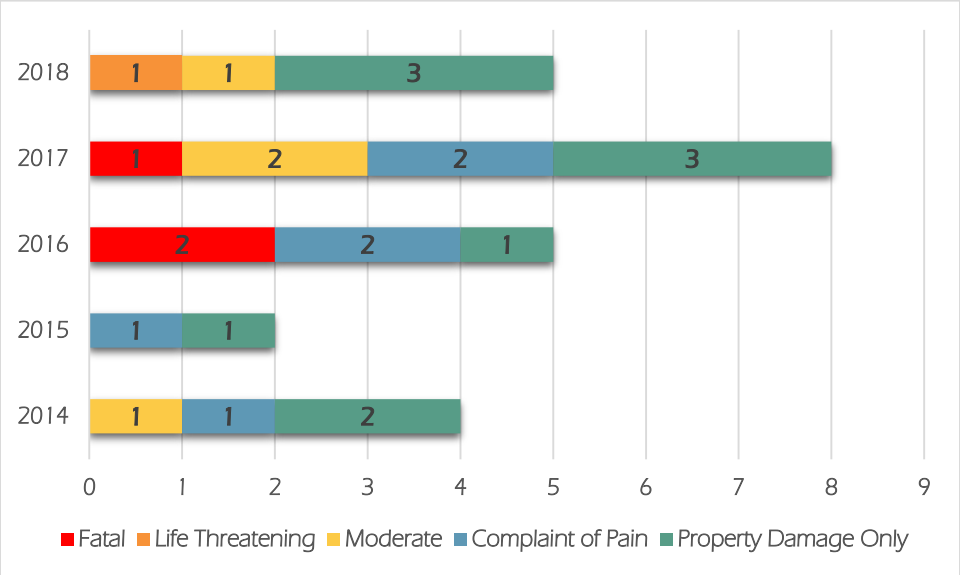


Source: Freight Analysis Framework version 4

Rail - Automobile Collisions

From 2014 through 2018, there were 24 crashes involving an automobile and a train. Figure 3.15 shows the breakdown of these crashes by severity.

Figure 3.15: Freight Rail Crashes by Year by Severity, 2014-2018



Source: SAMS, 2019; NSI, 2019

One crash involved a collision between a motorcycle and a train. This crash resulted in a life-threatening injury.

Fatal freight rail crashes represented nearly one (1) percent of all fatal crashes, even though rail crashes were only a very small percentage of all crashes in the MPA. Eleven automobile-train collisions occurred at crossings with Kansas City Southern (KCS) tracks, and 13 occurred at crossings with Canadian National Railway (CN) tracks. Of the 24 train crashes that occurred in the MPA there were:

- 16 in Hinds County;
- 7 in Rankin County; and
- 1 in Madison County.

The three roadway-railroad crossings in the MPA that experienced more than one automobile-train collision between 2014 and 2018 were:

- Andrew Jackson Circle at CN Railroad in Star;
- Parkside Place at KCS Railroad in Jackson; and
- Pocahontas Rd at CN Railroad in Pocahontas.

Derailments

According to the Federal Rail Administration, from 2014 to 2018, six (6) train derailments occurred within the Jackson MPA. Information about the derailments are detailed in Table 3.5.

Table 3.5: Derailments in the MPA from 2014 - 2018

Date	Nearest City	Railroad	County	Primary Cause	Severity
July 8, 2015	Pearl	KCS	Rankin	Switch previously run through	No Injury
June 10, 2016	Jackson	KCS	Rankin	Switch improperly lined	No Injury
March 21, 2017	Jackson	KCS	Rankin	Classification yard automatic control system switch failure	No Injury
June 12, 2017	Pearl	KCS	Rankin	Switch improperly lined	No Injury
June 16, 2017	Jackson	KCS	Rankin	Switch point worn or broken	No Injury
April 24, 2018	Edwards	KCS	Hinds	Broken plate	No Injury

Source: Federal Railroad Administration

Railroad Crossings with Active Warning Control Devices

To avoid collisions, warning/control devices are required at highway-railroad grade crossings. Aside from passive warning devices, such as yield and stop signs, many highway-railroad grade crossings have active warning devices. Active warning devices include devices and controls such as bells, flashing lights, and gates, in addition to passive warning devices.

The Mississippi Statewide Freight Plan sets a performance standard where all highway-railroad crossings between a public road that is functionally classified as a Collector or greater and a railroad on the MFN are to have active crossing warnings (gates and flashers). Highway-railroad crossings between a road that is functionally classified as a Collector or above and an MFN railroad that lack active warning devices are shown in Table 3.6.

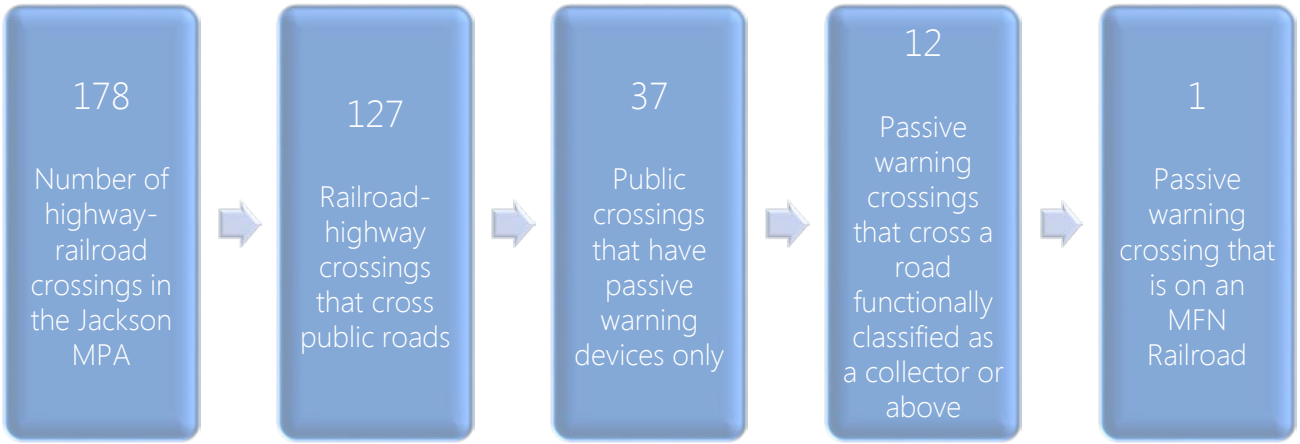


Table 3.6: Highway-Railroad Crossings Lacking Active Warning Devices on MFN Railroads, 2018

Railroad	Street	Place	County	Maximum Speed	Average Daily Traffic
CN	Loflin Rd	Star	Rankin	35 MPH	110

Source: Federal Railroad Administration

3.4 Air Cargo

Inventory

Historically, only a small amount of freight is shipped by air. However, the commodities transported this way tend to be high-value and time-sensitive. Additionally, airports tend to serve as distribution and manufacturing hubs.

The Jackson MPA has four public airports:

- Jackson-Evers International Airport in Jackson;
- Hawkins Field in Jackson;
- Bruce Campbell Field Airport in Madison; and
- John Bell Williams Airport in Raymond.

The Jackson-Evers International Airport contains two intermodal facilities: Emery Forwarding and Jackson International Airport. Both of these facilities service air and truck modes. The Jackson-Evers International Airport has over 75,000 square feet of existing air cargo building space and 450,000 square feet of cargo aircraft parking space.

The total number of aircraft based at each airport and the daily aircraft operations are shown in Table 3.7. The daily aircraft operations at Jackson-Evers International Airport also includes commercial flights.

Table 3.7: Based Aircraft and Daily Aircraft Operations

Airport	Based Aircraft	Daily Aircraft Operations
Jackson-Evers International	27	157
Hawkins Field	43	88
Bruce Campbell Field	70	127
John Bell Williams	112	126

Source: Federal Aviation Administration

Volumes

Of the four public use airports in the MPA, the only airport with cargo data available is Jackson-Evers International Airport. The cargo data summary at Jackson-Evers International Airport in 2017 is detailed below:

123rd
the Jackson Airport's rank of all U.S. airports in terms of air cargo by landed weight in 2017

75 million
amount of landed cargo weight (in pounds) at the airport in 2017

2%
decrease in the amount of landed cargo weight at the airport between 2016 and 2017

Commodity Flows

As mentioned earlier, goods that are shipped by air tend to be high-value and time-sensitive. Goods that are shipped via air are transported either by all-cargo carriers, such as Federal Express (FedEx) or United Parcel Service (UPS), or by passenger airlines in empty space either in the belly-holds of their aircraft or through a separate fleet of dedicated freight aircraft. According to the FAF, air travel accounted for approximately 0.02 percent of the total freight tonnage in the MPA. However, by value, the mode share for air was approximately 3.6 percent.

The top five (5) origins for air freight in the MPA by tonnage and by value are:

Tonnage

1. Massachusetts
2. California
3. Pennsylvania
4. Georgia
5. New Jersey

Value

1. California
2. Washington
3. Pennsylvania
4. Massachusetts
5. Georgia

The top five (5) destinations for air freight in the MPA by tonnage and by value are:

Tonnage

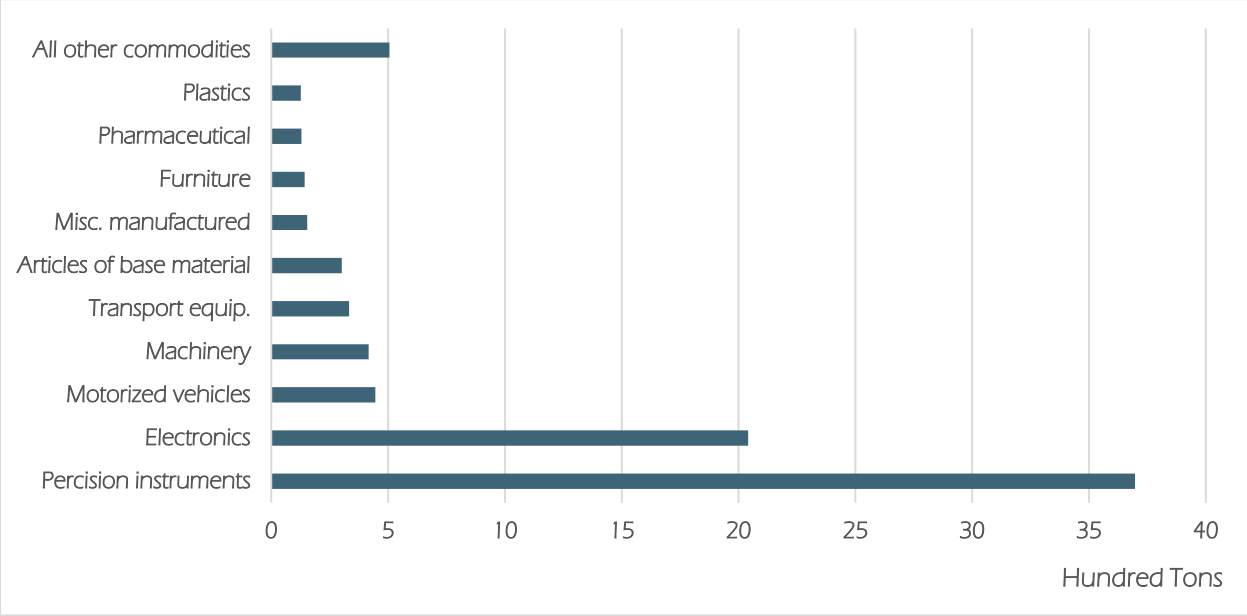
1. California
2. Florida
3. Pennsylvania
4. Alaska
5. Colorado

Value

1. California
2. Colorado
3. Florida
4. Texas
5. Virginia

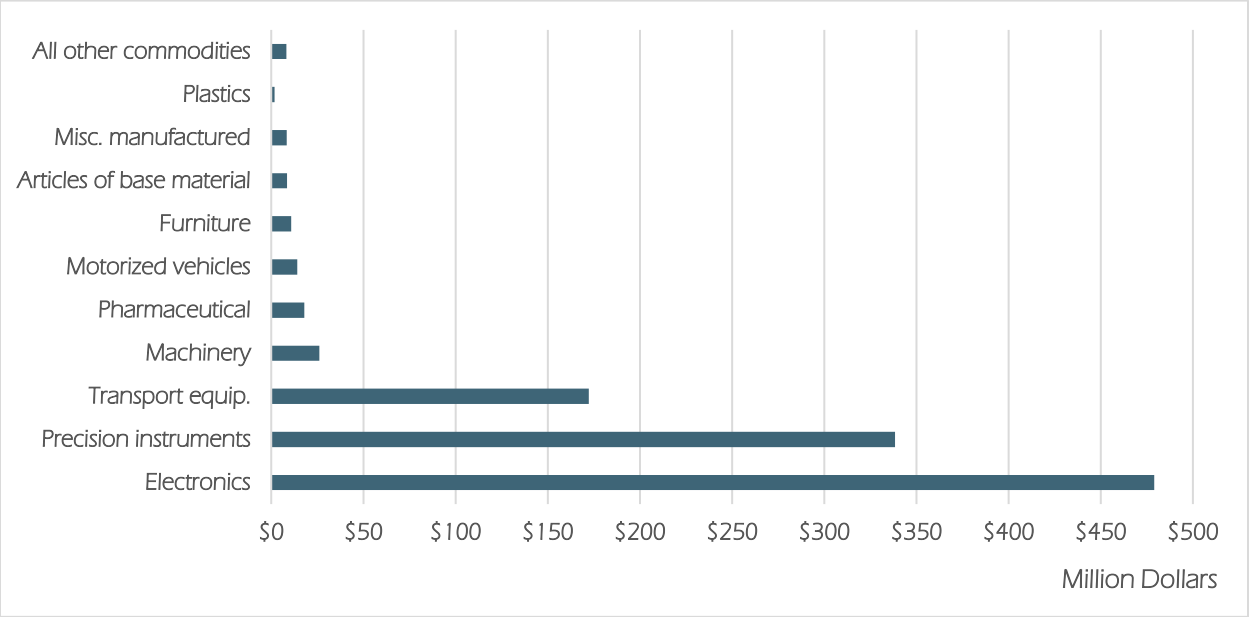
Figure 3.16 and Figure 3.17 shows the top ten commodities shipped via air by tonnage and by value, respectively. The top ten commodities accounted for 94 percent by tonnage and 99 percent by value.

Figure 3.16: Top Air Commodities by Tonnage, 2016



Source: Freight Analysis Framework version 4

Figure 3.17: Top Air Commodities by Value, 2016



Source: Freight Analysis Framework version 4

3.5 Waterways and Ports

Inventory

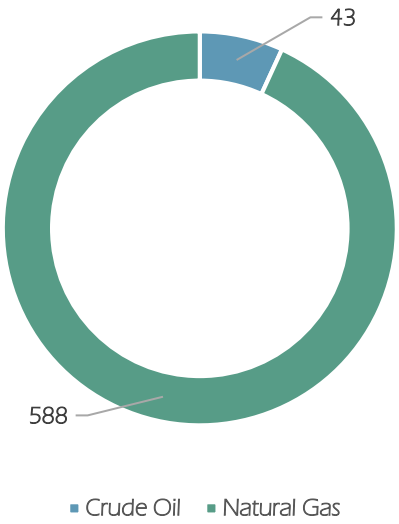
There are no major port facilities within the MPA. The closest major port is the Port of Vicksburg, located along the Mississippi River approximately 40 miles west of downtown Jackson. Both the Port of Vicksburg and the Mississippi River (designated as Marine Highway 55 (M-55)) are part of the NMFN. The Yazoo County Port is the port nearest the MPA; however, it is a small river port located in Yazoo City and does not serve as part of the MPA's waterway network.

3.6 Pipelines

Inventory

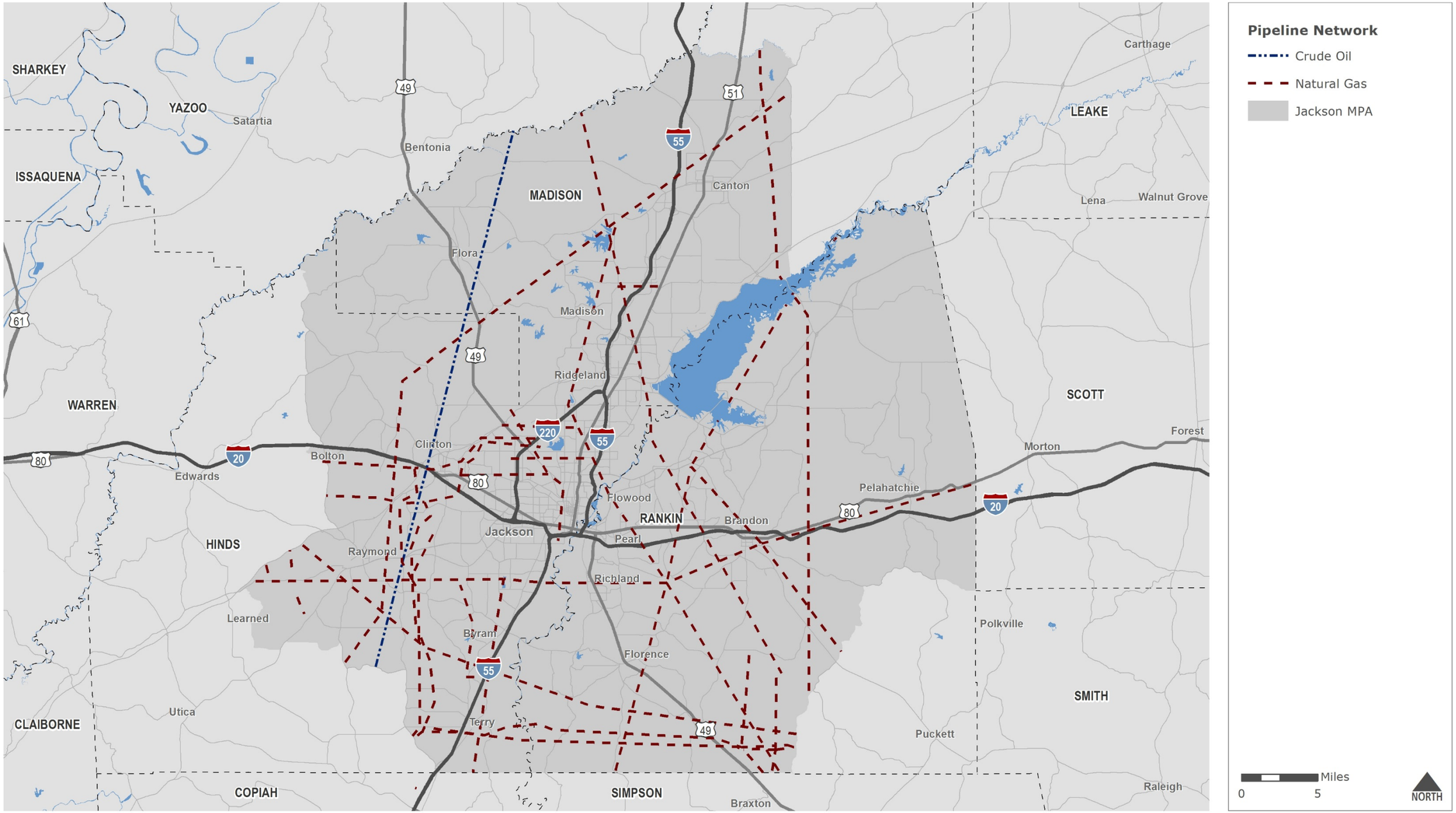
The MPA's pipeline network consists of approximately 632 miles of natural gas and crude oil pipelines. As of 2018, by length, most pipelines in the MPA are natural gas pipelines. Figure 3.18 details the pipeline length (in miles) by commodity carried. Figure 3.19 shows the MPA's pipeline network.

Figure 3.18: Pipeline Commodity by Length, 2018



Source: Energy Information Administration

Figure 3.19: 2018 MPO Pipeline Network



Data Sources: Energy Information Administration

Disclaimer: This map is for planning purposes only.

Commodity Flows

According to the FAF, the pipeline mode ranked second in tonnage and value in the MPA. By tonnage, pipelines carry more than 34 percent of all freight in the MPA. However, the pipeline's value share was only 12 percent.

The top five origins for pipeline freight account for 97 percent by tonnage and by value in the MPA. Three of the top five origins are located on the Gulf Coast. The top five origins by tonnage and value are:

Tonnage

1. "Rest of Louisiana"
2. "Rest of Arkansas"
3. Lake Charles, Louisiana
4. New Orleans, LA-MS (LA Part)
5. Houston, Texas

Value

1. New Orleans, LA-MS (LA Part)
2. "Rest of Louisiana"
3. "Rest of Arkansas"
4. Lake Charles, Louisiana
5. Houston, Texas

NOTE: "Rest of Louisiana" and "Rest of Arkansas" refer to the areas of those states that are outside the FAF 4 designated metropolitan areas.

The top five destinations for pipeline freight account for 77 percent by tonnage and 73 percent by value in the MPA. The top five destinations by tonnage and by value are:

Tonnage

1. "Rest of Alabama"
2. "Rest of Tennessee"
3. Mobile, Alabama
4. Memphis, Tennessee (TN Part)
5. Nashville, Tennessee

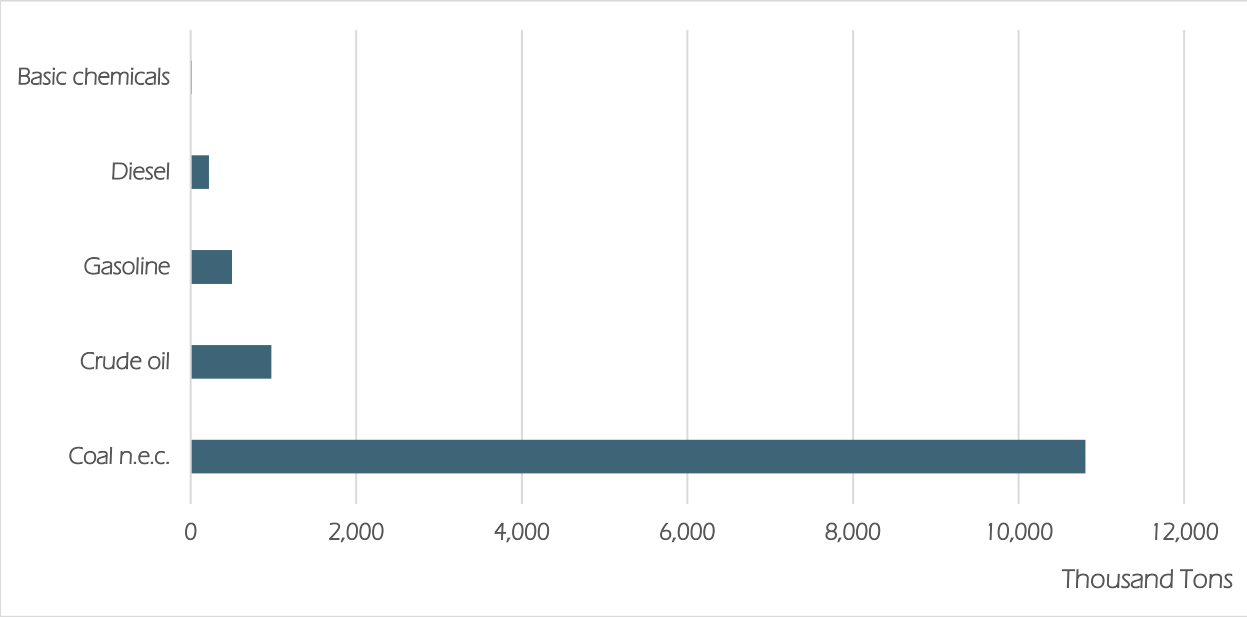
Value

1. "Rest of Alabama"
2. Corpus Christi, Texas
3. "Rest of Tennessee"
4. Mobile, Alabama
5. Memphis, Tennessee

NOTE: "Rest of Alabama" and "Rest of Tennessee" refer to the areas of those states that are outside the FAF 4 designated metropolitan areas.

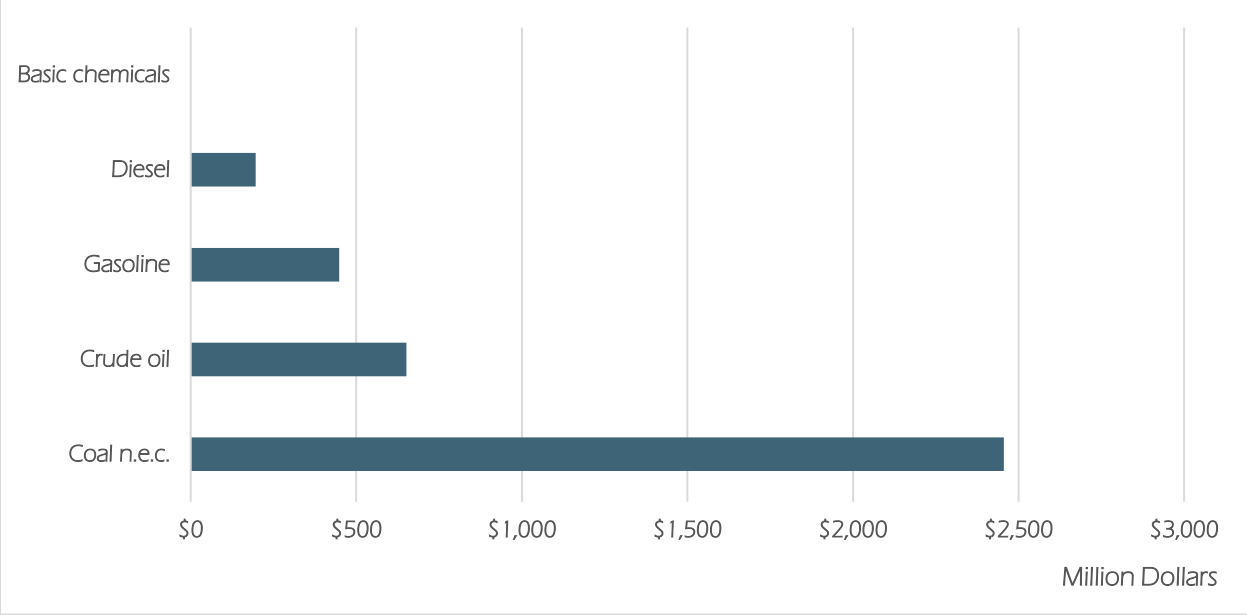
Figure 3.20 and Figure 3.21 show the five commodities carried by pipeline within the MPA by tonnage and by value, respectively. By weight and by value, coal n.e.c. is the top commodity, accounting for 86 percent of the total tonnage and 65 percent of freight value carried by pipeline.

Figure 3.20: Pipeline Commodities by Tonnage, 2016



Source: Freight Analysis Framework version 4

Figure 3.21: Pipeline Commodities by Value, 2016



Source: Freight Analysis Framework version 4

4.0 Bicycle and Pedestrian

4.1 Classification of Bicycle and Pedestrian Facilities

The bicycle and pedestrian facilities in the Jackson MPA are grouped into five (5) classifications which include:

- Shared Use/Bike Paths;
- Bike Lanes;
- Bikeable Shoulders;
- Bike Routes; and
- Sidewalks.

Figure 4.1 provides a brief explanation of the different types of bicycle and pedestrian facility classifications.

While each facility type is used to improve accessibility for the travelling public, there is no single bicycle and/or pedestrian facility that suits every user's needs. For example, sidewalks and shared use paths can be found along many roadways throughout the MPA, however, shared use paths and sidewalks do not provide the same functionality and thus should not be confused with one another. Sidewalks are narrower, designed with pedestrians in mind and should be located along both sides of a roadway. Shared use paths are wider, designed for use by both bicyclists and pedestrians and are commonly located only on one side of a roadway. A shared use facility is typically ten (10) feet in width which allows for bicyclists and/or pedestrians to easily pass one another. Sidewalks are typically five (5) feet in width which does not provide enough space for bicyclists and pedestrians to easily pass one another without conflict or potential collision. It typically is not deemed acceptable to allow bicycles on sidewalks, however, occasionally there are extenuating circumstances that merit the need to share the facility. Though five (5) feet is recommended by the American Association of State Highway and Transportation Officials (AASHTO) and the Federal Highway Administration (FHWA), the Jackson MPO recommends sidewalks be a minimum of six (6) feet in width to make it easier for pedestrians to easily pass one another.

Figure 4.1: Bicycle and Pedestrian Facility Types

Shared Use Path/ Bike Path

- Physically separated from motorized vehicular traffic by open space, buffer or barrier.
- Typically between 8 to 10 feet wide.
- Used by bicyclists, pedestrians, skaters, users of wheeled mobility devices and other non-motorized device users.

Bike Lane

- Portion of a roadway designated by striping, pavement markings and signage for the exclusive use of bicyclists.
- Located on both sides of a roadway and typically between 4 to 6 feet in width.
- Each lane is one way. Bicyclists travel in the same direction as motor vehicles.
- Lanes may be delineated between a travel lane and on street parking, curbs or the edge of pavement.
- Though they may be used by pedestrians, bike lanes are designed for the preferential use of bicyclists.

Bikeable Shoulder

- Functions similarly to bike lanes. Bikeable shoulders are delineated by using existing striping from the outermost vehicle lane to the edge of the shoulder.
- Located on both sides of a roadway. Should provide a minimum of four (4) feet of space for bicyclists from the outermost travel lane to the edge of the pavement.
- Each shoulder is one way with bicyclists traveling in the same direction as motor vehicles.
- Though they may be used by pedestrians, bikeable shoulders are designed for the preferential use of bicyclists

Bike Route

- Both bicyclists and motorists use a roadways travel lanes.
- No striping delineating a portion of the roadway is set aside for bicyclists.
- Identified with appropriate directional and informational markers which read "Bike Route" or "Share the Road."
- It is recommended that any roadway classified as a bike route should have a minimum width of 14 feet, but be less than 16 feet, from striped center line.
- Routes are used by bicyclists. Pedestrians may use bike routes if there are no other alternatives; however, it is not recommended due to safety concerns.

Sidewalk

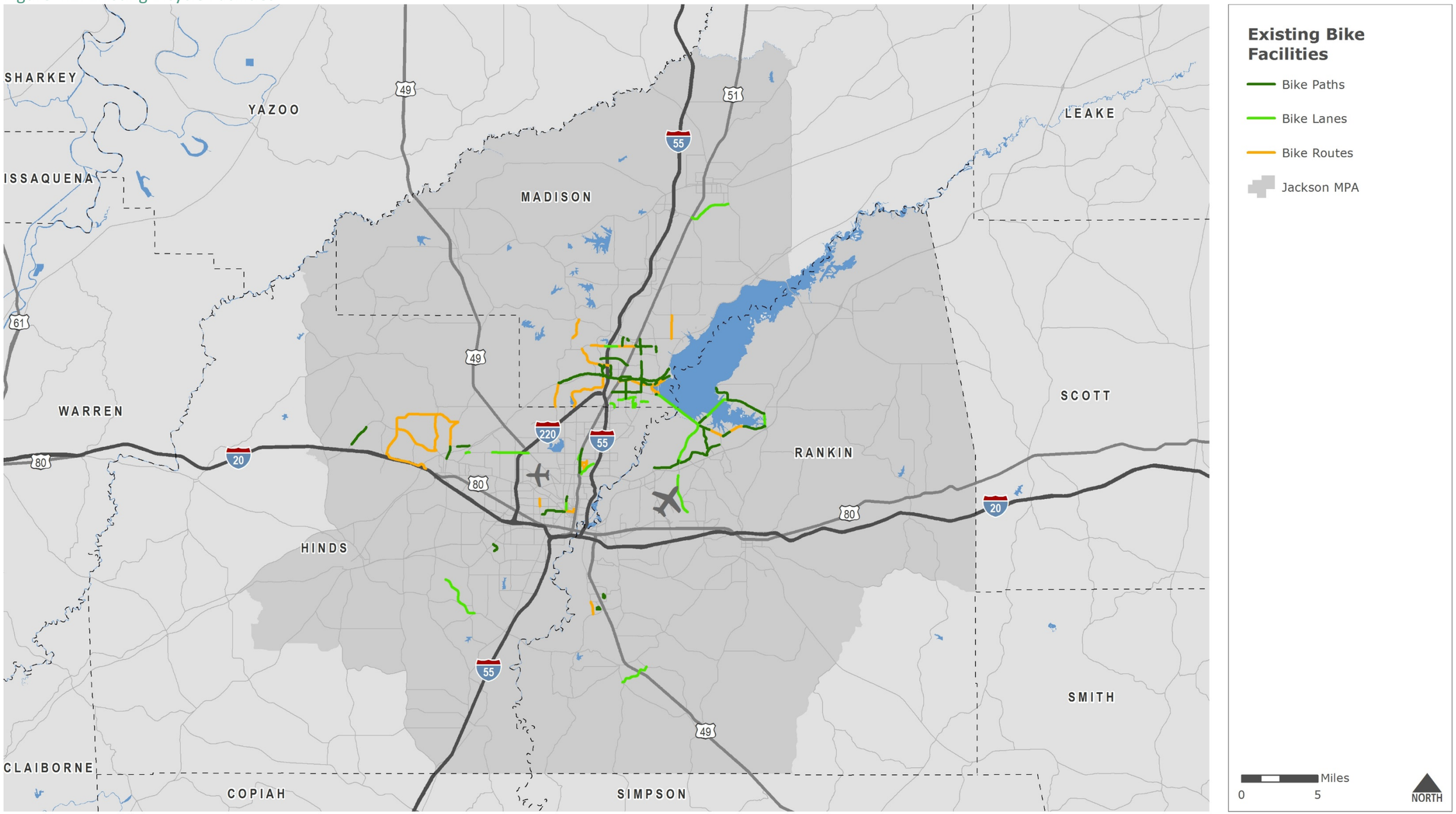
- Physically separated from motorized vehicular traffic by open space, buffer or barrier.
- Typically located within public right of way.
- Minimmum width recommended by AASHTO and FHWA is five (5) feet. Preferred width, to improve pedestrian mobility, is six (6) feet.
- Should be continuous, unobstructed and located on both sides of a roadway.
- Mainly used by pedestrians. Bicycle usage should be kept to a minimum.

4.2 Existing Inventory

The Jackson MPO's existing bicycle and pedestrian facilities network consists of over 300 miles of shared use/bike paths, bicycle lanes, bikeable shoulders, bicycle routes, and sidewalks. These facilities are primarily located along or connected to roadways in the Jackson MPA which are functionally classified as either Principal Arterials, Minor Arterials or Collectors (See Section 2.2 Roadway Network). The location of these facilities along functionally classified corridors provides system users with increased options for accessing daily needs as these areas are typically where retail shopping centers, recreation areas, hospitals, medical clinics, pharmacies, major employment centers, schools, universities and transit routes are located in metropolitan areas.

An inventory of existing bicycle and pedestrian facilities can be seen in Figures 4.2 and 4.3. Figure 4.3 provides an inventory of sidewalks in the Jackson MPA. It should be noted that this does not include a comprehensive inventory of sidewalk infrastructure, but rather includes sidewalks located along functionally classified roadways within the Jackson MPA.

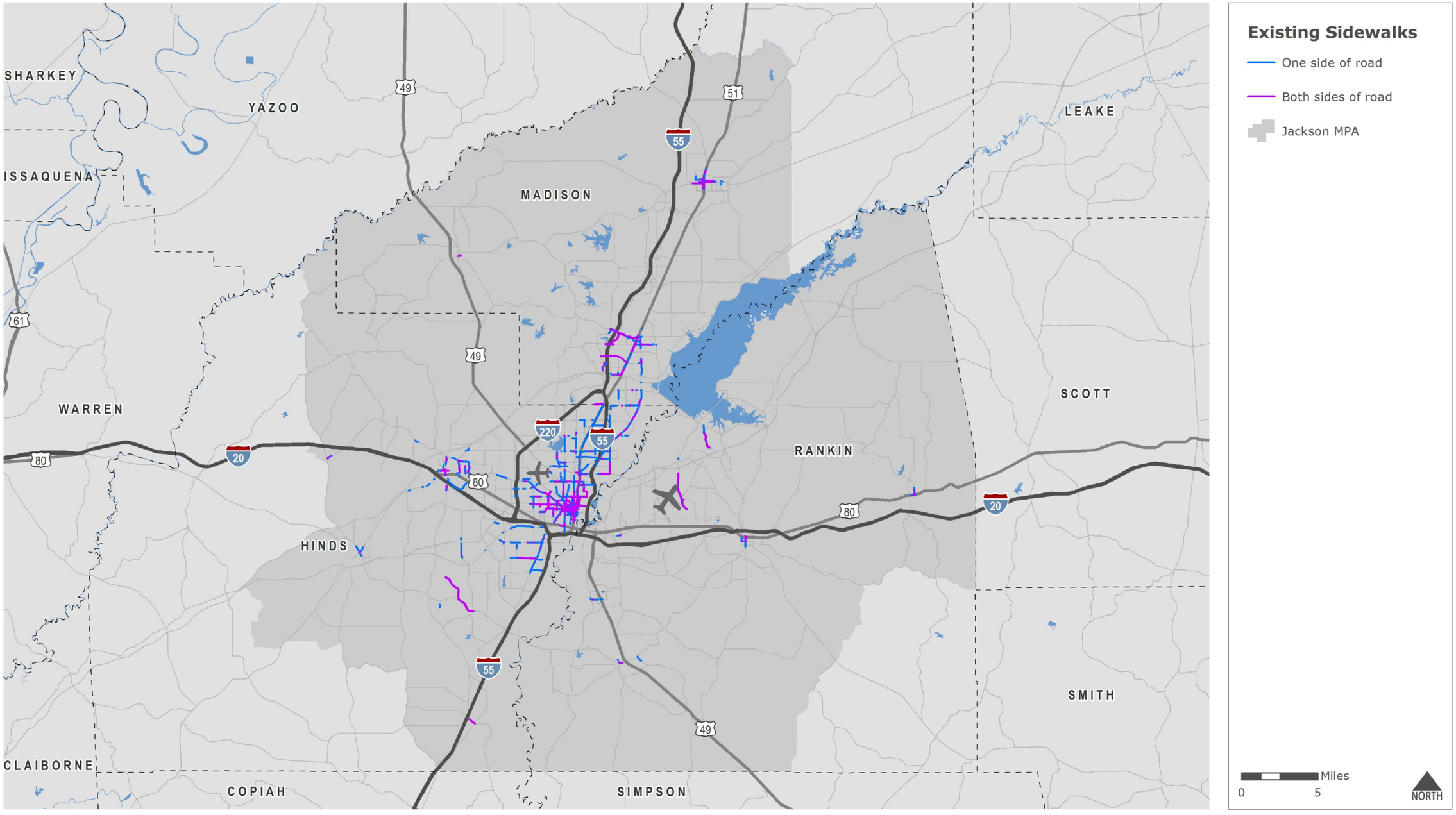
Figure 4.2: Existing Bicycle Facilities



Data Sources: MPO Staff

Disclaimer: This map is for planning purposes only.

Figure 4.3: Existing Pedestrian Facilities



Data Sources: MPO Staff

Disclaimer: This map is for planning purposes only.

Table 4.1 provides a listing of all projects that have been developed since the 2040 Metropolitan Transportation Plan (MTP) was adopted on November 19, 2015. An additional 35 miles of bicycle and pedestrian facilities have been added to the Jackson MPO's bicycle and pedestrian network since the previous plan was adopted. Each of the facilities in Table 4.1 are included in the existing network shown in Figures 4.2 and 4.3.

Table 4.1: Bicycle and Pedestrian Facilities Completed Since 2040 MTP

Location	Beginning Termini	Ending Termini	Bikeway Facility Type	Miles
Clinton-Tinnin Rd	W. Northside Dr	Williamson Rd	Route	2.5
Colony Park Blvd	Sunnybrook Rd	Hwy 51	Path/Sidewalk	1.3
Crawford Farms Blvd	Main St - Madison	Madison Ave	Path	0.6
E. Jackson St	Hwy 51	Jessamine Dr	Path	0.6
Eagle Post Rd	Hwy 469	Williams Rd	Lane	2.1
East Metro Corridor	Cooper Rd	Airlane	Lane/Sidewalk	0.7
Highland Colony Pkwy/Steed Rd Connector	Highland Colony Pkwy	Steed Rd	Path	0.4
Hinds County Pkwy	Siwell Rd	Parks Rd	Lane/Sidewalk	3.3
I-20 Frontage Rd	Creek	St. Thomas Pkwy	Route	3.0
Lake Harbour Dr Ext	Hwy 51	Highland Colony Pkwy	Path	0.8
Mill St	Capitol St	Taft St	Path/Lane/Route	0.9
Old Canton Rd	Hoy Rd	St. Augustine Dr	Path	1.0
Old Canton Rd Connector	Brashear Creek	Existing Path	Path	0.1
Pinehaven Rd	Arrow Dr	Williamson Rd	Route	1.8
Rice Rd	Craft Center	Craft Center Parking Lot	Path	0.2
St. Thomas Pkwy	W. Northside Dr	I-20 Frontage Rd	Route	1.8
State St	Sheppard St	Broadmoor Dr	Sidewalk	0.5
State St	Broadmoor Dr	Northside Dr	Path	0.3
State St	Northside Dr	Hartfield St	Path/Sidewalk	1.3
Town Center Blvd	Pear Orchard Rd	Wheatley St	Lane	0.5
W. Northside Dr	Williamson Rd	Clinton-Tinnin Rd	Route	3.1
Williamson Rd	Pinehaven Rd	W. Northside Dr	Route	5.0
Wirtz Rd	Old Fannin Rd	Gardens of Manship	Path	3.3
Woodrow Wilson Ave	Peachtree St	State St	Path	0.2
TOTAL MILES				**35.3**

In addition to the projects that have been completed since adoption of the previous plan, Table 4.2 lists all currently funded projects included in the Jackson MPO's Transportation Improvement Program (TIP) that are anticipated to be completed prior to adoption of the next MTP.

Table 4.2: Currently Funded Bicycle and Pedestrian Projects

Location	Beginning Termini	Ending Termini	Responsible Jurisdiction	Bikeway Facility Type
Arrow Dr	Pinehaven Dr	Clinton High School	Clinton	Path
Arrow Dr/Cynthia Rd	Clinton Park Elementary	Traceway Park	Clinton	Path
Museum to Market	High St	Riverside Dr	Jackson	Path
County Line Rd	Toys R Us Driveway	Ridgewood Rd	Jackson	Sidewalk
Gallatin St	Gallatin St Intersection	South St	Jackson	Sidewalk
Lamar St	Fortification St	Wilbanks St	Jackson	Sidewalk
Marshall St/Webster St	State St	State St	Jackson	Sidewalk
President St	Multiple Locations	Multiple Locations	Jackson	Sidewalk
Old Canton Rd	Canton Heights Dr	Parham Bridges Park	Jackson	Sidewalk
Old Canton Rd	Old Canton Ln	Glenway Dr	Jackson	Path
Meadowbrook Rd	Buckley Dr	West St	Jackson	Path
Rice Rd/Tisdale Rd	Wellington Way	Madison Ave	Madison	Path
Bozeman Rd	Gluckstadt Rd	Hwy 463	Madison County	Path
Reunion Pkwy	Hwy 51	Parkway East	Madison County	Shoulder
Boyce Thompson Dr	Rouse Elementary	Quarry Park	Brandon	Lane
Woodgate Dr/Service Dr	Crosswoods Rd	Brandon Library	Brandon	Path
Hwy 80	Louis Wilson Dr	Downtown Square	Brandon	Sidewalk

4.3 Existing Traffic and Usage Patterns

For years the amount of users of the transportation system bicycling or walking to their destination has been on a gradual decline. Several factors can be attributed to this shift, but one that has had a significant impact on the decline is suburbanization. Suburbanization is a population shift from core urban areas into suburbs surrounding those areas. This population shift to suburban areas increases the distance one must travel to get to his or her destination which results in users of the system finding active transportation modes less appealing and practical. This is not unique to the Jackson MPO area, but can be seen in many metropolitan areas across the country.

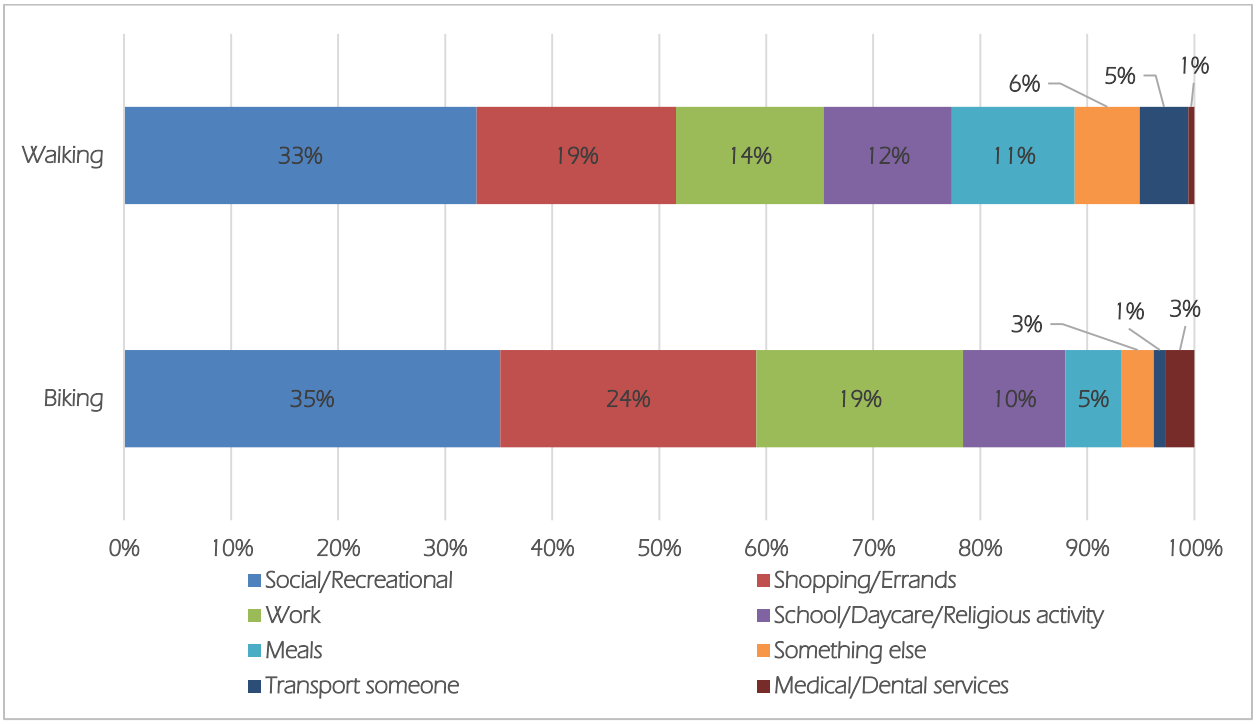
Though this decrease in the use of active transportation modes has been trending for decades, and currently bicycling and walking account for a relatively small portion of commuting patterns in Mississippi, developing infrastructure that supports active transportation modes will provide commuter's with alternative transportation options and when developed appropriately has the potential to supplement gaps in the multi-modal transportation network and once again present bicycling and walking as viable alternatives to motorized transportation modes.

Nationally 3.3 percent of people commuting to work bike or walk. That number is significantly lower in Mississippi and the Jackson MPO Planning Area as only 1.5 and 1.1 percent of people commuting to work bike or walk.

Typically, when referencing biking or walking the two are mentioned together as though they were synonymous with one another. While both are modes of active transportation their roles within the transportation system vary somewhat. Nationally, according to the 2017 National Household Travel Survey (NHTS), walking accounts for 11 percent of all household trips while bicycling accounts for only 1 percent.

While data indicates a significant difference in the amount of household trips between people walking and biking, Figure 4.4 illustrates the difference in trip purposes between the two. The highest percentage of trip purposes in small to mid-size metropolitan areas for those biking and walking is for social or recreational purposes at 35 and 33 percent respectively. Shopping/errands and work are the next two highest trip purpose categories for each while accessing medical or dental services and transporting someone are the two lowest trip purposes for both. For biking the top three trip purposes account for 78 percent of all trips and for walking they account for 66 percent.

Figure 4.4: Walking and Bicycling Trip Purposes



Note: Data is for metro areas with less than 1,000,000 residents
Source: National Household Travel Survey, 2017

The data shown in Figure 4.4 are travel pattern averages from multiple small to mid-size metropolitan areas from across the country, while this data may be somewhat representative of travel patterns in the Jackson MPO Planning Area it is not absolute as travel behavior differs from region to region. For example, in some urban areas biking or walking to work may be more prevalent than in others due to the area having a comprehensive bicycle and pedestrian network and also access to reliable transit services.

As mentioned earlier, there has been a continual decline in the number of users of the transportation system choosing active modes of transportation for their daily trip purposes. Table 4.3 shows that an overwhelming majority of workers in the U.S., Mississippi, the Jackson MPA and the City of Jackson drive alone or carpool to work. In the Jackson MPA, 95.5 percent of workers drive alone or commute to work which is in line with the state average of 94.5 percent, but a full 10 percent higher than the U.S. average of 85.5 percent. In contrast, less than 2 percent of all work trips in the MPA and the State involve commuters walking or biking to work with biking being the least used of each represented mode.

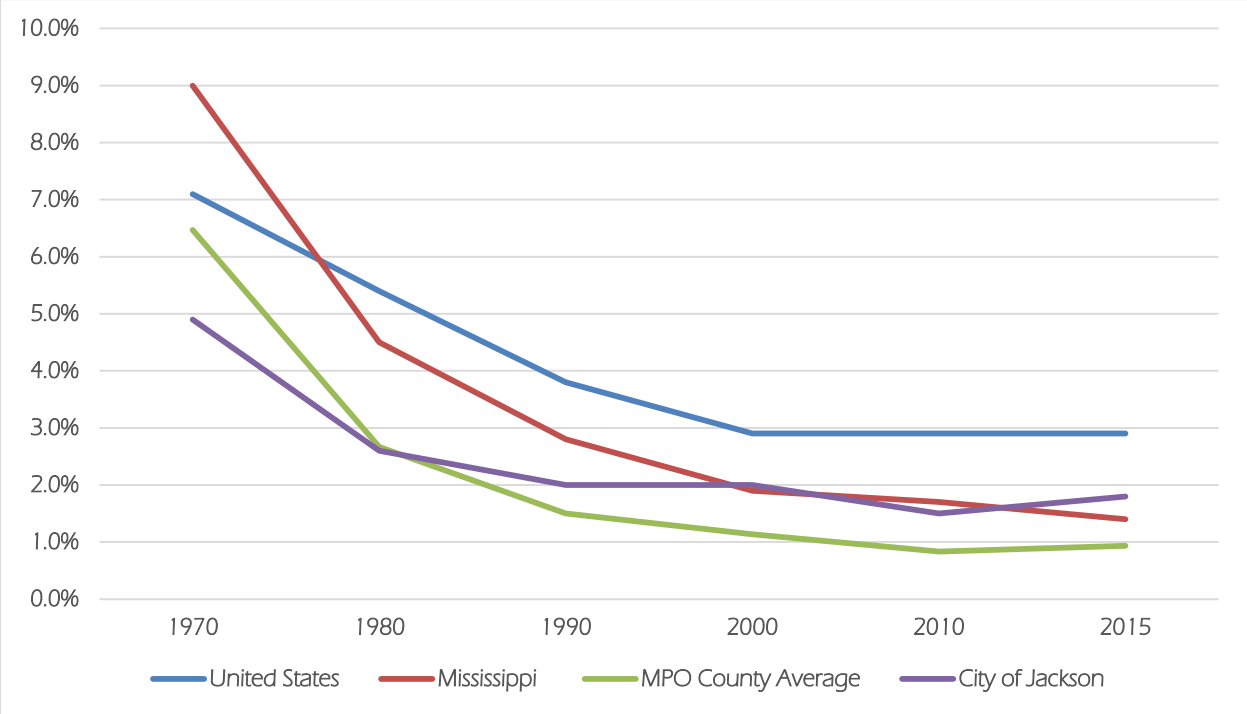
Table 4.3: Means of Transportation to Work

Mode	United States	Mississippi	Jackson MPA	City of Jackson
Drove Alone	76.4	85.3	86.2	84.5
Carpooled	9.1	9.2	9.3	10.4
Transit	5.0	0.3	0.3	0.8
Walked	2.7	1.4	1.0	1.9
Bicycle	0.6	0.1	0.1	0.1
Other	1.2	1.4	0.8	0.5

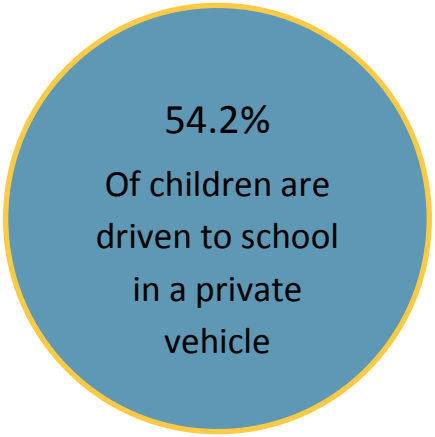
Note: Excludes those who worked from home
Source: ACS 2014-2018

Figure 4.5 below shows from 1970 to 2015 just how large of a decline there has been over the years in the amount of people walking to work. The largest decrease for all four listed areas occurring between 1970 and 1980. Though these numbers are bleak, between 2010 and 2015 the City of Jackson and the MPO Planning Area each experienced slight increases in the amount of people walking to work at 0.3 and 0.1 percent respectively.

Figure 4.5: Percentage of People Walking to Work, 1970 - 2015



Source: National Historic Geographic Information Systems; ACS 2013-2017 5-Yr Estimates



In addition to the substantial decrease in the amount of people walking to work, the number of children walking to school has also seen a sharp decline. According to a 2011 report from the National Center for Safe Routes to School, from 1969 to 2009 the percent of children five to fourteen years old that usually walked or bicycled to school dropped from roughly 50 percent to 13 percent. This can be attributed to a number of reasons, however, distance to school seems to play the most significant role.

The 2017 National Household Travel Survey found that 80.9 percent of students who lived a quarter mile or closer to school walked or biked, while less than one percent of students walked or biked if they lived more than two miles from school. The data also showed that as a whole out of over 50 million children that traveled to school only 10.4 percent walked.

4.4 Maintenance

Maintenance is a major concern as it relates to the Bicycle and Pedestrian network in the Jackson MPA. With each new facility added to the overall bicycle and pedestrian facility network, comes an additional demand for increased funding for maintenance of those facilities. While additional facilities are needed to improve connectivity of the network throughout the Jackson MPA to improve mobility, there is a present need to maintain and improve the existing infrastructure. Failure of jurisdictions to budget for maintenance of existing infrastructure can result in degradation of facilities to the point of rendering them unusable and thus useless to the traveling public who depend on them as a means of accessing everyday needs. In the Jackson MPA, there are currently multiple facilities in need of immediate repair.

Most municipal and county jurisdictions have maintenance schedules in place for other infrastructure maintenance needs, such as scheduled grass cutting/trimming of overgrown vegetation, debris removal, roadway restriping and repainting of municipal buildings and facilities. However, not all jurisdictions have similar schedules for maintenance of existing bicycle and pedestrian facilities. This differs from jurisdiction to jurisdiction as establishing maintenance schedules are deemed unnecessary in certain areas either due to a lack of significant bicycle and pedestrian infrastructure or if the type of facilities each jurisdiction is responsible for is being maintained as part of an existing roadway maintenance schedule.

4.5 Safety

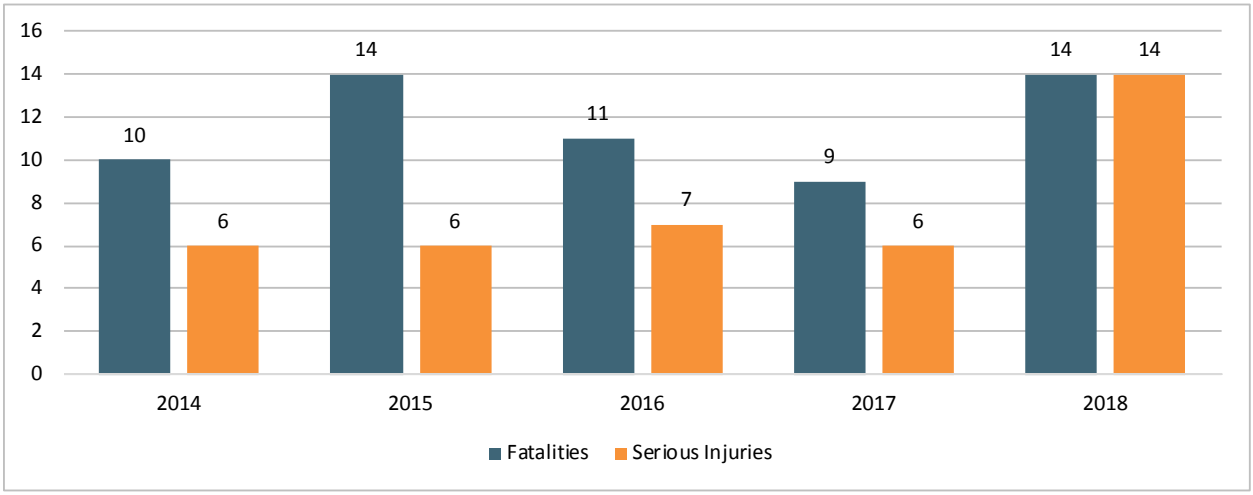
The Fixing America's Surface Transportation (FAST) Act requires MPO's and State DOT's to work collectively to examine performance data and establish targets for seven national performance goals which are focused on improving the overall transportation system. Safety is the first performance goal identified in the FAST Act. The Safety performance goal requires State DOTs and MPOs to set targets for five safety-related performance measures and report progress toward their achievement annually. Each of the measures focus on achieving a significant reduction in traffic fatalities and serious injuries on all public roads. The fifth safety performance measure focuses on reducing fatalities and serious injuries for non-motorized users of the transportation system.

Federal Safety Measures

1. Number of Fatalities: the total number of persons suffering fatal injuries in a motor vehicle crash during a calendar year.
2. Rate of Fatalities: the ratio of total number of fatalities to the number of vehicle miles traveled (in 100 million VMT) in a calendar year.
3. Number of Serious Injuries: the total number of persons suffering at least one serious injury in a motor vehicle crash during a calendar year.
4. Rate of Serious Injuries: the ratio of total number of serious injuries to the number of VMT (in 100 million VMT) in a calendar year.
5. Number of Non-Motorized Fatalities and Non-Motorized Serious Injuries: the combined total number of non-motorized fatalities and non-motorized serious injuries involving a motor vehicle during a calendar year.

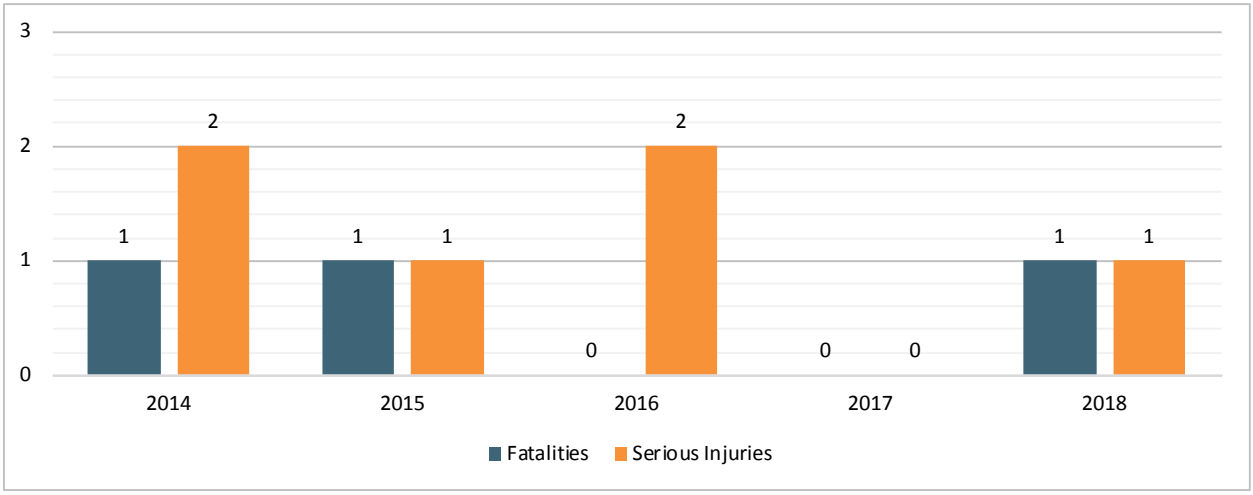
As can be seen in Figures 4.6 and 4.7, between 2014 and 2018 there were 58 pedestrians and 3 bicyclists that lost their lives as a result of a crash involving a motor vehicle in the Jackson MPA. During that same span, there were 39 pedestrians and 6 bicyclists involved in crashes that resulted in serious injuries. Figure 4.7 shows the amount of fatal and serious injury crashes involving bicyclists has remained consistent and low over the five (5) year period. In contrast, the amount of pedestrian fatalities and serious injuries caused by crashes with motor vehicles is significantly higher and inconsistent. This difference between the two is expected as there are a greater number of users of the transportation system that are pedestrians as opposed to bicyclists.

Figure 4.6: Pedestrian Fatalities and Serious Injuries



Source: SAMS, 2019; NSI, 2019

Figure 4.7: Bicyclist Fatalities and Serious Injuries



Source: SAMS, 2019; NSI, 2019

In 2018, pedestrians accounted for over 17 percent of all fatalities involving motor vehicle crashes nationally. That number is slightly lower in the state at 10 percent and is 17.2 percent in the Jackson MPO Planning Area. The higher number in the Jackson MPA is expected as nationally 80 percent of all pedestrian fatalities occur in urban areas where population densities are noticeably higher compared to those in rural areas.

5.0 Public Transit

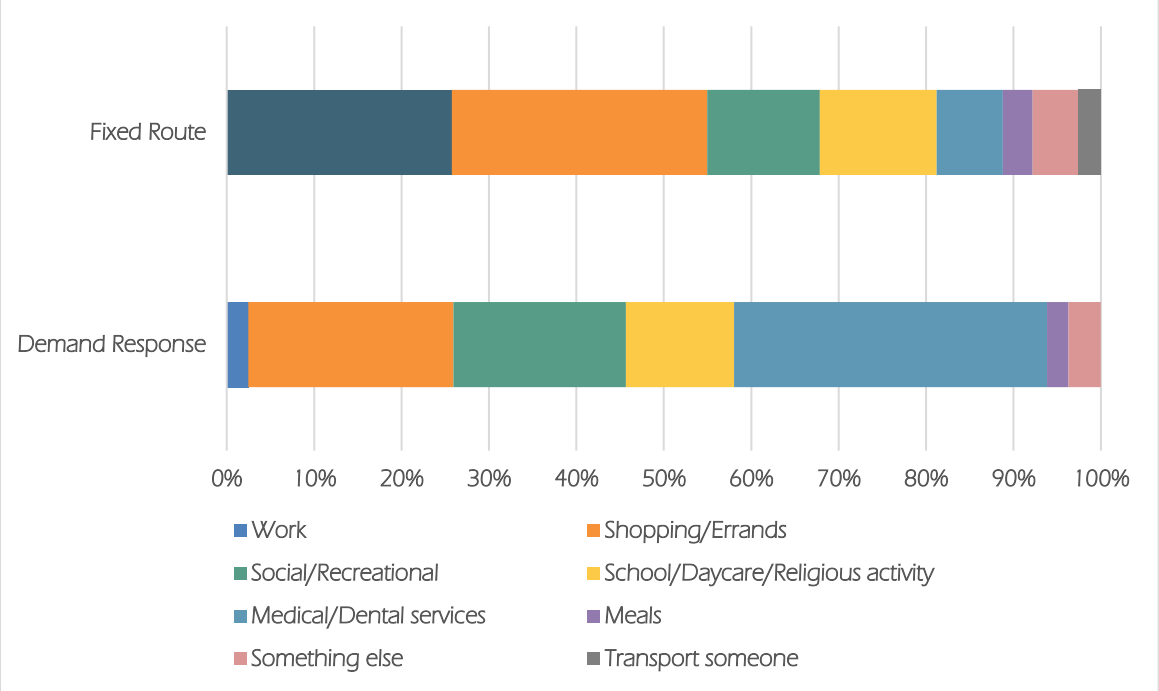
Public transit provides people with access to the places they need to go – work, school, grocery stores, medical facilities, and other destinations. For those that have no other choice, either because of economic or physical limitations, it is a lifeline service. For others, it reduces the burden of transportation costs and serves as a convenient alternative to driving.

Public transit also has significant benefits for the entire community as it can increase local business access to skilled workers, reduce congestion and emissions, reduce urban sprawl, and foster walkable communities.

Still, in small to mid-size metropolitan areas like the Jackson area, public transit accounts for a small percentage of all trips– less than 2 percent according to the 2017 National Household Travel Survey.

For those that do use public transit in these areas, trip purposes vary substantially. People riding fixed routes are primarily traveling for work or shopping/errands. People using demand response services are overwhelmingly traveling for medical, shopping/errands, or social/recreational purposes. However, trip purpose patterns will ultimately depend on the quality of public transit in the region.

Figure 5.1: Trip Purposes for Transit Riders in Small to Mid-Size Metro Areas



Note: Small to Mid-Size Metro Area = under 1,000,000 residents
Source: 2017 National Household Travel Survey

5.1 JTRAN

Services Provided

The City of Jackson, operating as JTRAN, is the primary public transit provider in the region, offering both fixed route bus service and complementary paratransit service within the City limits.

Fixed Route (Bus) Service

JTRAN operates nine bus routes in the city from Monday through Saturday, excluding major holidays. On weekdays, service begins around 5:15 a.m. and ends around 7:45 p.m. and on Saturdays, service begins around 6:45 a.m. and ends around 6:45 p.m. Frequencies vary by route, ranging from every 30 minutes to every 60 minutes. Routes are timed and coordinated to make transferring easy, with most routes terminating at Union Station in Downtown Jackson or at a few other major transfer locations. Figure 5.2 shows the current bus routes provided by JTRAN and Table 5.1 shows the frequencies of these routes.

The base fare for buses is $1.50, $1 for K-12 students with school ID; $0.75 for kids 6-14; and $0.50 for seniors at least 60, people with disabilities, or people with Medicare. Daily, weekly, and monthly passes are available as are special passes for college students and youths in the summer. Transfers are free.

Table 5.1: JTRAN Bus Routes and Frequencies

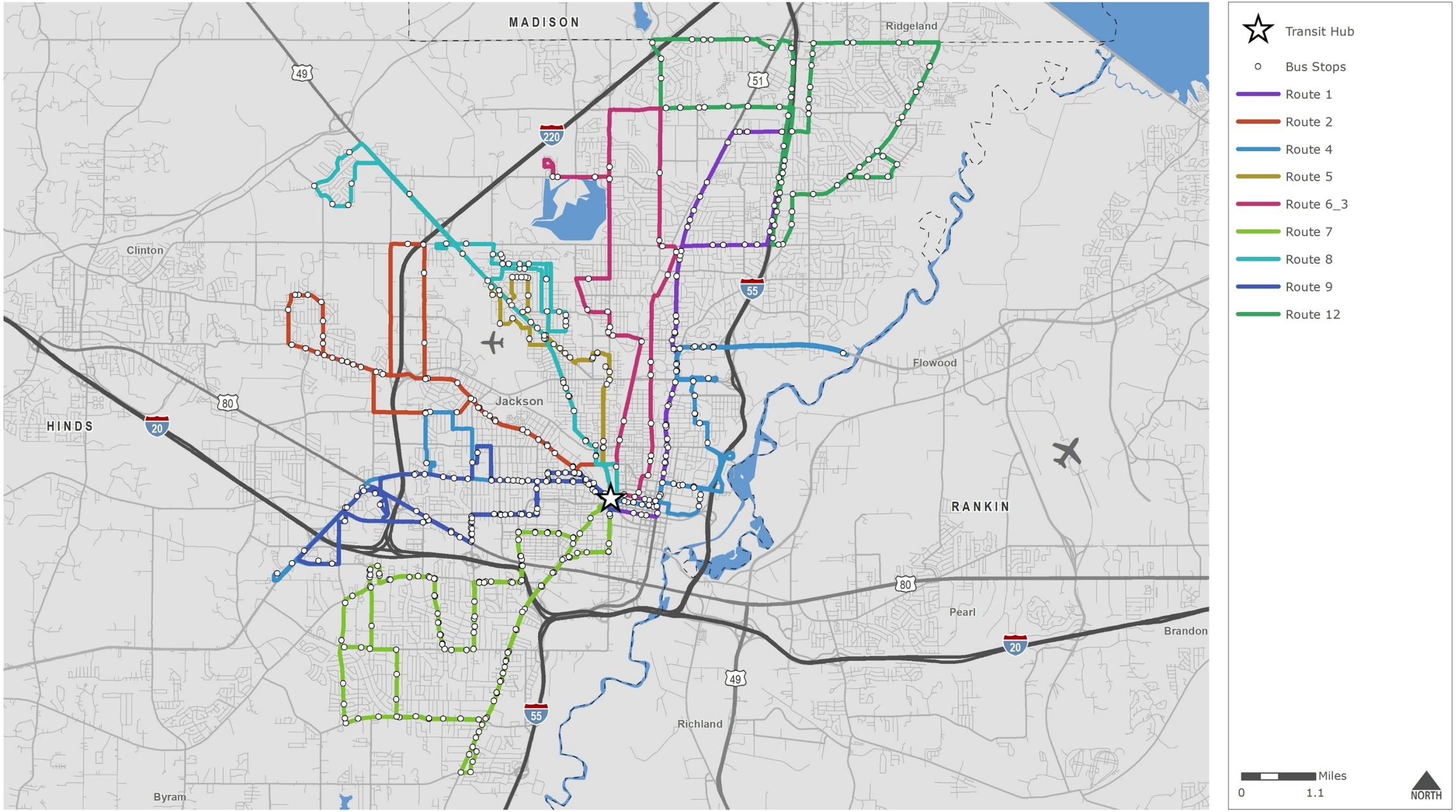
Route	Monday-Friday	Saturday
1 - North State Street	30 minutes	60 minutes
2 - West Capitol & Clinton Blvd	60 minutes	60 minutes
4 - Robinson Rd/Belhaven	60 minutes	60 minutes
5 - Bailey Ave/Medical Mall	60 minutes	60 minutes
6/3 - Virden Addition/Lake Hico	60 minutes	60 minutes
7 - Terry Rd/Raymond Rd	60 minutes	60 minutes
8 - MLK & Medgar Evers Blvd/Presidential Hills	30-60 minutes	60 minutes
9 - MetroCenter Mall/Walmart	60 minutes	60 minutes
12 - Save-a-Lot/Tougaloo College	30-60 minutes	60 minutes

Source: JTRAN

Handilift (Paratransit) Service

For qualified individuals with mobility impairments that are unable to use the system's bus service, JTRAN provides a paratransit service called Handilift within the City of Jackson. This advance reservation, door to door service is provided at the same time as bus service at a cost of $2.00 per trip.

Figure 5.2: JTRAN Fixed Route System



Data Sources: JTRAN

Disclaimer: This map is for planning purposes only.

Ridership Trends

After annual declines in fixed route ridership from 2014 to 2017, ridership rebounded slightly in 2018. At the same time, since 2014 paratransit ridership has grown steadily. The decline in fixed route ridership is due to many factors, including poor reliability in recent years and trends like a strong economy and low automobile loan rates.

Route 1 - North State Street has the highest average daily ridership of all JTRAN routes with 400 average daily boardings, accounting for nearly one-quarter of all JTRAN ridership. All other routes and the paratransit service as a whole average between 100 and 200 boardings a day.

Ridership does not vary substantially by month, staying around 40,000-50,000 boardings per month.

Table 5.2: JTRAN Annual Ridership by Mode, 2014-2018

Mode	2014	2015	2016	2017	2018
Fixed Route	635,110	608,303	448,513	453,770	518,302
Paratransit	37,194	38,274	40,882	43,758	43,730
Total	672,304	646,577	489,395	497,528	562,032

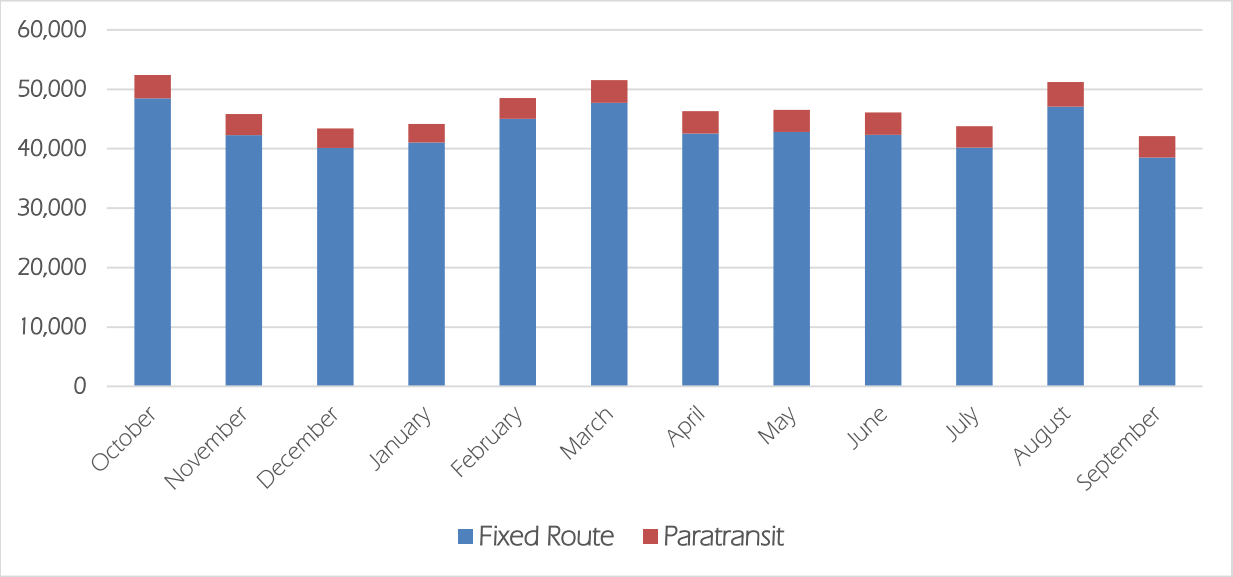
Source: National Transit Database

Table 5.3: JTRAN Average Daily Ridership by Route/Service, 2018

Route/Service	Average Daily Ridership
1 - North State Street	422
2 - West Capitol & Clinton Blvd	149
4 - Robinson Rd/Belhaven	141
5 - Bailey Ave/Medical Mall	160
6/3 - Virden Addition/Lake Hico	125
7 - Terry Rd/Raymond Rd	209
8 - MLK & Medgar Evers Blvd/Presidential Hills	164
9 - MetroCenter Mall/Walmart	180
12 - Save-a-Lot/Tougaloo College	108
Paratransit	143
TOTAL	**1,839**

Note: Average Daily Ridership based on holidays listed in passenger guide.
Source: JTRAN

Figure 5.3: Recent JTRAN Ridership by Month



Source: National Transit Database, FY 2018

Paratransit Origins and Destinations

Consistent with national trends, most paratransit trips appear to be medical-related. Figure 5.4 shows the concentrations of Handilift origins and destinations over a five-year period. The "hot spots" that emerge are major medical centers and shopping areas. Furthermore, the top 10 origins and destinations (Table 5.4) are almost exclusively medical or shopping related. These top 10 locations accounted for approximately 10 percent of all available paratransit data from FY 2013 to FY 2018.

Table 5.4: Top 10 Paratransit Origins and Destinations

Rank	Place	Address	Type
1	Jackson Medical Mall	350 W Woodrow Wilson Ave	Medical
2	Vocational Rehabilitation for the Blind	2550 Peachtree St	Medical
3	Walmart Supercenter	2711 Greenway Dr	Shopping
4	St. Dominic's Hospital	970 Lakeland Dr	Medical
5	Near Capital City Beverages	920 W County Line Rd	Unknown
6	University Medical Center	764 Lakeland Dr	Medical
7	University Medical Center	1410 E Woodrow Wilson Ave	Medical
8	Baptist Medical Center	1200 N State St	Medical
9	St. Dominic's Hospital	971 Lakeland Dr	Medical
10	Walmart Supercenter	815 S Wheatley St	Shopping

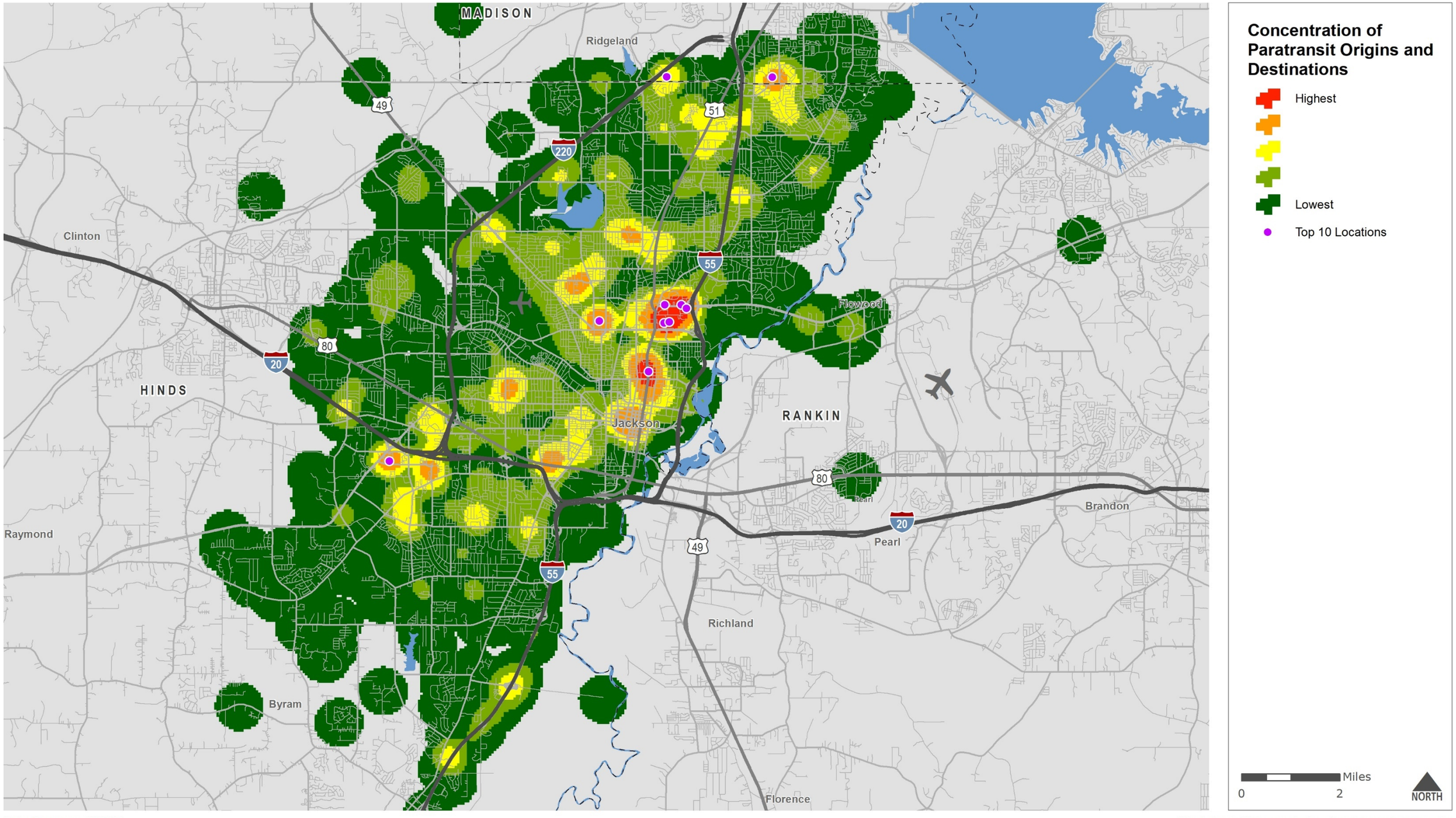
Source: JTRAN, Paratransit records from FY2013-2018.

Operating Trends

The level of service for JTRAN's fixed route service has been stable for the last five years, with no major increases or decreases in vehicle revenue hours or miles. However, due to declining ridership, the productivity and farebox recovery ratio for the system has declined during this time. Still, after years of increasing costs, operating costs decreased significantly in 2018.

For paratransit, the level of service provided has increased steadily over the last five years and ridership has even outpaced this expanded level of service. Productivity has also increased, likely due to shorter trips. As with fixed route service, operating costs decreased significantly in 2018.

Figure 5.4: Concentration of Paratransit Origins and Destinations, FY 2013-2018



Data Sources: JTRAN

Disclaimer: This map is for planning purposes only.

Table 5.5: JTRAN Fixed Route Trends, 2014-2018

Indicator	2014	2015	2016	2017	2018	Change (2014 - 2018)	Indicator
General System Statistics							
Urbanized Area Population	354,816	354,816	354,816	354,816	354,816	0.0%	--
Urbanized Area Square Miles	249	249	249	249	249	0.0%	--
Urbanized Area Population Density	1,424.3	1,424.3	1,424.3	1,424.3	1,424.3	0.0%	--
Vehicles Operated in Maximum Service	25	14	14	14	14	-44.0%	--
Vehicle Revenue Miles	748,796	744,158	746,497	659,871	782,107	4.4%	▲
Vehicle Revenue Hours	48,334	48,949	48,398	43,272	48,959	1.3%	--
Boardings	635,110	608,303	448,513	453,770	518,302	-18.4%	▼
Fare Revenue	$540,825	$507,355	$333,090	$348,943	$363,471	-32.8%	▼
Annual Operating Expense	$3,742,942	$4,440,134	$4,343,985	$4,303,983	$3,861,861	3.2%	--
Level of Service							
Vehicle Revenue Miles per Capita	2.1	2.1	2.1	1.9	2.2	4.4%	--
Vehicle Revenue Hours per Capita	0.1	0.1	0.1	0.1	0.1	1.3%	--
Productivity							
Boardings per Revenue Mile	0.8	0.8	0.6	0.7	0.7	-21.9%	▼
Boardings per Revenue Hour	13.1	12.4	9.3	10.5	10.6	-19.4%	▼
Boardings per Capita	1.8	1.7	1.3	1.3	1.5	-18.4%	▼
Cost Efficiency							
Operating Expense per Vehicle Revenue Mile	$5.00	$5.97	$5.82	$6.52	$4.94	-1.2%	--
Operating Expense per Vehicle Revenue Hour	$77.44	$90.71	$89.76	$99.46	$78.88	1.9%	--
Operating Expense per Boarding	$5.89	$7.30	$9.69	$9.48	$7.45	26.4%	▲
Farebox							
Average Fare	$0.85	$0.83	$0.74	$0.77	$0.70	-17.6%	▼
Farebox Recovery Rate	14.4%	11.4%	7.7%	8.1%	9.4%	-34.9%	▼

Source: National Transit Database

Table 5.6: JTRAN Paratransit Trends, 2014-2018

Indicator	2014	2015	2016	2017	2018	Change (2014 - 2018)	Trend
General System Statistics							
Urbanized Area Population	354,816	354,816	354,816	354,816	354,816	0.0%	--
Urbanized Area Square Miles	249	249	249	249	249	0.0%	--
Urbanized Area Population Density	1,424.3	1,424.3	1,424.3	1,424.3	1,424.3	0.0%	--
Vehicles Operated in Maximum Service	20	16	13	17	11	-45.0%	--
Vehicle Revenue Miles	339,819	322,338	275,906	338,788	355,785	4.7%	▲
Vehicle Revenue Hours	25,892	25,321	23,148	27,830	28,672	10.7%	▲
Boardings	37,194	38,274	40,882	43,758	43,730	17.6%	▲
Fare Revenue	$77,551	$76,061	$73,105	$76,597	$83,163	7.2%	▲
Annual Operating Expense	$3,068,264	$2,785,296	$2,835,795	$2,938,729	$1,980,630	-35.4%	▼
Level of Service							
Vehicle Revenue Miles per Capita	1.0	0.9	0.8	1.0	1.0	4.7%	--
Vehicle Revenue Hours per Capita	0.1	0.1	0.1	0.1	0.1	10.7%	--
Productivity							
Boardings per Revenue Mile	0.1	0.1	0.1	0.1	0.1	12.3%	▲
Boardings per Revenue Hour	1.4	1.5	1.8	1.6	1.5	6.2%	--
Boardings per Capita	0.1	0.1	0.1	0.1	0.1	17.6%	▲
Cost Efficiency							
Operating Expense per Vehicle Revenue Mile	$9.03	$8.64	$10.28	$8.67	$5.57	-38.3%	▼
Operating Expense per Vehicle Revenue Hour	$118.50	$110.00	$122.51	$105.60	$69.08	-41.7%	▼
Operating Expense per Boarding	$82.49	$72.77	$69.37	$67.16	$45.29	-45.1%	▼
Farebox							
Average Fare	$2.09	$1.99	$1.79	$1.75	$1.90	-8.8%	▼
Farebox Recovery Rate	2.5%	2.7%	2.6%	2.6%	4.2%	66.1%	▲

Source: National Transit Database

Safety and Security Trends

As a recipient of federal transportation funds, JTRAN is required to report safety and security events occurring on a transit right-of-way, in a transit revenue facility, in a transit maintenance facility, or involving a transit revenue vehicle.

Table 5.7 shows JTRAN's reported safety and security events from the last 5 years of available data and compares its incidence rates to the national and state averages of other urbanized area providers. While JTRAN has a high prevalence of safety and security events over the last five years compared to state and national averages, it has no reported incidents involved with a fatality. However, its high incidence rate and high injury rate merit attention.

Table 5.7: JTRAN Safety and Security Events, 2014-2018

	2014	2015	2016	2017	2018	Total
All Events	2	1	6	4	4	17
Fatalities	0	0	0	0	0	0
Injuries	1	1	11	3	4	20

Source: National Transit Database

Table 5.8: Safety and Security Events per 100,000 Vehicle Revenue Miles, 2014-2018

	JTRAN	Mississippi Urbanized Area Providers	U.S. Urbanized Area Providers
All Events	0.32	0.22	0.21
Fatalities	0.00	0.01	0.01
Injuries	0.38	0.24	0.26

Source: National Transit Database

Transit Asset Management

All transit agencies receiving federal funding are required to submit asset inventory data, condition assessments, performance targets, and a narrative report to the National Transit Database annually in addition to developing a Transit Asset Management (TAM) plan. JTRAN submits this information and recently developed a TAM plan.

Federal TAM regulations require transit agencies to address the four asset categories shown in Table 5.9, as applicable to the agency. For JTRAN, only the rolling stock, equipment, and facilities asset categories are applicable.

As of 2018, JTRAN had 74 vehicles in its rolling stock fleet, 7 vehicles in its equipment fleet, and 26 facilities (see Tables 5.10-5.12). During the development of its TAM Plan, JTRAN set performance targets for all asset categories in its rolling stock, equipment, and facility inventory. For rolling stock and equipment, this performance measure is simply the percentage of vehicles whose age exceeds the

Useful Life Benchmark (ULB). Each vehicle type has its own ULB target due to unique operating and maintenance characteristics. For facilities, the TAM performance measure is the percentage of facilities rated under 3.0 using FTA's TERM software (3.0 indicates adequate condition).

As shown in Tables 5.10 through 5.12, in 2018, JTRAN did not meet performance targets for some asset categories for its rolling stock, equipment, and facilities. Using its TAM Plan, JTRAN will continue to improve its performance and build towards a good state of repair for all of its assets.

Useful Life Benchmark: The expected lifecycle of a capital asset for a particular transit provider's operating environment, or the acceptable period of use in service for a particular transit provider's operating environment.

Note: ULB is distinct from the useful life definition used in FTA's grant programs

Table 5.9: Transit Asset Management Performance Measures

Asset Category	FTA established Performance Measure	Reported by JTRAN
Rolling Stock	% of revenue vehicles exceeding ULB	Yes
Equipment	% of non-revenue service vehicles exceeding ULB	Yes
Facilities	% of facilities rated under 3.0 on the TERM scale	Yes
Infrastructure	% of track segments under performance restriction	No

Note: ULB = Useful Life Benchmark; TERM is software used to rate facility conditions
Source: Federal Transit Administration

Table 5.10: JTRAN Rolling Stock Inventory and Performance

Vehicle Type	Total	ULB (years)	% Exceeding ULB	2019-2022 MPO Target	Status
Buses	49	7-12	63%	50%	Target Not Met
Cutaway Buses	25	4-7	48%	50%	Target Met
Overall	74	n/a	58%	n/a	n/a

Source: JTRAN Transit Asset Management Plan, 2018

Table 5.11: JTRAN Equipment Inventory and Performance

Vehicle Type	Total	ULB (years)	% Exceeding ULB	2019-2022 MPO Target	Status
Truck	2	4	100%	50%	Target Not Met
SUV	3	4	33%	50%	Target Met
Car	2	4	50%	50%	Target Met
Overall	7	n/a	57%	n/a	n/a

Source: JTRAN Transit Asset Management Plan, 2018

Table 5.12: JTRAN Facility Inventory and Performance

Asset Category	Total	Average TERM Scale Rating	% Under 3.0 on TERM Scale	2019-2022 MPO Target	Status
Administrative Buildings	2	2.5	50%	50%	Target Met
Maintenance	1	4	0%	0%	Target Met
Service Building	1	4	0%	0%	Target Met
Passenger Facility	22	1.05	100%	0%	Target Not Met
Overall	26	n/a	88%	n/a	n/a

Source: JTRAN Transit Asset Management Plan, 2018

5.2 Fixed Route Regional Peer Comparison

A peer comparison analysis is a benchmarking tool that allows an area to compare itself to areas with similar conditions. Ideally, the peer group has elements in common with the transit system studied such as population of area served, geographical location (state or region), and type of services offered.

Because this is a regional long-range transportation plan, the criteria to select peer systems is somewhat different from the typical criteria used by transit agencies in short-range transit development plans. The focus is on the urbanized areas of Jackson versus the service area of a particular agency.

Peer Selection Methodology

Selection criteria were utilized that were intended to highlight urban areas that are very similar to the Jackson, MS urbanized area in terms of urban structure, land use patterns, and demographics. These three factors, outside of the type and level of transit service provided, are the primary drivers of transit demand and barriers. By selecting peer areas similar to Jackson in these regards, we can highlight areas that are operating under similar constraints but producing different results. This is a beginning step that may involve further exploring transit service in other areas and learning from their decisions.

The selection criteria are: urbanized area size; location in the Southeast, urban sprawl composite index; high low-income population; influence of higher education, military, retirees, and tourism. The selection methodology is further outlined on the next page.

Urbanized Area Size

Urbanized areas must be the only urbanized area in a Metropolitan Statistical Area (MSA) or Combined Statistical Area (CSA) and have a population range between 200,000 and 620,928. That population corresponds to an urbanized area with a 2017 population within 75% of the Jackson, MS urbanized area and an urbanized area with a minimum population of 200,000 so that it is considered a Transportation Management Area (TMA). TMAs are subject to slightly different federal regulations and funding. 129 UZAs met these two criteria.

Urban Sprawl Composite Index

For the remaining urbanized areas, those that were more than one standard deviation (25 points) away from the Jackson, MS urbanized area on the Urban Sprawl Composite Index produced by the Metropolitan Research Center's Measuring Urban Sprawl and Validating Sprawl Measures, were excluded. This reduced the number of potential peer areas to less than 17 urbanized areas.

High Low-Income Population

Urbanized areas with a percentage of all households receiving food stamps that was significantly different from that of the Jackson, MS urbanized area were excluded. Significant was defined as within 30% of the Jackson, MS urbanized area percentage. Eleven areas were left, but of these Jackson has one of the lowest percentage of residents on food stamps.

Similar Influence of Higher Education, Military, and Retirement Communities

Urbanized areas with a percentage of its population aged 18 to 24 and/or 65 and over that were significantly different from that of the Jackson, MS urbanized area were removed. Significant was defined as within 30% of the Jackson, MS urbanized area percentage. Fayetteville, NC was removed because it contains a high percentage of military residents due to Fort Bragg.

Geographic Location

The areas outside of the Southeast were removed. State and local transit funding is much lower in the Southeast and the public perception of transit is much poorer. This left five areas as peers, shown in Table 5.14.

Table 5.13 shows the demographics and urban sprawl index of these five selected peer areas.

Table 5.13: Characteristics of Selected Peer Urbanized Areas

Urbanized Area	Urbanized Area Population (2017)	Urban Sprawl Index (2010)	% Aged 18-24 (2017)	% Aged 65+ (2017)	% Households Receiving Food Stamps (2017)
Jackson, MS	354,816	76.3	10.0	12.2	14.5
Peer Average	331,332	83.5	10.2	14.2	16.0
Augusta, GA	405,896	76.3	10.0	13.9	16.0
Lafayette, LA	266,174	92.4	10.0	12.3	13.6
Mobile, AL	325,732	97.5	10.0	14.8	18.5
Pensacola, FL	360,423	78.5	12.0	15.8	14.7
Shreveport, LA	298,437	72.6	9.0	14.1	17.2

Note: A higher score on the Urban Sprawl Index indicates less sprawl.
Sources: Census Bureau ACS 2013-2017 5-Year Estimates; Ewing and Hamidi 2010

Table 5.14: Selected Peer Regions

Region	Urban Fixed Route Systems
Augusta, SC-GA	Augusta Richmond County Transit Department (APT); Lower Savannah COG (LSCOG)
Lafayette, LA	Lafayette City-Parish Consolidated Government (LTS)
Mobile, AL	City of Mobile (WTS)
Pensacola, FL	Escambia County Board of County Commissioners, FL (ECAT)
Shreveport, LA	City of Shreveport (SporTran)
Jackson, MS	City of Jackson, MS (JTRAN)

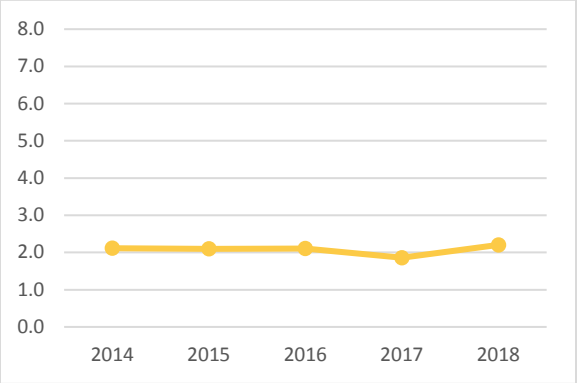
Table 5.15: Peer Fixed Route System Trends, 2018

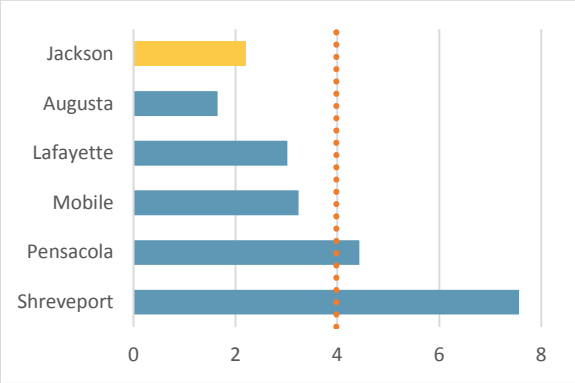
Indicator	Augusta	Lafayette	Mobile	Pensacola	Shreveport	Peer Average	Jackson
General System Statistics							
Urbanized Area Population	405,896	266,174	328,541	360,423	301,200	332,447	354,816
Urbanized Area Square Miles	262	179	227	239	188	219	249
Urbanized Area Population	1,547	1,485	1,450	1,509	1,604	1,519	1,424
Vehicles Operated in	15	15	21	36	41	26	14
Vehicle Revenue Miles	668,988	803,455	1,063,780	1,596,032	2,278,358	1,282,123	782,107
Vehicle Revenue Hours	49,468	51,424	76,679	107,464	150,444	87,096	48,959
Boardings	686,515	1,510,821	850,598	1,445,102	2,523,868	1,403,381	518,302
Fare Revenue	$577,933	$361,069	$585,706	$1,396,208	$1,650,260	$914,235	$363,471
Annual Operating Expense	$4,047,491	$4,817,775	$7,591,657	$9,789,815	$11,439,078	$7,537,163	$3,861,861
Level of Service							
Vehicle Revenue Miles per	1.6	3.0	3.2	4.4	7.6	4.0	2.2
Vehicle Revenue Hours per	0.1	0.2	0.2	0.3	0.5	0.3	0.1
Productivity							
Boardings per Revenue Mile	1.0	1.9	0.8	0.9	1.1	1.1	0.7
Boardings per Revenue Hour	13.9	29.4	11.1	13.4	16.8	16.9	10.6
Boardings per Capita	1.7	5.7	2.6	4.0	8.4	4.5	1.5
Cost Efficiency							
Operating Expense per Vehicle	$6.05	$6.00	$7.14	$6.13	$5.02	$6.07	$4.94
Operating Expense per Vehicle	$81.82	$93.69	$99.01	$91.10	$76.04	$88.33	$78.88
Operating Expense per	$5.90	$3.19	$8.93	$6.77	$4.53	$5.86	$7.45
Farebox							
Average Fare	$0.84	$0.24	$0.69	$0.97	$0.65	$0.68	$0.70
Farebox Recovery Rate	14.3%	7.5%	7.7%	14.3%	14.4%	11.6%	9.4%

Source: National Transit Database

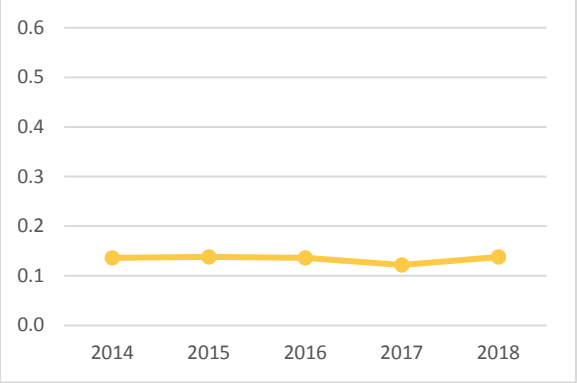
Level of Service Indicators

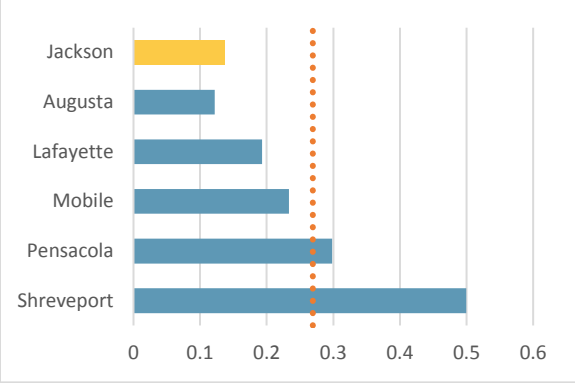
Vehicle Revenue Miles per Capita





Vehicle Revenue Hours per Capita

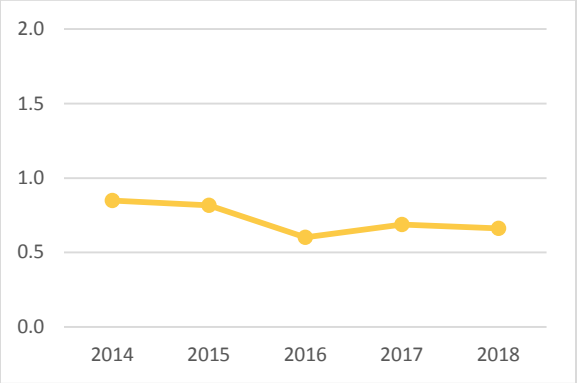


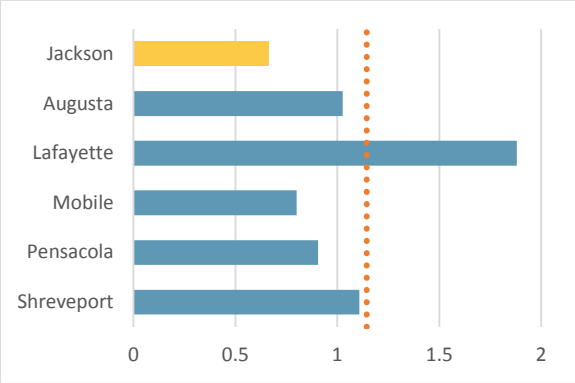


Peer Average

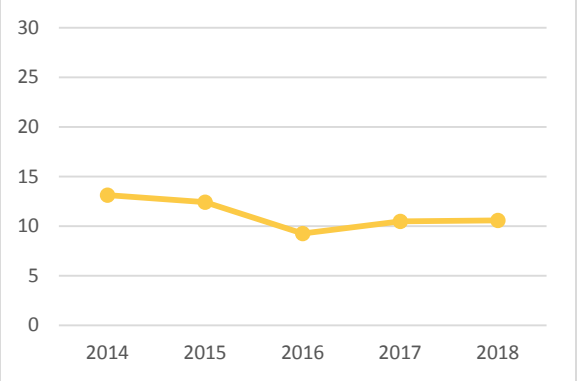
Productivity Indicators

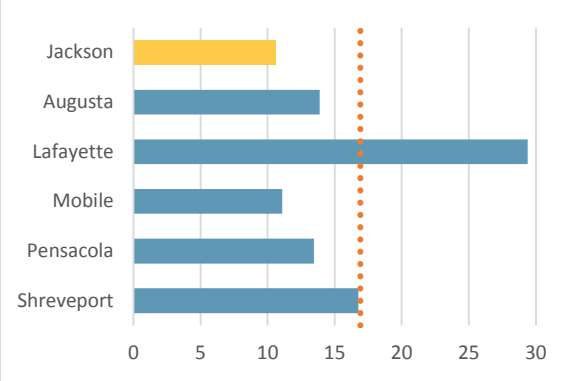
Boardings per Revenue Mile



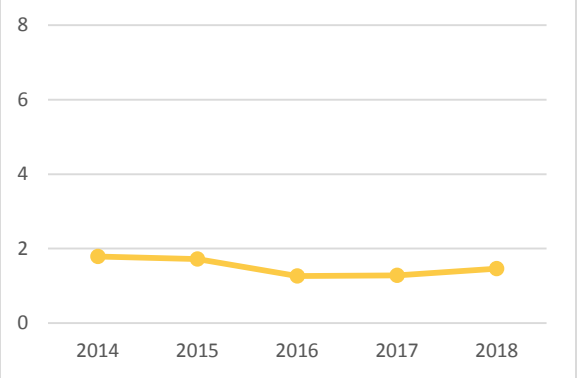


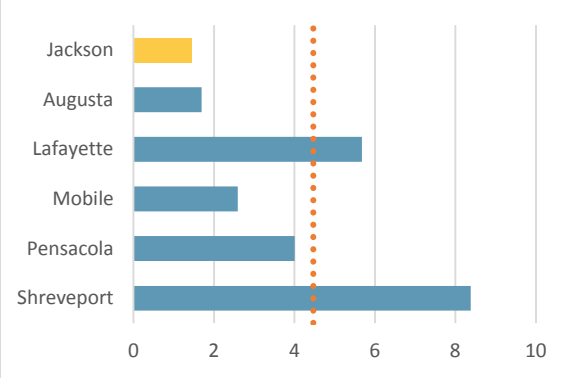
Boardings per Revenue Hour





Boardings per Capita

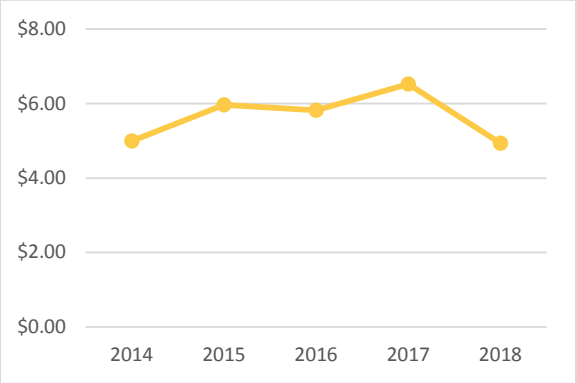


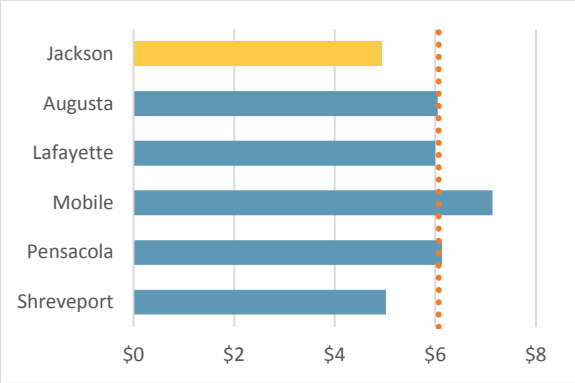


Peer Average

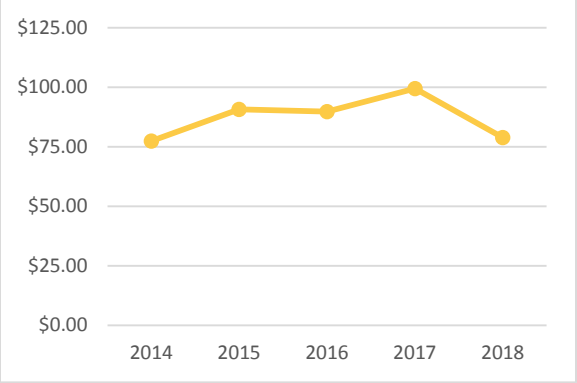
Cost Efficiency Indicators

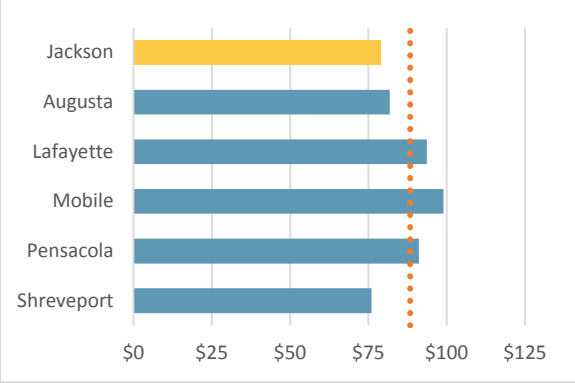
Operating Expense per Vehicle Revenue Mile



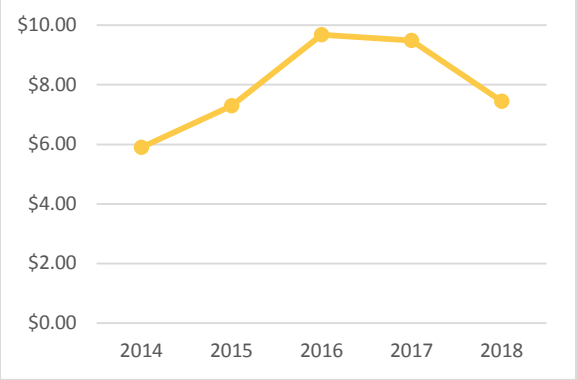


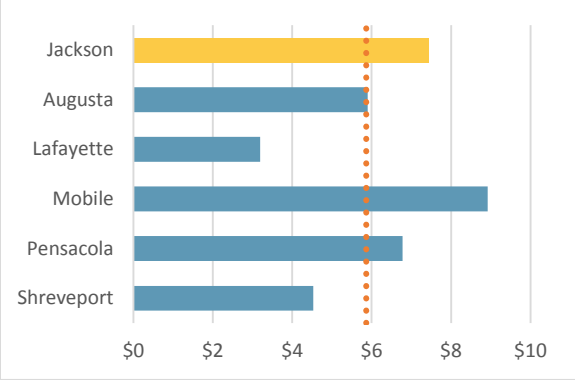
Operating Expense per Vehicle Revenue Hour





Operating Expense per Passenger Trip

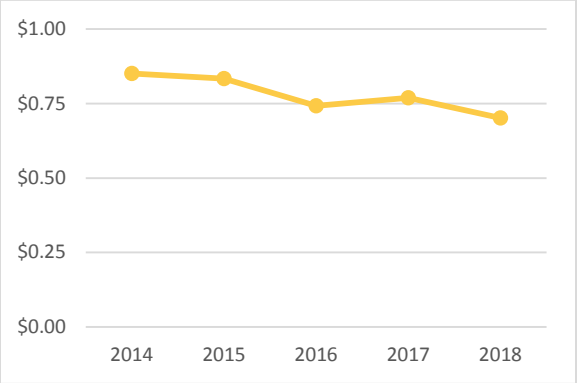


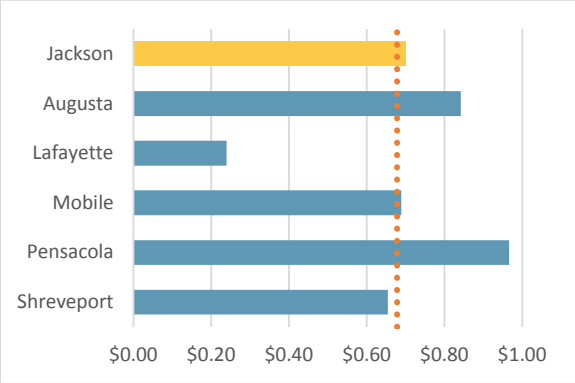


Peer Average

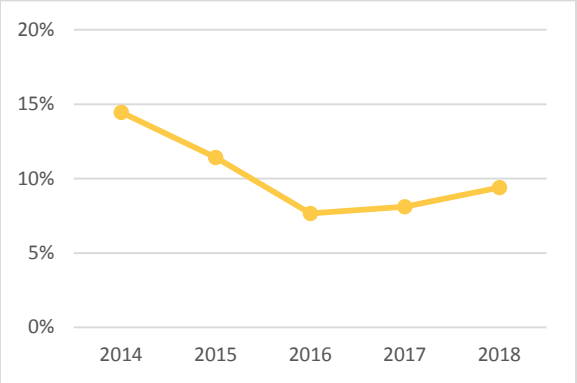
Farebox Indicators

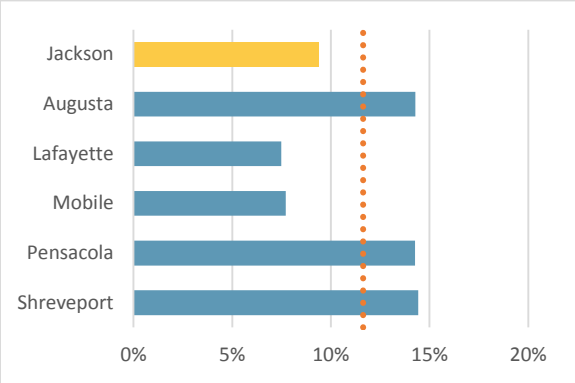
Average Fare





Farebox Recovery Rate





Peer Average

Fixed Route Regional Peer Comparison Findings

Table 5.15 provides relevant transit operations information for all fixed route, urban transit services operating in the selected peer regions. The following trends can be gleaned from this information:

- Level of Service
  - JTRAN provides significantly less transit service than most of its peers. This is true for both vehicle revenue hours and miles provided per capita.
- Productivity
  - By all measures, JTRAN is the least productive of its peers.
- Cost Efficiency
  - JTRAN is more cost-efficient than most of its peers and is similar in this regard to Shreveport.
  - However, due to low productivity, its cost per passenger trip is amongst the highest, along with Mobile.
- Farebox recovery
  - JTRAN's average fare is in line with most of its peers, though Lafayette reports a much lower average fare.
  - JTRAN's farebox recovery rate, or the share of operating costs covered by fares, is in the middle of its peers.

Overall, when compared to the selected peer regions, JTRAN provides much more limited transit service and is considerably less productive in attracting riders. However, JTRAN is cost-efficient when compared to its peers and is on par with them in terms of its farebox recovery rate.

5.3 Coordination with Other Transit Providers and Stakeholders

In addition to coordination with JTRAN, the MPO directly coordinates with other transit providers and stakeholders through the TRANS-CON group, one of six regional groups in Mississippi for local coordinated transit planning. The TRANS-CON group works together to assess regional transportation needs, identify transportation gaps, and develop alternatives and recommendations to address unmet needs and gaps.

Outside of JTRAN, other major transit providers in the region are:

- **Hinds County Human Resource Agency** - provides demand-response and deviated fixed route service for rural areas in Hinds County and for seniors and people with disabilities.
- **Madison County Citizens Services Agency** - provides demand-response service around Canton and for seniors and people with disabilities.
- **Rankin County Human Resource Agency** - provides demand-response service around Rankin County for eligible seniors and people with disabilities.

5.4 Intercity Public Transit

The Jackson MPA is served by two intercity transportation providers: Amtrak and Greyhound.

Amtrak – provides daily intercity rail service at the Jackson Station in Downtown Jackson via the City of New Orleans line from New Orleans to Chicago. Fares vary depending upon accommodations and travel itinerary. For more information, go to www.amtrak.com

Greyhound – provides intercity bus service at the Jackson Station in Downtown Jackson, offering connections throughout the Southeast and beyond. Fares vary depending upon accommodations and travel itinerary. For more information, go to www.greyhound.com

5.5 Transportation Network Companies

A Transportation Network Company (TNC) is a private company that matches passengers with vehicles, via websites and mobile apps. These are also referred to as ride-hailing services and Uber and Lyft are the largest of these service providers. Currently, both Uber and Lyft serve the Jackson area.

While these transportation services are not public transit, TNCs are increasingly partnering with the public sector to test new ways to provide public, or subsidized, transportation. These "pilot programs" are still evolving, but many focus on providing trips in low-demand areas or times of day or for people with disabilities.

5.6 Regional Transit Demand Analysis

Transit Demand Analysis

The regional demand analysis uses a GIS-based approach to identify the level of transit service supported throughout the Jackson MPA. There are a number of factors that can be analyzed to evaluate and predict transit demand in an area. Given the availability of data and regional scope of the 2045 MTP, the transit demand analysis focused on the following factors.

Residential density – A higher concentration of housing for residents and visitors in an area creates more potential transit riders in an area. This is especially true of very dense areas, where other factors, such as parking availability or congestion, may further influence demand.

Employment density – A higher concentration of employment in an area creates more potential transit riders in an area. This is especially true of very dense areas, where other factors, such as parking availability or congestion, may further influence demand. Some studies argue that employment density is more important for predicting ridership than residential densities.

Activity density – In areas with both residential areas and employment, it is necessary to consider a combined density.

Low-income household density – Low-income persons are more likely to ride transit due to a greater likelihood that they do not have regular access to a vehicle or seek to minimize travel by automobile for economic reasons.

Transit-supportive employment density – Certain industries attract transit riders at higher level than average. This is partly because some industries, such as retail and food services, employ a disproportionately large number of low-wage jobs. But it is also important to note that industries like healthcare and higher education often cluster employees at relatively dense "campuses" that can be well served by transit.

Density of adults without a vehicle – Persons without access to a vehicle are more likely to ride transit due to a lack of other options. A person may lack a vehicle because of economic reasons, physical or mental ability, or because of a decision to live a car-free lifestyle.

Table 5.16 shows the Transit Demand Analysis criteria and measurements. For each density criterion, an area's value is calculated. Before being assigned a level of service tier, all criteria values are multiplied by an area's street connectivity factor. Based on these adjusted values, level of service tiers are then assigned, based on industry standard thresholds.

Figure 5.5 illustrates the results of this analysis and the distribution of transit demand throughout the region.

Based upon Figure 5.5, there are several areas within the Jackson MPA that support fixed route service with frequencies of 60 minutes or better and most of these areas are already served by JTRAN routes. However, there are several areas outside of JTRAN's service area (the City of Jackson) that have moderate to high transit demand. In general, the areas with the highest demand for public transit are from Downtown Jackson to Fondren and then along I-55 and County Line Road. There are also other concentrations of high demand around major institutions and activity centers.

Table 5.16: Transit Demand Analysis Criteria and Level of Service Thresholds

Criteria	Measurement	Transit Level of Service				
		On-Demand	Flexible	60 min.	30 min.	15 min.
Residential Density	Households, dorm units, and hotel rooms per acre[1]	0 to 1	1 to 2	2 to 4	4 to 7	7+
	Households using food stamps, dorm units, and budget hotel rooms per acre	0 to 0.33	0.33 to 0.66	0.66 to 1.33	1.33 to 2.33	2.33+
	Households without vehicle, dorm units, and budget hotel rooms per acre	0 to 0.25	0.25 to 0.5	0.5 to 1	1 to 1.75	1.75+
Employment Density	Jobs and college enrollment per acre	0 to 5	5 to 10	10 to 25	25 to 50	50+
	Jobs per acre for industries with high percentage of workers riding transit[2]	0 to 2.5	2.5 to 5	5 to 12.5	12.5 to 25	25+
Activity Density	Sum of residential and employment density values	0 to 3.75	3.75 to 7.5	7.5 to 18.75	18.75 to 37.5	37.5+
	Sum of low-income residential and transit-supportive employment density values	0 to 1.5	1.5 to 3	3 to 7.5	7.5 to 15	15+
	Sum of no vehicle residential and transit-supportive employment density values	0 to 1.25	1.25 to 2.5	2.5 to 6.25	6.25 to 12	12+

[1] Dorms were converted to households assuming an average of 2.5 people per dorm and a hotel occupancy rate of 65% was assumed.

[2] Industries with high percentage of workers riding transit included NAICS codes: 44-45, 61, 62, 71, and 72

Transit-Dependent Populations

In order to ensure that the needs of the transit-dependent population are being addressed by the transit demand analysis, the concentration of various transit-dependent populations were mapped.

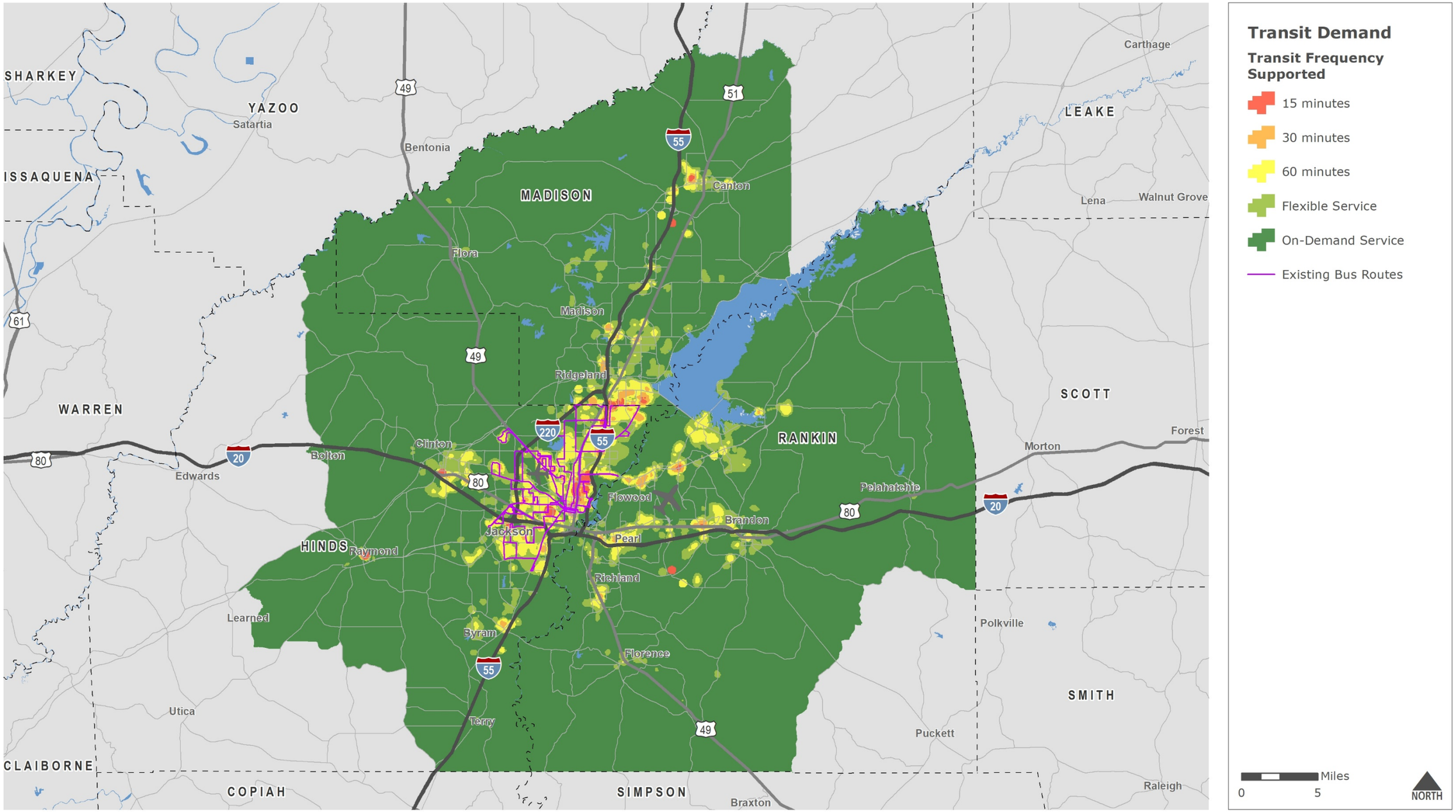
Figure 5.6 illustrates the concentration of households without regular access to a vehicle. The highest concentrations are in the City of Jackson, especially immediately north of Downtown and in older neighborhoods to the west, northwest, and southwest of Downtown.

Figure 5.7 depicts the concentration of low-income households. These households may have access to a car, but due to economic reasons, are more likely to rely on transit. The distribution of high-density clusters of low-income households is similar to that of households without access to a vehicle but includes more areas, including some outside the City of Jackson, like a western part of Canton.

Figure 5.8 shows the concentration of households that include people with disabilities. These households rely on transit because of physical or mental limitations. The highest concentrations are similar to the concentration of households without a vehicle and concentration of low-income households. However, there are also some other areas, such as the northeastern part of Jackson, along County Line Road, and parts of Brandon and Pearl.

Figure 5.9 shows the concentration of persons aged 65 or older. Similar to people with disabilities, this population is more likely to rely on transit because of physical or mental limitations. The highest concentrations of senior residents are similar to the concentration of people with disabilities but are much more widespread, including many more suburban areas.

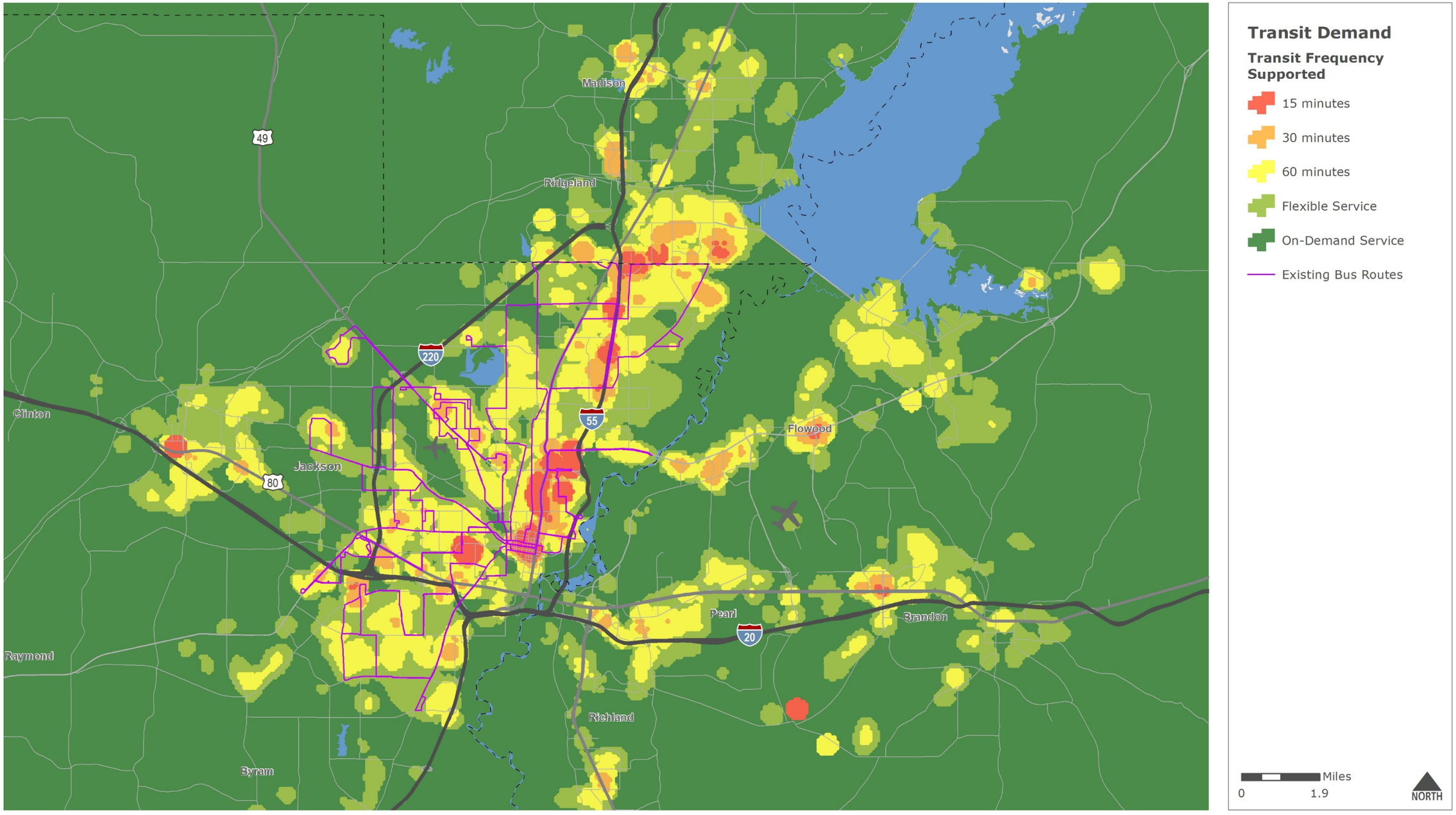
Figure 5.5: Regional Transit Demand Analysis



Data Sources: Neel-Schaffer

Disclaimer: This map is for planning purposes only.

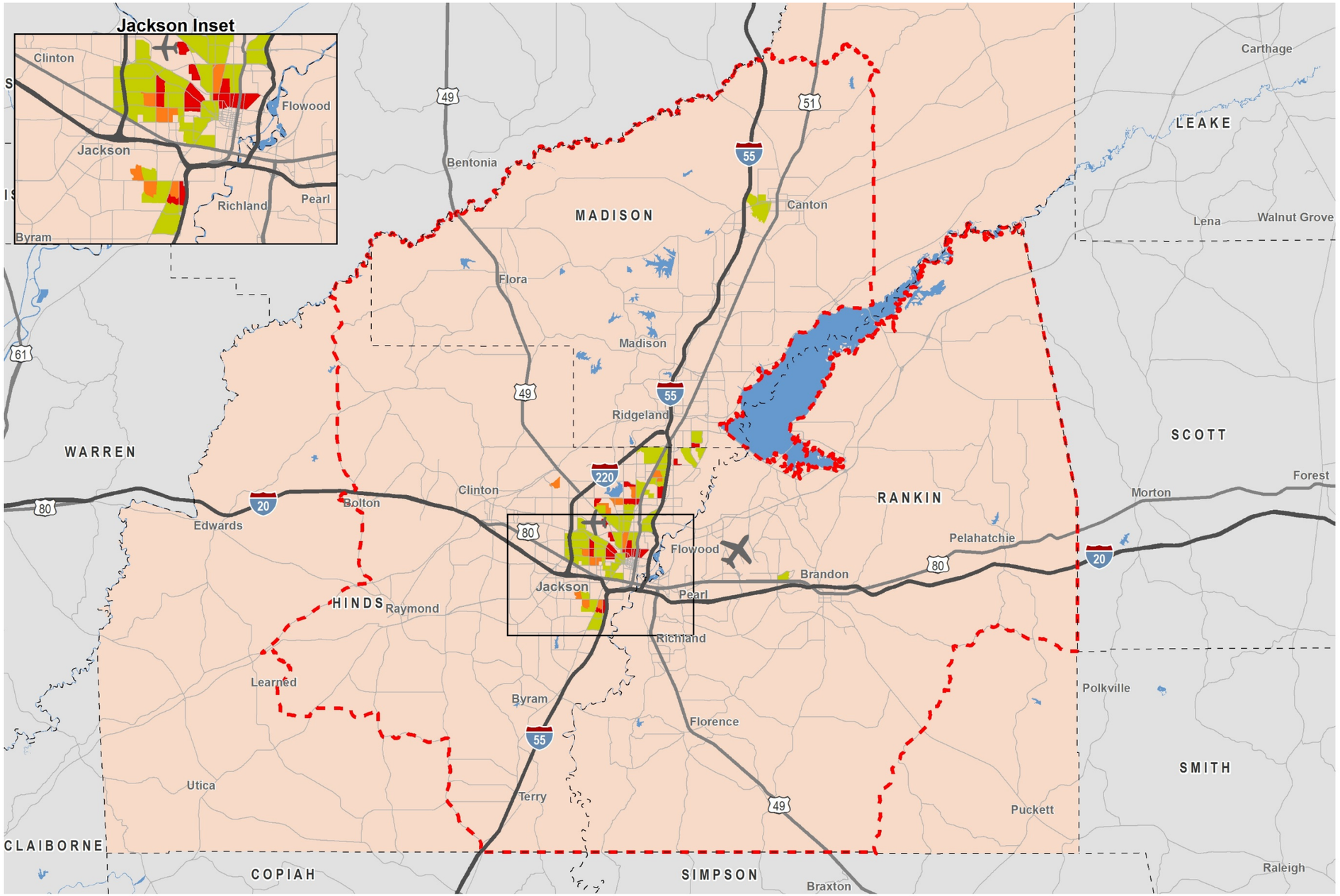
Figure 5.5 (Urban Core): Regional Transit Demand Analysis



Data Sources: Neel-Schaffer

Disclaimer: This map is for planning purposes only.

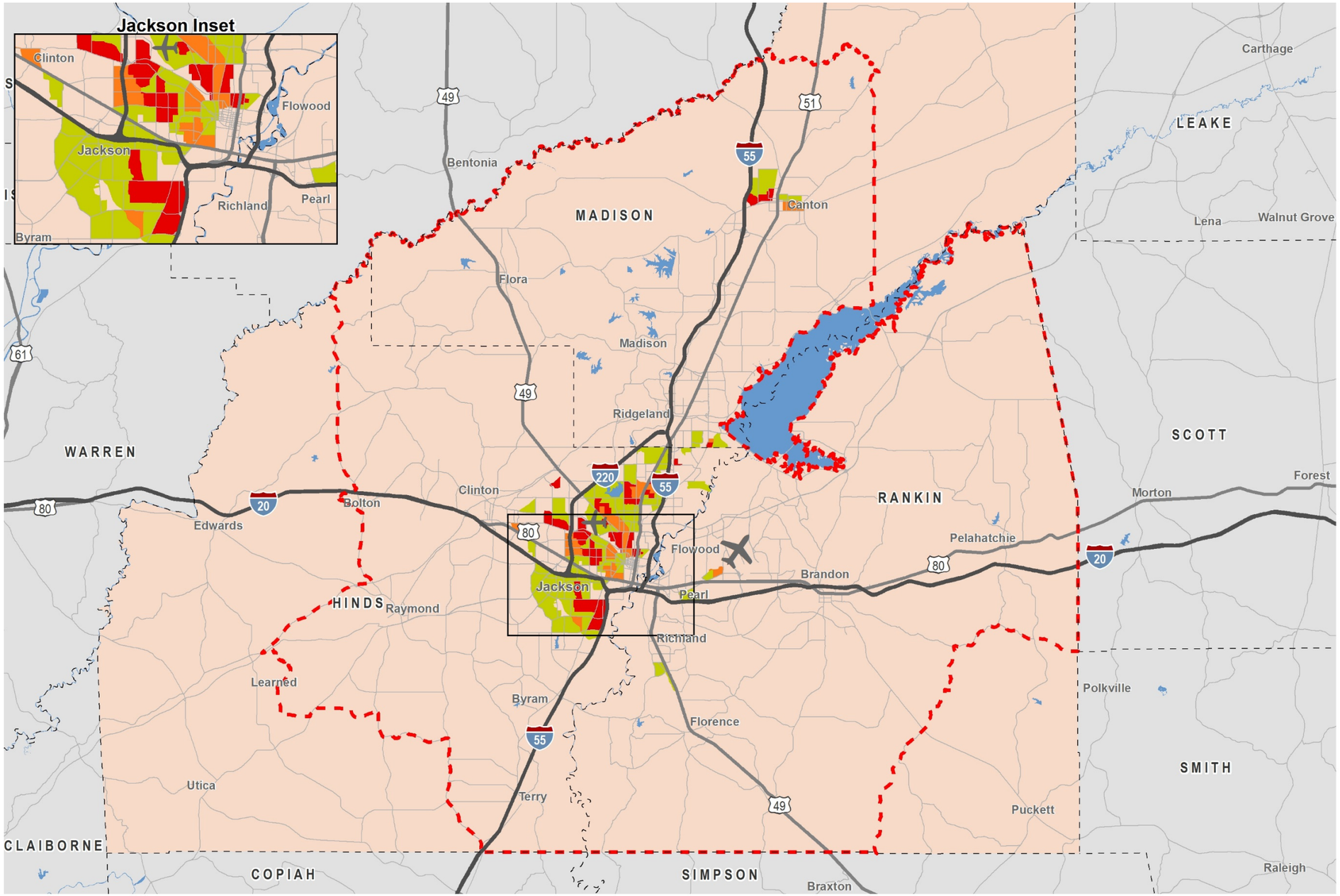
Figure 5.6: Concentration of Households with No Vehicle



Data Sources: Census Bureau, 2018 American Community Survey (5 year)

Disclaimer: This map is for planning purposes only.

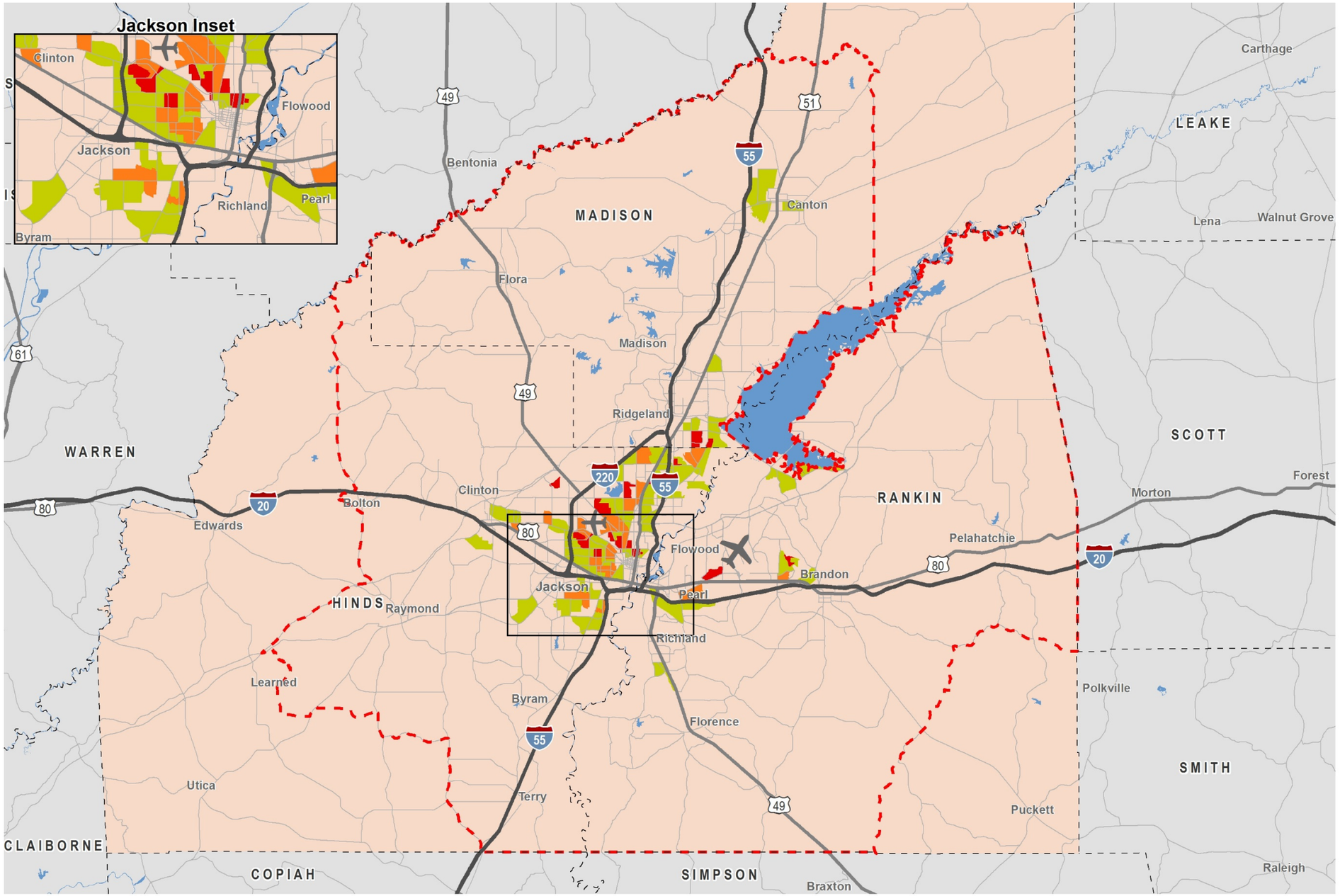
Figure 5.7: Concentration of Low-Income Households



Data Sources: Census Bureau, 2018 American Community Survey (5 year)

Disclaimer: This map is for planning purposes only.

Figure 5.8: Concentrations of People with Disabilities



Block Groups:

Households with a Person with a Disability per Acre

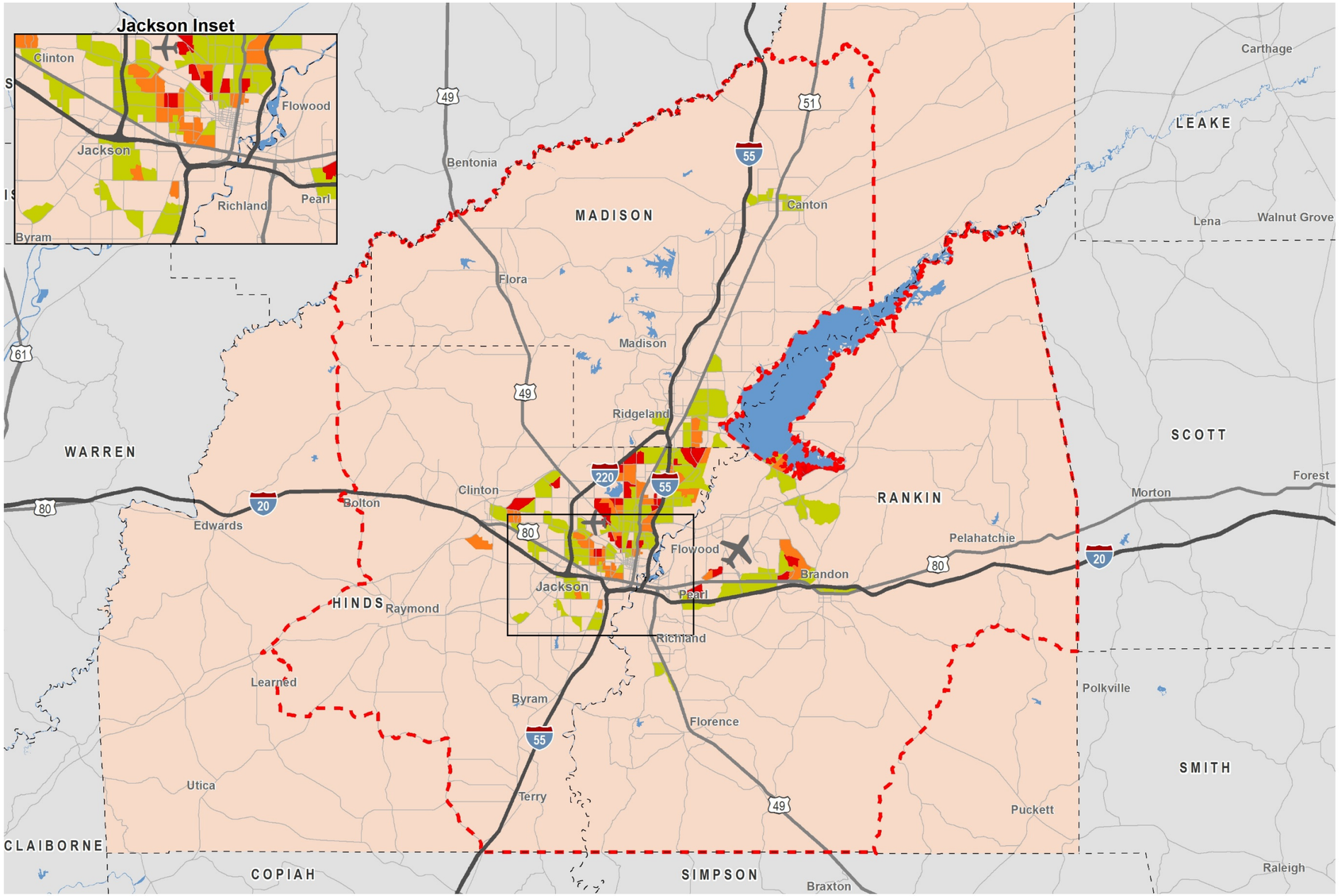
- 0.76 - 2.04
- 0.51 - 0.75
- 0.26 - 0.50
- 0.00 - 0.25
- Jackson MPA

Miles
0 5
NORTH

Data Sources: Census Bureau, 2018 American Community Survey (5 year)

Disclaimer: This map is for planning purposes only.

Figure 5.9: Concentrations of Senior Population



Data Sources: Census Bureau, 2018 American Community Survey (5 year)

Disclaimer: This map is for planning purposes only.