2045 Metropolitan Transportation Plan

Technical Report #2
Existing Conditions

Hattiesburg-Petal-Forrest-Lamar Metropolitan Planning Organization

DRAFT

April 2020

Metropolitan Planning Organization

HATTIESBURG PETAL FORREST LAMAR

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1.0 Introduction

This report identifies the conditions and characteristics of the existing transportation system in the Hattiesburg-Petal-Forrest-Lamar 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 a separate document, the 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.

81.2%

Households commute by motor vehicle and drive alone

For households in urbanized areas, like Hattiesburg, 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-59 begins at an intersection with I-10/I-12 in Slidell, LA and travels north to I-24 near Chattanooga, TN. It travels through the study area from south to north, proceeding through Hattiesburg on the western side of the study area.

- US 49 begins in Gulfport, MS at its intersection with US 90, proceeding northward to Hattiesburg and Jackson, and ending in Piggott, AR at US 62. US 49 proceeds through the study area from southeast to northwest.

- US 98 proceeds from west to east though the study area, part of which is along Hardy Street. This highway beings in Natchez, MS at US 84 and ends in Palm Beach, FL at FL A1A.

- US 11 parallels I-59 through the study area, and this highway was the original north-south highway through the study area from New Orleans, LA to Meridian, MS.

- MS 42 proceeds through the study area from west to east connecting Sumrall and Petal. A portion of this highway runs concurrently with US 49 and I-59 and another portion is designated as the Evelyn Gandy Parkway.

- MS 589 traverses through the western end of the study area from south to north connecting Sumrall and Purvis.

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 Hattiesburg 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.

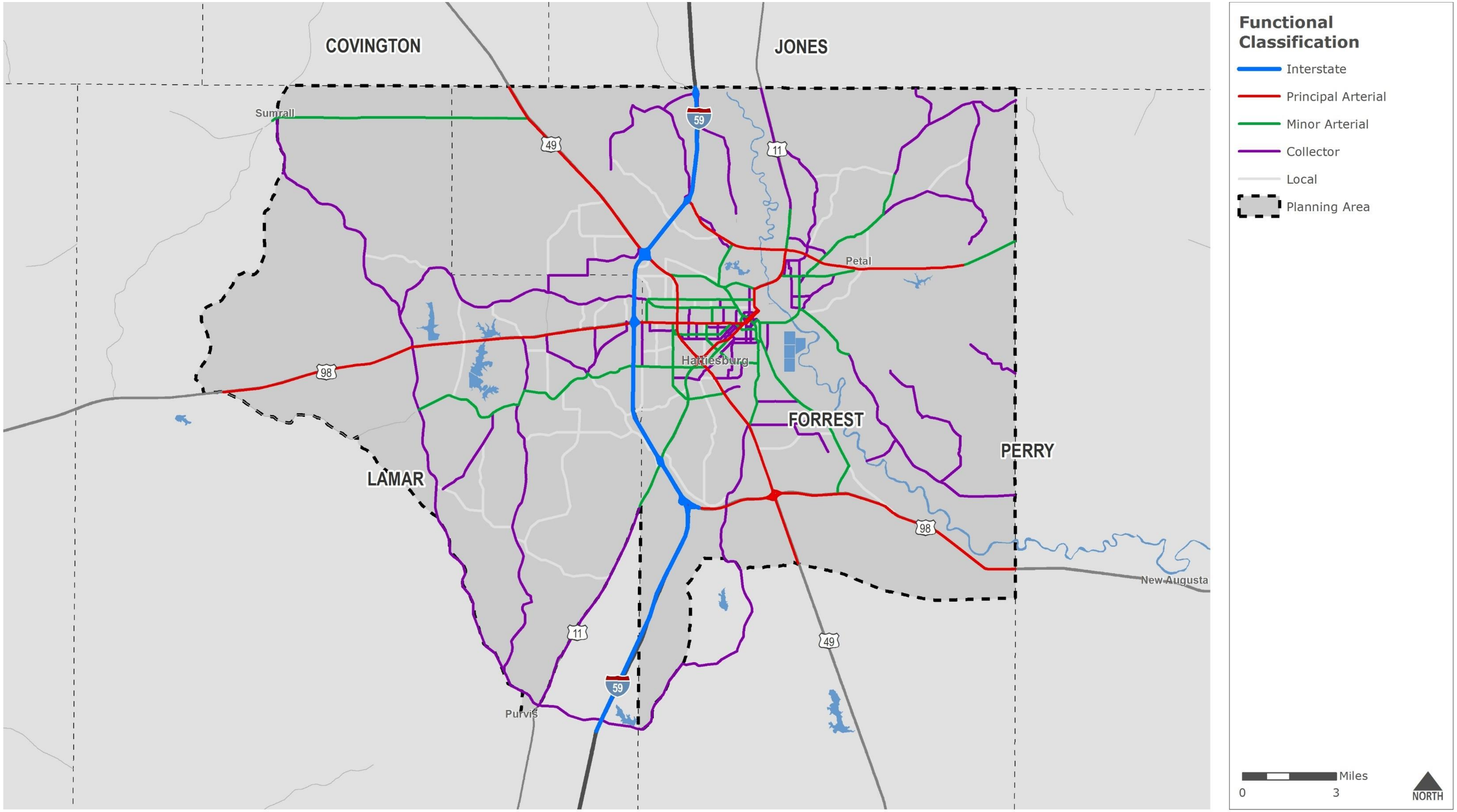
Within the arterial classification are principal and minor subclassifications. Within the collector classification are major and minor subclassifications within the rural areas. Principal arterials in both rural and urban areas serve as high volume traffic corridors. They provide access to the major 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 and rural minor collectors. Rural minor collectors perform the same function as rural major collectors but carry less volume.

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

Functional Class	Centerline Miles		Lane Miles	
	Miles	Percent	Miles	Percent
Interstate	22.3	5.2%	96.8	9.1%
Principal Arterial	61.8	14.3%	259.6	24.4%
Minor Arterial	74.2	17.2%	158.7	14.9%
Collector	179.9	41.8%	362.8	34.1%
Local	92.6	21.5%	186.7	17.5%
Total	430.8	100.0%	1,064.6	100.0%
Forrest County				
Interstate	17.4	5.8%	75.8	10.1%
Principal Arterial	48.2	16.2%	197.4	26.3%
Minor Arterial	59.9	20.1%	129.0	17.2%
Collector	114.4	38.4%	231.4	30.9%
Local	57.8	19.4%	115.7	15.4%
Total	297.7	100.0%	749.3	100.0%
Lamar County				
Interstate	4.9	3.7%	21.0	6.7%
Principal Arterial	13.6	10.2%	62.3	19.8%
Minor Arterial	14.3	10.8%	29.7	9.4%
Collector	65.5	49.2%	131.4	41.7%
Local	34.7	26.1%	71.0	22.5%
Total	133.0	100.0%	315.4	100.0%

Note: Centerline miles does not include ramps.
Source: HPFL/MPO Travel Demand Model

Figure 2.1: Functional Classification of Roadways, 2018



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 2018 is summarized in the graph below. Approximately three (3) percent of vehicle trips pass through the MPA. Internal commercial and freight vehicle trips (e.g., truck, taxi, etc.) account for about eight (8) percent of vehicle trips. The majority of vehicle trips in the MPA (53 percent) begin or end at home.

545,612

Daily trips within the MPA

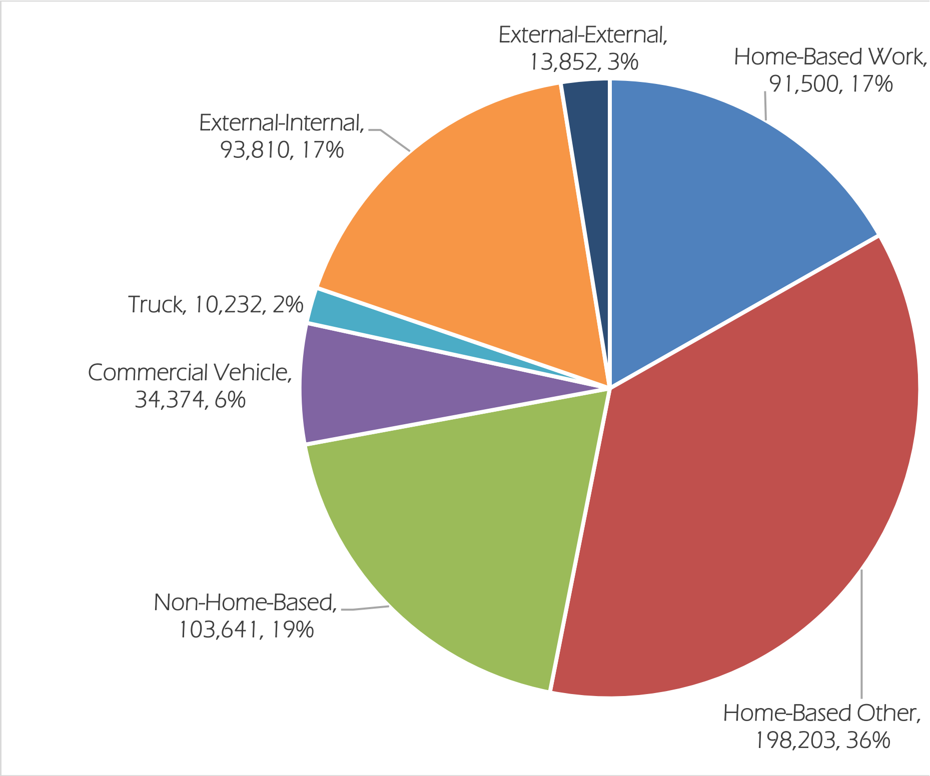


Table 2.2 displays how these trips are distributed onto the modeled transportation network. Most of the delay (over 67 percent) is estimated to occur on the principal and minor arterials. This coincides with where the most vehicle miles traveled and vehicle hours travelled occur. There is comparatively little delay estimated to occur on collectors and local roads.

Table 2.2: Roadway System Travel Characteristics, 2018

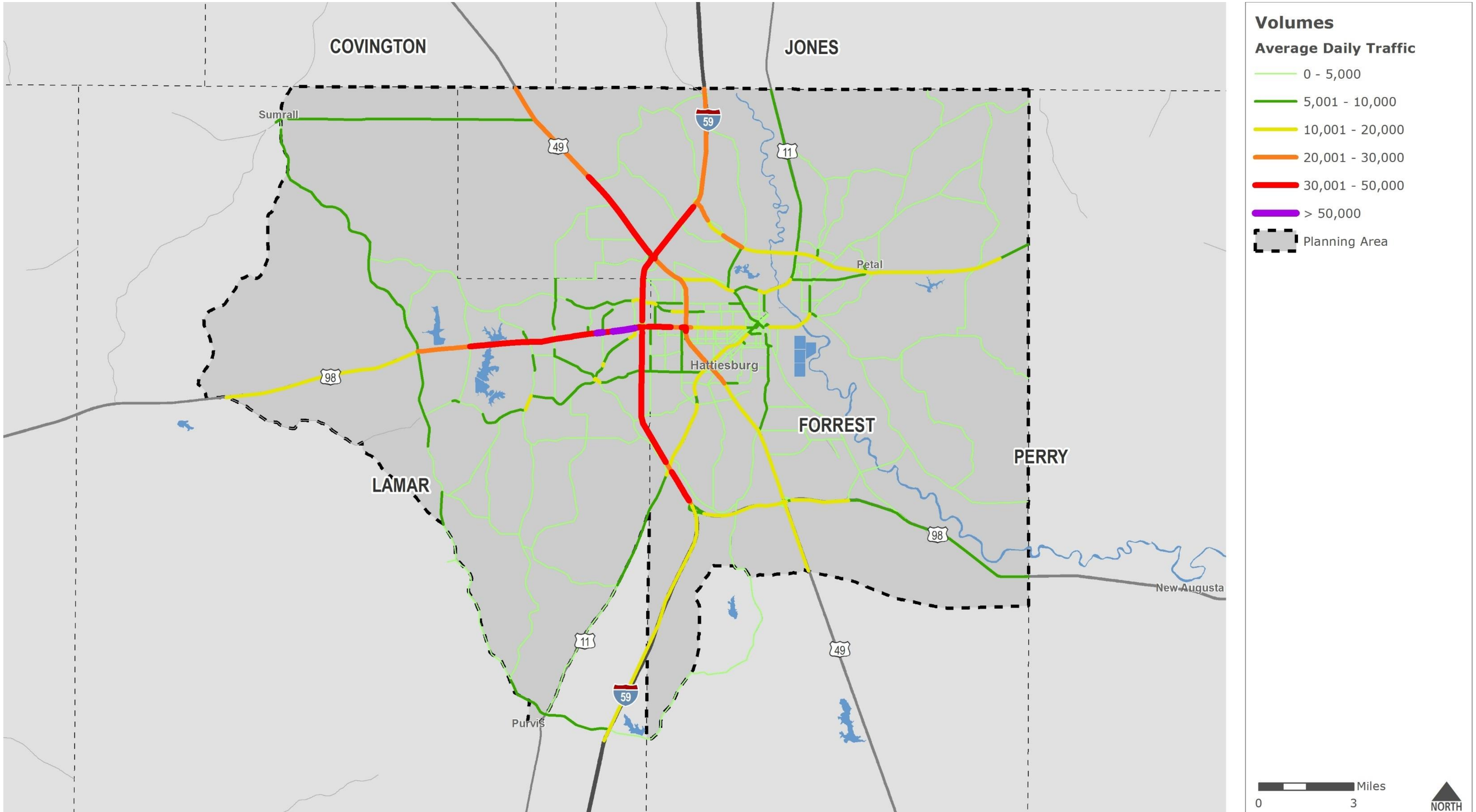
Functional Class	Daily Vehicle Miles Travelled (VMT)		Daily Vehicle Hours Travelled (VHT)		Daily Vehicle Hours of Delay (VHD)	
	Number	Percent	Number	Percent	Number	Percent
Interstate	647,445	22.2%	11,581	16.4%	1,902	17.4%
Principal Arterial	1,233,425	42.2%	29,739	42.1%	5,744	52.6%
Minor Arterial	435,074	14.9%	12,598	17.8%	1,579	14.5%
Collector	447,381	15.3%	11,831	16.8%	1,241	11.4%
Local	158,947	5.4%	4,876	6.9%	457	4.2%
Total	2,922,271	100.0%	70,624	100.0%	10,923	100.0%
Forrest County						
Interstate	483,488	25.1%	8,309	18.3%	1,120	18.7%
Principal Arterial	849,107	44.1%	19,533	42.9%	3,053	51.0%
Minor Arterial	341,053	17.7%	10,084	22.2%	1,225	20.5%
Collector	171,382	8.9%	5,061	11.1%	339	5.7%
Local	78,396	4.1%	2,530	5.6%	245	4.1%
Total	1,923,426	100.0%	45,516	100.0%	5,981	100.0%
Lamar County						
Interstate	163,957	16.4%	3,272	13.0%	782	15.8%
Principal Arterial	384,318	38.5%	10,206	40.6%	2,691	54.5%
Minor Arterial	94,021	9.4%	2,514	10.0%	354	7.2%
Collector	276,000	27.6%	6,770	27.0%	901	18.2%
Local	80,551	8.1%	2,346	9.3%	213	4.3%
Total	998,846	100.0%	25,108	100.0%	4,942	100.0%

Source: HPFL/MPO Travel Demand Model

Figure 2.2 displays the vehicular traffic in the MPA, which is greatest on I-59, US 98, US 49, and MS 42. These areas have estimated average daily volumes exceeding 33,000 vehicles.

Figure 2.3 displays the volume to capacity (V/C) ratios for the major roadways in the MPA. Currently, there are six (6) roadway segments in the MPA (summarized in Table 2.3) that experience a V/C ratio of 1.0 or greater, representing congested segments. Most 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 Hattiesburg MPA.

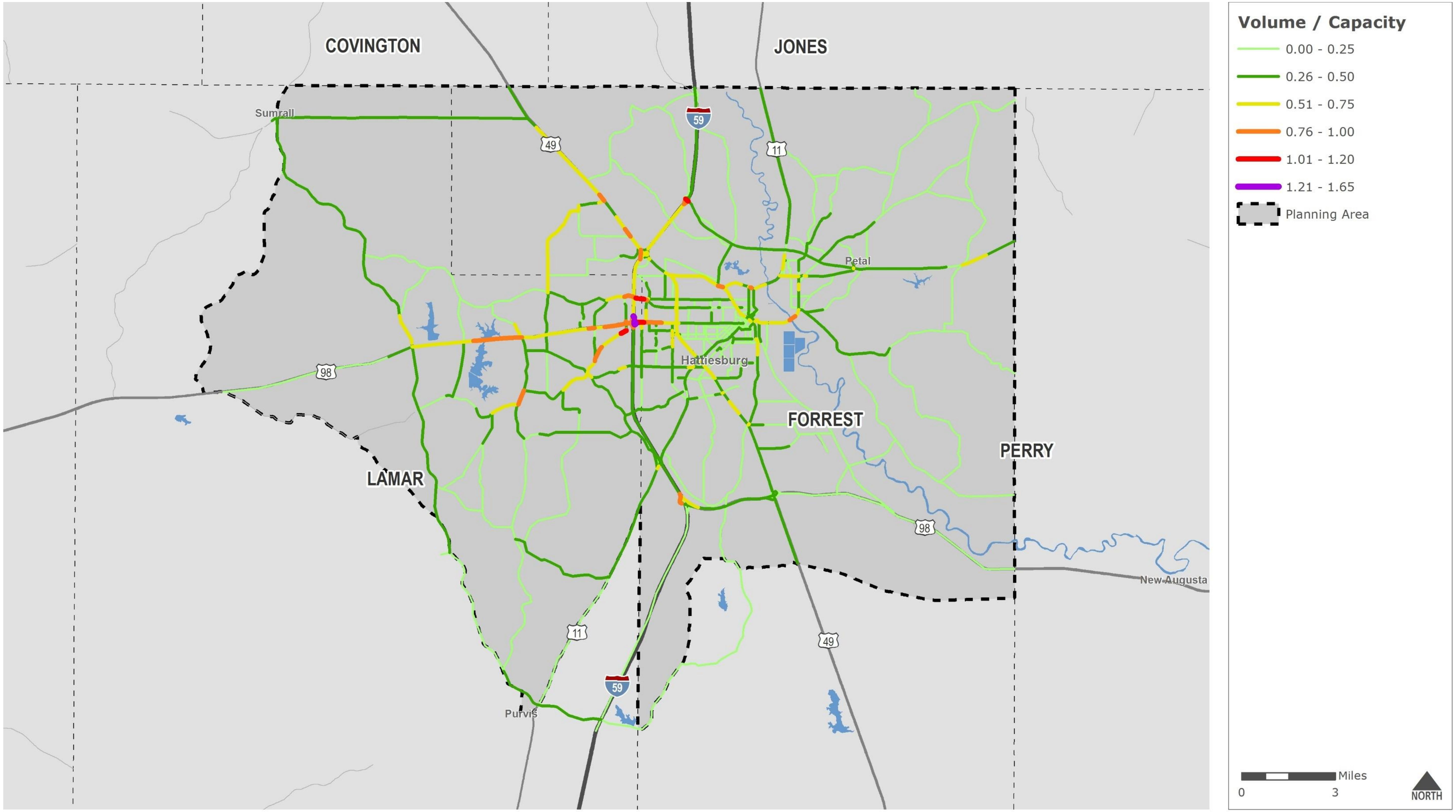
Figure 2.2: Average Daily Traffic on Roadways, 2018



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
US 98/Hardy St	I-59 NB Ramps to N 39th Ave	0.20
I-59 Collector-Distributor Road	Hardy St Off Ramp to I-59	0.24
Hardy St Off Ramp	Hardy St to I-59 Collector-Distributor Road	0.12
W 4th St	0.08 miles east of I-59 to 0.34 miles east of I-59	0.26
Eatonville Rd	I-59 SB Ramps to I-59 NB Ramps	0.11
Oak Grove Rd	N Cox Ave to Westover Dr	0.29

Source: HPFL/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 FHWA's National Performance Management Research Data Set (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 Hattiesburg MPA does not meet the full Enhanced 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 MPO is only responsible for reporting what the NPMRDS displays.

The NPMRDS data shows that both the Interstate and non-Interstate NHS systems within the MPA are very reliable.

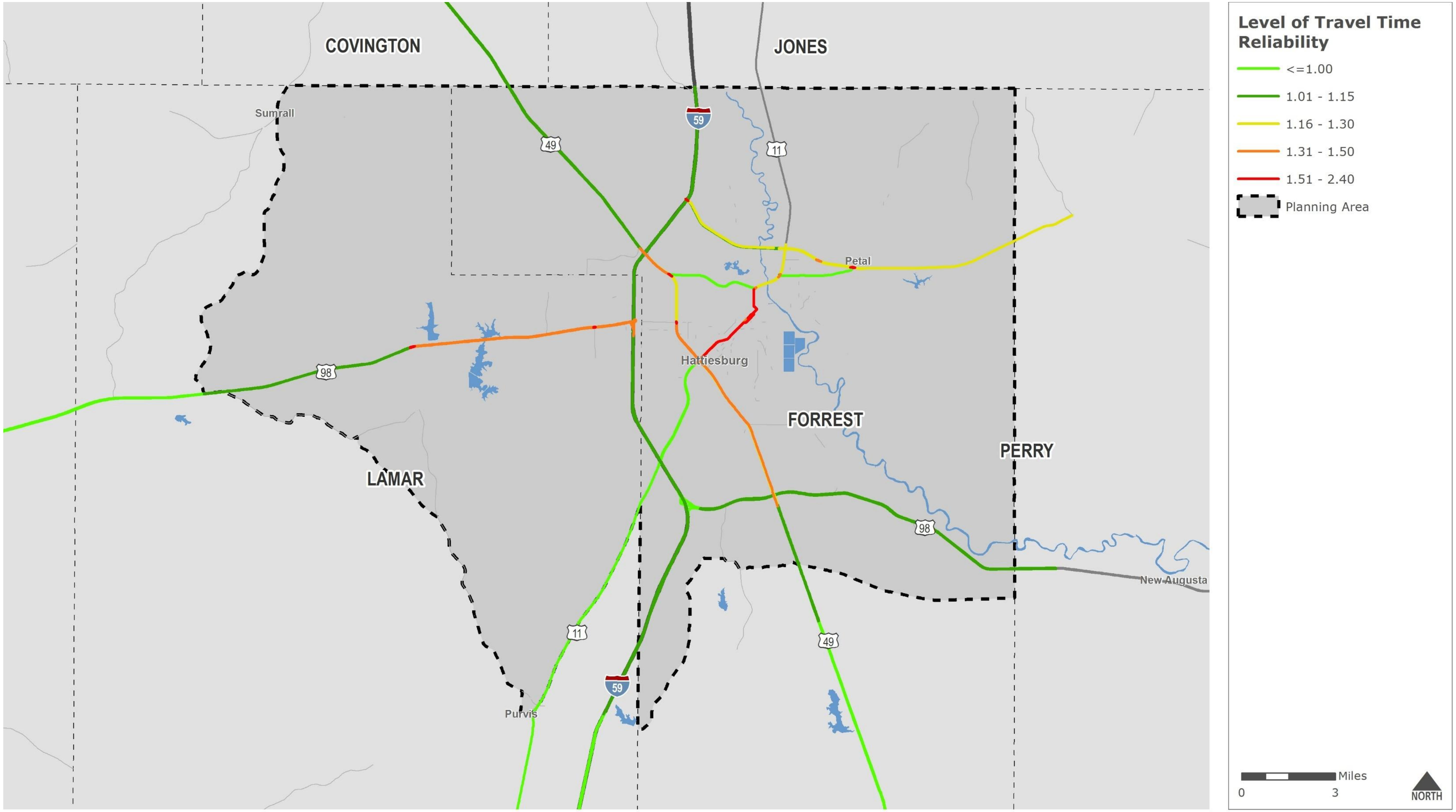
100.0%

Interstate NPMRDS reported NHS person-miles travelled are reliable

96.9%

Non-Interstate NPMRDS reported NHS person-miles travelled are reliable

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



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 road and bridge conditions were one of the public's top priorities. In a funding allocation exercise where the public was asked to allocate future transportation dollars by improvement type, the public allocated over 23 percent of all funding to maintaining roads through regular maintenance or due to safety concerns with the current roadway surfaces.

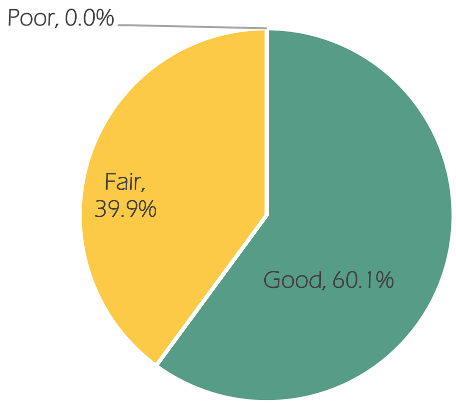
Pavement condition ratings for the MPA's roadways were obtained from data submitted by MDOT and found in the Highway Performance Monitoring System (HPMS). The HPMS is a national level highway information system that includes data on the:

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

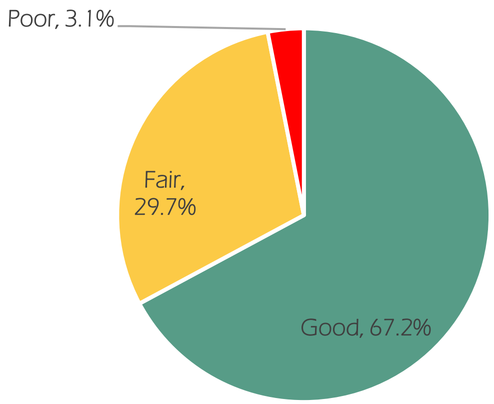
The HPMS data is a sample dataset collected across the entire federal-aid eligible system for interstate, arterial, and collector networks.

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

Interstate Pavement Condition



Non-Interstate NHS Pavement Condition

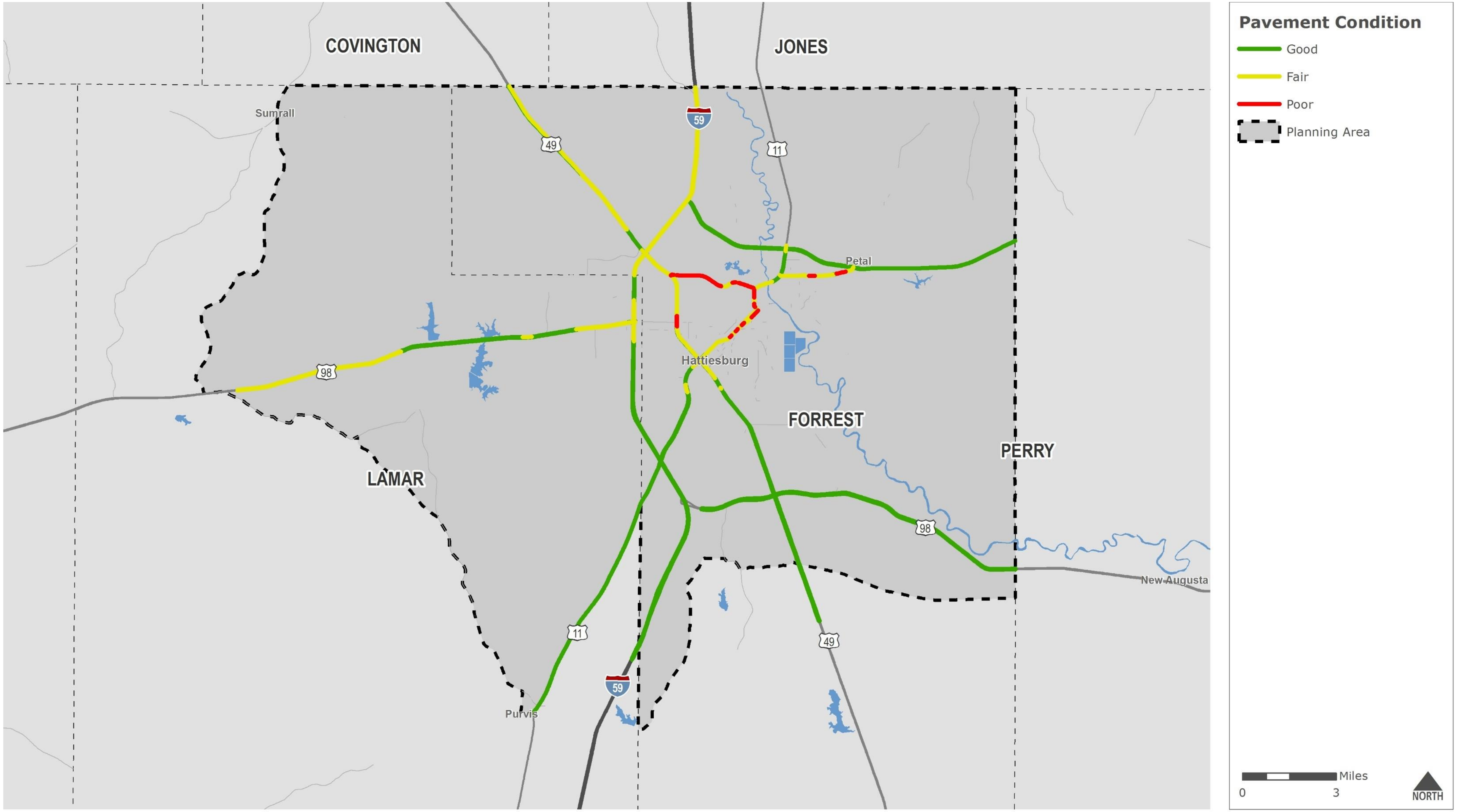


The data displayed in the above charts shows that there are currently no Interstate lane-miles within the MPA ranked as Poor. Currently, three (3) percent of Non-Interstate NHS pavements in the MPA rank as poor.

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

- US 11 between Broadway Dr and Old MS 42
- US 49 between 0.1 miles south of Hardy St and 0.2 miles north of Hardy St
- Old MS 42 between US 49 and US 11
- Central Ave between US 11 and MS 42

Figure 2.5: Roadway Pavement Conditions, 2018



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. In a funding allocation exercise where the public was asked to allocate future transportation dollars by improvement type, the public allocated over 23 percent of all funding to maintaining roads, which includes bridges.

There are nearly 273 bridges within, or in close proximity to, the Hattiesburg 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.

75.3%

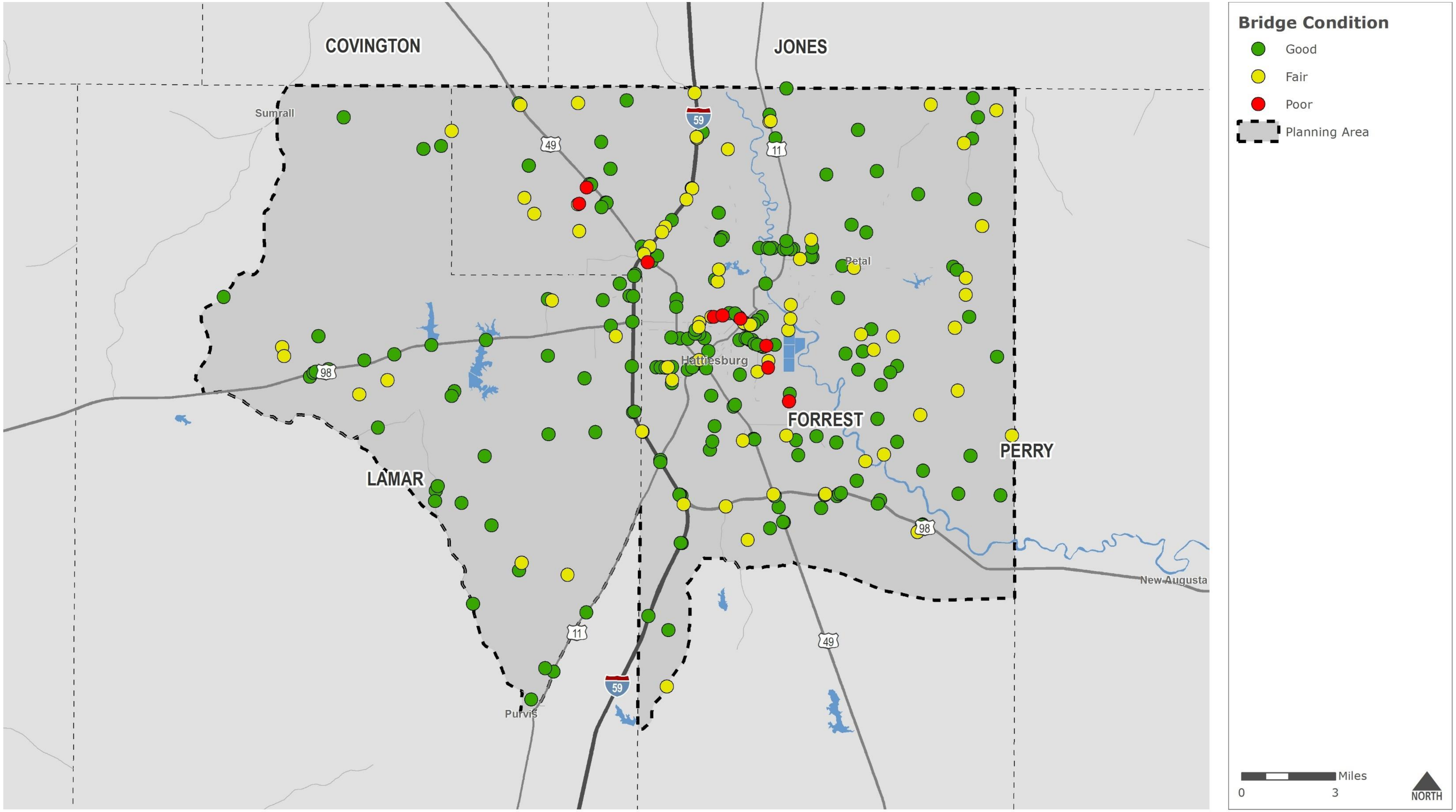
NPMRDS defined NHS Bridges in Good Condition

0.0%

NPMRDS defined NHS Bridges in Poor Condition

Figure 2.6 displays the condition of each bridge within the MPA. It should be noted that these include bridges that are a part of the National Highway System (NHS) and bridges that are not.

Figure 2.6: Bridge Conditions in the MPA, 2018



Data Sources: National Bridge Inventory

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 above. There are nine (9) structurally deficient bridges in the MPA, none of which 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 Metropolitan Planning Organization's (MPO) existing performance are discussed in the MPO's Performance Report.

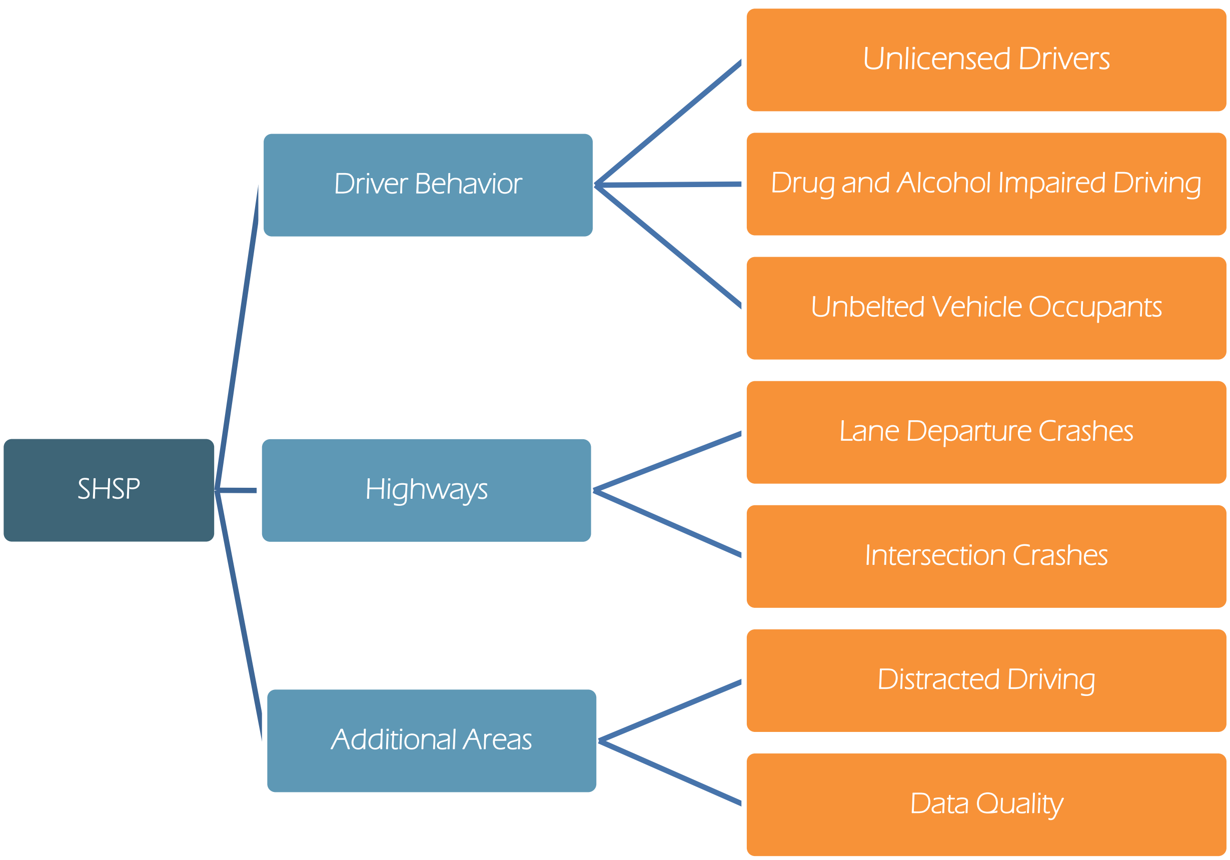
2019

Most Recent SHSP

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 the Mississippi Department of Transportation (MDOT), 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 Crash Reporting System (FARS) data, an average of 35,212 people 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

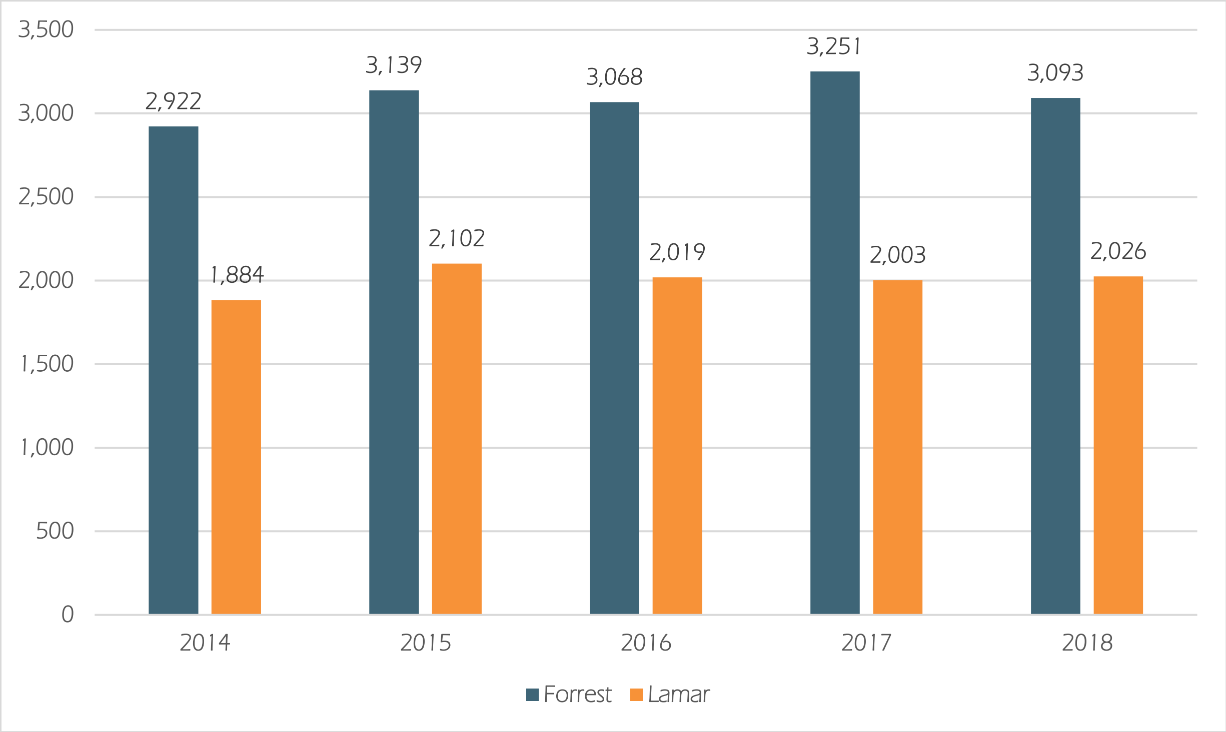
MPA Crash Trends

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

<u>Crashes by Year</u>

From 2014 through 2018, there were a total of 25,507 crashes within the MPA. Figure 2.8 displays the total number of crashes within the MPA by year and county.

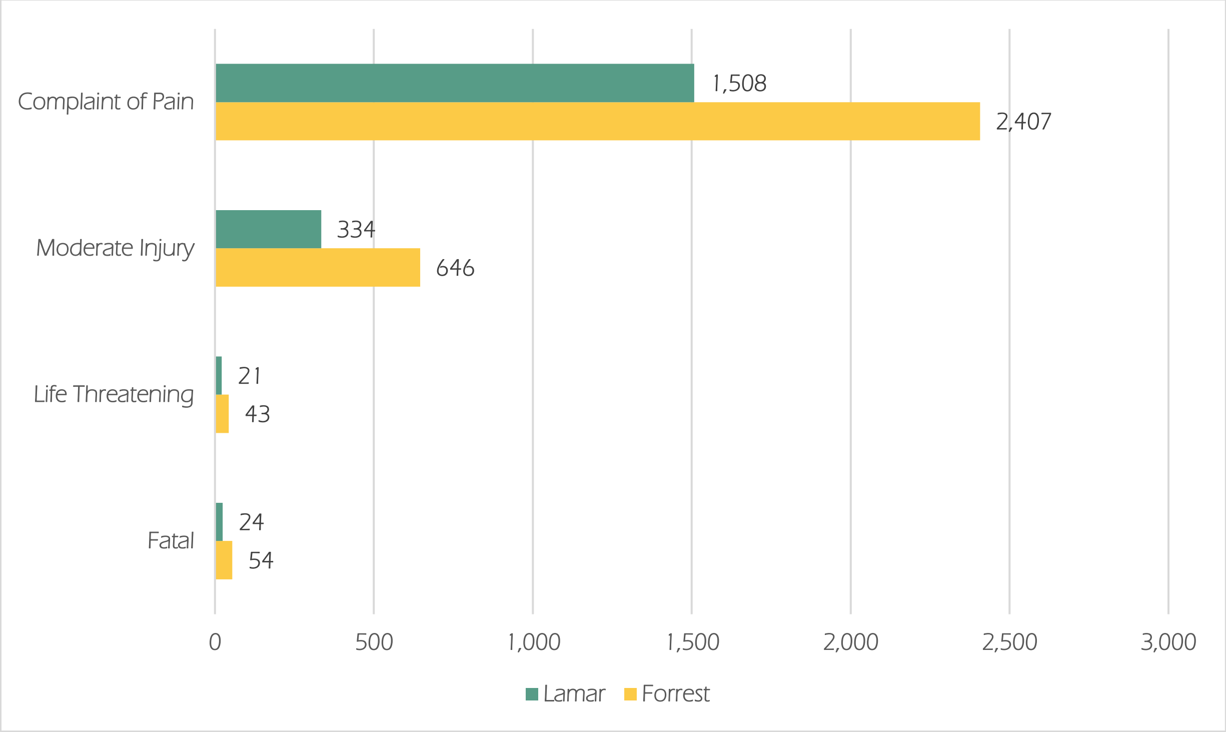
Figure 2.8: MPA Crashes by Year and County, 2014-2018



Crash Severity

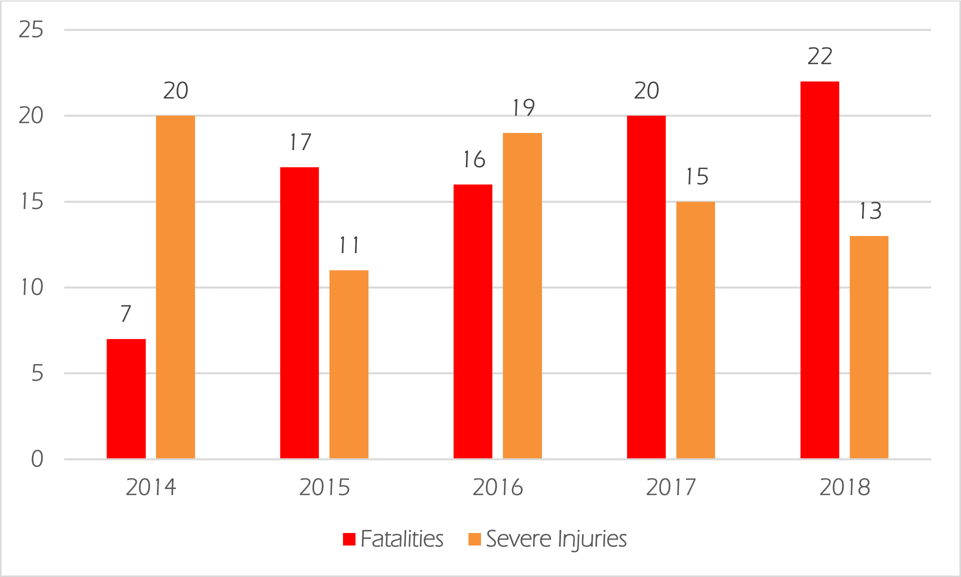
Crash severity reveals the extent to which crashes in the MPA pose a safety risk to roadway users. Within the MPA there were 78 fatal crashes and 64 life-threatening (severe injury) crashes during the analysis period. Less than one (1) percent of the total crashes resulted in a fatality or severe injury. Figure 2.9 displays the severity of the fatal/injury crashes within the MPA by county.

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



From 2014 through 2018, the fatal and life-threatening crashes resulted in 82 deaths and 78 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 593 crashes that involved drivers under the influence of a substance (alcohol, drugs, etc.) This means less than three (3) percent of the crashes in the MPA were related to DUI. However, these crashes also resulted in nearly 11 percent of the fatalities within the area.

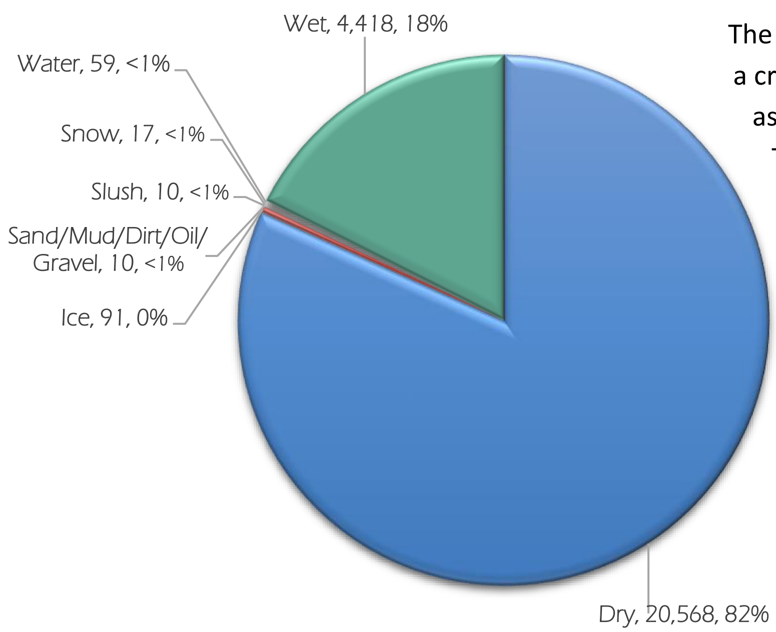
9

Fatalities from DUI crashes

Crash Times

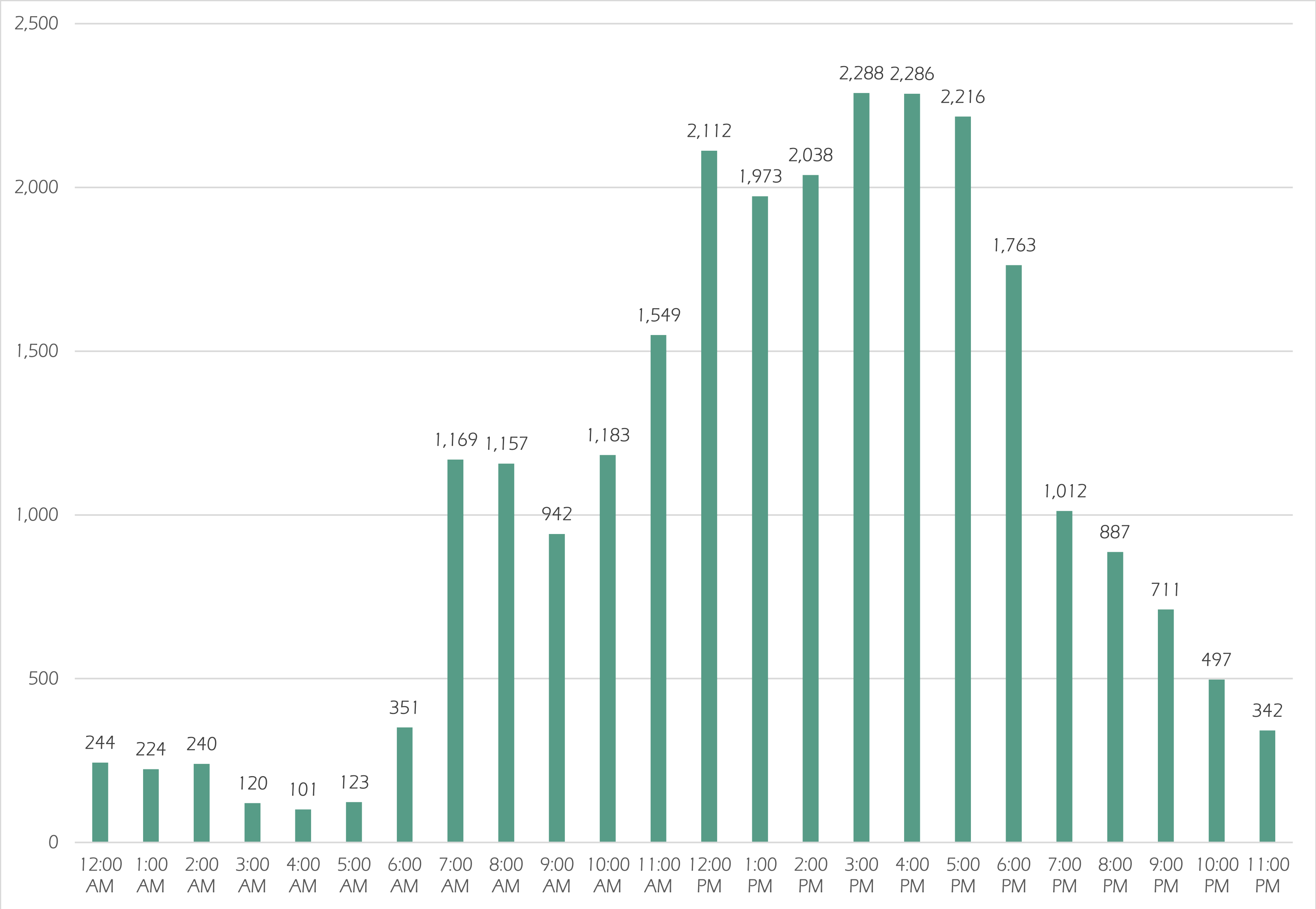
Identifying when crashes occur can assist with developing countermeasures for crashes affected by lighting, congestion, or other factors. Within the MPA, less than 20 percent of the crashes occur during hours where there is little to zero daylight. However, nearly 27 percent of the MPA's crashes occur 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 80 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	Forrest County	Lamar County	Total
Angle	3,666	2,269	5,935
Animal	23	19	42
Bicycle	38	6	44
Deer	213	123	336
Fell from Vehicle	54	19	73
Fixed Object	215	114	329
Head On	126	81	207
Hit and Run	512	304	816
Jackknife	6	4	10
Left Turn Cross Traffic	75	30	105
Left Turn Same Roadway	805	456	1,261
Opposite Direction Sideswipe	29	8	37
Other	85	32	117
Other Object	70	28	98
Overturn	36	13	49
Parked Vehicle	682	318	1,000
Pedestrian	122	29	151
Rear End Slow or Stop	5,320	4,186	9,506
Rear End Turn	126	71	197
Right Turn Cross Traffic	14	3	17
Run Off Road - Left	565	264	829
Run Off Road - Right	806	426	1,232
Run Off Road - Straight	35	16	51
Sideswipe	1,815	1,206	3,021
Train	8	0	8
Unknown	27	9	36
Total	15,473	10,034	25,507

Source: SAMS, 2019; NSI, 2019

Rear End

Most common collision type

73.2%

Crashes that are Angle, Sideswipe, or Rear End

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.

<u>Crash Frequencies</u>

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.

15.4% of MPA crashes occur on the top 20 crash frequency segments.

<u>Crash Rates</u>

Crash rates for the study area were based on the model network layer and existing year (2018) volumes obtained from the HPFL/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	Crash Frequency	Fatal	Life Threatening	Moderate Injury	Complaint of Pain	Property Damage Only
US 98 (Hardy St)	Weathersby Rd to Westover Dr	969	193.8	0	0	24	179	766
US 98 (Hardy St)	Cross Creek Pkwy to Weathersby Rd	307	61.4	1	1	13	53	239
Cross Creek Pkwy	W 4th St to US 98 (Hardy St)	280	56.0	0	0	8	47	225
US 98	Hegwood Rd/Jackson Rd to Cross Creek Pkwy	250	50.0	1	0	9	47	193
S 40th Ave	MS 198 (Hardy St) to 0.83 miles south	199	39.8	0	0	7	31	161
US 98	Cole Rd to Old US 11 /King Rd	176	35.2	1	0	13	36	126
MS 198 (Hardy St)	S 34th Ave to 0.28 miles east	174	34.8	0	0	5	25	144
MS 198 (Hardy St)	S 37th Ave to S 34th Ave	172	34.4	0	0	2	21	149
Westover Dr	US 98 (Hardy St) to Wildwood Cir	149	29.8	0	0	3	24	122
US 98	Old US 11 /King Rd to Hegwood Rd/Jackson Rd	140	28.0	0	1	6	28	105
I-59	0.73 miles north to Exit 65	127	25.4	0	0	4	21	102
US 98	MS 589 to Cole Rd	122	24.4	1	1	11	18	91
Hardy St	S 26th Ave to S 21st Ave	119	23.8	0	0	6	18	95
MS 42	Springfield Rd/Walnut Dr to 1.62 miles east	117	23.4	0	1	10	17	89
US 98	Old MS 24 to MS 589	112	22.4	3	1	13	19	76
MS 198 (Hardy St)	0.24 miles west to S 28th Ave	108	21.6	0	1	3	28	76
I-59	1.33 miles north to Exit 67 B	104	20.8	0	0	5	22	77
N 38th Ave	Mable St to MS 198 (Hardy St)	101	20.2	0	0	0	22	79
US 49 (MS 42)	Rawls Springs Loop Rd to Classic Dr	100	20.0	1	0	7	20	72
I-59	US 98 Bypass to Browns Bridge Rd	97	19.4	2	1	10	11	73
Total		3,923	785	10	7	159	687	3,060

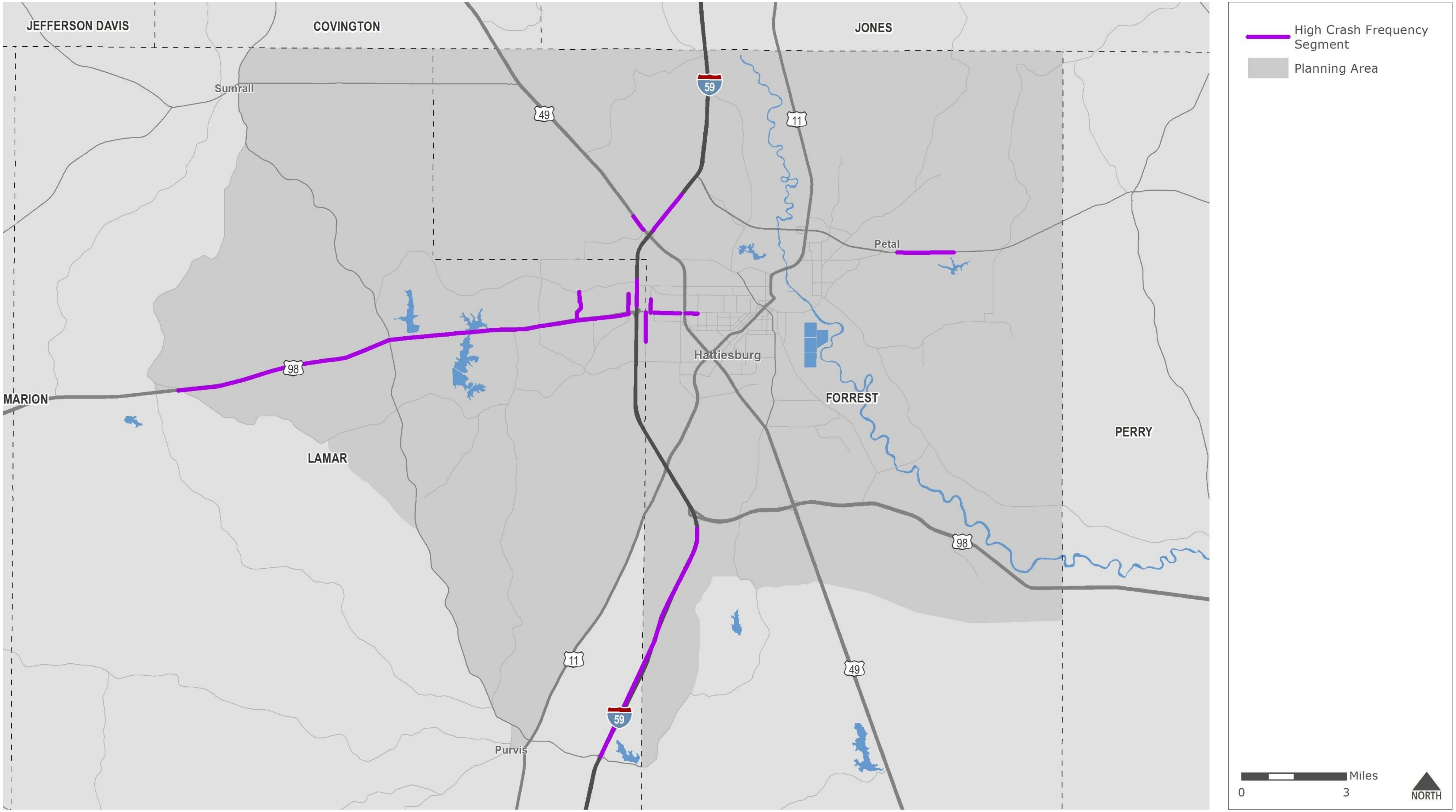
Source: SAMS, 2019; NSI, 2019

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

Route	Location	Total Crashes	Crash Frequency	ADT	Length (mi)	Crash Rate
Adeline St	W Scooba St to W Florence St	8	1.6	602	0.14	51.28
Westover Dr	US 98 (Hardy St) to Wildwood Cir	149	29.8	3,079	0.58	45.46
Weathersby Dr	Hartfield Rd to US 98 (Hardy St)	90	18.0	3,034	0.59	27.52
S 21st Ave	Mamie St to 0.17 miles north of Mamie St	7	1.4	809	0.17	27.13
S 40th Ave	MS 198 (Hardy St) to 0.83 miles south of S 40th Ave	199	39.8	5,842	0.83	22.38
Westover Dr	Wildwood Cir to W 4th St	31	6.2	2,631	0.29	22.08
Wisteria Dr	Country Club Rd to Wyatt Rd	3	0.6	716	0.10	22.02
Lincoln Rd	Monterrey Ln to S 28th Ave	74	14.8	6,946	0.28	21.00
Old US 11	Lincoln Rd to US 98	76	15.2	4,910	0.44	19.29
S Westover Dr	Oak Grove Rd to US 98	87	17.4	11,779	0.22	18.72
US 49	Northbound On-Ramp from US 11 Northbound	5	1.0	988	0.15	18.68
US 11 (Broadway Dr)	Lincoln Rd to US 49	49	9.8	15,160	0.10	17.05
Walnut St	Southern Ave to Rebecca Ave	6	1.2	1,089	0.20	15.10
S 24th Ave	Adeline St to Mamie St	2	0.4	548	0.13	15.04
Concart St	S 11th Ave to Mamie St	6	1.2	765	0.31	13.97
Memorial Dr	Bowling St to 0.15 miles south of Bowling St	3	0.6	810	0.15	13.73
Country Club Rd	Memorial Dr to Amos St	8	1.6	733	0.44	13.71
I-59	Northbound On-Ramp at US 11	12	2.4	2,976	0.17	13.20
Katie Ave	John St to Ronie St	4	0.8	940	0.18	13.15
Katie Ave	Ronie St to Walnut St	2	0.4	577	0.14	13.10

Source: SAMS, 2019; NSI, 2019

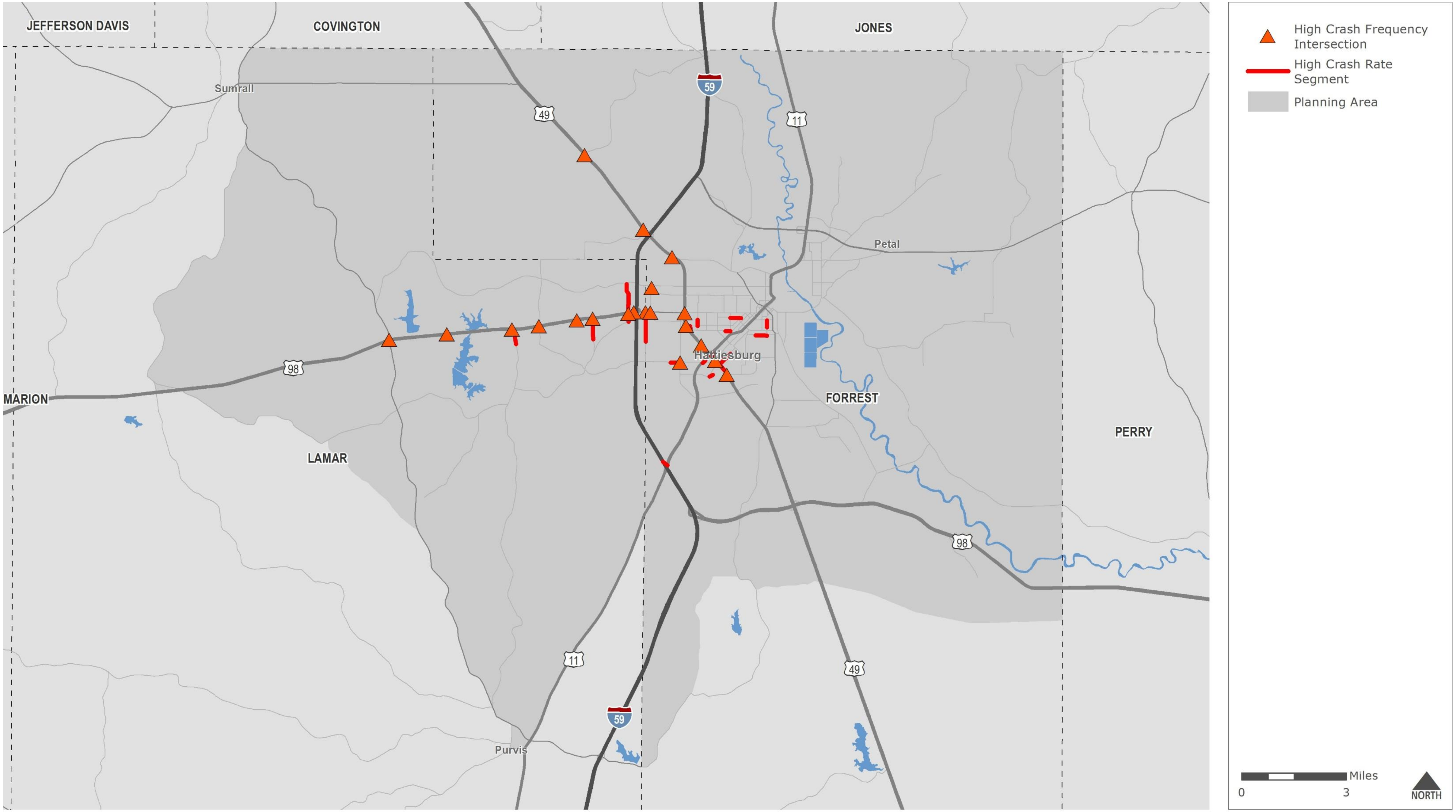
Figure 2.12: High Crash Frequency Areas, 2014-2018



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 7,800 intersection crashes in the MPA from 2014 to 2018.

30.6%

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.

50.1%

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	Crash Frequency	Fatal	Life-Threatening	Moderate Injury	Complaint of Pain	Property Damage Only
US 98 (Hardy St) @ Westover Dr	540	108.0	0	2	3	83	452
US 49 @ MS 198 / Hardy St	382	76.4	0	0	3	70	309
US 98 (Hardy St) @ Weathersby Rd	282	56.4	0	1	6	44	231
US 49 (MS 42) @ Classic Dr	255	51.0	1	1	6	44	203
MS 198 (Hardy St) @ 40th Ave	237	47.4	0	0	1	30	206
MS 198 (Hardy St) @ 38th Ave	234	46.8	0	0	6	33	195
US 98 @ Old US 11/King Rd	212	42.4	0	0	9	44	159
US 98 (Hardy St) @ Cross Creek Pkwy	180	36.0	0	0	3	34	143
US 49 at Cloverleaf Dr/Eddy St	174	34.8	0	0	8	38	128
US 49 @ Mamie St	163	32.6	0	0	10	40	113
US 98 @ MS 589	158	31.6	3	0	11	15	129
US 98 (Hardy St) / MS 198 (Hardy St) @ I-59 SB Ramps	151	30.2	0	0	4	29	118
US 49 @ Westside Ave / W Pine St	150	30.0	0	0	9	42	99
W 4th St @ N 38th Ave	136	27.2	0	0	0	16	120
US 98 @ Cole Rd	136	27.2	0	1	6	18	111
US 49 (MS 42) @ Peps Point Rd	129	25.8	0	0	4	25	100
US 49 @ N 31st Ave	100	20.0	0	0	3	16	81
US 98 @ Hedgwood Dr (Sandy Run Rd) / Jackson Rd	99	19.8	0	0	8	18	73
US 49 @ Helveston Rd/Wisteria Dr	97	19.4	0	1	5	22	69
Lincoln Rd @ S 28th Ave	96	19.2	0	0	1	15	80
Total	3,911	782	4	6	106	676	3,119

Source: SAMS, 2019; NSI, 2019

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

Intersection	Total Crashes	Crash Frequency	Angle	Animal	Bicycle	Deer	Fell from Vehicle	Fixed Object	Head On	Hit and Run	Jackknife	Left Turn Cross Traffic	Left Turn Same Roadway	Opposite Direction Sideswipe	Other	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	Train	Unknown
US 98 (Hardy St) @ Westover Dr	540	108.0	44	0	0	1	1	1	2	0	0	17	0	0	0	0	0	1	394	3	0	0	0	0	74	0	2	540
US 49 @ MS 198 / Hardy St	382	76.4	32	0	0	0	0	1	4	0	2	45	0	0	0	0	0	3	251	0	0	1	0	0	43	0	0	382
US 98 (Hardy St) @ Weathersby Rd	282	56.4	21	0	0	0	0	0	1	0	2	13	0	0	0	0	0	0	210	1	0	0	0	0	34	0	0	282
US 49 (MS 42) @ Classic Dr	255	51.0	19	0	1	1	0	2	0	0	2	8	0	2	0	0	0	2	183	1	1	0	0	0	32	0	1	255
MS 198 (Hardy St) @ 40th Ave	237	47.4	36	1	0	1	0	0	3	1	0	16	0	0	0	0	1	1	145	0	0	0	0	0	32	0	0	237
MS 198 (Hardy St) @ 38th Ave	234	46.8	42	0	0	0	0	0	1	0	0	19	1	0	0	0	0	0	148	2	0	0	3	0	18	0	0	234
US 98 @ Old US 11/King Rd	212	42.4	15	0	0	0	0	1	0	0	2	40	0	0	0	0	0	0	143	0	0	0	0	0	11	0	0	212
US 98 (Hardy St) @ Cross Creek Pkwy	180	36.0	27	0	0	1	0	0	0	0	0	18	0	0	0	0	0	0	111	1	0	0	2	0	20	0	0	180
Cloverleaf Dr @ S 36th Ave	174	34.8	22	0	0	0	0	2	3	0	0	9	0	0	0	0	1	1	111	3	0	0	2	0	20	0	0	174
US 49 @ Mamie St	163	32.6	11	1	0	0	1	0	0	0	0	11	0	0	0	0	2	2	122	0	0	0	1	0	12	0	0	163
US 98 @ MS 589	158	31.6	19	0	0	0	0	0	0	0	1	27	0	0	0	0	0	0	106	0	0	0	2	0	3	0	0	158
US 98 (Hardy St) / MS 198 (Hardy St) @ I-59 SB Ramps	151	30.2	18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	99	0	0	1	1	0	32	0	0	151
US 49 @ Westside Ave / W Pine St	150	30.0	21	0	0	0	0	1	1	0	1	15	0	0	0	0	0	0	92	0	0	0	2	0	16	0	1	150
W 4th St @ N 38th Ave	136	27.2	9	0	0	1	0	0	0	0	0	7	0	0	0	0	0	0	116	0	0	1	0	0	2	0	0	136
US 98 @ Cole Rd	136	27.2	38	0	0	0	0	0	4	0	2	13	0	0	0	0	0	0	62	1	0	0	1	0	15	0	0	136
US 49 (MS 42) @ Peps Point Rd	129	25.8	7	0	1	0	0	1	1	0	0	12	0	0	0	0	0	0	96	0	0	1	1	0	7	0	1	129
US 49 @ N 31st Ave	100	20.0	10	0	0	0	0	0	1	0	0	12	0	0	0	0	0	0	66	1	0	0	1	0	9	0	0	100
US 98 @ Hedgwood Dr (Sandy Run Rd) / Jackson Rd	99	19.8	7	0	0	0	0	0	0	0	1	6	0	0	0	0	0	0	79	0	0	1	0	0	5	0	0	99
US 49 @ Helveston Rd/Wisteria Dr	97	19.4	18	0	0	0	0	0	1	0	0	19	0	0	0	0	0	0	50	1	0	0	0	0	8	0	0	97
Lincoln Rd @ S 28th Ave	96	19.2	15	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	65	0	0	1	1	0	13	0	0	96
Total	3,911	782	431	2	2	5	2	9	22	1	13	307	1	2	1	0	4	10	2,649	14	1	6	17	0	406	0	5	3,911

Source: SAMS, 2019; NSI, 2019

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

Intersection	Total Crashes	Crash Frequency	ADT	Crash Rate
US 98 (Hardy St) @ Westover Dr	540	108.0	70,973	4.17
US 49 @ MS 198 / Hardy St	382	76.4	54,794	3.82
US 98 (Hardy St) @ Weathersby Rd	282	56.4	58,525	2.64
US 49 (MS 42) @ Classic Dr	255	51.0	40,674	3.44
MS 198 (Hardy St) @ 40th Ave	237	47.4	50,475	2.57
MS 198 (Hardy St) @ 38th Ave	234	46.8	44,196	2.90
US 98 @ Old US 11/King Rd	212	42.4	46,556	2.50
US 98 (Hardy St) @ Cross Creek Pkwy	180	36.0	48,254	2.04
US 49 at Cloverleaf Dr/Eddy St	174	34.8	30,180	3.16
US 49 @ Mamie St	163	32.6	34,867	2.56

Source: SAMS, 2019; NSI, 2019

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 both counties in the MPA have their own emergency management bodies and hazard mitigation plans. More information can be found on each county's website at:

The Emergency Management District (Forrest County) -

http://forresteoc.com/

Lamar County Emergency Management Department-

https://lamarcountyms.gov/ms/departments/emergency-management/

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.

University of Southern Mississippi

The University maintains several documents related to safety and security on campus. These documents allow the University to react to several types of emergencies, including hurricanes, tornadoes, earthquakes, and more.

More information can be found at:

https://www.usm.edu/safety/emergency-management-planning-and-response

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 Hattiesburg 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-59 within the MPA, are included as part of the STRAHNET. Another route within the MPA, US 98, serves as a STRAHNET Connector from I-59 to Camp Shelby.

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 Metropolitan Planning Area (MPA) contains several roadways that serve freight. The MPA has no active intermodal connectors or roadways designated as part of the National Highway Freight Network (NHFN)[2]. However, I-59 is part of the National Multimodal Freight Network (NMFN)[3]. In addition to the NMFN, there are several major roadways designated as Tier I and Tier II corridors in the Mississippi Freight Network (MFN), including:

- **I-59 is part of the Tier I Picayune-Hattiesburg-Meridian Corridor.**
- **US 49 is part of theTier I Jackson-Hattiesburg-Gulfport Corridor.**
- **US 98 is part of the Tier II McComb-Hattiesburg-Lucedale Corridor.**

In addition, MS 589 from US 98 to I-59 is listed as a key connector for the Tier II US 98 corridor in the MFN. The detailed freight network can be found in Mississippi's freight plan[4]. The MDOT freight network is shown in Figure 3.1.

Table 3.1 displays the information on the MPA's only intermodal terminal facility. The MPA also contains several trucking establishments which provide local and long-distance trucking services. The intermodal facility and major trucking establishments in the MPA are shown in Figure 3.1.

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[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

Table 3.1: Intermodal Terminal Facilities for Trucks

Name	Modes Served	City
Miller Transporters, Inc.	Rail & Truck	Hattiesburg

Source: Bureau of Transportation Statistics, 2015 National Transportation Atlas

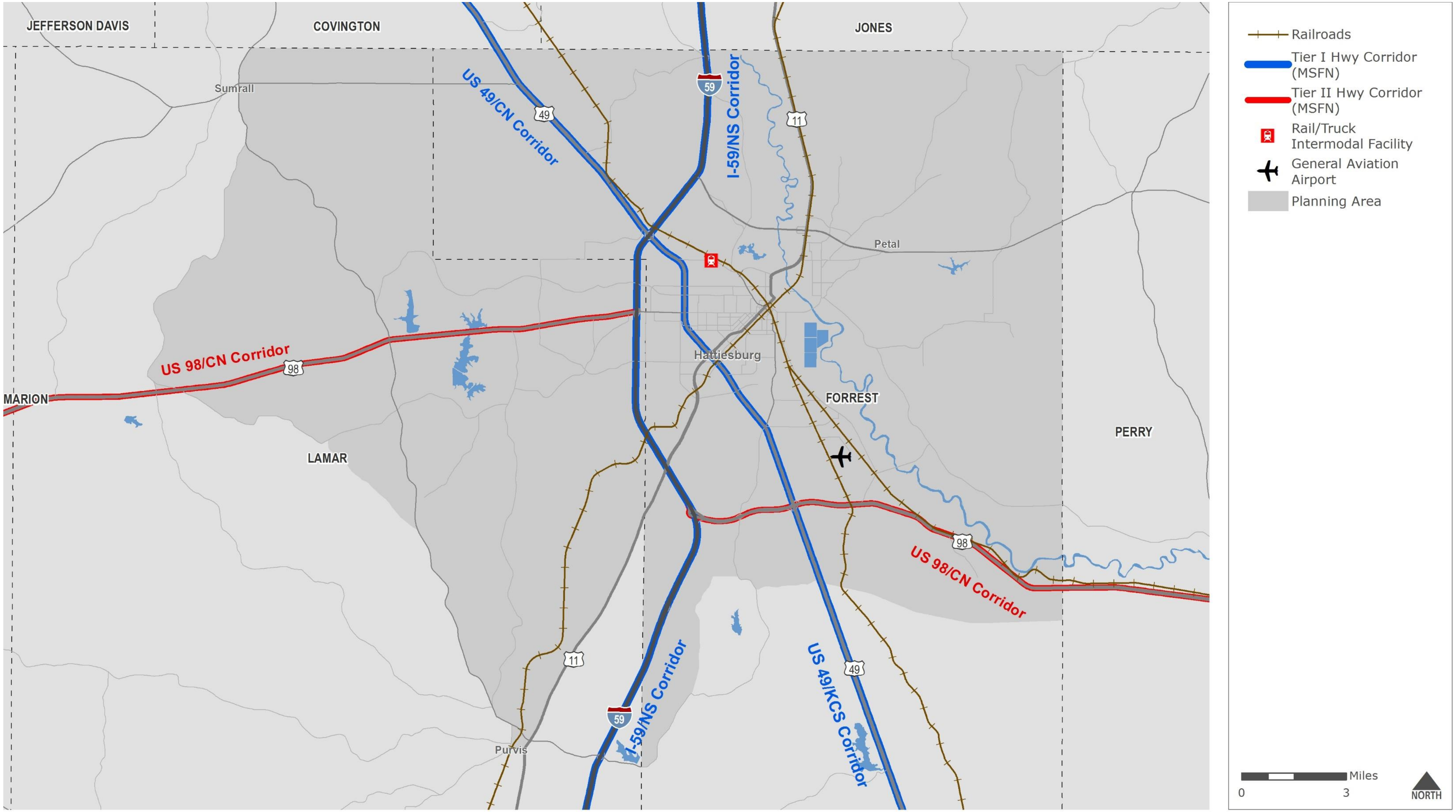
Volumes

To better understand the MPA's freight needs, the 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 that:

- Freight truck traffic is highest on I-59, US 49, and US 98. These correspond to the roadways included in the MFN.
- Freight truck traffic is also relatively high on US 11 and MS 42 from I-59 to Petal.

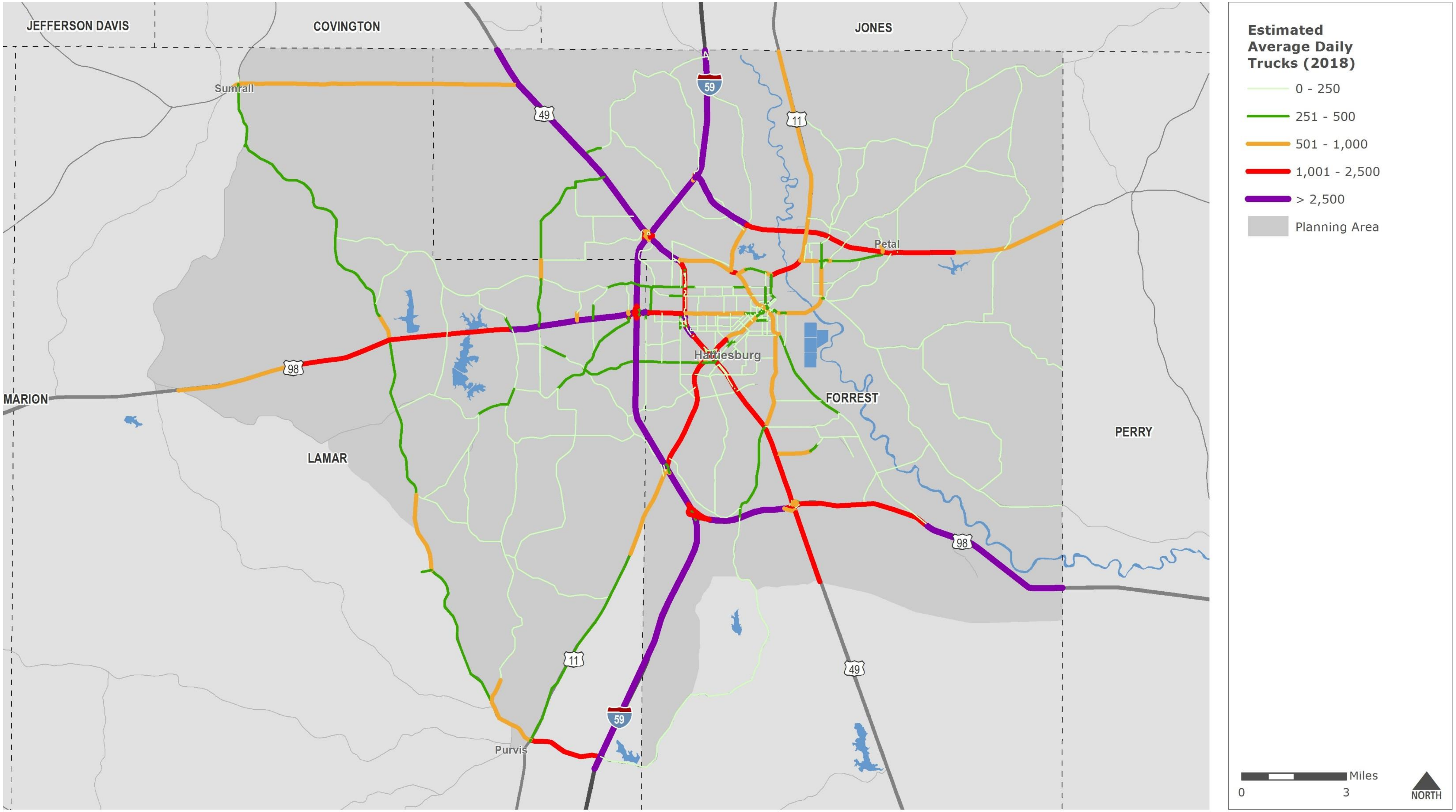
Figure 3.1: Regional Freight Network and Facilities - Trucking, 2018



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

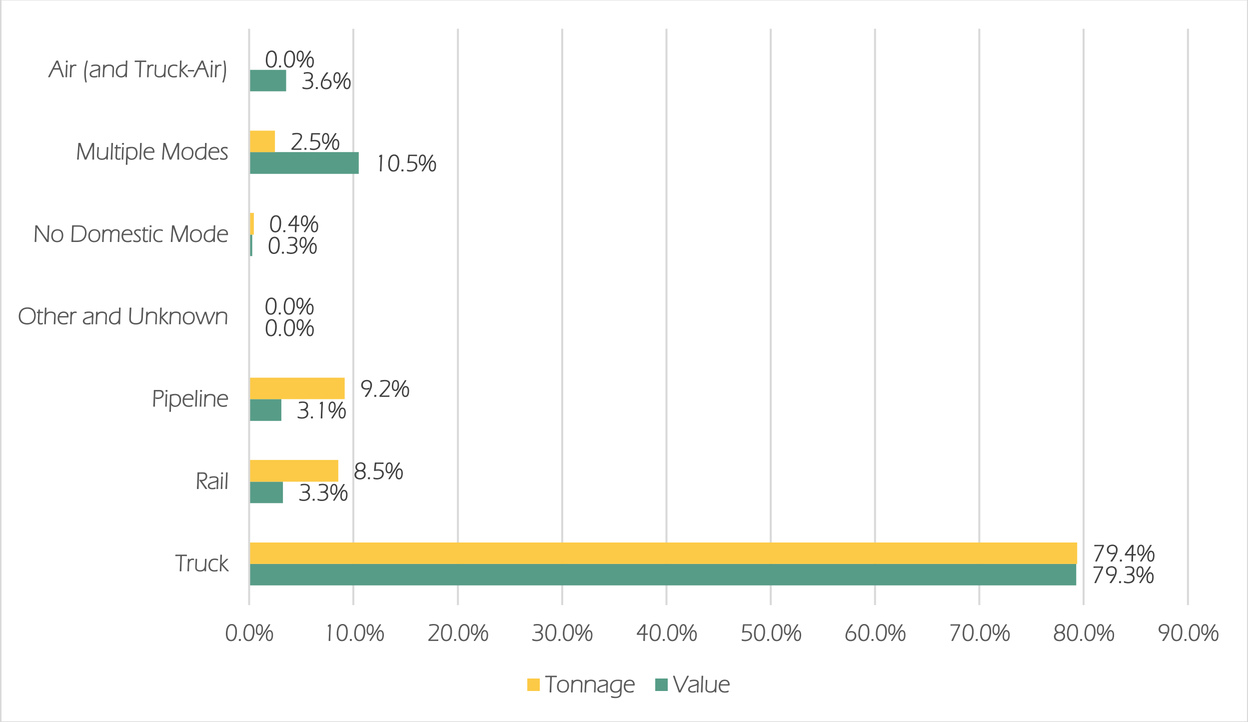
Using data obtained from the FHWA's Freight Analysis Framework (FAF), general trends in freight movement within the MPA can be observed. The freight truck movements for the MPA counties, and their statewide rankings, are summarized below.

In 2016:

- Forrest County ranked 23rd in Mississippi by truck freight tonnage and 19th by truck freight value.
- Lamar County ranked 58th in Mississippi by truck freight tonnage and 61st 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 78 percent of total tonnage and total value moved into, out of, and within the MPA. Rail ranks second by tonnage, but multiple modes ranks second by value in the MPA. The remaining modes account for approximately ten (10) percent of total tonnage and twelve (12) 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 63 percent originates outside the MPA ("inbound" movements), 36 percent originates in the MPA ("outbound" movements). Less than one (1) percent of freight tonnage stays within the MPA. Nearly 61 percent of the total truck freight tonnage is intrastate.

By value, the inbound movements represent approximately 55 percent while outbound movements represent more than 44 percent. Less than one (1) percent of freight by valuestays within the MPA. Although intrastate freight movements represent 61 percent of truck freight weight within the MPA, this movement is only approximately 34 percent of truck freight value.

Table 3.2: Commodity Flows by Truck, 2016

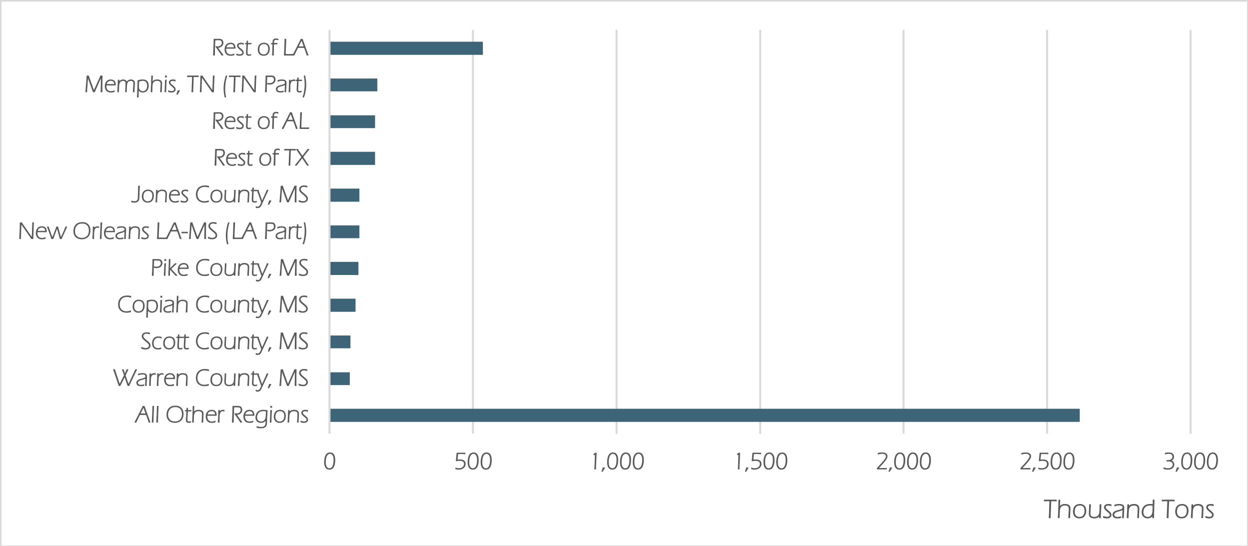
Direction	Tons (Thousands)	Percent of Total	Value ($ Million)	Percent of Total
Inbound (Interstate)	1,776	26.4%	$2,244	35.0%
Inbound (Intrastate)	2,481	36.8%	$1,303	20.4%
Outbound (Interstate)	785	11.7%	$1,962	30.6%
Outbound (Intrastate)	1,629	24.2%	$858	13.4%
Within MPA	65	1.0%	$37	0.6%
Total	6,736	100.0%	$6,404	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 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 (10) trading partners for both inbound and outbound freight movements in the MPA are:

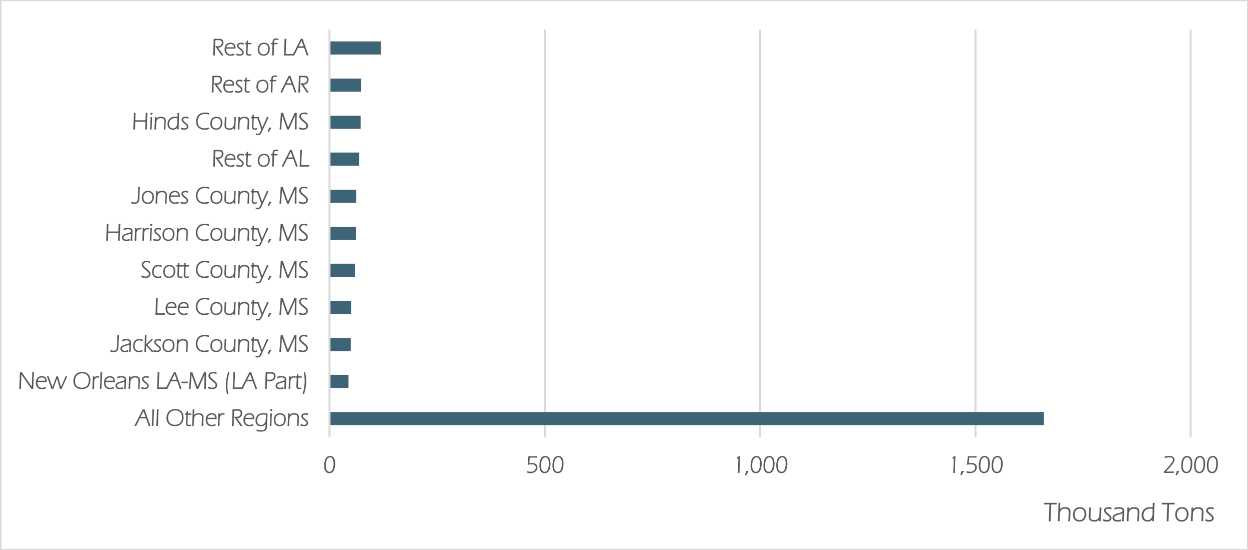
- Jones County, Mississippi
- Scott County, Mississippi
- "Rest of Alabama"
- The Louisiana Portion of the New Orleans-Metairie-Hammond, Louisiana-Mississippi region

Figure 3.4: Top Inbound Trading Partners by Total Truck Tonnage



Source: Freight Analysis Framework version 4

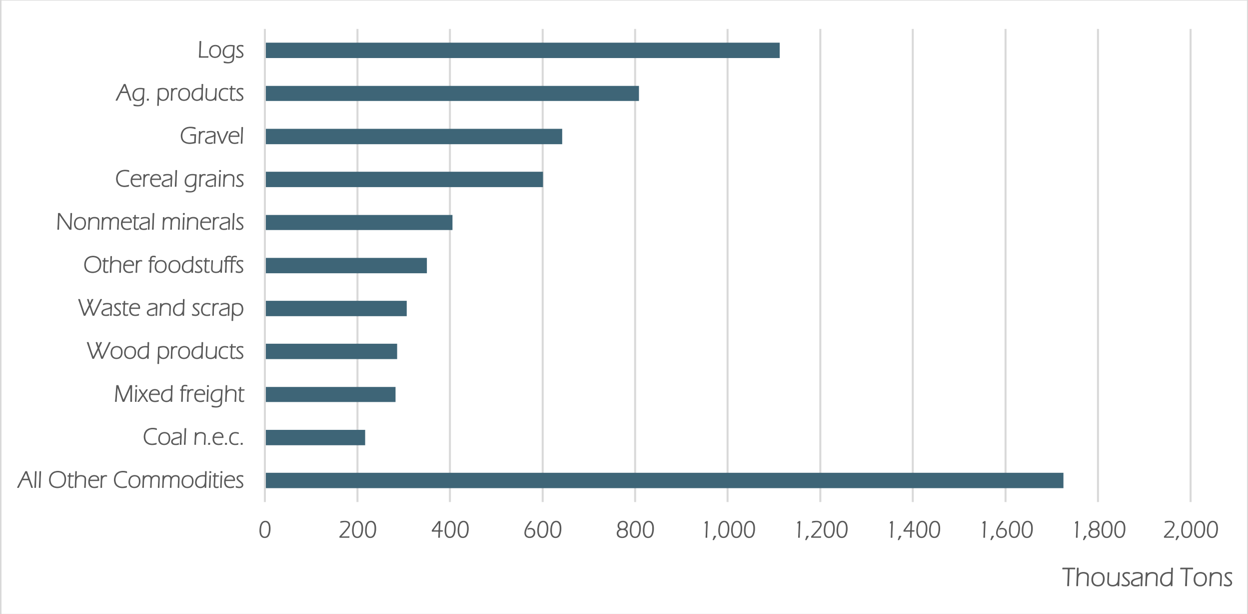
Figure 3.5: Top Outbound Trading Partners by Total Truck Tonnage



Source: Freight Analysis Framework version 4

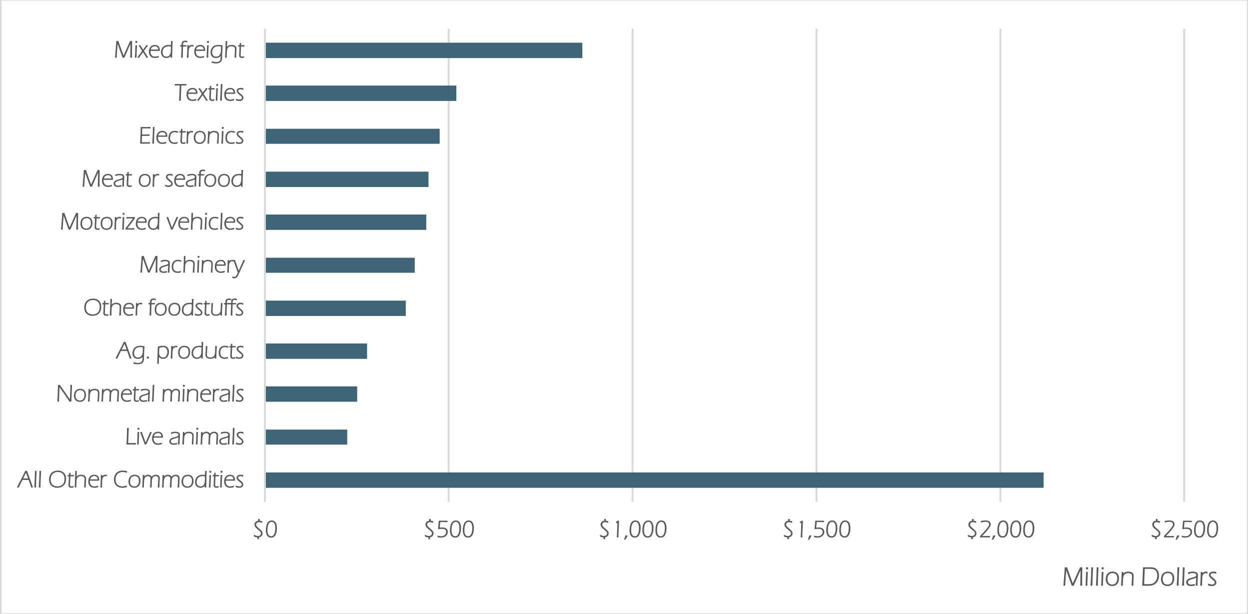
Figure 3.6 and Figure 3.7 show the top commodities shipped via truck by total tonnage and value, respectively. Logs are the top commodity by tonnage, and mixed freight is the top commodity by value. Together, the top ten (10) commodities account for 74 percent of total freight truck tonnage and approximately 67 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

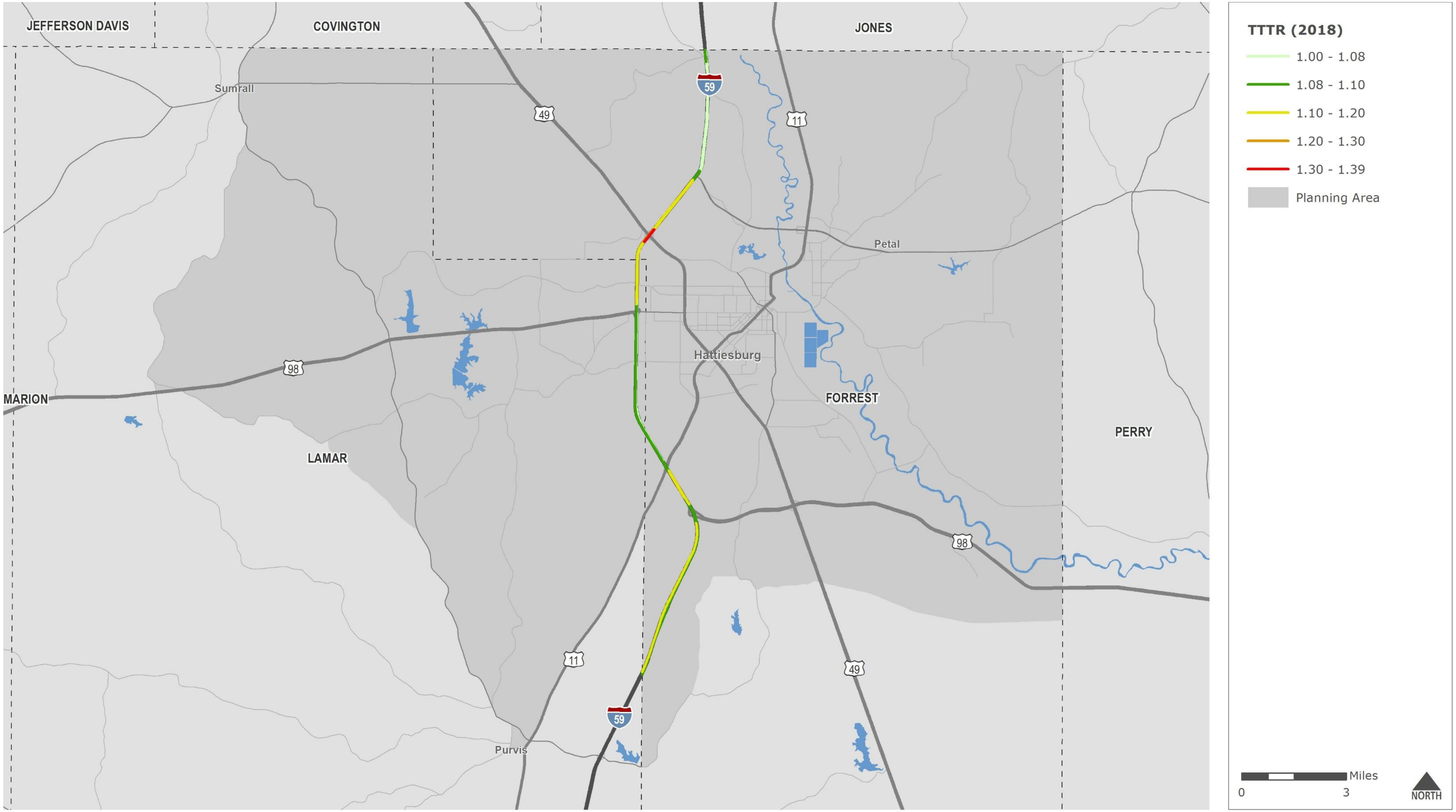
The FHWA has established a freight performance measure to capture truck travel time reliability on the MPA's Interstate highway system: the Truck Travel Time Reliability (TTTR) index[5].

The 2018 NPMRDS data indicates that I-59, the MPA's only Interstate, has an overall TTTR of 1.11.

The 2018 TTTR of each I-59 segment is shown in Figure 3.8. The state's freight performance measures, and the MPO's progress towards them, are discussed in the MPO's Performance Report.

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

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



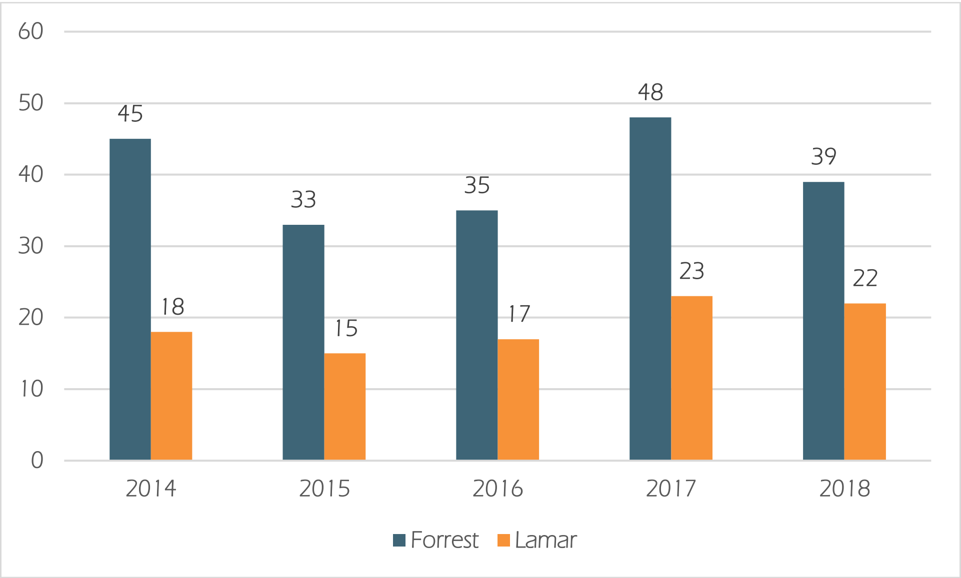
Data Sources: NPMRDS

Disclaimer: This map is for planning purposes only.

Safety

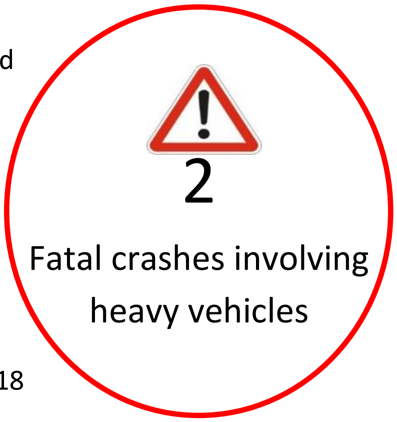
Crashes involving heavy vehicles were analyzed using crash records from 2014 to 2018 obtained from SAMS program. A total of 295 crashes involving heavy vehicles occurred within the Hattiesburg MPA counties during the five-year study period. Figure 3.9 shows the number of heavy vehicle crashes by county 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 three (3) percent of all fatal crashes in the study area involved a heavy vehicle.



Since heavy vehicle crashes represented just over one (1) percent of the total crashes during the study period, many locations experienced little to no heavy vehicle crashes. These intersections in the study area experienced more than five heavy vehicle crashes between 2014 and 2018 were:

- US 98 at Westover Dr
- US 49 at Classic Dr

These roadway segments in the study area experienced at least five heavy vehicle crashes between 2014 and 2018 were:

- I-59 between US 49 and River Rd
- I-59 between MS 42 (Evelyn Gandy Pkwy) and McPhail Rd
- US 98 between Weathersby Rd and Westover Dr

3.3 Railways

Inventory

The MPA has approximately 54 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 in 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 Norfolk Souther Railroad, running alongside the I-59 corridor, is part of the Tier I Picayune-Hattiesburg-Meridian Corridor.
- The Kansas City Southern Railroad, running alongside the US 49 corridor south of Hattiesburg, is part of the Tier I Jackson-Hattiesburg-Gulfport Corridor.
- The Canadian Northern Railroad, running alongside the US 49 corridor north of Hattiesburg, is part of the Tier I Southaven-Jackson-McComb Corridor.
- The Canadian Northern Railroad, running alongside the US 98 corridor east of Hattiesburg, is part of the Tier II McComb-Hattiesburg-Lucedale Corridor.

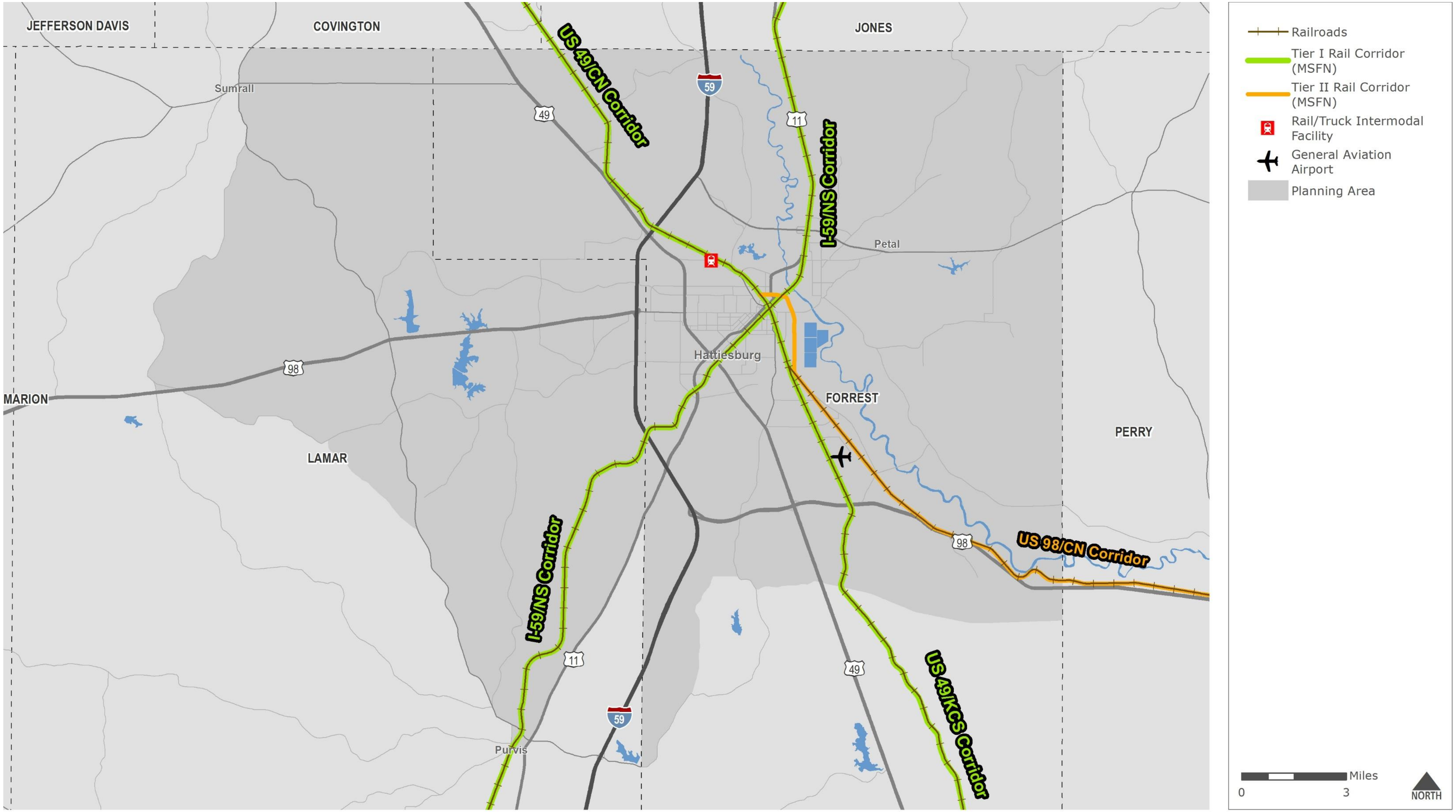
There is one intermodal facility in the MPA that serves railroads, shown in Table 3.3. There are also several line-haul railroad establishments within the MPA which provide intercity movement of trains between the terminals and stations on main and branch lines of a long-distance rail network. Figure 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
Miller Transporters, Inc.	Rail & Truck	Hattiesburg

Source: Bureau of Transportation Statistics, 2015 National Transportation Atlas

Figure 3.10: Regional Freight Network and Facilities - Rail, 2018



Data Sources: 2015 National Transportation Atlas; USDOT; MDOT

Disclaimer: This map is for planning purposes only.

Commodity Flows

Commodity Flows

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

In 2016:

- Forrest County ranked 11th in Mississippi by rail freight tonnage and 11th by rail freight value.
- Lamar County ranked 28th in Mississippi by rail freight tonnage and 51st 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 73 percent originates outside the MPA ("Inbound" movements), and 27 percent originates in the MPA ("Outbound" movements). Less than one (1) percent of total rail freight weight remains in the MPA. Approximately 93 percent of the total rail freight weight 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 92 percent of the total rail freight value is interstate.

Table 3.4: Commodity Flows by Rail, 2016

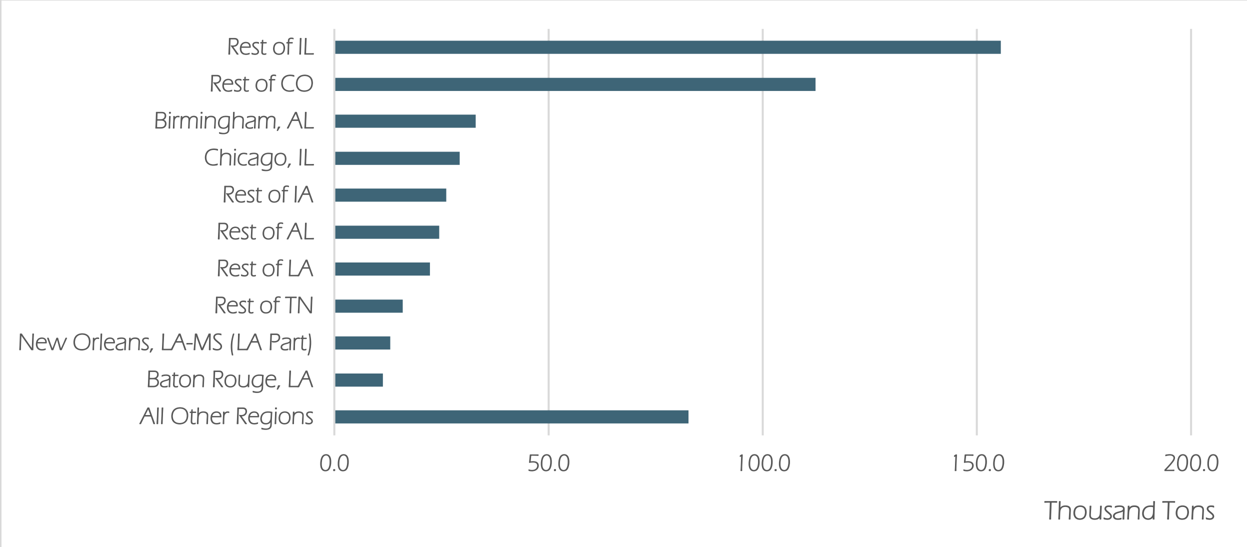
Direction	Tons (Thousands)	Percent of Total	Value ($ Million)	Percent of Total
Inbound (Interstate)	510	70.2%	$139	52.7%
Inbound (Intrastate)	23	3.2%	$10	3.7%
Outbound (Interstate)	166	22.9%	$102	38.9%
Outbound (Intrastate)	26	3.6%	$12	4.6%
Within MPA	1	0.1%	$0	0.1%
Total	725	100.0%	$263	100.0%

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 (10) inbound or outbound domestic trading partners for rail freight are in the southern or midwestern United States. Regions that are top ten (10) trading partners for both inbound and outbound freight movements in the MPA are:

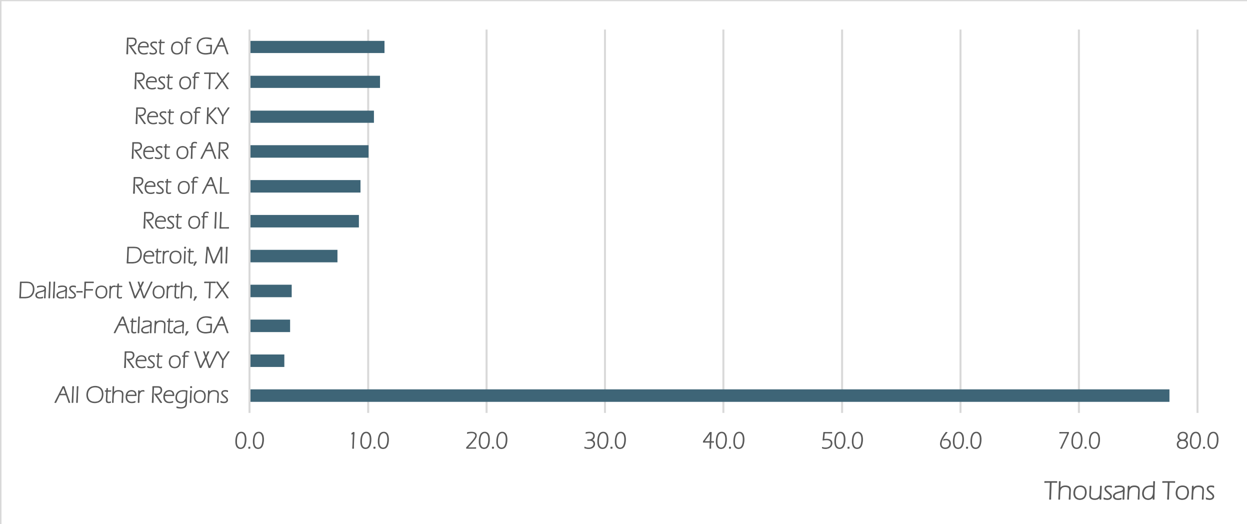
- "Rest of Alabama"
- "Rest of Illinois"

Figure 3.11: Top Inbound Trading Partners by Rail Tonnage



Source: Freight Analysis Framework version 4

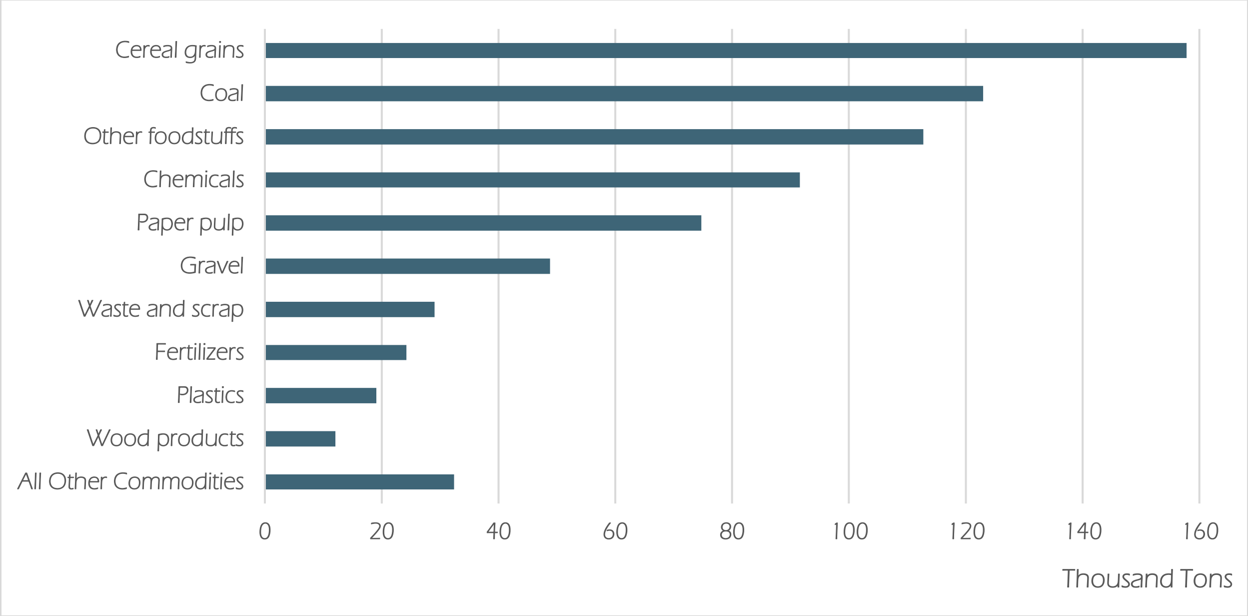
Figure 3.12: Top Outbound Trading Partners by Rail Tonnage



Source: Freight Analysis Framework version 4

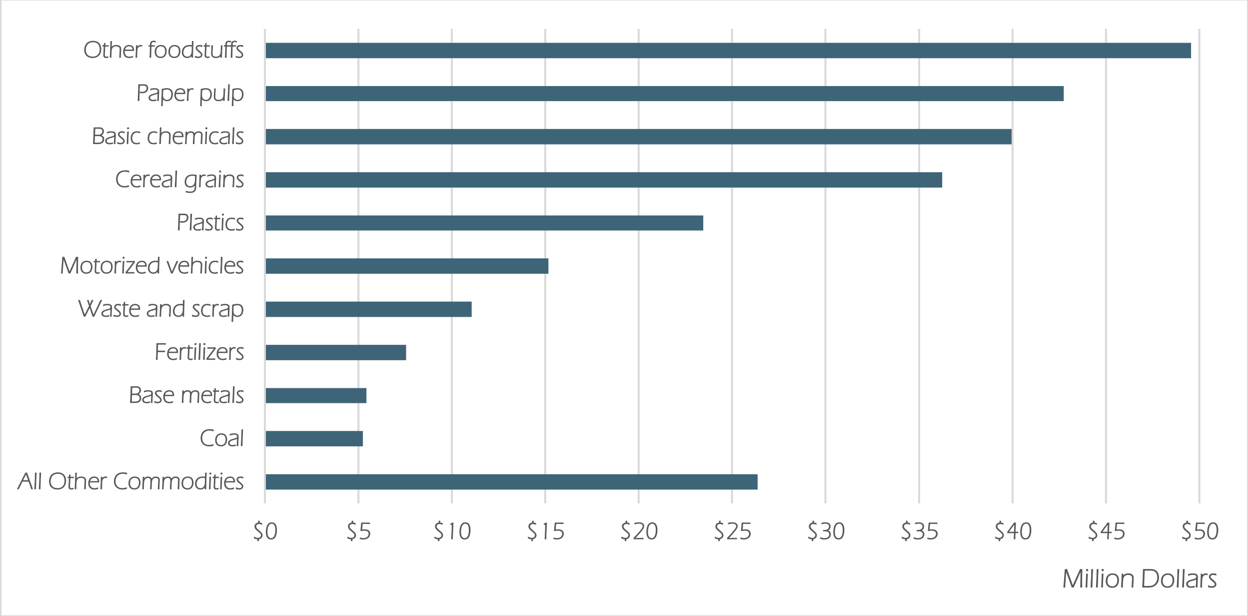
Figure 3.13 and Figure 3.14 show the top commodities by total weight and value, respectively, that are carried on the MPA's highway system. The top commodity by tonnage is cereal grains, and the top commodity by value is other foodstuffs. Together, the top ten (10) commodities account for 96 percent of total freight rail tonnage and approximately 90 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

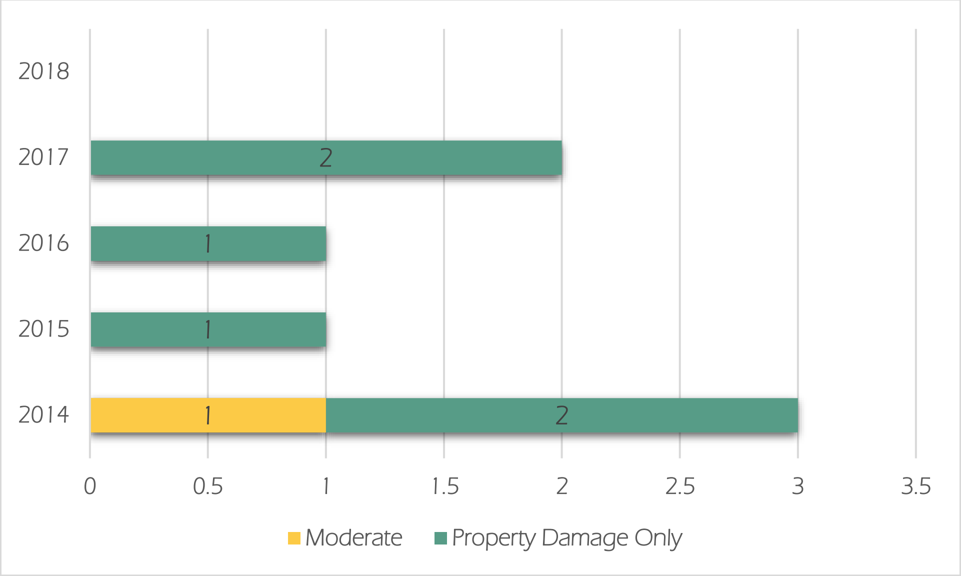


Source: Freight Analysis Framework version 4

Rail - Automobile Collisions

From 2014 through 2018, there were seven (7) 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



Source: SAMS, 2019; NSI, 2019

Two (2) automobile-train collisions occurred at crossings with Canadian Northern (CN) tracks, and five (5) occurred at crossings with Norfolk Southern (NS) tracks. All seven (7) crashes occurred in Forrest County.

Main St @ NS Railroad

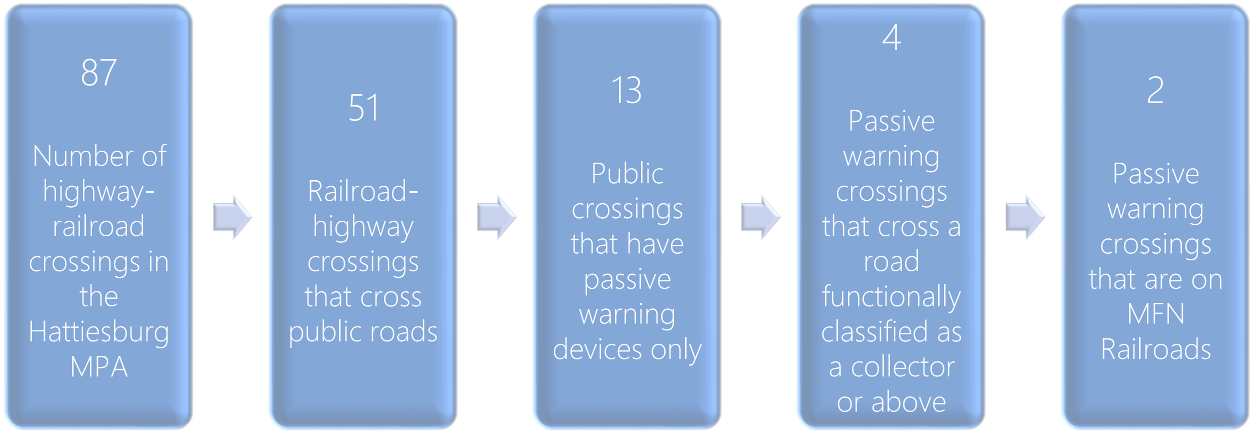
More than one crash from 2014 through 2018

Derailments

According to the Federal Rail Administration, from 2014 to 2018, there were no trail derailments that occurred within the Hattiesburg MPA.

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 warning (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 3.5.

Table 3.5: Highway-Railroad Crossings Lacking Active Warning Devices on MFN Railroads, 2018

Railroad	Street	Place	County	Maximum Speed	Average Daily Traffic
NS	Main St	Hattiesburg	Forrest	10 MPH	9,500
NS	Mobile St	Hattiesburg	Forrest	15 MPH	2,100

Source: Federal Railroad Administration

3.4 Air Cargo

Inventory

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

There is only one public airport in the Hattiesburg MPA: the Hattiesburg-Bobby L. Chain Municipal Airport. However, the regional airport serving Hattiesburg, the Hattiesburg-Laurel Regional Airport, is immediately north of the MPA in Jones County.

28

Based Aircraft at Hattiesburg-Bobby L. Chain Municipal Airport

123

Daily Aircraft Operations at Hattiesburg-Bobby L. Chain Municipal Airport

Volumes

Cargo data is not readily available for Hattiesburg-Bobby L. Chain Municipal Airport.

Commodity Flows

As previously mentioned, goods that are shipped by air tend to be high-value and time-sensitive. The goods 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 0.03 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. Florida

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

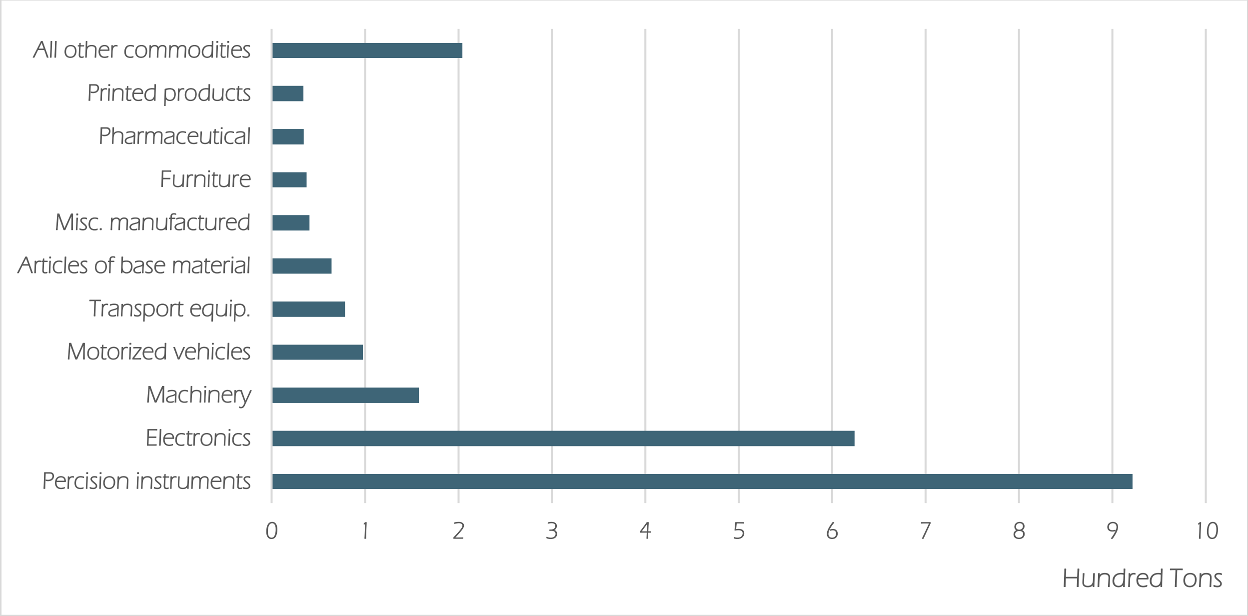
1. California
2. Pennsylvania
3. Florida
4. Alaska
5. Texas

Value

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

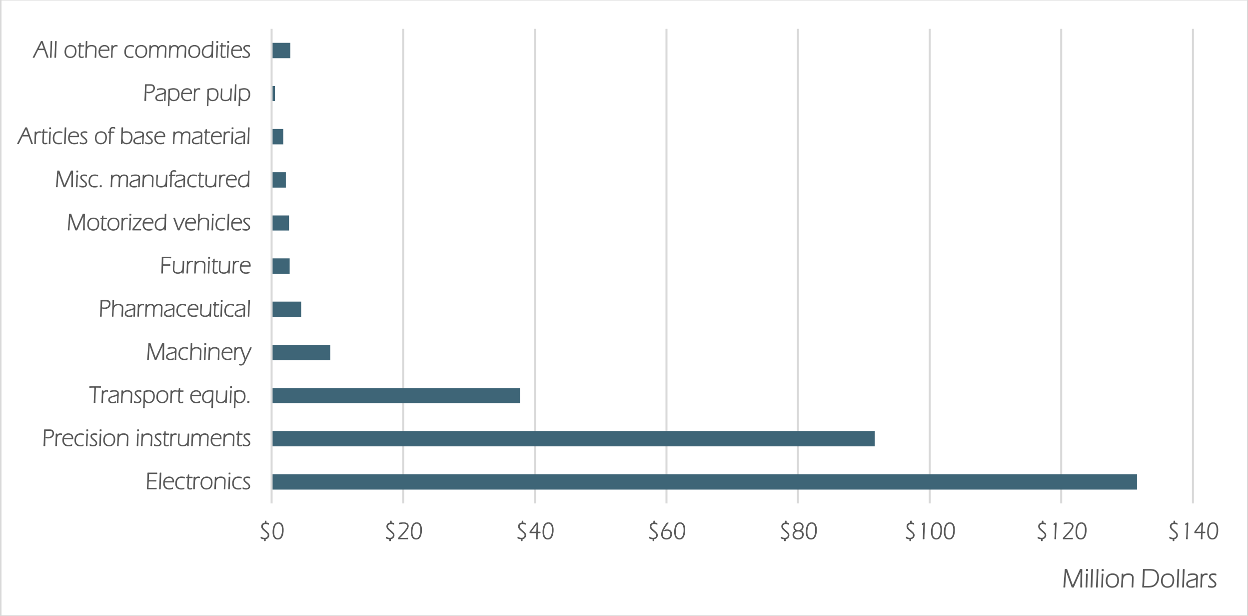
Figure 3.16 and Figure 3.17 shows the top commodities shipped via air by tonnage and by value, respectively. The top ten commodities account for 91 percent by tonnage and 99 percent by value.

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

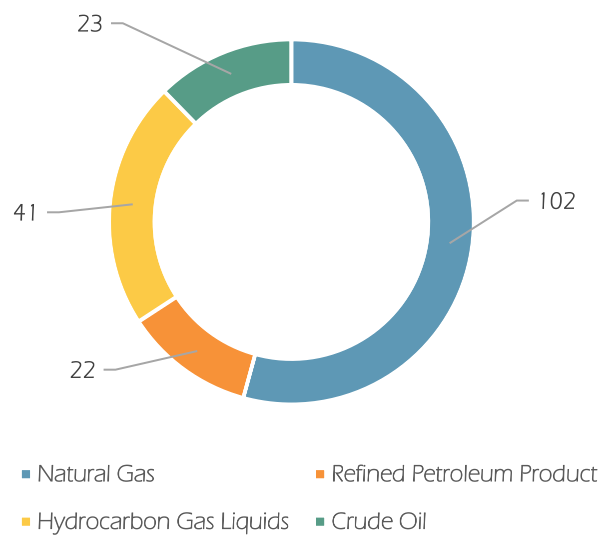
There are no major port facilities within the MPA. The closest major port is the Port of Gulfport, located along the Gulf of Mexico approximately 70 miles south of downtown Hattiesburg. In addition, Hattiesburg is located within close proximity to the Port of Pascagoula, Port Bienville in Bay St. Louis, the Port of New Orleans, and the Port of Mobile. The closest waterway to the MPA that is part of the NMFN is the Gulf Intracoastal Waterway. Additionally, the ports in Gulfport, Pascagoula, New Orleans, and Mobile are part of the NMFN.

3.6 Pipelines

Inventory

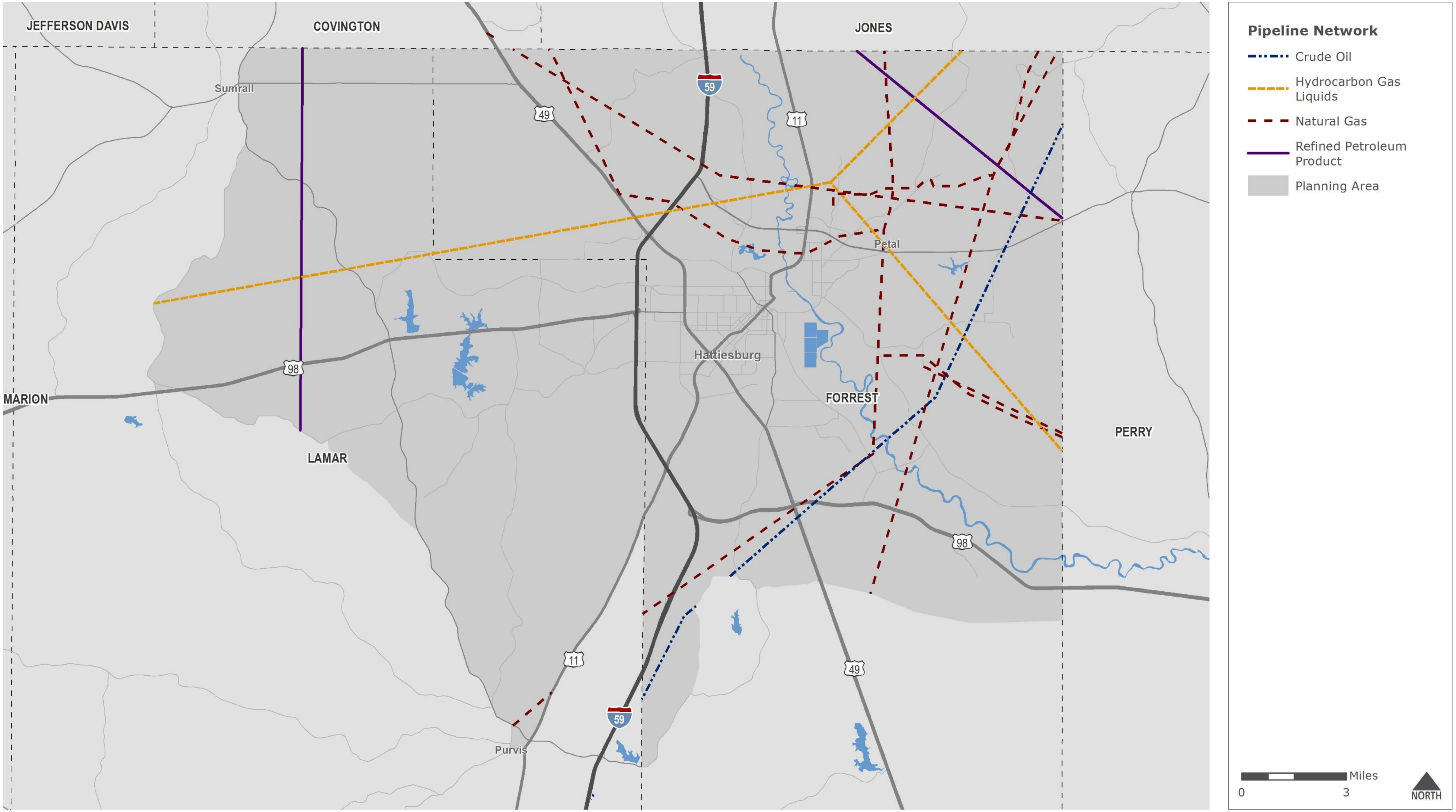
The MPA's pipeline network consists of approximately 188 miles of crude oil, hydrocarbon gas liquids, natural gas, and refined petroleum products pipelines as of 2018. By length, most pipelines in the MPA are natural gas. Figure 3.19 shows the MPA's pipeline network.

Figure 3.18: Pipeline Commodity by Length, 2018



Source: Energy Information Administration

Figure 3.19: MPO Pipeline Network, 2018



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 fifth in value in the MPA. By tonnage, pipelines carry nine (9) percent of all freight in the MPA. However, the pipeline mode's value share was only three (3) percent.

The top five origins for pipeline freight account for 97 percent by tonnage and 96 percent 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. "Rest of Louisiana"
2. "Rest of Arkansas"
3. New Orleans, LA-MS (LA Part)
4. Lake Charles, Louisiana
5. Houston, Texas

The top five destinations for pipeline freight account for 69 percent by tonnage and 76 percent by value in the MPA. The top five destinations by tonnage and by value are:

Tonnage

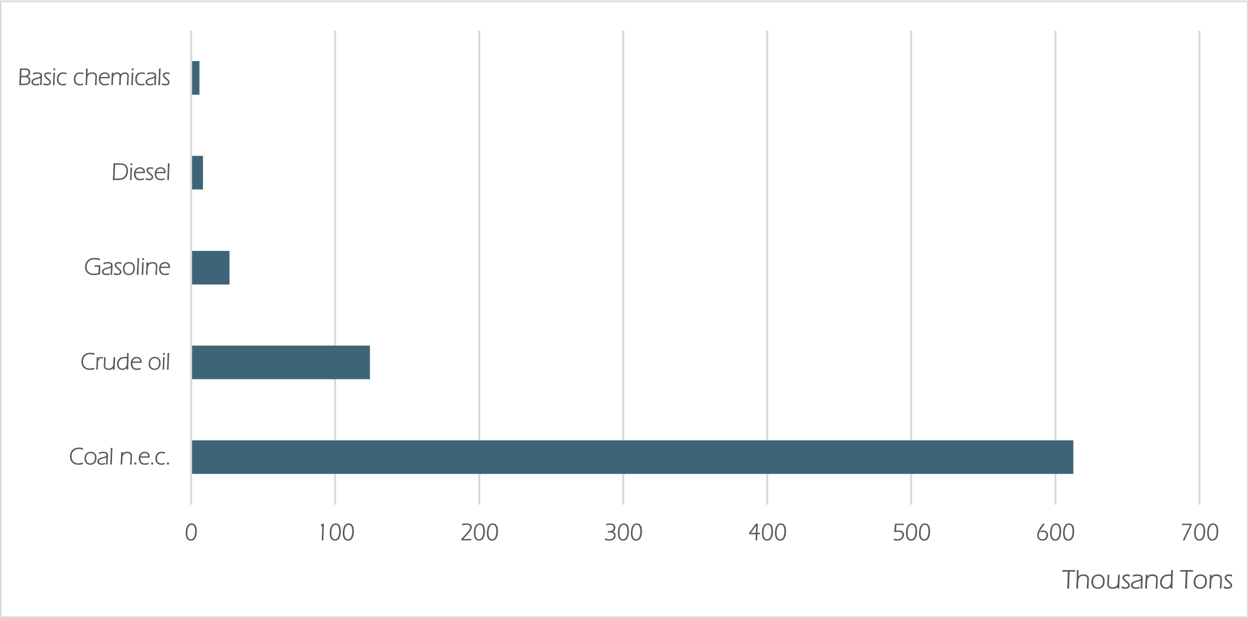
1. Corpus Christi, Texas
2. Rest of Alabama
3. Rest of Tennessee
4. Mobile, Alabama
5. Memphis, Tennessee (TN Part)

Value

1. Corpus Christi, Texas
2. "Rest of Alabama"
3. "Rest of Oklahoma"
4. Beaumont, Texas
5. "Rest of Tennessee"

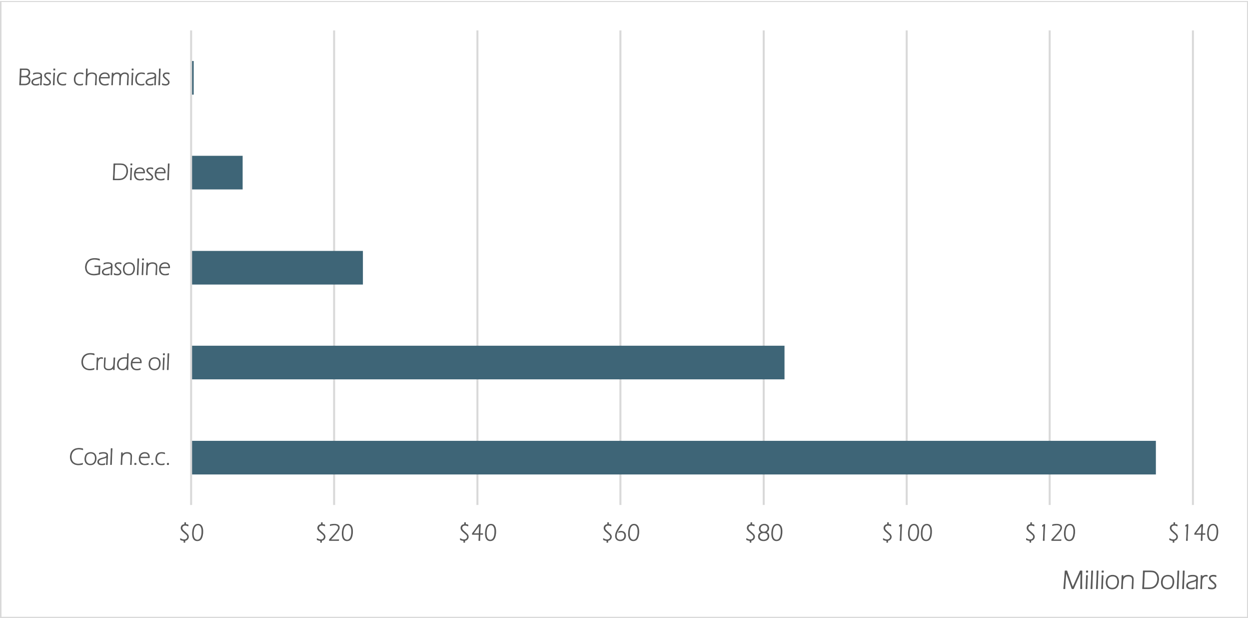
Figure 3.20 and Figure 3.21 show the five commodities carried by pipeline within the MPA by tonnage and by value, respectively. By tonnage and by value, coal n.e.c. is the top commodity, accounting for 79 percent of the total tonnage and 54 percent of freight value carried by pipeline.

Figure 3.20: Pipeline Commodities by Tonnage, 2016



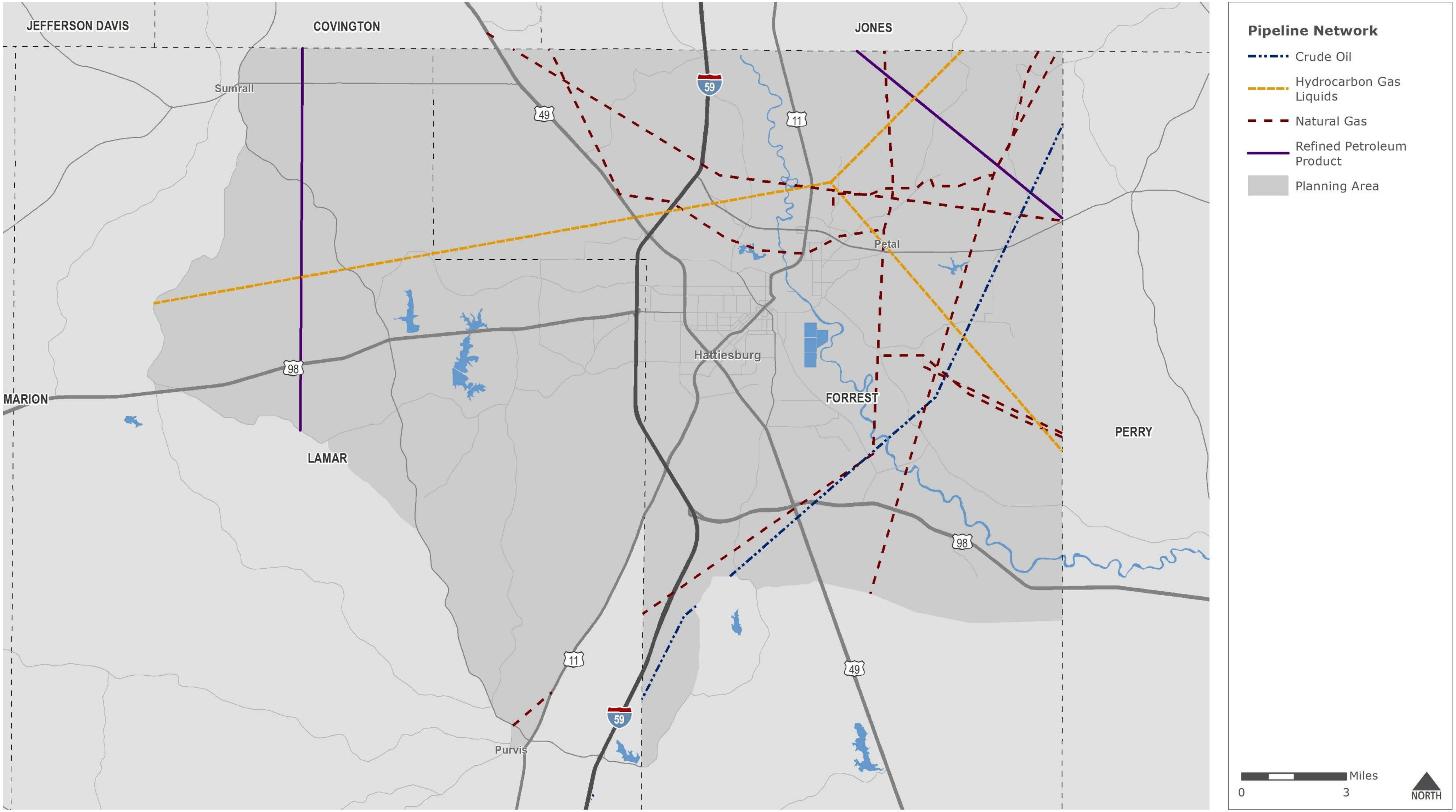
Source: Freight Analysis Framework version 4

Figure 3.21: Pipeline Commodities by Value, 2016



Source: Freight Analysis Framework version 4

Figure 3.18: MPO Pipeline Network, 2018



Data Sources: Energy Information Administration

Disclaimer: This map is for planning purposes only.

4.0 Bicycle and Pedestrian

4.1 Introduction

Walking and bicycling are a key transportation option, providing an affordable transportation alternative to many Americans. While Americans have always walked and ridden bikes, creating the infrastructure for, and ensuring there are safe, accessible places for walking and cycling has not always been a priority. The last two to three decades have seen communities make purposeful efforts to plan and install high-quality pedestrian and bicycle facilities. There are four reasons that cities, counties, and states are now focusing on this type of infrastructure: safety, equity, health, and economics.

Safety Benefits

According to the Pedestrian and Bicycle Information Center, a joint effort of the Federal Highway Administration (FHWA) and the National Highway Traffic Safety Administration (NHTSA), pedestrian and bicyclist fatalities from crashes with motor vehicles increased by 32 percent in the ten-year period between 2008 and 2017.[6] During the same time period traffic fatalities were decreasing.

While safe travel for pedestrians and bicyclists is problem, it is also important to note that data on crashes involving pedestrians and bicyclists is incomplete, inconsistent, and that there is no official record of injuries such as how fatalities are tracked by FARS. When the lack of good data is combined with the fact that many of these types of crashes are under-reported, the problem of pedestrian and bicycle safety is substantial.

Many communities are moving to incorporate Vision Zero policies, a multi-pronged approach to changing the built environment, enforcement policies, and influencing behavior to reduce and eventually eliminate traffic deaths and major injuries. The policies focus on education, enforcement, engineering, and emergency response.

Equity Benefits

Designing communities and transportation systems for cars excludes citizens that do not have regular access to personal vehicles. Vulnerable populations, such as low-income households, minorities, children, persons with disabilities, and older adults typically own fewer vehicles and have longer commutes. Transportation options such as walking and biking, are sometimes the only available and affordable transportation choice. Without access, essential services and employment are often out of reach for a significant portion of our nation.

Health Benefits

It is well known that the number of overweight and obese Americans has reached epidemic proportions. The Department of Health and Human Services documents that two-thirds of adults and nearly one in

[6] Pedestrian and Bicycle Information Center: http://www.pedbikeinfo.org/factsfigures/facts_safety.cfm

three children are overweight or obese.[7] The downstream effects of this epidemic are reflected in the record numbers of chronic illnesses of diabetes and heart disease. These chronic illnesses dramatically affect both the cost of health care and quality of life.

Along with prevention and medical treatment, regular physical activity is a critical part of the nation's recovery from the obesity epidemic. Making physical activity easy and safe plays a key role in successful strategies to fight obesity.

Economic Benefits

Surveys and research around the country are documenting the role that walkable and bicycle friendly communities play in the economic prosperity of a place. Research conducted by the National Association of Realtors and American Strategies show that in 2017, six (6) in ten (10) respondents say that they would pay more to live in a walkable community.[8]

4.2 Existing Bicycle and Pedestrian Facilities

Bicycle and Pedestrian Facility Inventory

An inventory of bicycle and pedestrian facilities was created by combining the City of Hattiesburg's inventory with an existing inventory for the City of Petal. These inventories are shown in Figure 4.1 for bicycle facilities and Figure 4.2 for pedestrian facilities.

For Hattiesburg, there is widespread sidewalk coverage In and around downtown, along Hardy Street, and around the University of Southern Mississippi. There are also sidewalks along major corridors in other parts of the city. There Is also a strong backbone of bike facilities In Hattiesburg, most notably with the Longleaf Trace but also around downtown, the University of Southern Mississippi, and other neighborhoods in the center of the city.

For Petal, sidewalk coverage is much more limited and there are no known bicycle facilities.

It is important to note that this inventory does not Include Information on the current condition or quality of these facilities. Aside from maintenance issues, many existing facilities may not meet the design guidelines adopted by the MPO In Its Pathways Master Plan.

Bike-Sharing and Scooter-Sharing

There are currently no bike-share or scooter-share services In the Metropolitan Planning Area.

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[7] National Center for Health Statistics:
https://www.cdc.gov/nchs/data/hestat/obesity_adult_13_14/obesity_adult_13_14.pdf
https://www.cdc.gov/nchs/data/hestat/obesity_child_13_14/obesity_child_13_14.pdf

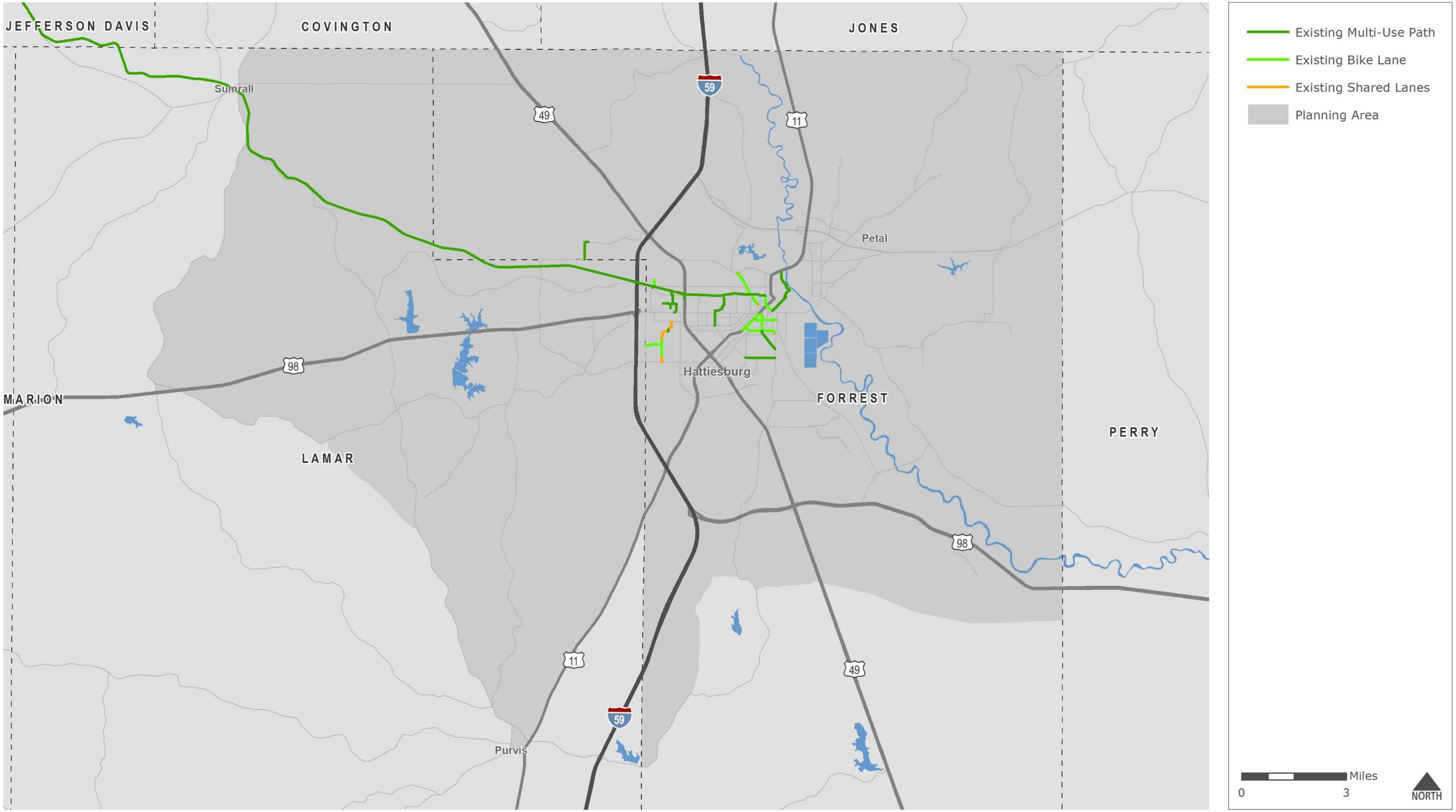
[8] National Association of Realtors: https://www.nar.realtor/sites/default/files/documents/2017%20Topline%20Results.pdf

However, in recent years shared mobility options like bike-sharing and scooter-sharing have become commonplace in urban areas throughout the country. These transportation services are provided publicly, privately, or through public-private partnerships and can be either dock-based or dockless. They can also be powered manually or electric.

Today, the markets for these shared mobility options are mostly in urban centers or in major activity centers like universities. Because these services are usually available to users by the minute or hour, they are typically used for relatively short, one-way trips.

Due to the rapid expansion of these services and a lack of associated Infrastructure Improvements (e.g. bike facilities or scooter lanes), there have been many reported conflicts with drivers and pedestrians. Many cities have banned these services and others have begun Introducing regulations and Improving Infrastructure to mitigate conflicts.

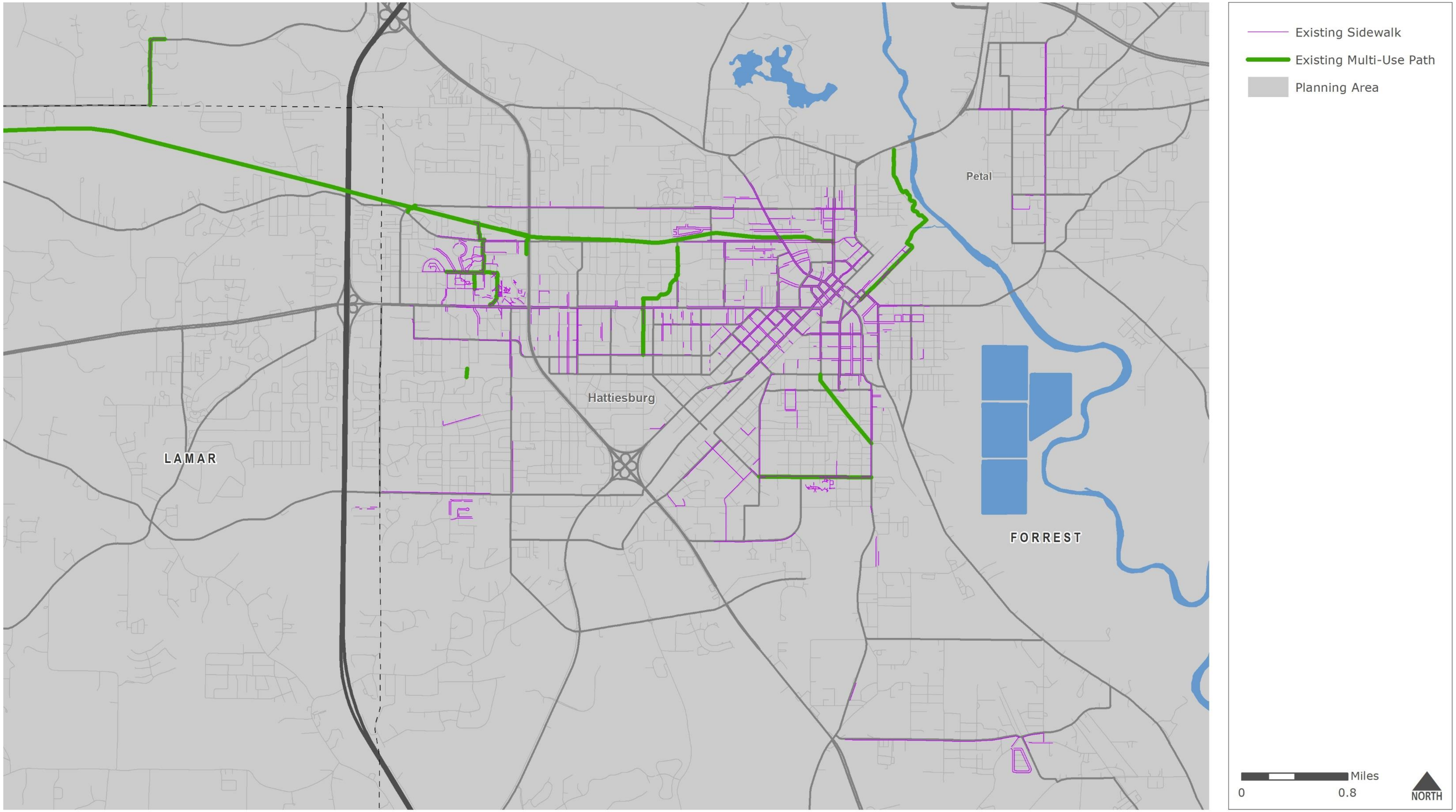
Figure 4.1: Existing Bicycle Facilities, 2018



Data Sources: MPO Staff; Neel-Schaffer

Disclaimer: This map is for planning purposes only.

Figure 4.2: Existing Pedestrian Facilities, 2018



Data Sources: MPO Staff; Neel-Schaffer

Disclaimer: This map is for planning purposes only.

4.3 Existing Traffic and Usage Patterns

The 2017 National Household Travel Survey (NHTS) estimates that, each day, about sixteen (16) percent of the U.S. population make a trip by walking and three (3) percent do so by biking. Still, there is great variation from area to area and person to person. Most notably, people in rural households were much more dependent on driving and people in urban households were more likely to walk or bike.

Bicycle and Pedestrian Traffic

While there is no local household travel survey about non-work trips, there are estimates of which modes workers in the region use to commute to work from the Census Bureau's American Community Survey.

This information, summarized in Table 4.1, shows that about three (3) percent of workers residing In the Hattiesburg Urbanized Area commute to work by walking or biking. This puts the Hattiesburg area between the state and national average for urbanized areas.

However, Figure 4.5 shows that there is great variation within the region. Most notably, 15 to 30 percent of workers residing on or near the University of Southern Mississippi (300 people) commute to work by walking or biking. While a high percentage of people living in Downtown Hattiesburg and along eastern Oak Grove Road commute by walking and biking, their overall numbers are not large. Outside of these areas, commuting by walking and biking is much less common.

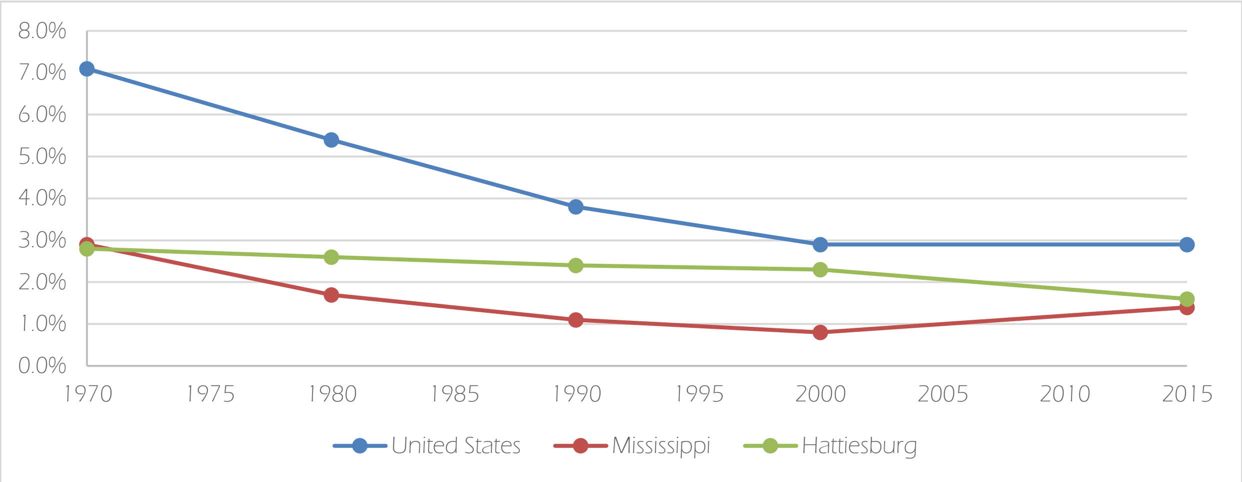
Figure 4.3 shows the decrease from 1970 to 2015 in the percentage of people who walk to work. Mississippi and Hattiesburg are both below the 2015 national average of 2.9%. Since 2000 the percent of people walking to work nationally has stayed constant but increased across Mississippi and decreased In Hattiesburg.

Table 4.1: Means of Transportation to Work in Urbanized Areas

Mode	National Average	State Average	Hattiesburg
Drove Alone	78.4%	86.6%	82.8%
Carpooled	9.5%	9.3%	7.9%
Rode Transit	7.1%	0.9%	0.3%
Biked	0.7%	0.2%	0.6%
Walked	3.0%	1.6%	2.2%
Other	1.3%	1.4%	6.2%

Source: Census Bureau, 2017 American Community Survey 5-year estimates

Figure 4.3: Percentage of People Walking to Work, 1970-2015



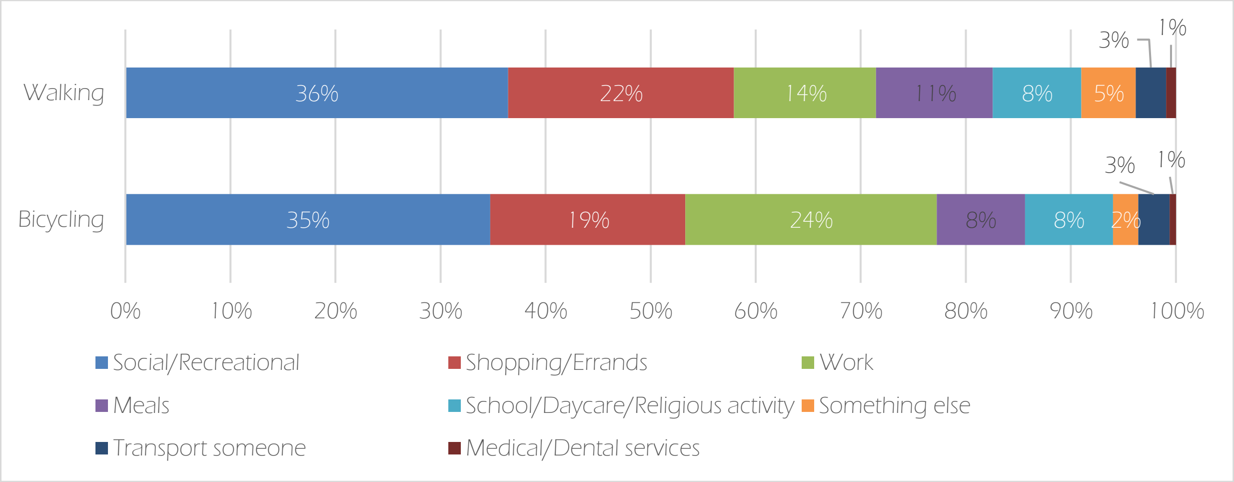
Source: National Historic Geographic Information Systems; ACS 2013-2017 5-Yr Estimates

Walking and Biking Trip Purposes

The primary purpose for both walking and biking in small metro areas is social or recreational, followed by shopping and errands. However, commuting to work constitutes 24 percent of bicycling trips compared to only 14 percent for walking trips.

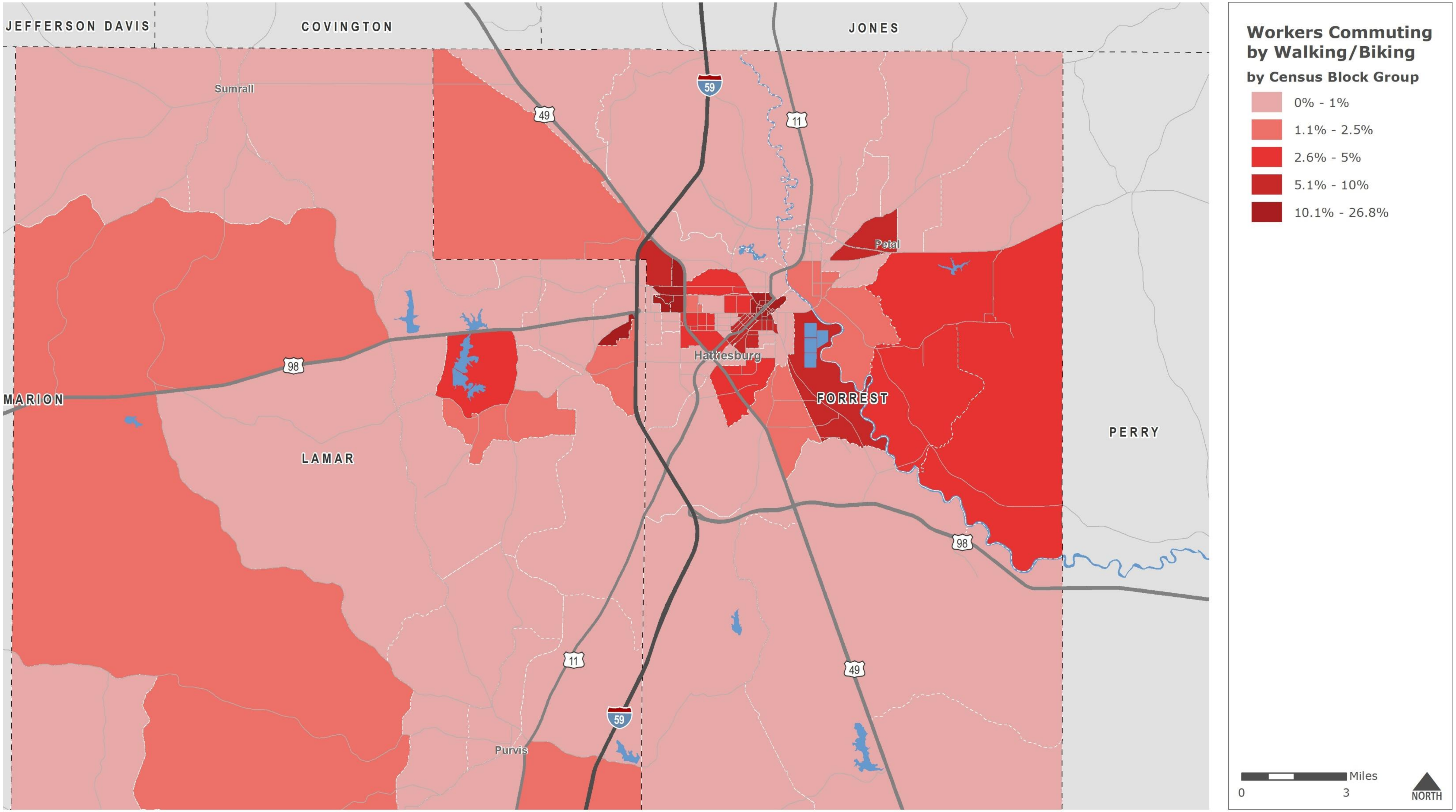
It is important to note that these travel patterns are an average and that there is great variation within metropolitan areas and between metropolitan areas. Work-related and utilitarian trips by walking and biking will be more common in areas where walking and biking is more comfortable and in areas where access to cars is more limited.

Figure 4.4: Walking and Bicycling Trip Purposes in Small Metro Areas



Note: Small Metro Area = under 250,000 residents
Source: National Household Travel Survey, 2017

Figure 4.5: Commuting by Walking and Biking in the Region



Data Sources: Census Bureau, 2017 American Community Survey

Disclaimer: This map is for planning purposes only.

4.4 Regional Bicycle and Pedestrian Demand Analysis

Latent Demand Score Analysis

In order to better understand the existing potential demand for pedestrian and bicycle trips, a latent demand score analysis was conducted that attempts to illustrate potential demand based on characteristics of the built environment, location of major attractors, and demographics.

The demand analysis is the same for pedestrians and bicyclists. The mapping exercise used fine-grained information to assess an area's potential demand for pedestrian or bicycle trips based on a 0-100 scale. Points were awarded based on the factors summarized in Table 4.2.

Table 4.2: Latent Demand Score Criteria

Factor	Measure	Maximum Points
Land Use	Population, jobs, and students per acre	30
	Within half mile of popular destination(s)[1]	15
Demographic	Senior (65+) and youth (<15) population per acre	10
	Households with no vehicle available or on-campus housing unit[2]	25
Travel Environment	Intersections per square mile[3]	20
	Total Possible Points	**100**

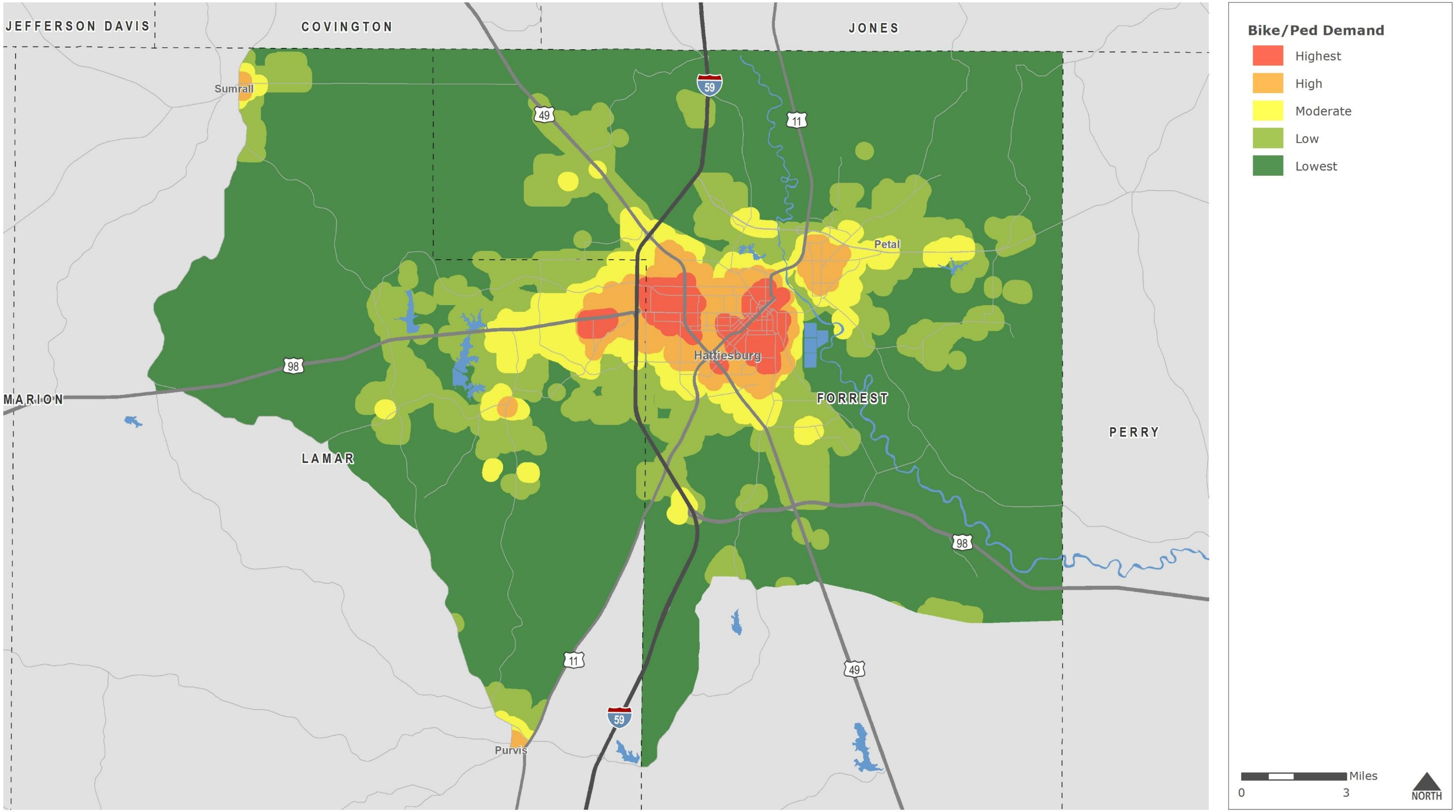
Notes: [1]Popular destinations are parks, major recreation centers, schools, libraries, hospitals, grocery stores, pharmacies, convenience stores, eating/drinking places, and hotels/motels. Universities were weighted 10x, other schools, and hospitals were weighted 5x and grocery stores, pharmacies, convenience stores, hotels/motels, and parks/rec centers were weighted 2x.
[2]On-campus housing units calculated by dividing group quarters dorm population by 2.2.
[3]Intersections with at least 4 segments are weighted 2x.

Findings

Figure 4.6 shows the results of the latent demand score analysis. Again, this exercise reflects relative potential demand, not absolute demand. Simply put, it shows which areas are more likely to have high or low demand relative to all other areas within MPA. It does not attempt to quantify the actual number of bicycle or pedestrian trips occurring in these areas.

The analysis indicates that the greatest potential bicycle and pedestrian demand is around the University of Southern Mississippi and an area extending from just north of Downtown Hattiesburg to William Carey University. There are also smaller areas of high demand, such as an area south of Hardy Street between Weathersby Road and I-59, parts of Petal, Midtown, and many areas between the Downtown Hattiesburg and the University of Southern Mississippi.

Figure 4.6 Bicycle and Pedestrian Demand in the Region, 2018



Data Sources: Census Bureau; InfoUSA; MPO Staff; Neel-Schaffer

Disclaimer: This map is for planning purposes only.

4.5 Bicycle and Pedestrian Safety

Collision data can help identify safety issues in the study area. However, vehicular collisions with pedestrian and bicycle are typically under-reported. Research indicates pedestrian collisions may be underreported to police by as much as 55% and bicycle collisions underreporting is thought to be even higher.[9]

There are three general categories of issues that contribute to traffic crashes involving bicyclists and pedestrians:

- motorist behavior,
- non-motorist behavior, and
- infrastructure.

Motorist behaviors include speeding, distraction, lack of traffic law awareness, non-compliance with traffic laws, and alcohol or drug impairment.

Non-motorist (i.e., pedestrian and bicyclist) behaviors include lack of traffic law awareness, non-compliance with traffic laws, poor conspicuity, and alcohol or other impairment.

Infrastructure issues include inadequate separation between motorists and non-motorists, lighting, and signage or crosswalks.

Understanding the scope of the impact of many these issues can be difficult to quantify. There is some data available. For each reported collision, data is collected for a range of factors. The lighting conditions, location of crash relative to intersections, and severity of injury are documented.

From these data collection efforts, national data indicates pedestrian safety can be improved through discouragement of mid-block crossings and implementation of lighting improvements. In 2017, pedestrians and bicyclists accounted for 18.2% of all traffic fatalities nationally. Of these fatalities 75% of pedestrian fatalities and 45% of bicycle fatalities occur in dark conditions. Crossing at non-intersections is also predictor in pedestrian and bicycle fatalities. A majority of pedestrian fatalities, 73%, occur at non-intersections and 58% of bicycle fatalities occur at non-intersections. This increases in urban settings where crossing density is higher.

[9] University of North Carolina Highway Research Center. http://www.pedbikeinfo.org/factsfigures/facts_safety.cfm

Bicycle Collision Data

Between 2014 and 2018, 51 bicycle collisions occurred in the MPA. Of the crashes involving bicycles, only 23 percent documented property damage only.

1

Bicycle fatality from 2014 through 2018

The percentage of bicycle collisions at non-intersections matches national trends with 43 percent of bicycle collisions occurring at non-intersections. A larger than anticipated proportion of collisions, 80%, occurred in Daylight conditions. The cyclist fatality occurred in daylight conditions at a non-intersection.

Pedestrian Collision Data

12

Pedestrian fatalities from 2014 through 2018

Between 2014 and 2018, 176 bicycle collisions that occurred. There was a fatality or severe injury in 78 percent of the pedestrian-involved crashes. Within the MPA, pedestrian collision data followed national trends. Non-intersection locations accounted for 78 percent of pedestrian-involved collisions, while 49 percent occurred in dark-lit or dark-unlit conditions. All of the pedestrian fatalities occurred at non-intersection locations and 92 percent of them occurred in dark-lit or dark-unlit conditions.

4.6 Existing Plans and Initiatives

MPO Pathways Master Plan

In April 2015, the Hattiesburg MPO adopted its Pathways Master Plan which provides a clear framework for the development of new facilities, programs, and policies that will support safe and convenient walking and biking conditions for transportation and recreation.

The plans primary recommendations included the following:

- Bicycle and pedestrian infrastructure recommendations.
  - This includes highlighting priority pedestrian corridors and zones and identifying a system of on-street bikeways and shared-use paths.
- Recommended support facilities and programs that can encourage, enforce, and educate those in the community about walking and biking.
- A short-term action plan for policy changes, programmatic changes, and infrastructure improvements.

Recent Initiatives

The following initiatives are underway:

- A multi-use pathway project is in development and will run the length of North 38th Avenue, connecting Hardy Street to Longleaf Trace along the university's western edge.
- Another future pedestrian/bike connection to Longleaf Trace from Classic Drive is soon to be under development.
- As a stand-alone project, Lamar County is in the ROW acquisition process for the construction of a multi-use pathway project along a large section of Old Hwy 11 using STP funds.

The City of Hattiesburg recently approved by referendum a one (1) percent sales tax which will fund additional recreation opportunities. The slate of potential projects utilizing these funds includes external access to the city parks and potential internal pedestrian and bike improvements.

5.0 Public Transit

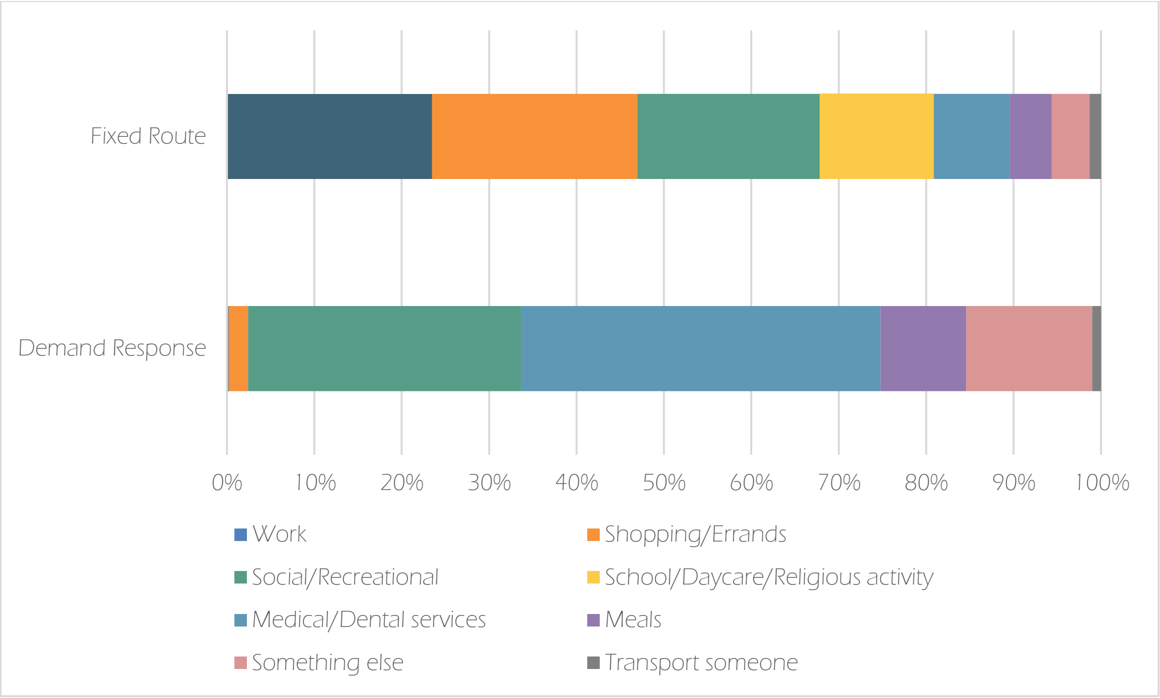
Public transit provides people with access to the places they need to go – work, school, grocery stores, medical facilities, and other destinations. For those that have no other choice, either because of economic or physical limitations, it is a lifeline service. For others, it reduces the burden of 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 metropolitan areas like the Hattiesburg area, public transit accounts for a small percentage of all trips– less than two 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, shopping, or social/recreational purposes. People using demand response services are overwhelmingly traveling for medical or social/recreational purposes. However, trip purpose patterns will ultimately depend on the availability of the service.

Figure 5.1: Trip Purposes for Transit Riders in Small Metro Areas



Note: Small Metro Area = under 250,000 residents
Source: 2017 National Household Travel Survey

5.1 Hub City Transit

Services Provided

The City of Hattiesburg, operating as Hub City Transit (HCT), provides fixed route bus service and complementary paratransit service within the City. Hub City Transit is the primary public transit provider in the Hattiesburg MPA.

Fixed Route (Bus) Service

Hub City Transit operates seven bus routes in the city Monday through Friday, from 6:00 a.m. until 6:30 p.m., excluding major holidays. Frequencies vary by route, ranging from every 15 minutes to every 50 minutes. Routes are timed to make transferring easy and all routes terminate at either the Hattiesburg Train Depot, University of Southern Mississippi, or Walmart at Hwy 49.

Figure 5.2 shows the current bus routes provided by Hub City Transit and Table 5.1 shows the frequencies of these routes.

Bus fares are 50 cents for regular riders, 25 cents for discounted riders, and free for riders with a Southern Miss or City of Hattiesburg ID.

Table 5.1: HCT Bus Routes and Frequencies

Route	Frequency
Green	Every 30 minutes
Blue	Every 30 minutes
Orange	Every 45 minutes
Brown	Every 45 minutes
Red	Every 40 minutes
Purple	Every 50 minutes
Gold	Every 15 minutes

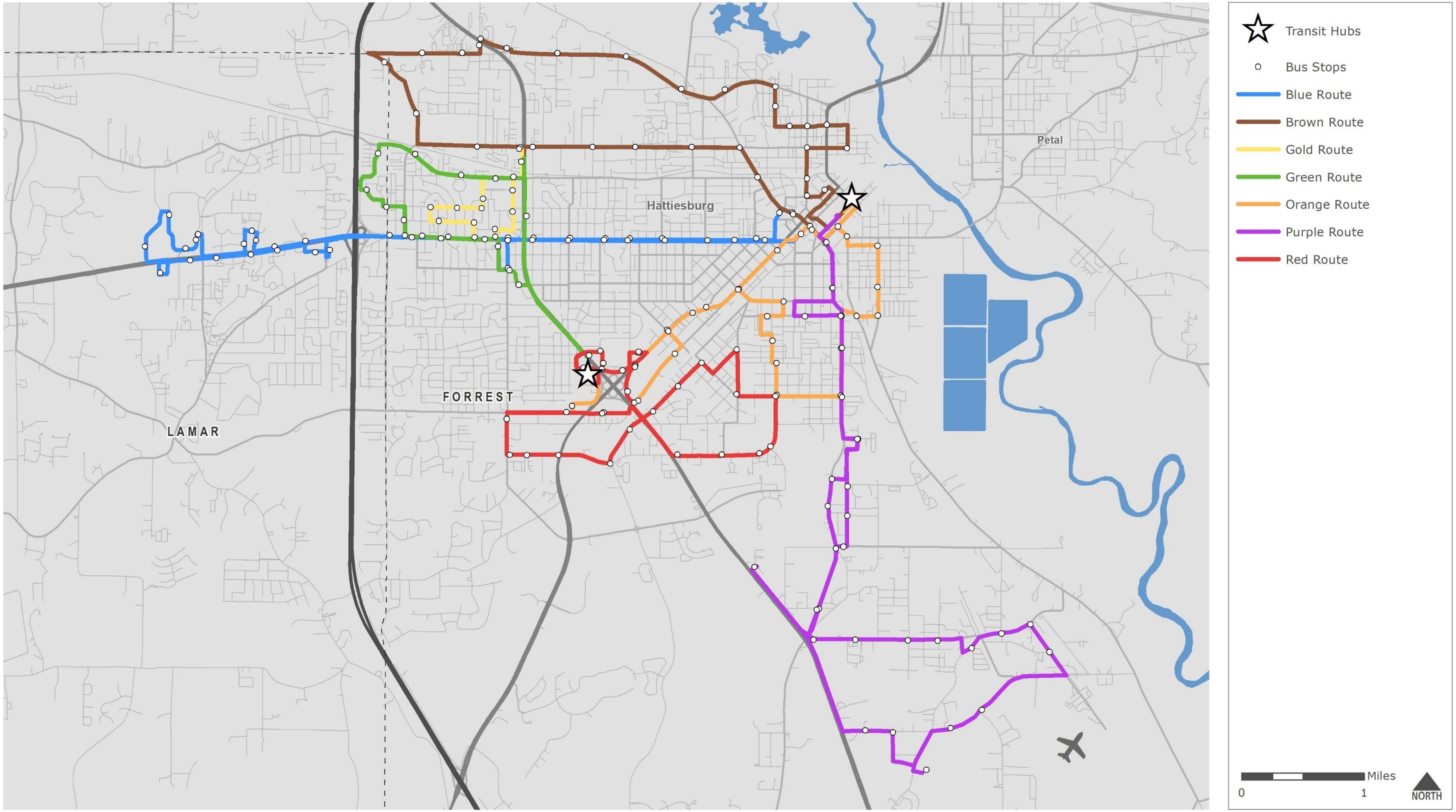
Source: City of Hattiesburg

Paratransit Service

For senior citizens and qualified individuals with mobility impairments that are unable to use the system's bus service, Hub City Transit provides paratransit service. This demand-responsive, advance reservation, address-to-address and door to door service is provided at the same time as fixed route bus service: Monday through Friday, from 6 a.m. to 6:30 p.m. Eligible passengers are not required to live within Hattiesburg City limits of the service area.

Fares for paratransit are the same as the fixed route bus fares.

Figure 5.2: Hub City Transit Fixed Route System



Data Sources: City of Hattiesburg

Disclaimer: This map is for planning purposes only.

Ridership Trends

In recent years, ridership for both the fixed route servie and paratransit service has declined. This mirrors the national trend of transit ridership decline, largely attributed to a strong economy and historically low automobile loan rates. However, preliminary data from 2019 indicates that HCT ridership has increased significantly after service improvements were made in July 2018 - including the introduction of the Gold Route and Green Route around the University of Southern Mississippi.

The Gold Route, which serves as a circulator shuttle on the main campus of the University of Southern Mississippi, accounts for approximately half of all Hub City Transit ridership. The Blue Route, serving the Hardy Street corridor, has the next highest ridership. Paratransit service accounts for about 25 trips per day.

Ridership varies greatly by month - peaking in the fall and spring semesters and bottoming out in the summer and winter months. This is largely driven by the high ridership of the USM-serving Gold Route.

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

Mode	2014	2015	2016	2017	2018
Fixed Route	90,759	90,913	93,516	77,741	74,616
Paratransit	9,047	7,998	8,218	5,382	6,448
Total	99,806	98,911	101,734	83,123	81,064

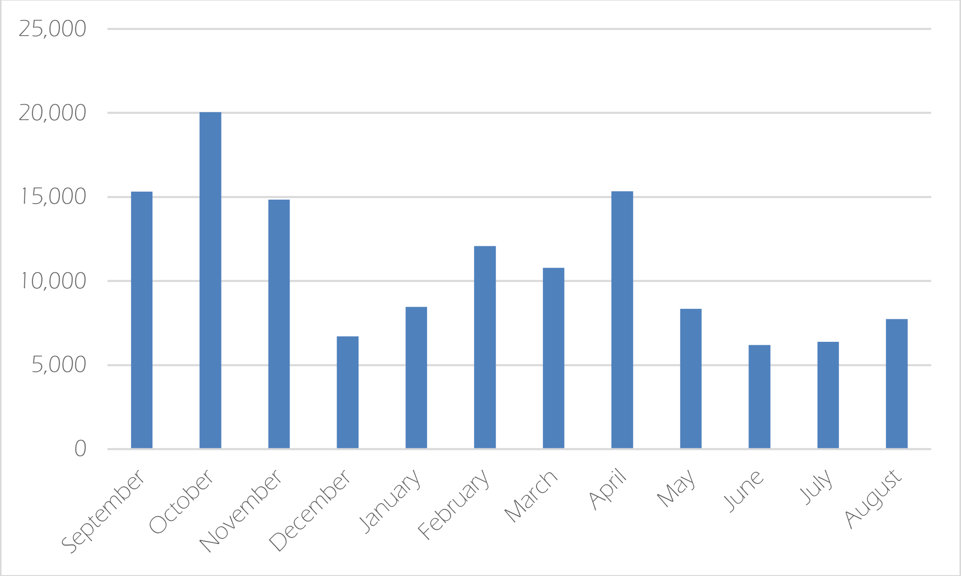
Source: National Transit Database

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

Route/Service	Average Daily Ridership
Green Route	27
Blue Route	81
Orange Route	44
Brown Route	45
Red Route	26
Purple Route	20
Gold Route	265
Paratransit	24
TOTAL	**531**

Note: Average Daily Ridership based on service days and holidays listed in HCT passenger guide
Source: City of Hattiesburg

Figure 5.3: Recent HCT Ridership by Month



Source: City of Hattiesburg, from September 2018 to August 2019

Operating Trends

The fixed route service expansion in July 2018 increased the number of vehicles operated in peak service from 4 to 7 and has drastically increased vehicle revenue hours and miles. Because this is a recent change, its impact will not be accurately captured in the operating statistics until 2019 National Transit Database statistics are compiled.

While the paratransit system has not expanded, its operating statistics have been more volatile from 2014 to 2018, especially in terms of ridership. However, the system was about as cost effective in 2018 as it was in 2014.

Table 5.4: HCT Fixed Route Trends, 2014-2018

Indicator	2014	2015	2016	2017	2018	Change (2014-2018)	Trend
General System Statistics							
Urbanized Area Population	80,461	80,461	80,461	80,461	80,461	0.0%	--
Urbanized Area Square Miles	70	70	70	70	70	0.0%	--
Urbanized Area Population Density	1,142.8	1,142.8	1,142.8	1,142.8	1,142.8	0.0%	--
Vehicles Operated in Maximum Service	4	4	4	4	7	75.0%	▲
Vehicle Revenue Miles	165,302	177,930	179,560	171,061	260,085	57.3%	▲
Vehicle Revenue Hours	10,956	10,912	10,000	10,780	13,369	22.0%	▲
Boardings	90,759	90,913	93,516	77,741	74,616	-17.8%	▼
Annual Operating Expense	$910,963	$909,986	$1,062,649	$1,140,480	$1,313,760	44.2%	▲
Level of Service							
Vehicle Revenue Miles per Capita	2.1	2.2	2.2	2.1	3.2	57.3%	▲
Vehicle Revenue Hours per Capita	0.1	0.1	0.1	0.1	0.2	22.0%	▲
Productivity							
Boardings per Revenue Mile	0.5	0.5	0.5	0.5	0.3	-47.7%	▼
Boardings per Revenue Hour	8.3	8.3	9.4	7.2	5.6	-32.6%	▼
Boardings per Capita	1.1	1.1	1.2	1.0	0.9	-17.8%	▼
Cost Efficiency							
Operating Expense per Vehicle Revenue Mile	$5.51	$5.11	$5.92	$6.67	$5.05	-8.3%	▼
Operating Expense per Vehicle Revenue Hour	$83.15	$83.39	$106.26	$105.80	$98.27	18.2%	▲
Operating Expense per Boarding	$10.04	$10.01	$11.36	$14.67	$17.61	75.4%	▲

Source: National Transit Database

Table 5.5: HCT Paratransit Trends, 2014-2018

Indicator	2014	2015	2016	2017	2018	Change (2014-2018)	Trend
General System Statistics							
Urbanized Area Population	80,461	80,461	80,461	80,461	80,461	0.0%	--
Urbanized Area Square Miles	70	70	70	70	70	0.0%	--
Urbanized Area Population Density	1,142.8	1,142.8	1,142.8	1,142.8	1,142.8	0.0%	--
Vehicles Operated in Maximum Service	3	3	3	3	3	0.0%	--
Vehicle Revenue Miles	62,550	58,290	54,576	35,977	47,860	-23.5%	▼
Vehicle Revenue Hours	5,976	5,952	3,263	2,856	4,223	-29.3%	▼
Boardings	9,047	7,998	8,218	5,382	6,448	-28.7%	▼
Annual Operating Expense	$337,698	$292,724	$241,418	$227,186	$235,272	-30.3%	▼
Level of Service							
Vehicle Revenue Miles per Capita	0.8	0.7	0.7	0.4	0.6	-23.5%	▼
Vehicle Revenue Hours per Capita	0.1	0.1	0.0	0.0	0.1	-29.3%	▼
Productivity							
Boardings per Revenue Mile	0.1	0.1	0.2	0.1	0.1	-6.9%	--
Boardings per Revenue Hour	1.5	1.3	2.5	1.9	1.5	0.9%	--
Boardings per Capita	0.1	0.1	0.1	0.1	0.1	-28.7%	--
Cost Efficiency							
Operating Expense per Vehicle Revenue Mile	$5.40	$5.02	$4.42	$6.31	$4.92	-8.9%	▼
Operating Expense per Vehicle Revenue Hour	$56.51	$49.18	$73.99	$79.55	$55.71	-1.4%	--
Operating Expense per Boarding	$37.33	$36.60	$29.38	$42.21	$36.49	-2.2%	--

Source: National Transit Database

Safety and Security Trends

As a recipient of federal transportation funds, Hub City Transit (HCT) 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 5.6 shows HCT'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 HCT has a low prevalence of safety and security events over the last five years, its only reportable incident resulted in a fatality.

Table 5.6: HCT Safety and Security Events, 2014-2018

	2014	2015	2016	2017	2018	Total
All Events	0	1	0	0	0	1
Fatalities	0	1	0	0	0	1
Injuries	0	0	0	0	0	0

Source: National Transit Database

Table 5.7: Safety and Security Events per 100,000 Vehicle Revenue Miles, 2014-2018

	Hub City Transit	Mississippi Urbanized Area Providers	U.S. Urbanized Area Providers
All Events	0.08	0.22	0.21
Fatalities	0.08	0.01	0.01
Injuries	0.00	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. Hub City Transit (HCT) submits this information and recently participated in a group TAM plan with MDOT and other transit agencies in Mississippi.

Federal TAM regulations require transit agencies to address the four asset categories shown in Table 5.8, as applicable to the agency. However, for HCT, only the rolling stock, equipment, and facilities asset categories are applicable.

As of 2018, HCT had 17 vehicles in its rolling stock fleet (see Table 5.9). This fleet consists of five different types of vehicles, though all are some type of bus or van. During the development of their TAM Plan, MDOT and the group of transit providers throughout the state set performance targets for each vehicle type. For rolling stock and equipment, this performance measure is simply the percentage of vehicles whose age exceeds the Useful Life Benchmark (ULB) established by the group. 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 5.9 and 5.10, in 2018, HCT did not meet performance targets for asset categories for its rolling stock or equipment. However, its only facility, the Hattiesburg Train Depot, is in adequate condition based on the TERM scale, meeting the performance target.

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 5.8: Transit Asset Management Performance Measures

Asset Category	FTA established Performance Measure	Reported by HCT
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 5.9: HCT Rolling Stock Inventory and Performance

Vehicle Type	Total	ULB (years)	% Exceeding ULB	Target	Status
Bus	2	5	100%	20%	Target Not Met
Trolleybus	1	5	100%	20%	Target Not Met
Cutaway Bus	11	5	73%	20%	Target Not Met
Van	1	5	100%	20%	Target Not Met
Mini-van	2	5	50%	20%	Target Not Met
Overall	17	n/a	76%	n/a	n/a

Source: MDOT Group Public Transit Asset Management Plan, 2018

Table 5.10: HCT Equipment Inventory and Performance

Vehicle Type	Total	ULB (years)	% Exceeding ULB	Target	Status
Service Vehicle	3	5	33%	20%	Target Not Met
Custom 3	2	5	50%	20%	Target Not Met
Overall	5	n/a	40%	n/a	n/a

Source: MDOT Group Public Transit Asset Management Plan, 2018

Table 5.11: HCT Facility Inventory and Performance

Asset Category	Facility	TERM Scale Rating	% Under 3.0 on TERM Scale	Target	Status
Passenger Facility	Hattiesburg Train Depot	3.0	0%	20%	Target Met

Source: MDOT Group Public 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 Hattiesburg versus the service area of a particular agency.

Peer Selection Criteria

Selection criteria were utilized that were intended to highlight urban areas that are very similar to the Hattiesburg, 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 Hattiesburg in these regards, we can highlight areas that 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; population density; high low-income population; and influence of higher education, retirees, and military. The selection methodology is further outlined on the following pages.

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 20,000 and 140,807. That population corresponds to an urbanized area with a 2017 population within 75% of the Hattiesburg, MS urbanized area.

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.

Population Density

Urbanized areas were then selected that fell within 25% of Hattiesburg's population density (number of people per square mile of the urbanized area. Levels of sprawl or dense populations can affect the efficiency of transit, making this an important criterion for peers.

High Low-Income Population

Urbanized areas with a percentage of all households receiving food stamps that was significantly different from that of the Hattiesburg, MS urbanized area were excluded. Significant was defines as within 25% of the Hattiesburg, MS urbanized area percentage.

Similar Influence of Higher Education, Military, and Retirement Communities

As the home of the University of Southern Mississippi, Hattiesburg, MS contains a large population of college and graduate students. Urbanized areas were removed with a percentage of its population in college or graduate school significantly different than Hattiesburg, MS. Significantly different was defined as within 60% of the Hattiesburg, MS urbanized area percentage. This eliminated Rome, GA and Lake Charles, LA. Within this range, however, Hattiesburg, MS still has a significantly higher college population. The five remaining areas were within 30% of the percentage of population aged 65 or above as the Hattiesburg, MS urbanized area. None of these five areas had a major military presence.

Table 5.12 shows the demographics and urban sprawl index of these five selected peer areas.

Table 5.12: 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)
Hattiesburg, MS	80,461	1,166	16	11	19
Peer Average	82,912	1,383	9	14	19
Alexandria, LA	84,567	1,291	7	14	22
Cleveland, TN	69,929	1,281	11	15	18
Jackson, TN	72,101	1,411	9	14	21
Jonesboro, AR	70,458	1,499	11	12	16
Monroe, LA	117,503	1,435	7	14	20

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 5.13: Selected Peer Regions

Region	Urban Fixed Route Systems
Alexandria, LA	City of Alexandria (Atrans)
Cleveland, TN	Cleveland Urban Area Transit System (CUATS)
Jackson, TN	Jackson Transit Authority (JTA)
Jonesboro, AR	City of Jonesboro (JETS)
Monroe, LA	City of Monroe (MTS)
Hattiesburg, MS	City of Hattiesburg (HCT)

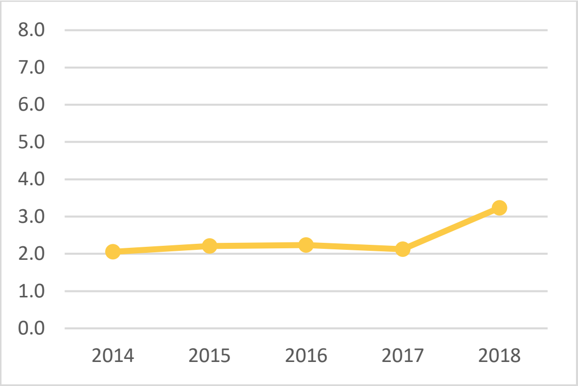
Table 5.14: Peer Fixed Route System Trends, 2018

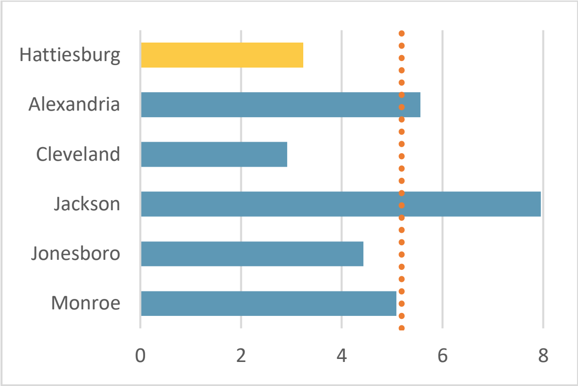
Indicator	Alexandria	Cleveland	Jackson	Jonesboro	Monroe	Peer Average	Hattiesburg
General System Statistics							
Urbanized Area Population	84,567	69,929	72,101	70,458	117,503	82,912	80,461
Urbanized Area Square Miles	66	55	51	47	84	61	70
Urbanized Area Population Density	1,285	1,281	1,407	1,492	1,401	1,373	1,143
Vehicles Operated in Maximum Service	8	7	9	8	13	9	7
Vehicle Revenue Miles	470,525	203,820	573,424	312,196	597,147	431,422	260,085
Vehicle Revenue Hours	33,825	18,003	40,102	17,069	39,217	29,643	13,369
Boardings	560,798	119,772	433,653	124,182	921,372	431,955	74,616
Annual Operating Expense	$2,536,457	$585,330	$2,271,390	$856,484	$4,759,061	$2,201,744	$1,313,760
Level of Service							
Vehicle Revenue Miles per Capita	5.6	2.9	8.0	4.4	5.1	5.2	3.2
Vehicle Revenue Hours per Capita	0.4	0.3	0.6	0.2	0.3	0.4	0.2
Productivity							
Boardings per Revenue Mile	1.2	0.6	0.8	0.4	1.5	0.9	0.3
Boardings per Revenue Hour	16.6	6.7	10.8	7.3	23.5	13.0	5.6
Boardings per Capita	6.6	1.7	6.0	1.8	7.8	4.8	0.9
Cost Efficiency							
Operating Expense per Vehicle Revenue Mile	$5.39	$2.87	$3.96	$2.74	$7.97	$4.59	$5.05
Operating Expense per Vehicle Revenue	$74.99	$32.51	$56.64	$50.18	$121.35	$67.13	$98.27
Operating Expense per Boarding	$4.52	$4.89	$5.24	$6.90	$5.17	$5.34	$17.61

Source: National Transit Database

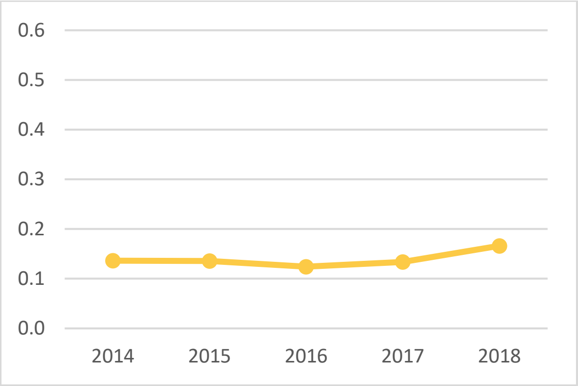
Level of Service Indicators

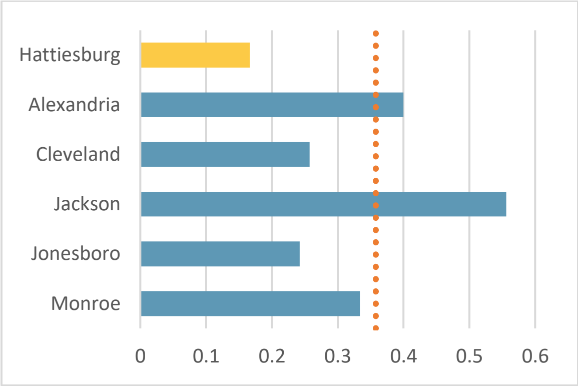
Vehicle Revenue Miles per Capita





Vehicle Revenue Hours per Capita

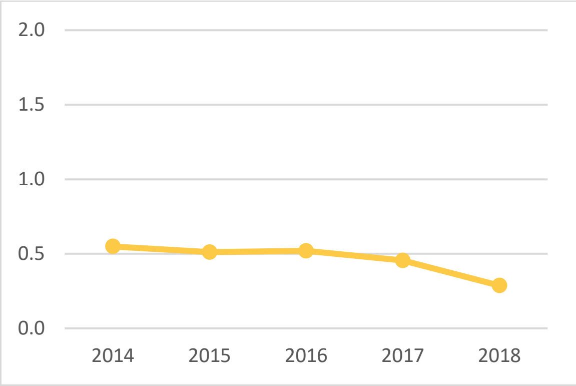


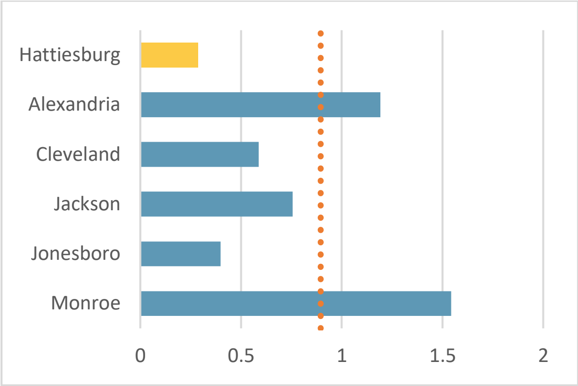


Peer Average

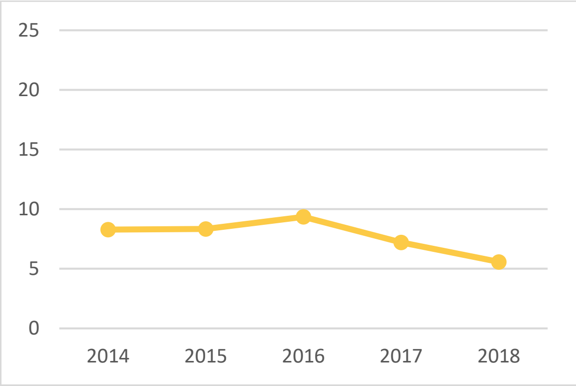
Productivity Indicators

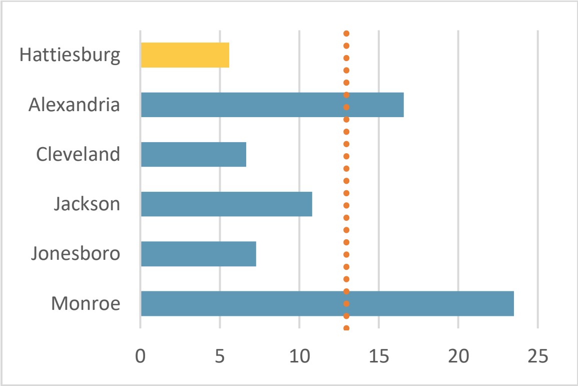
Boardings per Revenue Mile



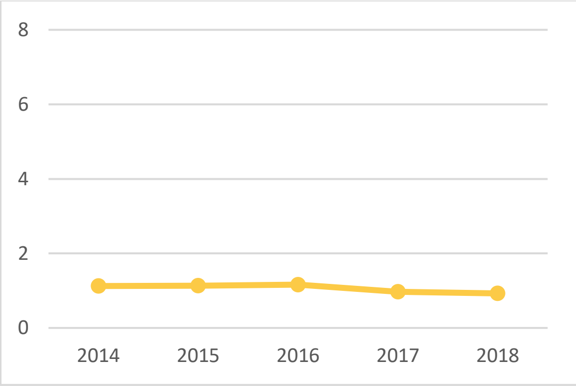


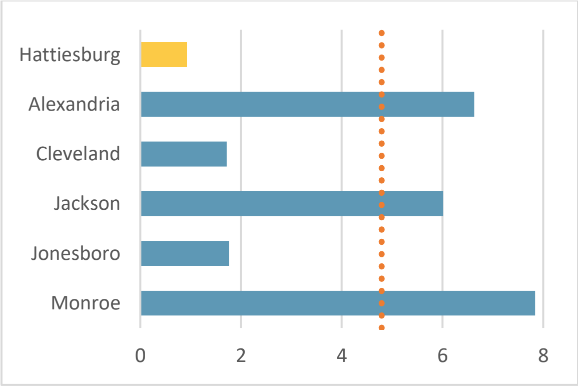
Boardings per Revenue Hour





Boardings per Capita

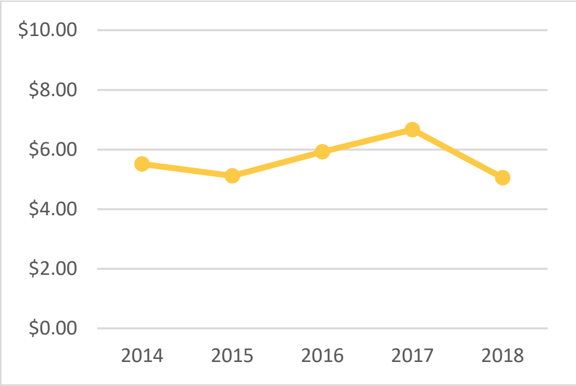


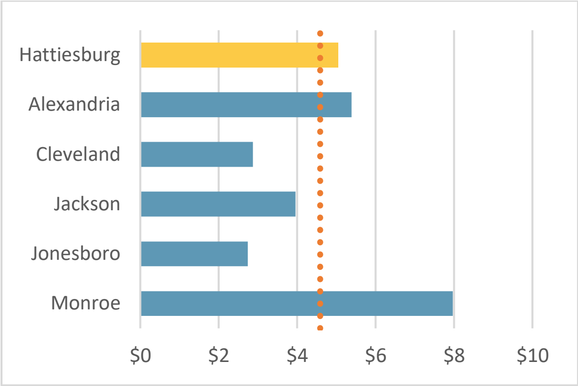


••• Peer Average

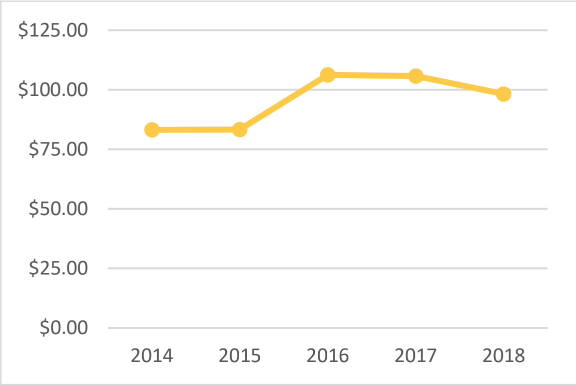
Cost Efficiency Indicators

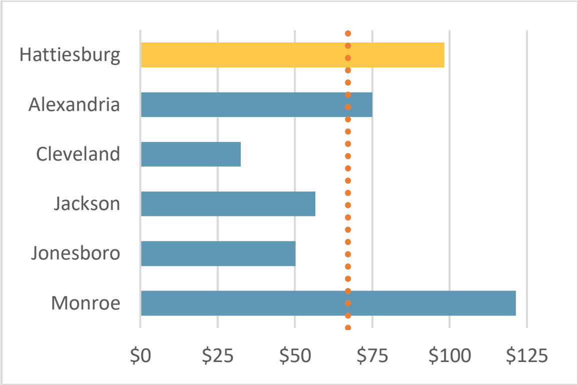
Operating Expense per Vehicle Revenue Mile



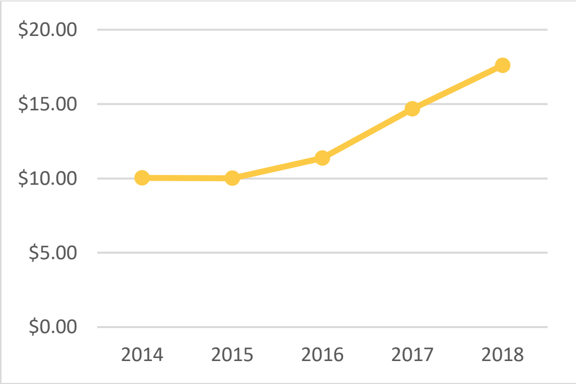


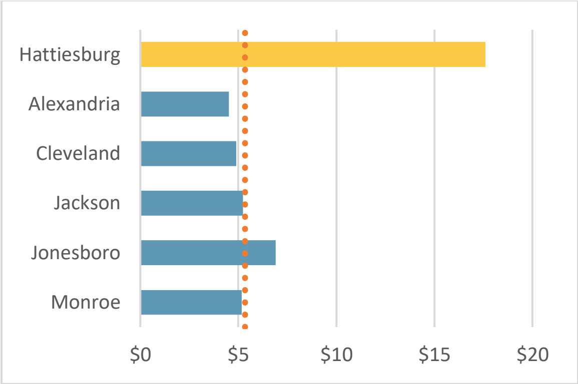
Operating Expense per Vehicle Revenue Hour





Operating Expense per Passenger Trip





Peer Average

Peer Comparison Analysis

Table 5.14 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
  - Hub City Transit 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, Hub City Transit is the least productive of its peers.
- Cost Efficiency
  - Hub City Transit is less cost-efficient than most of its peers and is similar in this regard to Alexandria and Monroe.
  - Due to low productivity, its cost per passenger trip vastly exceeds any of its peers.

Overall, when compared to the selected peer regions, Hub City Transit provides much more limited transit service, is considerably less productive in attracting riders, and is more expensive to operate.

A major caveat of this analysis is that Hub City Transit expanded in the summer of 2018, with most service improvements occurring near the University of Southern Mississippi. Future data will likely indicate major improvement compared to peers.

5.2 Other Local Public Transit Providers

While no other local public transit providers regularly operate within the Metropolitan Planning Area, there are many local public transit providers throughout Southern Mississippi. Hub City Transit coordinates directly with these other providers through the Southern Connect group, one of six regional groups in Mississippi for local coordinated transit planning.

The Southern Connect groups works together to assess regional transportation needs, identify transportation gaps, and develop alternatives and recommendations to address unmet needs and gaps.

5.3 Intercity Public Transit

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

Amtrak – provides daily intercity rail service at the Hattiesburg Train Deport via the Crescent line from New Orleans to New York City and stations in between. Fares vary depending upon accommodations and travel itinerary. For more information, go to www.amtrak.com

Greyhound – provides intercity bus service at a curbside stop on Campbell Loop near the interstate. This service is provided through a partner carrier and provides connections to Jackson, the Gulf Coast, and beyond. Fares vary depending upon accommodations and travel itinerary. For more information, go to www.greyhound.com

5.4 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 Hattiesburg 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.

5.5 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 Hattiesburg 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 5.15 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 5.4 illustrates the results of this analysis and the distribution of transit demand throughout the region.

Based upon Figure 5.4, there are several areas within the Hattiesburg MPA that support fixed route service with frequencies of 60 minutes or better and most of these areas are already served by HCT routes. The area with the greatest demand is along Hardy Street from the University of Southern Mississippi/Forrest General Hospital to the area around Turtle Creek Mall. Other areas of high demand are the area of US 49 near the interstate, the area around William Carey University, the Cloverleaf area, Downtown Hattiesburg, and historic neighborhoods around Downtown Hattiesburg.

Table 5.15: 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.

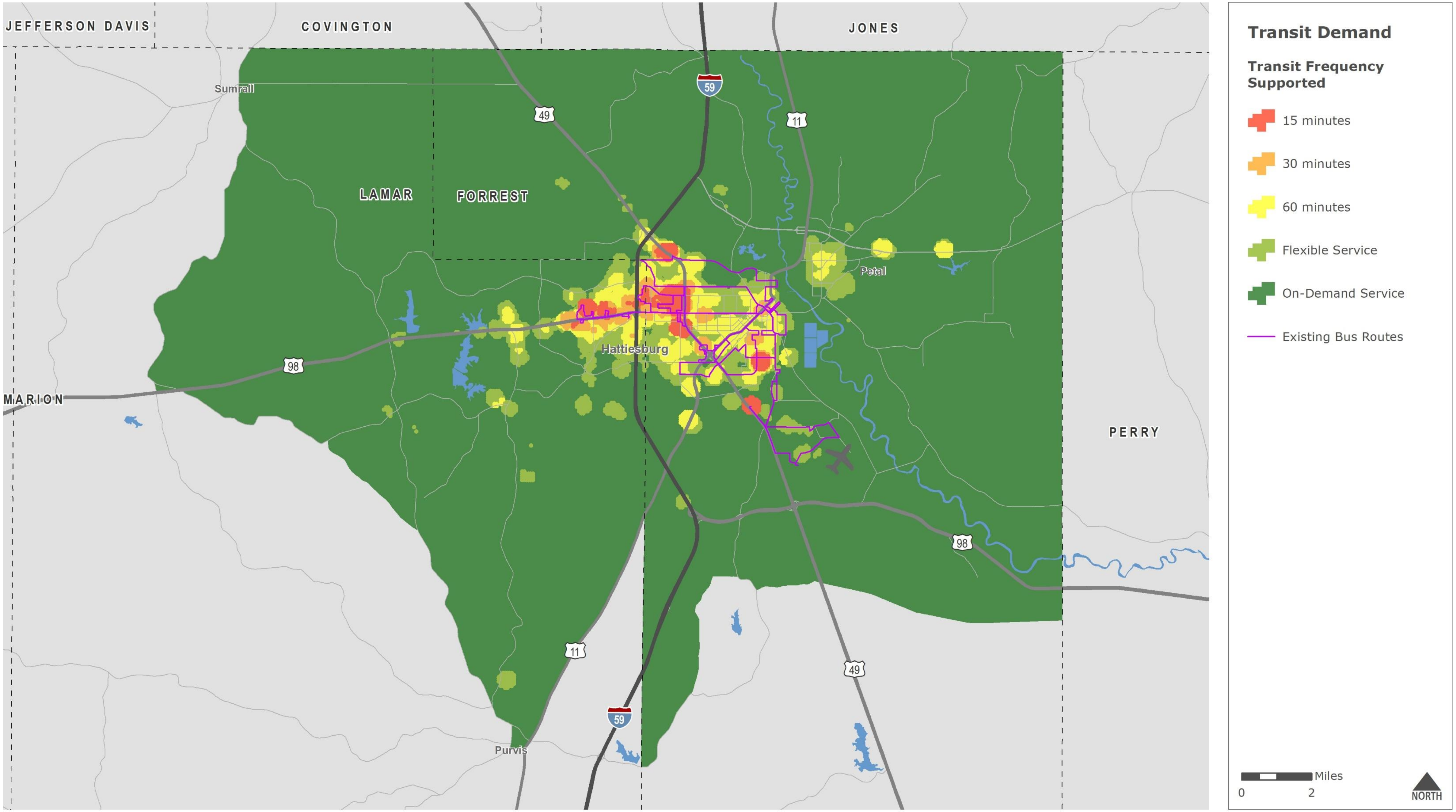
Figure 5.5 illustrates the concentration of households without regular access to a vehicle. The highest concentration is south and southwest of Downtown Hattiesburg, along Hall Avenue and Martin Luther King Avenue. There is also a small concentration near the University of Southern Mississippi.

Figure 5.6 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 also includes areas just north of Downtown Hattiesburg.

Figure 5.7 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, mostly around the University of Southern Mississippi and along Hall Avenue and Martin Luther King Avenue. However, the historic neighborhoods of Hattiesburg also have high rates of households including people with disabilities.

Figure 5.8 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 in the historic and older neighborhoods of Hattiesburg, especially south of Hardy Street.

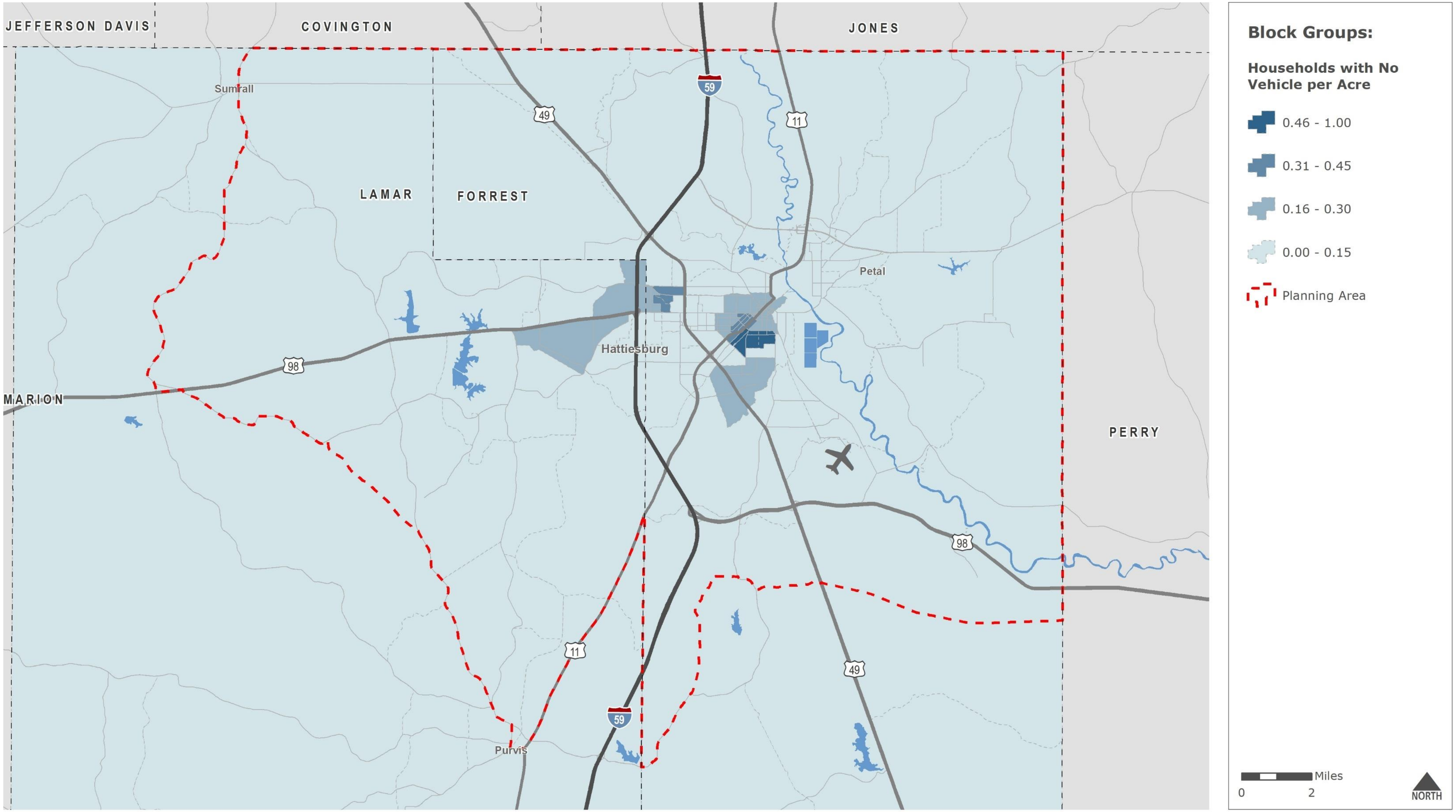
Figure 5.4: Regional Transit Demand Analysis



Data Sources: Neel-Schaffer

Disclaimer: This map is for planning purposes only.

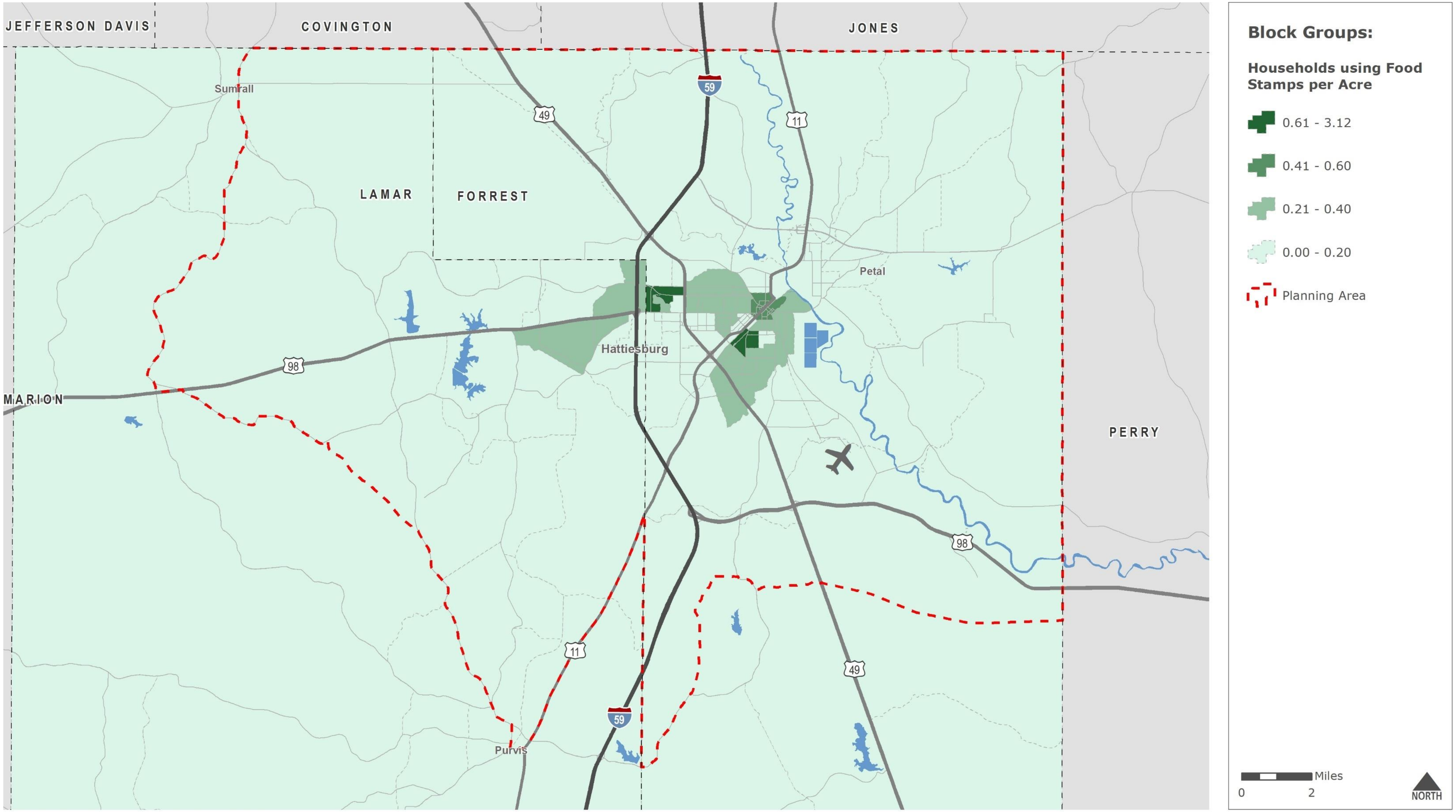
Figure 5.5: Concentration of Households with No Vehicle



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

Disclaimer: This map is for planning purposes only.

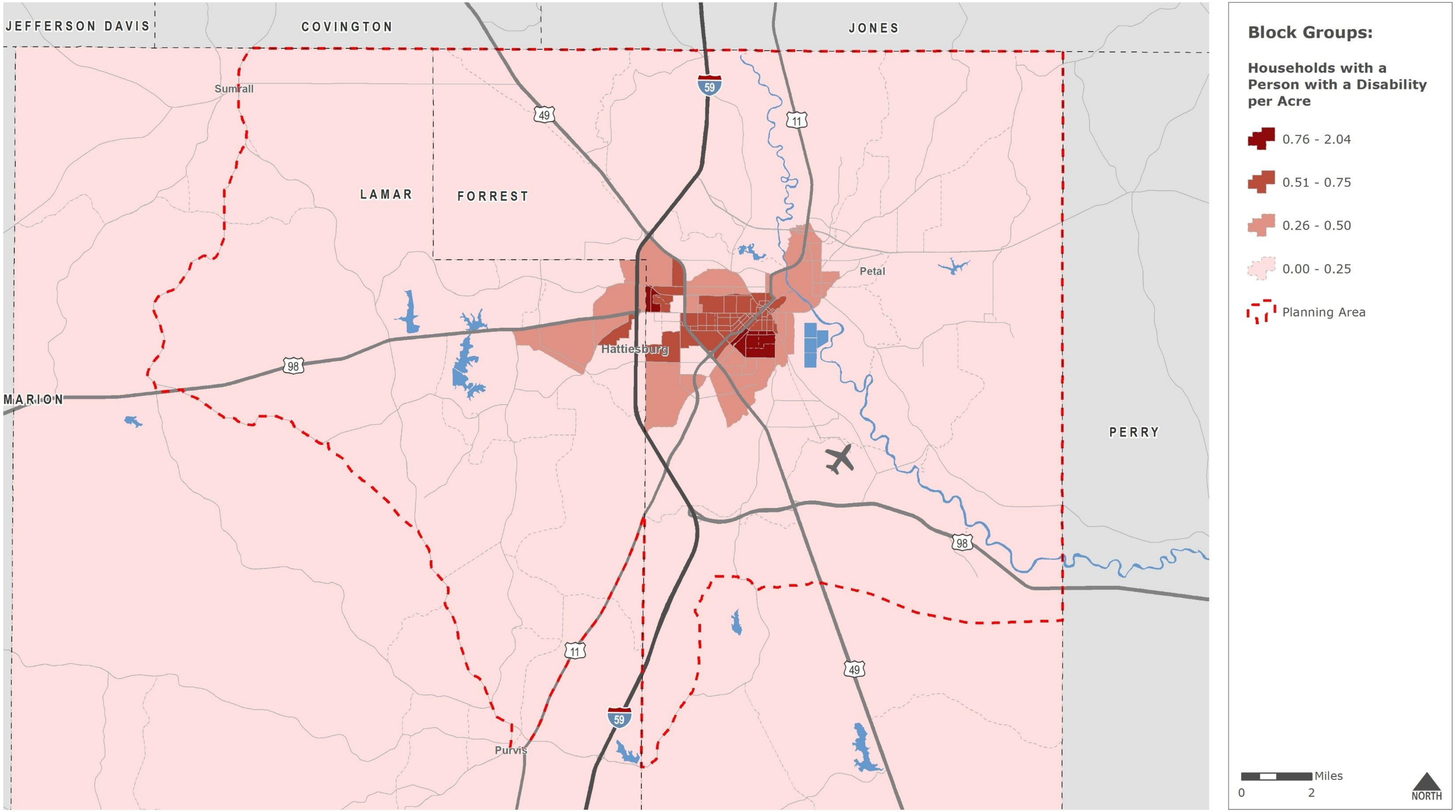
Figure 5.6: Concentration of Low-Income Households



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

Disclaimer: This map is for planning purposes only.

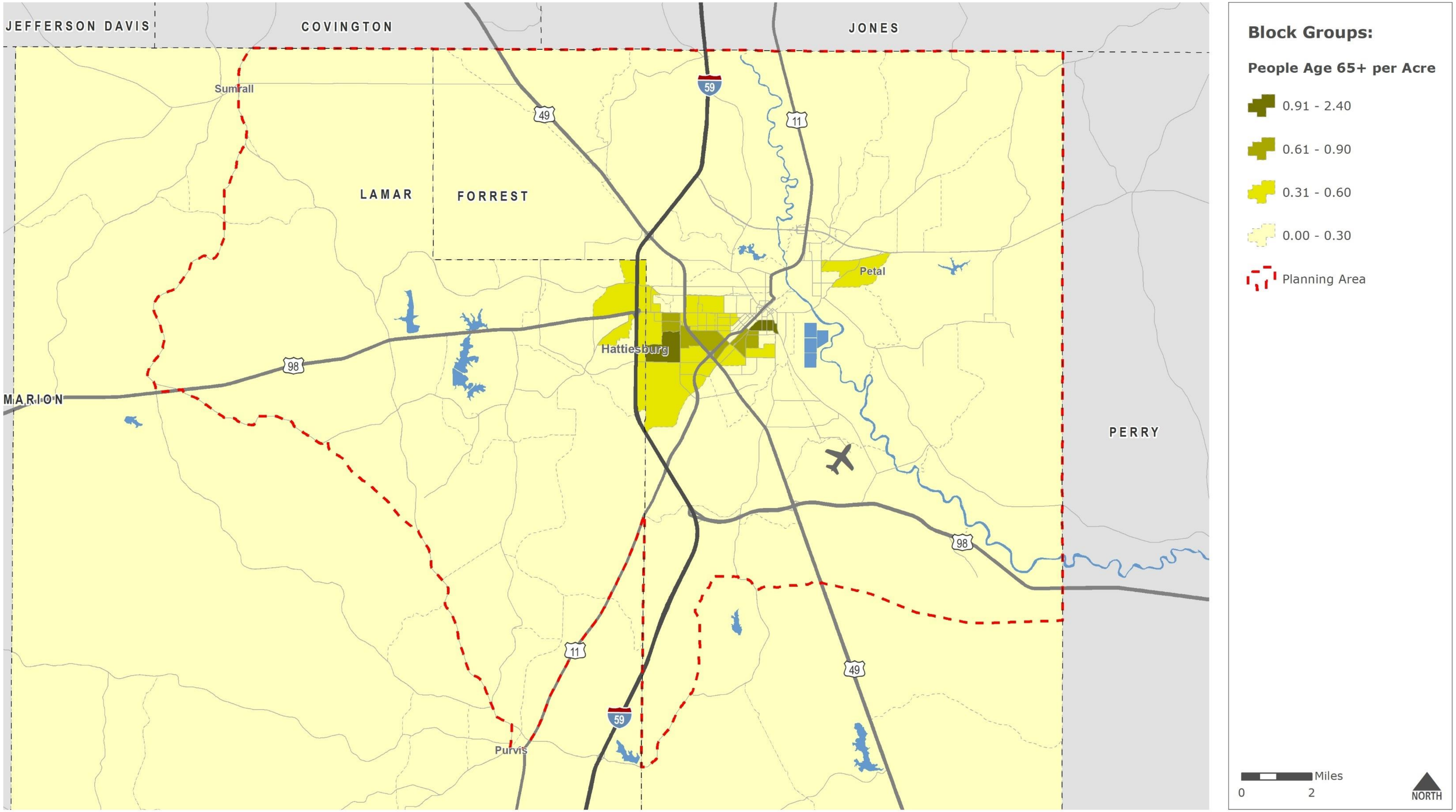
Figure 5.7: Concentrations of People with Disabilities



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

Disclaimer: This map is for planning purposes only.

Figure 5.8: Concentrations of Senior Population



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

Disclaimer: This map is for planning purposes only.