Gulf Regional Planning Commission

2050 Metropolitan Transporation Plan | GRPC MPO

Technical Report #6

DRAFT - Congestion Management Process

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Gulf Regional Planning Commission

2050 Metropolitan Transportation Plan

This Plan was prepared as a cooperative effort of the U.S. Department of Transportation (USDOT), Federal Highway Administration (FHWA), Federal Transit Administration (FTA), Mississippi Department of Transportation (MDOT), and local governments in partial fulfillment of requirements in Title 23 USC 134 and 135, amended by the IIJA, Sections 11201 and 11525, October 1, 2021. The contents of this document do not necessarily reflect the official views or policies of the USDOT.

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1.0 Introduction

1.1 Foreword/Background

A Congestion Management Process (CMP) is an analytical process that measures the operational effectiveness of major transportation facilities located within a Transportation Management Area (TMA), an urban area with a population greater than 200,000 people. A CMP proposes strategies required to address congested areas identified within a Transportation Management Area.

The Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA) required each Transportation Management Area to develop a Congestion Management System (CMS). Subsequent legislation has continued this requirement, and the CMS became the CMP with the 2005 SAFETEA-LU legislation and has been included as part of the 2021 Infrastructure Investment and Jobs Act (IIJA).

The CMP has been intended to be an on-going process, fully integrated into the metropolitan transportation planning process[1]. The most recent CMP effort for the Gulf Coast Metropolitan Area was conducted in 2020 in support of the CMPDD 2045 Metropolitan Transportation Plan (MTP) to:

- Analyze the Gulf Coast Metropolitan Planning Area's (MPA's) transportation system.
- Determine which areas experience the greatest mobility and maneuverability issues associated with traffic congestion.
- Identify a wide range of congestion reduction strategies and projects that, if implemented, can aid in improving free flow traffic conditions.

The updated CMP is being conducted in support of the GRPC 2050 MTP.

1.2 Defining Congestion

Congestion is defined as the delay compared to normal free-flow traffic conditions on major transportation systems that impedes traffic mobility and maneuverability.

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[1] https://www.fhwa.dot.gov/planning/congestion_management_process/cmp_guidebook/cmpguidebk.pdf

Traffic Congestion has several negative side effects, including:

Increase in transportation costs

Increased fuel consumption

Loss work productivity

Contributes to air pollution, negatively impacting health and environment

A CMP is an effective tool that assists in the management of new and existing transportation facilities. It does so by using travel demand reduction and supply management strategies that promote traffic mobility and accessibility in the region.

1.3 Federal Guidance/Federal Legislation

Federal legislation that guides CMP is detailed below.

Section 450.322 (a) of Subpart C (Metropolitan Transportation Planning and Programming), 23 CFR (Final Rule)

- The transportation planning process in a Transportation Management Area (TMA) shall address congestion management through a process that provides for safe and effective integrated management and operation of the multimodal transportation system, based on a cooperatively developed and implemented metropolitan-wide strategy, of new and existing transportation facilities eligible for funding under title 23 U.S.C. and title 49 U.S.C. Chapter 53 through the use of travel demand reduction (Including Intercity bus operators, employer-based commuting programs such as a carpool program, vanpool program, transit benefit program, parking cash-out program, shuttle program, or telework program), job access projects and operational management strategies.

1.4 Causes and Types of Congestion

Within urban areas across the United States, people are migrating from the core areas to the "outer rings" and suburbs. This out-migration trend has placed a strain on the existing infrastructure and affects other public facilities including transit, rental cars, bicycle lanes, and taxis.

The Gulf Coast region is the second largest metropolitan area in Mississippi. Situated on the Mississippi Gulf Coast, the MPA encompasses Hancock, Harrison, and Jackson Counties and is situated along the I-10 and US 49 corridors.

- The I-10 corridor connects west to New Orleans, Louisiana and Houston, Texas; and east to Mobile, Alabama and Jacksonville, Florida.
- The US 49 corridor connects north to Jackson, Mississippi.

The planning area's location along these corridors results in additional through traffic as travelers move between metropolitan areas. These additional trips lead to increased traffic not only on I-10 and US 49, but also on US 90, MS 53, MS 57, and MS 63.

Congestion can generally be classified as either recurring or non-recurring, as summarized below. The sources of congestion, based on a Federal Highway Administration (FHWA) summary, are shown in **Figure 1.1**.

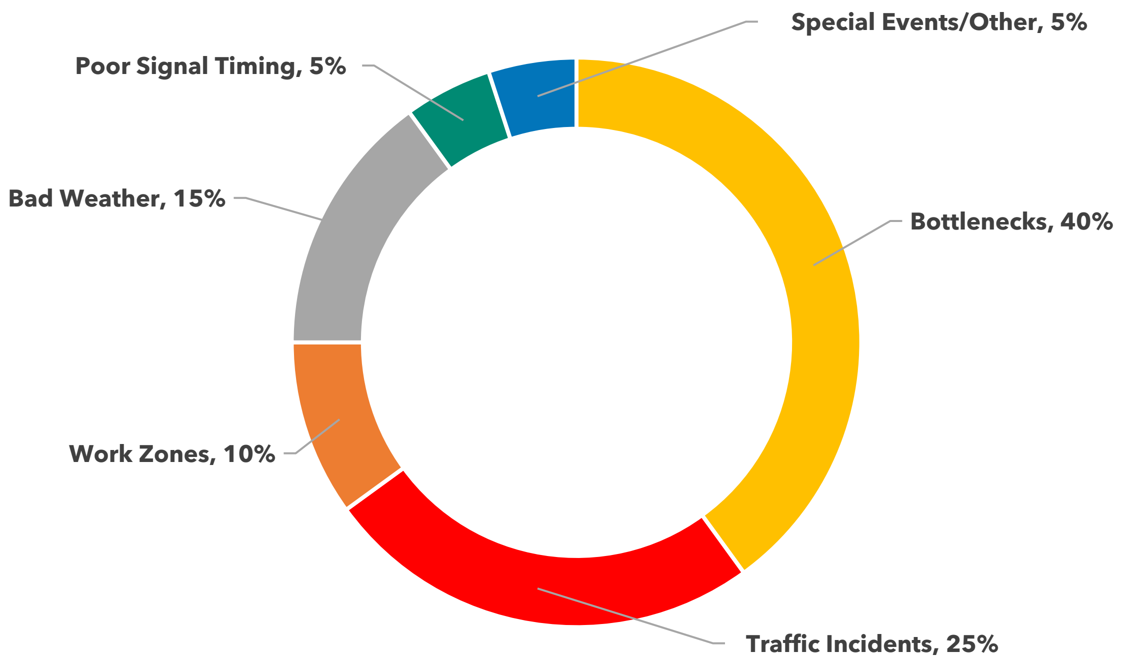
Recurring Congestion

- Recurring congestion is regularly occurring traffic congestion that happens at the same time every day during peak hours. This congestion occurs due to traffic demand exceeding roadway capacity.

Non-Recurring Congestion

- Non-recurring congestion occurs due to accidents, adverse weather, special events, work zones, and other factors that do not follow a predictable pattern. As such, non-recurring congestion is caused by non-standard or random events.

Figure 1.1: The Sources of Congestion – National Summary



Source: Figure ES.2 *The Sources of Congestion National Summary*
https://ops.fhwa.dot.gov/congestion_report/executive_summary.htm

As noted in FHWA's CMP Guidebook, there are four major dimensions of congestion, which can be influenced by several spatial and temporal factors. These factors are:

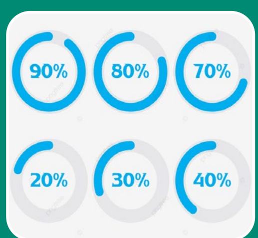
- Intensity,
- Duration,
- Extent, and
- Variability.

Intensity

- The relative severity of congestion that affects travel. Intensity has traditionally been measured through indicators such as V/C ratios or LOS measures that consistently relate the different levels of congestion experienced on roadways.

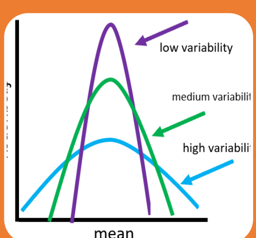
Duration

- The amount of time the congested conditions persist before returning to an uncongested state.



Extent

- The number of system users or components (e.g. vehicles, pedestrians, transit routes, lane miles) affected by congestion. For example, the proportion of system network components (roads, bus lines, etc.) that exceed a defined performance measure target.



Variability

- The changes in congestion that occur on different days or at different times of day. When congestion is highly variable due to non-recurring conditions, such as a roadway with a high number of traffic accidents causing delays, this has an impact on the reliability of the system.

1.5 Previous Congestion Management Strategies

Across the nation, there is a push to reduce Single Occupancy Vehicle (SOV) travel to reduce congestion. These efforts were guided by proposed alternative travel methods and travel demand strategies, such as carpooling/vanpooling and transit park-and-ride facilities. However, motorists preferred the convenience that SOVs provide, and the strategies proved ineffective. According to the Census Bureau, the percentage of workers along the Mississippi Gulf Coast that drove to work alone increased from 80 percent in 2010 to 85 percent in 2019[2,3].

The most recent CMP was adopted in 2020 in support of the GRPC 2045 MTP. The 2045 CMP, located within GRPC's 2045 MTP, considered a corridor to be congested if the segment's Index Rating was eight or greater out of a maximum possible score of sixteen.

The region's 2045 CMP identified **29** recurring congested segments covering **18** centerline miles of the CMP network.

The 2045 CMP also identified strategies to alleviate congestion on the identified corridors. These strategies were grouped into the following categories:

- Travel Demand Management
- Supply Management
- Land Use Management

The strategies for each category, and their objectives, from the 2045 CMP are shown in **Appendix A**.

1.6 Multimodal Mobility

The traditional understanding of congestion has been focused largely, if not solely, on automobiles. Typically, the standard solution for congestion reduction has been increasing roadway capacity (i.e. "building our way out of congestion"). However, this solution usually induces increased automobile travel, which may worsen the level of congestion that existed before the capacity expansion. By understanding congestion from a multimodal perspective, all modes can be considered potential sources and remedies for congestion. Several studies have indicated that transit[4], walking, and bicycling[5,6] can be tools to relieve automobile congestion.

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[2] https://data.census.gov/table/ACSDT5Y2010.B08101?q=B08101&g=310XX00US25060

[3] https://data.census.gov/table/ACSDT5Y2019.B08101?q=B08101&g=310XX00US25060

[4] Nakamura, K., Hayashi, Y. (2013). Strategies and instruments for low-carbon urban transport: An international review on trends and effects. Transport Policy. 29, pp. 264–274

[5] Litman, T. (2014). Congestion Evaluation Best Practices. In: International Transportation Economic Development Conference. Sheraton Dallas Hotel, Dallas, USA. Apr. 09-11, 2014. pp. 1–20.

[6] Litman, T. (2018). Smart Congestion Relief - Comprehensive Evaluation of Traffic Congestion Costs and Congestion Reduction Strategies. Victoria Transport Policy Institute, Victoria, Canada

Congestion also affects economic productivity. Growing freight demand increases congestion on the highway system as trucks and automobiles compete for space on the highway system while commuter trains and freight trains compete for space on the railroad network. This congestion affects both businesses and consumers as businesses require more operators and equipment to deliver goods while consumers wait longer for inventory deliveries[7].

The freight, transit, and bicycle and pedestrian networks are summarized in **Section 2.5 Analyze Congestion Problems and Needs**.

1.7 The CMP Framework

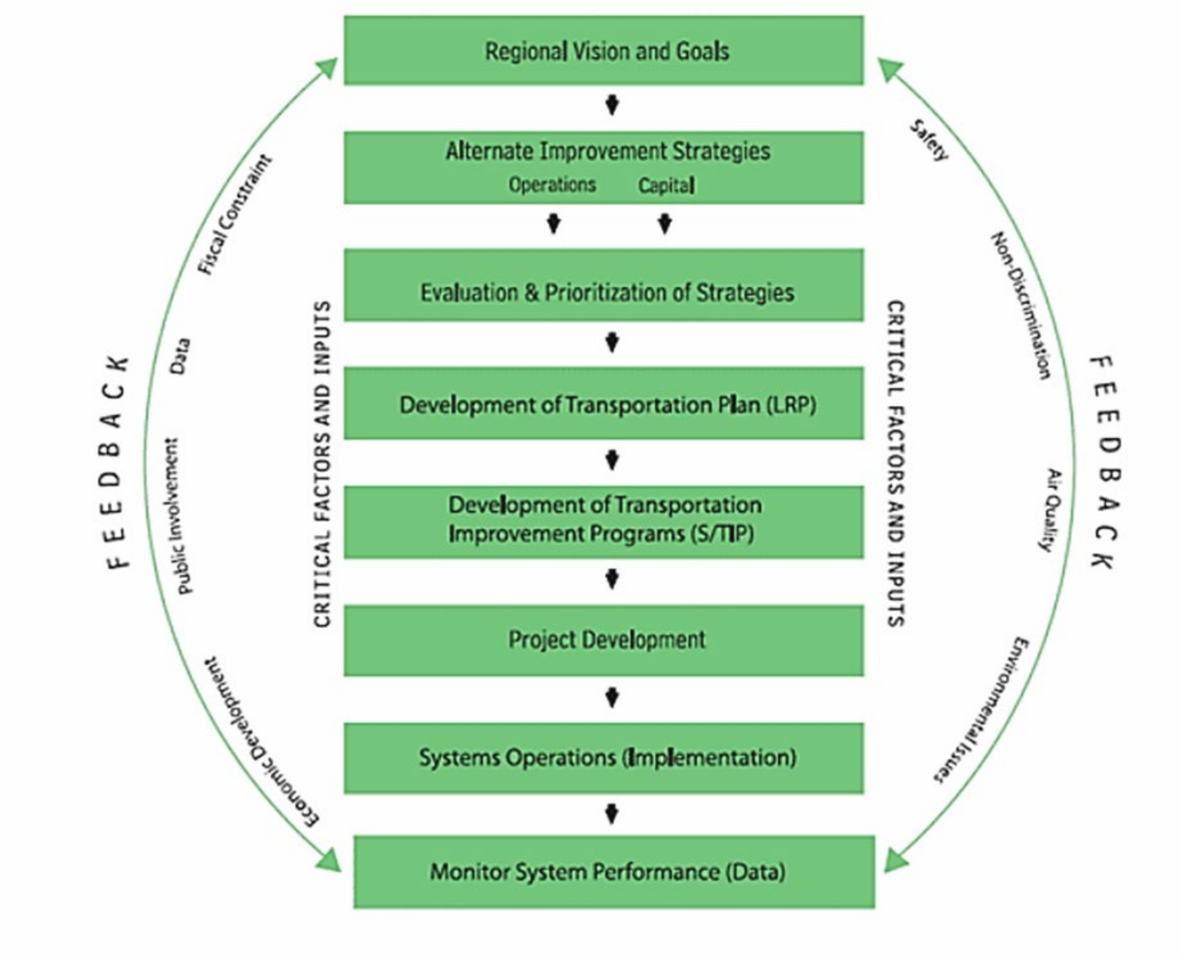
Figure 1.2 illustrates where the CMP fits within the broader planning perspective. The CMP is integrated into the development of the goals and objectives of GRPC's MTP and is used in the identification and evaluation of alternative strategies and final development of the MTP and Transportation Improvement Program.

The CMP can be utilized by regional stakeholders to:

- Develop numerous solutions for congestion mitigation and select the optimum alternative that addresses each issue.
- Create data driven analysis mechanisms that utilizes historical and real-time congestion data to continuously monitor and analyze congestion problems and needs.
- Identify other successful plans and incorporate strategies from other metropolitan areas nationwide.

[7] https://ops.fhwa.dot.gov/freight/freight_analysis/freight_story/congestion.htm

Figure 1.2: CMP and the Overall Planning Process

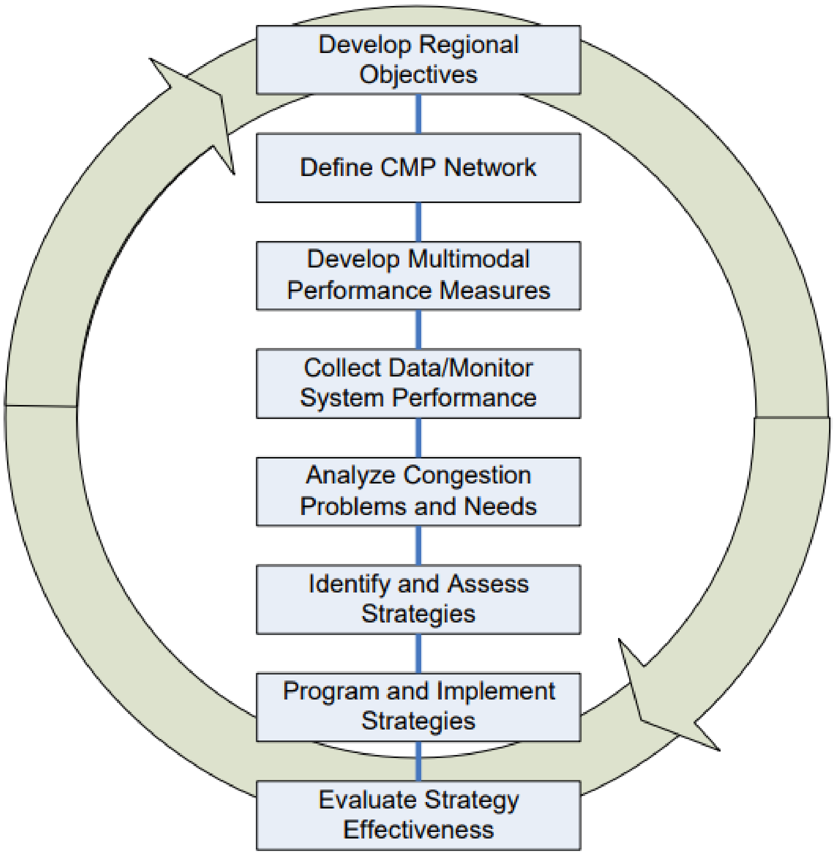


Source: FHWA Congestion Management Process: A Guidebook

2.0 The Eight-Step CMP Process

The FHWA's CMP Guidebook includes the eight-step CMP Process Model that serves as a guide for the actions to be taken in developing a CMP. While these actions are presented in a linear form, as illustrated in **Figure 2.1**, it is important to recognize that within the cycles of transportation planning, some of these actions may be revisited, or occur on an on-going basis.

Figure 2.1: CMP Process Flow Chart



Source: FHWA's CMP Guidebook

Consequently, the Process Model is not intended to serve as a step-by-step approach but is intended to convey the general flow of the approach, building on regional objectives to implementation of strategies, and evaluation of their effectiveness.

2.1 Step 1: Develop Congestion Management Objectives

The objectives were developed in coordination with the vision statement and regional goals found in the MTP. The relationship of the CMP objectives to the MTP goals is shown in **Table 2.1**.

Table 2.1: CMP Objectives and Applicable MTP Goals

CMP Objective	Applicable MTP Goal
Improve mobility and access across the region for pedestrians and bicyclists	Improve and expand transportation choices
Make public transportation a viable choice mode of transportation	Improve and expand transportation choices
Reduce motor vehicle crash fatalities and serious injuries	Improve safety and security
Reduce pedestrian and bicycle fatalities and serious injuries	Improve safety and security
Improve mobility by reducing traffic congestion and delay	Provide a reliable and high performing transportation system
Improve the mobility of freight by truck, rail, and other modes	Support the economic vitality of the region

Segments that experience significant congestion can have a negative impact on the system performance, as well as the safety performance, of the region's roadway network. Actions that improve these segments can potentially improve regional performance to satisfy the established MPO targets.

2.2 Step 2: CMP Network

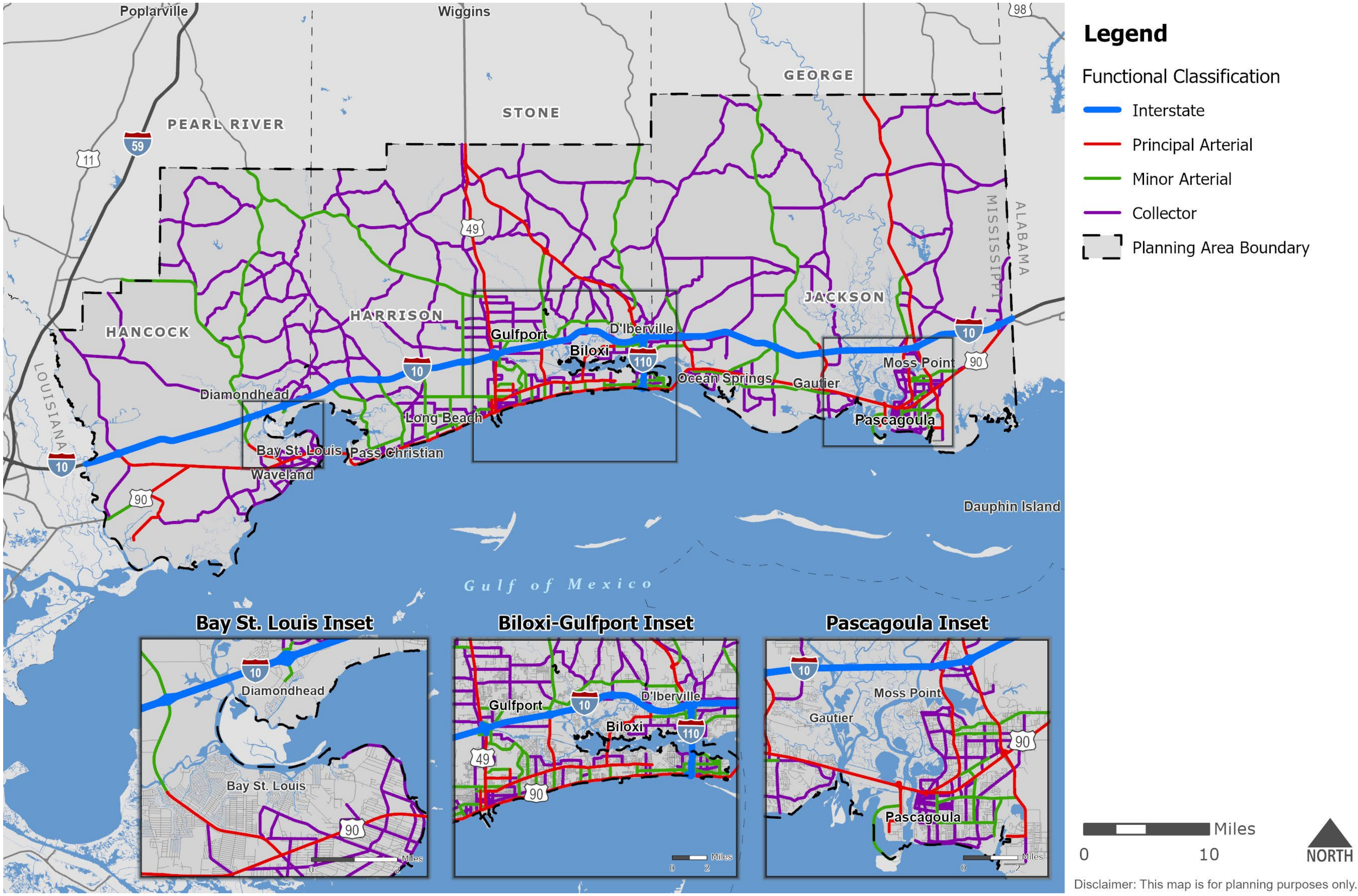
The planning area's overall roadway network consists of:

- Interstates
- Principal Arterials
- Minor Arterials
- Collectors
- Local Roads

Each facility type provides separate and distinct traffic service functions as described in Section 4.2 of *Technical Report #2: State of Current Systems*. Their designs vary in accordance with the characteristics of traffic to be served by the facility. The boundaries of the planning area, and its CMP network, are shown in **Figure 2.2**. **Figure 2.3** includes the Freight and Bicycle/Pedestrian networks within the region.

The CMP network includes all roadways within the travel demand model network that are functionally classified as a Collector or above.

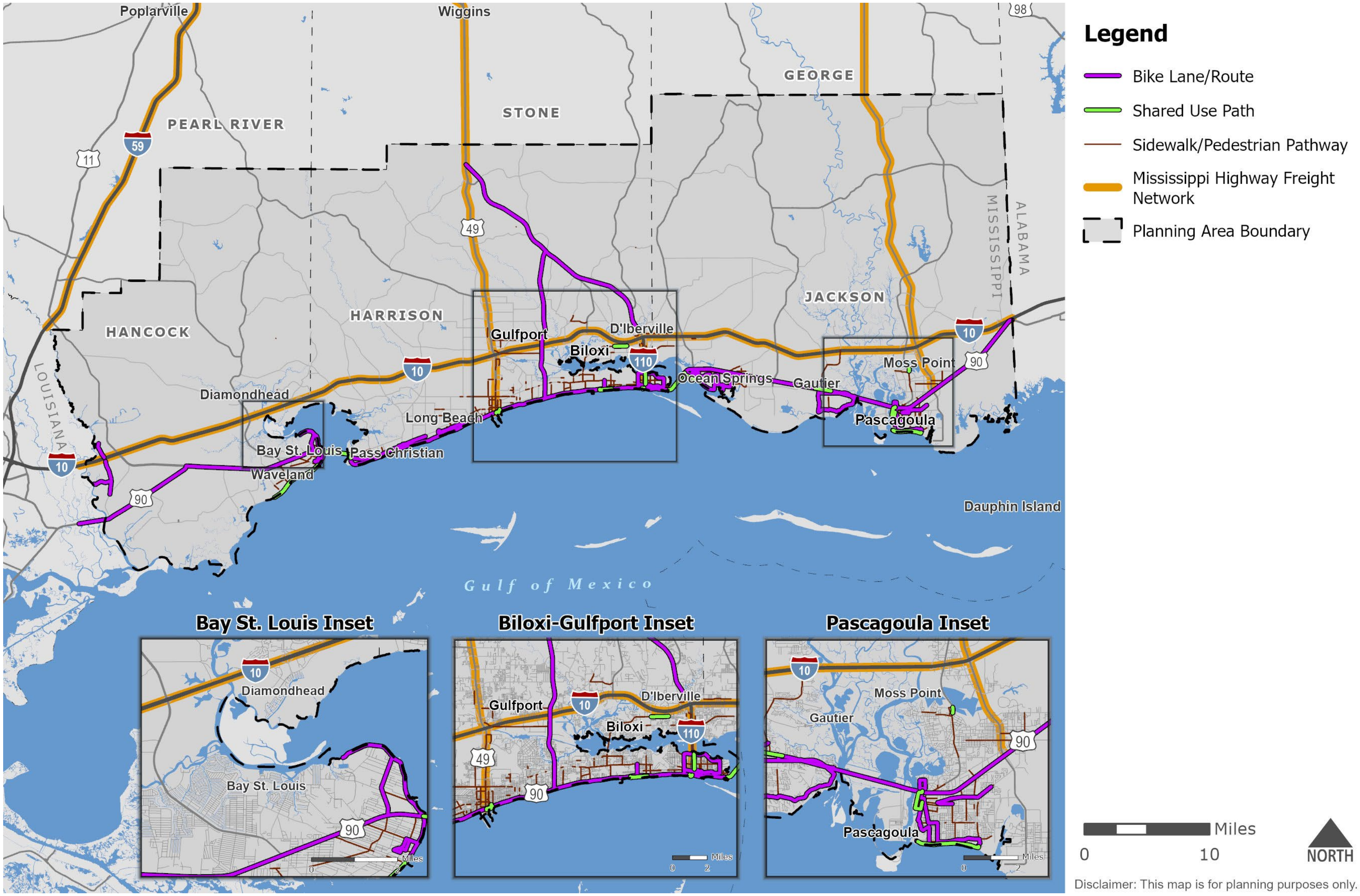
Figure 2.2: Planning Area and CMP Network



Disclaimer: This map is for planning purposes only.

Source: MDOT

Figure 2.3: Planning Area and Bike/Ped and Freight Networks



Source: MDOT and GRPC

2.3 Step 3: Develop Multimodal Performance Measures

The emphasis on performance-based planning introduced in MAP-21 and continued in the FAST Act and IIJA leads to planning processes becoming grounded in quantifiable performance measures. The measures selected for the CMP address the established objectives.

Performance measures are essential instruments that help to properly quantify and monitor the regional transportation system and traffic congestion.

The FHWA recommends that effective performance measures should incorporate the following characteristics:

- Include quantifiable data that are simple to present and interpret and have professional credibility,
- Describe existing conditions and can be used to identify problems and to predict changes,
- Can be calculated easily and with existing field data, uses techniques available for estimating the measure, and achieves consistent results,
- Applicable to multiple modes and is meaningful at varying scales and settings.

Federal Guidelines for Measuring Congestion

The federal guidelines for measuring congestion are discussed in federal legislation, shown below.

Section 450.322 (d)(3) of Subpart C (Congestion Management Process in Transportation Management Areas), 23 CFR (Final Rule)

- Establishment of a coordinated program for data collection and system performance monitoring to define the extent and duration of congestion, to contribute in determining the causes of congestion, and evaluate the efficiency and effectiveness of implemented actions. To the extent possible, this data collection program should be coordinated with existing data sources (including archived operational/ITS data) and coordinated with operations managers in the metropolitan area.

Performance Measures by Objective

The CMP objectives and the corresponding performance measures, along with the data sources used in support of the performance measures, are summarized in **Table 2.2**.

Table 2.2: CMP Performance Measures

Objectives	Performance Measures	Data Source
Improve mobility and access across the region for pedestrians and bicyclists	Bicycle and pedestrian Inventory (mileage)	GRPC
Make public transportation a more attractive mode of transportation	Transit ridership (number of riders), transit coverage	CTA
Reduce motor vehicle crash fatalities and serious injuries	Total crashes in a five-year period, fatal and serious injury crashes in a five-year period	MDOT
Reduce pedestrian and bicycle fatalities and serious injuries	Bicycle/pedestrian crashes in a five-year period, bicycle/pedestrian fatal and serious injury crashes in a five-year period	MDOT
Improve mobility by reducing traffic congestion and delay	Volume-to-Capacity Ratio, Total Congestion Score (Travel Time Index and Level of Service), total vehicle hours of delay, Level of Travel Time Reliability	Travel Demand Model, NPMRDS
Improve the mobility of freight by truck, rail, and other modes	Truck vehicle hours of delay, Truck Travel Time Reliability Index	Travel Demand Model, NPMRDS

Improve mobility and access across the region for pedestrians and bicyclists

Although bicycling and walking currently accounts for a relatively small portion of commuting patterns in Mississippi, a seamless bicycle and pedestrian network would provide the region with a viable alternative to motor vehicle transportation and reduce the level of congestion by removing vehicles from the roadway network. Additionally, this network would produce benefits for the health of the region's residents and workers while improving regional air quality.

The region's bicycle and pedestrian network includes shared used/bike paths, bicycle lanes, bikeable shoulders, bicycle routes, and sidewalks. The current bicycle and pedestrian network mileage will be compared with the network mileage as of the GRPC 2045 MTP to track the mileage changes between 2018 and 2022.

Make public transportation a more attractive mode of transportation

Transit can provide people with mobility and access to employment, shopping, medical care, and other destinations and opportunities. For some, transit is a lifeline service due to economic and/or physical limitations. For others, transit serves as an alternative to driving in addition to being a cheaper method of travel. Using transit removes automobiles from the roadway network and reduces overall network congestion, which can also improve the reliability of transit. Projects that promote the use of transit help reduce congestion and eliminate the need for costly capacity improvements while reducing induced demand.

The current annual number of transit riders will be compared with the number of annual transit riders as of the GRPC 2045 MTP to track ridership changes.

Reduce motor vehicle crash fatalities and serious injuries

Crash data obtained from MDOT will be used to identify the five-year crash trends for all crashes and for fatal and serious injury crashes. Additionally, the crash data will be used to identify non-recurring congestion, since incidents along a roadway may result in excessive delays. The current average five-year number of crashes (2019 – 2023), will be compared with the average five-year number of crashes as of the GRPC 2045 MTP (2014 – 2018).

Reduce pedestrian and bicycle fatalities and serious injuries

The pedestrian and bicycle crashes were pulled from the MDOT obtained crash data to identify the five-year crash trends for bicycle/pedestrian crashes and for fatal and serious injury bicycle/pedestrian crashes. The current average five-year number of bicycle/pedestrian crashes (2019 – 2023) will be compared with the average five-year number of bicycle/pedestrian crashes as of the GRPC 2045 MTP (2014 – 2018).

Improve mobility by reducing traffic congestion and delay

Volume-to-Capacity (V/C) Ratio

The V/C ratio is defined as the demand flow rate over the available capacity for a traffic facility. For this CMP effort, the Travel Demand Model volumes and capacities for each network link were used to develop V/C ratios, which compares the existing 24-hour traffic volumes to the daily capacity the roadways were designed to handle. The time of day (Morning, Midday, Afternoon, and Night) capacity factors developed in the Travel Demand Model are discussed in *Technical Report #1: Model Development Report*. Additionally, model volumes and capacities can be found in each model scenario's network files.

Segments with a V/C ratio greater than 1.00 are considered over capacity. The results of the V/C ratio study for each peak travel time (AM, MD, PM, or NT) are shown in **Appendix B**.

Many corridors in the MPA have received capacity improvements between 2018, the base year of the GRPC 2045 MTP, and 2022, the base year of the GRPC 2050 MTP. **Table 2.3** displays the corridors in the CMP network that have received capacity improvements between 2018 and 2022.

Table 2.3: Roadways with Improved Capacity between 2018 and 2022

Roadway	Limits	Previous Facility Type (2018)	New Facility Type (2022)
Dedeaux Rd	Three Rivers Rd to Stewart Rd	2-lane Undivided	4-lane Divided
Mallet Rd	Daisy Vestry Rd to Seaman Rd	2-lane Undivided	4-lane Divided

Total Congestion Score – Travel Time Index

The Travel Time Index (TTI) measures the amount of time delay that occurs when travelling a roadway segment. It is calculated by dividing the highest peak travel time (morning, midday, or afternoon) by the free-flow travel time (the travel time under optimal conditions with minimum interference from other traffic) and represents the increased travel time drivers experienced when travelling.

The TTI was measured by:

- Calculating the average travel time for three (3) different time periods
  - Morning "AM" Peak Period (6:00 AM - 9:00 AM)
  - Midday "MD" Peak Period (9:00 AM – 3:00 PM)
  - Afternoon "PM" Peak Period (3:00 PM - 6:00 PM)
- The nighttime "NT" travel times (6:00 PM and 6:00 AM) were not calculated due to the lower traffic volumes.
- Calculating the free-flow travel time of a segment using its free-flow speed
- Dividing the highest of the three peak travel times (AM, MD, or PM) by the free-flow travel time.

The equation used to calculate the TTI is shown below:

$$TTI = \frac{Highest\ Peak\ Period\ Travel\ Time}{Freeflow\ Travel\ Time}$$

Where:

- TTI – Travel Time Index
- Highest Peak Period Travel Time – the highest of the three peak period travel times (AM, MD, or PM)
- Free-flow Travel Time – the travel time at free-flow speed

TTI Example

- The highest peak period travel time on A Street between B Avenue and C Avenue is three (3) minutes.
- The free-flow travel time on that same segment is one (1) minute.
- Divide three (3) minutes, the highest peak period travel time, by one (1) minute, the free-flow travel time.
- This results in a TTI of 3.0, which implies that it takes three (3) times longer to travel this segment during the peak period.

The results from the TTI study for each peak travel time (AM, MD, or PM) are shown in **Appendix C**.

Total Congestion Score – Level of Service

The Level of Service (LOS) is a qualitative process used to analyze and assess a transportation facility's ability to efficiently service its daily traffic demand. There are six levels of service that can be assigned to a roadway segment: ranging from LOS A to LOS F. Where a LOS of A represents ideal free-flow traffic conditions, a LOS of F represents forced or breakdown flow.

The Level of Service definitions are shown in **Table 2.4**.

The assigned value for each LOS is based on:

- Speed
- Travel Time
- Freedom to maneuver
- Traffic interruptions

Table 2.4: Level of Service Definitions

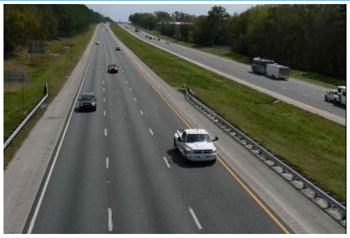
LOS	Definitions	Illustration
A	**Free flow conditions** – minimal or no restriction on speed or maneuverability	
B	**Reasonably free flow** – stable flow though operating speed begins to be restricted by other traffic	
C	**Stable flow** – drivers become more restricted in their freedom to select speed, change lanes, or pass	
D	**Approaching unstable flow** – tolerable average operating speeds are maintained but are subject to considerable sudden variation	
E	**Unstable flow** – speeds and flow rates fluctuate and there is little independence on speed selection or ability to maneuver	
F	**Forced or breakdown flow** – speeds and flow rates are below those attained in LOS E and may, for short periods, drop to zero	

Illustration Source: Highway Capacity Manual

The facility types used in calculating the LOS are:

- Freeways
- Multi-lane Highways
- Two-lane Highways
- Streets

These facility types are further described below:

Freeways

- Separated highways with full access control and at least two or more lanes in each direction; traffic flow does not stop under normal traffic conditions, only during excessive congestion or serious incidents
- LOS is based on **Density (passenger cars per mile per lane).**
- **Examples: I-10, I-110**

Multi-lane Highways

- Highways with at least two or more lanes in each direction; may or may not be median separated; do not have full access control - traffic can enter, exit, and cross the highway directly; can serve modes other than motorized traffic
- LOS is based on **Density (passenger cars per mile per lane).**
- **Examples: US 49 north of MS 53, MS 63, MS 67**

Two-lane Highways

- Highways with one lane in each direction; passing occurs in the opposing lane of traffic and is limited by the availabilty of gaps in the opposing traffic stream and sufficient sight distance
- LOS is based on **percent free-flow speed.**
- **Examples: US 90 near Louisiana State Line, MS 15, MS 57 north of I-10**

Streets

- Facilities where traffic signals, stop or yield signs, or roundabouts interrupt traffic flow; can serve multiple modes of transportation, such as motorized vehicles, pedestrians, bicycles, and transit
- LOS is based on **percent free-flow speed and v/c ratio.**
- **Examples: US 90 (Beach Boulevard), MS 605 south of I-10, Pass Road**

Image Source: Google Earth; Facility Types Source: Highway Capacity Manual
Example Images: Freeways – I-10 at I-110 Interchange; Multi-lane Highways – MS 67 at Wortham Road; Two-lane Highways – US 90 between Pearlington and MS 607; Streets – US 49 at US 90.

> **Any facility that has a V/C ratio greater than 1.00 automatically has a LOS of F, regardless of any other criteria (e.g. density, speed) for that facility.**

The LOS criteria for each facility type, and the LOS study results, are displayed in **Appendix D**. The facility types and LOS criteria for each facility type are based on the *Highway Capacity Manual*.

The LOS for each segment is then used to calculate an "LOS Index". This "LOS Index" was developed using the following process. An example LOS index calculation is shown in **Table 2.5**.

- Establishing two records for each segment, one for each direction.
- Adding the numeric LOS score of all three time periods (AM, MD, and PM) assigned to each record. (LOS A Score – 1; LOS B Score – 2; LOS C Score – 3; LOS D Score – 4; LOS E Score – 5; LOS F Score – 6)
- Calculating the average of the LOS scores to obtain the LOS Index rating.

Table 2.5: LOS Index Ranking Example

Roadway		AM	MD	PM	Total	Average
Main Street Eastbound	**LOS**	C	D	B	-	-
	Score	3	4	2	9	3.00
Main Street Westbound	**LOS**	A	C	C	-	-
	Score	1	3	3	7	2.33

LOS Example Overview

- The LOS on Main Street Eastbound is "C" in the morning peak (LOS score of 3), "D" in the midday peak (LOS score of 4), and "B" in the afternoon peak (LOS score of 2). Therefore, the total LOS score of the three peaks for Main Street Eastbound is *3+4+2=9*, and the LOS Index rating is 9/3=**3.00**.
- The LOS on Main Street Westbound is "A" in the morning peak (LOS score of 1), "C" in the midday peak (LOS score of 3), and "C" in the afternoon peak (LOS score of 3). Therefore, the total LOS score of the three peaks for Main Street Westbound is *1+3+3=7* and the LOS Index rating is 7/3=**2.33**.

Total Vehicle Hours of Delay

The total annual VHD are calculated by subtracting the estimated vehicle hours traveled if all travel demand were at free-flow speed from the estimated vehicle hours traveled at the observed travel speed. The existing (2022) and future (2050) daily VHD can be obtained from the Travel Demand Model to forecast the projected change in VHD between 2022 and 2050. The results of the VHD study are shown in **Appendix E**. The current total VHD will be compared with the total VHD as of the GRPC 2045 MTP as a comparison of congestion in the planning area.

Level of Travel Time Reliability

The Level of Travel Time Reliability (LOTTR) assesses the consistency, or dependability, of travel times from day to day or across different times of the day on the interstate and non-interstate National Highway System (NHS) systems. The FHWA defines LOTTR as the percent of person-miles on the interstate and NHS that are reliable. LOTTR is calculated as the ratio of the longer travel times (80th percentile) to a "normal" travel time (50th percentile), using National Performance Management Research Data Set (NPMRDS) or equivalent data. The current percent of person-miles that are reliable on the interstate and non-interstate NHS systems in the planning areas will be compared to this metric as of the GRPC 2045 MTP.

Improve the mobility of freight by truck, rail, and other modes

Truck VHD

Similar to total VHD, the current truck VHD will be compared with the truck VHD as of the GRPC 2045 MTP as a comparison of freight congestion in the planning area.

Truck Travel Time Reliability

The Truck Travel Time Reliability (TTTR) is the percent of truck-miles on the Interstate System that are reliable. TTTR is calculated as the ratio of the longer travel times (95th percentile) to a "normal" travel time (50th percentile), using NPMRDS or equivalent data.

2.4 Step 4: Collect Data and Monitor System Performance

This section describes the data sources used to conduct the congestion analysis within the planning area. The data sources tied to each performance measure were summarized in **Table 2.2**.

NPMRDS

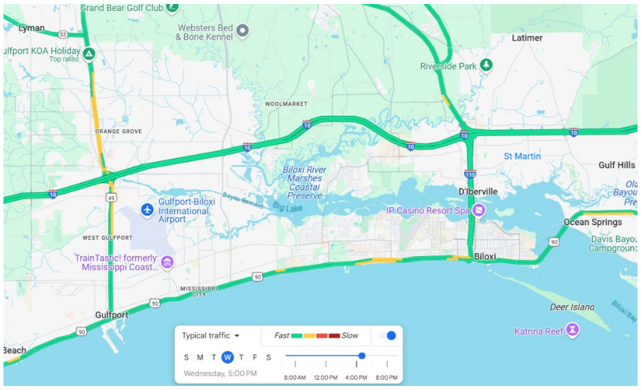
The NPMRDS is a vehicle probe-based data set used by the FHWA to support Transportation Performance Measures reporting requirements, Freight Performance Measures, and Urban Congestion Report programs. The data uses GPS information obtained from mobile phones, vehicles, and portable navigation devices to provide monthly passenger and freight vehicle average travel time in 5-minute intervals along the reported National Highway System.

NPMRDS can create dashboards that display the segment's LOTTR and TTTR. Additionally, NPMRDS can create maps showing the segment's speed, TTI, and Buffer Index.

Travel Demand Model

GRPC's Travel Demand Model predicts trip-making behavior such as the number of trips, their origins and destinations, and most probable trip routes. The model used for this CMP has an existing (base) year of 2022 and a horizon year of 2050. The model contains data on existing conditions, socioeconomic forecasts, and anticipated growth in external trips to replicate current travel demand and develop forecast travel demand on the region's roadway network. It can also be used to conduct a congestion analysis for future conditions.

Google Traffic



Example of the Google Typical Traffic Platform for a typical Wednesday afternoon peak
Source: Google Maps

A feature in Google Maps, Google Traffic displays traffic data using colored overlays on top of roads to represent the observed speed of traffic. It uses crowdsourcing from Google users to obtain the GPS locations of cellphone users and generates live traffic maps along roadway segments. This data, shown on a scale from fast (representing minimal or no congestion) to slow (representing heavy congestion), is displayed on a map. The data displays traffic conditions along a particular section of roads at specific times on specific days. Google Traffic was used to corroborate the congested segment results obtained from the NPMRDS data, which uses data from third-party vendors INRIX, TomTom, and HERE.

Crash Data

Crash data obtained from MDOT was used to identify five-year crash trends and non-recurring congestion, since incidents along a roadway may result in excessive delays. The region's safety analysis can be found in Section 4.7 *of Technical Report #2: State of Current System*.

The crash records include:

- Time
- Location (intersection or roadway segment)
- Severity
- Crash Type
- Location conditions (e.g. pavement condition, weather)

Bicycle/Pedestrian Network

GRPC provides an inventory of existing bicycle and pedestrian facilities. The MPO continues to partner with local governments and advocacy groups to promote biking and walking within the MPO region[8].

CTA

Within the Mississippi Gulf Coast area, the Coast Transit Authority (CTA) provides scheduled fixed-route and paratransit services. Currently, CTA has seven routes that serve Gulfport, Biloxi, D'Iberville, and Ocean Springs. The annual number of transit riders is provided by CTA.

2.5 Step 5: Analyze Congestion Problems and Needs

Once data is collected, the raw data must be translated into useful measures of performance. This section presents the results of the CMP analysis and identifies locations with congestion problems. Also, the multimodal mobility characteristics for the planning area are documented in this section.

Freight

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 major highways, Class I railroads, airports, and ports. The following is a summary of the region's freight network.

[8] https://grpc.com/mpo-programs/walking-and-bicycling/

Trucking
- MDOT Tier 1 Highways: I-10 and US 49
- MDOT Tier 2 Highways: MS 63

Railroads
- Class I Railroads: Kansas City Southern, Norfolk Southern
- Shortline Railroads: Mississippi Export Railroad

Airports
- Stennis International Airport
- Gulfport-Biloxi International Airport
- Trent Lott International Airport

Ports
- Port Bienville
- Port of Gulfport
- Biloxi Port Division
- Port of Pascagoula

According to the *2022 Mississippi Statewide Freight Plan*[9], three of the top ten Tier 1 Freight Network Bottlenecks and one of the top ten Tier 2 Freight Network Bottlenecks within the state are located in the planning area. These are located on:

- portions of US 49 between Airport Road and O'Neal Road and
- portions of MS 63 between Grierson Road and I-10.

The economic consequences of congestion delay to freight are significant to the region. The anticipated percent increases in commodity flow, auto VHD, and truck VHD between 2022 and 2050 are shown below. It is anticipated that the truck VHD percent increase will be more than quadruple that of the commodity flow percent increase, while the auto VHD percent increase will be more than double that of the commodity flow percent increase.

9 https://mdot.ms.gov/documents/Planning/Transportation%20Asset%20Management%20/MS%20Freight%20Plan/MS%20Statewide%20Freight%20Plan%202022-Amendment%20%2005.pdf

67percent increase in Commodity Flow between 2022 and 2050

144 percent increase in Auto VHD and congestion costs between 2022 and 2050

275 percent increase in Truck VHD and congestion costs between 2022 and 2050

More information on the current freight conditions can be found in Chapter 5 of *Technical Report #2: State of Current Systems*, while freight needs can be found in Chapter 5 of *Technical Report #4: Needs Assessment*.

Transit

From 2021 through 2023, CTA had an average ridership of around 525,000 passengers per year.

More information on the current transit conditions can be found in Chapter 6 of *Technical Report #2: State of Current Systems*, while transit needs can be found in Chapter 7 of *Technical Report #4: Needs Assessment*.

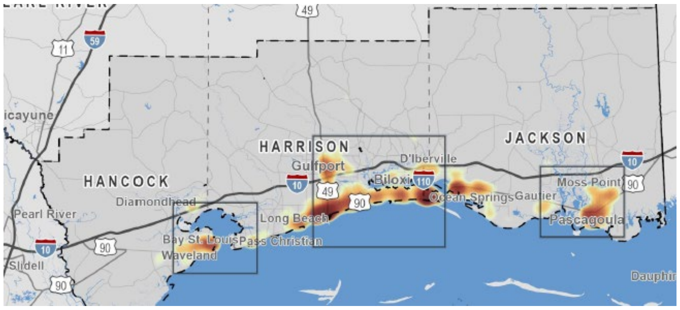
Bicycle and Pedestrian

The MPO's existing bicycle and pedestrian facilities network consists of over 394 miles of bike routes, sidewalks and shared pathways scattered throughout the MPO on functionally classified roadways and within local neighborhoods.

Bicycle and pedestrian facilities are grouped into the following classifications.

- Shared Use Path
- Bike Lane
- Bikeable Shoulder
- Bike Route
- Sidewalk

Additionally, a latent demand scoring was conducted to determine locations within the planning area where bicycle and pedestrian facilities are most likely to be used or wanted. High demand locations in the MPA include:



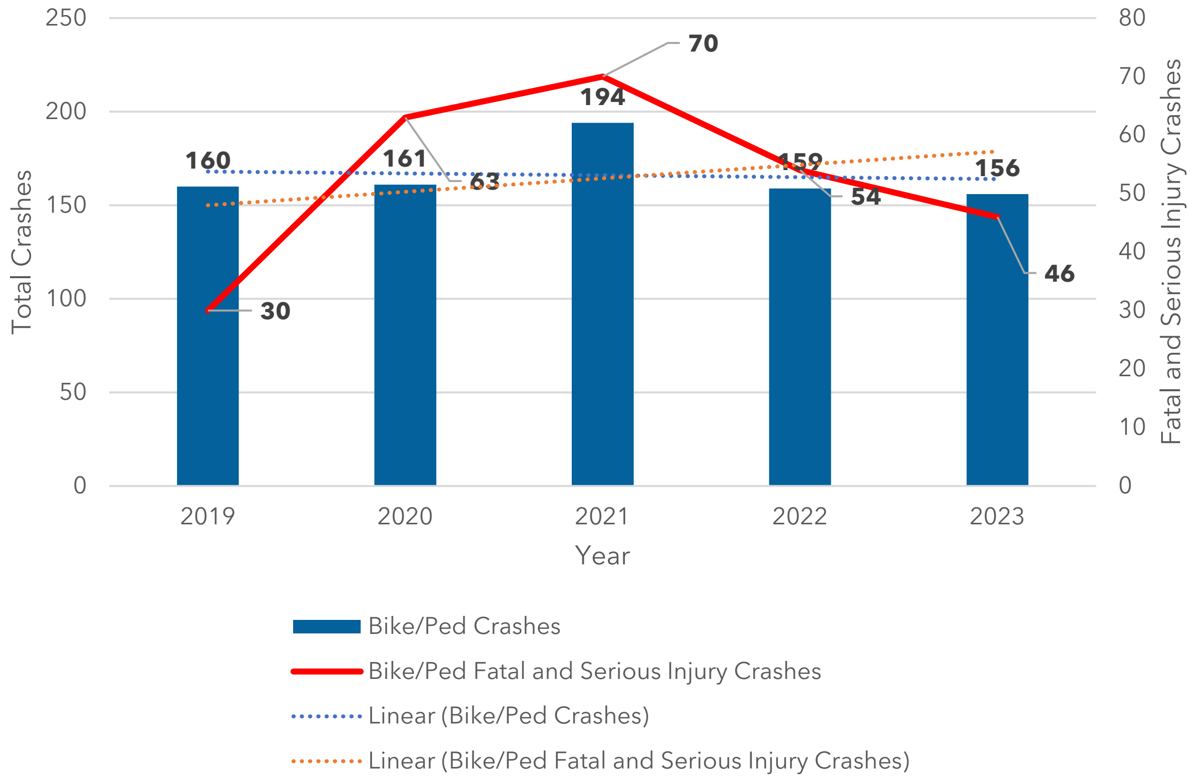
Source: Technical Report #2: State of Current Systems

- The urban cores of Gulfport and Biloxi
- Downtown Ocean Springs, Pascagoula, and Bay St. Louis

The year-to-year bicycle and pedestrian crash trends over the last five (5) years are shown in **Figure 2.4**. Based on the most recent five-year crash data, there is a trend of decrease year-to-year in the total number of bicycle and pedestrian crashes. However, the number of fatal and serious injury bicycle and pedestrian crashes have an increasing trend year-to-year.

More information on the current bicycle and pedestrian conditions can be found in Chapter 7 of *Technical Report #2: State of Current Systems*, while bicycle and pedestrian needs can be found in Chapter 6 of *Technical Report #4: Needs Assessment*.

Figure 2.4: Bicycle/Pedestrian Year-to-Year Trends



Source: MDOT
NOTE: Serious injury crashes were redefined in 2019. See Section 3.7 of *Technical Report #2 – State of Current Systems*.

Recurring Congestion

Prioritization of Recurring Congested Segments

Once all performance metric data was gathered the information was used to develop congestion scores for each link in the 2022 CMP network. **Table 2.6** lists the numeric values assigned to each study factor based on the results of the scoring described in **Section 2.3: Develop Multimodal Performance Measures**.

For the purposes of the recurring congestion analysis, safety scores were not analyzed since they are random events that create nonrecurring congestion.

Table 2.6: LOS and TTI Scoring

LOS Scoring		TTI Scoring	
LOS Value	**Score**	**TTI Value**	**Score**
≥ 5.00	4	**≥ 4.00**	4
4.00 - 4.99	3	**3.00 - 3.99**	3
3.00 - 3.99	2	**2.00 - 2.99**	2
2.33 - 2.99	1	**1.50 - 1.99**	1
< 2.33	0	**< 1.50**	0

The scores from the two metrics were added together for each roadway link direction to provide a final CMP Index Rating. The maximum possible CMP Index Rating score a two-way roadway link can receive is sixteen, and the maximum possible CMP Index Rating score a one-way roadway link can receive is eight. The CMP Index Rating score for one-way roadway links was doubled to adjust for the differences in maximum possible CMP Index Rating scores.

Roadway segments with a CMP Index Rating of eight or greater are considered to be congested. **Figure 2.5** displays the existing recurring congested segments of the 2022 Gulf Coast CMP network in 2022, based on their CMP Index Rating scores. These segments are also shown in **Table 2.7**, which includes the segment's CMP Index Rating and TTI and LOS scores as well as the segment freight network, transit, and bicycle and pedestrian information.

This CMP identifies **30** recurring congested segments covering nearly **39** miles of the CMP network.

The number of recurring congested segments and mileage (along with percentages of total segments and mileage), that are on the freight network, on the transit network, or have bicycle and pedestrian facilities are summarized to the right. Note that portions of the recurring congested segments may or may not be on one of the networks or have bicycle and pedestrian facilities.

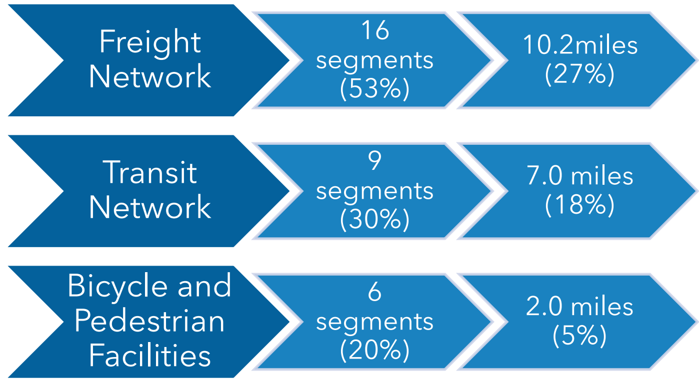
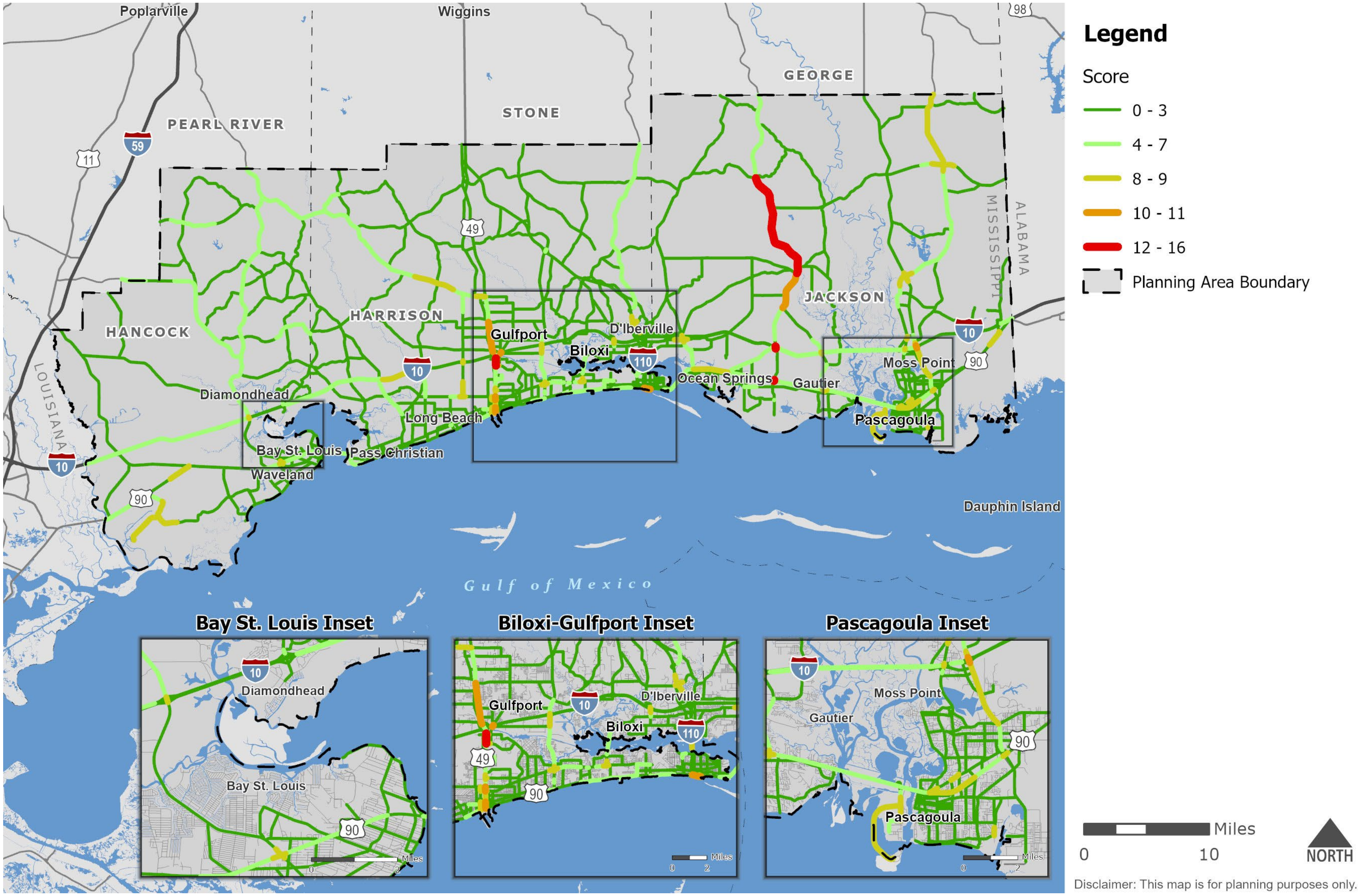


Figure 2.5: Recurring Congested Segments in 2022



Source: NPMRDS, Travel Demand Model

Table 2.7: CMP Index Rating for Recurring Congestion Segments (2022)

Rank	County	Roadway	Segment	Length (miles)	Directional TTI	Directional TTI	Directional LOS	Directional LOS	CMP Index Rating	Freight Network[1]	Transit Network[2]	Bike/Ped Facilities[3]
1	Harrison	US 49	Creosote Road to I-10 Eastbound	0.07	3	4	4	4	15	Tier 1	-	-
2	Harrison	US 49	Airport Road to 0.14 miles north of Airport Road	0.38	4	3	4	4	15	Tier 1	CTA	-
3	Harrison	US 49	0.14 miles north of Airport Road to Creosote Road	3.04	3	4	3	4	14	Tier 1	CTA	-
4	Jackson	MS 57	At US 90	9.12	2	3	4	4	13	CUFC	-	-
5	Jackson	MS 57	Jim Ramsay Road to Wire Road	0.14	1	3	4	4	12	-	-	-
6	Jackson	MS 57	I-10 Eastbound Off-Ramp to I-10 Westbound Off-Ramp	2.38	2	3	3	4	12	CUFC	-	-
7	Harrison	US 49	I-10 Westbound to O'neal Road	0.09	2	3	3	3	11	Tier 1	CTA	-
8	Harrison	US 49	25th Street to 28th Street	0.20	2	2	4	3	11	Tier 1	CTA	SW
9	Harrison	Three Rivers Road	Seaway Road to Crossroads Parkway	0.09	2	1	3	4	10	-	CTA	-
10	Jackson	MS 57	Gautier Vancleave Road to Jim Ramsay Road	0.18	1	1	4	4	10	-	-	-
11	Harrison	US 49	US 90 to 17th Street	0.51	2	2	3	3	10	Tier 1	CTA	SW
12	Harrison	US 90	I-110 to Main Street	1.39	2	2	3	3	10	-	-	SPP
13	Jackson	MS 63	I-10 Eastbound Off-Ramp to I-10 Westbound Off-Ramp	0.38	3	2	3	2	10	Tier 2	-	-
14	Harrison	MS 53	County Farm Road/Swan Road to Pendora Lane	0.26	1	1	3	4	9	-	-	-
15	Harrison	US 49	19th Street to 25th Street	1.90	2	2	2	3	9	Tier 1	CTA	SW
16	Jackson	MS 613	MS 614 to George County Line	3.13	1	1	4	3	9	-	-	-
17	Jackson	US 90	Marie Street to Market Street	0.77	2	2	2	3	9	-	-	-
18	Jackson	US 90	At MS 63/MS 611	0.10	2	2	2	3	9	CUFC	-	SR
19	Harrison	I-10 Westbound	County Farm Road On-Ramp to Menge Avenue Off-Ramp	0.47	1	-	3	-	8	Tier 1	-	-
20	Harrison	MS 53	CC Camp Road to County Farm Road/Swan Road	6.11	1	1	3	3	8	-	-	-
21	Harrison	MS 53	Old Highway 49 to US 49	0.71	2	2	2	2	8	-	-	-
22	Harrison	I-110 Southbound	Rodriguez Street On-Ramp to Bayview Avenue Off-Ramp	0.22	1	-	3	-	8	Tier 1	-	-
23	Jackson	US 90	MS 609/Washington Avenue to Ocean Springs Road	2.78	2	2	2	2	8	-	CTA	-
24	Harrison	US 49	17th Street to 19th Street	0.15	2	2	2	2	8	Tier 1	CTA	SW
25	Hancock	MS 43/MS 603	I-10 Eastbound Off-Ramp to I-10 Westbound Off-Ramp	0.14	1	2	2	3	8	-	-	-
26	Jackson	MS 63	I-10 Westbound Off-Ramp to Saracennia Road	0.24	1	1	3	3	8	Tier 2	-	-
27	Jackson	US 90	Telephone Road to Marie Street	0.18	1	2	2	3	8	-	-	-
28	Jackson	US 90	Market Street to Chicot Road	1.57	2	2	2	2	8	-	-	-
29	Jackson	MS 63	Grierson Street to Elder Ferry Road	1.29	2	2	2	2	8	Tier 2	-	-
30	Jackson	Bayou Casotte Parkway	Washington Avenue to Louise Street	0.31	2	2	2	2	8	-	-	-

NOTE 1: Freight Network Descriptions
- Tier 1: MDOT Tier I Freight Network
- Tier 2: MDOT Tier II Freight Network
- CUFC: Critical Urban Freight Corridor

NOTE 2: Transit Network Descriptions
- CTA: Coast Transit Authority

NOTE 3: Bike/Ped Facility Descriptions
- SPP: Separeted Pedestrian Pathway
- SR: Shared Roadway
- SW: Sidewalk

Public and Stakeholder Meeting and MPO Identification

All feedback from the public and stakeholders' meetings are considered in the CMP and the locations identified by the public are listed in **Table 2.8** and shown in **Figure 2.6**.

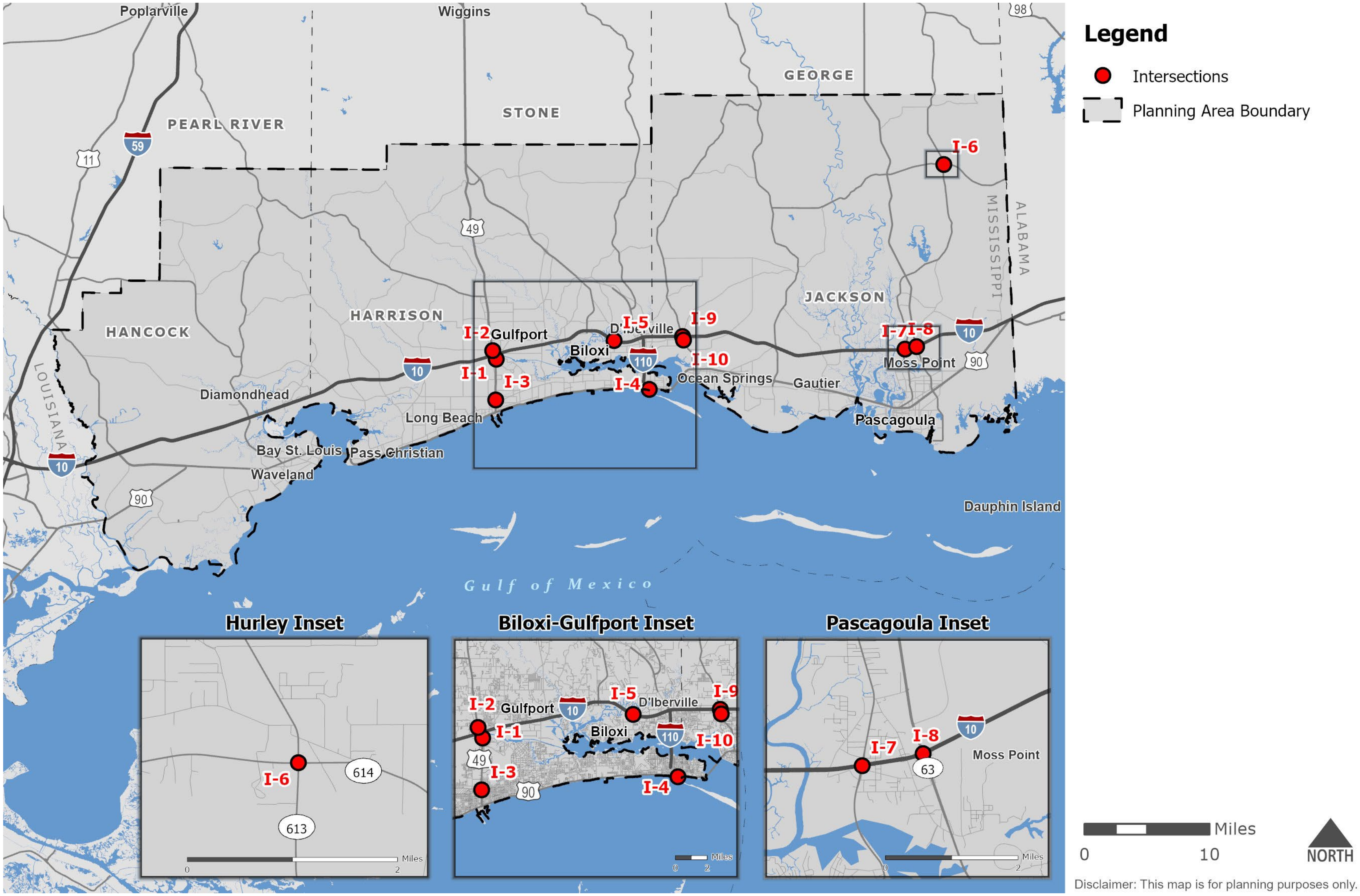
Table 2.8: Congested Locations Identified by Public Meeting Input

ID	Roadway	Location
I-1	US 49	@ Creosote Road
I-2	US 49	@ Landon Road
I-3	US 49	@ Pass Road
I-4	US 90	@ Lameuse Street
I-5	Cedar Lake Road	@ I-10
I-6	MS 613	@ MS 614
I-7	MS 613	@ I-10
I-8	MS 63	@ I-10
I-9	MS 609	@ I-10
I-10	MS 609	@ Big Ridge Road

Summary

Due to the limited scope of this study, location-specific recommendations for the identified top recurring segments have not been developed. Nonetheless, detailed corridor studies should be done for the identified top recurring segments to identify and validate the causes of recurring congestion as well as improvements to address these deficiencies.

Figure 2.6: Congested Locations Identified by Public Meeting Input



Source: Neel-Schaffer, Inc.

Non-Recurring Congestion

Non-recurring congestion represents a greater influence on total congestion. As the physical capacity of roadways are consumed by the growth in traffic, they also become more vulnerable to disruptions caused by traffic influencing events. These include traffic incidents, bad weather, and work zones. Additionally, these events can occur at any time and location, even those that don't usually experience congestion, thereby spreading congestion to more roadways and more times of the day.

The methodology[10] used to determine which roadway segments experience nonrecurring congestion was to:

- Group speed data into one-hour periods for a year and calculate the annual average speed and the annual standard deviation by hour for each segment.
- Group speed data into one-hour periods by hour and day and calculate the average speeds by hour.
- Tabulate the average speeds calculated in the previous steps, side by side, for all the speeds collected over the year 2023, for a specific time period (hour and day).
- Calculate the Standard Normal Deviate (SND) for each time period (hour and day) using the following equation.

$$SND_{i,j} = \frac{Speed_{i,j} - Annual\ Average\ Speed_i}{Annual\ Standard\ Deviation_i}$$

Where

- SND – Standard Normal Deviate
- i – Hour
- j - Day

Negative SND values that are greater than a selected threshold would indicate congestion beyond average levels. This indicates a high likelihood of non-recurring congestion. For this CMP effort, a threshold value of -1.5 was selected based on the research's sensitivity analysis. SND values which deviated by more than -1.5 (i.e., lower than -1.5) are indicative of non-recurring congestion speeds. Additionally, the delays for the time period (hour and day) where the SND deviated by more than -1.5 were calculated using the following equation.

[10] Andrew J. Sullivan, Virginia P. Sisiopiku, Bharat R. Kallem, "Measuring Non-Recurring Congestion in Small to Medium Sized Urban Areas" Prepared by the University Transportation Center for Alabama.

$$Time\ Delay = \frac{Segment\ Length}{Segment\ Speed_i} - \frac{Segment\ Length}{Segment\ Annual\ Average\ Speed_i}$$

Where

- Segment length is in miles
- Segment speeds are in MPH
- Time delay is in hours
- i – hour

With the methodology established, the following process was used to locate segments that experienced excessive non-recurring congestion in 2023:

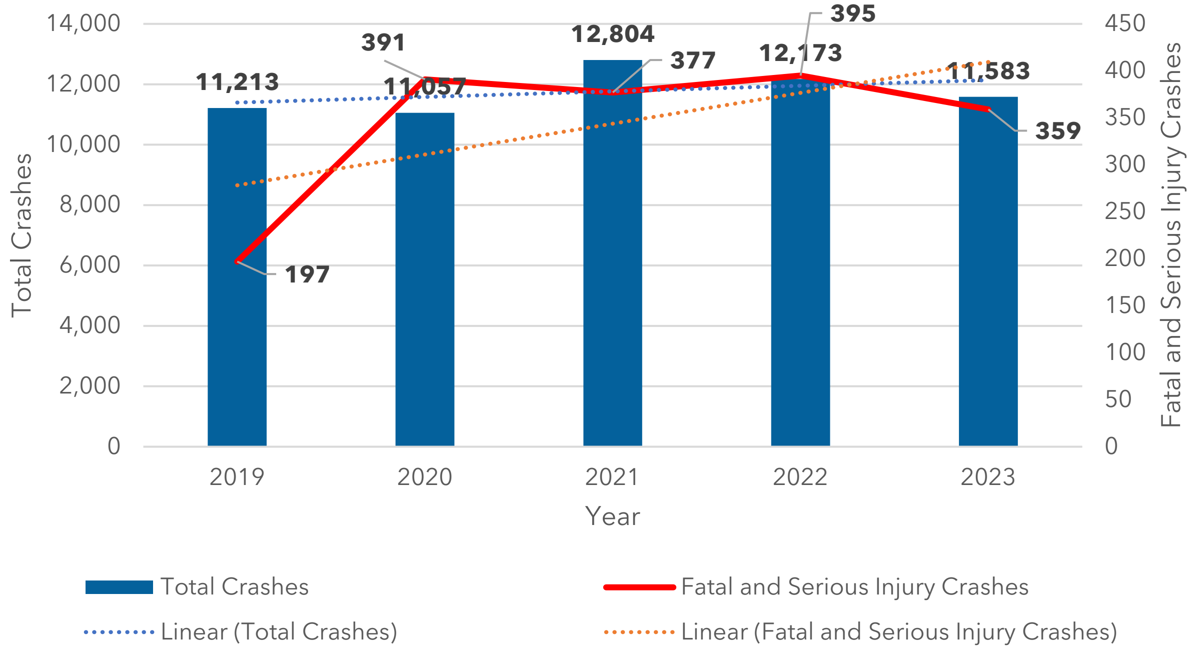
- Calculate the SND and the time delay (in hours) for each segment
  - Any segments that had a calculated maximum delay of at least half an hour (30 minutes) in 2023 were considered to experience excessive non-recurring congestion.
- Calculate the five-year crash trends using the 2019 – 2023 MDOT crash data for both total and fatal/serious injury crash frequencies.
  - The average yearly crash frequency was used to prioritize the segments experiencing excessive non-recurring congestion.

Crashes, especially those that result in a fatality or serious injury or involve hazardous materials, can result in significant congestion and dramatically reduce the available capacity and reliability of the entire transportation system. Additionally, congestion can result in additional crashes.

The MDOT crash data was used to identify trends in total crash frequency and those that resulted in a fatality or serious injury. The high crash frequency and high crash rate locations within the planning area are shown in Section 4.7 of *Technical Report #2: State of Current Systems*. The region's safety needs, as well as ways to reduce the number of crashes, are summarized in Section 4.3 of *Technical Report #4: Needs Assessment*.

The year-to-year crash trends are shown in **Figure 2.7**. Based on the most recent five-year crash data, there is a trend of a increase year-to-year in the number of total crashes and fatal and serious injury crashes.

Figure 2.7: Total Crashes Year-to-Year Trends



Source: MDOT
NOTE: Serious injury crashes were redefined in 2019. See Section 3.7 of Technical Report #2 – State of Current Systems.

Figure 2.8 displays the segments that experienced excessive non-recurring congestion in the year 2023. The non-recurring congestion crash trends for each segment are shown in **Table 2.9**.

Limitations

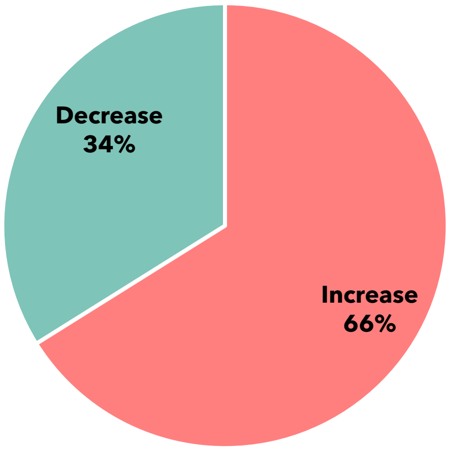
To develop a reliable methodology that identifies non-recurring congestion, a consistent and reliable travel time database is necessary. Speed data and travel times for each time interval (5-minute, 10-minute, 15-minute, or 1-hour) throughout an entire year is essential. However, the RITIS database contains several time intervals where speed and travel time data is unavailable or missing, making it difficult to perform an accurate and reliable nonrecurring congestion analysis.

Additionally, the RITIS database travel time data is not available for each individual travel lane for multi-lane highways. However, with minor incidents, there is a chance that the impacts from the incident would negatively impact only the travel lane experiencing the incident and not the other travel lanes. This indicates that the incident would not be reflected in the RITIS database even though an incident had occurred.

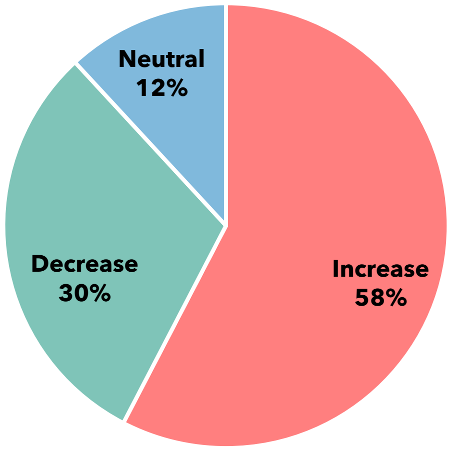
Segment Prioritization

The segments displayed in **Figure 2.8** were ranked based on the five-year average crash frequency. **Table 2.9** shows the following:

- Frequency of non-recurring congestion incidents
- The maximum delay for a non-recurring congestion incident
- The 5-year trends for total crash frequency and fatal and serious injury crash frequency for each segment. These trends can be either increase, decrease, or neutral (neither increase or decrease). As shown below, 66 percent of the segments have an increase in the 5-year total crash trend while 58 percent of the segments have an increase in the 5-year fatal/serious injury crash trends.

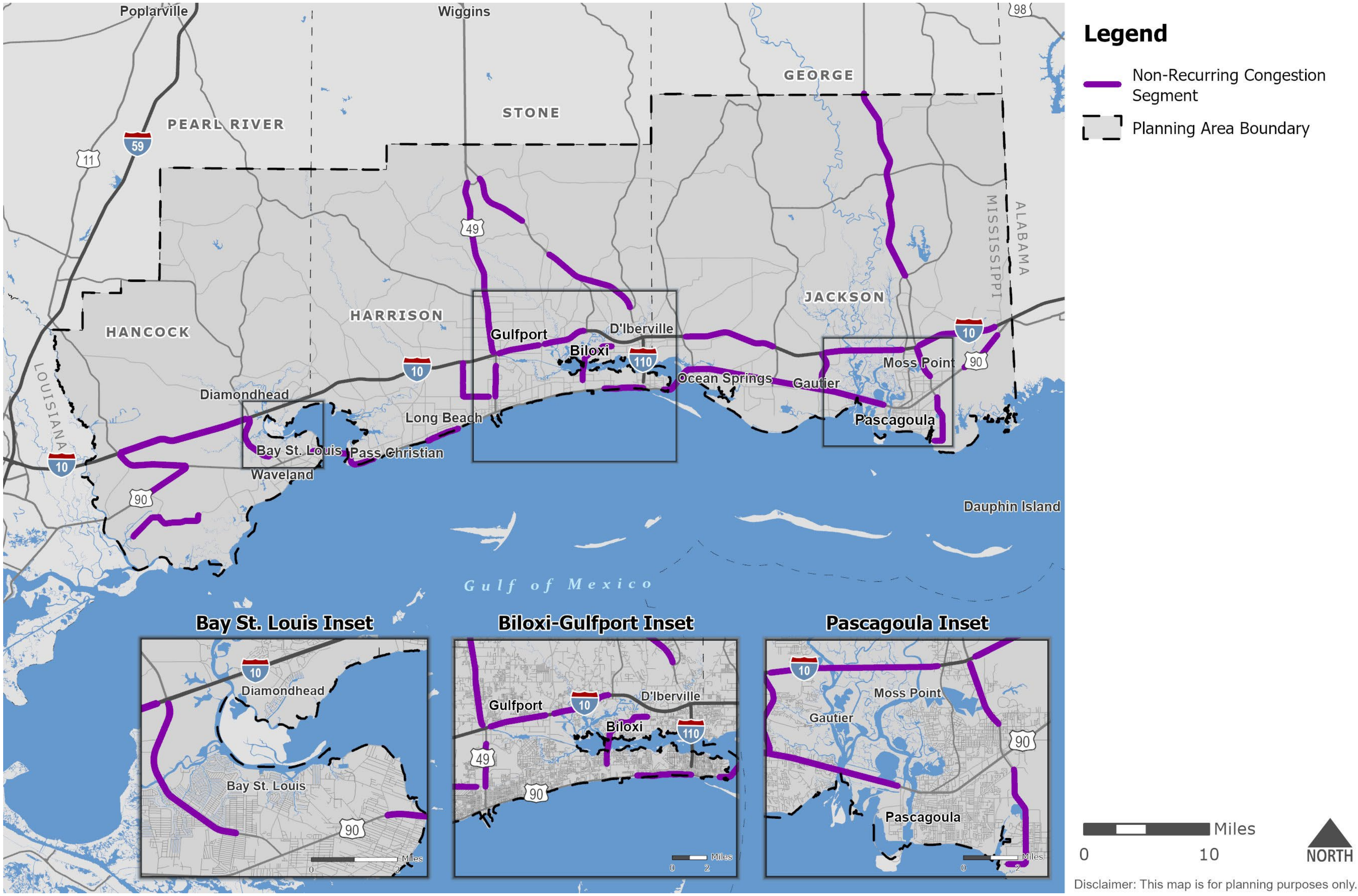


5-Year Total Crash Trend Non-Recurring Segment Distribution



5-Year Fatal/Serious Injury Crash Trend Non-Recurring Segment Distribution

Figure 2.8: Non-Recurring Congestion Segments



Source: NPMRDS

Table 2.9: Non-Recurring Congestion Segments

Roadway[1]	Segment	Length (miles)	2023 Non-Recurring Incidents	2023 Maximum Delay (Hours)	5-Year Annual Average Crash Frequency	5-Year Annual Average Fatal/Serious Injury Crash Frequency	5-Year Total Crash Trend	5-Year Fatal/Serious Injury Crash Frequency
US 49 Southbound	Angel Road/Bethel Road to MS 53/North Swan Road	9.41	191	2.20	114.0	5.2	Decrease	Decrease
MS 607 Eastbound	I-10 Eastbound Off-Ramp to US 90	5.55	315	1.75	30.6	1.6	Increase	Increase
US 49 Northbound	MS 53/North Swan Road to Angel Road/Bethel Road	9.41	205	1.73	114.0	5.2	Decrease	Decrease
US 90 Eastbound	Dunbar Avenue to Henderson Avenue	5.50	171	1.73	39.2	1.8	Decrease	Decrease
I-10 Westbound	MS 43/MS 603 On-Ramp to MS 607 Off-Ramp	10.42	255	1.34	40.0	3.6	Increase	Increase
MS 43/MS 603 Southbound	I-10 Eastbound Off-Ramp to Avenue B	4.11	265	1.29	43.8	2.6	Increase	Increase
MS 63 Northbound	MS 613 to MS 614	8.54	235	1.29	51.2	3.6	Increase	Increase
MS 607 Westbound	US 90 to I-10 Eastbound Off-Ramp	5.55	421	1.28	30.6	1.6	Increase	Increase
US 90 Westbound	Henderson Avenue to Dunbar Avenue	5.49	190	1.26	39.2	1.8	Decrease	Decrease
US 90 Eastbound	Ocean Springs Road to MS 57	3.78	172	1.18	214.0	5.8	Increase	Increase
US 90 Westbound	MS 617 (Jerry St Pe Highway) On-Ramp to Gautier Vancleave Road	4.65	154	1.07	117.0	4.6	Increase	Increase
MS 63 Northbound	MS 614 to George County Line	7.01	240	1.06	12.8	0.8	Increase	Increase
I-10 Eastbound	MS 63 On-Ramp to Franklin Creek Road Off-Ramp	6.19	165	1.04	27.8	1.6	Decrease	Increase
Lower Bay Road Eastbound	Port and Harbor Drive to Old Lower Bay Road	3.82	182	0.99	7.4	0.8	Decrease	Decrease
Popps Ferry Road Northbound	Hinman Avenue to Iron Horse Road	4.38	222	0.98	102.8	2.4	Increase	Increase
MS 611 Northbound	Port of Pascagoula to Old Mobile Highway	4.24	190	0.97	9.0	0.4	Decrease	Neutral
MS 611 Southbound	Old Mobile Highway to Port of Pascagoula	4.24	214	0.97	9.0	0.4	Decrease	Neutral
Popps Ferry Road Southbound	Iron Horse Road to Hinman Avenue	4.38	194	0.95	102.8	2.4	Increase	Increase
US 90 Eastbound	MS 57 to Gautier Vancleave Road	4.02	159	0.93	104.0	2.2	Increase	Increase
MS 63 Southbound	MS 614 to MS 613	8.53	226	0.90	51.2	3.6	Increase	Increase
US 90 Westbound	MS 607 to Lower Bay Road	3.86	136	0.90	8.8	0.6	Decrease	Increase
MS 63 Southbound	George County Line to MS 614	7.01	207	0.90	20.2	2.0	Increase	Increase
US 90 Eastbound	Lower Bay Road to MS 607	3.86	208	0.90	7.8	0.6	Decrease	Increase
US 90 Westbound	Franklin Creek Road to Old Stage Road	3.73	257	0.88	21.4	2.2	Increase	Increase
Lower Bay Road Westbound	Old Lower Bay Road to Port and Harbor Drive	3.82	179	0.86	7.4	0.8	Decrease	Decrease
US 90 Westbound	MS 57 to Ocean Springs Road	3.75	171	0.85	206.6	4.6	Increase	Increase
US 90 Westbound	Ocean Springs Road to MS 609/Washington Avenue	2.74	180	0.84	292.8	4.6	Increase	Decrease
Canal Road Southbound	I-10 Eastbound Off-Ramp to 28th Street	2.68	266	0.82	31.4	2.2	Decrease	Increase
US 90 Eastbound	White Harbor Road to South Cleveland Avenue	2.63	221	0.82	34.2	2.0	Decrease	Decrease
Canal Road Northbound	28th Street to I-10 Eastbound Off-Ramp	2.67	357	0.82	31.4	2.2	Decrease	Increase
Port and Harbor Drive Westbound	Lower Bay Road to Port Bienville	2.63	150	0.81	0.4	0.0	Increase	Neutral

Roadway[1]	Segment	Length (miles)	2023 Non-Recurring Incidents	2023 Maximum Delay (Hours)	5-Year Annual Average Crash Frequency	5-Year Annual Average Fatal/Serious Injury Crash Frequency	5-Year Total Crash Trend	5-Year Fatal/Serious Injury Crash Frequency
MS 67 Northbound	Lamey Bridge Road to MS 605 Off-Ramp	3.41	175	0.80	19.2	0.8	Increase	Increase
US 49 Southbound[RC]	O'Neal Road to I-10 Westbound Off-Ramp	2.38	123	0.73	382.0	4.8	Increase	Increase
MS 67 Northbound	MS 15 On-Ramp to Lamey Bridge Road	4.56	256	0.73	20.0	0.6	Increase	Increase
US 90 Eastbound	MS 609/Washington Avenue to Ocean Springs Road	2.70	152	0.73	292.8	4.6	Increase	Decrease
I-10 Westbound	MS 605 On-Ramp to US 49 Northbound Off-Ramp	3.24	137	0.72	30.6	0.8	Decrease	Decrease
US 90 Westbound	Gautier Vancleave Road to MS 57	4.04	183	0.72	104.0	2.2	Increase	Increase
US 90 Westbound	MS 609/Washington Avenue to Oak Street	3.12	157	0.71	125.6	3.6	Increase	Decrease
US 90 Eastbound	Gautier Vancleave Road to MS 617 (Jerry St Pe Highway) Off-Ramp	4.83	123	0.71	117.0	4.6	Increase	Increase
I-10 Westbound	Franklin Creek Road On-Ramp to MS 63 Off-Ramp	6.29	169	0.70	38.6	1.2	Increase	Increase
I-10 Eastbound	MS 607 On-Ramp to MS 43/MS 603 Off-Ramp	10.39	149	0.69	28.6	2.0	Increase	Increase
Gautier Vancleave Road Northbound	US 90 to I-10 Eastbound Off-Ramp	3.05	171	0.68	78.8	1.2	Increase	Decrease
Gautier Vancleave Road Southbound	I-10 Eastbound Off-Ramp to US 90	3.03	157	0.68	78.8	1.2	Increase	Decrease
I-10 Westbound	Shriners Boulevard On-Ramp to MS 605 Off-Ramp	3.36	124	0.66	43.8	0.6	Increase	Increase
US 90 Westbound	I-110 Southbound to Veterans Avenue	3.13	269	0.66	118.6	4.0	Increase	Increase
US 49 Northbound	O'Neal Road to MS 53/North Swan Road	2.07	135	0.65	115.4	2.0	Decrease	Decrease
MS 67 Northbound	East Wortham Road to Bethel Road	5.10	141	0.65	11.6	1.2	Increase	Neutral
US 90 Eastbound	Veterans Avenue to I-110 Northbound	2.88	313	0.62	118.6	4.0	Increase	Increase
28th Street Eastbound	Canal Road to 33rd Avenue	2.02	210	0.61	41.8	1.2	Increase	Increase
MS 43/MS 603 Northbound	Avenue B to I-10 Eastbound Off-Ramp	4.11	237	0.61	43.8	2.6	Increase	Increase
I-10 Eastbound	Gautier Vancleave Road On-Ramp to MS 613 Off-Ramp	6.15	201	0.61	57.0	0.8	Decrease	Decrease
US 90 Westbound	South Cleveland Avenue to White Harbor Road	2.63	212	0.60	34.2	2.0	Decrease	Decrease
Port and Harbor Drive Eastbound	Port Bienville to Lower Bay Road	2.63	151	0.58	1.4	0.0	Decrease	Neutral
MS 63 Northbound	Grierson Road to I-10 Eastbound Off-Ramp	2.50	187	0.56	72.0	3.8	Increase	Neutral
US 90 Eastbound	Oak Street to MS 609/Washington Avenue	3.12	170	0.56	125.6	3.6	Increase	Decrease
US 49 Northbound	28th Street to Airport Road	2.49	157	0.55	214.4	5.0	Decrease	Decrease
MS 63 Southbound	I-10 Eastbound Off-Ramp to Grierson Road	2.44	243	0.55	72.0	3.8	Increase	Neutral
US 49 Northbound[RC]	I-10 Westbound On-Ramp to O'Neal Road	2.46	102	0.55	382.0	4.8	Increase	Increase
I-10 Eastbound	MS 609 On-Ramp to MS 57 Off-Ramp	7.22	150	0.53	43.8	2.2	Increase	Increase

Source: NPMRDS
Note 1: Location experienced recurring congestion identified by **RC**

Summary

Based on the Non-Recurring Congestion Analysis, the following conclusions were drawn:

- There were 59 segments that experienced excessive non-recurring congestion, with delays of at least half an hour; the maximum delay was more than two hours.
- Two (2) segments that experienced excessive non-recurring congestion also experienced excessive recurring congestion.
- Non-recurring congestion predominantly occurs on:
  - I-10
  - US 49
  - US 90
  - MS 63
  - MS 67

Reliability

According to the FHWA, travel time reliability reflects the variability of travel time[11]. This lack of consistency in travel time occurs due to several factors which are essentially the sources of congestion identified in **Figure 1.1** happening separately or interacting. The contribution of these factors to the regional congestion transforms trip durations into unreliable travel times on a day-to-day basis which impedes appropriate travel planning and increases inconvenience for transportation system users.

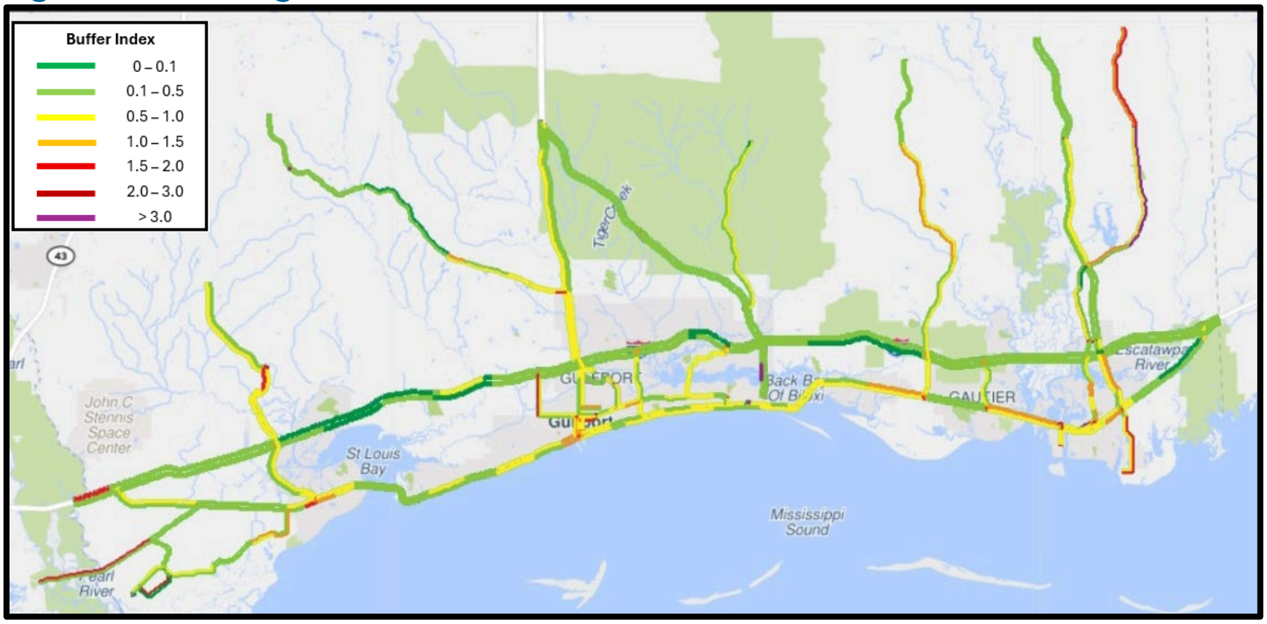
Buffer Time Index

Arriving to work 'on time' requires adding a factor of safety or a buffer to a commuter's travel time while planning for their daily commute. This buffer is commonly used to quantify travel time reliability in terms of *Buffer Index*, which is the size of the buffer as a percentage of the average travel time (95th percentile minus the average, divided by the average). **Figure 2.9**, **Figure 2.10**, and **Figure 2.11** show the average Buffer Index values during the AM, MD, and PM peaks for 2023, respectively. The corridors where commuters could anticipate unpredictable variability in trip durations during at least one peak (AM, MD, and/or PM) are listed in **Appendix F**.

[11] https://ops.fhwa.dot.gov/plan4ops/reliability.htm

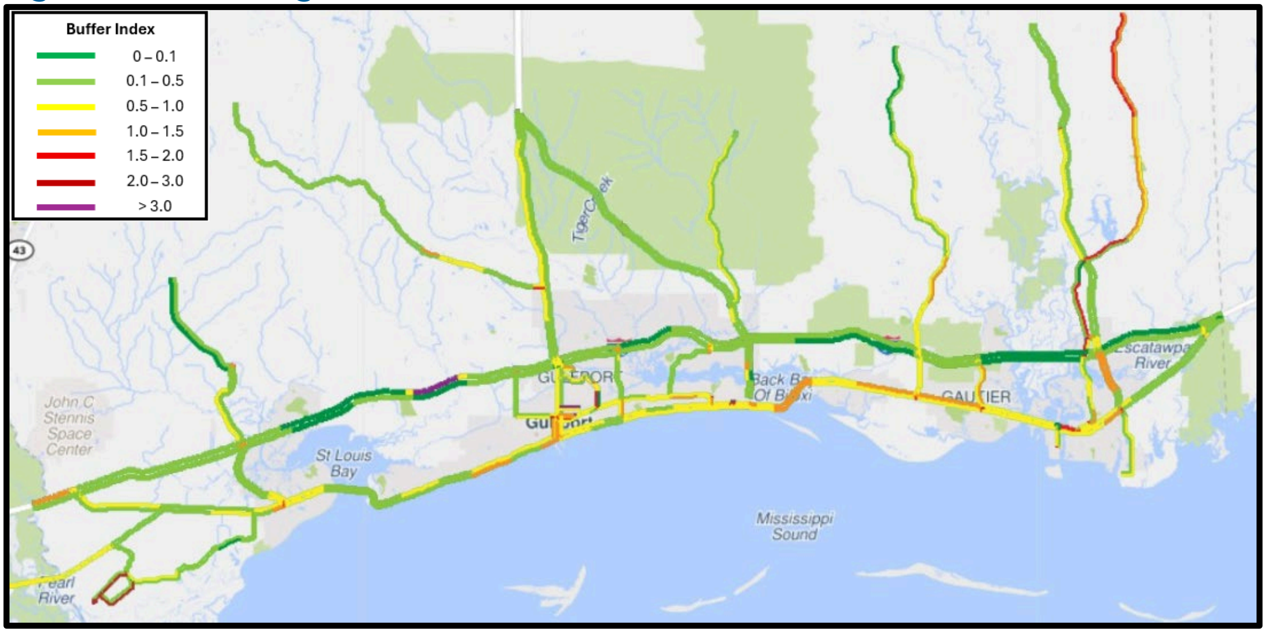
The Buffer Time Index (BTI) expresses the amount of extra "buffer of cushion" time needed to reach a destination on-time 95 percent of the time (late one working day per month). It is the ratio of the buffer or cushion time to the average travel time under regular traffic conditions. A buffer index of 1.0 indicates that for a 30-minute trip during regular traffic conditions, an extra 100 percent (or 30-minutes) buffer time is needed to reach the destination on time 95 percent of the time regardless of uncertainties.

Figure 2.9: Average Buffer Index Values – AM Peak - 2023



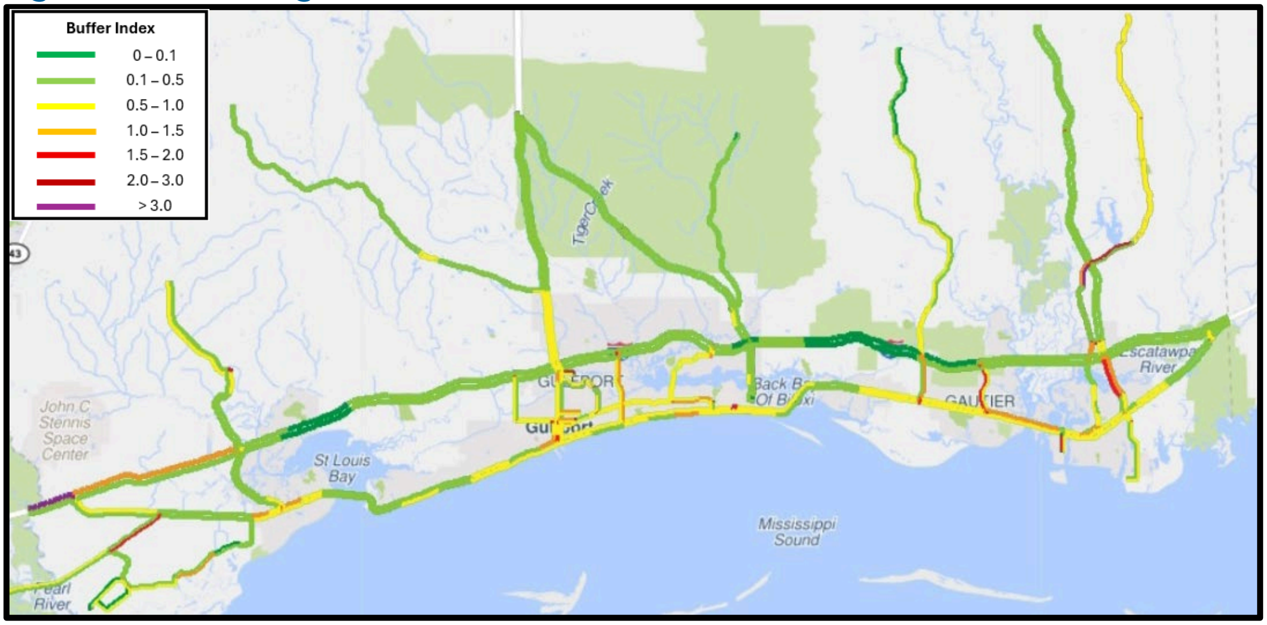
Source: NPMRDS

Figure 2.10: Average Buffer Index Values – MD Peak - 2023



Source: NPMRDS

Figure 2.11: Average Buffer Index Values – PM Peak - 2023



Source: NPMRDS

Level of Travel Time Reliability (LOTTR)

In addition to determining the congested locations using the CMP Index, the roadway's LOTTR was used to determine any additional bottlenecks that were not identified in the Recurring Congestion analysis shown in **Figure 2.4** and **Table 2.7**. **Figure 2.12** and **Figure 2.13** show monthly distributions as well as the yearly average for LOTTR during 2023. Within the region, the Interstate NHS LOTTR meets the target of for 11 of the 12 months for having a LOTTR less than 1.50 while the Non-

Interstate NHS LOTTR meets the target for all 12 months of having a LOTTR less than 1.50.

Figure 2.14 displays the change in Interstate and Non-Interstate NHS percent reliability (percent of person-miles traveled) between 2017 and 2023. As shown in **Figure 2.14**, the Interstate percent reliable has been steady at nearly 100 percent reliable since 2017. Meanwhile, the Non-Interstate NHS percent reliable has been greater than 90 percent since 2017.

Figure 2.15 displays the 2023 LOTTR of the monitored segments on the NHS routes within the planning area. The high LOTTR segments (greater than 1.50) that were not identified in the 2022 CMP analysis are listed in **Table 2.10**. More information on LOTTR can be found in Section 4.4 of *Technical Report #2: State of Current Systems*.

Figure 2.12: Monthly Distribution of LOTTR – Interstate System – 2023

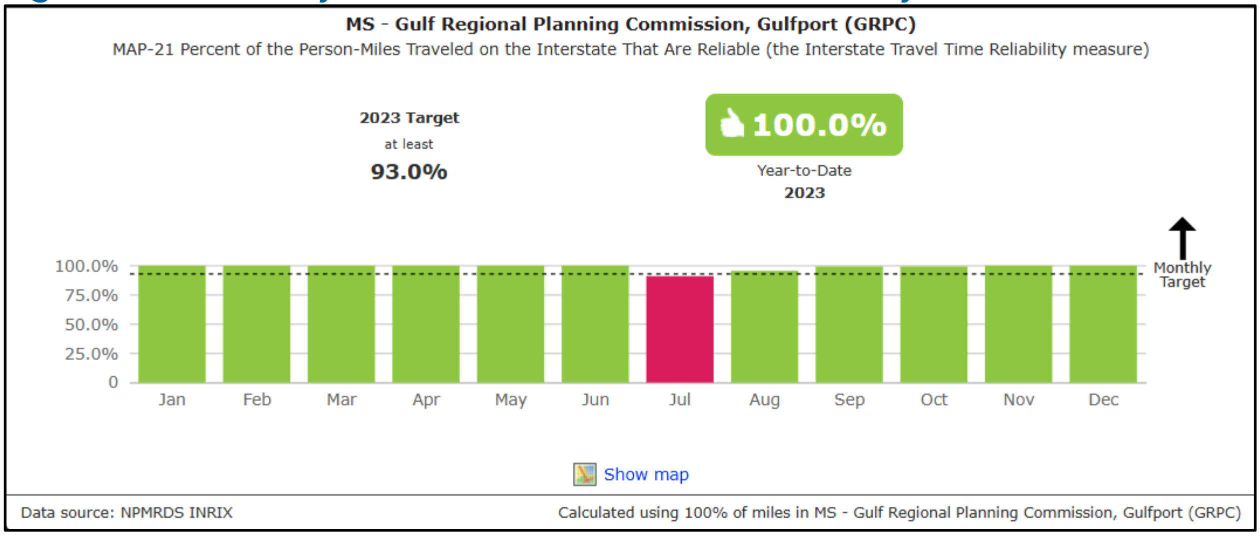


Figure 2.13: Monthly Distribution of LOTTR – Non-Interstate System – 2023

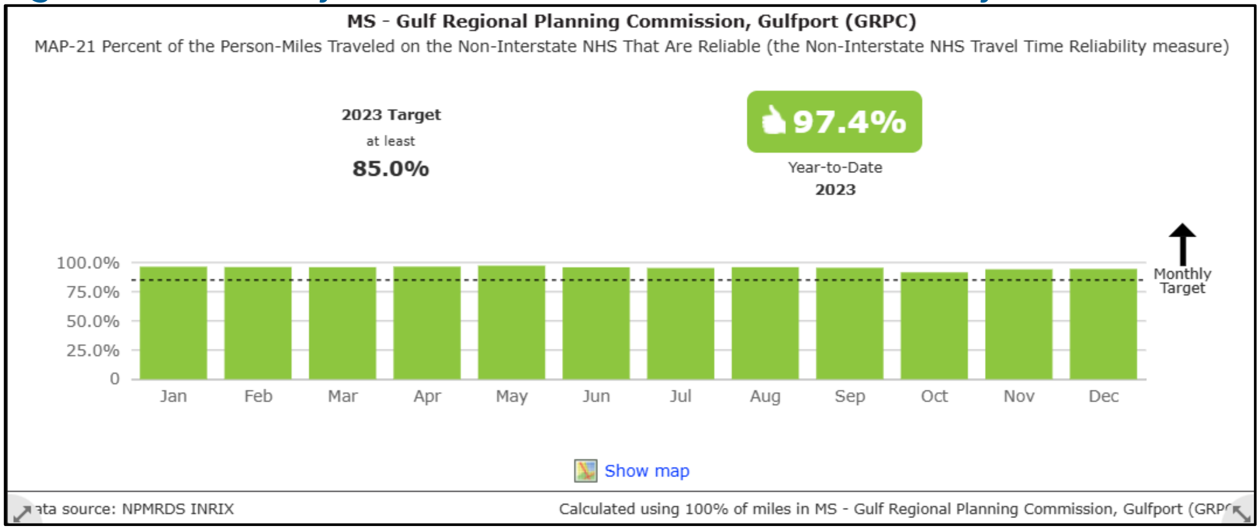
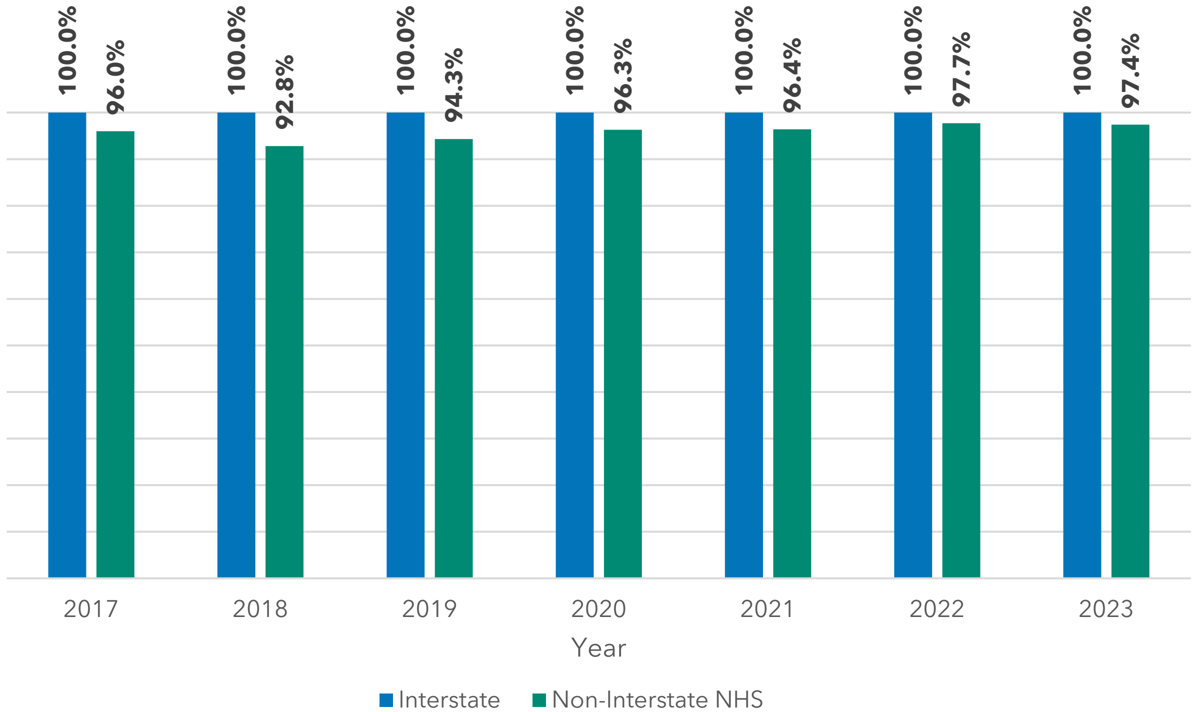


Figure 2.14: Historical LOTTR – 2017 to 2023



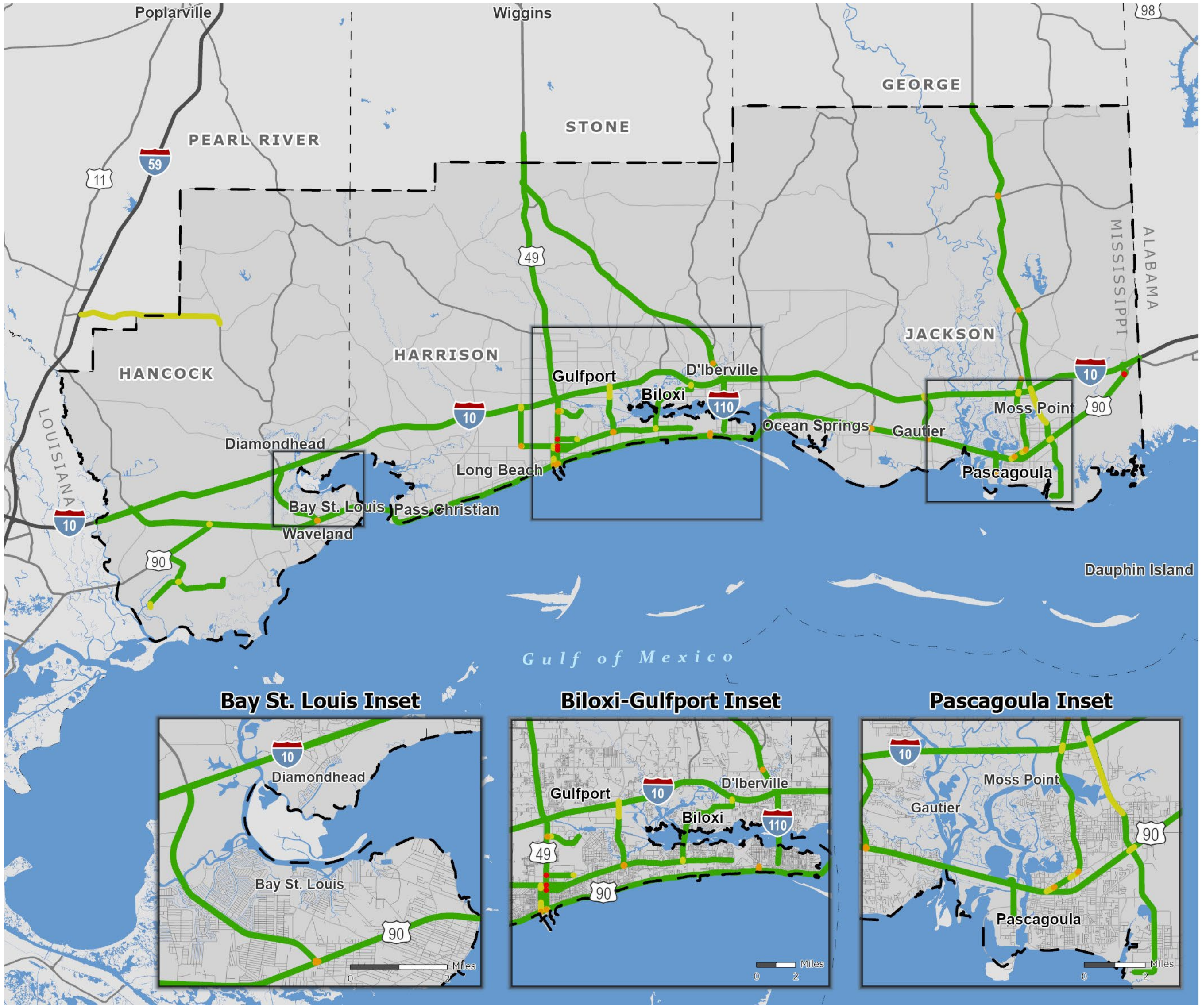
Source: NPMRDS

Table 2.10: High LOTTR Roadways Not Identified in CMP Rating Analysis

County	Route	Segment/Intersection
Hancock	Port and Harbor Drive	At Port Bienville
	US 90	At MS 43/MS 603
	US 90	At MS 607
	Lower Bay Road	At Port and Harbor Drive
Harrison	30th Avenue	17th St to US 90
	30th Avenue	28th Street to KCS Railroad
	Canal Road	At I-10
	Canal Road	At 28th Street
	Airport Road	US 49 to Three Rivers Road
	MS 605	Seaway Road to I-10
	Popps Ferry Road	At Pass Road
	Cedar Lake Road	Medical Park Drive to I-10
	US 49	At 34th Street
	34th Street	At 8th Avenue
	MS 15/MS 67	At Old Hwy 67/Lickskillet Road
	MS 605	At Pass Road
Jackson	US 90	At Gautier-Vancleave Road
	Gautier-Vancleave Road	At I-10
	MS 619	At Port of Pascagoula
	Telephone Road	US 90 to Market Street
	MS 613	14th Street to Hospital Road
	MS 613	At I-10
	MS 613	At Old Saracennia Road
	MS 63	Elder Ferry Road to I-10
	MS 63	At MS 613
	US 90	At Franklin Creek Road

SOURCE: NPMRDS

Figure 2.15: 2023 LOTTR on the National Highway System (NHS) Routes



Source: NPMRDS

Travel Time Reliability (TTTR)

Figure 2.16 shows the monthly distribution and yearly average for TTTR during 2023. As shown in **Figure 2.16**, the TTTR meets the target of less than 1.40 for ten (10) of the 12 months. **Figure 2.17** displays the change in TTTR between 2017 and 2023. As shown in **Figure 2.17**, the TTTR steadily increased between 2021 and 2023. This could be attributed to road work on I-10 Westbound between County Farm Road and Menge Avenue and near the Louisiana State Line and on I-110 Southbound in Biloxi that was ongoing in 2023.

Figure 2.16: Monthly Distribution of TTTR – 2023

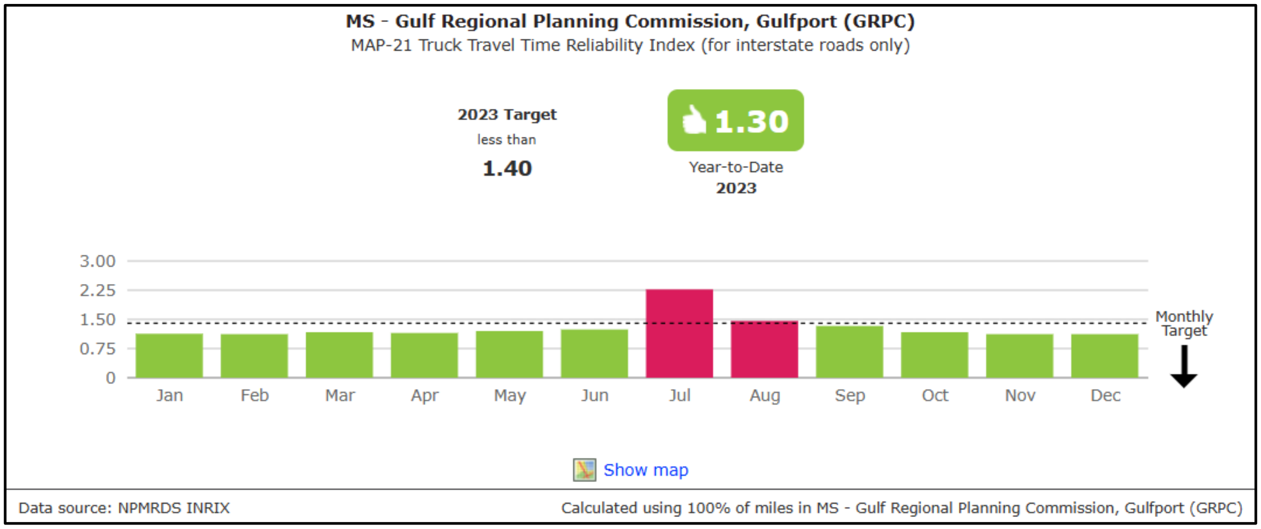
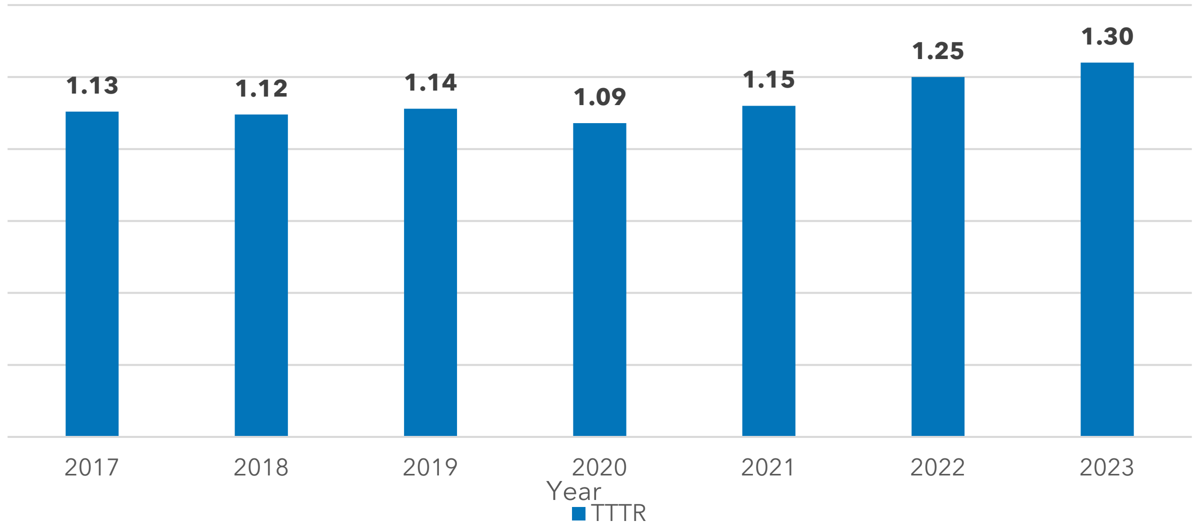


Figure 2.17: Historical TTTR – 2017 to 2023



Source: NPMRDS

2.6 Step 6: Identify and Assess Strategies

The federal legislation sections regarding congestion reduction strategies are listed below.

Section 500.109 (a) of Subpart A (Management Systems), 23 CFR (Final Rule)

- A congestion management system or process is a systematic and regionally accepted approach for managing congestion that provides accurate, up-to-date information on transportation system operations and performance and assesses alternative strategies for congestion management that meet State and local needs.

Section 450.322 (d)(4) of Subpart C (Metropolitan Transportation Planning and Programming), 23 CFR (Final Rule)

- Identification and evaluation of the anticipated performance and expected benefits of appropriate congestion management strategies that will contribute to the more effective use and improved safety of existing and future transportation systems based on the established performance measures. The following categories of strategies, or combination of strategies, are some examples of what should be appropriately considered for each area:
  - Demand management strategies, including growth management and congestion pricing;
  - Traffic operational improvements;
  - Public transportation improvements;
  - ITS technologies as related to the regional ITS Architecture; and
  - Where necessary, additional system capacity.

Section 450.322 (d)(5) of Subpart C (Metropolitan Transportation Planning and Programming) 23 CFR (Final Rule)

- A CMP shall include identification of an implementation schedule, implementation responsibilities, and possible funding sources for each strategy (or combination of strategies) proposed for implementation.

Identifying Congestion Reduction Strategies Using CMP Toolbox

There are constant changes in the way our society and economy operate. With increased commercial, residential, and industrial development, there is also increased transportation demand on existing transportation facilities. To address this increase in demand and ensuing congestion, appropriate strategies must be formulated to prevent deterioration in free flow traffic conditions. These strategies can include upgrading existing transportation facilities, creating additional facilities, and exploring the use of alternative travel methods.

The FHWA has identified four management strategies that provide a variety of measures that can be implemented to reduce traffic congestion. Those strategies are Demand Management Strategies, Traffic Operational Strategies, Public Transportation Strategies, and Road Capacity Strategies[12].

Demand management strategies are summarized in **Table 2.11**, traffic operations strategies are summarized in **Table 2.12**, public transportation strategies are summarized in **Table 2.13**, and road capacity strategies are summarized in **Table 2.14**.

Ad campaigns and education strategies can be incorporated into each of the management strategies to provide stakeholders and the public information on how the strategy can reduce congestion. Some examples of education strategies could include:

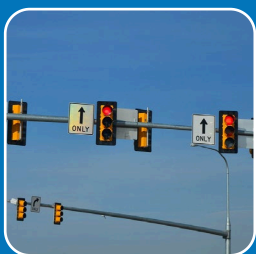
- Marketing the use of Transit as an alternative mode of transportation
- Encouraging healthier lifestyles through improved bicycle and pedestrian facilities
- Use of Traveler Information Systems by providing alternate routes
- Providing information on a proposed corridor or intersection improvement

Table 2.15 presents potential strategies that can be employed to alleviate or reduce congestion on segments identified in **Tables 2.7, 2.9, and 2.10** and **Figures 2.5, 2.6, 2.8, and 2.15**. Priorities gathered from public input are also reflected in the table.

[12] https://www.fhwa.dot.gov/planning/congestion_management_process/cmp_guidebook/cmpguidebk.pdf

Demand Management Strategies

•Demand Management, or Travel Demand Management (TDM), nonautomotive travel modes, and land use management can provide travelers with more options and reduce the number of vehicles of trips during congested periods. These include strategies that substitute communication for travel or encourage regional cooperation to change development patterns and/or reduce sprawl.

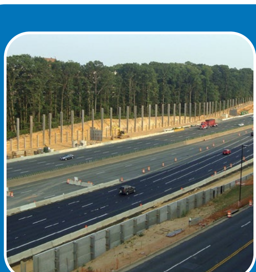


Traffic Operational Strategies

•These strategies focus on gettingmore out of the existing infrastructure. Rather than building new infrastructure, many transportation agencies have embraced strategies that deal with operation of the existing network of roads. Many of these operations-based strategies are supported by the use of enhanced technologies or Intelligent Transportation Systems (ITS).

Public Transportation Strategies

•Improving transit operations, improving access to transit, and expanding transit service can help reduce the number of vehicles on the road by making transit more attractive or accessible. These strategies may be closely linked to Demand Management and Traffic Operations Strategies. As with traffic operations, transit operations are often enhanced by ITS.



Road Capacity Strategies

•This category of strategies addresses adding more base capacity to the road network, including additional lanes and building new highways, as well as redesigning specific bottlenecks (such as interchanges and intersections) to increase their capacity. Given the expense and possible adverse environmental impacts of new single-occupant vehicle capacity, management and operations strategies should be given due consideration before additional capacity is considered.

Table 2.11: Demand Management Strategies

Strategy Group	Strategy	Description
Promoting Alternatives	Programs that encourage transit use	These programs give travelers that have the option of driving reasons to choose transit. Some programs can use: • Improving transit service (more service, faster service, and more comfortable service) • Improved stops and stations • Reduced fares and more convenient fare structures and payment systems • Marketing
	Pedestrian and bicycle improvements, and other strategies that promote nonmotorized travel	Pedestrian and bicycle improvements ensure that a network of infrastructure is in place to make bicycling or walking viable modes of travel. Some examples of infrastructure improvement to pedestrian and bicycle facilities include: • Bicycle lanes • Bicycle parking and storage facilities • Curb extensions • Intersection treatments • Paved shoulders and/or sidewalks • Shared-lane markings ("sharrows") • Signage and signalization • Trails and shared-use paths
Managing and Pricing Assets	Congestion pricing strategies	Congestion pricing works by shifting some rush hour highway travel to other transportation modes or to off-peak periods. Some strategies include: • High Occupancy Toll (HOT) and Express Toll Lanes • Roadway facility-based pricing • Zone-based pricing • Parking pricing
	Parking management	Parking management refers to strategies that result in a more efficient use of parking resources.
	Pricing fees for parking spaces	Efficient pricing fees for parking spaces can provide numerous benefits including increase turnover and therefore improved user convenience, parking facility cost savings, reduced traffic congestion, and increased revenues.
	Pricing fees for use of travel lanes	Pricing fees for use of travel lanes, or congestion pricing, works by shifting some rush hours traffic to over transportation modes or to off-peak periods.
	Increasing intercity freight rail or port capacity	Increasing freight rail or port capacity can reduce the number of trucks by shifting the freight from being carried by trucks to being carried by rail or water, thus reducing congestion.
Work Patterns	Flexible work hours programs	The organization has varying starting and ending working hours for employees, which can include: • Staggered hours are where employees arrive and depart work at different times in shifts, which may be staggered anywhere from 15 minutes to two (2) hours. • Flextime is where employees work specified hours each week but are given flexibility on where they arrive to work, take lunch, and leave work. • Compressed work weeks are where employees work more hours daily but work fewer days per week or pay period. (e.g. four ten-hour days instead of five eight-hour days)
	Telecommuting programs	Work is performed wherever the employee chooses. This is a system where employees do not commute or travel to a central place of

Strategy Group	Strategy	Description
Land Uses	Land use controls or zoning	Land use controls consist of government ordinances, codes, and permit requirements that restrict the private use of land and natural resources, to conform to public policies. These controls can provide a blueprint for sustainable growth and manage traffic.
	Growth management restrictions	Growth management restrictions often stem from concerns about the compatibility of new growth with surrounding uses and/or the need to minimize the costs associated with supplying public services, such as roads and streets, to support new development.
	Development policies that support transit-oriented designs	The utilization of effective and predictable transit encourages surrounding development which, in turn, supports transit. The basic principle is that convenient access to transit can be a key attraction that fosters mixed-use development, and the increased density in station areas not only support transit but also may accomplish other goals, including reducing congestion and urban sprawl, increasing pedestrian activity and economic development potential, and realizing environmental benefits.
	Incentives for high-density development	Incentives such as tax abatements and streamlined permitting processes can be used to stimulate the development of housing types which can reduce congestion.

Table 2.12: Traffic Operations Strategies

Strategy Group	Strategy	Description
Highway/Freeway Operations	Metering traffic onto freeways	Ramp meters are signals installed on freeway on-ramps to control the frequency at which vehicles enter the flow of traffic on the freeway. These signals reduce overall freeway congestion by managing the amount of traffic entering the freeway and by breaking up platoons that make it difficult to merge onto the freeway.
	Reversible commuter lanes	Reversible commuter lanes add peak-direction capacity to a two-way road and decrease congestion by borrowing available lane capacity from the other (off-peak) direction. This strategy can also be used for situations of non-recurring congestion, such as special events, construction, or evacuations.
	Access management	Access management strategies for highways include: • Left-turn restrictions • Intersection/signal spacing • Frontage Roads • Turn lanes • Roadway modifications (geometry, medians, sight distance)
	Movable median barriers	These barriers can be transferred between lanes to increase capacity in the peak direction. These barriers can also be used in work zones to prevent opposing traffic flow collisions.
	Automated toll collection improvements	Improving automated toll collections can improve traffic flow, decrease emissions, and are less expensive to build and operate than traditional toll collection methods.
	Conversion of HOV lanes to High Occupancy Toll (HOT) lanes	In many cases, HOV lanes may be underutilized and do not meet expectations about congestion relief benefits. Converting HOV lanes to HOT lanes is an innovative concept that can better utilize HOV lanes.
	Bus-only shoulder lanes	These shoulders can permit buses to bypass congestion.
Arterial and Local Roads Operations	Optimizing traffic signal timings	Optimizing traffic signal timing reduces idling and the acceleration of vehicles, as well as reducing stops and delay, leading to less fuel being burned and less emissions.
	Restricting turns at key intersections	Turning movement restrictions are a type of access management strategy used to improve the safety of intersections and driveways. Restricted and prohibited turn movements reduce the number of turning conflict points at intersections, which are generally known to reduce crash risk.
	Geometric improvements	Geometric improvements can include adding raised medians near intersections, adding bicycle lanes, and improved skew angles. Adding turn lanes are another intersection improvement. However, right-of-way restrictions need to be considered.
	Converting streets to one-way operations	One-way streets manage traffic patterns and reduce vehicle conflicts. These conversions work best in downtown or very congested areas, and they can offer improved signal timing.
	Transit Signal Priority (TSP)	TSP adjusts the timing of a traffic signal's red and green cycles to reduce the amount of time a transit vehicle spends waiting at a red light.
	Access management	Access management strategies for arterial and local roads include: • Driveway consolidation and spacing/design • Left-turn restrictions • Elimination of on-street parking • Intersection/signal spacing • Turn lanes • Roadway modifications (geometry, medians, sight distance)

Strategy Group	Strategy	Description
Arterial and Local Roads Operations	Traffic calming	Traffic calming refers to a full range of methods to slow cars through commercial and residential neighborhoods. This can benefit pedestrians and bicyclists since cars are driving at speeds that are safer and more compatible to walking and bicycling.
	Road Diets	Road Diets remove travel lanes from a roadway and utilize space for other uses and travel modes. The most common Road Diet reconfiguration is converting a four-lane undivided roadway to a three-lane roadway with a Two-Way Left-Turn Lane (TWLTL).
Other Operations Strategies	Incident management	Traffic incident management (TIM) consists of a planned and coordinated multi-disciplinary process to detect, respond to, and clear traffic incidents and restore traffic flow as safely and quickly as possible.
	Traveler information systems	These systems update drivers on current roadway conditions, including delays, incidents, weather-related messages, travel times, emergency alerts, and alternate routes. These systems allow drivers to make more effective travel decisions.
	Improved management of work zones	Managing traffic during construction is necessary to minimize traffic delays, maintain motorist and worker safety, complete roadwork in a timely manner, and maintain access for businesses and residents.
	Identifying weather and road surface problems	Weather can have impact traffic flow due to reduced visibility and or wet roadway surface conditions.
	Special events management	Special events such as sporting events, concerts, fairs, and conventions cause high levels of congestion due to an overload of the street and highway networks adjacent to the venue. However, agencies and organizers can easily coordinate a mitigation plan and deploy the proper resources to minimize the effects on normal traffic operation.
	Freight management	Congestion can be caused by restrictions on freight movement, such as the lack of space for trucks in urban areas.

Table 2.13: Public Transportation Strategies

Strategy Group	Strategy	Description
Operations Strategies	Realigned transit service schedules and stop locations	Realigning transit service schedules and stop locations eliminate non-productive route segments, reduce route mileage and/or increase speed, or ensure that major activity centers are served.
	Providing real-time information	Real-time transit information systems provide transit riders with up-to-the-minute information on bus arrivals via the internet, phone, and display boards at key bus stops. The information is based on real-time bus locations using GPS rather than a set schedule of arrival and departure times. Access to real-time travel information reduces actual and perceived wait times and increase the reliability of transit, which can encourage a mode shift.
	Providing travel conditions	Travel conditions information can allow users to make proper mode and route choices.
	Monitoring security	Enhancing the security, and safety, of transit customers, personnel, equipment, and facilities can alert officials of possible delays or closures as well as warn officials of possible intentional acts of crime or violence.
	Enhanced transit amenities and safety	Enhanced transit amenities and safety can make transit more attractive while bringing immense benefits to accessibility and performance.
	Universal farecards	Users can access multiple modes of travel, such as trains, buses, and taxis, with one card.
	Transit Signal Priority (TSP)	TSP tools modify signal timing or phasing when transit vehicles are present either conditionally for late runs or unconditionally for all arriving transit.
	Bus Rapid Transit (BRT)	BRT is a term used for a set of transit service improvements that include: • Grade-separated right-of-way • High-quality vehicles • Frequent service • Convenient user information • Efficient pre-paid fare collection • Efficient operations
Capacity Strategies	Reserved travel lanes	Reserved lanes help buses pass congested traffic. These lanes can include curbside lanes, median lanes, or contraflow lanes.
	More frequent transit or expanded hours of service	Expanded transit can reduce motor vehicles miles driven and traffic congestion.
	Expanded transit network	Expanding the transit network can increase the mode's attractiveness.
Accessibility Strategies	Bicycle and pedestrian facilities improvements	Improved bicycle and pedestrian facilities can reduce traffic congestion and pollution by providing alternate means of vehicular travel, as well as recreational opportunities which encourage healthy lifestyles.
	Provisions for bicycles	Transit vehicles with bikeracks mounted on buses allow a bicycle to be used at both ends of the journey, and helps cyclists who experience a mechanical failure, unexpected bad weather, or sudden illness. It also allows cyclists to pass major barriers where cycling is prohibited or particularly difficult.

Table 2.14: Road Capacity Strategies

Strategy Group	Strategy	Description
All	Construct new HOV or HOT lanes	High Occupancy Vehicle (HOV) lanes are lanes that have occupancy restrictions on usage to encourage ridesharing. High Occupancy Toll (HOT) lanes are available to HOV users without a toll. SOV users can use these lanes for a toll, which adjusts based on demand.
	Removing bottlenecks	Some strategies that can remove or fix bottlenecks include: Use a short section of traffic bearing shoulder as a peak-hour lane • Restriping • Modifying weaving areas • Ramp metering or closing entrance ramps • Improving traffic signal timing • Access management • Providing traffic diversion information (ITS).
	Intersection improvements	Intersection improvements can include adding raised medians near intersections, adding bicycle lanes, improved skew angles, reconfiguring signal timings, and adding advanced warning devices. Adding turn lanes are another intersection improvement. However, right-of-way restrictions need to be considered.
	Center turn lanes	These lanes, also known as Two-Way Left Turn Lanes (TWLTL), remove left-turning vehicles from the through lanes and store those vehicles in the median area until an acceptable gap in opposing traffic is available.
	Overpasses or underpasses at congested locations	Intersections handling a high volume of traffic and pedestrians (and possibly railroads) limit the capacity of the approaching roads. Grade separating these conflict points using overpasses and underpasses allows traffic to flow freely. This in turn makes conditions safer for vehicles, pedestrians, and trains.
	Closing gaps in the street network	Closing gaps in the street network by constructing new roads can mitigate congestion on existing roads. These new roads can also incorporate complete streets.
	Adding travel lanes	Increasing the number of lanes is not always possible due to physical and fiscal constraints. However, it remains an important approach to addressing congestion.

Table 2.15: Proposed Strategies for Alleviating Congestion

Roadway	Segment	County	Congestion Type[1]	Proposed Congestion Alleviation Strategy	Responsible Agency	Implementation Schedule (Construct by or before)
28th Street	At Canal Road	Harrison	LOTTR	Signal optimization, extend turn lanes	Gulfport	2050
28th Street	Canal Road to 33rd Avenue	Harrison	Non-Recurring	Safety improvements	Gulfport	2050
30th Avenue	US 90 to 17th Street	Harrison	LOTTR	Signal optimization	Gulfport	2030
30th Avenue	25th Street to 28th Street	Harrison	LOTTR	Signal optimization, improve railroad crossing	Gulfport	2030
Bayou Casotte Parkway	Washington Avenue to Louise Street	Jackson	Recurring	Improve port operations	Port of Pascagoula	2030
Canal Road	28th Street to I-10	Harrison	Non-Recurring	Safety improvements	Gulfport	2040
Canal Road	I-10 Eastbound Off-Ramp to I-10 Westbound Off-Ramp	Harrison	LOTTR	Signal optimization, interchange improvements	MDOT or Gulfport	2030
Cedar Lake Road	Medical Park Drive to I-10 Westbound	Harrison	LOTTR and Public Outreach	Signal optimization, access management	Biloxi or MDOT	2030
Gautier Vancleave Road	I-10 Eastbound Off-Ramp to I-10 Westbound Off-Ramp	Jackson	LOTTR	Signal optimization, interchange improvements	MDOT	2030
I-10	MS 607 to MS 43/MS 603	Hancock	Non-Recurring	Safety improvements	MDOT	2030
I-10	Menge Avenue to County Farm Road	Harrison	Recurring	Install ITS, promote use of alternate routes (Widening to 6 lanes ongoing)	MDOT	2030
I-10	US 49 to MS 605	Harrison	Non-Recurring	Safety improvements, install ITS, promote use of alternate routes	MDOT	2030
I-10	MS 605 to Shriners Boulevard	Harrison	Non-Recurring	Safety improvements, install ITS, promote use of alternate routes	MDOT	2030
I-10	MS 609 to MS 57	Jackson	Non-Recurring	Safety improvements, improve ITS, promote use of alternate routes	MDOT	2030
I-10	Gautier Vancleave Road to MS 613	Jackson	Non-Recurring	Safety improvements, improve ITS, promote use of alternate routes	MDOT	2030
I-10	MS 63 to Franklin Creek Road	Jackson	Non-Recurring	Safety improvements, improve ITS, promote use of alternate routes	MDOT	2030
Lower Bay Road	Port and Harbor Drive to Old Lower Bay Road	Hancock	Non-Recurring	Safety improvements	Hancock County	2030
Lower Bay Road	At Port and Harbor Drive	Hancock	LOTTR	Intersection improvements (extend turn lanes or roundabout)	Hancock County	2030
MS 15/MS 67	At Old Highway 67/Lickskillet Road	Harrison	LOTTR	Signal optimization	MDOT	2030
MS 43/MS 603	Avenue B to I-10	Hancock	Recurring and Non-Recurring	Signal optimization at I-10, safety improvements	MDOT	2030
MS 53	C C Camp Road to Pendora Lane	Harrison	Recurring	Signal optimization, extend or add turn lanes at intersections	MDOT	2030
MS 53	Old Highway 49 to US 49	Harrison	Recurring	Turn lanes at intersections, intersection improvements at US 49 under construction	MDOT	2030
MS 57	At US 90	Jackson	Recurring	Signal optimization, extend turn lanes	MDOT	2030
MS 57	I-10 Eastbound Off-Ramp to I-10 Westbound Off-Ramp	Jackson	Recurring	Signal optimization, interchange improvements	MDOT	2030
MS 57	Gautier Vancleave Road to Wire Road	Jackson	Recurring	Signal optimization, extend or add turn lanes at intersections (MS 57 realignment under construction as of 2025)	MDOT	2030
MS 605	At Pass Road	Harrison	LOTTR	Signal optimization, extend or add turn lanes	MDOT	2030
MS 605	Seaway Road to I-10 Westbound Off-Ramp	Harrison	LOTTR	Signal optimization, access management, interchange improvements at I-10	MDOT	2050
MS 607	I-10 to US 90	Hancock	Non-Recurring	Safety improvements	MDOT	2030
MS 609	At Big Ridge Road	Jackson	Public Outreach	Signal optimization, access management at Frontage Roads	MDOT	2030
MS 611	Port of Pascagoula to Old Mobile Avenue	Jackson	Non-Recurring	Improve traffic entering and exiting refineries	MDOT or Refineries	2030
MS 613	14th Street to Hospital Road	Jackson	LOTTR	Signal optimization, access management	MDOT	2030

Roadway	Segment	County	Congestion Type[1]	Proposed Congestion Alleviation Strategy	Responsible Agency	Implementation Schedule (Construct by or before)
MS 613	I-10 Eastbound Off-Ramp to I-10 Westbound Off-Ramp	Jackson	LOTTR and Public Outreach	Signal optimization, interchange improvements	MDOT	2030
MS 613	At Old Saracennia Road	Jackson	LOTTR	Signal optimization, extend turn lanes	MDOT	2030
MS 613	MS 614 to George County Line	Jackson	Recurring and Public Outreach	Intersection improvements at MS 614	MDOT	2030
MS 619	At USS Vicksburg Way	Jackson	LOTTR	Improve port operations	MDOT or Port of Pascagoula	2030
MS 63	Grierson Road to I-10	Jackson	Recurring, Non-Recurring, and LOTTR	Safety improvements, signal optimization, access management, extend turn lanes	MDOT	2030
MS 63	I-10 Eastbound Off-Ramp to Saracennia Road	Jackson	Recurring and Public Outreach	Signal optimization, interchange improvements	MDOT	2030
MS 63	At MS 613	Jackson	LOTTR	Signal optimization, extend turn lanes	MDOT	2030
MS 63	MS 613 to George County Line	Jackson	Non-Recurring	Safety improvements	MDOT	2030
MS 67	MS 15 to MS 607	Harrison	Non-Recurring	Safety improvements	MDOT	2030
MS 67	Wortham Road to Bethel Road	Harrison	Non-Recurring	Safety improvements	MDOT	2030
Pass Road	At Popps Ferry Road	Harrison	LOTTR	Signal optimization, extend or add turn lanes	Biloxi	2030
Popps Ferry Road	Pass Road to Iron Horse Road	Harrison	Non-Recurring	Safety improvements, drawbridge operations	Biloxi	2040 (Sunkist Country Club Road to Riverview Drive)
Port and Harbor Drive	Port Bienville to Lower Bay Road	Hancock	Non-Recurring	Improve port operations	Port Bienville	2030
Telephone Road	US 90 to Market Street	Jackson	LOTTR	Signal optimization, access management	Pascagoula	2030
Three Rivers Road	Seaway Road to Crossroads Parkway	Harrison	Recurring	Signal optimization, extend or add turn lanes	Gulfport	2040
US 49	US 90 to 25th Street	Harrison	Recurring	Signal optimization	MDOT	2030
US 49	25th Street to 28th Street	Harrison	Recurring and Public Outreach	Signal optimization	MDOT	2030
US 49	28th Street to Airport Road	Harrison	Non-Recurring	Safety improvements	MDOT	2030
US 49	At 34th Street	Harrison	LOTTR	Signal optimization	MDOT	2030
US 49	Airport Road to I-10	Harrison	Recurring	Signal optimization, access management	MDOT	2030
US 49	I-10 to O'neal Road	Harrison	Recurring and Non-Recurring	Safety improvements, signal optimization, access management	MDOT	2030
US 49	O'neal Road to Bethel Road	Harrison	Non-Recurring	Safety improvements (Widening to 6 lanes between Duckworth Road and MS 53 ongoing)	MDOT	2030 (O'neal Road to School Road)
US 90	Lower Bay Road to MS 607	Hancock	Non-Recurring	Safety improvements	MDOT	2030
US 90	At MS 607	Hancock	LOTTR	Intersection improvements (extend turn lanes or J-turn)	MDOT	2030
US 90	At MS 43/MS 603	Hancock	LOTTR	Signal optimization	MDOT	2030
US 90	Dunbar Avenue to Henderson Avenue	Hancock and Harrison	Non-Recurring	Safety improvements	MDOT	2030
US 90	White Harbor Road to Cleveland Avenue	Harrison	Non-Recurring	Safety improvements	MDOT	2030
US 90	Veterans Avenue to I-110	Harrison	Non-Recurring	Safety improvements	MDOT	2030
US 90	I-110 to Main Street	Harrison	Recurring	Signal optimization, access management	MDOT	2030
US 90	Oak Street to MS 619	Harrison and Jackson	Recurring and Non-Recurring	Safety improvements, signal optimization, access management	MDOT	2030 (MS 609 to Dolphin Drive)
US 90	At Gautier Vancleave Road	Jackson	LOTTR	Signal optimization	MDOT	2030
US 90	Telephone Road to Chicot Road	Jackson	Recurring	Signal optimization, access management	MDOT	2030
US 90	At MS 63/MS 611	Jackson	Recurring	Signal optimization	MDOT	2030
US 90	Grierson Road to Franklin Creek Road	Jackson	Non-Recurring	Safety improvements	MDOT	2030

Roadway	Segment	County	Congestion Type[1]	Proposed Congestion Alleviation Strategy	Responsible Agency	Implementation Schedule (Construct by or before)
US 90	At Franklin Creek Road	Jackson	LOTTR	Intersection improvements	MDOT	2030

NOTE 1: Congestion Types

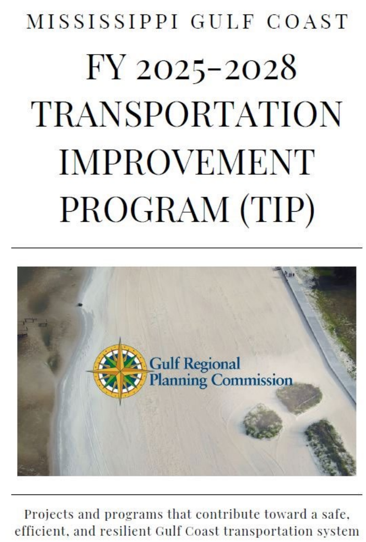
- Recurring: Locations identified in the Recurring Congestion Analysis (**Table 2.4**)
- Non-Recurring: Locations identified in the Non-Recurring Congestion Analysis (**Table 2.6**)
- LOTTR: Locations identified in the LOTTR analysis that were not identified in the Recurring Congestion Analysis (**Table 2.7**)
- Public Outreach: Locations identified by Public Outreach (**Table 2.5**)

2.7 Step 7: Program and Implement Strategies

The strategy toolbox identified in the previous section is expected to be subject to a rigorous evaluation process by different stakeholders. The process will include additional and more detailed analysis of short-listed projects pertaining to potential operational, safety, and cost elements associated with the implementation phase. A number of these projects might include transportation policy modifications or demand restraints which might require additional collaboration and outreach from elected officials. The implementation process might also require allocation of existing resources.

Programming and Implementation

Projects that are programmed for implementation are included in the Transportation Improvement Program (TIP)[13], a multi-year listing of transportation projects that have received a commitment of funding from a combination of federal, state, and/or local sources within the Jackson Metropolitan Planning Area. The TIP includes projects of various capital and operating needs, maintenance of the public transit services, and construction of bicycle and pedestrian improvements.


MISSISSIPPI GULF COAST
FY 2025-2028
TRANSPORTATION
IMPROVEMENT
PROGRAM (TIP)

Projects and programs that contribute toward a safe, efficient, and resilient Gulf Coast transportation system

The current TIP for the Gulf Coast MPO is the Mississippi Gulf Coast FY 2025 – 2028 Transportation Improvement Program.

The majority of funding sources for projects in the TIP come from federal funds allocated to Mississippi through transportation legislation that is administered through the Federal Highway Administration (FHWA) and Federal Transit Administration (FTA).

The current funding sources planned for the 2025-2028 TIP include.

- TMA
- Non Urban
- Transportation Alternatives
- Safety Group
- Studies/Projects Group
- Carbon Reduction Program – TMA
- Carbon Reduction Program – Non Urban

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[13] https://grpc.com/wp-content/uploads/2025/03/MS-Gulf-Coast-FY2025-2028-TIP-FULL-DRAFT_3-2025-1.pdf

CMP Implementation Partners

GRPC will work with the agencies listed below to implement many of its congestion mitigation strategies:

- Hancock, Harrison, and Jackson Counties
- Cities of:
  - Gulfport
  - Biloxi
  - D'Iberville
  - Waveland
  - Bay St. Louis
  - Diamondhead
  - Pass Christian
  - Long Beach
  - Ocean Springs
  - Gautier
  - Pascagoula
  - Moss Point
- MDOT
- FHWA
- FTA

The *Mississippi Gulf Coast FY 2025 – 2028 Transportation Improvement Program (TIP)*[13] identifies GRPC sponsored projects for each of the three (3) counties, MDOT sponsored projects, and the FHWA Eastern Federal Lands Highway Division sponsored projects.

2.8 Step 8: Evaluate Strategy Effectiveness

Federal Guidelines for Maintaining the Congestion Management Process

The federal legislation sections regarding the maintenance of the CMP are listed below.

Section 450.322 (d)(3) of Subpart C (Metropolitan Transportation Planning and Programming), 23 CFR (Final Rule)

- A CMP shall include the establishment of a coordinated program for data collection and system performance monitoring to define the extent and duration of congestion, to contribute in determining the causes of congestion, and evaluate the efficiency and effectiveness of implemented actions. To the extent possible, this data collection program should be coordinated with existing data sources (including archived operational/ITS data) and coordinated with operations managers in the metropolitan area.

Section 450.322 (d)(6) of Subpart C (Metropolitan Transportation Planning and Programming), 23 CFR

- The CMP shall include the implementation of a process for periodic assessment of the effectiveness of implemented strategies, in terms of the area's established performance measures. The results of this evaluation shall be provided to decision makers and the public to provide guidance on selection of effective strategies for future implementation.

System Performance and Maintenance

The overall goal of the CMP is to reduce traffic congestion within the planning area and improve free-flow traffic condition through the implementation of proposed congestion reduction strategies and projects. Two comparative analyses were performed to measure the effectiveness the proposed strategies the GRPC 2045 MTP CMP had on reducing traffic congestion in the region.

The first comparative analysis compares the planning area performance measures between the 2045 CMP and the 2050 CMP. The summary of this comparison is shown in **Table 2.16**. The changes in the performance measures are summarized below:

- The improved performance measures include:
  - Average Annual Bicycle/Pedestrian Crashes in Five-Year Period
  - Total Vehicle Hours of Delay (VHD)
  - Non-Interstate Percent of Person-Miles Traveled that are Reliable
  - Truck Vehicle Hours of Delay (VHD)
- The worsened performance measures include:
  - Transit Ridership

- Average Annual Crashes in Five-Year Period
- Average Annual Fatal Crashes in Five-Year Period
- Average Annual Serious Injury Crashes in Five-Year Period
- Average Annual Bicycle/Pedestrian Fatal Crashes in Five-Year Period
- Average Annual Bicycle/Pedestrian Serious Injury Crashes in Five-Year Period
- Truck Travel Time Reliability (TTTR)

- There were no changes for the following performance measures:
  - Bicycle and Pedestrian Inventory (mileage)
  - Interstate Percent of Person-Miles Traveled that are Reliable

Table 2.16: GRPC 2045 MTP CMP and GRPC 2050 MTP CMP Planning Area Comparative Analysis

Performance Measure[1]	2045 MTP CMP	2050 MTP CMP	Change
Bicycle and Pedestrian Inventory (mileage)[A]	546	546	-
Transit Ridership[A]	890,535	525,000	↘
Average Annual Crashes in Five-Year Period[B]	11,051.2	11,766.0	↗
Average Annual Fatal Crashes in Five-Year Period[B]	58.6	65.6	↗
Average Annual Serious Injury Crashes in Five-Year Period[B,C]	49.0	278.2	↗
Average Annual Bicycle/Pedestrian Crashes in Five-Year Period[B]	179.8	166.0	↘
Average Annual Bicycle/Pedestrian Fatal Crashes in Five-Year Period[B]	16.0	16.4	↗
Average Annual Bicycle/Pedestrian Serious Injury Crashes in Five-Year Period[B,C]	9.0	36.2	↗
Total Vehicle Hours of Delay[B]	33,712	16,151	↘
Interstate Percent of Person-Miles Traveled that are Reliable[A]	100.0%	100.0%	-
Non-Interstate Percent of Person-Miles Traveled that are Reliable[A]	92.8%	97.4%	↗
Truck Vehicle Hours of Delay[B]	3,458	853	↘
TTTR[B]	1.12	1.30	↗

NOTE 1A: ↗ indicates an improvement, ↘ indicates worsening changes, - indicates no changes
NOTE 1B: ↘ indicates an improvement, ↗ indicates worsening changes, - indicates no changes
NOTE 1C: There was a redefinition of Serious Injury severity crashes in 2019.

The second comparative analysis shows the proposed improvement for the 2045 MTP CMP congested roadways, if that roadway is congested in the 2050 MTP CMP, if there is an ongoing project, and the MTP's project implementation schedule. The results of the comparative analysis between the 2045 MTP CMP and 2050 MTP CMP are shown in **Table 2.17**.

As shown in **Table 2.17**, there are eight (8) segments that were in the 2045 MTP CMP where improvements were implemented are removed in the 2050 MTP CMP due to improved conditions. Those segments (along with improvements) are:

- Division Street from Santini Street to I-110 (Widened from two (2) lanes to four (4) lanes)
- I-10 Westbound from MS 613 to Gautier-Vancleave Road (Incident Bypass Signage installed)
- MS 43 from I-10 to Kiln Delisle Road (New signal installed at Texas Flat Rd/Crump Rd. Roadway resurfaced. Sign post reflectors installed.)
- MS 43 from Salem Road to Old Kiln Road (Turn lanes constructed at Salem Rd and Benville Rd. Sign post reflectors installed.)
- US 90 from Broad Avenue to US 49 (Vehicle detection upgraded at intersections.)
- US 90 from Telephone Road to Market Street (New signal equipment installed at intersections.)
- US 90 from Victor Street to Hospital Road (New signal equipment installed at intersections.)
- US 90 from 0.38 miles west of Chicot Street to Chicot Street (New signal equipment installed at intersections.)

Future Actions

To meet 23 CFR Section 450.322 (d)(3), the GRPC will need to regularly collect data to monitor the effectiveness of the congestion management strategies implemented throughout the region. This will be done as part of the CMP update process, as well as the additional analysis conducted as part of the MTP. These efforts will include evaluation of the performance of the regional transportation system as part of the MTP, but also additional analysis of the corridors included in the existing CMP network and the CMP network as updated by the MTP. Additionally, the MPO can evaluate the anticipated congestion impacts of candidate projects using the MPO's Travel Demand Model.

To understand the impact of the CMP strategies, the MPO can begin collecting data on projects included in the TIP to determine the before and after impacts of these projects and if they are assisting with CMP efforts and how projects may need to be changed to align with the CMP strategies. The MPO will review the results of these before and after analyses to assist in the identification of effective and ineffective strategies and revise the CMP as needed. Additionally, the CMP will be available on the MPO's website, available for public commenting during the MTP update process, and be part of the input sought from the general public during the public outreach process.

Table 2.17: GRPC 2045 MTP CMP and GRPC 2050 MTP CMP Comparative Analysis

Road	Segment	GRPC 2045 MTP CMP Proposed Improvement	Segment in GRPC 2050 MTP CMP	GRPC 2050 MTP CMP Congestion Type[1]	Previous Implementation Schedule (GRPC 2045 MTP CMP)	Status since GRPC 2045 MTP CMP	Current Implementation Schedule (GRPC 2050 MTP CMP)
Division St	Santini St to I-110	Widen to four (4) lanes divided; and traffic operational improvements (signal retiming)	No	N/A	2035	Project completed.	N/A
Gex Dr	I-10 to Aloha Dr	Widen to four (4) lanes divided; and traffic operational improvements (access management and/or interchange modifications)	No	N/A	2025	Roundabouts under construction as of 2025.	N/A
I-10 (Eastbound)	Gautier-Vancleave Rd to MS 613	Safety improvements; and ITS improvements	Yes	NRC - Entire Segment	2025	Incident Bypass Signage installed.	2030
I-10 (Westbound)	MS 613 to Gautier-Vancleave Rd	Safety improvements; and ITS improvements	No	N/A	2025	Incident Bypass Signage installed.	2030
MS 15	MS 67 to Bethel Rd	Safety improvements	No	N/A	2025	N/A	2030
MS 43	I-10 to Kiln Delisle Rd	Safety improvements	No	N/A	2025	New signal installed at Texas Flat Rd/Crump Rd. Roadway resurfaced. Sign post reflectors installed.	2030
MS 43	Salem Rd to Old Kiln Rd	Safety improvements	No	N/A	2025	Turn lanes constructed at Salem Rd and Benville Rd. Sign post reflectors installed.	2030
MS 53	County Farm Rd to Pendora Ln	Widen to four (4) lanes divided; and traffic operational improvements (signal retiming)	Yes	RC - Entire Segment	2035	N/A	N/A
MS 57	I-10 Eastbound Off-Ramp to I-10 Westbound Off-Ramp	Traffic operational improvements (signal retiming); widening MS 57 north of I-10.	Yes	RC - Entire Segment	2035	MS 57 widening and realignment north of I-10 under construction.	2030
MS 57	Jim Ramsay Rd to Wire Rd	Widen to four (4) lanes divided and realign; and safety improvements	Yes	RC - Entire Segment	2035	MS 57 widening and realignment north of I-10 under construction.	2030
MS 57	I-10 to Gautier-Vancleave Rd	Widen to four (4) lanes divided and realign; and safety improvements	No	N/A	2035	MS 57 widening and realignment north of I-10 under construction.	2030
MS 605	Pass Rd to Magnolia St	Traffic operational improvements (access management and/or interchange modifications)	Yes	LOTTR - Entire Segment	2025	Vehicle detection upgraded at Magnolia St.	2030
MS 605	0.18 miles south of Seaway Rd to I-10	Traffic operational improvements (signal retiming); widening MS 605 north of I-10 and/or widening Eastbound On-Ramp and Westbound Off-Ramp.	Yes	LOTTR - Entire Segment	2045	N/A	2050
MS 607	I-10 to US 90	Safety improvements; safety improvements to parallel I-10.	Yes	NRC - Entire Segment	2025	N/A	2030
MS 611	Wheeler Rd to Zollicoffer Rd	Traffic operational improvements; and/or staggered work shifts at refineries	No	N/A	2025	N/A	2030
MS 63	I-10 to Old Saracennia Rd	Traffic operational improvements (signal retiming, access management, and/or interchange modification)	Partial	RC - I-10 to Saracennia Rd	2025	N/A	2030

Road	Segment	GRPC 2045 MTP CMP Proposed Improvement	Segment in GRPC 2050 MTP CMP	GRPC 2050 MTP CMP Congestion Type[1]	Previous Implementation Schedule (GRPC 2045 MTP CMP)	Status since GRPC 2045 MTP CMP	Current Implementation Schedule (GRPC 2050 MTP CMP)
MS 63	MS 613 to MS 614	Safety improvements	Yes	NRC - Entire Segment	2025	Roadway resurfaced and rumble strips installed.	2030
MS 63	MS 614 to George County Line	Safety improvements	Yes	NRC - Entire Segment	2025	Roadway resurfaced and rumble strips installed.	2030
MS 67	MS 15 to Shriners Blvd	Safety improvements	Yes	NRC - Entire Segment	2025	N/A	2030
Popps Ferry Rd	Bonne Terra Blvd to Sunkist Country Club Rd	Traffic operational improvements (Drawbridge operations)	Yes	NRC - Entire Segment	2025	N/A	2030
Three Rivers Rd	Seaway Rd to Crossroads Pkwy	Reconstruct as four (4) lane divided; and traffic operational improvements (signal retiming).	Yes	RC - Entire Segment	2045	N/A	2050
US 49	Airport Rd to O'Neal Rd	Widen to six (6) lanes from School Rd to O'Neal Rd; and traffic operational improvements (signal retiming and/or access management) (entire segment). New roadway from Landon Rd to US 49.	Yes	RC - Entire Segment NRC - Entire Segment	2025	Project completed between O'Neal Rd and Flat Branch Bridge. Project under construction between Flat Branch Bridge and School Road. Continuous Flow Intersection at MS 53 under construction.	2030
US 49	US 90 to 28th St	Traffic operational improvements (signal retiming and/or access management)	Yes	RC	2025	Vehicle detection upgraded at intersections.	2030
US 49	MS 53 to Bethel Rd	Widen to six (6) lanes divided from MS 53 to O'Neal Rd; and safety improvements (entire segment).	Yes	NRC - Entire Segment	2025	Project under construction between Flat Branch Bridge and School Road. Continuous Flow Intersection at MS 53 under construction.	2030 (MS 53 to School Rd)
US 90	MS 43/MS 603 to Washington St	Traffic operational improvements (signal retiming and/or access management)	Partial	LOTTR - At MS 43/MS 603	2025	Vehicle detection upgraded at intersections.	2030
US 90	Broad Ave to US 49	Traffic operational improvements (signal retiming)	No	N/A	2025	Vehicle detection upgraded at intersections.	2030
US 90	I-110 to Main St	Traffic operational improvements (signal retiming)	Yes	RC - Entire Segment	2025	N/A	2030
US 90	MS 609 to Ocean Springs Rd	Widen to six (6) lanes; and traffic operational improvements (signal retiming and/or access management).	Yes	NRC - Entire Segment	2025	Vehicle detection upgraded at intersections.	2030
US 90	Telephone Rd to Market St	Traffic operational improvements (signal retiming and/or access management)	Yes	RC	2025	New signal equipment installed at intersections.	2030
US 90	Victor St to Hospital Rd	Traffic operational improvements (signal retiming and/or access management)	Yes	RC	2025	New signal equipment installed at intersections.	2030
US 90	0.38 miles west of Chicot St to Chicot St	Traffic operational improvements (signal retiming)	Yes	RC	2025	New signal equipment installed at intersections.	2030

Road	Segment	GRPC 2045 MTP CMP Proposed Improvement	Segment in GRPC 2050 MTP CMP	GRPC 2050 MTP CMP Congestion Type[1]	Previous Implementation Schedule (GRPC 2045 MTP CMP)	Status since GRPC 2045 MTP CMP	Current Implementation Schedule (GRPC 2050 MTP CMP)
US 90	MS 57 to Gautier-Vancleave Rd	Widen to six (6) lanes; traffic operational improvements (signal retiming and/or access management); and safety improvements.	Yes	NRC - Entire Segment LOTTR - At Gautier-Vancleave Rd	2025	Roadway resurfaced	2030
US 90	N 2nd St to Henderson Ave	Safety improvements; safety improvements to parallel I-10.	Yes	NRC - Entire Segment	2025	Flashing yellow arrow signals installed. I-10 under construction between Diamondhead and County Farm Rd.	2030

NOTE 1: Congestion Types
- RC: Recurring Congestion
- NRC: Non-recurring Congestion
- LOTTR: Level of Travel Time Reliability locations not flagged by the recurring congestion analysis

3.0 Cost of Congested Travel

Since traffic congestion imposes substantial direct and indirect costs on transportation system users, including excess travel time, additional fuel consumption and emissions, decreased travel time reliability as well as delayed freight operations, the need of accurate quantification of congestion costs is important. Most approaches to estimate congestion costs on the national or regional levels focused mainly on direct costs pertaining to excess travel time and fuel consumption by the system user. The problem with these approaches is that they do not take into consideration additional costs accumulated due to the increased unreliability or decreased mobility, for example. Although the travel time cost represents the major cost category the system is expected to endure while making a trip from one origin to another destination, there are a few other types that need to be considered including:

Unreliability Cost: The cost assumed by drivers in having to make necessary adjustments to account for the unpredictability of the total trip duration due to congestion. Travelers cope to some extent by leaving early for a destination or using alternative modes in anticipation of delays, which sometimes result in additional inconveniences.

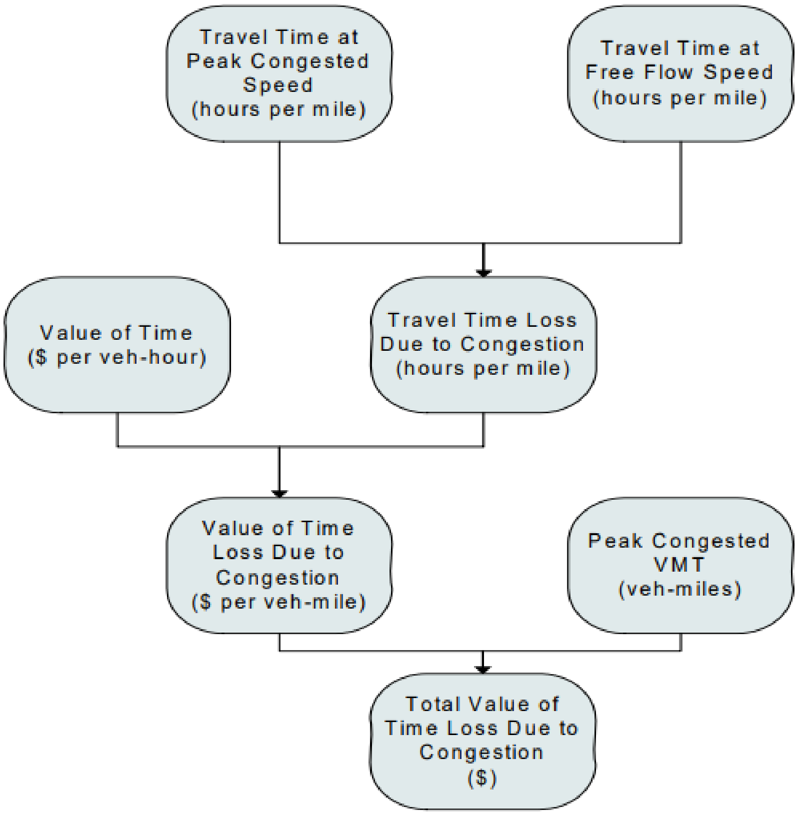
Vehicle Operating Cost: Traffic congestion leads to higher vehicle operating costs due to additional fuel consumption as well as extra wear-and-tear to the vehicle.

Mobility Cost: The mobility cost captures the productivity lost due to postponed or cancelled trips and is estimated as the consumer surplus derived from additional trips that would occur if congestion was alleviated or eliminated.

Emission Cost: The negative impacts of pollution depend not only on the quantity of emissions produced, but on the types of pollutants emitted, which has a direct contribution to the cost of travelling due to the operational and environmental tolls.

Appropriate estimation of excess travel time cost is extremely significant since it represents the largest fraction of the total cost of congestion. As mentioned before, travel time delay represents the value of the total amount of time that road users anticipate losing during congestion as compared to free flow travel. **Figure 3.1** illustrates the methodology of calculating excess travel time due to congestion.

Figure 3.1: Structure and Logic Diagram for Travel Time Cost



Source: USDOT Assessing the Full Costs of Congestion on Surface Transportation Systems and Reducing Them through Pricing https://www.transportation.gov/sites/dot.gov/files/docs/Costs%20of%20Surface%20Transportation%20Congestion.pdf

Accordingly, the travel time per mile in the peak congested period is:

$$Peak\ Congested\ Travel\ Time = \frac{Peak\ Congested\ Period\ Daily\ VHT}{Peak\ Congested\ Period\ Daily\ VMT}$$

Where:

- Peak Congested Vehicle Hours Traveled (VHT) is the difference between the VHT in the entire peak period (8 hours) and the VHT in the uncongested portion of that period.

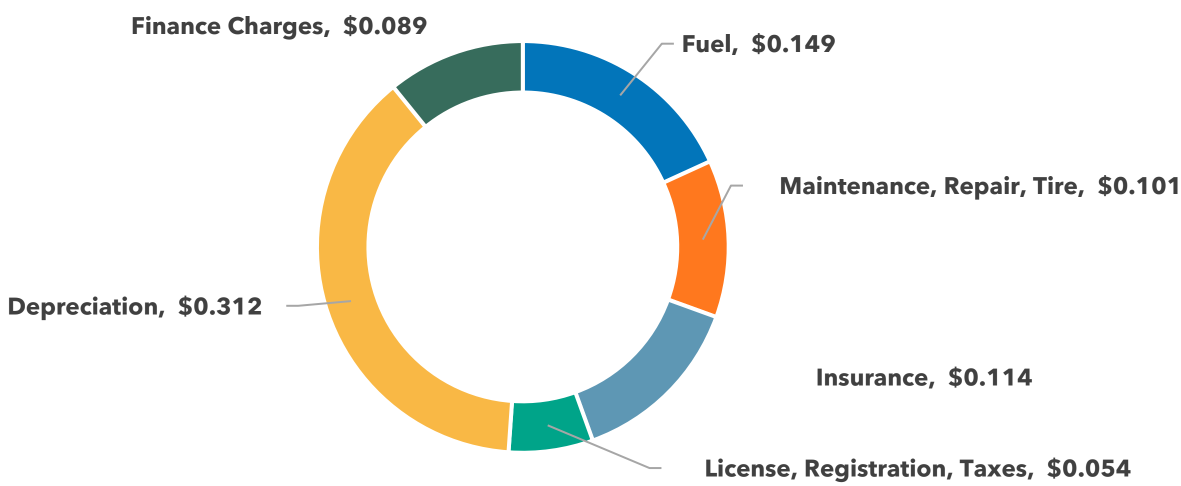
The value of excess travel time is the average differential cost of the extra travel time resulting from congestion according to the Texas A&M Transportation Institute Urban Mobility Report[14] criteria which has two key components: time and fuels utilized during congestion periods. Both components are estimated separately from each other. The datum for estimating the value of delay time is the median Bureau of Labor

[14] https://static.tti.tamu.edu/tti.tamu.edu/documents/mobility-report-2023-appx-c.pdf

Statistics (BLS) wage estimates for all occupations. Using a vehicle occupancy rate of 1.5 persons per vehicle and the median hourly wage for 2022 is $23.12 per person and the estimated value of delay time is $34.68 per personal vehicle.

The American Automobile Association (AAA) report included values for vehicle operating costs that was used as a basis to calculate the marginal cost per mile of travel for passenger vehicles, which are shown in **Figure 3.2**. The individual costs associated with the different classes of vehicles were weighed to produce an acceptable approximation for the operating vehicle.

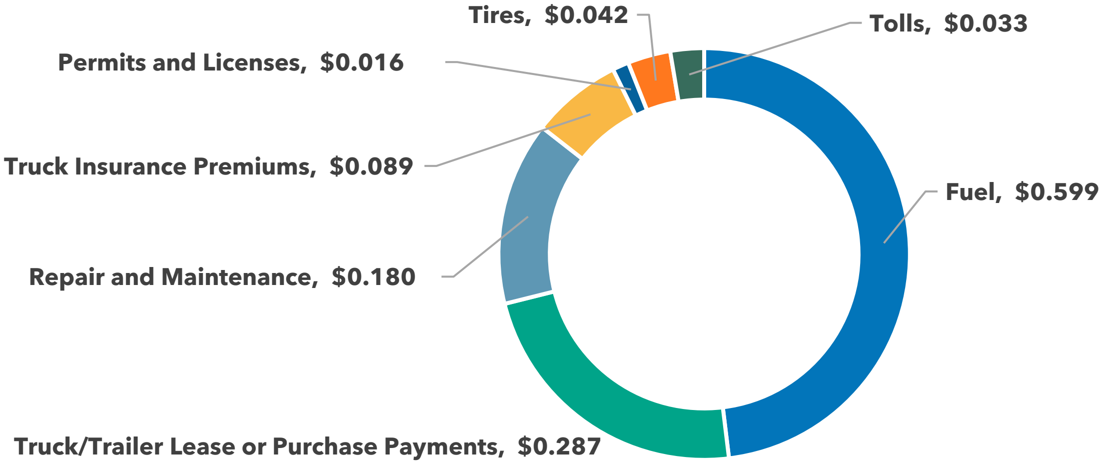
Figure 3.2: 2024 Passenger Vehicle Operating Costs per Mile



Source: American Automobile Association (AAA)

Figure 3.3 illustrates a breakdown of operational trucking costs according to the American Transportation Research Institute (ATRI) annual survey. Values are calculated on a per-mile and per-hour basis, which indicates an estimated average operating cost for commercial trucks of $1.246 per mile for 2024.

Figure 3.3: 2024 Estimates of Truck Operational Costs per Mile



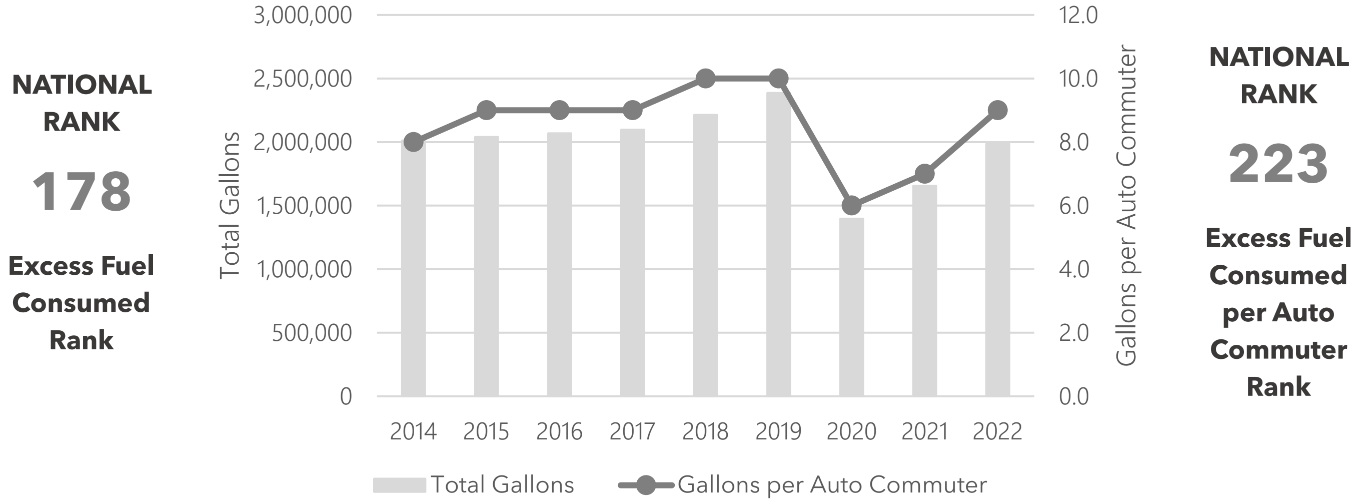
Source: American Transportation Research Institute (ATRI)

The *Texas A&M Transportation Institute Urban Mobility Report* illustrates congestion data within urban areas. This data includes annual excess fuel consumption, annual hours of delay, and annual congestion cost. The annual excess fuel consumption within the Gulf Coast Metropolitan Area is shown in **Figure 3.4**. The annual hours of delay within the Gulf Coast Metropolitan Area are shown in **Figure 3.5**. The Annual Congestion Cost within the Gulf Coast Metropolitan Area is shown in **Figure 3.6**. As shown in these figures, there were steady increases in excess fuel consumption, delays, and congestion costs between 2014 and 2019. However, there were decreases in 2020 due to the COVID-19 pandemic, followed by increases in 2021 and 2022.

The Urban Area Report performance measure summary for Gulfport can be found in **Appendix G**. It should be noted that the borders of the Gulfport urbanized area in the Urban Area Report do not match the planning area boundaries.

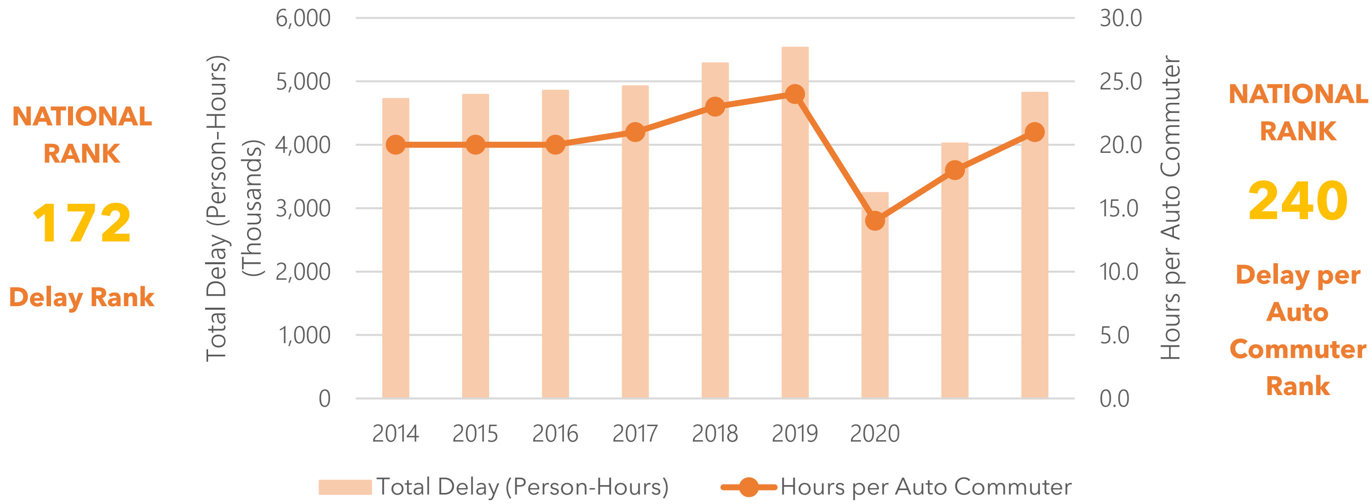
Due to data access limitations, the focus of this CMP would be to estimate the travel time cost due to excessive delay and vehicle operating cost.

Figure 3.4: Annual Excess Fuel Consumption within the Gulf Coast Metropolitan Area



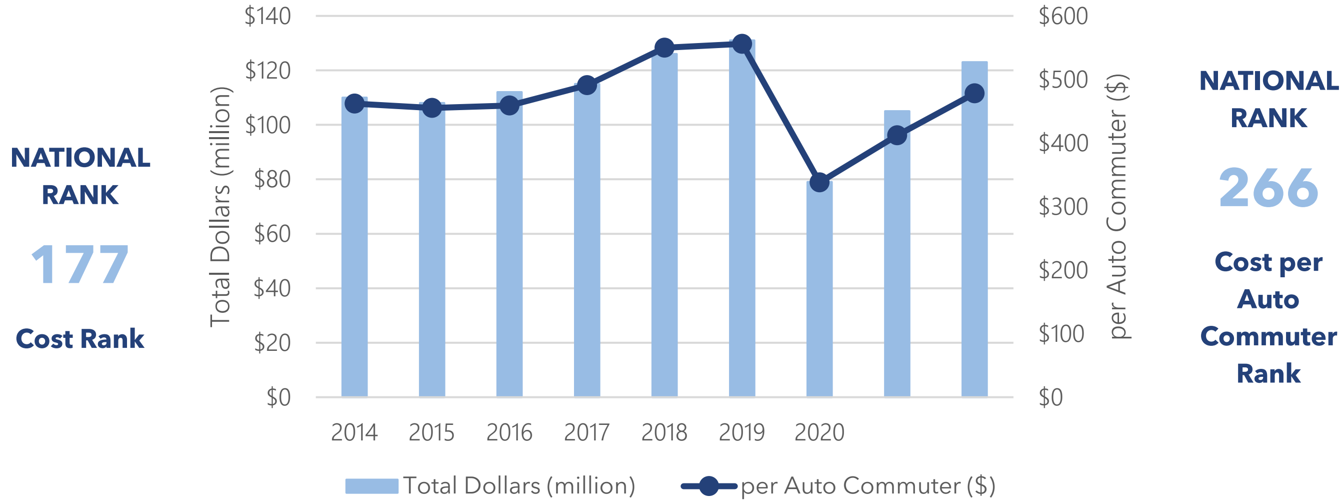
Source: Texas A&M Transportation Institute

Figure 3.5: Annual Hours of Delay within the Gulf Coast Metropolitan Area



Source: Texas A&M Transportation Institute

Figure 3.6: Annual Congestion Cost within the Jackson Metropolitan Area



Source: Texas A&M Transportation Institute

4.0 Future Congestion

Using the results from the Travel Demand Model, with only the "Existing plus Committed" (E+C) Projects implemented, in the region, the Vehicle Miles Traveled will increase by **32 percent** from 2022 to 2050, and the Vehicle Hours Traveled will increase by **39 percent** from 2022 to 2050. However, during this same time period, the Vehicle Hours of Delay will increase by **151 percent**. This large increase in VHD is expected to result in increased congestion on the roadway network. Chapter 4 of *Technical Report #4: Needs Assessment* further summarizes the congestion relief needs.

Using the same methodology for recurring congestion that was discussed in ***2.5 Step 5: Analyze Congestion Problems and Needs***, scores were developed for each link in the 2050 CMP network.

A non-recurring congestion analysis for the future was not conducted since the occurrence of random events such as crashes, road construction, or special events in the future cannot be determined. However, segments that currently experience non-recurring congestion due to crashes may experience longer delays in the future if no improvements are made. ***2.5 Step 5: Analyze Congestion Problems and Needs – Non-Recurring Congestion*** identifies the segments that experienced significant non-recurring congestion.

4.1 Existing plus Committed (E+C) Scenario

This scenario includes only the projects that are committed for construction. A list of E+C projects can be found in ***Technical Report #1: Transportation Modeling and Forecasting***.

A project is considered committed if:

- Construction was either completed or begun since 2022,
- A contract for construction has been awarded,
- Have completed the National Environmental Policy Act (NEPA) phase, or
- Have funding for right-of-way and/or construction programmed in the MPO's Transportation Improvement Program.

Table 4.1 presents the E+C projects. **Table 4.2** shows the segments that are expected to experience recurring congested in 2050, with only the E+C projects implemented. **Figure 4.1** displays the expected recurring congested segments of the

2050 Gulf Coast CMP network, ranked based on the results of the recurring congestion analysis process.

It is anticipated that the number of segments experiencing recurring congestion **more than double** between 2022 and 2050, while the mileage **will nearly double**.

The comparison in the number and mileage of recurring congested segments between the Base and E+C scenarios from a multimodal perspective is summarized below.

- The number of segments on Freight networks is anticipated to increase from 16 in the Base scenario to 25 in the E+C scenario (56 percent increase), while the mileage is anticipated to increase from 10.2 miles to 22.6 miles (122 percent increase).
- The number of segments on Transit networks is anticipated to increase from nine (9) in the Base scenario to 18 in the E+C scenario (100 percent increase), while the mileage is anticipated to increase from 7.0 miles to 9.9 miles (41 percent increase).
- The number of segments with bicycle and pedestrian facilities is anticipated to increase from six (6) in the Base scenario to eight (8) in the E+C scenario (33 percent increase), while the mileage is anticipated to increase from 2.0 miles to 4.9 miles (145 percent increase).

Number of Recurring Congested Segments → 30 segments in Base → 63 segments in E+C

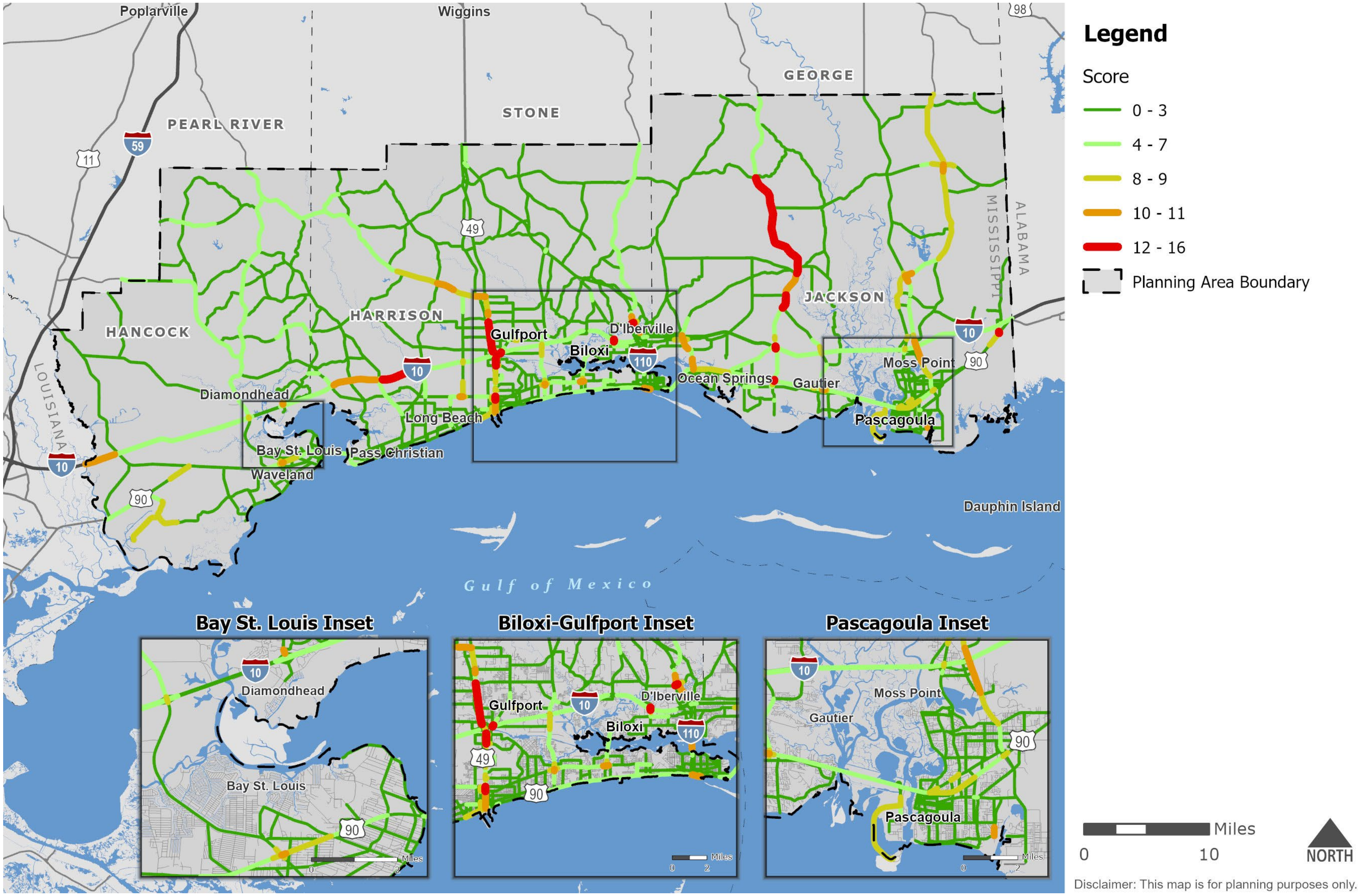
Length of Recurring Congested Segments → 39 miles in Base → 70 miles in E+C

Table 4.1: Gulf Coast MPO E+C Projects

Roadway	Location	Improvement	Opening Year
Landon Rd	34th St to Coleman Rd	Widen from 2 lanes to 5 lanes	2030
Dedeaux Rd	0.25 miles west of MS 605 to MS 605	Widen from 2 lanes to 4 lanes	2030
Washington Ave	Old Fort Bayou Rd to US 90	5 Lane to 4 Lane Divided	2030
Airport Rd	Business Center Dr to Washington Ave	Widen from 2 lanes to 4 lanes	2030
Popps Ferry Rd	US 90 to Pass Rd	Construct new 4-lane divided road	2030
Shriners Blvd	I-10 to Woolmarket Rd	Widen from 2 lanes to 4 lanes plus center turn lane	2030
US 90	MS 609 to Dolphin Dr	Widen to 6 lanes	2030
Washington Ave	Airport Rd to S Vista Dr	Widen from 2 lanes to 4 lanes	2030
Cleveland Ave	Klondyke Rd to Railroad St	2 lane to 2 lane with CTL	2030

Source: GRPC

Figure 4.1: Recurring Congested Segments in 2050



Source: NPMRDS, Travel Demand Model

Table 4.2: Future Recurring Congested Segments (2050)

Rank	County	Road Name	Segment	Length (miles)	Directional TTI	Directional TTI	Directional LOS	Directional LOS	2050 CMP Index Rating	2022 CMP Index Rating	Change in CMP Index (2022 to 2050)	Freight Network[1]	Transit Network[2]	Bike/Ped Facilities[3]
1	Harrison	US 49	Airport Road to I-10 Eastbound	0.59	3	4	4	4	15	15	0	Tier 1	CTA	-
2	Harrison	US 49	25th Street to 28th Street	0.26	3	3	4	4	14	11	3	Tier 1	CTA	SW
3	Harrison	US 49	I-10 Westbound to Dedeaux Road	0.93	3	3	4	4	14	11	3	Tier 1	CTA	-
4	Jackson	MS 57	At US 90	0.09	3	3	4	4	14	13	1	CUFC	-	-
5	Harrison	US 49	Oak Lane to O'neal Road	1.04	3	2	4	4	13	11	2	Tier 1	CTA	CTA
6	Jackson	MS 57	Jim Ramsay Road to Wire Road	9.12	1	3	4	4	12	12	0	-	-	-
7	Harrison	Three Rivers Road	Seaway Road to Crossroads Parkway	0.09	2	2	4	4	12	10	2	-	CTA	-
8	Harrison	US 49	Dedeaux Road to Oak Lane	0.41	2	3	3	4	12	11	1	Tier 1	CTA	-
9	Jackson	MS 57	I-10 Eastbound Off-Ramp to I-10 Westbound Off-Ramp	0.18	2	3	3	4	12	12	0	CUFC	-	-
10	Harrison	I-10 Westbound	County Farm Road On-Ramp to Menge Avenue Off-Ramp	3.04	2	-	4	-	12	8	4	Tier 1	-	-
11	Jackson	MS 57	Gautier Vancleave Road to Humphrey Road	1.08	2	2	4	4	12	10	2	-	-	-
12	Harrison	MS 53	Old Highway 49 (West) to Old Highway 49 (East)	0.30	2	2	4	3	11	8	3	-	-	-
13	Harrison	US 90	I-110 to Lamuse Street	0.42	2	3	3	3	11	10	1	-	CTA	SPP
14	Jackson	MS 57	Humphrey Road to Little Bluff Creek Bridge	1.28	2	1	4	4	11	10	1	-	-	-
15	Jackson	MS 57	0.19 miles south of Jim Ramsey Road to Jim Ramsey Road	0.19	1	2	4	4	11	10	1	-	-	-
16	Jackson	MS 63	I-10 Eastbound Off-Ramp to I-10 Westbound Off-Ramp	0.20	3	2	3	3	11	10	1	Tier 2	-	-
17	Hancock	I-10 Westbound	MS 607 Off-Ramp to Louisiana State Line	2.46	1	-	4	-	10	4	6	Tier 1	-	-
18	Harrison	I-10 Eastbound	Kiln Delisle Road On-Ramp to Menge Avenue Off-Ramp	3.46	1	-	4	-	10	4	6	Tier 1	-	-
19	Harrison	MS 53	County Farm Road/Swan Road to Pendora Lane	1.39	1	1	4	4	10	9	1	-	-	-
20	Harrison	MS 53	Old Highway 49 (East) to US 49	0.48	2	2	3	3	10	8	2	-	-	-
21	Harrison	US 49	0.21 miles south of Duckworth Road to Duckworth Road	0.21	2	2	3	3	10	6	4	Tier 1	-	-
22	Harrison	US 49	US 90 to 17th Street	0.38	2	2	3	3	10	10	0	Tier 1	CTA	SW
23	Harrison	US 49	19th Street to 25th Street	0.47	2	2	3	3	10	9	1	Tier 1	CTA	SW
24	Hancock	Gex Road	I-10 Westbound Off-Ramp to Aloha Drive	0.09	2	2	3	3	10	6	4	-	-	-
25	Harrison	US 90	Lameuse Street to Main Street	0.09	2	2	3	3	10	10	0	-	CTA	SPP
26	Jackson	MS 609	US 90 to 0.11 miles north of Windsor Porte Street	0.83	2	2	3	3	10	7	3	-	-	-
27	Jackson	MS 609	Josie Street to Lemoyne Boulevard	0.42	2	2	3	3	10	5	5	-	-	-
28	Harrison	I-110 Southbound	Rodriguez Street On-Ramp to Bayview Avenue Off-Ramp	0.71	1	-	4	-	10	8	2	Tier 1	-	-
29	Jackson	MS 57	Little Bluff Creek Bridge to 0.19 miles south of Jim Ramsey Road	0.59	1	1	4	4	10	10	0	-	-	-
30	Jackson	MS 63	I-10 Westbound Off-Ramp to Saracennia Road	0.36	1	1	4	4	10	8	2	Tier 2	-	-

Rank	County	Road Name	Segment	Length (miles)	Directional TTI	Directional TTI	Directional LOS	Directional LOS	2050 CMP Index Rating	2022 CMP Index Rating	Change in CMP Index (2022 to 2050)	Freight Network[1]	Transit Network[2]	Bike/Ped Facilities[3]
31	Jackson	Bayou Casotte Parkway	Washington Avenue to Louise Street	0.31	2	2	3	3	10	8	2	-	-	-
32	Harrison	MS 53	0.78 miles west of County Farm Road/Shaw Road to County Farm Road/Shaw Road	1.90	1	1	3	4	9	8	1	-	-	-
33	Harrison	US 49	Duckworth Road to MS 53/North Swan Road	1.26	2	2	2	3	9	6	3	Tier 1	-	-
34	Harrison	MS 605	0.18 miles south of Seaway Road to Seaway Road	0.18	2	2	2	3	9	6	3	CUFC	-	BL, SW
35	Harrison	US 49	17th Street to 19th Street	0.15	2	2	2	3	9	8	1	Tier 1	CTA	SW
36	Jackson	MS 609	Big Ridge Road/Money Farm Road to I-10 Eastbound Off-Ramp	0.19	2	2	3	2	9	6	3	-	-	-
37	Jackson	US 90	MS 609/Washington Avenue to Martin Luther King Jr Avenue	0.53	2	2	2	3	9	8	1	-	CTA	-
38	Jackson	MS 613	Saracennia Road to George County Line	14.03	1	1	4	3	9	8	1	-	-	-
39	Jackson	MS 57	Pine Savanna Drive to 0.22 miles north of Pine Savanna Drive	0.22	1	1	4	3	9	6	3	-	-	-
40	Jackson	US 90	At MS 63/MS 611	0.22	2	2	2	3	9	9	0	CUFC	-	SR
41	Jackson	US 90	Telephone Road to Market Street	0.28	2	2	2	3	9	9	1	-	-	-
42	Harrison	I-10 Eastbound	Menge Avenue On-Ramp to County Farm Road Off-Ramp	3.03	-	-	4	-	8	4	4	Tier 1	-	-
43	Harrison	MS 53	Carlton Cuevas Road to 0.78 miles west of County Farm Road/Shaw Road	1.49	1	1	3	3	8	6	2	-	-	-
44	Harrison	MS 53	Pendora Lane to Old Highway 49 (West)	1.90	2	2	2	2	8	7	1	-	-	-
45	Harrison	Dedeaux Road	Wingate Road to Stewart Road	0.23	1	1	3	3	8	0	8	-	CTA	-
46	Jackson	MS 63	Saracennia Road to Old Saracennia Road	0.52	1	1	3	3	8	6	2	Tier 2	-	-
48	Jackson	MS 57	Acadian Village Drive to Railroad Crossing	0.17	1	1	3	3	8	2	6	-	-	-
49	Jackson	US 90	Betchel Boulevard to Ocean Springs Road	1.44	2	2	2	2	8	8	0	-	CTA	SR
47	Jackson	MS 613	Wilson Springs Road to Indiantown Road	1.77	1	1	3	3	8	7	1	-	-	-
50	Jackson	Gautier Vancleave Road	I-10 Westbound Off-Ramp to 0.35 miles north of I-10 Frontage Road	0.33	2	2	2	2	8	7	1	-	-	-
51	Jackson	MS 609	0.11 miles north of Windsor Porte Street to 0.10 miles south of Spanish Drive	0.01	2	2	2	2	8	6	2	-	-	-
52	Jackson	MS 609	Lemoyne Boulevard to Big Ridge Road/Money Farm Road	0.41	2	2	2	2	8	6	2	-	-	-
53	Hancock	MS 43/MS 603	I-10 Eastbound Off-Ramp to I-10 Westbound Off-Ramp	0.14	1	2	2	3	8	8	0	-	-	-
54	Hancock	US 90	MS 43/MS 603 to Washington Street	1.23	2	2	2	2	8	6	2	-	-	-
55	Harrison	US 90	Broad Avenue to US 49	1.27	2	2	2	2	8	6	2	-	CTA	SW
56	Harrison	US 49	Jefferson Street to Lafayette Street	1.14	2	2	2	2	8	7	1	Tier 1	CTA	-
57	Harrison	US 49	At I-10	0.06	2	1	3	2	8	5	3	Tier 1	-	-
58	Harrison	MS 605	Spring Street to Magnolia Street	0.15	2	2	2	2	8	6	2	-	-	SW
59	Harrison	US 90	Hopkins Boulevard to I-110 Southbound	0.01	2	2	2	2	8	7	1	-	CTA	SW
60	Jackson	US 90	Martin Luther King Jr Boulevard to Holcomb Boulevard	0.55	2	2	2	2	8	8	0	-	CTA	-
61	Jackson	US 90	Magnolia Place to Beasley Road	0.14	2	2	2	2	8	4	4	-	-	-

Rank	County	Road Name	Segment	Length (miles)	Directional TTI	Directional TTI	Directional LOS	Directional LOS	2050 CMP Index Rating	2022 CMP Index Rating	Change in CMP Index (2022 to 2050)	Freight Network[1]	Transit Network[2]	Bike/Ped Facilities[3]
62	Jackson	US 90	Market Street to Chicot Road	1.57	2	2	2	2	8	8	0	-	-	-
63	Jackson	MS 63	Grierson Road to Elder Ferry Road	1.29	2	2	2	2	8	8	0	Tier 2	-	-

NOTE 1: Freight Network Descriptions
- Tier 1: MDOT Tier I Freight Network
- Tier 2: MDOT Tier II Freight Network
- CUFC: Critical Urban Freight Corridor

NOTE 2: Transit Network Descriptions
- CTA: Coast Transit Authority

NOTE 3: Bike/Ped Facility Descriptions
- SPP: Separeted Pedestrian Pathway
- SR: Shared Roadway
- SW: Sidewalk

5.0 Conclusions

High transportation demand in relatively populous metropolitan areas generates congestion which could vary in both intensity and extension depending on the relationship between supply and demand. The limited capacity of the existing road network within the Gulf Coast region leads to substantial congestion repercussions along several travel corridors during different times of the day for both commuters and non-commuters. System users carry the burden of those repercussions through excess travel times, higher crash rates, travel unreliability, additional emissions, and personal frustration, as well as additional costs for goods and services.

Unfortunately, the relationship between transportation supply and demand involves a wide array of clear and underlying elements that need continuous monitoring and data collection. Although the availability of new technologies offers tools to tackle congestion problems and needs more aggressively, resulting congestion remedies need to be taken to the next level in terms of policy and implementation. Accordingly, success in tackling congestion problems requires cooperation between transportation agencies, law enforcement, public safety agencies, the private sector, and the public.

The eight-step congestion management process included robust data collection and analysis which illustrated:

- The recurring and non-recurring congestion analyses showed that excessive recurring and non-recurring congestion occurs on I-10, US 49, US 90, MS 53, MS 57, and MS 63.
- GRPC is focusing on congestion mitigation with the current MTP. However, partial implementation of the MTP would essentially allow congestion problems to intensify and expand which would jeopardize the quality of life within the Gulf Coast metropolitan area, especially from a multimodal perspective.

Recommendations

- Continue to encourage utilizing alternative modes of transportation and/or car/vanpooling as means of decreasing the single-occupant vehicle travel demand.
- Enhance real-time communication with multi-modal travelers to provide them with information to help them with the decision-making process to avoid congestion before or during their trips.

- Enhance the interaction with the public to continuously obtain feedback about congestion problems and needs as well as the implemented strategies and policies.
- Continue to obtain data related to regional congestion. Variability of data nature and sources both public and private sector are becoming increasingly accessible and provide leverage in verifying and enhancing the analysis and findings.
- Monitor and analyze freight trends specially trucks, especially those relating to truck freight. Freight movement dynamics have a significantly different correlation with congestion than passenger travel trends.
- Encourage Traffic Incident Management (TIM). Continued TIM efforts will be beneficial for traffic incident monitoring and non- recurring congestion analysis.

Appendices

Appendix A: GRPC 2045 MTP CMP Strategies

Appendix B: Volume to Capacity Study

Appendix C: Travel Time Index Study

Appendix D: LOS Study

Appendix E: VHD Study

Appendix F: Buffer Index – Unpredictable Variability Corridors

Appendix G: Texas A&M Transportation Institute Urban Mobility Report

Appendix A: GRPC 2045 MTP CMP Strategies

Appendix A Introduction

The 2045 CMP proposed three (3) management strategies that provided a variety of measures that can be implemented to reduce traffic congestion. These strategies were travel demand management, supply management, and land use management.

Travel Demand Management

The use of Travel Demand Management alleviates congestion by employing methods that reduce the number of vehicles traveling major thoroughfares during peak traffic hours. These methods are summarized in **Table A.1**.

Table A.1: Travel Demand Management Strategies

Strategy	Description
Staggered work hours	The organization has varying starting and ending working hours for employees.
Alternative work locations	These facilities can be closer to the organization's customers and clients and/or employees' home. This is a system where employees do not commute or travel to a central place of work.
Telecommuting	Work is performed wherever the employee chooses. This is another system where employees do not commute or travel to a central place of work.
Carpooling/canpooling	Carpooling and/or vanpooling prevents the need for others to have to drive to a location themselves by sharing trips.
Toll roads	This is a type of road where a fee is assessed for passage. High-occupancy toll lanes and express toll lanes have variable fees that are adjusted in response to demand.

Source: GRPC 2045 Metropolitan Transportation Plan – Congestion Management Process

Supply Management

Supply management analyzes methods for reducing traffic congestion on major transportation facilities once it has been determined that the facilities have reached or exceeded their designed capacity. Supply management strategies that can be used as part of the CMP's efforts are shown in **Table A.2**.

Table A.2: Supply Management Strategies

Strategy	Description
ITS	ITS allows users to be better informed about transportation conditions and make more informed decisions. It encompasses a wide range of technologies such as cameras and variable message boards.
Transit park and ride facilities	Park and ride facilities are parking lots where people leave their vehicles and transfer to a bus system or carpool for the remainder of the trip.
Traffic signal synchronization	Traffic signal synchronization systems seek to minimize congestion and delays by timing traffic signals to allow vehicles to traverse the most intersections in the shortest possible amount of time.
Bicycle and pedestrian	Bicycling or walking can remove vehicle trips from roadways. This can be encouraged if bicycle and pedestrian facilities are adequate.
Increase highway capacity	Increasing highway capacity (e.g. adding lanes or new roads) is not always possible due to physical and fiscal constraints. However, it remains an important approach to addressing congestion.

Source: GRPC MPO 2045 Metropolitan Transportation Plan – Congestion Management Process

Land Use Management

The use of land use management reduces excessive traffic congestion by altering the way land is developed through the use of smart growth concepts. Smart growth analyzes future growth potential of an area and includes in its plan measures to abate/prevent excessive traffic demand on a thoroughfare. A summary of methods is shown in **Table A.3**.

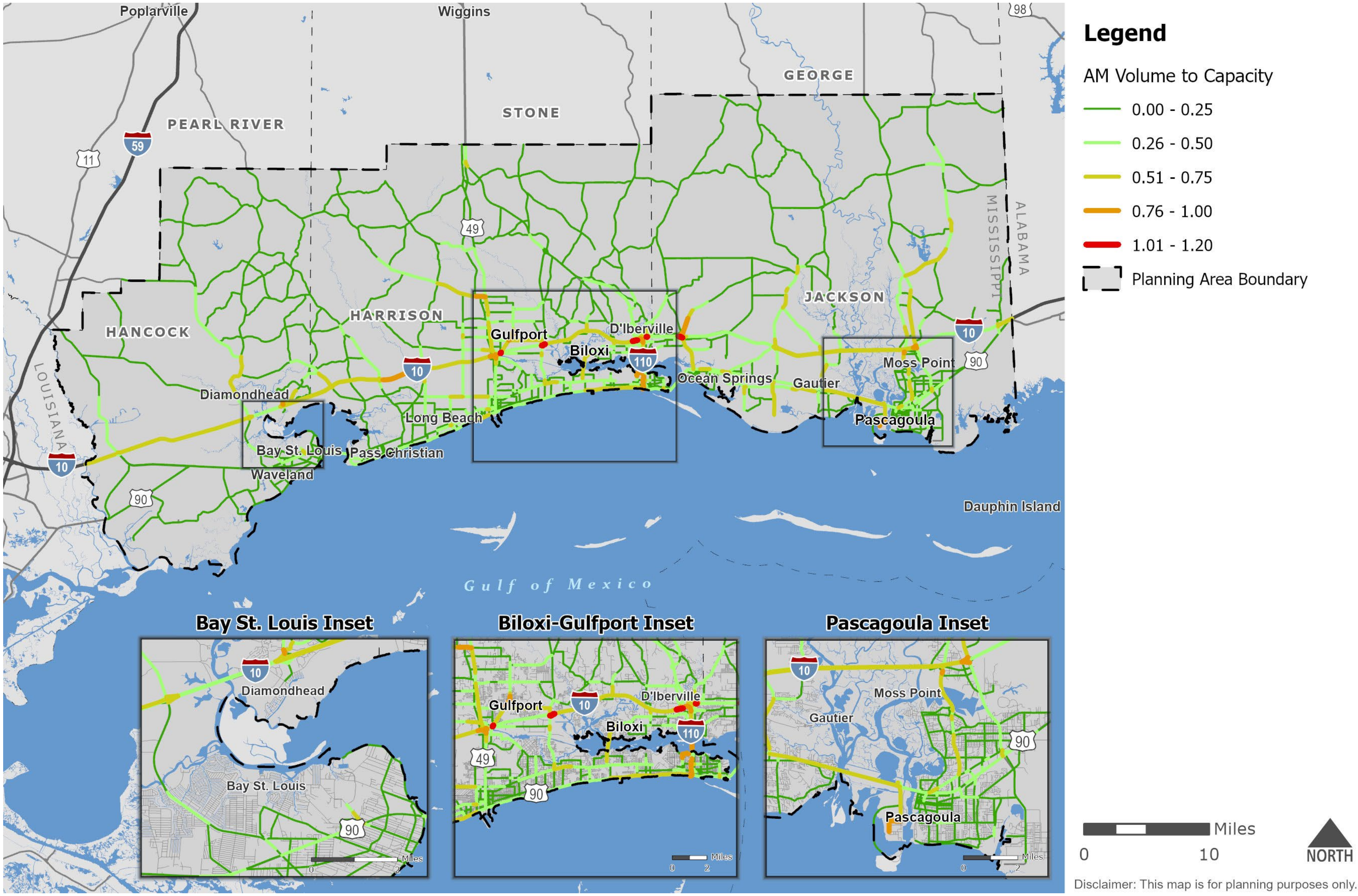
Table A.3: Land Use Management Strategies

Strategy	Description
Planning and zoning	Inadequate zoning, such as allowing larger developments, can overwhelm available transportation facilities.
Mixed use development	Mixed use developments have increased population density and encourage walking and bicycling and/or access to public transit. These developments also build up freight movement for goods and services.
Density development	High-density development increases the feasibility for transit, walking, and/or bicycling.
Transit	An improved transit system can increase its attractiveness and reduce the number of vehicle trips.

Source: GRPC 2045 Metropolitan Transportation Plan – Congestion Management Process

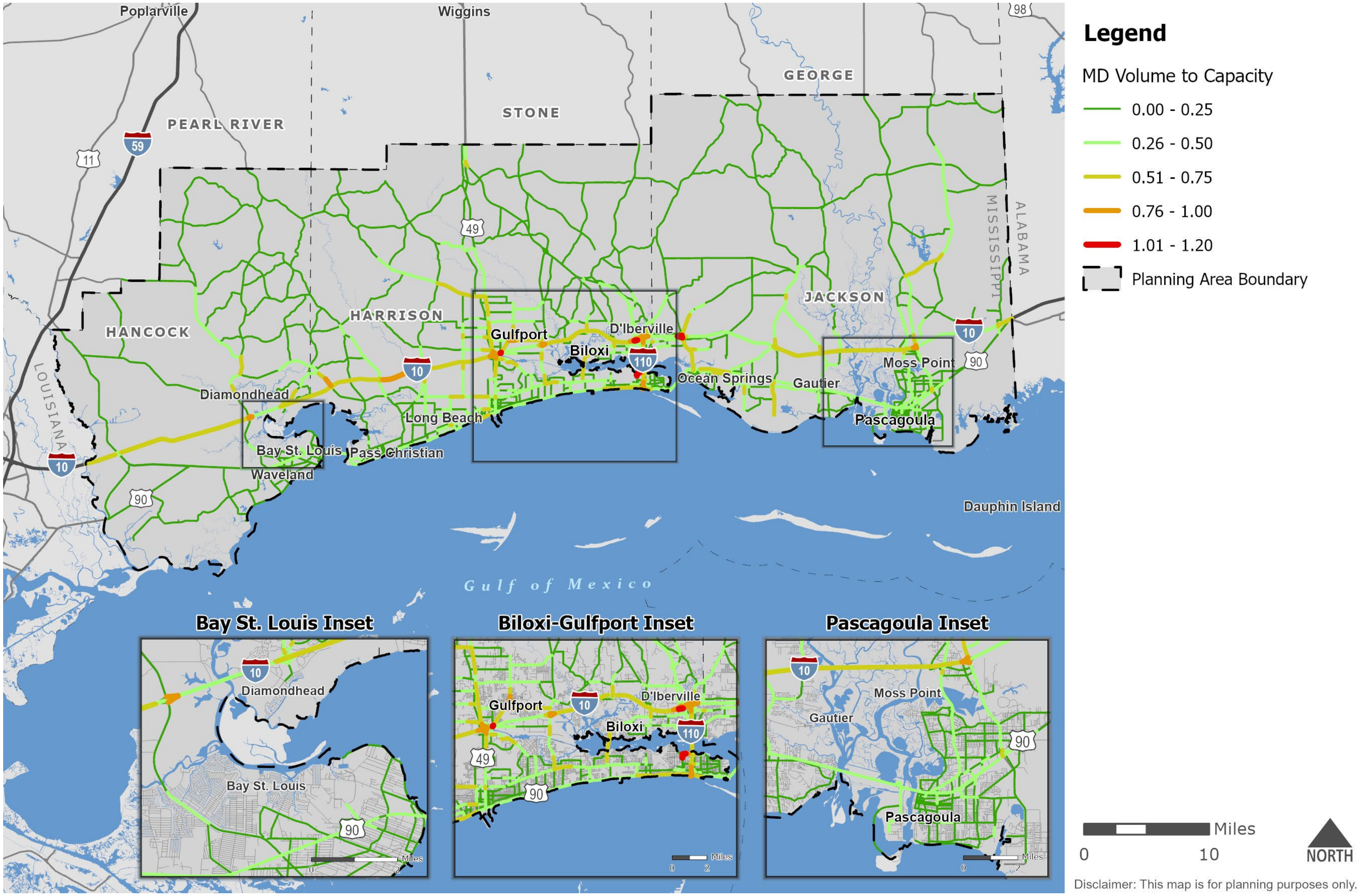
Appendix B: Volume to Capacity Study

Figure B.1: Volume to Capacity Ratio Study – 2022 AM Peak



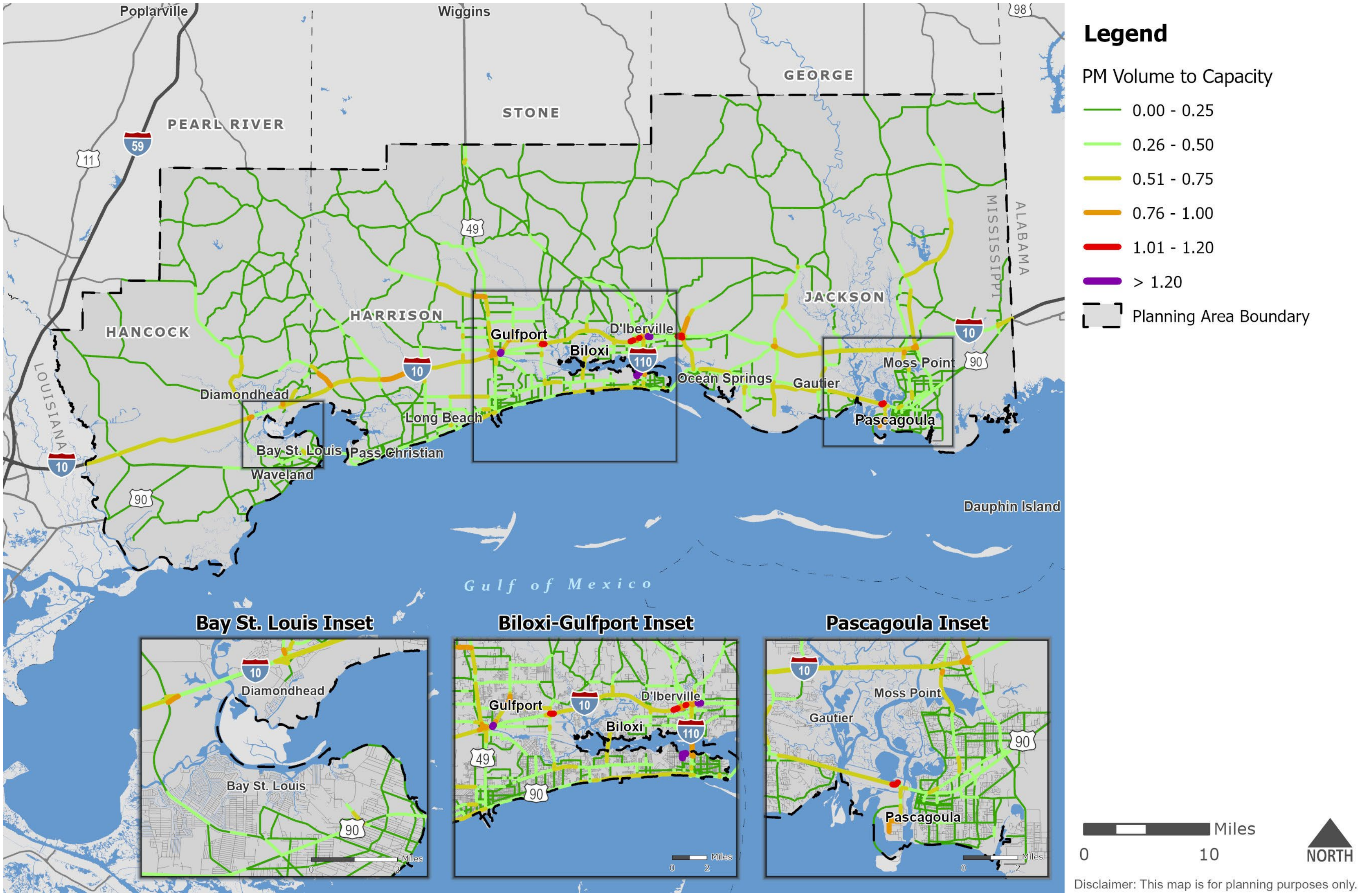
Source: Travel Demand Model

Figure B.2: Volume to Capacity Ratio Study – 2022 MD Peak



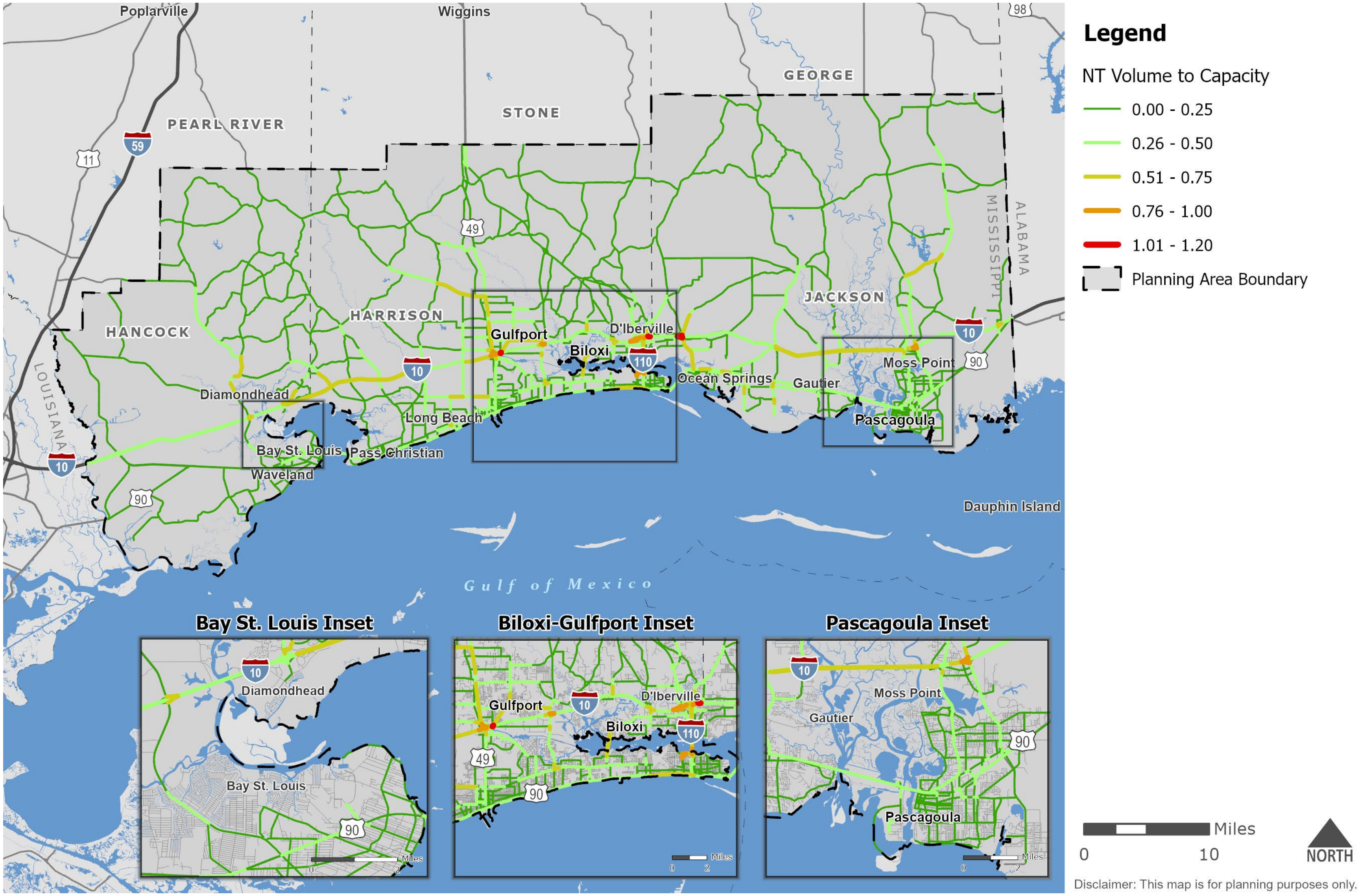
Source: Travel Demand Model

Figure B.3: Volume to Capacity Ratio Study – 2022 PM Peak



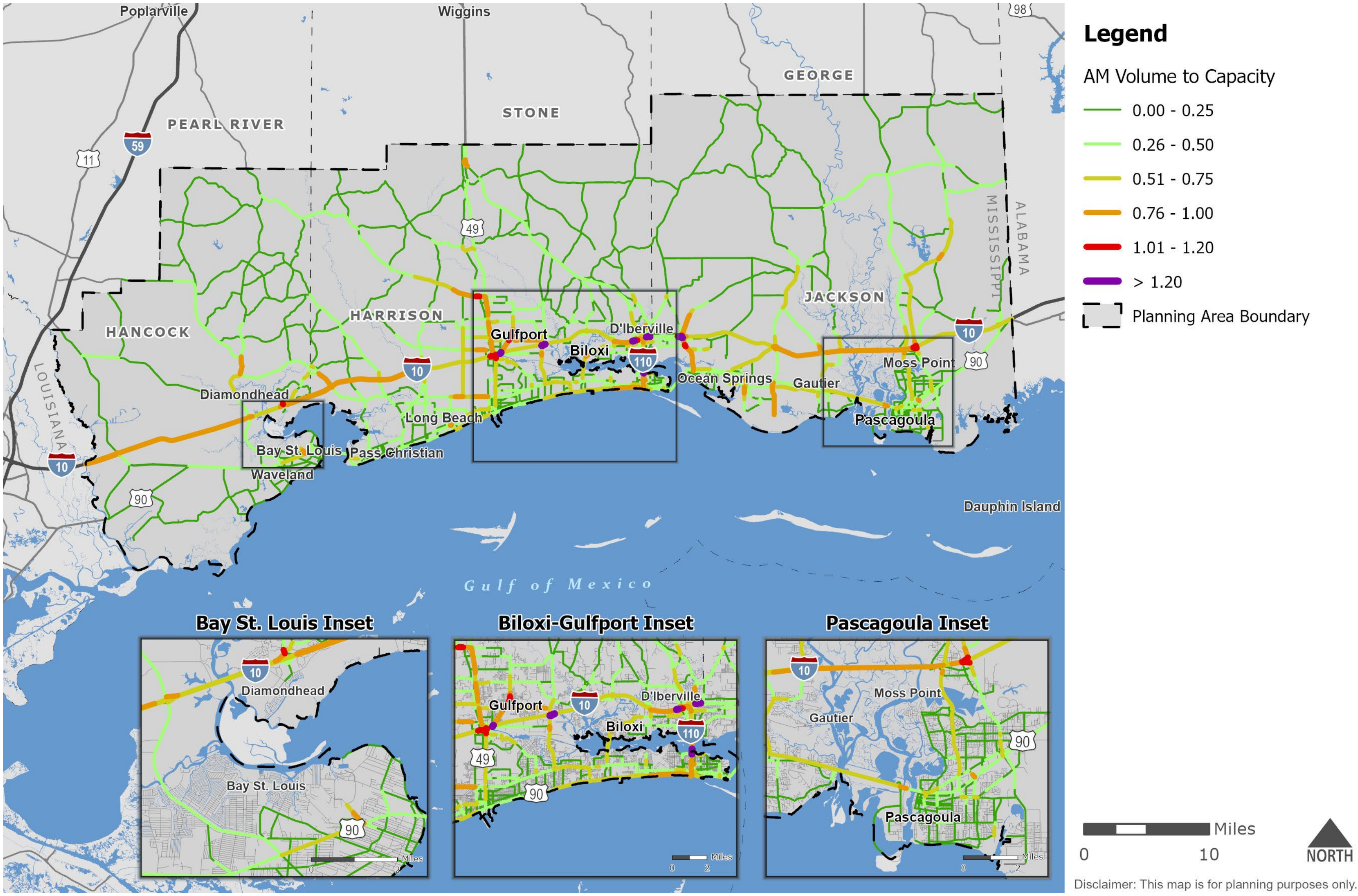
Source: Travel Demand Model

Figure B.4: Volume to Capacity Ratio Study – 2022 NT Peak



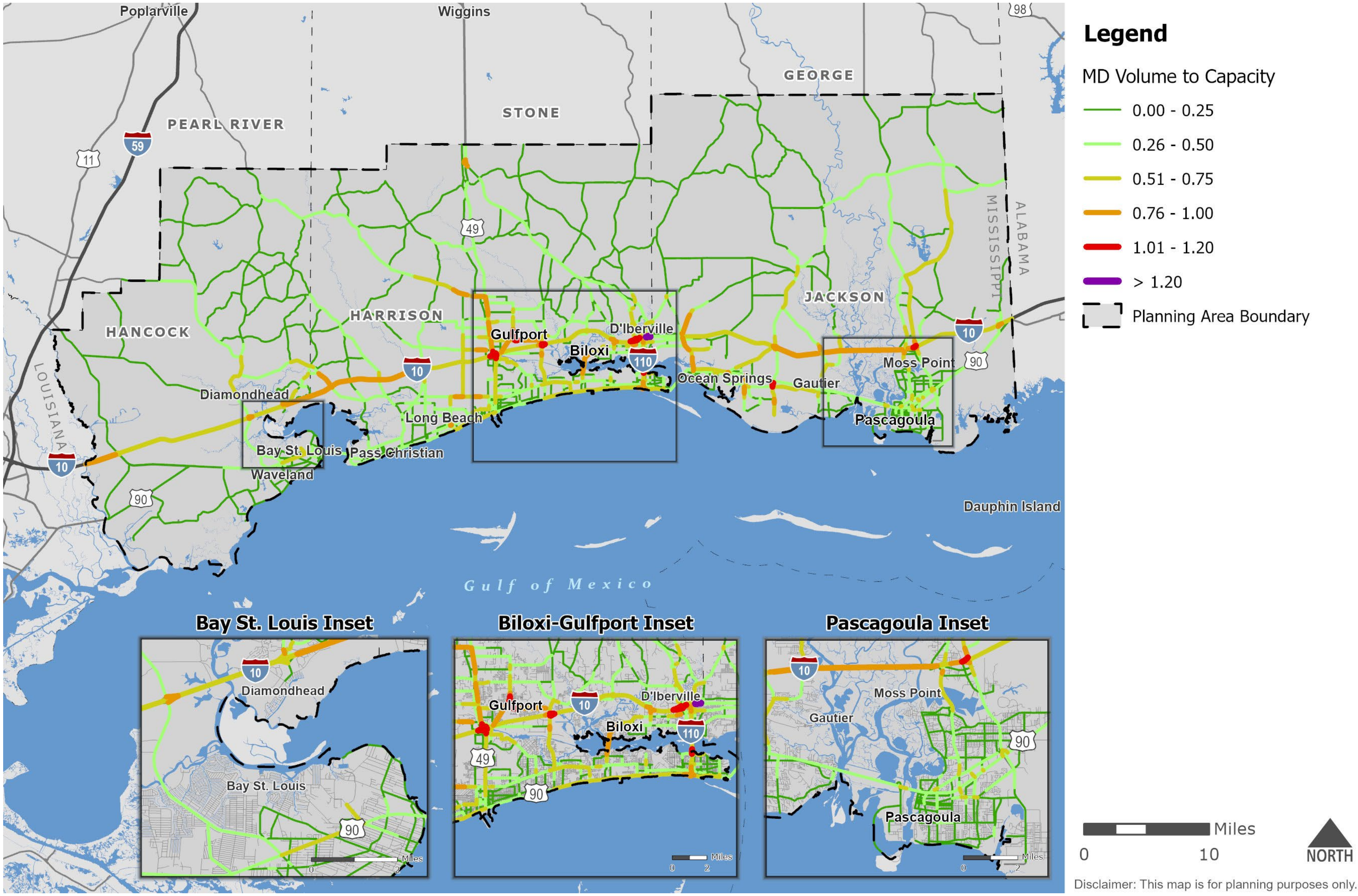
Source: Travel Demand Model

Figure B.5: Volume to Capacity Ratio Study – 2050 AM Peak



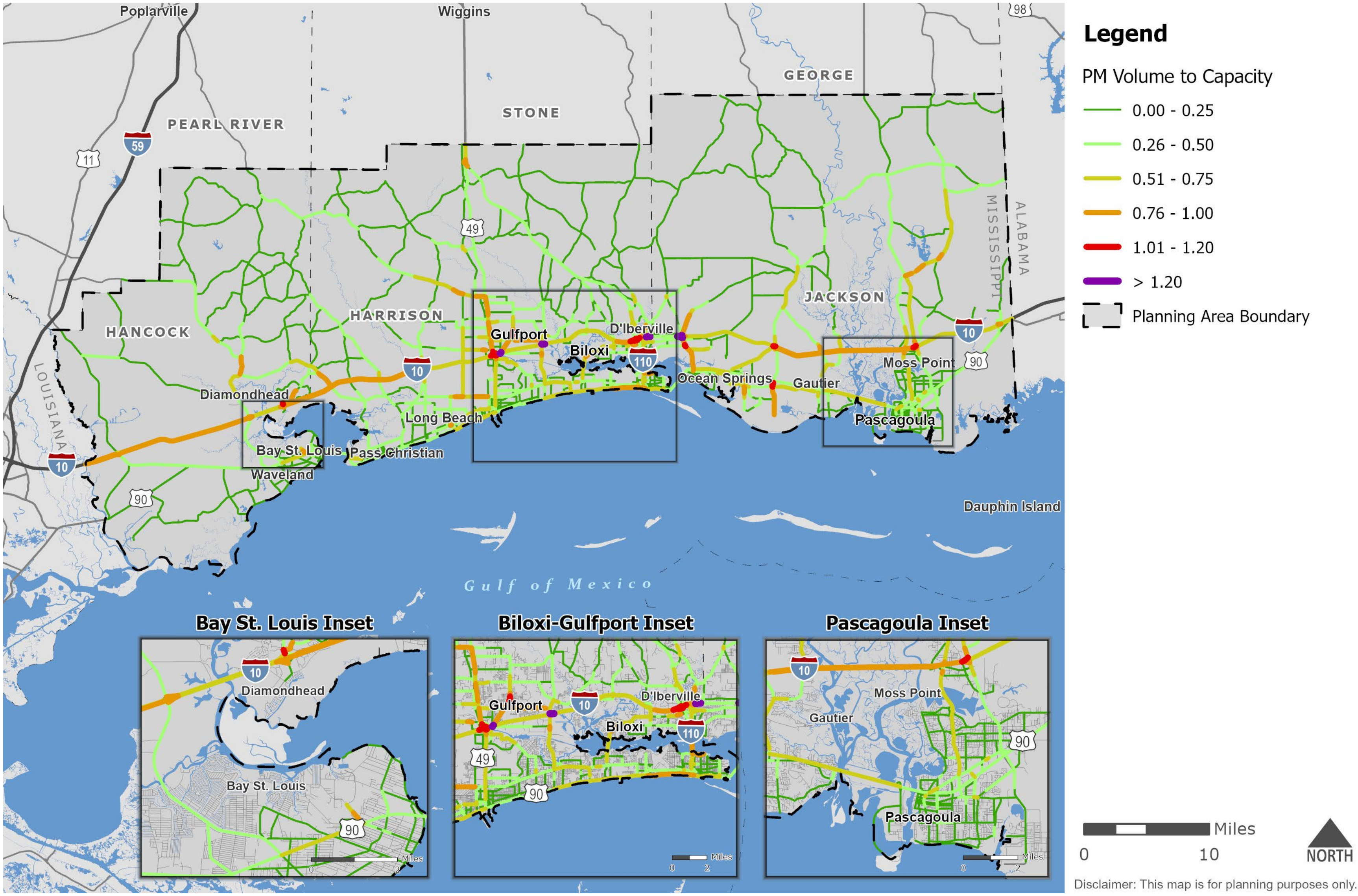
Source: Travel Demand Model

Figure B.6: Volume to Capacity Ratio Study – 2050 MD Peak



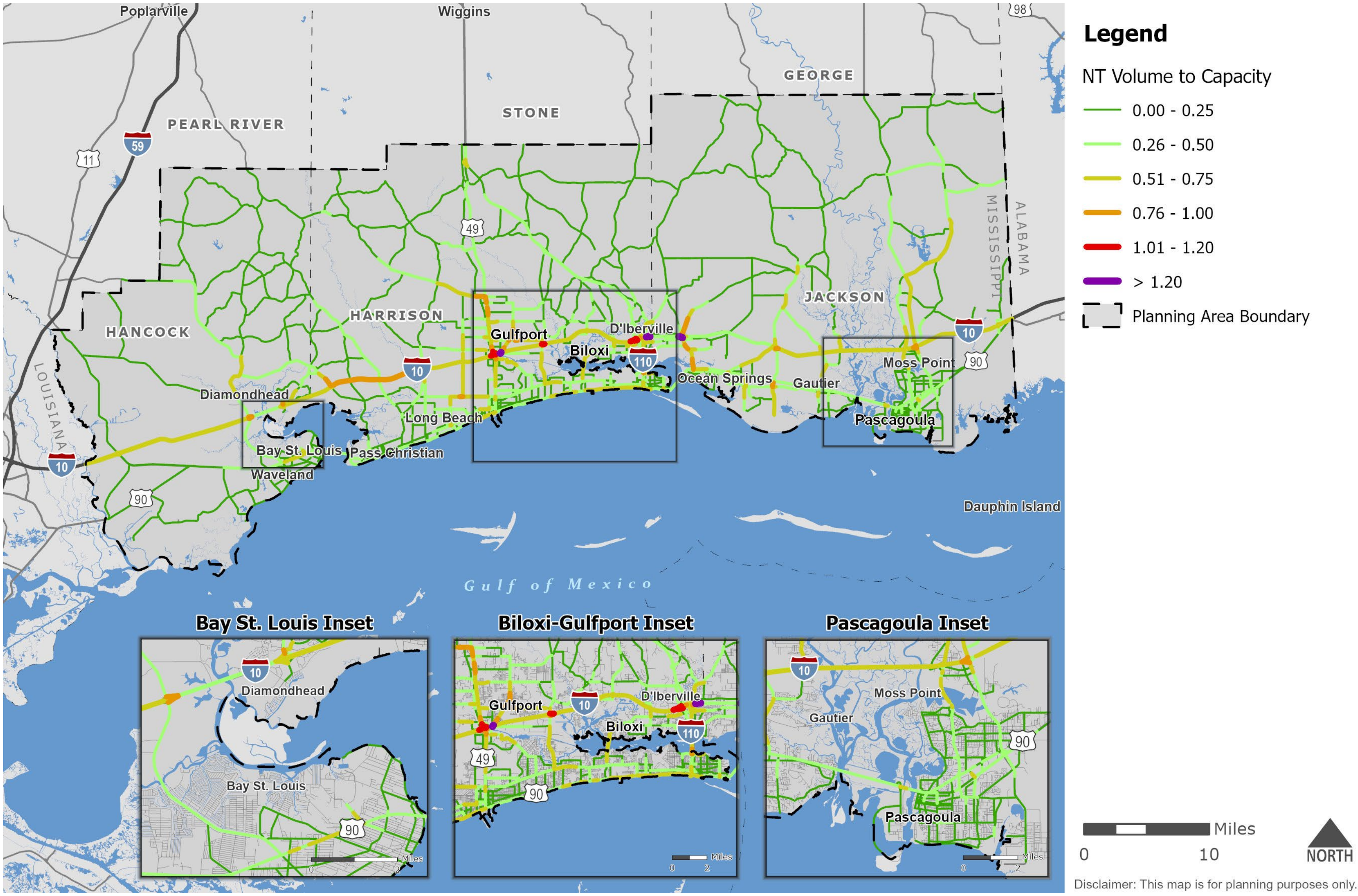
Source: Travel Demand Model

Figure B.7: Volume to Capacity Ratio Study – 2050 PM Peak



Source: Travel Demand Model

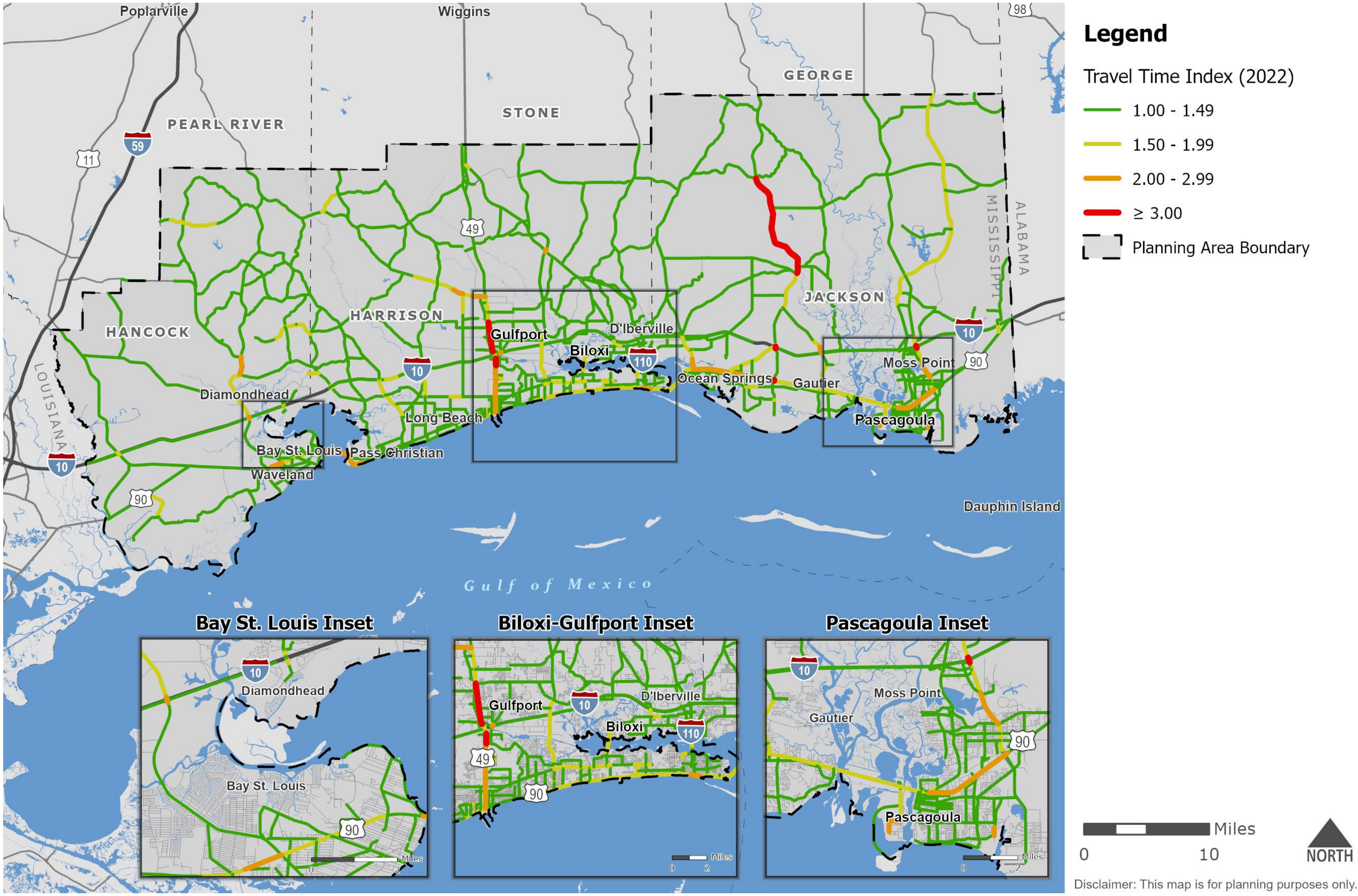
Figure B.8: Volume to Capacity Ratio Study – 2050 NT Peak



Source: Travel Demand Model

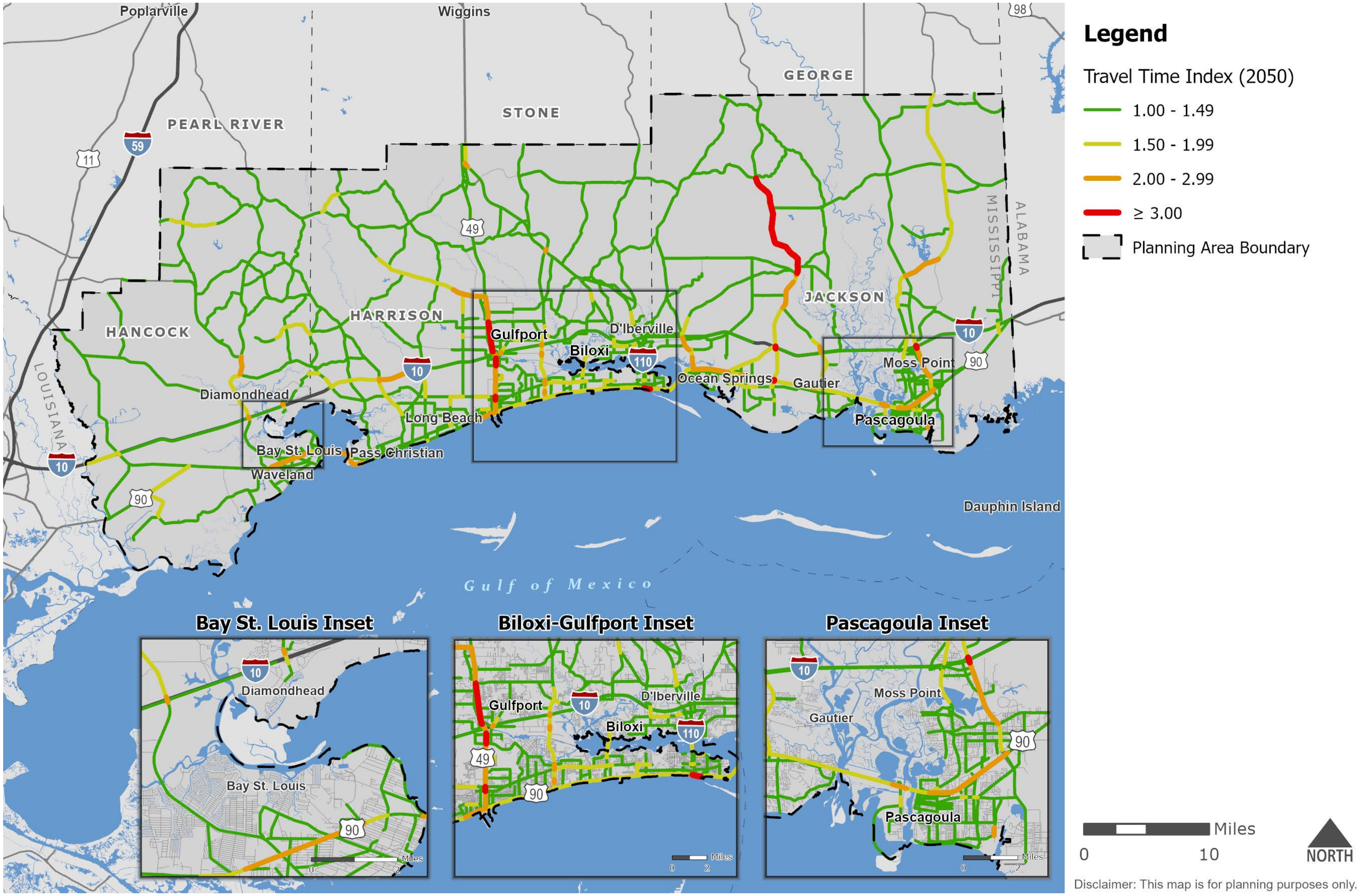
Appendix C: Travel Time Index Study

Figure C.1: Travel Time Index Study – 2022



Source: Travel Demand Model, NPMRDS

Figure C.2: Travel Time Index Study – 2050



Source: Travel Demand Model, NPMRDS

Appendix D: Level of Service Study

Freeways

The LOS criteria for freeway facilities, displayed in **Table D.1**, is based on the density of the freeway segment. The density is expressed in passenger cars per mile per lane and is calculated using the equation below. The freeway capacities at various free-flow speeds are displayed in **Table D.2**.

$$Density = \frac{V/C\ Ratio\ \times Capacity_f}{Peak\ Period\ Speed}$$

Where:

- Density is in Passenger Cars per Mile per Lane
- V/C Ratio is the Segment Volume to Capacity Ratio
- Capacity is in Passenger Cars per Hour per Lane
- Peak-Period Speed is in Miles per Hour (MPH)
- f – Free-flow speed

Table D.1: Freeway LOS Criteria

Level of Service	Density (Passenger Cars per Mile per Lane)	V/C Ratio
A	≤ 11	≤ 1.00
B	> 11 - 18	≤ 1.00
C	> 18 - 26	≤ 1.00
D	> 26 - 35	≤ 1.00
E	> 35 - 45	≤ 1.00
F	> 45	> 1.00

Source: Highway Capacity Manual

Table D.2: Freeway Capacities

Free-Flow Speed (MPH)	Capacity (Passenger Caps per Hour per Lane)
55	2,250
60	2,300
65	2,350
70	2,400

Source: Highway Capacity Manual

Multi-Lane Highways

The LOS criteria for uninterrupted flow multi-lane highways is based on the density of the multi-lane highway segment, expressed in passenger cars per mile per lane. The multi-lane highway density is calculated using the same formula as the freeway density. **Table D.3** displays the LOS criteria for multi-lane highways. The multi-lane highway capacities at various free-flow speeds are displayed in **Table D.4**.

Table D.3: Multi-Lane Highway LOS Criteria

Level of Service	Density (Passenger Cars per Mile per Lane)	V/C Ratio
A	≤ 11	≤ 1.00
B	> 11 - 18	≤ 1.00
C	> 18 - 26	≤ 1.00
D	> 26 - 35	≤ 1.00
E	> 35 - 45	≤ 1.00
F	> 45	> 1.00

Source: Highway Capacity Manual

Table D.4: Multi-Lane Highway Capacities

Free-Flow Speed (MPH)	Capacity (Passenger Cars per Hour per Lane)
45	1,900
50	2,000
55	2,100
60	2,200
65	2,300

Source: Highway Capacity Manual

Two-Lane Highways

The LOS criteria for two-lane highways, which are displayed in **Table D.5**, is based on percent free-flow speed.

Table D.5: Two-Lane Highways LOS Criteria

Level of Service	Percent Free-Flow Speed	V/C Ratio
A	> 91.7%	≤ 1.00
B	> 83.3% - 91.7%	≤ 1.00
C	> 75.0% - 83.3%	≤ 1.00
D	> 66.7% - 75.0%	≤ 1.00
E	≤ 66.7%	≤ 1.00
F	-	> 1.00

Source: Highway Capacity Manual

Streets

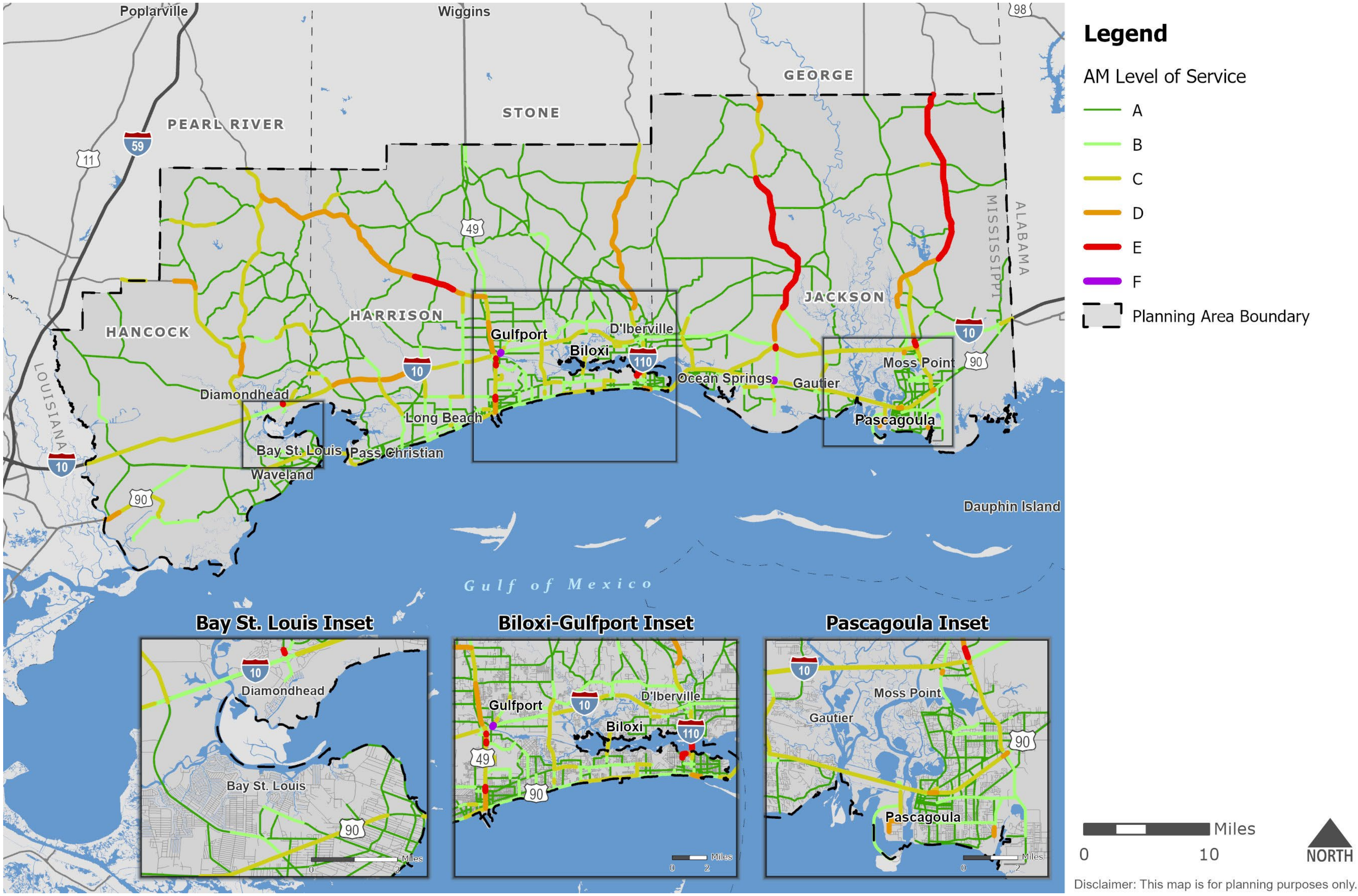
The LOS criteria for streets, which are displayed in **Table D.6**, is based on percent free-flow speed and v/c ratio.

Table D.6: Streets LOS Criteria

Level of Service	Percent Free-Flow Speed	V/C Ratio
A	> 80%	≤ 0.60
B	> 67% - 80%	> 0.60 - 0.70
C	> 50% - 67%	> 0.70 - 0.80
D	> 40% - 50%	> 0.80 - 0.90
E	> 30% - 40%	> 0.90 - 1.00
F	≤ 30%	> 1.00

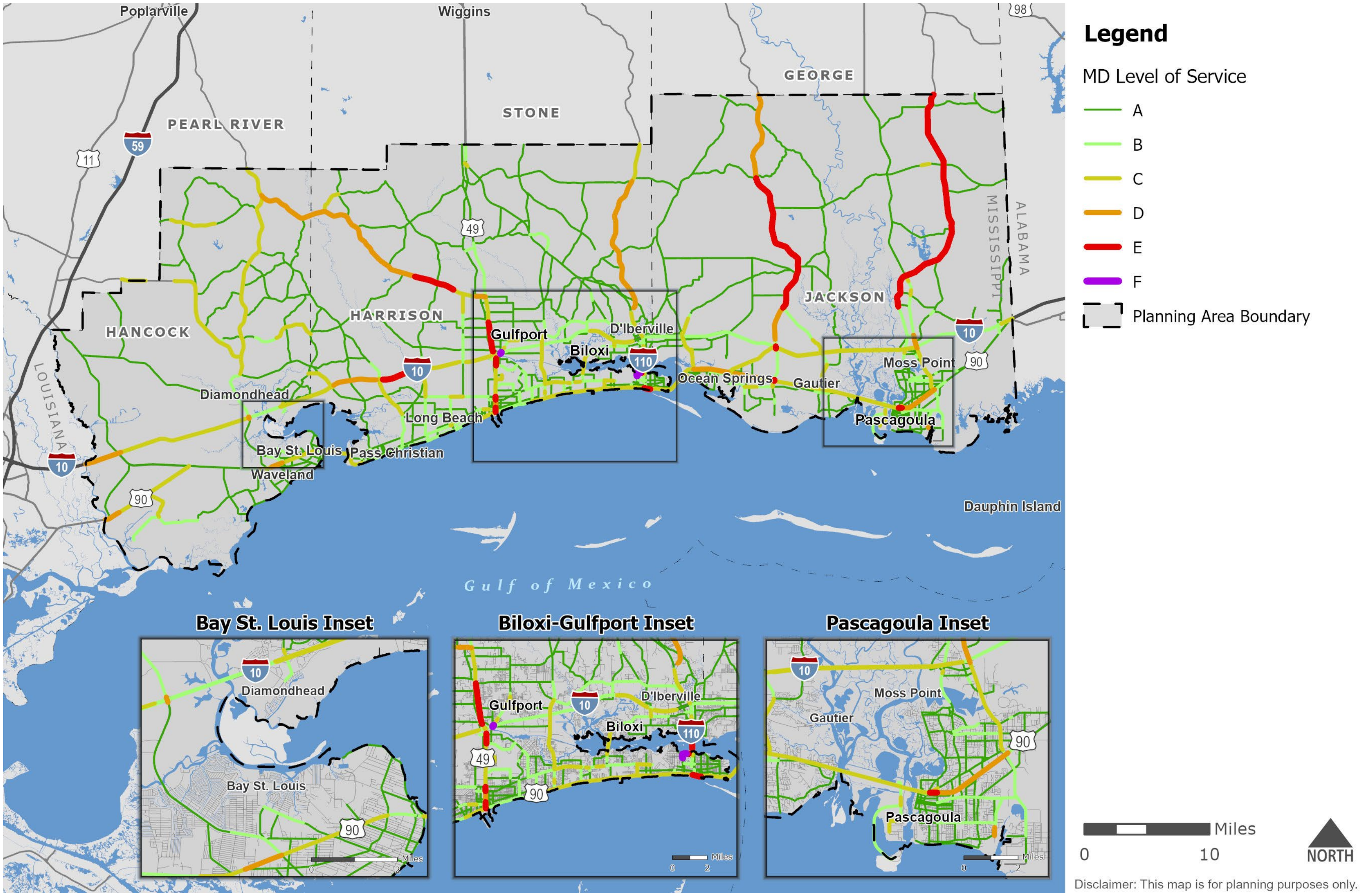
Source: Highway Capacity Manual

Figure D.1: Level of Service Study – 2022 AM Peak



Source: Travel Demand Model, NPMRDS

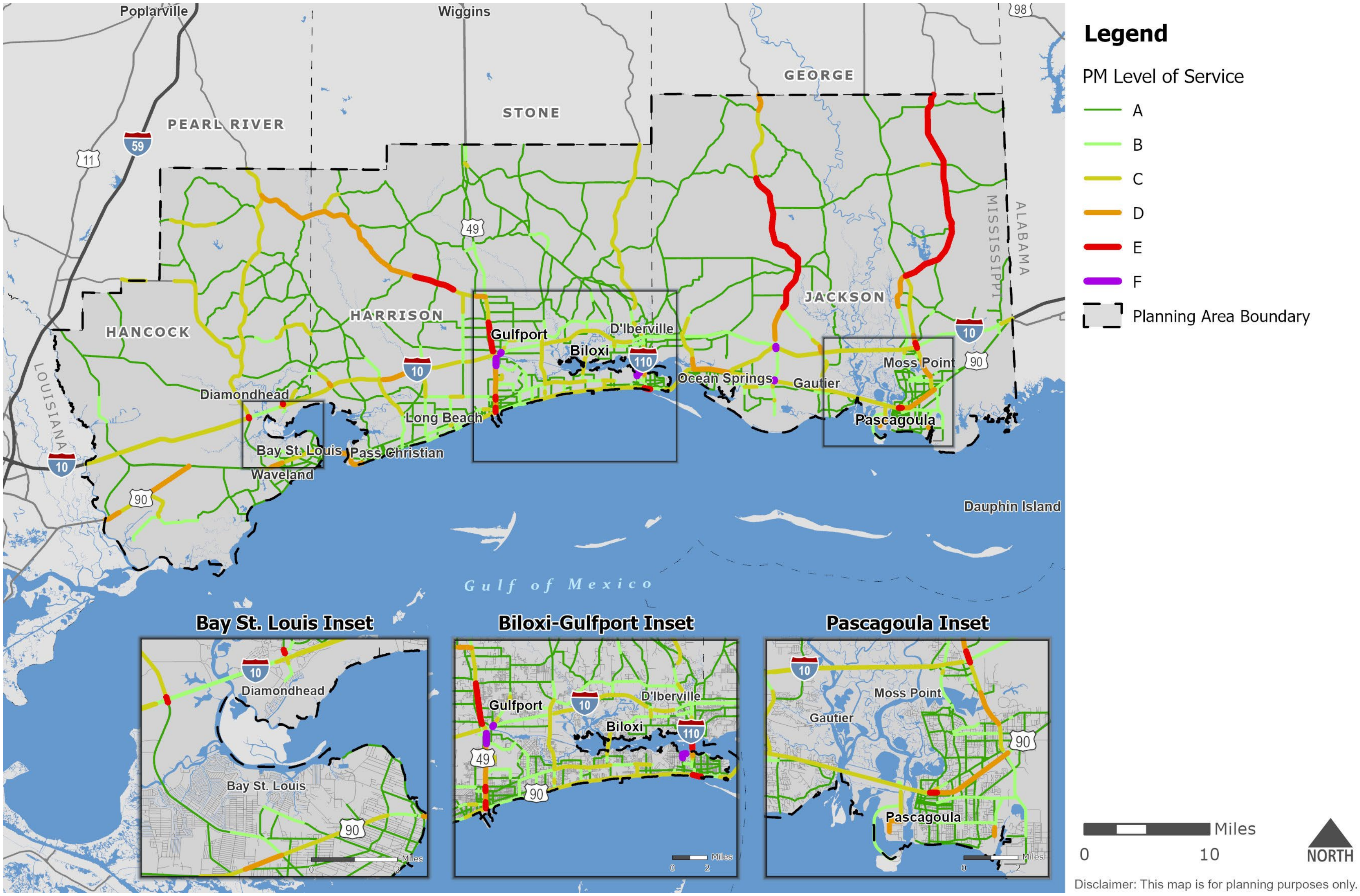
Figure D.2: Level of Service Study – 2022 MD Peak



Disclaimer: This map is for planning purposes only.

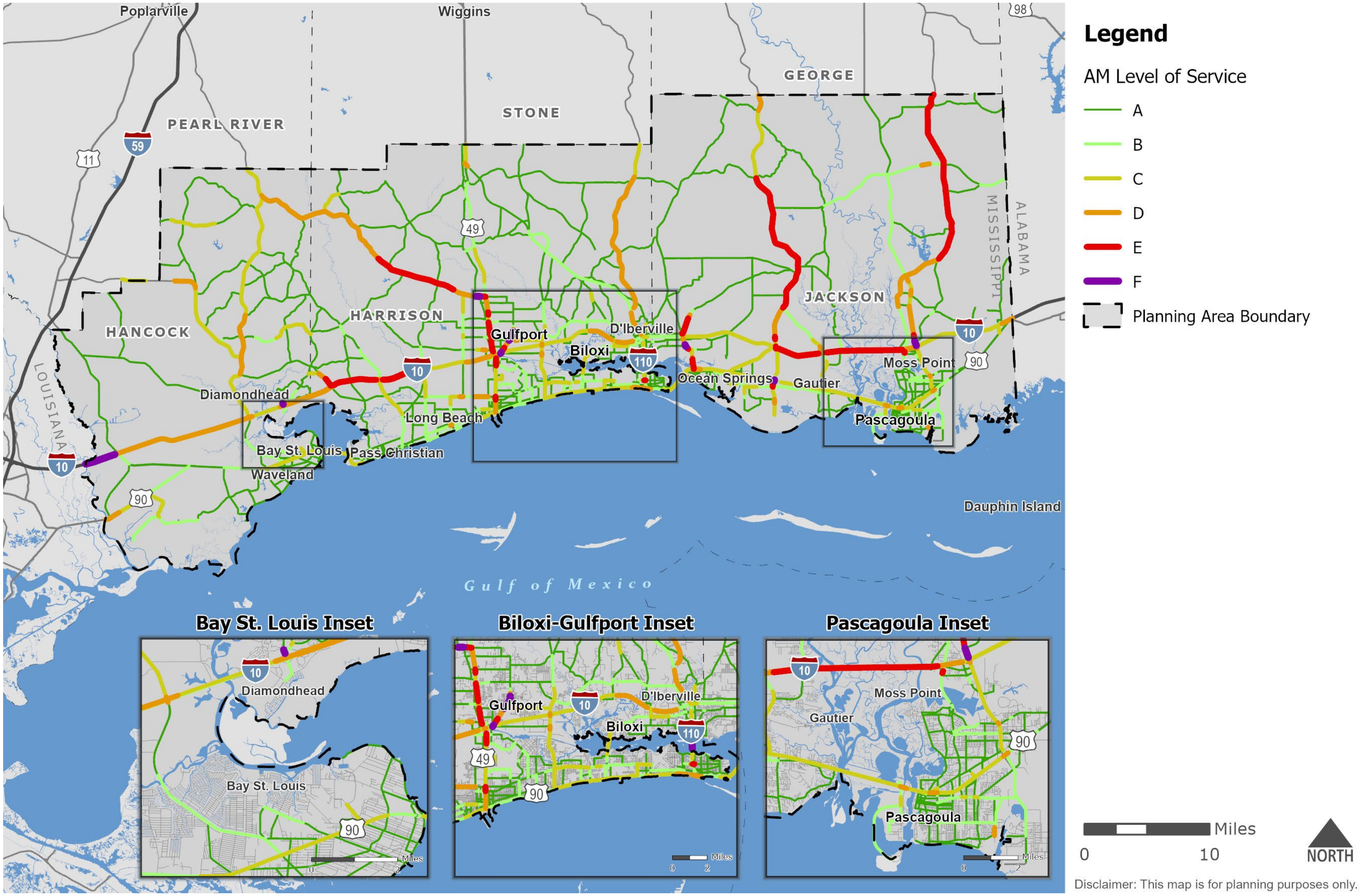
Source: Travel Demand Model, NPMRDS

Figure D.3: Level of Service Study – 2022 PM Peak



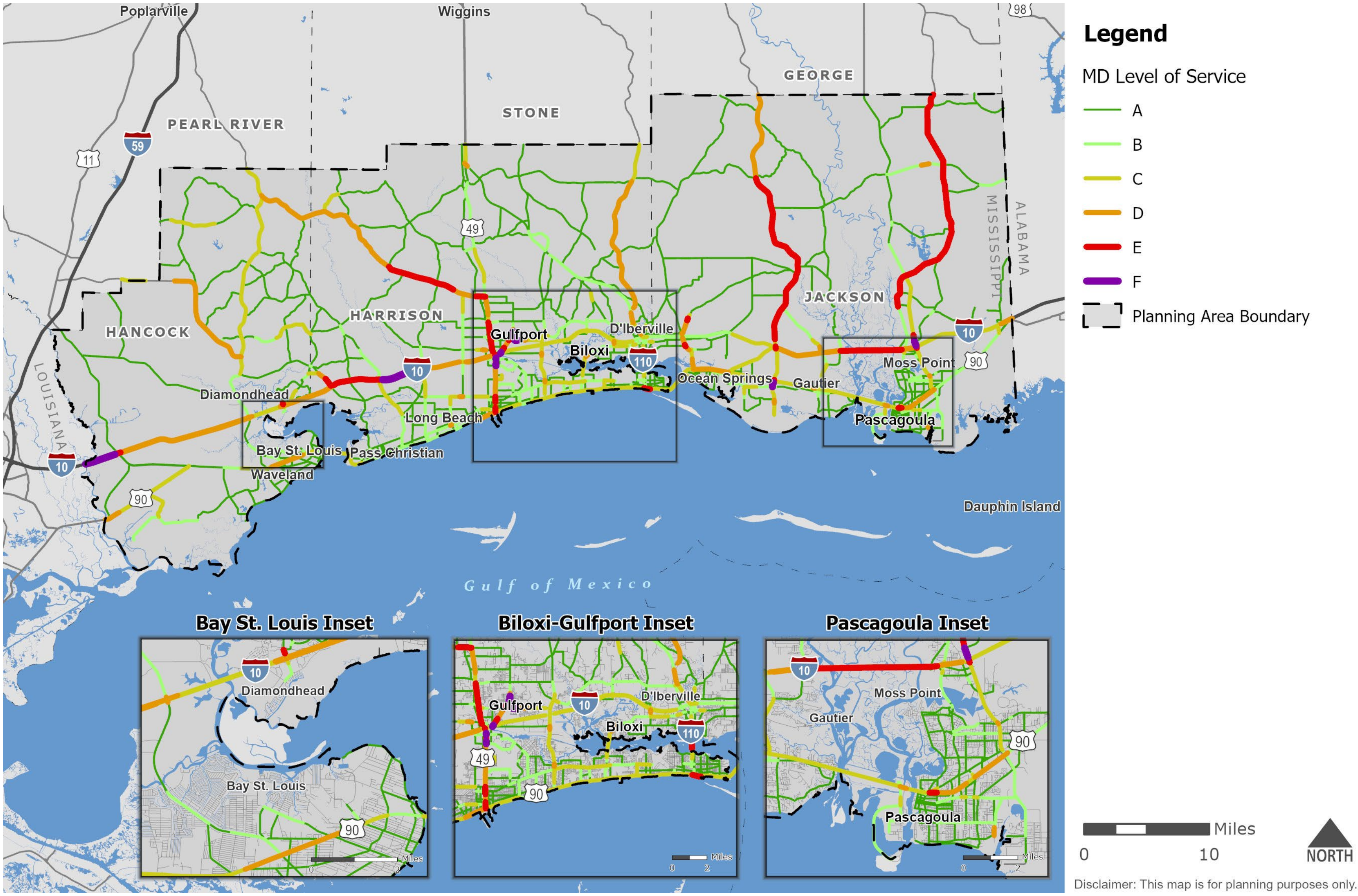
Source: Travel Demand Model, NPMRDS

Figure D.4: Level of Service Study – 2050 AM Peak



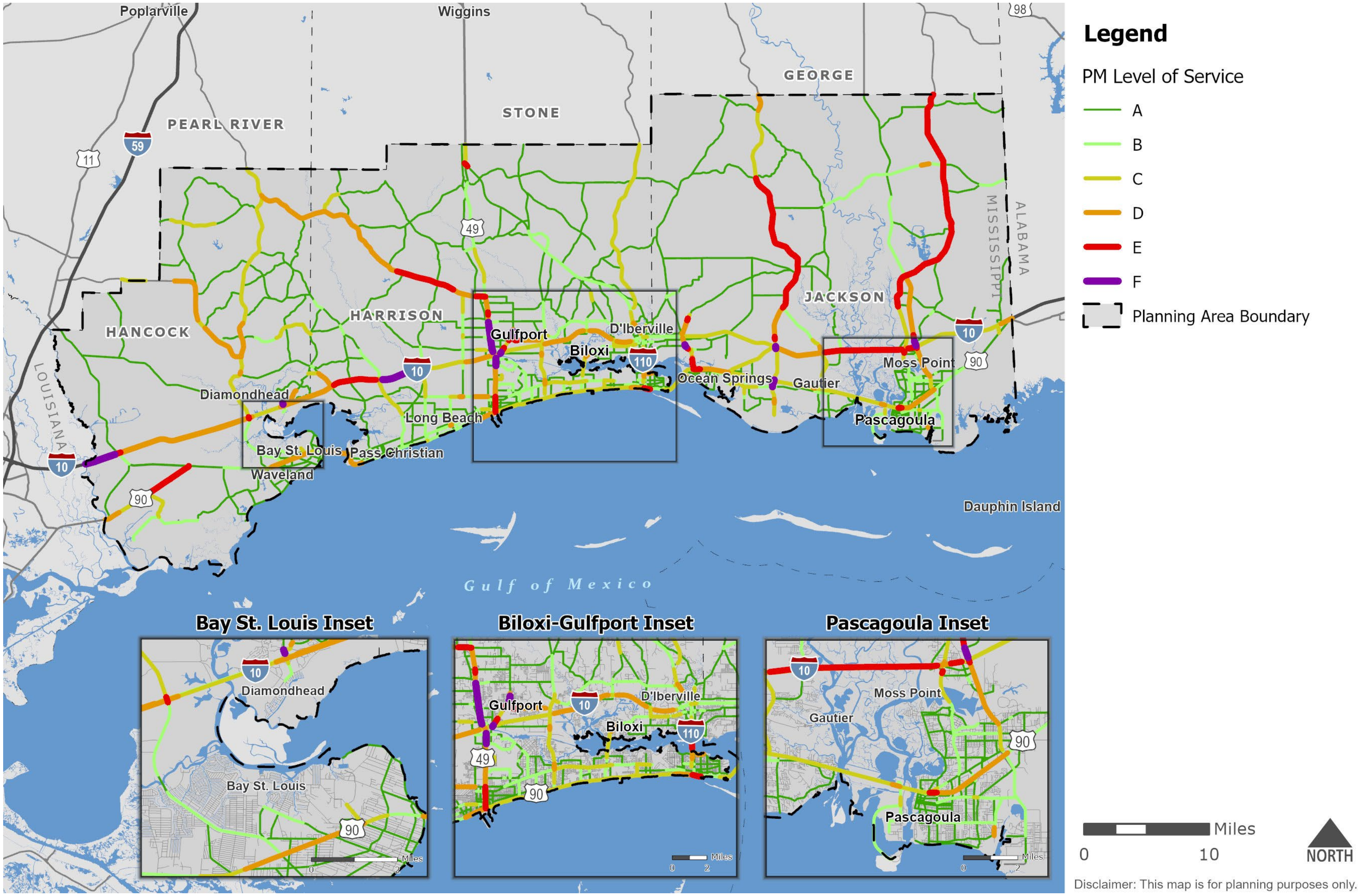
Source: Travel Demand Model, NPMRDS

Figure D.5: Level of Service Study – 2050 MD Peak



Source: Travel Demand Model, NPMRDS

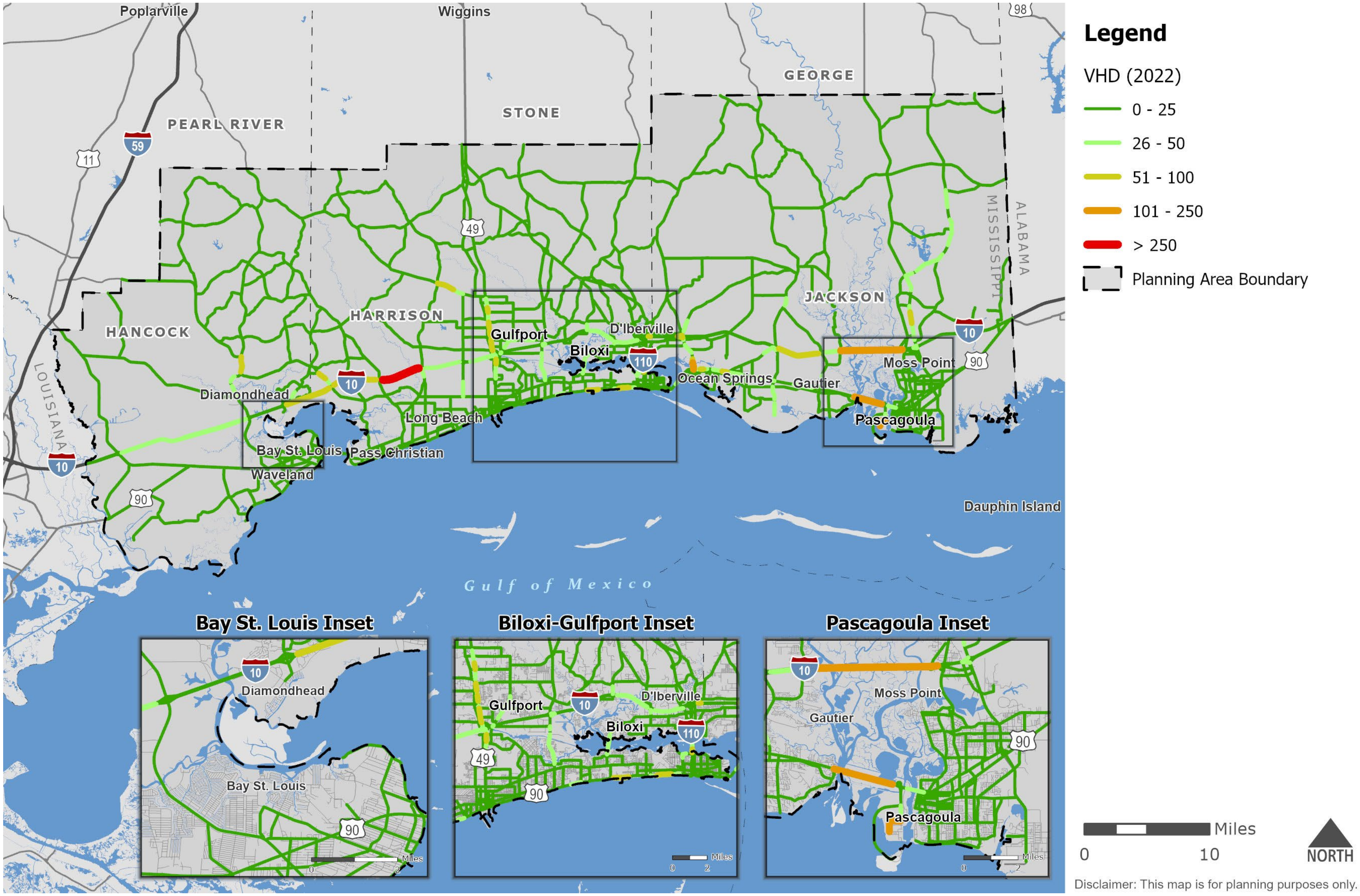
Figure D.6: Level of Service Study – 2050 PM Peak



Source: Travel Demand Model, NPMRDS

Appendix E: Vehicle Hours Delay Study

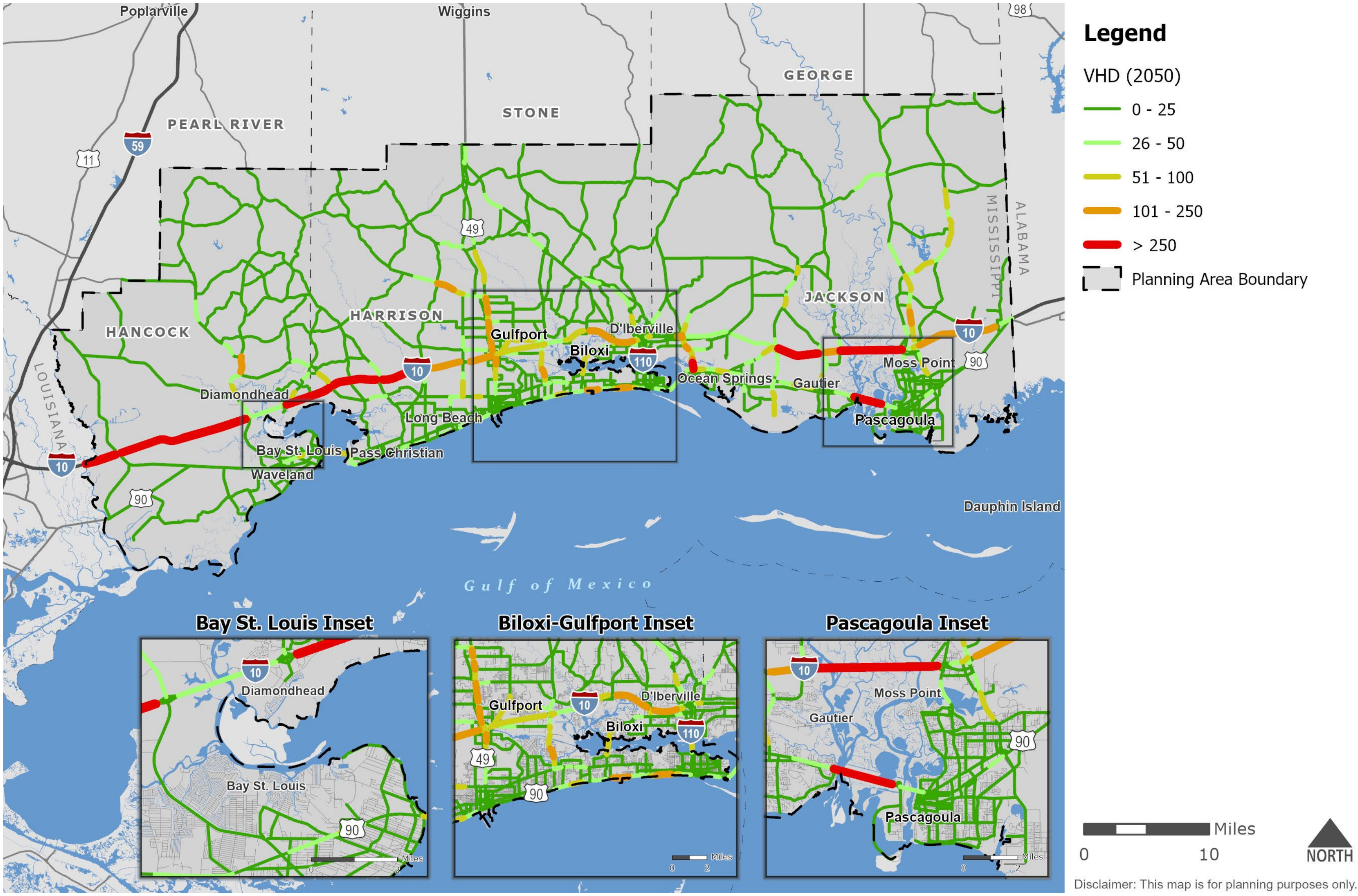
Figure E.1: Vehicle Hours of Delay Study – 2022



Disclaimer: This map is for planning purposes only.

Source: Travel Demand Model

Figure E.2: Vehicle Hours of Delay Study – 2050



Disclaimer: This map is for planning purposes only.

Source: Travel Demand Model

Appendix F: Buffer Index – Unpredictable Variability Corridors

Table F.1: Unpredictable Variability in Trip Duration (Buffer Index)

Corridor	Limits	AM	MD	PM
I-10 Westbound	County Farm Rd to Menge Ave	No	Yes	No
	MS 607 to Louisiana State Line	Yes	Yes	Yes
I-110 Northbound	At Bayview Ave	No	No	Yes
I-110 Southbound	At Rodriguez St	Yes	Yes	No
	Rodriguez St to Bayview Ave	Yes	No	No
US 49 Northbound	US 90 to 17th St	Yes	No	Yes
	17th St to I-10	No	No	Yes
US 49 Southbound	O'Neal Rd to I-10	No	No	Yes
	28th St to 25th St	No	Yes	Yes
	25th St to 17th St	No	Yes	No
	17th St to US 90	Yes	Yes	Yes
US 90 Eastbound	Lower Bay Rd to Old Spanish Trail	No	No	Yes
	Old Spanish Trail to MS 43/MS 603	Yes	Yes	No
	MS 43/MS 603 to Washington St	Yes	No	No
	White Harbor Rd to S Cleveland Ave	No	Yes	No
	Broad Ave to US 49	Yes	Yes	No
	Beauvoir Rd to Veterans Ave	No	No	Yes
	Oak St to MS 609	No	Yes	No
	Gautier-Vancleave Rd to Pascagoula St	No	No	Yes
	Chicot St to MS 63/MS 611	Yes	Yes	Yes
US 90 Westbound	At MS 63/MS 611	No	No	Yes
	Market St to Pascagoula St	No	Yes	Yes
	Pascagoula St to MS 619	No	Yes	No
	MS 619 to Gautier-Vancleave Rd	Yes	No	No
	Gautier-Vancleave Rd to MS 57	Yes	Yes	No
	MS 57 to Ocean Springs Rd	Yes	Yes	No
	MS 609 to Oak St	No	Yes	No
	Main St to I-110	No	Yes	No
	US 49 to Broad Ave	Yes	No	Yes
	Washington St to Old Spanish Trail	No	No	Yes
MS 43/MS 603 Northbound	At I-10	No	Yes	Yes

Corridor	Limits	AM	MD	PM
MS 43/MS 603 Northbound	Kiln-Delisle Rd to MS 603	No	No	Yes
MS 43/MS 603 Southbound	MS 603 to Kiln-Delisle Rd	Yes	No	No
	At I-10	Yes	Yes	Yes
MS 53 Northbound	Cable Bridge Rd to Saucier Lizana Rd	Yes	Yes	Yes
MS 53 Southbound	Old Hwy 49 to US 49	Yes	Yes	Yes
MS 57 Northbound	US 90 to I-10	No	No	Yes
	Gautier-Vancleave Rd to Jim Ramsay Rd	No	Yes	No
MS 57 Southbound	Wire Rd to Jim Ramsay Rd	Yes	No	No
	At I-10	Yes	No	Yes
MS 63 Northbound	Grierson St to I-10	Yes	Yes	Yes
MS 63 Southbound	I-10 to Grierson St	No	Yes	Yes
MS 605 Northbound	US 90 to Pass Rd	No	Yes	Yes
	Pass Rd to I-10	No	No	Yes
	At I-10	Yes	Yes	Yes
MS 605 Southbound	At I-10	Yes	Yes	Yes
MS 611 Northbound	Chevron Refinery to Old Mobile Ave	Yes	No	No
MS 613 Northbound	US 90 to Market St	No	Yes	Yes
	Market St to 14th St	No	No	Yes
	14th St to Shortcut Rd	Yes	No	Yes
	Shortcut Rd to Jefferson Ave	Yes	Yes	Yes
	Martin Luther King Blvd to Dantzier St	Yes	No	Yes
	At I-10	No	Yes	No
	Old Saracennia Rd to Wildwood Rd	No	Yes	Yes
	Saracennia Rd to MS 614	Yes	No	No
	MS 614 to George County Line	Yes	Yes	No
MS 613 Southbound	George County Line to MS 614	Yes	Yes	No
	MS 614 to Saracennia Rd	No	Yes	Yes
	Saracennia Rd to MS 63	Yes	Yes	Yes
	Old Saracennia Rd to I-10	No	Yes	No
	Dantzier St to Martin Luther King Blvd	Yes	No	No
	Martin Luther King Blvd to Shortcut Rd	No	No	Yes
	Shortcut Rd to 14th St	Yes	Yes	Yes
	14th St to Market St	Yes	No	No

Corridor	Limits	AM	MD	PM
MS 613 Southbound	Market St to US 90	No	No	Yes
Webre Rd Eastbound	Port & Harbor Dr to Lower Bay Rd	No	Yes	No
Webre Rd Westbound	Lower Bay Rd to Port & Harbor Dr	Yes	No	Yes
Port & Harbor Dr Eastbound	Port Bienville to Lower Bay Rd	No	Yes	No
Port & Harbor Dr Westbound	Lower Bay Rd to Port Bienville	No	No	Yes
Lower Bay Rd Northbound	Clemont Blvd to US 90	Yes	No	Yes
Lower Bay Rd Southbound	Clemont Blvd to Lakeshore Rd	Yes	No	No
	Lakeshore Rd to Old Lower Bay Rd	No	No	Yes
Canal Rd Southbound	I-10 to 28th St	Yes	No	No
Creosote Rd Eastbound	US 49 to Three Rivers Rd	No	Yes	Yes
Creosote Rd Westbound	Taylor Blvd to Three Rivers Rd	No	Yes	Yes
	Three Rivers Rd to US 49	Yes	No	Yes
Airport Rd Westbound	Three Rivers Rd to US 49	Yes	No	Yes
Washington Ave Northbound	45th St to Hewes Ave	No	No	Yes
Washington Ave Southbound	45th St to Pass Rd	No	Yes	Yes
34th St Westbound	8th Ave to US 49	Yes	Yes	Yes
28th St Eastbound	33rd Ave to Pass Rd	No	Yes	Yes
28th St Westbound	Pass Rd to US 49	No	Yes	Yes
	US 49 to 33rd Ave	No	No	Yes
30th Ave Northbound	US 90 to 25th St	Yes	No	No
	25th St to 28th St	Yes	Yes	Yes
30th Ave Southbound	28th St to 25th St	Yes	Yes	Yes
	25th St to US 90	No	Yes	Yes
Pass Rd Eastbound	US 49 to 28th St	Yes	No	No
	Courthouse Rd to MS 605	Yes	No	No
	Popps Ferry Rd to Veterans Ave	No	Yes	Yes
Pass Rd Westbound	Rodenberg Ave to Veterans Ave	No	No	Yes
	28th St to US 49	Yes	Yes	Yes
Rodenberg Ave Northbound	US 90 to Pass Rd	No	Yes	No
Popps Ferry Rd Eastbound	Pass Rd to Iron Horse Rd	No	No	Yes
	Iron Horse Rd to Cedar Lake Rd	No	Yes	Yes

Corridor	Limits	AM	MD	PM
Popps Ferry Rd Westbound	Cedar Lake Rd to Iron Horse Rd	Yes	Yes	Yes
Cedar Lake Rd Northbound	At I-10	Yes	No	No
Cedar Lake Rd Southbound	At I-10	Yes	No	Yes
Gautier-Vancleave Rd Northbound	US 90 to I-10	No	Yes	No
	At I-10	Yes	No	Yes
Gautier-Vancleave Rd Southbound	At I-10	Yes	No	Yes
	I-10 to US 90	No	No	Yes
Old Saracennia Rd Eastbound	MS 613 to MS 63	Yes	No	No
Old Saracennia Rd Westbound	MS 63 to MS 613	No	Yes	No

Source: NPMRDS
All segments where the buffer index exceeds 1.0 during either AM, MD, or PM peak period.

Appendix G: Texas A&M Transportation Institute Urban Mobility Report

Figure G.1: Annual Excess Fuel Consumed

Urban Mobility REPORT 2023

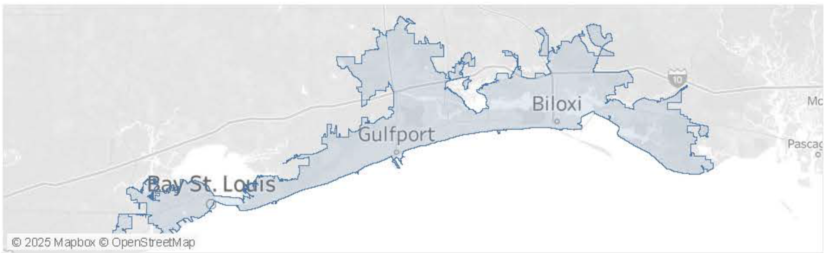
Gulfport MS

Texas A&M Transportation Institute

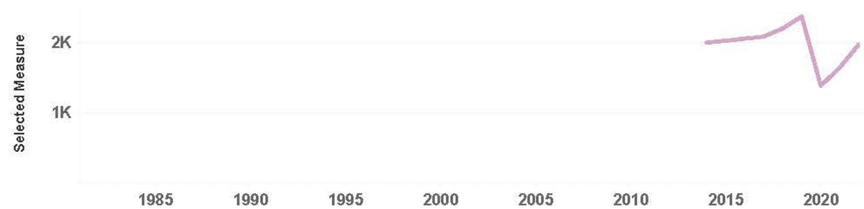
Year: None

Gulfport's 2022 delay is **4,819,000** total hours.

Measure: Annual Excess Fuel Consumed



Annual Excess Fuel Consumed



What Time Did Congestion Happen in 2022?

2022 Delay Split

, :

2022 Congestion

Total Annual Delay:	4,819,000 Hours	Planning Time Index (PTI):	1.02
Delay Rank:	172	PTI Rank:*	
Annual Delay/Commuter:	21 Hours	Travel Time Index (TTI):	1.07
Delay/Commuter Rank:	240	TTI Rank:	351
Congested Weekday Hours:			

Economic

Annual Congestion Cost:	$123M
Annual Congestion Cost Rank:	177
Congestion Cost/Commuter:	$478
Congestion Cost/Commuter Rank:	266

Cost Components

Value of Time:	$23.12/Hour
Commercial Value of Time:	$64.68/Hour
Avg State Gasoline Cost:	$3.07/Gallon
Avg State Diesel Cost:	$4.50/Gallon

2022 Peer Cost Comparisons

$0 $500 $1,000 $1,500 $2,000 $2,500 $3,000

Peer cost comparisons based on the average congestion cost/commuter for the population peer group that this urban area belongs.

Truck-Based

Annual Truck Delay:	143,000 Truck Hours	Wasted Truck Fuel:	278K Gallons
Truck Delay Rank:	270.0	Wasted Truck Fuel Rank:	257.00
Annual Congestion Cost (Trucks):	$9M	Excess CO2 from Trucks:	
Congestion Cost (Trucks) Rank:	270.0	Excess CO2 from Trucks Rank:*	

*Rank based on 101 legacy urban areas rather than all 494 urban areas.

Trucks made up **3%** of annual delay in **Gulfport** but **7%** of the total congestion costs in **2022.**

Environmental

Excess Fuel Consumed:	1,985K Gallons
Excess Fuel Consumed Rank:	178
Wasted Fuel/Commuter:	9 Gallons
Wasted Fuel/Commuter Rank:	223
Excess CO2 from Congestion:	
Excess CO2 from Congestion Rank:*	

Click to download PDF data tables for this urban area or a PDF version of this dispaly.

Source: Urban Mobility Report

Figure G.2: Excess Fuel Consumed per Commuter

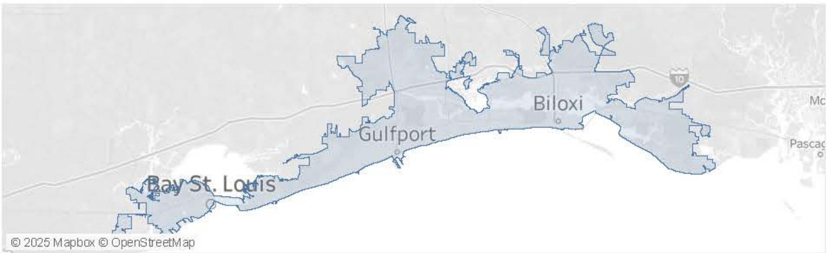
Urban Mobility REPORT 2023

Gulfport MS

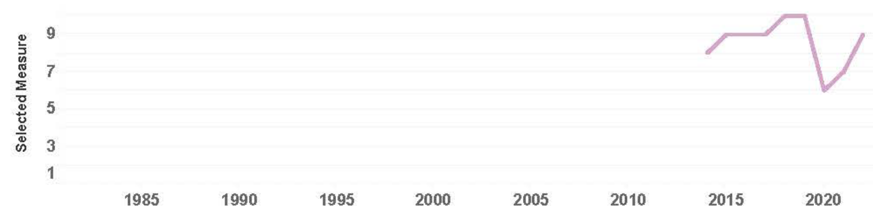
Year: None

Gulfport's 2022 delay is **4,819,000** total hours.

Measure: Excess Fuel Consumed per Commuter



Excess Fuel Consumed per Commuter



What Time Did Congestion Happen in 2022?

2022 Delay Split

, :

2022 Congestion

Total Annual Delay:	4,819,000 Hours	Planning Time Index (PTI):	1.02
Delay Rank:	172	PTI Rank:*	
Annual Delay/Commuter:	21 Hours	Travel Time Index (TTI):	1.07
Delay/Commuter Rank:	240	TTI Rank:	351
Congested Weekday Hours:			

Economic

Annual Congestion Cost:	$123M
Annual Congestion Cost Rank:	177
Congestion Cost/Commuter:	$478
Congestion Cost/Commuter Rank:	266

Cost Components

Value of Time:	$23.12/Hour
Commercial Value of Time:	$64.68/Hour
Avg State Gasoline Cost:	$3.07/Gallon
Avg State Diesel Cost:	$4.50/Gallon

2022 Peer Cost Comparisons

Peer cost comparisons based on the average congestion cost/commuter for the population peer group that this urban area belongs.

Truck-Based

Annual Truck Delay:	143,000 Truck Hours	Wasted Truck Fuel:	278K Gallons
Truck Delay Rank:	270.0	Wasted Truck Fuel Rank:	257.00
Annual Congestion Cost (Trucks):	$9M	Excess CO2 from Trucks:	
Congestion Cost (Trucks) Rank:	270.0	Excess CO2 from Trucks Rank:*	

*Rank based on 101 legacy urban areas rather than all 494 urban areas.

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Environmental

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Excess Fuel Consumed Rank:	178
Wasted Fuel/Commuter:	9 Gallons
Wasted Fuel/Commuter Rank:	223
Excess CO2 from Congestion:	
Excess CO2 from Congestion Rank:*	

Click to download PDF data tables for this urban area or a PDF version of this dispaly.

Source: Urban Mobility Report

Figure G.3: Annual Hours of Delay

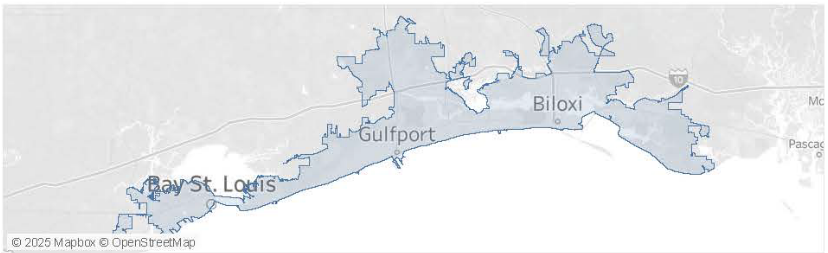
Urban Mobility REPORT 2023 **Gulfport MS**

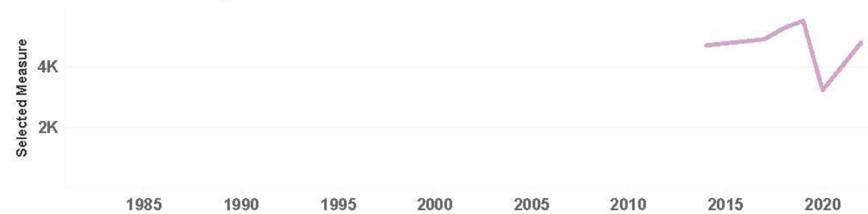
Texas A&M Transportation Institute

Year: None

Measure: Annual Hours of Delay

Gulfport's 2022 delay is **4,819,000** total hours.





What Time Did Congestion Happen in 2022?

2022 Delay Split

, :

2022 Congestion

Total Annual Delay:	4,819,000 Hours	Planning Time Index (PTI):	1.02
Delay Rank:	172	PTI Rank*	
Annual Delay/Commuter:	21 Hours	Travel Time Index (TTI):	1.07
Delay/Commuter Rank:	240	TTI Rank:	351
Congested Weekday Hours:			

Economic

Annual Congestion Cost:	$123M
Annual Congestion Cost Rank:	177
Congestion Cost/Commuter:	$478
Congestion Cost/Commuter Rank:	266

Cost Components

Value of Time:	$23.12/Hour
Commercial Value of Time:	$64.68/Hour
Avg State Gasoline Cost:	$3.07/Gallon
Avg State Diesel Cost:	$4.50/Gallon

2022 Peer Cost Comparisons

$0 $500 $1,000 $1,500 $2,000 $2,500 $3,000

Peer cost comparisons based on the average congestion cost/commuter for the population peer group that this urban area belongs.

Truck-Based

Annual Truck Delay:	143,000 Truck Hours	Wasted Truck Fuel:	278K Gallons
Truck Delay Rank:	270.0	Wasted Truck Fuel Rank:	257.00
Annual Congestion Cost (Trucks):	$9M	Excess CO2 from Trucks:	
Congestion Cost (Trucks) Rank:	270.0	Excess CO2 from Trucks Rank:*	

*Rank based on 101 legacy urban areas rather than all 494 urban areas.

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Environmental

Excess Fuel Consumed:	1,985K Gallons
Excess Fuel Consumed Rank:	178
Wasted Fuel/Commuter:	9 Gallons
Wasted Fuel/Commuter Rank:	223
Excess CO2 from Congestion:	
Excess CO2 from Congestion Rank:*	

Click to download PDF data tables for this urban area or a PDF version of this dispaly.

Source: Urban Mobility Report

Figure G.4: Delay per Auto Commuter

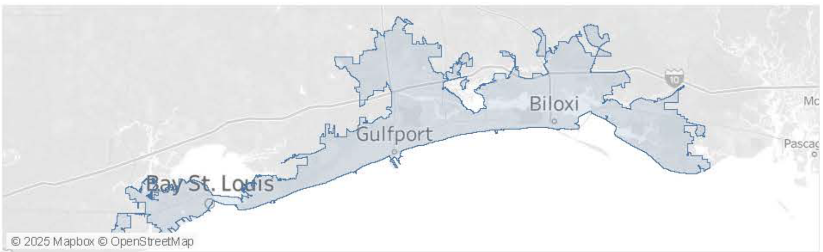
Urban Mobility REPORT 2023 — **Gulfport MS**

Texas A&M Transportation Institute

Year: None

Gulfport's 2022 delay is **4,819,000** total hours.

Measure: Delay per Auto Commuter



What Time Did Congestion Happen in 2022?

2022 Delay Split

, :

2022 Congestion

Total Annual Delay:	4,819,000 Hours	Planning Time Index (PTI):	1.02
Delay Rank:	172	PTI Rank:*	
Annual Delay/Commuter:	21 Hours	Travel Time Index (TTI):	1.07
Delay/Commuter Rank:	240	TTI Rank:	351
Congested Weekday Hours:			

Economic

Annual Congestion Cost:	$123M
Annual Congestion Cost Rank:	177
Congestion Cost/Commuter:	$478
Congestion Cost/Commuter Rank:	266

Cost Components

Value of Time:	$23.12/Hour
Commercial Value of Time:	$64.68/Hour
Avg State Gasoline Cost:	$3.07/Gallon
Avg State Diesel Cost:	$4.50/Gallon

2022 Peer Cost Comparisons

$0 $500 $1,000 $1,500 $2,000 $2,500 $3,000

Peer cost comparisons based on the average congestion cost/commuter for the population peer group that this urban area belongs.

Truck-Based

Annual Truck Delay:	143,000 Truck Hours	Wasted Truck Fuel:	278K Gallons
Truck Delay Rank:	270.0	Wasted Truck Fuel Rank:	257.00
Annual Congestion Cost (Trucks):	$9M	Excess CO2 from Trucks:	
Congestion Cost (Trucks) Rank:	270.0	Excess CO2 from Trucks Rank:*	

*Rank based on 101 legacy urban areas rather than all 494 urban areas.

Trucks made up **3%** of annual delay in **Gulfport** but **7%** of the total congestion costs in **2022.**

Environmental

Excess Fuel Consumed:	1,985K Gallons
Excess Fuel Consumed Rank:	178
Wasted Fuel/Commuter:	9 Gallons
Wasted Fuel/Commuter Rank:	223
Excess CO2 from Congestion:	
Excess CO2 from Congestion Rank:*	

Click to download PDF data tables for this urban area or a PDF version of this dispaly.

Source: Urban Mobility Report

Figure G.5: Annual Congestion Cost

Urban Mobility REPORT 2023

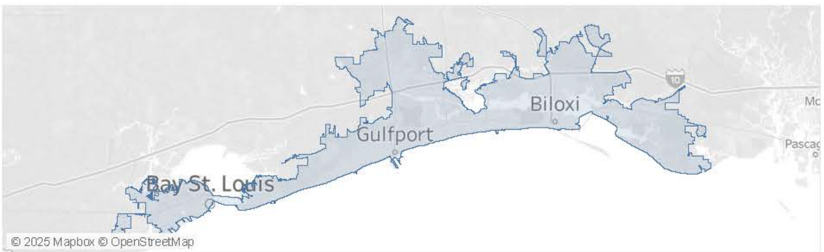
Gulfport MS

Texas A&M Transportation Institute

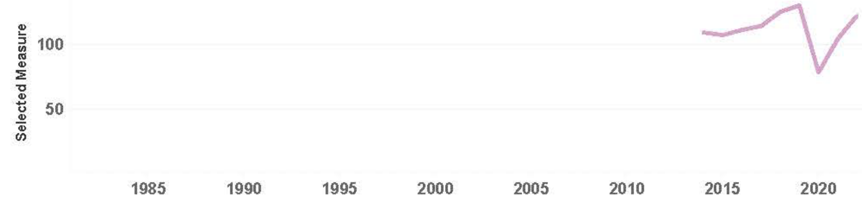
Year: None

Gulfport's 2022 delay is **4,819,000** total hours.

Measure: Annual Congestion Cost



Annual Congestion Cost



What Time Did Congestion Happen in 2022?

2022 Delay Split

2022 Congestion

Total Annual Delay:	4,819,000 Hours	Planning Time Index (PTI):	1.02
Delay Rank:	172	PTI Rank:*	
Annual Delay/Commuter:	21 Hours	Travel Time Index (TTI):	1.07
Delay/Commuter Rank:	240	TTI Rank:	351
Congested Weekday Hours:			

Economic

Annual Congestion Cost:	$123M
Annual Congestion Cost Rank:	177
Congestion Cost/Commuter:	$478
Congestion Cost/Commuter Rank:	266

Cost Components

Value of Time:	$23.12/Hour
Commercial Value of Time:	$64.68/Hour
Avg State Gasoline Cost:	$3.07/Gallon
Avg State Diesel Cost:	$4.50/Gallon

2022 Peer Cost Comparisons

Peer cost comparisons based on the average congestion cost/commuter for the population peer group that this urban area belongs.

Truck-Based

Annual Truck Delay:	143,000 Truck Hours	Wasted Truck Fuel:	278K Gallons
Truck Delay Rank:	270.0	Wasted Truck Fuel Rank:	257.00
Annual Congestion Cost (Trucks):	$9M	Excess CO2 from Trucks:	
Congestion Cost (Trucks) Rank:	270.0	Excess CO2 from Trucks Rank:*	

*Rank based on 101 legacy urban areas rather than all 494 urban areas.

Trucks made up **3%** of annual delay in **Gulfport** but **7%** of the total congestion costs in **2022.**

Environmental

Excess Fuel Consumed:	1,985K Gallons
Excess Fuel Consumed Rank:	178
Wasted Fuel/Commuter:	9 Gallons
Wasted Fuel/Commuter Rank:	223
Excess CO2 from Congestion:	
Excess CO2 from Congestion Rank:*	

Click to download PDF data tables for this urban area or a PDF version of this dispaly.

Source: Urban Mobility Report

Figure G.6: Congestion Cost per Auto Commuter

Urban Mobility REPORT 2023

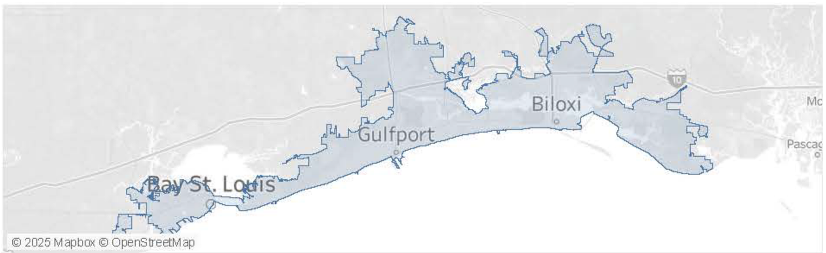
Texas A&M Transportation Institute

Gulfport MS

Year: None

Gulfport's 2022 delay is **4,819,000** total hours.

Measure: Congestion Cost per Auto Commuter



Congestion Cost per Auto Commuter

What Time Did Congestion Happen in 2022?

2022 Delay Split

, :

2022 Congestion

Total Annual Delay:	4,819,000 Hours	Planning Time Index (PTI):	1.02
Delay Rank:	172	PTI Rank:*	
Annual Delay/Commuter:	21 Hours	Travel Time Index (TTI):	1.07
Delay/Commuter Rank:	240	TTI Rank:	351
Congested Weekday Hours:			

Economic

Annual Congestion Cost:	$123M
Annual Congestion Cost Rank:	177
Congestion Cost/Commuter:	$478
Congestion Cost/Commuter Rank:	266

Cost Components

Value of Time:	$23.12/Hour
Commercial Value of Time:	$64.68/Hour
Avg State Gasoline Cost:	$3.07/Gallon
Avg State Diesel Cost:	$4.50/Gallon

2022 Peer Cost Comparisons

$0 $500 $1,000 $1,500 $2,000 $2,500 $3,000

Peer cost comparisons based on the average congestion cost/commuter for the population peer group that this urban area belongs.

Truck-Based

Annual Truck Delay:	143,000 Truck Hours	Wasted Truck Fuel:	278K Gallons
Truck Delay Rank:	270.0	Wasted Truck Fuel Rank:	257.00
Annual Congestion Cost (Trucks):	$9M	Excess CO2 from Trucks:	
Congestion Cost (Trucks) Rank:	270.0	Excess CO2 from Trucks Rank:*	

*Rank based on 101 legacy urban areas rather than all 494 urban areas.

Trucks made up **3%** of annual delay in **Gulfport** but **7%** of the total congestion costs in **2022.**

Environmental

Excess Fuel Consumed:	1,985K Gallons
Excess Fuel Consumed Rank:	178
Wasted Fuel/Commuter:	9 Gallons
Wasted Fuel/Commuter Rank:	223
Excess CO2 from Congestion:	
Excess CO2 from Congestion Rank:*	

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Source: Urban Mobility Report