Gulf Regional Planning Commission

2050 Metropolitan Transportation Plan | GRPC MPO

Technical Report #4

DRAFT – Needs Assessment

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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

This report discusses transportation needs for the Gulf Region Planning Commission (GRPC) MPO planning area. It is informed by the analysis in *Technical Report #2: State of Current Systems* and an assessment of future needs based on:

- current and forecasted trends,
- existing plans, and
- public and stakeholder input.

In addition to analyzing area needs, this assessment also identifies improvement recommendations to best support the MPO region as it continues to grow and evolve.

2.0 Special Considerations

Within the Metropolitan Transportation Plan (MTP), special considerations are given to context-specific conditions that impact the transportation network. These vary and may be based off a specific location or be related to specific events. This chapter describes the special considerations within the MPO region, including transportation network resilience, regional considerations, and tourism.

2.1 Resilience

Resilience is the ability to respond to, or recover from, a negative impact event or disruption. Within the context of the plan, this is the ability of transportation systems to withstand extreme or changing conditions and continue to provide or restore reliable mobility and accessibility throughout the region. Within resiliency measures, the impacts of weather, natural disasters, and human-induced events on transportation networks must be considered.

This sub-section reviews and builds from existing local, regional, and statewide plans to define a comprehensive approach to increasing resiliency throughout the regional transportation system. Through the identification of high-risk areas within the planning area, mitigation and maintenance strategies can be identified and may be selected to address resiliency concerns where appropriate.

Statewide Plans, Policies, and Considerations

The *State of Mississippi Standard Mitigation Plan*[1] is updated every five years in accordance with the Federal Disaster Mitigation Act of 2000, to serve the central purpose of "saving lives and reducing future losses". The plan guides natural and manmade hazard mitigation strategies, focused on the following statewide concerns:

- Flooding
- Extreme Weather
- Drought
- Earthquakes
- Wildfires
- Hurricanes
- Tornadoes
- Dam/Levee Failure
- Sea level Rise
- Cyberterrorism
- Infectious disease

Additionally, the statewide mitigation plan includes a list of mitigation actions recommended for projects based on technical feasibility, cost effectiveness, and environmental integrity. The most recent plan, updated in 2023, does not include

[1] 2023-State-of-Mississippi-Hazard-Mitigation-Plan-10.11.23.pdf

findings that are grouped by MPO, but does divide analysis and findings by region and/or county. An overview of plan findings is included below

Topography and Soils

All MPO counties have portions located in the Coastal Zone. This region is characterized by acidic soil and sands, with areas that are high in organic matter, and generally flat terrain. Northern portions of each county are also located in the Pine Belt. Unlike other areas, the Coastal Zone is positioned outside large deposits of expansive clay that can be found throughout other portions of the State.

Additionally, due to its location and geological features, counties within the Coastal Zone are prone to hazards associated with coastal erosion, changes in sea levels, and weather events which could cause tidal, flash, drainage, and riverine flooding.

Weather Readiness

Hancock and Jackson Counties, and the City of Bay St. Louis, were identified as being National Weather Service (NWS) StormReady communities. To receive an NWS StormReady designation, communities must:

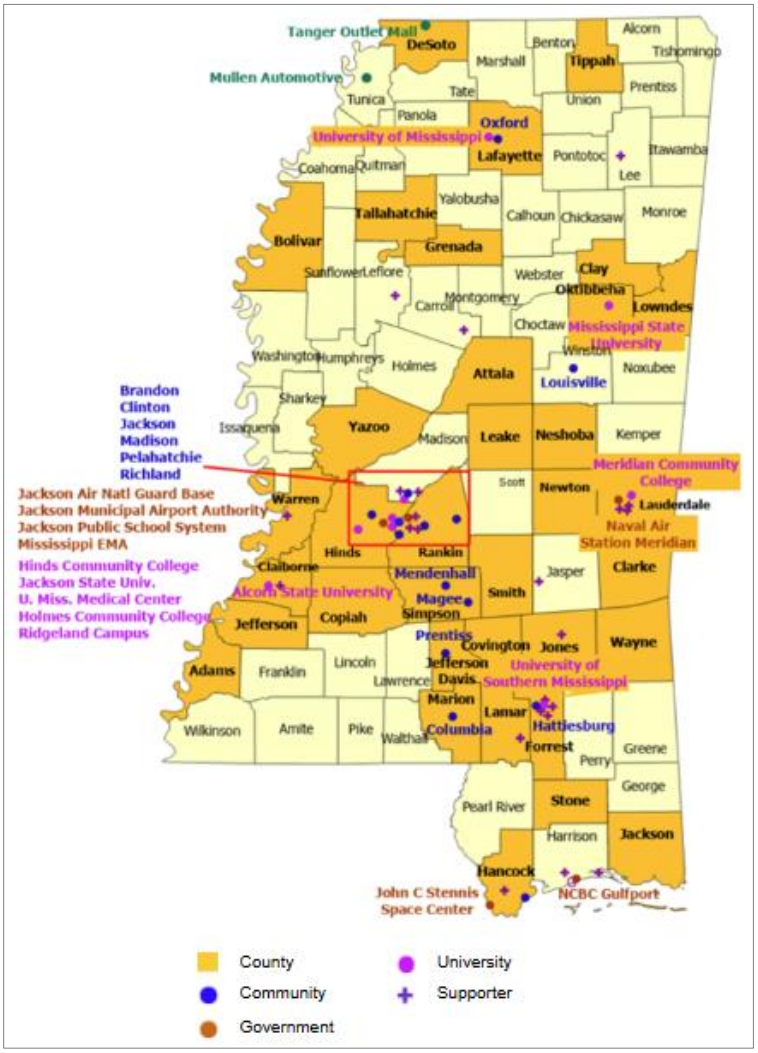
- Establish a 24-hour warning point and emergency operations center,
- Have mtuliple ways to receive weather warnings/forecasts and alert the public,
- Promote the importance of public readiness through community programs, and
- Develop a formal hazardous weather plan encompassing all components of the operation.

Additional StormReady supporters within MPO counties include:

- John C. Stennis Space Center,
- NCBC Gulfport,
- Gulfport Premium Outlets,
- Keith Huber Corporation, and
- Veterans Administration Hospital in Biloxi.

Figure 2.1 illustrates the location of StormReady sites in Mississippi.

Figure 2.1: StormReady Sites in Mississippi



Source: NWS; NOAA

To mitigate the risks associated with hurricanes, tornadoes, and other extreme weather hazards, Harrison, Hancock, and Jackson Counties each have FEMA 361 safe rooms and shelters. FEMA 361 shelters are those that are certified to be built to specific design standards and criteria laid out by FEMA and may be for individual or community use.

Community safe rooms serve the larger community, are often public, and may double as a community center, such as a gymnasium, when not in use.

FEMA-361
criteria goes further than shelter design standards by considering risk, shelter operation, and emergency management.

Dams and Structures

The Surface Water and Dam Safety Divisions of the Office of Land and Water Resources, Mississippi Department of Environmental Quality (MDEQ) is the agency responsible for developing dam safety regulations for the state.

MDEQ categorizes dams as **low**, **significant**, or **high hazard** based off the anticipated downstream impact of a dam failure. These are defined as:

- **Low Hazard** is a class of dam in which failure would at the most result in damage to agricultural land, farm buildings (except residences), or minor roads.

- **Significant Hazard** is a class of dam in which failure poses no threat to life, but may cause significant damage to main roads, minor railroads, or cause interruption of use or service of public utilities.
- **High Hazard** is a class of dam in which failure may cause loss of life, serious damage to residential, industrial, or commercial buildings; or damage to, or disruption of, important public utilities or transportation facilities such as major highways or railroads.

Three **High Hazard** dams are located within the MPO region. No significant hazard dams were identified.

As of 2023, there are 165 dams located in Jackson (38), Hancock (59), and Harrison (68) Counties[2]. Of these, most dam structures are classified as being low hazard, unclassified, or require additional information. Reported dam failures between 1982 - 2022 are included in the statewide mitigation plan[3]. **Table 2.1** lists the failures which were located within the region's counties for the latest ten years of the report, from 2012 to 2022.

Additionally, the plan identified 164 bridges within the region. Of these, one in Harrison and two in Jackson are listed as being at risk due to exposure and flood vulnerabilities.

Table 2.1: Dam Failures in GRPC MPO Counties (2012 – 2022)

County	Date	Structure Name	Type of Failure
Hancock	March 2014	St Regis Paper Company Lake Dam	The area received 3-5" of rainfall, activating the spillway and starting a series of headcuts in the spillway channel.
Jackson	May 2013	Spring Lake Dam	Owner attempted to rebuild dam; construction breached during heavy rain

Source: State of Mississippi Standard Mitigation Plan

Regional and Local Plans, Policies, and Considerations

The Mississippi Emergency Management Agency (MEMA) provides a regional approach to emergency management within the State of Mississippi. To facilitate this approach, Mississippi counties are divided into nine MEMA districts, each responsible

[2] 2023-State-of-Mississippi-Hazard-Mitigation-Plan-10.11.23.pdf

[3] https://www.msema.org/sites/default/files/about/2023-State-of-Mississippi-Hazard-Mitigation-Plan-10.11.23.pdf

for the development of a regional hazard mitigation plan for their respective area. The MPO falls within MEMA District 9, which updated it's Hazard Mitigation Plan in 2024[4].

This Hazard Mitigation Plan includes an analysis of hazards for each county and municipality to help bolster preparedness within the region. Primary hazards, and their risk level per county, are listed in **Table 2.2**.

Table 2.2: Hazards and Associated Risk Levels in GRPC Counties

Risk Level	Hancock County	Harrison County	Jackson County
High	Hurricane Tropical Storm Flood Severe Thunderstorm High Wind Storm Surge Tornado	Hurricane Tropical Storm Flood Severe Thunderstorm High Wind Storm Surge Tornado	Hurricane Tropical Storm Flood Severe Thunderstorm High Wind Storm Surge Tornado
Medium	Hailstorm Hazardous Materials Incident Train Derailment Extreme Heat Wildfire Drought Climate Change Sea Level Rise Infectious Disease	Hailstorm Hazardous Materials Incident Train Derailment Extreme Heat Wildfire Drought Climate Change Sea Level Rise Infectious Disease	Hailstorm Hazardous Materials Incident Train Derailment Extreme Heat Wildfire Drought Climate Change Sea Level Rise Infectious Disease
Low	Lightning Dam/Levee Failure Erosion Winter Weather Extreme Cold Earthquake	Lightning Dam/Levee Failure Erosion Winter Weather Extreme Cold Earthquake	Lightning Dam/Levee Failure Erosion Winter Weather Extreme Cold Earthquake

[4] https://www.waveland.ms.gov/media/5106

For these hazards, there is an improvement category which describes the type of improvement or effort that is needed. These categories include:

1. Prevention
2. Property Protection
3. Natural Resource Protection
4. Structural Projects
5. Emergency Services
6. Public Education/Awareness

Unlike the *Mississippi Standard Mitigation Plan,* the *District 9 Hazard Mitigation Plan* includes municipalities within their analysis and needs assessments. Identified high-priority recommendations from this plan, with both GRPC counties and cities, are summarized in **Table 2.3**. The complete list of recommendations, along with relevant analysis and findings, is available within the MEMA District 9 Hazard Mitigation Plan.

Table 2.3: MEMA District 9 Recommendation Summary for MPO Communities (2024)

City/County	Categories	Recommendation Summary
Hancock County		
Hancock County	1 - 6	Recommendations in each category included efforts to mitigate the impact of hurricanes and flooding, however severe thunderstorms, tornadoes, high wind, dam failure, coastal erosion, climate change, earthquake, wildfire, severe weather, storm surge, and all hazards were also within high-priority recommendations.
Bay St. Louis	1, 2, 6	Recommendations largely focus on additional planning and coordination efforts and programs to help relocate homeowners from special flood hazard areas and to educate the public and professionals on safety, storm risks, and hazard mitigation.
Diamondhead	1, 2, 4 - 6	Projects which addressed hurricanes, dam failures, and floods, and their related impacts, were the highest priority throughout all recommendations.
Waveland	1 - 6	Of the high priority recommendations, the majority relate to flooding, hurricane, general hazard, and erosion mitigation efforts. These include efforts to protect public records, clean and maintain drainage, increase construction standards, evaluate and install protective barriers against storm surges, and educate the public and property owners.
Harrison County		
Harrison County	1, 2, 4 - 6	Hurricanes, flooding, and all hazards mitigation efforts were the most commonly identified high-priority recommendations. Other high-priority mitigation efforts were identified for: tropical storms, thunderstorms, tornados, high wind events, storm surges, sea level rise, manmade hazards, coastal storms, wildfires, infectious disease, and all severe weather.
Biloxi	1, 2, 4 - 6	The highest priority projects focused on addressing manmade hazards, severe weather events, and floods; additionally, some recommendations would address all hazards, such as outreach and planning efforts, and upgrading alert systems.

City/County	Categories	Recommendation Summary
D'Iberville	1, 2, 4 - 6	The most common recommendations were centered on planning, property protection, and public education and awareness. Of these, the highest priority dealt with addressing development in flood prone areas, restricting new development, enforcing construction standards, and educating property and business owners.
Gulfport	1 - 6	Developing plans and increasing coordination efforts was the largest category for improvement recommendations. Other high priorities include retrofitting and upgrading existing critical facilities, bridges, and other infrastructure elements, marsh and wetland restoration and protection, emergency personnel training, and public education efforts.
Long Beach	1, 2, 4 - 6	Of the identified priorities, only two are listed as a high priority: efforts to mitigate flood, erosion, and severe weather hazards, and the installation of warning sirens.
Pass Christian	1, 3 - 6	Public education has the most identified recommendations. High priority recommendations, in this category and others, include increased coordination with and equipment for emergency services, upgrades to drainage and water infrastructure, the installation of a warning system, and additional plan development.
Jackson County		
Jackson County	1 - 6	Flood, wildfire, and all hazards were the most common high-priority mitigation types. Additional high-priority recommendations would address drought, dam failure, tropical storms, hurricanes, erosion, lightning, and hazardous materials.
Gautier	1 - 6	Nearly half of the recommendations identified (27 of 60) are within the planning category. High priority planning recommendations relate to enforcement, flood mitigation, wildfire management, dam failure, and general improvements that aim to address all hazards. Additional high priority recommendations relate to flooding, lightning, water conservation, hazardous materials, wildfires, and general hazard mitigation.
Moss Point	1, 2, 4 - 6	There are four high-priority recommendations, which are: drainage improvements, scaling system, an emergency power generator, and public education and outreach activities.

City/County	Categories	Recommendation Summary
Ocean Springs	1 - 6	High priority recommendations include efforts to protect against hazardous materials, wildfires, floods, hurricanes, storm surges, tornadoes, severe thunderstorms, and general hazards. This includes improving emergency response and services, adhering to construction standards, additional inspection, maintenance, standards of critical facilities and infrastructure, and addressing gaps in current plans and policies.
Pascagoula	1 - 6	Nearly all high priority recommendations relate to mitigating the impacts of flooding, hurricane, and other extreme weather events. This includes projects related to drainage, utility infrastructure, structural hardening, residential property elevation, wetland protection, certifications, and public education and outreach efforts.

2.2 Regional Considerations

The MPO is the agency responsible for transportation policy development, planning, and programming within the region. As such, it considers transportation resiliency needs that impact the whole region. This includes weather and climate-related events, which are detailed in this section. Mitigation for these events is further described in Section 2.3.

Weather and Climate Events

High Wind Events

The MPA spends half of each year, from June 1 through November 30, under threat of hurricanes and tropical storms that can cause extreme damage to the region. Being located near the Gulf of Mexico, these tropical systems can bring high wind events that can affect transportation systems. This includes bridge/road failure, debris blocking roadways, and unsafe travel conditions. Additionally, there is a risk for tornadoes as the MPA is located within the Southern United States, a region particularly vulnerable to tornadoes.

Both Harrison and Jackson are on the list of Mississippi counties which have experienced the most recorded tornadoes between 1950 – 2023[5]. On this, Harrison ranks third and Jackson ranks sixth, tied with Warren County. In total, MPO counties experienced 206 tornado events, which are all events that involve a tornado that made contact with the ground, regardless of severity. During the analysis period, 80 of these events occurred in Harrison County, 73 in Jackson County, and 53 in Hancock County.

Floods

Flooding hazards are also a concern, as MPO counties experienced 197 flooding events from 1950 – October 2022[5] and are the top three counties which experience severe, repetitive loss of property and amount of flood claims. As the planning area is a coastal environment, hurricanes, tropical storms, flash floods, riverine flooding, and storm surges pose a high-hazard risk to the region and can result in significant damage to transportation systems, such as roads being washed out or bridge supports being damaged.

[5] 2023-State-of-Mississippi-Hazard-Mitigation-Plan-10.11.23.pdf

Snow and Ice

Source: MDOT

Like most regions within the Southern United States, the region usually does not experience significant winter weather. However, even a small amount of winter precipitation can have a significant impact on the regional transportation system. Icy conditions can result in road and bridge closures and drivers unfamiliar with traveling during winter weather events may not be able to do so safely. The last significant snowstorm to impact the Gulf Coast was in 1974, during which snow accumulation totaled five inches.

Temperature Extremes

The MPA is located in an area that is classified as Humid, Subtropical (Cfa) according to the Köppen Climate Classification System. This is due to the region's average daily temperatures, with the high temperatures reaching into the nineties in July and August and low temperatures in the lower forties in January, and the amount of rainfall that is expected, with the region not experiencing a dry season. Both temperature extremes and precipitation can affect transportation systems. Extremely high temperatures can affect the integrity of the pavement, and extremely low temperatures, especially with winter weather, can cause road and bridge closures due to icing.

Wildfires

Wildfires present a risk to specific localities within the region. These events can cause a loss of woodland habitat and exacerbate air quality concerns, as the smoke brings additional pollutants into the atmosphere. Large wildfires can also impact transportation networks as smoke obstructs the view of the roadway and as large fires can lead to evacuations and road closures near unsafe areas.

2.3 Resiliency Action Plan

Resilience in transportation relies on a multifaceted approach utilizing data analysis, targeted remediation, and preventive maintenance. This allows for the transportation system to be developed with efficient and sustainable characteristics, increasing the overall resiliency of the network. This sub-section takes threats to the area into account and identifies mitigation efforts to build transportation network resiliency.

Identification of High-Risk Areas

To support resilient transportation systems, it is necessary to study historical data to mitigate and protect against future weather-related hazards. The *State of Mississippi Standard Mitigation Plan* provides this data on the state level by compiling details from topographic maps, government documents, and local studies. From this, datasets can be built, studied, and used to identify and monitor areas which are repeatedly impacted by natural disasters. Along with site characteristics, these datasets can be used to determine which mitigation strategies address the unique and specific needs of the area and should be selected for implementation.

Stormwater Mitigation

Source: pxfuel.com

How land is used and developed evolves along with the changes in area population and growth over time. New development often removes pervious areas such as grass, wetlands, and wooded areas, and replaces them with impervious surfaces such as new roadways, sidewalks, driveways, foundations, and parking lots. Increases in impervious surfaces can lead to excess runoff where existing drainage systems cannot properly manage the increased waterflow.

The inability for drainage systems to manage stormwater effectively can result in property damage, environmental concerns, and public health hazards as stormwater contaminants leech into new areas. Without proper drainage or stormwater mitigation efforts, new transportation projects can potentially worsen existing stormwater issues. To reduce the impacts of stormwater runoff, green infrastructure design elements can be utilized in addition to project planning and coordination efforts.

Green infrastructure is a cost-effective approach to managing weather events, while providing added benefits to the community.

The purpose of green infrastructure is to create more permeable surfaces that mimic the beneficial characteristics of the natural environment. This strategy uses vegetation, soil, and other elements to treat stormwater at its source and use the ground and plants as filters to eliminate potential pollutants. This approach supports the community's stormwater drainage system by slowing runoff and reducing stormwater discharge to mitigate flood risk.

Green infrastructure may also decrease the size of systems needed and reduce the overall cost of materials, maintenance, and future repairs. **Figure 2.2** shows effective

examples of green infrastructure that can be implemented, including permeable pavements, bioswales or vegetative swales, green streets and alleys, and green parking.

Figure 2.2: Green Infrastructure Examples

Source: https://www.epa.gov/green-infrastructure/what-green-infrastructure

Additionally, green infrastructure can be applied not only to transportation development, but to commercial buildings and residential homes as well. This can be done through incorporating green roofs, additional tree cover, rain gardens, bioswales, and rainwater collection and reuse.

Benefits of incorporating green infrastructure in these developments include reductions in flood damage, lower energy costs, and the potential for higher property values and rental rates. Additional benefits to property owners may include tax savings, rebates, or other incentives to help reduce the overall cost of implementing green infrastructure.

Strategies that incorporate green infrastructure design elements can be implemented by the MPO and its partner agencies to minimize the associated stormwater and flooding risks of infrastructure development projects.

These strategies include:

- Minimizing impervious surfaces and alterations to natural landscapes;
- Promoting the use of Low-Impact Development (LID) practices;
- Encouraging local agencies to adopt ordinances that include stormwater mitigation practices[6];
- Developing a Standard Urban Stormwater Mitigation Plan (SUSMP)[7];
- Identifing and prioritizing mitigation efforts in areas most likely to flood during heavy storm events;
- Developing emergency response measures that feature specified contract mechanisms in place for asset repair;
- Adopting open space preservation plans to balance land use and local development initiatives with preservation and conservation of the existing open space;
- Establishing stormwater fees to support the funding of stormwater management projects and practices[8];
- Offering incentives to encourage the use of pervious surfaces.

In addition to these strategies, public involvement and education efforts can help to inform the public and stakeholders on the impacts of stormwater runoff and how they can assist with mitigation.

Source: ensia.com

[6] AN ORDINANCE (greenvillecounty.org)

[7] susmp_rbfinal.PDF (ca.gov)

[8] FY25 Stormwater Budget Adoption - 2nd Reading (takomaparkmd.gov)

Flooding and High Wind Event Mitigation

Flooding and high wind events are closely associated with extreme weather. The following construction adaptation methods can be utilized to support infrastructure in regions vulnerable to these events such as tropical storms, hurricanes, and tornadoes. Bridge scour countermeasures

- Resizing culverts and widening bridge openings
- Cable and tower damping on bridges
- Raising vulnerable segments of the roadway
- Detention and retention basins
- Floodgates and stormwater pump stations

Figure 2.3: Construction Adaptation Method Examples

Due to the nature of flooding and high wind events, mitigation efforts largely fall into incorporating specific resiliency elements into project design. As such, there are fewer ways for residents to get involved in increasing the resiliency of the transportation network against these events when compared to stormwater runoff mitigation.

Snow and Ice Mitigation

In Southern climates, it is more common for ice or snow on roads to be mitigated through road salting. However, salting roads with traditional rock salt may lead to both environmental and public health concerns. As the salt dissolves, it drains with the stormwater and may contaminate water supplies, increase soil erosion, endanger wildlife, and increase soil salinity levels, which can inhibit the ability of plants to absorb water from their roots.

Source: MDOT

To address this, more sustainable options are available that can reduce the risk of environmental pollution while addressing winter precipitation accumulation on network roadways. Alternatives to rock salt include calcium chloride or brine solutions made from agriculture byproducts. Additionally, reducing the amount of sodium chloride used can also lessen the environmental impact, especially if other options are unattainable or otherwise difficult to incorporate into roadway de-icing efforts.

Although none of the alternatives completely reduce the negative impacts associated with salting, they have a smaller environmental impact and can be integrated into roadway deicing efforts over time. The MPO can coordinate with MDOT and local jurisdictions to begin the process of selecting and using deicing alternatives.

Maintenance

An important element of resilience is the continued routine inspection and maintenance of transportation assets to fortify the system against external damage. Through routine inspections and maintenance, existing cracks, instability, or defects can be repaired or otherwise addressed, increasing the ability of the infrastructure to withstand extreme weather events. This is especially true for transportation assets located in areas which are prone to flood, high wind, extreme heat, and other highly destructive events.

Examples of maintenance practices that promote network resiliency include:

- Prioritizing sites that are especially susceptible to natural hazard effects when implementing infrastructure updates;

- Coordinating with the MDOT and partner agencies to increase inspection frequency of bridges and roadways, ensuring the infrastructure is structurally sound and that storm erosion has not degraded it;
- Designing drainage systems and conducting regular inspections to ensure that roadways will not contribute to runoff that can lead to pooling; and,
- Implementing tree trimming in high-risk areas to proactively mitigate downed tree occurrences.

It is beneficial to adopt a wide range of preventive measures combining natural, constructed, and policy and education-based mitigation strategies. This ensures that the infrastructure can support regional weather impacts while limiting risks to structural integrity and public safety.

2.4 Tourism

Tourism plays an increasingly important role in economies as jobs shift into the service and information sectors[9]. As tourism grows in local and regional importance, the resiliency of the transportation network and how it relates to tourism should be considered. This includes identifying what currently serves tourists and travelers, such as welcome centers and amenities, as well as the needs to help improve the traveling experience for both first-time visitors and those rediscovering their communities.

State and Regional Tourism Overview

The Mississippi Development Authority maintains its own website, https://visitmississippi.org/, which serves as a hub for information on traveling and tourism activities across the state. It also includes an overview of tourism, such as the economic contribution of tourism to Mississippi, depicted in **Figure 2.4.**

Within the region, Coastal Mississippi is the organization in charge of promoting tourism. According to their 2021 Traveler Report[10], tourists spent just over $2.1 billion between both overnight and day visit tourism activities.

Compared to national averages, tourists to the region were more likely to stay at a hotel or resort, participate in outdoor, entertainment, or cultural activities, and were less likely to travel alone.

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[9] *OECD Tourism Trends and Policies*, 2018, Organization for Economic Cooperation and Development

[10] https://assets.simpleviewinc.com/simpleview/image/upload/v1/clients/gulfcoast/Coastal_Mississippi_Travel_USA_Visitor_Report_2021_bd816fde-63b5-472b-8519-57ef23ae7308.pdf

Figure 2.4: Contributions of Tourism to the Mississippi Economy (2023)

Source: https://visitmississippi.org/wp-content/uploads/2025/05/MDA13869-VisitMississippi-PartnerResourceGuide-P9.pdf

Welcome Centers

Within the State of Mississippi, there 12 welcome centers. Of these, two are located within the region: the Jackson County Welcome Center in Moss Point, and the Hancock County Welcome Center in Pearlington. More information about the location and status of welcome centers within Mississippi can be found at: https://visitmississippi.org/welcome-centers/.

In addition to welome centers, several visitors centers are located within the region and help to further distribute information to travelers and tourists. Locations include Bay St. Louis, Biloxi, Ocean Springs, and Pascagoula.

Transportation Options

Accessible transportation is an important part of getting tourists into and around the region. Roadways that serve the region include:

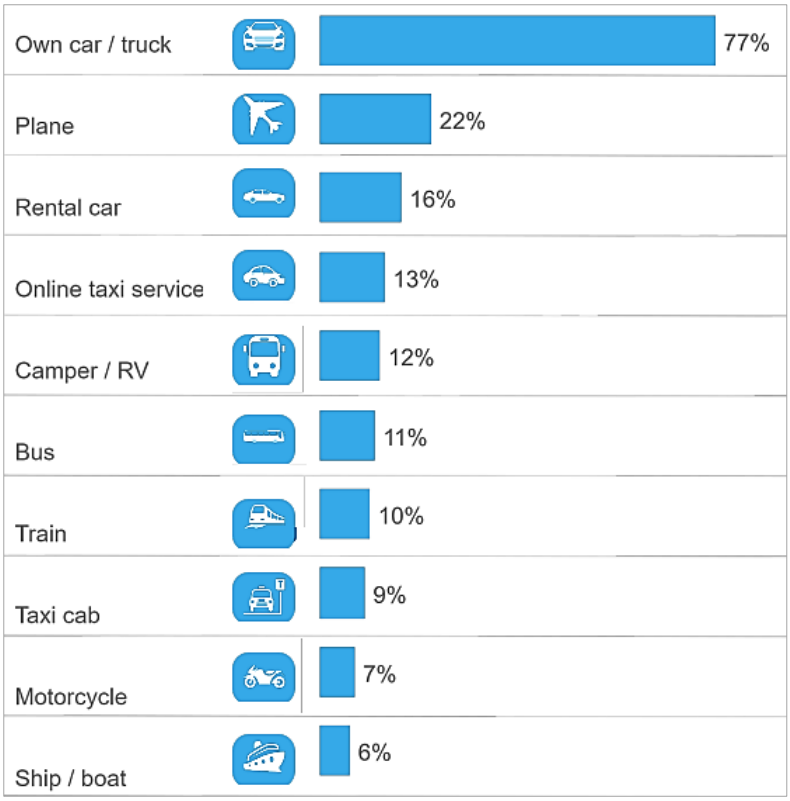
- I-10
- I-110
- US 49
- US 90
- MS 15
- MS 43
- MS 53
- MS 57
- MS 63
- MS 67
- MS 603
- MS 604
- MS 605
- MS 607
- MS 609
- MS 611
- MS 613
- MS 614
- MS 619

The number of major roadways which serve the region contributes to why visitors are most likely to travel via personal vehicle, as depicted in **Figure 2.5**.

In addition to the highway and interstate corridors, the area is serviced by the Gulfport-Biloxi, Stennis, and the Trent Lott International Airports. Additionally, there is one Greyhound and FLIXBUS station within the region, located in Biloxi, which helps to bring people by bus to Mississippi's Gulf Coast area.

Once inside the region, visitors have more transportation options. Transportation Networks Companies (TNCs), such as Uber and Lyft, operate in the area and can help to provide on-demand transportation services.

Figure 2.5: Percent of Tourists by Method of Travel to Mississippi's Gulf Coast (2021)



Source: Coastal Mississippi

Additionally, public transit, provided through the Coast Transit Authority (CTA), has both scheduled fixed-route and paratransit services within the region. Information on the services provided, such as fares, specific routes, service areas, and changes in the service map or routes, can be found on the CTA website (https://www.coasttransit.com).

While not currently available, Amtrak is restarting one of their routes that would directly travel through the MPA. Named the Mardis Gras route, this line plans to open in 2025 and would connect New Orleans, Louisiana to Mobile, Alabama. Future stops on this route, shown in **Figure 2.6**, will include four GRPC Cities: Bay St. Louis, Gulfport, Biloxi, and Pascagoula.

Figure 2.6: Amtrak Mardis Gras Route

Source: Amtrak

MPA Tourism Attractions and Amenities

The region offers diverse tourist attractions and boasts a variety of activities and venues. An interactive map, available on the Coastal Mississippi webpage, shown in **Figure 2.7.**, which allows visitors to plan their trips around the different coastal communities and activities within the different locations.

Figure 2.7: Coastal Mississippi Communities Interactive Map (2025)

Source: Coastal Mississippi

Top attractions within the area include:

- Ocean Adventures Marine Park
- Lynn Meadows Discover Center
- Mississippi Aquarium
- Pascagoula River Audubon Center
- Infinity Science Center
- Biloxi Shrimping Trip
- TrainTastic
- Brewery Tours
- Water Parks
- Recreational Trails
- National Heritage Areas
- Natural, Wetland, Island, and Historic Area Tours

The Gulf Coast region is also home to multiple cycling amenities, including bicycle trails and parks. These include the:

- 15.5-mile Live Oaks Bike Trail (pictured below),
- Historic Pascagoula Bike Trail,
- Brickyard Bayou Bike Park,
- Bay St. Louis Historical Bike,
- Walk or Drive Tour,
- Essence of Biloxi Bike and Drive Trail, and
- Shepherd State Park Trails.

Additionally, the region is home to multiple scenic routes, such as the Space, Highway 605, Gulf Coast, and Highway 67 Scenic Byways.

Live Oaks Bike Trail; Source: Coastal Mississippi

Additional amenities include high-quality dining, with some tourists visiting for the seafood and regional dishes, and a variety of lodging options. According to Coastal Mississippi, cities within the planning area boast a combined 546 restaurants and over 300 lodging options, including resorts, bed and breakfasts, beach hotels, vacation rentals, and RV parks and campgrounds. Additional information on lodging and amenities can be found at: https://www.coastalmississippi.com.

Tourism Needs

As the area continues to grow, it is important to identify both where tourism needs exist and where they are anticipated. Identifying these needs can help to mitigate future resiliency concerns as they relate to the transortation network. Identified needs include expansions to public transportation facilities and multi-modal networks, as well as promoting their use and increasing their accessibility for wider audiences.

Expanding Public Transportation provides access to tourist locations by transit and helps to reduce the impact of tourism on the roadway network. Currently, traveling solely by transit may be impractical due to the geographic spread of the region.

Additionally, the upcoming Amtrak line is expected to increase visitors and tourists to the area. As people arriving via train are unlikely to have a personal vehicle at their disposal, public transit routes should be planned and ready to implement once service on the Mardis Gras line starts. These routes should include service from the Amtrak stop to popular attractions, restaurants, lodging, information centers, and other transportation hubs. This may include the introduction of new, specialty routes, similar to the Casino Hopper CTA route, or may be incorporated as part of an existing bus route, as available.

Additional public transit recommendations, beyond those for tourism, are discussed in Section 7.

Expanded Sidewalks and Bike Facilities near attractions and the downtown areas makes walking and bicycling viable transportation modes. Consideration should also be made for pedestrians and cyclists in areas where visitors are expected to arrive without a personal vehicle, such as at the Greyhound and FLIXBUS Station, the upcoming Amtrak stops, and airports.

In less dense areas, recreational multi-use paths can attract visitors. Improving, connecting, and expanding bicycle and pedestrian facitilies in will improve visitor mobility and reduce the need for additional vehicular traffic while promoting healthy activity and non-motorized user safety. As many tourists travel for natural cycling and walking areas, connecting rural destinations with trails and multi-use paths can increase tourism in a more regional context.

Wayfinding can promote areas of interest and help visitors make the most of the local amentities. As it is most helpful to pedestrians and cyclists, wayfinding can also encourage alternative modes of transportation, keeping excess vehicular traffic off roadways while providing helpful information to visitors and tourists.

Interactive Route Mapping has become more prevalent in urban areas to help visitors identify their transportation options and plan their routes. While information does exist about individual facilities and bus routes, interactive maps that include transit, cycling, and pedestrian routes together can help promote alternative transportation options as a viable way to travel. Especially in the more densely populated areas along the coast, interactive maps can help increase the utilization of public transit and multi-modal networks, reducing the strain on the region's roadway networks.

3.0 Emerging Trends

In recent years, travel patterns have changed dramatically due to demographic changes and technological advances. Many of these changes are part of longer-term trends, while others are newer, emerging trends. This section details these trends, their potential impacts, and related mitigation strategies within the region.

The data presented in this chapter is based upon national trends, as local data is not readily available.

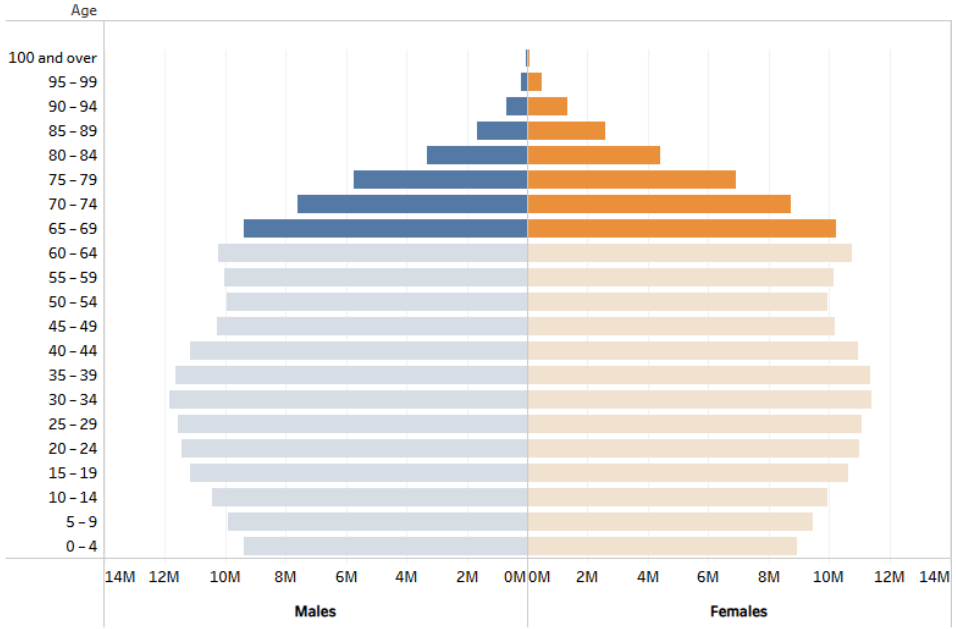
3.1 Changing Demographics and Travel Patterns

Demographic and travel data can be used to identify the potential impacts that accompany larger, national trends. Although these are broad in scope, they provide insight into what can be expected in the long term and help to identify mitigation strategies.

An Aging Population

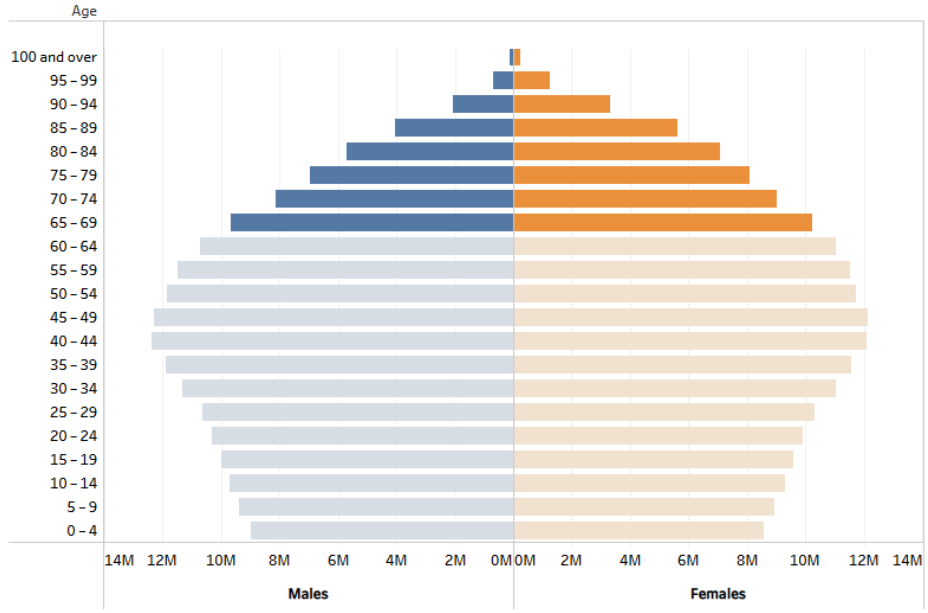
The average population of the Unites States is aging. According to the U.S. Census Bureau, persons aged 65 and older will grow in both number, from 63,327,000 to 82,130,000, and percent of total population, from 18.7 percent to 22.8 percent, between 2025 and 2050. This is illustrated in **Figure 3.1** and **Figure 3.2**.

Figure 3.1: 2025 Population Projections by Age and Sex



Source: US Census Bureau 2023 National Population Projections

Figure 3.2: 2050 Population Projections by Age and Sex



Source: US Census Bureau 2023 National Population Projections

Aging populations come with unique challenges as older adults are more likely to have a disability or other challenge that restricts their mobility options. This is expected to increase the demand for public transit and alternative modes of transportation.

People are Traveling Less

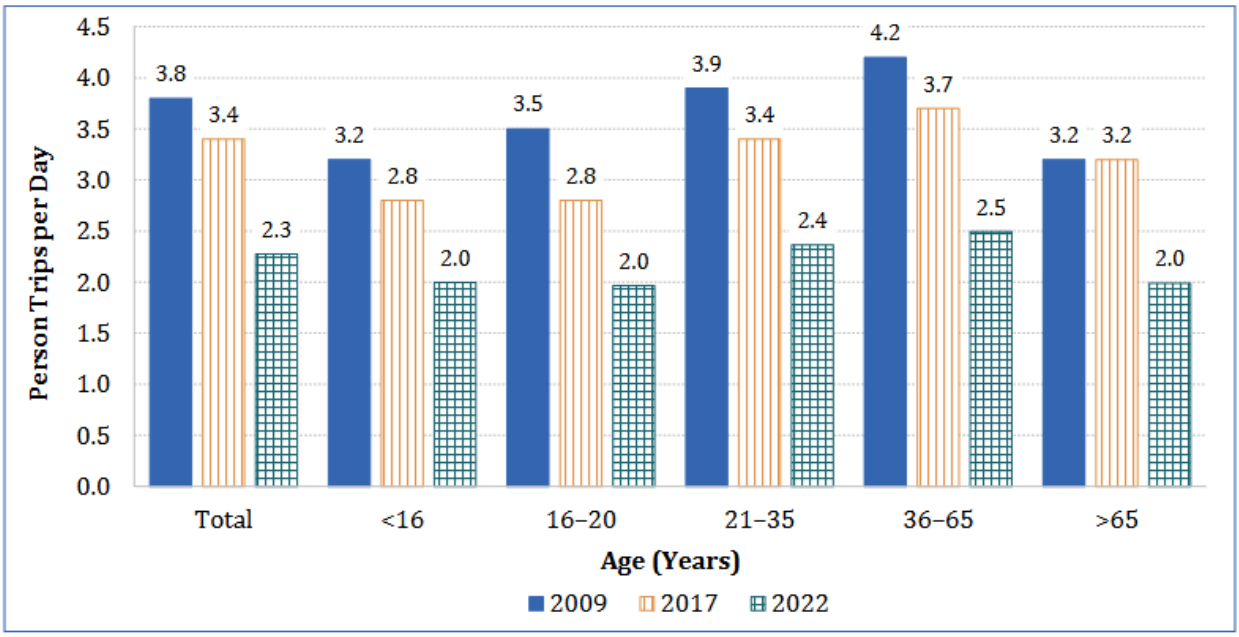
According to the 2022 National Household Travel Survey[11], published by the Federal Highway Administration (FHWA), people are traveling less than they have in the past. This trend can be seen in each age group, as illustrated in **Figure 3.3**, as well as in the different trips by purpose and sex of the traveler, as seen in **Figure 3.4**.

Traveling trends are impacted by reduced in-person socializing, an increase in online shopping use, and an increase in remote work policies.

While travel patterns have largely returned to pre-pandemic levels, remote work policies, whether they will continue, expand, or decrease over time, will impact the traveling habits and future transportation needs of the commuting public. This will directly inform which roadway improvement types are needed, as demand could potentially decline, requiring different solutions to be identified, or removing the need for previously planned improvements altogether.

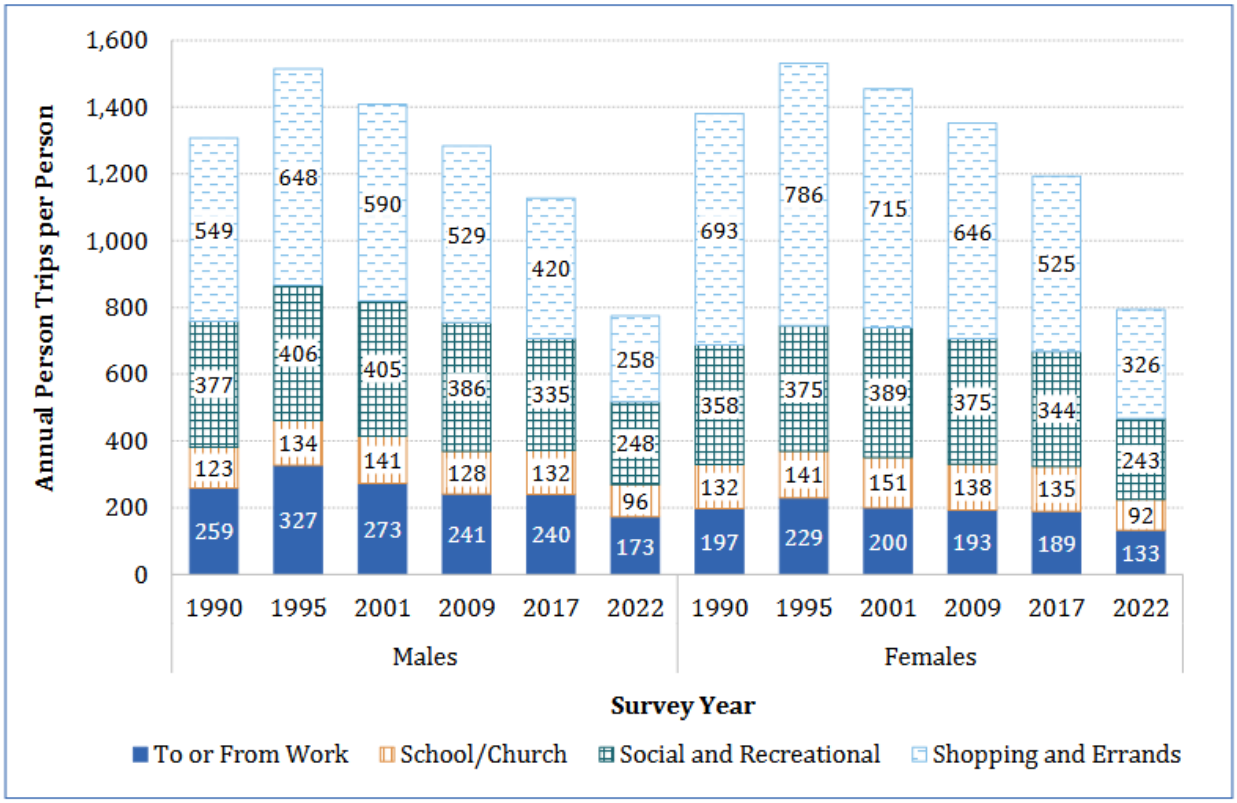
[11] https://rosap.ntl.bts.gov/view/dot/73764

Figure 3.3: Average Daily Person Trips by Age Group



Source: 2022 National Household Travel Survey

Figure 3.4: Number of Annual Person Trips per Person by Sex and Trip Purpose



Source: 2022 National Household Travel Survey

3.2 Shared Mobility

Recent trends show that people, especially within younger generations, are increasingly interested in car-free or car-lite lifestyles. As shown in **Figure 3.3**, people who are between the ages of 16 – 20 years old have the same average trips per day as those 65 or older. The short-term impacts of this would include people being more willing to pay a premium for housing in walkable and bikeable neighborhoods and a more frequent use of ride-hailing and shared mobility services. These activities could result in a long-term decrease in car ownership rates, increasing the need for investments in non-single occupancy vehicle mobility options.

Micromobility

Bike- and scooter-sharing are the most common types of micromobility options. These offer a unique solution to short trips by allowing for people to "rent" the bike or scooter for only the amount of time and distance it is needed[12].

On average, **Micromobility trips** are less than two miles long and take less than twenty minutes.

According to the most recent NACTO Micromobility Report[13], micromobility ridership in the United States rose by approximately 19 million trips from 2022 to 2023. While this does not equate a new peak ridership for the US, the rates of ridership, seen in **Figure 3.5**, are rising quickly.

To support this growth, NACTO identified three recommendations for increasing micromobility options, which include[14]:

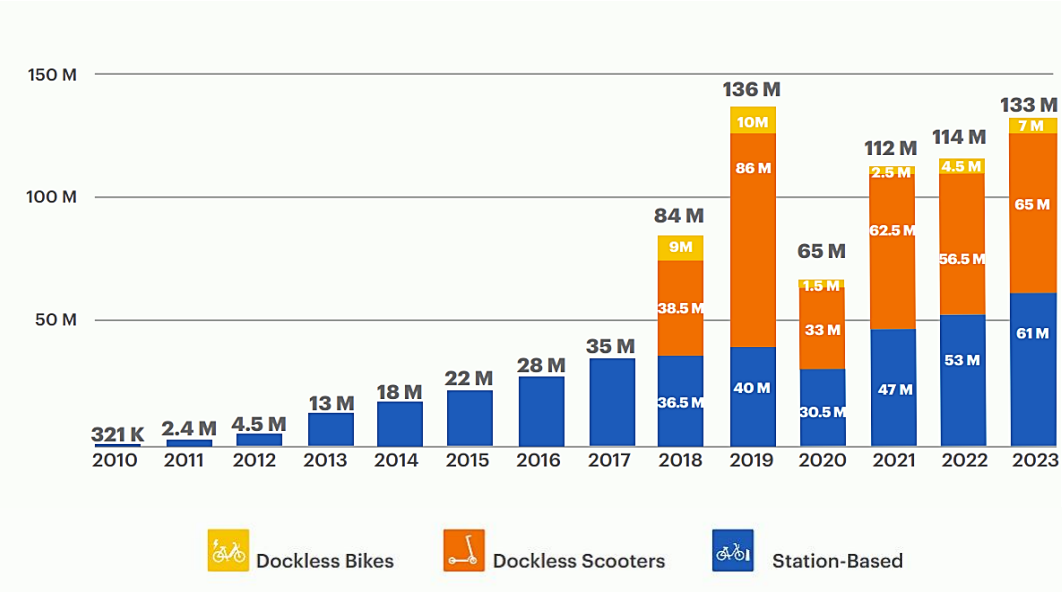
1. Invest public funds in shared micromobility capital and operating costs, which may include public-private partnerships to reduce the cost of mobility on the individual user.
2. Eliminate sales tax on micromobility services as other mobility options do not incur a sales tax.
3. Build infrastructure to support the safe use of micromobility, such as through the construction of protected bike lanes and placing shared micromobility devices near residential areas and popular destination.

[12] https://nacto.org/wp-content/uploads/2019/04/NACTO_Shared-Micromobility-in-2018_Web.pdf

[13] https://nacto.org/wp-content/uploads/Shared-micro-in-2023-snapshot_FINAL_July22-2024.pdf

[14] https://nacto.org/wp-content/uploads/Shared-micro-in-2023-snapshot_FINAL_July22-2024.pdf

Figure 3.5: Micromobility Ridership in the United States (2010 – 2023)



Source: NACTO Data Snapshot, August 2025

Although bike and scooter rental facilities do exist within the region, they are often traditional, brick-and-mortar rental businesses. Bicycles rented often need to be reserved, picked up and dropped off at the same business location, often during business hours, and may have restrictions on their use. As such, they are mostly restricted to specific tours or trails, discouraging their use as a micromobility option.

One vendor, Tour de Coast, instead allows for electric bikes to be rented via app, picked up from one of multiple hubs, and uses a fee structure that charges consumers by the minute, hour, or day. As such, this service provides an on-demand micromobility option within the cities of Pascagoula and Ocean Springs. More information can be found on their website at: https://tourdecoast.com/.

Tour De Coast Electric Rides

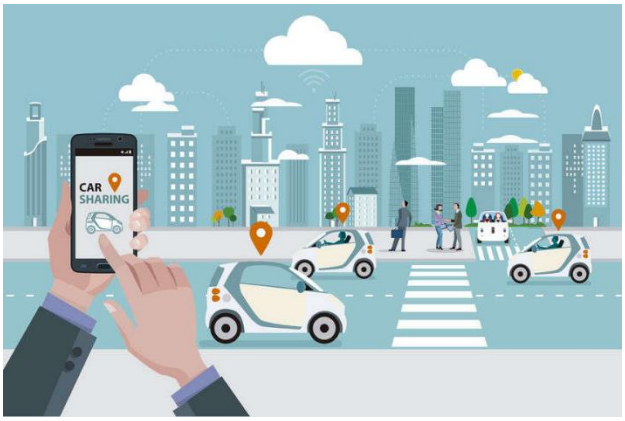
Transportation Network Companies

Ride-hailing and ridesharing are the terms typically used to describe the services provided by Transportation Network Companies (TNCs) like Uber and Lyft. These services have grown rapidly since their inception in the early 2010's, surpassing taxis in many metropolitan areas. Today, while TNCs are operating in most urban areas in the United States, service is limited or non-existent outside of these areas.

Both Uber and Lyft provide service within the region, with limited availability in the more rural areas further away from the coast. Additionally, longer and more rural trips

are likely to increase the cost of using TNC services. As such, it is important to address their affordability, such as through public-private partnerships.

Car Sharing



Car-sharing allows for short-term car rental services on a per day, hour, or even per minute basis. As the cost of utilizing the car is immediately felt, those who use this method to travel have shown an increase walking and biking, a reduction in vehicle miles traveled, and a reduction in fuel consumption[15]. Additionally, there is the benefit to households without access to a vehicle to rent one as needed. There are three models of car sharing:

1. **Roundtrip car-sharing**, such as through Zipcar and Maven, serve a market for longer or day trips, particularly where carrying supplies is a factor (such as shopping, moving, etc.). These car-share trips are typically calculated on a per hour or per day basis.
2. **One-way car-sharing** allows members to pick up a vehicle at one location and drop it off at another location. These car-sharing operations are typically calculated on a per minute basis.
3. **Peer-to-Peer (P2P) car-sharing** is characterized by short-term access to privately owned vehicles. An example of a P2P car-sharing operation is Turo.

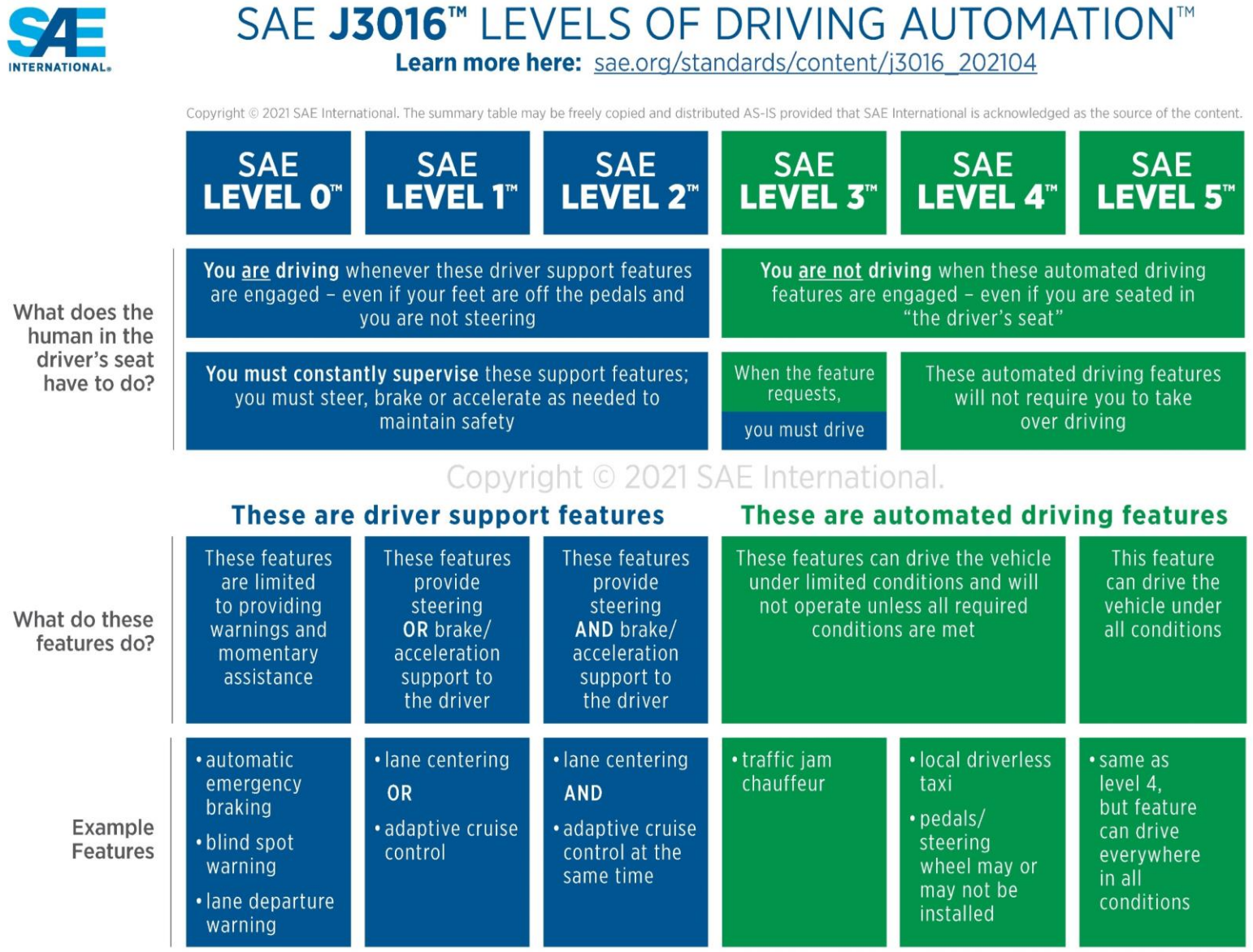
Due to the varied car-sharing models, there are no typical usage patterns. Some car-sharing trips are short and local, while others may be longer distance, and trips can be recurring or infrequent. Of these, Turo, a P2P car-sharing platform, has service within the MPO region.

3.3 Connected and Autonomous Vehicles

Today, most newer vehicles have some elements of both connected and autonomous vehicle technologies. CAV types, seen in **Figure 3.6**, are discussed in *Technical Report #2: State of Current Systems*. While these vehicles have not seen widespread application within the region, it is expected that future developments of these technologies will eventually bring them to the roadways.

[15] https://www.planning.org/publications/report/9107556/

Figure 3.6: Levels of Automation



Potential Timeline

While mid-level connected and autonomous vehicles are already on the market and traveling on roadways, there is uncertainty about the long-term future of these vehicles, especially fully autonomous vehicles. However, over the past couple of years, some level of consensus has emerged about the timeline of autonomous vehicle deployment, particularly[16,17]:

- Level 1 and 2 autonomous vehicles are expected to be more common, accounting for 50-60 percent of all new vehicles sold, by 2035.
    - These levels, which include lane/traffic jam assist, adaptive cruise control, and self-park, will continue to improve and become less expensive, fueling this growth in market share.
- Vehicles with higher degrees of autonomy (levels 3 and 4) will take longer to be available in the personal car market due to safety risks, liability concerns, and high costs.
- Most personal vehicles are expected to be autonomous in 2045, and to become affordable to most middle- and lower-income motorists by 2050.
- Autonomous trucks are projected to account for up to 30% of new truck sales in the US by 2035. Unlike personal vehicles, cost savings may be experienced by the use of autonomous trucks, motivating the market forward in this sector.

Additionally, market or economic fluctuations or instability may reduce how frequently new vehicles are purchased. This could slow the adoption of autonomous vehicles and may decrease the amount of new technology testing.

Potential Impacts

The development of connected and autonomous vehicles will change travel patterns, safety, and planning considerations. Ultimately, the actual impact of these vehicles will depend on how prevalent CAV technology is and the extent to which vehicles are privately owned or shared.

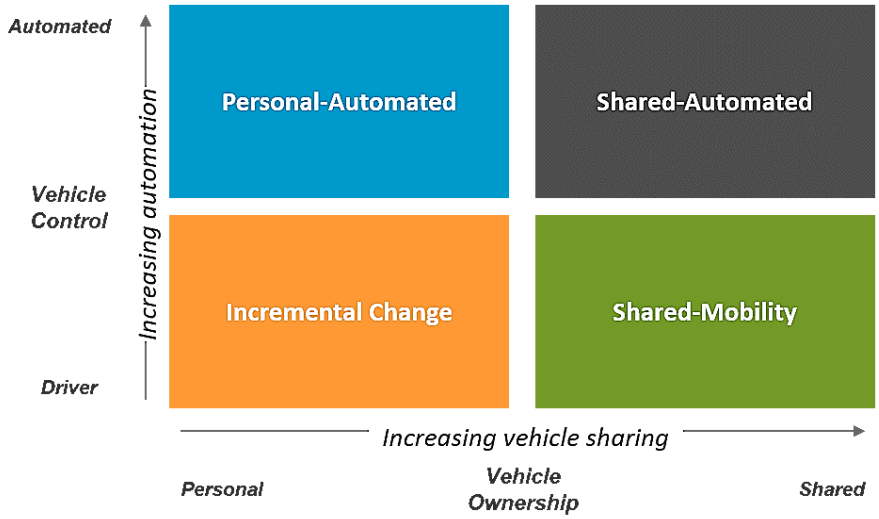
As shown in **Figure 3.7**, there are four potential scenarios, each with unique implications for transportation planning. These are:

- Personal-Automated
- Shared-Automated
- Incremental Change
- Shared-Mobility

[16] https://reports.weforum.org/docs/WEF_Autonomous_Vehicles_2025.pdf

[17] https://www.vtpi.org/avip.pdf

Figure 3.7: Future Mobility Scenarios



Source: US Dept. of Energy/Deloitte

Safety Impacts

In the long term, CAV technology is anticipated to reduce human error and improve overall traffic safety. Some CAVs are capable of sensing and quickly reacting to the environment via external sensors, connectivity to other vehicles, and GPS. This allows these vehicles to have a 360-degree visual of their surroundings to detect lane and roadway changes, as well as other vehicles, pedestrians, buildings, and obstacles.

Although CAV technology has immense long-term potential, it may decrease safety in the short term if drivers misuse partial automation and are not ready to take control of the vehicle in an emergency, particularly near work zones or when bicyclists and pedestrians enter the roadway. It may also present a safety concern if drivers have access to multiple vehicles, some with and some without this additional safety technology. This could result in a scenario where a driver expects to be notified of vehicles or road hazards while operating a vehicle without the enhanced safety features.

Advanced CAV technology has the potential to address about **95% of all vehicle crashes** involving unimpaired drivers.[18]

[18] U.S. DOT; Volpe, The National Transportation Systems Center

3.4 Electric and Alternative Fuel Vehicles

Alternative Fuel Vehicles (AFVs) are defined as vehicles that are substantially non-petroleum. Although electric or hybrid-electric vehicles are the most commonly recognizable types of AFVs, this category of vehicles also include those that use:

- hydrogen
- liquefied petroleum gas
- Compressed Natural Gas
- Liquefied Natural Gas
- 85% and 100% Methanol
- 85% and 95% Ethanol

Alternative fuel corridors (AFC) help to identify areas where travelers can expect to find alternative fuel stations and where this infrastructure is planned to expand in the future. As electric and hybrid vehicles are the most common, these corridors focus on electric vehicle charging stations. Within the region, as seen in **Figure 3.8**, Interstate 10 is pending on Mississippi's AFC network for electric vehicles. This map and additional information about Mississippi's AFC network can be found on the MDOT website at https://mdot.ms.gov.

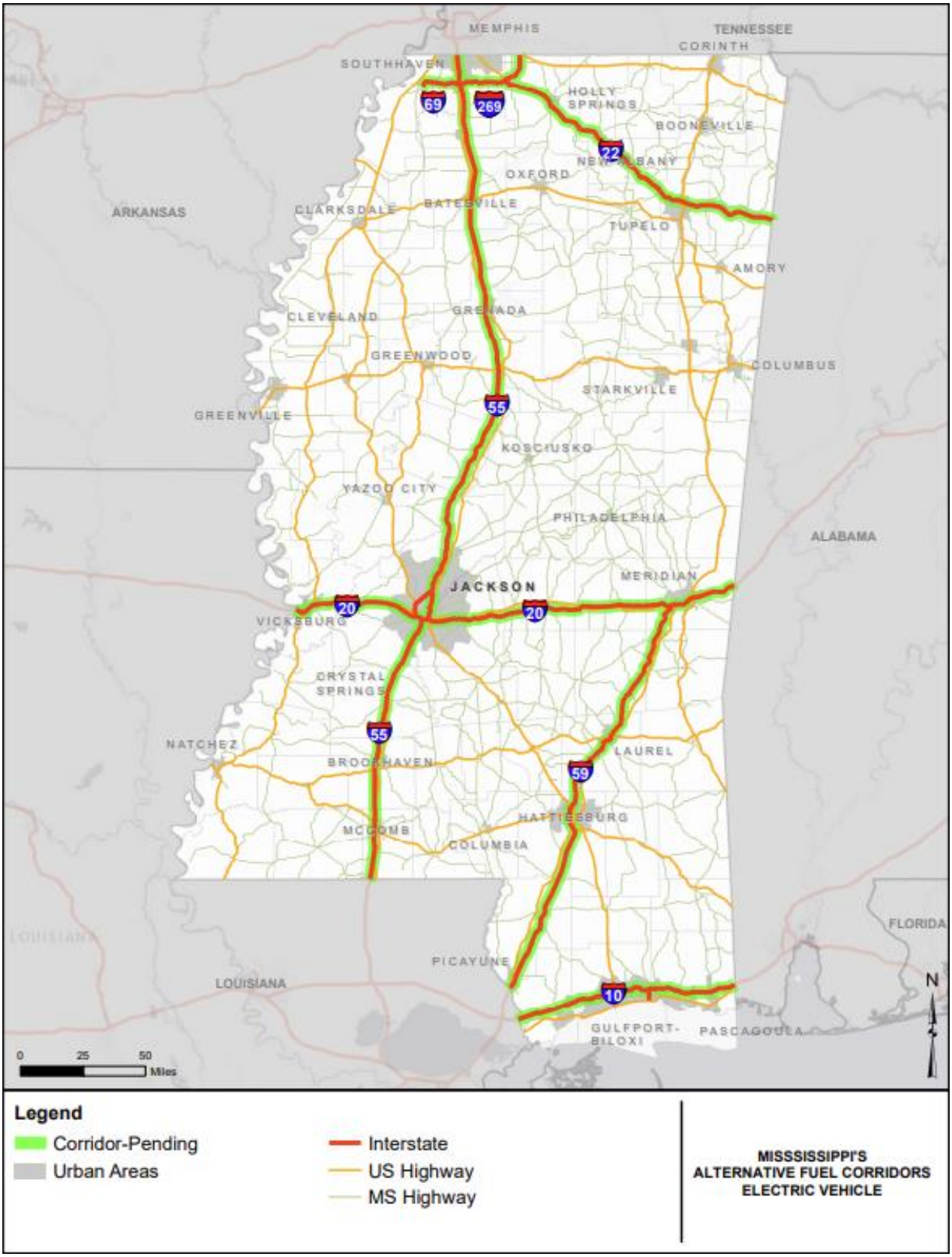
AFV Growth Projections

The **USEIA projects** that electric vehicles will make up about **9%** of all light duty vehicles by 2030, and **17%** by 2045.

Long-term projections for electric vehicles and other alternative fuels vary considerably. On the higher end, some projections estimate that electric vehicles will make up 30 percent of all cars in the United States by 2030.[19] The U.S. Energy Information Administration (USEIA) is more conservative, projecting that light-duty vehicles will take up about a third of the higher-end estimations, and freight vehicles will make up only two percent of the market share for electric vehicles by 2045. The projected share of vehicles by fuel type is depicted in **Figure 3.9.**

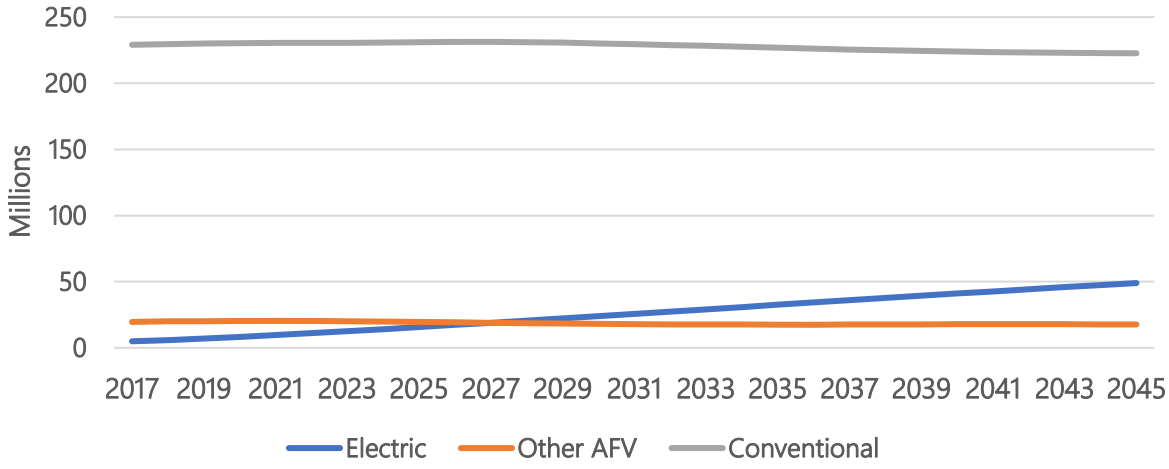
[19] https://www.iea.org/publications/reports/globalevoutlook2019/

Figure 3.8: Alternative Fuels Corridors within Mississippi



Source : MDOT

Figure 3.9: Light-Duty Vehicles on the Road by Fuel Type, 2017 to 2045



Source: U.S. Energy Information Administration, 2019 Annual Energy Outlook

Outside of electric vehicles, including both full and hybrid electric vehicles, the USEIA does not project other alternative fuels to grow significantly for light-duty vehicles. However, it does predict ethanol-flex fuel vehicles to grow significantly for light and medium freight vehicles.

EV Transit Growth

In the United States, electric buses are becoming more common as transit agencies pursue long-term operations and maintenance savings in addition to environmental and rider benefits. While electric buses have a high initial cost, these prices are anticipated to go down and utilization is likely to become more widespread. By 2030, it is anticipated that between 25 and 60 percent of new transit vehicles purchased will be electric.[20]

In 2021, CTA was the first transit agency in the State of Mississippi to incorporate an electric bus within their fleet[21]. CTA also utilizes hybrid-electric buses that help to reduce airborne pollutants and tailpipe emissions. The agency also encourages travelers, with programs such as Bike & Bus, to utilize multiple modes while visiting the coast.

[20] https://www.reuters.com/article/us-transportation-buses-electric-analysi/u-s-transit-agencies-cautious-on-electric-buses-despite-bold-forecasts-idUSKBN1E60GS

[21] https://coasttransit.com/wp-content/uploads/2022/01/CT21-13-Fall2021_8pg.Nwsltr_10_x11_.pdf

Potential Impacts

Air Quality Improvement

Electric and other alternative fuel vehicles have the potential to reduce automobile related emissions, a key concern within the region. While these fuels still have environmental impacts, they can reduce overall lifecycle emissions and direct tailpipe emissions substantially which benefits the region as it seeks to maintain air quality conformity.

Direct emissions are released from the tailpipe through evaporation from the fuel system and during the fueling process. These emissions include GHGs, smog-forming pollutants (such as nitrogen oxides), and pollutants harmful to human health.

Actions and strategies that can be implemented to improve air quality include:

- **Enforce stricter emission standards** on both diesel and gas cars. Private and public vehicles could be tested more frequently based on real-world, rather than laboratory, emissions. However, these standards are governed by federal regulations unless stricter state standards are adopted.
- **Reduce the number of car trips** through cycling or a combination of public transit and walking. This, also known as active travel, can help improve air quality, reduce urban noise pollution, and encourage healthy habits and more active lifestyles. Encouragement for such activities, however, requires adding connected multi-modal networks to make cycling more appealing for commuting, and not just leisure. When addressing multi-modal networks, cities should consider the demand for cycling, accessibility of this mode of travel, destinations that can be accessed by bicycle, and potential network interruptions.
- **Reduce the impact of pollutants** on children and people with underlying health conditions due to age or other illness. Numerous studies have shown that a vehicle occupant breathes in higher amounts of pollution than a cyclist or pedestrian on the same road as they travel in an enclosed space where pollutants remain trapped.
- **Make transit more attractive** to encourage higher transit ridership. Increased public transit ridership can greatly improve air quality. However, shifting trip modes from private vehicles to public transit depends on making it attractive to potential users. This is especially true in urban areas, where mobility and accessibility continue to present challenges.

Infrastructure Needs

While planning for the benefits and changes that accompany EVs, it is also important to understand the specific infrastructure that is needed to support EV adoption. Consumers and fleets considering EVs and Plug-in Hybrid Electric Vehicles (PHEVs) benefit from access to charging stations, also known as EVSE (Electric Vehicle Supply Equipment). For most drivers, the initial charging will be done at home or at fleet facilities, however, charging stations at workplaces and public destinations may also bolster market acceptance.

According to the U.S. Department of Energy, there are 26 electric vehicle charging stations within the MPA[22]. These are located in:

- Bay St. Louis (6),
- Biloxi (36),
- D'Iberville (16),
- Gulfport (29),
- Moss Point (6),
- Pascagoula (5), and
- Pass Christian (1)

Of these, the majority (74) are DC Fast, Level 3 or greater, charging stations. The remaining include sixteen Level 2 and nine Level 1 charging stations. The MPO and its partner agencies can explore expanding this infrastructure, especially in cities that are not currently serviced, to create a network of roadways that will support this emerging technology.

Gas Tax Revenues

It should be noted that as adoption rates of alternative fuels increase substantially, gas tax revenues will be reduced, and new user fees may need to be considered to replace the lost revenue. As electric and other alternative fuel vehicles use less gasoline compared to their conventional counterparts, their operation does not generate as much revenue from a gas tax.

Currently, gas taxes are one of the primary revenue sources that Mississippi uses to fund transportation projects. The current gas tax rate is 18 cents per gallon but is set to increase up to 27 cents per gallon on July 1, 2027[23]. Although raising the gas tax can help provide short-term relief to reductions in revenue and increases in equipment and personnel costs, it is important to find alternative revenue sources that can sustainably fund the construction, maintenance, and repair of Mississippi's bridges and roadways. To mitigate this, many states have begun imposing fees on electric and

[22] https://afdc.energy.gov/fuels/electricity-locations#/analyze?region=US-MS&tab=station&fuel=ELEC&ev_levels=all

[23] https://www.dor.ms.gov/business/gasoline-and-petroleum-faqs

hybrid vehicles to recoup lost transportation revenue and are considering pilot programs for taxes based on vehicle miles traveled.[24]

3.5 Travel Demand Management

Travel Demand Management (TDM) involves a set of strategies designed to change travel behavior and reduce Single Occupancy Vehicle (SOV) trips. When these strategies are implemented on an area-wide basis with support from government organizations, businesses, state and private universities, and residents, they may be able to reduce delay during peak periods on local roadway networks. Additionally, these strategies remain consistent with the region's Congestion Management Process.

Short-Term Recommendations

While some organizations and partners that already promote or use TDM exist within the region, there are additional short-term actions the MPO, local jurisdictions, and employers/residents can take to improve TDM within the planning area, including:

- Conduct a survey to identify the strengths and weaknesses of existing TDM programs.
- Improve and expand existing Gulf Coast Transit services based on input from passenger surveys, feasibility studies to add any new routes, and the transit plan.
- Use Emerging Technologies.
    - With the latest technologies, "big data" about travel behavior and congestion can be collected in regards to the region and used to develop policies and infrastructure improvements that helps in reducing SOVs and congestion.
- Promote an increased use of ridesharing services.
    - Use of shared trip options like UberPool and Lyft Shared can replace SOV travel thereby reduce congestion during peak periods.
    - Use of bike and scooter share systems for short trips and to provide last mile connections for transit passengers.
- Provide on-street and off-street bicyclist and pedestrian facilities near downtown areas, libraries, schools, and community centers.
- Work with local employers to develop programs and incentives that encourage employees to use transit to commute to work, such as creating programs that provide discounted transit passes.

[24] http://www.ncsl.org/research/energy/new-fees-on-hybrid-and-electric-vehicles.aspx

- Encourage future developments with a large footprint to have a bicycle and pedestrian circulation plan.
- Encourage major traffic generators within the planning area, like government agencies, hospitals, and major private businesses to adopt TDM strategies for employees and visitors.
- Manage transportation system impacts of freight and deliveries

Many of the most commonly used TDM strategies are displayed in **Figure 3.10**.

Figure 3.10: TDM Strategies

Carpooling

This strategy involves a group of people who live and work near each other commuting together in a single vehicle.

Vanpooling

This strategy involves allowing a group a people to share the ride, similar to a carpool but on a larger scale.

Transit

This strategy involves using transit to reach workplaces and other tasks. Generally, under this program, employers provide employees transit passes at discounted prices to encourage the use of transit to work.

Bike

This strategy involves using bike to reach nearby destinations instead.

Telecommuting

This strategy involves allowing employees to work from home or another off-site location part time or full-time. This strategy has gained additional acceptance due to the ongoing COVID-19 pandemic.

Walking

This strategy involves encouraging students and employees to walk to their school or workplace.

4.0 Roadways and Bridges

This chapter provides an overview of how the existing and forecasted future conditions are anticipated to impact roadway congestion, maintenance, and safety needs. Data used for analysis includes demographic metrics, travel time data, roadway project status, and stakeholder and public input.

4.1 Roadway Congestion Relief Needs

34.8%
Forecasted growth in person trips in the MPA and surrounding area from 2022 to 2050.

Population and employment growth forecasted to occur by 2050 were used to model the increase in person trips within and surrounding the GRPC region. From this, the Travel Demand Model (TDM) indicates that the number of person trips produced in the planning area will increase from approximately 1.3 million per day in 2022 to about 1.7 million per day in 2050.

Transportation projects with committed funding were included to incorporate anticipated increases in centerline miles and more accurately model the change in Vehicle Miles Traveled (VMT), Vehicle Hours Traveled (VHT), and Vehicle Hours of Delay (VHD) within the region. **Table 4.1** shows the change in centerline miles, as well as the forecasted change in VMT, VHT, and VHD. The data indicates that by 2050, the VMT will increase by approximately 34 percent and VHT will increase by just over 37 percent. However, during that same timeframe, the VHD increases by approximately 129 percent.

Table 4.1: Travel Demand Impact of Growth and Existing and Committed Projects, 2022 to 2050

Centerline Miles of Roadways				
Classification	**2022 (Existing)**	**2050 (E+C Projects)**	**Change**	**Percent Difference**
Interstate	81.3	81.3	0.0	0.00%
Principal Arterial	199.1	199.9	0.8	0.40%
Minor Arterial	267.9	276.4	8.5	3.17%
Major Collector	687.7	691.8	4.1	0.60%
Minor Collector	136.7	136.7	0.0	0.00%
Local	25.8	25.8	0.0	0.00%
Total	**1,398.5**	**1,411.9**	**13.4**	**0.96%**

Daily Vehicle Miles Traveled (VMT)				
Classification	**2022 (Existing)**	**2050 (E+C Projects)**	**Change**	**Percent Difference**
Interstate	4,602,356.6	6,220,019.1	1,617,662.5	35.15%
Principal Arterial	3,593,532.4	4,639,864.2	1,046,331.8	29.12%
Minor Arterial	1,486,087.8	2,120,807.6	634,719.8	42.71%
Major Collector	1,650,619.8	2,234,342.3	583,722.5	35.36%
Minor Collector	89,861.2	121,779.2	31,918.0	35.52%
Local	765,339.1	1,018,762.9	253,423.8	33.11%
Total	**12,187,796.9**	**16,355,575.3**	**4,167,778.4**	**34.20%**
Daily Vehicle Hours Traveled (VHT)				
Interstate	76,313.8	106,804.6	30,490.8	39.95%
Principal Arterial	82,289.7	109,144.9	26,855.2	32.63%
Minor Arterial	37,743.2	54,831.2	17,088.0	45.27%
Major Collector	45,101.8	62,672.5	17,570.7	38.96%
Minor Collector	2,515.2	3,453.8	938.6	37.32%
Local	50,004.2	66,523.2	16,519.0	33.04%
Total	**293,967.9**	**403,430.2**	**109,462.3**	**37.24%**
Daily Vehicle Hours of Delay (VHD)				
Interstate	2,571.1	9,752.7	7,181.6	279.3%
Principal Arterial	7,267.0	13,836.6	6,569.6	90.4%
Minor Arterial	2,473.0	5,554.4	3,081.4	124.6%
Major Collector	2,754.6	5,274.7	2,520.1	91.5%
Minor Collector	34.3	89.1	54.8	159.8%
Local	64.0	182.8	118.8	185.6%
Total	**15,164.0**	**34,690.3**	**19,526.3**	**128.8%**

Note: Values above exclude ramps.

Source: GRPC MPO Travel Demand Model.

Source: Microsoft Stock Images

Figure 4.1 illustrates the vehicular traffic in the MPA for 2050 if only the E+C projects are implemented. The number of roadway segments that experience a Volume to Capacity (V/C) ratio of 1.0 or greater would increase significantly by 2050, as shown in **Figure 4.2**.

It is important to note that not all congested street and highway segments should be widened with additional through lanes or turning lanes. In urban settings, it may be more appropriate to consider ITS improvements or Travel Demand Management (TDM) strategies. Congestion may also be reduced by improving pedestrian, bicycle, and/or transit conditions that will encourage alternative means of transportation. These strategies are discussed in *Technical Report #5: Plan Development*.

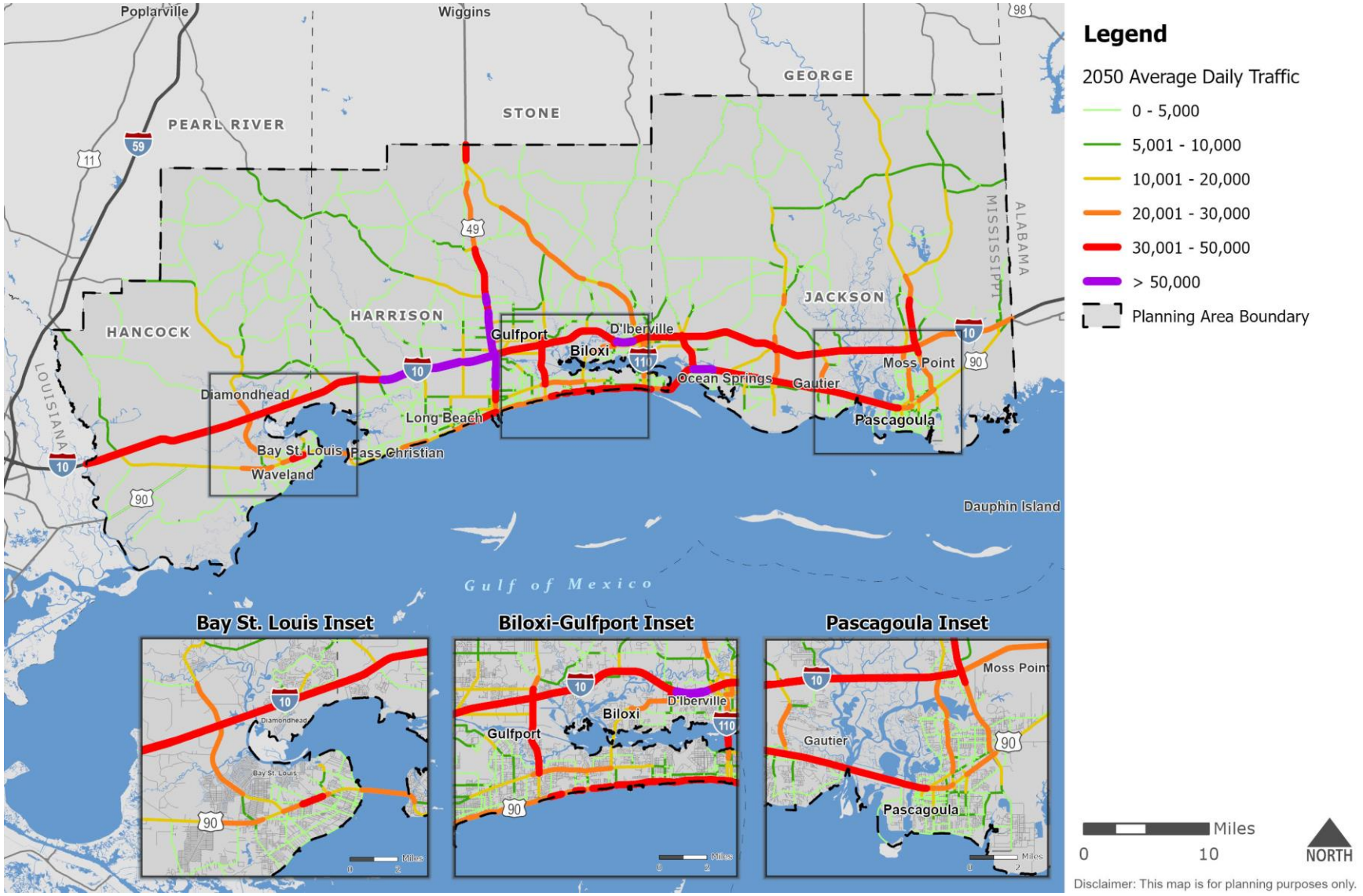
Public and Stakeholder Input

During the public and stakeholder involvement process, respondents were asked to identify the roadways and intersections they felt were most congested. The list below describes the areas that were most often identified.

- US 49
- I-10
- US 90
- MS 605 (Lorraine Rd)
- Creosote Rd at US 49
- Three Rivers Rd Intersection and Corridor Recommendations

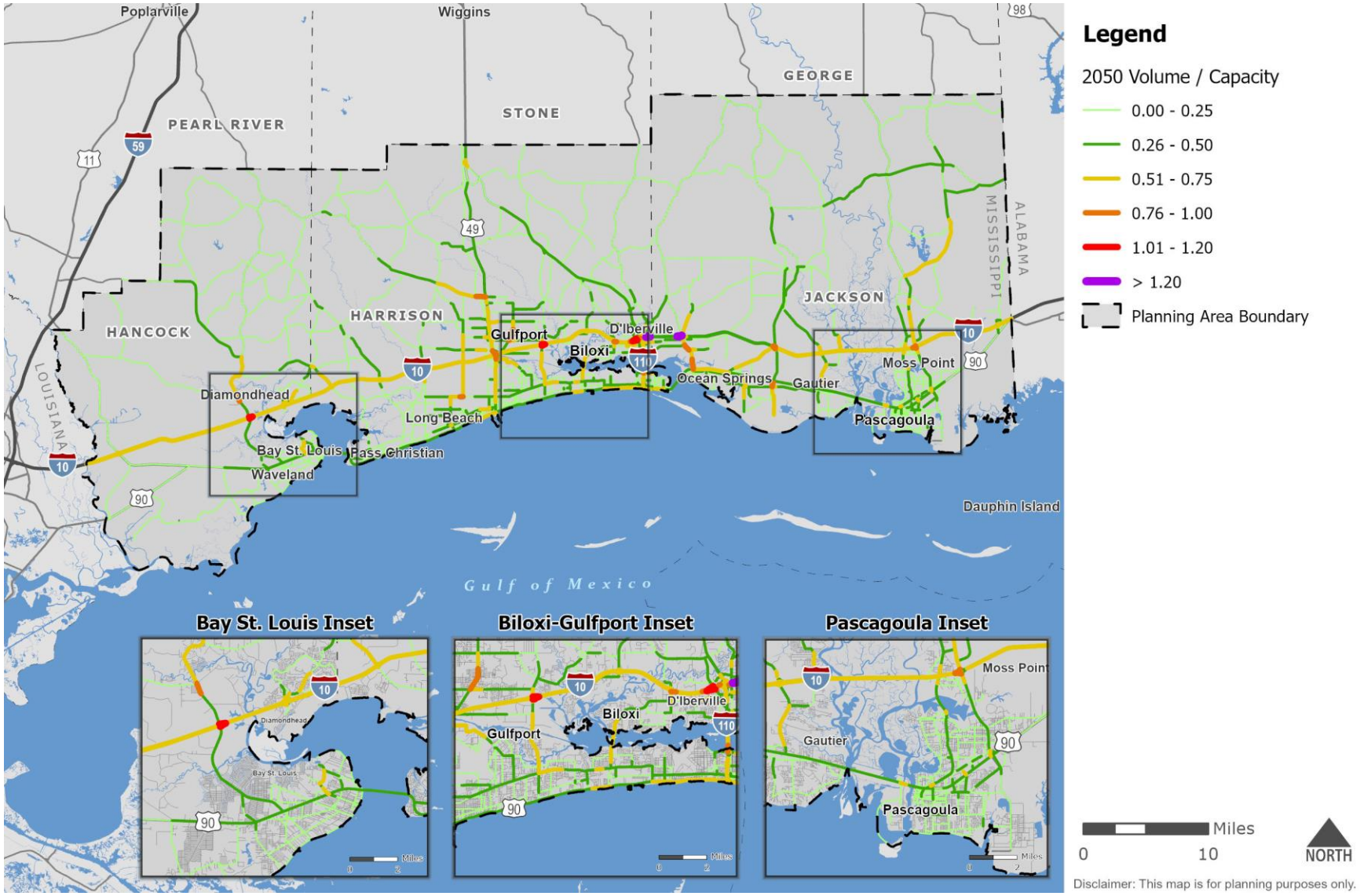
Table 4.2 displays the locations identified through public involvement and engineering review, the observed issues, and recommendations to address the intersection needs.

Figure 4.1: Average Daily Traffic on Roadways, 2050



Source: GRPC MPO Travel Demand Model

Figure 4.2: Future Volume to Capacity, 2050 (Existing + Committed)



Source: GRPC MPO Travel Demand Model

Table 4.2: Recommended Intersection/Interchange Improvement Projects for Congestion

Location	Limits	Observed Issues	Short-term Solution	Long-term Solution
US 49	Crossroads Pkwy/ Landon Rd to Ashley Dr	Multiple businesses along US 49; Short left turn lane on US 49 SB at Orange Grove Rd; short left turn lane on Dedeaux Rd to US 49 NB; short left turn lane on Landon Rd; congestion along • US 49, Orange Grove Rd, and Dedeaux Rd during AM peak • US 49 and Old Hwy 49 during PM peak • Intersections of US 49 at Crossroads Pkwy/Landon Rd, Orange Grove Rd, Community Rd, and Dedeaux Rd	Signal retiming; improve ITS	Extend left turn lanes; improve pedestrian infrastructure; corridor study
I-10	Washington Ave to MS 63	Large volume of vehicles; large presence of freight travel; I-10 eastbound near Fortress Personal Mausoleums drops from 3 lanes to 2 lanes; congestion along • Interchanges of I-10 at MS 63 and Washington Ave during PM peak • Washingtong Ave northbound during AM peak • MS 63 northbound during PM peak	Signal retiming at ramp terminals; improve ITS	Construct HOV or truck only lanes; extend deceleration lanes at I-10 and MS 63 interchange; corridor study
US 90	Rodenberg Ave to Ocean Springs Rd	Multiple business driveways along US 90; large volume of passenger vehicles; lanes drop from 6 lanes to 4 lanes in various locations along US 90; short left turn lanes along US 90 at Ocean Springs Rd, Guilford Rd, Bristol Blvd, Hanley Rd, MLK Jr Ave, Main St, Porter Ave, and Rodenberg Ave; speed drops at each end of Biloxi Bay Bridge; congestion along • Front Beach Dr, Government St, Hanley, and the intersections of US 90 at Oceans Springs Rd, Porter Ave, and Washington Ave during AM peak • Rue Maurepas, Government St, and the intersections of US 90 at Ocean Springs Rd, Hanley Rd, Bechtel Bvld, Holcomb Blvd, MLK Jr Ave, Porter Ave, and Rodenberg Ave during PM peak	Signal retiming; improve ITS; restripe intersections	Extend 6 lane sections; extend left turn lanes at various intersection; extend right turn lane from US 90 to Biloxi Beach; improve pedestrian infrastructure east of Biloxi Bay Bridge
MS 605 (Lorraine Rd)	Hillcrest Rd to Dedeaux Rd	Multiple businesses along MS 605; separate bike lane; short left turn lanes on MS 605 at the intersections of Reichold Rd and Intraplex Pkwy; railroad north of Seaway Rd; congestion along • Intersections of MS 605 at Dedeaux Rd, Reichold Rd, and I-10 during AM peak • Intersections of MS 605 at Intraplex Pkwy, Seaway Rd, and I-10 during PM peak • MS 605 during both periods	Signal retiming; improve ITS; restripe intersections	Extend short left turn lanes; improve pedestrian infrastructure; conduct study near railroad
Creosote Rd	at US 49	Large volume of vehicles; multiple businesses along US 49; nearby airport; railroad north of intersection; gas station driveways near intersection; congestion along • US 49 and Creosote Rd west of US 49 during AM peak • Three Rivers Rd, US 49 northbound south of Creosote Rd, and Creosote Rd west of US 49 during PM peak • Middle Driveway during both peak periods	Signal retiming; improve ITS; restripe intersections; conduct intersection study and study near railroad for overpass	
Three Rivers Rd	Creosote Rd to Oneal Rd	Three Rivers Rd northbound drops from 2 lanes to 1 lane at Seaway Rd; center turn lane drops south of Dedeaux Rd; large volume of vehicles along Three Rivers Rd; multiple businesses and residents along Three Rivers Rd; railroad south of Seaway Rd; congestion along • Three Rivers Rd northbound and during PM peak • Three Rivers Rd southbound, Klein Rd near schools, during AM peak • Intersections of Three Rivers Rd at Creosote Rd, Seaway Rd, and Oneal Rd during PM peak	Signal retiming; improve ITS; restripe intersections	Widen from 2 lanes to 3 lanes; convert turn lane/thru lane to dedicated left turn lane on Three Rivers Rd to Seaway Rd; conduct intersection studies at various intersections

Source: GRPC, NSI

4.2 Roadway Maintenance Needs

Pavement Maintenance

Few of the region's roadways have poor pavement conditions; however, all segments are likely to experience maintenance needs that will lead to decreased safety or emergency roadway repairs which can increase congestion. In addition, pavements in fair condition will eventually fall into poor condition before the plan's horizon year of 2050. *Technical Report #2: State of Current Systems* displays the pavement conditions of the NHS monitored roadways within the planning area.

In the short-term, particular attention should be given to roadway segments with particularly long stretches of poor pavement. In the planning area, these segments include various areas along:

- US 90
- 25th St/E Pass Rd
- 28th St
- Port and Harbor Dr
- Canal Rd

Bridge Maintenance

Addressing the needs of bridges in fair or poor condition will improve safety, reduce maintenance costs, and avoid future bridge shutdowns. Bridges are rated by the National Bridge Inventory based on the conditions of the following categories:

- Decks,
- Superstructure,
- Substructure,
- Stream Channel, and Channel Protection.

The analysis within *Technical Report 2: State of the Current Systems* revealed that less than 0.1 percent of bridges are in poor condition. Of these, 84 bridges were identified as being on the National Highway System.

A bridge is in Poor condition if any of the above categories are rated "Poor". Bridges in need of repair or additional maintenance may be improved via this plan through other transportation projects, such as a roadway widening. Other bridges could instead be improved through line-item funding for operations and maintenance. These bridges are recommended for improvements as funding becomes available.

4.3 Roadway Safety Needs

Within the planning area, nearly 59,000 crashes occurred between 2019 and 2023. During that timeframe, there were 328 fatal crashes and 1,391 serious injury or suspected serious injury crashes. Recommendations for reducing the most common types of crashes are outlined below, and **Table 4.3** displays the roadway locations with the greatest frequency of rear end crashes within the region.

The highest number of crashes in the MPA were **rear-end crashes**, comprising over a third of collisions.

Reducing Rear-End Collisions

Rear-end collisions can be attributed to several factors, such as:

- driver inattentiveness
- large turning volumes
- slippery pavement
- inadequate roadway lighting
- crossing pedestrians
- poor traffic signal visibility
- congestion
- inadequate signal timing
- an unwarranted signal

In general, the recommendations for reducing rear-end crashes include:

- Analyzing turning volumes to determine if a right-turn lane or left-turn lane is warranted.
  - Providing a turning lane separates the turning vehicles from the through vehicles, preventing through vehicles from rear-ending turning vehicles.
  - If a large right-turn volume exists, increasing the corner radius for right-turns is an option.
- Checking the pavement conditions.
  - Rear-end collisions caused by slippery pavement can be reduced by lowering the speed limit with enforcementor by providing overlay pavement, adequate drainage, grooved pavement, and/or a “Slippery When Wet” sign.
- Ensuring roadway lighting is sufficient for drivers to see the roadway and surroundings.
- Determining if there is a large amount of pedestrian traffic.
  - Pedestrians crossing the roads may impede traffic and force drivers to stop suddenly.
  - If crossing pedestrians are an issue, options include installing or improving crosswalk devices and providing pedestrian signal indicators.
- Checking the visibility of the traffic signals at all approaches.
  - In order to provide better visibility of the traffic signal, options include installing or improving warning signs, overhead signal heads, installing 12” signal lenses, visors, back plates, or relocating/adding signal heads.

- Verifying that the signal timing is adequate to serve the traffic volumes at the trouble intersections.
    - Options include adjusting phase-change intervals, providing or increasing a red-clearance interval, providing progression, and utilizing signal actuation with dilemma zone protection.
- Verifying that a signal is warranted at the given intersection.

Table 4.3: Top 5 Rear End Crash Locations and Recommendations by County

Location	Rear End Crashes (2019-2023)	Observation	Recommendation
Hancock County			
US 90 at MS 43/Nicholson Ave	78	Only black backplates (or missing) on signals, poor pavement striping, gas station driveway near intersection	Ensure adequate signal clearance intervals, add reflective backplates, improve pavement striping, convert protected/permitted left turn phasing to protected left turn phasing
US 90 at Waveland Ave/ Klin Waveland Cutoff Rd	40	Only black backplates (or missing) on signals, poor pavement striping, gas station driveway near intersection	Ensure adequate signal clearance intervals, add reflective backplates, improve pavement striping, convert protected/permitted left turn phasing to protected left turn phasing
MS 603 at Longfellow Dr	38	Poor pavement striping, short acceleration lane, short right turn lane on MS 603 to Longfellow Dr	Improve pavement striping, extend acceleration lane from Longfellow Dr to MS 603 NB, extend right turn lane from MS 603 to Longfellow Dr, add flashing yellow and red lights, conduct intersection study
I-10 WB at MS 43/MS 603	37	High posted speed limit on MS 603 (55 MPH), only black backplates (or missing) on signals, poor pavement striping, poor intersection lighting	Ensure adequate signal clearance intervals, add reflective backplates, improve pavement striping, convert protected/permitted left turn phasing to protected left turn phasing, improve intersection lighting
US 90 at Blue Meadow Rd/Main St	35	Only black backplates (or missing) on signals, poor pavement striping, gas station driveways near intersection	Ensure adequate signal clearance intervals, add reflective backplates, improve pavement striping, convert protected/permitted left turn phasing to protected left turn phasing, conduct intersection study
Harrison County			
MS 605 (Cowan Rd) at Pass Rd	296	No signal backplates, poor intersection lighting, poor pavement striping	Ensure adequate signal clearance intervals, add reflective backplates, improve intersection lighting, improve pavement striping
US 49 at Creosote Rd	257	High posted speed limit on US-49 (50 MPH), only black backplates (or missing) on signals, poor intersection lighting, poor pavement striping	Ensure adequate signal clearance intervals, add reflective backplates, improve intersection lighting, improve pavement striping
US 49 at Crossroads Pkwy	223	High posted speed limit on US-49 (50 MPH), poor intersection lighting, only black backplates (or missing) on signals	Ensure adequate signal clearance intervals, improve intersection lighting, add reflective backplates
US 49 at Dedeaux Rd	199	High posted speed limit on US 49 (50 MPH), only black backplates (or missing) on signals, poor intersection lighting, poor pavement striping	Ensure adequate signal clearance intervals, add reflective backplates, improve intersection lighting, improve pavement striping
US 49 at MS 53/North Swan Rd	150	High posted speed limit on US 49 (65 MPH) and MS 53 (55 MPH), only black backplates (or missing) on signals, poor intersection lighting, poor pavement striping	Ensure adequate signal clearance intervals, add reflective backplates, improve intersection lighting, improve pavement striping, add signal ahead warning beacons that activate when light is about to turn red

Location	Rear End Crashes (2019-2023)	Observation	Recommendation
Jackson County			
MS 605 (Cowan Rd) at Pass Rd	296	No signal backplates, poor intersection lighting, poor pavement striping	Ensure adequate signal clearance intervals, add reflective backplates, improve intersection lighting, improve pavement striping
US 49 at Creosote Rd	257	High posted speed limit on US-49 (50 MPH), only black backplates (or missing) on signals, poor intersection lighting, poor pavement striping	Ensure adequate signal clearance intervals, add reflective backplates, improve intersection lighting, improve pavement striping
US 49 at Crossroads Pkwy	223	High posted speed limit on US-49 (50 MPH), poor intersection lighting, only black backplates (or missing) on signals	Ensure adequate signal clearance intervals, improve intersection lighting, add reflective backplates
US 49 at Dedeaux Rd	199	High posted speed limit on US 49 (50 MPH), only black backplates (or missing) on signals, poor intersection lighting, poor pavement striping	Ensure adequate signal clearance intervals, add reflective backplates, improve intersection lighting, improve pavement striping
MS 605 (Cowan Rd) at Pass Rd	296	No signal backplates, poor intersection lighting, poor pavement striping	Ensure adequate signal clearance intervals, add reflective backplates, improve intersection lighting, improve pavement striping

Reducing Side Impact / Angle Crashes

Angle crashes were the second most common within the region. These crashes can be caused by several factors, such as:

- restricted sight distance
- excessive speed
- inadequate roadway lighting
- poor traffic signal visibility
- inadequate signal timing
- inadequate advance warning signs
- running a red light
- large traffic volumes

In general, the recommendations for reducing side impact and angle collisions include:

- Verifying that the sight distance at all intersection approaches is not restricted.
  - Options to alleviate restricted sight distance include removing the sight obstruction and/or installing or improving warning signs.
- Conducting speed studies to determine whether speed was a contributing factor.
  - To reduce crashes caused by excessive speeding, the speed limit can be lowered with enforcement, the phase change interval can be adjusted, or rumble strips can be installed.
- Ensuring roadway lighting is sufficient for drivers to see the roadway and surrounding area.
- Checking the visibility of the traffic signal at all approaches.
  - To provide better visibility of the traffic signal, options include installing or improving warning signs, overhead signal heads, installing 12" signal lenses, visors, back plates, and/or relocating or adding signal heads.
- Verifying that the signal timing is adequate to serve the traffic volumes.
  - Options include adjusting phase change intervals, providing or increasing a red-clearance interval, providing progression, and/or utilizing signal actuation with dilemma zone protection.
- Verifying that the intersection is designed to handle the traffic volume.
  - If the traffic volumes are too large for the intersection's capacity, options include adding one or more lane(s) and retiming the signal.
- Conducting a roundabout study.
  - By design, roundabouts reduce the likelihood of angle collisions.

Table 4.4 displays the roadway locations with the greatest frequency of angle crashes within the MPA.

Table 4.4: Top 5 Angle Crash Locations and Recommendations by County

Location	Angle Crashes (2019-2023)	Observation	Recommendation
Hancock County			
I-10 at MS 607	21	High posted speed limit on MS 607 (65 MPH), short left turn lane from MS 607 to I-10, poor intersection lighting	Extend left turn lanes on MS 607 to I-10, improve intersection lighting, conduct intersection study
US 90 at Dunbar Ave	21	Only black backplates (or missing) on signals	Ensure adequate signal clearance intervals, add reflective backplates, improve pavement striping, improve intersection lighting, convert protected/permitted left turn phasing to protected left turn phasing, conduct intersection study
Gex Dr at W Aloha Dr	20	Poor pavement striping, poor intersection lighting, gas station driveway near intersection	Improve pavement striping, improve intersection lighting, add flashing red light, conduct intersection study
US 90 at Bayou La Croix Rd/Lakeshore Rd	17	High posted speed limit on US 90 (65 MPH), poor intersection lighting, Lakeshore Dr/Bayou La Croix Rd crossing	Improve intersection lighting, add flashing yellow and red light, conduct intersection study
I-10 WB at MS 43/MS 603	15	High posted speed limit on MS 603 (55 MPH), only black backplates (or missing) on signals, poor pavement striping, poor intersection lighting	Ensure adequate signal clearance intervals, add reflective backplates, improve pavement striping, convert protected/permitted left turn phasing to protected left turn phasing, improve intersection lighting
Harrison County			
W Railroad St at 42nd Ave	35	Poor intersection lighting, poor pavement striping	Improve intersection lighting, improve pavement striping, conduct roundabout study
30th Ave at 17th St	33	No signal backplates, poor intersection lighting, poor pavement striping	Ensure adequate signal clearance intervals, add reflective backplates, improve intersection lighting, improve pavement striping, add/convert protected/permitted left turn phasing to protected left turn phasing, add left turn lanes
33rd Ave at 15th St	32	Poor sight distance, poor intersection lighting, poor pavement striping	Ensure adequate sight distance, improve intersection lighting, improve pavement striping, conduct roundabout study
US 49 at Creosote Rd	31	High posted speed limit on US-49 (50 MPH), only black backplates (or missing) on signals, poor intersection lighting, poor pavement striping	Ensure adequate signal clearance intervals, add reflective backplates, improve intersection lighting, improve pavement striping
US 49 at Crossroads Pkwy	30	High posted speed limit on US-49 (50 MPH), poor intersection lighting, only black backplates (or missing) on signals	Ensure adequate signal clearance intervals, improve intersection lighting, add reflective backplates
Jackson County			
US 90 (Denny Ave) at Chicot Rd	39	Only black backplates (or missing) on signals, poor intersection lighting, poor pavement striping	Ensure adequate signal clearance intervals, add reflective backplates, improve intersection lighting, convert protected/permitted left turn phasing to protected left turn phasing

Location	Angle Crashes (2019-2023)	Observation	Recommendation
Tucker Rd at Cook Rd/Seaman Rd	30	No signal backplates, poor intersection lighting, poor pavement striping	Ensure adequate signal clearance intervals, add reflective backplates, improve intersection lighting, improve pavement striping
MS 63 at Dutch Bayou Rd	28	High posted speed limit on MS 63 (55 MPH), poor pavement striping	Improve pavement striping, add signage for left lane stop ahead, add flashing yellow light, conduct safety study
US 90 (Denny Ave) at MS 613 (Market St)	26	Only black backplates (or missing) on signals, poor intersection lighting, poor pavement striping	Ensure adequate signal clearance intervals, improve intersection lighting, improve pavement striping, add reflective backplates, add/convert protected/permitted left turn phasing to protected left turn phasing
US 90 at Hanley Rd	26	Only black backplates (or missing) on signals, poor pavement striping, second nearby intersection at Hanley Rd and Bienville Blvd Service Rd	Ensure adequate signal clearance intervals, improve intersection lighting, improve pavement striping, add reflective backplates, add/convert protected/permitted left turn phasing to protected left turn phasing, conduct intersection study

Reducing Other Collision Types

The remaining representative crash types can be attributed to incidents involving animals, backing up, bicycle/pedestrian encounters, fixed objects, head on collisions, jackknifing, rollovers, running off the road (the third most common crash type in the region), and vehicle defects. Recommendations for increasing safety and reducing the number of crashes for these crash types include:

- Determining if the speed limit is too high or if vehicles in the area are traveling over the speed limit.
    - Reducing the speed can reduce the severity of crashes and make drivers more attentive to their surroundings.
- Verifying the clearance intervals for all signalized intersection approaches and ensuring that there is an "all red" clearance.
    - For larger intersections, it is particularly important to have a long enough clearance interval for vehicles to safely make it through the intersection before the light turns red.
- Checking for proper intersection signage, especially if the roadway geometry may be confusing for the driver.
- Verify that all one-way streets are marked "One-Way", and "No Turn" signs are placed at appropriate locations.
- Verifying that pavement markings are visible during day and night hours.
- Verifying that the roadway geometry can be easily maneuvered by drivers.
- Evaluating left and right turning volumes to determine if a right turn and/or left turn lane is warranted.
- Ensuring roadway lighting is sufficient for drivers to see roadway and surroundings.
- Checking the visibility of the traffic signals from all approaches.
- Verifying that lane are marked properly and provide turning and through movement directions, as well as signage that indicates lane configurations.
    - These directions will prevent cars from dangerously switching lanes at the last minute thereby reducing crash potential.

Stakeholder and Public Input

During the public and stakeholder involvement process, respondents were asked to identify the roadways and intersections they perceived with the most safety issues. The locations that were most often identified are described below and are potential candidates for additional safety studies within the MPA.

- I-10
- US 49
- US 90
- Pass Rd
- Lorraine Rd
- I-10 at I-110 Interchange

5.0 Freight Analysis and Needs

This chapter includes an analysis on the mobility, safety, and asset conditions that impact the different modes that transport freight, as well as the impact that those freight modes themselves have on the local infrastructure.

5.1 Freight Overview

Freight projections from the Freight Analysis Framework (FAF)[25] indicate that commerce and trade will continue to grow throughout the region from 2022 to 2050, which will lead to an increase in freight tonnage, value, and transported volume. Increases in freight traffic will add to the demand for transportation facilities, leading to roadway congestion as more vehicles are needed to move the goods from one mode, or location, to another.

The following sections address this growth, its impact on current and future transportation infrastructure, and recommendations to help reduce the strain on roadway networks within the planning area.

5.2 Freight Transported by Truck

This section summarizes future freight truck movement and needs. As the movement of goods via truck mode increases, so too does the number of heavy vehicles on the roadways.

Trucking can be considered the lifeblood of day-to-day living as it is vital to transporting goods from one place to another. These trips are responsible for the majority of the distance between the first-mile (origin) of goods and the last-mile (destination), where products are sold or delivered. As such, trucks which transport freight are heavy users of the roadways.

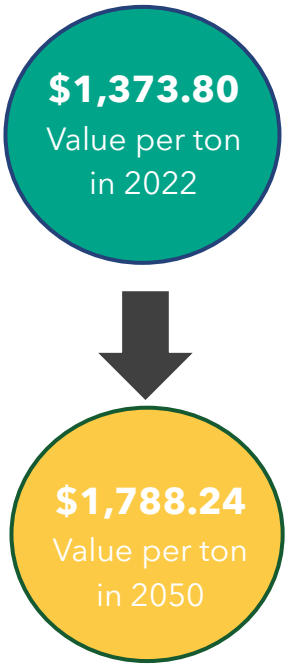
When addressing freight moved by truck, planners need to consider:

- **truck volumes,**
- **truck congestion,**
- **adequate truck parking,**
- **roadways designs accommodating trucks, and**
- **pavement and bridge conditions.**

[25] https://ops.fhwa.dot.gov/freight/freight_analysis/faf/

Commodity Flow Growth

According to the FAF, Version 5, within the Mississippi region, truck as a mode is expected to increase by both tonnage and value of freight transported. From 2022 to 2050, the tonnage of freight will increase by about 67 percent and the value of freight per ton transported by approximately 30 percent. The truck commodity flow growth for the region is displayed in **Table 5.1.**



Infrastructure Impacts

Roadway Volumes

The roadways with the highest freight truck traffic in 2022 are shown in *Technical Report #2: State of Current Systems*. As additional commodities are transported throughout the region and trips increase from 2022 through 2050, these roadways are expected to see an increase in truck traffic. **Figure 5.1** displays the anticipated growth in freight truck traffic, while **Figure 5.2** shows the region's estimated 2050 truck volumes on its roadway network.

High truck volumes locations indicate where pavement conditions are most likely to be impacted by heavy vehicles. Locations with a high volume to capacity (V/C) ratio indicate both congestion and potential bottlenecks. **Figure 5.3** combines these two metrics and illustrates them on the region's roadway network.

Areas within the planning area that are anticipated to have a high V/C ratio and significant number of trucks include:

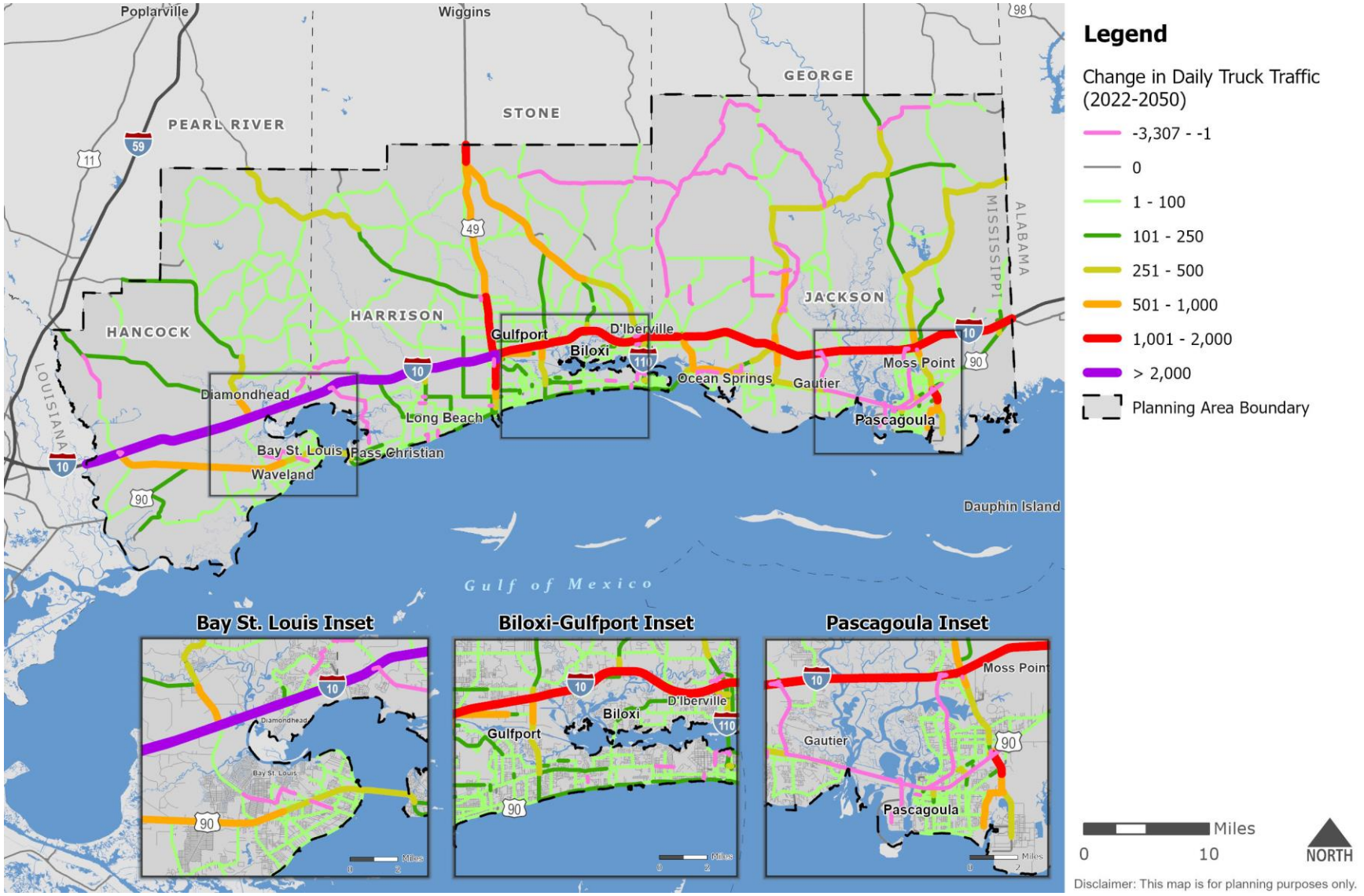
- I-10 W On-Ramp at US 49
- I-10 E Off-Ramp at US 49
- I-10 E Off-Ramp at D'Iberville Blvd
- I-10 E On-Ramp at I-110
- I-10 Off-Ramp at Lamey Brg Rd
- I-10 E Off-Ramp/W On-Ramp at Washington Ave
- I-10 W On-Ramp at MS 63
- Three Rivers Rd from Seaway Rd to Crossroads Pkwy

Table 5.1: Changes in Commodity Flows by Truck, 2022 to 2050

Mississippi (includes MPA)								
Direction	Tons (Thousand)				Value ($ million)			
	2022	2050	Change	Percent Change	2022	2050	Change	Percent Change
Inbound (Interstate)	33,999	59,774	25,775	76%	73,884	159,287	85,403	116%
Inbound (Intrastate)	76,136	121,071	44,935	59%	34,173	64,719	30,546	89%
Outbound (Interstate)	30,009	53,549	23,540	78%	84,473	195,144	110,671	131%
Total	**140,144**	**234,393**	**94,249**	**67%**	**192,530**	**419,150**	**226,620**	**118%**

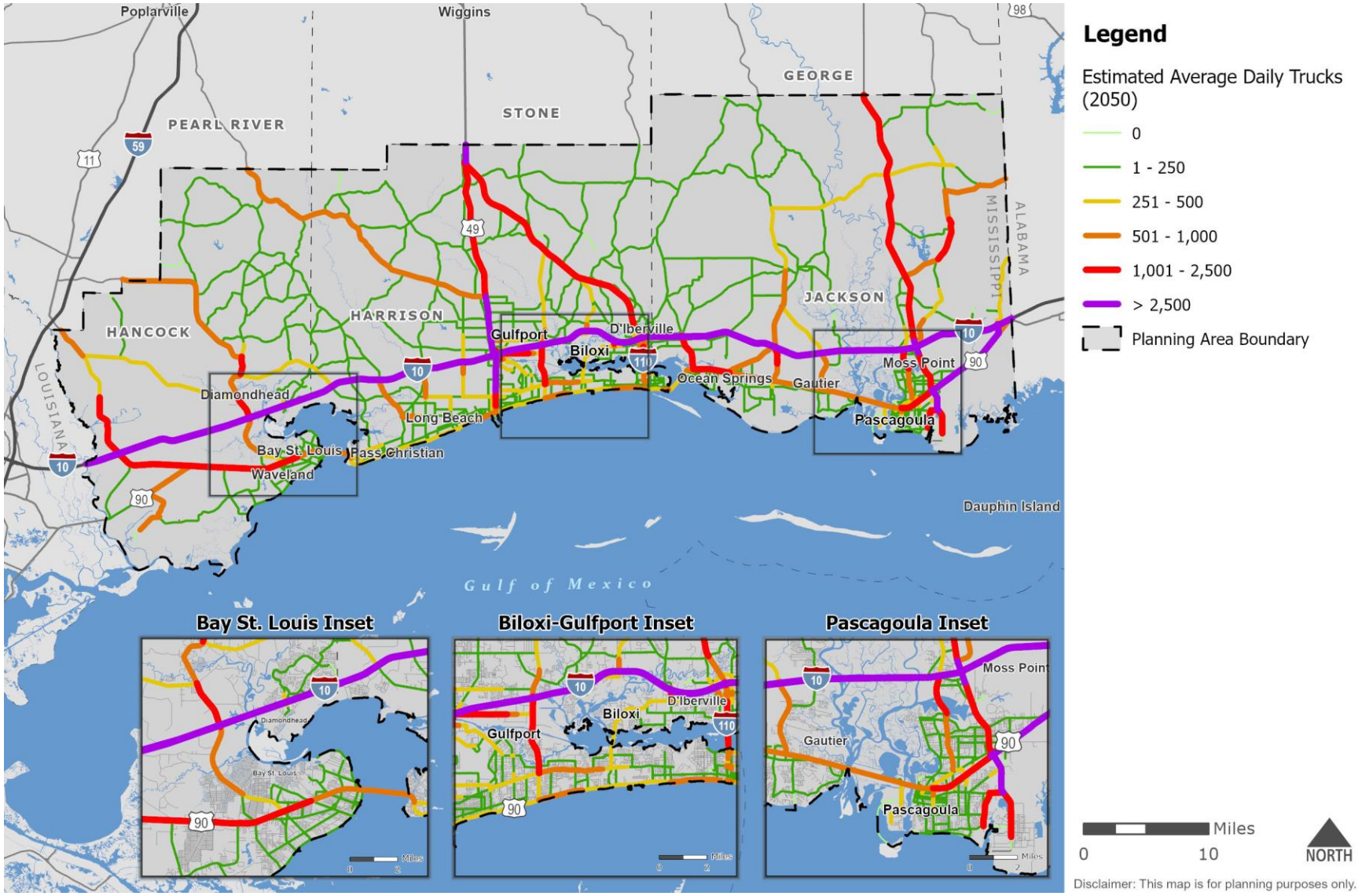
Source: Freight Analysis Framework 5.5, 2025

Figure 5.1: Freight Truck Growth, 2022 to 2050



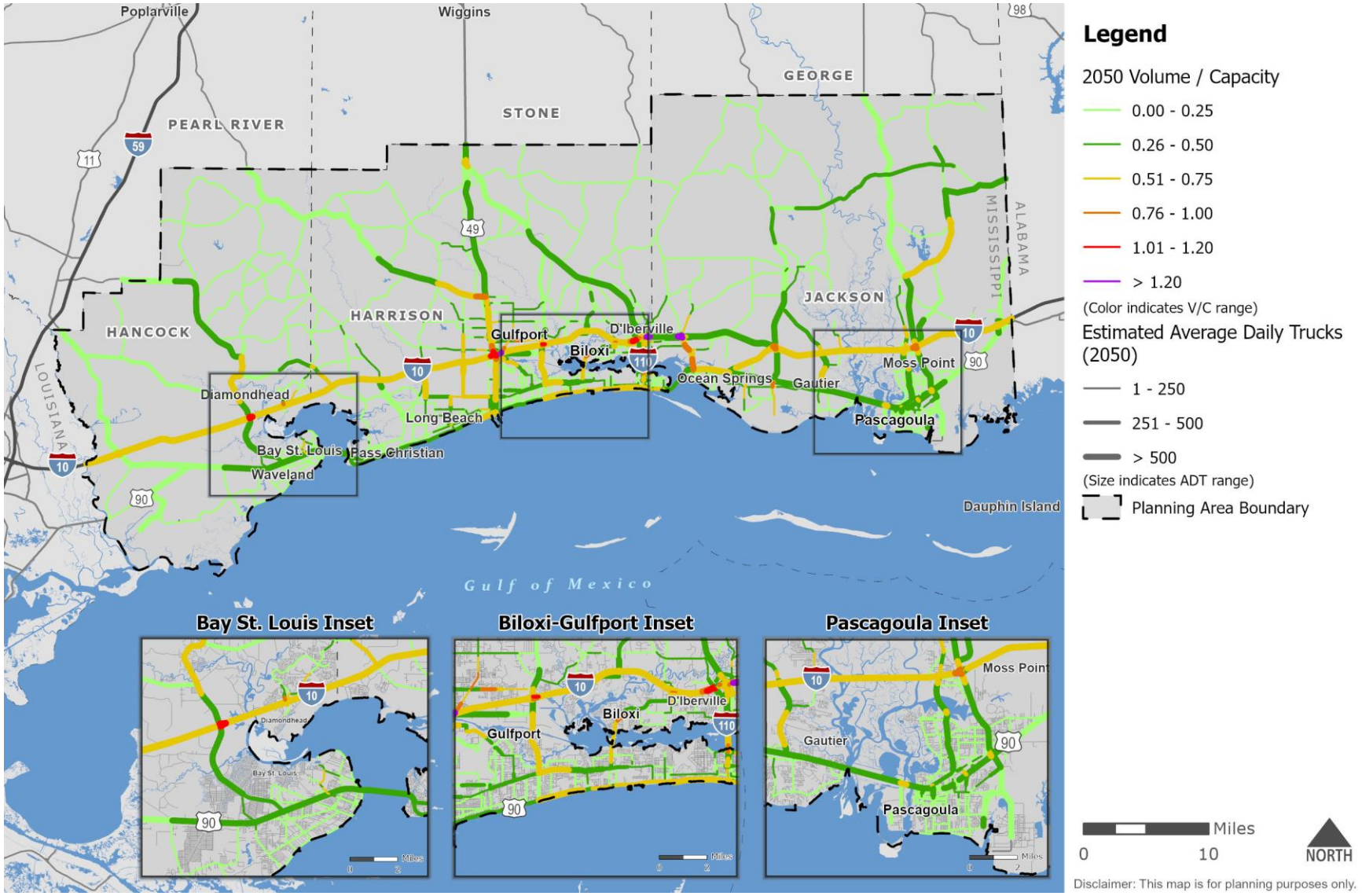
Source: GRPC MPO Travel Demand Model

Figure 5.2: Freight Truck Traffic, 2050



Source: GRPC MPO Travel Demand Model

Figure 5.3: Congested Freight Truck Corridors, 2050



Source: GRPC MPO Travel Demand Model

Bridge conditions should be monitored to ensure that bridges can handle the increases in freight traffic and that bridges with low vertical clearances require trucks to detour to avoid the risk of striking the bridge infrastructure, which can result in bridge and road closures.

Safety

The increases in truck traffic are also likely to increase heavy vehicle crashes. While all crashes can result in delays and increased operating costs for freight truck traffic, crashes involving heavy vehicles are more likely to have a greater disruption to traffic flow when compared to a crash between only passenger vehicles. This is especially true when considering crashes that involve chemicals, gasses, flammable liquids, or other hazardous materials.

Safety recommendations that can significantly contribute to reducing the frequency and severity of crashes involving heavy vehicles in the region are shown in **Figure 5.4**[26].

[26] https://www.fmcsa.dot.gov/ourroads/tips-truck-and-bus-drivers

Figure 5.4: Safety Recommendations for Heavy Vehicle Crashes

Enhanced Driver Training - Implement mandatory advanced driver training programs focusing on defensive driving techniques, hazard recognition, and safe driving practices specifically tailored for operators of heavy vehicles.

Incident Response Training - Provide specialized training for emergency responders on handling incidents involving heavy vehicles to ensure swift and safe resolution of accidents.

Regular Vehicle Maintenance - Establish stringent maintenance schedules for heavy vehicles to ensure all safety-critical components, such as brakes, tires, and lights, are in optimal condition.

Speed Management - Enforce stricter speed limits for heavy vehicles in high-risk areas and consider the use of speed governors to automatically limit the maximum speed of heavy vehicles.

Fatigue Management - Introduce comprehensive fatigue management programs, including mandatory rest breaks and monitoring of driving hours to prevent driver fatigue.

Collision Avoidance Technology - Encourage the adoption of advanced driver-assistance systems (ADAS) such as automatic emergency braking, lane departure warning, and blind-spot detection in heavy vehicles.

Improved Roadway Design - Enhance roadway infrastructure by improving signage, lighting, and adding dedicated lanes for heavy vehicles where feasible to reduce interactions with smaller vehicles.

Public Awareness Campaigns - Conduct regular public awareness campaigns to educate all road users about the limitations and safety practices associated with sharing the road with heavy vehicles.

Data-Driven Enforcement - Utilize crash data analytics to identify high-risk locations and times for heavy vehicle crashes and deploy targeted enforcement and safety measures in those areas.

Collaborative Stakeholder Engagement - Foster collaboration between government agencies, trucking companies, and safety organizations to continuously evaluate and improve heavy vehicle safety policies and practices.

5.3 Freight Transported by Rail

This section summarizes future freight moved by rail and its impact on the infrastructure.

Commodity Flow Growth

According to FAF data, between 2022 and 2050, freight moved by rail is expected to increase by nearly 84 percent. This will result in either additional rail cars being added to existing trips (when possible) or an increase in the number of rail trips. Both of these actions would increase the system's maintenance needs and duration of traffic stoppages at crossings. Additionally, adding rail trips would also increase the frequency of traffic stoppages.

Infrastructure Impacts

Volume and capacity data were not available for all rail segments within the planning area. While this limits the ability to forecast future capacity utilization rates and regional needs, GRPC and partner agencies can consider several enhancements to plan for the future growth of freight moved by rail.

Weight Limits

Consistent railroad weight capacity is important to maintaining freight rail movement efficiency and cost advantage. Shippers on rail lines that exceed standard 286,000-pound gross carloads may either be forced to use trucks, increasing the load on the roadway infrastructure, or to break loads inefficiently, increasing the number of freight trips and traffic stoppages. Within the region, mainline railroads can accommodate the industry standard of 286,000 pounds. No information is available for lines that branch from the main lines.

Traffic Control and Signaling

A traffic control system, called Positive Train Control (PTC), is designed to automatically stop a train before certain incidents occur. The PTC systems are integrated command, control, communications, and information systems for controlling train movements with safety, security, precision, and efficiency. PTC must be designed to prevent the following:

- Train to train collisions
- Derailments caused by excessive speed
- Unauthorized movements by trains onto sections of track where maintenance activities are taking place
- Movement of a train through a track switch left in the wrong position

To support the implementation and ongoing maintenance of PTC technology in the region, the MPO and its rail partners can consider efforts that address coordination and advocacy, funding support, emergency response planning, and public outreach and education.

Actionable steps to support these efforts include:

1. Coordination and Advocacy

- Collaborate with local rail operators, regulatory agencies, and stakeholders to ensure a coordinated and efficient rollout of PTC technology.
- Advocate for the adoption of PTC technology on rail lines within the MPA to enhance rail safety and operational efficiency.

2. Funding Support

- Assist rail operators in identifying and applying for state or federal funding opportunities to support the implementation of PTC technology, including grants, loans, or other financial assistance programs.
- Explore opportunities for leveraging MPO funds or partnerships to help offset the costs associated with PTC implementation and maintenance.

3. Emergency Response Planning

- Collaborate with emergency response agencies and first responders to develop comprehensive emergency response plans specific to incidents involving trains equipped with PTC technology.

4. Public Outreach and Education

- Raise public awareness about the benefits of PTC technology for rail safety and the community at large through outreach campaigns, public meetings, and educational materials.
- Engage with local schools, community organizations, and media outlets to promote understanding and support for PTC implementation efforts in the MPA.

By integrating these items into their plan, GRPC can actively support and facilitate the successful implementation of PTC technology on rail lines within their jurisdiction, contributing to enhanced rail safety and operational efficacy in the region.

Safety

Between 2019 and 2023, there were two crashes involving an automobile and a train within the study area. Crashes such as these pose a high safety threat, can result in significant delays for both road and rail users, and can increase the operational costs

for freight. The MPO can work with local rail partners to continue to address and maintain railroad safety in the region.

Highway-Railroad Crossings

Technical Report #2: State of Current Systems shows that there are 357 public highway-rail grade crossings within the region. Of these, 120 are equipped only with passive warning devices. Passive warning devices, such as cross bucks, warning signs, regulatory signs, and pavement markings, do not actively warn traffic of approaching trains. Active crossing devices, such as bells, flashing lights, and gates, improve safety at rail crossings by informing travelers when a train is approaching.

The MPO can work with rail partners to add active crossing devices at these locations to improve safety.

5.4 Freight Transported by Air

While only a small amount of freight is typically shipped by air, the commodities transported by air tend to be high-value and time sensitive. Additionally, airports often serve as regional distribution and manufacturing hubs.

There are three public-use airports within the region:

- Stennis International Airport (KHSA)[27],
- Gulfport-Biloxi International Airport (KGPT)[28], and
- Trent Lott International Airport (KPQL)[29].

KHSA and KPQL both serve general aviation, meaning little freight is transported by these airports. KGPT is the only airport in the planning area that serves commercial aviation as well as general aviation.

One roadway segment on US 49, located to the west of KGPT, is considered a Tier 1 bottleneck location. US 49 is a major throughfare with high truck volumes and provides connectivity to other major freight corridors. Critical bottlenecks along this corridor can have significant economic impacts and may impact the transportation of freight arriving to or departing from the airport.

To address the anticipated congestion, GRPC and its freight partners can:

[27] https://flystennis.com/

[28] https://www.flygpt.com/

[29] https://www.co.jackson.ms.us/153/Airport

- Coordinate with the MDOT to conduct a signal retiming and coordination study.
- Coordinate and stagger freight truck trips leaving the airport, trucking, oilfield, and offshore businesses to spread the number of truck trips out across a longer period of time.

Commodity Flow Growth

Commordity flow growth is expected to increase by both the ton and value of freight transported via air. According to the FAF, from 2022 to 2050, the tonnage of freight utilizing air is anticipated to increase by approximately 135 percent, and the value of air freight is estimated to increase by nearly 180 percent.

5.5 Freight Transported by Waterway

There are four port facilities within the region which provide valuable connectivity to national and international markets. The four port facilities in the region are:

- Port Bienville,
- Port of Gulfport,
- Biloxi Port Division, and
- Port of Pascagoula.

All four ports are located along the Mississippi Sound, which is a component of the Gulf Intracoastal Waterway (GIWW). The GIWW is part of the USDOT Marine Administration's (MARAD) Marine Highway Program[30] and has been designated as Marine Highway 10 (M-10). Additionally, the Port of Gulfport and Port of Pascagoula, along with the GIWW and waterways that connect to these ports, are part of the National Multimodal Freight Network (NMFN).

Commodity Flow Growth

Commodity data, tonnage, and operations information about the ports are not readily available. However, as freight continues to grow, so will the amount that arrives at the ports. Delivering freight from the ports to other areas within or outside of the region relies on other modes, often by rail or truck. The MPO and its partner agencies can monitor the pavement conditions along these freight routes to maintain their Good condition.

5.6 Freight Transported by Pipeline

Pipelines provide additional freight capacity since they handle liquid bulk, such as crude oil and natural gas, which would need to be transported by another mode if the

[30] https://www.maritime.dot.gov/

pipelines were unavailable. The MPA's pipeline network consists of just over 410 miles of pipelines. The majority of the pipelines, by length, carry natural gas, while the remainder are hydrocarbon gas liquids or refined petroleum products.

Commodity Flow Growth

According to the FAF, from 2022 to 2050, the anticipated change in tonnage and value of pipeline freight is about 36 percent and 32 percent, respectively.

Infrastructure Impacts

As pipelines are typically private investments, their needs and conditions are not publicly available. Nonetheless, last-mile transportation of liquid bulk is often completed by trucks, meaning that additional truck trips are likely to occur to support pipeline freight. Roadways that service pipeline facilities can be monitored by the MPO and its partner agencies to ensure pavements are kept in Good condition and congestion is minimized.

6.0 Bicycle and Pedestrian

Within the planning area, there are over 390 miles of bike routes, sidewalks, and shared pathways. This chapter discusses the needs related to this existing bicycle and pedestrian infrastructure, the future demand for these facilities, and recommendations to enhance and grow the regions bicycle and pedestrian network.

6.1 Infrastructure and Facility Needs

Bicycle and pedestrian facilities are located throughout the planning area on functionally classified roadways and within local neighborhoods. The MPO recognizes the importance of these pedestrian facilities and the connectivity they provide. As such, the MPO supports the development of pedestrian-focused facilities along all existing and proposed roadways, where right-of-way and safety permits.

Additionally, the MPO and its partner agencies have demonstrated the desire to expand the existing bicycle and pedestrian infrastructure. To support this, GRPC endorses Complete Streets policies and, in September 2015, the Transportation Policy Committee of the MPO adopted an initial Complete Streets policy for the region. In March 2020, GRPC released the *Active Community Study*[31] for the Gulf Coast which contains detailed bicycle/pedestrian demand analysis maps.

Needs

The MTP supports the efforts undertaken as part of the region's *Active Community Study* and MULTIPLAN 2045, combining the plans' findings and recommendations with those developed using the MTP's safety and gap analyses. This allows for the continuation of addressing previously identified needs, while supporting the continued growth of the region through the consideration of new needs, and thus, additional recommendations to meet those needs.

Growing Demand for Active Transportation

There is a significant demand for safe and convenient walking, bicycling, and other non-motorized transportation options in the region, which will continue to grow as the region itself grows. This reflects a growing desire for healthier lifestyles and alternatives to car-dependent travel, however there is a lack of infrastructure available to provide for it.

[31] Active-Transportation.pdf

Need for Collaboration

While the region contains several cities and towns that have strong, individual non-motorized networks, they are not connected between one another. This is partially due to the geographic spread of the region, which is comprised of approximately 70 miles of coastline from the Louisiana State Line to Alabama State Line. The lack of connections can also be attributed to how different agencies and jurisdictions within the region coordinate. The MPO and its partner agencies can more efficiently address the needs of bicyclists and pedestrians within the region by beginning a collaborative approach to maintenance schedules, identification of unsafe areas, potential sources of connectivity between jurisdictions, funding solutions, and more.

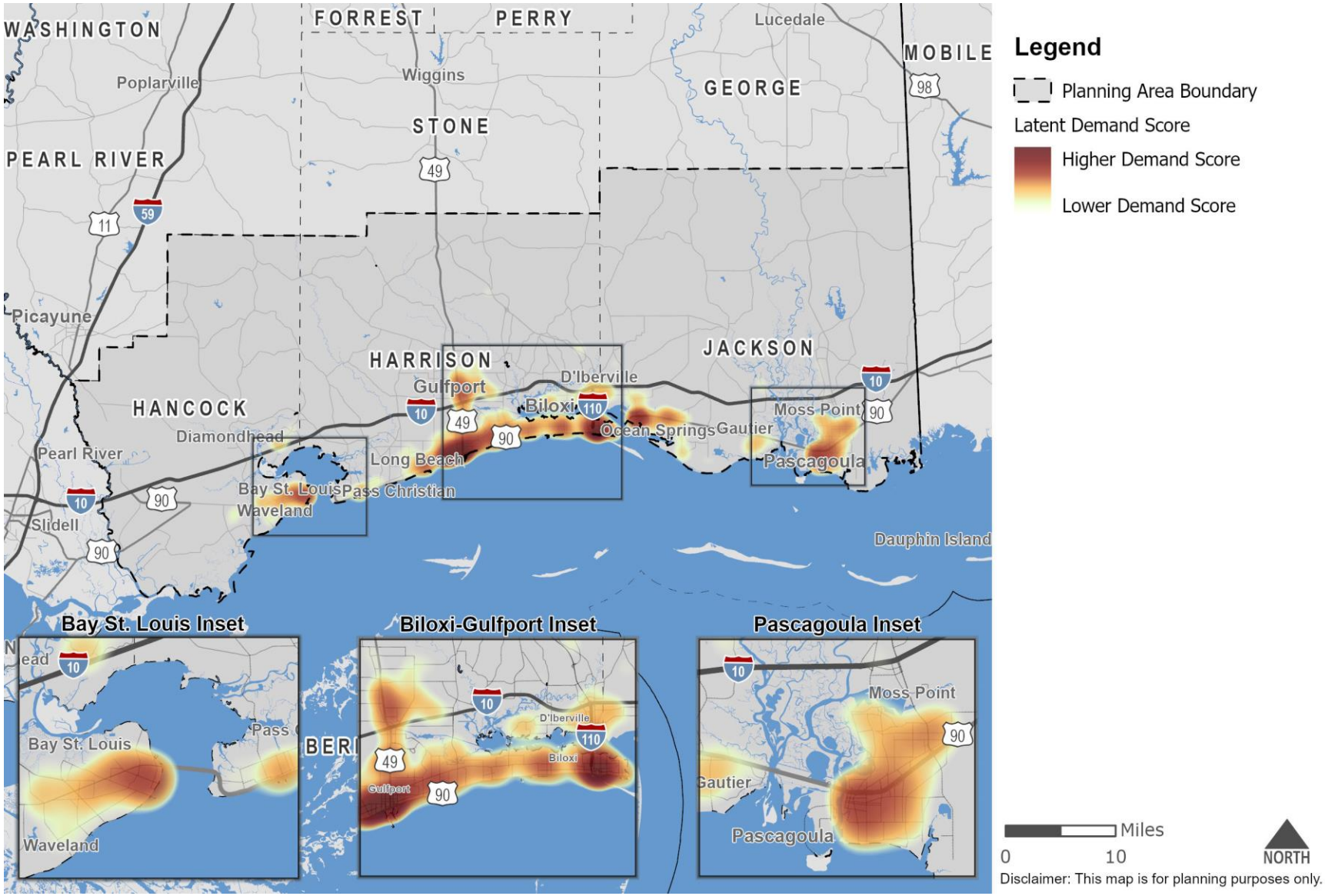
Limited Infrastructure and Connectivity

Within the planning area, there are few existing infrastructure and connectivity gaps that create challenges for residents to safely bicycle or walk between communities, schools, workplaces, and recreational areas. The region has invested a lot in its non-motorized infrastructure so that tourists have access to its two main attractions: the beaches and casinos.

The MTP conducted a Gap Analysis, comparing the results of the Latent Demand Scoring, which displayed the same demand areas as the *Active Community Study*, in *Technical Report #2: State of Current Systems* to the existing non-motorized infrastructure. The gap analysis was used to determine where there exists high demand but low access, displayed in **Figure 6.1** Within the region, gaps exist at/in:

- Northeast Pascagoula
- Area wide infill
- Rural areas

Figure 6.1: Latent Demand Scoring Results



Recommendations

Develop a Connected Network

The MPO and its partner agencies can prioritize the development of a connected network of safe and accessible bicycle and pedestrian infrastructure throughout the region. This network should connect communities, schools, workplaces, and key destinations.

Prioritize Safety

Additionally, the non-motorized network would benefit greatly from safety improvements to existing infrastructure, including traffic calming measures, high-visibility crosswalks, and bike lanes. While the region has a better-than-average non-motorized fatality and serious injury rate, especially for an urbanized area, safety improvements are needed to keep this trend going.

Implement a Multimodal Approach

The region can continue to foster a multimodal approach to transportation, promoting the use of public transit, walking, and bicycling as complementary modes of travel to traditional vehicular travel. The development of a multi-modal network can reduce the number of vehicles on the roadway, reduce congestion, increase safety, and improve air quality.

Incorporate Additional Funding Mechanisms

In addition to the non-motorized transportation set-aside required by the transportation bill, the MPO and its partner agencies can set aside additional MPO funding, or seek additional funding sources[32] and grants, to improve existing sidewalk infrastructure, reconstruct facilities to meet ADA standards, and close gaps within the pedestrian network.

6.2 Maintenance

While maintenance is, and will always be, a major challenge for any type of transportation infrastructure, it is incumbent upon all jurisdictions responsible for these facilities to ensure they remain functional and are able to serve their purpose within the larger network. Additionally, as bicycle and pedestrian facilities are added to the region's transportation network, they must be designed in compliance with ADA

[32] https://www.fhwa.dot.gov/environment/bicycle_pedestrian/funding/funding_opportunities.pdf

requirements. Existing facilities may require repairs, maintenance, and/or updates to comply with ADA requirements.

To support maintenance goals, local jurisdictions should begin identifying funding sources for annual maintenance of these facilities. Failure to have dedicated funding sources in place for maintenance of existing and future infrastructure can result in degradation of these facilities to the point of rendering them unusable, and thus useless, and potentially unsafe, to those who may depend on them for access to everyday needs.

If there is a lack of available funding for maintenance, local jurisdictions should explore alternative maintenance strategies through partnerships with other organizations and the creation of maintenance programs, such as "Adopt-a-Trail". Adopt-a-Trail programs allow groups such as bicycling/running clubs and homeowner associations to be responsible for the maintenance of an identified segment of a bicycle or pedestrian facility.

6.3 Safety and Security Needs

Safety

States and MPOs are required to set targets and report annual progress regarding the number of non-motorized fatalities and serious injuries to meet one of their five Federal Safety Measures. From 2019 to 2023, the region averaged 43.2 non-motorized serious injuries per year and 16.6 non-motorized fatalities per year.

Nationally, pedestrians account for over 17.5 percent of all fatalities in motor vehicle traffic crashes, and most of these deaths occur at uncontrolled crossing locations, such as mid-block or un-signalized intersections. These sites put pedestrians at higher risk due to inadequate or inconvenient pedestrian crossing opportunities, creating barriers to safe, convenient, and complete pedestrian networks.

While traffic crashes between motorists and non-motorized users of the transportation system can be caused by the lack of effective safety infrastructure, distracted driving plays an even more significant role in these types of incidents. Distracted driving is any activity that diverts attention from driving, including:

- talking or texting on a phone or device,
- eating and drinking,
- talking to people in the vehicle,
- “rubber necking”,
- operating entertainment, or
- navigation system

In most cases, addressing driver inattentiveness could have a more profound impact on reducing automobile crashes than infrastructure improvements.

Distracted walking can also be a contributing factor to crashes involving pedestrians. While texting and driving is a known danger, distracted walking results in more injuries per mile than distracted driving. Though injuries from car accidents involving texting are often more severe, physical harm resulting from texting and walking occurs more frequently as pedestrians inadvertently step into the roadway, cross a driveway, or otherwise enter a space where vehicles travel. This places an equal responsibility on both drivers and pedestrians to pay attention to their surroundings to reduce their chances of being involved in a crash.

Safety Recommendations

To improve safety for both bicyclists and pedestrians, local jurisdictions within the region can coordinate with MDOT and local police departments to obtain detailed crash records. This can help to locate high crash locations, allowing for specific safety measures with the greatest impact on reducing crashes at each location to be identified.

Some areas may be identified as high crash locations between motorists and bicyclists/pedestrians. For these, assessments should be made to determine the primary causes of repeated incidents and the appropriate safety countermeasures to best address the underlying issues. These countermeasures can vary widely, and may include traffic calming measures, such as road diets or raised crosswalks, improved signage or pavement markings, signalization at intersections, or education programs designed to prevent these crashes from occurring in the future.

The *Gulf Coast Vision Zero Action Plan* (2024) identified bicycle and pedestrian areas of concern for safety. These locations are grouped together by county and are shown in **Table 6.1** through **Table 6.3**.

Potential solutions to address these concerns include:

- constructing new sidewalks,
- extending/connecting existing sidewalks,
- constructing multi-use pathways, and
- evaluating the feasibility of a road diet.

Table 6.1: Hancock County Areas of Safety Concern

Street	From	To	City
Beach Blvd	Union St	State Street	Bay St Louis
US 90	Old Spanish Tr	McLaurin St	Waveland
Waveland Ave	Carrol St	Spruce St	Waveland

Source: Gulf Coast Vision Zero Action Plan

Table 6.2: Jackson County Areas of Safety Concern

Street	From	To	City
US 90	Johnston Rd	De La Pointe Dr	Gautier
Main St	Elder St	Jackson Ave	Moss Point
MS 63	Grierson St	Frederick St	Moss Point
US 90	Halstead Rd	Ocean Springs Rd	Ocean Springs
US 90	Washington Ave	Holcomb Blvd	Ocean Springs
Government St	Washington Ave	Ridgeview Dr	Ocean Springs
Ingalls Ave	Mantou St	Geerkin St	Pascagoula
14th St Service Rd	Denny Ave	Dead End	Pascagoula
US 90	Telephone Rd	Hospital Rd	Pascagoula
Veterans Ave	Jefferson Ave	South of Shortcut Rd	Pascagoula
Tucker Rd	McClelland Rd	Parker Rd	

Source: Gulf Coast Vision Zero Action Plan

Table 6.3: Harrison County Areas of Safety Concern

Street	From	To	City
Caillavet St	Division St	Esters Blvd	Biloxi
US 90	Caillavet St	Main St	Biloxi
Pass Rd	Eisenhower Dr	Keesler Gate	Biloxi
Irish Hill Dr	Travia Ave	Rodenberg Ave	Biloxi
US 90	Cajun RV Park	Rodenberg Ave	Biloxi
Central Ave	Bay Shore Dr	Sunset Dr	D'Iberville
Lamey Bridge Rd	Big Ridge Rd	Toncrey Rd	D'Iberville
Lemoyne Rd	Bienville Dr	Laura Acres Dr	D'Iberville
Pass Rd	US 49	MS 605	Gulf Port
Courthouse Rd	30th St	Courthouse Place	Gulf Port
US 49	Airport Rd	MLK Jr Blvd	Gulf Port
33rd St	34th Ave	26th Ave	Gulf Port
Pass Rd	Ford St	Dudley St	Gulf Port
Three Rivers Rd	Seaway Rd	Angels Dr	Gulf Port
Three Rivers Rd	Duckworth Rd	Oneal Rd	Gulf Port
Seaway Rd	Three Rivers Rd	White Ave	Gulf Port
Old Highway 49	Clark Rd	Landon Rd	Gulf Port
US 49	Oneal Rd	Community Rd	Gulf Port
Dedeaux Rd	US 49	MS 605	Gulf Port
US 90	20th Ave	33rd Ave	Gulf Port
28th Ave	Simmons Dr	18th Ave	Gulf Port
US 49	34th St	Pass Rd	Gulf Port
Pineville Rd	Ashley Ln	Seal Ave	Long Beach
Old Pass Rd	Cleveland Ave	15th St	Long Beach/Gulfport

Source: Gulf Coast Vision Zero Action Plan

Security

In addition to safety concerns, there are also numerous security concerns to a bicycle and pedestrian network. These include, but are not limited to:

- the possibility of criminal attack,
- theft, and
- vandalism.

These concerns are primarily along portions of shared use bicycle and pedestrian paths that are isolated from the roadway right of way.

Security Recommendations

To provide a greater sense of security for users of shared use paths, project engineers and managers should strongly consider incorporating additional security features in the development of all new facilities. This can include increased lighting, cameras, and emergency phone boxes placed at strategically located areas along each facility.

Priority should also be placed on consulting with local law enforcement agencies to request that officers periodically patrol these facilities. Increasing law enforcement presence is a major factor in deterring crime before it happens. Local advocates willing to participate should consider the feasibility of organizing bicycle and pedestrian safety watch groups to intermittently patrol the facilities. Even if law enforcement officials periodically patrol shared use facilities, there is no way to guarantee they will always be available in case of an emergency. A safety watch group provides a secondary deterrent to crime when law enforcement officials are unavailable.

Implementing prevention measures to aid in reducing theft and vandalism of support facilities along bicycle and pedestrian corridors is also a need. Installing Closed Circuit Television (CCTV) systems to constantly monitor high value support facilities would greatly diminish the potential of these assets from being stolen or vandalized. Additionally, providing physical barriers, such as fencing, limits access to these areas and serves as an additional security deterrent.

6.4 Recommended Short-Term Non-Motorized Projects

Using the results of the gap analysis discussed earlier, the recommendations from the public survey, and stakeholders, the projects displayed in **Table 6.4** can be considered for prioritization as part of the MPO's set-aside for non-motorized transportation funding. These should be considered in conjunction with the existing projects from MULTIPLAN 2045 and safety studies for the locations identified in **Table 6.1** through **Table 6.3**. The recommended projects focus primarily on creating connections from smaller to larger, more established, communities within the planning area. This can help provide a comprehensive network, connecting various jurisdictions within the planning area and providing enhanced mobility networks for people who utilize bicycle and pedestrian infrastructure.

Table 6.4: Potential Short-Term Bike and Pedestrian Projects

Street	From	To	Recommendation
Hwy 613	Dutch Bayou Rd	Wildwood Road	Safety study; bike/ped improvements
Washington Ave	Lemoyne Blvd	Old Port Bayou Rd	Safety study; bike/ped improvements
Hwy 80	Rich Ave	Cedar St	Multimodal improvements; corridor study
Pass Rd*	33rd Ave	Rodeo Rd	Roadway maintenance; multimodal improvements
Northeast Pascagoula			Sidewalk study

*Recommended short-term project identified in *Gulf Coast Vision Zero Action Plan*

7.0 Public Transit

This section provides an overview of recommendations to meet the different challenges related to transit within the region as identified in *Technical Report #2: State of the Current Systems*.

7.1 Transit System Overview and Recommendations

Coast Transit Authority (CTA) currently performs better than peer agencies in cost efficiency, effective resource utilization, ridership, and financial stability. This is notable as the area is less dense, serving a lower population, and serves a smaller area than peer communities.

Though services are strong, CTA can work to expand service availability. By increasing vehicle operational hours per capita, services can be expanded while maintaining their high efficiency. Transit recommendations are discussed below.

Improving Ridership

Although ridership levels were identified as being on-par when compared to peer transit provider levels, recommendations to maintain and grow ridership include:

- Add more vehicles and extend service hours to improve accessibility.
- Add bus stop shelters, real-time tracking, and better amenities.

These improvements would allow for services to be provided during hours when demand is still high and provide a more comfortable experience for riders who experience wait times.

Optimizing Operating Efficiency

Operation efficiency recommendations allow for improvements to be made through optimization and leveraging assets. Although transit in the planning area was efficient when compared to peer services, recommendations to further enhance operational efficiencies include:

- Focus on high-demand areas and adjust low-performing routes.
- Invest in fuel-efficient or electric vehicles and optimize maintenance schedules.
- Analyze operations and rider feedback to prioritize changes effectively.

These recommendations can be addressed in tandem with those to increase ridership and revenues, as operational efficiencies often lead to a better rider experience and increased financial stability.

Increasing Revenue

Strategies to increase revenues can be implemented alongside those to reduce costs to further address financial needs and budget requirements. Recommendations to increase transit revenues include:

- Run campaigns, offer discounts, and incentivize ridership
- Offer tiered fares for premium services and use bus exteriors for advertising

As revenues through fare collections are higher than peer averages, it is not recommended that revenue increases come from higher fares at this time.

Stakeholder Collaboration

Meaningful stakeholder collaboration informs how recommendations are implemented and prioritized. Due to this, stakeholder identification and coordination regarding implementation efforts is critical. Public feedback should also be regularly reviewed to identify additional needs and monitor the results of strategy implementation. This feedback should inform enhancements in transit operations and future routes or programs, as well as to monitor the success of existing services and amenities.

7.2 Transit Gap Analysis

Transit routes were analyzed to identify where gaps exist in current service, which can be considered when routes change or when new services or routes are added. Within the planning area, two areas were identified as transit gap locations: Pascagoula and Bay St. Louis.

Expanding transit options in these locations, especially around popular destinations and high-density areas, can help make transit more accessible to a greater ridership base while addressing low operational efficiency and generating additional revenues.

7.3 Additional Considerations

In addition to addressing the needs of the transit system itself, it is important to also consider the transportation needs of residents within the region. The housing and transportation affordability analysis, located in *Technical Report #2: State of Current Systems,* found that affordability in the region is negatively impacted by a high reliance on personal vehicles for transportation. As such, it is recommended for the MPO and its partner agencies to employ strategies to decrease this dependence.

The primary means to reduce personal vehicle dependence is through increasing the availability of safe and accessible public transit systems. This would address regional affordability by offering a reliable mode of transportation to a greater service area and additional riders. As users of public transit often also use bicyclist or pedestrian infrastructure, all road users should be kept in mind when planning transit projects. Additionally, public transit, pedestrian, and bicyclist considerations can be integrated into transportation projects, allowing for some cost reduction and consolidation in the different project phases.

Land use also plays a role in affordability and transit use, as supporting compact, multimodal neighborhoods can help increase the efficiency of future public transit services and reduce the overall cost of transportation on residents. These initiatives are essential to improving the affordability of transportation on households within the region.

8.0 Multimodal Needs

This chapter focuses on the existing supply of emerging modes, while discussing their future application or transportation modes that will complement them. The ability of emerging modes to support the region's transportation networks is dependent on its ability to integrate with them, including, but not limited to:

- fare payments and tolls,
- pickup/drop-off locations,
- reliability, and
- ease of scheduling.

Both this report and *Technical Report #2: State of Current Systems* outline various conditions, characteristics, and needs of the region's multimodal transportation system, including the roadway network, bicycle and pedestrian facilities, freight networks, and public transportation networks. The subsections below borrow and build upon sections from the Technical Reports.

8.1 Prominent Emerging Modes

Transportation Network Companies

Transportation Network Companies, such as Uber and Lyft, are increasingly partnering with the public sector to test new ways to provide public, or subsidized, transportation. Although pilot programs are still evolving, many focus on providing trips in low-demand areas or times of day or for people with disabilities, which can be used to supplement, or connect to, transit services where existing service is unavailable. TNCs generally operate with a fare structure comprised of base fares combined with per-minute and per-mile fees.

Additional services within the region include Greyhound and FLIXBUS, with Amtrak slated to restart service in 2025.

Micromobility

Micromobility is a mode of transportation that includes lightweight vehicles, such as bicycles and scooters, that are available on-demand through self-service rental programs, and that use time or distance as a basis for their fare structure. Within the region, there are multiple bike, and some scooter, rental facilities, however, most of these are traditional bike rental businesses, where the vehicle would have to be rented and returned to the business, often during business hours, and may only be for use on a specific trail or tour area.

One vendor, Tour de Coast, instead allows for electric bikes to be rented via app, picked up from one of multiple hubs, and uses a fee structure that charges consumers

by the minute, hour, or day. As such, this service provides an on-demand micromobility option within the cities of Pascagoula and Ocean Springs. More information can be found on their website at: https://tourdecoast.com/.

8.2 Impact of Emerging Modes on Infrastructure

Roadway Facilities

The planning area consists of a large, expansive roadway network with connectivity between the different towns and cities within the region. These facilities provide convenience, speed, and accessibility to the urban core, suburbs, and rural areas. This infrastructure has limited room and funds to expand and is greatly impacted by changes in the number of vehicles on the roadways.

The use of the emerging modes, particularly TNCs, has the ability to decrease the number of vehicles on the roadways, decrease congestion, maintain air quality, and improve travel reliability for roadway users. This, however, will require the coordination of pick ups, drop offs, and movement of vehicles on the roadway network between locations. Additionallly, promoting the consideration of pick-up and drop-off locations during site development or redevelopment can reduce future safety hazards if rideshare vehicles are expected to back up onto the roadway near major destinations.

Bicycle and Pedestrian Facilities

The region boasts a connected and extensive network of bicycle and pedestrian facilities, with coverage and connectivity between the different towns, cities, and main tourist attractions. These facilities provide broad coverage and connectivity for bicyclists and pedestrians within more densely populated areas, however, they begin to decrease in the suburbs and are sparse in rural areas.

In addition to the existing network, there are several proposed facilities to expand it. As this infrastructure expands, micromobility options can be used to provide faster and more accessibile transportation options. This includes transit system access, as bike and pedestrian infrastructure that connects to transit stops may provide the convenience and speed of travel needed for residents and visitors to utilize a mix of mode options as a practical alternative to personal vehicle use.

Public Transportation

Fixed-route public transportation in the region is provided by CTA and has been discussed in *Technical Report #2: State of Current Systems*. However, there is limited availability of transit service outside of the urban core and it often requires planned-

out trip schedules through specialized providers. Part of the MTP includes a transit plan and recommendations for how the transit infrastructure can serve the region.

Transit system growth will also need to consider:

- how microtransit can integrate rural and urban trips together,
- how Transportation Network Companies can partner with existing service or complement it, and
- the impact of micromobility helping to provide non-motorized users greater opportunity to access the transit system.