Hattiesburg-Petal-Forrest-Lamar Metropolitan Planning Organization

2040

Metropolitan Transportation Plan

January 2016

HATTIESBURG PETAL FORREST LAMAR
Metropolitan Planning Organization

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1.0 Introduction

The 2040 Metropolitan Transportation Plan (MTP) is the long-range transportation plan for the Hattiesburg Metropolitan Planning Area (MPA), replacing the 2035 MTP. The 2040 MTP was developed concurrently with the 2040 Mississippi Unified Long-Range Transportation Infrastructure Plan (MULTIPLAN).

The 2040 MTP sets a regional vision and course of action for addressing the transportation needs of the Hattiesburg MPA over the next twenty-five years. Its recommendations are the result of public input, technical analysis, and close coordination between local municipalities and counties, public transportation providers, the Mississippi Department of Transportation (MDOT), and other members of the Hattiesburg-Petal-Forrest-Lamar Metropolitan Planning Organization (MPO).

The 2040 MTP utilizes a performance-based approach to metropolitan transportation planning that is described in detail in Chapter 2: Plan Development Process.

1.1 The Metropolitan Planning Organization (MPO)

Purpose and Primary Functions

An MPO is a federally-mandated transportation policy-making body made up of representatives from local government and transportation agencies who have authority and responsibility within the MPAs.

With the passage of the Federal-Aid Highway Act of 1962, Congress made metropolitan transportation planning a condition for receipt of federal funds for transportation projects in urban areas with a population of 50,000 or greater. That legislation, and subsequent legislation, has encouraged a continuing, cooperative, and comprehensive (3-C) transportation planning process between MPOs, states, and public transit providers in these urban areas.

According to the Federal Highway Administration (FHWA) report *The Transportation Planning Process: Key Issues*, there are six core functions of an MPO:

1. **Establish a setting for effective decision-making:** Establish and manage a fair and impartial setting for effective regional decision-making in the metropolitan area.
2. **Identify and evaluate transportation improvement options:** Develop transportation improvement options and use data and planning methods to evaluate whether those options support criteria and system performance targets. Planning studies and evaluations are included in the Unified Planning Work Program (UPWP)

4. **Prepare and maintain a Metropolitan Transportation Plan (MTP):** Develop and update a long-range transportation plan for the metropolitan area covering a planning horizon of at least 20 years. MPOs prepare MTPs using performance measures and targets.
5. **Develop a Transportation Improvement Program (TIP):** Develop a short-range, four-year program of priority transportation improvements drawn from the MTP. The MPO creates the TIP with spending, regulating, operating, management, and financial tools. The TIP represents immediate priority actions to achieve the area's goals and associated system performance targets.
6. **Identify performance measure targets and monitor whether implemented projects are achieving targets:** MPOs coordinate with state and public transportation operators to establish performance targets that address performance measures, as set forth in federal law, related to surface transportation and public transportation. A System Performance Report, that tracks progress in meeting performance targets, will be prepared when updating future plans.
7. **Involve the public:** Involve the general public and other affected constituencies related to the essential decision-making elements listed above.

Federal Designation

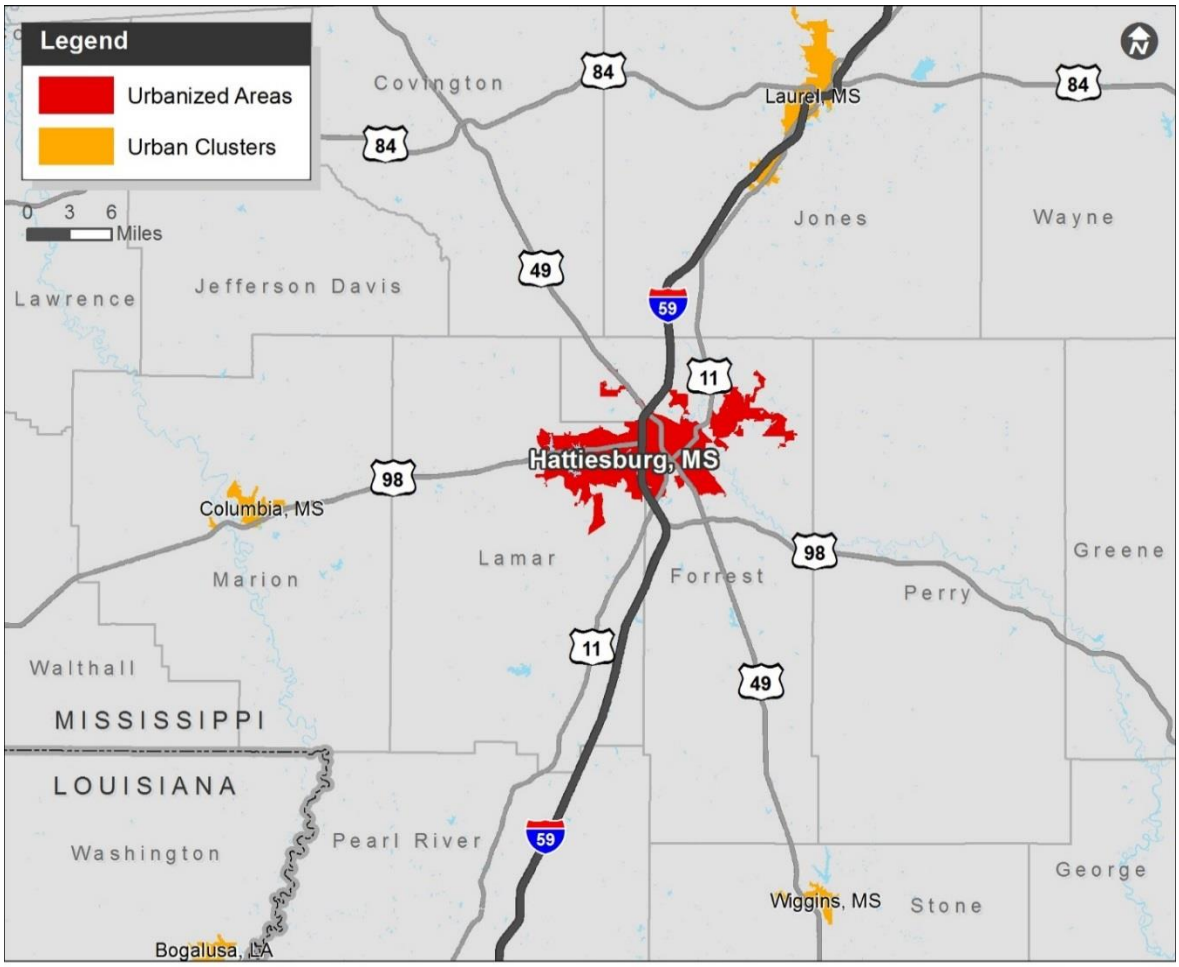
The Census Bureau defines urban areas after each decennial census, with all other areas being classified as rural. After identifying urban areas, the Census Bureau classifies all urban areas as either an urbanized area or an urban cluster. Urbanized areas must have at least 50,000 people, while urban clusters are all remaining urban areas or those with a population ranging from 2,500 to 49,999.

MPOs have authority within an area referred to as the MPA. MPAs are established around urbanized areas with formalized agreements between the affected jurisdictions and the governor(s) of the affected state(s). Typically, the MPA includes the smoothed urban area and all areas expected to urbanize within the next 20 years. The MPA boundary may also be influenced by jurisdictional lines, physical features of the landscape, or major roadways.

After the 2010 Census, urban areas were redefined. The first step in identifying the extent of urban areas is to identify a densely settled core of census tracts and/or census blocks that meet minimum population density requirements, along with any adjacent territory containing non-residential urban land uses. Then, additional densely settled areas are added to this core based on their proximity. Finally, to qualify as an urban area, the area identified by Census Bureau criteria must encompass at least 2,500 people, at least 1,500 of which reside outside institutional group quarters.

Following the 2010 Census, the Census Bureau identified just over 450 urbanized areas in the United States. Figure 1.1 shows the location of urban clusters and urbanized areas near the Hattiesburg Urbanized Area.

Figure 1.1 Nearby Urban Areas



Disclaimer: This map is for planning purposes only.
Map Source: Neel-Schaffer, Inc.

Based on US 2010 Census data
Data Sources: Census Bureau

About the Hattiesburg-Petal-Forrest-Lamar MPO

The Hattiesburg-Petal-Forest-Lamar Metropolitan Planning Organization (HPFLMPO) was created after the 1980 Census, at which point the urban area centered around Hattiesburg exceeded 50,000 persons and was designated an urbanized area. The City of Hattiesburg serves as the Lead Planning Agency (LPA) for the MPO, with its Department of Urban Development fulfilling MPO staffing requirements.

Figure 1.2 shows the boundaries of the smoothed Hattiesburg urbanized area and the HPFLMPO's MPA. Again, the MPA encompasses the smoothed urban area and contiguous areas likely to become urbanized within the next 20 years.

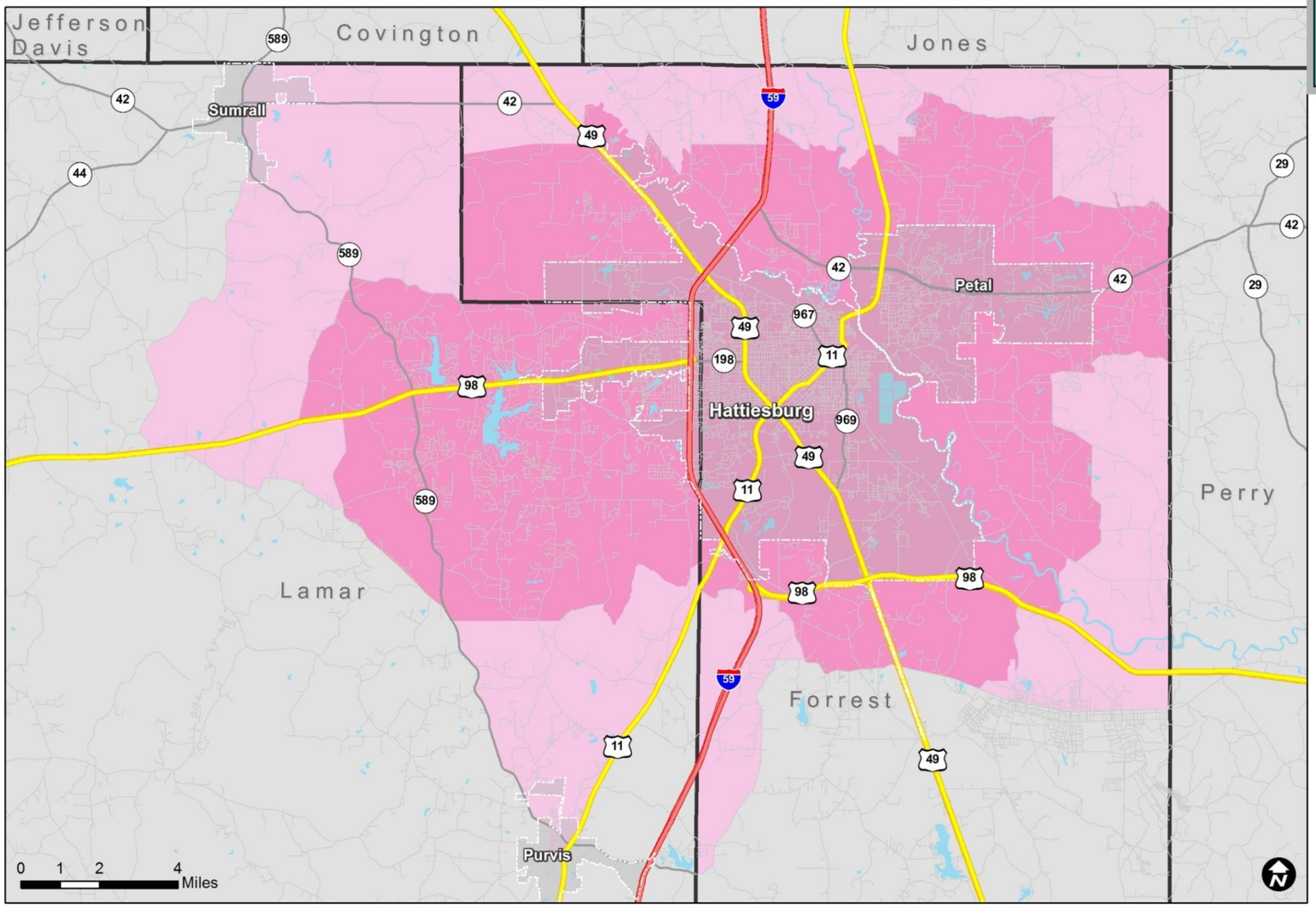
The Hattiesburg MPA includes the Hattiesburg urbanized area but does not include any other urban areas. The 2010 population for the Hattiesburg MPA is approximately 106,500. Most of the MPA population, approximately 97,500, is within the smoothed urbanized area.

All local governments within the smoothed urbanized area are members of the MPO and they are encouraged to actively participate in the metropolitan transportation planning process. These local governments include:

- City of Hattiesburg
- City of Petal
- Forrest County
- Lamar County

In addition to local governments, public transportation providers, the Mississippi Department of Transportation (MDOT), the Federal Highway Administration (FHWA), the Federal Transit Administration (FTA), and other stakeholders participate in the MPO transportation planning process.

FIGURE 1.2 METROPOLITAN PLANNING AREA



2040 MTP

Legend

- Interstates
- U.S. Highways
- State Highways
- Other Roadways
- Water
- Municipalities
- Smoothed Urbanized Area
- Metropolitan Planning Area
- Counties

Regional Context

Disclaimer: This map is for planning purposes only. Contact MPO Staff for more information.

Map Source: Neel-Schaffer, Inc.

Data Sources: Census Bureau; MPO Staff

Organizational Structure and Committees

Two committees shape the decision-making process of the MPO: the Policy Committee, which is the official decision-making body and the Technical Committee, which advises the Policy Committee on technical matters of projects, plans, and programs.

Policy Committee

The Policy Committee reviews all recommendations from the Technical Committee and makes final decisions regarding all documents and products produced by the MPO including, but not limited to the Unified Planning Work Program (UPWP,) Metropolitan Transportation Plan (MTP), Public Participation Plan (PPP), and Transportation Improvement Program (TIP).

Policy Committee membership is comprised of elected officials from municipalities and counties within the MPO, as well as state and federal agencies holding an interest in transportation planning. Members consist of the following:

- The Mayor of the City of Hattiesburg;
- The Mayor of the City of Petal;
- The Board President of Forrest County;
- The Board President of Lamar County;
- The Mississippi Department of Transportation;
- The Federal Highway Administration; and
- The Federal Transit Administration.

Technical Committee

The Technical Committee serves as an advisory committee that makes recommendations to the Policy Committee regarding all documents and products produced by the MPO including, but not limited to the UPWP, MTP, PPP, and TIP.

Committee membership is comprised of public works officials, engineers, planners and other representatives whose skills and training are more technical in nature. Members represent each of the county and municipal jurisdictions located in the MPO, state and federal transportation agencies, and other agencies involved in streets/highways, public transportation, bicycling/walking, aviation, and freight. Members consist of the following:

- City of Hattiesburg;
- City of Petal;
- Forrest County;
- Lamar County;
- The Mississippi Department of Transportation;
- The Federal Highway Administration;
- University of Southern Mississippi;
- Hattiesburg/Laurel Regional Airport;
- Southern Mississippi Planning and Development District;
- Hub City Transit;
- Illinois Central Railroad; and
- Norfolk Southern Corporation.

1.2 The Metropolitan Transportation Plan

Purpose and Authority of Plan

Since the 1962 Federal-Aid Highway Act, federal legislation has required metropolitan transportation plans for urban areas with a population of at least 50,000 as a condition of receipt of surface transportation funds. Today, metropolitan transportation plans are governed by Federal Law 23 U.S.C. §134 and regulations codified in 23 C.F.R. §450.

According to the FHWA's The Transportation Planning Process: Key Issues:

> "Metropolitan transportation planning is the process of examining travel and transportation issues and needs in metropolitan areas. It includes a demographic analysis of the community in question, as well as an examination of travel patterns and trends. The planning process includes an analysis of alternatives to meet projected future demands, and for providing a safe and efficient transportation system that meets mobility while not creating adverse impacts to the environment."

The primary purpose of metropolitan transportation planning, and MTPs by extension, is to ensure that transportation planning in urbanized areas is carried out through a continuing, cooperative, and comprehensive (3-C) planning process. This 3-C process ensures that transportation planning is based on the most current information, reflects regional needs and priorities that are consistent with those of the state, takes into account all modes of transportation, and is consistent with other planning efforts, such as land use and economic-development plans.

Adoption of the MTP is the first step towards the implementation of any transportation project using federal funds or any regionally significant transportation project, regardless of funding source. Following formal adoption of the plan, a project can be programmed for design, right-of-way acquisition, or construction in the Transportation Improvement Program (TIP), which identifies funding sources, fiscal year(s) of implementation, and the estimated amount of funding to be used.

Federal Requirements

Every MPO must prepare and update a transportation plan for its MPA in accordance with the federal requirements set forth in federal law (23 U.S.C. §134) and codified in 23 C.F.R. §450. Aside from ensuring that the metropolitan transportation planning process is continuous, cooperative, and comprehensive, the MTP must provide for consideration and implementation of projects, strategies, and services that will address the following eight planning factors:

1. Support the economic vitality of the metropolitan area, especially by enabling global competitiveness, productivity, and efficiency;
2. Increase the safety of the transportation system for motorized and non-motorized users;
3. Increase the security of the transportation system for motorized and non-motorized users;
4. Increase accessibility and mobility of people and freight;
5. Protect and enhance the environment, promote energy conservation, improve the quality of life, and promote consistency between transportation improvements and state and local planned growth and economic development patterns;
6. Enhance the integration and connectivity of the transportation system, across and between modes, for people and freight;
7. Promote efficient system management and operation; and
8. Emphasize the preservation of the existing transportation system.

MTP Development and Content

The MTP must utilize the most recently available, valid information and assumptions to provide long- and short-range strategies and actions for the MPA that preserve and enhance the multimodal transportation system and facilitate the safe and efficient movement of people and goods.

Federal regulations (23 C.F.R. §450) require the MTP to include:

- Projections of future demand of people and goods over the period of the plan (at least 20 years);
- Inventory of existing and proposed transportation facilities, with an emphasis on nationally and regionally significant facilities;
- Operational and management strategies that improve the efficiency and safety of the existing transportation system;
- Capital investment and other strategies to preserve the existing and future transportation system and improve multimodal capacity based on regional priorities and needs;
- Evaluation of environmental impacts and potential mitigation activities;
- Pedestrian and bicycle transportation facilities;
- Transportation and transit enhancement activities;

- A financial plan that demonstrates that the plan is fiscally constrained;
- Comparison of the transportation plan with state and local conservation plans and maps and natural and historic resource inventories, if available;
- A safety element that incorporates or summarizes the priorities, goals, countermeasures, or projects for the MPA contained in the state's Strategic Highway Safety Plan;
- Reasonable opportunity for the public and all relevant parties to review the transportation plan and to provide comments; and
- Consideration of the results of a Transportation Management Area's Congestion Management Process.

Transportation Management Areas and the Congestion Management Process

Urbanized areas with populations exceeding 200,000 typically have more complex transportation systems and associated challenges than smaller regions. Accordingly, these large urbanized areas have additional planning responsibilities and are designated as Transportation Management Areas (TMAs).

The major MTP-related requirement for TMAs is the development of a Congestion Management Process (CMP). The CMP is intended to address congestion through a process that provides for effective transportation system management and operations, based on cooperatively developed travel demand reduction and operational management strategies. The CMP establishes a systematic method to identify and evaluate transportation improvement strategies, including operations and capital projects.

Projects and strategies from the CMP should be considered for inclusion in the MTP and subsequently, the TIP.

The Hattiesburg urbanized area does not exceed 200,000 in population nor is expected to increase by 2040.

Air Quality Attainment

Areas exceeding air quality standards for transportation-related pollutants are designated as either an air quality nonattainment area or maintenance area. If an MPO includes nonattainment or maintenance areas, it must ensure that it's MTP, TIP, and federally funded projects conform to the purpose of the state's air quality plan, known as the State Implementation Plan (SIP).

Areas designated as air quality nonattainment areas must also update their plans every four years as opposed to every five years.

The HPFLMPO is currently in attainment for air quality pollutant emissions. However, the U.S. Environmental Protection Agency (EPA) does periodically update air quality standards. In the future, the MPO could become a non-attainment area if standards become higher or pollution becomes worse in the region.

Consistency with Other Plans

A major federal requirement of the MTP is that it is consistent with other plans.

The metropolitan transportation planning process must be carried out in coordination with the statewide transportation planning process. The MTP should be consistent with state's Strategic Highway Safety Plan and any other safety and security plans. Both the Statewide Transportation Improvement Program (STIP) and TIP must be consistent with the MTP. Changes must be made to the MTP before changes can be made in the TIP or STIP.

The MTP should be developed to be consistent with the coordinated public transit human services transportation plan and any plans for regional Intelligent Transportation Systems (ITS) architecture.

The MTP should also be developed to be consistent with locally-adopted planning documents, such as land use plans and economic development plans.

Planning Horizon and Update Cycle

The MTP must have a planning horizon of at least 20 years from its effective date and be updated at least every four years in air quality nonattainment and maintenance areas, and at least every five years in attainment areas. This requirement ensures that transportation plans remain valid and consistent with current and forecasted transportation and land use conditions.

The 2040 MTP must be updated at least five years from its adoption date, since the MPA is not a designated nonattainment or maintenance area. In order to maintain a 20-year planning horizon, the 2040 MTP must be updated and adopted by the same adoption date in 2020.

In between the five-year update cycle, the MPO may make amendments and modifications to the MTP at any time without a requirement to extend the horizon year. However, these revisions must be approved by the MPO under the requirements set forth in the PPP and described later in this chapter.

Transportation Equity

According to the FHWA document The Transportation Planning Process Briefing Book:

> "Transportation Equity refers to the way in which the needs of all transportation system users, in particular the needs of those traditionally underserved by existing transportation systems, such as low-income and minority households, older adults, and individuals with disabilities, are reflected in the transportation planning and decision making process and its services and products. Transportation Equity means that transportation decisions deliver equitable benefits to a variety of users and that any associated burdens are avoided, minimized, or mitigated so as not to disproportionately impact disadvantaged populations."

Federal legislation and executive orders prohibit discrimination and/or exclusion from participation in any program or activity receiving federal financial assistance on the basis of race, color, national origin, disability, income, minority-status, or Limited-English Proficiency. The MPO's Public Participation Plan (PPP) specifies the manner in which the MPO prevents discrimination and accommodates these populations. The PPP is discussed further in Chapter 2: Plan Development Process.

Title VI of the Civil Rights Act of 1964 ensures that no person is excluded from participation in, denied the benefit of, or subjected to discrimination under any program or activity receiving federal financial assistance on the basis of race, color, or national origin.

The Rehabilitation Act of 1973 and the Americans with Disabilities Act (ADA) of 1990 encourages the participation of people with disabilities in the development of transportation and paratransit plans and services.

Executive Order 12898: Federal Actions to Address Environmental Justice in Minority Populations and Low Income Populations, was signed by President Clinton in 1994. There are three fundamental Environmental Justice (EJ) principles:

- To avoid, minimize, or mitigate disproportionately high and adverse human health and environmental effects, including social and economic effects, on minority populations and low-income populations.
- To ensure the full and fair participation by all potentially affected communities in the transportation decision-making process.
- To prevent the denial of, reduction in, or significant delay in the receipt of benefits by minority and low-income populations.

Executive Order 13166: Improving Access to Services for Persons with limited English Proficiency was signed by President Clinton in 2000. Along with Title VI of the Civil Rights Act of 1964, the federal government requires federal agencies to examine the services they provide, identify any need for service to those with limited English proficiency (LEP), and develop and implement a system to provide those services so LEP persons can having meaningful access to them. For recipients of federal financial assistance, such as MPOs, the federal government requires provision of meaningful access to their LEP applicants and beneficiaries.

Performance-Based Planning

According to the FHWA report Performance Based Planning and Programming Guidebook:

> "Performance-Based Planning and Programming (PBPP) refers to the application of performance management within the planning and programming processes of transportation agencies to achieve desired performance outcomes for the multimodal transportation system. PBPP attempts to ensure that transportation investment decisions are made - both in long-term planning and short-term programming of projects - based on their ability to meet established goals."

The most recent transportation legislation, the Moving Ahead for Progress in the 21st Century Act (MAP-21), was adopted in 2012. One of its most significant changes to the metropolitan transportation planning process is that it mandates performance-based planning for all MPOs. While the United States Department of Transportation (USDOT) is currently in the rulemaking stage of creating performance-based planning regulations, some information and guidance has already emerged.

In general, MTPs and TIPs will be required to be developed through a performance-driven, outcome-based approach that supports the national goals stated in MAP-21 and illustrated in Table 1.1.

Table 1.1 MAP-21 National Performance Goals

Goal Area	National Goal
Safety	To achieve a significant reduction in traffic fatalities and serious injuries on all public roads
Infrastructure condition	To maintain the highway infrastructure asset system in a state of good repair
Congestion reduction	To achieve a significant reduction in congestion on the National Highway System
System reliability	To improve the efficiency of the surface transportation system
Freight movement and economic vitality	To improve the national freight network, strengthen the ability of rural communities to access national and international trade markets, and support regional economic development
Environmental sustainability	To enhance the performance of the transportation system while protecting and enhancing the natural environment
Reduced project delivery delays	To reduce project costs, promote jobs and the economy, and expedite the movement of people and goods by accelerating project completion through eliminating delays in the project development and delivery process, including reducing regulatory burdens and improving agencies' work practices

Source: FHWA

MPOs will also be required to monitor national performance measures developed by USDOT and track these measures over time. Performance measures under development by USDOT reflect most of the national goals articulated in MAP-21. Though subject to further clarification, the performance measures currently proposed by USDOT include:

- The number of serious injuries and fatalities;
- Serious injuries and fatalities per 100 million vehicle miles traveled on public roads;
- The condition of pavements on the interstate system;
- The condition of pavements on the National Highway System (excluding the interstate);
- The condition of bridges on the National Highway System;
- The performance of the Interstate System;
- The performance of the National Highway System (excluding the Interstate System);
- Traffic congestion;

- Freight movement on the Interstate System;
- On-road mobile source emissions; and
- Public Transit state of Good Repair.

Once all of the national performance measures are adopted, states will work with their MPOs to set state targets. Then, each MPO will set its own targets for its respective MPA and will be required to monitor and evaluate these performance measures in a performance report every four to five years, in tandem with updating its MTP. The MPO may elect to track more performance measures than USDOT requires.

Amending and Modifying the MTP

Between five-year updates, the need may arise for revisions to the MTP which significantly alter the scope or budget of the MTP. Typically this situation arises when existing projects are modified or removed or new projects are added. Since federally funded projects included in the short-range TIP for the MPO area must be consistent with the fiscally constrained MTP, these revisions would require either a formal amendment or an administrative modification.

The HPFLMPO defines the exact situations when a formal amendment or administrative modification would be appropriate. This document is available from MPO staff. 23 C.F.R. §450.104 provide the following definitions:

> "Administrative modification means a minor revision to a long- range Statewide or metropolitan transportation plan, Transportation Improvement Program (TIP), or Statewide Transportation Improvement Program (STIP) that includes minor changes to project/project phase costs, minor changes to funding sources of previously- included projects, and minor changes to project/project phase initiation dates. An administrative modification is a revision that does not require public review and comment, re-demonstration of fiscal constraint, or a conformity determination (in non- attainment and maintenance areas)."
>
> "Amendment means a revision to a long-range statewide or metropolitan transportation plan, TIP, or STIP that involves a major change to a project included in a metropolitan transportation plan, TIP, or STIP, including the addition or deletion of a project or a major change in project cost, project/project phase initiation dates, or a major change in design concept or design scope (e.g., changing project termini or the number of through traffic lanes). Changes to projects that are included only for illustrative purposes do not require an amendment. An amendment is a revision that requires public review and comment, re-demonstration of fiscal constraint,

or a conformity determination (for metropolitan transportation plans and TIPs involving "non-exempt" projects in nonattainment and maintenance areas). In the context of a long-range statewide transportation plan, an amendment is a revision approved by the state in accordance with its public involvement process."

1.3 Current Trends Affecting Transportation Planning

Changing Socio-Demographics

There are many national social and demographic trends affecting travel demand and transportation in general. In summary, the U.S. is projected to grow more slowly, age more rapidly, become more ethnically diverse, and experience more growth in central urban areas and suburban areas.

The U.S. Census Bureau projects that the U.S. population will grow from 310 million in 2010 to 380 million by 2040. While substantial in absolute terms, the rate of growth during this period is slower than in recent decades. Most of this slowdown is attributed to lower fertility rates amongst U.S. women and lower rates of immigration. Despite lower rates of immigration, the majority of population growth over the next 25 years is anticipated to come from immigrants and their descendants.

At the same time, longer lifespans are creating a population that will continue to see its elderly population grow in both absolute and percentage terms. This will likely translate to less overall trips per capita, but especially to less automobile trips per capita.

The increase in ethnic diversity in the U.S. population will likely have a short-term effect that increases carpooling, transit ridership, walking, and biking, while decreasing Vehicle Miles Traveled (VMT) per capita. However, as immigrants adapt to American culture, they are anticipated to adopt travel patterns similar to native residents. This means a possible increase in VMT per capita for immigrants and their descendants in later decades.

The American workforce is also changing, largely mirroring demographic changes. As the population ages, the overall labor force participation rate will decrease as a lower proportion of the population will be in the prime working-age group. While some of this decrease in labor force participation may be made up by retiree-age workers seeking part-time employment, there is an anticipated drop in overall employment by 2050. Since commute trips are a major contributing factor to peak period congestion, structural workforce trends will have a major impact on transportation.

Though population and employment growth is anticipated to slow down, growth will likely continue to be uneven throughout the United States. The migration patterns from rural to urban and from Northeast and Midwest to the Southeast and Western part of the

country are likely to continue. However, growth within metropolitan areas is expected to change slightly.

Suburban population and employment growth is anticipated to continue to outpace that of central urban areas, but growth in central urban areas is expected to occur at a faster rate than in recent decades. Both changes have the potential to decrease VMT per capita as urban residents are more likely to use transit, walk, or bike and suburban areas have the opportunity to develop more walkable and transit-oriented areas. However, there is also the potential for increases in VMT per capita, if destinations continue to scatter within metropolitan regions and transit does not effectively serve these areas and provide an attractive alternative to driving.

While some of the projected socio-demographic trends may have conflicting impacts on travel demand, there appears that total VMT will increase in growing areas, while VMT per capita will stagnate or decline and more trips will be made by public transit, walking, biking, carpooling, or other means.

Changing Technology

The actual impact of technological improvements on transportation is difficult to predict. However, there are many current technological trends that are influencing travel demand.

Telecommuting has been around for several decades now. While telecommuting increased at a rapid rate over the past couple of decades, it continues to represent a small percentage of the overall workforce. However, advancement in communications and incentives provided by local governments implementing Transportation Demand Management (TDM) programs may cause this workplace trend to continue to grow, thereby reducing the demand for peak period travel.

Technology is also improving operations of existing and new transportation infrastructure by allowing for improved ITS. According to the USDOT, ITS technologies "improve transportation safety and mobility, reduce environmental impacts, and enhance productivity through the integration of advanced communications-based information and electronic technologies into the transportation infrastructure and vehicles."

ITS technologies that are likely to have a major impact on future transportation include connected vehicles, automated vehicles, and live data collection and dissemination. These technologies will enable new ITS solutions and improve existing ones such as traffic signal coordination, reversible lane systems, traffic monitoring, demand-based roadway and parking pricing, and real-time travel information.

Bikesharing, carsharing, and ridesharing are all relatively new technologies that are impacting travel demand, especially in urban areas. These technologies are constantly improving with technological advances.

Bikesharing and carsharing are both essentially rental services whereby a person pays for temporary use of a vehicle (bike or automobile, respectively). There are many variations of each service, but the intent is to provide convenience when one does not have access to a private vehicle. In urban areas where many trips can be made by walking, biking, or public transit, bikesharing and carsharing are filling in the gaps for destinations not easily accessible by these modes. In this manner, these rental services are making car ownership less important for urban residents. If these services become more widespread, VMT per capita, and perhaps overall VMT would decline in many urban areas.

Ridesharing, according to the Victoria Transport Policy Institute, is "carpooling or vanpooling service in which the vehicle carries additional passengers when making a trip, with minimal additional mileage." It is offered by multiple providers, such as public transit agencies, private taxis, vanpools, and carpools. The continued growth of smartphones and advancement in GPS and mobile technology are constantly improving ridesharing services. As with bikesharing and carsharing, ridesharing offers an affordable alternative to vehicle ownership in walkable areas or to traditional taxis in all areas.

Declining Transportation Revenues

Gasoline taxes are the primary revenue source for both federal and state transportation funds. Despite the fact that transportation project construction costs have increased over the last twenty years, the last increase in the federal gasoline tax was in 1993, and the last increase in the Mississippi gasoline tax was in 1987. Furthermore, no significant new revenue streams have emerged to fill these funding gaps.

The Federal Highway Trust Fund, the primary source of funding for highway and transit projects, has been on the brink of insolvency many times in recent years. At the same time, MDOT has delayed projects because of a lack of state-matching funds.

USDOT, state DOTs, and local agencies have taken a variety of approaches to deal with declining and uncertain transportation revenue. For instance, In order to maximize its shrinking revenues, the FHWA encourages innovative financing strategies for transportation projects through its Innovative Program Delivery program.

At the local level, many local governments have begun to look at the Return on Investment (ROI) of their capital improvement projects, especially transportation projects. They have also raised new transportation revenue through temporary bonds, tax increases, special assessment districts, and other means.

At all levels, it is becoming increasingly important to prioritize transportation projects based on some measure of cost-effectiveness. It will also be necessary to seek innovative and alternative means of financing and funding transportation. There are many successful examples of local and state agencies utilizing public-private partnerships, privatization, Tax-Increment Financing (TIF), and other innovative financing structures to overcome funding shortfalls.

2.0 Plan Development Process

2.1 Performance-based Planning Approach

The 2040 MTP utilizes a performance-based planning approach that can be expanded in later updates as federal rule-making and guidance on national performance measure monitoring are established.

Performance based planning and programming (PBPP) is the application of performance management - a strategic approach to decision-making that is based on the development, application, and monitoring of performance data - to the long-range planning and programming process. PBPP uses data derived indicators about the current and desired transportation system to set strategic directions to analyze how funds are invested and programmed, and to evaluate program outcomes.

MAP-21 introduced requirements for performance-based planning in statewide and metropolitan planning. It requires USDOT to establish performance measures that will enable states and MPOs to track their performance in addressing the national goals set forth in MAP-21 described in Chapter 1: Introduction. Once these performance measures become effective, states and MPOs are required to adopt state and metropolitan targets, respectively, for each measure.

While federal guidance on MAP-21 performance measures and targets is still emerging, the general planning process below illustrates how the 2040 MTP incorporates an outcome-oriented, performance-based planning approach:

1. **Set Regional Vision** – A regional vision is developed based on previous plans and public input.
2. **Define Goals and Objectives** – Goals are developed that address desired outcomes consistent with the regional vision and national goals set forth in MAP-21. Then, objectives that are specific and measurable are established to support achievement of the stated goals.
3. **Establish System Performance Measures** – Performance measures to monitor are selected and are consistent with the MTP's stated goals and objectives, as well as with available guidance on federal performance measures. Monitoring these measures over time will allow the MPO to be responsive to unintended or unforeseen changes.
4. **Assess Baseline System Performance** – Existing conditions of the transportation system are assessed from an asset inventory, technical analysis, and input received from the public and stakeholders.

5. **Identify Desired System Performance** – Because performance targets are not yet set and some necessary data are not yet available, the 2040 MTP solely focuses on the preferred overall trend of performance measures (i.e., the direction of results).

6. **Forecast Future Conditions and Need** – Future growth in population and employment from 2013 to 2040 is forecasted. The impacts of the forecasted change in land use and demographic patterns were then modeled using the existing transportation network and committed projects. Future projects were then evaluated both individually and as part of larger packages of projects.

7. **Develop Implementation Strategy** – A prioritization methodology is developed to rank future transportation projects that are consistent with the stated goals and objectives as well as public and stakeholder input. The projects that most effectively balance future demand with these concerns are then included in the fiscally constrained project list, so long as there is no preliminary concern of significant environmental impact or disproportionately adverse effects to environmental justice populations.

2.2 Title VI in Development of the Metropolitan Transportation Plan

The HPFLMPO is committed to ensuring public participation in the development of all transportation plans and programs. It is the overall goal of the MPO that the transportation planning process is open, accessible, transparent, inclusive, and responsive. As a continuing effort by the MPO to provide public access and the means by which to engage in the planning process, the MTP development process is compliant with and follows all Title VI laws, processes, and programs, including the following:

- Civil Rights Act of 1964, 42 USC 2000d, et seq. prohibits exclusion from participation in any federal program on the basis of race, color, sex, or national origin.
- Rehabilitation Act of 1973, 29 USC 701 Section 504, prohibits discrimination on the basis of a disability, and in terms of access to the transportation planning process.
- Americans with Disabilities Act of 1990 prohibits discrimination based solely on disability. ADA encourages the participation of people with disabilities in the development of transportation and paratransit plans and services. In accordance with ADA guidelines, all MTP meetings take place in locations which are accessible by persons with mobility limitations or other impairments.
- Executive Order 12898 or referred to as Environmental Justice, requires that federal programs, policies and activities affecting human health or the environment will identify and avoid disproportionately high and adverse effects on minority or low income populations. The intent is to ensure that no racial, ethnic,

or socioeconomic group bears a disproportionate share of negative environmental consequences resulting from government programs and policies.

- Limited English Proficiency (LEP) Plan which is required by Title VI of the Civil Rights Act of 1964, Executive Order 13166, and FTA Circular C 4702.1B, October 2012.

The MPO's Public Participation Plan (PPP) supports Title VI compliance by enabling and encouraging all members of the public to actively participate in the development of the MTP. Details on the public involvement process for the MTP are discussed in the next section.

2.3 Public Involvement Process

Public involvement is the cornerstone of metropolitan transportation planning. Successfully engaging the public throughout the planning process provides decision-makers with the information necessary to ensure that public concerns and needs are being addressed adequately.

Federal Requirements

Federal regulation (23 CFR 450.316) requires that each MPO develop and use a documented participation plan that defines a process for providing citizens with reasonable opportunities to be involved in the metropolitan transportation planning process. This PPP is required to address the following:

- Adequate public notice of activities and time for public review and comment.
- Timely notice and access to information.
- Employment of visualization techniques to describe plans and programs.
- Make information available electronically and on the internet.
- Hold meetings at convenient times and easily accessible venues.
- Consider and respond to public input in a timely fashion.
- Seek out and consider the needs of the traditionally underserved in the community, such as low-income and minority populations.
- Provide additional opportunity for public comment on all plans, and changes to plans, following initial agency and public reviews during development, especially the MTP and TIP.
- Coordination with statewide public involvement and consultation processes.
- Periodically review procedures and effectiveness of plan strategies.

- Provide a summary of public comments on the draft for the MTP and TIP and include those in the final documents.
- Provide a minimum of a 45 day public comment period before finalization of a PPP Plan or an update of an existing PPP Plan.

Federal legislation and executive orders also prohibit discrimination and/or exclusion from participation in any program or activity receiving federal financial assistance on the basis of race, color, national origin, disability. Special accommodations must also be made for minority, low-income, and limited English proficiency (LEP) populations.

Public Participation Plan Requirements

The MPO's PPP addresses all the federal requirements and was adopted in 2013. The 2040 MTP public involvement process follows the procedures outlined in the PPP and reproduced below:

- There shall be two public meetings for the MTP prior to TPC approval.
- Provide reasonable public access to technical and policy information used in the development of the MTP and conduct open public meetings where matters related to transportation programs are being considered. Give adequate public notice of public participation activities and allow time for public review and comment at key decision points.
- Seek out and consider the needs of those traditionally under-served by existing transportation systems, including but not limited to the transportation disadvantaged, minorities, elderly, persons with disabilities, and low-income households who may face challenges accessing employment and other services.
- Provide timely information about transportation issues and processes to citizens, affected public agencies, representatives of transportation agencies, private providers of transportation, other interested parties and segments of the community affected by transportation plans, programs and projects (including but not limited to local jurisdiction concerns).
- Provide a public comment period of not less than 30 calendar days prior to adoption of the MTP, or any formal amendments or update to the MTP. Notice of the comment period will be advertised in a newspaper of general circulation and various other publications prior to the commencement of the 30-day comment period. Notice will also be mailed to the entire HPFLMPO mailing list prior to the start of the 30-day comment period.
- A summary of all oral and written comments for the MTP will be provided to the TPC and available for public review and placed in MPO minutes. When significant

written and oral comments are received on the draft MTP, a summary, analysis, and report on the disposition of comments shall be made part of the final MTP.

- If the final draft of any transportation plan differs significantly from the one available for public comment by the MPO and raises new material issues, which interested parties could not reasonably have foreseen, an additional opportunity for public comment on the revised plan shall be made available.

Beyond requirements for the MTP, all MPO activities must accommodate persons with disabilities and LEP persons. All MPO meetings are required to take place in locations which are accessible by persons with mobility limitations or other impairments. The MPO also provides notice of the availability of language assistance to LEP persons.

Public Involvement Activities

To develop a MTP that effectively meets the needs of the public and is consistent with local values, extensive public involvement activities were conducted. Members of the general public participated by:

- clarifying a regional vision by expressing their satisfaction with current transportation system conditions;
- identifying future transportation projects to be evaluated in the MTP;
- communicating their ideal transportation investment strategies; and
- providing feedback on draft versions of the MTP.

Various outreach methods were used to inform the public about the update process and the public involvement activities. Beyond providing public notice in local print media, outreach methods included the following:

- engaging transportation partners and stakeholders, such as state and federal government agencies;
- reaching out to all agencies, businesses, associations and others on the MPO's contact list database;
- using social media (Facebook/Twitter/MindMixer/websites);
- issuing a press release to media representatives;
- reaching out to special-needs groups such as Living Independently for Everyone (LIFE);
- placing phone calls and sending emails to known Environmental Justice groups and minority community leaders; and

- posting fliers in shopping and community centers as well as in churches and private venues.

A schedule of the primary public involvement activities is summarized in Table 2.1. Documentation of the public participation process is located in the Appendix.

Table 2.1 Public Participation Outreach Schedule

Activity	Purpose	Date, Time, and Location
Public Meeting Open House and Workshop	Kickoff Event and Public Visioning (Lamar County).	Wednesday, February 18, 2015 4:00 – 6:00 PM Breland Community Center 79 Jackson Road, Hattiesburg, MS
Public Meeting Open House and Workshop	Kickoff Event and Public Visioning (Forrest County).	Thursday, February 19, 2015 4:00 – 6:00 PM Hattiesburg Historic Train Depot 308 Newman Street, Hattiesburg, MS
Draft MTP released	Draft made available for public comment.	Friday, October 30, 2015 made available online and at MPO office
Public Meeting Open House	Presentation of Draft MTP to public (Forrest)	Thursday, November 5, 2015 4:00 – 6:00 PM Hattiesburg Historic Train Depot 308 Newman Street, Hattiesburg, MS
Public Meeting Open House	Presentation of Draft MTP to public (Lamar)	Tuesday, November 10, 2015 4:00 – 6:00 PM Oloh Community Center 45 Oloh Road, Sumrall, MS
Joint Technical Committee and Policy Committee Meeting and Public Hearing	Presentation of Draft MTP and summary of comments received. Committees considers adoption of MTP if no significant changes needed.	Wednesday, December 16, 2015 10:00 AM Hattiesburg Historic Train Depot 308 Newman Street, Hattiesburg, MS
Technical Committee and Policy Committee Meeting and Public Hearing	Revision of Draft MTP to address comments of MPO committees. Committees adopt MTP.	Wednesday, January 13 & 27, 2016 10:00 AM Hattiesburg Historic Train Depot 308 Newman Street, Hattiesburg, MS

2.4 Stakeholder Consultation and Coordination

To develop a truly effective transportation plan that addresses the needs of all system users, it is necessary to obtain input from all stakeholders. For this reason, the consultation and coordination process is an important component of plan development. The consultation process is designed to make an additional effort to gather input from key stakeholder constituencies that may not be adequately represented in the public participation process described above.

Federal Requirements

As with public involvement for citizens, Federal regulations (23 CFR 450.316) require MPOs to develop and use a documented participation plan that defines a process for providing transportation-related stakeholders with reasonable opportunities to be involved in the metropolitan transportation planning process. These stakeholders include: affected public agencies, representatives of public transportation employees, freight shippers, providers of freight transportation services, private providers of transportation, representatives of users of public transportation, representatives of users of pedestrian walkways and bicycle transportation facilities, representatives of the disabled, and other interested parties.

Federal regulations also encourage MPOs to consult with agencies and officials responsible for other planning activities within the MPA that are affected by transportation or to coordinate its planning process, to the maximum extent practicable, with such planning activities. Beyond this, MTPs are required to give due consideration of other related planning activities within the MPA and to include transportation services and projects within the MPA that are provided by other agencies that receive federal funding, such as public transit systems or national parks.

The metropolitan planning process requires that where a metropolitan planning area includes federal public lands and/or Indian Tribal lands, the affected federal agencies and Indian Tribal governments shall be involved appropriately in the development of transportation plans and programs.

Consultation Activities

Beyond the opportunities provided to the general public described previously, the MPO's PPP provides a list of agencies for consultation. This list includes:

- Elected Officials
- Local Government Staff
- Transportation Agencies (Airports, Transit, Freight Services, etc.)
- Local Media (TV, Radio, Print, etc.)
- Homeowners Associations
- Civic Groups
- Special Interested Groups
- Libraries (For Public Display)

- Consultation with federal, state and local agencies responsible for land use management, natural resources, environmental protection, conservation and historic preservation, and other environmental issues.
- Consultation with parties that would have an interest in the planning and development of the transportation network including affected public agencies in the metropolitan planning area.
- Private Freight Shippers
- Representatives of Public Transportation Employees
- Providers of Freight Transportation Services
- Private Providers of Transportation
- Representatives of Users of Public Transportation
- Representatives of Users of Pedestrian Walkways
- Representatives of Users of Bicycle Transportation Facilities
- Representatives of the Disabled
- Indian Tribal Governments

Coordination Activities

In addition to consulting stakeholders throughout the development of the MTP, the MPO and the consultant team (Neel-Schaffer) coordinated with stakeholder groups to obtain relevant data (e.g., inventories of natural, historic, and community resources) and to review existing plans, maps, and other information for consistency with the MTP.

2.5 Visioning Activities and Results

To gather public input for the development of the MTP, the MPO held two open-house style public meeting at the beginning of the plan update process. These meetings were intended to gain insight into the public's desired future of transportation in the Hattiesburg MPA. At these meetings, stakeholders and members of the general public shared their concerns, ideas, values, and visions regarding the state of both the current transportation system and future transportation needs for the region.

The following sections describe the visioning activities and its outcomes. Overall, the results of these activities mirror national trends. In particular, the results suggest three major themes:

- increased emphasis on system maintenance and preservation;

- increased emphasis on projects and programs improving conditions for pedestrians, bicyclists, and transit riders; and
- increased emphasis on streetscape improvements, which improve community aesthetics and create safer, more attractive environments for pedestrians, bicyclists, and transit riders.

Comments received outside of these activities can be found in the Appendix.

Visioning Meeting Format and Activities

The February 18th and 19th meetings served as a kickoff for both the MTP and the Mississippi Unified Long-Range Transportation Infrastructure Plan (MULTIPLAN). The format of the meeting was a combination of an open-house and workshop-style meeting. For the first part of the meeting, participants were provided information on the planning process and the current state of transportation in the MPA and the state as a whole. In the second part of the meeting, participants were guided through three activities designed to solicit input on local priorities. Throughout the meeting MPO staff, MDOT staff, and the consultant team were available to explain the activities and provide any necessary assistance.

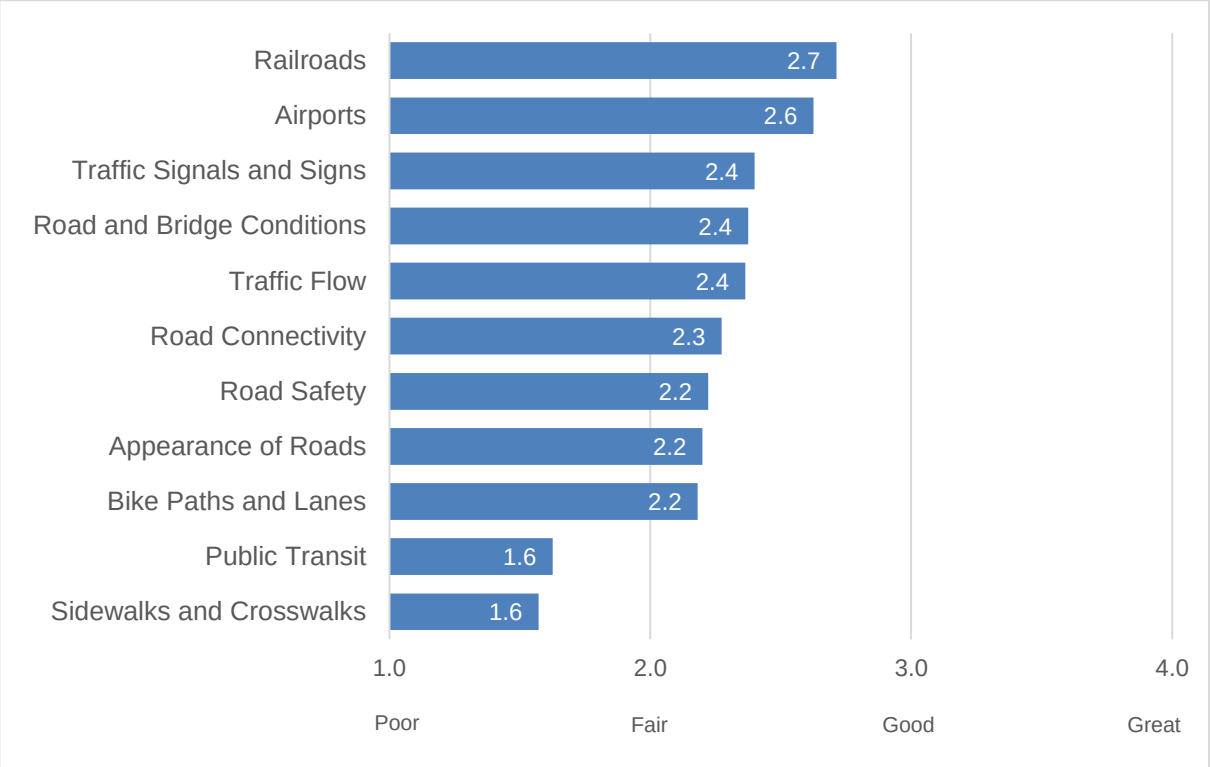
Workshop Activity I - Current State of the Transportation System

Activity I asked participants to rate the current performance of different aspects of the transportation system. Participants indicated performance as poor, fair, good, or great. If participants weren't sure or unfamiliar with a particular aspect of the transportation system, they did not respond. Figure 2.1 displays the results of this activity.

For most aspects of the transportation system, the overall rating ranged from fair to good. Only public transit and sidewalks and crosswalks were rated as poor, on average.

There are no water ports in the MPA and no participants provided a response for this aspect of the transportation system, so this information was not included.

Figure 2.1 Rating of Transportation Conditions Activity I Results



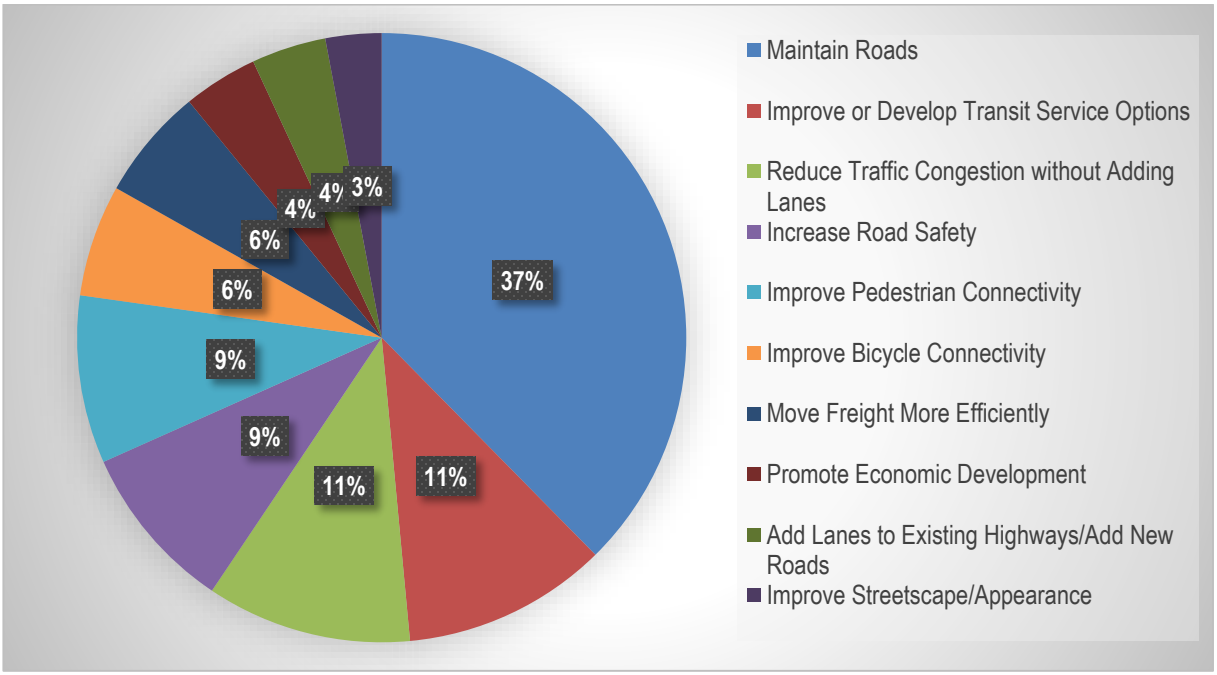
Source: Visioning Activities

Workshop Activity II – Transportation Spending

For Activity II, the moderator provided each participant with a sheet of paper that listed various types of transportation improvements and brief descriptions of each. The participants were each given 100 dollars to allocate to the various types of improvements. Participants were required to use all of their allocated transportation dollars and were allowed to put as much or as little as they wished into each item. Figure 2.2 displays the average desired distribution of funding by the participants.

Overall, participants allocated about one-third of all transportation funding to maintaining roads. Conversely, participants only allocated 4 percent of all transportation funding to add lanes to existing highways/add new roads. Alternatives to roadway capacity projects received the majority of the remaining funding.

Figure 2.2 Transportation Spending Activity II Results



Source: Visioning Activities

Workshop Activity III – The Transportation System in 2040

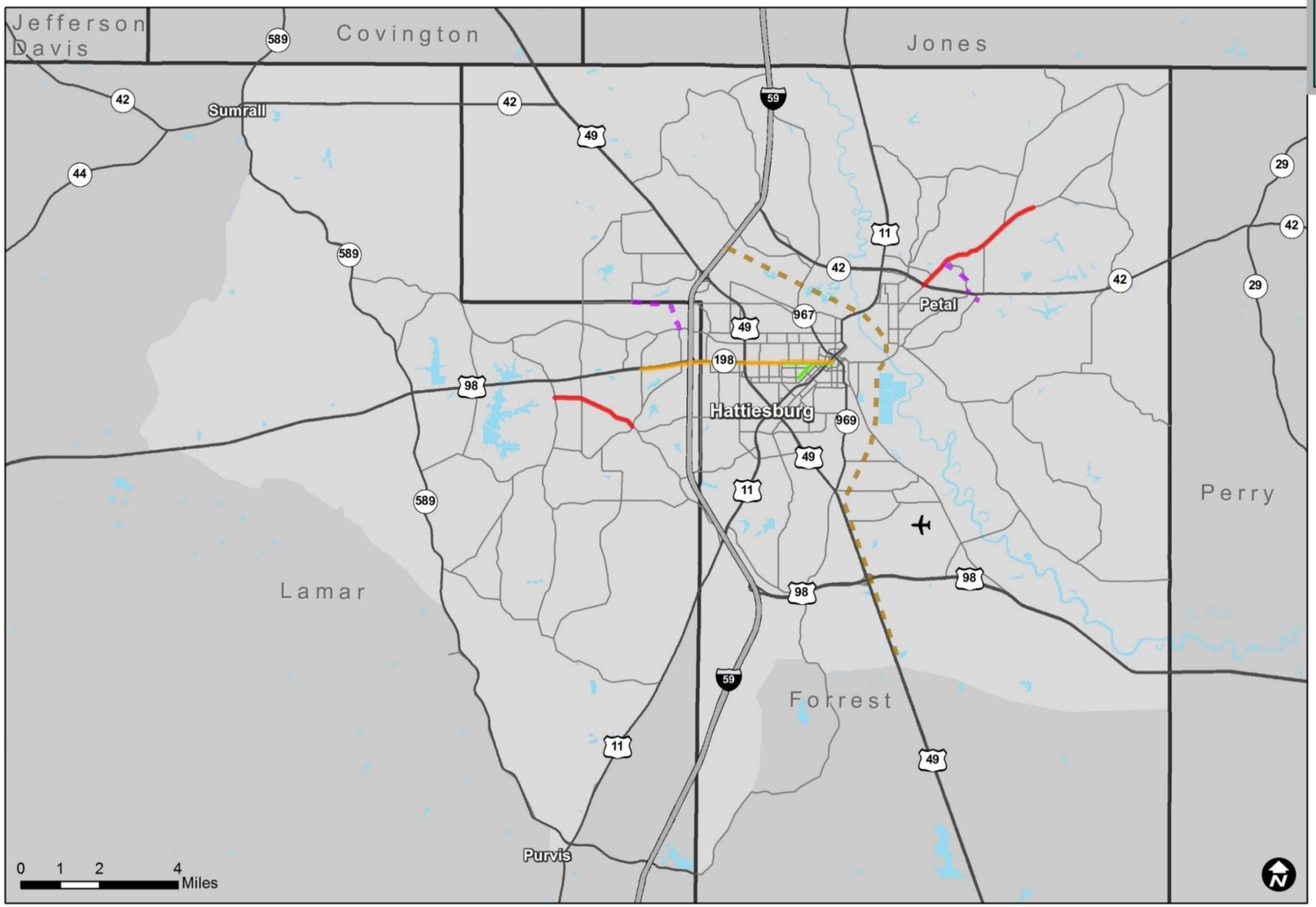
For Activity III, participants were seated at a table with a large-scale blank map of the MPA that included the roadway network, water bodies, and landmarks. The moderator asked participants to consider future transportation needs over the next 25 years and mark needed improvements on the map.

The results from this activity are illustrated in Figure 2.3 and were used to identify future transportation projects to test for inclusion in the fiscally constrained MTP.

In addition to these transportation projects, participants also noted projects of perceived statewide significance on the statewide maps. While not included in the 2040 MTP, these projects include:

- a regional loop around Hattiesburg with connections near Prentiss, Columbia, Wiggins, New Augusta, and Laurel;
- connector roads from Highway 98 West to I-59 and from I-59 to Highway 49; and
- better access management along Highway 49 to improve safety.

FIGURE 2.3 TRANSPORTATION CONCEPTS FROM PUBLIC INPUT



2040 MTP

Legend

- General Aviation
- Commercial Service Airport
- Interstate
- Secondary Roadways
- Other Major Roadways in MPO
- Water
- Metropolitan Planning Area
- Counties

Transportation Concepts

- Roadway Widening
- ITS
- Rail
- New Roadway
- Bicycle/Pedestrian Way

Disclaimer: This map is for planning purposes only. Contact MPO Staff for more information.

Map Source: Neel-Schaffer, Inc.

Data Sources: Public Meeting Visioning Exercise

2.6 MTP Subcommittee

A subcommittee of the Technical Committee was formed to guide the development of the 2040 MTP. MPO Staff were also a part of this subcommittee. The subcommittee met several times throughout the plan development process to discuss various aspects of the MTP.

The MTP subcommittee activities are shown in Table 2.2. The input from this subcommittee will be discussed in later sections as it relates to the forecasting of future population and employment patterns (Chapter 7) and identification of potential transportation projects to be evaluated (Chapter 10).

Table 2.2 MTP Subcommittee Schedule of Activities

Activity	Purpose	Date, Time, and Location
Meeting #1	Discuss Goals and Objectives, MTP Process, test projects, and forecasting future growth areas.	Wednesday, November 19, 2014 2:00 PM Hattiesburg Historic Train Depot 308 Newman Street, Hattiesburg, MS
Meeting #2	Discuss test projects results.	Wednesday, August 19, 2015 2:00 PM Hattiesburg Historic Train Depot 308 Newman Street, Hattiesburg, MS
Meeting #3	Present and Discuss Draft MTP projects.	Tuesday, September 29, 2015 2:00 PM Hattiesburg Historic Train Depot 308 Newman Street, Hattiesburg, MS

3.0 Visioning and Performance Measures

3.1 Public Vision

Results from the public visioning exercises and stakeholder consultation, included in Chapter 2, indicate a need for a more balanced transportation system that provides viable alternatives to driving alone or carpooling. This need is reflected in the Vision Statement below, which guided the development of goals, objectives, and performance measures.

Vision Statement

A seamlessly-integrated, multimodal transportation system that connects people of all backgrounds and abilities to their desired destinations in a safe, convenient, and efficient manner. A transportation system that promotes a sustainable region with a high quality of life.

3.2 Goals and Objectives

The development of goals and objectives are often discussed simultaneously in transportation planning. However, it is important to make a critical distinction between goals and objectives, especially as they relate to performance-based metropolitan transportation planning, as required by MAP-21.

A goal is a broad statement that describes a desired end state. Goals should be consistent with the stated Vision and form the basis for selecting investments and activities that will effectively bring about that Vision.

An objective is a specific, measurable statement that supports achievement of a goal. A good objective should include or lead to the development of a performance measure. Objectives can be broken down into outcome, output, and activity-based objectives, as explained in Table 3.1. Outcome-based objectives are preferred for long-range planning because they allow the most effective communication with the public. Output and activity-based objectives should support the outcome-based objectives..

The 2040 MTP goals and objectives provided in this chapter are consistent with public/stakeholder input, and national transportation goals and planning factors specified in MAP-21.

Table 3.1 Outcome, Output, and Activity-based Objectives

Type	Description	Example
Outcome	Reflect concerns of the public, customers, or stakeholders; these objectives are often the most meaningful to the public and relate most directly to system goals; however, they may be influenced by a range of factors beyond the control of transportation agencies.	Reduce hours of incident-based delay experienced by travelers
Output	Reflect quantity of activities that affect outcomes, and may be more directly influenced by a transportation agency (although they also may not be entirely in the control of the agency).	Reduce the clearance time for traffic incidents (For incident clearance the transportation agency would need to work with law enforcement, etc.)
Activity	Reflect actions that are taken by transportation agencies. These are less directly tied to the outcome, and often directly relate to a strategy being implemented.	Increase the number of cameras tracking system conditions

Source: FHWA and FTA, "Advancing Metropolitan Planning for Operations: The Building Blocks of a Model Transportation Plan Incorporating Operations - A Desk Reference," April 2010.

Goal 1: Affordable, Convenient, and Reliable Access to Destinations by Multiple Modes of Transportation

Objectives:

- *Increase the percentage of trips made by bicycling, walking, and public transit.*
- *Reduce the percentage of households that spend more than 45% of their income on housing and transportation.*
- *Increase the percentage of the population with an average in-vehicle travel time of 20 minutes or less for all trips during peak hours.*
- *Increase the percentage of the population and employment within a half mile of a transit route (fixed or semi-fixed) with a frequency of one hour or less during peak hours.*
- *Increase the percentage of the population and employment within a half mile of marked bicycle facilities.*
- *Increase the percentage of collector and arterial roadway centerline miles in urban areas with sidewalk on both sides.*
- *Expand fixed-route and paratransit/demand response transit service to the weekend and into the late evening on weekdays.*
- *Reduce the annual hours of delay from recurring and non-recurring congestion experienced by motorists and transit riders.*

- *Improve on-time performance of fixed-route transit service.*
- *Increase the percentage of para-transit/demand-response trips that pick up passengers within two hours of request.*

Goal 2: A Connected Regional Economy Accessible to National and Global Markets

Objectives:

- *Increase the percentage of land in the smoothed urban area that is within one mile of an arterial roadway, excluding preservation areas such as national parks. What about rural areas?*
- *Minimize delay on principal arterials connecting rural and urban areas.*
- *Increase scheduled public transit connections between communities within the Metropolitan Planning Area.*
- *Designate and construct a network of regional multi-use paths and on-street bicycle facilities that connect activity centers throughout the Metropolitan Planning Area.*
- *Minimize railroad freight delay by improving operations and infrastructure and reducing railroad/roadway and land use conflicts*
- *Improve operations at intermodal freight and passenger facilities such as transload facilities, airports, and multimodal transit centers by ensuring sufficient storage capacity for all vehicles and cargo.*
- *Minimize delay on MDOT-designated Strategic Corridors and the USDOT-designated national freight network.*
- *Maintain a minimum average speed of 55 mph on Interstate facilities for efficient freight travel.*
- *Increase inter-city transit service to other Urbanized Areas in the Southeast by adding new destinations and increasing the frequency of existing service.*
- *Improve the average speed of existing passenger rail service between New Orleans, Louisiana and Charlotte, North Carolina as an extension of the Southeast High Speed Rail Corridor and maintain a local station.*
- *Provide daily commercial flights between the Hattiesburg-Laurel Regional Airport and a major international airport hub.*

Goal 3: A Well-Maintained and Efficient Transportation System

Objectives:

- *Reduce the percentage of roadway miles classified as Interstates, Arterials, and Collectors with a Pavement Condition Rating (PCR) of 72 or lower, indicating a need for resurfacing or reconstruction.*
- *Decrease the number of bridges on public roads that are classified as Structurally Deficient or Functionally Obsolete.*
- *Ensure that all transit facilities and vehicles are in a State of Good Repair, as required by the Federal Transit Administration.*
- *Reduce the length of sidewalk and crosswalk infrastructure along arterials and collectors that requires repair or maintenance.*
- *Reduce the length of bicycle facility and multi-use path infrastructure that requires repair or maintenance.*
- *Ensure that airport equipment, facilities, and pavement on runways, taxiways, and aprons are in good condition.*
- *Ensure that active railroad infrastructure is in good condition, especially tracks, vehicles, bridges, and roadway crossings.*
- *Reduce annual Vehicle Miles Traveled per capita and Vehicle Hours Traveled per capita through Transportation Demand Management strategies.*
- *Increase the number of congested intersections and corridors managed by Intelligent Transportation Systems.*
- *Reduce the number of underutilized roadway corridors in urban areas with projected 2040 Volume to Capacity ratios below 0.75 by reallocating roadway space to other modes and purposes where such reallocation is deemed appropriate.*
- *Increase fixed route and paratransit/demand response transit passenger trips while reducing the operating cost per passenger trip for both.*

Goal 4: A Safe, Secure, and Resilient Transportation System

Objectives:

- *Reduce the number of automobile crashes on public roads resulting in fatalities or serious injuries and the respective rates per 100 million Vehicle Miles Traveled.*
- *Reduce the number of bicycle and pedestrian crashes resulting in fatalities or serious injuries and the respective rates per capita.*

- *Reduce the number of safety and security incidents, injuries, and fatalities for all transit systems and the respective rates per 100,000 Vehicle Miles.*
- *Reduce the number of highway-rail crossing accidents, injuries, and fatalities for freight and passenger rail.*
- *Ensure that no aviation-related incidents or accidents are attributed to local airport operations or facilities.*
- *Increase the redundancy and diversity of the transportation network by increasing the number of emergency evacuation alternatives for multiple modes of transportation, with special consideration for the carless population.*
- *Improve the flexibility of the transportation network by increasing the number of intersections and corridors managed by Intelligent Transportation Systems.*

Goal 5: A Transportation System That Creates a Sense of Place and Improves Public Health

Objectives:

- *Increase the amount of public art installations and street furniture designed by local artists along transportation right of ways and on transportation facility properties.*
- *Increase the tree canopy and vegetated space along transportation right of ways.*
- *Increase the number of events projects where roadways are temporarily transformed for community events or tactical urbanism projects such as festivals and Better Block campaigns.*
- *Increase new residential and commercial development and reinvestment adjacent to transportation improvements in historic districts and areas with a high density of housing built at least 50 years ago.*
- *Increase the number of TAZs with a balanced Jobs to Housing ratio.*
- *Increase the population residing in urban TAZs where the combined length of sidewalk along collectors and arterials is at least 1.5 times greater than the length of those roadways.*
- *Increase the percentage of urban TAZs within 1 mile of a multiuse path.*
- *Increase the percentage of K-8 students that walk or bike to school.*
- *Reduce the number of urban food deserts with no fixed-route transit service.*
- *Reduce the number of days with poor air quality.*

Goal 6: A Transportation System That Distributes Benefits and Burdens in an Equitable Manner

Objectives:

- *Minimize the disparity between the percentage of Environmental Justice/Low Mobility (EJ/LM) area households that spend 45% of their income on housing and transportation versus all other areas.*
- *Minimize the disparity in the average travel time to work between EJ/LM areas and all other tracts.*
- *Minimize disparity between travel time by driving and by riding transit to primary employment centers and major medical and educational destinations in EJ/LM areas*
- *Increase the ratio of sidewalk and multi-use path length to roadway length in EJ/LM areas and areas within a half mile of fixed-route transit service.*
- *Minimize the disparity in exposure to arterial traffic (VMT) and associated greater air and noise pollution for EJ groups.*
- *Minimize the disparity between bicycle and pedestrian crashes in EJ/LM areas and other areas.*

Goal 7: A Transportation System That Minimizes Detrimental Impacts to the Natural and Historic Environment and Practices Environmental Stewardship

Objectives:

- *Reduce transportation-related greenhouse gas emissions per capita.*
- *Increase the number of transit and other fleet vehicles fueled by alternative and hybrid fuels that reduce fossil-fuel dependency.*
- *Reduce the number of days with poor air quality.*
- *Develop more residential units and commercial developments in infill locations than in greenfield locations.*
- *Reduce collisions between automobiles and trains and animals in high collision areas by introducing design countermeasures.*
- *Ensure that no programmed transportation project has a significantly adverse impact to historic sites or park and recreation areas where a feasible and prudent alternative exists.*

Goal 8: A Meaningful Public Involvement Process That Influences Transportation Decision-Making

Objectives:

- *Local residents, businesses, and other stakeholders are educated on the transportation planning process and local transportation issues and they provide an increased level of meaningful input that is incorporated into the decision-making process.*
- *The socioeconomic composition of public participants resembles that of the Metropolitan Planning Area as a whole and includes representation from a variety of urban, suburban, and rural communities.*
- *Projects prioritized for funding have support from the community as a whole as well as the majority of residents and businesses directly impacted.*

Goal 9: A Fiscally-Constrained 25-year Metropolitan Transportation Plan That Addresses Existing and Future Needs While Maximizing Projected Revenues.

Objectives:

- *Projected revenues through 2040 are greater than or equal to the projected cost of all programmed projects and maintenance.*
- *The overwhelming majority of programmed projects demonstrate a high benefit-cost ratio, regardless of mode.*

  Increase the number of projects completed before the anticipated Stage Year and below the projected cost.

3.3 System Performance Measures

Once the USDOT finalizes the national performance measures required by MAP-21 and the state DOTs have set state targets for these measures, MPOs will be required to set their own regional targets and evaluate their performance in the MTP.

At the time of development of the 2040 MTP, the USDOT was still in the rulemaking process for the national performance measures required by MAP-21 and some of the data required to track performance were not available. Therefore, the 2040 MTP simply states the national performance measures, which the MPO will be required to monitor in the future.

The national performance measures to monitor in the future are:

- Pavement condition on the Interstate System and remainder of National Highway System (NHS)
  - Percentage of Interstate pavements in Good condition
  - Percentage of Interstate pavements in Poor condition
  - Percentage of Non-Interstate NHS pavements in Good condition
  - Percentage of Non-Interstate NHS pavements in Poor condition
- Performance of the Interstate System and the remainder of the NHS
  - Measures forthcoming
- Bridge condition on the NHS
  - Percentage of bridges in Good condition
  - Percentage of bridges in Poor condition
- Fatalities and serious injuries
  - Number of fatalities (5-year rolling average)
  - Number of injuries (5-year rolling average)
  - Fatalities per 100 million Vehicle Miles Travelled (VMT) (5-year rolling average)
  - Injuries per 100 million VMT (5-year rolling average)
- Traffic congestion
  - Measures forthcoming
- On-road mobile source emissions.
  - Measures forthcoming
- Freight movement on the Interstate System
  - Measures forthcoming
- State of Good Repair (SGR) for public transit
  - Measures forthcoming

Future versions of the MTP will summarize current performance in regard to these measures and state the MPO's performance targets for each measure. The MPO may also add additional performance measures in the future, if so desired.

4.0 The Environment

4.1 The Environment and the MTP

Transportation planning must take into account the impacts of transportation on both the natural and human environment. By providing appropriate consideration of environmental impacts early in the planning process, the MTP increases opportunities for inter-agency coordination, enables expedited project delivery, and promotes outcomes that are more environmentally sustainable.

Federal Requirements

Federal regulations (23 C.F.R. §450) require the MTP to address environmental concerns by doing the following:

1. The development of the MTP must involve consultation with state and local agencies responsible for land use management, natural resources, environmental protection, conservation, and historic preservation. This should include a comparison of the MTP with state conservation plans or maps and inventories of natural or historic resources, if this information is available.
2. The MTP must discuss types of potential environmental mitigation activities relating to the implementation of the MTP, including potential areas for these activities to occur and activities which may have the greatest potential to mitigate the effects of the MTP projects and strategies. Mitigation activities do not have to be project-specific and can instead focus on broader policies, programs, and strategies. The discussion must involve consultation with federal, state, and tribal land management, wildlife, and regulatory agencies.

The National Environmental Policy Act (NEPA) (1970) established the basic framework for integrating environmental considerations into federal decision-making. Federal regulations relating to NEPA (40 C.F.R. 1508) define mitigation as:

- Avoiding the impact altogether by not taking a certain action or parts of an action.
- Minimizing impacts by limiting the degree or magnitude of the action and its implementation.
- Rectifying the impact by repairing, rehabilitating, or restoring the affected environment.
- Reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action.
- Compensating for the impact by replacing or providing substitute resources or environments.

Section 4(f) of the U.S. Department of Transportation Act of 1966 provides additional environmental protection for property in publicly owned parks, recreational areas, wildlife and waterfowl refuges, and historic sites by preventing these properties from being used for transportation purposes unless there is no feasible and prudent alternative, the action includes all possible planning to minimize harm to the property, or a *de minimis* impact determination is made.

Executive Order 12898: Federal Actions to Address Environmental Justice in Minority Populations and Low Income Populations, was signed by President Clinton in 1994. It seeks to reaffirm the intent of Title VI of the Civil Rights Act of 1964, NEPA, and other federal laws, regulations and policies by establishing the following Environmental Justice (EJ) principles for all federal agencies and agencies receiving federal funds, such as MPOs:

- To avoid, minimize, or mitigate disproportionately high and adverse human health and environmental effects, including social and economic effects, on minority populations and low-income populations.
- To ensure the full and fair participation by all potentially affected communities in the transportation decision-making process.
- To prevent the denial of, reduction in, or significant delay in the receipt of benefits by minority and low-income populations.

MTP Project Environmental Screening

Detailed, project-specific environmental impact evaluations are beyond the scope of an MTP. However, the 2040 MTP uses an environmental screening process to evaluate the relative likelihood of significant environmental impacts for all considered transportation projects. This process utilizes available inventories of all relevant natural and cultural resources and socioeconomic and demographic data from the U.S. Census Bureau.

Table 4.1 shows resources and issues typically considered in environmental impact evaluations. The environmental screening process utilized by the 2040 MTP will be described in detail later.

Table 4.1 Typical Environmental Resources and Issues Evaluated

Resource	Importance	Relevant Regulations
HAZMAT Sites	Health hazards, costs, delays, liability for both State & federal projects on either existing or acquired right-of-way	Various federal regulations
Air Quality	Public health, welfare, productivity, and the environment are degraded by air pollution	Clean Air Act of 1970; 40 CFR Parts 51 & 93; State Implementation Plan
Noise	Noise can irritate, interrupt, and disrupt, as well as generally diminish the quality of life	Noise Control Act of 1972
Wetlands	Flood control, wildlife habitat, water purification; applies to both State and federally funded projects	Clean Water Act of 1977; Executive Order 11990; 23 CFR 777
Threatened and Endangered Species	Loss of species can damage or destroy ecosystems, to include the human food chain	Endangered Species Act of 1973; 7 CFR 355
Floodplains	Encroaching on or changing the natural floodplain of a water course can result in catastrophic flooding of developed areas	Executive Order 11988; 23 CFR 650; 23 CFR 771
Farmlands	Insure conversion compatibility with State and local farmland programs and policies	Farmland Protection Policy Act of 1981; 7 CFR 658
Recreation Areas	Quality of life; neighborhood cohesion	Section 6(f) of the Land and Water Conservation Fund Act; Section 4(f) of the DOT Act of 1966 (when applicable); 23 CFR 771
Historic Structures	Quality of life; preservation of the national heritage	National Historic Preservation Act of 1966 (Section 106); the DOT Act of 1966 [Section 4(f)]; 23 CFR 771; 36 CFR 800
Archaeological Sites	Quality of life; preservation of national and Native American heritage	National Historic Preservation Act of 1966 (Section 106); the DOT Act of 1966 [Section 4(f)]; 23 CFR 771; Executive Order 13175
Environmental Justice	To avoid, minimize, or mitigate disproportionately high impacts on minorities and low-income populations; basic American fairness	Title VI, Civil Rights Act of 1964; Executive Order 12898

4.2 Regional Context

Climate Topography, Soils, and Vegetation

Climate, topography, soils, and vegetation are all factors that must be considered during project and program design. While these characteristics vary within any area, areas with similar characteristics are grouped into ecoregions. In this manner, understanding the characteristics of the region's ecoregions provide insights into potential environmental issues to consider when developing transportation projects or programs.

The climate in the MPA is classified as Humid, Subtropical (Cfa) according to the Koppen climate classification system. According to the National Weather Service station at Hattiesburg Chain Municipal Airport, from 1981 to 2010, the average July high temperature was approximately 92 degrees Fahrenheit, while the average January low temperature was approximately 37 degrees Fahrenheit. Average annual rainfall was approximately 59 inches.

The MPA is mostly in the Southern Pine Plains and Hills ecoregion. The only area not in this ecoregion is a corridor approximately two miles wide that follows the Leaf River and the portion of the Bouie River below I-59. This corridor is in the Southeastern Floodplains and Low Terraces ecoregion. The characteristics of these ecoregions are described in Table 4.2.

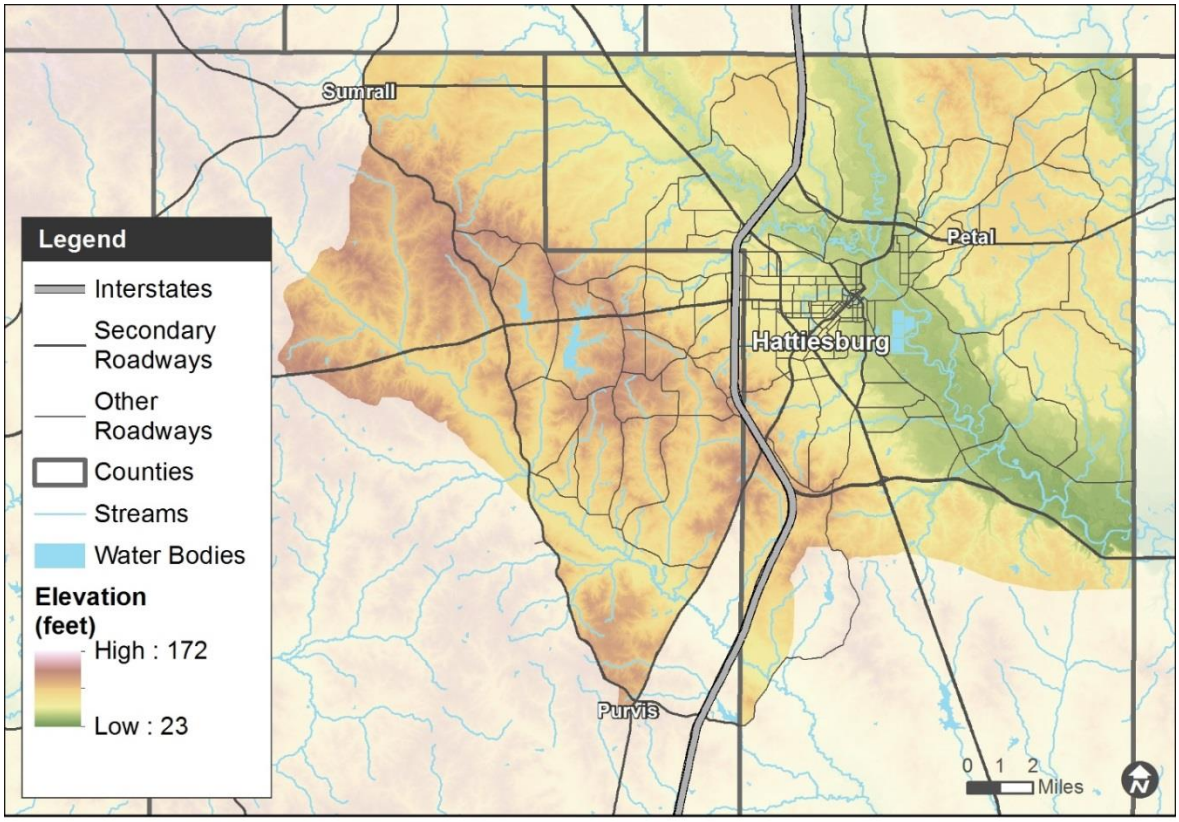
Table 4.2 Ecoregion Characteristics in the Metropolitan Planning Area

Level IV Ecoregion	Physiography	Elevation/ Local Relief (feet)	Geology	Potential Natural Vegetation
Southern Pine Plains and Hills (Southeastern Plains)	Southward-sloping, dissected irregular plains, some low rolling hills, mostly broad gently sloping ridgetops; low to moderate gradient sand and clay bottomed streams.	20-510/ 100-250	Quaternary sandy clay decomposition residuum, alluvial gravel and sand; Tertiary (Miocene) fine to coarse sand, gravelly sand, and clay.	Pine and pine-oak forest. Mostly longleaf pine, some slash pine to the south in wet areas, southern red oak, turkey oak, sand post oak, saw palmetto; some southern floodplain forest with cypress-gum swamp and bottomland hardwoods.
Southeastern Floodplains and Low Terraces (Southeastern Plains)	Major river floodplains and associated low terraces; low gradient streams with sandy and silty substrates, oxbow lakes, ponds, and swamps.	10-250/ 5-35	Quaternary alluvial gravelly sand, quartz gravel and sand, silts, and clays.	Southern floodplain forest. Includes cypress-gum swamp (bald cypress, pond cypress, water tupelo, swamp tupelo) and bottomland hardwood forest (bottomland oaks, sweetgum, American elm, red maple, green ash, water hickory).

Source: EPA, Ecoregions of Mississippi

A Digital Elevation Model (DEM) of the MPA is illustrated in Figure 4.1. What this information indicates is that the MPA is low-lying with some areas of gently rolling terrain. The lowest areas are along the Leaf River and Bouie River while the areas of highest elevation are in Lamar County. There are also ravines along major streams.

Figure 4.1 Metropolitan Digital Elevation Map



Disclaimer: This map is for planning purposes only.

Data Sources: USGS, National Elevation Dataset

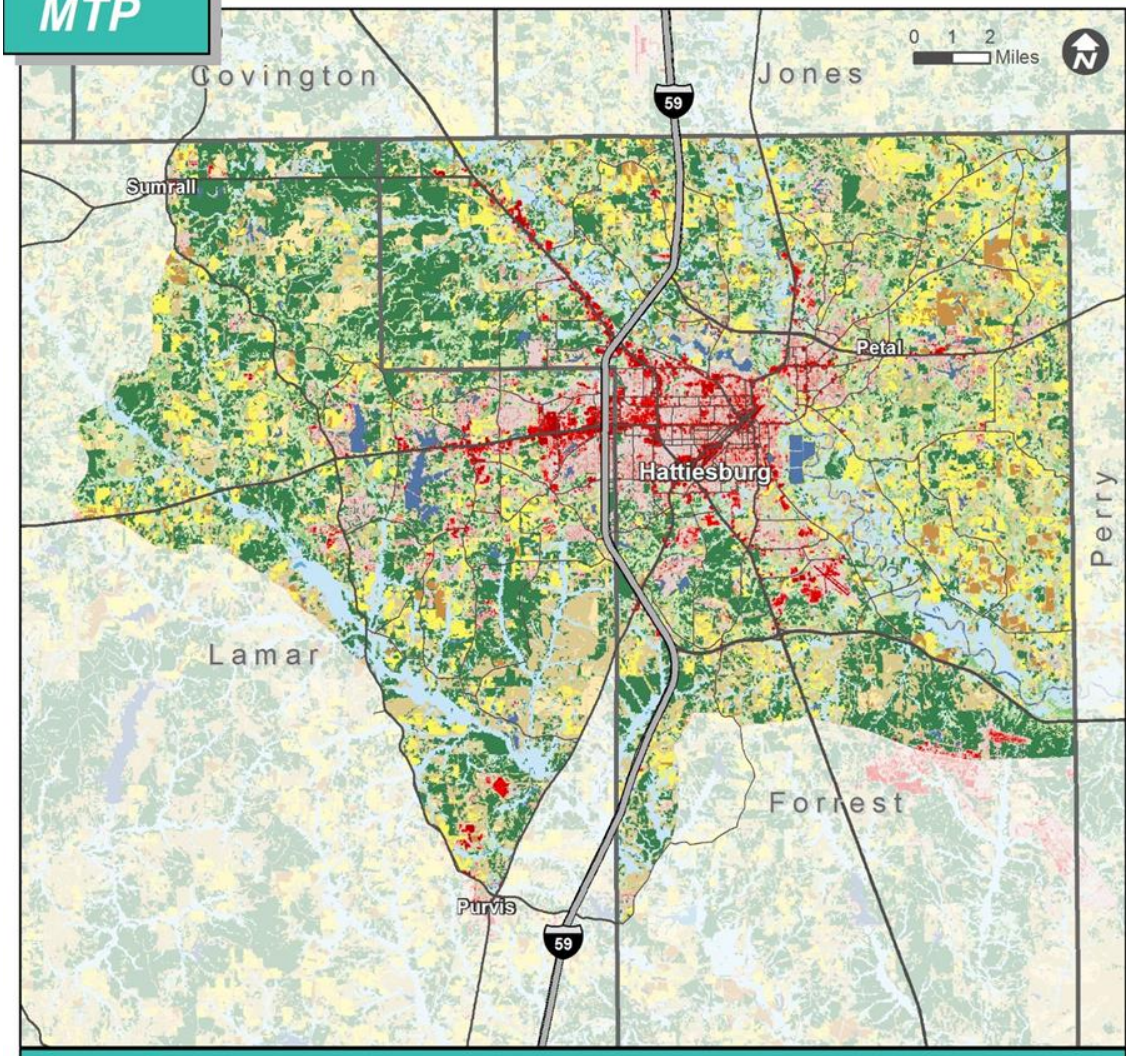
Map Source: Neel-Schaffer, Inc.

Land Cover

The land cover of the MPA is illustrated in Figure 4.2 and summarized in Figure 4.3. According to this information, developed areas only account for 17 percent of the land in the MPA. Forested lands dominate the landscape, making up 40 percent of the land area. However, the portion of the MPA in Lamar County is much more forested than the portion in Forrest County, which is mostly pasture/hay and cultivated crops.

2040 MTP

FIGURE 4.2 LAND COVER CLASSIFICATION



Legend

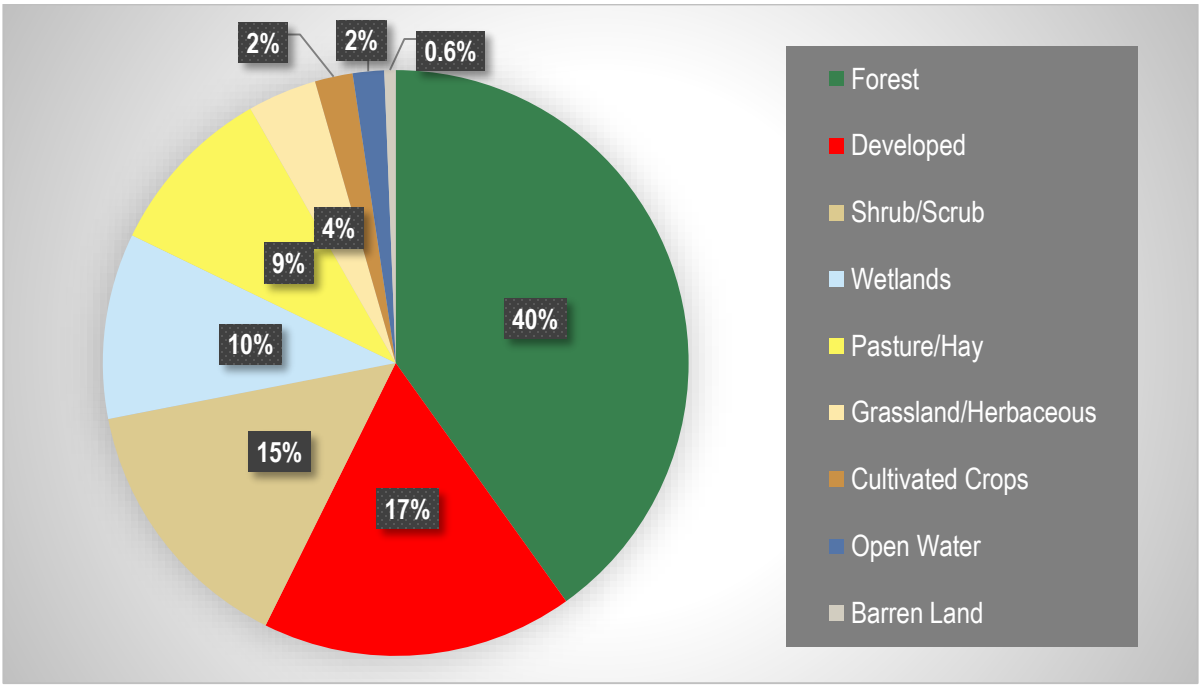
- Interstates
- Secondary Roadways
- Other Roadways
- Counties
- Open Water
- Developed, Open Space
- Developed, Low Intensity
- Developed, Medium Intensity
- Developed, High Intensity
- Barren Land
- Deciduous Forest
- Evergreen Forest
- Mixed Forest
- Shrub/Scrub
- Grassland/Herbaceous
- Pasture/Hay
- Cultivated Crops
- Woody Wetlands
- Emergent Wetlands

Disclaimer: This map is for planning purposes only.

Map Source: Neel-Schaffer, Inc.

Data Sources: USGS 2011 National Land Cover Database

Figure 4.3 Land Cover Classification Breakdown



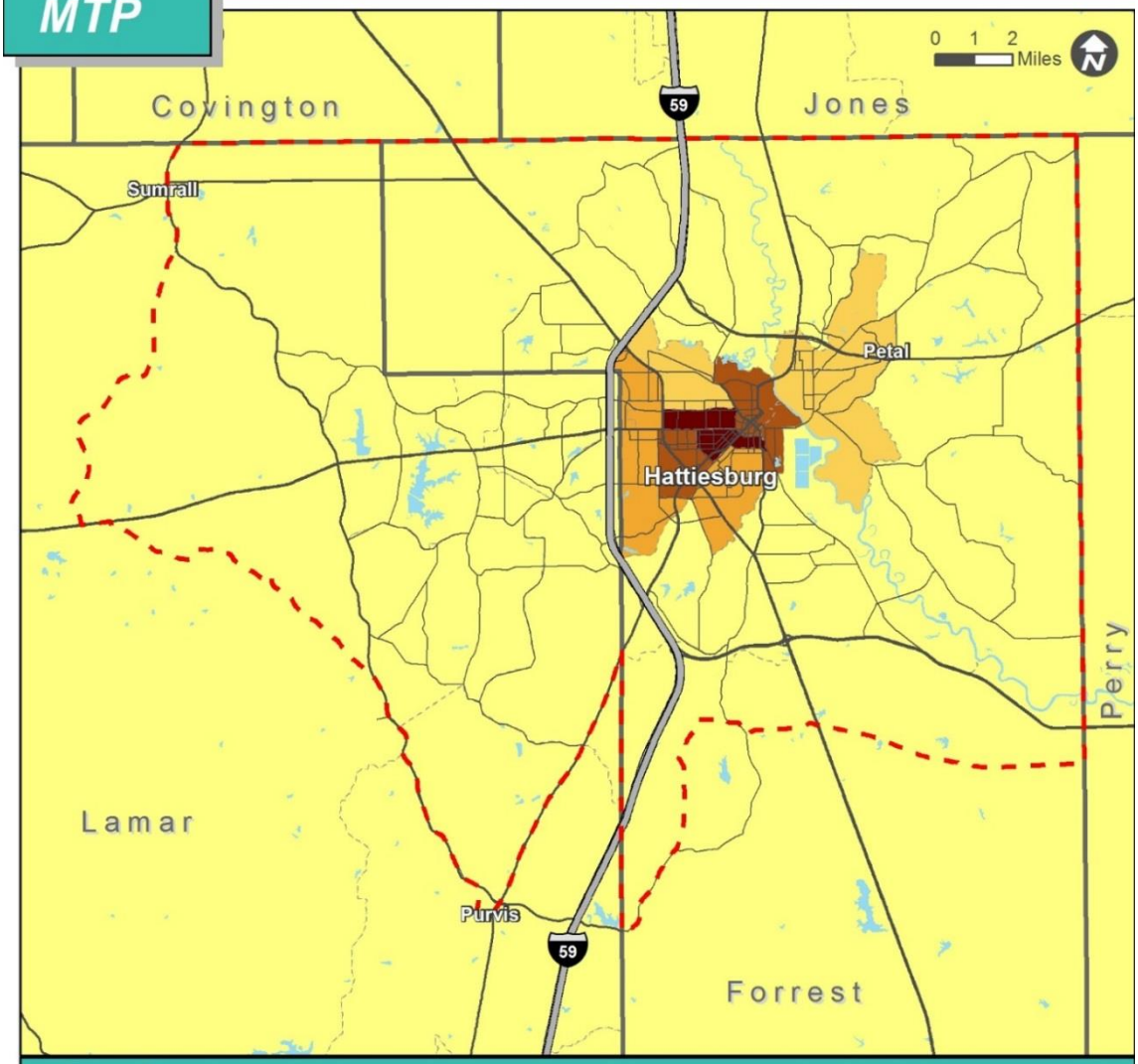
Source: USGS, 2011 National Land Cover Database

Historical Urban Development

The historical urban development of the MPA offers insights into the likely distribution of historic and other cultural resources. Figure 4.4 shows that the areas with the greatest concentrations of historical housing structures, or those at least 50 years old, are in the center of the city of Hattiesburg. There are likely smaller concentrations not revealed by this information in the historic centers of many of the smaller municipalities within the MPA. This information is merely intended to illustrate general patterns.

2040 MTP

FIGURE 4.4 CONCENTRATION OF HOUSING BUILT PRE-1960



Legend

Census Tracts

Homes per Square Mile Built Pre-1960

- 0 - 50
- 51 - 100
- 101 - 250
- 251 - 500
- 501 - 1508

- Interstates
- Secondary Roadways
- Other Roadways
- Metropolitan Planning Area
- Counties
- Water Bodies

Disclaimer: This map is for planning purposes only.

Map Source: Neel-Schaffer, Inc.

Data Sources: 2009-2013 ACS

4.3 Air Quality and Emissions

Air Quality and Transportation

Highway vehicles and non-road equipment are mobile sources of air toxins, compounds which are known or suspected by the EPA to cause cancer or other serious health and environmental effects. Mobile sources, via the combustion of fossil fuels, release nitrogen dioxide and Volatile Organic Compounds (VOC), which chemically react in the presence of heat and sunlight to form ground-level ozone. Ground-level ozone can trigger a variety of health problems such as asthma and can also have harmful effects on sensitive vegetation and ecosystems.

The EPA regulates vehicle emissions and fuel efficiency through its vehicle Greenhouse Gas Emissions and Corporate Average Fuel Economy (CAFE) standards. It also regulates and monitors pollutants considered harmful to public health and the environment through the National Ambient Air Quality Standards (NAAQS) authorized by the Clean Air Act (1970). The EPA has set NAAQS for six principal "criteria" pollutants. These are listed in Table 4.3 along with the current standards.

All counties within the MPA are currently in attainment of the NAAQS.

Transportation conformity is a process required of MPOs pursuant to the Clean Air Act Amendments of 1990 (CAAA of 1990) to ensure that federal funding and approval are given to those transportation activities that are consistent with air quality goals. The CAAA require that transportation plans, programs, and projects in nonattainment or maintenance areas that are funded or approved by the FHWA be in conformity with the State Implementation Plan (SIP) which represents the state's plan to either achieve or maintain the NAAQS for a particular pollutant.

Should any of the counties within the MPA ever exceed NAAQ standards and are designated as a nonattainment or maintenance area, the MTP will be subject to a conformity analysis. If this were to occur in the future, the transportation model, which forms the basis of transportation decision making, provides numeric outputs that may be utilized in regional air quality modeling.

Table 4.3 National Ambient Air Quality Standards (NAAQS) as of 2015

Pollutant		Primary/ Secondary	Averaging Time	Level	Form
Carbon Monoxide		primary	8-hour	9 ppm	Not to be exceeded more than once per year
			1-hour	35 ppm	
Lead		primary and secondary	Rolling 3 month average	0.15 $\mu g/m^3$	Not to be exceeded
Nitrogen Dioxide		primary	1-hour	100 ppb	98th percentile of 1-hour daily maximum concentrations, averaged over 3 years
		primary and secondary	Annual	53 ppb	Annual mean
Ozone		primary and secondary	8-hour	70 ppb	Annual fourth-highest daily maximum 8-hr concentration, averaged over 3 years
Particle Pollution	$PM_{2.5}$	primary	Annual	12 $\mu g/m^3$	Annual mean, averaged over 3 years
		secondary	Annual	15 $\mu g/m^3$	Annual mean, averaged over 3 years
		primary and secondary	24-hour	35 $\mu g/m^3$	98th percentile, averaged over 3 years
	PM_{10}	primary and secondary	24-hour	150 $\mu g/m^3$	Not to be exceeded more than once per year on average over 3 years
Sulfur Dioxide		primary	1-hour	75 ppb	99th percentile of 1-hour daily maximum concentrations, averaged over 3 years
		secondary	3-hour	0.5 ppm	Not to be exceeded more than once per year

Source: EPA

4.4 Public Health

There is a growing number of local and state governments that are performing health impact assessments for transportation projects and programs in order to more comprehensively address public health outcomes. Transportation can affect public health in many ways, but the most commonly discussed include:

- **Safety**: Roadway design can affect the risk for traffic related injuries and fatalities. Between 2011 and 2013, there was an average of 15 crashes per year in the Hattiesburg MPA that resulted in at least one fatality.
- **Air Quality**: Air pollution from vehicle emissions worsens chronic respiratory diseases, such as asthma.
- **Noise Pollution**: Noise pollution can cause hearing loss, stress related illnesses, high blood pressure, speech interference, and sleep disruption.
- **Physical Activity**: A lack of sufficient bicycle and pedestrian infrastructure can limit opportunities for physical activity.
- **Accessibility**: Transportation can limit access to healthy food, recreational opportunities, and healthcare facilities.

Transportation-Related Health Statistics in the Region

The role of transportation in public health outcomes is especially important in the MPA. Table 4.4 shows county public health indicators that are influenced by the transportation system. For the most part, the counties in the MPA have slightly better health indicator measures than Mississippi as a whole, but lag far behind the 90th percentile of U.S. counties in all selected measures. Forrest County is slightly worse than Lamar County in all selected measures except that a higher percentage of its population has access to exercise opportunities.

Since it is obvious that the counties in the Hattiesburg MPA are less healthy than the top 10 percent of U.S. counties in health areas strongly influenced by transportation, it is useful to compare the counties to their peers. When compared to peer areas, using the Center for Disease Control's (CDC) Community Health Status Indicators program, data show more nuanced transportation and health-related issues that burden the residents of the counties in the MPA. For example, while obesity is high in Forrest and Lamar counties, only Lamar County has a high obesity rate when compared to its peers. Table 4.5 shows the public health indicators where the MPA counties perform in the bottom quartile when compared to their peer counties. The issues highlighted by this peer analysis could potentially be improved by increasing physical activity, increasing access to opportunities for exercise and parks, and improving roadway safety.

Table 4.4 Selected County Public Health Indicators

Place	Percentage of Adults Reporting Poor or Fair Health	Average Number of Physically Unhealthy Days in Last 30 Days	Average Number of Mentally Unhealthy Days in Last 30 Days	Percentage of Adults that are Obese	Percentage of Adults Reporting as Physically Inactive	Percentage of Population With Access to Exercise Opportunities
Forrest County	19.9%	3.9	4.4	34.5%	33.0%	78.9%
Lamar County	18.6%	3.4	3.7	33.6%	27.8%	57.8%
Mississippi	21.5%	4.1	4.1	35.3%	32.5%	59.0%
Top U.S. Counties*	10.0%	2.5	2.3	25.0%	20.0%	92.0%

Note: * 90th percentile, i.e., only 10% are better.

Source: 2015 County Health Rankings, University of Wisconsin Population Health Institute

Table 4.5 Selected Regional Public Health Indicators below Peer Areas

Health Indicator	Forrest County	Lamar County
Motor vehicle deaths	X	X
Diabetes deaths	X	
Alzheimer's disease deaths	X	X
Chronic lower respiratory disease deaths	X	
Stroke deaths		X
Adult obesity		X
Adult overall health status		X
Older adult depression	X	X
Adult physical inactivity		X
Access to parks		X

Source: CDC, Community Health Status Indicators, 2015

Transportation and Physical Activity

While transportation planning typically addresses safety, air quality, noise pollution, and accessibility, only recently has the planning process begun to consider the impact of transportation on physical activity. Of particular focus in transportation planning is the impact of the built environment on walking and biking.

Walking and biking are important physical activities because they are regular, light to moderate physical activities which can significantly decrease a person's risk for cardiovascular disease, colon cancer, type 2 diabetes, obesity, osteoporosis, and depression. Walking and biking can also improve psychological well-being and quality of life. Therefore, providing convenient and attractive pedestrian and bicycle infrastructure and encouraging walking and biking can improve public health outcomes for a community.

4.5 Project Development Considerations

This section outlines how the MTP addresses environmental mitigation of proposed transportation projects.

Wetlands, Waterways, and Flooding

Transportation projects were evaluated for proximity to wetlands, impaired waters, flood zones, and navigable waters. While transportation projects should be sensitive to all bodies of water, these water bodies merit special attention for the following reasons:

- Wetlands have many environmental benefits, most notably water purification, flood protection, shoreline stabilization, groundwater recharge and streamflow maintenance, and fish and wildlife habitat. Wetlands are protected by the Clean Water Act.
- Impaired waters are already too polluted or otherwise degraded to meet the state water quality standards.
- Encroaching on or changing the natural floodplain of a water course can result in catastrophic flooding of developed areas.
- Structures built across navigable waterways must be designed in consultation with the Coast Guard, as required by the Coast Guard Authorization Act of 1982.

Figure 4.5 displays the proposed MTP transportation projects along with the location of wetlands and impaired waters. Figure 4.6 displays the proposed MTP transportation projects and flood zones.

There are no navigable waterways within the MPA that are part of the U.S. Army Corps of Engineers Navigable Waterway Network. Navigable waterways are defined as waters that

have been used in the past, are now used, or are susceptible to use as a means to transport interstate or foreign commerce up to the head of navigation.

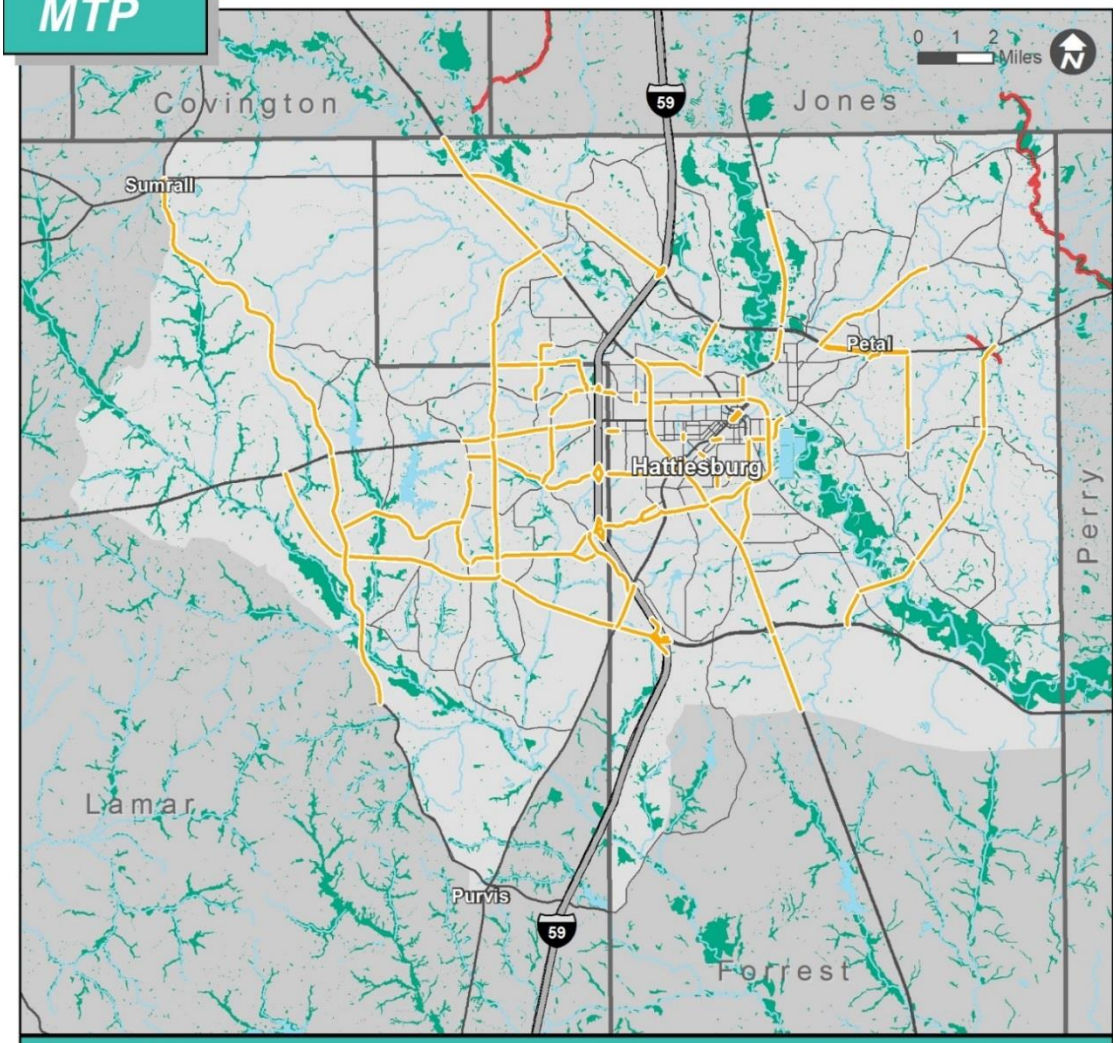
Mitigation

This early in the planning stage, there are not enough resources available to assess project level impacts to specific wetlands. As individual projects proceed through the MDOT project delivery process and NEPA process, it is anticipated that project sponsors will:

- Ensure that transportation facilities constructed in floodways will not increase flood heights.
- Take steps to avoid wetland and flood zone impacts where practicable.
- Consider strategies which minimize potential impacts to wetlands and flood zones.
- Provide compensation for any remaining unavoidable impacts through activities to restore or create wetlands.
- Projects near impaired waters should consider measures to improve the quality of these waters.

2040 MTP

FIGURE 4.5 WETLANDS AND IMPAIRED WATERS



Legend

- Test Projects
- Interstates
- Secondary Roadways
- Other Roadways in MPA
- Impaired Waters
- Streams
- Water Bodies
- Wetlands
- Metropolitan Planning Area
- Counties

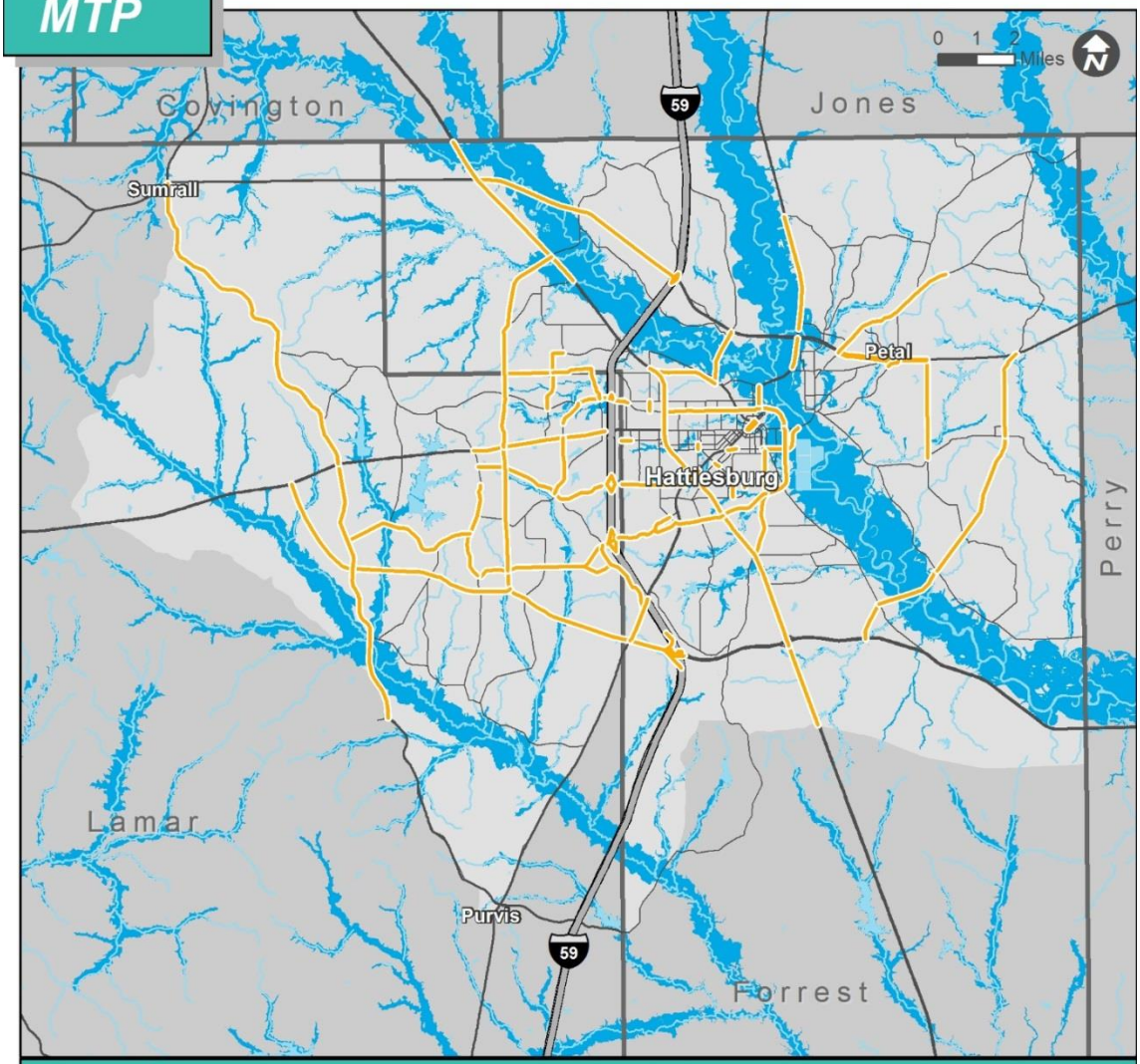
Disclaimer: This map is for planning purposes only.

Map Source: Neel-Schaffer, Inc.

Data Sources: FWS; EPA

2040 MTP

FIGURE 4.6 FLOOD ZONES



Legend

- Test Projects
- Interstates
- Secondary Roadways
- Other Roadways in MPA
- Streams
- Water Bodies
- Flood Zones
- Metropolitan Planning Area
- Counties

Disclaimer: This map is for planning purposes only.

Map Source: Neel-Schaffer, Inc.

Data Sources: FEMA

Wildlife

Transportation projects were evaluated for proximity to identified critical habitat areas for threatened and endangered species and wildlife refuges.

The Endangered Species Act (ESA) [16 U.S.C. 1531 et. seq.] of 1973, as amended, was enacted to provide a program for the preservation of endangered and threatened species, and to provide protection for the ecosystems upon which these species depend for their survival. All federal agencies or projects utilizing federal funding are required to implement protection programs for designated species and to use their authorities to further the purposes of the act.

An endangered species is a species in danger of extinction throughout all or a significant portion of its range. A threatened species is a species likely to become endangered within the foreseeable future throughout all or a significant portion of its range. Proposed species are those which have been formally submitted to Congress for official listing as threatened or endangered.

Species may be considered endangered or threatened when any of the five following criteria occurs:

1. The current/imminent destruction, modification, or curtailment of their habitat or range
2. Overuse of the species for commercial, recreational, scientific, or educational purposes
3. Disease or predation
4. The inadequacy of existing regulatory mechanisms
5. Other natural or human-induced factors affect continued existence.

Section 4(f) of the Department of Transportation (DOT) Act of 1966 affords protection to wildlife or waterfowl refuges when USDOT funds are invested in a project. There are no wildlife management areas or refuges within the MPA.

Table 4.6 lists species classified as endangered or threatened within the MPA counties. Species with ranges unrefined beyond the state level are not included. Figure 4.7 displays the proposed MTP transportation projects along with the location of identified critical habitat areas. Note that not all protected species have identified critical habitat areas.

Mitigation

Preliminary planning undertaken within the context of development of the MTP does not include resources sufficient to assess project specific impacts to species habitats. Table 4.6 is incorporated to establish the potential need for further study as projects are carried forward through the MDOT project delivery process, the NEPA process, design, and construction. Projects will be developed in consultation with U.S. Fish and Wildlife Service and MDWFP, and to the extent practicable, actions which impact critical habitats will be avoided.

Table 4.6 Species Identified under Endangered Species Act in Region

Group	Name	Status	Identified Critical Habitat	Forrest County	Lamar County
Bird	Red-cockaded woodpecker (Picoides borealis)	Endangered	yes	yes	yes
Bird	Wood stork (Mycteria americana)	Threatened	no	yes	yes
Ferns and Allies	Louisiana quillwort (Isoetes louisianensis)	Endangered	no	yes	no
Fish	Atlantic sturgeon (Gulf subspecies) (Acipenser oxyrinchus (=oxyrhynchus) desotoi)	Threatened	yes	yes	no
Fish	Pearl darter (Percina aurora)	Candidate	no	yes	no
Mammal	Louisiana black bear (Ursus americanus luteolus)	Threatened	yes	yes	yes
Mammal	American black bear (Ursus americanus)	Similarity of Appearance (Threatened)	no	yes	yes
Reptile	Yellow-blotched map turtle (Graptemys flavimaculata)	Threatened	no	yes	no
Reptile	Black pine snake (Pituophis melanoleucus lodingi)	Threatened	proposed	yes	yes
Reptile	Gopher tortoise (Gopherus polyphemus)	Threatened	no	yes	yes

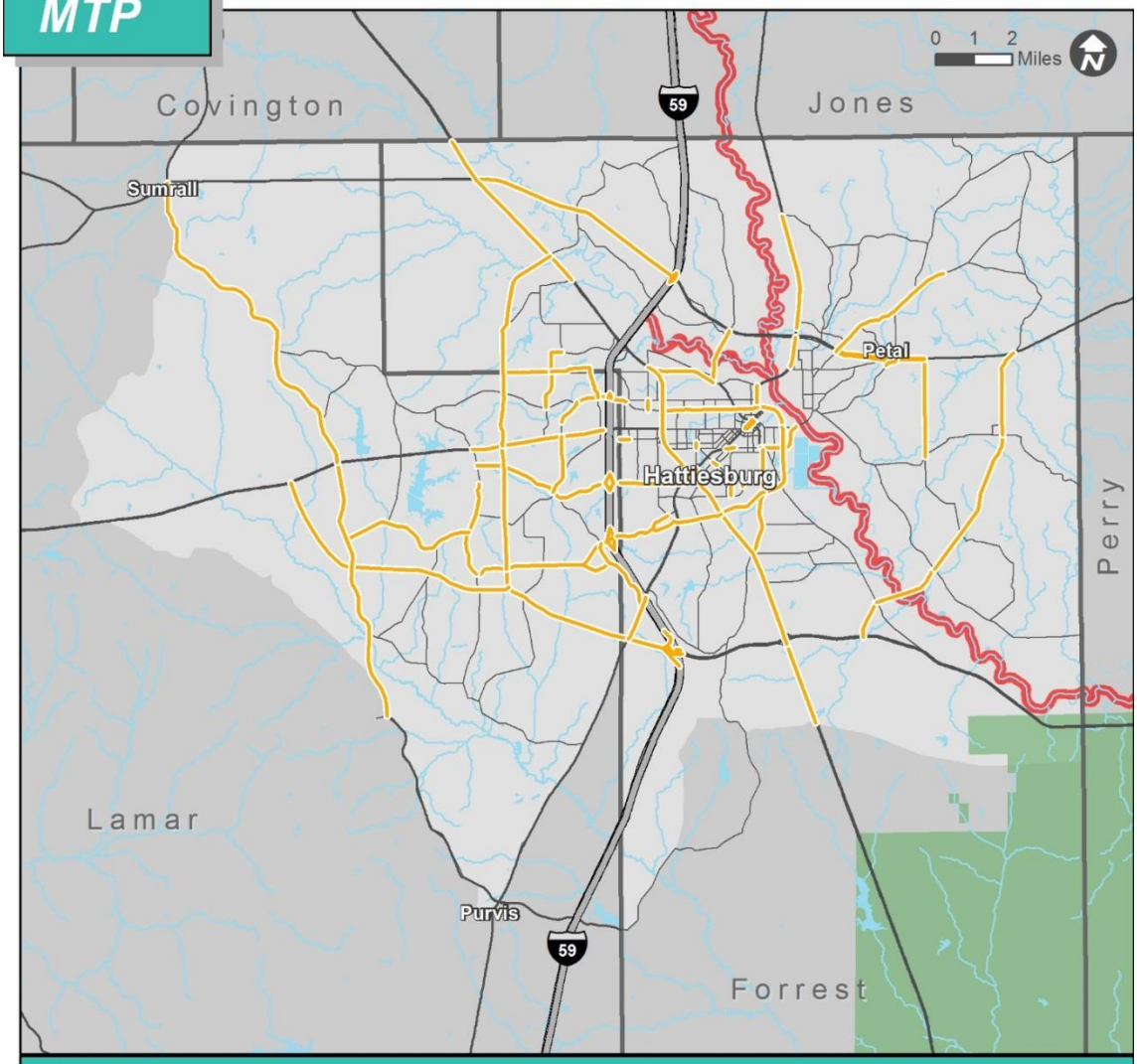
Source: U.S. Fish and Wildlife Service, Environmental Conservation Online System

In addition to federally protected species, transportation projects should be sensitive to species that are protected by state law. Mississippi's endangered species law, the Nongame and Endangered Species Conservation Act of 1974, declares that "species or subspecies of wildlife indigenous to the state should be accorded protection in order to maintain and to the extent possible enhance their numbers." An endangered species or subspecies of wildlife is one whose survival and continued welfare in the state is in jeopardy or is likely to become so in the near future. Mississippi's official list of endangered species is reviewed every two years by the MDWFP, and may be amended by additions or deletions as deemed appropriate. MDWFP is responsible for management of endangered species and enforcement of the Nongame and Endangered Species Conservation Act.

The only state-protected species whose range could potentially include parts of the MPA are the Dusky Gopher Frog, Rainbow Snake, and Southern Hognose Snake. All have a state protection status of "Listed Endangered".

2040 MTP

FIGURE 4.7 CRITICAL HABITATS



Legend

- Test Projects
- Interstates
- Secondary Roadways
- Other Roadways in MPA
- Streams
- Water Bodies
- Critical Habitat of Federally-Listed Aquatic Species
- National Forest
- Metropolitan Planning Area
- Counties

Disclaimer: This map is for planning purposes only.

Map Source: Neel-Schaffer, Inc.

Data Sources: FWS

Historic and Recreational Resources

Transportation projects were evaluated for proximity to historic sites and publicly owned recreational facilities.

Section 4(f) of the Department of Transportation (DOT) Act of 1966 affords protection to publicly owned parks and recreation areas and all historic sites listed or eligible for listing on the National Register of Historic Places when USDOT funds are invested in a project.

In order to be eligible for the National Register of Historic Places (NRHP), a district, site, building, structure, or object must possess integrity of location, design, setting, materials, workmanship, feeling, and association and generally must be at least 50 years old. It will also be evaluated by the following criteria:

- Association with events that have made a significant contribution to the broad patterns of our history; or
- Association with the lives of significant persons in or past; or
- Embodiment of the distinctive characteristics of a type, period, or method of construction, or representative of the work of a master, or possession of high artistic values, or representative of a significant and distinguishable entity whose components may lack individual distinction; or
- Provision or likelihood to provide information important in history or prehistory.

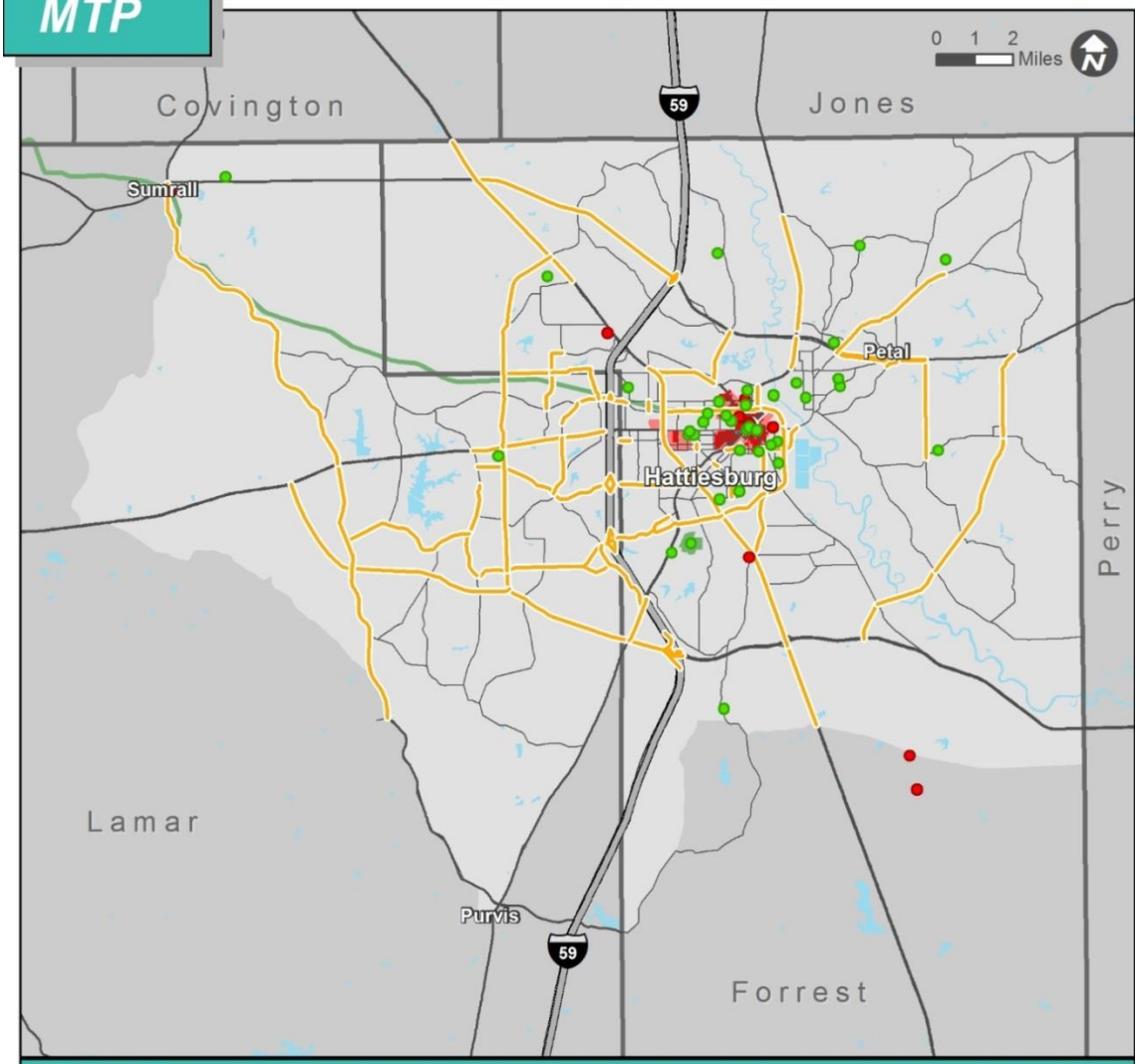
Figure 4.8 shows historic sites and districts listed on the National Register as well as local historic districts. It is important to note that the local historic districts are not necessarily protected by 4(f) regulations unless they meet NRHP eligibility. Furthermore, there may be additional properties not listed on either register which are eligible for the NRHP. Figure 4.8 excludes historic features deemed 'restricted' or 'sensitive', such as sensitive archaeological sites and shows the major publicly owned parts and recreation areas..

Mitigation

Projects will be developed in consultation with the State Historic Preservation Office (SHPO) and to the extent practicable; actions which adversely impact NRHP properties and publicly owned recreation areas will be avoided. When historic properties are adversely affected, mitigation will include data recovery as appropriate to document the essential qualities of the historic resources. When publicly owned recreation areas are adversely affected, appropriate compensation will be provided.

2040 MTP

FIGURE 4.8 HISTORIC AND RECREATIONAL RESOURCES



Legend

- Parks and Recreation Centers
- National Register Historic Buildings
- Parks and Recreation Areas
- Local Historic District
- National Register Historic District
- Test Projects
- Interstates
- Secondary Roadways
- Other Roadways in MPA
- Water Bodies
- Metropolitan Planning Area
- Counties

Disclaimer: This map is for planning purposes only.

Map Source: Neel-Schaffer, Inc.

Data Sources: NPS; City of Hattiesburg

Potentially Hazardous Properties

Transportation projects were evaluated for proximity to potentially hazardous sites identified by the Comprehensive Environmental Response, Compensations, and Liability Act (CERCLA), commonly known as Superfund. Addressing these early on in the process can reduce costs, delays, and liabilities.

CERCLA was enacted in 1980 and established prohibitions and requirements concerning closed and abandoned hazardous waste sites, provided for liability of persons responsible for releases of hazardous waste at these sites; and established a trust fund to provide for cleanup when no responsible party could be identified. CERCLA also enabled the revision of the National Contingency Plan, which established the National Priorities List (NPL).

The NPL is the list of national priorities among the known releases or threatened releases of hazardous substances, pollutants, or contaminants throughout the United States and its territories. The NPL is intended primarily to guide the EPA in determining which sites warrant further investigation.

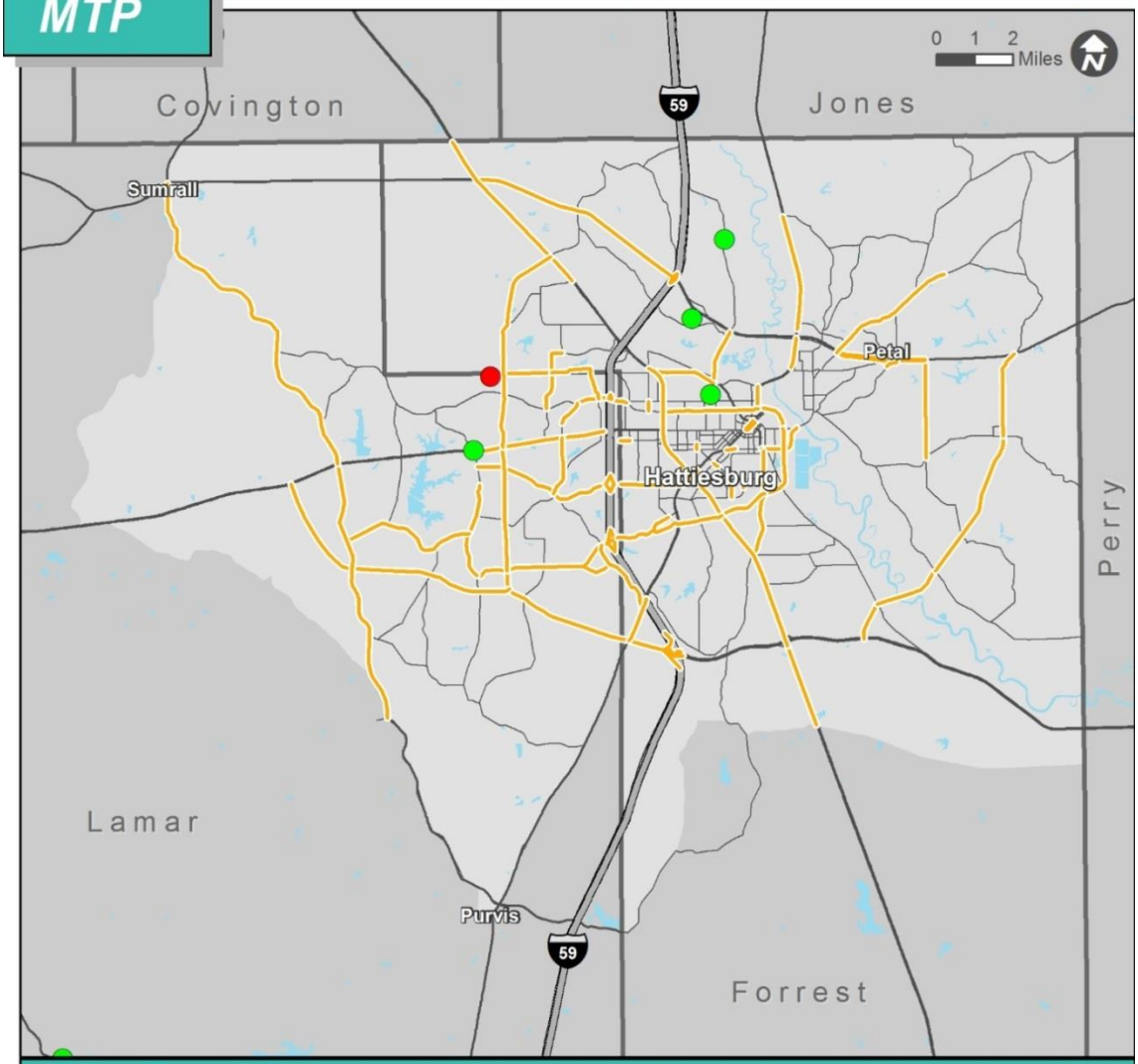
Using the EPA's Clip N Ship application, it was determined that there is one site in the MPA listed on the NPL in the MPA, the Davis Timber Company property in Lamar County. As of 2012, the site had gone through the clean-up process. This site and other sites evaluated for inclusion in the NPL in the MPA are illustrated in Figure 4.9.

Mitigation

At this stage in project development, not enough information is available to determine impacts and mitigation. However, transportation projects affected by or affecting potentially hazardous properties will be evaluated during the MDOT project delivery process, the NEPA process, design, and construction.

2040 MTP

FIGURE 4.9 POTENTIALLY HAZARDOUS SITES



Legend

Potentially Hazardous Sites
- National Priorities List (Superfund)
- Evaluated for National Priorities List
- Test Projects

- Interstates
- Secondary Roadways
- Other Roadways in MPA
- Water Bodies
- Metropolitan Planning Area
- Counties

Disclaimer: This map is for planning purposes only.

Map Source: Neel-Schaffer, Inc.

Data Sources: EPA CERCLIS

Community Impacts

A transportation project may produce various impacts to public spaces, residences, and businesses.

Mitigation

Impacts associated with specific projects will be assessed in conformance with local, state, and federal regulations, NEPA guidance, and the MDOT project delivery process.

Certain impacts, such as those associated with an increase in traffic related noise, can potentially be mitigated. Also, to the extent practicable, projects should be developed using Context Sensitive Solutions.

Environmental Justice

Executive Order 12898 establishes guidance on federal actions, which includes projects receiving federal funds, to address EJ in minority populations and low-income populations (February 11, 1994). The order specifies actions to be taken on a range of issues that are intended to promote nondiscrimination in federal actions, to provide minority and low-income communities equal access to public information regarding a federal action, and to provide an opportunity for public participation in the evaluation of a federal action in matters relating to human health and the environment. In particular, the order stipulates that:

> "To the greatest extent practicable and permitted by law... each Federal agency shall make achieving environmental justice part of its mission by identifying and addressing as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low income populations... (Order Section I-101)
>
> Each Federal Agency shall conduct its programs, policies, and activities that substantially affect human health or the environment, in a manner that ensures that such programs, policies, and activities do not have the effect of excluding persons...from participation in, denying persons the benefits of, or subject persons...to discriminations under such programs, policies, and activities, because of their race, color, or national origin (Order Section 2-2)."

Figure 4.10 shows TAZs in the MPA which are likely to have disproportionately high concentrations of minority and/or low-income persons. Since TAZs vary in density and populations are not evenly distributed throughout TAZs, this map is mainly meant for illustrative purposes. All TAZs exceeding the MPA average for percent minority (38.7

percent) and/or percent living in poverty (23.3 percent) are classified as areas with potential EJ concerns. TAZs exceeding one and a half times the MPA average for these attributes are further classified as areas with potentially high EJ concerns.

Mitigation

In an attempt to prevent disproportionately high and adverse effects on minority or low-income populations early in the planning process, the 2040 MTP determines the relative likelihood of EJ issues for all transportation projects. Projects with a relatively higher likelihood of EJ issues are then awarded less points in the project prioritization process.

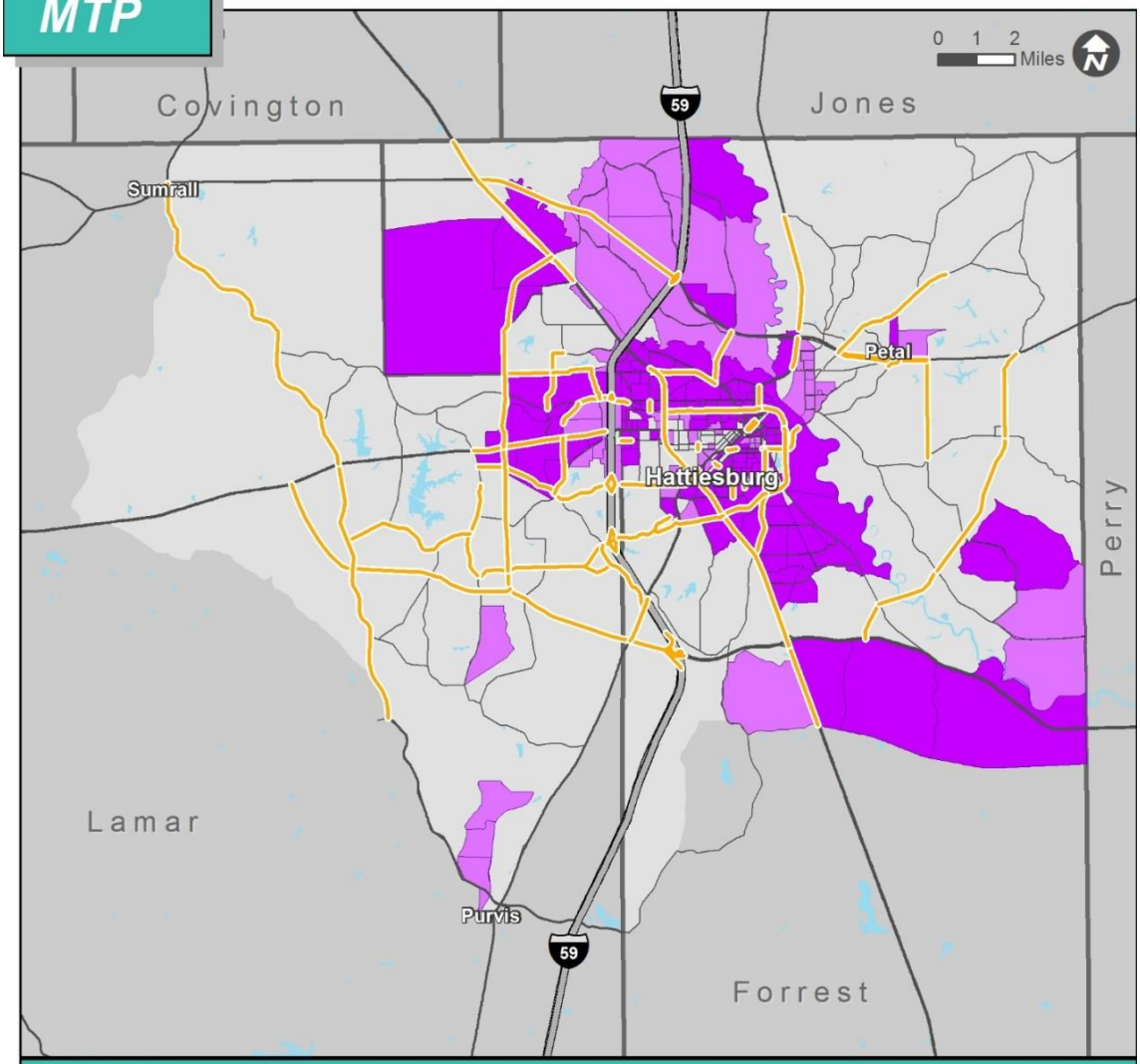
In order to determine a project's propensity for EJ issues, the MTP compares the socioeconomic composition of a project corridor to the socioeconomic composition of the MPA as a whole. Project corridors are defined as a quarter mile on either side of a project. Using data from the Census Bureau, calculations are made to determine if these corridors are home to a disproportionately high concentration of minorities or persons living in poverty. The generalized process is as follows:

- The overall percentage of minority population (non-White or Hispanic) is calculated for the entire MPA. This is 38.7 percent.
- The overall percentage of the population, excluding group quarters population, living in poverty is calculated for all block groups intersecting the entire MPA. This is 23.3 percent.
- Each proposed roadway project is buffered by a quarter mile radius.
- Socioeconomic data for this buffer area are calculated using a GIS process that distributes 2010 Census and 2009-2013 American Community Survey socioeconomic data from census blocks and block groups to existing residential areas within the buffer area. Population residing in institutional facilities, such as prisons and nursing homes, are excluded from the analysis.

This is a high-level planning exercise and is not intended to be as detailed as a project-specific environmental analysis. However, by screening proposed transportation projects for potential EJ issues, the MTP seeks to avoid funding projects with potentially disproportionately high and adverse impacts to minority and low-income populations and to identify high-priority projects that may warrant greater community outreach early on in the project development process.

2040 MTP

FIGURE 4.10 POTENTIAL EJ AREAS OF CONCERN



Legend

Traffic Analysis Zones:
Level of EJ Concern
- High (Above 1.5x Average)
- Moderate (Above Average)

- Test Projects
- Interstates
- Secondary Roadways
- Other Roadways in MPA

- Water Bodies
- Metropolitan Planning Area
- Counties

Disclaimer: This map is for planning purposes only.

Map Source: Neel-Schaffer, Inc.

Data Sources: 2010 Census and 2009-13 ACS

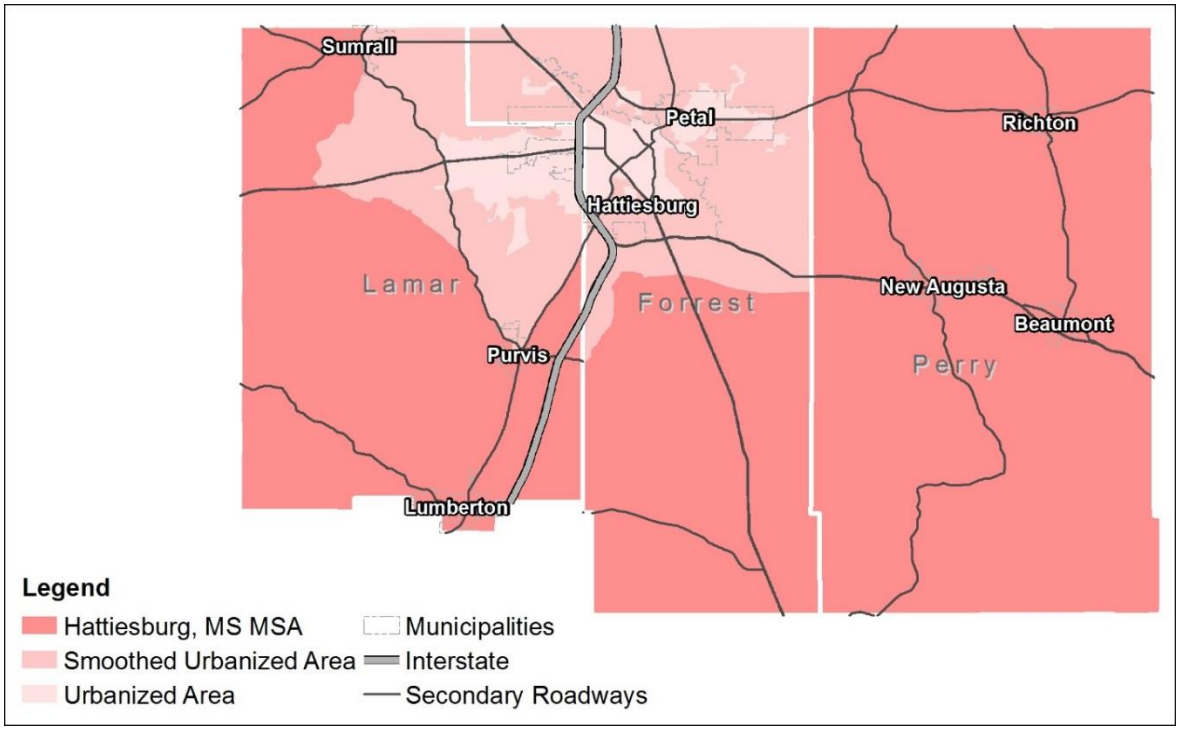
5.0 Current Land Use, Population, Economic, and Travel Patterns

5.1 Regional Context

The U.S. Office of Management and Budget (OMB) defines Metropolitan Statistical Areas (MSAs) and Micropolitan Statistical Areas (μSAs) as core-based statistical areas that include the county or counties containing a core urban area and any adjacent counties that have a high degree of social and economic integration, as measured by commuting to work. For this reason, these geographic areas are useful for understanding the broader context of land use, population, economic, and travel patterns in a region.

The Hattiesburg MPA contains the Hattiesburg MSA's core urban area, the Hattiesburg urbanized area, and is situated entirely within the MSA, which consists of Forrest, Lamar, and Perry counties. These areas are illustrated in Figure 5.1 below.

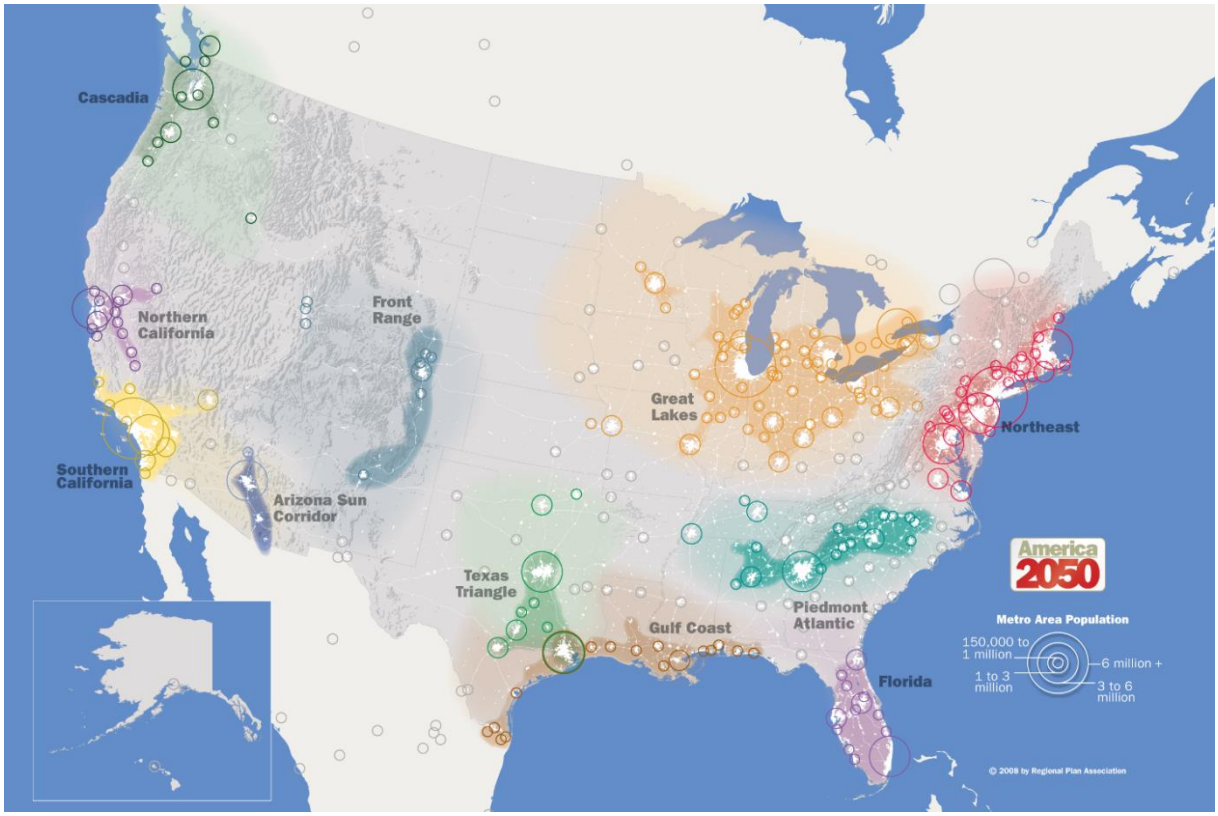
Figure 5.1 Components of Hattiesburg, MS Metropolitan Statistical Area



Beyond the MSA, the Hattiesburg MPA is typically not considered to be a part of a U.S. megaregion, or a large geographic area encompassing multiple major and minor metropolitan areas. However, according to the American 2050 project by the Regional Plan Association, it is within the area of influence for the Gulf Coast megaregion, as illustrated in Figure 5.2.

While the definition and classification of megaregions varies, they are important for transportation planning because they indicate strong economic and social ties in a geographic area that is larger thanMPAs. Because of this, regional planning coordination becomes increasingly important in the megaregions. In the future, the HPFLMPO will more than likely begin to coordinate transportation planning efforts with nearby MPOs in the Gulf Coast Megaregion, such as the Mississippi Gulf Coast MPO or New Orleans MPO.

Figure 5.2 Megaregions in the United States



Source: Regional Plan Association, 2015

5.2 Land Use Patterns

As indicated in Figure 4.2 of chapter 4, most of the developed land in the MPA is centered around the cities of Hattiesburg and Petal. Areas classified as urban by the Census Bureau are similarly concentrated around these cities, as illustrated in Figure 5.3.

Population densities, employment densities, and activity densities within the MPA are illustrated in Figures 5.4 through 5.9.

Population densities in the MPA are the greatest within the city of Hattiesburg, with a smaller concentration also occurring near the Central Business District (CBD) of the city of Petal.

Employment densities are the greatest in four key employment centers: the Hattiesburg CBD; the Midtown/Forrest General Hospital/University of Southern Mississippi area; the Turtle Creek Mall/Wesley Medical Center area; and the Cloverleaf Mall/Walmart area.

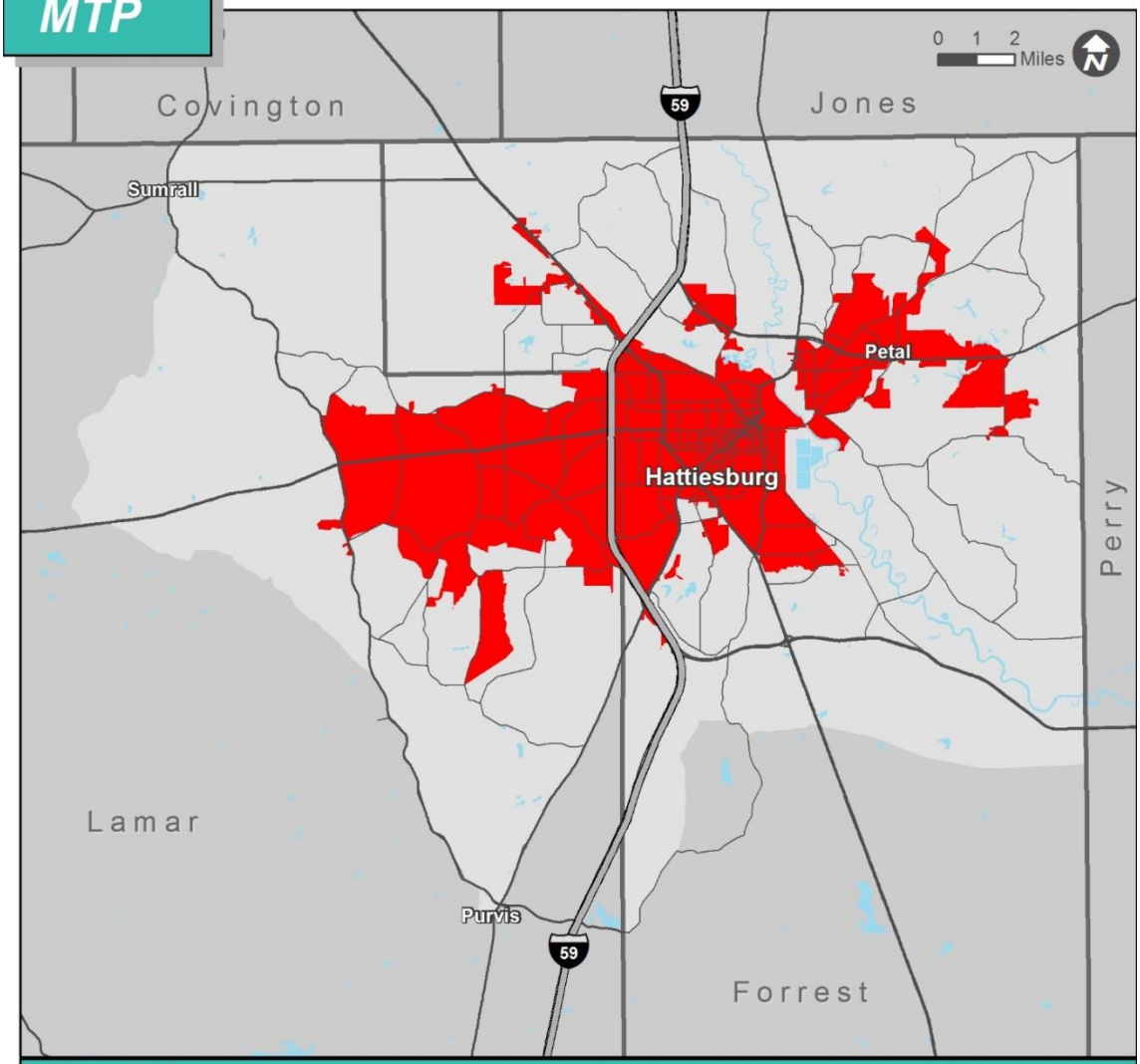
Retail and Food Service employment (NAICS 44-45, 722) is concentrated most heavily along Hardy Street from the Turtle Creek Mall area to Midtown. A smaller corridor stretches along US 11 from the Cloverleaf Mall area to the Hattiesburg CBD. Office employment (NAICS 51-56, 62) is concentrated most heavily near the two major hospitals, Forrest General Hospital and Wesley Medical Center, as well as the Hattiesburg CBD. The heaviest concentrations of industrial employment (NAICS 21, 31-33, 42, 48-49) are near the Hattiesburg-Forrest County Industrial Park and Hattiesburg Chain Municipal Airport. Industrial employment is also concentrated near the Marshall Durbin plant and on some railroad corridors and US 49, northwest of I-59.

Activity density, or the combination of population and employment density, is important to discuss, since some areas may not have significantly high population or employment density alone but still generate significant activity. By looking at these two factors together, one gets a better understanding of the impact of mixed-use areas, whether those uses are mixed vertically or horizontally.

The general land use patterns described above are consistent with existing land use maps and zoning regulations for the local governments in the MPA.

2040 MTP

FIGURE 5.3 URBAN AREAS IN THE MPA



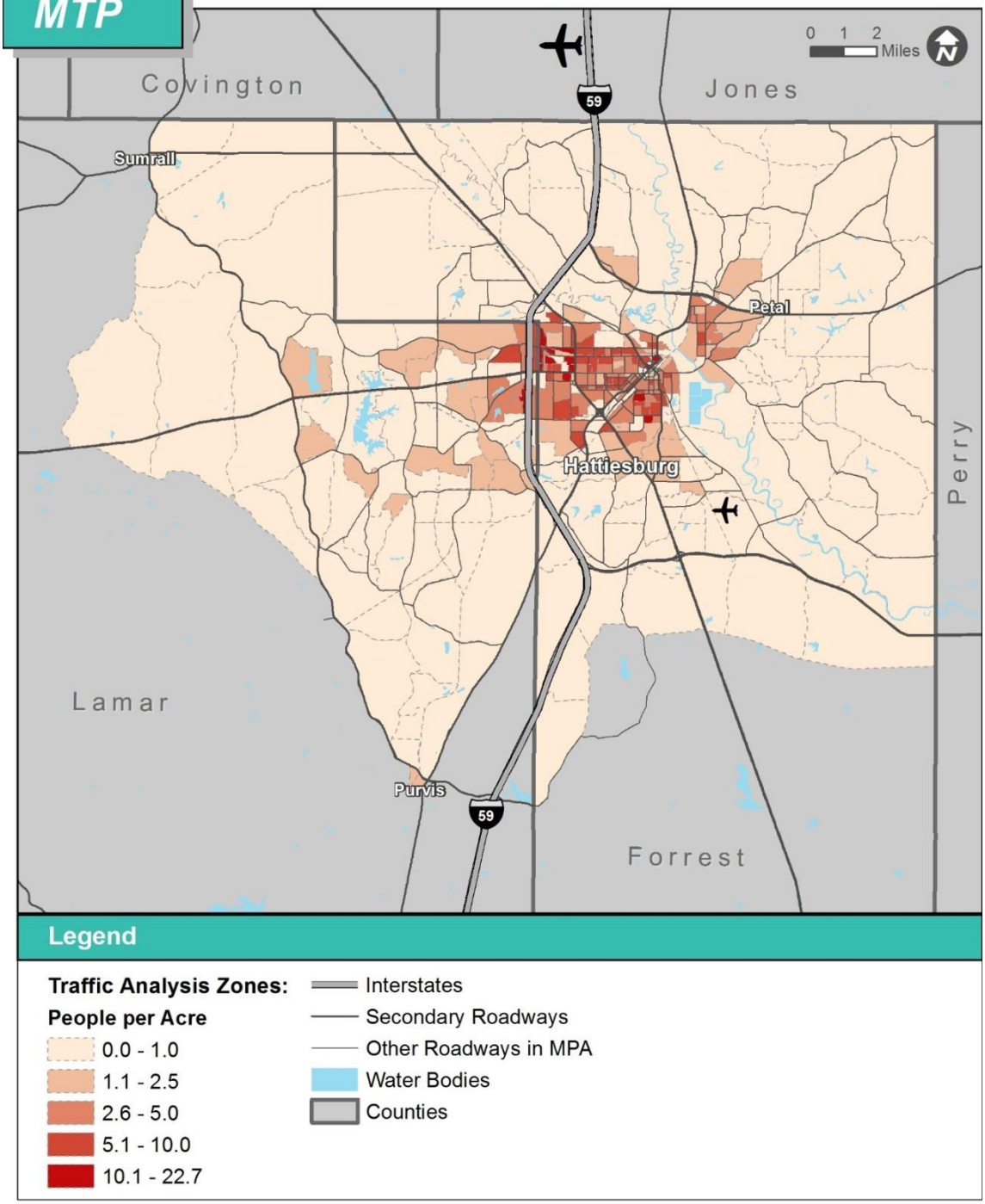
Disclaimer: This map is for planning purposes only.

Map Source: Neel-Schaffer, Inc.

Data Sources: Census Bureau

2040 MTP

FIGURE 5.4 POPULATION DENSITY, 2010



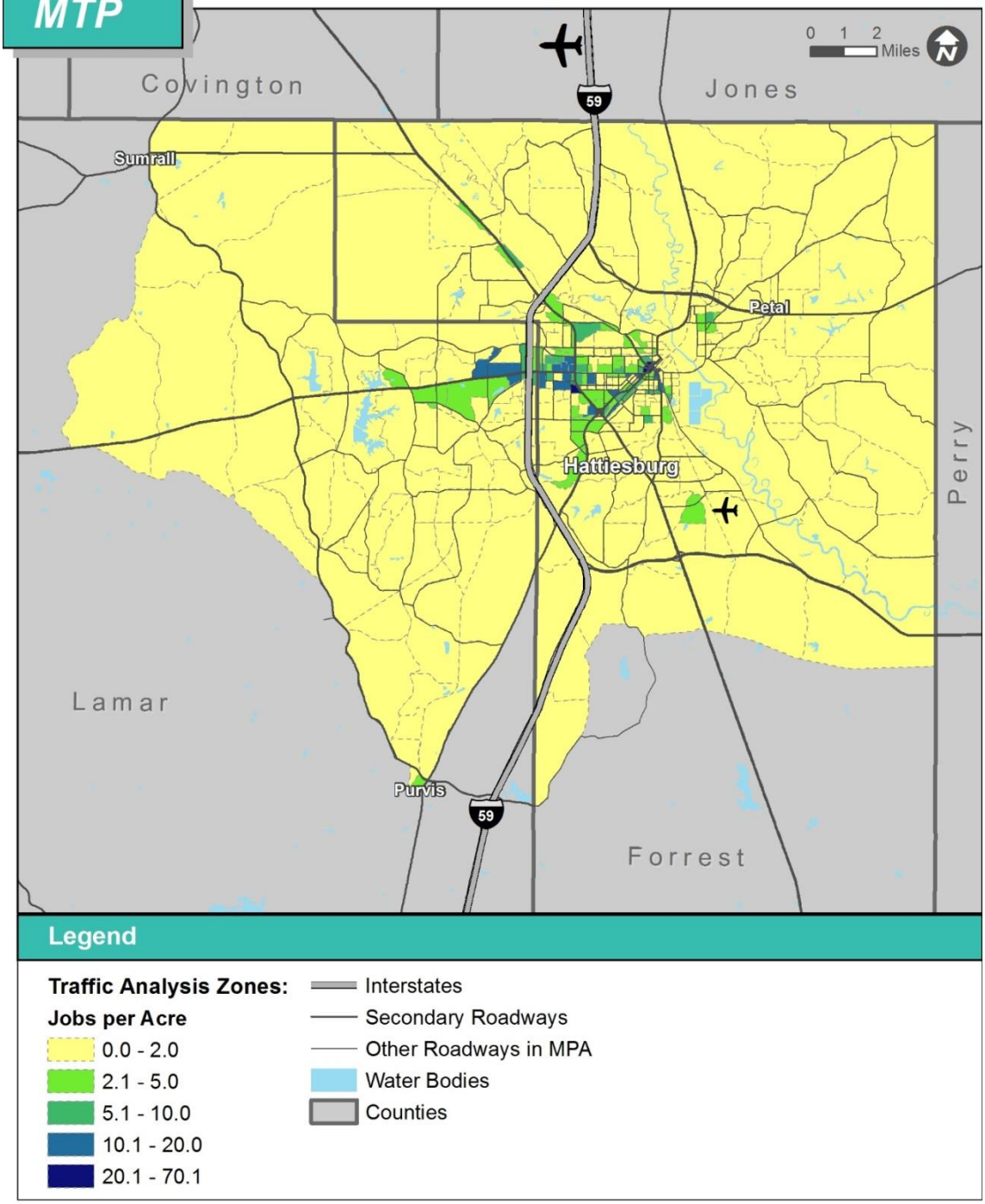
Disclaimer: This map is for planning purposes only.

Map Source: Neel-Schaffer, Inc.

Data Sources: 2010 Census

2040 MTP

FIGURE 5.5 EMPLOYMENT DENSITY, 2010



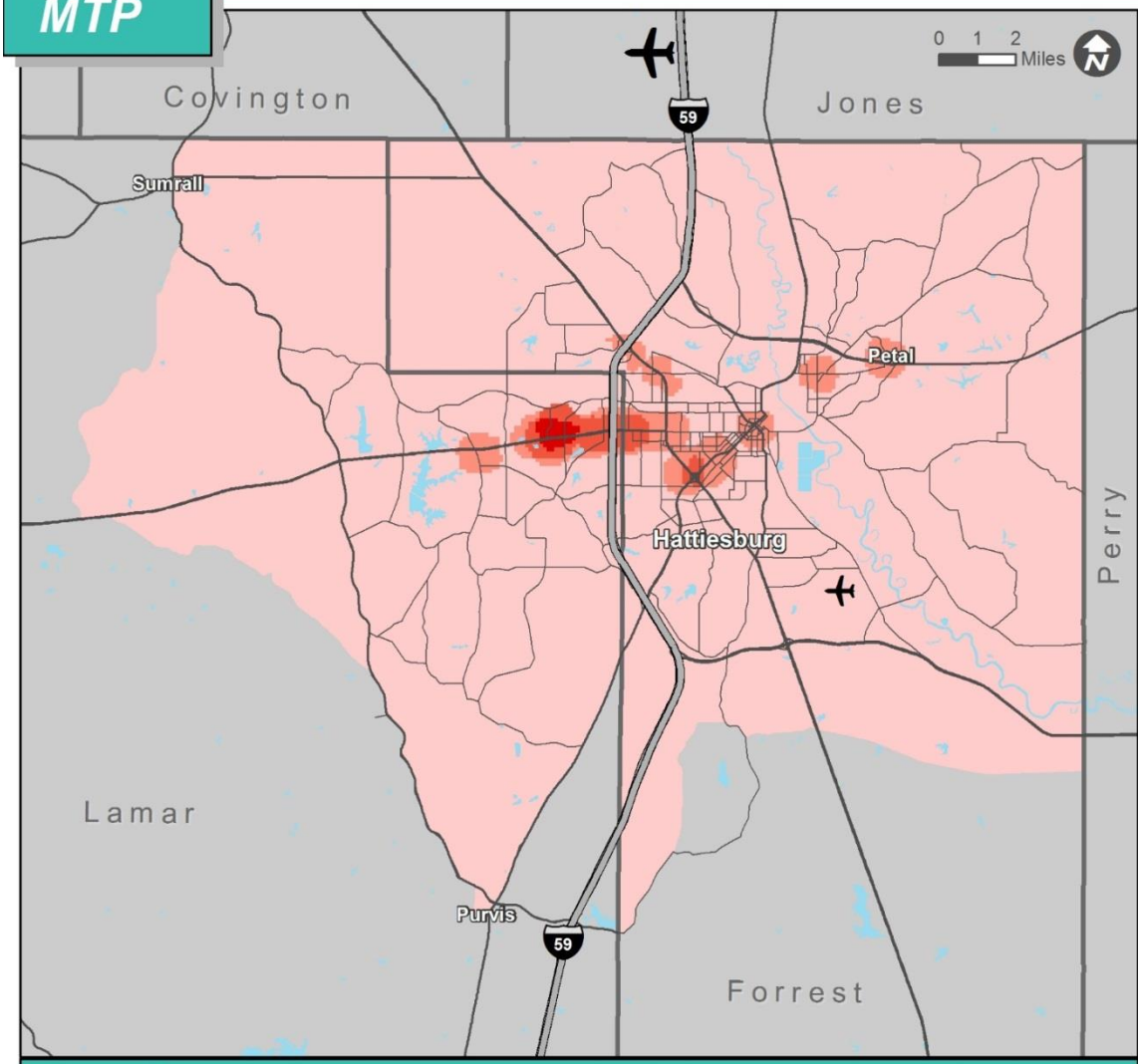
Disclaimer: This map is for planning purposes only.

Map Source: Neel-Schaffer, Inc.

Data Sources: InfoUSA

2040 MTP

FIGURE 5.6 RETAIL AND FOOD EMPLOYMENT CONCENTRATION



Legend

Retail and Food Service Employment Concentration
- Low
- Medium
- High
- Very High

- Interstates
- Secondary Roadways
- Other Roadways in MPA
- Water Bodies
- Counties

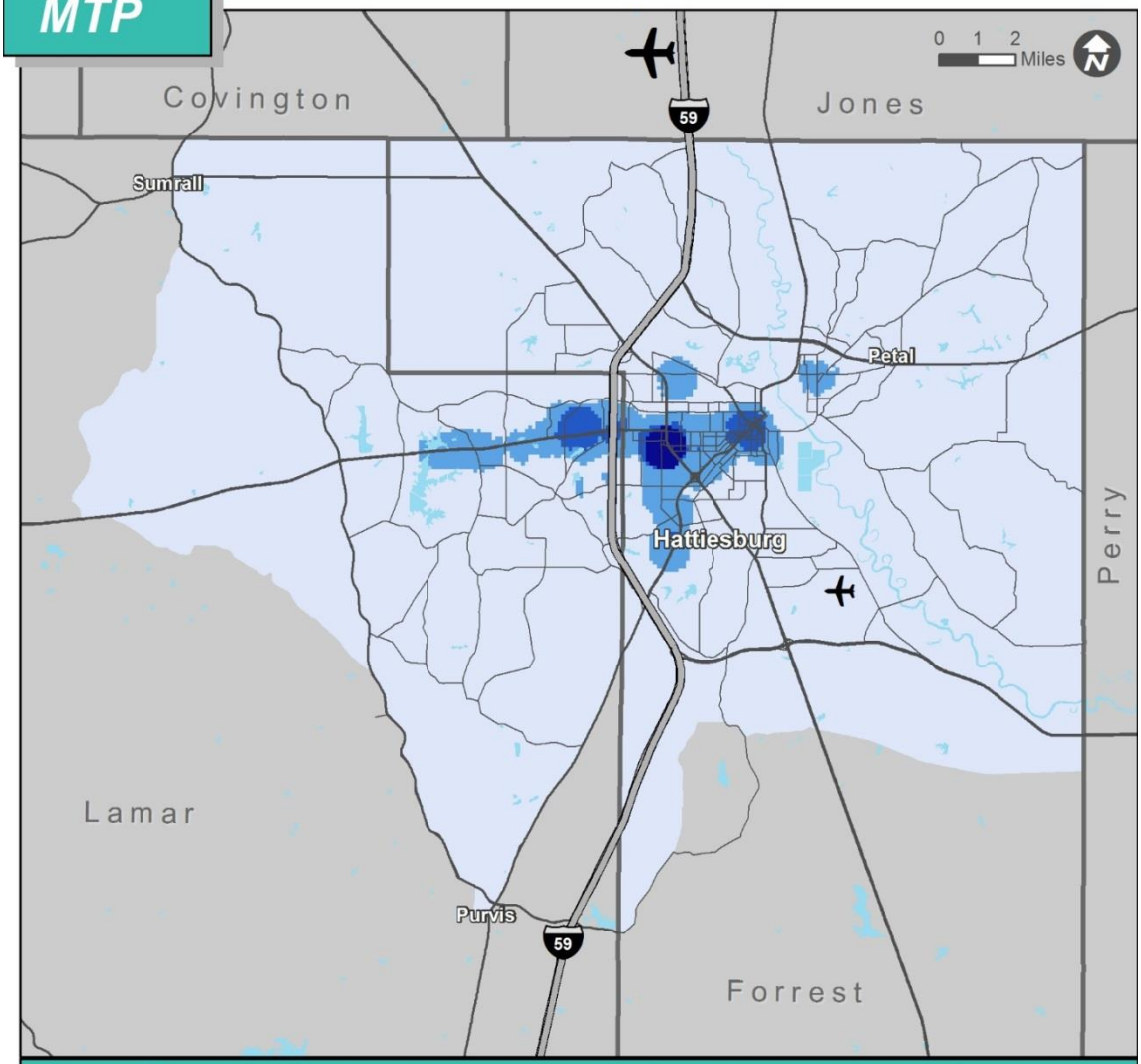
Disclaimer: This map is for planning purposes only.

Map Source: Neel-Schaffer, Inc.

Data Sources: InfoUSA

2040 MTP

FIGURE 5.7 OFFICE EMPLOYMENT CONCENTRATION



Legend

Office Employment Concentration	Interstates
Low	Secondary Roadways
Medium	Other Roadways in MPA
High	Water Bodies
Very High	Counties

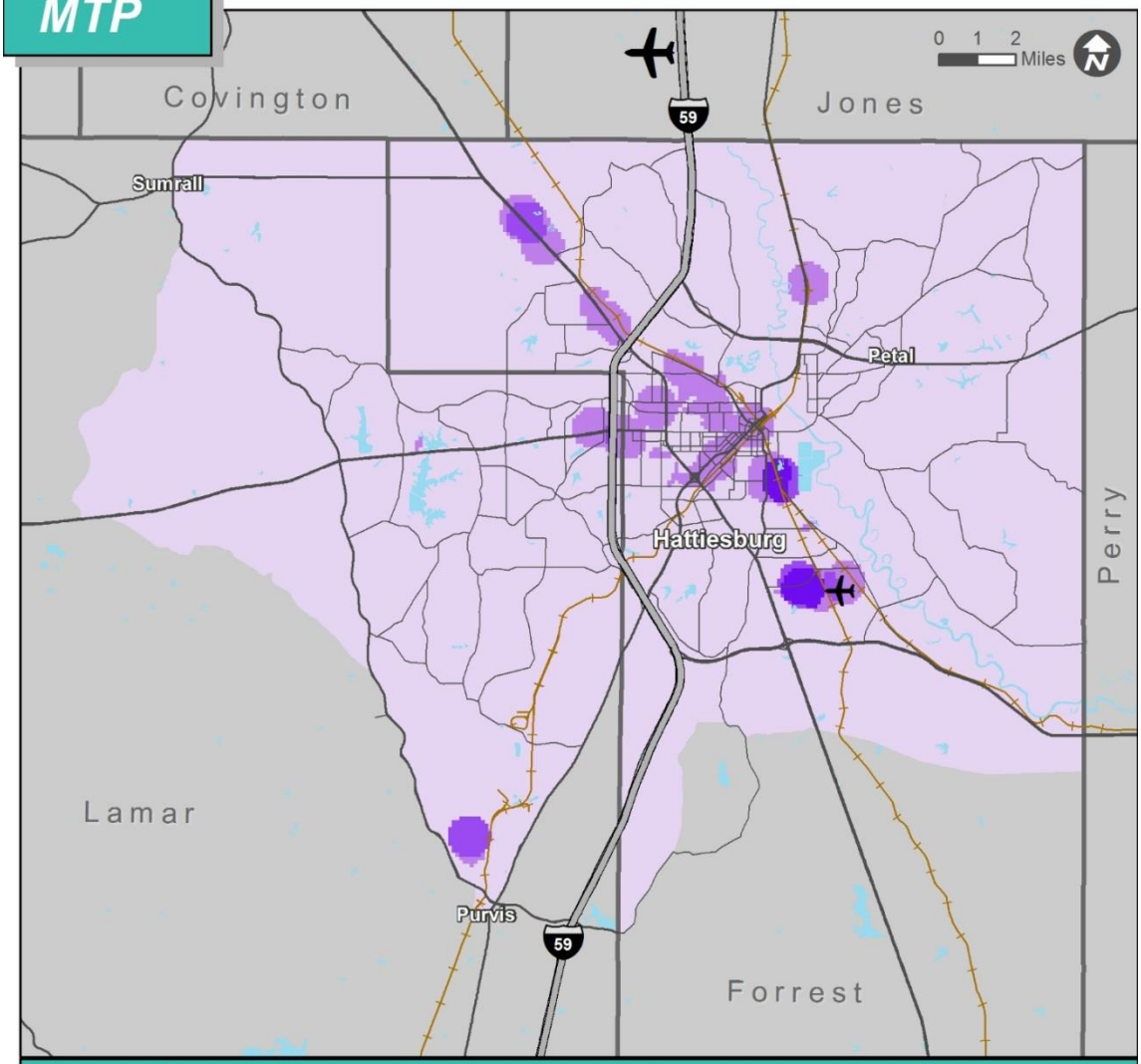
Disclaimer: This map is for planning purposes only.

Map Source: Neel-Schaffer, Inc.

Data Sources: InfoUSA

2040 MTP

FIGURE 5.8 INDUSTRIAL EMPLOYMENT CONCENTRATION



Legend

Industrial Employment Concentration
- Low
- Medium
- High
- Very High

- Interstates
- Secondary Roadways
- Other Roadways in MPA
- Railroads
- Water Bodies
- Counties

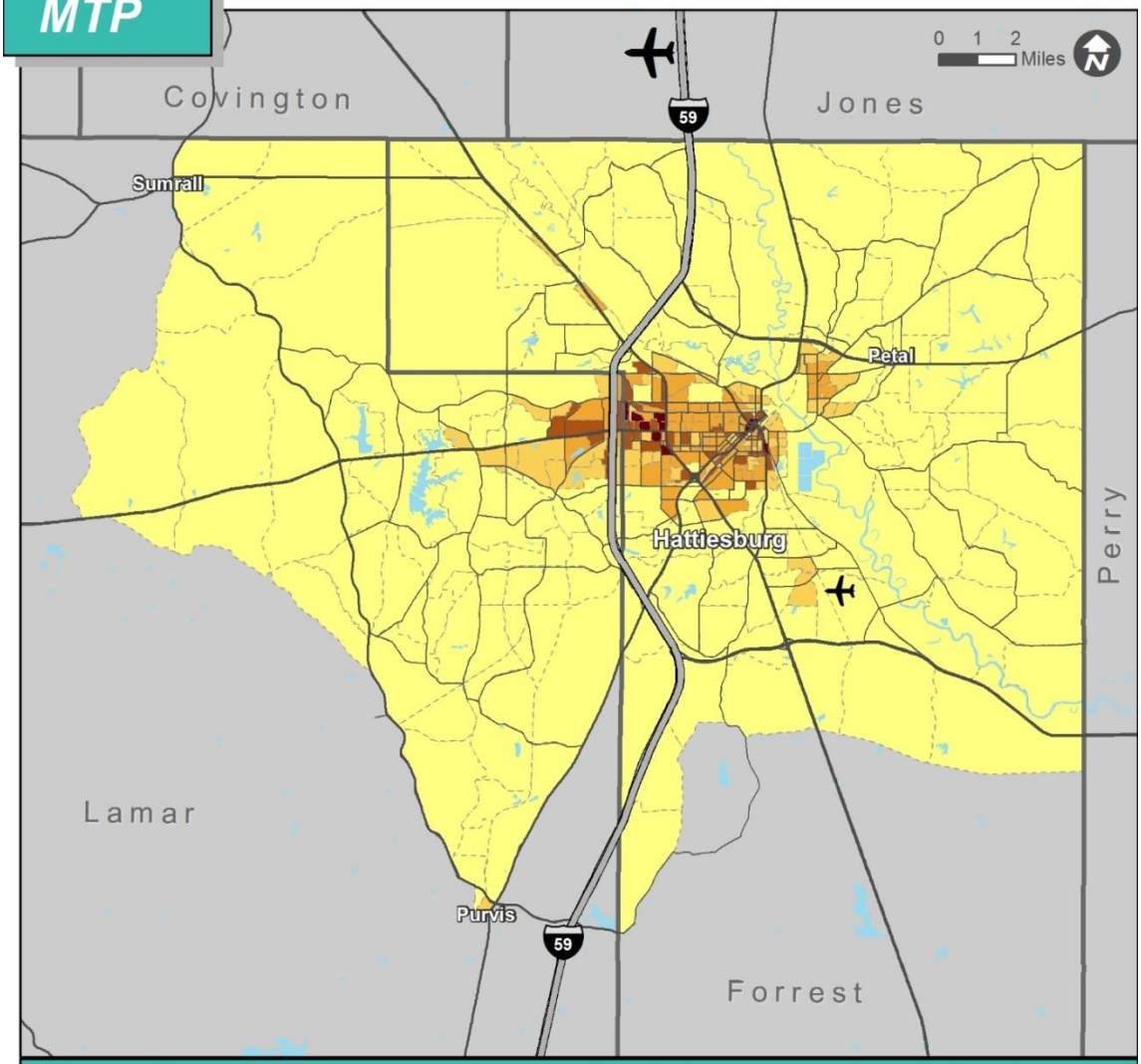
Disclaimer: This map is for planning purposes only.

Map Source: Neel-Schaffer, Inc.

Data Sources: InfoUSA

2040 MTP

FIGURE 5.9 ACTIVITY DENSITY, 2010



Legend

Traffic Analysis Zones:
Jobs and People per Acre
- 0.0 - 2.5
- 2.6 - 5.0
- 5.1 - 10.0
- 10.1 - 20.0
- 20.1 - 70.9

- Interstates
- Secondary Roadways
- Other Roadways in MPA
- Water Bodies
- Counties

Disclaimer: This map is for planning purposes only.

Map Source: Neel-Schaffer, Inc.

Data Sources: 2010 Census and InfoUSA

5.3 Population and Economic Trends

Population Trends

Historical Trends

Between 2000 and 2010, growth in the MPA greatly outpaced Mississippi and the U.S. as a whole. However, population growth has been much more rapid in Lamar County than in Forrest County, which actually lagged both Mississippi and the nation as a whole. Table 5.1 provides a summary of the population changes in the Hattiesburg MPA.

By municipality, Petal had the highest increase in population. However, much of that is likely due to the dramatic expansion of the city through annexation during this period.

Figure 5.10 shows changes in occupied housing units from 2000 to 2010 by Traffic Analysis Zone (TAZ). This map indicates that most growth has occurred at the edges of the urban area, especially in unincorporated areas.

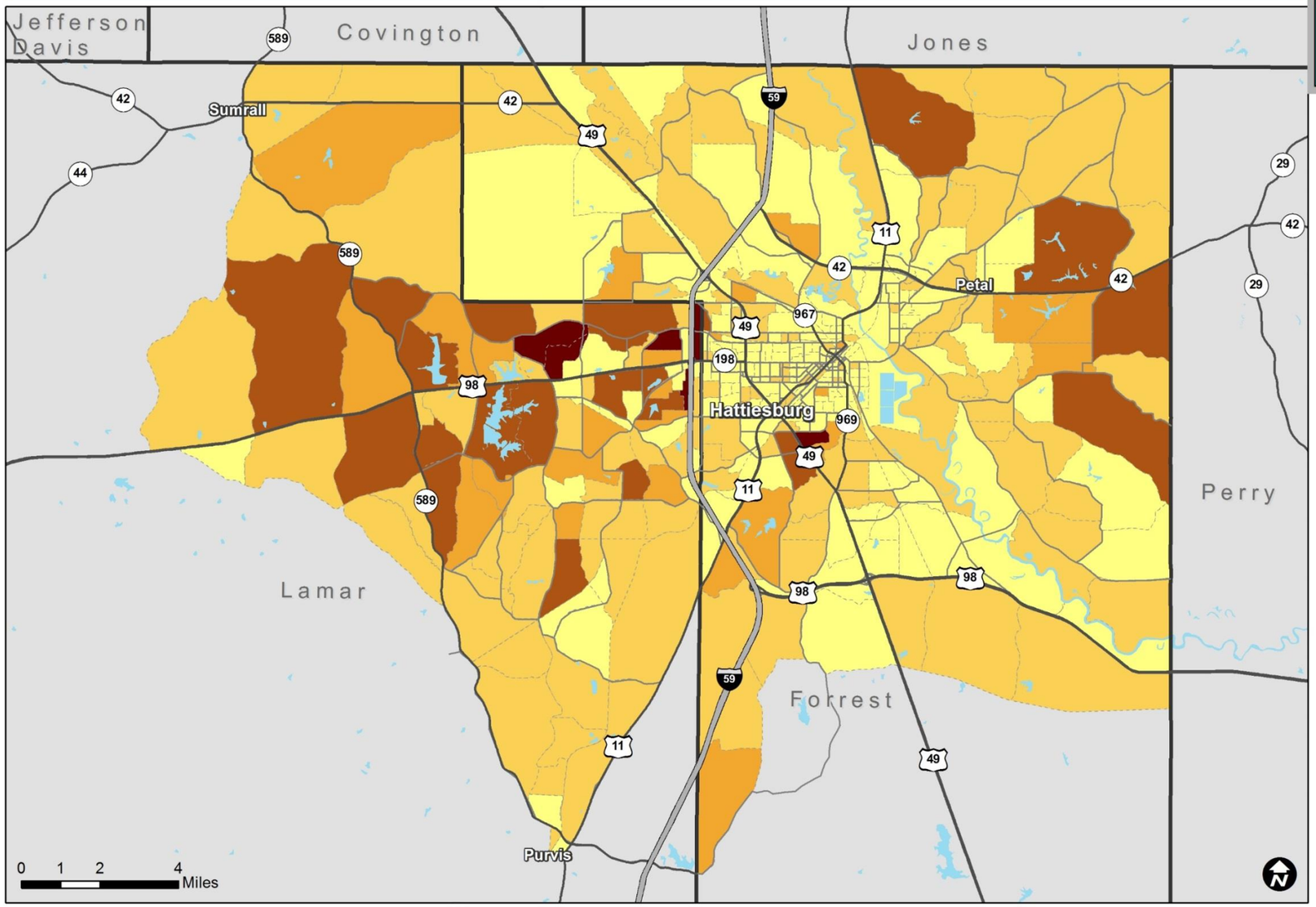
Figure 5.11 shows areas that transitioned from either undeveloped to developed or from a lower intensity of development to a higher intensity of development from 2001 to 2011. Outside of a few major industrial and commercial developments, most of these areas are new subdivisions. These newly developed areas are consistent with the high growth areas illustrated in Figure 5.10.

Table 5.1 Population Change in MPA and Local Jurisdictions, 2000 to 2010

Place	2000	2010	Change 2000 to 2010		
			Number	Percent	Annualized Growth Rate
Hattiesburg	44,779	45,989	1,210	2.7%	0.27%
Petal	7,579	10,454	2,875	37.9%	3.27%
Purvis	2,164	2,175	11	0.5%	0.05%
Sumrall	1,005	1,421	416	41.4%	3.52%
Forrest County	72,604	74,934	2,330	3.2%	0.32%
Lamar County	39,070	55,658	16,588	42.5%	3.60%
Metropolitan Planning Area	91,137	106,413	15,276	16.8%	1.56%
Mississippi	2,844,658	2,967,297	122,639	4.3%	0.42%
United States	281,421,906	308,745,538	27,323,632	9.7%	0.93%

Source: U.S. Census Bureau

FIGURE 5.10 DISTRIBUTION OF HOUSING UNIT GROWTH, 2000-2010



2040 MTP

Legend

Traffic Analysis Zones:

Change in Occupied Housing Units

- Less than 1
- 1 - 50
- 51 - 100
- 101 - 250
- 251 - 466
- Interstate
- Secondary Roadways
- Other Major Roadways in MPO
- Water
- Counties

Note: Some block boundaries changed in 2010. These blocks were split by an automated process.

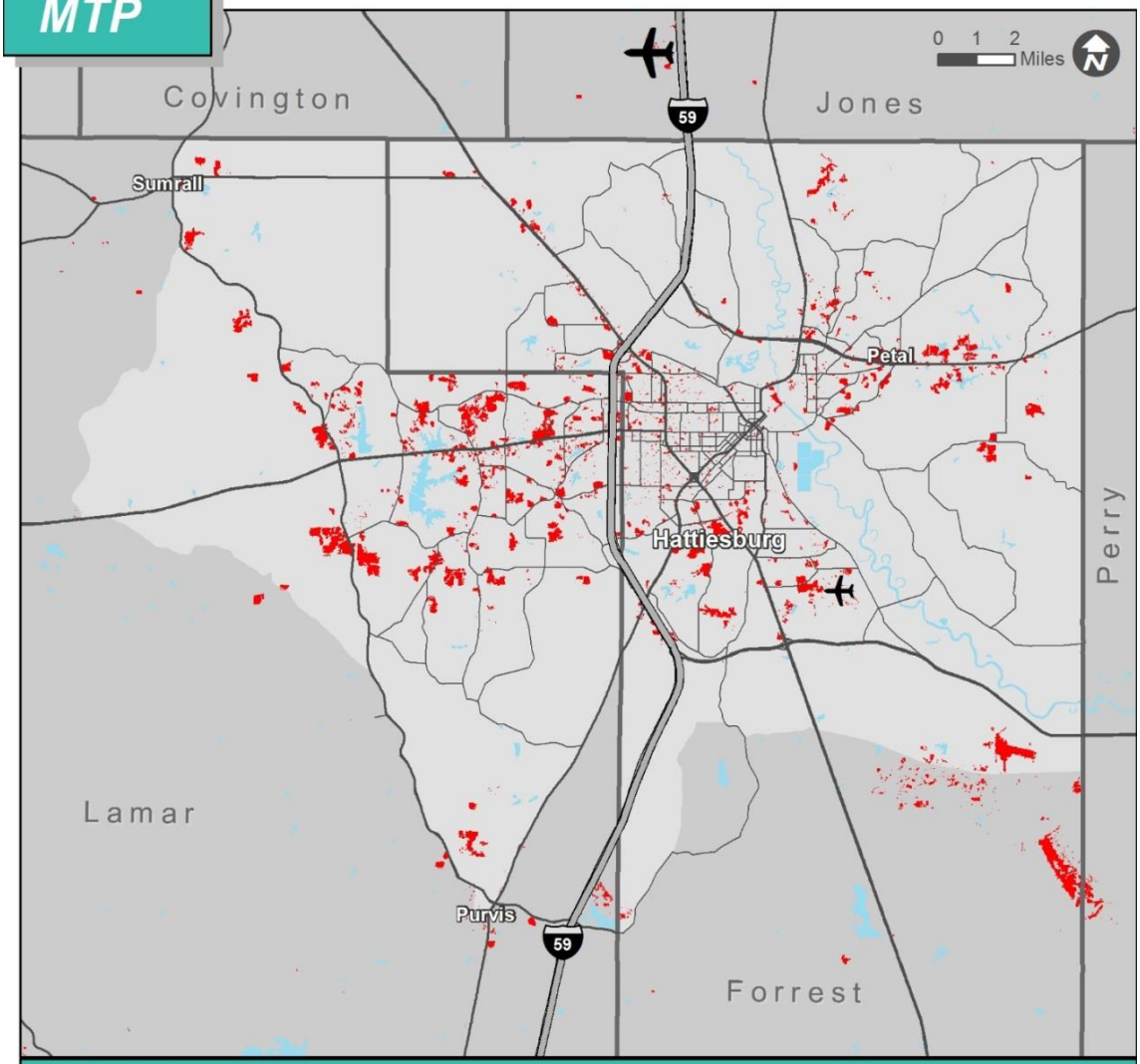
Disclaimer: This map is for planning purposes only. Contact MPO Staff for more information.

Map Source: Neel-Schaffer, Inc.

Data Sources: 2010 and 2000 Census

2040 MTP

FIGURE 5.11 AREAS DEVELOPED FROM 2001 TO 2011



Legend

- Interstates
- Secondary Roadways
- Other Roadways in MPA
- Areas Developed from 2001 to 2011
- Water Bodies
- Metropolitan Planning Area
- Counties

Disclaimer: This map is for planning purposes only.

Map Source: Neel-Schaffer, Inc.

Data Sources: USGS 2011 National Land Cover Database

Recent Trends

Population estimates from 2014 suggest a continuation of historical trends, more or less. Lamar County is outpacing the U.S. in population growth while Forrest County is lagging behind the U.S's annualized growth rate. However, the rate of growth in Forrest County and Hattiesburg appear to have increased, with both now growing faster than the state as a whole.

Because residential building permit data is unavailable for unincorporated areas in Forrest and Lamar counties, the only conclusion that can be drawn from residential building permit data is that Hattiesburg is outpacing Petal and the smaller municipalities in new housing unit construction by a large margin.

Table 5.2 Estimated Population Change in MPO Jurisdictions, 2010 to 2014

Place	2010	2014 (estimate)	Change 2010 to 2014		
			Number	Percent	Annualized Growth Rate
Hattiesburg	45,989	47,016	1,027	2.2%	0.55%
Petal	10,454	10,727	273	2.6%	0.65%
Purvis	2,175	2,322	147	6.8%	1.65%
Sumrall	1,421	1,702	281	19.8%	4.61%
Forrest County	74,934	76,330	1,396	1.9%	0.46%
Lamar County	55,658	60,099	4,441	8.0%	1.94%
Mississippi	2,967,297	2,994,079	26,782	0.9%	0.30%
United States	308,745,538	318,857,056	10,111,518	3.3%	1.08%

Source: U.S. Census Bureau

Table 5.3 Housing Units Permitted, 2012-2014

Permit-Issuing Jurisdiction	Housing Units
Hattiesburg	484
Petal	59
Sumrall	54
Purvis	1

Notes: If annual information is not provided by a permit-issuing place, data is imputed by the Census Bureau. Forrest County and Lamar County do not issue building permits for unincorporated areas within their jurisdiction.
Source: U.S. Census Bureau, Building Permits Survey

Low-Income Populations

Low-income areas are important to consider because they are less likely to own a vehicle or commute to work by driving. They are therefore, more dependent on walking, biking, carpooling, or using transit. From 2009 to 2013, the percentage of people living below the federal poverty threshold in the in the MPA counties was 23.2 percent. This percentage was above both the United States (15.4 percent) and the state of Mississippi (22.7 percent).

However, because the federal poverty threshold is a national standard, it is not sensitive to regional variations in cost of living. In areas with a relatively low cost of living, such as Mississippi, using the federal poverty measure means that poverty is exaggerated in many areas. In order to address this issue, the number of households participating in the Supplemental Nutrition Assistance Program (SNAP) will be utilized instead. This program, also known as Food Stamps, takes into account variations in the cost of living between different states.

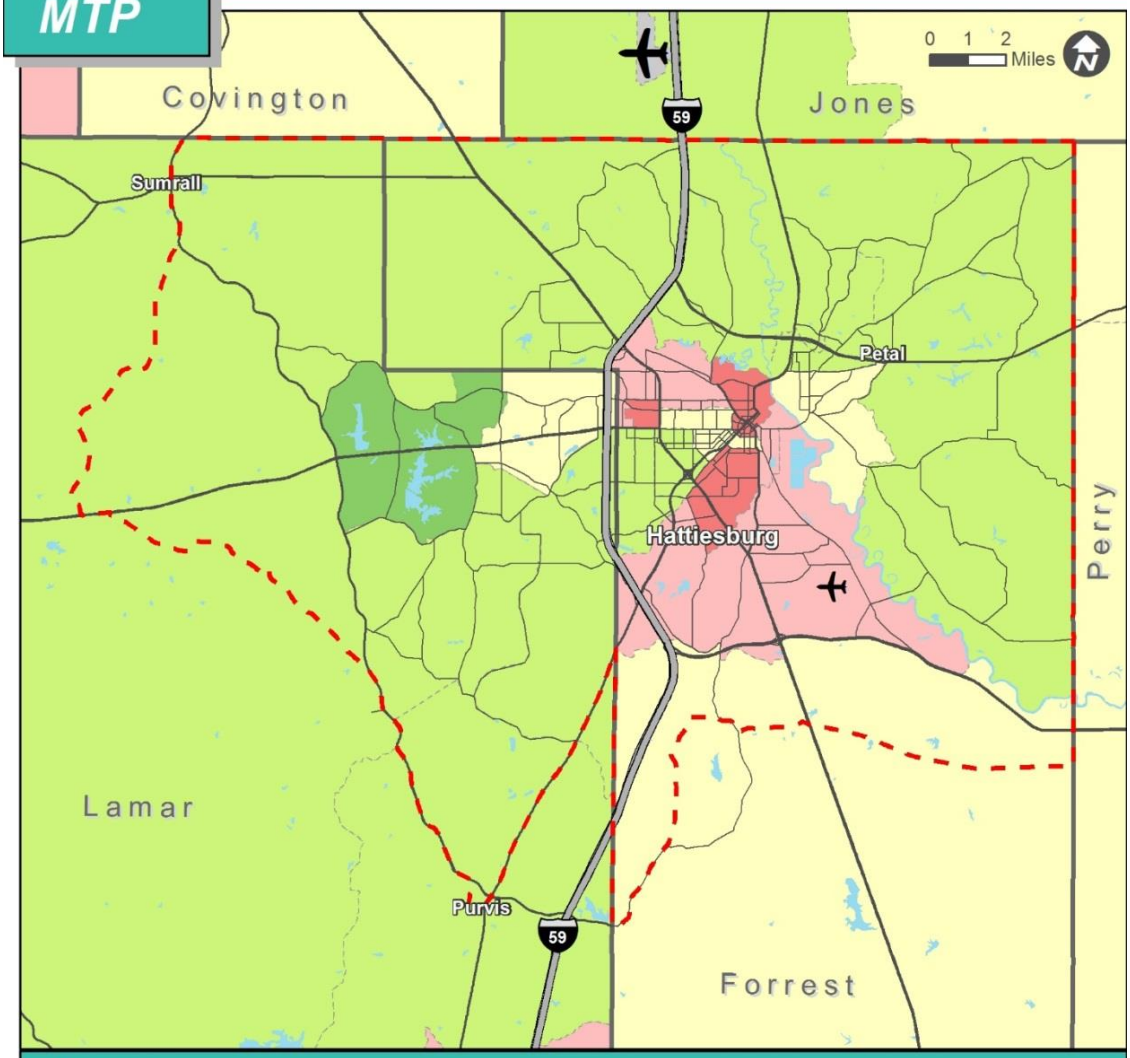
From 2009 to 2013, the percentage of households receiving food stamps in the counties in the MPA was 17.1 percent. This percentage was in between that of the United States (12.4 percent) and the state of Mississippi (17.4 percent).

As shown in Figures 5.12 and 5.13, there is great variation in the concentration of low-income households within the MPA. Figure 5.12 shows median household income levels throughout the region by comparing the median household income of each census tract to the median household income of the Hattiesburg MSA, which was $41,297 (in 2013 dollars) from 2009-2013. This map suggests that the area north of Hardy Street and east of I-59 and the area southeast of US 11 in Hattiesburg are mostly low-income areas. On the other end of the spectrum, the areas around Canebrake Lake and Hennington Lake in Lamar County appear to be relatively affluent.

Figure 5.13 shows that the greatest concentrations of people living in poverty are within the city of Hattiesburg, especially along the Hardy Street corridor and a large area around William Carey University.

2040 MTP

FIGURE 5.12 MEDIAN HOUSEHOLD INCOME BY CENSUS TRACT



Legend

Census Tracts

Median Annual Household Income (2013 dollars)

- $12,188 - $20,649
- $20,650 - $33,038
- $33,039 - $41,297
- $41,298 - $74,335
- $74,336 - $81,712

- Metropolitan Planning Area
- Interstates
- Secondary Roadways
- Other Roadways in MPA
- Water Bodies
- Counties

Notes: AMI = Area Median Income. Areas with no households are shown in gray.

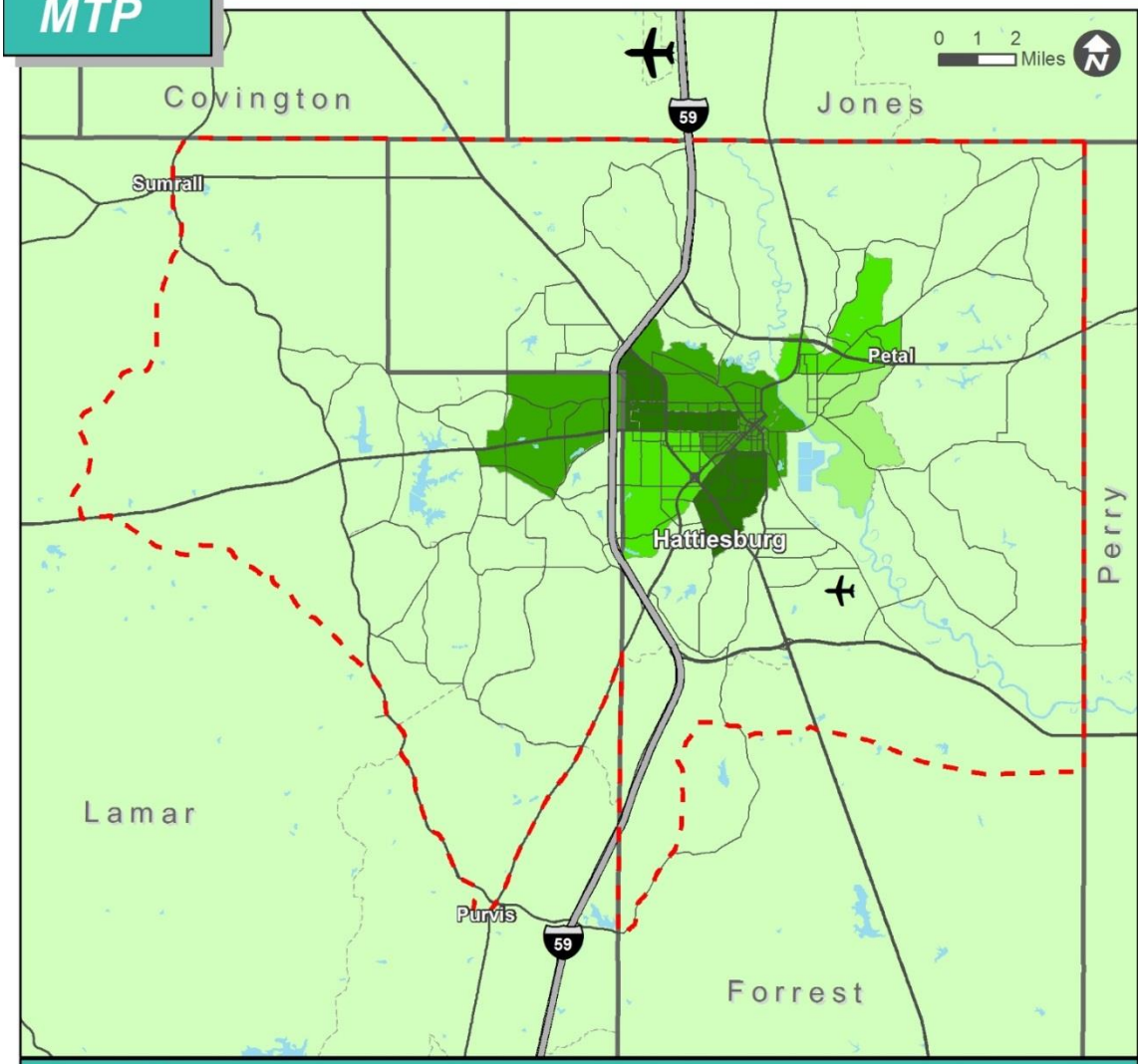
Disclaimer: This map is for planning purposes only.

Map Source: Neel-Schaffer, Inc.

Data Sources: 2009-2013 ACS

2040 MTP

FIGURE 5.13 CONCENTRATION OF LOW-INCOME HOUSEHOLDS



Legend

Census Tracts

SNAP (Food Stamp) Households per Square Mile

- 0 - 25
- 26 - 50
- 51 - 100
- 101 - 200
- Above 200

- Metropolitan Planning Area
- Interstates
- Secondary Roadways
- Other Roadways in MPA
- Water Bodies
- Counties

Disclaimer: This map is for planning purposes only.

Map Source: Neel-Schaffer, Inc.

Data Sources: 2009-2013 ACS

Employment Trends

Historical employment data is not available at a geographic level that would allow for detailed analysis of employment within the MPA. However, county-level data from the Bureau of Economic Analysis (BEA) for select industries was obtained for Forrest and Lamar counties.

The change in total employment (full-time and part-time) from 2009 to 2013 in the MPA counties by industry is shown in Table 5.4. While population growth in the MPA outpaces the U.S., employment growth from 2009 to 2013 in the MPA appears to actually have grown slightly slower than the U.S. at 3.2 percent versus 4.7 percent growth. General trends from the BEA data show that:

- The healthcare and social assistance industry had the greatest absolute increase, with about 783 jobs added.
- The construction, state and local government, and educational services had the greatest decreases with a loss of approximately 550, 400, and 300 respectively.
- Employment in the mining industry grew significantly in both absolute and percentage terms.

Table 5.4 Change in Employment in MPA Counties by Industry, 2009-2013.

Description	2009	2013	Change	
			Number	Percent
Total employment	75,949	78,370	2,421	3.2%
Farm employment	914	838	-76	-8.3%
Forestry, fishing, and related activities	503	530	27	5.4%
Mining	482	750	268	55.6%
Utilities	616	639	23	3.7%
Construction	4,838	4,294	-544	-11.2%
Manufacturing	3,559	3,922	363	10.2%
Wholesale trade	1,808	1,932	124	6.9%
Retail trade	10,202	10,288	86	0.8%
Transportation and warehousing	2,128	2,385	257	12.1%
Information	623	649	26	4.2%
Finance and insurance	2,770	2,922	152	5.5%
Real estate and rental and leasing	2,654	2,850	196	7.4%
Professional, scientific, and technical services	(D)	(D)	(D)	(D)
Management of companies and enterprises	(D)	(D)	(D)	(D)
Administrative and waste management services	3,665	4,242	577	15.7%
Educational services	1,630	1,324	-306	-18.8%
Health care and social assistance	8,351	9,134	783	9.4%
Arts, entertainment, and recreation	1,108	1,088	-20	-1.8%
Accommodation and food services	7,041	7,266	225	3.2%
Other services, except public administration	4,138	4,726	588	14.2%
Federal, civilian government	875	779	-96	-11.0%
Military	986	1,176	190	19.3%
State and local government	13,720	13,296	-424	-3.1%

Note: (D) = Not shown to avoid disclosure of confidential information, but the estimates for this item are included in the totals.

Source: U.S. Department of Commerce, Bureau of Economic Analysis

5.4 Freight Demand

While locally-serving freight trips only make up a portion of all freight trips, understanding local demand for freight within the MPA is critical for ensuring that the region's transportation system is moving goods in an efficient manner and enabling the region to be economically competitive.

Specialized Freight Generating Industries

As the "Hub City" for the Mississippi Pine Belt region, the Hattiesburg MPA is home to a large number of freight-generating establishments that locate in the MPA for its proximity to major transportation facilities, skilled workforce, and large market of consumers. However, in order to better understand the magnitude of certain freight-generating industries, it is necessary to compare the relative size of freight-generating industries within the MPA to that of Mississippi and the United States as a whole.

Of particular interest for freight planning are the mining, construction, manufacturing, wholesale trade, retail trade, transportation and warehousing, and accommodation and food services industries. This section will focus on these industries and subsectors within these industries.

In order to identify the freight-generating industries in which the MPA specializes, location quotients were calculated for Forrest County and Lamar County combined. Location quotients are ratios that compare an industry's percentage of total employment in one area to that same industry's percentage of total employment in a larger, more all-encompassing area, such as a state or country. In this manner, they highlight specialized industries by pointing out which industries employ a disproportionately high number of people when compared to the state or country as a whole. Typically, a location quotient of 1.2 or higher indicates a specialized industry.

Specialized Freight-Generating Industries

To start off, location quotients for broadly defined freight-generating industries are provided in Table 5.5. The data source for this information is the Bureau of Economic Analysis' (BEA) Local Area Personal Income and Employment, which is the most complete, publicly available data source for employment.

The data indicates that the Hattiesburg MPA is specialized in the retail trade industry and accommodation and food services industry when compared to the nation and state. Aside from these two industries, it does not appear that the MPA is specialized in any other broadly defined freight-generating industry. However, it may be specialized in subsectors within these broadly defined industries, as will be discussed next.

Table 5.5 Location Quotients for Freight-Generating Industries in the MPA, 2013

Industry	Employment	Percent of Total	MS Location Quotient	U.S. Location Quotient
Mining (NAICS 21)	750	1.0%	0.85	1.09
Construction (NAICS 23)	4,294	5.5%	0.93	1.08
Manufacturing (NAICS 31-33)	3,922	5.0%	0.54	0.72
Wholesale trade (NAICS 42)	1,932	2.5%	0.98	0.71
Retail trade (NAICS 44-45)	10,288	13.1%	1.22	1.30
Transportation and warehousing (NAICS 48-49)	2,385	3.0%	0.86	0.92
Accommodation and food services (NAICS 72)	7,266	9.3%	1.17	1.29
Total employment	78,370	100.0%	n/a	n/a

Note: MPA is defined for these purposes as the combined total of Forrest and Lamar counties.

Source: U.S. Bureau of Economic Analysis, Table CA25N

Specialized Subsectors of Freight-Generating Industries

In order to drill down and determine what sub-sectors of freight-generating industries are specialized in the MPA, a different data source is utilized, the Quarterly Census of Employment and Wages from the Bureau of Labor Statistics (BLS). While this data source does not capture as many jobs as the BEA source, it does provide a higher level of detail. Still, as with the previous source, some industry subsectors are not disclosed for confidentiality purposes. These subsectors, many of which may represent specializations for the MPA, cannot be included in the analysis. It is also worth noting that the BLS source

undercounts contracted jobs, which are common in some of the major freight generating industries, especially mining and construction.

Table 5.6 highlights specialized subsectors of freight-generating industries. With the caveat that specialized subsectors with only a few employers may not be captured due to confidentiality issues, the following trends in specialization can be observed:

- Mining
    - The MPA is not specialized in any subsector in this industry from, at least using the data available. There are also relatively few jobs in the mining industry in the MPA.
- Construction
    - The MPA is specialized in the "construction of buildings" subsector when compared to the nation. While there are many jobs in this subsector, no establishment comprises a large percentage of all jobs.
- Manufacturing
    - The MPA is specialized in the "food manufacturing," "printing and related support activities," "non-metallic mineral product manufacturing," and "machinery manufacturing" subsectors. Major employers in these subsectors include Marshall Durbin Poultry, Borden Dairy, Kohler Co., and Johnson Controls.
- Wholesale Trade
    - The MPA is not specialized in the wholesale trade of either durable goods or nondurable goods. However, these subsectors still employ a large number of workers and the MPA is nearly specialized in the wholesale trade of durable goods when compared to the state. Major employers in the wholesale trade industry include the Sam's Club Distribution Center and Lowe's Flatbed Distribution, both of which deal with durable goods.
- Retail Trade
    - The MPA is specialized in many subsectors. The most specialized subsectors with a high number of jobs include: "sporting goods, hobby, book, and music stores;" "general merchandise stores;" "furniture and home furnishings stores;" and "clothing and clothing accessories stores." Major employers in all specialized retail subsectors include Academy Sports and Outdoors, Mississippi Music Inc., Walmart, Dirt Cheap, At Home, Lowe's Home Improvement, and Home Depot.

- Transportation and Warehousing
    - While there are many jobs in transportation and warehousing industry as a whole in the MPA, the MPA is not specialized in the "truck transportation" subsector. No establishment comprises a large percentage of all transportation and warehousing jobs.
- Accommodation and Food Services
    - The MPA is specialized in the "food services and drinking places" subsector. While there are many jobs in this subsector, no establishment comprises a large percentage of all jobs.

Table 5.6 Location Quotients for Subsectors of Freight-Generating Industries in the MPA, 2014

Subsector	Freight Generator Type	Employees	Percent of Total	MS Location Quotient	U.S. Location Quotient
Mining (NAICS 21)					
Support activities for mining	D&P	184	0.3%	0.81	1.03
Construction (NAICS 23)					
Construction of buildings	D&P	659	1.2%	1.11	1.20
Heavy and civil engineering construction	D&P	394	0.7%	0.73	1.07
Specialty trade contractors	D&P	950	1.7%	0.69	0.60
Manufacturing (NAICS 31-33)					
Food manufacturing	D&P	1,097	2.0%	0.97	1.81
Printing and related support activities	D&P	100	0.2%	1.31	0.54
Plastics and rubber products manufacturing	D&P	247	0.4%	0.80	0.90
Nonmetallic mineral product manufacturing	D&P	187	0.3%	1.15	1.20
Fabricated metal product manufacturing	D&P	123	0.2%	0.25	0.21
Machinery manufacturing	D&P	553	1.0%	0.89	1.21
Wholesale trade (NAICS 42)					
Merchant wholesalers, durable goods	D&P	1,002	1.8%	1.15	0.85
Merchant wholesalers, nondurable goods	D&P	585	1.1%	0.88	0.71
Retail trade (NAICS 44-45)					
Motor vehicle and parts dealers	D&P	1,017	1.8%	1.17	1.34
Furniture and home furnishings stores	D&P	280	0.5%	1.67	1.52
Building material and garden supply stores	D&P	690	1.2%	1.11	1.39

Subsector	Freight Generator Type	Employees	Percent of Total	MS Location Quotient	U.S. Location Quotient
Food and beverage stores	D&P	874	1.6%	0.92	0.72
Health and personal care stores	D&P	557	1.0%	1.17	1.34
Gasoline stations	D&P	729	1.3%	1.00	2.04
Clothing and clothing accessories stores	D&P	742	1.3%	1.42	1.33
Sporting goods, hobby, book and music stores	D&P	543	1.0%	2.34	2.17
General merchandise stores	D&P	2,433	4.4%	1.34	1.91
Miscellaneous store retailers	D&P	417	0.7%	1.35	1.25
Transportation and warehousing (NAICS 48-49)					
Truck transportation	P	392	0.7%	0.42	0.68
Accommodation and food services (NAICS 72)					
Accommodation	D	479	0.9%	0.34	0.62
Food services and drinking places	D	6,333	11.4%	1.43	1.46

Notes: D = Delivery and P = Production; Subsector not included if employed less than 100 employees.

Source: Bureau of Labor Statistics, Quarterly Census of Employment and Wages, 2014 Annual Average

Freight Transported by Subsector of Freight-Generating Industries by Weight

As shown in Table 5.7, the top 10 subsectors of freight-generating industries account for about 98 percent of all freight tonnage from major freight-generating establishments. These industry subsectors speak both to the role of the Hattiesburg MPA as the urban center of the Pine Belt region of Mississippi and to the specialized industries in the local economy.

Freight delivered to or shipped from merchant wholesaler establishments (durable and nondurable) account for over half of all freight generated by weight in the MPA. This is not surprising given the role of wholesale in the distribution of goods in urban areas and the presence of major wholesale establishments in the MPA such as Sam's Club Distribution Center and Lowe's Flatbed Distribution.

Other major freight generating industries that serve the basic needs of the Hattiesburg MPA include nonmetallic mineral product manufacturing, chemical manufacturing, food manufacturing, building material and garden equipment and supplies dealers, beverage and tobacco product manufacturing, paper manufacturing, and wood product manufacturing. Economic theory suggests that many of these industries, which produce

consumable products, tend to be located close to points of consumption in order to reduce transportation costs and maximize profits.

Several of the industry subsectors in the top 10 also speak to the Hattiesburg MPA's specializations, such as petroleum and coal products manufacturing. Some of the subsectors mentioned as serving basic needs above may also be specialized subsectors, such as food manufacturing.

Table 5.7 Top 10 Freight-Generating Industry Subsectors by Weight in the MPA, 2011

Rank	Subsector	Tonnage	Percentage
1	Merchant Wholesalers, Durable Goods	6,306,424	55.2%
2	Nonmetallic Mineral Product Manufacturing	1,370,598	12.0%
3	Petroleum and Coal Products Manufacturing	741,543	6.5%
4	Merchant Wholesalers, Nondurable Goods	671,950	5.9%
5	Chemical Manufacturing	520,631	4.6%
6	Food Manufacturing	426,718	3.7%
7	Building Material and Garden Equipment and Supplies Dealers	380,765	3.3%
8	Beverage and Tobacco Product Manufacturing	330,259	2.9%
9	Paper Manufacturing	315,199	2.8%
10	Wood Product Manufacturing	80,477	0.7%

Note: Only includes freight from major freight-generating establishments in IHS database.

Source: Transearch; IHS Freight Finder

Major Commodities Transported

Commodity flows are not available for the Hattiesburg area from the FHWA's Freight Analysis Framework. However, commodity flow data from Transearch/IHS Freight Finder was obtained. According to this data, the following six commodities make up approximately 90 percent of the total freight tonnage generated by major freight-generating establishments in the MPA in 2011:

1. Non-metallic Minerals (54 percent);
2. Bulk Movement in Boxcars (11 percent);
3. Chemical or Allied Products (8percent);
4. Clay, Concrete, Glass or Stone Products (7 percent);
5. Coal (5 percent); and
6. Food or Kindred Products (5 percent).

Tables 5.8 and 5.9 illustrate the differences between the top ten commodities for inbound (Table 5.8) and outbound (Table 5.9) freight by weight for all major freight-generating establishments in the MPA.

Table 5.8 Top 10 Commodities Shipped to Major Freight Generating Establishments by Weight

	Goods	Tons	Percent
1	Non-metallic Minerals	1,543,829	34.9%
2	Chemicals or Allied Products	800,523	18.1%
3	Coal	628,185	14.2%
4	Bulk Movement in Boxcars	321,259	7.3%
5	Petroleum or Coal Products	317,936	7.2%
6	Food or Kindred Products	251,470	5.7%
7	Farm Products	212,179	4.8%
8	Clay, Concrete, Glass or Stone Products	143,261	3.2%
9	Lumber or Wood Products, excluding Furniture	90,267	2.0%
10	Waste or Scrap Materials	36,716	0.8%

Source: Transearch; IHS Freight Finder, 2011

Table 5.9 Top 10 Commodities Shipped from Major Freight Generating Establishments by Weight

	Goods	Tons	Percent
1	Non-metallic Minerals	4,667,739	66.7%
2	Bulk Movement in Boxcars	947,400	13.5%
3	Clay, Concrete, Glass or Stone Products	693,370	9.9%
4	Food or Kindred Products	285,293	4.1%
5	Miscellaneous Freight Shipments	138,349	2.0%
6	Chemicals or Allied Products	83,451	1.2%
7	Lumber or Wood Products, excluding Furniture	78,095	1.1%
8	Pulp, Paper, or Allied Products	36,171	0.5%
9	Petroleum or Coal Products	34,680	0.5%
10	Waste or Scrap Materials	13,775	0.2%

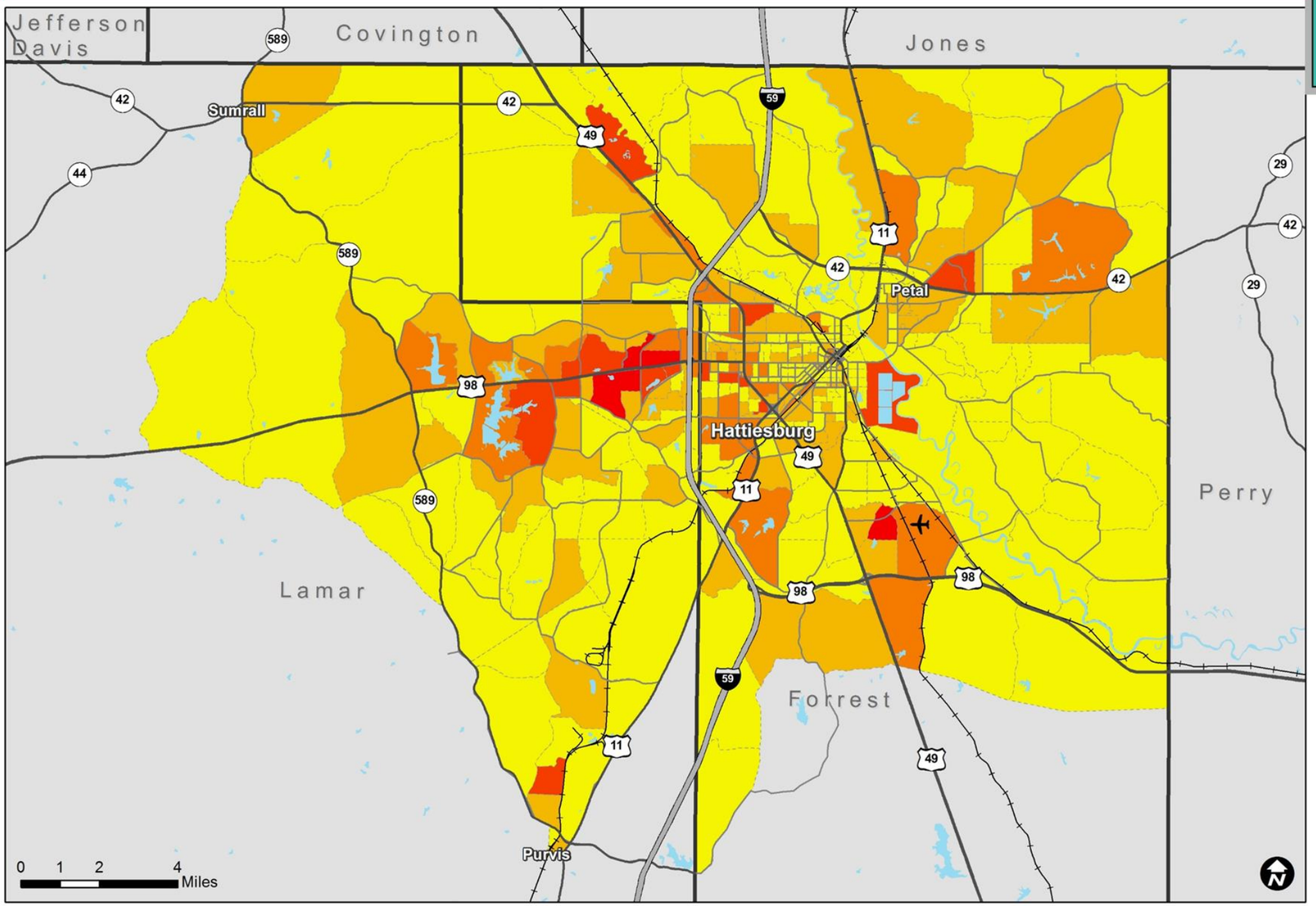
Source: Transearch; IHS Freight Finder, 2011

Generation of Freight Trips in MPO

There are many industrial, wholesale trade, commercial, and other establishments in the MPA that generate freight truck trips. Figure 5.14 illustrates the number of freight trips generated by TAZ.

This map shows that there are several clusters of relatively high freight demand in the MPA. These areas include the US 98/Hardy Street commercial corridor, the US 49 industrial corridor, the Hattiesburg-Forrest County Industrial Park; the Purvis-Lamar County Industrial Park; and smaller concentrations of freight demand such as the areas around the Petal Walmart and Marshall Durbin poultry plant.

FIGURE 5.14 FREIGHT TRUCK TRIP GENERATION, 2013



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Legend

Truck Trips Generated by TAZ

Least — Most

- Interstate
- Secondary Roadways
- Other Major Roadways in MPO
- Railroads
- Water
- Counties

Disclaimer: This map is for planning purposes only. Contact MPO Staff for more information.

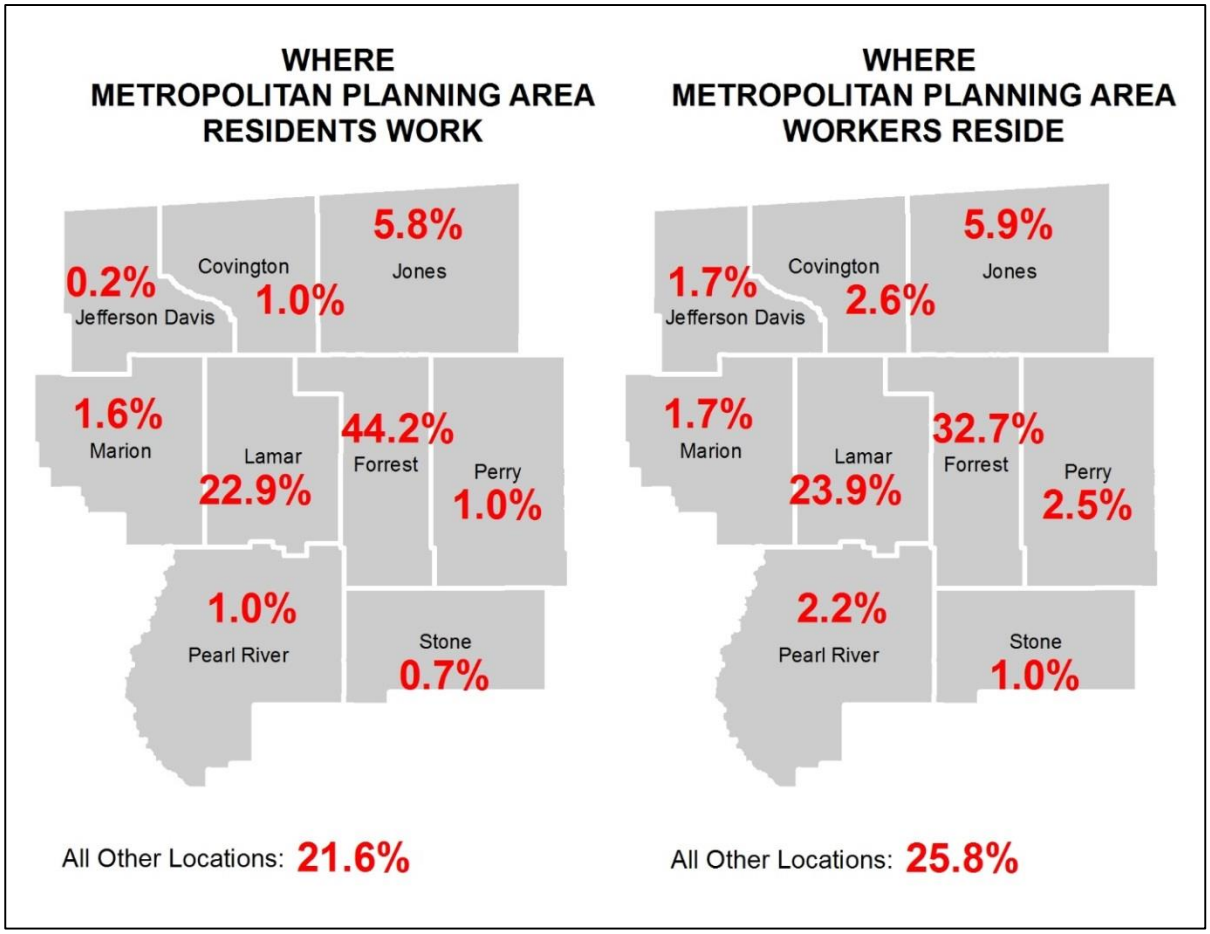
Map Source: Neel-Schaffer, Inc.

Data Sources: Hattiesburg Regional Travel Demand Model

5.5 Travel Patterns

Commuting patterns shed some light on travel patterns, even though work trips only account for approximately 20 percent of all trips. The Census Bureau's Longitudinal Employer-Household Dynamics (LEHD) program provides detailed commuting data. Commuting patterns from this dataset are illustrated in Figure 5.15 below.

Figure 5.15 Commuting Patterns within the Combined Statistical Area



Source: LEHD 2013

Most MPA residents work in the two counties within the MPA. However, about 33 percent work outside the MPA, with adjacent Jones County (5.8 percent), Harrison County (2.9 percent), and Hinds County (2.7 percent) being the three largest outside destinations.

Only about 57 percent of the workers are also residents in the MPA. Of all outside sources of MPA workers, Jones County (5.9 percent), Harrison County (2.7 percent), and Covington County (2.6 percent) are the three largest. For some of the surrounding

counties, especially the more rural counties, workers commuting to the Hattiesburg MPA make up a significant percentage of their county's total workforce.

As illustrated in Figure 5.16, travel time to work is relatively short within the MPA. From 2009 to 2013, there were no census tracts where the mean travel time to work was over 46 minutes. Virtually all workers reside in tracts that have mean commute times under 30 minutes. Commute times are shortest in tracts near major employment centers, such as the Midtown area and Hattiesburg CBD.

Table 510 shows that, from 2009 to 2013, just over 80 percent of commuters in the MPA counties drove alone to work and 10 percent carpool. Walking and biking to work was uncommon, as was commuting by transit. However, there are areas where commuting by walking or by public transit are more likely to occur, as illustrated in Figure 5.17.

Areas with higher rates of commuting by transit and walking are mostly located around the University of Southern Mississippi and in low-income tracts near the Hattiesburg CBD. These areas appear to somewhat relate to areas where a high percentage of households lack regular access to a vehicle, as shown in Figure 5.18.

There are some areas in the MPA where over 20 percent of households do not have regular access to a vehicle. Overall though, about 7 percent of all MPA households do not have access to a vehicle.

Table 5.10 Means of Transportation to Work in Metropolitan Planning Area Counties

	Commuters	Percent of Total
Total	57,067	100.0%
Drove Alone	47,789	83.7%
Carpooled	5,856	10.3%
Other	1,528	2.7%
Walked	1,407	2.5%
Bicycled	271	0.5%
Rode Transit	216	0.4%

Note: Commuters excludes those that work at home.

Source: Census Bureau, 2009-2013 ACS

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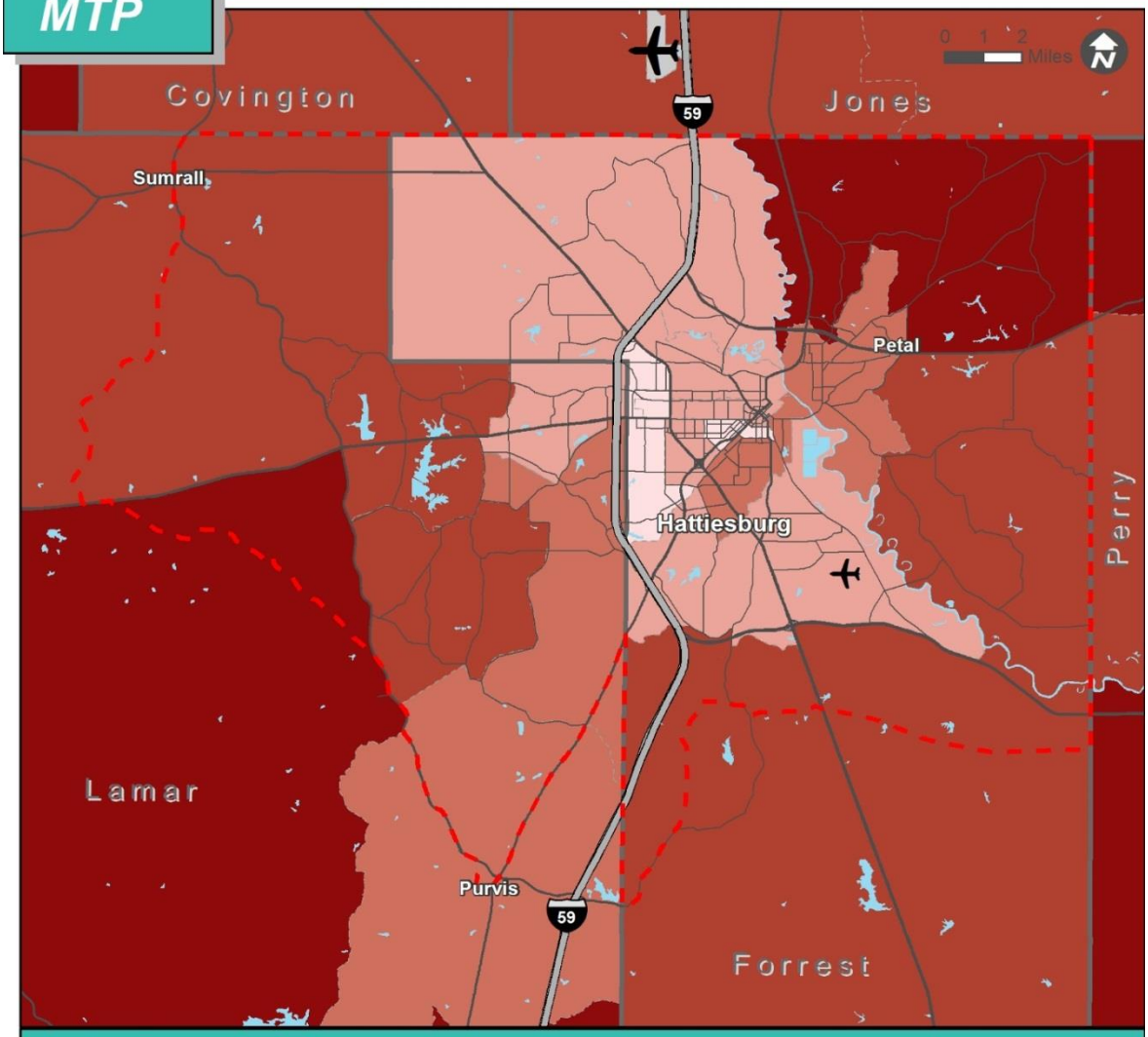
FIGURE 5.16 MEAN TRAVEL TIME TO WORK



Legend

Census Tracts

Mean Commute Time (minutes)

- 10 - 15
- 16 - 20
- 21 - 25
- 26 - 30
- 31 - 46

- Metropolitan Planning Area
- Interstates
- Secondary Roadways
- Other Roadways in MPA
- Water Bodies
- Counties

Note: Areas with no resident workers are shown in gray.

Disclaimer: This map is for planning purposes only.

Map Source: Neel-Schaffer, Inc.

Data Sources: 2009-2013 ACS

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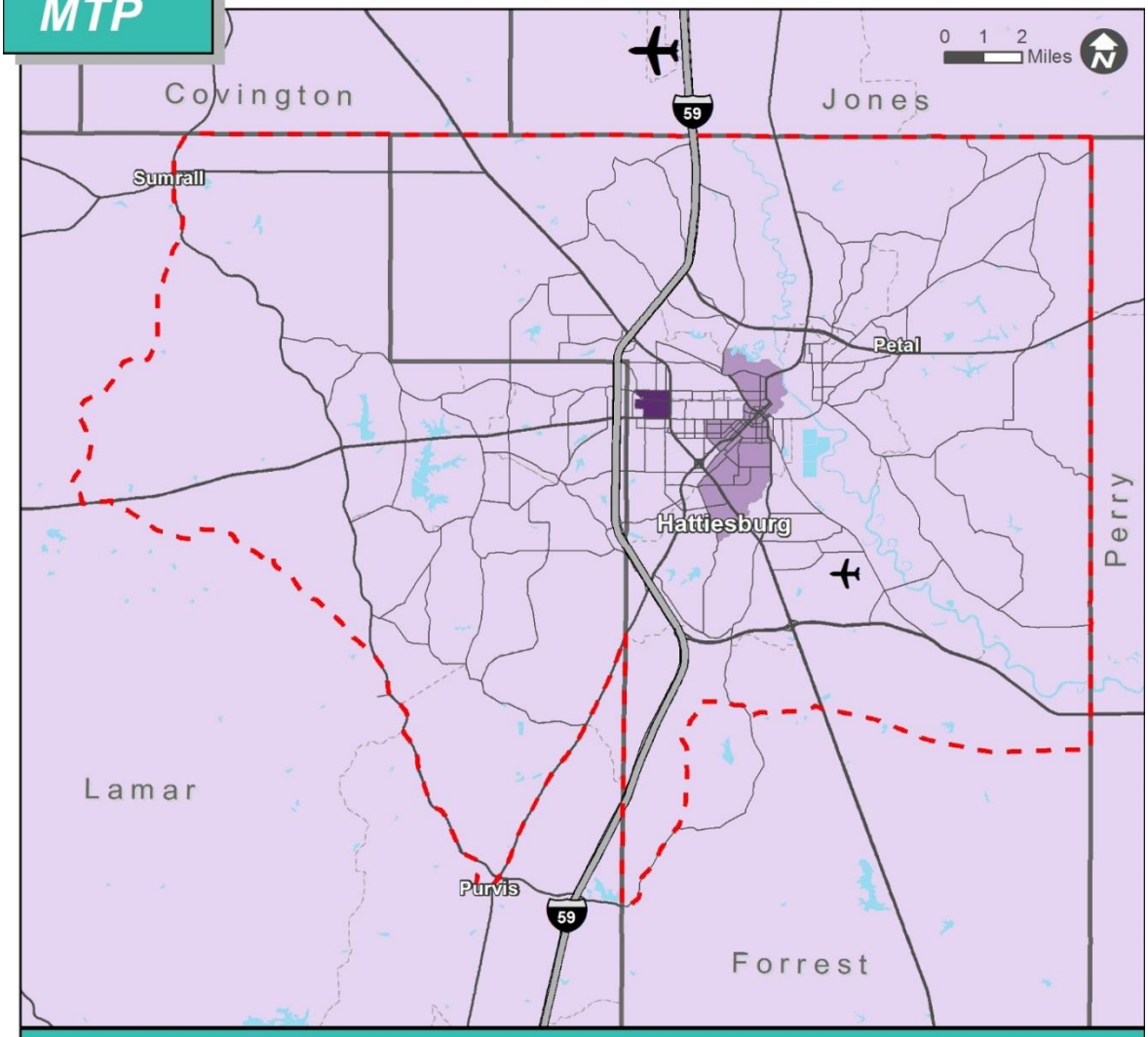
FIGURE 5.17 WORKERS COMMUTING BY TRANSIT OR WALKING



Legend

Census Tracts

Workers Commuting by Transit or Walking

- 0% - 5%
- 6% - 10%
- 11% - 20%
- Above 20%

- Metropolitan Planning Area
- Interstates
- Secondary Roadways
- Other Roadways in MPA
- Water Bodies
- Counties

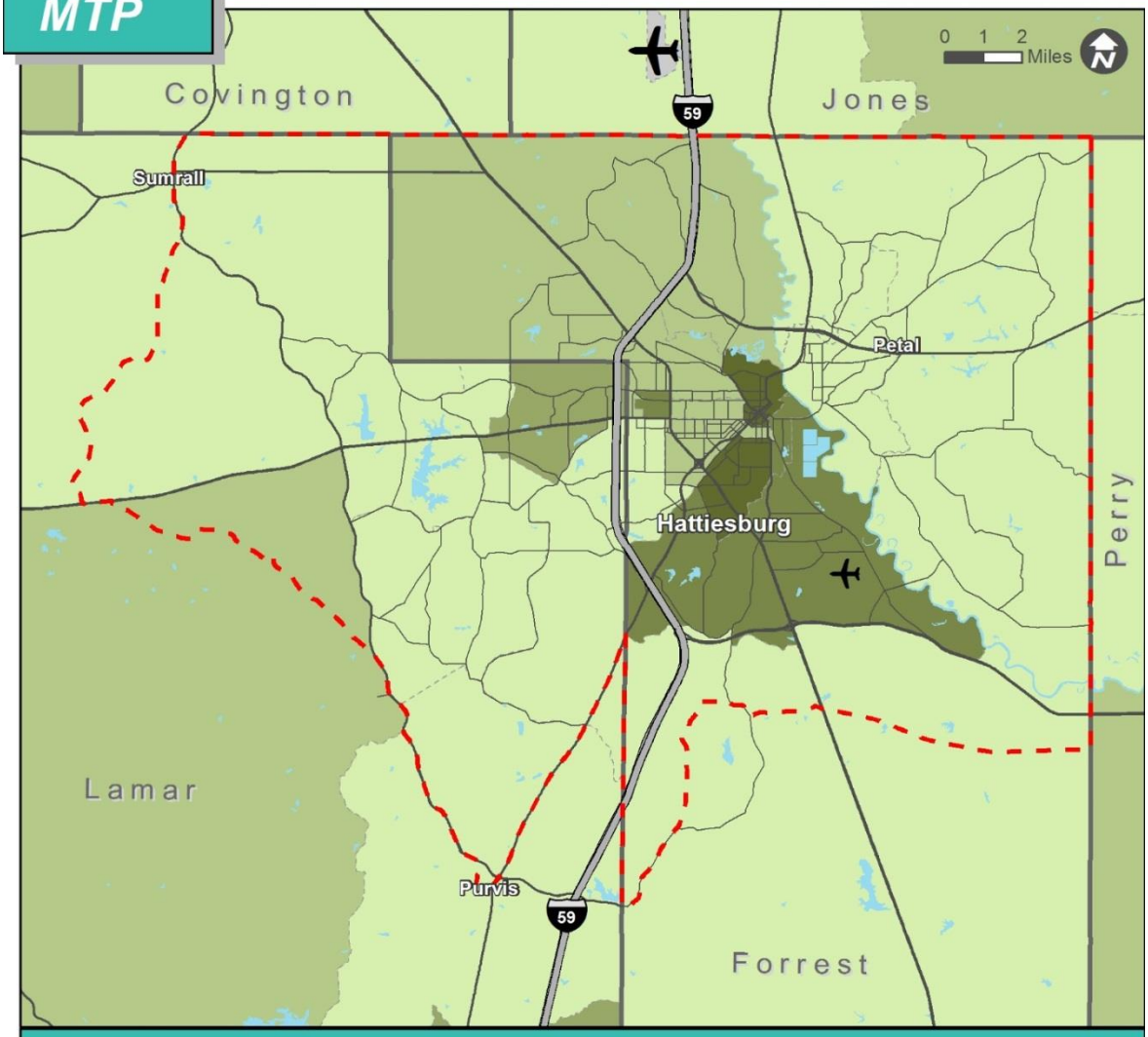
Disclaimer: This map is for planning purposes only.

Map Source: Neel-Schaffer, Inc.

Data Sources: 2009-2013 ACS

2040 MTP

FIGURE 5.18 HOUSEHOLDS WITH NO ACCESS TO A VEHICLE



Legend

Census Tracts

Percentage of Households with No Vehicle

- 0% - 5%
- 6% - 10%
- 11% - 15%
- 16% - 20%
- Over 20%

- Metropolitan Planning Area
- Interstates
- Secondary Roadways
- Other Roadways in MPA
- Water Bodies
- Counties

Note: Areas with no households are shown in gray.

Disclaimer: This map is for planning purposes only.

Map Source: Neel-Schaffer, Inc.

Data Sources: 2009-2013 ACS

6.0 The Existing Transportation System

Planning for future transportation system improvements starts with evaluating the existing transportation system. This chapter identifies the conditions and characteristics of the existing transportation system.

6.1 Roadways and Bridges

The region's roadways and bridges are used by personal motor vehicles, public and private transportation providers, freight trucks, and bicyclists. For this reason the region's roadways and bridges are of great importance.

For households in small urbanized areas like Hattiesburg, traveling by motor vehicle is the primary means of transportation. According to the 2009 National Household Travel Survey (NHTS), approximately 75 percent of all household trips in urbanized areas with populations between 50,000 and 200,000 were made in a motor vehicle. This means that the condition of the MPO's roadways and bridges affect the overwhelming majority of household travel.

The needs of bicyclists, public transit, and freight will be discussed in greater detail later in this chapter. The focus of this section will be on household travel by motor vehicle.

The Roadway Network

Several federal and state highways serve the study area. These facilities constitute the main network of roadways in the area. The most significant of these facilities are described in Table 6.1.

Table 6.1 Major Roadways

Roadway	Description
I-59	I-59 begins at an intersection with I-10/I-12 in Slidell, LA and travels north to I-24 near Chattanooga, TN. It travels through the study area from south to north, proceeding through Hattiesburg on the western side of the study area.
US 49	US 49 begins in Gulfport, MS at its intersection with US 90, proceeding northward to Hattiesburg and Jackson, and ending in Piggott, AR at US 62. US 49 proceeds through the study area from southeast to northwest.
US 98	US 98 proceeds from west to east through the study area, part of which is along Hardy Street. This highway begins in Natchez, MS at US 84 and ends in Palm Beach, FL at FL A1A.
US 11	US 11 parallels I-59 through the study area, and this highway was the original north-south highway through the study area from New Orleans, LA to Meridian, MS.
MS 42	MS 42 proceeds through the study area from west to east connecting Sumrall and Petal. A portion of this highway runs concurrently with US 49 and I-59, and another portion is designated as the Evelyn Gandy Parkway.

Roadway	Description
MS 589	MS 589 traverses through the western end of the study area from south to north connecting Sumrall and Purvis.
MS 198	MS 198 connects I-59 to US 49 from west to east, along Hardy Street. This highway is an old alignment of US 98.

Roadways by Functional Classification

Each type of roadway serves a function in the overall roadway network. Roadways are divided into functional classes based on their intended balance of mobility (speed) and access to adjacent land. Their designs vary in accordance with this functional classification.

Interstates: These facilities are divided highways with full control of access and grade separations at all intersections. The controlled access character of interstates results in high-lane capacities, which are three times greater than the individual lane capacities of urban arterial streets.

Expressways: These facilities provide for movement of large volumes of traffic at relatively high speed, and are primarily intended to serve long trips. Expressways have some grade separated intersections, while the majority of the intersections are widely spaced and signalized.

Arterials: These facilities are important components of the overall transportation system. They serve both as feeders to interstates and expressways, and as principal travel ways between major land use concentrations within the study area. Arterials are typically divided facilities (undivided where right-of-way limitations exist) with relatively high traffic volumes and traffic signals at major intersections. The primary function of arterials is to move traffic; they are the main means of local travel. A secondary function of arterials is land access.

Collectors: These facilities provide both land service and traffic movement functions. Collectors serve as intermediate feeders between arterials and local streets and primarily accommodate short distance trips. Since collector streets are not intended to accommodate long through trips, they are generally not continuous for any great length.

Local Streets: The sole function of these facilities is to provide access to immediately adjacent land. Within the local street classification, three subclasses are established to indicate the type of area served: residential, industrial, and commercial. These streets are not included in the computer network, with the exception of a few segments that provide connectivity in the model network and improve the reliability of the model.

Figure 6.1 illustrates the functional classification of the Hattiesburg MPA's roadways and Table 6.2 summarizes this information by centerline miles and lane miles.

Table 6.2 Roadway Model Network Lane Mileage by Functional Class

Functional Class	Centerline Miles		Lane Miles	
	Miles	Percent	Miles	Percent
Interstate	22	6.7%	89	10.3%
Principal Arterial	62	18.8%	256	29.6%
Minor Arterial	76	22.7%	170	19.6%
Collector	172	51.8%	350	40.5%
Total	**332**	**100.0%**	**865**	**100.0%**

Note: Does not include local roads

Source: Hattiesburg Regional Travel Demand Model

Roadways by Maintenance Responsibility

Since most roadways are local roads, it is not surprising that nearly 60 percent of roadways are maintained by counties or municipalities, as indicated in Table 6.3 and illustrated in Figure 6.2. All of the principal arterials and many of the minor arterials are state highways or federal highways and are state-maintained roadways. All of the roadways classified functionally as local are maintained by a county or municipal agency. Most collectors are also maintained by a county or municipal agency.

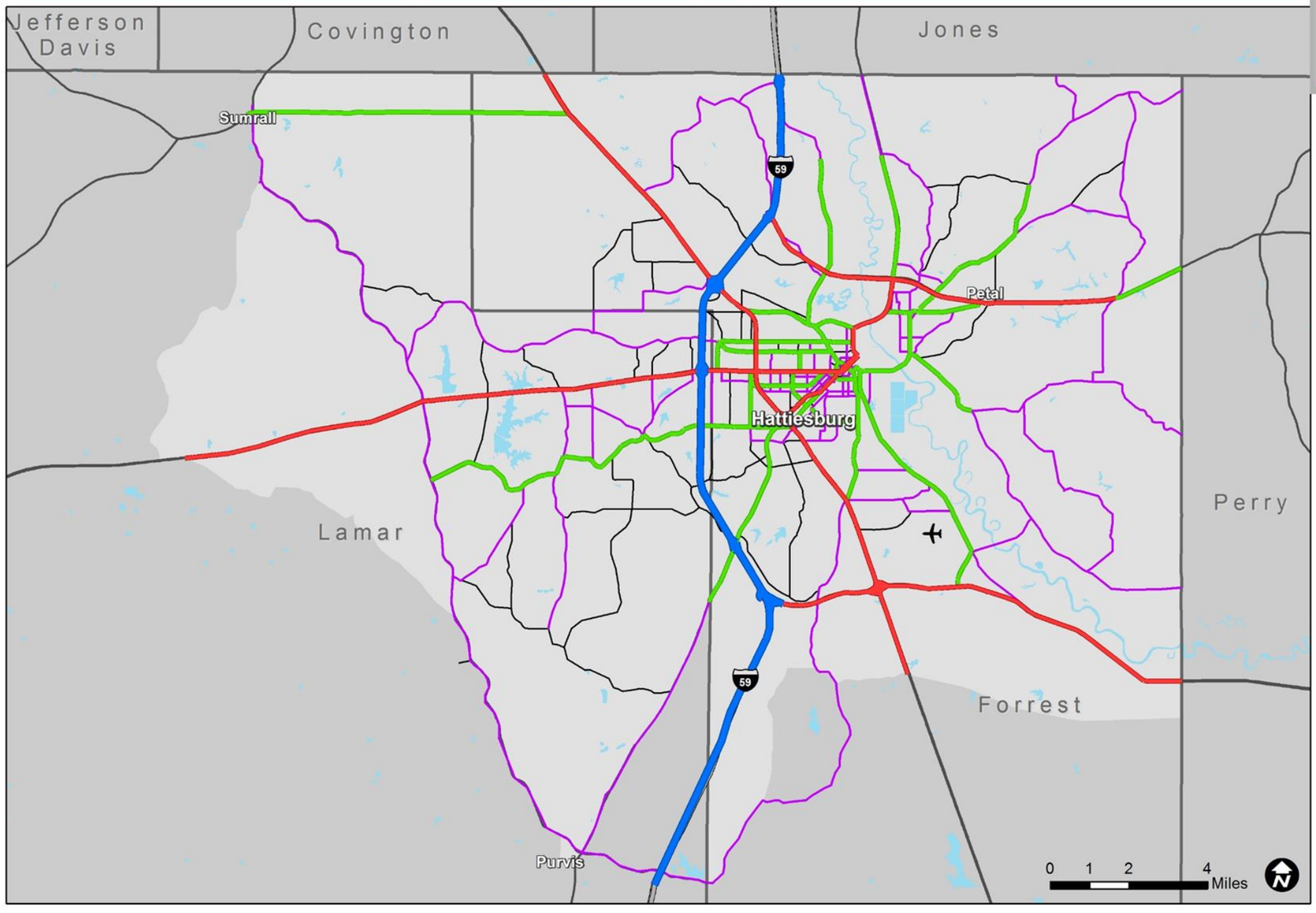
Table 6.3 Roadway Network Centerline Mileage by Maintenance Responsibility

Maintenance Responsibility	Centerline Miles		Lane Miles	
	Miles	Percent	Miles	Percent
State	134	40.4%	449	51.9%
County or Municipality	198	59.6%	416	48.1%
Total	**332**	**100.0%**	**865**	**100.0%**

Note: Excludes local roads

Source: Hattiesburg Regional Travel Demand Model

FIGURE 6.1 FUNCTIONAL CLASSIFICATION OF ROADWAYS



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Legend

Functional Classification:

- Interstate
- Principal Arterial
- Minor Arterial
- Collector
- Local

Roadways Outside MPA:

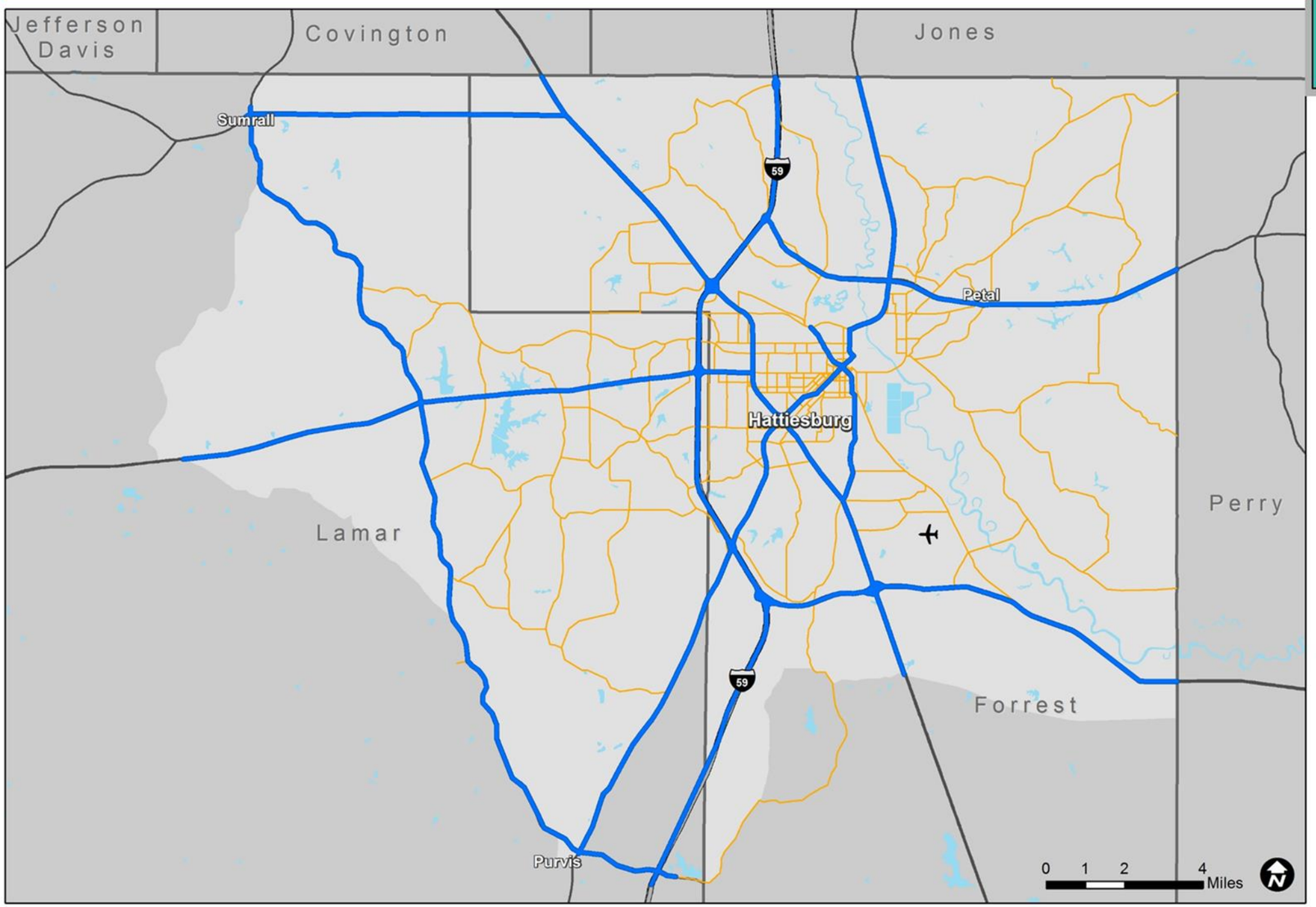
- Interstate
- Secondary Roadways
- Water Bodies
- Metropolitan Planning Area
- Counties

Disclaimer: This map is for planning purposes only. Contact MPO Staff for more information.

Map Source: Neel-Schaffer, Inc.

Data Sources: Hattiesburg Regional Travel Demand Model

FIGURE 6.2 ROADWAY MAINTENANCE RESPONSIBILITY IN MPA



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Maintenance Responsibility of Model Network Roadways:

- State (MDOT)
- Local (County or Municipality)

Roadways Outside MPA:

- Interstate
- Secondary Roadways
- Water Bodies
- Metropolitan Planning Area
- Counties

Disclaimer: This map is for planning purposes only. Contact MPO Staff for more information.

Map Source: Neel-Schaffer, Inc.

Data Sources: Hattiesburg Regional Travel Demand Model

Pavement Conditions

Maintaining sufficient pavement conditions ensure that roadways operate at their full capacities and provide roadway users with safer, more comfortable travel experiences that minimize vehicle wear and tear.

Results from the 2040 MTP public input meeting showed that road and bridge conditions were one of the public's top priorities. In a funding allocation exercise where the public was asked to allocate future transportation dollars by improvement type, the public allocated over one-third of all funding to maintaining roads. On average, the public rated their current satisfaction with road and bridge conditions as fair.

Pavement Conditions on National Highway System

Pavement condition ratings for all interstates and a sample of non-interstate National Highway System (NHS) pavements were determined using the 2013 Highway Performance Monitoring System (HPMS) data submitted by MDOT to the Federal Highway Administration (FHWA). The HPMS is a national level highway information system that includes data on the extent, condition, performance, and use and operating characteristics of the nation's highways. HPMS data is sample data, collected across the entire federal-aid eligible system, for interstate, arterial and collector networks. The pavement condition provided is based on the International Roughness Index (IRI), cracking, rutting, and faulting.

As part of the implementation of the Moving Ahead for Progress in the 21st Century Act (MAP-21) signed into law in 2012, pavement condition performance monitoring will be required by MPOs in the near future. The proposed performance measures classify pavement conditions using a combination of data from the HPMS, including IRI, cracking, rutting, and faulting. All pavements on the NHS will be classified as either in good, fair, or poor condition. Because the 2013 HMPS data only provides the IRI rating, this is what is used to discuss existing pavement conditions for the MTP.

Table 6.4 shows the percentage of the Hattiesburg MPA's NHS and additional lane miles that are currently in good, fair, poor, and very poor condition based on the IRI. The ranges for IRI values in Table 6.4 are consistent with what proposed FHWA rulemaking indicates will be federal performance measure thresholds with the exception of very poor, which is intended to further distinguish pavement conditions. Approximately four percent of the total NHS lane miles and approximately six percent of the total lane miles with data are in poor or very poor condition.

It is important to note that the 2013 HPMS data is nearly three years old and does not account for recent repaving or reconstruction of roadways since at least January, 2013.

Figure 6.3 shows that the worst pavement conditions are around the Hattiesburg Central Business District (CBD) and US 49 northwest of I-59. All of the interstate system in the MPA is in fair or better condition.

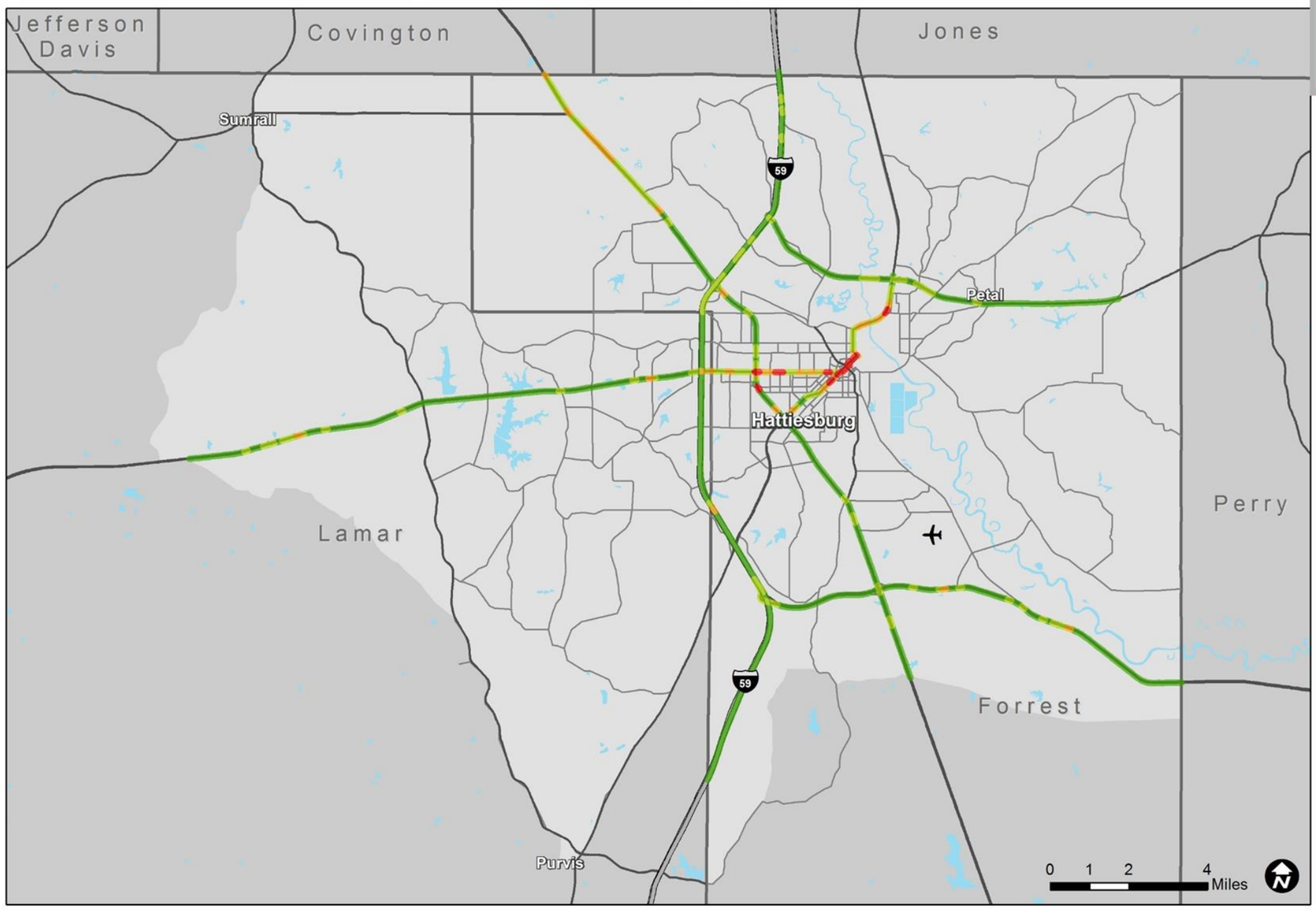
Table 6.4 Pavement Condition for Roadways

IRI Rating	NHS Routes[1]		All Routes with Data[2]	
	Lane Miles	Percent of Total	Lane Miles	Percent of Total
Good (<95)	232.9	78.2%	237.5	75.2%
Fair (95-170)	53.0	17.8%	58.6	18.5%
Poor (170-220)	10.0	3.4%	15.4	4.9%
Very Poor (>220)	1.9	0.6%	4.4	1.4%
Total	**297.7**	**100.0%**	**315.9**	**100.0%**

Note: [1]Includes all NHS routes except for STRAHNET Connector along Weldy Rd.
[2]Only additional route is US 11 from US 49 to MS 42.

Source: USDOT, 2013 Highway Performance Monitoring System

FIGURE 6.3 ROADWAY PAVEMENT CONDITIONS



2040 MTP

Legend

Major Roadway Segments with Data

IRI Rating

- 30 - 94 (Good Condition)
- 95 - 170 (Fair Condition)
- 171 - 220 (Poor Condition)
- 221 - 400 (Very Poor Condition)
- Interstates
- Secondary Roadways
- Other Major Roadways in MPO
- Other Water Bodies
- Metropolitan Planning Area
- Counties

Disclaimer: This map is for planning purposes only. Contact MPO Staff for more information.

Map Source: Neel-Schaffer, Inc.

Data Sources: USDOT, 2013 Highway Performance Monitoring System

Bridge Conditions

Bridges are a critical part of the overall transportation network, serving as important connections over waterways, providing grade separation between roadways and other transportation facilities, and connecting transportation facilities to each other. Bridges must be maintained and upgraded as needed to ensure that they are not serving as safety or environmental hazards, bottlenecks, or limitations to freight movement.

As previously mentioned, results from the 2040 MTP public input meeting showed that the public places a high priority on maintaining the current transportation system. In a funding allocation exercise where the public was asked to allocate future transportation dollars by improvement type, the public allocated over one-third of all funding to maintaining roads, which includes bridges. On average, the public rated their current satisfaction with road and bridge conditions as fair.

There are nearly 350 bridges within, or within close proximity, to the Hattiesburg MPA. Most of these are crossing waterways, but there are also many structures crossing over other roadways and railroads. According to National Bridge Inventory (NBI) data, no bridges are of historic significance in the Hattiesburg MPA inventory.

Bridge Conditions and Sufficiency Ratings

Bridge conditions for all bridges in the United States with public roads passing above or below are included in the NBI which defines bridges to include bridge-length culverts. This data source is updated annually and provides valuable condition information.

As part of the implementation of MAP-21, bridge condition performance monitoring will be required by MPOs in the near future. The proposed performance measures for bridges are the percentage of NHS bridges classified as being in good condition and the percentage of NHS bridges classified as being in poor condition. The proposed definition of good and poor are based on a structure's deck, superstructure, and substructure rating or culvert rating.

Table 6.5 shows the number and percentage of bridges classified by FHWA condition for both NHS bridges alone and for all bridges. Nearly all of the bridges on the NHS system in the MPA are in fair or good condition. Nineteen bridges in the Hattiesburg MPA are defined as poor by the proposed FHWA standards. Figure 6.4 shows the location of bridges in poor condition. Only two of the bridges in poor condition are on NHS routes.

Table 6.5 Bridges by Condition

Condition	NHS Bridges in MPA		All Bridges in MPA	
	Number	Percent	Number	Percent
Good Condition	53	72.6%	210	61.8%
Fair Condition	18	24.7%	59	17.4%
Poor Condition	2	2.7%	19	5.6%
No Data	0	0.0%	52	15.3%
Total	**73**	**100.0%**	**340**	**100.0%**

Source: National Bridge Inventory

FHWA may use the deck area of bridges to define the percentage of NHS bridges classified as being in good condition and poor condition. Table 6.6 shows this breakdown for both NHS and all bridges in the Hattiesburg MPA. The percentage of deck area in poor condition for both the NHS and for all bridges is higher than the percentage of the number of bridges in poor condition. This indicates that the bridges in poor condition are relatively large in size.

Table 6.6 Bridge Deck Area by Condition

Condition	NHS Bridges in MPA		All Bridges in MPA	
	Square Meters	Percent	Square Meters	Percent
Good Condition	62,561	78.4%	111,302	76.2%
Fair Condition	10,693	13.4%	25,272	17.3%
Poor Condition	6,584	8.2%	9,567	6.5%
Total Deck Area	**79,838**	**100.0%**	**146,141**	**100.0%**

Note: About 15 percent of bridges did not have deck dimensions. Culverts also do not have deck dimensions.

Source: National Bridge Inventory

Another way of evaluating bridge condition is their sufficiency rating assigned in the NBI. Historically, in order to be eligible for federal funds for bridge rehabilitation or replacement, a bridge must have a sufficiency rating of 80 or lower for rehabilitation and below 50 for replacement. Table 6.7 shows that 19 bridges, just over five percent of all bridges, in the Hattiesburg MPA may warrant replacement while another 94 may warrant rehabilitation. Figure 6.4 illustrates the sufficiency ratings of bridges in poor condition.

Table 6.7 Bridges by Sufficiency Rating

Sufficiency Rating	NHS Bridges in MPA		All Bridges in MPA	
	Number	Percent	Number	Percent
Above 80	54	74.0%	175	51.5%
50-80	19	26.0%	94	27.6%
Less than 50	0	0.0%	19	5.6%
No Data	0	0.0%	52	15.3%
Total	**73**	**100.0%**	**340**	**100.0%**

Source: National Bridge Inventory

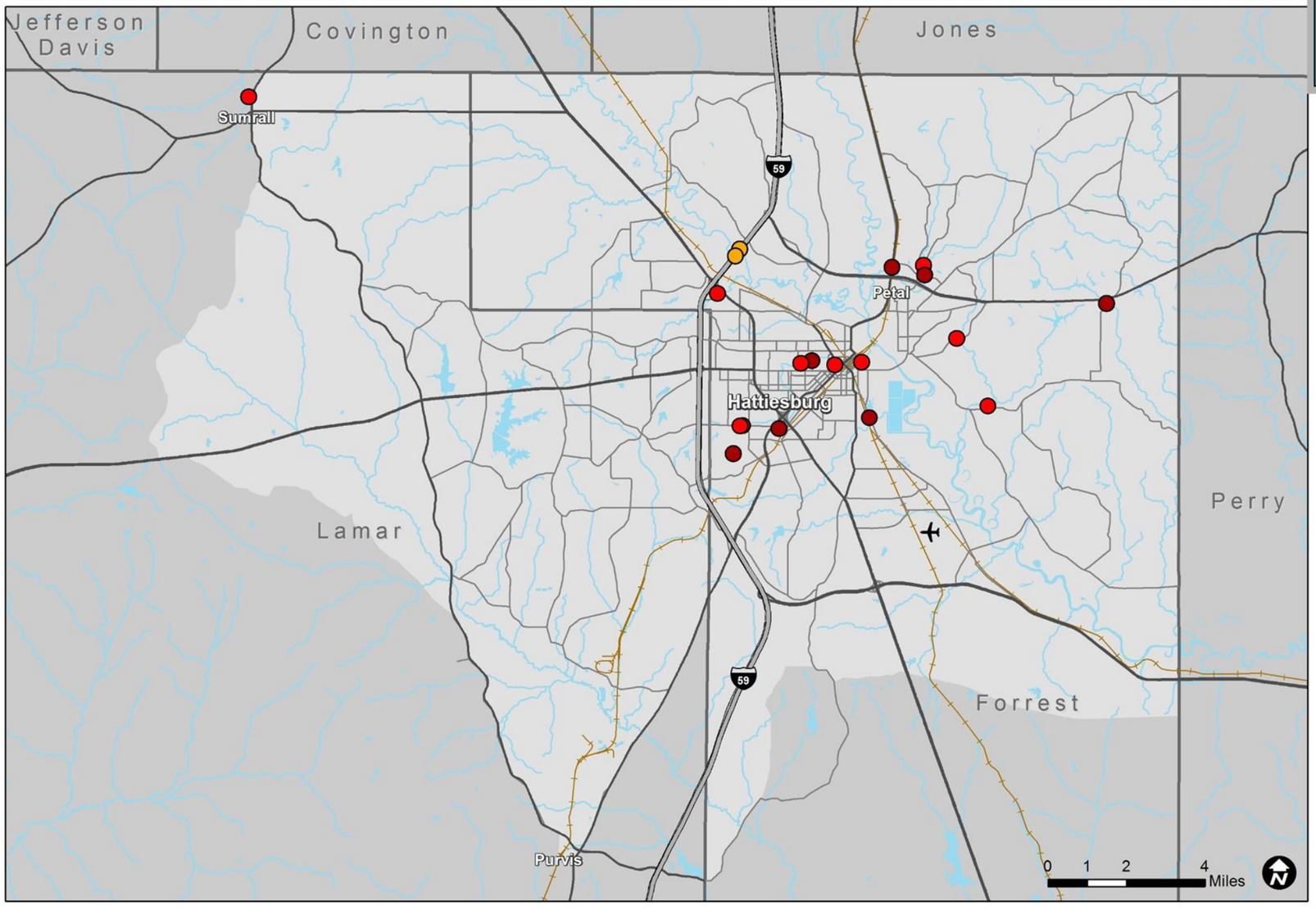
Structurally Deficient and Functionally Obsolete Bridges

Aside from the sufficiency rating, bridges constructed more than ten years ago in the NBI are evaluated to determine if they are either "structurally deficient" or "functionally obsolete." Neither of these designations necessarily means that a bridge is unsafe. Structural deficiency is characterized by deteriorated conditions of significant bridge elements and potentially reduced load-carrying capacity. A "structurally deficient" bridge typically requires significant maintenance and repair to remain in service and would eventually require major rehabilitation or replacement to address the underlying deficiency. A bridge is considered "functionally obsolete" when it does not meet current design standards (for criteria such as lane width), either because the volume of traffic carried by the bridge exceeds the level anticipated when the bridge was constructed and/or the relevant design standards have been revised. Addressing functional obsolescence may require the widening or replacement of the structure.

There are 19 structurally deficient bridges in the Hattiesburg MPA, two of which are on the NHS. There are also an additional 34 functionally obsolete bridges in the MPA, none of which are on the NHS.

In addition to the two bridge condition performance measures which MPOs must track, all states must ensure that no more than ten percent of the total deck area of NHS bridges in the state is classified as structurally deficient.

FIGURE 6.4 SUFFICENCY RATING OF BRIDGES IN POOR CONDITION



2040 MTP

Legend

Sufficiency Rating of All Bridges in Poor Condition*

- 7 - 25
- 26 - 50
- 51 - 63
- Interstates
- Secondary Roadways
- Other Major Roadways in MPO
- Railroads
- Streams
- Other Water Bodies
- Metropolitan Planning Area
- Counties

Note: *All bridges in poor condition in the MPA are Structurally Deficient.

Disclaimer: This map is for planning purposes only. Contact MPO Staff for more information.

Map Source: Neel-Schaffer, Inc.

Data Sources: USDOT, 2013 National Bridge Inventory

Traffic, Congestion, and Reliability

The number of daily trips by trip purpose in 2013, as estimated by the Travel Demand Model is summarized in Table 6.8. This data shows that just over one in thirteen vehicle trips is originating outside of the MPA and that internal commercial and truck vehicle trips (e.g., freight, taxi, etc.) account for about one in ten vehicle trips. Most household vehicle trips originating in the MPA begin or end at home.

Table 6.8 Daily Vehicle Trips by Purpose, 2013

Trip Purpose	Vehicle Trips	Percent
Home-Based Work	83,706	16.5%
Home-Based Other	183,361	36.0%
Non-Home Based	97,181	19.1%
Commercial Vehicle	32,995	6.5%
Truck	9,829	1.9%
External-Internal	88,296	17.3%
External-External	13,852	2.7%
Total	**509,220**	**100.0%**

Source: Hattiesburg Travel Demand Model, NSI

Table 6.9 shows how these trips are distributed onto the modeled transportation network, which excludes most of the local roads. Most of the delay (about 74 percent) is estimated to occur on the principal arterials and interstates, which are also where most vehicle miles traveled and vehicle hours occur. Conversely, there is little delay estimated to occur on collectors and travel on these roadways only account for 16 percent of vehicle miles traveled and 18 percent of vehicle hours traveled.

Table 6.9 Roadway System Travel Characteristics, 2013

Functional Class	Daily Vehicle Miles Traveled (VMT)		Daily Vehicle Hours Traveled (VHT)		Daily Vehicle Hours of Delay	
	Number	Percent	Number	Percent	Number	Percent
Interstate	621,013	23.77%	11,219	16.70%	1,877	12.40%
Principal Arterial	1,134,731	43.44%	30,592	45.54%	9,269	61.24%
Minor Arterial	442,742	16.95%	13,551	20.17%	2,291	15.14%
Collector	413,955	15.85%	11,813	17.59%	1,698	11.22%
Total	**2,612,441**	**100.00%**	**67,175**	**100.00%**	**15,134**	**100.00%**

Source: Hattiesburg Travel Demand Model, NSI

Figure 6.5 confirms that vehicular traffic in the Hattiesburg MPA is greatest on I-59, US 98, and US 49. These areas have estimated average daily volumes exceeding 30,000 vehicles.

Traffic is better understood when roadway capacities are taken into account. Volume to capacity (V/C) ratios are often used to illustrate congestion on roadway segments. Figure 6.6 shows these V/C ratios for the major roadways in the Hattiesburg MPA. Currently only twelve roadway segments, summarized in Table 6.10, exceed a V/C ratio of 1.00. These twelve segments are mostly near the intersections of roadways and/or at interstate interchanges with high traffic volumes with a V/C ratio range of 1.00 to 1.59. This suggests that peak period congestion is currently an issue in the Hattiesburg MPA.

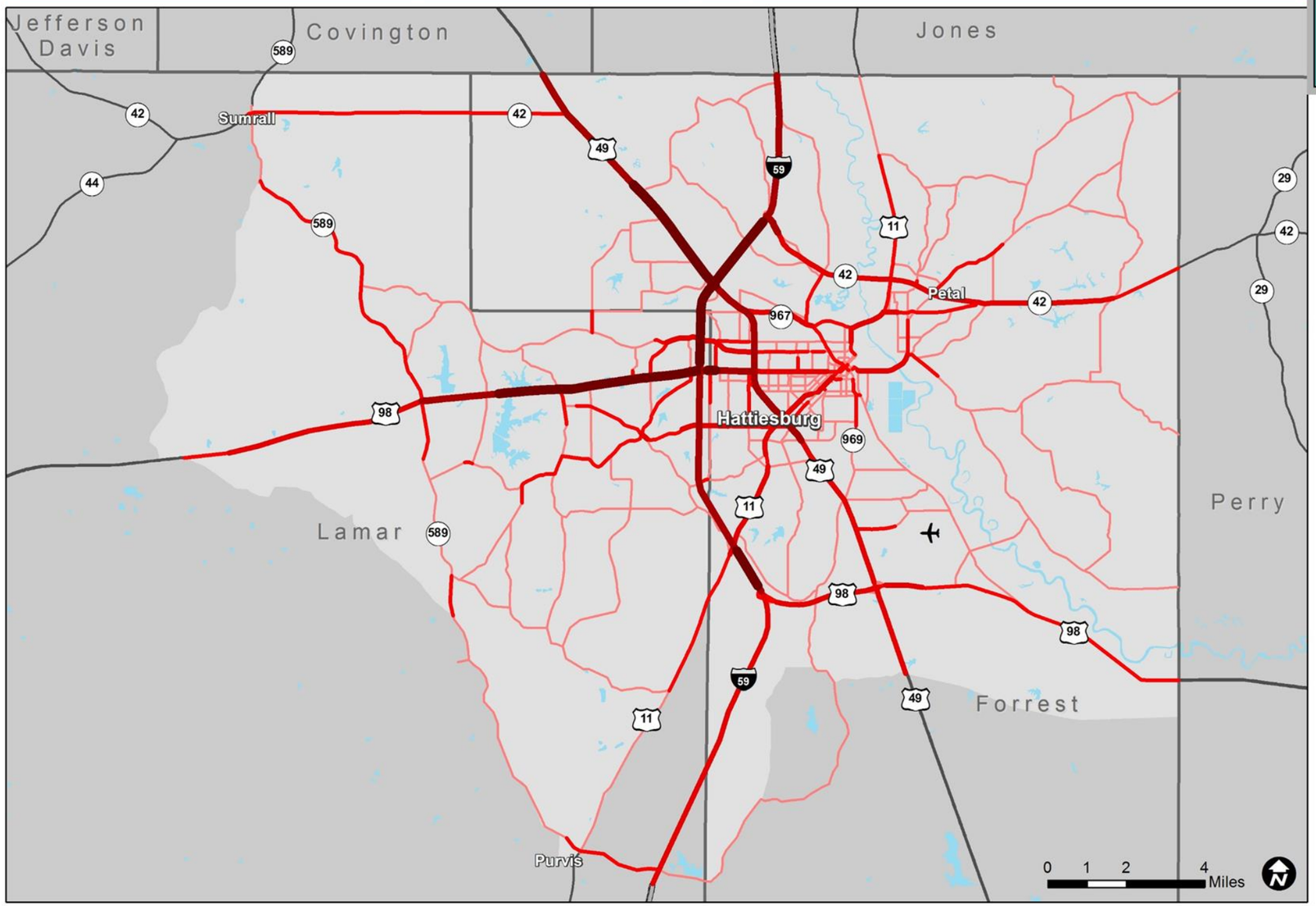
Table 6.10 Roadway Corridors with Volumes Exceeding Capacity, 2013

Roadway	From/To	Length (miles)
US 98	W Lake Rd to King Rd	1.56
US 98	Lakewood Dr to Weathersby Rd	0.19
US 98	Mayfair St to Coca Cola Dr	0.20
US 98	Westover Dr to N 38th Ave	0.64
I-59 NB Clover On-Ramp	@ US 98	0.12
I-59 C-D Rd	I-59 NB Clover On-Ramp to I-59 NB On-Ramp	0.20
I-59 NB On-Ramp	I-59 C-D Road to I-59	0.04
I-59 SB Off-Ramp	@ US 98	0.21
W 4th St	Westover Dr to N 38th Ave	0.76
MS 42	SB Ramps to NB Ramps on I-59	0.11
MS 42	0.3 mi N of Peps Point Rd to Rawls Springs Rd	1.13
MS 42	Blackwell Blvd to Rawls Springs Loop Rd	0.29

Source: Hattiesburg Travel Demand Model, NSI

While most of the region's roadways do not have daily volumes that exceed their daily capacities, there may still be congestion issues at specific times, notably peak periods. Travel time reliability addresses this issue by evaluating how travel times vary in time, typically by time of day. For the purposes of the MTP, travel time reliability analysis will focus on peak periods. Reliability issues related to traffic incidents, construction, special events, or other events would require a more detailed analysis.

FIGURE 6.5 AVERAGE DAILY TRAFFIC ON ROADWAYS, 2013



2040 MTP

Legend

Modeled Network:

Average Daily Traffic

- 0 - 5,000
- 5,001 - 10,000
- 10,001 - 20,000
- 20,001 - 30,000
- 30,000 - 65,000

Roadways Outside MPA:

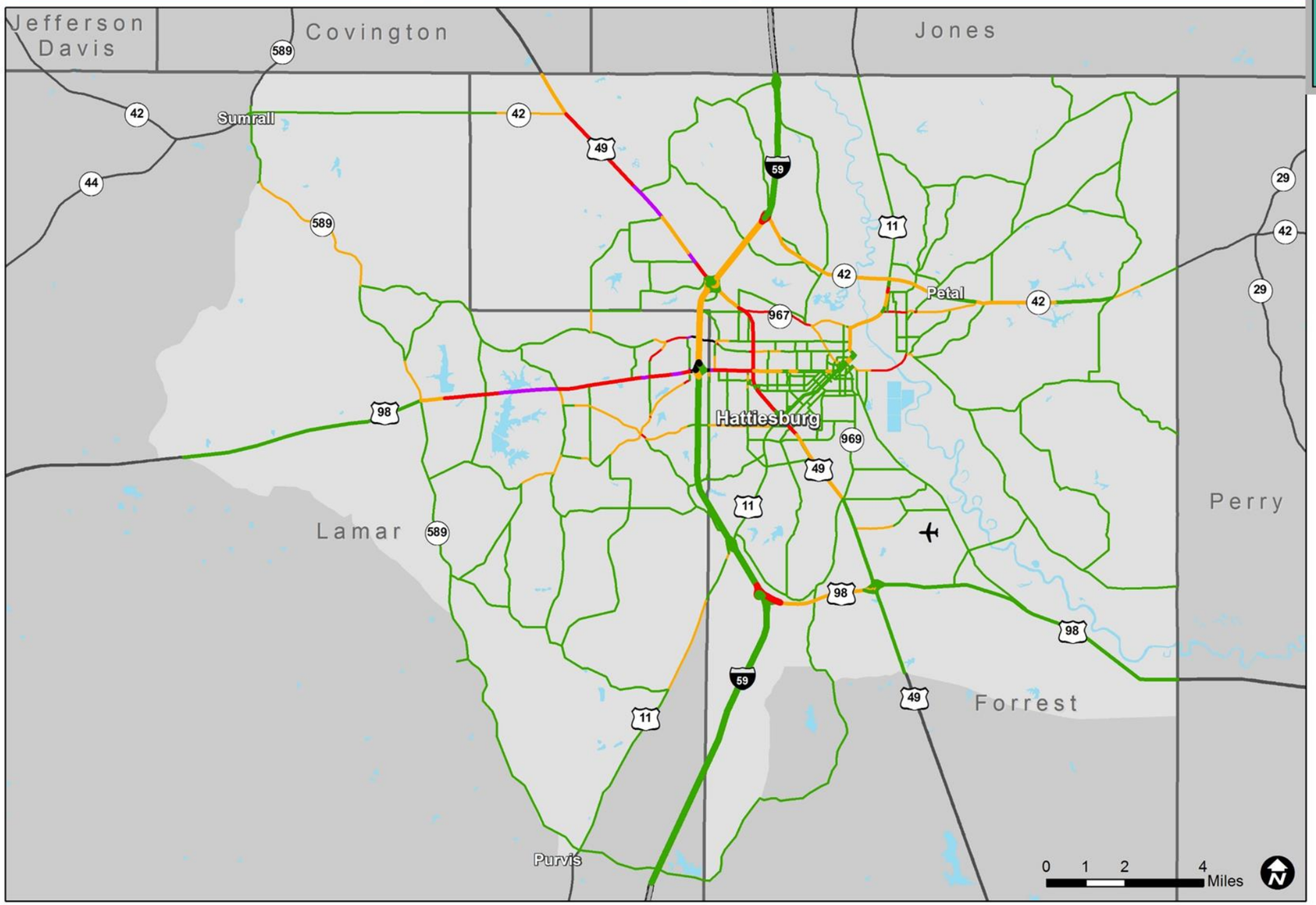
- Interstate
- Secondary Roadways
- Water Bodies
- Metropolitan Planning Area
- Counties

Disclaimer: This map is for planning purposes only. Contact MPO Staff for more information.

Map Source: Neel-Schaffer, Inc.

Data Sources: Hattiesburg Regional Travel Demand Model

FIGURE 6.6 EXISTING ROADWAY CONGESTION, 2013



2040 MTP

Legend

Modeled Network:

Volume/Capacity Ratio

- 0.00 - 0.50
- 0.51 - 0.75
- 0.76 - 1.00
- 1.01 - 1.20
- 1.21 - 1.60

Roadways Outside MPA:

- Interstate
- Secondary Roadways
- Water Bodies
- Metropolitan Planning Area
- Counties

Disclaimer: This map is for planning purposes only. Contact MPO Staff for more information.

Map Source: Neel-Schaffer, Inc.

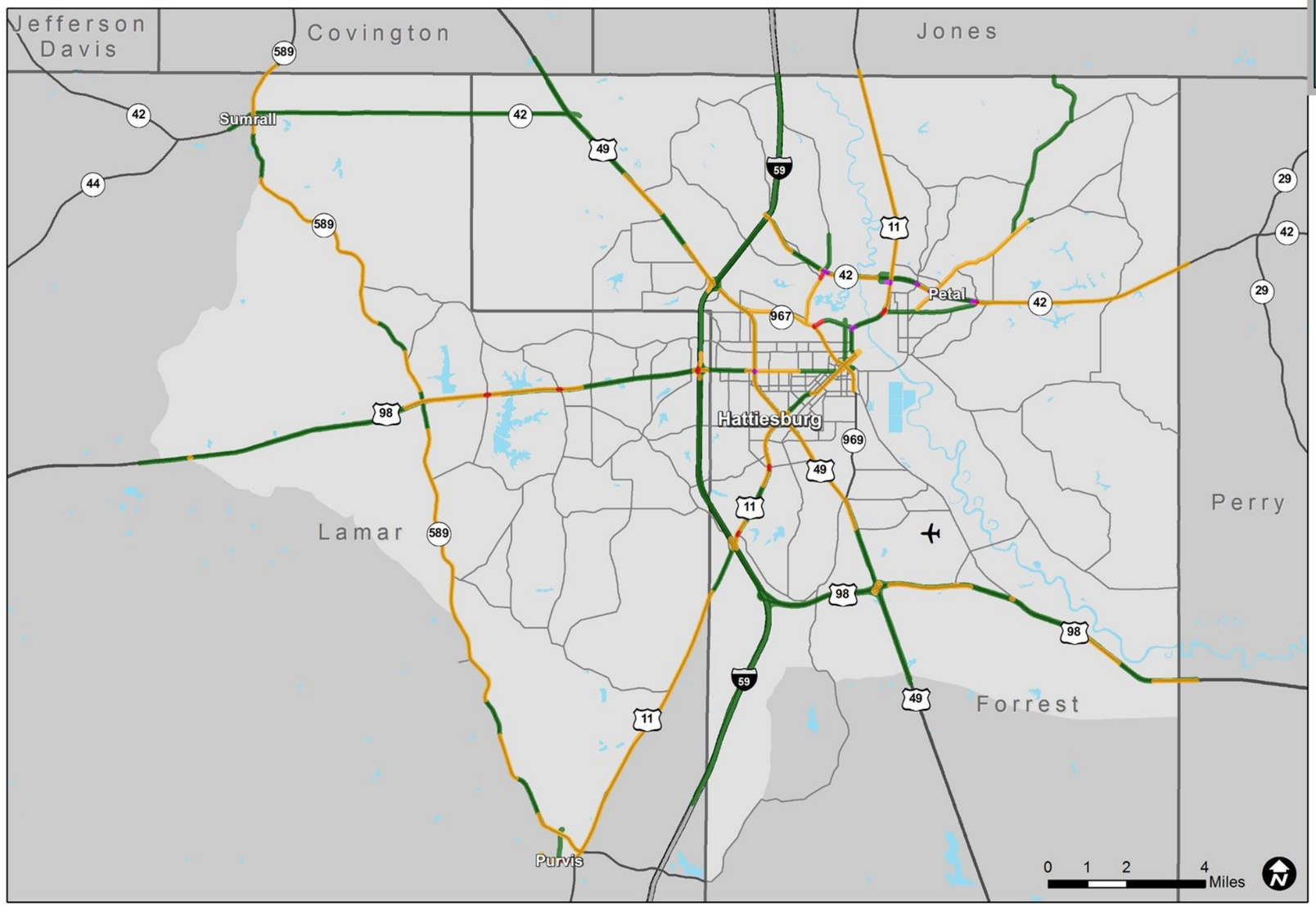
Data Sources: Hattiesburg Regional Travel Demand Model

Figure 6.7 and Figure 6.8 show Travel Time Indices (TTI) for major roadways during AM and PM peak periods in the Hattiesburg MPA. The TTI is the ratio of actual travel time to free-flow travel time and illustrates areas that experience congestion during peak periods.

Travel time reliability overall is worse in the PM peak than in the AM peak. Typically, roadway segments that experience AM reliability issues also experience PM reliability issues. Areas experiencing relatively high peak-period congestion, as indicated by the TTI include:

- US 98 (Hardy Street) from Old US 11 to US 49
- Morriston Road and Mars Hill Road near Morriston.
- Several intersections in and around Petal.

FIGURE 6.7 TRAVEL TIME RELIABILITY, AM PEAK



2040 MTP

Legend

Travel Time Index:

- Under 0.80 (Very Unreliable)
- 0.81 - 0.90 (Unreliable)
- 0.91 - 1.00 (Somewhat Unreliable)
- 1.00 and Over (Very Reliable)
- Interstate
- Secondary Roadways
- Other Major Roadways in MPO
- Water Bodies
- Metropolitan Planning Area
- Counties

Notes: Data shows the Travel Time Index (TTI) for peak period weekday travel in 2013. For this map, the TTI is defined as the ratio of the observed 85th percentile speed during peak periods to the free-flow speed. Because of differences in data and methodologies, the values and breaks in values in this map should not be compared to other TTI values. It is intended to identify roadway segments of relative unreliability within the MPA.

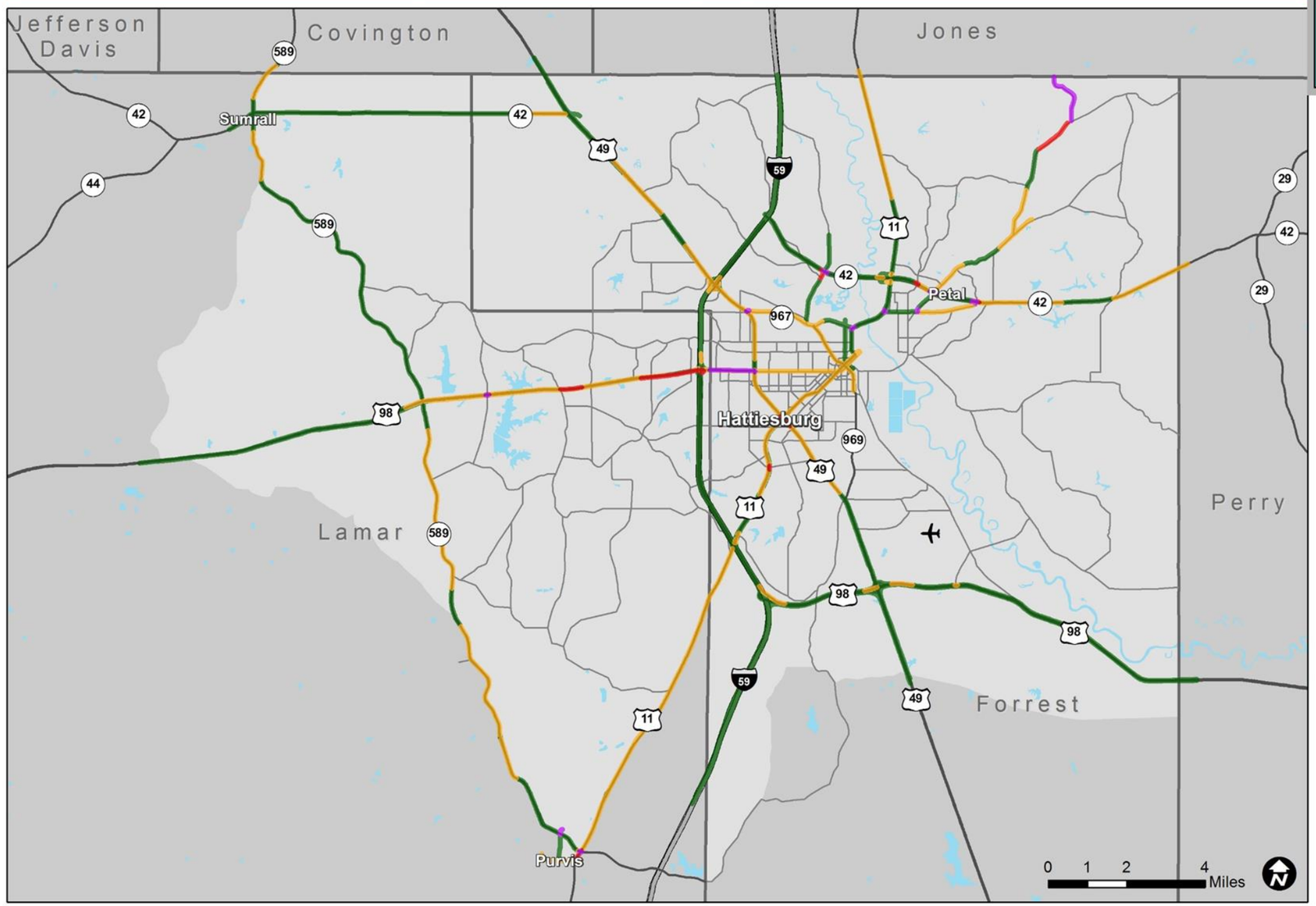
The morning peak is defined as 6:30 AM to 8:30 AM. The afternoon peak is defined as 4 PM to 6 PM. Free-flow speed is derived from the average 85th percentile speed of non-peak hours.

Disclaimer: This map is for planning purposes only. Contact MPO Staff for more information.

Map Source: Neel-Schaffer, Inc.

Data Sources: INRIX

FIGURE 6.8 TRAVEL TIME RELIABILITY, PM PEAK



2040 MTP

Legend

Travel Time Index:

- Under 0.80 (Very Unreliable)
- 0.81 - 0.90 (Unreliable)
- 0.91 - 1.00 (Somewhat Unreliable)
- 1.00 and Over (Very Reliable)
- Interstate
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Map Source: Neel-Schaffer, Inc.

Data Sources: INRIX

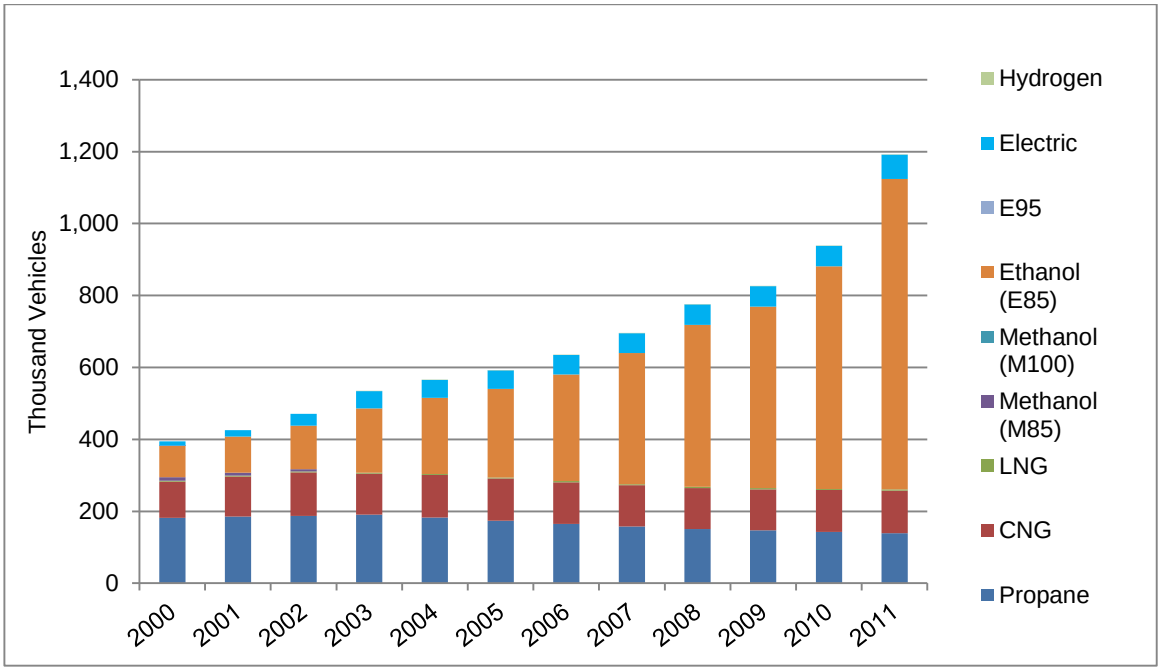
Alternative Fuel Vehicles and Stations

Alternative Fuel Vehicles (AFVs) are vehicles which rely on fuels that are substantially non-petroleum, yield substantial energy security benefits, and offer substantial environmental benefits. These include fuels such as liquefied petroleum gas (propane), Compressed Natural Gas (CNG), Liquefied Natural Gas (LNG), 85% and 100% Methanol (M85 and M100), 85% and 95% Ethanol (E85 and E95), electricity, and hydrogen. E85 and E95 should be distinguished from the more universal E10 and E15 fuels which have lower concentrations of ethanol and thus are not considered low-carbon. AFVs also include hybrid vehicles.

Existing Stock of AFVs

Local information on the number of AFVs in use was not available at the time of this plan. However, data from the U.S. Department of Energy's Alternative Fuels Data Center indicate that, nationally, the AFVs in widest use today are those that run on E85, propane, compressed natural gas, and electricity. The number of AFVs in use increased steadily from 1995 to 2011, largely due to federal policies that encourage and incentivize the manufacture, sale, and use of vehicles that use non-petroleum fuels. The popularity of ethanol vehicles grew widely during this time period while the number of other alternative fueled vehicles remained relatively constant.

Figure 6.9 Alternative Fuel Vehicles in Use in United States, 2000-2011



Source: U.S. Department of Energy, Alternative Fuels Data Center

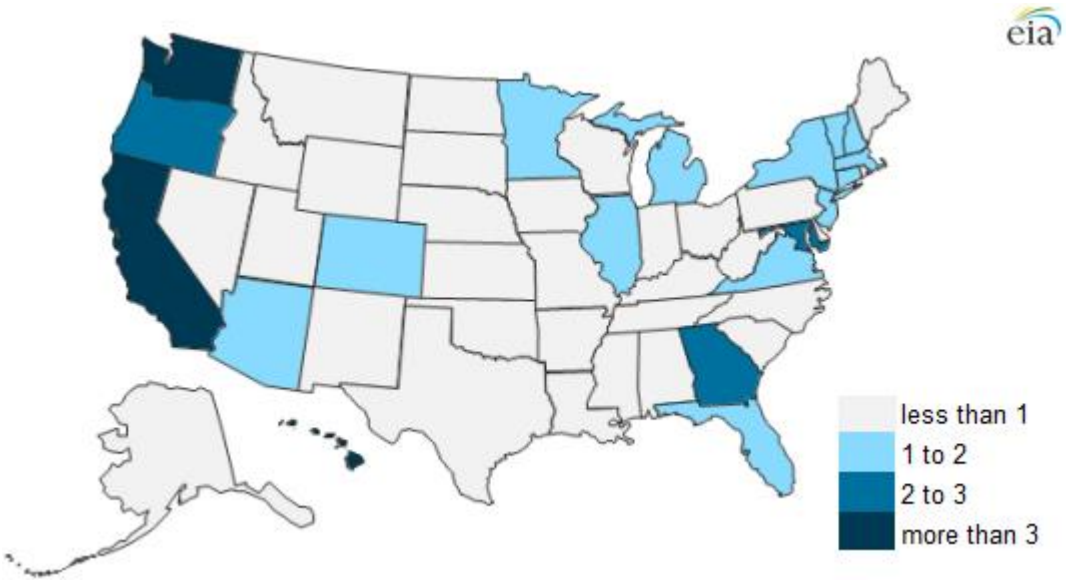
Though the federal dataset that tracked AFVs in use up to 2011 does not have more recent information available, recent data from other sources show that the number of electric vehicles has begun to steadily increase. At the same time, there is growing concern that biofuels such as ethanol may have an overall environmental impact that is worse than petroleum based fuels, once indirect emissions and land use impacts are taken into account.

According to 2013 data from the U.S. Energy Information Administration's *Annual Energy Outlook*, the most popular alternative fuel sources for cars and light-duty trucks in the U.S. are E85 (flex-fuel vehicles) and electricity (hybrid electric vehicles and plug-in electric vehicles). In 2013, ethanol AFVs accounted for slightly over five percent of all cars and light-duty trucks, which includes fleet vehicles. Electric AFVs only accounted for slightly over one percent.

While AFVs are gaining market share amongst light-duty household and fleet vehicles, conventional fuel vehicles (gasoline and diesel) accounted for nearly 99% of all light-medium, medium, and heavy-duty trucks on the road in 2013.

It should be noted that the popularity of different AFVs varies greatly by region, with E85 AFVs being more popular in the Midwest and electric AFVs, especially plug-in electric vehicles, being more popular on the West Coast, as shown in Figure 6.10.

Figure 6.10 Plug-In Electric Vehicles per 1,000 Registered Vehicles



Source: U.S. Energy Information Administration, based on Federal Highway Administration data and R.L. Polk & Company. Published December 10, 2014

AFV Stations

At the national level, over 60% of all AFV stations are for electric vehicles and approximately 18% are for propane. E85 accounts for15% and CNG 5%. All other types are less than 1%. At the state level, Mississippi has not invested as heavily in AFV stations for electric vehicles, E85, or CNG. Instead, about 84% of the AFV stations are propane. It is important to note that publicly accessible AFV stations are constructed and managed both by private entities and local governments.

The availability of AFV stations in the Hattiesburg MPA mirrors that of Mississippi as a whole. There are four public AFV stations in the MPA: three for propane and one for electric vehicles. Per capita, the Hattiesburg MSA has an above average number of propane stations and below average number of electric stations. The national average and top five small MSAs are shown in tables 6.12 and 6.13 for comparison.

Table 6.11 Alternative Fuel Vehicle Stations in the Hattiesburg MPA

Facility	Address	County	Type
Blossman Gas Inc	5536 Highway 42 Hattiesburg, MS	Forrest	Propane
Herring Gas Co	594 Highway 589 Purvis, MS	Lamar	Propane
U-Haul	918 Broadway Dr Hattiesburg, MS	Forrest	Propane
Petro Automotive Group	6248 Highway 98 W Hattiesburg, MS	Lamar	Electric

Source: 2015 National Transportation Atlas

Table 6.12 Propane Vehicle Stations per Capita in Small MSAs (<250,000 pop.)

Rank	Metropolitan Statistical Area	Public Propane Fuel Stations	Population (2014)	Stations per 100,000
1	Wichita Falls, TX	8	151,536	5.3
2	Abilene, TX	8	166,900	4.8
3	Longview, TX	9	217,481	4.1
4	Bismarck, ND	5	126,526	4.0
5	Gadsden, AL	4	103,531	3.9
21	Hattiesburg, MS	4	149,312	2.7
		Average of Small MSAs with at least 1 station		1.6

Note: Includes planned and temporarily unavailable stations
Source: 2015 National Transportation Atlas; 2014 American Community Survey

Table 6.13 Electric Vehicle Stations per Capita in Small MSAs (<250,000 pop.)

Rank	Metropolitan Statistical Area	Public Electric Charging Stations	Population (2014)	Stations per 100,000
1	Corvallis, OR	15	86,316	17.4
2	Bloomington, IL	29	188,917	15.4
3	Kahului-Wailuku-Lahaina, HI	25	163,108	15.3
4	Wenatchee, WA	14	114,392	12.2
5	Napa, CA	16	141,667	11.3
142	Hattiesburg, MS	1	149,312	0.7
			Average of Small MSAs with at least 1 station	2.3

Note: Includes planned and temporarily unavailable stations
Source: 2015 National Transportation Atlas; 2014 American Community Survey

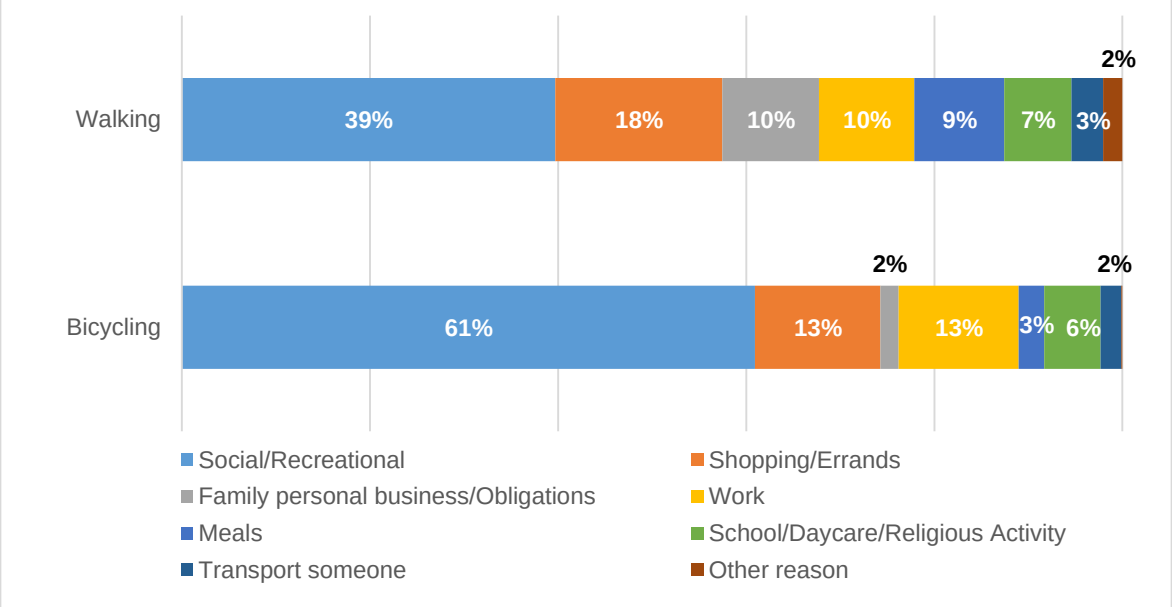
6.2 Bicycle and Pedestrian

Bicycle and pedestrian conditions are often discussed alongside each other. However, their role within the transportation system is very different. First of all, in small urbanized areas like Hattiesburg, the 2009 National Household Travel Survey (NHTS) indicates that walking accounts for 11 percent of all household trips while bicycling only accounts for one (1) percent. Pedestrian trips are not only more common, but they also are of critical importance for those who do not drive and physically cannot or choose not to bicycle.

Survey data showing trip purposes by mode also highlights some of the differences between walking and bicycling in small urbanized areas. While the predominant trip purpose for both walking and bicycling, aside from returning home, is social/recreational purposes, walking has a higher percentage of its trips that are utilitarian in nature, such as shopping/errands and family personal business/obligations. Furthermore, the percentage of all trips made by bicycling for social/recreational purpose is much higher than for walking.

It is important to note that while these household travel patterns represent urbanized areas on average, there are many areas where pedestrian and bicycle trips are more utilitarian and similar to overall travel patterns. Typically, this would be expected in areas with attractive pedestrian and bicycle environments that encourage walking and biking.

Figure 6.11 Walking and Bicycling Trip Purposes



Source: 2009 National Household Travel Survey

Existing Conditions

Sidewalk and Bicycle Facility Coverage

For the MTP, an inventory obtained from the city of Hattiesburg of existing sidewalks and bicycle facilities in the Hattiesburg MPA was used as a starting point. Figure 6.13 shows that sidewalks and bicycle facilities are not common throughout the MPA or even in all urban areas. Sidewalk coverage is best within the Central Business Districts (CBDs) of Hattiesburg, and to some extent near the University of Southern Mississippi (USM). Bicycle facilities are very sparse, though they are also more common near the Hattiesburg CBD and USM. It is worth noting that the Longleaf Trace extends westward beyond the MPA to Prentiss, MS.

Existing Traffic and Usage Patterns

No information on pedestrian or bicycle traffic is available for the Hattiesburg MPA. The distribution of demand will be discussed later, but for purposes of understanding actual usage of pedestrian and bicycle infrastructure, work and school trips are discussed.

As shown in Table 6.14, bicycle and pedestrian trips make up less than three (3) percent of work commute trips in the Hattiesburg MPA. However, this was not always the case, as illustrated in Figure 6.12. Hattiesburg, like many metropolitan areas in the Southeastern United States, saw extensive automobile-oriented suburban growth during the latter half of the 20th century. While this growth pattern enabled workers to live in larger houses on larger lots, it also meant that they typically lived too far from their workplace to make walking or biking to work an attractive option. In areas where transit was not available, this meant an almost complete reliance on the automobile to get to work, either by driving alone or carpooling.

For many of the same reasons that walking and biking to work decreased, school children have become less likely to walk or bike to school. Furthermore, in order to reduce operating and capital costs, new schools have tended to be fewer but larger and located at the urban fringe because of more affordable, available land. This is in marked contrast to the historical role of schools in American cities as a neighborhood anchor. According to the National Center for Safe Routes School's 2011 report, How Children Get to School:

- From 1969 to 2009, the percent of children 5 to 14 years of age that usually walked or bicycled to school dropped from 48 percent to 13 percent; and
- From 1969 to 2009, the percent of children in grades K–8 that lived within one mile of school dropped from 41 percent to 31 percent.

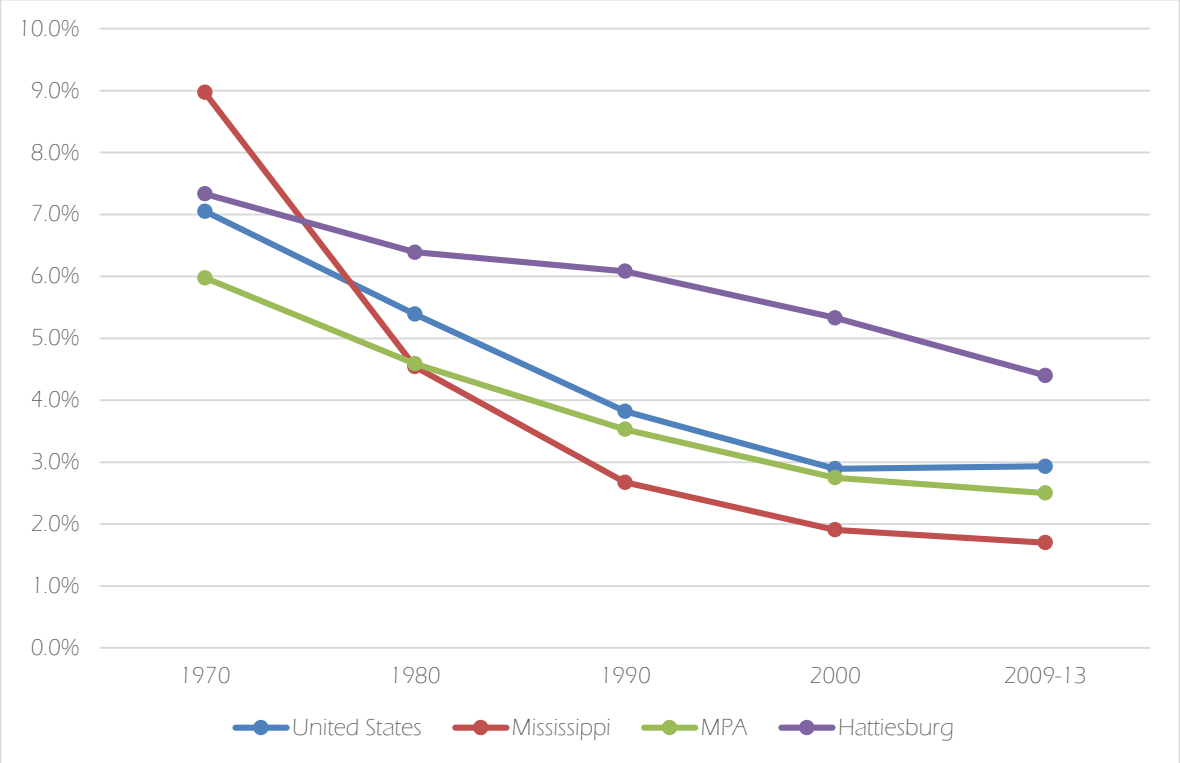
Table 6.14 Means of Transportation to Work

Mode	United States	Mississippi	MPA	Hattiesburg
Drove Alone	79.8%	85.6%	83.7%	80.0%
Carpooled	10.2%	11.0%	10.3%	10.4%
Rode Transit	5.2%	0.5%	0.4%	0.5%
Walked	2.9%	1.7%	2.5%	4.4%
Bicycled	0.6%	0.1%	0.5%	1.3%
Other	1.2%	1.2%	2.7%	3.3%

Note: Excludes those that worked at home. For MPA, mode share was derived from all block groups intersecting the MPA.

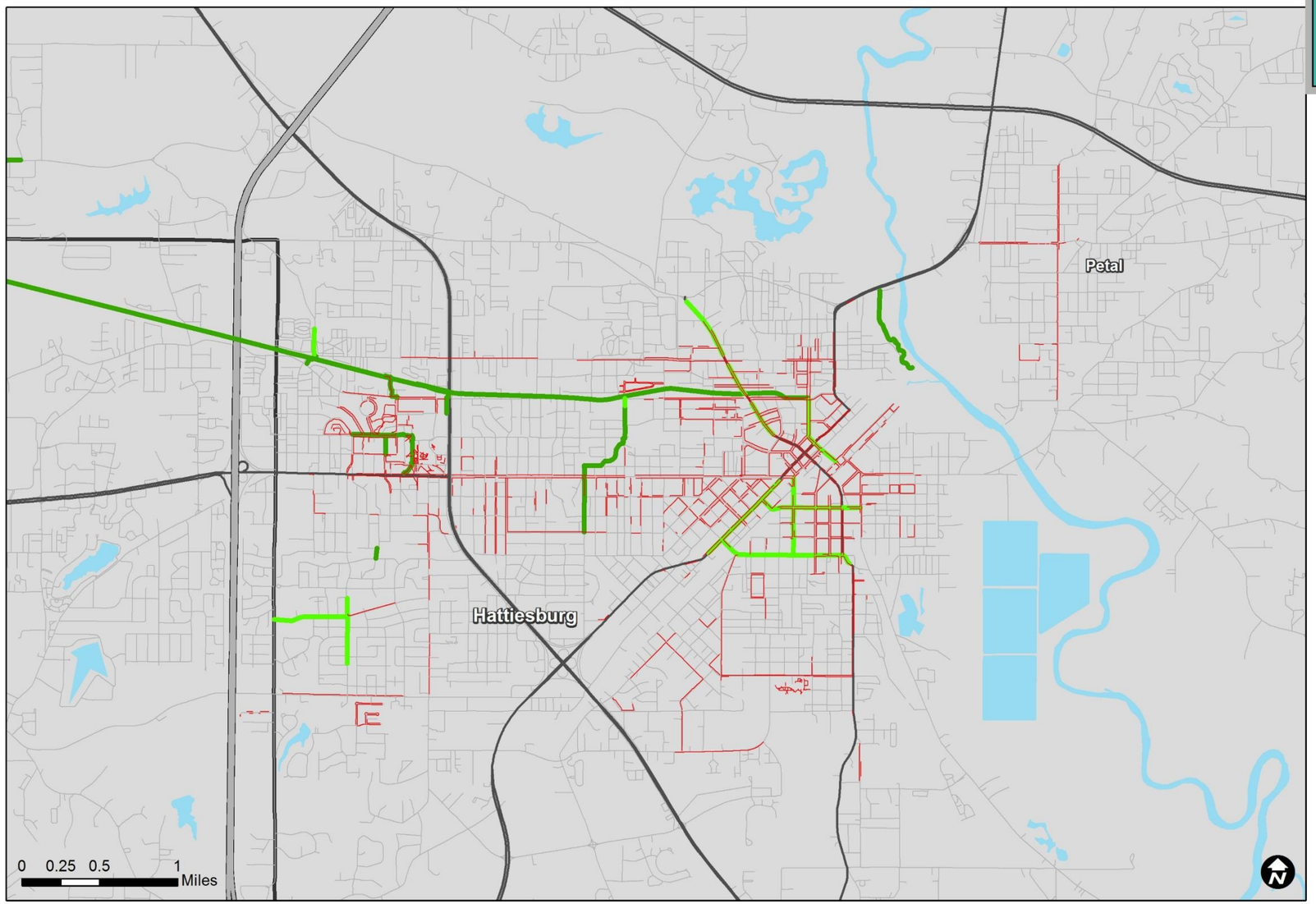
Source: 2009-2013 ACS

Figure 6.12 Percentage of Commuters Walking to Work, 1970-present



Source: National Historic Geographic Information Systems

FIGURE 6.13 EXISTING BICYCLE AND PEDESTRIAN FACILITIES



2040 MTP

Legend

- Existing Sidewalk
- Existing Shared Use Path
- Existing Bike Lane
- Interstate
- Secondary Roadways
- CombinedRoadsJacksonRd
- County Boundaries
- Water
- Metropolitan Planning Area

Disclaimer: This map is for planning purposes only. Contact MPO Staff for more information.

Map Source: Neel-Schaffer, Inc.

Data Sources: City of Hattiesburg; Neel-Schaffer, Inc.

Latent Demand Score Analysis

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

The demand analysis is the same for pedestrians and bicyclists. The mapping exercise used fine-grained information to assess an area's potential demand for pedestrian or bicycle trips based on a 0-100 scale. Points were awarded based on the factors summarized in Table 6.15.

Figure 6.14 shows the results of the latent demand score analysis. Again, this exercise reflects relative potential demand, not absolute demand. Simply put, it shows which areas are most likely to have high or low demand relative to all other areas within the MPA. It does not attempt to quantify the actual number of bicycle or pedestrian trips occurring in these areas.

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

Table 6.15 Pedestrian Demand Analysis Factors

Factor	Measure	Maximum Points
Land Use	Population and Jobs per Acre	30
	Within half mile of Popular Destination(s)[1]	15
Demographic	Elderly (65+) and Youth (<15) population per Acre	10
	Non-institutionalized Adults with no Vehicle Available and On-Campus Student Housing Population per Acre	25
Travel Environment	Intersections per square mile[2]	20
	Total Possible Points	100

Notes: [1]Popular destinations are parks, major recreation centers, schools, libraries, hospitals, grocery stores, pharmacies, convenience stores, cafes, and restaurants/bars. Universities were weighted 10x, other schools and hospitals were weighted 5x and grocery stores, pharmacies, and convenience stores and parks/rec centers were weighted 2x.
[2]Intersections with at least 4 segments are weighted 2x.

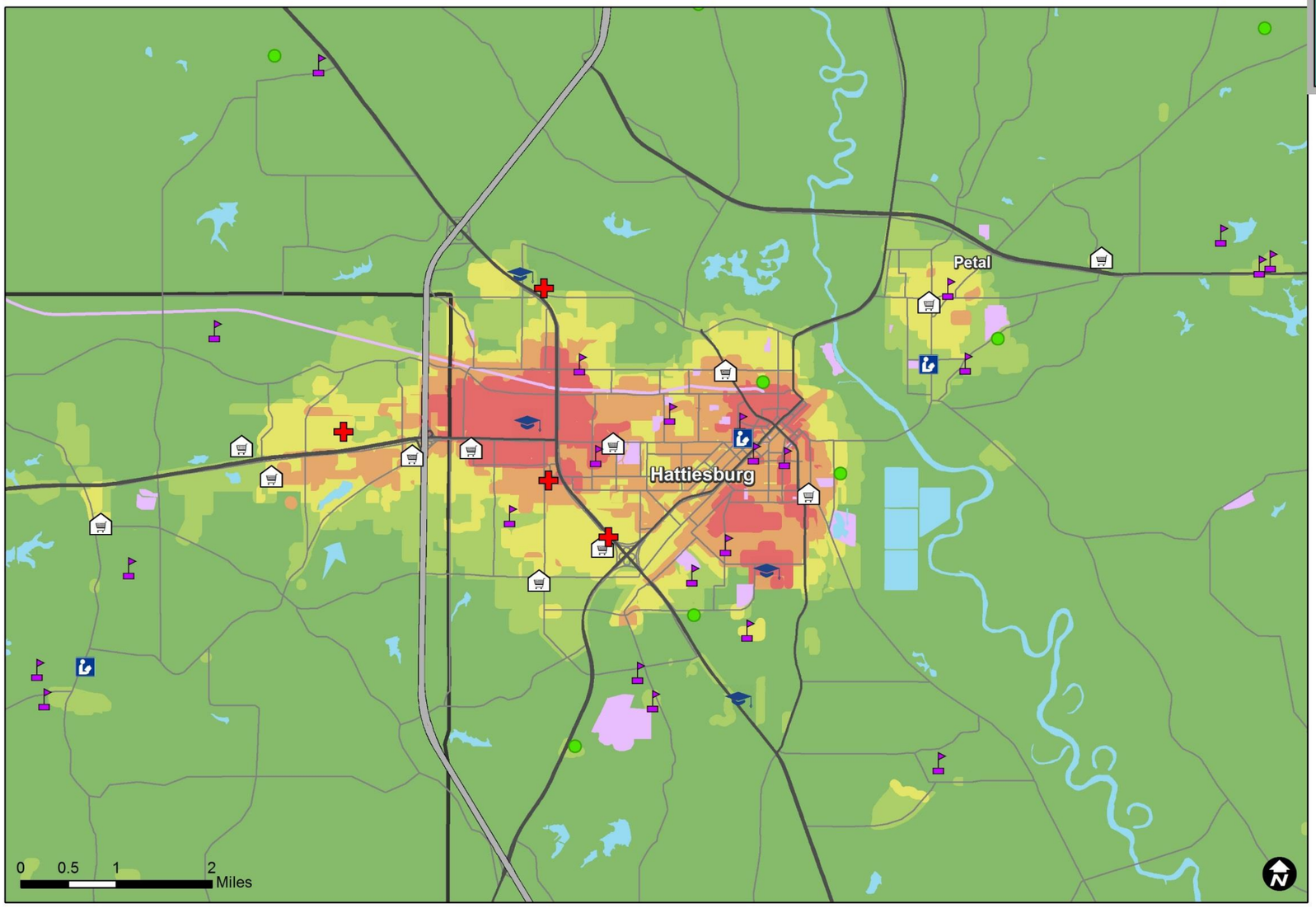
Existing Plans

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

The plans primary recommendations include the following:

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

FIGURE 6.14 EXISTING BICYCLE AND PEDESTRIAN DEMAND



2040 MTP

Legend

- Libraries
- Schools
- Colleges and Universities
- Major Medical Facilities
- Supermarket
- Rec Centers
- Longleaf Trace
- Parks
- Interstate
- Secondary Roadways
- Other Major Roadways in MPO
- County Boundaries
- Water

Relative Bike/Ped Demand

- Very High
- High
- Moderate
- Low
- Very Low

Disclaimer: This map is for planning purposes only. Contact MPO Staff for more information.

Map Source: Neel-Schaffer, Inc.

Data Sources: Neel-Schaffer, Inc.; InfoUSA; Census Bureau

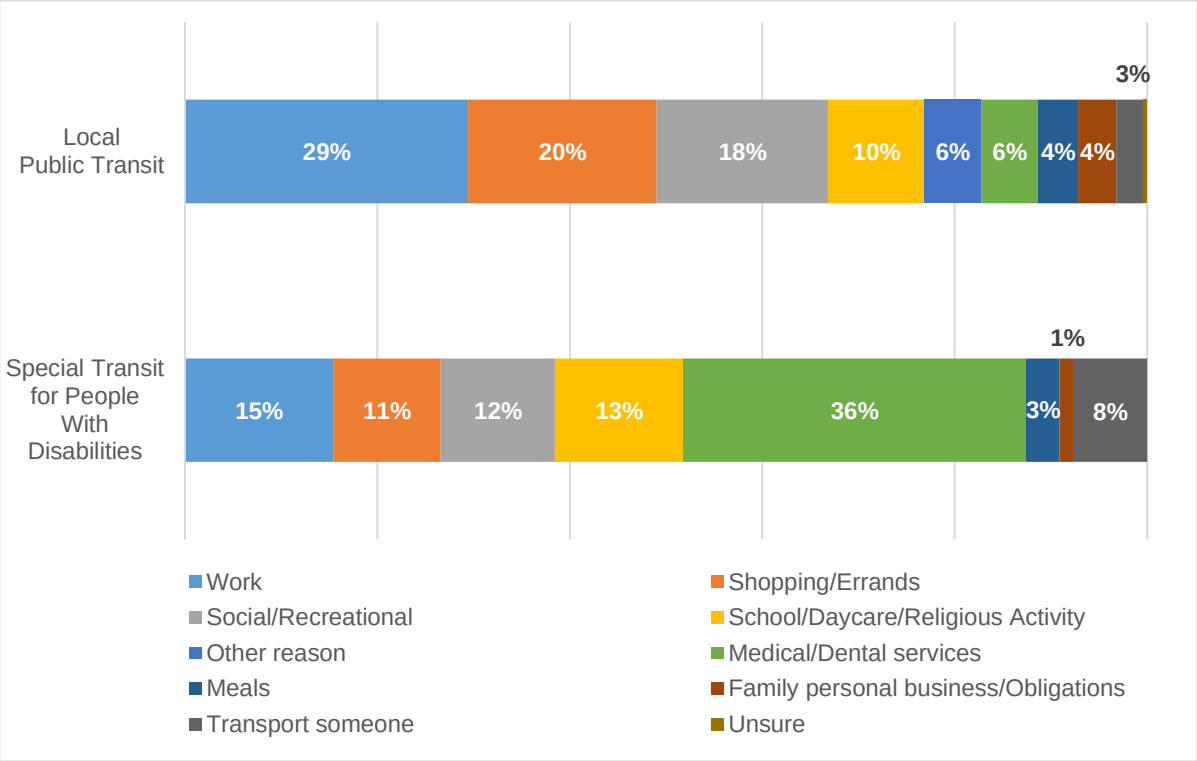
6.3 Public Transit

Public transit provides people with mobility and access to employment, shopping, medical care, and other destinations and opportunities. For those that have no other choice, either because of economic or physical limitations, it is a lifeline service. For others, it reduces the burden of transportation costs and serves a convenient alternative to driving, among other things. Public transit also has significant benefits for the community as a whole as it can increase local business access to skilled workers, reduce congestion and emissions, reduce urban sprawl, and foster walkable communities.

However, in small urbanized areas like Hattiesburg, the 2009 National Household Travel Survey (NHTS) indicates that local public transit trips only account for only 2.3 percent of all trips. According to the survey data, the predominant trip purpose for local public transit in these areas, aside from returning home, is for work-related trips (29 percent), while shopping/errand trips (20 percent) and social/recreational trips (18 percent) also account for a sizable percentage of all local transit trips.

Paratransit service and other demand response services for people with disabilities are also important in small urbanized areas because fixed route transit service may not be easily accessible. As Figure 6.15 shows, 36 percent of all non-home bound trips for this type of transit service are medical-related. Work-related trips are the second most common, but only account for 15 percent of trips.

Figure 6.15 Public Transit Trip Purposes



Note: Local Public Transit includes local public bus, commuter bus, shuttle bus, commuter train, subway/elevated train, street car/trolley, special transit-people w/disabilities, and ferry.

Source: 2009 National Household Travel Survey

Local Public Transit Providers

There are many transit providers in the Hattiesburg MPA. Hub City Transit (HCT), the city of Hattiesburg's transit system, along with a few smaller transit providers support the needs of urban, rural, low-income, disabled, and elderly populations. While there are as many as five (5) agencies utilizing Federal Transit Administration (FTA) funds for service in the MPA, the primary provider of concern in the MPA is HCT.

Hub City Transit

HCT offers fixed route and paratransit services for certified users (disabled or temporary impairment) for trips within the city of Hattiesburg. As the primary provider of public transit in the MPA, HCT services will be the focus of the 2040 MTP.

The HCT system operates four fixed routes Monday through Friday, from 6:00 a.m. to 6:30 p.m., excluding major holidays. Routes operate on a pulse, or hub-and-spoke system, with all buses returning to the Hattiesburg Train Depot at hourly intervals.

For persons with permanent or temporary disabilities, HCT provides a paratransit service which complements its fixed route system. This service is for passengers who have a temporary or permanent impairment that prevents independent use of fixed route services. The service operates at the same times as the fixed route service.

Other Providers

The following agencies utilize FTA funds for transit service in the Hattiesburg MPA oriented to the elderly and disabled or rural community residents: Community Development, Inc.; Pine Belt Mental Healthcare Resources; Southern Mississippi Planning and Development District; and Five County Child Development Program, Inc./Five County Community Transportation Program.

Coordination of Services

Coordination of transportation services is required by the State of Mississippi's policies and goals for administering public transportation services. Stakeholders meet to achieve the following goals:

- More efficient service delivery;
- More cost effective service delivery;
- Increased capacity;
- Easier access; and
- A better quality of life.

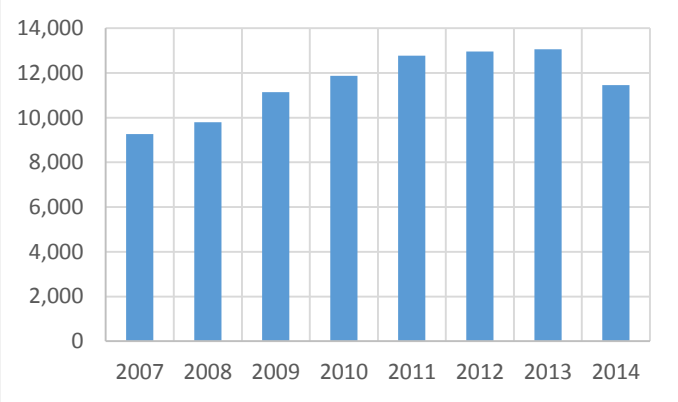
The state is divided into six (6) Regional Coordination Groups tasked with assessing transportation needs, identifying service gaps, and developing alternatives and recommendations to address unmet needs and gaps. The Hattiesburg MPA is part of the Southern Mississippi Transit (SMT) group. TRANS-CON is made up of transit representatives from Jefferson Davis, Covington, Jones, Wayne, Marion, Lamar, Forrest, Perry, Greene, Pearl River, Stone, George, Hancock, Harrison, and Jackson counties.

Intercity Transit

The Hattiesburg MPA is served by two major intercity transit services, Amtrak and Greyhound Lines. Amtrak passenger train service operates out of the Hattiesburg Train Depot while the Greyhound stop is on US 49 near Rawls Springs.

The Hattiesburg Train Depot is only served by one Amtrak route, the Crescent Route between New Orleans and New York, pictured in Figure 6.16. A New York-bound train stops in Hattiesburg at 9:30 a.m. and a New Orleans-bound train stops in Hattiesburg at 4:38 p.m. In 2014, Amtrak ridership at the Hattiesburg Train Depot was 11,448. Since 2007, ridership has increased from just over 9,000, as shown in Figure 6.17.

Figure 6.17 Hattiesburg Amtrak Ridership, 2007-14



Source: National Association of Railroad Passengers, 2013; Amtrak

Figure 6.16 Crescent Amtrak Route

Image Source: Neel-Schaffer, Inc.

Local Fixed Route Service

Operating Characteristic Trends

Table 6.16 shows operating characteristics of HCT's fixed route system from Fiscal Years 2012 and 2013, the only available recent data on the National Transit Database.

This operating information shows that HCT's fixed route service has been stable in terms of the service provided and

ridership. Operating costs increased significantly from 2012 to 2013 but without additional information, it is not clear if that was a temporary or long-term trend. The system is not very productive or efficient, though this is likely the result of land use patterns and is typical of fixed route transit service in small urban areas in the South. The system is heavily subsidized, as fares made up only 3-6 percent of operating costs.

Table 6.16 Recent Operating Characteristics for Hub City Transit Fixed Routes

General Performance	2012	2013
Service Area Population	47,230	47,556
Passenger Trips	86,302	91,591
Total Operating Expense	641,349	867,600
Service Supply and Quality		
Vehicles Operated in Maximum Service	4	4
Vehicle Revenue Miles	111,061	175,963
Vehicle Revenue Hours	10,824	10,560
Average Age of Fleet	7.2	5.2
Service Consumption		
Passenger Trips per Capita	1.83	1.93
Passenger Trips per Revenue Mile	0.78	0.52
Passenger Trips per Revenue Hour	7.97	8.67
Efficiency		
Operating Expense per Capita	$13.58	$18.24
Operating Expense per Passenger Trip	$ 7.43	$ 9.47
Operating Expense per Revenue Mile	$ 5.77	$ 4.93
Operating Expense per Revenue Hour	$59.25	$82.16
Farebox Recovery		
Fare Revenue	$38,741	$31,526
Farebox Recovery Ratio	6.04%	3.63%

Note: Service Area is City of Hattiesburg population as of July 1 from Population Estimates Program

Source: National Transit Database

Route Information

Figure 6.18 shows the HCT fixed routes, which are limited to the City of Hattiesburg. All of these routes operate with headways of one hour and pulse at the Hattiesburg Train Depot, making transfers between routes convenient. A 2012 ridership survey shows that daily ridership ranges from around 25 to 125 boardings, depending on the route. This information is shown in Table 6.17.

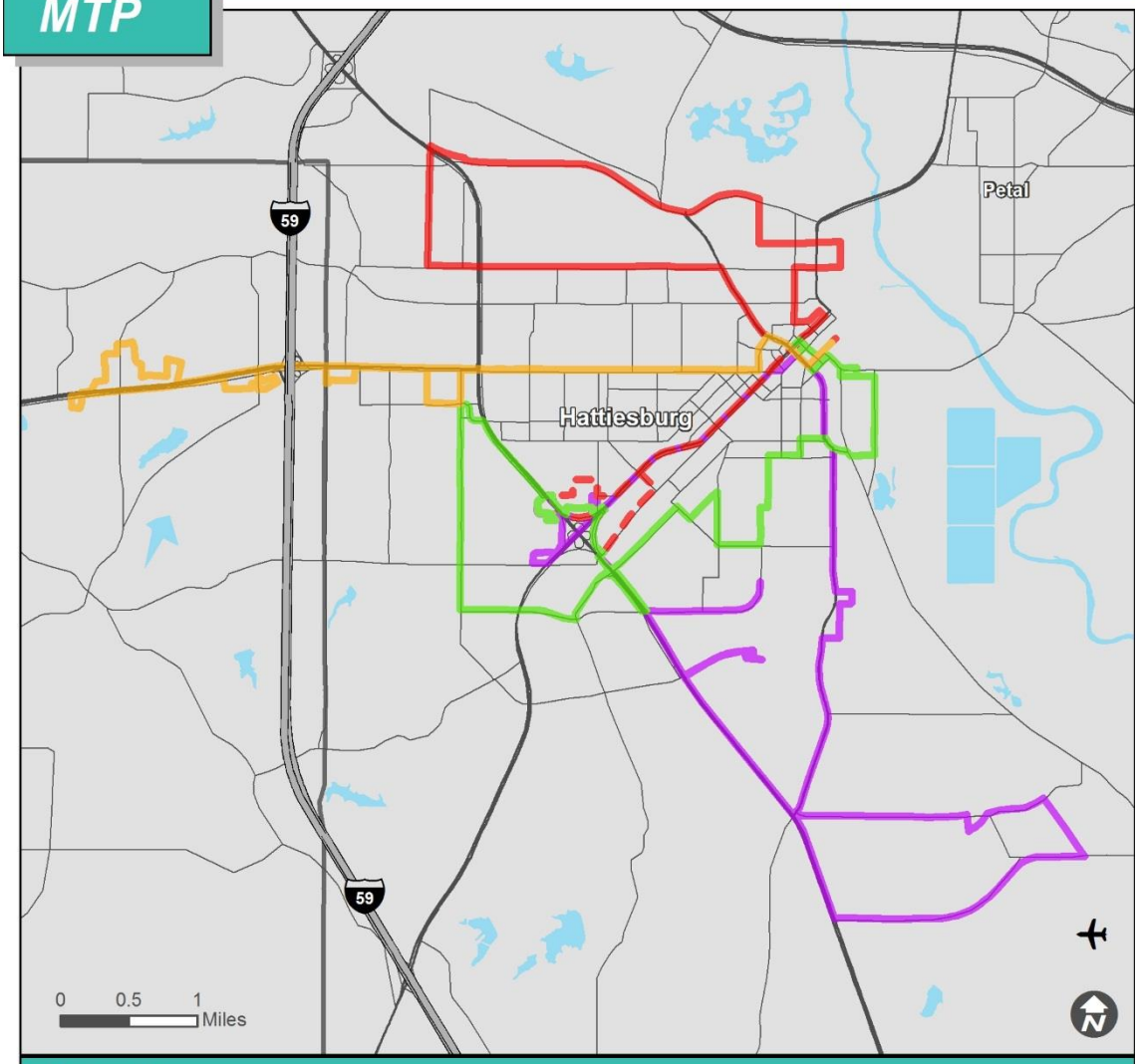
Table 6.17 Hub City Transit Route Ridership

Route	2012 Daily Ridership Survey
Route 1 – Hardy Street	127
Route 2 – Dabbs & Cloverleaf	102
Route 3 – Mobile & Broadway	99
Route 4 – Palmers Crossing	23

Source: City of Hattiesburg

2040 MTP

FIGURE 6.18 HUB CITY TRANSIT ROUTES, 2015



Legend

Hub City Transit Bus Routes	Interstates
1 - Hardy Street	Secondary Roadways
2 - Dabbs and Cloverleaf	Other Roadways in MPA
3 - Broadway	Counties
3 - Mobile	Water Bodies
4 - Palmers Crossing	Metropolitan Planning Area

Disclaimer: This map is for planning purposes only.

Map Source: Neel-Schaffer, Inc.

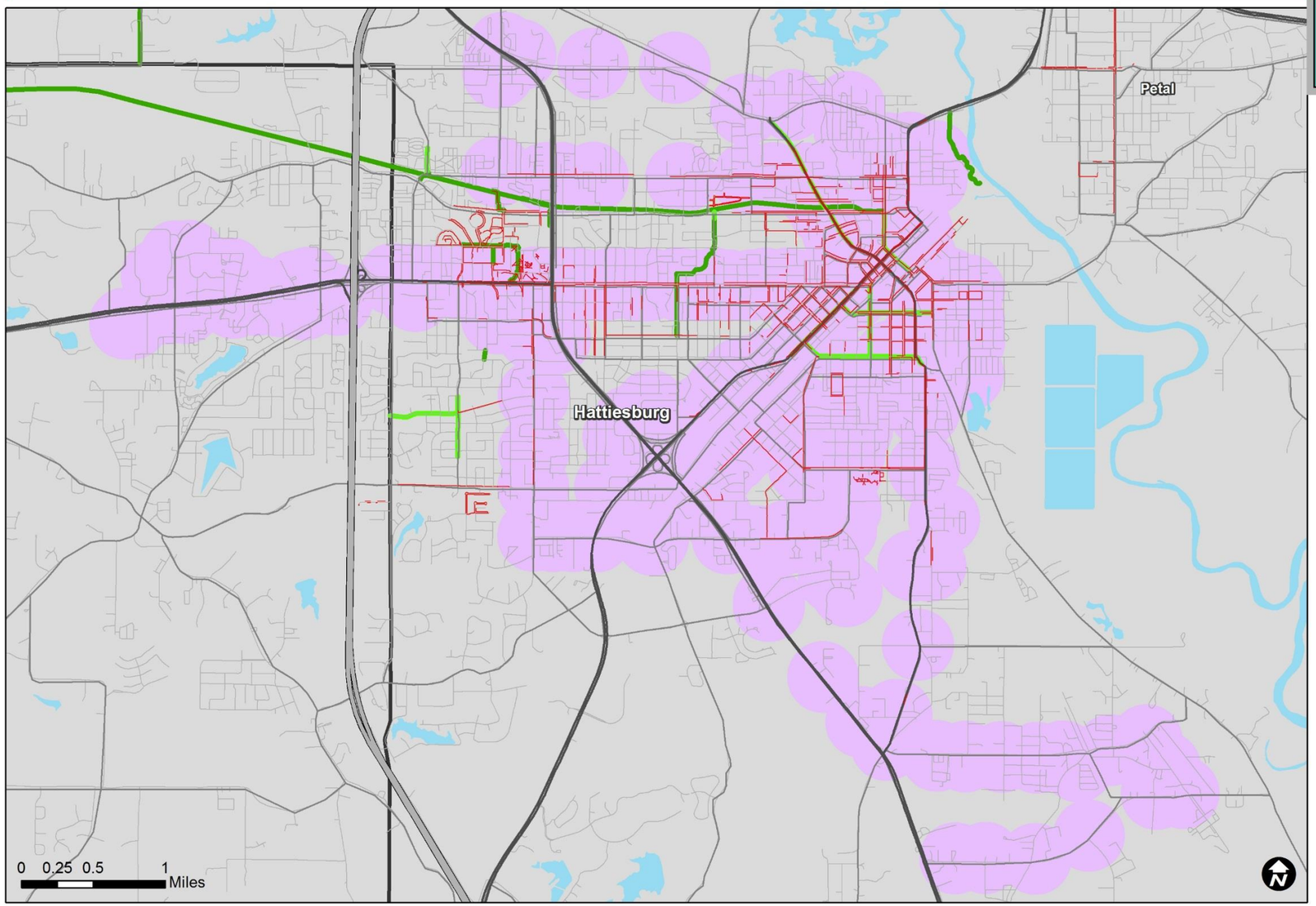
Data Sources: City of Hattiesburg

Hub City Bus Stop Accommodations and Accessibility

Although information on the number of ADA compliant landing pads and surrounding ADA compliant ramps was not available, an inventory of sidewalks in the MPO was obtained from the City of Hattiesburg. Figure 6.19 shows these sidewalks in relation to quarter mile buffers of existing stop locations. Because sidewalk coverage is poor in many parts of the Hattiesburg MPA, many of the areas around transit stops also have poor sidewalk coverage. The only area with a relatively complete sidewalk is the area around the Hattiesburg CBD.

Connectivity between public transit and bicycle facilities are also important since bicycling may extend the reach of transit. This is why it is important to have bicycle racks on buses and to have bicycle racks at stops where demand is anticipated. Existing bicycle facilities are also shown in Figure 6.19.

FIGURE 6.19 SIDEWALKS AND BICYCLE FACILITIES NEAR TRANSIT STOPS



2040 MTP

Legend

- Existing Sidewalk
- Existing Shared Use Path
- Existing Bike Lane
- Interstate
- Secondary Roadways
- Other Major Roadways in MPO
- All Other Roadways
- County Boundaries
- Water
- 1/4 Mile Buffer of Transit Stops
- Metropolitan Planning Area

Disclaimer: This map is for planning purposes only. Contact MPO Staff for more information.

Map Source: Neel-Schaffer, Inc.

Data Sources: City of Hattiesburg

Service Area Demographics

To gain a better understanding of the users of the HCT system a comparison was made between the demographic characteristics of the Hattiesburg MPA and the service area of HCT. Table 6.18 provides a comparison of key demographic attributes.

This information shows that HCT providers better coverage to minority areas than the MPA population as a whole. It also shows that the transit systems provides better coverage to employment than to residential areas. Both of these characteristics are typical of transit systems.

Table 6.18 Service Area Characteristics Comparison

Characteristic	Metropolitan Planning Area	Quarter Mile of HCT Stops	HCT Percentage of MPA Total
Total Households	41,263	10,642	25.8%
Total Population	106,413	27,090	25.5%
Minority	41,182	18,749	45.5%
Total Employment	69,505	39,682	57.1%

Source: 2010 Census; InfoUSA

Local Transit Paratransit Service

HCT provides complementary paratransit service Monday through Friday from 6:00 a.m. to 6:30 p.m., for qualified individuals with mobility impairments who are unable to use the fixed route service. The paratransit service is a demand-response, advance reservation, address-to-address and curb to curb service. Eligible passengers are not required to live within Hattiesburg City limits of service area. Wheelchair accessible vehicles are available to assist in transporting persons with disabilities.

Transit Vehicle and Facility Conditions

Vehicle Conditions

HCT currently has nine fixed route, diesel-fueled buses and four diesel-fueled paratransit vehicles. HCT also utilizes two gasoline-fueled support/service vehicles. All vehicles are currently ADA accessible.

As shown in Table 6.19, half of the fixed route buses have at least four years of useful life and the other half have eight years. Given that all of the buses were ranked in good

condition, through preventative maintenance these vehicles should last long past their useful lives.

The paratransit vehicle conditions shown in Table 6.20 show that most of the vehicles had low mileage in 2013.

Table 6.19 Existing Bus Conditions, 2013

Length	29'	29'	27'	25'	25'
Capacity	45	35	27	32	22
Vehicles	2	1	1	2	3
Average Lifetime Miles	207,797	9,438	31,228	124,586	114,250

Source: National Transit Database

Table 6.20 Existing Paratransit Vehicle Conditions, 2013

Length	25'	25'
Capacity	17	16
Vehicles	1	3
Average Lifetime Miles	96,925	17,425

Source: National Transit Database

Facility Conditions

The Hattiesburg Train Depot serves as the bus transfer facility for HCT in addition to being served by Amtrak. Initial renovations to this facility were completed in 2007 to better accommodate transportation uses and to restore its historic character. The facility remains in good condition and is heavily used by passengers and transit vehicles.

Regional Transit Demand Analysis

In order to assess the existing and future demand for transit services in the Hattiesburg MPA, a series of analyses are conducted. First, a Transit Supportive Index is developed in order to quantify existing transit demand throughout the region. Then, existing concentrations of transit-dependent populations and future growth areas are identified. Finally, after evaluating all of this information, a set of long-term regional transit corridors is recommended along which future transit service should be encouraged.

Transit Supportive Index

The regional demand analysis uses a GIS-based approach to identify areas of transit demand throughout the Hattiesburg MPA. There are a number of factors that can be analyzed to evaluate and predict transit demand in an area. Given the availability of data and regional scope of the 2040 MTP, a Transit Supportive Index was developed for the Hattiesburg MPA that includes the following factors.

Household density – A higher concentration of population in an area creates more potential transit riders in an area. This is especially true of very dense areas, where other factors, such as parking availability or congestion, may influence demand.

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

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

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

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

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

Street connectivity – A well connected street network, assuming sufficient pedestrian infrastructure is provided, enables pedestrians to directly and conveniently access a transit stop or their destination. All things being equal, an area with better connectivity is more likely to attract a higher number of transit riders than an area with poor connectivity. Furthermore, connectivity increases the likelihood that a transit route will be able to serve an area in an efficient manner, with minimal deviations.

It is important to note that the index is a relative measure of transit demand. It does not estimate an actual number of transit trips generated. Instead, it is intended as a tool to identify corridors and nodes in the region with the highest transit demand.

Table 6.21 shows the Transit Supportive Index criteria and measurements. For each density criterion, an area's value is calculated. Before being assigned a score, all criteria values are multiplied by an area's street connectivity factor. Based on these adjusted values, areas are then assigned a Transit Supportive Index score of one through five, with five being the most transit supportive. Thresholds separating the index scores are based on existing literature and are tailored to the Hattiesburg MPA in order to give a sufficient distribution of scores.

Figure 6.20 illustrates the distribution of transit demand throughout the region using the Transit Supportive Index.

Table 6.21 Transit Supportive Index Criteria

Criteria	Measurement	Index Score				
		1	2	3	4	5
Residential Density	Households per acre	0 to 1	1 to 2	2 to 4	4 to 7	7+
Employment Density	Employment per acre	0 to 5	5 to 10	10 to 25	25 to 50	50+
Low-Income Residential Density	Households using food stamps per acre	0 to 0.33	0.33 to 0.66	0.66 to 1.33	1.33 to 2.33	2.33+
Low-Income Employment Density	Employment per acre for predominantly low-income industries	0 to 2.5	2.5 to 5	5 to 12.5	12.5 to 25	25+
Residential Vehicle Availability	Adults without vehicle per acre	0 to 0.25	0.25 to 0.5	0.5 to 1	1 to 1.75	1.75+
Activity Density	Sum of highest residential and employment density value	0 to 3.75	3.75 to 7.5	7.5 to 18.75	18.75 to 37.5	37.5+
Street Connectivity	Percentage of intersections that are four-way	33%-50%, multiply values by 1.25; >50%, multiply values by 1.5				

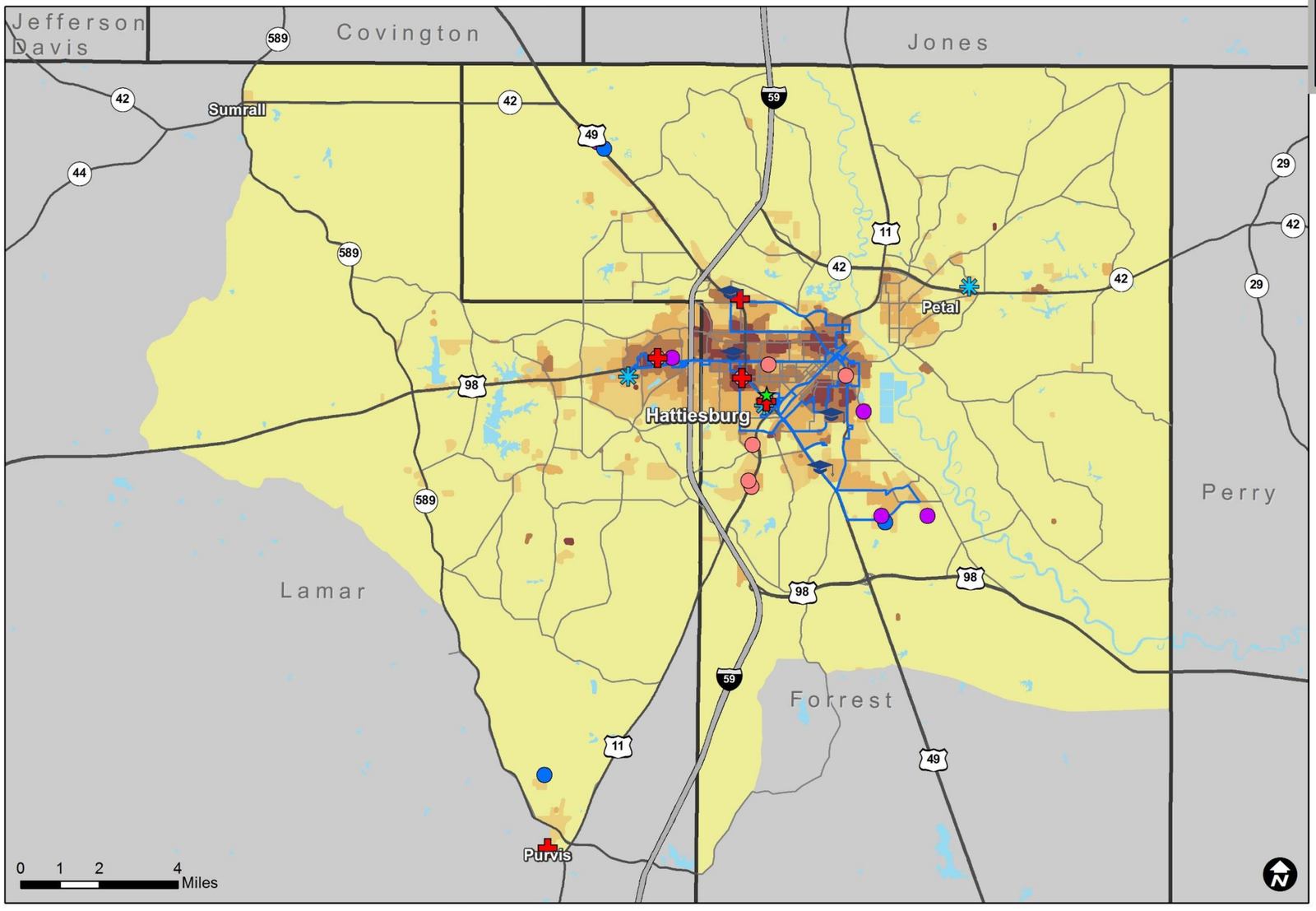
Based upon Figure 6.20 there are several areas of moderate to high demand within the Hattiesburg MPA that are not currently served byHCT. Still, most of the high demand areas currently have good coverage, even if service is infrequent or indirect.

The areas of highest demand are near the major hospitals, USM, a corridor along 4th Street from USM to the Hattiesburg CBD, and the area from the Hattiesburg CBD to William Carey University. These areas have the greatest potential to support higher frequency transit and Transit-Oriented Development that minimizes the need for a personal automobile. Furthermore, they are already the home or workplace of many transit-dependent people.

Major destinations were not given unique consideration in the analysis for the Transit Supportive Index. However, as shown in Figure 6.20, the index did a good job of capturing most major destinations, including WIN job centers (workforce development centers), major hospitals, major institutions of higher learning, and Walmart stores.

Figure 6.20 also shows the location of major employers in industries which represent "ladders of opportunity" for low-income workers in the MPA, industries including healthcare and social assistance, manufacturing, and wholesale trade. Many of the major employers in these mid-wage, mid-skill industries are currently covered by HCT routes

FIGURE 6.20 REGIONAL TRANSIT DEMAND ANALYSIS



2040 MTP

Legend

Transit Supportive Index

Lowest Low Moderate High Highest

- Colleges and Universities
- WIN Job Center
- Major Medical Facilities
- Walmart Stores

Major Employers in Mid-Wage, Mid-Skill Industries:

- Healthcare and Social Assistance
- Manufacturing
- Wholesale Trade
- Existing Fixed Routes
- Interstate
- Secondary Roadways
- Other Major Roadways in MPO
- Water
- Counties

Disclaimer: This map is for planning purposes only. Contact MPO Staff for more information.

Map Source: Neel-Schaffer, Inc.

Data Sources: Neel-Schaffer, Inc.; InfoUSA; Census Bureau

Transit-Dependent Populations

In order to ensure that the needs of the transit-dependent population are being addressed by the transit demand analysis, the concentration of various transit-dependent populations were mapped. This mapping exercise also illustrates areas that may not be adequately served by existing HCT sit routes.

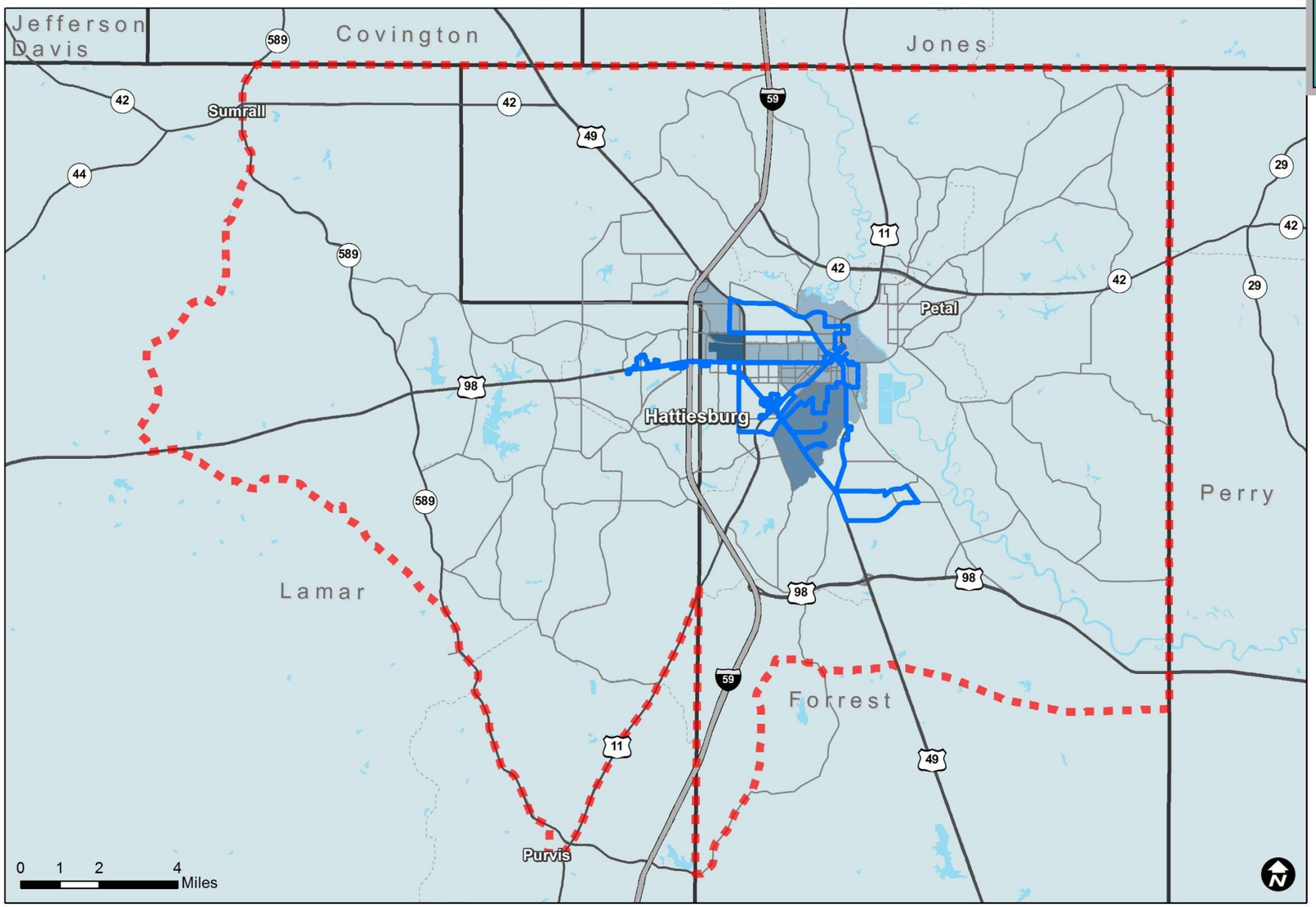
Figure 6.21 illustrates the concentration of households without regular access to a vehicle. The highest concentration is near USM, where about 25 percent of households do not have access to a vehicle. The area from the Hattiesburg CBD to William Carey University also has a high concentration of households without regular access to a vehicle. HCT currently provides good coverage to these areas.

Figure 6.22 depicts the concentration of low-income households. These households may have access to a car but due to economic reasons are more-likely to rely on transit. The distribution of high density clusters of low-income households is similar to that of households without access to a vehicle. Again, HCT currently covers most of these areas.

Figure 6.23 shows the concentration of persons with disabilities. These households rely on transit simply because of physical or mental limitations. The distribution of concentrations of disabled persons is more widespread than the previous two transit-dependent populations. The two highest concentrations are in areas from the Hattiesburg CBD to William Carey University and from the CBD to USM.

Figure 6.24 shows the concentration of persons aged 65 or older. Similar to disabled persons, this population is more likely to rely on transit because of physical or mental limitations. The highest concentrations of elderly persons are in an area from Midtown to Lincoln Road and an area immediately southeast of the Hattiesburg CBD.

FIGURE 6.21 CONCENTRATION OF ZERO-VEHICLE HOUSEHOLDS



2040 MTP

Legend

- Metropolitan Planning Area
- Existing Fixed Routes
- Interstate
- Secondary Roadways
- Other Major Roadways in MPO
- Water

Census Tracts:

Households with No Vehicle per Acre

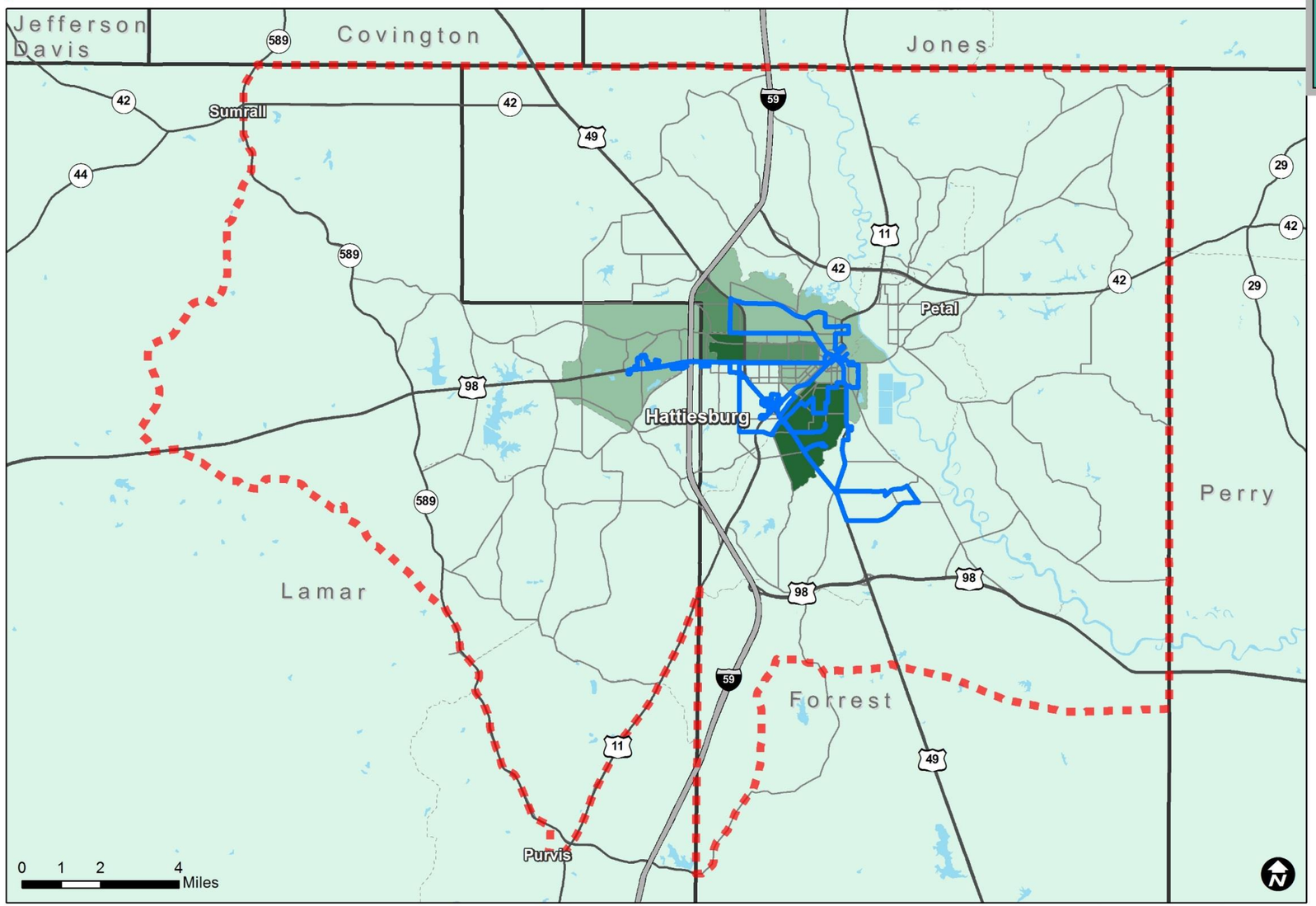
- 0.00 - 0.10
- 0.11 - 0.20
- 0.21 - 0.30
- 0.31 - 0.40
- Counties

Disclaimer: This map is for planning purposes only. Contact MPO Staff for more information.

Map Source: Neel-Schaffer, Inc.

Data Sources: 2009-2013 ACS

FIGURE 6.22 CONCENTRATION OF LOW-INCOME HOUSEHOLDS



2040 MTP

Legend

- Metropolitan Planning Area
- Existing Fixed Routes
- Interstate
- Secondary Roadways
- Other Major Roadways in MPO
- Water

Census Tracts:

Households using Food Stamps per Acre

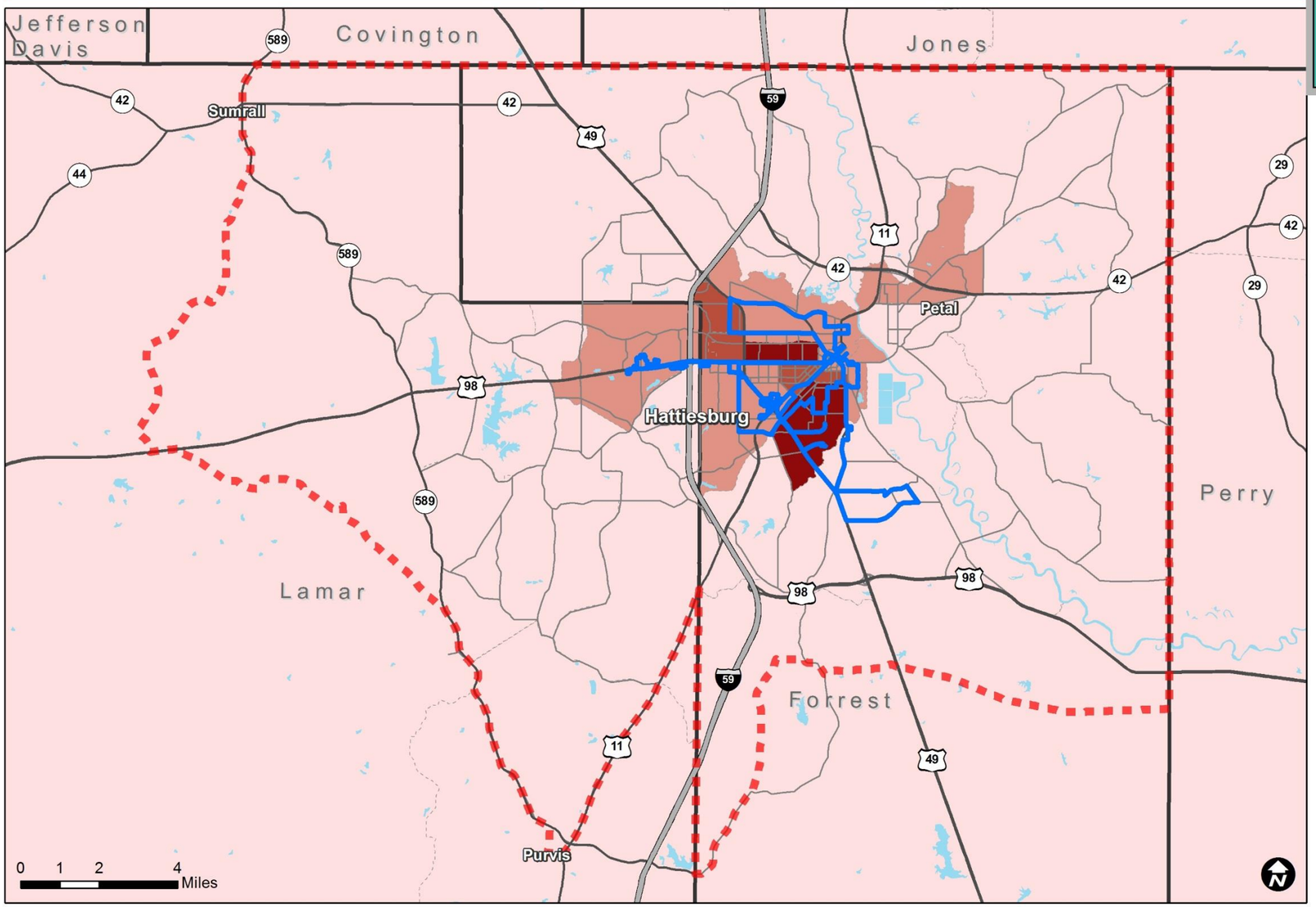
- 0.00 - 0.15
- 0.16 - 0.30
- 0.31 - 0.45
- 0.46 - 0.60
- Counties

Disclaimer: This map is for planning purposes only. Contact MPO Staff for more information.

Map Source: Neel-Schaffer, Inc.

Data Sources: 2009-2013 ACS

FIGURE 6.23 CONCENTRATION OF PERSONS WITH DISABILITIES



2040 MTP

Legend

- Metropolitan Planning Area
- Existing Fixed Routes
- Interstate
- Secondary Roadways
- Other Major Roadways in MPO
- Water

Census Tracts:

Disabled Persons per Acre

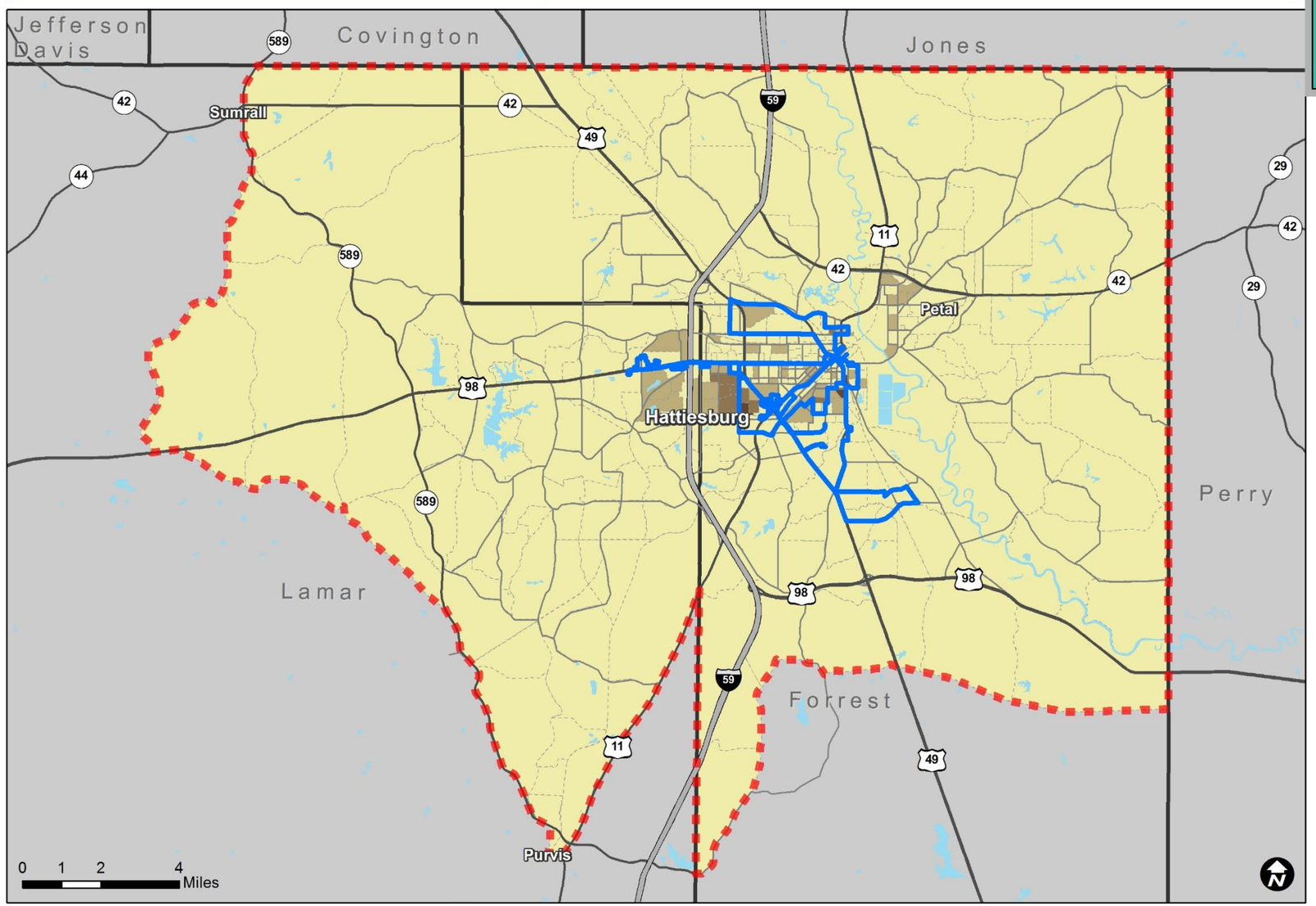
- 0.00 - 0.25
- 0.26 - 0.50
- 0.51 - 0.75
- 0.76 - 1.10
- Counties

Disclaimer: This map is for planning purposes only. Contact MPO Staff for more information.

Map Source: Neel-Schaffer, Inc.

Data Sources: 2009-2013 ACS

FIGURE 6.24 CONCENTRATION OF PERSONS AGE 65 AND OLDER



2040 MTP

Legend

- Metropolitan Planning Area
- Existing Fixed Routes
- Interstate
- Secondary Roadways
- Other Major Roadways in MPO
- Water

Persons Age 65+ per Acre

- 0.00 - 0.50
- 0.51 - 1.00
- 1.01 - 2.00
- 2.01 - 6.65
- Counties

Disclaimer: This map is for planning purposes only. Contact MPO Staff for more information.

Map Source: Neel-Schaffer, Inc.

Data Sources: 2010 Census

Peer Comparison

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

Because the 2040 MTP is regional and long-term in nature, the criteria to select peer systems are somewhat different from the typical criteria used by transit agencies in short-range transit development plans. For the MTP, the focus is on the entire Hattiesburg, MS urbanized area versus the service area of a particular agency.

Selection Criteria

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

The selection criteria include: location in the south; urbanized area size; urbanized area population density; urbanized area's share of MSA population; similar college/university influence; similar low-income population; similar influence of military and retirement communities; and comparable transit service.

Table 6.22 shows the demographics and urban sprawl index of the five selected peer areas using these criteria. The selection criteria and methodology are further outlined below.

In South Region of United States

Areas outside of the Census Bureau's South Region were removed. This was done because state and local transit funding is lower in this region and the public perception of transit is much lower. This left 194 UZAs.

Urbanized Area Size

That UZA must have a 2010 population within 75 percent of the Hattiesburg UZA (80,358). This corresponds to a range from 50,000 to 140,627 and reduces the number of potential peers to 94 UZAs.

Urbanized Area Population Density

For the remaining UZAs, those whose population density exceeded 25 percent of Hattiesburg's population density (1,142 persons per square mile [ppsm]) were excluded. This corresponds to a range from 857 to 1,428 ppsm and reduces the number of potential peers to 52 UZAs.

UZA's Share of MSA Population

UZAs that have a substantial portion of their overall area that is part of an MSA with another UZA or is contiguous with another UZA are excluded. This is done so that, like Hattiesburg, selected peer UZAs are not part of a larger region with a high level of commuting between multiple urbanized areas. In these more polycentric regions, there would likely be a higher demand for transit because of a bigger region. This reduced the remaining number of potential peers to 33 UZAs.

Similar College/University Influence

UZAs must be within 50 percent of Hattiesburg's percentage of the population18 and over enrolled in college or graduate school (19.7 percent). This corresponds to a range from 9.9 percent to 29.6 percent. This reduced the remaining number of potential peers to 14 UZAs.

Similar Low-income Population

UZAs must be within 25 percent, or 6.8 percentage points, of percentage of households receiving food stamps. This corresponds to a range from 14.7 percent to 24.5 percent. This reduced the remaining number of potential peers to 11 UZAs.

Similar influence of Military and Retirement Communities

UZAs must be within 25 percent of Hattiesburg's percentage of population that is retired, removing all above 18.4 percent. This reduced the remaining number of potential peers to 8 UZAs.

Any area with a sizable percentage of workforce in military removed. This reduced the remaining number of potential peers to 7 UZAs.

Comparable Transit Service

Of the 7 remaining UZAs, only 5 areas had what would be considered a small urban, fixed-route system supplemented by paratransit. Other areas were better categorized as a demand response system, which would not lend to comparability to a fixed route system.

Table 6.22 Characteristics of Selected Peer Urbanized Areas

Urbanized Area (UZA)	Population (2010)	Population Density (ppsm)	Percent of Population 18 and over in College	Percent of Households Using Food Stamps	Percent of Population Retired
Cleveland, TN	66,777	1,223	11.4%	20.8%	17.7%
Jackson, TN	71,880	1,406	13.5%	20.6%	16.8%
Jonesboro, AR	65,419	1,394	14.6%	17.5%	14.7%
Monroe, LA	116,533	1,422	9.9%	18.8%	14.1%
Rome, GA	60,851	1,277	11.3%	20.0%	16.3%
Average of Selected Peers	76,292	1,344	12.1%	19.5%	15.9%
Hattiesburg, MS	80,358	1,165	19.7%	19.6%	14.7%

Source: Census Bureau, 2010 Census and 2009-2013 American Community Survey

Peer Comparison

Table 6.23 on the following page provides service area information and operational characteristics for the primary fixed route transit systems operating in the selected peer urban areas. This information is broken down into transit system characteristics; service supplied and consumed, operating efficiency, and fare revenue. The follow trends can be gleaned from this information:

- Demographics and Land Use
    - HCT serves the lowest density service area of all the peer UZA systems. This could make it more difficult for Hattiesburg to achieve higher efficiencies when compared to its peers. However, without route information from other agencies, it is not possible to know a more accurate measure of service area density: the density of all areas within a quarter mile of all bus stops.
- Transit System Size
    - HCT operates a lower number of vehicles than most of the peer areas but is similar to systems in Cleveland, TN (CUATS) and Jonesboro, AR (JET).

- Service Supplied and Consumed
    - HCT is on par with CUATS and JET in terms of service provided. However, Jackson, TN (JTA); Monroe, LA (Monroe Transit); and Rome, GA (RTD) all provide significantly higher levels of service.
    - Similarly, after accounting for the differences in level of service supplied, it becomes clear that HCT, CUATS, and JET are unproductive when compared to JTA, Monroe Transit, and RTD.
- Cost Efficiency
    - Despite being similar in productivity to CUATS and JET, HCT is much less cost efficient to operate. In fact, it is at or near the bottom in all three cost efficiency measures.
- Fare Revenue
    - HCT's low average fare could explain its low cost efficiency when compared to CUATS and JET, which provide similar levels of service and are similarly productive.
    - HCT has the lowest average fare and the lowest farebox recovery ratio, the percentage of operating costs covered by fare revenues.

This peer comparison suggests that HCT is providing a lower level of service than many of its peers. Also, likely because of its lower fares, HCT is slightly more productive than CUATS and JET, which provide similarly low levels of service. However, its lower fares also likely explain why HCT is less cost-efficient than either of these two systems.

Table 6.23 Operating Characteristics for Fixed Route Services in Peer Urbanized Areas

Transit System Characteristics	Cleveland, Tennessee	Jackson, Tennessee	Jonesboro, Arkansas	Monroe, Louisiana	Rome, Georgia	Peer Average	Hattiesburg, Mississippi
Fixed Route Systems	CUATS	JTA	JET	Monroe Transit	RTD	n/a	HCT
Service Area Population	66,333	67,685	51,804	50,000	36,159	54,396	47,556
Service Area Square Miles	24	59	39	31	32	37	54
Service Area Population Density (ppsm)	2,764	1,155	1,328	1,613	1,130	1,598	876
Vehicles Operated in Maximum Services	5	9	3	15	27	12	4
Service Supplied and Consumed							
Annual Vehicle Revenue Miles	211,320	568,940	192,780	776,328	454,104	440,694	175,963
Annual Vehicle Revenue Hours	19,936	39,570	10,710	55,467	29,425	31,022	10,560
Annual Unlinked Trips	92,872	600,624	58,206	1,265,378	1,054,484	614,313	91,591
Passenger Trips per Capita	1.4	8.9	1.1	25.3	29.2	11.3	1.9
Passenger Trips per Revenue Mile	0.4	1.1	0.3	1.6	2.3	1.4	0.5
Passenger Trips per Revenue Hour	4.7	15.2	5.4	22.8	35.8	19.8	8.7
Cost Efficiency							
Operating Expense per Vehicle Revenue Mile	$3.42	$4.24	$3.00	$5.57	$5.10	$4.70	$4.93
Operating Expense per Vehicle Revenue Hour	$36.29	$60.95	$54.00	$78.01	$78.78	$66.79	$82.16
Operating Expense per Passenger Trip	$7.79	$4.02	$9.94	$3.42	$2.20	$3.37	$9.47
Fare Revenue							
Average Fare	$0.41	$0.66	$0.73	$0.68	$0.49	$0.60	$0.34
Farebox Recovery Rate	5.2%	16.4%	7.3%	19.8%	22.5%	17.9%	3.6%

Source: National Transit Database, 2013 Reporting Information for “Municipal Bus” service.

6.4 Freight

Freight Movement

Movement by Weight and Value for Trucks and Rail

The Hattiesburg MPA is one of the lowest freight generating urban areas in Mississippi, both in terms of weight and value of commodities transported. Using data obtained from Transearch/IHS Freight Finder, general trends in freight movement can be observed.

In 2011, Forrest County was the 18th highest truck freight-generating county in Mississippi, but still trailed counties from other metropolitan areas as well as several non-metropolitan counties. Lamar County was even lower, at 32nd. In terms of value though, Forrest County fared a little better, ranking 13th and Lamar County ranked 37th.

This information suggests that Forrest County is generating relatively high-value freight while Lamar is generating relatively low-value freight.

Table 6.24 shows that in 2011, truck freight originating or destined for Forrest and Lamar counties accounted for less than three percent of either truck freight volume by weight or value in Mississippi. For rail, the two counties accounted for eight percent of all rail freight volume by weight in Mississippi and four percent of all rail freight value.

Table 6.24 Inbound and Outbound Freight Movement by Weight and Value in MPA Counties, 2011

	Truck		Rail	
	Tons	Value	Tons	Value
Forrest County, MS	2,072,118	$2,153,484,948	1,033,168	$713,690,333
Lamar County, MS	1,123,982	$712,026,545	905,644	$156,191,215
MPA Counties	3,196,100	$2,865,511,492	1,938,812	$869,881,549
Mississippi	115,368,000	$116,161,879,000	24,986,000	$23,909,792,000

Note: Excludes through-traffic

Source: Transearch/IHS Freight Finder

Still, it should be noted that the information above does not include through traffic, which is the majority of freight transported in Mississippi, as indicated in Table 6.25. Nearly 60 percent of all truck freight volume by weight is through traffic in Mississippi, while nearly 80 percent of all rail freight volume by weight is through traffic.

Table 6.25 Freight Movement in Mississippi by Direction by Weight, 2011

	Inbound	Outbound	Intrastate	Through	Total
Truck	45,579,000	37,366,000	32,423,000	154,033,000	269,401,000
Rail	14,804,000	8,734,000	1,448,000	93,389,000	118,375,000

Source: Transearch/IHS Freight Finder

Table 6.26 Inbound and Outbound Freight Truck Movement in MPA by Direction by Weight, 2011

	From Outside Mississippi	To Outside Mississippi	From Other Mississippi County	To Other Mississippi County	Within County	Total
Forrest County, MS	634,554	534,500	253,264	646,331	3,469	2,072,118
Lamar County, MS	268,967	364,654	179,053	308,368	2,940	1,123,982
MPA Counties	903,521	899,154	432,317	954,699	6,409	3,196,100

Note: Excludes through-traffic

Source: Transearch/IHS Freight Finder

Movement for Other Modes

While data on truck and rail freight is available from the Transearch/IHS data, other modes were not available for the MPA counties. Furthermore, because of the MPA's size and relatively low freight volumes, the FHWA's Freight Analysis Framework (FAF) commodity flow data is not available for any geography relevant to the MPA. However, we can glean some information from the state of Mississippi's data.

Table 6.27 shows that, in Mississippi, truck and rail modes account for about 94 percent of all ton-miles of freight in the state. Since there are no water ports in the MPA, it can be assumed that the truck and rail modes account for the overwhelming majority of ton-miles in the MPA as well. A key difference between the two modes of freight movement is that rail tends to travel much greater distances, nearly 750 miles compared to about 275 miles for trucks.

Table 6.27 Means of Transporting Freight Originating in Mississippi, 2012

	Ton-miles (millions)		Average miles per shipment	
	Number	Percent change from 2007	Number	Percent change from 2007
All Modes	24,662	-28.4%	420	-40.7%
Truck	16,443	-8.6%	278	16.5%
Rail	6,646	-8.3%	726	-19.3%
Inland Water	1,451	-60.3%	S	S
Parcel, U.S.P.S. or Courier	109	-46.1%	625	-45.9%
Air	S	S	885	-11.0%
Pipeline	S	S	S	S
Deep Sea	S	S	S	S
Great Lakes	S	S	S	S
Other Modes	13	-100%	0	-100%

Note: "S" = Withheld because estimate did not meet publication standards.

Source: U.S. Department of Transportation, Bureau of Transportation Statistics and U.S. Census Bureau, 2012 Commodity Flow Survey.

Freight Origins and Destinations

Given that approximately 80 percent of all rail volume by weight in Mississippi is through traffic, no origin or destination data was analyzed for rail freight beyond the state level. These state level trends can be found in MDOT's Unified Long-Range Transportation Infrastructure Plan (MULTIPLAN). Major trading partners by rail are widely distributed across North America.

For truck traffic, origin and destination data is more relevant as less than 60 percent of freight truck traffic is through traffic.

Intra-Metropolitan Trucking Origins and Destinations

Less than one percent of all inbound freight volume by weight transported by trucks in the MPA counties actually originates in the MPA counties. Similarly, less than one percent of all outbound freight volume by weight transported by trucks in the MPA counties is destined for the MPA counties.

This information suggests that the MPA is very dependent on outside freight to meet its need for goods and commodities and that the freight that does originate in the MPA is overwhelmingly not locally-serving. Simply put, most inbound freight comes from outside of the MPA and most outbound freight is destined for an area outside of the MPA.

Major Outside Truck Trading Partners

The overwhelming majority of all inbound (99 percent) and all outbound (99 percent) freight volume by weight transported by trucks in the MPA originates or is destined for an area outside of the MPA.

Table 6.28 shows the top ten outside trading partners by weight. These trading partners accounted for about 55 percent of all freight volume by weight transported by trucks in 2011. Most of the major trading partners are relatively close and located in or near major metropolitan areas. Note that trading partners within Mississippi are provided as counties and outside of Mississippi they are provided as Bureau of Economic Analysis (BEA) regions, which are larger than a Metropolitan Statistical Area (MSA).

Table 6.28 Major Outside Truck Trading Partners Ranked by Total Tons, 2011

Rank	Trading Partner	Inbound		Outbound		Total	
		Tons	Share of All Tons	Tons	Share of All Tons	Tons	Share of All Tons
1	Louisiana Portion of New Orleans BEA	178,464	9.6%	338,750	25.3%	517,214	16.2%
2	Marion County, MS	323,874	17.4%	5,768	0.4%	329,641	10.3%
3	Mobile, AL BEA	102,694	5.5%	116,958	8.7%	219,652	6.9%
4	Hinds County, MS	115,731	6.2%	23,877	1.8%	139,608	4.4%
5	Louisiana Portion of Baton Rouge BEA	68,753	3.7%	63,535	4.7%	132,288	4.1%
6	Jones County, MS	8,025	0.4%	114,144	8.5%	122,169	3.8%
7	Walthall County, MS	109,543	5.9%	2,548	0.2%	112,091	3.5%
8	Jackson County, MS	67,206	3.6%	16,532	1.2%	83,738	2.6%
9	Birmingham, AL BEA	35,855	1.9%	22,655	1.7%	58,510	1.8%
10	Houston, TX BEA	15,165	0.8%	35,480	2.7%	50,644	1.6%

Note: Excludes through-traffic

Source: Transearch/IHS Freight Finder

Trucking Network and Facilities

Network

The MPA has no active intermodal terminal facilities, roadways designated as intermodal connectors, or roadways designated as part of the draft National Primary Freight Network (NPFN). However, there are several major roadways designated as Tier I and Tier II corridors in the Mississippi Freight Network (MFN), including:

1. Interstate 59 is part of the Tier I Picayune-Hattiesburg-Meridian Corridor;
2. US 49 is part of the Tier I Jackson-Hattiesburg-Gulfport Corridor; and
3. US 98 is part of the Tier II McComb-Hattiesburg-Lucedale Corridor.

In addition to the above roadways, MS 589 from US 98 to I-59 is listed as a key connector for the Tier II US 98 corridor in the MFN. All of these elements of the freight network are illustrated in Figure 6.25.

Facilities

There are no active intermodal terminal facilities listed by the Bureau of Transportation Statistics in the MPA. The Miller Transporters, Inc. Rail/Truck intermodal facility in northern Hattiesburg is listed but is currently inactive.

Beyond intermodal terminal facilities, there are many trucking establishments within the MPA. These establishments provide both local and long distance trucking services. Figure 6.25 shows the location of the major trucking establishments within the MPA.

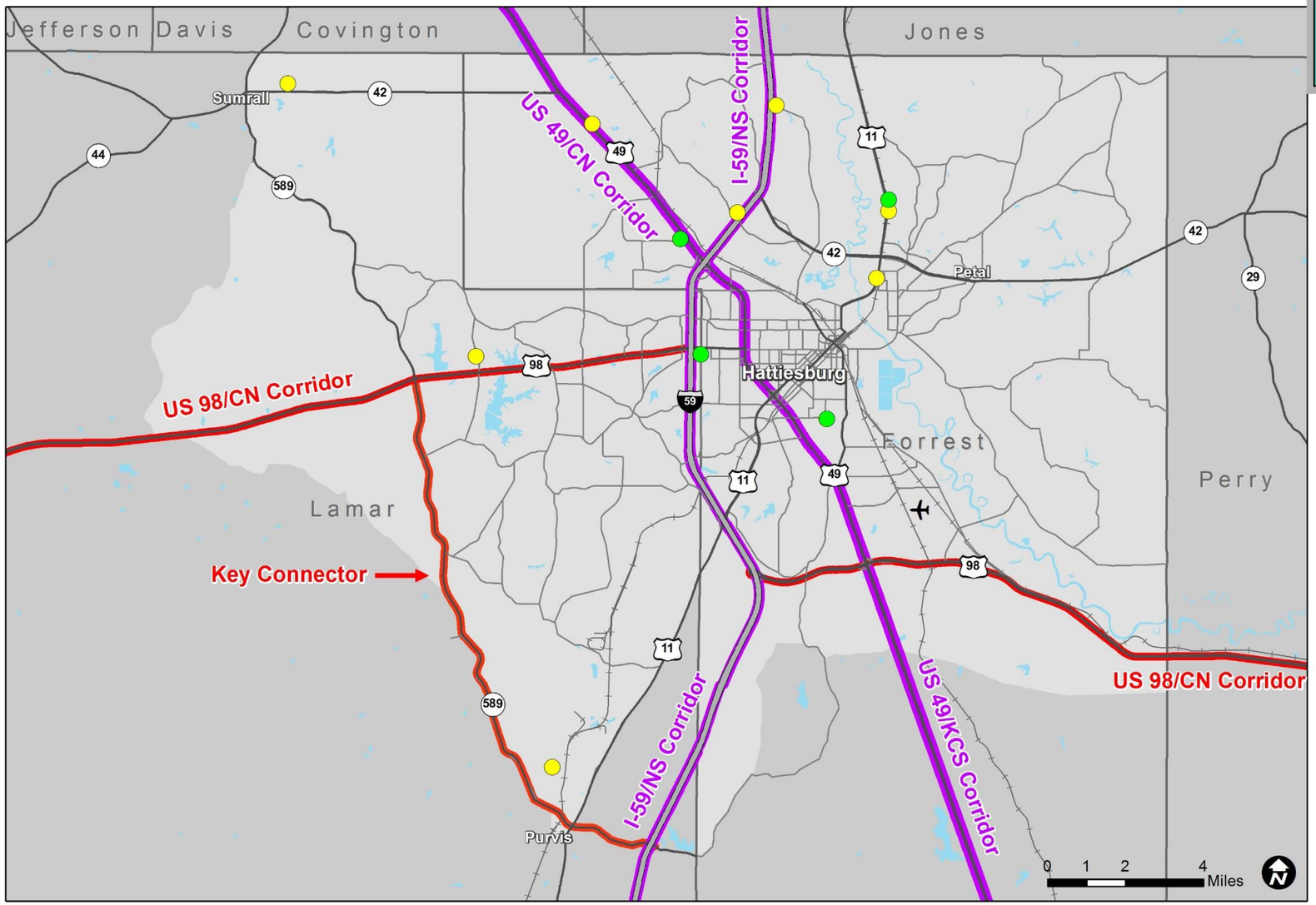
Traffic

In an effort to better understand freight needs, a statewide freight demand model was developed for MDOT for its 2040 update to the statewide long-range transportation plan. One output of this model is the estimated daily freight truck volumes on major roadways in the State. These estimated volumes are illustrated in Figure 6.26.

The estimated freight truck volumes suggest the following trends:

- Freight truck traffic is greatest on I-59, US 49, and US 98. These correspond to the roadways included in the MFN.
- Freight truck traffic is also relatively high on portions of MS 42, MS 11 and a few other roadways segments.

FIGURE 6.25 FREIGHT NETWORK AND FACILITIES - TRUCKING



Legend

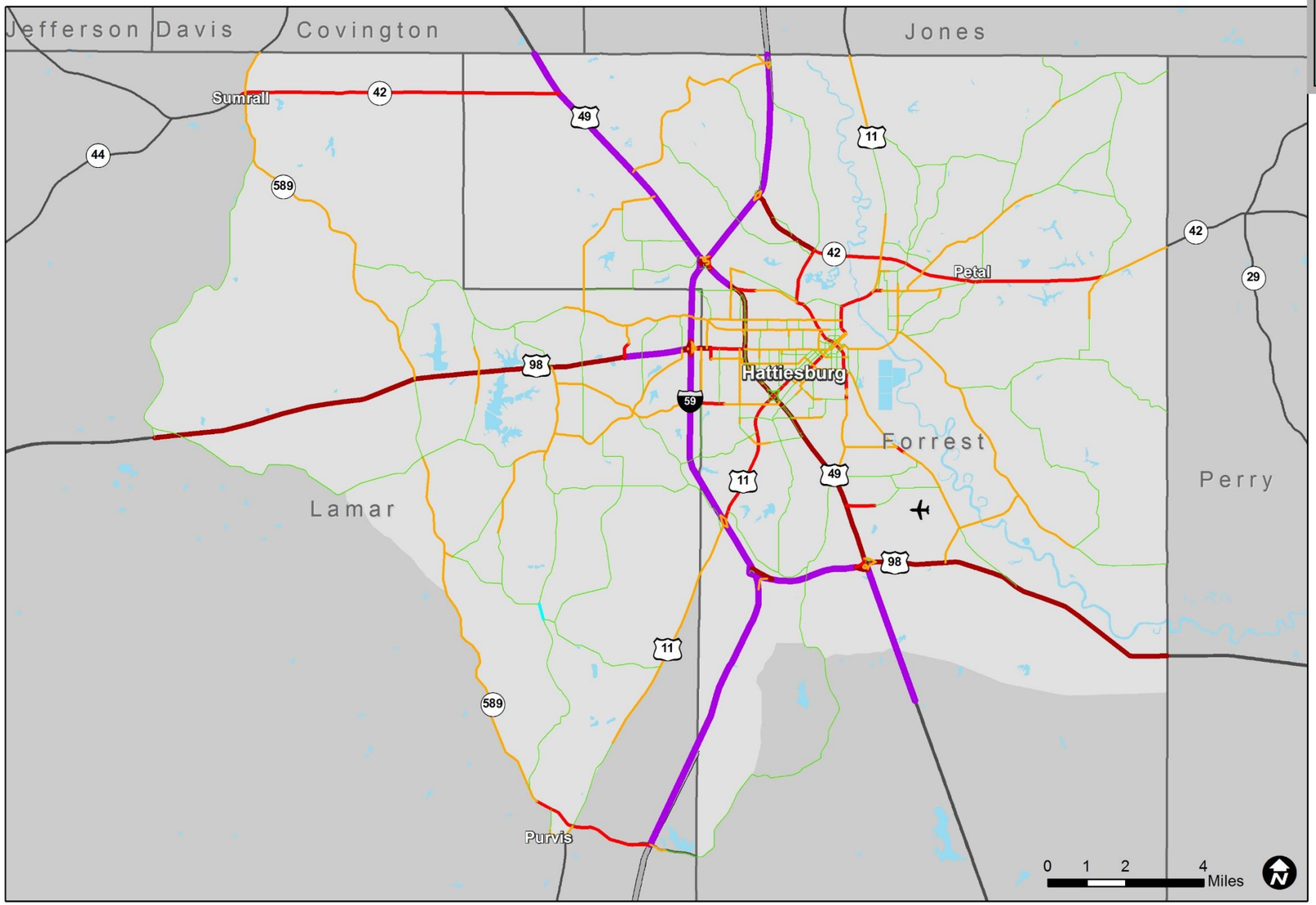
- General Aviation Airport
- Major Local Trucking Businesses
- Major Long Distance Trucking Businesses
- Interstate
- Secondary Roadways
- Other Major Roadways in MPO
- Railroads
- Tier I Highway Corridor (MS Freight Network)
- Tier II Highway Corridor (MS Freight Network)
- Water Bodies
- Metropolitan Planning Area
- Counties

Disclaimer: This map is for planning purposes only. Contact MPO Staff for more information.

Map Source: Neel-Schaffer, Inc.

Data Sources: 2014 National Transportation Atlas; USDOT; MDOT; Hattiesburg Travel Demand Model; Census Bureau

FIGURE 6.26 MODELED MPO FREIGHT TRUCK TRAFFIC, 2015



2040 MTP

Legend

Estimated Average Daily Trucks (2015)

- 0 - 100
- 100 - 500
- 500 - 1,000
- 1,000 - 2,500
- 2,500 - 11,224
- General Aviation Airport
- Interstate
- Secondary Roadways
- Water Bodies
- Metropolitan Planning Area
- Counties

Disclaimer: This map is for planning purposes only. Contact MPO Staff for more information.

Map Source: Neel-Schaffer, Inc.

Data Sources: Statewide Freight Travel Demand Model; 2014 National Transportation Atlas; Census Bureau

Rail Network and Facilities

Network

The MPA has approximately 65 miles of railroads. The majority of this is Class I railroads that are designated as part of the Tier I or Tier II freight corridors in the MFN. The draft NPFN does not include railroads.

The railroads in the MPA that are part of the MFN corridors are as follows:

1. Norfolk Southern Railway is part of the Tier I Picayune-Hattiesburg-Meridian Corridor;
2. Canadian National Railway and Kansas City Southern Railway are part of the Tier I Jackson-Hattiesburg-Gulfport Corridor; and
3. Canadian National Railway is part of the Tier II McComb-Hattiesburg-Lucedale Corridor.

Figure 6.27 shows railroads in the MPA along with the MFN corridors. Non-main lines are also shown.

Facilities

There are no active intermodal terminal facilities listed by the Bureau of Transportation Statistics in the MPA. The Miller Transporters, Inc. Rail/Truck intermodal facility along Canadian National Railway tracks in northern Hattiesburg is listed but is currently inactive.

There are two line-haul railroad establishments within the MPA: the Norfolk Southern establishment in Downtown Hattiesburg and the Kansas City Southern Railway establishment near Camp Shelby. Line-haul railroad establishments provide for the intercity movement of trains between the terminals and stations on main and branch lines of a long-distance rail network, excluding local switching services.

There are two major railroad yards within the MPA: the Hattiesburg Yard in in Downtown Hattiesburg and the Dragon Yard near US 11 between Petal and the Leesville community. Railroad yards are a combined series of tracks that allow for the efficient storage, processing, and/or loading/unloading of railroad cars.

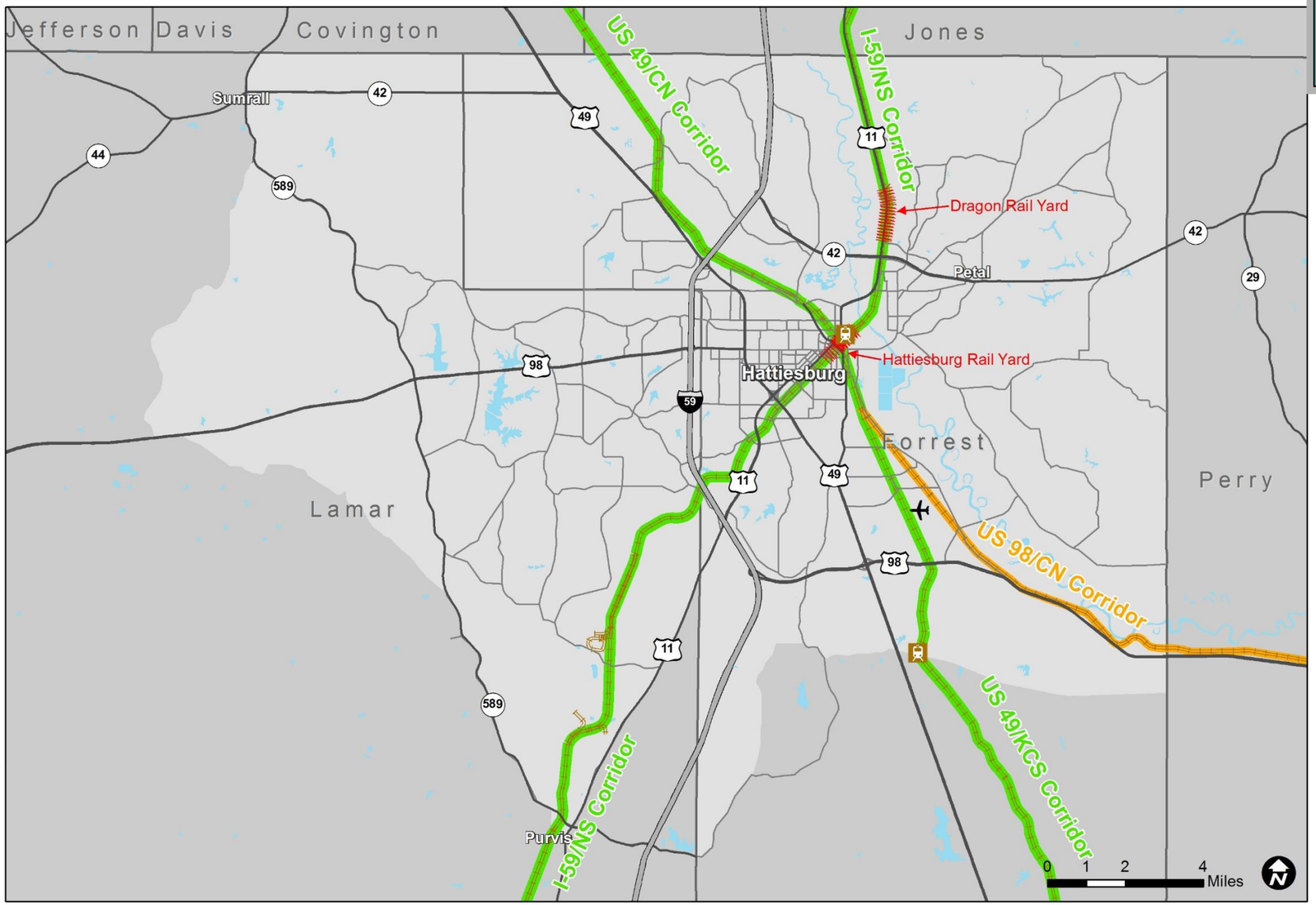
Figure 6.27 shows the location of the line-haul establishments and railroad yards within the MPA.

Traffic

In an effort to better understand freight needs, a statewide freight demand model was developed for MDOT for its 2040 update to the statewide long-range transportation plan. One output of this model is the estimated annual flow, in tons, on railroads along most MFN corridors in the State. These estimated flows for railroads in the MPA are illustrated in Figure 6.28.

While the relative amount of traffic on the major railroad corridors in the MPA may be better understood with this information, it is important to note that these annual flows are for entire railroad corridors and do not show variation along the route. Still, variation may not be that significant since the majority of rail traffic in Mississippi is through traffic.

FIGURE 6.27 FREIGHT NETWORK AND FACILITIES - RAIL



2040 MTP

Legend

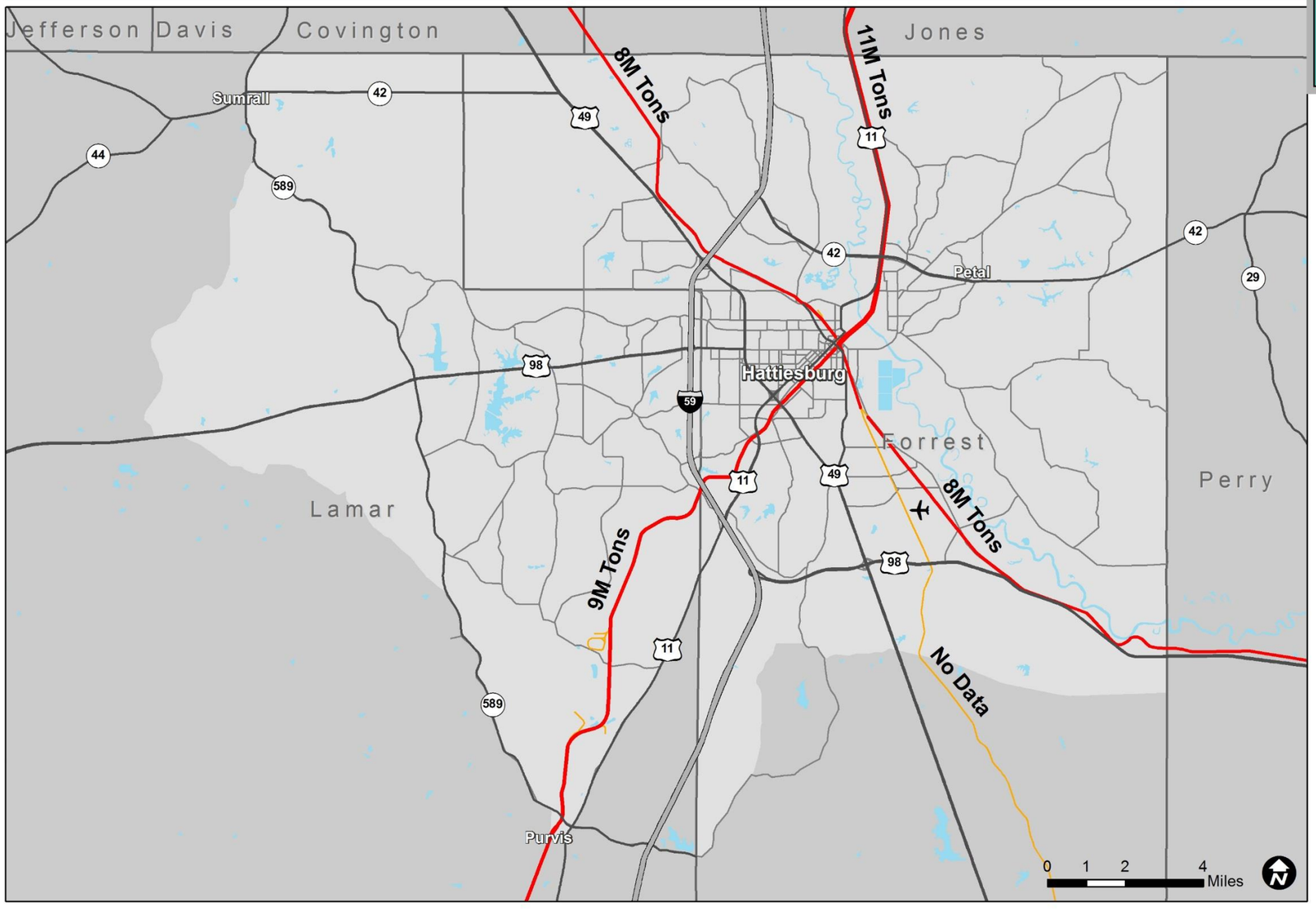
- General Aviation Airport
- Line-Haul Railroad Establishments
- Railroad Yards
- Railroads
- Tier I Rail Corridor (MS Freight Network)
- Tier II Rail Corridor (MS Freight Network)
- Interstate
- Secondary Roadways
- Other Major Roadways in MPO
- Water Bodies
- Metropolitan Planning Area
- Counties

Disclaimer: This map is for planning purposes only. Contact MPO Staff for more information.

Map Source: Neel-Schaffer, Inc.

Data Sources: 2014 National Transportation Atlas; InfoUSA; MDOT; Hattiesburg Travel Demand Model; Census Bureau

FIGURE 6.28 FREIGHT TRAFFIC ON RAIL CORRIDORS



2040 MTP

Legend

Annual Tons of Freight on Railroads

- 8 million
- 9 million
- 10 million
- 11 million
- Railroads with No Data
- General Aviation Airport
- Interstate
- Secondary Roadways
- Other Major Roadways in MPO
- Water Bodies
- Metropolitan Planning Area
- Counties

Disclaimer: This map is for planning purposes only. Contact MPO Staff for more information.

Map Source: Neel-Schaffer, Inc.

Data Sources: Statewide Freight Travel Demand Model; 2014 National Transportation Atlas; Census Bureau

Airports

Facilities

While only a small amount of freight is typically shipped by air, these commodities tend to be high in value. Also, the area around airports also tends to serve as distribution and manufacturing hubs.

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

Cargo Volume

The Hattiesburg-Laurel Regional Airport only handled approximately 6,500 pounds of domestic freight and mail cargo in 2013 and 2014, ranking 624th of 820 U.S. airports.

No cargo data was available for Hattiesburg-Bobby L. Chain Municipal Airport.

Statewide Freight Plan

The Mississippi Statewide Freight Plan (MSFP) was completed in February 2015. This plan is a comprehensive evaluation of the state's freight transportation system that allows for efficient planning and investment in the preservation, improvement, and strategic expansion of the state's freight system. Of particular importance, the MSFP does the following:

1. Identifies highway and rail freight corridors of statewide significance. These corridors are called Mississippi Freight Network (MFN) corridors and are classified into Tier I and Tier II corridors, as noted previously.
2. Identifies improvement strategies through a needs assessment, with a focus on ensuring continued efficient and safe movement of freight within the key freight corridors.

The MFN corridors have been highlighted in previous chapters of the 2040 MTP. The potential freight improvement projects specific to the Hattiesburg MPA in the MSFP are summarized below. High-priority, short-range improvement recommendations are in italics.

1. Safety and security improvements
    - Safety improvements along US 49 (Tier I corridor) and along US 98 (Tier II corridor). These improvements may be outside of the MPA.
    - Upgrade all Tier I rail corridor grade crossings (collector road or higher) to full active crossing warning devices.
    - Upgrade all US 98 public corridor crossings along the CN main line with at least 2 active warning devices.
2. Infrastructure preservation
    - Reconstruct two US 98 bridges to lift weight restrictions. These bridges may be outside of MPA.
    - Reconstruct two US 49 bridges to lift weight restrictions. *These bridges may be outside of MPA.*
    - Raising I-59, US 49 bridges to meet 16' clearance performance standard. Not all bridges along these corridors currently meet this performance standard set by the MSFP. However, there may be no bridges in need of raising within the MPA.
3. Operational efficiency enhancement
    - Leverage deployment of the Hattiesburg region ITS Incident Management System and TMC Operations to include expanded commercial vehicle elements.

The MSFP also sets performance standards for Tier I and Tier II corridors. While beyond the scope of the 2040 MTP, further analysis of the MPA's corridors with respect to these standards could identify high priority areas for improvement.

6.5 Safety

The safety element of the 2040 MTP focuses on gathering and analyzing available safety data and then identifying general hazardous areas. Due to the limited scope of this study, it does not identify location specific recommendations for the identified hazardous locations. However, potential countermeasures which could be used to mitigate various crash types have been included in Chapter 3: Future Transportation Needs.

Roadways Crash Data Analysis

According to the National Highway Traffic Safety Administration (NHTSA) Fatality Analysis Reporting System (FARS), between 2011 and 2013 approximately 33,000 fatalities have occurred on United States' roadways each year. Every crash, regardless of the severity, costs money and time in damages, emergency services, and delays. These costs affect both governments and taxpayers. Despite the trend of reduced crashes over previous years, crashes and roadway safety still need to be addressed. One of the goals of this plan is to improve travel safety by reducing the risk of crashes on the roadways.

Crash records, corrected with the MDOT Safety Analysis Management System (SAMS) latitude and longitude data, from Forrest and Lamar Counties in the MPO study area from 2011 to 2013 were used in the crash analysis of the study area. The crash records included the time and location of the crash, severity of the crash, and crash location conditions. A total of 14,248 automobile only crashes occurred within the study area. Table 6.29 shows a breakdown of the crashes by county and year.

Table 6.29 Automobile Crashes by Year, 2011-2013

Crash Year	Forrest	Lamar	Total
2011	2,845	1,954	4,799
2012	2,818	1,760	4,578
2013	2,913	1,958	4,871
Total	**8,576**	**5,672**	**14,248**

Source: SAMS, 2011- 2013

Roadway Crash Trends

The first step in improving travel safety is determining the cause of the crashes. This study analyzed the time of day, roadway surface conditions, roadway lighting, crash severity, collision type, and whether or not alcohol was involved in the crashes. This information is presented and discussed on the following pages.

For each crash, the data shows approximately what time of day the crash occurred. These times are divided into hourly increments as shown in Table 6.30. Within the study area, approximately 81 percent of the crashes occurred from 7:00 AM to 7:00 PM, which corresponds with typical travel to work, school, and other various activities. The highest number of crashes occurred between 12:00 PM and 6:00 PM, when traffic is likely to be the heaviest. The number of crashes was much lower between 12:00 AM and 6:00 AM, when businesses and schools are closed and traffic is typically lighter.

Table 6.30 Automobile Crashes by Time of Day, 2011-2013

Hour Beginning	Forrest	Lamar	Number of Crashes	Percentage
Midnight	108	43	151	1.1%
1:00 AM	89	35	124	0.9%
2:00 AM	103	28	131	0.9%
3:00 AM	48	21	69	0.5%
4:00 AM	39	20	59	0.4%
5:00 AM	60	32	92	0.6%
6:00 AM	119	66	185	1.3%
7:00 AM	429	254	683	4.8%
8:00 AM	403	207	610	4.3%
9:00 AM	336	181	517	3.6%
10:00 AM	426	265	691	4.8%
11:00 AM	510	349	859	6.0%
12:00 PM	684	524	1,208	8.5%
1:00 PM	644	475	1,119	7.9%
2:00 PM	639	460	1,099	7.7%
3:00 PM	773	512	1,285	9.0%

Hour Beginning	Forrest	Lamar	Number of Crashes	Percentage
4:00 PM	723	492	1,215	8.5%
5:00 PM	753	567	1,320	9.3%
6:00 PM	501	389	890	6.2%
7:00 PM	339	235	574	4.0%
8:00 PM	258	195	453	3.2%
9:00 PM	248	142	390	2.7%
10:00 PM	193	107	300	2.1%
11:00 PM	151	73	224	1.6%
Total	**8,576**	**5,672**	**14,248**	**100.0%**

Source: SAMS, 2011- 2013

The roadway surface condition at the time of the crash may also be a contributing factor. A breakdown of the surface conditions for all crashes in the study area is shown in Table 6.31. Approximately 2,500 (about 18 percent) crashes occurred during wet pavement conditions. Nearly 12,000 crashes, approximately 81 percent, occurred during dry conditions. Although wet roadway surface conditions could have been a factor in some instances, the majority of the crashes were unaffected by wet conditions.

Table 6.31 Automobile Crashes by Roadway Surface Conditions, 2011-2013

Roadway Surface Condition	Forrest	Lamar	Number of Crashes	Percentage
Dry	6,977	4,632	11,609	81.5%
Wet	1,529	999	2,528	17.7%
Water	27	25	52	0.4%
Snow	1	-	1	0.0%
Ice	1	-	1	0.0%
Sand/Mud/Dirt/Oil/Gravel	5	2	7	0.0%
Unlisted	36	14	50	0.4%
Total	**8,576**	**5,672**	**14,248**	**100.0%**

Source: SAMS, 2011- 2013

The lighting conditions during the time of each crash are also considered in this analysis. Table 6.32 includes a breakdown of the crashes that occurred under various lighting conditions. Over 76 percent of the crashes occurred during daylight. About 12 percent of crashes occurred when it was dark outside with street lights, and about 10 percent of the crashes occurred at night with no street lights.

Table 6.32 Automobile Crashes by Roadway Lighting, 2011-2013

Lighting	Forrest	Lamar	Number of Crashes	Percentage
Daylight	6,458	4,401	10,859	76.2%
Dark – Lit	1,191	580	1,771	12.4%
Dark – Unlit	783	600	1,383	9.7%
Dawn	40	19	59	0.4%
Dusk	104	72	176	1.2%
Total	**8,576**	**5,672**	**14,248**	**100.0%**

Source: SAMS, 2011- 2013

Crash severity should also be considered, and this data is shown in Table 6.33. Within the study area, 14,248 automobile crashes occurred between 2011 and 2013, with 46 crashes claiming lives and 3,133 crashes causing injuries. Only 0.7 percent of the total crashes resulted in a fatality or severe injury. Just over 78 percent of the crashes had no injuries reported.

Table 6.33 Automobile Crashes by Severity, 2011-2013

Severity	Forrest	Lamar	Number of Crashes	Percentage
Fatal	31	15	46	0.3%
Severe	28	24	52	0.4%
Moderate	409	295	704	4.9%
Complaint	1,447	930	2,377	16.7%
No Injury	6,661	4,408	11,069	77.7%
Unlisted	0	0	0	0.0%
Total	**8,576**	**5,672**	**14,248**	**100.0%**

Source: SAMS, 2011- 2013

The type of collision is also an important factor in determining the cause of crashes. Table 6.34 shows the number of crashes by collision type that occurred between 2011 and 2013. The four highest collision types, making up nearly 86 percent of the crashes in the study area, were rear-end collisions, angle collisions, sideswipe collisions, and run off road collisions. Rear-end crashes account for the majority of the collisions (just above 36 percent) and are typically concentrated at or near signalized intersections. According to the crash data, angle crashes are the second most common collision type followed by sideswipe crashes.

Table 6.34 Automobile Crashes by Collision Type, 2011-2013

Collision Type	Forrest	Lamar	Number of Crashes	Percentage
Run off road	1,106	813	1,919	13.5%
Vehicle overturn	23	9	32	0.2%
Object fell from vehicle	28	10	38	0.3%
Other object in road	71	52	123	0.9%
Roadside object	89	50	139	1.0%
Parked vehicle	295	140	435	3.1%
Rear end	2,933	2,241	5,174	36.3%
Left turn same roadway	440	260	700	4.9%
Left turn cross traffic	3	1	4	0.0%
Right turn cross traffic	0	1	1	0.0%
Head on	62	42	104	0.7%
Sideswipe	918	603	1,521	10.7%
Angle	2,324	1,273	3,597	25.2%
Hit and Run	91	75	166	1.2%
Animal	173	93	266	1.9%
Other	18	9	27	0.2%
Unknown	2	0	2	0.0%
Total	**8,576**	**5,672**	**14,248**	**100.0%**

Source: SAMS, 2011- 2013

The last factor considered in this analysis is whether or not alcohol was involved in these crashes. Alcohol is a factor in many crashes across the United States, so it is worth evaluating in this study. Table 6.35 shows a breakdown of alcohol involvement for crashes that occurred in the study area between 2011 and 2013. About 3 percent of overall crashes in the study area involved alcohol. Of the 46 total fatal crashes within the study area, 4 were fatal crashes related to alcohol involvement, resulting in a nearly 10 percent share of total fatality crashes being alcohol related.

Table 6.35 Alcohol Involvements in Automobile Crashes, 2011-2013

Alcohol	Forrest	Lamar	Number of Crashes	Percentage
Alcohol involved	273	149	422	3.0%
Alcohol not involved	8,303	5,523	13,826	97.0%
Total	**8,576**	**5,672**	**14,248**	**100.0%**

Source: SAMS, 2011- 2013

Crash Locations

There were about 7,500 intersection crashes in the study area over a three year period, 2011 to 2013. The total crashes at each intersection were computed by locating the crashes that occurred within 100 feet of that intersection. Table 6.36 shows the top 10 intersections with the highest crash frequency in each county. Table 6.37 shows the top 20 intersections with the highest crash frequency as well as the severity of the crashes. Table 6.38 shows the collision types that occurred at the top 20 intersections. Table 6.39 and Table 6.40 display the locations of the top intersections with rear end and right angle crashes respectively, along with the intersection control at respective intersection.

Since the nature of this study is to only identify trends, this study did not attempt to analyze each location and corresponding crash records but merely depended on the data included in crash databases provided by MDOT.

Table 6.36 Top 10 Intersections with High Automobile Crash Frequency by County, 2011-2013

Forrest		Lamar	
Intersection	Crashes	Intersection	Crashes
US 49 @ MS 198 (Hardy St)	159	US 98 (Hardy St) @ Westover Dr	308
US 49 @ Classic Dr	148	US 98 (Hardy St) @ Weathersby Rd	178
MS 198 (Hardy St) @ N 38th Ave	127	US 98 (Hardy St) @ Cross Creek Pkwy	133
US 49 @ Eddy St/Cloverleaf Dr	106	MS 198 (Hardy St) @ S 40th Ave	132
US 49 @ W Pine St	85	US 98 (Hardy St) @ I-59 SB Off Ramp	111
US 49 @ Mamie St	78	US 98 @ King Rd/Old Hwy 11	103
US 49 @ N 31st Ave	70	US 98 @ MS 589	79
N 38th Ave @ W 4th St	65	Lincoln Rd @ Oak Grove Rd	43
Lincoln Rd @ 28th Ave	54	US 98 @ Cole Rd	39
US 49 @ Helveston Rd/Wisteria Dr	54	W 4th St @ Westover Dr/West Hills Dr	38

Source: SAMS, 2011- 2013

Table 6.37 Top 20 Intersections with High Automobile Crash Frequency by Severity, 2011-2013

Rank	Location	Crashes	Fatal	Severe	Moderate	Complaint	No Injury
1	US 98 (Hardy St) @ Westover Dr	308	0	0	6	55	247
2	US 98 (Hardy St) @ Weathersby Rd	178	0	0	3	23	152
3	US 49 @ MS 198 (Hardy St)	159	0	0	2	32	125
4	US 49 @ Classic Dr	148	0	0	7	31	110
5	US 98 (Hardy St) @ Cross Creek Pkwy	133	0	0	8	23	102
6	MS 198 (Hardy St) @ S 40th Ave	132	0	0	3	22	107
7	MS 198 (Hardy St) @ N 38th Ave	127	0	0	2	7	118
8	US 98 (Hardy St) @ I-59 SB Ramp	111	0	1	3	19	88
9	US 49 @ Eddy St/Cloverleaf Dr	106	0	0	2	10	94
10	US 98 @ King Rd/Old Hwy 11	103	0	0	4	14	85
11	US 49 @ W Pine St	85	0	0	0	24	61
12	US 98 @ MS 589	79	0	0	7	13	59
13	US 49 @ Mamie St	78	0	0	2	21	55
14	US 49 @ N 31st Ave	71	0	0	2	23	46
15	N 38th Ave @ W 4th St	66	0	0	1	6	59
16	Lincoln Rd @ 28th Ave	54	0	0	2	7	45
17	US 49 @ Helveston Rd/Wisteria Dr	54	1	0	5	18	30
18	US 49 @ Old Hwy 42	47	0	0	2	14	31
19	US 11 (Broadway Dr) @ Lincoln Rd	45	0	0	1	9	35
20	MS 42 (Evelyn Gandy Pkwy) @ E Central Ave/Byrd Pkwy	44	0	0	2	11	31
	Total	**2,128**	**1**	**1**	**64**	**382**	**1,680**

Source: SAMS, 2011- 2013

Table 6.38 Top 20 Intersections with High Automobile Crash Frequency by Collision Type, 2011-2013

Rank	Intersection	Crashes	Run off road	Vehicle Overturn	Object fell from vehicle	Other object in road	Parked vehicle	Rear end	Left turn same roadway	Head on	Sideswipe	Angle	Hit and Run
1	US 98 (Hardy St) @ Westover Dr	308	0	0	0	0	0	215	20	0	57	15	1
2	US 98 (Hardy St) @ Weathersby Rd	178	1	0	0	0	0	128	14	1	17	16	1
3	US 49 @ MS 198 (Hardy St)	159	5	1	2	1	0	103	9	1	24	13	0
4	US 49 @ Classic Dr	148	2	0	0	1	0	97	7	1	19	21	0
5	US 98 (Hardy St) @ Cross Creek Pkwy	133	0	0	0	0	0	76	20	0	17	19	1
6	MS 198 (Hardy St) @ S 40th Ave	132	0	0	0	0	0	86	9	0	31	6	0
7	MS 198 (Hardy St) @ N 38th Ave	127	2	0	0	0	0	79	9	0	10	27	0
8	US 98 (Hardy St) @ I-59 SB Ramp	111	3	0	0	0	0	85	1	0	13	9	0
9	US 49 @ Eddy St/Cloverleaf Dr	106	0	0	0	0	0	78	8	1	8	10	1
10	US 98 @ King Rd/Old Hwy 11	103	0	0	0	0	0	65	18	0	12	7	1
11	US 49 @ W Pine St	85	1	0	1	0	0	54	11	0	6	12	0
12	US 98 @ MS 589	79	0	0	0	0	1	57	12	0	4	5	0
13	US 49 @ Mamie St	78	0	0	0	0	0	58	6	0	4	10	0
14	US 49 @ N 31st Ave	71	2	1	0	0	0	36	9	0	5	18	0
15	N 38th Ave @ W 4th St	66	1	0	1	0	0	31	6	1	7	19	0
16	Lincoln Rd @ 28th Ave	54	1	0	0	0	0	34	1	0	4	13	1
17	US 49 @ Helveston Rd/Wisteria Dr	54	1	0	0	0	0	23	17	0	4	9	0
18	US 49 @ Old Hwy 42	47	2	0	0	0	0	32	4	0	6	3	0
19	US 11 (Broadway Dr) @ Lincoln Rd	45	1	0	0	0	0	26	6	0	5	7	0
20	MS 42 (Evelyn Gandy Pkwy) @ E Central Ave/Byrd Pkwy	44	0	0	0	0	0	30	9	0	1	4	0
	Total	**2,128**	**22**	**2**	**4**	**2**	**1**	**1,393**	**196**	**5**	**254**	**243**	**6**

Source: SAMS, 2011- 2013

Table 6.39 Top Intersections with High Automobile Rear-End Crash Frequency, 2011-2013

Rank	Intersection	Number of Crashes	Intersection Control
1	US 98 (Hardy St) @ Westover Dr	215	Signal
2	US 98 (Hardy St) @ Weathersby Rd	128	Signal
3	US 49 @ MS 198 (Hardy St)	103	Signal
4	US 49 @ Classic Dr	97	Signal
5	MS 198 (Hardy St) @ S 40th Ave	86	Signal
6	US 98 (Hardy St) @ I-59 SB Off Ramp	86	Signal
7	MS 198 (Hardy St) @ N 38th Ave	79	Signal
8	US 49 @ Eddy St/Cloverleaf Dr	78	Signal
9	US 98 (Hardy St) @ Cross Creek Pkwy	76	Signal
10	US 98 @ King Rd/Old Hwy 11	65	Signal

Source: SAMS, 2011- 2013

Table 6.40 Top Intersections with High Automobile Angle Crash Frequency, 2011-2013

Rank	Intersection	Number of Crashes	Intersection Control
1	US 49 W Service Rd @ W 7th St	30	Unsignalized
2	MS 198 (Hardy St) @ N 38th Ave	27	Signal
3	US 49 @ Classic Dr	21	Signal
4	US 98 (Hardy St) @ Cross Creek Pkwy	19	Signal
5	N 38th Ave @ W 4th St	19	Signal
6	US 49 @ N 31st Ave	18	Signal
7	US 98 (Hardy St) @ Weathersby Rd	16	Signal
8	US 11 @ W Central Ave	16	Unsignalized
9	US 98 (Hardy St) @ Westover Dr	15	Signal
10	US 11 @ Sullivan Kilrain Rd	15	Unsignalized

Source: SAMS, 2011- 2013

Crash Rates

Crash rates for the study area were based on the model network layer and base year (2013) volumes obtained from the Hattiesburg MPO travel demand model. The length of each segment was calculated and the corresponding daily traffic volumes from the model are used in the crash rate equation. The equation that was used to calculate segment crash rates is:

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

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

N = average annual crash frequency of the segment

ADT = average daily traffic of the segment

L = length of the segment in miles

Table 6.41 shows the ten segments with the highest crash frequencies in the study area, as well as their corresponding crash rates, while Table 6.42 shows the ten segments with the highest automobile crash rates in the study area (segments with ADT greater than 10,000 and length greater than 0.1 miles).

Table 6.41 Top 10 High Automobile Crash Frequency Segments and Crash Rates, 2011-2013

Segment	From	To	Total Crashes	Annual Crash Frequency	ADT	Length	Crash Rate*
US 98 (Hardy St)	W Hospital Dr/ Fairfield Dr	Mayfair Rd	108	36	47,043	0.27	7.88
Cross Creek Pkwy	US 98 (Hardy St)	.22 miles North of US 98 (Hardy St)	81	27	8,256	0.22	41.02
I-59	MS 589	US 98E	80	27	16,686	7.14	0.61
US 98 (Hardy St)	Weathersby Rd	W Hospital Dr/ Fairfield Dr	65	22	43,269	0.33	4.21
US 98 (Hardy St)	Lake Forgetful	Cross Creek Pkwy	58	19	38,228	0.50	2.78
N 38th Ave	Pearl St	Mable St	56	19	8,504	0.26	23.87
MS 198 (Hardy St)	S 34th Ave	N 32nd Ave	45	15	27,697	0.17	8.69

Segment	From	To	Total Crashes	Annual Crash Frequency	ADT	Length	Crash Rate*
US 98	Gravel Pit Rd	Pioneer Rd South	45	15	39,453	0.09	11.35
S 40th Ave	MS 198 (Hardy St)	O'Ferrall Dr	41	14	6,932	0.10	56.68
I-59	US 49	River Rd Underpass	41	14	39,789	1.33	0.71

Note: *Crash Rate is expressed in crashes per million vehicle miles traveled

Source: SAMS, 2011- 2013

Table 6.42 Top 10 High Automobile Crash Rate Segments, 2011-2013

Segment	From	To	Total Crashes	Annual Crash Frequency	ADT	Length	Crash Rate*
Cross Creek Pkwy	US 98 (Hardy St)	.22 miles N of US 98 (Hardy St)	81	27	8,256	0.22	41.02
N 38th Ave	Pearl St	Mable St	56	19	8,504	0.26	23.87
W 4th St	Westover Dr	0.13 mi E of Westover Dr	24	8	11,362	0.13	15.40
MS 198 (Hardy St)	N 32nd Ave	31st Ave	40	13	27,664	0.11	12.26
W 4th St	Weathersby Rd	Madison Pl	20	7	9,561	0.19	10.21
Weathersby Rd	US 98 (Hardy St)	Methodist Blvd	22	7	7,753	0.25	10.17
MS 198 (Hardy St)	N 35th Ave	S 34th Ave	34	11	28,849	0.12	9.08
MS 198 (Hardy St)	S 34th Ave	N 32nd Ave	45	15	27,697	0.17	8.69
MS 198 (Hardy St) Eastbound	I-59 SB Off Ramp	I-59 NB On Ramp	38	13	28,868	0.12	8.61
US 49	0.11 mi S of 4th St Underpass	4th St Underpass	22	7	22,223	0.11	8.28

Note: *Crash Rate is expressed in crashes per million vehicle miles traveled

Source: SAMS, 2011- 2013

The equation that was used to calculate intersection crash rates is:

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

Where: Intersection Crash Rate = crashes per million vehicles entering.

N = average annual crash frequency of the segment

ADT = average daily traffic of the segment

Table 6.43 shows the ten intersections with the highest crash rates in the study area.

Table 6.43 Top 10 High Crash Rate Intersections, 2011-2013

Location	Total Crashes	Annual Crash Frequency	ADT	Crash Rate*
US 98 (Hardy St) @ Westover Dr	308	103	70,441	3.99
Lincoln Rd @ 28th Ave	54	18	12,619	3.91
US 49 @ Classic Dr	148	49	39,292	3.44
US 98 @ MS 589	79	26	23,001	3.14
US 98 (Hardy St) @ Weathersby Rd	178	59	52,917	3.07
MS 198 (Hardy St) @ N 38th Ave	127	42	38,124	3.04
US 49 @ W Pine St	85	28	26,132	2.97
N 38th Ave @ W 4th St	66	22	21,026	2.87
MS 198 (Hardy St) @ S 40th Ave	132	44	43,583	2.77
US 98 (Hardy St) @ Cross Creek Pkwy	133	44	44,021	2.76

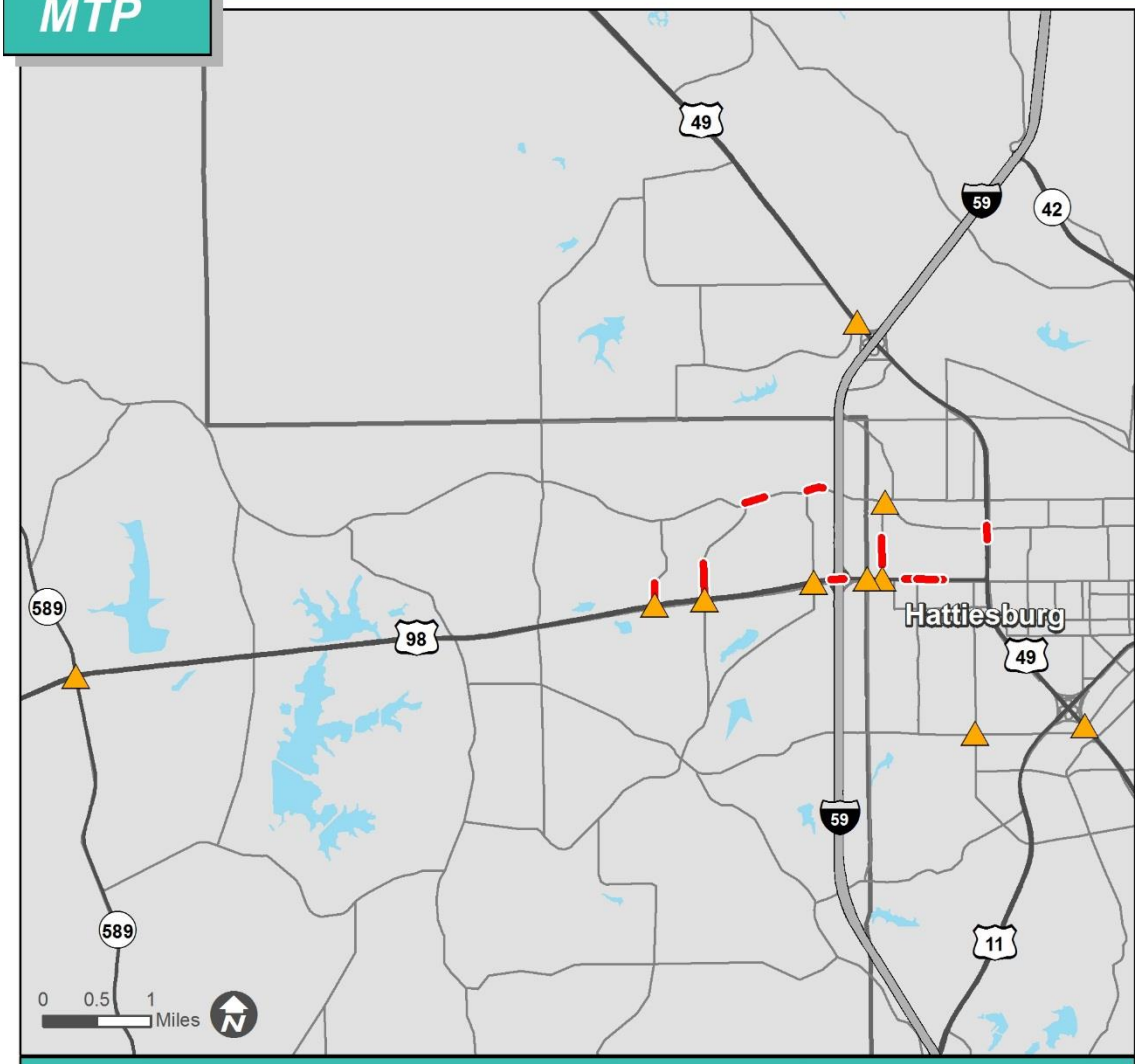
Note: *Crash Rate is expressed in crashes per million vehicles entering

Source: SAMS, 2011- 2013

Figure 6.29 illustrates the locations of the top 10 crash rate intersections and segments.

2040 MTP

FIGURE 6.29 HIGH AUTOMOBILE CRASH RATE AREAS



Legend

- Top 10 Crash Rate Intersections
- Top 10 Crash Rate Segments
- Interstate
- Secondary Roadways
- Other Major Roadways in MPO
- Water Bodies
- Metropolitan Planning Area
- Counties

Disclaimer: This map is for planning purposes only.

Map Source: Neel-Schaffer, Inc.

Data Sources: SAMS, 2011-2013

Mississippi Strategic Highway Safety Plan

A Strategic Highway Safety Plan (SHSP) is a statewide-coordinated safety plan that was developed to reduce fatalities along state highways and all public roads.

The State of Mississippi maintains a SHSP that was put in place as part of the SAFETEA-LU requirements. The original SHSP was developed in 2007 using the 4Es of traffic safety: Engineering, Enforcement, Emergency response, and Education. The 2007 SHSP, completed by the Mississippi Department of Transportation (MDOT) and the Mississippi Department of Public Safety (MDPS), set a goal of reducing traffic-related fatalities to 700 traffic fatalities by 2011, but this was considered a stretch goal since the average number of traffic fatalities during the study period (2000 to 2007) was almost 900 traffic fatalities per year, and the trend was flat. The 2007 SHSP identified five critical emphasis areas and sixteen critical strategies. In 2013, the SHSP was updated to build upon the original SHSP, with a new identified goal of reducing annual traffic fatalities by 25 percent by 2017, exceeding the national goal of reducing traffic fatalities by half over the next 20 years.

Mississippi has a long tradition of investing in all phases of highway safety. Examples of strategies, based on the 4Es and data collection, include:

- Engineering: Edge treatments including rumble strips and wider edge lines; Performing roadway safety assessments; MDOT's Safety Analysis Management System (SAMS) to design and develop a web-based geographic information system (GIS)-enabled application; and the Office of State Aid Road Construction (OSARC) overseeing more than 10,000 miles of county highway and construction to American Association of State Highway and Transportation Officials (AASHTO) standards.
- Enforcement: Primary safety belt law enacted in May 2006, as well as a strong "Click It or Ticket" Public Information and Education (PI&E) campaign to increase seat belt usage; usage of blitz periods throughout the year by use of Mississippi Office of Highway Safety (MOHS) funds to conduct Saturation Patrols, Sobriety Checkpoints, and Selective Traffic Enforcement by local enforcement departments and the Mississippi Highway Patrol; and grants provided by the Federal Motor Carrier Highway Safety Administration (FMCSA) to reduce the number of commercial vehicle collisions on Mississippi roadways.
- Education: The success of the "Drive Sober or Get Pulled Over" PI&E campaign to address driving under the influence (DUI) in increasing DUI arrests in Mississippi, particularly for offenders under 21; and the creation of a Judicial Outreach Liaison (JOL) program to help educate judges across the state regarding impaired-driving issues.

- Emergency Medical Services (EMS): The establishment of a Statewide Trauma System; linking data between EMS, law enforcement, emergency services, and hospitals to produce crash-outcome studies; ensuring EMS management information system maintains the National EMS Information System standards (NEMSIS); and coordination with providers of air medical services resulting in nine established bases in the state.
- Data: The recent investment into data systems technology (SAMS and ReportBeam) to greatly improve data accuracy and timeliness as well as analysis capabilities.

The SHSP was updated in 2013 and includes all elements of the 2007 plan. The updated SHSP:

- Addresses the frequency, rate, and primary factors contributing to fatalities and life-changing injuries on all Mississippi roads
- Is consistent with Federal Highway Administration (FHWA) procedural guidance
- Establishes a mission, vision, and goal for all safety partners in the State of Mississippi
- Incorporates input provided by safety partners representing national, state, and local agencies; and private safety advocacy groups
- Follows a data driven process that considers all users on all roads
- Provides a guide for future safety investments
- Addresses the 4Es of safety (Engineering, Enforcement, Education, and Emergency medical services)

The process in developing the Mississippi SHSP begins with the crash analysis and concludes with the SHSP report and is the culmination of more than a year of work between MDOT and its safety partners. Figure 6.30 shows the process used in developing the Mississippi SHSP.

Figure 6.30 Mississippi SHSP Update Development Process

Source: Mississippi Strategic Highway Safety Program

During the development of the current SHSP, three driver behavior and two highway emphasis areas were identified for implementation of countermeasures based on data availability, improvement potential, and access to resources. The three driver behavior emphasis areas are:

- Seat belts
- Alcohol and drugs
- Unlicensed or suspended licensed drivers

The two highway emphasis areas are:

- Lane departure crashes
- Intersections

In addition, focus has been emphasized on distracted driving and commercial vehicle safety within the state.

During the Safety Strategies Workshop on September 30, 2010 in Jackson, which included a large number of stakeholders, a comprehensive list of potential safety improvement strategies was assembled for each Emphasis Area. Following the workshop, MDOT and MOHS staff evaluated and screened the initial comprehensive lists of safety strategies using crash data, effectiveness, implementation cost, and the input provided by the participants in the Safety Strategies Workshop. Figure 6.31 shows the screening of the initial Safety Strategies for Mississippi.

Figure 6.31 Screening of Initial Safety Strategies for Mississippi

Source: Mississippi Strategic Highway Safety Program

Bicycle and Pedestrian Crash Data Analysis

Crashes involving pedestrians and bicyclists were analyzed based on the crash records from 2011 to 2013 obtained from MDOT's SAMS program and was based on the crash type provided by MDOT. A total of 62 pedestrian crashes and 49 bicycle crashes occurred in the study area during the three year study period and are illustrated in Figure 6.32. Table 6.44 breaks down the number of pedestrian and bicycle crashes by county and by year.

Table 6.44 Pedestrian and Bicycle Crashes (2011 - 2013)

Mode	Year	Forrest	Lamar	Total
Pedestrian	2011	20	3	23
	2012	10	5	15
	2013	15	9	24
Total Pedestrian		**45**	**17**	**62**
Bicycle	2011	14	2	16
	2012	13	2	15
	2013	17	1	18
Total Bicycle		**44**	**5**	**49**

Source: SAMS, 2011-2013

Between 2011 and 2013, four fatal pedestrian crashes and one fatal bicycle crash occurred in the study area, as shown in Tables 6.45 and 6.46. Only about 11 percent of pedestrian crashes and 12 percent of bicycle crashes were property damage only (PDO).

Table 6.45 Pedestrian Crashes by Severity (2011-2013)

Severity	Forrest	Lamar	Number of Crashes	Percentage
Fatal	4	0	4	6.5%
Severe	2	0	2	3.2%
Moderate	18	3	21	33.9%
Complaint	18	10	28	45.2%
No Injury	3	4	7	11.3%
Unlisted	0	0	0	0.0%
Total	**45**	**17**	**62**	**100.0%**

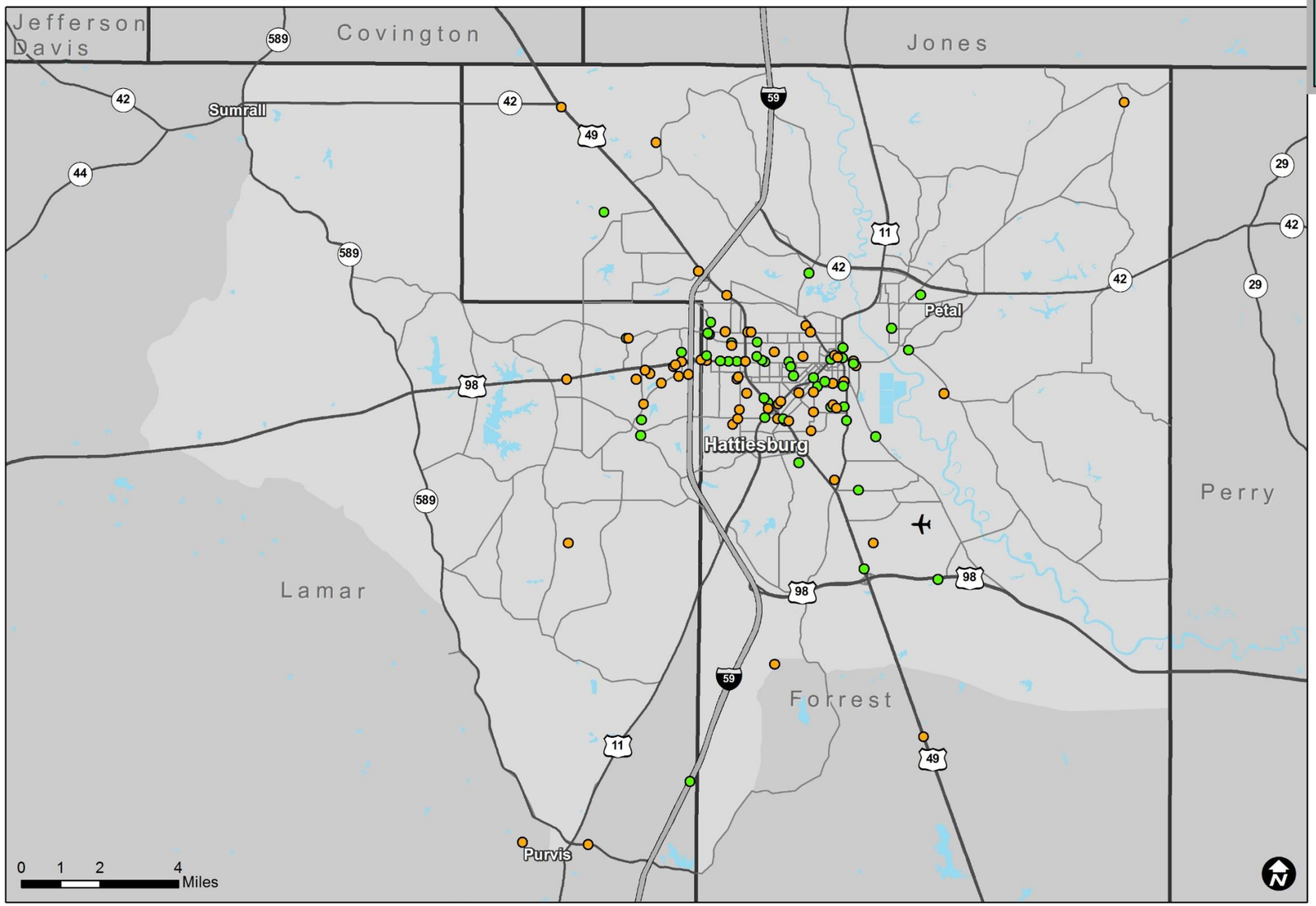
Source: SAMS, 2011-2013

Table 6.46 Bicycle Crashes by Severity (2011-2013)

Severity	Forrest	Lamar	Number of Crashes	Percentage
Fatal	0	1	1	2.0%
Severe	1	0	1	2.0%
Moderate	14	2	16	32.7%
Complaint	23	2	25	51.0%
No Injury	6	0	6	12.2%
Unlisted	0	0	0	0.0%
Total	**44**	**5**	**49**	**100.0%**

Source: SAMS, 2011-2013

FIGURE 6.32 AUTOMOBILE CRASHES INVOLVING BICYCLES AND PEDESTRIANS



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Legend

Crash Type

- Bicycle
- Pedestrian
- Interstate
- Secondary Roadways
- Other Major Roadways in MPO
- Water
- Metropolitan Planning Area
- Counties

Disclaimer: This map is for planning purposes only. Contact MPO Staff for more information.

Map Source: Neel-Schaffer, Inc.

Data Sources: SAMS, 2011-2013

Transit Safety Events Analysis

HCT utilizes a small system waiver and does not report monthly safety or security incidents. Therefore, no safety or security information can be gleaned from the National Transit Database.

Freight Truck Safety Analysis

Crashes involving heavy vehicles were analyzed using crash records from 2011 to 2013 obtained from MDOT's SAMS program. Using latitude and longitude data, crashes involving heavy vehicles were isolated based on location. A total of 170 crashes involving heavy vehicles occurred within the Hattiesburg MPA counties during the three year study period. Table 6.47 shows the number of heavy vehicle crashes by county during the study period.

Table 6.47 Heavy Vehicle Crashes by Year by County (2011-2013)

Crash Year	Forrest	Lamar	Total
2011	36	14	50
2012	42	18	60
2013	35	25	60
Total	**113**	**57**	**170**

Source: SAMS, 2011-2013

Between 2011 and 2013, two fatal crashes involving heavy vehicles occurred within the study area. While this represented just over 1 percent of heavy vehicle crashes, nearly 4 percent of all fatal crashes in the study area involved a heavy vehicle.

Because the number of heavy vehicle crashes represented only 1.2 percent of total crashes during the study period, many locations experienced either zero or very few heavy vehicle crashes. The only two intersections in the study area that experienced at least three heavy vehicle crashes between 2011 and 2013 are:

- US 49 @ Classic Dr (4 crashes)
- US 49 @ Old Hwy 42 (3 crashes)

Table 6.48 shows the roadway segments with high heavy vehicle crash rates, or those segments with crash rates above the MPA average (2.57 crashes per 100,000 truck VMT) and at least 100 daily trucks. Both of these segments are immediately adjacent to the intersection of US 49 and Old Hwy 42, where three crashes occurred from 2011 to 2013, as previously noted.

In order to develop a crash rate for heavy vehicles for roadway segments, segments from the statewide freight network were buffered by 250 feet. All heavy vehicle crashes occurring within a buffer were assigned to that segment. Then, crash rates were calculated as the number of heavy truck crashes per 100,000 truck vehicle miles traveled, using estimated truck volumes from the statewide model. Segments with under 100 daily trucks and/or under 3 heavy vehicle crashes were discarded.

Table 6.48 Roadway Segments with High Heavy Vehicle Crash Rates

Roadway Segment	From	To	Miles	Average Daily Truck Traffic	Heavy Vehicle Crashes, 2011-2013	Heavy Vehicle Crashes per 100,000 Truck VMT
US 49	N 31st Ave	Old Hwy 42	0.16	2,350	4	2.91
US 49	Old Hwy 42	North of Sims Rd	0.13	1,950	3	3.26

Source: SAMS, 2011-2013

Rail Safety Analysis

Rail-Automobile Collisions

Two crashes involving an automobile and train occurred in the Hattiesburg MPA between 2011 and 2013. These locations are:

- Old Okahola Rd @ Norfolk Southern Railway
- E Front St @ Norfolk Southern Railway

Derailments

According to the Federal Rail Administration (FRA), from 2011 to 2013, one trail derailment occurred on a Norfolk Southern Railway in Lamar County. No injuries or fatalities were reported in any of these derailments. The cause of derailment was under investigation as of April 30, 2015.

Railroad Crossings with Active Warning/Control Devices

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

The MSFP sets a performance standard of having all highway-railroad crossings involving a road functionally classified as a collector road or higher to have an active warning signal.

Out of the 70 at-grade railroad crossings in the Hattiesburg MPA, 42 are across public roads. 18 of these crossings have passive warning devices only. Of these 18, only two are located on streets functionally classified as a collector or higher. Of these two, one crossing is on a railroad in the MFN Tier I category and one is in the Tier II category. These two crossings are highlighted in Table 6.49.

Table 6.49 Major At-Grade Highway-Railroad Crossings Lacking Active Warning Devices on Tier I Railroads

Railroad	MFN Tier	Street	Place	County	Maximum Speed	Average Daily Traffic
CN	Tier I	Mobile St	Hattiesburg	Forrest	49 MPH	2,700
CN	Tier II	Tatum Rd	Hattiesburg	Forrest	49 MPH	1,000

Source: Federal Railroad Administration

6.6 Security

While safety and security are closely related, they are differentiated by the cause of the harm from which the transportation system and its users are being protected. Safety encompasses the prevention of unintentional harm to system users or their property. This includes vehicular crashes (whether of cars, trucks, buses, airplanes, or bicycles), train derailments, slope failures or other sudden destruction of roadways due to natural causes, and falls or injuries to pedestrians due to poorly constructed or absent facilities, among other issues. Security involves the prevention of intentional harm to the transportation system or its users, including theft or dismemberment of elements of transportation infrastructure, assault on users of the system, or large-scale attacks intended to completely disrupt the movement of people and goods.

MPO Role

The main role of MPOs in planning for security is to coordinate with relevant agencies, such as emergency management officials, police and sheriff's departments, fire departments and rescue squads. However, MPO's can take certain measures to improve security prevention, protection, response, and recovery.

Prevention

As related to security, prevention refers to efforts to limit access to resources that may be compromised or efforts to increase surveillance. Examples of prevention measures include access control systems, closed circuit television (CCTV) systems, security alarms, fencing, locks, and architectural barriers. The design of facilities and public spaces can also incorporate features that deter security breaches.

Protection

For facilities that are high vulnerability risks, additional design measures should be considered. These measures would mitigate potential security risks, should they occur.

Response

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

Recovery

Short-term and long-term recovery plans should be familiar to transportation decision-makers. This includes everything from evacuating to restoring local businesses and neighborhoods. MDOT has dedicated evacuation routes and there is a hazard mitigation plan for all counties in the MPA.

In the Hattiesburg MPO area, Forrest and Lamar Counties each have their own emergency management bodies. More information can be found on each county's operations at:

Forrest County-
http://forresteoc.com/

Lamar County-
http://www.lamarcounty.com/11/index.php?option=com_content&view=article&id=170&Itemid=109

Ultimately it is the responsibility of each MPO to craft a security policy consistent with its goals, state guidance, and MAP-21. Security will be a consideration in the establishment of MPO goals and the support for MPO funding priorities. The following presents potential areas of focus, recognizing that hurricane evacuation is a primary concern within the Hattiesburg Urbanized Area.

Use of MPO Transportation Model to Assess Evacuation Plans

The TransCAD regional model will be modified to simulate evacuation events, including the investigation of evacuation scenarios both to test the effectiveness of existing plans and to improve plans for routing traffic through the MPO region.

Use of Area Transit Systems to Support Evacuation Events

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

Integration of Intelligent Transportation Systems (ITS) in Evacuation Planning

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

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

As the MTP projects are refined within the context of the MDOT Construction Program, project features will be reviewed for consistency with a hurricane evacuation purpose and need.

Hurricanes

Finally, every hurricane produces a unique evacuation event. Evacuees are influenced by the amount of notice provided in advance of the storm's landfall, as well as the projected storm path and intensity. Information on hurricane evacuation routes and procedures can be found at:

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