OVERVIEW

MULTIPLAN (Mississippi's Unified Long-range Transportation Infrastructure Plan) is one of the most ambitious, comprehensive planning efforts ever undertaken by a state transportation agency using a single contract. The Mississippi Department of Transportation (MDOT), seeking to update its existing statewide transportation plan, decided to examine the widest range of transportation issues and futures as the State entered the 21st Century. In addition, MDOT embraced its role as a planning partner with the four Mississippi Metropolitan Planning Organizations (MPOs) by including the updates of the MPO plans and MPO models in the same endeavor.

WHAT WAS STUDIED?

MULTIPLAN's scope included nearly every possible component relative transportation planning and the impact transportation has on quality of life. Individual elements of MULTIPLAN include:

- *Phase I Study*, which provided a seamless transition to the primary Phase II study, as well as continuing the FHWA recognition needed to continue capital program progress;
- *Intelligent Transportation System (ITS)* standalone initiative, designed to provide "early starts" projects to jump start the state's ITS program;
- Standalone *State Rail Plan*, which also served as input to the MULTIPLAN analysis;
- *Air quality initiative*, designed to proactively ready MDOT for the potential air-related environmental quality issues ahead;
- *MPO Plans* for Jackson, Hattiesburg, Gulf Coast and DeSoto County;
- *MPO model initiatives* for each MPO;
- *Freight element*, which provides the important linkage between freight transportation, the economy, and quality of life;
- *Statewide Travel Demand Model* for MDOT, built on a TRANSCAD platform, providing the Department with a cutting edge technical tool;
- Comprehensive *public involvement initiative*, which kept MDOT's stakeholders advised of progress throughout the study;
- Technically-based *capital needs assessments* for each mode;
- *Financial element*, the centerpiece of which is a baseline finance projection to 2030;
- Comprehensive, wide-ranging re-evaluation of s*tate transportation goals, objectives, and action steps*; and
- *Recommendations for transportation*, based upon all the information and input gathered over the MULTIPLAN timeline.

MULTIPLAN TIMELINE

MULTIPLAN was originally intended to be a lengthy study; beginning in 2001 with a 12-month Phase 1, it was anticipated that MULTIPLAN would culminate in late 2004. However, in order to synch development of the MDOT Linear Referencing System (LRS) with MULTIPLAN's

statewide travel demand model, it was necessary to pause the primary MULTIPLAN activities beginning in March 2003 in order to allow these timelines to mesh. This "timeout" was very critical to the ultimate development of MULTIPLAN and the statewide model.

HURRICANE KATRINA

Just as activities for MULTIPLAN were nearly reaching their conclusions in mid 2005, Hurricane Katrina struck the Gulf Coast. The consultant team took another important pause to allow MDOT, local governments, and federal efforts to activate and prioritize important recovery efforts.

The combined effects of these two pauses extended the MULTIPLAN timeline more than two years. However, the delays in no way diminish MULTIPLAN'S relevance, timeliness, recommendations or information gathering. The data timeline for MULTIPLAN is pre-Katrina, but the vision remains the year 2030. In fact, while Katrina may have dramatically impacted the short-term activities in Mississippi and the Gulf Coast, the storm will have a negligible long-term effect on the state's transportation infrastructure.

PUBLIC INVOLVEMENT

Input was obtained throughout the study period from other local, state and national agencies, private organizations and companies, and members of the public. MULTIPLAN public involvement activities, which are described in an appendix to this Report, culminated in a series of six meetings geographically spread around the State in September 2006.

WHAT HAPPENS NEXT?

MULTIPLAN provides a tremendous amount of information, analysis, and choices for Mississippi's citizens, decision-makers and stakeholders. The Plan provides the platform to bring these elements together and consider the long-term future of transportation in the State. Ultimately, the direction for transportation is not contained in these pages; it is in the hands of those who will live it.

PLAN GOALS AND STRATEGIES

MULTIPLAN goals were identified during Phase I of the project[1]. The goals were developed as a result of a review of the 1996 LRTP goals and a cooperative interview process involving the Working and Advisory Committees, MDOT staff and other stakeholders, including the Transportation Commission and Office Directors.

[1] Mississippi Unified Long-Range Transportation Infrastructure Plan (MULTIPLAN), Phase I Report, March 2002.

THE SEVEN MULTIPLAN GOALS

The seven goals and the strategies adopted to meet these goals are summarized below.

- *Accessibility and Mobility: Improve Accessibility and Mobility for Mississippi's People, Commerce and Industry*

  A greater proportion of Mississippians are within access to the state's highway system through the Four-Lane Highway Program and other initiatives. The State also enjoys a relatively high level of travel mobility. Sufficient intermodal accessibility and mobility are essential not only for passenger travel, but freight movement as well in order to meet the needs of the state's industrial and commercial sectors. It is important to ensure access and mobility for all citizens, regardless of physical limitations, social status, economic level or geographic location.

- *Safety: Ensure High Standards of Safety in the Transportation System*

  A core priority of MDOT is transportation safety across all modes. Safety-deficient facilities can lead not only to lost financial resources and time but, more importantly, loss of life. While Mississippi continues to rank high nationally in the statewide rate of traffic fatalities on the state's highway system, improvement has been made through concentrated and coordinated efforts. Mississippians should be able to look to MDOT as the driving force behind the development and implementation of multimodal transportation safety programs.

- *Maintenance and Preservation: Maintain and Preserve Mississippi's Transportation System*

  Mississippi has an extensive multimodal transportation system, in which the State has made a substantial investment. If the system is to continue serving the state's citizens and the investment is to be recognized, placing a high priority on the maintenance and preservation of the existing infrastructure is fundamental. Funding for future rehabilitative costs will directly affect accessibility and mobility, not to mention safety, of the state's passenger and commercial transportation system. Further, the strain on resources brought about by an inadequate maintenance system will have a direct effect on the economic development efforts of the State as well.

- *Environmental Stewardship: Ensure that Transportation System Development is Sensitive to Human and Natural Environment Concerns*

  A sound transportation plan must address the relationship between the movement of people and goods and the impact upon the environment. Such a relationship is recognized within SAFETEA-LU through a number of programs, including Congestion Mitigation and Air Quality (CMAQ). Additional Federal Acts to take into account include the National Environmental Policy Act (NEPA), Clean Air Act Amendments of 1990, and the Energy Policy Act of 1992. Preservation and protection of Mississippi's human and natural environment and resources for the benefit of future generations must be a goal of the current MULTIPLAN.

- *Economic Development: Provide a Transportation System that Encourages and Supports Mississippi's Economic Development*

  Transportation and the supporting infrastructure are essential to economic growth and development within Mississippi. Not only does a superior transportation system support and retain existing economic development interests within the State, but it will help to make Mississippi attractive in the recruitment of new economic development. It is important that the transportation system not only serves the state's citizens and businesses, but also places the citizens and businesses in a position that makes them competitive on a national and global scale.

- *Awareness, Education and Cooperative Processes: Create Effective Transportation Partnerships and Cooperative Processes that Enhance Awareness of the Needs and Benefits of an Intermodal System*

  As every Mississippian either uses or is affected by the state's transportation system, it is important that all citizens have an awareness of both the benefits and needs of the system. A well-informed citizenry, public interest and stakeholder base, and state legislature will lead to well-informed decisions and long-term fiscal planning. One of the most difficult aspects of successful transportation planning efforts is balancing and coordinating the multitude of interests involved in the decision-making process. Through the development of education and cooperative processes with proper communication on all levels, sufficient balance can be attained.

- *Finance: Provide a Sound Financial Basis for the Transportation System*

  With the focus on the traveling public, the citizens of Mississippi rightly expect the financing they provide for the state's transportation system be managed and invested responsibly. A challenge for MDOT is to ensure that adequate funding is available for the long-term health of the system. Multiple and varied funding sources must be identified and managed responsibly so that the transportation needs of Mississippi's citizens and economic interests are met.

The goals, strategies and action steps for MULTIPLAN are listed in more detail in **Table 1-1**.

Table 1-1: Matrix of Goals and Strategies

GOALS		STRATEGIES	ACTION STEPS
ACCESSIBILITY AND MOBILITY	IMPROVE ACCESSIBILITY AND MOBILITY FOR MISSISSIPPI'S PEOPLE, COMMERCE AND INDUSTRY	1.1 Improve accessibility/mobility through highway initiatives and provide reasonable access to the state's highway system	1) Complete construction and open to traffic Phases II-III of the *Four-Lane Highway Program* by the adopted schedule dates
			2) Complete construction of *Vision 21* program highways identified as "immediate" need
			3) Promote implementation of Interstate 69 serving Mississippi
			4) Improve access between Central Mississippi and the Gulf Coast region
		1.2 Enhance Mississippi's research and implementation of Intelligent Transportation Systems Technologies	1) Continue to participate in cooperative programs with other states to study and implement system improvements in mobility, operational efficiency, and safety-based initiatives on emerging new technologies and operational management systems
			2) Continue implementation of Early Start ITS technologies, including automated weigh stations, video surveillance devices and signal systems with two-way communications
		1.3 Improve accessibility / mobility for non-highway modes	Promote / implement Mississippi's "Multimodal Finance Program" to improve non-highway modes and provide a sound financial basis for long-range planning
		1.3.1 Establish coordinated regional public transportation processes that consider community needs	1) Promote and support the development of regional, full service transit systems that have the ability to meet a variety of customer needs within and across urban and rural areas
			2) Develop a strategic marketing plan and support public transportation development plans
			3) Continue to work with service providers and others to ensure that Mississippi's citizens with disabilities have equal access to public transportation services
		1.3.2 Support airport improvements and development that address increasing air traffic	1) Monitor and inventory the air transportation system to determine areas of increasing traffic
			2) Support the ongoing planning efforts to increase needed airport capacity
			3) Support highway planning for airport access as a workable intermodal system
			4) Support the FAA Project Implementation Program
		1.3.3 Promote increased use of the state's freight and passenger rail system	1) Eliminate railroad clearance restrictions (tri-level, double-stack and Amtrak Superliner) and remove speed restrictions where feasible and cost beneficial
			2) Increase rail capacity where constrained and investigate potential rail bypasses to alleviate safety and congestion problems
			3) Encourage more widespread use of intercity rail service
		1.3.4 Encourage continued use of the state's water ports	1) Promote the preservation and enhancement of port operational capacity
			2) Continue to promote highway and rail access to port facilities through the Intermodal Connector Improvement Program
			3) Coordinate marine interests with other modes
		1.3.5 Integrate bicycle and pedestrian modes into the statewide transportation planning process	1) Integrate bicycle / pedestrian movement into the areas of highway / bridge design and facility standards, transit access, and policy planning
			2) Increase awareness of state and local engineers and planners regarding bicycle / pedestrian needs, and coordinate bikeway planning with the Department of the Interior and the National Park Service on appropriate facilities such as the Natchez Trace Parkway
		1.4 Enhance and encourage the use of intermodal transportation alternatives and linkages	1) Increase awareness of intermodal transportation alternatives through the transportation planning process
			2) Identify opportunities for new and/or improved passenger and freight intermodal facilities and services in metropolitan planning

Table 1-1: Matrix of Goals and Strategies (cont.)

GOALS		STRATEGIES	ACTION STEPS
SAFETY	PROMOTE PUBLIC HEALTH & SAFETY BY WORKING TO ELIMINATE TRANSPORTATION-RELATED DEATHS AND INJURIES	2.1 Design and implement a Strategic Safety Plan (SSP) that will improve safety on Mississippi's entire highway system	1) Create a comprehensive SSP addressing the driver, roadway, vehicle and emergency response
			2) Establish mechanisms for the most cost-effective, cooperative efforts to identify safety deficiencies and develop effective countermeasures
			3) Identify causes of past crashes and implement countermeasures; improve crash location data in safety files
			4) Continue to meet and develop design policies for safety and pursue safety initiatives as authorized and funded annually
			5) Strengthen local coordination by developing local safety plans in cooperation with local governments
		2.2 Encourage a secure and safe environment for public transportation that includes safe equipment, facilities and personal security	1) Sponsor safety training and awareness programs on passenger relations, personal security, emergency and accident handling procedures, safe driving, and special assistance for older adults and people with disabilities
			2) Require the development and implementation of public transportation safety program plans
		2.3 Support statewide improvements to rail crossings and corridors	1) Undertake planning activities to: identify and systematically reduce the number of at-grade rail-highway grade crossings; upgrade existing rail-highway grade crossings through the installation of electronically activated gates and flashing lights; and develop safety corridor projects that benefit rail and highway users, including the evaluation of private grade crossings
			2) Coordinate the establishment of engineering standards for railroad-highway grade crossings
			3) Improve crossings to insure safe pedestrian and nonmotorized vehicle movement
			4) Encourage local communities to improve sight distances at all crossings
		2.4 Continue to improve work zone and workplace safety	1) Improve public awareness of work zone safety hazards
			2) Reduce work zone accidents through increased enforcement, traveler information, and communications techniques
			3) Identify actions and programs that reduce work place accidents
		2.5 Provide safe and efficient multimodal access to Mississippi's airports	1) Monitor and work with airport authorities and local jurisdictions to upgrade and preserve transportation corridors to provide safe access to airports
			2) Work with local authorities to protect air space around the state's airports
			3) Work with airport authorities and local governments to implement and coordinate the State Aviation System Plan
		2.6 Support measures to ensure waterway safety	1) Promote waterway safety and reduce conflicts between recreational and commercial users of navigable waterways through coordination with and support of appropriate state and federal agencies
			2) Coordinate navigation and safety design features with the Army Corps of Engineers and U.S. Coast Guard
		2.7 Provide safe travel for pedestrians and bicyclists	1) Consider inclusion of sidewalks and bike lanes (where feasible) and design intersections to reduce accidents when major state-maintained streets and highways are renovated
			2) Install sidewalks on Mississippi's state-maintained urban arterials and collectors (where feasible) to reduce pedestrian accidents
			3) Develop criteria for widening and paving of highway shoulders
		2.8 Develop and implement comprehensive safety awareness, education and training programs	1) Publish documents describing elements of Mississippi's safety awareness program
			2) Support the "Safe and Sober" program of the Governor's Highway Safety Program, including supporting and strengthening existing DUI laws
			3) Support legislation of a .08 Blood Alcohol Content level
			4) Support the safety belt usage program of the Governor's Highway Safety Program
			5) Support the "Drive Smart" Program
			6) Continue support for "Operation Lifesaver," a national public education program dedicated to reducing crashes, injuries and fatalities at highway-rail grade crossings

Table 1-1: Matrix of Goals and Strategies (cont.)

GOALS		STRATEGIES	ACTION STEPS
MAINTENANCE AND PRESERVATION	MAINTAIN AND PRESERVE MISSISSIPPI'S TRANSPORTATION SYSTEM	3.1 Complete reconstruction and rehabilitation of deficient segments of state highways	1) Implement a comprehensive program to improve segments of arterial highways that require reconstruction and/or rehabilitation
			2) Widen and pave shoulders on rural and urban arterial and collector streets to protect the structural integrity of roadbeds and to improve maintainability of roads and rights-of-way
		3.2 Implement capital improvement maintenance programs that reduce the backlog of deficient pavements and bridges	1) Utilize the Pavement and Bridge Management Systems to identify the optimum preservation strategies
			2) Implement a prioritized preservation program that reduces the backlog of deficient pavements and bridges
			3) Develop an annual maintenance needs budget based on standards and workloads
			4) Develop and provide a maintenance training program to improve performance where needed
			5) Implement improvements that minimize life-cycle costs
		3.3 Enforce pavement and bridge weight and size regulations and implement preventive measures to avoid loads which would result in premature deterioration	1) Expand the system of permanent scales and extend the hours of operation at those locations where there is the greatest likelihood of significant volumes of overweight and oversize vehicles
			2) Routinely evaluate the program for deploying portable scales to maximize its contribution to overall weight enforcement on the state highway system
		3.4 Support improved maintenance and planned replacement of public transportation equipment and facilities	1) Support the construction of regional maintenance centers for rural public transportation systems
			2) Support the planned replacement of buses and vans based on life-cycle cost considerations
		3.5 Support rail corridor and infrastructure maintenance and preservation programs	1) Identify endangered railroad lines critical to the transportation interests of the State
			2) Implement the rails-to-trails program through identification and development of rail corridors
		3.6 Support airport development and maintenance programs	1) Assist in grant applications for airport improvement and maintenance programs
			2) Support the development of planned maintenance procedures and pavement management programs
		3.7 Support waterway port development, maintenance and preservation programs	1) Establish mechanisms for identifying waterfront land that may be needed for port or marine transport use and take appropriate steps to preserve the availability of land for such use
			2) Assist in grant acquisition for port improvement and maintenance programs
			3) Support the development of planned maintenance procedures

Table 1-1: Matrix of Goals and Strategies (cont.)

GOALS		STRATEGIES	ACTION STEPS
ENVIRONMENTAL STEWARDSHIP	PROTECT AND ENHANCE THE NATURAL AND HUMAN ENVIRONMENT AFFECTED BY TRANSPORTATION SYSTEM DEVELOPMENT	4.1 Partner with Federal and State Resource Agencies	1) Meet with Federal and State Resource Agencies, as well as conservation organizations, to gain further understanding of their mission, visions, and goals
			2) Educate agencies of MDOT's mission, visions and goals
			3) Promote early and continued collaboration to be proactive in seeking avoidance and minimization solutions to potential impacts on the environment
		4.2 Improve community / public participation in transportation decision-making	1) Increase public satisfaction through early and continued collaboration
			2) Demonstrate that the citizenry's issues / concerns are being thoroughly investigated
			3) Ensure that decisions / solutions to transportation system development integrates information / suggestions from the public
		4.3 Promote Context Sensitive Solutions / Design for transportation system development	1) Evaluate use of Context Sensitive Solutions / Design on all projects as a tool to avoid and minimize impacts to the environment
			2) Implement flexibility in highway design criteria to gain better acceptance of projects by communities and resource agencies
		4.4 Integrate environmental stewardship within the Agency	1) Enhance environmental awareness through education and training
			2) Continue MDOT's transformation of improved environmental processes
			3) Integrate NEPA in transportation planning
		4.5 Address Environmental Justice issues	1) Assure that underserved, low income, and minority entities are immersed in the environmental processes
		4.6 Improve the timeliness and efficiency of the environmental process	1) Increase the Environmental Division's personnel
			2) Identify and share resources within state and federal agencies to avoid duplication of efforts
			3) Establish the infrastructure necessary to track the project development process

Table 1-1: Matrix of Goals and Strategies (cont.)

GOALS		STRATEGIES	ACTION STEPS
ECONOMIC DEVELOPMENT	PROVIDE A TRANSPORTATION SYSTEM THAT ENCOURAGES AND SUPPORTS MISSISSIPPI'S ECONOMIC DEVELOPMENT	5.1 Continue development and implementation of highway programs geared towards economic development efforts	1) Develop and implement the *Vision 21* mid-range program
			2) Integrate planning for Economic Development Highways into MDOT's program
			3) Complete the Mississippi portion of the identified Appalachian and Delta Regional Corridors and develop needed access roads
		5.2 Promote the role of airports for tourism and economic development	1) Participate with the Mississippi Development Authority (MDA) in promoting tourism utilization of general aviation airports through brochures, production of aviation charts, and assessment of economic benefits of tourism use of airports
			2) Support planning and location of industrial and business development sites near airports
		5.3 Stimulate economic development in rural and urban areas by improving public transportation networks and broadening and encouraging the use of public transport	1) Support the establishment of a state interagency working group for integrated development of public transit services with housing, employment, energy conservation and other community and economic development programs
			2) Advocate improved intercity and rural public transit programs to address job development needs in rural areas
		5.4 Promote a balanced freight transportation system that takes advantage of the inherent efficiencies of each mode	1) Monitor and predict the impacts of freight movements and consider freight service needs in the planning process
			2) Work with the MDA to promote the state's freight transportation system and intermodal advantages in industrial recruitment activities
		5.5 Assure effective transportation linkages for freight and passengers to attract a larger share of international trade and travel to the State	1) Assist in the promotion of airports for both international passenger and cargo service, including opportunities for air cargo in Latin American trade
			2) Review linkages of FTZs to the highway network, rail network, port facilities, and airports to ensure that FTZs have appropriate, efficient linkages with the transportation system elements needed to promote effective utilization
		5.6 Support continued development of the state's water ports	1) Document the impact ports play in economic development and coordinate with the Mississippi Development Authority regarding port and waterway development
			2) Maintain an active role in relevant Mississippi port organizations and interest groups and promote port interests with other public agencies and organizations
		5.7 Prioritize transportation system improvements and investments considering intermodal connectivity	1) Consider access to ports, airports and industrial park facilities in highway project programming
			2) Support collaboration between modes for improving service and upgrading and rehabilitation of facilities
			3) Identify opportunities for new and/or improved intermodal facilities as part of the planning process for transit, trucks, railroads, airports and ports
		5.8 Support the improvement of bicycle facilities at Mississippi's scenic and recreational areas for tourism attraction	1) Support the continued construction of bike / pedestrian facilities throughout the State

Table 1-1: Matrix of Goals and Strategies (cont.)

GOALS		STRATEGIES	ACTION STEPS
AWARENESS, EDUCATION AND COOPERATIVE PROCESSES	CREATE EFFECTIVE TRANSPORTATION PARTNERSHIPS AND COOPERATIVE PROCESSES THAT ENHANCE AWARENESS OF THE NEEDS AND BENEFITS OF AN INTERMODAL SYSTEM	6.1 Elevate public involvement in Mississippi's transportation plans and programs to foster participation by all citizens	1)) Identify MDOT's transportation customers and facilitate improved / formalized methods for communication between them
			2) Implement a proactive public involvement process that allows every Mississippi citizen easy access and the opportunity to comment on information about MDOT's plans and programs
			3) Consider all public comments on plans and programs, and respond to all stakeholder comments and questions
			4) Develop opportunities for stakeholders to provide input on MDOT policies, plans, programs and improvements
		6.2 Create a higher level of public awareness for transportation problems, needs, issues and solutions	1) Establish methods and products that inform Mississippi's citizens, local officials, media, and legislators about transportation issues
			2) Create an improved dialogue between the media and MDOT to facilitate public awareness of transportation topics
			3) Promote a collaborative process among federal, state, and local governments, organizations and interest groups (public and private), and business to foster improved service planning, communications and coordination
		6.3 Elevate the visibility of transportation by implementing regular monitoring and reporting procedures	1) Use the MULTIPLAN and STIP to inform stakeholders and officials of MDOT's intended accomplishments
			2) Monitor progress against planned accomplishments and report to the public on a regular basis
			3) Establish the use of MDOT documents as regular reporting tools to the Department's stakeholders
		6.4 Continue the established cooperative partnership between the Mississippi Development Authority, MDOT, and transport providers for marketing of transport services	1) Improve the cooperative processes between MDOT and transport providers to gather information on transportation capabilities, facilities, intermodal connections, rates and services that can be used to mount effective marketing campaigns
			2) Improve the cooperative processes between MDOT, MDA and the transport providers to offer strong marketing and business development efforts on behalf of the service providers
		6.5 Develop an intermodal-based awareness program that will encourage transfers between the transportation modes	1) Emphasize intermodal transportation alternatives in the transportation planning process
			2) Develop a coordinated public information and education program about available intermodal services (and other energy-efficient alternatives)
			3) As part of the metropolitan planning process, identify opportunities for new and/or improved passenger and freight intermodal facilities and services

Table 1-1: Matrix of Goals and Strategies (cont.)

GOALS		STRATEGIES	ACTION STEPS
FINANCE	PROVIDE A SOUND FINANCIAL BASIS FOR THE TRANSPORTATION SYSTEM	7.1 Establish a balanced funding program to achieve MDOT's objectives	1) Develop/provide information to decision-makers that establishes a sound rationale for strong transportation programs in Mississippi
			2) Explore alternative funding sources to supplement the traditional surface transportation funds, including various local option taxes, benefit districts, impact fees, and others
			3) Utilize the financial planning element of MULTIPLAN to identify a sound financial program that: a) implements the *Vision 21* program b) reduces the backlog of highway and bridge needs c) preserves the purchasing power of transportation revenues associated with inflation
			4) Cooperate with the Governor and the Legislature in restructuring transportation revenue laws
			5) Utilize the funding provided by the Transportation Commission through TEA-21 for National Highway System connectors
		7.2 Help alleviate the shortfall of funds for public transportation, aviation, water ports, and rail capital and maintenance programs	1) Support implementation of the Multimodal Finance Program
			2) Maintain financial support to ensure that the ongoing development of the public transportation system can be accomplished
			3) Continue support of the Aeronautics State Aid program for improvements to general aviation and air carrier airports
			4) Encourage better access for financing of major capital improvement projects for ports, including improved utilization and awareness of the Port Revitalization Revolving Loan Fund
			5) Examine various methods of securing permanent funding for rail passenger service and other railroad main line public uses
		7.3 Develop strategies to increase Mississippi's share of federal transportation funding	1) Work with the state's Congressional delegation to identify high priority projects that merit special federal funding consideration
			2) Strengthen the dialogue between the Transportation Commission, legislature, and Governor to prioritize projects and identify Mississippi's transportation needs with the state's Congressional leadership
			3) Work through AASHTO, SASHTO, LATTS, ARC and other interest groups to shape new transportation legislation to benefit Mississippi
		7.4 Develop a financing program for intermodal transportation facilities that will encourage transfers between the transportation modes	1) Undertake Major Transportation Investment Studies where appropriate to ensure that major federally-aided projects incorporate the most beneficial mix of transportation alternatives, including intermodal facilities and services
			2) Direct specific attention to intermodal facilities as part of the budget development process
			3) Define roles (including cost-sharing arrangements) of the state government, local governments, and private sector regarding financing of intermodal facilities

TRENDS INFLUENCING PLAN NEEDS

The section looks at trends in Mississippi population, employment and highway fatalities to provide context and background for MULTIPLAN activities.

POPULATION TRENDS

Existing and future trends in population growth are significant factors in evaluating and identifying transportation needs. The demand for transportation improvements and services is directly impacted by the growth of population. This section provides an overview of population growth trends and characteristics for Mississippi. Information on Mississippi's current population levels and projected growth patterns was collected to help anticipate changes in transportation demand over the next 20 years[2]. In addition, information on population characteristics that have traditionally been significant for understanding travel demand and behavior are presented, including population density, age and ethnicity. **Figure 1-1** shows Mississippi's county and MDOT District boundaries for reference with the data provided in the following sections.

Statewide Population Growth

Between 1990 and 2000 the population of Mississippi grew by 10.5 percent, from 2.57 to 2.84 million. This compared to a growth rate of 13.2 percent for the whole of the U.S.A. Mississippi's growth during the 1990s was very much in line with that experienced by three of the four adjacent states of Alabama, Arkansas and Louisiana. The average growth in these states was 9.2 percent during this period. Growth in Tennessee was higher at 16.7 percent, which exceeded the national average.

Mississippi's 2000 population placed it 31st in the list of most populous states – the same position as in 1990.

Population growth in the 1990s was higher throughout the U.S.A. than in the previous decade. This was particularly true in Mississippi, where the 10.5 percent growth in the 1990s was five times the 2.1 percent growth experienced in the 1980s. Population totals and growth rates in the past two decades are shown in **Table 1-2** and **Figure 1-2** for Mississippi, adjacent states and the country as a whole.

Table 1-2: Mississippi Population: 1980, 1990 and 2000

State	1980 Population	1990 Population	2000 Population	Growth in Decade	
				1980-1990	1990-2000
Mississippi	2,520,638	2,573,216	2,844,658	2.1%	10.5%
Alabama	3,893,888	4,040,587	4,447,100	3.8%	10.1%
Arkansas	2,286,435	2,350,725	2,673,400	2.8%	13.7%
Louisiana	4,205,900	4,219,973	4,468,976	0.3%	5.9%
Tennessee	4,591,120	4,877,185	5,689,283	6.2%	16.7%
USA	**226,545,805**	**248,709,873**	**281,421,906**	**9.8%**	**13.2%**

[2] Source: Census Bureau, Census 2000.

Figure 1-1: Mississippi County and MDOT District Boundaries

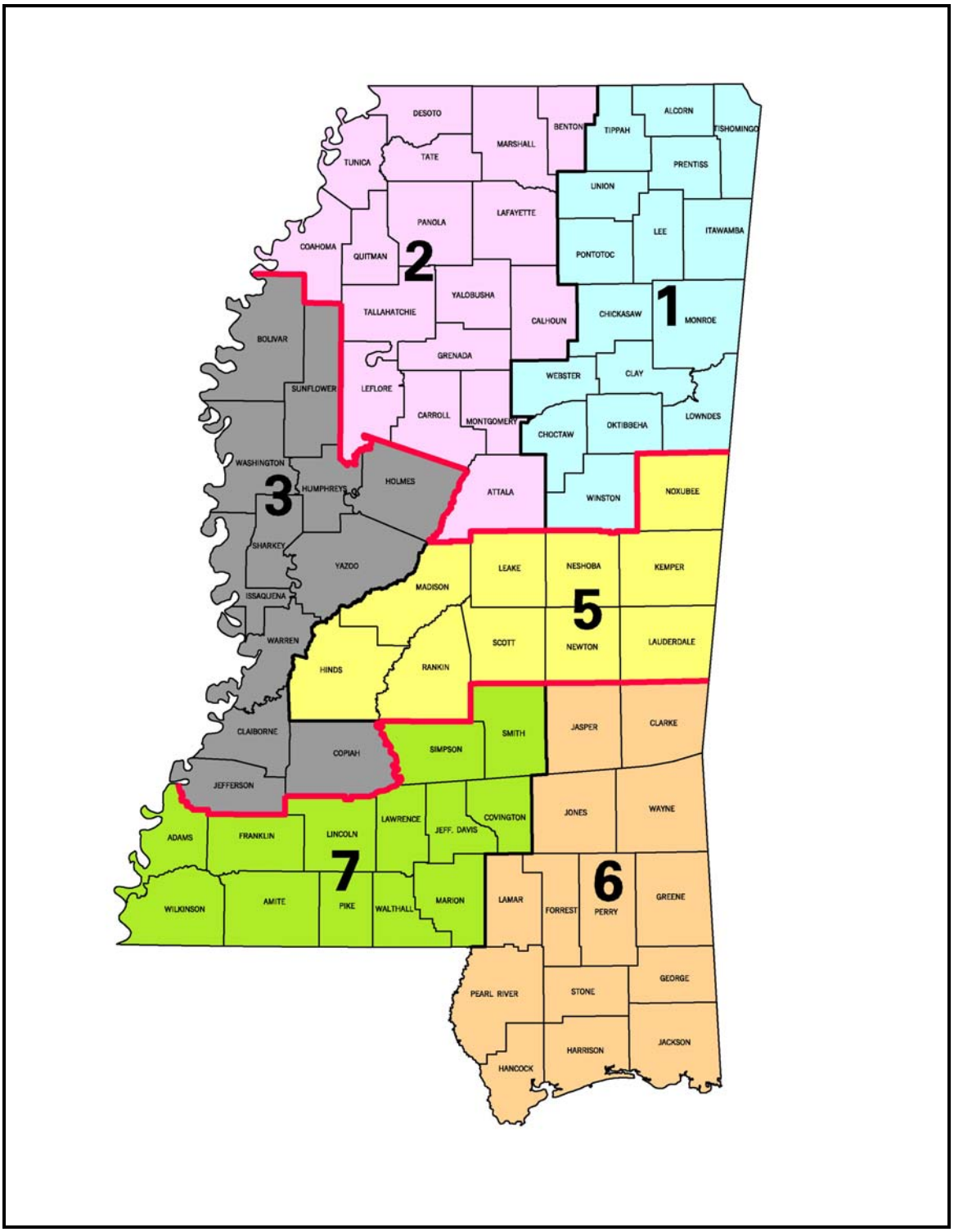
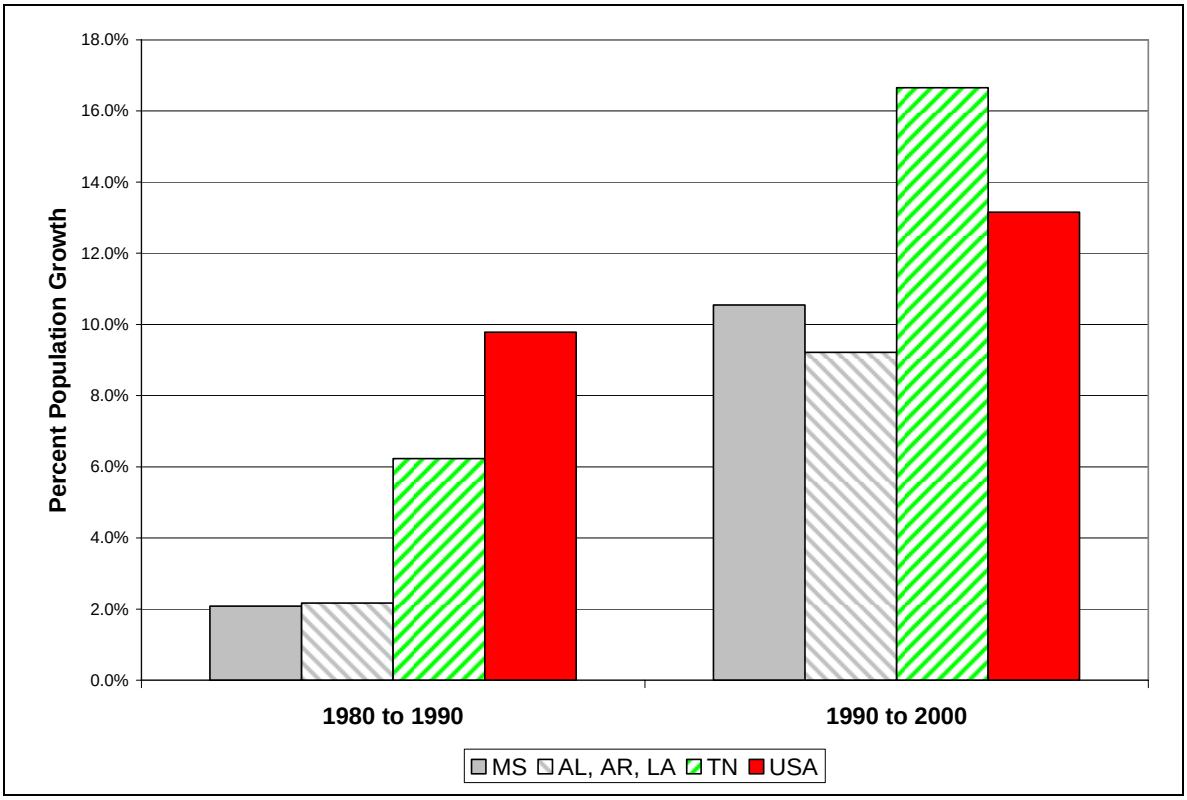


Figure 1-2: Population Growth In Mississippi and Adjacent States



County Population Growth

Population by county for 1990 and 2000, the population change between 1990 and 2000, and population density for 2000 are shown in the following figures:

- **Figure 1-3** shows the distribution of Mississippi's population by county in 1990.
- **Figure 1-4** shows the distribution of Mississippi's population by county in 2000, the most recent census year.
- **Figure 1-5** provides the percent population change that occurred by county between 1990 and 2000.
- **Figure 1-6** provides the population density per square mile of land area by county in 2000, the most recent census year.

Hinds County is the most populous of the 82 counties in Mississippi, with 250,800 people in 2000 or 8.8 percent of the statewide population. Hinds County is followed in size by Harrison, Jackson and Rankin counties. This order remained unchanged from 1990 to 2000. In the 2000 Census, DeSoto County moved up from 8th to 5th place.

Figure 1-3:
Mississippi Population by County, 1990

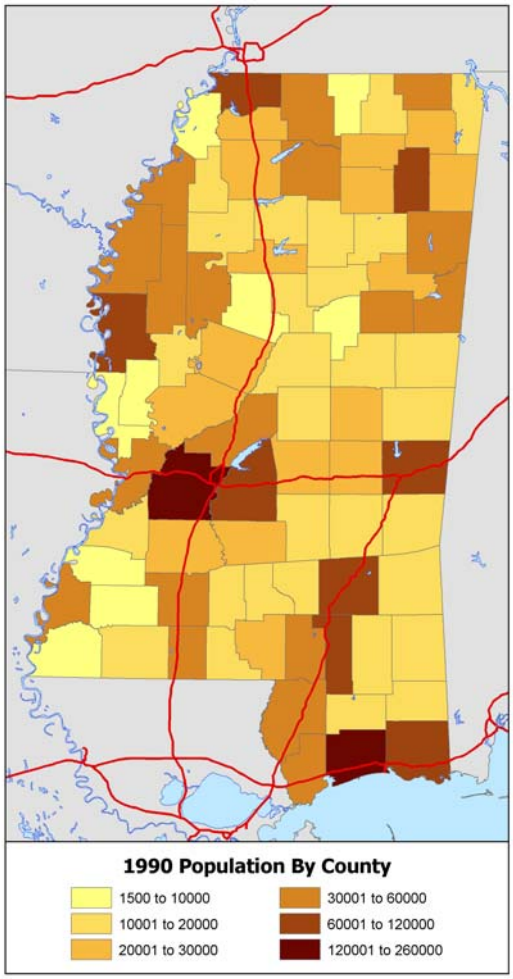
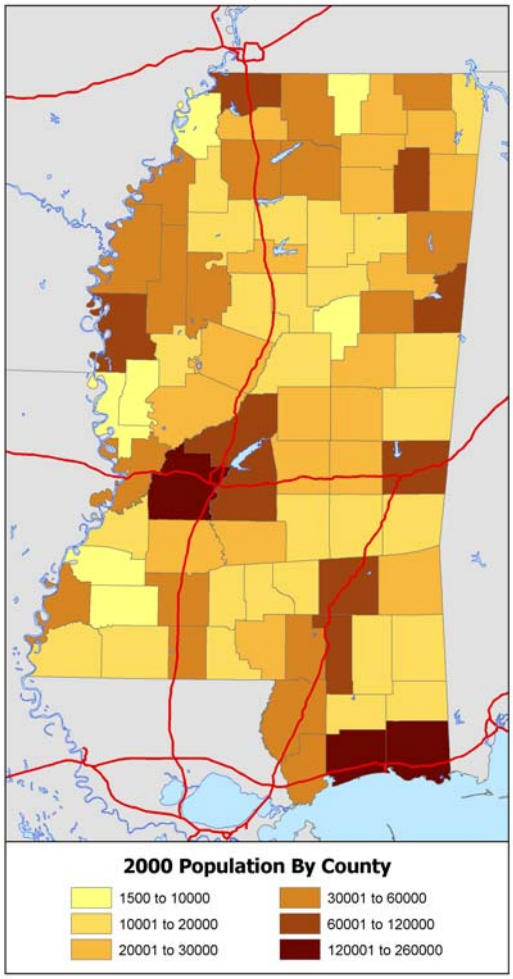


Figure 1-4:
Mississippi Population by County, 2000



Source: U.S. Census Bureau

For counties with a population in excess of 30,000 the two that rose most in rank by population were Hancock County (from 23rd to 15th) and Lamar County (from 26th to 18th). All of the seven counties mentioned in the last two paragraphs are located within Metropolitan areas, as discussed below.

As shown in Figure 1-5, the counties that grew by over 33 percent during the decade were located in three areas: south of Memphis, in the Jackson urban area and on the Gulf Coast.

Figure 1-5:
Percentage Population Change
1990 to 2000

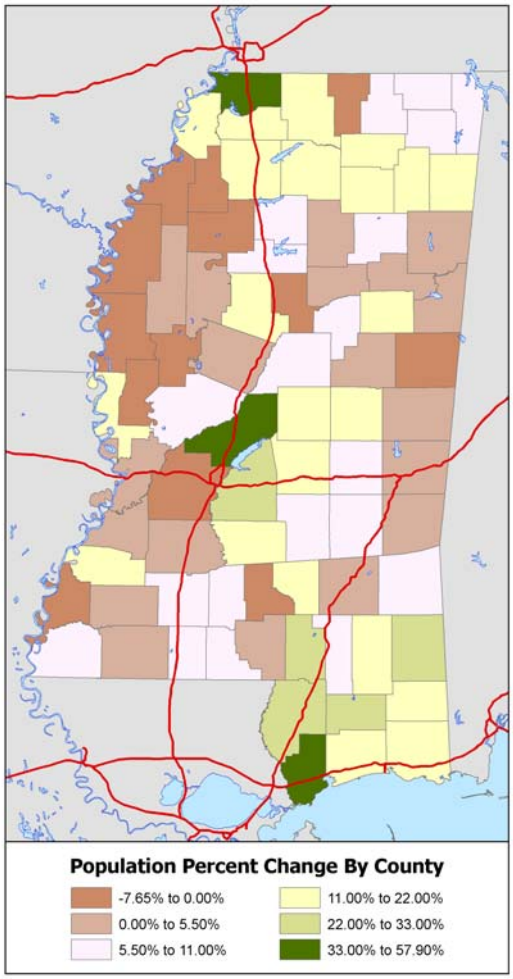
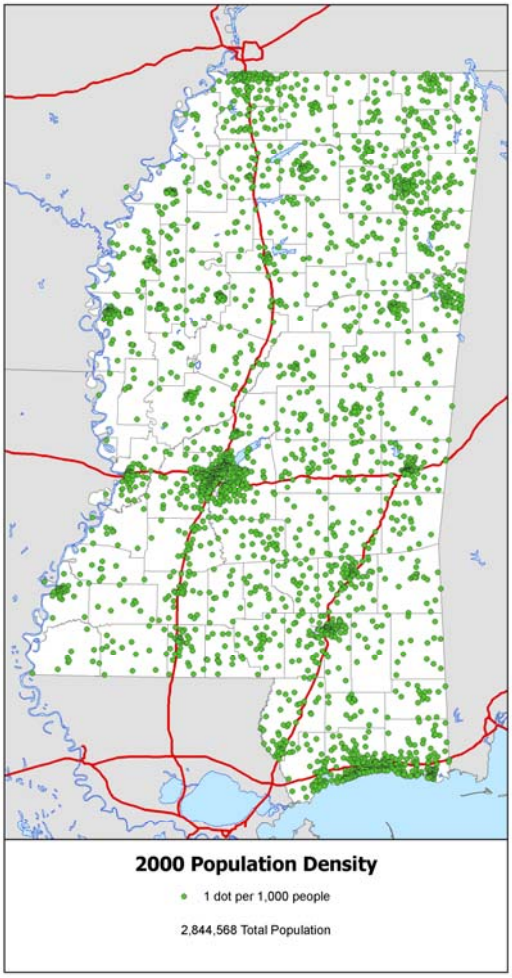


Figure 1-6:
Mississippi Population Density
by County, 2000



Source: U.S. Census Bureau

MSA Area Population Growth

Three Metropolitan Statistical Areas (MSAs) are located within the State:

- Jackson MSA;
- Hattiesburg MSA; and
- Biloxi-Gulfport-Pascagoula MSA.

DeSoto County in northwest Mississippi is also within an MSA, namely the Memphis MSA.

Changes in MSA population between 1990 and 2000 are shown in **Table 1-3**. In all three MSAs lying entirely within the state population increases over the decade exceeded the statewide average of 10.5 percent.

Table 1-3: Population in Mississippi MSAs

MSA Name	Total Population		Change 1990 to 2000	
	1990	2000	Number	Percent
Jackson MSA (Hinds, Madison and Rankin Counties)	395,396	440,801	45,405	11.5%
Hattiesburg MSA (Forrest and Lamar Counties)	98,738	111,674	12,936	13.1%
Biloxi-Gulfport-Pascagoula MSA (Hancock, Harrison and Jackson Counties)	312,368	363,988	51,620	16.5%
Memphis MSA (DeSoto County, Mississippi only)	67,910	107,199	39,289	57.9%
Memphis TN-AR-MS MSA (all counties in MSA)	981,747	1,135,614	153,867	15.7%

Jackson MSA – The Jackson MSA is made up of Hinds, Madison and Rankin counties. The MSA includes the Jackson Urbanized Area, which is located in central Mississippi, approximately 50 miles east of the Mississippi River. The Urbanized Area straddles the Pearl River and includes portions of all three counties – the northeast portion of Hinds County, the northwest portion of Rankin County and the southeast portion of Madison County. The area includes the municipalities of Jackson, Clinton, Terry, Pearl, Flowood, Richland, Brandon, Ridgeland and Madison. Since 1975, the Central Mississippi Planning and Development District (CMPDD) has been designated as the Metropolitan Planning Organization responsible for planning in the Jackson Urbanized Area.

While the Jackson MSA experienced population growth of 11.5 percent during the 1990s, the growth in the nine municipalities within the Jackson Urbanized Area averaged only 6.0 percent. Rates of growth ranged widely within the Urbanized Area from a high of 97 percent in Madison (from 7,471 to 14,692) to a decrease in population of -6.3 percent in the City of Jackson (196,637 to 184,256).

Hattiesburg MSA – The Hattiesburg MSA encompasses Forrest and Lamar counties. It includes the Hattiesburg-Petal-Forrest-Lamar (HPFL) MPO. The HPFL area has been referred to as the "HUB" because it is located at the intersection of the various transportation corridors that radiate away from the metropolitan area to the rest of the State. Interstate 59 and U.S. routes 49 and 98 pass through Hattiesburg, connecting the area to Jackson, Gulfport, Natchez, Mobile (AL) and New Orleans (LA). Between 1990 and 2000 the Hattiesburg MSA population increased by 13.1 percent, from 98,738 to 111,674).

Biloxi-Gulfport-Pascagoula MSA – This MSA situated on the Gulf Coast includes Hancock, Harrison and Jackson counties. The MSA includes the Mississippi Gulf Coast Urbanized Area, located approximately 50 miles east of New Orleans, Louisiana and 35 miles west of Mobile, Alabama. The Urbanized Area runs along the Mississippi Sound a length of 74 miles. The Area includes the Municipalities of Waveland, Bay St. Louis, Pass Christian, Long Beach, Gulfport, Biloxi, D'Iberville, Ocean Springs, Gautier, Moss Point and Pascagoula. The Gulf Regional Planning Commission (GRPC) is responsible for planning in the MSA. Between 1990 and 2000 the Biloxi-Gulfport-Pascagoula MSA population increased by 16.5 percent, from 312,368 to 363,988)

Memphis MSA – This five-county MSA includes DeSoto County in northwest Mississippi. The other counties are Crittenden in Arkansa and Fayette, Shelby and Tipton in Tennessee. While the MSA grew in terms of population by an average of 15.7 percent, over a quarter of the 153,867 increase occurred in DeSoto County, where the population increased from 67,910 to 107,199, an increase of 57.9 percent.

MDOT District Population Growth

Mississippi Department of Transportation (MDOT) divides the State into six Districts:

- District 1 – covers 16 counties in the northeast of the State, with the District Office located in Tupelo;
- District 2 – covers 17 counties in the northwest of the State, with the District Office located in Batesville;
- District 3 – covers 12 counties in the west-central region of the State, with the District Office located in Yazoo City;
- District 5 – covers 10 counties in the east-central region of the State, with the District Office located in Newton;
- District 6 – covers 14 counties in the southeast of the State, with the District Office located in Hattiesburg; and
- District 7 – covers 13 counties in the southwest of the State, with the District Office located in McComb.

Population growth in the 1990s in each MDOT District is shown in **Table 1-4**.

Table 1-4: MDOT District Population

MDOT District	Total Population		Population Increase	
	1990	2000	Number	Percent
District 1	434,322	474,849	40,527	9.3%
District 2	381,043	445,424	64,381	16.9%
District 3	306,391	307,769	1,378	0.4%
District 5	581,575	641,848	60,273	10.4%
District 6	614,303	704,764	90,461	14.7%
District 7	255,582	270,004	14,422	5.6%
State Totals	**2,573,216**	**2,844,658**	**271,442**	**10.5%**

Growth varied widely by district from a low of 0.4 percent to a high of 16.9 percent. The lowest growth in population was experienced by District 3 in the west-central region of the State along the eastern banks of the Mississippi River. The next lowest District at 5.6 percent growth was District 7, which lies adjacent and to the south of District 3.

The Districts that grew most rapidly in population are located at opposite ends of the State. District 2 in the northwest grew by 16.9 percent. The very rapid growth in DeSoto County, part of the Memphis MSA, has already been noted. The second fastest rate of growth (14.7 %) occurred in District 6. This District includes the Biloxi-Gulfport-Pascagoula MSA, which itself grew at 16.5 percent.

Population Projections

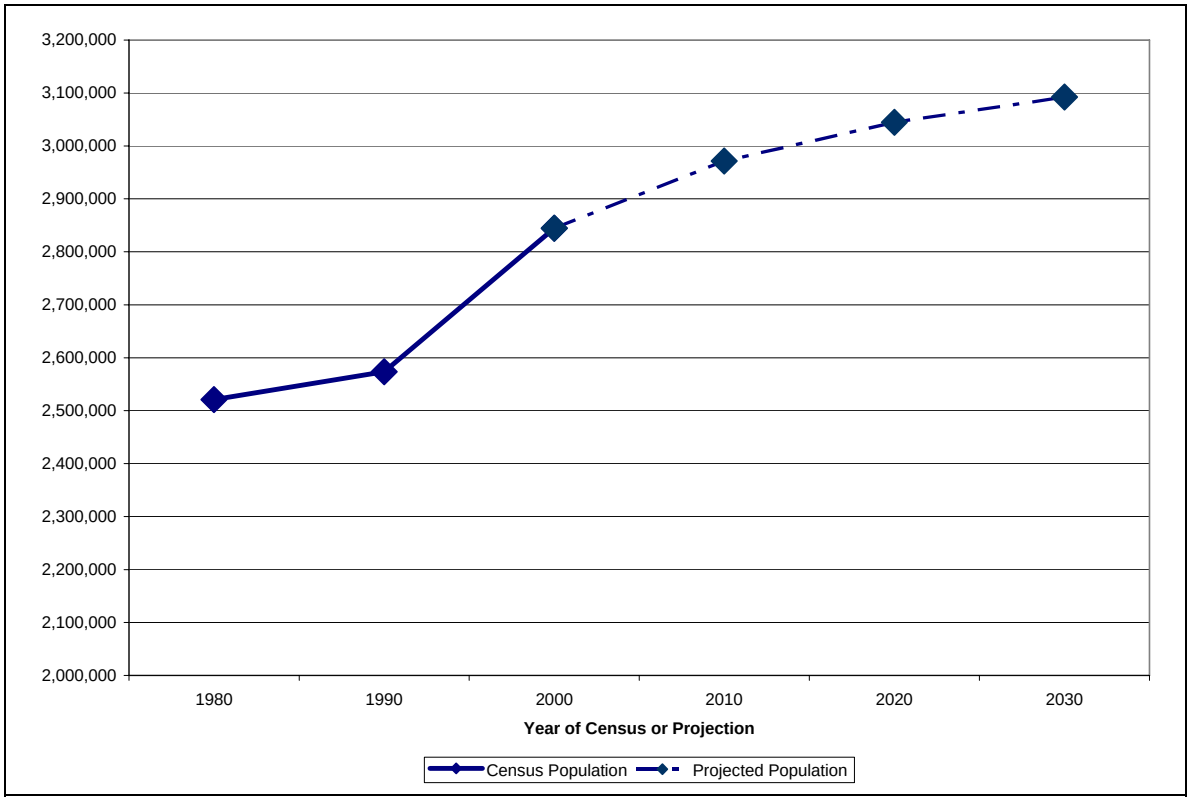
Projections of population in future years are based on U.S. Census Bureau "Interim Projections Consistent with Census 2000", released in April 2005[3]. Projections for Mississippi and adjacent states are summarized in **Table 1-5**. The projected growth in Mississippi population is also illustrated in **Figure 1-7**.

Table 1-5: Population Projections, 2000 - 2030

	Population in Thousands (1)						Decade Percentage Growth					Total
State	**1980**	**1990**	**2000**	**2010**	**2020**	**2030**	**80s**	**90s**	**00s**	**10s**	**20s**	**00-30**
Mississippi	2,521	2,573	2,845	2,971	3,045	3,092	2.1%	10.5%	4.5%	2.5%	1.6%	8.7%
Alabama	3,894	4,041	4,447	4,596	4,729	4,874	3.8%	10.1%	3.4%	2.9%	3.1%	9.6%
Arkansas	2,286	2,351	2,673	2,875	3,060	3,240	2.8%	13.7%	7.5%	6.4%	5.9%	21.2%
Louisiana	4,206	4,220	4,469	4,613	4,719	4,803	0.3%	5.9%	3.2%	2.3%	1.8%	7.5%
Tennessee	4,591	4,877	5,689	6,231	6,781	7,381	6.2%	16.7%	9.5%	8.8%	8.8%	29.7%
USA	226,546	248,710	281,422	308,936	335,805	363,584	9.8%	13.2%	9.8%	8.7%	8.3%	29.2%

Note: (1) 1980, 1990 and 2000 populations from Decennial Census. 2010, 2020 and 2030 populations are U.S. Census Bureau projections (nominal date of July 1).

Figure 1-7: Mississippi Population Projections to 2030



[3] U.S. Census Bureau, website at http://www.census.gov/population/www/projections/popproj.html.

The rapid rate of growth in population experienced by Mississippi in the 1990s (10.5 %) is projected to moderate during the next three decades. The percentage increase in each decade is projected to be 4.5, 2.5 and 1.6 percent respectively. Overall between 2000 and 2030 it is projected that Mississippi's population will increase by 8.7 percent, from 2,844,658 at the 2000 Census to approximately 3,092,000.

Note that U.S. Census Bureau estimates of population changes from July 1, 2000 to July 1, 2004 are consistent with these projections. The 4.5 percent increase projected for the 2000-2010 decade amounts to an average growth rate of 0.44 percent per year. The estimated growth of 1.90 percent between July 1, 2000 and July 1, 2004 represents an average growth rate of 0.47 percent per year.

While population growth rates in Mississippi are projected to be similar to those for the adjacent states of Alabama and Louisiana, the U.S. Census Bureau projects faster growth for Arkansas, Tennessee and the country as a whole. As a result, it is projected that Mississippi may be 33rd in the list of most populous states by 2030.

Summary of Special Population Characteristics Related to Transportation

In addition to population change and projections, the U.S. Census reports additional information about characteristics of the population, such as age, race, gender, household composition, income, and employment. These special population characteristics can have an influence on how needs are determined for the transportation system. Age and income characteristics are summarized below. Employment characteristics are discussed later.

Age – Age is one of the most significant characteristics of the population because of its effect on programs and services throughout the State, such as health care, housing, school, higher education enrollment and size of the labor force, as well as other public services that can relate directly to the transportation system. It is often beneficial to combine certain age groups together in order to better evaluate their implications on statewide planning of programs and services. The following groups are regarded by the Office of Social and Economic Analysis as having especially significant social and economic influences:

- Seniors: Persons age 65 and older (65 to 84) are grouped together because they are eligible for programs including Social Security and Medicare.
- Pre-school and School Age Children: Persons between 5 and 17 are often grouped together because of their influence on educational and health-related services.
- Baby Boom Generation: Persons born during the unusually high birth rate from the end of World War II to the mid-1960s. The baby boom generation spans two population age groups – 35 to 44 and 45-54.

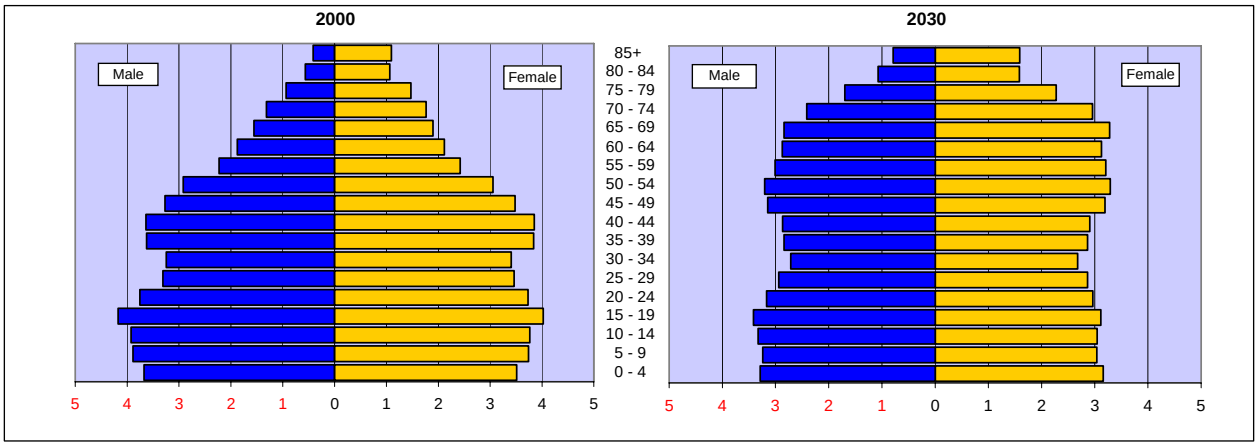
Table 1-6 shows the age characteristics of the statewide population in Mississippi for the year 2000. **Figure 1-8** shows that between 2000 and 2030 Mississippi's senior population is projected to increase dramatically. The percentage of the population 65 and over is projected to increase from 12.1 to 20.5 percent.

Table 1-6: Age Characteristics of Mississippi's Population

Age Group	2000 Census		2030 Projection	
	Population	Percent	Population	Percent
Under 5	204,364	7.2%	199,382	6.4%
5 to 17	570,823	20.1%	512,640	16.6%
18 to 24	310,974	10.9%	270,323	8.7%
25 to 34	381,798	13.4%	346,262	11.2%
35 to 54	787,353	27.7%	752,035	24.3%
55 to 64	245,823	8.6%	377,701	12.2%
65 to 84	300,632	10.6%	560,421	18.1%
85 and over	42,891	1.5%	73,646	2.4%
Total Persons	**2,844,658**		**3,092,410**	
Under 18	775,187	27.3%	712,022	23.0%
18 and over	2,069,471	72.7%	2,380,388	77.0%
65 and over	343,523	12.1%	634,067	20.5%

Source: U.S. Census Bureau, State Interim Population Projections by Age and Sex: 2004-2030, accessible via "Projections" link from U.S. Census Bureau home page.

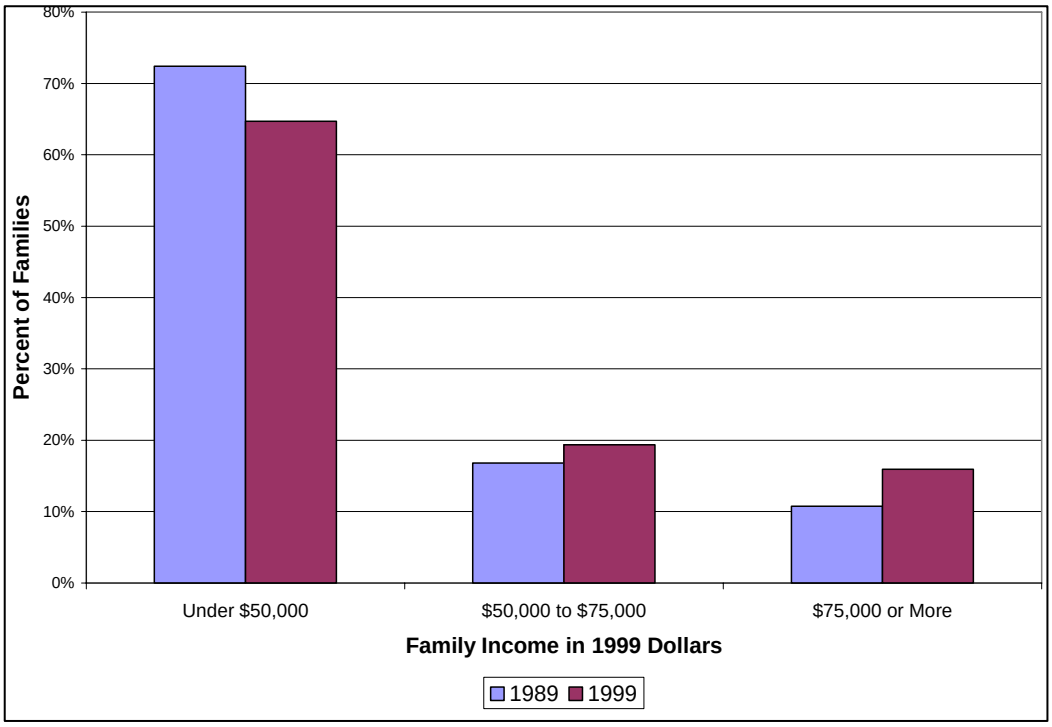
Figure 1-8: Population Pyramids for Mississippi (2000 and 2030) (Percent of Total Population)



Income – The 2000 Census reported the median family income in Mississippi during 1999 was $37,406. This compares with an estimated income of $31,896 for 1989, obtained by adjusting the 1990 Census estimate of $24,448 for inflation, using the Consumer Price Index. The Census 2000 figure represents an increase in median family income of 17.3 percent during the decade of the 1990s. The national average for median family income in 1999 as reported in the 2000 Census was $50,046.

Figure 1-9 shows the distribution of various income levels of Mississippi families.

Figure 1-9: Percent of Mississippi Families by Selected Family Income



Implications for Population Trends

- Overall, population growth will continue to place increasing demands on Mississippi's transportation system. The state's suburban and urban fringe areas will experience greater travel because of increases in the numbers of people who live there. Determining how to balance the demands of high-growth suburban areas with the economic development needs of lower-growth rural areas and central cities will be a challenge.

- Mississippi counties with heavy tourism and recreational activities, such as the Gulf Coast area, have experienced significant percent population growth. With the aging of the baby boom generation into active retirement years the demographic opportunities for continued expansion in these areas is considerable. It will be necessary to ensure that the transportation system has the appropriate infrastructure and services to support this growth.

- The baby boom generation's work-related travel and economic activity will continue to place significant demands on the state's transportation system. With an aging population, the availability of special transit services for medical and personal travel will become increasingly important.

EMPLOYMENT TRENDS

The economic development of a region can be greatly influenced by the efficiency of the transportation system. If the system fails to provide the means for quick and convenient movement of people and goods, the region's economic growth may fail to reach its potential.

Statewide Employment

Mississippi employment grew by 14.0 percent between 1990 and 2000, which exceeded the 10.5 percent growth in total population and the 13.0 percent growth in persons 16 years or older. **Table 1-7** compares employment data for Mississippi, adjacent states and for the country as a whole. Employment growth in Mississippi and in three of the four adjacent states exceeded the 12.1 percent growth in employment for the whole country.

Table 1-7: Statewide Employment Data for 1990 and 2000

State	1990 Employment	2000 Employment	Growth in Decade		
			Employment	Pop. Total	Pop. 16+
Mississippi	1,028,773	1,173,314	14.0%	10.5%	13.0%
Alabama	1,741,794	1,920,189	10.2%	10.1%	11.2%
Arkansas	994,289	1,173,399	18.0%	13.7%	15.1%
Louisiana	1,641,614	1,851,777	12.8%	5.9%	8.8%
Tennessee	2,250,842	2,651,638	17.8%	16.7%	17.0%
USA	**115,681,202**	**129,721,512**	**12.1%**	**13.2%**	**13.2%**

Source: U.S. Census Bureau. Employed persons 16 and over, excluding Armed Forces.

County Employment

The county employment levels are shown for both 1990 and 2000 in **Figure 1-10** and **Figure 1-11**, respectively. **Figure 1-12** shows the percent change in county employment between 1990 and 2000. While statewide growth in employment has increased by 14 percent, seven counties have increased by over 34 percent:

- DeSoto County – 62.3 percent;
- Hancock County – 56.0 percent;
- Tunica County – 53.7 percent;
- Madison County – 48.0 percent;
- Stone County – 39.8 percent;
- Lamar County – 39.1 percent; and
- Rankin County – 35.4 percent.

Areas of strong employment growth are consistent geographically with population growth. Two of the above counties (DeSoto and Tunica) are located in the northwest of the State within MDOT District 2 and just south of Memphis, Tennessee. Three of the counties (Hancock, Stone and Lamar) are in MDOT District 6, in the Gulf Coast region, along the I-59 corridor between Hattiesburg and New Orleans or adjacent to these areas. The remaining two counties (Madison and Rankin) are more centrally located within the State and constitute two of the three counties in the Jackson MSA.

Figure 1-10:
Mississippi Employment by County, 1990

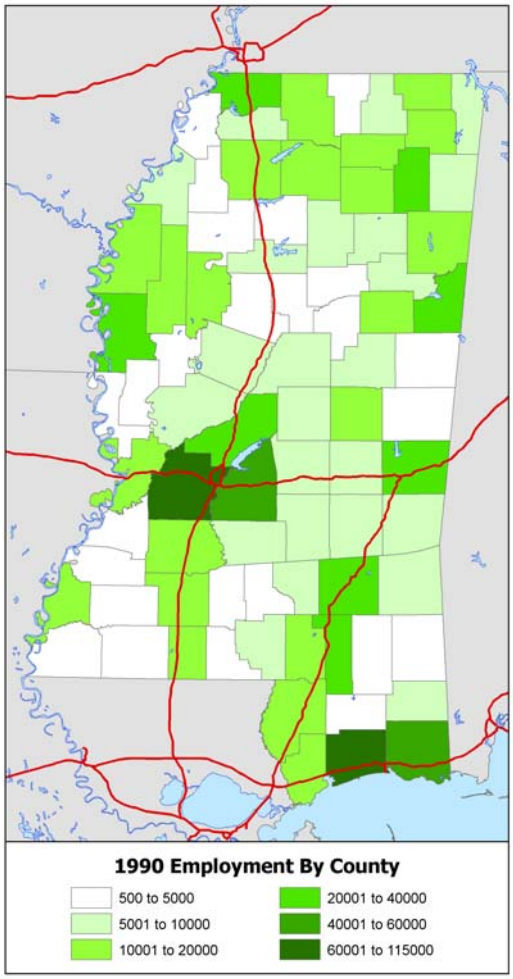
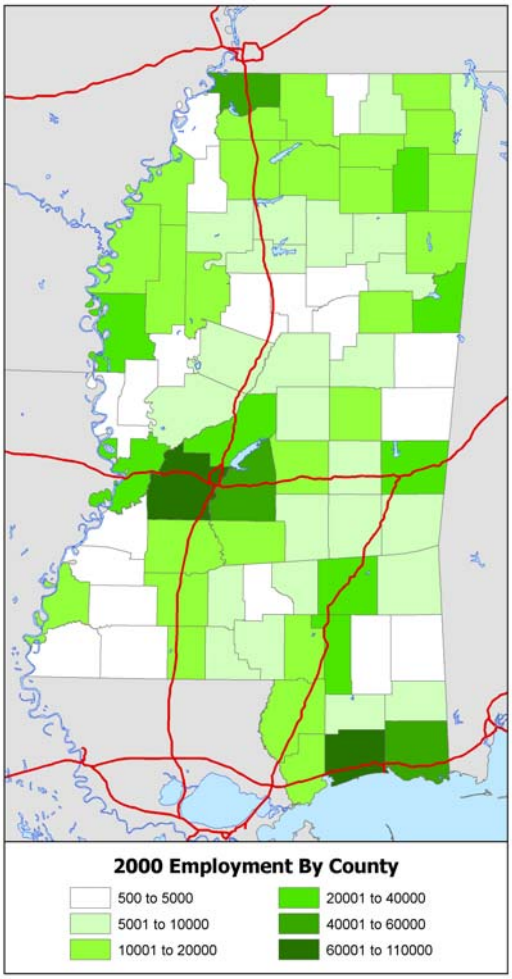


Figure 1-11:
Mississippi Employment by County, 2000



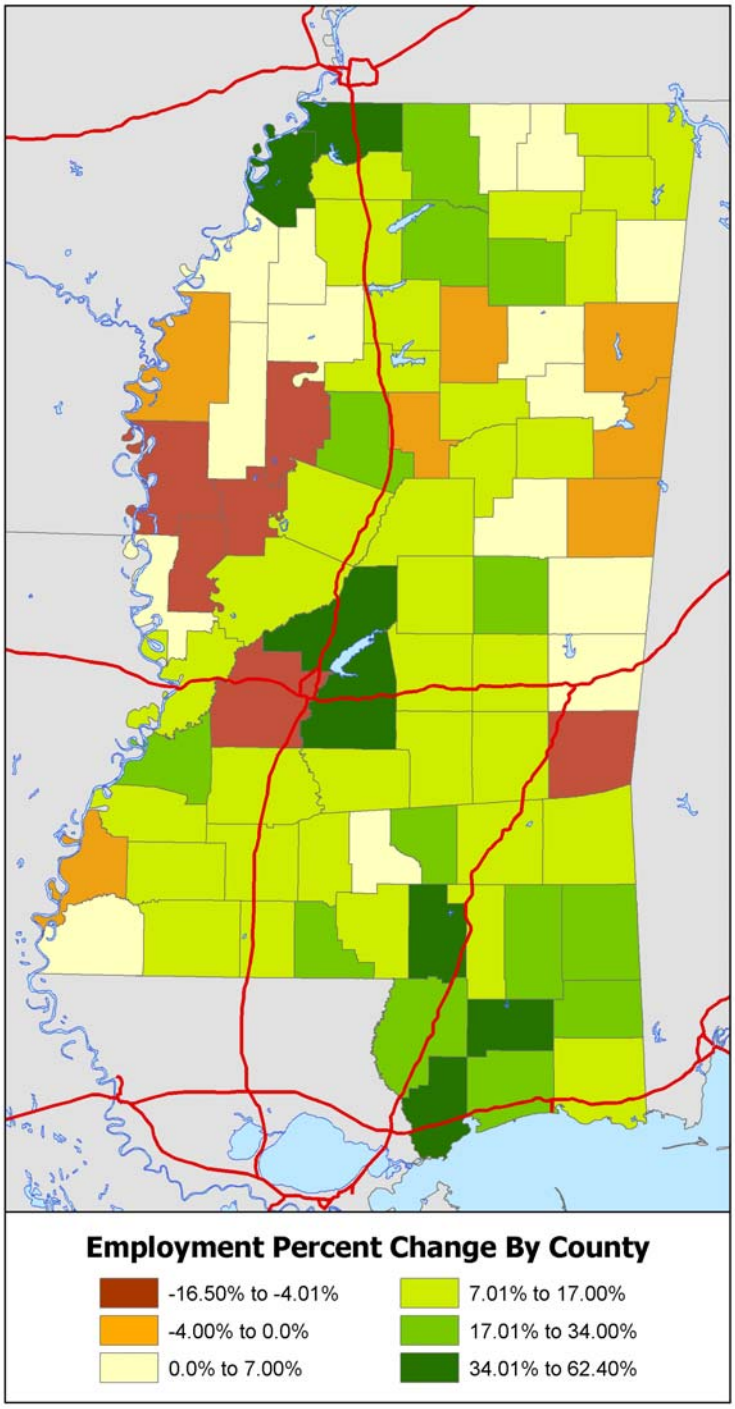
Source: U.S. Census Bureau

Employment by Industry and Occupation

The distribution of jobs by Industry in Mississippi and the U.S.A. at the time of the 2000 Census is illustrated in **Figure 1-13**. While the distributions are similar (within ±2 %) for most categories of industry, Mississippi has a higher proportion of jobs in the Manufacturing industries than the country as a whole (18.3 to 14.1 %). On the other hand Mississippi lags the U.S.A. in the percentage of Professional, Scientific and Management jobs (5.2 to 9.3 %).

Jobs in Mississippi and the U.S.A. by Occupation are shown in **Figure 1-14**. Mississippi has a higher proportion of jobs involving production, transportation and material moving occupations than the national average (20.4 compared to 14.6 %), but a smaller percentage of management, professional and related occupations (27.4 to 33.6 %).

Figure 1-12: Percentage Employment Change
1990 to 2000



Source: U.S. Census Bureau

Figure 1-13: Percent of Jobs by Industry, Mississippi and United States (2000)

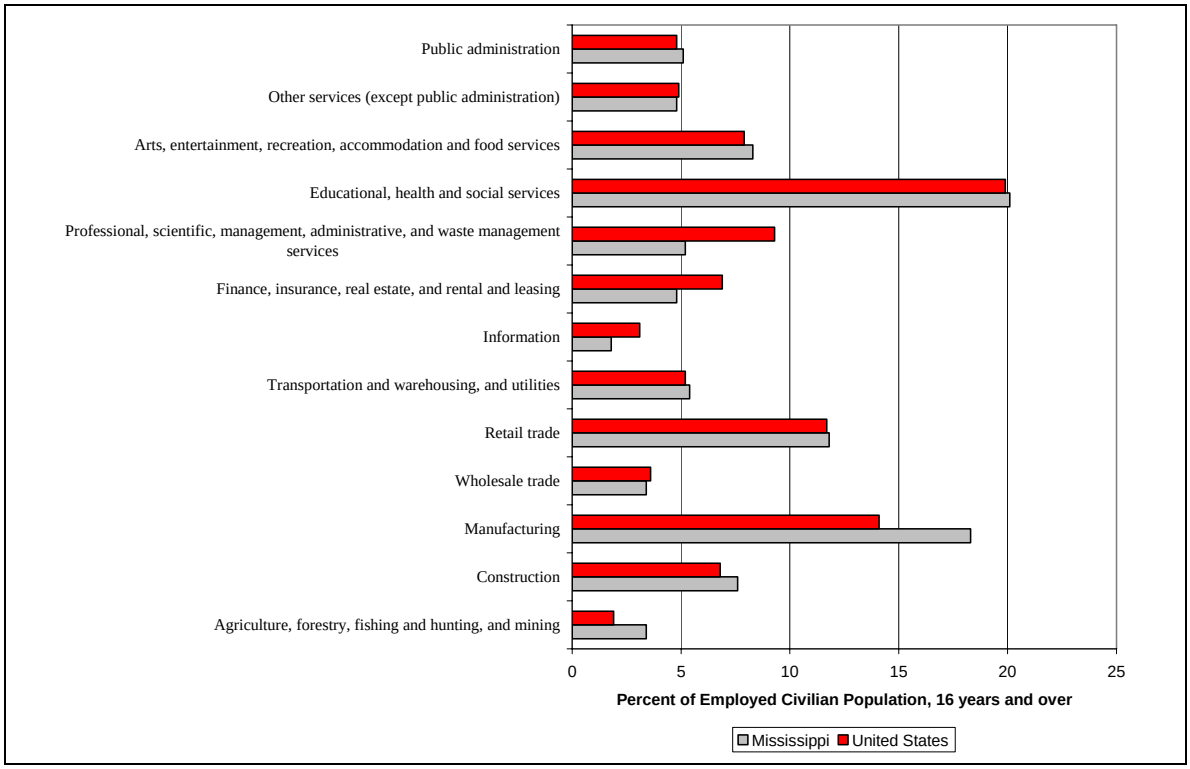
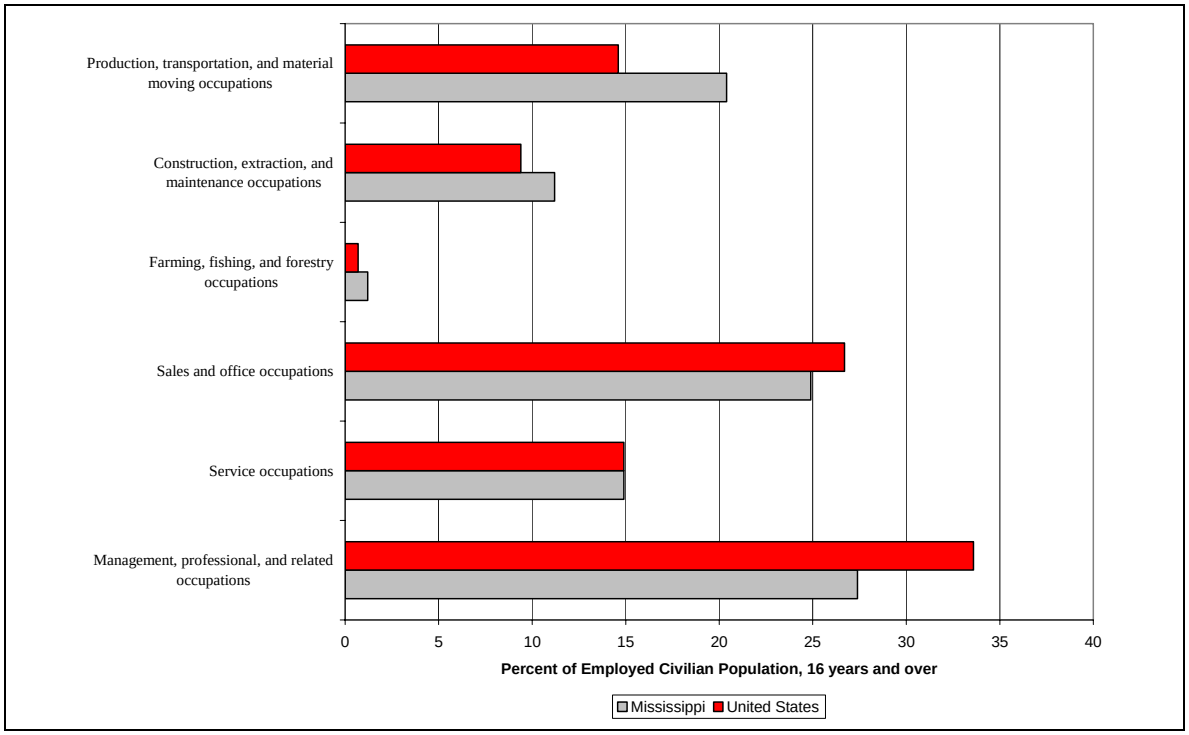


Figure 1-14: Percent of Jobs by Occupation, Mississippi and United States (2000)



Employment Projections

Future trends for Mississippi employment are provided by the Mississippi Department of Employment Security, who project that employment will increase by 16.3 percent from 2002 to 2012 (1,288,940 to 1,498,500)[4]. This rate of growth exceeds the 14.0 percent experienced during the ten years between 1990 and 2000. A 14.8 percent increase in employment is projected nationwide during the 2002 to 2012 period[5].

Commuting Trends

Between 1990 and 2000 the statewide percentage of employed persons, 16 and over, working outside their county of residence increased by 6.0 percent, from 25.9 to 31.9 percent. In nine Mississippi counties the increase was over twice the statewide average:

- Sharkey County – 15.3 percent;
- Chickasaw County – 14 .2 percent;
- Jefferson County – 14.0 percent;
- Yalobusha County – 13.6 percent;
- Jefferson Davis County – 13.5 percent;
- Coahoma County – 13.0 percent;
- Quitman County – 13.0 percent;
- Holmes County – 12.4 percent; and
- Yazoo County – 12.1 percent.

Eight counties experienced a reduction in the percentage of employed persons working outside their county of residence:

- Tunica County – -8.6 percent;
- Hancock County – -7.9 percent;
- Noxubee County – -4.2 percent;
- Rankin County – -3.0 percent;
- Lamar County – -1.9 percent;
- Madison County – -1.9 percent;
- Benton County – -0.7 percent; and
- Jasper County – -0.7 percent.

Counties with the highest percentages of employed persons working outside their county of residence in 2000 include:

- Carroll County – 76.0 percent;
- Issaquena County – 66.6 percent;
- DeSoto County – 64.1 percent;
- Benton County – 62.7 percent;
- Greene County – 62.6 percent;
- Marshall County – 61.5 percent;
- Kemper County – 60.5 percent;

[4] Website: http://www.projectionscentral.com.
[5] U.S. Department of Labor, Bureau of Labor Statistics.

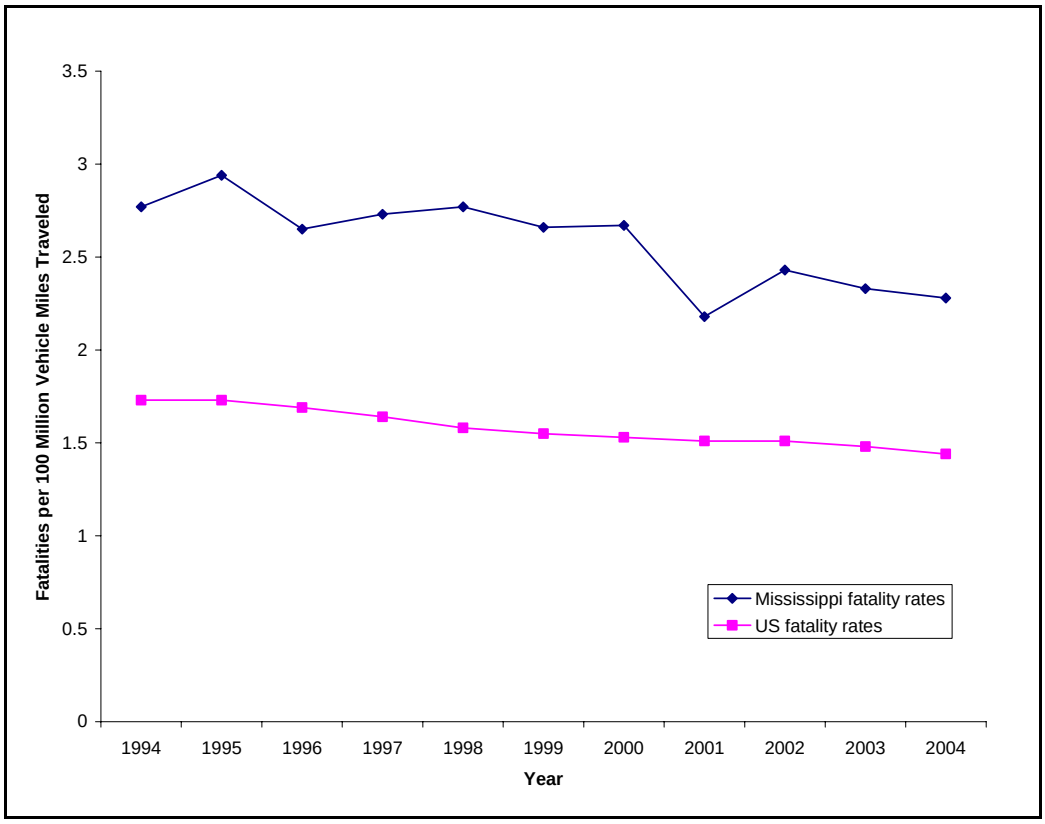
- Lamar County – 60.3 percent;

Three of the eight counties listed above lie in the most northwest region of the State adjacent to the Tennessee border and the Memphis metropolitan area. The importance of this area as a place of employment is confirmed by the percentages of workers shown as working outside of the state of Mississippi. For DeSoto, Marshall and Benton counties these percentages were 54.3, 37.1 and 20.6 percent, respectively. Tate County, just south of DeSoto County, also had over 20 percent of its workers employed out of state (22.4 %).

SAFETY

Safety is an important element of the MULTIPLAN effort and the mission of MDOT. The safety of roads can be defined by the number of crashes, near-misses, injuries, or fatalities. This section focuses on fatalities in Mississippi, the most severe consequence of crashes. Traffic fatality rates in Mississippi from 1994 to 2004 are compared with the U.S. average fatality rates in **Figure 1-15**.

Figure 1-15: Fatality Rates - Mississippi Average Compared to U.S. Average



Mississippi's highway fatality rates are above the national average. Mississippi has reduced its fatality rate nearly 18 percent over the past 10 years (in the top third of the states), but the state's fatality rate still remains relatively high (58% above the U.S. average).

The following 10 states were taken as peer states, due to their geographic proximity or similar size and characteristics: Virginia, North Carolina, South Carolina, Tennessee, Georgia, Arkansas, Kentucky, Louisiana, Missouri and West Virginia. Fatalities on rural and urban highways in Mississippi, the peer states, and the nation, are shown **Table 1-8** and **Table 1-9**, respectively.

Table 1-8: Rural Fatalities, by Functional Classification

2004 – Rural Fatalities							
State	**Interstate**	**Other Principal Arterial**	**Minor Arterial**	**Major Collector**	**Minor Collector**	**Local**	**Total**
Mississippi	**59**	**44**	**28**	**74**	**269**	**217**	**691**
Louisiana	78	87	109	169	72	120	635
Arkansas	77	151	113	126	3	80	550
Kentucky	71	138	81	226	119	102	737
Tennessee	98	99	213	130	90	146	776
Georgia	127	165	198	198	43	124	855
South Carolina	108	168	243	306	59	-	884
North Carolina	82	192	143	292	155	286	1,150
Virginia	55	97	141	134	13	84	524
West Virginia	67	68	66	102	7	47	357
Missouri	112	208	126	232	32	119	829
U.S. Total	**3,246**	**5,012**	**5,049**	**5,552**	**1,801**	**4,080**	**24,740**

Table 1-9: Urban Fatalities, by Functional Classification

2004 – Urban Fatalities							
State	**Interstate**	**Other Principal Arterial**	**Minor Arterial**	**Major Collector**	**Minor Collector**	**Local**	**Total**
Mississippi	**55**	**7**	**9**	**16**	**23**	**77**	**187**
Louisiana	54	2	91	41	25	38	251
Arkansas	31	15	47	14	3	44	154
Kentucky	37	13	81	44	7	45	227
Tennessee	78	5	191	120	51	61	506
Georgia	118	20	167	240	65	128	738
South Carolina	11	6	34	34	17	-	102
North Carolina	53	22	62	18	3	223	381
Virginia	71	13	84	96	64	45	373
West Virginia	14	-	13	17	-	10	54
Missouri	62	81	38	22	17	81	301
U.S. Total	**2,516**	**1,656**	**4,811**	**3,536**	**1,339**	**3,303**	**17,161**

Compared to these peer states, Mississippi's highways have a comparable number of fatalities for rural and urban areas. However, using fatality rates as the basis of comparison, Mississippi's rural and urban highways have higher rates than the average rates for peer states and the national rate, as shown in **Table 1-10**.

Table 1-10: Peer State Fatality Rates, by Area Type in 2004

State	Rural			Urban			Total
	Fatalities	VMT (million)	Fatality rate per million VMT	Fatalities	VMT (million)	Fatality rate per million VMT	Fatality rate per million VMT
Mississippi	**691**	**24,114**	**.029**	**187**	**15,317**	**.012**	**.041**
Louisiana	635	21,603	.029	251	23,004	.011	.040
Arkansas	550	19,941	.028	154	11,707	.013	.041
Kentucky	737	27,351	.027	227	19,971	.011	.038
Tennessee	776	29,610	.026	506	41,333	.012	.038
Georgia	855	43,995	.019	738	68,625	.011	.030
South Carolina	884	32,089	.028	102	17,462	.006	.034
North Carolina	1,150	47,183	.024	381	48,720	.008	.032
Virginia	524	30,598	.017	373	48,279	.008	.025
West Virginia	357	14,775	.024	54	5,527	.010	.034
Missouri	829	31,512	.026	301	37,482	.008	.034
U.S. Total	**24,740**	**1,070,248**	**.023**	**17,161**	**1,892,265**	**.009**	**.032**

In 2004, Mississippi was 32nd in the nation in total fatalities, 1st in fatalities per 100 million VMT (vehicle-miles of travel), per 100,000 drivers and per 100,000 registered vehicles, and 2nd in fatalities per 100,000 population. These fatality measures are listed in **Table 1-11**.

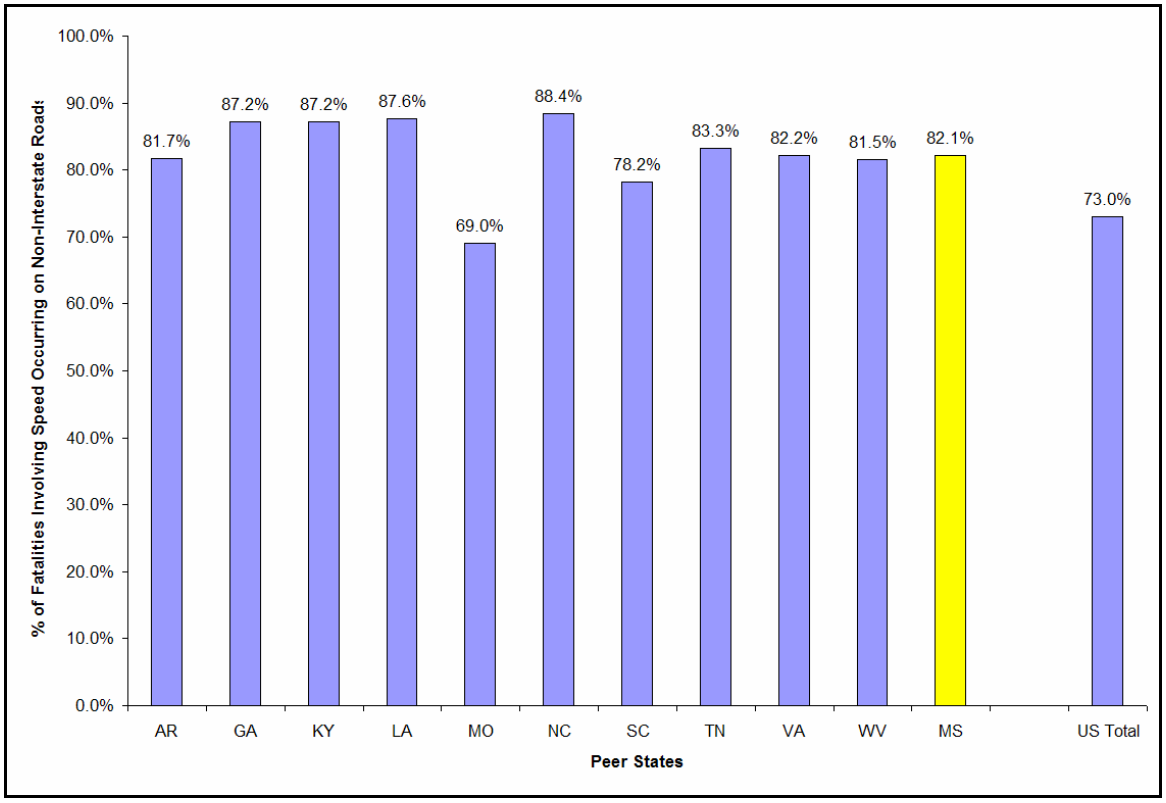
Table 1-11: Comparison of Mississippi Fatality Rates

2004	Mississippi	MS Ranking	US	Best State
Fatalities	900	32nd	42,636	---
Fatality Rate per 100M VMT	2.28	1st	1.44	0.87
Fatality Rate per 100,000 drivers	47.47	1st	21.44	10.25
Fatality Rate per 100,000 registered vehicles	45.19	1st	17.92	8.51
Fatality Rate per 100,000 Population	31.00	2nd	14.52	7.42

Source: 2004 Toll of Motor Vehicle Crashes Report, National Highway Traffic Safety Administration.

In 2004, 82.1 percent of Mississippi's fatalities involving speeding occurred on non-interstate roads vs. the U.S. average of 73.0 percent. Among the peer states, only Missouri is lower than the U.S. average percentage in this statistic, as illustrated in **Figure 1-16**.

Figure 1-16: Share of Fatalities on Non-Interstate Roads that Involve Speeding



Other factors relating to Mississippi's crash and fatality rates include the following:

- In 2004, 38 percent of all Mississippi fatalities involved alcohol, compared with the U.S. average of 39 percent. This represents a reduction from the 45 percent of Mississippi fatalities in 1994.
- Mississippi's fatality rate per 100 million vehicle miles traveled has dropped 40 percent since 1975, compared to the U.S. average of 57 percent North Carolina had the greatest reduction among peer states with a 61 percent drop.
- Seat belt usage by drivers involved in fatal crashes has gone up from 29 percent to 33 percent since 1994, but this is far below the 60 percent U.S. average.
- Mississippi's pedestrian fatality rate in 2004 is the 19th highest in the U.S. .

Table 1-12 shows a breakdown of fatalities regarding location, pedestrians and large trucks for Mississippi and the U.S.A. In Mississippi the percent of fatalities killed in roadway departure fatalities, is significantly higher (81%) than the national average (60%). This is the highest percentage in the U.S.

Table 1-12: Fatalities Relating to Roadway, Pedestrians and Large Trucks

State	Roadway Departure Fatalities[(1)]	Intersection Fatalities[(1)]	Pedestrian Fatalities[(1)]	Fatalities in Crashes Involving Large Trucks	Total Fatalities
Mississippi	**727**	**166**	**44**	**101**	**900**
Percent of Total Killed	80.8%	18.4%	4.9%	11.2%	---
US Total	25,676	9,117	4,641	5,190	42,636
Percent of Total Killed	60.2%	21.4%	10.9%	12.2%	---

Source: 2004 Toll of Motor Vehicle Crashes Report, National Highway Traffic Safety Administration.
(1) Fatalities based on FHWA Definition

Table 1-13 shows the 2004 fatalities by person type and vehicle type. The percentages of total killed in passenger cars and light trucks in Mississippi are all higher than nation-wide figures.

Table 1-13: Persons Killed by Person Type and Vehicle Type

State	Person Type						Total Killed
	Occupants by Vehicle Type				Motorcycle Riders	Nonmotorists	
	Passenger Cars	Light Trucks	Other/ Unknown[(1)]	Total Occupants		Total[(2)] Nonmotorists	
Mississippi	**465**	**313**	**34**	**812**	**40**	**48**	**900**
Percent of Total Killed	51.7%	34.8%	3.8%	90.2%	4.4%	5.3%	---
US Total	19,091	12,602	1,441	33,134	4,008	5,494	42,636
Percent of Total Killed	44.8%	29.6%	3.4%	77.7%	9.4%	12.9%	---

Source: 2004 Toll of Motor Vehicle Crashes Report, National Highway Traffic Safety Administration.
(1) Other/Unknown include Occupants of Large Trucks, Buses and Other Unknown Vehicle Types.
(2) Total Non Motorists include Pedestrians, Pedalcyclists and Other Non Motorists.

Safety Summary

In summary, Mississippi has made good progress in reducing fatalities and crashes over the past ten years. The seat belt usage in Mississippi has been increasing, which may have aided in the safety progress. Causes like running-off-the road can sometimes be traced to highway conditions and design, while alcohol and speeding fatalities are usually tougher to link. While fatality rates in Mississippi remain high, there have been significant reductions over the past decade.

PLANNING ISSUES

AIR QUALITY PLANNING ISSUES

One important consideration in meeting MULTIPLAN Environmental Stewardship goals is to understand the relationship between transportation and air quality and consider how the movement of people and goods impacts air quality. The state of Mississippi has been fortunate to-date by continuing to attain the federal air quality standards[6] and is joined by Vermont and Florida as the only states east of the Mississippi River that meet the federal standards. Nevertheless, future growth may have impacts on the State's ability to retain its attainment status because one county is borderline and three additional counties are near borderline in terms of *just barely* attaining the ozone standard. This section of MULTIPLAN discusses air quality and transportation impacts and status within Mississippi. It also briefly describes what actions the State can take to prepare to meet federal requirements for transportation planning in air quality nonattainment areas.

Under the Federal Clean Air Act, the Environmental Protection Agency (EPA) establishes primary air quality standards to protect public health, including the health of sensitive populations such as people with asthma, children, and older adults. EPA has set national ambient air quality standards (NAAQS) for six principal air pollutants: Ground-level ozone (O3), Particulate Matter (PM), Nitrogen Dioxide (NO_2), Sulfur Dioxide (SO_2), Carbon Monoxide (CO), and Lead (Pb). The Mississippi Department of Environmental Quality (MDEQ) monitors all of these pollutants except lead. Because lead is no longer used in automobile fuels, it was determined that it no longer needs to be monitored in Mississippi[7]. MDEQ also monitors hazardous air pollutants, however, there are no NAAQS for these pollutants.

If any region in the State were to be designated by the EPA as nonattainment for any one of the above pollutants, a statutorily required process[8] to determine the transportation impact on emissions applies. Certain findings must be made that the transportation investments planned in the region (and/or state) are consistent with the MDEQ plan to meet the federal air quality standard(s).

Ozone

The eight-hour ozone standard is met when the three-year average of the annual fourth highest daily maximum eight-hour average concentration (also known as the design value) is less than 0.08 parts per million (ppm) or 84 parts per billion. MDEQ monitors ozone continuously from March 1 through October 31 each year at 11 monitoring sites throughout the State. Five of these monitors are in the Gulf Coast counties and one monitor is in DeSoto County. The others are located throughout the State. According to the MDEQ monitors, the 2005 ozone design value for DeSoto County was 80, Hancock County 79, Harrison 76 and 83 (two monitors), and Jackson County 81 and 74 (two monitors). This data shows that DeSoto, Hancock, Harrison, and Jackson Counties are quite close to the eight-hour ozone standard and may, in future years, fall into nonattainment. **Figure 1-17** shows the 2005 eight-hour ozone monitoring data throughout the State.

[6] National Ambient Air Quality Standards (NAAQS)
[7] Mississippi Department of Environmental Quality, 2005 Air Quality Data Summary.
[8] This process is required in section 176(c) of the Clean Air Act and is known as transportation conformity.

Figure 1-17: 8-hour Ozone Monitoring Data (2005)

Ozone Standards

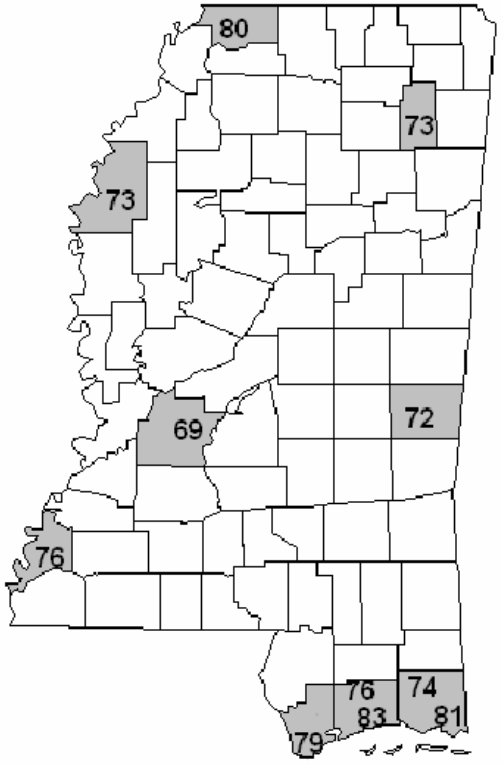
There are two ozone standards: (1) 8-hour average and (2) 1-hour average. The 1-hour average ozone standard was revoked by EPA on June 30, 2005. MDEQ monitors ozone continuously from March 1 through October 31 each year at the monitoring sites listed below.

Primary and Secondary 8-Hour Ozone Standard

The 8-hour standard is met when the 3-year average of the annual fourth highest daily maximum 8-hour average concentration (also known as the design value) is less than 0.08 parts per million (ppm) or 84 parts per billion (ppb).

2005 8-Hour Ozone Design Values
Standard – 84 ppb

County	City	2005 Design Values (ppb)
Adams County	Natchez	76
Bolivar County	Cleveland	73
DeSoto County	Hernando	80
Hancock County	Port Bienville I.P.	79
Harrison County	Gulfport	83
Harrison County	Saucier	76
Hinds County	Jackson	69
Jackson County	Pascagoula	81
Jackson County	Vancleave	74
Lauderdale County	Meridian	72
Lee County	Tupelo	73



Source: MDEQ 2005 Air Quality Data Sum

Particulate Matter (PM2.5)

High exposure to fine particulate matter ($PM_{2.5}$) can have impacts on the respiratory system because these fine particles can lodge deep in the lungs. Children (whose lungs are not fully developed), asthmatics, and the elderly are particularly prone to the impacts of fine particles. The $PM_{2.5}$ NAAQS is a new standard, which was set in 1997 and is currently being implemented. There are two $PM_{2.5}$ standards, an annual average concentration and a 24-hour average concentration. MDEQ monitors PM every 3rd day at 16 monitoring sites throughout the State. The annual average standard is met when the annual average does not exceed 15.0 micrograms per cubic meter (µg/m3).

While no county in Mississippi exceeded the annual average standard in 2005, several counties are relatively close to the standard. Again, the Gulf Coast counties of Jackson, Hancock, and Harrison are all above 10 µg/m3 and DeSoto County monitors showed an annual average of 11.4 µg/m3. In addition, several other counties show readings close to the standard with Jones County showing a 14.4 µg/m3. Based on the 2005 annual averages, the Department should closely monitor the situation in order to be prepared should one or more counties fall into nonattainment for PM. All counties in the State are well under the 24-hour average for PM exposure levels. **Figure 1-18** shows the $PM_{2.5}$ 2005 monitored readings in Mississippi.

Other Pollutants

The other criteria pollutants: Particulate Matter – 10 (PM10), Oxides of Nitrogen (NOx), Carbon Monoxide (CA), and Nitrogen Dioxide (NO2), Sulfur Dioxide (SO2) apply nationally; however, Mississippi counties are well below the national standards for these pollutants.

Transportation and Air Quality Planning Requirements

The federal Clean Air Act of 1990 (CAA) explicitly tightened the requirements for transportation agencies in areas designated as air quality nonattainment or maintenance areas for one or more pollutants. Subsequently, the U.S. Department of Transportation authorizing legislation of 1991 (Intermodal Surface Transportation Efficiency Act (ISTEA); 1998 - Transportation Equity Act for the 21st Century (TEA-21); and most recently (August 2005) the Safe Accountable Flexible Efficient Transportation Act: A Legacy for Users (SAFETEA-LU) reinforced the CAA requirements by linking the transportation planning process with the air quality requirements, in a process known as transportation conformity. In order to meet the requirements of transportation conformity, in EPA designated nonattainment or maintenance areas, the states and metropolitan areas must demonstrate that their transportation plans and Transportation Improvement Programs (TIPs) are consistent with the State Implementation Plan for air quality.

The state of Mississippi continues to meet the NAAQS throughout the State. To date, the transportation conformity requirements of the CAA do not apply anywhere in the State. Nevertheless, the State has included in its goals a recognition that increased public awareness and early and continued collaboration with environmental agencies to be important to meeting three of its Environmental Stewardship goals: 1) partnering with federal and state resources agencies, 2) Integrating environmental stewardship within the Mississippi Department of Transportation, and, 3) Enhance environmental awareness through education and training. Addressing these goals will be an ongoing activity at the Department and will help to ensure that

Figure 1-18: $PM_{2.5}$ Monitoring Data (2005)

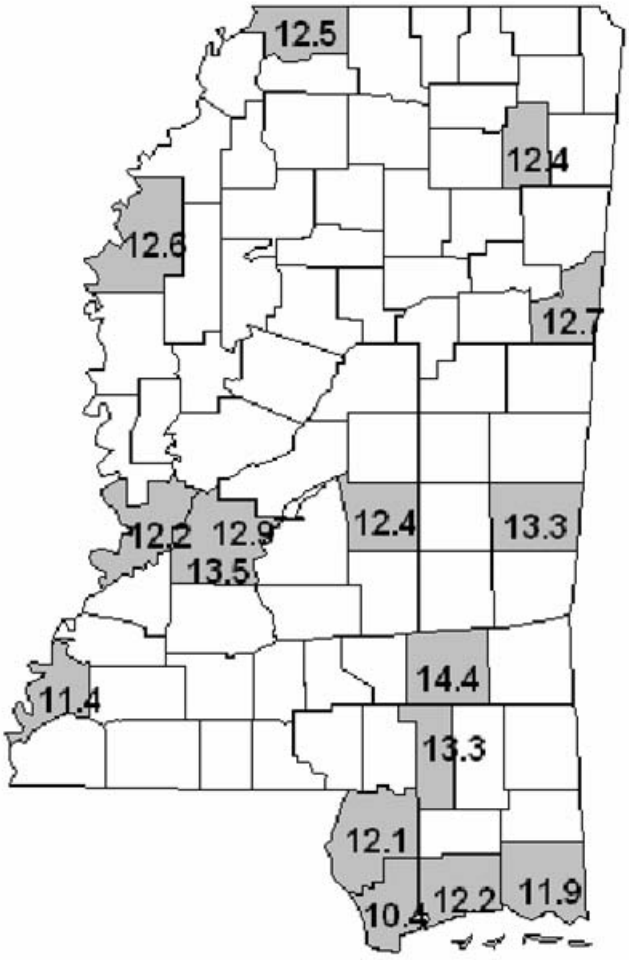
$PM_{2.5}$ Standards

There are two $PM_{2.5}$ standards: (1) Annual Average and (2) 24-Hour Average. MDEQ monitors $PM_{2.5}$ every 3rd day at the monitoring sites listed below.

Primary and Secondary Annual Average Standard – 15.0 µg/m³

The annual average standard is met when the annual average does not exceed 15.0 micrograms per cubic meter (µg/m³).

County	City	2005 Annual Average (µg/m³)
Adams County	Natchez	11.4
Bolivar County	Cleveland	12.6
DeSoto County	Hernando	12.5
Forrest County	Hattiesburg	13.3
Hancock County	Port Bienville I.P.	10.4
Harrison County	Gulfport	12.2
Hinds County	Northeast Jackson	12.9
Hinds County	Downtown Jackson	13.5
Jackson County	Pascagoula	11.9
Jones County	Laurel	14.4
Lauderdale County	Meridian	13.3
Lee County	Tupelo	12.4
Lowndes County	Columbus	12.7
Pearl River County	Picayune	12.1
Scott County	Roosevelt S.P.	12.4
Warren County	Vicksburg	12.2



Source: MDEQ 2005 Air Quality Data Sum

coordination with the state and federal resource agencies occurs and that the public is aware of potential air quality issues in the future.

Emerging Issues

DeSoto County is part of the Memphis, TN Metropolitan Statistical Area (MSA). The Memphis area is an 8-hour ozone nonattainment area and the impacted area includes Crittenden County, Arkansas but does not include DeSoto County, MS. DeSoto County is the fastest growing county in Mississippi with a 57.9 percent increase in population from 1990-2000. The greater Memphis area grew at a rate of 15.7 percent overall, with DeSoto County being one of the fastest growing counties in the region.

The MSA that includes Biloxi-Gulfport-Pascagoula is situated on the Gulf Coast and includes Hancock, Harrison and Jackson Counties. The Mississippi Gulf Coast Urbanized Area runs 74 miles along the Mississippi Sound. The area was hard hit by Hurricane Katrina but was a rapidly growing MSA during the past decade and population increased 16.5 percent from 1990-2000. Hurricane Katrina caused catastrophic damage to the Hancock County monitoring sites due to the storm surge and high winds. Other monitoring sites along the coast sustained little or no damage. The Gulf Coast was also rapidly growing prior to Hurricane Katrina and it is too soon to tell how long it might be before this area of the State starts growing again.

With respect to the four “at risk” counties for meeting the eight-hour ozone and PM2.5 standards, the Department will be closely monitoring the air quality status of these counties and will be prepared to address the transportation conformity requirements in the future, should any counties in Mississippi be designated by EPA as nonattainment.

Prior to the designations of the eight-hour ozone standard, DeSoto County, in cooperation with the MDEQ and the agencies in the Memphis metropolitan area, developed a number of actions that could be undertaken to help reduce ozone levels in DeSoto County. These measures included:

- Placing additional restrictions on open burning, construction activities and maintenance activities on days with high ozone levels;
- Designating two of the additional lanes that will be added to I-55 from MS 304 to the Tennessee State Line as high occupancy vehicle (HOV) lanes where feasible and reasonable, to encourage ridesharing;
- Providing additional Congestion Mitigation Air Quality Improvement funds to DeSoto County; and
- Providing additional enhancement program funds for developing pedestrian and bikeways in DeSoto County.

These measures were considered as part of an Early Action Compact that DeSoto County agreed to participate in with the other agencies in the Memphis Urbanized Area to attempt to meet the national air quality standards before being officially designated as nonattainment. Subsequently, the Memphis area was designated as an air quality nonattainment area for ozone and the area does not include DeSoto County. Therefore, the Early Action Compact was dissolved. DeSoto County is not currently required to take any transportation-related actions to reduce ozone. Should any area be designated as nonattainment in the future by EPA, the State

will ensure that actions which were previously considered will be reconsidered along with other possible ways to reduce pollutants that contribute to ozone (NOx and VOCs) and PM2.5.

Actions within the Department of Transportation

The staff at the Department has taken several actions to become informed about the requirements that are triggered when an area is designated by U.S. EPA as an air quality nonattainment area. The State has been actively involved in the Arkansas, Tennessee, and Mississippi Ozone Study (ATMOS) for several years. Also, the Department participated in the discussions in 2003 and 2004 on the Early Action Compact with other agencies in the Memphis area. Several measures were identified that, if implemented, would reduce emissions should a region(s) in the State become a nonattainment area. In addition, a training course on the transportation conformity requirements was attended by several MDOT staff.

The Department also participates actively in discussions with other state DOTs through their membership in the American Association of State Highway Transportation Officials (AASHTO). The Department works closely with the Metropolitan Planning Organizations (MPOs) in Gulfport, Hattiesburg and Central Mississippi, and monitors closely the air quality issues in Memphis, Tennessee.

The state of Mississippi has fortunately been able to retain their status as a state that does not violate the national air quality standards. As part of the Environmental Stewardship goal, the Department will continue to review proposed investments in order to consider the air quality impacts. In the next several years, dramatic reductions in NOx will be felt nationwide as a result of EPA's 2007 heavy-duty truck emission rule and the new low sulfur diesel fuel requirement to take effect nationwide in October, 2006. These emission reductions will be very helpful for areas to attain and maintain, the federal air quality standards.

CHANGES IN PLANNING LEGISLATION

When the prior Mississippi Statewide Plan was completed in 1996, planning regulations developed under the auspices of the Intermodal Surface Transportation Efficiency Act (ISTEA) were in effect. The transportation Efficiency Act for the 21st Century (TEA-21),[9] which was enacted in 1998, continued many of the same planning provisions of ISTEA, but also changed some of the regulations.

More recently, the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU) was enacted to further build upon the prior legislation[10]. SAFETEA-LU promotes more efficient and effective Federal surface transportation programs by focusing on transportation issues of national significance, while giving state and local transportation decision makers more flexibility for solving transportation problems in their communities.

The following sections highlight some of the changes in legislation affecting transportation planning processes.

[9] The transportation Efficiency Act for the 21st Century (TEA-21), enacted June 9, 1998, as Public Law 105-178. The TEA-21 Restoration Act, enabled July 22, 1998 provided technical corrections to the original law.

[10] Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU) enacted August 10, 2005.

State Consultation with Local Officials

The regulations implemented as a result of ISTEA stated that there should be a reasonable opportunity for public officials to comment, and local officials should be consulted on project selection in nonmetropolitan areas. TEA-21 requirements formalized the process and ensured local input, by requiring the states to consult with nonmetropolitan local officials in transportation decision-making and to document the process for consultation.

SAFETEA-LU expands these requirements and requires that the state's long-range transportation plan be developed in consultation with:

- MPOs in metropolitan area;
- Affected nonmetropolitan officials with responsibility for transportation; and
- The tribal government and the Secretary of the Interior, with respect to areas of the state under the jurisdiction of an Indian tribal government.

The state shall also provide citizens, affected public agencies, representatives of public transportation employees, freight shippers, private providers of transportation, representatives of users of public transportation, representatives of users of pedestrian walkways and bicycle transportation facilities, representatives of the disabled, providers of freight transportation services and other interested parties with a reasonable opportunity to comment on the proposed plan.

In accordance with the above, MDOT conducts long-range transportation planning activities in compliance with these consultation requirements.

Key Planning Factors

Under ISTEA, there were 23 separate factors for statewide transportation planning. TEA-21 streamlined these factors through the establishment of seven planning factors, which relied on legislative language to guide the planning process, use non regulatory approaches to promote good practices, and support the local application of planning factors to fit local circumstances.

SAFETEA-LU increased the number of planning factors to eight by separating the factors of **safety** and **security**, added nonmetropolitan areas to the regions where economic vitality should be supported and emphasized the need for consistency between transportation improvements and planned growth and economic development patterns. The resulting eight planning factors are:

- Support the economic vitality of the United States, the states, nonmetropolitan areas and metropolitan areas, especially by enabling global competitiveness, productivity, and efficiency;
- Increase the safety of the transportation system for motorized and nonmotorized users;
- Increase the security of the transportation system for motorized and nonmotorized users;
- Increase the accessibility and mobility of people and freight;
- Protect and enhance the environment, promote energy conservation, improve quality of life and promote consistency between transportation improvements and state and local planned growth and economic development patterns;

- Enhance the integration and connectivity of the transportation system, across and between modes throughout the State, for people and freight;
- Promote efficient system management and operation; and
- Emphasize the preservation of the existing transportation system.

ISTEA defined 23 factors for statewide planning and 16 factors for metropolitan planning; the eight factors identified in SAFETEA-LU are applicable to both statewide and metropolitan planning, further enabling closer coordination.

ITS Technology Investments

Under ISTEA, there were no regulations regarding ITS technology. Recognizing that ITS is an emerging area, TEA-21 and SAFETEA-LU directs that all ITS projects funded with highway trust monies be consistent with national ITS architecture, standards, and protocols. The purpose of such a regulation is to include more ITS investments in plans and programs, and to mainstream ITS investments as an alternative that is considered for improvements. Furthermore, this regulation is designed to ensure that ITS investments work together.

Highway Safety Improvement Program

SAFETEA-LU establishes a new core Highway Safety Improvement Program (HSIP) that is structured and funded to make significant progress in reducing highway fatalities. It creates a positive agenda for increased safety on our highways by almost doubling the funds for infrastructure safety and requiring strategic highway safety planning, focusing on results. Other programs that target specific areas of concern, such as work zones, older drivers and pedestrians, including children walking to school, further reflect SAFETEA-LU's focus on safety.

The HSIP requires states to develop and implement a Strategic Highway Safety Plan (SHSP) and submit annual reports to the Secretary that describe at least 5 percent of their most hazardous locations, progress in implementing highway safety improvement projects and their effectiveness in reducing fatalities and injuries.

Strategic Highway Safety Plans will be used in the Highway Safety Improvement Program to identify and analyze highway safety problems and opportunities, include projects or strategies to address them, and evaluate the accuracy of data and the priority of proposed improvements. The SHSP must be based on accurate and timely safety data, consultation with safety stakeholders, and performance-based goals that address infrastructure and behavioral safety problems on all public roads. States are also required to develop an evaluation process to assess results and use the information to set priorities for highway safety improvements. States that do not develop a strategic plan by October 1, 2007, will be locked in at their FY 2007 HSIP apportionment level pending development of a plan. States with SHSPs have additional flexibility to use up to 10 percent of their HSIP funds for behavioral and other safety projects if they meet rail grade crossing and infrastructure safety needs as defined in their SHSPs.

SAFETEA-LU Compliance

The June 9, 2006 *Federal Register* provided notice that FHWA and FTA are jointly proposing a revision of regulations governing the development of Statewide and Metropolitan transportation plans and programs. This Notice of Proposed Rule Making is referred to as an "NPRM." Prior to this, the joint FHWA/FTA rules governing how Statewide and Metropolitan Planning is to be conducted and what must be addressed have remained virtually unchanged since their issuance in 1993 in response to ISTEA. Since 1993, only two statutory changes and several guidance documents have been issued.

After SAFETEA-LU's enactment in 2005, FHWA dictated that planning documents currently in progress may continue to be developed and approved based on the existing rules. However, transportation plans and programs adopted after July 1, 2007 must comply with all the SAFETEA-LU planning provisions and provisions of the NPRMs as finalized. States opting to implement the SAFETEA-LU requirements prior to July 1, 2007 must satisfy all the SAFETEA-LU provisions prior to adoption of plans and programs.

The proposed rules are not major shifts from the current regulations. They incorporate and reiterate past changes and guidance documents. Guidance such as integrating planning with NEPA and increased emphasis on consultation with local officials, transit users, and freight shippers and service providers are strengthened in the NPRM. These guidance documents are included as an appendix to the NPRM.

The NPRMs reflect changes in response to the passage of SAFETEA-LU and the recognition that transportation planning and issues facing transportation have evolved and changed since 1993. Some of these issues and changes include: the 2000 census identified increased urbanization; planning technology has improved (for example, Geographic Information Systems and visualization) and changed (proliferation in the use of the Internet and the World Wide Web); the need for the nation to compete in a global economy and resulting need for greater emphasis on moving freight efficiently; and the very limited number of miles being added to the roadway system, resulting in a need to maximize the use and efficiency of the existing system.

Following are the key statutory changes and MULTIPLAN compliance for statewide planning and programs as contained in the NPRM presented in the *Federal Register*, Friday, June 9, 2006, Part II, Department of Transportation, FHWA 23 CFR Parts 450 and 500; FTA 49 CFR Part 613, Statewide Transportation Planning; Metropolitan Transportation Planning:

New Planning Factors: Security and safety of the transportation system are now stand-alone planning factors, signaling an increased importance on each.

- Addressed in MULTIPLAN Goal 2.

Expanded Planning Factor: The planning factor related to the environment was expanded to include promoting consistency between transportation improvements and state and local planned growth and economic development patterns.

- Addressed in MULTIPLAN Goal 4 and 5.

Environmental Mitigation: The long range statewide transportation plan shall include a discussion of potential environmental mitigation activities, to be developed in consultation with federal, state and tribal wildlife, land management and regulatory agencies.

- Addressed in MULTIPLAN Goal 4.1.

New Consultations: States shall consult "as appropriate" with "state, local, and federally-recognized tribal agencies responsible for land use management, natural resources, environmental protection, conservation and historic preservation" in developing the long-range statewide transportation plan.

- Addressed in MULTIPLAN Goal 4.
- The Public Involvement Process included agency coordination at all levels.

STIP Cycles and Scope: STIPs are to be updated every four years and must include projects covering four years.

- Not applicable to MULTIPLAN.

Visualization Techniques: States shall employ visualization techniques in the development of the Long-Range Statewide Plan to the maximum extent possible.

- The Public Involvement Process used a variety of visualization techniques in the development of MULTIPLAN.

Publication: States shall publish or otherwise make available for pubic review the long-range statewide transportation plan "including in electronically accessible formats and means such as the World Wide Web".

- MULTIPLAN will be available on MDOTs webpage.

Strategic Highway Safety Plan (SHSP): States must develop a strategic highway safety plan that identifies and analyzes safety problems and opportunities in order to use Highway Safety Improvement Program funds for new eligible activities under 23 U.S.C. 148.

- Addressed in MULTIPLAN Goal 2.

State Highway Improvement Program Projects in the STIP: Projects or strategies contained in State highway safety improvement program from the SHSP must be consistent with the requirements of the STIP.

- Not applicable to MULTIPLAN.

Indian Reservation Road Projects in the STIP: "Funds available to Indian tribes for Indian reservations roads shall be expended on projects identified in a transportation improvement program approved by the secretary." (23 U.S.C. 202).

- Not applicable to MULTIPLAN.

Overall, the NPRM is written to provide states and MPOs maximum flexibility in their planning process and in their final plans and programs. This flexibility has both strengths and weaknesses. One potential weakness is that the flexibility in the NPRM may leave states and MPOs open to legal challenges relative to what should be included in their planning process, their final plan documents and programs. It may be relevant for FHWA and FTA to revisit and provide greater clarification and specificity to proposed changes in some area such as environmental mitigation, etc. It may also be important for FHWA and FTA to provide protection from litigation by stating that a "good faith effort" by the states and MPO is what should be adjudicated and not the specific activities or products. Comments on the NPRM were received until September 7, 2006. FHWA and FTA hope to finalize the rules based on the comments in early 2007.

EMERGING STATEWIDE PLANNING ISSUES AND IMPACTS ON MISSISSIPPI

Since the *1996 Mississippi Long Range Transportation Plan* was completed, a number of new focus areas have emerged. Many of these issues have long been considered, but have recently gained more importance. Some of these issues are addressed specifically in SAFETEA-LU, and others have been adapted as a result of changing needs and concerns. Emerging issues in statewide transportation planning include the following:

- Performance-based planning;
- Land use considerations;
- Planning and NEPA linkages;
- Environmental Justice;
- Freight movement issues;
- Innovative finance options;
- Management and operations;
- Safety; and
- Impacts of technology (e.g. ITS).

Performance-based Planning

A major component of ISTEA was its emphasis on multimodal and long-range planning. Combined with a need to make the most efficient use of scarce resources, an increased concern about the connections between transportation and economic development, and increased environmental, social, and equity concerns, ISTEA created an environment for new emphases in transportation planning. The emphasis on multimodal transportation planning was strengthened in TEA-21, leading to a major push towards performance-based planning, and this emphasis is continued in SAFETEA-LU.

Performance-based planning constitutes a planning paradigm being adopted by state DOTs across the country. Throughout the 1990's to the present, effective management and operation of existing transportation infrastructure have been increasing in importance to public officials.

Increased congestion, as well as diminished ability to add new automobile capacity, have combined to make efficient transportation system management and operations important issues for today's decision-makers. Today, the maintenance of states' economic well-being and quality of life depend in large part on the efficient management of their transportation systems.

Performance-based planning has been effectively utilized within organizations that formally adopt specific goals and objectives into their long-range planning efforts, as MDOT has done.

Performance-based planning includes the following elements:

- Identification of goals and quantifiable objectives;
- Definition of measures that relate to the goals and objectives;
- Identification of analytical methods and data required to generate the performance measures; and
- Application of the measures in a process of alternatives evaluation, decision support, and ongoing monitoring.

The primary reasons for performance-based transportation planning can be summarized in the following six categories[11]:

- **Accountability:** The periodic reporting of performance measurement provides a means of determining whether resources are being allocated to identified priority needs.
- **Efficiency:** Performance measurement increases the effectiveness of internal measurement processes through focusing resources on increasing the efficiency of organizational outputs and delivery processes.
- **Effectiveness:** Performance measurement provides a means to link the outcomes of policy decisions with the day-to-day actions of transportation agencies.
- **Communications:** Performance measurement allows for the periodic delivery of information to customers and stakeholders regarding the progress being made toward desired goals and objectives.
- **Clarity:** Performance measurement focuses attention on the desired outcomes of decisions, which can clarify the purpose of an agency's actions and/or expenditures.
- **Improvement over time:** Regular performance measurement through continual monitoring of the transportation system allows for periodic, results-based refinement of policies and programs.

Figure 1-19 describes the influence of performance measurement on the transportation planning process:

- Performance measures define data requirements in the transportation planning process;
- Performance measures influence the development of analytical methods used in the transportation planning process; and
- Performance measures are a critical means of providing feedback to the decision-making process on the results of previous decisions.

Examples of Statewide Performance-based Transportation Planning in Practice – Several examinations of state DOT use of performance measurement illustrate the central role that efficient management of transportation systems and operations have on transportation decision-making.

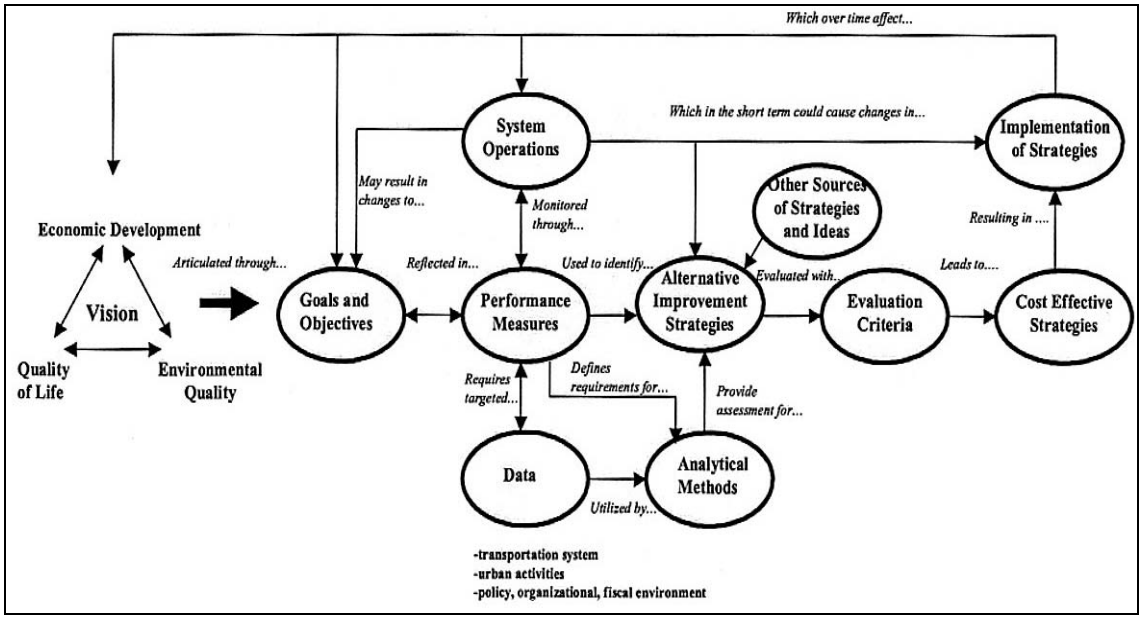
Minnesota DOT – The Minnesota Department of Transportation (MnDOT) has, since the mid 1990's, incorporated performance measures into its management philosophy. They are organized so as to reflect a range of outcomes influenced by transportation system performance. These outcomes and example measures include[12]:

- *Time-Related:* A predictable travel time for length of trip is maintained so that customer expectations are met.
  - o Vehicle-miles traveled (VMT) under congested conditions
  - o Average travel time between specific origins and destinations
  - o Percentage of Minnesotans satisfied with trip time length

[11] Pickrell, S. and L. Neumann, *Linking Performance Measures with Decision-making,* from the proceedings of the *Conference on Performance Measures to Improve Transportation Systems and Agency Operations* organized by the Transportation Research Board in Irvine, California on October 29 – November 1, 2000 [TRB, 2000].

[12] Minnesota Department of Transportation, January, 2000. *Moving Minnesota from 2000 to 2020: Minnesota Statewide Transportation Plan*.

Figure 1-19: Performance Measures in the Transportation Planning Process[13]



- *Safety:* Incidents and crash rates are minimized to MnDOT's current and potential ability to influence infrastructure, partnerships / education, full range of solutions and driver behavior.
  - o Motor vehicle crash rates / fatal crashes by roadway design category
  - o Percentage of Minnesotans feeling safe while driving in work zones
  - o Percentage of Minnesotans satisfied with the safety of roadways

- *Infrastructure Condition:* Maintaining a condition of infrastructure that meets customer expectations.
  - o Pavement quality index
  - o Structural / functional bridge ratings

- *Access and Level of Service:* Service levels are provided in a manner that meet personal travel and shipping needs.
  - o Percentage of Minnesotans with satisfactory transit options
  - o Posted bridges and bridge load carrying capacity
  - o Miles of trunk highway seasonal load restriction postings
  - o Percentage of Minnesotans satisfied with travel information

- *Environment:* MnDOT is a proactive, responsible steward of environmental resources.
  - o Percentage of residential areas in incorporated areas exposed to noise that exceeds standards
  - o Number of wetland acres impacted, mitigated or replaced by MnDOT

[13] Meyer, M.D., and Miller, E., 2001. Urban Transportation Planning: A decision-oriented approach, 2nd ed. New York: McGraw-Hill.

- *Socioeconomics:* Transportation investments will yield the highest possible economic return to the region, tempered by an evaluation of community values, as well as social and environmental impacts.
  - o Total VMT
  - o Freight ton-miles traveled
  - o Maintenance and construction expenditures per VMT
  - o Percentage of highway funds going to construction

Florida DOT – The Florida Department of Transportation has framed its performance-based planning process around the concept of "mobility" to "support investment decisions and policy analysis." Mobility is defined as "the ease to which people and goods move throughout the community, state and world," and is measured as the quantity of travel served, the quality of travel, accessibility and utilization of transportation systems. Measures for each include[14]:

- *Quantity*
  - o Person-miles traveled
  - o Truck-miles traveled
  - o Person-trips
  - o Transit ridership

- *Quality*
  - o Average speed (weighted by person-miles traveled)
  - o Average delay per vehicle
  - o Average door-to-door travel time
  - o Reliability (variance of average travel time or speed)
  - o Maneuverability (vehicles per hour per lane in the peak hour)
  - o Ratio of automobile travel time to transit travel time

- *Accessibility*
  - o Connectivity to intermodal facilities (percentage of freight or passenger intermodal facilities within five miles)
  - o Proximity of dwelling units and employment opportunities
  - o Proximity of industrial warehouse facilities
  - o Percentage of miles where there is bicycle accommodation in right of way
  - o Percentage of miles with sidewalk coverage
  - o Transit coverage (percentage of population served by transit within 'X' minutes)
  - o Transit frequency (vehicles per hour)
  - o Span of service (hours of operation per day)

- *Utilization*
  - o Percentage of system heavily congested (at LOS 'E' or 'F')
  - o Vehicles per lane-mile
  - o Percentage VMT under congested conditions
  - o Duration of congestion (lane-mile-hours at LOS 'E' or 'F')
  - o Transit load factor (percentage of seats occupied)

California DOT – The California Department of Transportation (CalTrans) has implemented a robust performance-based planning system that links performance measurement with informed

[14] Florida Department of Transportation, September, 2000. *2000 Annual Performance Report: An Evaluation of the 1999 Short Range Component of the 2020 Florida Transportation Plan*

decision-making. The purpose of performance measurement at CalTrans is described as follows[15]:

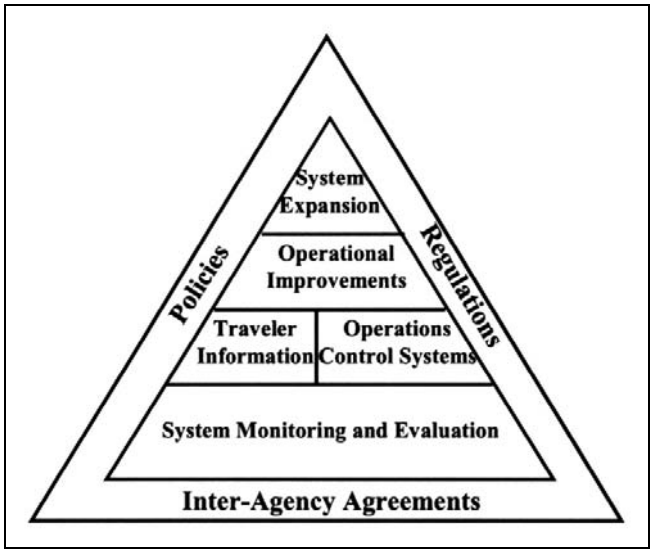
- "To develop indicators / measures to assess the performance of California's multimodal transportation system to support informed transportation decisions by public officials, operators, service providers, and system users."

- "To establish a coordinated and cooperative process for consistent performance measurement throughout California."

The CalTrans Traffic Operations Unit has developed a strategic plan founded on performance-based transportation planning principles, where system management serves as the base for an integrated approach towards programmatic decision-making within the organization.

An operations-oriented system management strategy has been developed that provides a basis for coordinating institutional linkages and partnerships that are necessary for successful implementation[16]. **Figure 1-20** illustrates this process:

Figure 1-20: CalTrans Operations-Oriented System Management [17]



Metropolitan Performance-based Transportation Planning – Performance-based transportation planning at the metropolitan level differs from statewide efforts with respect to the scale at which it is applied. However, an examination of metropolitan performance-based transportation planning can be a useful supplement to a discussion of statewide applications of these methods.

[15] Wolf, J., 2000. "Performance Measurement & Integrated Transportation Management Systems: A Traffic Operations Perspective." Sacramento, CA: California Department of Transportation.

[16] Meyer, M.D., 2001. "Measuring System Performance: The Key to Establishing Operations as a Core Agency Mission." An initial submittal for review for presentation at the 2002 Annual Meeting of the Transportation Research Board.

[17] Hatata, T. In TRB [2000].

Albany, NY – The Capital District Transportation Committee (CDTC) in Albany, NY serves as the Metropolitan Planning Organization (MPO) for the New York counties of Albany, Rensselaer, Saratoga and Schenectady. It has been one of the earliest and leading organizations to apply performance measurement to transportation planning.

In 1992, the CDTC revised its transportation improvement program (TIP) development process in light of ISTEA legislation. As part of this process, new approaches were adopted for incorporating system performance into planning and decision-making. The approach taken was framed around four characteristics of the performance measures incorporated into the *New Visions* planning process[18]:

- Some impacts can be legitimately presented in monetary terms
- Other impacts can be quantified, but should not be monetarized
- Other impacts cannot be easily quantified, but should be discussed in narrative fashion (these are called *distributional effects*)
- All three types of measures are important and should be available for the decision-making process

A set of core performance measures, defined through the *New Visions* process, were grouped into three categories:

- **Transportation Service Quality**
  - *Access – What travel alternatives exist?*
    - Percentage of person-trips within a defined non-auto to auto time difference
    - Percentage of person-trips having a travel time advantage over nondrive-alone modes
    - Number or percent of major freight movements with modal alternatives
  - *Accessibility – How long does travel take?*
    - Travel time between representative locations (including major intermodal facilities)
    - Peak vs. off-peak travel time, by quickest mode
  - *Congestion – What is the exposure level to congestion?*
    - Hours of excess-delay (recurring and nonrecurring), by mode
  - *Flexibility – Can the transportation system respond to unexpected conditions?*
    - Reserve capacity on system
    - Percentage of person-trips that could be accommodated by modes other than auto
    - Number of corridors with reasonable alternatives during closure

- **Resource Requirements**
  - *Safety – What are the safety costs associated with transportation?*
    - Estimated societal cost of transportation accidents
  - *Energy – How much energy is consumed in providing, maintaining and using the transportation system?*
    - Equivalent BTU / day for transportation capital, maintenance, operation and use
  - *Economic Cost: How much does use of the transportation system cost, aside from safety and energy costs?*

[18] Capital District Transportation Committee, January, 1998 (Adopted March, 1997). *New Visions for Capital District Transportation.*

  - Annualized capital, maintenance, operating and (monetary) user costs for the transportation system
  - Value of commercial travel time

- **External Effects**
  - *Air Quality – What is the effect of the transportation system on air quality?*
    - Daily emission levels (NOx, CO_2, VOC, HC)
    - Air quality attainment status
  - *Land Use – How does the transportation system (and changes to it) affect land use?*
    - Amount of open space
    - Degree to which existing residences and businesses are dislocated
    - Land use-transportation compatibility index[19]
    - Community character index[20]
  - *Environmental – How does the transportation system affect important environmental features?*
    - Impacts on sensitive areas (wetlands, parklands, historic areas, archaeological sites)
    - Noise exposure index[21]
  - *Economic – How does the transportation system (or changes to it) affect the economic health of the region?*
    - Narrative discussion of transportation system features that support or constrain economic activity.

These examples illustrate the important role that transportation system management and operations play in performance monitoring. Travel time, delay, congestion levels, reliability of travel time, accident rates, travel costs, and customer satisfaction all reflect the degree to which the transportation system is operating at acceptable levels of performance, and are (in these examples) important considerations in the decision-making process.

Customer-oriented Performance Measurement – One of the key features of transportation policy, management and planning over the past decade has been an increasing focus on serving the customer[22]. Several state DOTs have begun to monitor customer satisfaction with the overall performance of the transportation system, as well as satisfaction with DOT performance.

MnDOT has an extensive program through which it conducts customer satisfaction surveys. The most recent results of these surveys for seven market segments (commuters, personal travelers, farmers, emergency vehicle operators, freight carriers, shippers and intermodal operators) showed that these groups consistently rated the following services provided by MnDOT as being most important (in order of importance[23]):

[19] Index captures the level of traffic intrusion in residential areas, defined as daily traffic divided by average residential driveway spacing. Compatibility between arterial and local access function is defined as daily traffic divided by average commercial driveway spacing.

[20] Measure is a combination of quantitative and qualitative factors that reflect community quality of life by subregion (central cities, inner suburbs, outer suburbs, small cities and villages, rural areas).

[21] Index is the product of dB_a and number of households in areas in which dB_a exceeds accepted thresholds. dB_a is a scale used to measure noise levels, using decibels as the unit of measurement.

[22] American Association of State Highway and Transportation Officials (AASHTO), 1998. *The Changing State DOT*. Washington, D.C.: AASHTO.

[23] Minnesota DOT, [2000].

- Plowing, salting and sanding of snow covered roads;
- Maintaining roads and bridges;
- Installing road signage;
- Roadway features such as lighting, guard rails and pavement striping;
- Building roads and bridges;
- Posting of speed zones;
- Removing roadway and shoulder debris;
- Managing traffic with signals, ramp meters and passing lanes; and
- Travel information.

The report concludes that "the data indicates users are most interested in those products and services that deliver an immediate travel benefit in terms of comfortable, efficient and safe means of moving people or freight from one location to the next."

MnDOT also established a freight advisory committee tasked with developing freight-oriented performance measures for the Twin Cities metropolitan area[24]. After the advisory committee identified the system performance concerns of greatest importance, state DOT staff defined corresponding performance measures.

Table 1-14 shows the types of performance measures proposed by MnDOT. Of note in this set of measures is the comparative nature of system performance to other metropolitan areas (a gauge of economic competitiveness), and travel time as specified by particular origin-destination pairs.

These examples indicate that certain system operations characteristics of trip making and of system performance are more important to transportation system users than others. These characteristics can serve as the basis for monitoring system performance in a manner that is directly relevant to the customer, while at the same time, evaluating and prioritizing criteria that influence the selection of system investment strategies.

A typical set of such measures might include:[25]

- System reliability – change in travel time for specific origin-destination pairs;
- Travel time (or speed) – for specific origin-destination pairs, possibly by route and time of day;
- Safety – number of crash incidents, or possibly economic costs of accidents;
- Average delay at top "x" bottleneck points in transportation system; and
- Customer satisfaction measures.

Challenges Associated with Performance-based Transportation Planning – Despite the many benefits of incorporating performance-based planning techniques into transportation planning, there remain significant obstacles that can hinder successful implementation. In general, these obstacles relate to *linking operations management and performance measurement within a specific organization.*

[24] Larson, M. in TRB [2000].
[25] Meyer, M.D., [2001].

Table 1-14: Freight-Oriented Performance Measures from Minnesota

Performance Category	Performance Measures
Predictable, competitive travel time between origins and destinations within the Twin Cities metro region	• Metro freeway travel time by route and time of day • Average speed on metro freeways by route and time of day • Congestion ranking of metro freeways, by route • Congestion level compared to other major metro areas
Economic benefit / cost	• Benefit / cost ratio of major state transportation projects
Transportation investment	• State's transportation investment and spending as a percentage of gross state product
Intercity travel time	• Peak hour average travel speeds on major routes between 27 state regional centers • Shipper point-to-point travel time
Freight travel time to global markets	• Travel time to major regional, national and global markets – by rail, air, water and truck
Competitiveness of shipping rates	• Shipment cost per mile – by ton or value, by mode for major commodities
Crash rate and cost comparison	• Dollar value of crashes and crash cost comparison by mode • Crash rate per mile traveled by freight mode
Bottlenecks and impediments	• Number of design impediments to freight traffic, by type and mode
Timely access to intermodal terminals	• Number of design impediments slowing access to truck, rail, air and waterway terminals

In other words, the biggest challenge to successful implementation of performance-based transportation planning is institutionalizing these techniques so that they become standard operating procedure within a given agency. How is this to be done?

While there is no single answer to this question, there are common threads that run through transportation organizations that have successfully integrated performance measurement into their decision-making structure.

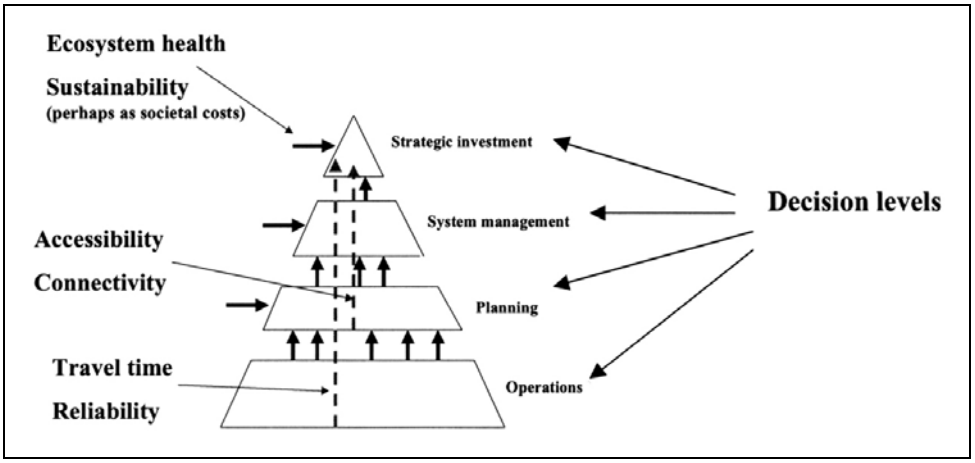
Define Core Measures – Organizations interested in adopting a performance-oriented decision-making framework are often stymied from the start in that they cannot assess what performance measures should serve as the core set of information for informing decisions.

In some cases, a large set of performance measures might be suitable for an organization so that decision-making at all levels may benefit from this information. In others, a smaller set of measures, aimed at the core business of the organization, may be adequate.

Figure 1-21 illustrates how performance-based planning can be incorporated into the primary business processes of organizations responsible for providing transportation service. Some

performance measures can be defined for use in a specific context, for example: maintenance, operations, construction and planning. These measures are used to improve program delivery for that particular function.

Figure 1-21: Performance Measures Institutionalized Within a Decision-making Structure[26]



However, some performance measures transcend different decision-making levels. For example, system reliability and average travel time, which are important issues at the operations level, also become critical performance considerations within other levels of decision-making. In Figure 1-21, they are considered all the way to strategic investment decision-making. It follows that if the performance measures are institutionalized throughout the decision-making structure, then the types of strategies that result in the most cost-effective improvements in these system performance categories could very well surface to the top of the transportation program.

Data Management – Performance-based transportation planning is grounded in routine monitoring of transportation system performance through modal management systems. Without the regular collection of system performance data, progress towards adopted goals and objectives cannot be assessed, and consequently cannot be achieved.

However, system monitoring and associated performance assessment is a very data-intensive process, highly demanding of organizational resources. The state of Montana[27], in developing its statewide performance-based planning mechanism, provides an example of how an agency must contend with the issue of data management in performance-based transportation planning.

TranPlan 21, Montana's long-range, statewide transportation planning effort, specifies policy actions that specifically link project evaluation, selection and programming with the development of technical capabilities to be used as tools in this process. Given this policy direction, in 1995 the Montana Department of Transportation (MDT) began to upgrade its technical resources independently of, and concurrently with, the development of *TranPlan21*. Specifically, MDT

[26] Meyer, M.D., 2000. "Measuring That Which Cannot Be Measured (at Least According to Conventional Wisdom), in TRB [2000].

[27] Straehl, Sandra S., and Neumann, Lance A., 2001. "Performance Programming: Guiding Resource Allocation to Achieve Policy Objectives," an initial submittal for review and presentation at the 2002 TRB Annual Meeting.

developed an Oracle-based relational database information system called the Transportation Information System (TIS). The TIS allows information to flow between various management systems via a universal linear referencing system capable of portraying and analyzing attributes from multiple sets of data.

To allow the visualization of system data in a spatial context, Geographic Information System (GIS) software has been incorporated into the TIS. The linkage between project nomination and a performance-based transportation program is created through a funding distribution plan supported by the "System Performance Query Tool" function of the TIS.

The query tool is an Oracle-based system that supports District Administrators in building project nominations by providing access to the same management system information that is used to develop the funding distribution plan. The query tool incorporates the GIS capabilities of the TIS, allowing for mapped views of transportation facilities in question with historic improvement and maintenance information, along with any other desired management system information.

The query tool also provides a search function that displays all projects within a specific needs category, and can identify all roadway segments within specific condition ranges specified by the user.

In short, the System Performance Query Tool allows project nomination that is consistent with planned funding distributions, while maintaining the ability of District personnel to choose projects based on their engineering judgment and public involvement.

Obviously, project programming activities in support of *TranPlan 21* could not be placed on hold until the upgrade of MDT's technical capabilities are complete. Consequently, a significant effort on the part of MDT management system analysts was required to complete the programming analysis. Once the TIS is finalized, it will take significantly less "brute force" to accomplish this task.

Land Use Considerations

With the multimodal planning emphases of ISTEA, TEA-21, and SAFETEA-LU it is recognized that transportation systems do not operate in a vacuum. The transportation system impacts many other aspects of states and communities, including economic development, the environment, and land use. Much research has been conducted regarding the "land use / transportation connection", and it is accepted that the relationship is circular in nature; that is, land use affects transportation and transportation affects land use.

To reach specified goals of a transportation plan, land use policies should be in place that support these goals. Although land use is more commonly thought of as a major issue at the metropolitan planning level, land use policies can impact statewide planning as well. If no land use policies are in place in high-growth areas, uncontrolled, sprawling growth may occur. If this growth is not managed, the transportation system may not be adequate to handle increasing demands, which could not only make travel more difficult in localized areas, but could also negatively impact major access routes to other parts of the State. In Mississippi, growth along the Gulf Coast may hinder travel along major freight routes to inland points as well as along the Coast itself.

Because land use is largely a local issue, strong coordination mechanisms must be in place between the state DOT and MPOs and other local agencies to ensure that land use policies are supportive of both local and statewide goals.

Planning and NEPA Linkages

Compliance with the National Environmental Policy Act (NEPA) has become an integral component of transportation project development since the Act was enacted in 1969. The purposes of NEPA, as stated in the Act, are

> *"To declare a national policy which will encourage productive and enjoyable harmony between man and his environment; to promote efforts which will prevent or eliminate damage to the environment and biosphere and stimulate the health and welfare of man; to enrich the understanding of the ecological systems and natural resources important to the Nation; and to establish a Council on Environmental Quality."*

A peer exchange meeting, hosted by the U.S. DOT in May of 2001, brought together state transportation departments to discuss how they are improving transportation decision-making through linking planning and NEPA processes and further, how these linkages have led to seamless, more connected, and more systematic planning and project development efforts.

The participating states brought forth a number of core attributes of successful transportation decision-making processes:[28]

- Understanding by transportation agencies of both why they should change their planning and project development processes and what those changes may look like;
- Acceptance by transportation agencies of environmental stewardship;
- Commitment by management demonstrated through process endorsement and support;
- Inter-agency relationships and education;
- Early involvement by agencies in planning and project development;
- Development of data-driven processes (GIS) to foster standardized systems; and
- Establishment of time frames with set coordination points.

While substantial differences exist between states and even within states, the lessons learned through informational exchange and the linkage of planning and project development processes can help to overcome the common obstacles that may be experienced.

Environmental Justice

The issues surrounding Environmental Justice have long been known to transportation planners, although these issues were more heavily emphasized with the passage of ISTEA, and

[28] U. S. Department of Transportation, 2001. *Summary of Peer Exchange on Improving Transportation Decision-making through Planning, NEPA, and Project Development Linkage*, a paper summarizing the peer exchange meeting held in Baltimore, MD on May 22-23, 2001.

were further amplified in the TEA-21 and SAFETEA-LU legislation. The tenets of Environmental Justice are based on Title VI of the 1964 Civil Rights Act, which states that "No person in the United States shall, on the ground of race, color, or national origin, be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any program or activity receiving federal financial assistance".

To provide more specific policies regarding Environmental Justice, Executive Order 12898 was issued in 1994, which states that federal agencies must identify and address disproportionately high and adverse human health or environmental effects on low-income and minority populations. The U.S. DOT issued its own Environmental Justice order in 1997, which states that the DOT will continuously monitor its programs, policies, and activities to ensure that disproportionately high and adverse effects on minority and low-income populations are avoided, minimized or mitigated.

As stated earlier, TEA-21 clarified and SAFETEA-LU extended the Environmental Justice expectations regarding data collection, analyses, and public involvement processes. Historically, concerns regarding compliance with Environmental Justice regulations have most often been raised during project development; however, these regulations are also in effect in relation to the planning process and products of the planning process. With regard to processes and analyses, the forthcoming Final Rule on Statewide and Metropolitan Planning, as well as subsequent documents, are expected to contain guidance on procedural and analytical methodologies for assuring compliance with Title VI and the Executive Order.

MDOT plans to develop an Environmental Justice program based on six principles:

- Equity;
- Scope;
- Flexibility;
- Meaningful public participation;
- Rigorous analysis; and
- Appropriate mitigation.

Freight Movement Issues

As noted earlier, freight movement issues became more prominent under TEA-21, and this continues in SAFETEA-LU, as shown through its presence in the planning factors. The growing emphasis on intermodalism has resulted in a stronger freight planning environment. Particularly in Mississippi, the freight movements and connections between water, rail, and highway have an enormous impact on the entire transportation system. SAFETEA-LU recognizes the growing importance of freight movement.

Innovative Finance Options

For state DOTs, there is never enough money. The growth in transportation needs continues to outpace the growth in resources available to address these needs. Traditionally, states have paid for major projects using state, federal, and local monies on a "pay-as-you-go" basis. This incremental approach usually requires large projects to be built in phases over a number of years. Over time, major projects can be delayed for long periods of time until funding becomes available, and the cost of partially-completed projects continues to increase due to inflation.

Innovative finance is a term used to describe strategies and mechanisms to supplement traditional sources of funding, with the overall goal of implementing projects more efficiently. A wide variety of innovative finance tools can be categorized as follows:

- New or nontraditional sources of revenue;
- New financing mechanisms designed to leverage resources;
- New funds management techniques; and
- New institutional arrangements.

The U.S. DOT is cognizant of the funding constraints that impact the states, and are thus supportive of the concept of innovative finance. A number of specific innovative finance techniques have been enabled by legislation.

Management and Operations

SAFETEA-LU emphasized the importance of system management and operations through its inclusion as one of the eight planning factors (*Promote efficient system management and operation*). In this era of scarce resources, it is critical to ensure that funds are applied in the most cost-effective manner possible, and efficient system management ensures that monies are allocated based on benefits and needs. Tools such as pavement and bridge management systems are examples of mechanisms which, if used properly, can help ensure that resources are properly allocated.

Renewed Emphasis on Safety

The growth in the use of our transportation systems is far outpacing the growth in transportation infrastructure, resulting in an increase in potential conflicts. The growth in travel has resulted in a renewed emphasis on safety. SAFETEA-LU includes safety as one of the eight planning factors (*Increase the safety of the transportation system for motorized and nonmotorized users*). The intended outcome of the inclusion of safety as a planning factor is an emphasis on safety in transportation plans, programs, and projects, which will ultimately lead to safer transportation systems.

Security

It is clear the events of 9/11 have changed the nation and security for all modes of transportation must be evaluated on a continual basis. In August 2005, President Bush signed into law the Safe, Accountable, Flexible, Efficient Transportation Act: a Legacy for Users (SAFETEA-LU) reauthorizing federal surface transportation programs through 2009. SAFETEA-LU added a provision to evaluate transportation security issues. Security is no longer only an operational consideration, but needs to be incorporated into the long-range surface transportation planning process. MDOT and MPOs throughout the state must play a critical role in conducting vulnerability analyses, establishing a mechanism encouraging communications between related parties, supporting the development of emergency response plans and using ITS for surveillance and control.

In this context, MDOT has integrated the following security provisions on a statewide basis:

- Trucking Security Program (TSP) - The TSP uses available resources by training trucking and highway professionals to be more aware of their surroundings, to learn what homeland security related information is pertinent to report and to whom. It provides a resource network and an analysis center, both of which link trucking professionals efficiently and effectively to appropriate federal, state, local, tribal, and regional law enforcement professionals, and enables them to share information to combat terrorist activity and resolve security concerns.

- Mississippi State University was selected to establish and manage the national Highway Watch Program's Emergency Planning and Education Center (EPE). The EPE Center conducts exercises with the highway industry's leading companies and organizations to assess readiness and capabilities, and to assist the sector in developing response plans for terrorist attacks and significant national emergencies. The EPE Center also has developed training programs to help executives, operations managers, and line employees understand their roles in the evolving national plan for responding to emergencies of this nature.

- Mississippi was among the first Southeastern states to enlist in Highway Watch. With the Mississippi Trucking Association in the lead, the state's transportation sector, which includes bus companies, school bus operators, transportation workers, and state and local police officers, are involved in this security program.

- MDOT is actively coordinating with Louisiana Department of Transportation and Development (LDOTD) and Arkansas State Highway and Transportation Department (AHTD) on bridge security. Due to this coordination, CCTV cameras are positioned on major bridge crossings and they are monitored by trained DOT staff.

- Under the direction of the Department of Homeland Security, Mississippi is participating in the National Incident Management System (NIMS). The NIMS is the Nation's first standardized management approach that unifies federal, state, and local levels of government for incident response. Numerous MDOT staff have been trained through this program and additional staff will participate in future training classes.

- MDOT has increased the number of commercial vehicle inspections at ports and weigh stations.

- As part of the national effort to protect the nation from radiological and nuclear threats, MDOT is participating in efforts outlined by the Domestic Nuclear Detection Office (DNDO). The DNDO mission addresses a broad spectrum of radiological and nuclear protective measures, but is focused directly on nuclear detection. MDOT has installed nuclear detection devices, which are used at ports, weigh stations and border crossings.

- In the event of a national disaster, MDOT has established hurricane evacuation routes and guidelines that provide important information for coastal residents during an evacuation. These policies and procedures can also be implemented for other non-hurricane disasters. MDOT policies and procedures include: alternative evacuation routes, Interstate contraflow plans and traffic control plans in Hattiesburg.

MDOT will continue to be on the forefront of security issues as it relates to surface transportation. As projects are identified at the local level, MDOT will coordinate with MPOs and other local planning agencies to incorporate security enhancing projects into the State Transportation Improvement Program (STIP).

Impacts of Technology (e.g. ITS)

As stated earlier, ITS is addressed in SAFETEA-LU. ITS strategies have proven to be cost-effective investments for transportation system improvements, and will continue to become more prominent in transportation plans, programs, and projects. In Mississippi, ITS has the potential to be particularly effective in improving freight operations.

SUMMARY OF PLANNING ISSUES

A number of issues have begun to emerge recently in statewide transportation planning practices. While long considered, and with some specifically addressed in SAFETEA-LU, many planning issues have become more prominent. These issues include the following:

- Performance-based planning
- Land use considerations
- Planning and NEPA linkages
- Environmental Justice
- Air quality issues
- Freight movement issues
- Innovative finance options
- Management and operations
- Safety
- Impacts of technology

While each of these issues is a significant component of the MULTIPLAN, performance-based planning is one that has taken on increased importance within state DOT's throughout the nation. The primary reasons for the increased focus can be summarized as follows:

- Accountability
- Efficiency
- Effectiveness
- Communications
- Clarity
- Improvement over time

The lessons learned from state DOTs and other entities have been integrated throughout the MULTIPLAN to address not only performance-based planning issues, but also each of the most prominent issues emerging nationally in transportation planning. Further, the lessons learned from the best practices analyses have been applied to the MULTIPLAN in such a manner that the specific needs of Mississippi are addressed.

MISSISSIPPI STATEWIDE MODEL

The statewide model is capable of producing reliable and timely passenger vehicle and freight traffic forecast for the non-urban portion of Mississippi's highway transportation system. It is a tool to support highway planning and investment decisions, to permit a consistent methodology in project evaluations, and to develop a better understanding of changes occurring in the statewide travel demand that may be related to larger national trends.

The Mississippi Statewide Model (MSSTM) uses a traditional three steps trip-based modeling approach consisting of trip production, trip distribution and trip assignment. Each of these steps is described briefly in the following sections and in more details in the Mississippi Statewide Model Methodology Report.

NETWORK AND TRAFFIC ANALYSIS ZONES

To make the MSSTM sensitive to changes in interstate auto and truck travel patterns affecting Mississippi, the network and zone system was extended well beyond Mississippi to cover the continental United States. However, for both accuracy and practicability, the network and zone system is very detailed within Mississippi and becomes much less detailed as the distance from Mississippi increases.

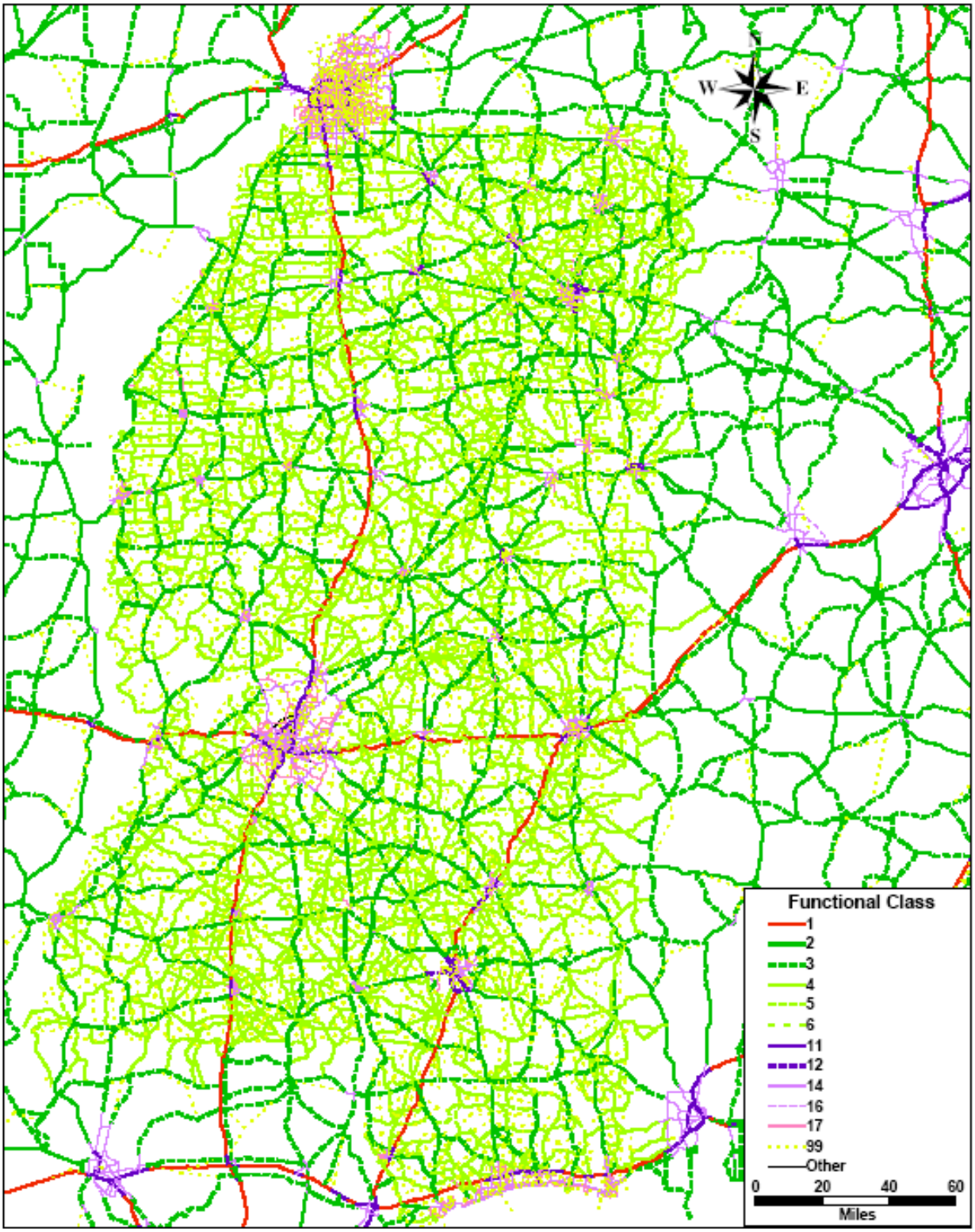
Network Coverage

The roadway coverage for Mississippi was developed from the TMIS network. In the rural areas interstate, arterial and collector roadways were included. They were supplemented with roads to provide connection or access to some of the TAZs. In the urban areas, the network mostly included roads that are extensions of the rural network or roads that provide the necessary connectivity between TAZs. In total, the roadway network inside Mississippi includes approximately 23,500 miles as shown in **Table 1-15**. **Figure 1-22** displays the MSSTM network within Mississippi.

Table 1-15: MSSTM Network Summary in Mississippi

Functional Class		Miles	Percent
RURAL			
	Interstate	487	2.1%
	Major Arterial	1,996	8.5%
	Minor Arterial	3,871	16.5%
	Major Collector	11,406	48.5%
	Minor Collector	2,211	9.4%
	Local	135	0.6%
Total Rural		**20,106**	**85.5%**
URBAN			
	Interstate	195	0.8%
	Other Freeways	74	0.3%
	Other Major Arterial	852	3.6%
	Minor Arterial	874	3.7%
	Collector	1,393	5.9%
	Local	19	0.1%
Total Urban		**3,407**	**14.5%**
TOTAL MILES		**23,513**	**100.0%**

Figure 1-22: MSSTM Network in Mississippi



Outside Mississippi, the network coverage was structured to be dense in areas surrounding Mississippi to help capture local trips crossing state lines and to connect with the more detailed Mississippi network. The areas of dense network correspond roughly to the counties in the states surrounding Mississippi. In addition, the Memphis MPO TAZ and highway systems were incorporated into the MSSTM and a more detailed network was required to support it. Outside of this ring of highways, only interstates were included in the network.

Network Attributes

The portion of the statewide network corresponding to the State System where the Linear Referencing System (LRS) was coded contains all data items from the Roadway Characteristic file. All other links in Mississippi only have the attributes contained in the TMIS file. Links outside Mississippi have attributes from the National Highway Planning Network. In addition, highway links in the three Mississippi urban areas of Jackson, Gulfport and Hattiesburg, as well as Shelby County TN, have attributes from the respective urban models. While the information from all these various sources was included, it was necessary to normalize some of the information to a common set of characteristics to properly run the MSSTM. The most important data items for modelling purposes were: functional class, free flow speed and capacity.

Traffic Analysis Zones

The TAZ system within Mississippi was developed to complement the level of detail of the model network, while at the same time permitting easy connection with Census data. There are a total of 3,305 zones within Mississippi in the MSSTM. Among them 640 zones are within one of the four Mississippi MSA: Jackson, Gulfport, Hattiesburg and DeSoto county (part of the Memphis MSA).

To be consistent with the network, the external zone system has two layers. The first layer includes the states surrounding Mississippi. Within this buffer, TAZs are equivalent to counties. The second layer extended to the remaining continental United States. It utilizes the Bureau of Economic Analysis (BEA) zones.

Shelby County in Tennessee which includes most of the Memphis urban area was treated differently. The then current Memphis MPO model zone system and network for Shelby County was incorporated into the MSSTM. The zonal socio-economic data were also obtained and merged into the MSSTM.

Outside Mississippi the zone system consists of 952 TAZs: 148 BEA zones, 292 county zones and 512 Shelby County zones.

Zonal Data

Beside the highway network, the most important set of data influencing where trips are coming and going is the socio-economic data by zone. The key variables used by the Mississippi Statewide Model include population, households by size and income, and employment by category. During the data review process, it was agreed to use several sources of data depending on the year and the geography (inside Mississippi versus outside Mississippi). A summary of base year and future years socio-economic data is provided in **Table 1-16**.

Table 1-16: Socio-Economic Data Summary

Socio-Economic Variable (in thousands)	Base Year 2000	Future Years				2000-2030	
		2005	2010	2020	2030	Total Growth	Annual Growth
Micro Model (Mississippi)							
Population	2,845	2,921	3,036	3,290	3,575	25.7%	0.8%
Households	1,048	1,093	1,154	1,266	1,358	29.6%	0.9%
Retail Employment	202	208	220	243	267	32.0%	0.9%
Service Employment	468	506	573	707	843	80.3%	2.0%
Total Employment	1,226	1,263	1,364	1,567	1,773	44.6%	1.2%
Macro Model (Outside MS) Memphis							
Population	897	916	942	1,001	1,071	19.4%	0.6%
Households	339	351	367	397	420	24.2%	0.7%
Retail Employment	106	104	107	113	117	10.1%	0.3%
Service Employment	202	218	243	291	339	68.0%	1.7%
Total Employment	636	655	706	806	904	42.0%	1.2%
Rest of Continental U.S.							
Population	272,354	286,192	300,241	330,634	364,340	33.8%	1.0%
Households	102,263	109,095	117,528	128,914	139,761	36.7%	1.0%
Retail Employment	26,411	27,204	28,713	31,731	34,748	31.6%	0.9%
Service Employment	51,590	56,130	62,322	74,707	87,092	68.8%	1.8%
Total Employment	159,387	167,042	179,170	203,426	227,682	42.8%	1.2%

Sources: 2000 Census Data
Dunn & Bradstreet 2000 Employment Data
Woods & Pools (2005 Publication)
Consultant Calculations

PASSENGER TRIP TABLE DEVELOPMENT

Long Distance Passenger Trips

The most comprehensive data source for characterizing the long distance travel of persons living in the United States is the 1995 American Travel Survey (ATS). The survey, sponsored by the Bureau of Transportation Statistics (BTS), was designed to fill data gaps in understanding long distance origin-destination passenger travel patterns at state and metropolitan levels. The survey reported trips that were 100 miles or more during 1995 for all purposes, all modes and all seasons throughout the country.

The survey sample of 54,120 households was designed to ensure reliable estimates of state-to-state long distance trips. The description of origin and destination of a long distance trips includes the state and, if applicable, the larger metropolitan statistical area (MSA) where the trip originated and terminated. In Mississippi only Jackson is included in the larger MSA group. The survey estimate of long distance trips was distributed to all county-to-county pairs that fit the trip description in terms of the state or MSA origin and destination and in terms of trip length. The distribution among eligible county-to-county pairs was done proportional to population, employment or a combination of the two depending on the trip purpose. Population was always used as the distribution factor for trip origins. For trip destinations, the distribution was done based on the following variables:

- Business trips based on the employment at the destination;
- Tourist trips based on the employment at the destination; and
- Other Trips based on a combination of population and employment.

A similar distribution of long distance trips from the county system to the model zone system inside Mississippi was then used and is explained in more details in the MS STM Methodology Report.

Final adjustments included:

- Transformation from annual to daily person trips;
- Transformation from 1995 to Model 2000 base Year;
- Production Attraction Round Trips to Origin Destination Two-Way Trips;
- Person Trip Table to Vehicle Trip Table; and
- Calibration Adjustments.

Table 1-17 summarizes the 2000 daily long distance person and vehicle trips for the three trip purposes.

Table 1-17: Summary of Year 2000 Daily Long Distance Trips

Long Distance Trip Purpose	LD Daily Person Trips		LD Daily Vehicle Trips	
	Intrastate	Interstate (1)	Intrastate	Interstate (1)
Business	10,330	388,216	7,432	258,811
Tourist	4,245	741,831	1,665	290,914
Other	16,455	1,235,953	8,027	546,882
Total	**31,030**	**2,366,000**	**17,123**	**1,096,607**

Note: (1) Interstate trips include all states in continental U.S.

Short Distance Passenger Trips

The short distance passenger trips include those trips that are of shorter distance (less than 100 miles). Typically these shorter trips are made on a daily basis as opposed to the long distance trips which are usually made on an occasional basis. As a result, the purposes for the model short trips are similar to those found in a typical urban travel demand model and include:

- Home Based Work (HBW):
- Home Based Other (HBO); and
- Non Home Based (NHB).

The HBO and NHB trips were developed using a traditional trip generation/trip distribution methodology typical of urban travel demand models. The trip generation for HBW was done as for HBO and NHB, except that the distribution of HBW was based on the Journey-to-Work data from the 2000 Census Transportation Plan Package (CTPP).

The source of trip generation rates for HBW, HBO and NHB trips was the 2001 National Household Travel Survey (NHTS). Approximately 26,000 households were surveyed nationwide for the NHTS. After reviewing various potential cross classifications to develop trip rates, the selected cross classification included the following four variables:

a. MSA size: for MS this includes Non MSA, MSA less than 500,000 in population, MSA size between 500,000 and three millions population (around Memphis).
b. Population density at the block group level: less or greater than 1,000 for MSAs; less than 100, between 100 and 500, and greater than 500 for Non MSA's (rural areas).
c. Household size: one person, two persons, three persons, or four and more.
d. Household income range: less than $15,000, between $15,000 and $50,000, and greater than $50,000

With these fairly detailed population categories, it is believed that the trip characteristics can be well represented with national data.

The trip attraction model for HBO and NHB trips was also developed based on the 2001 NHTS data. Using the national sample and the detailed origin trip purpose and destination trip purpose of each sample trip, it was possible to link each trip destination to a specific socio-economic data (population, total employment, retail employment, service employment) and develop linear equations by trip purpose.

Trip distribution is a procedure that links the trip productions to the trip attractions for each zone pair. The resulting output of trip distribution is a trip table containing the number of trips between every zone combination in the modeling area. For the statewide model, trip distribution for the HBO and NHB purposes followed the standard gravity model procedures.

The HBW, HBO and NHB trip tables as developed through the trip generation and trip distribution steps described above represent person trips in Production to Attraction (PA) format. The trips were then converted to Origin to Destination format and person trips converted to vehicle trips using vehicle occupancy factors by trip purpose.

Table 1-18 summarizes the 2000 daily short distance person and vehicle trips by purpose.

Table 1-18: Summary of Year 2000 Daily Short Distance Trips

Short Distance Trip Purpose	Person Trips	Vehicle Trips
HBW	1,089,076	990,069
HBO	4,988,227	3,023,168
NHB	3,152,236	2,020,664

BASE YEAR TRUCK TRIPS

Similar to the passenger model, there are two general types of truck trips:

- The interstate and intrastate long distance truck trips; and
- The shorter local truck trips.

The main source of data for the long distance truck trips was the commodity flow data from Reebie Associates (now part of Global Insights). MDOT purchased a set of data which included:

- Commodity flow tonnages by mode and 2-digit Standard Transportation Commodity Code (STCC) either originating from or destined to Mississippi;

- Overhead (through) commodity flow tonnages by mode and 2-digit STCC for Mississippi and Tennessee; and
- Loaded and empty truck movements, including overhead movements for the same zone system.

The Reebie data were provided at the county level and had to be adjusted to fit the MSSTM zone system. Similar to the long-distance American Travel Survey data, the adjustment applied some disaggregation procedures tailored to each commodity flow.

The initial assignment of the Reebie truck trip table was compared to truck counts at a few critical locations where one would expect that the majority of trucks traveling on these segments are long distance oriented (interstate location outside urban areas and close to the State borders). As a result of this comparison, some adjustment to the Reebie truck trip table was done using an origin-destination matrix estimation (ODME) procedure. Matrix estimation is used to adjust an initial trip table (seed matrix) so that the assigned volumes match the counts selected for comparison.

The Reebie data does not include a number of truck trips. The largest category of "missing" trucks being local trucks. These were developed separately. The general approach to developing the Mississippi local truck trip table was to develop an initial local truck trip table and then to adjust it using an origin-destination matrix estimation (ODME) procedure so that the local truck assigned volumes match the residual truck counts (truck counts minus Reebie long distance truck assignment).

Table 1-19 summarizes the final truck trips for the 2000 base year. Local truck trips accounted for more than 87 percent of the total truck trips, which is similar to other statewide models.

Table 1-19: Summary of Year 2000 Daily Truck Trips

Truck Type	Truck Trips	Percentage
Long Distane Trucks	77,801	12.6%
Intrastate	12,554	2.0%
Interstate	65,247	10.6%
Local Trucks	538,386	87.4%
Total	**616,187**	**100.0%**

TRAFFIC ASSIGNMENT AND MODEL RESULTS

After all the trip table components were developed and adjusted, autos and trucks were assigned independently in the MSSTM. Truck were assigned first using a Stochastic User Equilibrium procedure, but with very large capacity based on the assumption that trucks often travel through congested areas at off-peak times and that most trucks are not familiar with many alternative paths. Once the trucks were assigned, the assigned volumes were used as preloaded values before assigning autos. Autos were then assigned using the SUE procedure, but with actual capacities as calculated for each link.

The forecasting accuracy of the statewide model focuses primarily on the rural highway system for both auto and truck traffic. Within the rural highway system, the model should have

increased accuracy as functional class increases from collector to arterial and interstate. **Table 1-20** shows overall traffic validation results by functional classes.

Table 1-20: Validation Results – VMT Comparison by Rural Functional Class

Functional Class	Total Miles	Links with Traffic Count			Vehicle Miles of Travel (VMT)			Average Traffic	
		Number	Miles	% Total	Counted	Modeled	% Difference	Counted	Modeled
Arterial System									
Interstate	486	58	130	26.7%	2,661,431	2,665,427	0.2%	20,979	21,136
Major Arterial	1,929	302	547	28.4%	3,935,888	3,942,567	0.2%	7,978	7,924
Minor Arterial	3,870	618	1,146	29.6%	3,093,618	3,217,159	4.0%	3,119	3,221
Total Arterial	**6,285**	**978**	**1,823**	**29.0%**	**9,690,937**	**9,825,153**	**1.4%**	**5,679**	**5,736**
Non-Arterial System									
Major Collector	11,368	725	1,245	11.0%	1,746,351	1,490,842	-14.6%	1,816	1,590
Minor Collector	2,205	28	39	1.8%	14,671	15,692	7.0%	743	761
Local	134	19	15	11.2%	7,843	12,760	62.7%	1,055	1,199
Total Non-Arterial	**13,707**	**772**	**1,299**	**9.5%**	**1,768,865**	**1,519,294**	**-14.1%**	**1,758**	**1,550**
Total	**19,992**	**1,750**	**3,122**	**15.6%**	**11,459,802**	**11,344,447**	**-1.0%**	**3,949**	**3,890**

The model does very well in replicating statewide VMT for the rural arterial system with about 1% difference. For the non arterial system, the model under predicts the VMT by 14%, which is due in part to the scale of the zone system.

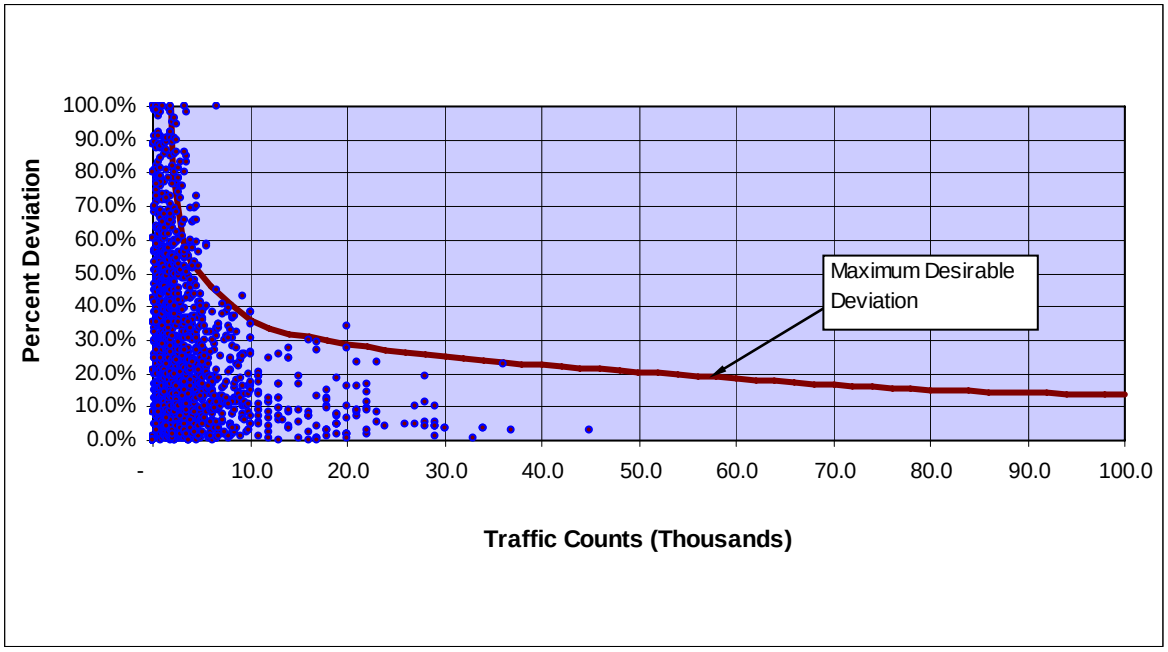
An additional validation standard for network assignment results is the maximum allowable deviation from the observed traffic counts. The figure below shows this approach where those highway links with the highest volumes are expected to have a lower percent deviation from the observed data than those of lower volume. The Mississippi Statewide model performed well with all but a few observations lying below the target curve, as shown in **Figure 1-23**.

FORECASTING PROCEDURES

The previous sections described the development and validation of the base year statewide model. However, the primary purpose and function of the model is to forecast future auto and truck traffic on some assumed Mississippi statewide highway system, existing or proposed.

The MSSTM uses a number of different techniques to forecast how travel demand will change in the future depending on the travel type/purpose. A brief summary of the methodologies used for each market is presented below. However, county level forecast growth in households and/or employment produced by Woods & Poole (W&P) is used to drive the travel forecasts for all markets. W&P data is reported for both the base year 2000 and forecasted for future year from 2005 to 2030. This includes data for population, households, household income and several employment types. Table 1-16, presented earlier, summarizes the forecast for some key socio-economic variables driving the travel forecast.

Figure 1-23: Percent Deviation for Rural Links with Counts



Future Long Distance Auto Trips

Since the base year trip table for the long distance passenger trips was developed from survey data rather than a gravity model, the forecast for these trips was based on the base year trip table. Growth factors for each origin zone and each destination zone were developed based on the socio-economic forecast for each zone. Depending on the trip purpose different socio-economic variables were used. A “Fratar” procedure was then used to estimate the future trip table. This iterative procedure adjusted the base year trip table until the total trips from and to each zone matched the control totals provided for the future year.

Future Short Distance Auto Trips

Like the long distance auto trips, the base year HBW trip table was developed based on various data, some of which were only available in the base year (2000 Census JTW data). So, the forecast for this category of trips was based on the base year trip table and a “Fratar” procedure to grow the base year to a future year. For HBW, the socio-economic data used for growing the base year trip table included the change in number of households at the production zone and the change in total employment at the attraction zone.
The base year trip tables for HBO and NHB trip purposes were obtained by applying the gravity model. The future trip tables were estimated using the same models and the future year socio-economic data at the zone level.

Future Truck Trips

The long distance truck trip tables were developed from the Reebie data and the local truck trip tables were developed using a matrix estimation procedure, which adjusted trips so that assigned volumes matched observed volume. The same methodology cannot be applied to

forecast future year truck trip tables as some of the data, such as traffic counts, are not available for future years. Instead, future year truck trip tables were forecast by applying the same “Fratar” procedure as for auto long distance trips, but using different variables to “grow” total truck trips originating or terminating at each zone.

For the long distance truck trips, the “Fratar” procedure was applied separately for each commodity flow (2 digits STCC) using the relevant socio-economic variables to grow the number of trucks at each origin zone and each destination zone. The growth in truck traffic also took into account productivity factors.

For local truck trips, the growth factors for each zone were calculated using the same combination of population and employment as was used to develop the local truck seed matrix from the Quick Response Freight Manual.