

Florida's Mobility Performance Measures Program

*A summary of the development and current implementation of
mobility performance measures in Florida.*

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Florida Department of Transportation
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Why Does Florida Need Mobility Performance Measures?

Citizens, elected officials, policy makers and transportation professionals in Florida are seeking new ways of measuring the performance of the transportation system to answer the following questions:

- How do we improve transportation to serve people and commerce in Florida?
- What are we getting back from our investment in transportation?
- Are we investing in transportation as efficiently as possible?

Mobility performance measures are needed to answer these questions and to track performance over time. They also provide accountability and link strategic planning to resource allocation. By defining specific measures, the Florida Department of Transportation (Department) is able to measure the effectiveness of programs in meeting Department objectives.

We measure ourselves for two reasons - to make sure we are spending the taxpayers' money as efficiently as possible and to try to improve how we provide transportation to the people of Florida.

Tom Barry
Secretary of Transportation

Performance measures are becoming an important part of the way government works in Florida, and the Department of Transportation is helping to lead the way in this process.

*The Department will provide a **SAFE** transportation system that ensures the **MOBILITY** of people and goods, enhances **ECONOMIC PROSPERITY** and **PRESERVES** the quality of our environment and communities.*

Mission Statement
Florida Department of Transportation

What Are The Mobility Performance Measures Based On?

Florida's mobility performance measures are tied to the goals and objectives established in the 2020 Florida Transportation Plan. The plan establishes four goals: safety, system preservation and management, economic competitiveness, and quality of life.

Following a review of national research, Florida's Mobility Performance Measures Program is based on several principles:

- The process is policy-driven and is supported by data.
- The measures reflect the users' experience on the system.
- The measures address multimodal considerations.
- The results are understandable to the general public.
- The results from the mobility performance measures can be forecast into the future.

Which Mobility Performance Measures Are Used In Florida?

Mobility is defined as *"the ease with which people and goods move throughout their community, state and world."*

Florida's mobility performance measures describe the following dimensions of mobility:

- Quantity of travel - Reflects the magnitude of the use of a facility or service.
- Quality of travel - Describes travel conditions and the effects of congestion.
- Accessibility - Describes the ease with which people can connect to the multimodal transportation system.
- Utilization - Indicates whether or not a transportation system is properly sized and has the ability to accommodate growth.

Table 1 illustrates the mobility performance measures for highways within each of these dimensions.

The Department is currently working with local transit authorities in Florida to collect mobility performance measures. These measures are summarized in Table 2.

Table 1. Mobility Performance Measures for Highways

Dimension of Mobility	Mobility Performance Measures					Definitions ¹
		State Highway System	Florida Intrastate Highway System	Florida Intrastate Highway System Corridors	Metropolitan Highway Systems	
Quantity of Travel	Person miles traveled	●	●	●	●	AADT * length * vehicle occupancy
	Truck miles traveled	●	●	●	●	AADT * length * % trucks
	Vehicle miles traveled	●	●	●	●	AADT * length
	Person trips				●	Total person trips
Quality of Travel	Average speed	●	●	●		Average speed ² weighted by PMT
	Delay	●	●	●	●	Average delay
	Average travel time			●		Distance / speed ²
	Average trip time				●	Door to door trip travel time
	Reliability			●	●	% of travel times that are acceptable
	Maneuverability			●		Vehicles per hour per lane
Accessibility	Connectivity to intermodal facilities	●	●	●	●	% within 5 miles (1 mile for metropolitan)
	Dwelling unit proximity		●	●	●	% within 5 miles (1 mile for metropolitan)
	Employment proximity		●	●	●	% within 5 miles (1 mile for metropolitan)
	Industrial/warehouse facility proximity		●			% within 5 miles
	% miles bicycle accommodations	●			●	% miles with bike lane/shoulder coverage
	% miles pedestrian accommodations	●			●	% miles with sidewalk coverage
Utilization	% system heavily congested	●	●	●	●	% miles at LOS E or F
	% travel heavily congested	●	●	●	●	% daily VMT at LOS E or F
	Vehicles per lane mile	●	●	●	●	AADT * length / lane miles
	Duration of congestion	●	●	●	●	Lane-mile-hours at LOS E or F

¹ Definitions shown are generally for daily analysis. Calculations for the peak are based on prevailing conditions during the typical weekday 5:00 to 6:00 PM peak.

² Speed based on models using the HCM or field data.

AADT - annual average daily traffic
 PMT - person miles traveled
 VMT - vehicle miles traveled
 LOS - level of service
 HCM - Highway Capacity Manual

Table 2. Mobility Performance Measures for Metropolitan Transit Systems

	Mobility Performance Measure	Definition
Quantity of Travel	Ridership	Total passenger trips
Quality of Travel	Auto / Transit Travel Time Ratio	Door-to-door trip time
	Reliability	On-time performance
Accessibility	Coverage	% person minutes served
	Frequency	Buses per hour
	Span	Hours of service per day
Utilization	Load Factor	% seats occupied

How Are The Mobility Performance Measures Reported?

Mobility performance measures are reported for combinations of systems, time periods and area types.

Systems for Reporting

For the purpose of this report, mobility performance measures are reported for the following systems: State Highway System, the Florida Intrastate Highway System, corridors and metropolitan systems.

State Highway System

- Approximately 12,000 centerline miles of roads and highways.
- The State Highway System is 10 percent of Florida's public roads, but carries 66 percent of all traffic.

Florida Intrastate Highway System

- Comprises 3,778 miles of existing roadways, including: Interstate highways, Florida's Turnpike and selected urban expressways and major regional arterial highways.
- Priority subset of the State Highway System designed to serve high speed and high volume traffic movements within the state.

Figure 1 shows the State Highway System and the Florida Intrastate Highway System.

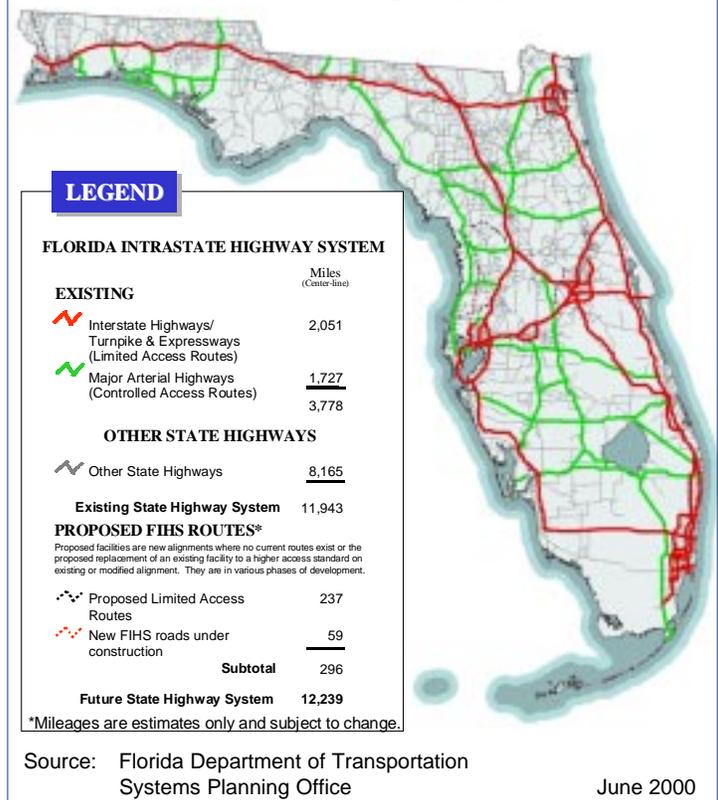
Corridors

- As defined for the purpose of this report, corridors are shorter segments of the Florida Intrastate Highway System with lengths ranging from 2 to 30 miles located in or near urbanized areas.
- Corridors enable the breakdown of specific segments for detailed analysis in order to identify problems and evaluate solutions.

Metropolitan Transportation Systems

- There are 25 urbanized areas in Florida, with a population of at least 50,000 each. Nearly 80 percent of Florida's people live in an urbanized area.
- Transportation systems in urbanized areas are of interest due to the intensity of population and demands for mobility that occur there.
- Mobility performance measures are reported for both highways and transit systems within urbanized areas.

Figure 1. Florida's State Highway System and Florida Intrastate Highway System (FIHS)



Time Periods for Reporting

Two time periods are used in reporting mobility performance measures: peak hour and daily.

Peak Hour

- The peak hour is the hour during which the greatest amount of travel occurs on a typical weekday.
- This hour was established to be 5:00 to 6:00 PM following a review of data from the Department's Telemetered Traffic Monitoring Site (TTMS) program.

Daily

- The reporting period is defined as an average typical day throughout the year.

Area Types for Reporting

For the purposes of this report, Florida is divided into specific geographic areas based on the size of the population: the seven largest urbanized counties, other urbanized areas and other areas.

Seven Largest Urbanized Counties

- Florida has seven counties with populations in excess of 500,000: Dade, Broward, Palm Beach, Pinellas, Hillsborough, Orange and Duval.
- These counties contain 53 percent of Florida's population.

Other Urbanized Areas

- The Bureau of Census considers areas with populations greater than 50,000 and high population densities to be urbanized.
- These areas are often on the fringe of the seven largest urbanized counties and are typically where mobility trends are changing the most rapidly.

Other Areas

- Other areas include urban areas (5,000 to 50,000 in population), urban places or communities (up to 5,000 in population) and rural areas.
- Land use and the demand for mobility are less intense in these areas.

How Are The Mobility Performance Measures Determined?

Estimation of mobility performance measures is based on a combination of measured (field data) and modeled results.

Data Sources

- Most of the data can be obtained from existing data collection systems such as the Department's Roadway Characteristics Inventory (RCI) and Traffic Characteristics Inventory (TCI).
- Average vehicle occupancy data were obtained from the 1990 National Personal Transportation Survey (NPTS).
- Transit system data were collected by local transit authorities.
- Proximity data for the accessibility performance measures were obtained from a land use database.
- In some cases (such as reliability), special data collection studies are required.
- Florida is moving towards incorporating data collected through Intelligent Transportation Systems (ITS) in its estimation of mobility performance measures.

Modeling Approach

- Models were developed for this effort based on the principles of the Transportation Research Board's Highway Capacity Manual (HCM) and default values developed for the Department's Level of Service (LOS) Handbook.
- The models are designed to provide data at the statewide level rather than at the local level.
- The models do not account for all of the details of traffic conditions resulting in possible underestimation of congestion. However, the models allow for estimation of statewide mobility trends.

What Are The Mobility Trends On Florida's Highways?

The following summarizes the mobility trends for the State Highway System and the Florida Intrastate Highway System. Within each of these systems, mobility performance measure trends are summarized for each of the dimensions of mobility: quantity of travel, quality of travel, accessibility and utilization. The analysis of corridor and metropolitan highway systems is still in progress.

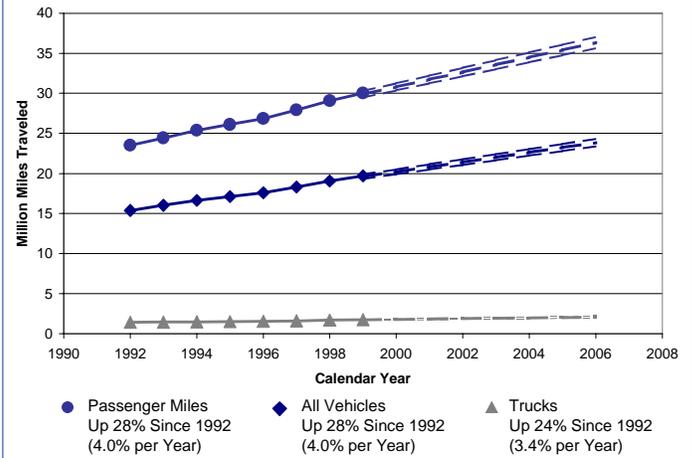
State Highway System

Quantity of Travel

Peak Hour

Figure 2 summarizes the trends of person miles traveled, truck miles traveled and vehicle miles traveled during the peak hour on the State Highway System from 1992 to 1999.

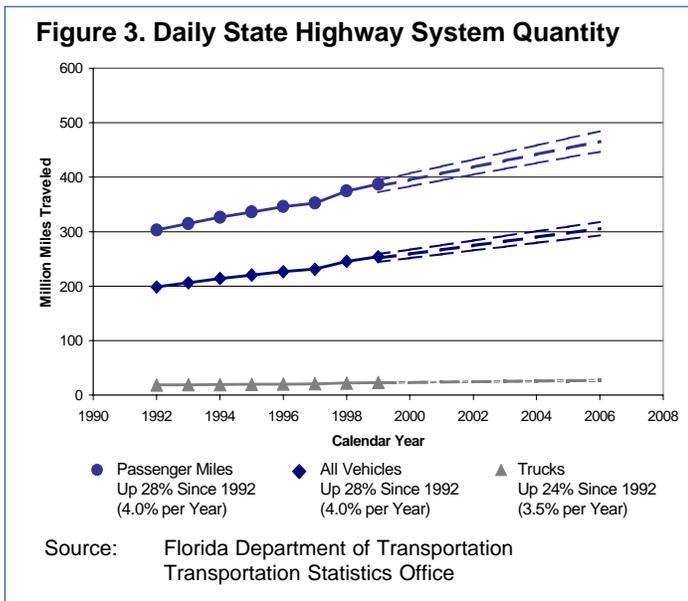
Figure 2. Peak State Highway System Quantity



Source: Florida Department of Transportation
Transportation Statistics Office

Daily

Figure 3 summarizes the average daily trends of person miles traveled, truck miles traveled and vehicle miles traveled on the State Highway System from 1992 to 1999.



Quality of Travel

The following trends for quality of travel on the State Highway System have been observed:

- Average speeds for the entire State Highway System remained relatively steady at around 48 mph during the peak hour throughout the 1990s.
- Delay on the State Highway System increased 21 percent from 1992 to 1999, an average increase of 3 percent per year.

Accessibility

The following characterize the accessibility provided by the State Highway System:

- 100 percent of the significant intermodal facilities in Florida are located within 5 miles of a State Highway System facility.
- 68 percent of the eligible¹ miles of the State Highway System provide accommodations for bicycles.
- 23 percent of the eligible¹ miles of the State Highway System provide accommodations for pedestrians.

¹ Eligible miles do not include Interstates, Turnpikes or Expressways (limited-access facilities) where bicycle and pedestrian travel are prohibited.

Utilization

The following trends for utilization of the State Highway System have been observed:

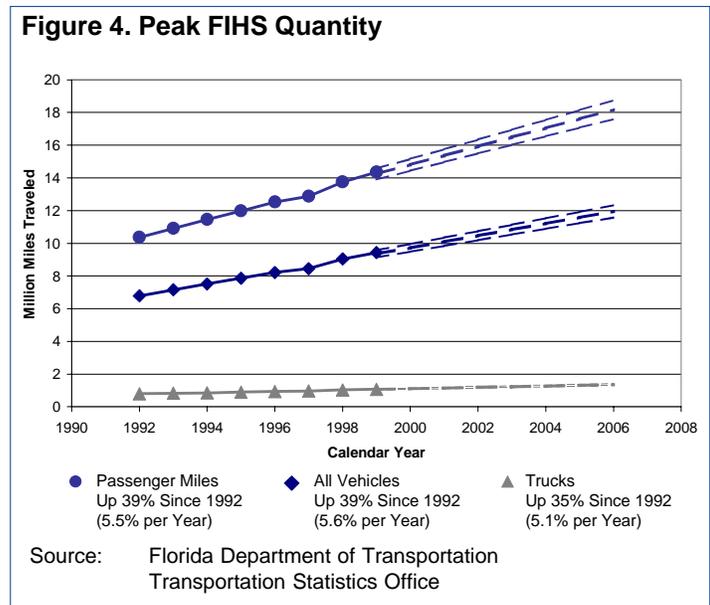
- The percentage of the State Highway System that is heavily congested (levels of service E or F) during the peak hour increased from 9 percent in 1992 to 12 percent in 1999.
- The percent of heavily congested travel on the State Highway System increased from 20 percent in 1992 to 24 percent in 1999.
- Vehicles per lane mile on the State Highway System increased 21 percent from 1992 to 1999.
- Duration of congestion on the State Highway System increased 38 percent from 1992 to 1999, an average increase of 5 percent per year.

Florida Intrastate Highway System

Quantity of Travel

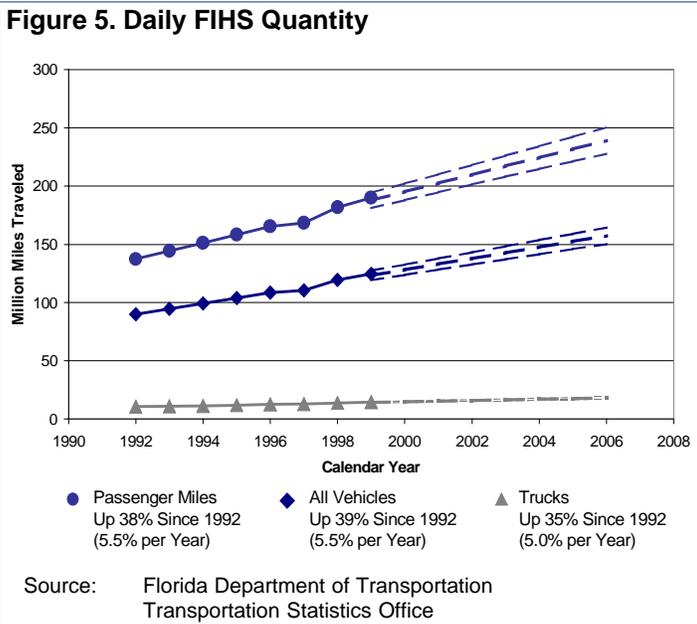
Peak Hour

Figure 4 summarizes the trends of person miles traveled, truck miles traveled, and vehicle miles traveled on the Florida Intrastate Highway System during the peak hour from 1992 to 1999.



Daily

Figure 5 summarizes the average daily trends of person miles traveled, truck miles traveled, and vehicle miles traveled on the Florida Intrastate Highway System from 1992 to 1999. In addition, the following trends have been observed:



- Travel demand increased faster on the Florida Intrastate Highway System than on the State Highway System during this period.
- Travel demand increased faster on Florida's Turnpike than on other Intrastate Highways, indicating a strong reliance on this system for both travel and goods movement.

Quality of Travel

The following trends for quality of travel on the Florida Intrastate Highway System have been observed:

- Average travel speeds for the entire Florida Intrastate Highway System remained relatively steady at around 60 mph during the peak hour throughout the 1990s.
- Interstate speeds decreased throughout this period. This indicates that the speed limit increases of the mid-1990s were more than offset by increasing traffic volumes and congestion.
- Delay on the Florida Intrastate Highway System increased 7 percent from 1992 to 1999, an average increase of 1 percent per year, demonstrating benefits from the Department's capacity improvement programs on rural highways.

- Delay within the seven largest counties along Florida Interstate Highways increased 180 percent from 1992 to 1999, an average increase of 26 percent per year.

Accessibility

The following characterize the accessibility provided by the Florida Intrastate Highway System:

- 89 percent of the significant intermodal facilities in Florida are located within 5 miles of an FIHS facility.
- Two-thirds of Florida's population and jobs are located within 5 miles of an FIHS facility.
- 80 percent of Florida's industrial and warehousing facilities are located within 5 miles of an FIHS facility.

Utilization

The following trends for utilization of the Florida Intrastate Highway System have been observed:

- The percentage of the Florida Intrastate Highway System that is heavily congested (levels of service E or F) during the peak hour increased from 6 percent in 1992 to 9 percent in 1999.
- The percent of heavily congested travel on the Florida Intrastate Highway System increased from 17 percent in 1992 to 25 percent in 1999.
- Heavily congested travel increased faster on the Interstate System than on other FIHS facilities.
- Vehicles per lane mile on the Florida Intrastate Highway System increased 31 percent from 1992 to 1999.
- Vehicles per lane mile increased faster on the Turnpike than on the other elements of the FIHS, indicating that travelers are more willing to pay tolls on Turnpike facilities to avoid congestion.
- Duration of congestion on FIHS facilities increased 83 percent from 1992 to 1999, an average of 12 percent per year.

Future Directions

Florida is continuing to refine its Mobility Performance Measures Program, and future directions include the following:

- Incorporation of person trip based measures,
- Development of dynamic display systems for the measures,
- Refinement and reporting of the reliability measure,
- Reporting of measures at the corridor level, and
- Incorporation of ITS data and analyses.



For More Information, Contact:

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