2011 Transportation MAP Report

A Snapshot of Atlanta's Transportation System Performance

Recipient of the AGA's 2010 Gold Certificate of Achievement in Service Efforts and Accomplishment Reporting

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2011 Transportation **M**etropolitan **A**tlanta **P**erformance Report

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About the Georgia Regional Transportation Authority

Who We Are

The Georgia Regional Transportation Authority (GRTA) collaboratively leads Georgia's effort to set clear expectations and specific goals for the performance of the state's transportation network. GRTA works in four major areas to improve Georgia's mobility, air quality and land use practices:

- Strategic Transportation Performance
- Today's Regional Transit
- Future Regional Transit Infrastructure
- Rural and Human Services Transportation

GRTA's Guiding Principles

- GRTA will operate as an open, accountable, efficient and effective public authority.
- GRTA will operate within a decision-making framework that values public participation.
- GRTA decisions shall be based upon fact-based analysis that provides the greatest public benefit for the resources invested.
- GRTA will work for the best interest of the region in cooperation with federal, state, regional and local partners.
- GRTA will advocate and implement a transportation system that is multi-modal, seamless, and accessible to all.

Acknowledgements

The Georgia Regional Transportation Authority acknowledges and thanks the following partner organizations which contributed to compiling the 2011 Transportation MAP (Metropolitan Atlanta Performance) Report:

- The Georgia Department of Transportation (GDOT).
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- U.S. Department of Transportation
- The Environmental Protection Division of the Georgia Department of Natural Resources
- The Atlanta Regional Commission (ARC)
- Metropolitan Atlanta Rapid Transit Authority (MARTA).

The Transportation MAP Report is updated and produced annually by GRTA.

To access this report and its appendices online, visit http://www.grta.org under the "Strategic Transportation Performance" section.

Executive Summary

The 2011 Transportation MAP Report updates the annual Transportation MAP Report, which sets performance measures for tracking the performance of the transportation system in Metropolitan Atlanta. Measures are organized in six general categories—Mobility, Transit Accessibility, Air Quality, Safety, Customer Satisfaction, and Transportation System Performance. These categories broadly align with the four statewide transportation goals—supporting economic growth and competitiveness, ensuring safety and security, maximizing the value of transportation assets, and minimizing impact on the environment.

In 2009, the state of Georgia enacted legislation reforming Georgia's transportation decision-making structure and calling for the development of the Statewide Strategic Transportation Plan (SSTP). The SSTP was established as a means to guide the state's transportation investment decisions. The first SSTP was adopted by the State Transportation Board and the Governor in 2010, establishing a new paradigm of results-based investments in public infrastructure to support economic growth.

As part of the SSTP, the Georgia Department of Transportation (GDOT) is required to issue a semi-annual Progress report to the Governor and state Legislature updating the SSTP's transportation system performance measures, evaluating the allocation of planned transportation funds, and monitoring the on-time and on-budget performance of transportation investments. Additionally, the SSTP is to be updated every two years to reflect the current transportation goals, strategies, system conditions, funding availability and regulations.

The categories identified in the Transportation MAP Report broadly align with the SSTP goals—supporting economic growth and competitiveness, ensuring safety and security, maximizing value of transportation assets, and minimizing impact on environment. In future years, this report will be incorporated into the SSTP Progress report, in order to help the state to measure the performance of metro Atlanta transportation programs within the SSTP.

Mobility

For the purposes of this report, freeway congestion is measured by the travel time index (TTI). It is the ratio of the travel time, a traveler experiences, and the free-flow travel time. In 2010, the region-wide TTI was 1.25 and 1.35 during the morning and evening peak hour, respectively. This was virtually the same as in 2009; hence congestion in the region remained at the same level.

Travel time reliability is defined as how much the travel time to make the same trip varies over the course of time. Two measures are used to determine travel time reliability—the planning time index (PTI) and the buffer time index (BTI). PTI tells a traveler how much extra time, compared to the free-flow travel time, he or she needs to plan for to make a trip so that he or she can be sure to arrive at his or her destination on time 19 times out of 20 times. BTI provides the same extra planning time compared to the average congested travel time. In 2010, both PTI and BTI increased in the afternoon compared to 2009, demonstrating that afternoon commutes have become less reliable. The reliability in the morning commutes remained basically unchanged over the same period.

Daily vehicle miles traveled per licensed driver reports how many miles the average metropolitan Atlanta driver drives each day. This measure increased slightly to 41.6 miles per driver in 2010 compared to 39.9 in 2009, interrupting a downward trend that began in 1998.

Pavement condition rating is the percentage of pavement rated better than PACES of 70, a system by which GDOT measures the quality of the roadway pavement. Although the pavement condition rating of Atlanta's roads increased to 63 in 2010 from 62 in 2009, this metrics is at a critically low level.

Transit passenger miles traveled is similar to vehicle miles traveled. In 2010, the region-wide transit passenger miles traveled decreased 940 millions from a peak of 992 millions in 2009.

Annual transit passenger boardings reports how many times in a given year individuals boarded a bus or train. These boardings declined from 169 millions in 2009 to 157 millions in 2010, a drop of seven percent.

Accessibility

This year's report introduces a new measure— average number of workers that can reach a major employment center by car in 45 minutes during the morning peak period (6:00 a.m. - 10:00 a.m.). This measure is based on a combination of modeled and observed data and applies to the 20-county Metro Atlanta region. In the 2010 base year there were 800,000 workers that could reach a major employment center by car in 45 minutes or less.

The transit revenue service hours measure reports how many hours in a given year transit vehicles (buses and train cars) were available to carry passengers. MARTA has provided a combined total of 3,291,000 revenue service hours in 2010, reversing an upward trend that started in 2007. The annual revenue service hours provided by the other transit providers in 2009 —C-TRAN, Cobb Community Transit (CCT), Douglas County Rideshare (DCR), GRTA, Gwinnett Transit, and VPSI—although lower in 2010, have increased by about 360 percent compared to the base year of 2001.

The passenger trips per transit service hour measure reports the average number of people using a transit vehicle in a revenue service hour. In 2010 the passenger trips per transit service hour—a measure of transit efficiency—decreased to 44 for MARTA and 15 for the other transit providers.

The overall number of vanpools in the region dropped to 375 in 2011 after years of impressive upward march. The vanpool decrease was due to a combination of contractual issues, transfer of vanpools between the private vanpool providers, and a price increase per vanpool seat. Still, the number of vanpool has increased by 110 percent compared to the base year of 2002.

Air Quality

The emissions measures—daily vehicle emissions of volatile organic compounds, nitrogen oxides and primary fine particulate matter released from cars and trucks—show that vehicle emissions in 2010 were 56, 50 and 54 percent of their respective year 2000 level—close to a decrease in half over ten years. These results confirm a robust trend of shrinking transportation impact on the environment.

Safety

Traffic crash fatalities measure counts how many people die in traffic crashes in metropolitan Atlanta each year. The traffic crash fatalities per 100 million vehicle miles traveled (VMT) relate these fatalities to the VMT. After the peak of 542 fatalities and 1.17 fatalities per 100 million miles in 2006, a remarkable decrease in both absolute traffic crash fatalities to 346 and the fatalities per 100 million miles to 0.70 was registered in 2010.

Pedestrian and bicyclist fatalities measure counts how many pedestrians and bicyclists die in traffic-related incidents each year. The comparative measure is the number of pedestrian and bicyclist deaths per 100,000 population. Pedestrian fatalities increased from 77 in 2006 to 86 in 2010, while the bicyclist fatalities declined from six to three during the same period.

Roadway clearance time contributes to improving safety and reducing congestion in metropolitan Atlanta. This time, at 38 minutes for tractor-trailers and 24 minutes for other vehicles in 2011, increased slightly compared to 37 and 23 minutes in 2010, respectively. Yet, roadway clearance time it is still close to the lowest levels since these records began.

Customer Satisfaction

Customer transportation satisfaction shows the percentage of Metropolitan Atlanta residents that rate a roadway service attribute as “excellent” or “good.” Satisfaction with roadway safety improved the most from 59.2 percent in 2003 to 71.6 percent in 2011. Satisfaction with roadway condition, at 65.9 percent, has the second highest rank, although it slipped from 73 percent in 2003. In contrast, Atlanta’s residents are the least satisfied with the traffic flow conditions. Still, satisfaction with traffic flow conditions improved by 5.6 points from 29.9 percent to 35.5 percent for the same period. The overall roadway customer satisfaction index increased from 54 percent in 2003 to 58.1 percent in 2011. In other words, close to 6 out of 10 Atlanta residents give an overall rating of “excellent” or “good” to roadway conditions, traffic flow, and safety combined.

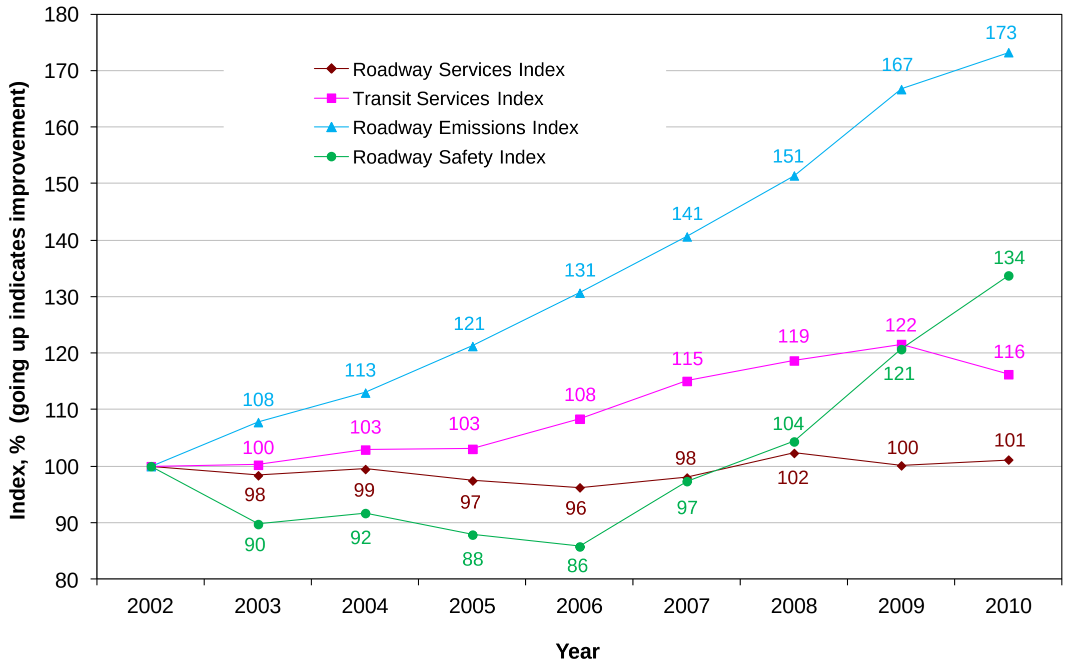
Xpress service customer satisfaction tracks the customer satisfaction of Metropolitan Atlanta residents with the GRTA *Xpress* transit service. The data come from the 2010 and 2011 *Xpress* customer satisfaction surveys conducted by GRTA. Survey respondents were asked to score 17 key service characteristics and their overall satisfaction with the transit service as Excellent, Very Good, Good, Fair, or Poor. Responses to service questions were then transformed into a Service Quality Index where a response of “Excellent” was given a score of 5 and a response of “Poor” was given a score of 1. The overall satisfaction with the GRTA *Xpress* service declined from 4.2 in 2010 to 4.02 in 2011 but still scored highest among the other transit providers— CCT and GCT.

Transportation System Performance

The Atlanta transportation performance indices synthesize in a single number the state of the roadway services, roadway safety, roadway emissions, and transit services in the Atlanta region. Each index is produced based on a number of corresponding input measures weighted by their relative importance. Each of these indices is normalized to a 100 scale for the base 2002 year. An index number of more than 100 indicates improvement over the base year.

The roadway emissions index increased again to 173 in 2010, an improvement of three quarters over the 2002 base year. The transit services index declined to 116 in 2010 but still demonstrates a 16 percent improvement since 2002 due to the expansion of the small transit providers. The roadway services index is basically flat for the period reflecting the persistent congestion problem in the region. Finally, the roadway safety improved again in 2010 for an remarkable overall jump from 86 in 2006 to 134 in 2010, thus reflecting improved safety on Atlanta's roads. Figure 1 depicts the four indices.

Figure 1: Atlanta Transportation Performance Indices



Introduction

The Transportation MAP (Metropolitan Atlanta Performance) Report was initiated in 2003 by a group of regional agencies with the objective of documenting current developments, trends, achievements and issues with Metropolitan Atlanta's transportation system. The agencies tracking the measures in this report are the U.S. Department of Transportation, GDOT, the Environmental Protection Division (EPD) of the Georgia Department of Natural Resources, ARC, GRTA, and MARTA.

This report summarizes measures grouped in six areas: Mobility, Transit Accessibility, Air Quality, Safety, Customer Satisfaction, and Transportation System Performance. The report's content is organized so that it reflects the outlined structure by functional area, with each area including a high-level summary for one or more specific performance measures. Additionally, detailed information about the freeway travel times, planning time index and buffer time index is provided in the Appendix. These measures are generally obtained for the 13-county Atlanta area consisting of Cherokee, Clayton, Cobb, Coweta, DeKalb, Douglas, Fayette, Forsyth, Fulton, Gwinnett, Henry, Paulding, and Rockdale Counties.

Base years have been set for the measures, typically 2000 or 2001. Each year, after the data is collected and certified, the agencies present a report of the region's progress in the transportation arena. New measures are developed and added to this report as they become necessary.

Over the past few decades Atlanta's population and economy have grown rapidly. The transportation system is at the heart of this success. However, underinvestment in critical transportation infrastructure, combined with shrinking resources, requires that the region optimize the use of available transportation funds to achieve the best results from operating and maintaining existing transportation assets as well as to continue expanding the system. This holistic investment process should lead to a sustainable transportation system capable of addressing traffic congestion, labor market accessibility, safety, and economic competitiveness in a global economy.

Investing in Tomorrow's Transportation Today (IT^3) started Georgia's effort to bring a results-oriented, strategic approach to transportation planning and implementation. In 2008, IT^3 built the foundation of the first ever business case for a new direction in investment in Georgia's and Atlanta's transportation networks. In 2009, the "Transforming Transportation Investment Act" updated Georgia's transportation governance structure. In 2010, the next phase of this process culminated in the first Georgia Statewide Strategic Transportation Plan, which calls for a new, objectives-driven and performance-based approach to the transportation system. In this plan the State of Georgia adopted four transportation goals which in turn are supported by ten measurable objectives. A summary of these goals and objectives is presented in Table 1 on the next page. The first SSTP Progress Report—published in June 2012, updates the SSTP's transportation system performance measures, evaluates the allocation of planned, future transportation funds using the SSTP investment guidelines, and monitors the on-time and on-budget performance of transportation investments.

Table 1: Statewide Strategic Transportation Plan Goals and Objectives

Goal	Objective
Supporting Georgia's economic growth and competitiveness	Improved access to jobs encouraging growth in private-sector employment
	Reduction in traffic congestion costs
	Improved efficiency, reliability of commutes in major metropolitan areas
	Efficiency and reliability of freight, cargo, and goods movement
	Border-to-border and interregional connectivity
	Support for local connectivity to statewide transportation network
Ensuring safety and security	Reduction in crashes resulting in injury and loss of life
Maximizing the value of Georgia's assets, getting the most out of the existing network	Optimized capital asset management
	Optimized throughput of people and goods through network assets throughout the day
Minimize impact on the environment	Reduce emissions, improve air quality statewide, limit footprint

Another major step was the adoption of the "Transportation Investment Act of 2010". This bill created the opportunity for generating new transportation resources by providing the option for twelve special districts in the State to submit a referendum to the voters for a one percent regional sales tax, the proceeds of which will go towards transportation infrastructure projects in each district. As a result of the transportation referendum on July 31, 2012, three Georgia districts approved the tax to pay for certain transportation projects:

- Central Savannah River District covering eastern Georgia including the Augusta area;
- River Valley District covering central western Georgia including the Columbus area;
- Heart of Georgia Altamaha District covering counties in south central Georgia.

The three districts are projected to collect and invest in transportation projects about 1.8 billion dollars between 2013 and 2022.

The next step in this effort is the adoption of the Governor Deal's Strategic Goals for Georgia. Its vision calls for a lean and responsive state government that allows communities, individuals and businesses to prosper. The six strategic goals are:

- Educated: Developing life-, college-, and work-ready students;
- Mobile: Transporting people and products in a 21st century Georgia;
- Growing: Creating jobs and growing businesses;
- Healthy: Accessible care and active lifestyles;
- Safe: Protecting the public's safety and security;
- Responsible and Efficient Government: Fiscally sound, principled, conservative.

The mobility, accessibility, and safety measures in Transportation MAP Report support tracking implementation of the strategic goals of mobile and safe Georgia.

How the Transportation MAP Report is Produced

Purpose and Scope

This is the eighth annual Transportation MAP Report published by GRTA. The report is posted publicly on the GRTA website www.grta.org, distributed electronically across the region and nationally, and its findings are presented before various professional and policy forums.

The data collection and publishing of the report is based on the state's fiscal year cycle beginning July 1st and ending June 30th and also includes the latest calendar year data whenever available. The purpose of this work is to document the current state of, and recent trends in Metropolitan Atlanta's transportation system performance. This report presents the performance results but does not attempt to fully analyze the reasons for those results. Moreover, the report is intended to be a high-level "snapshot" of the regional transportation system across institutional and jurisdictional boundaries, and to disseminate this information to the policy makers and citizens across the region as well as nationally.

This report is evolving over time to better align with the goals and objectives of the Georgia's Statewide Strategic Transportation Plan and to eventually support its implementation in the Atlanta region. In future years, the Transportation MAP report will be incorporated into GDOT's semi-annual SSTP Progress Report, in order to help the state to measure the performance of metro Atlanta transportation programs within the SSTP.

The scope of this report is shaped by the fact that it tracks the Metropolitan Atlanta's transportation system performance and not the performance of individual departments or jurisdictions responsible for various functional and geographical elements of this system. This more holistic approach in tracking and reporting on a transportation system, however, makes it impossible to relate system performance and outcomes to specific efforts and resources spent by any single agency or jurisdiction. Therefore, for the most part, presented results are not associated with actual expenses or resources spent. This report tracks the performance of the transportation system in six areas—Mobility, Transit Accessibility, Air Quality, Safety, Customer Satisfaction, and Transportation System Performance. The intent is to capture these different and complementing aspects in a holistic "picture" of the transportation system. The report's content is organized so that it reflects the outlined structure by functional area, with each area including a high-level summary for one or more specific performance measures. Additionally, detailed information about the freeway travel times, planning time index and buffer time index is provided in the Appendix to the report.

Goals and Objectives

A starting motivation for the Transportation MAP Report is to help implement the GRTA's mission statement and purpose by ensuring that the Atlanta region sets goals and measures progress, and expands the practice of performance-based transportation planning by creating an integrated set of performance measures. Due to this report having a regional scope, GRTA spearheads a cooperative effort with other partner agencies responsible for Atlanta's transportation system—the Federal Highway Administration, ARC, GDOT, Georgia Department of Natural Resources, and MARTA. A steering committee comprising of representatives of these agencies, the media, the Georgia Institute of Technology, and others, guides the development of this transportation performance measurement effort.

The report has a regional and cross-agency scope and as such cannot include establishing goals and objectives for Atlanta's transportation system in isolation. Such goals and objectives are an integral part of the first Statewide Strategic Transportation Plan (see Table 1 on page 4) adopted in 2010, and consequently are applicable to the Atlanta's transportation system. Hence, the Transportation MAP Report's natural direction is towards providing performance measurement aligned with the SSTP goals and objectives as well as the Governor's Strategic Goals for Georgia.

The SSTP transportation goals and objectives were developed based on a collaborative and inclusive approach, which started with the Investing in Tomorrow's Transportation Today initiative (with GRTA being instrumental in the process) in 2008 and was finalized as part of the SSTP in 2009. Synthesizing the best practices across the nation and internationally was the starting block in this process. These practices were then integrated with a "Georgia customer" perspective, addressing the needs and expectations of Georgia's citizens and businesses. This perspective was created by involving and completing interviews with the major stakeholders (commercial users, rural residents, medium-sized city residents, urban residents) and professionals across the State of Georgia.

Data Reliability

A special quality of the Transportation MAP Report is that all but two measures are based on observed or measured data (as opposed to modeled data). Information used in this report is gathered from a variety of sources deemed to be the most reliable for each specific metric. The data for the transit-related measures come from the National Transit Database. Although it is considered the best source of quality-controlled transit data, the reasonableness of this information is checked against data from the transit providers in the region. Similarly, the source of safety information is the Fatality Analysis Reporting System Encyclopedia. The rest of the information is gathered by the GRTA staff from regional sources. GDOT provides VMT, pavement condition, roadway clearance, and NaviGAtor real-time freeway information. GRTA, in conjunction with the Georgia Institute of Technology, processes the NaviGAtor data to produce freeway travel times and indices. Population data is obtained from ARC and verified against data from the U.S. Census. The number of licensed drivers is provided by the Department of Driver Services. The Georgia Environmental Protection Division is a source of air quality data. Data processing in order to obtain the measures is done by the GRTA staff. The transportation performance indices are an original work of the GRTA staff. Each of them is based on a number of related measures and synthesizes them into a single number for ease of use and presentation.

Each data element and the overall information are reviewed for reasonableness. Any data issues are discussed and resolved with the party providing this information. Special care is taken to make sure that data definitions, collection methods, and processing methodologies are the same across years. Changes in any of these elements are duly noted in the report. In the rare occasions where data points are missing or determined not be accurate, they are omitted from the respective period and a note is provided. This quality-controlled data is then subjected to the same processing procedures and measures' definitions, which ensures consistency in the measurement results and reliable historic trends.

Resources Used and Efficiency

This report tracks the performance of the Metropolitan Atlanta regional transportation system as a whole, not the performance of individual departments or jurisdictions within the region. Moreover, transportation users' behavior interacts with the characteristics of the transportation system producing outcomes and measurements that cannot, for the most part, be attributed singularly to the resources invested in or used to operate this system. Examples of such measures are the vehicle miles travelled per licensed driver, and the number of fatalities (traffic, pedestrian, bicyclists). Therefore, it is appropriate, whenever possible, to relate the system-wide performance and outcomes to the total regional capital and operating expenditures, and not to specific resources spent by any single agency or jurisdiction. This approach is applicable to the regional transit systems, taken as a whole, and their related expenditures. Figure 2 summarizes the historical transit capital and operational expenditures for the Atlanta region, which can be compared to the respective transit-oriented measures—transit passenger miles traveled, annual transit passenger boardings, transit revenue service hours, and number of vanpools. Additionally, passenger trips per transit service hour is a standalone effectiveness measure providing historical information on the effectiveness of the transit service provided by MARTA and the other transit providers.

The overall transit expenditures decreased by about nine percent in 2010 compared to their peak in 2009. This is due exclusively to a drop in capital expenditures by 34 percent while operating expenditures were about the same in an effort to maintain the current level of transit service. This indicates that transit expenditures are not sufficient to maintain the existing transit systems and fresh capital investments are necessary for these systems to meet the current and future transit needs in the Atlanta region.

Figure 2: Metropolitan Atlanta Transit Capital and Operating Expenditures

Comparisons for Assessing Performance

Comparative historical information for each measure provides the basis for assessing any positive or negative trends. Since the adoption of the first Statewide Strategic Transportation Plan in 2010 Metropolitan Atlanta transportation agencies have been working together to establish specific investment and performance targets for the region. Adopting such targets will provide an opportunity to determine whether the system's performance is meeting the region's goals.

Another way of assessing Atlanta's transportation performance is by comparing it to the performance of other regions with similar transportation systems and characteristics—Charlotte, NC; Chicago, IL; Dallas, TX; San Diego, CA; and Seattle, WA. The regional data for the daily VMT per person, travel time index, congestion cost per person, passenger miles traveled per person, passenger boardings per person, congestion cost savings per person due to operations treatments, and public transportation are for the year 2010 and come from the 2011 Urban Mobility Report. The data source for the fatality rate and pedestrian fatality rate per 100,000 population is the Traffic Safety Facts 2009.

Table 2: 2010 Atlanta and Other Regions Comparison

Urban Area	Population (thousands)	Freeway and Arterial Streets Daily VMT per Person	Travel Time Index	Annual Congestion Cost per Person	Annual Passenger Miles Travelled per Person	Annual Passenger Boardings per Person	Congestion Cost Savings per Person Due to Operations Treatments	Congestion Cost Savings per Person Due to Public Trans-portation	Fatality Rate per 100,000 Population	Pedestrian Fatality Rate per 100,000 Population
Atlanta, GA	4,304	21	1.23	$578	217	36	$28	$43	8.69	2.22
Charlotte, NC	1,052	20	1.17	$359	116	21	$16	$13	8.23	1.85
Chicago, IL	8,583	12	1.24	$956	462	72	$41	$237	5.33	1.19
Dallas, TX	5,158	21	1.23	$652	91	14	$41	$24	8.00	2.15
San Diego, CA	3,087	19	1.19	$499	180	32	$43	$44	5.82	1.53
Seattle, WA	3,237	17	1.27	$591	379	58	$50	$97	4.87	2.11

Although Atlanta has the third highest population amongst these cities, the region is also the least densely populated. This generally requires that Atlantans travel longer distances—21 miles daily per person— and contributes to the region sharing with Dallas the rank of second most congested region as measured by the travel time index of 1.23. However, Atlanta's annual congestion cost per person of $578 is below the middle of the range, with only Charlotte and San Diego ranking better. The Atlanta region has a relatively well developed transit system, which places it comfortably in the middle of the range as measured by the annual passenger miles traveled per person (217) and the passenger boardings per person (36). The beneficial effects of Atlanta's transit system are demonstrated by congestion cost savings per person of about $28 annually. Still, the Atlanta region ranks second to last here, underscoring the need to continue maintaining and expanding efficiently its transportation system. Similarly, operational treatments contribute to reducing congestion costs per Atlantan by $43 annually. Nevertheless, Atlanta lags significantly behind Chicago ($237) and Seattle ($97) in this area. Finally, there is much more to be done for improving safety where Atlanta has the highest fatality rates per 100,000 population and pedestrian fatality rate per 100,000 population.

Mobility

The mobility measures listed below track highway and transit system mobility:

- Freeway travel time index,
- Planning time index,
- Buffer time index,
- Daily vehicle miles traveled (VMT) per person or driver,
- Pavement condition rating,
- Transit passenger miles traveled, and
- Annual transit passenger boardings.

The first five measures address the ease and reliability with which an individual vehicle can travel over the roads, the distances the average person or driver drives each day, and the physical condition of the roadway. The final two measures track how far people in the region travel on public transit in a year, which is roughly analogous to annual vehicle miles traveled, and the number of trips that people make using public transit each year.

The freeways are at the heart of Atlanta's highway system. The roads that move traffic onto and off the freeway are called arterials. The amount of traffic a road is designed to handle is the road's capacity. The traffic actually on the road is its volume. The volume, capacity and travel time are used to calculate mobility measures.

Freeway Travel Time Index

Measuring congestion on the region's freeways is a difficult task that can be approached using a variety of tools. The travel time index is one measure of congestion. It summarizes the degree of congestion, in terms of travel time, that a traveler experiences compared to free-flow conditions. A TTI of 1 is a free-flow condition – typically a speed-limit ride. A TTI of more than 1 illustrates how much more time it takes to make a trip during the congested periods. For example, for I-75/I-85 northbound from I-20 to I-85, a distance of 4.4 miles, the TTI at the afternoon peak (5:00 p.m.) is 1.8. This means that at the speed limit the trip takes about 4.8 minutes, but that the congestion at 5:00 p.m. adds another 3.8 minutes to the trip (1.8 x 4.8 minutes = 8.6 minutes). A TTI number closer to 1 is better.

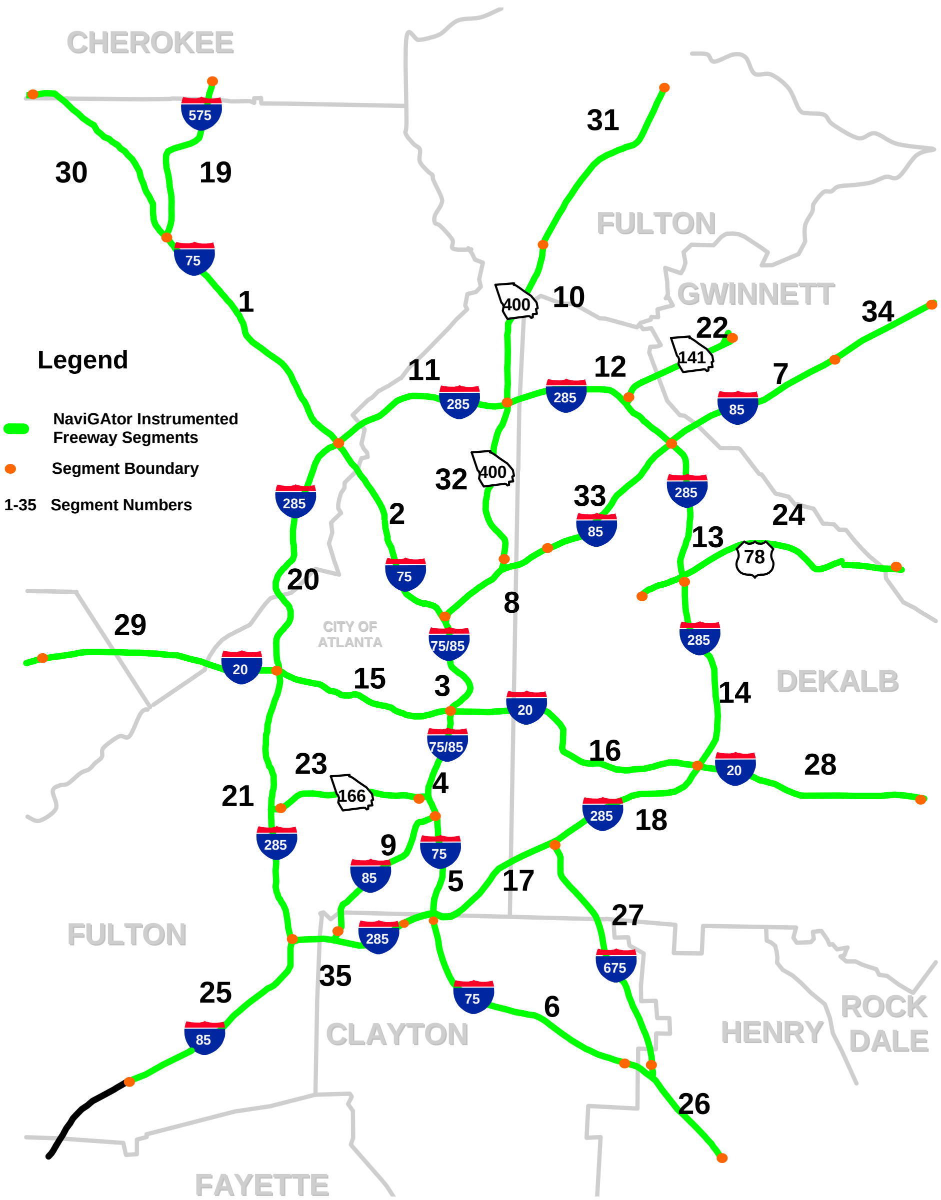
TTI is obtained as the ratio of the average travel time over the free-flow travel time to traverse a certain portion or segment of the freeway system. For this report, measurements were created using GDOT's NaviGAtor video detection cameras. The Metropolitan Atlanta freeway network covered by the Georgia NaviGAtor system is currently split into 35 bidirectional segments (segments 17 and 18 came online in 2007, segments 19 and 20 in 2008, and another 15 segments in 2009). Additionally, the NaviGAtor data stream and methodology for its aggregation changed too. The combined impact of these changes made TTI values before and after 2009 not directly comparable. Coverage is determined by the functioning NaviGAtor infrastructure across the Metropolitan Atlanta freeway system as depicted on Figure 3 on the next page.

These cameras are strategically placed to monitor speeds and volumes, with each camera taking a measurement every 20 seconds. As many as 2.6 billion measurements are taken by these cameras each year. The measurements are examined and aggregated into 15-

minute intervals for the morning peak period (6:00 a.m. to 10:00 a.m.) and evening peak period (3 p.m. to 7 p.m.) for the weekdays only. Subsequently, the freeway travel time index during the slowest region-wide one-hour morning (7:45 a.m. to 8:45 a.m.) and evening peak (5:00 p.m. to 6:00 p.m.) period is obtained for each of the 35 segments. The regional travel time index is then obtained as the weighted average of the freeway segment TTIs with VMT used as weight. In cases when a segment TTI is less than one the respective segment TTI is assumed equal to one. The higher the TTI number the worse the congestion is. Figure 4 on the next page depicts the Metropolitan Atlanta TTI for the slowest one-hour morning and afternoon peak period, respectively.

The freeway travel time index measure is the VMT-weighted average of the freeway segments' TTIs for the one-hour morning and evening peak period with the slowest regional freeway travel speed, averaged across all directional freeway segments.

Figure 3: NaviGAtor Video Detection Coverage



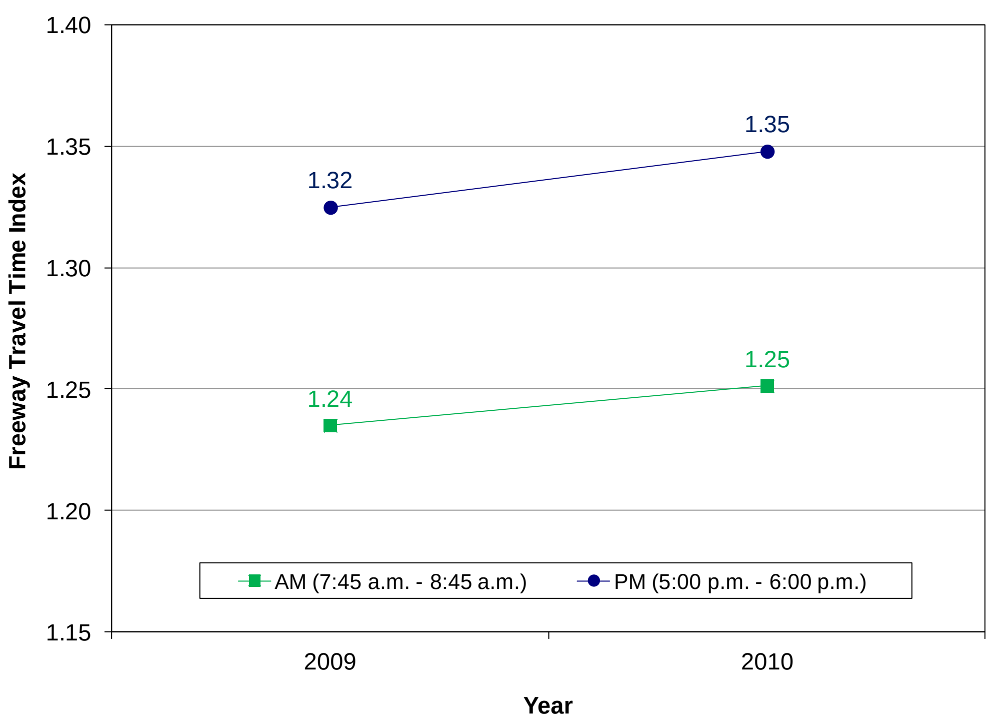
The morning peak period TTI increased slightly from 1.24 in 2009 to 1.25 in 2010. Similarly, during the afternoon peak period the average TTI worsened from 1.32 in 2009 to 1.35 in 2010.

The worst performing morning segment in 2010 was southbound GA-400 between McFarland Road to Holcomb Bridge Road, with an average TTI of 2.75. The worst performing evening segment was northbound GA-400 between Holcomb Bridge Road and McFarland Road, with TTI of 2.93. The actual travel times by freeway segment used in obtaining the regional TTI are summarized in the Appendix.[1]

It is important to recognize that the regional TTI measure is a VMT-weighted average. With speeds on some segments of the freeway network in excess of 70 mph and others at less than 30 mph, at the same time of day, the average TTI may seem low to those who regularly travel the segments with slower speeds. The freeway travel time index, by creating a weighted average TTI for the slowest one-hour periods of the day, provides a constant by which the performance of the freeway network can be compared from year to year. Additionally, the measure provides a record of the performance of individual segments of the network, thus making it easier for the region to assess the impacts on congestion of improvements or degradations to individual segments of the freeway network.

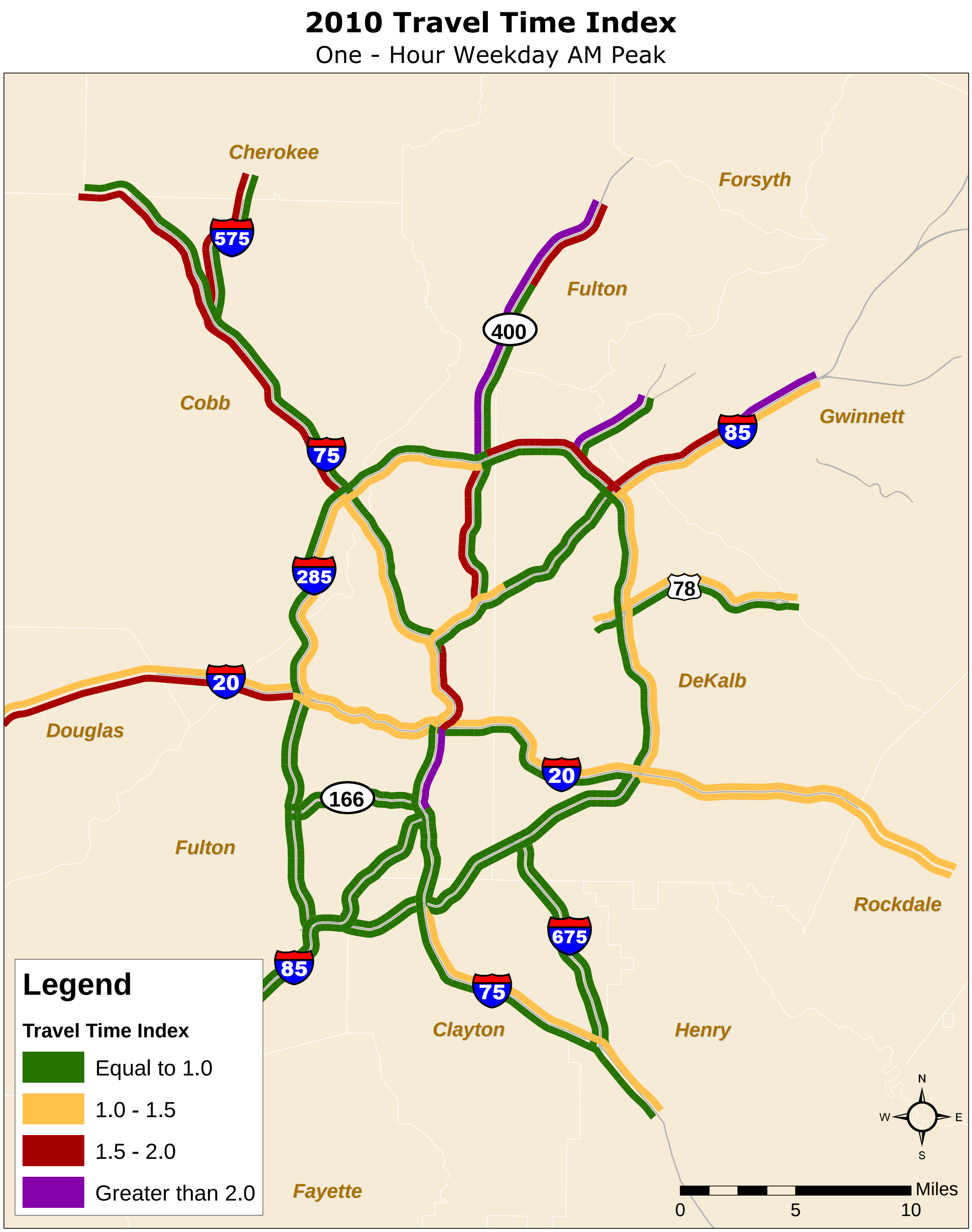
In order to put the regional TTI measure in context, the travel time index, by individual segment, is summarized in Table 3 on page 14. Additionally, the 2009 TTIs, depicted by freeway segment, are presented in Figure 5 (morning peak hour) and Figure 6 (evening peak hour) on pages 12 and 13, respectively.

Figure 4: Freeway Travel Time Index



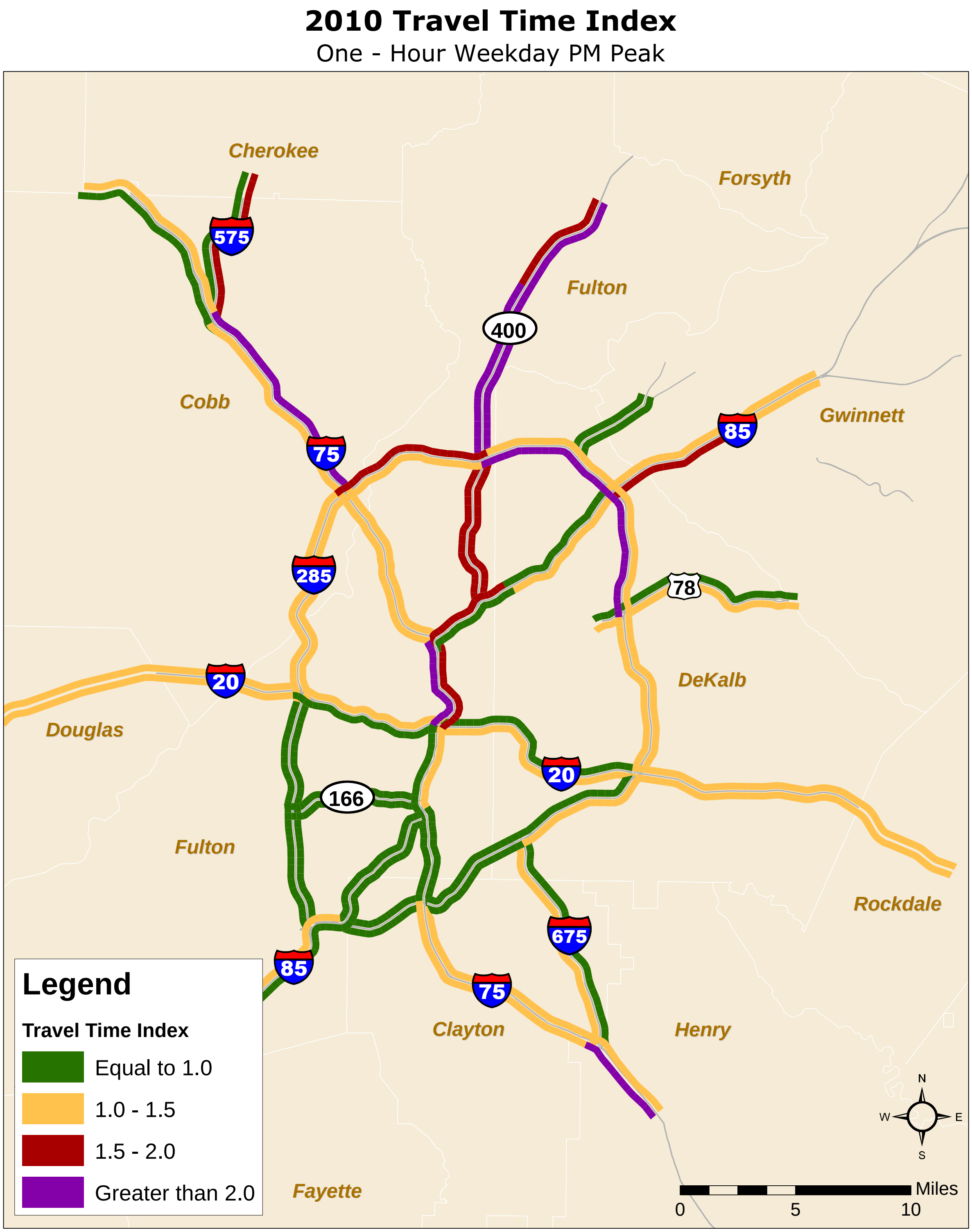
[1] The travel time graphs by freeway segment are located at http://www.grta.org/tran_map/Appendix_2011_MAP_Report.pdf, starting on page 53.

Figure 5: 2010 Travel Time Index – Morning Peak (7:45 a.m. – 8:45 a.m.)



Note: The Travel Time Index is expressed as the ratio of the average travel time in a given period and the free-flow travel time.

Figure 6: 2010 Travel Time Index – Afternoon Peak (5 p.m. – 6 p.m.)



Note: The Travel Time Index is expressed as the ratio of the average travel time in a given period and the free-flow travel time.

Table 3: 2010 Travel Time Index by Freeway Segment (Segment-Specific Peak Hour)

Freeway Segment Description	Segment Length (miles)	Morning Peak Hour	Morning Peak Hour TTI	Evening Peak Hour	Evening Peak Hour TTI
1: I-75 NB (from I-285 to I-75/I-575)	9.88	9:00	1.00	17:00	2.49
1: I-75 SB (from I-75/I-575 to I-285)	9.71	7:30	1.62	17:30	1.07
2: I-75 NB (from I-85 to I-285)	8.50	9:00	1.07	17:00	1.30
2: I-75 SB (from I-285 to I-85)	7.74	6:15	1.10	18:00	1.15
3: I-75/I-85 NB (from I-20 to I-85)	4.40	8:00	1.56	17:00	1.80
3: I-75/I-85 SB (from I-85 to I-20)	4.26	8:30	1.07	17:15	2.53
4: I-75 NB (from I-85 to I-20)	3.89	7:45	2.03	16:00	1.35
4: I-75 SB (from I-20 to I-85)	3.72	7:15	1.00	16:45	1.00
5: I-75 NB (from I-285 to I-85)	4.03	7:15	1.00	15:00	1.00
5: I-75 SB (from I-85 to I-285)	4.16	9:00	1.00	17:00	1.00
6: I-75 NB (from SR 138 to I-285)	9.91	7:15	1.17	15:00	1.05
6: I-75 SB (from I-285 to SR 138)	9.93	6:00	1.00	17:00	1.33
7: I-85 NB (from I-285 to Beaver Ruin Rd)	6.69	8:00	1.06	17:00	1.99
7: I-85 SB (from Beaver Ruin Rd to I-285)	7.01	8:00	1.57	17:15	1.10
8: I-85 NB (from I-75/I-85 to North Druid Hill Rd)	4.07	8:30	1.00	17:30	1.01
8: I-85 SB (from North Druid Hill Rd to I-75/I-85)	4.26	8:00	1.43	17:00	1.97
9: I-85 NB (from I-285 to I-75/I-85)	7.87	7:15	1.00	15:30	1.00
9: I-85 SB (from I-75/I-85 to I-285)	6.07	6:00	1.00	17:00	1.00
10: GA-400 NB (from I-285 to Holcomb Bridge Rd)	8.35	9:00	1.03	17:15	2.23
10: GA-400 SB (from Holcomb Bridge Rd to I-285)	8.08	7:30	2.28	16:45	2.08
11: I-285 EB (from I-75 to GA-400)	7.80	8:00	1.45	17:15	1.09
11: I-285 WB (from GA-400 to I-75)	7.26	9:00	1.00	17:00	1.76
12: I-285 EB (from GA-400 to I-85)	6.55	7:15	1.00	17:15	2.29
12: I-285 WB (from I-85 to GA-400)	6.39	7:45	1.59	17:00	1.24
13: I-285 NB (from US-78 to I-85)	5.69	7:45	1.45	15:30	1.01
13: I-285 SB (from I-85 to US-78)	5.82	8:15	1.00	17:00	2.36
14: I-285 NB (from I-20 to US-78)	7.96	7:45	1.47	17:30	1.04
14: I-285 SB (from US-78 to I-20)	7.40	8:30	1.00	16:45	1.21
15: I-20 EB (from I-285 to I-75/I-85)	7.35	7:45	1.04	18:00	1.00
15: I-20 WB (from I-75/I-85 to I-285)	6.54	6:00	1.05	17:00	1.14
16: I-20 EB (from I-75/I-85 to I-285)	9.81	6:00	1.00	17:00	1.10
16: I-20 WB (from I-285 to I-75/I-85)	9.41	8:00	1.07	16:45	1.00
17: I-285 NB (from I-75 to I-675)	5.66	9:00	1.00	17:15	1.00
17: I-285 SB (from I-675 to Airport Tunnel)	5.49	7:15	1.00	18:00	1.00
18: I-285 NB (from I-675 to I-20)	5.98	8:00	1.00	17:00	1.11
18: I-285 SB (from I-20 to I-567)	6.14	9:00	1.00	15:00	1.00
19: I-575 NB (from I-75/I-575 to Arnold Mill Rd)	7.17	9:00	1.00	17:00	1.52
19: I-575 SB (from Arnold Mill Rd to I-75/I-575)	7.38	7:15	1.97	17:45	1.00
20: I-285 NB (from I-20 to I-75)	9.35	8:00	1.09	17:15	1.04
20: I-285 SB (from I-75 to I-20)	10.52	8:15	1.00	17:00	1.42
21: I-285 NB (from I-85 to I-20)	10.10	7:45	1.00	17:30	1.00
21: I-285 SB (from I-20 to I-85)	9.80	9:00	1.00	17:45	1.00
22: SR 141 NB (from I-285 to Holcomb Bridge Rd)	3.71	9:00	1.00	17:15	1.00
22: SR 141 SB (from Holcomb Bridge Rd To I-285)	4.12	7:45	2.04	15:00	1.00
23: SR 166 EB (from I-285 to I-75/I-85)	5.95	9:00	1.00	17:15	1.00
23: SR 166 WB (from I-75/I-85 to I-285)	6.41	6:00	1.00	17:30	1.00
24: US 78 EB (from North Druid Hills Rd to West Park Pl)	10.00	6:00	1.00	17:30	1.04
24: US 78 WB (from West Park Pl to North Druid Hills Rd)	10.26	7:15	1.09	15:00	1.00
25: I-85 NB (from SR 74 to I-285)	7.36	7:30	1.00	17:15	1.00
25: I-85 SB (from I-285 to SR 74)	8.93	9:00	1.00	17:15	1.18
26: I-75 NB (from Hudson Bridge Rd to SR 138)	4.31	7:00	1.37	15:30	1.15
26: I-75 SB (from SR 138 to Hudson Bridge Rd)	4.48	6:00	1.00	17:00	2.46
27: I-675 NB (from I-75 to I-285)	9.54	6:30	1.02	15:15	1.00
27: I-675 SB (from I-285 to I-75)	10.02	9:00	1.00	17:15	1.08
28: I-20 EB (from I-285 to SR 138)	15.04	6:00	1.04	17:15	1.40
28: I-20 WB (from SR 138 to I-285)	15.60	7:00	1.43	17:45	1.07
29: I-20 EB (from SR 92 to I-285)	13.20	7:15	1.69	15:00	1.11
29: I-20 WB (from I-285 to SR 92)	12.95	6:00	1.02	17:15	1.13
30: I-75 NB (from I-75/I-575 to SR 92)	8.71	0.38	1.00	0.72	1.15
30: I-75 SB (from SR 92 to I-75/I-575)	9.70	0.31	1.62	0.64	1.00
31: GA-400 NB (from Holcomb Bridge Rd to McFarland Rd)	8.63	8:00	1.59	17:00	2.93
31: GA-400 SB (from McFarland Rd to Holcomb Bridge Rd)	9.17	7:15	2.75	17:15	1.72
32: GA-400 NB (from I-85 to I-285)	6.71	8:15	1.00	17:00	1.50
32: GA-400 SB (from I-285 to I-85)	6.29	8:00	2.03	17:15	1.72
33: I-85 NB (from North Druid Hill Rd to I-285)	5.46	9:00	1.00	17:00	1.04
33: I-85 SB (from I-285 to North Druid Hill Rd)	6.36	8:00	1.00	17:15	1.00
34: I-85 NB (from Beaver Ruin Rd to Old Peachtree Rd)	3.82	7:15	1.19	17:00	1.35
34: I-85 SB (from Old Peachtree Rd to Beaver Ruin Rd)	3.89	7:45	2.58	17:15	1.32
35: I-285 EB (from I-85 to I-75)	3.54	9:00	1.00	17:45	1.00
35: I-285 WB (from I-75 to I-85)	3.82	8:30	1.00	17:00	1.00

The TTIs presented in this table are the VMT-weighted average TTI for each of the segments during the one-hour segment-specific peak period with the slowest average speed.

Freeway Planning Time Index

Travel time reliability can be defined as how much trip travel times vary over the course of time. This variability in travel times from one day to the next is due to the fact that underlying conditions vary widely. Consequently, travelers must plan for these unreliable conditions on congested roadways by leaving earlier than normal just to avoid being late.

The planning time index (PTI) is a measure of trip reliability and is expressed similarly to the TTI – with PTI of 1 being a speed-limit trip and a PTI of 2 being a trip that takes twice as long to make. PTI tells a traveler how much extra time he or she needs to plan for to make a trip so that he or she can be sure to arrive at his or her destination on time 19 times out of 20 (95 percent of the trips). For example, for I-75/I-85 northbound from I-20 to I-85, a distance of 4.4 miles, the PTI at the evening peak (5:00 p.m.) is 3.36. That means that if a traveler wants to be sure to get from the I-20 to I-85 reliably (19 times out of 20) that he or she would have to plan for a trip of about 16 minutes (3.36 x 4.8 minutes = 16 minutes), versus the 4.8 minutes he or she would expect during free-flow conditions. PTI is computed as the ratio of the 95th percentile travel time, also known as planning time, over the free-flow travel time obtained for a certain portion or segment of the freeway system. A PTI number closer to 1 is better.

Measurements for the planning time index were created using GDOT's NaviGAtor video detection cameras as described in the freeway travel time index section of the report. The Metropolitan Atlanta freeway network covered by the Georgia NaviGAtor system is split into 20 bidirectional segments. Coverage is determined by the functioning NaviGAtor infrastructure across the Metropolitan Atlanta freeway system as depicted on Figure 3 on page 10. The measurements are examined and aggregated into 15-minute intervals for the morning peak period (6:00 a.m. to 10:00 a.m.) and evening peak period (3 p.m. to 7 p.m.) for the weekdays only. Subsequently, the freeway planning time index during the slowest region-wide one-hour morning (7:45 a.m. to 8:45 a.m.) and evening peak (5:00 p.m. to 6:00 p.m.) period is obtained for each of the 35 segments. The regional planning time index is then obtained as the weighted average of the freeway segment PTIs with VMT used as weight. In cases when a segment PTI is less than one the respective segment PTI is assumed equal to one. The higher the PTI number the less reliable the travel time is. Figure 7 on the next page depicts the Metropolitan Atlanta PTI for the slowest one-hour morning and afternoon peak period, respectively.

The freeway planning time index measure is the VMT-weighted average of the freeway segments' PTIs for the one-hour morning and evening peak period with the slowest regional freeway travel speed, averaged across all directional freeway segments.

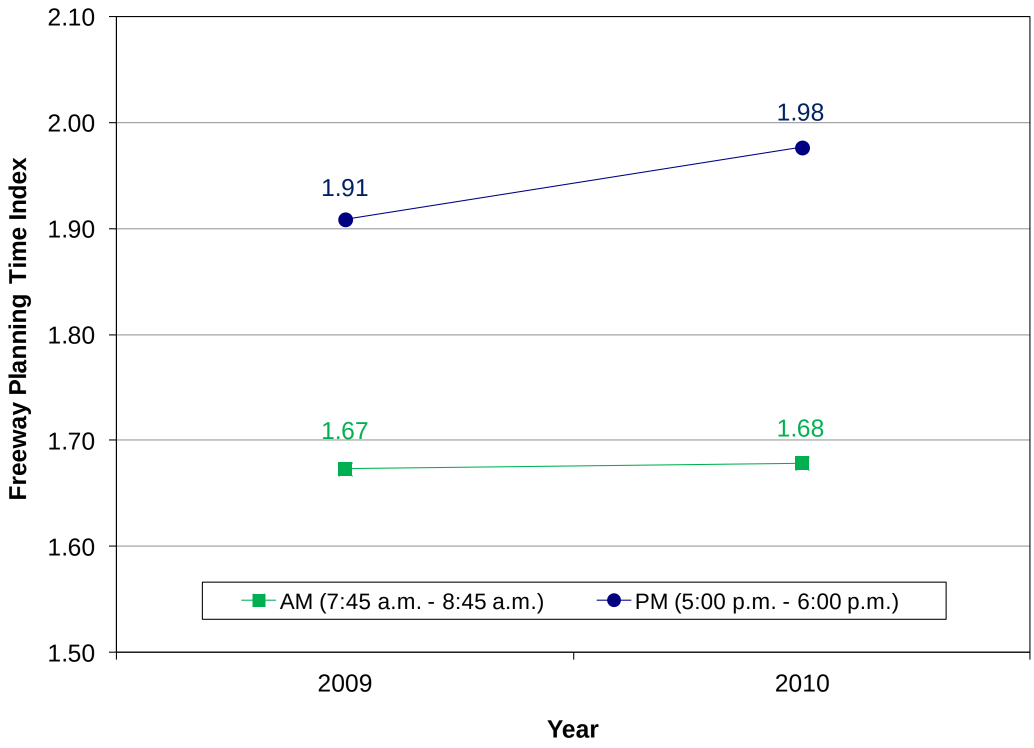
For the 2009 base year, during the morning peak period, PTI was 1.67. This PTI increased slightly to 1.68 in 2009. During the afternoon peak period the average PTI worsened from 1.91 in 2009 to 1.98 in 2010.

The worst performing morning segment in 2010 was southbound SR 141 between Holcomb Bridge Road and I-285, with an average PTI of 4.29. The worst performing evening segment was southbound GA-400 between I-285 and I-85, with PTI of 4.29. The actual planning time index values by freeway segment used in obtaining the regional PTI are summarized in the Appendix.[2]

The freeway planning time index, by creating a weighted average PTI for the slowest one-hour periods of the day, provides a benchmark by which the travel time reliability of the freeway network can be compared from year to year. Additionally, the measure provides a record of the reliability of individual segments of the network, thus making it easier for the region to assess the impacts on reliability of improvements or degradations to individual segments of the freeway network.

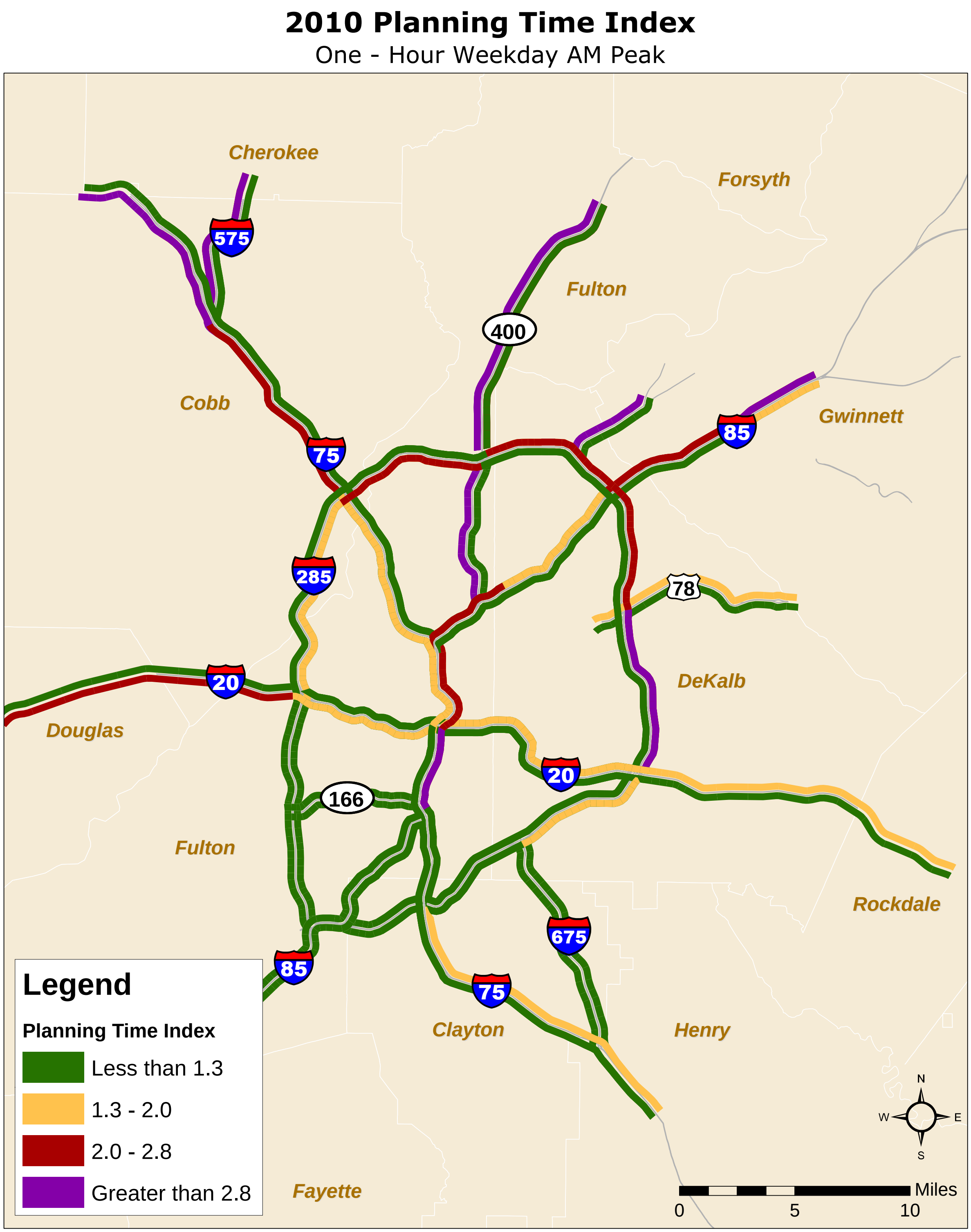
In order to put the regional PTI measure in context, the planning time index, by individual segment, is summarized in Table 4 on page 19. Additionally, the 2010 PTIs, depicted by freeway segment, are presented in Figure 8 (morning peak hour) and Figure 9 (evening peak hour) on pages 17 and 18, respectively.

Figure 7: Freeway Planning Time Index



[2] The planning time index graphs by freeway segment are located at http://www.grta.org/tran_map/Appendix_2011_MAP_Report.pdf, starting on page 88.

Figure 8: 2010 Planning Time Index – Morning Peak (7:45 a.m. – 8:45 a.m.)



Note: Planning Time Index is expressed as the ratio of the planning time and free-flow travel time.
Planning time represents the amount of time needed to be on-time 95 percent of the time.

Figure 9: 2010 Planning Time Index – Afternoon Peak (5 p.m. – 6 p.m.)

Note: Planning Time Index is expressed as the ratio of the planning time and free-flow travel time.
Planning time represents the amount of time needed to be on-time 95 percent of the time.

Table 4: 2010 Planning Time Index by Freeway Segment (Segment-Specific Peak Hour)

Freeway Segment Description	Segment Length (miles)	Morning Peak Hour	Morning Peak Hour PTI	Evening Peak Hour	Evening Peak Hour PTI
1: I-75 NB (from I-285 to I-75/I-575)	9.88	9:00	1.04	17:00	3.71
1: I-75 SB (from I-75/I-575 to I-285)	9.71	7:30	2.31	17:30	1.31
2: I-75 NB (from I-85 to I-285)	8.50	9:00	1.00	17:00	2.46
2: I-75 SB (from I-285 to I-85)	7.74	6:15	2.64	18:00	2.67
3: I-75/I-85 NB (from I-20 to I-85)	4.40	8:00	2.14	17:00	3.36
3: I-75/I-85 SB (from I-85 to I-20)	4.26	8:30	1.70	17:15	4.05
4: I-75 NB (from I-85 to I-20)	3.89	7:45	3.21	16:00	3.22
4: I-75 SB (from I-20 to I-85)	3.72	7:15	1.00	16:45	1.27
5: I-75 NB (from I-285 to I-85)	4.03	7:15	1.00	15:00	1.00
5: I-75 SB (from I-85 to I-285)	4.16	9:00	1.00	17:00	1.37
6: I-75 NB (from SR 138 to I-285)	9.91	7:15	1.54	15:00	1.19
6: I-75 SB (from I-285 to SR 138)	9.93	6:00	1.25	17:00	2.91
7: I-85 NB (from I-285 to Beaver Ruin Rd)	6.69	8:00	1.18	17:00	2.79
7: I-85 SB (from Beaver Ruin Rd to I-285)	7.01	8:00	2.36	17:15	1.51
8: I-85 NB (from I-75/I-85 to North Druid Hill Rd)	4.07	8:30	1.02	17:30	1.38
8: I-85 SB (from North Druid Hill Rd to I-75/I-85)	4.26	8:00	2.29	17:00	3.47
9: I-85 NB (from I-285 to I-75/I-85)	7.87	7:15	1.00	15:30	1.00
9: I-85 SB (from I-75/I-85 to I-285)	6.07	6:00	1.00	17:00	1.16
10: GA-400 NB (from I-285 to Holcomb Bridge Rd)	8.35	9:00	1.12	17:15	3.74
10: GA-400 SB (from Holcomb Bridge Rd to I-285)	8.08	7:30	3.36	16:45	3.85
11: I-285 EB (from I-75 to GA-400)	7.80	8:00	2.29	17:15	1.75
11: I-285 WB (from GA-400 to I-75)	7.26	9:00	1.07	17:00	2.96
12: I-285 EB (from GA-400 to I-85)	6.55	7:15	1.08	17:15	3.93
12: I-285 WB (from I-85 to GA-400)	6.39	7:45	2.22	17:00	2.41
13: I-285 NB (from US-78 to I-85)	5.69	7:45	2.57	15:30	1.48
13: I-285 SB (from I-85 to US-78)	5.82	8:15	1.06	17:00	4.07
14: I-285 NB (from I-20 to US-78)	7.96	7:45	3.12	17:30	1.63
14: I-285 SB (from US-78 to I-20)	7.40	8:30	1.00	16:45	1.85
15: I-20 EB (from I-285 to I-75/I-85)	7.35	7:45	1.54	18:00	1.06
15: I-20 WB (from I-75/I-85 to I-285)	6.54	6:00	1.40	17:00	1.50
16: I-20 EB (from I-75/I-85 to I-285)	9.81	6:00	1.18	17:00	1.57
16: I-20 WB (from I-285 to I-75/I-85)	9.41	8:00	1.85	16:45	1.34
17: I-285 NB (from I-75 to I-675)	5.66	9:00	1.00	17:15	1.07
17: I-285 SB (from I-675 to Airport Tunnel)	5.49	7:15	1.00	18:00	1.00
18: I-285 NB (from I-675 to I-20)	5.98	8:00	1.63	17:00	1.87
18: I-285 SB (from I-20 to I-567)	6.14	9:00	1.00	15:00	1.00
19: I-575 NB (from I-75/I-575 to Arnold Mill Rd)	7.17	9:00	1.00	17:00	2.33
19: I-575 SB (from Arnold Mill Rd to I-75/I-575)	7.38	7:15	3.46	17:45	1.06
20: I-285 NB (from I-20 to I-75)	9.35	8:00	1.62	17:15	1.65
20: I-285 SB (from I-75 to I-20)	10.52	8:15	1.00	17:00	2.34
21: I-285 NB (from I-85 to I-20)	10.10	7:45	1.00	17:30	1.21
21: I-285 SB (from I-20 to I-85)	9.80	9:00	1.00	17:45	1.24
22: SR 141 NB (from I-285 to Holcomb Bridge Rd)	3.71	9:00	1.00	17:15	1.01
22: SR 141 SB (from Holcomb Bridge Rd To I-285)	4.12	7:45	4.29	15:00	1.00
23: SR 166 EB (from I-285 to I-75/I-85)	5.95	9:00	1.00	17:15	1.05
23: SR 166 WB (from I-75/I-85 to I-285)	6.41	6:00	1.01	17:30	1.03
24: US 78 EB (from North Druid Hills Rd to West Park Pl)	10.00	6:00	1.00	17:30	1.28
24: US 78 WB (from West Park Pl to North Druid Hills Rd)	10.26	7:15	1.51	15:00	1.00
25: I-85 NB (from SR 74 to I-285)	7.36	7:30	1.10	17:15	1.01
25: I-85 SB (from I-285 to SR 74)	8.93	9:00	1.00	17:15	1.74
26: I-75 NB (from Hudson Bridge Rd to SR 138)	4.31	7:00	1.86	15:30	1.80
26: I-75 SB (from SR 138 to Hudson Bridge Rd)	4.48	6:00	1.15	17:00	3.96
27: I-675 NB (from I-75 to I-285)	9.54	6:30	1.06	15:15	1.03
27: I-675 SB (from I-285 to I-75)	10.02	9:00	1.03	17:15	1.42
28: I-20 EB (from I-285 to SR 138)	15.04	6:00	1.09	17:15	1.83
28: I-20 WB (from SR 138 to I-285)	15.60	7:00	1.90	17:45	1.22
29: I-20 EB (from SR 92 to I-285)	13.20	7:15	2.69	15:00	1.18
29: I-20 WB (from I-285 to SR 92)	12.95	6:00	1.06	17:15	1.42
30: I-75 NB (from I-75/I-575 to SR 92)	8.71	0.38	1.17	0.72	1.70
30: I-75 SB (from SR 92 to I-75/I-575)	9.70	0.31	2.87	0.64	1.13
31: GA-400 NB (from Holcomb Bridge Rd to McFarland Rd)	8.63	8:00	1.01	17:00	2.47
31: GA-400 SB (from McFarland Rd to Holcomb Bridge Rd)	9.17	7:15	3.49	17:15	1.41
32: GA-400 NB (from I-85 to I-285)	6.71	8:15	1.09	17:00	2.76
32: GA-400 SB (from I-285 to I-85)	6.29	8:00	3.52	17:15	4.29
33: I-85 NB (from North Druid Hill Rd to I-285)	5.46	9:00	1.00	17:00	1.76
33: I-85 SB (from I-285 to North Druid Hill Rd)	6.36	8:00	1.50	17:15	1.00
34: I-85 NB (from Beaver Ruin Rd to Old Peachtree Rd)	3.82	7:15	1.46	17:00	1.74
34: I-85 SB (from Old Peachtree Rd to Beaver Ruin Rd)	3.89	7:45	3.79	17:15	2.05
35: I-285 EB (from I-85 to I-75)	3.54	9:00	1.00	17:45	1.06
35: I-285 WB (from I-75 to I-85)	3.82	8:30	1.39	17:00	1.44

The PTIs presented in this table are the VMT-weighted average PTI for each of the segments during the one-hour segment-specific peak period with the slowest average speed.

Freeway Buffer Time Index

The buffer time index (BTI) is another measure of trip reliability. It represents the extra time (or buffer) that a traveler needs to add to a congested trip time to consistently arrive on time 19 out of 20 times. BTI is expressed as a percentage of the average congested trip time. So, for the same 5:00 o'clock afternoon trip on I-75/I-85 from I-20 to I-85, which takes on average about 8.6 minutes, a traveler needs to allow for a buffer of 87 percent if he or she wants to be on time 19 out of 20 times. In other words, this traveler needs about 16 minutes—87 percent more time than 8.6 minutes, if he or she wants to be sure of arriving on time 19 out of 20 times. A lower BTI percentage (closer to 0) is better.

Measurements for the buffer time index were created using GDOT's NaviGAtor video detection cameras as described in the freeway travel time index section of the report. The freeway buffer time index measure is the VMT-weighted average of the freeway segments' BTIs for the one-hour morning and evening peak period with the slowest regional freeway travel speed, averaged across all directional freeway segments. The resulting BTI for Metropolitan Atlanta is depicted on Figure 10.

For the 2009 base year, during the morning peak period, BTI was 34.2 percent. This BTI improved to 33.2 percent in 2006 in 2010. During the afternoon peak period the BTI declined from 49.8 percent in 2009 to 46.1 percent in 2010.

The worst performing morning segment in 2010 was southbound I-75 between I-285 and I-85, with BTI of 141 percent. The worst performing evening segment was southbound GA-400 SB between I-285 and I-85, with an average BTI of 149 percent. The actual BTI values by freeway segment used in obtaining the regional BTI are summarized in the Appendix.[3]

The buffer time index, by individual segment, is summarized in Table 5 on page 24. Additionally, the 2009 BTIs, depicted by freeway segment, are presented in Figure 11 (morning peak hour) and Figure 12 (evening peak hour) on pages 22 and 23, respectively.

[3] The buffer time index graphs by freeway segment are located at http://www.grta.org/tran_map/Appendix_2011_MAP_Report.pdf, starting on page 123.

Figure 10: Freeway Buffer Time Index

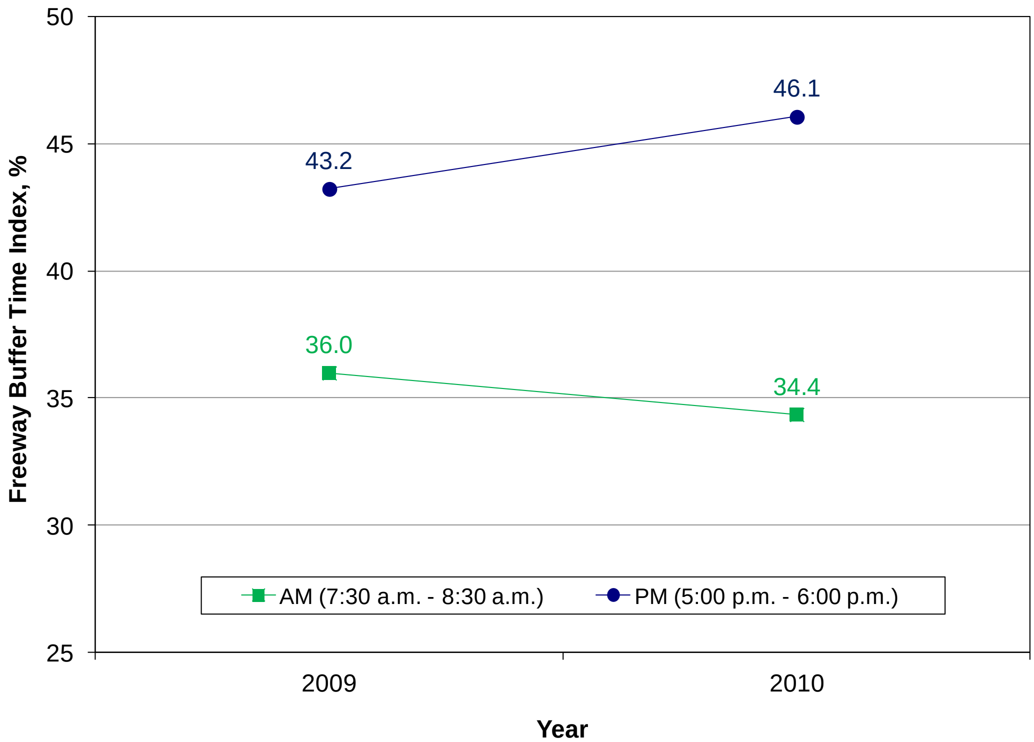
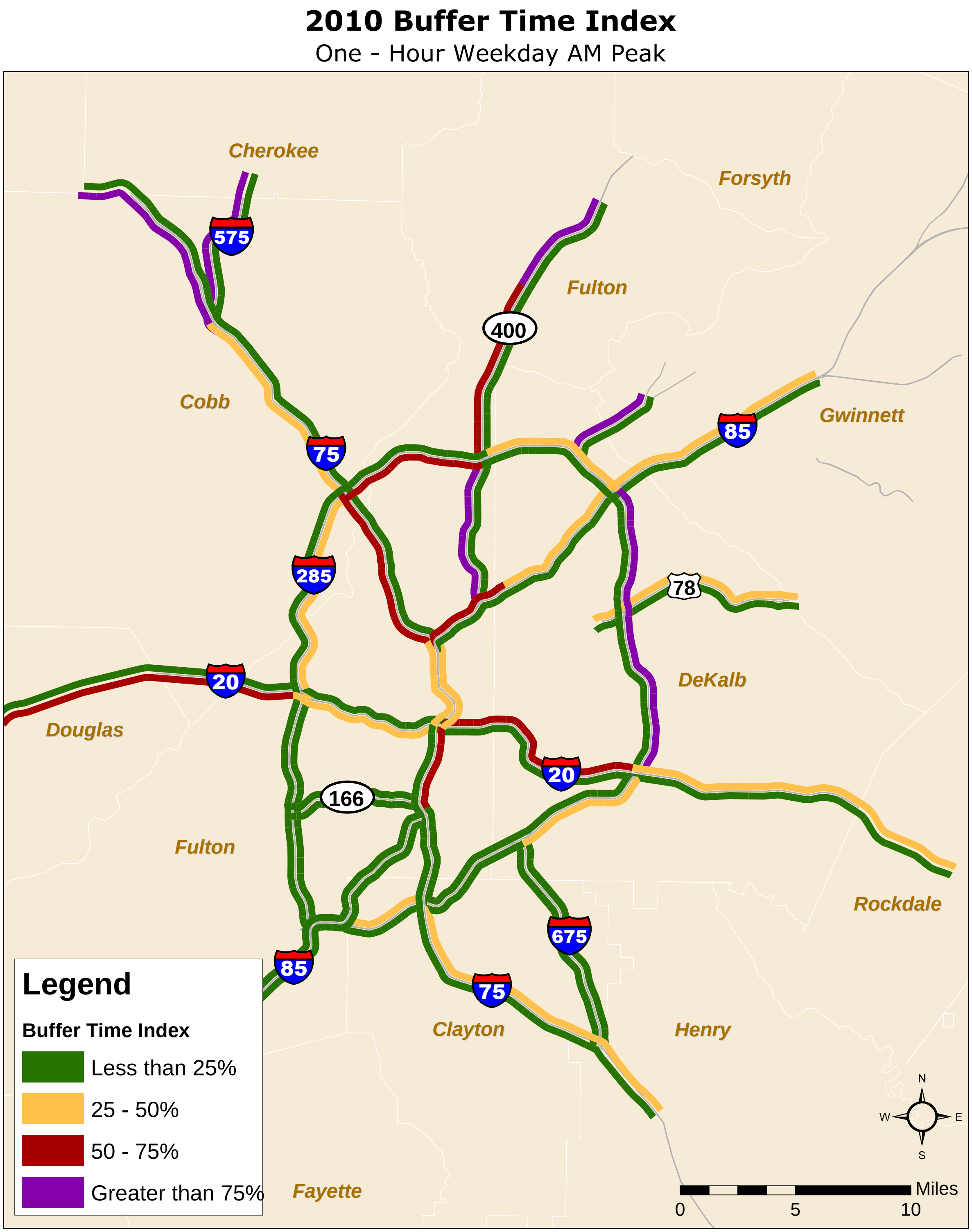
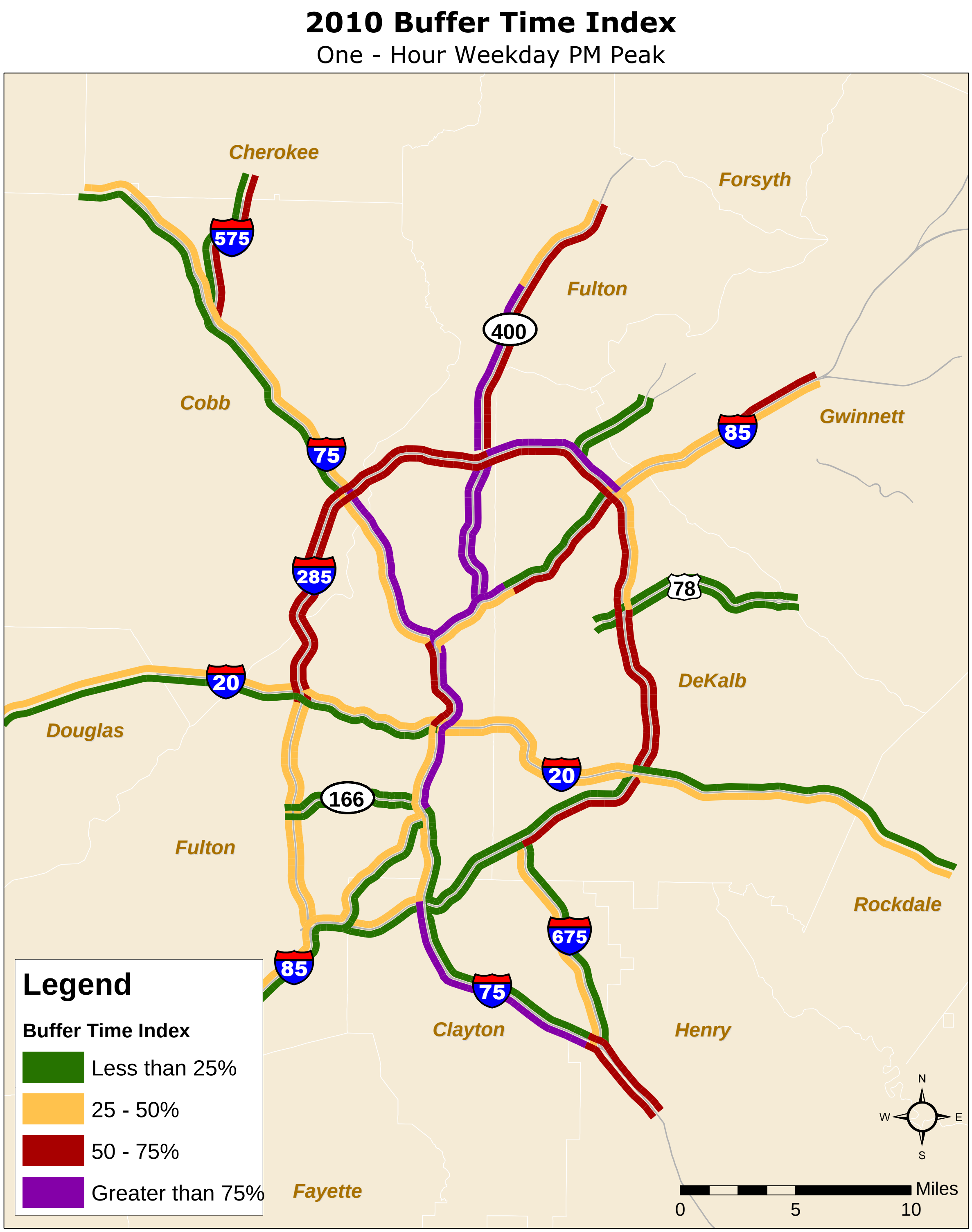


Figure 11: 2010 Buffer Time Index – Morning Peak (7:45 a.m. – 8:45 a.m.)



Note: Buffer Time Index represents the amount of extra "buffer" needed to be on-time 95 percent of the time and is expressed as a percentage of the average travel time.

Figure 12: 2010 Buffer Time Index – Afternoon Peak (5 p.m. – 6 p.m.)



Note: Buffer Time Index represents the amount of extra "buffer" needed to be on-time 95 percent of the time and is expressed as a percentage of the average travel time.

Table 5: 2010 Buffer Time Index by Freeway Segment (Segment-Specific Peak Hour)

Freeway Segment Description	Segment Length (miles)	Morning Peak Hour	Morning Peak Hour BTI	Evening Peak Hour	Evening Peak Hour BTI
1: I-75 NB (from I-285 to I-75/I-575)	9.88	9:00	4%	17:00	49%
1: I-75 SB (from I-75/I-575 to I-285)	9.71	7:30	42%	17:30	22%
2: I-75 NB (from I-85 to I-285)	8.50	9:00	12%	17:00	89%
2: I-75 SB (from I-285 to I-85)	7.74	6:15	141%	18:00	127%
3: I-75/I-85 NB (from I-20 to I-85)	4.40	8:00	36%	17:00	87%
3: I-75/I-85 SB (from I-85 to I-20)	4.26	8:30	59%	17:15	60%
4: I-75 NB (from I-85 to I-20)	3.89	7:45	58%	16:00	138%
4: I-75 SB (from I-20 to I-85)	3.72	7:15	6%	16:45	27%
5: I-75 NB (from I-285 to I-85)	4.03	7:15	10%	15:00	7%
5: I-75 SB (from I-85 to I-285)	4.16	9:00	5%	17:00	44%
6: I-75 NB (from SR 138 to I-285)	9.91	7:15	31%	15:00	13%
6: I-75 SB (from I-285 to SR 138)	9.93	6:00	25%	17:00	118%
7: I-85 NB (from I-285 to Beaver Ruin Rd)	6.69	8:00	12%	17:00	40%
7: I-85 SB (from Beaver Ruin Rd to I-285)	7.01	8:00	50%	17:15	36%
8: I-85 NB (from I-75/I-85 to North Druid Hill Rd)	4.07	8:30	13%	17:30	37%
8: I-85 SB (from North Druid Hill Rd to I-75/I-85)	4.26	8:00	59%	17:00	76%
9: I-85 NB (from I-285 to I-75/I-85)	7.87	7:15	18%	15:30	9%
9: I-85 SB (from I-75/I-85 to I-285)	6.07	6:00	9%	17:00	29%
10: GA-400 NB (from I-285 to Holcomb Bridge Rd)	8.35	9:00	9%	17:15	68%
10: GA-400 SB (from Holcomb Bridge Rd to I-285)	8.08	7:30	47%	16:45	86%
11: I-285 EB (from I-75 to GA-400)	7.80	8:00	58%	17:15	60%
11: I-285 WB (from GA-400 to I-75)	7.26	9:00	18%	17:00	68%
12: I-285 EB (from GA-400 to I-85)	6.55	7:15	19%	17:15	72%
12: I-285 WB (from I-85 to GA-400)	6.39	7:45	39%	17:00	95%
13: I-285 NB (from US-78 to I-85)	5.69	7:45	77%	15:30	45%
13: I-285 SB (from I-85 to US-78)	5.82	8:15	12%	17:00	73%
14: I-285 NB (from I-20 to US-78)	7.96	7:45	112%	17:30	57%
14: I-285 SB (from US-78 to I-20)	7.40	8:30	11%	16:45	52%
15: I-20 EB (from I-285 to I-75/I-85)	7.35	7:45	48%	18:00	13%
15: I-20 WB (from I-75/I-85 to I-285)	6.54	6:00	32%	17:00	32%
16: I-20 EB (from I-75/I-85 to I-285)	9.81	6:00	20%	17:00	42%
16: I-20 WB (from I-285 to I-75/I-85)	9.41	8:00	73%	16:45	46%
17: I-285 NB (from I-75 to I-675)	5.66	9:00	3%	17:15	24%
17: I-285 SB (from I-675 to Airport Tunnel)	5.49	7:15	6%	18:00	8%
18: I-285 NB (from I-675 to I-20)	5.98	8:00	68%	17:00	68%
18: I-285 SB (from I-20 to I-567)	6.14	9:00	5%	15:00	2%
19: I-575 NB (from I-75/I-575 to Arnold Mill Rd)	7.17	9:00	3%	17:00	53%
19: I-575 SB (from Arnold Mill Rd to I-75/I-575)	7.38	7:15	76%	17:45	8%
20: I-285 NB (from I-20 to I-75)	9.35	8:00	49%	17:15	58%
20: I-285 SB (from I-75 to I-20)	10.52	8:15	8%	17:00	65%
21: I-285 NB (from I-85 to I-20)	10.10	7:45	15%	17:30	32%
21: I-285 SB (from I-20 to I-85)	9.80	9:00	7%	17:45	36%
22: SR 141 NB (from I-285 to Holcomb Bridge Rd)	3.71	9:00	6%	17:15	12%
22: SR 141 SB (from Holcomb Bridge Rd To I-285)	4.12	7:45	110%	15:00	6%
23: SR 166 EB (from I-285 to I-75/I-85)	5.95	9:00	4%	17:15	9%
23: SR 166 WB (from I-75/I-85 to I-285)	6.41	6:00	6%	17:30	7%
24: US 78 EB (from North Druid Hills Rd to West Park Pl)	10.00	6:00	3%	17:30	23%
24: US 78 WB (from West Park Pl to North Druid Hills Rd)	10.26	7:15	38%	15:00	1%
25: I-85 NB (from SR 74 to I-285)	7.36	7:30	10%	17:15	8%
25: I-85 SB (from I-285 to SR 74)	8.93	9:00	6%	17:15	48%
26: I-75 NB (from Hudson Bridge Rd to SR 138)	4.31	7:00	36%	15:30	56%
26: I-75 SB (from SR 138 to Hudson Bridge Rd)	4.48	6:00	18%	17:00	61%
27: I-675 NB (from I-75 to I-285)	9.54	6:30	4%	15:15	2%
27: I-675 SB (from I-285 to I-75)	10.02	9:00	3%	17:15	32%
28: I-20 EB (from I-285 to SR 138)	15.04	6:00	5%	17:15	31%
28: I-20 WB (from SR 138 to I-285)	15.60	7:00	33%	17:45	14%
29: I-20 EB (from SR 92 to I-285)	13.20	7:15	59%	15:00	6%
29: I-20 WB (from I-285 to SR 92)	12.95	6:00	3%	17:15	25%
30: I-75 NB (from I-75/I-575 to SR 92)	8.71	0.38	24%	0.72	47%
30: I-75 SB (from SR 92 to I-75/I-575)	9.70	0.31	77%	0.64	14%
31: GA-400 NB (from Holcomb Bridge Rd to McFarland Rd)	8.63	8:00	15%	17:00	51%
31: GA-400 SB (from McFarland Rd to Holcomb Bridge Rd)	9.17	7:15	130%	17:15	47%
32: GA-400 NB (from I-85 to I-285)	6.71	8:15	18%	17:00	84%
32: GA-400 SB (from I-285 to I-85)	6.29	8:00	74%	17:15	149%
33: I-85 NB (from North Druid Hill Rd to I-285)	5.46	9:00	8%	17:00	68%
33: I-85 SB (from I-285 to North Druid Hill Rd)	6.36	8:00	53%	17:15	12%
34: I-85 NB (from Beaver Ruin Rd to Old Peachtree Rd)	3.82	7:15	23%	17:00	29%
34: I-85 SB (from Old Peachtree Rd to Beaver Ruin Rd)	3.89	7:45	47%	17:15	54%
35: I-285 EB (from I-85 to I-75)	3.54	9:00	13%	17:45	23%
35: I-285 WB (from I-75 to I-85)	3.82	8:30	52%	17:00	47%

The BTIs presented in this table are the VMT-weighted average BTI for each of the segments during the one-hour segment-specific peak period with the slowest average speed.

Mobility

Daily Vehicle Miles Traveled Per Licensed Driver / Person

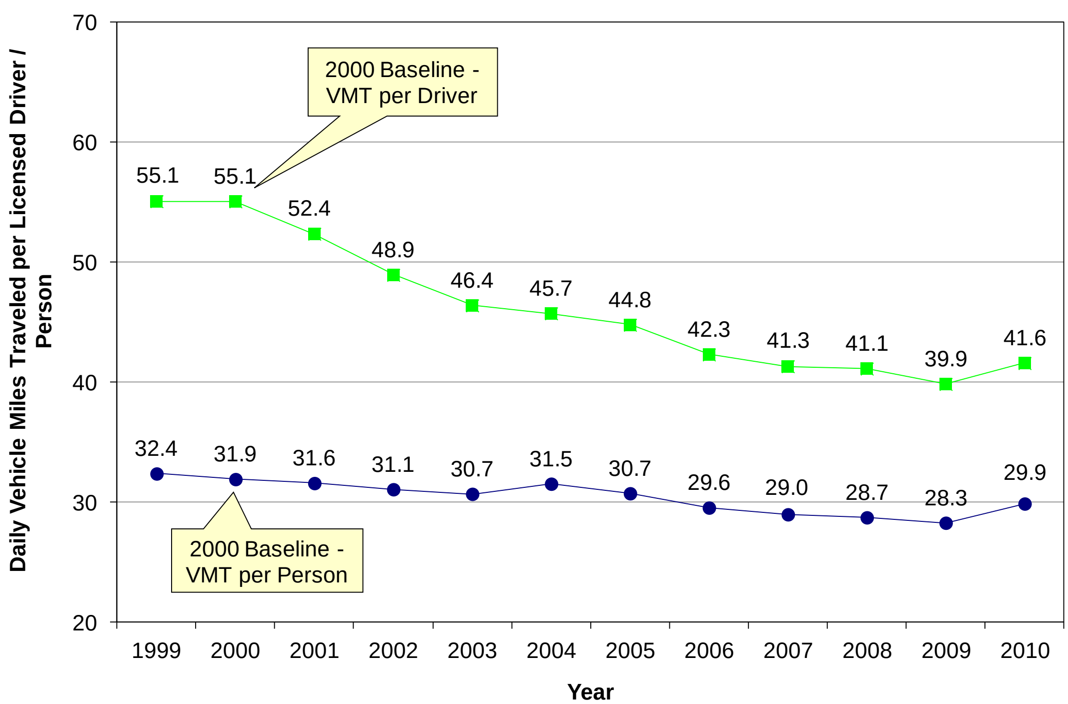
Daily vehicle miles traveled per licensed driver/person reports how many miles the average metropolitan Atlantan driver drives each day and how many miles the average metropolitan Atlantan rides in a non-transit vehicle each day.[4] A lower number is better.

In the baseline year of 2000, the daily vehicle miles traveled per licensed driver were 55.1 miles. In 2010, the daily vehicle miles traveled per licensed driver increased to 41.6 compared to 39.9 in 2009. Still, the 2010 miles had dropped by almost a quarter compared to 2000. Similarly, daily vehicle miles traveled per person increased to 29.9 in 2010 compared to 28.3 in 2009 but had declined by about eight percent from 2000 to 2010.

Reduction of VMT may be interpreted as a sign that people are choosing to live closer to their daily work, play, and other destinations, that they are more carefully choosing their routes or are trip chaining, or that they are engaging in other behaviors such as carpooling, vanpooling, riding transit, walking or biking that result in reducing the distances that they drive each day.

Reducing VMT reduces the amount of emissions generated by the vehicles. With the 13-county region's population expected to increase to approximately six million persons by 2030, reducing VMT will be a necessary component of controlling the vehicle emissions that contribute to poor air quality.

Figure 13: Daily Vehicle Miles Traveled Per Licensed Driver / Person



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[4] Daily vehicle miles traveled per licensed driver is computed as the total daily VMT divided by the number of the licensed drivers in the 13-county Atlanta area. The VMT data and licensed drivers data are obtained from GDOT and the Department of Driver Services (DDS), respectively. Daily vehicle miles traveled per person is computed as the total daily VMT divided by the total population for the former 13-county Atlanta area. The population data are obtained from ARC.

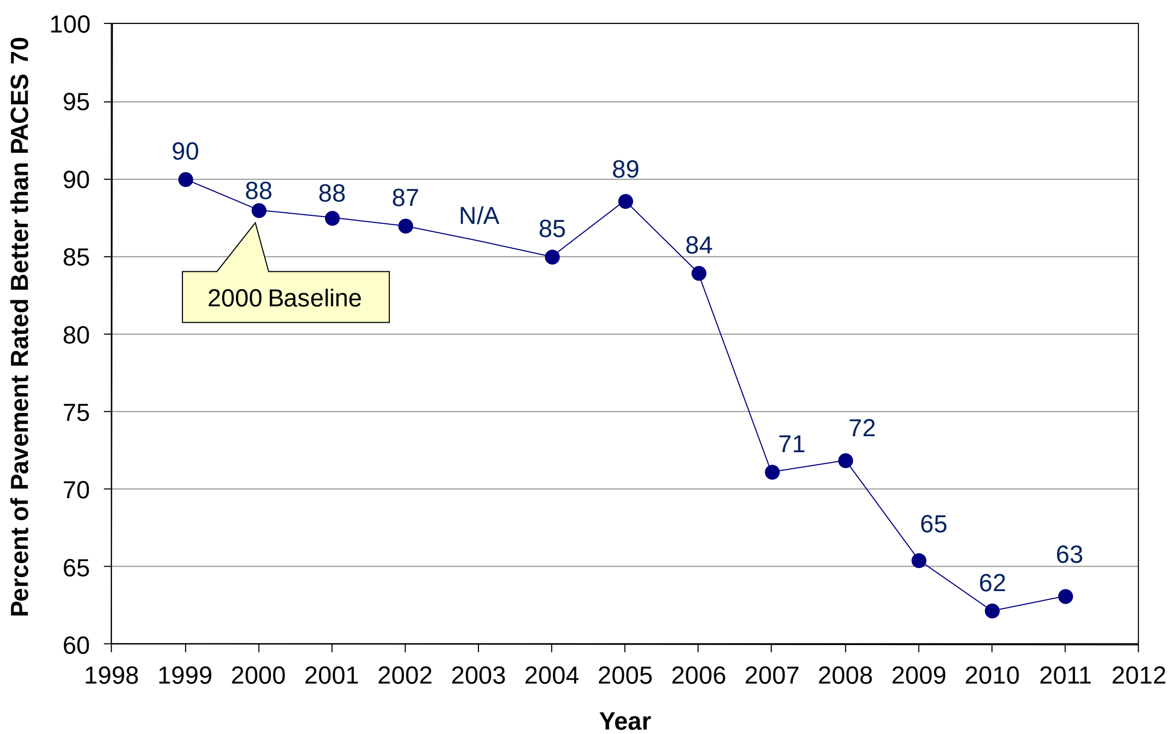
Pavement Condition Rating

It is important to keep pavement in good shape. When roadway surfaces are not maintained, the roadway must be rebuilt from the ground up. It is more economical to systematically maintain roadways than to rebuild them.

The PACES (Pavement Condition Evaluation System) rating is a system by which GDOT measures the quality of the roadway pavement. A pavement in perfect condition receives a maximum value of 100, meaning an excellent ride. A rating of zero would mean the road is pretty much impassable. GDOT reviews roads with a rating of 70 or below to determine if they are good candidates for a preservation action, typically resurfacing or rehabilitation. Although it may be expanded in the future, currently the PACES rating covers only state and national highway system routes, i.e. those roads for which GDOT has maintenance responsibility. A higher number is better.

Pavement condition rating is the percentage of pavement rated better than PACES of 70. In the baseline year of 2000, 88 percent of the GDOT roads had a PACES rating of 70 or better.[5] The 2005 spike in pavement condition rating, due to GDOT implementing several resurfacing projects during that year, was followed by a sharp decline in this rating to 63 in 2010. Although the 2010 rating is up slightly compared to 2009, the long-term trend may be viewed as a reflection of under-investment in maintaining the existing roadway system.

Figure 14: Percent of Pavement Rated Better than PACES 70



[5] A 2003 pavement condition rating estimate is not available because of a statewide data collection problem.

Transit Passenger Miles Traveled

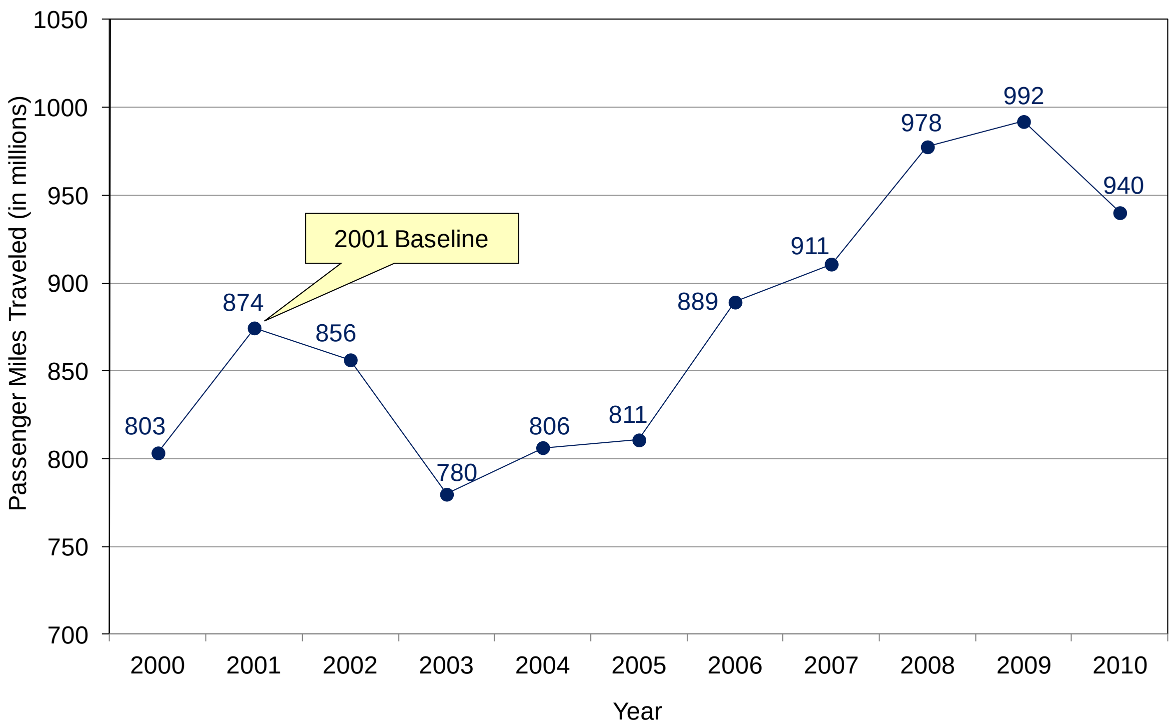
Transit passenger miles traveled is similar to vehicle miles traveled. Rather than reporting a daily average, however, it reports the annual total miles metropolitan Atlantans rode on buses and trains in a given year. A higher number is better.

Increasing transit passenger miles traveled may reduce the growth in VMT that can be expected from increased population. Lower VMT can result in lower emissions, which contributes to improved air quality.

Transit agencies provide rail, bus and paratransit services. Paratransit services are special transportation services for people with disabilities who are unable to use fixed-route public transportation for some or all of their mobility needs. The paratransit passenger miles traveled in 2010 were about 8 million or 0.8 percent of the total transit miles traveled.

In the base year of 2001, passengers using public transit traveled 874 million miles. That figure slid to a low of 780 million miles in 2003 and reached a peak of 992 million miles in 2009. However, passenger miles travelled in the declined to 940 million in 2010 mainly due to the impact of transit service cuts across the region.

Figure 15: Transit Passenger Miles Traveled[6]



[6] The transit passenger miles information comes from the National Transit Database (NTD).

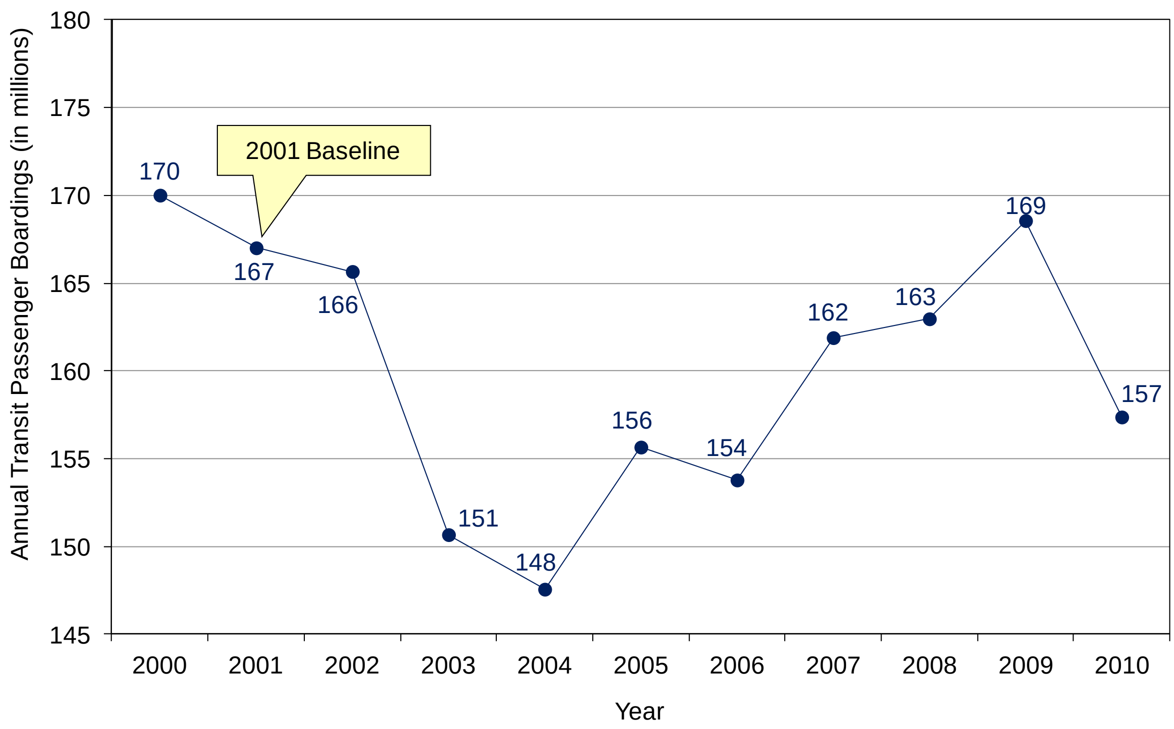
Annual Transit Passenger Boardings

Annual transit passenger boardings reports how many times in a given year individuals boarded a bus or train. Every boarding is counted, including transfers. Thus a transit user making a trip to and from work boards twice if they make a trip with no transfers or four times if they make a trip with one transfer each way. For example, riding MARTA rail from Decatur to Five Points and transferring to the North Springs Line to travel to Medical Center and returning again counts as four separate boardings. A higher number is better.

In the base year of 2001, there were 167 million passenger boardings. That number declined to 148 million boardings in 2004, and rebounded to 169 million boardings in 2009. However, passenger boardings dropped to 157 million in 2010 due in part to the impact of the transit service cuts and adjustments. The annual paratransit passenger boardings in 2010 were 0.62 million or 0.4 percent of the annual transit passenger boardings.

As with transit passenger miles traveled, increasing transit boardings may offset potential increases in VMT attributable to increased population, with the corresponding reduction in vehicle emissions.

Figure 16: Annual Transit Passenger Boardings[7]



[7] The transit passenger boardings (unlinked passenger trips) information comes from the NTD.

Accessibility

The accessibility measures assess the accessibility of employment centers by car and the availability of transit to the public. There are four specific measures:

- Average number of workers that can reach a major employment center by car in 45 minutes,
- Transit revenue service hours,
- Passenger trips per transit service hour, and
- Number of vanpools.

The more accessible employment centers are the bigger the employment-shed is, thus leading to better match between the needs of employers and employees and increased economic efficiency. The more accessible and available transit is, the more likely it is to be used, leading to increased transit passenger miles traveled and transit boardings and their associated benefits.

Average Number of Workers That Can Reach a Major Employment Center by Car in 45 Minutes

This is a newly introduced measure supplied by the GDOT's first SSTP Progress Report.

This measure is based on a combination of modeled and observed data and applies to the 20-county Metro Atlanta region. It should be noted that ARC's model was modified for the purposes of developing this measure, and therefore the results do not necessarily reflect the official travel forecasts produced and endorsed by ARC.

In brief, the ARC's travel demand model is used to estimate the average time it takes to travel by car from any location in the 20-county region to each of the 13 major regional employment centers during the morning rush hours on a typical weekday.[8] In addition, real-world speed data from GDOT's NaviGAtor system (see Figure 3 on page 10) are used in place of the modeled speeds. Using this travel time information, the "employment-shed" for each center is estimated—i.e., the surrounding area from which workers can reach the center in 45 minutes or less by car during the morning peak period (6:00 a.m. - 10:00 a.m.). The number of workers living in each employment-shed is then estimated using spatially allocated socioeconomic data from ARC, and the average size (in terms of number of workers) of the 13 major employment-sheds is calculated and reported.

In the 2010 base year there were 800,000 workers that could reach a major employment center by car in 45 minutes or less.

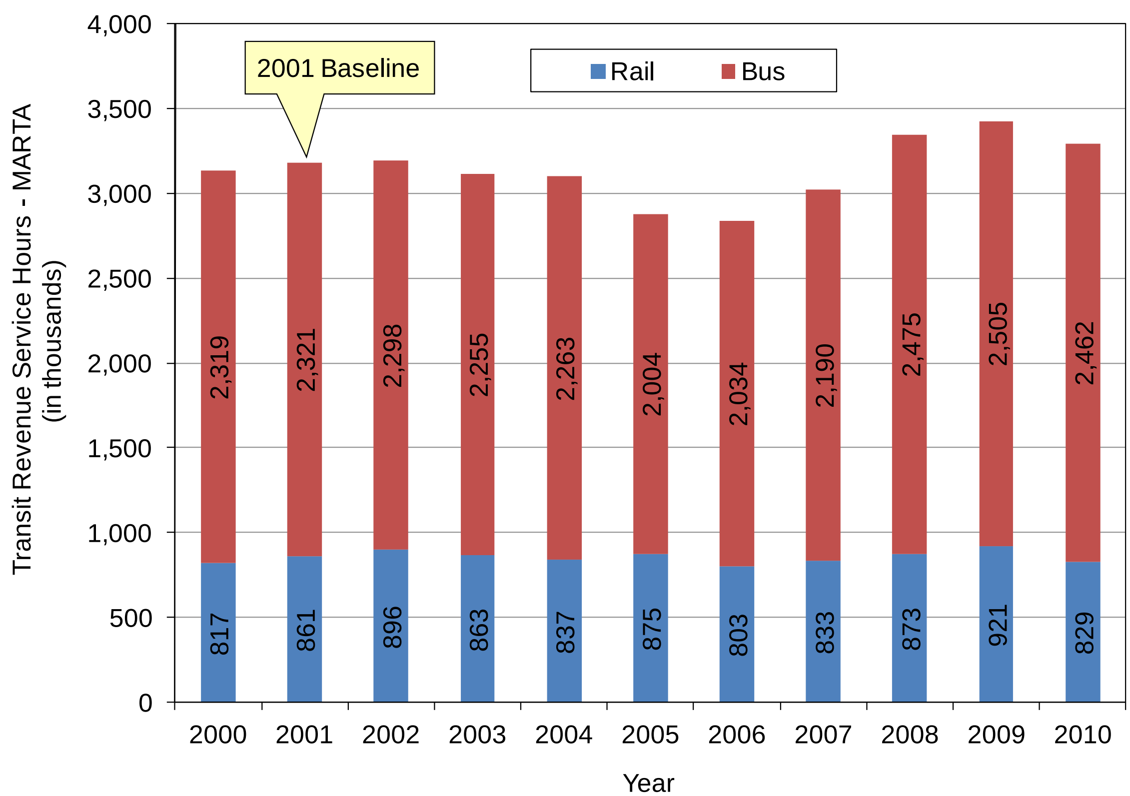
[8] The 13 major regional employment centers are: Airport, Buckhead, Central Business District, Cumberland/Galleria, Emory University/CDC, Fulton Industrial, Gwinnett Place/Discover Mills, Midtown, North Point, Peachtree Corners/Norcross, Perimeter, Southlake, and Town Center.

Transit Revenue Service Hours

People can't use transit if it is not in service when they need it. The transit revenue service hours measure reflects the availability of transit to the public. This measure reports how many hours in a given year transit vehicles (buses and train cars) were available to carry passengers. One vehicle in operation for one hour equals one revenue service hour. Higher numbers are better in that more transit service is available for more hours.

In the baseline year of 2001 there were 3,339,000 revenue service hours provided by MARTA, CCT, DCR, transit providers reported through GRTA and Gwinnett County Transit (GCT). MARTA provided 3,182,000 revenue service hours. The other transit systems combined provided a total of 157,000 revenue service hours. (C-TRAN service began in October of 2001 and Gwinnett County Transit began service in November of 2001. Their first year revenue service hours are reported as part of the 2002 statistics.). MARTA has provided a combined total of 3,291,000 revenue service hours in 2010, reversing an upward trend that started in 2007.

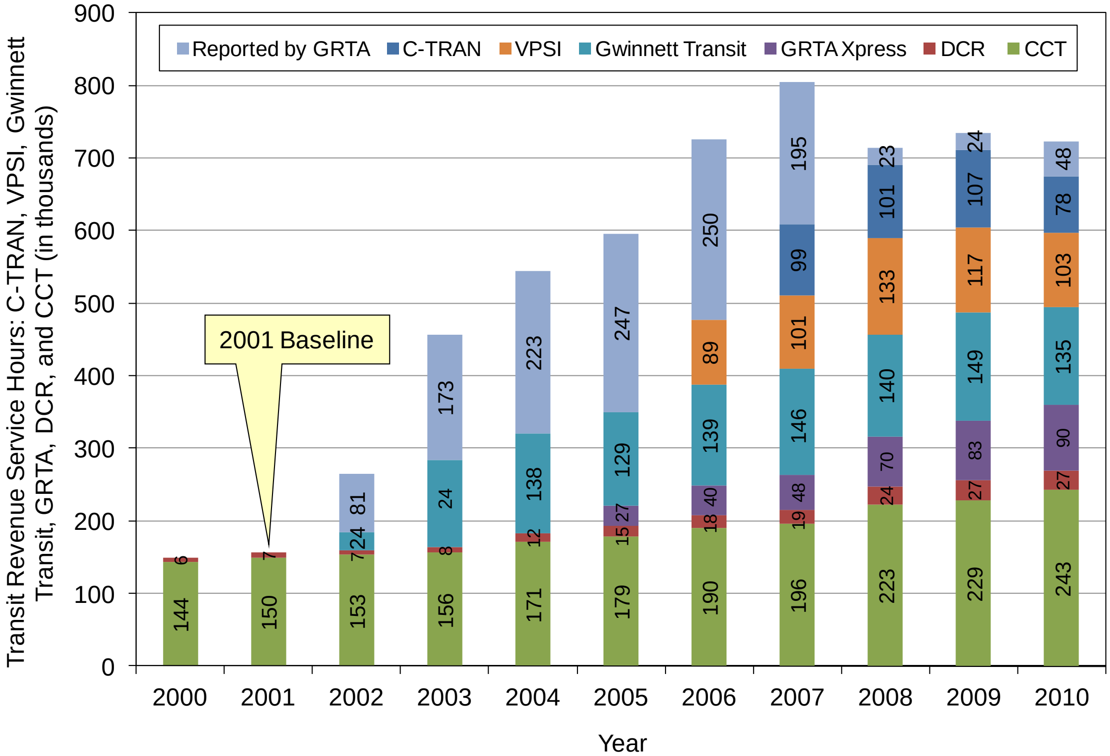
Figure 17: Transit Revenue Service Hours – MARTA[9]



[9] The transit revenue service hours are the sum of the rail and bus revenue service hours. The bus figure also includes the paratransit service. The revenue service hours information comes from the NTD.

Accessibility

Figure 18: Transit Revenue Service Hours: C-TRAN, Cobb Community Transit, Douglas County Rideshare, GRTA *Xpress*, Reported by GRTA, Gwinnett County Transit, and VPSI



C-TRAN, Cobb Community Transit, Douglas County Rideshare, GRTA *Xpress*, other transit providers reported through GRTA, Gwinnett County Transit, and VPSI have provided a combined total of 724,000 revenue service hours in 2010, an increase of about 360 percent over the base year of 2001.[10] The combined share of these transit providers in the regional transit revenue service hours has increased from 4.7 percent in 2001 to 18 percent in 2010.

[10] The transit service providers reporting to the NTD through GRTA are C-TRAN, Quicklink, Emory Shuttle, and VPSI for 2002; C-TRAN, Quicklink, Emory Shuttle, VPSI, and GRTA Vanpool for 2003; Buckhead Shuttle, Quicklink, and GRTA Vanpool for 2004; C-TRAN, Buckhead Shuttle, and GRTA Vanpool for 2005; C-TRAN, Buckhead Shuttle, and GRTA Vanpool for 2006; Buckhead Shuttle, and GRTA Vanpool for 2007; GRTA Vanpool for 2008;GRTA Vanpool for 2009; GRTA and Enterprise Vanpools for 2010.

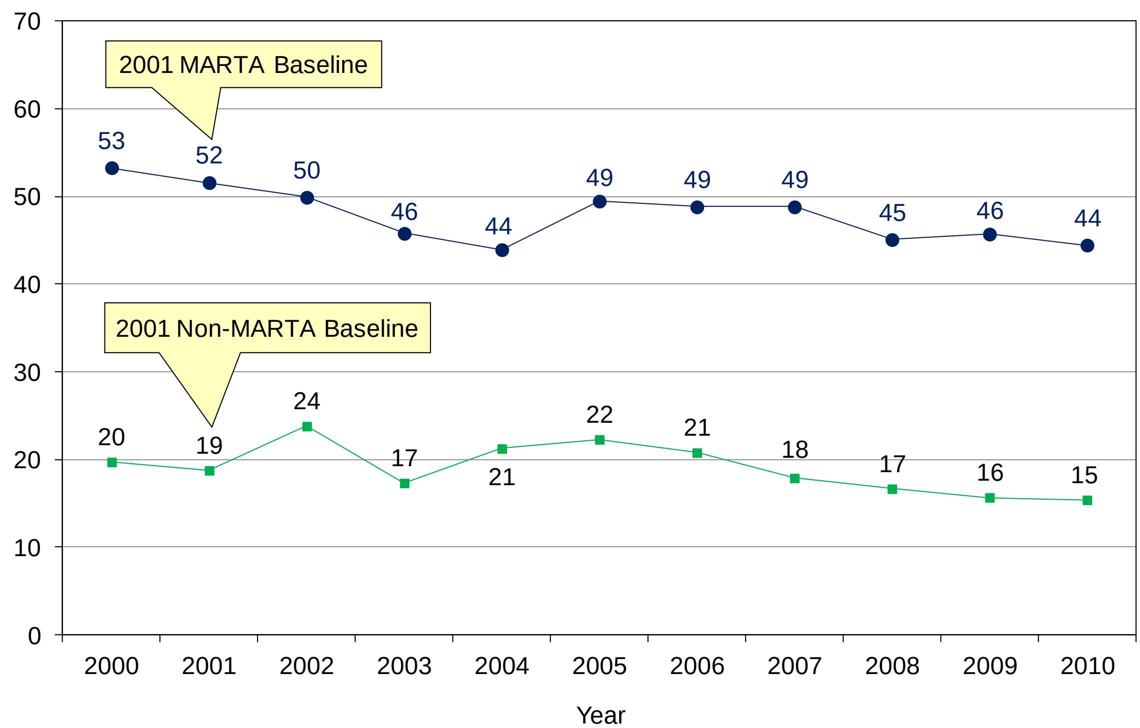
Accessibility

Passenger Trips per Transit Service Hour

It is important for a transit system to operate efficiently in order for the system to be sustainable over the long term. Passenger trips per transit service hour reflects transit system efficiency. This measure reports the average number of people using a transit vehicle in a revenue service hour. One vehicle in operation for one hour equals one revenue service hour. A rail car is assumed to be able to carry twice as many passengers as a bus. In other words, a transit bus or rail car in service for one hour can expect to see this many boardings. A higher number is better.

In the baseline year of 2001 there were 52 passenger trips per transit service hour for MARTA. That number declined to 44 in 2010. The other transit systems combined (C-TRAN, Cobb Community Transit, Douglas County Rideshare, GRTA, Gwinnett County Transit, and VPSI) had 19 passenger trips per transit service hour in 2001, which declined to 15 in 2010. These numbers indicate a considerable decline in transit operating efficiency.

Figure 19: Passenger Trips per Transit Service Hour



Accessibility

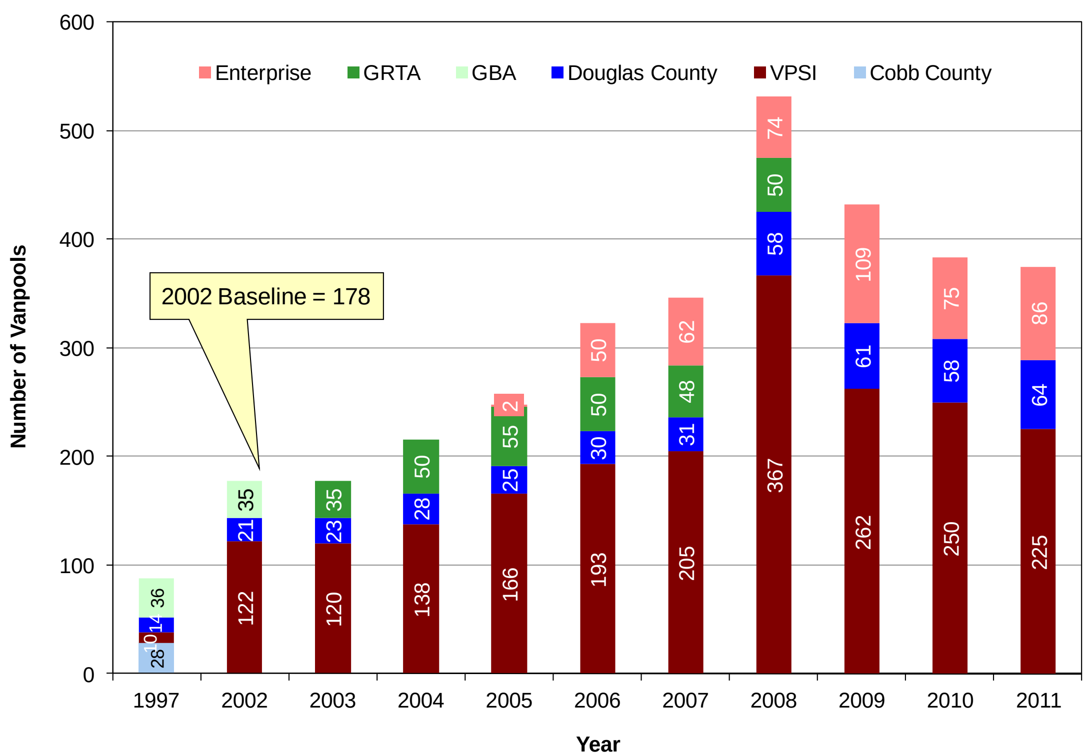
Number of Vanpools

This measure reports how many vanpools are in operation at the end of each year. It captures vanpools operating in formal programs in the metropolitan Atlanta region. A higher number is better.

Vanpools operate at the convenience of the vanpool group and are able to be in service at any hour of the day and to travel any route the group desires, from door-to-door service to pickup and drop-off at fixed locations. This flexibility is particularly useful for people working second and third shifts, and those working at locations not currently served by public transportation. A typical vanpool operating a 15-passenger van takes seven cars off the road, contributing to reductions in both emissions and congestion.

Prior to 1997, there were four vanpool programs operating in the region – CCT's vanpool program, VPSI, Douglas County Rideshare and the Georgia Building Authority's (GBA) vanpool program. When CCT's vanpool program disbanded service in October of 1997, all 28 of its routes were taken over by VPSI. VPSI is a private operator in the region and also provides some service to the public operators. Another private operator, Enterprise, entered the market in 2005 and started offering vanpool services. In October of 2003 GRTA absorbed the GBA's vanpools into its operation. Subsequently, GRTA disbanded service in October of 2008. The base year for vanpools in the region is 2002, when 178 vanpools were operating. The total number of vanpools in metro Atlanta was 375 at the end of 2011. This represents a significant drop from the peak of 549 vanpools in 2008. Still, the number of vanpools in 2011 is more than 110 percent higher compared to the base year of 2002.

Figure 20: Number of Vanpools



Accessibility

Air Quality

Daily Vehicle Emissions

This measure tracks certain pollutants that are released from cars and trucks each day. The pollutants measured are fine particulate matter, volatile organic compounds (VOCs) and nitrogen oxides (NO_x). Fine particulate matter is a general term used for solid particles and liquid droplets that are in the air and have a diameter of less than 2.5 microns. (The average human hair is about 70 microns in diameter and talcum powder particles are about 10 microns in diameter). VOCs are organic compounds that can vaporize and enter the atmosphere under normal conditions. Nitrogen oxides are produced from nitrogen and oxygen during combustion. NO_x and VOCs are precursors to ozone. Lower emissions numbers are better.

The U.S. Environmental Protection Agency (EPA) has designated the metropolitan Atlanta area as a nonattainment area under the National Ambient Air Quality Standards for 8-hour ozone and fine particulate matter. The 8-hour ozone standard is based on the measured concentration of ozone in the air, averaged over eight-hour periods. Emissions of VOC and NO_X, as well as primary particulate matter, which is emitted directly by vehicle engines, are used as proxies for air quality since they are directly related to the performance of the transportation system.

Total daily vehicle emissions of VOC, NO_X and primary $PM_{2.5}$ are estimated for the 13-county Atlanta area by multiplying the total daily VMT for the area by the corresponding MOBILE6 emissions factors. In order to make the measures directly comparable, their absolute values are converted into percentages and then compared to the baseline (year 2000) levels. Figure 21on the next page shows that total daily vehicle VOC, NO_X and primary $PM_{2.5}$ emissions in 2010 were 56, 50, and 54 percent of their respective year 2000 levels—close to a decrease in half over ten years. Since the average total daily VMT has continued to increase most years, these decreases in emissions are mostly due to declining emission factors resulting from advanced emission control technologies on newer vehicles and the Georgia Environmental Protection Division's clean gasoline and vehicle emissions inspection programs. As a result of these and other emission reductions, the Atlanta area met the 1997 eight-hour ozone standard by the attainment date of June 15, 2011.[11] Additionally, Georgia plans to attain the 1997 annual $PM_{2.5}$ standard by 2013.[12]

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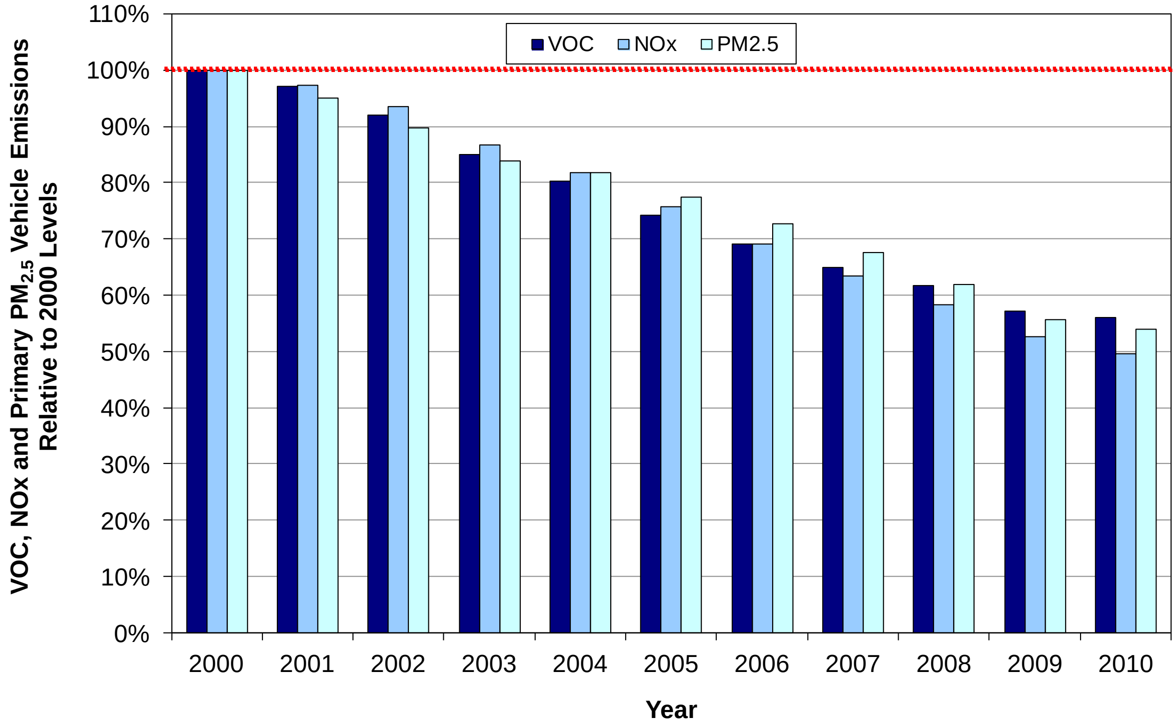
[11] Final Determination of Attainment. Federal Register Volume 77, Number 45 (March 7, 2012)

[12] Proposed Georgia's State Implementation Plan for the Atlanta PM2.5 Nonattainment Area (submitted to EPA on July 6, 2010)

Figure 21: VOC, NO_X and $PM_{2.5}$ Vehicle Emissions in the Atlanta Area Relative to Year 2000



Safety

The safety measures address personal transportation safety as well as the roadway clearance time. The latter measure also affects mobility in the region, as each minute an incident blocks a travel lane results in three to seven minutes of delay and increases the probability of secondary incidents as traffic backs up.

Metropolitan Atlanta's safety record is influenced by the efforts to improve safety across the state. Georgia is addressing the needed traffic safety work to decrease the number of fatalities by implementing the Governor's Strategic Highway Safety Plan (SHSP). The SHSP addresses statewide highway fatalities by organizing a 22 agency collaborative leadership, including GRTA, SHSP operations manager, safety program data evaluation, and 14 task team action plans. The four safety E's of education, engineering, enforcement, and emergency medical services are incorporated to achieve the goal of continuously reducing highway fatalities by 41 each year. Georgia has reduced highway fatalities from 1,693 in 2006 to 1244 in 2010, a 26 percent drop.

Traffic Crash Fatalities

This measure counts how many people die in traffic crashes in metropolitan Atlanta each year. To understand how the raw number of deaths compares across the state and country, the number of deaths per 100 million miles driven is calculated. Fewer are better.

In the base year of 2001, the 13-county Atlanta region experienced 494 traffic crash fatalities at a rate of 1.12 fatalities per 100 million miles driven.[13] After the peak of 542 fatalities and 1.17 fatalities per 100 million miles in 2006, a remarkable decrease in both absolute traffic crash fatalities to 346 and the fatalities per 100 million miles to 0.70 was registered in 2010. Although the Atlanta region has much lower fatality rate compared to the state of Georgia and the nation as a whole still more work needs to be done to improve traffic safety and decrease the number of fatalities.

[13] Data for the safety measures comes from the Fatality Analysis Reporting System web-based encyclopedia located at http://www-fars.nhtsa.dot.gov. The total number of traffic crash fatalities includes the vehicle occupants, motorcycle riders, and nonmotorists fatalities on all roads in the 13-county Atlanta area.

Figure 22: Traffic Crash Fatalities

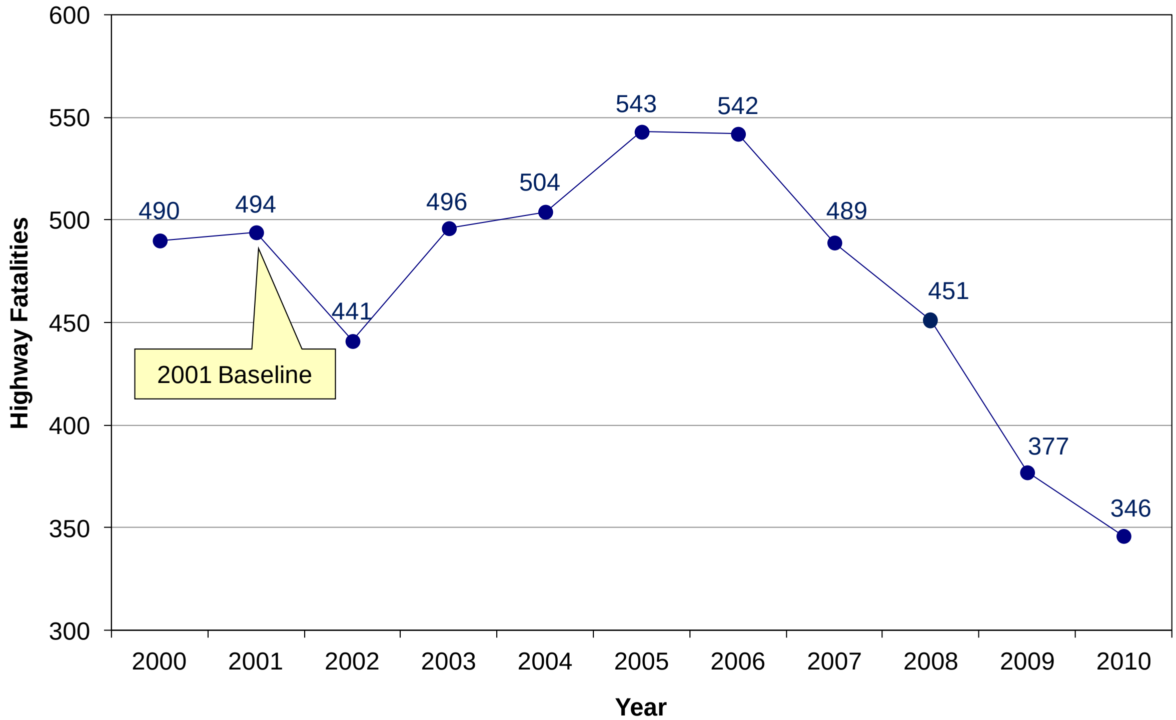
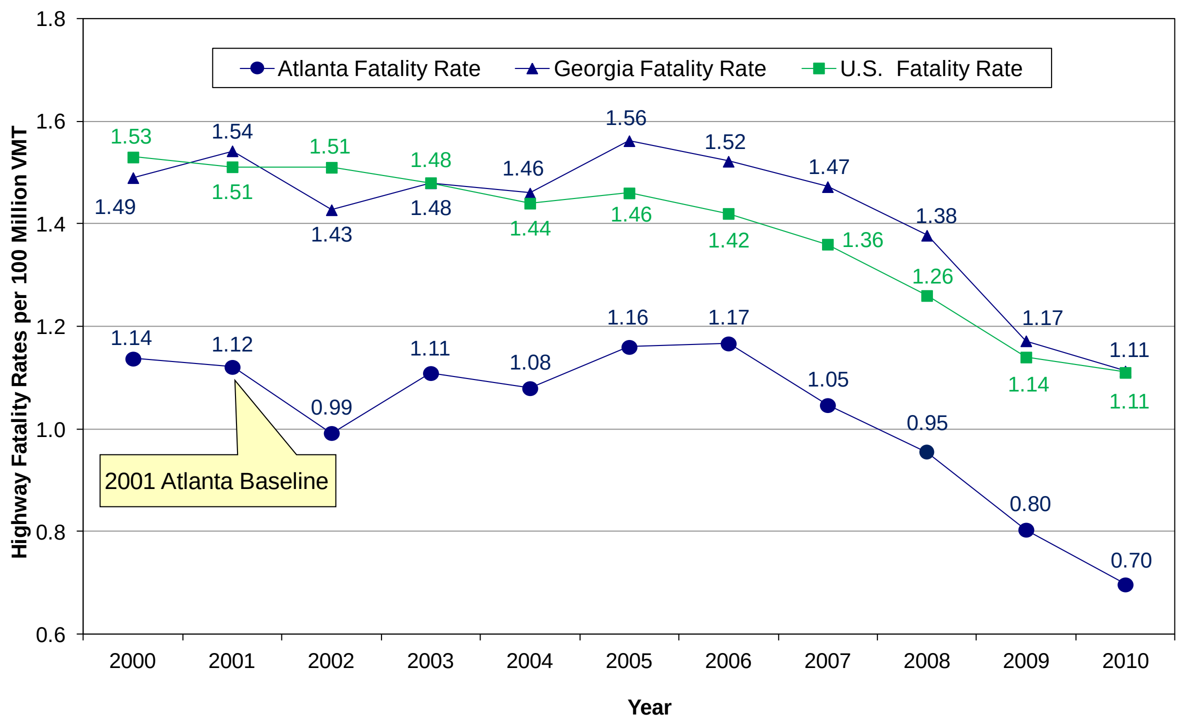


Figure 23: Traffic Crash Fatality Rates per 100 Million Vehicle Miles Traveled

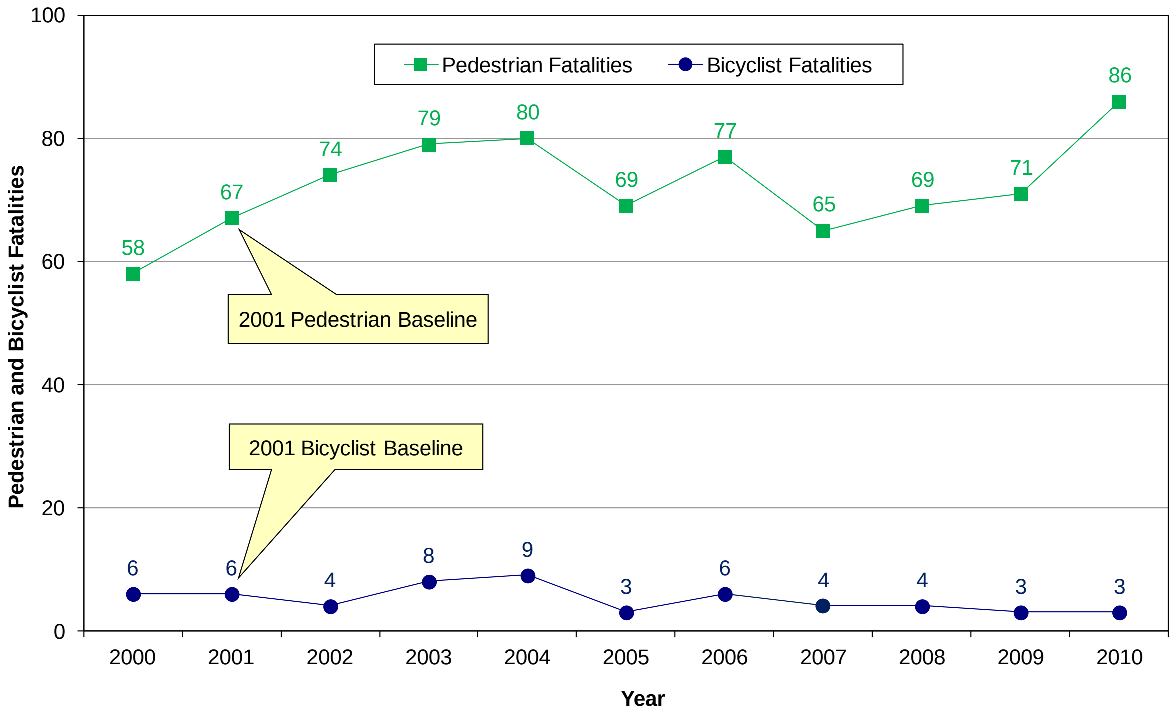


Pedestrian and Bicyclists Fatalities

This measure counts how many pedestrians and bicyclists die in traffic-related incidents each year. The comparative measure is the number of pedestrian and bicyclist deaths per 100,000 population. Fewer are better.

In the base year of 2001 there were 67 pedestrian and six bicyclist fatalities in the 13-county Atlanta region. Pedestrian fatalities increased from 77 in 2006 to 86 in 2010, while the bicyclist fatalities declined from six to three during the same period.

Figure 24: Pedestrian and Bicyclist Fatalities



The pedestrian fatality rate per 100,000 population increased from 1.79 in 2006 to 1.89 in 2010, while the respective bicyclist fatality rate declined from 0.14 to 0.07 during the same period. The 2010 bicyclist fatality rate of 0.07 is less than half the baseline rate of 0.16 in 2001.

Figure 25: Pedestrian Fatality Rate per 100,000 Population

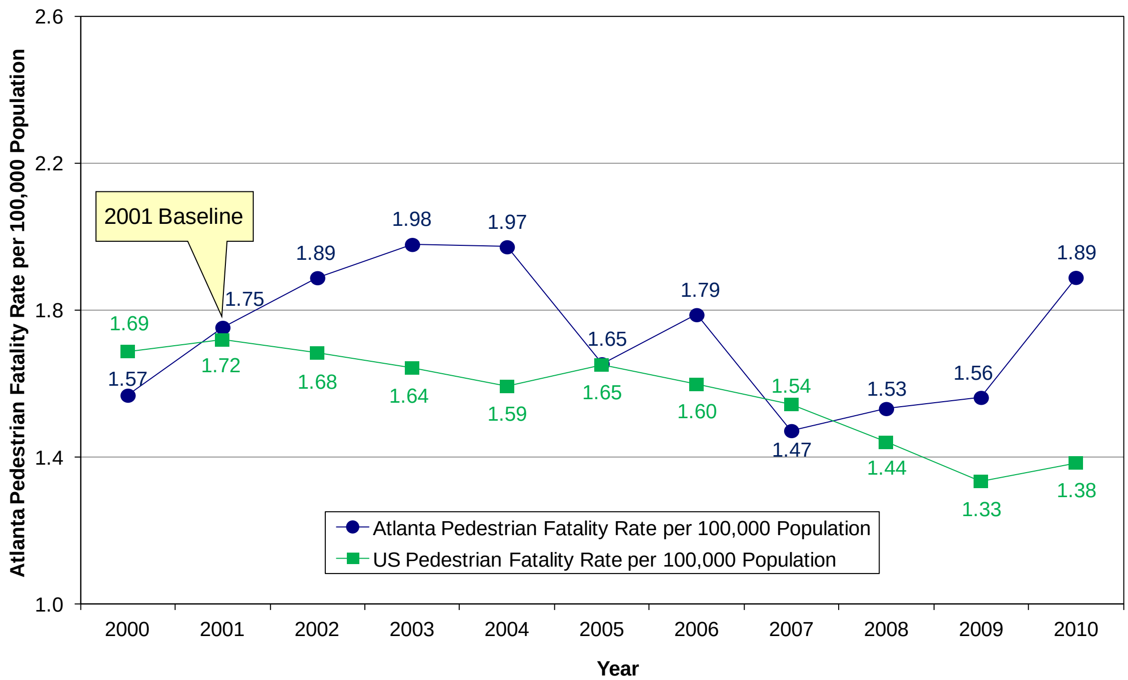
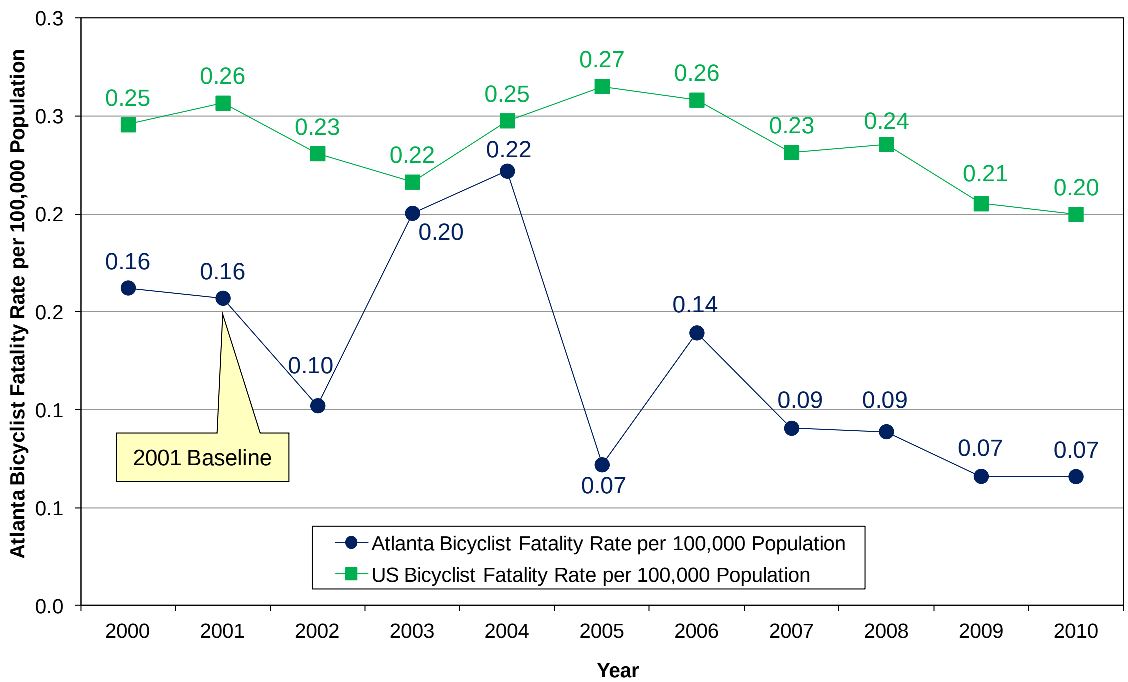


Figure 26: Bicyclist Fatality Rate per 100,000 Population



Roadway Clearance Time

This measure calculates the amount of time between the first time a responsible agency such as the police, HERO, fire or other agency becomes aware of an incident and when all lanes of the affected road are available for service. In other words, it is the amount of time from when somebody who can do something about it knows about an incident until all the lanes are open for traffic again. A lower number is better.

Over fifty percent of all congestion nationally is non-recurring. It is caused by traffic incidents, work zones, and weather.[14] For each minute an incident blocks a travel lane, roughly three to seven minutes of delay is created. Some studies have shown as much as seventy percent of daily delay is due to "non-recurring" congestion.[15]

Traffic incident management is a strategy that uses many different techniques to help emergency responders quickly and safely clear traffic incidents so the roadway can return to normal flow with a minimum of additional delay. The Traffic Incident Management Enhancement (TIME) Task Force, a partnership between transportation agencies, police, fire, towing and recovery operators, and other emergency responders, has been implementing techniques to improve traffic incident management in Metro Atlanta.

The TIME Program sponsors the Towing and Recovery Incentive Program (TRIP). TRIP is a recovery incentive program to pay heavy-duty recovery companies a monetary bonus for clearing commercial vehicle wrecks quickly. TRIP helps to reduce the impact of major traffic incidents in Metro Atlanta while meeting TIME's aggressive clearance goal of 90 minutes or less. The TRIP program, which began in January 2008, has contributed to reducing the length of major lane-blocking incidents.

The key performance measure for traffic incident management in Atlanta is "roadway clearance time." Roadway clearance time is defined as the "time between first recordable awareness of incident by a responsible agency and first confirmation that all lanes are available for traffic flow."[16] The response time is the time between the first recordable awareness of an incident and the first arrival by a responder on scene.

In 2002, the baseline year, response time for tractor-trailer incidents was 17 minutes and for automobiles 10 minutes. On-scene time for tractor-trailer incidents was 65 minutes, and 30 minutes for automobiles. The roadway clearance time for a typical tractor-trailer incident was more than twice (82 minutes) the 40 minute duration of an automobile incident.[17] The difference in time is influenced by a number of factors, including degree of seriousness, HAZMAT concerns, number of lanes affected, and availability of equipment necessary to accommodate tractor-trailer size and weight.

Roadway clearance time for incidents involving tractor-trailers at 38 minutes is up in 2011 compared to the minimum of 31 minutes in 2009. Still, it has dropped by about 54 percent from its 2002 value. Similarly, the roadway clearance time for incidents involving automobiles was 24 minutes in 2011, a drop of 40 percent from its respective 2002 value.[18]

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[14] http://ops.fhwa.dot.gov/program_areas/reduce-non-cong.htm
[15] http://depts.washington.edu/trac/bulkdisk/pdf/568.2.pdf
[16] FHWA Focus States Initiative - Traffic Incident Management Performance Measures - Action Plan. http://ops.fhwa.dot.gov/eto_tim_pse/preparedness/tim/pm.htm
[17] Data source—monthly incident data found in the GDOT's HERO Monthly Statistics publication.
[18] The 2007 data is available for the months April through December only.

Figure 27: Roadway Clearance Time – Tractor-trailers

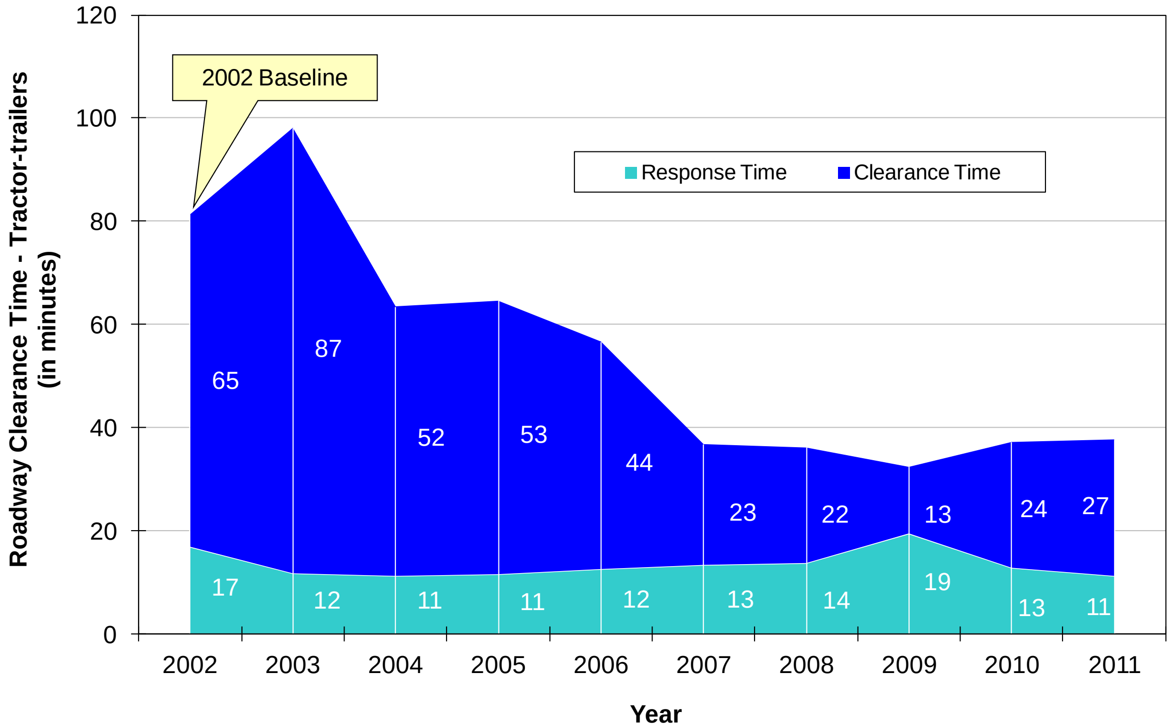
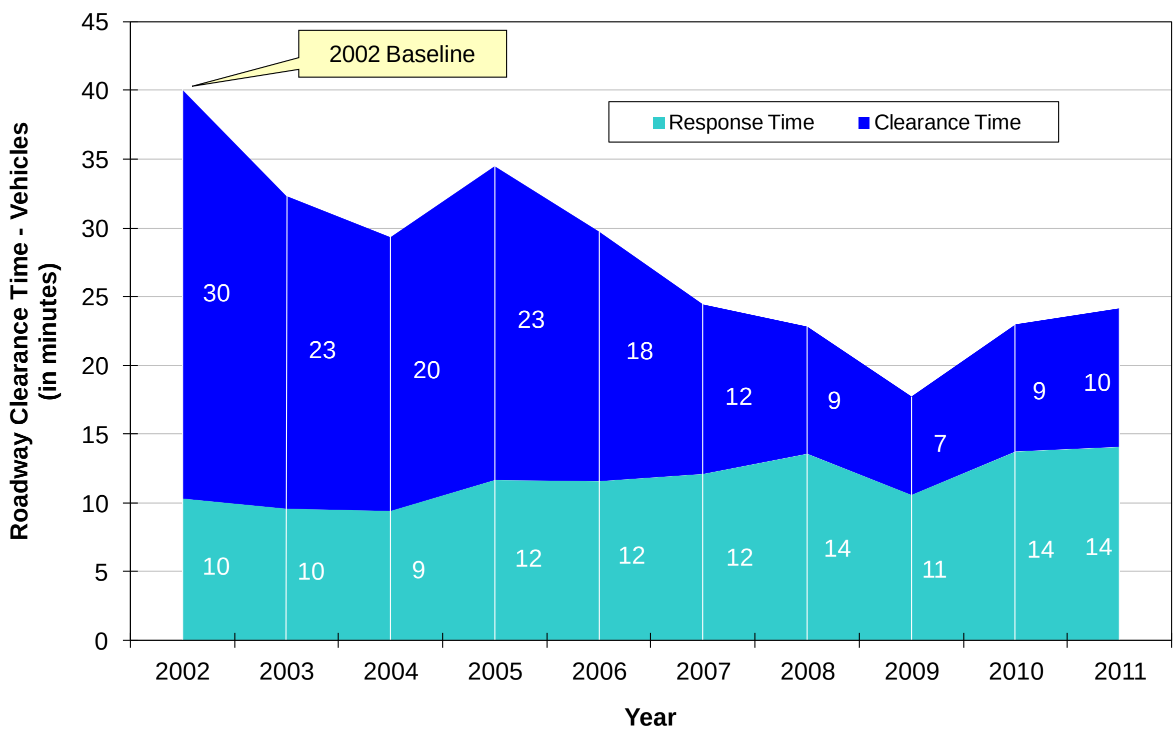


Figure 28: Roadway Clearance Time – Passenger Vehicles



Customer Satisfaction

The transportation system has its “customers” and transportation agencies recognize the need to improve customer service and customer satisfaction. The following performance measures reflect the satisfaction of the transportation user, in addition to other aspects of the transportation system construction, maintenance, and service delivery. Customer satisfaction measures provide balance from the perspective of the end user and can be a valuable tool for informing decision-makers on how well transportation services are being provided.

Roadway System Customer Satisfaction

This set of measures tracks the customer satisfaction of Metropolitan Atlanta residents with the state roadway system. The data come from the 2011 public opinion poll conducted for GDOT by Georgia State University. The respondents in this telephone survey were selected through a stratified sampling process of Atlanta residents 18 years and older. Random digit dialing was used to randomly select 100 respondents. The respondents were asked, to use an A to F grading scale (A for Excellent, B for Good, C for Fair, D for Poor, and F for Failing) to rate the following aspects of the state roadways that they normally use:

1. Their condition and ride quality;
2. Traffic flow and congestion; and
3. Safety.

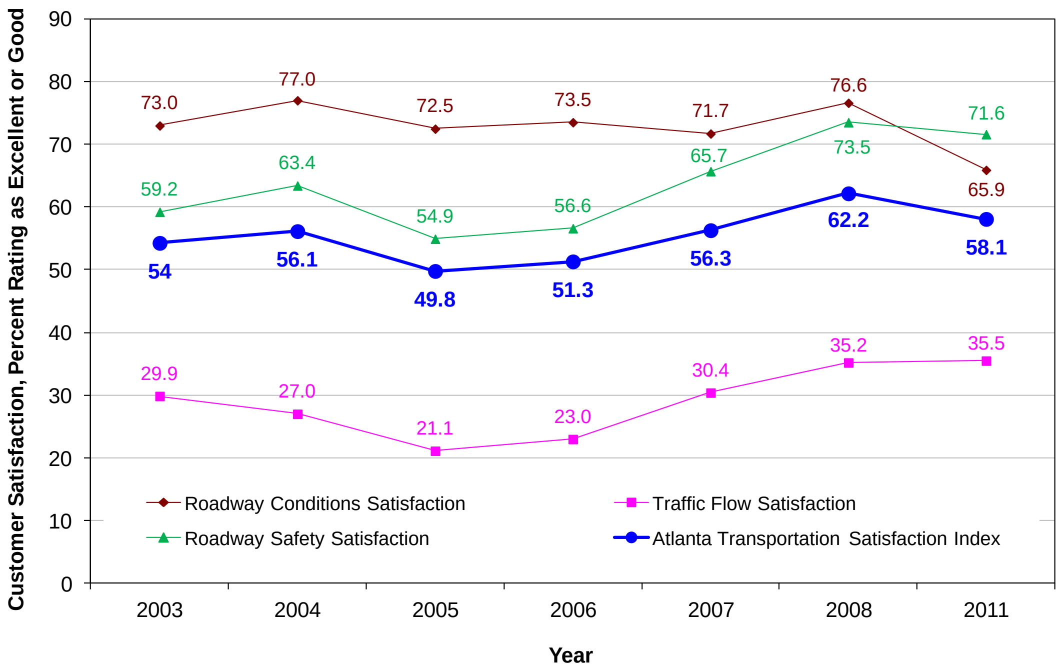
The cumulative percentage of A and B grades is then used for the following customer satisfaction measures, corresponding to the above questions:

1. Roadway Conditions Satisfaction
2. Traffic Flow Satisfaction
3. Roadway Safety Satisfaction

The percentages of Atlanta’s respondents that rate as a very high priority roadway maintenance, reducing traffic congestion, and roadway safety are 66, 65, and 70 percent, respectively. A composite Atlanta Transportation Satisfaction Index is produced based on these three basic satisfaction measures weighted by their relative priority. The three basic satisfaction measures and the satisfaction index are depicted in Figure 29 on the next page.

Review of the ratings of Metropolitan Atlanta residents of the state roadway system reveals a broadly positive picture. Satisfaction with roadway safety shows the highest improvement from 59.2 percent in 2003 to 71.6 percent in 2011. The validity of this development is confirmed objectively by a significant reduction in traffic fatalities since 2005. Satisfaction with roadway conditions, although second highest at 65.9 in 2011, dropped compared to 76.6 in 2008. This decline is probably due to the worsening roadway conditions as evidenced by the pavement condition rating measure. Atlanta’s residents are the least satisfied with the traffic flow conditions, reflecting the persistent congestion problem in the region. Still, satisfaction with traffic flow conditions improved by 5.6 points from 29.9 percent in 2003 to 35.5 percent in 2011. The overall roadway customer satisfaction index increased during the same period from 54 percent to 58.1 percent. In other words, almost six out of ten Atlanta residents give an overall rating of “excellent” or “good” to the roadway conditions, traffic flow, and safety combined.

Figure 29: Customer Satisfaction Measures



Xpress Service Customer Satisfaction

This measure tracks the customer satisfaction of Metropolitan Atlanta residents with the GRTA *Xpress* transit service. The data come from the 2010 and 2011 *Xpress* customer satisfaction surveys conducted by GRTA. The 2011 Customer Satisfaction Survey covered all 37 Xpress routes. GRTA contracts with Cobb Community Transit to operate five of those routes and with Gwinnett County Transit to operate four routes. Furthermore, CCT and GCT each manage and operate three of their routes. Survey respondents were asked to score 17 key service characteristics and their overall satisfaction with the transit service as Excellent, Very Good, Good, Fair, or Poor. Responses to service questions were then transformed into a Service Quality Index where a response of “Excellent” was given a score of 5 and a response of “Poor” was given a score of 1.

The overall satisfaction with the GRTA *Xpress* service declined from 4.2 in 2010 to 4.02 in 2011 but still scored highest among the other transit providers— CCT and GCT.

The overall satisfaction with the CCT service in 2011, while still high at 3.8, declined from 3.9 in 2010. GCT managed to improve its customers’ overall satisfaction with its service from 3.8 in 2010 to 3.98 in 2011.

These results demonstrate a very high level of customer satisfaction with the *Xpress* transit service. This is an important finding especially in light of the fact that the vast majority of the *Xpress* riders are not transit dependent.

Transportation System Performance

Atlanta Transportation Performance Index

The Atlanta Transportation Performance Index synthesizes a number of different factors reflecting roadway, transit, safety and air quality performance measures. This composite index is a single measure that tracks the state of the metropolitan Atlanta transportation system, similarly to the way the temperature is the main weather-related measure. The main advantage of the transportation performance index is that it minimizes the number of measures reported.

The Atlanta transportation performance index is obtained by employing the weighted sum model. A composite index is produced based on 12 input measures weighted by their relative importance.[19] The composite transportation performance index consists of four basic indices—Roadway services index, Roadway safety index, Roadway emissions index, and Transit services index—tracking separately important performance aspects of roadway and transit services.[20] Each of these indices is normalized to a 100 scale for the base 2002 year for ease of presentation. An index number of more than 100 indicates improvement over the base year.

The composite transportation performance index is not published in this year's report due to the ongoing reassessment of the weights of the four basic indices.

The four transportation performance indices help understand whether the different aspects of the region's transportation system are improving or worsening. The roadway emissions index maintained its unbroken upward trend reaching 173 in 2010, an improvement of almost three fourths over the 2002 base year. The key contributing factor here is the decreasing emission rates per vehicle mile traveled.

The roadway safety index showed the best improvement by increasing from a low of 86 in 2006 to 134 in 2010 due to the remarkable decrease in roadway fatalities during these years.

The transit services index rose to 122 in 2009 due mainly to the rapid growth of new and small transit providers in the region. This was followed in 2010 by a decline to 116 because of transit services cutbacks. Still, transit services improved by 16 percent compared to the base year of 2002.

The roadway services index is basically flat at 101 in 2010 compared to 100 in 2002. This reflects the persistent congestion problem in the region.

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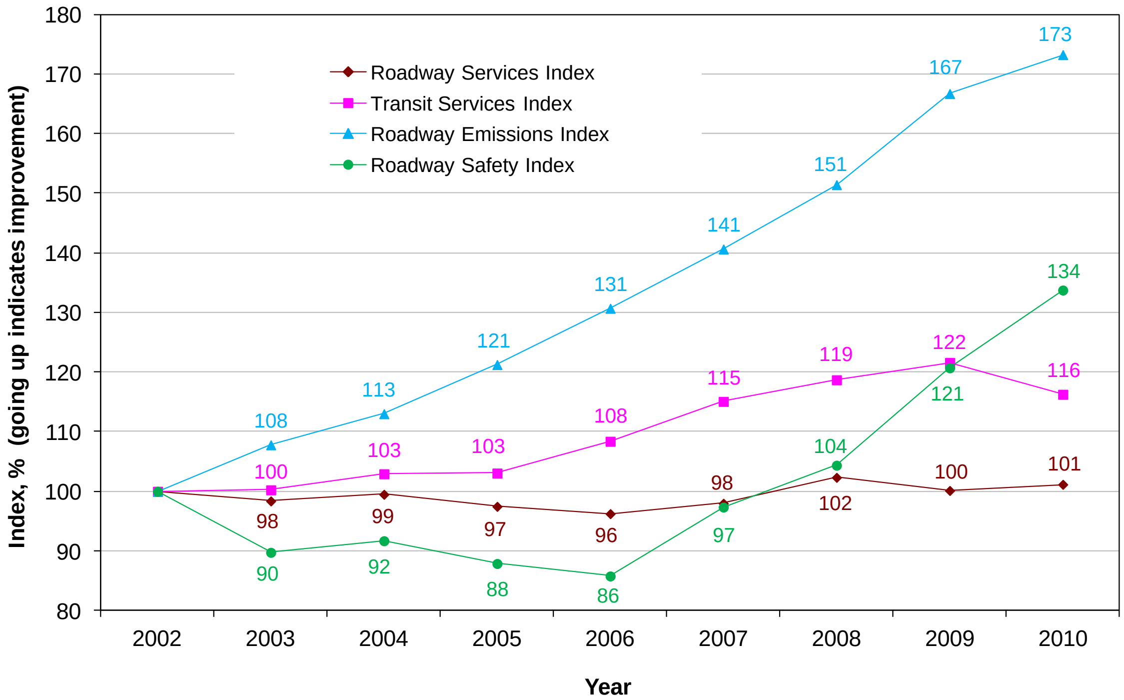
[19] The ATPI is composed of the following measures: Travel time index, Planning time index, Daily vehicle miles traveled, Transit revenue service hours - MARTA, Transit revenue service hours - other, Transit passenger miles traveled, Transit passenger boardings, Vehicle NO_x emissions, Vehicle VOC emissions, Vehicle $PM_{2.5}$ emissions, Traffic crash fatality rate per 100 million VMT, Pedestrian and bicyclist fatalities per 100,000 population.

[20] The roadway services index is composed of the following measures: travel time index, planning time index, and daily vehicle miles traveled. The roadway safety index consists of the traffic crash fatality rate per 100 million VMT and pedestrian and bicyclist fatalities per 100,000 population. The transit services index includes transit revenue service hours - MARTA, transit revenue service hours - other, transit passenger miles traveled, and transit passenger boardings. The roadway emissions index is based on the vehicle nitrogen oxides emissions, vehicle volatile organic compounds emissions, and vehicle primary fine particulate matter emissions.

Figure 30: Atlanta Transportation Performance Indices



Summary of 2011 Transportation MAP Measures

	Performance Measure	*Description*		*Baseline*		*Update*	
				Value	*Year*	*Value*	*Year*
Mobility	Freeway travel time index *The slowest periods:* *7:30 a.m. – 8:30 a.m.* *5:00 p.m. – 6:00 p.m.*	Freeway TTI, weighted by segment VMT, during the slowest regional one-hour morning and evening peak period		1.25 *1.32 (PM)*	2009	1.26 *1.35 (PM)*	2010
Mobility	Freeway planning time index *The slowest periods:* *7:30 a.m. – 8:30 a.m.* *5:00 p.m. – 6:00 p.m.*	Freeway PTI, weighted by segment VMT, during the slowest regional one-hour morning and evening peak period		1.67 *1.91 (PM)*	2009	1.68 *1.98 (PM)*	2010
Mobility	Freeway buffer time index *The slowest periods:* *7:30 a.m. – 8:30 a.m.* *5:00 p.m. – 6:00 p.m.*	Freeway BTI, weighted by segment VMT, during the slowest regional one-hour morning and evening peak period		36.0% *43.2% (PM)*	2009	34.4% *46.1% (PM)*	2010
Mobility	Daily vehicle miles traveled per licensed driver / per person	Vehicle miles traveled per licensed driver / person per day		55.1	2000	41.6	2010
Mobility				31.9	2000	29.9	2010
Mobility	Pavement condition rating	Percent of the state roadway system with a PACES rating greater than 70		88%	2000	63%	2011
Mobility	Transit passenger miles traveled	Transit passenger miles traveled (in millions)		874	2001	940	2010
Mobility	Annual transit passenger boardings	Cumulative sum of the number of passengers who board public transportation vehicles annually (in millions)		167	2001	157	2010
Accessibility	Average number of workers that can reach a major employment center by car in 45 minutes	Average number of workers that can reach a major employment center in the 20-county Metro Atlanta by car in 45 minutes or less during the morning peak period.		800,000	2010	N/A	N/A
Accessibility	Transit revenue service hours (MARTA, C-TRAN/CCT/DCR/ GRTA/VPSI/ Gwinnett Transit)	Total number of hours trains and buses are running and available to carry passengers in a year (in thousands)	MARTA	3,182	2001	3,291	2010
Accessibility			Other	157	2001	724	2010

SUMMARY OF 2011 TRANSPORTATION MAP MEASURES (2)

	Performance Measure	Description		Baseline Value	Baseline Year	Update Value	Update Year
Accessibility	Passenger trips per transit service hour (MARTA, C-TRAN/CCT/DCR/ GRTA/VPSI/ Gwinnett Transit)	Average number of unlinked passenger trips per revenue hour trains and buses are running and available to carry passengers in a year	MARTA	52	2001	44	2010
			Other	19	2001	15	2010
	Number of vanpools	Total number of vanpools operating in a given year in the 28- county Atlanta area		178	2002	375	2011
Air Quality	Daily vehicle emissions (relative to 2000 levels)	VOC		100%	2000	56%	2010
		NO_x		100%	2000	50%	2010
		Primary $PM_{2.5}$		100%	2000	54%	2010
Safety	Traffic crash fatalities/ Traffic crash fatality rate	Total number of traffic crash fatalities		494	2001	346	2010
		Traffic crash fatality rate per 100 million VMT		1.12	2001	0.70	2010
	Pedestrian and bicyclist fatalities / Pedestrian and bicyclist fatality rate per 100,000 pop.	Pedestrian fatalities		67	2001	86	2010
		Bicyclist fatalities		6	2001	3	2010
		Pedestrian fatality rate		1.75	2001	1.89	2010
		Bicyclist fatality rate		0.16	2001	0.07	2010
	Roadway clearance time	Incidence response and clearance time (in min.)	Tractor-trailers	81	2002	38	2010
			Vehicles	40	2002	24	2010
Customer Satisfaction	Roadway Customer Satisfaction* ** This is the percentage of respondents rated the respective condition as Excellent or Good.*	Roadway Conditions Satisfaction		73%	2003	65.9%	2011
		Traffic Flow Satisfaction		29.9%	2003	35.5%	2011
		Roadway Safety Satisfaction		59.2%	2003	71.6%	2011
		Atlanta Transportation Satisfaction Index		54.0%	2003	58.1%	2011
	*X*press / CCT / GCT Service Customer Satisfaction	Service Quality Index* **Score of 5 is for "excellent," score of 1 for "poor" service*		4.2 *X*pr. 3.9 CCT 3.8 GCT	2010	4.0 *X*pr. 3.8 CCT 4.0 GCT	2011
Transp. System Performance	Atlanta Transportation Performance Indices* ** An index number of more than 100 indicates improvement over the base year.*	Roadway services index		100	2002	101	2010
		Transit services index		100	2002	116	2010
		Roadway emissions index		100	2002	173	2010
		Roadway safety index		100	2002	134	2010

Appendix: Freeway Travel Time, Planning Time Index, and Buffer Time Index

The Appendix can be accessed at
http://www.grta.org/tran_map/Appendix_2011_MAP_Report.pdf

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