CAMBRIDGE SYSTEMATICS

# 2040 Statewide Transportation Plan / 2015 Statewide Strategic Transportation Plan: Existing Conditions

*Technical Memorandum 3*

final technical

**memorandum**

*prepared for*

**Georgia Department of Transportation**

*prepared by*

**Cambridge Systematics, Inc.**

*with*

GeoStats Services
Gresham, Smith & Partners
Reynolds, Smith & Hills, Inc.

*January 2014*

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# Executive Summary

This document is the third Technical Memorandum to be produced under the Georgia Department of Transportation's (GDOT or "the Department") Statewide Transportation Plan/Statewide Strategic Transportation Plan Update (SWTP/SSTP) project. This report builds on the Methodology Report and Literature Review submitted under Task 1, and the Data Collection Plan submitted under Task 2. The report documents the inventory, capacity, usage, performance and major issues/deficiencies of each of the primary modes of transportation in Georgia, including highway/truck, public transportation, rail, bicycle and pedestrian, aviation, and marine ports. Both passenger and freight transportation are addressed, with freight transportation included in the truck, rail, aviation, and marine port chapters. The format of the chapters varies slightly depending on the best way to present the specific modal information. Also, mapping formats have been standardized where possible, but because of the different scale required of some topics, formats vary in some cases.

The report relies primarily on existing data sources to update the information provided in the last update of the Statewide Transportation Plan (SWTP) published in 2006. However, several improvements have been made to data sources in the intervening years; for example, the development by GDOT of a Statewide Travel Demand Model, which was relied on heavily for the analysis of existing highway conditions. In addition, a gate survey of truck movements was conducted at the four truck/rail intermodal yards in the Atlanta region to improve upon dated information. The report also relies heavily on data recently developed by GDOT on other projects as fully documented in the Literature Review report, including the Freight and Logistics Plan (F&L) of 2012, and the Interstate System Preservation (ISP) Plan of 2013. Regional data sources such as metropolitan planning organization (MPO) travel demand models are also used, as are national data sources such as the National Transit Database (NTD) and the U.S. Census Transportation Planning Products (CTPP) program.

This section highlights the major findings of the report by mode:

## HIGHWAYS

A primary mission of GDOT is to plan, maintain, and operate Georgia's highway system. This responsibility includes the portion of the highway system that GDOT owns, as well as administering U.S. DOT funds for those portions of the highway system that it does not own, but which are eligible for Federal-Aid Highway System funding. Under Federal Transportation regulations, GDOT shares the responsibility for planning and programming Federal transportation funding with 16 MPOs in those urbanized areas with populations greater than 50,000. GDOT

has the sole responsibility to maintain and operate its solely owned highways in Urban Areas.

- There are over 123,000 miles of public roads in Georgia, of which GDOT owns only 15 percent. However, the GDOT-owned roads are among the most heavily traveled in Georgia, including all of the Interstate Highway System, 95 percent of the National Highway System (NHS) roads, and 58 percent of roads eligible for funding under the Federal-Aid Highway System (FAS) programs administered by GDOT. The entire FAS carries over 75 percent of the Vehicle Miles Traveled (VMT) in Georgia.
- There are 14,739 roadway bridges and related structures in Georgia. GDOT owns 55 percent of the bridges, but those bridges represent 77 percent of the bridge deck area in the State.
- There are few roads which are owned by GDOT, or for which GDOT administers Federal funding, that have pavement conditions rated below Good. A very small percentage of roadway miles in Georgia overall are in Good or less pavement condition (i.e., most are in Very Good or Excellent condition). For the most part, pavement condition is comparable across GDOT and non-GDOT owned roads. The most significant distinction in condition is on Major Collectors. Those that are owned by jurisdictions other than GDOT have worse conditions than on the GDOT-owned roads.
- Overall, across the State and on an average daily basis, nonaccess-controlled roadways average Level of Service (LOS) B and access controlled roadways average LOS C. The commonly accepted design standard for roads in rural areas is LOS C, and for urban areas is LOS D. However, peak-hour conditions on certain roadways, particularly in the Atlanta metropolitan region, and a few other urbanized areas such as Savannah, can be as low as LOS F at times, meaning that the roadways are operating over capacity and are highly congested. For example, according to the ARC Travel Demand Model, existing congestion on the Downtown Connector in Atlanta is a LOS of E, V/C of 0.87, on a daily basis but is a LOS F, V/C of 1.11, during the PM peak hours. The links on I-285 south of Spaghetti Junction (the I-85/I-285 interchange in northern DeKalb County) are a LOS E, V/C of 0.89 on a daily basis, but are a LOS F with a V/C of 1.10 during the PM peak hours.
- Bridge performance has been defined by the percent of bridges which are Structurally Deficient (SD) and Functionally Obsolete (FO). SD bridges are not unsafe, but they may have to function with load and speed restrictions, and require significant short-term repair and long-term rehabilitation or replacement. FO bridges do not meet current design standards or the level of traffic exceeds the bridge's capacity. Only 2 percent of bridges owned by GDOT are rated as SD, while 10 percent of non-GDOT-owned bridges that are not on the Federal-Aid system are rated SD. Twelve percent of Federal-Aid system bridges are rated FO, and 14 percent of non-Federal Aid bridges are rated FO. The most significant distinction in performance is on bridges owned

by GDOT which is better than the performance of bridges owned by municipalities.

## TRUCKS

- The trucking industry carries the vast majority of freight moved in the State, about 75 percent by tonnage. Trucking serves a dual role as an end-to-end freight mode moving goods between origins and destinations, and as the mode connecting other modes (rail, marine, air cargo) to final destinations for multimodal freight trips. This industry relies on the highway network for its operation with the Interstate system serving as the most heavily used component, particularly for long-haul movements. The local road network serves as the last-mile connector for the State's major freight facilities, and is especially important as Georgia has many significant freight facilities. Atlanta is the southeast hub for the two Eastern U.S. Class I railroads, Norfolk Southern Railroad (NS) and CSX Transportation (CSXT). Savannah is the fourth largest container port in the U.S. Hartsfield Jackson Atlanta International Airport (HJAIA) is the 10th largest air cargo airport in the U.S.
- In August 2013, the State Transportation Board adopted an official Freight Corridor Network. Along with the Interstate system, this network includes several U.S. and state highways such as U.S. 1 which connects to the Kaolin hub in Sandersville; U.S. 84 which provides port access to the agricultural industries in Southwest Georgia; U.S. 441 which connects to the new Caterpillar plant in Athens; the Fall Line Freeway which provides intercity connectivity between Augusta and Columbus; the Macon-LaGrange Corridor which improves access for the Kia plant via the Port of Savannah; Georgia Route 6 which connects to Norfolk Southern Railroad's (NS) Austell rail/truck intermodal yard in Atlanta; and the Jimmy DeLoach Parkway and Bourne Avenue which provide last-mile connectivity for the Port of Savannah.
- There is a relatively balanced mix of local, long-haul (both inbound and outbound), and through truck trips in Georgia. Florida is by far the largest trading partner, followed by the other neighboring states. The most common trip ends within the State are the Atlanta and Savannah regions. Atlanta is both a large consuming destination and a transshipment freight hub through the four large intermodal rail/freight yards operated by NS and CSXT. Most Savannah traffic is related to the Port and its associated warehouses.
- The highest truck volumes in the State are on the Interstate highways in the Atlanta region, including I-285, I-75, and I-85. The highest truck volumes on non-Interstate highways also are in the Atlanta region, including SR 316, SR 70, and SR 400. Trucks experience the most congestion on the Interstates in the Atlanta region, particularly on I-75 north of I-285, I-575, I-85 southbound, I-20 outside of I-285, and I-285 in the north for trucks heading toward SR 400. Trucks also experience congestion along I-520 in Augusta, I-20 east and west

of the Atlanta region, I-75 north of the region, and in the Savannah region on the routes serving the Port.

- In addition to the congestion issues described above, other issues facing truck operations in the State are truck crashes (with I-285 having the highest incidence), lack of sufficient roadside truck parking, truck size and weight regulations (which are lower than in some neighboring states), and transitioning to an alternative fuel (particularly natural gas) infrastructure.

## TRANSIT

- The Georgia Department of Transportation – Intermodal Division – Transit Section administers the Federal Transit Administration's Public Transit Program for the State of Georgia's small urban (Section 5307) and non-urbanized/rural (Section 5311) regions.
- GDOT is responsible for the overall administration of the Rural Public Transportation (RPT) program, which provides transit services to 112 of Georgia's 159 counties. GDOT, along with other human service transit providers, including the Departments of Human Services (DHS) and of Community Health (DCH), coordinates rural human services transportation (RHST) across the State. These RPT programs are coordinated across the State by Regional Commissions (RC), MPOs, cities, and counties. In 2011, GDOT helped to facilitate the process for rural transit providers to work with a third-party provider (Route Match, Inc.) to help manage operations, optimize scheduling, and increase the cost-effectiveness of RPT services. RPT services are provided by public and private entities, using both nonprofit and for-profit contractors. Customers may access RPT services with no restrictions on trip purpose (i.e., work, shopping, medical appointments, recreation, etc.).
- There are 15 urban fixed-route transit providers in Georgia, of which 4 are located within the boundaries of the Atlanta Regional Commission (ARC) MPO and are classified as "Very Large." This designation is given to those systems within an urbanized area whose population is greater than 1,000,000. These 4 urban fixed-route systems within Metro Atlanta include: 1) the Metropolitan Atlanta Rapid Transit Authority (MARTA), which is by far the largest transit operator in the State and the only one to provide rail service; 2) the Georgia Regional Transportation Authority (GRTA), which operates express bus services to downtown Atlanta; 3) Cobb Community Transit (CCT); and 4) Gwinnett County Transit (GCT).
- Three of the 15 urban fixed-route systems within the State are classified as "Large," which is the designation given to those systems within an urbanized area whose population is between 200,000 and 999,000. The 3 large urban fixed-route systems within Georgia are Chatham Area Transit (CAT) in Savannah, METRA in Columbus, and Augusta Public Transit (APT).

- The remaining eight urban fixed-route systems within the State are classified as "Small," which is the designation given to those systems within an urbanized area with a population of less than 200,000. The eight small urban fixed-route systems within the State are the Albany Transit System (ATS), the Athens Transit System (ATS), the Cherokee Area Transit System (CATS), the Douglas County Rideshare (DCR), the Hall Area Transit (HAT), the Liberty Transit (LT), and the Macon-Bibb County Transit Authority (MTA).
- Most systems operate daily services with the exception of Sundays, and charge fares of $1.00 to $2.00 per trip with discounts for children, students, and the elderly. The majority of these operators also provide on-demand paratransit service to elderly, disabled, and low-income residents.
- The largest urban fixed-route vehicle fleets (aside from MARTA and GRTA) are the Gwinnett and Cobb systems, with around 100 vehicles each. The majority of systems slightly increased fleet size between 2007 and 2012, and have an average fleet age of 5.1 years compared to 7.3 for the U.S. as a whole. The Chatham and Cobb County systems have the highest ridership, with just under 4 million annual trips respectively. Most systems experienced ridership increases between 2009 and 2012 in spite of the recent recession.
- Statewide, 2.26 percent of commuters take transit to work. The city with the highest rate of transit commuters is Atlanta at 12.66 percent.
- Transit system performance is measured nationally by the Federal Transit Administration (FTA) using data collected through the National Transit Database (NTD). Performance is based on six measures of operating costs and number of trips. In 2012, most of Georgia's urban fixed-route systems outperformed the national average for their class size in most measurement categories, with the exception of the systems in the 25-49 and 50-99 vehicle classes.
- The major issues facing transit in Georgia are focused around the availability of funding and coordination to cover needs, and the lack of transit service in some rural counties. As the economy rebounds, the population ages, and younger people increasingly seek alternative modes of travel, demand for public transit is likely to increase. The restriction on the use of State motor fuel tax revenue for transit means that funding must come from annual legislative appropriations from the general fund, or from special tax referenda. GDOT's RHST funding needs in FY 2012 were $30.4 million, and are projected to increase to $42.7 million by FY 2030.

## RAIL

- Georgia has over 6,000 miles of railroad track, of which approximately 4,844 is in active service. Two large East Coast Class I railroads, Norfolk Southern (NS) and CSX Transportation (CSXT), operate 70 percent of the trackage. The remaining miles are operated by 26 Class III or Short-Line railroads. Two state

agencies, GDOT and the State Property Commission, own 676 miles of track which is leased out to various operators.

- The Class I rail lines connect rail hubs in Atlanta to the Midwest and to ports in Georgia and Florida. The two busiest corridors are the CSXT corridor between Jacksonville, Florida and Tennessee via Waycross, Cordele, and Atlanta; and a parallel NS corridor via Cordele, Macon, and Atlanta.
- The primary rail/truck intermodal terminals are located in Atlanta and Savannah, the latter of which serve primarily port traffic. There are 42 carload and 18 bulk transload facilities located across the State.
- Georgia's rail tonnage is dominated by carload traffic when measured by weight, but is almost evenly split between carload and intermodal (container/ trailer) traffic when measured by value. Through traffic (neither originating nor terminating in Georgia) constitutes the largest share of this traffic, and intrastate traffic the smallest share. By far the dominant commodity, by tonnage, shipped via rail in Georgia is inbound coal to serve a small number of large coal-fired power plants.
- Georgia's rail network capacity has largely been able to keep up with demand in recent years, but there are a number of constraints which could prove problematic in the future, including bottlenecks (particularly Howell Junction in northwest Atlanta); substandard weight limits and vertical clearances; single trackage; limited terminal capacity; and the need for improved traffic management systems to meet evolving Federal requirements.
- All passenger rail service in Georgia is operated by Amtrak, which runs four long-distance trains through Georgia along two rail corridors. The northern corridor through Atlanta, owned by NS, connects to North Carolina and points north in the mid-Atlantic states, and to Birmingham and New Orleans to the southwest. The Atlantic corridor is owned by CSXT and connects through Savannah to Florida to the south, and the Carolinas and points north in the mid-Atlantic. There are five stations in Georgia, of which the vast majority of boardings occur in Atlanta and Savannah. Plans call for relocating the Atlanta station in order to create a true multimodal hub. A variety of studies have been conducted of various high-speed and commuter rail lines in the State, but no projects currently are funded.

## BICYCLE AND PEDESTRIAN

- GDOT is committed to a Complete Streets approach of "routinely incorporating bicycle, pedestrian, and transit accommodations into transportation infrastructure projects as a means for improving mobility, access, and safety to the traveling public." As such, GDOT works with local governments and regional agencies to ensure that bicycle, pedestrian and transit needs are met through coordination from project planning through project construction. These needs are best identified and sponsored at the regional/local level.

- According to the U.S. DOT's National Walking and Bicycling Study: 15-Year Status Report (2010), there has been a 25 percent increase nationally in the number of bicycling and walking trips since 2001.
- GDOT uses the design standards of the American Association of State Highway and Transportation Officials (AASHTO) Guide for the Development of Bicycle Facilities. Bicycle lanes are GDOT's preferred bicycle facility type. These are on-road, one-way lanes, four feet in width, adjacent to vehicular traffic, to be used for bicycle travel only.
- GDOT has identified a network of 14 bicycle routes across Georgia, consisting of 2,943 miles. Approximately 70 percent of this network is on GDOT state routes. Infrastructure on these routes includes both paved shoulders and bicycle lanes. Beyond this designated state bicycle route system, there are almost 3,500 miles of bicycle facilities identified by local governments, MPOs, and RCs.
- Pedestrian infrastructure consists primarily of sidewalks, which are most often found in urban and suburban environments. According to GDOT's Design Policy Manual, sidewalks are preferred to be a minimum of five feet in width allowing two wheelchairs to pass, with curb ramps.
- Statewide, 1.78 percent of commuters bike or walk from their home locations to work. The city with the highest rate of bike/walk commuting is Athens, a college city, at 6.2 percent.
- Between 2010 and 2012, according to GDOT's Office of Traffic Operations, there were 1,125 crashes involving a bicycle, and 3,204 involving a pedestrian statewide. Most of the high-crash locations are located in MPO areas, which is not surprising given the higher incidence of biking and walking in urban areas.
- Major issues include the need for improved bicycle route signage; the need to update route designation based on changing traffic and roadway characteristics; and lack of continuity in sidewalk coverage, curb ramps, and sidewalks in rural areas.

## AVIATION

- There are 104 publicly owned, public use airports in Georgia, of which 9 offer scheduled commercial service, and the remaining 95 are classified as general aviation. The 9 commercial service airports handled approximately 47 million enplanements in 2012, of which almost 46 million were handled by the Hartsfield-Jackson Atlanta International Airport (HJAIA). The next busiest commercial service airport, with 789,000 enplanements, is the Savannah-Hilton Head International Airport (SAV). Between 2008 and 2012, during the years of the recession, enplanements increased at HJAIA but decreased overall at the other airports. Cargo service also is dominated by HJAIA, but a small

amount of cargo also is handled at Savannah-Hilton Head and at the Southwest Georgia Regional Airport (ABY) in Albany.

- Airports are stratified and rated by GDOT in the 2003 Georgia Airports System Plan (GASP) into Levels I (minimum standard general aviation), II (business airport of local impact), and III (business airport of regional significance and/or commercial service). Currently, 88 of the 104 airports meet airport runway length standards. The number of airports having a pavement condition index of at least 70, and meeting runway to taxiway separation requirements, has declined slightly in recent years. This may be partly due to changes in the standards or the change in airport function or classification. The number of airports meeting the need to have Runway Safety Areas (RSA) standards has increased slightly. The number of airports having an approved airport layout plan within the last five years has decreased significantly.
- The GASP established goals of having around 90 percent (depending on the airport level) of the State's population able to access an airport within a 30- to 60-minute drive time (depending on the airport level). The State is close to meeting this goal and the vast majority of the State's population lives within a 30- to 60-minute drive time of an airport.
- State airport appropriations have declined from nearly $12 million in 2009 to $2.3 million in 2012.

## MARINE PORTS

- There are three active marine port complexes in Georgia owned and operated by the Georgia Ports Authority (GPA) – the Ports of Savannah, Brunswick, and Bainbridge. The largest of these complexes is the Port of Savannah. The terminals at this port handle container, refrigerated, break-bulk, and roll-on/roll-off (RoRo) cargoes such as automobiles. The Garden City Terminal, located on the Savannah River about seven miles northwest of downtown Savannah, handles primarily containers. This is the largest of the GPA facilities and the largest single terminal container operation in North America. Ocean Terminal is the GPA's break-bulk facility near downtown Savannah.
- The terminals at the Port of Brunswick include the Colonel's Island RoRo and Agribulk facilities, Mayor's Point Terminal, and Marine Port Terminal. The Port of Bainbridge is located along the Apalachicola-Chattahoochee-Flint Waterway and handles primarily bulk commodities. The Port of Columbus along the Chattahoochee Intracoastal Waterway is inoperable due to low water levels which have persisted for several years. There also are dozens of private terminals along Georgia's waterways where individual companies generally ship their own products, primarily bulk goods and fuel oils.
- The Port of Savannah's container operations have grown exponentially in recent decades, such that it is now the fourth largest U.S. container port handling almost 3 million 20-foot equivalent (TEU) container units annually.

It is the second busiest port in the U.S. handling the export of U.S. goods, and has an unusually even balance of import and export products. The Port has 37 weekly container ship calls, which is the second highest on the East Coast to the Port of New York/New Jersey. The Port is critical to the economy of Georgia, handling the export of key commodities, including forestry/wood products, agriculture products, and kaolin. The Port of Brunswick is the third busiest U.S. RoRo port.

- The Port of Savannah faces several major challenges and opportunities in coming years. It is the largest port in the U.S. that does not have a large local consuming population, but rather serves as a gateway for destinations located hundreds of miles away. This makes Savannah a discretionary port of call, and it is critical that it remain competitive in its key attributes. The current channel depth of 42 feet is well short of the 47 feet needed to service the largest ships that will start traveling through an expanded Panama Canal in 2015. The expansion of the Panama Canal offers an opportunity to grow the Port's share of the rapidly growing Asian market, but also a threat of losing existing business in this market to East Coast competitors if the channel depth is not increased. Therefore, the Savannah Harbor Expansion Project (SHEP) was identified as the most important freight project in the State in the Georgia Freight and Logistics Plan.
- Other challenges facing the Port of Savannah include landside capacity and local traffic congestion. In order to achieve its full capacity of 6.25 million TEUs, the Port needs additional ship to shore container cranes, gantry cranes within the container yard, an additional truck gate off of Grange Road, reduction in container dwell time, and the initiation of 16-hour truck gate operations. Traffic counts have shown that most port truck traffic is to and from nearby warehouse facilities, where goods are reloaded for transport to Atlanta and other destinations. Local traffic congestion where port truck and auto commuter traffic mixes, particularly on SR 21, is likely to worsen as the Port continues to grow. Of the 3,000,000 annual TEUs handled at the port, a little over 300,000 move by intermodal rail. Increasing the rail share, along with local roadway improvements, are strategies for addressing the issue of roadway congestion.

# 1.0 Highways

A primary mission of the Georgia Department of Transportation (GDOT) is to plan, maintain, and operate Georgia's highway system. This responsibility includes the portion of the highway system that GDOT owns, as well as administering U.S. DOT funds for those portions of the highway system that it does not own, but which are eligible for Federal Aid Highway System funding.

## 1.1 INVENTORY OF FACILITIES

The inventory of highways describes the public roads as defined above, typically paved travel ways, and the bridges on those public roads.

### 1.1.1 Public Roads

As shown in Table 1.1 (p. 1-2), there are over 123,000 miles of public roads in Georgia. The majority of those roads are owned by Counties, 66 percent, and Municipalities, 16 percent, while GDOT owns only 15 percent. However, the roads owned by GDOT are among the most important roads in Georgia. Using the approved Federal Highway Administration's (FHWA) Functional Classifications that are also used to determine roads that are eligible for Federal Aid funding, GDOT owns:

- All of the miles[1] on the Interstate Highway System (IHS);
- Ninety-five percent of mileage on the National Highway System (NHS), which as of October 2012, in addition to the Interstates, now includes all Other Freeways, Expressways, and Other undivided Principal Arterials; and
- Fifty-eight percent of all roads eligible for funding under the Federal Aid Highway System (FAS) programs administered by GDOT.[2]

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[1] Mileage is reported as Center Line Miles (CLM). This excludes the double counting of directionally separated roads, and roads that are designated with multiple signage. For example, the section of I-75/I-85 in Atlanta known as the Downtown Connector is reported as 16.3 center line miles. It does not separately list miles for both of these signed routes, nor does it separately report its northbound and southbound miles.

[2] This category includes those roads that are a mandatory part of the Federal-Aid highway system. It excludes roads designated as local, and roads designated as rural minor collectors. Under MAP-21, the most recent Federal Transportation Authorization legislation, GDOT, at its discretion, can expend certain funds on rural minor collectors. GDOT has exercised similar rights under provisions in past transportation authorization bills. However, because doing so is discretionary, in this SWTP/SSTP, Federal-Aid Highways shall refer to those roads which are required to be included.

## Table 1.1 Miles of Public Roads by Ownership and Functional Classification/System

| Functional Classification/System | GDOT | County | Municipal | Others[a] | Federal Agencies[b] | Total |
|---|---|---|---|---|---|---|
| Interstate | 1,248 | – | – | – | – | 1,248 |
| Other Freeways and Expressways | 139 | 7 | – | – | 1 | 147 |
| Other Principal Arterial | 4,329 | 184 | 82 | 0 | 2 | 4,598 |
| Minor Arterial | 6,666 | 1,989 | 825 | 1 | 56 | 9,538 |
| Major Collector | 5,536 | 8,723 | 1,297 | 3 | 23 | 15,583 |
| Minor Collector | 2 | 7,196 | 229 | 1 | 60 | 7,489 |
| Local | 8 | 63,195 | 17,732 | 386 | 3,622 | 84,943 |
| Interstate Highway System | 1,248 | – | – | – | – | 1,248 |
| | 100% | | | | | 100% |
| National Highway System[c] | 5,716 | 191 | 82 | – | 4 | 5,993 |
| | 95% | 3% | 1% | – | 0% | 100% |
| Federal Aid Highway System | 17,919 | 10,903 | 2,205 | 5 | 83 | 31,115 |
| | 58% | 35% | 7% | 0% | 0% | 100% |
| Totals | 17,929 | 81,295 | 20,166 | 392 | 3,765 | 123,546 |
| | 15% | 66% | 16% | 0% | 3% | |

Source: Cambridge Systematics, from GDOT Data, non-Federal Aid (shaded rows) from FHWA's 2011 Highway Statistics.

[a] This category includes public roads owned by other non-Federal public agencies, for example, the Georgia Department of Natural Resources.

[b] This category includes, for example, public roads in military bases, or in national parks and forests that are owned by Federal agencies.

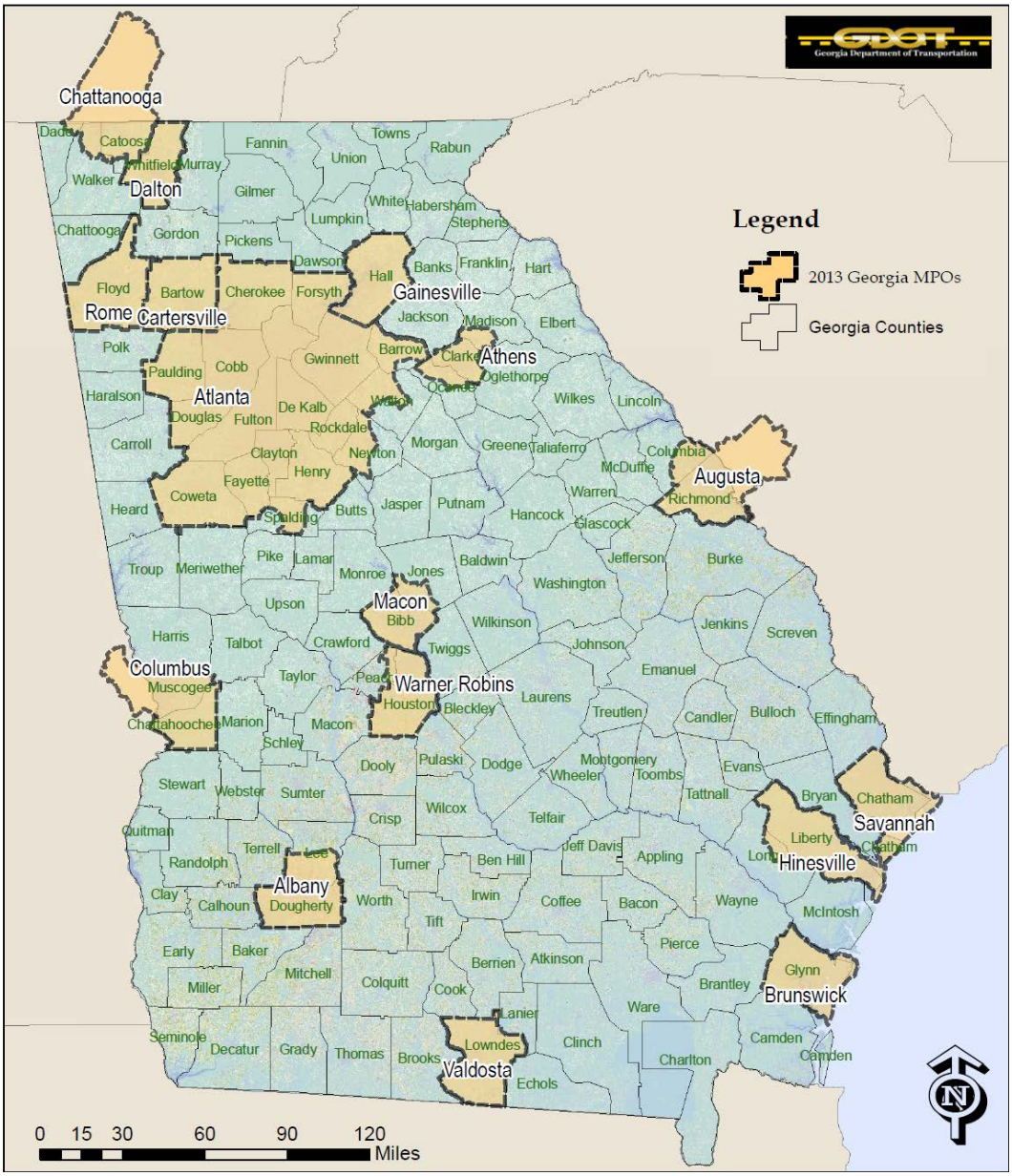
[c] The official National Highway System (NHS) update, which took place in early 2013, was not reflected in the databases that were used in this memo. However, that NHS update differs little from the subtotals of Interstate, Other Freeways and Expressways, and Other Principal Arterials which is used as a proxy for the updated NHS in this memo. Redoing the analysis might increase the precision, but it would not affect any findings. The NHS update is being incorporated into the project Road Database and will be used in subsequent SWTP/SSTP analyses and memoranda.

Under Federal Transportation regulations, GDOT shares the responsibility for planning and programming Federal transportation funding with MPOs in those urbanized areas with populations greater than 50,000. As shown in Table 1.2 (p. 1-7), according to the 2010 U.S. Census, there are 16 Urbanized Areas (UZA) in which GDOT shares responsibility for planning and programming Federal Highway funding. This includes the largest UZA, Atlanta, with 69 percent of the urban[3] population in Georgia; Georgia's portions of the bistate UZAs of Chattanooga, Columbus and Augusta; and the Cartersville UZA which is the Bartow County MPO, which passed the 50,000 population threshold as of the 2010 U.S. Census. The percentage of Georgia's miles on Interstate, National, and Federal Aid Highway Systems is still greater in rural areas, which are the sole responsibility of GDOT. Additionally, GDOT has the sole responsibility to maintain and operate its solely owned highways in Urban Areas. The MPO regions are shown in Figure 1.1 (p. 1-4)

Not unexpectedly (as shown in Table 1.3 (p. 1-10), because the highways under the jurisdiction of GDOT have higher functional classifications, GDOT's share of lane-miles, which is the number of lanes on a highway times its mileage, is even larger than its share of miles. Roads owned by other jurisdictions in rural areas are almost exclusively two-lane roads. Figure 1.2 (p. 1-5) shows the Federal-aid roadways by functional class for the State, and Figure 1.3 (p. 1-6) shows the detail for the Atlanta region. Figure 1.4 (p. 1-9) shows the number of lanes on the Federal-aid highway system, and Figure 1.5 (p. 1-11) shows lane-miles by functional classification.

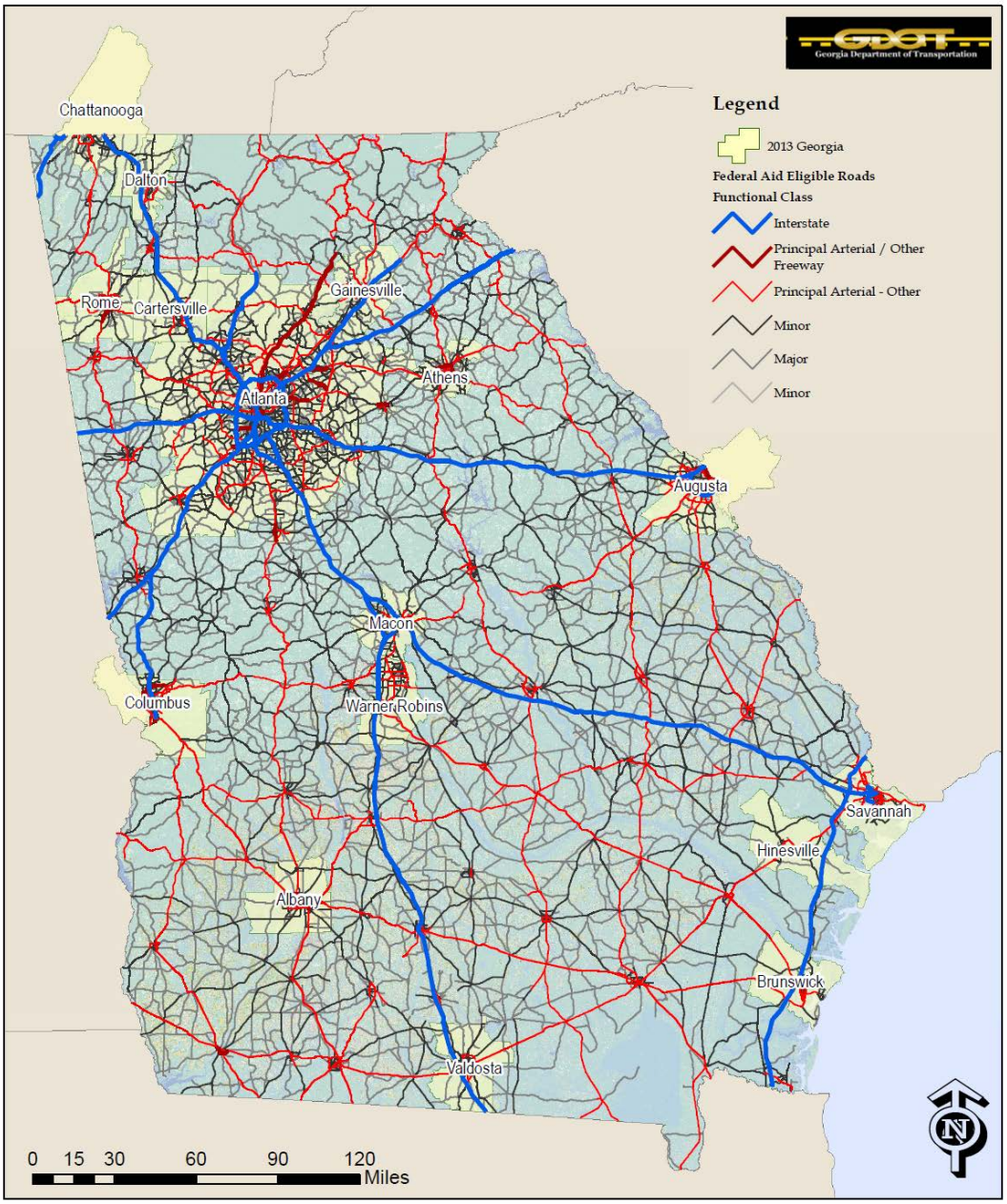
[3] Urban and rural areas as defined by the U.S. Census Bureau.

## Figure 1.1 MPOs in Georgia



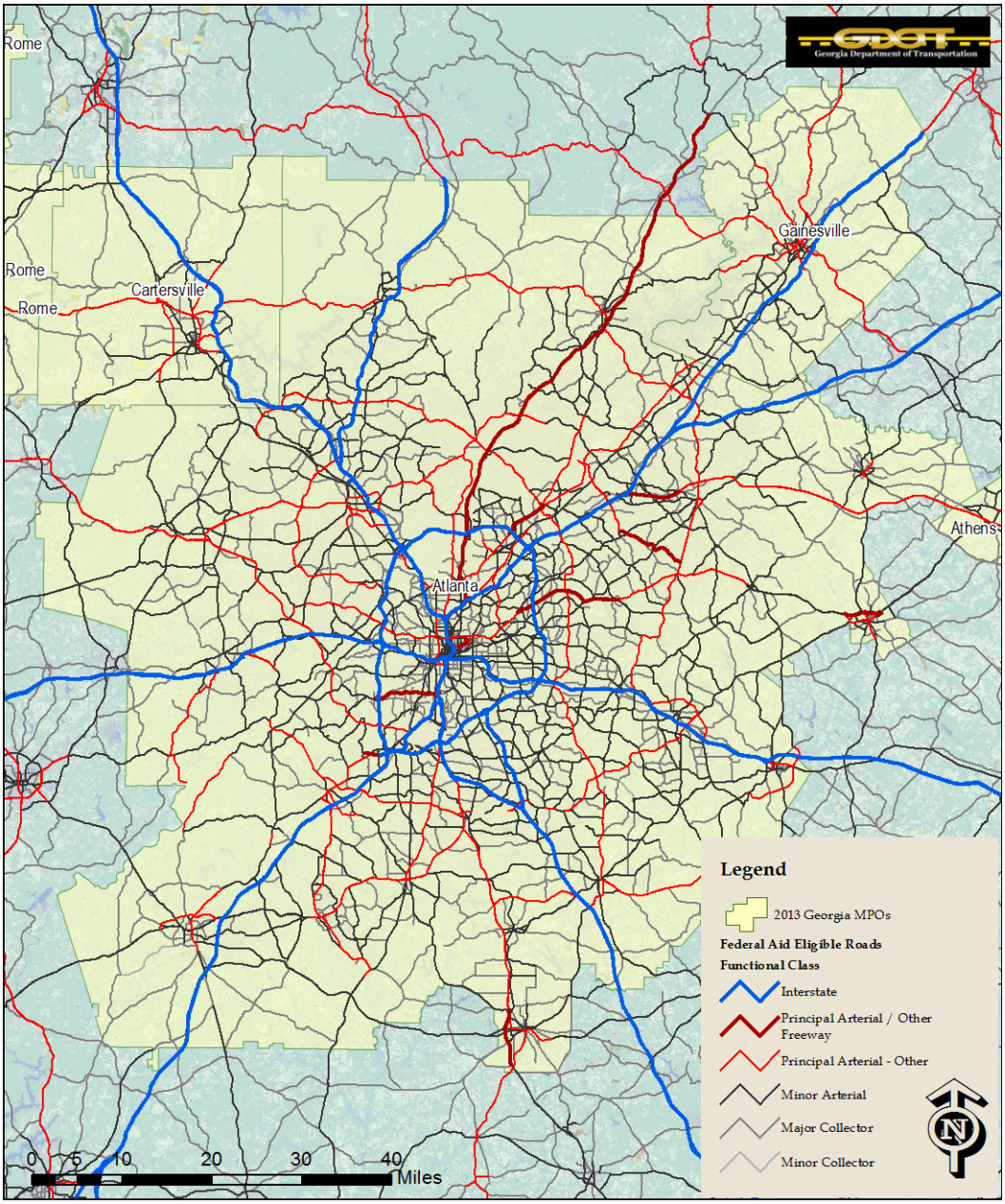

Source: Westats from GDOT data.

## Figure 1.2 Federal Aid Highways




Source: Westats from GDOT data.

Figure 1.3 Federal Aid Highways
*Atlanta Detail*




Source: Westats from GDOT data.

## Table 1.2 Federal Aid Highway Mileage by MPO and by Functional Classifications and Systems

| Federal Aid Urbanized Area (MPO[a]) | 2010 Census UZA Population | Interstate | Other Freeways and Expressways | Other Principal Arterial | Subtotal National Highway System | Minor Arterial | Major Collector | Subtotal Federal Aid |
|---|---|---|---|---|---|---|---|---|
| Atlanta (Atlanta Regional Commission) | 4,515,419 | 337 | 89 | 659 | 1,085 | 2,135 | 1,769 | 4,989 |
| Augusta-Richmond County, Georgia-South Carolina (Augusta-Richmond County PC) | 386,787 | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| (Georgia portion) | 283,283 | 34 | 7 | 124 | 165 | 145 | 89 | 399 |
| Chattanooga, Tennessee-Georgia (Chattanooga Hamilton County RPA) | 381,112 | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| (Georgia portion) | 78,364 | 21 | | 22 | 43 | 95 | 113 | 252 |
| Savannah (Coastal Region MPO (CORE)) | 260,677 | 44 | 0 | 125 | 170 | 102 | 83 | 355 |
| Columbus, Georgia-Alabama (Columbus-Phenix City MPO) | 253,602 | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| (Georgia portion) | 192,338 | 15 | 10 | 87 | 112 | 137 | 82 | 330 |
| Macon (Macon-Bibb County Planning and Zoning Commission) | 137,570 | 43 | | 41 | 83 | 154 | 144 | 382 |
| Warner Robins (Warner Robins MPO) | 133,109 | 28 | | 73 | 101 | 165 | 96 | 363 |
| Gainesville (Gainesville-Hall Metropolitan Planning Organization (GHMPO)) | 130,846 | 30 | | 57 | 87 | 100 | 186 | 373 |
| Athens-Clarke County (Athens-Clarke County MPO) | 128,754 | | 19 | 58 | 77 | 139 | 118 | 335 |
| Albany (Albany MPO) | 95,779 | | 11 | 73 | 84 | 148 | 150 | 382 |
| Dalton (Dalton MPO) | 85,239 | 19 | | 31 | 50 | 81 | 108 | 240 |

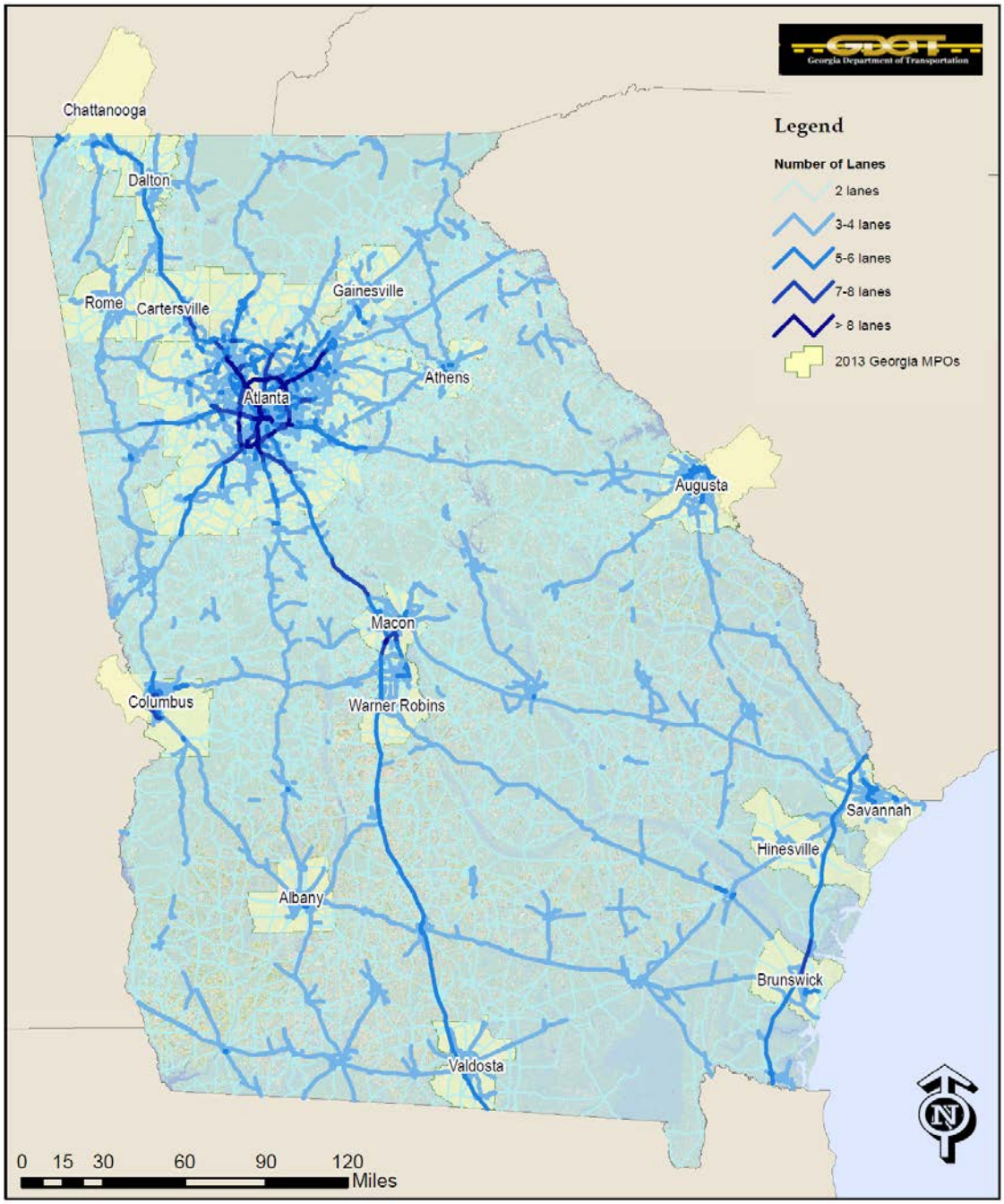
## Table 1.2 Federal Aid Highway Mileage by MPO and by Functional Classifications and Systems (continued)

| Federal Aid Urbanized Area (MPO[a]) | 2010 Census UZA Population | Interstate | Other Freeways and Expressways | Other Principal Arterial | Subtotal National Highway System | Minor Arterial | Major Collector | Subtotal Federal Aid |
|---|---|---|---|---|---|---|---|---|
| Valdosta (Valdosta-Lowndes MPO) | 77,085 | 31 | | 58 | 90 | 108 | 141 | 338 |
| Rome (Rome/Floyd CPC) | 60,851 | | 7 | 62 | 69 | 82 | 197 | 348 |
| Cartersville (Bartow County MPO) | 52,477 | 30 | | 44 | 74 | 107 | 128 | 310 |
| Hinesville (Hinesville, Georgia MPO) | 51,456 | 13 | | 25 | 38 | 89 | 72 | 199 |
| Brunswick (Brunswick MPO) | 51,024 | 17 | | 61 | 78 | 84 | 60 | 222 |
| Other Small Urban Clusters | 937,880 | 116 | 5 | 1,048 | 1,169 | 1,971 | 2,317 | 5,498 |
| Subtotal Urban Georgia Portions | 7,272,151 | 774 | 154 | 2,510 | 3,438 | 5,595 | 5,342 | 14,374 |
| | | 61% | 100% | 54% | 57% | 61% | 34% | 46% |
| Subtotal Rural | 2,415,502 | 491 | – | 2,122 | 2,613 | 3,662 | 10,473 | 16,707 |
| | | 39% | 0% | 46% | 43% | 40% | 66% | 54% |
| Total Georgia | 9,687,653 | 1,265 | 154 | 4,624 | 6,050 | 9,217 | 15,817 | 31,081 |

Source: Cambridge Systematics from GDOT Data.

[a] The MPO names are those listed by the Georgia Association of MPOs (GAMPO): http://www.gampo.org/index.htm.

Figure 1.4 Number of Lanes on Federal Aid System Highways



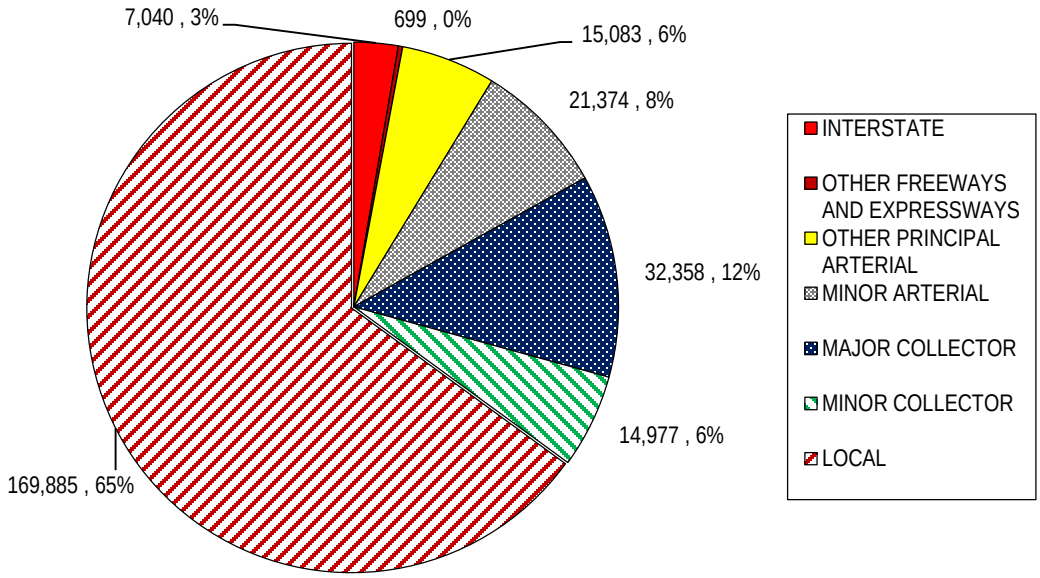

Source: Westats from GDOT data.

## Table 1.3 Lane-Miles by Functional Classification and Ownership

| Functional Classification/*System* | | GDOT | County | Municipal | Others[a] | Federal Agencies[b] | Total |
|---|---|---|---|---|---|---|---|
| Interstate | Lane-Miles | 7,040 | 0 | 0 | 0 | 0 | 7,040 |
| | | 100% | 0% | 0% | 0% | 0% | 100% |
| | Average Lanes | 5.57 | – | – | – | – | 5.57 |
| Other Freeways and Expressways | Lane-Miles | 665 | 13 | 16 | 5 | – | 699 |
| | | 95% | 2% | 2% | 1% | 0% | 100% |
| | Average Lanes | 4.58 | 3.91 | 4.00 | 3.75 | | 4.55 |
| Other Principal Arterial | Lane-Miles | 14,184 | 584 | 305 | 10 | 0 | 15,083 |
| | | 90% | 6% | 3% | 0% | 0% | 100% |
| | Average Lanes | 3.25 | 3.41 | 3.18 | 4.00 | – | 3.26 |
| Minor Arterial | Lane-Miles | 15,328 | 3,430 | 2,498 | 117 | 2 | 21,374 |
| | | 58% | 24% | 18% | 1% | 0% | 100% |
| | Average Lanes | 2.30 | 2.44 | 2.30 | 2.16 | 2.00 | 2.32 |
| Major Collector | Lane-Miles | 11,696 | 4,706 | 15,945 | 1 | 10 | 32,358 |
| | | 21% | 36% | 43% | 0% | 0% | 100% |
| | Average Lanes | 2.02 | 2.17 | 2.03 | 2.01 | 2.07 | 2.05 |
| *Interstate Highway System* | *Lane-Miles* | *7,040* | – | – | – | – | *7,040* |
| | | *100%* | – | – | – | – | *9%* |
| | *Average Lanes* | *5.57* | – | – | – | – | *5.57* |
| *National Highway System* | *Lane-Miles* | *21,889* | *597* | *321* | *14* | – | *22,822* |
| | | *96%* | *3%* | *1%* | *0%* | | *30%* |
| | *Average Lanes* | *3.79* | *3.41* | *3.21* | *3.92* | – | *3.77* |
| *Federal Aid Highway System* | *Lane-Miles* | *48,913* | *8,733* | *18,764* | *132* | *11* | *76,554* |
| | | *60%* | *20%* | *19%* | *0%* | *0%* | *100%* |
| | *Average Lanes* | *2.68* | *2.33* | *2.08* | *2.27* | *2.06* | *2.46* |

Source: Cambridge Systematics, from GDOT Data.

Figure 1.5 Lane-Miles by Functional Classification

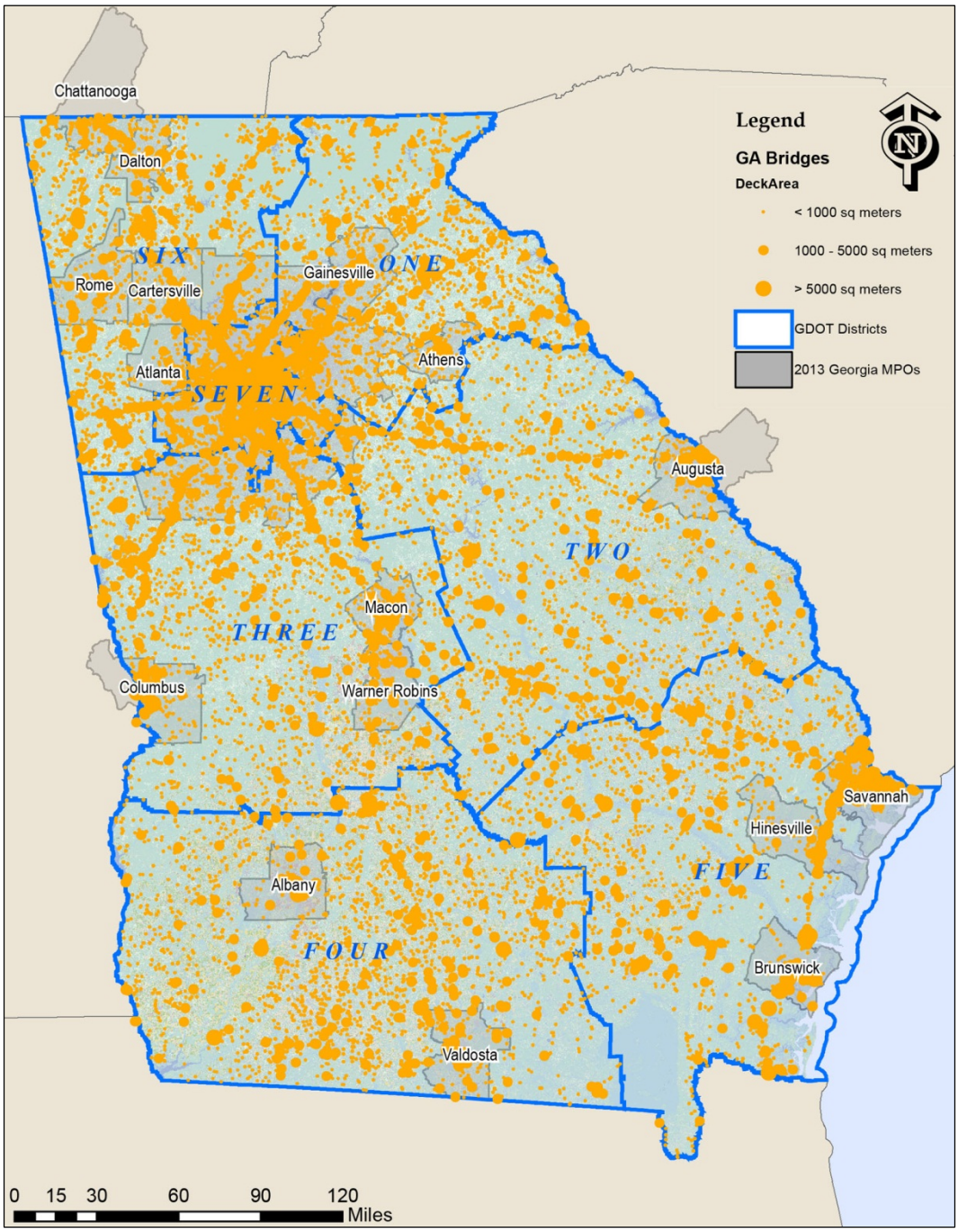



Source: Cambridge Systematics, Federal Aid Highways from GDOT Data, Non-Federal Aid Highways from FHWA's 2011 Highway Statistics.

### 1.1.2 Bridges

All bridges are eligible for Federal highway funding. However, the amount available to Off-System bridges (those located on roads that are not part of the Federal Aid Highway System) is limited. The number of all bridges, by ownership and by the functional classifications included in the various Federal Highway funding systems, is shown in Table 1.4 (p. 1-13). The count of bridges includes all structures and may be misleading because the "bridge" category also includes all overpasses and large culverts (those with an opening greater than or equal to 20 feet). A more meaningful sense of the scale of GDOT's ownership of bridges is provided by the size of the deck area of the bridges as shown in Table 1.5 (p. 1-14) and Figure 1.6 (p. 1-12). GDOT owns 45 percent of the bridges, but those bridges represent 76 percent of the deck area of bridges in Georgia.

## Figure 1.6 Bridges




Source: Westats from GDOT data.

## Table 1.4 Count of Bridges on Public Roads by Ownership and Functional Classification/System

| Functional Classification/ *System* | GDOT | County | Municipal | Others[a] | Federal Agencies[b] | Total |
|---|---|---|---|---|---|---|

| | | | | | | |
|---|---|---|---|---|---|---|
| Interstate | 986 | – | – | – | – | 986 |
| Other Freeways and Expressways | 186 | 6 | – | – | – | 192 |
| Other Principal Arterial | 1,645 | 73 | 25 | – | – | 1,743 |
| Minor Arterial | 1,950 | 444 | 143 | – | – | 2,537 |
| Major Collector | 1,425 | 1,647 | 151 | – | – | 3,223 |
| Minor Collector | 41 | 1,107 | 2 | – | – | 1,150 |
| Local | 360 | 4,022 | 230 | 44 | 99 | 4,755 |
| *Interstate Highway System* | *986* | – | – | – | – | *986* |
| | *100%* | – | – | – | – | *7%* |
| *National Highway System* | *2,817* | *79* | *25* | – | – | *2,921* |
| | *96%* | *3%* | *1%* | – | – | *20%* |
| *Federal Aid Highway System* | *6,192* | *2,170* | *319* | – | – | *8,681* |
| | *71%* | *25%* | *4%* | – | – | *60%* |
| *Off-Federal Aid Highway System* | *401* | *5,129* | *232* | *44* | *99* | *5,905* |
| | *7%* | *87%* | *4%* | *1%* | *2%* | *40%* |
| Totals | 6,593 | 7,299 | 551 | 44 | 99 | 14,586 |
| | 45% | 50% | 4% | 0% | 1% | 100% |

Source: Cambridge Systematics from GDOT Data.

[a] This category includes public roads owned by other non-Federal public agencies, for example, the Georgia Department of Natural Resources.

[b] This category includes, for example, public roads in military bases, or in national parks and forests that are owned by Federal agencies.

Table 1.5 Bridge Deck Area by Ownership and Functional Classification/ System
*Thousands of Square Feet*

| Functional Classification/ *System* | GDOT | County | Municipal | Others[a] | Federal Agencies[b] | Total |
|---|---|---|---|---|---|---|
| Interstate | 19,215 | – | – | – | – | 19,215 |
| Other Freeways and Expressways | 3,823 | 63 | – | – | – | 3,885 |
| Other Principal Arterial | 21,080 | 1,363 | 423 | – | – | 22,867 |
| Minor Arterial | 17,243 | 2,248 | 1,399 | – | – | 20,890 |
| Major Collector | 9,516 | 5,723 | 652 | – | – | 15,891 |
| Minor Collector | 398 | 2,804 | 2 | – | – | 3,204 |
| Local | 5,146 | 8,253 | 1,020 | 171 | 310 | 14,899 |
| *Interstate Highway System* | *19,215* | – | – | – | – | *19,215* |
| | *100%* | – | – | – | – | *19%* |
| *National Highway System* | *44,118* | *1,426* | *423* | – | – | *45,967* |
| | *95%* | *3%* | *1%* | *0%* | *0%* | *46%* |
| *Federal Aid Highway System* | *70,877* | *9,397* | *2,475* | – | – | *82,748* |
| | *86%* | *11%* | *3%* | *0%* | *0%* | *82%* |
| *Off-Federal Aid Highway System* | *5,545* | *11,057* | *1,022* | *171* | *310* | *18,103* |
| | *37%* | *54%* | *6%* | *2%* | *2%* | *18%* |
| Totals | 76,421 | 20,454 | 3,496 | 171 | 310 | 100,852 |
| | 76% | 20% | 3% | >1% | >1% | 100% |

Source: Cambridge Systematics from GDOT's 2012 National Bridge Inventory Submittal.

[a] This category includes public roads owned by other non-Federal public agencies, for example, the Georgia Department of Natural Resources.

[b] This category includes, for example, public roads in military bases, or in national parks and forests that are owned by Federal agencies.

## 1.2 CAPACITY

The capacity of the road system depends on the number of lanes that are available and the operation of those lanes. The capacity on controlled access roads, without intersections, is available 100 percent of the time. The capacity of travel lanes on partially controlled roads (e.g., those whose opposing lanes are separated by a median), and uncontrolled access roads, depends on how often the right-of-way is given to those lanes at their intersections with other roads.

The capacity of bridges[4] is not typically used in transportation planning, because the capacity to carry traffic is generally the same as the roads on which the bridges are located. Capacity on local roads intended to serve as access to land uses might be abundant while capacity on the higher functionally classified roads that are necessary to travel between these land uses might be more heavily utilized.

For this SWTP/SSTP, the capacity of roads will be reported as they are coded in GDOT's Statewide Travel Demand Model (SWM). These capacities are stated in terms of vehicles per day. These capacities have been weighted by multiplying them by the length of each link in the SWM and are shown in Table 1.6.

### Table 1.6 SWM Capacity Miles by Functional System
*Thousands*

| Functional Classification/*System* | GDOT | All Others | Total |
|---|---|---|---|
| Interstate | 147,670 | – | 147,670 |
| Other Freeways and Expressways | 19,261 | 2,582 | 21,843 |
| Other Principal Arterial (Controlled Accessed) | 10,920 | – | 10,920 |
| Other Principal Arterial (Uncontrolled Access) | 164,001 | 29,154 | 193,155 |
| Minor Arterial | 107,493 | 13,677 | 121,171 |
| Major Collector | 77,794 | 18,956 | 96,750 |
| *Interstate Highway System* | *147,670* | *–* | *147,670* |
| *National Highway System* | *341,852* | *31,736* | *373,589* |
| *Federal Aid Highway System* | *527,140* | *64,370* | *591,509* |

Source: Cambridge Systematics from GDOT Road Inventory Data.

While the capacities in the Statewide model will be used to estimate road usage, and capacity is not a reported field in road inventory databases, a rough estimate of capacity can be derived from the reported lane-miles in the road inventory. These capacities are estimated as 20,000 vehicles per day per lane[5] on controlled access NHS roads:, 16,000 vehicles per day per lane on the partially or uncontrolled NHS roads, and 12,000 vehicles per day per lane on the uncontrolled minor arterials and major collectors roads that represent the remainder of the FAS, as shown in Table 1.7.

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[4] Having less traffic capacity than the roads serving the bridge is one of the conditions that will result in a bridge being classified as Functionally Obsolete, a condition that will be discussed in Section 1.4.2.

[5] Two thousand vehicles per hour for 10 hours a day, where 10 hours represent 3 hours at 100 percent of capacity and 21 hours at one-third of capacity. This right-of-way is typically available 100 percent of the time on controlled access roads, but must be shared at intersections with other roads: assumed to be 60 percent of the time on NHS uncontrolled roads, 50 percent of the time on the remainder of Federal-Aid roads.

Table 1.7 Road Inventory Estimated Daily Capacity Miles by Functional System
*Thousands*

| Functional Classification/*System* | GDOT | All Others | Total | SWM to Inventory Ratio |
|---|---|---|---|---|
| Interstate | 140,808 | 0 | 140,808 | 1.05 |
| Other Freeways and Expressways | 13,304 | 674 | 13,978 | 1.56 |
| Other Principal Arterial (Controlled Accessed) | 4,884 | 0 | 4,884 | 2.24 |
| Other Principal Arterial (Uncontrolled Access) | 167,276 | 10,785 | 1.08 | |
| Minor Arterial | 122,622 | 48,372 | 170,994 | 0.71 |
| Major Collector | 93,566 | 165,294 | 258,861 | 0.37 |
| *Interstate Highway System* | *140,808* | *0* | *140,808* | 1.05 |
| *National Highway System* | *326,273* | *11,459* | *337,731* | 1.11 |
| *Federal Aid Highway System* | *542,461* | *225,125* | *767,586* | 0.77 |

Source: Cambridge Systematics from GDOT Road Inventory Data.

The rough estimates suggest that the highway capacities in the SWM are as expected for the Interstate and National Highway System road links. The SWM reports less than the estimated observed capacities on the Minor Arterials and Major Collectors that comprise the remainder of the Federal Aid System, but the SWM includes only the most highly utilized roads that are important for inter-connected travel. It includes most roads on the intestate highways and minor arterials, but includes fewer miles of Major Collectors and few miles of the non-Federal Aid, Minor Collectors, and Local Roads which likely accounts for the lower share of reported capacities on those roads.

# 1.3 USE (TRAFFIC VOLUMES)

## 1.3.1 Roads

As documented in the Technical Memorandum on Methodology,[6] traffic volume information for highways comes from the travel demand models available to GDOT, instead of those maintained in other databases. The rationale for doing this is that the travel demand models include capacities that can also measure congestion, and that the travel demand models can be used to develop forecasts and test alternatives. This is not true of existing volumes in other databases. However, the volumes as reported from counts were compared with those

[6] Cambridge Systematics, et al., Statewide Transportation Plan/Statewide Strategic Transportation Plan Update: Task I – Development of Study Methodology, Georgia Department of Transportation, June 7, 2013.

volumes reported in the SWM to ensure that the volumes reflecting existing conditions in that database are consistent with those reported from observed counts in other databases.

The Vehicle-Miles of Travel (VMT)[7] as reported by GDOT's SWM on Federal Aid Highways in Georgia is shown in Table 1.8. The usage of the roads in Georgia by functional classification and system is almost the opposite of the situation for miles and capacity. Even though it represents only 1.1 percent of the centerline miles and 3.2 percent of the lane-miles, the Interstate Highway System and Other Freeways, of which over 99 percent are owned by GDOT, carries almost 44 percent of the Vehicle-Miles of Travel (VMT) on the Federal Aid Highway System in Georgia.

## Table 1.8 Statewide Model's Current VMT by Functional System

| Functional Classification/System | GDOT | All Others | Total |
|---|---|---|---|
| Interstate | 95,566,176 | 0 | 95,566,176 |
| Other Freeways and Expressways | 10,927,676 | 1,366,192 | 12,293,868 |
| Other Principal Arterial | 51,321,086 | 11,835,810 | 63,156,896 |
| Minor Arterial | 29,595,422 | 5,076,228 | 34,671,649 |
| Major Collector | 6,903,244 | 3,348,818 | 10,252,062 |
| *Interstate Highway System* | *95,566,176*<br>*100%* | *0*<br>*0%* | *95,566,176*<br>*44%* |
| *National Highway System* | *157,814,938*<br>*92%* | *13,202,002*<br>*8%* | *171,016,940*<br>*79* |
| *Federal Aid Highway System* | *194,313,603*<br>*90%* | *21,627,048*<br>*35%* | *215,940,651*<br>*100%* |

Source: Cambridge Systematics from GDOT SWM.

As noted above, the VMT reported by the SWM was compared with the reports of VMT derived from observed traffic counts from GDOT's road databases. Those results are shown in Table 1.9 (p. 1-18). Also shown in that table is the ratio of the VMT from the SWM and the VMT derived from "observed" counts. While the VMT for the entire Federal Aid Highway System from the SWM is 94 percent of observed VMT for the entire Federal Aid Highway System, the SWM VMT on Interstates is 119 percent of observed VMT, the SWM VMT on the National Highway System is 124 percent of observed VMT and the SWM VMT on Minor Arterials and Major Collectors are, respectively, 59 percent and 31 percent of observed VMT. However, these differences actually increase the credibility of the SWM. The SWM is used to estimate weekday (Monday to Friday) travel while the observed VMT represents annual traffic on all days (Sunday to Saturday). Weekday average VMT typically is 120 percent of average annualized VMT. Also, while the Interstate and National Highway Systems are fully represented in the

[7] Vehicle Miles of Travel is a customary measure of road usage. A vehicle-mile is one vehicle traveling one mile.

SWM, only the most important Minor Arterials and Major Collectors, based on volume and connectivity, are included in the model.

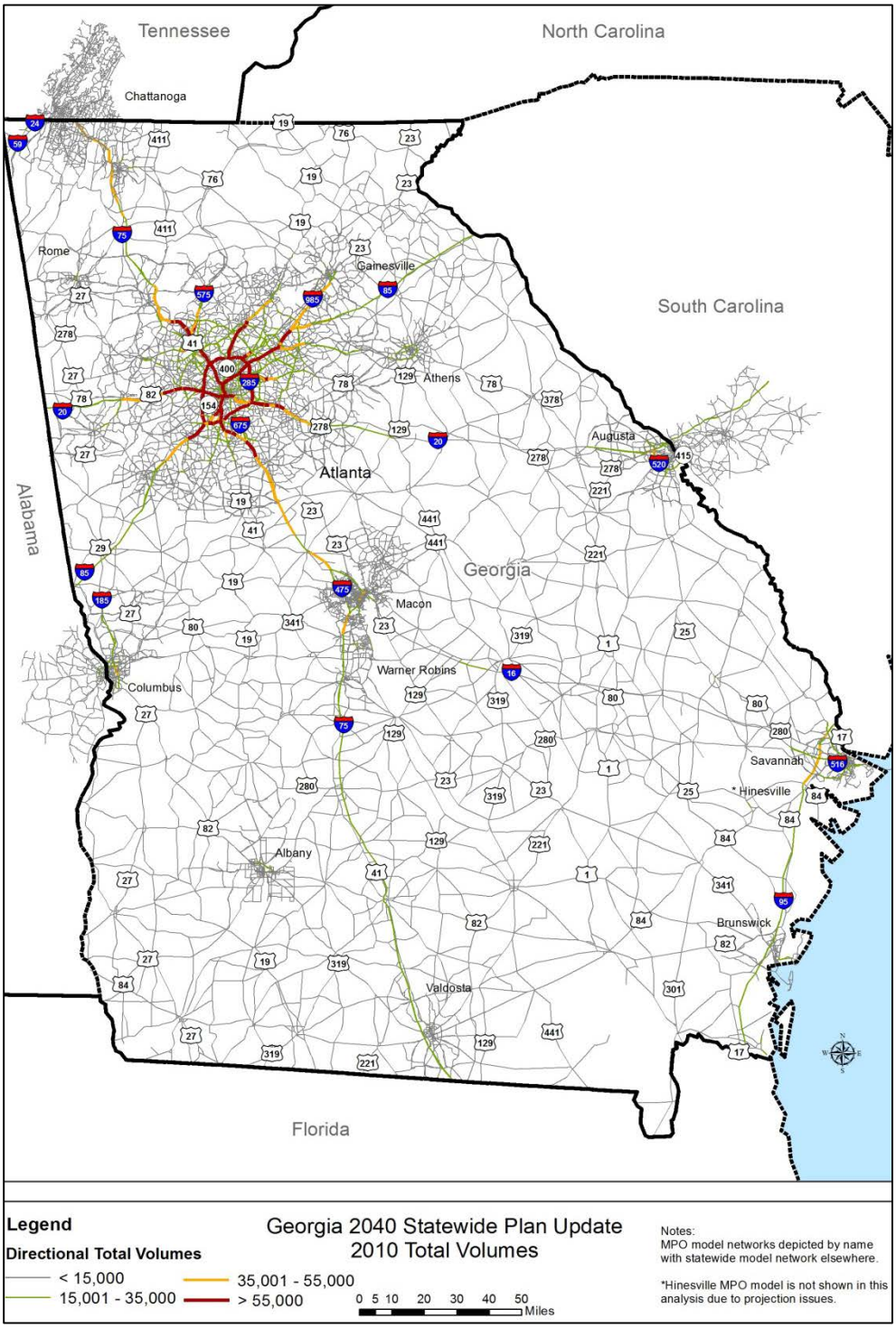
## Table 1.9 Road Inventory: 2012 VMT by Functional System

| Functional Classification/ System | GDOT | All Others | Total | SWM to Observed Ratio |
|---|---|---|---|---|
| Interstate | 79,998,716 | 647 | 79,999,363 | 1.19 |
| Other Freeways and Expressways | 8,230,248 | 269,028 | 8,499,276 | 1.45 |
| Other Principal Arterial | 45,145,671 | 4,362,792 | 49,508,462 | 1.28 |
| Minor Arterial | 38,438,465 | 20,111,309 | 58,549,774 | 0.59 |
| Major Collector | 12,283,378 | 20,320,834 | 32,604,212 | 0.31 |
| *Interstate Highway System* | *79,998,716* | *647* | *79,999,363* | 1.19 |
| | *100%* | *0%* | *35%* | |
| *National Highway System* | *133,374,635* | *4,632,466* | *138,007,101* | 1.24 |
| | *97%* | *3%* | *60%* | |
| *Federal Aid Highway System* | *184,096,477* | *45,064,609* | *229,161,087* | 0.94 |
| | *80%* | *20%* | *100%* | |

Source: Cambridge Systematics from GDOT data.

While the SWM incudes the most important roads in Georgia, estimates are not intended to replace the more detailed models that are operated by the MPOs in Georgia. Those models include more of the Minor Arterial and Major Collector roads. While the SWM, and every one of the MPOs with the exception of ARC and the Georgia portion of Chattanooga (Tennessee), model daily traffic, the ARC and Chattanooga models include separate models for peak and off-peak periods and thus their volumes are more representative of road usage, especially during peak periods. The link volumes from the SWM, supplemented by those from the MPO models, are shown in Figure 1.7 (1-19).

## Figure 1.7 Existing Daily Traffic Volumes from Statewide and MPO Travel Demand Models




Source: Cambridge Systematics from GDOT and MPO Travel Demand Models.

### 1.3.2 Bridges

As noted previously, the usage of bridges is reported because the volume to capacity ratio of bridges is one of the attributes that is measured to determine if a bridge is Functionally Obsolete. What is reported for bridges is the average daily traffic (ADT) carried by the travel lanes on the bridge. Those values are shown in Table 1.10 (p. 1-21).

The bridges on the Interstate Highway System, owned entirely by GDOT, carry almost 50 percent of the Average Daily Traffic (ADT) on all bridges in Georgia, even though those bridges represent only 7 percent of the number and 22 percent of the deck area of bridges in Georgia. The bridges on the National Highway System, almost entirely owned by GDOT, carry over 73 percent of the Average Daily Traffic (ADT) on all bridges in Georgia, even though those bridges represent only 20 percent of the number and 47 percent of the deck area of bridges in Georgia. The bridges on the entire Federal Aid Highway System, of which 71 percent are owned by GDOT, carry over 94 percent of the Average Daily Traffic (ADT) on all bridges in Georgia, even though those bridges represent only 59 percent of the number and 82 percent of the deck area of bridges in Georgia. Bridges which are located off of the Federal Aid Highway System (few of which are owned by GDOT) carry less than 6 percent of the ADT of all bridges in Georgia, even though they represent almost 41 percent of the number and 18 percent of the deck area of bridges in Georgia.

## Table 1.10 ADT on Bridges by Functional Classification/System

| Functional Classification/*System* | GDOT | County | Municipal | Others[a] | Federal Agencies[b] | Total |
|---|---|---|---|---|---|---|
| Interstate | 72,206,545 | | – | | 2,400 | 72,208,945 |
| Other Freeways and Expressways | 7,895,350 | 183,570 | – | 187,630 | | 8,266,550 |
| Other Principal Arterial | 22,674,125 | 1,282,890 | 441,840 | 16,700 | 2,450 | 24,418,005 |
| Minor Arterial | 15,237,871 | 4,429,960 | 1,610,283 | 62,830 | 5,260 | 21,346,204 |
| Major Collector | 4,205,280 | 3,606,316 | 767,159 | 91,210 | 7,020 | 8,676,985 |
| Minor Collector | 78,690 | 1,456,712 | 4,000 | 1,510 | 4,110 | 1,545,022 |
| Local | 3,620,233 | 3,344,170 | 432,980 | 43,870 | 59,203 | 7,500,456 |
| *Interstate Highway System* | *72,206,545* | *0* | *0* | *0* | *2,400* | *72,208,945* |
| | *100%* | *–* | *–* | *–* | *–* | *50%* |
| *National Highway System* | *102,776,020* | *1,466,460* | *441,840* | *204,330* | *4,850* | *104,893,500* |
| | *98%* | *1%* | *0%* | *0%* | *0%* | *73%* |
| *Federal Aid Highway System* | *122,219,171* | *9,502,736* | *2,819,282* | *358,370* | *17,130* | *134,916,689* |
| | *86%* | *11%* | *3%* | *0%* | *0%* | *94%* |
| *Off-Federal Aid Highway System* | *3,698,923* | *4,800,882* | *436,980* | *45,380* | *63,313* | *9,045,478* |
| | *37%* | *54%* | *6%* | *2%* | *2%* | *6%* |
| Totals | 125,918,094 | 14,303,618 | 3,256,262 | 403,750 | 80,443 | 143,962,167 |
| | 87.47% | 9.94% | 2.26% | 0.28% | 0.06% | 100.00% |

Source: Cambridge Systematics from GDOT data.

[a] This category includes public roads owned by other non-Federal public agencies, for example, the Georgia Department of Natural Resources.

[b] This category includes, for example, public roads in military bases, or in national parks and forests that are owned by Federal agencies.

# 1.4 PERFORMANCE

## 1.4.1 Roads

### *Pavement Condition*

The physical condition of pavements in Georgia is measured by its COPACES (Computerized Pavement Condition Evaluation System) score. The COPACES score is a numerical Rating that evaluates rutting, cracks, and other surface deficiencies on a scale of 1 to 100. The average scores, weighted by mileage, are shown in Table 1.11. The scores by miles as shown in Table 1.12 (p. 1-23) and Figure 1.8 (p. 1-24) have been reported as ranges that represent Good, Fair, and Poor. Miles with a COPACES score of "NULL," are excluded from the calculations shown in Tables 1.11 and 1.12. As indicated in Figure 1.8, this value typically indicates roads that have recently been resurfaced, for which no pavement inspection was conducted. The pavement condition on these roads presumably is excellent.

The characterization of Good, Fair, and Poor was based on GDOT's Performance Dashboard web site.[8] On that web site, "Fair" condition for non-Interstate roads is defined as an average COPACES Rating of 70 to 80. "Fair" condition for Interstates is defined as an average COPACES Rating of 75 to 80. Based on these definitions, it is assumed that a "Good" or better condition must be a COPACES Rating greater than 80 for both Interstate and non-Interstate roads, and that a "Poor" condition must be a COPACES Ratings of less than 75 for Interstate roads and less than 70 for non-Interstate roads.

Table 1.11 Weighted COPACES by Ownership and Functional Classification/ System

| Functional Classification/System | GDOT | County | Municipal | Others[a] | Federal Agencies[b] | Total |
|---|---|---|---|---|---|---|
| Interstate | 86.23 | 0 | 0 | 0 | 0 | 86.23 |
| Other Freeways and Expressways | 81.87 | 70.00 | 70.00 | 0 | 75.00 | 80.49 |
| Other Principal Arterial | 79.35 | 75.37 | 73.31 | 0 | 75.00 | 78.83 |
| Minor Arterial | 78.37 | 74.06 | 75.34 | 54.00 | 70.69 | 77.11 |
| Major Collector | 80.55 | 71.54 | 70.67 | 76.05 | 73.99 | 74.75 |
| Interstate Highway System | 86.23 | - | - | - | - | 86.23 |
| National Highway System | 80.97 | 75.30 | 73.12 | - | 75.00 | 80.40 |
| Federal Aid Highway System | 79.91 | 72.04 | 72.46 | 60.64 | 72.82 | 76.54 |

Source: Cambridge Systematics from GDOT data.

[a] This category includes public roads owned by other non-Federal public agencies, for example, the Georgia Department of Natural Resources.

[b] This category includes, for example, public roads in military bases, or in national parks and forests that are owned by Federal agencies.

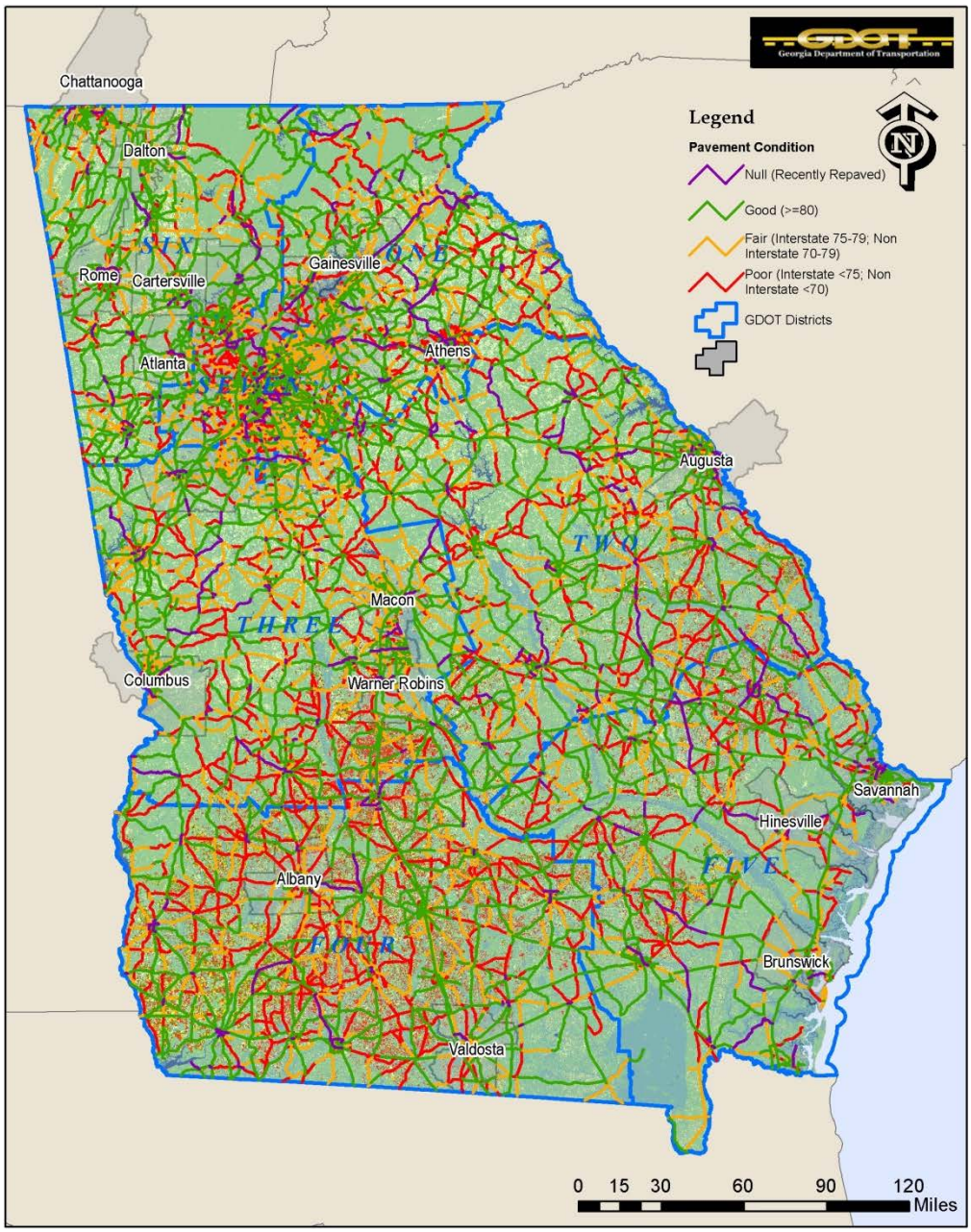
[8] http://www.dot.ga.gov/informationcenter/statistics/performance/Pages/COPACES-NonInterstate.aspx and http://www.dot.ga.gov/informationcenter/statistics/performance/Pages/COPACES-Interstate.aspx.

## Table 1.12 Miles by COPACES by Functional Classification and by Owner

| Functional Classification | Owner | Weighted Average COPACES | Good <80 | Fair 70-80 (75-80 Interstate) | Poor <70 (<75 Interstate) |
|---|---|---|---|---|---|
| Interstate | GDOT | 86.23 | 922 | 112 | 196 |
| | | | 75% | 9% | 16% |
| | Others | – | – | – | – |
| | | | – | – | – |
| | Total | 86.23 | 922 | 112 | 196 |
| | | | 75% | 9% | 16% |
| Other Freeways and Expressways | GDOT | 81.87 | 62 | 23 | 27 |
| | | | 55% | 21% | 24% |
| | Others | 70.83 | – | 16 | – |
| | | | 0% | 100% | 0% |
| | Total | 80.49 | 62 | 39 | 27 |
| | | | 48% | 30% | 21% |
| Other Principal Arterial | GDOT | 79.35 | 1,941 | 1,580 | 534 |
| | | | 48% | 39% | 13% |
| | Others | 74.83 | 144 | 251 | 130 |
| | | | 27% | 48% | 25% |
| | Total | 78.83 | 2,085 | 1,831 | 664 |
| | | | 46% | 40% | 14% |
| Minor Arterial | GDOT | 78.37 | 3,005 | 2,227 | 922 |
| | | | 49% | 36% | 15% |
| | Others | 74.83 | 672 | 1,419 | 703 |
| | | | 24% | 51% | 25% |
| | Total | 77.11 | 3,676 | 3,646 | 1,625 |
| | | | 41% | 41% | 18% |
| Major Collector | GDOT | 80.55 | 3,174 | 1,929 | 713 |
| | | | 55% | 33% | 12% |
| | Others | 71.43 | 1,534 | 4,408 | 3,920 |
| | | | 16% | 45% | 40% |
| | Total | 74.75 | 4,708 | 6,338 | 4,633 |
| | | | 30% | 40% | 30% |
| All Federal Aid Highways | GDOT | 79.91 | 7,369 | 4,581 | 2,015 |
| | | | 53% | 33% | 14% |
| | Others | 72.11 | 2,350 | 6,094 | 4,753 |
| | | | 18% | 46% | 36% |
| | Total | 76.54 | 9,719 | 10,675 | 6,768 |
| | | | 36% | 39% | 25% |

Source: Cambridge Systematics from GDOT data.

Figure 1.8 COPACES Pavement Condition




Source: Westats from GDOT data.

While COPACES is GDOT's preferred system for monitoring pavement condition, it may not be the performance measure that will be used for purposes of MAP-21. Additionally, the forecasting of pavement condition with COPACES is not as well developed as with other more commonly used pavement condition measures. For these reasons, the existing pavement condition using the International Roughness

Index (IRI)[9] and Present Serviceability Rating (PSR)[10] as reported in FHWA's Highway Statistics were also examined. FHWA reports pavement scores by numerical ranges. To provide context for those ranges, qualitative labels have been assigned of "Excellent" through "Poor." Those reporting ranges for IRI and PSR are shown in Table 1.13. Miles by pavement condition using these two rating indices are shown in Table 1.14 (p. 1-26).

### Table 1.13 FHWA Pavement Scoring Ranges

| IRI Range | PSR Range | Qualitative Labels |
|---|---|---|
| <60 | >3.9 | Excellent |
| 60-94 | 3.5-3.9 | Very Good |
| 95-170 | 2.6-3.4 | Good |
| 171-220 | 2.1-2.5 | Fair |
| >220 | <=2.0 | Poor |

According to the IRI pavement scoring system, over 99 percent of pavement miles on the Interstate Highway System (all of which is owned by GDOT) is in Good or better condition and over 90 percent is in Very Good or better condition. On the entire National Highway System, of which over 95 percent of the miles are owned by GDOT, and which currently consists of the Interstates and all Principal Arterials, over 99 percent of pavement miles are in Good or better condition and over 90 percent are in Very Good or better condition. On the entirety of the Federal Aid System, over 99 percent of pavement miles are in good or better condition and over 95 percent are in Very Good or better condition.

No pavement scores are given for roads which are not part of the Federal Aid Highway System but only 10 out of those 92,432 miles are owned by GDOT. The Highway Statistics also report on the PSR score for only the Minor Arterial and Major Collectors, which are both part of the Federal Aid system. By that scoring system, almost 89 percent of those roads are in Good or better condition and over 38 percent is in Very Good or better condition.

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[9] The International Roughness Index (IRI) is reported in inches per mile. Lower IRI represents smoother riding roadways. Reference: World Bank Technical Paper Number 46, 1986.

[10] The "Present Serviceability Rating" (PSR) is a subjective, primarily ride-based system adapted from the "AASHTO ROAD TESTS" conducted in the late 1950s and early 1960s. The PSR values range from 0.1 to 5.0; higher PSR values represent smoother riding roadways. Reference: Highway Special Report 61E, 1962.

## Table 1.14 Miles by Pavement Condition

| | International Roughness Index (IRI) | | | | | | Present Serviceability Rating (PSR) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Not Reported | Excellent <60 | Very Good 60-94 | Good 95-170 | Fair 171-220 | Poor >220 | Excellent >3.9 | Very Good 3.5-3.9 | Good 2.6-3.4 | Fair 2.1-2.5 | Poor <=2.0 |
| **Interstate** | | | | | | | | | | | |
| Urban | 12 | 332 | 133 | 50 | 7 | – | N/A | N/A | N/A | N/A | N/A |
| | 2% | 64% | 26% | 10% | 1% | 0% | | | | | |
| Rural | 20 | 416 | 216 | 62 | 1 | – | N/A | N/A | N/A | N/A | N/A |
| | 3% | 60% | 31% | 9% | 0% | 0% | | | | | |
| Total | 32 | 748 | 349 | 112 | 8 | – | N/A | N/A | N/A | N/A | N/A |
| | 3% | 62% | 29% | 9% | 1% | 0% | | | | | |
| **Other Freeways and Expressways** | | | | | | | | | | | |
| Urban | – | 61 | 66 | 21 | – | – | N/A | N/A | N/A | N/A | N/A |
| | 0% | 41% | 45% | 14% | 0% | 0% | | | | | |
| Rural | – | – | – | – | – | – | N/A | N/A | N/A | N/A | N/A |
| | – | – | – | – | – | – | | | | | |
| Total | – | 61 | 66 | 21 | – | – | N/A | N/A | N/A | N/A | N/A |
| | 0% | 41% | 45% | 14% | 0% | 0% | | | | | |
| **Other Principal Arterials** | | | | | | | | | | | |
| Urban | – | 667 | 934 | 274 | 13 | 6 | N/A | N/A | N/A | N/A | N/A |
| | 0% | 35% | 49% | 14% | 1% | 0% | | | | | |
| Rural | 2 | 1,696 | 898 | 43 | 2 | – | N/A | N/A | N/A | N/A | N/A |
| | 0% | 64% | 34% | 2% | 0% | 0% | | | | | |
| Total | 2 | 2,363 | 1,832 | 317 | 15 | 6 | N/A | N/A | N/A | N/A | N/A |
| | 0% | 60% | 36% | 3% | 1% | 0% | | | | | |

## Table 1.14 Miles by Pavement Condition (continued)

| | International Roughness Index (IRI) | | | | | | Present Serviceability Rating (PSR) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Not Reported | Excellent <60 | Very Good 60-94 | Good 95-170 | Fair 171-220 | Poor >220 | Excellent >3.9 | Very Good 3.5-3.9 | Good 2.6-3.4 | Fair 2.1-2.5 | Poor <=2.0 |
| **Minor Arterials** | | | | | | | | | | | |
| Urban | – | 2,357 | 690 | 225 | 50 | – | 253 | 205 | 460 | 60 | 0 |
| | 0% | 71% | 21% | 7% | 2% | 0% | 26% | 21% | 47% | 6% | 0% |
| Rural | – | 2,742 | 2,413 | 34 | – | – | 1,463 | 2,095 | 4,581 | 1,145 | – |
| | 0% | 53% | 47% | 1% | 0% | 0% | 16% | 23% | 49% | 12% | 0% |
| Total | – | 5,099 | 3,103 | 259 | 50 | – | 1,715 | 2,300 | 5,041 | 1,206 | 0 |
| | 0% | 60% | 36% | 3% | 1% | 0% | 17% | 22% | 49% | 12% | 0% |
| **Major Collectors** | | | | | | | | | | | |
| Urban | – | 1,392 | 28 | 25 | – | – | 250 | 133 | 673 | 48 | – |
| | 0% | 96% | 2% | 2% | 0% | 0% | 23% | 12% | 61% | 4% | 0% |
| Rural | – | 1,767 | 138 | 7 | – | 1 | N/A | N/A | N/A | N/A | N/A |
| | 0% | 92% | 7% | 0% | 0% | 0% | | | | | |
| Total | – | 3,159 | 166 | 32 | – | 1 | N/A | N/A | N/A | N/A | N/A |
| | 0% | 94% | 5% | 1% | 0% | 0% | | | | | |

Source: Cambridge Systematics from FHWA's 2009 Highway Statistics.

### *Level of Service (LOS)*

Level of Service (LOS) of traffic differs by type of roadway and is a complex consideration of traffic density, speeds, delay, volume to capacity ratio, peak conditions, etc. For this SWTP/SSTP, Level of Service is computed only as a comparison of daily volumes to capacity (V/C). The Level of Service thresholds for roads that is reported in the documentation for the SWM is:

- LOS A – V/C ratio greater than or equal to 0.0 and less than 0.3;
- LOS B – V/C ratio greater than or equal to 0.3 and less than 0.5;
- LOS C – V/C ratio greater than or equal to 0.5 and less than 0.7;
- LOS D – V/C ratio greater than or equal to 0.7 and less than 0.85;
- LOS E – V/C ratio greater than or equal to 0.85 and less than 1.0; and
- LOS F – V/C ratio greater than or equal to 1.0.

As noted previously the volumes and capacities for the SWTP/SSTP were taken from the SWM; however, these volumes and capacities are in substantial agreement with those that could be estimated from the road inventory. The exception is for the roads that are included in the Minor Arterials or Major Collectors that comprise the non-NHS component of the Federal Aid Highway System. This is because not all of these roads are included as links in the SWM. However, the SWM consists of roughly the same share of Minor Arterial and Major Collector roads for both volume and capacity, and thus a LOS that is based on V/C ratios is expected to be representative for these roads.

Table 1.15 (p. 1-29) shows V/C ratios and LOS by functional system, where the V/C ratios are the average daily VMT to the daily capacity miles. Overall, the LOS on all Federal Aid System Highways in Georgia averages LOS B. For the Interstate System, the average is LOS C. For the NHS roads, the average is a LOS C. The commonly accepted design standard for roads in rural areas is LOS C; and for roads in urban areas is LOS D. It should be stressed that, as is typical of a statewide plan, these averages are based on daily volumes. Figure 1.9 (p. 1-30) shows Daily LOS by individual highway link from the SWM and MPO travel demand models. While overall LOS as shown in Table 1.14 (p. 1-26) is acceptable, daily LOS on certain roadways is below acceptable conditions at LOS E/F.

Table 1.16 (p. 1-29) shows the percentage of miles, according to the SWM, by Functional Classification/System that currently operate at LOS A or B, LOS C or D, and those that are congested as indicated by a LOS E or F. Daily congestion according to this table and as shown in Figure 1.9 (p. 1-30), is primarily a problem on the Interstate System.[11] Peak-period conditions on certain roadways, particularly in the Atlanta metropolitan region, can be much worse. The Atlanta Regional Commission operates a model with peak hour travel periods. As shown

[11] Note that LOS E/F, or v/c ratios over 0.85, are classified as the most congested conditions per GDOT standards. Therefore, for example, LOS E and a v/c of .85 in Augusta looks like the same as LOS F and v/c of 1.0 in Atlanta, but in reality the congestion in Atlanta is much more severe.

in Figure 1.10 (p. 1-31), the ARC travel demand model shows 320 miles as operating at LOS E/F based on links where the daily volume to the daily capacity ratio exceeds 0.85, while it shows 639 miles operating at LOS E/F during the AM peak period and 2,596 miles operating at LOS E/F during the PM peak period. According to the ARC Travel Demand Model, existing congestion on the Downtown Connector in Atlanta is operating at slightly over the lower threshold of LOS E, with a V/C of 0.87 on a daily basis, but is operating at LOS F with a V/C of 1.11 during the PM peak period. The links for I-285 south of Spaghetti Junction (I-85/285 interchange) operate just slightly over the lower daily LOS E threshold with a V/C ratio of 0.89, but operate at a LOS F during the PM peak period with a V/C of 1.10.

## Table 1.15 SWM Daily V/C Ratio and LOS by Functional System

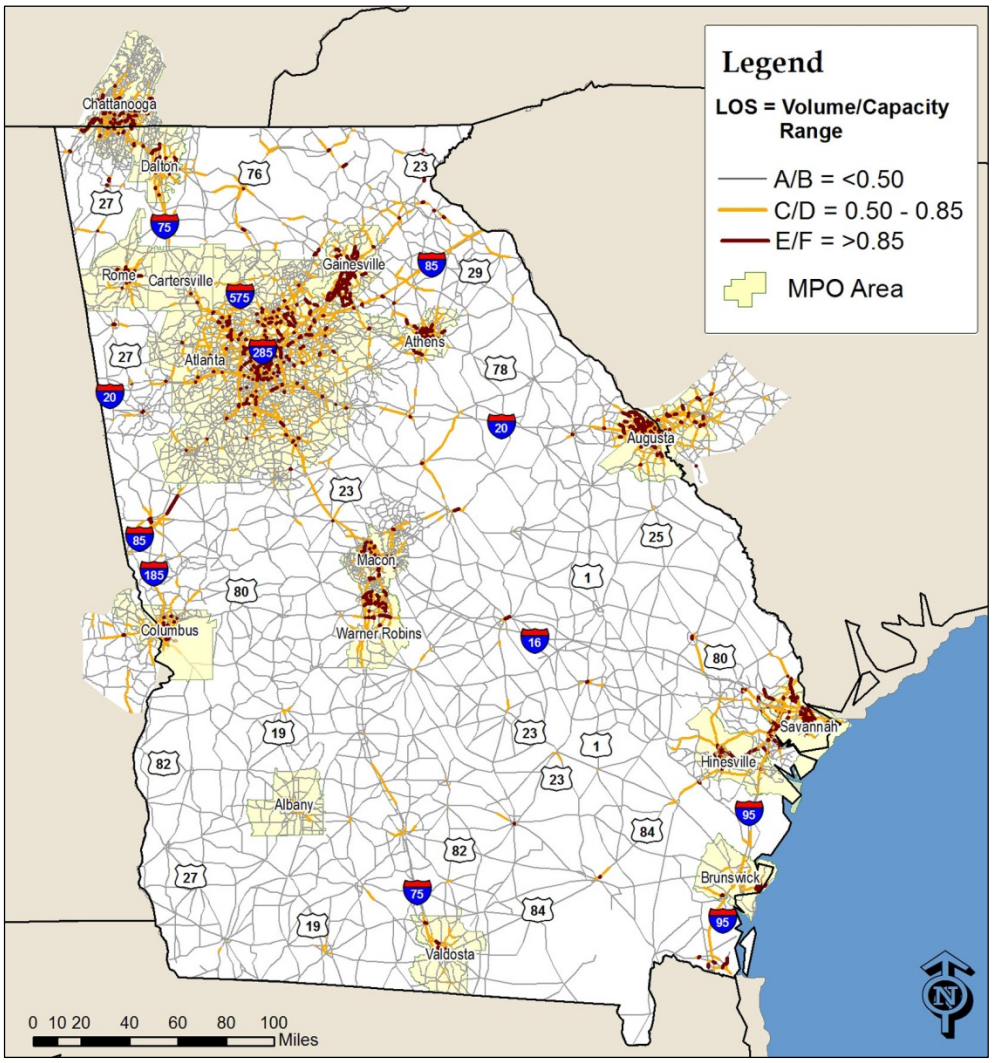
| Functional Classification/System | GDOT | All Others | Total | LOS |
|---|---|---|---|---|
| Interstate | 0.65 | | 0.65 | C |
| Other Freeways and Expressways | 0.57 | 0.53 | 0.56 | C |
| Other Principal Arterial | 0.29 | | 0.31 | B |
| Minor Arterial | 0.28 | 0.37 | 0.29 | A |
| Major Collector | 0.09 | 0.18 | 0.11 | A |
| *Interstate Highway System* | *0.65* | *–* | *0.65* | *C* |
| *National Highway System* | *0.46* | *0.42* | *0.46* | *B* |
| *Federal Aid Highway System* | *0.37* | *0.34* | *0.37* | *B* |

Source: Cambridge Systematics from GDOT SWM.

## Table 1.16 Percent Road Miles by Functional Classification and by LOS

| Functional Classification/System | A/B | C/D | E/F |
|---|---|---|---|
| Interstate | 49% | 35% | 16% |
| Other Freeways and Expressways | 51% | 32% | 17% |
| Other Principal Arterial | 76% | 16% | 8% |
| Minor Arterial | 85% | 11% | 4% |
| Major Collector | 96% | 3% | 1% |
| *Interstate Highway System* | 49% | 35% | 16% |
| *National Highway System* | 70% | 20% | 10% |
| *Federal Aid Highway System* | 83% | 8% | 5% |

Figure 1.9 Existing (2010) Daily LOS on Federal Aid Highways




Source: Cambridge Systematics from GDOT SWM

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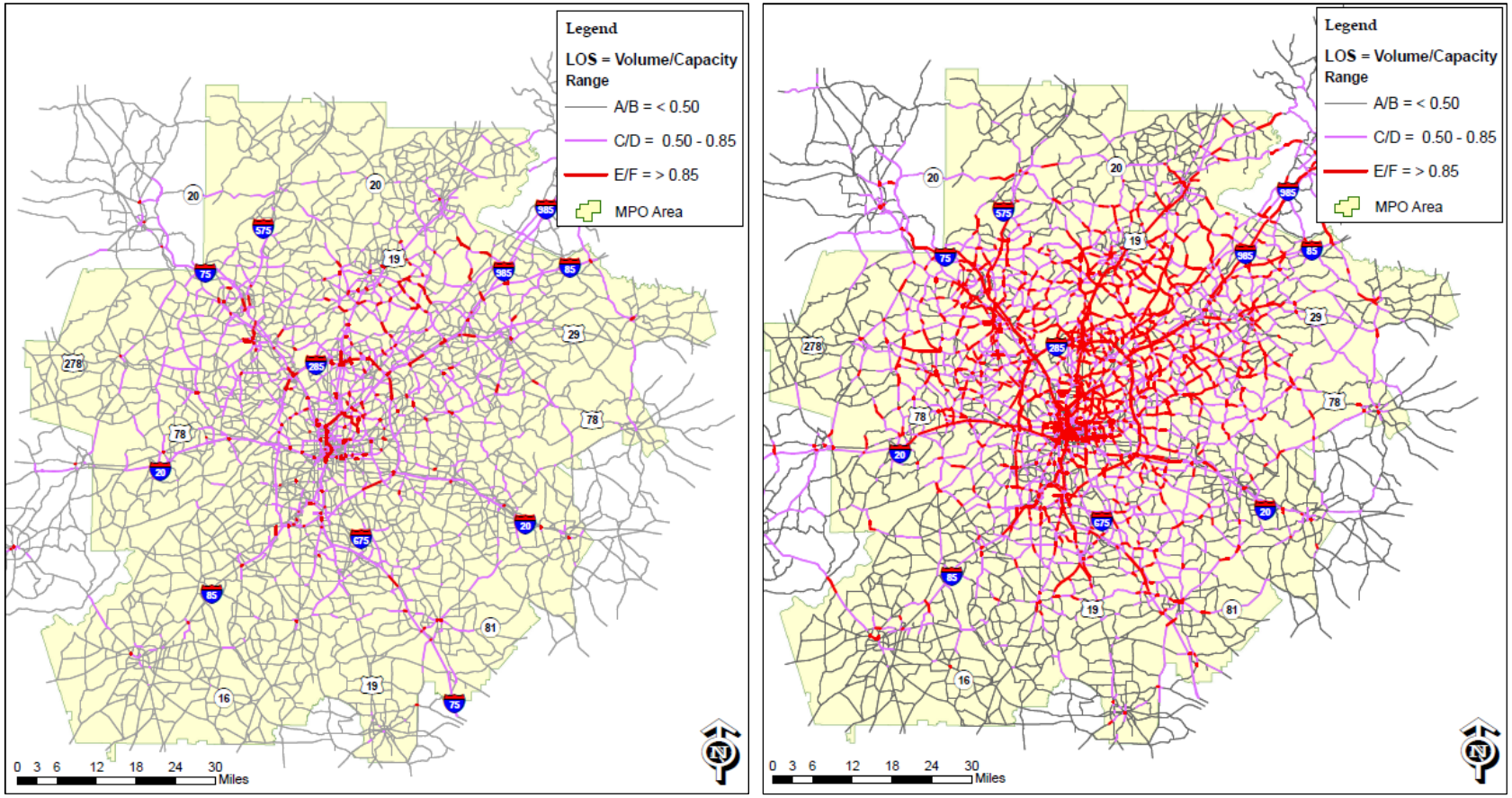
Figure 1.10 Atlanta 2010 LOS from the MPO Travel Demand Model
*Daily LOS PM Peak Period LOS*




Source: Cambridge Systematics from Atlanta Regional Commission Travel Demand Model.

### 1.4.2 Bridges

*Bridges Meeting Georgia Standards (for Inventory Rating)*

The approach for calculating the bridge condition priority score, as shown in Table 1.17, reflects a modification of GDOT's current existing Bridge Prioritization Formula (BPF), which is used by GDOT to prioritize bridges for replacement, as documented in the Interstate Risk Assessment Plan.[12] The BPF relies on data elements for each bridge in Georgia collected and updated during routine and special inspections and stored in GDOT's Bridge Inventory System. Many of these elements are then translated to a National Bridge Inventory (NBI) file for submission to FHWA.

Table 1.17 Bridge Condition Priority Score Elements

| Element | Weight |
|---|---|
| Inventory rating (IR) | 28% |
| Truck AADT | 28% |
| Deck condition rating (if a bridge) | 11% |
| Superstructure condition rating (if a bridge) | 11% |
| Substructure condition rating (if a bridge) | 11% |
| Culvert condition rating (if a culvert) | 33% |
| Critical feature (scour and fracture) | 11% |

Each of the elements is scored on a zero to one scale based on the methodologies described below, and then multiplied by its weight. These values are then added, resulting in a total score ranging from zero to one. A bridge with a score of one would be in poor condition relative to other bridges, and would be a high priority in terms of repair. On the other end of the scale, a bridge with a score of zero is in excellent condition, relative to other bridges.

Inventory Rating, as shown in Table 1.18 (p. 1-33), is one of the most heavily weighted elements. It is a capacity rating that represents the load level that can safely utilize an existing structure for an indefinite period of time. GDOT has previously incorporated inventory rating tiers into the BPF. These tiers have been adopted for this study with no changes. Inventory rating is included in the NBI dataset as Item 66.

[12] Cambridge Systematics, *Georgia Interstate Highway Risk Assessment: Project Memorandum 1*, Georgia Department of Transportation, April 2013.

## Table 1.18 Inventory Rating (IR) Score

| Tiers | Tiers (from BPF) | Value (from BPF) |
|---|---|---|
| 1 | IR ≤15 | 35 |
| 2 | IR >15 | 25 |
| 3 | IR >21 | 13 |
| 4 | IR >24 | 0 |

GDOT's Bridge data was reviewed to determine the existing bridges that are in the highest Tier for Inventory Rating. The number of those bridges is shown in Table 1.19, and the percentage that those bridges are of all bridges is shown in Table 1.20 (p. 1-34).

## Table 1.19 Bridges Meeting GDOT Standards *For Inventory Rating*

| Functional Classification/System | GDOT | County | Municipal | Others[a] | Federal Agencies[b] | Total |
|---|---|---|---|---|---|---|
| Interstate | 716 | – | – | – | 2 | 718 |
| Other Freeways and Expressways | 124 | 6 | – | 1 | – | 131 |
| Other Principal Arterial | 1,287 | 66 | 21 | – | 3 | 1,377 |
| Minor Arterial | 1,510 | 323 | 113 | 3 | 4 | 1,953 |
| Major Collector | 1,049 | 1,056 | 116 | 7 | 6 | 2,234 |
| Minor Collector | 21 | 723 | 1 | – | 3 | 748 |
| Local | 251 | 2,683 | 175 | 19 | 77 | 3,205 |
| Interstate Highway System | 716 | – | – | – | 2 | 718 |
| National Highway System | 2,127 | 72 | 21 | 1 | 5 | 2,226 |
| Federal Aid Highway System | 4,686 | 1,451 | 250 | 11 | 15 | 6,413 |
| Off-Federal Aid Highway System | 272 | 3,406 | 176 | 19 | 80 | 3,953 |
| Totals | 4,958 | 4,857 | 426 | 30 | 95 | 10,366 |

Source: Cambridge Systematics from GDOT data.

[a] This category includes public roads owned by other non-Federal public agencies, for example, the Georgia Department of Natural Resources.

[b] This category includes, for example, public roads in military bases, or in national parks and forests that are owned by Federal agencies.

Table 1.20 Percent of Bridges meeting GDOT Standards
*For Inventory Rating*

| Functional Classification/System | GDOT | County | Municipal | Others[a] | Federal Agencies[b] | Total |
|---|---|---|---|---|---|---|
| Interstate | 73% | – | – | – | 100% | 73% |
| Other Freeways and Expressways | 67% | 100% | – | 100% | – | 68% |
| Other Principal Arterial | 78% | 90% | 84% | – | 100% | 79% |
| Minor Arterial | 77% | 73% | 79% | 60% | 67% | 77% |
| Major Collector | 74% | 64% | 77% | 64% | 100% | 69% |
| Minor Collector | 51% | 65% | 50% | 0% | 60% | 65% |
| Local | 70% | 67% | 76% | 43% | 78% | 67% |
| Interstate Highway System | 73% | – | – | – | 100% | 73% |
| National Highway System | 76% | 91% | 84% | 50% | 100% | 76% |
| Federal Aid Highway System | 76% | 67% | 78% | 61% | 88% | 74% |
| Off-Federal Aid Highway System | 68% | 66% | 76% | 41% | 77% | 67% |
| Totals | 75% | 67% | 77% | 47% | 79% | 71% |

Source: Cambridge Systematics from GDOT data.

[a] This category includes public roads owned by other non-Federal public agencies, for example, the Georgia Department of Natural Resources.

[b] This category includes, for example, public roads in military bases, or in national parks and forests that are owned by Federal agencies.

By these standards, the majority of bridges are classified in the highest Inventory Rating tier. There is little difference between the percentage of bridges on each functionally classified road that are owned by GDOT and those that are owned by others.

There are issues with this measure, including an inability to predict it out to the future. This measure is best suited for an analysis on a bridge by bridge basis, but not for a network summary. For GDOT's Intestate Risk Assessment Plan, the measure that is being used, which is also the measure in MAP-21, is percent deck area on bridges classified as Structurally Deficient. This measure is also being used for transportation planning by the Atlanta Regional Commission MPO. A discussion of Structurally Deficient Bridges and Functionally Obsolete Bridges is presented in the next sections.

### *Structural Deficiency (SD)*

Structural deficiencies are characterized by deteriorated conditions of significant bridge elements and potentially reduced load-carrying capacity. A "structurally deficient" designation does not imply that a bridge is unsafe, but such bridges typically require significant maintenance, repair, and operational restrictions to

remain in service, and would eventually require major rehabilitation or replacement to address the underlying deficiency.

The number of Structurally Deficient Bridges by Functional Classification and System and by ownership is shown in Table 1.21, and the percentages of Structurally Deficient bridges are shown in Table 1.22 (p. 1-36). The Deck Area of Structurally Deficient Bridges by Functional Classification and System and by ownership is shown in Table 1.23 (p. 1-37), and the percentages of Deck Area of Structurally Deficient bridges are shown in Table 1.24 (p. 1-38).

Only 2 percent of the bridges and 2 percent of the deck area of bridges owned by GDOT are Structurally Deficient. A similar condition exists for the bridges on the Interstate Highway System, National Highway System, and Federal Aid Highway System for which Federal funding is administered by GDOT, where the highest percentage of Structurally Deficient bridges is just over 3 percent. Even the Off-System bridges, which are almost exclusively owned by entities other than GDOT, have a low percentage of bridges, 10 percent, or bridge deck areas, 9 percent, that are rated as Structurally Deficient.

### Table 1.21 Count of SD Bridges on Public Roads by Ownership and Functional Classification/System

| Functional Classification/System | GDOT | County | Municipal | Others[a] | Federal Agencies[b] | Total |
|---|---|---|---|---|---|---|
| Interstate | 11 | 0 | 0 | 1 | 0 | 12 |
| Other Freeways and Expressways | 26 | 1 | 0 | 0 | 1 | 28 |
| Other Principal Arterial | 44 | 27 | 11 | 0 | 3 | 85 |
| Minor Arterial | 21 | 110 | 13 | 0 | 1 | 145 |
| Major Collector | 0 | 92 | 1 | 1 | 1 | 95 |
| Minor Collector | 1 | 464 | 19 | 5 | 18 | 507 |
| Local | 103 | 694 | 44 | 7 | 24 | 872 |
| Interstate Highway System | 11 | 0 | 0 | 1 | 0 | 12 |
| | 92% | 0% | 0% | 8% | 0% | 1% |
| National Highway System | 81 | 28 | 11 | 1 | 4 | 40 |
| | 65% | 22% | 9% | 1% | 3% | 5% |
| Federal Aid Highway System | 102 | 230 | 25 | 2 | 6 | 270 |
| | 28% | 63% | 7% | 1% | 2% | 31% |
| Off-Federal Aid Highway System | 104 | 1,158 | 63 | 12 | 42 | 602 |
| | 8% | 84% | 5% | 1% | 3% | 69% |
| Totals | 206 | 1,388 | 88 | 14 | 48 | 872 |
| | 12% | 80% | 5% | 1% | 3% | |

Source: Cambridge Systematics from GDOT's 2012 National Bridge Inventory Submittal.

[a] This category includes public roads owned by other non-Federal public agencies, for example, the Georgia Department of Natural Resources.

[b] This category includes, for example, public roads in military bases, or in national parks and forests that are owned by Federal agencies.

## Table 1.22 Percent of SD Bridges on Public Roads by Ownership and Functional Classification/System

| Functional Classification/System | GDOT | County | Municipal | Others[a] | Federal Agencies[b] | Total |
|---|---|---|---|---|---|---|
| Interstate | 1% | 0% | 0% | 50% | 0% | 1% |
| Other Freeways and Expressways | 0% | 0% | 0% | 0% | 0% | 0% |
| Other Principal Arterial | 2% | 1% | 0% | 0% | 100% | 2% |
| Minor Arterial | 2% | 6% | 8% | 0% | 60% | 3% |
| Major Collector | 2% | 7% | 8% | 0% | 10% | 5% |
| Minor Collector | 0% | 8% | 50% | 20% | 50% | 8% |
| Local | 0% | 12% | 8% | 4% | 39% | 10% |
| Interstate Highway System | 1% | 0% | 0% | 50% | 0% | 1% |
| National Highway System | 1% | 1% | 0% | 25% | 33% | 1% |
| Federal Aid Highway System | 2% | 6% | 7% | 6% | 28% | 3% |
| Off-Federal Aid Highway System | 0% | 11% | 8% | 4% | 40% | 10% |
| Totals | 2% | 9% | 8% | 4% | 36% | 6% |

Source: Cambridge Systematics from GDOT's 2012 National Bridge Inventory Submittal.

[a] This category includes public roads owned by other non-Federal public agencies, for example, the Georgia Department of Natural Resources.

[b] This category includes, for example, public roads in military bases, or in national parks and forests that are owned by Federal agencies.

## Table 1.23 Deck Area of SD Bridges by Ownership and Functional Classification/System
*Thousands of Square Feet*

| Functional Classification/System | GDOT | County | Municipal | Others[a] | Federal Agencies[b] | Total |
|---|---|---|---|---|---|---|
| Interstate | 1.4 | – | – | 0.2 | – | 1.6 |
| Other Freeways and Expressways | – | – | – | – | – | – |
| Other Principal Arterial | 7.1 | 0.3 | – | – | 0.0 | 7.4 |
| Minor Arterial | 2.7 | 1.5 | 1.4 | – | 0.2 | 5.8 |
| Major Collector | 1.1 | 4.8 | 0.9 | – | 0.0 | 6.9 |
| Minor Collector | – | 2.3 | 0.0 | 0.0 | 0.0 | 2.3 |
| Local | 0.1 | 6.7 | 1.1 | 0.1 | 0.4 | 8.3 |
| Interstate Highway System | 1.4 | – | – | 0.2 | – | 1.6 |
| | 1% | 0% | 0% | 0% | 0% | 5% |
| National Highway System | 8.5 | 0.3 | – | 0.2 | 0.0 | 9.0 |
| | 2% | 0% | 0% | 0% | 0% | 28% |
| Federal Aid Highway System | 12.3 | 6.7 | 2.3 | 0.2 | 0.2 | 21.7 |
| | 57% | 31% | 11% | 1% | 1% | 67% |
| Off-Federal Aid Highway System | 0.1 | 8.9 | 1.1 | 0.1 | 0.4 | 10.7 |
| | 0% | 5% | 1% | 0% | 0% | 33% |
| Totals | 12.4 | 15.6 | 3.4 | 0.3 | 0.6 | 32.4 |
| | 1% | 2% | 0% | 0% | 0% | |

Source: Cambridge Systematics from GDOT's 2012 National Bridge Inventory Submittal.

[a] This category includes public roads owned by other non-Federal public agencies, for example, the Georgia Department of Natural Resources.

[b] This category includes, for example, public roads in military bases, or in national parks and forests that are owned by Federal agencies.

Table 1.24 Percent of Deck Area of SD Bridges by Ownership and Functional Classification/System
*Thousands of Square Feet*

| Functional Classification/System | GDOT | County | Municipal | Others[a] | Federal Agencies[b] | Total |
|---|---|---|---|---|---|---|
| Interstate | 1% | 0% | 0% | 50% | 0% | 1% |
| Other Freeways and Expressways | 0% | 0% | 0% | 0% | 0% | 0% |
| Other Principal Arterial | 3% | 2% | 0% | 0% | 100% | 3% |
| Minor Arterial | 2% | 7% | 11% | 0% | 49% | 3% |
| Major Collector | 1% | 10% | 16% | 0% | 3% | 5% |
| Minor Collector | 0% | 9% | 100% | 9% | 61% | 8% |
| Local | 0% | 10% | 11% | 4% | 12% | 6% |
| Interstate Highway System | 1% | 0% | 0% | 50% | 0% | 1% |
| National Highway System | 2% | 2% | 0% | 20% | 3% | 2% |
| Federal Aid Highway System | 2% | 7% | 10% | 8% | 11% | 3% |
| Off-Federal Aid Highway System | 0% | 10% | 11% | 5% | 13% | 6% |
| Totals | 2% | 9% | 10% | 6% | 13% | 3% |

Source: Cambridge Systematics from GDOT's 2012 National Bridge Inventory Submittal.

[a] This category includes public roads owned by other non-Federal public agencies, for example, the Georgia Department of Natural Resources.

[b] This category includes, for example, public roads in military bases, or in national parks and forests that are owned by Federal agencies.

## *Functionally Obsolete (FO)*

A bridge is considered Functionally Obsolete when it does not meet current design standards (for criteria such as lane width), either because the volume of traffic carried by the bridge exceeds the level anticipated when the bridge was constructed and/or the relevant design standards have been revised. Addressing functional deficiencies may require the widening or replacement of the structure. Rural bridges tend to have a higher percentage of structural deficiencies, while urban bridges have a higher incidence of functional obsolescence due to rising traffic volumes.[13] The number of Functionally Obsolete bridges by Functional Classification and System and by ownership are shown in Table 1.25 (p. 1-39), and the percentages of Functionally Obsolete bridges are shown in Table 1.26 (p. 1-40). The deck area of Functionally Obsolete bridges by Functional Classification and System and by ownership are shown in Table 1.27 (p. 1-40), and the percentages of deck area of Functionally Obsolete bridges are shown in Table 1.28 (p. 1-41).

[13] If a bridge is determined to be Functionally Obsolete and Structurally Deficient, it is classified as Structurally Deficient.

Only 11 percent of the bridges and 12 percent of the deck area of bridges owned by GDOT are Functionally Obsolete. A similar condition exists for the bridges on the Interstate Highway System, National Highway System, or Federal Aid Highway System for which Federal funding is administered by GDOT, where the highest percentage of Functionally Obsolete bridges is just over 12 percent. Even the Off-System bridges, which are almost exclusively owned by entities other than GDOT, have a very low percentage of bridges, 14 percent, or bridge deck areas, 13 percent, that are rated as Functionally Obsolete.

### Table 1.25 Count of FO Bridges on Public Roads by Ownership and Functional Classification/System

| Functional Classification/System | GDOT | County | Municipal | Others[a] | Federal Agencies[b] | Total |
|---|---|---|---|---|---|---|
| Interstate | 16.3 | – | – | – | – | 16.3 |
| Other Freeways and Expressways | – | – | – | – | – | – |
| Other Principal Arterial | 25.3 | 3.7 | 0.3 | – | – | 29.3 |
| Minor Arterial | 22.6 | 4.6 | 6.5 | 0.4 | 0.1 | 34.1 |
| Major Collector | 10.9 | 6.4 | 1.4 | – | 0.8 | 19.4 |
| Minor Collector | 0.5 | 3.0 | – | 0.0 | – | 3.5 |
| Local | 6.4 | 6.9 | 4.8 | 0.4 | 0.6 | 19.1 |
| Interstate Highway System | 16.3 | – | – | – | – | 16.3 |
| | 100% | 0% | 0% | 0% | 0% | 13% |
| National Highway System | 41.6 | 3.7 | 0.3 | – | – | 45.6 |
| | 91% | 8% | 1% | 0% | 0% | 37% |
| Federal Aid Highway System | 75.1 | 14.6 | 8.2 | 0.4 | 0.9 | 99.2 |
| | 76% | 15% | 8% | 0% | 1% | 81% |
| Off-Federal Aid Highway System | 6.9 | 9.9 | 4.8 | 0.4 | 0.6 | 22.6 |
| | 31% | 44% | 21% | 2% | 3% | 19% |
| Totals | 82.0 | 24.5 | 13.0 | 0.8 | 1.5 | 121.7 |
| | 8% | 3% | 1% | 0% | 0% | |

Source: Cambridge Systematics from GDOT's 2012 National Bridge Inventory Submittal.

[a] This category includes public roads owned by other non-Federal public agencies, for example, the Georgia Department of Natural Resources.

[b] This category includes, for example, public roads in military bases, or in national parks and forests that are owned by Federal agencies.

## Table 1.26 Percent of FO Bridges on Public Roads by Ownership and Functional Classification/System

| Functional Classification/System | GDOT | County | Municipal | Others[a] | Federal Agencies[b] | Total |
|---|---|---|---|---|---|---|
| Interstate | 6% | 0% | 0% | 0% | 0% | 6% |
| Other Freeways and Expressways | 0% | 0% | 0% | 0% | 0% | 0% |
| Other Principal Arterial | 10% | 19% | 7% | 0% | 0% | 11% |
| Minor Arterial | 13% | 23% | 27% | 50% | 20% | 16% |
| Major Collector | 10% | 10% | 24% | 0% | 80% | 11% |
| Minor Collector | 19% | 9% | 0% | 40% | 0% | 9% |
| Local | 12% | 13% | 14% | 22% | 35% | 13% |
| Interstate Highway System | 6% | 0% | 0% | 0% | 0% | 6% |
| National Highway System | 8% | 17% | 7% | 0% | 0% | 8% |
| Federal Aid Highway System | 10% | 13% | 24% | 19% | 50% | 11% |
| Off-Federal Aid Highway System | 12% | 12% | 14% | 22% | 33% | 12% |
| Totals | 10% | 12% | 20% | 22% | 38% | 12% |

Source: Cambridge Systematics from GDOT's 2012 National Bridge Inventory Submittal.

[a] This category includes public roads owned by other non-Federal public agencies, for example, the Georgia Department of Natural Resources.

[b] This category includes, for example, public roads in military bases, or in national parks and forests that are owned by Federal agencies.

## Table 1.27 Deck Area of FO Bridges by Ownership and Functional Classification/System

*Thousands of Square Feet*

| Functional Classification/System | GDOT | County | Municipal | Others[a] | Federal Agencies[b] | Total |
|---|---|---|---|---|---|---|
| Interstate | 16.3 | – | – | – | – | 16.3 |
| Other Freeways and Expressways | 2.2 | – | – | – | – | 2.2 |
| Other Principal Arterial | 25.3 | 3.7 | 0.3 | – | – | 29.3 |
| Minor Arterial | 22.6 | 4.6 | 6.5 | 0.1 | 0.4 | 34.1 |
| Major Collector | 10.9 | 6.4 | 1.4 | 0.8 | – | 19.4 |
| Minor Collector | 0.5 | 3.0 | – | – | 0.0 | 3.5 |
| Local | 6.4 | 6.9 | 4.8 | 0.6 | 0.4 | 19.1 |
| Interstate Highway System | 16.3 | – | – | – | – | 16.3 |
| | 100% | 0% | 0% | 0% | 0% | 13% |
| National Highway System | 43.7 | 3.7 | 0.3 | – | – | 45.6 |
| | 92% | 8% | 1% | 0% | 0% | 37% |
| Federal Aid Highway System | 77.2 | 14.6 | 8.2 | 0.9 | 0.4 | 99.2 |

| Functional Classification/System | GDOT | County | Municipal | Others[a] | Federal Agencies[b] | Total |
|---|---|---|---|---|---|---|
| | 76% | 14% | 8% | 1% | 0% | 81% |
| Off-Federal Aid Highway System | 6.93 | 9.9 | 4.8 | 0.6 | 0.4 | 22.6 |
| | 31% | 44% | 21% | 3% | 2% | 19% |
| Totals | 84.2 | 24.5 | 13.0 | 1.5 | 0.8 | 121.7 |
| | 68% | 20% | 10% | 1% | 1% | |

Source: Cambridge Systematics from GDOT's 2012 National Bridge Inventory Submittal.

[a] This category includes public roads owned by other non-Federal public agencies, for example, the Georgia Department of Natural Resources.

[b] This category includes, for example, public roads in military bases, or in national parks and forests that are owned by Federal agencies.

## Table 1.28 Percent of Deck Area of FO Bridges by Ownership and Functional Classification/System
*Thousands of Square Feet*

| Functional Classification/System | GDOT | County | Municipal | Others[a] | Federal Agencies[b] | Total |
|---|---|---|---|---|---|---|
| Interstate | 8% | 0% | 0% | 0% | 0% | 8% |
| Other Freeways and Expressways | 0% | 0% | 0% | 0% | 0% | 0% |
| Other Principal Arterial | 12% | 25% | 7% | 0% | 0% | 13% |
| Minor Arterial | 14% | 20% | 48% | 47% | 28% | 17% |
| Major Collector | 13% | 12% | 26% | 0% | 92% | 14% |
| Minor Collector | 14% | 12% | 0% | 12% | 0% | 12% |
| Local | 11% | 10% | 48% | 12% | 20% | 13% |
| Interstate Highway System | 8% | 0% | 0% | 0% | 0% | 8% |
| National Highway System | 9% | 24% | 7% | 0% | 0% | 10% |
| Federal Aid Highway System | 11% | 16% | 35% | 16% | 46% | 12% |
| Off-Federal Aid Highway System | 11% | 11% | 48% | 12% | 19% | 13% |
| Totals | 11% | 13% | 39% | 14% | 29% | 12% |

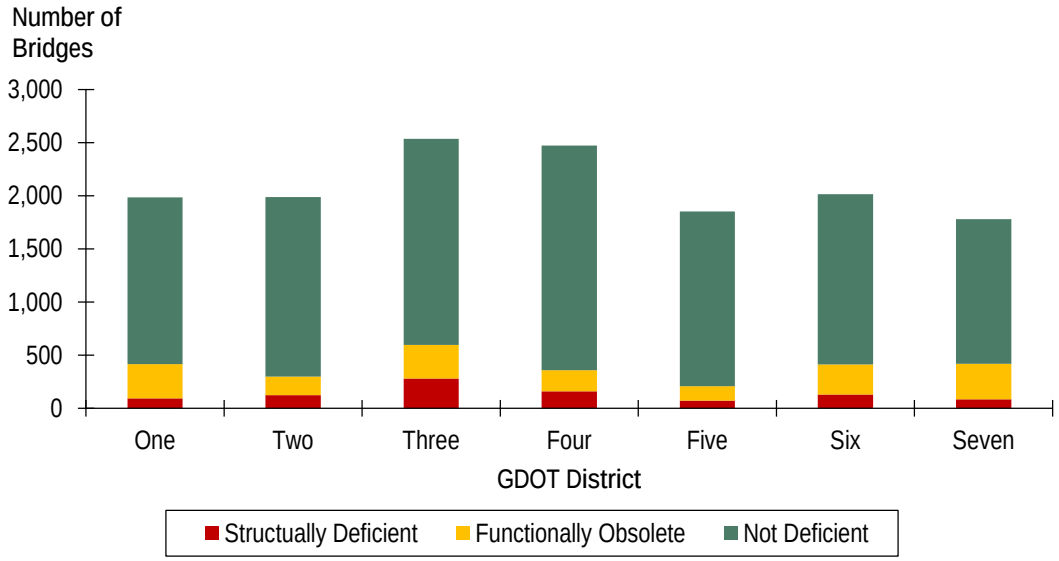
Source: Cambridge Systematics from GDOT's 2012 National Bridge Inventory Submittal.

[a] This category includes public roads owned by other non-Federal public agencies, for example, the Georgia Department of Natural Resources.

[b] This category includes, for example, public roads in military bases, or in national parks and forests that are owned by Federal agencies.

As shown in the SD and FO tables above, there are few SD or FO bridges in Georgia. As shown in Figure 1.11, the distribution of those bridges is roughly the same in all areas of Georgia.

Figure 1.11 Bridge Status by GDOT District



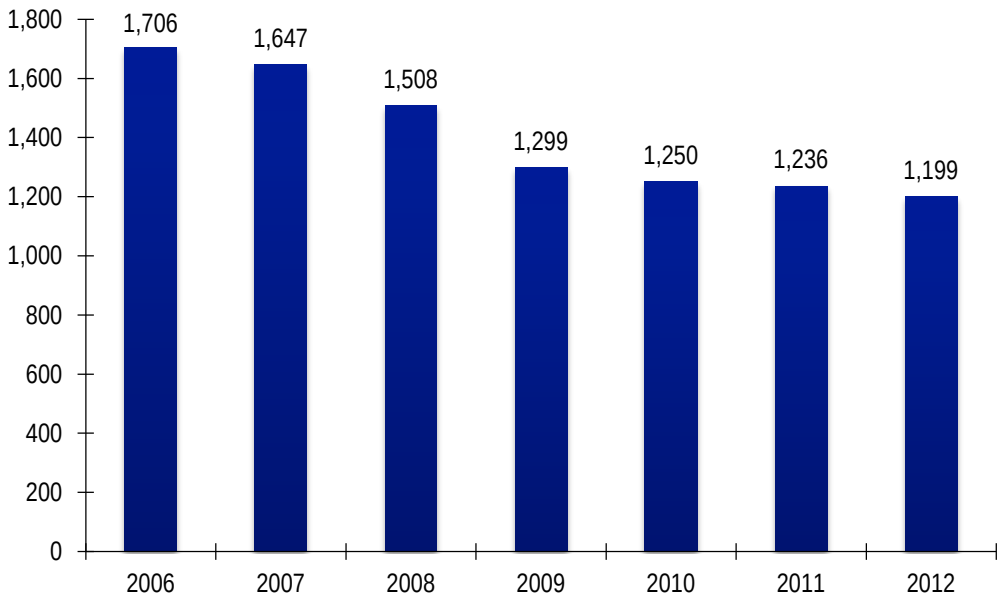

Source: Westats from GDOT's 2012 National Bridge Inventory Submittal

## 1.5 SAFETY

Improving highway safety has been a top priority of GDOT for many years. Safety can be measured by the number and rate of fatalities, injuries of different types, and property damage crashes. As shown in Figures 1.12 and 1.13 (p. 1-43) the number of fatalities and serious injuries[14] has declined significantly in the past decade.

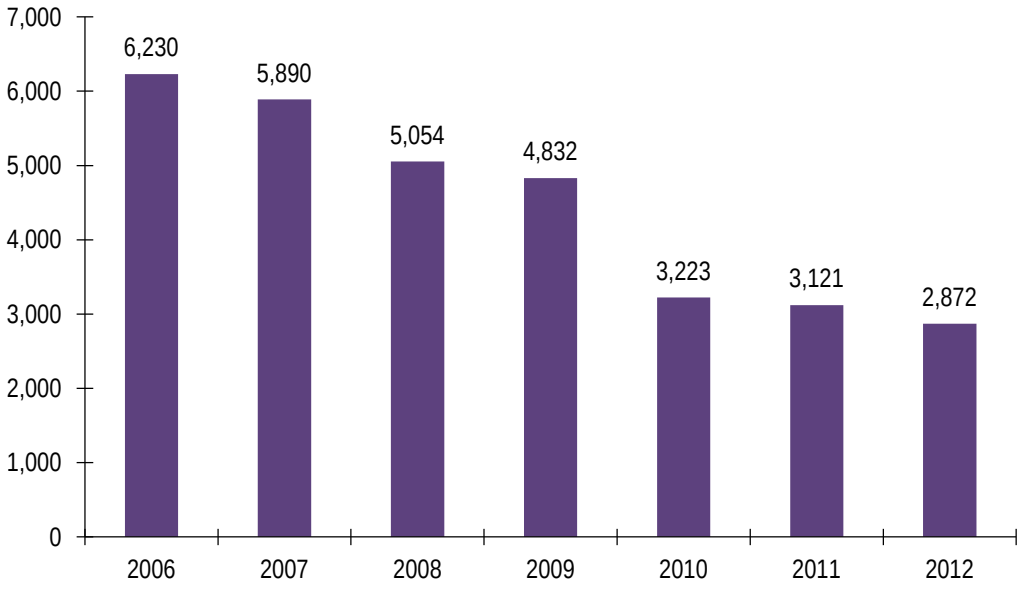
[14] Serious injuries are defined by GDOT as those requiring significant medical attention at the scene of the crash.

## Figure 1.12 Highway Fatalities




Source: Georgia Department of Transportation as of November 1, 2013.

## Figure 1.13 Highway Serious Injuries




Source: Georgia Department of Transportation as of November 1, 2013.

## 1.6 SUMMARY OF MAJOR ISSUES/ CURRENT DEFICIENCIES

On average, there are few roads which are owned by GDOT, or for which GDOT administers Federal funding, that have a pavement condition of Fair or Poor. In fact, a very small percentage of roadway miles in Georgia overall are in Good or less pavement condition. The pavement condition on the Major Collectors that are owned by Other jurisdictions and are eligible for Federal Highway Aid as administered by GDOT, is worse than that on GDOT-owned roads. While the overall condition of pavement is outstanding, there are sections of roads, as shown in Figure 1.7 (p. 1-19) and in Tables 1.11 (p. 1-22) and 1.12 (p. 1-23), where pavement deficiencies exist.

The bridges as measured by the Inventory Rating show few deficiencies. This finding is consistent with the finding using the Structural Deficiency rating that is likely to be a MAP-21 performance measure. On average there are few bridges and a low percentage of deck areas of bridges owned by GDOT, or which are part of the Federal Aid Highway System for which Federal Funding is administered by GDOT, that are Structurally Deficient. In fact, there is also a low percentage, just over 10 percent, of Off-System Bridges that are Structurally Deficient. There are only a slightly higher percentage of SD bridges owned by others compared to those bridges that are owned by GDOT. While the overall conditions of bridges are outstanding, there are Structurally Deficient bridges.

On average, there are few bridges and a low percentage of deck areas of bridges owned by GDOT, or which are part of the Interstate, National, or Federal Aid Highway Systems for which GDOT administers funding, that are Functionally Obsolete. The percentage of Off-System bridges that are Functionally Obsolete (14 percent), is not significantly higher than the percentage of Federal Aid System bridges that are Functionally Obsolete (12 percent). There is no difference between the percentages of bridges that are Functionally Obsolete and owned by GDOT compared to those bridges that are owned by Counties. There is a slightly higher percentage of Functionally Obsolete bridges owned by Cities and Others compared to bridges that are owned by GDOT. While the overall conditions of bridges are outstanding, there are Functionally Obsolete bridges.

The reason for the small disparities in infrastructure performance between GDOT-owned facilities and those owned by others is unclear. Possible reasons include: less access to Federal Aid funding; more non-Federal funds devoted to these roads by GDOT than by other jurisdictions; or better design, maintenance, or rehabilitation practices by GDOT compared to other jurisdictions.

On average, the daily traffic operating Level of Service on the components of the Federal Aid Highway System, exceeds design standards. While the average performance shows that there are no existing deficiencies, GDOT must also deal with extreme conditions, not just with averages. There are many highways that experience congestion, particularly in the urban areas within MPOs during peak periods. Congestion seems confined to the National Highway System, and particularly on the Interstate Highway System.

## 1.7 FEDERAL AID SYSTEM HIGHWAY DATABASE

As described in the Technical Memorandum for Task 2,[15] a comprehensive database has been prepared to assist in the preparation of the SWTP/SSTP. For the Inventory of Existing Highway Conditions, various queries have been prepared of that database, which assisted in preparing the tables shown in this section. These queries have been stored in a series of Excel Files. The Pivot Tables in those Excel Workbooks allow for the data outputs to be reported based on selections made in the Report Filters. These Report Filters allow for separate reports to be prepared for any values, or combination of values, of:

- MPO;
- Urban/Rural designation;
- GDOT District;
- County;
- Congressional district; and
- Access Control.

An example of the reports that can be generated by the Pivot Tables of Center Line Miles by Ownership and Functional Classification, for the Atlanta Regional Commission, is shown in Table 1.29 (p. 1-46).

[15] Cambridge Systematics, et al., *Statewide Transportation Plan/Statewide Strategic Transportation Plan Update: Task II – Data Collection Plan*, Georgia Department of Transportation, July 22, 2013.

Table 1.29 Example of Pivot Table: Federal Aid Highway Miles by Functional Classification and by Owner
*Filtered for the Atlanta Regional Commission*

| MPO | Atlanta |
|---|---|
| Urban/Rural | (All) |
| GDOT_DIST | (All) |
| County | (All) |
| CONG_DIST | (All) |
| Access Control | (All) |

Attribute Filters

| Center Line Miles | Owner | | | |
|---|---|---|---|---|
| Functional Classification | State Highway Agency | County Highway Agency | City or Municipal Highway Agency | Grand Total |
| Interstate | 348 | | | 348 |
| Principal Arterial – Other Freeways and Expressways | 82 | 4 | 3 | 89 |
| Principal Arterial – Other | 573 | 47 | 39 | 660 |
| Minor Arterial | 1,014 | 707 | 424 | 2,144 |
| Major Collector | 194 | 1,015 | 575 | 1,783 |
| FAS Total | 2,210 | 1,772 | 1,041 | 5,023 |

Source: Cambridge Systematics from GDOT Data.

From the Road Inventory database that was generated from the Federated Road Enhanced Database (FRED), Bridge, and COPACES data, there are separate Excel Workbook files that will generate Pivot Tables for:

- Miles of Federal Aid Highway;
- Number of Bridges;
- Deck Area of Bridges;
- Capacity (Lane-Miles) of Highways;
- Usage (Count-Based VMT) of Highways; and
- Usage (AADT) of Bridges;
- Performance (COPACES) of Highways; and
- Performance of Bridges.

And from the Statewide Model (SWM), separate Excel workbook files that will generate Pivot Tables for:

- Miles (Model-Based) of Highway;
- Capacity (Model-Based) of Highways;
- Usage (Model-Based VMT) of Highways; and
- Performance (LOS) of Highways.

# 2.0 Trucking

## 2.1 INVENTORY OF FACILITIES

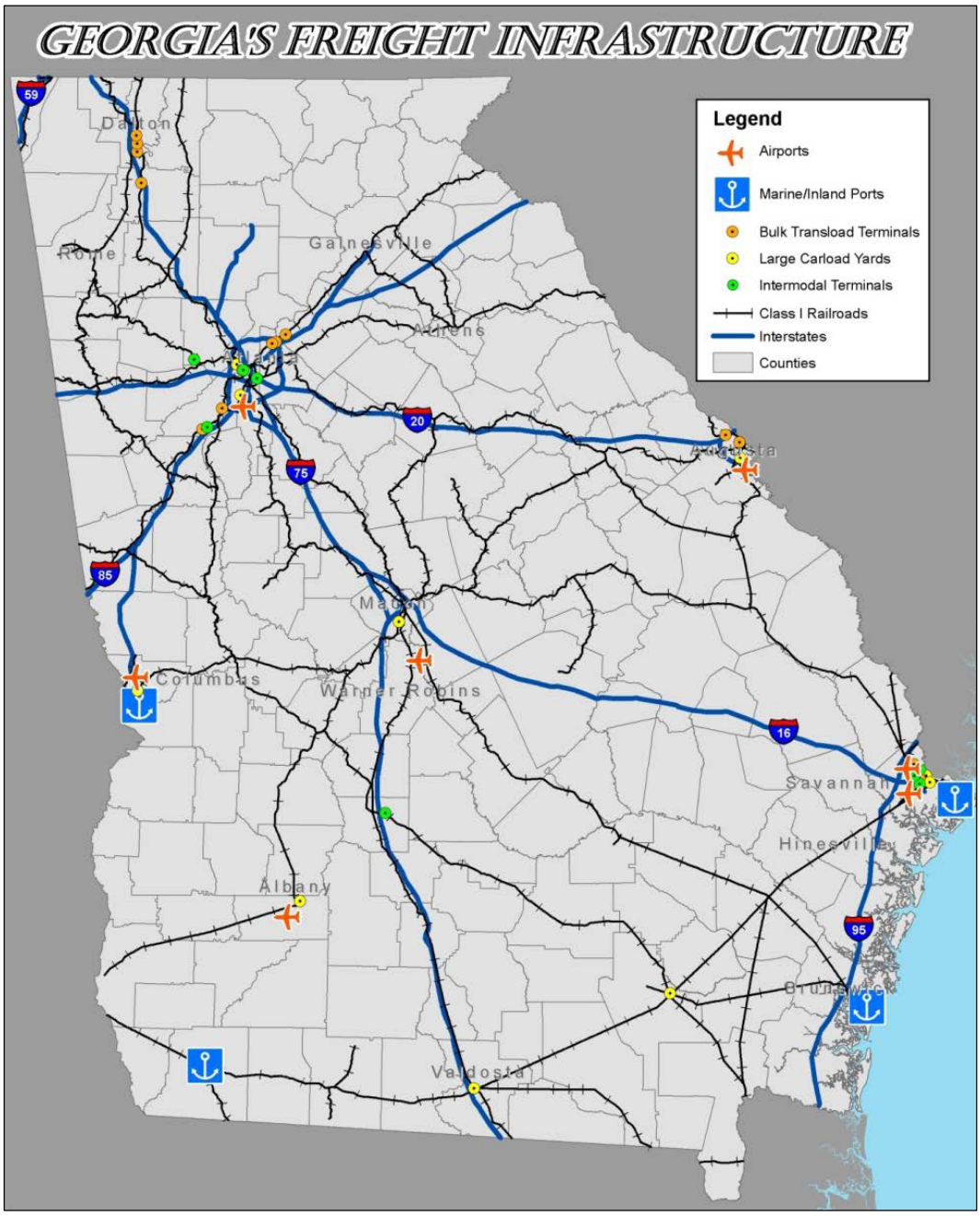
Much of the information from this chapter has been extracted from the Georgia Statewide Freight and Logistics Plan which was completed in 2012 with updates to reflect the most recently available data for freight movement in Georgia.

The trucking industry carries the vast majority of the freight moved in the State. Trucking serves a dual role as both an end-to-end freight mode moving goods between origins and destinations, and as the mode connecting other freight modes (rail, marine and air cargo) to final destinations for multimodal freight trips. The trucking industry relies on the highway network for its operation with the Interstate System serving as the most heavily used component of the highway network, particularly for long-haul movements.

The local road network serves as the last-mile connector for the State's major freight facilities. This last-mile connectivity is important as Georgia has significant freight assets for rail, marine and air which rely on the trucking mode. The Port of Savannah, the fourth largest container port in the U.S. along with the other ports in Georgia, rely on the trucking industry to deliver goods to the port gates and to connect with inland customers. In 2012, Hartsfield-Jackson Atlanta International Airport (HJAIA) was the 10th largest in the country in terms of air cargo tonnage. Air cargo typically relies on the trucking mode for all of its off-airport goods movement. Georgia is also the southeast hub of operations for both of the Class I railroads in the eastern half of the U.S. (Norfolk Southern Railroad (NS) and CSX Transportation (CSXT)). The trucking mode connects goods from rail intermodal yards and bulk rail/highway transfer facilities to the gates of customers throughout the State.

The major components of Georgia's freight infrastructure are shown in Figure 2.1 (p. 2-2) with the trucking mode connecting to all of the major freight facilities in the State. Each of these freight modes is described in more detail in the subsequent chapters.

Figure 2.1 Key Elements of Georgia's Freight Infrastructure

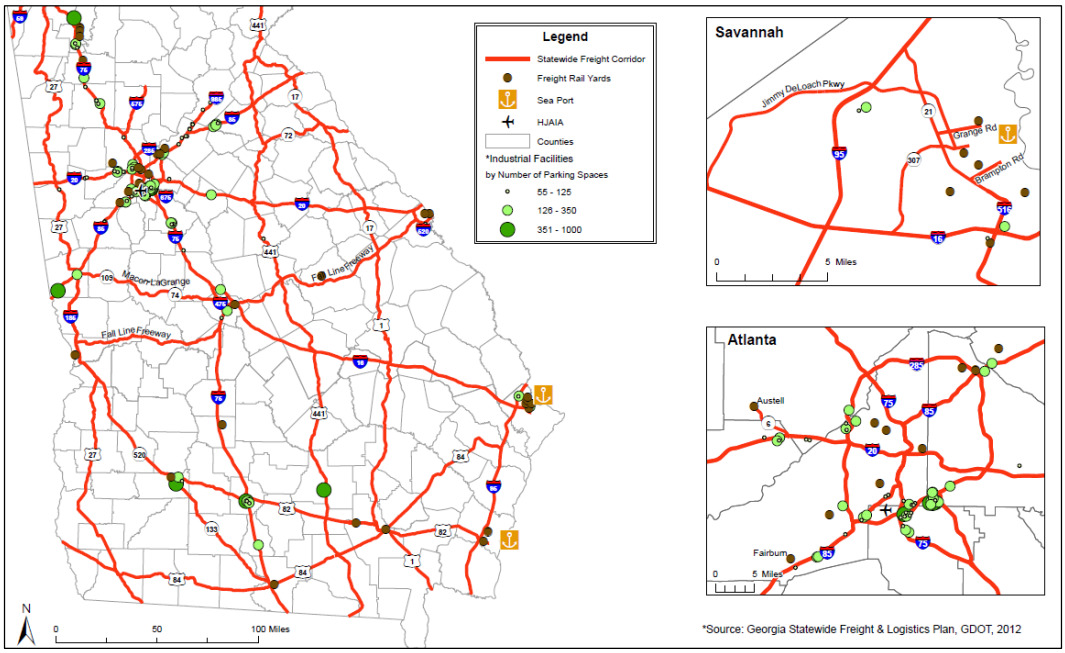



Source: GDOT Freight and Logistics Plan, 2012.

In August of 2013, the Georgia State Transportation Board voted to adopt an official Freight Corridor Network. The intent of the network is to describe a cohesive and complete map of Georgia's priority of roads for freight movements. Along with the Interstate System, the freight network includes several U.S. and state highways such as U.S. 1 which connects to the Kaolin hub in Sandersville; U.S. 84 which provides port access to the heavy agricultural activities in the southwest portion of the State; U.S. 441 which connects to the recently opened Caterpillar

plant in Athens; the Fall Line Freeway which provides intercity connectivity from Augusta to Columbus; and the Macon-Lagrange Connector which improves access for the Kia Plant and its suppliers to international markets via the Port of Savannah. The Freight Corridor Network also provides connectivity to the State's key freight facilities, including roadways such as SR 6 which connects to the Austell intermodal yard in Atlanta, and the Jimmy DeLoach Parkway and Bourne Avenue which provide last-mile connectivity for the Port of Savannah. Figure 2.2 shows the full Georgia Statewide Freight Corridor Network.

Figure 2.2 Georgia Statewide Designated Freight Corridor




Source: State Transportation Board Designated Freight Corridors per Georgia code, 2013.

## 2.2 CAPACITY

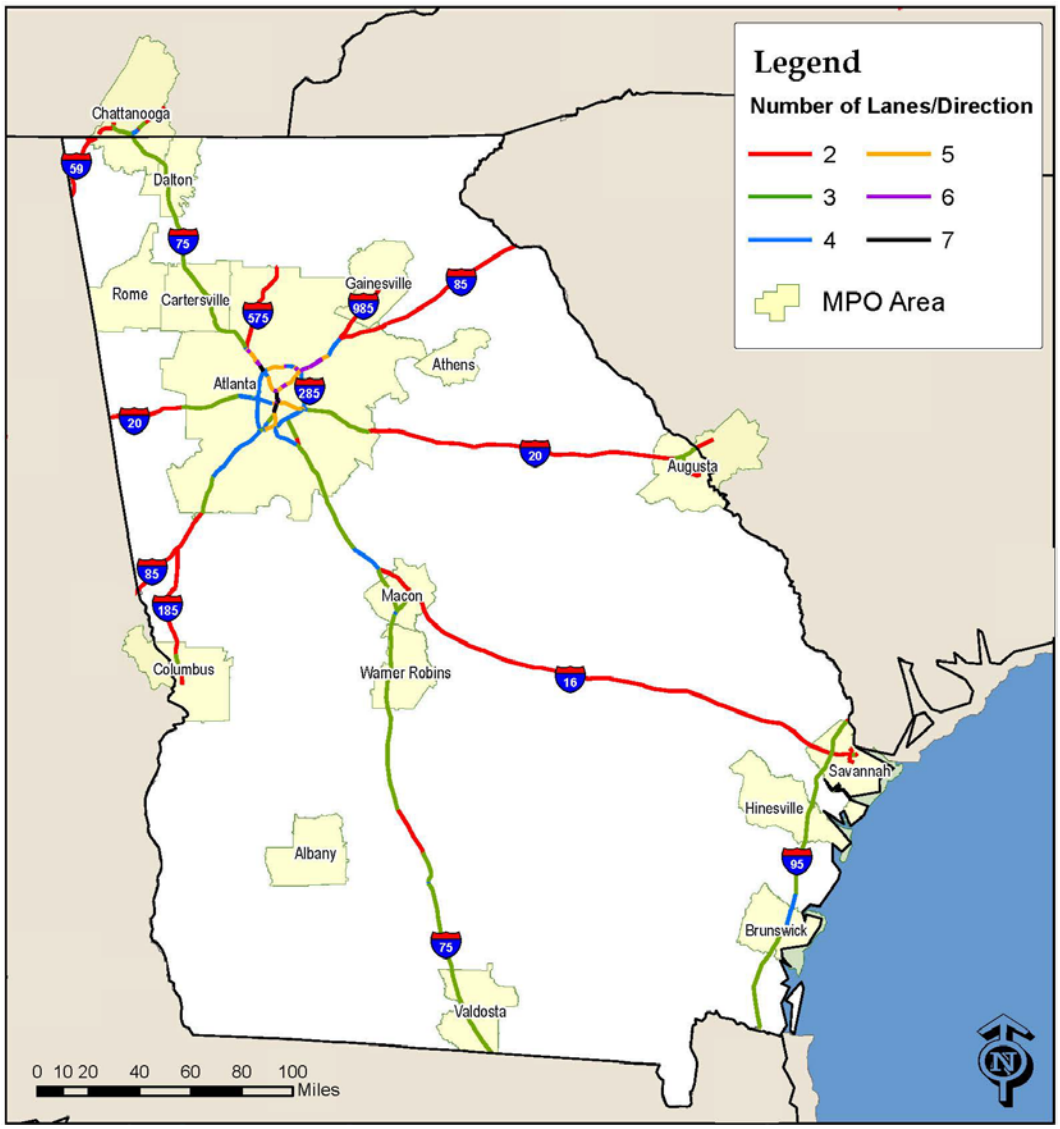
From a trucking perspective, one of the most important characteristics of a state's road network is the Interstate System. The Interstate System is the preferred roadway to use for trucks as it has the highest design speeds and the most compatible geometric features for trucking operations. Therefore, the capacity of the Interstate System is a significant driver of the quality of trucking operations. During peak commute periods in urban areas, the capacity impacts the level of congestion that trucks experience. During off-peak hours, the excess capacity of Interstates adds a level of increased safety for trucking operations. The excess capacity also serves to reduce the potential for complete road shutdown due to crashes. This is particularly important for Interstates in small urban and rural regions where crashes are a bigger issue than congestion.

The number of lanes for the Interstate System is shown in Figure 2.3. The portions of the Interstate System with the most capacity are in the Atlanta metropolitan

region where most of the Interstate System is six or more lanes wide. Outside of the Atlanta region, I-75 is notable in that it is a minimum of six lanes along its entire route within the State, except for a short portion through the Macon region.

The capacity of the non-Interstate portions of the Georgia Designated Freight Corridors also impacts trucking operations. While the vast majority of the non-Interstate portion of these corridors are at least four lanes wide, there are significant portions which remain only two lanes, including the Macon-LaGrange connector and portions of U.S. 441 and U.S. 1. Many of these two-lane sections currently have projects in the right-of-way stage or preliminary engineering stage and will eventually become four-lane facilities.

Figure 2.3 Number of Lanes for Georgia Interstate System

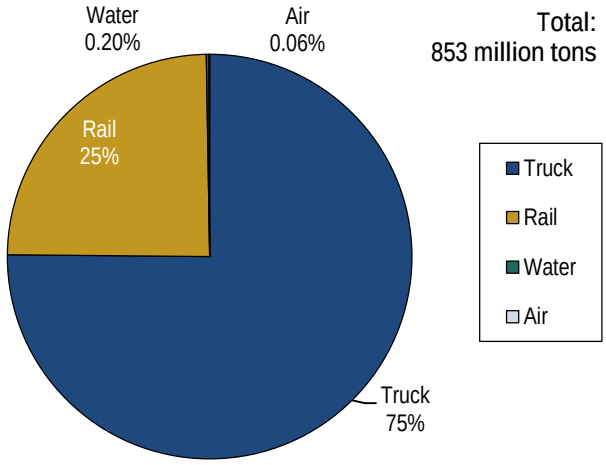


## 2.3 USE

The truck mode carries the vast majority of goods in Georgia. It accounts for 75 percent of the total 853 million tons of freight flowing in the State. The dominance of trucking is due to its flexibility in terms of being able to handle varying shipment sizes and its ability to achieve door-to-door delivery virtually anywhere without making any modal transfers. Truck also is a relatively high-speed mode with relatively low total trip costs for most freight trip types.

The rail mode is typically more efficient than trucks at carrying bulk loads and intermodal freight distances of 500 miles or more. The rail share of the total tonnage moved in Georgia is roughly 25 percent. Twenty-seven million tons of freight was moved through Georgia Ports Authority terminals during the fiscal year ending in June 2013. Roughly 90 percent of the marine cargo was shipped through the terminals at the Port of Savannah. Air cargo tends to carry time-sensitive, high-value, and relatively lightweight cargo. In Georgia, virtually all of the air cargo is shipped through Hartsfield-Jackson Atlanta International Airport (HJAIA). Both the water and air mode comprise less than 1 percent of Georgia's freight on a tonnage basis. Figure 2.4 shows the mode share by tonnage for Georgia.

Figure 2.4 Freight Tonnage by Mode
*2007*




Source: Georgia Freight and Logistics Plan.

Table 2.1 (p. 2-7) lists the top 50 truck count locations in the State. Figure 2.5 (p. 2-8) shows the top 50 truck count locations on a map using labels from "1" through "50" to indicate the highest to the lowest truck count locations corresponding with the list in Table 2.1. These truck count data reflect 2009 truck volumes as recorded by the GDOT Office of Transportation Data (OTD).

The OTD truck count data shows that Georgia's highest truck volumes in the State are in the Atlanta region. The top 20 truck count locations in the State are on I-285 and I-75 between Chattanooga and Macon. The top 5 truck count locations are on I-75 just outside of I-285 and along the "western wall" of I-285. Truck count data collected for the GDOT Radial Microsimulation Study[16] (Figure 2.6., p. 2-9)) showed similarly high volumes on I-85 between I-285 and I-985. The GDOT OTD data did not have any truck count data along this segment of I-85.

Table 2.2 (p. 2-10) shows the top 10 non-Interstate locations for truck counts. The top 4 locations are in the Atlanta region, including one on State Road (SR) 316, one on SR 70 (Fulton Industrial Boulevard), and two on SR 400. Other notable non-Interstate locations with high truck volumes include U.S. 19 in the Albany region, SR 6 (Thornton Road) in Fulton County, U.S. 78 in DeKalb County, and SR 3 (Tara Boulevard) in Spalding County.

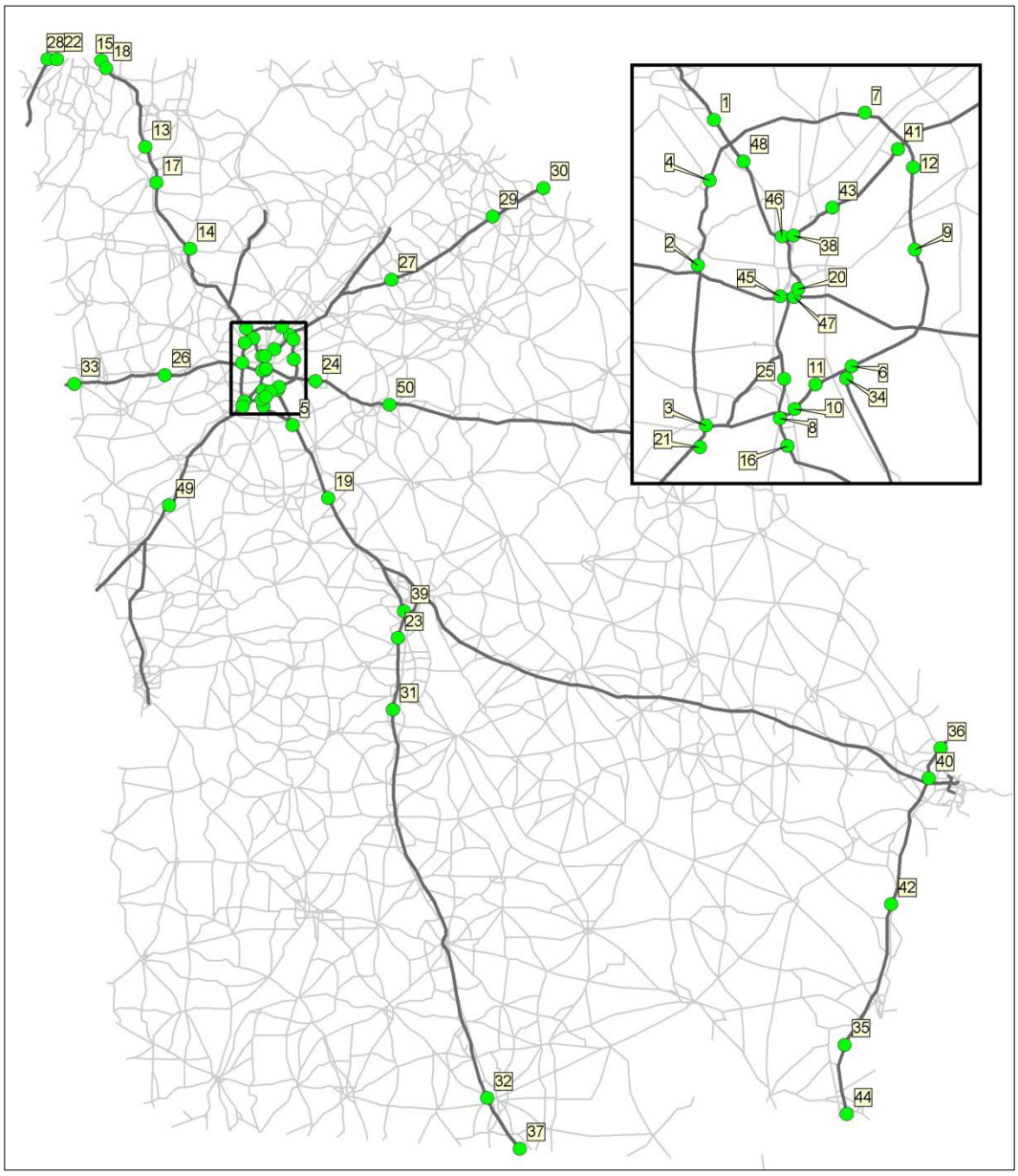
[16] This study was published in 2010 but the counts were conducted several years earlier.

## Table 2.1 Top 50 Truck Count Locations in Georgia *2009*

| Rank | County | Route | Beginning Mile | End Mile | AADT | Truck Percents | Truck AADT |
|---|---|---|---|---|---|---|---|
| 1 | Cobb | I-75 | 2.38 | 3.96 | 281,480 | 9 | 25,333 |
| 2 | Fulton | I-285 | 9.87 | 11.46 | 154,680 | 14 | 21,655 |
| 3 | Fulton | I-285 | 0 | 0.81 | 132,830 | 16 | 21,253 |
| 4 | Cobb | I-285 | 2.57 | 4.09 | 158,060 | 13 | 20,548 |
| 5 | Henry | I-75 | 16.26 | 19.75 | 141,840 | 14 | 19,858 |
| 6 | DeKalb | I-285 | 23.61 | 24.91 | 147,970 | 13 | 19,236 |
| 7 | DeKalb | I-285 | 1.96 | 2.98 | 209,100 | 9 | 18,819 |
| 8 | Clayton | I-75 | 8.66 | 9.71 | 205,020 | 9 | 18,452 |
| 9 | DeKalb | I-285 | 12.45 | 14.12 | 180,360 | 10 | 18,036 |
| 10 | Clayton | I-285 | 0 | 2.29 | 127,410 | 14 | 17,837 |
| 11 | Fulton | I-285 | 53.03 | 54.32 | 126,930 | 14 | 17,770 |
| 12 | DeKalb | I-285 | 6.72 | 8.91 | 196,140 | 9 | 17,653 |
| 13 | Whitfield | I-75 | 0 | 2.84 | 61,430 | 27 | 16,586 |
| 14 | Bartow | I-75 | 12.82 | 16.28 | 66,000 | 25 | 16,500 |
| 15 | Catoosa | I-75 | 12.03 | 13.44 | 86,350 | 19 | 16,407 |
| 16 | Clayton | I-75 | 6.23 | 8.65 | 178,470 | 9 | 16,062 |
| 17 | Gordon | I-75 | 4.96 | 7.75 | 63,610 | 25 | 15,903 |
| 18 | Catoosa | I-75 | 8.4 | 12.02 | 67,030 | 23 | 15,417 |
| 19 | Butts | I-75 | 0.33 | 4.58 | 71,310 | 21 | 14,975 |
| 20 | Fulton | I-75 | 7.31 | 7.96 | 285,590 | 5 | 14,280 |
| 21 | Fulton | I-85 | 8.63 | 11.78 | 136,380 | 10 | 13,638 |
| 22 | Dade | I-24 | 3.53 | 4.13 | 61,740 | 22 | 13,583 |
| 23 | Peach | I-75 | 8.81 | 11.12 | 73,120 | 18 | 13,162 |
| 24 | DeKalb | I-20 | 11.86 | 14.96 | 130,910 | 10 | 13,091 |
| 25 | Fulton | I-75 | 0.53 | 1.73 | 155,520 | 8 | 12,442 |
| 26 | Douglas | I-20 | 0.64 | 4.63 | 72,350 | 17 | 12,300 |
| 27 | Jackson | I-85 | 0 | 2.09 | 56,490 | 21 | 11,863 |
| 28 | Dade | I-24 | 0 | 0.94 | 42,990 | 26 | 11,177 |
| 29 | Franklin | I-85 | 4.38 | 8.43 | 39,070 | 28 | 10,940 |
| 30 | Hart | I-85 | 0.29 | 2.14 | 39,540 | 27 | 10,676 |
| 31 | Houston | I-75 | 3.21 | 10.06 | 44,180 | 24 | 10,603 |
| 32 | Lowndes | I-75 | 16.01 | 18.04 | 43,050 | 23 | 9,902 |
| 33 | Haralson | I-20 | 0 | 4.66 | 31,390 | 31 | 9,731 |
| 34 | DeKalb | I-675 | 0 | 2.71 | 74,510 | 13 | 9,686 |
| 35 | Camden | I-95 | 14.19 | 26.36 | 45,450 | 21 | 9,545 |
| 36 | Chatham | I-95 | 16.63 | 20.2 | 47,070 | 20 | 9,414 |
| 37 | Lowndes | I-75 | 0 | 1.55 | 36,030 | 26 | 9,368 |
| 38 | Fulton | I-85 | 27.81 | 29.09 | 229,810 | 4 | 9,192 |
| 39 | Bibb | I-475 | 0 | 3.99 | 50,990 | 18 | 9,178 |
| 40 | Chatham | I-95 | 7.4 | 10.14 | 66,670 | 13 | 8,667 |
| 41 | DeKalb | I-85 | 5.94 | 7.14 | 213,720 | 4 | 8,549 |
| 42 | McIntosh | I-95 | 13.66 | 21.92 | 42,180 | 20 | 8,436 |
| 43 | DeKalb | I-85 | 0 | 0.9 | 210,330 | 4 | 8,413 |
| 44 | Camden | I-95 | 0 | 1.15 | 54,320 | 15 | 8,148 |
| 45 | Fulton | I-20 | 8.47 | 8.78 | 157,790 | 5 | 7,890 |
| 46 | Fulton | I-75 | 11.2 | 12.13 | 189,900 | 4 | 7,596 |
| 47 | Fulton | I-20 | 9.26 | 10.05 | 179,980 | 4 | 7,199 |
| 48 | Fulton | I-75 | 17.13 | 18.06 | 172,020 | 4 | 6,881 |
| 49 | Meriwether | I-85 | 0 | 4.43 | 41,920 | 16 | 6,707 |
| 50 | Newton | I-20 | 7.89 | 12.22 | 41,600 | 16 | 6,656 |

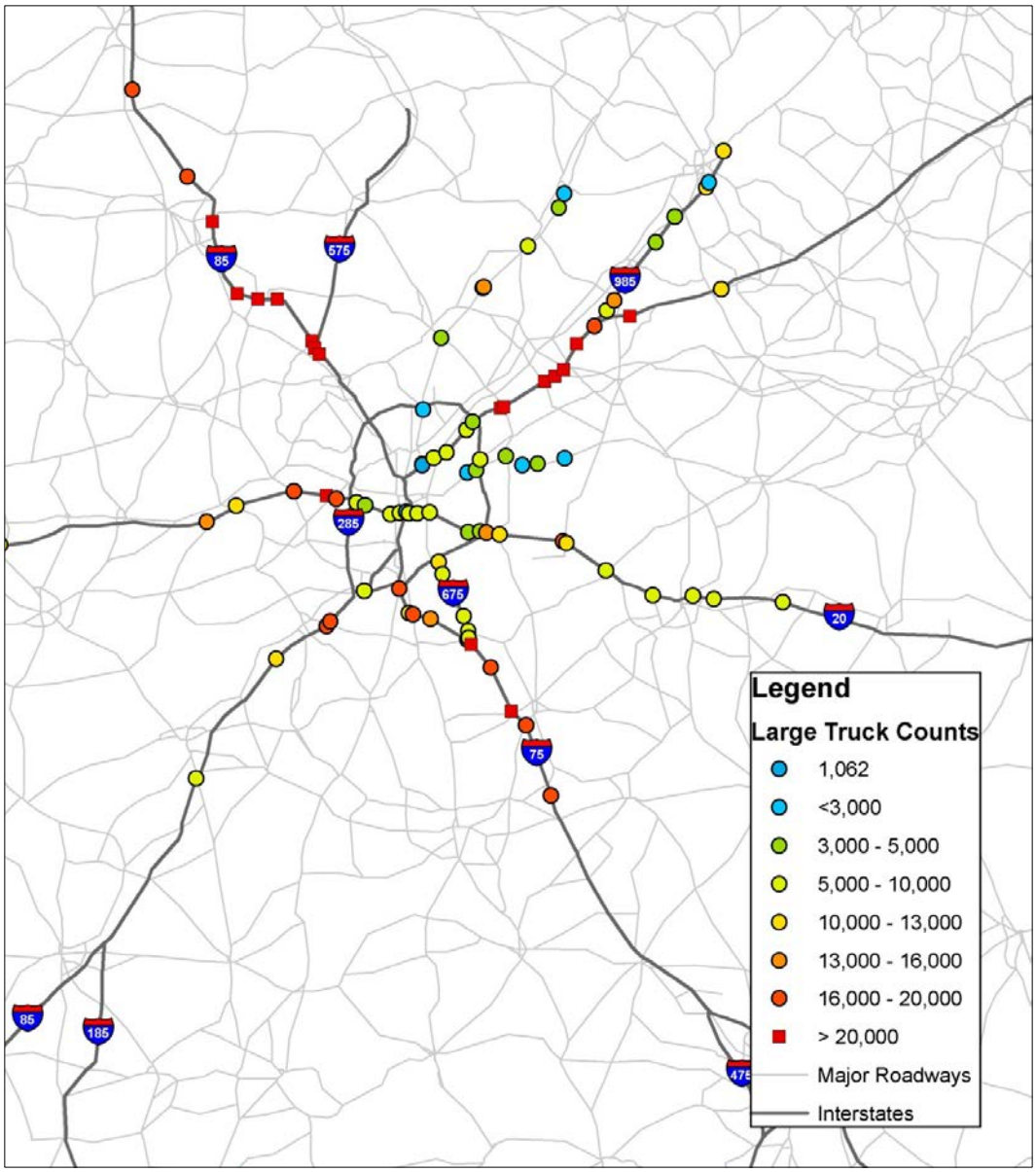
Source: GDOT Classification Data, 2009.

Figure 2.5 Top 50 Highest Truck Count Locations in Georgia *2009*




Source: GDOT Classification Data, 2009.

Figure 2.6 Large Truck Counts in Atlanta from GDOT Radial Microsimulation Study
*2007*




Source: GDOT Radial Microsimulation Study, 2007.

Table 2.2 Top 10 Truck Count Non-Interstate Locations in Georgia *2009*

| County | Route | Beginning Mile | End Mile | AADT | Truck Percent | Truck AADT |
|---|---|---|---|---|---|---|
| Gwinnett | SR 316 | 0.00 | 2.44 | 87,220 | 7 | 6,105 |
| Fulton | SR 70 | 28.65 | 29.65 | 27,870 | 20 | 5,574 |
| Fulton | SR 400 | 6.97 | 8.43 | 181,960 | 3 | 5,459 |
| Fulton | SR 400 | 16.32 | 18.15 | 129,790 | 4 | 5,192 |
| Spalding | SR 3 | 5.58 | 6.22 | 34,890 | 14 | 4,885 |
| Dougherty | U.S. 19 | 3.51 | 4.99 | 39,440 | 11 | 4,338 |
| DeKalb | U.S. 78 | 1.55 | 2.79 | 106,530 | 4 | 4,261 |
| Dougherty | U.S. 19 | 7.18 | 8.14 | 39,510 | 10 | 3,951 |
| Fulton | SR 6 | 4.29 | 5.81 | 31,560 | 12 | 3,787 |
| Laurens | SR 19 | 19.55 | 19.94 | 6,370 | 58 | 3,695 |

Source: GDOT Classification Data, 2009.

From a tonnage perspective, there is a relatively balanced mix of local, long-haul, and through truck flows within Georgia. Table 2.3 (p. 2-11) shows that roughly 30 percent of the truck traffic from a tonnage perspective runs through the State without stopping. Thirty-five percent of the truck tons have both their origin and destination within the State. The remaining 35 percent is split roughly evenly between outbound and inbound flows. Therefore, planning for truck movements needs to account for all of these truck trip types.

For the inbound and outbound truck flows, Figure 2.7 (p. 2-11) shows that the largest state-level trading partners are the neighboring states of Florida, Alabama, South Carolina, North Carolina, and Tennessee, with Florida being by far the largest trading partner with Georgia. Truck roadside origin-destination (O-D) surveys collected[17] at Georgia weigh stations show the distribution of truck trips around the State with the highest through truck percentage occurring on I-95 (over half of all trucks surveyed) and the lowest occurring on I-20 (approximately 25 percent of all trucks surveyed) as shown in Figure 2.8 (p. 2-12). Based on the number of through truck trips that travel on I-75 and I-95, Florida is also by far the largest generator of through truck trips for the State.

Within Georgia, the most common trip ends for truck traffic are in the Atlanta and Savannah metropolitan regions. Table 2.4 (p. 2-13) shows the top 10 counties for inbound and outbound truck flows within Georgia. Chatham County is the largest outbound county for the State with over 27 million tons of outbound goods. Fulton County is the largest inbound generator of truck tons with over 28 million tons, and it is the second largest generator of outbound tons with over 14 million tons. Overall, the Atlanta metropolitan region has a mix of a large consuming population and significant freight generators that attract a large portion of freight,

[17] These counts were collected for GDOT's Truck Lanes Needs Identification Study published in 2008. Most of the data was collected in 2006.

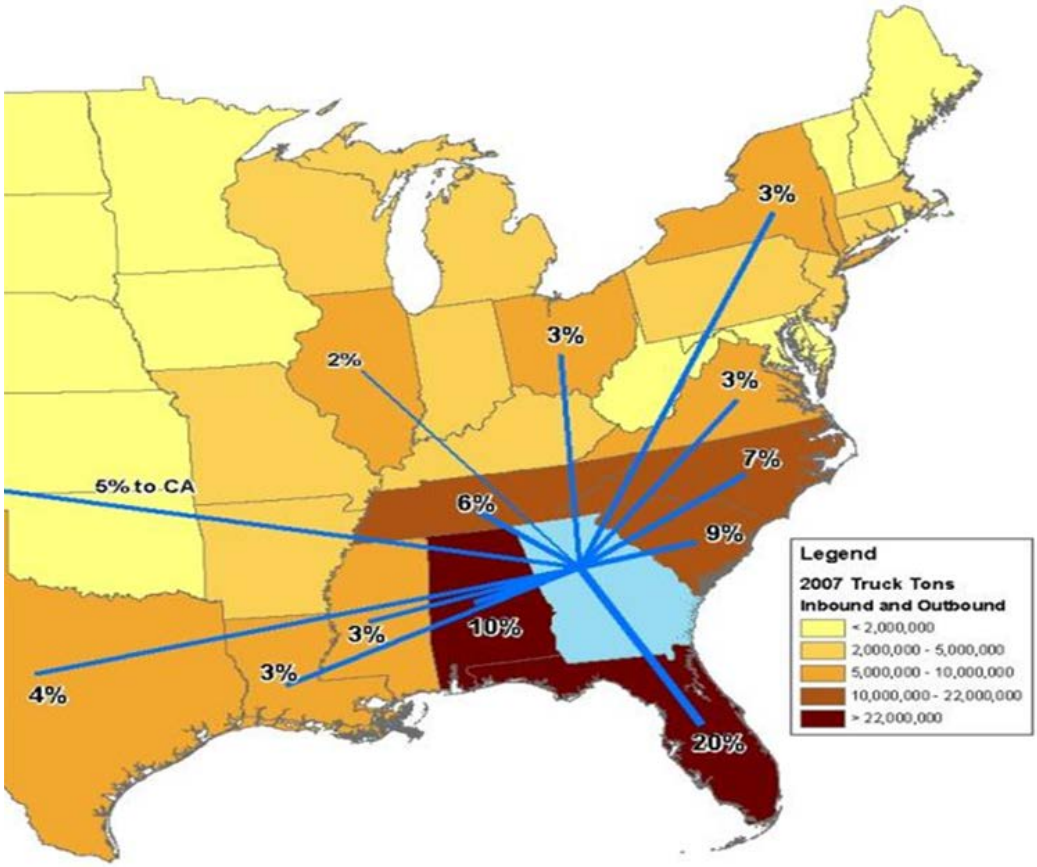
while the Savannah metropolitan region attracts truck traffic based primarily on the traffic generated by the local port terminals and associated warehouse facilities.

## Table 2.3 Summary of Truck Flows by Type of Movement for Georgia

| Type of Movement | 2007 Tons | Percent of Total |
|---|---|---|
| Within | 226,021,926 | 35% |
| Through | 190,325,118 | 30% |
| Outbound | 118,071,185 | 18% |
| Inbound | 106,380,868 | 17% |
| Total | 640,799,096 | 100% |

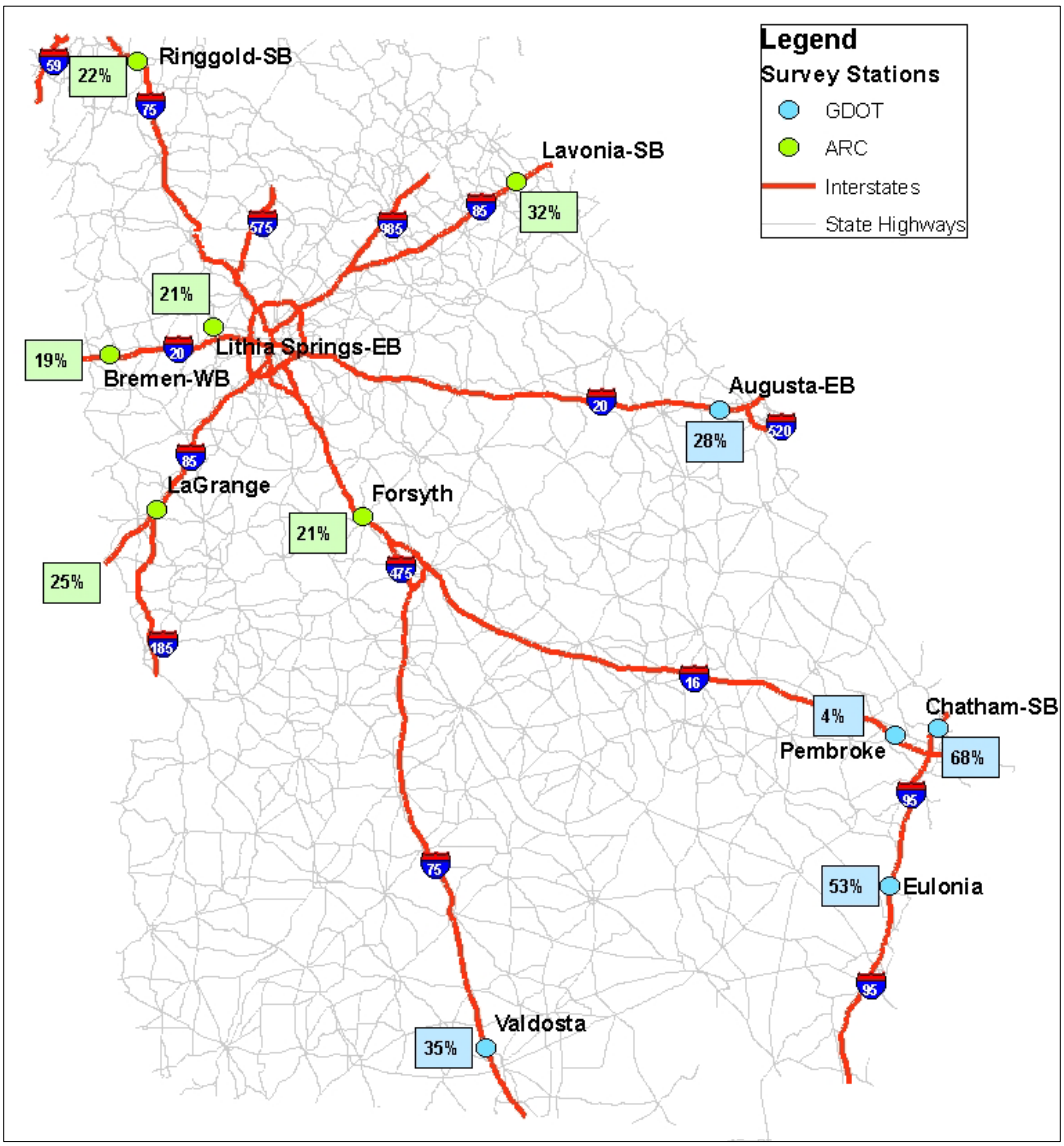
Source: TRANSEARCH.

## Figure 2.7 Top Trading Partners for Georgia Truck Traffic
*Inbound and Outbound Combined, 2007*




Source: 2007 TRANSEARCH Data.

Figure 2.8 O-D Survey Through Truck Percent on Interstates
*2006*




Source: GDOT Truck Lane Needs Identification Study Data, ARC Regional Freight Mobility Plan 2005 Data.

## Table 2.4 Top 10 Counties for Inbound and Outbound Truck Flows

| County | Truck Tons Inbound | County | Truck Tons Outbound |
|---|---|---|---|
| Fulton | 28,354,215 | Chatham | 24,747,960 |
| Chatham | 8,677,489 | Fulton | 14,315,413 |
| Gwinnett | 4,315,205 | DeKalb | 4,510,309 |
| DeKalb | 4,248,574 | Gwinnett | 3,762,409 |
| Cobb | 3,574,647 | Glynn | 3,632,475 |
| Tift | 3,427,215 | Richmond | 3,497,863 |
| Richmond | 3,033,269 | Cobb | 2,789,090 |
| Carroll | 2,956,327 | Tift | 2,687,926 |
| Clayton | 2,748,225 | Bibb | 2,341,544 |
| Muscogee | 2,630,894 | Hall | 2,180,890 |

In August 2013, as part of this SWTP/SSTP Update, a gate survey of trucks entering rail intermodal yards in the Atlanta metropolitan area was conducted to collect information on the origins, destinations, commodities, and routes used by trucks accessing the region's rail network. Table 2.5 shows a summary of the results of the origins and destinations from the truck survey. This table shows that the vast majority of the trucks accessing the intermodal yards have trip ends that are within the State of Georgia. Therefore, the intermodal yards can truly be considered freight assets that support the State's freight-related industries.

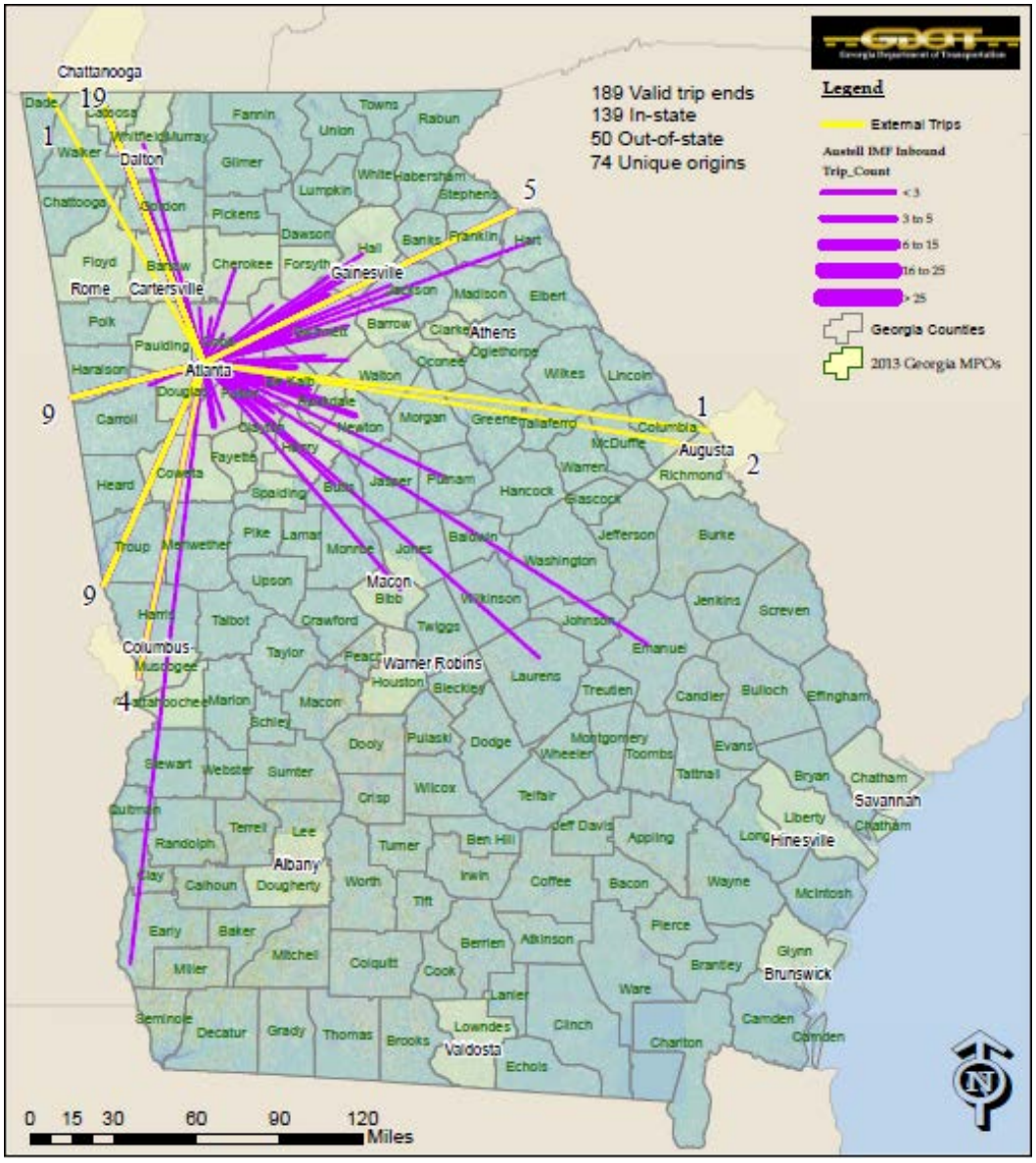
## Table 2.5 Truck Trip Distribution for Atlanta Rail Intermodal Yards

| Site | Inbound from outside Georgia | Outbound to outside Georgia | Total Inbound | Total Outbound |
|---|---|---|---|---|
| Fairburn | 57 | 37 | 261 | 249 |
| Hulsey | 52 | 35 | 279 | 267 |
| Austell | 50 | 25 | 191 | 182 |
| Inman | 44 | 46 | 216 | 189 |
| Total | 203 | 143 | 947 | 887 |

Source: GDOT SWTP/SSTP Intermodal Yard Truck Intercept Survey, August 2013.

Figure 2.9 (p. 2-14) shows a state map of the origins of goods brought into the Norfolk Southern Austell intermodal yard. It shows that while there is a concentration of freight being moved from within the Atlanta metropolitan region, the truck trips do come from several regions across the State, including Augusta, Albany, Dalton, Macon, and Valdosta. Similar results were found at the other rail intermodal yards. Maps of these origins and destinations can be found in the stand-alone appendix of this report. Therefore, the entire State benefits from the presence of these intermodal yards.

Figure 2.9 Atlanta Regional Truck Trip Origins and Destinations for the Austell Intermodal Rail Yard

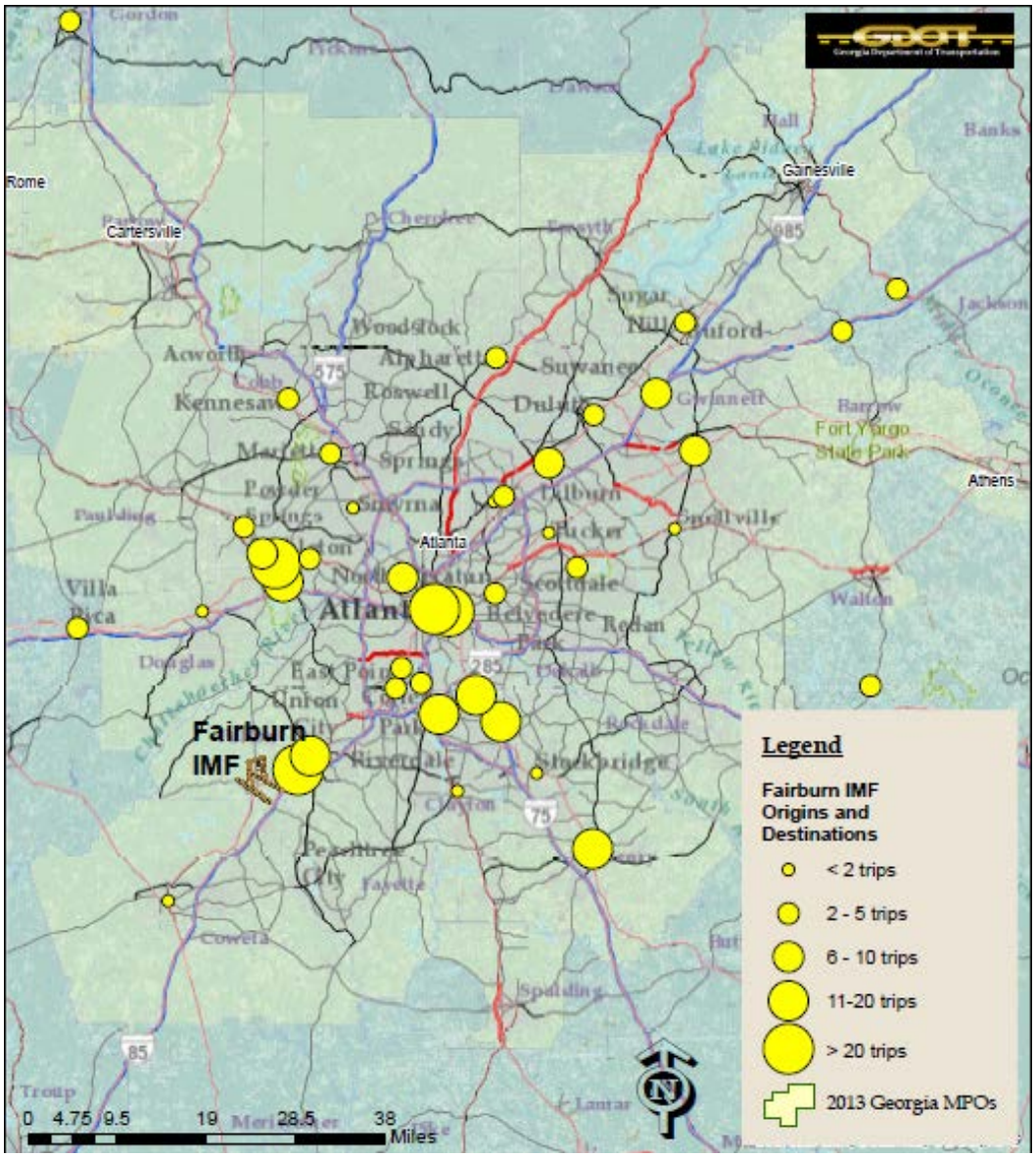



Source: GDOT SWTP/SSTP Intermodal Yard Truck Intercept Survey, August 2013.

Figure 2.10 (p. 2-15) shows a map depicting the trip ends for origins and destinations of trucks accessing the CSXT Fairburn intermodal yard. It shows that while there are trips across the entire Atlanta metropolitan region, there is a concentration of trips on the southern and western sides of the region. This highlights the portion of the region that is most freight-dependent. It also may highlight the need for future rail intermodal expansion efforts to consider locations on the eastern side of the metropolitan region to support businesses that are expanding in that

region, such as several new developments which have occurred along the I-85 corridor northeast of Atlanta.

Figure 2.10 Atlanta Regional Truck Trip Origins and Destinations for the Fairburn Intermodal Rail Yard




Source: GDOT SWTP/SSTP Intermodal Yard Truck Intercept Survey, August 2013.

## 2.4 PERFORMANCE

A good measure of the performance of the trucking industry is average truck speeds on the Interstate System. This is useful data because of the importance of

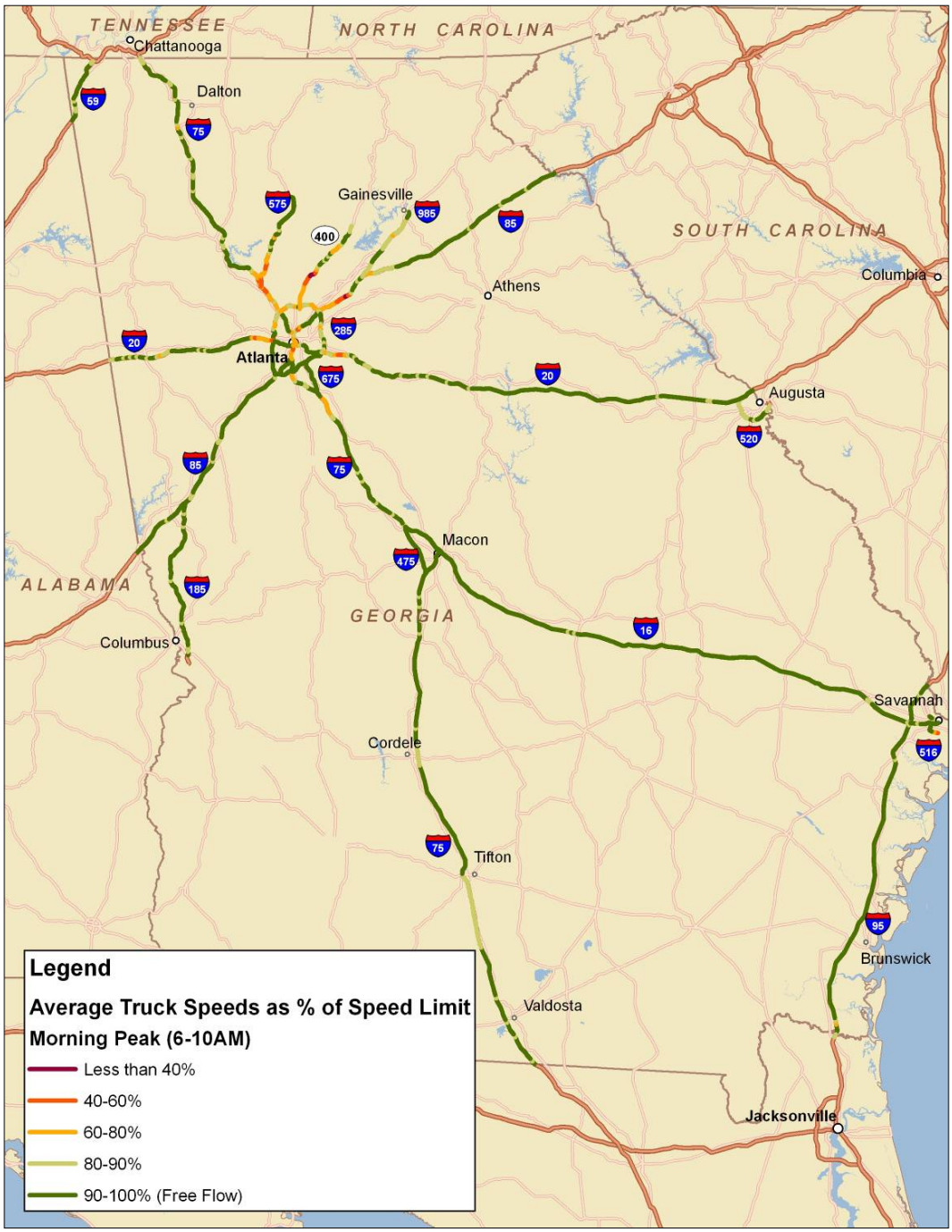
the System for truck traffic and the regular occurrence of congestion on the network throughout the State and during several times of the day. For the Georgia Freight and Logistics Plan, truck speeds were estimated for the Interstate System in Georgia and for SR 400 based on truck GPS data collected by the FHWA/ American Transportation Research Institute (ATRI) Freight Performance Measurement database between July 2009 and June 2010. This data is shown on maps in Figures 2.11 to 2.14 (pp. 2-17 to 2-20).

Figure 2.11 shows the truck speeds during the 6:00 a.m. to 10:00 a.m. period for Georgia's Interstate System. From a highway mileage perspective, the vast majority of the System is uncongested during the morning peak period. However, as expected, the most congested locations are in the Atlanta metropolitan region, particularly along I-20 east and west, and I-75 north. There is also congestion impacting truck speeds in the Augusta region along I-520 and on I-516 in the Savannah metropolitan region. There are congested segments on I-75 south of the Atlanta metropolitan region. However, that congestion is associated with construction along I-75 during the majority of the period of GPS data collection.

Figure 2.12 zooms in on truck speeds in the Atlanta metropolitan region during the morning commute period. It shows that the most congested locations are on I-75 north of I-285, I-575, I-85 for truck traffic heading in the southbound direction, and I-20 outside of I-285 heading into the region. I-285 is also heavily congested at the "top end" (between I-75 and I-85) for truck traffic heading in the direction of SR 400. All of these locations are considered to have the lowest level of performance for truck movements in the State.

Figure 2.13 shows truck speeds on the Interstate System throughout the State during the typically uncongested midday period between 10:00 a.m. and 3:00 p.m. Figure 2.14 zooms in on Atlanta and shows locations of low truck speeds relative to typical Interstate design speeds. These are most common at Interstate interchanges such as I-20/I-285 west of Atlanta, I-75/I-285 south of Atlanta, and SR 400/I-285 north of Atlanta. This localized congestion is an indication that the design of these Interstate interchanges is not ideal for trucks, since high speeds cannot be achieved even during generally uncongested periods. Additionally, the I-75/I-85 connector in downtown Atlanta also shows significantly low truck speeds during the midday period. This is likely due to a combination of relatively high vehicle volumes, narrow lanes, and roadway geometries such as curvature that reduce truck speeds throughout the day. There are also several light green segments of Interstate during the midday period that indicate that trucks are not able to achieve the speed limit of the facility, but still able to travel at relatively high speeds.

Figure 2.11 Average Truck Speeds as a Percent of Speed Limit
*Morning Peak*

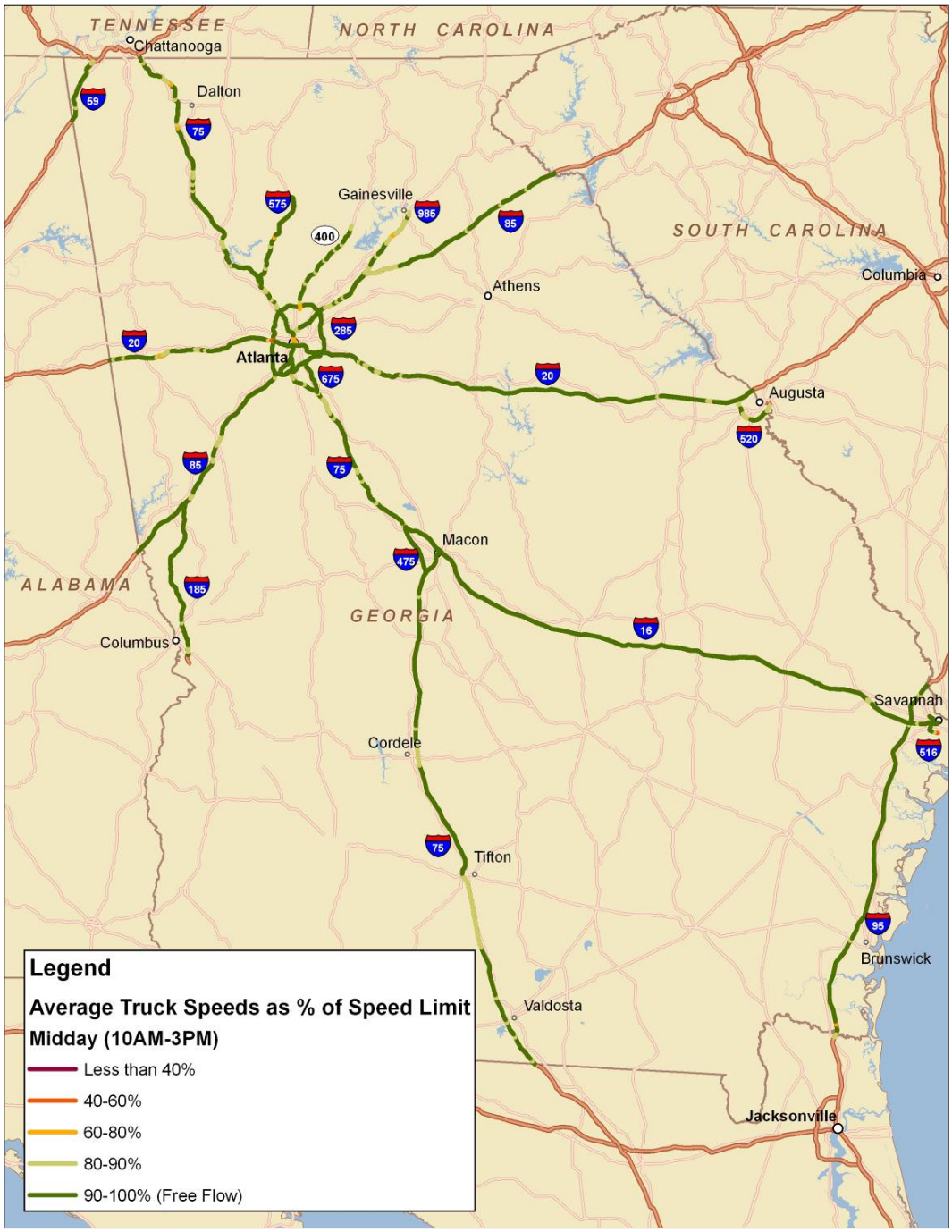



Source: FHWA/ATRI Freight Performance Measurement Data.

Figure 2.12 Metro Atlanta Average Truck Speeds as a Percent of Speed Limit
*Morning Peak*

Source: FHWA/ATRI Freight Performance Measurement Data.

Figure 2.13 Average Truck Speeds as a Percent of Speed Limit
*Midday*




Source: FHWA/ATRI Freight Performance Measurement Data.

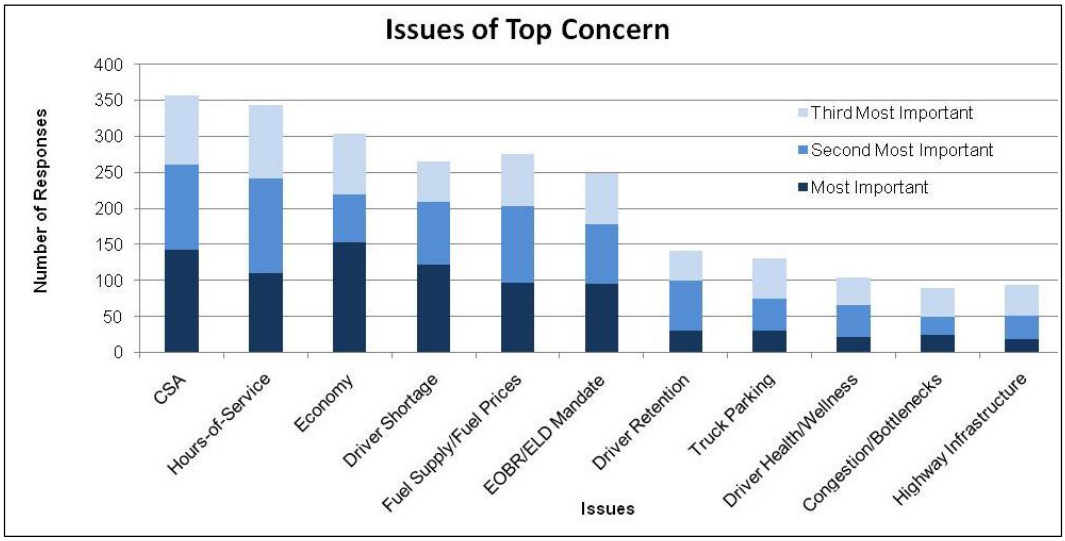
Figure 2.14 Metro Atlanta Average Truck Speeds as a Percent of Speed Limit *Midday*

Source: FHWA/ATRI Freight Performance Measurement Data.

## 2.5 SUMMARY OF MAJOR ISSUES, DEFICIENCIES, AND OPPORTUNITIES

At the national level, the American Transportation Research Institute (ATRI) conducts an annual survey of truck operators to determine the major issues from the trucking industry perspective. Figure 2.15 shows the results of this survey for 2012. Truck operators consider the recently enacted Compliance Safety Analysis (CSA) program to be their most important issue for 2012. This program expands the tracking of truck driver behavior and violations, and is more stringent about the number and types of violations that a truck driver can accrue before their commercial driver license is suspended. The program is expected to significantly reduce the number of drivers available from an already shrinking pool. The second most important issue is Hours-Of-Service changes that went into effect in 2013 that reduce the operating windows for truck drivers. The economy was the third most important issue after being the top issue for both 2010 and 2011.

Figure 2.15 Top Truck Operator Issues




Source: American Transportation Research Institute.

The Georgia Freight and Logistics Plan also identified significant truck issues specific to Georgia. Many of these overlap with the issues identified in the ATRI survey and can be categorized as relating to:

- Congestion/Reliability;
- Safety;
- Truck Parking;
- Truck Size and Weight Regulation; and
- Alternative Fuels.

The truck speed maps in the previous section illustrate the levels of congestion faced daily by the trucking industry in the Atlanta metropolitan area. Truck movements are significantly slowed during the peak commute periods. As congestion levels continue to increase, the off-peak time periods that are typically the most reliable begin to shrink in size. Therefore, both truck travel times and reliability are negatively impacted by congestion adding costs to the supply chain, thereby reducing the competitiveness of Georgia businesses and increasing costs to Georgia's consumers. Truck speeds are also an issue on portions of the Georgia State Designated Freight Network. In particular, the segments that are currently two lanes with several entry and egress points tend to have slower speeds than what is desirable for the trucking industry.

For Georgia's trucking industry, a key capability issue is predicting and managing the variability in the performance of the highway network. This variability is termed "reliability" and reflects changes in the amount, location, and severity of congestion on a day-to-day basis. Real-time traffic data is becoming increasingly available and utilized by truck fleet operators, enabling them to respond to changes in the highway performance on a real-time basis. However, quantifying highway reliability and incorporating reliability into supply chain design has not occurred. Therefore, reliability still has the potential to cause significant disruption to the movement of goods, and add costs to the logistics chain. Additionally, GDOT's Highway Emergency Response Operators (HERO) primarily patrol Interstates in the Atlanta region and do not have full coverage of the entire Georgia Interstate System. HERO units can significantly improve incident response times by moving crashed vehicles out of the traffic stream. Because crashes are the primary determinant of reliability, reducing incident delay can significantly improve the reliability of the highway infrastructure, especially during peak hours.

The Georgia Freight and Logistics Plan also included an extensive safety analysis that resulted in the following key findings:

- In 2008, 180 people died in truck-involved crashes in Georgia and 3,800 people were injured,[18] ranking the State as the 22nd highest in terms of truck-involved fatalities with 0.17 fatalities per 100 million truck miles traveled.
- Nearly 30,000 of the 57,200 truck-involved crashes (52 percent) during the 2007 to 2009 time period occurred in the Atlanta metropolitan region, making it by far the location with the highest number of truck-involved crashes in Georgia. Savannah had the second highest number of crashes with just 1,666.
- I-285 is the corridor with the highest number of truck-involved crashes with 6,271 crashes and an extraordinarily high crash rate of 13 crashes per million truck VMT. This is potentially due to high truck volumes and the significant amount of weaving that occurs on I-285 and the relative difficulty trucks have in performing these maneuvers.

[18] Fatality Analysis Reporting System (FARS) 2008 Final.

- Even though only 25 percent of the total truck-involved crashes occur in rural regions, 57 percent of truck-involved fatal crashes occur in rural regions. This is potentially due to the relatively higher percentage of high-speed head-on collisions in rural regions. This also indicates that vehicular safety is a particular concern on two-lane roads with high volumes of trucks in rural regions

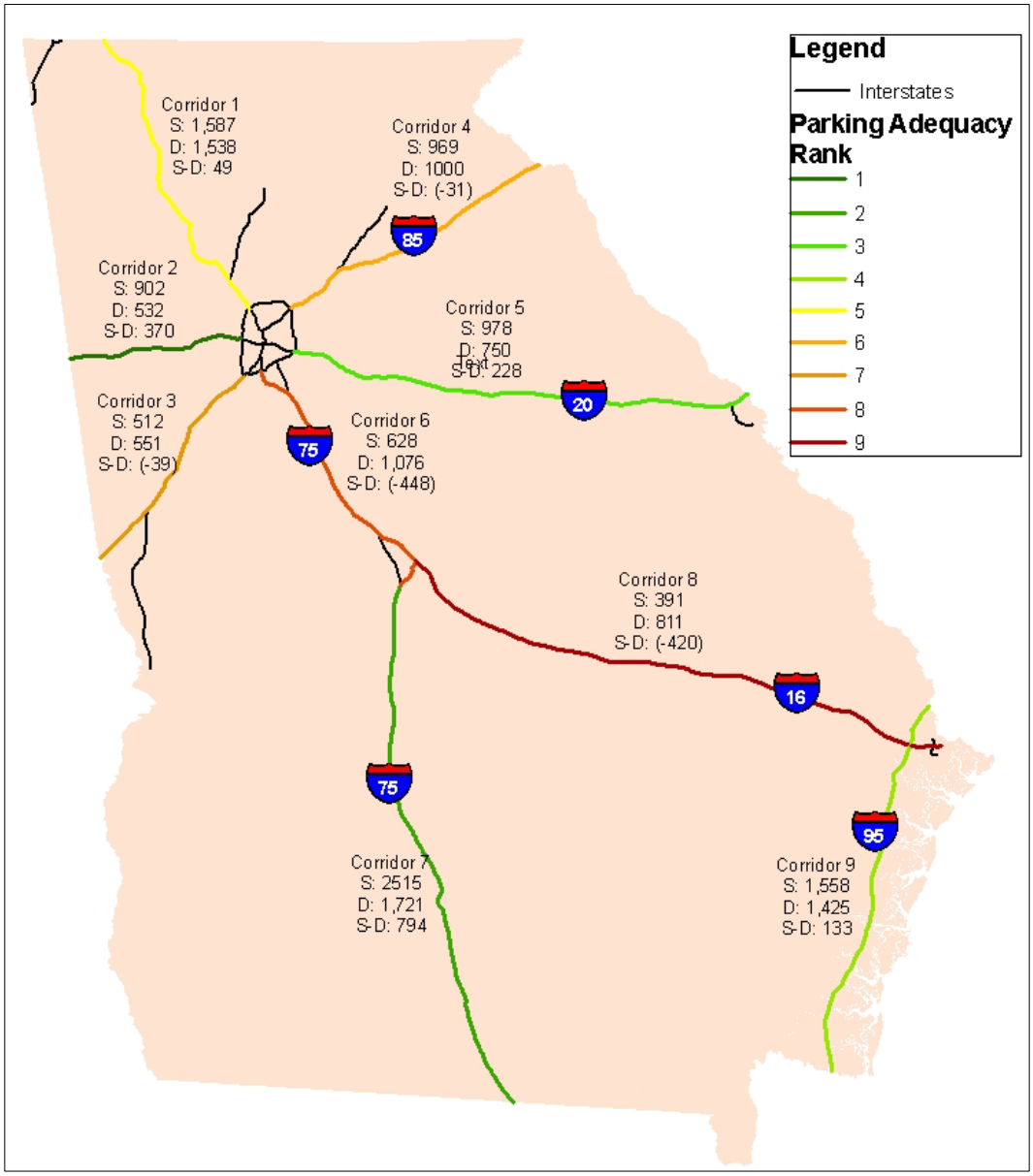
The Georgia Freight and Logistics Plan also included an analysis of truck parking in the State that estimated the most parking deficient corridors as shown in Figure 2.16 (p. 2-24), with red indicating the most severe shortage segments and green indicating adequate truck parking. Based on the analysis, the most significant truck parking shortages are on I-75, I-16, and I-85.

The GDOT Oversize Permit unit issues approximately 180,000 permits annually for overweight trucks and this number is increasing at a rapid rate in Georgia and most other states. Permit fees range from $125 to $500 and do not appear sufficient to cover the additional wear and tear on the State's highway infrastructure.

Georgia's maximum gross vehicle weight limit of 100,000 pounds is significantly lower than those of some neighboring states, which utilize 150,000 pounds. This low limit can add extra costs to the trucking industry which must use multiple shipments or attempt to bypass the State to carry loads above 100,000 pounds. This mismatch in weight limits has also led some to advocate for a regional harmonization of truck oversize and overweight permitting practices. There is also a disconnect between bridge maintenance and the needs of oversize overweight trucks in Georgia such that trucks must travel long, circuitous routes to avoid low weight limits on bridges in need of repair.

The U.S. DOT is currently studying the impacts of various increases in truck size and weight characteristics, including raising the national Interstate weight limits to 97,000 pounds for a vehicle with six axles. The proposal has strong support from the trucking industry, shippers, and some states where heavy trucks currently pass through village and town centers on the state network. The proposed configuration was tested during a one-year congressionally authorized pilot period on the Interstates of Vermont and on I-95 in Maine. The results of that study may provide a template for other states to analyze the potential impacts of allowing the six-axle, 97,000-pound truck onto their systems. If the proposal becomes Federal law, Georgia could allow this configuration on its Interstate System.

Figure 2.16 Truck Parking Adequacy for Corridors in Georgia




Source: Google Satellite Image Data.

Diesel has historically been the fuel of choice for truck manufacturers in the U.S. due to its fuel efficiency relative to gasoline. Diesel engines also produce higher levels of torque than gasoline engines, making them even more fuel efficient as the vehicle's loaded weight increases. However, these engines are more expensive than gasoline engines to purchase and maintain, but these higher costs are more than offset by their increased fuel efficiency and durability. Diesel fuel prices have risen significantly over the last two decades along with the price of gasoline. From 1994 to 1999, the price of diesel was close to $1 per gallon. Between 2000 and 2005, diesel prices rose from $1 to $2 per gallon and over the past three years, the price

of diesel has remained between $3 and $4 per gallon. Fuel represents roughly 25 percent of the costs of the average trucking company. Therefore, diesel fuel prices going up by 300 to 400 percent over the past decade has had the impact of significantly increasing the total costs of the average trucking firm. This has a significant impact on trucking profitability, costs to shippers, and final costs to consumers.

The rise in the price of diesel has increased the consideration of an alternative fuel source for the on-road trucking fleet. Much of the consideration of alternative fuels for trucks has centered on the potential for expanding the use of natural gas. The proponents of increased use of natural gas have cited three main reasons for supporting its increased use in the U.S.:

- Natural gas is cheaper than the other forms of energy. Recent technological development has allowed for the identification and extraction of significant natural gas reserves around the world, with much of this natural gas being located in the U.S. This increased supply has managed to significantly reduce the price of natural gas from its 2008 high back to 2003 prices, making it extraordinarily inexpensive compared to diesel fuel. These cost savings would translate into higher profitability for Georgia's trucking industry and for shippers across the State.
- Natural gas is cleaner than other nonrenewable sources, particularly diesel and gasoline. The use of natural gas rather than diesel in trucks would reduce carbon monoxide and particulate matter emissions by over 90 percent; it would reduce hydrocarbon emissions by over 50 percent; and it would reduce $NO_x$ emissions by between 35 and 60 percent. These emissions reductions far exceed the reductions being generated by programs currently in operation.
- With natural gas being produced in the U.S., switching the trucking fleet to natural gas would decrease U.S. imports and, therefore, boost economic output and employment domestically.

Converting an existing diesel engine to a natural gas engine would cost between $6,000 and $12,000 depending on the design of the engine. This conversion also would require the installation of insulated tanks which adds some additional cost to the conversion.[19] Due to the lower cost of natural gas, the operating costs of a natural gas truck are significantly less than for diesel trucks. The payback period for the more expensive capital cost incurred for a long-haul truck can be as low as one and a half years.[20]

One of the major barriers of switching from a diesel truck fleet to a natural gas truck fleet is the lack of a nationwide LNG or CNG refueling infrastructure. Most LNG refueling stations are privately owned. According to the Department of

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[19] Source: http://www.omnitekcorp.com/altfuel.htm.

[20] Source: http://www.omnitekcorp.com/altfuel.htm.

Energy, there are only 825 CNG and 39 LNG refueling stations throughout the U.S., compared to approximately 68,000 stations that sell diesel fuel. Building fueling stations can be extremely costly, with average construction costs over $1 million per station.[21]

[21] Source: http://www.eia.doe.gov/oiaf/aeo/otheranalysis/aeo_2010analysispapers/natgas_fuel.html.

# 3.0 Public Transportation

## 3.1 INVENTORY OF TRANSIT FACILITIES

### 3.1.1 Urban Fixed-Route Transit System Overview

In 2013, Georgia has 15 urban fixed-route and, in most cases, complimentary paratransit public transportation systems in operation throughout the State. Table 3.1 (p. 3-2) lists these systems in alphabetical order along with their acronym, Metropolitan Planning Organization (MPO), county-level service area, and city-level service area.

The Metropolitan Atlanta Rapid Transit Authority (MARTA) is the largest public transit provider and only heavy rail system in the State. In 2011, MARTA reported 63,104,604 bus-only riders and operating revenues of close to $365 million. Another significant transit provider is the Georgia Regional Transportation Authority (GRTA) which operates commuter-oriented express (Xpress) bus service from the outlying metropolitan counties into the Atlanta midtown and downtown areas. GRTA's Xpress buses currently operate in 12 counties and carry 1,867,211 passengers each year. MARTA and GRTA are noted in this initial section due to their importance in the overall transit sector for the State. However, they are funded through different mechanisms and have varied reporting standards than the other 13 GDOT-funded transit systems. After this initial review, the section will focus on the 13 GDOT-funded systems (excluding MARTA and GRTA).

Figure 3.1 (p. 3-3) illustrates the geographic distribution and classification of the 15 urban fixed-route transit systems throughout the State. The numbers on the map correspond to the transit system number ID shown in Table 3.1 (p. 3-2). Seven of the 15 systems are located within the Atlanta Regional Commission (ARC) Metropolitan Planning Organization:

- Cherokee Area Transit (CATS);
- Cobb Community Transit (CCT);
- Douglas County Rideshare (DCR);
- Georgia Regional Transportation Authority (GRTA);
- Gwinnett County Transit (GCT);
- Hall Area Transit (HAT); and
- Metropolitan Atlanta Rapid Transit Authority (MARTA).

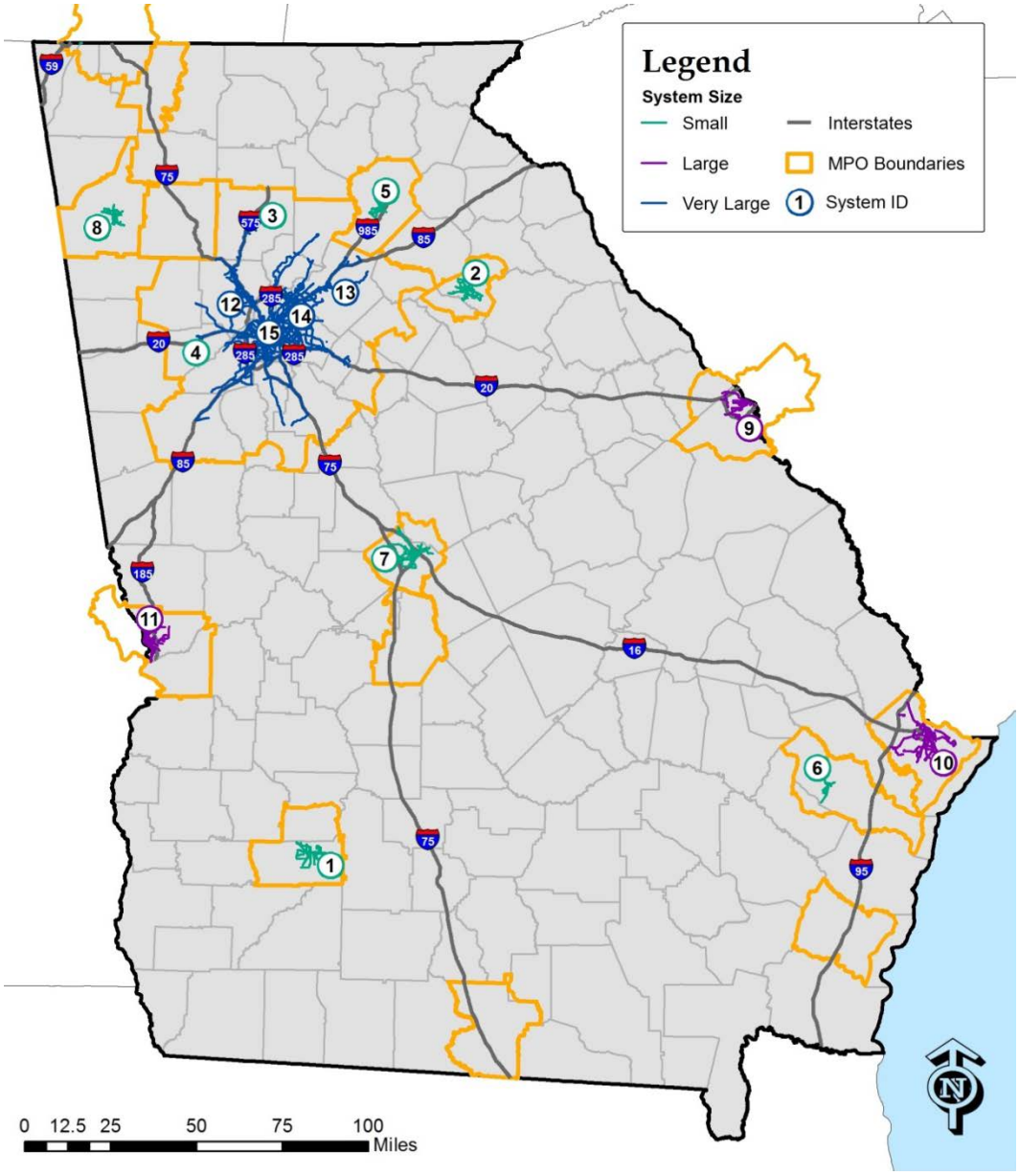
## Table 3.1 Urban Fixed-Route Transit Providers

| Size | Number ID | Fixed-Route Transit System | Acronym | Metropolitan Planning Organization (MPO) | Service Area(s) by County |
|---|---|---|---|---|---|
| Small | 1 | Albany Transit System | ATS | Dougherty Area Regional Transportation Study | Dougherty |
| | 2 | Athens Transit System | ATS | Madison Athens-Clarke Oconee Regional Transportation Study | Clarke |
| | 3 | Cherokee Area Transit System | CATS | Atlanta Regional Commission | Cherokee |
| | 4 | Douglas County Rideshare | DCR | Atlanta Regional Commission | Douglas |
| | 5 | Hall Area Transit | HAT | Gainesville-Hall MPO | Hall |
| | 6 | Liberty Transit | LT | Hinesville Area MPO | Liberty |
| | 7 | Macon-Bibb County Transit Authority | MTA | Macon Area Transportation Study | Bibb |
| | 8 | Rome Transit Department | RTD | Floyd-Rome Urban Transportation Study | Floyd |
| Large | 9 | Augusta Public Transit | APT | Augusta Regional Transportation Study | Columbia, Richmond |
| | 10 | Chatham Area Transit Authority | CAT | Coastal Region MPO | Chatham |
| | 11 | Columbus Transit System | METRA | Columbus-Phenix City Transportation Study | Muscogee |
| Very Large | 12 | Cobb Community Transit | CCT | Atlanta Regional Commission | Cobb, Fulton |
| | 13 | Gwinnett County Transit | GCT | Atlanta Regional Commission | Gwinnett, DeKalb, Fulton |
| | 14 | Georgia Regional Transit Authority | GRTA | Atlanta Regional Commission | Fulton, DeKalb, Gwinnett, Cobb, Cherokee, Forsyth, Rockdale, Clayton, Henry, Coweta, Douglas, Paulding |
| | 15 | Metropolitan Atlanta Rapid Transit Authority | MARTA | Atlanta Regional Commission | Fulton, DeKalb |

Source: GDOT Office of Intermodal Programs; Cherokee Area Transportation Study; Hinesville Area Metropolitan Planning Organization.

GRTA operates the express bus component of the Cherokee Area Transportation System (CATS), Cobb Community Transit (CCT), and Gwinnett County Transit (GCT) services. The Douglas County Rideshare (DCR) program is a commuter-oriented service consisting of vanpools and carpool assistance.

Figure 3.1 Urban Fixed-Route Transit Systems




Source: GDOT, MARTA, Albany Transit System, Athens Transit System, APT, CAT, CCT, METRA, Douglas County Rideshare, GCT, GRTA, HAT, LT, MTA, RTD.

The 13 GDOT-funded urban public transit systems' service hours are listed in Table 3.2 (p. 3-4). The majority of these systems have continual service during the weekdays and on Saturday. Augusta Public Transit (APT) and Chatham Area Transit (CAT) provide Sunday service. Gwinnett County Transit (GCT) and Rome Transit Department (RTD) do not offer weekend service. The Columbus Transit System (CTS) offers early morning and afternoon/evening service with a break in the morning. This schedule applies to weekday and Saturday service.

## Table 3.2 Urban Public Transit System Service Hours

| Size | System Name | Service | | |
|---|---|---|---|---|
| | | Monday-Friday | Saturday | Sunday |
| Small | Albany Transit System | 6:00 a.m.-10:00 p.m. | 7:00 a.m.-10:00 p.m. | N/A |
| | Athens Transit System | 5:50 a.m.-8:30 p.m. | 6:20 a.m.-8:20 p.m. | N/A |
| | Cherokee Area Transit System | 8:00 a.m.-3:45 p.m. | 8:00 a.m.-3:45 p.m. | N/A |
| | Douglas County Rideshare | 5:30 a.m.-10:30 p.m. | 6:10 a.m.-9:05 p.m. | N/A |
| | Hall Area Transit | 5:25 a.m.-9:45 p.m. | 8:00 a.m.-9:42 p.m. | N/A |
| | Liberty Transit | 5:20 a.m.-11:00 p.m. | 5:20 a.m.-8:00 p.m. | N/A |
| | Macon-Bibb County Transit Authority | 5:00 a.m.-10:00 p.m. | 5:00 a.m.-8:00 p.m. | N/A |
| | Rome Transit Department | 5:40 a.m.-6:30 p.m. | N/A | N/A |
| Large | Augusta Public Transit | 5:30 a.m.-10:25 p.m. | 5:30 a.m.-10:15 p.m. | 6:40 a.m.-7:30 p.m. |
| | Chatham Area Transit Authority | 5:00 a.m.-1:30 a.m. | 5:00 a.m.-1:30 a.m. | 6:00 a.m.-8:30 p.m. |
| | Columbus Transit System | 4:45 a.m.-8:00 a.m., 1:00 p.m.-11:30 p.m. | 4:45 a.m.-7:30 a.m., 1:00 p.m.-3:20 p.m. | N/A |
| Very Large | Cobb Community Transit | 4:30 a.m.-8:30 p.m. | 4:30 a.m.-8:30 p.m. | N/A |
| | Gwinnett County Transit | 6:30 a.m.-6:00 p.m. | N/A | N/A |
| | Georgia Regional Transportation Authority | 5:00 a.m.-8:30 p.m. | N/A | N/A |
| | Metropolitan Atlanta Regional Transit Authority | 3:30 a.m.-1:35 p.m. | 3:30 a.m.-1:35 p.m. | 3:30 a.m.-1:35 p.m. |

Source: GDOT Office of Intermodal Programs; Chatham Area Transit Authority; Cherokee Area Transportation Study; Hinesville Area Metropolitan Planning Organization.

Note: N/A = Service is not provided for this time period.

Table 3.3 (p. 3-5) lists the fare structures for Georgia's urban public transit systems. The standard, single-trip, adult fare ranges between $1.00 and $2.00 per trip. GRTA Xpress pass fares are either $3.00 or $4.00 for one-way service based on designated zones. Express bus fares for a single ride using GCT range between $3.75 and $5.00 based on zone. Express bus fares using CCT are $5 per trip. The Douglas County Rideshare (DCR) fare is based on a monthly rate. Each transit system has a varied fare structure for child, student, and elderly passengers with the elderly fares typically one-third to one-half the cost of the standard adult fare. The majority of these services also have a paratransit component. The population served by these programs includes, but is not limited to, older adults, low-income individuals, those who do not own a vehicle, and individuals with disabilities. The paratransit service costs range from $2.50 to $7.00 per trip.

Table 3.3 Urban Public Transit System Fare Structure

| Size | System Name | Fare | | | | | |
|---|---|---|---|---|---|---|---|
| | | Adult | Student | Child | Elderly | Transfer | Paratransit |
| Small | Albany Transit System | $1.25 | $1.25 | $0.50 | $0.50 | $0.00 | N/A |
| | Athens Transit System | $1.50 | $1.25 | $0.00 | $0.75 | $0.00 | $3.00 |
| | Cherokee Area Transit System | $1.25 | $1.25 | $0.00 | $0.60 | $0.00 | N/A |
| | Douglas County Rideshare | $82-$126/ month | $82-$126/ month | $82-$126/ month | $82-$126/ month | N/A | N/A |
| | Hall Area Transit | $1.00 | $0.50 | $0.50 | $0.50 | $0.00 | Variable |
| | Liberty Transit | $1.00 | $1.00 | $1.00 | $0.50 | $1.00 | $2.00 |
| | Macon-Bibb County Transit Authority | $1.25 | $1.25 | $0.75 | $0.50 | $0.50 | $2.50 |
| | Rome Transit Department | $1.00 | $0.50 | $0.00 | $0.50 | $0.25 | $2.50 |
| Large | Augusta Public Transit | $1.25 | $0.60 | $0.00 | $0.60 | $0.50 | $2.50-$7.00 |
| | Chatham Area Transit Authority | $1.50 | $1.50 | $1.50 | $0.75 | $0.00 | $1.80 |
| | Columbus Transit System | $1.30 | $1.00 | $1.00 | $0.65 | $0.00 | $2.50 |
| Very Large | Cobb Community Transit | $2.00 | $1.50 | $0.00 | $1.00 | $0.00 | $4.00 |
| | Gwinnett County Transit | $2.00 | $2.00 | $2.00 | $1.00 | $0.00 | $3.50 |
| | Georgia Regional Transportation Authority | $3.00-$4.00 | $3.00-$4.00 | $0.00 | $3.00-$4.00 | N/A | N/A |
| | Metropolitan Atlanta Regional Transit Authority | $2.50 | $2.50 | $0.00 | $1.00 | $0.00 | $4.00 |

Source: GDOT Office of Intermodal Programs; Cherokee Area Transportation Study; Hinesville Area Metropolitan Planning Organization.

It is important to note that there have been major system changes since the last update of the Statewide Transportation Plan in 2006. These changes include the Liberty County Transit System (LT) which commenced operation in 2010 to serve the City of Hinesville, the City of Flemington, and the Fort Stewart Military Installation. The Cherokee Area Transportation System (CATS) started operations in 2012 with two routes in downtown Canton. Also, the Clayton County C-Tran service, which linked Clayton County with MARTA and the Hartsfield-Jackson Atlanta International Airport, was discontinued in March of 2010.

### 3.1.2 Rural "On-Demand" Public Transit System Overview

The Department's Intermodal Division's Transit programs include but are not limited to responsibility for the administration and implementation of the statewide Rural Public Transportation (RPT) Program and mobility management. The Department's RPT systems are the backbone of Georgia's human services

coordination between the RHST network and other partner agencies, including DHS and DCH. The population served by this program includes, but is not limited to, older adults, low-income individuals, those who do not own a vehicle, and individuals with disabilities.

The coordination of the rural transit programs is performed by different agencies across the State. Three Regional Commissions (RC), the Coastal Regional Commission, the Three Rivers Regional Commission, and the Southwest Georgia Regional Commission, are responsible for the rural transit services in these areas. In other areas, the Metropolitan Planning Organizations (MPO) coordinate these programs. Within non-MPO areas, counties as well as a few cities are tasked with administering this service. In 2011, GDOT helped to facilitate the process for rural transit providers to work with a third-party provider (Route Match, Inc.) to help manage operations, optimize scheduling, and increase the cost-effectiveness of RPT services. Route Match, Inc. uses a sophisticated technology platform and routing software whose goal is to enable coordinating agencies to better meet passengers' needs and to reduce administrative and reporting burdens. The routing system also assists the Department and local agencies in collecting operational/financial data to improve operational management, decision-making, and cost-effectiveness.

In most areas, the rural transit service is provided by third-party commercial companies that manage small to medium-sized vehicles or shuttle buses that are owned by local jurisdictions. These on-demand services have flexible routing and scheduling to meet the needs of their passengers. On-demand services can take passengers to any destination within their service area, and typical trips include medical appointments and routine shopping for groceries and other household items. Figure 3.2 (p. 3-8) shows the counties which have urban fixed-route service, rural on-demand service, and a combination of both types of service. Figure 3.3 (p. 3-9) shows the rural counties that offer flexible transit service. There are a handful of rural transit services within municipalities that are not countywide. These municipalities include:[22]

- City of Vienna, Dooly County;
- City of Unidilla, Dooly County;
- City of Cedartown, Polk County;
- City of Americus, Sumter County; and
- City of Social Circle, Walton County.

The most notable deficiencies in rural on-demand service are located within the rural areas of the Southern Georgia, Heart of Georgia, River Valley, Central Savannah River Area, Northeast Georgia, and Middle Georgia RC districts. The

[22] Source: American Society of Civil Engineers (ASCE) Infrastructure Report Card for the State of Georgia (September 2013).

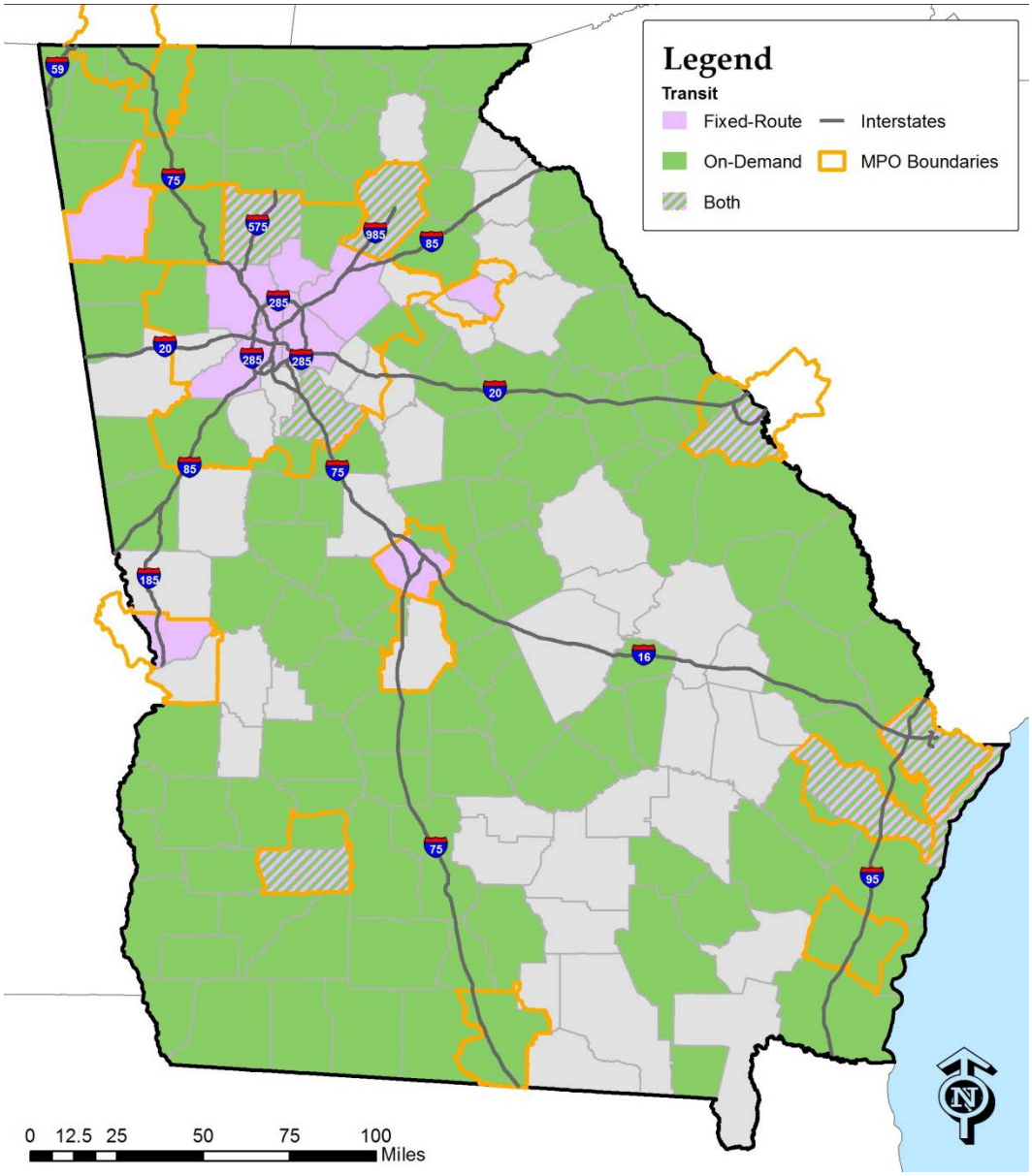
specific counties lacking service are shown in Table 3.4 with their Regional Commission District; 37 of Georgia's 159 counties are lacking service.

## Table 3.4 Counties Lacking Transit Service *By Regional Commission*

| | |
|---|---|
| **Southern Georgia Regional Commission** | |
| Atkinson County | Coffee County |
| Ben Hill County | Echols County |
| Brantley County | Irwin County |
| Charlton County | Lanier County |
| Clinch County | |
| **Heart of Georgia Altamaha Regional Commission** | |
| Appling County | Johnson County |
| Candler County | Laurens County |
| Emanuel County | Tattnall County |
| Evans County | Toombs County |
| Jeff Davis County | |
| **River Valley Regional Commission** | |
| Chattahoochee County | Schley County |
| Harris County | Webster County |
| Marion County | |
| **Central Savannah River Area Regional Commission** | |
| Washington County | |
| **Atlanta Regional Commission** | |
| Clayton County | Fayette County |
| | Rockdale County |
| **Middle Georgia Regional Commission** | |
| Houston County | Monroe County |
| **Georgia Mountains Regional Commission** | |
| Franklin County | White County |
| Stephens County | |
| **Northeast Georgia Regional Commission** | |
| Barrow County | Newton County |
| Jasper County | Oconee County |
| Madison County | Oglethorpe County |
| **Three Rivers Regional Commission** | |
| Carroll County | Meriwether County |

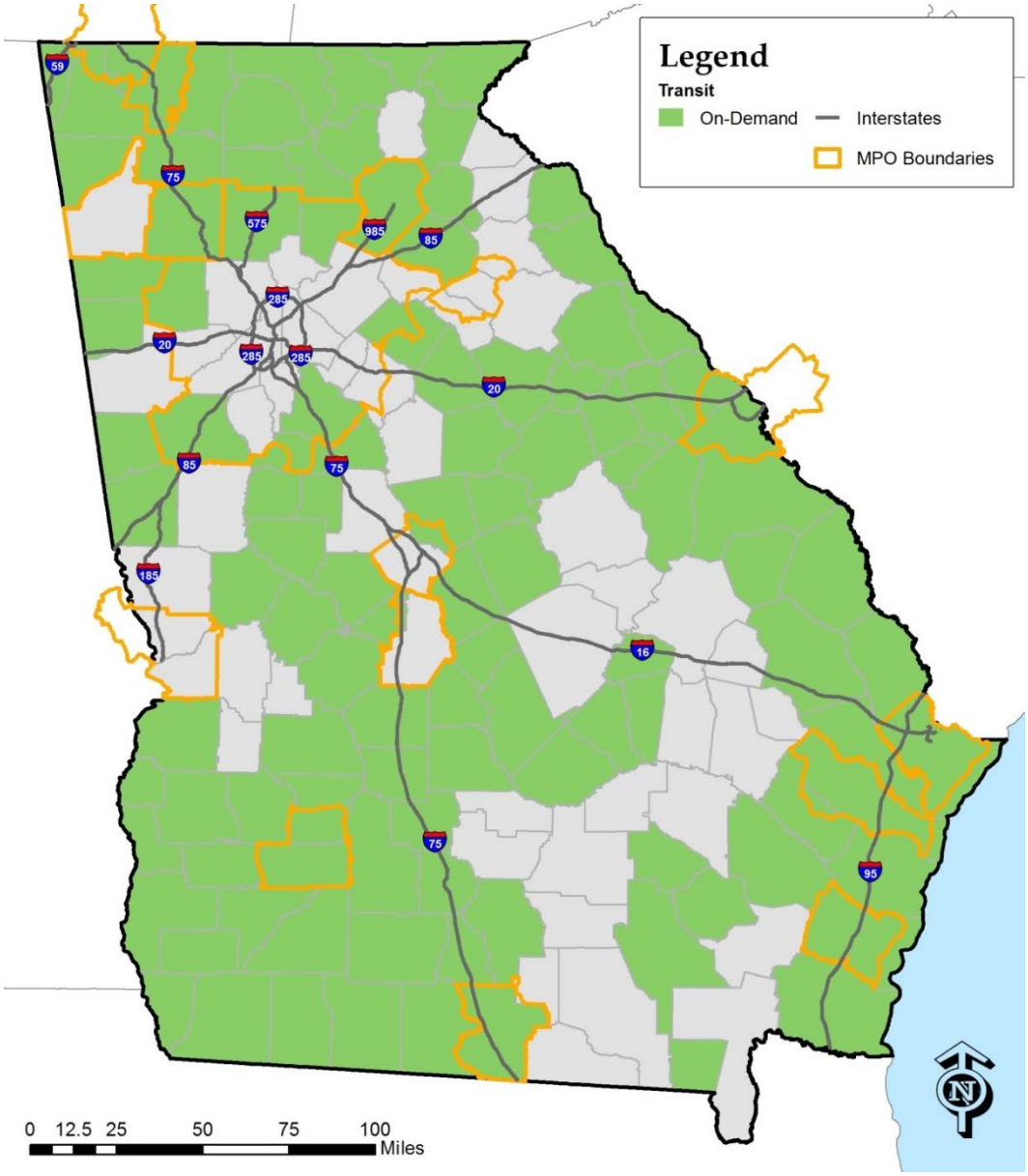
Source: American Society of Civil Engineers (ASCE) Infrastructure Report Card for the State of Georgia (September 2013)

Figure 3.2 Fixed-Route and Route On-Demand Transit Service by County




Source: American Society of Civil Engineers (ASCE) Infrastructure Report Card for the State of Georgia (September 2013).

Figure 3.3 Rural On-Demand Public Transit Service by County




Source: American Society of Civil Engineers (ASCE) Infrastructure Report Card for the State of Georgia (September 2013).

### 3.1.3 Other Transit Systems

In addition to the GDOT-funded transit systems discussed above, there are other transit systems that warrant mention as they enhance the overall transit sector for the State. The majority of universities and colleges within Georgia operate some type of shuttle or transit system for students. These services range from simple two- to three-vehicle van/shuttle services to major transit systems, such as the Georgia Tech (Stinger Shuttle) and the University of Georgia (UGA) Campus

Transit system. The UGA Campus Transit connects riders with the Athens Transit System (ATS), and students and university employees can ride both systems for free.

Other private transit systems service employment dense areas such as Buckhead (BUC Shuttle) in the Perimeter area and in Atlantic Station (Free Ride) in the Midtown area of Atlanta. These systems also connect to MARTA, GRTA, and other area public transit systems. In addition, the Chatham Area Transit operates a free downtown shuttle (DOT) for residents and visitors. Hartsfield-Jackson Atlanta International Airport and the Savannah/Hilton Head International Airport operate parking shuttles. The Savannah airport K-Shuttle also has regularly scheduled service into downtown Savannah and to Hilton Head Island.

### 3.1.4 Park-and-Ride Facilities

There are 156 park-and-ride facilities located throughout the State. As shown in Figure 3.4 (p. 3-11), the majority of the park-and-ride facilities are located within the Atlanta metropolitan area in proximity to the Interstate System. Many of the park-and-ride facilities within Fulton and DeKalb counties are on MARTA property and primarily serve MARTA rail and bus riders. Many park-and-ride lots also serve other transit systems, such as the Cobb Community Transit (CCT), Gwinnett County Transit (GCT), and the Georgia Regional Transportation Authority (GRTA) Xpress bus service. It is important to note that park-and-ride facilities also serve as drop-off and pick-up locations for carpools, vanpools, and private shuttles.

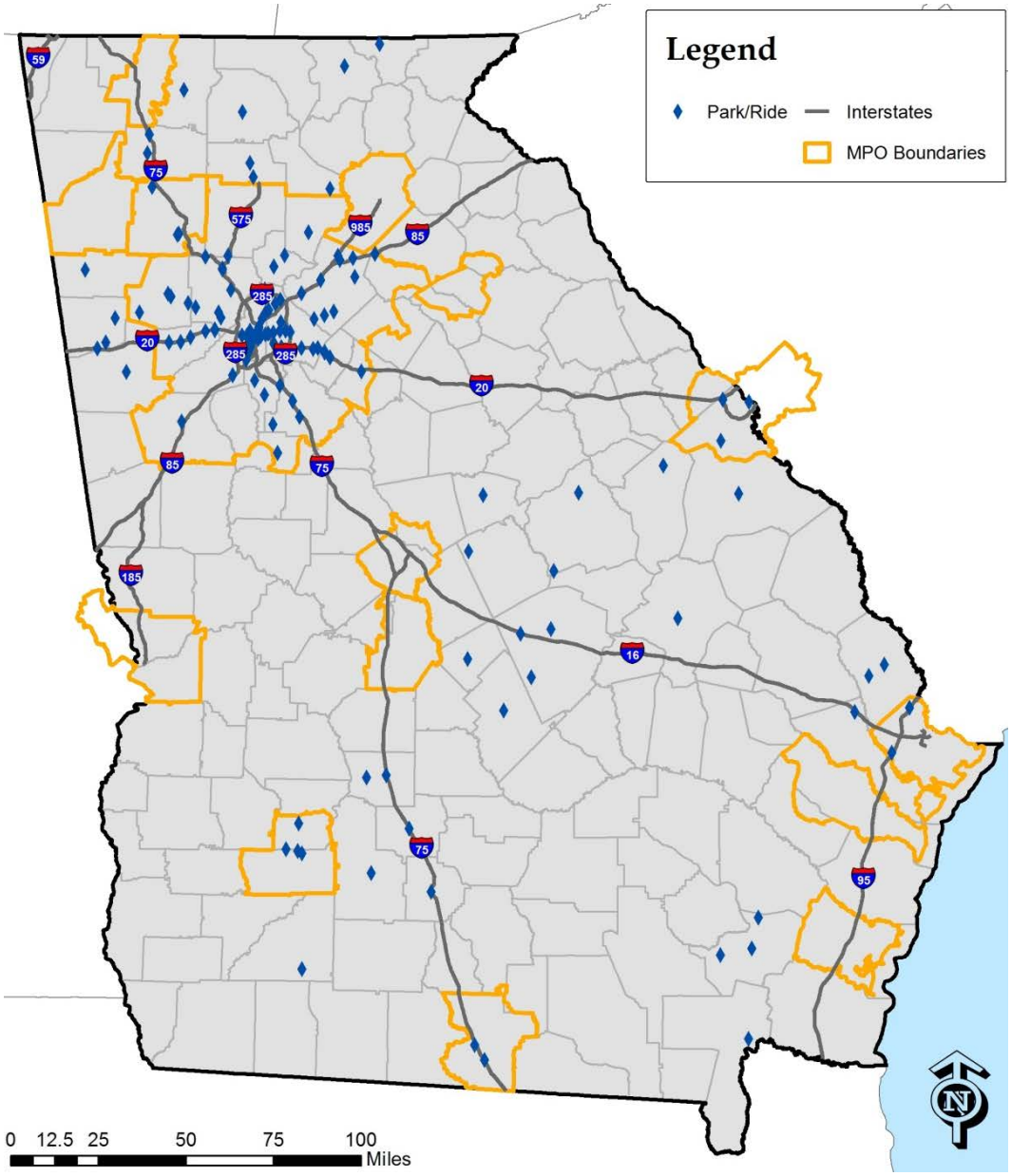
As shown in Table 3.5, six metropolitan planning organizations have at least 1 park-and-ride facility, with 91 located in the Atlanta Regional Commission (ARC) area. A total of 105 park-and-ride facilities are located within metropolitan planning organization boundaries, while the other 51 are located outside of these MPO jurisdictional boundaries. Forty-nine counties have at least 1 park-and-ride facility.

Table 3.5 Metropolitan Planning Organizations with Park-and-Ride Facilities

| Metropolitan Planning Organization | Number of Park-and-Ride Facilities |
|---|---|
| Atlanta Regional Commission | 91 |
| Dougherty Area Regional Transportation Study | 4 |
| Augusta Regional Transportation Study | 3 |
| Cartersville-Bartow County Metropolitan Planning Commission | 3 |
| Coastal Region Metropolitan Planning Organization | 2 |
| Valdosta-Lowndes Metropolitan Planning Commission | 2 |
| Rest of the State | 51 |
| Total | 156 |

Source: GDOT Office of Intermodal Programs; Atlanta Regional Commission.

Figure 3.4 Park-and-Ride Facilities




Source: GDOT Office of Intermodal Programs, Atlanta Regional Commission.

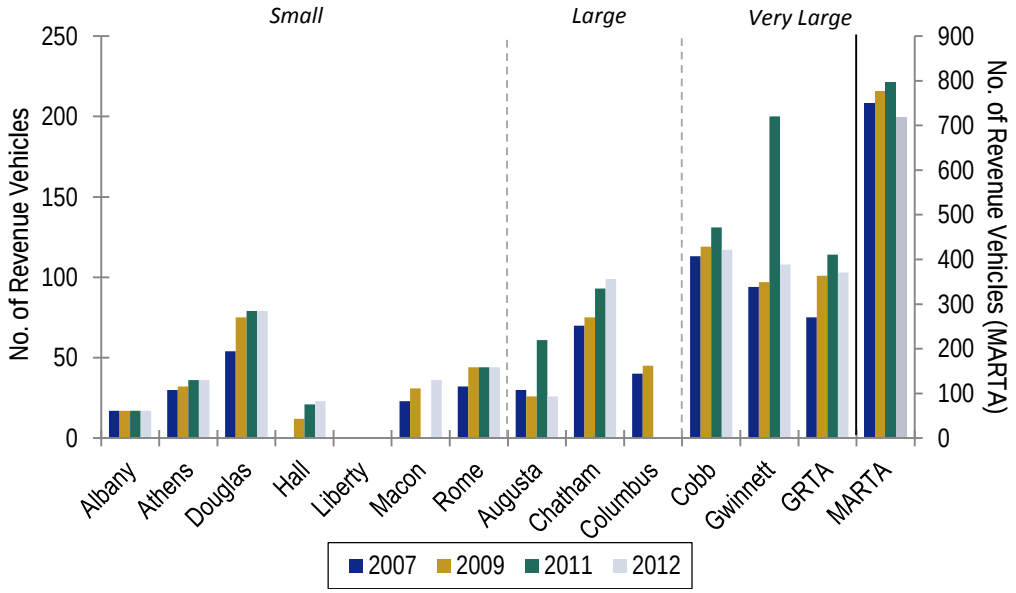
The park-and-ride facilities that are not located on MARTA property vary in size from over 1,000 spaces (Sugarloaf Mills Park-and-Ride in Gwinnett County) to less than 20 spaces in rural counties such as Laurens, Washington, Burke, and Gordon. The Sugarloaf Mills facility serves the Gwinnett County Transit (GCT), GRTA Xpress bus, and the Georgia Rideshare program. Some of the larger lots are lighted and have shelter for passengers. The smaller facilities typically do not include these amenities.

# 3.2 TRANSIT CAPACITY

## 3.2.1 Urban Fixed-Route Public Transit Systems

Figure 3.5 shows the total number of revenue vehicles for each urban public transit system. Cobb Community Transit (CCT) and Gwinnett County Transit (GCT) have the largest number of vehicles. Cobb reported 113 vehicles in 2007 and 2009 and increased its fleet size to 117 vehicles in 2012. Gwinnett County Transit (GCT) reported 94 vehicles in 2007, and increased its fleet size to 108 vehicles in 2012. The majority of the systems slightly increased their fleet sizes over the 2007 to 2012 timeframe. Note that there was no reported data for the new Liberty Transit system. MARTA is also shown on the graph, but its data is represented by the vertical axis on the right since it has far more revenue vehicles than the other urban systems.

Figure 3.5 Number of Revenue Vehicles
*2007 to 2011*




Source: GDOT Office of Intermodal Programs.

The average age of the fleet ranges from 2.6 years for the Macon-Bill Transit Authority to 7.1 years for the Rome Transit Department (RTD). Table 3.6 (p. 3-13) shows the average fleet age for each system. Based on the 2012 National Transit Database, the average fleet age in the U.S. is 7.3 years compared to 5.1 years in Georgia. All of the Georgia systems except for RTD are below the national average.

Table 3.6 Average Age of Fleet
*2012*

| Size | Transit System | Acronym | Average Fleet Age in Years |
|---|---|---|---|
| *Small* | Albany Transit System | ATS | 5.45 |
| | Athens Transit System | ATS | 6.38 |
| | Cherokee Area Transportation Authority | CATS | *N/A* |
| | Douglas County Rideshare | N/A | 5.20 |
| | Hall Area Transit | HAT | 3.41 |
| | Liberty Transit | LT | *N/A* |
| | Macon-Bibb County Transit Authority | MTA | 2.58 |
| | Rome Transit Department | RTD | 7.07 |
| *Large* | Augusta Public Transit | APT | 3.54 |
| | Chatham Area Transit Authority | CAT | 5.14 |
| | Columbus Transit System | METRA | *N/A* |
| *Very Large* | Cobb County Transit | CCT | 6.06 |
| | Gwinnett County Transit | GCT | 5.79 |
| | Georgia Regional Transportation Authority | GRTA | 3.51 |
| | Metropolitan Atlanta Regional Transit Authority | MARTA | 6.71 |

Source: NTD 2012 Reporting Data.

### 3.2.2 Rural Public Transit Systems

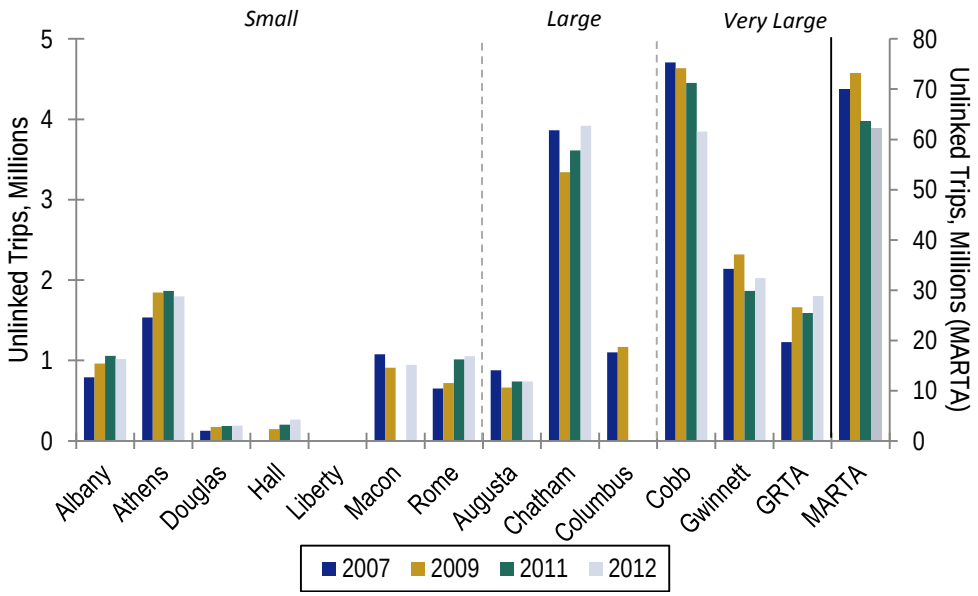
The rural public transit system fleet includes 612 smaller vehicles, including shuttle vans and buses to transport passengers. These types of vehicles typically have a passenger capacity of 8 to 15 riders. There is variance in terms of fleet size. Some providers operate less than 5 vehicles. Other systems, especially those close to urban areas, report fleet sizes of around 20 to 30 vehicles. Most systems have a few vehicles that are wheelchair accessible.

## 3.3 TRANSIT USE

### 3.3.1 Urban Public Transit Systems

Figure 3.6 and Table 3.7 (p. 3-14) show the ridership in the form of annual unlinked trips for each urban public transit system for 2007, 2009, 2011, and in 2012. Chatham County Transit (CAT) has the highest number of riders with 3,917,881 in 2012. Cobb County Transit (CCT) was close behind with a ridership of 3,845,823 in 2012. The majority of the transit systems experienced increases in ridership between 2007 and 2009; however, several systems showed a loss in ridership between 2009 and 2011 during the recession. Most of the systems showed an increase in ridership between 2011 and 2012. The transit systems in Albany, Athens, and Cobb County showed decreases in both 2011 and 2012 from the previous years.

## Figure 3.6 Urban Transit System Ridership
*2007 to 2011*




Source: GDOT Office of Intermodal Programs.

## Table 3.7 Urban Transit System Ridership
*2007 to 2012*

| Size | Transit System | Acronym | Annual Unlinked Trips (Ridership) | | | |
|---|---|---|---|---|---|---|
| | | | 2007 | 2009 | 2011 | 2012 |
| *Small* | Albany Transit System | ATS | 789,718 | 962,392 | 1,055,743 | 1,013,786 |
| | Athens Transit System | ATS | 1,536,693 | 1,847,507 | 1,866,789 | 1,798,971 |
| | Cherokee Area Transportation System | CATS | N/A | N/A | N/A | N/A |
| | Douglas County Rideshare | N/A | 128,186 | 172,337 | 185,960 | 191,499 |
| | Hall Area Transit | HAT | N/A | 144,341 | 202,933 | 265,256 |
| | Liberty Transit | LT | N/A | N/A | N/A | N/A |
| | Macon-Bibb County Transit Authority | MTA | 1,076,629 | 909,958 | N/A | 945,580 |
| | Rome Transit Department | RTD | 652,706 | 718,207 | 1,014,181 | 1,053,720 |
| *Large* | Augusta Public Transit | APT | 879,257 | 665,437 | 738,964 | 737,552 |
| | Chatham Area Transit Authority | CAT | 3,862,819 | 3,340,510 | 3,614,406 | 3,917,881 |
| | Columbus Transit System | METRA | 1,102,498 | 1,168,328 | N/A | N/A |
| *Very Large* | Cobb Community Transit | CCT | 4,707,162 | 4,634,090 | 4,451,703 | 3,845,823 |
| | Gwinnett County Transit | GCT | 2,141,186 | 2,319,551 | 1,867,211 | 2,026,533 |
| | Georgia Regional Transportation Authority | GRTA | 1,227,213 | 1,660,737 | 1,589,234 | 1,802,443 |
| | Metropolitan Atlanta Regional Transit Authority | MARTA | 69,837,657 | 73,196,202 | 63,644,633 | 62,178,203 |

Source: NTD Reporting Data (2007-2012).

### 3.3.2 Commuting Information

The United States Census Bureau maintains the Census Transportation Planning Products (CTPP) program, which is a summary of Census data collected through the 10-year U.S. Census and the American Community Survey (ACS), presented for transportation purposes. Current CTPP demographic data covers the period from 2006 through 2010 and includes the locations of participants' home and employment, which are used to analyze key transportation information, such as distances traveled to and from work. From this analysis, commuting patterns can be obtained for use in transportation planning. The CTPP data is limited in that it only includes information related to work trips and does not document transit use for nonwork purposes. Using the CTPP data, commuting patterns for commuters taking transit to work was obtained across the State and in several key cities, including Atlanta and Savannah. Statewide, 2.26 percent of commuters take transit to work. The city with the highest rate of transit commuters is Atlanta at 12.66 percent. A summary of this information is shown in Table 3.8.

Table 3.8 Transit Commuting Patterns by City

| City | Total Commuters | Transit Commuters | Percent Transit Users |
|---|---|---|---|
| Athens | 51,120 | 1,840 | 3.60% |
| Atlanta | 195,910 | 24,810 | 12.66% |
| Columbus | 83,195 | 740 | 0.89% |
| Decatur | 8,970 | 630 | 7.02% |
| Dunwoody | 22,460 | 975 | 4.34% |
| Macon | 33,505 | 699 | 2.09% |
| Marietta | 30,095 | 1,470 | 4.88% |
| Roswell | 43,955 | 555 | 1.26% |
| Sandy Springs | 50,735 | 3,565 | 7.03% |
| Savannah | 56,860 | 2,690 | 4.73% |
| Georgia (total) | 4,241,385 | 96,005 | 2.26% |

Source: ACS 2006-2010 Five-year estimates

Note: Transit includes bus, streetcar/trolley, heavy rail, railroad, and ferry services.

### 3.3.3 Rural Public Transit System

Table 3.9 (p. 3-16) provides ridership in the form of annual unlinked trips for each rural public transit system provider for 2012 as reported in the NTD. The average ridership was 24,873 passengers. Montgomery County Transit reports the lowest number of trips (1,797), and the Southwest Georgia Regional Commission has the highest number (333,761).

## Table 3.9 Rural Transit Provider Ridership
*2012*

| Rural Transit Provider | Ridership |
|---|---|
| Augusta-Richmond County Commission | 19,120 |
| Bacon County | 8,196 |
| Baldwin County Transit | 11,079 |
| Banks County Transit | 5,096 |
| Bartow Transit | 33,456 |
| Berrien County | 7,725 |
| Bleckley County Transit | 20,530 |
| Brooks County Transit | 19,198 |
| Burke County Transit | 20,810 |
| Catoosa County | 25,723 |
| Chattooga County Transit | 12,815 |
| Cherokee County Transit | N/A |
| City of Americus | 27,931 |
| City of Cedartown | 6,621 |
| City of Unadilla | 3,450 |
| City of Vienna | 18,661 |
| Clay County | 81,481 |
| Coastal Regional Commission | 196,294 |
| Columbia County Commission Transit | 48,151 |
| Cook County Transit | 27,805 |
| Coweta County | 26,880 |
| Crawford County Transit | 5,803 |
| Crisp County Transit | 20,075 |
| Dade County Transit | 29,192 |
| Dawson County Transit | 9,615 |
| Dodge County Transit | 18,956 |
| Elbert County Transit | 7,198 |
| Fannin County Transit | 16,914 |
| Forsyth County Public Transportation | 20,405 |
| Gilmer County Transit System | 11,763 |
| Glascock County Transit | 8,618 |
| Gordon County Transit | 9,771 |
| Greene County Commission Transit | 22,720 |
| Habersham County Transit | 3,087 |
| Hall Area Transit | 25,066 |
| Hancock County Transit | 19,227 |
| Haralson County Transit | 12,114 |
| Hart County Public Transit | 7,873 |
| Heard County Transit | 7,595 |
| Henry County Transit | N/A |
| Jackson County Transit | 5,156 |
| Jefferson County Transit | 23,632 |

| Rural Transit Provider | Ridership |
|---|---|
| Jenkins County Transit | 5,139 |
| Jones County Transit | 8,529 |
| Lincoln County Transit | 15,059 |
| Lowndes County | 25,136 |
| Lumpkin County | 5,399 |
| Macon County Transit | 9,137 |
| McDuffie County Commission Transit | 42,574 |
| Montgomery County Transit | 1,797 |
| Morgan County Transit | 26,132 |
| Murray County Transportation System | 27,455 |
| Paulding County | 21,286 |
| Peach County Transit | 15,331 |
| Pickens County | 16,649 |
| Pierce County Transit | 14,994 |
| Pulaski County Transit | 5,467 |
| Putnam County Commission Transit | 16,865 |
| Quitman County Transit | 16,529 |
| Rabun County | 10,779 |
| Randolph County Transit | N/A |
| Social Circle Area Transit | 8,850 |
| Southwest Georgia Regional Commission | 333,761 |
| Talbot County Transit | 34,425 |
| Taliaferro County Board of Commissioners | 6,922 |
| Taylor County Transit | 13,874 |
| Telfair County Transit | 14,029 |
| Thomas County Transit | 96,123 |
| Three Rivers Regional Commission | 81,241 |
| Tift Transit System | 11,272 |
| Towns County | 7,777 |
| Treutlen County Commission | 3,798 |
| Troup County Transit | 23,410 |
| Turner County Transit | 12,874 |
| Twiggs County Transit | 11,157 |
| Union County Transit | 4,653 |
| Walker County Transit | 31,709 |
| Ware County | 15,105 |
| Warren County Commission Transit | 12,334 |
| Wayne County Transit | 38,928 |
| Wheeler County Transit | 5,727 |
| Whitfield County WTS | 46,104 |
| Wilcox County Transit | 10,116 |
| Wilkes County Commission Transit | 15,617 |
| Wilkinson County Commission Transit | 9,714 |

Source: NTD 2012 Reporting Data

## 3.4 TRANSIT PERFORMANCE

The 2012 National Transit Database (NTD) was used as a source of performance measures for each urban fixed-route transit system. The NTD requires all public transit systems that receive Federal and state funding to provide data regarding the performance of their system on an annual basis. This data establishes performance measures by which each agency can be evaluated and deficiencies can be identified. The standard NTD performance measures are as follows:

- **Operating Expense per Vehicle Revenue Mile (VRM).** The cost to operate a transit system is recorded and divided by every mile that a vehicle travels while in revenue service (Revenue/VRM). Operating expenses include fuel, vehicle maintenance, staff salary, facility cost/maintenance, and other expenses eligible for Federal funding. This analysis provides a per-mile cost for a transit system to operate allowing for comparison of systems that vary in size, operating hours, and other similar factors.
- **Operating Expense per Vehicle Revenue Hour (VRH).** Similar in function to the VRM calculation, this performance measure analyzes the cost to operate each transit system per hour for every hour that the system is providing revenue service.
- **Operating Expense per Passenger Mile.** This measure evaluates how much operational cost a system incurs per mile that a passenger travels. This metric is utilized to evaluate the cost-effectiveness of the system.
- **Operating Expense per Unlinked Passenger Trip.** Unlinked trips are defined as the total number of passengers boarding a bus, as mandated by government and industry standard data collection authorities. Operating expense per unlinked passenger trip divides the total cost to operate the system by the total number of unlinked trips in order to determine the cost per trip. This metric also is used to evaluate a system's cost-effectiveness.
- **Unlinked Passenger Trips per Vehicle Revenue Mile (VRM).** This metric divides the total number of unlinked passenger trips (total boardings) by the total miles traveled during revenue service or VRMs. This analysis determines how many passengers, on average, were on each bus for every revenue mile traveled.
- **Unlinked Passenger Trips per Vehicle Revenue Hour (VRH).** Similar in function to the unlinked passenger trips per VRM, this performance measure evaluates the average number of passengers utilizing a transit system for every hour of revenue service provided. This measure is used to gauge system efficiency.

Table 3.10 (p. 3-19) illustrates how each of the five public transit agencies are performing based on the NTD measures. While each system is unique and operates based on the needs of the population in its respective service area, the NTD

performance measures allow a comparison to be made to determine the industry averages.

Analysis of the reported system performance for 2012 shows that the average operating expense per VRM currently is $4.95 with a high of $7.96 and a low of $0.59. The average operating expense per VRH is $78.06, meaning that every hour the system operates revenue service it will cost $78.06. Operating expense per passenger mile is averaging $0.82 statewide, while operating expense per unlinked passenger trip averages $1.70. Unlinked passenger trips per VRM vary significantly for each system with an average of 1.2. In order to meet the minimum reporting requirements for NTD, a system must report a score of 1.0 or higher for unlinked passenger trips per VRM. An average of 17.76 unlinked trips per VRM is reported systemwide with a high of 27.73 by MARTA and a low of 6.08 by Douglas County Rideshare system.

## Table 3.10 Performance of Public Transit Agencies Based on NTD Measures

| | Transit System | Acronym | Operating Expense per Vehicle Revenue Mile (in Dollars) | Operating Expense per Vehicle Revenue Hour (in Dollars) | Operating Expense per Passenger Mile (in Dollars) | Operating Expense Per Unlinked Passenger Trip (in Dollars) | Unlinked Passenger Trips per Vehicle Revenue Mile | Unlinked Passenger Trips per Vehicle Revenue Hour |
|---|---|---|---|---|---|---|---|---|
| *Small* | Albany Transit System | ATS | $4.15 | $66.75 | $0.56 | $2.74 | 1.52 | 24.38 |
| | Athens Transit System | ATS | $5.31 | $61.17 | $0.85 | $2.47 | 2.15 | 24.80 |
| | Cherokee Area Transportation System | CATS | N/A | N/A | N/A | N/A | N/A | N/A |
| | Douglas County Rideshare | DCR | $0.59 | $23.34 | $0.10 | $3.84 | 0.15 | 6.08 |
| | Hall Area Transit | HAT | $3.07 | $41.45 | $1.25 | $4.97 | 0.62 | 8.34 |
| | Liberty Transit | LT | N/A | N/A | N/A | N/A | N/A | N/A |
| | Macon-Bibb County Transit Authority | MTA | $3.68 | $58.44 | $1.39 | $5.70 | 0.65 | 10.24 |
| | Rome Transit Department | RTD | $4.86 | $67.76 | $0.57 | $2.60 | 1.87 | 26.02 |
| *Large* | Augusta Public Transit | APT | $6.59 | $77.26 | $1.67 | $5.75 | 1.15 | 13.43 |
| | Chatham Area Transit Authority | CAT | $5.25 | $66.56 | $1.17 | $3.67 | 1.43 | 18.12 |
| | Columbus Transit System | METRA | N/A | N/A | N/A | N/A | N/A | N/A |
| *Very Large* | Cobb County Transit | CCT | $5.30 | $89.98 | $0.59 | $4.53 | 1.17 | 19.84 |
| | Gwinnett County Transit | GCT | $6.30 | $117.76 | $0.33 | $7.00 | 0.90 | 16.83 |
| | Georgia Regional Transportation Authority | GRTA | $6.31 | $162.09 | $0.36 | $9.35 | 0.68 | 17.34 |
| | Metropolitan Atlanta Regional Transportation Authority | MARTA | $7.96 | $104.13 | $0.99 | $3.76 | 2.12 | 27.73 |

Source: NTD 2012 Reporting Data.

In order to establish national benchmarks used for comparison of Georgia's transit system performance to others throughout the country, NTD reporting data was collected and analyzed. Table 3.11 demonstrates the overall Georgia transit system average performance by system size and compares these averages to the average performance of all transit systems of similar size in the country. When national performance measure data is aggregated for comparison, the competitiveness of Georgia's transit systems varies depending on the system reporting size. The large Georgia transit systems with 250 to 100 revenue service vehicles are reporting higher than the national average on four of the six NTD performance measures. The Medium/Large systems with 99 to 50 revenue service vehicles are reporting at levels less competitive than the Medium/Large systems with five of the six performance measures reporting below the national average. Georgia systems in the Medium/Small reporting category (49 to 25 vehicles) are performing the same as the Medium/Large systems category with five of the six performance measures below the national average. Small systems with 24 to 1 revenue service vehicles have noted deficiencies in reporting compliance systemwide, with Georgia systems underperforming in three of the six reporting categories.

## Table 3.11 Comparison of Georgia to National Averages for Urban Transit System Performance

| | Performance Measures | Average for Georgia Transit Systems | NTD National Average |
|---|---|---|---|
| Large Systems: 100-250 Revenue Vehicles | Annual Vehicle Miles | 8,791.5 | 6,136.2 |
| | Annual Vehicle Revenue Miles | 7,676 | 5,404 |
| | Annual Vehicle Hours | 356.3 | 395.4 |
| | Annual Vehicle Revenue Hours | 309.3 | 361 |
| | Unlinked Passenger Trips | 18,963.2 | 10,443.5 |
| | Passenger Miles | 135,528 | 62,754.3 |
| Medium/Large Systems: 50-99 Revenue Vehicles | Annual Vehicle Miles | 2,448.2 | 2,582 |
| | Annual Vehicle Revenue Miles | 2,171.6 | 2,291.5 |
| | Annual Vehicle Hours | 119 | 157 |
| | Annual Vehicle Revenue Hours | 108.1 | 142 |
| | Unlinked Passenger Trips | 2,026.359 | 3,269.7 |
| | Passenger Miles | 22,087.6 | 20,134.2 |
| Medium/Small Systems: 25-49 Revenue Vehicles | Annual Vehicle Miles | 693 | 1,303.9 |
| | Annual Vehicle Revenue Miles | 648.3 | 1,164 |
| | Annual Vehicle Hours | 72 | 86 |
| | Annual Vehicle Revenue Hours | 68.6 | 77.8 |
| | Unlinked Passenger Trips | 5,953 | 1,640.4 |
| | Passenger Miles | 4,426.5 | 9,091.3 |
| Small Systems: 1-24 Revenue Vehicles | Annual Vehicle Miles | 367.6 | 399.7 |
| | Annual Vehicle Revenue Miles | 338.2 | 300.8 |
| | Annual Vehicle Hours | 28.2 | 26.2 |
| | Annual Vehicle Revenue Hours | 25.7 | 20.4 |
| | Unlinked Passenger Trips | 304.9 | 343.6 |
| | Passenger Miles | 1,151 | 2,788.4 |

Source: NTD 2012 Reporting Data.

Note: All performance data reported in thousands.

## 3.5 SUMMARY OF MAJOR ISSUES/ CURRENT DEFICIENCIES

The major issues facing the transit sector in Georgia are focused around the availability of funding and coordination to cover the needs. With the restriction on the use of state motor fuel tax funds for transit, future increases in demand will become more and more difficult to address.

The review of the ridership data for the transit systems shows that the majority of the systems experienced an increase in ridership between 2009 and 2012. Those systems that experienced a ridership decrease could be related to a number of factors, such as the economic downturn and lower employment rates, leading to fewer work-, shopping-, and service-oriented trips by transit. However, as the economy rebounds, as the baby boomer population ages, and as younger people seek alternative travel and lifestyle options, there is likely to be a higher dependence on transit than ever. Public transportation can meet some of these mobility demands, and provide Georgia residents with alternatives to driving, while also positively impacting the issues of highway congestion and air quality.

As found in the data, the fleet of the transit systems throughout the State is aging, with the average vehicle age of 5.1 years. Transit vehicles are typically replaced based on age and mileage standards, whichever is reached first. The FTA standard for urban bus replacements is generally over 10 years or 500,000 miles. With the average vehicle age just over 5 years, still below the national average, transit systems could be faced with major capital expenditures to replace aging vehicles in the coming decade.

In addition, as evidenced in the transit service figures, many areas, particularly in the rural areas of the State, have no transit service, with some lacking rural on-demand services. This lack of service can cause significant hardships on the population in areas with no services in accessing work, retail, and service activities.

# 4.0 Rail

Georgia is served by two large Class I freight railroads – Norfolk Southern (NS) and CSX Transportation (CSXT), 23 Class III and switching railroads, and by the national passenger service carrier, Amtrak. Freight traffic has grown significantly since the 1980s as a result of new services, changing markets and trade patterns, and shifting modal economics. This section describes freight service and it has a stand-alone Section (4.5) devoted to passenger service. Further detail on the rail system can be found in the 2009 Statewide Rail Plan (SRP), and the 2012 Statewide Freight and Logistics (F&L) Plan. Indeed, much of the information presented here is drawn from these reports. In addition, many of the topics discussed here will be covered in far greater depth as part of a comprehensive Statewide Rail Plan that is scheduled to begin in 2014.

## 4.1 Freight Rail Inventory

Georgia is an important rail state, with over 6,000 miles of track and right-of-way, of which approximately 4,844 miles are in active service. This places Georgia seventh in the nation. Including trackage rights, the 2 large eastern Class I railroads – CSXT and Norfolk Southern (NS) – operate approximately 3,400 miles and 70 percent of the total active trackage in the State. The remaining 1,400 miles of track are operated by 23 Class III and switching railroads (revenues of less than $40 million). Major holding companies – Genesee & Wyoming, OmniTrax, and Pioneer Railcorp – manage the majority (14) of these short-line (Class III) railroads, and smaller operators manage the remaining 9 railroads. There are no Class II (regional) railroads in Georgia.

As with many other states, Georgia has direct ownership in active and inactive rail lines. Two State agencies – GDOT and the State Property Commission – collectively own 676 miles of track and other rail facilities in the State. CSXT leases 136 miles from the State Property Commission, and various short-line operators lease 540 miles from GDOT. In addition, the Georgia Ports Authority owns rail terminal facilities associated with the ports of Savannah and Brunswick. The railroads serving Georgia are listed in Table 4.1 (p. 4-2).

CSXT and NS dominate service in the eastern half of the U.S., with both extensively serving the State of Georgia. Given the statewide importance of these two railroads, they are described in more detail below. Information on the various short-line properties can be found in the 2012 Statewide Freight and Logistics Plan and 2009 Statewide Rail Plan.

Figure 4.1 (p. 4-3) shows Georgia's rail network by ownership and illustrates the relationship between the local railroads and the Class I railroad networks. Lines highlighted in yellow are owned by GDOT. Figure 4.2 (p. 4-4) shows insets for Atlanta and Savannah, the cities with the most intensive freight rail service.

## Table 4.1 Freight Railroads Operating in Georgia

| Railroad | SCAC[a] | Parent Company | Rail Miles Operated in Georgia[b] | Percent Total Georgia Rail Miles Operated |
|---|---|---|---|---|
| Class I Railroads | | | | |
| CSXT Transportation | CSXT | | 1,614[c] | 33.3% |
| Norfolk Southern | NS | | 1,778 | 36.7% |
| Local Railroads | | | | |
| The Athens Line, LLC | ABR | B.R. Anderson | 37 | 0.8% |
| Chattahoochee Bay Railroad | CHAT | Genesee and Wyoming, Inc. | 2 | 0.0% |
| Chattahoochee Industrial Railroad | CIRR | Genesee and Wyoming, Inc. | 27 | 0.6% |
| Chattooga and Chickamauga Railway Co. | CCKY | Genesee and Wyoming, Inc. | 48[c] | 1.0% |
| First Coast Railroad | FCRD | Genesee and Wyoming, Inc. | 14 | 0.3% |
| Fulton County Railway, LLC | FCR | OmniTRAX | 25 | 0.5% |
| Georgia and Florida Railway | GFRR | OmniTRAX | 255[c] | 5.3% |
| Georgia Central Railway, LP | GC | Genesee and Wyoming, Inc. | 171 | 3.5% |
| Georgia Northeastern Railroad Co., Inc. | GNRR | Independent | 95[c] | 2.0% |
| Georgia Southern Railway | GS | Pioneer Railcorp | 129[c] | 1.5% |
| Georgia Southwestern Railroad, Inc. | GSWR | Genesee and Wyoming, Inc. | 230[c] | 4.7% |
| Georgia Woodlands Railroad, Inc. | GWRC | OmniTRAX | 18 | 0.4% |
| Golden Isles Terminal Railroad Inc. | GITM | Genesee and Wyoming, Inc. | 20 | 0.4% |
| Great Walton Railroad Co. | GRWR | B R. Anderson | 10 | 0.2% |
| Hartwell Railroad Co. | HRT | B.R. Anderson | 58 | 1.2% |
| Heart of Georgia Railroad Inc. | HOG | Atlantic Western Transportation | 202[c] | 4.2% |
| Riceboro Southern Railway, LLC | RSOR | Genesee and Wyoming, Inc. | 18 | 0.4% |
| Sandersville Railroad | SAN | Independent | 9 | 0.2% |
| Squaw Creek Southern Railroad | SCS | Respondek Railroad Corp. | 22 | 0.5% |
| St. Marys Railroad | SM | Independent | 13 | 0.3% |
| St. Marys West Railway | SMW | Independent | 23 | 0.5% |
| Valdosta Railway, LP | VR | Genesee and Wyoming, Inc. | 14 | 0.3% |
| Switching and Terminal Railroads | | | | |
| Savannah Port Terminal Railroad, Inc. | SAPT | Genesee and Wyoming, Inc. | 18 | 0.4% |
| Total Miles Operated (including trackage rights) | | | 4,844 | 100.0% |

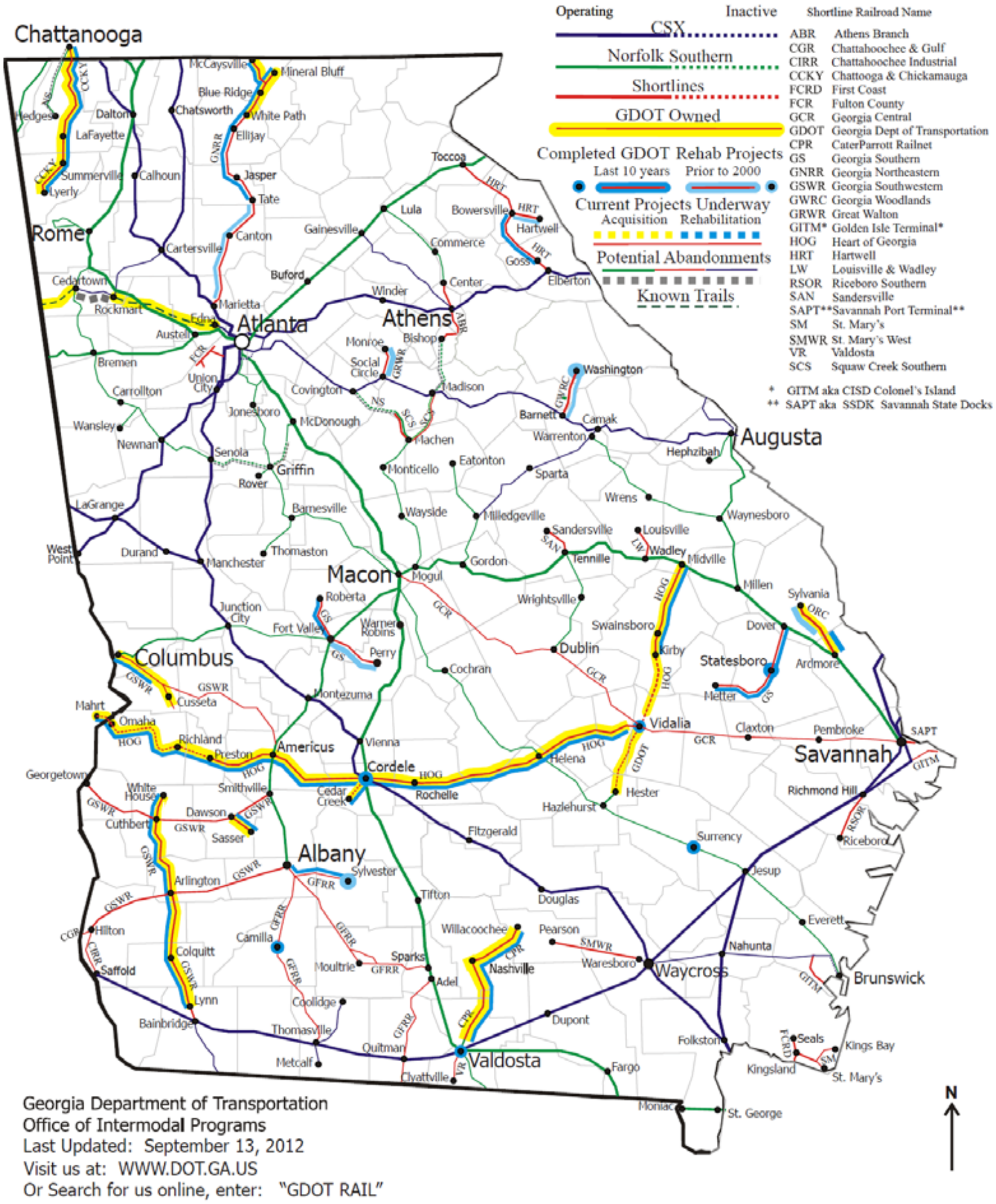
Source: Georgia Statewide Freight and Logistics Plan, 2011, with updates from AAR and web research.

[a] Standard Carrier Alpha Code, an industry standard two- to four-letter abbreviation.

[b] 2011 mileage shown for each carrier includes trackage rights; the total miles shown for all carriers exceeds physical mileage.

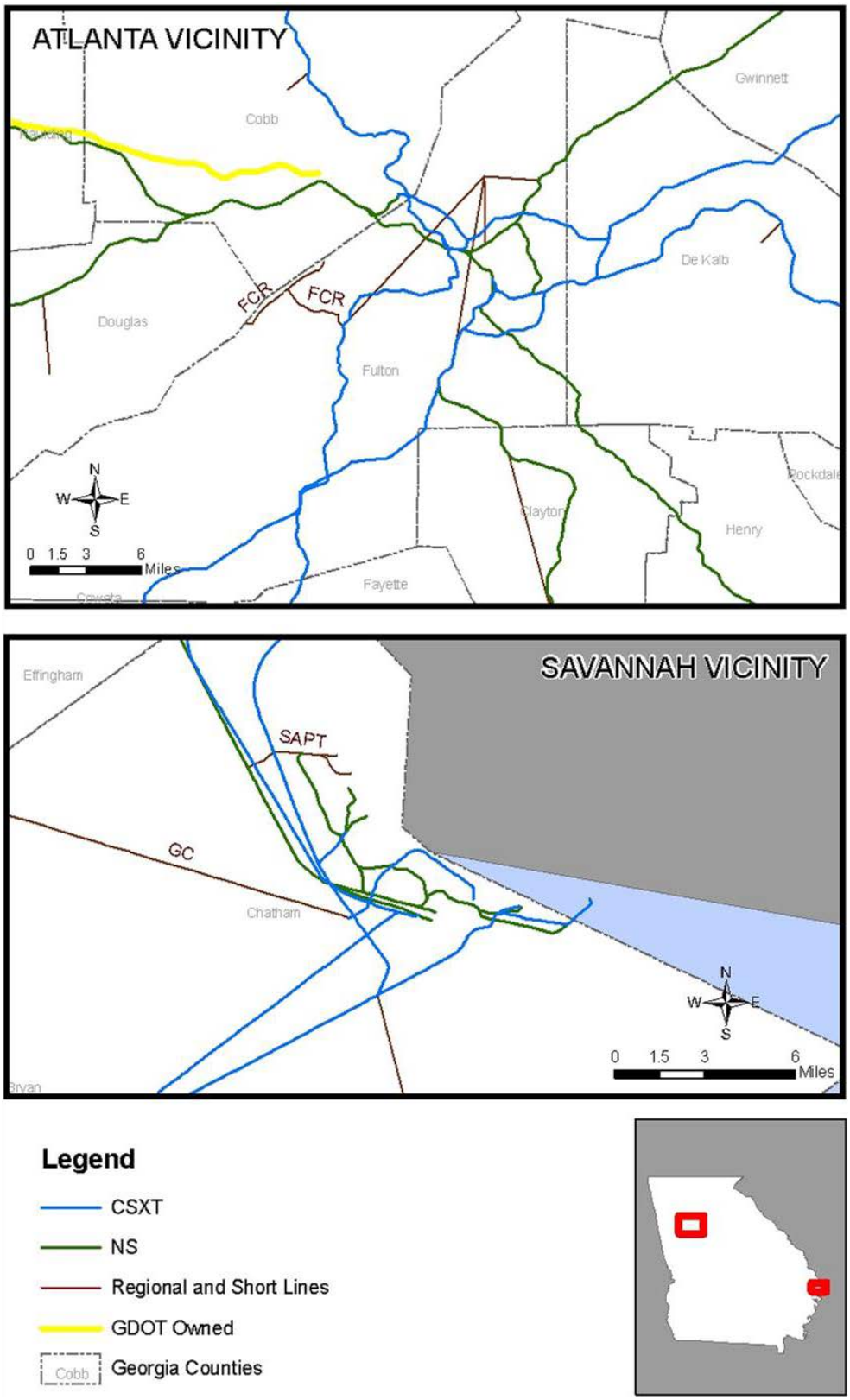
[c] Right-of-way fully owned or partially owned by GDOT or the State Property Commission.

## Figure 4.1 Georgia's Rail Network




Source: http://www.dot.ga.gov/travelingingeorgia/rail/Documents/FreightRailMap.pdf.

Figure 4.2 Georgia Rail System Insets



Most freight and passenger rail traffic through Georgia historically was routed through Atlanta. As a result, large freight handling facilities were constructed over the years in and around Atlanta, many of which continue to be operated by NS and CSXT in the present day. This goes for the terminals and yards, as well as the main lines linking Atlanta with the rest of the State and the nation.

The primary rail lines traversing the State of Georgia are the Class I rail lines that connect the rail hubs in Atlanta to the Midwest and to the ports in Georgia and Florida. Figures 4.3 and 4.4 (pp. 4-7 and 4-8) show the State's rail network coded by rail density measured in million gross ton-miles per mile (MGTM/mi) and reported by the Federal Railroad Administration (FRA). The two busiest corridors, as determined by rail density, are:

- The CSXT corridor between Jacksonville, Florida and Tennessee (and beyond) via Waycross, Cordele and Atlanta. The corridor includes the Jesup, Fitzgerald, Manchester, W&A, and Etowah subdivisions; and
- A parallel NS Corridor via Cordele, Macon, and Atlanta. The corridor includes the Valdosta, Macon, Atlanta South, and Atlanta North subdivisions.

The other major corridors, which run generally parallel to I-85, include the NS Greenville-Atlanta and East End subdivisions, the CSXT Abbeville and A&WP subdivisions, and the CSXT Columbia, Nahunta and Jesup subdivisions in the Coastal Georgia region. Several of the short-line railroads also provide significant connections: the Georgia Central between Savannah and Macon; and the Heart of Georgia, which connects to the Georgia Central and which will serve the Cordele Intermodal Center that currently is under development.

There are over 42 rail terminals in Georgia as listed in Table 4.2 (p. 4-9). While these facilities are clustered in the Atlanta and Savannah areas, every corner of the State has specific types of rail terminals designed to support the local needs of rail-related industries and support the larger rail networks that traverse Georgia.

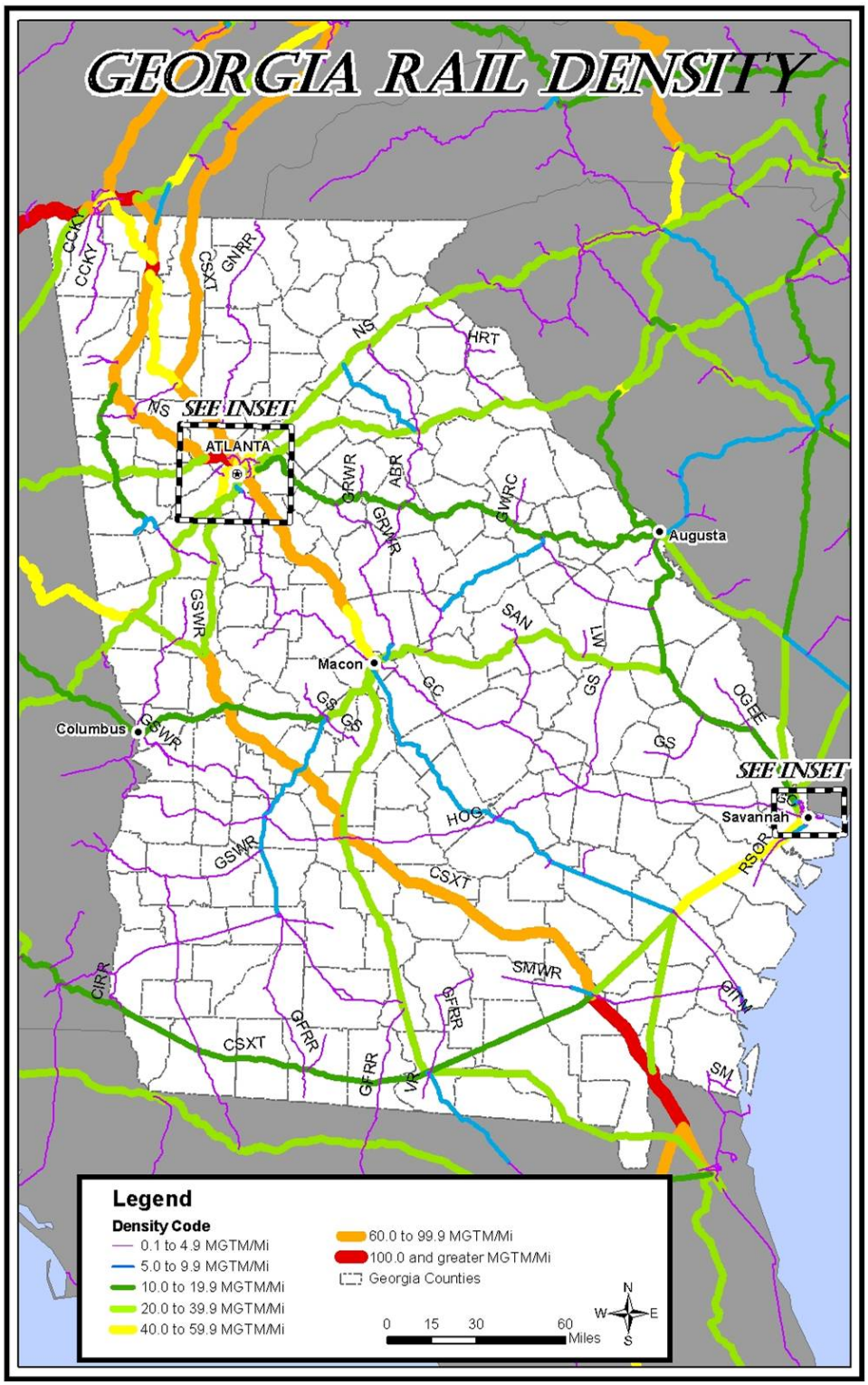
The State's rail intermodal terminals are located in the Atlanta, Savannah, and Brunswick areas. In the Atlanta area, NS maintains intermodal facilities at Austell and East Point, and at Inman Yard in the City of Atlanta. CSXT operates intermodal terminals at Fairburn Yard and Hulsey Yard in Southeast Atlanta. Combined, the NS and CSXT Intermodal facilities in the Atlanta area complete more than 900,000 lifts annually. Intermodal facilities in the Savannah area primarily serve port traffic and include the Mason Intermodal Container Transfer Facility (ICTF) served by NS, the Chatham ICTF served by CSXT, the NS Dillard Yard, and the CSXT Savannah Yard. Intermodal terminals serving the Port of Brunswick include the Anguilla Yard on Colonel's Island and the Myd Harris Yard in Brunswick.

The processing and handling of railcars, including receiving carloads, classification of railcars into blocks or units destined for common destinations, and the building and preparation of trains for departure, occur at carload system yards throughout the State. Major carload system yards on the CSXT network in Georgia include Rice Yard in Waycross, Tilford Yard in Atlanta, and Southford Yard in Savannah. Tilford Yard is a major hub for CSXT operations in the Southeast. Rice Yard is the largest by acreage and serves CSXT operations in an area bounded by the I-95 Corridor, Florida, and New Orleans. NS's primary carload yards are located in Macon, Atlanta, Savannah, Doraville, Valdosta, Albany, Augusta, Rosser, Columbus, and East Point. The Atlanta and Macon yards are major hubs for NS carload service in the Southeastern United States.

Bulk transload facilities are terminals where bulk goods, such as grain, chemicals, Portland cement, and plastic pellets are shifted between modes through the physical transfer of commodities. This process allows shippers to exploit the efficiencies associated with high-capacity rail equipment for the primary move, while utilizing the highway system for initial pick-up or final delivery where rail service is not available.

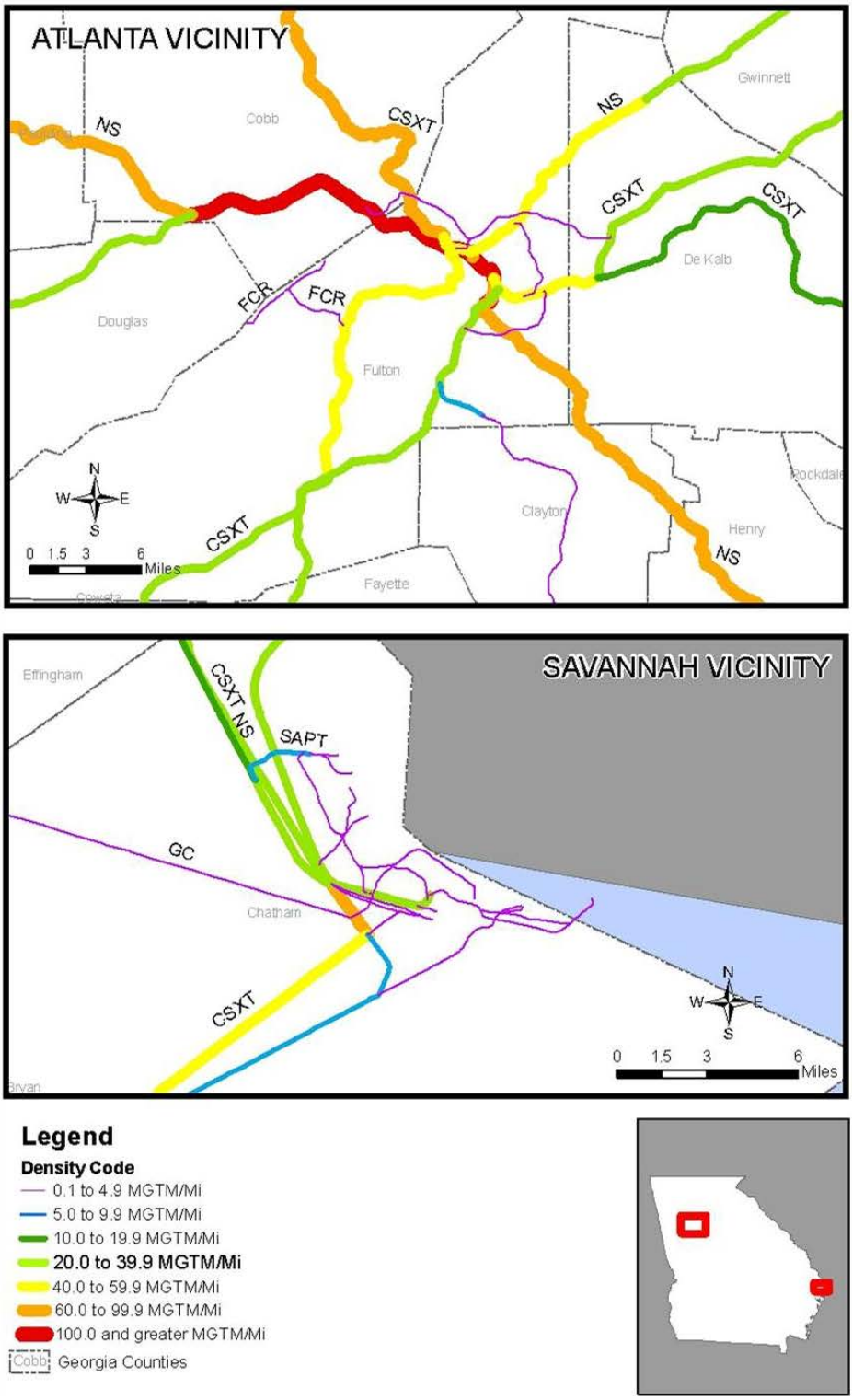
There are 18 rail/highway bulk transload facilities in Georgia. Seven are maintained by NS and CSXT, while the others are independent terminals located on CSXT, NS, and short-line and terminal railroads. NS and CSXT operate terminals in Dalton in Northern Georgia, in Augusta, and the Atlanta metropolitan region (Doraville and Tilford yards), and CSXT also operates in Savannah. The Atlanta-area terminals are the largest by size and volume for both railroads.

Figure 4.3 Georgia Rail Density




Source: Georgia Statewide Freight and Logistics Plan, 2011.

Figure 4.4 Georgia Rail Density Insets



## Table 4.2 Freight Rail Terminals in Georgia

| Location | Terminal Name | Terminal Type | Annual Volume or Facility Acreage |
|---|---|---|---|
| Albany | NS Albany Yard | Large Carload System Yard | 50,000 cars processed |
| Anguilla | Anguilla Yard (GITM) | Intermodal | N/A |
| Atlanta | Hulsey Yard (CSXT) | Intermodal | 125,000+ lifts |
| Atlanta | Inman Yard (NS) | Intermodal | 250,000 lifts |
| Atlanta | East Point RoadRailer (NS) | Intermodal | N/A |
| Atlanta | CSXT Tilford Yard | Large Carload System Yard | 300+ acres |
| Atlanta | NS Atlanta Yard | Large Carload System Yard | 350,000 cars processed |
| Atlanta | CSXT Transflo – Atlanta | Rail/Highway Bulk Terminal | 26+ acres |
| Augusta | NS Augusta Yard | Large Carload System Yard | 50,000 cars processed |
| Augusta | CSXT Transflo – Augusta | Rail/Highway Bulk Terminal | 10+ acres |
| Augusta | NS Thoroughbred Bulk Transfer – Augusta | Rail/Highway Bulk Terminal | 500 |
| Austell | Whitaker Yard (NS) | Intermodal | 300,000 lifts |
| Brunswick | Myd Harris | Intermodal | N/A |
| Calhoun | Dixie Transport – Calhoun (CSXT and NS served facility) | Rail/Highway Bulk Terminal | N/A |
| College Park | A&R Transport – College Park (CSXT- and NS-served facility) | Rail/Highway Bulk Terminal | N/A |
| Columbus | NS Columbus Yard | Large Carload System Yard | 40,000 cars processed |
| Cordele | Cordele (under construction) | Intermodal | 20,000 lifts initial capacity |
| Dalton | CSXT Transflo – Dalton | Rail/Highway Bulk Terminal | 5+ acres |
| Dalton | NS Thoroughbred Bulk Transfer – Dalton | Rail/Highway Bulk Terminal | 2,000 |
| Dalton | New South Distribution (CSXT-served facility) | Rail/Highway Bulk Terminal | N/A |
| Doraville | NS Doraville Yard | Large Carload System Yard | 100,000 cars processed |
| Doraville | NS Thoroughbred Bulk Transfer –Doraville | Rail/Highway Bulk Terminal | 3,000 |
| Doraville | Bulkmatic Transport (NS-served facility) | Rail/Highway Bulk Terminal | N/A |
| East Point | NS East Point Yard | Large Carload System Yard | 40,000 cars processed |
| Fairburn | Fairburn (CSXT) | Intermodal | 240,000+ lifts |
| Fairburn | SPTS, Div. of Trimac (CSXT-served facility) | Rail/Highway Bulk Terminal | N/A |
| Macon | NS Macon Yard | Large Carload System Yard | 500,000 cars processed |
| Norcross | Pax Industries – Norcross (NS-served facility) | Rail/Highway Bulk Terminal | N/A |
| Rosser | NS Rosser Yard | Large Carload System Yard | 50,000 cars processed |

| Location | Terminal Name | Terminal Type | Annual Volume or Facility Acreage |
|---|---|---|---|
| Sandersville | B-H Transfer (Sandersville Railroad facility) | Rail/Highway Bulk Terminal | N/A |
| Savannah | Savannah Yard (CSXT) | Intermodal | 50,000+ lifts |
| Savannah | Dillard Yard (NS) | Intermodal | 15,000 lifts |
| Savannah | Mason ICTF | Intermodal | 230,000+ lifts |
| Savannah | Chatham ICTF | Intermodal | N/A |
| Savannah | CSXT Southover | Large Carload System Yard | 200+ acres |
| Savannah | NS Savannah Yard | Large Carload System Yard | 100,000 cars processed |
| Savannah | CSXT Transflo – Savannah | Rail/Highway Bulk Terminal | 14 acres |
| Savannah | Colonial Terminals (CSXT-, NS-served facility) | Rail/Highway Bulk Terminal | N/A |
| Savannah | Paktank (CSXT-, NS-, Savannah State Docks-served facility) | Rail/Highway Bulk Terminal | N/A |
| Valdosta | NS Valdosta Yard | Large Carload System Yard | 50,000 cars processed |
| Waresboro | St Mary's Railway West (SMWR-served facility) | Rail/Highway Bulk Terminal | N/A |
| Waycross | CSXT Rice Yard | Large Carload System Yard | 700+ acres |

Sources: CSXT Transportation; Norfolk Southern Corporation; Bulk Transporter "Georgia Bulk Intermodal Transload Facility," http://bulktransporter.com, accessed November 22, 2010, Georgia Ports Authority; Cordele Intermodal Services.

## 4.2 FREIGHT RAIL NETWORK CAPACITY

The network's physical characteristics may limit the volume that Georgia's railroads can handle in a market-responsive manner in the long term. This capacity is imperative in that it affects not only the quality of service received by Georgia's freight shippers, but also by the ability to support passenger services in the shared use model that is standard in North America. Reliable operations of passenger trains require more "slack" capacity than may be necessary for purely freight operations. Key elements that determine physical capacity limits are as follows:

- **Vertical clearances**. Modern railcars are taller than they once were, and not all lines can accommodate double-stacked container trains and tri-level auto-rack cars.
- **Weight limits**. Since the early days of railroads, cars have become ever larger and heavier, as technology improved and shipping demands grew. Since the mid-1990s the weight limit for a standard four-axle car has increased from 263,000 to 286,000 pounds.
- **Number of tracks**. The more tracks that exist, the greater the number of trains that can be handled on a given line. In industrial areas alongside busy main

lines, this category includes tracks that are needed to efficiently serve customers without delaying through traffic.

- **Traffic control and signaling**. Signaling systems help ensure safe operations and effect permissible passenger and freight train speeds, while traffic control systems improve capacity utilization in an efficient manner. Traffic management systems can range from simple to complex, with lines experiencing higher traffic volumes benefiting from more advanced systems. These include automated technologies that help insure operational safety (such as automatic block signals), and computerized dispatching systems that help manage the flow of trains over a route.
- **Terminal and yard capacity**. Free-flowing main lines are of little value when shipments get delayed at yards and terminals. For a given configuration, terminal capacity is perhaps the most variable, as operational strategies can have the greatest impact.

Figures 4.5 through 4.8 (pp. 4-15 to 4-18) show the status of each of these network features in Georgia. To view the insets noted for each of these figures, refer to the Georgia Statewide Freight and Logistics Plan.

In recent years, Georgia's freight rail system has largely been able to keep up with capacity demands. However, it is evident that certain infrastructure deficiencies, most notably substandard weight limits and vertical clearances, as well as additional main line track, expanded terminals, and improved traffic management systems will be necessary. These restrictions will limit the system's capability to accommodate higher volumes and a broader range of commodity types that would appeal to a more diverse range of existing and potential rail customers. The following sections discuss current conditions related to weight, vertical clearances, number of main line tracks, and signal types.

### 4.2.1 286,000-Pound Railcar Capacity

The industry standard railcar weight for bulk commodities (such as grain, lumber, coal, and chemicals) has transitioned in recent years from 263,000 pounds to 286,000 pounds (referred to colloquially in the industry as 286,000). While most of the primary Class I rail lines have achieved 286,000-pound capability, many short-line railroads throughout the country are not capable of handling 286,000 railcars. As 286,000 railcars become ever more common, short-line railroads will find themselves at a disadvantage if they are unable to accommodate them. Upgrading lightweight track requires a significant capital investment, particularly if improvements must be made to bridges. Railcar weight limits for Georgia's Class I and short-line railroads, as available, are illustrated in Figure 4.5 (p. 4-15).

Most of Georgia's main line trackage owned by the Class I railroads can accommodate 286,000 railcars. The sole exception on CSXT is the Cartersville Subdivision, a branch connecting the CSXT Etowah Subdivision with the NS Cedartown Subdivision. On the NS, the Moores Subdivision in Augusta and the Dublin Subdivision, which is approximately 35 miles of track that connects the NS

Savannah Subdivision near Sandersville and the Georgia Central near Dublin, are not cleared to handle 286,000-pound loads.

For short-lines, the picture is more mixed. Short-line railroads capable of accommodating 286,000 railcars include ABR, CCKY (between MP 419 and 445.4 only), CHAT, FCR, GRWR north of the CSXT Georgia Subdivision (between Social Circle and Monroe), HOG, HRT between Toccoa and Elberton, SAN, and VR. Railroads that lack 286,000 capacity include CCKY (286,000 permitted between MP 419 and 445.4 only), CIRR, FCRD, GC, GITM, GNRR, GWRC, and GRWR south of the CSXT Georgia Subdivision, GSWR, and RSOR. Weight limit data for several of Georgia's short-line railroads, consisting of FCRD, GFRR, GS, LW, SCS, SM, and SMWR, is not readily available.

### 4.2.2 Vertical Clearances

With the general adoption of larger railcars, most notably tri-level auto carriers and double-stack intermodal cars, vertical height requirements have grown to upwards of 20 feet, and the defined height for fully unrestricted clearance is presently 22 feet 6 inches. A height of 20 feet 8 inches can accommodate a pair of stacked domestic containers (each 9 feet 6 inches high), and has become the minimum standard for vertical clearance for lines handling intermodal traffic. Due to bridges and other obstructions, many rail lines in Georgia do not meet this requirement. Vertical clearances on CSXT, NS, and many of the State's short-line railroads are mapped in Figure 4.6 (p. 4-16).

The most restrictive clearances of 15 feet 6 inches (AAR "Plate C") exist on the CSXT Cartersville Subdivision, CSXT Coolidge Spur, CSXT Metcalf Spur, CCKY, CIRR, FCRD, GC, GITM, GSWR, RSOR, and VR. Container on flat car (COFC) and trailers on flat car (TOFC) are permitted on the CSXT Etowah Subdivision and CSXT Gainesville-Midland Subdivision, but with 18 feet 6 inches clearance, these lines cannot accommodate double-stack trains. With 19 feet 6 inches clearance, low-cube double-stack and tri-level auto carriers can be accommodated on the CSXT Camak Subdivision, CSXT McCormick Subdivision, CSXT Bainbridge Subdivision, and CSXT Atlanta Terminal A. The balance of the CSXT rail network in Georgia has a clearance of at least 22 feet 6 inches and is capable of accommodating standard double-stack trains. NS's primary mainlines through the State of Georgia are double-stack cleared. Elements of the NS network that do not have the necessary clearance to accommodate double-stack service include the Albany, Brunswick, Columbus, Dothan,[23] and Griffin subdivisions, and short spur lines throughout the State.

[23] The name refers to the *subdivision* name assigned to the *rail tracks*, not the geography in which it is located. This would include railroad tracks in southwest Georgia that are serving Dothan, Alabama.

### 4.2.3 Main-Line Track Capacity

The Georgia Freight and Logistics Plan identified that 95 percent of all main-line trackage in the State of Georgia is single-track. Main Class I routes have passing sidings at regular intervals, which allow trains moving in opposite directions or at different rates of speed to pass one another. While this arrangement is effective for traffic volumes that have historically occurred over Georgia's main lines, as traffic increases and/or there is a greater mix of different types of trains, full double track becomes a necessity. Typically, this threshold falls in the range of 30 or more trains per 24-hour period. At present, most double track segments are located in the immediate vicinity of Atlanta and Savannah, as illustrated in the map in Figure 4.7 (p. 4-17). On the CSXT system, double-track segments include portions of the CSXT Terminal A Subdivision in Cobb and Fulton Counties, the Griffin Subdivision in central Fulton County, the Abbeville Subdivision in DeKalb County, and portions of the Savannah East Route and Charleston subdivisions in Chatham County. On the NS system, portions of the Norcross Subdivision in Fulton and DeKalb Counties, the Atlanta-North Subdivision in Fulton County, and the Savannah Subdivision in Chatham County are double-tracked. The aforementioned subdivision segments represent approximately 2 percent of mainline track miles in Georgia. Mainline track mileage by number of tracks is summarized in Table 4.3.

Table 4.3 Mainline Track Mileage by Number of Tracks

| Number of Tracks | Mileage | Percent of Total Mileage |
|---|---|---|
| Unknown (Zero) | 120 miles | 2.5% |
| One | 4,563 miles | 95.4% |
| Two | 100 miles | 2.1% |
| Total | 4,783 miles | 100.0% |

Source: Georgia Statewide Freight and Logistics Plan, 2011.

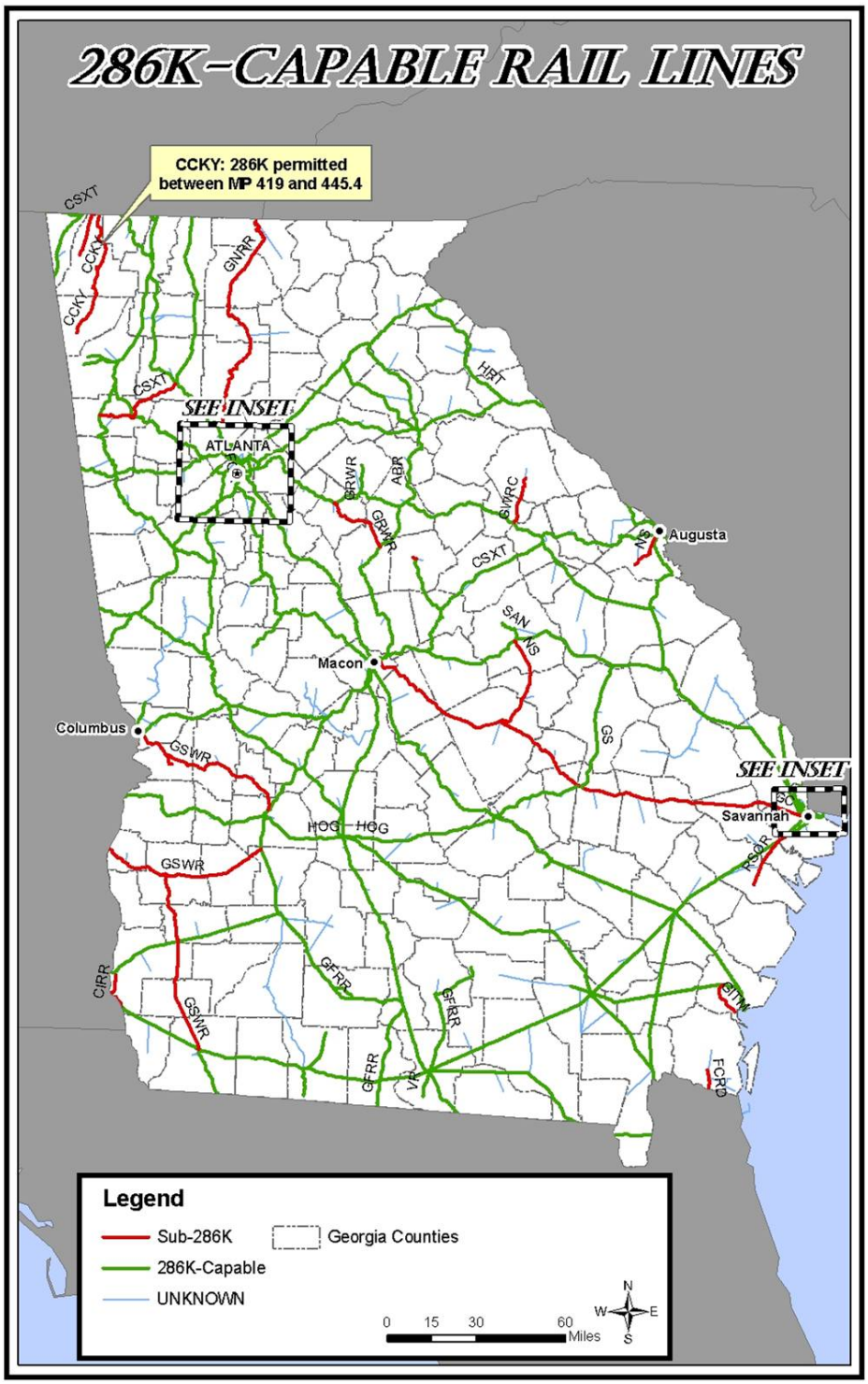
### 4.2.4 Traffic Control Systems

In addition to the number of main line tracks, another important attribute affecting main line capacity is the type of traffic control system. Railroads in Georgia primarily make use of three different signal systems to control traffic movements on their systems. These are Manual, Automatic Block Signals (ABS), and Centralized Train Control (CTC). Manual (also known as "dark") systems rely on paper- and/or radio-based dispatching techniques, with railroad crews specifically following the permissions given to them by the dispatchers to ensure safe operation and avoid conflicts. This system works best in areas where traffic is limited to a few trains per day, and speeds are limited to less than 49 miles per hour for freight and 59 miles per hour for passenger service. Georgia's signal systems are shown in Figure 4.8 (p. 4-18).

ABS systems also rely on dispatching using paper- and/or radio-based techniques, but provide a layer of safety by automatically indicating the presence of trains in "blocks" located between signals, thus ensuring the safe separation of multiple trains operating over a line segment. With ABS in place, maximum permissible speeds can be up to 80 miles per hour for both freight and passenger. Within the State of Georgia, subdivisions equipped with ABS include the NS Valdosta, NS Albany, CSXT Georgia, CSXT A&WP, and a portion of the GSWR railroad near Columbus.

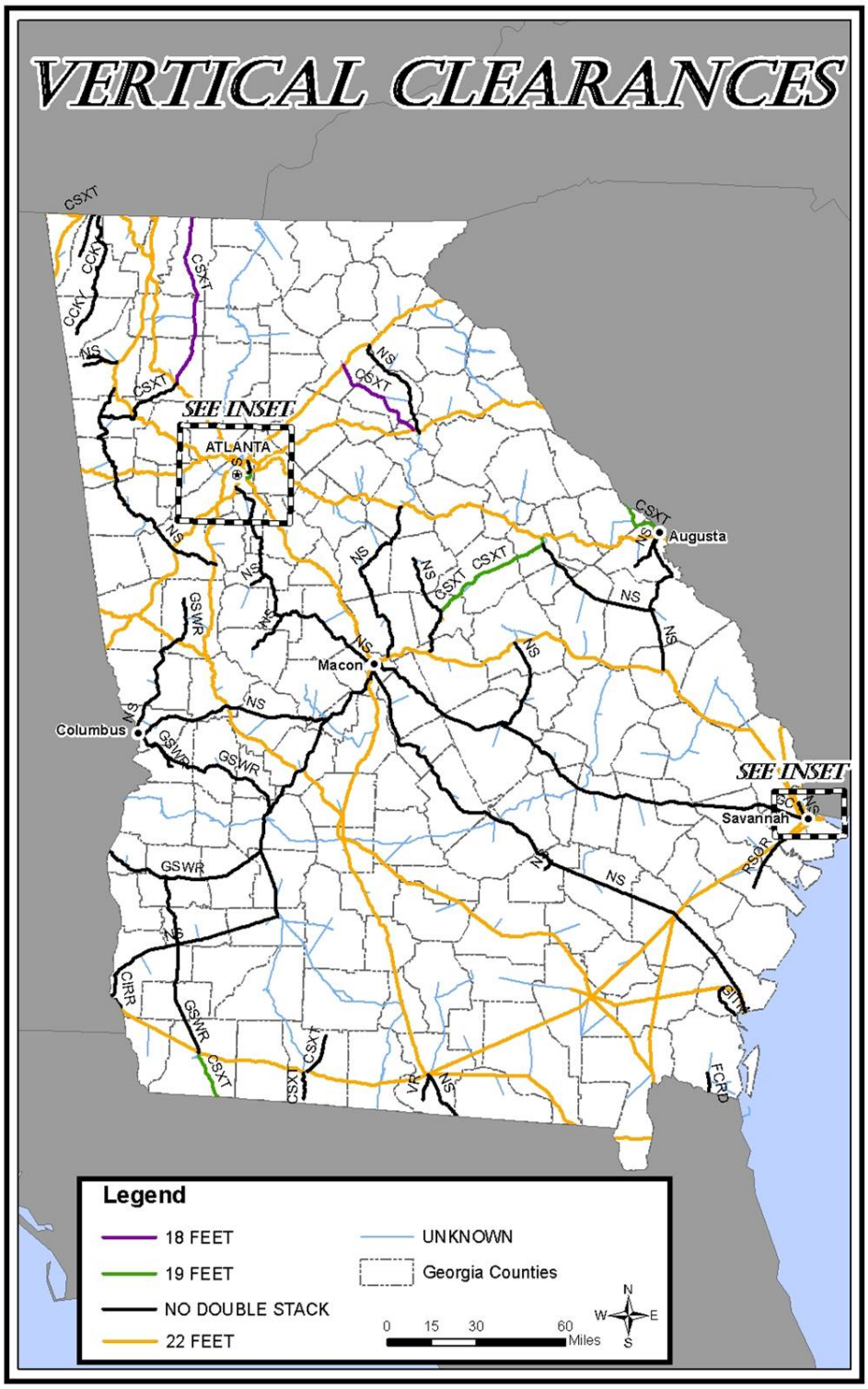
Centralized Train Control (CTC) systems permit the dispatcher to remotely manage train movements by controlling signal indications and train routing over a geographic jurisdiction such as a subdivision or terminal area. CTC is layered on top of an ABS system, which provides occupied block protection. Implementation of CTC leads to considerable capacity improvements, and is almost always taken as a first less costly step when traffic increases call for increased line capacity. CSXT's Fitzgerald, Abbeville, Etowah, W&A, Jesup, and Nahunta Subdivisions, and NS' Atlanta North, Atlanta South, East End, and Greenville-Atlanta Subdivisions are controlled using a CTC system. On the CSXT Thomasville and Camak subdivisions and the NS Brunswick, Cedartown, Griffin, and Savannah subdivisions, switches are changed manually.

Figure 4.5 Classification of Rail Lines by 286,000-Pound Weight Limit



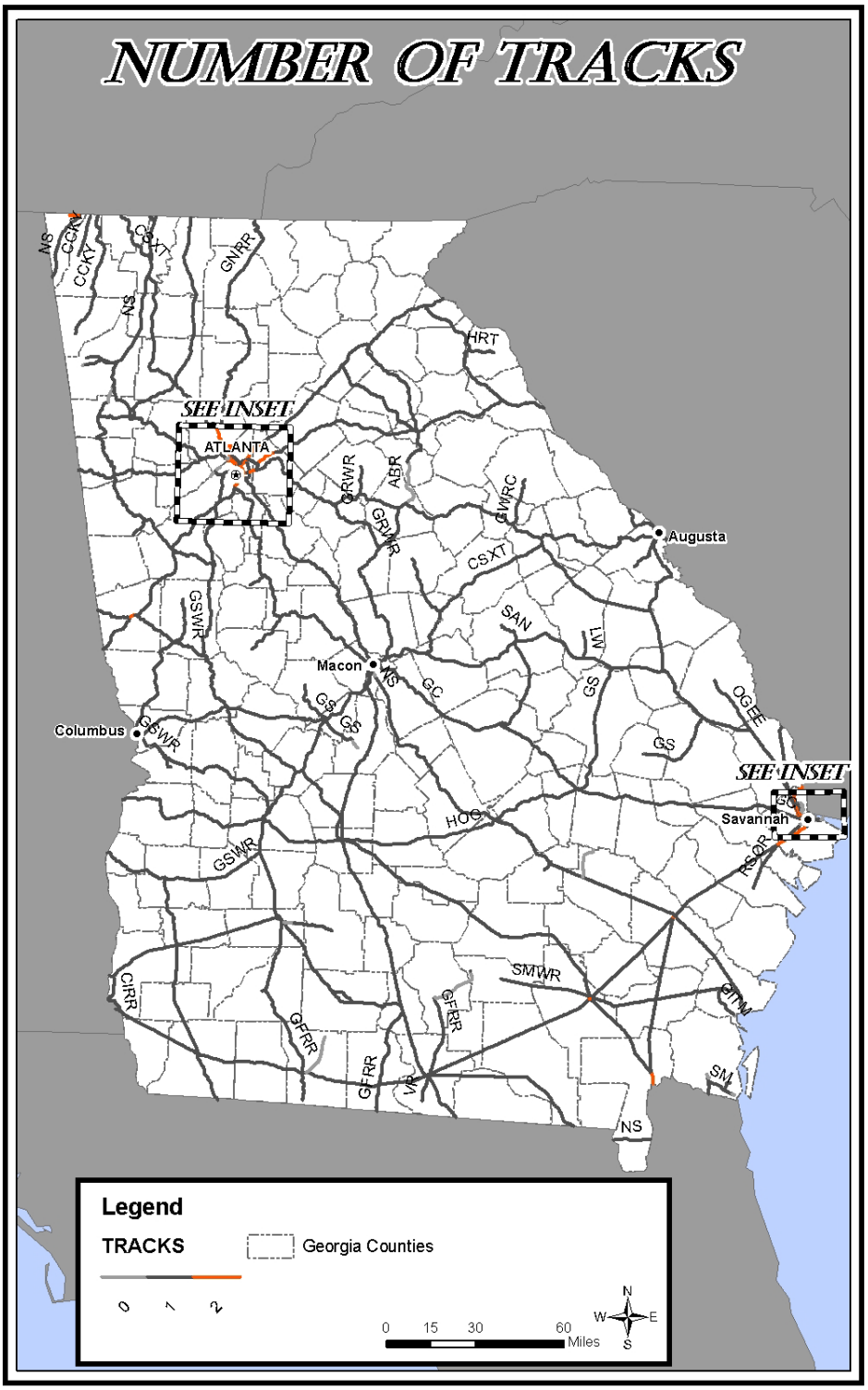

Source: Georgia Statewide Freight and Logistics Plan, 2011.

Figure 4.6 Vertical Clearances for Georgia Rail System



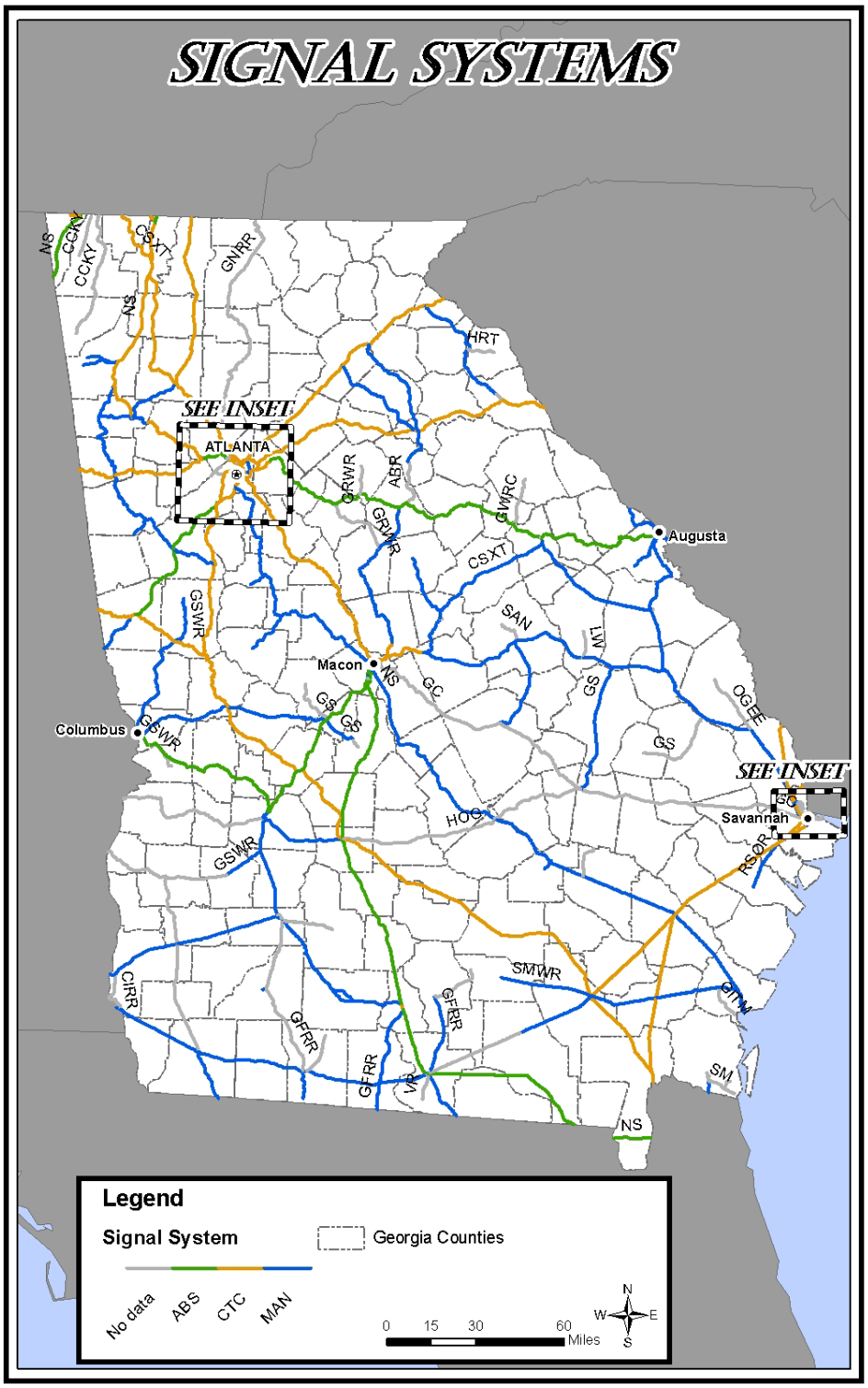

Source: Georgia Statewide Freight and Logistics Plan, 2011.

Figure 4.7 Number of Railroad Tracks for Georgia Rail System




Source: Georgia Statewide Freight and Logistics Plan, 2011.

Figure 4.8 Signal Systems for Georgia Rail System




Source: Georgia Statewide Freight and Logistics Plan, 2011.

# 4.3 USE AND PERFORMANCE FOR FREIGHT

Material presented in this section primarily draws on the 2011 Georgia F&L Plan, which utilized 2007 data as the base year and thus does not reflect the dramatic drop in traffic volumes that took place during the recession that started in the second half of 2008. Since then, overall rail tonnage has recovered to levels within 10 percent of 2007.[24] Not surprisingly, the recovery has been uneven among short-lines, which were particularly hard hit during the recession.

## 4.3.1 Traffic Composition

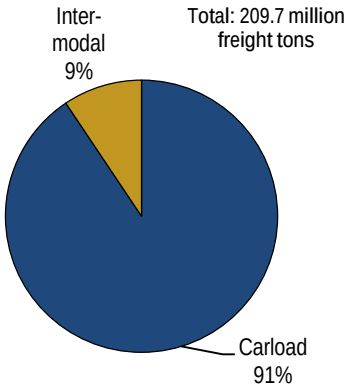
The following sections provide an overview of the nature of the freight traffic handled on Georgia's rail network in terms of commodities, origins and destinations, and flow.

### *Demand by Rail Equipment Type*

In 2007, 91 percent of tonnage was carried in railcars and 9 percent in intermodal equipment, as shown in Figure 4.9 (p. 4-20). However, intermodal containers and trailers accounted for 44 percent of all rail equipment units moved in Georgia, as illustrated in Figure 4.10 (p. 4-20). This disparity between intermodal tonnage and intermodal units is the direct result of the much larger capacity of railcars versus intermodal equipment. A typical modern rail car has two to four times the volume and up to five times the tonnage capacity of a 53-foot highway trailer or container. This effect is compounded further by the tendency of intermodal freight to have a lower density than carload freight, which typically consists of dense bulk products such as coal and grain.

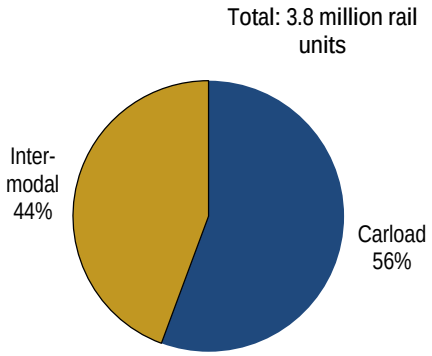
[24] In 2007, Georgia's freight railroads moved 210 million tons of freight valued at $213 billion. By 2011, two years following the depth of the 2008-2009 recession, total rail tonnage handled in Georgia was 189 million tons, or approximately 10% less than in 2007. Source: https://www.aar.org/keyissues/Documents/Railroads-States/Georgia-2010.pdf.

Figure 4.9 Georgia Rail Tonnage by Carload and Intermodal Equipment
*2007*




Source: Georgia Statewide Freight and Logistics Plan, 2011.

Figure 4.10 Georgia Rail Units by Carload and Intermodal Equipment
*2007*



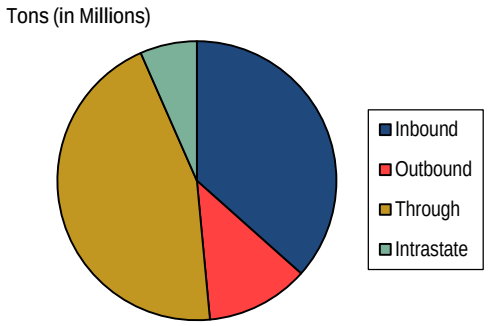

Source: Georgia Statewide Freight and Logistics Plan, 2011.

## *Demand by Direction*

Figure 4.11 (p. 4-21) shows the tonnage inbound, outbound, intrastate and through freight by tonnage and value for 2007. Through movements are the largest type of rail flow, accounting for 94 million tons. Inbound movements amounting to 77 million tons account for a larger share of tonnage than value, reflecting that the primary inbound commodity by tonnage is coal for electricity generation. Much of the coal comes from Kentucky or is transloaded in Memphis from points further north and west as shown in Figure 4.12 (p. 4-21). Outbound shipments accounted for 25 million tons, while intrastate freight represented the smallest proportion of traffic at 14 million tons. Outbound shipments include a wide range of commodities and are destined for a wide range of locations. As shown in Figure 4.13 (p. 4-21), no single destination accounts for more than 10 percent of the total rail outbound flows.

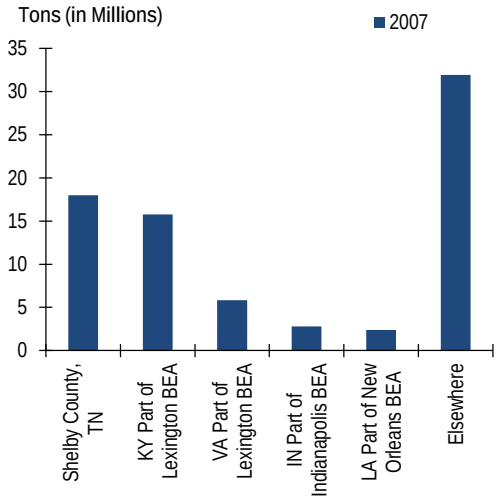
The noteworthy components of intrastate rail include a little over 5 million tons of carload rail between the Port of Savannah and locations across the State, primarily in support of the kaolin industry in Central Georgia. Additionally, there are over one million tons of rail intermodal between the Port of Savannah and the Atlanta metropolitan region. With another roughly 900,000 tons between the Port of Savannah and the Memphis region, over half of the rail intermodal traffic generated at the Port of Savannah goes to or through the Atlanta metropolitan region.

Figure 4.11 Georgia Rail Tonnage by Direction and Year
*2007*



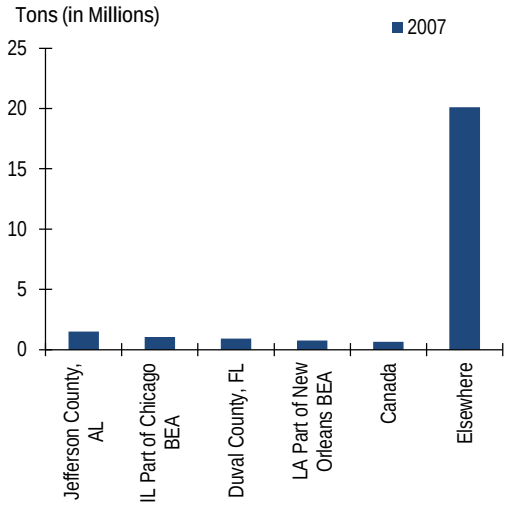

Source: Georgia Statewide Freight and Logistics Plan, 2011

Figure 4.12 Top Rail Origins by Tonnage
*2007*




Source: Georgia Statewide Freight and Logistics Plan, 2011.

Figure 4.13 Top Rail Destinations by Tonnage
*2007*




Source: Georgia Statewide Freight and Logistics Plan, 2011.

### *Demand by Direction and Commodity*

In 2007, commodities moving through the State by rail totaled 94 million tons of freight, which was equivalent to 45 percent of all rail traffic in Georgia. Seventy percent of through traffic was associated with just five commodities, of which the leading single commodity was coal at 24 million tons and 26 percent. The top five inbound commodities by tonnage account for 82 percent of all inbound tons. The largest inbound commodity is coal with over 40 million tons and 50 percent of the inbound share. The two top outbound rail commodities as measured by tons are nonmetallic minerals, and clay, concrete, glass and stone products; each account for about 4.6 million tons or 18 percent of the total.

### *County Rail Freight Production and Attraction*

Figure 4.14 (p. 4-23) depicts the 2007 geographic distribution of Georgia's originating and terminating rail tonnage by county. The leading rail freight originating counties are Chatham County, Washington County, and Fulton County. Shipments from Chatham County exceeded 3.8 million tons annually and are mostly chemicals, freight-all-kinds (i.e., intermodal), pulp and paper, and food products. Washington County primarily ships kaolin much of which is destined for the Port of Savannah. More than 80 percent of the 3.3 million tons originating in Fulton County (Atlanta metro area) are intermodal shipments. Other top freight producing regions in Georgia are Talbot, Jones, and Richmond Counties, shipping between 2.6 and 3.0 million tons each.

The Georgia destination with the highest tonnage is Monroe County, which attracted in excess of 16.6 million tons. Most of this traffic was utility coal destined for Georgia Power's Robert W. Scherer Power Plant in Juliette, which is the fifth largest coal utility plant in the United States.[25] Bartow and Chatham Counties are the next highest destinations for rail tonnage, each accounting for more than 10 million tons. Shipments to Bartow County are largely coal, while shipments to Savannah (Chatham County) are diverse, including kaolin, freight-all-kinds (i.e., intermodal), pulp and paper, empty shipping containers, and chemicals. Fulton County is a top destination attracting over 7.4 million tons annually of freight-all-kinds, food, clay, concrete, glass or stone, nonmetallic minerals, chemicals, and transportation equipment.

While the overall significance of small railroads may appear to be modest at 1.3 percent of all rail traffic, 6.3 percent of carloads originated in Georgia start their trip on a short-line.

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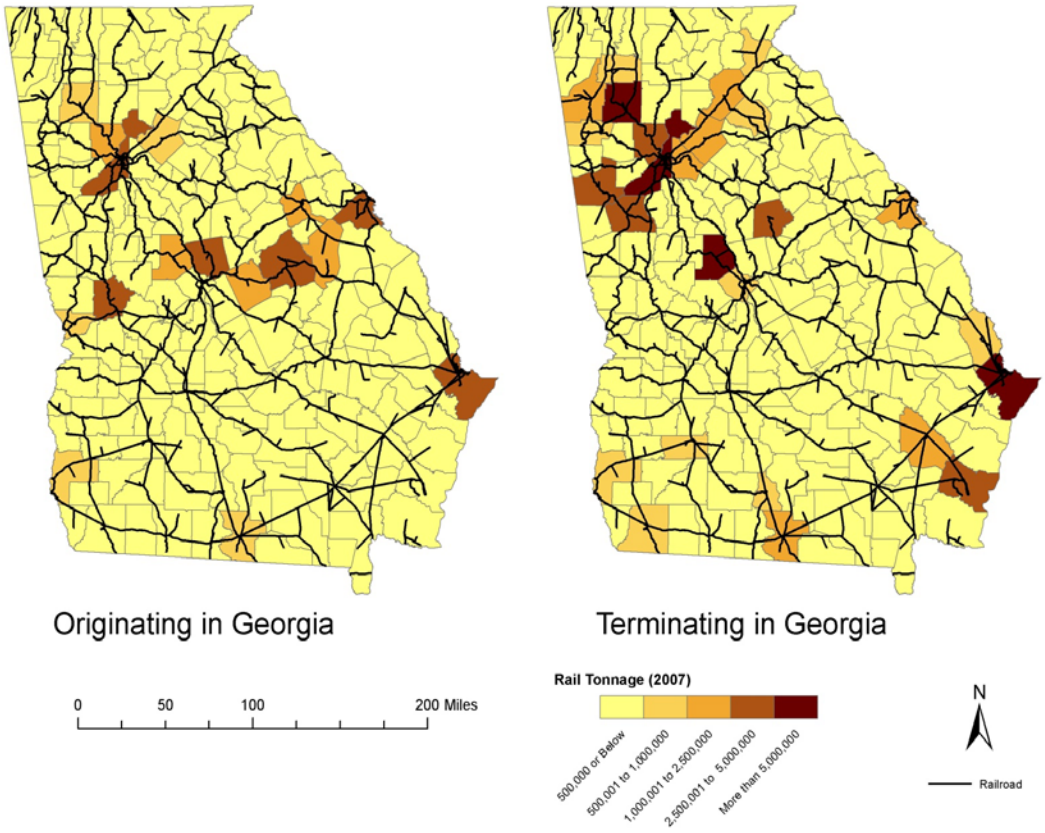
[25] http://www.eia.gov/energyexplained/index.cfm?page=electricity_in_the_united_states#tab3.

Figure 4.14 Rail Tonnage Originating and Terminating in Georgia Counties *2007*



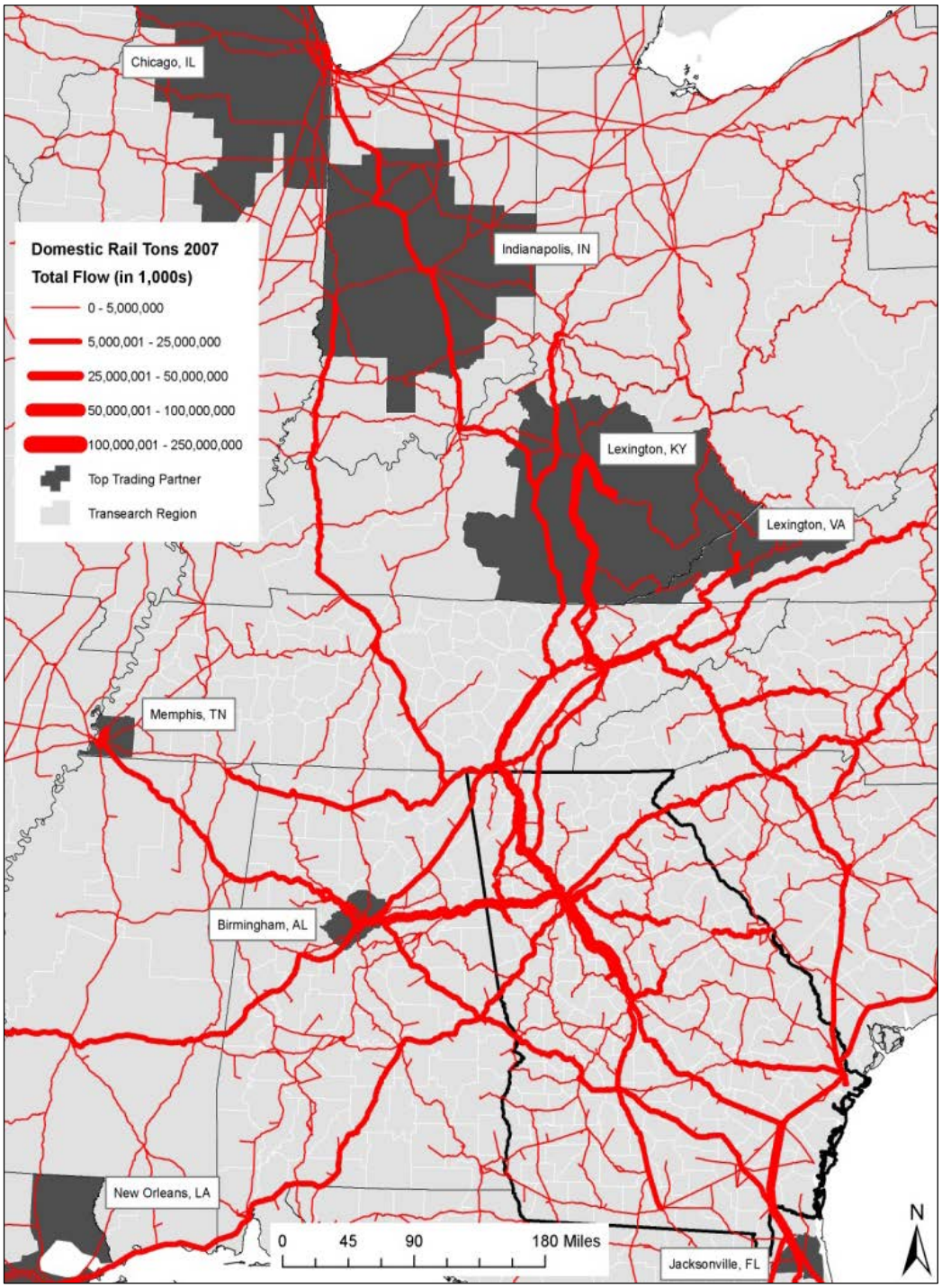

Source: Georgia Statewide Freight and Logistics Plan, 2011.

## 4.3.2 Regional Rail Flows

As noted previously, Georgia's and the Southeast's rail network built up around Atlanta, with direct routes to the major trade centers. As Figure 4.15 (p. 4-24) illustrates, this pattern is evident with the high volume of traffic, including through, that traverses Georgia's rail network. Rail traffic density is most heavily concentrated on lines leading to Atlanta, with routes linking the Midwest, Atlanta, and Florida having the heaviest traffic flows. The largest single commodity in terms of tonnage consists of coal brought in to Georgia from Appalachia, the Illinois Basin, and the Powder River Basin (PRB) for purposes of electricity generation. Routes toward the Northeast have more modest volumes.

Among Georgia's largest trading partners are the regional gateways (Chicago, Memphis, Meridian, and New Orleans) where traffic is interchanged between the big eastern railroads (NS and CSXT) and the big western railroads (BNSF, Kansas City Southern, and Union Pacific). Southern Indiana and the combined Lexington BEA are suppliers of utility coal. Georgia also hosts a considerable volume of through traffic that originates or terminates in Florida, passing through Georgia from the Midwest.

Figure 4.15 Georgia Rail Flows and Top Trading Partners
*2007*




Source: Georgia Statewide Freight and Logistics Plan, 2011.

# 4.4 MAJOR ISSUES AND CONCERNS

Georgia's rail system has largely been able to keep up with capacity demands. The Class I railroads have and are making substantial ongoing investments in their physical plant, as they move to exploit commercial opportunities that produce an acceptable financial return. This includes ongoing reinvestment in infrastructure to maintain a state of good repair, facility expansions, adoption of new technologies to improve efficiencies and service performance, and major investments in the Federally mandated Positive Train Control (PTC) system. Also underway are major new market initiatives, such as Norfolk Southern's Crescent Corridor project, a package of infrastructure improvements, and new services that aim to attract new business in currently unserved markets.

The long-term viability of Georgia's rail system will be contingent on addressing certain infrastructure deficiencies, most notably substandard weight limits and vertical clearances, as well as a lack of additional main line track, expanded terminals, and a need to improve traffic management systems. These restrictions will limit the system's capability to accommodate higher volumes and the types of services that would appeal to a more diverse range of existing and potential rail customers. Several of these issues disproportionately affect short-lines, due to their smaller volumes, traffic mix, and weaker capital structure.

Key issues facing Georgia's railroads are described in the following sections, with a focus on those that are most germane to the SWTP/SSTP Update.

## 4.4.1 Physical Constraints

Physical constraints have been largely discussed in previous sections. This includes weight limits, vertical clearance, and the presence or lack of signal systems. In addition, there are some specific system bottlenecks that need to be addressed, as well as the more general issue of track capacity.

### *Rail System Bottlenecks*

The 2009 GDOT State Rail Plan and the I-95 Corridor Coalition Southeast Rail Operations Study, Phase 2 (SEROps II) identified specific bottlenecks along certain corridors and within yards. In both studies, the Atlanta metropolitan area was identified as having most of the bottlenecks in the State due to congestion at yards, mainlines, and junctions. Congestion in Atlanta impacts rail service throughout the Southeast, due to its function as the primary rail hub in the region. Particularly impacted is the CSXT Etowah, W&A, Abbeville, and Manchester subdivisions and the NS East End Subdivision, which can have far-reaching impacts on freight movement through large portions of Georgia and into South Carolina, Tennessee, and Alabama.

Howell Junction, located in northwest Atlanta, was identified as being the most critical bottleneck. The junction is an at-grade intersection of five rail lines that handles approximately 100 CSXT and NS freight trains daily, along with Amtrak's

daily Crescent passenger service (see Section 4.5). While improvements to Howell Junction will eventually be necessary to maintain the flow of freight traffic, additional passenger service operating through the junction, as envisioned with the construction of a new multimodal center located downtown and startup of a new regional passenger rail service, also will require action.

In the central and southern regions of Georgia, NS identified its Savannah Subdivision between Macon and Savannah, including the Macon Terminal area as a bottleneck due to recent and anticipated growth in port-related traffic. CSXT identified the Nahunta Subdivision between Waycross and Jacksonville, the A-Line between Savannah and Florida, and the "Bowline" between Montgomery, Bainbridge, and Waycross as having current and emerging capacity issues.

### *Track Capacity*

With more than 95 percent of Georgia's main lines consisting of single track with passing sidings, there is little capacity along some of the major corridors for increased train volumes. These constraints become particularly acute if additional passenger train service is desired, due to the requirements to adhere to a reliable schedule and the variations in speeds between passenger and freight trains. Subdivisions that are likely to become especially constrained include the NS Atlanta North, Atlanta South, and Brunswick subdivisions, and the CSXT Etowah, Fitzgerald, and Manchester subdivisions.

### *Weight Limits and Vertical Clearance*

Portions of Georgia's rail infrastructure cannot accommodate the standard 286,000-pound railcar capacity. This includes a few short sections of Class I railroad trackage, and significant short-line mileage. Similarly, competitive intermodal service requires the ability to handle double-stack containers, 19 feet 6 inches for international doubles and tri-level auto racks, and 22 feet 6 inches for unrestricted domestic double-stack. In Georgia, the CSXT and NS networks are cleared for double-stack service, with a few exceptions of mostly short-branch lines. In contrast, many short-lines do not even have 19 feet 6 inches clearance. However, clearances are a far less critical issue for short-lines than rail car weight, which has much more of impact on their core traffic.

## 4.4.2 Short-Lines

The primary driver affecting short-line performance is volume and the associated revenues. Without sufficient volume, a short-line will struggle to survive over the long term, and will be unable to maintain and renew its infrastructure. Deteriorated infrastructure results in poorer service and higher operating costs, which in-turn can further dampen demand. The performance and prospects of the short-line sector are complex, of which select elements are highlighted in this section. These issues range from physical conditions to public policy, evolving economies and transportation markets, and institutional constraints.

Among many short-lines, track and other infrastructure is less well maintained than at the large railroads, with lighter weight rail, inferior tie and ballast conditions, and no active signaling system. As a result, mainline trains speeds are lower, typically 40 miles per hour or less, operations are far less automated, and some lines are unable to accommodate heavier modern rolling stock. While such conditions may be adequate for existing traffic, as the needs of customers change and new ones are recruited, substandard conditions will impede the long-term viability of a route. With the large railroads moving to 286,000 pounds as the standard maximum car weight, the ability to handle modern rolling stock has become a particular concern; the competitive position of short-lines that are unable to efficiently handle this equipment will be substantially compromised.

The needs of short-lines to improve infrastructure has been acknowledged at the Federal level as well as in many states. Since 2005, a Federal investment tax credit specifically directed at short-lines (Section 45G of the U.S. tax code) has been available that provides a direct credit of up to 50 percent of capital investments. However, in Georgia, support has been on an ad hoc basis, and primarily on the state-owned properties.

Particularly important to short-lines are the ongoing pressures to adopt a general increase in the maximum permissible weights for trucks. Short-lines are likely to bear the brunt of policy changes in this arena, given their heavy orientation toward small volume carload traffic. Also noteworthy has been the substantial build-up of Federal safety regulations in the past five years. These include new mandates to implement Positive Train Control (see below), reporting requirements for bridges, and other safety-related changes.

Mirroring the North American system, the performance of Georgia's rail system is reliant on the efficient cooperation of the rail carriers for its overall success. Small railroads, with their narrow geographic coverage, must rely heavily on connecting carriers to serve the market needs of their customers, and achieve financial and operational success. Central to these relationships are the agreements between short-lines and their Class I connections. A short-line may or may not have independent rate-making authority (i.e., the ability to negotiate its own revenue levels for local and interchanged traffic). If carloads were interchanged with one or more railroads, traditionally each rail entity would be entitled to individually establish a rate for its participation in handling a shipment. In the case of several short-lines in the State, this ability to make rates is superseded or preempted by agreements with their Class I connections. These agreements, which were established when the line was spun off by the former Class I owner, often restrict independent rate-making, car supply, and the interchange of cars to the line's original owner, even if connections to other carriers are available. These and other restrictions create what has become known as a "captive" short-line.

### 4.4.3 Positive Train Control

Positive Train Control (PTC) refers to technology that is capable of preventing train-to-train collisions, overspeed derailments, and casualties or injuries to

roadway workers. The technology combines GPS locating of all trains, infrastructure switches, crossings, and junctions; computer cataloging of speed restrictions and traffic conditions; and wireless communications between all operating units, including engineers, dispatchers, and work crews. The Rail Safety Improvement Act of 2008 (RSIA) mandated the widespread installation of PTC systems by December 2015 on all lines handling passenger trains or hazardous materials, essentially the majority of the entire national rail system. In Georgia, CSXT's and NS's main lines, along with a few segments of short-lines, will require installation of PTC. The substantial financial demands placed on the Class I railroads to implement PTC has resulted in the diversion of capital from other potential investments, including those that would directly benefit capacity and service.

## 4.5 PASSENGER RAIL

This section provides an overview of the existing passenger rail services. At present, all passenger rail services operating within Georgia are provided by Amtrak, of which there are four routes:

- Crescent – from New York through Atlanta to New Orleans;
- Palmetto from New York terminating in Savannah;
- Silver Service (Meteor and Star) – from New York through Savannah terminating in Miami; and
- Auto Train – from Lorton, Virginia to Sanford, Florida through Savannah without stopping.

All of these trains are Amtrak long-distance trains, and thus are not subject to the provisions in Section 209 of the 2008 Passenger Rail Improvement and Investment Act (PRIIA) that shift responsibility for funding intercity services of up to 750 miles in length to host states.

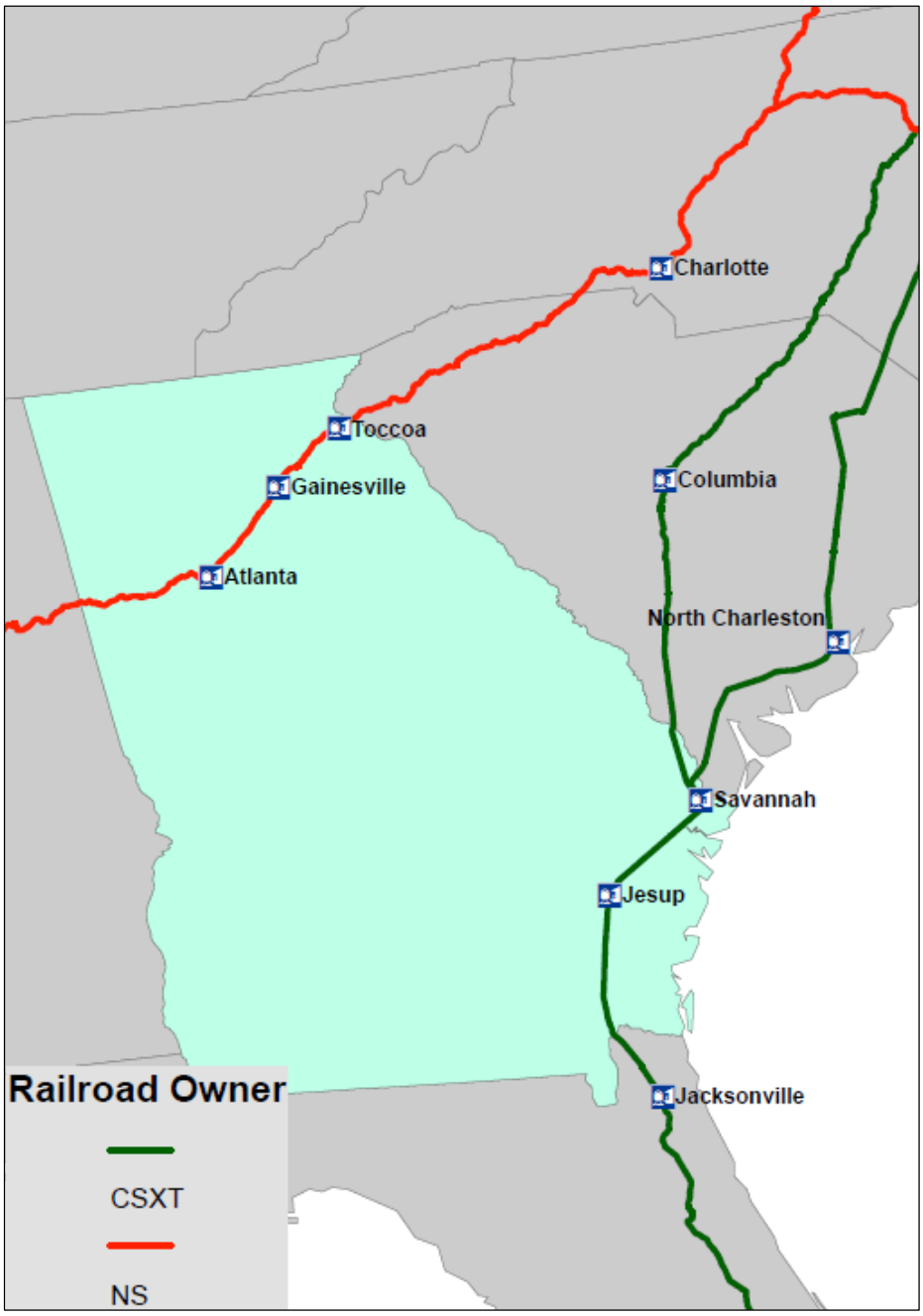
At present, there is no regional or commuter service operating in Georgia, although several services have been proposed in recent years.

### 4.5.1 Inventory of Facilities

Passenger trains operate over two rail corridors in Georgia, as shown in Figure 4.16 (p. 4-30). The northern corridor through Atlanta connects to Greenville, Charlotte, and points north and Birmingham to New Orleans to the Southwest. The northern corridor is owned by NS and consists of 157 track miles within Georgia.

The Atlantic corridor is owned by CSXT and consists of 156 track-miles within Georgia. The corridor consists of one route south from Savannah to Jacksonville, Tampa, and Miami, Florida. North of Savannah, the route splits, with one train operating through Columbia, South Carolina and Cary and Rocky Mount, North Carolina and on to Richmond, Washington, D.C., and New York. The other more eastern route travels through Charleston, South Carolina and Fayetteville, North Carolina before rejoining the western route at Rocky Mount.

Figure 4.16 Georgia Existing Passenger Rail Stations and Lines by Owner




Presently, Amtrak trains call at five stations in Georgia. The Atlanta and Gainesville stations are both owned by NS, while the other stations are locally owned. Plans are in place to relocate the Atlanta station stop about a mile south of the existing station in Atlanta's Brookwood neighborhood to the area of downtown known as "The Gulch." The planning for the MMPT is currently in the National Environmental Impact Statement (EIS) phase.

### 4.5.2 Capacity

Both northern and southern passenger rail corridors consist of a mix of single and double track. There are active freight sidings and rail yards along both lines. North Carolina is adding double track and removing at-grade crossings as well as improving service between Raleigh and Charlotte through the Piedmont Improvement Program. The Crescent line uses the same tracks from Greensboro to Charlotte and should see an improvement in reliability once this project is complete in early 2017.

Ridership demand on the *Crescent* between Atlanta and Washington, D.C. exceeds train capacity, according to the September 2011 PRIAA Section 210 report of the *Crescent* and *Silver Service*. Ridership demand on the *Crescent* south of Atlanta drops off and there is excess capacity on the line. The PRIAA report proposed dropping cars at Atlanta southbound and attaching them to the northbound train. This has not yet been implemented, in part due to the issue of storing the cars for servicing until the northbound train arrives.

The capacity of Amtrak's eastern long-distance passenger trains has been constrained by the number of available single-level sleeper cars. These cars are used on the long-distance corridors connecting to the Northeast, including the *Crescent* and *Silver Service* operating through Georgia, because vertical clearance limits on the Northeast Corridor preclude the use of double-level cars that are utilized on most other long-distance trains. In 2010 Amtrak ordered 130 Viewliner II passenger cars to augment the number of sleeper cars and to replace dining and baggage cars built in the 1940s and 1950s. The older cars are limited to a maximum speed of 110 miles per hour, which is less than the desired operating speed of 125 miles per hour over the Northeast Corridor. By replacing these cars, Amtrak can boost the efficiency of Northeast Corridor operations by standardizing train operations between conventional and high-speed (Acela) trains. Delivery is expected to begin in late 2013 and conclude by 2015.

The 2011 PRIAA report proposed connecting Macon, Georgia and Columbus, Georgia to the *Crescent* via thruway bus service. Thruway bus service is a way to build up a ridership base for future rail service. However, thruway bus service to the current Atlanta station is limited by available curb space. Moreover, any additional northbound riders from a thruway bus service could not be served without additional coach capacity. This service has not yet been implemented.

Similar to the *Crescent*, ridership demand for the *Silver Meteor* exceeded capacity during the summer peak travel season. In 2011, Amtrak added another coach to the *Silver Meteor* which led to a noticeable increase in ridership.

### 4.5.3 Use

The five Amtrak routes that operate in Georgia are shown in Table 4.4 (p. 4-32). Figure 4.17 (p. 4-33) shows the average annual Amtrak ridership activity to/from/through Georgia on all Amtrak routes except for the Auto Train. The total ridership on the route within each state is indicated by the thickness of the lines and the total passenger activity (boardings and alightings) is indicated by the size of the station marker.

The Atlantic corridor routes carry the majority of riders through Georgia, although the share of Georgia riders, shown in Table 4.5 (p. 4-34), is higher on the *Crescent* than on the combined *Silver Service/Palmetto* routes.

Atlanta and Savannah are by far the two busiest stations in Georgia as shown in Table 4.6 (p. 4-34). The remaining three stations represent less than 10 percent of the total passenger activity. Approximately 74 percent of Amtrak ridership in Georgia is through traffic with an origin and destination outside of Georgia.

Table 4.4 Current Amtrak Service in Georgia

| | Route Length (Miles) | | | |
|---|---|---|---|---|
| Route | Overall | Within Georgia | Frequency | Termini |
| Crescent | 1,377 | 157 | Daily | New York – New Orleans |
| Silver Star | 1,480 | 144 | Daily | New York – Miami via Columbia, South Carolina and Tampa, Florida |
| Silver Meteor | 1,348 | 124 | Daily | New York – Miami via Charlestown, South Carolina |
| Palmetto | 829 | 12 | Daily | New York – Savannah via Charlestown, South Carolina |
| Auto Train | 855 | 124 | Daily | Lorton, Virginia – Sanford, Florida |

Source: Amtrak schedule; Route length in Georgia calculated from FRA rail network, includes one northbound and one southbound trip per day.

Figure 4.17 Georgia Amtrak Ridership Activity by Corridor and Station

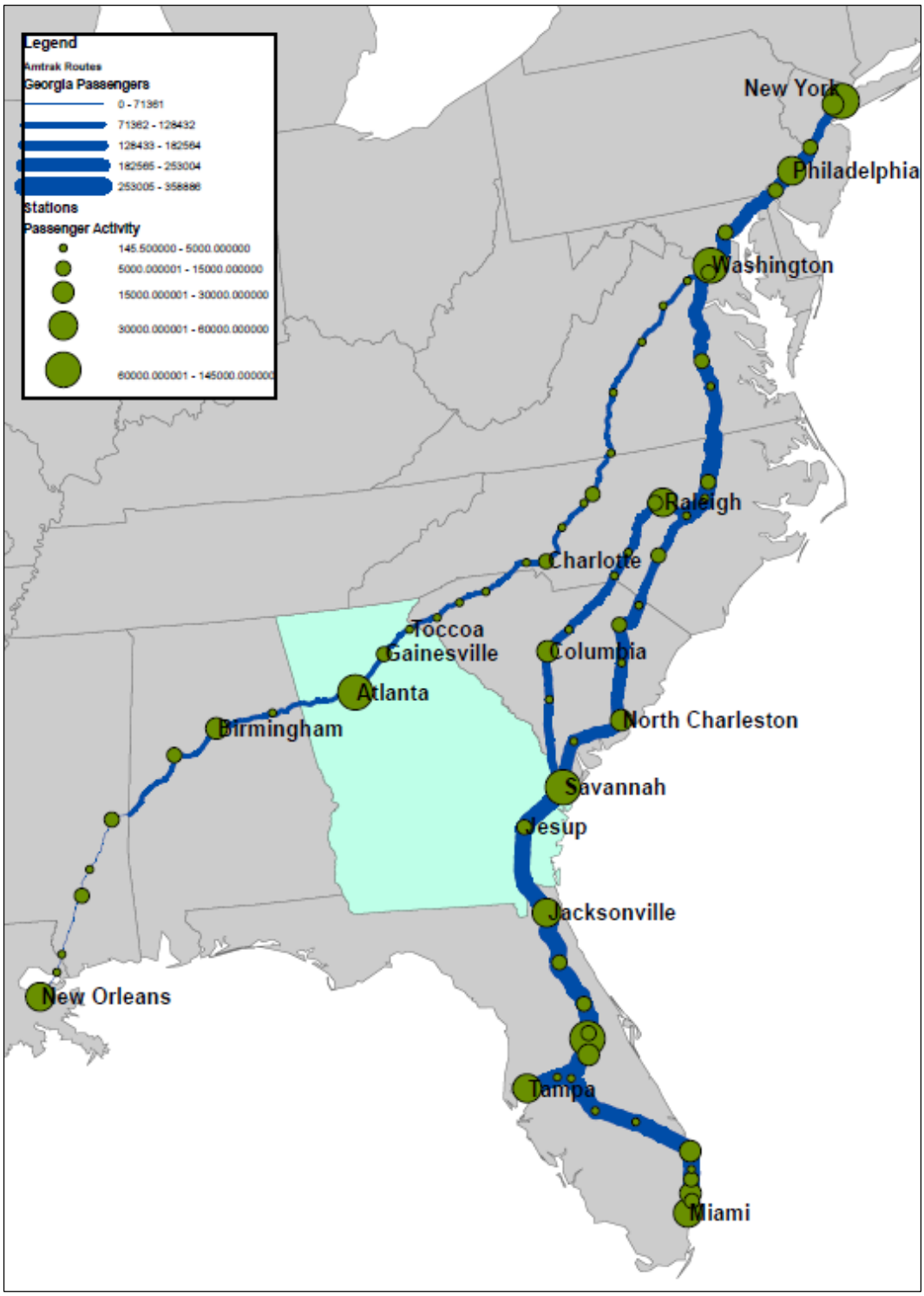



Table 4.5 Amtrak Service Georgia Ridership

| Route | Average Annual Ridership (FY 11-12) | Percent within Georgia |
|---|---|---|

| | Total | Within Georgia | |
|---|---|---|---|
| Crescent | 304,176 | 168,635 | 55% |
| Silver Service/Palmetto | 996,966 | 399,306 | 40% |
| Auto Train | 262,020 | 0 | 0% |

Source: Amtrak (August, 2013).

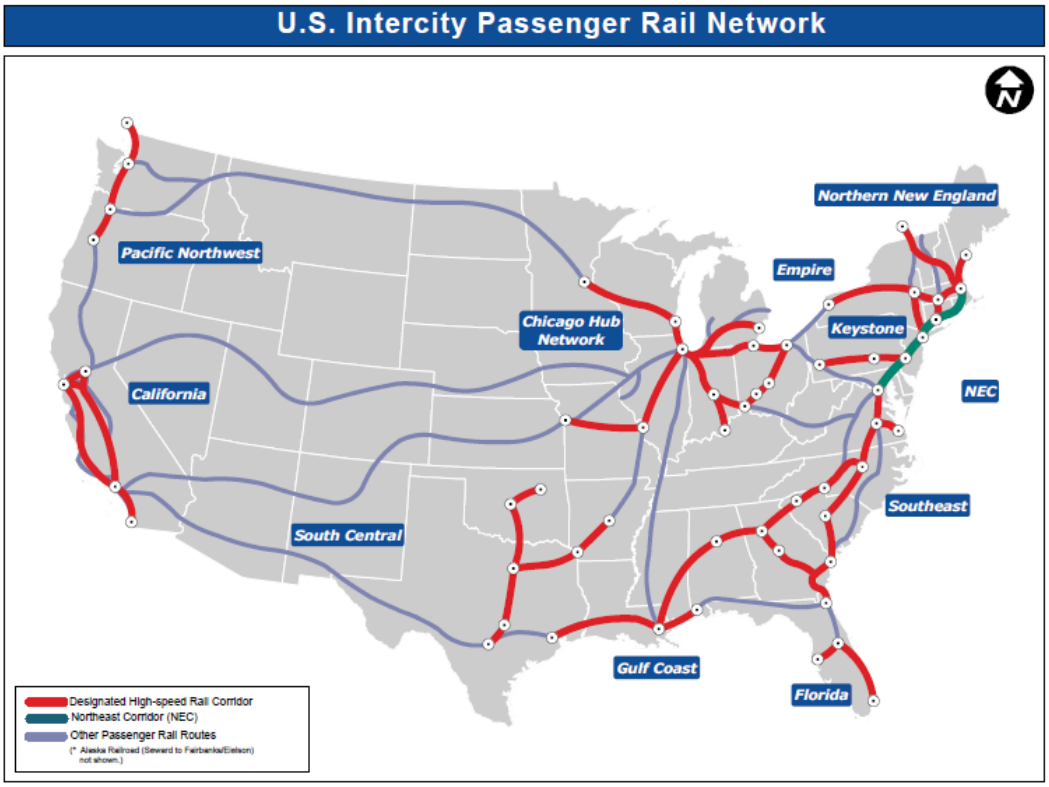
## Table 4.6 Passenger Activity by Station

| Station | Average Passenger Activity (FY 11-12) |
|---|---|
| Atlanta | 109,896 |
| Gainesville | 6,054 |
| Toccoa | 3,436 |
| Savannah | 70,850 |
| Jesup | 9,998 |

Source: Amtrak (August, 2013).

Several rail service studies have been completed since the GDOT 2009 State Rail Plan. GDOT's March, 2012 High-Speed Rail Planning Services study analyzed three corridors within Georgia for High-Speed Rail (see Figure 4.18 (p. 4-35)). Georgia is part of the Southeast High-Speed Rail (SEHSR) Coalition and GDOT has led planning activity on the three corridors and an additional corridor through Tennessee to Louisville, Kentucky.

Figure 4.18 High-Speed Rail Strategic Plan Designated Corridors




Source: U.S. Department of Transportation, Federal Railroad Administration, RPD, High-Speed Passenger Rail report, available at http://www.fra.dot.gov/Elib/Document/1468 as of August 2013.

North Carolina has been improving railroad facilities along the designated SEHSR corridor that, once completed, will improve the travel time and reliability for Amtrak routes that serve Georgia. Currently, double track is being constructed on the railroad between Greensboro and Charlotte, North Carolina where the *Crescent* route operates. The Selma to Raleigh segment, where the *Silver Star* operates, has been upgraded to allow maximum speeds of 79 miles per hour, up from 59 miles per hour.

Virginia and North Carolina completed a Tier II EIS report in 2012 for the Richmond, Virginia to Raleigh, North Carolina segment of the SEHSR corridor. The *Silver Meteor, Auto Train,* and *Palmetto* use most of this segment and the *Silver Star* uses the entire segment. The improvements proposed in the EIS report would improve travel time and reliability across all of these routes.

GDOT is leading the Atlanta to Charlotte Passenger Rail Corridor Investment Plan (PRCIP). Tier I of the Environmental Impact Statement (EIS) is underway and a Record of Decision is scheduled for fall 2015.

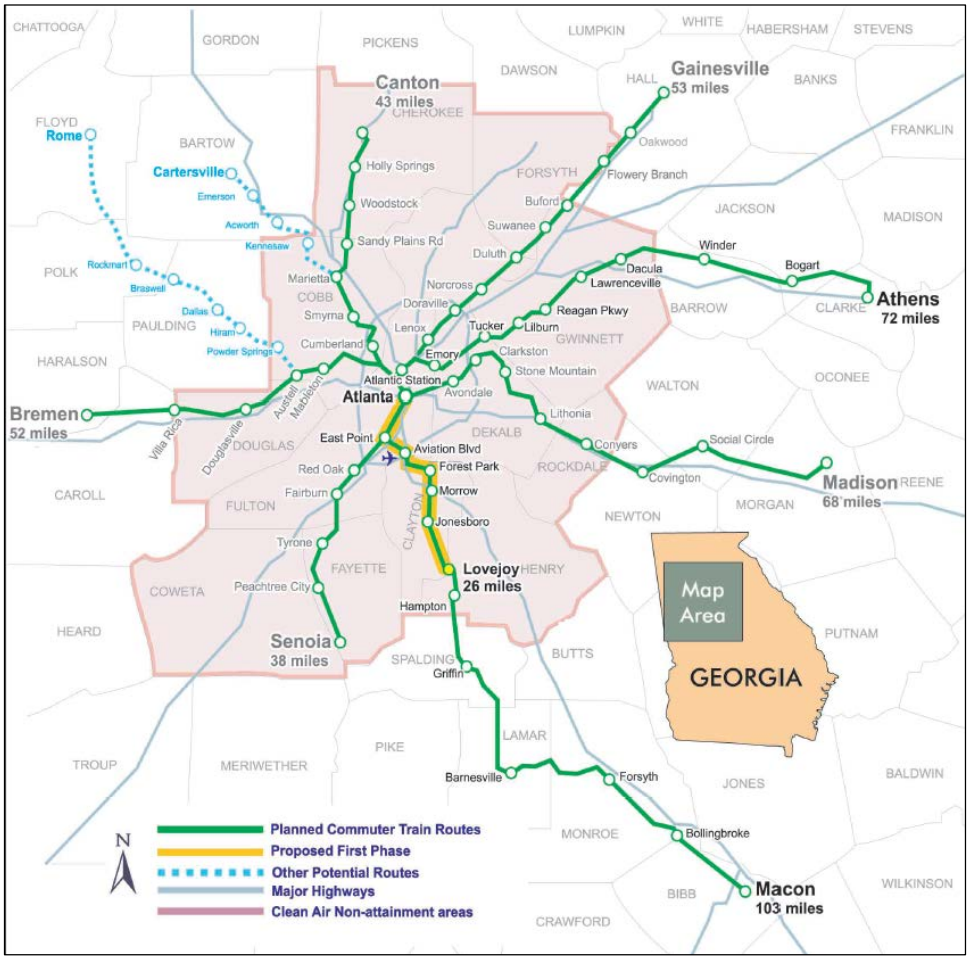
GDOT also commissioned a study, completed in 2012, to evaluate High-Speed Rail operations on three corridors:

- Atlanta to Birmingham, Alabama;
- Atlanta to Macon to Jacksonville, Florida; and
- Atlanta to Chattanooga and Nashville, Tennessee, to Louisville, Kentucky.

The study concluded that HSR on all three corridors is feasible and recommended that Tier I NEPA Document and Service Development Plans be pursued for each. At this time, NEPA analysis and planning has not yet begun.

The Georgia Rail Passenger Program (GRPP) defined a series of potential Atlanta commuter rail lines, shown in Figure 4.19. Service between Lovejoy and Atlanta is proposed to be the first phase.

## Figure 4.19 Proposed Atlanta Commuter Rail Service




Source: Georgia Department of Transportation, available at: http://www.dot.ga.gov/travelingingeorgia/rail/Documents/CommuterRailMap.pdf as of August 2013.

A transportation referendum (known as T-SPLOST) which would have raised sales taxes by 1 percent to fund regional transportation projects was voted down last year in 9 of Georgia's 12 regional commission districts. The district containing the 10 core counties of the metropolitan Atlanta area was among those that rejected the referendum. As a result, the current future of GRPP is unclear.

### 4.5.4 Performance

At present, all regular passenger rail services in Georgia are operated by Amtrak as system trains. Thus, GDOT has minimal influence over their operation, train composition, schedules, station stops, etc. Given that these services are hosted by the Class I railroads on track that is primarily used by freight trains, they are also subject to many of the issues identified in the Freight Rail sections. These include capacity constraints that affect reliability and travel times (such as at Howell Junction in Atlanta), and limited flexibility in making schedule and other service adjustments. Furthermore, increases in frequency or improvements in speeds that are being contemplated will incur significant up-front costs to compensate the owning railroads for the necessary capacity to ensure that freight services are not impacted. Thus, any actions beyond minor adjustments, such as increasing train lengths to accommodate higher passenger volumes, will require significant funding.

A 2012 FRA *Analysis of Amtrak Delays* report summarized the following primary causes to Amtrak delays:

- Slow orders due to poor track conditions;
- Capacity utilization (congestion);
- Host effects – owner of railroad dispatching freight trains;
- Crew changes (turn points);
- Cumulative delays (late arrival of previous train causes further delays, i.e., not enough turn time); and
- Mechanical problems.

Table 4.7 (p. 4-38) shows the on-time performance for the Georgia routes from June 2012 to June 2013. *Track and Signals* and *Train Interference* are the most common causes of delay on all routes. Amtrak has little control over these delays because they occur on tracks owned by freight railroads and the interference is most often associated with freight trains. The only delay cause that Amtrak has direct control over is *Operational* delays, which are train crew and schedule-related delays.

Table 4.7 Georgia Amtrak On-Time Performance (June 2012-June 2013)

| | Crescent | Silver Service/Palmetto | Auto Train |
|---|---|---|---|
| On-Time Performance | 71.4% | 60.2% | 81.0% |
| Delay Cause 1 | Train Interference (33.6%) | Track and Signals (31.2%) | Train Interference (52.0%) |
| Delay Cause 2 | Track and Signals (26.7%) | Train Interference (30.0%) | Track and Signals (25.1%) |
| Delay Cause 3 | Operational (12.7%) | Passenger (15.5%) | Weather (10.2%) |

Source: Amtrak web site.

Moving forward, the primary constraint facing passenger service is the availability of funding to undertake improvements and support ongoing operations of increased or new intercity and regional services. Other southeastern states, including Virginia, North Carolina, and Florida, have actively supported the development of passenger services by leveraging Federal funding through a combination of state and local funding. A passenger rail program in Georgia would require similar strategies.

The linchpin to expanded service in Georgia is the development of a larger and more centrally located train station in Atlanta coupled with improvements to Howell Junction. As discussed previously, this development would allow additional intercity and regional services, and provide efficient means to add capacity to the *Crescent* between Atlanta and the Northeast.

# 5.0 Bicycle and Pedestrian

## 5.1 INVENTORY OF FACILITIES

The Georgia Department of Transportation (GDOT) is committed to a Complete Streets approach of "routinely incorporating bicycle, pedestrian and transit (user and vehicle) accommodations into transportation infrastructure projects as a means for improving mobility, access, and safety to the traveling public."[26] As such, GDOT works with local governments and regional agencies to ensure that bicycle, pedestrian, and transit needs are met through coordination from project planning through project construction. Due to the scale and trip length for most pedestrians and cyclists, needs for nonmotorized transportation are generally identified and sponsored at the regional and/or local level. GDOT supports the incorporation of bicycle, pedestrian, and transit facilities along State-maintained facilities when specific GDOT warrants for pedestrian, bicycle, and transit accommodation are met.

As a percentage of total travel, bicycle usage, and walking remains a small, but growing, component of the nation's transportation system. According to the U.S. DOT's *National Walking and Bicycling Study: 15-Year Status Report* (2010), between 1990 and 2009, there was an increase in both the number and percentage of bicycling and walking trips across the U.S., from 7.9 percent in 1990 to 11.9 percent in 2009. Similarly, the study found that there has been a 25 percent increase in both bicycling and walking trips since 2001. The statistics for Georgia are estimated to be similar, if perhaps somewhat lower, than the national numbers. Funding also continues to challenge the growth of the State's pedestrian and bicycle networks; however, certain local governments have developed policies and targeted more funding toward nonmotorized transportation.

This section presents a broad statewide summary of the existing conditions of Georgia's bicycle and pedestrian systems. None of the MPOs or GDOT were found to maintain historical inventories of bicycle or pedestrian facilities, therefore trends in the number of facilities or associated mileages across the State since the last update of the SWTP in 2006 are not available.

### 5.1.1 Bicycle Infrastructure

Regardless of the presence of bicycle accommodations, bicyclists are legally allowed on any roadway other than those that specifically exclude nonmotorized modes of transportation (e.g., in Georgia, bicycles are not permitted on Interstates). However, many bicyclists prefer roads with bicycle infrastructure, which includes signed shared roadways, bicycle lanes, paved shoulders that are considered "bikeable," and shared-use path facilities.

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[26] *GDOT Design Policy Manual Revised 8-23-13;* Chapter 9 – Complete Streets Design Policy.

GDOT adopts the design standards of the American Association of State Highway and Transportation Officials (AASHTO) *Guide for the Development of Bicycle Facilities*. Signed, shared roadways are those that have directional signage indicating that the road is a designated bicycle facility. These facilities may have additional infrastructure such as bicycle lanes or paved shoulders, or may only have signage indicating that the road is to be shared with bicycles. Figure 5.1 shows an example of a signed bicycle route.

Figure 5.1 Example of Signed Bicycle Route

Bicycle lanes are GDOT's preferred bicycle facility type.[27] These are on-road, one-way lanes adjacent to vehicular traffic, to be used for bicycle travel. The minimum standard calls for bicycle lanes to be at least four feet in width. On roadways that do not have curb and gutter, the paved shoulder may be the designated bicycle facility. Shoulders that are considered bikeable are those that have at least four feet of pavement.

Shared-use paths can be both stand-alone or travel within the roadway right-of-way physically separated from vehicular traffic. These shared-use paths are designed similarly to roadways but at a smaller scale, in that they are designed for

[27] "Bicycle lanes and related improvements shall be incorporated into all widening and reconstruction projects when there is an existing bikeway or if the project is on an approved Bicycle Route. The term "Bicycle Route" is defined as "any roadway where there is an existing bikeway or any location where a bicycle facility is identified for such roadway in a state, regional, or local transportation plan." *GDOT Design Policy Manual*, Chapter 6.12 and Glossary.

two-way travel and can have designated speed limits. According to AASHTO, shared-use path widths should be 10 feet at a minimum, but larger widths are recommended in areas with higher use.

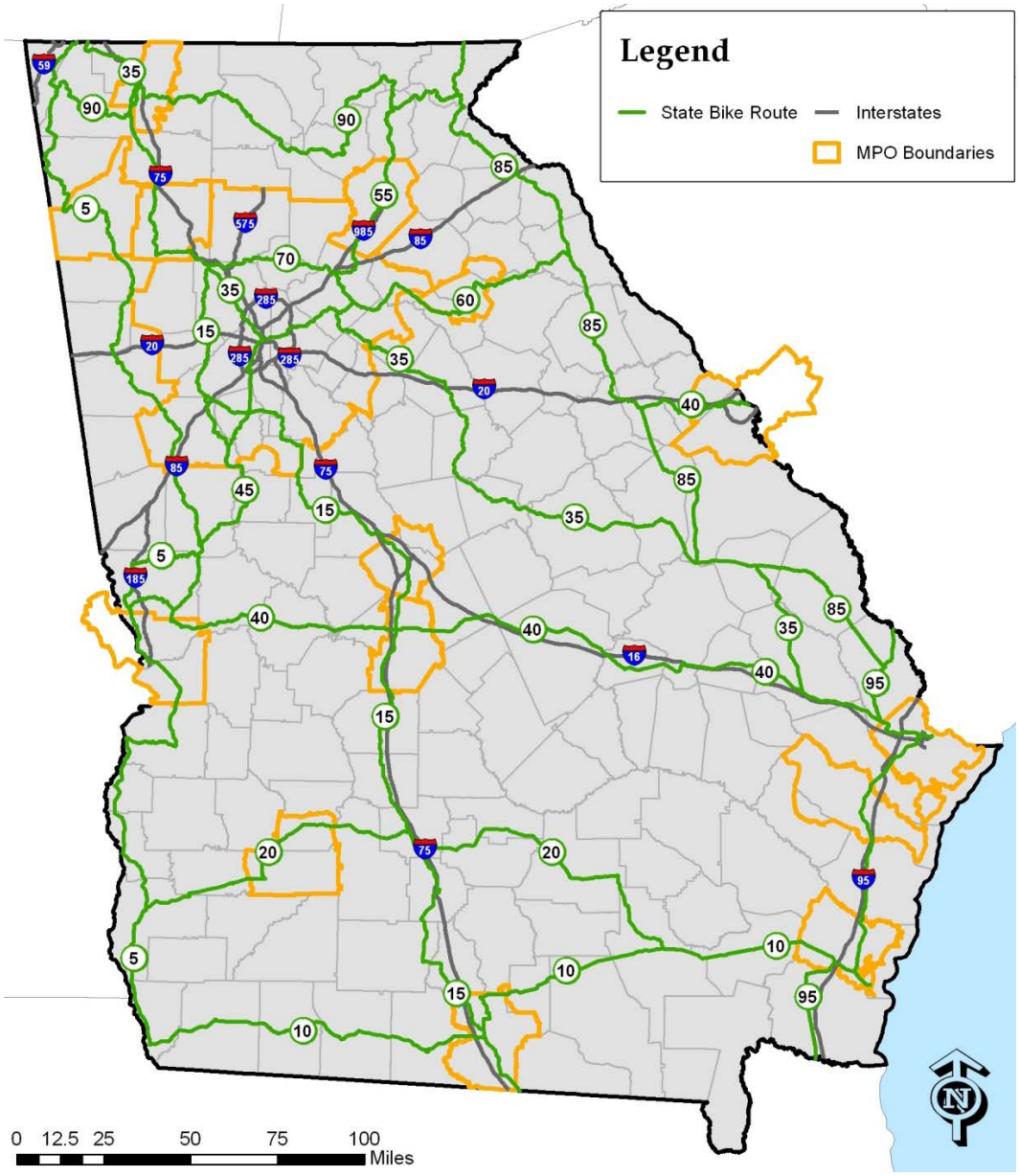
GDOT has identified a network of 14 designated bicycle routes across the State. This network, shown in Figure 5.2 (p. 5-4) with routes listed in Table 5.1, connects population centers throughout the State and is intended to primarily serve longer distance riders between and within these areas. This bicycle route network consists of 2,943 miles of roadway across the State. Approximately 70 percent (2,060.1 miles) of this network is on GDOT state routes (the Federal-aid route network), and the remaining 30 percent (882.9 miles) is off the state route system (on county and local roads). Infrastructure along these routes consists of on-road facilities, including paved shoulders and bicycle lanes. While many of these routes are signed, GDOT is working to add signage to all routes.

### Table 5.1 Georgia State Bicycle Routes

| Direction | Route Number | Route Name |
|---|---|---|
| East-West | 10 | Southern Crossing |
| | 20 | Wiregrass |
| | 40 | TransGeorgia |
| | 50 | Augusta Link |
| | 60 | Athens Link |
| | 70 | Northern Crescent |
| | 90 | Mountain Crossing |
| North-South | 5 | Chattahoochee Trace |
| | 15 | Central |
| | 35 | March to the Sea |
| | 45 | Little White House |
| | 55 | Appalachian Gateway |
| | 85 | Savannah River Run |
| | 95 | Coastal |

Source: GDOT Complete Streets Policy.

Figure 5.2 Georgia State Bicycle Routes




Source: GDOT.

Beyond this designated state bicycle route system, there are numerous bicycle facilities, many of which are bicycle routes that are designated by local governments, MPOs, and Regional Commissions. Figure 5.3 (p. 5-6) displays bicycle facilities throughout the State, including bike lanes, paved shoulders, shared use paths, and signed routes. (Note: geographic information for routes in all areas is not available.) Table 5.2 (p. 5-5) lists the mileage of these facilities by MPO.

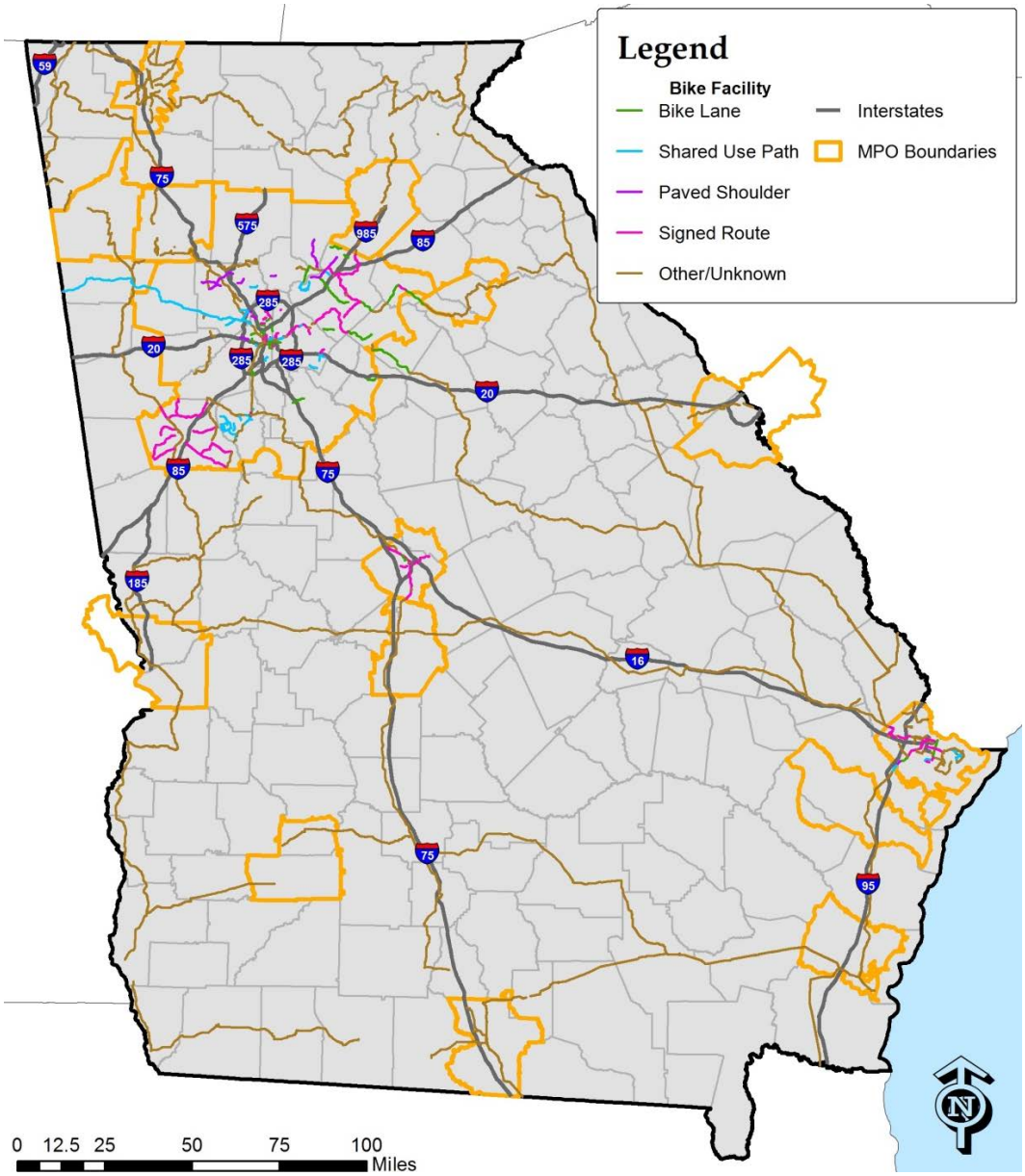
Figures 5.4 and 5.5 (pp. 5-7 and 5-8) are insets which show the bicycle routes in the Atlanta and Savannah regions in more detail.

## Table 5.2 Mileage of Bicycle Facilities, by MPO

| MPO | Mileage of Bicycle Facilities |
|---|---|
| Albany: Dougherty Area Regional Transportation Study | 26.63 |
| Athens: Madison Athens-Clarke Oconee Regional Transportation Study | 29.81 |
| Atlanta: Atlanta Regional Commission | 654.99 |
| Augusta: Augusta Regional Transportation Study | 21.15 |
| Cartersville: Bartow County-Cartersville MPO | 27.01 |
| Brunswick: Brunswick Area Transportation Study | 72.46 |
| Columbus: Columbus-Phenix Planning Department | 43.66 |
| Dalton: Dalton-Whitfield County MPO | 108.12 |
| Gainesville: Gainesville-Hall MPO | 31.50 |
| Hinesville: Hinesville Area MPO | 26.28 |
| Macon: Macon-Bibb Planning and Zoning Commission | 42.77 |
| Rome: Floyd-Rome Urban Transportation Study | 33.56 |
| Savannah: Coastal Region MPO | 129.51 |
| Valdosta: Valdosta-Lowndes MPO | 45.45 |
| Warner Robins: Warner Robins MPO | 53.66 |
| Rest of State | 2,105.80 |
| TOTAL | 3,452.36 |

Source: GDOT, Atlanta Regional Commission (ARC), Augusta Regional Transportation Study (ARTS), Brunswick Area Transportation Study (BATS), Coastal Region MPO (CORE MPO), Columbus-Phenix City MPO, Dalton-Whitfield County MPO, Floyd-Rome Urban Transportation Study (FRUTS), Gainesville-Hall MPO, Hinesville Area MPO (HAMPO), Macon Area Transportation Study (MATS), Madison Athens-Clarke Oconee Transportation Study (MACORTS), Valdosta-Lowndes MPO, Warner Robins Area Transportation Study (WRATS).

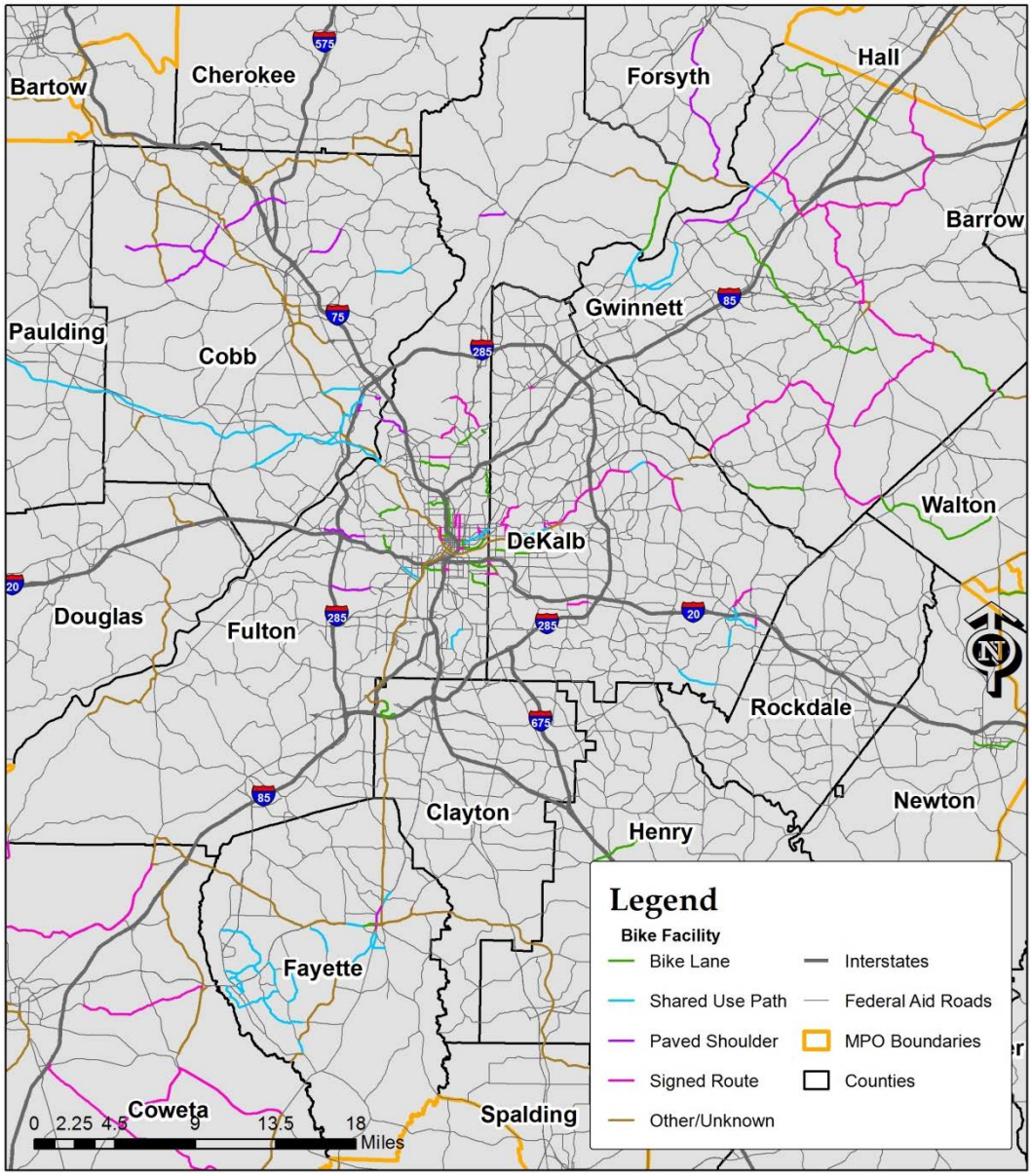
Figure 5.3 Existing Bicycle Infrastructure




Source: GDOT, ARC, ARTS, Cartersville-Bartow County MPO, BATS, CORE, C-PCTS, Dalton-Whitfield County MPO, DARTS, FRUTS, GHMPO, HAMPO, MATS, MACORTS, Valdosta-Lowndes MPO, and WRATS.

Note: Geographical information for bicycle facilities is not available in all areas.

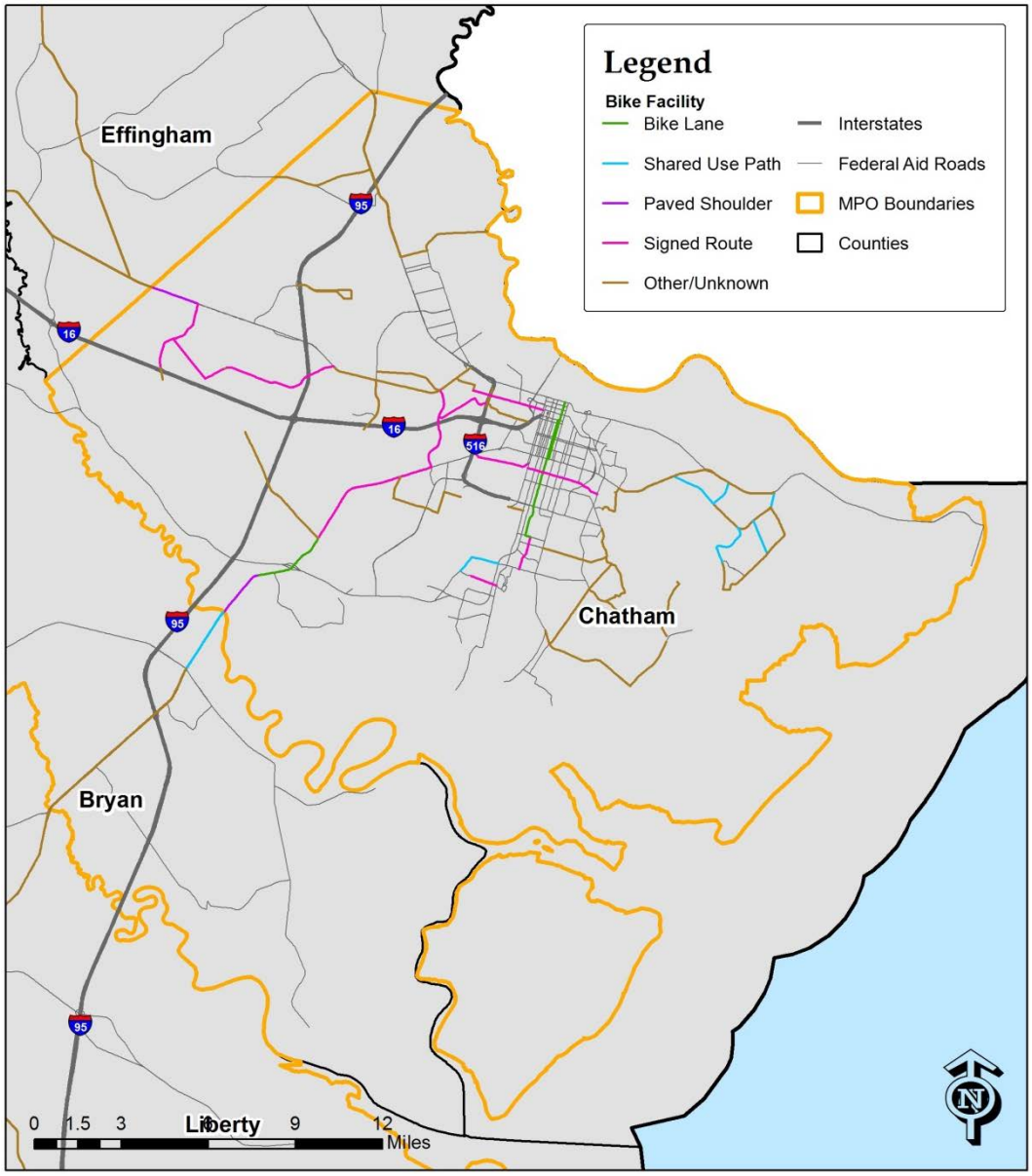
Figure 5.4 Bicycle Routes in Atlanta




Sources: GDOT, ARC (September 2013).

Note: Geographical information for bicycle facilities is not available in all areas.

Figure 5.5 Bicycle Routes in Savannah




Sources: GDOT, CORE MPO (September 2013).

Note: Geographical information for bicycle facilities is not available in all areas.

### 5.1.2 Pedestrian Infrastructure

Pedestrian infrastructure consists primarily of sidewalks, which are most often found in urban and suburban environments. Sidewalks are often used for the "last mile" of a given trip, be that for travel to school or work, shopping, or access to public services, and also are used for recreation, such as jogging and strolling. According to GDOT's *Design Policy Manual*, sidewalks are preferred to be a minimum of five feet in width clear of obstructions, which allows adequate space

for two wheelchairs to pass. In locations where there is high pedestrian traffic, wider sidewalks are recommended. This recommendation also is consistent with requirements set by the Americans with Disabilities Act (ADA).

Curb ramps are an essential component of pedestrian infrastructure, and are required by the ADA to be present at all crosswalks. These ramps are the transition areas where the sidewalk meets the curb, and the ramp area is sloped to meet street level at a crossing. For visually impaired pedestrians, the base of a curb ramp also includes raised markers, called truncated domes, to signal the edge of the sidewalk and where the street begins. These ramps also are helpful for pedestrians (such as the elderly) who may have trouble navigating a step down from the sidewalk to street level.

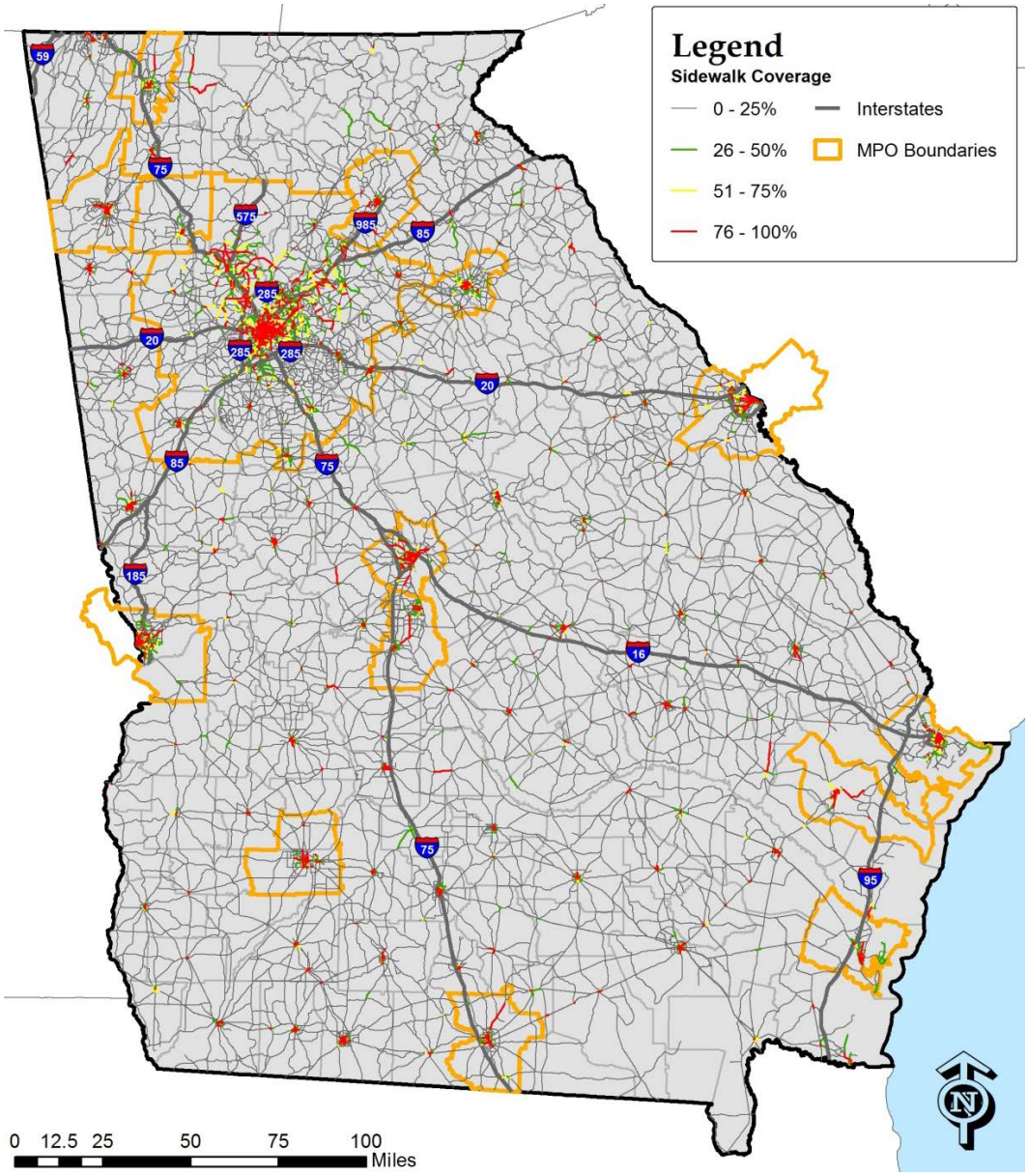
Figure 5.6 (p. 5-10) displays sidewalk coverage on Federal-aid roads, although a large portion of pedestrian infrastructure is typically found on local facilities. Road segments are classified as having sidewalks on one or both sides on zero to 25 percent of the segment length, 26 to 50 percent of the segment length, 51 to 75 percent of the segment length, and 76 to 100 percent of the segment length. Table 5.3 lists the mileage of sidewalks on Federal-aid roads in each MPO, on both sides of the road and on one side, and lists the percent of the total Federal-aid road mileage that has sidewalks on both sides and on one side.

## Table 5.3 Summary of Sidewalks on Federal Aid Roads, by MPO

| | Federal Aid Roads with Sidewalks on Both Sides | | Federal Aid Roads with Sidewalks on One Side | |
|---|---|---|---|---|
| MPO | Mileage | Percent of Total | Mileage | Percent of Total |
| Albany: Dougherty Area Regional Transportation Study | 29.39 | 7% | 25.13 | 6% |
| Athens: Madison-Athens-Clarke-Oconee Transportation Study | 20.93 | 6% | 39.56 | 12% |
| Atlanta: Atlanta Regional Commission | 563.4 | 11% | 511.03 | 10% |
| Augusta: Augusta Regional Transportation Study | 48.07 | 11% | 38.45 | 9% |
| Brunswick: Brunswick Area Transportation Study | 20.78 | 9% | 29.27 | 13% |
| Chattanooga: Chattanooga-Hamilton County MPO | 11.74 | 5% | 4.64 | 2% |
| Columbus: Columbus-Phenix Planning Department | 43.4 | 13% | 49.91 | 14% |
| Dalton: Dalton-Whitfield County MPO | 15.71 | 6% | 23.25 | 10% |
| Gainesville: Gainesville-Hall MPO | 24.28 | 6% | 9.68 | 3% |
| Hinesville: Hinesville Area MPO | 22.05 | 11% | 11.66 | 6% |
| Macon: Macon-Bibb Planning and Zoning Commission | 68.02 | 17% | 16.8 | 4% |
| Rome: Rome-Floyd Consolidated Planning Commission | 24.08 | 7% | 7.78 | 2% |
| Savannah: Coastal Region MPO | 52.2 | 13% | 31.07 | 8% |
| Valdosta: Valdosta-Lowndes MPO | 25.74 | 7% | 12.08 | 3% |
| Warner Robins: Warner Robins MPO | 23.11 | 6% | 23.54 | 6% |
| Rest of State | 639.88 | 3% | 427.04 | 2% |

Source: GDOT Federated Road Enhanced Database (FRED).

Figure 5.6 Sidewalk Coverage on Federal Aid Roads




Source: GDOT Federated Road Enhanced Database (FRED).

## 5.2 USE

The number of bicycling and walking trips is difficult to measure, as these counts are not obtained as simply as collecting motor vehicle traffic counts or transit ridership data. The United States Census Bureau maintains the Census Transportation Planning Products (CTPP) program, which is a summary of Census data collected through the 10-year U.S. Census and the American Community Survey (ACS), presented for transportation purposes. Current CTPP demographic data covers the period from 2006 through 2010 and includes the locations of participants' home and employment, which are used to analyze key transportation information, such as distances traveled to and from work. From this analysis, commuting patterns can be obtained for use in transportation planning. The CTPP data is limited in that it only includes information related to work trips and does not document bicycle and pedestrian travel for nonwork purposes. Using the CTPP data, commuting patterns for those bicycling and walking to work was obtained across the State and in several key cities such as Atlanta and Savannah. Statewide, 1.78 percent of commuters bike or walk from their home location to work. The city seeing the highest rate of bicycle or pedestrian commuters is Athens (a college city) at 6.2 percent. A summary of this bicycling and walking information is shown in Table 5.4.

Table 5.4 Bicycling and Walking Commuting Patterns

| City | Total Commuters | Bike/Ped Commuters | Percent Bike/Ped Users |
|---|---|---|---|
| Athens | 51,120 | 3,170 | 6.20% |
| Atlanta | 195,910 | 10,020 | 5.11% |
| Columbus | 83,195 | 1,515 | 1.82% |
| Decatur | 8,970 | 435 | 4.85% |
| Dunwoody | 22,460 | 480 | 2.14% |
| Macon | 33,505 | 1,280 | 3.82% |
| Marietta | 30,095 | 1,135 | 3.77% |
| Roswell | 43,955 | 520 | 1.18% |
| Sandy Springs | 50,735 | 815 | 1.61% |
| Savannah | 56,860 | 2,465 | 4.34% |
| Georgia (Total) | 4,241,385 | 75,345 | 1.78% |

ACS 2006-2010 Five-Year Estimates.

## 5.3 PERFORMANCE

The locations of crashes involving one or more bicycles or pedestrians were obtained for the years 2010 through 2012 from the GDOT Office of Traffic Operations. For this time period, there were a total of 1,125 crashes involving a bicycle and 3,204 crashes involving a pedestrian. This data was aggregated to identify segments of the Federal-aid road network that had one or more crash involving a bicycle or pedestrian. Bicycle and pedestrian crash data are shown in Figures 5.7 through 5.10 (pp. 5-15 to 5-18), by road segment and by county. The county identifier came from GDOT's hard-copy crash records. It is important to note that there may be some inconsistencies in this data, but it has been determined to be a reasonable and objective data source.

The counties with the highest number of crashes involving a bicycle were Chatham and Fulton, with 174 and 152 crashes, respectively. Chatham and Fulton Counties each experienced more than 1.5 times more crashes involving a bicycle than the county with the next highest number of crashes, Clarke County, with 90 crashes. At least one crash involving a bicycle was recorded in 79 of Georgia's 159 counties, and no crashes involving a bicycle were recorded in the remaining 80 counties.

The county with the highest number of crashes involving a pedestrian was Fulton County, with 711 crashes. This is more than twice the number that occurred in the county with the next highest number of crashes, DeKalb County, which had 304 crashes. At least one crash involving a pedestrian was recorded in 106 counties and no crashes involving a pedestrian were recorded for the remaining 53 counties. The number of counties experiencing crashes involving bicycles or pedestrians by threshold is shown in Table 5.5.

### Table 5.5 Number of Counties with Crashes Involving a Bicycle or Pedestrian

| | Number of Counties | |
|---|---|---|
| Crashes | Bicycle | Pedestrian |
| 0 Crashes | 78 | 48 |
| 1 to 5 Crashes | 57 | 64 |
| 6 to 10 Crashes | 6 | 12 |
| 11 to 20 Crashes | 4 | 11 |
| 21 to 100 Crashes | 12 | 15 |
| Over 100 Crashes | 2 | 9 |

Because of significant differences in the lengths of road segment, the crash data was analyzed to obtain a crash rate for each segment, which allows for a consistent comparison among all sections. This crash rate was determined by dividing the number of crashes along a given segment by the total number of crashes involving a bicycle or pedestrian along that segment. This calculation resulted in a rate of crashes per mile for each segment. Tables 5.6 and 5.7 (p. 5-14) list the results of this analysis, showing the top 10 segments with the highest crash rates involving bicycles and pedestrians, respectively. Segments with a length of less than 250 feet were excluded.

All of the top 10 high-crash locations for those involving bicycle and pedestrians occurred in MPO areas: Augusta, Atlanta, Savannah, Macon, Athens, Gainesville, and Columbus. Because it is expected that there are larger numbers of bicyclists and pedestrians in urban areas, it is not surprising that these areas saw higher numbers of crashes involving bicycles and pedestrians in this three-year period. Additionally, 8 of the 10 high-crash segments involving a bicycle also were high-crash segments involving a pedestrian.

Table 5.6 Top 10 High-Crash Locations for Crashes Involving Bicycles *2010 through 2012*

| Road Name | From | To | Segment Length (Miles) | County | Number of Crashes | Crash Rate (Crashes per Mile) |
|---|---|---|---|---|---|---|
| 13th Street | Broad Street | Jones Street | 0.05 | Richmond | 15 | 300.00 |
| Trinity Avenue | Central Avenue | Washington Street | 0.09 | Fulton | 19 | 211.11 |
| Bay Street | Montgomery Street | Drayton Street | 0.33 | Chatham | 41 | 124.24 |
| Walnut Street | 1st Street | 2nd Street | 0.11 | Bibb | 10 | 90.91 |
| West Broad Street | North Lumpkin Street | East Campus Road | 0.24 | Clarke | 17 | 70.83 |
| South Lumpkin Street | Baldwin Street | Baxter Street | 0.11 | Clarke | 7 | 63.64 |
| Jesse Jewell Parkway SW | Main Street SW | Bradford Street South | 0.05 | Hall | 3 | 60.00 |
| Veterans Parkway | 10th Street | 8th Street | 0.26 | Muscogee | 12 | 46.15 |
| Durham Park Road | I-285 | South Indian Creek Drive | 0.42 | DeKalb | 15 | 35.71 |
| 10th Avenue | 11th Street | 10th Street | 0.08 | Muscogee | 3 | 37.5 |
| Durham Park Road | I-285 | S. Indian Creek Drive | 0.45 | DeKalb | 15 | 33.33 |

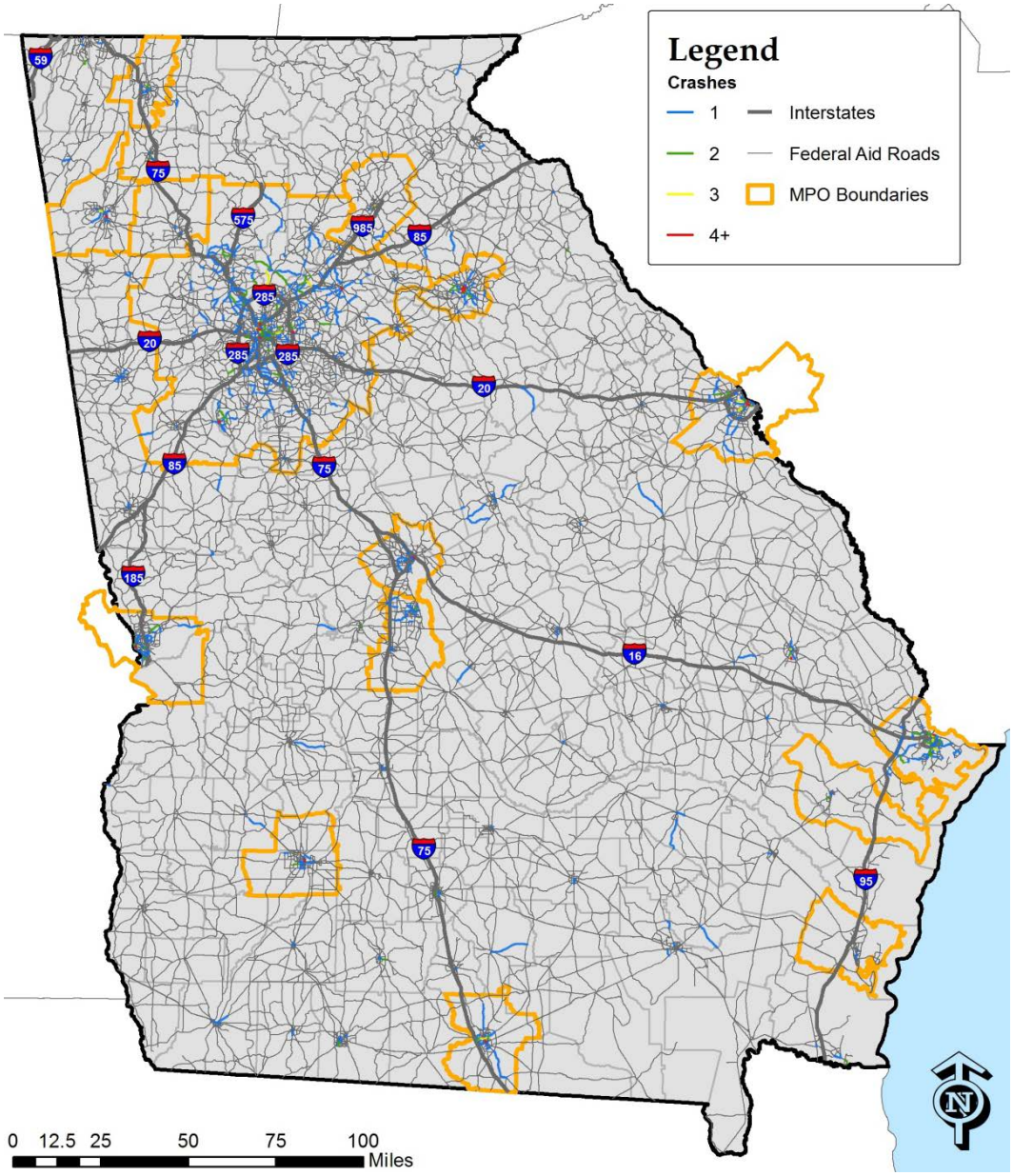
Source: GDOT Office of Traffic Operations.

Table 5.7 Top 10 High-Crash Locations for Crashes Involving Pedestrians *2010 through 2012*

| Road Name | From | To | Segment Length (Miles) | County | Number of Crashes | Crash Rate (Crashes per Mile) |
|---|---|---|---|---|---|---|
| Trinity Avenue | Central Avenue | Washington Street | 0.09 | Fulton | 60 | 666.67 |
| 13th Street | Broad Street | Jones Street | 0.05 | Richmond | 26 | 520 |
| Durham Park Road | I-285 | South Indian Creek Drive | 0.42 | DeKalb | 102 | 242.86 |
| Walnut Street | 1st Street | 2nd Street | 0.11 | Bibb | 14 | 127.27 |
| Veterans Parkway | 10th Street | 8th Street | 0.26 | Muscogee | 33 | 126.92 |
| Jesse Jewell Parkway SW | Main Street SW | Bradford Street South | 0.05 | Hall | 6 | 120 |
| Bay Street | Montgomery Street | Drayton Street | 0.33 | Chatham | 25 | 75.76 |
| West Broad Street | North Lumpkin Street | East Campus Road | 0.24 | Clarke | 14 | 58.33 |
| Jonesboro Street | Toby Springs Lane | Atlanta Street | 0.27 | Henry | 8 | 29.63 |
| East Lee Street | North Main Street | Stonewall Street SE | 0.07 | Terrell | 2 | 28.57 |

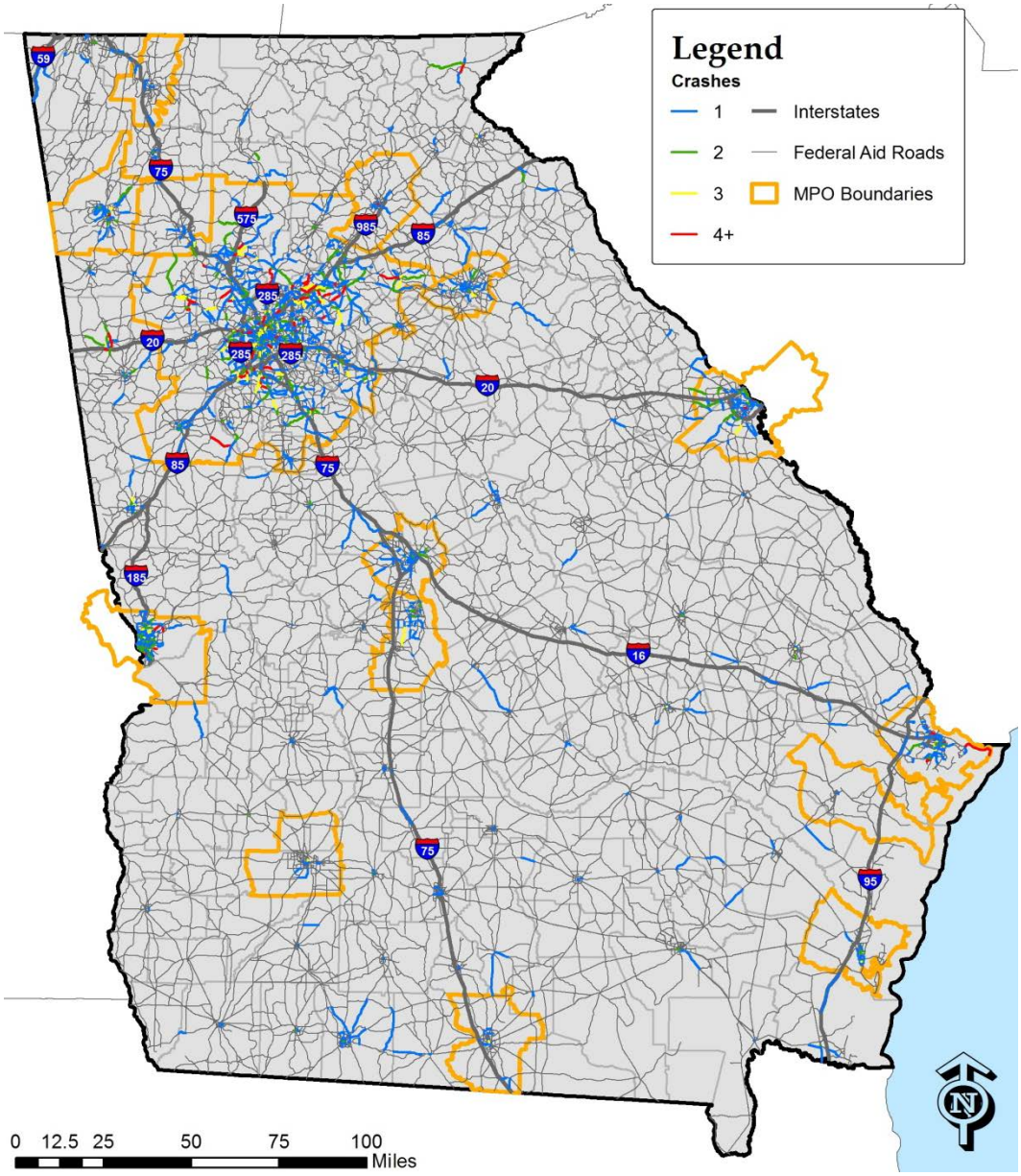
Source: GDOT Office of Traffic Operations.

Figure 5.7 Crashes Involving Bicycles by Segment
*2010 through 2012*



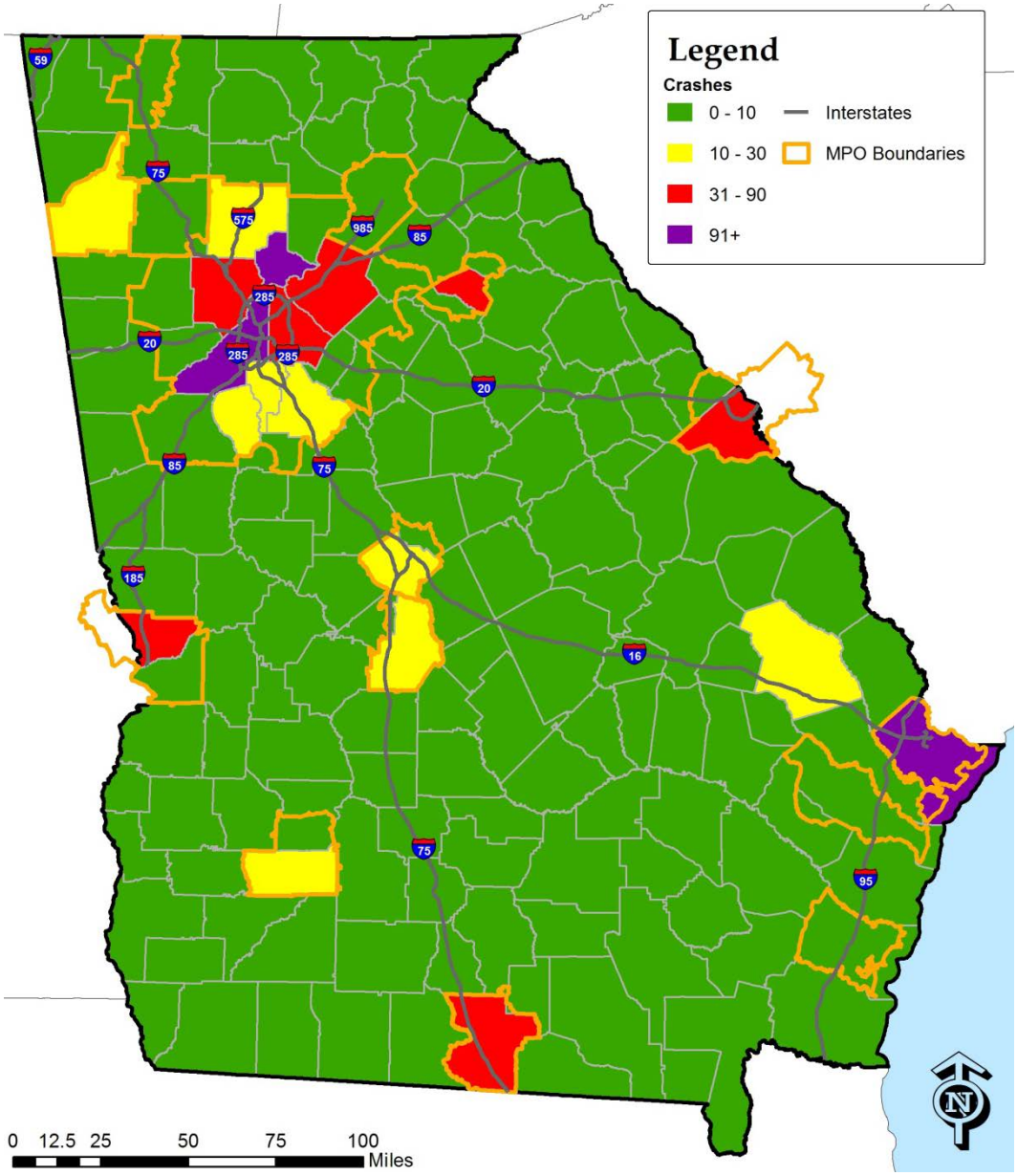

Source: GDOT Office of Traffic Operations.

Figure 5.8 Crashes Involving Pedestrians by Segment
*2010 through 2012*



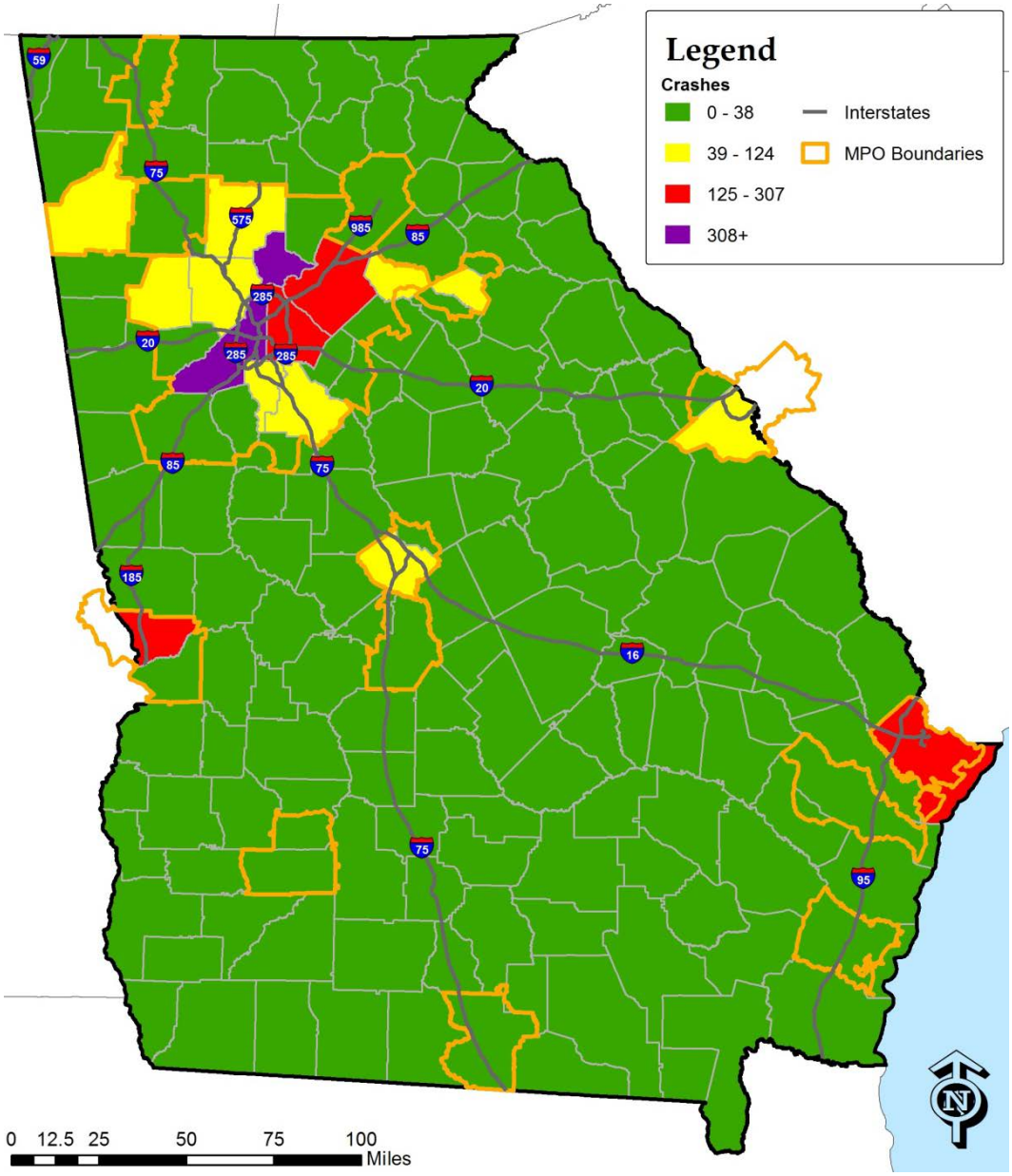

Source: GDOT Office of Traffic Operations.

Figure 5.9 Crashes Involving a Bicycle by County
*2010 through 2012*




Source: GDOT Office of Traffic Operations.

Figure 5.10 Crashes Involving a Pedestrian by County
*2010 through 2012*




Source: GDOT Office of Traffic Operations.

## 5.4 MAJOR ISSUES/CURRENT DEFICIENCIES

GDOT has installed signage for a number of the State's designated bicycle routes, but many routes still lack this identification. This signage is important for raising awareness of these state routes for motorists and to provide directional information to riders. Additionally, as roadways that include a designated state bicycle route have been improved (e.g., such as widening) since the inception of the state bicycle network, the characteristics of some of these roadways no longer provide a friendly bicycling environment, and should be reevaluated. Increased traffic along some of these routes also adversely impacts bicycle travel along the route. For example, SR 15/U.S. 23/U.S. 441 in Rabun County was a two-lane facility in 1995 when the bicycle route network was identified, and it has since been widened to a four-lane facility. High vehicle travel speeds, high traffic volumes, and a lack of bicycle facilities along this route make it much less favorable for bicycle travel.

A primary issue with the sidewalk/pedestrian networks throughout the State is a lack of continuity where there are many gaps in sidewalk coverage or no facilities in primarily rural areas. These gaps and the lack of facilities hinder pedestrian travel in that individuals are not always able to make complete pedestrian trips, and may be forced to make part of their walking trip in the vehicular travelway or along a roadside without adequate pedestrian accommodations. At times, this may hinder walking trips altogether along certain routes if pedestrians cannot depend on a continuous, safe walking route. Additionally, curb ramps are not always present at crosswalks, which presents an unsafe condition to elderly and disabled pedestrians. Large portions of the sidewalk network are on local streets and are therefore implemented and maintained by local governments. Coordination between local governments and GDOT is essential in providing a connected, continuous network of pedestrian facilities.

# 6.0 Aviation

## 6.1 INVENTORY OF FACILITIES

According to the Federal Aviation Administration (FAA), the definition of airports refers to any area of land or water used or intended for landing or takeoff of aircraft, and includes an appurtenant or pertinent area used or intended for airport buildings, facilities, as well as rights-of-way together with the buildings and facilities. The aviation system in Georgia is comprised of 104 publicly owned, public use airports, of which 9 airports offer scheduled commercial service; the other 95 are general aviation airports which are essential to the State's transportation infrastructure and economic vitality.

The *Georgia Aviation System Plan* (GASP), adopted in 2003, was developed to identify the needs of Georgia airports and took a strategic approach to planning for the future aviation system. The principles and recommendations of the GASP continue to direct the growth of the statewide aviation system.

### 6.1.1 Overview of Georgia Public Airports

Georgia airports collectively include 16,170,834 square yards of pavement. The statewide aviation network currently supports 4,996 aircraft based at Georgia airports. Hartsfield-Jackson Atlanta International Airport (HJAIA) is the largest commercial service airport in the State of Georgia with facilities that include two terminals, domestic and international, with seven concourses.

### 6.1.2 Airport Level of Service

The FAA defines airports by categories of airport activities, including commercial service, cargo service, reliever, and general aviation airports.

1. **Commercial Service Airports –** Publicly owned airports that have at least 2,500 passenger boardings each calendar year and receive scheduled passenger service. Passenger boardings refer to revenue passenger boardings on an aircraft in service in air commerce whether or not in scheduled service.
2. **Cargo Service Airports –** Airports that, in addition to any other air transportation services that may be available, are served by aircraft providing air transportation of only cargo with a total annual landed weight of more than 100 million pounds. "Landed weight" means the weight of aircraft transporting only cargo in intrastate, Interstate, and foreign air transportation. An airport may be both a commercial service and a cargo service airport.
3. **Reliever Airports –** Airports designated to relieve congestion at Commercial Service Airports and to provide improved general aviation access to the overall community. These may be publicly or privately owned.

4. **General Aviation Airports –** This category is the largest single group of airports in the U.S. aviation system. The category includes privately owned, public use airports that enplane 2,500 or more passengers annually and receive scheduled airline service.

Georgia airports are further stratified into categories by the level at which they operate and the role they play in Georgia's aviation system. These levels are designated by the GASP as follows:

- **Level I –** Minimum Standard General Aviation Airport. Level I airports should accommodate all single-engine and some small twin-engine general aviation aircraft. For Level I airports, a minimum runway length objective of 4,000 feet has been established; ideally, operations at Level I airports should also be aided by a nonprecision instrument approach.
- **Level II –** Business Airport of Local Impact. Level II airports should be capable of accommodating all business and personal use single- and twin-engine general aviation and a broad range of the corporate/business jet fleet. For Level II airports, a minimum runway length objective of 5,000 feet has been established; operations at Level II airports should also be aided by a nonprecision instrument approach.
- **Level III –** Business Airport of Regional Impact. Level III airports are air carrier and general aviation airports of regional significance capable of accommodating commercial aircraft or a variety of business and corporate jet aircraft. For Level III airports, a minimum runway length objective of 5,500 feet has been established; ideally, operations at Level III airports should also be aided by a precision instrument approach.

Figure 6.1 (p. 6-3) identifies all 104 airports throughout the State and illustrates each by level of service. The 9 Level III airports which provide commercial service are distinguished from the other Level III airports.

### 6.1.3 Changes since Previous SWTP

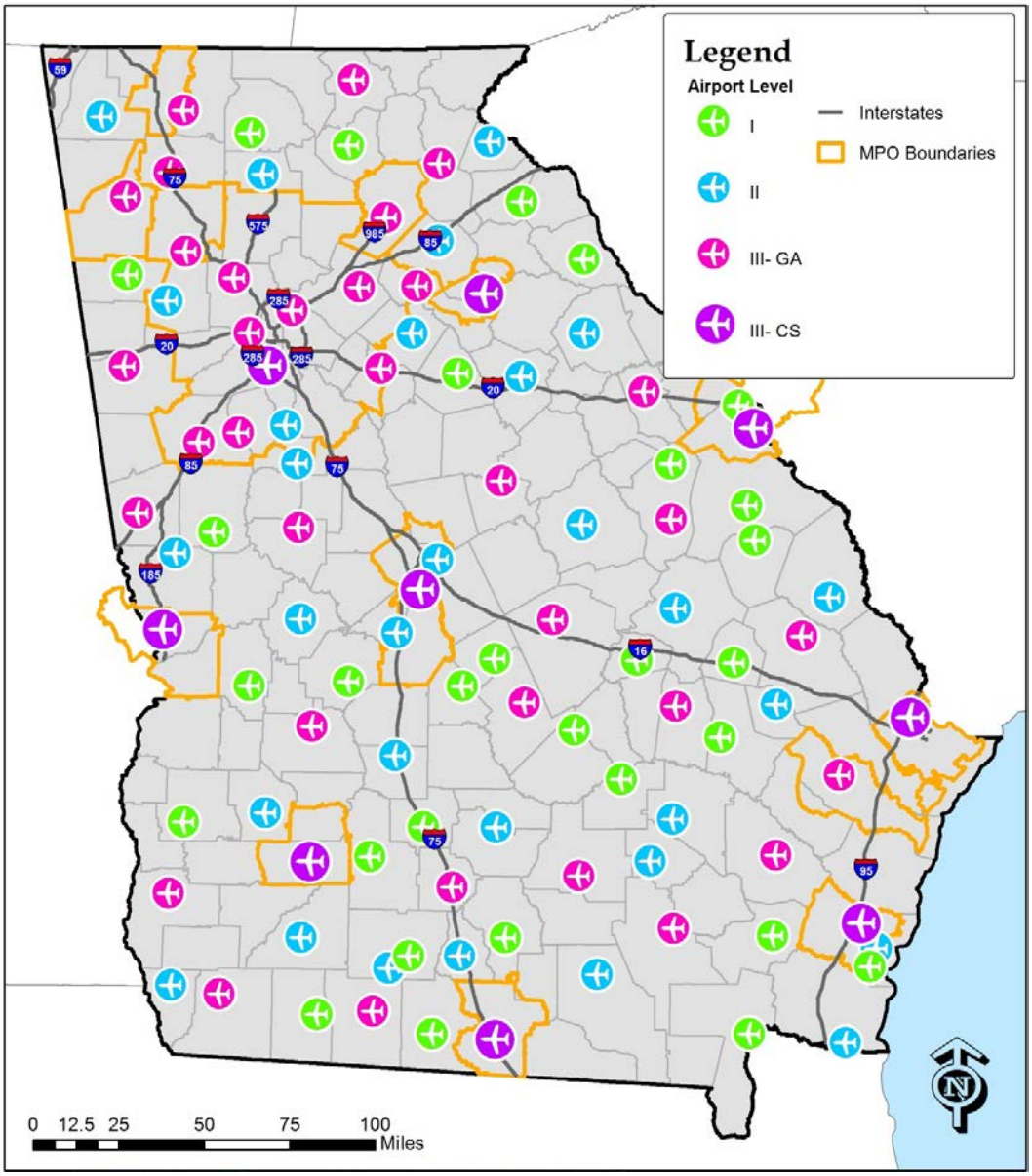
In the 2006 Statewide Transportation Plan (SWTP) there were 103 publicly owned, public-use airports in operation in comparison to the 104 operating in 2013. In November 2008 the Paulding Northwest Atlanta Airport opened in Paulding County, the first new airport to add system capacity in Georgia since 1975.

Georgia became the 10th state to join the Federal Aviation Administration's (FAA) State Block Grant Program (SBGP) in October 2008. This program allows the State to assume the administrative responsibilities that are traditionally performed by the FAA for general aviation airports. The SBGP also provides the State with flexibility in administering Federal Airport Improvement Program (AIP) funds in order to more effectively meet the aviation needs across the State.

Another change that has occurred since the 2006 SWTP is the State's financial contributions in the form of aviation appropriations. According to the Georgia

Department of Transportation Intermodal Division, State appropriations for aviation reached its peak in 2009 at nearly $12 million and declined to its low of $1.64 million in 2011, a decrease of 86 percent. In more recent years, appropriations have held steady around $2 million.

Figure 6.1 Overview of Public Airports by Level of Service




Sources: GDOT, FAA (September 2013).

## 6.2 OPERATIONS

Georgia's nine commercial service airports handled approximately 1.2 million aircraft operations and more than 47 million enplaned passengers in 2012. This

total includes over 45 million enplanements at HJAIA, which is the world's busiest airport. As shown in Table 6.1, of the remaining eight commercial service airports outside of Atlanta, Savannah-Hilton Head International and Augusta Regional at Bush Field reported the largest number of passenger enplanements.

Table 6.1 Georgia Air Carrier Airports 2012 Enplanements

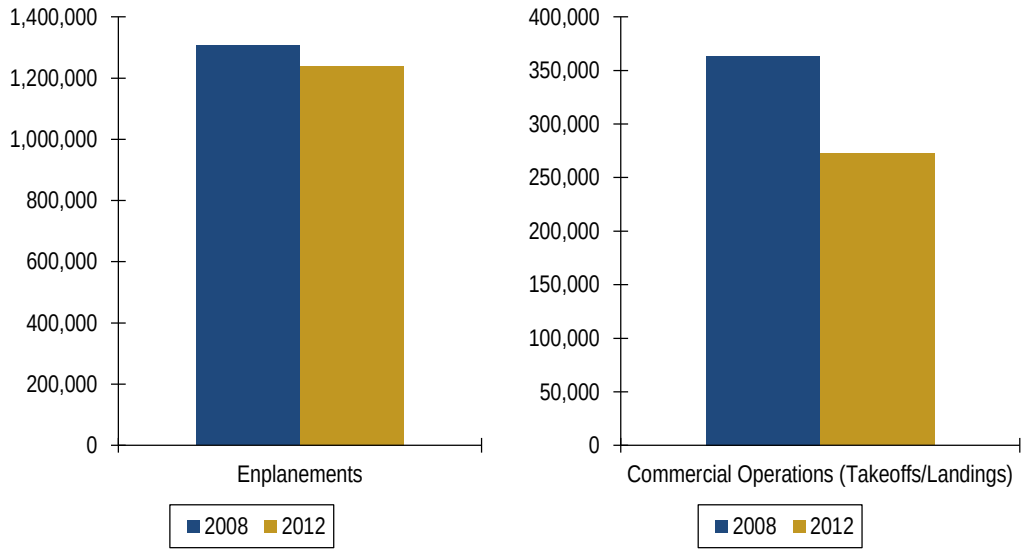
| Airport Name | Location | 2012 Enplanements |
|---|---|---|
| Hartsfield-Jackson Atlanta International | Atlanta | 45,798,809 |
| Savannah-Hilton Head International | Savannah | 789,256 |
| Augusta Regional at Bush Field | Augusta | 271,691 |
| Columbus Metropolitan | Columbus | 74,336 |
| Valdosta Regional | Valdosta | 37,030 |
| Brunswick-Golden Isles | Brunswick | 31,284 |
| Ben Epps | Athens | 1,694 |
| Middle Georgia Regional | Macon | 843 |
| Total | | 47,038,437 |

Source: FAA Passenger Enplanements Report.

### 6.2.1 Commercial Service Operations

Excluding HJAIA (discussed below), performance data for 2008 and 2012 shows that overall commercial service enplanements and operations declined, as shown in Figure 6.2 (p. 6-5), due to the global economic downturn that began in 2008.

Figure 6.2 Comparison of Commercial Service Aviation System Performance
*Excludes HJAIA*

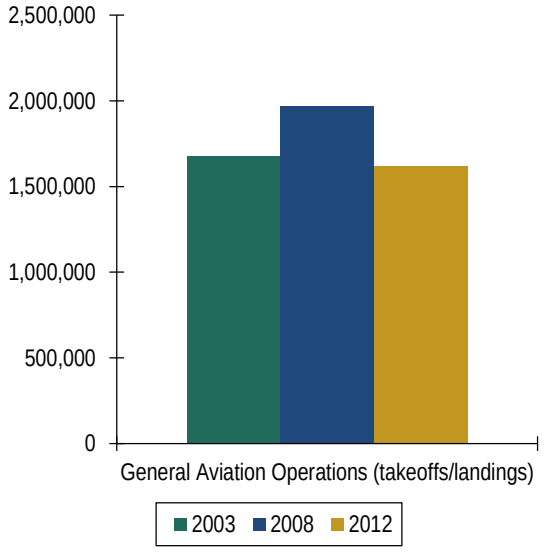



Source: GDOT Intermodal and FAA Annual Enplanement Reporting.

### 6.2.2 General Aviation Operations

General aviation service has realized a decrease of approximately 20 percent since the peak in 2008. Figure 6.3 (p. 6-6) shows operations (takeoffs and landings) have decreased by 3.9 percent between 2003 and 2012, with an increase in 2008 prior to the onset of the recession. The Georgia Department of Transportation's 2011 "Georgia Airports Mean Business" initiative identifies general aviation airports as a critical component to the State's growing economy and emphasizes its commitment to support the growth of these airports.

Figure 6.3 Comparison of General Aviation Airports System Operations



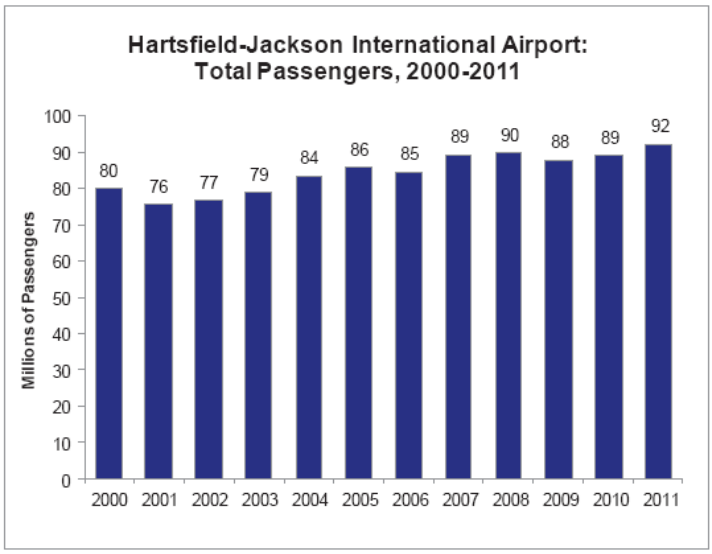

Source: GDOT Intermodal Aviation System Plan Summary.

### 6.2.3 Hartsfield-Jackson Atlanta International Airport (HJAIA)

Due to the magnitude of service performed by HJAIA, it is critical to disaggregate the reported operations data from the statewide aviation performance data in order to demonstrate the role that this airport plays in the overall statistical analysis. Figure 6.4 (p. 6-7) shows total passengers from 2000 to 2011 while Figure 6.5 (p. 6-7) shows HJAIA enplanements in comparison to the remaining 8 commercial service airports. The comparison indicates that, although there is a decline in enplanements reported by Georgia commercial service airports, HJAIA shows an increase resulting in an overall gain in annual enplanements. Figure 6.6 (p. 6-8) shows HJAIA operations in comparison to the other commercial service providers.

Figures 6.4 (p. 6-7), 6.5 (p. 6-7), and 6.6 (p. 6-8) demonstrate the magnitude of HJAIA's enplanements and commercial service flights on the Georgia aviation system. HJAIA is a significant economic engine and a critical facility to the global competitiveness of the Georgia aviation system and the State's overall economic vitality.

## Figure 6.4 HJAIA Total Passengers and Performance Data

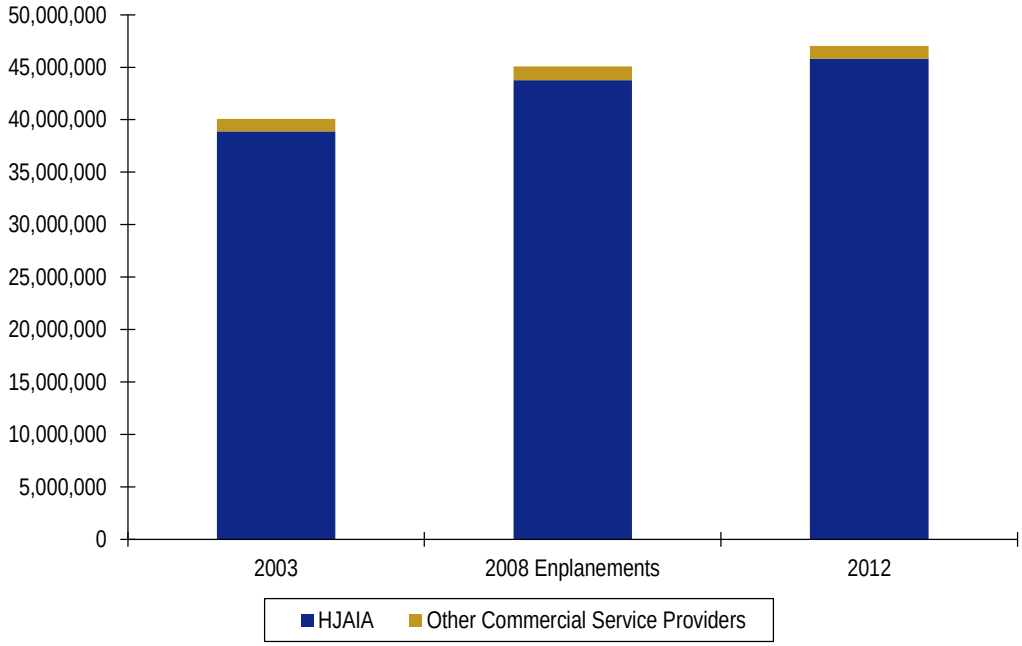



Source: Hartsfield-Jackson Atlanta International Airport

- Atlanta's Hartsfield-Jackson International Airport is the world's busiest passenger airport. The airport hosts 31 passenger airlines which carried 92 million passengers in 2011.
- Hartsfield-Jackson improved international capacity with the opening of its new 12 gate International Terminal in May 2012.
- Hartsfield-Jackson has three main air cargo complexes which maintain more than 1.3 million square feet of air cargo handling space. According to the Airports Council International, Hartsfield-Jackson Airport ranked 10th in the nation in total cargo in 2011.
- In September 2012, Atlanta's airport handled 53,929 metric tons of cargo, a 3.1% decline from September of 2011.

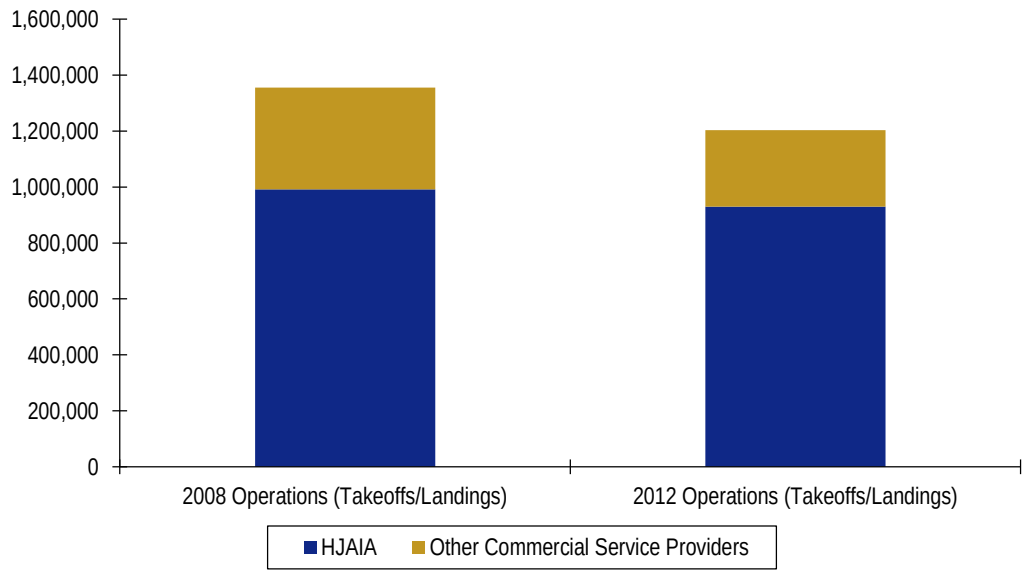
Source: OPB Georgia in Perspective – A Mobile Georgia.

## Figure 6.5 Comparison of Commercial Service Enplanements




Source: GDOT Intermodal and FAA Annual Enplanement Report.

Figure 6.6 Comparison of Commercial Service Operations




Source: GDOT Office of Intermodal Programs.

### 6.2.4 Cargo Service

Only three airports had air cargo volumes above 2 million pounds in 2012: HJAIA, the Southwest Georgia Regional Airport (in Albany), and the Savannah-Hilton Head International Airport. HJAIA represents more than 95 percent of the total air cargo volume in Georgia (see Table 6.2, p. 6-9). Air cargo travels in the belly of commercial passenger airliners, on dedicated freight carriers such as UPS and FedEx, and on all-cargo air carriers. Both types of cargo are represented at HJAIA.

The cargo area at HJAIA consists of a North Cargo Complex, a Midfield Cargo Complex, and a South Cargo Complex. The North Cargo Complex is the largest in terms of office square footage and ramp square footage. It also has the most parking positions for aircraft and truck bays of the facilities. The North Cargo Terminal building contains 378,000 square feet of floor space plus additional space on a mezzanine level. The North Cargo Complex also includes a 600,000-square-foot aircraft ramp, a building leased by UPS, another building leased by DHL/ Airborne, a perishable goods facility that is refrigerated, and an equine center.

The Midfield Cargo Complex is the largest in terms of warehouse square footage with more than 500,000 square feet available to store goods. However, it does not include any ramps. The South Cargo Complex is the airport's newest air cargo facility. It was completed in 1999 and added roughly 300,000 square feet of warehousing space. This makes it the smallest of the cargo complexes at the airport. This complex includes 3 buildings of roughly equal size. It also includes 8 aircraft parking spots, 126 truck bays, and a ramp of 700,000 square feet.

Table 6.2 Total Air Freight Movement in the State of Georgia in 2012
*Pounds*

| Airport | Enplaned at Airport | Deplaned at Airport | Total Air Freight |
|---|---|---|---|
| Albany, Georgia (Southwest Georgia Regional) | 18,736,277 | 21,675,369 | 40,411,646 |
| Augusta, Georgia (Augusta Regional at Bush Field) | 122,574 | 30,633 | 153,207 |
| Atlanta, Georgia (Hartsfield-Jackson Atlanta International) | 278,761,631 | 259,141,696 | 537,903,327 |
| Atlanta, Georgia (DeKalb Peachtree) | 11,882 | – | 11,882 |
| Brunswick, Georgia (Brunswick Golden Isles) | – | – | – |
| Columbus, Georgia (Columbus Metropolitan Airport) | 219,901 | 129,435 | 349,336 |
| Dublin, Georgia (W.H. "Bud" Barron) | – | 1,150 | 1,150 |
| LaGrange, Georgia (LaGrange-Callaway) | – | 70,531 | 70,531 |
| Columbus, Georgia (Lawson AAF) | 900,315 | 533,571 | 1,433,886 |
| Macon, Georgia (Middle Georgia Regional) | 240 | 98,293 | 98,533 |
| Macon, Georgia: Robins AFB | 74,018 | 34,736 | 108,754 |
| Rome, Georgia (Richard B Russell) | – | 6,440 | 6,440 |
| Savannah, Georgia (Savannah/Hilton Head International) | 5,442,713 | 8,331,834 | 13,774,547 |
| Savannah, Georgia (Hunter AAF) | 451,073 | 856,016 | 1,307,089 |
| Valdosta, Georgia (Valdosta Regional) | – | – | – |
| Total Pounds | 304,720,625 | 290,909,708 | 595,630,333 |

Source: Research and Innovative Technology Administration (RITA); U.S. Department of Transportation (U.S. DOT).

Geographic constraints, existing leases with noncargo businesses, and a need to accommodate passenger growth would typically inhibit HJAIA's ability to address future warehousing needs for increasing cargo tonnage. At the same time, the growing use of freighters would increase demand for aircraft parking. A broader, but no less significant issue is that landside operations indicate problems with access, trucking operations, and vehicle parking. These issues, however, are less critical than they were 5 years ago. Since 2006, the cargo volumes have decreased by about 25 percent. From a building perspective the airport should have sufficient capacity to easily accommodate growth for the next 5 to 10 years. Beyond that, there is a proposed new building "C" in the South Complex which will add more than 100,000 square feet of capacity when built. There are additional sites available for new cargo facilities that can be added to accommodate future growth on an as needed basis. This could include a cargo apron for parking international freighters.

Southwest Georgia Regional Airport's cargo activity is limited to a small UPS operation that connects to the main hub in Louisville, Kentucky. Cargo activity has decreased and there are no indicated capacity issues with either the facility or aeronautical infrastructure.

The Savannah/Hilton Head International Airport has the lowest cargo activity levels. Due to the high cargo volumes generated by the Port of Savannah, estimates for potential air cargo activity levels are typically overestimated. Despite the multimodal infrastructure in the region, air cargoes and ocean borne cargoes are rarely compatible and "sea-air" shipping is not often needed for transporting goods. Air products are typically time-sensitive, smaller, lighter, and far more expensive than the bulk items that move on ships. All of the airport cargo facilities are owned by the airport and the main cargo tenant is FedEx.

Based on the 2007 Global Insight TRANSEARCH freight flow database, the origins and destinations for Georgia's domestic air cargo are fairly dispersed throughout the country. As shown in Tables 6.3 and 6.4 (p. 6-11), California is the highest origin state comprising 13 percent of the originating air cargo traffic, and Tennessee (home to FedEx's Memphis hub) is the largest destination of domestic air cargo with 18 percent of the flows. The TRANSEARCH database also provides estimates of the commodity distribution for air cargo. Table 6.5 (p. 6-11) shows that roughly one-third of all of Georgia air cargo can be categorized as miscellaneous mixed shipments. Mail and contract traffic represents another 21 percent of total volume. Therefore, over half of the air cargo in the State is from one of these 2 commodities. The other 18 commodities represent the remaining portion of the air cargo for Georgia.

### Table 6.3 Top Origin States for Georgia's Domestic Air Cargo

| Domestic Origins of Air Cargo Traffic | Percent of Total Tons |
|---|---|
| California | 13% |
| Texas | 7% |
| Indiana | 7% |
| New York | 7% |
| Tennessee | 6% |
| Other States | 58% |
| Total | 100% |

Source: 2007 Global Insight TRANSEARCH freight flow database.

## Table 6.4 Top Destination States for Georgia's Domestic Air Cargo

| Domestic Destinations of Air Cargo Traffic | Percent of Total Tons |
|---|---|
| Tennessee | 18% |
| Texas | 16% |
| Florida | 14% |
| California | 6% |
| Ohio | 5% |
| Other States | 42% |
| Total | 100% |

Source: 2007 Global Insight TRANSEARCH freight flow database.

## Table 6.5 Commodity Distribution for Georgia Air Cargo

| Commodity | Percent of Total Tons |
|---|---|
| Miscellaneous Mixed Shipments | 33% |
| Mail or Contract Traffic | 21% |
| Machinery | 9% |
| Chemicals or Allied Products | 9% |
| Transportation Equipment | 8% |
| Electrical Equipment | 5% |
| Printed Matter | 3% |
| Precision Instruments, Photo Equipment, Optical Equipment | 2% |
| Apparel or Related Products | 2% |
| Fabricated Metal Products | 2% |
| Pulp, Paper, or Allied Products | 1% |
| Rubber or Miscellaneous Plastics | 1% |
| Food or Kindred Products | 1% |
| Fresh Fish or Marine Products | 1% |
| Miscellaneous Manufacturing Products | 1% |
| Farm Products | 1% |
| Textile Mill Products | <1% |
| Clay, Concrete, Glass, or Stone | <1% |
| Leather or Leather Products | <1% |
| Primary Metal Products | <1% |
| Total | 100% |

Source: 2007 Global Insight TRANSEARCH freight flow database.

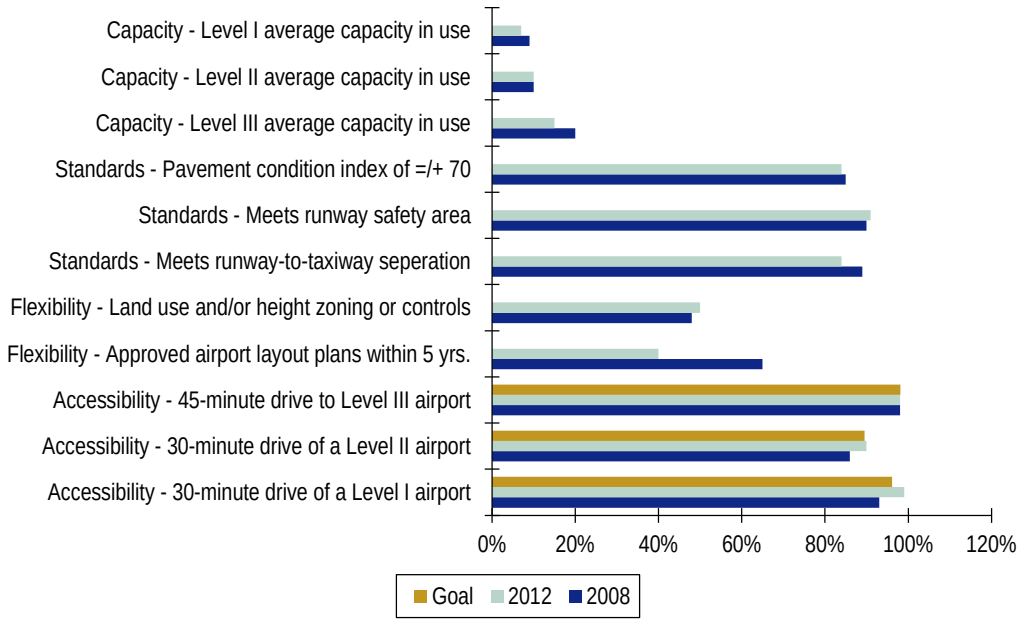
## 6.3 PERFORMANCE

All airports in the Georgia Aviation System are categorized into three levels, which create a baseline for evaluation in the GASP. Four performance measures were established by GDOT with specific benchmarks for each measure used to evaluate the aviation system. The performance measures defined in the GASP are as follows:

1. **Capacity –** Ability to provide airside/landside facilities to meet existing and future needs;
2. **Standards –** Ability to meet applicable design standards;
3. **Flexibility –** Compatibility of airports to meet the needs of local communities; and
4. **Accessibility –** Accessibility of system airports from both the air and ground.

Figure 6.7 shows a comparison of the 2008 versus 2012 performance data within the GASP analysis structure.

Figure 6.7 GASP Performance Measures Analysis
*Excludes HJAIA*




Source: GDOT 2013 Aviation System Plan.

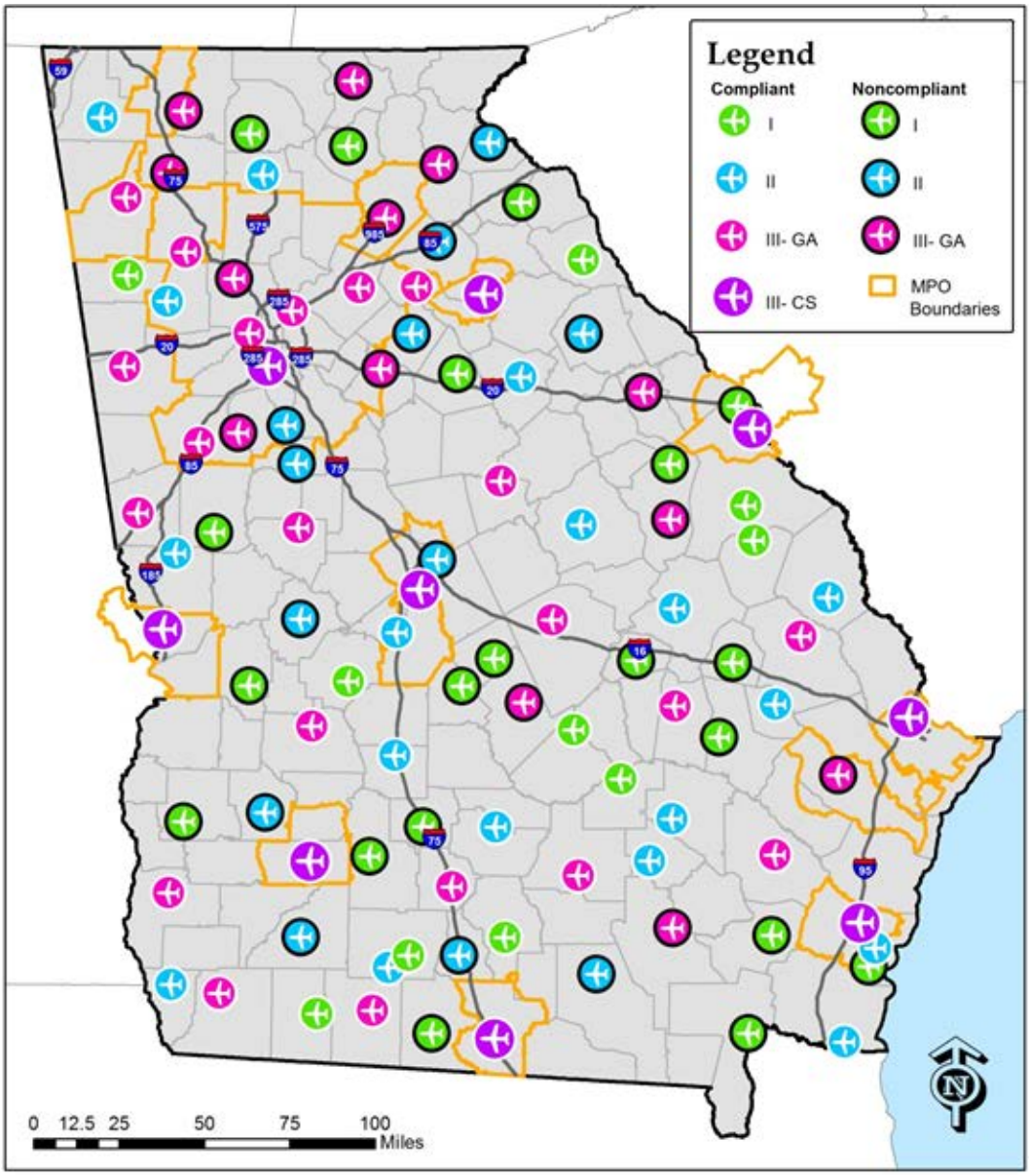
Analysis of the 2008 and 2012 performance measures provides a valuable cross section of how the aviation system in Georgia is operating today and how performance is trending over the last four years. The comparison shows that both Level III and Level I airports report reductions in capacity in use, while Level II airports have remained consistent. Airports at all levels have excess capacity. It is also demonstrated that fewer airports are meeting the pavement condition index standard and runway-to-taxiway separation, while compliance with meeting the Runway Safety Area (RSA) standard has improved.[28] Evaluation of the flexibility performance measures indicates that while more airports are implementing control measures on encroachment, there has been a significant reduction in the number of airports that have airport layout plans approved in the last five years. All levels of airports in the State are currently meeting or exceeding GDOT's goals for population accessibility within a 30- to 45-minute drive to Level I, II, and III airports (discussed further in Section 6.3.2).

### 6.3.1 Runway Lengths

One factor that determines the level of an airport is the runway length. Level I airports should maintain a runway length of 4,000 feet or greater; Level II airports should maintain a runway length of 5,000 feet or greater; and Level III airports should maintain a runway length of 5,500 feet or greater. Figure 6.8 (p. 6-14) shows all airports in the State by level and identifies those that are compliant with the minimum runway length for their operating level and those that are not in compliance with the minimum standards. There are currently 88 airports meeting minimum runway length standards and 16 airports with deficiencies. Analysis by level shows that 62 percent of Level I airports, 88 percent of Level II airports, and 100 percent of Level III airports are currently meeting minimum runway length standards. As shown in Figure 6.9 (p. 6-15), more airports at all levels are meeting runway length minimums in 2010 compared to 2005.

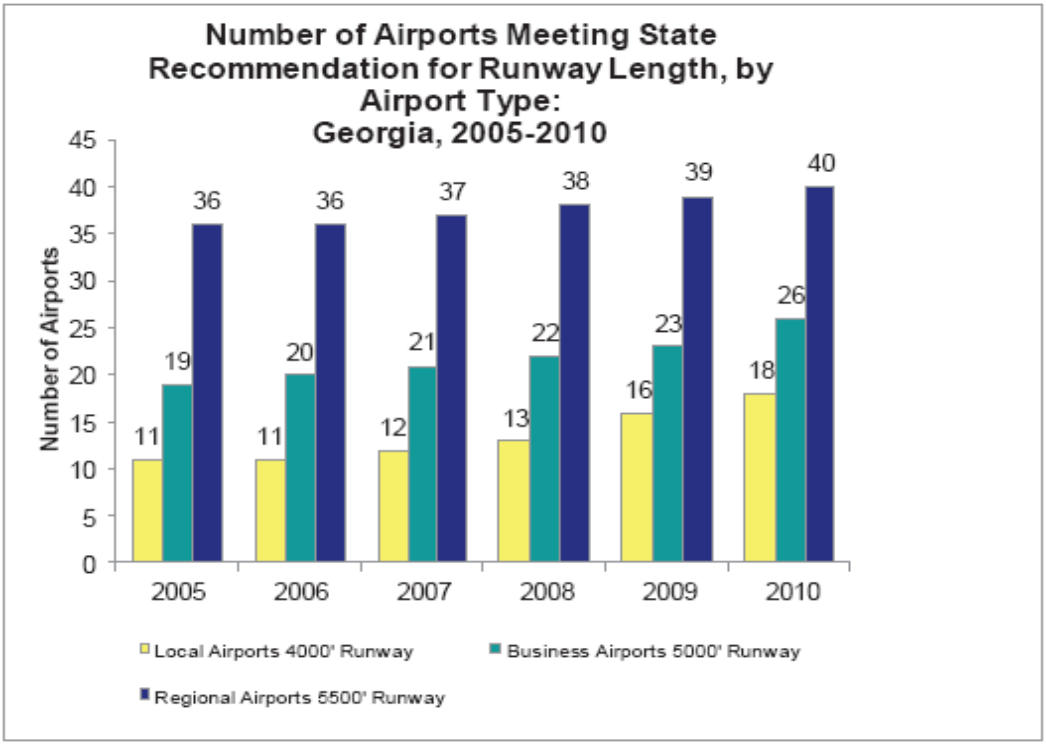
[28] Runway Safety Areas (RSA) are graded areas beyond the runway pavement to reduce the risk of damage to aircraft in the event of an undershoot, overshoot, or excursion from the runway.

Figure 6.8 Georgia Airports Runway Deficiencies




Sources: GDOT, FAA (September 2013).

Figure 6.9 Airport Runway Length by Airport Type




Source: OPB Georgia in Perspective – A Mobile Georgia.

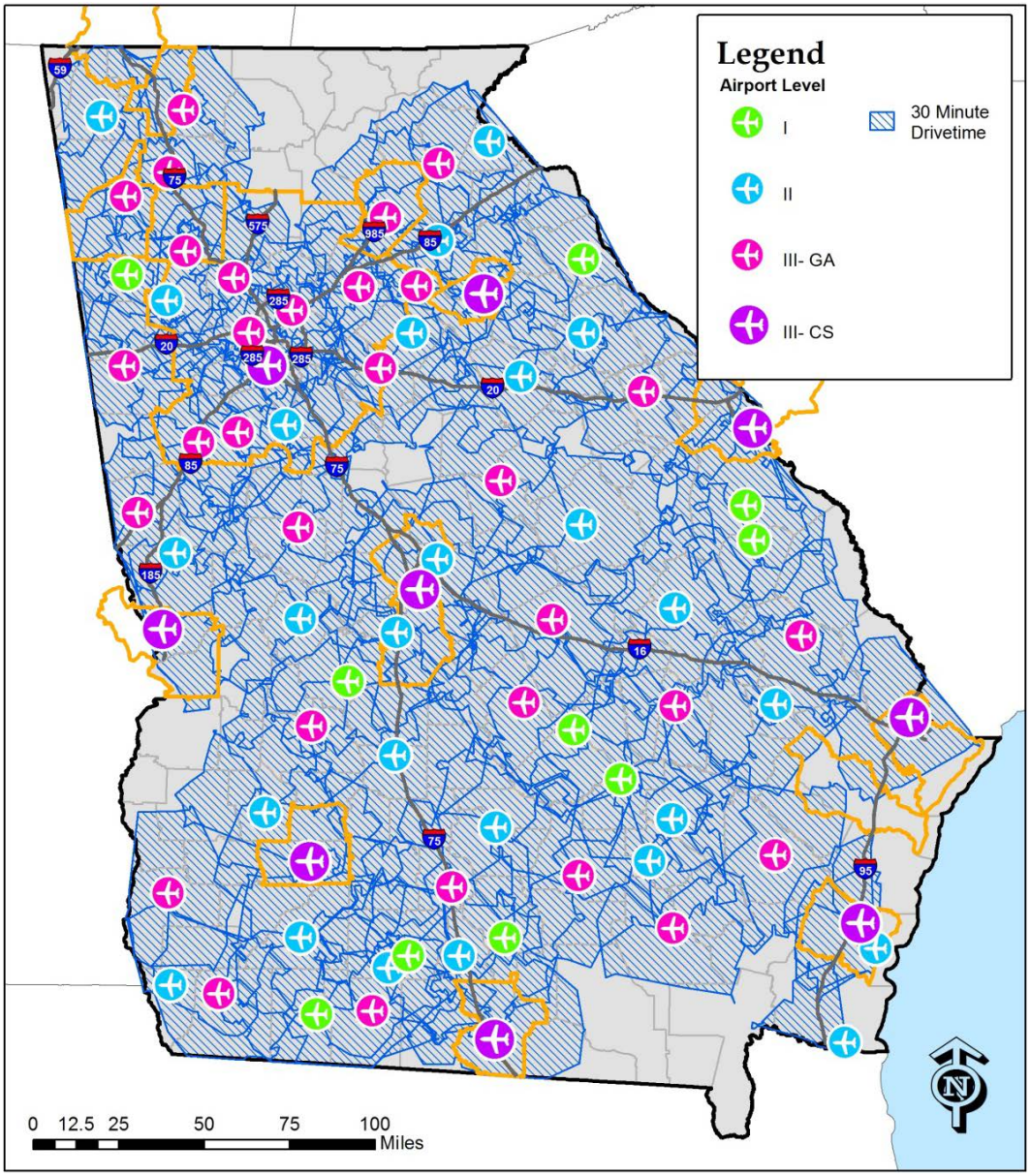
### 6.3.2 Airport Accessibility

According to the GASP, an airport system that is easily accessible is important to the State's transportation and economic objectives. The System Plan established the following targets for system accessibility:

- **Level I Airport –** Within a 30-minute drive time of all areas of the State;
- **Level II Airport –** Within a 30-minute drive time of all areas of the State; and
- **Level III Airport –** Within a 45-minute drive time of all areas of the State and a 60-minute drive time for commercial service airports.

General aviation airports with a runway length of 4,000 feet or greater are shown in Figure 6.10 with the adjacent population within a 30-minute drive time highlighted. The GASP set a performance goal of 96.1 percent accessibility to populations within a 30-minute drive time and Level I airports, as a group, currently exceed this goal by 2.9 percent.

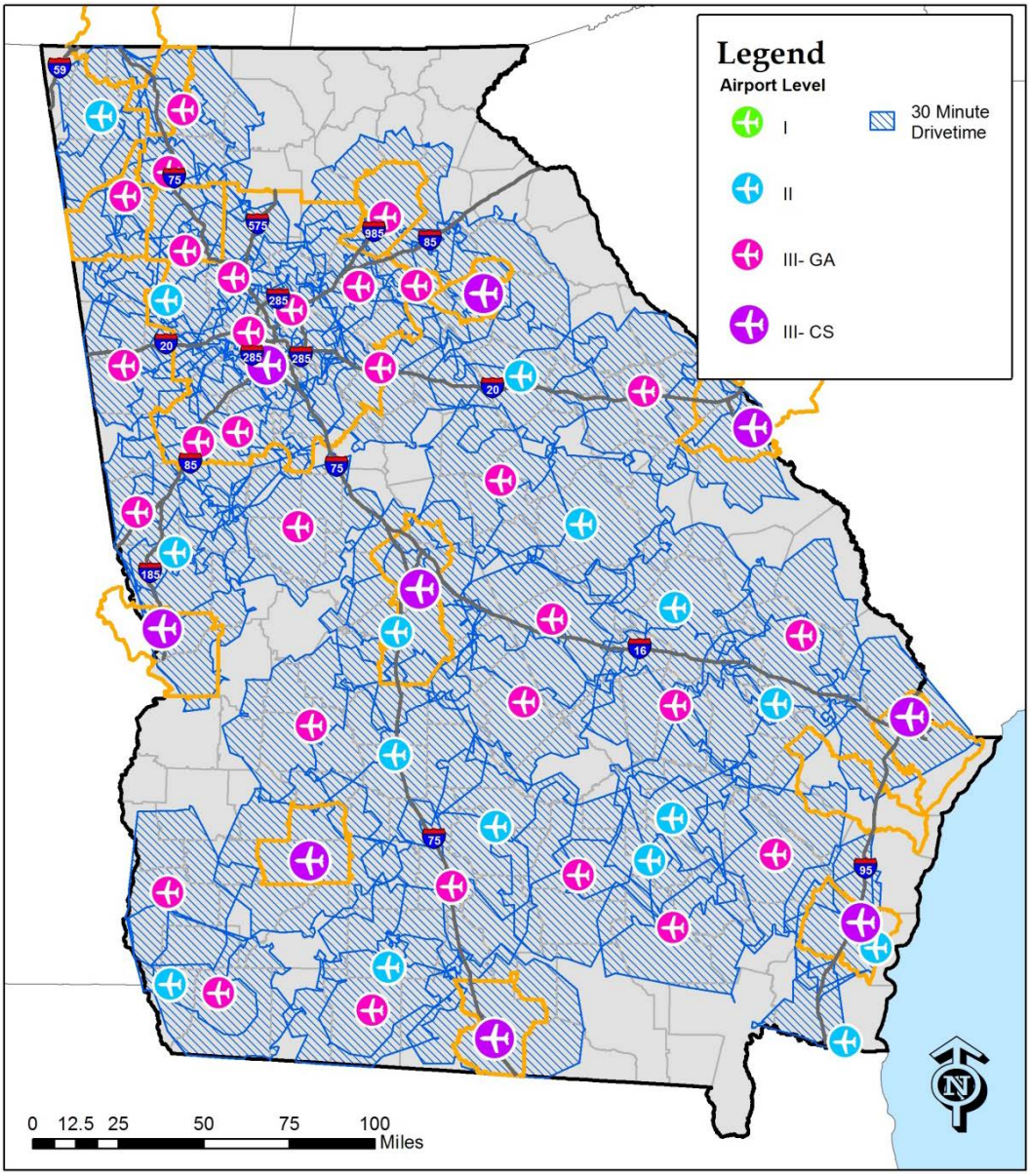
Figure 6.10 Airport Accessibility – 4,000-Foot Runway within a 30-Minute Drive Time




Sources: GDOT, FAA (December 2013).

The general aviation and commercial service airports with runway lengths of 5,000 feet or greater are shown in Figure 6.11 with the adjacent population within a 30-minute drive time highlighted. The GASP set a performance goal of 89.5 percent accessibility to populations within a 30-minute drive time and, as a group, airports with a runway length of 5,000 feet or greater currently exceed this goal by 0.5 percent.

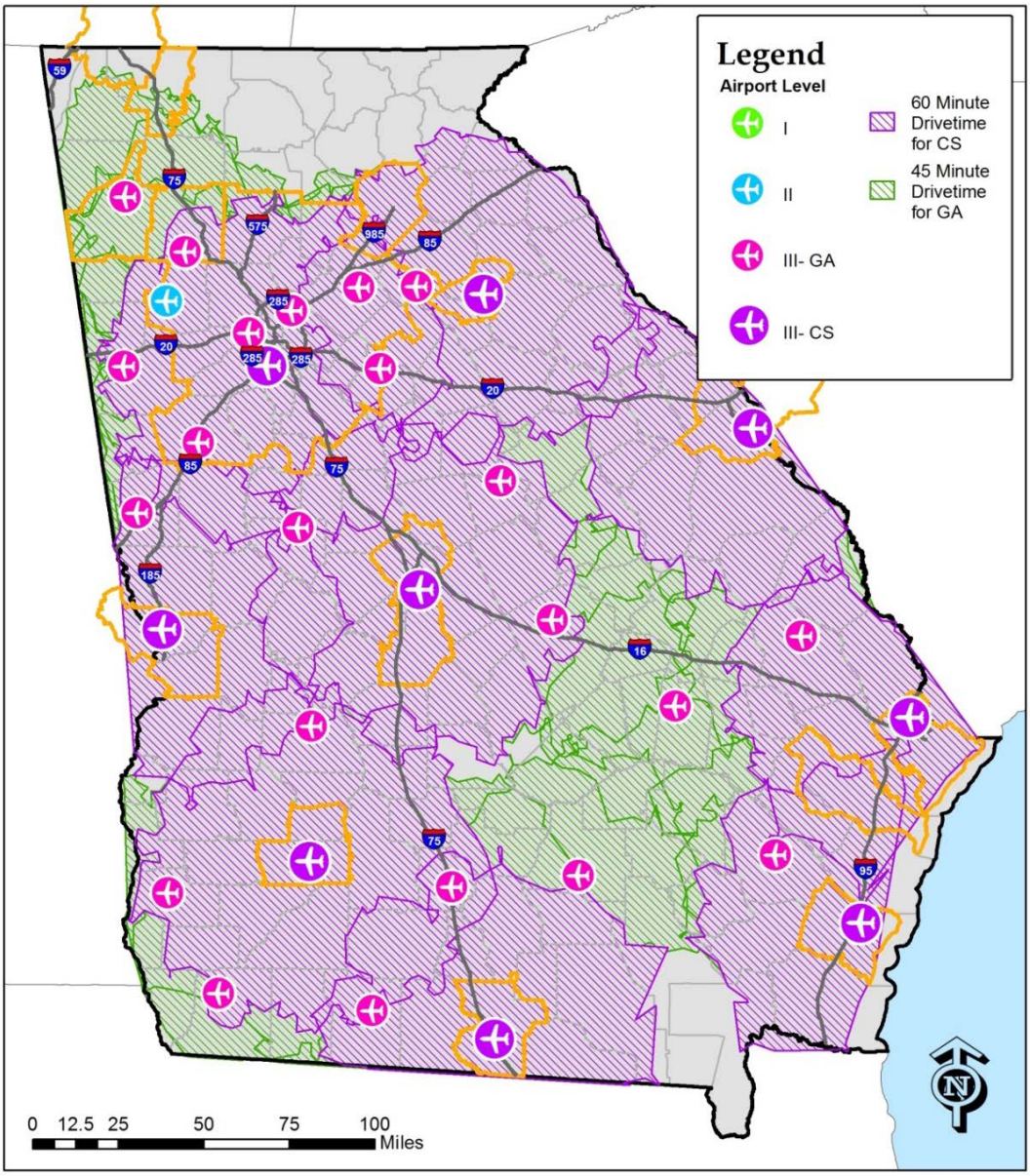
Figure 6.11 Airport Accessibility – 5,000-Foot Runway within a 30-Minute Drive Time




Sources: GDOT, FAA (December 2013).

The general aviation and commercial service airports with runway lengths of 5,500 feet or greater are shown in Figure 6.12 with the adjacent population within a 45- to 60-minute drive time highlighted. Service gaps are present predominantly in coastal regions and communities bordering the state line. The GASP set a performance goal of 98.1 percent accessibility to populations within a 45- to 60-minute drive time and, as a group, airports with a runway length of 5,500 feet or greater are currently reporting 98 percent coverage with a deficiency of only 0.1 percent.

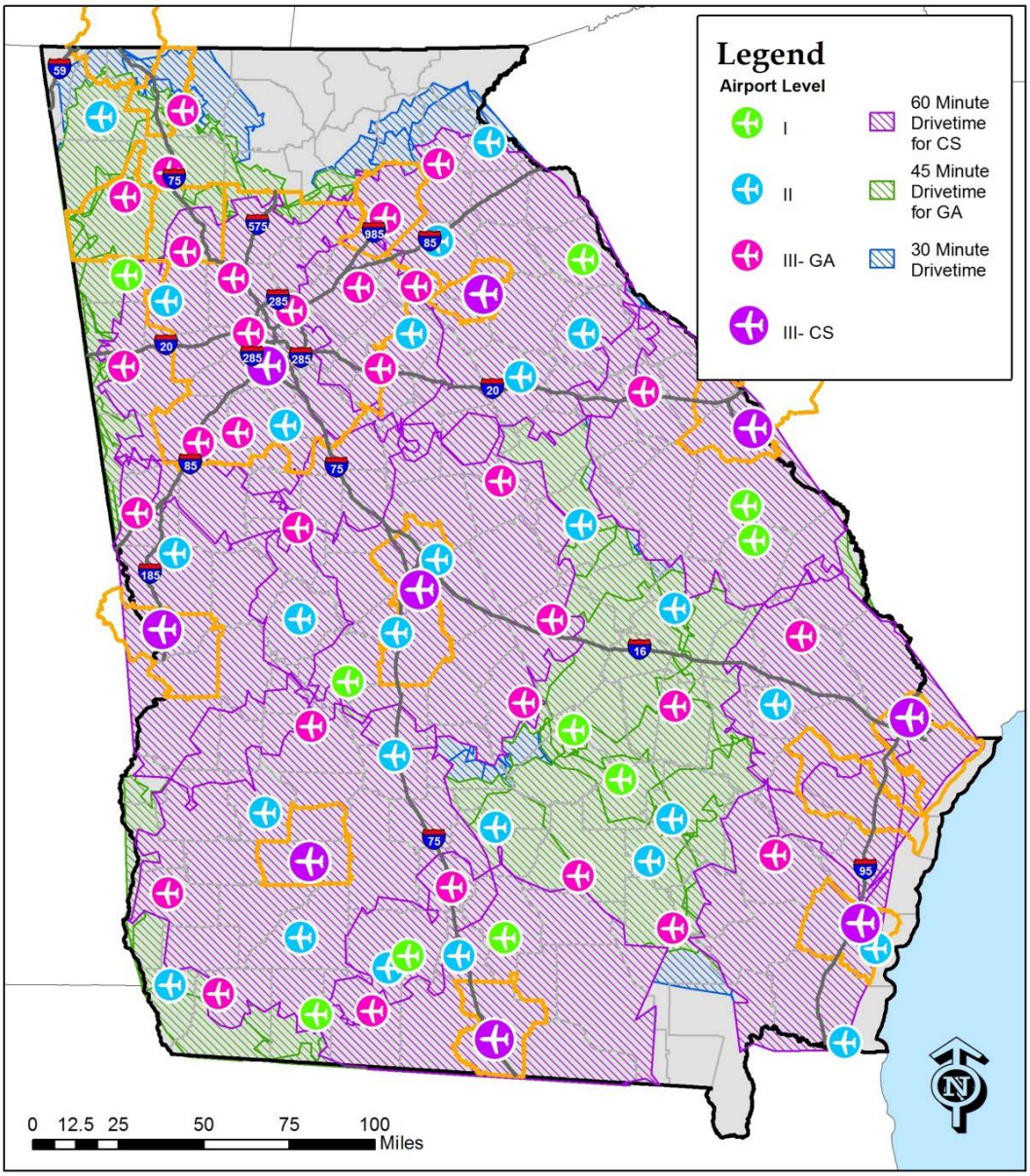
Figure 6.12 Airport Accessibility – 5,500-Foot Runway within a 45-Minute Drive Time/60-Minute Drive Time




Sources: GDOT, FAA (December 2013).

Figure 6.13 shows Georgia's general aviation and commercial service airports with the correlating travel times highlighted. This graphic demonstrates the full breadth of the aviation system in Georgia and shows that there are very limited populations that do not have reasonable access to airport services.

Figure 6.13 Consolidated Airport Accessibility
*Drive Time*




Sources: GDOT, FAA (December 2013).

## 6.4 SUMMARY OF MAJOR ISSUES/DEFICIENCIES

During the development of the GASP, a list of facility types and services that should be in place at airports for each functional level was established. The list provides a baseline by which all airports can be evaluated and scored to determine if they are meeting the State's objectives for service and performance.

### 6.4.1 Summary of Level I Airports

Table 6.6 shows data from the GASP illustrating the minimum standards for a Level I airport used to demonstrate the types of objectives by which each airport will be evaluated. Each airport is evaluated against the minimum requirements established for its facility and service level.

Table 6.6 GASP Minimum Service and Facility Standards for Level I Airports

| Airside Facilities | Minimum Requirements |
|---|---|
| Runway Length | 4,000 feet |
| Runway Width | 75 feet |
| Taxiways | Full parallel desirable; turnarounds at each end minimum objective |
| Lighting System | MIRL and MITL |
| Approach | Nonprecision |
| NAVAIDs/Visual Aids | Rotating beacon, segmented circle, and wind cone; PAPIs, and other aids as required for nonprecision approach |
| General Aviation Facilities | Minimum Requirements |
| Hangared Aircraft Storage | 60% of based aircraft fleet |
| Apron Parking/Storage | 40% of based aircraft fleet plus an additional 25% for visitors/employees |
| Services | Minimum Requirements |
| Fuel | AvGas and/or jet fuel as required |
| FBO | Limited Service |

Source: 2003 GASP.

The most significant deficiencies noted for Level I airports include the need to install Medium Intensity Taxiway Lights (MITL), Precision Approach Path Indicators (PAPI), and Medium Intensity Runway Lights (MIRL), and a lack of Fixed-Base Operation (FBO) services. The most common facility deficiencies include a lack of taxiway turnarounds and insufficient terminal space and parking facilities. Despite insufficiencies reported by Level I airports, there has been a significant increase in the compliance rate from 49 percent compliant in 2008 to 63 percent meeting minimum service and facility requirements in 2012.

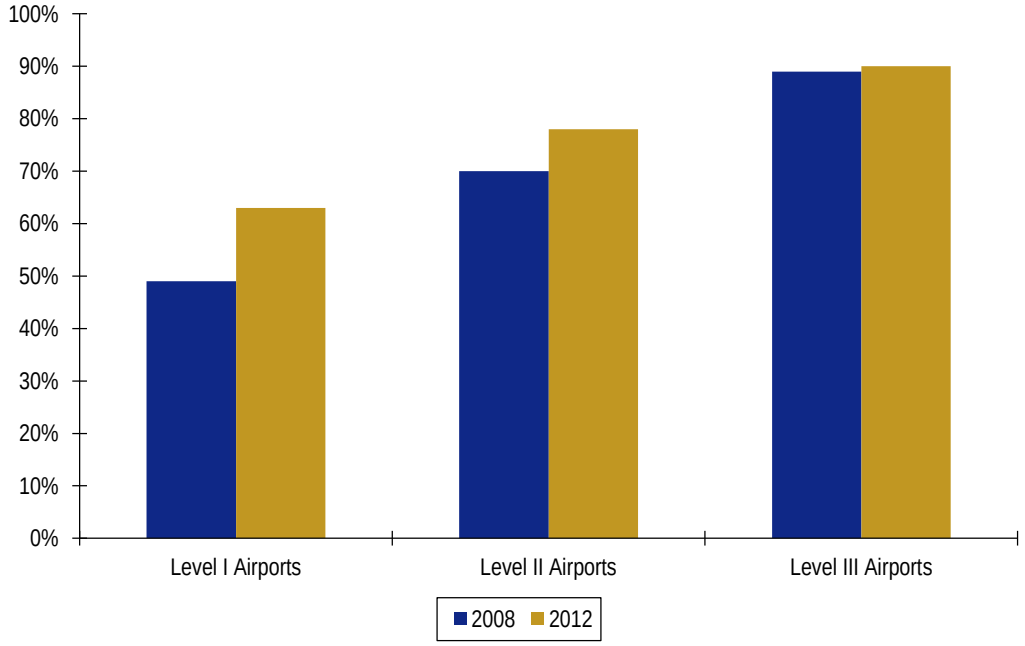
### 6.4.2 Summary of Level II Airports

Level II airports have seen an increase in compliance meeting the minimum service and facility requirements from 70 percent compliant in 2008 to 78 percent compliant in 2012. The most consistent deficiencies reported by Level II airports include lack of MITL, no Automated Surface Observing System (ASOS/AWOS) for weather tracking, and a lack of rental car services. The facility deficiency for Level II airports that has the greatest impact on capacity and performance is insufficient runway length with an average deficiency of approximately 965 feet.

### 6.4.3 Summary of Level III Airports

Level III airports have the largest compliance rate in the Georgia aviation system from a compliance rate of 89 percent in 2008 to 90 percent in 2012. The most frequently reported deficiencies include a lack of precision approach equipment, needed upgrades from MIRL to High-Intensity Runway Lights (HIRL), insufficient hangar spaces, and a need for additional parking facilities. Figure 6.14 shows a comparison of facilities that meet minimum facility and service objectives by level from 2008 to 2012.

Figure 6.14 Percentage of Georgia Airports Meeting Service and Facility Objectives



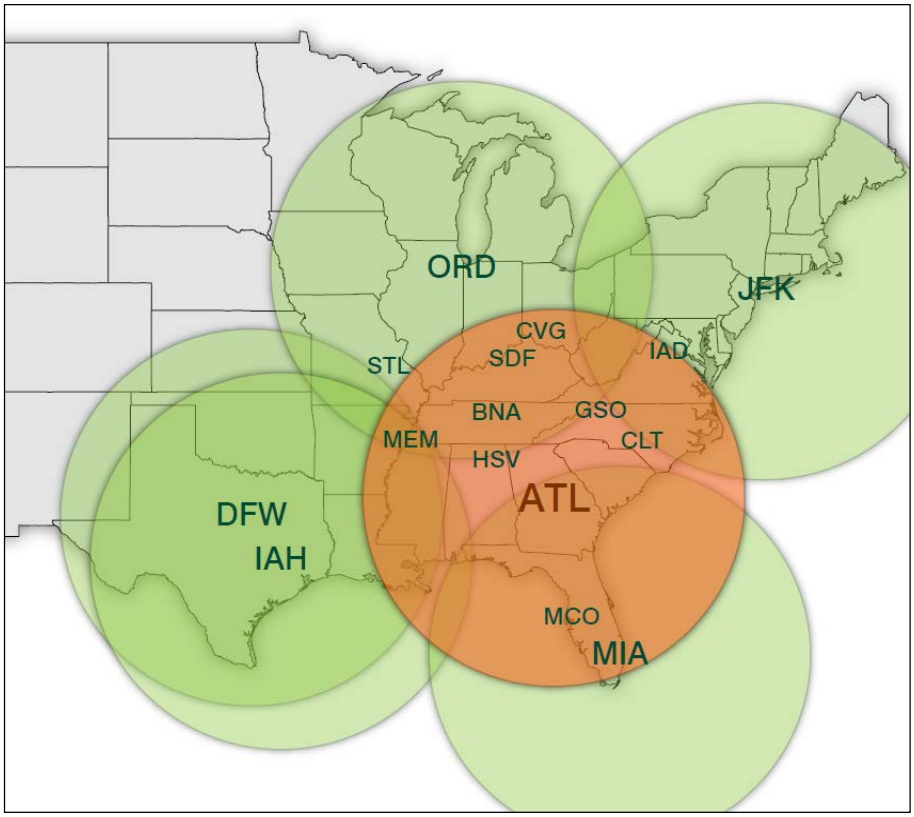

Source: GDOT Intermodal 2013 Aviation System Plan Summary.

### 6.4.4 Summary for Cargo Airports

The economic benefit of HJAIA's cargo operations is quite significant. According to HJAIA's 2009 Economic Impact Study, air cargo operations at the airport generated 31,385 direct, indirect, and induced jobs for the Atlanta region. This economic activity amounts to $7.4 billion in additional business revenue and $1.8 billion in additional personal income in the Atlanta region

While there are no current cargo capacity restraints at HJAIA, there are challenges to growing its cargo operations. John F. Kennedy International Airport (JFK) in New York has a geographic advantage to service air cargo markets in the heavily populated northeast U.S. Miami International Airport (MIA) has a geographic advantage to service Florida. Chicago's O'Hare International Airport has a geographic advantage to service the Midwest markets, and both Dallas/Fort Worth International Airport (DFW) and Houston's George Bush International Airport (IAH) in Texas have a geographic advantage to capture flights from Asia. The catchment area of airports tends to be roughly one day's truck drive (500 miles) with the areas of the aforementioned airports shown in Figure 6.15. This figure shows the stiff competition that Atlanta faces in all directions in terms of capturing air cargo traffic.

Figure 6.15 International Air Cargo Catchment Areas




Source: Georgia Department of Transportation, Freight, and Logistics Plan, 2012.

Another important development for Georgia air cargo was the recent purchase of AirTran Airways by Southwest Airlines. AirTran did not carry air cargo, while Southwest Airlines does. In 2010, Southwest Airlines reported $125 million of revenue from air cargo compared to $850 million by Delta Airlines. The addition of Southwest Airlines to HJAIA will provide more options and flexibility for shippers and forwarders that utilize air cargo. This will be particularly noteworthy for domestic air cargo, because the vast majority of Southwest Airlines flights are domestic.

The second largest cargo airport, the Southwest Georgia Regional Airport in Albany, currently is considering plans to improve its runway capacity to accommodate the increased weight of the existing daily UPS Airbus 300 freighters and potential Boeing 757 and Boeing 767 freight aircraft in the future.[29]

[29] Georgia Department of Transportation, Freight and Logistics Plan, 2012.

# 7.0 Marine Ports

## 7.1 INVENTORY OF FACILITIES

Much of the information from this chapter has been extracted from the Georgia Statewide Freight and Logistics Plan which was completed in 2012 with several updates to reflect the most recently available data for freight movement in Georgia.

The vast majority of the marine tonnage moves through publicly owned terminals, which are operated by the Georgia Ports Authority (GPA). GPA's port facilities include the following:

- **The Port of Savannah –** The terminals at this Port specialize in the handling of container, refrigerated, break-bulk, and roll-on/roll-off (RoRo) cargoes.[30] The Garden City Terminal primarily handles containers. It is located on the Savannah River about seven miles northwest of downtown Savannah. This is the largest of all of the GPA's facilities and the largest single terminal container operation in North America. Ocean Terminal is the GPA's break-bulk activity center near downtown Savannah. It has 96 acres of outside storage and 1.4 million square feet of warehousing. It also includes transit shed space that back up 10 berths for cargoes like linerboard, lumber, and steel.
- **The Port of Brunswick –** The terminals at this Port specialize in the handling of break-bulk, agri-bulk, and roll-on/roll-off (RoRo) cargoes; and provide service for importers and exporters of forest products, paper products, bulk commodities, and automobiles. The terminals at this Port include Colonel's Island Terminal RoRo Facility and Agri-Bulk Facility, Mayor's Point Terminal, and Marine Port Terminal.
- **The Port of Bainbridge –** This port is located along Georgia's inland waterways on the Apalachicola-Chattahoochee-Flint Waterway. Port Bainbridge primarily handles bulk commodities that are shipped by barge such as gypsum, cottonseed, and cypress bark mulch.
- **The Port of Columbus –** This port is also located on Georgia's inland waterways along the Chattahoochee Intracoastal Waterway. Port Columbus has been inoperable for several years due to low water levels on its inland waterway system.

There are also dozens of private terminals along the Georgia coast and the inland waterways. These terminals are typically owned and operated by companies that

[30] Break-bulk is non-containerized cargo shipped as a unit such as barrels, boxes, cartons, drums and pallets. Roll-on/roll-off cargo are items that can be driven off of ships such as automobiles and other transportation equipment.

exclusively ship their own products as opposed to third-party terminal operators. The majority of goods shipped through private ports are bulk and dry-bulk goods along with fuel and fuel oils to power local manufacturing operations. Table 7.1 shows some of the largest privately owned port terminals in the State.

## Table 7.1 Private Port Facilities in Georgia

| Private Port Facilities | Type of Goods | Key Port Features |
|---|---|---|
| 76 Lubricants Co. | Receipt and shipment of petroleum products | 150,000 barrel storage capacity |
| Atlantic Wood Industries Wharf | Shipment of timber and timber products | 35 acres open storage |
| Brunswick Oil Wharf | Receipt of fuel oil for plant consumption | 20,000 barrel storage tank. Railway and highway connections |
| Citgo Asphalt Refining Co. | Receipt of crude oil. Shipment of petroleum products. Shipment and occasional receipt of asphalt | 1.1 million barrels total capacity |
| Colonial Terminals Savannah Plant No. 1 | Receipt and shipment of petroleum products, petrochemicals, and chemicals. Loading of marine diesel fuel. | 1.7 million barrel capacity storage tanks |
| Colonial Terminals Savannah Plant No. 2 | Shipment and occasional receipt of dry-bulk commodities, including kaolin and fertilizer. Shipment of liquid kaolin | 770,000 barrel storage tank capacity |
| East Coast Terminal Co. | Receipt and shipment of conventional and containerized general cargo, steel products, liner board, and wood pulp. Receipt of cement clinker, bauxite, gypsum and liquid sulfur | 4 transit sheds; 28 acres open storage; 1 million gallon storage tank capacity |
| Georgia Kaolin Terminals | Shipment of dry-bulk materials, including kaolin. Receipt and shipment of break-bulk materials, including lumber, steel products. Shipment of bagged clay | 130,000-square-foot warehouse for break-bulk commodities |
| Georgia Steamship Co. | Receipt and shipment of conventional general cargo, paper rolls, lumber, plywood, supplies, and equipment | 48 acres open storage. 230,000 square feet covered storage |
| Gold Bond Building Products | Receipt of gypsum rock | Open storage for 1,000,000 tons. One receiving hopper for self-unloading vessels |
| GP Gypsum Corp. | Receipt of gypsum rock and limestone by self-unloading vessels | Railroad track connection to CSXT; 250,000-ton capacity |
| International Paper Savannah Barge Wharf Port Facility | Shipment of paperboard by barge. Receipt of fuel oil for plant consumption | 660 x 75-foot steel frame metal-covered building. Fuel oil plant consumption received from adjacent Citgo Asphalt Refining |
| Koch Materials Co. | Receipt of asphalt | 245,000 barrel capacity storage tanks |
| Savannah River Wharf Co. | Receipt and shipment of dry-bulk commodities, including wood chips; Receipt of aggregate | 250,000-ton open storage capacity |

| Private Port Facilities | Type of Goods | Key Port Features |
|---|---|---|
| Savannah Sugar Refinery Wharf | Receipt of raw sugar and molasses. Receipt of fuel oil for plant consumption | 3.7 million gallon capacity storage tanks. 150,000-ton covered storage area |
| Southern Bulk Industries | Receipt and shipment of break-bulk commodities, including logs, steel and gypsum board | Covered storage to 100,000 square feet |
| Southern LNG | Receipt of liquefied natural gas | pipelines extend to 1.2 million barrel storage capacity |
| ST Services, East Tank Farm | Receipt of petroleum products | 543,850 barrel storage capacity |
| ST Services, West Tank Farm | Receipt and shipment of petroleum products | 318,000 barrel storage capacity |
| Standard Concrete Products | Shipment of precast-concrete products by barge | 7 acres of open storage area |
| Marcona Ocean Industries Dock Port Facility | Receipt of dry-bulk materials, including argonite, calcite, titanium ores and slag | 200,000-ton capacity open storage area for dry-bulk |
| Savannah Electric and Power Co. Plant Kraft | Receipt of coal and fuel oil for plant consumption | 200,000-ton open storage capacity for coal. 30,000 barrel fuel oil storage tank |
| Blue Circle Cement Co. | Receipt of bulk cement | 30,800-ton storage capacity for bulk cement |
| Quality Seafood Co. | Receipt of seafood | N/A |
| Georgia Pacific Corp | Receipt of fuel oil for plant consumption | 20,000 barrel storage capacity |

Source: U.S. Army Corps of Engineers.

## 7.2 CAPACITY

One method to measure the capacity of a port is the depth of the berth and channel. The depth of the port determines the size of the ship that can access the port. The current Port of Savannah channel depth is 42 feet at mean low water (MLW) conditions. This is well short of the 47 feet needed to consistently service the larger ships that will start traveling through the Panama Canal in 2015. The port can currently only handle larger ships during high tide periods. There are several ports on the East Coast that already have deeper channels and berths than the Port of Savannah, as shown in Table 7.2 (p. 7-4). Due to the highly competitive nature of attracting port traffic and the importance of the port to Georgia's economy, the lower channel depth of the Port of Savannah is a significant disadvantage for the State.

## Table 7.2 Current Atlantic Channel and Berth Depths for Major Container Ports
*Q3 2010*

| Port | Terminal | Channel Depth Range (Feet) | Berth Depth Range (Feet) |
|---|---|---|---|
| Savannah | Garden City | 42 | 42-48 |
| Baltimore | Seagirt | 36-50 | 45 |
| | Dundalk | 36-50 | 34-46 |
| | North Locust Point | 36-50 | 34 |
| | South Locust Point | 36-50 | 30-36 |
| Boston | Conley Container Terminal | 35-40 | 35-45 |
| Charleston | Columbus Street | 47 | 40 |
| | North Charleston | 47 | 40 |
| | Wando Welch | 47 | 45 |
| Jacksonville | Blount Island | 38 | 38 |
| | Talleyrand | 38 | 38 |
| Miami | Lummus Island | 36-44 | 42 |
| | Seaboard Marine Terminal | 36-44 | 50 |
| New York/ New Jersey | Maher Terminals | 40 | 45 |
| | APMT | 40 | 45 |
| | Port Newark | 40 | 40-50 |
| | Red Hook Marine | 45 | 42 |
| | Global Terminal | 45 | 42 |
| | New York Container Terminal | 45 | 35-42 |
| Philadelphia | Packer Avenue | 40 | 40 |
| | Tioga Marine Terminal | 40 | 36 |
| | Tioga Cont.(RoRo Berth) | 40 | 36 |
| Port Everglades | Midport/Northport | 45 | 38 |
| | Southport Container Terminal | 45 | 44 |
| Virginia | APM Terminals (Portsmouth) | 50 | 49-56 |
| | Newport News | 40 | 36-40 |
| | Norfolk International Terminal | 50 | 50-55 |
| | Portsmouth | 43 | 40 |
| Wilmington, Delaware | Port of Wilmington | 38-40 | 38 |
| Wilmington, North Carolina | Wilmington, North Carolina | 42 | 38 |

Source: Moffat and Nichol.

Another way to measure the capacity of a port is to consider the number of containers that can be moved through the facility assuming maximum output of the port's footprint. This output is impacted by the number of berths, the size of berths, the number and size of cranes, and other operational characteristics of the port. Based on the availability of space, equipment, and technology at the Port of Savannah, the capacity of the current port operations is approximately 4 million 20-foot equivalent units (TEUs) today. The long-term maximum capacity of the port is approximately 6.25 million TEUs.

## 7.3 USE

Port volumes at GPA ports had record highs for fiscal year 2013 (July 2012 to June 2013) in total tonnage, bulk cargo, total auto-machinery units, and freight moved by intermodal rail; 27.2 million tons of cargo were moved across all of the GPA terminals in FY 2013. Bulk cargo was up by 61.8 percent from 2012, or 964,392 tons, to reach 2.5 million tons in FY 2013. At the East River Terminal in Brunswick, biofuels, including wood pellets helped to drive the terminal to a 151,896-ton bulk cargo improvement over FY 2012 to reach 663,441 tons of bulk cargo in FY 2013.

FY 2013 auto and machinery units were at an all-time high of 636,942 units – an increase of 66,958 relative to the previous year. Volume increases in FY 2013 were in part due to business from new customers, including Subaru and Toyota. Other factors include heavy machinery exports from companies like Caterpillar, contributing to a 127,830-ton increase in break-bulk tonnage at the Colonel's Island terminal. The FY 2013 volumes by commodity group are shown in Table 7.3 (p. 7-6). Measured in TEUs, the GPA's throughput for FY 2013 was 2.94 million TEUs which is steady relative to the previous years. Of the total container volume, a record number, 314,623 containers, were moved by intermodal rail.

The Port of Savannah is by far the largest port in the GPA complex in terms of TEUs, tonnage, and dollar value as shown in Table 7.4 (p. 7-6). The Port of Savannah is also the fastest growing container port in the U.S. over the last three decades, growing from just 200,000 TEUs in 1980 to nearly 3 million TEUs today. In 2000, the Port of Savannah was not a top 10 container port in the U.S. and now it is consistently ranked as the fourth largest port. The Port of Savannah was the second busiest U.S. container port for the export of American goods by tonnage in FY 2013. It also handled 8.7 percent of the U.S. containerized cargo volume and 12.5 percent of all U.S. containerized exports in FY 2013. Table 7.5 (p. 7-6) shows the volumes at the top ports in the U.S. over the past 30 years. The Port of Brunswick is the second busiest port in the GPA complex, the third busiest port in the U.S. for total roll-on/roll-off cargo, and the second busiest port for the import of such cargo.

## Table 7.3 Volumes by Commodity Groups in Georgia, FY 2013

*Total Annual Tonnage for Fiscal Year 2009 through 2013 (in Short Tons)*

| | 2009 | 2013 | Percent Growth (Four Years) |
|---|---|---|---|
| Container | 18,397,312 | 22,206,101 | 21% |
| Noncontainer | 4,234,529 | 5,029,473 | 19% |
| Break-bulk | 1,873,483 | 2,504,325 | 34% |
| Bulk | 2,361,046 | 2,525,148 | 7% |
| Total Tonnage | 22,631,841 | 27,235,574 | 20% |

Source: Georgia Ports Authority.

## Table 7.4 Volumes by Port in Georgia, FY 2010

| Port (FY 2010) | Containers | Tons | Dollar Value |
|---|---|---|---|
| Port of Savannah | 2,927,371 | 23,758,563 | $9,100,985,875 |
| Port of Brunswick | 0 | 2,180,334 | $287,325,556 |
| Port of Bainbridge | 0 | 82,521 | N/A |
| Port of Columbus | 0 | 0 | 0 |
| Total | 2,927,371 | 27,230,000 | $9,388,311,430 |

Source: Georgia Ports Authority.

## Table 7.5 TEUs at Largest U.S. Container Ports

| | | | | | | | Growth | |
|---|---|---|---|---|---|---|---|---|
| Port | 1980 | 1990 | 2000 | 2008 | 2009 | 2012 | 1980-2012 | 2009-2012 |
| Los Angeles | 0.6 | 2.1 | 4.9 | 7.9 | 6.7 | 8.1 | 1,250% | 21% |
| Long Beach | 0.8 | 1.6 | 4.6 | 6.4 | 5.1 | 6.0 | 650% | 18% |
| PANYNJ | 1.9 | 1.9 | 3.1 | 5.3 | 4.5 | 5.5 | 189% | 22% |
| Savannah | 0.2 | 0.4 | 0.9 | 2.6 | 2.4 | 3.0 | 1,400% | 25% |
| Oakland | 0.8 | 1.1 | 1.8 | 2.2 | 2.1 | 2.3 | 188% | 10% |
| Hampton Roads (Virginia) | 0.4 | 0.8 | 1.3 | 2.1 | 1.7 | 2.1 | 425% | 24% |
| Seattle | 0.8 | 1.2 | 1.5 | 1.7 | 1.6 | 1.9 | 138% | 19% |
| Houston | 0.3 | 0.5 | 1.1 | 1.8 | 1.8 | 1.9 | 533% | 6% |
| Tacoma | N/A[a] | 0.9 | 1.4 | 1.9 | 1.5 | 1.7 | N/A[a] | 13% |
| Charleston | 0.2 | 0.8 | 1.6 | 1.6 | 1.2 | 1.5 | 650% | 25% |
| Total U.S. (Mainland) | 7.4 | 14.4 | 27.5 | 39.7 | 34.3 | | | |

Source: American Association of Port Officials, Consultant Analysis.

[a] Tacoma did not track container traffic in 1980.

The importance of the Port of Savannah to Georgia's economy is demonstrated by the commodities that are shipped through the facility. Table 7.6 (p. 7-8) shows the top 10 import commodities for the State for 2012. Georgia's forestry/wood products industry was worth over $15 billion in 2011. The leading export commodity from the Port of Savannah over the past five years has been wood pulp with over 182,000 TEUs of the commodity exported in 2012. The third largest export commodity from the Port of Savannah is paper products which are closely linked to the forestry industry.

Georgia's agriculture industry farm gate receipts were worth over $13 billion in 2011. Food products are the second largest export from the Port of Savannah with 162,221 TEUs shipped in 2012. The two fastest growing export commodities through the Port of Savannah since 2008 are automotive products and fabrics (such as cotton). These are also critical industries for the State of Georgia. The exports of each of these products have grown over 70 percent since 2008.

The State of Georgia is the largest producer of kaolin in the world, and much of this commodity is shipped through the Port of Savannah. Clay products, primarily kaolin, is the fourth highest commodity with 97,138 TEUs of exports in 2012. This is a 2 percent decrease relative to the 2008 volume reflecting a stable, but still large industry for the State.

The largest commodities imported through the Port of Savannah are products that are ultimately sold to individual consumers. Table 7.7 (p. 7-8) shows the top 10 import commodities for Georgia for 2012. Furniture continues to be the top import with over 148,000 TEUs. This is followed by retail consumer goods with over 127,000 TEUs. Machinery, appliances, and electronics are the next largest import with over 122,000 TEUs. Automotive products are the fastest growing import commodity. This includes both fully assembled vehicles and automotive parts. Imports of this commodity have grown 60 percent since 2008 and now represent 104,173 of the total TEUs imported to the State.

The Port of Savannah is also unique relative to most top container ports, because it has a balanced import-export profile in terms of TEUs with a roughly 50-50 split between exports and imports. This balance can be contrasted with the other major container ports, which rely primarily on imports for their volumes.

The Port of Savannah has 37 weekly container services. This is second highest on the East Coast to the 39 weekly container services at the Port Authority of New York/New Jersey. This allows for servicing a large number of trade lanes around the world. Table 7.8 (p. 7-9) shows the loaded TEUs by trade lane for each of the major regions. The Asian trade lanes accounted for over 50 percent of Savannah's container volumes in 2012. This highlights the importance of the Panama Canal to the Port of Savannah and to the economy of Georgia. It is critical that the port is able to handle the types of ships that will benefit from the expansion of the Panama Canal.

## Table 7.6 Top 10 Commodity Groups for Exports into Savannah *In Loaded TEUs*

| Commodity Grouping | 2008 | 2012 | Percent Growth |
|---|---|---|---|
| Wood Pulp | 166,772 | 182,320 | 9% |
| Food | 127,026 | 162,221 | 28% |
| Paper Products, including Waste | 126,727 | 152,606 | 20% |
| Clay | 98,808 | 97,138 | -2% |
| Automotive | 51,501 | 90,598 | 76% |
| Fabrics, including Raw Cotton | 46,848 | 80,538 | 72% |
| Machinery, Appliances and Electronics | 62,809 | 74,835 | 19% |
| Chemical | 61,777 | 69,862 | 13% |
| Resins and Rubber | 61,047 | 63,374 | 4% |
| Retail Consumer Goods | 53,807 | 56,806 | 6% |
| Other | 157,678 | 198,421 | 26% |
| Total | 1,014,800 | 1,228,719 | 21% |

Source: Georgia Ports Authority.

## Table 7.7 Top 10 Commodity Groups for Imports into Savannah *In Loaded TEUs*

| Commodity Grouping | 2008 | 2012 | Percent Growth |
|---|---|---|---|
| Furniture | 186,153 | 148,612 | -20% |
| Retail Consumer Goods | 148,468 | 127,731 | -14% |
| Machinery, Appliances and Electronics | 116,601 | 122,257 | 5% |
| Automotive | 65,035 | 104,173 | 60% |
| Hardware and Housewares | 97,729 | 95,824 | -2% |
| Food | 67,415 | 78,231 | 16% |
| Apparel | 53,344 | 52,637 | -1% |
| Mineral | 56,156 | 50,643 | -10% |
| Toys | 50,067 | 42,991 | -14% |
| Chemical | 31,292 | 36,632 | 17% |
| Other | 214,573 | 218,259 | 2% |
| Total | 1,086,832 | 1,077,989 | -1% |

Source: Georgia Ports Authority.

Table 7.8 Top Trade Lanes for the Port of Savannah, FY 2012
*In TEUs*

| Trade Lane | TEUs | Percent of Total |
|---|---|---|
| Northeast Asia | 1,065,935 | 46% |
| Mediterranean | 268,537 | 12% |
| Southeast Asia | 232,231 | 10% |
| North Europe | 172,845 | 7% |
| Southern Asia/India | 123,637 | 5% |
| Middle East | 100,101 | 4% |
| East Coast South America | 70,047 | 3% |
| West Coast South America | 46,199 | 2% |
| Other | 227,174 | 10% |
| Total | 2,306,706 | 100% |

Source: Port Import-Export Reporting System.

Note: The Port of Savannah moved over 600,000 empty TEUs accounting for the difference between the 2.31 million TEUs shipped by trade lanes, and the total 2.98 million TEUs shipped through the port.

The port also has a significant impact on land usage in the Savannah region. There are 44.4 million square feet of industrial real estate in the Savannah market. This is much larger than the industrial square footage of other cities of similar population, as the Port of Savannah drives a great deal of industrial activity in the region. As of the end of 2012, the vacancy rate in the Savannah region was just 12 percent, slightly more than half of the 22 percent vacancy rate at the height of the recession when port volumes were at their lowest.

The Port of Savannah also generates a large volume of truck and freight rail traffic to deliver freight to final inland destinations. The most recently available truck count and origin-destination (O-D) survey data for trucks at and nearby to the Port of Savannah was collected for the 2006 GDOT Truck Lane Needs Identification Study. Truck count data at key locations is shown in Table 7.9 (p. 7-10). Estimates of truck volumes at these locations were projected to 2013 using container growth rates at the Port of Savannah from 2005 to 2013 using constant mode split assumptions. It is hoped that new survey data will become available from the GPA before this project is completed.

Average daily train volumes nearby to the Port of Savannah were estimated for 2010 in the Georgia Statewide Strategic Transportation Plan. Volumes were 1.77 for the Norfolk Southern Mason ICTF yard and 1.40 for the CSXT Chatham ICTF. This equates to over 3 trains per day and over 15 trains per week.

## Table 7.9 Daily Truck Counts in Savannah Region

| Site | Direction | Truck Volume (2005 Count) | 2013 Truck Volume (Estimate) |
|---|---|---|---|
| SR 21 Savannah | Northbound | 1,494 | 2,480 |
| SR 21 Savannah | Southbound | 1,576 | 2,616 |
| SR 25 Savannah | Northbound | 901 | 1,496 |
| SR 25 Savannah | Southbound | 783 | 1,300 |
| Port of Savannah | Gate 3 | 3,189 | 5,294 |
| Port of Savannah | Gate 4 | 2,128 | 3,532 |
| Port of Savannah | Gates 3 and 4 Total | 5,317 | 8,826 |

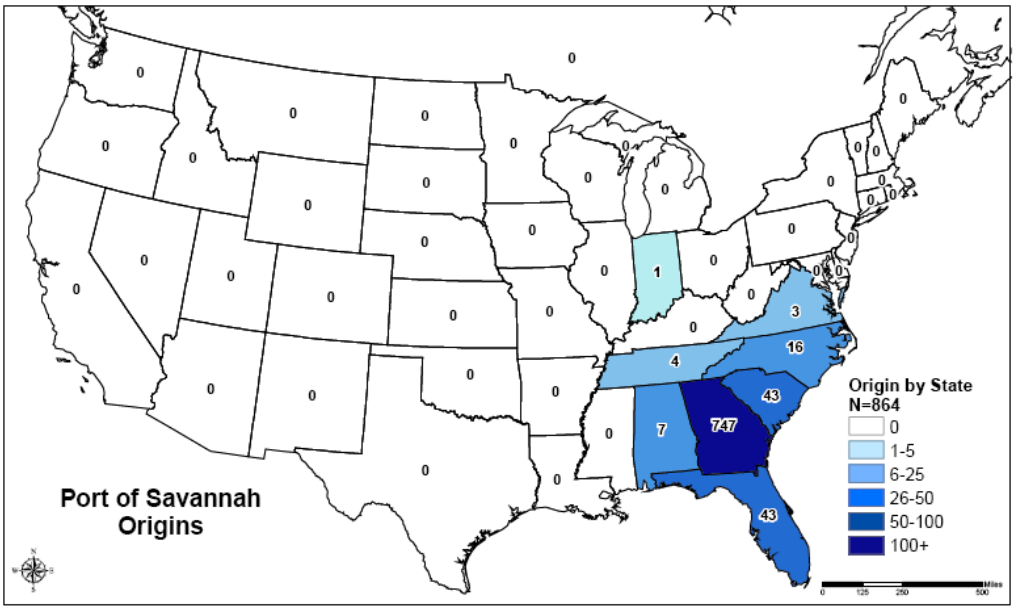
Source: GDOT Truck Lane Needs Identification Study and Cambridge Systematics, Inc.

A series of truck O-D surveys were conducted in the spring and summer of 2006 as part of the GDOT Truck Lane Needs Identification Study to collect real-world information on truck movements and O-D pairs throughout the State. Of most relevance for marine transportation in Georgia is that there were 411 surveys conducted at Gate 3 at the Port of Savannah and 476 surveys were conducted at Gate 4. These are the most heavily trafficked gates in the port representing roughly 80 percent of the total truck moves nearby in and out of the port gates.

The data collected through the port gate surveys is the most accurate available real-world depiction of the travel patterns of trucks generated due to port activity. As shown in Figure 7.1 (p. 7-11), the survey found that 86 percent (747 of 864 respondents) of the trucks arriving at the Port of Savannah are from locations within the State of Georgia, with the neighboring states of South Carolina and Florida representing roughly 5 percent of the total respondents, and only one truck originating from outside of the Southeastern United States.

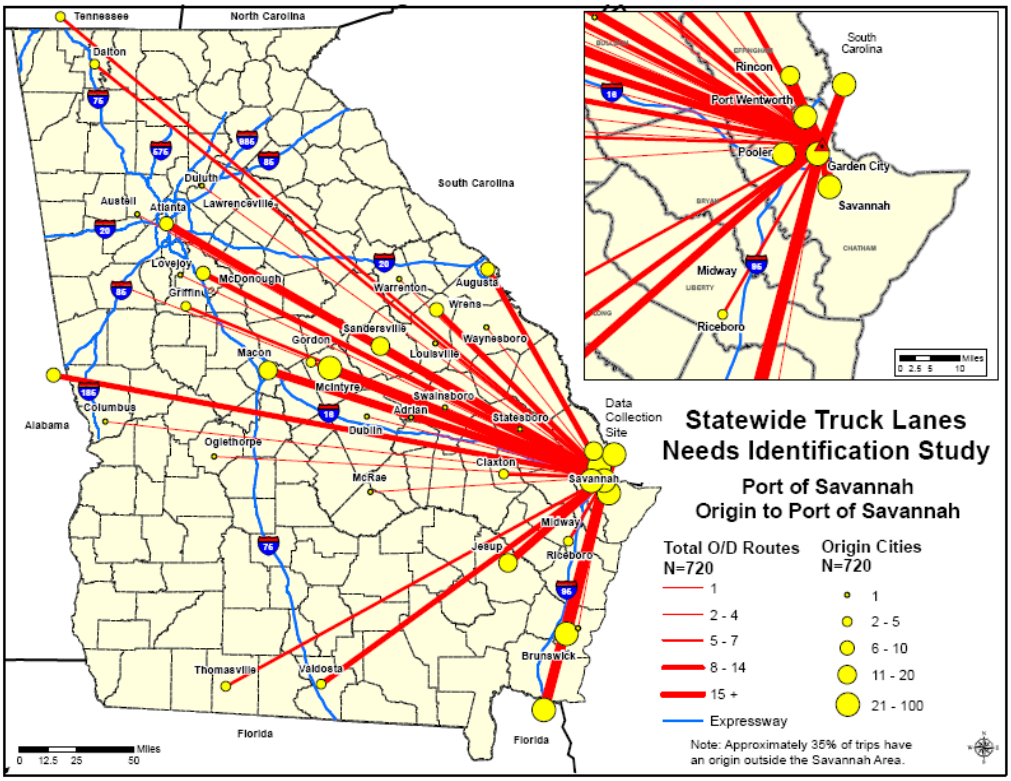
Figure 7.2 (p. 7-11) shows truck trip origins within the State of Georgia based on the port origin/destination surveys. Sixty-three percent of surveyed trucks had trip origins within Chatham County, with the vast majority of those trip origins occurring within a radius of a few miles of the Port of Savannah as shown in Figure 7.3 (p. 7-12). These survey results demonstrate that the vast majority of truck trips from the port are short-distance truck trips to and from the warehouse district nearby to the port.

## Figure 7.1 Distribution of Port of Savannah Truck Trip Origins within the United States



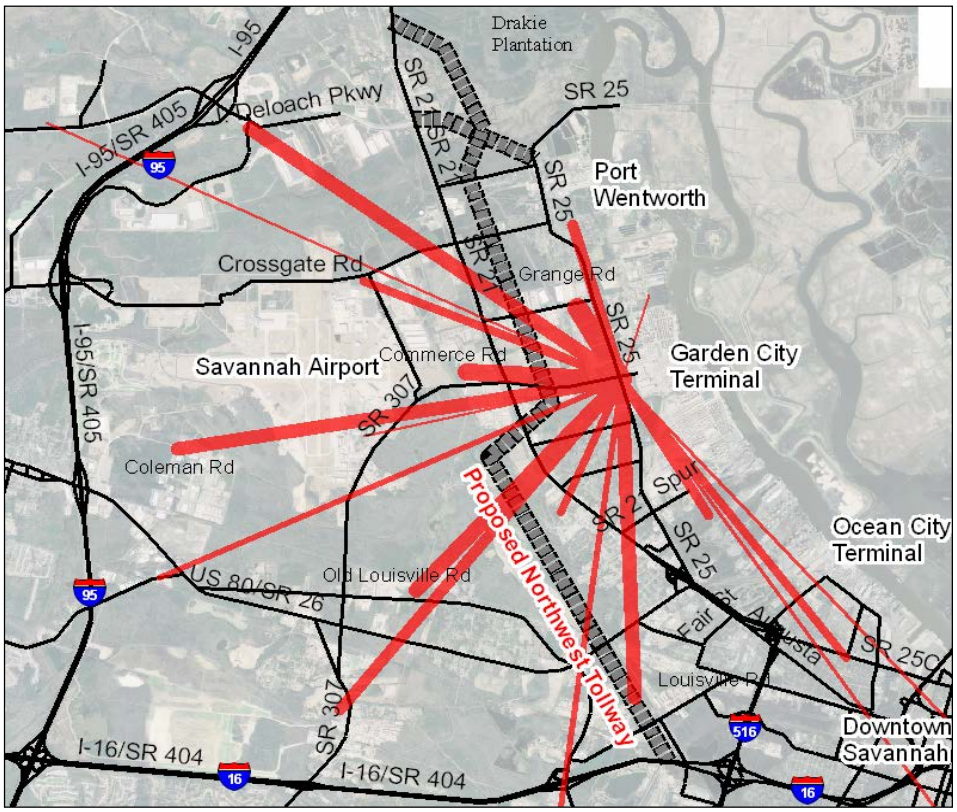

Source: GDOT Truck-Only Lane Needs Identification Study, 2006.

## Figure 7.2 Distribution of Port Truck Trip Origins within Georgia




Source: GDOT Truck-Only Lane Needs Identification Study, 2006.

## Figure 7.3 Distribution of Chatham County Port Truck Trip Origins




**Legend**

**OD Survey Data**

**Observed Trips**

- 1
- 2 - 4
- 5 - 7
- 8 - 16
- 17 - 21
- 22 - 26
- 27 - 34
- 35 - 58
- 59 - 60
- 61 - 131

Source: GDOT Truck-Only Lane Needs Identification Study, 2006.

## 7.4 PERFORMANCE AND MAJOR ISSUES/DEFICIENCIES

Savannah is the largest port in the U.S. that does not have a relatively large local population of consumers nearby the port location. Therefore, virtually all of the freight that moves through the Port of Savannah is destined for locations hundreds or thousands of miles away from the Port. This makes Savannah a discretionary port in that the ships that call at this Port could call at any number of ports on the East Coast. This is in contrast to the Ports of Los Angeles, Long Beach, New York/ New Jersey, Oakland, Seattle and Houston that all have a large local population of millions of consumers that is significantly easier to reach through the nearby port complexes. Even the Port of Virginia port complex in Hampton Roads has a local population of nearly 2 million in the Norfolk region and the much larger Washington, D.C. metropolitan region less than 200 miles away. All of these other ports will retain much of their ship traffic regardless of competitive forces in the marketplace. Therefore, the size of the Port of Savannah is in large part a reflection of the high overall performance of the Port of Savannah and its supporting road, rail, and warehouse/distribution center infrastructure.

However, there are a few performance issues related to the Port of Savannah. The current port channel depth of 42 feet at mean low water is a significant deficiency. Not being able to handle larger ships is likely to increase the cost of moving goods through the Port of Savannah as more ships would be needed to carry the same amount of goods. Figure 7.4 (p. 7-14) shows the impacts of the deepening and widening of the Panama Canal on the maximum ship size to travel through the canal. Post-Panamax ships are 2.5 times larger in terms of the number of containers relative to current Panamax ships. Additionally, there are several ports on the East Coast that already have deeper channels and berths than the Port of Savannah. Therefore, there is competitive pressure to deepen the harbor. The deepening of the Savannah Harbor, commonly referred to as the Savannah Harbor Expansion Project (SHEP) was noted as the most important freight project in the State of Georgia by the recently completed Georgia Freight and Logistics Plan.

The increased volumes at the Port of Savannah combined with the increased use of rail have also generated an increase in the number of trains traveling through at-grade rail crossings in the local Savannah region. The recent completion of the Highway 307 overpass removed 21 road crossings. However, as shown by the solid red dots on Figure 7.5 (p. 7-14), there are still several dozen more crossings in the region that impede automobile, truck, and train traffic from traveling at maximum speeds. The yellow, green, and red lines on this map show the current rail alignment through the Port of Savannah subregion and the red circles indicate grade-separated rail crossings. The orange dots depict the Garden City and Ocean Terminals.

Figure 7.4 Maximum Ship Sizes at Panama Canal Today and After Expansion

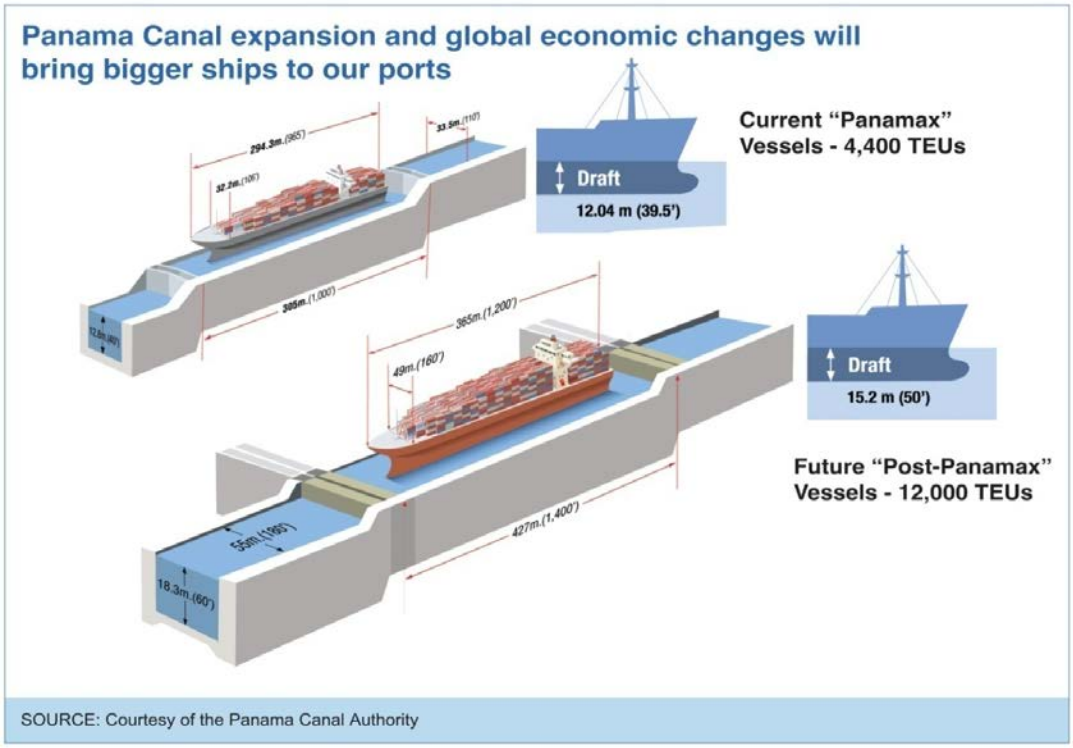
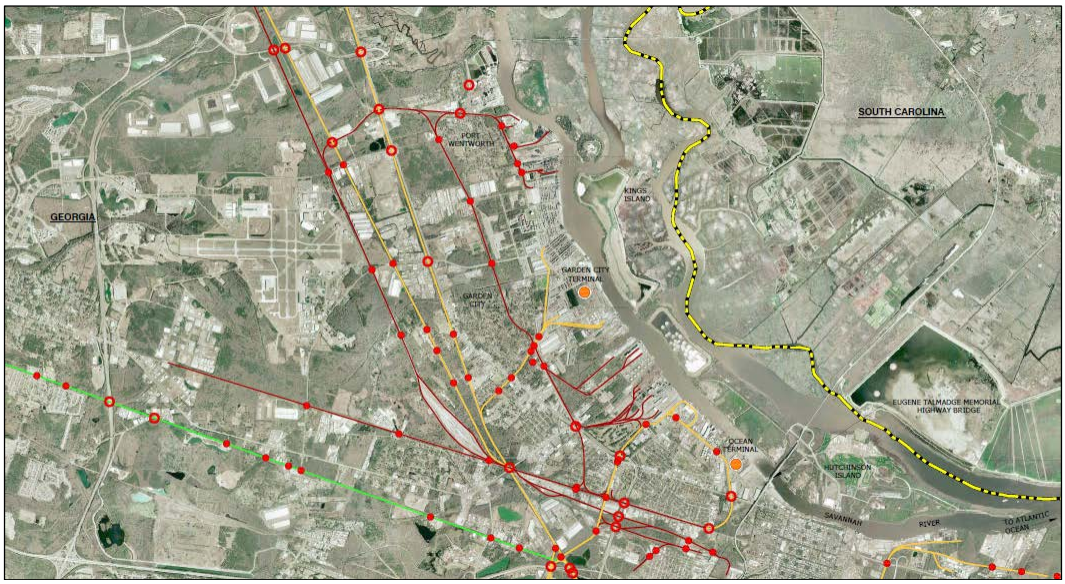



Figure 7.5 Rail Lines and Rail Crossings in the Port of Savannah Subarea



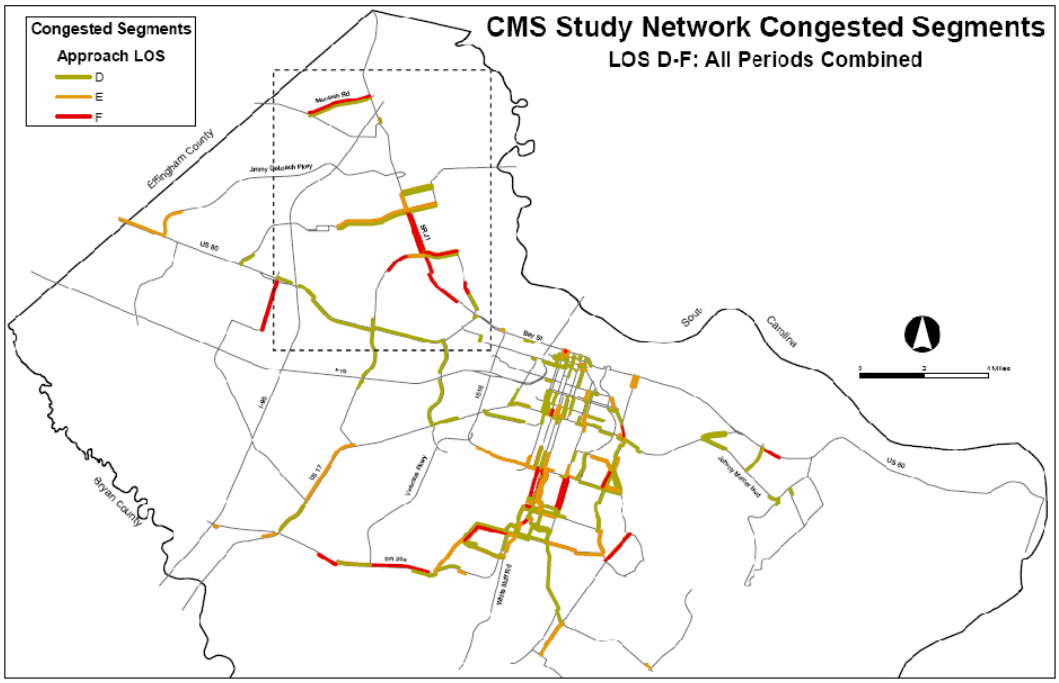

Source: Georgia Freight and Logistics Plan.

There are also significant near-term needs related to achieving the full capacity of the Port of Savannah of 6.25 million TEUs:

- Up to 32 ship-to-shore container cranes along the Garden City Terminal berth;
- Up to 169 rubber-tired gantry cranes within the container yard;
- Additional truck gate (Gate 8) off of Grange Road;
- Reduced container dwell times; and
- Sixteen-hour truck gate operations.

The growth estimates for trucks in the Port of Savannah subarea depict a picture of growing concern for traffic congestion in the region surrounding the port. The Chatham County-Savannah Congestion Management Study (CMS) was conducted in 2004 to evaluate conditions of the existing roadway network. This study used GPS travel time runs to estimate operating conditions on the roads surrounding the port. The results defined congested segments as those where average travel run speeds were less than 70 percent of the posted speed limit. These are shown in Figure 7.6.

Figure 7.6 Map of Chatham County Congested Locations




Source: Savannah Chatham-County 2030 Long-Range Transportation Plan, September 2004.

Note: Port subarea study area shown in dashed lines.

According to the CMS, the eastbound and westbound segments of SR 21 between Bonnybridge Road and just south of SR 307 were the 11th and 12th most congested segments in Chatham County in 2004. Other critical segments nearby to the port include:

- Gulfstream Road between the Savannah Airport and Highway 25 (Ocean Highway);
- Bourne Avenue between Highway 25 (Ocean Highway) and just west of Highway 21; and
- U.S. 80 between Highway 307 and Chatham Parkway.

Based on the results of these travel time studies and the rapid growth forecast for the Port of Savannah, it is reasonable to conclude that there is today an even greater strain on the local road system adjacent to the Port. In particular, more recent travel time runs on Georgia State Road 21 have revealed severe congestion during the a.m. and p.m. commute periods when auto traffic mixes with port-related truck traffic. The Interstate interchange at I-95 and Georgia State Road 21 has been cited as one of the most congested Interstate interchanges in Georgia.