

Georgia Statewide Freight & Logistics Plan, 2010-2050

Task 2 Report



Strategic Need For Investing



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1.0 Introduction

The purpose of this report is to describe the competitive position of Georgia's freight and logistics sector relative to other regions in the country, and to build a case for increased investment in Georgia's freight-related assets. This report is designed to continue the analysis and conclusions initially discussed in the 2010 Georgia Department of Transportation (GDOT) Statewide Strategic Transportation Plan (SSTP).

In the executive summary of the SSTP, the following four general themes were introduced to describe transportation in the State:

1. Over the past few decades, Georgia's population and economy grew rapidly, and our unique world-class transportation assets were critical to that success.
2. However, rather than investing to preserve and extend our competitive advantage in transportation, Georgia has been under-investing and "coasting" on past success.
3. At current funding levels, performance will continue to deteriorate, threatening our ability to compete for jobs and growth in the future.
4. Alternatively, a new investment strategy supported by additional resources could transform our transportation network and create over \$480 billion in GDP growth for Georgia over the next 30 years and generate up to 425,000 new jobs.

For purposes of this report, these themes have been revisited with a focus on identifying how the themes can be specifically related to the freight and logistics sector. **The Freight and Logistics-focused themes are as follows:**

- **Theme 1** - Georgia's world-class freight transportation assets have been critical to the State's economic growth.
- **Theme 2** - However, after decades of high levels of investment in its freight transportation assets, Georgia has been under-investing and "coasting" on past success.
- **Theme 3** - With major shifts currently underway in freight and logistics, continued underinvestment in freight transportation assets will jeopardize Georgia's role as freight hub of the Southeast.
- **Theme 4** - By regaining its competitive advantage, Georgia will position itself to capture several billion dollars of additional GDP growth over the next 30 years.

This report is structured by discussing each of these four themes in the following sections. The first two themes are discussed jointly in Section 2.0, the third is discussed in Section 3.0, and the fourth is discussed in Section 4.0.

This report is the deliverable of Task 2 of the Georgia Freight & Logistics Plan 2010-2050. The full task structure of the project is as follows:

- **Task 1** – Stakeholder Involvement;
- **Task 2** – Linking the Freight Plan with the Statewide Strategic Transportation Plan;
- **Task 3** – Strategic Freight and Logistics Framework;
- **Task 4** – Economic Evaluation and Projection; and
- **Task 5** – Recommendations and Project Evaluation.

Task 3 through Task 5 will describe the performance of the freight transportation system, quantify the economic value of freight transportation, identify specific solutions to improve freight transportation, and prioritize projects into packages based on alternative funding futures.

2.0 Importance of Georgia's Freight Transportation Assets

Theme 1 – “Georgia’s world-class freight transportation assets have been critical to the State’s economic growth.”

Theme 2 – “However, after decades of high levels of investment in its freight transportation assets, Georgia has been under-investing and ‘coasting’ on past success.”

2.1 HISTORICAL INVESTMENT IN TRANSPORTATION

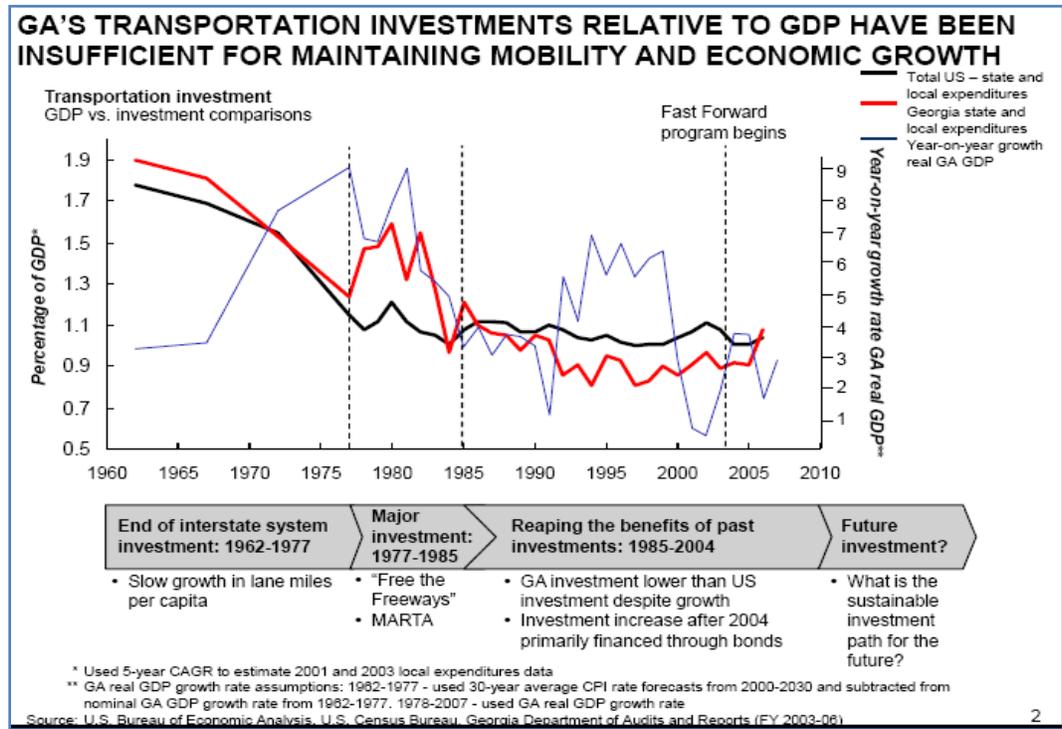
As discussed in Georgia’s State Strategic Transportation Plan, “For nearly half a century, Georgia’s economy has created prosperity for citizens and businesses throughout the State, and the decision to invest and create world-class transportation infrastructure clearly was central to that success.” Figure 2.1 shows Georgia’s investment in transportation infrastructure as a share of GDP relative to the rest of the United States. From 1960 to 1985, Georgia consistently invested more of its GDP in transportation infrastructure than the rest of the U.S.

During this period, freight-related transportation assets expanded significantly in the State, including: the emergence of the Atlanta airport as a national and international hub for passenger and cargo traffic, the ascension of the Port of Savannah as the fastest-growing port in the United States, an extensive Interstate state, and the largest rail network in the Southeast. This higher-than-average investment in the freight transportation system was a key factor in the rapid GDP expansion experienced by the State in the 1970s, 1980s, and 1990s.

However, beginning in the late 1980s, Georgia began to under-invest in its transportation system. During this period, transportation investment in the State was lower than that of the country as a whole. This underinvestment has been a key component of the underperformance of the Georgia economy in the post-2000 period. The contrast between the periods of overinvestment and underinvestment are illustrated in Figure 2.3. Georgia’s economy grew faster than other states in the Southeast and the rest of the United States in the 1990s. However, during the 2000s, it grew slower than these other regions.

Figures 2.4 and 2.5 show the same pattern by comparing Georgia’s economic growth to other states in the Southeast from 1990 to 2007. From 1990 to 1997, Georgia grew faster than any other state in the Southeast. However, from 1998 to 2007, Georgia was only the third fastest growing economy in the Southeast.

Figure 2.1 Historical Investment in Transportation and Georgia Economic Performance



Source: 2010 GDOT Statewide Strategic Transportation Plan.

Figure 2.2 Economic Performance of Georgia, Southeast, and the United States

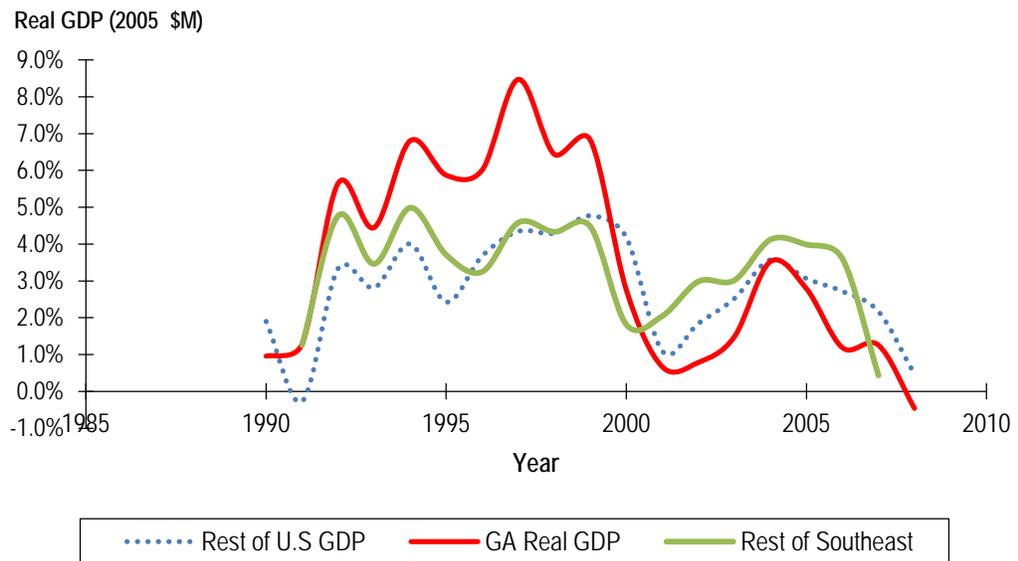


Figure 2.3 Economic Growth of States in Southeast U.S., 1991-1997

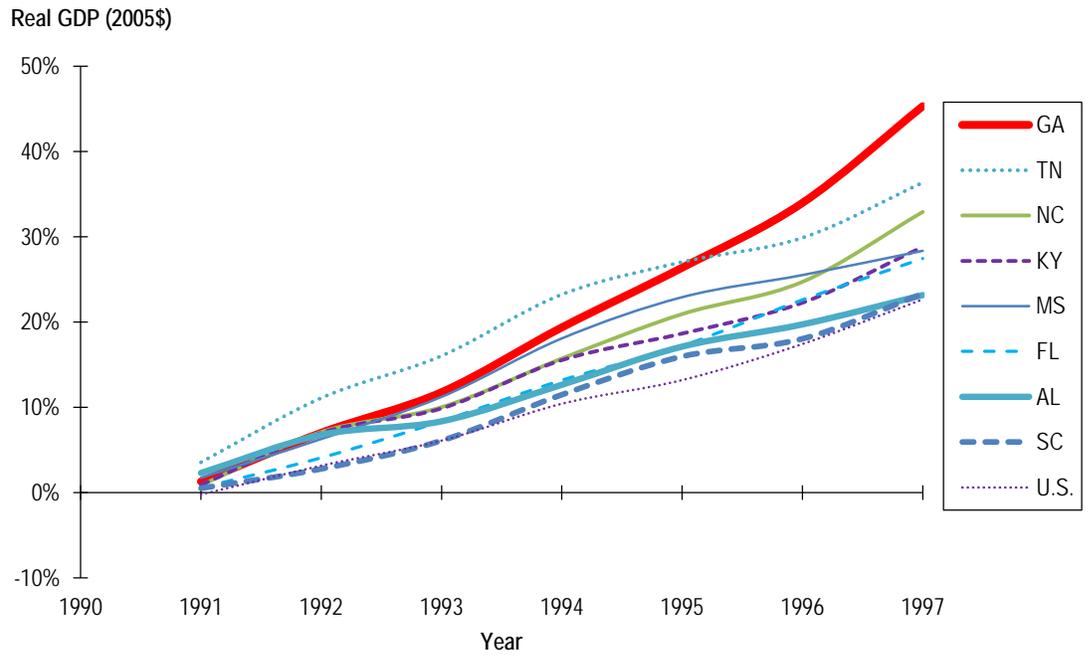
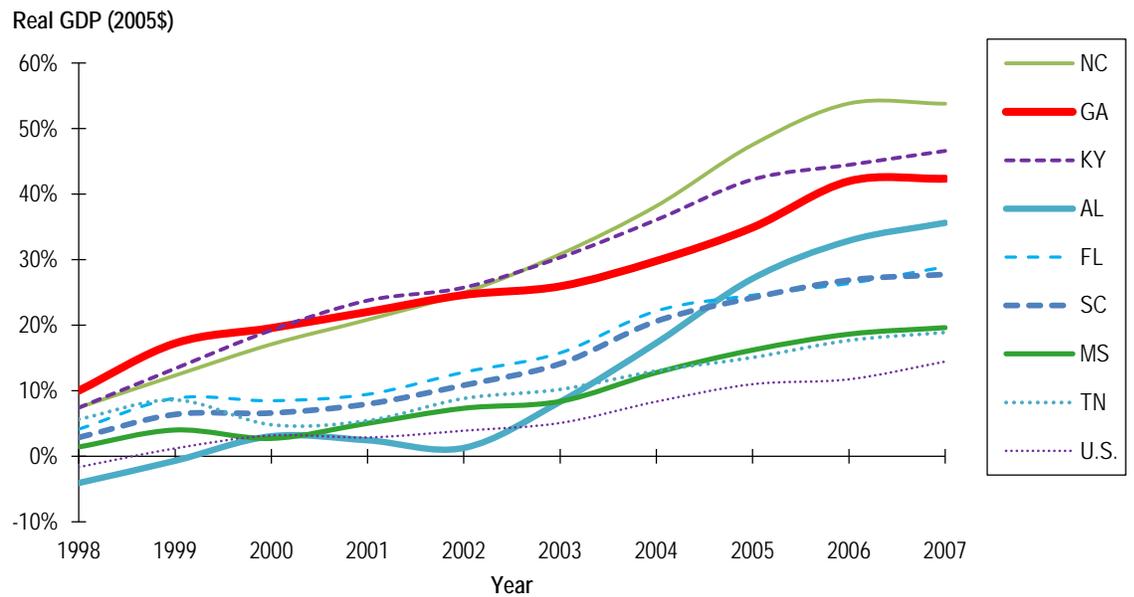


Figure 2.4 Economic Growth of States in Southeast U.S., 1998-2007



2.2 GEORGIA'S FREIGHT-RELATED SECTORS: LEADER IN THE 1990S, LAGGARD IN THE 2000S

The performance of Georgia's freight-related sectors has mirrored that of the overall economy over the last 20 years. Between 1990 and 1997, Georgia's freight-related sectors grew more rapidly than they did in other states in the Southeast and in the United States as a whole. However, between 1998 and 2007, Georgia's freight-related sectors underperformed both the Southeast and the United States.

Figures 2.5 through 2.8 show the cumulative growth of the four freight-related sectors: 1) Transportation and Warehousing; 2) Manufacturing; 3) Wholesale Trade; and 4) Retail Trade. For each of these sectors, Georgia was a leader in the 1990s, and became a laggard in the 2000s, similar to Georgia's higher overall GDP in the 1990s and lower overall GDP in the 2000s. This parallel performance reinforces the notion of the critical importance of freight-related sectors to the Georgia economy.

Freight-related sectors have been strong indicators for overall economic performance in the State. This implies that investment in the transportation assets that are critical to freight transportation would lead not just to growth in the freight-related sectors, but growth in the overall state economy.

Figure 2.5 Growth in Economic Output for Transportation and Warehousing

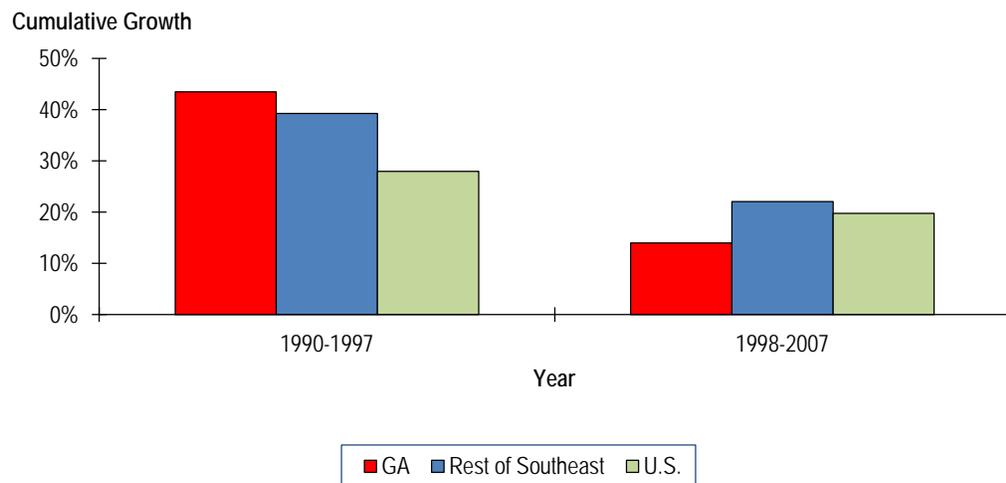


Figure 2.6 Growth in Economic Output for Manufacturing

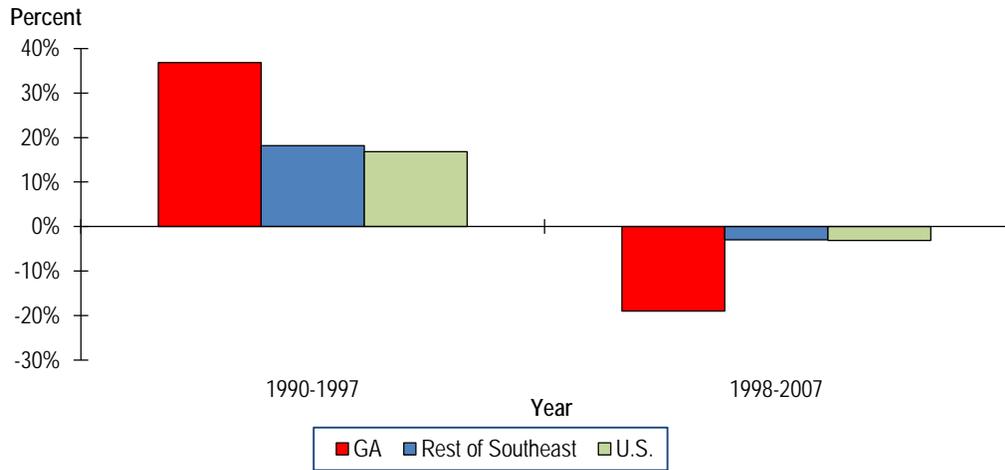


Figure 2.7 Growth in Economic Output for Wholesale Trade

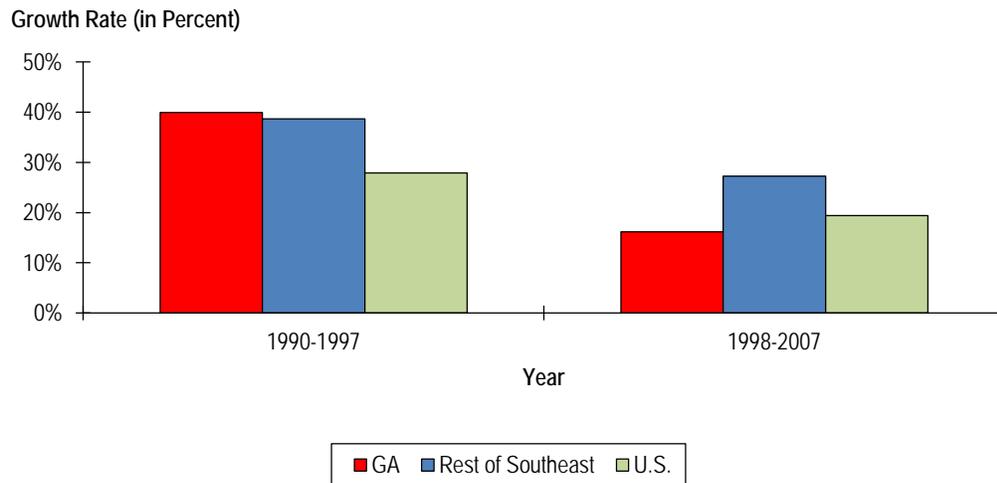
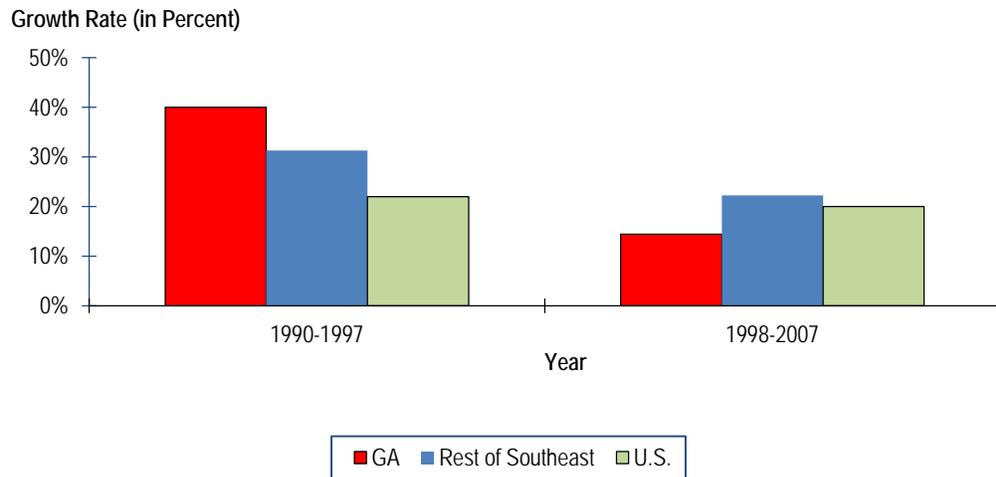


Figure 2.8 Growth in Economic Output for Retail Trade



2.3 IMPORTANCE OF GEORGIA'S HIGHWAY ASSETS

Georgia highways are the support system for the State's trucking industry. In 2008, the trucking industry provided 243,477 jobs in Georgia, which equates to 1-in-14 jobs in the State. Total trucking industry wages paid in 2008 exceeded \$11.9 billion, or an average annual salary of \$49,006. There are approximately 35,000 trucking companies currently located in Georgia and most of them are small, locally owned businesses.

Georgia has continued to invest in numerous capacity enhancement projects over the past 30 years. One of the more notable projects was the *Freeing the Freeways* program. Over the course of the 1980s, roughly \$1.5 billion was spent to add capacity to Atlanta-area freeways, nearly tripling the Interstate lane miles from 1980 to 1990.¹ GDOT's "Freeing the Freeways" program added highway capacity to 122 miles of urban freeways inside I-285. Four-lane facilities were widened to between 6 and 12 lanes, almost tripling capacity. Interstate lane miles increased from 500 in 1980 to 1,400 in 1990.

More recent investments include the State Route 400 extension connecting I-285 to I-85 in the early 1990s, the construction of I-675 in south Atlanta in the mid-1980s, and the creation of I-575 in north Atlanta in the early 1980s. The construction of I-675 was an important truck route that allows trucks to bypass I-75, which is often heavily congested, to reach I-285, I-20, and I-85 more easily.

¹ TCRP Report 42. *Consequences of the Interstate Highway System for Transit: Summary of Findings*. Transportation Research Board, 1998.

Additionally, the GDOT “Fast Forward” Program added to the State’s investment in transportation.

Georgia Highway Mileage Relative to Other Southeastern States

The more recent highway investments have been significant, but not enough to keep pace with the investments made in other states. Georgia has gone from being a leader in investing in its highway system to becoming a laggard. A significant part of this under performance is due to the fact that Georgia has the second lowest gas tax in the U.S.

Georgia had the second fastest-growing Interstate system in the Southeast in terms of lane mileage from 1985 to 1990, falling to the third fastest growing from 1990 to 2000, and now Georgia is tied for last in terms of Interstate lane mileage growth (Table 2.1). Similarly, Georgia was the fastest growing State in the Southeast in terms of lane mileage for Interstates, freeways, and principal arterials from 1985 to 1990, falling to fifth fastest growing from 1990 to 2000, and now Georgia is the seventh fastest growing State in terms of lane mileage for Interstates, freeways, and principal arterials (Table 2.2).

Georgia has not added any new Interstate mileage since 1990 (Table 2.3), and it has not added any new freeway and principal arterial mileage since 2000 (Table 2.4). Other states in the Southeast have been much more successful in adding new Interstates, freeways, and principal arterials relative to Georgia.

Table 2.1 Growth in Southeast Lane Mileage for Interstates

1985-1990		1990-2000		2000-2009	
State	Growth	State	Growth	State	Growth
North Carolina	19%	North Carolina	19%	North Carolina	13%
Georgia	11%	Florida	11%	Kentucky	8%
Florida	10%	Georgia	6%	Florida	7%
South Carolina	6%	Kentucky	6%	Tennessee	6%
Kentucky	6%	South Carolina	5%	South Carolina	5%
Alabama	3%	Tennessee	5%	Mississippi	3%
Tennessee	3%	Alabama	3%	Georgia	2%
Mississippi	0%	Mississippi	1%	Alabama	2%

Table 2.2 Growth in Southeast Lane Mileage for Interstates, Freeways, and Principal Arterials

1985-1990		1990-2000		2000-2009	
State	Growth	State	Growth	State	Growth
Georgia	13%	Florida	31%	Mississippi	18%
Florida	9%	Tennessee	30%	Kentucky	13%
Kentucky	9%	Kentucky	19%	Tennessee	11%
North Carolina	7%	Mississippi	18%	South Carolina	11%
South Carolina	4%	Georgia	13%	North Carolina	11%
Mississippi	4%	North Carolina	12%	Florida	10%
Tennessee	3%	South Carolina	4%	Georgia	6%
Alabama	3%	Alabama	4%	Alabama	4%

Table 2.3 Growth in Southeast System Mileage for Interstates

1980-1990		1990-2000	
State	Growth	State	Growth
North Carolina	22%	North Carolina	20%
South Carolina	13%	South Carolina	7%
Alabama	12%	Tennessee	4%
Georgia	7%	Florida	3%
Florida	6%	Alabama	2%
Kentucky	4%	Mississippi	2%
Mississippi	3%	Georgia	0%
Tennessee	3%	Kentucky	0%

Table 2.4 Growth in Southeast System Mileage for Interstates, Freeways, and Principal Arterials

1980-2000		2000-2008	
State	Growth	State	Growth
Florida	42%	Kentucky	12%
Tennessee	36%	Mississippi	11%
Kentucky	34%	North Carolina	7%
Mississippi	28%	South Carolina	7%
Georgia	16%	Tennessee	7%
South Carolina	13%	Alabama	3%
North Carolina	11%	Florida	2%
Alabama	7%	Georgia	0%

Atlanta Congestion Relative to Other Southeastern Cities

The rapid growth of Georgia combined with the limited investment in the highway system over the more recent years has led to increased congestion across the State. The congestion is most evident in the Atlanta metropolitan region. It is well-known that Atlanta is one of the more congested cities in the country, and this is borne out by congestion data in the city.

The Texas Transportation Institute Urban Mobility Report develops annual estimates of congestion based on a number of different factors. Atlanta is by far the most congested city in the Southeast. The average freeway delay per commuter per day is over 26 minutes (Table 2.5). The next highest city is Miami with roughly 18 minutes of daily freeway delay per commuter.

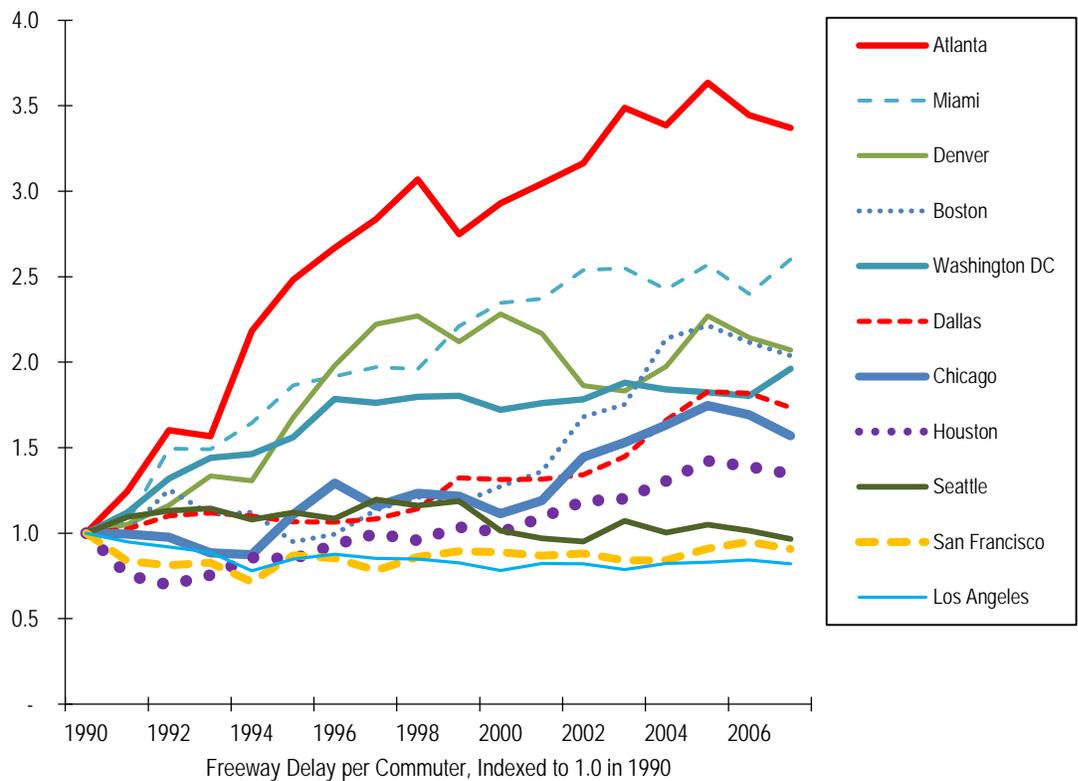
Table 2.5 Congestion in Southeastern Cities, 2008

City	Freeway Delay per Commuter (Minutes)
Atlanta	26.5
Miami	17.7
Charlotte	14.7
Jacksonville	13.8
Memphis	11.4
Tampa	7.4
Charleston	4.6
New Orleans	4.1

Relative to the largest cities in the U.S., metro Atlanta has also experienced the fastest growth in freeway delay per commuter; congestion has roughly tripled since 1990. The next fastest growth rate of congestion is Miami where congestion increased by two and a half times over the last 20 years. More importantly, several other metropolitan regions, such as Los Angeles, Houston, and Chicago, have been able to keep their congestion roughly flat since 1990.

The impact of congestion is significant for companies considering whether to locate (or remain located) in metro Atlanta; it has the highest levels of congestion in the Southeast, and the fastest growing congestion in the nation -- these two factors will impact the number of employees within commute distance of a company. For freight-related companies, these factors will impact the efficiency of moving goods.

Figure 2.9 Growth in Freeway Delay Since 1990 in Large Metro Regions



2.4 IMPORTANCE OF GEORGIA’S FREIGHT RAIL ASSETS

Georgia’s “corner store” location also has allowed it to become the railroad hub for the Southeast. The State’s location at the foothills of the Appalachian Mountains provides it with good access to the Mid-Atlantic, the Northeast, and the Midwest along with points further west. This positioning is particularly important in regards to intermodal rail.

From a strategic perspective, intermodal rail is more important than the other two major types of rail – carload and break-bulk. The containers used for intermodal rail provide a seamless connection between marine ports, railroads, and trucks. Intermodal also is the fastest growing rail category, and it carries the highest value rail freight.

The investments made in intermodal rail in Georgia have been significant. Norfolk Southern expanded its intermodal rail capacity at Inman Yard throughout the 1980s. During the same time period, CSX reorganized its intermodal yard at Hulsey Yard for increased intermodal throughput. More recently, CSX opened a second intermodal rail yard in Fairburn, Georgia in 1999. Norfolk Southern moved most of its intermodal rail operations to its Austell Yard which was opened in 2002. Georgia now moves the most intermodal containers of any state in the Southeast as shown in Table 2.6.

Table 2.6 Intermodal Rail Tonnage in the Southeast

State	2002 Thousands of Tons
Georgia	814
Tennessee	643
Kentucky	566
Mississippi	404
Florida	288
South Carolina	115
North Carolina	101
Alabama	43
Total	2,973

Source: FHWA Freight Analysis Framework 2 (“FAF2”).

Georgia Rail Traffic Compared to Rest of the United States

While Georgia has exceeded the investment made in other parts of the Southeast, it has not kept pace with other regions in the country. Intermodal rail traffic in the Southeast lags behind the Western U.S. The most heavily trafficked rail lines in terms of intermodal rail are the lines connecting the West Coast with Chicago and Texas, and the lines connecting the Northeast with Chicago. There is only

one mid-sized intermodal rail lane in the Southeast which connects Jacksonville to Atlanta to the Midwest (Figure 2.10).

Figure 2.10 Intermodal Net Tons, 2006

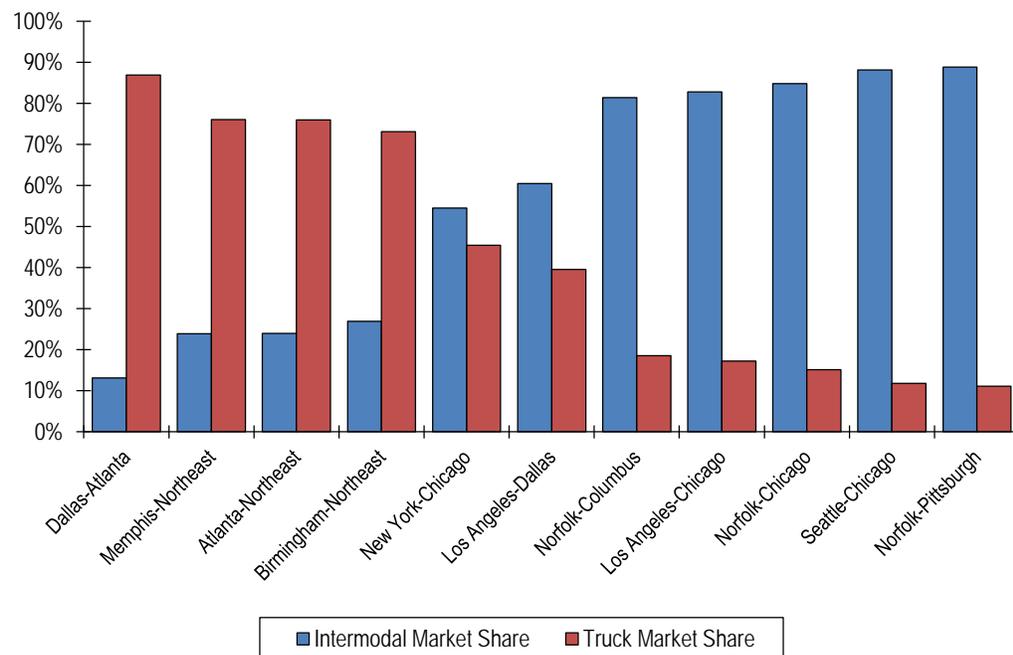


Source: Federal Railroad Administration, 2008.

There also is low market share of intermodal rail for trade lanes emanating from Georgia relative to other trade lanes in the country. Figure 2.11 shows that intermodal rail is less than 15 percent of the freight traffic between Atlanta and Dallas, and that intermodal rail is less than 25 percent of the intermodal rail traffic between Atlanta and the Southeast.

This can be compared to intermodal rail market shares of over 80 percent for trade lanes from Chicago to Los Angeles, Chicago to Seattle, Chicago and Norfolk, and Pittsburgh to Norfolk. These high intermodal rail shares are in part due to the high levels of intermodal container traffic arriving at the ports of coastal cities. However, it also is in part due to the lack of development of intermodal rail trade lanes in the Southeast, particularly those in Georgia.

Figure 2.11 Intermodal Rail Market Share for Select Trade Lanes



Georgia Participation in Recent Rail Projects

There are several rail projects recently completed or underway in the eastern United States. The NS Heartland Corridor and the CSX National Gateway rail projects are improving the connection between the Mid-Atlantic and the Midwest. The Meridian Expressway is improving the rail connection between Mississippi and Texas. The NS Crescent Corridor is connecting the Northeast with the Mid-South and Southeast. The competitive impacts of these projects are discussed in detail in Section 3.0.

The important thing to note at this point is that Georgia is barely a participant in these projects. None of these rail expansion projects will bring new intermodal yards to Georgia. Only a portion of the Crescent Corridor runs through the State of Georgia. The states that are experiencing the most significant rail expansion are states where partnerships between the State, the railroads, and shippers have been leveraged to streamline concepts, design, construction, and funding of projects.

2.5 IMPORTANCE OF GEORGIA'S MARINE PORT ASSETS

The growth of international trade has been one of the most important economic developments in the past 40 years. In the United States, international trade has grown from being just 11 percent of GDP in 1970 to 27 percent of GDP in 2000. Globally, over 50 percent of the world's economic activity was based on interna-

tional trade in 2000. One major component of international trade has been the rapid expansion of the Panama Canal. In 1996, only 235,000 20-foot equivalent unit (TEU) containers were moved through the Panama Canal. In 2008, that figure had grown to 4.6 million containers, an astounding 1,857 percent growth.

There have been significant investments by the Georgia Ports Authority that have positioned Georgia to capitalize on this growth. Some of the key investments are as follows:

- **1967** - Georgia Ports Authority operates first container crane in South Atlantic at Port of Savannah;
- **1980** - A 175-ton capacity crane opens at Savannah's Garden City Terminal;
- **1991** - Tallmadge Bridge replaced with a cable-stayed bridge to provide adequate air draft over the Savannah harbor;
- **1994** - Savannah River channel deepened to 42 feet to accommodate larger ships with up to 4,800 TEUs;
- **2002** - Mason rail Intermodal Container Transfer Facility (ICTF) opens in Savannah;
- **2005** - Two "super post-Panamax" cranes come on-line at Savannah;
- **2008** - GDOT completed US Route 17 overpass at GPA's Colonel's Island Terminal (Brunswick). Four new super Post-Panamax cranes placed into operation in Savannah;
- **2009** - Chatham intermodal container transfer facility opens Savannah; and
- **2010** - Container Berth 8 completed at Garden City Terminal in Savannah

These investments have led to the Port of Savannah being the fastest growing port in the U.S. Figure 2.12 shows Savannah's growth trajectory from just over 200,000 TEUs in 1980 to over 2,500,000 in 2008. Table 2.7 shows the Port of Savannah with over 1,200% growth between 1980 and 2008. This growth propelled it past several other ports to be the current 4th largest port in the US.

The Port of Savannah has a relatively even balance of imports and exports (Figure 2.13). This gives it additional strategic value to Georgia, because it is used to support businesses in the State in expanding their customer base overseas. Many other ports are used to import goods that are produced in foreign countries.

The marine ports are the freight mode in Georgia that has experienced the most consistent investment over the last 50 years. However, if there was one metric that defines ports in the 21st century it is the depth of the harbor. The increasingly larger ships that are being put in to service require deeper drafts to navigate to port harbors. Along this specific dimension, Georgia has not deepened its port in over 15 years, while many other ports already have started the deepening process.

Figure 2.12 Container Growth at Port of Savannah, 1980-2008

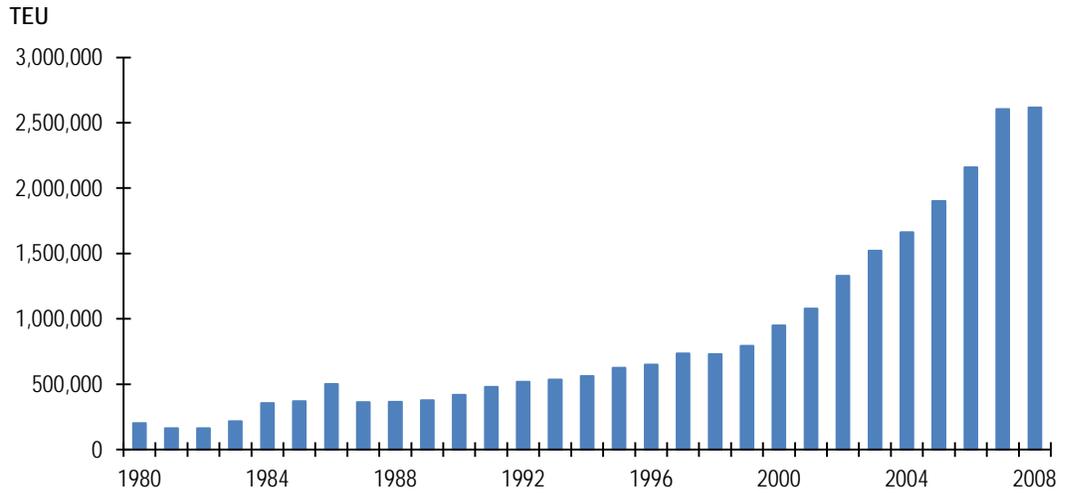


Figure 2.13 Import-Export Balance at Port of Savannah, 1997-2008

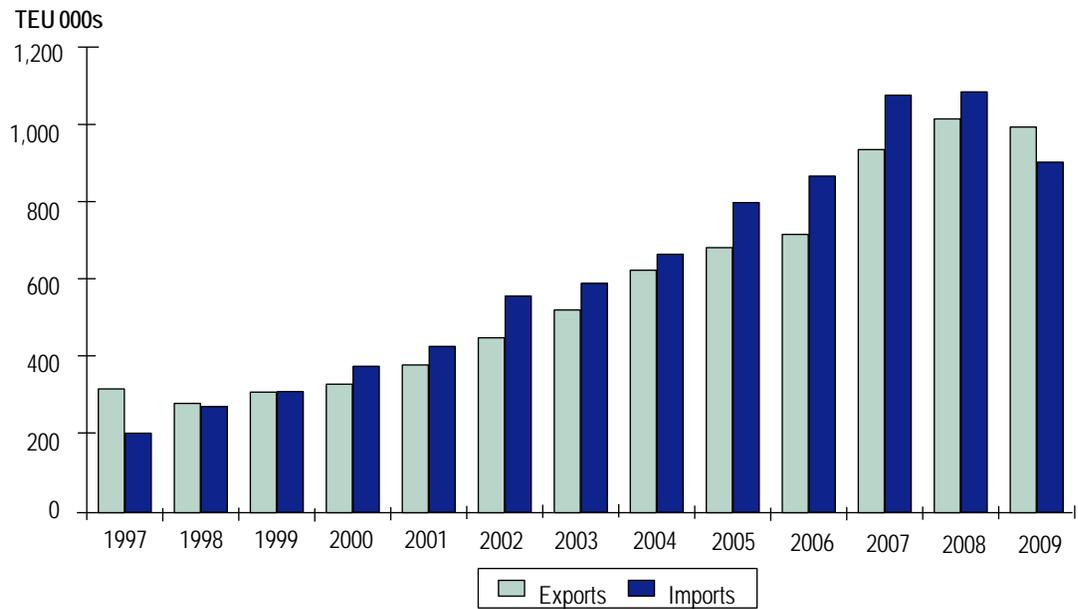


Table 2.7 Savannah Performance Relative to Other Container Ports

Port	1980	1990	2000	2008	2009	Growth	
						1980-2008	2008-2009
Los Angeles	0.6	2.1	4.9	7.9	6.7	1,141%	-14%
Long Beach	0.8	1.6	4.6	6.4	5.1	670%	-20%
PANYNJ	1.9	1.9	3.1	5.3	4.5	170%	-13%
Savannah	0.2	0.4	0.9	2.6	2.4	1,203%	-10%
Oakland	0.8	1.1	1.8	2.2	2.1	186%	-8%
Houston	0.3	0.5	1.1	1.8	1.8	498%	0%
Hampton Roads (Virginia)	0.4	0.8	1.3	2.1	1.7	433%	-16%
Seattle	0.8	1.2	1.5	1.7	1.6	118%	-7%
Tacoma	N/A ^a	0.9	1.4	1.9	1.5	N/A ^a	-17%
Charleston	0.2	0.8	1.6	1.6	1.2	586%	-28%
Total U.S. (Mainland)	7.4	14.4	27.5	39.7	34.3	436%	-14%

Source: American Association of Port Officials, Project team analysis.

^a Tacoma did not track container traffic in 1980.

2.6 IMPORTANCE OF GEORGIA'S AIR CARGO ASSETS

The Hartsfield-Jackson Atlanta International Airport (HJIA) is by far the largest airport in the State. According to the 2009 Economic Impact Study for the airport, the facility generates 434,000 jobs for metropolitan Atlanta and \$58.2 billion in business revenues to the region. This includes direct, indirect, and induced economic activity. The air cargo facility is responsible for a significant portion of this economic activity including 31,385 jobs and \$7.5 billion in business revenue for the Atlanta metropolitan region.

The Atlanta airport has benefitted from significant investment over the past 40 years to make it a domestic and international hub for air cargo. In 1977, the \$500 million redesign of the Atlanta airport was called the largest construction project in the south. This expansion made the Atlanta airport the largest in the Southeast attracting Delta Airlines to make the airport its primary hub. This also was a critical turning point for air cargo, because the majority of air cargo utilizing the Atlanta airport is flown in the belly of passenger planes. Therefore, air cargo in Georgia is very much dependent on the routes and flights offered to passengers by Delta Airlines.

The 1970s Atlanta airport expansion was followed by the development of a fourth runway in 1984. In 2000, the opening of the South Air Cargo Terminal allowed for additional parking positions and cargo warehouse space at the Atlanta airport. The opening of the fifth runway in 2005 increased the passenger capacity of the airport by 40 percent with air cargo capacity increasing significantly as well. Air cargo tonnage more than tripled between 1975 to the mid-

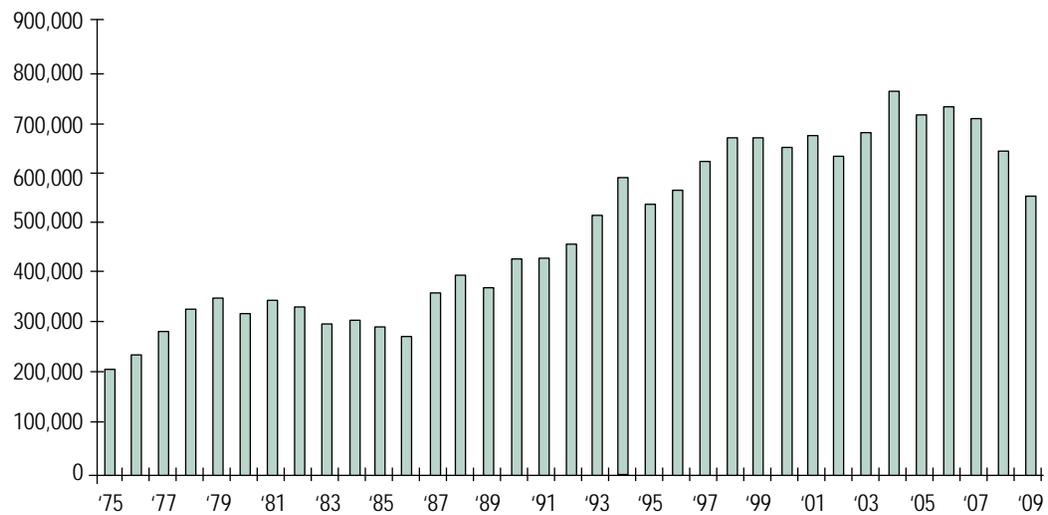
2000s (Figure 2.14). Atlanta currently is the 10th largest airport in the country in terms of the amount of air cargo tonnage (Table 2.8).

Over the last few years, the City of Atlanta has aggressively pursued increased cargo activity at the airport. It recently signed announced signing of a new cargo carrier to its roster which will add an additional daily all-cargo flight between Atlanta and Seoul, South Korea. The new service alone will generate 25 jobs and have an estimated \$24 million impact on Atlanta and the Southeast.

The recently proposed merger between Southwest Airlines and Airtran Airlines will also provide breadth and scale to the airport’s air cargo competitiveness.

Figure 2.14 Atlanta Airport Air Cargo Growth

ATL Air Cargo Tonnage



Source: Airports Council International Traffic Report.

Table 2.8 Top U.S. Airports for Air Cargo

Airport	Operations	Millions	
		2009 Tons	2008 Tons
Memphis	Integrator Hub – FedEx	3.7	3.7
Anchorage	Trans-Pacific Transfer Operations	2.0	2.3
Louisville	Integrator Hub – UPS	1.9	2.0
Miami	Primary Gateway to Latin America	1.6	1.8
Los Angeles	Primary Asian Gateway	1.5	1.6
NYC (Kennedy)	Gateway to Europe and Asia	1.1	1.5
Chicago (O’Hare)	Central U.S, International Gateway	1.0	1.3
Indianapolis	FedEx Secondary Hub	0.9	1.0
Newark-Liberty	FedEx Secondary Hub	0.8	0.9
Dallas/Ft. Worth	American Airlines Hub	0.6	0.7
Atlanta	Delta Hub	0.6	0.7

3.0 Georgia's Economic Competitiveness At Stake

Theme 3 – “With major shifts currently underway in freight and logistics, continued under-investment in freight transportation assets will jeopardize Georgia’s role as freight hub of the Southeast.”

Each of the freight modes is undergoing radical shifts in terms of its role and positioning for handling the movement of goods in the 21st century. These shifts are occurring due to ongoing changes in the global economy, technological improvements, and increased concern about the impact of freight on the environment. This section examines how these changes are impacting Georgia’s competitiveness across three dimensions of trade:

1. **Global Trade** - Trade between Georgia and countries outside the United States;
2. **Domestic Trade** - Trade between Georgia and other states in the United States; and
3. **Local Trade** - The movement or circulation of goods within the State of Georgia, particularly intra-urban goods movement.

3.1 GLOBAL TRADE

Georgia’s global trade consists of both air cargo and marine cargo. These modes are polar opposites in terms of their operating characteristics. Air cargo is the fastest mode, but it also is the most expensive. It is typically used for time-sensitive freight movement. This can include goods that are easily perishable such as fresh flowers, or spare parts that are critical for continued operation of a factory.

Marine cargo is the slowest of the freight modes. It also is the least expensive on a per-mile basis. It is used for nonperishable goods that are not time-sensitive. Georgia is fortunate to have both a world-class airport and marine port which connect the State with international markets around the world. This provides a wide range of modal alternatives for Georgia-based companies that have suppliers and customers overseas.

However, both of these modes are undergoing significant changes that Georgia must be prepared to consider when developing its competitive positioning going forward.

Air Cargo

Overall, global air cargo demand will continue to increase as international trade continues to be a larger component of the world's economy. However, in the short run, the most significant change will be how air cargo responds to new security requirements. A congressional mandate issued in 2007 requires that the Transportation Security Administration screen 50 percent of all air cargo on-board passenger aircraft. The mandate goes further to require 100 percent inspection by August 2010. These new security requirements increase shipment times and costs.

Some companies, including agricultural shippers, are concerned that the new rule will impact their ability to bring perishable goods to market. Other companies are concerned about how the costs will be passed on to the shippers, and how this will impact the prices that can be offered to end customers of air cargo. Both of these impacts are likely to reduce demand for air cargo at a time when the industry is just now stabilizing following the devastating effects of the recent recession on air cargo.

The competitiveness of international air cargo at any airport is impacted by the number and pairings of international flights and the airport's catchment area. The catchment area is the region from and into which cargo is drawn and distributed. For air cargo, catchment areas are typically eight hours of truck driving time, or the distance that can be reached by driving a truck for one day under the current hours of service regulations. The catchment area of the Atlanta airport overlaps with the catchment areas of other airports in each direction. To the south, Atlanta's catchment area overlaps with the Miami International Airport. To the northeast, Atlanta's catchment area overlaps with the three major international airports in the New York area. To the northwest, Atlanta's catchment area overlaps with the Chicago's O'Hare International airport. To the west, Atlanta's catchment area overlaps with Houston and Dallas.

These overlapping catchment areas means that Atlanta faces stiff competition in terms of capturing international belly cargo traffic. Competing airports have numerous international routes combined with geographic advantages relative to Atlanta. The New York airports will compete vigorously for international air cargo to Europe. The Miami airport will capture much of the international traffic from Latin America. Houston, Dallas, and Chicago are well-positioned to capture air cargo from Asia. The Atlanta airport has a competitive advantage for air cargo only within a few hours driving time of its airport due to the competition from these airports. Additionally, the impact of the recent recession is that virtually all of the commercial gateways have available capacity and are aggressively pursuing increased cargo opportunities.

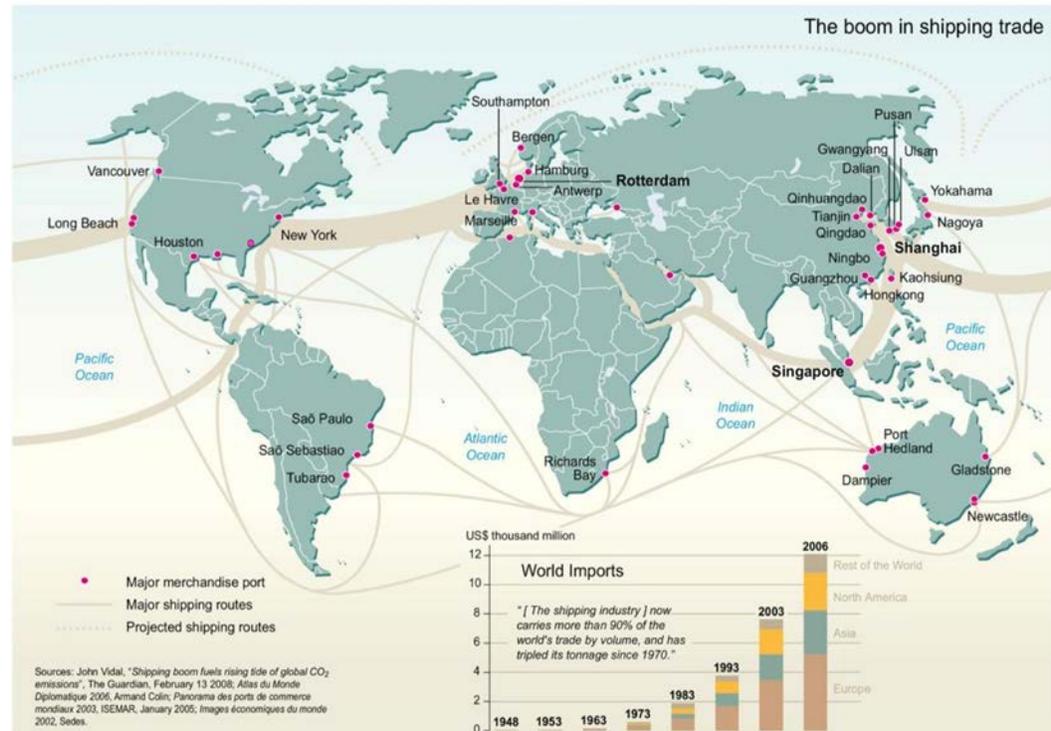
Marine Cargo

There currently are three major marine cargo trade lanes that impact the U.S. (Figure 3.1). The first is the marine cargo trade between Europe and the eastern

coast of the U.S.; the second is the marine cargo trade between Asia and the western coast of the United States; and the third is the marine cargo between Asia and the East Coast of the U.S. traveling through the Panama Canal.

The expansion of this third marine cargo trade lane will be the most significant change to global trade for the next few decades.

Figure 3.1 Marine Cargo Trade Lanes



Source: ITTS presentation to FHWA Talking Freight Seminar, February 2010.

The Panama Canal is undergoing a construction project to add a third set of locks. The third set of locks will be deeper, wider, and longer allowing for much larger ships to pass through the Panama Canal facility. This five billion dollar expansion program includes the following components:

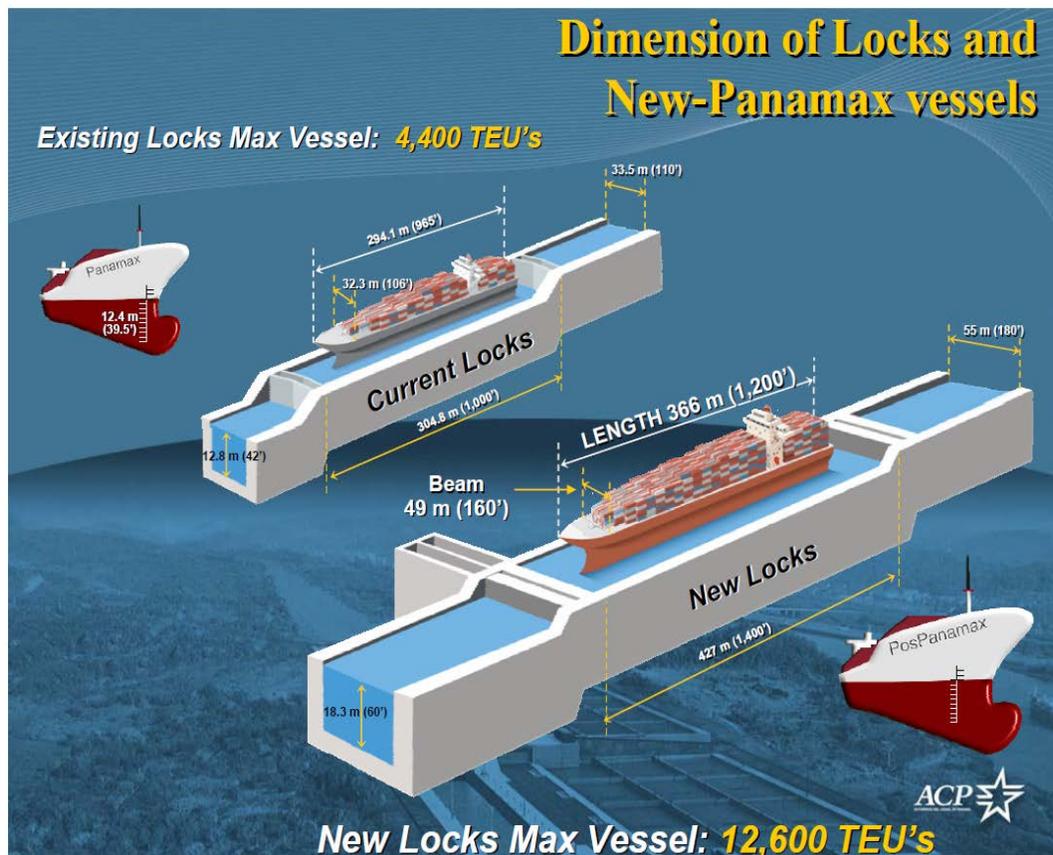
- Deepening and widening of the Atlantic entrance channel;
- New approach channel for the Atlantic Post-Panamax locks;
- Atlantic Post-Panamax locks with three water saving basins per lock chamber;
- Raising the maximum lake operating water level;
- Widening/deepening of navigational channel in lake and Culebra Cut;
- New approach channel for the Pacific Post-Panamax locks;

- Pacific Post-Panamax locks with 3 water saving basins per lock chamber; and
- Deepening and widening of the Pacific entrance channel.

The project is scheduled to be open for traffic early in 2016². The difference between the size of ships allowable under the current set of locks and the third set of locks is shown in Figure 3.2. The canal will be large enough to allow for ships that are as long as four football fields. Currently, the largest ship that can operate in the canal can carry 4,400 TEUs. The new locks will enable ships as large as 12,600 TEUs to operate through the canal. This is an increase of 250 percent for maximum allowable ships through the canal.

This increase in containers per ship creates tremendous cost advantages for shipliners that utilize the Panama Canal. For goods moving between the East Coast of the United States and Asia, it will become cheaper to utilize the Panama Canal rather than utilizing ports on the West Coast along with a domestic rail bridge to the East Coast.

Figure 3.2 Maximum Vessels at Existing and New Panama Canal Locks



Source: Panama Canal presentation to FHWA Talking Freight Seminar, February 2010.

² <http://savannahnow.com/share/blog-post/mary-carr-mayle/2014-06-23/panama-canal-director-new-locks-open-early-2016>

As mentioned in Section 2.0, trade through the Panama Canal grew from 236,000 TEUs as recently as 1996 to 4.6 million TEUs in 2008. There are several estimates for the impact of the Panama Canal on shifting container moves from the West Coast to the East Coast. The Panama Canal Authority expects that when opened, the Panama Canal will add 1.8 million containers to its current volume; Drewery Consultants estimate this number could be as high as 3 million. By comparison, the Port of Savannah currently handles approximately 2.5 million containers per year.

While the growth in traffic from the Panama Canal promises to be significant, the actual growth from the Panama Canal expansion will depend on the actions and reactions of all of the players involved in the current intermodal international shipping global supply chain. Additionally, macroeconomic factors, trade agreements, oil prices, and environmental regulations also will play a role. Some of the factors that are in play include:

- Economic outlook for U.S. and global economy – Are we in the midst of establishing a “new norm”?
- How long will outsourcing continue to occur, which industries will be impacted, and where will it move to?
- How will uncertainty in the near- and long-term trajectory of the U.S. dollar impact demand for imports and exports?
- Will cap and trade type policies restrict global trade or push global trade into newer, larger, and more environmentally friendly ships?
- How will west coast ports and railroads respond to losing traffic to the East Coast?
- How will regional population growth impact the distribution of demand for goods in the U.S.?
- How will the Panama Canal price its new services? Note that ship owners already have successfully lowered the first set of prices proposed by the Canal by citing hardship from the recession.
- How successful will ports in the Caribbean be in offering trans-loading services?

Competitive Strength of Port of Savannah

The Port of Savannah is in a very strong competitive position to capture a large portion of the growth projected to come through the Panama Canal. Over the last two decades, Savannah has successfully captured the warehouse and distribution traffic for many large retailers. Savannah has significant landside capacity enabling it to add more warehouse and distribution centers in land that already is owned by the port.

Savannah has also shown its competitive strength relative to other ports in the U.S. by being the fastest growing port in the country. In many ways, by continuing to do what it already has done in the past, Savannah can expect to participate in the rapid growth of traffic through the canal.

However, the deepening of the Panama Canal has created an additional dimension on which east coast ports will compete – harbor depth. Real-time water depths at ports can vary significantly depending on tides. A port that is 44 feet during low tide can be 50 feet during high tide. One way to compare water depths between ports is to consider the mean low water depth as done by the Panama Canal in Table 3.1. At a current mean low water depth of 42 feet, the Port of Savannah would not be able to offer low tide service to the largest ships using the canal.

Table 3.1 Mean Low Water Depth at East and Gulf Coast Ports

East and Gulf Coast Ports	Mean Low Water (MLW) Depth
Norfolk	48 feet
Charleston	47 feet
New Orleans	45 feet
New York/New Jersey	43 feet
Wilmington	42 feet
Savannah	42 feet
Houston	40 feet
Baltimore	40 feet
Miami	39 feet
Jacksonville	38 feet
Boston	38 feet
Philadelphia	38 feet

NOTE: The Ports of L.A./Long Beach, Oakland, and Seattle ports already are at 50 feet MLW depth.

Relative to water depths at other east coast ports, the Port of Savannah is somewhere in the middle of the pack. There are several ports that are deeper than Savannah, and several ports that are shallower than Savannah (Table 3.1). There currently is an intense focus to get as close to 50 feet as possible for water depth of East coast ports. The outcome of this race will be the most important factor in determining the cost-efficiency of goods moving through the Panama Canal.

The cost of dredging channels to deeper levels is typically in the billions of dollars. Therefore, it is unlikely that all ports on the East Coast will get to the 50-foot depth. Additionally, the ports that get a deepened channel first will be able to offer deep water service to shippers, ship owners, and retailers earlier, thereby developing somewhat fixed components of supply chains in terms of warehouses and distribution centers that will be able to support shipments that

are seeking this cost-effective service. In short, there will be tremendous “first mover advantage” to the ports that are able to deepen their harbors first.

For several years, the Port of Savannah has been securing funding and conducting environmental studies to ensure that the Savannah harbor is deepened. The completion of this dredging will be a critical step in the continued leadership by the Port of Savannah in terms of delivering cost savings and logistics advantages for companies in Georgia that are importing and exporting goods.

Key Investments Underway and Planned at East Coast and Gulf Coast Ports

The competitive landscape for east coast and gulf coast ports can be divided into strong, moderate, and weak competitors. The strongest competitors are likely to be the Port of New York/New Jersey, the Port of Virginia (Norfolk), and the Port of Charleston. Moderate competitors will likely be the Port of Jacksonville and the Port of Houston. Weaker competitors are likely to include ports in Miami, Mobile, the Tampa Bay area, and Philadelphia. This section discusses key investments and competitive positioning of several ports in the East Coast and Gulf Coast.

Port of New York/New Jersey. This is the largest port complex in the country outside of Southern California. This port will continue to benefit to nearby access to large population centers along the north eastern seaboard – from Boston to Washington, D.C. This port also is a multimodal operator with ownership and operating authority for several bridges, toll roads, tunnels, and transit systems in the New York metropolitan area. Its large size provides it with ready access to financing and organizational strength to enable it to expand as desired. The port currently has significant expansion plans which it already has financed, including plans to deepen its water depth to 50 feet, expand on-dock rail facilities, improve road access to the port, and build a 110-acre terminal. However, this port has significant upgrading needed to prepare for the largest of the ships from the Panama Canal. The Bayonne Bridge needs to be raised to allow the vertical clearance needed for the largest Panama Canal ships. The Goethals Bridge has near-term repair needs which also will be significant. Both of these projects are expected to cost over one billion dollars, which could potentially delay other port expansion plans.

The Port of Virginia (Norfolk). The Virginia Port Authority competes with Savannah for cargo in the South-Atlantic and Midwest. The Port of Norfolk benefits from already having a deep water harbor sufficient to handle the largest of the Panama Canal ships. It also has a sophisticated set of rail improvements that are coming on-line through the Heartland Corridor, National Gateway, and Crescent Corridor rail improvement projects. The Port of Virginia also has actively expanded capacity by adding storage area and improving on-dock rail access. This has significantly increased Norfolk’s container capacity. In 2007, APM Terminals invested over \$500 million in a new automated container terminal. In 2010, Virginia International Terminals reached an accord with APM

Terminals to take-over operations of this facility. The new fully automated APM terminal at Portsmouth also has added new capacity to the Hampton Roads region. The 2040 Port of Virginia Master Plan focuses on the following key areas:

- **Capacity Improvements** - Infrastructure and equipment investment to handle continued growth;
- **Craney Island Marine Terminal** - New state-of-the-art highly automated terminal will see operations commencing sometime around 2022; and
- **Distribution and Logistics** - Exploiting opportunities and challenges with inland transportation infrastructure, multimodal capabilities, and distribution-related activities

The port at Norfolk has a major disadvantage on its roadway connections to the south. A truck traveling south from the port is required to utilize a 100-mile, four-lane state highway with several unrestricted access points that passes through several residential communities. This makes truck travel to the south from the port a significant challenge.

Port of Charleston. The Port of Charleston is Savannah's nearest neighbor, traditionally competitive in all trade routes, but primarily on those to South America. Over the past 10 years, Charleston did not make the investments to attract Asian trade and focused on improving productivity and not expansion of capacity thus maintaining their South American and Transatlantic trade volumes. Going forward, Charleston is focused on adding capacity in order to try and capture a share of the fast growing Asian trade. These investments include the New Charleston Navy Base Terminal - at full build out the facility will increase port capacity by 1.4 million TEU, or approximately 50 percent. There also is a Capital Plan of \$217.2 million - total spending for fiscal years 2010 and 2011 to fund road and rail improvements. As is the case with the Port of Norfolk, all efforts on improving land access for truck and rail between the Port of Savannah and its hinterland needs to be continuously improved, both in terms of transportation costs and transit times (inventory costs). The Port of Charleston has historically competed with Savannah to be the first port of call for ships arriving in the southeastern United States from Asia. This competition will intensify as the Panama Canal continues its expansion. Charleston's chief advantage is that it already has a relatively deep harbor with 47 feet reported at low tide. While they would like to deepen its harbors further, there are no concrete plans or widespread public support for it at this time. The focus of Charleston's recent efforts have been on the relocation of its container terminal to an old army base. However, there is considerable public opposition to the relocation. Only recently, did the port settle a lawsuit with the Coastal Conservation League to relocate its facilities. Additionally, several connecting roads, including a truck-only facility have yet to be built. There also is much debate over the relocation of one or more intermodal railyards to nearby the new container yard location.

Port of Jacksonville. The Port of Jacksonville (Jaxport) also has historically competed with Savannah to be the first port of call for ships arriving in the southeastern United States from Asia. This competition is likely to continue as traffic volumes increase. One advantage of the Jacksonville port is that it can reach the large populations of Miami, Tampa, Atlanta, and Charlotte within a one-day's drive. The Port of Savannah has challenges reaching South Florida relative to the Port of Jacksonville. The Port of Jacksonville also recently completed a 158-acre container terminal to be operated by Mitsui O.S.K. Lines (MOL). It also has reached an agreement with Hanjin on opening a 90-acre terminal in 2011. CSX also provides on-dock rail access at this port. Jaxport budgeted \$70 million for infrastructure and terminal capital projects in 2010. However, the port only recently completed dredging to get to a uniform depth of 40 feet at all of its terminals. This depth would significantly restrict the size of the ships which dock at this location. This would be particularly restrictive as the Panama Canal completes its third set of locks. The port has plans to dredge to dredge to 45 feet, but it has not yet secured financing or conducted the required studies for this deepening.

The Port of Philadelphia. The Port of Philadelphia is positioned to serve both the Mid-Atlantic and northeast markets. It is often seen as a low-cost competitor to the Port of New York/New Jersey and Port of Baltimore., however, it is not well-positioned to compete against the Port of Savannah. This port was seeking bids on a \$400 million privately financed container terminal, however, it had to pull its request due to a lack of interest. The port was interested in dredging to 45 feet, but was sued by State of Delaware to halt due to environmental impacts.

The Port of Houston. This port recently expanded its Bayport Terminal doubling the port's total terminal capacity. It also is geographically well-positioned to distribute goods to Texas, the Mid-South, and locations along the I-69 corridor. However, this port has not yet committed to the full set of expansions needed to capitalize on the expansion of the terminal. The water depth at the port is only 40 feet at low tide. Therefore, significant dredging would be needed to enable the port to receive the largest of Panama Canal ships.

The Port of Wilmington. The North Carolina State Ports Authority (NCSPA) announced it suspended plans to open the largest international terminal on the East Coast in Brunswick County. Nevertheless the port of Wilmington possesses potential of becoming a serious competitor for Asian trade. The proposed Port expansion projects in Morehead City and Wilmington are designed to make North Carolina a key player in international trade. NCSPA sold \$44 million in bonds in February, 2010 to support terminal expansion projects, including reconstruction of a container berth at Port of Wilmington and a 177,000 ft² warehouse at the Port of Morehead City. The recent Wilmington Harbor Deepening Project brought 42-foot deep water the entire length of the Cape Fear River navigational channel, from the ocean near Southport to the Port, however, there are significant environmental concerns and community resistance to expansion. Additionally, road and rail access from the new port facility are challenging.

Port of Mobile. Large-scale improvements by the Port of Mobile will transform it into a credible threat to the Gulf tier of Savannah's market. Since 2000, Alabama State Port Authority (ASPA) has invested nearly \$500 million in capital improvements and expansion projects to serve containers, bulk, and breakbulk commodities. In November 2008, the new 350,000 TEU per year Mobile Container Terminal opened. APM Terminals and CMA CGM's Terminal Link have joint responsibility for operations. The terminal offers modern container handling equipment, 45 feet of water depth and is linked to five Class I railroads. Full build-out will increase annual capacity to 800,000 TEU in a series of phased future developments. In July 2010, APM Terminals acquired the 20 percent share held by CMA CGM. During 2009, ASPA commenced the process to gain private investment for its \$75 million, 74-acre Garrows Bend Intermodal Container Transfer Facility (ICTF) at Choctaw Point, with a desire to complete the process within three years. To sustain its southern market flank the Port of Savannah, together with surface transportation agencies, need to take this competitive threat seriously and formulate access improvements.

Port of Miami. The Port of Miami has plans to deepen to 50 feet in the next three years to take advantage of the Panama Canal expansion. However, the majority of the effort at this port has been directed towards developing the Port of Miami Tunnel. This project will allow for port trucks to connect directly with I-95 without mixing with automobile traffic. It also will resolve significant weaving issues for several stretches of the Interstate as well. The primary drawback of the Port of Miami is that its geographic position at the tip of Florida puts it at a significant disadvantage to draw distribution-type traffic.

Tampa Bay Area Ports. The Port of Tampa does not have significant expansion plans. However, it does have a long-term goal to capture a larger share of Florida-destined intermodal container traffic. The largest expansion in the Tampa Bay area has been by the Port of Manatee which recently purchased land for its first ever container port.

Port of Savannah. The Port of Savannah also is recognized as the major competitor to the Ports of Los Angeles and Long Beach for Asian trade. It has managed to divert significant business from major retail importers who have been long-time customers of the two major ports in Southern California (Inland Empire). The success has afforded Georgia rapid port growth and large increases in employment in the distribution sector. This success was driven by the Port of Savannah's management with significant contribution seen through investment in access by GDOT, by private sector investments in rail and trucking and training and management systems by other departments of the state government. In order to sustain this growth the State of Georgia's continued support will be needed.

3.2 DOMESTIC TRADE

Georgia's domestic trade occurs through a combination of rail and truck traffic. To the extent, that Georgia has strong modal rail and truck connections with the rest of the country, goods produced in Georgia will be able to compete with similar goods produced in other regions. However, as the performance of Georgia's domestic trade lanes deteriorates, other regions will have a competitive advantage over Georgia. As discussed in Section 2.0, the public and private sectors in Georgia have invested significantly for decades in rail and highway assets. This section examines how Georgia is likely to fare along the same dimensions in the future.

Rail

As listed in Section 2.0, there are four major rail investments that are impacting the eastern United States.

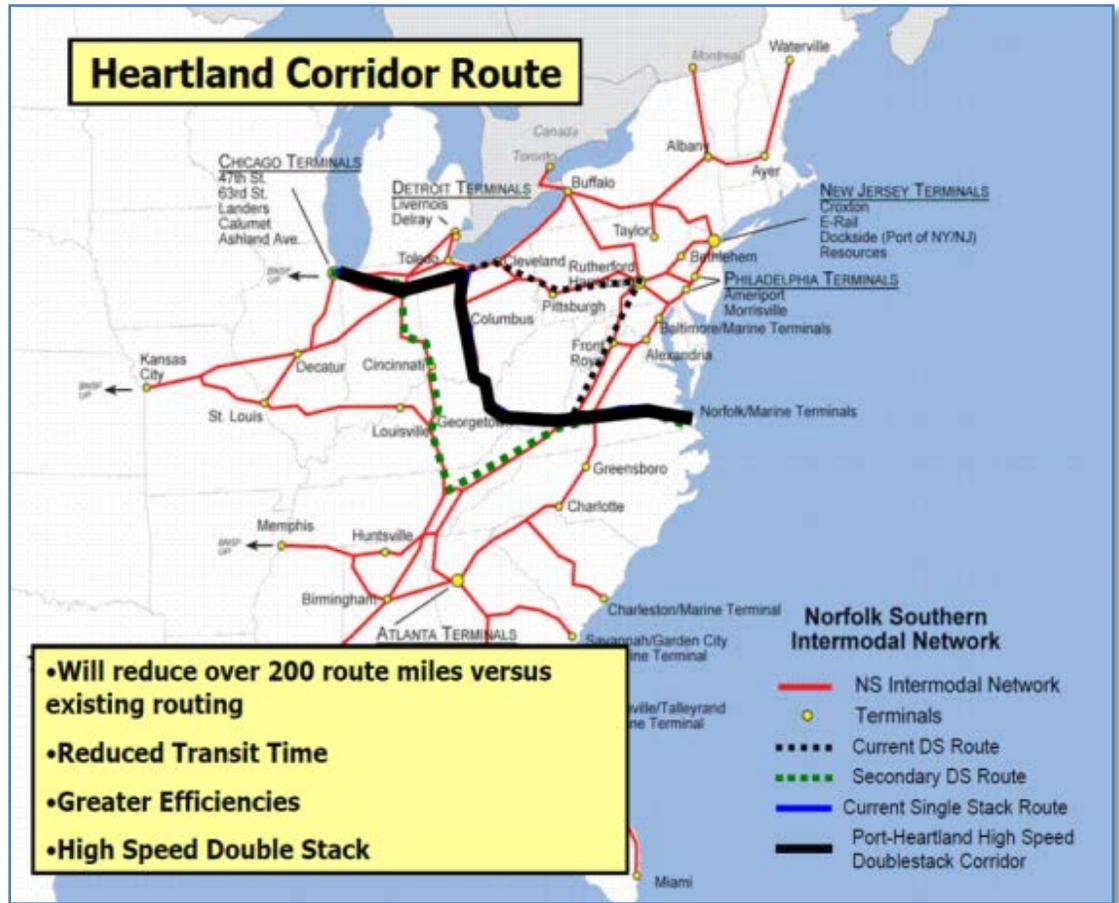
1. Norfolk Southern's "Heartland Corridor";
2. CSX's "National Gateway";
3. Norfolk Southern/KCS' "Meridian Speedway"; and
4. Norfolk Southern's "Crescent Corridor".

Heartland Corridor. The Heartland Corridor is an effort by Norfolk Southern to provide intermodal "double-stack" container service between the Port of Norfolk and Chicago (Figure 3.3). As of September 9, 2010, this project is complete and running multiple double-stack container trains per day. The project increased the height of 28 tunnels in Virginia, West Virginia, and Kentucky. It also removed 28 overhead obstructions through modifications in bracing, fencing, overhead wire removal, and miscellaneous signal work in West Virginia and Ohio. The result was a new high-speed double-stack capable rail line that reduces 200 miles of the current double-stack rail line used by Norfolk Southern (Figure 2.20).

This was a multi-year development project that will add significant rail capacity between the Mid-Atlantic portion of the U.S. (particularly the Port of Virginia at Norfolk) and the Midwest U.S. (particularly Chicago). The project will also serve to enhance trade between intermediate cities and both domestic and global locations by providing easy access to Chicago and the Port of Norfolk using the Heartland Corridor.

In particular, the Rickenbacker Terminal in Ohio was expanded in anticipation of additional intermodal rail traffic being generated. There are also plans for a new intermodal terminal in Pritchard, West Virginia which will take advantage of the increased intermodal rail traffic through the region.

Figure 3.3 Map of Norfolk Southern Heartland Corridor



The total project cost of the corridor rail improvements were \$151 million. There were several sources of funding for this project including:

- \$95 million of authorized SAFETEA-LU funds which are subject to obligation limitation;
- A Virginia Rail Enhancement Grant of \$9.75 million; and
- An Ohio Rail Development Commission Grant of just under \$1 million.

Norfolk Southern paid the balance of the project cost. Additional projects that were funded and are related to the Heartland Corridor are:

- \$60 million allocated for a Commonwealth Railway Mainline Safety Relocation Project in Portsmouth, Virginia;
- \$62 million allocated for expansion of the Rickenbacker intermodal terminal in Columbus, Ohio;
- \$18 million for the new Pritchard Intermodal terminal; and
- \$18 million provided for the new Roanoke Region Intermodal Terminal.

The Appalachian Transportation Institute at Marshall University estimated that over the next 20 years, the Heartland Corridor will provide between \$201 to \$368 million in economic benefits to shippers moving freight in the Heartland Corridor. Their study also estimated that the Central Corridor component of this project would increase economic activity in West Virginia by \$50 million per year with associated increases in employment and tax revenue providing \$4.4 million to \$11.3 million in direct benefits annually to existing shippers in West Virginia, eastern Kentucky, and southeastern Ohio.

According to a separate study performed by Insight Research for the Columbus Regional Airport Authority and Norfolk Southern, the terminal improvement components of the Heartland Corridor was estimated to add over 10,000 jobs by 2028 and result in increased economic impacts of \$1 billion by 2028. Therefore, the cost of the Heartland Corridor paid for itself both in terms of benefits to private shippers and benefits to the general public.

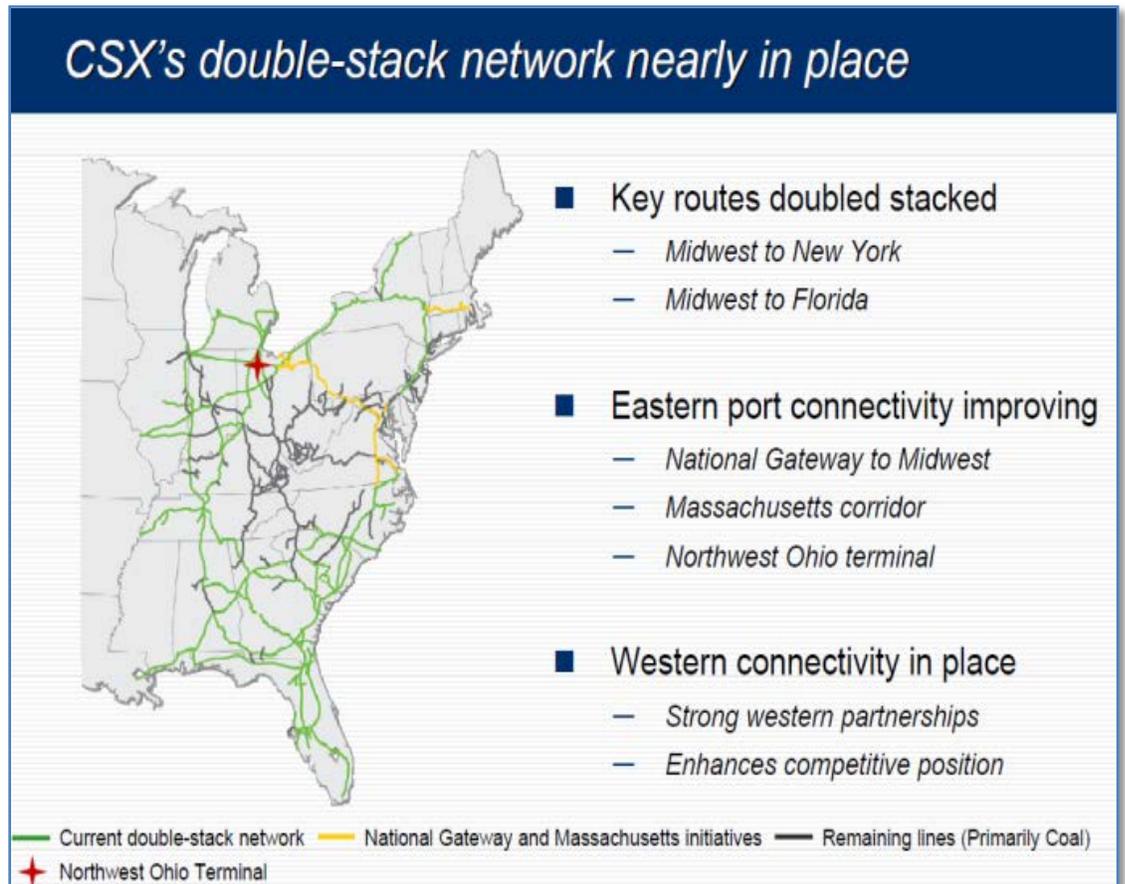
CSX National Gateway. The CSX National Gateway represents CSX's efforts to complete the double-stacking of its entire rail line. It is a \$842 million public-private partnership infrastructure initiative to create a highly efficient freight transportation link between the mid-Atlantic ports and the Midwest. The National Gateway is supported by a broad coalition that includes governors and regional officials across six states, more than three dozen members of Congress, three port authorities, and a large number of global shippers, ocean carriers, business organizations, and environmental groups.

The sponsoring states of Ohio, Maryland, Pennsylvania, Virginia, and West Virginia have pledged \$189 million to this effort, and CSX already has contributed \$395 million to the project. The National Gateway coalition was awarded \$98 million in Transportation Investment Generating Economic Recovery (TIGER) grant money. The funds will go immediately to construction projects that enhance the use of fuel efficient and environmentally friendly freight rail.

National Gateway incorporates two primary parts. First, CSX would build or expand several of its intermodal terminals. At the same time, CSX would work together with state and Federal government agencies to create double-stack clearances beneath public overpasses along the railroad. The National Gateway will enhance three existing rail corridors that run through Maryland, Virginia, North Carolina, Pennsylvania, Ohio, and West Virginia (Figure 3.4).

Construction began in late 2010 and the entire program is scheduled for completion in 2015. In September 2013, the project's first phase was completed that providing double-stack intermodal rail service between CSX's existing terminal in Chambersburg, Pa. and its hub facility in Northwest Ohio. Focus is now on completing phase two which will provide double-stack capability between Chambersburg, Pa. and mid-Atlantic ports in Maryland and Virginia.

Figure 3.4 Map of CSX National Gateway



According to the National Gateway web site, nationalgateway.org, the project provides over \$10 billion in public benefits in the route's first 10 years of operations. The benefits of the National Gateway include:

- Improving safety and reduces highway maintenance costs by converting over 14 billion highway miles to rail;
- Reducing CO₂ emissions by almost 20 million tons;
- Saving over \$3.5 billion in shipping costs; and
- Reducing fuel consumption by nearly two billion gallons.

Crescent Corridor. The most significant rail development impacting the southeastern United States is Norfolk Southern's Crescent Corridor. This project will create the nation's most direct intermodal rail route between the Northeast and the South (Figure 3.5). It includes constructing 300 miles of new passing track and double track by full development. It also includes 11 new or expanded rail intermodal terminals. The project will expand and upgrade existing rail lines

along the corridor to accommodate fast freight trains and also purchase new locomotives and freight cars, and build new terminals.

Figure 3.5 Map of NS Crescent Corridor



The Crescent Corridor Coalition includes 10 states (Georgia, Alabama, Tennessee, Virginia, North Carolina, West Virginia, Pennsylvania, Mississippi, New Jersey, and Delaware), 18 U.S. Senators, 44 U.S. Representatives, 15 Planning Organizations, and more than 200 state and locally elected officials, nonprofits and logistics companies.

The total estimated cost of the Crescent Corridor is \$2.5 billion. The full corridor development can be achieved as early as 2021 depending upon matching public funds. Under full development, Norfolk Southern estimates that there will be 1.3 million annual truckloads that are divertible through the use of 28 dedicated Crescent Corridor trains. Each train trip will have an average length of haul of 1,100 miles.

In early 2010, the Crescent Corridor Coalition TIGER-funds grant application was accepted. The TIGER grant components included intermodal terminal development in Greencastle, Harrisburg, Philadelphia, Birmingham, and Memphis as well as rail route enhancements in each of the five states, including rail and ties, straightening curves, adding passing and double tracks, and new signals in order to support truck competitive transit times. The TIGER grant

award from US DOT was \$105 million -- the largest of all awards; it will be distributed equally between the new Birmingham and Memphis regional intermodal facilities.

A study commissioned by the Crescent Corridor Coalition identified significant benefits for the entire project and for the State of Georgia. It estimated that there were \$16 in public benefits for every \$1 of public funds invested from 2011 to 2030, and \$25 in public benefits for every \$1 of public funds invested from 2011 to 2040. This analysis was based on monetizing public benefits at a 3 percent discount rate. Full benefits are shown in Table 3.2.

Additionally, Insight Research Corporation performed economic, employment, and tax revenue impact analyses for the six proposed new or expanded intermodal facilities in the TIGER grant application and the surrounding 50-mile service areas. This analysis indicated that the new intermodal activity would result in 73,000 jobs created by 2030 and \$40 billion in cumulative economic impact between 2009 and 2030. Norfolk Southern believes these estimates to be conservative.

The estimated reduction in trucks on Georgia's Interstates includes:

- 199,000 fewer trucks on I-85 north of Atlanta;
- 191,000 fewer trucks on I-85 south of Atlanta;
- 286,000 fewer trucks on I-20 east of Atlanta; and
- 181,000 trucks on I-20 west of Atlanta.

Table 3.2 Estimated Annual Benefits of Crescent Corridor for Georgia and Entire Project

Benefit Category	Entire Project	Georgia
Logistics Cost Savings	\$1 Billion	N/A
Congestion Savings	\$575 Million	\$25 Million
Safety Savings	\$146 Million	\$7 Million
Fuel Savings	170 Million Gallons	8 Million Gallons
CO ₂ Eliminated	1.9 Million Tons	84,000
Highway Maintenance Savings	\$90 Million	\$5 Million
Total Monetized Public Benefits	\$2 Billion	N/A

Source: Norfolk Southern Presentation at Southeast Diesel Collaboration Partners Day, June 2010.

Construction on the Crescent Corridor began in northern Virginia in 2008. The Charlotte terminal is under construction, and the entire corridor is expected to be completed by 2013. Phase 1 improvements for the Crescent Corridor include

improvements at terminals in the northeast along with a new terminal in Memphis and improved terminal in Birmingham, Alabama. Phase 2 improvements include a new terminal in Eastern Tennessee, and a terminal upgrade in Charlotte. Phase 3 improvements include a new terminal in southern Virginia and improvements to the intermodal yard in Atlanta.

While the successful TIGER grant application is indicative of the huge returns in investing in freight rail, the \$105 million in TIGER grant funding only covers improvements in Tennessee and Alabama, and will not significantly impact goods movement in Georgia. To see the full benefits of the Crescent Corridor in Georgia, a public-private partnership would likely need to be considered partnering the resources of the Federal government, the State of Georgia, other States along the Crescent Corridor, and Norfolk Southern.

Norfolk Southern/Kansas City Southern Meridian Speedway. This project is a joint venture between Norfolk Southern and Kansas City Southern to improve the rail lines connecting Meridian, Mississippi and Shreveport, Louisiana. Kansas City Southern purchased the deteriorated rail line 1994, and started a major overhaul of the line.

The ultimate goal is to increase capacity and improve transit times between these two cities, and ultimately create a faster connection for rail traffic between the Southeast and the Southwest generally, and Atlanta to Dallas specifically. Norfolk Southern contributed \$300 million to this venture for capital improvements in exchange for 30 percent ownership of the line.

Intermodal Rail Benefits for Global Trade

A large percentage of intermodal rail traffic is moving goods that originate from or are destined to an international marine port. Therefore, improved intermodal rail facilities benefit both domestic trade and global trade. The top three rail improvements occurring in the eastern half of the United States (Heartland Corridor, National Gateway, and Crescent Corridor) all connect with port facilities. From a strategic standpoint, it is important to note that all three of these improvements are connecting with the Port of Virginia (Norfolk). These three intermodal rail improvements add significantly to Norfolk's competitive positioning by providing improved rail access to the north, west, and south of the port to the major metropolitan economies in the eastern U.S. The Port of Savannah will not be a direct beneficiary of any of these three rail improvements. Nor will other ports in the Southeast.

Long-Haul Corridors

The other facet of domestic trade is moving goods using the highway system. The vast majority of domestic trade occurs using the highway network, and intermodal rail uses the road network to connect with final origins and destinations. A review of improvements on long-haul corridors in the Southeast found that there were only a handful that included significant improvements that were

recently completed or underway. One of the key long-haul corridors under development is I-22 which is connecting Memphis with Birmingham. This Interstate is largely complete, except for some short sections near the Birmingham and Memphis metropolitan regions. The Tennessee DOT recently completed a statewide corridor study of I-40/I-81, and began improvements to this corridor by adding truck climbing lanes at several locations. The I-69 corridor is a national long-haul corridor that connects Texas with Indiana. It is being completed in sections with the pieces in Memphis, Tennessee currently under construction.

3.3 LOCAL TRADE

For purposes of this report, local trade refers to travel between metropolitan regions within Georgia or travel within any specific metropolitan region. There are several projects underway in metropolitan regions in the Southeast to improve intra-urban traffic. While these projects are primarily being designed to improve passenger car traffic, they also will improve the movement of goods by increasing efficiency for trucks as well. These local trade corridor improvements include:

- I-485 “Outer Beltway” in Charlotte, North Carolina;
- Urban Loop in Greensboro, North Carolina;
- I-140 Outer Loop in Wilmington, North Carolina;
- I-69/I-269 in Memphis, Tennessee;
- TN-840 Beltway in Nashville, Tennessee; and
- I-795 Outer beltway in Jacksonville, Florida.

This list of projects indicates that there will continue to be improvements to the local highway system in metropolitan regions in the Southeast. Most notable is that North Carolina is developing three beltway-type projects indicating that they are progressing significantly in terms of improving the highway network in the State.

4.0 Benefits of Investing in Georgia's Freight Transportation System

Theme 4 – “By regaining its competitive advantage, Georgia will position itself to capture several billion dollars of additional GDP growth over the next 30 years.”

There are two methods that can be used to estimate the benefit from increased investment in the State's freight transportation system. The first method incorporates a standard transportation economic analysis to estimate the impact of reduced congestion costs on economic activity. The second method looks broadly at key freight-related sectors in Georgia and determines what the economic opportunity is from continuing on the current trajectory relative to returning to a position of leadership in the Southeast. This section describes the results of each of these methods.

4.1 METHOD 1 – ECONOMIC IMPACT OF REDUCED CONGESTION

As mentioned in Section 2.0, Atlanta has the highest level of congestion in the Southeast, and its congestion has been growing faster than any other major metropolitan city in the country. This has been a significant contributor to the reduced economic performance of Georgia relative to other states in the Southeast and the rest of the United States.

Regional Economic Modeling Inc. (REMI) has developed an economic model that estimates the total economic impact from changes in the cost of congestion for a region. The economic benefits are calculated based on the impact of reducing the dollar amount spent on transportation for each industry. This cost reduction translates to lower costs for each industry which, therefore, allows for lower prices, higher quantities of goods shipped, and increased profits.

The REMI model examined the impact of a 0.5 percent annual decline in the cost of congestion over 30 years. The model estimated that this reduction in the cost of congestion would result in the Georgia economy gaining \$16 billion of economic output and 188,000 jobs between 2011 and 2040. \$7.1 billion of economic output and 28,500 jobs would be generated for freight-related sectors during the same time period.

4.2 METHOD 2 – ECONOMIC IMPACT OF GEORGIA RETURNING TO HISTORICAL MARKET SHARE IN FREIGHT-RELATED SECTORS

Another method to estimate the economic potential of investment in freight transportation is to consider the broader economic impact of potential growth trajectories of freight-related sectors in Georgia. As discussed in Section 2.0, Georgia's economic growth was the strongest of all southeast states between 1990 and 1997. However, after 1998 Georgia's economy grew at a slower pace than both other states in the Southeast and the United States as a whole.

The Southeast as a region is poised to capture a significant portion of the nation's growth as population continues to increase at a faster rate than the rest of the country. Additionally, companies continue to relocate to the Southeast to take advantage of lower operating costs and salaries than other regions.

The question that lays before Georgia is will it continue its downward trajectory, will it remain where it is today, or will it return to its position of leadership in the southeastern economy. This question can be analyzed quantitatively by looking at Georgia's market share relative to other states in the Southeast in 1998, 2007, and projected out to 2020 for the four freight-related sectors discussed in Section 2.0.

The four freight-related sectors are: 1) Transportation and Warehousing; 2) Manufacturing; 3) Retail Trade; and 4) Wholesale Trade. For each of these four sectors Georgia's market share relative to other southeast states declined. The economic impact in terms of dollars of Gross State Product (GSP) is shown in Tables 4.1 through 4.4 for each sector, respectively.

As summarized in Table 4.5, the difference between continuing on its current trajectory and regaining its previous leadership in freight-related sectors amounts to a difference of \$22 billion in GSP in 2020.

Table 4.1 Impact of Alternative Growth Trajectories
Transportation and Warehouse Sector

	1998	2007	By year 2020 – If Georgia...		
			Maintains Current Market Share	Continues on Current Trajectory	Regains 1998 Market Share
Total	61	73	97	97	97
Georgia	12.8	14.6	18.4	19.4	20.4
Georgia – Percent of Total	21%	20%	19%	20%	21%
Rest of Southeast	48.2	58.4	78.6	77.6	76.6
Rest of Southeast – Percent of Total	79%	80%	81%	80%	79%

Table 4.2 Impact of Alternative Growth Trajectories, *Manufacturing Sector*

	1998	2007	By year 2020 – If Georgia...		
			Maintains Current Market Share	Continues on Current Trajectory	Regains 1998 Market Share
Total	291	276	255	255	255
Georgia	49.5	40.0	37.0	30.6	43.4
Georgia – Percent of Total	17.0%	14.5%	14.5%	12.0%	17.0%
Rest of Southeast	241.5	236.0	218.0	224.4	211.7
Rest of Southeast – Percent of Total	83.0%	85.5%	85.5%	88.0%	83.0%

Table 4.3 Impact of Alternative Growth Trajectories, *Wholesale Trade*

	1998	2007	By year 2020 – If Georgia...		
			Maintains Current Market Share	Continues on Current Trajectory	Regains 1998 Market Share
Total	138	167	222	222	222
Georgia	24.8	28.4	37.7	35.5	40.0
Georgia – Percent of Total	18%	17%	17%	16%	18%
Rest of Southeast	113.2	138.6	184.3	186.5	182.0
Rest of Southeast – Percent of Total	82%	83%	83%	84%	82%

Table 4.4 Impact of Alternative Growth Trajectories, *Retail Trade*

	1998	2007	By year 2020 – If Georgia...		
			Maintains Current Market Share	Continues on Current Trajectory	Regains 1998 Market Share
Total	108	136	190	190	190
Georgia	20.5	24.5	34.2	32.3	36.1
Georgia – Percent of Total	19%	18%	18%	17%	19%
Rest of Southeast	87.5	111.5	155.8	157.7	153.9
Rest of Southeast – Percent of Total	81%	82%	82%	83%	81%

Table 4.5 Impact of Alt. Growth Trajectories: Summary, \$Billions Econ. Output

Sector	Billions of Dollars		
	2020 – If Georgia Continues on Current Trajectory	2020 – If Georgia Regains 1998 Market Share	Difference
Transportation and Warehousing	19.4	20.4	1.0
Manufacturing	30.6	43.4	12.8
Wholesale Trade	35.5	40.0	4.5
Retail Trade	32.3	36.1	3.8
Total Difference in Economic Output			22.1

5.0 Conclusions on Investment in Freight Transportation Assets

The level of growth of Georgia's freight-related sectors is correlated to the level of investment in the State's freight transportation system. In the 1990s, Georgia's rapid economic growth was in part due to the growth of the freight-related sectors which in turn was a result of the high levels of investment in freight transportation assets in the 1970s and 1980s.

However, beginning around the mid-1980s, investment in freight transportation assets declined for the highway mode. The other freight modes reached a plateau in terms of investment. Other states in the Southeast that maintained high levels of investment in their freight transportation systems grew more rapidly than Georgia in the 2000s.

Each freight mode is undergoing rapid changes that represent an inflection point in the growth trajectories in the Southeast. For the trucking mode, increased urban highway congestion levels are creating growth opportunities for states that can keep their levels of congestion in check. For the freight rail mode, there are several large-scale, public-private rail improvement projects in the Eastern United States. However, rail through the Southeast continues to be relatively low compared to other regions of the country.

There is an opportunity for Georgia to increase its rail competitiveness with the Mid-Atlantic, the Northeast, and the Southwest. However, the level of investments required to increase rail market share is beyond the capital availability of the Class I railroads. Georgia will need to partner with the railroads to improve the use of freight rail for the movement of goods. The Crescent Corridor represents one step in that direction. This project and similar projects deserve special consideration for public-private partnerships by the State of Georgia. Georgia also may need to partner with neighboring states to ensure that the full benefit of freight rail improvements accrue to Georgia goods.

The completed deepening and widening of the Panama Canal represents an inflection point in freight traffic on the East Coast. Regardless of the Panama Canal expansion, the annual increase in containers through the port is roughly equivalent to the current number of containers handled at the Port of Savannah. If the Port of Savannah captures just 10 percent of this increased container traffic, the port could double its size in the next 10 years. This would require improving its road and rail infrastructure to ensure that Savannah has the premier portside, landside, and inland facilities to attract the larger ships that will come through the Panama Canal.

Competition for Savannah to capture this increased traffic will be stiff; several ports on the East Coast and Gulf Coast have plans to deepen their harbors, and

others are making road and rail connections to improve their competitive positioning relative to the Port of Savannah. For example, the Port of Virginia (Norfolk) has three of the large-scale rail improvement projects improving rail access at their port which will provide a significant attractiveness relative to other east coast ports, particularly since their harbor channel is already 48 feet deep. Additionally, west coast ports and railroads are continuing to improve their service and rationalizing their pricing in response to east coast competition. Even ports in the Caribbean have plans to offer transloading shipment services to capture the Panama Canal traffic.

Air cargo continues to grow in its importance by providing shipments of time-sensitive international and domestic freight. However, the recent economic recession combined with new screening requirements will create significant challenges to the Atlanta air cargo market that go beyond its currently geographically constrained position.

The fact that Georgia has experienced a market share decline of the southeast economy relative to other states in the region indicates that there is a significant opportunity to increase the State's economic output through targeted investments across several dimensions, including the freight transportation system. From a pure congestion perspective the economic growth from an improved transportation system can be \$16 billion over the next 30 years.

From the perspective of Georgia reversing the trend of the last 10 years, and regaining its 1990s market share for freight-related sectors, there is the potential for \$22 billion of annual growth in the year 2020 alone. Regaining this leadership can occur; it will require timely and significant investments in freight transportation to become a reality.

Strategy

Funding for delivering freight project and program improvements is one fundamental challenge for all states, as is reflected in many national and regional reports. One example is the 2014 Manufacturing and Logistics Report Card³ completed by Ball State University. This report card was national in scope and focused on several categories for each state, including "logistics health" defined as:

"The movement of goods is of central importance to the production of goods. Without a robust logistics industry, manufacturing and commodity production will not occur. Logistics comprises not merely the capacity to move goods, but to store inventory and manage the distribution and processing of manufactured goods. Logistics firms depend upon many of the same factors as manufacturing firms in their location decision, but there is a more complex interplay between local conditions and the existing or planned transportation networks of roads, railroads, waterways, and airports.

³ <http://projects.cberdata.org/reports/Conexus2014-US.pdf>

*To measure the health of the logistics industry, we include the share of total logistics industry income as a share of total state income, and the employment per capita. We also include commodity flows data by both rail and road. **To this we measure infrastructure spending as the per capita expenditure on highway construction.***

For Georgia, the Ball State University 2014 report card gave the state a “B” for logistics health. Because the grade relied on the metric of ‘per capita expenditure on highway construction’, and reflecting on Georgia’s investment history discussed in previous pages of this document, it is conceivable that this factor contributed to the state not receiving an “A” in the category of logistics health.

However, as part of the continued focus on supporting and growing its freight and logistics industries, the state is strategically pursuing funding approaches to change it’s the investment trend for freight-beneficial investments. Discussions of this strategy are featured in the Freight and Logistics Plan’s *Task 5 Recommendations* document.