



Southeast Rail Plan

Final Report

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Contents

1. Introduction.....	6
1.1 IMPLICATIONS OF COVID-19	6
1.2 STUDY OVERVIEW.....	7
1.3 WHAT IS A REGIONAL RAIL PLAN?	7
1.4 SIGNIFICANCE OF THE SOUTHEAST REGION.....	9
1.5 GEOGRAPHIC SCOPE OF STUDY	10
1.6 STUDY PROCESS.....	11
2. Planning Context.....	17
2.1 STUDY AREA OVERVIEW	17
2.2 TRANSPORTATION NETWORK AND TRAVEL DEMAND	32
2.3 RECENT AND ONGOING PASSENGER RAIL PLANNING EFFORTS	62
3. Network Analysis Approach	85
3.1 HIGH-PERFORMANCE RAIL SERVICE TIERS	85
3.2 ANALYSIS METHODS AND THE CONNECT PLANNING TOOL	86
3.3 CORRIDOR IDENTIFICATION PROCESS	88
3.4 TECHNICAL PROCESS – NETWORK BUILDING BLOCKS	95
4. Southeast Regional Network Vision	102
4.1 FROM BUILDING BLOCKS TO DRAFT NETWORK	102
4.2 RECOMMENDED REGIONAL NETWORK	102
4.3 PHASING CONSIDERATIONS	105
4.4 BASIC PERFORMANCE (KPIS)	109
4.5 KEY FINDINGS BY CORRIDOR AND NETWORK	109
4.6 TRANSPORTATION NETWORK CONSIDERATIONS	111
4.7 NETWORK IMPLEMENTATION CONSIDERATIONS	113
5. Governance	114
5.1 EXISTING REGIONAL RAIL COORDINATION EFFORTS IN THE SOUTHEAST.....	114
5.2 SOUTHEAST GOVERNANCE DISCUSSIONS.....	115
5.3 GOVERNANCE APPROACH AND INSTITUTIONAL CONSIDERATIONS.....	115
5.4 REGIONAL COORDINATION CHALLENGES	117
5.5 GOVERNANCE FINDINGS, RECOMMENDATIONS, AND CONCLUSIONS	118
6. Action Items and Next Steps	122
6.1 CONNECTING WITH OTHER REGIONAL RAIL PLANS.....	122
6.2 INCORPORATION INTO STATE RAIL PLANS AND LONG-RANGE PLANS	122
6.3 POTENTIAL FOLLOW-ON REGIONAL STUDIES.....	123
6.4 GOVERNANCE ACTION ITEMS	123



Tables

Table 1.	Stakeholder Workshops	13
Table 2.	Southeast Study Area Population	23
Table 3.	State Manufacturing Production and Employment (2018).....	28
Table 4.	Freight Miles by Ownership	34
Table 5.	Existing Intercity Rail Service in SE Study Area.....	38
Table 6.	Amtrak Station Activity by State in the SE Study Area.....	38
Table 7.	Commuter Rail Services in the Southeast Study Area.....	45
Table 8.	Other Rail Transit and Ridership in the Southeast Study Area.....	46
Table 9.	Airport Performance	51
Table 10.	Highway Corridors in the Southeast Study Area	54
Table 11.	Cargo Throughout at Major Ports in the Southeast Study Area.....	62
Table 12.	Definitions of High-Performance Rail Service Tiers.....	85
Table 13.	Key Performance Indicators	88
Table 14.	Overview of Alternative Multi-State Governance Models.....	116



Figures

Figure 1.	Previous and Ongoing FRA Regional Rail Plan Study Areas.....	8
Figure 2.	Megaregions in the United States.....	9
Figure 3.	Southeast Rail Plan Study Area	11
Figure 4.	Southeast Study Inputs	14
Figure 5.	Mid-Atlantic Megaregion	19
Figure 6.	Piedmont Megaregion	20
Figure 7.	Florida Megaregion	21
Figure 8.	Top 15 States by Population Growth (2010–2015).....	22
Figure 9.	2015 Most Populous CBSAs within proximity of Atlanta (millions)	25
Figure 10.	2015 Most Populous CBSAs within 500 Miles of Atlanta (millions)	26
Figure 11.	CBSA Population Growth within SE Study Area States (2015 – 2040)	27
Figure 12.	Manufacturing Employment Count by County (2018).....	29
Figure 13.	Geographic Features of the Southeast Study Area	31
Figure 14.	Generalized Daily Freight Traffic.....	33
Figure 15.	Intercity Passenger Rail Routes within the SE Study Area	39
Figure 16.	Top 15 Rail Travel Trips by Annual Trips in the Southeast Study Area.....	42
Figure 17.	Top 15 Rail Travel Pairs within 500 miles in the Southeast Study Area	43
Figure 18.	Amtrak Ridership (2010 – 2018)	44
Figure 19.	Commercial Airports in the Southeast Study Area.....	48
Figure 20.	Top 10 Airports in the Southeast Study Area by Annual Enplanements.....	49
Figure 21.	Top 15 Annual Air Travel Trips in the Southeast Study Area	50
Figure 22.	Top 15 Annual Air Travel Pairs in the Southeast Study Area.....	50
Figure 23.	Percentage of Flights On-Time at Major U.S. Airports.....	52
Figure 24.	Most Heavily Traveled Highways in the Southeast Study Area.....	55
Figure 25.	Population along Key Interstate Corridors in the Southeast Study Area (2015 and 2040).....	56
Figure 26.	Top 15 Auto Travel Trips in the Southeast Study Area	57
Figure 27.	Top 15 Auto Travel Pairs in the Southeast Study Area.....	57
Figure 28.	New Intercity Bus Routes Serving Florida (2019).....	59
Figure 29.	Top 15 Bus Market Pairs by Scheduled Frequency in the Southeast Study Area.....	60
Figure 30.	Major Ports in the Southeast Study Area.....	61
Figure 31.	District of Columbia State Rail Plan Rail Network (2017).....	64
Figure 32.	Major Railroad Structures in the District (2017)	65
Figure 33.	Proposed Virginia Passenger Rail Projects	67
Figure 34.	CCX Intermodal Terminal Under Construction (August 2020).....	72
Figure 35.	Crane components for CCX being unloaded at the Port of Wilmington.....	73
Figure 36.	South Carolina Rail System.....	75
Figure 37.	2015 Georgia State Rail Plan Intercity Passenger Rail Vision	78
Figure 39.	All Aboard Florida System	80
Figure 39.	Brightline Station, Orlando.....	81
Figure 40.	Southern Rail Commission Priorities	84
Figure 41:	Corridor Assessment Factors	89
Figure 42.	Corridor Configurations for the Southeast Study Area	90
Figure 43.	Population Growth (2015–2055)	91



Southeast Rail Plan

Figure 44.	Existing Mode Share and Travel Time Estimates (Washington, D.C. to Atlanta Corridor)	92
Figure 45.	Existing Mode Share and Travel Time Estimates (Atlanta to Tampa Corridor)	93
Figure 46.	Existing Mode Share and Travel Time Estimates (Nashville to Atlanta Corridor)	94
Figure 47.	Existing Mode Share and Travel Time Estimates (Intra-Florida Travel Corridor)	95
Figure 48.	Preferred Intra-Florida Travel Connections	98
Figure 49.	Florida-Atlanta Corridor Tests	99
Figure 50.	Southeast Regional Network Vision	104
Figure 51.	Baseline Network	106
Figure 52.	Backbone Network	107
Figure 53.	Full Network	108
Figure 54.	Market Pair Travel Times for Baseline, Backbone, and Full Networks	112
Figure 55.	Rail Trips by Rail Travel Time for Baseline, Backbone, and Full Networks	113
Figure 56.	Governance Models' Applicability to Project Phases	117



Acronyms and Abbreviations

AADT	Average Annual Daily Traffic
APTA	American Public Transportation Association
ATL	Hartsfield-Jackson Atlanta International Airport
CATS	Charlotte Area Transit System
CBSA	Core-Based Statistical Areas
CONNECT	CONceptual Network Connections Tool
CRISI	Consolidated Rail Infrastructure and Safety Improvements
DDOT	District of Columbia Department of Transportation
DOT	Department of Transportation
FDOT	Florida Department of Transportation
FEC	Florida East Coast Railway
FHWA	Federal Highway Administration
FRA	Federal Railroad Administration
GDOT	Georgia Department of Transportation
GDP	Gross Domestic Product
HPR	High-Performance Rail
HSGT	High-speed ground transportation
KPI	Key Performance Indicators
L RTP	Long-Range Transportation Plans
MARC	Maryland Area Regional Commuter
MMPT	Multimodal Passenger Terminal
MPO	Metropolitan Planning Organizations
MSA	Metropolitan Statistical Area
NCDOT	North Carolina Department of Transportation
NCRRP	National Cooperative Rail Research Program
NEC	Northeast Corridor
NS	Norfolk Southern
O&M	Operations and Maintenance
OMB	Office of Management and Budget
SCDOT	South Carolina Department of Transportation
SE Study	Southeast Regional Rail Planning Study
SEC	Southeast Corridor Commission
SIS	Strategic Intermodal System
SRP	State Rail Plan
TDOT	Tennessee Department of Transportation
TEU	Twenty-foot equivalent unit
TRB	Transportation Research Board
TRCL	Tri-Rail Coastal Link
VDOT	Virginia Department of Transportation
DRPT	Virginia Department of Rail and Public Transportation
VOT	Value of Time
VRE	Virginia Railway Express
VSRP	Virginia’s Statewide Rail Plan
WMATA	Washington Metropolitan Area Transit Authority



1. Introduction

The Southeast Regional Rail Planning Study (SE Study) is a multi-state network planning study for high-performance rail (HPR) in the Southeast United States. Led by the Federal Railroad Administration (FRA) in partnership with stakeholders from across the Southeast, the SE Study presents a long-term vision for intercity passenger rail in the Southeast. The SE Study is part of the FRA's national rail planning effort to develop a national toolkit for the conceptual planning of HPR networks at the multi-state and megaregion levels. The SE Study examines the potential for HPR and creates a framework for developing intercity passenger rail connections to form a long-range vision. This study builds on established rail initiatives for the Southeast, plus ongoing state planning efforts and other activities in the region.

The Southeast Regional Rail Planning Study (SE Study) serves several purposes. The SE Study identifies and describes a common, long-term vision for intercity passenger rail service for the multi-state core study area—Florida, Georgia, North Carolina, South Carolina, Tennessee, Virginia, and Washington D.C.—and identifies the potential institutional arrangements and planning and development activities needed to achieve the vision.

The SE Study, along with the Midwest Regional Rail Planning Study,¹ are the most recent studies following the initial Southwest Multi-State Rail Planning Study.² The analysis efforts for each study used the CONceptual NETwork Connections Tool (CONNECT) to help analyze HPR corridors and networks. These regional rail planning efforts are intended to support existing statewide and regional processes, such as state rail plans (SRP) and long-range transportation plans (LRTP).

This final report provides an overview of the SE Study, explains the study process, including stakeholder input and technical analysis, and documents study findings and recommendations. This report concludes with potential governance considerations, recommended actions, and next steps to advance a regional rail network in the Southeast.

1.1 IMPLICATIONS OF COVID-19

The SE Study was completed during the coronavirus (COVID-19) pandemic. COVID-19 has had and will continue to have significant impacts on travel and intercity passenger rail, resulting in the reduction of intercity train frequencies across the United States and in some cases temporary cancellations of service. These impacts will need to be fully analyzed as the outbreak subsides and travel patterns resume to fully understand the effects. The SE Study is focused on a long-term vision for intercity passenger rail and assumes that intercity travel behaviors will resume in the long-term with a growth rate similar to pre-pandemic ridership levels.

¹ Federal Railroad Administration. Midwest Regional Rail Planning Study. <https://www.midwestrailplan.org>

² Federal Railroad Administration. Southwest Multi-State Rail Planning Study, September 2014. <https://www.fra.dot.gov/eLib/Details/L16013>



1.2 STUDY OVERVIEW

Encompassing six states in the Southeast, as well as Washington, D.C., the SE Study supports the FRA’s national rail planning effort by identifying a vision for a passenger rail network. The purpose of the study is to advance regional rail planning and to produce a framework for a Southeast passenger rail network. The framework includes a high-level prioritization of corridors, proposed enhancements for a governance structure, and funding strategies for consideration. With a long-term planning horizon of 2055, this study focuses on conceptual-level planning for HPR, with the goal of facilitating future rail planning and streamlining project implementation. Throughout the effort, recommendations from stakeholders were sought and incorporated, resulting in the proposed Southeast passenger rail network.

The SE Study team undertook the following efforts to develop this document:

- Summarized existing rail and transportation plans
- Assessed existing and potential future passenger travel demand
- Analyzed the performance of each corridor as a standalone investment and as part of a potential network
- Developed phasing principles and considerations for future prioritization of Southeast corridors
- Proposed a Southeast governance structure building on previous efforts to-date
- Assembled a comprehensive list of common funding sources currently available for intercity passenger rail programs

These efforts resulted in the recommended Southeast passenger rail network outlined in this document.

1.3 WHAT IS A REGIONAL RAIL PLAN?

A regional rail plan identifies a potential long-term vision for a multi-state intercity passenger rail network. A regional rail plan study process analyzes existing conditions, projections of future travel demand, and the optimal role of passenger rail service within a multimodal transportation context. The study process is intended to serve as a visioning exercise for stakeholders to lay the groundwork for future HPR development concepts.

Many recent federal and state passenger rail planning activities have focused on either (1) individual corridors between major cities or (2) comprehensive rail planning within individual states. However, as the SE Study demonstrates, developing rail plans within the context of a broader regional outlook provides several benefits:

- Better integrates rail projects with other transportation modes
- Promotes greater involvement by stakeholders and builds consensus
- Identifies priorities that support both the logical sequencing of developing networks and the efficient use of limited funding
- Yields more cost-effective investments

A regional rail plan contains two primary components:

- A network plan that identifies a potential regional network of “candidate corridors” for further study

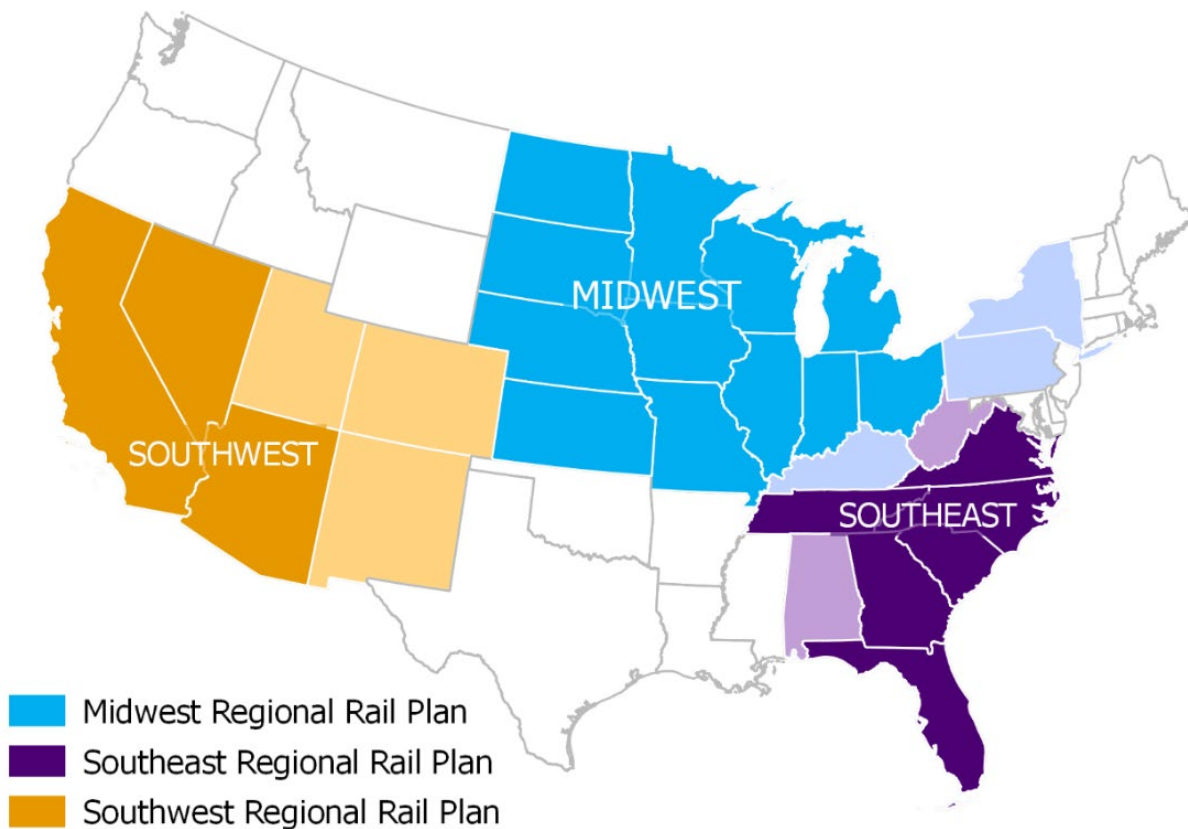


- Governance strategies to identify challenges and opportunities related to the development and delivery of the regional network

Chapters 1 and 2 of this study provide an overview of the planning scope, process, and data. Chapters 3 and 4 of this study describe the network analysis approach and findings, while Chapter 5 outlines the governance considerations. Chapter 6 explores action items and next steps for the member states.

Conducted in parallel with the SE Study, the FRA also led a regional planning process in the Midwest, outlined in the Midwest Regional Rail Planning Study. These two efforts have further developed and refined the principles contained in the FRA's first multi-state regional rail plan (the Southwest Multi-State Rail Planning Study), which was published in 2014. See Figure 1 for FRA regional rail plan study areas.

Figure 1. Previous and Ongoing FRA Regional Rail Plan Study Areas



Source: Federal Railroad Administration

Note: Study areas that are the primary focus of each regional rail plan are indicated with darker color shades. Participatory states outside these study areas are indicated with lighter color shades.

The FRA recommends that regional rail plans include the following information for the purposes of identifying multi-state corridors for future evaluation, planning, and implementation:

- Demographic trends

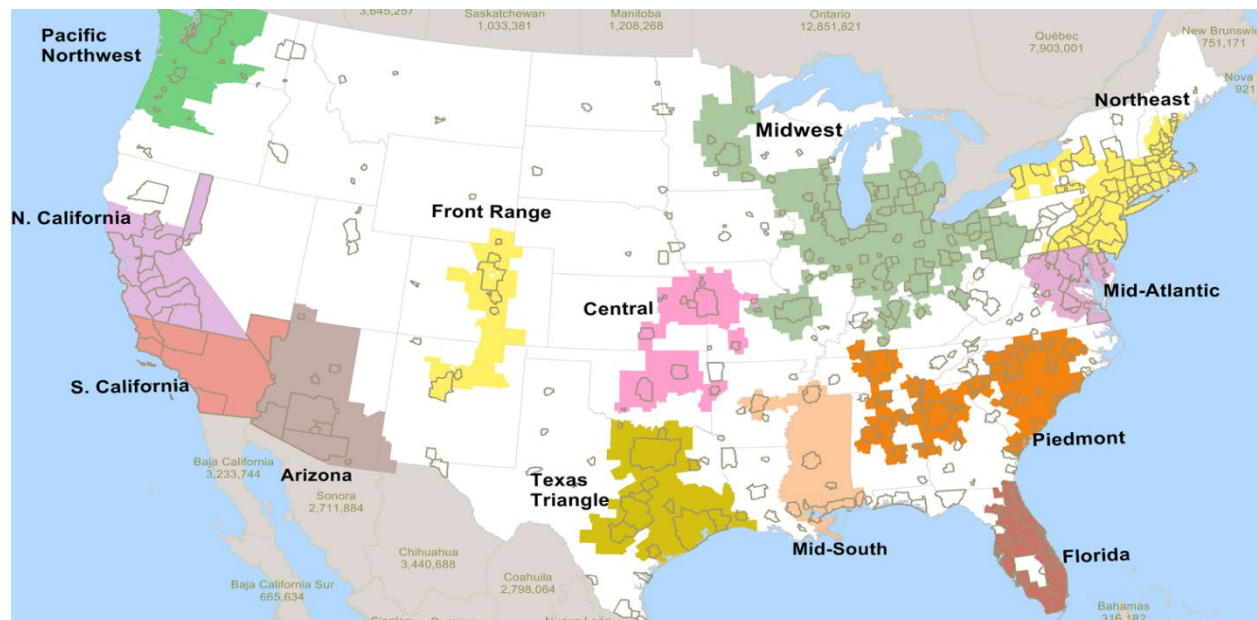
- Travel patterns and market analysis
- Transportation network conditions and connectivity
- Conceptual estimates of rail network costs, ridership, and financial performance
- Institutional and governance challenges and opportunities

The FRA encourages states to participate in developing regional rail plans to coordinate planning for facilities and services that cross, or someday may cross, state boundaries. As described in Chapter 6, a regional rail plan complements individual SRPs and prioritizes corridors that cross state lines for additional study and implementation. However, a regional rail plan will not reach the depth and breadth of detailed corridor analyses. Further analysis beyond the scope of a regional rail plan is required before project implementation.

1.4 SIGNIFICANCE OF THE SOUTHEAST REGION

The Southeast is home to over 67 million residents,³ or roughly 21 percent of the U.S. population according to 2015 U.S. Census Bureau data. Five of the fifteen fastest growing states between 2010 and 2015 are in the Southeast and forecasts also suggest rapid population growth among Southeast states, particularly in urbanized areas. Spread across an area of 229,000 square miles, the region hosts three of the thirteen U.S. megaregions: Mid-Atlantic, Piedmont, and Florida (Figure 2). The Southeast economy has a gross domestic product (GDP) of \$2.4 trillion, or roughly 14 percent of U.S. GDP.⁴ Despite a growing population and important role in the national economy, the Southeast is served by geographically limited and infrequent intercity passenger rail service.

Figure 2. Megaregions in the United States



Source: U.S. Department of Transportation, Federal Highway Administration

³ U.S. Census Bureau, 2015.

⁴ Bureau of Economic Analysis. GDP in 2014 dollars.



Passenger rail service is limited primarily to long-distance trains with restricted hours or state-supported routes that connect a limited number of cities. The Virginia Department of Rail and Public Transportation (DRPT) and the North Carolina Department of Transportation (NCDOT) provide funding for Amtrak-operated state-sponsored routes within their states and that connect to the Northeast Corridor (NEC). In Florida, Brightline (a privately operated passenger rail consortium) began operating rail service between Miami and West Palm Beach in January 2018.⁵ Brightline is the first privately operated passenger rail system in the U.S. since the creation of Amtrak in 1970.

Over the last several years, the Southeast states have worked to develop the Southeast Corridor from Washington, D.C. to Atlanta. The Virginia–North Carolina Interstate High-Speed Rail Compact provides an example of an institutional arrangement across state lines to plan and implement higher speed rail projects. More recently, the Southeast states have formed the Southeast Rail Corridor Commission (SEC) to enhance the coordination and cooperative development of the Southeast Corridor. The FRA has invested nearly \$1 billion in federal funds in the region for various initiatives ranging from planning to project development.

1.5 GEOGRAPHIC SCOPE OF STUDY

In this study, six states—Virginia, North Carolina, Tennessee, South Carolina, Georgia, and Florida—and Washington D.C. define the Southeast (Figure 3). Although this plan focuses on the Southeast, the SE Study team recognizes that connections to significant travel markets (e.g., Chicago, New Orleans, and the NEC) exist outside the Southeast study boundary. Where appropriate, this plan considers the potential benefits of these travel markets. Section 2.1 presents a detailed discussion of the SE Study Area.

⁵ Brightline. <https://gobrightline.com>

Figure 3. Southeast Rail Plan Study Area



Source: U.S. Census Bureau (2010), cartographic boundary shapefiles; Federal Railroad Administration (2016)

1.6 STUDY PROCESS

1.6.1 Study Stakeholders and Outreach Efforts

Study stakeholders include a cross-section of critical audiences representing the diverse array of entities interested in HPR in the Southeast, including state departments of transportation (DOTs), the U.S. Department of Transportation modal administrators, metropolitan planning organizations (MPOs), other regional or statewide planning organizations and transit operators, as well as potential host railroads and passenger rail operators, both private and public. In addition to the SE Stakeholder Group, the FRA engaged other interested parties to ensure a wide range of participation in this study. The FRA established the following outreach objectives to guide stakeholder involvement for this study:



- Work directly with states implementing passenger rail service through the planning process.
- Engage advocates and regional partners in the planning process at key points.
- Coordinate with implementing and jurisdictional partners.
- Inform interested parties of project study milestones, study progress, and results.
- Create an avenue for all parties to provide input through in-person meetings, webinars, and/or the project website.

Stakeholder engagement was a critical component to ensure that the SE Study reflects the goals, priorities, and needs of the Southeast and its communities. The SE Study team formed the SE Stakeholder Group comprising the following:

- FRA, the SE Rail Plan facilitator
- Lead Stakeholders including representatives of six state DOTs (Florida, Georgia, Tennessee, South Carolina, North Carolina, Virginia) and Washington, D.C.
- Additional stakeholders (30 total) representing MPOs, local transportation agencies, Class I⁶ and regional railroads, advocacy groups and others, nominated by state DOT representatives and selected by the FRA to achieve geographic and subject matter diversity
- Interested parties (invited by the FRA) who were informed about the purpose and progress of the study, invited to listen in, and provide comment during SE Stakeholder Group meetings

The SE Stakeholder Group was charged with the following responsibilities:

- Provide input on developing a conceptual vision for an integrated high-performance, regional intercity passenger rail network for the Southeast.
- Share, collaborate with, and consider all input needed for analysis.
- Identify potential institutional, governance, and financial arrangements.
- Review the full range of opportunities and constraints, as well as state and regional priorities.
- Strategize future planning activities and priorities.
- Consider potential roles for public-private partnerships.

Over the course of the study, the SE Study team hosted five workshops across the Southeast, in which the SE Stakeholder Group worked to identify a future potential Southeast rail network. Members of the SE Stakeholder Group also participated in webinars and one-on-one discussions to collaborate with and inform the FRA on the study's process and analyses. Members shared and considered information about potential network connections, existing and forecast regional demographic trends and travel patterns, economic activity, and noted capacity constraints in the current and future regional transportation network. The SE Stakeholder Group members also considered a regional governance body, and its role in advancing the Southeast rail network.

⁶Primary Class I railroads in the Southeast region that were included as stakeholders include CSX and Norfolk Southern.



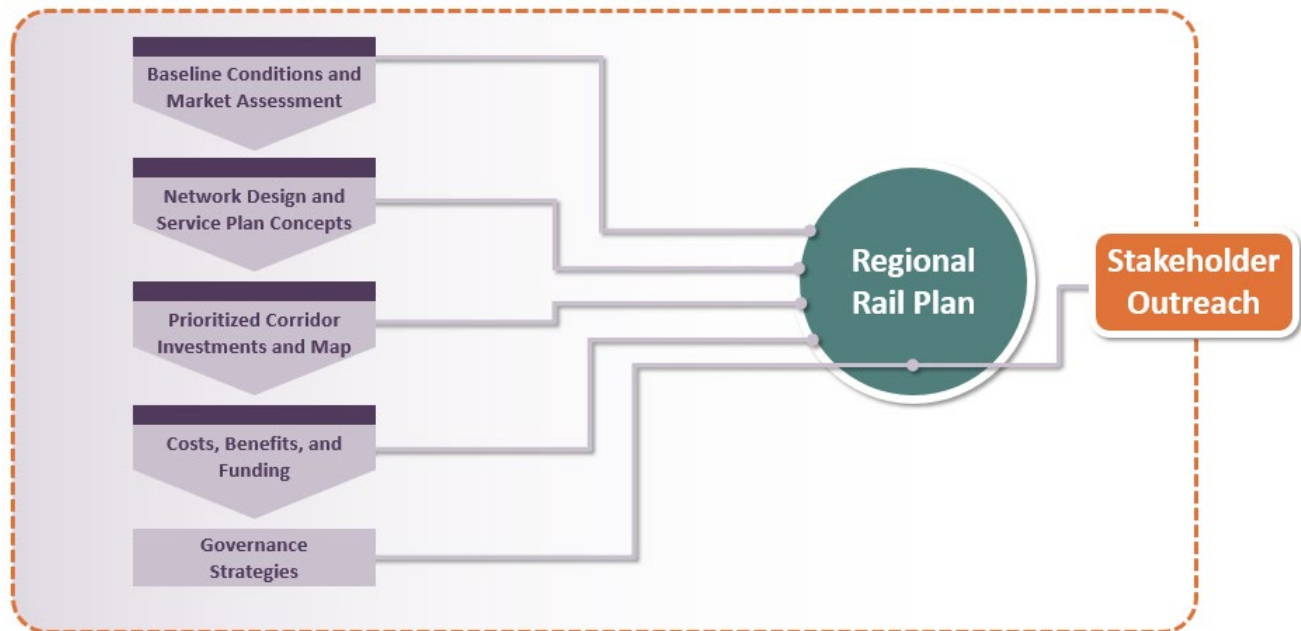
Table 1. Stakeholder Workshops

WORK SHOP	DATE	LOCATION	PRINCIPAL TOPICS	ADDITIONAL TOPICS
1	September 20, 2016	Columbia, SC	Introduction to Study Structure, Objectives and Outcomes	<ul style="list-style-type: none"> ■ Educated on CONNECT Tool capabilities and discussed work completed during 5-year annual update schedule ■ Introduced the study of governance structures, initiate conversation about governance needs and wants ■ Received initial feedback on key network connections within the Southeast
2	December 15, 2016	Arlington, VA	Baseline Conditions and Market Analysis	<ul style="list-style-type: none"> ■ Lead Stakeholder presented state plans, opportunities, and constraints ■ Discussed first draft of map showing key connections ■ Finalized CONNECT education, including demonstration of tool
3	March 1, 2017	Orlando, FL	Stakeholder Feedback on Draft Network	<ul style="list-style-type: none"> ■ Discussed methodology and evaluation criteria for SE rail network development ■ Presented initial network results ■ Continued discussion of governance models
4	June 29, 2017	Atlanta, GA	Stakeholder Feedback on Draft Network	<ul style="list-style-type: none"> ■ Presented ranges for key performance indicators for network ■ Identified tradeoffs in networks configuration and level of service ■ Provided update on Southeast governance model
5	November 14, 2017	Raleigh, NC	Presentation of Draft Final Network	<ul style="list-style-type: none"> ■ Presented draft final network and key performance indicators ■ Discussed corridor prioritization criteria ■ Identified lessons learned

Throughout the SE Study process, the FRA in partnership with the Southeast states, led a thorough planning process to develop a long-term vision for high-performance passenger rail in the Southeast. Figure 4 illustrates the key elements of the planning process that have guided the development of the SE Study.



Figure 4. Southeast Study Inputs



Working in collaboration with the SE Stakeholder Group, the SE Study team conducted the following key tasks:

- Prepared a Baseline Conditions and Market Assessment Report that identified emerging trends in population, growth, major travel patterns, and travel demand; summarized each Southeast state’s rail plan, policy direction, and key rail projects; and identified potential connections between Core-Based Statistical Areas (CBSAs⁷)
- Performed qualitative and quantitative screenings through use of the CONNECT Tool, detailed screening methodology, and evaluation criteria on corridors identified in the Baseline Conditions and Market Assessment Report and from stakeholder input
- Developed network configuration options that included various service characteristics
- Proposed a draft Southeast rail network
- Identified prioritization considerations for implementation of a future network
- Facilitated discussions about the development of a short-term governance model and its role in advancing the Southeast rail network, including the following:
 - Strategies to transition to a long-term governance model

⁷ A Core-Based Statistical Area (CBSA) is a U.S. geographic area defined by the Office of Management and Budget. A CBSA consists of one or more counties (or equivalents) anchored by an urban center of at least 10,000 people plus adjacent counties. The counties are tied socioeconomically to the urban center by commuting.

- An outline of the responsibilities executed by a longer-term governance model

1.6.2 Introduction to CONNECT

A key component to the analysis efforts for the SE Study was the use of the CONceptual Network Connections Tool (CONNECT), a sketch planning tool that estimates the overall performance of HPR corridors and networks. The Excel-based tool assesses proposed HPR services either at a corridor level or as part of a larger HPR network. Originally developed as part of the FRA's Southwest Multi-State Rail Planning Study, CONNECT analyzes travel corridors between CBSAs and is intended for use at the outset of an early planning analysis (such as through a regional planning process), before detailed corridor studies are undertaken.

CONNECT allows for flexibility in testing HPR networks driven by user-defined inputs, and then calculates the financial and operational performance of a network. CONNECT can help illustrate the importance of connecting markets and their potential impact on corridor and network performance. As described in Chapter 3, the SE Study team utilized CONNECT to inform network development and analysis. Section 3.1 provides more detailed information about CONNECT, including intended uses and limitations.

CONNECT is not a substitute for detailed corridor and network planning and does not produce investment-grade results. The model does not identify intermediate- or smaller-city potential stations between CBSAs on a particular corridor and strictly considers CBSAs as defined and designated by the US Census Bureau. These are metro areas that contain a core urban area of 10,000 or more in population and includes any adjacent counties that have a high degree of social and economic integration with the urban core. Areas that have multiple large urban concentrations may be designated as separate CBSAs according to the US Census Bureau and are treated as such in CONNECT. Furthermore, the ridership, revenue, capital cost, operations and maintenance (O&M) cost, and public-benefit outputs represent only order-of-magnitude estimates of potential corridor and network performance for a particular network.

CONNECT was used to build a draft HPR network for the Southeast, including associated service plans, operational data, and the estimated financial and operational performance of the network. CONNECT outputs provided a range of ridership, revenue, cost, and public-benefit estimates. CONNECT also provided an analytic basis for the decision-making process and for relative comparisons between corridors and networks with various configurations and service options. It also provided an ability to assess the relative importance of rail network connectivity.

1.6.3 Guiding Principles for Southeast Regional Rail Network Planning

Four guiding principles for the SE Study emerged through stakeholder discussions early in the process and served as the foundation for the major study activities and outcomes. The first three principles represent the stakeholders' desired outcomes of the SE Study. The fourth principle emphasizes the need for stakeholders to collaborate on addressing challenging issues. Stakeholders should consider the following principles when developing a mission statement and formal goals and objectives in future phases of network planning.

- **Guiding Principle 1** – Support development of safe, reliable, efficient, and interconnected multimodal travel options.
- **Guiding Principle 2** – Balance cost-effectiveness and return on investment with the benefits of developing a premier regional transportation system.



Southeast Rail Plan

- **Guiding Principle 3** – Envision a multi-state rail network that supports environmental, social, and economic sustainability.
- **Guiding Principle 4** – Encourage cross-state coordination to achieve the most optimal outcomes in network planning.



2. Planning Context

The transportation planning context in the Southeast is shaped by centers of population growth and economic activity, and the demand for travel between those centers. All three of these planning factors influence the success of HPR. To define the baseline conditions, a market assessment was conducted to evaluate the travel market and demand to understand travel patterns by mode between major markets. Understanding these dynamics is critical to planning for rail service designed to meet the needs of travelers and to compete with other travel modes. Future population growth projections were also evaluated to assess where population growth could occur and how that growth could affect travel patterns. This chapter examines these three key planning factors for the Southeast core study area (SE Study Area) and focuses on data relevant to assessing the suitability for HPR. This high-level analysis informed the identification of corridors that could be included in a multi-state network.

Travel markets and the existing transportation network are described and evaluated in this chapter using a combination of CONNECT data and other available data from the U.S. Census Bureau, FHWA, FRA, FAA, and other sources. Due to the 2015 baseline year in CONNECT, population data and trends derived from CONNECT are presented to reflect 2015 as the most recent data year. More information on the CONNECT tool is described in chapter 3. Other data sets described in this chapter are reflective of the most recent available data at the time of writing.

2.1 STUDY AREA OVERVIEW

The SE Study Area is defined as the states of Florida, Georgia, North Carolina, South Carolina, Tennessee, Virginia, and Washington, D.C. The states of West Virginia and Alabama are participatory states (Figure 3), meaning they were informed of the study, but are not included in the analysis of the SE Study Area. In some instances, connections to markets outside the SE Study Area were included in the analysis to represent the impact connecting services would have on the performance of the network.



2.1.1 Megaregions

The SE Study Area encompasses three megaregions: Mid-Atlantic, Piedmont, and Florida. It is anticipated that in the next three decades more than half of the nation's population growth and as much as two-thirds of its economic growth will occur in megaregions.⁸

Mid-Atlantic

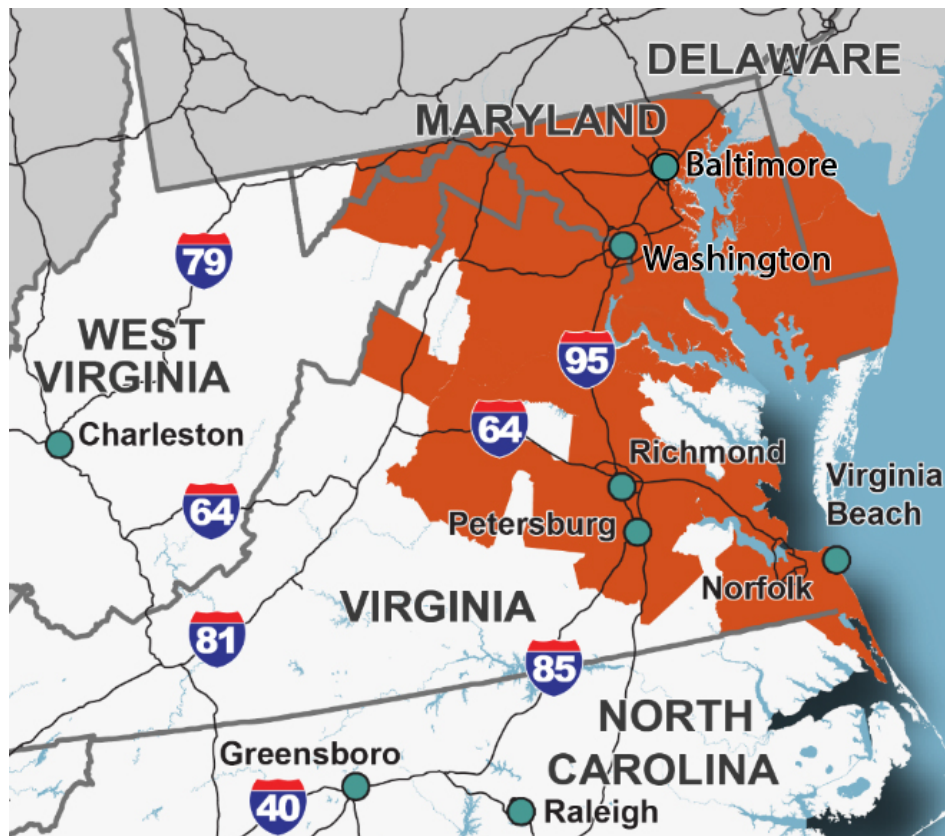
The Mid-Atlantic Megaregion (Figure 5) consists of three metropolitan areas: Washington, D.C./Baltimore, MD; Richmond/Petersburg, VA; and Virginia Beach/Norfolk, VA. I-95 and I-64 are the primary transportation corridors and where the largest population and employment concentrations are located. Service and government/military is the major industry. Washington, D.C.'s political and administrative center and Richmond's biotechnology industry are growing, highlighted by the building of the Virginia Biotechnology Research Park. The Dulles Technology Corridor, which is part of the Washington, D.C. metro area, has a high concentration of internet, communication technology, and software engineering firms. The Hampton Roads region, which includes Norfolk, Virginia Beach, Newport News, and Williamsburg, is a major regional tourist destination known for its protected beach areas, several state parks, and historical sites. Hampton Roads is also home to several universities and military bases, which are integral components of the region's economy.

Megaregions are defined as places with large markets, significant economic capacity, substantial innovation, and highly skilled talent. They include transportation and communication networks that include metropolitan centers and their surrounding areas that often cross county and state boundaries.

Source: Federal Highway Administration (2016)

⁸ https://cgrd.gatech.edu/sites/default/files/projects/fhwahep17091_final_report_092017.pdf

Figure 5. Mid-Atlantic Megaregion



Source: U.S. Census Bureau (2010), Cartographic Boundary Shapefiles; Regional Plan Association (2016). Our Maps: U.S. Megaregions. America 2050. <http://www.america2050.org/maps/>

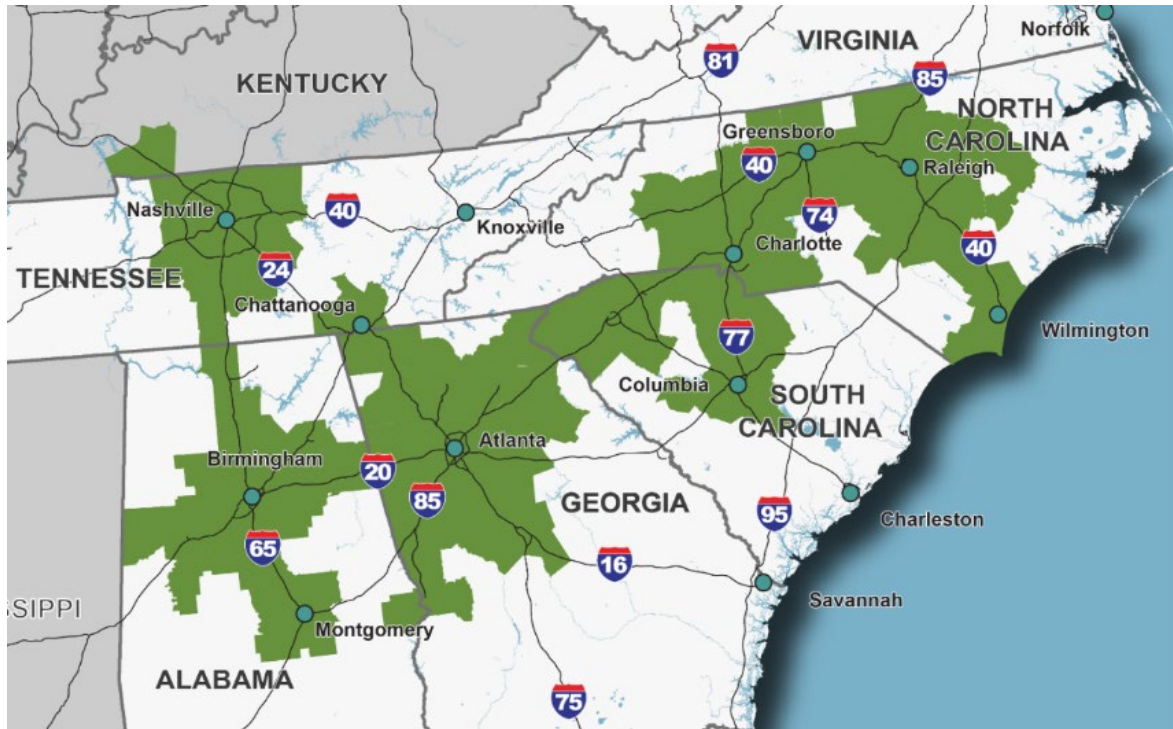
Piedmont

The Piedmont Megaregion (Figure 6) contains ten metropolitan centers in five Southeast states.⁹ The megaregion spans from Birmingham, AL, in the west to Wilmington, NC, in the east along I-20, I-85, and I-40. Nashville, TN, is also within the megaregion along the I-75/I-24 Corridor north of Atlanta. Other major metropolitan centers include Charlotte, Raleigh, and Greensboro, NC; Columbia and Greenville, SC; Montgomery, AL; and Chattanooga, TN. Atlanta, GA, is a major business, convention and transportation hub and is ranked tenth in the nation in GDP.¹⁰ Atlanta also houses more than four-fifths of the nation's largest business branch offices.

⁹ Ross, Catherine. Megaregions: Literature Review of Organizational Structures and Finance of Multi-jurisdictional Initiatives and the Implications for Megaregion Transportation Planning in the U.S., 2011.

¹⁰ Bureau of Economic Analysis. Gross Domestic Product by Metropolitan Area, 2016. https://www.bea.gov/newsreleases/regional/gdp_metro/2017/pdf/gdp_metro0917.pdf

Figure 6. Piedmont Megaregion



Source: U.S. Census Bureau (2010), Cartographic Boundary Shapefiles; Regional Plan Association (2016). Our Maps: U.S. Megaregions. America 2050. <http://www.america2050.org/maps/>

While Atlanta serves as the core city in the Piedmont Megaregion, several other metropolitan centers within the megaregion are important economic hubs. Charlotte has become a major U.S. financial center and is the second largest banking headquarters in the nation after New York City. Raleigh-Durham is one of the top biotech and life science regions in the world, and numerous high-technology and medical corporations are now located in the area. Columbia is one of the fastest growing metro areas in the Southeast—home to six major universities and Fort Jackson, the nation’s largest Army training facility. Montgomery—the capital of Alabama and its second largest city—is home to a major military installation, the U.S. Air Force Air University, and an extensive service industry. Due to their proximity via I-65, both Montgomery and Birmingham share overlapping industries and regional growth.

Nashville serves as middle Tennessee’s population and economic center and is the third largest metropolitan center in the megaregion. Nashville’s regional economy is growing because of its competitive labor force, college educated workers, and an appealing business environment. The Chattanooga area is the second fastest growing metro area in Tennessee, and its growing business environment is anchored by corporations in the automotive industry.

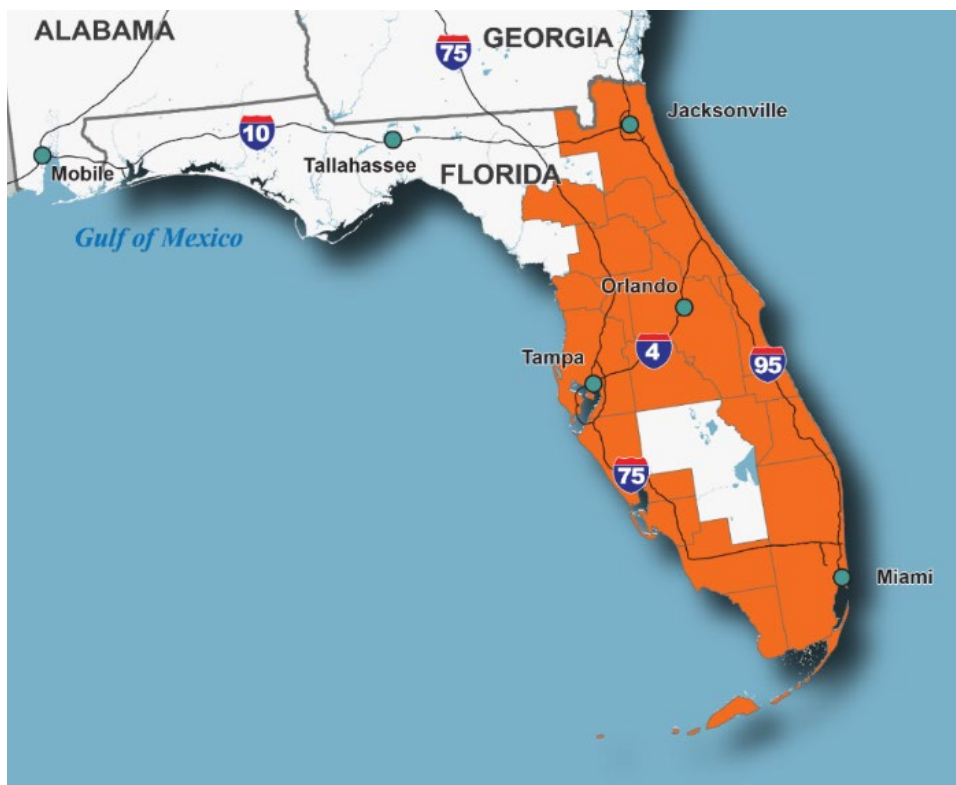
Florida

The Florida Megaregion (Figure 7) consists of four metropolitan centers.⁹ The megaregion spans from Jacksonville in the north, to Miami in the south, and Tampa and Orlando in central Florida. The Florida Megaregion is one of the fastest growing and most diverse areas in the United States. The populations of Miami, Orlando, Tampa, and Jacksonville are expected to grow at least 30 percent over the next 30 years. Although Miami is the core city of the megaregion, Orlando plays a significant role in providing destinations to major tourist attractions, including Disney World and Universal Orlando.

Florida’s rail system has four main linkages:

- Tampa-Orlando
- Miami-Orlando
- Jacksonville-Savannah, GA
- Orlando-Jacksonville

Figure 7. Florida Megaregion



Source: U.S. Census Bureau (2010), Cartographic Boundary Shapefiles; Regional Plan Association (2016). Our Maps: U.S. Megaregions. America 2050. <http://www.america2050.org/maps/>

Miami-South Florida is the seventh largest Metropolitan Statistical Area (MSA) in the U.S. with nearly 6 million people, and the largest metro area by population in the SE Study Area outside of Washington, D.C. Miami-South Florida serves as Florida’s core economic driver and is a major center for commerce and finance, international business, telecommunications, and two of the largest ports in SE Study Area. The Miami area serves as the headquarters of Latin American operations for more than 1,000 multinational corporations. As of 2018, Miami-South Florida is served by Brightline passenger rail service, which connects, Miami, Fort Lauderdale, and West Palm Beach with planned service to Orlando and Tampa.



Tampa is the economic hub of west central Florida and the home of tourism, healthcare, finance, insurance, technology, construction, and maritime industries. Florida’s high-tech corridor, centered on I-4 between Tampa Bay and Orlando, is a technology-rich region that supports industries in aerospace and other high-tech clusters of innovation.

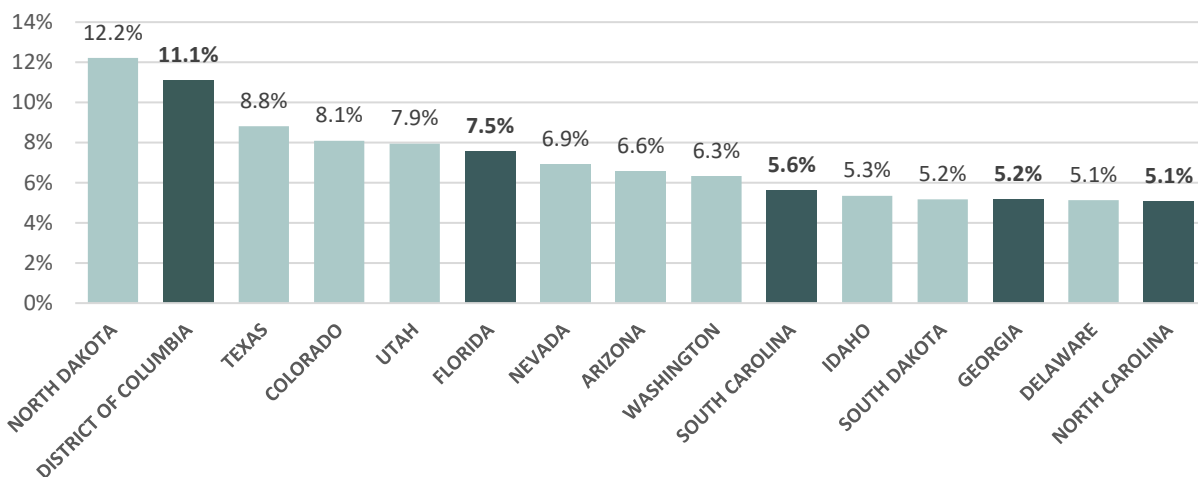
The Jacksonville metropolitan area is the economic center of northeast Florida. The region has more than 1.6 million residents, with one of the fastest growing technology sectors in the country, a thriving health and life sciences community, and a well-established logistics and distribution industry. The region is also known for its more than 20 educational institutions of higher learning.¹¹

2.1.2 Population

The SE Study Area contains some of the highest growth areas in the U.S. Washington, D.C., Florida, South Carolina, Georgia, and North Carolina were among the top 15 fastest growing states in the country between 2010 and 2015, with populations increasing between 5.1 and 11.1 percent (Figure 8).¹² As a whole, the population growth rate between 2010 and 2015 for the entire SE Study Area was 5.3 percent, which was significantly higher than the national growth rate of 3.9 percent during the same period (Table 2).

In 2015, the SE Study Area also contained three of the ten most populous states in the country: Florida, Georgia, and North Carolina (Table 2). The total population in these three states (40.5 million) comprised more than 10 percent of the 321.4 million residents in the U.S. As a whole, the SE Study Area has more than 20 percent of the total U.S. population. By 2040, the SE Study Area is predicted to add 28.6 million people and expand from 21 percent to 23 percent of the U.S. population.¹³

Figure 8. Top 15 States by Population Growth (2010–2015)



Source: U.S. Census Bureau (2015). Annual Estimates of the Resident Population: April 1, 2010 to July 1, 2015. Population Division.

¹¹ JAXUSA Regional Partnership. The Region, 2016. <http://jaxusa.org/the-region>

¹² U.S. Census Bureau. Annual Estimates of the Resident Population: April 1, 2010 to July 1, 2015. Population Division.

¹³ Woods and Poole. Economic Data: Forecasts for Population and Employment Growth, 2016.



Table 2. Southeast Study Area Population

	2015 POPULATION	U.S. RANK	2010–2015 POPULATION GROWTH	U.S. RANK
Washington D.C.	672,228	49*	11.1%	2
Virginia	8,382,993	12	4.5%	19
North Carolina	10,042,802	9	5.1%	15
South Carolina	4,896,146	23	5.6%	10
Georgia	10,214,860	8	5.2%	13
Florida	20,271,272	3	7.5%	6
Tennessee	6,600,299	17	3.8%	22
Alabama	4,858,979	24	1.5%	37
West Virginia	1,844,128	38	-0.5%	51*
SE Study Area	67,783,707		5.3%	N/A

Source: U.S. Census Bureau (2015). Annual Estimates of the Resident Population: April 1, 2010 to July 1, 2015. Population Division.
*Including Washington, D.C.

Population Use in CONNECT Analysis

The CONNECT baseline conditions and market assessment were conducted using data aggregated to the CBSA level. CBSAs are defined by the U.S. Office of Management and Budget (OMB) as geographic regions consisting of counties or equivalent entities associated with at least one urbanized cluster with a population of at least 10,000, plus adjacent counties having a high degree of social and economic integration measured through work commutes.¹⁴ CBSAs are generally subdivided into smaller geographic units: MSAs, which contain at least one urbanized area with a population of 50,000 or more; and, Micropolitan Statistical Areas, which contain an urban core with a population between 10,000 and 50,000. OMB defines CBSAs to provide a nationally consistent set of geographic entities for use in tabulating and presenting statistical data related to the nation’s demographics.

In 2015, approximately 97 percent of the SE Study Area’s population was in urban areas,¹⁵ as defined by the U.S. Census Bureau.¹⁶ Urban areas account for just 8 percent of the total land area in the eight SE Study Area states and Washington, D.C.

Population growth rates provide the planning and policy context for the development of a future regional passenger rail network. Between 2010 and 2015, population growth within the SE Study Area’s MSAs outpaced

¹⁴ Core-Based Statistical Areas definition based on Office of Management and Budget. Metropolitan and Micropolitan Statistical Areas, 2015. https://www.census.gov/geo/reference/gtc/gtc_cbsa.html

¹⁵ As of 2010, the U.S. Census Bureau defines Urban Areas as densely settled core of census tracts and/or census blocks that mean minimum population density requirements. To qualify as an urban area, the territory identified according to criteria must encompass at least 2,500 people. The U.S. Census Bureau identifies two types of urban areas: Urbanized Areas of 50,000 or more people, and Urban Clusters of at least 2,500 and less than 50,000 people. Source: 2010 Census Urban Area FAQs. <https://www.census.gov/geo/reference/ua/uafaq.html>

¹⁶ U.S. Census Bureau. 2011–2015 American Community Survey 5-Year Estimates.



the national MSA growth by more than 2 percent.¹⁷ In 2015, over 91 percent of the SE Study Area population lived within CBSAs.¹⁸

SE Study Area's CBSAs were identified based on geographic location and 2015 population size to compare population and the region's spatial population characteristics. CBSA's identified in the SE Study Area are either within the six core states and Washington, D.C.; two participatory states; or within 500 miles of Atlanta – the most central large CBSA in the region. In developing the Southeast rail network, Atlanta was identified as the geographic center point in the region to capture proximate markets suitable for intercity rail service. Markets deemed suitable for intercity rail service in the Southeast are those within or nearly within 500 miles of Atlanta which includes much of the SE Study Area. There were 43 CBSAs selected for specific market analysis, which were divided into four different categories:

- **Primary Cities** – the largest CBSAs in the Southeast with populations greater than 5 million
- **Major Cities** – CBSA population greater than 1.5 million
- **Regional Cities** – CBSA population greater than 500,000
- **Other Cities**¹⁹ – the largest city in its respective state, but the CBSA population is less than 500,000

These same CBSAs are re-examined in the context of the Southeast's existing transportation network later in this chapter.

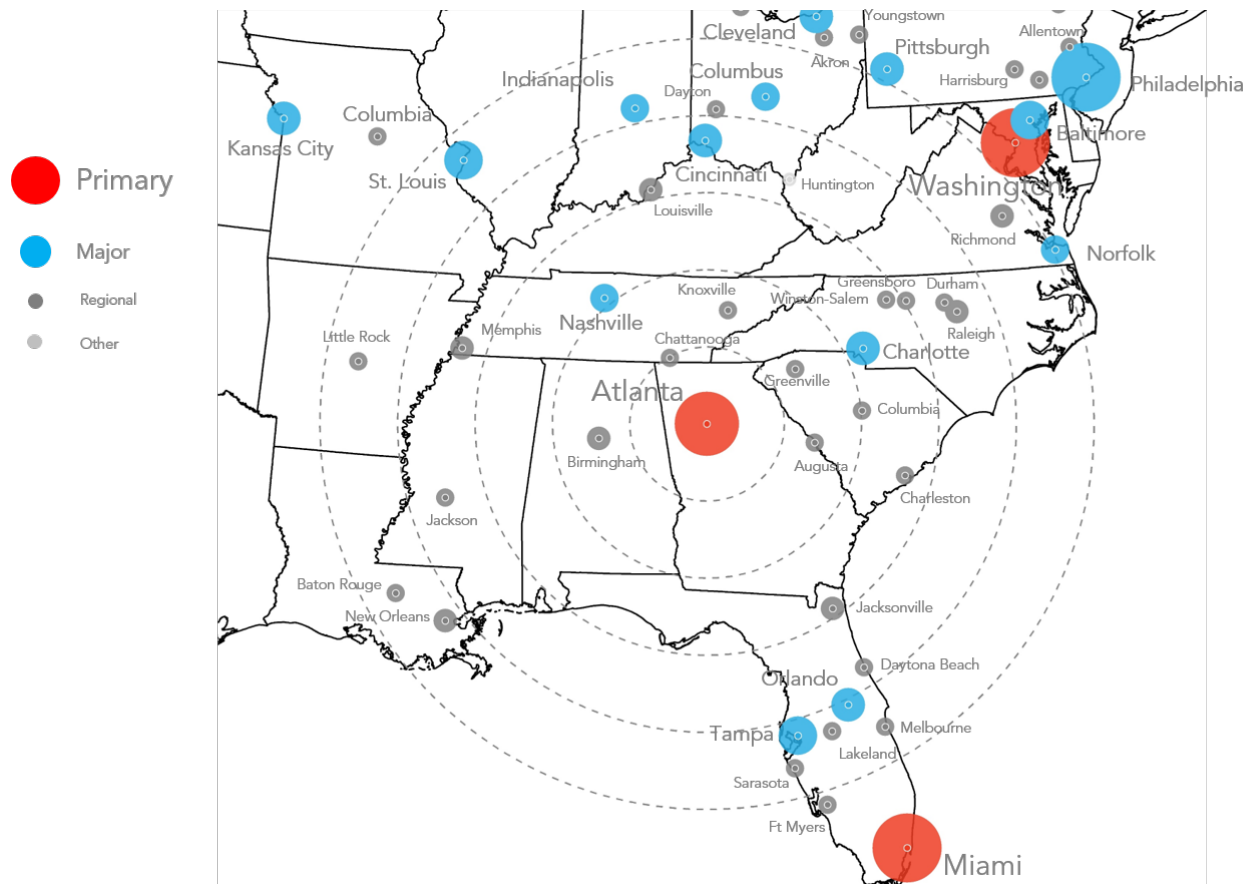
Figure 9 shows the CBSAs selected for analysis by category. The Primary City of Atlanta is the largest, centrally located CBSA. Within 500 miles of Atlanta, 9 CBSAs are categorized as Major Cities, 25 as Regional Cities, and 1 as Other City.

¹⁷ According to U.S. Census Bureau data, the national population grew at a rate of 3.9% between 2010 and 2015. A growth rate of 5.9% was calculated for the metropolitan and micropolitan statistical areas within the nine states comprising the SE Study Area: Alabama, Georgia, Florida, North Carolina, South Carolina, Tennessee, Virginia, West Virginia, and Washington DC.

¹⁸ U.S. Census Bureau. American Communities Survey, 2010 – 2015 5-Year Estimates. Core-Based Statistical Area Population Estimates.

¹⁹ Huntington, WV, is the largest CBSA in the state but has a population less than 500,000. It is included in the Market Analysis.

Figure 9. 2015 Most Populous CBSAs within proximity of Atlanta (millions)



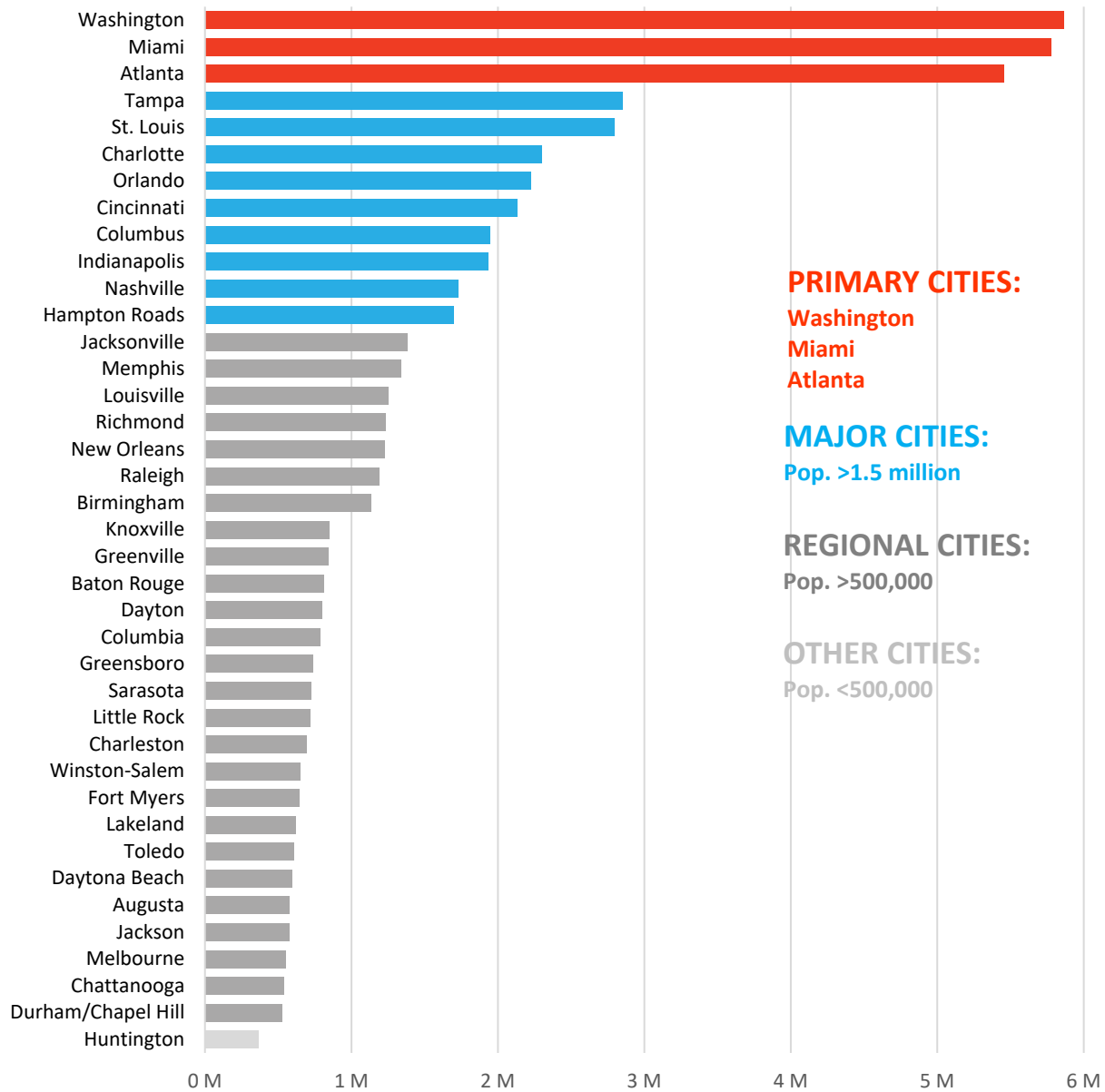
Source: U.S. Census Bureau (2015)

Figure 10 shows the CBSAs ranked by their populations. Atlanta, Miami, and Washington, D.C. are much larger than all other CBSAs in the Southeast, each with populations greater than 5 million. Nine cities within 500 miles of Atlanta feature populations greater than 1.5 million; however, only five of the nine cities are within the SE Study Area.

The Southeast features many mid-sized cities with populations greater than 500,000. The presence of the Southeast’s Primary and Major markets with many intermediate Regional markets suggests the potential of significant travel demand for improved rail connections between these markets.



Figure 10. 2015 Most Populous CBSAs within 500 Miles of Atlanta (millions)

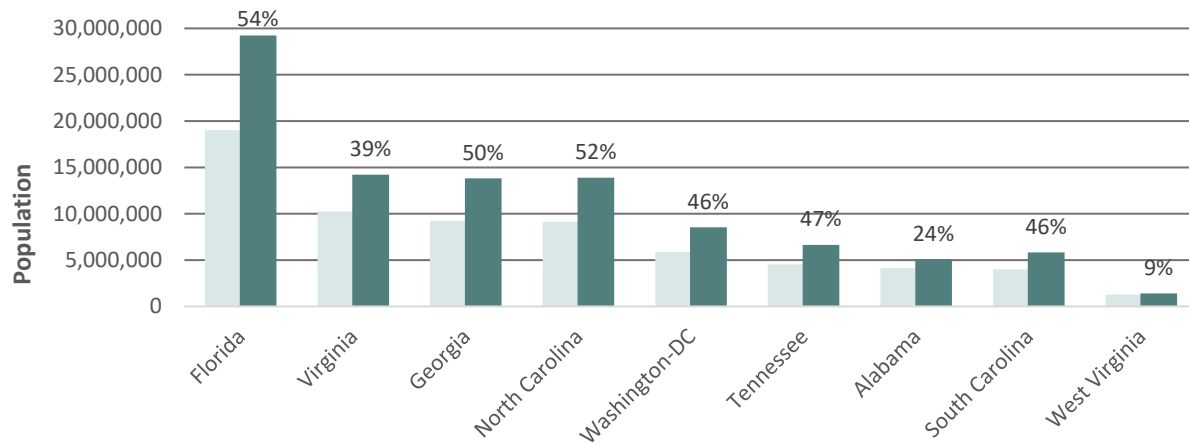


Source: CONNECT

Figure 11 shows significant growth is expected in the SE Study Area by 2040.²⁰ Between 2015 and 2040, Florida and Georgia are forecast to grow more than 50 percent, more than twice the national average. In total, the SE Study Area is predicted to add 28.6 million people and expand from 21 percent to 23 percent of the U.S. population.

²⁰ All CBSA level data in this paragraph sourced from Woods and Poole. Economic Data: Forecasts for Population and Employment Growth, 2016.

Figure 11. CBSA Population Growth within SE Study Area States (2015 – 2040)



Note: Labels denote percentage growth (2015–2040) ■ 2015 ■ 2040

Source: Woods and Poole. Economic Data: Forecasts for Population and Employment Growth, 2016.

2.1.3 Economy

The Southeast has strong agricultural, manufacturing, and logistics economies. These economies rely on the Southeast’s multimodal transportation system including rail, road, and marine ports. Historically, these economies have contributed to freight demand, and rail in the Southeast is an important link in supply chains connecting shippers east of the Mississippi to foreign markets via ports on the Atlantic Coast. These links also provide benefits to some passenger services, which typically operate on freight railroad infrastructure.

The Southeast is a goods-producing region. Its combined GDP from the manufacturing sector, which totaled \$993.7 billion in 2016 (18.6 percent of the nation’s total²¹), stemmed from the efforts of nearly 2.28 million employees (19.6 percent of the nation’s total²²). Within the region, five states rank in the national top twenty in terms of production value with Florida and Virginia sitting at 21st and 22nd. All but West Virginia and the District of Columbia rank in the top twenty in terms of manufacturing employment (Table 3).

²¹ U.S. Census Bureau. Annual Survey of Manufacturers: State Total Value of Shipments and Receipts, 2016.

²² U.S. Census Bureau. County Business Patterns: State Manufacturers Employees, 2016.



Table 3. State Manufacturing Production and Employment (2018)

STATE	PRODUCTION		EMPLOYMENT	
	\$ Millions	U.S. Rank	Number	U.S. Rank
North Carolina	\$210,018	8	444,240	9
Georgia	\$166,678	10	388,972	11
Tennessee	\$156,874	12	334,568	12
Alabama	\$149,126	15	258,092	17
South Carolina	\$117,397	19	244,105	20
Florida	\$84,735	21	318,662	13
Virginia	\$84,735	22	238,974	18
West Virginia	\$23,851	36	48,099	39
Washington, DC	\$330	51	1,190	51

Source: U.S. Census Bureau Annual Survey of Manufacturers and County Business Patterns

Figure 12 shows the concentrations of manufacturing employment within the Southeast at the county level. Counties with high manufacturing employment form a corridor beginning in north central North Carolina that extends southwest through northwestern South Carolina, central Georgia, and into south central Alabama, essentially following I-85. A second corridor to the east, also follows a number of interstates as it moves from western Virginia into eastern Tennessee and finally central Alabama. Counties with high manufacturing employment levels can be found along the Gulf and Atlantic Coasts, highlighted by those seen in Florida, South Carolina, and Georgia.

County Business Patterns data for 2018 show an employment level of nearly 338,000 for manufacturers of transportation equipment within the study region, followed with roughly 300,000 for food manufacturing and 213,000 for fabricated metal product manufacturing.²³ Other subsectors with levels over 100,000 employees include manufacturers of chemicals, plastic and rubber products, machinery, and wood products. The textile industry employs roughly 63,000 employees and is responsible for roughly 34 percent of the nation’s textile employees and 23 percent of textile product employees.

According to the 2017 USDA Census of Agriculture, the Southeast region’s six billion pounds of peanut production accounts for 85 percent of the country’s total while its 513 million pounds of tobacco represented almost 72 percent of the nation’s total. The region is also home to over 57 percent of the nation’s citrus acreage, nearly 47 percent of the nation’s broiler production, and a quarter of its cotton production.

Georgia produced 3.58 billion pounds of peanuts in 2017, half of the nation’s total, while Alabama (700 million), Florida (643 million), North Carolina (477 million), South Carolina (471 million), and Virginia (128 million) also produce substantial peanut crops.

North Carolina’s production of tobacco, like Georgia, accounted for half of the nation’s total with over 363 million pounds in 2017 while Virginia (53.4 million) and Tennessee (42.8 million) were also large producers. Georgia (nearly 27 million pounds), South Carolina (23.9 million), and Florida (2.4 million) also produced tobacco crops.

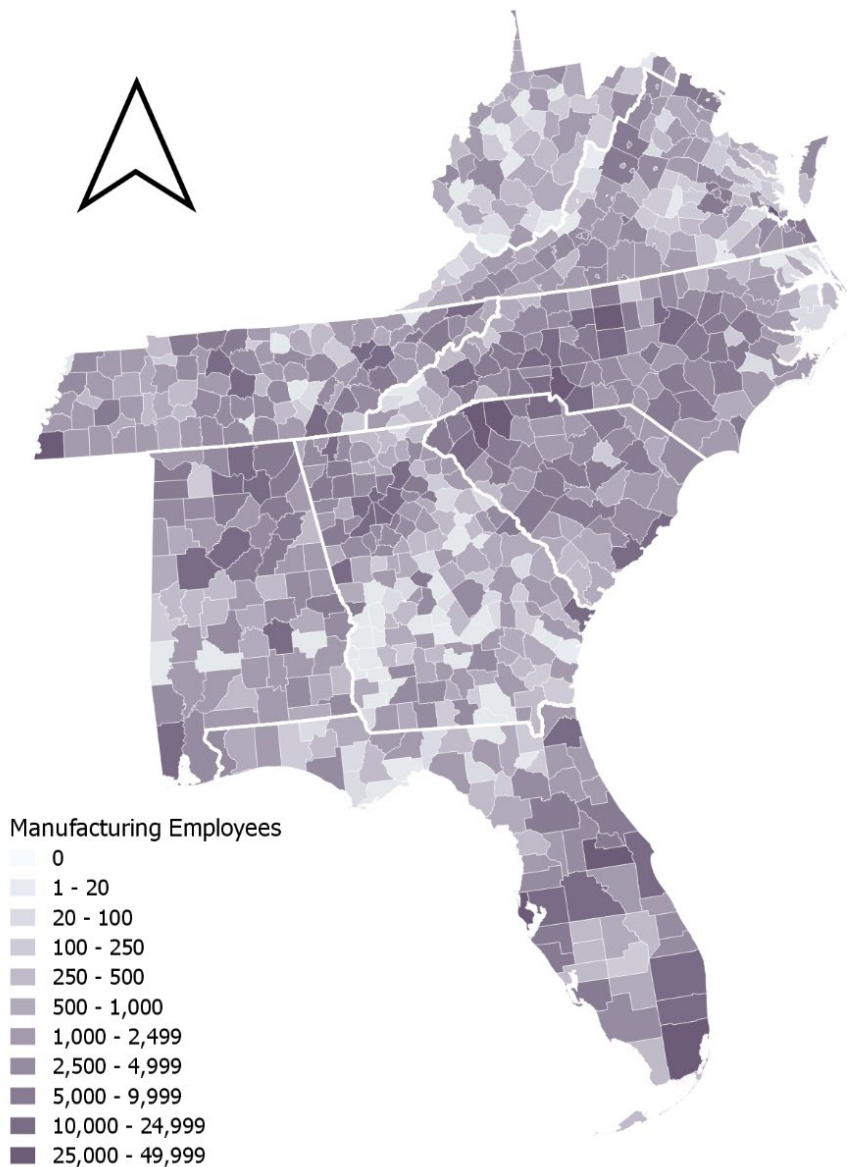
²³ U.S. Census Bureau. County Business Patterns, 2018.

Florida alone was home to 474,540 acres of citrus products, which represented over 57 percent of the nation’s 824,983 acres in 2017.

In terms of number of broiler chicken sales, Georgia and Alabama led the region with over a billion each (1.38 and 1.1 billion, respectively), followed by North Carolina (833 million), Virginia (261.6 million), South Carolina (241.4 million), Tennessee (169.5 million), West Virginia (84.7 million), and Florida (65.7 million).

In 2017, Georgia led the region’s cotton production with 2.2 million bales, followed by Alabama (782,633 bales), North Carolina (727,812 bales), Tennessee (727,324 bales), South Carolina (451,108 bales), Virginia (193,236 bales), and Florida (154,093 bales).

Figure 12. Manufacturing Employment Count by County (2018)



Source: U.S. Census Bureau County Business Patterns, 2018



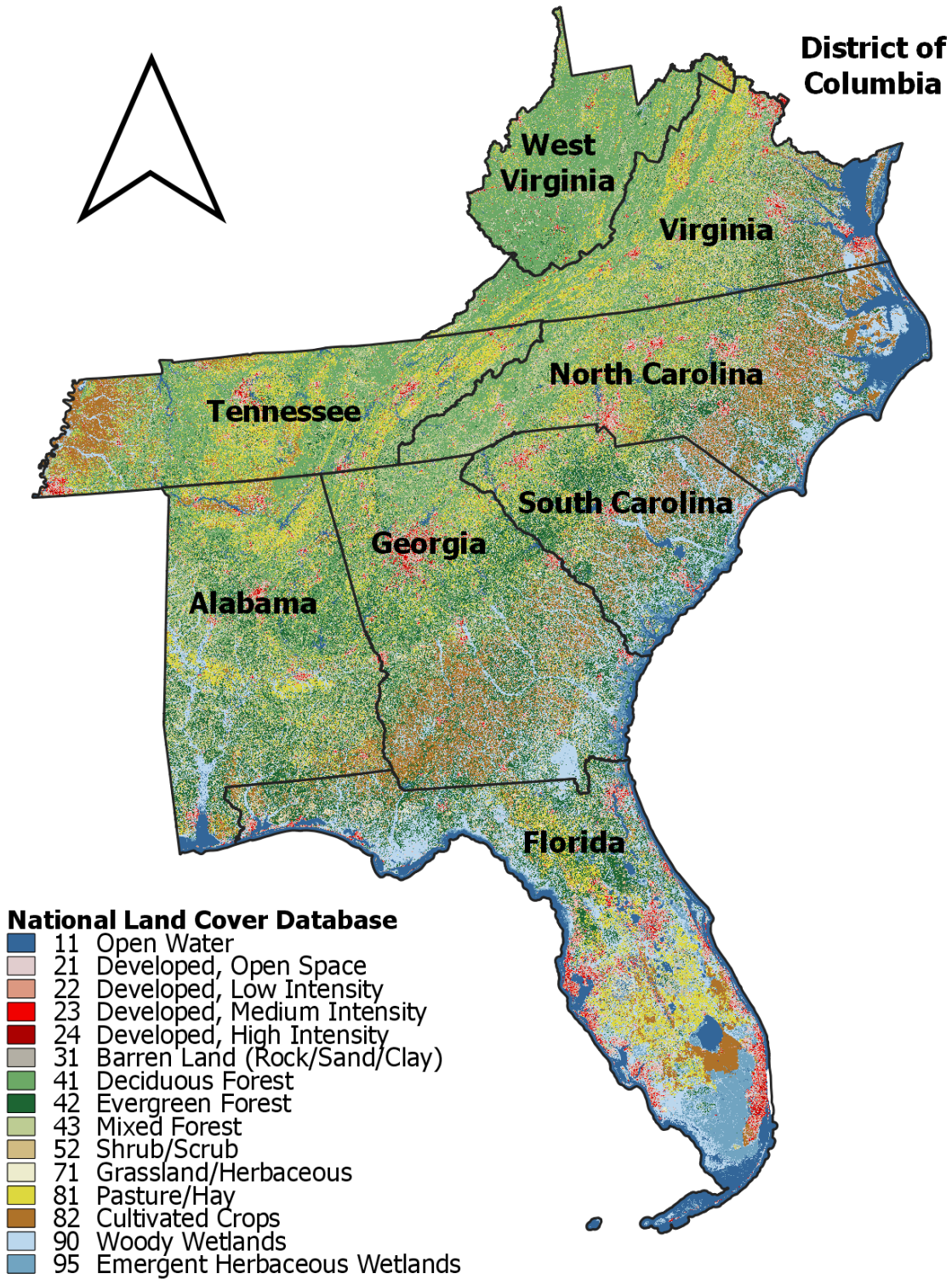
2.1.4 Geography

Figure 13 shows that the SE Study Area encompasses several regions with vastly different geographic features. The Appalachian Mountain Range (including the Blue Ridge and Smoky Mountains) consists of pastures and deciduous and mixed forests, makes its way through the region (including eastern portions of West Virginia and Tennessee and the western portions of Virginia and North Carolina), and extends into northern South Carolina and Georgia before ending in north central Alabama.

The Piedmont region sits to the east of the Appalachian Range, extending from New Jersey and southeastern Pennsylvania through central Virginia and North Carolina, northwestern South Carolina, northern Georgia, and into central Alabama. Many rivers and tributaries sourced in the Appalachian Mountains flow through the Piedmont region and the coastal plains before reaching the Atlantic Ocean and Gulf of Mexico. The coastal portion of the region contains large amounts of woody wetlands and emergent herbaceous wetlands, including the Everglades National Park in southern Florida.

The region is home to vast deciduous, evergreen, and mixed forests that provide ample resources for the forestry industry. The Piedmont region and coastal plains are characterized as having rolling hills and clay-like soils which, coupled with long growing seasons, have produced crops closely connected to the states of the region including citrus, tobacco, peanuts, and cotton.

Figure 13. Geographic Features of the Southeast Study Area



Source: U.S. Geological Survey, Department of the Interior: National Land Cover Database, 2016



2.2 TRANSPORTATION NETWORK AND TRAVEL DEMAND

The transportation system serving the SE Study Area is diverse in modes and the markets served. Robust population growth and high travel demands have shaped the Southeast transportation system, but capacity constraints continue to affect the region's rail, highway, and air networks. Increasing congestion on the transportation network reduces reliability, increases costs, and decreases safety, threatening economic growth, environment sustainability, and community livability. As auto and air travel continue to grow, demands for alternative mobility solutions will likely grow.

This section summarizes the SE Study Area's existing transportation system, including rail, highway, air, intercity bus, local transit service, and ports. It also provides an overview of the planned improvements that could affect the capacity of each mode and influence the viability of a regional rail network.

2.2.1 Rail Network

The passenger rail network in the SE Study Area is integrated with Class I freight carriers because most existing service operates on privately owned rights-of-way under operating agreements with freight railroads. The region's two Class I railroads—CSX Transportation (CSX) and Norfolk Southern (NS)—host the majority of passenger rail service within their corridors. Commuter rail serves select metropolitan areas in the SE Study Area, and Amtrak provides intercity rail service in all states in varying capacities.

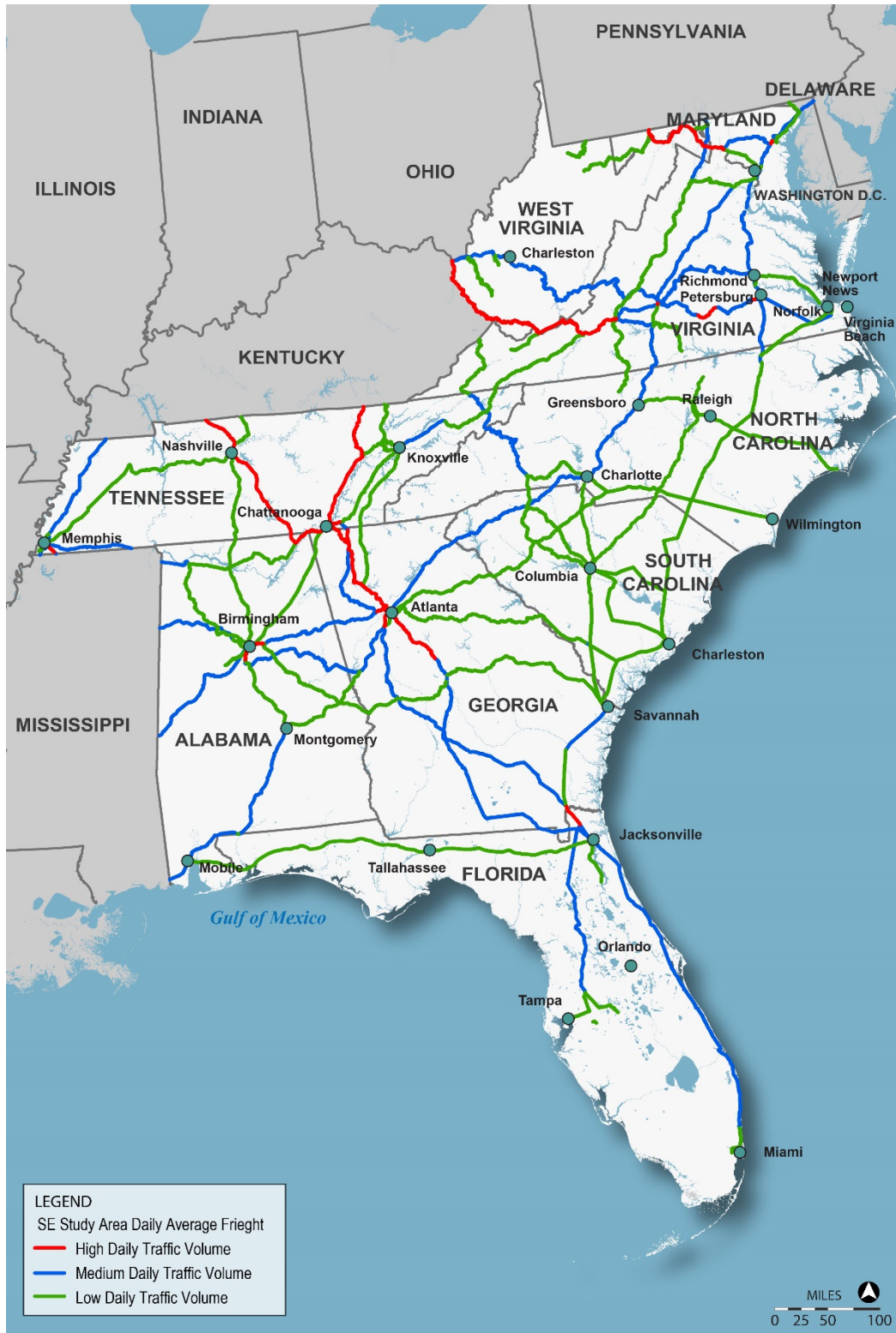
Freight Rail

The SE Study Area encompasses critical elements of the intercontinental freight network that provide access to major ocean ports, regional airports, inland ports, connecting rail lines, and highways. Goods movement by freight carriers occupies much of the region's rail network capacity. Preserving the infrastructure that supports the movement of goods in and out of the Southeast and improving the efficiency and reliability of the existing system is essential to the economic health of the region and the country.

The freight rail network described in this section is based primarily on information contained in the SE Study Area's SRPs.²⁴ The SE Study Area's current Class I freight rail network is shown on Figure 14 and summarized in Table 4. In total, across the six core study states and Washington, D.C. there are 19,669 miles of Class I trackage.

²⁴ South Carolina Department of Transportation. Charting a Course to 2040: South Carolina Multimodal Transportation Plan, 2014; Florida Department of Transportation. Florida Freight Mobility and Trade Plan, Investment Element, 2014; Georgia Department of Transportation. 2015 Georgia State Rail Plan, 2015; North Carolina Department of Transportation Rail Division. Comprehensive State Rail Plan, 2015; Virginia Department of Rail and Public Transportation. 2013 Virginia Statewide Rail Plan, 2013.

Figure 14. Generalized Daily Freight Traffic



Source: Federal Railroad Administration (2015); Jacobs (2016)



Table 4. Freight Miles by Ownership

	CSX TRACK MILES	NS TRACK MILES	OTHER CLASS I TRACK MILES	OTHER (NON- CLASS I) TRACK MILES	TOTAL ROUTE MILES
Washington, D.C.	21	N/A	N/A	6	27
Virginia	958	1,883	N/A	196	3,037
North Carolina	1,082	1,242	N/A	975	3,299
South Carolina	1,281	764	N/A	343	2,388
Tennessee	827	662	175	872	2,579
Georgia	1,589	1,756	N/A	1,381	4,643
Florida	1,712	103	N/A	1,284	5,142
Total	7,675	6,741	175	6,524	21,114

Source: D.C. State Rail Plan, 2017. Virginia Statewide Rail Plan, 2017. North Carolina Comprehensive State Rail Plan, 2015. South Carolina State Rail Plan, 2014. Tennessee Statewide Rail Plan, 2019. Georgia State Rail Plan, 2016. Florida Rail System Plan, 2018.

WASHINGTON, D.C.

Although the Washington, D.C. freight rail network is small in terms of rail infrastructure mileage, it serves a key role in the regional freight network because several freight trains originate, terminate, or are dispatched through the District. Two Class I railroads operate in the District over track owned by CSX, which also maintains one major freight rail yard in the District. NS services are provided via trackage rights agreements on CSX infrastructure. Six National Gateway projects are within the Washington, D.C. boundaries:

- Double track and increased clearance of Virginia Avenue Tunnel
- Lower track under New Jersey Avenue
- Lower track under L’Enfant Promenade
- Lower track under ramp from I-395 to/from 12th Street
- Lower track under 12th Street
- Modify Long Bridge swing span

VIRGINIA

Virginia’s major freight lines converge at the following key nodes: Norfolk, Richmond, Lynchburg, Roanoke, and Alexandria. CSX’s north-south intermodal mainline in Virginia is known as the National Gateway. An important component of the National Gateway is the A Line, which is part of CSX’s Florida to New York Corridor. The National Gateway is the primary intermodal freight corridor connecting the Port of Virginia to national markets and is currently being improved to accommodate double-stack intermodal trains. CSX’s Coal Corridor is another major corridor, though declining in traffic, carrying east-west unit trains of coal from the Appalachian coalfields through Richmond and down the Virginia Peninsula to the CSX-served Coal Marine Terminals in Newport News and the return of empty coal trains back to the mines.

The NS north-south intermodal mainlines in Virginia are known as the Crescent Corridor. One segment runs through Virginia from Hagerstown, Maryland, southward through Front Royal, Manassas, and Danville to the Carolinas (the Piedmont line). The Crescent Corridor second mainline segment parallels I-81 from Hagerstown, Maryland, through Front Royal, Roanoke, and Bristol (the Shenandoah line) and serves the Commonwealth’s Virginia Inland Port near Front Royal.



The NS east-west intermodal mainline in Virginia, known as the Heartland Corridor, runs from the Port of Virginia, through Roanoke, to the West Virginia border in southwest Virginia and then to Midwest markets in Ohio, Illinois, and other states. The Heartland Corridor is the primary NS intermodal corridor connecting the Port of Virginia to national markets. Significant segments of the NS Coal Corridor and Heartland Corridor overlap.

NORTH CAROLINA

In North Carolina, CSX operates along three primary corridors. An east-west line runs from Charlotte to the Port of Wilmington, passing through Pembroke and Hamlet. The north-south A Line is CSX's busiest line in North Carolina and traverses the eastern part of the state, paralleling I-95. CSX also has a major north-south corridor in the western part of the state that connects Tennessee to South Carolina and is a conduit for coal from Appalachia to power plants in North Carolina and the Southeast.

The primary NS Corridor parallels I-85 through the central part of the state connecting Charlotte and Greensboro with Atlanta and the Northeast. The eastern leg of the NS Crescent Corridor utilizes the NS-operated Corridor paralleling I-85 through North Carolina. The portion of the corridor between Charlotte and Greensboro is owned by the North Carolina Railroad Company (NCR) over which NS operates through a long-term lease. Connecting to the NS Crescent Corridor is another important NS line from Charlotte to Columbia, SC.

The continuation of the NCR beyond the Charlotte to Greensboro portion over which NS operates is another critical component of the North Carolina freight rail network. The line's continuation to Durham, Raleigh, Selma, and Morehead City provides an important east-west connection to several intersecting lines.

SOUTH CAROLINA

In South Carolina, CSX operates and maintains 1,354 route miles of track crossing the state. The major rail yards for CSX in South Carolina are located in Charleston and Florence with transfer terminals in Greenville and Spartanburg. A major north-south line runs from Spartanburg to West Columbia. A separate north-south line runs from Florence to Charleston. In addition to the mileage CSX owns, it has trackage right over NS between Columbia and Charleston. The CSX link between Greenwood, SC, and Athens, GA, handles the greatest rail tonnage, with two separate CSX lines sharing trackage, contributing to this high density. Other notable tonnage movements go through Laurens County, Columbia, and Charleston. In April 2018, CSX introduced new intermodal service connecting the Inland Port Dillon along its mainline.

NS operates 703 route miles and trackage rights from Newberry to Spartanburg. NS also operates intermodal service connecting the SC Inland Port – Greer with the Port of Charleston along its mainline.

TENNESSEE

Tennessee has six Class I railroads that operate within the state including CSX, NS, BNSF, Union Pacific, Canadian National, and Kansas City Southern. Together the Class I railroads operate 2,643 track miles in the state. CSX operates transfer terminals in Chattanooga, Knoxville, Memphis, Smyrna, and Spring Hill. Tennessee has one major rail yard, located in Nashville. The major north-south rail line enters Tennessee from Kentucky, passing through Nashville and Smyrna. The Nashville hub has additional lines moving out to Spring Hill and Memphis. An additional north-south rail line enters from Kentucky and passes through Knoxville and Chattanooga.



GEORGIA

The primary rail lines traversing Georgia are Class I rail lines connecting rail hubs in Atlanta to the Midwest and ports in Georgia and Florida. The two busiest corridors by rail density are the CSX Corridor between Jacksonville, FL, and Tennessee; and a parallel NS Corridor via Cordele, Macon, and Atlanta. Other major corridors run generally parallel to I-85. The major railroad yards in Georgia are in Waycross, Atlanta, and East Savannah.

CSX owns 1,420 miles of rail line in Georgia. The north-south route begins in Tennessee and passes through Dalton in the north, then into Atlanta and Fairburn, and finally through Waycross. An east-west route begins in Alabama, passes into Fairburn, then through Atlanta and Lawrenceville, and out into South Carolina. A southern line passes from Alabama through Waycross and Savannah and into South Carolina.

FLORIDA

CSX is the single largest operating railroad in Florida, with a large network covering northern and central Florida and the Greater Miami area in south Florida. CSX serves most of the state's major urban areas and provides national Class I network connections for many of Florida's short line railroads. CSX's primary base of operations in Florida is Jacksonville with important yards throughout the state. CSX has two major north-south lines—the A Line and the S Line—which terminate in central Florida.

CSX recently sold the east-west Gulf Coast line between Jacksonville and Pensacola to the Florida Gulf Atlantic Railroad in 2019. This corridor provides important connections to points west of Florida on the Gulf Coast and New Orleans.

NS owns two main lines in Florida, terminating at Jacksonville and Navair (near Lake City). While the NS infrastructure within Florida includes 103 miles of track, it has a haulage agreement with Florida East Coast Railway for the 350-mile line between Jacksonville and Miami.²⁵ The two lines join at Valdosta, GA, and interchange with the NS interstate network at Macon, GA. Trackage rights agreements allow NS to operate over the approximately 53 miles of CSX's A Line between Jacksonville and Palatka (where NS serves a Georgia Pacific paper mill).²⁶

Major Freight Rail Investments

Major freight rail investments are frequently undertaken to improve important freight corridors in the Southeast. In addressing rail needs, freight railroads often act autonomously when making business decisions regarding their rail rights-of-way, with a fiduciary responsibility to conduct business in a manner that maximizes fiscal returns for ownership. Corporate decisions on which rail improvement projects are to be financed within any particular year are based on the best interests of the respective railroads with consideration of the business climate, risk, and return on investment.

Major rail investments to improve freight capacity and service in the eastern United States include:

²⁵ A haulage agreement is a commercial arrangement between freight rail carriers in which one freight rail carrier acts similar to a contractor in moving the other freight rail carrier's rail cars over host railroad trackage.

²⁶ Trackage rights is an agreement between railroad companies in which the owner of tracks grants another railroad company some use of them.



- The NS Heartland Corridor
- The CSX National Gateway
- The NS Crescent Corridor

The Heartland Corridor investments allowed NS to provide double-stack intermodal container service between the Port of Norfolk and Chicago. 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 double-stack capable rail line that is 200 miles shorter than the former double-stack rail line used by NS.

The CSX National Gateway enhanced three existing rail corridors that run through Maryland, Virginia, North Carolina, Pennsylvania, Ohio, and West Virginia. National Gateway had two primary phases that included building or expanding several intermodal terminals, followed by working with state and local governments to remove obstructions to double-stack clearances beneath public overpasses. The Virginia Avenue Tunnel project in Washington, D.C. was completed in Fall 2018 and was the last of 61 clearance projects that comprise this public-private partnership.

The NS Crescent Corridor will create the nation's most direct intermodal rail route between the Northeast and the South. The project is scheduled for completion in 2020 and will expand and upgrade existing rail lines along the corridor to accommodate faster freight trains. The project includes constructing 300 miles of new passing track and double track. It also includes 11 new or expanded rail intermodal terminals. The project will also invest in new capital equipment and terminal facilities.

Intercity Passenger Rail

Class I railroads own the majority of the approximately 11,600 route miles of rail rights-of-way track and infrastructure, over which Amtrak operates intercity passenger rail service in the Southeast. When Amtrak was created in 1970, there were few regional trains outside of the Northeast and Chicago areas providing corridor services. Since that time, commuter rail services and freight density have increased substantially, creating capacity issues on existing rail corridors.

Amtrak operates long-distance routes that serve portions of the SE Study Area and state-supported corridor routes in Virginia and North Carolina. Table 5 summarizes the seven long-distance and five state-supported routes (with states indicated in parentheses) that Amtrak operates across the SE Study Area. Figure 15 illustrates the intercity passenger routes within the SE Study Area. Table 6 summarizes station activity by state in the SE Study Area.



Table 5. Existing Intercity Rail Service in SE Study Area

ROUTE	FREQUENCY	ROUTE LENGTH (MILES)	TERMINI	HOST RAILROADS
Auto Train	Daily	914	Lorton, Virginia–Sanford, Florida	CSX/Amtrak
Cardinal	3 trips per week	1,146	New York–Chicago	CSX/NS/BBrRR
Crescent	Daily	1,367	New York–New Orleans	NS/CSX
Silver Meteor	Daily	1,507	New York–Miami	CSX/DOT/FR
Silver Star	Daily	1,592	New York–Miami	CSX/NS/FDOT/FR
Palmetto	Daily	885	New York–Savannah	CSX
Northeast Corridor	20 total per weekday	226	Boston–Wash. D.C.	CSX/NS/MNRR
Northeast Corridor Regional (VA)	Daily	735	NY–Wash. D.C.–Lynchburg–Roanoke	CSX/NS/MNRR
Northeast Corridor Regional (VA)	Daily	789	NY–Wash. D.C.–Richmond NY–Wash. D.C.–Newport News	CSX/NS/MNRR
Northeast Corridor Regional (VA)	Daily	679	NY–Wash. D.C.–Norfolk	CSX/NS/MNRR
Piedmont (NC)	Three daily	173	Raleigh–Charlotte	NS/NCRR
Carolinian (NC)	Daily	723	Charlotte–New York	CSX/NS
Brightline	16 daily	65	West Palm Beach–Miami	FECR
City of New Orleans	Daily	930	Chicago–Memphis–New Orleans	CN
Sunset Limited	3 trips per week	1,995 (2,764 ORL–LAX)	Los Angeles–New Orleans (New Orleans–Orlando suspended in 2005)	BNSF/UP

Source: Amtrak Host Railroad Report, May 2018;

*Sun Sentinel. Brightline has New Departure Times. Here's What to Expect in 2020, Dec. 2019. <https://www.sun-sentinel.com/business/fl-bz-brightline-refines-2020-schedule-20191231-gxivodbxefdqljq3xkyqts3im-story.html>

Table 6. Amtrak Station Activity by State in the SE Study Area

STATE	NETWORK ROUTES	# OF STATIONS	TOTAL # OF TRAINS PER DAY	TOTAL BOARDINGS/ALIGHTINGS	MOST ACTIVE STATIONS >70,000 BOARDINGS/ALIGHTINGS
Washington D.C.	6	1	~85 trains	4,971,128	Union Station
Virginia	6	20	> 20 trains	1,606,007	Alexandria, Charlottesville, Fredericksburg, Lorton, Lynchburg, Newport News, Richmond–Staples Mill
North Carolina	6	16	7 trains	944,706	Cary, Charlotte, Durham, Greensboro, Raleigh
South Carolina	4	11	4 trains	217,984	Charleston
Georgia	4	5	4 trains	164,153	Atlanta
Florida	4	18	3 trains	1,027,196	Jacksonville, Miami, Orlando, Sanford, and Tampa
Tennessee	1	2	1 train	75,944	Memphis

Source: Amtrak (2018) Amtrak Fact Sheets for Fiscal Year 2017

Figure 15. Intercity Passenger Rail Routes within the SE Study Area



Source: Amtrak (2016), Brightline (2018)



Amtrak services within the Southeast can be described as following:

- **Auto Train** - The Auto Train is a 914-mile-long route for passengers and their automobiles between Lorton, VA (near Washington, D.C.) and Sanford, (near Orlando). The Auto Train is a direct, non-stop service that carries passengers with automobiles or motorcycles, and operates one southbound and one northbound train daily. The Auto Train functions as a collector of passengers and automobiles traveling between various markets in the Mid-Atlantic and Northeast and various markets in Florida. Due to the unique nature of this train, many origin and destination CBSA pairs are not represented in the train's endpoints.
- **Cardinal** service is a 1,146-mile route between New York Penn Station and Chicago Union Station, with major intermediate stops at Philadelphia, PA; Washington, D.C.; Charlottesville, VA; Charleston, WV; Huntington, WV; Cincinnati, OH; and Indianapolis, IN.
- **Crescent** service is a 1,367-mile route between New York Penn Station and New Orleans Union Passenger Terminal. The route travels through Philadelphia, PA; Baltimore, MD; Washington, D.C.; Charlotte, NC; Atlanta, GA; Birmingham, AL; and New Orleans, LA.
- **Silver Meteor/Silver Star/Palmetto** services share much of the same route:
 - The **Silver Meteor's** route covers 1,507 miles between New York City and Miami, FL. The train originates from New York's Penn Station and travels south to Washington D.C. via Amtrak's NEC. From there the train operates almost entirely over CSX track through Richmond, VA; Fayetteville, NC; North Charleston, SC; Savannah, GA; Jessup, GA; Jacksonville, FL; and Orlando, FL. It also uses the Central Florida Rail Corridor from Deland, FL, to Poinciana, FL, and the South Florida Rail Corridor from West Palm Beach to Miami.
 - The **Silver Star** is a 1,592-mile route running from New York City south to Miami, FL, via the NEC to Washington, D.C. then via Richmond, VA; Raleigh, NC; Columbia, SC; Savannah, GA; Jacksonville, FL; Orlando, FL; and Tampa, FL.
 - The **Palmetto** is an 885-mile route from New York City south to Savannah, GA, via the NEC to Washington, D.C. then via Richmond, VA; Fayetteville, NC; and Charleston, SC. The Palmetto is a shorter version of the Silver Meteor (above), which continues south to Miami, FL.
- **Piedmont** and **Carolinian** services are state supported and connect the state's most heavily populated corridor between Raleigh and Charlotte, NC. The Piedmont is a 173-mile route between Raleigh and Charlotte and the Carolinian is a 723-mile route that runs between Charlotte, NC, and New York City.
- **Amtrak Northeast Corridor (NEC) service** is the busiest railroad in North America, with approximately 2,200 Amtrak, commuter, and freight trains in operation over some portion of the Washington, D.C.-Boston route each day.²⁷ Although Virginia is not strictly part of the NEC, Amtrak receives state funding to support Virginia's state-supported routes. Virginia's state-supported routes serve as extensions of the NEC, providing service from Washington, D.C. to Lynchburg, Roanoke, Richmond, Newport News, and Norfolk, VA. The Carolinian, state-supported by North Carolina that also provides service through

²⁷ Amtrak. National Facts: Northeast Corridor Services, 2016. <https://www.amtrak.com/national-facts>



Virginia, also operates on the NEC and offers service from Charlotte, NC, to Washington, D.C. Through Amtrak's partnership with states, state-supported routes carried nearly 14.7 million passengers in 2015.²⁸

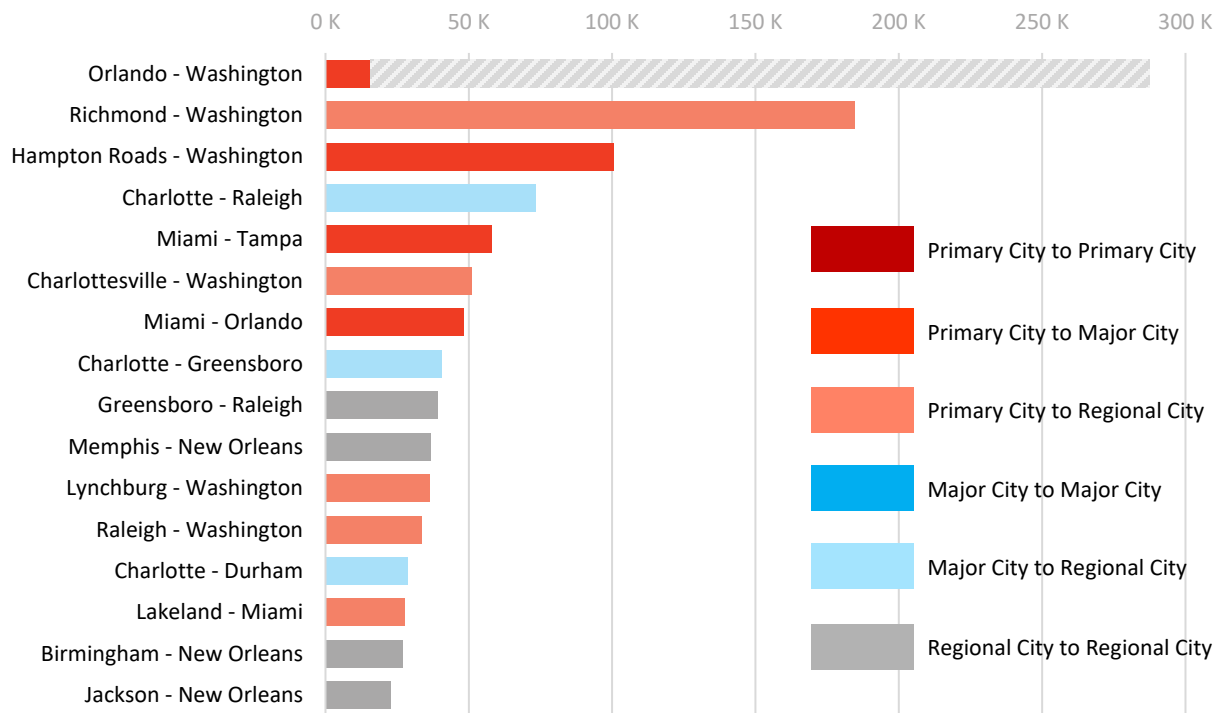
- **Amtrak's The City of New Orleans** service is one long-distance train that operates through Tennessee, a 930-mile route daily originating in Chicago, IL, traveling through Memphis, TN, and terminating in New Orleans, LA.
- **Sunset Limited service** is a long-distance service that operates between New Orleans, LA, and Los Angeles, CA; however, service east of New Orleans to Orlando, FL, has been suspended since 2005. Recent efforts by Amtrak and the Southern Rail Commission among others have been made to restore suspended Gulf Coast services between New Orleans and Mobile, AL, and on to Jacksonville, FL.

Southeast regional passenger rail volumes are heavily concentrated in the Washington, D.C./Virginia area, Florida, and North Carolina (Figure 16 and Figure 17). The Orlando to Washington, D.C. travel pair leads as the top rail market, which is likely representative of the unique Auto Train service that provides transportation for passengers and their personal vehicles between those two market pairs. Thus, the Orlando to Washington, D.C. travel pair is likely representative of several other end-to-end market pairs that include Orlando to Washington, D.C. as a portion of the overall trip and is excluded from this market assessment. The Richmond to Washington travel pair is the largest traditional rail market. The top 15 pairs in Virginia and North Carolina are representative of the state-supported Amtrak service that exists in those respective localities. Miami is also a hub with top travel pairs to and from Tampa, Orlando, and Lakeland. Top market pairs are also seen between New Orleans, Memphis, and Jackson. Among top city pairs, all trips are intraregional in nature.

²⁸ Amtrak. National Facts: State-Supported Services, 2016. <https://www.amtrak.com/national-facts>



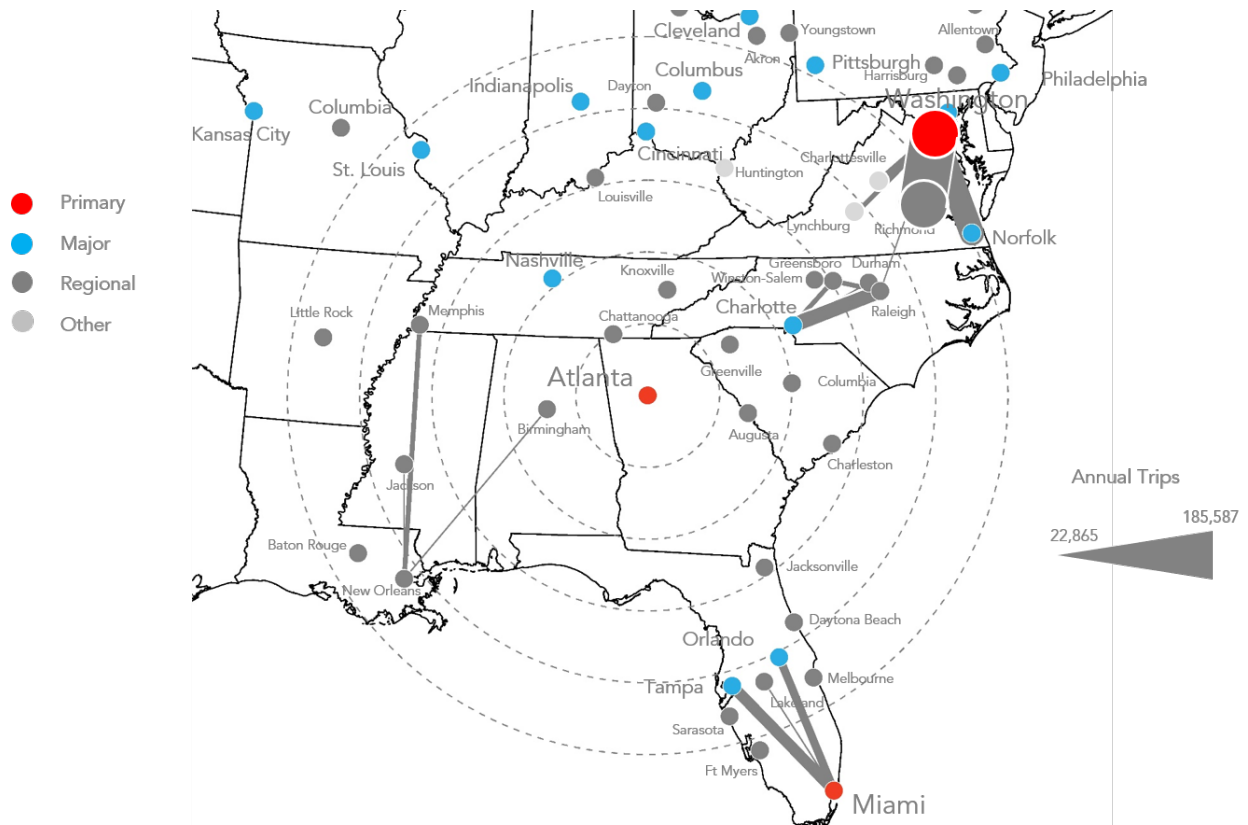
Figure 16. Top 15 Rail Travel Trips by Annual Trips in the Southeast Study Area



Source: CONNECT, Amtrak (2015)

Note: Orlando – Washington CBSA pair (287,434 annual trips) features artificially high counts attributed to the Auto Train. Considering the unique characteristics of the Auto Train and its functionality in transporting personal automobiles, many trips between Orlando and Washington on the Auto Train originate or terminate outside of the Orlando and Washington CBSAs. These trips are delineated in Figure 16 and thus excluded from the top 15 pairs in Figure 17.

Figure 17. Top 15 Rail Travel Pairs within 500 miles in the Southeast Study Area



Source: CONNECT, Amtrak (2015)

Virginia is served by seven train routes and 21 stations. Routes include the Cardinal, the Crescent, the Palmetto, the Silver Meteor, the Silver Star, and the Carolinian. The busiest station in the state is Richmond – Staples Mill Road, followed by Lorton and Alexandria. Despite minimal overall population growth between 2010 and 2018,²⁹ ridership in Virginia is up 48 percent during the same time span, underscoring the popularity of Amtrak’s service in the state. An estimated 45 percent of the population lives within 30 miles of an Amtrak station. Amtrak’s efforts in Virginia to bring expanded Northeast Regional rail service into the state are responsible for a large portion of the growth in ridership for routes serving Virginia. In 2018, Amtrak operated over 20 daily trains and two tri-weekly trains in Virginia, providing service to 1.5 million passengers (Figure 18).

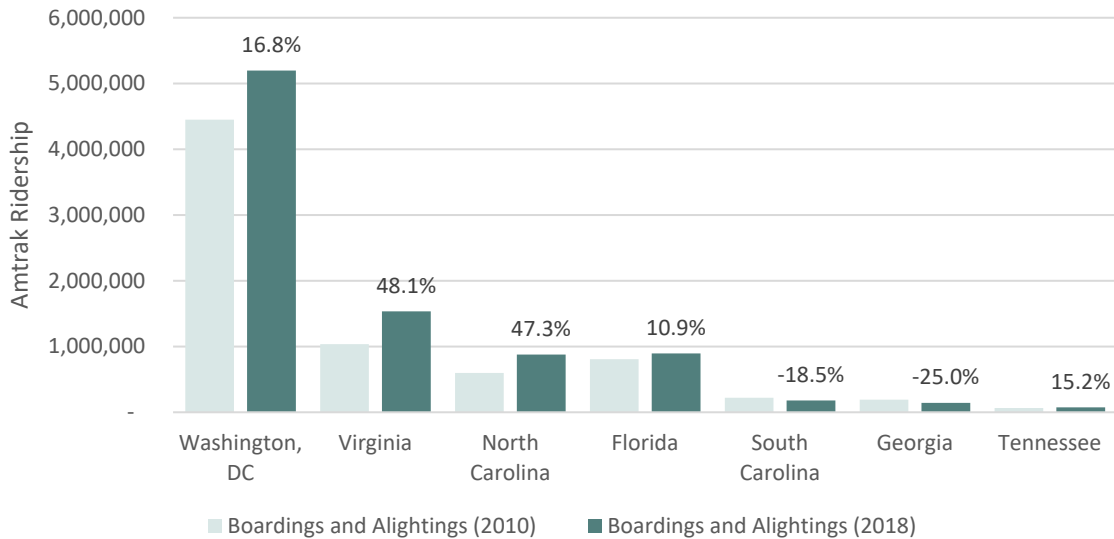
Ridership in Washington, D.C. is substantially greater than any of the other SE Study Area states, but also includes passengers traveling between Washington, D.C. and other major stations within the NEC outside the SE Study Area. Nine train routes serve Washington, D.C. at Union Station. In 2018, Union Station featured over 5 million combined boardings and alightings (Figure 18). Access to downtown is also convenient to visitors and business travelers because the station is a major transportation hub for the metro area, combining Amtrak, Washington Metropolitan Area Transit Authority Metro transit, Virginia Railway Express (VRE), Maryland Area Regional Commuter (MARC) services, intercity bus options, taxis, rental car, and bike share. The station

²⁹ According to 2018 U.S. Census Bureau Annual Estimates of the resident population, the Virginia state population grew approximately 7 percent between 2010 and 2018.



connects 100,000 train, bus and subway passengers each day. Washington, D.C. also hosts a major Amtrak maintenance facility in the Ivy City Yard. Given its small land area and urban density, 100 percent of Washington, D.C.’s population resides within 30 miles of an Amtrak station. Ridership growth in Washington, D.C. was commensurate with population growth³⁰ between 2011 and 2018, growing 16.8 percent.

Figure 18. Amtrak Ridership (2010 – 2018)



Source: Amtrak Fact Sheets for Fiscal Years 2010 and 2018

North Carolina is served by six train routes that are a mix of long-distance and regional services serving 22 stations, including the Carolinian and the Piedmont, which are state supported. In North Carolina, approximately 33 percent of the population lives within 30 miles of an Amtrak station. Between 2011 and 2015 Amtrak ridership in North Carolina grew approximately 10 percent, with nearly every station experiencing increases in ridership during this period. Charlotte, Greensboro, and Raleigh Stations were the busiest with a combined 448,000 boardings and alightings in 2018. A large increase in ridership also occurred at the Cary Station during this period due primarily to the Cary Station expansion, completed in 2011. The largest ridership gains were in the Charlotte to Raleigh Corridor, the state’s most populated corridor, which has the most frequent service, and is the terminus for the Piedmont trains. The addition of one daily roundtrip on the Piedmont Corridor in 2010 has likely contributed to the increases in ridership in North Carolina.

South Carolina’s four long-distance train routes—the Crescent, the Palmetto, the Silver Meteor, and the Silver Star—serve 11 stations. The Crescent route takes passengers through Spartanburg, Greenville, and Clemson. Charleston is the state’s busiest station, followed by Florence. All trains that serve the state run daily, but

³⁰ According to 2018 U.S. Census Bureau Annual Estimates of the Resident Population, the Washington D.C.–Arlington–Alexandria Metropolitan Statistical Area grew 15.4 percent between 2010 and 2018.



principally at night. An estimated 82 percent of the population lives within 30 miles of an Amtrak rail or bus station.

Georgia is served by four long-distance trains at five stations throughout the state. The Silver Meteor and Silver Star offer service between New York City and Florida through coastal Georgia. The Palmetto offers service between New York City and Savannah, Georgia. The Crescent offers daily trips between New York City and New Orleans via Atlanta. Over 55 percent of the population of Georgia lives within 30 miles of an Amtrak station.

Florida is served by three Amtrak train routes and 18 stations. The Silver Service route (Silver Star and Silver Meteor) provides passengers access to the state’s major cities such as Orlando and Miami. The Auto Train route provides a unique opportunity for passengers to travel down with their car from Lorton, VA, to Sanford. Sanford (southern terminus of the Auto Train) is the state’s busiest station, followed by Orlando. In Florida, about 33 percent of the population lives within 25 miles of an Amtrak station and 41 percent live within 50 miles of an Amtrak Station. Ridership across Florida increased 10.9 percent between 2010 and 2018.

Amtrak ridership in Georgia and South Carolina decreased between 2010 and 2018. Georgia experienced the greatest decrease at approximately 25 percent. In Georgia, the greatest declines occurred at the Atlanta, Savannah, and Toccoa stations. The Charleston and Greenville stations in South Carolina experienced the greatest decline in ridership.

Amtrak’s only train running through Tennessee, the City of New Orleans, runs between Chicago and New Orleans. The route through Tennessee follows the Mississippi River along the western border of the state, making only two stops in Newbern and Memphis at Central Station on South Main Street. Memphis is the state’s busiest station. Despite minimal overall population growth, ridership in Tennessee has been steadily climbing, increasing approximately 15 percent between 2010 and 2018. Growing ridership in Tennessee underscores the expanding popularity of Amtrak’s services in the state. An estimated 18 percent of the population lives within 30 miles of an Amtrak rail or bus station.

Commuter Rail

Five states in the SE Study Area have commuter rail service. Table 7 summarizes the existing commuter rail services. Of the SE Study Area, the Washington, D.C. area provides the most extensive commuter rail service with two systems—MARC and VRE—which provide service to more than 50,000 passengers daily.

Table 7. Commuter Rail Services in the Southeast Study Area

SYSTEM	CURRENT OPERATOR	SERVICE AREA	AVERAGE DAILY RIDERSHIP	SYSTEM LENGTH (MILES)	# OF STATIONS
Maryland Area Regional Commuter	Maryland Transit Administration	Washington, D.C., Maryland, West Virginia	34,700	187	42
Virginia Railway Express	Virginia Railway Express	Washington, D.C., Virginia	17,300	90	19
Tri-Rail	South Florida Regional Transportation Authority	Miami/Fort Lauderdale/ West Palm Beach, Florida	14,600	70.9	18



SYSTEM	CURRENT OPERATOR	SERVICE AREA	AVERAGE DAILY RIDERSHIP	SYSTEM LENGTH (MILES)	# OF STATIONS
SunRail	Florida Department of Transportation	Orlando, Florida	2,650	31.7	12
Music City Star	Middle Tennessee Regional Transportation Authority	Nashville, Tennessee	1,200	32	7

SOURCE: American Public Transportation Association (APTA). Public Transportation Ridership Report, Q4 2017. <https://ti.org/pdfs/2017-Q4-Ridership-APTA.pdf>

Florida features two commuter rail systems: South Florida’s Tri-Rail System and Central Florida’s SunRail System. Both operations feature a single corridor serving the Miami and Orlando metropolitan areas, respectively.

Tennessee is home to Nashville’s Music City Star, a single corridor that operates on weekdays only, and primarily during peak hours.

2.2.2 Other Rail Transit and Ridership

Several rail transit systems operate in the Southeast that are not classified as commuter rail, including urban light- and heavy-rail transit systems represented in Table 8. Washington, D.C.’s Metrorail provides the most extensive rail transit service among all systems, providing over 750,000 daily rides. Connections to major transportation facilities including Ronald Reagan Washington National Airport and Washington Union Station, and the Silver Line Phase II extension is expected to connect Metrorail to Washington Dulles International Airport by 2020.

Table 8. Other Rail Transit and Ridership in the Southeast Study Area

SYSTEM	CURRENT OPERATOR	TYPE	SERVICE AREA	AVERAGE DAILY RIDERSHIP	SYSTEM LENGTH (MILES)	# OF STATIONS
Metrorail	Washington Metropolitan Area Transit Authority	Heavy rail	Washington D.C., Maryland, Virginia	760,200	117	91
Tide Light Rail	Hampton Roads Transit	Light rail	Norfolk, Virginia	4,100	7.4	11
LYNX Rapid Transit Services	Charlotte Area Transit System	Light rail	Charlotte, North Carolina	16,900	19.3	26
MARTA	Metropolitan Atlanta Rapid Transit Authority	Heavy rail	Atlanta, Georgia	213,200	48	38
Metrorail	Miami-Dade Transit	Heavy rail	Miami, Florida	66,700	24.4	23

Source: <http://www.apta.com/resources/statistics/documents/ridership/2017-q4-ridership-apta.pdf>

The Metropolitan Atlanta Rapid Transportation Authority operates the second most extensive urban heavy-rail system in the SE Study Area and serves more than 200,000 passengers daily.

Other urban rail systems of note include the LYNX Rapid Transit Service operated by the Charlotte Area Transit System (which recently opened a 9.3-mile extension of the LYNX Blue Line), Miami-Dade Transit



Metrorail (which serves urban areas of Miami-Dade County), and Norfolk's Tide (a light-rail system that connects several central neighborhoods of Norfolk).

2.2.3 Air Network

Figure 19 shows a number of commercial airports in the SE Study Area within the major metropolitan areas. In 2015, total annual enplanements exceeded 20 million at three airports in the SE Study Area: Miami International, Atlanta International, and Charlotte Douglas International. Atlanta and Charlotte were among the top 10 airports in the U.S. by passengers enplaned.

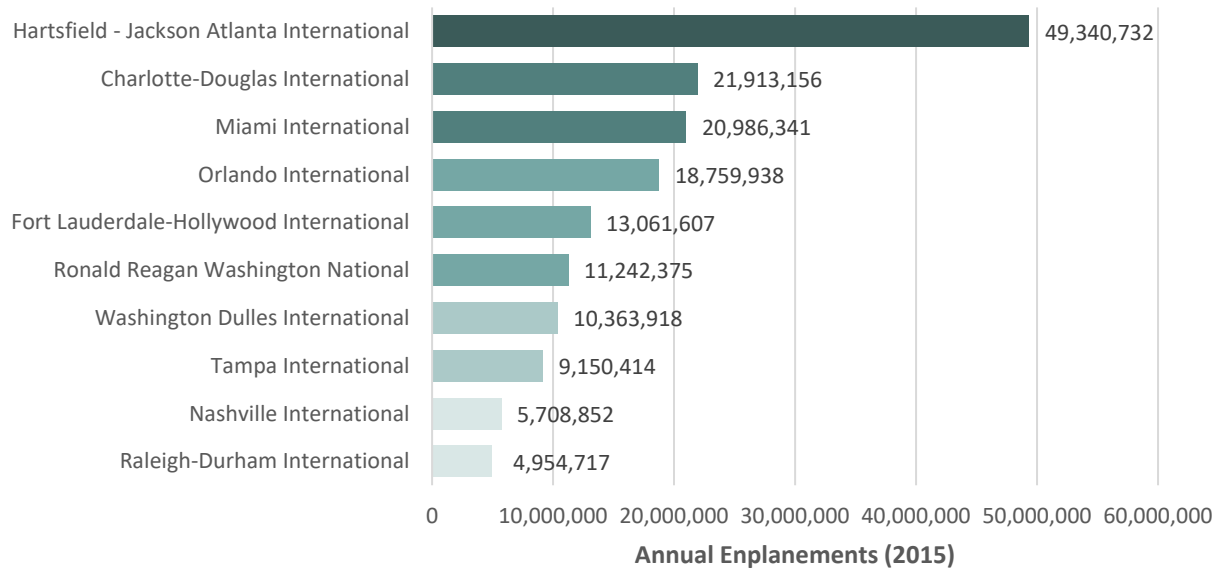


Figure 19. Commercial Airports in the Southeast Study Area



Source: Federal Aviation Administration (2015)

Figure 20. Top 10 Airports in the Southeast Study Area by Annual Enplanements



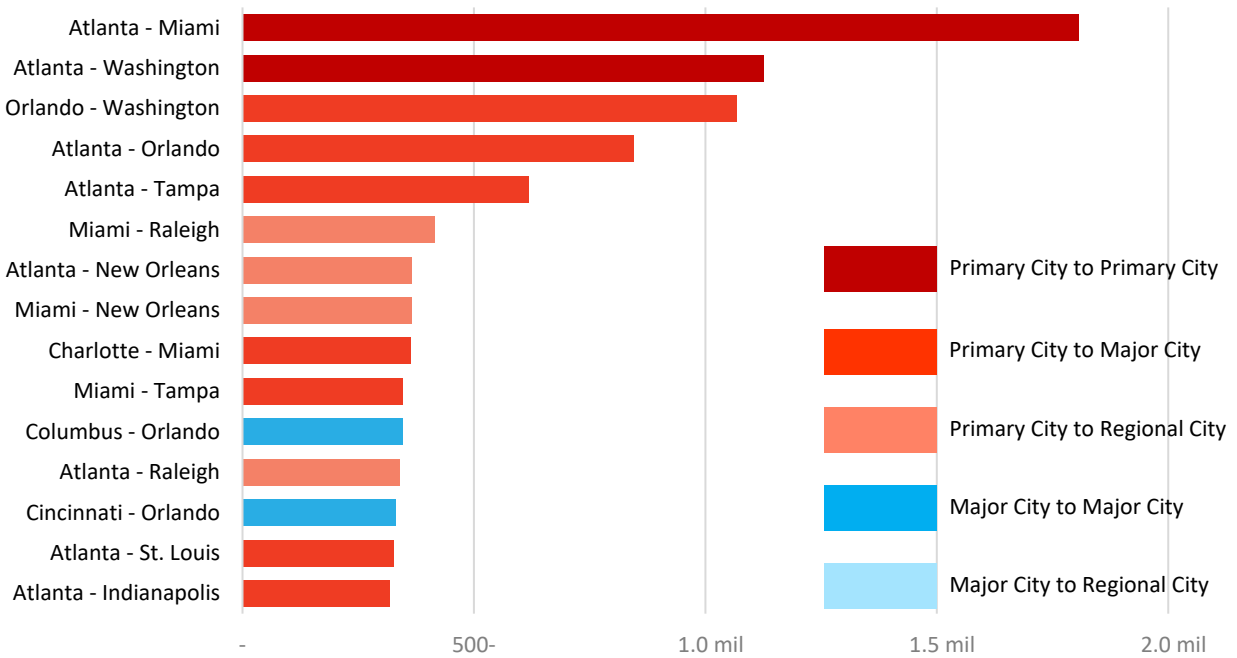
Source: Federal Aviation Administration (2015)

Relatively little intrastate commercial air travel exists in the Southeast. The two largest intrastate markets are Miami to Orlando and Miami to Tampa, but even these routes carry many fewer passengers than short-haul air routes in California or the Northeast. Interstate commercial air travel is more prevalent in the Southeast, with Atlanta, Washington, D.C., Miami, Orlando, and Charlotte serving as the highest demand destinations for local flights between the largest airports in the SE Study Area. Atlanta was included in eight of the top 15 Southeast air travel city pairs in 2015 and in four of the top five (Figure 21). Atlanta – Miami was the top pair with approximately 1.8 million trips in 2015 followed by Atlanta – Washington (1.126 million)³¹, Orlando – Washington (1.069 million), Atlanta – Orlando (0.846 million), and Atlanta – Tampa (0.619 million). Miami was a top city pair as well with connections to primary and regional cities including Raleigh, New Orleans, Charlotte, and Tampa. A number of the top air travel pairs connect Southeast cities with cities traditionally considered Midwestern, including St. Louis and Indianapolis with Atlanta, and Cincinnati and Columbus with Orlando (Figure 22).

³¹ Includes Reagan National (DCA) and Dulles International (IAD) Airports.

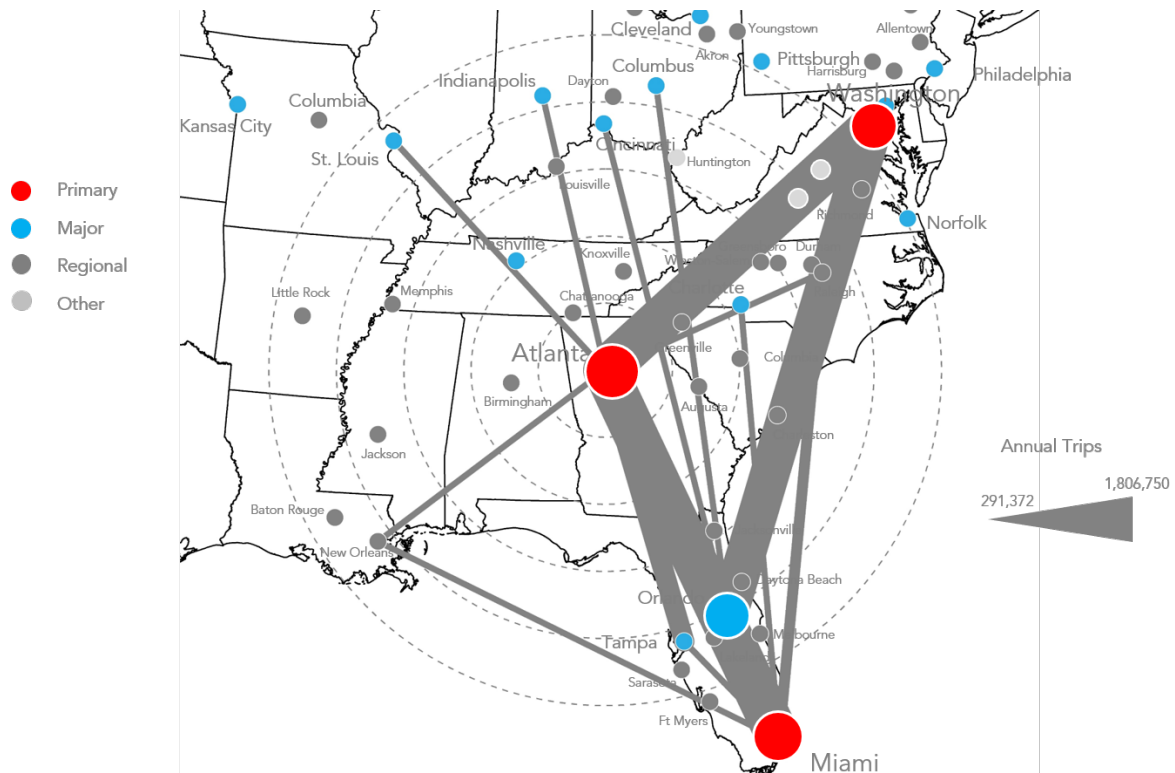


Figure 21. Top 15 Annual Air Travel Trips in the Southeast Study Area



Source: CONNECT

Figure 22. Top 15 Annual Air Travel Pairs in the Southeast Study Area



Source: CONNECT



Constraints are prevalent and growing at the eight major airports in the SE Study Area. Table 9 reports airport performance metrics, including percentage of on-time departures and average delays. One indicator of the challenges faced by airports is on-time arrival performance. In this category, seven of the eight major airports located in the SE Study Area (Tampa, Charlotte, Washington Dulles, Washington Reagan, Orlando, Miami, and Fort Lauderdale) ranked in the bottom half of the 29 largest airports in the U.S. for on-time arrival performance (Figure 23).

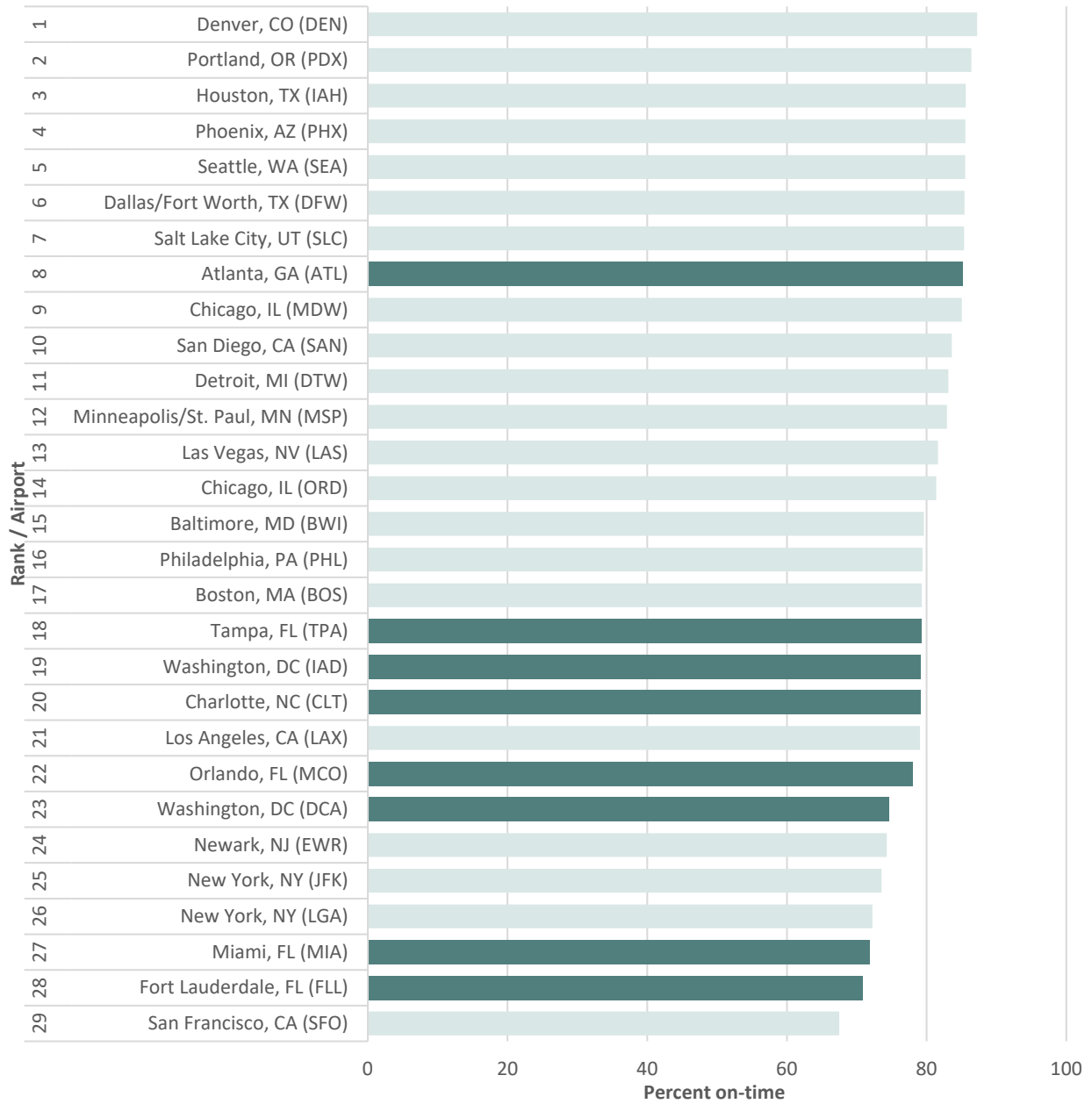
Table 9. Airport Performance

ON-TIME PERFORMANCE (2016)				
AIRPORT	% ON-TIME DEPARTURE	% ON-TIME ARRIVAL	AVERAGE DELAY (MINUTES) DEPARTURE	AVERAGE DELAY (MINUTES) ARRIVAL
Atlanta	83	86	60	73
Tampa	82	81	64	59
Charlotte	82	84	60	55
Orlando	80	80	65	63
Washington Reagan	82	79	66	58
Miami	77	78	66	66
Ft. Lauderdale	78	78	63	59
Washington Dulles	83	84	74	63

Source: Bureau of Transportation Statistics (2016)



Figure 23. Percentage of Flights On-Time at Major U.S. Airports



Airport Capacity Needs

The Federal Aviation Administration's (FAA) *FACT3: Airport Capacity Needs in the National Airspace System* report published in 2015 assessed the future capacity of 48 airports in the U.S., with a goal to determine which airports have the greatest need for additional capacity. FACT3 is intended to provide information about which airports are expected to be capacity constrained in the future even with reasonably optimistic assumptions about future delay and congestion factors. This information can then be used to scope additional efforts for system wide analysis or airport-specific improvements.

The FACT3 analysis identified airports that are expected to need additional capacity in two future time periods: 2020 and 2030. The analysis considered planned improvements as well as runway and airport infrastructure improvements in its estimates for future capacity. The analysis has identified several capacity problems at airports serving densely populated megaregions and includes large hub airports such as Atlanta Airport. The demand for travel in high-density intercity corridors requires the continued development of alternate modes to provide additional options along with short-haul air travel.

FACT3 analysis found that Atlanta Airport will have significant capacity constraints by 2020, even after all currently planned improvements are implemented. The report also found that by 2030, additional airports in the SE Study Area (Atlanta, Charlotte Douglas International, and Fort Lauderdale/Hollywood International) will need additional capacity if planned improvements are not implemented. The airports in Atlanta and Charlotte will remain constrained even after planned improvements.

Hartsfield-Jackson Atlanta International Airport (ATL) also meets the FACT3 criteria to be considered congested, although the airport has seen significant delay reduction with the opening of its fifth parallel runway in 2006. ATL can be congested during certain periods of the day because of the extensive connecting hub activity at the airport. The City of Atlanta is updating its master plan to assess future facility requirements, including assessment of the need for further runway development and their timeframe for implementation.

In addition to capacity issues for ATL, FACT3 analysis found that four of the top five short-haul air markets originating in Raleigh are to destinations on the NEC, as are two of the top three coming from Charlotte. There is at least as much demand from the cities in the northeastern portion of this megaregion to connect to Washington, D.C. and beyond as there is with Atlanta. This air data reinforces the benefit of analyzing potential rail corridors in the northeastern end of the Piedmont Megaregion and strengthen efficient transportation connections between the North Carolina cities and the NEC.

2.2.4 Roadway and Highway Network

Several interstate highways traverse the SE Study Area. Table 10 describes the major corridors in the SE Study Area. Figure 24 shows interstate highways that provide connections between major CBSAs in the SE Study Area. The Average Annual Daily Traffic (AADT) volume on many of these highways is greater than 40,000. Key corridors that traverse through the SE Study Area include I-95, I-85, I-81, I-77, I-75, I-40, I-24, I-10 and I-4. The areas adjacent to these key corridors are very populated, placing a high demand on connections between regional destinations within the SE Study Area. These corridor populations are expected to grow substantially over the next 25 years. Figure 25 illustrates the population growth expected to occur within the CBSAs adjacent to each major highway corridor.



Table 10. Highway Corridors in the Southeast Study Area

HIGHWAY CORRIDOR	CITIES SERVED	TOTAL LENGTH (MILES)	CORRIDOR DESCRIPTION
I-95	Washington, D.C., Richmond, Fayetteville, Savannah, Jacksonville, and Miami	1,053	The I-95 Corridor is a vital connection between Northeast consumer markets and Southeast ports and manufacturing centers. I-95 serves as one of the major freight corridors and is part of Florida's Strategic Intermodal System characterizing its importance as a national, statewide, and regionally significant facility. Congestion has made I-95 one of the most unreliable corridors in the U.S.
I-85	Montgomery, Atlanta, Charlotte, Greensboro, Raleigh-Durham, and Richmond	666	I-85 is the most direct and heavily traveled route between Richmond and Atlanta. Commercial truckers constitute about a quarter of the traffic along this stretch, making this an extremely important route connecting commerce along the East Coast.
I-77	Charlotte, Columbia	262	I-77 is a north-south Interstate Highway connecting Cleveland, Ohio to Columbia, South Carolina. In North Carolina, I-77 enters the state at Charlotte.
I-75	Knoxville, Chattanooga, Atlanta, Tampa, Fort Myers, Naples, and Miami	988	I-75 serves as one of the major freight corridors and is part of Florida's Strategic Intermodal System. I-75 is one of the primary ways for freight to access major cities in Florida.
I-40	Nashville, Knoxville, Asheville, Greensboro, Raleigh-Durham, and Wilmington	879	I-40 experiences capacity problems in urban areas and on steep mountain grades. Tennessee's strategic highway system includes routes the state considers critical to statewide mobility and regional connectivity. Interstate I-40 is part of this system and has been classified as needing improvement, while protecting and maximizing capacity over the next decade.
I-24	Nashville and Chattanooga	184	I-24 is a key freight corridor that travels through Tennessee, connecting Nashville and Chattanooga.
I-10	Jacksonville, Tallahassee, Pensacola, Mobile	362	I-10 is the southernmost east-west Interstate Highway in the United States, stretching from Jacksonville, FL to California. It connects major cities across the Southeast and Southwest.
I-4	Dayton Beach, Orlando, and Tampa	132	I-4 serves as major freight corridor and is part of Florida's Strategic Intermodal System. I-4 now far exceeds its capacity and, as a result, traffic congestion has become a major problem.

Source. Federal Highway Administration

Figure 24. Most Heavily Traveled Highways in the Southeast Study Area

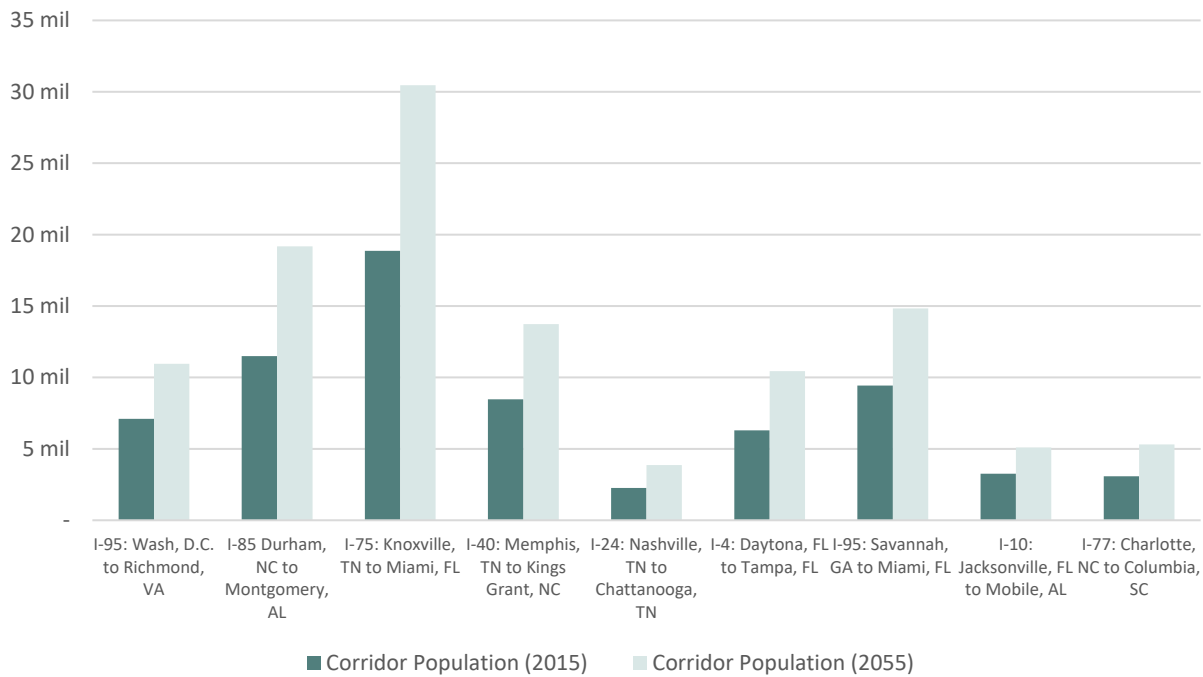


Source: Federal Highway Administration (2015); Florida Dept. of Transportation (2016); Virginia Dept. of Transportation (2015); South Carolina Dept. of Transportation (2015); Georgia Dept. of Transportation (2015); North Carolina Dept. of Transportation (2015); Tennessee Dept. of Transportation (2015); CH2M (2016)

Note: AADT values are only reported for Core States and for major interstate highways. AADT information is aggregated from latest available state DOT traffic data using the FHWA National Highway Planning Network.



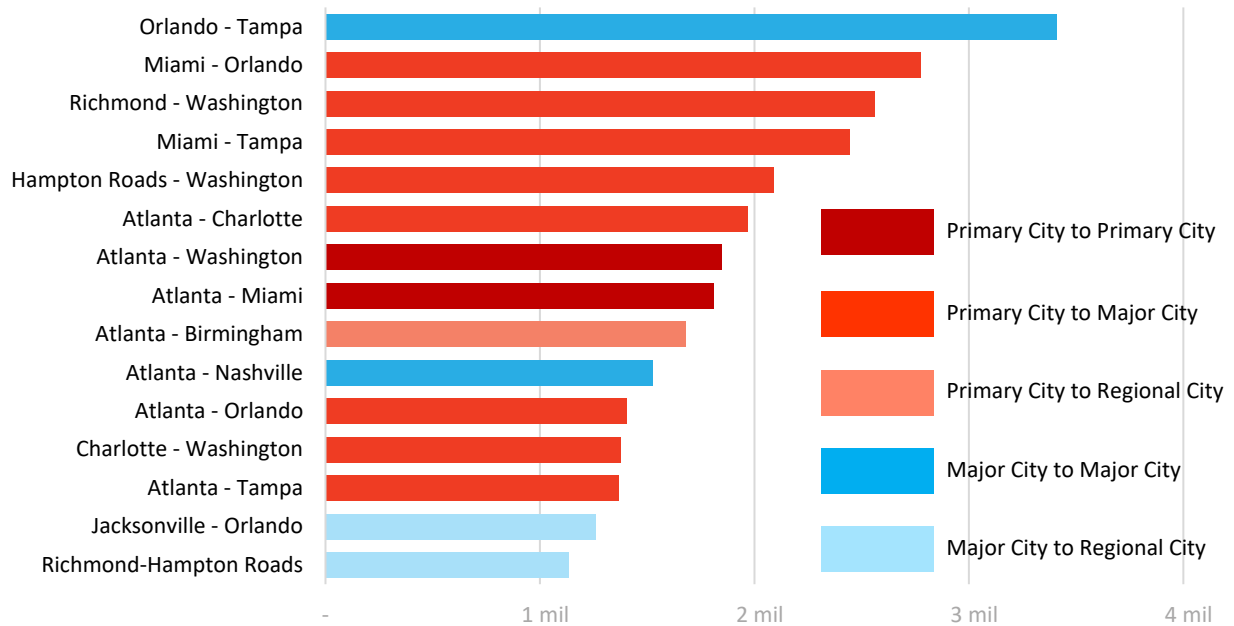
Figure 25. Population along Key Interstate Corridors in the Southeast Study Area (2015 and 2040)



Source. CONNECT

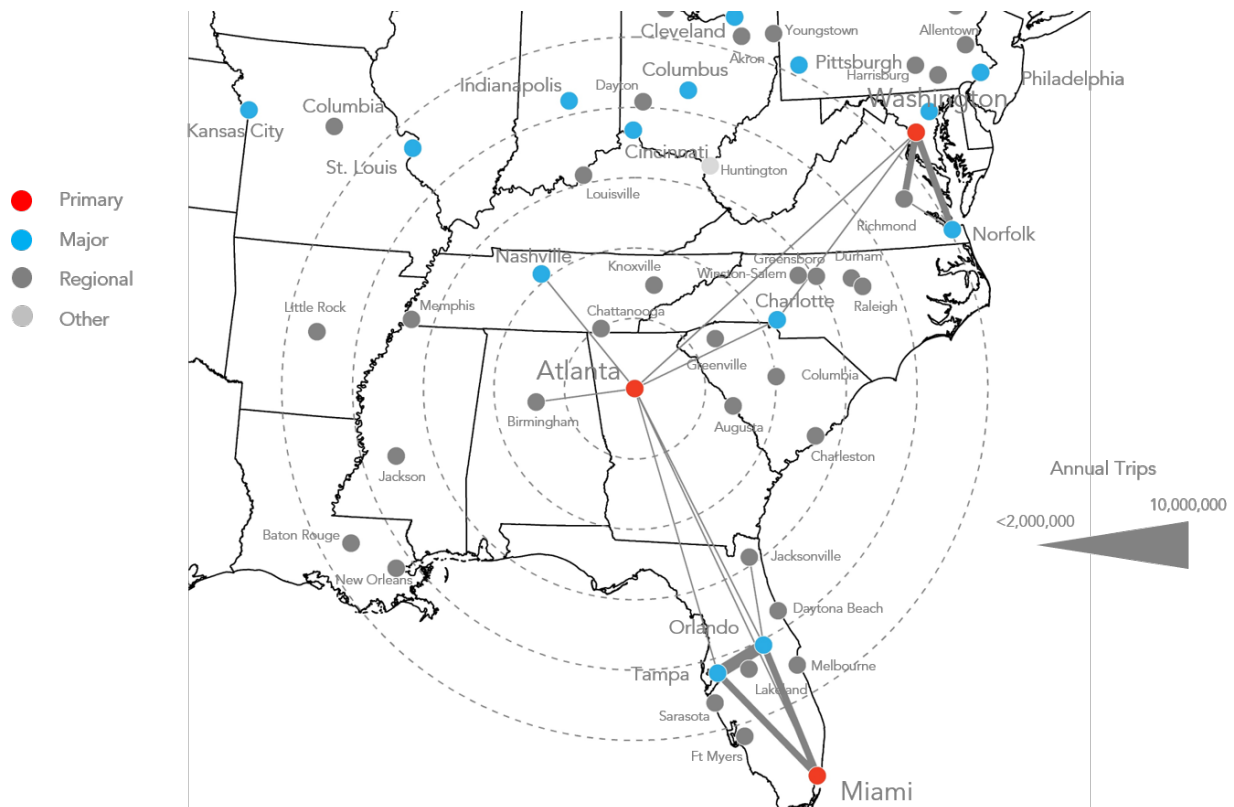
Of the top 15 CBSA travel pairs, nearly half include Atlanta as an endpoint. Orlando – Tampa is the top travel pair with 3.5 million vehicle trips. Travel pairs between a primary city and a major city accounted for eight of the top 15 spots with Miami – Orlando, Richmond – Washington, Miami – Tampa, and Norfolk – Washington all with more than 2 million annual trips. Major city to regional city pairs represented two of the top 15 pairs. A concentration of intrastate city pairs in the top 15 are in Florida. Most other top 15 pairs are interstate pairs. Figure 26 and Figure 27 depict the top 15 auto travel pairs in the Southeast.

Figure 26. Top 15 Auto Travel Trips in the Southeast Study Area



Source: CONNECT

Figure 27. Top 15 Auto Travel Pairs in the Southeast Study Area



Source: CONNECT



2.2.5 Intercity Bus Network

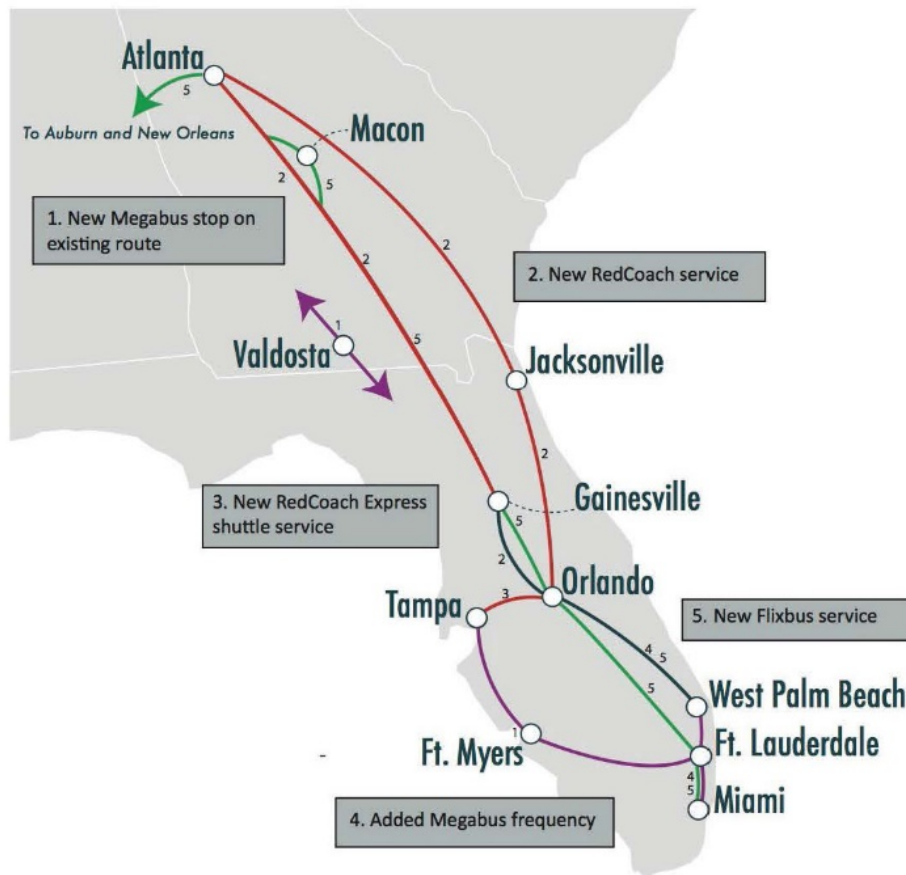
There are numerous intercity bus operators in the Southeast, including Megabus and Greyhound. Until recently, much of the intercity bus network focused on connecting markets that are within about 200 miles of each other, such as Orlando-Miami, Atlanta-Charlotte, and Charlotte-Durham. However, recent service expansions, particularly from the Germany-based FlixBus, have provided more extensive connections across the Southeast. The Virginia Department of Rail and Public Transportation (DRPT) launched the Virginia Breeze in 2017 to connect small towns and cities throughout the state to Washington, D.C. Elsewhere, new service has also been added between Atlanta and New Orleans through Alabama.³²

Florida has a high concentration of intercity bus routes, and critical new ones were added in 2019, including connections to Atlanta (Figure 28). RedCoach, a premium bus operator in Florida, launched a new service in 2019 called RedCoach Express, which offers lower cost fares for trips between Orlando and Tampa. Megabus and Flixbus also both now offer service between Atlanta and Orlando, connecting two of the largest markets in the Southeast.

Intercity bus operators are likely to attract more fare sensitive riders than intercity rail. Bus operators can quickly ramp up or scale down service in response to demand and they have limited investment in fixed infrastructure, meaning they can offer cheaper fares. However, some passengers are willing to pay a premium for time savings and comfort benefits of intercity passenger rail.

³² Chaddick Institute for Metropolitan Development DePaul University, Making Connections: 2020 Outlook for the Intercity Bus Industry in the United States.

Figure 28. New Intercity Bus Routes Serving Florida (2019)

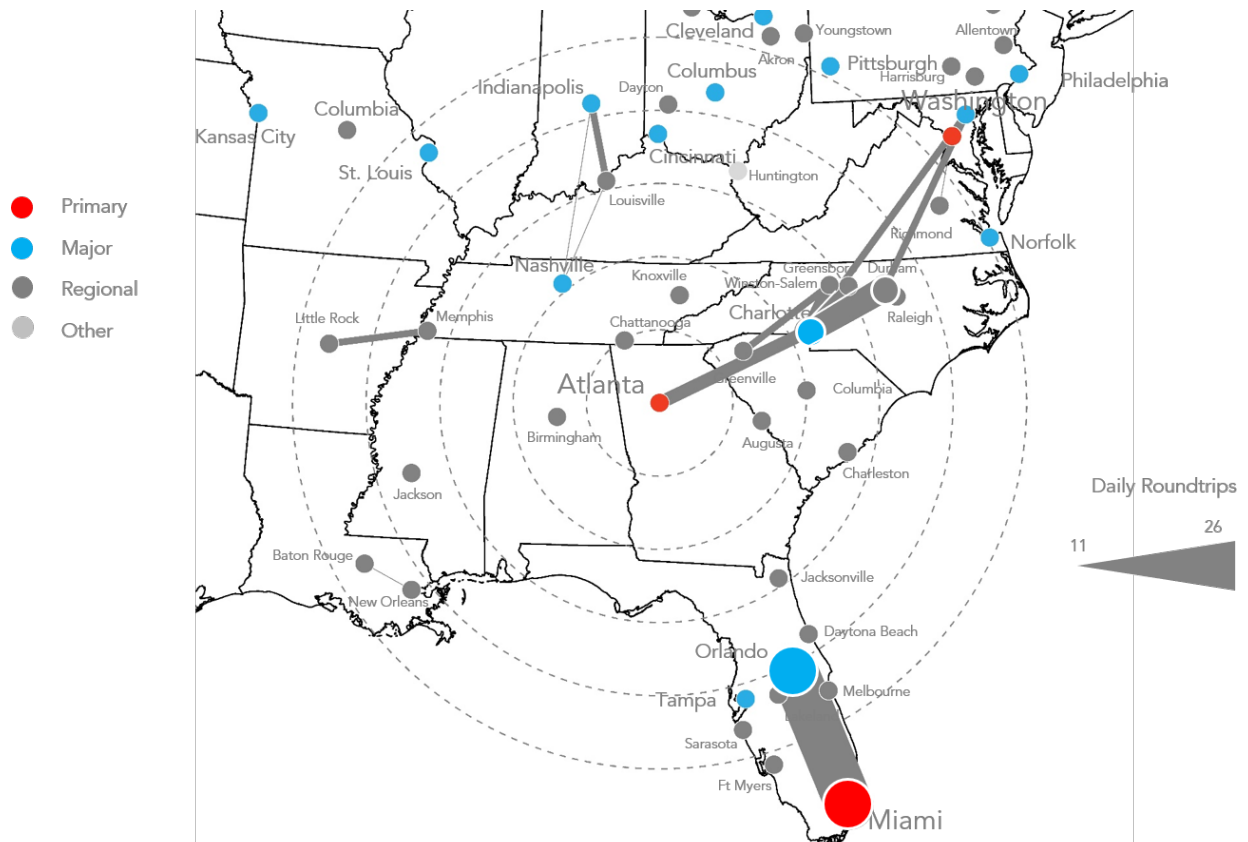


Source: Chaddick Institute for Metropolitan Development DePaul University, *Making Connections: 2020 Outlook for the Intercity Bus Industry in the United States*.

To estimate top intercity bus travel pairs and demand, data on scheduled daily roundtrips for intercity bus operators were collected based on publicly available schedules for January 2020. Since bus operations dynamically adjust schedules to demand and price seats to increase occupancy, the number of daily roundtrips is a proxy for travel demand between markets. Actual ridership numbers are likely very small compared to auto trips and in many market pairs, air trips. Similar to auto and rail, most bus trips are under 300 miles. Scheduled bus frequencies reveal different demand patterns with new market pairs appearing. Many bus market pairs appear to serve CBSAs with significant college/university student populations such as Greenville – Winston-Salem, Atlanta – Durham/Chapel Hill, and Durham/Chapel Hill – Winston-Salem. The presence of these services are likely representative of the price sensitivity of college/university students and customers in these markets. Figure 29 depicts the top 15 travel market pairs in the Southeast based on daily scheduled bus trips.



Figure 29. Top 15 Bus Market Pairs by Scheduled Frequency in the Southeast Study Area



Source: Quetica

2.2.6 Commercial Marine Ports

The seaports that move international trade into and out of the U.S. rely on rail and other modes to connect domestic markets and production to the global economy. Interstate highways and rail lines are of key importance to the Southeast Study Area’s seaports to transport goods to their final destination. Figure 30 shows the location of the major seaports in the SE Study Area. The Ports of Virginia, Charleston, Savannah, and Miami are among the top 25 U.S. International Trade Freight Gateways in the U.S. measured by value of shipments. When considering total trade based on cargo volume, five SE Study Area ports rank among the top 30 in the U.S. Together they handled a total of 165.7 million tons of goods in 2014³³. Twenty-foot equivalent unit (TEU) measures are an indication of a port’s intermodal container handling capacity. In the SE Study Area, four ports exceed one million TEUs.

Table 11 summarizes the cargo and container volumes of the top U.S. water ports in the SE Study Area.

³³ Bureau of Transportation Statistics, 2017. Note: All these statistics are reflective of conditions before the opening of the widened Panama Canal

Figure 30. Major Ports in the Southeast Study Area



Source: U.S. Census Bureau (2015); Federal Rail Administration (2015); Amtrak (2016); CH2M (2016); Woods and Poole Economic Data (2016)



Table 11. Cargo Throughout at Major Ports in the Southeast Study Area

PORT NAME	TOTAL TONNAGE (millions of short tons)	CONTAINER VOLUME (thousands of TEU)
Port of Virginia	54.0	2,656
Port of Wilmington	5.4	260
Port of Charleston	23.0	1,996
Port of Savannah	36.4	3,645
Port of Jacksonville	18.5	968
Port Everglades	24.2	1,037
Port of Miami	8.0	1,028
Port Tampa Bay	35.3	N/A

Source: Bureau of Transportation Statistics (2017)

The Port of Virginia receives high volumes of intermodal traffic that are transported by rail to yards near the final destinations, and then moved by truck to the final destination.

Port Tampa Bay is the largest of the Florida ports by tonnage and land and is a critical economic engine for central Florida. Port Tampa Bay is a full-service port, handling all types of cargo in addition to cruise ships and other maritime activities such as shipbuilding and repair facilities. Part of the FDOT’s I-4/Selmon Expressway Connector project provided a dedicated express truck ramp that links Port Tampa Bay directly with the interstates, greatly enhancing connectivity to customers in west central Florida and beyond.

2.3 RECENT AND ONGOING PASSENGER RAIL PLANNING EFFORTS

State LRTPs and modal plans, including SRPs, reflect long-term visions for multimodal networks (highways, rail, air, and water) serving passengers and freight. The passenger rail policy described in this section is based primarily on information contained in the SE Study Area’s SRPs.

2.3.1 Washington, D.C.

The **District of Columbia State Rail Plan (SRP) (2017)** provides guidelines for future rail investment, addressing intercity passenger rail, freight rail, and commuter rail. Passenger and freight rail services share the use of key infrastructure within Washington, D.C. (the District), creating capacity and operational challenges. Within the District, CSX owns and operates freight rail services, with NS holding access rights over CSX-owned rail infrastructure. Union Station hosts ten different Amtrak routes and MARC and VRE commuter rail services in addition to extensive transit options. Union Station faces capacity constraints affecting many components of passenger service operation, including a lack of storage facilities, constrained passenger facilities, and limited space for track expansion. Union Station is the second busiest Amtrak station in the nation with over 5 million yearly riders and ridership projected to double over the next 20 years.

Amtrak provides intercity passenger rail via a number of services, including the Acela, Capitol Limited, Cardinal, Carolinian/Piedmont, Crescent, NEC, Northeast Regional, Silver Service/Palmetto, and Vermonter. VRE and MARC provide commuter rail service to and from the District. The services are limited by facility and operational constraints, including a lack of line and station capacity, and access challenges. Operational constraints also limit services at the two commuter rail stations in the District, Union Station (MARC and VRE) and L’Enfant Plaza (VRE). L’Enfant Station is VRE’s busiest station and VRE is planning for increased service



by 2040. Long Bridge, the sole rail connection across the Potomac River between the District and Virginia, is a choke point for rail services. The existing two-track railroad bridge, owned by CSX, serves freight, intercity passenger, and commuter rail.

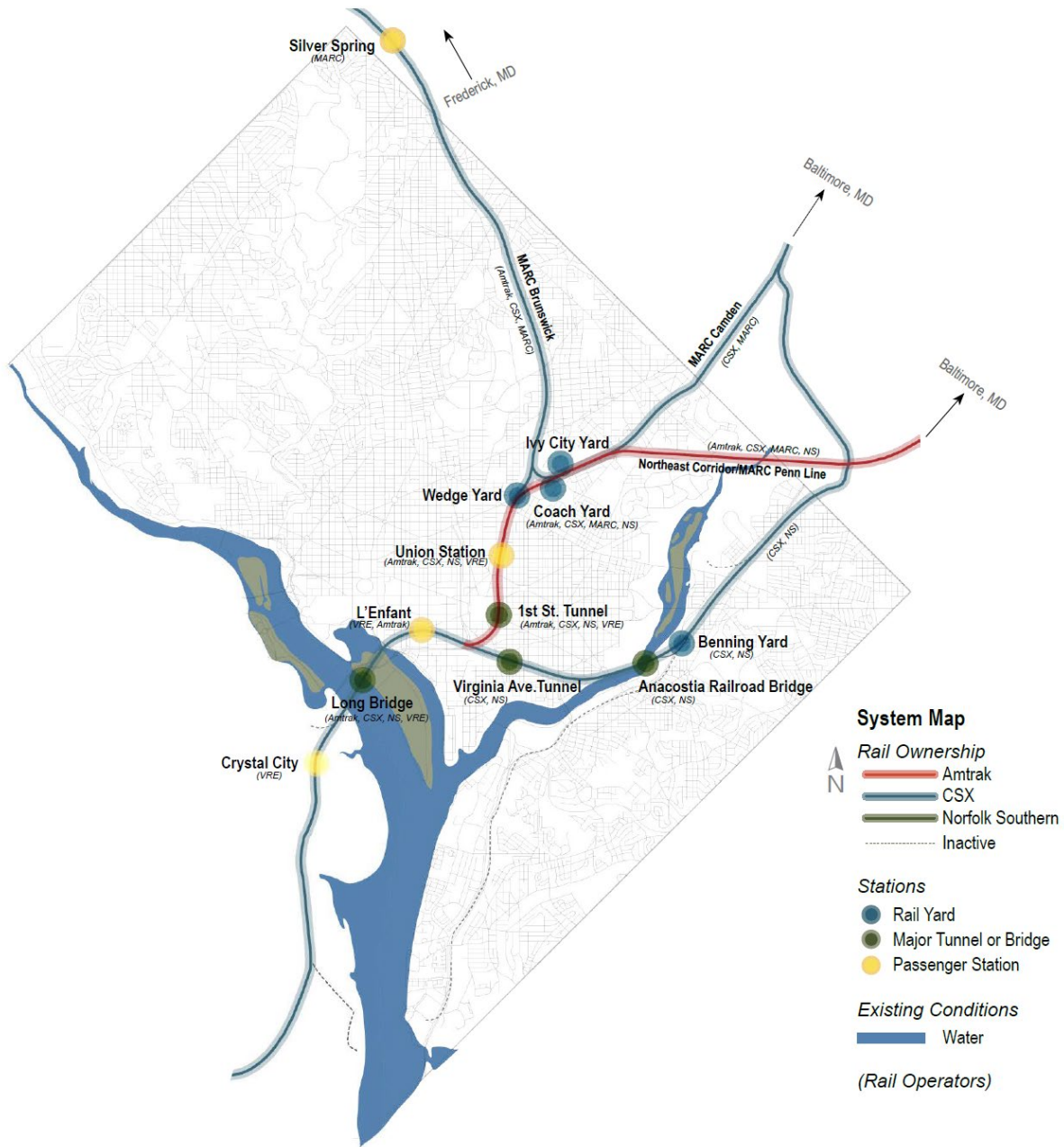
The District's rail network is integral to both the metropolitan and national rail networks (Figure 31). Union Station is the southern terminus of the Amtrak-owned NEC and is the northern terminus of the planned Southeast Corridor. The District is the junction linking CSX's Northeast, Southeast, and Midwest freight operations. As such, the District is key in the CSX National Gateway initiative to improve rail traffic flows between the Eastern Seaboard and Midwest. Figure 32 illustrates the major railroad structures located within the District. These include the Long Bridge, Virginia Avenue Tunnel, First Street Tunnel, Amtrak Anacostia Bridge, and Anacostia Railroad Bridge.

The SRP identifies passenger rail projects including improvements to Union Station, upgrades/increased capacity on the Long Bridge/L'Enfant Station Corridor, and new midday storage capacity for commuter rail services. These projects will provide needed capacity, connectivity, and operational flexibility for growing passenger rail flows between the District and points north and south. Some other key improvements and projects include the following:

- Implementing short-term projects to increase capacity and improve the passenger experience as described in the Union Station Master Plan. Improvements will include widening and lengthening platforms, expansion of passenger facilities, planning for improved access and egress, considering development opportunities above the rail yard, and integrating bus and streetcar facilities
- Long Bridge – the expansion of the Long Bridge has completed environmental review and preliminary engineering.



Figure 31. District of Columbia State Rail Plan Rail Network (2017)



Source: District of Columbia (2017). District of Columbia Rail Plan. <https://ddot.dc.gov/page/district-columbia-state-rail-plan>

Figure 32. Major Railroad Structures in the District (2017)



Source: District of Columbia (2017). District of Columbia Rail Plan. <https://ddot.dc.gov/page/district-columbia-state-rail-plan>



2.3.2 Virginia

The DRPT is responsible for rail, public transportation, and commuter services. Capacity is a challenge for Virginia's rail network because passenger and freight rail operate on shared corridors owned by Class I railroads, where both passenger and freight services have experienced rapid growth in the past decade.

Historically, the State of Virginia negotiated for train capacity on the Class I networks, which has created a need to invest in constructing additional rail infrastructure.

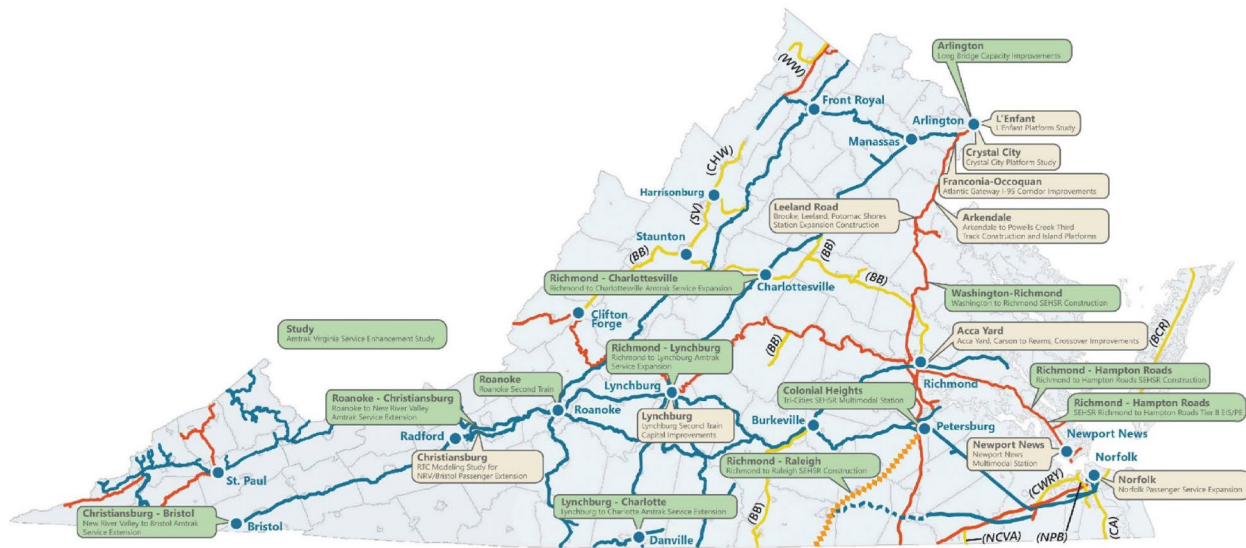
In 2019, the Transforming Rail in Virginia plan was announced which outlines an agreement to expand service and improve reliability on Virginia's rail lines, creating a pathway to separate passenger and freight operations along the Richmond to Washington, D.C. corridor. This plan includes building a new Virginia-owned Long Bridge across the Potomac River, with tracks dedicated exclusively to passenger and commuter rail. The Long Bridge Final Environmental Impact Statement/Record of Decision was completed in 2020.

Virginia's Statewide Rail Plan (VSRP) (2017) is an element of Virginia's overall transportation planning framework. The VSRP identifies passenger rail projects that support the Virginia Statewide Transportation Plan 2040. The VSRP establishes goals for safety and security, resiliency, operations, delivery, transparency, coordinating land use and transportation, intermodal connectivity, economic development, and return on investment. The VSRP recommends a number of short-range (FY 2018-2023) and long-range (FY 2024-2042) priority passenger rail improvements and investments projects, including those listed below and shown in Figure 33.

- **I-95 Passenger Service** enhances passenger and freight rail operations with more frequent service and capacity between Washington, D.C., Richmond, and Petersburg through to North Carolina, with service connecting to the NEC
- **I-64 Passenger Service** enhances passenger and freight rail operations with more frequent service and capacity between the Hampton Roads Region (Norfolk/Virginia Beach/Williamsburg/Newport News), Richmond, and Washington, D.C. with service connecting to the NEC
- **VRE** expands commuter rail service and stations, and improves existing stations and platforms
- **Southeast Corridor** continues to advance rail service from Washington, D.C. through to North Carolina to provide passengers with more efficient and reliable service
- **Atlantic Gateway** will increase capacity and service from the Virginia–North Carolina state line through Washington, D.C. and supports the enhancement of VRE and Amtrak service on CSX-owned track in the I-95 Corridor
- **U.S. 29, U.S. 460, and I-81** advances investments to build capacity projects to alleviate congestion and allow the operation of additional frequencies between Roanoke and Bristol, Lynchburg and Charlotte, and Lynchburg and Richmond.
- **Crescent Corridor** expands rail capacity and facilitates to support the expansion of Amtrak service to Roanoke to two daily round trip and extending service to Bristol.

- **Heartland Corridor** includes exploring the possibility of new passenger service between Roanoke and part of this freight corridor.

Figure 33. Proposed Virginia Passenger Rail Projects



Passenger Rail Projects in Virginia

- Shortline Railroad
- CSX Transportation
- Norfolk Southern
- Cities/Towns
- Short-Range Programs
- Long-Range Programs
- Discontinued
- S-Line (planned for reactivation)

Railroads in Virginia

- CSX CSX Transportation
- NS Norfolk Southern
- BCR Bay Coast Railroad
- BB Buckingham Branch Railroad
- CA Chesapeake & Albemarle Railroad
- CHW Chesapeake Western Railway
- CWRY Commonwealth Railway
- NPB Norfolk & Portsmouth Belt Line Railroad
- NCVA North Carolina & Virginia Railroad
- SV Shenandoah Valley Railroad
- WW Winchester & Western Railroad

Source: Virginia Statewide Rail Plan (2017) <http://www.drpt.virginia.gov/rail/reference-materials/virginia-state-rail-plan>

A majority of Virginia’s population and employment centers are along the I-95 and I-64 corridors, and passenger rail service along these corridors will enhance connections between the state’s population and employment centers and will also enhance freight rail operations in the state. Additional I-95 and I-64 passenger service will provide more frequent service, capacity, and travel time savings within the region, particularly impacting service between Virginia and Hampton Roads, Richmond, Washington, D.C., and service to the NEC.

The Southeast Corridor projects, including Richmond to Raleigh, Richmond to Hampton Roads, and Washington, D.C. to Richmond (DC2RVA) will provide more frequent rail services to the Virginia and North Carolina areas. In 2017, North Carolina and Virginia completed the Richmond to Raleigh Tier II EIS and Record of Decision, which proposes four round trips per day between Charlotte and Washington, D.C. and four additional trips between Raleigh and Charlotte. The project will provide rail infrastructure improvements and service upgrades to improve travel time, service frequency, and on-time performance. For Richmond to Hampton Roads, the project proposes six daily roundtrips between Richmond and Norfolk, and three daily round trips between Richmond and Newport News. DC2RVA is one segment of the much larger Southeast



Corridor . DC2RVA will add five additional frequencies to the network. The DC2RVA projects consider improvements to that corridor that will also allow for the implementation of improvements to the Newport News and Norfolk services. The rail corridor also hosts freight trains operated by track owner CSX and tenant NS, and commuter trains operated by VRE.

The Atlantic Gateway project, a joint effort between the Virginia Department of Transportation (VDOT) and DRPT, was awarded a \$165 million FASTLANE grant in 2016.³⁴ The federal grant is being matched with \$565 million in private funds and \$710 million in other public funding sources for total resources of \$1.4 billion. The multimodal project is focused on improving congestion and safety at critical existing freight and passenger bottlenecks along the I-95 Corridor between Fredericksburg and Washington, D.C. The rail component of the Atlantic Gateway project consists of five parts:³⁵

- Long Bridge Phase 1 – build a fourth main line track between the south bank of the Potomac River to Alexandria to improve capacity for use by VRE, Amtrak, and eventually high-speed rail.
- Dedicating the S-Line – dedicate the abandoned CSX line between the North Carolina state line and south of the Richmond area for future high-speed rail use.
- Constructing a Third Main Line Track (Franconia to Occoquan) – build a third main line track between the VRE station in Franconia/Springfield to the Occoquan River in Fairfax County to improve capacity along the CSX freight corridor for additional VRE use and eventually high-speed rail.
- Engineering for Long Bridge Phase 2 – conduct the design, engineering, permitting, and construction of the full Long Bridge Project over the Potomac River to D.C.
- Improving Rail Operations Along the Corridor – design and install two universal track crossovers south of Fredericksburg to increase Amtrak trains’ ability to meet and pass freight trains, expand intermodal and freight service, as well as for eventual use by high-speed rail.

The non-rail Atlantic Gateway projects focus on I-95 and I-395 improvements, including extending express lanes from Fredericksburg to the Potomac River, expanding bus service along the corridor, building new and reconstructed commuter and truck parking facilities, as well as corridor intelligent transportation system and advanced technology improvements that include, among other items, a roughly 50-mile stretch outfitted with Autonomous Vehicle Enhancement technology for deployment and testing.

Recent intercity rail service expansions include the extension of Northeast Regional service to Lynchburg (2009) and later Roanoke (2017), addition of service to Richmond and Newport News (2010), extension of service to Norfolk (2012), and the subsequent addition of service to Norfolk (2019).³⁶ These routes are in addition to the

³⁴ Virginia Department of Transportation. Governor McAuliffe Announces Virginia’s Selection for \$165 Million FASTLANE Grant to Deliver the Atlantic Gateway Project, 2016.

http://www.virginiadot.org/newsroom/statewide/2016/governor_mcauliffe_announces_virginias102651.asp

³⁵ Atlantic Gateway. Component 1: Rail and Infrastructure, 2020.

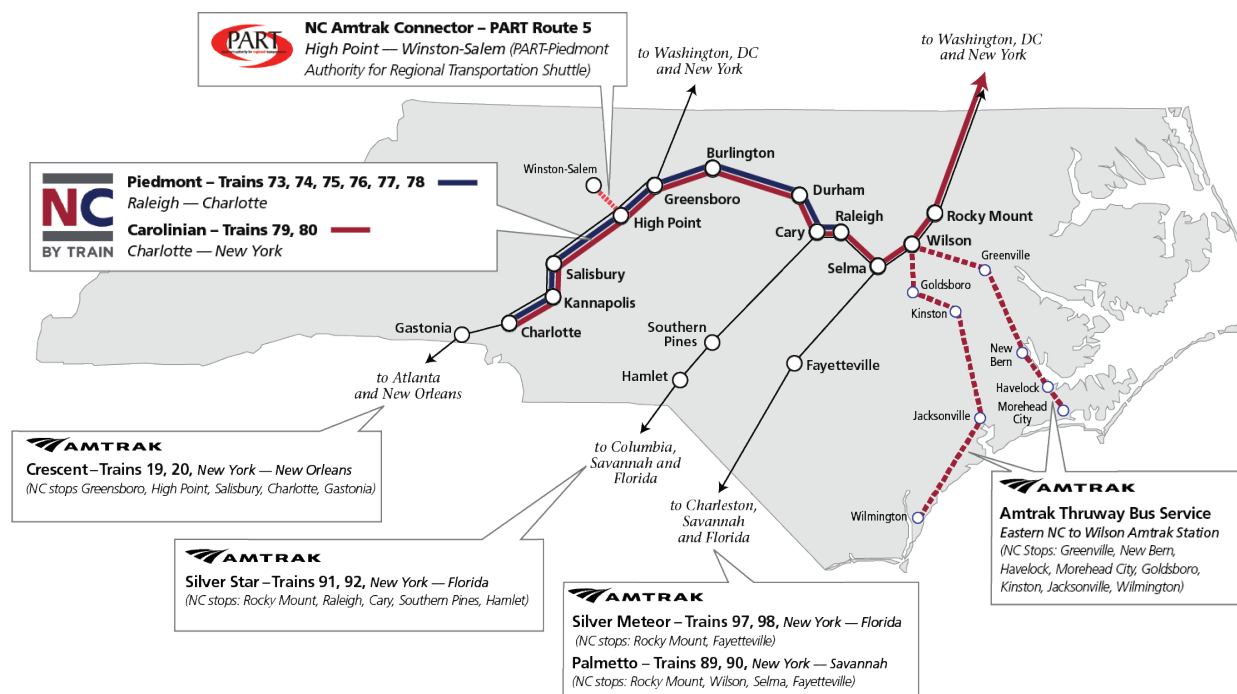
http://www.atlanticgateway.net/learn_more/component_1.asp

³⁶ Virginia Department of Rail and Public Transportation. The First Decade of Virginia Sponsored Amtrak Service, 2019. <http://drpt.virginia.gov/media/2889/10-years-of-va-sponsored-amtrak-service-final.pdf>

state’s existing intercity Amtrak services: the Auto Train, Carolinian/Piedmont, Crescent, Northeast Regionals, and the Silver Service/Palmetto.

2.3.3 North Carolina

Amtrak serves 16 cities across North Carolina, with Charlotte being the busiest station, followed by Raleigh, Greensboro, Cary, and Durham. Two-thirds of Amtrak’s stations in the state are in the Piedmont Crescent, the state’s most populous and congested regions (Charlotte, Triad, and Triangle). The Piedmont Crescent hosts the state-supported intercity passenger train service, the Piedmont and Carolinian routes. NCDOT recently added a third *Piedmont* frequency (2018) and anticipates adding a fourth in 2023. Coupled with the *Carolinian*, the third Piedmont provides four round trips between Charlotte and Raleigh.



North Carolina’s Comprehensive State Rail Plan (2015) envisioned a system of intercity passenger services connecting North Carolina’s major metropolitan areas to other communities and destinations within the state and along the East Coast. It also identified the need to partner with freight railroads to identify projects that could provide North Carolina industries with better connectivity to the rail network. North Carolina’s Comprehensive State Rail Plan is currently being updated and is anticipated to emphasize the following initiatives, that are similar to those identified in the 2015 plan.

Passenger Rail



- Modernize and Expand North Carolina’s Passenger Rail Fleet - The initiative to add the Raleigh to Charlotte fifth frequency uses \$35.6 million in funding identified in the STIP as Project P-5719C. This funding is in addition to \$77 million from the FRA State of Good Repair (SOGR) fund to purchase railcars for the *Piedmont* and expand the Charlotte Locomotive and Railcar Maintenance Facility (LRMF). The purchased railcars will allow NCDOT to retire the oldest Piedmont railcars. A subsequent State of Good Repair Grant proposal has been awarded to expand the initial award and scope to include full trainsets for the *Piedmont*, including power. The grant would also build a larger Charlotte Locomotive and Railcar Maintenance Facility. The expanded grant would pair \$56 million in state funds with \$156 million in federal funds.
- Study Potential Travel Time Improvements – Adding the sixth Raleigh to Charlotte frequency (fifth *Piedmont*) will require additional improvements on the corridor between Raleigh and Greensboro. The scope of these improvements needs to be fully developed through additional study. A subset of these improvements could be used to reduce travel time between Raleigh and Charlotte to three hours.
- Promote and Expand Passenger Rail Service – Once additional equipment is obtained, fourth and fifth *Piedmont* trains will be added. In addition, NCDOT, through coordination with Metropolitan Planning Organizations and Rural Planning Organizations plans to pursue extensions of the *Piedmont* service to connect urban and rural communities – potentially Wake Forest and Selma. The extension to Wake Forest could serve as an incremental step toward building the Raleigh to Richmond portion of the Southeast Corridor, a top priority for NCDOT Rail Division. Other new services identified in the vision include service to Goldsboro, Wilmington, Morehead City, Fayetteville, Sanford, Winston-Salem, Asheville, Gastonia, and Kings Mountain. The Gastonia and Kings Mountain projects could help develop the Charlotte approach to the Atlanta to Charlotte passenger rail corridor.
- Southeast Corridor – As noted previously, NCDOT’s Rail Plan is anticipated to include incremental service extensions that will help develop the Southeast Corridor, with a primary goal to partner with our neighboring states to secure funding to construct the entire Raleigh to Richmond segment to connect the Southeast with DC and the Northeast. In addition, NCDOT will support the Southeast Corridor Commission and potential efforts to pursue funding for the Tier 2 EIS for the Atlanta to Charlotte corridor.
- Integrate Passenger Rail into the State’s Multimodal Transportation Network – The plan will include additional station projects that have been requested by communities along existing service routes. The plan will also identify potential commuter rail corridors.
- Enhance Safety and Resiliency - The plan is also anticipated to include projects that enhance safety and resiliency on the North Carolina rail network.

Freight Rail

North Carolina’s freight rail network is a key component of the supply chain, connecting the state’s seaports with consumer and industry destinations throughout the state and region. North Carolina’s extensive freight rail network includes two Class I railroad operators and 24 short line operators, which combined traverse 86 of the state’s 100 counties. Both Class I and short line railroad corridors are supported through public and private



investment to improve areas of concern such as safety, access, or economic opportunity. Because the rail network is a privately-owned asset, any projects and long-range programs must be developed in partnership with the Class I railroads, short line operators, and other stakeholders. Holistic planning efforts incorporate input and direction from multiple stakeholders, including rural and metropolitan planning organizations, railroad operators, the public, and adjacent states.

NCDOT implements freight rail improvements ranging from safety enhancements to new construction. As the needs of North Carolina's freight rail operators change, NCDOT responds by shifting focus to those topics that rank as top priorities. Additionally, changes in freight rail industry trends also affect how NCDOT shapes policy and guidance.

Improvements to the freight rail network in North Carolina's rail plan are anticipated to meet one or more of the following goals:

- Grow Freight Rail Access and Capacity
- Enhance Rail Safety and Resiliency
- Integrate Freight Rail into the Multimodal Transportation Network
- Advance a Corridor-Level Approach to Rail Planning and Investment

A major freight initiative in North Carolina, developed through a partnership between the state and CSX, is the construction of the CCX intermodal terminal near Rocky Mount. Construction is underway and is anticipated to be completed in 2021. The state-of-the-art intermodal terminal will provide eastern North Carolina, southern Virginia, and South Carolina access to CSX's domestic intermodal network. CSX is currently finalizing the anticipated domestic market schedules and working toward developing a partnership with regional port(s) to serve international freight traffic.



Figure 34. CCX Intermodal Terminal Under Construction (August 2020)



Figure 35. Crane components for CCX being unloaded at the Port of Wilmington



2.3.4 ,South Carolina

Amtrak provides service to 11 cities across South Carolina. Currently only long-distance service is provided, comprising the Crescent, Silver Meteor, Silver Star, and Palmetto. Except for the Charlotte to Atlanta portion of the Southeast Corridor, no intercity rail service proposals have advanced in the state. This service will provide an alternative mode for intercity travel to improve travel times and reliability. The project also proposes improved access to airports and terminus rail stations.

South Carolina's Multimodal Transportation Plan (2014) supports providing surface transportation infrastructure and services that will advance the efficient and reliable movement of people and goods throughout the state. After the interstate system, the Strategic Corridor Network system identified in the Multimodal Transportation Plan represents the second most significant network of corridors that are critical to interregional mobility for South Carolina. These routes are important in terms of their ability to impact modal shifts for both people and freight movements. The mobility and system reliability goal aim to utilize the existing transportation system to facilitate enhanced modal options for a growing and diverse population and economy.³⁷

Strategies related to passenger rail that have been incorporated in the Statewide Multimodal Transportation Plan include the following:

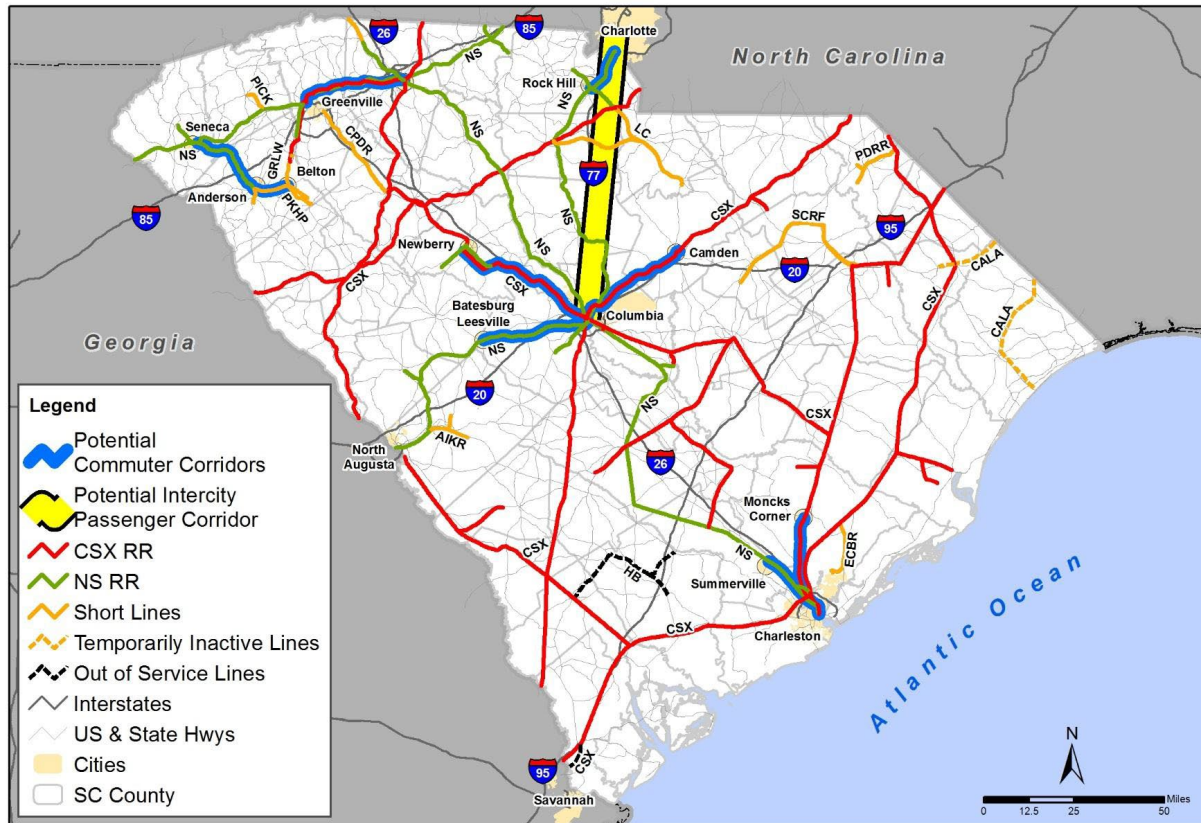
- Advance passenger rail service from Charlotte to Atlanta through the Upstate of South Carolina.
- Explore an initial intercity passenger rail feasibility study for connecting Charlotte, NC, with Columbia, following either an existing CSX freight line or a greenfield alignment parallel to I-77.
- Ensure that no railroad right-of-way is abandoned and lost for future public use and identify funding to purchase abandoned rail right-of-way identified as having potential future passenger rail transportation applications.

Figure 36 depicts South Carolina's rail system and proposed passenger rail initiatives.

South Carolina's Statewide Rail Plan (2014) reports that interest in improved intercity service is limited to proposed high-speed passenger operation linking Charlotte, NC, to Atlanta, GA, and connectivity between Charlotte and Columbia. There have not been any proposals to improve existing Amtrak service.

³⁷ South Carolina Department of Transportation (SCDOT). Charting a Course to 2040: South Carolina Multimodal Transportation Plan. South Carolina Statewide Freight Plan, 2014.

Figure 36. South Carolina Rail System



Source: South Carolina's Multimodal Transportation Plan (2014) <https://www.scdot.org/Multimodal>



2.3.5 Georgia

Passenger rail service in Georgia offers frequency and connectivity to cities throughout the state. Georgia, like South Carolina, is served only by long-distance Amtrak service via the Crescent, the Silver Meteor, the Silver Star, and the Palmetto. On-time performance and customer satisfaction measures fall short of goals for this service. The current Atlanta Amtrak station has limited operational flexibility; one key challenge is that the passenger train occupies a freight main line track during its stop, potentially creating conflict with freight trains when serving the station. A lack of passenger rail capacity (station and track) reflects the limited level of capital investment over past decades in Georgia.

Georgia's **2040 Statewide Transportation Plan (2016)** and **2018 Statewide Strategic Transportation Plan** support mobility through expanding and improving transit in underserved regions. The plans' recommended investment strategy is to continue to support fixed route transit service in urbanized areas not currently served and expand and improve transit to underserved portions of urbanized areas.

The **Georgia State Rail Plan (2015)** envisions "a safe and energy efficient state rail system that enables the economic well-being of Georgians by expanding access and enhancing mobility for people and goods in an environmentally sustainable manner." The plan's rail service goals include providing for a reliable, enhanced and interconnected passenger rail system. Initiatives include improvements to on-time performance for existing services, ADA compliance at rail stations, and expansion of intercity and commuter passenger services.

The plan's Intercity Passenger Rail Network Vision (Figure 37) emphasizes new intercity and commuter rail services to enhance mobility in major cities within the state and between surrounding states. The investments support the rail vision and goals articulated above.

Key projects and environmental studies in Georgia include:

- Atlanta Multimodal Passenger Terminal (MMPT), proposed train station in downtown Atlanta in the vicinity of the Gulch. Station would provide a central station facility for several proposed rail lines between Atlanta and destinations throughout the Southeast.
- Charlotte to Atlanta Tier I EIS, proposed service that would travel southeast through portions of North Carolina and South Carolina into Atlanta. This project will connect to the proposed MMPT and Atlanta Airport, and the Charlotte Gateway Station and Charlotte Douglas International Airport.
- Atlanta to Chattanooga Tier I EIS, proposed service from Atlanta to Chattanooga. The project will connect to the proposed MMPT and Atlanta Airport. Project would form a portion of the Atlanta – Chattanooga – Nashville – Louisville proposed intercity passenger rail corridor.
- Improvements to existing Amtrak stations, including the potential relocation of the Atlanta Amtrak station.

Recent past planning and feasibility studies in Georgia include:

- Atlanta – Birmingham (Gulf Coast Corridor), the eastern leg of the Gulf Coast Corridor. The route extends from ATL through the proposed Atlanta Multimodal Passenger Terminal (MMPT), terminating at the Birmingham Multimodal Transit Center and has advanced to a feasibility study.
- Atlanta – Macon – Savannah – Jacksonville (Southeast Corridor), begins at the proposed Atlanta MMPT with stops in Macon, Savannah, Brunswick, terminating at the Jacksonville Regional Transportation Center.

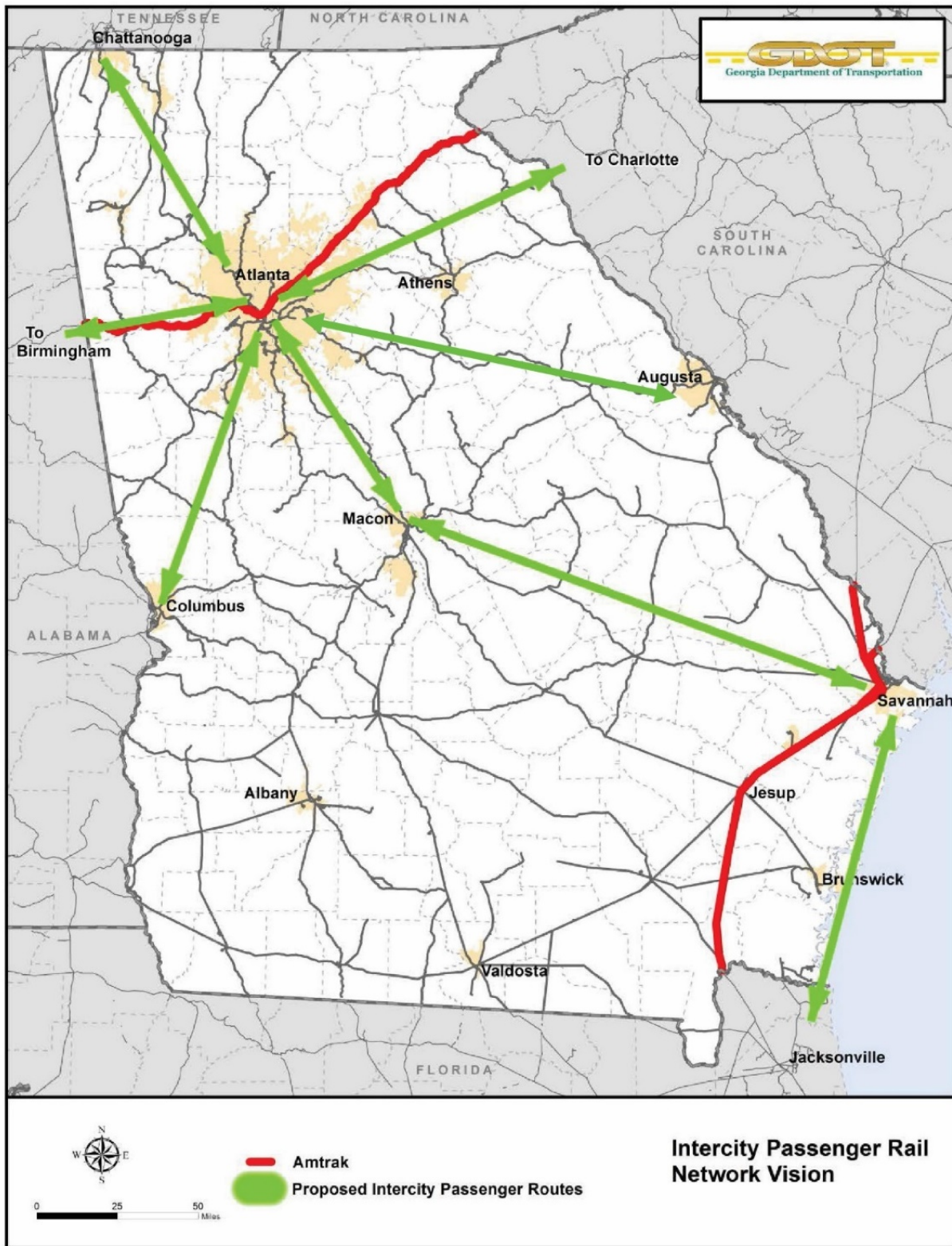


- Atlanta – Chattanooga – Nashville – Louisville, proposed intercity passenger rail corridor. The route begins at the Atlanta Airport, with major stops at the Atlanta MMPT, Chattanooga, Nashville, and terminating in Louisville. The Atlanta – Chattanooga leg has a completed Tier 1 EIS.
- Columbus to Atlanta High Speed Rail Feasibility Study, feasibility of intercity passenger rail. Study was completed in 2014.³⁸

³⁸ Columbus Consolidated Government. Columbus to Atlanta High Speed Rail, 2014.
<http://www.columbusga.org/Planning/HSRail.htm>



Figure 37. 2015 Georgia State Rail Plan Intercity Passenger Rail Vision



Source: Georgia State Rail Plan (2015) <http://www.dot.ga.gov/IS/Rail/StateRailPlan>



2.3.6 Florida

Florida is served by Amtrak long-distance intercity trains, Tri-Rail and SunRail commuter trains, and privately funded Brightline intercity trains. Amtrak operates the Auto Train, Silver Meteor, and Silver Star covering 24 stations throughout the state.

Tri-Rail (operated by the South Florida Regional Transportation Authority) links Miami, Fort Lauderdale, and West Palm Beach on the South Florida Rail Corridor, which is CSX's former Miami Subdivision line, now wholly owned by FDOT, between Mangonia Park in Palm Beach County and the Miami Intermodal Center. Tri-Rail connects directly to Amtrak at numerous stations, and to Metrorail at the Tri-Rail Metrorail Transfer Station in northern Miami-Dade County and at the Miami Airport station.

SunRail (operated by the Central Florida Commuter Rail Commission) is a 49-mile commuter rail line connecting Volusia, Seminole, Orange, and Osceola Counties and the City of Orlando. The existing rail line has 16 stations along the former CSX A Line, also wholly owned by FDOT. CSX operates freight service over the passenger service corridors owned by FDOT (SunRail and SFRC). The proposed SunRail Phase 2 North Expansion will extend the existing service 12 miles to the north from the City of DeBary to the City of DeLand in Volusia County. Future plans for SunRail Phase 3 include proposed service from the Sand Lake Road Station to Orlando International Airport's new Intermodal Station (where the western end of Brightline is proposed to terminate).

Brightline is a privately funded intercity passenger rail service that provides service on the Florida East Coast Railway (FEC) between Miami and Orlando (Figure 39). The Miami to West Palm Beach segment opened in the Spring 2018, with three stations (Miami, Fort Lauderdale, and West Palm Beach) in this segment. Phase 2 of the Brightline Orlando to Miami service is under construction and is proposed to operate on the north-south segment of the FEC from Miami to Cocoa (Brevard County) and then traverse east-west to the Orlando International Airport and on to the Disney themed parks (Figure 39). The east-west segment is proposed to operate on new tracks within the Beachline Expressway (SR 528) primarily to the south of the existing highway. The service with speeds of 125 mph and a three-hour transit time will be competitive with air and auto between Miami and Orlando. While Brightline service was suspended on March 25, 2020, due to COVID-19 shutdowns, progress continues including plans to lay 170 miles of track and a three-year estimate for project completion by 2022.³⁹ Subsequent expansion plans are being explored by Brightline, including an extension to the Disney World area as part of a larger effort to extend service to Tampa. Planning is also underway to extend service on the southern end of the system to the Port of Miami.⁴⁰

The **Florida Transportation Plan Vision Element (2015)** describes the policy vision for Florida's transportation system over the next 50 years and emphasizes providing more transportation choices for people and freight including improved intrastate air, rail, transit, and water transportation services where they support market demand or regional and community visions. Implementation of the Florida Transportation Plan is established through the FDOT statewide plans and the Strategic Intermodal System (SIS), which prioritizes a

³⁹ Brightline. Orlando Planned Future Extension, 2020. <https://www.gobrightline.com/orlando>

⁴⁰ Orlando Sentinel. Brightline name returns, replacing short-lived Virgin brand as passenger rail aims for Disney station, 2020. <https://www.orlandosentinel.com/news/transportation/os-ne-brightline-name-returns-virgin-bankruptcy-20200807-zajziy3wsza5tjsg7tvc5rsaa-story.html>



network of transportation facilities important to the state's economic competitiveness. The **SIS Policy Plan (2016)** establishes the policy framework for planning and managing Florida's SIS and includes three objectives to guide future SIS plans and investments:

- **Interregional Connectivity:** Ensure the efficiency and reliability of multimodal transportation connectivity between Florida's economic regions and between Florida and other states and nations.
- **Intermodal Connectivity:** Expand transportation choices and integrate modes for interregional trips.
- **Economic Development:** Provide transportation systems to support Florida as a global hub for trade, tourism, talent, innovation, business, and investment.

Other Rail Initiatives to provide enhanced passenger rail mobility and improved rail connections are underway in Florida. FDOT is updating its Statewide Rail System Plan to reflect

these ongoing projects. FDOT conducted planning efforts as part of the Tri-Rail Coastal Link (TRCL) study to evaluate potential new commuter rail service along 85 miles of the FEC between Jupiter and Miami. The TRCL study evaluated opportunities to introduce commuter passenger rail service connecting 28 coastal communities along FEC's corridor between Miami and Jupiter east of the existing Tri-Rail service corridor. The TRCL study proposed passenger stations spaced approximately 2 to 5 miles apart, consistent with average commuter rail station spacing. The TRCL service plan assumed that passenger service will be co-located with existing and future FEC freight service, Brightline intercity passenger service, and integrated with existing Tri-Rail service. As part of the study, coordination was conducted with All Aboard Florida/FEC Industries to co-locate planned TRCL service and stations at the proposed Brightline stations.

SFRTA plans to extend the existing Tri-Rail service from the Metrorail Transfer Station in northern Miami-Dade County on the existing Tri-Rail Corridor to downtown Miami via the FEC, designated the Tri-Rail Downtown Miami Link, which will terminate at the Miami Central Station co-located with Brightline and Metrorail services.

Figure 38. All Aboard Florida System



Source: Railway Gazette (11/10/15)

Figure 39. Brightline Station, Orlando



Source: <https://www.gobrightline.com/orlando>

Brightline is in discussions with Miami-Dade County to build out the Northeast Corridor commuter line as outlined in the Transportation Planning Organization’s 2016 SMART Plan Transit Initiative with commuter stations in Wynwood, the Desin District, El Portal, North Miami, and the Florida International University in Biscayne Bay. The SMART Plan Northeast Corridor exhibits high transit demand and is a critical regional corridor stretching from downtown Miami to Palm Beach.⁴¹ Service is expected to start in 2022 and would be operated as a separate type of service from the other scheduled express trains. In October 2019, Miami-Dade agreed to pay Brightline \$76 million to construct a commuter station adjacent to the Aventura Mall at the 19700 block of West Dixie Highway.⁴²

⁴¹ Miami-Dade Transportation Planning Organization. Strategic Miami Area Rapid Transit Plan, 2019. <http://www.miamidadetpo.org/library/smartplan-brochure-2019.pdf>

⁴² “Miami-Dade Approves \$76 million to bring Brightline trains to Aventura Mall.” *Miami Herald*, 2019. <https://www.miamiherald.com/news/local/community/miami-dade/article235992038.html>



2.3.7 Tennessee

Passenger rail service is provided along the western edge of Tennessee in Memphis via Amtrak's City of New Orleans route, which runs daily from Chicago to New Orleans, and includes two stations: Newbern-Dyersburg and Memphis. Approximately 3,000 miles of active rail lines are within Tennessee. The Music City Star in Nashville is the state's lone commuter rail operation.

Tennessee's 25-Year LRTP (2015) provides the foundation for prioritizing transportation investments across the state. The 25-Year LRTP was formed using a framework of eight policy papers to review and discuss key topics relevant to the Tennessee Department of Transportation's (TDOT) vision and guiding principles. TDOT's guiding principle most relevant to passenger rail is to "Provide for the Efficient Movement of People and Freight: Optimize the movement of people and goods by providing greater access to transportation services for all people and by building better connections among different modes of transportation."

The eight policy papers cover a range of topics and provide insight on how the state is performing and opportunities for improvement. Although none of the policy papers specifically address passenger rail, the paper titled *Mobility: Public Transit, Transportation Demand Management, and Non-Motorized Modes* addresses the state's issues around public transit. This paper proposes the following recommendations for public transit, travel demand management, and non-motorized transportation:

- TDOT should take a greater role in the planning of regional transit as a means of improving mobility and managing demand.
- TDOT should require that agencies applying for state or federal funding maintain and submit a Transit Development Plan, which would help define and guide future public transit needs for that agency. These plans could help ensure that the transit systems and networks across the state are coordinated, effective, and provide the proper linkages within their service area.
- TDOT should continue to increase rural planning organization responsibilities to encompass more multimodal considerations (e.g., transit planning, non-motorized, etc.).
- TDOT should develop a new Statewide Strategic Transit Plan for Tennessee.
- As TDOT establishes a program for congestion reduction investments in the 3-Year Plan, Active Transportation and Demand Management strategies should be considered.
- TDOT should develop a Multimodal Access Policy and Program, which would include internal guidelines and training.
- To expand on the Multimodal Access Policy, TDOT should work to provide technical resources for local municipalities on this topic.

Studies that have explored potential passenger rail in Tennessee include the following:

- Chattanooga to Nashville Maglev Feasibility Study (May 2008)
- Northwest Corridor (Nashville to Clarksville) Initial Feasibility Study (2008)
- Potential Intercity Passenger Rail Corridors Evaluation (2011)



- Chattanooga Passenger Rail Feasibility Study and Rail Implementation Plan (September 2016)
- Atlanta – Chattanooga High Speed Ground Transportation Project Tier 1 ROD (September 2017)

The Tennessee SRP is a companion to its 25-Year LRTP and Statewide Multimodal Freight Plan that “reflects the role of rail mobility in serving Tennessee’s passenger and freight demands.”⁴³ While TDOT does not own or operate any of the passenger rail services in the state, the SRP notes the agency’s support of Amtrak and Regional Transportation Authority (RTA) passenger rail service in the state due to the positive impact on the mobility of its citizens.

Near-term intercity passenger rail improvements and investments identified by the SRP include additional service frequency on the City of New Orleans route to match the additional two trains running between Chicago and Carbondale and the redevelopment of the Memphis Central Station, which included the opening of a boutique hotel in 2019. Other proposed passenger rail improvements and investments in the SRP include modifications to the seat pitch on Superliner Coaches and number of rooms on the Superliner Transition Sleeping Cars. It identifies and discusses three passenger rail corridors for future development:

- Jacksonville-Atlanta-Chattanooga-Nashville-Louisville-Chicago
- Little Rock to Memphis
- Roanoke to Bristol

The SRP calls for short-term commuter rail improvements and investments in Memphis, Nashville, and Wilson County; longer-term improvements on existing rail transit corridors in Memphis and Nashville; and longer-term development of new rail transit corridors in Chattanooga, Knoxville, Nashville, and Memphis. It includes eight freight rail policy and initiative recommendations and a list of financially unconstrained projects that include 14 Class I and 13 short line improvements and investments. The plan also identifies passenger rail issues, including a lack of public funding, the need to rely on privately owned freight railroad networks, and not having a national rail plan to outline national priorities and guide intercity passenger rail planning across multiple state and local jurisdictions.

2.3.8 Southern Rail Commission

Passenger rail service connecting Mobile with New Orleans has not been operational since Hurricane Katrina destroyed essential rail infrastructure along the Sunset Limited Corridor between New Orleans and Orlando in 2005. Reinstating service between New Orleans and Mobile, as shown as part of ‘Priority Route 4 Gulf Coast Passenger Rail’ in Figure 40, has been a focal point of the commission’s efforts. Tracing its roots to a June 1982 congressional ruling allowing the formation of interstate rail compacts, its mission is to engage and inform public and private rail interests to support and influence transportation choices as well as to facilitate emergency evacuation routes.

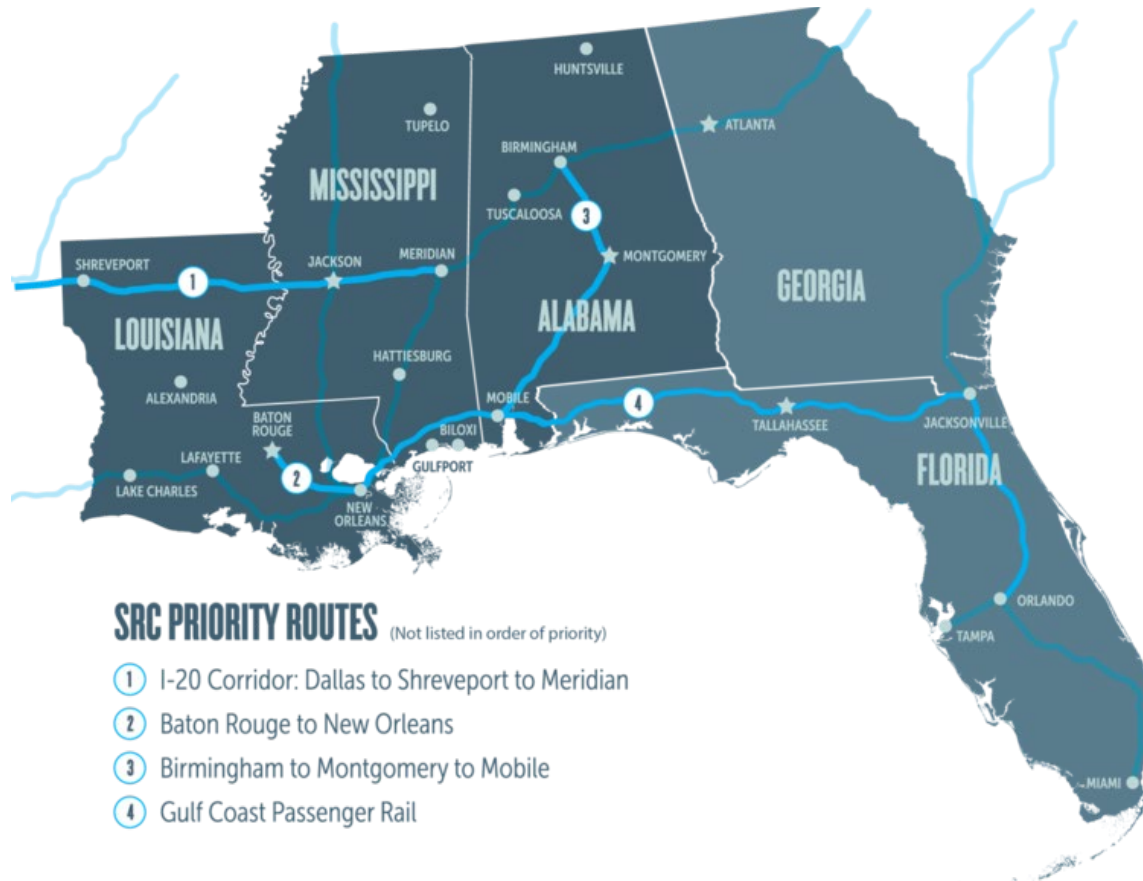
The Southern Rail Commission partners include the States of Alabama, Louisiana, and Mississippi as well as their DOTs; Amtrak; the FRA; the Association of American Railroads; Southern Line Pacific; Rail Passengers

⁴³ Tennessee Department of Transportation. Tennessee Statewide Rail Plan, .2019.
https://www.tn.gov/content/dam/tn/tdot/freight-and-logistics/TDOT_RailPlan_updated_2019.pdf.



Association; States for Passenger Rail Coalition; the Center for Planning Excellence; Transportation for America; and Rail-Volution.

Figure 40. Southern Rail Commission Priorities



Source: Southern Rail Commission (July 2020)

Recent efforts to win federal dollars to co-invest with state funds for the line’s eventual operation have proved successful. In June 2019, the federal government provided \$33 million from FRA’s Consolidated Rail Infrastructure and Safety Improvements program to complete major infrastructure and capital improvements needed. In August 2019, a \$4.3 million Restoration and Enhancement Grant from the U.S. Department of Transportation was awarded to support the return of passenger rail service along the Mississippi Gulf Coast. Then in February 2020, the Mobile City Council voted to approve financial support for the rail service. Most recently in May 2020, the FRA granted a second award of \$5.45 million to the Southern Rail Commission to support operating costs for the first three years of service operation. The service plan is to include two daily round trips between Mobile and New Orleans with stops in Bay St. Louis, Gulfport, Biloxi, and Pascagoula by 2023.

3. Network Analysis Approach

This chapter summarizes the approach used in the SE Study to develop a regional network vision. The study approach includes the methodology for the initial corridor screening process; development, analysis, and refinement of network options; and the subarea analyses performed to inform these network configuration options. This summary also identifies the regional planning framework including FRA’s HPR service tiers, the CONNECT tool, and the SE Study team’s use of the tool to inform the SE Study network development and analysis. As part of this methodology, initial corridors were screened using CONNECT and a baseline conditions analysis of major markets was conducted to identify key corridor connections within a network context. The key corridors formed the building blocks for analyzing subareas within the region to inform the development of network configuration options documented within this chapter.

3.1 HIGH-PERFORMANCE RAIL SERVICE TIERS

In 2009, the FRA established classifications for HPR services contemplated in regional rail plans. This framework describes the stages of development of HPR corridors and provides consistent definitions of HPR service levels.⁴⁴ The framework classifies HPR corridors into three distinct service and infrastructure tiers—Core Express, Regional, and Emerging/Feeder. The network vision presented in a regional rail plan defines each corridor in terms of these service tiers. Defining features of the tiers include maximum speeds, presence of dedicated or shared infrastructure, population served, service frequency, and minimum reliability targets based upon on-time performance parameters. Table 12 lists the FRA’s definitions of HPR service tiers and associated features and parameters.

Table 12. Definitions of High-Performance Rail Service Tiers

CORRIDORS	TOP SPEEDS (MPH)	OTHER COMMON CHARACTERISTICS	PRIMARY MARKETS SERVED	MINIMUM RELIABILITY TARGET (ON-TIME PERFORMANCE)
Core Express	Over 125	Frequent service; dedicated tracks, except in terminal areas; electric-powered	Serving major metropolitan centers	99%
Regional	90-125	Frequent service; dedicated and shared tracks, electric- and diesel-powered	Connecting mid-sized urban areas with each other or with larger metropolitan areas	95%
Emerging/ Feeder	Up to 90	Tracks shared by passenger and freight trains	Connecting mid-sized and smaller urban areas with each other or with larger metropolitan areas	85%*

Source: Federal Railroad Administration, 2018 SE Rail Forum Presentation (March 2018)

*On-time performance target might increase in the future

⁴⁴ Federal Railroad Administration. High-Speed Rail in America, High-Speed Rail Strategic Plan, April 2009. <http://www.fra.dot.gov/eLib/Details/L02833>



One constraint to acknowledge regarding assumptions about HPR service tiers is that private freight rail infrastructure owners may have policies that do not permit HPR service on shared track. For the SE Study, the recommendations include key corridor connections, but do not specify the location or alignment of the corridor. More detailed planning studies are necessary to make specific location and alignment decisions.

3.2 ANALYSIS METHODS AND THE CONNECT PLANNING TOOL

As introduced in Section 1.6.2, CONNECT is a high-level, sketch planning tool that estimates the performance of user-defined HPR corridors and networks. The SE Study used CONNECT as the primary analytical tool to test and compare the effects of network performance. This section provides an overview of the CONNECT planning tool, limitations of the tool, and a summary of the Key Performance Indicators (KPIs), or key metrics, that measure the operational and financial performance of the network configurations.

3.2.1 CONNECT Overview

The FRA developed CONNECT to provide an analytical tool to evaluate the performance of HPR corridors in the context of regional rail networks. CONNECT allows users to define service assumptions and to facilitate the analysis of service tiers and network configurations to identify a range of optimal service characteristics



for each corridor within a regional rail network context. At a sketch level, the tool enables users to develop and generate a baseline rail network, service parameters, network performance data, and capital and operational cost estimates. CONNECT results can be used to provide a coarse-level screening to inform the decision-making process in the early stages of corridor and network rail planning.

CONNECT uses CBSAs to define corridor configurations and as the catchment areas for corridor and network populations. As mentioned previously, CBSAs are metro areas that contain a core urban area of 50,000 or more in population and includes any adjacent counties that have a high degree of social and economic integration with the urban core. Areas that have multiple large urban concentrations may be designated as separate CBSAs according to the US Census Bureau and are treated as such in CONNECT.

CONNECT relies on a national trip table of CBSA-to-CBSA travel demand data for CBSA pairs between 50 to 800 miles of each other. The CBSA-based geography provides flexibility for high-level sketch planning and enables CONNECT to account for ridership and cost, independent from specific station locations, but rather considers the potential of the market as a whole. Long-distance intercity passenger rail services (over 800 miles) are excluded because trips exceeding this distance typically default to air travel as the most convenient mode of transportation. Similarly, short-distance trips of less than 50 miles are also excluded to remove potential commute-based trips that align with the characteristic of transit travel rather than intercity travel.

CONNECT provides high-level forecasts informed by the service tier, proposed train frequencies, and CBSAs served. The tool produces order-of-magnitude estimates for ridership, revenue, capital and O&M costs, and other performance outputs that enable the user to understand relative differences in service and frequency options for various corridor and network configurations. Capital-cost calculations consist of a simplified costing

model, and O&M costs calculations are based on a simplified service plan defined in terms of daily frequencies and average speeds.

The CONNECT tool acts as a “coarse screen” and helps stakeholders in the early stages of the planning process identify the most compelling options from a wide range of configurations before proceeding to more in-depth and detailed analysis on specific alignments. CONNECT can supplement ongoing corridor analyses within regions, such as the Southeast, that have corridors undergoing various stages of more detailed planning and project development, but where potential markets outside of a corridor-specific study area have not been evaluated. In such a case, CONNECT can help the user better understand the potential implications of connecting travel markets and the potential impact of these markets on the future network.

CONNECT Update

During the first phase of the Southeast Plan and the Midwest Regional Rail Plan, which occurred concurrently, the FRA identified necessary updates to the trip table database and CONNECT model to improve the accuracy of model assumptions and results—updates related primarily to auto trip volumes and their calculations. Based on the CONNECT updates, the proposed Southeast rail network was reevaluated with an updated model to confirm network performance and necessary adjustments.

3.2.2 CONNECT Limitations

CONNECT is designed to allow users to define and perform an initial assessment of potential network configurations, but is not a substitute for detailed planning analysis, such as location-specific service planning, demand modeling, revenue forecasting, and environmental analyses. CONNECT produces order-of-magnitude estimates applicable to regional planning including estimates of ridership, revenue, capital and O&M costs, and other performance indicators, but is not capable of generating investment or construction grade results. Nevertheless, these estimates empower the user to conceptualize and compare the potential performance of a defined network.

CONNECT uses generalized calculations rather than corridor-specific outputs and does not reflect the same level of accuracy as a detailed, corridor-level study in determining the ridership, revenue, or capital and operational costs of existing corridors. CONNECT results are appropriate for early comparisons of corridors and network configurations, such as in the context of a regional rail planning study, or other similar high-level study, to determine general feasibility. Furthermore, CONNECT data is generalized at the CBSA level, which limits the ability to analyze corridor and network performance only on a CBSA-to-CBSA basis. For example, identifying multiple station stops in one CBSA will not alter the ridership results directly (i.e., additional stops do not increase catchment areas or travel time access), but it will increase travel time due to an additional station stop and dwell, which affects ridership results.

Importantly, the capital-cost calculations are derived by a simplified costing model that uses unit costs derived from domestic and international averages that can be modified by the user. In addition, the cost of capital (debt service), for example, is not included in these calculations. For this reason, the model may underestimate total capital costs over time. To calculate O&M costs, CONNECT applies a simplified service plan consisting of daily frequencies and average speeds to drive the cost estimates and similar to the capital-cost calculations, uses domestic and international averages.



In terms of revenue, CONNECT only looks at only projected fare revenue. Ancillary revenues such as real estate development, commercial leases, value capture, and tax increment financing, are all location specific and are not included in this model. For that reason, this model may underestimate a corridor or network’s revenue potential.

3.2.3 Summary of Analysis Methods

The SE Study team used CONNECT to identify preliminary potential corridors, conduct an initial screening to analyze and refine corridors, and conduct further screening to identify and analyze network connections within the SE Study Area. During the corridor identification and screening process (Section 3.3), and network development process (Section 3.4), the SE Study team used CONNECT results to compare and screen corridor and network configurations for the long-term horizon year 2055. As part of the analysis, optimal service characteristics were analyzed.

The SE Study team used a series of quantitative metrics, and designated KPIs that were calculated using the CONNECT model outputs to compare network performance. Table 13 summarizes the KPIs used in the SE Study.

Table 13. Key Performance Indicators

KEY PERFORMANCE INDICATORS	DEFINITION
Revenue per passenger mile	Annual revenue generated for every train-mile of service provided
Annual operating cost per passenger mile	Annual operating and maintenance cost for one train-mile of service
Annual capital cost per passenger mile	Annual capital cost for one train-mile of service
Operating recovery ratio	The percentage of operating and maintenance costs covered by revenue
Total recovery ratio	The percentage of total costs (operating and maintenance plus annualized capital costs) covered by revenue
Annual subsidy per passenger mile	The difference between the annual revenue and the annual total cost per passenger mile
Rail mode share	The percentage of annual inter-CBSA person trips using intercity passenger rail vs. auto, bus, or airplane
Average load factor	The average load factor or occupancy of trains for all corridor segments

3.3 CORRIDOR IDENTIFICATION PROCESS

In collaboration with participating stakeholders, the SE Study team conducted screening analyses at key milestones during the planning process to identify HPR corridors within the SE Study Area, and then to develop networks from the set of key corridors. This section summarizes the steps conducted for the corridor screening and results used to identify the HPR corridors.

In addition to the three high-performance tiers, a network independent service tier is defined outside the criteria for high-performance tiers. A network independent corridor shows potential to become part of the network in the future but does not have enough demand or does not fulfill other criteria that would allow a categorization as a high-performance tier. Such corridors could act as supplemental links in the network and can be developed independently from the high-performance network. Network independent corridors are not included in performance evaluations and resulting KPIs.

Prior to this study, the Southeast had never undertaken an effort to identify a vision for a long-term, regional rail network. States and localities had completed numerous feasibility and corridor studies; however, these studies had never been connected into a larger vision. As a first step to identify potential network configurations, an initial screening process was conducted to identify corridors that could support long-term, HPR service. The 2015 baseline conditions (population, travel demand and the existing and planned transportation network described in Chapter 2) were used to identify the existing rail-related key corridors between major travel markets.

The initial screening analyzed 54 potential corridors (Figure 42) using CONNECT as the primary analytical tool. The corridor performance was evaluated using multiple frequencies and HPR service tier variations with CONNECT model default parameters to understand the impact of service frequency as well as service speeds on the overall potential rail demand. The resulting model output was used to identify the corridors with the highest potential for generating ridership and the lowest potential cost subsidy. As provided in Section 3.2, the KPIs were used to compare the corridor configurations. Other qualitative factors such as multimodal connectivity, already programmed projects and geographic/topographic constraints were considered in the comparison of corridor configuration options. Figure 41 depicts the qualitative and quantitative factors considered for the following three example corridors:

- Corridor 3: Charlotte – Washington
- Corridor 13: Atlanta – Birmingham – Memphis
- Corridor 29: Memphis – Nashville – Louisville

The assessment was applied to all 54 potential corridors.

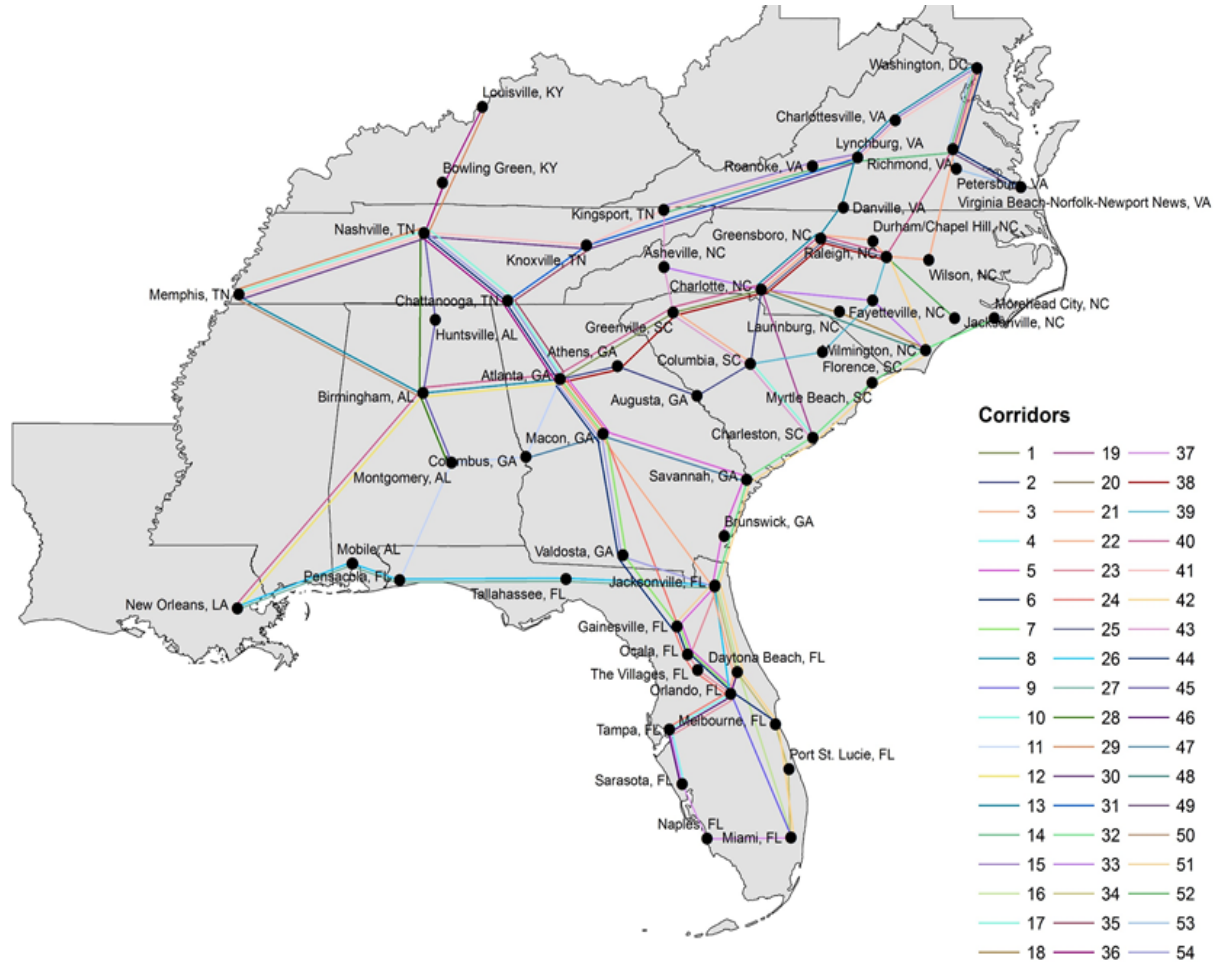
Figure 41: Corridor Assessment Factors

No.	City/CBSA-Level Qualitative Assessment							Corridor-Level Qualitative Assessment		QUALITATIVE TOTAL
	Metro-politan/CBSA Population per Mile	Highway Traffic	Mode Split	Airport Enplane-ments	Existing Amtrak/Pax Rail Service	Urban Transit System Presence	Port/Freight Hub	Inclusion in State Rail Plans or other assessments	Geographic/Topographic Constraints	
3										
13										
29										

less favorable
 moderately favorable
 more favorable

For the purposes of the initial screening, each individual evaluation criterion was weighted equally and the corridors were ranked by comparing the resulting KPIs to the other corridors. The initial screening identified key corridors between major travel markets for 2055 and beyond.

Figure 42. Corridor Configurations for the Southeast Study Area



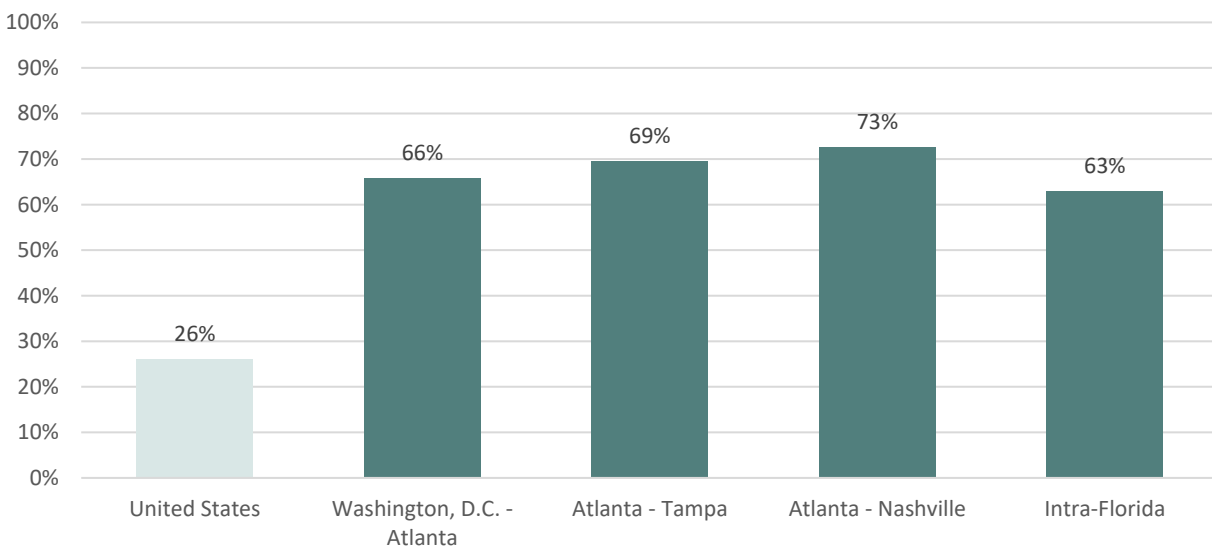
3.3.1 Major Market Analysis

The initial screening results informed the identification of key corridors between major population centers that yielded substantial operational and financial performance based on the evaluation of the KPIs. The development of the network configurations focused on providing enhanced passenger rail connectivity between these major Southeast markets for the following key corridor connections:

- Washington, D.C. to Atlanta
- Atlanta to Tampa (via Orlando)
- Atlanta to Nashville
- Intra-Florida Travel Corridor

This section provides brief descriptions of each of these corridors, including current major transportation infrastructure network connectivity, travel demand from the baseline year 2015, and growth trends, plus 2055 intercity passenger rail ridership. Information about existing mode share and travel times, as detailed in the figures below, was derived from CONNECT.

Figure 43. Population Growth (2015–2055)



Source: CONNECT (corridor growth), 2015 U.S. Census Projections of the Size and Composition of the U.S. Population: 2014 to 2060 (United States growth)

3.3.2 Washington, D.C. to Atlanta Corridor

The Washington, D.C. to Atlanta Corridor spans nearly 700 miles, and includes the intermediate CBSAs of Richmond, Raleigh, and Charlotte. The corridor is divided into three primary segments:

- Washington, D.C. to Richmond
- Richmond to Raleigh
- Raleigh to Charlotte
- Charlotte to Atlanta

Most of the corridor follows the general routing of the I-85 and I-95 corridors, which are two of the most heavily traveled highway corridors in the SE Study Area and accommodate tens of millions of trips annually. Initial screening indicated that this corridor, which links four of the most populous CBSAs in the D.C.-Virginia and Piedmont Megaregions, should be a high priority for future high-performance passenger rail service.

Some of the corridor’s distinguishing characteristics include the following:

- **Demographics** – 2015 population is 19.3 million for the CBSAs along the primary corridor connecting Washington, D.C., Richmond, Raleigh, Charlotte, and Atlanta. This area represents one of the most populated corridors in the U.S. outside of the Northeast and California. By 2055, population along the corridor is projected to grow 66 percent, significantly faster than projected national growth rate of 26 percent between 2015 and 2055.
- **Mode share** – Due to the long distance, air travel is the primary modal choice for end-to-end corridor travel. However, auto travel is the dominant mode between individual segments of the corridor (Figure

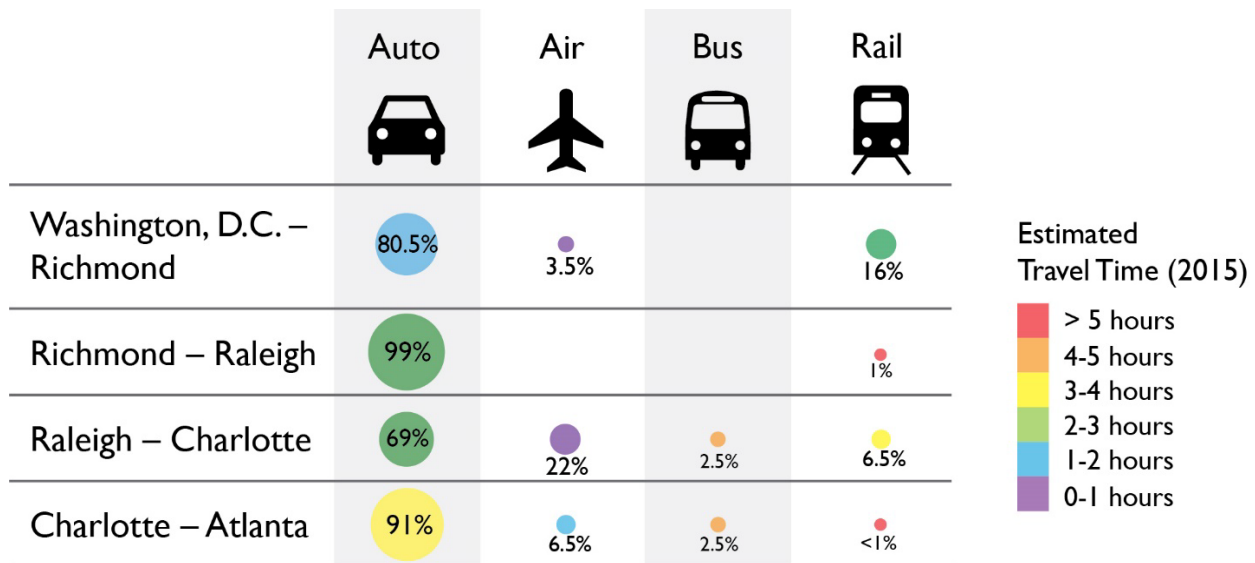


44). It is worth noting that existing mode share of passenger train travel between Washington, D.C. to Richmond, and from Raleigh to Charlotte are among the largest for all corridors in the Southeast due to existing state-supported services between these markets.

- **Annual trips** – Annual person trips within the Atlanta to Washington, D.C. Corridor is high. Between all the CBSAs in the corridor, 2015 total travel demand is nearly 69 million trips annually.
- **Existing rail service** – A number of Amtrak routes serve the corridor, including the Crescent (New York – New Orleans, one train pair per day), Carolinian (Charlotte – New York, one train pair per day), Piedmont (Raleigh – Charlotte, three train pairs per day), and NEC Regional service (New York – D.C. – Richmond, eight train pairs per day). The corridor also follows the existing proposed Southeast Corridor, although there is no high-performance passenger service (+110 mph) that serves the corridor.

Figure 44 depicts the existing mode share and travel time estimates for the corridor.

Figure 44. Existing Mode Share and Travel Time Estimates (Washington, D.C. to Atlanta Corridor)⁴⁵



3.3.3 Atlanta to Tampa Corridor (via Orlando)

The Atlanta to Tampa Corridor spans more than 550 miles and includes a number of intermediate CBSAs such as Jacksonville, Daytona Beach, and Orlando. Georgia and Florida are two of the fastest growing states in the U.S., and the states’ population growths over the next few decades is projected to significantly exceed the national average. Initial screening revealed strong emphasis on connecting major market CBSAs between Atlanta and Tampa, for which there is limited passenger rail service. ATL, which provides connections to major Florida markets, has significant congestion issues today, which are projected to worsen through 2030.

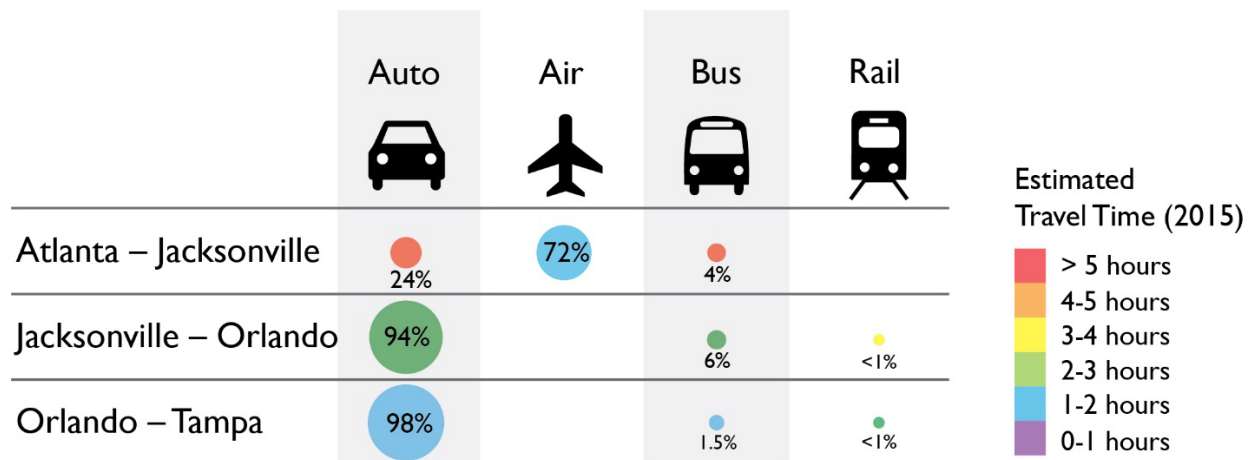
⁴⁵ Washington, D.C. – Richmond, Richmond – Raleigh, and Raleigh – Charlotte corridors are the only three Southeast corridors with existing state-supported services.

Some of the corridor’s distinguishing characteristics include the following:

- **Demographics** – As of 2015, population along the corridor is more than 13.5 million. By 2055, population is projected to grow by 69 percent to 34 million, which is nearly three times as fast as the projected national population growth rate.
- **Mode share** – Due to the long distance, air is the primary modal choice for end-to-end corridor travel, along with travel between Atlanta and Jacksonville. However, as shown in Figure 45, auto demand represents more than 90 percent of travel for both Jacksonville to Orlando and Orlando to Tampa.
- **Annual trips** – Annual person trips within the Atlanta to Tampa Corridor are high. Between all the CBSAs in the corridor, total travel demand is greater than 60 million trips annually.
- **Existing rail service** – Passenger rail service is limited between Atlanta and major markets in Florida. The Atlanta market is served by Amtrak Crescent service (one train pair per day) that connects to Charlotte and Greensboro, NC, from which a connection can be made to major markets farther south along the Atlantic Coast. As of July 2020, no direct passenger rail service exists from Atlanta to any major markets in Florida, despite current travel demand. Major markets in Florida are served by the Silver Star, Silver Meteor, and Auto Train, which each run once daily.

Figure 45 depicts the existing mode share and travel time estimates on the corridor.

Figure 45. Existing Mode Share and Travel Time Estimates (Atlanta to Tampa Corridor)



3.3.4 Nashville to Atlanta Corridor

The Nashville to Atlanta Corridor spans 250 miles and includes the intermediate CBSA of Chattanooga. Nashville, Chattanooga, and Atlanta are three of the fastest growing CBSAs in the SE Study Area, and the corridor emerged as a priority route for passenger rail service in the initial screening process. While these regions are not served by intercity passenger rail service, Nashville and Chattanooga could provide a key linkage between the Southeast and Midwest passenger rail markets, serving destinations such as St. Louis, Chicago, Louisville, and Indianapolis. In addition, a Final Tier I Environmental Impact Statement has been prepared by

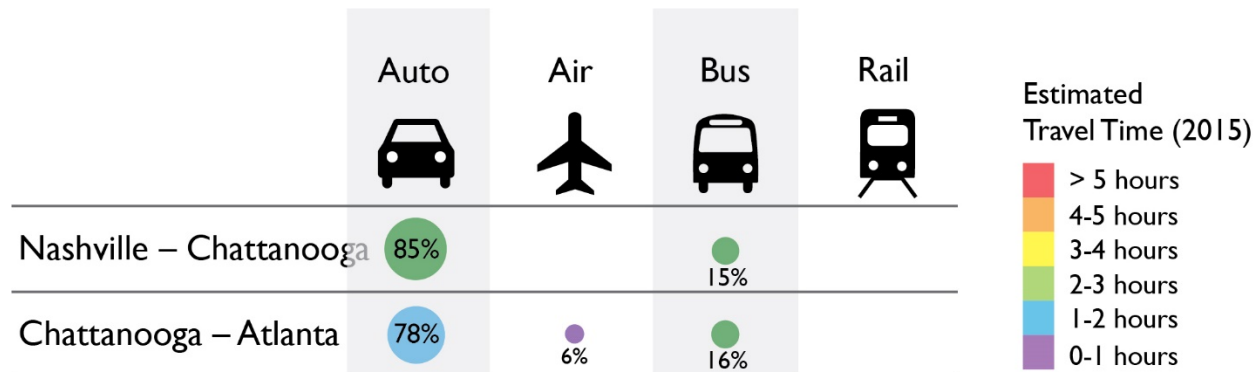


the FRA for high-speed ground transportation (HSGT) between Atlanta and Chattanooga. The HSGT route would run approximately 120 miles along I-75. Some distinguishing characteristics of the corridor include:

- **Demographics** – As of 2015, population along the corridor is more than 7.8 million. By 2055 population is projected to grow by 73 percent to 13.6 million, nearly three times the national population growth rate.
- **Mode share** – Due to the short distance of the corridor, auto travel is the primary modal choice (Figure 46) for both end-to-end corridor travel between segments. The Atlanta to Nashville Corridor has the highest bus mode share among all Southeast corridors analyzed, which is an indicator of potential demand for passenger rail service.
- **Annual trips** – Annual trips within the Atlanta to Nashville Corridor are moderate, and total travel demand between all the CBSAs as of 2015 was 6.6 million trips annually.
- **Existing rail service** – Passenger rail service on this corridor does not exist.

Figure 46 depicts the existing mode share and travel time estimates of the corridor.

Figure 46. Existing Mode Share and Travel Time Estimates (Nashville to Atlanta Corridor)



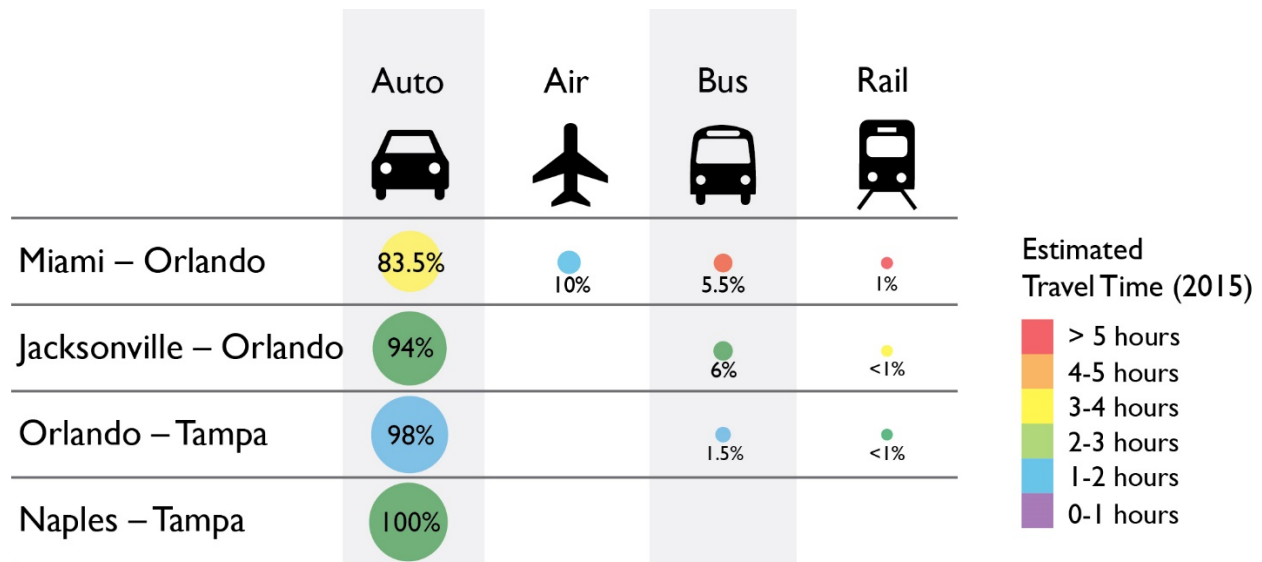
3.3.5 Intra-Florida Travel Corridor

Florida currently ranks as the third most populous state in the U.S. and is projected to grow at more than twice the national population growth rate over the next few decades. Initial screening results revealed a strong emphasis on enhancing passenger rail connectivity within Florida, including major markets such as Miami, Orlando, and Tampa, as well as connectivity between regional CBSAs on the Gulf Coast linking Naples, Fort Myers, Sarasota/Bradenton, and Tampa; and on the Atlantic Coast linking Miami to Jacksonville through Port St. Lucie, Orlando, and Daytona Beach. Florida is served by a few intercity passenger rail routes, including Amtrak’s Silver Star, Silver Meteor, and Auto Train service, but the service these routes provide does not meet HPR service criteria. South Florida has also been served by Brightline service since 2018, though operations are limited between Miami and West Palm Beach, which lie within the same CBSA. Thus, existing Brightline ridership data is not included.

Some distinguishing characteristics of the corridor include the following:

- **Demographics** – As of 2015, population along key intra-Florida travel corridors was more than 15.7 million; by 2055, population is projected to grow by 63 percent to 25.7 million.
- **Mode share** – Auto travel is the primary modal choice for travel between intra-Florida destinations (Figure 47), facilitated primarily by interstates such as I-4, I-75, and I-95. Air connections are limited for individual corridor segments due to relatively short travel distances.
- **Annual trips** – Annual trips for intra-Florida corridors are at a high level. Between all the CBSAs in the corridor, total travel demand is greater than 87 million trips annually.
- **Existing rail service** – Amtrak provides intercity passenger rail service within Florida on the Silver Star and Silver Meteor, which provide connections between Jacksonville, Orlando, Tampa, and Miami, and the Auto Train, which serves Jacksonville and Sanford. These routes run once daily and their operations are below criteria for HPR service. A re-introduction of the Sunset Limited Amtrak service between New Orleans and Jacksonville is being contemplated. This service terminated in New Orleans after Hurricane Katrina damage in 2005 interrupted service east of New Orleans. As discussed in Chapter 2, Brightline began service in 2018 between Miami, Fort Lauderdale, and West Palm Beach. Phase II expansion is planned from West Palm Beach to Orlando.

Figure 47. Existing Mode Share and Travel Time Estimates (Intra-Florida Travel Corridor)



3.4 TECHNICAL PROCESS – NETWORK BUILDING BLOCKS

To better inform the network development, the major travel markets identified during the initial screening were further assessed to identify strategic passenger rail connections at the subarea level within the Southeast Regional Network. Previous and ongoing corridor planning efforts discussed in Section 2.3 were also considered during the preliminary corridor screening efforts. Sections 3.4.1 to 3.4.5 summarize the key findings from the focused subarea analyses that were used to develop and refine the network vision. As part of the network development, the SE Study team performed five subarea-specific analyses (network building blocks)



to inform the overall network configuration and refinement for the recommended Southeast passenger rail network vision including:

- Intra-Florida Connections
- Florida-Atlanta Corridor
- Southeast Corridor Connections (DC-ATL)
- Tennessee Connections
- Alabama/New Orleans Connections

The following sections summarize the iterative approach and key results from the evaluation of five distinct subarea network analyses that informed the major components of the recommended Southeast Regional Network described in Chapter 4.

3.4.1 Intra-Florida Travel Connections

Of the 57 Southeast CBSA pairs with one million or more trips in 2055, 11 pairs are within the state of Florida (intra-Florida). The intra-Florida subarea analysis consisted of origin-destination travel demand comparisons between four corridor Configurations plus analysis of two Options for Configuration 2 and Configuration 3. The SE Study team also tested additional “Alligator Alley” Sub-Options. The intra-Florida Configurations assessed are identified as the following:

- Configuration 1: Naples to Jacksonville via Tampa, Orlando, and Daytona Beach
- Configuration 2: Naples to Miami via Tampa, Orlando, and Melbourne (“horseshoe”)
 - Option 2.1: A shared corridor from Orlando to Melbourne (assuming proposed Brightline Phase II alignment) to reach Jacksonville and/or Miami
 - Option 2.2: Two separate corridors from Orlando to Daytona Beach/Melbourne to reach Jacksonville and/or Miami
- Configuration 3: Tampa to Miami via Orlando and Melbourne
 - Option 3.1: A shared corridor from Orlando to Melbourne (assuming proposed Brightline Phase II alignment) to reach Jacksonville and/or Miami
 - Option 3.2: Two separate corridors from Orlando to Daytona Beach/Melbourne to reach Jacksonville and/or Miami
- Configuration 4: Tampa to Miami via Orlando and Melbourne, including additional secondary connections to Jacksonville via Gainesville and along the Atlantic Coast between Miami and Jacksonville
- Alligator Alley Sub-Options: Provides a direct route between Miami to Naples across the Florida Everglades. An Alligator Alley connection was assessed with Options 2.2 and 3.2.

The following key findings resulted from the intra-Florida subarea analysis:

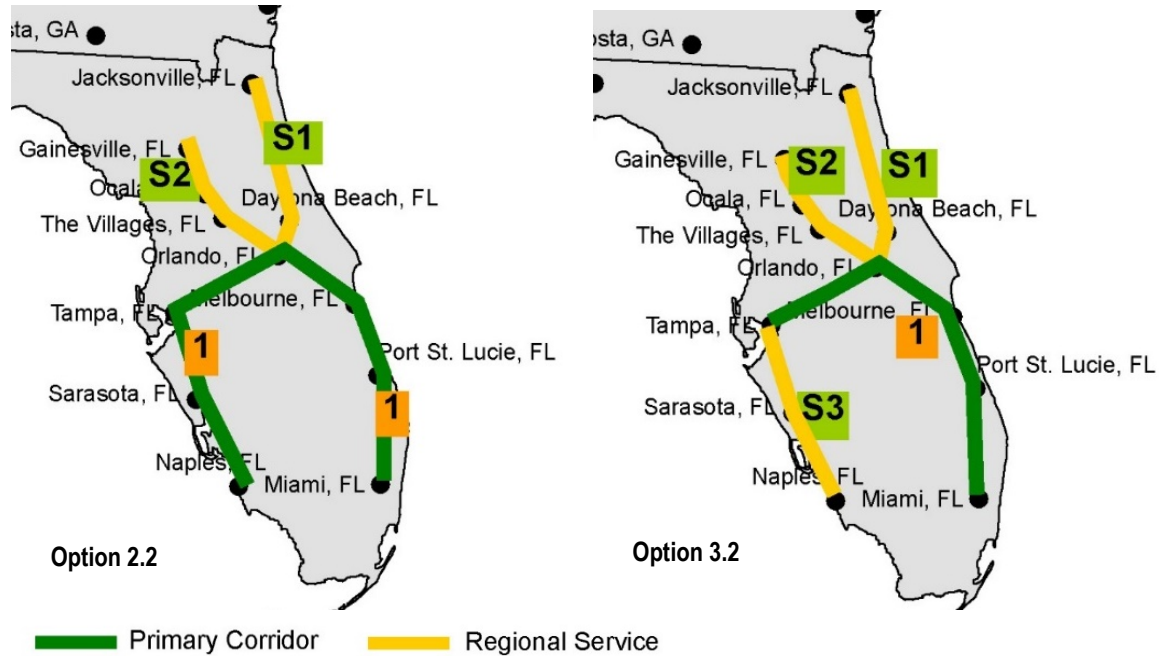


- Configuration 1 performed worst among the intra-Florida configurations tested. This option had the lowest KPI performance across the board, scoring in the bottom tier for operating recovery ratio, annual O&M cost, and passengers per train miles. As such, it was eliminated from further analysis.
- Configuration 2 and Configuration 3 had the highest overall KPIs, including the best operating/recovery ratio, lowest capital and O&M costs, and highest ridership (passengers per train-mile).
 - Configurations 2 and 3 were analyzed in more detail to prioritize alternative routes between a shared corridor from Orlando to Melbourne to reach Jacksonville and/or Miami (Options 2.1 and 3.1), and two separate corridors from Orlando to Daytona Beach/Melbourne to reach Jacksonville and/or Miami (Options 2.2 and 3.2). The KPI results of this analysis indicated that the Options 2.2 and 3.2 routing were preferable and these options remained.
 - In addition, four Sub-Options of Options 2.2 and 3.2 were analyzed for a Miami to Naples (“Alligator Alley”) connection because of high travel demand between the two CBSAs. The four Sub-Options were differentiated as to whether they included a direct route between the two CBSAs and whether the Naples to Tampa connection was Core Express or regional service. Results showed that this direct connection performed worse particularly for total recovery ratio, annual capital cost per passenger mile, and passengers per train-mile. As such, the two Sub-Options that included a direct route through “Alligator Alley,” from Naples to Miami, were eliminated from further analysis.
- Configuration 4, which included additional connections north and south of Orlando, while performing better than Configuration 1, underperformed the remaining Options 2.2 and 3.2 in terms of KPIs and was also eliminated from further analysis.

In summary, Options 2.2 and 3.2—two separate corridors from Orlando to Daytona Beach/Melbourne, distinguished from the Brightline Phase 2 alignment, to reach Jacksonville and/or Miami, without an Alligator Alley connection—scored the highest among all Intra-Florida options analyzed. These Options performed highest for nearly all KPIs, including operating recovery ratio, total recovery ratio, annual capital cost per passenger mile, annual O&M cost, subsidy per passenger mile, and passengers per train-mile. These Options, as shown in Figure 48, were utilized as the basis for the analysis in Section 3.4.2.



Figure 48. Preferred Intra-Florida Travel Connections

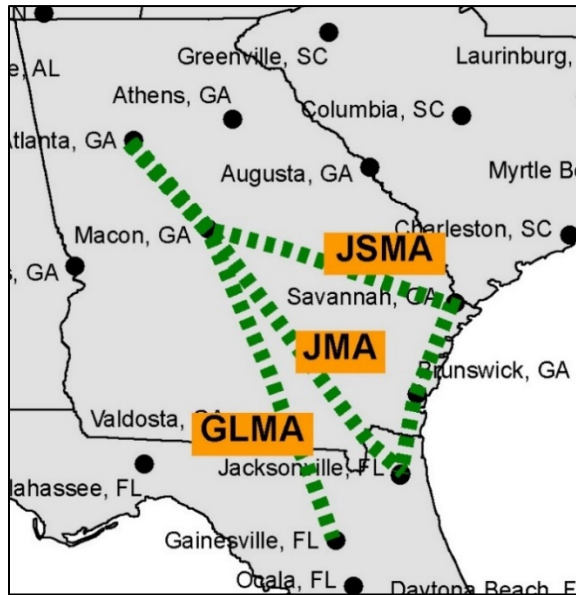


3.4.2 Florida-Atlanta Corridor

To determine the most optimal routing and service between Florida and the rest of the Southeast, the SE Study team utilized the highest scoring Intra-Florida Travel Connections tests, Options 2.2 and 3.2, to analyze connections with the major hub of Atlanta and the broader SE Study network. Three separate Florida-Atlanta corridors were identified as noted below and shown in Figure 49:

- Jacksonville to Atlanta via Macon (JMA)
- Jacksonville to Atlanta via Savannah and Macon (JSMA)
- Gainesville to Atlanta via Lake City and Macon (GLMA)

Figure 49. Florida-Atlanta Corridor Tests



The following key findings resulted from the Florida-Atlanta Corridor subarea analysis:

- The direct route from Jacksonville to Atlanta via Macon scored as the best alternative for both Options 2.2 and 3.2, as measured by KPIs. The Jacksonville to Atlanta via Macon route yielded high-performance metrics for annual revenue, subsidy per passenger mile, and operating recovery ratio among other KPIs.
- Among the two Jacksonville to Atlanta via Macon alternative routes, the best alternative for connections with the Intra-Florida Travel Connections was Option 2.2 (Naples to Miami via Tampa, Orlando and Melbourne on a separate corridor), which yielded the highest performance for annual O&M costs, passengers per train-mile, and total recovery ratio.
- As a result of this analysis, preferred alternative corridors were defined for both Intra-Florida Travel Connections and Florida to Atlanta Corridor service, including service from Atlanta to Jacksonville, Jacksonville to Tampa via Orlando, Miami to Naples (via Orlando), and a connection from Orlando to Ocala and Gainesville.
- Subarea results from Sub-Option 2.2 including the Alligator Alley Sub-Option were further analyzed in larger network context to determine best service tier (see Chapter 4).

3.4.3 Southeast Corridor Connections (DC-ATL)

The SE Study team analyzed the core Washington, D.C. to Atlanta Southeast Corridor Connections described in Section 3.4.3 as the baseline Southeast Regional Network backbone or “trunk line” configuration. The Southeast Corridor was considered an effective baseline corridor as it is centrally located within the SE Study Area and is an existing and growing regional intercity passenger service with significant investments and programmed projects underway. For this subarea analysis, the SE Study team did not study various alignment configurations, but only tested variations that attempted to optimize service frequency and determine the



appropriate service tier. The result identified a Core Express service tier from Atlanta to Washington, D.C. with optimum frequency shown in the final SE Regional Network.

In addition to the Southeast Corridor, the SE Study team evaluated alternative connecting corridors and network configurations. Corridors evaluated included CBSAs in Georgia, South Carolina, North Carolina, and Virginia. Corridors that performed most favorably among the KPIs and qualitative assessment were included in the final network and include the Asheville-Charleston Corridor, Fayetteville-Winston-Salem Corridor, and the Atlanta-Augusta-Charlotte portion of the Birmingham-Charlotte Corridor. Existing state-supported corridors in Virginia were incorporated into the network. In addition to positive KPI results, these corridors greatly expand access to the rail network throughout the Southeast and to provide greater connectivity across the region as whole.

3.4.4 Tennessee Connections

Analyses for this subarea focused on connections between the Southeast region via Atlanta and CBSAs in Tennessee, including Chattanooga, Nashville, and Memphis, with testing of a connection between Chattanooga and Knoxville including a potential linkage to Bristol, and with connections to the Midwest region (Chicago) via Nashville and Memphis.

The following key findings resulted from the Tennessee Connections subarea analysis:

- The Atlanta-Nashville Corridor scored very highly on KPIs, showing a significant demand between Nashville, Chattanooga, and Atlanta. As a result of this analysis, preliminary recommendations indicated a tier service of either Core Express or Regional service.
- Connections from Nashville and Memphis were best suited to provide links between Chicago, St. Louis and other destinations to the north in coordination with Midwest Regional Rail Planning Study.
- Emerging corridor service was found best suited for the Memphis to Nashville Corridor.
- The Knoxville to Chattanooga Corridor showed low annual network ridership and low recovery costs, which resulted in categorization as a potential independent network corridor.

3.4.5 Alabama/New Orleans Connections

Analyses for this subarea focused on connections and alternative configurations between the Southeast region core via Atlanta and the Birmingham and Montgomery, Alabama CBSAs (Montgomery to Atlanta connection via Auburn, Alabama and Columbus, Georgia). The subarea analysis included an extended connection to New Orleans, Louisiana (outside the SE Study Area) from Montgomery via Pensacola, Florida and Mobile, Alabama.

The following key findings resulted from the Alabama/New Orleans Connections subarea analysis:

- The best performing connections required two route segments offering different service tiers from Atlanta to Birmingham and from Atlanta to New Orleans.
- Due to relatively high ridership forecast, the Birmingham to Atlanta Corridor was recommended as a higher Regional service tier.



- The corridor between New Orleans and Atlanta, via Mobile, Pensacola, Montgomery, Auburn, and Columbus, Georgia was recommended as an Emerging Feeder tier service level.



4. Southeast Regional Network Vision

This chapter summarizes the recommended Southeast Regional Network Vision. The vision includes recommendations for high-performance, intercity passenger rail network in the Southeast through 2055 and phasing considerations for future detailed studies.

4.1 FROM BUILDING BLOCKS TO DRAFT NETWORK

An integral part of the network analysis approach outlined in Chapter 3 was receiving stakeholder feedback through individual discussions with the lead stakeholders to address ongoing state and regional planning efforts. Additionally, coordination was conducted with the Midwest Regional Rail Planning Study to consider connectivity from the Midwest region.

During the network refinement process, detailed sensitivity testing of the corridors was conducted using CONNECT to identify the optimum service type and frequency of each corridor within the network context based on operational performance as well as cost tradeoffs. This detailed screening of network scenario refinements included additional evaluations to ensure the CBSA routing within the corridor resulted in high-performance corridors and that supply and demand was balanced in each corridor. For the corridors, the optimization and refinement process to verify recommended serviced tiers included tests to evaluate both express and all-stop service patterns.

4.2 RECOMMENDED REGIONAL NETWORK

Figure 50 shows the recommended Southeast Regional Network Vision. The SE Regional Rail Plan is intended to complement individual SRPs and long-range transportation planning documents to prioritize additional studies and implementation of passenger and freight rail enhancements.

The Southeast Regional Network Vision includes existing and programmed intercity passenger rail services, including a Core Express Southeast Corridor, a Regional Brightline service from Orlando to Miami, connectivity to the existing NEC, connections to Nashville and Chicago via the Midwest Network, and several connecting corridors to expand the reach of the network.

4.2.1 Florida Configuration

The configuration that performed the best across nearly all KPIs consists of four corridors – Core Express corridor from Atlanta to Tampa via Jacksonville and Orlando, Regional corridor from Naples to Tampa, Regional corridor from Miami to Orlando, and an Emerging corridor from Gainesville to Orlando. This configuration is inclusive of Brightline’s Miami to Orlando corridor, of which the West Palm Beach to Orlando segment is under construction as of summer 2020. Following the analysis and selection of the best-performing Florida configuration, recent Brightline planning efforts have focused on extending the Miami to Orlando corridor to Tampa. Thus, the recommended Florida configuration incorporates small adjustments – (1) the integration of the Orlando to Tampa segment with the Regional Miami to Orlando corridor and thereby (2) the truncation of the Core Express Atlanta to Tampa corridor to Orlando.



4.2.2 Alabama and Tennessee Configuration

The western portion of the Southeast Region consists of four corridors that provide connections in Tennessee and Alabama to the larger regional and interregional network. A Regional or Core Express corridor is included from Atlanta to Nashville with an assumed connection to the Midwest Regional Rail Network continuing to Chicago. This corridor is proposed as either service tier considering a significant portion of the corridor lies in the Midwest Regional Rail Plan geography and the high performance of the corridor at both service tiers. A Regional corridor provides connections between Birmingham and Atlanta with continued service to Augusta, Columbia, and Charlotte. An Emerging corridor provides connections between Nashville and Memphis. Another Emerging corridor was proposed between Atlanta and New Orleans which partially reflects recent efforts to establish state-supported service between New Orleans and Mobile. This corridor deviates from existing Amtrak Crescent service to serve larger CBSAs between Atlanta and New Orleans and to minimize travel time.

4.2.3 Georgia and Carolinas Configuration

This area of the network features a Core Express corridor between Atlanta and Orlando, serving the large intermediate markets of Macon, Jacksonville, and Daytona. The Southeast Corridor is depicted as a Core Express corridor from Atlanta to Washington, D.C., serving Charlotte, Raleigh, and other intermediate markets. A Regional corridor from Birmingham to Atlanta continues to Augusta, Columbia, and Charlotte. Additionally, three Emerging corridors provided connecting service off the Southeast Network's Core Express spine – Macon to Savannah, Asheville to Charleston via Charlotte and Columbia, and Winston-Salem to Fayetteville, via Greensboro and Raleigh.

4.2.4 Virginia and Washington, D.C. Configuration

The northern portion of the Southeast Region consists of three corridors that provide intra- and inter-Virginia connections. The Southeast Corridor continues as a Core Express corridor from Raleigh to Washington, D.C. via Richmond. A corridor between Washington, D.C. to Hampton Roads via Richmond provides an enhanced Regional service from the existing Emerging state-supported Amtrak service. An Emerging corridor from Washington, D.C. to Roanoke mimics existing state-supported Amtrak service.

4.2.5 Network Independent Configuration

Other corridors that have been studied and acknowledged but were not included in the proposed Southeast Network are defined as Network Independent Corridors. These corridors are identified as having minimal effects on the network performance but are necessary to include to provide additional connections throughout the Southeast Network. The corridors classified as Network Independent Corridors include:

- Myrtle Beach to Columbia
- Wilmington to Fayetteville
- Roanoke to Chattanooga via Blacksburg, Bristol, and Knoxville
- Virginia connections to Richmond from Charlottesville and Lynchburg



Figure 50. Southeast Regional Network Vision⁴⁶



⁴⁶ Hampton Roads is representative of the Virginia Beach-Norfolk-Newport News CBSA.



4.3 PHASING CONSIDERATIONS

To establish the full Southeast Regional Network Vision, incremental phasing of enhanced or new passenger rail service will be necessary based on results of future studies and available funding sources for implementation and operation. Further detailed corridor- and project-level planning analysis will be needed at the state and local level to establish prioritized corridor investments. Ultimately, local, state, and regional priorities and funding availability will determine project prioritization. Given the significant network effect on ridership highlighted above, a coordinated approach that develops the network incrementally is important to fully recognize the benefits of a network solution rather than an implementation of standalone corridors.

Recognizing the challenges in implementing a regional rail network, the SE Study established incremental phasing scenarios that reflect the early investment in high performing portions of the network as a possible solution to phasing in the full Southeast Regional Network Vision. The phasing scenarios are intended to provide the various government agencies, rail operators, and owners with a practical phasing approach toward achieving the full Southeast Network, but are not meant to direct the phasing approach. The actual phased implementation of the network will be decided by the Southeast region stakeholders.

The three phasing scenarios developed include the Baseline Network, Backbone Network, and Full Network. These networks are represented in Figure 51, Figure 52, and Figure 53, respectively.

The Baseline Network reflects existing state-supported service in the Southeast, including Roanoke to Washington, D.C., Hampton Roads to Washington, D.C., and Charlotte to Washington, D.C., via Raleigh. The Charlotte to Washington, D.C. Corridor is featured as an improved Regional corridor and is representative of recent Southeast Corridor planning efforts. The Miami to Orlando Corridor is also included as a Regional corridor to reflect Brightline's future service extension to Orlando.

The Backbone Network incorporates the Baseline Network investments and features additional investments in an Atlanta to Charlotte and Atlanta to Orlando Core Express spine and the extension of the Regional Miami to Orlando Corridor to Tampa. These network additions are reflective of longer-term Southeast Corridor planning efforts and Brightline's long-term service extension plans.

The third phasing scenario is the Full Network and reflects the entire Southeast Network evaluated in the SE Study. The Full Network includes the Baseline Network and Backbone Network corridors in addition to several feeder and connecting corridors. The Washington, D.C. to Charlotte and Hampton Roads to Washington, D.C. portions of the network are also improved to Core Express and Regional corridors, respectively.



Figure 51. Baseline Network⁴⁶

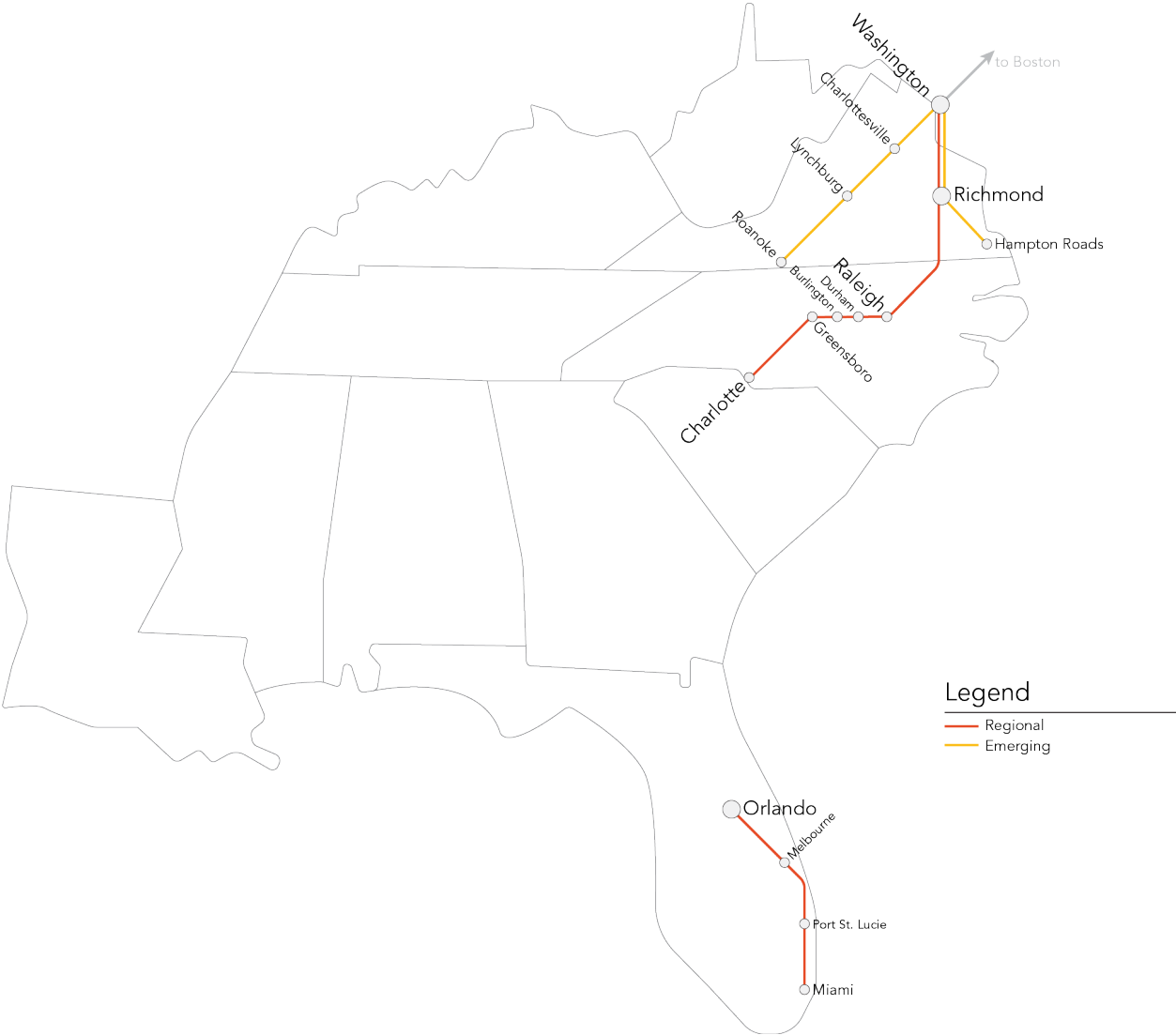


Figure 52. Backbone Network⁴⁶





Figure 53. Full Network⁴⁶



4.4 BASIC PERFORMANCE (KPIs)

A comprehensive analysis compared the recommended Southeast Regional Network performance to the performances of Baseline and Backbone Networks described in the previous section. The nine KPIs used in early scenario development and previously outlined in Chapter 3 were applied to the entire Southeast Regional Network.

The performance analysis for the Southeast Regional Network Vision compared eight unique scenarios featuring various horizon years:

- Baseline Network for 2015 and 2035
- Backbone Network for 2035 and 2045
- Full Network buildout for 2045 and 2055

The most significant performance changes between network scenarios were seen between the Baseline Network and Backbone Network. Between these scenarios the operating cost recovery ratio transitions from a subsidy to a surplus. Increases in the O&M subsidy per passenger mile are also seen, particularly when comparing the Baseline Network to the Backbone Network and Full Network. Overall, the Backbone Network in 2045 performs most favorably as the network focuses on providing core services on only the highest performing portions of the Full Network. This scenario features several higher performing KPIs, including the highest O&M cost recovery ratio, lowest capital cost per passenger mile, and highest O&M surplus. The addition of the smaller connecting corridors in the Full Network results in reductions of some KPIs; however, the coverage provided in the Full Network is significantly greater.

Sensitivity tests were also performed utilizing the 2055 Full Network configuration. Auto time, auto congestion, auto cost, air fare, and value of time (VOT) were analyzed to gauge the variability of their impact on 2055 Full Network KPIs. For 2055 Full Network passenger ridership, variations for airfare and highway travel time had the highest impact. Similar results were found for 2055 Full Network revenue impact, with variations of airfare and highway travel time having the highest impact. For fare sensitivity, analysis found reduced fares could slightly increase ridership and network revenue. This sensitivity test assumed baseline cost and conditions for competing modes, as well as a baseline VOT. Results would vary significantly if passengers' VOT differ from assumptions. Given the CONNECT model results are high-level and primarily used for comparative evaluation, this testing indicates the need for more detailed corridor analysis to evaluate the ridership and revenue impacts of these sensitivity factors.

4.5 KEY FINDINGS BY CORRIDOR AND NETWORK

Analysis and refinement of the Southeast Regional Network utilizing the CONNECT model has preliminarily demonstrated that the full Southeast passenger rail network could provide significant performance benefits through regional connectivity. Through the full study process, a number of key findings have emerged, including the identification of a recommended network configuration, key market connections, optimized service characteristics, and the potential to alleviate vehicle miles traveled and capture regional air demand.



A summary of key findings are as follows:

- The Southeast Regional Network would provide passenger rail access to more than 70 percent of all Southeast residents. This would significantly improve upon existing service, which provides mostly limited long-distance service to 55 percent of all Southeast residents.
- Overall, the performance of every corridor included in the Southeast Regional Network would improve in the recommended network context and would enable 3,481 discrete origin-destination pairs within the Southeast geography, 749 of which would feature a single transfer.
- The Core Express spines of Atlanta to Washington, D.C. and Atlanta to Orlando would carry the majority of all riders in the Southeast Regional Network, serving an estimated 70 percent of all network riders for at least one segment of their trip.
- The Core Express corridors of Atlanta to Washington, D.C. and Atlanta to Orlando would support the overall performance of the Southeast Regional Network, featuring operating cost recovery ratios of 2.75 and 2.04, respectively.
- Core service between Washington, D.C. and Atlanta would significantly improve connectivity for many corridors, streamline connections to CBSAs with limited existing service, and enable connections to CBSAs previously without passenger rail service.
- The case for fast and frequent Core Express service along the Washington, D.C. to Atlanta Corridor would be strengthened in the context of the multi-state network. Planning for this segment should account for Emerging Feeder and Regional service corridors that link together mid-sized markets in Virginia, North Carolina, South Carolina, Florida, and Alabama.

The Southeast Network would provide passenger rail access to more than 70 percent of all Southeast residents.

By 2055, the Southeast Regional Network could alleviate 12 billion vehicle miles traveled per year within the Southeast Study Area, which is equivalent to more than 2,500 lane miles of highway widening.

The Southeast Regional Network could attract over 6.3 million annual airline passengers traveling within the Southeast Study Area by 2055.



- There is a very strong case to support intra-Florida service with Orlando as a central node connecting the Core Express Southeast Corridor, Emerging service to Gainesville, Regional service to Tampa and Miami, and continued Regional service between Tampa and Naples.
- The case for regional service between Atlanta, Chattanooga, and Nashville is strengthened by connections to the greater Southeast Network, as well potential connections to the Midwest Network.
- The Atlanta to Chicago Corridor, and more specifically, the Atlanta to Nashville portion of the corridor, features strong performance with an estimated 2.10 operating cost recovery ratio.
- The Southeast Regional Network would generate additional growth of 37 million rail trips, most of which would be diverted from other modes, and could alleviate approximately 12 billion annual passenger miles, principally along heavily traveled interstate corridors such as I-4, I-75, I-85, and I-95.
- Core Express service could alleviate future intercity air demand between major Southeast airport hubs such as Washington, D.C., Charlotte, Atlanta, and Orlando.

In the Full Network buildout of the Southeast Regional Network, Atlanta is expected to have more than 12 million boardings and alightings in 2055, approximately 2 million higher than the amount for New York Penn Station, the busiest passenger rail hub in the U.S.

4.6 TRANSPORTATION NETWORK CONSIDERATIONS

4.6.1 Regional and Interregional Ridership

The Southeast Regional Network would include assumed connectivity to the Chicago hub in the Midwest region via Nashville and Memphis as well as connectivity to the NEC. For the purposes of this analysis, only the ridership impacts from origin and destination pairs that are within the Southeast geography were included. Costs and benefits of trips taking place solely outside of the Southeast area were excluded.

Trips continuing beyond the SE Study Area on the Atlanta to Chicago and Boston to Washington, D.C. Corridors would be a significant portion of total Southeast Regional Network ridership. An estimated 12 million annual riders, or 33 percent of all Southeast Regional Network ridership, would continue beyond Nashville and Washington, D.C. into the Midwest and Mid-Atlantic Regions, respectively. The connection and integration of the Southeast Regional Network with services beyond the SE Study Area would be a significant source of ridership and should be considered as rail planning efforts advance.

4.6.2 Market Pair Travel Times and Connectivity

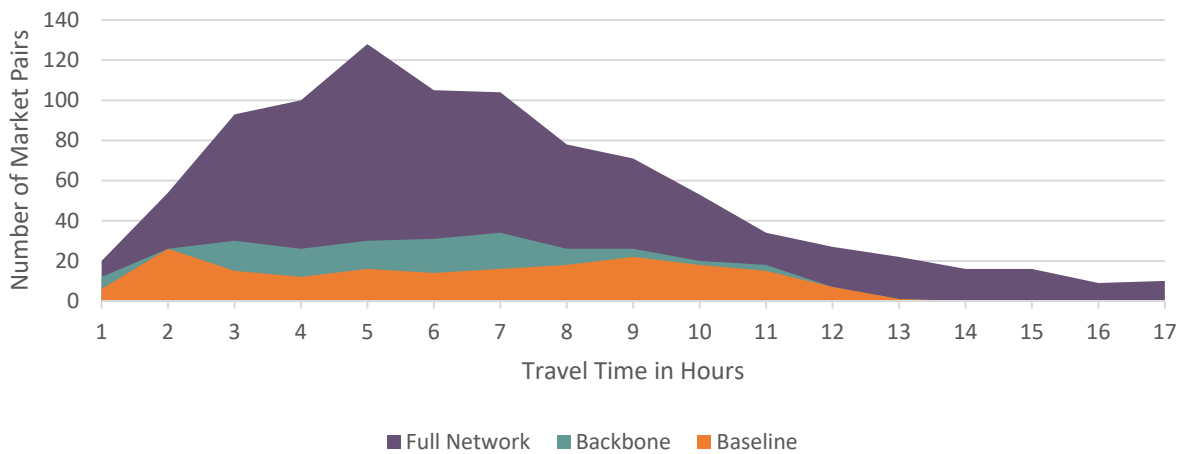
Investing in a higher quality, higher speed intercity rail system has potential implications for the larger transportation network. These types of benefits are important for communicating the vision to a broader audience.

Significant benefits of investing in an expansive and higher speed intercity rail system would be the connectivity benefits and reductions in travel time between markets. The three Southeast phasing scenarios—Baseline Network, Backbone Network, and Full Network—provide an example of how different levels of investment would affect both the number of market pairs served and travel times. Figure 54 shows the number of market



pairs and their travel times for the Baseline Network, Backbone Network, and Full Network scenarios. On the Baseline Network, relatively few market pairs would be served. Market pair travel times would be relatively evenly distributed, with many market pair travel times varying considerably from 1 to 13 hours. The Backbone Network would feature more possible market pairs but would also evenly distribute them with a consistent number of trips taking 2 to 9 hours and with fewer market pairs with travel times outside of that range. The Full Network would feature dramatically more market pairs and a peak travel time among those pairs of 5 hours. The Full Network, or proposed Southeast Regional Network, would offer access to more markets with shorter travel times.

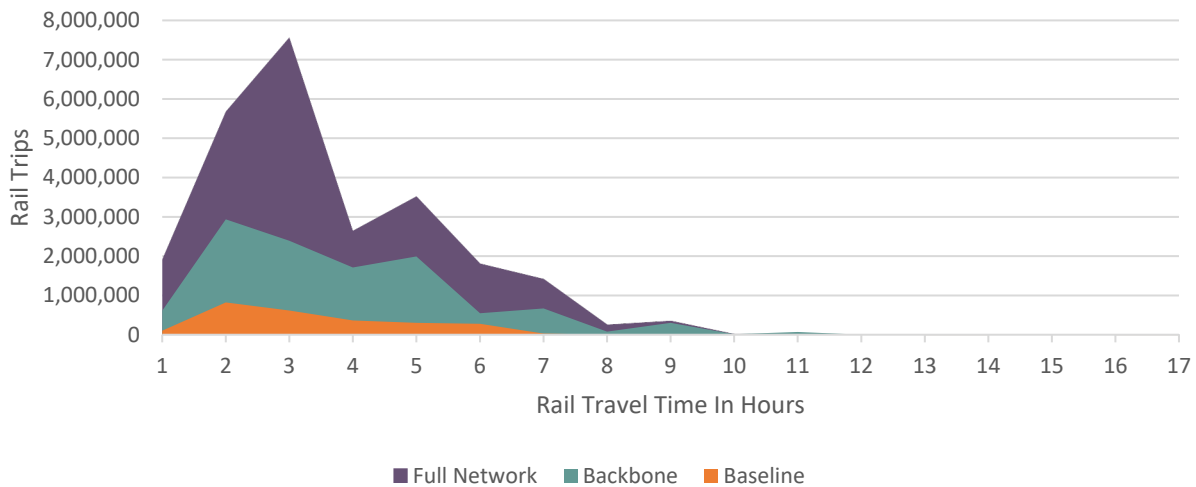
Figure 54. Market Pair Travel Times for Baseline, Backbone, and Full Networks



Source: CONNECT

Evaluating the estimated number of passengers affected by different levels of investment is helpful in determining priorities and understanding high-utility investments. Using the phasing scenarios as an example, Figure 55 depicts rail trip in the context of the estimated rail travel time. All three phases would generally see declines in rail trips longer than 5 hours. The Baseline Network would feature only a small number of trips primarily greater than 1 hour or less than 7 hours. The Backbone Network would feature the highest number of passengers on market pairs approximately 2 hours away in rail travel time and would decline gradually to trips that are approximately 6 hours away in rail travel time. The Full Network would feature significantly more passenger benefits for passenger trips overall and especially for trips estimated to be 2 to 4 hours away in rail travel time. The large peak seen is likely representative of the Washington, D.C. to Atlanta and Atlanta to Orlando Core Express spine proposed through the SE Study Area which provides faster travel times and is more accessible through the various connecting corridors.

Figure 55. Rail Trips by Rail Travel Time for Baseline, Backbone, and Full Networks



Source: CONNECT

4.7 NETWORK IMPLEMENTATION CONSIDERATIONS

Developing and implementing a regional rail network is a complex and difficult process. The involvement of multiple government agencies acting at different levels and across different jurisdictions, as well as private rail operators and owners, necessitates an interstate governance structure. Uniquely, the Southeast has some examples of existing governance structures—the Virginia–North Carolina Compact, the Southern Rail Commission, and the burgeoning Southeast Corridor Commission. The governance component of this study evaluates the future needs and role of a governance structure moving forward.



5. Governance

Implementation of the SE Study will require extensive coordination among the states and other key stakeholders. Passenger rail projects are complicated by the mix of private and public owners and operators of infrastructure and rolling stock, as well as a legacy of more than 40 years of federal law, regulation, and commercial negotiations among the affected parties. Coordination must address several complex issues from corridor planning to implementation efforts. At the same time, coordination must also consider each state’s regulatory, financial, political, and institutional framework along with host and operating railroads’ policies and perspectives.

A regional governance structure, if properly designed and managed, can provide direction and advance a unified vision. Regional governance can also provide the platform to support multi-state planning and legislative initiatives, and ultimately longer-term investments to implement multi-state corridor upgrades and new demand-oriented passenger rail services.

This chapter summarizes the study approach to governance and institutional considerations, including input received from lead stakeholders, and governance findings and recommendations for this study.

5.1 EXISTING REGIONAL RAIL COORDINATION EFFORTS IN THE SOUTHEAST

The Fiscal Year 2017 Consolidated Appropriations directed the FRA to allocate \$1,000,000 to stand-up the Southeast Corridor Rail Commission. The purpose of this funding is to aid the Southeast states in furthering a mechanism to support long-term cooperation between stakeholders. Since that time, the Southeast states of Virginia, North Carolina, South Carolina, Georgia, Florida, and Tennessee and Washington, D.C. have established the Southeast Corridor Commission (SEC) and have been working collaboratively to establish the SEC’s guiding principles, mission statement, and bylaws in addition to undertaking studies of the Southeast Corridor to promote and prioritize its development. Having been established through federal legislation, the SEC is an example of a “Federal-State Commission” governance model. The SEC meets quarterly, and a technical committee meets monthly to discuss and coordinate ongoing developments in the region’s rail network.

The Virginia–North Carolina Interstate High Speed Rail Compact (VA-NC Compact) was established in 2004.⁴⁷ The VA-NC Compact formally convened in 2010 to “study, develop, and promote a plan for the design, construction, financing, and operation of interstate high-speed rail service through and between points in the Commonwealth of Virginia and the State of North Carolina and adjacent states.”⁴⁸ This governance model is a “Multi-State Commission,” and is one of only three interstate rail compacts that have been chartered in the U.S. (the others being the Midwest Intercity Passenger Rail Commission and Southern Rail Commission). Best

⁴⁷ Virginia and North Carolina utilized the authority provided in Section 410 of the Amtrak Reform and Accountability Act of 1997 (Public Law 105-134) to enter into their interstate rail compact.

⁴⁸ Commonwealth of Virginia Compacts § 33.2-1400. Virginia–North Carolina Interstate High-Speed Rail Compact.

practices and lessons learned from the VA-NC Compact provide valuable guidance for establishment of a larger Southeast region governance model currently being advanced through the SEC.

5.2 SOUTHEAST GOVERNANCE DISCUSSIONS

The FRA facilitated the SE Plan governance discussions. Representatives of the state DOTs in the region were the lead stakeholders and primary participants in discussions related to governance. The FRA facilitated three governance-specific workshops during the study with the lead stakeholders. These workshops were held preceding the network planning and development meetings.

Additional participating stakeholders, comprised of representatives of other groups with an interest and a relationship to governance as potential partners in undertaking projects such as host railroads, local municipalities, and MPOs, received regular updates on governance discussion topics and considerations during the SE Stakeholder Group meetings.

5.3 GOVERNANCE APPROACH AND INSTITUTIONAL CONSIDERATIONS

The objective of the governance component of the SE Study was to identify key institutional considerations for advancing a broad, multi-state rail planning effort, and to evaluate potential governance models the Southeast stakeholders could implement in the region. Lead stakeholders have acknowledged that a governance structure with clear authority, responsibility, and a mandate for overseeing and implementing the outcomes of a regional planning initiative is necessary to facilitate successful coordination and development of rail improvement projects across multiple states and jurisdictions.

The FRA and lead stakeholders drew from two main sources for governance frameworks related to passenger rail programs. The first is the report from the FRA's Southwest Multi-State Rail Planning Study from September 2014. In this document, the FRA describes the approach taken by the Southwest states to work through their governance and institutional issues, receive input from stakeholders, consider various governance models, and ultimately report on the stakeholders' governance findings and recommendations.

The second document *Developing Multi-State Institutions to Implement Intercity Passenger Rail Programs* is a Transportation Research Board (TRB) research paper, from the National Cooperative Rail Research Program (NCRPP) released in September 2016. The TRB research paper summarized conclusions from literature research and case studies from existing rail and other multi-state institutional models and is complemented by focus group discussions. A critical review and assessment of the data resulted in the recommendation of eight governance models. However, the study also states that "no single governance model has proven to be particularly effective for advancing passenger rail" partly because no model was applied for the complete lifecycle of a program beginning at planning ending at O&M.

During the study, FRA developed a Regional Rail Planning Governance Structures White Paper,⁴⁹ which evaluated eight multi-state governance models (Table 14). This information was used in the SE Study process to engage lead stakeholders in a series of conversations, interviews, and workshops to understand their

⁴⁹ Federal Railroad Administration. *Regional Rail Planning Governance Structures White Paper* prepared for the Southeast Regional Rail Planning Study, 2017.



perspectives regarding governance, and to focus toward models and strategies desirable for states and the region.

Table 14. Overview of Alternative Multi-State Governance Models

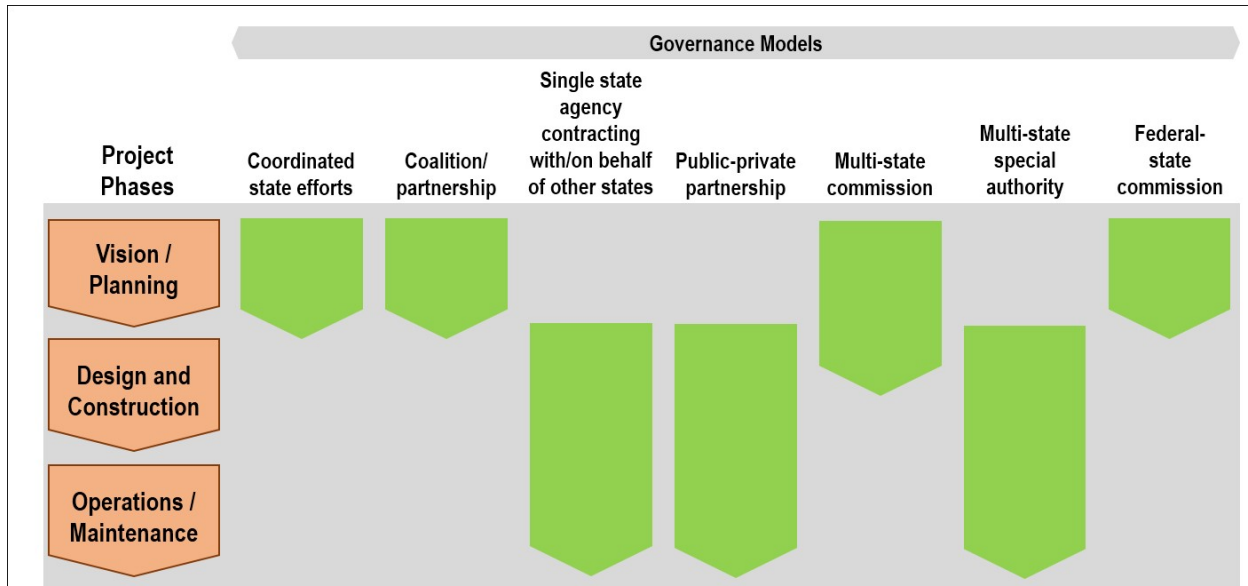
NO	MODEL	DEFINITION	PHASE OF DEVELOPMENT
1	Coordinated State Efforts	Where two or more states agree to coordinate passenger rail efforts within their respective states.	<ul style="list-style-type: none"> ■ Visioning ■ Planning
2	Coalition/ Partnership	Where multi-state partners convene on a voluntary basis to carry out activities of common interest. May also be carried out in coordination with a non-profit corporation.	<ul style="list-style-type: none"> ■ Visioning ■ Planning
3	Single State Agency Contracting with or on Behalf of Other States	Where an existing or newly created entity within a single state addresses multi-state interests, primarily through contractual arrangements with other states.	<ul style="list-style-type: none"> ■ Design ■ Construction ■ Operations and Maintenance
4	Public-Private Partnership	Where the government and the private sector enter into an arrangement that allows for greater private-sector participation in the delivery of transportation projects.	<ul style="list-style-type: none"> ■ Design ■ Construction ■ Operations and Maintenance
5	Multi-State Commission	Where two or more states coordinate multi-state interests through a formal agreement that establishes a governing body.	<ul style="list-style-type: none"> ■ Planning ■ Preliminary Design
6	Multi-State Special Authority	Where an independent entity, often a distinct governmental body, delivers a limited number of public services within defined boundaries across state lines and can exercise a broad range of typical governmental powers.	<ul style="list-style-type: none"> ■ Design ■ Construction ■ Operations and Maintenance
7	Federal-State Commission	Where a body of federal, state, and, sometimes, local leaders organize to address a critical need.	<ul style="list-style-type: none"> ■ Planning
8	Freight Railroads	Where freight railroads lead delivery of passenger rail services. Note: this is not a practical model for passenger rail service in the U.S.	<ul style="list-style-type: none"> ■ Design ■ Construction ■ Operations and Maintenance

The eight governance models were discussed in more detail with the lead stakeholders throughout the duration of the SE Study.

The lead stakeholders recognized the need for a governance structure that can be tailored based on the phase or stage of the program or project. Not all states within a region will have a role in advancing specific corridor programs or projects, and as programs and projects of regional significance are advanced, funded, designed, and constructed, the various stakeholders' responsibilities change over time depending on the nature of the program. Transitions in stakeholders' responsibilities may occur in parallel as different segments within the network are prioritized and implemented. To account for these changing responsibilities, states require the ability to develop and implement additional governance models that provide the needed structure, processes, and decision-making models specific to the program or project.

Figure 56 shows the NCRRP study's recommendation for which models are most applicable to a project's main phases.

Figure 56. Governance Models' Applicability to Project Phases



Source: NCRRP

Over time, a governance structure may transition to a model better suited to specific project phases. The stakeholders can also refine and tailor the model to specific needs as the project progresses and changes to scope and objectives occur. An overall parent governance structure can form sub-structures for specific purposes. Some of these sub-structures can become permanent groups, while others may be limited until their assignments are completed.

In summary, various multi-stakeholder governance models have been implemented for many different purposes. For regional rail planning and implementation, there is no “one model fits it all” framework that spans from the initial vision through managing day-to-day O&M.

5.4 REGIONAL COORDINATION CHALLENGES

As with any multi-party agreement, regional rail plan stakeholders may be confronted with conflicting interests and goals, limited resources, legal and regulatory constraints, or conflicts with existing agreements. Stakeholder interviews and governance model workshop discussions revealed several potential challenges that a governance model will need to address and proactively manage:

- Lack of or limited political support
- Limited resources
- Conflicting or divergent levels of interest
- Conflicting or competing objectives for prioritizing projects in an unpredictable and constrained funding environment
- Slow decision-making process within federal, state, local, and railroad organizations



- Equitable stakeholder representation relative to role within the region
- Difficulty determining sustainable cost-sharing commitments
- Difficulty maintaining transparency and providing an open process for stakeholder participation and engagement
- Competing or conflicting federal, regional, state, and local laws, regulations, and responsibilities
- Difficulty in communicating the public benefits of a singular project to the broader region

Despite these challenges, successful regional governance models exist. Further, the lead stakeholders recognize that a variety of multi-stakeholder governance models have been implemented for many different purposes. For regional rail planning and implementation, it is unlikely that only one governance model framework will be used from the initial vision through day-to-day O&M. The models presented provide an overview of what has been successfully used in the intercity passenger rail environment, but ultimately the lead stakeholders need to jointly discuss and develop a tailored approach that best meets each entity's needs, accounting for individual limitations, while achieving the goal of advancing regional rail planning outcomes.

5.5 GOVERNANCE FINDINGS, RECOMMENDATIONS, AND CONCLUSIONS

Throughout the SE Study effort, stakeholders worked with FRA to determine what is working in existing governance structures, identified gaps, and defined state priorities in terms of advancing and elevating current governance structure. This section summarizes the findings and makes recommendations on how to advance projects in the Southeast in a manner that is consistent with the outcomes of the SE Study. The Southeast states have in part addressed the following recommendations through the creation of the SEC:

1. **Bring together and maintain political support and interest throughout the entire lifespan of project implementation.** Passenger rail has been a lower priority compared to other transportation modes and freight rail in some of the Southeast states. Stakeholders acknowledged that it will be necessary to garner the long-term support from elected officials and find champions who can support the future of passenger rail throughout the entire lifespan of project implementation.
2. **Utilize a formal governance model to help address limited/competing government resources and regulations.** Limited funding opportunities at the state and federal levels present an impediment to implementing a long-term vision. In addition, distinct and conflicting regulatory and legal requirements between the SE Study Area states may present a challenge to multi-state project planning, environmental review, permitting, and project construction.
3. **Determine a process for project prioritization and cost-sharing commitments.** Stakeholders have indicated that there may be conflicting or competing objectives for prioritizing individual projects in an unpredictable and constrained long-term funding environment. In addition, concerns about cost sharing and individual state restrictions on spending money in other states pose challenges.
4. **Provide an opportunity for equitable stakeholder representation and participation.** Equitable stakeholder representation relative to the role within the region and providing an open process for ongoing engagement are key considerations identified by stakeholders. Given the likely phased implementation, it is imperative that state stakeholders have a substantial decision-making role in segments that impact their



state. It will be necessary to ensure decisions-makers from all the SE Study Area states are involved, and authority on specific roles and responsibilities is allocated in a transparent manner.

5. **Build a vision to guide multi-step planning and help ensure long-term success.** Building and sustaining a unified vision across the entire SE Study Area is a noted challenge, particularly in communicating the public benefits of a singular project in one state to the broader multi-state region. Stakeholders have noted that implementing a gradual, step-based process and multi-layered approach will require developing significant buy-in to ensure success.

These recommendations can form the foundation of a governance framework, which along with clearly defined roles and responsibilities are critical to the successful governance structure, as well as to the successful operations of the regional rail network. Ideally, a regional governance model should prioritize and advance near-term projects across the region and lead to a visionary multi-state investment strategy for a long-term regional rail network. Such a model should have the capacity to coordinate continued regional planning and communication, identify the regional rail network's investment needs and its role in the future economic growth and development, and help define institutional arrangements that will be required for follow-on phases of the program.

Lead stakeholders expressed preference for a phased implementation of a regional governance model. Initially, a less formal/structured governance model (“Coordinated State Efforts or Coalition/Partnership”) would allow for coordinated visioning and corridor planning to provide a foundation. For the longer term, the states would transition toward a more formal/structured model to manage the shared responsibility of implementing, operating, and maintaining the regional rail network. The exact structure of the formal/structured model would be determined at later date, but some initial suggestions are presented below.

5.5.1 Short-Term Governance Model Action Recommendations

For short-term governance, a coordinated partnership is recommended among the Southeast states. After the 2017 Consolidated Appropriations allotted \$1 million in funding to the Southeast states to establish a governance body, the Southeast states have adopted a Memorandum of Understanding to establish the SEC. The SEC has also developed and adopted bylaws and a mission statement. At this initial stage, the SEC is focused on knowledge sharing, coordinated planning, and the development of an overall vision. The SEC will also determine the steps forward to successive governance models with broader functions.

5.5.2 Transition Plan Action Recommendations

Building upon the administration and implementation of a short-term governance model, the Southeast states would pivot to the development of a long-term model to formalize the roles and responsibilities of each state and stakeholder to implement, operate, and maintain a regional rail network. Establishing a formal committee would address the steps/sub-structures necessary to transition from a short-term to a long-term model. Membership in the committee may include local elected officials and political appointees and be supported by a planning/technical committee that includes MPOs and DOT staff for evaluation and analysis.

Priority focus areas that can be defined by a formal committee would include the following:

1. Development of regional project priorities
2. Specific scope, phases, and development for projects



3. Stakeholder involvement
4. Equitable stakeholder representation
5. Funding resources
6. Identification of existing assets
7. Risk allocation
8. Managing conflicts and resolution
9. Political or legislative policy changes
10. Decision-making processes

5.5.3 Long-Term Governance Model Action Recommendations

A formal committee could review governance models and their functionalities and develop a shared vision for a regional model that all stakeholders can support. Southeast stakeholders felt strongly that a governance model should be organized as an umbrella organization that allows for the flexibility for individual states to develop agreements for specific projects. For example, the framework for a Southeast regional governance model could involve creation of a larger multi-state coalition, and within that structure, individual agreements between parties (like the VA-NC agreement) could be chartered to address specific projects or corridors.

Recommended models for long-term regional governance are as follows:

- **Multi-State Commission**, where two or more states coordinate multi-state interests through a formal agreement that establishes a governing body. Multi-state commissions also typically require some form of federal authorizing legislation, as well as approval through each member state's legislature. Each state may have oversight authority for the funds allocated to the commission. Benefits of this governance model include its value for multi-state planning and development of an overall vision, capacity to address challenging policy issues such as cost sharing, and its broad standing through required legislation in each state legislature and federal action. Disadvantages include the length of time that may be needed to establish a commission, and the potential for jurisdiction members to focus on their individual state's needs as a higher priority than the broader regional vision. The VA-NC Compact is an example of a Multi-State Commission advancing intercity passenger rail initiatives in the Southeast today.
- **Multi-State Special Authority**, where an independent entity, often a distinct governmental body, delivers a limited number of public services within defined boundaries across state lines, and can exercise a broad range of typical governmental powers. Establishment of a multi-state special authority generally requires an interstate compact that involves identical legislation in each participating state and approval through federal legislation. A multi-state special authority is functionally capable of planning, constructing, operating, and maintaining transportation projects and services, and can work more flexibly than an entity that must function under the constraints of each state's legal framework. Special financing devices are more available to this governance model, and establishment of special authority can increase assurance that the entity will endure over time. However, multi-state special authorities are often difficult to implement, and this model can be challenging to expand function of the authority or amend compacts, which require federal congressional approval.
- **Federal-State Commission**, where a body of federal, state, and, sometimes, local leaders organize to address a critical need. Federal-state commissions are generally authorized through federal legislation and can have a multitude of powers and responsibilities, including the ability to issue funds in the form of grants



to participating states. A federal-state commission can be effective for development of an overarching vision and providing a platform for discussion and consensus among regional stakeholders. This governance model can address challenging policy issues such as cost sharing and through engagement between the federal government with states and regions can attract federal funding. At the same time, a federal-state commission can be viewed as a model that limits state power and has a traditional funding structure that relies on annual federal appropriations. The SEC is an example of a Federal-State Commission advancing intercity passenger rail initiatives in the Southeast today.



6. Action Items and Next Steps

6.1 CONNECTING WITH OTHER REGIONAL RAIL PLANS

The Southeast Regional Network would provide a coordinated multi-state vision for the optimal role of regional intercity passenger rail service in the multimodal transportation context. This integrated vision for a regional rail network considers how linkages with other modes could create an integrated transportation system to carry travelers from origin to destination throughout the region in a cost-effective manner. This chapter describes recommended actions and next steps for the advancement of the regional rail network in the Southeast.

6.1.1 Possible Interregional Plan

A potential future study that examines connections between the Southeast and other regions has been identified as an opportunity to further integrate the SE Regional Network into a larger interregional rail network. As described in Chapter 1, the SE Study's primary analysis encompassed developing a regional network for the Southeast states south of Washington, D.C. and west to Tennessee and Alabama. Although not the focus of the study, connections to significant travel markets outside of the SE Study were included, such as connections to the existing NEC (extending north from Washington, D.C.), Chicago, and New Orleans. As noted in Chapter 1, the Midwest states and FRA conducted the Midwest Regional Rail Planning Study simultaneously to identify a vision for a high-performance, multi-state intercity passenger rail network in 12 Midwest states from North Dakota south to Kansas and east to Ohio.

6.2 INCORPORATION INTO STATE RAIL PLANS AND LONG-RANGE PLANS

The Southeast Regional Network would support rail planning objectives and existing statewide processes, including development of SRPs and long-range transportation planning efforts, and would facilitate future project-specific planning efforts such as corridor studies. The SE Regional Rail Plan is a vision for enhanced regional rail connectivity that is intended to complement MPO long-range plans, SRPs, and multi-state rail planning efforts in prioritizing additional studies and implementation strategies to enhance passenger and freight rail services. This long-term vision and consensus approach for planning and implementation will help establish a unified platform for developing passenger rail in this region.

Throughout the development of this SE Study, the SE Stakeholder Group (see Chapter 1) provided background information for ongoing state rail planning efforts and initiatives to be considered during development of the regional rail network. Additionally, the lead stakeholders provided feedback at key milestones during the planning study which resulted in a collaborative vision for the future high-performance passenger rail network in the Southeast. The recommendations within this report provide opportunities for future development of high-performance passenger rail connectivity based on the conceptual planning efforts conducted at the regional (multi-state) level. Due to the conceptual-level planning, this regional rail plan is not intended to replace the need for detailed project-specific corridor planning and project development (such as Tier 1 [program-level] or Tier 2 [project-level] environmental studies) required prior to project implementation.

6.3 POTENTIAL FOLLOW-ON REGIONAL STUDIES

6.3.1 Atlanta Terminal Study

Atlanta is the crossroads of the Southeast and a transportation hub for the region. Atlanta hosts both Norfolk Southern (NS) and CSX freight traffic, and acts as a transfer point for freight service to multiple routes across the United States. Over the years, multiple studies have been developed with passenger routes operating to or through Atlanta, and multiple proposals have been under consideration for commuter rail lines that connect Atlanta to communities with economic ties and commuting patterns to the city. A terminal area study of Atlanta that considers all rail service seeking to operate to or through Atlanta could identify opportunities to allow these services to connect to Atlanta while also supporting the individual operational needs of each service. As a major hub for the Southeast region, unlocking the Atlanta terminal area would allow for rail connections with the multiple metropolitan areas that show strong market demand to reach the city. The Southeast Regional Rail Plan envisions the following corridors connecting to Atlanta:

- Atlanta, GA- Charlotte/Raleigh, NC- Washington, D.C.
- Atlanta, GA – Macon, GA – Orlando, FL
- Birmingham, AL – Atlanta, GA – Augusta, GA/Columbia, SC – Charlotte, NC
- Atlanta, GA – Chattanooga/Nashville, TN – Chicago, IL
- Atlanta, GA – Columbus, GA – Montgomery, AL – Pensacola, FL – New Orleans, LA

6.4 GOVERNANCE ACTION ITEMS

As summarized in Chapter 5, the SE Study lead stakeholders expressed preference for phased implementation of a regional governance model. Initially, a less formal/structured governance model (“Coordinated State Efforts or Coalition/Partnership”) would allow for coordinated visioning and corridor planning to provide a foundation.

As previously described, this work is underway in the Southeast with the establishment of the SEC. The mission of the SEC is to facilitate the Southeast states to work collaboratively along with the FRA, Amtrak, and the freight railroads to advance the development and implementation of a common vision for the Southeast Rail Corridor. With the funding received in 2017, the SEC has developed an action plan that will advance their mission as well as help determine future phases of the SEC itself. The SEC is currently undertaking an economic benefits study to analyze the effects of rail on the Southeast’s state economies and consider how different implementation strategies of the rail network may impact the economic performance of the region as a whole. The SEC is also developing an implementation plan that synthesizes the infrastructure required to support additional service frequencies on the Southeast Corridor. The plan also identifies regulations and best practices for right-of-way acquisition to help states work more effectively across state lines.

The SEC meets quarterly to discuss and coordinate ongoing developments in the region’s rail network as well as direct the advancement of the SEC-sponsored studies. Additionally, a technical committee meets monthly to keep state DOTs and the FRA informed and coordinated on the status of the SEC’s work and other developments relevant to the region’s rail network.

For the longer term, the Southeast states would transition toward a more formal/structured model to manage the shared responsibility of implementing, operating, and maintaining the regional rail network. Continued



Southeast Rail Plan

multi-state coordination on a governance framework for the Southeast will be necessary to establish the institutional arrangements, financial requirements, and activities to achieve the vision for the Southeast Regional Network. The work of the SEC will describe the steps to advance to successive governance models and to keep the SEC's role in the Southeast Regional Network aligned with its phase of development. The ultimate governance structure will facilitate the prioritization and advancement of near-term projects across the region and develop a visionary multi-state investment strategy for a long-term Southeast Regional Network.