



Charting a Course to 2040

SOUTH CAROLINA MULTIMODAL TRANSPORTATION PLAN

SOUTH CAROLINA STATEWIDE FREIGHT PLAN

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ACRONYMS

AASHTO	American Association of State Highway and Transportation Officials
ATRI	American Transportation Research Institute
BCA	Benefit Cost Analyses
CALA	Carolina Southern Railway
CMAAs	Critical Management Areas
CMV	Commercial Motor Vehicle
COG	Council of Government
CPDR	Carolina Piedmont Railroad
CTC	County Transportation Committee
DHEC	South Carolina Department of Health and Environmental Control
ECBR	East Cooper and Berkeley Railroad
EDI	Electronic Data Interface
FHWA	Federal Highway Administration
GDP	Gross Domestic Product
GE	General Electric
GRLW	Greenville & Western Railway Company
GVW	Gross Vehicle Weight
HAZMAT	Hazardous Materials
HB	Hampton & Branchville Railroad Company
ITS	Intelligent Transportation Systems
LC	Lancaster and Chester Railway Company
LOS	Level of Service
LTL	Less than truckload
MAP-21	Moving Ahead for Progress in the 21 st Century
MnDOT	Minnesota Department of Transportation
MPH	Miles per Hour
MPO	Metropolitan Planning Organization
MTP	South Carolina Statewide 2040 Multimodal Transportation Plan
NAICS	North American Industry Classification System
NCFRP	National Cooperative Freight Research Program
NFAHA	Non-Federal Aid Highway Account
NHS	National Highway System
NS	Norfolk Southern
PCR	Pavement Condition Rating
PDRR	Pee Dee River Railway
PFN	Primary Freight Network
PICK/PKHP	Pickens Railway Company

ROI	Return On Investment
SCRF	South Carolina Central
SCTIB	South Carolina Transportation Infrastructure Bank
SFN	Strategic Freight Network
SFP	South Carolina Statewide Freight Plan
SHF	State Highway Fund
SIC	Standard Industrial Classification
SCPA	South Carolina State Ports Authority
STIP	Statewide Transportation Improvement Program
STRAHNET	Strategic Highway Network
TDL	Transportation, Distribution and Logistics
TITF	Transportation Infrastructure Task Force
TL	Truckload
USDOT	United States Department of Transportation
V/C	Volume/Capacity
VMT	Vehicle Miles Traveled
WCLR	Waccamaw Coastline Railroad



1 INTRODUCTION

The movement of goods is critical to the economic health of a state, particularly in one such as South Carolina that has access to major ocean ports, seven regional airports, inland ports, rail lines and highways. The purpose behind the development of South Carolina’s first Statewide Freight Plan (SFP) is to satisfy the requirements of MAP-21 legislation and more importantly respond to the critical role of transportation infrastructure and freight movement to the economy of the state.

A stakeholder outreach was conducted specifically for the purpose of developing the SFP. This outreach began with the collective Kick-Off meeting held for the South Carolina Statewide 2040 Multimodal Transportation Plan (MTP) and continued through a series of one-on-one interviews with members of the freight community, a series of four Regional Listening Sessions were held across the state, online surveys were conducted to collect input and data from the freight community, and online webinars were held during plan development.

The SFP includes an inventory of transportation assets that contribute to the movement of goods in SC, and that includes all modes of transportation, regardless of asset ownership. In addition, an overview of freight generators, businesses and geographic areas contributing to freight movements is also provided. The inventory also includes a profile of goods movement for SC, summarizing the tonnages and commodities for both historical years and forecast years of data, aligning data analyses for the MTP and the SFP.

Similar to the national freight focus, a Strategic Freight Network is identified in the SFP. This system reflects the roadways, railroads, and other transportation infrastructure needed for the efficient movement of goods in to, out of, and through SC. The identification of a Strategic Freight Network in South Carolina assists the state in identifying its critical rural freight corridors and helps SCDOT justify the inclusion of significant corridors in the National Freight Network. The process of identifying this network in South Carolina can support SCDOT in making prioritization decisions regarding investments in transportation infrastructure across the state and can inform SCDOT of what roadway corridors, in addition to those included in the National Freight Network, need particular attention to support efficient and safe goods movement.

Taking the overarching goals and objectives of the MTP, the SFP begins to address those performance measures identified for the MTP as well as expand upon the overall goals and incorporate the needs of the freight community of South Carolina, reflecting input from freight stakeholders and information derived from other elements of the MTP. The SFP identifies the freight system and infrastructure available for goods movement, presents estimated demands on the freight system, and recommends potential project and policy level strategies to accomplish these goals.

1.1 MAP-21 and the SC Statewide Freight Plan¹

Section 1118 of MAP-21 requires that a State Freight Plan developed pursuant to Section 1118 include, at a minimum, the following elements:

- An identification of significant freight system trends, needs, and issues with respect to the state;
- A description of the freight policies, strategies, and performance measures that will guide the freight-related transportation investment decisions of the state;
- A description of how the plan will improve the ability of the state to meet the national freight goals established under section 167 of title 23, United States Code;
- Evidence of consideration of innovative technologies and operational strategies, including intelligent transportation systems, that improve the safety and efficiency of freight movement;
- In the case of routes on which travel by heavy vehicles (including mining, agricultural, energy cargo or equipment, and timber vehicles) is projected to substantially deteriorate the condition of roadways, a description of improvements that may be required to reduce or impede the deterioration; and
- An inventory of facilities with freight mobility issues, such as truck bottlenecks, within the state, and a description of the strategies the state is employing to address those freight mobility issues.

The SC SFP addresses these elements and continues to identify strategies for incorporating freight planning into regular practice for SCDOT and partner agencies. This SFP also includes a strategic freight network for the state and relative performance measures to identify and prioritize projects impacting the performance of the freight transportation system of SC.

1.2 Freight Transportation Goals and Objectives for South Carolina

The SFP is intended to function as a stand-alone supplement to the MTP. The development of the MTP began with a comprehensive process of Vision development and the development of overarching goals, objectives and performance measures. The project management team for the MTP executed an integrated process of data collection, information and survey data gathering, and analysis. This SFP reflects and references elements of the MTP as well as the Statewide Interstate Plan, Statewide Strategic Corridor Plan, the Statewide Transit and Human Services Coordination Plan, and the Statewide Rail Plan.

The vision statement of the MTP is as follows:

¹ <https://www.federalregister.gov/articles/2012/10/15/2012-25261/interim-guidance-on-state-freight-plans-and-state-freight-advisory-committees#h-8>

Safe, reliable surface transportation and infrastructure that effectively supports a healthy economy for South Carolina.

In addition to this vision statement, a series of goals were identified to further develop the statewide plan. For each of these goals, an additional series of itemized metrics were developed as performance measures to implement throughout the statewide plan.

- **MOBILITY AND SYSTEM RELIABILITY GOAL:** Provide surface transportation infrastructure and services that will advance the efficient and reliable movement of people and goods throughout the state.
- **SAFETY GOAL:** Improve the safety and security of the transportation system by implementing transportation improvements that reduce fatalities and serious injuries as well as enabling effective emergency management operations.
- **INFRASTRUCTURE CONDITION GOAL:** Maintain surface transportation infrastructure assets in a state of good repair.
- **ECONOMIC AND COMMUNITY VITALITY GOAL:** Provide an efficient and effective interconnected transportation system that is coordinated with the state and local planning efforts to support thriving communities and South Carolina’s economic competitiveness in global markets.
- **ENVIRONMENTAL GOAL:** Partner to sustain South Carolina’s natural and cultural resources by minimizing and mitigating the impacts of state transportation improvements.

Each of these goals has a series of objectives, guiding principles, and performance measures that tie the conceptual elements of the vision and goals to actual program and project implementation.

From a federal perspective, additional goals for a statewide freight plan are identified in MAP-21. The six national goals below are incorporated into the South Carolina SFP. National goals have been categorized into the above listed goals established for the MTP.

Goals in the National Freight Policy established in 23 U.S.C. 167

1. Improving the contribution of the freight transportation system to economic efficiency, productivity, and competitiveness
2. Reducing congestion on the freight transportation system
3. Improving the safety, security, and resilience of the freight transportation system
4. Improving the state of good repair of the freight transportation system
5. Using advanced technology, performance management, innovation, competition, and accountability in operating and maintaining the freight transportation system
6. Reducing adverse environmental and community impacts of the freight transportation system

1.3 Stakeholder Input

In partnership with the South Carolina Department of Commerce (SCDOC) and the South Carolina Ports Authority (SCPA), the South Carolina Department of Transportation (SCDOT) partook in a wide range of stakeholder engagement to capture input and perspective from as many users of the state's transportation system as possible to develop a statewide freight plan to support the most users of the system. A detailed inventory of stakeholder outreach is available in the [Technical Memorandum: SC Statewide Freight Plan Stakeholder Input](#). This stand-alone document includes detailed survey questions and analysis of responses.

The stakeholder process started with the kickoff meeting for the overall Statewide Multimodal Plan, which included a freight oriented breakout discussion on July 31, 2012. Through the fall of 2012, one-on-one interviews began with members of the transportation industry, following an interview instrument. Online surveys were broadcast to members of the transportation industry active in South Carolina. In January 2013, a series of four regional listening sessions were held in Columbia, Florence, Greer, and North Charleston. Through the remaining months of plan development, a series of stakeholder webinars were hosted to provide updates to stakeholders and collect feedback on elements of the plan.

1.4 Kick-Off Meeting

A formal kick-off meeting of the South Carolina Statewide 2040 Multimodal Transportation Plan was held on July 31, 2012 at the Colonial Center in Columbia. Hosted by SCDOT, the kick off meeting was attended by approximately 140 stakeholders from around South Carolina. Key elements of the performance-based statewide multimodal plan include developing vision, goals, and objectives, formulating performance targets, identifying multimodal transportation needs, estimating future revenues, developing future scenarios, environmental screening, integrating bicycle and pedestrian planning, and safety. In addition to the statewide multimodal plan, the following individual modal plans have been developed:

- Statewide Strategic Corridors for Transport and Commerce;
- Interstate Highway Plan;
- Statewide Transit and Coordination Plan, Statewide Rail Plan, and;
- Statewide Freight Plan.

These individual plans, in addition to the Statewide Multimodal Transportation Plan, address state and federal requirements including MAP-21, the new surface transportation reauthorization act.

After a presentation on the background and purpose of the MTP, a freight break out group then focused a discussion on freight related issues. Approximately 30 people attended the freight break out group discussion. A series of questions were asked of the group, and the group continued a lively discussion of freight issues around South Carolina and the southeastern United States.

1.5 Freight Stakeholder Interviews

In late 2012, the CDM Smith Team conducted one-on-one interviews with key South Carolina stakeholders in the Statewide Multimodal Freight Plan. These entities were identified after canvassing private stakeholders in South Carolina in order to select a broad cross-sectional representation of manufacturers, shippers, and transportation service providers. While the respondents' identities will remain confidential as per the terms of conducting the interviews, a summary of the types of key stakeholders that were interviewed by the CDM Smith team is as follows:

- Cargo Airport
- Class I Railroad
- Full Service Heavy Haul Carrier
- Full Truckload carrier
- Large Manufacturer
- Multimodal logistics service provider

1.5.1 Respondent Demographics

Among the key stakeholders interviewed, most or all maintain corporate headquarters in South Carolina, with offices in Charleston, Columbia, Florence, and Greer. In addition to their headquarters' locations, the respondents reported additional offices and facilities in Darlington, Gaston, Greenville, Greenwood, Greer, Myrtle Beach, Spartanburg, and Swansea. While the respondents typically characterized their businesses as transportation and warehousing providers (75 percent of respondents) or manufacturers (25 percent), the stakeholders range in size from employing 25-50 people to having over 1,000 employees on their payroll. These outstanding companies provide a large amount of freight and shipments to South Carolina's supply chains each month, shipping goods via road (>15,000 truckload (TL) shipments per month), rail (>75,000 train cars per month), air (>10M tons per month), and water (>1000 sea containers per month; >2 ships per month).

1.5.2 Shipping and Receiving Overview—Geography

The key stakeholders interviewed represent global companies with key suppliers and customers in many neighboring states in addition to South Carolina: North Carolina, Georgia, Alabama, and Tennessee. A predominant response during the survey was that these key Transportation, Distribution and Logistics (TDL) stakeholders focus their efforts east of the Mississippi River, with some emphasis being placed on large U.S. coastal towns. The major airports that facilitate air cargo work with customers who have established facility locations. Air cargo carriers normally operate on the airport premises or in close proximity to facilitate immediate shipment of time-sensitive or valuable freight. In contrast, truckload carriers typically locate their operations close to their customers' facilities and/or requirements in order to provide fast, effective transportation resources.

1.5.3 Shipping and Receiving Overview—Products and Markets

South Carolina's strength in freight transportation was made evident as the key stakeholders described the wide variety of products and goods that they manufacture and/or ship from/to their locations in the state. Some of the key product types or groups mentioned by the interviewees included the following:

- Automotive (e.g., vehicles, vehicle kits, engines, exhausts, instrumentation, seating, accelerators, and brake pedals)
- Consumer and retail items, including e-commerce, food, and beverages
- Industrial materials (e.g., iron, steel, scrap metal, beams, chemicals, and plastics)
- Paper, packaging, and home improvement items
- Heavy haul loads (e.g., mine support shield, construction equipment, heavy industry)

While no single product group or type was uniformly recognized as the fastest growing in South Carolina, the stakeholders mentioned that pharmaceutical, automotive, agriculture, and consumer retail market products were each experiencing growth in late 2012. Many of the stakeholders interviewed are involved in both domestic and international trade.

1.5.4 Shipping and Receiving Overview—Facilities

Private stakeholders utilize warehouses of all sizes depending upon product types and volumes. While the smallest respondent reported operating a 4,000 square foot facility with three dock doors, other stakeholders operate and manage facilities in excess of 500,000 square feet with hundreds of dock doors. Further, one respondent described their rail-based infrastructure as containing over 20 miles of track and rail spurs. This is in contrast with a respondent who reported simply a short segment of rail being available to their TDL operations.

1.5.5 Shipping and Receiving Overview—Transportation Modes

While the majority of the stakeholder respondents reported using full truck load (TL) transportation, a large number of the respondents also utilize both air and rail transportation modes for their shipping needs. Rail shipments were characterized as both box car loads and containers, while less than truckload (LTL) shipments were also mentioned by the respondents in addition to full TL. In addition to air cargo operations, some respondents reported using expedited packages and/or operating specialized transport assets in their supply chains. South Carolina businesses regularly use express carriers, freight forwarders, and air charter services for their air shipping needs. A number of the stakeholders interviewed utilize the Port of Charleston for shipping operations, as well as other key ports such as Savannah and New York/New Jersey.

Some respondents mentioned the slow economy has benefitted them by the increased availability of rail capacity. One respondent suggested that they have concern with consistency and reliability of rail service, which often causes them to choose an alternative mode of freight transport. While freight transit speed is desirable, respondents stated reliability and consistency of transit time is more important.

The development of an inland port in Greer by the Port of Charleston and Norfolk Southern Railroad was identified by some respondents as potentially beneficial, while others indicate it would not be helpful to their needs. While an interesting mix of responses were received from the stakeholders, the predominant tone of these responses was positive as rail was seen an economical, environmentally

friendly way to move freight. In addition, as South Carolina's Upstate region both sources and consumes a large amount of the state's TDL freight, the location of the port was deemed reasonable by the respondents and identified as a way to both grow Greenville-area businesses and help reduce the volume of trucks on the I-26 corridor. However, some respondents feared that the inland port will cause some truck carriers' business to decline and could cause additional, unwanted traffic issues on the roads that service the inland port's Greer location (including SC 101 and I-85). However, from an infrastructure perspective, having the multimodal option was viewed as necessary and it will provide opportunities for geographic expansion to the west from the Upstate.

1.5.6 Key Supply Chain Factors and Performance Requirements

Many different factors have the potential to impact a company's supply chain structure and delivery performance capabilities. Many of the stakeholders interviewed put special emphasis on transportation costs and on-time or just-in-time delivery to and from their customers and suppliers. It is not uncommon for carriers to target their deliveries within delivery windows that are less than two hours wide. In the extreme, one carrier reported their customer's requirement for a 15 minute delivery window is due to process/batch setup restrictions. Failure to meet such stringent delivery windows can result in a missed production run or stopped production or construction operations. In fact, more than one respondent reported that they were held financially responsible for any operations downtime caused by their own late or tardy shipment arrival.

In order to provide such timely transportation, a number of respondents suggested that access to non-highway modes of transportation plays a key role in delivery performance. Most stakeholders stated the freight network in South Carolina was adequate. While one respondent noted that new bridges in the Charleston and Myrtle Beach areas have made a positive impact on their operations, another stakeholder cautioned that congestion and bottlenecks in the freight network can be costly in terms of impacting a firm's available hours of service (e.g., >\$100 per hour in lost opportunity cost).

The biggest challenge facing the interviewed stakeholders in terms of meeting their supply chain and freight mobility needs is the condition of South Carolina's transportation infrastructure. A majority of the stakeholder respondents suggested that this problem will only grow if not properly addressed and funded. While the lack of a trained workforce was also mentioned by some respondents as a challenge, it was noted that South Carolina's technical schools are doing a good job of delivering a better quality of truck driver than is available in other states. Finally, in addition to facilities and/or service needs, most respondents agreed that increased regulations are causing increased transportation rates and costs (e.g., >25 percent increase in trucking costs since 2008 due to EPA emissions rules, hours-of-service regulations, and operational costs).

1.5.7 South Carolina Transportation Strengths and Opportunities for Improvement

The key TDL stakeholders interviewed had many positive comments pertaining to the Statewide Multimodal Transportation Plan and the current state of TDL in South Carolina. The strengths of South Carolina that were mentioned include the Port of Charleston and its deep water draft and a reliable work force. South Carolina's outstanding cargo airports were cited for their ease of accessibility, and

the state's truck and rail capabilities were seen as reputable and effective. Taken as a whole, South Carolina TDL companies can (and do) serve communities east of the Mississippi River in <24 hours due to our state's excellent access to interstate highways I-85, I-95, I-77, and I-26. Finally, many respondents applauded SCDOT, SCPA and the Department of Commerce for their progressive leadership.

When asked about overall improvement opportunities for the state of South Carolina's TDL industry, many respondents focused on the state's transportation infrastructure. Comments focused on areas of roads that have been neglected, needed infrastructure maintenance, and limited resources for our state's infrastructure. Many of the key stakeholders interviewed suggested that if no solution is found to our state's current infrastructure issues, there will be no reason for companies to set up businesses in South Carolina. Further, stakeholders would not want to see access to the newly announced inland port impacted due to external transportation infrastructure and congestion issues. The general sentiment was that infrastructure repair and maintenance is needed to keep South Carolina TDL firms competitive, especially on our state's bridges and interstates. Closures, detours, and re-routes can be severely detrimental to business and economic development.

1.6 Online Surveys

In accordance with USDOT guidance in Section 1117 of the federal transportation reauthorization legislation, MAP-21, the MTP solicited input from the users and providers of the state's freight transportation system. The information requested from this stakeholder group, e.g. motor carriers, manufacturers, distributors, provides private sector observations on:

- Supply chain influences on modal availability and selection,
- Contribution of the state's freight transportation infrastructure to goods movement,

A limitation to the accuracy of this information is the sample size, rate of survey completion, and with anonymity of the respondent, the ability to clarify or fact check responses. The value of stakeholder input continues to possess significant benefit for the plan by providing practical operator experience in comparison to the policy and investment outcomes of previous planning efforts.

1.6.1 Survey Audience

A link to the survey was provided to the freight stakeholder group through SCDOT and other outlets. The intended audience was, but was not limited to:

- Carriers among the transportation modes, e.g. air, highway, rail, water
- Manufacturers and industrial facilities
- 3PL, 4PL, logistics, freight forwarders
- Distributors
- Advocacy groups, associations

1.6.2 Survey Structure

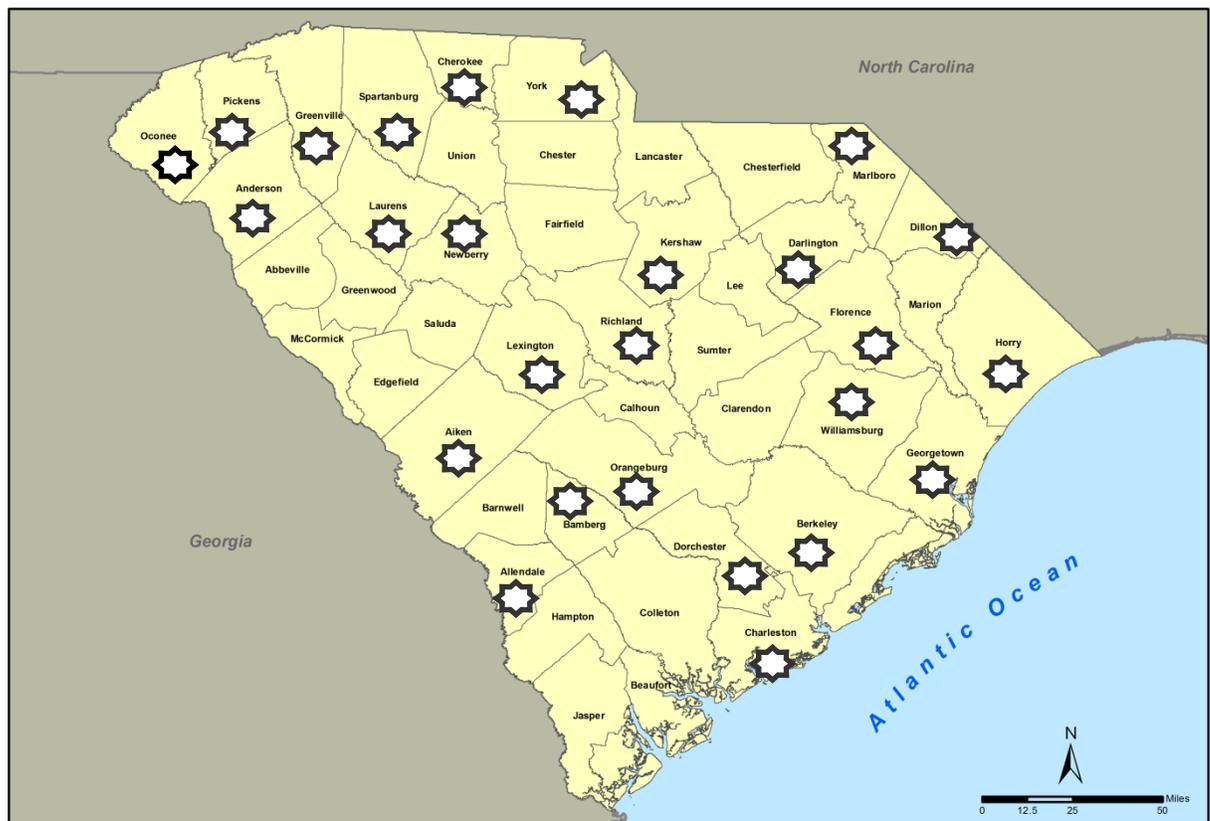
The survey utilized an online form consisting of twenty-seven questions. Questions were formed into sections, listed below:

- Part A / Background: Information on the respondents organization
- Part B / Facilities and Markets: Description of commodities and markets served
- Part C / Modes and Services Requirements: Modal usage descriptions
- Part D / Service Requirements: Modal selection criteria
- Part E / Operating Conditions in South Carolina: Observations of the freight transportation system
- Part F / General Transportation Service: Evaluations of the freight transportation system

Ninety-nine respondents participated in the survey. Forty-six completed the entire survey.

The survey identified 90 locations for respondents with 84 being located in the counties noted in **Figure 1-1**. The remaining respondents self-identified as counties located in neighboring states, simply as the United States, or international.

Figure 1-1: Respondents by County



The locations represented are within the economic spheres of larger population centers, e.g. cities of Charleston, Myrtle Beach, Florence, Columbia, Greenville, Spartanburg, Charlotte, NC, and Augusta, GA. Rural regions in the state, potentially representative of spheres centered on the towns of McCormick, Greenwood, Sumter, and Beaufort did not participate.

1.7 Regional Listening Sessions

The statewide planning team held a series of regional listening sessions. Geographically, the meetings were held in locations where attendees had to drive less than one hour to attend. Four locations were identified: Columbia, Florence, Greer and North Charleston. **(Figure 1-2)** Invitations were sent via email and invitees were asked to register via the online based Evite invitation service.

The total number of attendees at the four regional listening sessions was 95, with 79 meeting worksheets being completed.

The meeting format for each of the four regional listening sessions was identical with an introduction from SCDOT, a welcome from the TDL Council, and then a facilitated discussion about freight and infrastructure. During the facilitated discussion, notes were typed and projected for the attendees to review and correct as necessary.

Figure 1-2: Location of Regional Listening Sessions



Three questions were asked of the participants to guide the discussion. The specific worksheet language is provided below:

1. *“What **current plans** are supportive of your business, and what is not being addressed in planning and infrastructure that needs to be addressed to help your industry in the future?”*

(Worksheet Language, “With your current freight transportation needs and known responses in mind, what is working in our state today? ...What needs are not adequately addressed and how may they?”)

- What is working well? (Positive conditions)
 - What’s not (e.g. gaps, deficits, etc.)? (Negative conditions)
2. “What current plans are supportive of your business, and what is not being addressed in planning and infrastructure that needs to be addressed to help your industry in the **future**?” (Worksheet Language, “Looking into the future, what changes in your freight transportation needs will need to be addressed in future plans? ...Are there potential future conditions which currently are not being addressed? ...Is there a solution currently being pursued which will address a future need?”)
- What are the future opportunities that should be leveraged? (Opportunities)
 - What are the future challenges that should be addressed? (Challenges)
3. “What element of the multimodal transportation plan are you most interested in seeing the results and recommendations of?” (Worksheet language, “What specific area should be addressed in the plan?”)

The responses varied in different regions of the state as did the responses on worksheets compared with those verbalized in the sessions. Common themes resulting from Question 1, “With your current freight transportation needs and known responses in mind, what is working in our state today?” and “What needs are not adequately addressed and how may they?” is summarized as follows:

Is Working	Is Not Working
Good Interstate System	Interstate Congestion
Good Access to intermodal points (port, rail terminals, airports)	Roadway Maintenance/Pavement Conditions
Port of Charleston	Capacity and condition of roadways and railways at intermodal connections

In responding to the questions about what is and is not working well today, the themes heard, by location included:

COLUMBIA

Is Working	Is Not Working
Good Interstate System	Roadway Maintenance
Good Port and Port Planning	Intermodal Connections
Good Intermodal Planning (rail, highway, air, water)	Need better planning coordination between state and local agencies

FLORENCE

Is Working	Is Not Working
Rail customers report good business through Port of Charleston	Interstate Congestion
Good Interstate Access	Trucks in historic downtowns
Successful local transportation sales tax program	Unsafe rail crossings

GREER

Is Working	Is Not Working
Good Interstate System	Roadway Maintenance
Good Air System; Greenville-Spartanburg Airport (GSP) is a model for efficiency	Interstate Congestion
Good access to Port of Charleston	Short line rail access has been reduced and is needed for industrial development

NORTH CHARLESTON

Is Working	Is Not Working
Good Interstate System	Roadway Congestion
Good connectivity between freight origins and destinations	Hours of operation at port terminals
Good support from SCDOT to trucking industry	Roadway Maintenance
	Lack of leadership in project execution

For Question 2, “Looking into the future, what changes in your freight transportation needs will need to be addressed in future plans? ...Are there potential future conditions which currently are not being addressed? ...Is there a solution currently being pursued which will address a future need?” the following represents common themes from all four regional meetings:

Common themes, by location, in responses to Question 2 were as follows:

COLUMBIA

Opportunities	Challenges
Support for harbor deepening and port expansion	Interstate congestion to accommodate growth
Positive inland port and intermodal planning	Need more rail access to accommodate growth
Existence of investment looking for a plan in SC to develop industrial properties	Lack of availability of alternative fuels
Develop a prioritization plan to outline goals for SC growth	Need better planning coordination across transportation and utilities for planned growth

FLORENCE

Opportunities	Challenges
Available land for infrastructure growth	Lack of disaster planning
Observing growth in multiple industries (food processing, wood pellets, aerospace)	Railroads planning for expansion but lack of “last mile” planning in place
Available short line railroads can be preserved and used to support industrial growth	Federal regulations will still be in place, regardless of state policy and regulation
Available workforce and training programs	Neighboring states are making advances in support of economic growth

GREER

Opportunities	Challenges
Expectations of growth	Lack of clear plan to move infrastructure improvements forward to support growth
Much auto traffic is local; potential for transit solutions to congestion	Lack of “Certified Industrial Sites” for growth
Looking to technology to assist in mitigating transportation issues (INRIX travel time data, electric vehicles, autonomous autos)	Need to plan ahead for intermodal capacity needs (GSP, SCPA Inland Port Terminal)
Plan for multimodal transportation system (SCPA Inland Port Terminal, GSP)	Community engagement and education

NORTH CHARLESTON

Opportunities	Challenges
Political support for infrastructure finance is increasing	Capacity of infrastructure to accommodate port expansion and regional growth
Community in support of alternative transportation finance solutions	Education and awareness of the public of freight issues and transportation needs
Success of local sales tax programs	Short haul pricing compared with rail movements
Coordination across state agencies to leverage common goals	Infrastructure projects need to be coordinated with planned land use development

For Question 3, “*What specific area should be addressed in the plan?*” the following represents the common themes from the four regional meetings:

1. **FUNDING** – In every meeting, funding and project finance were mentioned more than all other topics. There was agreement that without a long term funding scenario, the statewide plan strategies would not support their business and community needs. The comments and suggestions ranged from fuel tax considerations to local option sales tax programs to public private partnerships. All groups agreed they look forward to having a better understanding of the long term plan for financing both new construction projects as well as maintenance of the transportation system.

2. **PRIORITIZATION** – Along with funding, all groups vocalized concern over state level prioritization of transportation projects and funding allocations. While most agreed they would support higher fees or taxes to support transportation, all agreed clearly presented project prioritization would be required to gather such support. Suggestions included cost/benefit analyses for transportation projects, case studies of how other such projects have been beneficial elsewhere, and measuring the impacts of a project on the local community and economic development as part of the ranking process.
3. **SPECIFIC INFRASTRUCTURE PROJECTS** – Each region indicated specific roadways of regional concern. In most cases, Interstate highways were listed by name (i.e., I-26, I-95, I-85, I-385, and I-73). Groups were interested in learning of how their local concerns ranked on a statewide level with needs of other communities and if the funding for such projects were prioritized.
4. **MULTIMODAL TRANSPORTATION GOALS** - Each region had unique interests, but all regions expressed an interest and desire to know the statewide plan considerations for mass transit, use of inland waterways to move goods, and intermodal shifting potential for goods. All regions expressed interest in how to improve efficiencies of moving goods and people across modes in both urban and rural areas for both time and cost benefits, including transit to serve the growing retirement and urban workforce populations and transportation systems to support rural land use development, drive the cost of truck to rail transfer downward, and provide alternatives to truck traffic increases expected with growth at the Port of Charleston.

1.8 Stakeholder Webinars

In an effort to reach out to stakeholders throughout the development of the MTP, a series of webinars were hosted by SCDOT. The format of the webinar was an online based presentation with telephone accessed, spoken presentations. Participants had the ability to post questions and ask them over the phone through a meeting operator. The audience was presented with poll questions from time to time when feedback was requested of the group. All webinars were hosted during the business day, allowing stakeholders from around the state to participate from their home or place of business without the burden of travel to a central meeting location. Handouts and agendas were provided through both the project website as well as the webinar LiveMeeting® interface.

The first freight stakeholder webinar was hosted on Wednesday, April 10, 2013. Thirty-eight participants attended the webinars via internet and teleconference. The webinars were grouped by mode to appeal to a synergistic group of stakeholders. The freight stakeholders were grouped with the stakeholders also interested in the Rail Plan due to the overlap of information, data, and analysis of the two modal plans. The agenda of the webinar included an overview of the overall statewide plan, specifically the Vision, Goals, and Performance Measures along with an update on the progress of the MTP. The discussion of the freight plan included a progress report of the plan development and a presentation of the freight system of SC. Commodity flow data and traffic congestion maps were presented for review by the stakeholders. Time was allotted for interactive questions and answers.

A second freight stakeholder webinar was hosted on Tuesday, January 7, 2014. 53 participants attended the webinars via internet and teleconference. The webinars were again held in groups by mode to attract stakeholders with similar interests, so the freight webinar was held in conjunction with the Rail Plan webinar. The agenda included an update on the MTP, including a briefing on revenue projections, modal scenario planning efforts, and modal needs in SC. The freight plan discussion included a progress report of the plan development and a presentation of the goals and objectives of the SFP, a presentation of the Strategic Freight Network, and an introduction to the proposed performance measures as related to evaluating the performance of the Strategic Freight Network. Time was allotted for interactive questions and answers during the webinar presentation.

1.9 Freight Advisory Committee

A recommendation in MAP-21 Sec. 1117 provides guidance for the development of a SFP to establish a State Freight Advisory Committee to assist in the development of the plan and provide an ongoing advisory role in statewide freight planning. SCDOT has created such a committee, which will be referred to as the “Freight Advisory Council” (FAC), to participate in the late phases of the development of the SFP and to continue monitoring on-going freight related planning activities. The inaugural meeting of this committee was held in May 2014.

The following defines the approach for forming and engaging a SCDOT State Freight Advisory Committee. This proposed approach is intended for on-going discussion through the recent establishment and ongoing role of the FAC.

1.9.1 Purpose for the State Freight Advisory Committee

In accordance with MAP-21 Sec. 1117, the purpose of a State Freight Advisory Committee is twofold:

- As drafts of the Statewide Freight Plan become available, the SFAC would review and assist in the finalization of the SFP;
- After the completion of the SC MTP and SFP, the Committee’s long term purpose is to continue to provide guidance to SCDOT on freight transportation matters, issues, trends, and needs.

1.9.2 Duties and Responsibilities of the State Freight Advisory Committee

A list of proposed duties and responsibilities of a State Freight Advisory Committee follows. The SFAC’s proposed duties and responsibilities are intended to compliment and not duplicate the roles or responsibilities of existing state mandated committees.

Through SCDOT, a State Freight Advisory Committee will:

- 1) Make recommendations and propose methods, strategies, or technologies to improve, promote, and preserve the freight rail, water, highway, air cargo, and intermodal facilities and transportation systems in South Carolina;
- 2) Provide guidance on freight-related transportation issues including priorities, projects, and funding needs;

- 3) Promote freight related transportation systems and capital infrastructure improvements throughout South Carolina;
- 4) Assist SCDOT in ensuring that the department's program prioritization process and methods for determining priorities among locations remain accurate and responsive to freight needs;
- 5) Guide SCDOT's continuous state transportation systems planning processes;
- 6) Provide a forum for exchange of information concerning the public and private sectors' view of needs and requirements in the state's transportation systems; and
- 7) Participate in future statewide freight planning efforts.



2 FREIGHT INFRASTRUCTURE, CONDITIONS AND THE STRATEGIC FREIGHT NETWORK

Preserving and enhancing the infrastructure that moves goods through and within South Carolina for all modes is important. Continuing to provide important connections for freight generators/attractors to the routes moving freight and connections between modes is critical in retaining existing industries and attracting new industries in the state. Identifying a Strategic Freight Network (SFN) including roadway and railway networks and the modes they connect is an important step in identifying what corridors and assets are important to the movement of freight.

2.1 Profile of Freight Transportation Assets

Reemergence of high volumes of waterborne traffic at the Port of Charleston facilities in recent decades has and is continuing to shape the current multimodal infrastructure within the state. Investment has occurred, publicly and privately funded, generating a network reflective of the modal needs of the freight transportation system user. As the needs of the user change or shift in priority, the current system will serve as the foundation on which investments will be applied. This section will provide a catalogue of each mode's specific infrastructural features.

2.1.1 Highway

Highway goods movement is a cornerstone to the national freight transportation system. Highway, or "trucking", transports 70 percent of all the tonnage in the U.S. This takes place as "over-the-road" or short to long distance truck trips and "final mile" or pick-up and delivery movements. The dominance of the mode is derived through access and availability. Except where shippers or receivers have constructed facilities with immediate access to rail, water, or air assets, trucks serve as a connector between the alternative mode and the user or as the single transport mode. The lack of immediate access to other modes extends beyond the individual user. Resulting from geography, consolidations or bankruptcies, and operational decisions within the individual modes, communities and regions have been left without direct service by the other modes of water, rail or air. This lack of access to alternative modes has resulted in 80 percent of those communities, across the country, singularly dependent on trucking for access to goods and materials.

Availability is a second factor in this mode's dominant position in the freight transportation system. The "barrier to entry" or level of start-up and continuing costs for trucking is the lowest of all the modes. This characteristic has generated an extremely high number of providers. The lower operating costs, as compared to rail or air, and the elevated number of participants in this mode has produced a trend of lower costs to users accompanied by a higher level of service customization to meet the individual user's needs. As a result, users engage highway transport, in many cases, where alternative modes are accessible, as a part of or encompassing the entire transportation solution.

Highway infrastructure consists of several key elements. The key associated features of the infrastructure can be examined through a comprehensive examination of:

- Functional Class
- Bridges
 - Minimum Vertical Clearance
 - Weight or Load Restrictions
- Railroad Crossings
 - At-grade
 - Grade Separated

2.1.1.1 Infrastructural Features

The dominant feature utilized by trucking is the publicly available roadway network. This network consists of multiple classifications, each assigned to a specific roadway in a collaborative manner by the involved jurisdictions. Assignment of the specific classification is dependent upon the intended use. The major functional systems, as defined by American Association of State Highway and Transportation Officials (AASHTO) Design Policy Manual, are Freeway, Arterial, Collectors, and Local Streets. As local streets are typically not intended to carry truck traffic, except to accommodate immediate access for pick-up or delivery functions, the focus for truck movements are Collector and above. These three classifications have additional sub-classifications within each, providing further definition, e.g. urban versus rural, principle versus minor.

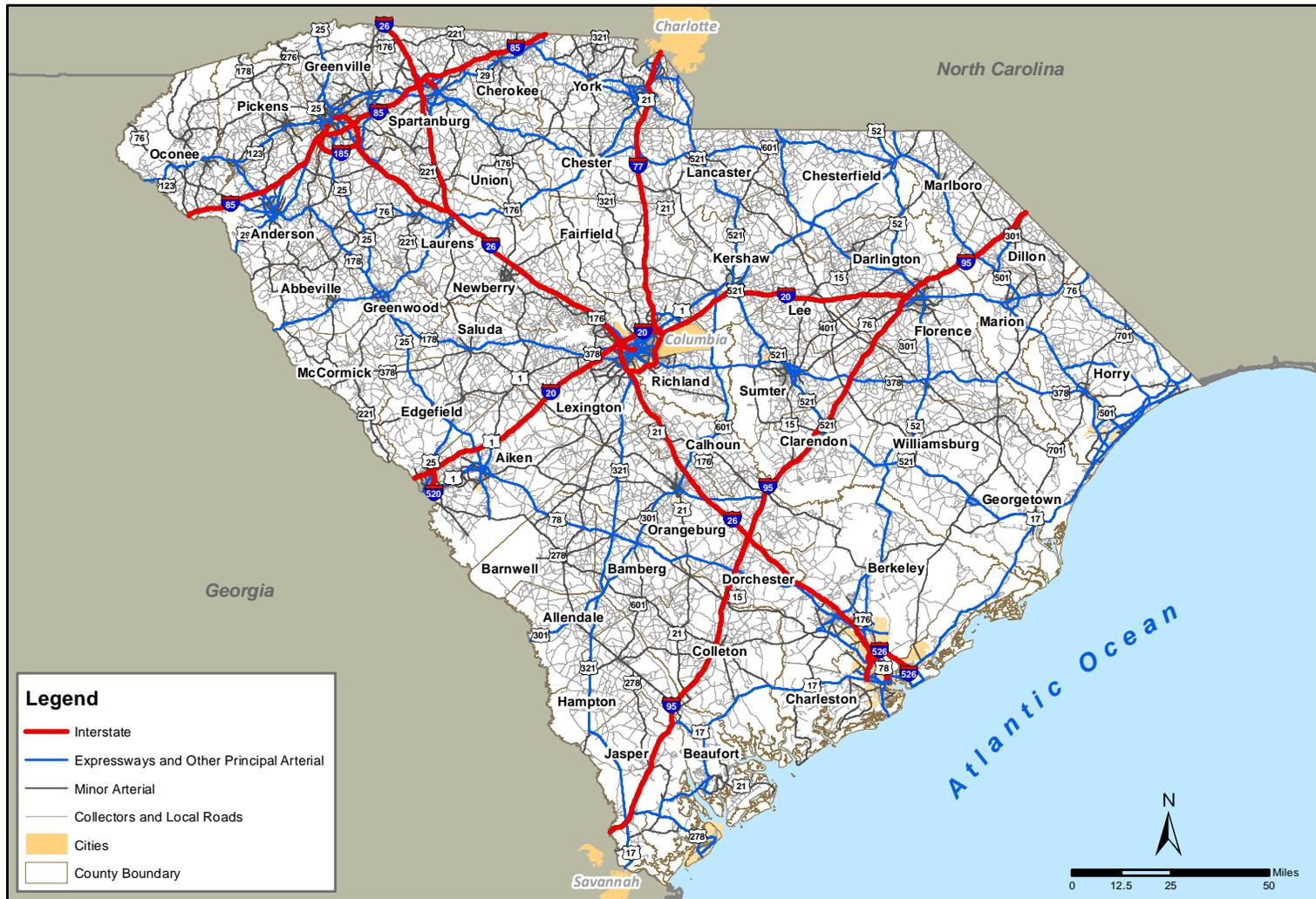
SCDOT maintains the fourth largest center line miles measured state network in the nation. **Table 2-1** notes the total mileage for each of the classifications with **Figure 2-1** illustrating the presence of each of these classifications within the state.

Table 2-1: Mileage, by Classification in South Carolina

Road Classification	SCDOT	
	Miles	Lane Miles
Rural Roads		
Rural Interstates	580.5	2,375.9
Rural Principal Arterials	1,289.4	3,860.0
Rural Minor Arterials	3,278.7	7,247.1
Rural Major Collectors	10,318.0	20,734.3
Rural Minor Collectors	1,976.2	3,952.3
Rural Local Roads	12,822.2	25,660.7
Rural Totals	30,264.9	63,830.3
Urban Roads		
Urban Interstates	270.1	1,423.6
Urban Expressways	81.8	320.4
Urban Principal Arterials	1,053.3	3,951.7
Urban Minor Arterials	1,477.7	3,968.2
Urban Collectors	2,207.4	4,646.4
Urban Local Roads	6,054.1	12,204.8
Urban Totals	11,144.4	26,515.1
Rural + Urban	41,409.3	90,345.4

Source: 2012 SCDOT Highway Performance Management System (HPMS) database

Figure 2-1: Functional Classifications, South Carolina



Functional classification and the associated characteristics may be used as a predictor of truck usage. Though final construction may be inconsistent with the design characteristics, as a whole, the intended use and design vehicle will guide features that may induce commercial operator usage.

2.1.1.2 Interstates

The first and most identified functional class for truck use is the interstate system. This limited access highway provides a reliable and safe roadway to transport goods typically over long distances. Though restricted by the ability to access other roadways, local or shorter distance trips may gravitate to these systems. This classification is described as:

- Designed for uninterrupted flow
- Access to the freeway facility is controlled and limited to ramp locations. A freeway experiencing extreme congestion differs greatly from a non-freeway facility experiencing extreme congestion, in that the conditions creating the congestion are commonly internal to the facility, not external to the facility.
- May have interactions with other freeway facilities as well as other classes of roads in the vicinity. The performance of a freeway may be affected when demand exceeds capacity on these nearby road systems.

Five interstates travel through the state; I-20, I-26, I-77, I-85, and I-95.

- I-20
 - Termini
 - Near Florence, SC, at the junction with I-95
 - Near Kent, TX, at the junction with I-10
 - Total distance is 1,539 miles with 141 miles within the state
 - Major municipalities
 - Florence, SC
 - Columbia, SC
 - Augusta, GA
 - Atlanta, GA
 - Birmingham, AL
 - Jackson, MS
 - Dallas/Ft Worth, TX
- I-26
 - Termini
 - In Charleston, SC, at the junction with U.S. 17
 - In Kingsport, TN, at the junction with U.S. 11W
 - Total distance is 347 miles with 221 miles within the state
 - Major municipalities
 - Charleston, SC
 - Columbia, SC

- Spartanburg, SC
- Asheville NC
- I-77
 - Termini
 - Near Columbia, SC at the junction with I-26
 - In Cleveland, OH, at the junction with I-90
 - Total distance is 611 miles with 90 miles within the state
 - Major municipalities
 - Columbia, SC
 - Charlotte, NC
 - Charleston, WV
 - Cleveland, OH
- I-85
 - Termini
 - In Montgomery, AL, at the junction with I-65
 - In Petersburg, VA, at the junction with I-95
 - Total distance is 669 miles with 106 miles within the state
 - Major municipalities
 - Montgomery, AL
 - Atlanta, GA
 - Greenville/Spartanburg, SC
 - Charlotte, NC
 - Greensboro, NC
 - Petersburg, VA
- I-95
 - Termini
 - In Miami, FL, at the junction with U.S. 1
 - Near Houlton, ME, at the Canadian border
 - Total distance is 1,924 miles with 199 miles within the state

The posted speed limit for interstates and other limited access facilities in the state is noted in **Table 2-2**. Truck volumes on South Carolina interstates are shown in **Figure 2-2**.

The design vehicle² for this classification is wheelbase-67, or WB-67, with a design speed of 70 mph. The WB-67 is defined as a tractor-trailer, instate combination vehicle with an overall wheelbase of 67 feet.

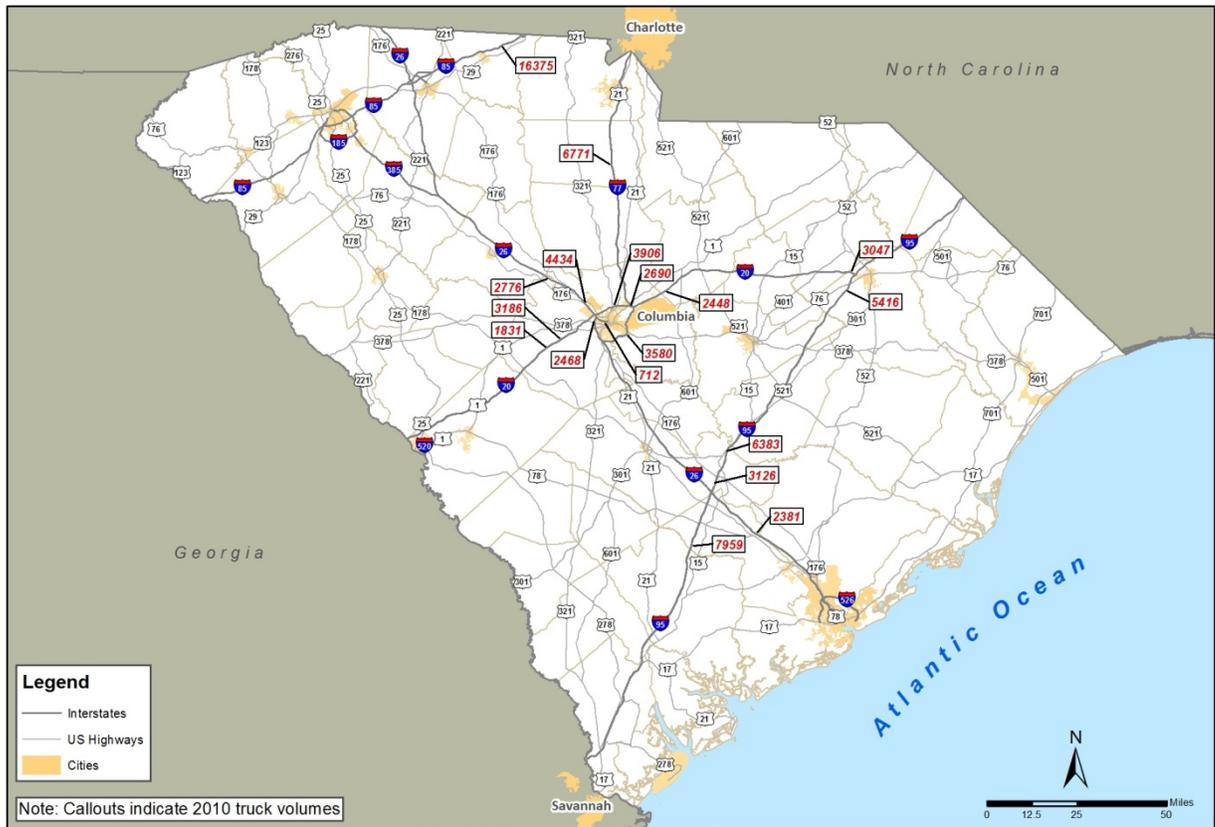
² Vehicle type with defined operational characteristics utilized in the design of features on a roadway. Design vehicle represents the vehicle with the most significant performance needs for the intended use of the roadway.

Table 2-2: Posted Speed Limits, Interstate and Other Limited Access, South Carolina

State	Rural Interstates		Urban Interstates		Other Limited Access Roads	
	Cars (mph)	Trucks (mph)	Cars (mph)	Trucks (mph)	Cars (mph)	Trucks (mph)
South Carolina	70	70	70	70	55	55

Source: GHSA, http://www.ghsa.org/html/stateinfo/laws/speedlimit_laws.html, February 12, 2013

Figure 2-2: 2010 Interstate Truck Volumes



2.1.1.3 Arterial

The arterial class represents a set of roadways intended to be used for longer trips and accommodate greater traffic volumes than collectors or local roads. Arterials can provide for more efficient through trips, which are longer than trips on collector facilities and local streets.

This classification provides access to areas not adjacent to the interstate system and between non-adjacent areas of freight activity, not immediately accessible by the interstate system.

Arterial posted speeds are designated in coordination between relevant jurisdictions. This applies to existing and future roadways.

The design vehicle for this classification consists of three types, corresponding to the sub-classification. For Interstate Principle Arterial the design vehicle is WB-67 with a design speed of 65 mph. Primary or Principal Arterial, rural and urban, range from WB-40 to WB-62, with rural design speed of 65 mph and urban of 55 mph. Minor arterial, rural, the SU or single unit truck is the design vehicle at 65 mph. The urban sub-classification differs, using the WB-40 at 40 mph.

2.1.1.4 Collector

This classification provides traffic circulation patterns in commercial, residential areas and distributes traffic from arterials to local destinations. Truck utilization of these roadways typically reflects local truck trips.

The design vehicle for rural and urban collector is the SU or single-unit truck. Design speed varies from 55 mph for rural to 35 mph for urban.

2.1.1.5 Bridges

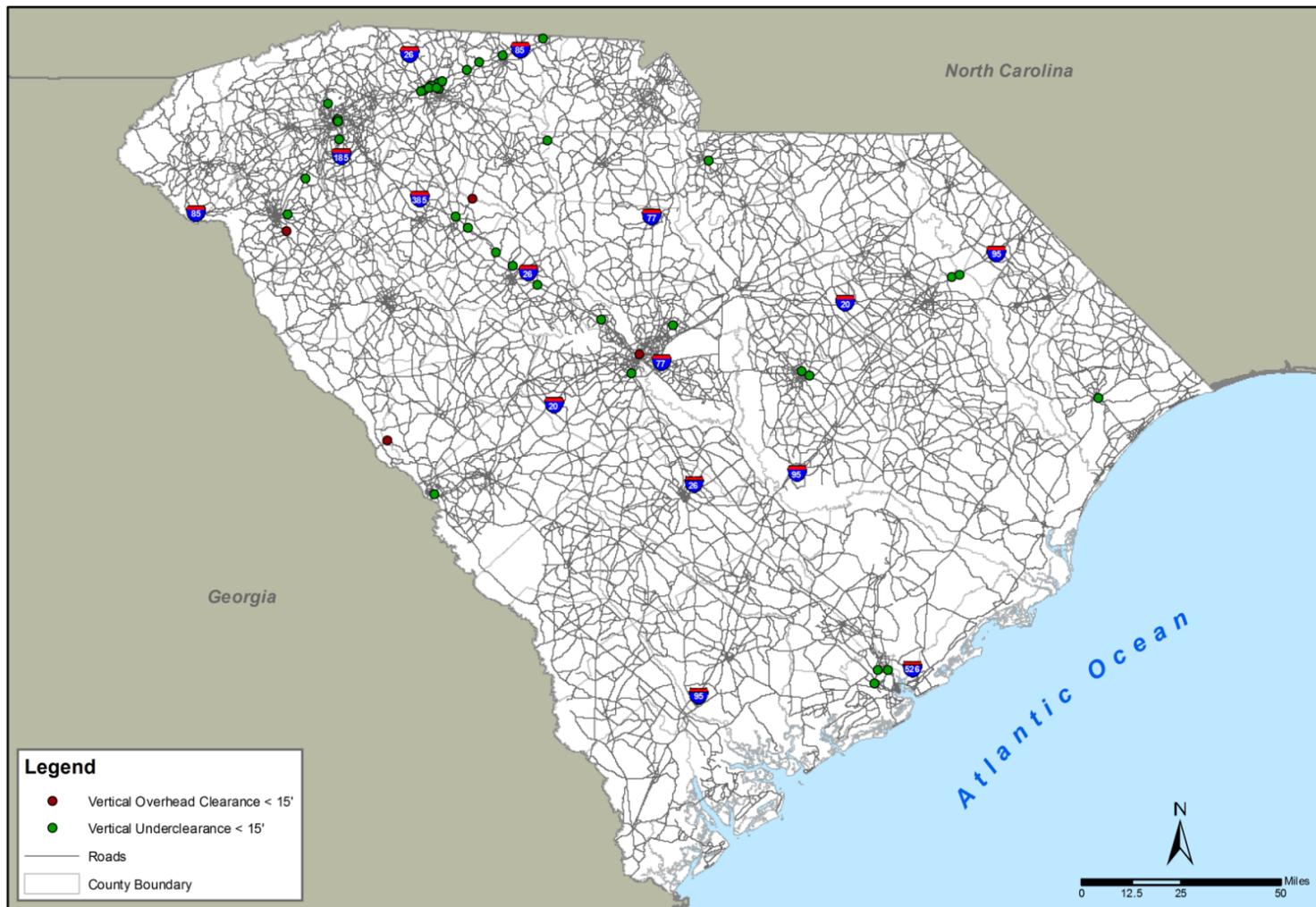
Two physical characteristics of bridges located on or spanning the roadway impact the inclusion as part of a commercial motor vehicle (CMV) operator's route: Vertical Minimum Clearance and Weight-Load Restrictions. Vertical minimum clearance is the distance from the road surface to the lowest point on the overhead obstruction (bridge) within the confines of the travel lane. The larger CMV, class 8, which includes interstate tractor-trailer combinations and many of those combinations used for pick-up and delivery, has an operating height of 13 feet and 6 inches.³ Interstate design standards have a minimum vertical clearance standard of 15 feet. Other functional classes may not define clearance standards or include structures built prior to standards being introduced. On collector, arterial and interstate roadways within the state, there are 47 bridges reported as less than 15 feet, in under or over clearance. Forty-three bridges are on the classification itself, presenting less than 15 feet clearance to vehicles traveling on roadways passing beneath. Four pass over the classified roadways with less than 15 feet clearance.

Figure 2-3 illustrates the location of these bridges.

Weight-load restrictions limit the gross vehicle weight (GVW) of a vehicle driving across the structure. These restrictions may be a function of the bridge design and intended purpose or use. Another factor may be the level of previous use or structural age. In combination, a restriction placed on a bridge may range from a simple notation, without any formal limitations, to a more defined restriction on what weight and types of vehicles may use the structure. There are 136 bridges with specific load restrictions assigned. One is categorized as a "B," 5 are "K," and 135 are "P." Relevant categories for this inventory are described in **Table 2-3**. These are illustrated in **Figure 2-4**.

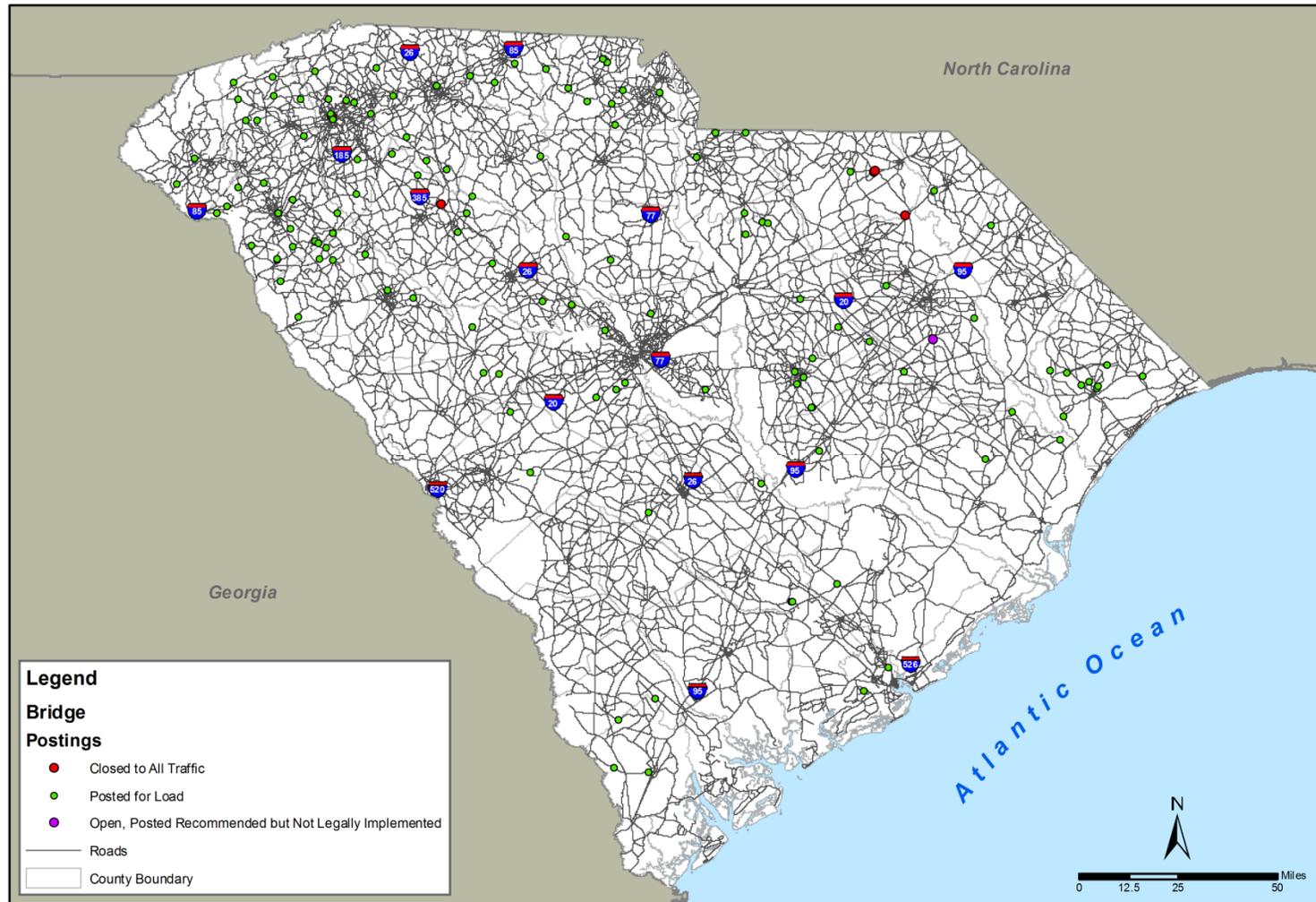
³ Equipment in excess of this height, dependent upon state and local regulations, are subject to permitting requirements. Those requirements have a route selection component that must account for and avoid low clearances.

Figure 2-3: Bridges, Vertical Clearances, Over and Under, Less than 15 feet



Source: National Bridge Inventory File, 2012

Figure 2-4: Bridges, Load Restrictions



Source: National Bridge Inventory File, 2012.

Table 2-3: Load Restriction Categories

Load Restriction Categories	Description
B	Open, posting recommended but not legally implemented (all signs not in place or not correctly implemented)
K	Bridge closed to all traffic
P	Posted for load (may include other restrictions such as temporary bridges which are load posted)

Source: National Bridge Inventory File, 2012

2.1.1.6 Railroad Crossings

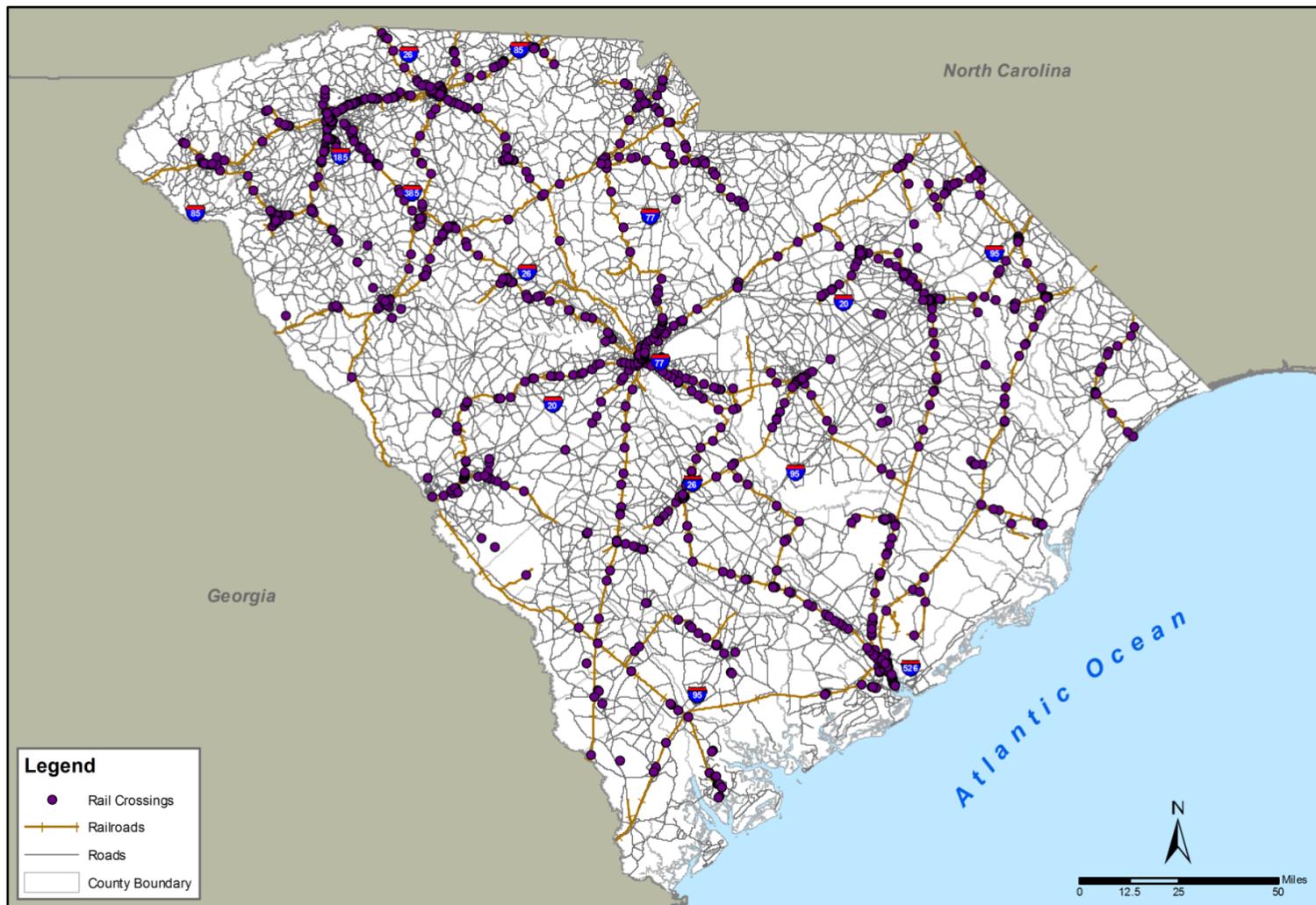
The presence of railroad crossings, more specifically at-grade, on roadways has the potential to offer safety or operational concerns to those CMV utilizing the roadway. Grade separated crossings, where the roadway and rail are at different elevations, pose a concern of clearance versus an actual CMV and train interaction. The ability for the CMV to travel across a raised track, to fully exit the path of a potential train before reaching a stop bar, or have the line of sight to identify warning signalization are three leading causes of CMV and train related accidents. Depending on the type of cargo being transported, CMV operators may be required to come to a complete stop before proceeding across an at-grade crossing. This has the potential to adversely affect the flow of CMV and passenger vehicles.

There are 640 grade separated crossings located within the state. At-grade crossings are more prevalent at 3,493. **Table 2-4** notes the number of crossings by functional classification. A high number of crossings lack a detailed road classification. The absence of this field, in the Federal Railroad Administration’s data base for railroad crossings, results from individual inspectors failing to notate the proper or any classification at the time of the inspection. **Figure 2-5** illustrates the locations of known grade separated and at-grade crossings.

Table 2-4: Railroad Crossings, by Functional Classification

Highway Classification	Total Crossings	At Grade	Grade Separated
Urban Interstate	9	0	9
Urban -- Principal Arterial - Other Freeways & Expressways	1	1	0
Urban -- Principal Arterial - Other	152	144	8
Urban -- Minor Arterial	304	293	11
Urban -- Collector	265	261	4
Rural Interstate	0	0	0
Rural -- Principal Arterial - Other	53	49	4
Rural -- Minor Arterial	140	136	4
Rural -- Major Collector	410	407	3
Rural -- Minor Collector	186	186	0
Total Known	1,520	1,482	38
Classification Unknown	2,613	2,011	602
Total	4,133	3,493	640

Figure 2-5: Railroad Crossings, At-grade and Grade Separated, Interstate, Arterial, Collector



2.1.2 Rail

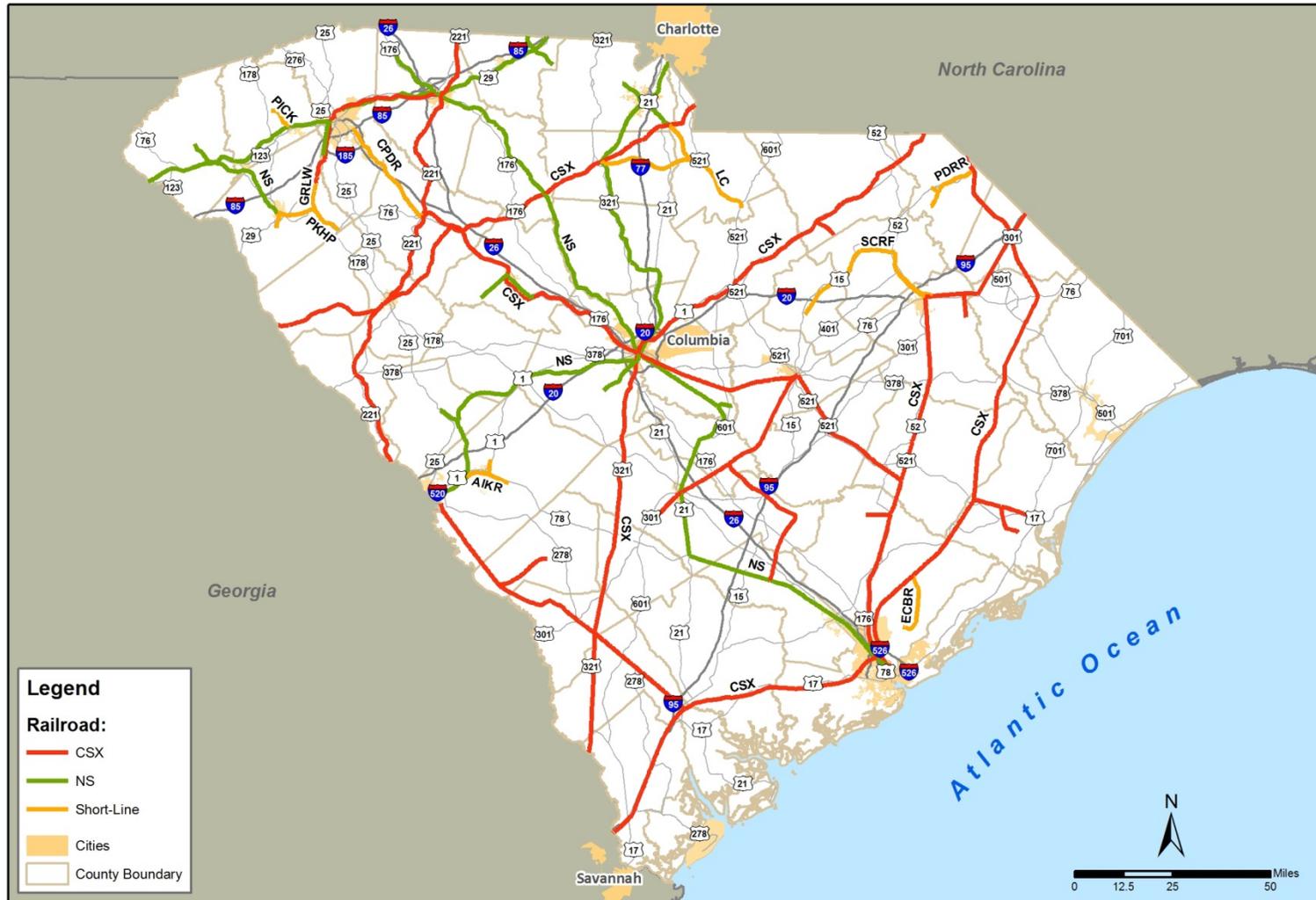
Railroad transport provides a relatively lower cost, higher capacity and low environmental impact landside solution to the long distance movement of goods. Operating a variety of rail car configurations, (e.g. tanker, open top hopper, side load, closed boxcar, flatcar) and the ability to compile trains of over 100 units; rail provides shippers with a low cost solution to moving goods. Due to the nature of the load-unload and overall train operations, rail typically reduces rates or costs to the shipper as the distance traveled increases. With a limited number of locomotives or power units required to transport the significant volume of goods, in comparison to other landside solutions (e.g. truck) the impact on air quality, noise pollution, and other environmental factors is significantly reduced.

Intermodal traffic on today's railroads has been the fastest growing segment of all the cargo types. Over 50 percent of the tonnages transported as intermodal rail are imports or exports.⁴

Railroads, unlike trucking, operate on infrastructure primarily owned by the railroad company. Though regulated by the federal government, the railroad has the opportunity to make all operational decisions regarding services and market place without outside influences. **Figure 2-6** illustrates the current rail infrastructure in the state, noting Class I and Class III (Short Lines).

⁴ <https://www.aar.org/keyissues/Documents/Background-Papers/Overview-U.S.-Freight-RRs.pdf>, February 13, 2103

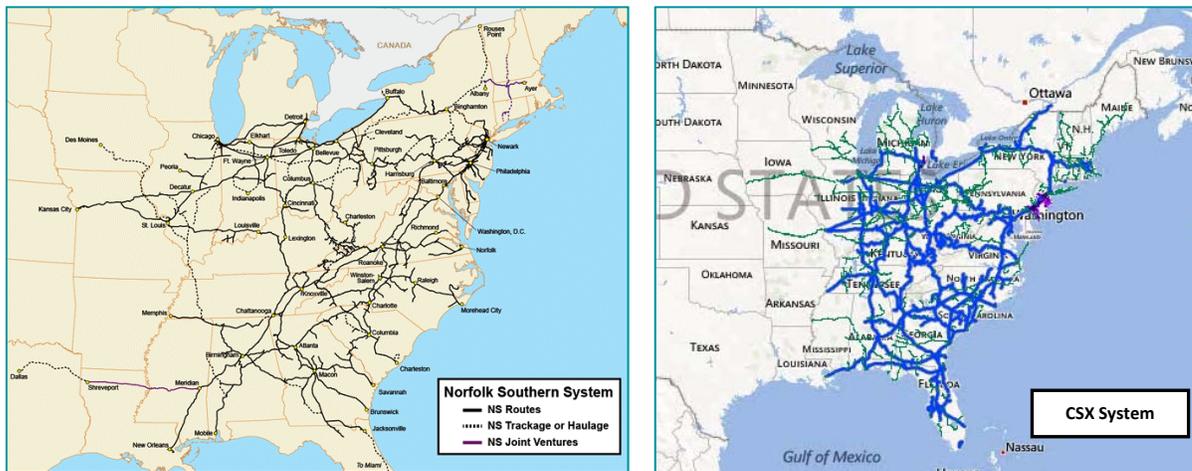
Figure 2-6: Railroad Infrastructure with Owner Assignments



2.1.2.1 Class I

There are seven Class I⁵ railroads in operation within the U.S. Two Class I railroads operate in South Carolina: Norfolk Southern (NS) and CSX. Each operates exclusively east of the Mississippi River. Illustrations of the individual coverage or service areas are presented in **Figure 2-7**.

Figure 2-7: Norfolk Southern and CSX Coverage Areas



Source: www.nscorp.com, www.csx.com, February 27, 2013

CSX Transportation (CSXT)

This Class I railroad, a transportation unit of CSX Corporation (CSX), operates approximately 23,000 route miles and serves 23 states, the District of Columbia and two Canadian provinces. As South Carolina’s largest railroad with 1,269 route miles, it covers virtually every area of the state. The railroad has a division office in Florence. In addition to the mileage it owns, it also has trackage rights over NS between Columbia and Charleston. Major South Carolina commodities are petroleum and coal products, lumber and wood products, chemicals and allied products, coal, and miscellaneous mixed shipments (intermodal). CSX Intermodal is the intermodal arm of CSX Corporation.

Norfolk Southern Railway (NS)

This Class I railroad operates a total of approximately 21,500 route miles and serves 22 states, the District of Columbia, and one Canadian province. In South Carolina, NS operates 679 route miles and has trackage rights over CSXT from Newberry to Spartanburg. The Norfolk Southern Railway Company is owned by the Norfolk Southern Corporation. The railroad has a division office in Greenville. Major commodities transported over the NS in South Carolina are coal; lumber and wood products; chemicals; pulp, paper, and allied products; and, transportation equipment.

⁵ American Association of Railroads classification, railroad with revenues in excess of \$378 million

2.1.2.2 Short Line or Class III

Aiken Railway Company, LLC (AIKR)

This new railway, which began service in December, 2012, is a wholly-owned subsidiary of Western Carolina Railway Service Corporation, the same company that owns and operates the Greenville and Western. It leases and operates two NS branch lines in Aiken County – the 12.45-mile line between Warrentonville and Oakwood, and the 6.45-mile line running between Aiken and North Aiken – totaling 18.9 miles in length.

Carolina Piedmont

In 1990, RailTex, Inc. purchased from CSXT and began operating the 39-mile branch line between Laurens and East Greenville as its Carolina Piedmont Division (CPDR). The railroad is now owned by Genesee & Wyoming and is operated as the Carolina Piedmont Railroad. Traffic is interchanged with CSXT at Laurens. The railroad currently operates 35 mainline miles in Laurens, and Greenville Counties. Major commodities transported include plastic resin gas turbines and wind turbines. Major customers include General Electric and Cryovac.

Carolina Southern Railroad Company (CALA)

After purchasing 75.5 miles of track from CSXT, this Class III or short line carrier began operations in 1987 as the Mid-Atlantic Railroad. The purchase included the Mullins, SC to Whiteville, NC branch line (36.5) miles, and the Chadbourn, NC to Conway, SC branch line (39.0) miles. The company changed hands in 1995 and is now known as the Carolina Southern Railroad. It operates over 51 miles of track within South Carolina, serving Marion and Horry Counties, including 14.5 miles of the Mullins-Whiteville branch, 25.0 miles of the Chadbourn-Conway branch, and 11.5 miles of the Horry County Railroad leased to Waccamaw Coast Line-WCLR, and operated by CALA. The headquarters is located in Conway. The CALA interchanges rail traffic with CSXT at Mullins. The railroad is currently out of service except in the Mullins area due to bridge deficiencies.

Principal commodities carried include coal, aggregates, wallboard, and lumber. Major shippers include Santee Cooper, Martin Marietta, Builder’s First Source, Atlantic Publishing, and Southern States Cooperative.

Greenville & Western Railway Company (GRLW)

This railroad commenced operations in late 2006 after acquiring a 13-mile-long CSXT line segment from Pelzer to Belton in Anderson County. The railroad interchanges traffic with CSXT at Pelzer and with the Pickens Railroad Company at Belton, which also provides access to NS. The railway receives unit trains for Kinder Morgan with Belton Industries and Belton Metals other on-line rail users. Principal on-line commodities are ethanol, biodiesel, plastics, scrap metal, limestone, paper, and fertilizer.

Hampton and Branchville Railroad Company (HB)

This short line carrier was originally chartered in December, 1891 to serve the local timber industry. Prior to 1986, the HB operated over 17 route miles of track from H&B Junction to Hampton. In 1986, 29 additional miles of track were acquired from CSXT. The HB operates over 40 miles of track between

Hampton and Canady's, all in Hampton and Colleton Counties. The railroad's major customer was SCE&G, which just closed its Canaday's power plant. As a result, the railroad is currently out of service. The HB connects with CSXT at Hampton.

Lancaster and Chester Railway Company (LC)

Prior to 2001, the railroad ran 29 miles between Chester and Lancaster. This original line segment dates back to an 1873 charter for a three-foot narrow gauge railroad that finally reached Lancaster from Chester in 1894. In 2001 a NS branch line running from Catawba to Lancaster and continuing east to Kershaw was acquired extending the railroad's total length to almost 60 miles and its presence to four counties - Chester, Kershaw, Lancaster, and York.

The railroad serves a variety of shippers/receivers, including PPG, Guardian Glass, Thyssen-Krupp Steel, Mississippi Lime, ADM, Gerdau Ameristeel, GAF Materials, Circle S Mills, and Boral/Owens Corning among others. Major commodities are chemicals, sand, steel, corn, soybeans, soybean oil and meal, recycled base oil, and building materials. The railroad interchanges traffic with both CSXT and NS at Chester. It became a part of Gulf and Ohio Railways, Inc. in December, 2010.

Palmetto Railways

Palmetto Railways, previously known as South Carolina Public Railways (SCPR), provides technical assistance and consulting services in railroad matters to state, local, and municipal governments. As a division of the South Carolina Department of Commerce, Palmetto Railways operates three railroad subdivisions.

The Charleston Subdivision (**Port Utilities Commission of Charleston – PUCC**) and North Charleston Subdivision (**Port Terminal Railroad – TPR**) provide switching services to the terminals of the South Carolina Ports Authority and other various industries in Charleston County, interchanging with CSX Transportation and Norfolk Southern. As terminal switching railroads, PUCC and PTR have no mainline miles of track.

The Charity Church Subdivision (**East Cooper and Berkley Railroad – ECBR**) located in southern Berkeley County serves BP Chemical, Nucor Steel and Santee Cooper Cross Generating Station, interchanging with CSX Transportation at State Junction. In addition, several industrial sites are available for development adjacent to the railroad. This 17-mile line, which began operations on November 15, 1978, extends from State Junction (Cordesville) to Charity Church in Berkeley County.

Pee Dee River Railway Corporation (PDRR)

In 1987 Marlboro County purchased the CSXT branch line extending from McColl to Marlboro via Tatum and Bennettsville along with a spur from Bennettsville to Breeden and contracted with the Pee Dee Railway Corporation (PDRR) to provide rail service. The PDRR began operations the same year.

A 3.8-mile spur was soon constructed to a new Willamette Industries (now Domtar) pulp, paper, and board complex (the latter now Flakeboard). The PDRR is a subsidiary of the Aberdeen and Rockfish Railroad Company, which has headquarters in Aberdeen, NC.

Pulp, paper, chemicals, aggregates, fertilizer, and plastic pellets are the predominate products handled over its current 25-mile length. Its major customers are Domtar, Mohawk, Flakeboard, Hanson Aggregates, and Southern States Cooperative. Traffic is interchanged with CSXT at McColl.

Pickens Railroad Company (PICK and PKHP)

The Pickens Railway Company consists of two separate operations located in the Upstate. One is the original Pickens Railroad (PICK), which runs 8.5 miles from a connection with the NS main track at Easley to Pickens in Pickens County that began operation in 1898. The other, the railroad's Honea Path Division (PKHP), is a combination of NS and CSXT branch lines located in Anderson County running from Anderson to Honea Path, via Belton, 28.5 miles. Service began over the first of these line segments in 1990.

The railroad's principal shippers include, among others: Owens Corning, Electrolux, Scots, Michelin, Southern States Cooperative, Crop Production Services, Carolina Recycling, PCA, and Tri-County Fertilizer. These customers account for the majority of the railroad's carloadings comprised of limestone, plastics, rubber, carbon black, fertilizer, scrap metal, paper, grain, and borate ore. Traffic is interchanged with NS at Easley and Anderson, as well as with GRLW at Belton and hence to a CSXT connection in Pelzer.

The railroad has filed an abandonment application for the 8.5-mile-long original Pickens Railroad.

S.C. Central Railroad Company (SCRF)

In 1987, RailTex, Inc. purchased two disconnected segments of railroad from CSXT located in Florence, Darlington, Chesterfield, and Lee Counties. The SC Central Railroad Company, Inc. (SCRF) began operations over the two line segments in December of that year. RailAmerica, Inc.⁶ acquired RailTex in 2000, but was itself purchased in 2012 by Genesee & Wyoming Inc., who now owns the railroad and operates 42 miles of mainline. The one operational segment connects and interchanges traffic with CSXT at Florence and extends to Bishopville via Darlington, Floyd, and Hartsville. It has a broad base of customers, with the largest being Nucor Steel, Sonoco Products, and Republic Services. Commodities handled by the railroad are dominated by chemicals, plastics, steel, and waste. The other segment connected and interchanged traffic with CSXT at Cheraw and extended southward to Society Hill. Service is no longer provided on this segment and abandonment has been approved but not yet implemented.

2.1.3 Water

Ocean and inland water transport provide access to markets overseas and a low cost solution via barge and short sea shipping around the state and continent. With the globalization of the supply chain over the previous decades, the ability to transport materials and goods between continents has flourished. This movement is characterized by the increasing utilization of containerization. With this method as a standard, intermodal connectivity between ocean and landside transport eases cost and increases

⁶ RailAmerica, Inc. has been acquired by Genesee and Wyoming, Inc. (October, 2012) and is awaiting Surface Transportation Board approval to control the company.

speed across the entire supply chain. The use of inland waterway and short sea shipping, a transport method having been in decline within the U.S., has experienced a minor renaissance with recent innovations and capital investment.

Significant water ports are illustrated in **Figure 2-8**. The SCPA operates six facilities, five of which are located in or near the city of Charleston. The sixth terminal is located in Georgetown SC, approximately 60 miles north of the area. SCPA oversees Port Royal and the multi-jurisdictional Port Royal Tract Development Agreement.

The Jasper Ocean Terminal is a proposed additional port for the state. This facility would be located on the channel leading into the Port of Savannah. This proposal is for the construction of a container terminal jointly owned between the SCPA and Georgia Ports Authority.

2.1.4 Air

Air cargo consists of mail products and freight commodities. There are numerous entities that are participants in this mode, e.g. freight forwarders, deferred air carriers. The physical carriage of goods in this mode occurs on dedicated, cargo configured aircraft or in the “belly” or luggage compartments of passenger aircraft. With the transition to regional jets to service smaller markets (e.g. Columbia, Florence, Greenville-Spartanburg, and Charleston) major airlines and their regional partners have reduced the overall available space for air cargo. Increased requirements to satisfy elevated security for this cargo type has also decreased the amount of cargo by limiting the number of acceptable shippers at smaller airports. This reduction has shifted cargo to other modes or to consolidators or forwarders who transport these shipments to larger airports via ground transportation. A third factor in the reduction of air cargo volumes are economic conditions. As the asset costs (e.g. aircraft, fuel, and terminals) outweigh those of other modes, the cost to shippers is extremely high. As economic pressures influence transportation budgets, many former air customers shift to less costly but slower transportation modes by modifying the needs of their individual supply chains.

With the economic development pursuits of high technology industries, the need for accessible air transport, passenger and cargo, is a high priority in site selection. Other areas of the country have identified the need to understand the physicality of smaller airports and airfields located throughout their state to forecast potential investment needs to satisfy these site needs. **Figure 2-9** illustrates those airports and fields open for public usage. Six are classified as “primary” by the FAA as they accommodate greater than 10,000 enplanements annually. There are an additional fifty-five hard surface runway airports and four grass or “turf” runway surfaced airports available for public use. **Figure 2-10** illustrates the ten hard surface and six turf runway equipped airfields that are currently designated for private use. These include military and personal airfields.

Figure 2-8: Water Ports of South Carolina



Figure 2-9: Airports and Airfields, Public Access, South Carolina

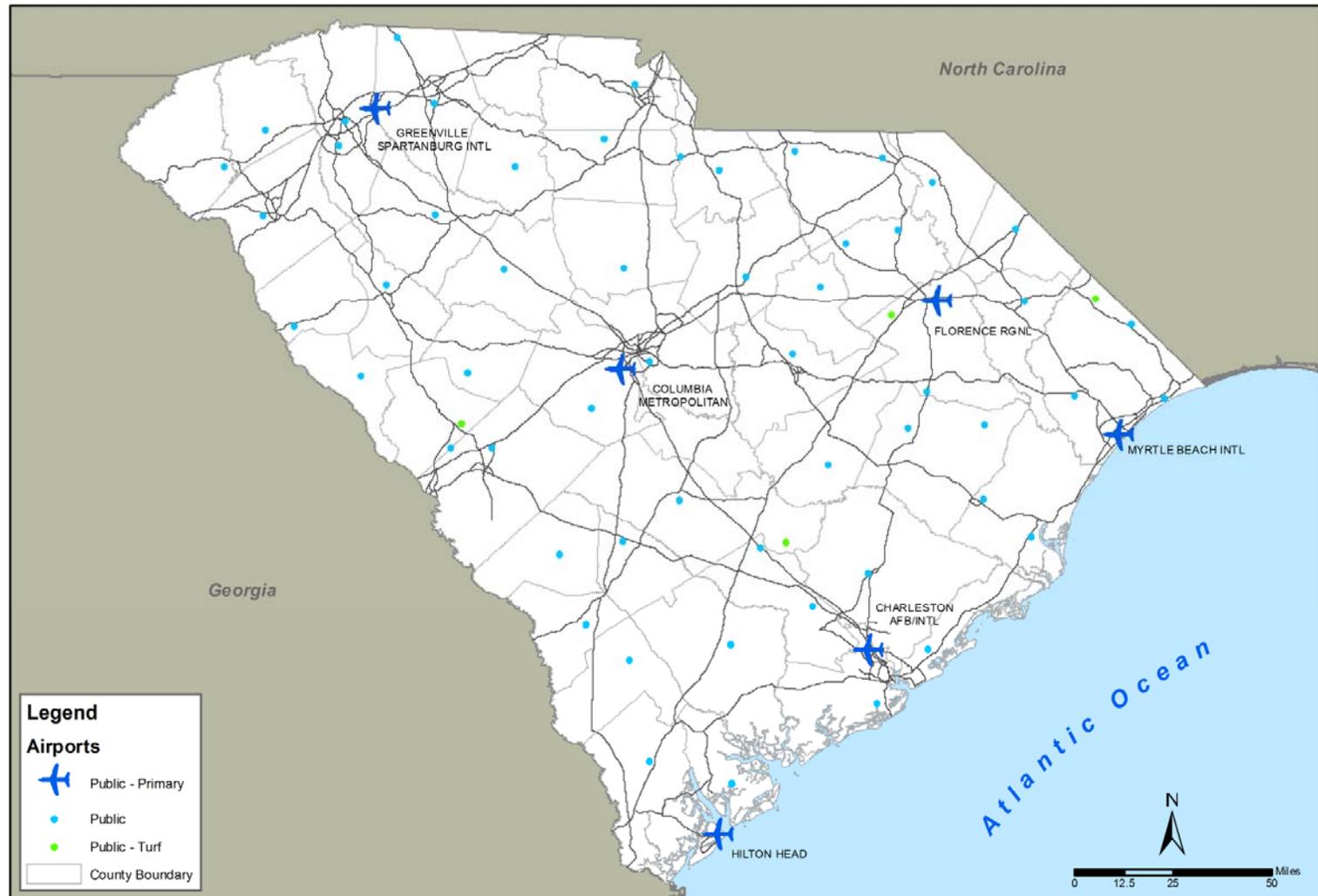
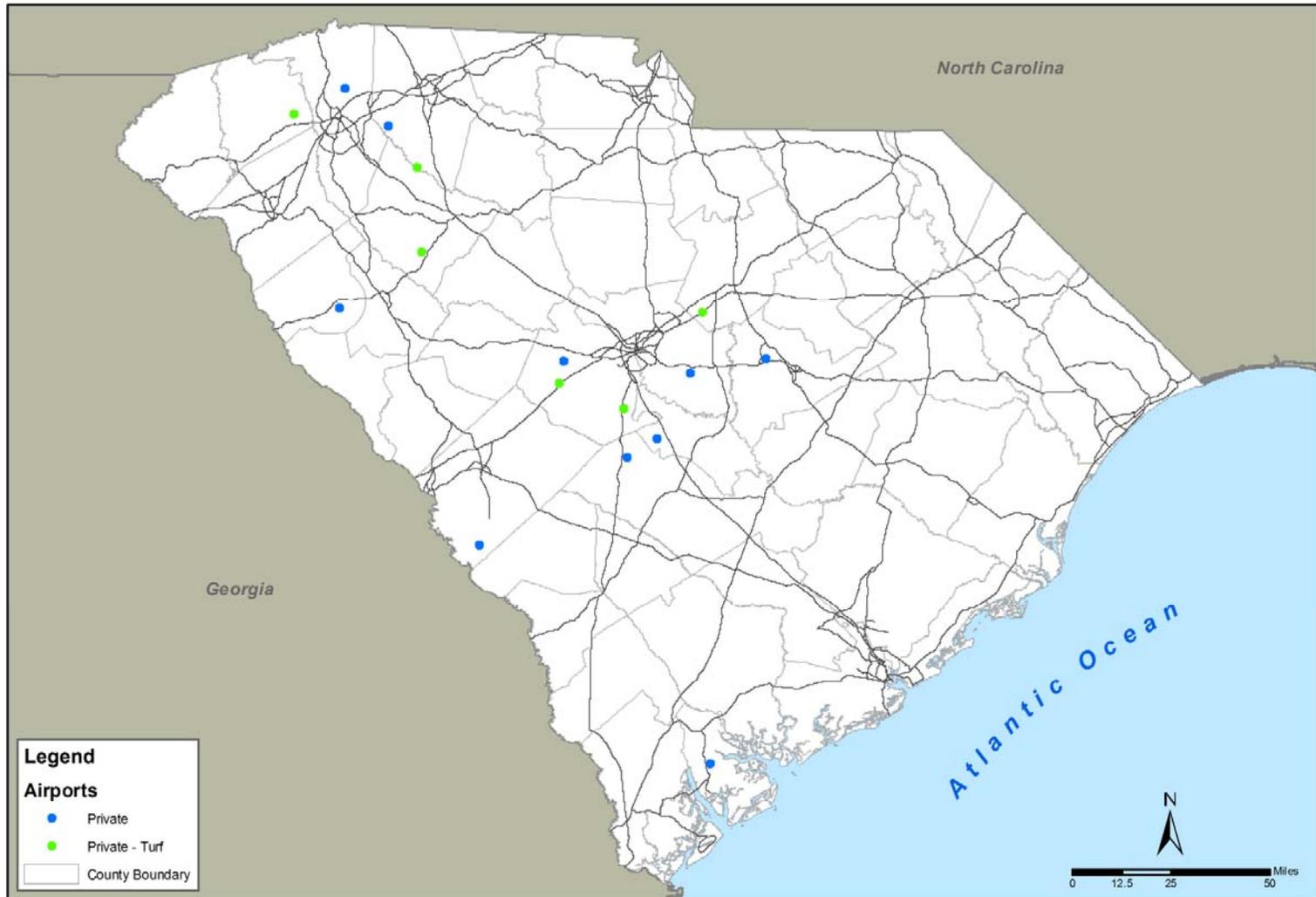


Figure 2-10: Airports and Airfields, Private Access, South Carolina



2.1.5 Freight Transfer Facilities

To facilitate the efficient usage of individual modes, in a multimodal system, nodes of interactivity are necessary. These nodes, commonly referred to as “intermodal”, provide the equipment and real estate to productively move goods from one mode to another, e.g. truck and rail. Within the state three significant examples of intermodal facilities exist. Two additional are proposed and have been accepted for advanced planning and construction.

Two “rail-truck” intermodal facilities exist in North Charleston: Norfolk Southern and CSXT. Most recently a third facility in Greer opened in November 2013. An additional facility is proposed to serve a new port terminal in Charleston. One “air-truck” facility exists in Columbia: UPS.

An additional intermodal facility has been constructed near the Charlotte-Douglas airport in Charlotte, NC on the Norfolk Southern Crescent Corridor. While outside of South Carolina, this facility is served by I-85 and I-77 in South Carolina.

2.2 Strategic Freight Network

2.2.1 National Freight Network

MAP-21 identifies a number of elements related to the improvement of the freight network in the U.S. One key provision is that it requires the U.S. DOT to designate a National Freight Network within one year of the enactment of MAP-21. The process to identify the National Freight Network is currently underway. This network will consist of three components as per MAP-21:

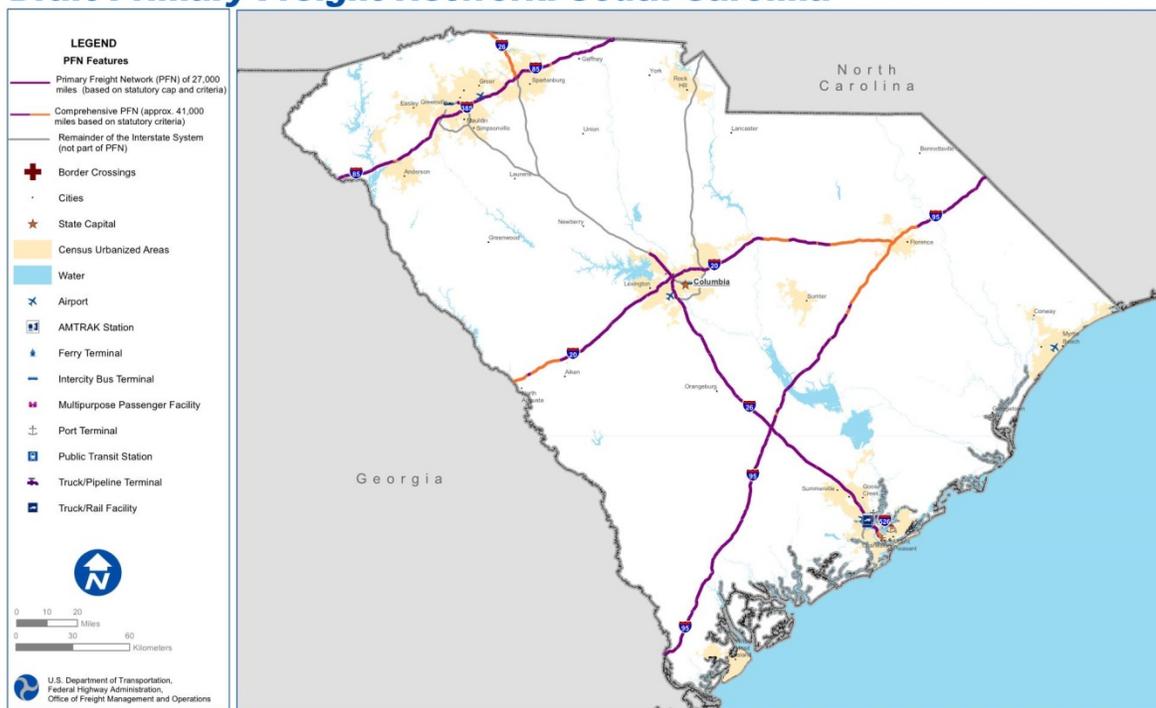
1. A primary freight network (PFN), as designated by the Secretary,
2. Any portions of the Interstate System not designated as part of the PFN, and
3. Critical rural freight corridors.

The PFN will contain a maximum of 27,000 existing roadway centerline miles with an additional 3,000 centerline miles of roadway critical to the future movement of goods. The States will be responsible for designating the critical rural freight corridors under MAP-21 criteria (§1115; 23 USC 167). An initial draft of the National Primary Freight Network is presented in **Figure 2-11**.

The identification of a Strategic Freight Network in South Carolina can assist the state in identifying its critical freight corridors and can help the SCDOT to justify the inclusion of significant corridors in the National Freight Network. The process of identifying this network in South Carolina can assist the SCDOT in making decisions regarding investments in transportation infrastructure across the state and can inform the SCDOT of what roadway corridors, in addition to those included in the National Freight Network, need particular attention in terms of goods movement.

Figure 2-11: Draft Primary Freight Network

Draft Primary Freight Network: South Carolina



Source: http://www.ops.fhwa.dot.gov/freight/infrastructure/pfn/state_maps/sc_southcarolina.pdf

2.2.2 Freight Movement in South Carolina

Over 375 million tons of freight, valued at nearly \$600 billion, moved across South Carolina’s freight network in 2011. While the predominant form of transport of freight in South Carolina is by truck, the state is also served by a system of Class I and short line railroads, marine port terminals, inland port terminals, six primary public airports and a range of intermodal facilities. Trucking accounts for the largest modal share: 300.6 million tons (80.0 percent) valued at \$506.2 billion (84.5 percent). Rail comprises the second largest modal share at 70.3 million tons (18.7 percent) and \$79.1 billion (13.2 percent). Major truck and rail tonnage movements are followed by water, air, and pipeline, respectively.

In 2012, the logistics sector, comprised of Retail Trade, Wholesale Trade and Transportation, Warehousing and Utilities industries, accounted for 19.1 percent of all South Carolina employment, illustrating the significance of the transportation and logistics industry in the state. In the same year, manufacturing, a freight intensive industry, accounted for 12 percent of total employment in South Carolina.⁷ In recent decades, multi-national companies, including BMW and Boeing as well as large tire manufacturers, including Continental, Michelin and Bridgestone have located major facilities in the

⁷ <http://sccommerce.com/data-resources/state-facts>

state. In addition, the U.S. Department of Defense, a significant driver of freight demand, has installations for all five branches of the military in the state. With a large percentage of freight moved by truck through the state, the estimated 4.1 million trips made annually by out-of-state leisure visitors has a substantial impact on the movement of goods across the state's roadway network.⁸ As is evident, the movement of goods along all modes is critical in South Carolina.

Understanding the supply chain and providing sufficient connections between modes is important to the economic vitality of the state. Site selection practices by current and future businesses evaluating South Carolina look to the availability and capacities of the freight transportation system to move raw materials, sub-assemblies, and finished goods along the supply chain. Modal selection is done by a process of evaluating each mode with six criteria: transit times, reliability, cost, capacity, safety and accessibility.

Preserving and enhancing the infrastructure that moves goods through and within the state for all modes is important. Continuing to provide important connections for freight generators/attractors to the routes moving freight and connections between modes is critical in retaining existing industries and attracting new industries in the state. Identifying a Strategic Freight Network including roadway and railway networks and the nodes they connect is an important step in identifying what corridors and assets are important to the movement of freight.

2.2.3 Freight Transportation Goals and Objectives for South Carolina

A number of goals have been identified and developed as part of the planning process for the South Carolina Multimodal Transportation Plan (MTP) to support the vision statement of the plan. The vision statement established for the MTP is as follows:

Safe, reliable surface transportation and infrastructure that effectively supports a healthy economy for South Carolina.

The goals for the South Carolina Statewide Freight Plan (SFP) incorporate the goals of the MTP as well as goals identified for a freight plan within MAP-21 legislation (23 U.S.C. 167). As a result, the goals for the SFP encompass specific goals for the state while incorporating the National Freight Policy goals to be consistent with these. The specific goals of the South Carolina SFP are as follows:

- Mobility and System Reliability Goal
- Safety Goal
- Infrastructure Condition Goal
- Economic and Community Vitality Goal
- Environmental Goal
- Equity Goal

⁸ <http://www.scprt.com/files/Research/10-12AvgOutstate.pdf>

Objectives and guiding principles have also been developed for each of the goal areas. In addition, performance measures have been developed for each objective in order to provide a base reference point and understanding of the performance of the goods movement network in South Carolina.

2.2.4 South Carolina Strategic Freight Network

The movement of goods is critical to the economic health of a state, particularly in one such as South Carolina that has access to major ocean ports, regional airports, inland ports, rail lines and highways. Preserving the infrastructure that supports the movement of goods into, through, and out of the state and improving the efficiency and reliability of the existing system is important to the economy of the state.

MAP-21 authorizes the U.S. DOT to allow a maximum Federal share of 95 percent for an Interstate System project or 90 percent for a non-interstate project if the project demonstrates an improvement to the efficiency of the freight system and is identified in a State Freight Plan. By identifying a Strategic Freight Network, SCDOT will be in a better position to make informed decisions regarding projects to improve the efficiency of the freight infrastructure. The efforts to improve the efficiency and reliability can be strategically focused on the network identified in this planning process. Performance measures identified to measure the current system and the future performance of the system can be applied to the Strategic Freight Network to focus on the performance of the strategic network. The South Carolina Strategic Freight Network will identify those routes and assets on which to focus funding and projects to facilitate and improve freight movement.

2.2.4.1 Strategic Network Evaluation Criteria

The Draft South Carolina Strategic Freight Network was developed using various information sources and a number of criteria. The first draft of the network takes into account all modes of transporting freight including the physical networks – roadways and railroads, as well as the nodes that they connect – airports, water ports and significant freight transfer facilities.

2.2.4.2 Airports, Water Ports and Inland Port

All six of the “primary” public airports are included in the Strategic Freight Network. Airports provide transport of goods that are often high value and require timely delivery.

The water ports described above are all included in the Strategic Freight Network, including the developing container terminal in North Charleston. These facilities provide important access of waterborne freight for exports and imports internationally as well as movements across states.

The new inland port in Greer is included in the Strategic Freight Network for its ability to provide an important connection between truck and rail freight movement. This inland port is located in the Northwest portion of the state and can provide important connections to the Norfolk Southern Class I railroad and the roadway system. It will allow for the transfer of shipping containers between rail and truck for shipment to and from the coastal water ports.

These facilities are included in the Strategic Freight Network and are used in developing the roadway and railway portions of the network. The Strategic Freight Network should include routes that provide connectivity to the overall system to and from these assets.

2.2.4.3 Strategic Freight Roadway Network

The process to develop the draft roadway network began by mapping the commodity flow by tons on the TRANSEARCH network. The TRANSEARCH roadway network was developed based on the Oak Ridge National Highway Network developed and updated by the Center for Transportation Analysis, Oak Ridge National Laboratory. This data was then used to calculate a percentage of the highest total tonnage on any one route. This percentage reflects a gradient measure comparing all the route segments included in the TRANSEARCH network to the route segment with the highest volume flow. The values were separated using natural breaks into four ranges: less than 2.5 percent (reflecting local connectivity), 2.6 to 5 percent, 6 to 59 percent and greater than 59 percent. The networks with less than 2.5 percent of the highest volume segment were considered to be of local importance, not providing significant cross regional/cross state access for freight movements. These routes on the TRANSEARCH network were not included in the initial round of identification of the Draft Strategic Freight Network.

The next step was to compare the resulting map with a map of the 2011 TRANSEARCH assignments from the travel demand model. Upon comparing the maps, it appeared that for the most part, networks with over 500 trucks per day aligned closely with the networks with greater than 2.6 percent of the highest volume segment. The segments that differed were then compared and the final draft strategic freight network was developed. For the most part, roadway segments estimated to have more than 500 daily trucks were included in the strategic freight network. The exceptions included I-85 and I-385 south of Greenville which did not show high truck percentages given overall traffic volumes. They did illustrate high percentages of highest total tonnage based on TRANSEARCH data so they were included as they are also significant interstates. Though I-85 Business Route in Spartanburg illustrated high volumes of truck traffic in the model, a number of clearance issues were identified so this segment of I-85 was not included. The centerline miles in this network total 2,483 miles. **Figure 2-12** illustrates the Strategic Freight Roadway Network.

U.S. 78 through south-central South Carolina was included in the Strategic Freight Roadway Network for its potential role in moving goods via truck through South Carolina. This was recommended through the stakeholder engagement process as a route of interest of the South Carolina Ports Authority. Further discussion of this route is included in Section 7.2.

2.2.4.4 Rail

The Strategic Freight Network will include all active lines on the Class I and Class III railroads throughout the state.

2.2.5 Current Conditions of the Strategic Freight Network

Preserving the assets that are part of the Strategic Freight Network is important to improve and sustain the reliability and efficiency of the goods movement network in South Carolina. Congestion, bottlenecks, weight restrictions, clearance restrictions and at-grade railroad crossings are factors that impact the reliability of a system. The Strategic Freight Network identifies the roadway and rail networks that provide through state and cross-regional movement as well as connections to the nodes of the network that include ports, airports and inland freight facilities. These networks have been identified as important to the flow of goods. This section provides information regarding the current condition of the network.

2.2.5.1 Interstate System

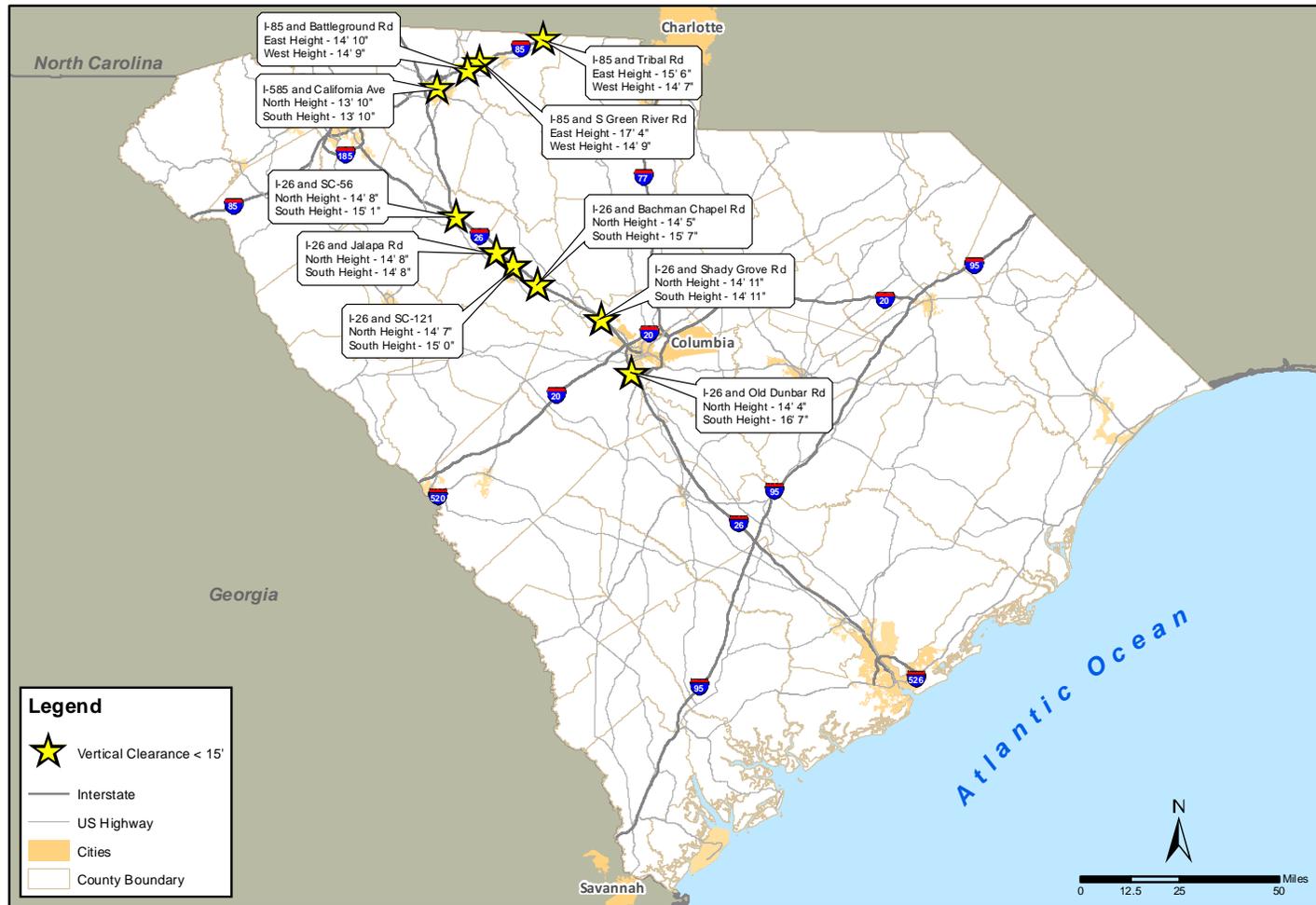
All interstates through South Carolina are included in the Strategic Freight Network, except I-85 Business in Spartanburg. The existing conditions of the system as well as bottlenecks and locations of recurring congestion were analyzed and evaluated.

As rated by SCDOT's Pavement Management Department, the majority of Interstate centerline miles are categorized as being in very good or good condition (58 percent), with 30 percent in fair condition. Though the majority of the Interstate system in South Carolina currently has a pavement rating of very good or good and the state continues to add service life years to the system through a resurfacing program, there is a net loss in service life years due to deterioration. Based on the 2012 South Carolina State of the Pavement Report, the Interstate roads have lost over 10,000 miles of service life over the last five years.

There are 353 bridges on urban interstates and 375 on rural interstates in South Carolina.⁹ There are currently no weight restricted bridges on the strategic freight network. Currently there are six bridges with vertical clearance restrictions less than 15 feet along I-26, three along I-85 and one over I-585. These ten clearance restrictions along the interstates impact the movement of freight along these corridors. **Figure 2-13** illustrates these bridges with the associated cross street.

⁹ South Carolina National Bridge Inventory (NBI) database, January 7, 2013 data export.

Figure 2-13: Bridges with Clearance Issues

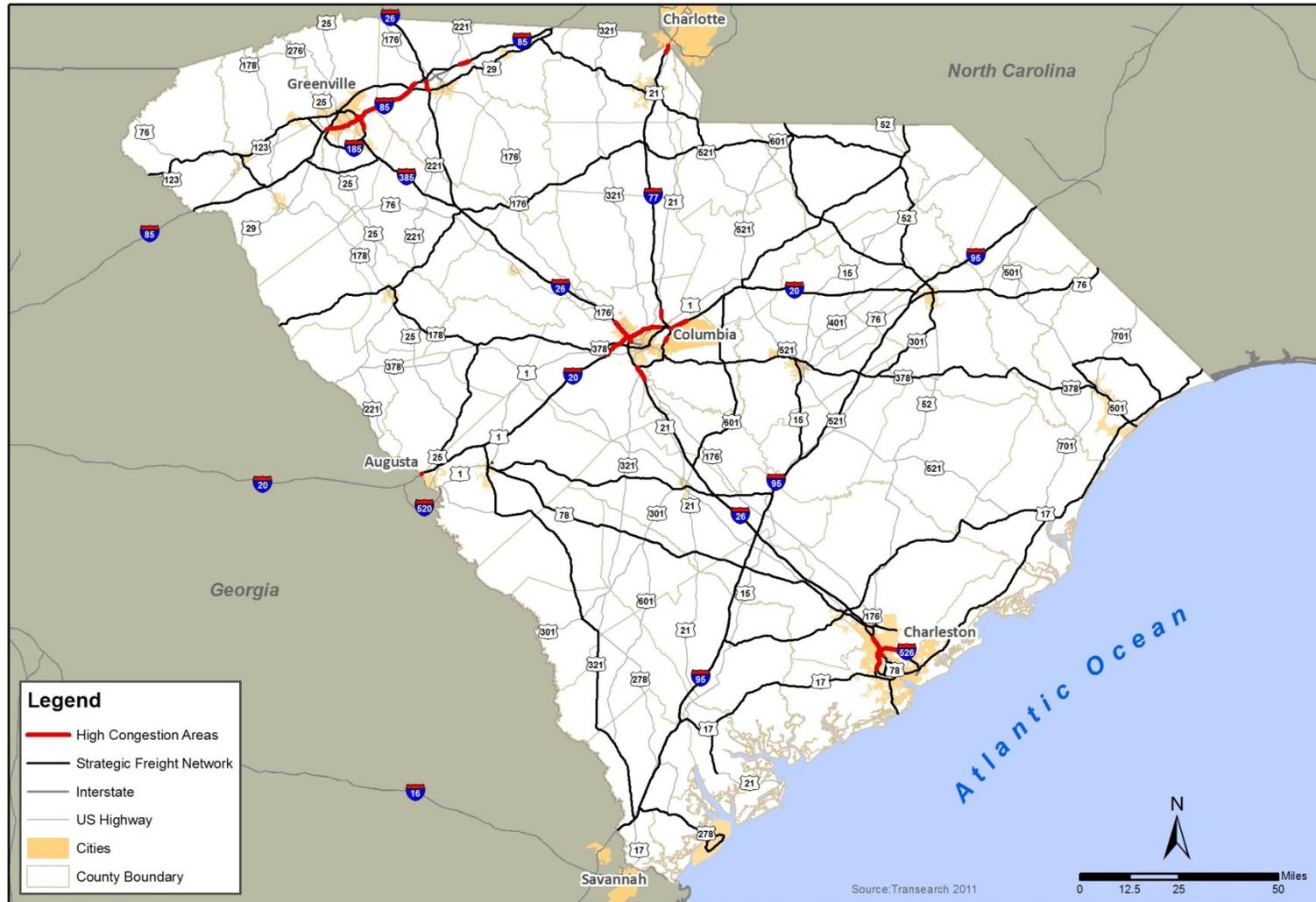


Density and Level of Service analyses were completed for the interstate system in South Carolina as part of the SC MTP. This analysis identified bottlenecks and congested corridors along the interstates. No points of recurring congestion or bottlenecks were identified along I-95, I-185, I-520, or I-585. The following describes the congestion points and bottlenecks along the other interstates. **Figure 2-14** illustrates these locations.

- I-20: The I-77 and Clemson Road interchanges are the respective bottleneck points along I-20 during the AM peak hour and PM peak hour. It should be noted that this segment is currently under construction for widening from four to six lanes. In addition, during the PM peak hour, the bottleneck points along I-20 include the three interchanges with Broad River Road, I-26, and U.S. 378.
- I-26: In the Columbia area, the I-20 interchange is the primary bottleneck point during the AM peak hour and the I-20 and St. Andrews Road interchanges are the primary bottleneck points during the PM peak hour. In the Charleston area, the U.S. 52 Connector/Ashley Phosphate Road interchange and the merge to I-526 are the primary bottleneck points during the AM peak hour and the I-526 and Ashley Phosphate Road interchanges are the primary bottleneck points during the PM peak hour.
- I-77: The primary bottleneck point along I-77 southbound is approaching the Forest Drive interchange in the Columbia area every Thursday in the AM peak hour, due to weekly graduation ceremonies of Fort Jackson.
- I-85: The Woodruff Road/I-385 interchange is the primary bottleneck for both directions of I-85 during both the AM and PM peak hours.
- I-126: The I-26 interchange is the primary bottleneck along I-126 westbound during the PM peak hour.
- I-385: The primary bottleneck along I-385 is the interchange with I-85.
- I-526: During the PM peak hour, the primary bottleneck along I-526 eastbound is the I-26 interchange and the primary bottleneck points along I-526 westbound are the I-26 interchange, the merge from Leeds Avenue, and the Paul Cantrell Boulevard interchange.

In addition to the model forecast to identify congestion and bottlenecks, a forecast freight trend analysis was completed for the state using TRANSEARCH data. As a result of this analysis, corridors that are expected to have a large increase in freight movement by 2040 were identified. Based on 2011 TRANSEARCH data I-26, I-385, I-20, I-77 and U.S. 17 carried over one million tons of freight. In 2040 I-20, I-26 and I-385 are expected to move over five million tons of freight. Based on this analysis, these three roadways should be a primary focus for infrastructure repair and improvements.

Figure 2-14: Freight Bottleneck Locations (2011)





3 GOODS MOVEMENT PROFILE OF SOUTH CAROLINA

3.1 Current Freight Trends

Over 375 million tons of freight moved across South Carolina’s infrastructure in 2011. Such freight includes finished goods, materials, and supplies. Classified as commodities, this chapter summarizes tonnage movements and their associated values. Following an overview of the commodity reporting convention and the primary data source used to evaluate freight flows and values, current year volumes are summarized by mode and direction.

3.1.1 Overview

South Carolina freight movements are evaluated by mode, direction, quantity, and year using TRANSEARCH data. Modes include truck, rail, port, air, and pipe. Directional flows include inbound (from outside the state into South Carolina), outbound (from South Carolina to another state/country), intrastate, and through-state and provide key information in assessing the role of freight in the South Carolina economy. Freight quantities include tons, units,¹⁰ and values (expressed in 2011 constant dollars). Movements are summarized for the most recent year available (2011) and the Statewide Freight Plan’s planning horizon year of 2040.

Standard Transportation Commodity Code (STCC) – STCC is a publication containing specific product information used on waybills and other shipping documents. A STCC is a seven digit code categorized by 38 commodity groupings. A STCC for any physical product is associated with a commodity description conforming to exact descriptions in freight transportation classifications of rail and motor carriers.¹¹ STCC is maintained and published by the Association of American Railroads (AAR), and updated annually to meet user needs, particularly North American Freight Railroads. The Railroad Waybill, 1993 Commodity Flow Survey (CFS), and TRANSEARCH use the STCC coding system. The hierarchical STCC structure allows data collapsibility, enabling summarization of commodity information at various levels. For example, the 2-digit STCC of ‘01’ represents ‘Farm Products,’ the 3-digit of ‘011’ identifies ‘Field Crops,’ the next level ‘0112’ indicates ‘Raw Cotton.’ While freight flows are tallied at the 4-digit STCC level, information is typically reported at the 2-digit commodity level.¹²

TRANSEARCH® – Developed by IHS Global Insight, TRANSEARCH is a comprehensive database of North American freight flows, compiled from more than a hundred industry, commodity, and proprietary data exchange sources. TRANSEARCH combines primary shipment data obtained from some of the nation’s largest rail and truck freight carriers with information from public, commercial, and

¹⁰ units are unavailable for air, port, and pipe modes

¹¹ Rail Inc.; <https://www.railinc.com/rportal/37>

¹² Freight Analysis Framework (FAF): Issues and Plans, U.S. DOT Federal Highway Administration; http://ops.fhwa.dot.gov/freight/freight_analysis/faf/faf2_reports/report4/rpt4_commodity_class.pdf

proprietary sources to generate a base year estimate of freight flows at the county level. Further, TRANSEARCH establishes market-specific production volumes by industry or commodity, drawn mostly from IHS Global Insight's Business Markets Insights (BMI) database, and supplemented by trade association and industry reports, and U.S. government-collected data – especially from the Input/Output (I/O) tables produced by the Bureau of Economic Analysis (BEA). Note that waterborne port movements reported by TRANSEARCH exclude foreign non-NAFTA movements (i.e., to/from Europe, Asia, South America, etc.), as discussed subsequently.

3.1.2 Freight Summary

Over 375 million tons of freight, valued at nearly \$600 billion, moved across South Carolina's freight network in 2011. Trucking accounts for the largest modal share: 300.6 million tons (80.0 percent) valued at \$506.2 billion (84.5 percent). Rail comprises the second largest modal share at 70.3 million tons (18.7 percent) and \$79.1 billion (13.2 percent). Major truck and rail tonnage movements are followed by water, air, and pipeline, respectively.

Directionally, through traffic comprises the largest share: 172.9 million tons (46.0 percent) valued at \$316.7 billion (52.9 percent). State inbound tonnages (79.7 million, 21.2 percent) are slightly greater than outbound (70.8 million, 18.8 percent); but, outbound values (\$146.7 billion, 24.5 percent) are notably greater than inbound values (\$105.8 billion, 17.7 percent), indicating a relative trade value surplus. As such, on average, the state imports lower value-per-ton commodities and exports higher-value-per-ton commodities. This suggests that South Carolina imports raw materials used in the production of value-added goods and then exports processed goods. Lastly, intrastate goods movements comprise the smallest directional movement by volume (52.3 million tons, 13.9 percent) and value (\$29.9 billion, 5.0 percent).

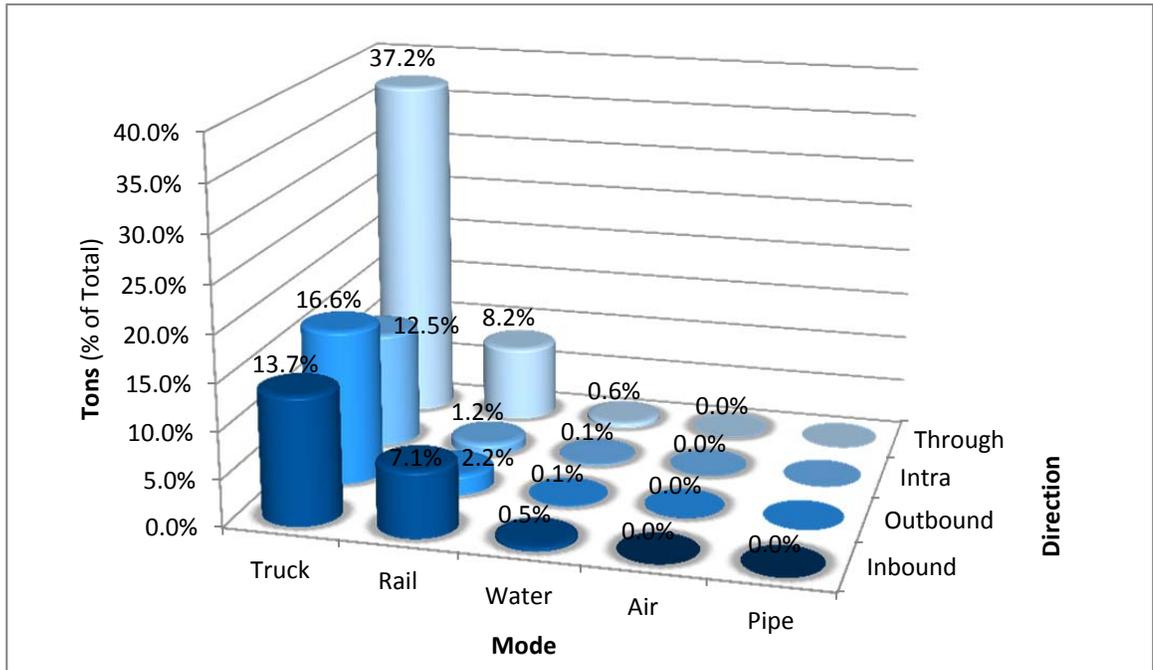
Tonnage and value movements are summarized by mode and direction in **Table 3-1**, and relative tonnage and value shares are illustrated in **Figure 3-1** and **Figure 3-2**. The ensuing sections disaggregate the modal and directional freight flows by major commodity type and domestic trading partners with South Carolina.

Table 3-1: South Carolina Total Freight Traffic by Mode and Direction (2011)

Direction	Truck	Rail	Water	Air	Pipe	Total
Tons						
Inbound	51,341,521	26,631,734	1,754,800	17,225	93	79,745,373
Outbound	62,439,243	8,114,084	204,436	15,794	N/A	70,773,557
Intra	47,102,262	4,681,040	523,621	97	N/A	52,307,020
Through	139,685,267	30,872,783	2,279,084	39,764	N/A	172,876,899
Total	300,568,293	70,299,641	4,761,940	72,881	93	375,702,849
Value, in millions						
Inbound	\$86,877	\$15,098	\$1,388	\$2,402	\$0	\$105,765
Outbound	\$130,677	\$11,249	\$341	\$4,437	N/A	\$146,703
Intra	\$23,567	\$5,938	\$382	\$11	N/A	\$29,898
Through	\$265,120	\$46,853	\$1,482	\$3,224	N/A	\$316,680
Total	\$506,241	\$79,137	\$3,593	\$10,074	\$0	\$599,046

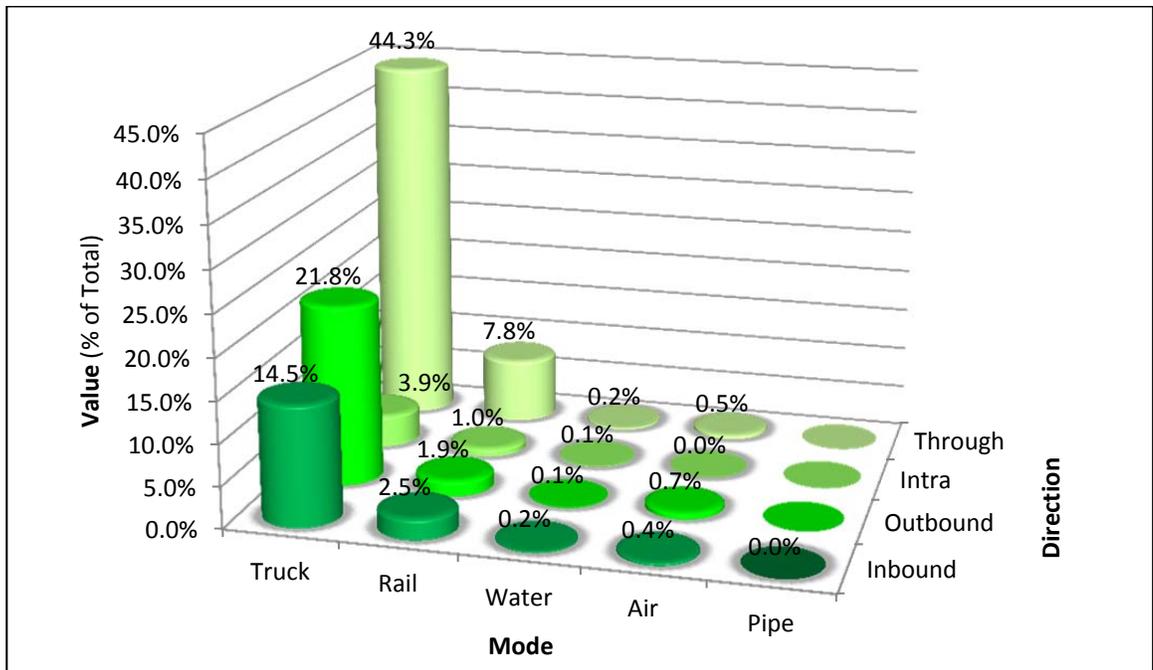
Source: prepared by CDM Smith, based on TRANSEARCH data for 2011

Figure 3-1: South Carolina Freight Traffic by Mode and Direction (2011 Tons)



Source: prepared by CDM Smith, based on TRANSEARCH data for 2011

Figure 3-2: South Carolina Freight Traffic by Mode and Direction (2011 Value)



Source: prepared by CDM Smith, based on TRANSEARCH data for 2011

3.1.3 Current Freight Flows

The following discussion presents year 2011 freight flows by mode and direction. Each subsection summarizes modal directional flows by the top ten two-digit STCC commodity movements.

3.1.3.1 Truck Freight

South Carolina truck movements in 2011 totaled 300.6 million tons, valued at \$506.2 billion, and carried within 25.7 million units, as shown in **Table 3-2**. On average, total truck commodity movements are valued at \$1,684/ton. Through truck movements are the largest directional movements, 46.5 percent of total tonnage, 42.8 percent of units, and 52.4 percent of value. Outbound truck tonnage (62.4 million) and value (\$130.7 billion) are greater than inbound movements (51.3 million tons, \$86.9 billion). At nearly \$2,100 per ton, outbound movements are also the most valuable per-ton (on average) of the directional movements.

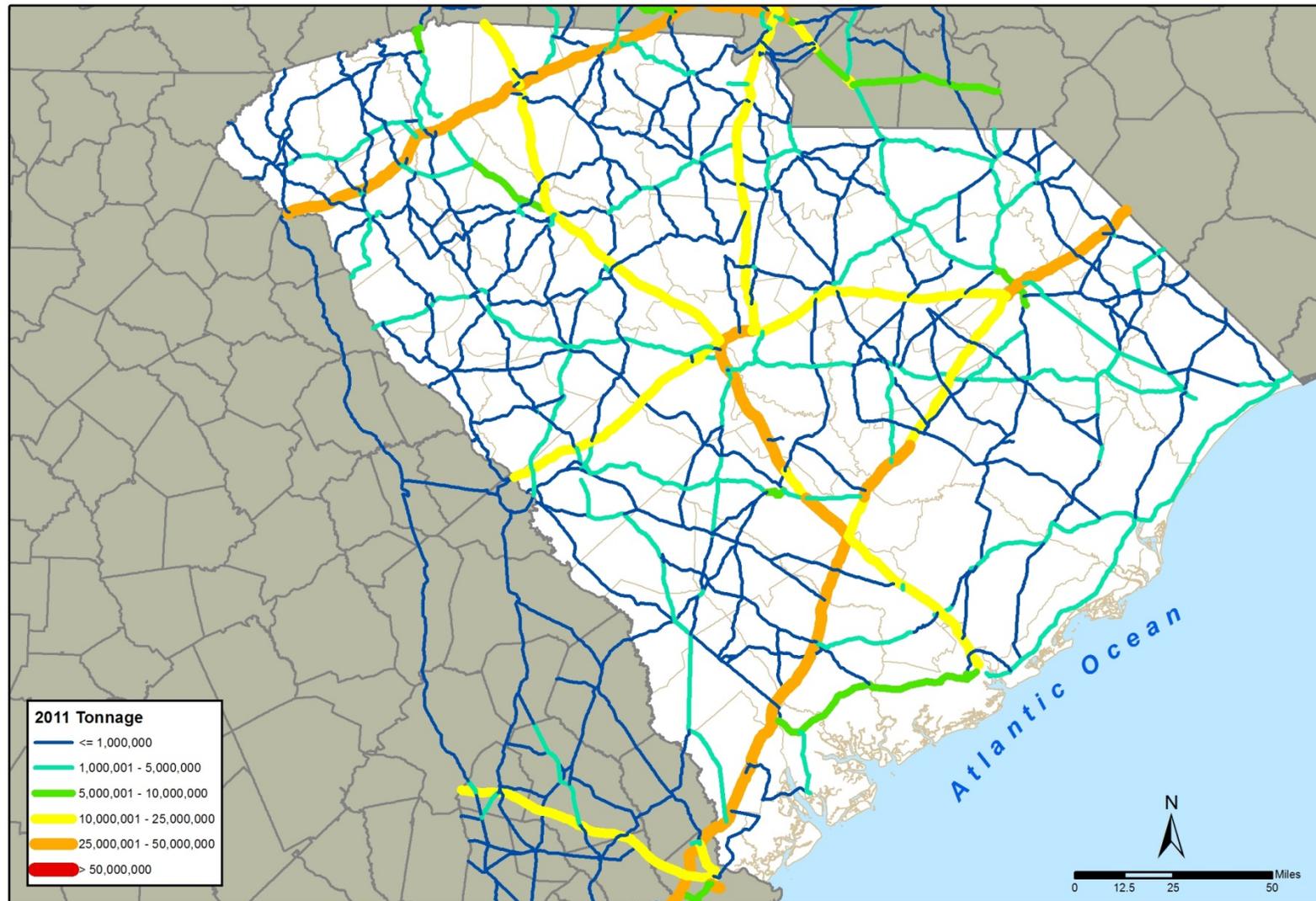
Table 3-2: South Carolina Truck Freight by Direction (2011)

Direction	Tons		Units		Value (in millions)		Average Value/Ton
	Amount	Percent	Amount	Percent	Amount	Percent	
Outbound	62,439,243	20.8%	4,739,453	18.4%	\$130,677	25.8%	\$2,093
Inbound	51,341,521	17.1%	4,767,946	18.5%	\$86,877	17.2%	\$1,692
Intra	47,102,262	15.7%	5,199,131	20.2%	\$23,567	4.7%	\$500
Through	139,685,267	46.5%	11,016,677	42.8%	\$265,120	52.4%	\$1,898
Total	300,568,293	100.0%	25,723,208	100.0%	\$506,241	100.0%	\$1,684

Source: prepared by CDM Smith, based on TRANSEARCH data for 2011

As one might expect, the major freight corridors include the five interstates (I-20, I-26, I-77, I-85, and I-95), as seen in **Figure 3-3**. Additionally, major U.S. and state highways in the urban centers also accommodate significant freight flows.

Figure 3-3: South Carolina Truck Freight Density (2011)



Source: prepared by CDM Smith, based on TRANSEARCH data for 2011

Inbound Truck

Table 3-3 presents major inbound truck commodities to South Carolina in 2011. Such movements total 51.3 million tons, via 4.8 million units, valued at \$86.9 billion, with an average value/ton of \$1,692. In tonnage terms, top inbound movements include: *Secondary Traffic*¹³ (7.8 million, 15.1 percent), *Food and Kindred Products* (7.0 million, 13.6 percent), and *Nonmetallic Minerals* (5.4 million, 10.5 percent). In unit terms, *Shipping Containers* constitute almost half (2.2 million, 46.9 percent) of the total 4.8 million inbound truck units.¹⁴ In value terms, the top commodities include: *Transportation Equipment* (\$10.3 billion, 11.8 percent), *Secondary Traffic* (\$9.6 billion, 11.1 percent), and *Food and Kindred Products* (\$8.5 billion, 9.8 percent).

Table 3-3: South Carolina Truck Inbound Freight by Major Commodities (2011)

STCC2	Commodity	Tons		Units		Value (in millions)		Average Value/Ton
		Amount	Percent	Amount	Percent	Amount	Percent	
50	Secondary Traffic	7,757,513	15.1%	384,689	8.1%	\$9,613	11.1%	\$1,239
20	Food or Kindred Products	6,977,107	13.6%	303,678	6.4%	\$8,531	9.8%	\$1,223
14	Nonmetallic Minerals	5,392,547	10.5%	221,821	4.7%	\$103	0.1%	\$19
01	Farm Products	4,584,299	8.9%	278,665	5.8%	\$4,668	5.4%	\$1,018
29	Petroleum or Coal Products	4,388,456	8.5%	182,905	3.8%	\$2,730	3.1%	\$622
28	Chemicals or Allied Products	3,803,333	7.4%	184,053	3.9%	\$7,334	8.4%	\$1,928
24	Lumber or Wood Products	3,403,303	6.6%	135,069	2.8%	\$779	0.9%	\$229
32	Clay, Concrete, Glass or Stone	2,765,141	5.4%	168,225	3.5%	\$814	0.9%	\$294
33	Primary Metal Products	2,294,428	4.5%	92,006	1.9%	\$5,178	6.0%	\$2,257
26	Pulp, Paper or Allied Products	2,097,830	4.1%	87,261	1.8%	\$2,752	3.2%	\$1,312
	Remaining Commodities	7,877,563	15.3%	2,729,575	57.2%	\$44,374	51.1%	\$5,633
	Total	51,341,521	100.0%	4,767,946	100.0%	\$86,877	100.0%	\$1,692

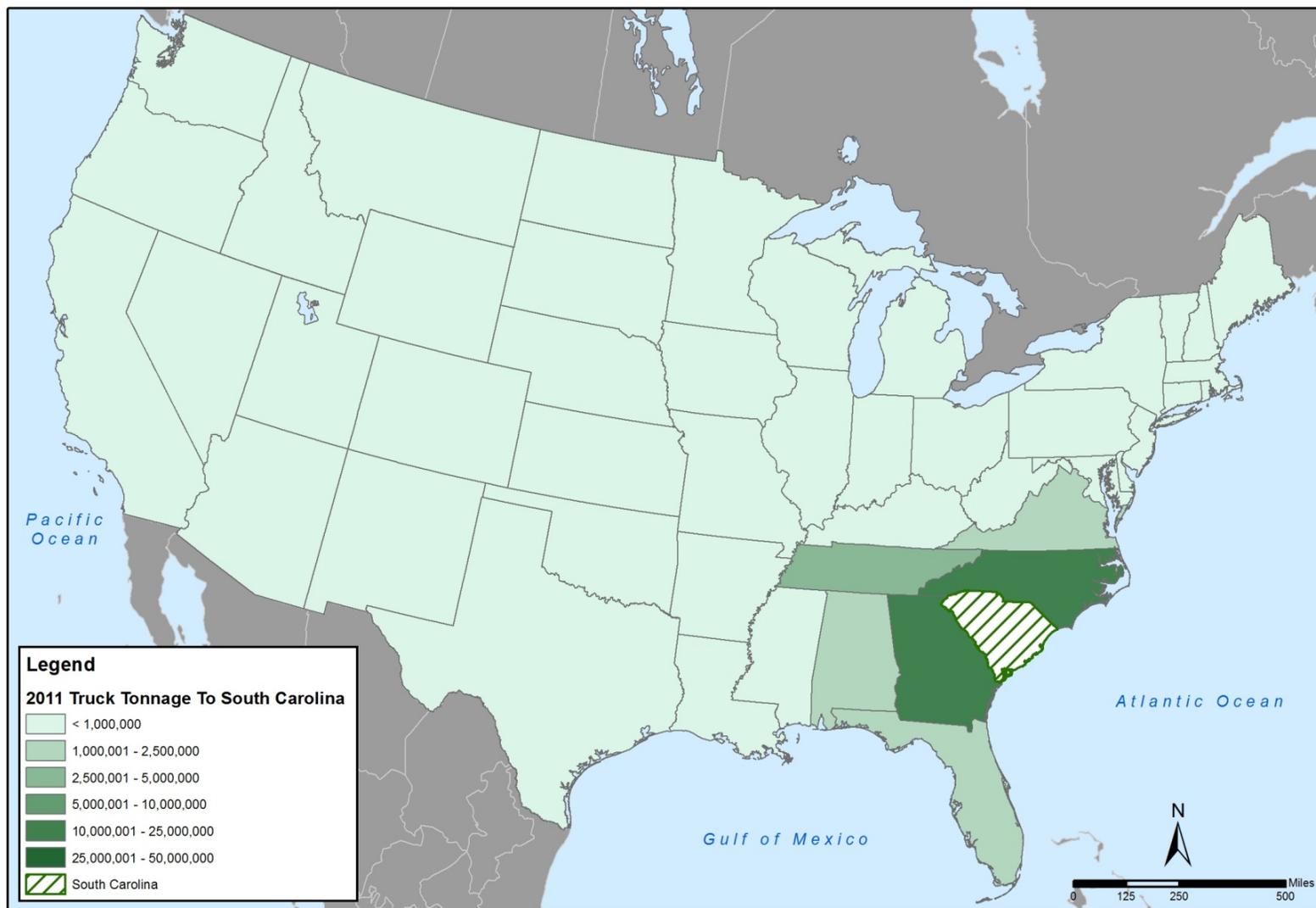
Source: prepared by CDM Smith, based on TRANSEARCH data for 2011

Truck Inbound Tonnage Origin – Major inbound tonnages in 2011 to South Carolina are predominately from the two bordering states of Georgia and North Carolina, as shown in **Figure 3-4**. The 16.8 million tons from Georgia (32.8 percent of total inbound) are led by *Nonmetallic Minerals* (2.6 million), *Food or Kindred Products* (2.5 million), *Petroleum or Coal Products* (2.4 million) and *Lumber or Wood Products* (2.3 million). North Carolina tonnage is distributed broadly among several commodity types including *Nonmetallic Minerals* (2.7 million), *Secondary Traffic* (2.5 million), *Food or Kindred Products* (2.2 million), and *Farm Products* (2.0 million).

¹³ Secondary Traffic is generally mixed commodities moving between locations such as warehouses, distribution centers.

¹⁴ Note, since the tonnage associated with *Shipping Containers* is not in the top ten, the associated units are not shown separately in Table 3-3, rather it is included under *Remaining Commodities*; similar occurrences are also present in other tables.

Figure 3-4: South Carolina Truck Inbound Freight by State Origin (2011)



Source: prepared by CDM Smith, based on TRANSEARCH data for 2011

Truck Inbound Tonnage Destination – Major inbound tonnages in 2011 are shown by county destination in **Figure 3-5**. Truck movements originating beyond South Carolina are primarily traveling to urban areas in South Carolina, led by port-related movements in Charleston County (7.8 million tons), and the Upstate manufacturing counties of Greenville (5.6 million tons) and Spartanburg (3.9 million tons).

- Charleston County destined truck movements from out-of-state are led by 1.3 million tons of *Pulp, Paper or Allied Products*, followed closely by an additional 1.3 million tons of *Food or Kindred Products*.
- Greenville County destined truck movements from out-of-state are led by 0.9 million tons of *Secondary Traffic*, 0.8 million tons of *Food or Kindred Products*, and 0.7 million tons of *Petroleum or Coal Products*.
- Similarly, Spartanburg County destined truck movements are led by *Secondary Traffic* (0.6 million tons), *Food or Kindred Products* (0.5 million tons), and *Petroleum or Coal Products* (0.4 million tons).

Outbound Truck

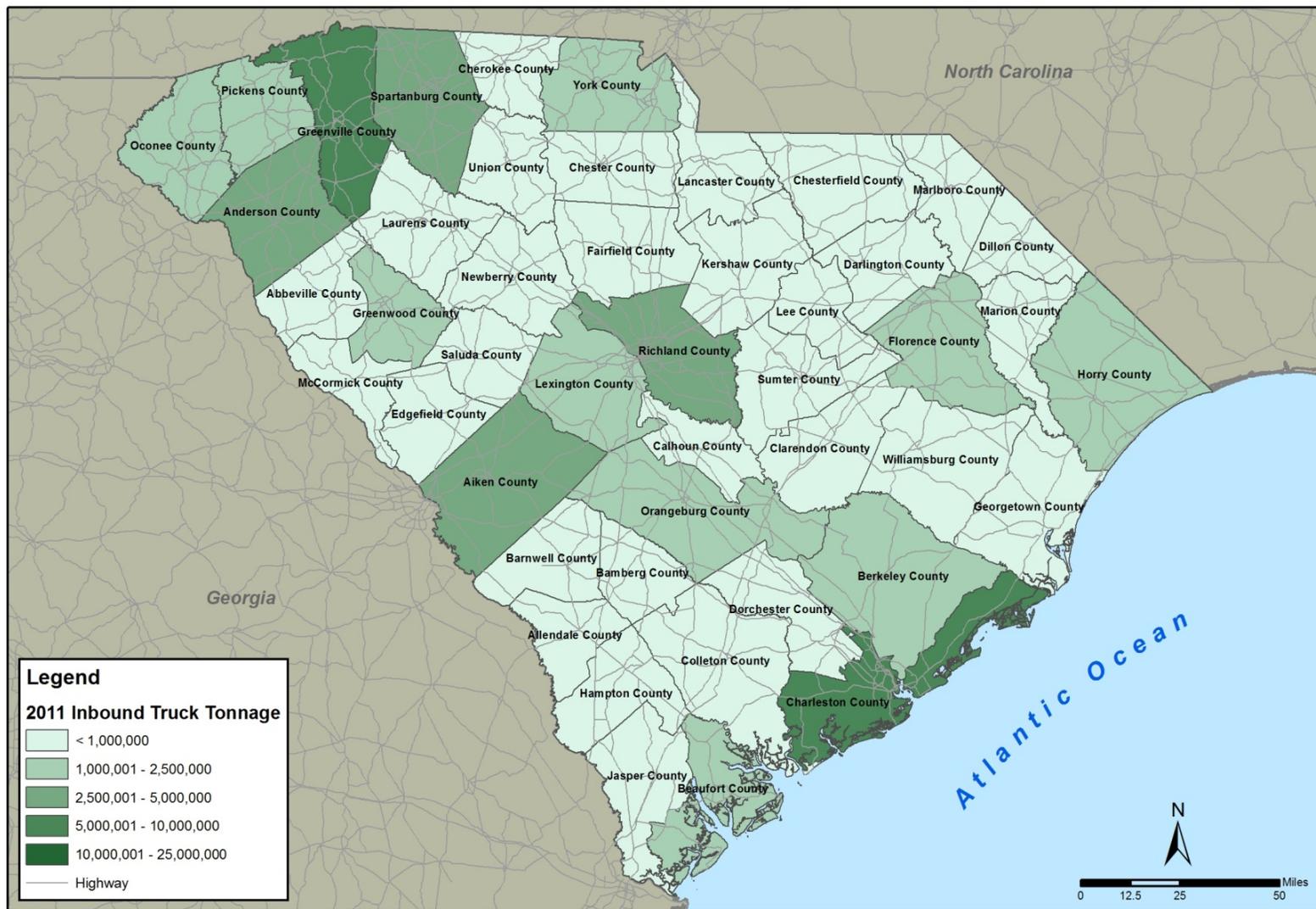
Table 3-4 presents major outbound truck commodities from South Carolina in 2011. Such outbound truck movements total 62.4 million tons, via 4.7 million units, valued at \$130.7 billion, with an average value/ton of \$2,093. In tonnage terms, top outbound movements include: *Chemicals and Allied Products* (14.4 million, 23.1 percent), *Secondary Traffic* (7.9 million, 12.6 percent), and *Nonmetallic Minerals* (5.8 million, 9.2 percent). In unit terms, *Shipping Containers* constitute a third (1.6 million, 33.0 percent) of the total 4.7 million outbound truck units. In value terms, top commodities include: *Chemical and Allied Products* (\$27.5 billion or 21.0 percent), *Transportation Equipment* (\$20.0 billion or 15.3 percent), and *Machinery* (\$12.6 billion or 9.6 percent).

Table 3-4: South Carolina Truck Outbound Freight by Major Commodities (2011)

STCC2	Commodity	Tons		Units		Value (in millions)		Average Value/Ton
		Amount	Percent	Amount	Percent	Amount	Percent	
28	Chemicals or Allied Products	14,449,432	23.1%	698,079	14.7%	\$27,499	21.0%	\$1,903
50	Secondary Traffic	7,893,859	12.6%	394,290	8.3%	\$10,174	7.8%	\$1,289
14	Nonmetallic Minerals	5,755,518	9.2%	236,752	5.0%	\$63	0.0%	\$11
20	Food or Kindred Products	5,127,127	8.2%	224,029	4.7%	\$7,049	5.4%	\$1,375
24	Lumber or Wood Products	4,267,132	6.8%	168,416	3.6%	\$1,277	1.0%	\$299
32	Clay, Concrete, Glass or Stone	4,226,729	6.8%	264,695	5.6%	\$1,064	0.8%	\$252
37	Transportation Equipment	2,638,535	4.2%	189,471	4.0%	\$19,950	15.3%	\$7,561
01	Farm Products	2,337,332	3.7%	140,018	3.0%	\$2,585	2.0%	\$1,106
26	Pulp, Paper or Allied Products	2,153,504	3.4%	89,001	1.9%	\$3,269	2.5%	\$1,518
40	Waste or Scrap Materials	1,981,171	3.2%	91,116	1.9%	\$463	0.4%	\$234
	Remaining Commodities	11,608,904	18.6%	2,243,586	47.3%	\$57,283	43.8%	\$4,934
	Total	62,439,243	100.0%	4,739,453	100.0%	\$130,677	100.0%	\$2,093

Source: prepared by CDM Smith, based on TRANSEARCH data for 2011

Figure 3-5: South Carolina Truck Inbound Freight by County Destination (2011)



Source: prepared by CDM Smith, based on TRANSEARCH data for 2011

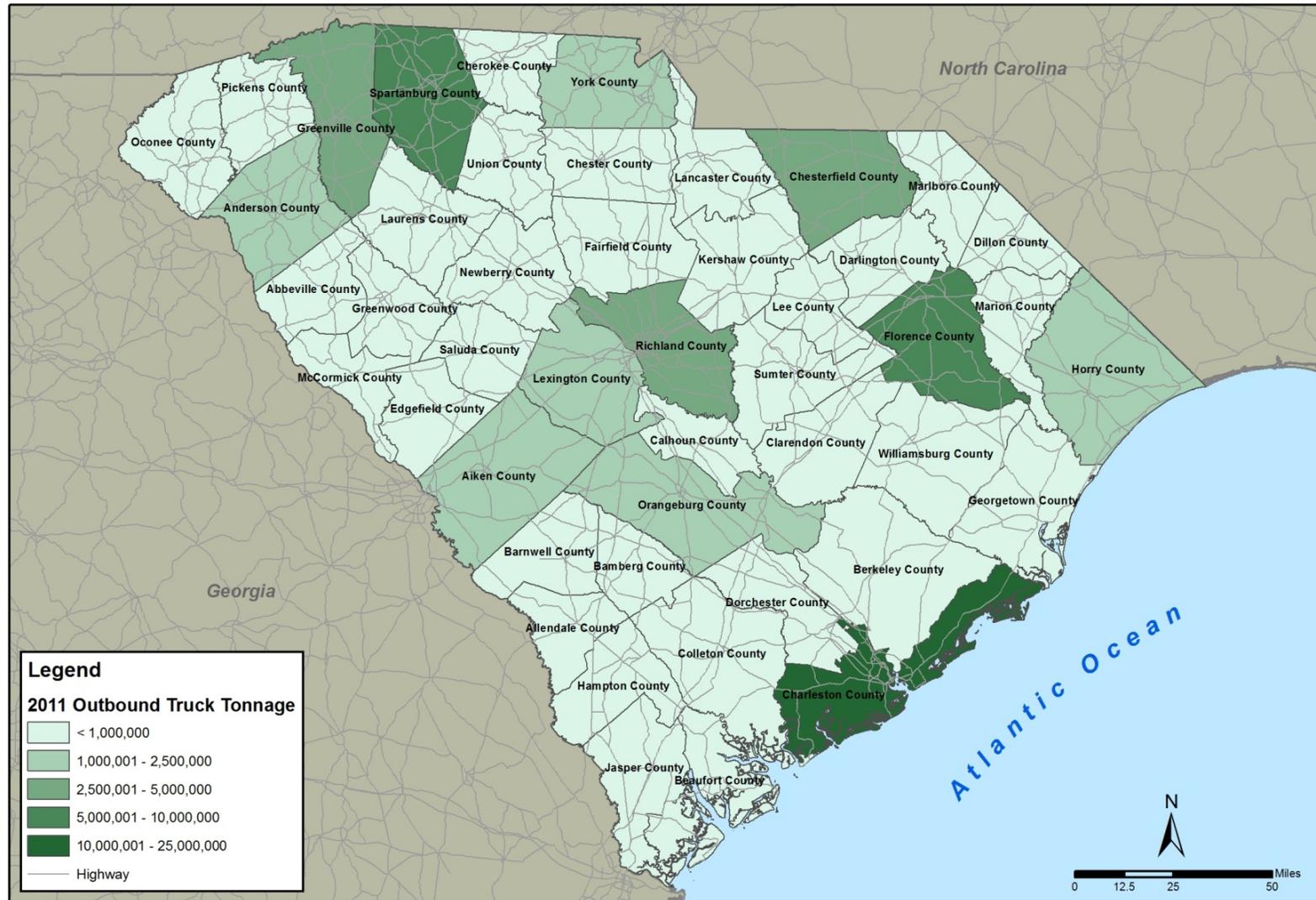
Outbound Tonnage Origin – Major outbound tonnages in 2011 are shown by county origin in **Figure 3-6**. Truck movements destined out-of-state are primarily traveling from Charleston County (11.8 million tons), Spartanburg County (8.0 million tons), and Florence County (6.4 million tons).

- Charleston County originated truck commodity movements destined out-of-state are led primarily by 3.4 million tons of *Chemicals or Allied Products*, with an additional 1.4 million tons of *Secondary Traffic*, and 1.2 million tons of *Transportation Equipment*.
- Spartanburg County originated tonnage is led by 2.6 million tons of *Chemicals or Allied Products*, 1.4 million tons of *Nonmetallic Minerals*, and 0.8 million tons of *Clay, Concrete, Glass or Stone*.
- Florence County originated tonnage is dominated by 4.8 million tons of *Chemicals or Allied Products*; all other commodities total 1.6 million tons.

Outbound Tonnage Destination – Over one-third of outbound tonnage in 2011 was destined to North Carolina (22.4 million tons, 35.8 percent), followed by Georgia (12.1 million tons, 19.5 percent), and Florida (5.9 million tons, 9.4 percent) as shown in **Figure 3-7**.

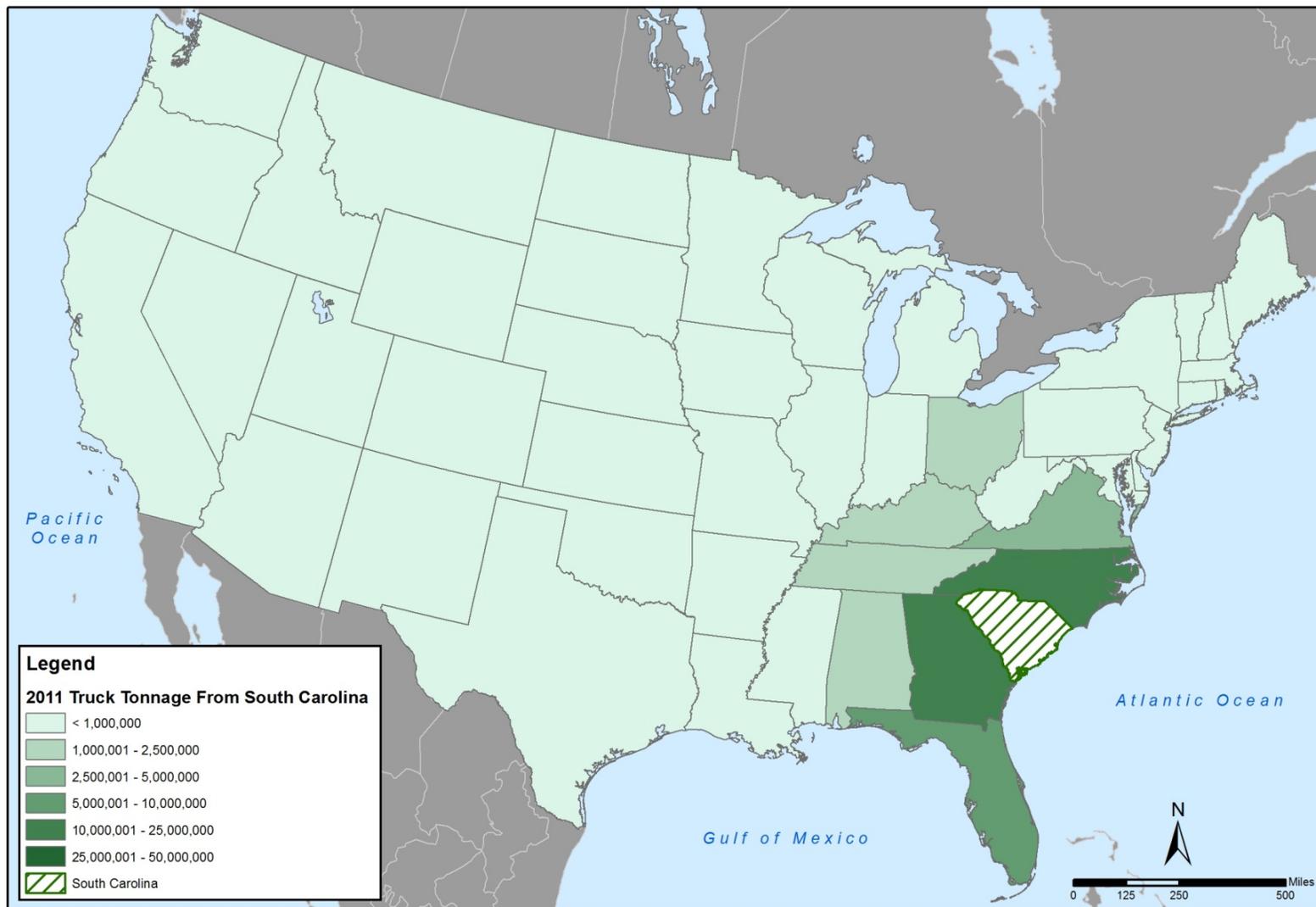
- 22.4 million tons to North Carolina are led by *Nonmetallic Minerals* (4.9 million tons), *Clay, Concrete, Glass or Stone* (2.9 million tons), and *Lumber or Wood Products* (2.6 million tons).
- Georgia destined truck tonnage is distributed among *Chemicals or Allied Products* (2.3 million tons) and *Food or Kindred Products* (1.5 million tons).

Figure 3-6: South Carolina Truck Outbound Freight by County Origin (2011)



Source: prepared by CDM Smith, based on TRANSEARCH data for 2011

Figure 3-7: South Carolina Truck Outbound Freight by State Destination (2011)



Source: prepared by CDM Smith, based on TRANSEARCH data for 2011

Through Truck

Table 3-5 presents through-state truck commodities in 2011. Such movements totaled 139.7 million tons, via 11.0 million units, valued at \$265.1 billion, with an average value/ton of \$1,898. In tonnage terms, the top through movements include: *Secondary Traffic* (37.0 million, 26.5 percent), *Nonmetallic Minerals* (13.9 million, 9.9 percent), and *Food or Kindred Products* (13.7 million, 9.8 percent). In unit terms, *Shipping Containers* and *Secondary Traffic* together constitute over one half (5.9 million, 53.5 percent) of the total 11.0 million through truck units, with 3.9 million and 2.0 million, respectively. In value terms, the top commodities include: *Secondary Traffic* (\$60.0 billion, 22.6 percent), *Machinery* (\$25.2 billion, 9.5 percent), and *Electrical Equipment* (\$21.6 billion, 8.2 percent).

Table 3-5: South Carolina Truck Through-State Freight by Major Commodities (2011)

STCC2	Commodity	Tons		Units		Value (in millions)		Average Value/Ton
		Amount	Percent	Amount	Percent	Amount	Percent	
50	Secondary Traffic	36,976,761	26.5%	1,980,093	18.0%	\$59,988	22.6%	\$1,622
14	Nonmetallic Minerals	13,861,065	9.9%	570,172	5.2%	\$229	0.1%	\$17
20	Food or Kindred Products	13,728,202	9.8%	598,051	5.4%	\$17,048	6.4%	\$1,242
32	Clay, Concrete, Glass or Stone	12,340,547	8.8%	723,091	6.6%	\$2,726	1.0%	\$221
01	Farm Products	10,236,594	7.3%	556,684	5.1%	\$10,038	3.8%	\$981
28	Chemicals or Allied Products	7,486,211	5.4%	360,949	3.3%	\$18,256	6.9%	\$2,439
29	Petroleum or Coal Products	7,436,158	5.3%	309,327	2.8%	\$4,884	1.8%	\$657
26	Pulp, Paper or Allied Products	6,437,108	4.6%	267,080	2.4%	\$7,570	2.9%	\$1,176
24	Lumber or Wood Products	4,968,497	3.6%	195,471	1.8%	\$1,755	0.7%	\$353
40	Waste or Scrap Materials	4,033,678	2.9%	186,824	1.7%	\$969	0.4%	\$240
	Remaining Commodities	22,180,445	15.9%	5,268,935	47.8%	\$141,656	53.4%	\$6,387
	Total	139,685,267	100.0%	11,016,677	100.0%	\$265,120	100.0%	\$1,898

Source: prepared by CDM Smith, based on TRANSEARCH data for 2011

Intrastate Truck

Table 3-6 summarizes intrastate truck commodities in South Carolina in 2011. Such movements total 47.1 million tons, via 5.2 million units, valued at \$23.6 billion, with an average value/ton of \$500. In tonnage terms, top intrastate movements include: *Nonmetallic Minerals* (24.5 million, 52.0 percent), *Secondary Traffic* (7.4 million, 15.8 percent), and *Clay, Concrete, Glass, or Stone* (3.8 million, 8.1 percent). In unit terms, *Shipping Containers* and *Nonmetallic Minerals* together constitute over three-quarters (4.0 million tons, 77.8 percent) of the total 5.2 million intrastate truck units, with 3.0 million and 1.0 million, respectively. In value terms, the top commodities include: *Secondary Traffic* (\$11.5 billion, 48.9 percent), *Chemicals or Allied Products* (\$2.7 billion, 11.6 percent), and *Farm Products* (\$1.4 billion, 6.1 percent). Intrastate movements are dominated by *Nonmetallic Minerals* (in tonnage terms); but, because the commodity has one of the lowest values/ton (\$11), the total value of such commodity movements is a small fraction of intrastate commodity values.

Table 3-6: South Carolina Truck Intrastate Freight by Major Commodities (2011)

STCC2	Commodity	Tons		Units		Value (in millions)		Average Value/Ton
		Amount	Percent	Amount	Percent	Amount	Percent	
14	Nonmetallic Minerals	24,484,473	52.0%	1,007,163	19.4%	\$266	1.1%	\$11
50	Secondary Traffic	7,429,177	15.8%	385,629	7.4%	\$11,518	48.9%	\$1,550
32	Clay, Concrete, Glass or Stone	3,821,814	8.1%	238,914	4.6%	\$878	3.7%	\$230
24	Lumber or Wood Products	2,706,423	5.7%	106,856	2.1%	\$809	3.4%	\$299
40	Waste or Scrap Materials	1,953,523	4.1%	90,840	1.7%	\$425	1.8%	\$218
01	Farm Products	1,951,925	4.1%	112,647	2.2%	\$1,448	6.1%	\$742
29	Petroleum or Coal Products	1,705,677	3.6%	71,268	1.4%	\$1,004	4.3%	\$589
28	Chemicals or Allied Products	1,371,031	2.9%	65,656	1.3%	\$2,724	11.6%	\$1,987
20	Food or Kindred Products	565,669	1.2%	24,625	0.5%	\$835	3.5%	\$1,475
33	Primary Metal Products	394,680	0.8%	16,048	0.3%	\$721	3.1%	\$1,828
	Remaining Commodities	717,869	1.5%	3,079,484	59.2%	\$2,939	12.5%	\$4,093
	Total	47,102,262	100.0%	5,199,131	100.0%	\$23,567	100.0%	\$500

Source: prepared by CDM Smith, based on TRANSEARCH data for 2011

3.1.3.2 Rail Freight

South Carolina rail movements in 2011 totaled 70.3 million tons, valued at \$79.1 billion, and carried within 1.3 million units, as shown in **Table 3-7**. On average, total rail commodity movements are valued at \$1,126/ton. Through-state rail movements are the largest directional movements: 43.9 percent of total tonnage, 59.7 percent of units, and 59.2 percent of value. Inbound rail tonnage (26.6 million) is significantly greater than outbound (8.1 million); however, in terms of value inbound and outbound movements are closer (\$15.1 billion inbound versus \$11.2 billion outbound) due to the notably higher average value/ton of outbound (\$1,386) versus inbound (\$567).

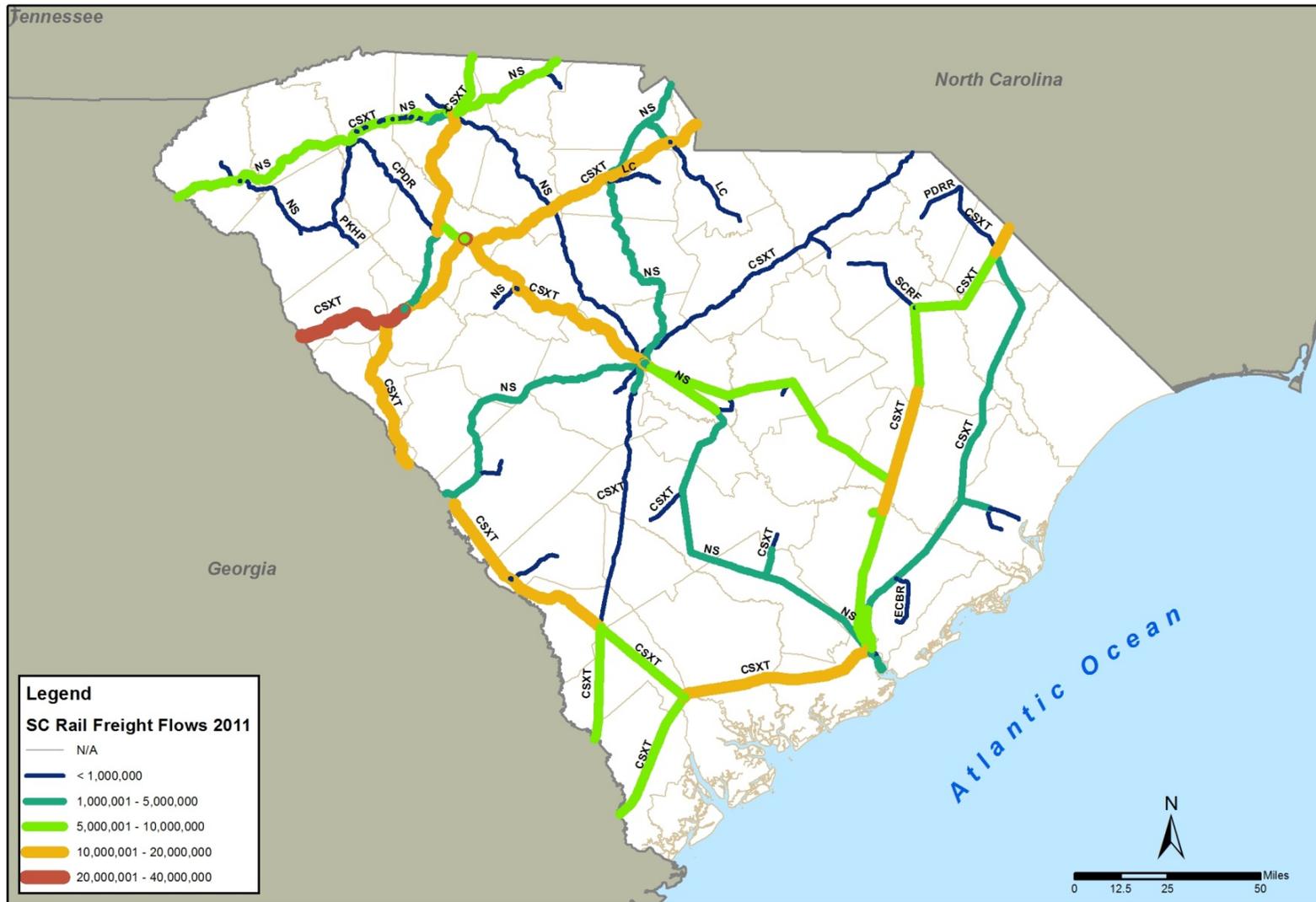
Table 3-7: South Carolina Rail Freight by Direction (2011)

Direction	Tons		Units		Value (in millions)		Average Value/Ton
	Amount	Percent	Amount	Percent	Amount	Percent	
Outbound	8,114,084	11.5%	132,876	10.3%	\$11,249	14.2%	\$1,386
Inbound	26,631,734	37.9%	326,686	25.2%	\$15,098	19.1%	\$567
Intra	4,681,040	6.7%	62,648	4.8%	\$5,938	7.5%	\$1,268
Through	30,872,783	43.9%	772,568	59.7%	\$46,853	59.2%	\$1,518
Total	70,299,641	100.0%	1,294,778	100.0%	\$79,137	100.0%	\$1,126

Source: prepared by CDM Smith, based on TRANSEARCH data for 2011

As shown in **Figure 3-8**, the CSXT link between Greenwood, SC and Athens, GA handles the greatest rail tonnage per line. In this segment, two separate CSX lines share trackage, contributing to this high density. Other notable tonnage movements go through Laurens County, Columbia and Charleston.

Figure 3-8: South Carolina Rail Freight Density (2011)



Source: prepared by CDM Smith, based on TRANSEARCH data for 2011

Inbound Rail

Table 3-8 presents major inbound rail commodities to South Carolina in 2011. Such movements total 26.6 million tons, via 326,686 units, valued at \$15.1 billion, with an average value/ton of \$567. In tonnage terms, top inbound movements include: *Coal* (14.0 million, 52.5 percent), *Chemical or Allied Products* (3.8 million, 14.3 percent), and *Farm Products* (1.4 million, 5.3 percent). In unit terms, *Coal* and *Miscellaneous Mixed Shipments* constitute over half (172,931, 52.9 percent) of the total 326,686 inbound rail units. In value terms, the top commodities include: *Chemical or Allied Products* (\$5.6 billion or 37.4 percent), *Miscellaneous Mixed Shipments* (\$3.3 billion or 21.7 percent), and *Transportation Equipment* (\$2.6 billion or 17.3 percent).

Table 3-8: South Carolina Rail Inbound Freight by Major Commodities (2011)

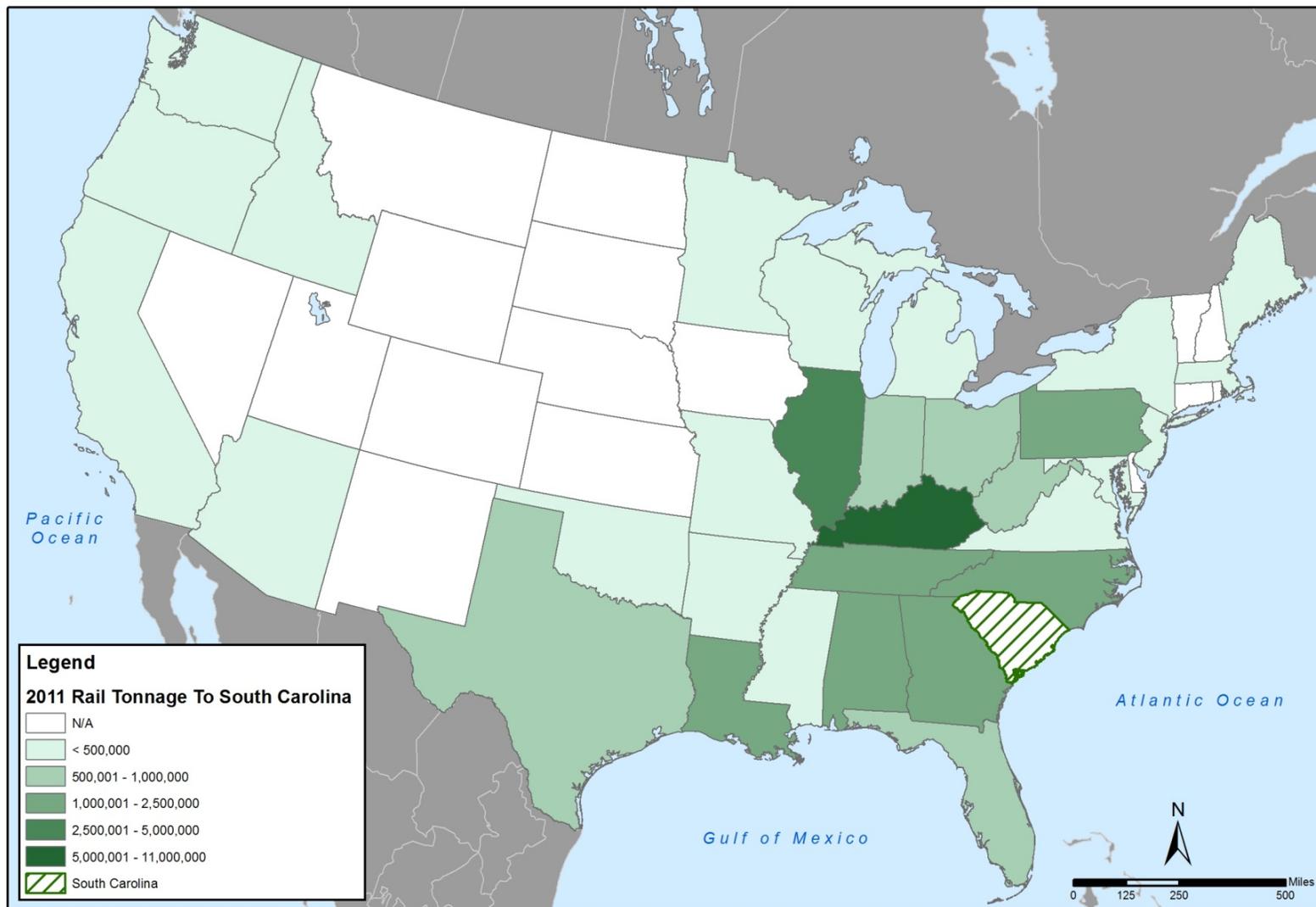
STCC2	Commodity	Tons		Units		Value (in millions)		Average Value/Ton
		Amount	Percent	Amount	Percent	Amount	Percent	
11	Coal	13,983,033	52.5%	121,091	37.1%	\$512	3.4%	\$37
28	Chemicals or Allied Products	3,809,668	14.3%	42,340	13.0%	\$5,639	37.4%	\$1,480
01	Farm Products	1,418,092	5.3%	13,612	4.2%	\$261	1.7%	\$184
40	Waste or Scrap Materials	1,172,576	4.4%	12,824	3.9%	\$339	2.2%	\$289
14	Nonmetallic Minerals	1,048,310	3.9%	10,196	3.1%	\$11	0.1%	\$11
26	Pulp, Paper or Allied Products	1,011,832	3.8%	13,740	4.2%	\$772	5.1%	\$763
32	Clay, Concrete, Glass or Stone	941,196	3.5%	9,792	3.0%	\$132	0.9%	\$140
20	Food or Kindred Products	816,624	3.1%	10,380	3.2%	\$564	3.7%	\$690
46	Misc. Mixed Shipments	647,560	2.4%	51,840	15.9%	\$3,279	21.7%	\$5,063
24	Lumber or Wood Products	606,736	2.3%	6,820	2.1%	\$76	0.5%	\$125
	Remaining Commodities	1,176,107	4.4%	34,051	10.4%	\$3,515	23.3%	\$2,989
	Total	26,631,734	100.0%	326,686	100.0%	\$15,098	100.0%	\$567

Source: prepared by CDM Smith, based on TRANSEARCH data for 2011

Rail Inbound Tonnage Origin – Over half (52.5 percent) of inbound tonnage is *Coal*, chiefly from Kentucky (10.2 million), but also from Pennsylvania (1.6 million), and Illinois (1.3 million). The second major commodity railed into South Carolina is *Chemical or Allied Products*, led by Louisiana, Illinois, Texas, and North Carolina (ranging from 0.5 million to 0.7 million). Inbound rail tonnage by state of origin is shown in **Figure 3-9**.

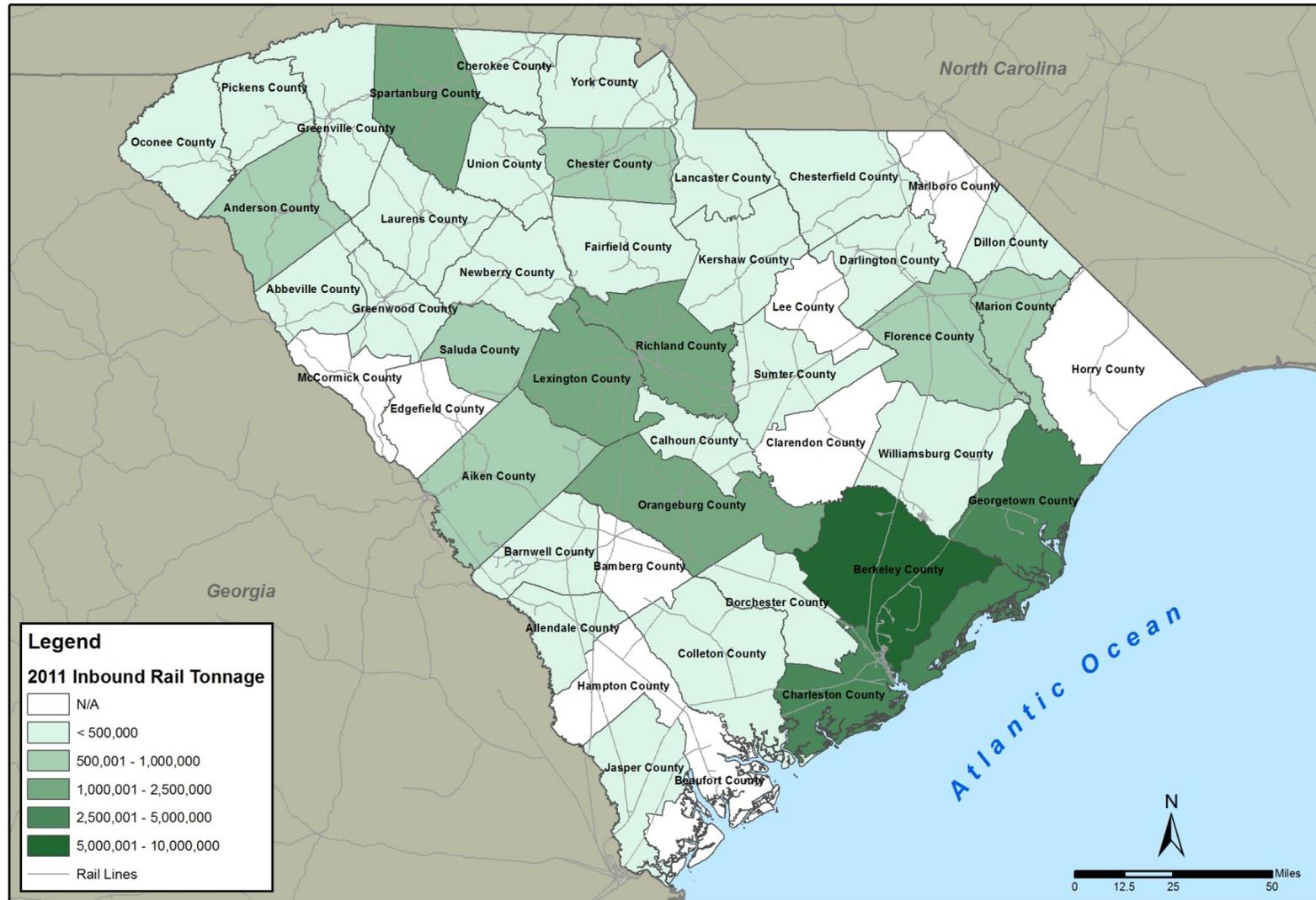
Rail Inbound Tonnage Destination – Major inbound tonnage in 2011 are shown by county destination in **Figure 3-10**. Rail movements originating from out-of-state are primarily traveling to the coastal counties: Berkeley (7.4 million tons), Charleston (3.5 million tons), and Georgetown (2.5 million tons). Berkeley and Georgetown movements are dominated by coal (84 percent of both counties). Regarding the second largest inbound rail tonnage, *Chemicals or Allied Products*, 25.0 percent (1.0 million tons) of the 3.8 million tons go to Spartanburg County. Other major inbound rail movements include 0.8 million tons of *Waste or Scrap Materials* to Berkeley County, and 0.8 million tons of *Nonmetallic Minerals* to Marion County.

Figure 3-9: South Carolina Rail Inbound Freight by State of Origin (2011)



Source: prepared by CDM Smith, based on TRANSEARCH data for 2011

Figure 3-10: South Carolina Rail Inbound Freight by County Destination (2011)



Source: prepared by CDM Smith, based on TRANSEARCH data for 2011

Outbound Rail

Table 3-9 presents the outbound major commodities by rail from South Carolina in 2011. Such outbound rail movements total 8.1 million tons, via 132,876 units, valued at \$11.2 billion, with an average value/ton of \$1,386. In tonnage terms, top inbound movements include: *Pulp, Paper or Allied Products* (1.7 million, 20.9 percent), *Primary Metal Products* (1.6 million, 19.2 percent), and *Chemicals or Allied Products* (1.5 million, 18.4 percent). In unit terms, *Miscellaneous Mixed Shipments* and *Pulp, Paper or Allied Products* together constitute almost one half (58,636, or 44.1 percent) of the total 132,876 outbound rail units. In value terms, the top commodities include: *Chemical and Allied Products* (\$3.1 billion or 27.1 percent), *Primary Metal Products* (\$2.4 billion or 21.7 percent), and *Miscellaneous Mixed Shipments* (\$2.4 billion or 21.0 percent).

Table 3-9: South Carolina Rail Outbound Freight by Major Commodities (2011)

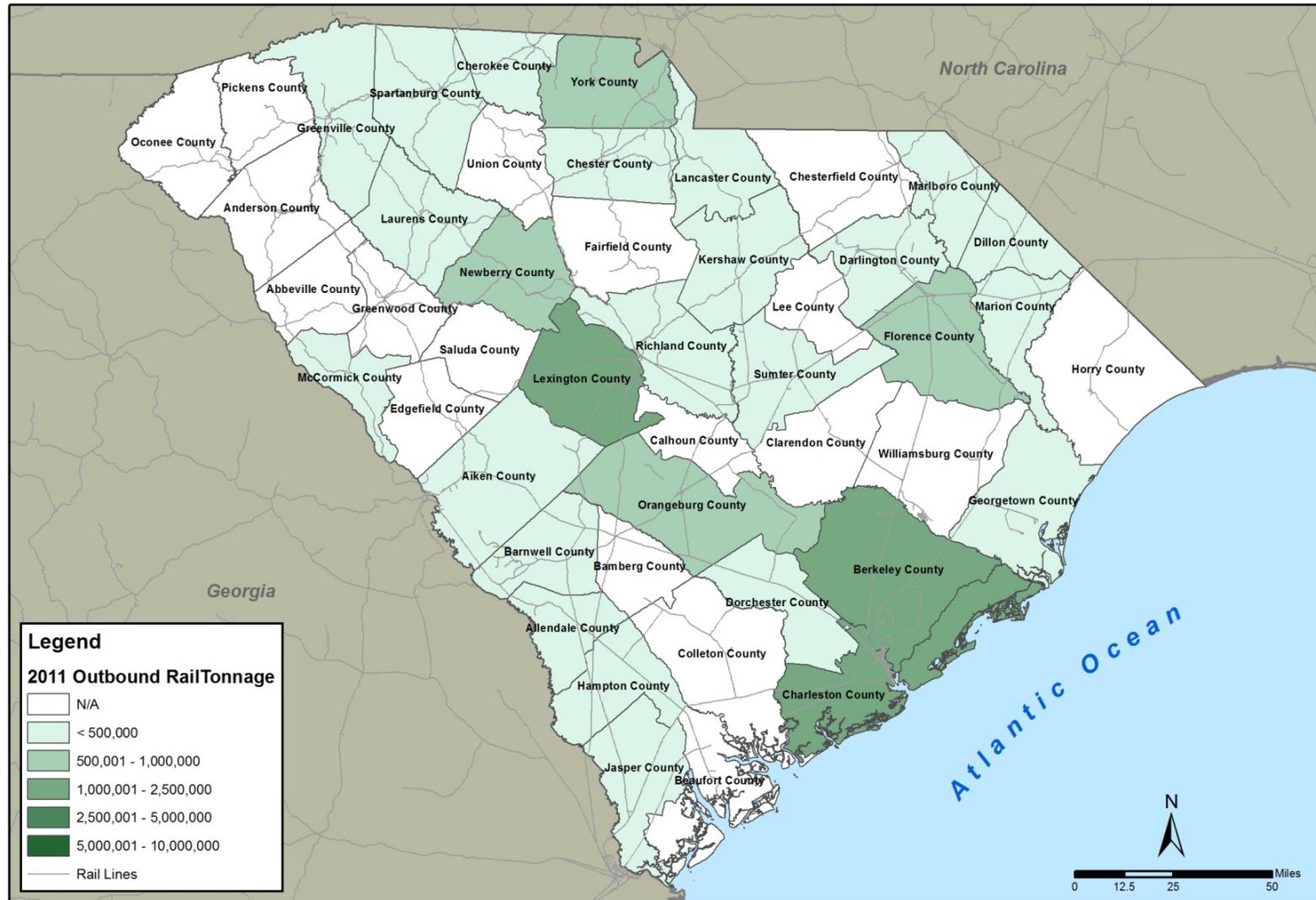
STCC2	Commodity	Tons		Units		Value (in millions)		Average Value/Ton
		Amount	Percent	Amount	Percent	Amount	Percent	
26	Pulp, Paper or Allied Products	1,694,212	20.9%	22,756	17.1%	\$1,917	17.0%	\$1,131
33	Primary Metal Products	1,554,440	19.2%	17,480	13.2%	\$2,440	21.7%	\$1,570
28	Chemicals or Allied Products	1,494,440	18.4%	15,744	11.8%	\$3,053	27.1%	\$2,043
24	Lumber or Wood Products	1,072,916	13.2%	12,052	9.1%	\$247	2.2%	\$231
32	Clay, Concrete, Glass or Stone	827,204	10.2%	7,792	5.9%	\$83	0.7%	\$101
46	Misc. Mixed Shipments	467,240	5.8%	35,880	27.0%	\$2,366	21.0%	\$5,063
40	Waste or Scrap Materials	354,348	4.4%	4,204	3.2%	\$96	0.9%	\$271
14	Nonmetallic Minerals	279,364	3.4%	2,712	2.0%	\$2	0.0%	\$8
20	Food or Kindred Products	115,604	1.4%	1,448	1.1%	\$71	0.6%	\$618
37	Transportation Equipment	91,340	1.1%	4,304	3.2%	\$792	7.0%	\$8,671
	Remaining Commodities	162,976	2.0%	8,504	6.4%	\$182	1.6%	\$1,114
	Total	8,114,084	100.0%	132,876	100.0%	\$11,249	100.0%	\$1,386

Source: prepared by CDM Smith, based on TRANSEARCH data for 2011

Outbound Tonnage Origin – Major outbound tonnages in 2011 are shown by county origin in **Figure 3-11**. Rail movements destined out-of-state primarily originate from Charleston County (1.2 million tons), Berkeley County (1.1 million tons), and Lexington County (1.0 million tons). From a commodity perspective; *Pulp, Paper or Allied Products* are led by 0.5 million tons from York county and 0.3 million from both Charleston and Florence Counties; *Primary Metal Products* predominantly originate from Berkeley County (0.9 of 1.6 million tons); and *Chemicals or Allied Products* predominately originate from Lexington and Charleston Counties.

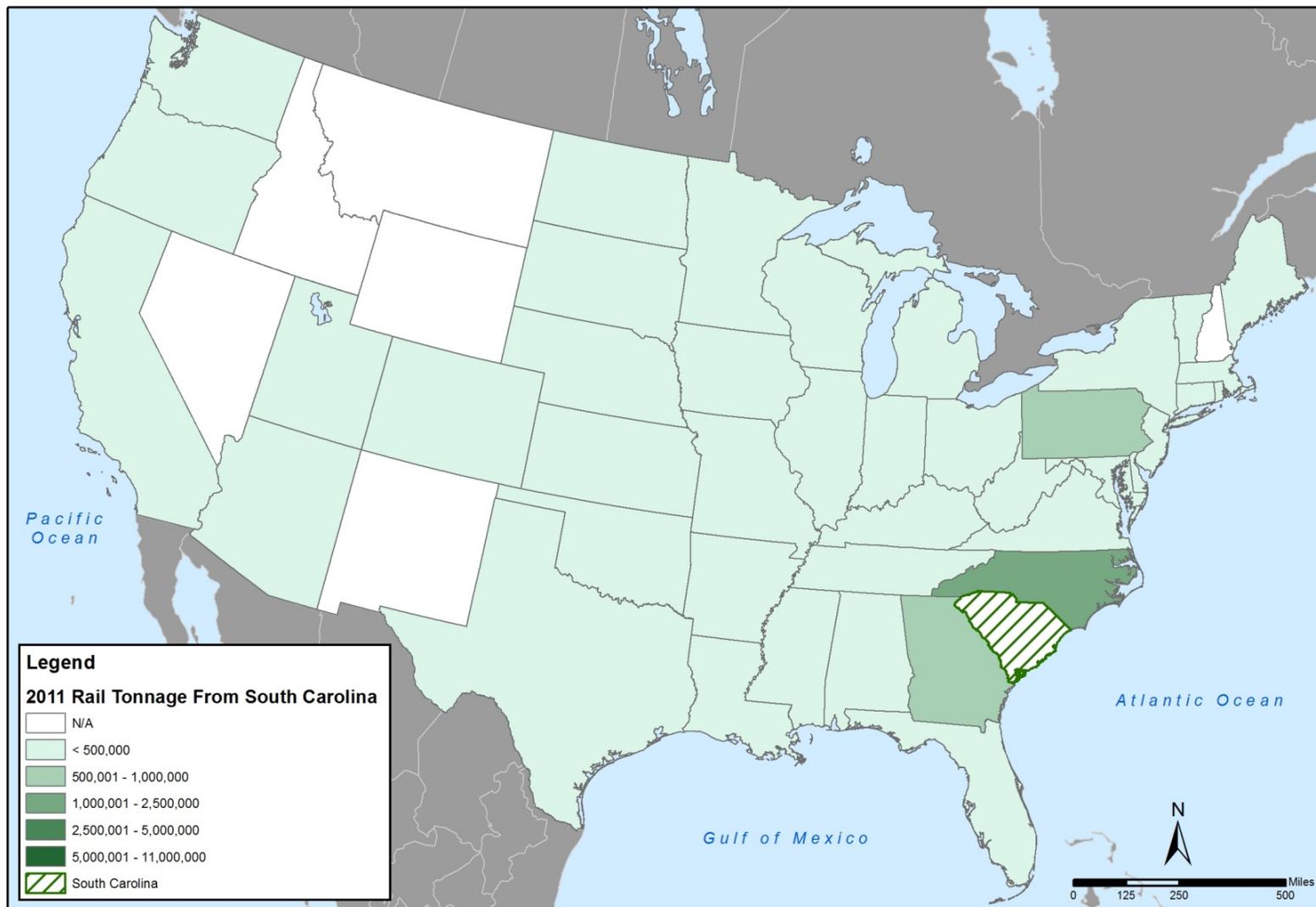
Outbound Tonnage Destination – One-fifth of outbound rail in 2011 went to North Carolina (1.7 million tons, 20.4 percent), followed by Georgia (0.9 million tons, 10.6 percent), and Pennsylvania (0.6 million tons, 7.8 percent) as shown in **Figure 3-12**. North Carolina movements were led by *Lumber or Wood Products* (0.6 million tons) and *Clay, Concrete, Glass or Stone* (0.5 million tons). Georgia-bound tonnage was led predominantly by *Pulp, Paper or Allied Products* (0.3 million tons), and Pennsylvania-bound shipments were primarily *Primary Metal Products* (0.3 million tons) and *Pulp, Paper or Allied Products* (0.2 million tons).

Figure 3-11: South Carolina Rail Outbound Freight by County Origin (2011)



Source: prepared by CDM Smith, based on TRANSEARCH data for 2011

Figure 3-12: South Carolina Rail Outbound Freight by State of Destination (2011)



Source: prepared by CDM Smith, based on TRANSEARCH data for 2011

Through Rail

Table 3-10 presents through-state rail commodities in 2011. Such movements total 30.9 million tons, via 772,568 units, valued at \$46.9 billion, with an average value/ton of \$1,518. In tonnage terms, the top through movements include: *Chemicals or Allied Products* (6.3 million, 20.3 percent), *Coal* (5.4 million, 17.6 percent), and *Miscellaneous Mixed Shipments* (4.2 million, 13.6 percent). In unit terms, *Miscellaneous Mixed Shipments* constitute over one third (298,376 or 38.6 percent) of the total 772,568 through rail units. In value terms, the top commodities include: *Miscellaneous Mixed Shipments* (\$21.1 billion or 45.1 percent), *Chemicals or Allied Products* (\$10.0 billion or 21.3 percent), and *Food or Kindred Products* (\$2.3 billion or 5.0 percent).

Table 3-10: South Carolina Rail Through-State by Major Commodities (2011)

STCC2	Commodity	Tons		Units		Value (in millions)		Average Value/Ton
		Amount	Percent	Amount	Percent	Amount	Percent	
28	Chemicals or Allied Products	6,259,967	20.3%	76,505	9.9%	\$9,979	21.3%	\$1,594
11	Coal	5,424,923	17.6%	47,487	6.1%	\$198	0.4%	\$37
46	Misc. Mixed Shipments	4,190,264	13.6%	298,376	38.6%	\$21,126	45.1%	\$5,042
20	Food or Kindred Products	2,973,736	9.6%	62,392	8.1%	\$2,347	5.0%	\$789
26	Pulp, Paper or Allied Products	2,327,000	7.5%	51,920	6.7%	\$2,231	4.8%	\$959
32	Clay, Concrete, Glass or Stone	1,786,024	5.8%	18,944	2.5%	\$352	0.8%	\$197
14	Nonmetallic Minerals	1,771,967	5.7%	17,655	2.3%	\$56	0.1%	\$31
01	Farm Products	1,475,440	4.8%	15,483	2.0%	\$364	0.8%	\$247
24	Lumber or Wood Products	872,488	2.8%	13,028	1.7%	\$263	0.6%	\$302
29	Petroleum or Coal Products	733,796	2.4%	8,523	1.1%	\$849	1.8%	\$1,157
	Remaining Commodities	3,057,178	9.9%	162,255	21.0%	\$9,089	19.4%	\$2,973
	Total	30,872,783	100.0%	772,568	100.0%	\$46,853	100.0%	\$1,518

Source: prepared by CDM Smith, based on TRANSEARCH data for 2011

Intrastate Rail

Table 3-11 summarizes intrastate rail commodities in South Carolina in 2011. Such movements total 4.7 million tons, via 62,648 units, valued at \$5.9 billion, with an average value/ton of \$1,268. In tonnage terms, top intrastate movements include: *Chemicals or Allied Products* (1.1 million, 23.3 percent), *Nonmetallic Minerals* (0.9 million, 20.0 percent), *Lumber or Wood Products* (0.9 million, 18.7 percent). In unit terms, *Transportation Equipment* and *Chemicals or Allied Products* together constitute almost one half (29,560 or 47.2 percent) of the total 62,648 intrastate rail units. In value terms, the top commodities include: *Transportation Equipment* (\$3.4 billion or 58.1 percent), *Chemicals or Allied Products* (\$1.5 billion or 25.3 percent), and *Machinery* (\$0.4 billion or 7.3 percent).

Table 3-11: South Carolina Rail Intrastate by Major Commodities (2011)

STCC2	Commodity	Tons		Units		Value (in millions)		Average Value/Ton
		Amount	Percent	Amount	Percent	Amount	Percent	
28	Chemicals or Allied Products	1,088,680	23.3%	10,360	16.5%	\$1,501	25.3%	\$1,379
14	Nonmetallic Minerals	934,604	20.0%	8,916	14.2%	\$9	0.2%	\$10
24	Lumber or Wood Products	876,560	18.7%	9,520	15.2%	\$109	1.8%	\$124
10	Metallic Ores	466,800	10.0%	4,652	7.4%	\$14	0.2%	\$31
37	Transportation Equipment	392,596	8.4%	19,200	30.6%	\$3,448	58.1%	\$8,784
40	Waste or Scrap Materials	359,960	7.7%	3,680	5.9%	\$106	1.8%	\$295
26	Pulp, Paper or Allied Products	229,760	4.9%	3,160	5.0%	\$168	2.8%	\$730
32	Clay, Concrete, Glass or Stone	136,480	2.9%	1,200	1.9%	\$12	0.2%	\$86
33	Primary Metal Products	74,680	1.6%	840	1.3%	\$115	1.9%	\$1,543
48	Waste	58,680	1.3%	640	1.0%	\$0	0.0%	\$0
	Remaining Commodities	62,240	1.3%	480	0.8%	\$455	7.7%	\$7,308
	Total	4,681,040	100.0%	62,648	100.0%	\$5,938	100.0%	\$1,268

Source: prepared by CDM Smith, based on TRANSEARCH data for 2011

3.1.3.3 Port Freight

South Carolina port (water) movements in 2011 reported by TRANSEARCH totaled 4.8 million tons, valued at \$3.6 billion, see **Table 3-12**. It is important to note that the TRANSEARCH reported movements *exclude* foreign non-NAFTA movements to Europe, Asia, South America, etc. However, ground movements by truck/rail to from South Carolina ports are included under the other modal movements.¹⁵

On average, reported port commodity movements are valued at \$755/ton. Through port movements are the largest directional movements, 47.9 percent of total tonnage and 41.2 percent of value. Inbound port movements are a close second, constituting 36.9 percent of total tonnage movements via water and 38.6 percent of total value. Further, inbound port volumes and values are far greater than outbound movements: 8.6 times the volume and 4.1 times the value. As such, the outbound value/ton for waterborne movements are almost twice the value/ton for inbound waterborne movements: \$1,666 and \$791, respectively. Note that the TRANSEARCH does not provide units for waterborne movements.

The following subsections detail the TRANSEARCH-reported movements by direction. Further, it is noted that due to the exclusion of foreign non-NAFTA movements the reported volumes are significantly less than those reported by U.S. Army Corps of Engineers (USACE). Hence, the last subsection summarizes the directional tonnage differences between the two sources.

¹⁵ This is further discussed in subsections 3.1.3.1 and 3.1.3.2.

Table 3-12: South Carolina Port Freight by Direction (2011), excluding Foreign Non-NAFTA Movements

Direction	Tons		Value (in millions)		Average Value/Ton
	Amount	Percent	Amount	Percent	
Outbound	204,436	4.3%	\$341	9.5%	\$1,666
Inbound	1,754,800	36.9%	\$1,388	38.6%	\$791
Intra	523,621	11.0%	\$382	10.6%	\$730
Through	2,279,084	47.9%	\$1,482	41.2%	\$650
Total	4,761,940	100.0%	\$3,593	100.0%	\$755

Source: prepared by CDM Smith, based on TRANSEARCH data for 2011

Inbound Port

Table 3-13 summarizes inbound port commodities from the U.S., Mexico, and Canada to South Carolina in 2011, as reported by TRANSEARCH. Such reported movements total 1.8 million tons, valued at \$1.4 billion, with an average value/ton of \$791. In tonnage terms, the top inbound movements include: *Petroleum or Coal Products* (0.7 million, 42.0 percent), *Chemical or Allied Products* (0.7 million, 40.0 percent), and *Nonmetallic Minerals* (0.2 million, 9.3 percent). In value terms, the top commodities include: *Chemical or Allied Products* (\$703 million, 50.7 percent), *Petroleum or Coal Product* (\$606 million, 43.6 percent), and *Waste or Scrap Materials* (\$34 million, 2.4 percent).

Table 3-13: South Carolina Port Inbound Freight by Major Commodities (2011)

STCC2	Commodity	Tons		Value (in millions)		Average Value/Ton
		Amount	Percent	Amount	Percent	
29	Petroleum or Coal Products	736,474	42.0%	\$606	43.6%	\$823
28	Chemicals or Allied Products	702,522	40.0%	\$703	50.7%	\$1,001
14	Nonmetallic Minerals	162,874	9.3%	\$1	0.1%	\$8
40	Waste or Scrap Materials	127,999	7.3%	\$34	2.4%	\$262
24	Lumber or Wood Products	10,892	0.6%	\$1	0.1%	\$125
20	Food or Kindred Products	7,585	0.4%	\$18	1.3%	\$2,332
11	Coal	3,524	0.2%	\$0	0.0%	\$34
01	Farm Products	1,023	0.1%	\$6	0.4%	\$5,493
32	Clay, Concrete, Glass or Stone	981	0.1%	\$8	0.6%	\$8,434
35	Machinery	298	0.0%	\$4	0.3%	\$12,594
	Remaining Commodities	628	0.0%	\$8	0.5%	\$12,026
	Total	1,754,800	100.0%	\$1,388	100.0%	\$791

Source: prepared by CDM Smith, based on TRANSEARCH data for 2011

Outbound Port

Table 3-14 summarizes outbound port commodities from South Carolina to the U.S., Mexico, and Canada in 2011, as reported by TRANSEARCH. Such reported movements totaled 204,436 tons, valued at \$341 million, with an average value/ton to \$1,666. In tonnage terms, the top inbound movements include: *Clay, Concrete, Glass or Stone* (71,095, 34.8 percent), *Petroleum or Coal Products* (48,160, 23.6 percent), and *Primary Metal Products* (35,244, 17.2 percent). In value terms, the top commodities

include: *Machinery* (\$157 million, 46.1 percent), *Primary Metal Products* (\$45 million, 13.2 percent), and *Chemicals or Allied Products* (\$45 million, 13.2 percent).

Table 3-14: South Carolina Port Outbound Freight by Major Commodities (2011)

STCC2	Commodity	Tons		Value (in millions)		Average Value/Ton
		Amount	Percent	Amount	Percent	
32	Clay, Concrete, Glass or Stone	71,095	34.8%	\$10	2.9%	\$139
29	Petroleum or Coal Products	48,160	23.6%	\$44	12.9%	\$914
33	Primary Metal Products	35,244	17.2%	\$45	13.2%	\$1,280
28	Chemicals or Allied Products	23,719	11.6%	\$45	13.2%	\$1,895
26	Pulp, Paper or Allied Products	15,114	7.4%	\$18	5.2%	\$1,164
35	Machinery	4,383	2.1%	\$157	46.1%	\$35,817
40	Waste or Scrap Materials	1,959	1.0%	\$1	0.3%	\$563
14	Nonmetallic Minerals	1,803	0.9%	\$0	0.0%	\$36
34	Fabricated Metal Products	983	0.5%	\$3	0.8%	\$2,829
36	Electrical Equipment	908	0.4%	\$11	3.3%	\$12,344
	Remaining Commodities	1,069	0.5%	\$7	2.0%	\$6,514
	Total	204,436	100.0%	\$341	100.0%	\$1,666

Source: prepared by CDM Smith, based on TRANSEARCH data for 2011

Through Port

Table 3-15 summarizes through port commodities via South Carolina in 2011, as reported by TRANSEARCH. Such reported movements totaled 2.3 million tons, valued at \$1.5 billion, with an average value/ton of \$650. In terms of both tonnage and value, the top through movements are *Petroleum or Coal Products*, constituting 1.6 million tons (70.4 percent of tonnage totals) and \$1.3 billion (85.4 percent of value totals).

Table 3-15: South Carolina Port Through Freight by Major Commodities (2011)

STCC2	Commodity	Tons		Value (in millions)		Average Value/Ton
		Amount	Percent	Amount	Percent	
29	Petroleum or Coal Products	1,604,744	70.4%	\$1,266	85.4%	\$789
14	Nonmetallic Minerals	342,976	15.0%	\$7	0.4%	\$19
20	Food or Kindred Products	198,179	8.7%	\$129	8.7%	\$651
28	Chemicals or Allied Products	126,599	5.6%	\$61	4.1%	\$484
26	Pulp, Paper or Allied Products	3,494	0.2%	\$2	0.2%	\$685
24	Lumber or Wood Products	767	0.0%	\$0	0.0%	\$650
46	Misc. Mixed Shipments	728	0.0%	\$3	0.2%	\$4,511
22	Textile Mill Products	368	0.0%	\$4	0.3%	\$12,134
33	Primary Metal Products	252	0.0%	\$0	0.0%	\$1,925
36	Electrical Equipment	226	0.0%	\$2	0.2%	\$10,902
	Remaining Commodities	751	0.0%	\$6	0.4%	\$7,677
	Total	2,279,084	100.0%	\$1,482	100.0%	\$650

Source: prepared by CDM Smith, based on TRANSEARCH data for 2011

Intrastate Port

Table 3-16 summarizes intrastate port commodities within South Carolina in 2011, as reported by TRANSEARCH. Such reported movements totaled 523,621 tons, valued at \$382 million, with an average value/ton of \$730. Note that only four aggregate STCC commodities are moved intrastate via port/water: *Petroleum or Coal Products, Coal, Primary Metal Products, and Waste or Scrap Materials.* *Petroleum or Coal Products*, constitute the major intrastate tonnage moved (387,795, 74.1 percent) and commodity value (\$354 million, 92.6 percent).

Table 3-16: South Carolina Port Intrastate Freight by Major Commodities (2011)

STCC2	Commodity	Tons		Value (in millions)		Average Value/Ton
		Amount	Percent	Amount	Percent	
29	Petroleum or Coal Products	387,795	74.1%	\$354	92.6%	\$914
11	Coal	112,493	21.5%	\$4	1.0%	\$34
33	Primary Metal Products	19,588	3.7%	\$23	6.1%	\$1,195
40	Waste or Scrap Materials	3,744	0.7%	\$1	0.3%	\$259
	Total	523,621	100.0%	\$382	100.0%	\$730

Source: prepared by CDM Smith, based on TRANSEARCH data for 2011

Port Tonnage Comparison

As noted, the TRANSEARCH-reported water tonnage movements (and the associated values) are lower than United States Army Corp of Engineers (USACE) data for the Port of Charleston and Georgetown. **Table 3-17** summarizes total tonnage volumes reported by the USACE at 17.9 million tons in year 2011, which is 276 percent (13.2 million tons) greater than the 4.8 million tons reported by TRANSEARCH. Differences are significant for all inbound and outbound movements.¹⁶ While TRANSEARCH port movements includes all waterborne freight to/from the U.S. and NAFTA countries (i.e., Canada and Mexico), it excludes foreign movements to/from Europe, Asia, South America, etc. Hence, TRANSEARCH waterborne movements are significantly lower than the USACE reported tonnage movements.¹⁷

The various factors that result in different tonnage volumes between the two sources are outlined below.

- *U.S. and NAFTA vs. All Movements* – USACE tonnage data includes all foreign and U.S. tonnage movements. Conversely, TRANSEARCH only includes port waterborne movements within the U.S. and NAFTA countries (i.e., Mexico and Canada); other foreign movements to/from Europe, Asia, South America, etc. are not included in the TRANSEARCH port waterborne movement data. However, it is important to note that once all waterborne movements (i.e., U.S., NAFTA, European, Asian, etc.) reach South Carolina their movement is tracked by ground modes (i.e., truck and rail). Similarly, all landside truck and rail tonnage movements to the Port of Charleston are included in TRANSEARCH, regardless of destination (U.S., NAFTA, Europe, Asia, etc.).

¹⁶ Intrastate and through-state movements are not reported by USACE; conversely, intra-port movements are not reported by TRANSEARCH.

¹⁷ More detailed tonnage movements are compared by direction and commodity with the widely vetted USACE volumes.

Table 3-17: South Carolina Port Tonnage Discrepancy Summary (2011)

Direction	Tons		Difference	
	TRANSEARCH	USACE	Tons	Percent
Outbound	204,436	11,368,911	11,164,475	5,461%
Inbound	1,754,800	6,095,489	4,340,689	247%
Intrastate	523,621	N/A	N/A	N/A
Intra-port	N/A	452,218	N/A	N/A
Through	2,279,084	N/A	N/A	N/A
Total	4,761,940	17,916,618	13,154,678	276%

Source: prepared by CDM Smith, based on TRANSEARCH data and USACE data for 2011.

Note TRANSEARCH does not report *intra-port* movements and excludes foreign non-NAFTA movements, and USACE does not breakout *intrastate* or *through* movements.

- *Intrastate Movements* – USACE reports all port origin and destination movements, but does not breakout intrastate movements between South Carolina ports. Conversely, TRANSEARCH focuses on a commodity’s movement assigning an origin region, destination region, and in some cases, an intrastate movement.
- *Intra-port Movements* – USACE reports intra-port tonnage (452,218) while TRANSEARCH does not.
- *Commodity Convention* – TRANSEARCH reports data using the STCC (Standard Transportation Commodity Code) commodity classification versus the HS (Harmonized System) used by the USACE. The concordance is not uniform or direct.
- *Time Lag* – Due to the significant time reporting lag of USACE data (e.g., end-of-year) incorporated into the TRANSEARCH estimates, TRANSEARCH tonnage estimates are made in part from prior-year USACE Waterborne Commerce Statistics.
- *Bunkering* – Maritime fuel pumped from on-shore fuel farms to bunker ships that then supply fuel to moored vessels (including tug boats/barges). Such harbor fueling operations (akin to fuel trucks at airports) are counted as freight movements by USACE but are not by TRANSEARCH.

So, both sources are pertinent to the South Carolina freight movement analysis. While USACE tonnage closely approximates actual individual port-reported volumes, the TRANSEARCH data tends to eliminate multiple movements of the same commodity (intra-port movements), as well as other non-freight movements (i.e., bunker fueling).

3.1.3.4 Air Freight

South Carolina air freight movements reported by TRANSEARCH in 2011 totaled 72,881 tons, valued at \$10.1 billion, as shown in **Table 3-18**. On average, total air commodity movements are valued at \$138,227/ton, which is significantly higher than all other transportation modes. Through air movements comprise the largest direction tonnage movement (54.6 percent of total tonnage); but, outbound is highest by value (44.0 percent of total). As such, the average value/ton of outbound air movements (\$280,898) is twice that of the next highest (inbound at \$139,474). Intrastate air cargo movements are negligible. Note that the TRANSEARCH does not provide units for air movements.

Table 3-18: South Carolina Air Freight by Direction (2011)

Direction	Tons		Value (in millions)		Average Value/Ton
	Amount	Percent	Amount	Percent	
Outbound	15,794	21.7%	\$4,437	44.0%	\$280,898
Inbound	17,225	23.6%	\$2,402	23.8%	\$139,474
Intra	97	0.1%	\$11	0.1%	\$108,453
Through	39,764	54.6%	\$3,224	32.0%	\$81,089
Total	72,881	100.0%	\$10,074	100.0%	\$138,227

Source: prepared by CDM Smith, based on TRANSEARCH data for 2011

Inbound Air

Table 3-19 summarizes the inbound air commodities to South Carolina in 2011. Such movements total 17,225 tons, valued at \$2.4 billion, with an average value/ton of \$139,474. In tonnage terms, the top inbound movements include: *Miscellaneous Mixed Shipments* (6,088, 35.3 percent), *Textile Mill Products* (3,194, 18.5 percent), and *Instruments, Photo Equipment, Optical Equipment* (2,593, 15.1 percent). In value terms, the top commodities include: *Miscellaneous Mixed Shipments* (\$660 million, 27.5 percent), *Instruments, Photo Equipment, Optical Equipment* (\$528 million, 22.0 percent), and *Miscellaneous Manufacturing Products* (\$497 million, 20.7 percent).

Table 3-19: South Carolina Air Inbound Freight by Major Commodities (2011)

STCC2	Commodity	Tons		Value (in millions)		Average Value/Ton
		Amount	Percent	Amount	Percent	
46	Misc. Mixed Shipments	6,088	35.3%	\$660	27.5%	\$108,453
22	Textile Mill Products	3,194	18.5%	\$56	2.3%	\$17,506
38	Instrum, Photo Equipment, Optical Eq	2,593	15.1%	\$528	22.0%	\$203,616
36	Electrical Equipment	2,023	11.7%	\$442	18.4%	\$218,474
39	Misc. Manufacturing Products	812	4.7%	\$497	20.7%	\$612,291
27	Printed Matter	702	4.1%	\$15	0.6%	\$21,613
35	Machinery	678	3.9%	\$70	2.9%	\$103,775
37	Transportation Equipment	349	2.0%	\$79	3.3%	\$227,462
01	Farm Products	339	2.0%	\$11	0.5%	\$32,801
28	Chemicals or Allied Products	142	0.8%	\$33	1.4%	\$233,242
	Remaining Commodities	307	1.8%	\$10	0.4%	\$34,095
	Total	17,225	100.0%	\$2,402	100.0%	\$139,474

Source: prepared by CDM Smith, based on TRANSEARCH data for 2011

Outbound Air

Table 3-20 summarizes major outbound air commodities from South Carolina in 2011. Such movements total 15,794 tons, valued at \$4.4 billion, with an average value/ton of \$280,898. In tonnage terms, the top inbound movements include: *Miscellaneous Manufacturing Products* (5,211, 33.0 percent), *Miscellaneous Mixed Shipments* (4,935, 31.2 percent), and *Farm Products* (1,239, 7.8 percent). In value terms, the top commodities include: *Miscellaneous Manufacturing Products* (\$3.2 billion or 71.9 percent), *Miscellaneous Mixed Shipments* (\$535 million, 12.1 percent), and *Instrument, Photo Equipment, Optical Equipment* (\$201 million, 4.5 percent).

Table 3-20: South Carolina Air Outbound Freight by Major Commodities (2011)

STCC2	Commodity	Tons		Value (in millions)		Average Value/Ton
		Amount	Percent	Amount	Percent	
39	Misc. Manufacturing Products	5,211	33.0%	\$3,190	71.9%	\$612,133
46	Misc. Mixed Shipments	4,935	31.2%	\$535	12.1%	\$108,453
01	Farm Products	1,239	7.8%	\$11	0.2%	\$8,940
33	Primary Metal Products	1,124	7.1%	\$120	2.7%	\$106,585
38	Instrum, Photo Equipment, Optical Eq	989	6.3%	\$201	4.5%	\$203,606
36	Electrical Equipment	862	5.5%	\$193	4.4%	\$223,811
35	Machinery	452	2.9%	\$42	0.9%	\$93,055
37	Transportation Equipment	403	2.6%	\$69	1.6%	\$171,060
28	Chemicals or Allied Products	230	1.5%	\$69	1.6%	\$301,476
22	Textile Mill Products	132	0.8%	\$2	0.1%	\$17,438
	Remaining Commodities	216	1.4%	\$3	0.1%	\$14,847
	Total	15,794	100.0%	\$4,437	100.0%	\$280,898

Source: prepared by CDM Smith, based on TRANSEARCH data for 2011

Through Air

Table 3-21 summarizes major through-traffic air commodities via South Carolina in 2011. Such movements total 39,764 tons, valued at \$3.2 billion, with an average value/ton of \$81,089. In tonnage terms, the top through movements include: *Mail or Contract Traffic* (19,048, or 47.9 percent), *Chemicals or Allied Products* (5,106, 12.8 percent), and *Machinery* (4,773, 12.0 percent). In value terms, the top commodities include: *Miscellaneous Manufacturing Products* (\$809 million, 25.1 percent), *Electrical Equipment* (\$800 million, 24.8 percent), and *Machinery* (\$494 million, 15.3 percent).

Intrastate Air

Miscellaneous Mixed Shipments were the only South Carolina intrastate air movement reported by TRANSEARCH in 2011. Volume totaled 97 tons, valued at \$11 million, with an average value/ton of \$108,453.

3.1.3.5 Pipeline Flows

Total pipeline movements reported by TRANSEARCH in 2011 comprised a single inbound commodity: *Petroleum or Coal Products*, in the amount of 93 tons, valued at \$63,501, for a value/ton of \$682.

Table 3-21: South Carolina Air Through Freight by Major Commodities (2011)

STCC2	Commodity	Tons		Value (in millions)		Average Value/Ton
		Amount	Percent	Amount	Percent	
43	Mail or Contract Traffic	19,048	47.9%	\$50	1.5%	\$2,615
28	Chemicals or Allied Products	5,106	12.8%	\$471	14.6%	\$92,271
35	Machinery	4,773	12.0%	\$494	15.3%	\$103,512
36	Electrical Equipment	3,751	9.4%	\$800	24.8%	\$213,292
22	Textile Mill Products	1,507	3.8%	\$27	0.8%	\$17,623
39	Misc. Manufacturing Products	1,321	3.3%	\$809	25.1%	\$612,291
37	Transportation Equipment	1,230	3.1%	\$280	8.7%	\$227,343
38	Instrum, Photo Equipment, Optical Eq	830	2.1%	\$169	5.2%	\$203,928
01	Farm Products	634	1.6%	\$15	0.5%	\$24,045
33	Primary Metal Products	380	1.0%	\$40	1.3%	\$106,584
	Remaining Commodities	1,184	3.0%	\$70	2.2%	\$58,716
	Total	39,764	100.0%	\$3,224	100.0%	\$81,089

Source: prepared by CDM Smith, based on TRANSEARCH data for 2011

3.1.4 Freight Growth

Tonnage across the South Carolina freight network is forecast by TRANSEARCH to grow 81 percent from 2011 to 2040, as summarized in **Table 3-22**. While air yields the fastest tonnage growth rate (97 percent), truck growth is nearly as rapid (91 percent), and much greater in terms of volume (273.6 million ton increase). Specifically, truck tonnage is forecast to grow from 300.6 million tons in 2011 to 574.1 million in 2040. While outbound truck growth is the fastest (119 percent), through tonnage growth is the greatest by volume (130.3 million tons). A more modest growth in rail (31,144 tons, 44 percent) is led by outbound (6.6 million tons, 81 percent) and through-state movements (15.9 million tons, 52 percent). TRANSEARCH waterborne forecasts indicate a slight decline (-134 million tons, -3 percent), which is non-intuitive given the potential growth opportunity in eastern sea-trade after opening of the expanded Panama Canal. Further, the non-intuitive waterborne Transearch forecast exemplifies the constraints of its waterborne volumes, which exclude non-NAFTA flows from/to Europe, Asia, Middle East, etc. Note that once imports from Non-NAFTA countries arrive at the Port of Charleston Transearch does trace these movements by mode within the U.S., Canada, and Mexico. Similarly, modal movements to the Port of Charleston are also tabulated by Transearch.

The following subsections detail the modal tonnage and value growth by direction between 2011 and 2040, as well as the interim year of 2025. Tables are sorted by top ten commodities in 2040 in terms of either volume or units.

Table 3-22: South Carolina Freight Ton Forecast by Modal Direction (2011 and 2040)

Direction	Air	Pipe	Rail	Truck	Water	Total
Tons, in thousands						
Year 2011						
Outbound	15.8	N/A	8,114	62,439	204	70,774
Inbound	17.2	0.1	26,632	51,342	1,755	79,745
Intra	0.1	N/A	4,681	47,102	524	52,307
Through	39.8	N/A	30,873	139,685	2,279	172,877
Total	72.9	0.1	70,300	300,568	4,762	375,703
Year 2040						
Outbound	26.9	N/A	14,681	136,769	335	151,811
Inbound	45.1	0.1	32,301	80,750	2,180	115,276
Intra	0.3	N/A	7,672	86,589	460	94,721
Through	71.3	N/A	46,791	270,018	1,654	318,534
Total	143.6	0.1	101,444	574,127	4,628	680,342
Growth, 2011 to 2040						
Year 2011-2040						
Outbound	70%	N/A	81%	119%	64%	115%
Inbound	162%	32%	21%	57%	24%	45%
Intra	197%	N/A	64%	84%	-12%	81%
Through	79%	N/A	52%	93%	-27%	84%
Total	97%	32%	44%	91%	-3%	81%
Tons, in thousands						
Outbound	11.1	N/A	6,567	74,330	130	81,038
Inbound	27.9	0.0	5,669	29,409	425	35,531
Intra	0.2	N/A	2,990	39,487	-64	42,414
Through	31.5	N/A	15,918	130,333	-625	145,657
Total	70.7	0.0	31,144	273,558	-134	304,640

Source: prepared by CDM Smith, based on TRANSEARCH data for 2011 and 2040

Table 3-23: South Carolina Truck Freight Tonnage and Value by Year and Direction (2011, 2025, 2040)

Direction	Tons		Value (in millions)		Average Value/Ton
	Amount	Percent	Amount	Percent	
Year 2011					
Outbound	62,439,243	20.8%	\$130,677	25.8%	\$2,093
Inbound	51,341,521	17.1%	\$86,877	17.2%	\$1,692
Intra	47,102,262	15.7%	\$23,567	4.7%	\$500
Through	139,685,267	46.5%	\$265,120	52.4%	\$1,898
Total	300,568,293	100.0%	\$506,241	100.0%	\$1,684
Year 2025					
Outbound	99,728,413	22.5%	\$214,834	27.0%	\$2,154
Inbound	71,764,311	16.2%	\$137,812	17.3%	\$1,920
Intra	75,709,836	17.1%	\$37,873	4.8%	\$500
Through	196,353,233	44.3%	\$405,673	51.0%	\$2,066
Total	443,555,794	100.0%	\$796,193	100.0%	\$1,795
Year 2040					
Outbound	136,768,895	23.8%	\$282,795	24.8%	\$2,068
Inbound	80,750,401	14.1%	\$173,591	15.2%	\$2,150
Intra	86,588,879	15.1%	\$47,377	4.2%	\$547
Through	270,018,418	47.0%	\$636,306	55.8%	\$2,357
Total	574,126,593	100.0%	\$1,140,069	100.0%	\$1,986

Source: prepared by CDM Smith, based on TRANSEARCH data for 2011, 2025, and 2040

3.1.4.1 Truck Forecasts

Table 3-23 depicts the directional composition of truck movements in South Carolina between 2011 and 2040, which is relatively constant over the future analysis horizon. Truck tonnage is forecast to increase from 300.6 million in 2011 to 574.1 million in 2040, a cumulative increase of 91.0 percent, for a compound average annual growth rate (CAGR) of 2.3 percent. Truck commodity value is forecast to increase from \$506.2 billion in 2011 to \$1.14 trillion by 2040, a cumulative increase of 125.2 percent, for a CAGR of 2.8 percent. In effect, the truck tonnage and value are projected to approximately double by 2040.

Freight density across the South Carolina road network is shown in **Figure 3-13**, which indicates the highest truck volumes are on I-85, I-26 from Columbia south to the I-95 interchange, and on I-95. Truck freight density change between year 2011 and 2040 is shown in **Figure 3-14**, which indicates the same I-85, I-26, and I-95 segments as having the highest growth.

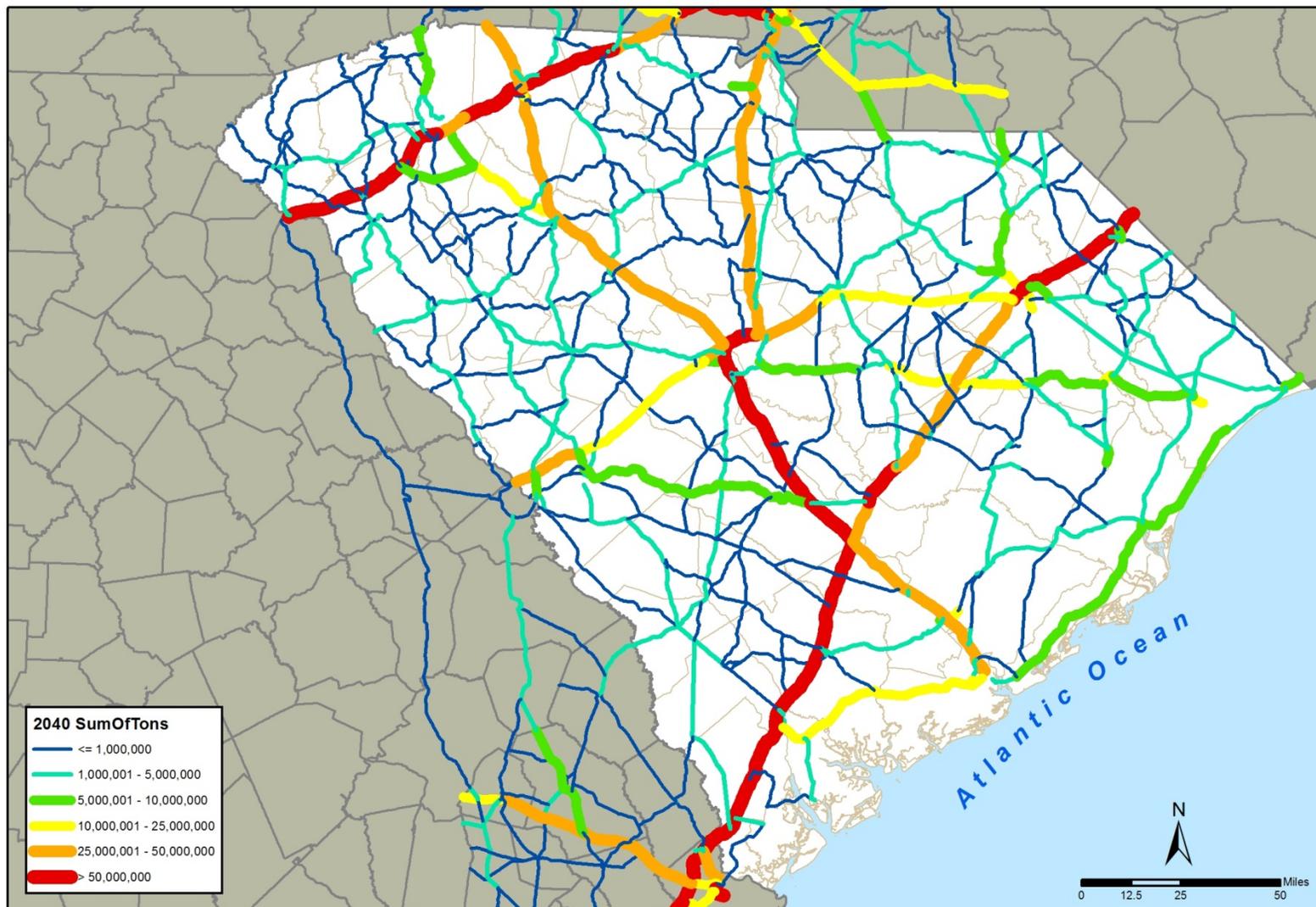
Table 3-24 summarizes major commodity tonnage movements by truck in 2040, and the associated commodity tonnage growth from 2011.

- *Total Tonnage* – Major commodities in 2040 include: *Secondary Traffic* (137.2 million, 23.9 percent), *Nonmetallic Minerals* (87.3 million, 15.2 percent), and *Chemicals or Allied Products* (54.2 million, 9.4 percent), exhibiting 2.9 percent, 2.0 percent, and 2.4 percent CAGR, respectively.
- *Tonnage Growth* – Commodities with the highest tonnage growth rates between 2011 and 2040 include: *Instrument, Photo Equipment, Optical Equipment* (0.7 million to 3.1 million, 5.5 percent CAGR), *Miscellaneous Mixed Shipments* (137,000 to 507,000, 4.6 percent CAGR), and *Furniture and Fixtures* (1.6 million to 5.3 million, 4.1 percent CAGR).
- *Value Growth* – Commodities with the highest value growth rates between 2011 and 2040 include: *Instrument, Photo Equipment, Optical Equipment* (5.6 percent CAGR), *Electrical Equipment* (5.6 percent CAGR), and *Miscellaneous Mixed Shipments* (4.9 percent CAGR).

Table 3-25 summarizes major truck movements (i.e., units) in 2040 by commodity type. Truck movements in 2040 total 574.1 million tons, via 49.4 million units, valued at \$1.1 trillion, with an average value/ton of \$1,986.

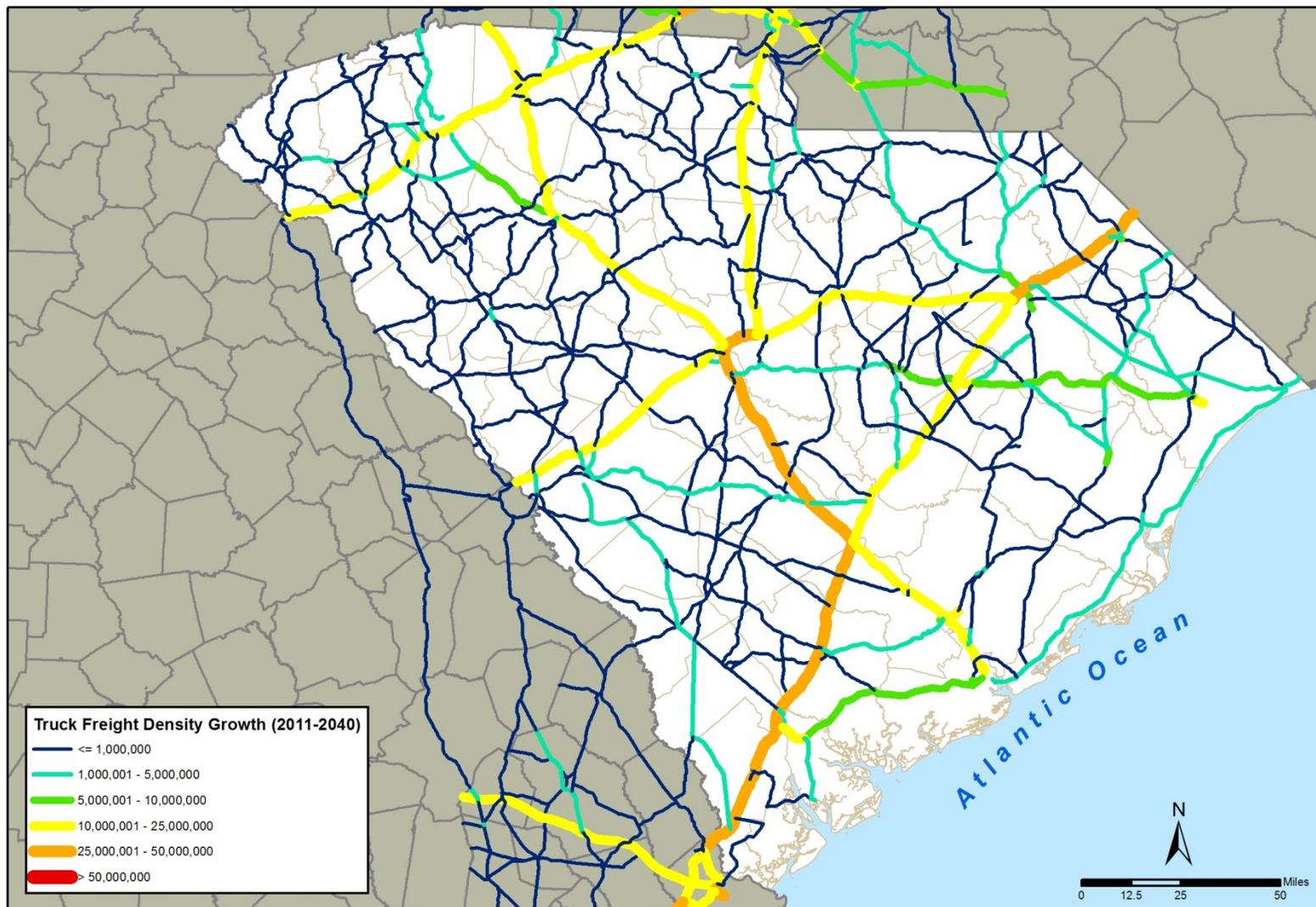
- *Total Units* – *Shipping Containers* and *Secondary Traffic* constitute more than one half (27.6 million, 55.8 percent) of the total 49.4 million 2040 truck units.
- *Total Value* – Top commodities include: *Secondary Traffic* (\$197.8 billion or 17.3 percent), *Electrical Equipment* (\$176.7 billion or 15.5 percent), and *Chemicals or Allied Products* (\$133.3 billion or 11.7 percent).

Figure 3-13: South Carolina Truck Freight Density (2040)



Source: prepared by CDM Smith, based on TRANSEARCH data for 2040

Figure 3-14: South Carolina Truck Freight Density Growth (2011-2040)



Source: prepared by CDM Smith, based on TRANSEARCH data for 2011 and 2040

Table 3-24: South Carolina Truck Freight Tonnage Forecast by Major Commodity (Tons)

STCC2	Commodity	2011		2040		Percent Change	
		Amount	Percent	Amount	Percent	Total	CAGR
50	Secondary Traffic	60,057,310	20.0%	137,245,144	23.9%	128.5%	2.9%
14	Nonmetallic Minerals	49,493,602	16.5%	87,298,162	15.2%	76.4%	2.0%
28	Chemicals or Allied Products	27,110,007	9.0%	54,243,903	9.4%	100.1%	2.4%
20	Food or Kindred Products	26,398,106	8.8%	47,176,616	8.2%	78.7%	2.0%
32	Clay, Concrete, Glass or Stone	23,154,231	7.7%	43,691,898	7.6%	88.7%	2.2%
01	Farm Products	19,110,151	6.4%	26,935,679	4.7%	40.9%	1.2%
26	Pulp, Paper or Allied Products	10,823,197	3.6%	26,033,670	4.5%	140.5%	3.1%
24	Lumber or Wood Products	15,345,355	5.1%	25,421,965	4.4%	65.7%	1.8%
40	Waste or Scrap Materials	8,708,692	2.9%	22,033,759	3.8%	153.0%	3.3%
29	Petroleum or Coal Products	14,666,362	4.9%	15,656,460	2.7%	6.8%	0.2%
	Remaining Commodities	45,701,280	15.2%	88,389,336	15.4%	93.4%	2.3%
	Total	300,568,293	100.0%	574,126,593	100.0%	91.0%	2.3%

Source: prepared by CDM Smith, based on TRANSEARCH data for 2011 and 2040

Table 3-25: South Carolina Truck Freight Forecast – Tons, Units, and Value by Commodity (2040 Units)

STCC2	Commodity	Tons		Units		Value (in millions)		Average Value/Ton
		Amount	Percent	Amount	Percent	Amount	Percent	
42	Shipping Containers	313,524	0.1%	20,516,426	41.5%	\$1,283	0.1%	\$4,091
50	Secondary Traffic	137,245,144	23.9%	7,070,197	14.3%	\$197,752	17.3%	\$1,441
14	Nonmetallic Minerals	87,298,162	15.2%	3,590,990	7.3%	\$1,202	0.1%	\$14
28	Chemicals or Allied Products	54,243,903	9.4%	2,613,491	5.3%	\$133,346	11.7%	\$2,458
32	Clay, Concrete, Glass or Stone	43,691,898	7.6%	2,612,929	5.3%	\$10,678	0.9%	\$244
20	Food or Kindred Products	47,176,616	8.2%	2,055,698	4.2%	\$64,471	5.7%	\$1,367
01	Farm Products	26,935,679	4.7%	1,563,074	3.2%	\$28,838	2.5%	\$1,071
26	Pulp, Paper or Allied Products	26,033,670	4.5%	1,079,642	2.2%	\$32,034	2.8%	\$1,230
30	Rubber or Misc. Plastics	12,450,885	2.2%	1,047,385	2.1%	\$51,528	4.5%	\$4,138
40	Waste or Scrap Materials	22,033,759	3.8%	1,017,366	2.1%	\$5,190	0.5%	\$236
	Remaining Commodities	116,703,351	20.3%	6,229,185	12.6%	\$613,748	53.8%	\$5,259
	Total	574,126,593	100.0%	49,396,384	100.0%	\$1,140,069	100.0%	\$1,986

Source: prepared by CDM Smith, based on TRANSEARCH data for 2040

3.1.4.2 Rail Forecast

Table 3-26 depicts the directional composition of rail movements in SC between 2011 and 2040, which is relatively constant over the future analysis horizon. Rail tonnage is forecast to increase from 70.3 million in 2011 to 101.4 million in 2040, a cumulative increase of 44.3 percent, for a CAGR of 1.3 percent. Rail commodity value is forecast to increase from \$79.1 billion in 2011 to \$133.7 billion by 2040, a cumulative increase of 68.9 percent, for a CAGR of 1.8 percent. Comparatively, inbound tonnage is projected to increase at a CAGR of 0.7 percent, less than half the rate of outbound tonnage (2.1 percent CAGR).

Table 3-26: South Carolina Rail Freight Tonnage and Value by Year and Direction (2011, 2025, 2040)

Direction	Tons		Value (in millions)		Average Value/Ton
	Amount	Percent	Amount	Percent	
Year 2011					
Outbound	8,114,084	11.5%	\$11,249	14.2%	\$1,386
Inbound	26,631,734	37.9%	\$15,098	19.1%	\$567
Intra	4,681,040	6.7%	\$5,938	7.5%	\$1,268
Through	30,872,783	43.9%	\$46,853	59.2%	\$1,518
Total	70,299,641	100.0%	\$79,137	100.0%	\$1,126
Year 2025					
Outbound	12,201,205	13.3%	\$17,765	14.3%	\$1,456
Inbound	31,409,789	34.2%	\$25,403	20.5%	\$809
Intra	7,572,991	8.3%	\$14,742	11.9%	\$1,947
Through	40,564,508	44.2%	\$66,050	53.3%	\$1,628
Total	91,748,492	100.0%	\$123,960	100.0%	\$1,351
Year 2040					
Outbound	14,680,693	14.5%	\$19,905	14.9%	\$1,356
Inbound	32,300,623	31.8%	\$24,016	18.0%	\$744
Intra	7,671,510	7.6%	\$9,181	6.9%	\$1,197
Through	46,790,954	46.1%	\$80,589	60.3%	\$1,722
Total	101,443,780	100.0%	\$133,691	100.0%	\$1,318

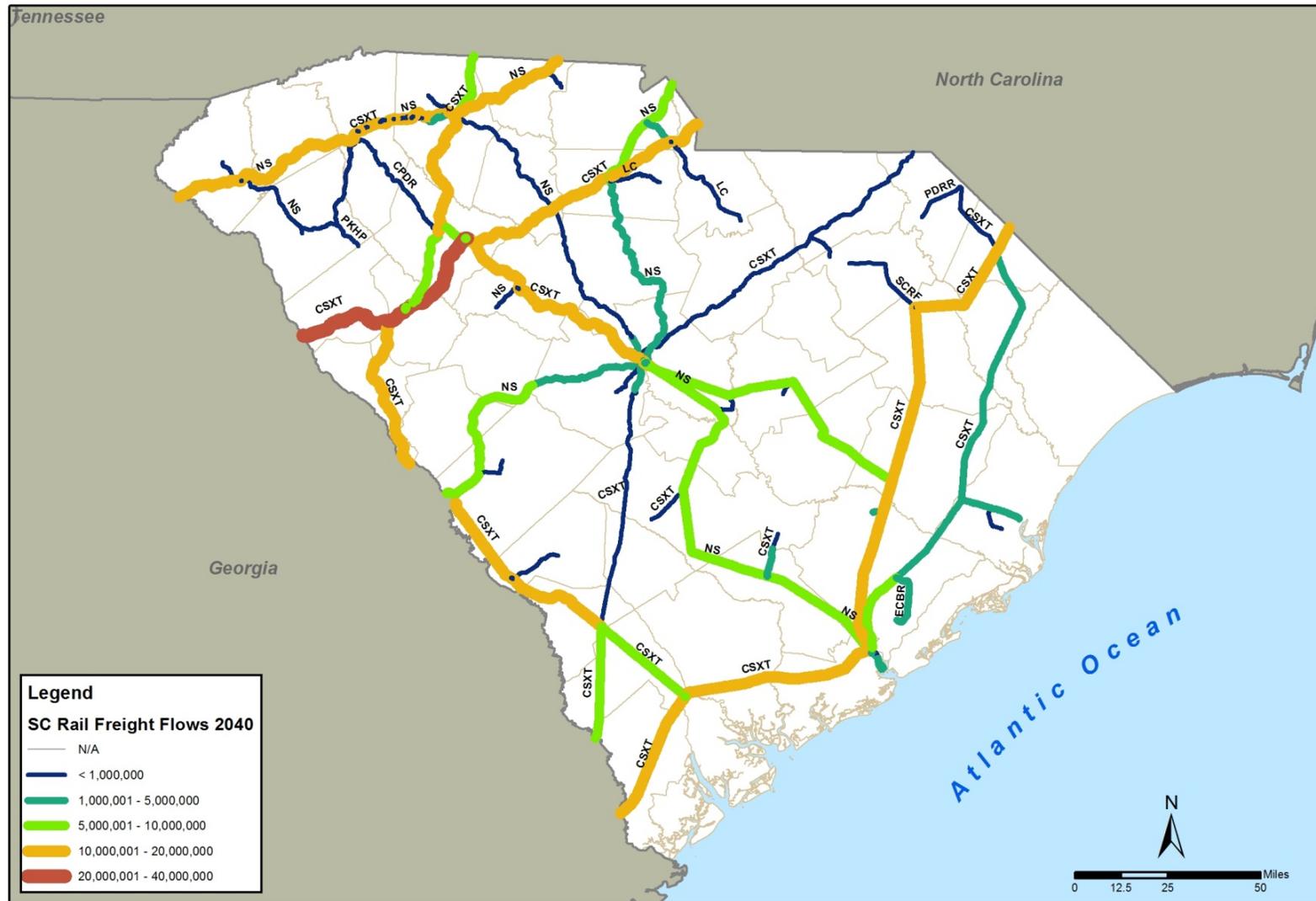
Source: prepared by CDM Smith, based on TRANSEARCH data for 2040

As shown in **Figure 3-15**, the link between Greenwood, SC and Athens, GA continues to handle the greatest rail tonnage per line (compare with Figure 3-8). Similarly, the greatest rail tonnage growth appears to accrue to the major Class I rail lines (see **Figure 3-16**).

Table 3-27 summarizes major commodity tonnage movements by rail in 2040, and the associated commodity tonnage growth from 2011.

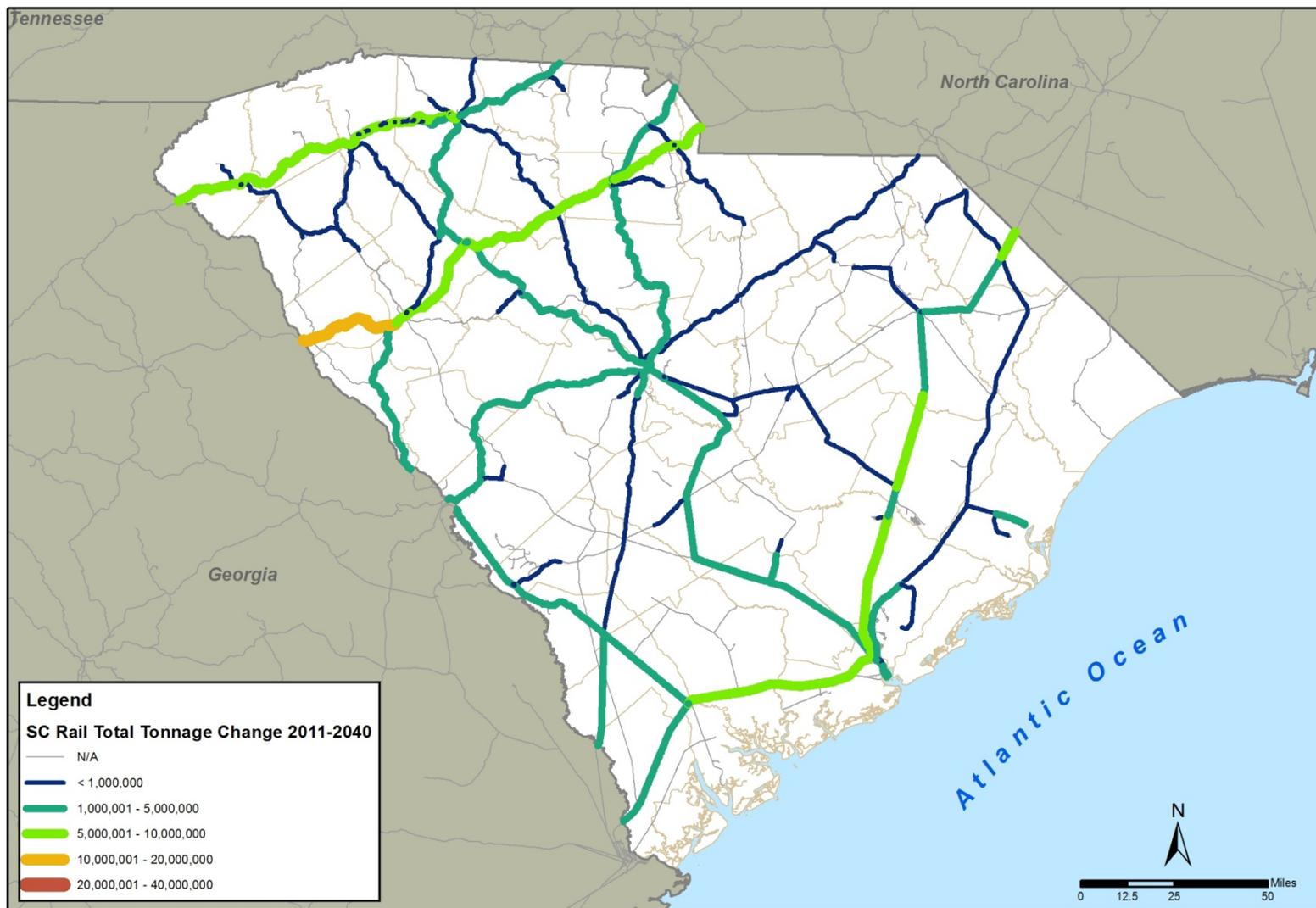
- **Total Tonnage** – Major rail commodities in 2040 include: *Chemicals or Allied Products* (23.7 million, 23.4 percent), *Coal* (13.9 million, 13.7 percent), and *Pulp, Paper or Allied Products* (9.4 million, 9.2 percent), exhibiting 2.2 percent, -1.1 percent, and 2.0 percent CAGR, respectively.
- **Tonnage Growth** – Commodities with the highest tonnage growth rates between 2011 and 2040 include: *Miscellaneous Manufacturing Products* (15,720 to 68,609, 5.2 percent CAGR), *Machinery* (73,400 to 277,897, 4.7 percent CAGR), and *Instrument, Photo Equipment, Optical Equipment* (6,120 to 19,392, 4.1 percent CAGR).
- **Value Growth** – Commodities with the highest value growth rates between 2011 and 2040 include: *Miscellaneous Manufacturing Products* (5.2 percent CAGR), *Machinery* (4.6 percent CAGR), and *Instrument, Photo Equipment, Optical Equipment* (4.4 percent CAGR).

Figure 3-15: South Carolina Rail Freight Density (2040)



Source: prepared by CDM Smith, based on TRANSEARCH data for 2040

Figure 3-16: South Carolina Rail Freight Density Growth (2011-2040)



Source: prepared by CDM Smith, based on TRANSEARCH data for 2011 and 2040

Table 3-27: South Carolina Rail Tonnage Freight Forecast by Commodity (2011, 2040)

STCC2	Commodity	2011		2040		Percent Change	
		Amount	Percent	Amount	Percent	Total	CAGR
28	Chemicals or Allied Products	12,652,755	18.0%	23,695,739	23.4%	87.3%	2.2%
11	Coal	19,407,956	27.6%	13,908,527	13.7%	-28.3%	-1.1%
26	Pulp, Paper or Allied Products	5,262,804	7.5%	9,356,797	9.2%	77.8%	2.0%
46	Misc. Mixed Shipments	5,305,064	7.5%	9,073,440	8.9%	71.0%	1.9%
32	Clay, Concrete, Glass or Stone	3,690,904	5.3%	7,712,312	7.6%	109.0%	2.6%
40	Waste or Scrap Materials	2,401,380	3.4%	7,364,368	7.3%	206.7%	3.9%
20	Food or Kindred Products	3,905,964	5.6%	6,438,792	6.3%	64.8%	1.7%
24	Lumber or Wood Products	3,428,700	4.9%	5,436,834	5.4%	58.6%	1.6%
14	Nonmetallic Minerals	4,034,245	5.7%	5,261,962	5.2%	30.4%	0.9%
01	Farm Products	2,917,244	4.1%	4,798,603	4.7%	64.5%	1.7%
	Remaining Commodities	7,292,625	10.4%	8,396,405	8.3%	15.1%	0.5%
	Total	70,299,641	100.0%	101,443,780	100.0%	44.3%	1.3%

Source: prepared by CDM Smith, based on TRANSEARCH data for 2011 and 2040

Table 3-28 summarizes major railcar movements (i.e., units) in 2040 by commodity type. Rail movements in 2040 total 101.4 million tons, via 2.0 million units, valued at \$133.7 billion, with an average value/ton of \$1,318.

- Total Units – *Miscellaneous Mixed Shipments* and *Chemicals or Allied Products* constitute almost half (930,552, 46.1 percent) of the total 2.0 million 2040 rail units.
- Total Value – Top commodities include: *Miscellaneous Mixed Shipments* (\$45.8 billion or 34.2 percent), *Chemicals or Allied Products* (\$42.7 billion or 32.0 percent), and *Pulp, Paper or Allied Products* (\$9.1 billion or 6.8 percent).

Table 3-28: South Carolina Rail Freight Forecast – Tons, Units, and Value by Commodity (2040 Units)

STCC2	Commodity	Tons		Units		Value (in millions)		Average Value/Ton
		Amount	Percent	Amount	Percent	Amount	Percent	
46	Misc. Mixed Shipments	9,073,440	8.9%	649,852	32.2%	\$45,760	34.2%	\$5,043
28	Chemicals or Allied Products	23,695,739	23.4%	280,700	13.9%	\$42,742	32.0%	\$1,804
26	Pulp, Paper or Allied Products	9,356,797	9.2%	160,799	8.0%	\$9,141	6.8%	\$977
11	Coal	13,908,527	13.7%	120,821	6.0%	\$509	0.4%	\$37
20	Food or Kindred Products	6,438,792	6.3%	120,281	6.0%	\$4,954	3.7%	\$769
42	Shipping Containers	912,868	0.9%	117,973	5.8%	\$0	0.0%	\$0
40	Waste or Scrap Materials	7,364,368	7.3%	92,888	4.6%	\$2,074	1.6%	\$282
32	Clay, Concrete, Glass or Stone	7,712,312	7.6%	78,453	3.9%	\$1,175	0.9%	\$152
24	Lumber or Wood Products	5,436,834	5.4%	75,627	3.7%	\$1,041	0.8%	\$192
14	Nonmetallic Minerals	5,261,962	5.2%	51,501	2.6%	\$141	0.1%	\$27
	Remaining Commodities	12,282,140	12.1%	270,450	13.4%	\$26,153	19.6%	\$2,129
	Total	101,443,780	100.0%	2,019,345	100.0%	\$133,691	100.0%	\$1,318

Source: prepared by CDM Smith, based on TRANSEARCH data for 2040

As shown in Table 3-27 coal movements by rail are projected to decline 28.3 percent from 19.4 million tons in 2011 to 13.9 million tons in 2040. Excluding coal, rail freight movements are projected to grow by 72.0 percent from 50.9 million tons in 2011 to 87.5 million tons in 2040.

3.1.4.3 Port Forecast

Table 3-29 depicts the directional composition of port movements in SC between 2011 and 2040. The composition of directional port movements shifts over time, with outbound movements assuming an increasing proportion and through movements assuming a reduced percentage of total movements. TRANSEARCH forecasts South Carolina port tonnage to actually decrease from 4.8 million in 2011 to 4.6 million in 2040, a cumulative decline of -2.8 percent, for a CAGR of -0.1 percent. This is reflective of the limitations of TRANSEARCH waterborne forecasts, which exclude movements to non-NAFTA countries (i.e., Asia, Europe, South America, etc.). Conversely, port commodity values are forecast to increase modestly from \$3.6 billion in 2011 to \$4.2 billion by 2040, a cumulative increase of 15.7 percent, for a CAGR of 0.5 percent.

Table 3-29: South Carolina Port Freight Tonnage and Value by Year and Direction (2011, 2025, 2040)

Direction	Tons		Value (in millions)		Average Value/Ton
	Amount	Percent	Amount	Percent	
Year 2011					
Outbound	204,436	4.3%	\$341	9.5%	\$1,666
Inbound	1,754,800	36.9%	\$1,388	38.6%	\$791
Intra	523,621	11.0%	\$382	10.6%	\$730
Through	2,279,084	47.9%	\$1,482	41.2%	\$650
Total	4,761,940	100.0%	\$3,593	100.0%	\$755
Year 2025					
Outbound	313,701	6.6%	\$759	19.9%	\$2,420
Inbound	2,106,173	44.3%	\$1,634	42.9%	\$776
Intra	550,039	11.6%	\$345	9.0%	\$627
Through	1,782,620	37.5%	\$1,072	28.1%	\$602
Total	4,752,532	100.0%	\$3,811	100.0%	\$802
Year 2040					
Outbound	334,603	7.2%	\$1,394	33.5%	\$4,167
Inbound	2,180,232	47.1%	\$1,490	35.9%	\$684
Intra	459,909	9.9%	\$263	6.3%	\$572
Through	1,653,587	35.7%	\$1,009	24.3%	\$610
Total	4,628,332	100.0%	\$4,157	100.0%	\$898

Source: prepared by CDM Smith, based on TRANSEARCH data for 2011, 2025, and 2040

Table 3-30 summarizes major commodity tonnage movements by port in 2040, and the associated commodity tonnage growth from 2011.

- *Total Tonnage* – In 2040, the largest commodities include: *Petroleum or Coal Products* (1.8 million, 38.0 percent), *Chemicals or Allied Products* (873,133, 18.9 percent), and *Nonmetallic*

Minerals (624,397, 13.5 percent), exhibiting -1.6 percent, 0.1 percent, and 0.7 percent CAGR, respectively.

Table 3-30: South Carolina Port Freight Tonnage Forecast by Commodity (2011, 2040)

STCC2	Commodity	2011		2040		Percent Change	
		Amount	Percent	Amount	Percent	Total	CAGR
29	Petroleum or Coal Products	2,777,173	58.3%	1,759,619	38.0%	-36.6%	-1.6%
28	Chemicals or Allied Products	852,841	17.9%	873,133	18.9%	2.4%	0.1%
14	Nonmetallic Minerals	507,653	10.7%	624,397	13.5%	23.0%	0.7%
40	Waste or Scrap Materials	133,885	2.8%	573,869	12.4%	328.6%	5.1%
20	Food or Kindred Products	205,942	4.3%	261,595	5.7%	27.0%	0.8%
11	Coal	116,018	2.4%	174,853	3.8%	50.7%	1.4%
24	Lumber or Wood Products	11,659	0.2%	151,000	3.3%	1195.1%	9.2%
33	Primary Metal Products	55,271	1.2%	69,554	1.5%	25.8%	0.8%
32	Clay, Concrete, Glass or Stone	72,287	1.5%	51,938	1.1%	-28.1%	-1.1%
26	Pulp, Paper or Allied Products	18,608	0.4%	36,606	0.8%	96.7%	2.4%
	Remaining Commodities	10,603	0.2%	51,768	1.1%	388.2%	5.6%
	Total	4,761,940	100.0%	4,628,332	100.0%	-2.8%	-0.1%

Source: prepared by CDM Smith, based on TRANSEARCH data for 2011

- *Tonnage Growth* – Commodities with the highest rates of tonnage growth between 2011 and 2040 include: *Lumber or Woods Products* (11,659 to 151,000, 9.2 percent CAGR), *Ordnance or Accessories* (49 to 407, 7.6 percent CAGR), and *Miscellaneous Freight Shipments* (2 to 17, 7.2 percent CAGR).
- *Value Growth* – Commodities with the highest rates of value growth between 2011 and 2040 include the same three, with 8.5 percent, 7.6 percent, and 7.2 percent growth, respectively.

3.1.4.4 Air Freight Forecast

Table 3-31 depicts the directional composition of air movements in South Carolina between 2011 and 2040, which is relatively constant over the future analysis horizon. Air tonnage is forecast to increase from 72,881 in 2011 to 143,601 in 2040, a cumulative increase of 97.0 percent, for a CAGR of 2.4 percent. Air commodity value is forecast to increase from \$10.1 billion in 2011 to \$27.6 billion by 2040, a cumulative increase of 174.2 percent, for a CAGR of 3.5 percent.

Table 3-32 summarizes major commodity tonnage movements by air in 2040, and the associated commodity tonnage growth from 2011.

- *Total Tonnage* – Major air commodities in 2040 include: *Electrical Equipment* (26.0 thousand or 18.1 percent), *Instruments, Photo Equipment, Optical Equipment* (24.5 thousand or 17.1 percent), and *Machinery* (22.0 thousand or 15.4 percent), exhibiting 4.8 percent, 6.1 percent, and 4.6 percent CAGR, respectively.

Table 3-31: South Carolina Air Freight Tonnage and Value by Year and Direction (2011, 2025, 2040)

Direction	Tons		Value (in millions)		Average Value/Ton
	Amount	Percent	Amount	Percent	
Year 2011					
Outbound	15,794	21.7%	\$4,437	44.0%	\$280,898
Inbound	17,225	23.6%	\$2,402	23.8%	\$139,474
Intra	97	0.1%	\$11	0.1%	\$108,453
Through	39,764	54.6%	\$3,224	32.0%	\$81,089
Total	72,881	100.0%	\$10,074	100.0%	\$138,227
Year 2025					
Outbound	26,992	26.6%	\$8,372	47.1%	\$310,167
Inbound	25,649	25.2%	\$4,136	23.3%	\$161,250
Intra	216	0.2%	\$23	0.1%	\$108,453
Through	48,804	48.0%	\$5,237	29.5%	\$107,309
Total	101,661	100.0%	\$17,768	100.0%	\$174,781
Year 2040					
Outbound	26,884	18.7%	\$9,879	35.8%	\$367,468
Inbound	45,121	31.4%	\$8,462	30.6%	\$187,538
Intra	289	0.2%	\$31	0.1%	\$108,453
Through	71,307	49.7%	\$9,246	33.5%	\$129,664
Total	143,601	100.0%	\$27,618	100.0%	\$192,327

Source: prepared by CDM Smith, based on TRANSEARCH data for 2011

Table 3-32: South Carolina Air Freight Tonnage Forecast by Commodity (2011, 2040)

STCC2	Commodity	2011		2040		Percent Change	
		Amount	Percent	Amount	Percent	Total	CAGR
36	Electrical Equipment	6,636	9.1%	25,986	18.1%	291.6%	4.8%
38	Instrum, Photo Equipment, Optical Eq	4,413	6.1%	24,539	17.1%	456.1%	6.1%
35	Machinery	5,903	8.1%	22,046	15.4%	273.5%	4.6%
39	Misc. Manufacturing Products	7,344	10.1%	18,276	12.7%	148.9%	3.2%
43	Mail or Contract Traffic	19,208	26.4%	15,096	10.5%	-21.4%	-0.8%
46	Misc. Mixed Shipments	11,488	15.8%	10,320	7.2%	-10.2%	-0.4%
28	Chemicals or Allied Products	5,478	7.5%	8,661	6.0%	58.1%	1.6%
22	Textile Mill Products	4,832	6.6%	6,643	4.6%	37.5%	1.1%
37	Transportation Equipment	1,982	2.7%	4,712	3.3%	137.8%	3.0%
01	Farm Products	2,212	3.0%	3,607	2.5%	63.1%	1.7%
	Remaining Commodities	3,387	4.6%	3,717	2.6%	9.7%	0.3%
	Total	72,881	100.0%	143,601	100.0%	97.0%	2.4%

Source: prepared by CDM Smith, based on TRANSEARCH data for 2011

- *Tonnage Growth* – Commodities with the highest rates of tonnage growth between 2011 and 2040 include: *Instruments, Photo Equipment, Optical Equipment* (4,413 to 24,539, 6.1 percent CAGR), *Nonmetallic Minerals* (51 to 219, 5.2 percent CAGR), and *Electrical Equipment* (6,636 to 25,986, 4.8 percent CAGR).
- *Value Growth* – Commodities with the highest rates of value growth between 2011 and 2040 include the same three, with the same respective CAGR as tonnage

3.1.4.5 Pipeline Forecast

Total South Carolina pipeline movements in 2040 forecast by TRANSEARCH comprise only one commodity and one direction: inbound *Petroleum or Coal Products*, totaling 123 tons, valued at \$83,701, with a value/ton of \$682. Such volume represents a cumulative 31.8 percent increase (CAGR of 1.0 percent) from the year 2011 volume.



4 FREIGHT PERFORMANCE MEASURES

Performance measures are an effective method to focus attention on organizational goals and monitor progress towards achieving the goals. Externally communicated, a simple and streamlined performance management program can drastically improve communication with the general public, the private sector and elected officials. In particular, performance measurement can justify past and future investment in freight infrastructure. Internally, performance measures can be integrated into SCDOT to provide three distinct functions:

PLANNING: Performance measures can be used as a tool to evaluate proposed plan elements and scenarios to gauge their effectiveness in achieving the plan's goals and objectives. These high-level metrics are created to evaluate trade-offs and are projected over the 25 year planning horizon.

IMPLEMENTATION: Performance measures can be used as a tool to emphasize agency goals and objectives within the policy development, budgeting, programming, and project selection processes. For example, the measures might assist decision makers in the project selection process by providing metrics about their potential effectiveness in meeting the plan's goals and objectives.

ACCOUNTABILITY: Performance measures can be used as a tool to facilitate tracking and reporting South Carolina's progress in achieving the plan's goals and objectives to support accountability for plan implementation and results.

Freight specific performance measures will provide SCDOT with the ability to monitor how well the transportation system is accommodating safe and efficient freight movement. The measures will allow for the identification of trends or challenges before they become problems and in turn make SCDOT more flexible and responsive to private sector needs. In addition, freight performance measures will allow SCDOT to more effectively communicate with freight stakeholders. Ultimately, the recommended freight performance measures should become a reasonable, updatable element to the regular planning process for SCDOT.

These measures have been developed within the context of the goals established in the SFP and the overall MTP. These measures, designed specifically to capture performance of the freight system, are intended to supplement, not replace, the measures in the MTP, which are intended to demonstrate overall performance of the transportation system.

4.1 South Carolina’s Transportation Goals

As a result of the visioning process and outreach events, SCDOT concluded that the state is facing significantly different challenges than during the last MTP update in 2008. As such, the goals and objectives of the 2014 update have shifted. In particular, the goals and objectives developed are closely aligned with supporting the state’s economy.

The goals for the SFP incorporate the goals of the MTP as well as goals identified for a freight plan within MAP-21 legislation (23 U.S.C. 167). As a result, the goals for the SFP encompass specific goals for the state while incorporating the National Freight Policy goals for consistency. The specific goals of the South Carolina SFP are as follows:

- Mobility and System Reliability Goal
- Safety Goal
- Infrastructure Condition Goal
- Economic and Community Vitality Goal
- Environmental Goal
- Equity Goal

These performance measures have been developed for each identified objective in order to provide a base and understanding of the performance of the goods movement network in South Carolina.

The specific goals of the South Carolina SFP, with associated Guiding Principles and associated Performance Measures, are shown in **Table 4-1** through **Table 4-6**.

Table 4-1: Mobility and System Reliability Goal

Objective	Potential Measure
Reduce the number of system miles at unacceptable congestion levels ⁽¹⁾	Reduction of South Carolina’s Strategic Freight Network mileage that at less than a LOS E for urban areas and LOS C for rural areas
Improve travel time reliability (on priority corridors or congested corridors) ⁽¹⁾	Average or weighted buffer index or travel time index on priority corridors
Reduce congestion on the freight transportation system. ⁽²⁾	Miles of Strategic Freight Network above acceptable congestion levels
Guiding Principles	
Utilize the existing transportation system to facilitate enhanced modal options for a growing and diverse population and economy	
Improve cost efficiency of intermodal goods movement, increasing diversity in modal choice.	
Encourage availability of both rail and truck modes to major freight hubs (ports, airports, intermodal facilities)	
Use advanced technology, performance management, innovation, competition, and accountability in operating and maintaining the freight transportation system. ⁽²⁾	

Notes: (1) Included in MTP Goals and Performance Measures

(2) Included in National Freight Planning goals established under 23 U.S.C. 167

Table 4-2: Safety Goal

Objective	Measure
Improve the safety, security, and resilience of the freight transportation system. ⁽²⁾	Number of large trucks reported in accidents (fatal, non-fatal, injury reported, hazardous materials) Five year trends
Improve substandard roadways ⁽¹⁾	Percent of substandard roadway improved
Guiding Principles	
Better integrate safety improvements for all users of roadways in preservation programs by identifying opportunities to better accommodate vulnerable users, such as pedestrians or bicycles, when improvements are included in adopted local or state plan	

Notes: (1) Included in MTP Goals and Performance Measures

(2) Included in National Freight Planning goals established under 23 U.S.C. 167

Table 4-3: Infrastructure Condition Goal

Objective	Measure
Maintain or improve the current state of good repair for the NHS ⁽²⁾	Number of Miles of Interstate and NHS rated at “good” or higher condition
Reduce the percentage of remaining state highway miles (non-interstate/strategic corridors) moving from a “fair” to a “very poor” rating while maintaining or increasing the % of miles rated as “good”.	Reduction in the percentage of remaining state highway miles (non-interstate/strategic corridors) moving from a “fair” to a “very poor” rating while maintaining or increasing the % of miles rated as “good”.
Improve the condition of the state highway system bridges ⁽¹⁾	Percent of deficient bridge deck area
Guiding Principles	
Improve prioritization of “last mile” infrastructure.	
Recognize the importance of infrastructure condition in attracting new jobs to South Carolina by considering economic development when determining improvement priorities. ⁽¹⁾	
Encourage availability of both rail and truck modes to major freight hubs (for example ports, airports and intermodal facilities). ⁽¹⁾	
Continue to coordinate with the SC Public Railways and SC Ports Authority to consider road improvements needed to support the efficient movement of freight between the Inland Port and the Port of Charleston and between port terminals.	

Notes: (1) Included in MTP Goals and Performance Measures

(2) Included in National Freight Planning goals established under 23 U.S.C. 167

Table 4-4: Economic and Community Vitality Goal

Objective	Measure
Utilize the existing transportation system to facilitate enhanced freight movement to support a growing economy. ⁽¹⁾	Truck travel time index on the freight corridor network; Annual hours of truck delay; Freight Reliability
Guiding Principles	
Work with economic development partners to identify transportation investments that will improve South Carolina's economic competitiveness. ⁽¹⁾	
Improve access and interconnectivity of the state highway system to major freight hubs (road, rail, marine and air) ⁽¹⁾	
Encourage availability of both rail and truck modes to major freight hubs (ports, airports, and intermodal facilities). ⁽¹⁾	
Partner with public and private sectors to identify and implement transportation projects and services that facilitate freight movements. ⁽¹⁾	
Encourage rail improvements that will improve connectivity and reliability of freight movement to global markets. ⁽¹⁾	
Improve the contribution of the freight transportation system to economic efficiency, productivity, and competitiveness. ⁽²⁾	
Increase public awareness of the significance of goods movement and freight transportation infrastructure on SC economic sustainability and growth.	
Partner with communities to improve "last mile" planning efforts in urban communities to minimize the impact of goods movement and improve efficiencies.	
Raise profile of integrated multi-agency, state level freight planning.	
Support private investment in freight infrastructure.	

Notes: (1) Included in MTP Goals and Performance Measures

(2) Included in National Freight Planning goals established under 23 U.S.C. 167

Table 4-5: Environmental Goal

Guiding Principles
Reduce adverse environmental and community impacts of the freight transportation system. ⁽²⁾
Work with environmental resource agency partners to explore the development of programmatic mitigation in South Carolina ⁽¹⁾
Partner to be more proactive and collaborative in avoiding versus mitigating environmental impacts. ⁽¹⁾

Notes: (1) Included in MTP Goals and Performance Measures

(2) Included in National Freight Planning goals established under 23 U.S.C. 167

Table 4-6: Equity Goal

Guiding Principles
Ensure planning and project selection processes adequately consider rural accessibility and the unique mobility needs of specific groups. ⁽¹⁾
Ensure broad based public participation is incorporated into all planning and project development processes. ⁽¹⁾
Identify a Strategic Statewide Freight Network that supports all modes (road, rail, ship, air) and all users (owners, operators, users).
Incorporate valuation of economic impact into project prioritization.

Notes: (1) Included in MTP Goals and Performance Measures

(2) Included in National Freight Planning goals established under 23 U.S.C. 167

4.2 The National Focus on Freight

The current transportation authorization, MAP-21, transformed the policy and programmatic framework for investments to guide the infrastructure growth and development. In particular, MAP-21 focuses on establishing a performance-based approach to managing the federal surface transportation program. To this end, the legislation formally establishes seven national transportation goals, including:

- Safety,
- Infrastructure Condition,
- Congestion Reduction,
- System Reliability,
- Freight Movement and Economic Vitality,
- Environmental Sustainability, and
- Reduced Project Delivery Delay.

To implement MAP-21, FHWA is currently developing rules that will define the national measures for each goal, establish performance reporting requirements, and provide guidance on integrating national goals and measures into planning and programming activities.

In addition to the general focus on performance-based approaches, MAP-21 also requires the USDOT establish a national freight policy to improve the condition and performance of the national freight network. MAP-21 also mandates states develop freight plans that outline how the state will assist in meeting the national freight goals, which are outlined in **Table 4-7**.

Table 4-7: National Freight Policy Goals

Goal	Details
Economic Competitiveness	To invest in infrastructure improvements and to implement operational improvements that strengthen the contribution of the national freight network to the economic competitiveness of the United States; reduce congestion; and increase productivity, particularly for domestic industries and businesses that create high-value jobs
Safety, Security, Resiliency	To improve the safety, security, and resilience of freight transportation
State of Good Repair	To improve the state of good repair of the national freight network
Advanced Technology	To use advanced technology to improve the safety and efficiency of the national freight network
Performance and Accountability	To incorporate concepts of performance, innovation, competition, and accountability into the operation and maintenance of the national freight network
Economic Efficiency	To improve the economic efficiency of the national freight network
Environmental	To reduce the environmental impacts of freight movement on the national freight network

4.3 Developing Freight Performance Measures

Many transportation agencies have well established performance measurement systems to track overall system performance, but efforts to look specifically at freight performance are often still under development. Freight performance measurement is improving however, as state and national efforts to define freight measurement evolve. The sections that follow summarize some of these national and state-level efforts to establish and measure freight transportation performance. These efforts contributed to the recommended performance measures for the South Carolina Strategic Freight Network.

4.4 Recommended Freight Performance Measures for South Carolina

The establishment of freight performance measures by SCDOT will assist in the SFP and MTP, by providing the link from the agency policies, programs, plans, and projects back to the goals and objectives of the SFP and MTP. The measures will allow SCDOT to actively track the performance of their freight network and will be critical for the identification of freight specific trends and challenges. The measures will make SCDOT more flexible and responsive to the needs of its freight stakeholders and will assist in communicating about freight performance to external partners. The measures will be most useful if they are appropriately tailored to South Carolina. The considerations used for recommending measures include:

- **Data availability** – the data and analysis tools needed for the measure should be readily available or easy to obtain. The data should be reliable, accurate, and timely.
- **Strategic alignment** – the measures should align well with the goals and objectives of the SFP and MTP.
- **Understandable and explainable** – the measures should be easy to understand and useful when communicating to external partners.
- **Causality** – the measures should focus on the items under SCDOT’s span of control.
- **Decision-making value** – The measures should provide predictive, diagnostic and reporting value to agency decision makers.

Using these criteria and the lessons learned from the efforts discussed above, eight freight performance measures were identified. Many of these measures are redundant with the MTP, but some have been enhanced to reflect more relevant freight-specific metrics. These measures, and the associated SFP goals and objectives, are outlined in **Table 4-8** through **Table 4-13**. The measures considered for each goal and objectives are also identified.

Table 4-8: Mobility and System Reliability Goal

Objective	Measures Considered	Selected Measures
Reduce the number of system miles at unacceptable congestion levels ⁽¹⁾	Reduction of South Carolina’s Strategic Freight Network mileage that at less than a LOS E for urban areas and LOS C for rural areas	Reduction of South Carolina’s Strategic Freight Network mileage that operates at less than a LOS E for urban areas and LOS C for rural areas
Improve travel time reliability (on priority corridors or congested corridors) ⁽¹⁾	Average or weighted buffer index or travel time index on priority corridors	
Reduce congestion on the freight transportation system. ⁽²⁾	Miles of Strategic Freight Network above acceptable congestion levels	Improvement of travel time reliability on Strategic Freight Network

Notes: (1) Included in MTP Goals and Performance Measures
(2) Included in National Freight Planning goals established under 23 U.S.C. 167

Table 4-9: Safety Goal

Objective	Potential Measures	Selected Measure
Improve the safety, security, and resilience of the freight transportation system. (2)	Number of large trucks reported in crashes (fatal, non-fatal, injury reported, hazardous materials) Five year trends	Number of large trucks reported in crashes (fatal, non-fatal, injury reported, hazardous materials) Five year trends
Improve substandard roadways ⁽¹⁾	Percent of substandard roadway improved	

Notes: (1) Included in MTP Goals and Performance Measures
(2) Included in National Freight Planning goals established under 23 U.S.C. 167

Table 4-10: Infrastructure Condition Goal

Objective	Potential Measure	Selected Measures
Maintain or improve the current state of good repair for the NHS ⁽²⁾	Number of Miles of Interstate and NHS rated at “good” or higher condition	Percentage of miles of Interstate and NHS rated at “good” or higher condition Percent of deficient bridge deck area
Reduce the percentage of remaining state highway miles (non-interstate/strategic corridors) moving from a “fair” to a “very poor” rating while maintaining or increasing the percentage of miles rated as “good”.	Reduction in the percentage of remaining state highway miles (non-interstate/strategic corridors) moving from a “fair” to a “very poor” rating while maintaining or increasing the percentage of miles rated as “good”.	
Improve the condition of the state highway system bridges ⁽¹⁾	Percent of deficient bridge deck area	

Notes: (1) Included in MTP Goals and Performance Measures
(2) Included in National Freight Planning goals established under 23 U.S.C. 167

Table 4-11: Economic and Community Vitality Goal

Objective	Potential Measures	Selected Measures
Utilize the existing transportation system to facilitate enhanced freight movement to support a growing economy. ⁽¹⁾	Truck travel time index on the Strategic Freight Network Relative costs of logistics to overall statewide productivity	Truck travel time index on the freight corridor network; Annual hours of truck delay; Freight Reliability

Notes: (1) Included in MTP Goals and Performance Measures
(2) Included in National Freight Planning goals established under 23 U.S.C. 167

Table 4-12: Environmental Goal

Guiding Principles
Reduce adverse environmental and community impacts of the freight transportation system. ⁽²⁾
Work with environmental resource agency partners to explore the development of programmatic mitigation in South Carolina ⁽¹⁾
Partner to be more proactive and collaborative in avoiding versus mitigating environmental impacts. ⁽¹⁾

Notes: (1) Included in MTP Goals and Performance Measures
(2) Included in National Freight Planning goals established under 23 U.S.C. 167

Table 4-13: Equity Goal

Guiding Principles
Ensure planning and project selection processes adequately consider rural accessibility and the unique mobility needs of specific groups. ⁽¹⁾
Ensure broad based public participation is incorporated into all planning and project development processes. ⁽¹⁾
Identify a Strategic Statewide Freight Network that supports all modes (road, rail, ship, air) and all users (owners, operators, users).
Incorporate valuation of economic impact into project prioritization.

Notes: (1) Included in MTP Goals and Performance Measures
(2) Included in National Freight Planning goals established under 23 U.S.C. 167

4.4.1 Details of the Recommended SFP Performance Measures

The following table provides a model for how the SCDOT might outline the recommended freight performance measures for internal development purposes. The table includes a description of how they might be calculated and what the key inputs are. In addition, the table provides a model for how the measures might be defined in language. Ideally, the freight performance measures will eventually be presented in a graphically and easy-to-understand manner suitable for public and stakeholder communication.

Congestion: Reduction of South Carolina’s Strategic Freight Network mileage that at less than a LOS E for urban areas and LOS C for rural areas		
Current Congested Miles	X,XXX miles	Definition of Measure: Level of service is a methodology employed to analyze the overall operational conditions on a transportation facility. There are six levels of service A (free flow) to F (failure).
Short-Term goal (2018)	Reduction by X%	
Long-Term goal (2040)	Reduction by XX%	
Key Inputs: Speed/travel-time, Density (Vehicle Counts/Capacity), Delay.	Method of Calculation: SCDOT Travel Demand Model	

Reliability and Economic and Community Vitality: Improvement of travel time reliability on Strategic Freight Network		
Current Reliability	# Unproductive Minutes	Definition of Measure: The buffer index represents the extra time a truck driver must add to his/her trip to make an on-time arrival 95% of the time. This measure is distinctly different than measuring congestion, because congestion analysis (LOS, V/C analyses) looks at the overall congestion of a facility (annual performance) and the buffer index measures the actual reliability of the facility.
Short-Term goal (2018)	X% Decrease of unproductive minutes	
Long-Term goal (2040)	XX% Decrease of unproductive minutes	
Key Inputs: Real-time truck speed data	Method of Calculation: $\text{Unreliability (Unproductive minutes)} = \frac{\text{Average Travel Time} \times \text{95\% Travel Time} - \text{Average Travel Time}}{\text{Average Travel Time}}$ <p>Reliability of logical segments of the Strategic Freight Network will be calculated and the results weighted relative to that segments truck percentage. This will result in a holistic view of reliability.</p>	

Commercial Vehicle Safety: Large truck crashes and HAZMAT Incidents		
Current Crash Rate Trend	XX%	Definition of Measure: Number of large trucks reported in crashes (fatal, non-fatal, injury reported, hazardous materials). Five year trends
Short-Term goal (2018)	X%	
Long-Term goal (2040)	XX%	
Key Inputs: South Carolina Crash Database	Method of Calculation: Calculation of five year moving average of truck crashes per SCDOT combined crash rate formula (combining fatal, injury and property damage crashes) and HAZMAT incidents.	

Pavement Quality: Interstate and NHS Condition		
Good or Better Pavement	XX%	Definition of Measure: Percentage of Miles of Interstate Routes and NHS rated at “good” or higher condition
Short-Term goal (2018)	X%	
Long-Term goal (2040)	XX%	
Key Inputs: PCR Ratings	Method of Calculation: $\frac{\text{Lane Miles of “Good” or higher rated pavement on IR and NHS routes}}{\text{Total lane miles of IR and NHS routes}}$	



5 FREIGHT POLICY REVIEW

South Carolina's ability to provide a robust, multimodal freight transportation system has been critically important in supporting the current trend of growth in freight movements. The SFP identifies potential SCDOT policy directions to support the continued success of the state's freight generating industries. While policy-making is a multi-faceted activity, it is important to note there are four primary policy documents that will guide the creation of South Carolina's freight policies:

- **Charting a Course to 2040:** South Carolina's Statewide Multimodal Transportation Plan, provides an overall framework and vision for the State Freight Plan;
- **Corresponding 2040 SCDOT Plans:** These plans supplement the State Freight Plan by providing detailed information about certain freight modes, like rail;
- **SCDOT Strategic Plan:** Provides the framework for SCDOT internal implementation of potential policy changes to improve freight; and
- **Moving Ahead for Progress in the 21st Century Act (MAP-21):** Establishes a recommended framework for state freight plans and provides national freight policy guidance.

5.1 Framework for Freight Policy

5.1.1 Charting a Course to 2040: South Carolina's Statewide Multimodal Plan

The SFP is intended to function as a stand-alone supplement to the MTP. The development of the MTP began with a comprehensive Visioning process, inclusive of workshops and meetings with SCDOT executive leadership, which was the foundation to developing the 2040 MTP goals and objectives. SCDOT coordinated the vision development with Plan partners including the Department of Commerce, the Federal Highway Administration and the South Carolina Ports Authority. This SFP reflects and references elements of the MTP as well as the Statewide Interstate Plan, Statewide Strategic Corridor Plan, and the Statewide Rail Plan.

5.1.1.1 MTP Goals and Objectives

As a result of the visioning process and outreach events, SCDOT concluded that the state is facing significantly different challenges than during the last MTP update in 2008. As such, the goals and objectives of the 2013 update cannot just be extensions of previous plans. In particular, the goals and objectives developed are closely aligned with supporting the state's economy and addressing MAP-21 requirements.

The goals for the SFP incorporate the goals of the MTP as well as goals identified for a freight plan within MAP-21 legislation (23 U.S.C. 167). Specific goals of the SFP are as follows:

- Mobility and System Reliability Goal
- Safety Goal
- Infrastructure Condition Goal
- Economic and Community Vitality Goal
- Environmental Goal
- Equity Goal

Recommended policies for freight transportation planning have been developed for each objective identified for these six SFP goals in order to provide a base and understanding of the performance of the goods movement network in South Carolina.

5.2 SCDOT Strategic Plan

The Strategic Plan is SCDOT’s internal business plan; it describes “how” SCDOT will deliver products and services. The document is designed to guide SCDOT employees in the fulfillment of the department’s mission and priorities. This contrast with the MTP, which is an externally-focused document, intended to describe broadly “what” the Department will provide to its customers. The Department’s Strategic and Multimodal plans have separate audiences, but must be carefully crafted to complement each other. Similarly, the SFP reflects and references elements of the MTP and Strategic Plan. The Strategic Plan includes a vision and identifies the following critical management areas (CMAs). The Strategic Plan, MTP and SFP are being developed in parallel. **Figure 5-1** identifies the three CMAs that are directly relevant to the MTP and clearly indicates how information will flow between the two plans to maintain consistency:

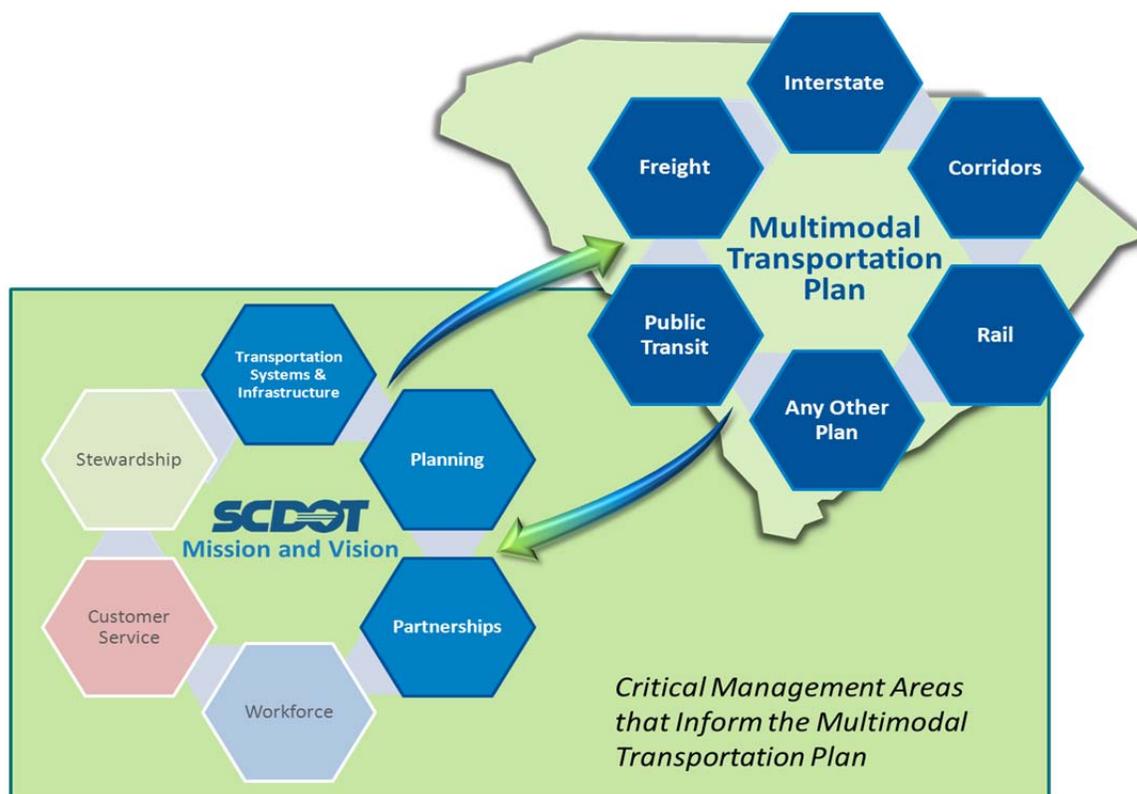
- Partnerships;
- Planning; and
- Transportation Systems and Infrastructure.

5.3 Moving Ahead for Progress in the 21st Century (MAP-21)

MAP-21 transformed the policy and programmatic framework for investments to guide the infrastructure growth and development. In particular, MAP-21 modernized and consolidated many of the surface transportation programs developed in the 1990s into a few core performance based programs.

MAP-21 integrates performance into many federal transportation programs and contains several performance elements. The cornerstone of MAP-21's highway program transformation is the transition to a performance and outcome-based program. States are required to invest resources in projects to achieve individual targets that collectively will make progress toward national goals. Among these one of the larger MAP-21 goals is one to improve freight movement and economic vitality, “to improve the national freight network, strengthen the ability of rural communities to access national and international trade markets, and support regional economic development.”

Figure 5-1: Relationship between Strategic Plan and Multimodal Transportation Plan



MAP-21 requires the USDOT establish a national freight policy to improve the condition and performance of the national freight network. The law includes the following seven goals the policy should achieve:

- **Economic Competitiveness** - Invest in infrastructure improvements and to implement operational improvements that strengthen the contribution of the national freight network to the economic competitiveness of the United States; reduce congestion; and increase productivity, particularly for domestic industries and businesses that create high-value jobs.
- **Safety, Security, Resiliency** - Improve the safety, security, and resilience of freight transportation.
- **State of Good Repair** - Improve the state of good repair of the national freight network.
- **Advanced Technology** - Use advanced technology to improve the safety and efficiency of the national freight network.
- **Performance and Accountability** - Incorporate concepts of performance, innovation, competition, and accountability into the operation and maintenance of the national freight network.
- **Economic Efficiency** - Improve the economic efficiency of the national freight network.

- **Environmental** - Reduce the environmental impacts of freight movement on the national freight network.

5.3.1 MAP-21 Statewide Freight Plans

MAP-21 encourages states to develop comprehensive freight plans to improve the condition and performance of the freight network. The law provides a unique opportunity for states to identify projects that are listed at an increased level of federal participation. Normally, federally supported projects are funded by an 80 percent federal share and a 20 percent state/local match. For Interstate Highway projects listed in a state freight plan the federal share can increase to 95 percent and for non-Interstate Highway projects 90 percent. Projects listed should improve the overall efficiency of the freight system. In order to capture this unique opportunity a state freight plan should:

- Identify of significant freight system trends, needs and issues with respect to the state
- Describe of the freight policies, strategies, and performance measures that will guide the freight-related transportation investment decisions of the state
- Describe of how the plan will improve the ability of the state to meet the national freight goals established under section 167 of title 23, United States Code
- Consider of innovative technologies and operational strategies, including intelligent transportation systems, that improve the safety and efficiency of freight movement
- Describe improvements that may be required to reduce or impede the deterioration of routes on which travel by heavy vehicles (including mining, agricultural, energy cargo or equipment and timber vehicles).
- Develop an inventory of facilities with freight mobility issues, such as truck bottlenecks, within the state, and a description of the strategies the state is employing to address those freight mobility issues.

This South Carolina SFP has been developed to meet MAP-21 SFP requirements. The plan has been developed collaboratively with public and private partners. The plan identifies a strategic freight network, in Section 2.2, where the state can employ strategies and invest to efficiency and effectively support the state and national freight policy goals. **Table 5-1** illustrates how the SFP goals and objectives will help achieve the national goals.

Table 5-1: SFP Compliance with MAP-21 National Freight Policy Goals

South Carolina SFP Goals and Objectives	National Freight Policy Goals						
	Economic Competitiveness	Safety, Security, Resiliency	State of Good Repair	Advanced Technology	Performance and Accountability*	Economic Efficiency	Environmental
Goal 1: Mobility and System Reliability							
Objective 1-A: Congestion Reduction	X			X	X	X	X
Objective 1-B: Modal Options	X	X		X	X	X	
Objective 1-C: Average Speed	X			X	X	X	X
Objective 1-D: Reliability	X	X			X	X	
Objective 1-E: Congestion of Freight Network	X			X	X	X	X
Goal 2: Safety							
Objective 2-A: Safety, Security, and Resiliency	X	X		X	X	X	
Objective 2-B: Improve Substandard Roadways	X	X			X		
Goal 3: Infrastructure Condition							
Objective 3-A: State of good repair for the NHS	X	X	X		X		
Objective 3-B: Increase overall rating of highways	X	X	X		X		
Objective 3-C: SCDOT System Bridges	X	X	X		X		
Goal 4: Economic and Community Vitality							
Objective 4-A: Access and Interconnectivity to Major Freight Hubs	X	X			X	X	X
Objective 4-B: Facilitate Enhanced Freight Movement To Support a Growing Economy.	X			X	X	X	X
Objective 4-C: Travel Speed and Travel Time Reliability	X	X		X	X	X	X
Goal 5: Environmental							
Objective 5-A		X			X		X
Goal 6: Equity							
Objective 6-A: ID Strategic Freight Network	X	X	X	X	X	X	
Objective 6-B: Valuation of Economic Impact	X				X	X	X

*All objectives have a corresponding performance measure (See Chapter 4)

5.4 Funding for Freight Infrastructure

5.4.1 Administrative Structure of SCDOT

The South Carolina Transportation Commission serves as the formal governing body for SCDOT. Seven of its commissioners are directly elected by the state legislative delegation from each of the seven SCDOT districts. One member is appointed by the governor. The Commission serves as the official

policy-making body for the SCDOT. The Secretary of Transportation serves as the Chief Administrative Officer of SCDOT and is charged by the Governor to carry out the policies of the Commission.¹⁸

5.4.2 Funding Challenges

While South Carolina is the 29th most populated state, it is home to the 4th largest state-maintained highway system in the nation.¹⁹ South Carolina is one of five states responsible for their secondary road network. The national average for state-maintained road miles is approximately 19 percent of the respective state's total roadway network; SCDOT is responsible for two-thirds of all public roads in the state, which totals 41,409 miles (2012).²⁰

This creates significant challenges for system-wide (including freight) investment. Federal funding accounts for almost 60 percent of the SCDOT budget, whereas across the nation the average is about 30 percent. According to the South Carolina Transportation Infrastructure Task Force, based on Year 2013 funding levels, the state would have to increase state funding by \$700 million to bring the state's reliance on federal funding into line with the national average (30 percent of funding derived from federal funds and 70 percent derived from state funds). Even more telling however, is that it would take an additional \$4.1 billion increase to match funding levels in other states on a purely per mile basis because South Carolina maintains 63 percent of the state's public roads compared to an average of 19 percent nationally.²¹

5.4.3 State Funding Sources

South Carolina's state funding sources are organized into four main programs. Two are controlled by SCDOT; the remaining two programs are controlled by independent commissions. These programs are funded largely (71 percent) from the state motor fuels user fee, which totals \$0.16 per gallon. It is important to note the state motor fuels user fee has not increased since 1987 and is not indexed to inflation.²²

5.4.3.1 State Highway Fund (SHF)

SCDOT's major state funding program is the SHF. It functions similar to a general revenue account for the agency. The SHF is formally administered by the Secretary of Transportation and governed by the Commission. The SHF funds maintenance and operations, construction, transit, debt service, payroll and other overhead expenses, and provides the local match for federal funding. There are annual statutory transfers from this fund to the South Carolina Transportation Infrastructure Bank and C-Fund (described below). In addition, approximately \$3.5 million is transferred annually to the Department of Natural Resource's Watercraft Fund.

¹⁸ <http://www.scdot.org/inside/leadership.aspx>

¹⁹ SCDOT Strategic Management Plan, July 2013, page 2.

²⁰ 2012 SCDOT Highway Performance Management System (HPMS) database

²¹ SC Transportation Infrastructure Task Force, Final Report, Dec 2012, page 2.

²² <http://www.scdot.org/inside/HighwayPolicy/statefunding.aspx>

5.4.3.2 Non-Federal Aid Highway Account (NFAHA)

In 2005, the NFAHA was created to fund maintenance projects that were not eligible for federal maintenance dollars. Therefore, this account can only be used for maintenance on non-federal aid roads and cannot be used to pay for administrative expenses. Unlike the SHF, 90 percent of which is funded by motor fuel user fee revenue, the NFAHA is funded from many sources including driver license fees and inspection fees for petroleum products. The NFAHA is formally administered by the Secretary of Transportation and governed by the Commission.

5.4.3.3 C-Fund

Unlike the previous two programs, the C-Fund program is controlled by 46 individual County Transportation Committees (CTC) whose membership is appointed by their respective legislative delegation. The individual CTCs select their own projects. However, state law limits the amount of C-Funds spent on local roads to 75 percent of the CTC's C-Fund allocation. CTCs are enabled to administer their C-Fund programs/projects independently. However, a number of CTCs request SCDOT manage the administration of their local programs.²³

5.4.3.4 South Carolina Transportation Infrastructure Bank (SCTIB)

The SCTIB has an independent board comprised of members including the SCDOT Commission Chairman, two appointed by the Governor, two appointed by the Speaker of the House, and two appointed by the President Pro Tempore of the Senate. Any state or local agency/district can apply for a SCTIB loan to construct an eligible project.²⁴

Eligible projects include improvements to highways and bridges that cost more than \$100 million, including all planning, environmental, right-of-way and construction costs. The project must provide a public benefit as described as, "enhancement of mobility and safety; promotion of economic development; or increase in the quality of life and general welfare of the public."²⁵ Over the past 15 years, the SCTIB has leveraged \$3 billion dollars of investment to complete over \$5 billion of highway improvements.²⁶

5.4.3.5 Local and Non-Traditional Funding Sources

Over the past two decades, local governments have played an increasing role in funding transportation projects. Since 1996, SCDOT estimates local investment in Federal-Aid projects to be about \$1.2 billion. A large majority of that amount served as matching dollars for investment dollars from the SCTIB. The state's Transportation Infrastructure Task Force (TITF) report stated that local investment in SCTIB projects averaged about \$89 million annually.

In 1998, SCDOT formed a public/private partnership to design, build, finance, operate and maintain a four-lane bypass around Greenville. When the project opened in 2001, toll revenue collected was well below projections that were used to structure the toll revenue backed bonds used to fund the

²³ <http://www.scdot.org/doing/cProgram.aspx>

²⁴ South Carolina Code Section 11-43-130

²⁵ South Carolina Transportation Infrastructure Bank ("Bank"), Financial Assistance Application Process

²⁶ <http://sctib.sc.gov/Pages/FrequentlyAskedQuestions.aspx>

construction of the facility. This shortfall continued until 2010, when the partnership filed for bankruptcy and the bonds were subsequently restructured in August 2012.²⁷

While this proved a challenge for the partnership, it did represent a private investment of \$211 million in the highway network. Subsequently, this investment was used as a SCTIB funding match for the Upstate GRID project. The match leveraged \$406 million from the SCTIB to build 14 projects in the Greenville region.²⁸

5.4.4 House Bill 3360

In June 2013, Governor Haley signed into law a bill that will add over \$1 billion of road and bridge investment over the next decade. The bill directs \$50 million of general fund revenue to the SCTIB for the next ten years. This will allow the SCTIB to front-load over \$500 million of projects immediately through their ability to issue bonds. The law outlines that these funds cannot be used for projects already in the SCTIB pipeline. The law mandated SCDOT submit to the SCTIB a list of projects for their consideration (underway); however the SCTIB has ultimate project selection authority over this new funding.

In addition, the law directs 50 percent of sales tax collected on motor vehicle purchases each year be used to improve secondary roads (about \$41 million in 2013). There is also a transfer of \$50 million from the general fund to SCDOT to leverage \$250 million in federal bridge funding.²⁹

5.4.5 State Funding Limitations on Freight

While there are no direct statutory limitations on using state-based funding sources for freight projects, there are some limitations based on project eligibility. The four major state funding sources are largely funded (71 percent) by state-motor fuel tax revenue. As such, there is a statutory limitation on allocating funding to non-traditional projects. This impacts SCDOT's ability to choose the most effective freight related improvements. For example, small rail projects that could have large impacts on long-haul truck traffic on South Carolina's highways would be difficult to fund using traditional state or federal programs.

Taking advantage of opportunities to shift some goods movements from truck to rail, especially heavy bulk shipments, may help reduce roadway congestion and highway maintenance costs but also result in less pollutants and a lower cost due to better efficiencies in fuel per ton-mile. Based on American Association of Railroad estimates, it would have taken an addition 3.9 million truck trips to move the freight that traveled on South Carolina's railroads in 2011.³⁰ Rail is a critical mode in South Carolina and should remain viable to ensure freight moves efficiently throughout the state.

²⁷ http://www.fhwa.dot.gov/ipd/project_profiles/sc_southern_connector.htm

²⁸ TITF Report

²⁹ <http://www.governor.sc.gov/ExecutiveOffice/SigningStatements/Documents/H.%203360%20Transportation%20System%20and%20Funding.pdf>

³⁰ AAR, Freight Railroads in South Carolina, June 2013

An example of a project that may not be eligible to receive traditional state highway funding would be Norfolk Southern’s Crescent Corridor initiative. As part of this effort, the railroad is improving the rail mainline that parallels I-85, a major truck route, through the upstate of South Carolina. The railroad estimates that the route will divert over 286,000 long-haul trucks from South Carolina’s roadways resulting in the reduction of over 4 million gallons of fuel consumed and 43,000 tons of CO₂ released annually.³¹

With additional flexibility to provide funding assistance for projects like this, SCDOT could help improve freight transportation through smaller, more strategic investments. However for larger projects, South Carolina’s current restrictions closely mirror similar constraints placed on the use of traditional formula-based funding from the Federal Highway Administration.

5.5 Partnership and Coordination

As mentioned earlier, partnerships with local governments and other funding partners have been indicative of the larger shift to developing projects collaboratively. However, SCDOT’s partnerships are not strictly financial ones. In fact, very few are. By its nature, SCDOT is a partner driven organization. Partnership is identified as a critical management area and part of the SCDOT Strategic Plan. Furthermore, partnership is identified as one of the top ten agency priorities, “Achieve strong, cooperative and collaborative relationships with key government entities and other stakeholders in the transportation arena.”³² As such, SCDOT partnered with the Department of Commerce, SCPA and FHWA to develop the MTP and SFP. In addition, the following partners participate in the day-to-day and long-term success of the South Carolina freight system.

5.5.1 Airports

South Carolina’s major cargo airports serve an important role in the state’s multimodal freight transportation network. South Carolina is home to two, top 100 air cargo airports in the U.S. (by landed weight); Charleston International (73rd) and Greenville-Spartanburg International (84th). While, shipping by air is the quickest and most reliable mode of transport, it is also the most costly. Because of this, air freight usually consists of goods that are highly perishable or particularly valuable. The quality of the connection between the air and highway mode is critical to the success of the air cargo mode.

5.5.2 Councils of Government

South Carolina is divided into ten planning districts served by a Council of Government (COG). Each COG serves as a roundtable for local governments to address common challenges like infrastructure and economic development. The COGs and SCDOT work together to address transportation issues outside of MPO designated areas. In particular, the COGs receive a sub-allocation from the SCDOT’s Guideshare program and develop a five year programming document. The projects selected by COGs are included in the Statewide Transportation Improvement Program.

³¹ http://www.thefutureneedsus.com/images/uploads/SC_FactSheet.pdf

³² SCDOT Strategic Management Plan, June 2013, Page 4

5.5.3 Economic Development Organizations and Chambers of Commerce

South Carolina has been economically successful by continuously adapting to market changes. Much of the credit for these successes has been the many public and quasi-public organizations across the state whose goal it is to attract, expand, and maintain business in South Carolina. Groups like the Economic Development Organizations and Chambers of Commerce, serve as a critical linkage between SCDOT and potential economic development opportunities. These relationships will be critical tactically, for direct infrastructure development, but also strategically as SCDOT continues to focus on improving the state's economy through transportation investment.

5.5.4 Freight Railroads

Freight rail services in South Carolina are provided by 14 railroads including two Class I railroads, namely CSX and Norfolk Southern. Palmetto Railways (formerly South Carolina Public Railways), a branch of the South Carolina Department of Commerce, operates three of the 12 short line or terminal switching railroads. Freight rail will continue to play an increasing role in the state's multimodal freight network. Several projects are in development to improve the connectivity between the maritime, rail, and truck modes. In particular, there are improvements planned at the Port of Charleston including a new intermodal container transfer facility with dual access for the state's two Class I railroads. An inland port developed in Greer by the SCPA recently opened in November 2013, which is estimated to take 25,000 truck-trips off of I-26 by converting those loads to rail.³³ However, I-85 and those state roads in the Greer area are projected to have increased demands. Tools should be put in place to ensure the capacity of critical intermodal connectors as freight demand grows in the area. Each of these projects will significantly impact South Carolina's freight community and SCDOT's strategic freight network.

5.5.5 Metropolitan Planning Organizations

Metropolitan Planning Organizations (MPOs) are responsible for transportation planning and overseeing transportation investments in South Carolina's urban areas. Each MPO receives a federally mandated sub-allocation of Guideshare funds to develop transportation programs and projects in their respective areas. Each of South Carolina's 11 MPOs develops a fiscally constrained long range transportation plan and Transportation Improvement Program, and some of the major MPOs are directly engaged in freight planning. Outside of their formal role in transportation planning, MPOs serve as an important facilitator and convener of local interests that can be very helpful with developing sensitive freight transportation projects.

5.5.6 Other State Agencies

While SCDOT is the primary state agency responsible for transportation, there are other state agencies and organizations that have a formal or related role. For example, Palmetto Railways operates three common carrier railroads. Similarly agencies like the SCPA operate the Port of Charleston. Agencies like the Department of Motor Vehicles, Department of Public Safety, and the State Law Enforcement

³³ Road concerns raised as inland port progresses in Greer. (2013). Retrieved from <http://www.greenvilleonline.com/article/20130408/NEWS/304080016/Road-concerns-raised-inland-port-progresses-Greer>

Division have a regulatory but critical role in the success of the South Carolina freight transportation system.

5.5.7 Professional Associations

Professional associations and advocacy groups can be an important partner in the freight planning process. Groups like the South Carolina Trucking Association and the South Carolina Association of Railroads can communicate industry concerns and feedback to SCDOT through their leadership or access to their members. Additionally, these groups add some legitimacy to outreach efforts both in terms of communicating the importance of SCDOT's efforts to stakeholders, but also for vetting stakeholder feedback.

5.5.8 Multijurisdictional Partnerships

SCDOT is a member of the I-95 Corridor Coalition, a voluntary multi-state partnership that includes all major transportation related agencies along this busy interstate corridor from Maine to Florida. The Coalition allows jurisdictions throughout the corridor to make decisions through consensus to enhance overall transportation system performances along the eastern seaboard.³⁴ This partnership will be critical as freight tonnage on I-95 is expected to grow by more than 80 percent by 2023. The majority of which (55 percent) will be passing through the state^{35,36}

South Carolina is home to many multi-jurisdictional/state freight corridors. I-95, I-26, and I-85 are heavily used interstates, and project's like Norfolk Southern's Crescent Corridor connects the major northern and southern U.S. population centers and passes directly through the state. It is critical for South Carolina's freight future that collaborative partnerships like the I-95 Corridor Coalition continue into the future.

5.6 A New Way to Look at Freight

A principal message from the SFP's outreach efforts was the need for a fundamental policy shift to sharpen South Carolina's focus on the role of freight and how it supports the state's economy. While the freight assets of the state are many, so are the decision-makers who guide investment throughout the state. The shift in policy should:

- 1) Increase focus on the complete multimodal system,
- 2) Approach freight as a mode, and
- 3) Include the dedication of a flexible funding source for freight projects.

5.6.1 Recognize the Multimodal Freight Transportation System

Recognizing that transportation funds come from a variety of sources and have a wide range of planning stipulations attached, SCDOT can increase collaboration to coordinate transportation

³⁴ <http://www.i95coalition.org/i95/Home/WhatistheCoalition/tabid/112/Default.aspx>

³⁵ Current version of SC Statewide Freight Plan (Inventory and existing freight infrastructure) (2013) CDM Smith

³⁶ Freight and Rail Stakeholders Webinar. Retrieved from (2013) http://www.dot.state.sc.us/Multimodal/pdf/freight_rail_webinar.pdf

infrastructure investments to better align goals and performance of the freight transportation system as a whole.

5.6.1.1 Potential Strategies

- SCDOT should focus on further developing and supporting its rail division as it works closely with private sector railroads and Palmetto Railways to increase the resiliency, effectiveness and efficiency of the freight transportation system. The highway and railroad freight modes must work together collaboratively to achieve the common goal, to move freight.
- SCDOT should maintain the designation of a formal liaison to work closely with the Port of Charleston to increase throughput at the port but also the state. This liaison would focus on improving communication between agencies and therefore raise the profile of land-side transportation needs that hinder further port productivity. This partnership should focus on maximizing the value captured at the port and corresponding inland ports while minimizing public costs for moving freight destined beyond the state’s borders.

5.6.2 Approach Freight as a Mode in the SCDOT Project Prioritization Process

Approved in 2007, Act 114 dramatically changed the structure of SCDOT and the project prioritization methodology. An important aspect of Act 114 is the inclusion of truck traffic percentages in the methodology. While the inclusion of truck volumes does not completely capture South Carolina’s freight needs, it does show a historical focus on freight projects in the selection process. The act requires SCDOT and its MPO/COG partners to prioritize projects within certain project types, as shown in **Table 5-2**.

Table 5-2: Act 114 Required Project Prioritization Categories.

SCDOT Prioritization Project Types	MPO/COG Prioritization Types
Interstate Mainline Capacity & Interchanges	Roadway Widening
Interstate Rehabilitation	New Facilities
Bridge Replacement	Intersection Improvements
Non-interstate Resurfacing	
Safety	

5.6.2.1 Potential Strategy

SCDOT should work to include freight as a required prioritization category in Act 114.

5.6.3 Dedication of a Flexible Funding Source for Freight Projects

5.6.3.1 Potential Strategy

- SCDOT should work to create a specific program to fund projects on the strategic freight network. This is especially important as MAP-21 provides an opportunity for states to identify projects that are on the network at an increased level of federal participation.
- Normally, federally developed projects are funded by an 80 percent federal share and a 20 percent state/local match. For projects listed in the SFP and on the interstate system the

federal share can increase to 95 percent. For non-interstate projects, the share can increase to 90 percent.

While it is important to create a process to specifically select freight projects, it is another challenge to fund those projects. The SCDOT TITF provided several options and alternative ways that other states have addressed similar issues. While their list is not prescriptive, it exhibits a multitude of various options. The Task Force identified the following “potential revenue enhancements” (taken directly from the Task Force’s Final Report):³⁷

- 1) User Fee on Motor Fuel
- 2) Indexing and Removing the Sales Tax Exception
- 3) Driver’s License Fees
- 4) Automotive Registration Fees
- 5) Truck Registration Fees
- 6) Electric Power Tax
- 7) Tolls
- 8) Public-Private Partnerships (PPPs)
- 9) Use Fee on Vehicle Purchases
- 10) General Fund Revenues
- 11) Insurance Premium Safety Surcharge
- 12) Encroachment Permit Fees
- 13) Alternative Fuel Vehicle User Fees
- 14) Vehicle Miles Traveled (VMT) Fees
- 15) Severance Taxes
- 16) Rental Car Fees
- 17) User Fees for Electric and Non-Motorized Vehicles
- 18) Turnback Program

5.7 Freight Policy Strategies

The South Carolina SFP freight policy strategies serve as primary guidance as SCDOT works to achieve the goals and objectives found in the MTP and SFP. These strategies will serve as the framework for SCDOT as it makes project and program related investment decisions, and works with public and private partners on freight related issues.

Each goal and objective has several strategies that will assist SCDOT in achieving the overall vision of the MTP and SFP. Each goal, objective and strategy was developed after outreach to SCDOTs numerous public and private partners. The SFP outreach efforts and results are documented extensively in Chapter 1.

³⁷ http://www.scdot.org/inside/pdfs/TITF_Final_Report.pdf

5.7.1 Goal 1: Mobility and System Reliability

Provide surface transportation infrastructure and services that will advance the efficient and reliable movement of people and goods throughout the state.

5.7.1.1 Guiding Principles:

- Utilize the existing transportation system to facilitate enhanced modal options for a growing and diverse population and economy.
- Improve cost efficiency of intermodal goods movement, increasing diversity in modal choice.
- Encourage availability of both rail and truck modes to major freight hubs (ports, airports, intermodal facilities). Develop efficient connectivity from railroads and roadways to ports, airports and other intermodal facilities.
- Use advanced technology, performance management, innovation, competition, and accountability in operating and maintaining the freight transportation system.

5.7.1.2 Strategies:

Objective 1-A: Reduce the number of system miles at unacceptable congestion levels.

- Prioritize projects designed to improve freight mobility and eliminate freight bottlenecks.
- Identify opportunities with private sector stakeholders where operational-level decisions could be made to reduce reoccurring congestion (i.e. shifting delivery times, mode shift, etc.).
- Review the potential use of time-of-day truck restrictions through major chokepoints.
- Identify corridors where non-traditional capacity building improvements may significantly reduce congestion (Intelligent Transportation Systems (ITS), Managed Lanes, Value Pricing, etc.).

Objective 1-B: Utilize the existing transportation system to facilitate modal options for a growing population and economy

- Develop local transportation plans for areas surrounding freight intermodal facilities.
- Facilitate the creation of local task-forces led by all jurisdictions involved to prioritize and address issues as a group to support execution of the local plan.
- Review and select key intermodal connectors to actively monitor for maintenance and operations issues.
- Identify and close any first/last mile gaps remaining or created near major intermodal centers and manufacturing hubs.
- Optimize the strategic advantage of South Carolina’s multimodal system.
- Develop criteria and a process to leverage private and local investment to expedite transportation project delivery to be more responsive to private sector needs.

- Evaluate each major modal connection hub and identify key operating characteristics and strategies to improve its distribution network.
- Establish Freight Advisory Committee as recommended by MAP-21.
- Support and participate in industry groups like the TDL Council and economic development groups.
- Focus on positioning SCDOT’s rail office to work with the railroads to pursue non-traditional funding sources for freight rail investment.

Objective 1-C: Improve the average speed on congested corridors

- Prioritize projects designed to improve the movement of freight on high truck volume corridors.
- Promote the use of real-time traffic information to assist in appropriate routing decisions.
- Continue to work with multi-jurisdictional and multi-state partners to make corridor-wide system decisions (i.e. I-95 Corridor Coalition).

Objective 1-D: Improve travel time reliability (on priority corridors or congested corridors)

- Promote and support use of ITS technology to increase efficiency and reliability key corridors.
- Promote and support the use of a common information technology solution/protocol to share real-time information with freight system users.
- Continuously monitor and evaluate operational information to identify and rectify system challenges before they become problems.

Objective 1-E: Reduce congestion on the freight transportation system

- Identify a strategic freight network for South Carolina.
- Include the network designated by USDOT, as well as other highway and multimodal routes that are critical to South Carolina’s economy.
- Develop this network in concert with a supply-chain analysis of South Carolina’s critical industries.
- Identify and address freight bottlenecks on the strategic freight network.
- Ensure freight implications and benefits are included in the SCDOT project prioritization process.

5.7.2 Goal 2: Safety

Improve the safety and security of the transportation system by implementing transportation improvements that reduce fatalities and serious injuries as well as enabling effective emergency management operations.

5.7.2.1 Guiding Principles

- Better integrate safety improvements for all users of roadways in preservation programs by identifying opportunities to better accommodate vulnerable users, such as pedestrians or bicycles, when improvements are included in adopted local or state plan:

5.7.2.2 Strategies

Objective 2-A: Improving the safety, security, and resilience of the freight transportation system.

- Develop a freight network resiliency plan.
 - This plan would help bring freight dependent business back online sooner after an emergency event and would help with hurricane relief efforts.
 - This would be developed with SCDOT’s freight and homeland security partners.
- Create a commercial vehicle crash database.
 - Extract commercial vehicle crash data from the statewide crash database to track and identify patterns or particular situations to address.
- Reduce risk to non-motorized transportation users.
 - Clearly sign and mark bicycle and pedestrian facilities where the Strategic Freight Network and state/local bike plans overlap.
- Explore programs to incentivize short line rail infrastructure investment.
- Enter into a partnership with the railroads to prioritize grade crossing improvements and explore opportunities to make small public improvements to leverage the railroad’s responsibility to maintain/improve crossings.

Objective 2-B: Improve substandard roadways and bridges

- Identify and prioritize substandard roadways on the Strategic Freight Network in the statewide maintenance/construction program.
 - Special emphasis should be put on intermodal connectors, because of their importance to multimodal connection and therefore reduced supply chain costs.
- Identify and prioritize sub-standard bridges on the Strategic Freight Network to meet current and future fleet vehicle dimensional needs.

5.7.3 Goal 3: Infrastructure Condition

Maintain surface transportation infrastructure assets in a state of good repair.

5.7.3.1 Guiding Principles

- Improve prioritization of “last mile” infrastructure.
- Recognize the importance of infrastructure condition in attracting new jobs to South Carolina by considering economic development when determining improvement priorities.
- Encourage availability of both rail and truck modes to major freight hubs (for example ports, airports and intermodal facilities).

- Continue to coordinate with Palmetto Railways and SCPA to consider road improvements needed to support the efficient movement of freight between the inland ports, the Port of Charleston, and between port terminals.

5.7.3.2 Strategies

Objective 3-A: Maintain or improve the current state of good repair for the NHS.

- Focus on actively managing the condition of NHS Intermodal Connectors.
- Continue work with state agency transportation partners like Palmetto Railways and SCPA to identify opportunities to support efficient freight movement by identifying potential efficiencies created by utilizing multiple modes or a complete mode shift.

Objective 3-B: Reduce the percentage of remaining state highway miles (non-interstate/strategic) moving from a “fair” to a “very poor” rating while maintaining or increasing the percent of miles pavement condition as “good”.

- Identify portions of state highway mileage which have strong correlation between truck volumes and substandard ratings.
 - More strategically allocate maintenance dollars where they can get the biggest return on investment.

Objective 3-C: Improve the condition of the state highway system bridges.

- Identify and prioritize work to reinforce bridges on the Strategic Freight Network that are functionally/structurally obsolete.
- Actively track and analyze trends of bridge inspection reports on the Strategic Freight Network to identify issues to alleviate future system disruptions.

5.7.4 Goal 4: Economic and Community Vitality

Provide an efficient and effective interconnected transportation system that is coordinated with the state and local planning efforts to support thriving communities and South Carolina’s economic competitiveness in global markets.

5.7.4.1 Guiding Principles

- Work with economic development partners to identify transportation investments that will improve South Carolina’s economic competitiveness.
- Encourage availability of both rail and truck modes to major freight hubs (ports, airports, and intermodal facilities).
- Partner with public and private sectors to identify and implement transportation projects and services that facilitate freight movements.
- Encourage rail improvements that will improve connectivity and reliability of freight movement to global markets.
- Improve the contribution of the freight transportation system to economic efficiency, productivity, and competitiveness.

- Increase public awareness of the significance of goods movement and freight transportation infrastructure on SC economic sustainability and growth.
- Partner with communities to improve “last mile” planning efforts in urban communities to minimize the impact of goods movement and improve efficiencies.
- Raise profile of integrated multi-agency, state level freight planning.
- Support private investment in freight infrastructure.

5.7.4.2 Strategies

Objective 4-A: Improve access and interconnectivity of the state highway system to major intermodal facilities (road, rail, marine, and air).

- Prioritize intermodal connection projects above other freight projects, as these projects are more often the most conducive to reducing overall supply chain costs; similarly this could reduce overall maintenance costs to the state for maintaining roads that are not built to handle heavy truck traffic.
- Transition SFP private sector partners to play an active role in SCDOT planning process in the future, including the development of a Freight Advisory Council.
- Undertake an effort with SCDOT’s public and private partners to educate the public on the importance of freight to South Carolina, including elected officials, and the general public.
- Work with rail, marine, and air partners to share expertise and create cross-functional relationships to help identify non-highway projects and key connectors on the strategic freight network.

Objective 4-B: Utilize the existing transportation system to facilitate enhanced freight movement to support a growing economy.

- Instill goods movement perspective in the SCDOT’s planning process and decisions by:
 - Ensuring SCDOT policies incorporate freight movements in planning, design, and operations.
 - Updating SCDOT organization and processes to be more truly multimodal.
 - Increase the role of the SCDOT Office of Intermodal and Freight Programs in conversations internally and externally to increase enhance the multi-modal system.
 - Designated a SCDOT planning liaison to the SCPA.
- Provide transportation and land use planning guidance and direction to local and regional agencies to support economic development and freight mobility.
- Work with other state agencies to ensure consistency of regulations that impact freight mobility.
- Coordinate freight plans and programs of municipalities, counties, MPOs, and COGs.
- Identify infrastructure corridors that are critical to developing South Carolina’s export market.

- Work with local jurisdictions to create truck routing and other restrictions that will expedite last mile trips while minimizing impact on surrounding community.

Objective 4-C: Maintain, or improve upon, current truck travel speed and/or travel time reliability performance.

- Working with the private sector, actively address freight bottlenecks on or off the SCDOT system.
- Continuously monitor and evaluate established SFP performance measures to identify and rectify system challenges before they become problems.

5.7.5 Goal 5: Environmental

Be a partner to sustain South Carolina’s natural and cultural resources by minimizing and mitigating the impacts of state transportation improvements.

5.7.5.1 Guiding Principles

- Reduce adverse environmental and community impacts of the freight transportation system.
- Work with environmental resource agency partners to explore the development of programmatic mitigation in South Carolina.
- Partner to be more proactive and collaborative in avoiding versus mitigating environmental impacts.

5.7.5.2 Strategies

Objective 5-A

- Develop a post-process tool to quantify freight system investment’s effect on the environment in the South Carolina Travel Demand Model, both in terms of statewide benefits, and localized impacts.
- Work with agency partners to expedite the environmental permitting process while maintaining a focus on minimizing environmental impacts.

5.7.6 Goal 6: Equity

Manage a transportation system that recognizes the diversity of the state and strives to accommodate the mobility needs of all of South Carolina’s citizens.

5.7.6.1 Guiding Principles

- Ensure planning and project selection processes adequately consider rural accessibility and the unique mobility needs of specific groups.
- Ensure broad based public participation is incorporated into all planning and project development processes.

5.7.6.2 Strategies

Objective 6-A: Identify a Strategic Statewide Freight Network that supports all modes (road, rail, ship, air) and all users (owners, operators, users).

- Prioritize freight projects across the modes.
 - Develop tools to help decision-makers weigh projects among all modes against each other.
- Balance financial justifications like returns on investment (ROI) and benefit cost analyses (BCA) with the community impacts.
- Leverage private sector investment to amplify the effects of public sector funding and to gain political support for non-traditional project types.
- Formally incorporate outreach to certain SCDOT’s freight partners to capture rural accessibility and the unique mobility needs of specific groups.

Objective 6-B: Incorporate valuation of economic impact into project prioritization.

- Develop a tool to analyze impact of proposed freight projects that evaluates the following:
 - Economic Feasibility (BCA) – The effects of any freight improvements on mobility, livability, and connectivity will be evaluated. Of these, mobility is often the most easily quantified in economic terms since it addresses the travel efficiency gains associated with user travel time; vehicle miles traveled (VMT) and accidents.
 - Economic Impact – An additional economic impact analysis can then be done that builds upon the benefit perspective. The resultant personal and business transport costs savings can be assessed to ascertain the resultant job, income, and output related impacts that arise from the improvement alternatives key to any impact analysis is to avoid, or at least identify, any transfer impacts; for example business relocation from area to another because of an improvement (e.g., no “net” gain).
 - Funding/Financial Analysis – Financial analyses usually refer to “revenue-generating” projects in which a financial analysis of a revenue stream (i.e., tolls) are compared to the project construction and operation costs over the project life (i.e., construction period plus 20 years of operation). Such financial analyses commonly referred to as “Return-on-Investment” in the private sector, can be pursued as either a privately- or publicly-funded project.



6 ECONOMIC CONTEXT OF FREIGHT TRANSPORTATION IN SOUTH CAROLINA

Historically, South Carolina has prospered by investing in strategic infrastructure to capitalize on shifts in the global supply chain. The transformation of the state's economy from largely agricultural to a manufacturing and service based one increased the need for an efficient and competitive freight transportation system. The ability of South Carolina to respond quickly to the changing business environment enabled the state to become a major advanced-manufacturing center in the Southeast. In recent decades, multi-national companies like BMW, Boeing and large tire manufactures like Continental, Michelin and Bridgestone have located major facilities in the state. In 2012, manufacturing accounted for 12 percent of total employment in the state.³⁸

In addition to manufacturing, the U.S. Department of Defense is a large driver of freight demand in South Carolina. All five branches of the military have installations in the state. The SC Department of Commerce estimates that the military has a nearly \$16 billion economic impact on the state, and supports more than 138,000 jobs.³⁹

Tourism has a substantial impact on the availability of the state's transportation network for freight users. Annually, the South Carolina Department of Parks, Recreation and Tourism estimates that over 4.1 million trips are made on South Carolina highway by out-of-state leisure visitors.⁴⁰ The majority of these trips are made on major corridors that service major pass-through tourist traffic as well, like I-95 and I-26.

Though the major means of freight transport in South Carolina is by truck, the state is also served by a system of Class I and short line railroads, marine port terminals, inland port terminals, six primary public airports and a range of intermodal facilities.

In 2012, the logistics sector (comprised of Retail Trade, Wholesale Trade and Transportation, Warehousing and Utilities industries) accounted for 19.1 percent of all South Carolina employment, illustrating the significance of the transportation and logistics industry in the state. In the same year, manufacturing, a freight intensive industry, accounted for 12 percent of total employment in South Carolina.⁴¹ As is evident, the movement of goods along all modes is critical in South Carolina.

Understanding the supply chain and providing sufficient connections between modes is important to the economic vitality of the state. Site selection practices by current and future businesses evaluating South Carolina look to the availability and capacities of the freight transportation system to move raw materials, sub-assemblies, and finished goods along the supply chain. Modal selection is done by a

³⁸ <http://scommerce.com/data-resources/state-facts>

³⁹ <http://scommerce.com/news/press-releases/military-base-task-force-appoints-charlie-farrell-new-executive-coordinator>

⁴⁰ <http://www.scprt.com/files/Research/10-12AvgOutstate.pdf>

⁴¹ <http://scommerce.com/data-resources/state-facts>

process of evaluating each mode with six criteria: transit times, reliability, cost, capacity, safety and accessibility.

The relationship between the freight transportation infrastructure and the users of the system should be viewed as a mutually evolving relationship essential to the economic health of the state. The presence of inherent agricultural and trade opportunities in the early history of the state fostered the development of modes of transportation to support these businesses by transporting goods to markets. As these business models matured, bringing competition from other producers, a range of geographic markets, and evolving technological solutions to historical challenges, business sectors built upon existing freight systems and developed new economic activities and models. The increased need for efficiency required by changing models advanced enhancements within existing, and supported new, modes of freight transportation. These reactionary responses to sector and modal emergence led to the ability to meet changing supply chain needs in the state. Attracting new businesses produced new needs as these organizations matured and adapted to meet global competition. These building blocks of the current freight transportation system can be expected to continue to evolve as the economy of South Carolina grows.

An examination of the modal infrastructure within the state, the symbiotic inventory of businesses and the users of the freight system, is required to understand each side of the evolutionary equation.

Most South Carolinians are aware of the role played by the Port of Charleston in the economy of South Carolina. According to the 2008 SCSPA Economic Impact Study,⁴² the South Carolina Ports Authority (SCPA) facilitates over \$44.8 billion in total economic output. \$11.8 billion of that is in the form of labor income to 240,000 employees. An estimated 24,700 of those employees work in port operations and the remaining 236,100 employees are port users shipping cargo through the marine terminals in Charleston and Georgetown. Along with the Port, high profile, freight-intensive employers have driven the state's economy. In the survey of freight transportation providers and users, respondents listed the top goods being shipped into, out of, and around the state as automotive, consumer or retail products, industrial materials, paper and packaging, and other heavy haul items. In addition to those current shipments, they noted growth in shipments in automotive, pharmaceutical, agricultural and consumer or retail goods. This listing of goods signals the industries currently operating in the state and those increasing in production.

South Carolina is a "gateway" state and a major freight focus point for the U.S. due to the significant imports and exports passing through the Port of Charleston. Also, South Carolina is a "connector" state because of significant volumes of north-south freight flows along the U.S. east coast. Both roles are critical to the economic posture of the U.S. and the southeast region. Because of its geographical location, South Carolina serves as a gateway for international trade. As a consequence, manufacturing and the logistics and distribution industries have experienced significant growth in the state.

⁴² http://www.port-of-charleston.com/About/statistics/Economic_Impact_2008.pdf

6.1 Importance of Meeting Supply Chain Needs

Site selection practices by current and future businesses evaluating South Carolina as a potential location for business look to the availability and capacities of the freight transportation system to move raw materials, sub-assemblies, and finished goods along the supply chain. Businesses select locations for facilities within the supply chain, such as manufacturing facility or distribution center, based upon the presence of current or anticipated transportation infrastructure to meet these supply chain needs. Once there is an understanding of current supply chain needs and identification of forecast needs, freight policy and infrastructure improvement plans can be prepared to sustain the existing economy of the state as well as support potential growth.

6.2 Modal Selection Process within the Supply Chain

Supply chain theory and practice defines a process for the evaluation and selection of the various modes to satisfy freight transportation needs between the differing stages of product delivery. Modal usage is determined through the application and evaluation of each mode to a set of six criteria. Each criterion describes a condition that can be unique to the particular commodity, supply chain, or business model. The six criteria are compared to the needs of a specific movement within a complete supply chain. In satisfying these six criteria, modes of transportation are chosen and may be selected as a “chain” or combination of modal selections. This latter selection, “multimodal”, encompasses a significant percentage of movements for modern product manufacturing.

The six criteria are:

- **Transit Times:** The time required for the movement of materials or goods from one point to another within the supply chain. This may encompass raw materials to refinement, refinement to manufacturing, manufacturing to distribution, and distribution to consumer. It is noted that this may not always result in a selection of the fastest as other factors influence the relevant need for speed of movement.
- **Reliability:** The degree of predictability that the stated transport time will be adhered to when the materials or goods are shipped. Acceptance of known and predictable delays, e.g. rush hour congestion for truck movement in a major metropolitan area, may not be viewed as a disqualifier where the delay can be predicted and planned for.
- **Cost:** Cost is taken into consideration with the previous two criteria and heavily influences modal selection. Transportation cost must not place an inordinate burden on the final cost of the product. Transportation may impart a cost on the final price of the product sufficient to render the goods non-competitive to another supplier offering.
- **Capacity:** The potential mode of transportation must meet the need to transport sufficient quantities. The mode should also have the ability to transport quantities at an acceptable price per weight or volume measure.
- **Safety:** Safety is the stewardship to other occupants of the mode of transportation. This may be to adjacent shipments or passengers traveling on the same mode. Businesses need the

confidence that the mode of transportation will provide damage-free, good condition receipt of materials or goods transported.

- **Accessibility:** The mode of transportation must be available to both the shipper and the receiver. It is also considered that the connecting mode, or intermodal connections, are available at a reasonable cost.

In responses from a survey conducted with freight transportation providers and users in South Carolina, transit time and reliability ranked highly in their supply chain decision making, as the demand for just-in-time delivery has increased in recent years. Cost was also considered a key factor in supply chain management for providers and users in South Carolina.

6.3 Application of Criteria

The practical application of these six criteria can be viewed as two stages: Assessment and Application.

In the Assessment stage, Safety and Accessibility may be used to accept or reject a mode for further consideration. Business planners assess the ability of the mode of transportation to safely move the commodity, particularly challenging commodities such as hazardous materials or oversized windmill assemblies. The availability and accessibility of the mode is assessed. All modes may be available yet must be reasonably located and accessible for the movement of the commodity. A railroad may be located three hours by truck, in the opposite direction of the final destination. The overall truck transit time from origin to destination is six hours. This may render the railroad as “out of route” or circuitous. This may negatively impact the necessary transit times and required cost needs of the supply chain.

Table 6-1 illustrates the generally accepted reliability and relevant transit time of each mode.

Table 6-1: Modal Comparisons by Selection Criteria

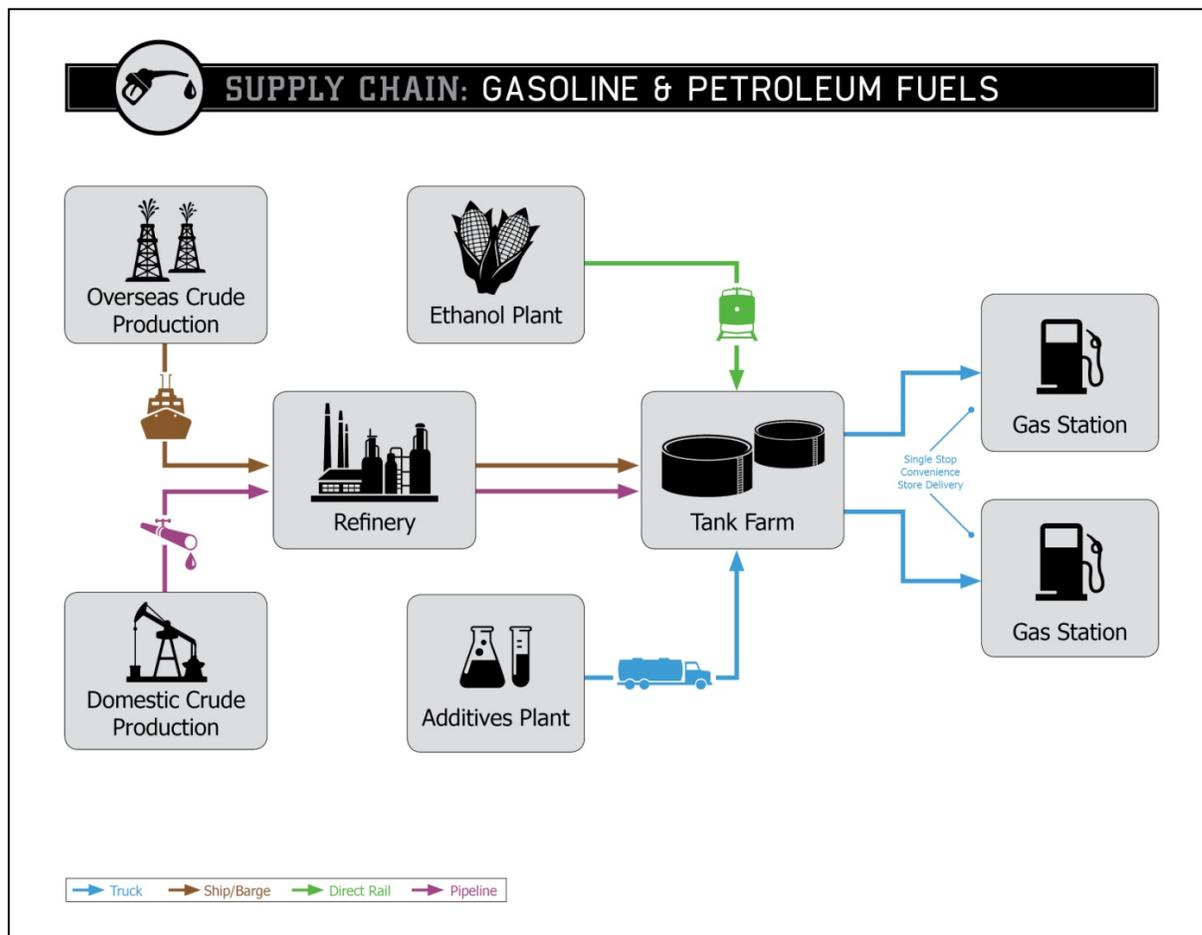
Transit	FAST	<----->			SLOW	
Mode	Air	Truck	Rail	Water	Pipeline	
Reliability	Higher	Variable			Lower	Higher
Freight Profile	Low Weight, High Value, High Time Sensitive, High Inventory Cost	Broad Range of Weight, Value, Sensitivity, and Inventory Cost			High Weight, Lower Value, Low Time Sensitivity, Low Inventory Cost	Variable characteristics associated with the specialized nature of the commodity

Once this assessment takes place for the region, the “Application” of the criteria can describe the type or profile of the freight most likely to employ the mode. This becomes the fundamental planning criteria for transportation facilities enhancing freight mobility. Not only does this identify needed facilities but supports the prevention of planning and designing for unnecessary transportation facilities or facilities not appropriate to support the local freight needs.

6.3.1.1 Case Study of Modal Selection and Usage

A real world example of this modal selection process, the global gasoline and petroleum supply chain is presented. The gasoline supply chain is concisely traced from origin to final distribution location, where the end user intersects with the supply chain. The entire process is illustrated in **Figure 6-1**.

Figure 6-1: Case Study, Gasoline and Petroleum Supply Chain



Source: CDM Smith

The supply chain is subject to provider-supplier locations, having both overseas and domestic sources. Foreign sources are transported by ocean tanker, which is an example of geographically limited modal choices or accessibility. Domestic sources, national and continental, gravitate to that mode providing the most reliable and cost efficient transport. Though rail and truck are available, this sector typically transports by pipeline, where that mode exists. Pipeline presents the least potential for regular disruptions to supplies and satisfies the need to provide a steady source material for the continuous operation of the refinery. Water and pipeline modes continue beyond the refinery to provide product to various points for distribution across the country.

Stored in “tank farms”, the product requires an injection from two separate supply chains, which may or may not be subject to the supply chain decision making process guiding the overall modal selection process. As many grades of fuel are blended with ethanol, movement of large quantities of liquid ethanol products is necessary. Transported in bulk, requiring a low cost mode to carry high volumes, this is typically carried to the tank farms for mixing via rail. Other chemicals are required to raise the refined product to grades for commercial usage. These are not necessary in such large quantities as the ethanol additive, and may be co-located with the tank farm. To efficiently transport these additives, truck is the common selection. The quantities may be high volume, which may lend itself to rail, but these producers may not have direct rail access. “Final mile” or distribution to the point where the consumer is located, is from the tank farm or “rack” to the local fueling station. Truck is the final mode to conclude this supply chain as the local gasoline station typically does not have access to other modes.

It is this understanding of commodity types and modal selection that planners apply additional data to drive freight planning policy and programming in South Carolina. As demonstrated, a wide range of components are present in the supply chain decision making process, resulting in site selection processes unique to each business currently operating or considering future operations in South Carolina. With these considerations, the statewide freight plan applied these concepts to help formulate a set of policies to support a resilient and sustainable freight transportation system, as discussed in Section 5.7.



7 CORRIDOR LEVEL STRATEGIES AND CONTINUED FREIGHT PLANNING

7.1 The Freight Planning Process

This SFP was developed in partnership of SCDOT, SCPA, FHWA, and the SC Department of Commerce, along with a wide range of public and private sector partners around the region. Chapter 1 details this outreach effort, and SCDOT continuously supported and facilitated participation in the development of plan documents and strategies through the planning process.

The identified freight related improvements on the corridor level recommended in this plan were derived from an analysis of current conditions of the state's freight infrastructure assets conducted as part of the larger statewide MTP process, partnered with the development of the strategic freight network and input from freight stakeholders. This initial list is presented as an initial methodology for continued freight planning and prioritization process for SCDOT and partner planning agencies. These projects are identified in alignment with strategies made for sustained or enhanced partnerships with other agencies in the state, including both public entities and private sector representatives. This is demonstrated in Section 5.55 and allows for the potential leverage of financial resources to both plan and program infrastructure improvements on the public roadway system as well as private infrastructure assets, such as marine terminals, intermodal facilities, airports or railroads.

SCDOT also included data and information available from MPO and other local level freight planning efforts. Drawing from those experiences and resources allowed for aligned SFP and individual freight planning efforts. This is evident in the inclusion of "last mile" considerations in policy and project strategies. Recognizing that not all local projects are of statewide significance, this was considered in the methodology for the identification of the strategic freight network for SC.

7.2 Corridor Level Strategies

In Chapter 2, a list of freight bottlenecks were identified through a preliminary analysis of observed truck counts, feedback from freight stakeholders, travel time data, and TRANSEARCH commodity flow data. This initial list included the following bottleneck locations:

- **I-20:** The I-77 and Clemson Road interchanges are the respective bottleneck points along I-20 during the AM peak hour and PM peak hour. It should be noted that this segment is currently under construction for widening from four to six lanes. In addition, during the PM peak hour, the bottleneck points along I-20 include the three interchanges with Broad River Road, I-26, and U.S. 378.
- **I-26:** In the Columbia area, the I-20 interchange is the primary bottleneck point during the AM peak hour and the I-20 and St. Andrews Road interchanges are the primary bottleneck points during the PM peak hour. In the Charleston area, the U.S. 52 Connector/Ashley Phosphate Road interchange and the merge to I-526 are the primary bottleneck points during the AM

peak hour and the I-526 and Ashley Phosphate Road interchanges are the primary bottleneck points during the PM peak hour.

- I-77: The primary bottleneck point along I-77 southbound is approaching the Forest Drive interchange in the Columbia area every Thursday in the AM peak hour, due to weekly graduation ceremonies of Fort Jackson.
- I-85: The Woodruff Road/I-385 interchange is the primary bottleneck for both directions of I-85 during both the AM and PM peak hours.
- I-126: The I-26 interchange is the primary bottleneck along I-126 westbound during the PM peak hour.
- I-385: The primary bottleneck along I-385 is the interchange with I-85.
- I-526: During the PM peak hour, the primary bottleneck along I-526 eastbound is the I-26 interchange and the primary bottleneck points along I-526 westbound are the I-26 interchange, the merge from Leeds Avenue, and the Paul Cantrell Boulevard interchange.

An additional analysis was conducted to take a more specific look at the supply chain of the South Carolina economy, both spatially and quantitatively. This analysis of key commodities moving into, out of, and through South Carolina by mode, tons, and values identified a series of key goods critical to the supply chain of South Carolina.

Table 7-1 and **Figure 7-1** show the top ten 4-digit commodities based on total tonnage using the supply chain level aggregation method. Truck mode dominates other modes for the top ten 4-digit commodities. Only truck and water modes are used for intra-state movement. Similarities and differences of commodities among movement types can be observed. The top three inbound commodities are Warehouse & Distribution Center, Broken Stone or Riprap, and Primary Forest Materials; for outbound, they are Plastic Material or Synthetic Fibers, Warehouse & Distribution Center, and Primary Forest Materials; for the intra-state direction, they are Broken Stone or Riprap, Warehouse & Distribution center, and Gravel or Sand; and finally, for through, they are Warehouse & Distribution Center, Broken Stone or Riprap, and Concrete Products.

Table 7-2 and **Figure 7-2** show the top ten 4-digit commodities based on value in each mode and movement type. The top three inbound commodities are Warehouse & Distribution Center, Motor Vehicles, and Solid State Semiconductors; for outbound, they are Plastic Material or Synthetic Fibers, Motor Vehicles, and Warehouse & Distribution Center; for the intra-state direction, they are Warehouse & Distribution Center, Plastic Material or Synthetic Fibers, and Rail Intermodal Drayage from Ramp; and for through, they are Warehouse & Distribution Center, Rail Intermodal Drayage from Ramp, and Rail Intermodal Drayage to Ramp. For the inbound and outbound movements, surplus value for outbound and inbound products can be observed; e.g., the Motor Vehicle commodity has higher total outbound value than total inbound value.

Table 7-1: Top Ten 4-Digit Commodities for Supply Chain Level Aggregation (Tonnage)

STCC4	Commodity	Tons (in thousands)						Total
		Rail	Truck	Air	Water	Pipe	Other	
Inbound								
50 1	Warehouse & Distribution Center	0	9,442	0	0	0	0	9,442
14 21	Broken Stone or Riprap	0	3,578	0	0	0	0	3,578
24 11	Primary Forest Materials	0	2,497	0	42	0	0	2,539
29 11	Petroleum Refining Products	10	1,606	0	686	0	0	2,302
28 18	Misc. Industrial Organic Chemicals	514	302	0	733	0	0	1,550
29 12	Liquefied Gases, Coal or Petroleum	0	1,503	0	0	0	0	1,503
14 41	Gravel or Sand	0	1,232	0	170	0	0	1,402
01 42	Dairy Farm Products	0	1,257	0	0	0	0	1,257
29 51	Asphalt Paving Blocks or Mix	0	1,174	0	30	0	0	1,204
33 12	Primary Iron or Steel Products	25	1,152	0	0	0	0	1,176
Outbound								
28 21	Plastic Mater or Synth Fibers	29	12,706	0	33	0	0	12,768
50 1	Warehouse & Distribution Center	0	11,630	0	0	0	0	11,630
24 11	Primary Forest Materials	0	4,013	0	0	0	0	4,014
14 21	Broken Stone or Riprap	0	3,544	0	0	0	0	3,544
14 41	Gravel or Sand	1	3,182	0	0	0	0	3,184
28 18	Misc. Industrial Organic Chemicals	2	2,670	0	7	0	0	2,680
32 71	Concrete Products	0	2,512	0	78	0	0	2,590
32 73	Ready-mix Concrete, Wet	0	1,998	0	0	0	0	1,998
37 11	Motor Vehicles	16	1,425	0	0	0	1	1,443
20 26	Processed Milk	0	1,304	0	0	0	0	1,304
Intra								
14 21	Broken Stone or Riprap	0	22,936	0	0	0	0	22,936
50 1	Warehouse & Distribution Center	0	9,217	0	0	0	0	9,217
14 41	Gravel or Sand	0	6,209	0	0	0	0	6,209
24 11	Primary Forest Materials	0	1,931	0	0	0	0	1,931
32 73	Ready-mix Concrete, Wet	0	1,925	0	0	0	0	1,925
32 71	Concrete Products	0	1,721	0	0	0	0	1,721
29 11	Petroleum Refining Products	0	1,160	0	354	0	0	1,514
28 21	Plastic Mater or Synth Fibers	0	1,415	0	0	0	0	1,415
40 24	Paper Waste or Scrap	0	1,231	0	0	0	0	1,231
14 91	Misc. Nonmetallic Minerals, Nec	0	1,095	0	0	0	0	1,095
Through								
50 1	Warehouse & Distribution Center	0	39,295	0	0	0	0	39,295
14 21	Broken Stone or Riprap	8	9,307	0	110	0	0	9,424
32 71	Concrete Products	0	4,952	0	0	0	0	4,952
50 22	Rail Intermodal Drayage from Ramp	0	4,185	0	0	0	0	4,185
14 41	Gravel or Sand	18	3,999	0	48	0	0	4,065
32 95	Nonmetal Minerals, Processed	110	3,589	0	0	0	0	3,699
26 11	Pulp or Pulp Mill Products	206	3,431	0	2	0	0	3,639
29 11	Petroleum Refining Products	15	2,171	0	1,234	0	0	3,420
24 11	Primary Forest Materials	2	3,391	0	0	0	0	3,392
50 21	Rail Intermodal Drayage to Ramp	0	2,885	0	0	0	0	2,885

Figure 7-1: Top Ten 4-Digit Commodities for Supply Chain Level (Total Tonnage)

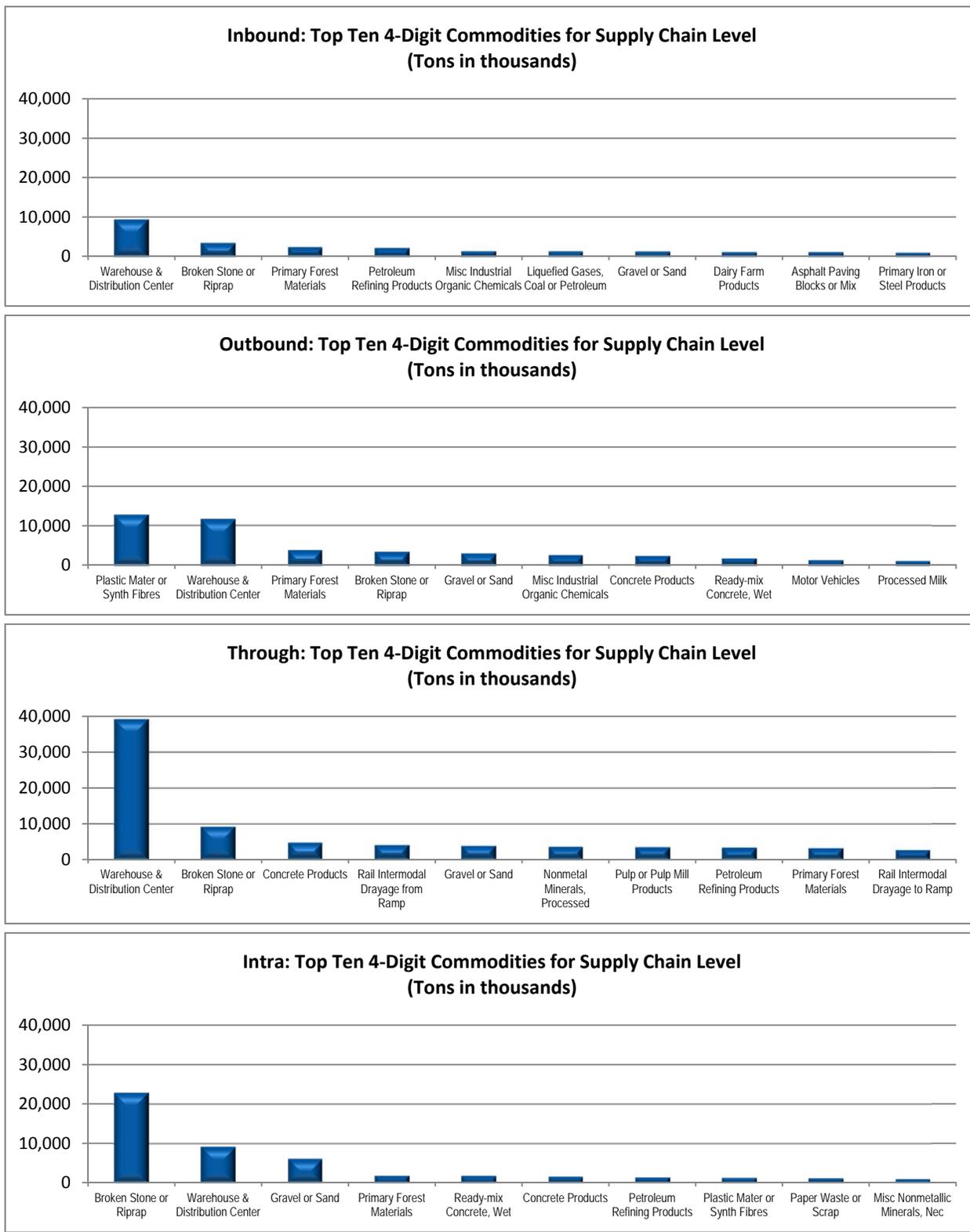


Table 7-2: Top Ten 4-Digit Commodities for Supply Chain Level Aggregation (Value)

STCC4	Commodity	Value (in millions)						Total
		Rail	Truck	Air	Water	Pipe	Other	
Inbound								
50 1	Warehouse & Distribution Center	\$0	\$10,571	\$0	\$0	\$0	\$0	\$10,571
37 11	Motor Vehicles	\$1	\$7,650	\$0	\$0	\$0	\$0	\$7,651
36 74	Solid State Semiconductors	\$0	\$3,748	\$0	\$0	\$0	\$0	\$3,748
37 14	Motor Vehicle Parts or Accessories	\$6	\$3,013	\$0	\$1	\$0	\$395	\$3,414
28 31	Drugs	\$0	\$3,021	\$38	\$18	\$0	\$0	\$3,077
01 51	Live Poultry	\$0	\$2,253	\$0	\$0	\$0	\$0	\$2,253
29 11	Petroleum Refining Products	\$7	\$1,465	\$0	\$591	\$0	\$0	\$2,062
50 22	Rail Intermodal Drayage from Ramp	\$0	\$2,045	\$0	\$0	\$0	\$0	\$2,045
26 21	Paper	\$71	\$1,738	\$0	\$0	\$0	\$0	\$1,809
33 12	Primary Iron or Steel Products	\$20	\$1,565	\$0	\$0	\$0	\$0	\$1,585
Outbound								
28 21	Plastic Mater or Synth Fibers	\$54	\$26,104	\$0	\$60	\$0	\$0	\$26,218
37 11	Motor Vehicles	\$214	\$13,020	\$0	\$8	\$0	\$7	\$13,250
50 1	Warehouse & Distribution Center	\$0	\$13,020	\$0	\$0	\$0	\$0	\$13,020
37 14	Motor Vehicle Parts or Accessories	\$162	\$9,324	\$0	\$0	\$0	\$0	\$9,486
39	Misc. Manufacturing Products	\$0	\$0	\$4,581	\$0	\$0	\$0	\$4,581
30 11	Tires or Inner Tubes	\$1	\$3,635	\$0	\$0	\$0	\$15	\$3,652
22 21	Man-made or Glass Woven Fibre	\$1	\$3,172	\$0	\$1	\$0	\$0	\$3,173
28 31	Drugs	\$0	\$2,983	\$87	\$0	\$0	\$0	\$3,071
35 19	Misc. Internal Combustion Engines	\$2	\$2,944	\$0	\$0	\$0	\$0	\$2,946
28 18	Misc. Industrial Organic Chemicals	\$5	\$2,628	\$0	\$15	\$0	\$0	\$2,647
Intra								
50 1	Warehouse & Distribution Center	\$0	\$10,318	\$0	\$0	\$0	\$0	\$10,318
28 21	Plastic Mater or Synth Fibers	\$0	\$2,905	\$0	\$0	\$0	\$0	\$2,905
50 22	Rail Intermodal Drayage from Ramp	\$0	\$2,896	\$0	\$0	\$0	\$0	\$2,896
50 21	Rail Intermodal Drayage to Ramp	\$0	\$1,830	\$0	\$0	\$0	\$0	\$1,830
29 11	Petroleum Refining Products	\$0	\$1,059	\$0	\$324	\$0	\$0	\$1,383
37 14	Motor Vehicle Parts or Accessories	\$0	\$611	\$0	\$0	\$0	\$0	\$611
01 51	Live Poultry	\$0	\$543	\$0	\$0	\$0	\$0	\$543
01 19	Misc. Field Crops	\$0	\$399	\$0	\$0	\$0	\$0	\$399
32 29	Misc. Glassware, blown or Pressed	\$0	\$359	\$0	\$0	\$0	\$0	\$359
43 11	Mail and Express Traffic	\$0	\$336	\$0	\$0	\$0	\$0	\$336
Through								
50 1	Warehouse & Distribution Center	\$0	\$43,991	\$0	\$0	\$0	\$0	\$43,991
50 22	Rail Intermodal Drayage from Ramp	\$0	\$17,702	\$0	\$0	\$0	\$0	\$17,702
50 21	Rail Intermodal Drayage to Ramp	\$0	\$12,205	\$0	\$0	\$0	\$0	\$12,205
36 74	Solid State Semiconductors	\$1	\$10,943	\$0	\$0	\$0	\$0	\$10,944
37 11	Motor Vehicles	\$419	\$9,185	\$0	\$0	\$0	\$19	\$9,622
28 31	Drugs	\$1	\$9,136	\$95	\$0	\$0	\$0	\$9,232
37 14	Motor Vehicle Parts or Accessories	\$14	\$7,822	\$0	\$1	\$0	\$11	\$7,847
21 11	Cigarettes	\$0	\$6,692	\$0	\$0	\$0	\$0	\$6,692
26 21	Paper	\$161	\$4,772	\$0	\$2	\$0	\$0	\$4,935
35 31	Constr Machinery or Equipment	\$8	\$4,730	\$0	\$0	\$0	\$0	\$4,738

Figure 7-2: Top Ten 2-Digit Commodities for Supply Chain Level (Total Value)



Additional summaries of regional origins and destinations by Bureau of Economic Analysis (BEA) zones were developed, presenting further rankings of commodity types and modal shares. This geospatial analysis of trade patterns by commodity type lead to the identification of key trade corridors necessary for economic sustainability and expansion in the Southeastern United States.

As these BEA-to-BEA commodity flows are directly tied to the route-specific infrastructure required to move the goods, this analysis further highlights the importance of the interstates within South Carolina, for example, for truck transportation. An example of this geospatial analysis is illustrated in **Table 7-3** and **Table 7-4**.

Southeast ports are regional ports and currently there are four container ports in four states within 200 nautical miles of each other. Due to the significant capital investment requirements and more importantly the strategic achievable opportunity to deepen the Charleston harbor to a minimum of 50-feet, South Carolina must enhance the choices available to move freight to and from inland consumption and manufacturing markets. While the Port of Savannah currently has a distance and time advantage to the Atlanta market, South Carolina can take progressive steps to improve our competitive position to serve this key freight area.

These steps will result in enhanced infrastructure opportunities for economically depressed areas that lie along the U.S. 78/278 corridor. Census statistics demonstrate the need for additional economic development and manufacturing opportunities that can be facilitated through additional infrastructure investment.

Enhancing the 78/278 corridor between Charleston and Augusta to I-520/20 will offer South Carolina alternative routes for freight movement that may provide a greater return on investment.

Aligning this analysis with the above listed preliminary list of freight bottlenecks, the following corridors are recommended for priority improvements to preserve and improve freight by truck within South Carolina:

- I-26 between Charleston and Columbia,
- I-385 near Greenville,
- I-85 through the Upstate,
- I-20 through the Columbia metropolitan area,
- I-77 through the Columbia metropolitan area,
- U.S. 17 through the Lowcountry,
- U.S. 78/U.S. 278 through the Lower and Upper Savannah area.

**Table 7-3: The Largest 4-Digit Commodity Movement between BEA Regions in 2011
(Tons in Thousands, Value in \$M)**

		To Region						
		Augusta, GA	Charleston, SC	Charlotte, NC	Columbia, SC	Greenville, SC	Savannah, GA	Wilmington, NC
From Region	Augusta, GA	50 1 Warehouse & Dist. Center Tons / Value Rail Truck 30.2/\$33.8 100.00%/100.00%	01 19 Misc. Field Crops 31.3/\$17.1 100.00%/100.00%	24 11 Primary Forest Materials 50.1/\$6.2 100.00%/100.00%	24 11 Primary Forest Materials 144.1/\$17.9 100.00%/100.00%	50 1 Warehouse & Dist. Center 55.0/\$61.6 100.00%/100.00%	01 19 Misc. Field Crops 13.7/\$7.4 100.00%/100.00%	24 11 Primary Forest Materials 51.8/\$6.4 100.00%/100.00%
	Charleston, SC	50 1 Warehouse & Dist. Center Tons / Value Rail Truck 76.0/\$85.0 100.00%/100.00%	14 21 Broken Stone or Riprap 998.1/\$9.0 1.20%/1.15% 98.80%/98.85%	50 1 Warehouse & Dist. Center 129.4/\$144.9 100.00%/100.00%	29 11 Petroleum Refining Products 938.7/\$863.0 1.94%/2.56% 98.06%/97.44%	50 1 Warehouse & Dist. Center 583.9/\$653.7 100.00%/100.00%	50 1 Warehouse & Dist. Center 55.4/\$62.0 100.00%/100.00%	28 18 Misc. Indus. Organic Chemicals 585.3/\$728.3 99.65%/99.73% 0.35%/0.27%
	Charlotte, NC	32 11 Flat Glass Tons / Value Rail Truck 18.3/\$3.7 100.00%/100.00%	50 1 Warehouse & Dist. Center 61.6/\$69.0 100.00%/100.00%	14 21 Broken Stone or Riprap 315.8/\$2.8 100.00%/100.00%	14 21 Broken Stone or Riprap 1,024.6/\$9.2 100.00%/100.00%	50 1 Warehouse & Dist. Center 107.1/\$119.9 100.00%/100.00%	50 1 Warehouse & Dist. Center 11.4/\$12.8 100.00%/100.00%	14 41 Gravel or Sand 228.1/\$1.8 100.00%/100.00%
	Columbia, SC	14 41 Gravel or Sand Tons / Value Rail Truck 193.1/\$1.5 8.47%/8.27% 91.53%/91.73%	14 21 Broken Stone or Riprap 1,623.8/\$14.4 31.80%/30.85% 68.20%/69.15%	14 41 Gravel or Sand 294.2/\$2.3 100.00%/100.00%	14 21 Broken Stone or Riprap 3,549.1/\$31.9 100.00%/100.00%	14 41 Gravel or Sand 1,290.9/\$9.9 100.00%/100.00%	01 14 Oil Kernels, Nuts or Seeds 60.3/\$13.3 100.00%/100.00%	24 11 Primary Forest Materials 234.9/\$29.2 2.55%/2.54% 97.45%/97.46%
	Greenville, SC	50 1 Warehouse & Dist. Center Tons / Value Rail Truck 74.0/\$82.9 100.00%/100.00%	14 21 Broken Stone or Riprap 366.6/\$3.2 100.00%/100.00%	14 21 Broken Stone or Riprap 178.4/\$1.6 100.00%/100.00%	14 21 Broken Stone or Riprap 1,207.3/\$10.9 100.00%/100.00%	14 21 Broken Stone or Riprap 6,861.0/\$61.7 100.00%/100.00%	50 1 Warehouse & Dist. Center 51.7/\$57.8 100.00%/100.00%	50 1 Warehouse & Dist. Center 223.3/\$250.0 100.00%/100.00%
	Savannah, GA	24 11 Primary Forest Materials Tons / Value Rail Truck 22.1/\$2.8 100.00%/100.00%	32 73 Ready-mix Concrete, Wet 337.7/\$23.3 100.00%/100.00%	24 11 Primary Forest Materials 17.2/\$2.1 100.00%/100.00%	24 11 Primary Forest Materials 79.5/\$9.9 100.00%/100.00%	50 1 Warehouse & Dist. Center 31.5/\$35.3 100.00%/100.00%	32 73 Ready-mix Concrete, Wet 31.8/\$2.2 100.00%/100.00%	24 11 Primary Forest Materials 32.8/\$4.1 100.00%/100.00%
	Wilmington, NC	28 21 Plastic Material or Synth Fibers Tons / Value Rail Truck 32.5/\$66.7 100.00%/100.00%	14 21 Broken Stone or Riprap 1,300.6/\$11.7 100.00%/100.00%	24 11 Primary Forest Materials 92.7/\$11.5 100.00%/100.00%	14 21 Broken Stone or Riprap 823.2/\$7.4 100.00%/100.00%	28 21 Plastic Material or Synth Fibers 509.2/\$1,045.4 100.00%/100.00%	01 14 Oil Kernels, Nuts or Seeds 70.5/\$15.6 100.00%/100.00%	14 41 Gravel or Sand 724.9/\$5.6 100.00%/100.00%

**Table 7-4: The Largest 4-Digit Commodity Movement between BEA Regions in 2040
(Tons in Thousands, Value in \$M)**

		To Region						
		Augusta, GA	Charleston, SC	Charlotte, NC	Columbia, SC	Greenville, SC	Savannah, GA	Wilmington, NC
From Region	Augusta, GA	32 73 Ready-mix Concrete, Wet 63.7/\$4.4	32 73 Ready-mix Concrete, Wet 81.6/\$5.6	24 11 Primary Forest Materials 58.2/\$7.3	24 11 Primary Forest Materials 175.0/\$21.8	24 11 Primary Forest Materials 54.9/\$6.8	40 24 Paper Waste or Scrap 22.2/\$4.6	24 11 Primary Forest Materials 69.1/\$8.6
	Tons / Value Rail Truck	100.00%/100.00%	100.00%/100.00%	100.00%/100.00%	100.00%/100.00%	100.00%/100.00%	100.00%/100.00%	100.00%/100.00%
	Charleston, SC	32 71 Concrete Products 125.9/\$17.5	14 21 Broken Stone or Riprap 7,609.0/\$68.4 0.86%/0.83%	50 1 Warehouse & Dist. Centers 210.3/\$235.5	29 11 Petroleum Refining Products 1,097.7/\$1,007.1 1.32%/1.74%	50 1 Warehouse & Dist. Centers 830.1/\$929.3	50 1 Warehouse & Dist. Centers 89.1/\$99.7	28 18 Misc. Indus. Organic Chemicals 1,108.7/\$1,377.2 98.87%/99.12%
	Tons / Value Rail Truck	100.00%/100.00%	99.14%/99.17%	100.00%/100.00%	98.68%/98.26%	100.00%/100.00%	100.00%/100.00%	1.13%/0.88%
	Charlotte, NC	32 11 Flat Glass 35.7/\$7.3	26 11 Pulp or Pulp Mill Products 93.0/\$36.2	14 21 Broken Stone or Riprap 442.0/\$4.0	14 21 Broken Stone or Riprap 1,472.6/\$13.2	50 1 Warehouse & Dist. Centers 134.0/\$150.0	50 1 Warehouse & Dist. Centers 15.9/\$17.8	14 41 Gravel or Sand 169.7/\$1.3
	Tons / Value Rail Truck	100.00%/100.00%	100.00%/100.00%	100.00%/100.00%	100.00%/100.00%	100.00%/100.00%	100.00%/100.00%	100.00%/100.00%
	Columbia, SC	14 41 Gravel or Sand 422.0/\$3.2 5.79%/5.64%	14 21 Broken Stone or Riprap 1,676.5/\$14.8 37.91%/36.87%	14 41 Gravel or Sand 219.9/\$1.7	14 21 Broken Stone or Riprap 3,371.2/\$30.3	14 41 Gravel or Sand 973.3/\$7.5	01 14 Oil Kernels, Nuts or Seeds 65.0/\$14.4	14 41 Gravel or Sand 322.0/\$2.5
	Tons / Value Rail Truck	94.21%/94.36%	62.09%/63.13%	100.00%/100.00%	100.00%/100.00%	100.00%/100.00%	100.00%/100.00%	100.00%/100.00%
Greenville, SC	50 1 Warehouse & Dist. Centers 160.2/\$179.4	28 21 Plastic Material or Synth Fibers 1,082.7/\$2,222.6	50 1 Warehouse & Dist. Centers 353.2/\$395.4	14 21 Broken Stone or Riprap 1,402.9/\$12.6	14 21 Broken Stone or Riprap 9,226.9/\$82.9	50 1 Warehouse & Dist. Centers 146.5/\$164.0	50 1 Warehouse & Dist. Centers 641.2/\$717.8	
Tons / Value Rail Truck	100.00%/100.00%	100.00%/100.00%	100.00%/100.00%	100.00%/100.00%	100.00%/100.00%	100.00%/100.00%	100.00%/100.00%	
Savannah, GA	29 11 Petroleum Refining Products 92.2/\$84.2	32 73 Ready-mix Concrete, Wet 371.1/\$25.6	50 1 Warehouse & Dist. Centers 101.1/\$113.2	50 1 Warehouse & Dist. Centers 389.1/\$435.6	50 1 Warehouse & Dist. Centers 399.4/\$447.2	50 1 Warehouse & Dist. Centers 71.6/\$80.2	50 1 Warehouse & Dist. Centers 183.5/\$205.5	
Tons / Value Rail Truck	100.00%/100.00%	100.00%/100.00%	100.00%/100.00%	100.00%/100.00%	100.00%/100.00%	100.00%/100.00%	100.00%/100.00%	
Wilmington, NC	50 1 Warehouse & Dist. Centers 152.5/\$170.7	14 21 Broken Stone or Riprap 1,317.6/\$11.8	50 1 Warehouse & Dist. Centers 350.3/\$392.1	14 21 Broken Stone or Riprap 7,103.0/\$63.9	50 1 Warehouse & Dist. Centers 1,369.5/\$1,533.2	50 1 Warehouse & Dist. Centers 147.7/\$165.4	14 41 Gravel or Sand 1,611.7/\$12.4	
Tons / Value Rail Truck	100.00%/100.00%	100.00%/100.00%	100.00%/100.00%	100.00%/100.00%	100.00%/100.00%	100.00%/100.00%	100.00%/100.00%	

7.3 Modal Shift Potential

The SFP stakeholder survey indicates that 71 percent of respondents used truckload for their shipments, 54 percent used less than truckload, 48 percent used container vessels, 18 percent used air, and 6 percent used pipeline. Responses indicate that truck is the preferred mode due to its reliability, safety, access to other modes and specialized transport needs. According to TRANSEARCH database, in 2011, 78 percent of shipments were transported by truck, 20 percent by rail, and 2 percent by air, pipeline and water. Regardless of the data source, it is clear that truck is the preferred mode for goods movement and the demand for truck mobility will continue to grow with the economy of South Carolina. With the recently opened SCPA Inland Port in Greer (October 2013) and the planned Palmetto Railways' Naval Base Intermodal Facility in North Charleston, South Carolina is taking a proactive role in expanding modal options for the transportation industry.

With the understanding that goods movement and model choice for goods movement are largely determined by the private transportation industry, the SFP provides an opportunity to explore additional options for planning for non-highway movement of goods in South Carolina. A modal shift analysis was conducted to evaluate the impact of a range of potential scenario and conditional factors on the likelihood of goods moving from a truck mode to a rail mode of transport. The identified scenarios are provided for illustrative purposes only and are not suggested for adoption.

7.3.1 Intermodal Transportation and Inventory Cost Model Analysis

For this analysis, the Intermodal Transportation and Inventory Cost (ITIC) model was used to assess the impact of the selected policies on modal shift in South Carolina. Scenarios related to truck regulations were not evaluated because the ITIC model does not have the capability to assess the impact of truck hours-of-service, and increasing the truck size and weight would make the truck mode more attractive. For this analysis, the inbound shipments (shipments originated in South Carolina) and outbound shipments (shipments terminated to South Carolina) that utilized truckloads were considered, based upon values reported and estimated by TRANSEARCH. The percentage of local, short haul, and long haul truck trips represent 33 percent, 53 percent and 14 percent of truck movements (inbound and outbound) in 2011, respectively. These percentages are projected to change to 32 percent, 52 percent and 16 percent in 2040. Local and short haul truck trips are not candidates for diversion because their short distances do not allow them to take advantage of the low-cost, long-distance rail transport. Thus, truck movements with potential for diversion are limited to long haul truck movements, which as indicated above represent 16 percent of the truck movements in the state in the year 2040.

Table 7-5 and

Table 7-6 summarize the results of the analysis for inbound and outbound shipments, respectively. The daily truck trips are computed by dividing the annual weight of shipments in tons by the maximum load per truck, which is assumed to be 50,000 lbs., based on the ITIC manual, and dividing that quotient by the number of working days in a year, assumed to be 260. The diversion percentage shown in the last column indicates how effective a scenario may be in influencing modal shift.

Table 7-5: Modal Diversion Potential for Inbound Shipments to South Carolina

Policies	Base Case Results	Scenario Case Results		
	Daily truck trips	Daily truck trips	Truck trips diverted to rail	Diversion (%)
Scenario 1: Do nothing (highway travel time reliability is decreased)	164	164	0	0
Scenario 2: Decrease dwell time at terminal, from 2 days to 1 day.	164	122	42	25
Scenario 3: decrease loading/unloading time at terminal, from 30 minutes to 20 minutes.	164	164	0	0
Scenario 4: Improve rail reliability by 2%	164	162	2	1
Scenario 5: Increase rail speed from 30 to 35 mph.	164	164	0	0
Scenario 6: Reduce rail cost by 1%	164	102	62	38

Table 7-6: Modal Diversion Potential for Outbound Shipments from South Carolina

Policies	Base Case Results	Scenario Case Results		
	Daily truck trips	Daily truck trips	Truck trips diverted to rail	Diversion (%)
Scenario 1: Do nothing (highway travel time reliability is decreased)	237	221	16	7
Scenario 2: Decrease dwell time at terminal, from 2 days to 1 day.	237	119	118	50
Scenario 3: decrease loading/unloading time at terminal, from 30 minutes to 20 minutes.	237	237	0	0
Scenario 4: Improve rail reliability by 2%	237	210	26	11
Scenario 5: Increase rail speed from 30 to 35 mph.	237	237	0	0
Scenario 6: Reduce rail cost by 1%	237	129	108	46

- **Scenario 1** represents the status-quo approach. With this example, it is expected that the growing truck volume will further contribute to highway congestion and thus will reduce highway travel time reliability by 2 percent.
- **Policies 2 and 3** represent scenarios in which funding incentives are provided to terminal operators for infrastructure improvement, in the form of reducing terminal dwell time (from 2 to 1 day) and container loading/unloading time (from 30 to 20 minutes).
- **Policies 4 and 5** represent scenarios where the rail service quality is improved, in the form of higher travel time reliability (i.e. less variation in service time) and higher rail speed (from 30 to 35 mi/hr).
- **Scenario 6** considers the scenario where the rail cost is decreased by 1 percent. It should be noted that in the ITIC model, the rail cost is assumed to be 95 percent of the truck door-to-door cost.

The ITIC model was also used to investigate the modal diversion potentials for I-26, I-95, I-85 and I-20 corridors in South Carolina. In addition to shipments originating and/or terminating within South Carolina, through traffic analysis for these corridors are limited to shipments originated or terminated to North Carolina, Georgia and Florida for the purpose of reasonable influence on planning and implementation strategy.

It is important to remember that the above percentages of truck trips diverted to rail are only on a limited subset of freight movements suitable for diversion as discussed earlier. Table 7-7 provides a summary of the effectiveness of each scenario. It can be seen that Scenario 6 (reduce rail cost by 1 percent) is potentially the most effective in inducing a shift from highway to rail, at both the corridor and state levels. The ITIC model indicates that the corresponding diversion percentages for Scenario 6 are 51 percent and 42 percent. Scenario 6 would require subsidies for the rail mode. Another effective strategy includes Scenario 2 (decrease dwell time at terminal from 2 to 1 day)). Scenario 2 is similar to Scenario 6 in that it would potentially require additional infrastructure investments.

Table 7-7: Summary of Scenario Effectiveness for Modal Shift

Policy	Average diversion % among corridors	Diversion % for entire state
High (Diversion > 40%)		
Scenario 6: Reduce rail cost by 1%	51%	42%
Moderate (20% < Diversion ≤ 40%)		
Scenario 2: Decrease dwell time at terminal, from 2 days to 1 day	40%	38%
Low (diversion ≤ 20%)		
Scenario 4: Improve rail reliability by 2%	4%	6%
Scenario 1: Do nothing (highway travel time reliability is decreased)	2%	3.5%
Scenario 5: Increase rail speed from 30 to 35 mph	0%	0%
Scenario 3: decrease loading/unloading time at terminal, from 30 minutes to 20 minutes	0%	0%

7.4 Framework for Continuing Freight Planning

In addition to freight policy strategies outlined in Chapter 5, the following provides a general framework for continuing freight planning in South Carolina.

7.4.1 State Rail Plan

A State Rail Plan follows a formula of data inventory, analyses and strategies as prescribed by the FRA. For planning purposes in South Carolina, an integrated planning process, as conducted with the SC MTP, is recommended for future updates to both the State Rail Plan and the SFP. While limitations in governance and funding exist, both plans mutually benefit from synergistic stakeholder engagements, data collections and analyses, and collaborative strategies and project identification. Avoiding redundancy in effort and data prevent wasted planning funds, and preventing contradiction in strategies should minimize the potential for conflict in plan implementation.

7.4.2 Long Range Statewide Multimodal Transportation Plan (SC MTP)

Similar to a State Rail Plan, a Long Range Statewide Transportation Plan benefits from the combined effort of developing a SFP. A collaborative, iterative planning process that utilizes a common data set

and common set of assumptions allows the planning team to align goals and objectives with analyses with final strategies. It is recommended that the SFP be a tool for future project identification, project prioritization, and project funding scenario planning.

7.4.3 Metropolitan Area Freight Plans

The SFP should be available for use by MPO level planners when developing local LRTPs and urban freight plans. These data inputs and assumptions allow for aligned goals and objectives as well as statewide priorities for project prioritization. This also provides data resources for local planners, often without such resources, to identify regional freight needs. This supports local, “last mile” planning challenges and opportunities. This SFP should also provide a tool for state level planners to review local freight plans for alignment in priority.

7.4.4 Plans for Adjacent States

Goods movement is rarely guided or limited by geopolitical boundaries. With the guidance of MAP-21, states should be developing SFPs across the country. Making the South Carolina SFP available to neighboring states benefits all parties in data sharing, project prioritization, and opportunities for collaboration in planning for major regional freight supportive projects. Historically, projects of regional significance, such as interstate widening, high speed rail, or other major investments benefit from multijurisdictional planning, cooperation and funding. As demonstrated throughout the SFP, commodity flow data reflect significant influence from goods movements throughout the Southeastern United States and beyond. Collaborative planning makes for more effective use of freight transportation dollars.

More specifically, this SFP provides input to future multi-state freight corridor plans for both highway and rail movements. This also supports freight planning efforts for metropolitan areas on or near state borders, such as Charlotte, NC, Augusta, GA, and Savannah, GA and as far as Atlanta, GA or Jacksonville, FL.

7.4.5 Collaborative Planning Throughout Supply Chain

As partner agencies, such as SCPA and Palmetto Railways, proceed with projects like the Inland Port in Greer, SC and the NBIF in North Charleston, SC, SCDOT should preserve and enhance the collaborative planning efforts with these agencies. As those projects become operating pieces of the supply chain in South Carolina, SCDOT should closely monitor their performance, as well as the performance of the roadway and rail systems supporting them. Close attention should be paid to the role those facilities play in the trends in goods movements and modal share of goods movement in the state. This will allow planners to prioritize appropriate transportation funding to preserve the freight infrastructure of South Carolina and remain flexible to the changing trends in distribution patterns.