REGIONAL FREIGHT TRANSPORTATION PLAN UPDATE

EXISTING AND FUTURE FREIGHT AND GOODS MOVEMENT ASSESSMENT

OCTOBER 2022

CORE
COASTAL REGION MPO

Regional Freight Transportation Plan Update

Existing and Future Freight and Goods Movement Assessment

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Table of Contents

1 Introduction 1
1.1 Existing Plans and Studies Impacting Freight 1
Georgia Department of Transportation (GDOT) Freight and Logistics Plan Update, 2013 1
GDOT Georgia State Rail Plan, 2020 2
CORE MPO Metropolitan Transportation Plan, 2020 3
CORE MPO Regional Freight Transportation Plan, 2016 4
SR 307 Corridor Study, 2021 4
SR 21 Access Management Study, 2021 5
Effingham County Transportation Master Plan, 2021 5
2 Commodity Flow Analysis 7
2.1 Directional Split 7
2.2 Top Commodities 9
All Directions 9
Inbound and Outbound Shipments 11
2.3 Top Trading Partners 14
Intrastate Trading Partners 14
Interstate Trading Partners 16
International Trading Partners 18
2.4 Modal Split 19
Truck 20
Rail 24
Water 27
Air 30
3 Freight Activity Patterns 33
3.1 Routing of Truck and Rail Commodity Flows 33
Truck Commodity Flows 33
Rail Commodity Flows 40
3.2 Truck Origin-Destination Patterns 57
Truck Trips in the Study Area 57
Truck Trips at the Port of Savannah 61
4 Freight Transportation and Warehousing Facilities 66
5 Summary 72

List of Tables

Table 2.1 CORE MPO International Trade Summary 18
Table 2.2 Average Value per Ton by Mode 20
Table 3.1 Train Movements at At-Grade Crossings Near the Port of Savannah 47
Table 4.1 Transportation and Warehousing in the CORE MPO Region 68

List of Figures

Figure 2.1 CORE MPO Tons by Direction, 2019 and 2050 8
Figure 2.2 CORE MPO Value by Direction, 2019 and 2050 9
Figure 2.3 Top Commodities by Tonnage, 2019 and 2050 10
Figure 2.4 Top Commodities by Value, 2019 and 2050 11
Figure 2.5 Top Inbound Commodities by Tonnage, 2019 and 2050 12
Figure 2.6 Top Inbound Commodities by Value, 2019 and 2050 12
Figure 2.7 Top Outbound Commodities by Tonnage, 2019 and 2050 13
Figure 2.8 Top Outbound Commodities by Value, 2019 and 2050 14
Figure 2.9 Top Intrastate Trading Partners by Inbound and Outbound Tonnage, 2019 and 2050 15
Figure 2.10 Top Intrastate Trading Partners by Inbound and Outbound Value, 2019 and 2050 16
Figure 2.11 Top Interstate Trading Partners by Inbound and Outbound Tonnage, 2019 and 2050 17
Figure 2.12 Top Interstate Trading Partners by Inbound and Outbound Value, 2019 and 2050 18
Figure 2.13 CORE MPO Tons by Mode, 2019 and 2050 19
Figure 2.14 CORE MPO Value by Mode, 2019 and 2050 20
Figure 2.15 CORE MPO Truck Tons by Direction, 2019 and 2050 21
Figure 2.16 CORE MPO Truck Value by Direction, 2019 and 2050 22
Figure 2.17 Top Truck Commodities by Tonnage, 2019 and 2050 23
Figure 2.18 Top Truck Commodities by Value, 2019 and 2050 23
Figure 2.19 CORE MPO RailTons by Direction, 2019 and 2050 24
Figure 2.20 CORE MPO Rail Value by Direction, 2019 and 2050 25
Figure 2.21 Top Rail Commodities by Tonnage, 2019 and 2050 26
Figure 2.22 Top Rail Commodities by Value, 2019 and 2050 26
Figure 2.23 CORE MPO Water Tons by Direction, 2019 and 2050 27

Figure 2.24 CORE MPO Water Value by Direction, 2019 and 2050 28
Figure 2.25 Top Water Commodities by Tonnage, 2019 and 2050 29
Figure 2.26 Top Water Commodities by Value, 2019 and 2050 29
Figure 2.27 CORE MPO Air Tons by Direction, 2019 and 2050 30
Figure 2.28 CORE MPO Air Value by Direction, 2019 and 2050 31
Figure 2.29 Top Air Commodities by Tonnage, 2019 and 2050 32
Figure 2.30 Top Air Commodities by Value, 2019 and 2050 32
Figure 3.1 CORE MPO Truck Units by Direction, 2019 and 2050 33
Figure 3.2 Truck Flows in the CORE MPO Region, 2019 35
Figure 3.3 Truck Flows in the CORE MPO Region, 2050 36
Figure 3.4 Routed Truck Tonnage in the CORE MPO Region, 2019 38
Figure 3.5 Routed Truck Tonnage in the Core MPO Region, 2050 39
Figure 3.6 CORE MPO Rail Units by Direction, 2019 and 2050 40
Figure 3.7 Rail Flows in the CORE MPO Region, 2019 41
Figure 3.8 Rail Flows in the CORE MPO Region, 2050 42
Figure 3.9 Routed Rail Tonnage in the CORE MPO Region, 2019 44
Figure 3.10 Routed Rail Tonnage in the CORE MPO Region, 2050 45
Figure 3.11 At-Grade Rail Crossings Near the Port of Savannah 46
Figure 3.12 Train Volumes at At-Grade Crossings Proximate to the Port of Savannah 48
Figure 3.13 Heatmap of Train Volumes at At-Grade Crossings Proximate to the port of savannah 49
Figure 3.14 Port of Savannah Rail Tonnage by Traffic Type, 2019 and 2050 50
Figure 3.15 Port of Savannah Rail Units by Traffic Type, 2019 and 2050 51
Figure 3.16 International Rail Flows in the CORE MPO Region, 2019 52
Figure 3.17 International Rail Flows in the CORE MPO Region, 2050 53
Figure 3.18 International Routed Rail Tonnage in the CORE MPO Region, 2019 55
Figure 3.19 International Routed Rail Tonnage in the CORE MPO Region, 2050 56
Figure 3.20 Average Daily Truck Trips by County in the Study Area, 2019 57
Figure 3.21 Heavy Truck Trips to or from the Study Area 59
Figure 3.22 Medium Truck Trips to or from the Study Area 60
Figure 3.23 Time of Day Distribution of Daily Average Truck Trips to or from the Study Area 61
Figure 3.24 Average Daily Truck Trips by County to and From the Port 62
Figure 3.25 Heavy Truck Trips to or from the Port of Savannah 63
Figure 3.26 Medium Truck Trips to or from the Port of Savannah 64
Figure 3.27 Time of Day Distribution of Truck Trips to or from the Port of Savannah 65
Figure 4.1 Warehouses in the Savannah Region 67
Figure 4.2 Transportation and Warehousing in the CORE MPO Region 69
Figure 4.3 Joint Development Authority Industrial Sites in the CORE MPO Region 71

1 INTRODUCTION

The Coastal Region Metropolitan Planning Organization (CORE MPO) region serves a gateway for global trade and for freight movement in the Southeast, due in large part to the Port of Savannah – the nation's 4th largest container port. In addition to the Port of Savannah, the region contains a comprehensive multimodal network of freight railroads and railyards, major highways, cargo-serving airports, as well as a substantial warehousing/distribution/logistics industry to manage freight movements over that network. In addition, the region is an emerging manufacturing hub for businesses looking to create and ship a diverse portfolio of finished products to clients around the globe. Overall, goods movement in the Savannah region has a major impact on the regional and state economy.

In support of the region's multimodal freight network and the people and businesses that rely on it, the CORE MPO is conducting an update of its Regional Freight Transportation Plan. The purpose of this technical memorandum is to perform an assessment of existing and future freight movements throughout the region. There are three main components to the assessment: (1) commodity flow analysis, (2) freight activity pattern analysis, (3) and an inventory of warehouses/distribution centers and freight transportation facilities. Collectively, these analyses provide a comprehensive picture and existing goods movement in the region and how they may evolve over the long-term.

1.1 Existing Plans and Studies Impacting Freight

In recent years, there have been several studies performed at the statewide or regional levels that have an impact on freight in the CORE MPO region. This section of the report provides a brief overview of recent studies that are particularly relevant for understanding existing and future freight movements throughout the region.

Georgia Department of Transportation (GDOT) Freight and Logistics Plan Update, 2013

The GDOT Statewide Freight and Logistics Action Plan was completed in 2013. The plan performed an assessment of the State's multimodal freight needs and provided a strategy for addressing those needs. It was conducted in conjunction with the private sector to facilitate a strategic, business-oriented approach to develop specific freight and logistics improvement solutions with the largest economic returns. The Plan integrated freight modes into GDOT activities and serves as an economic development tool for marketing Georgia and growing jobs and investment. It should be noted that GDOT has begun the process of updating the statewide freight plan.

Some key findings from the Georgia Freight and Logistics Action Plan include the following:

- Trucking is the dominant mode of moving freight in Georgia and is expected to continue to be the dominant mode over the long term. It is also the primary connecting mode for marine, rail, and air cargo to final destinations in Georgia. The trucking industry experiences a significant amount of congestion, primarily but not limited to Metro Atlanta, where both long-haul and local/distribution truck traffic are the highest. This congestion is forecast to get more severe (in terms of delay per vehicle), longer (in terms of the duration of peak periods), and more prevalent on the interstate corridors that connect Atlanta with key trading partners including the CORE MPO region.

- The Port of Savannah is the key distinguishing feature of the freight infrastructure in Georgia. It has been successful in capturing discretionary container traffic along the East Coast and boosting Georgia's economy. Deepening the Savannah Harbor and channel to accommodate the larger ships is critical to maintaining this distinction. To maximize Georgia's full potential to move marine cargo in the longer term, an additional port in Jasper County, South Carolina will be needed along with expansion of the rail and road connections to both the Port of Savannah and the Jasper Port.

- The Georgia Freight and Logistics Action Plan determined that by investing $18-$20 billion over the next 40 years in freight improvement projects, the State could generate over $65 billion in additional economic output and thousands of new jobs. This includes investments in the CORE MPO region such as the I-16/I-95 interchange reconstruction.

GDOT Georgia State Rail Plan, 2020

The GDOT Georgia State Rail Plan was developed for the purpose of guiding the state's freight and passenger rail transportation planning activities and project development plans for the next 20 years. The 2020 Georgia State Rail Plan provided updates to the 2015 Plan on conditions that have changed and important short-term and long-term opportunities for investment including:

- The increasing demand for passenger and freight rail services;

- Upgrades to state owned rail to ensure economic competitiveness; and

- Supporting operational improvements to maximize efficiency of the rail network and multimodal connections.

A key finding of the 2020 Georgia State Rail Plan was that the state's position in freight rail has risen since the 2015 State Rail Plan was completed. Georgia increased in ranking among states in terms of number of freight railroads, originated rail tons, and originated rail carloads. The 2020 State Rail Plan also found that while total freight rail tonnage had decreased, the number of rail carloads had increased with the rise of intermodal traffic in the state.

Additionally, the 2020 Georgia State Rail Plan identified some key opportunities related to freight rail that would impact the CORE MPO region:

- **Sea and Inland Ports.** Continued investment in rail connectivity to ports drives the capacity and ability of the rail and port network to increase job growth, attract new commerce, and sustain economic competitiveness.

- **Blocked Crossings.** Extended blockages of highway-rail crossings create mobility and safety issues. Eliminating or reducing these blockages is a key freight rail investment area for the state.

- **Short Line Improvements.** Investments that upgrade the infrastructure of the short line rail network (such improved weight capacity to handle 286,000-lb. axle loads) would boost rural economic development and help to divert freight traffic from the state's highway network.

- **Increasing the Usage of Freight Rail.** A single freight train can remove several hundred trucks from Georgia's highways leading to reduced greenhouse gas emissions and improved safety (i.e., the rate of fatalities per ton-mile for rail is substantially lower than trucking).

The 2020 State Rail Plan's emphasis on improving the efficiency and usage of freight rail would impact freight-intensive industries in the study area as well as the Port of Savannah. The 2020 State Rail Plan noted that logistics and supply chain is a key industry supported by rail in Georgia and there are several warehouses and distribution centers located throughout the study area.

CORE MPO Metropolitan Transportation Plan, 2020

Mobility 2045 is the CORE MPO Metropolitan Transportation Plan that serves as a guide for comprehensive, cooperative, and continuing transportation planning throughout the Coastal Region MPO planning area. The plan defines the vision to meet travel demands expected over the next 26 years with a focus on supporting a planning process that incorporates community values, needs, land use, and modal alternatives. It should be noted that the CORE MPO is in the process of updating its long-range plan – Mobility 2050.

Mobility 2045 was guided by the following goal areas, many of which specifically include freight in their definitions or in their supporting objectives:

- **System Performance.** An efficient, reliable, multi-modal transportation system that supports economic competitiveness and enhances tourism.
- **Safety and Security.** A safe, secure, and resilient transportation system for all types of users and for freight.
- **Accessibility, Mobility and Connectivity.** Access and mobility, equitably and reliably available, for people and for freight, through a range of travel options and an integrated, connected transportation system.
- **Environment and Quality of Life.** Healthy sustainable environment through the compatible integration of land use and transportation while taking into consideration the impact of transportation including that of stormwater.
- **State of Good Repair.** Maintain a state of good repair.
- **Intergovernmental Coordination.** Wise use of public funds through coordination and a performance-based planning process.

Mobility 2045 recognized that the movement of freight and goods, especially from the Port of Savannah, will continue to greatly impact the region's transportation network. Although the roadway network is the primary mode over which freight is moved, the region also relies on its rail network and its various operators to efficiently move freight to and from the region. Many of the recommendations developed as part of the CORE MPO's 2015 Regional Freight Transportation Plan were incorporated into Mobility 2045.

CORE MPO Regional Freight Transportation Plan, 2016

The CORE MPO Regional Freight Transportation Plan was prepared in 2016 to provide the region's long-term blueprint for enhancing freight mobility across the Savannah region and improving its economic competitiveness. The plan assessed freight transportation assets, identified needs, and provided recommendations for achieving the region's vision and goals for freight.

A key finding of the 2016 Regional Freight Transportation Plan was that freight traffic and freight-oriented land use developments would continue to grow in the region over the long term. Furthermore, this growth would exacerbate the region's current freight-related challenges. The 2016 Regional Freight Transportation Plan also identified some specific corridors and areas that should be the focus of improvements. Examples include SR 21 which was identified as a top ten crash hotspot. SR 307, SR 21, and Brampton Road along with other corridors providing primary access to the Port of Savannah were identified as freight bottlenecks. US 17 through Richmond Hill and the SR 21/I-95 interchange were also identified as hotspots for congestion. In addition, the communities surrounding SR 21 and adjacent to the Port of Savannah were identified as environmental justice areas.

The 2016 Regional Freight Transportation Plan made several recommendations regarding land use and freight infrastructure improvements. Some key recommendations included:

- Develop an ITS/Traffic Messaging System for communication with trucks to utilize alternative routes on the freight transportation network.
- Develop corridor signal timing on major truck routes – example GDOT Regional Traffic Operations Program (RTOP). RTOP candidates for the CORE MPO region would include US 80, SR 21, and SR 307.
- Develop a wayfinding system between Port of Savannah and interstate corridors.
- Continue the CORE MPO Freight Advisory Committee (FAC).

SR 307 Corridor Study, 2021

The SR 307 Corridor Study was completed in 2021 and focuses on SR 307 between SR 25/US 17/Ogeechee Road to the south and SR 25/Coastal Highway at the Port of Savannah's Garden City Terminal to the north. As a freight corridor that serves as a primary artery to the Georgia Ports Authority's (GPA) Garden City Terminal, SR 307 is a critical component of the region's economic and community vitality. In addition, the corridor serves not just as a gateway to the Port of Savannah and adjacent activity centers, but also as a required point of passage to and from downtown Savannah. The SR 307 Study focused on maintaining mobility and safety along the corridor to promote the long-term success of the surrounding area. More specifically, the primary goals and objectives of the SR 307 Corridor Study were:

- Identify and prioritize short-term (0-5 Years) and long-term (5+ Years) improvement projects needed for the SR 307 corridor to operate at an acceptable level of service.
- Prioritize recommended improvements to facilitate planning and programming of projects through the CORE MPO Metropolitan Transportation Plan (MTP) process.

- Justify the future programming of projects in the CORE MPO's Transportation Improvement Program (TIP) and Total Mobility Plan.

One key finding of the study was that bottlenecks at SR 26/US 80/Louisville Road and SR 21/Augusta Road are likely to continue to contribute to significant delays for freight and passenger vehicle trips traversing the corridor during the peak periods of the day. Another key finding was that existing crash history suggests that peak hour congestion may contribute to a high frequency of rear-end collisions at these locations. The crash data also indicated that a lack of access management and conflicts between the tractor-trailer and commuting passenger car traffic streams result in SR 307 between Pine Meadow Drive and Robert B. Miller Road being particularly susceptible to collisions. The SR 307 Corridor Study developed several project recommendations for addressing safety and mobility needs along the corridor.

SR 21 Access Management Study, 2021

The SR 21 Access Management Study was completed in 2021 and focuses on SR 21/Augusta Road from SR 25/Burnsed Boulevard to Grange Road. SR 21 is a major thoroughfare that provides access to the Port of Savannah, I-95, and I-516. It is characterized by the presence of freight-oriented land uses (including industrial and warehousing developments) along with low density retail, restaurants, and grade schools. Furthermore, the Savannah Chatham County Public School System is constructing a new K-12 campus along the corridor. The purpose of the SR 21 Access Management Study was to analyze existing and future roadway conditions and provide recommendations to address the corridor's operations and safety, multimodal improvements, streetscape elements, and economic development.

One key finding of the SR 21 Access Management Study was that as much as 40 percent of the roadside is given over to curb cuts including driveways and intersection openings. Portions of the corridor have driveway densities as high as 79 driveways per mile. That means there are turning and deceleration conflicts occurring along the entire length of the segment which impacts all roadway users including freight vehicles. Another key finding was that crashes along the corridor exceeded statewide averages for similar roadways, indicating that safety is a particular concern for the corridor. The SR 21 Access Management Study developed several project recommendations for addressing safety and mobility needs along the corridor. Among them, it recommended that the existing two-way-left-turn lane between Minus Avenue and Smith Avenue be replaced with a raised landscaped median to improve safety and access management along the corridor.

Effingham County Transportation Master Plan, 2021

Since 1960, Effingham County has experienced substantial and accelerating growth in both industry and population, growing from around ten thousand residents in 1960 to over sixty-five thousand today. This growth is showing no sign of slowing as Effingham County is estimated to have grown by over twenty-five percent from 2010 to 2020, the sixth-fastest growing county in the state (on a percentage basis). This growth has already begun to put a substantial strain on Effingham County's transportation network, increasing congestion and safety concerns along its roadways. The Effingham County Transportation Master Plan outlined recommended improvements to address the County's current and future transportation needs.

The Master Plan noted that the dynamics of freight movement throughout Effingham County are of special concern. Much of the economic activity in Effingham County is linked – directly or indirectly – to activities at the Port of Savannah or to the Norfolk Southern and CSX rail lines that run through the county. Recently Effingham County enacted a truck route ordinance which focuses truck traffic on specific routes with the appropriate characteristics and facilities to support them. Furthermore, the Master Plan observed that large

concentrations of freight-related employment follow the County's freight corridors. However, access to these corridors is increasingly limited and does not provide direct, simple access to properties along the rail lines near the center of the county.

Some key recommendations from the Effingham County Transportation Master Plan for addressing freight and other needs include:

- Thirty-one intersection projects ranging from additional turn lanes to new traffic signals.
- An expansion of the freight network throughout the County and projects to improve existing roadways to connect SR 17, SR 21, SR 119, and Effingham Parkway.
- Increased network including new routes parallel to SR 21 and Blue Jay Road to provide redundancy and improve reliability.
- Improved connectivity to areas outside the County including a new connection west to improve connectivity to I-16 and a widening of SR 21 towards I-95 and the Port of Savannah.
- Countywide bicycle and pedestrian facilities connecting the Cities of Guyton, Springfield, and Rincon, improving quality of life and providing alternative ways to move around the county.

2 COMMODITY FLOW ANALYSIS

The needs of the Savannah region's freight system are driven by both the current and future demand for freight transportation. Overall, in 2019 about 163 million tons of freight worth $367 billion were transported to, from, within, or through the CORE MPO Region. This is projected to more than double in 2050 and grow to over 392 million tons worth $895 billion.

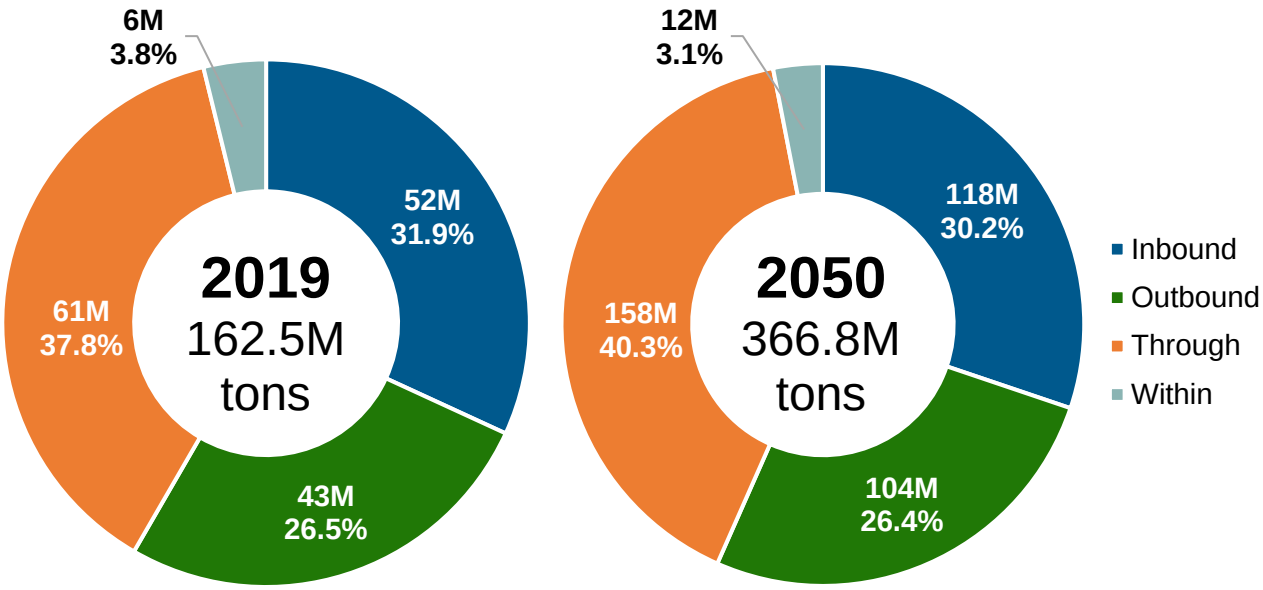
This chapter examines the demand for freight transportation services in the CORE MPO region by analyzing the commodities flows underlying that demand. The analysis examines flows of goods by truck, rail, water, and air freight modes. This includes analyzing how and where the commodities moved and the region's predominant trading partners across three geographies: within Georgia, within the United States, and internationally.

It is important to note that two data sources were used to complete this analysis: S&P Global's TRANSEARCH and the U.S. Census Bureau's USA Trade Online. TRANSEARCH was the primary data source. This database consists of commodity flows by mode for a 2019 base year and a 2050 horizon year. As TRANSEARCH only reports international trade between United States-Mexico-Canada Agreement (USMCA) nations, this data was supplemented with information from USA Trade Online. The U.S. Census Bureau's USA Trade Online database contains information on all U.S. international trade and is compiled from multiple sources including the following: Electronic Export Information (EEI); automated data submitted through the U.S. Customs' Automated Commercial System; and information compiled from import entry summary forms, warehouse withdrawal forms, and Foreign Trade Zone documents. Data on 2019 international trade via water and air for the CORE MPO region were collected and incorporated into the analysis. Since the USA Trade Online database contains current and historical trade data only, 2050 horizon year international commodity flow estimates for the study area were produced using commodity-specific growth rates derived from the TRANSEARCH database.

2.1 Directional Split

Figure 2.1 shows the flow of goods by tonnage across the study region by direction in 2019 and 2050. In 2019, almost 38 percent of all freight tonnage was moved through the region without making a stop. Through movements accounted for the largest share of tonnage. This is due, in large part, to freight shipments traveling along I-95 as it provides access to Florida and major population centers along the east coast. The prevalence of through movements is also due to the region's rail network as CSX Transportation and Norfolk Southern have main lines traversing the study area.

FIGURE 2.1 CORE MPO TONS BY DIRECTION, 2019 AND 2050



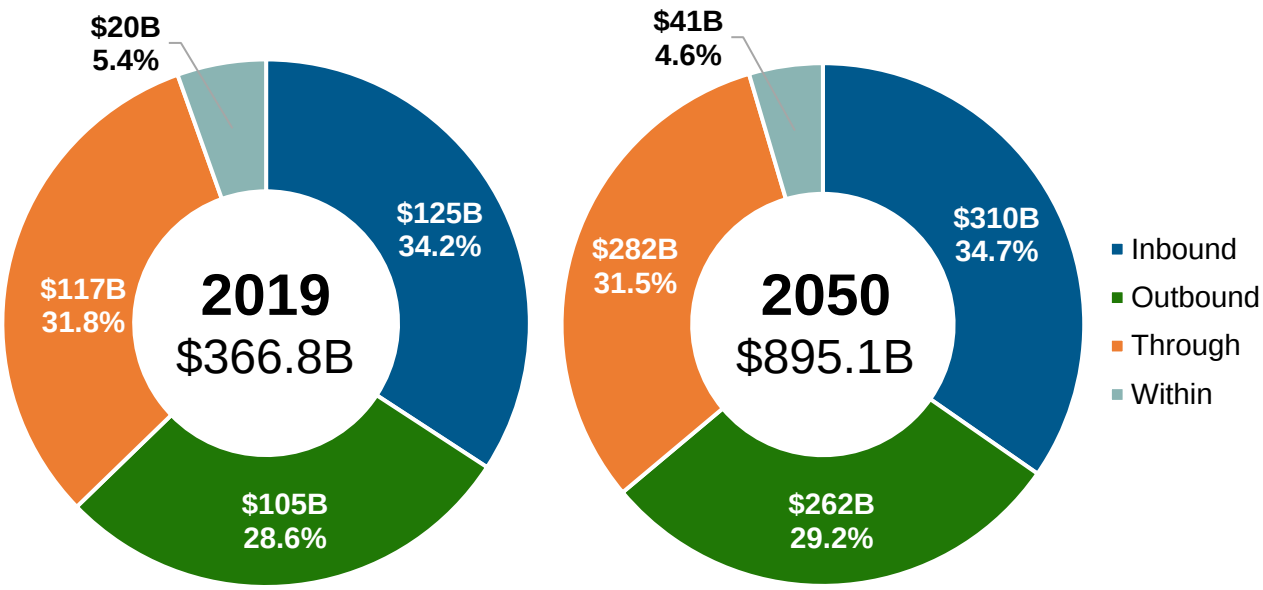
Source: TRANSEARCH; U.S. Census Bureau, USA Trade Online; Cambridge Systematics, Inc. analysis.

Inbound shipments accounted for the next highest share of goods by total tonnage. They represented 32 percent of total tons in 2019. Outbound shipments represented 27 percent of goods in 2019. About 4 percent of tonnage has an origin or destination within the region.

By 2050, the proportions of tonnage by direction are projected to remain largely consistent with 2019 values. Through tonnage will have grown 2.5 percent to over 40 percent by 2050, while the remaining directions will have decreased slightly from their respective 2019 percentages. Inbound shipments are estimated to still exceed outbound shipments in terms of total tonnage, but the gap between them will shrink from about 5.4 percentage points in 2019 to 3.8 percentage points in 2050.

Figure 2.2 shows the breakdown of freight movements in the CORE MPO region by direction with respect to value for 2019 and 2050. By value, inbound shipments comprise the highest share of value by direction with about 34 percent in 2019. Through movements comprise the next highest share at nearly 32 percent. Outbound and within shipments make up approximately 29 percent and 5 percent of total value. That the share by total value of inbound, outbound, and inbound shipments exceed their shares by total tonnage implies that those goods have a higher average value per ton of freight than those that pass through the region without stopping. Outbound freight falls into a similar category of having a higher percentage of freight value in each year than freight tonnage. 2050 projections of value by direction are largely consistent with the 2019 results.

FIGURE 2.2 CORE MPO VALUE BY DIRECTION, 2019 AND 2050



Source: TRANSEARCH; U.S. Census Bureau, USA Trade Online; Cambridge Systematics, Inc. analysis.

2.2 Top Commodities

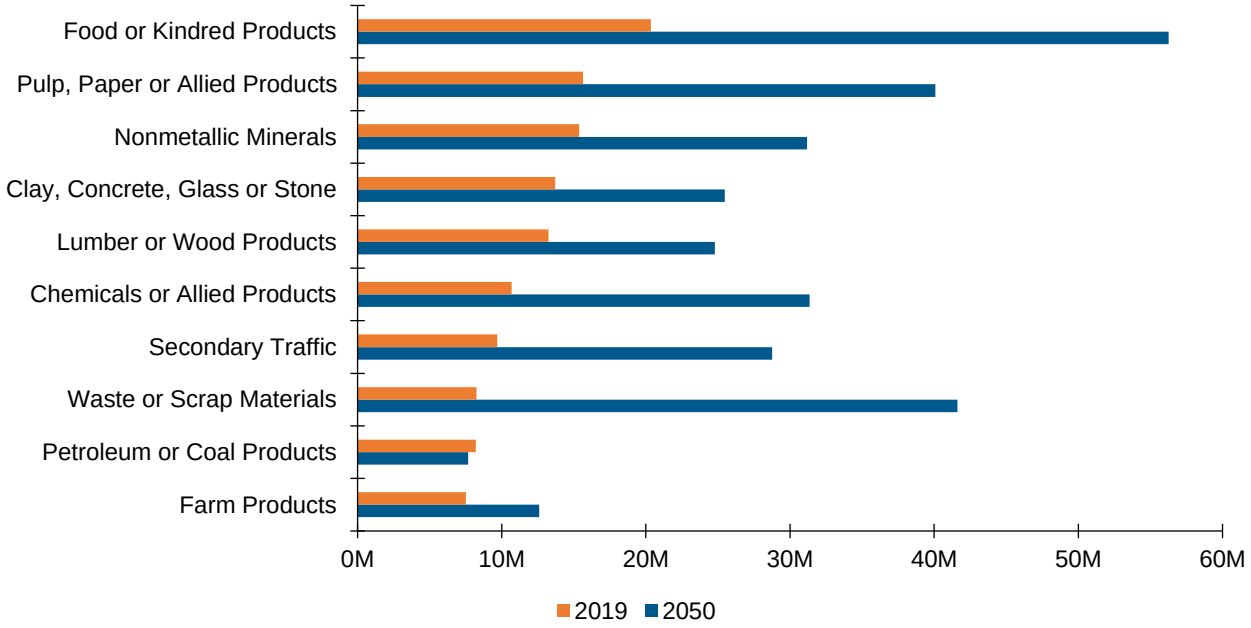
All Directions

The top commodities by total tonnage across all directions for 2019 and 2050 are shown in Figure 2.3. In 2019, "food or kindred products" was the largest commodity type shipped in the CORE MPO region. Over 20 million tons of food or kindred products was transported in the region, which accounts for about 12.5 percent of the total tonnage in 2019. This commodity includes goods such as meat, milk, fruits, vegetables, and flour, among others. This is followed by "pulp, paper, or allied products" and "nonmetallic minerals" (e.g., gravel, sand with about 15 million tons each. Many of these commodities can be linked to major industry sectors in the coastal region and throughout Georgia. For example, forestry is a significant industry throughout Georgia with multiple lumber mills processing logs from harvested timber. Paper and paper products is another example as there processing facilities in the CORE MPO region and in nearby Liberty County. Other commodities – such as nonmetallic minerals and "clay, concrete, glass, or stone" – represent bulk goods that tend to account for higher shares of tonnage.

By 2050, nearly all of the 2019 top 10 commodities are projected to increase in magnitude. However, this growth will not be distributed evenly among the top commodities. "Clay, concrete, glass, or stone" is the fourth-highest commodity by tonnage in 2019 and will only grow 86 percent from 2019 to 2050. Other commodities are projected to grow substantially such as "chemicals or allied products" (e.g., soap, paints, drugs) by 193 percent and "secondary traffic" (e.g., shipments between warehouses and distribution centers) by 197 percent. The largest-growing commodity is "waste or scrap materials," which will grow 404 percent from 8.2 million tons in 2019 to 42 million tons in 2050. This is projected the become the second-highest commodity by tonnage in 2050 and account for 11 percent of total tonnage. Food or kindred products will remain the most common commodity by tonnage. Notably, "petroleum or coal products" (which does not

include lump coal but instead includes paving and roofing materials and refined petroleum products such as fuels and liquefied gases) are projected to decrease in total tonnage by about 5 percent.

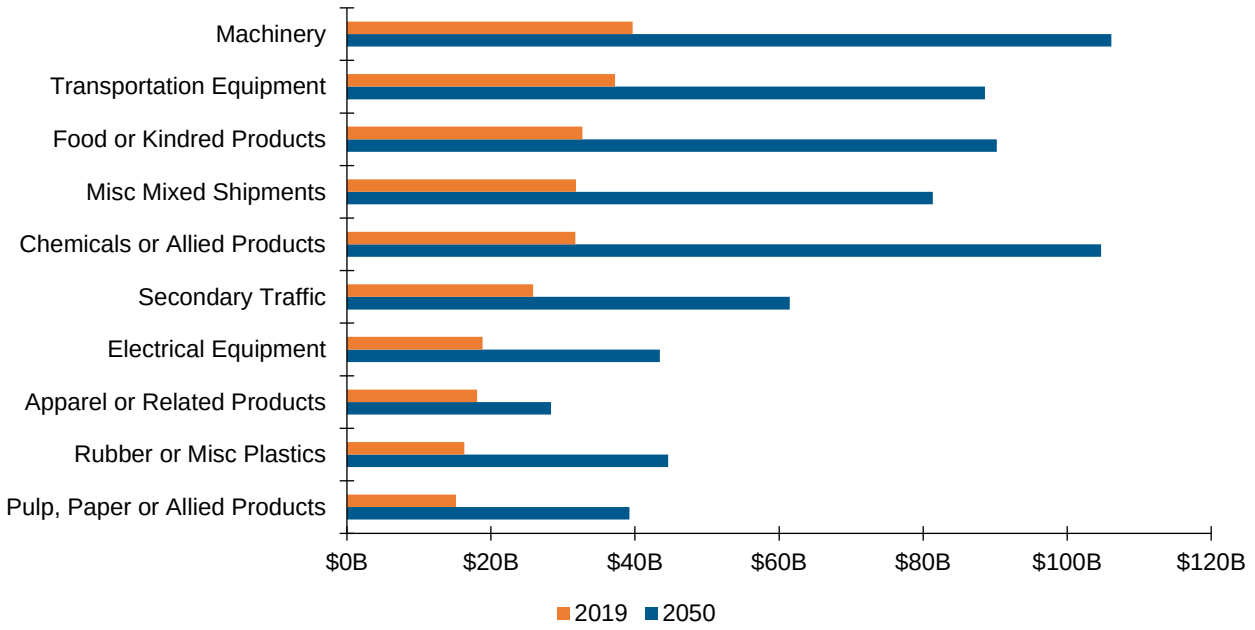
FIGURE 2.3 TOP COMMODITIES BY TONNAGE, 2019 AND 2050



Source: TRANSEARCH; U.S. Census Bureau, USA Trade Online; Cambridge Systematics, Inc. analysis.

By value in 2019 (as opposed to by weight), Figure 2.4 shows that the top commodity in both 2019 and 2050 is “machinery”. In 2019, machinery transported throughout the region was valued at almost $40B; in 2050, this grew to over $106B, a growth of 167 percent. In 2019, this is followed by “transportation equipment” ($37B) and “food and kindred products” ($33B), the top commodity by tonnage. In 2050, the order of the top five commodities change as “chemicals and allied products” becomes the second-highest commodity by value with over $100B. “Chemicals and allied products” grows the most out of the top 10 commodities between 2019 and 2050 with an increase of 230 percent between the analysis years.

FIGURE 2.4 TOP COMMODITIES BY VALUE, 2019 AND 2050



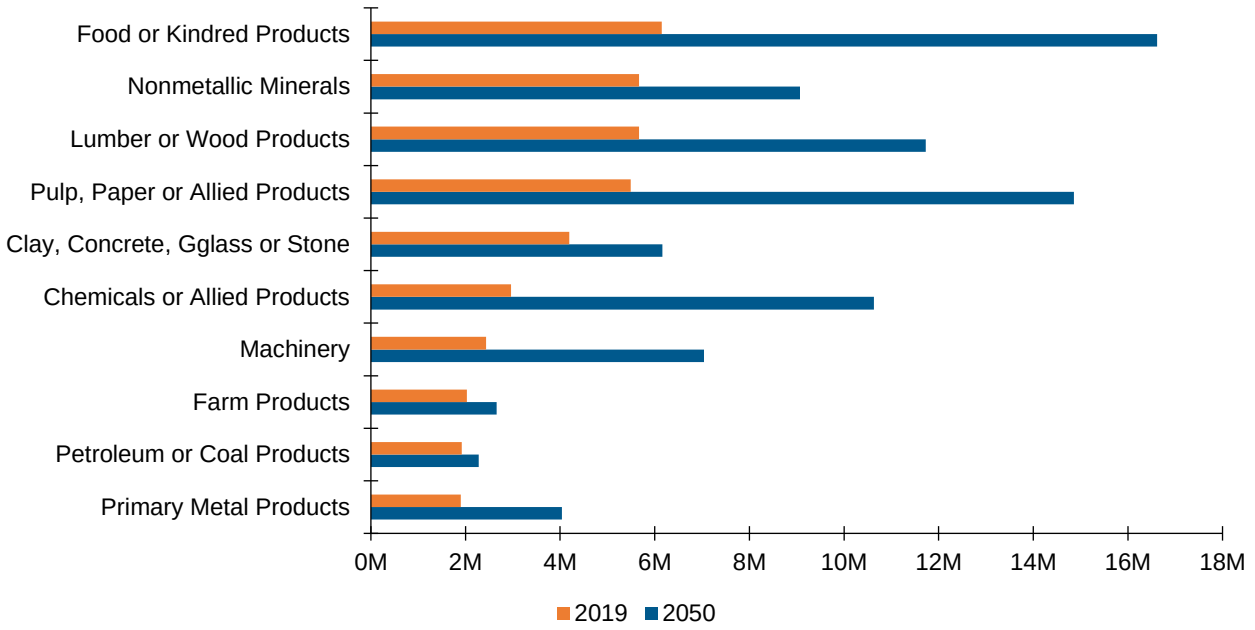
Source: TRANSEARCH; U.S. Census Bureau, USA Trade Online; Cambridge Systematics, Inc. analysis.

Inbound and Outbound Shipments

Figure 2.5 shows the top commodities for inbound shipments for 2019 and 2050. Food or kindred products was the top commodity shipped into the region. In 2019 it accounted for nearly 6.15 million tons and is projected to increase to over 16 million tons by 2050. This commodity includes goods such as meat, milk, fruits, vegetables, and flour, among others. It was followed by nonmetallic minerals, lumber or wood products, pulp and paper products, and clay, concreted, glass, or stone. As previously mentioned, many of these commodities can be linked to major industry sectors in the coastal region and throughout Georgia – such as forestry and paper products manufacturing. By 2050, lumber and wood products and pulp and paper products are projected to surpass nonmetallic minerals in total tonnage.

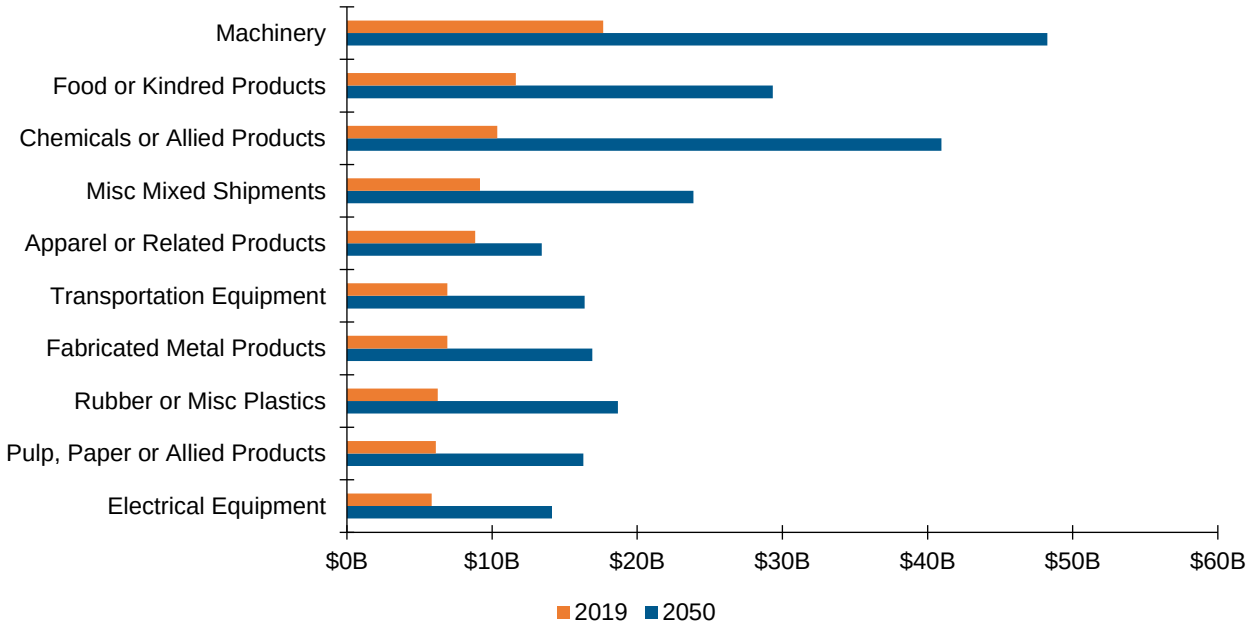
Figure 2.6 shows the top inbound commodities by value. Machinery was the top commodity shipped into the region representing $17.7 billion worth of engines, farm equipment, construction equipment, cranes, and other goods. By 2050, this is projected to increase to over $48.2 billion. Machinery was followed by food or kindred products, chemicals, mixed shipments (e.g., various goods that are grouped together for shipping), and apparel as top commodities. Chemicals or allied products (e.g., soap, paints, drugs) are projected to surpass food or kindred products as the second highest value commodity class shipped inbound to the region by 2050.

FIGURE 2.5 TOP INBOUND COMMODITIES BY TONNAGE, 2019 AND 2050



Source: TRANSEARCH; U.S. Census Bureau, USA Trade Online; Cambridge Systematics, Inc. analysis.

FIGURE 2.6 TOP INBOUND COMMODITIES BY VALUE, 2019 AND 2050



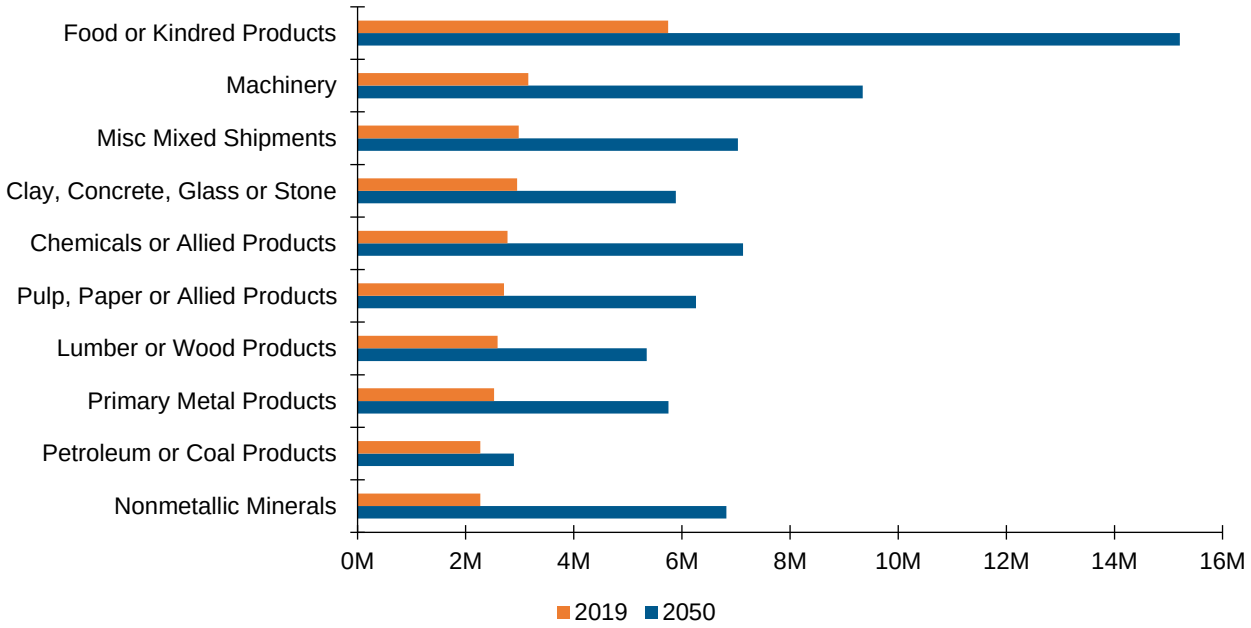
Source: TRANSEARCH; U.S. Census Bureau, USA Trade Online; Cambridge Systematics, Inc. analysis.

Figure 2.7 shows the top commodities for outbound shipments for 2019 and 2050. The most prevalent goods shipped outbound from the region are largely consistent with the top inbound shipments. The exception is that “miscellaneous mixed shipments” replaces farm products as a top commodity. Miscellaneous mixed

shipments are two or more different commodity types packaged together for shipping. Food or kindred products was a top commodity for both inbound (6 million tons in 2019 and 16 million tons in 2050) and outbound (6 million tons in 2019 and 15 million tons in 2050) flows in both analysis years. Shipments of clay, concrete, glass, or stone is the only other commodity in the top five for both inbound and outbound.

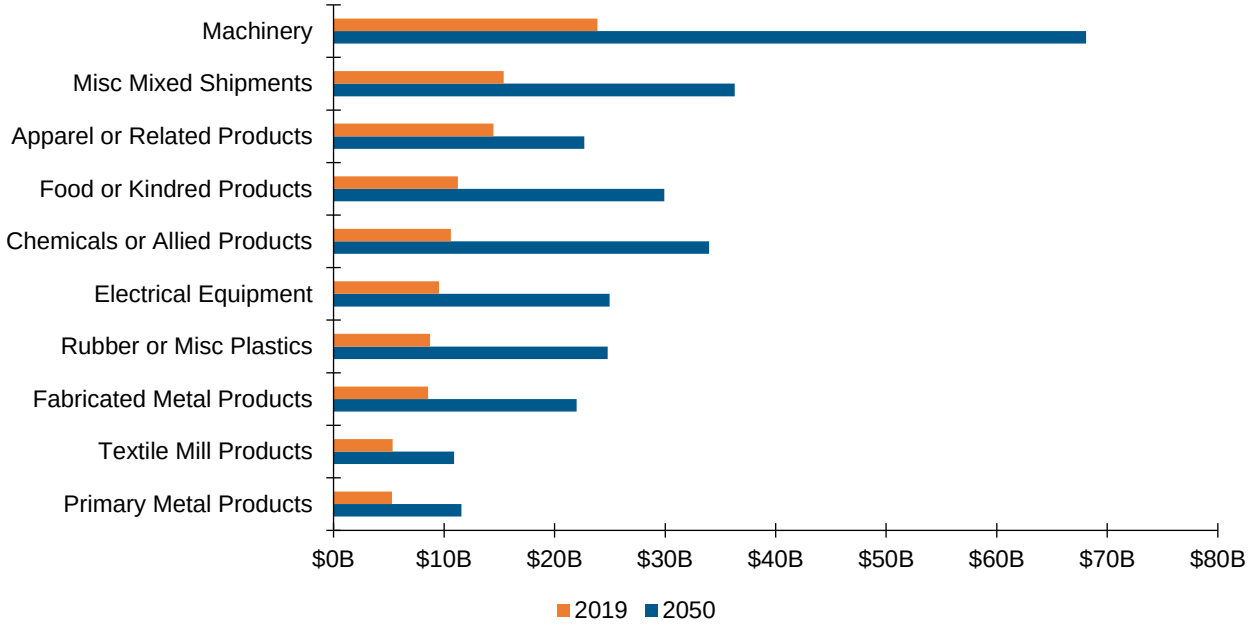
Figure 2.8 contains the top outbound commodities by value. The top 10 commodities by value are the same as those by weight except that the "textile mill products" and "primary metal products" commodity groups replacing the "transportation equipment" and "pulp, paper, or allied products" commodity groups. Textile mill products include goods such as fabrics, floor coverings, yarn and thread, and tire cords and fabrics, among others. Primary metal products include steel works and rolling mill products, iron and steel castings, and metal basic shapes as examples. Machinery is the top outbound commodity by value.

FIGURE 2.7 TOP OUTBOUND COMMODITIES BY TONNAGE, 2019 AND 2050



Source: TRANSEARCH; U.S. Census Bureau, USA Trade Online; Cambridge Systematics, Inc. analysis.

FIGURE 2.8 TOP OUTBOUND COMMODITIES BY VALUE, 2019 AND 2050



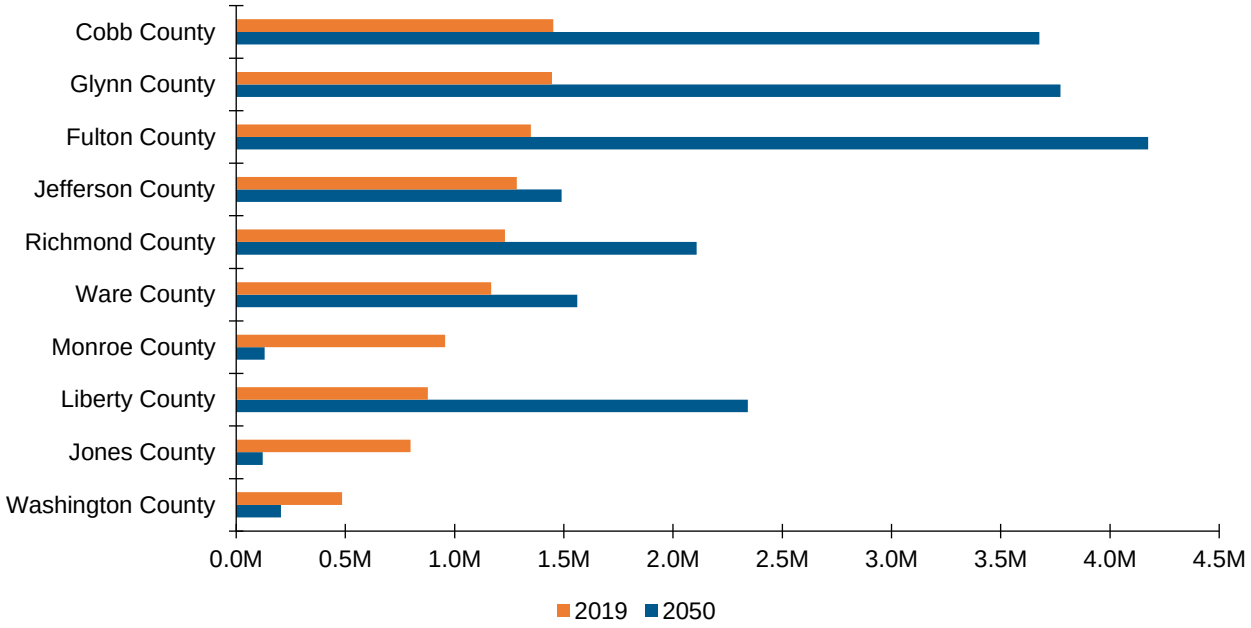
Source: TRANSEARCH; U.S. Census Bureau, USA Trade Online; Cambridge Systematics, Inc. analysis.

2.3 Top Trading Partners

Intrastate Trading Partners

Being a major center for trade on the eastern coast of the United States, the CORE MPO region has an abundance of trade partners across the world. In 2019, 13 percent of the region's total tonnage consisted of trade with other Georgia counties. This is projected to increase in magnitude but decrease in total share to 11 percent by 2050. Figure 2.9 shows the region's top in-state trading partners. Two of the three top in-state trading partners are in Metro Atlanta as Cobb and Fulton Counties each traded about 1.4 million tons with the CORE MPO region in 2019. Glynn County, the other county in the top three, encompasses the city of Brunswick and the Port of Brunswick which is another freight activity center in the state. Together, the top three counties account for about 20 percent of the region's in-state trade.

FIGURE 2.9 TOP INTRASTATE TRADING PARTNERS BY INBOUND AND OUTBOUND TONNAGE, 2019 AND 2050

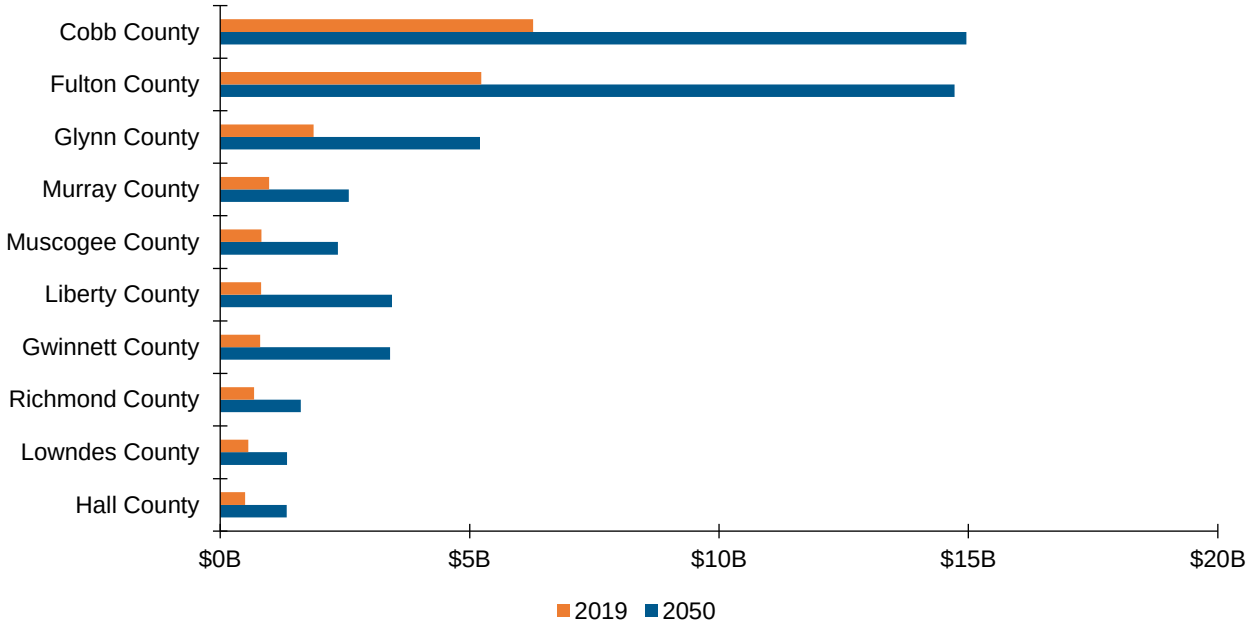


Source: TRANSEARCH; U.S. Census Bureau, USA Trade Online; Cambridge Systematics, Inc. analysis.

By 2050, all three of these trade destinations are projected to increase their trade tonnage with the CORE MPO region by between 150 and 210 percent. They are also expected to remain the top three in-state trading partners. Their share of in-state trade is projected to grow from about 20 percent to over 26 percent by 2050. This suggests a further concentration of intrastate trade with these top counties.

Figure 2.10 shows the top intrastate trading partners by value. The same top three in-state trading partners by tonnage are the same when ranked by value. Cobb, Fulton, and Glynn Counties accounted for about $13.2 billion in total trade with the CORE MPO region. This is projected to increase to approximately $34.9 billion by 2050. Collectively, Cobb, Fulton, and Glynn Counties account for about 47 percent of total intrastate trade value.

FIGURE 2.10 TOP INTRASTATE TRADING PARTNERS BY INBOUND AND OUTBOUND VALUE, 2019 AND 2050

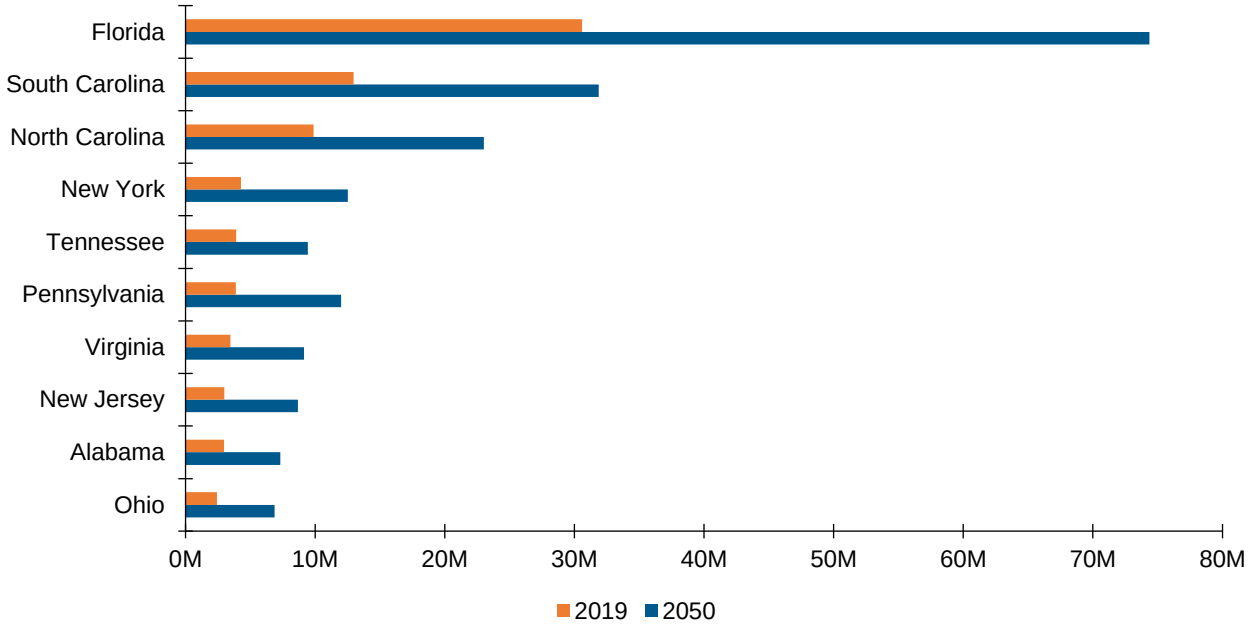


Source: TRANSEARCH; U.S. Census Bureau, USA Trade Online; Cambridge Systematics, Inc. analysis.

Interstate Trading Partners

In 2019, 60 percent of the CORE MPO region's total tonnage was traded with states besides Georgia. This is projected to increase to approximately 63 percent by 2050. Figure 2.11 shows the CORE MPO region's top 10 interstate trading partners. Florida is the largest trading partner as it accounted for 31 million tons of total trade (about 32 percent of total interstate trade) in 2019. It is expected that Florida will remain the region's top interstate trading partner by 2050 with 74 million tons of total trade. Four of the top five trading partners – Florida, South Carolina, North Carolina, and Tennessee – are located in the Southeast. Other interstate trading partners with at least 3 million tons of annual trade include New York, Pennsylvania, Virginia, and New Jersey.

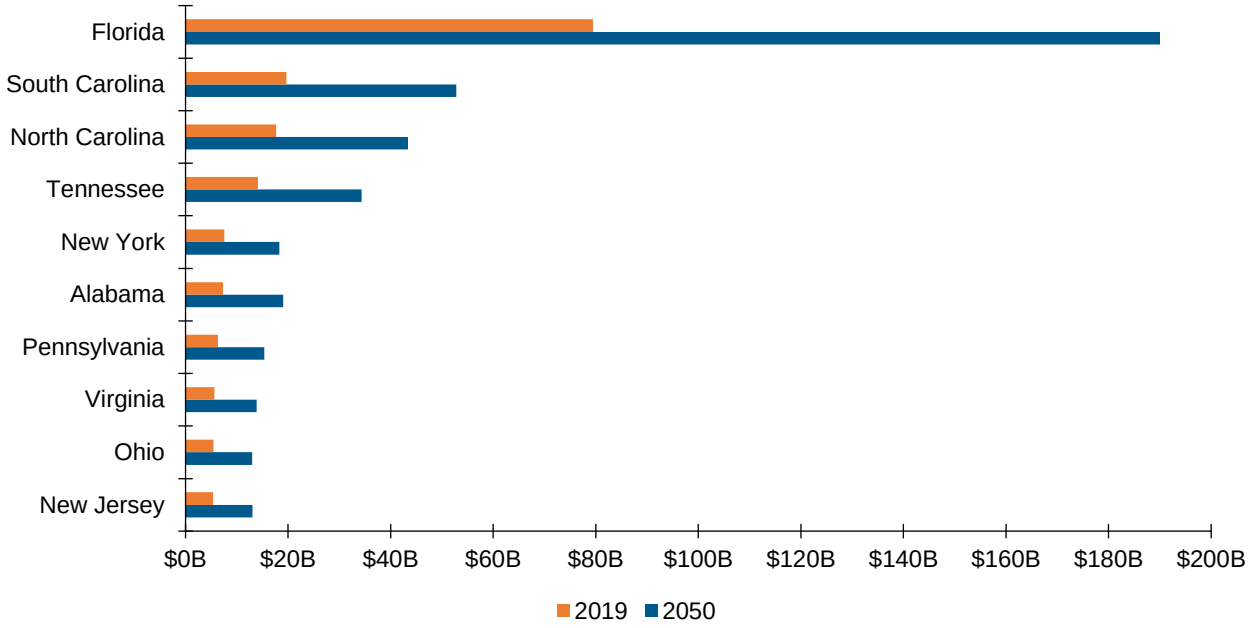
FIGURE 2.11 TOP INTERSTATE TRADING PARTNERS BY INBOUND AND OUTBOUND TONNAGE, 2019 AND 2050



Source: TRANSEARCH; U.S. Census Bureau, USA Trade Online; Cambridge Systematics, Inc. analysis.

By value, about 60 percent of the region's total trade was with states besides Georgia. The top trading partners by value, shown in Figure 2.12, are largely consistent with the top trading partners by tonnage. Florida is the top interstate trading partner with 37 percent of trade by value in both 2019 ($79 billion) and 2050 ($190 billion). It is followed by South Carolina, North Carolina, New York, and Tennessee.

FIGURE 2.12 TOP INTERSTATE TRADING PARTNERS BY INBOUND AND OUTBOUND VALUE, 2019 AND 2050



Source: TRANSEARCH; U.S. Census Bureau, USA Trade Online; Cambridge Systematics, Inc. analysis.

International Trading Partners

International trade comprises about 26 percent of total tonnage and approximately 31 percent of total value of the CORE MPO's total trade. Table 2.1 summarizes the region's international trade. Asia is the region's top trading partner both in terms of tonnage (24M and 56M in 2019 and 2050) and value ($71B and $166B in 2019 and 2050). It is followed by Europe with about 10.15 million tons of total trade. The CORE region has substantial trade with Canada and Mexico as well. Trade with Mexico is projected to increase the most among the region's international trading partners. By 2050, the total tonnage and value of trade with Mexico is expected to increase 210 percent and 231 percent, respectively.

TABLE 2.1 CORE MPO INTERNATIONAL TRADE SUMMARY

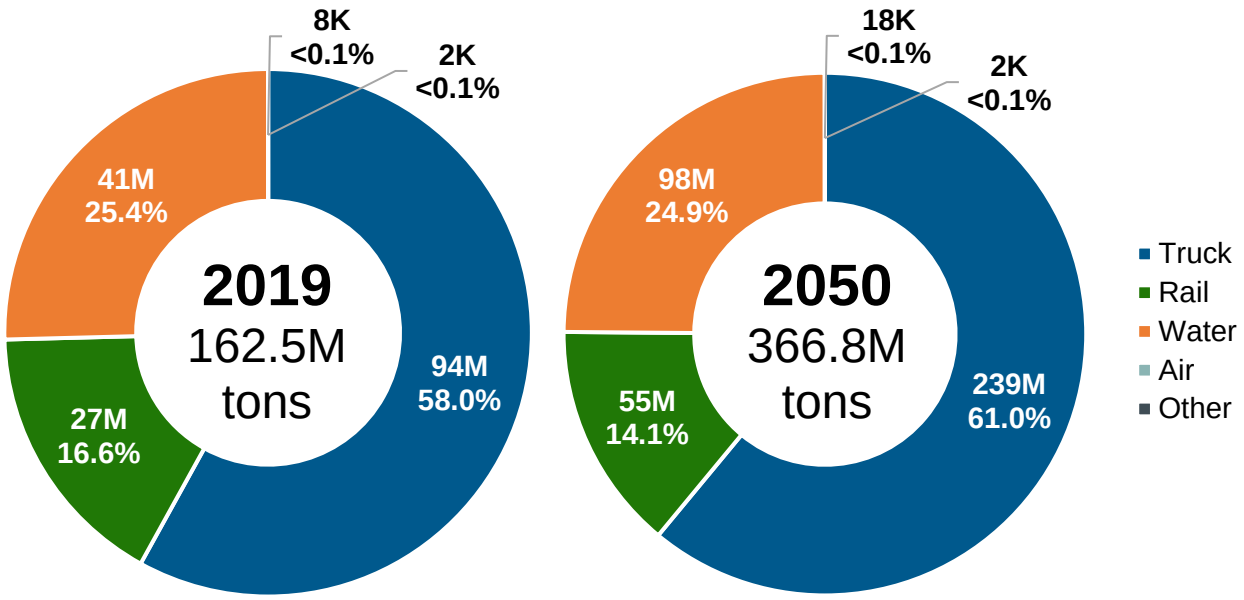
Trading Partner	2019 Tonnage	2050 Tonnage	2019 Value	2050 Value
Asia	23.74 M	55.78 M	$70.87 B	$166.16 B
Europe	10.15 M	24.77 M	$24.41 B	$65.74B
South/Central America	3.91 M	9.32 M	$4.62 B	$10.86 B
Canada	1.48 M	3.51 M	$2.63 B	$8.15 B
Africa	1.14 M	2.84 M	$2.11 B	$4.78 B
Mexico	0.94 M	2.92 M	$1.56 B	$5.16 B
Australia and Oceania	0.47 M	1.27 M	$3.09 B	$8.50 B
Greenland	< 0.01 M	< 0.01 M	< $0.01 B	< $0.01 B

Source: TRANSEARCH; U.S. Census Bureau, USA Trade Online; Cambridge Systematics, Inc. analysis.

2.4 Modal Split

Figure 2.13 shows the total tonnage by mode for 2019 and 2050. The majority of freight in the CORE MPO region is moved by truck – over 58 percent in 2019. By 2050, trucking is projected to increase its share of total goods moved throughout the region to about 61 percent.

FIGURE 2.13 CORE MPO TONS BY MODE, 2019 AND 2050

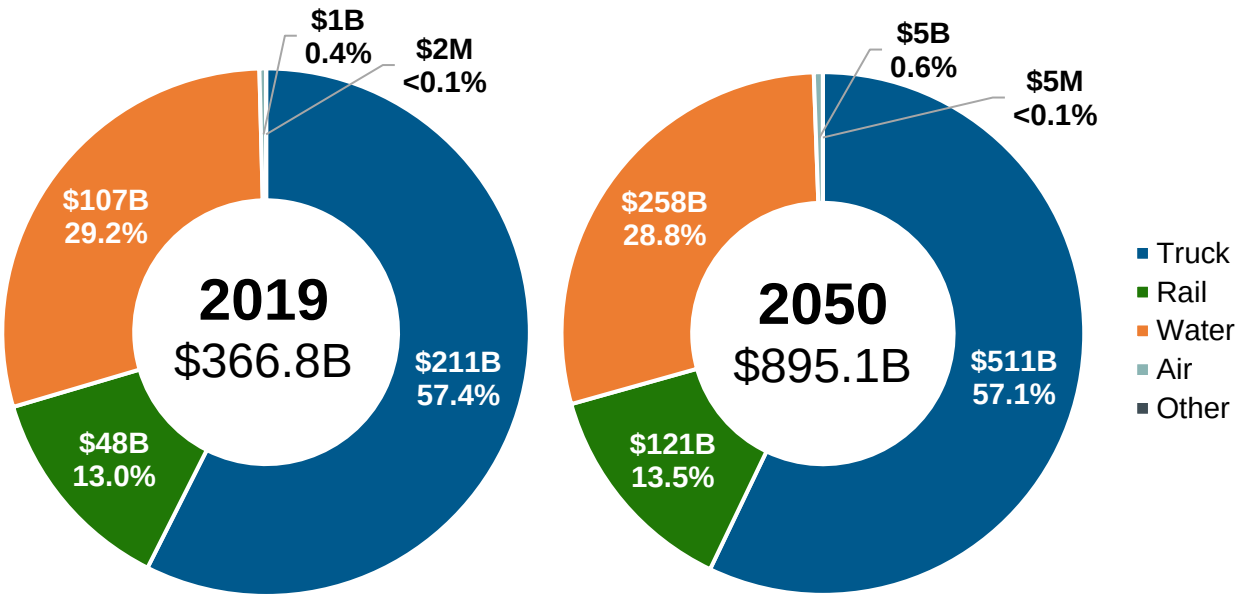


Source: TRANSEARCH; U.S. Census Bureau, USA Trade Online; Cambridge Systematics, Inc. analysis.

After trucking, the region's ports and waterways accounted next largest share of total tons. In 2019, about 25 percent of the region's goods were transported by water. This share was projected to remain nearly constant at about 25 percent in 2050. Rail was the next largest mode by total tonnage. It accounted for about 17 percent of the region's total tonnage in 2019. By 2050, though the magnitude of goods shipped by rail throughout the region is projected to increase, the share is expected to decrease to about 14 percent by 2050. Air and "other modes" account for small shares, less than 1 percent, of the region's freight activity in terms of tonnage.

Figure 2.14 examines mode share in the CORE MPO region by value. By value, the majority of the region's goods are moved by truck. In 2019, trucking accounted for over 57 percent (about $211 billion) of the region's goods movement in terms of value. This share is projected to remain nearly constant over the long term. By 2050, trucking is expected to carry about $511 billion worth of goods through the region which represents about 57 percent of total value. Waterborne goods account for the next largest share of freight by value. In 2019, the share of freight value moved by water was about 29 percent. This is projected to remain nearly constant through 2050. Goods transported by air tend to have higher values than those shipped by other freight modes. In 2019, about $1 billion in goods were transported to or from the region via air. This is projected to grow to about $5 billion by 2050.

FIGURE 2.14 CORE MPO VALUE BY MODE, 2019 AND 2050



Source: TRANSEARCH; U.S. Census Bureau, USA Trade Online; Cambridge Systematics, Inc. analysis.

Table 2.2 shows this average value per ton by mode in 2019 and 2050. The results imply that over the long term the region's rail, water, and air freight assets will increasingly carry higher value goods. All of these modes show an increase in the value per ton over the 2019-2050 horizon. As strategies and recommendations are developed for addressing the region's freight needs, these results show the importance of solutions that take a multimodal perspective.

TABLE 2.2 AVERAGE VALUE PER TON BY MODE

Mode	Value per Ton in 2019	Value per Ton in 2050
Truck	$2,234	$2,136
Rail	$1,772	$2,188
Water	$2,591	$2,643
Air	$194,862	$276,761
Other	$821	$2,555

Source: TRANSEARCH; U.S. Census Bureau, USA Trade Online; Cambridge Systematics, Inc. analysis.

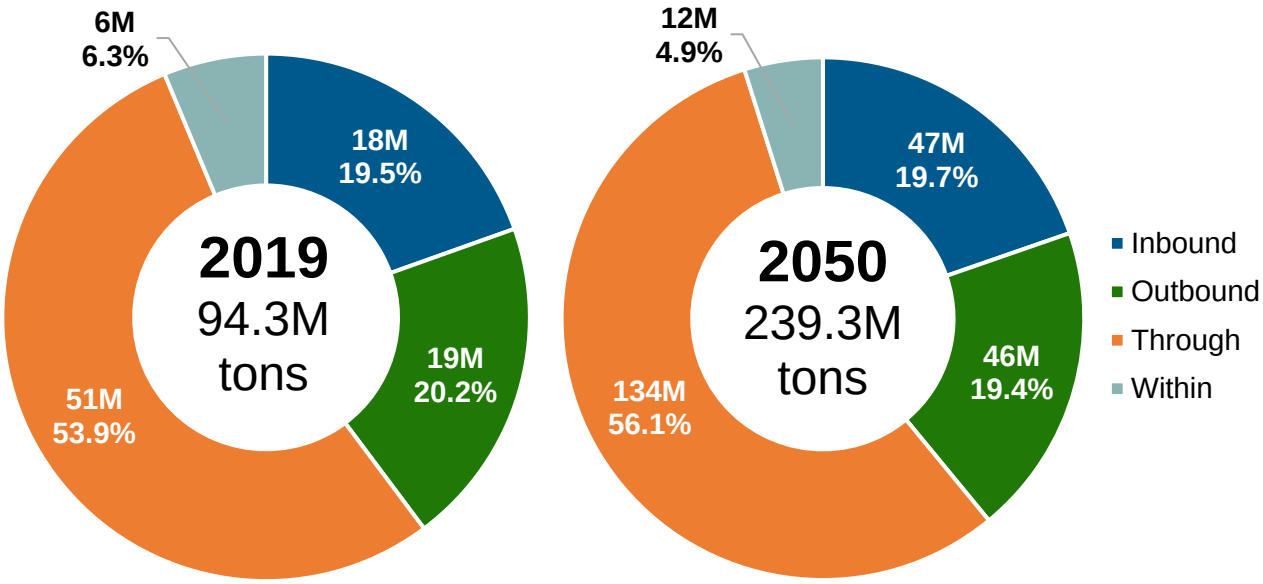
Truck

Over 94.3 million tons of goods valued at nearly $210.7 billion were transported by truck in the CORE MPO region in 2019 as shown in Figure 2.15 and Figure 2.16. The largest share of freight by tonnage on CORE MPO highways consists of through traffic – goods traveling through the region without stopping. In 2019, over 51 million tons of goods were estimated to pass through the region (nearly 54 percent of total tonnage). Over 37 million tons of highway freight (nearly 40 percent) consists of inbound or outbound commodity flows. Freight originating in other states or in-state regions (i.e., inbound movements) and freight destined for other

states or in-state regions (i.e., outbound movements) each account for about 20 percent of total flows. A smaller share of the highway freight produced in the CORE MPO region remains in the 3-county area.

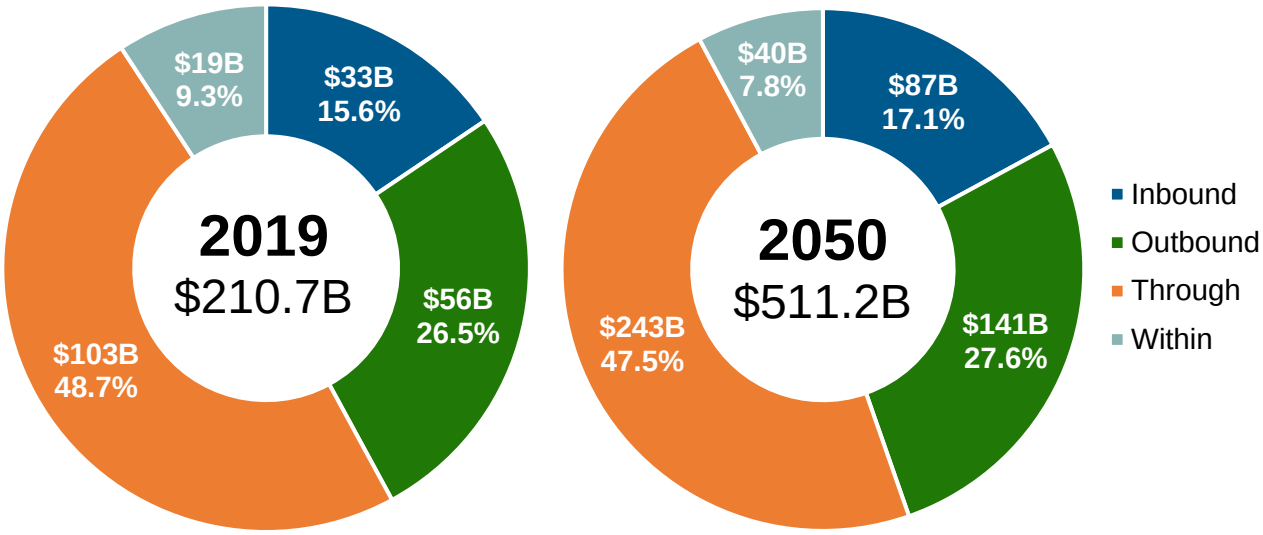
Around 239 million tons of goods, valued at over $511 billion, are expected to be shipped through, into, within, and out of the CORE MPO region in 2050 via highway as shown in Figure 2.15 and Figure 2.16. In terms of tonnage, through movements are projected to account for the largest share at 56 percent. Inbound and outbound flows are nearly balanced at nearly 19.7 percent and 19.4 percent, respectively. The analysis indicates a considerable increase in through movements from 51 million tons to 134 million tons from 2019 to 2050. This implies that in the future the region's highways will increasingly serve as a conduit for the national movement for goods.

FIGURE 2.15 CORE MPO TRUCK TONS BY DIRECTION, 2019 AND 2050



Source: TRANSEARCH; U.S. Census Bureau, USA Trade Online; Cambridge Systematics, Inc. analysis.

FIGURE 2.16 CORE MPO TRUCK VALUE BY DIRECTION, 2019 AND 2050



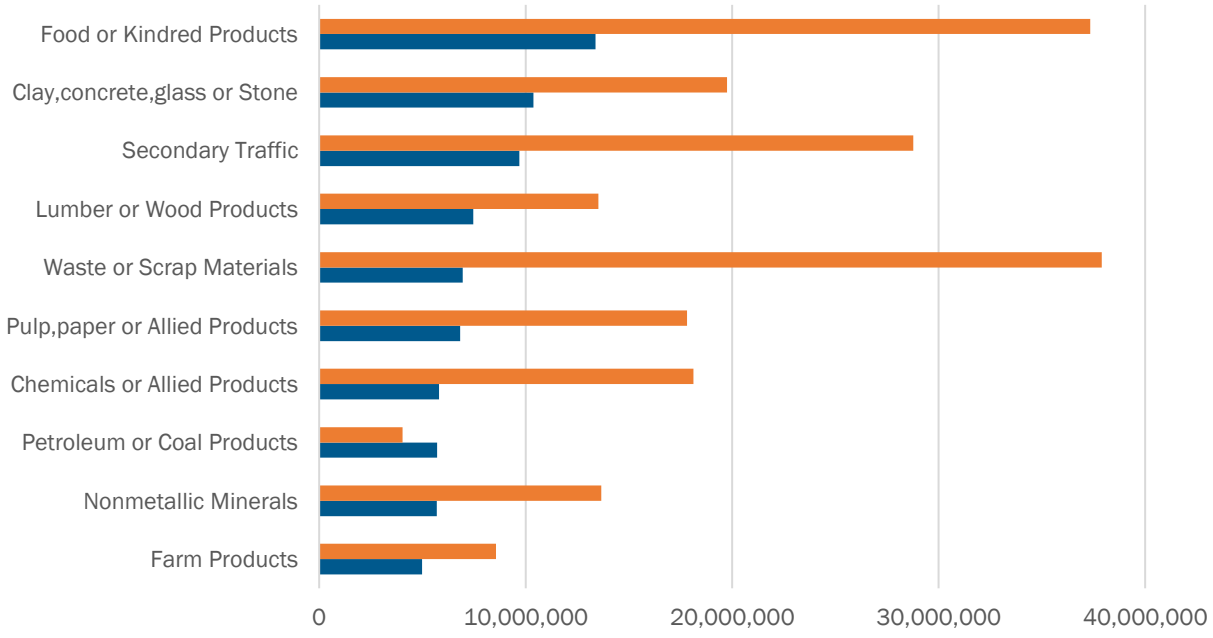
Source: TRANSEARCH; U.S. Census Bureau, USA Trade Online; Cambridge Systematics, Inc. analysis.

In terms of value, through movements are projected to account for the largest portion of total value at nearly 48 percent in 2050. Through movements are followed in terms of total value by outbound (nearly 28 percent) and inbound (about 17 percent) as shown in Figure 2.16. The substantial projected increase in through tonnage has a correspondingly large expected increase in value. In 2019, the value of through movements was estimated to exceed $103 billion. By 2050, these movements are expected to double to about $243 billion. The value of goods outbound from the CORE MPO region is expected to more than double from about $56 billion to approximately $141 billion in 2050. Inbound shipments are expected to increase in value from about $33 billion in 2019 to approximately $87 billion in 2050. Overall, the CORE MPO region's highways are expected to experience higher tonnages as well as an influx of goods with much higher values. It will be imperative to prepare for this growth as some roadways may not currently be able to manage this demand.

Figure 2.17 and Figure 2.18 show the top commodities by total tonnage and value, respectively, transported on the CORE MPO region's highway system. Bulk commodities – such as concrete and stone, lumber and wood products, waste and scrap, and farm products – are representative of the heaviest goods on the region's highway system. Many of these goods also reflect the state's and the region's large agricultural, natural resources, and manufacturing industries. The prevalence of secondary traffic, which consists of truck movements between warehouses and distribution centers, reflects the region's role as a logistics hub for the Southeast and nationally. Combined, the top ten commodities by tonnage account for approximately 82 percent of the total tonnage for commodities transported by truck in the region in both years.

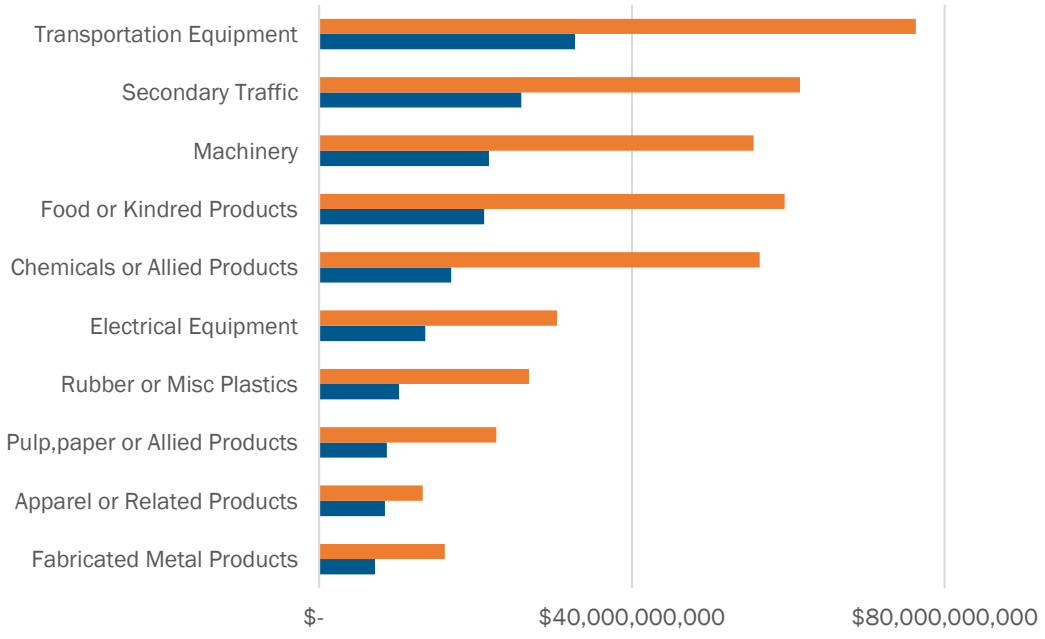
By value, the top commodities are reflective of the region's and the state's manufacturing base which includes transportation equipment (e.g., automobiles, aircraft, vehicle parts), chemicals, small engines, and paper products. Top commodities by value include transportation equipment, secondary traffic, machinery, food products, and chemicals. Combined, the top ten commodities by value account for approximately 80 percent of the total value for commodities transported by truck in the region in both years.

FIGURE 2.17 TOP TRUCK COMMODITIES BY TONNAGE, 2019 AND 2050



Source: TRANSEARCH; U.S. Census Bureau, USA Trade Online; Cambridge Systematics, Inc. analysis.

FIGURE 2.18 TOP TRUCK COMMODITIES BY VALUE, 2019 AND 2050



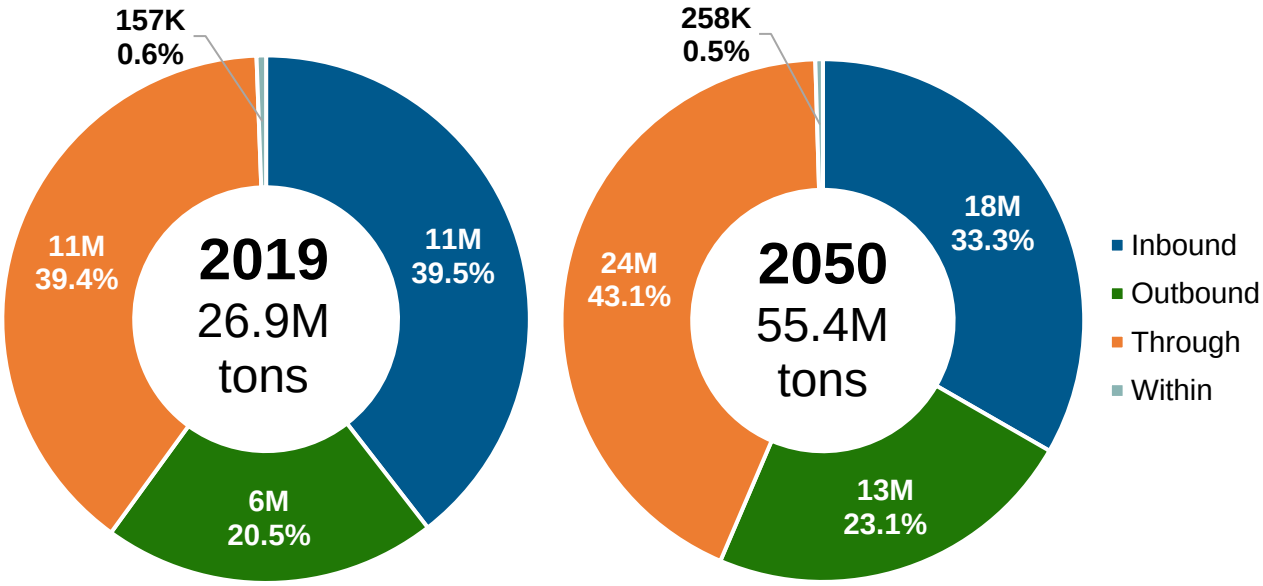
Source: TRANSEARCH; U.S. Census Bureau, USA Trade Online; Cambridge Systematics, Inc. analysis.

Rail

The region's rail network transported nearly 27 million tons of freight valued at nearly $47.7 billion in 2019 as shown in Figure 2.19 and Figure 2.20. Inbound and through movements comprise the largest shares of freight by tonnage on CORE MPO railroads at about 39.5 percent and 39.4 percent, respectively. Together, they accounted for approximately 22 million tons of freight. In 2019, outbound freight rail movements accounted for about 20.5 percent of total flows. Only a very small share of the rail freight produced in the CORE MPO region remains in the three-county area, less than one percent.

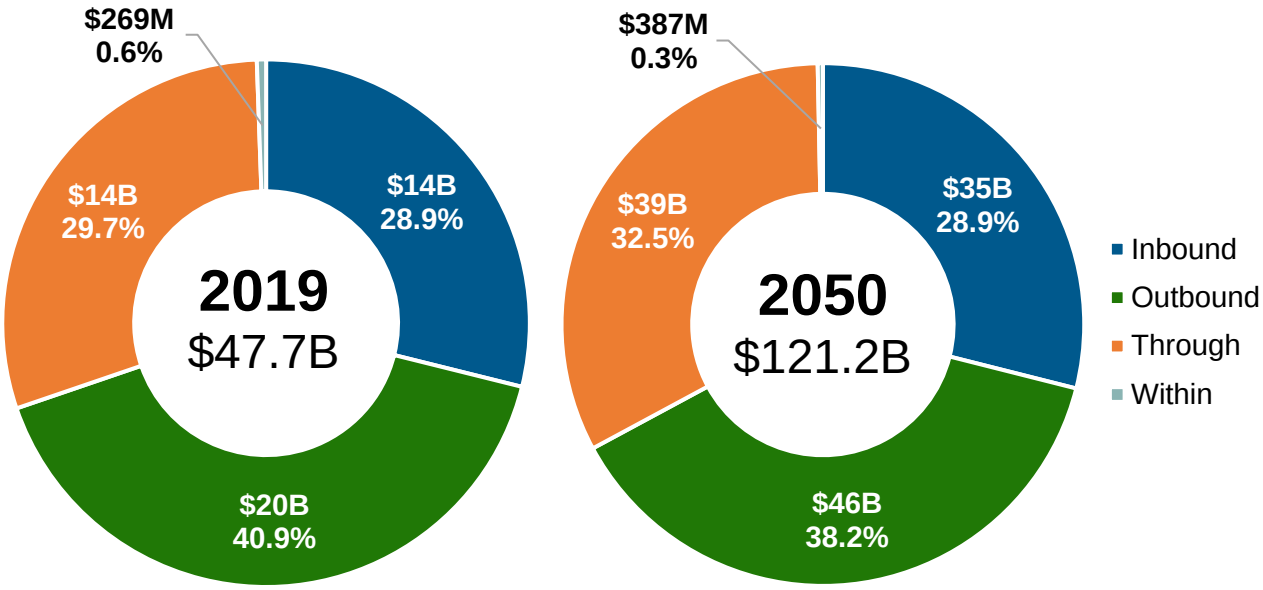
Over 55 million tons of goods, valued at over $121 billion, are expected to be shipped through, into, within, and out of the CORE MPO region in 2050 via rail as shown in Figure 2.19 and Figure 2.20. In terms of tonnage, through movements are projected to increase their share of freight rail traffic to account for the largest share at about 43 percent. Inbound movements are project to grow in magnitude (from about 11 million tons in 2019 to 18 million tons in 2050), but to decrease in total share from about 39.5 percent to 33.3 percent. Outbound flows are expected to grow in magnitude and increase their total share, from about 20.5 percent of total rail flows to over 23 percent. Similar to the analysis of highway commodity flows, the data implies that in the future the region's railroads will increasingly serve national movements of goods that pass through without stopping.

FIGURE 2.19 CORE MPO RAILTONS BY DIRECTION, 2019 AND 2050



Source: TRANSEARCH; U.S. Census Bureau, USA Trade Online; Cambridge Systematics, Inc. analysis.

FIGURE 2.20 CORE MPO RAIL VALUE BY DIRECTION, 2019 AND 2050

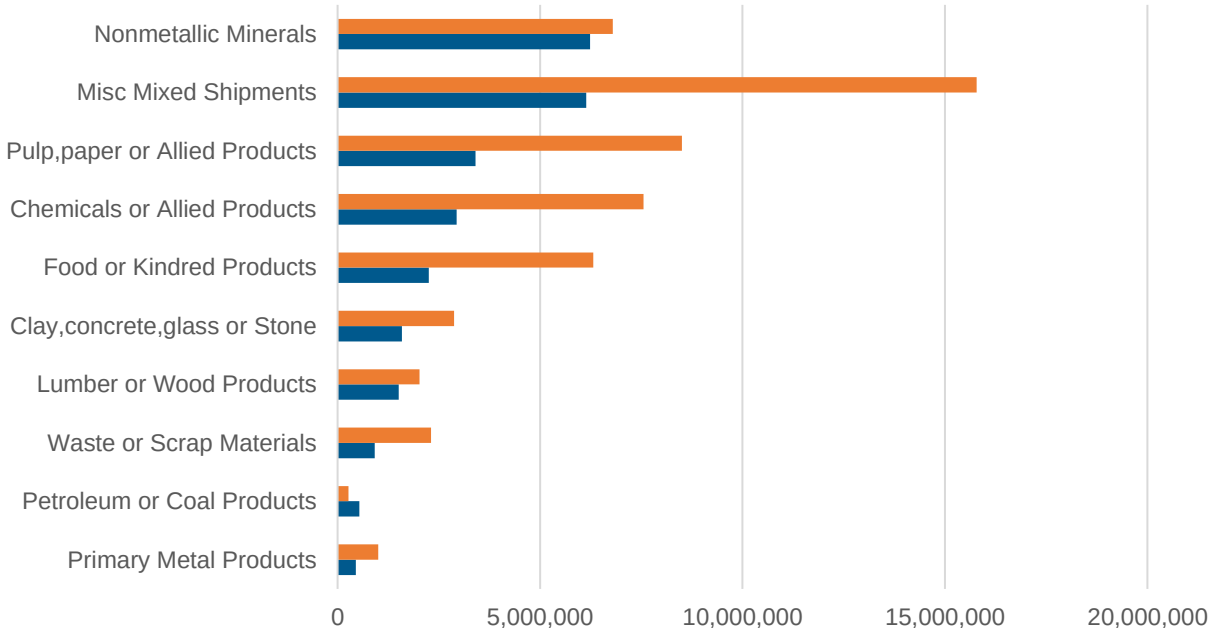


Source: TRANSEARCH; U.S. Census Bureau, USA Trade Online; Cambridge Systematics, Inc. analysis.

In terms of value, outbound movements are projected to account for the largest portion of total freight rail value at nearly 38 percent in 2050. Outbound movements are followed in terms of total value by through (nearly 33 percent) and inbound (about 29 percent) as shown in Figure 2.20. All freight movement directions except “within” are projected to more than double in value from 2019 to 2050. Outbound movements will increase the most, with an additional $26 billion in value, followed by through movements with an additional $25 billion and inbound movements with an additional $21 billion. Overall, the CORE MPO region’s highways are expected to experience higher tonnages as well as an influx of goods with much higher values. It will be imperative to prepare for this growth as some roadways may not currently be able to manage this demand.

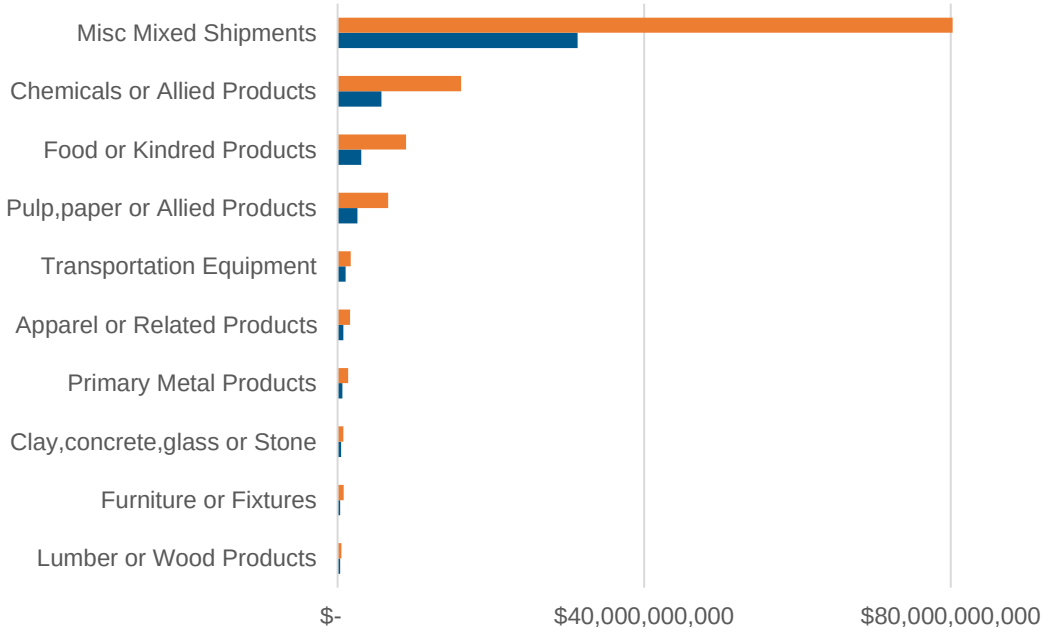
Figure 2.21 and Figure 2.22 show the top commodities by total tonnage and value, respectively, transported on the CORE MPO region's freight rail network. Bulk commodities including nonmetallic minerals (e.g., stone, sand, gravel, chemical and fertilizer minerals), pulp and paper products, chemicals, lumber and wood products, waste and scrap, and clay and stone are among the heaviest goods on the region's railroads. By value, the top freight rail commodities include transportation equipment, miscellaneous mixed shipments, chemicals, food products, pulp and paper products, and transportation equipment. Combined, the top ten commodities by tonnage account for approximately 96 percent of the total tonnage and 97 percent of the total value for commodities transported by rail in the region.

FIGURE 2.21 TOP RAIL COMMODITIES BY TONNAGE, 2019 AND 2050



Source: TRANSEARCH; U.S. Census Bureau, USA Trade Online; Cambridge Systematics, Inc. analysis.

FIGURE 2.22 TOP RAIL COMMODITIES BY VALUE, 2019 AND 2050

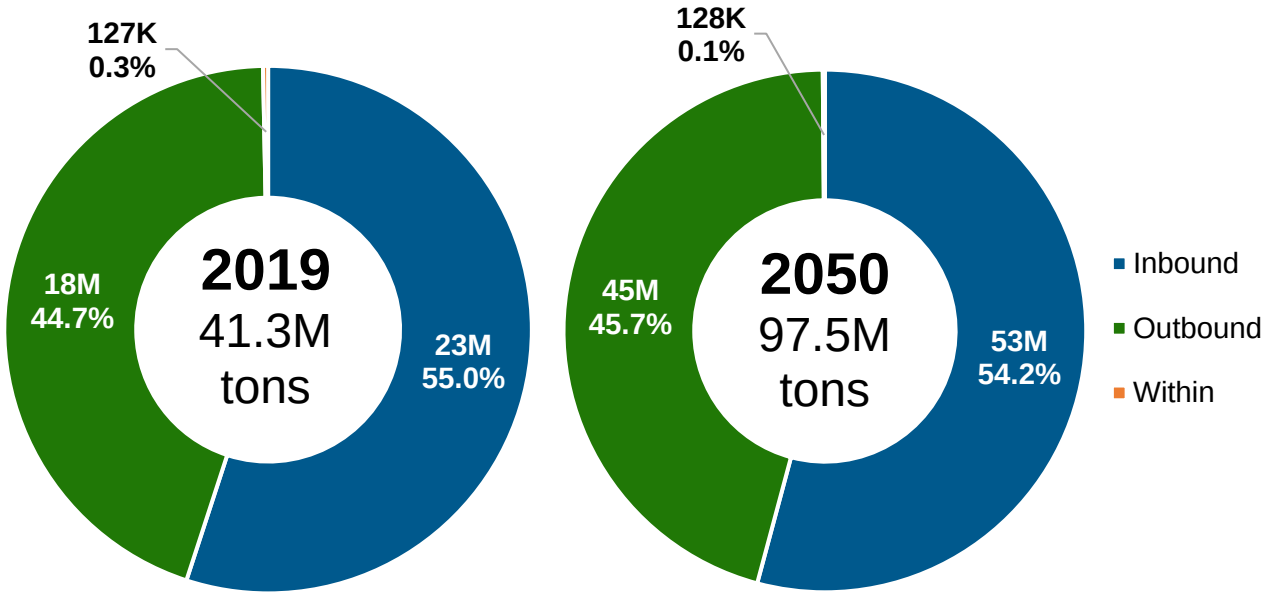


Source: TRANSEARCH; U.S. Census Bureau, USA Trade Online; Cambridge Systematics, Inc. analysis.

Water

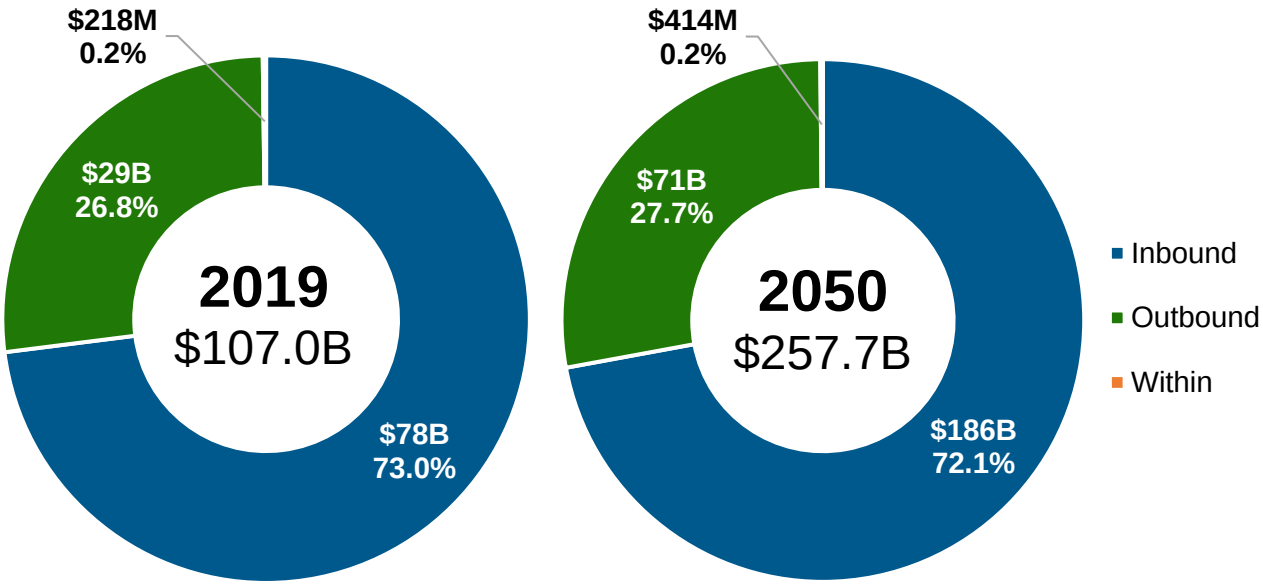
Over 41 million tons of freight valued at over $107 billion was transported by the CORE MPO region's ports and waterways in 2019 as shown in Figure 2.23 and Figure 2.24. Inbound and outbound movements accounted for about 55 percent and 44.7 percent of total flows, respectively. Only a very small share of the waterborne freight produced in the CORE MPO region remains in the three-county area, less than one percent. By 2050, the amount of waterborne goods shipped in the region are projected to grow to nearly 98 million tons of goods, valued at nearly $258 billion as shown in Figure 2.23 and Figure 2.24. The directional split in waterborne freight (i.e., inbound, outbound, and within) is expected to remain largely consistent with 2019 values.

FIGURE 2.23 CORE MPO WATER TONS BY DIRECTION, 2019 AND 2050



Source: TRANSEARCH; U.S. Census Bureau, USA Trade Online; Cambridge Systematics, Inc. analysis.

FIGURE 2.24 CORE MPO WATER VALUE BY DIRECTION, 2019 AND 2050

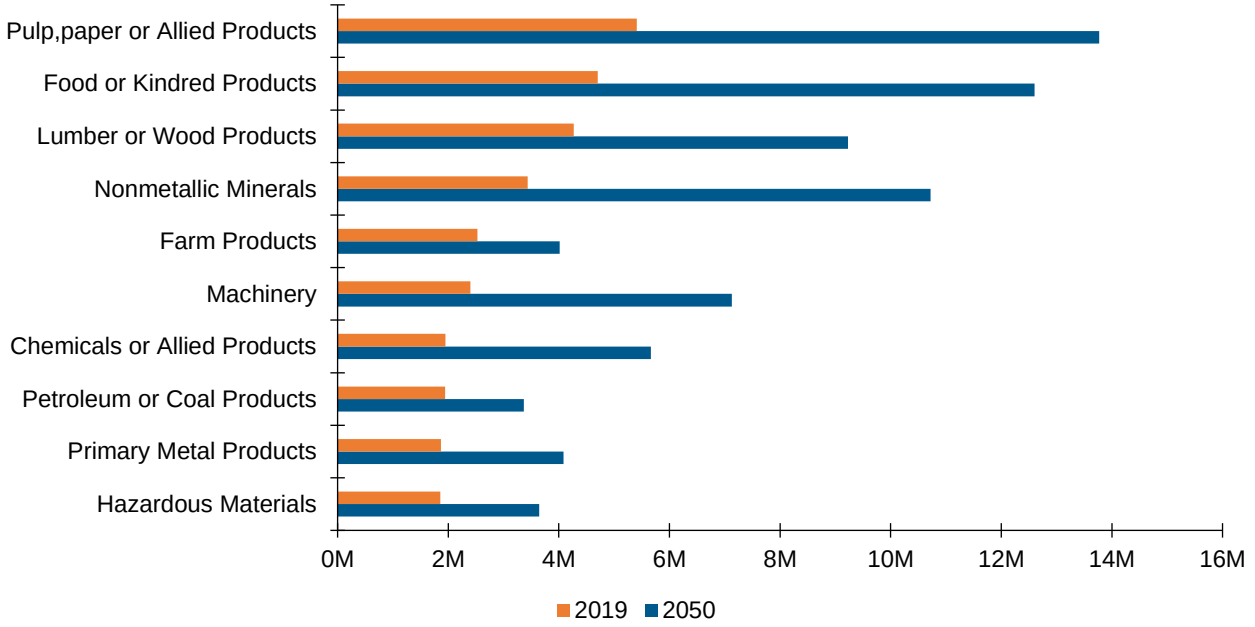


Source: TRANSEARCH; U.S. Census Bureau, USA Trade Online; Cambridge Systematics, Inc. analysis.

In terms of value, inbound movements are projected to account for the largest portion of total waterborne value at about 72 percent in 2050. The remainder of value is largely captured by outbound movements at about 27.7 percent with less than 1 percent of value consisting of within movements as shown in Figure 2.24. The breakdown in value by direction is generally consistent between the 2019 and 2050 estimates.

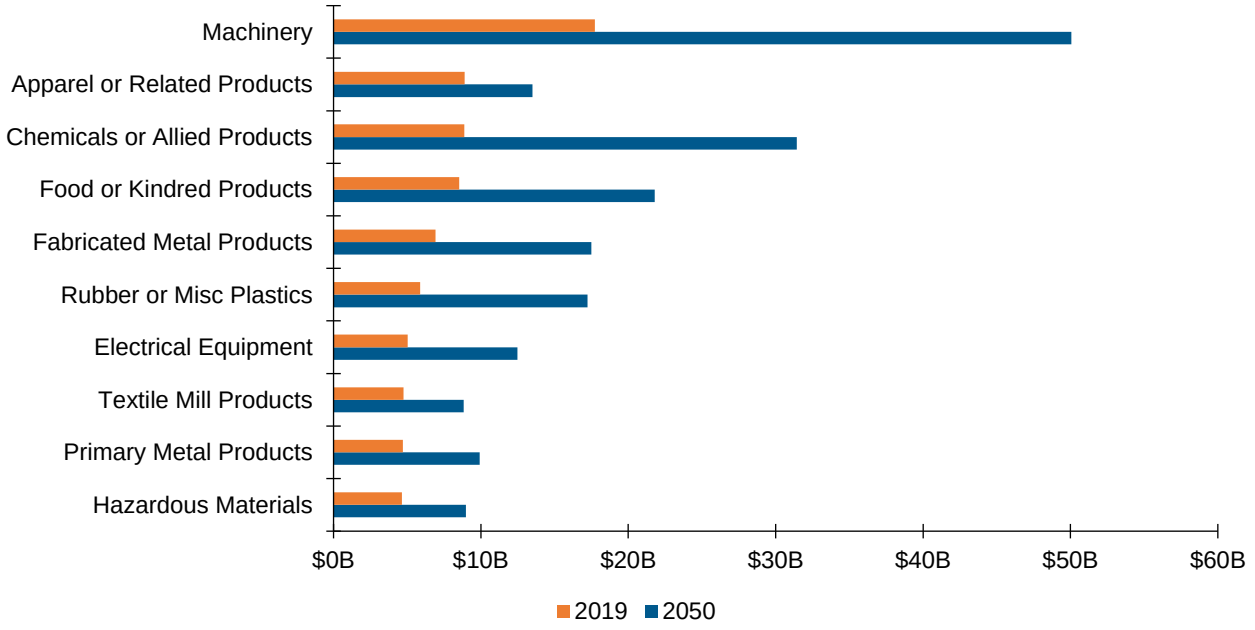
Figure 2.25 and Figure 2.26 show the top commodities by total tonnage and value, respectively, transported by the CORE MPO region's waterways. These include pulp and paper products, food products, lumber and wood products, nonmetallic minerals, and farm products. By value, the top waterborne commodities include machinery, apparel, chemicals, food products, and fabricated metal products (e.g., cutlery, plumbing fixtures and heating equipment, wire, bolts and other fasteners, and structural metal products). Combined, the top ten commodities account for approximately 74 percent of the total tonnage and 72 percent of the total value for commodities transported by water in the region.

FIGURE 2.25 TOP WATER COMMODITIES BY TONNAGE, 2019 AND 2050



Source: TRANSEARCH; U.S. Census Bureau, USA Trade Online; Cambridge Systematics, Inc. analysis.

FIGURE 2.26 TOP WATER COMMODITIES BY VALUE, 2019 AND 2050

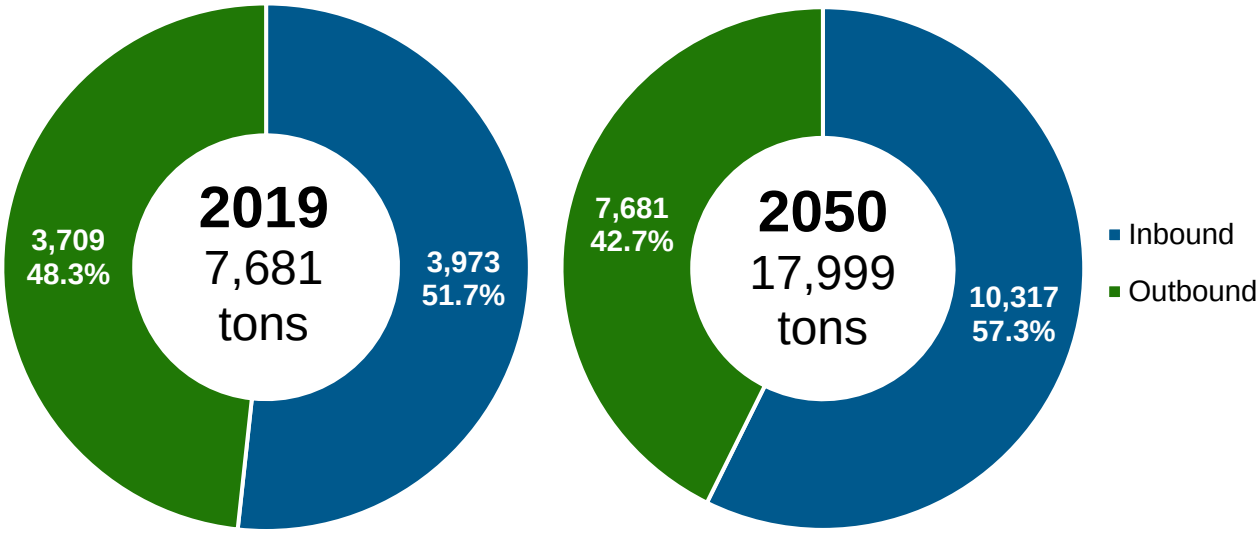


Source: TRANSEARCH; U.S. Census Bureau, USA Trade Online; Cambridge Systematics, Inc. analysis.

Air

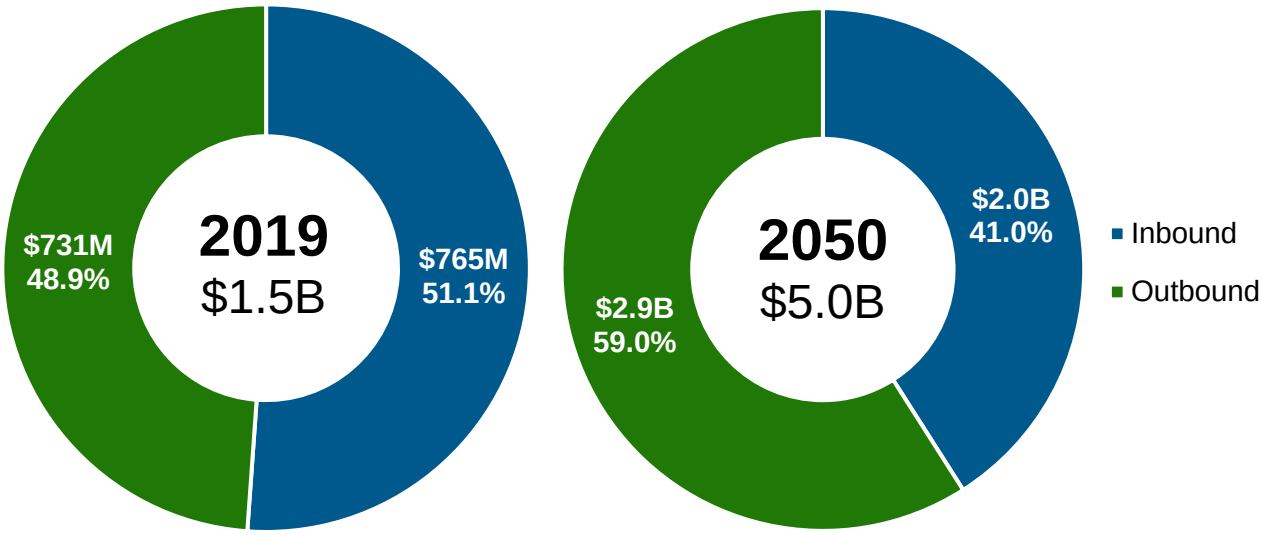
The region's airports transport a relatively small amount of freight. However, the types of goods handled by the air cargo network tend to be high value. As shown in Figure 2.27 and Figure 2.28, nearly 7,700 tons of freight valued at about $1.5 billion was transported by the CORE MPO region's airports. Inbound and outbound movements accounted for about 52 percent and 48 percent of total flows, respectively. By 2050, the amount of goods shipped via air are projected to grow to nearly 18,000 tons, valued at about $5 billion.

FIGURE 2.27 CORE MPO AIR TONS BY DIRECTION, 2019 AND 2050



Source: TRANSEARCH; U.S. Census Bureau, USA Trade Online; Cambridge Systematics, Inc. analysis.

FIGURE 2.28 CORE MPO AIR VALUE BY DIRECTION, 2019 AND 2050

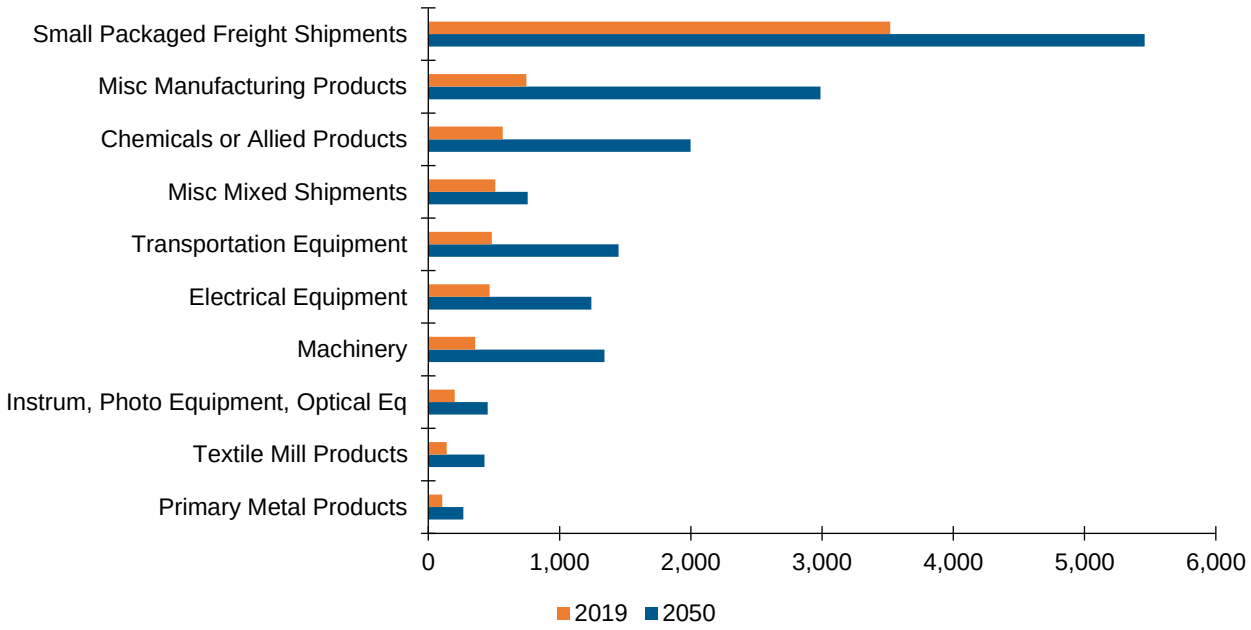


Source: TRANSEARCH; U.S. Census Bureau, USA Trade Online; Cambridge Systematics, Inc. analysis.

The directional split between inbound and outbound movements by tonnage is expected to remain largely consistent between 2019 and 2050. However, in terms of value outbound movements are projected to overtake inbound movements and account for the largest portion of total air freight value at about 59 percent in 2050. This is largely driven by projected growth miscellaneous manufactured products (e.g., toys, sporting and athletic goods, office supplies, novelties).

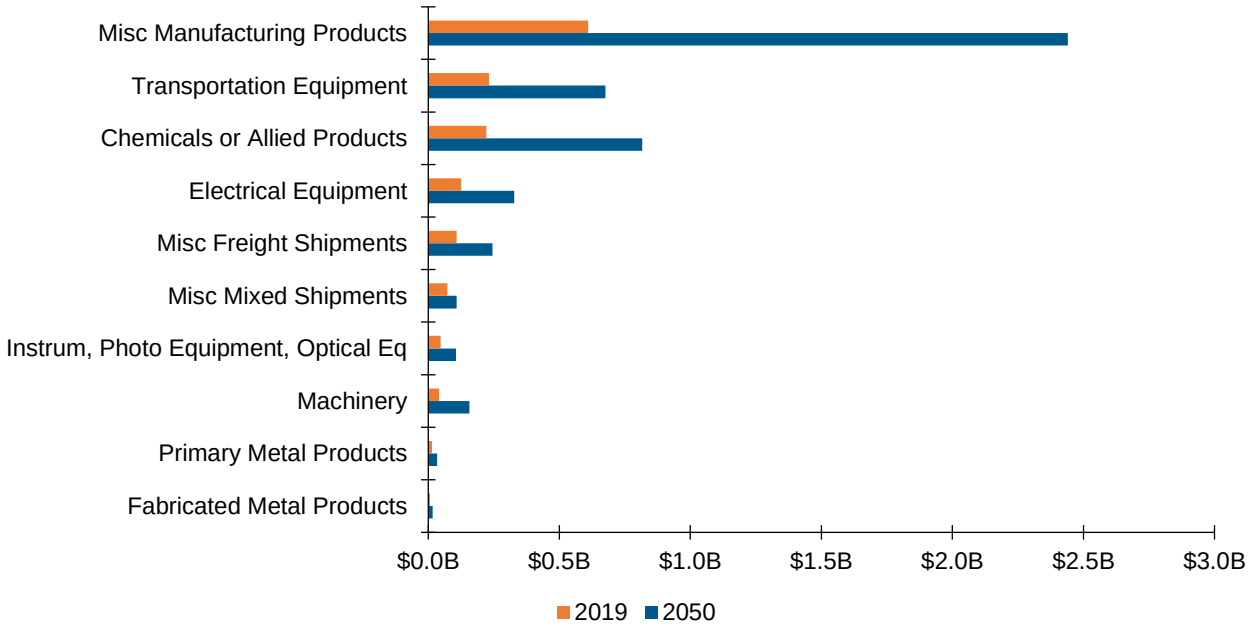
Figure 2.29 and Figure 2.30 show the top commodities by total tonnage and value, respectively, transported by air in the CORE MPO region. By both tonnage and value, these primarily consist of low-weight, high-value goods such as small packages (e.g., e-commerce types of goods), miscellaneous manufactured products, chemicals (which include drugs and other pharmaceutical products), electronics, and transportation equipment which includes vehicle parts. Combined, the top ten commodities account for approximately 92 percent of the total tonnage and 99 percent of the total value for commodities transported by air in the region.

FIGURE 2.29 TOP AIR COMMODITIES BY TONNAGE, 2019 AND 2050



Source: TRANSEARCH; U.S. Census Bureau, USA Trade Online; Cambridge Systematics, Inc. analysis.

FIGURE 2.30 TOP AIR COMMODITIES BY VALUE, 2019 AND 2050



Source: TRANSEARCH; U.S. Census Bureau, USA Trade Online; Cambridge Systematics, Inc. analysis.

3 FREIGHT ACTIVITY PATTERNS

This section of the report examines freight activity patterns throughout the three-county region. It provides insight into where, when, and how freight moves across the region's multimodal freight network. This can be important for supporting long-range planning and operations. The analysis gathers data from multiple sources – including commodity flow data from TRANSEARCH, truck global positioning (GPS) data from INRIX, and daily train volume data at at-grade crossings from the Federal Railroad Administration – to paint a comprehensive picture of freight activity in the region.

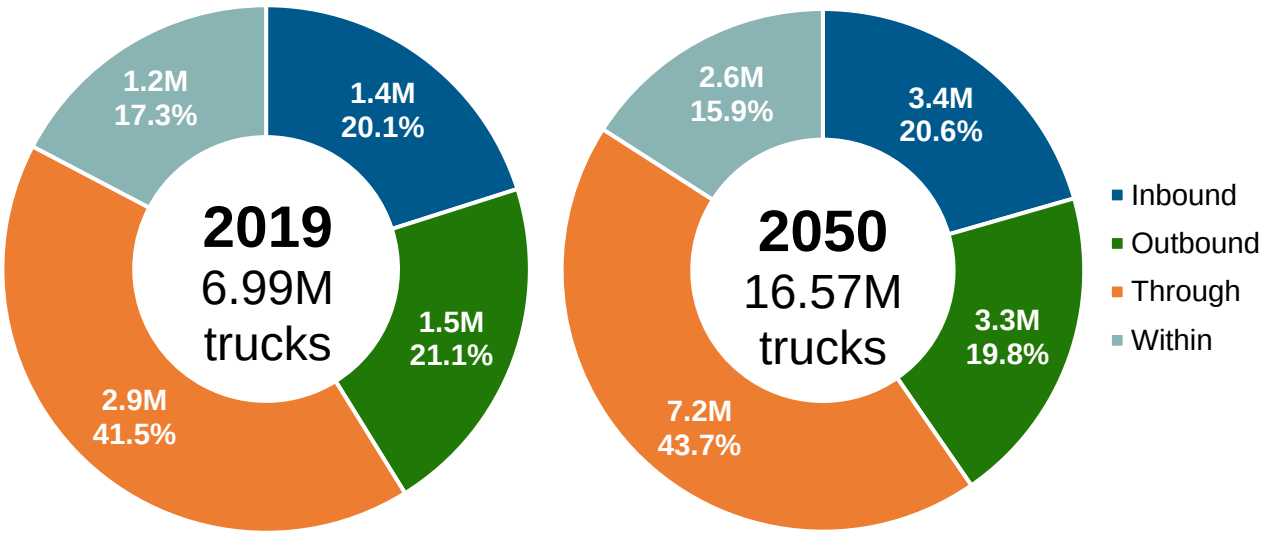
3.1 Routing of Truck and Rail Commodity Flows

The following section contains information on routed truck and rail commodity flows. This analysis was produced by assigning TRANSEARCH data to the highway network to estimate the number of units along roadways and railways in the region. In addition, the analysis examines data on daily train volumes at at-grade crossings near the Port of Savannah using information from the Federal Railroad Administration.

Truck Commodity Flows

Figure 3.1 is a breakdown of truck unit movements by direction in both 2019 and 2050. In 2019, about 7 million total trucks moved throughout the region, with about 40 percent of those movements passing through the region without stopping. This share increases slightly to 44 percent of the total 16.7 million trucks in 2050. About 20 percent of truck movements originated in the CORE MPO region in both years, as well as 20 percent of truck units terminating in the region. Between 16-17 percent of movements in the analysis years stayed within the region.

FIGURE 3.1 CORE MPO TRUCK UNITS BY DIRECTION, 2019 AND 2050

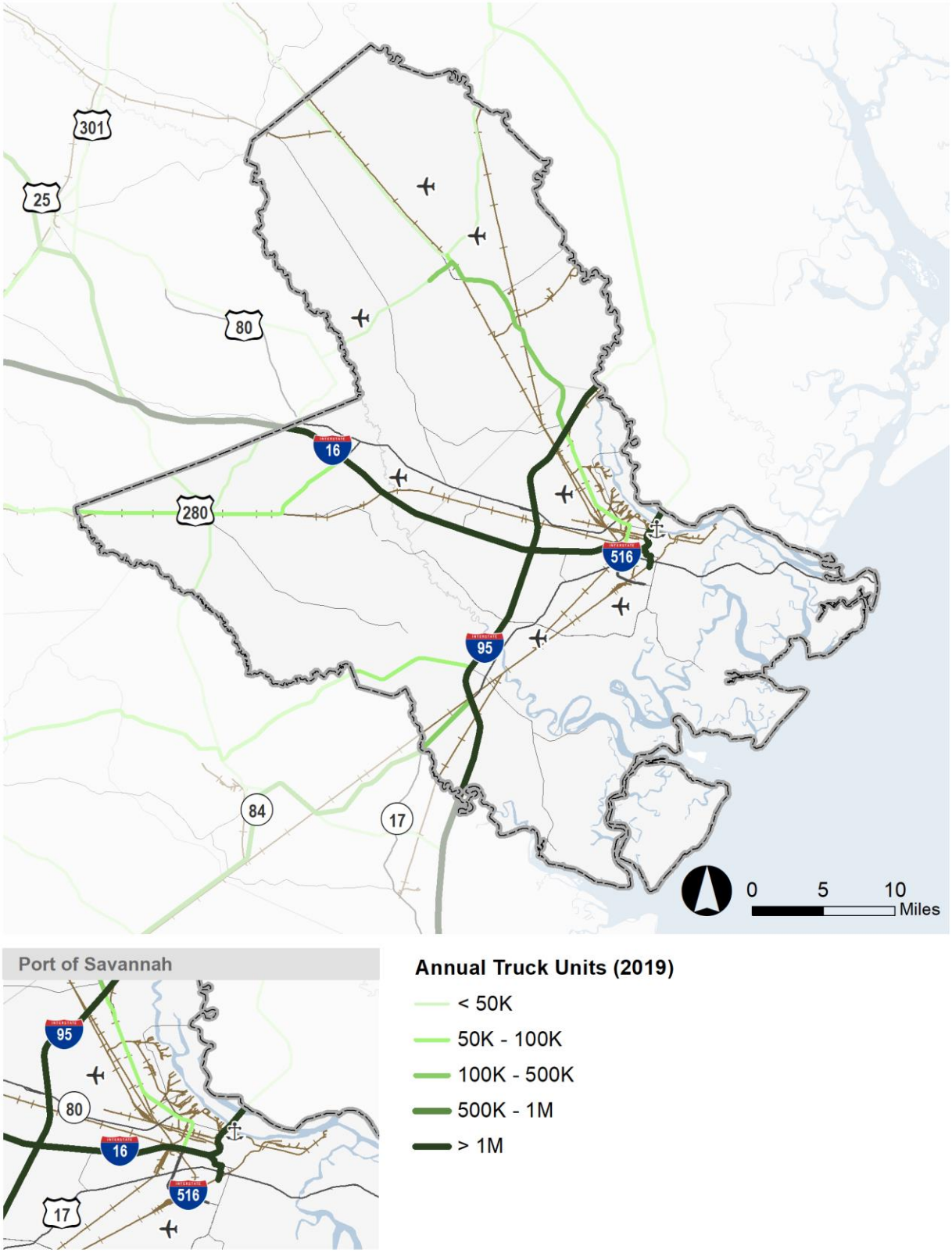


Source: TRANSEARCH; Cambridge Systematics, Inc. analysis.

Figure 3.2 and Figure 3.3 show the routed TRANSEARCH data in the CORE MPO region for 2019 and 2050, respectively. The results indicate that Interstate highways carry over 1,000,000 trucks in each analysis year. Except for the Truman Parkway, which is a limited-access highway, no other roadways experience such high levels of truck traffic. It is interesting to note that the data suggests that most of the region's truck traffic enters and exits the region through I-16 going west and I-95 going south. Not as many trucks are estimated to travel into South Carolina.

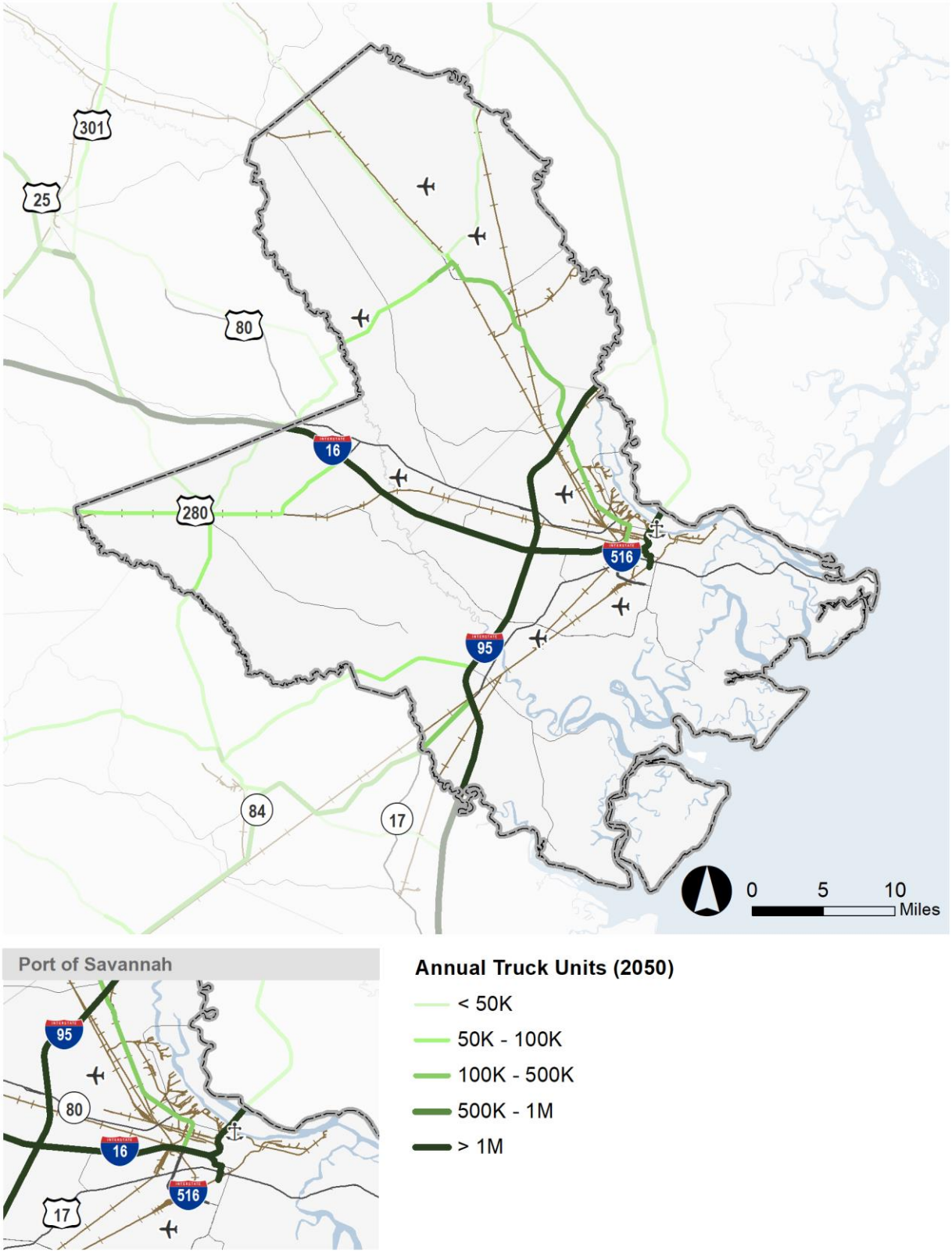
Other roadways that experience high levels of truck traffic include US 17 in the southern part of the region, US 280 in the western part of the region, and SR 21 going northwest from downtown Savannah towards the Port of Savannah. These roadways experience over 100,000 trucks in each analysis year. Similar patterns exist in 2050 as shown in Figure 3.3.

FIGURE 3.2 TRUCK FLOWS IN THE CORE MPO REGION, 2019



Source: TRANSEARCH; Cambridge Systematics, Inc. analysis.

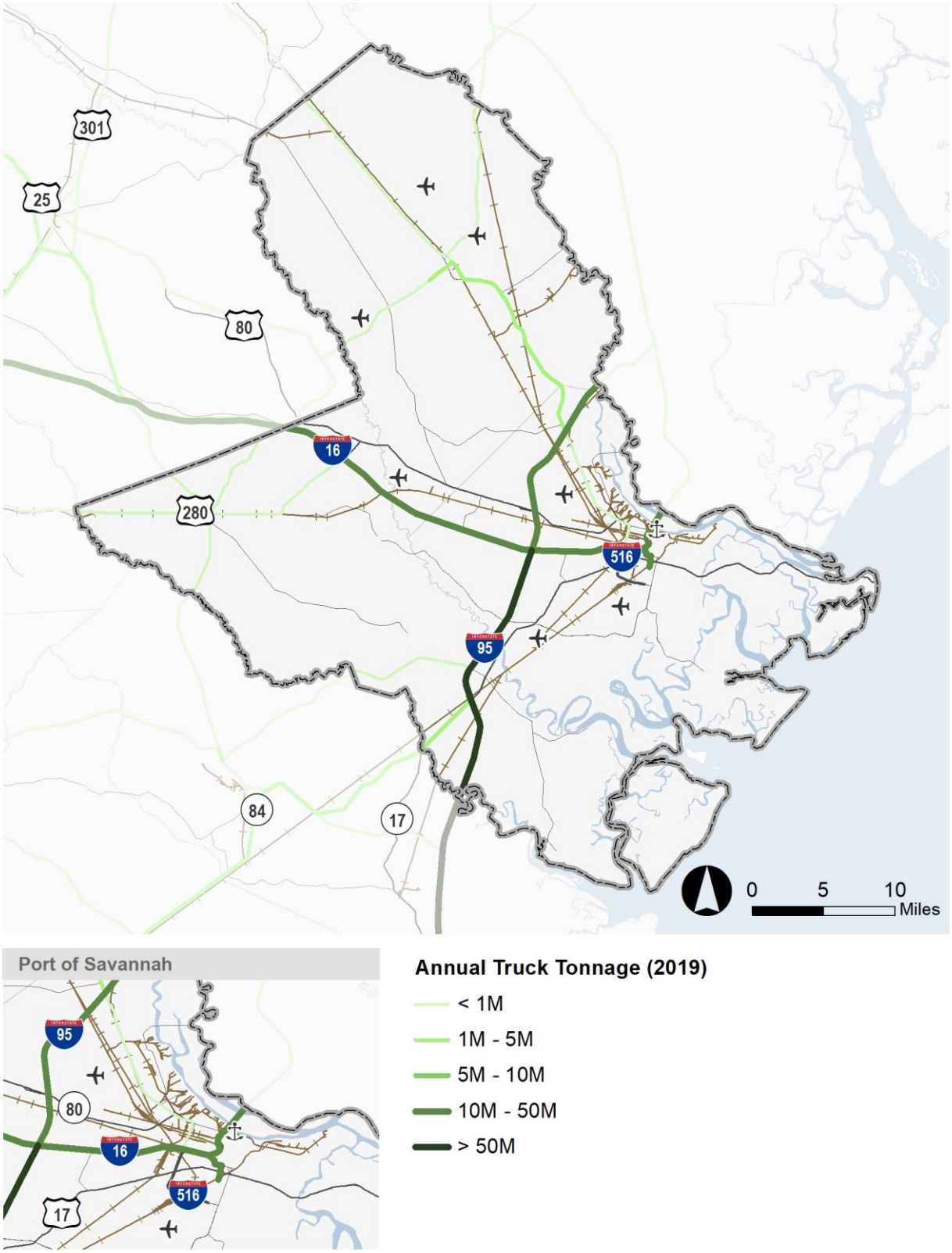
FIGURE 3.3 TRUCK FLOWS IN THE CORE MPO REGION, 2050



Source: TRANSEARCH; Cambridge Systematics, Inc. analysis.

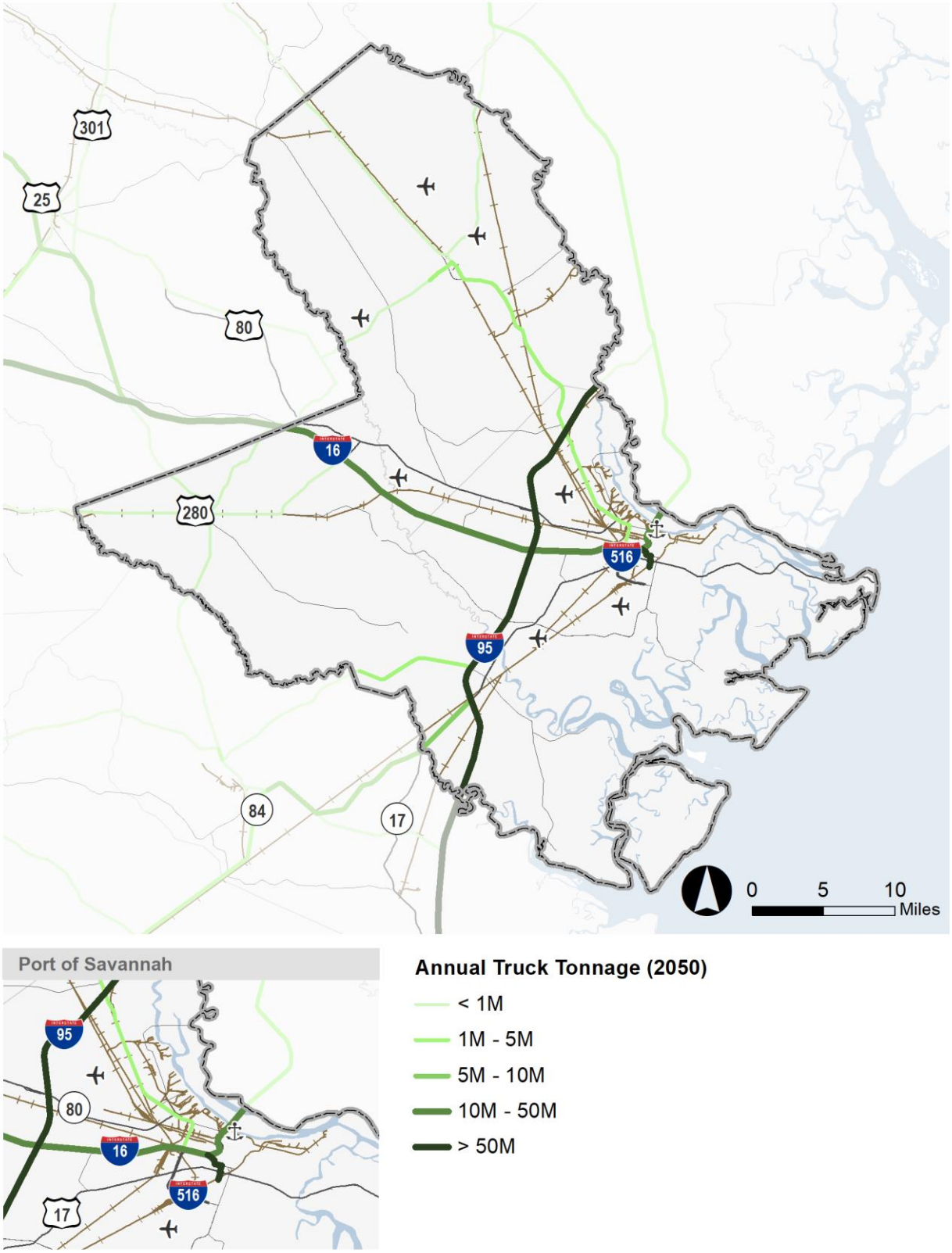
Figure 3.4 and Figure 3.5 are similar to the previous two figures, but instead display routed truck tonnage (as opposed to routed truck units). This is important from an asset management perspective because routes that carry higher tonnages of freight experience greater and more rapid pavement deterioration. Similarly, Interstate highways have the highest truck tonnages in the region. I-95 south of its interchange with I-16 is estimated to carry over 50 million tons annually in 2019 and 2050. Other Interstate corridors are estimated to generally carry between 10 million and 50 million tons annually in 2019 and 2050. By 2050, the entirety of I-95 in the CORE MPO region is projected to carry over 50 million tons annually, as well a small portion of I-516.

FIGURE 3.4 ROUTED TRUCK TONNAGE IN THE CORE MPO REGION, 2019



Source: TRANSEARCH; Cambridge Systematics, Inc. analysis.

FIGURE 3.5 ROUTED TRUCK TONNAGE IN THE CORE MPO REGION, 2050

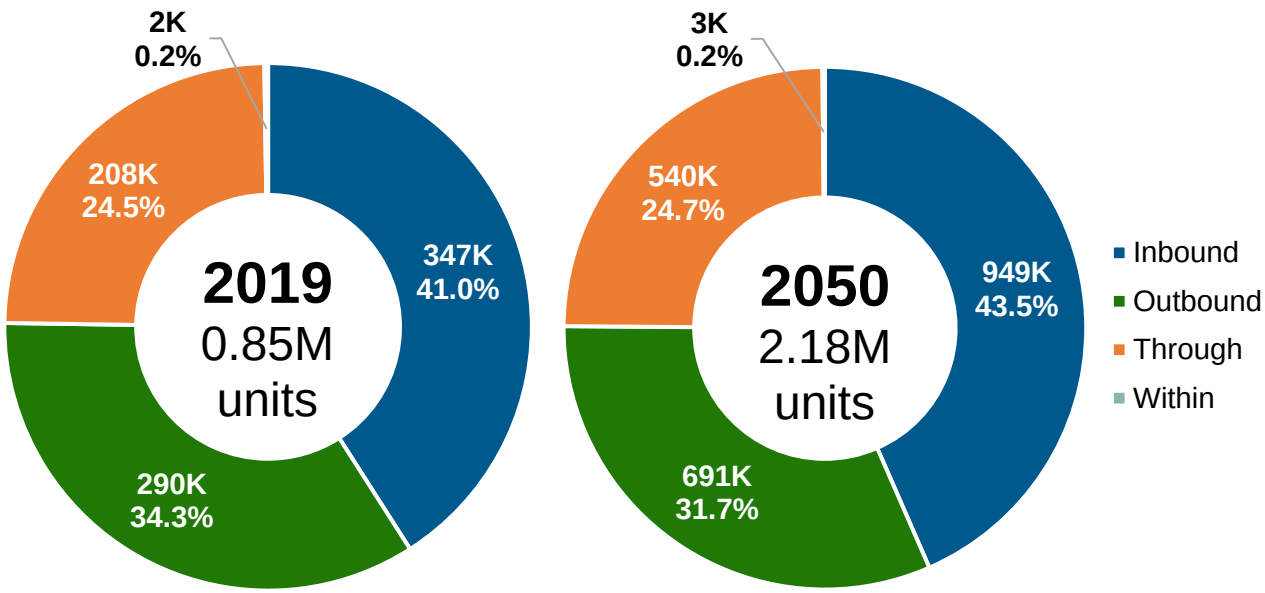


Source: TRANSEARCH; Cambridge Systematics, Inc. analysis.

Rail Commodity Flows

Figure 3.6 shows the rail unit movements (i.e., carloads and trailers/containers on flatcars) by direction in 2019 and 2050. In 2019, just nearly 850,000 total rail units moved throughout the region, with about 41 percent of those consisting of inbound movements to the region. By 2050, inbound movements are projected to grow to represent about 43.5 percent of the region's approximately 2.18 million total rail units. Outbound movements are estimated to comprise just over 34 percent of rail units in 2019 and are projected to decrease in total share of traffic to nearly 32 percent by 2050. Just under 25 percent of the rail units are estimated to pass through the region without stopping.

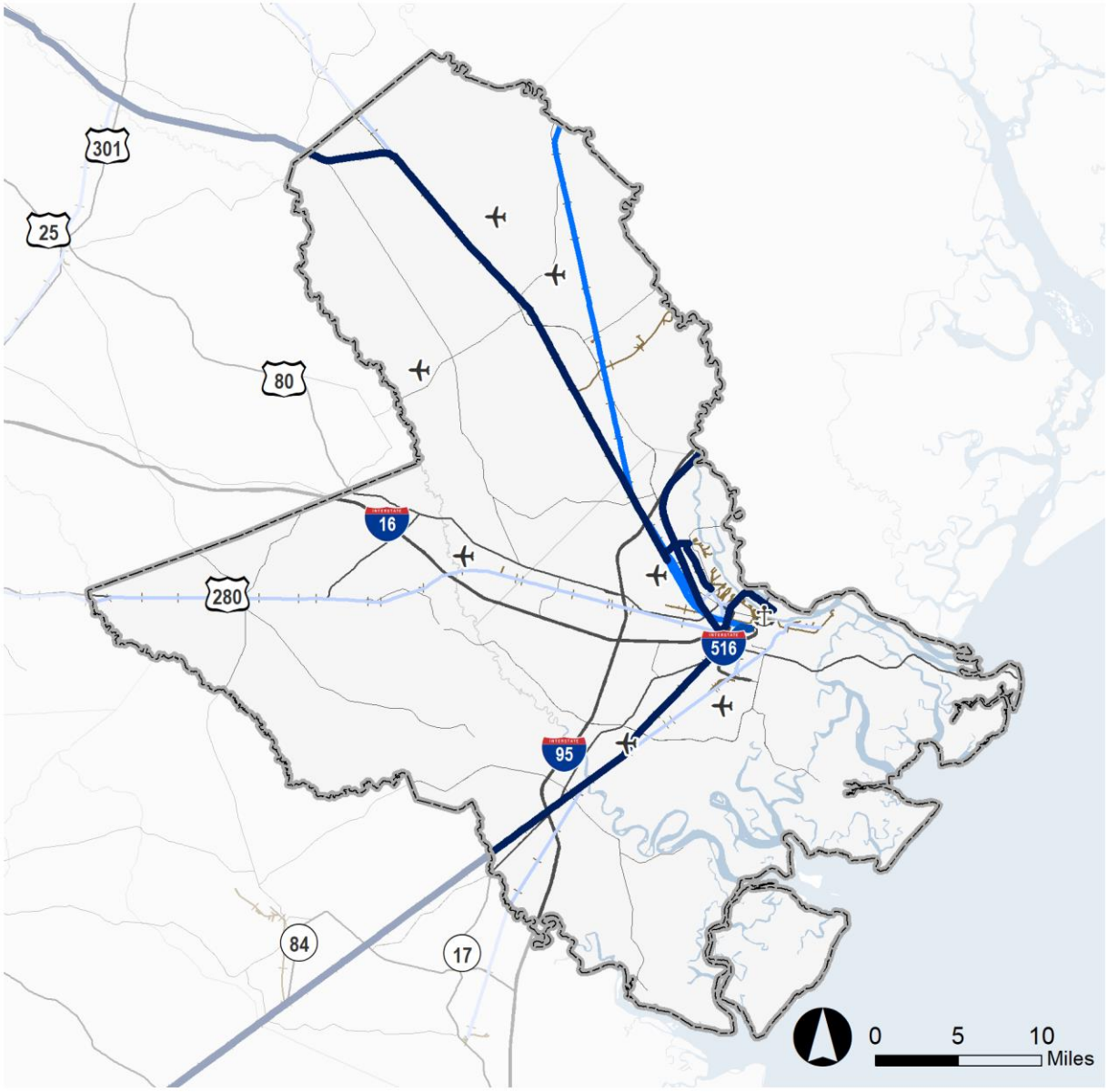
FIGURE 3.6 CORE MPO RAIL UNITS BY DIRECTION, 2019 AND 2050

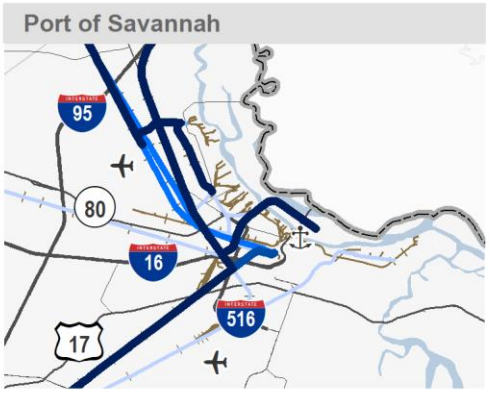


Source: TRANSEARCH; Cambridge Systematics, Inc. analysis.

Figure 3.7 and Figure 3.8 show the routed TRANSEARCH rail data for the CORE MPO region for 2019 and 2050, respectively. In both years, the highest concentration of rail traffic is experienced by segments proximate to the Port of Savannah and along the Savannah River. These segments of track are estimated to carry over 100,000 rail units annually in 2019 and 2050. Based on the data, the highest volume segments in the region include: (1) the CSX Transportation line north of the Port of Savannah into South Carolina which parallels I-95; (2) the Norfolk Southern line northwest from the port; and (3) the CSX Transportation southwest from the port. All of these lines are expected to increase in traffic by 2050.

FIGURE 3.7 RAIL FLOWS IN THE CORE MPO REGION, 2019



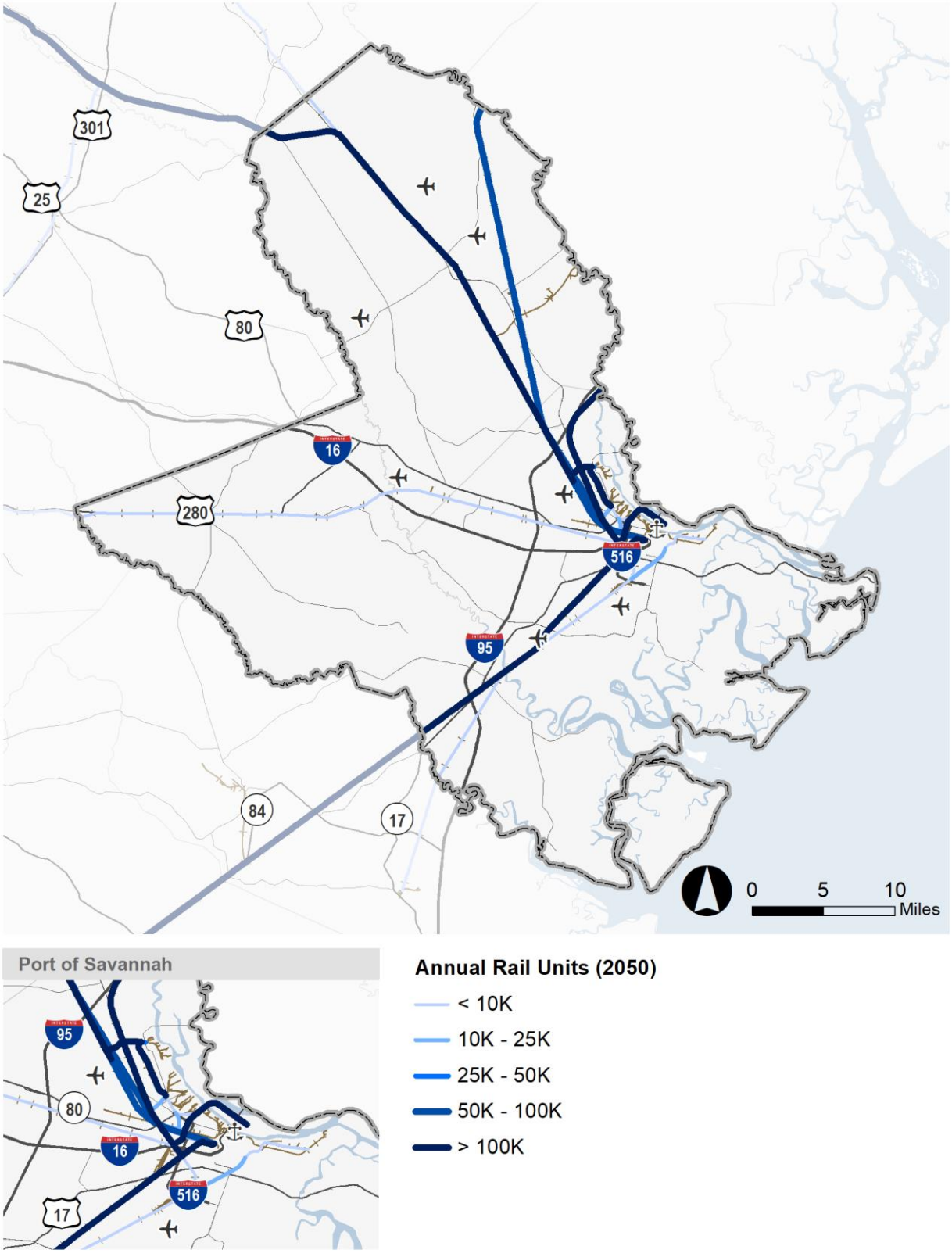


Annual Rail Units (2019)

- < 10K
- 10K - 25K
- 25K - 50K
- 50K - 100K
- > 100K

Source: TRANSEARCH; Cambridge Systematics, Inc. analysis.

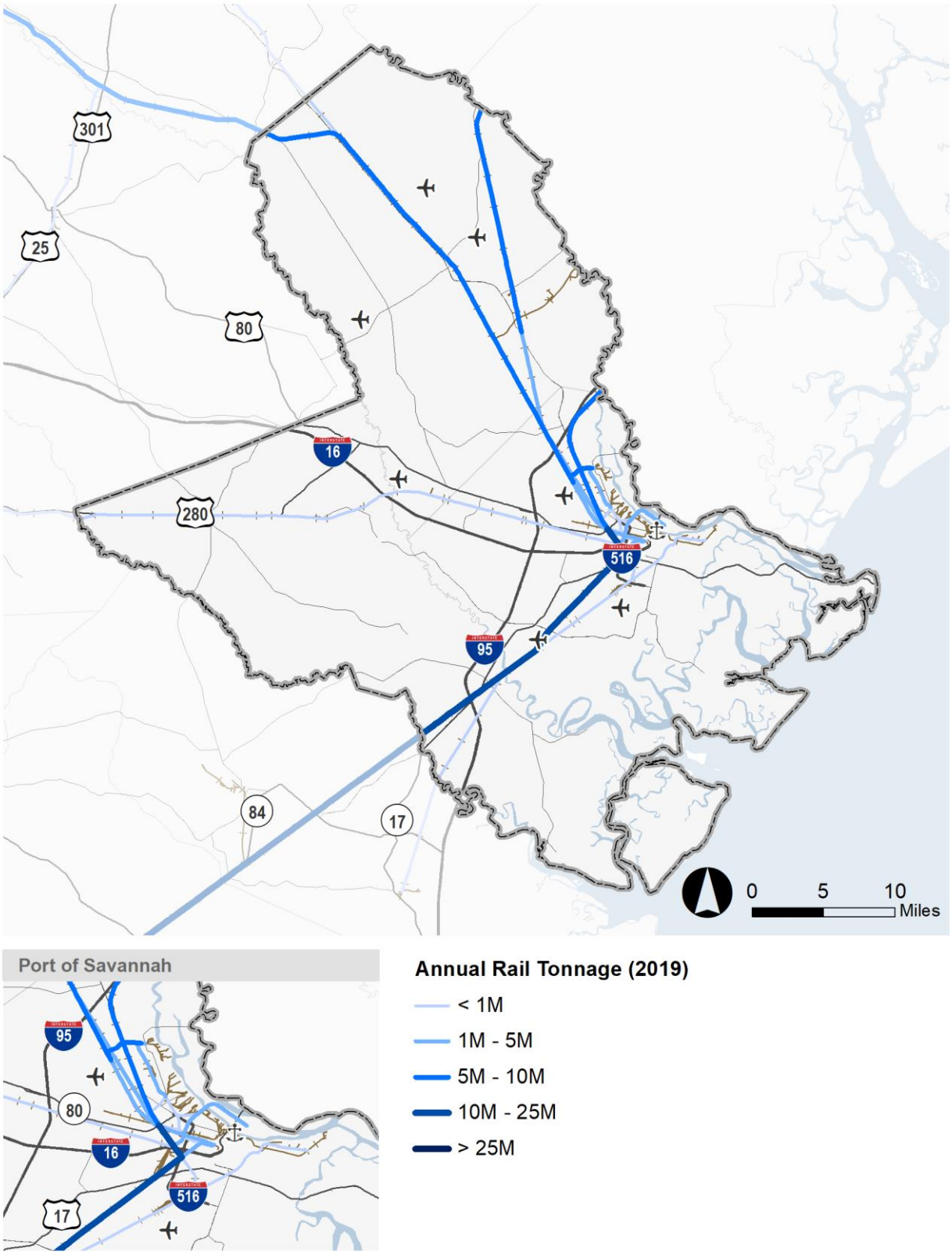
FIGURE 3.8 RAIL FLOWS IN THE CORE MPO REGION, 2050



Source: TRANSEARCH; Cambridge Systematics, Inc. analysis.

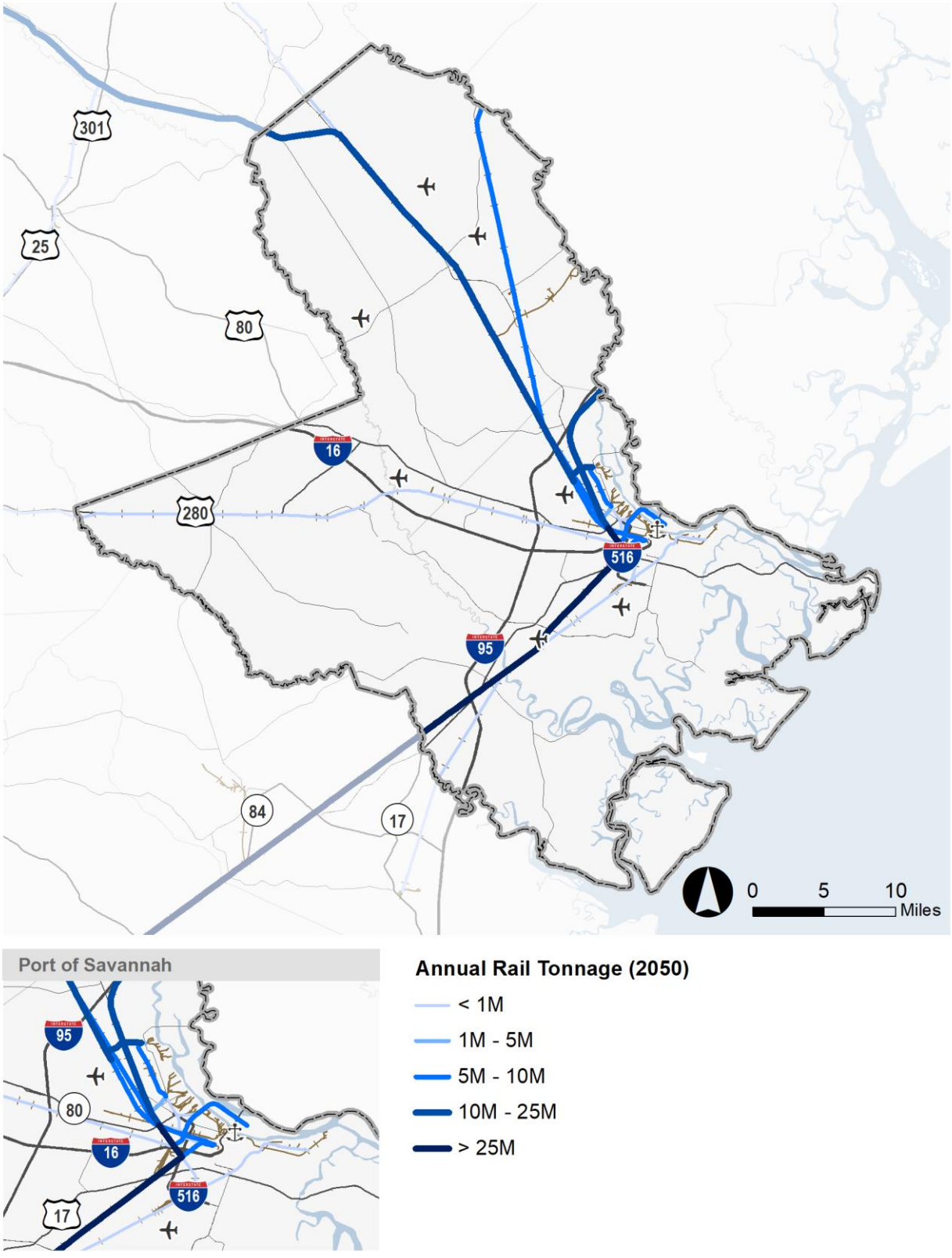
Figure 3.9 and Figure 3.10 are similar to the previous two figures, but instead display routed tonnage (as opposed to routed units) on the rail network. These maps highlight the same routes as before but provide context as to how much tonnage they carry. The same routes previously discussed carry at least 5 million tons annually in 2019 and over 10 million annually in 2050. The CSX rail line southwest from the Port of Savannah is estimated to carry the most tonnage with about 15 million tons in 2019 and 34 million tons in 2050.

FIGURE 3.9 ROUTED RAIL TONNAGE IN THE CORE MPO REGION, 2019



Source: TRANSEARCH; Cambridge Systematics, Inc. analysis.

FIGURE 3.10 ROUTED RAIL TONNAGE IN THE CORE MPO REGION, 2050

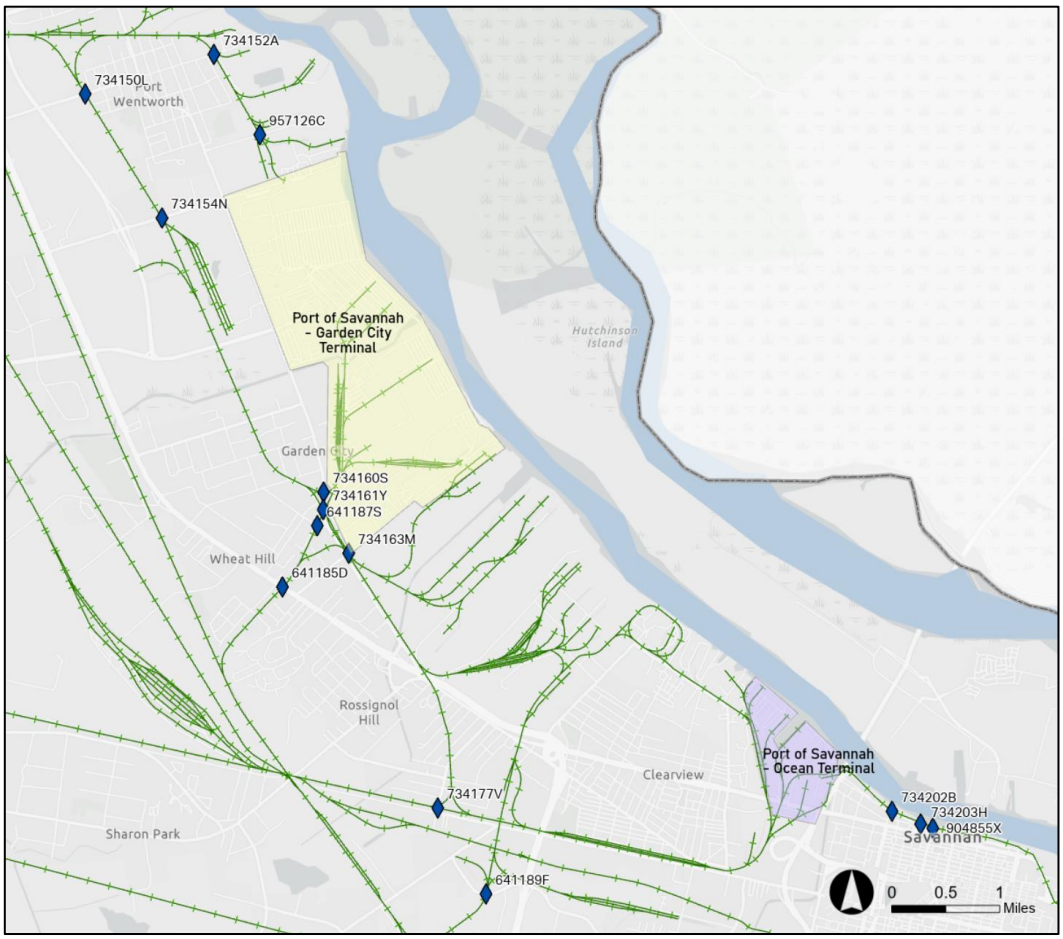


Source: TRANSEARCH; Cambridge Systematics, Inc. analysis.

Port of Savannah Train Volumes

Generally, the Port of Savannah generates about 6 trains daily out of its Garden City and Ocean Terminals based on feedback from the Georgia Ports Authority. Some additional insights on train activity at the Port of Savannah can be developed using information published in the Federal Railroad Administration (FRA) highway-rail crossing database. For this analysis, 15 at-grade, public, open railroad crossings were considered due to their location on high volume tracks around the entrances to the Port of Savannah's Garden City Terminal (North) and Ocean Terminal (South). These 15 crossings are shown in Figure 3.11. Four of these 15 crossings, primarily those east of the Ocean Terminal, reported no activity. The reason is because the Georgia Ports Authority (GPA) does not often load trains with cargo at that location.

FIGURE 3.11 AT-GRADE RAIL CROSSINGS NEAR THE PORT OF SAVANNAH



Source: Federal Railroad Administration; AECOM.

Table 3.1 contains the FRA data on total through and switching train movements for at-grade crossings that report some level of train activity. Through train movements are those where a train passes a crossing en route to its destination. Switching movements are those associated with building rail units into trains or breaking down trains into units so that they may be delivered to a customer or attached to a different train. The largest volume of daily through train movements occur across four crossing locations: crossings 734152A and 957126C north of the Garden City Terminal, crossing 641187S south of the Garden City Terminal, and crossing 734177V south of the port across the east-west stretch of railroad between the two

terminals. These total daily through train volumes equate to approximately 4,000 to 6,500 trains annually around the two terminals.

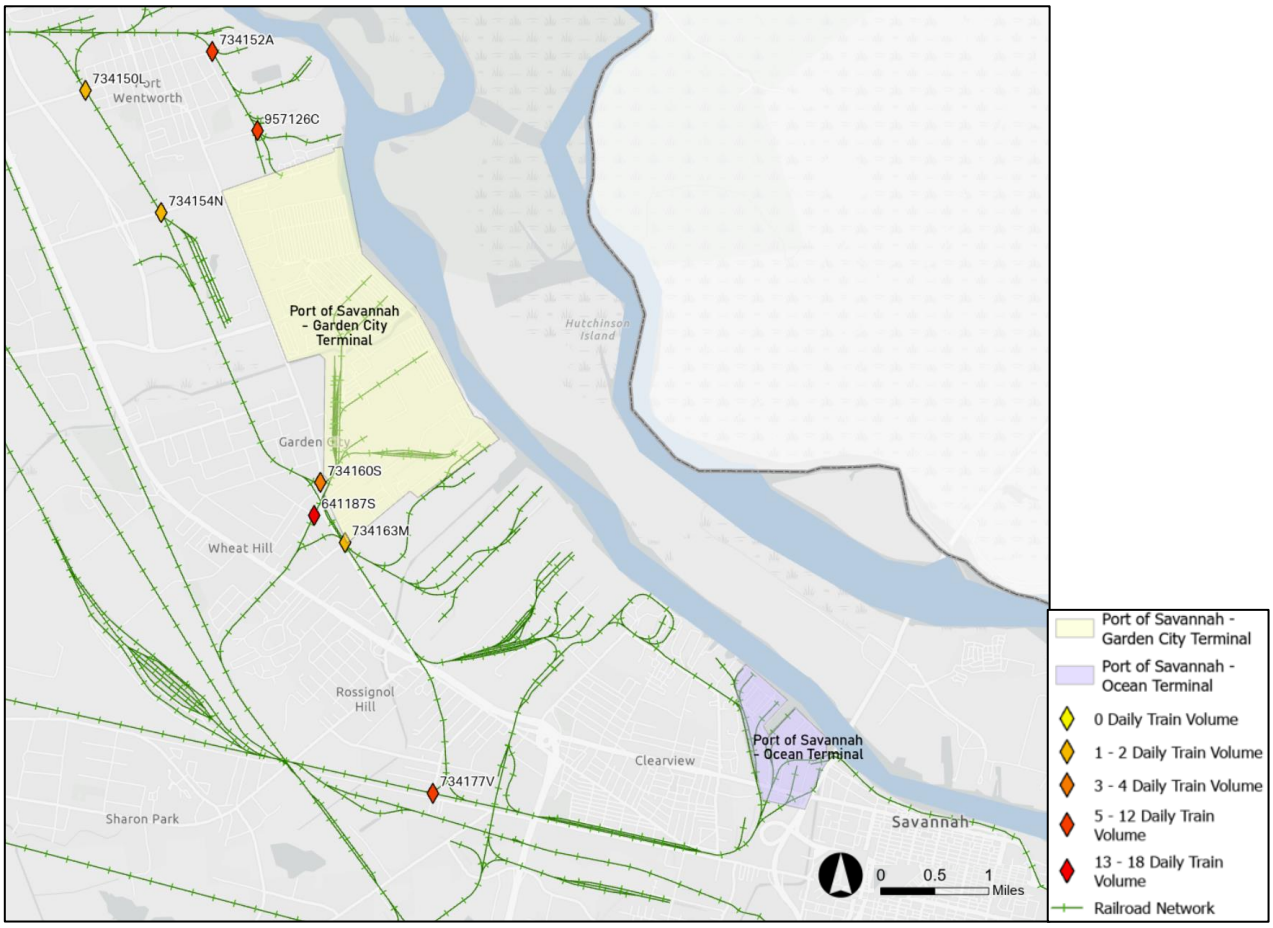
TABLE 3.1 TRAIN MOVEMENTS AT AT-GRADE CROSSINGS NEAR THE PORT OF SAVANNAH

Crossing ID	Railroad	Switching Movements	Through Train Movements
641187S	CSX	3	18
641189F	CSX	6	0
641213E	CSX	2	0
734150L	NS	0	2
734152A	NS	10	12
734154N	NS	0	2
734160S	NS	2	4
734161Y	NS	8	0
734163M	NS	2	2
734177V	NS	10	11
957126C	NS	10	12

Source: Federal Railroad Administration, 2022; AECOM; Cambridge Systematics.

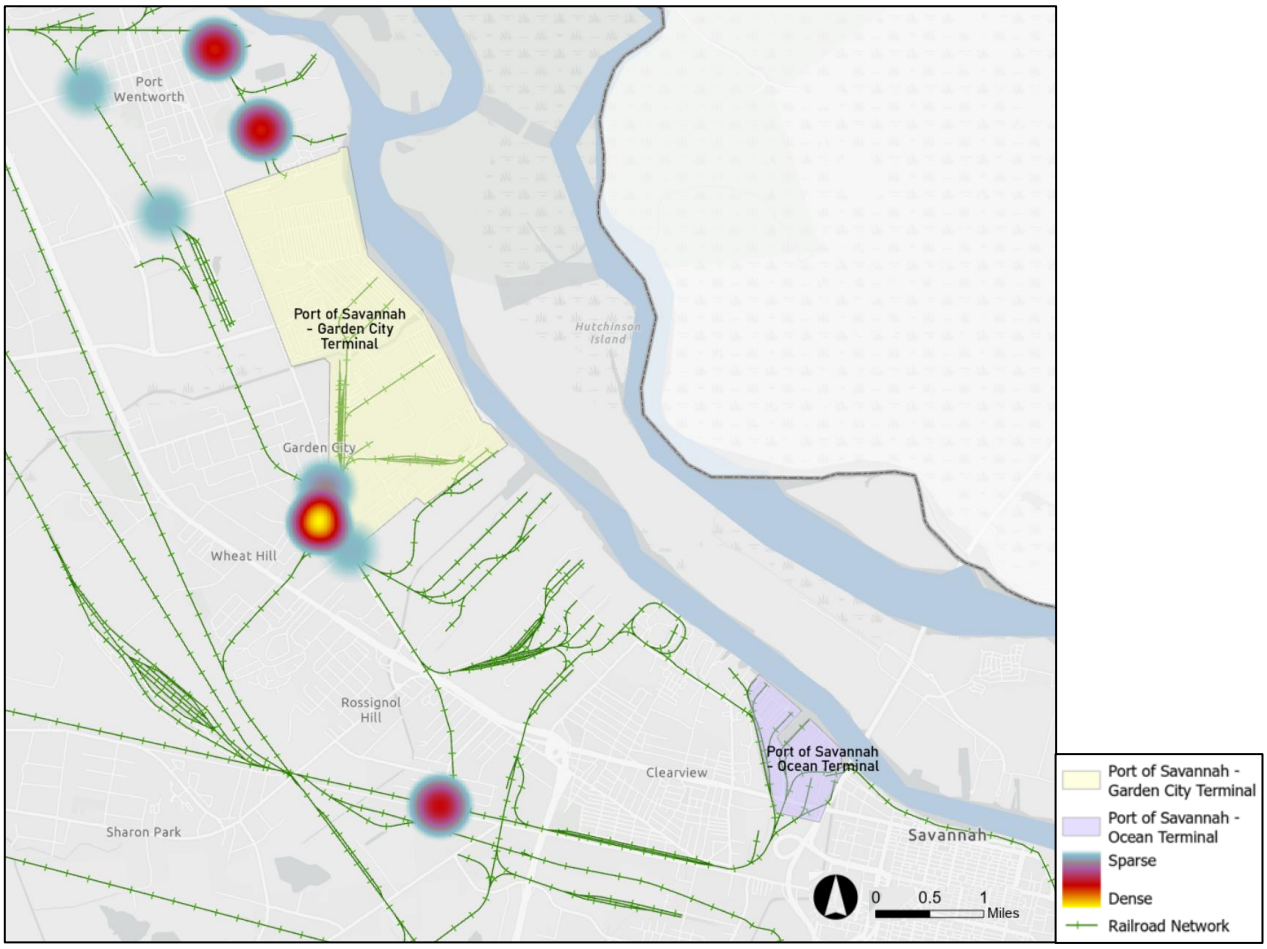
Figure 3.12 shows the average daily train volumes for the crossings. This data can be visualized as a heat map to accentuate the high train volume areas near the Port of Savannah. These four hot spots are shown in Figure 3.13. The densest hot spot area is to the south entrance of the Garden City Terminal, where crossings 641187S and 743160S are located. These patterns may change because of the recently opened Mason Mega Rail Terminal, which added over 97,000 feet of new rail and expanded the Garden City Terminal for a total of 34 miles of track. It will enable the Port of Savannah to receive six 10,000-foot trains simultaneously, thereby greatly increasing capacity and potentially redistributing train patterns.

FIGURE 3.12 TRAIN VOLUMES AT AT-GRADE CROSSINGS PROXIMATE TO THE PORT OF SAVANNAH



Source: Federal Railroad Administration, 2022; AECOM; Cambridge Systematics.

FIGURE 3.13 HEATMAP OF TRAIN VOLUMES AT AT-GRADE CROSSINGS PROXIMATE TO THE PORT OF SAVANNAH



Source: Federal Railroad Administration, 2022; AECOM; Cambridge Systematics.

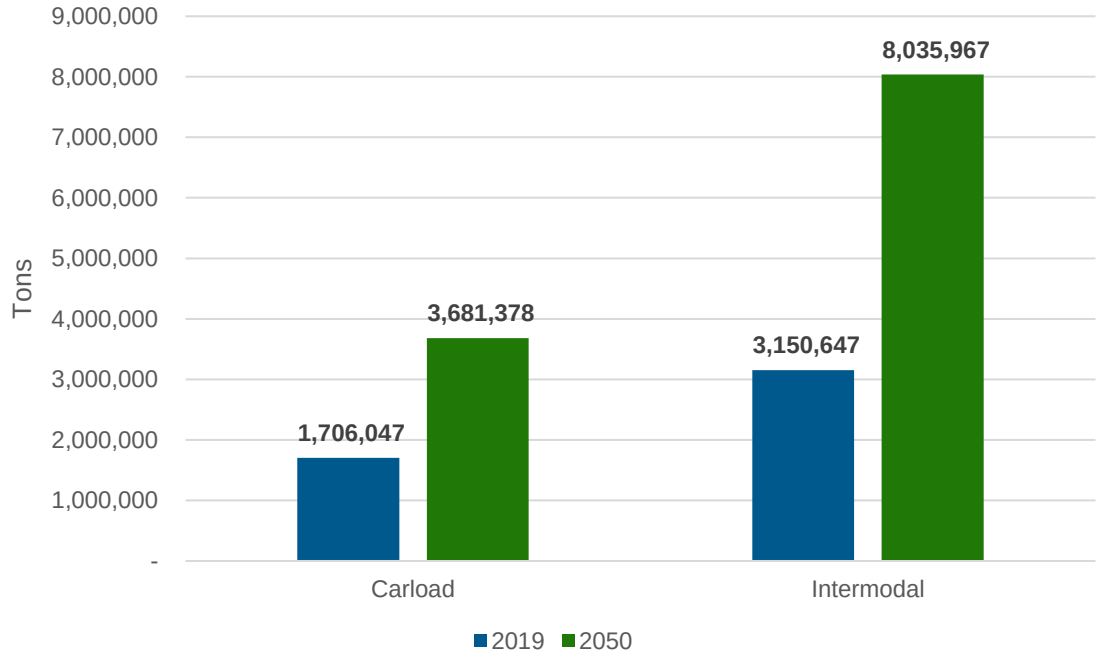
In addition to the FRA data, information from the TRANSEARCH database also provides insights into train volumes associated with the Port of Savannah. TRANSEARCH flags international shipments as either import or exports. Given that the Port of Savannah is the only international gateway in the region for shipments arriving or departing via rail, international rail shipments to and from the region were assumed to be served by the Port of Savannah. It is important to note that the forecasted routing does not consider network or operational changes that may impact the specific rail routes taken to and from the Port of Savannah.

Figure 3.14 shows the estimated tonnage of rail by traffic type served by the Port of Savannah in 2019 and 2050. Carload traffic consists of boxcars, hopper cars, and tankers and is typically used to transport bulk goods such as agricultural products, sand, gravel, coal, and chemicals or other liquids. Intermodal traffic consists of containers or trailers and can be used to transport a variety of goods. For the Savannah region, the top five containerized commodities to or from the port by rail in 2019 include freight all kinds (FAK) shipments[1], metal scrap or tailings, chemical preparations, plastic materials or synthetic fibers, and tires or inner tubes. In 2019, over 1.7 million carload tons and 3.1 million intermodal tons are estimated to have been

[1] FAK shipments consists of various goods that have been grouped together so that they may be transported as a single shipment at a fixed rate.

shipped to or from the Port of Savannah. By 2050, those values are projected to increase to nearly 3.7 million carload tons and over 8 million intermodal tons. This represents an increase of nearly 116 percent for carload tonnage and 155 percent for intermodal tonnage.

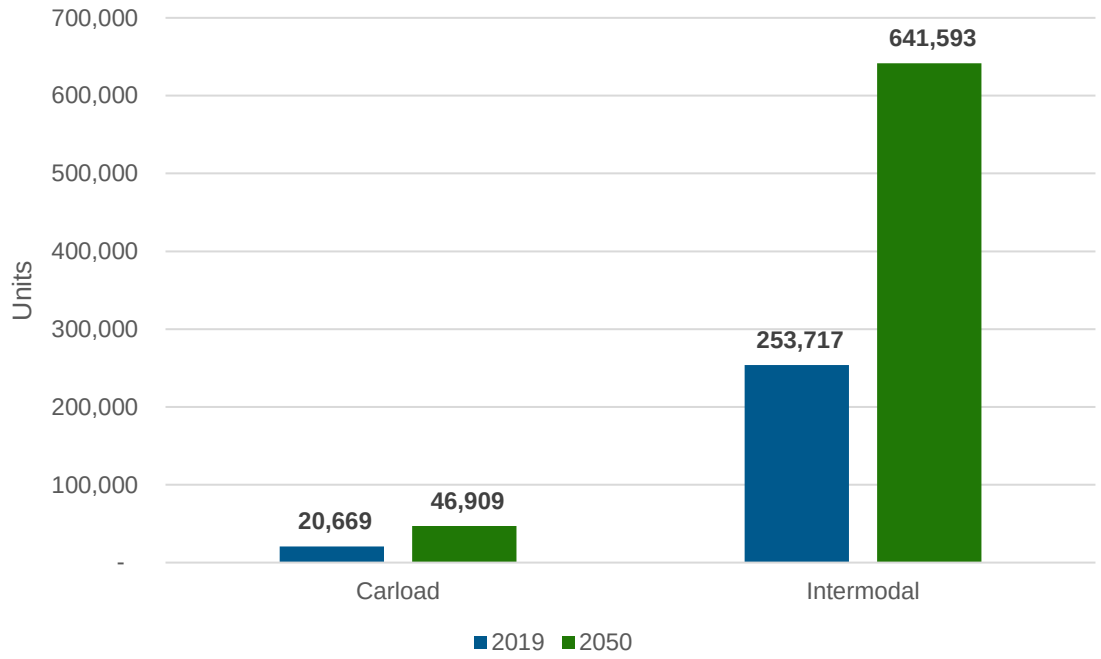
FIGURE 3.14 PORT OF SAVANNAH RAIL TONNAGE BY TRAFFIC TYPE, 2019 AND 2050



Source: TRANSEARCH; Cambridge Systematics, Inc. analysis.

In terms of units (i.e., carloads and containers on flatcars) of rail traffic serving the Port of Savannah, in 2019 nearly 21 carloads and 254,000 intermodal containers are estimated to have been shipped to or from the Port of Savannah. By 2050, those values are projected to increase to nearly 47,000 carloads and nearly 642,000 intermodal tons. This represents an increase of nearly 127 percent for carload tonnage and 153 percent for intermodal tonnage.

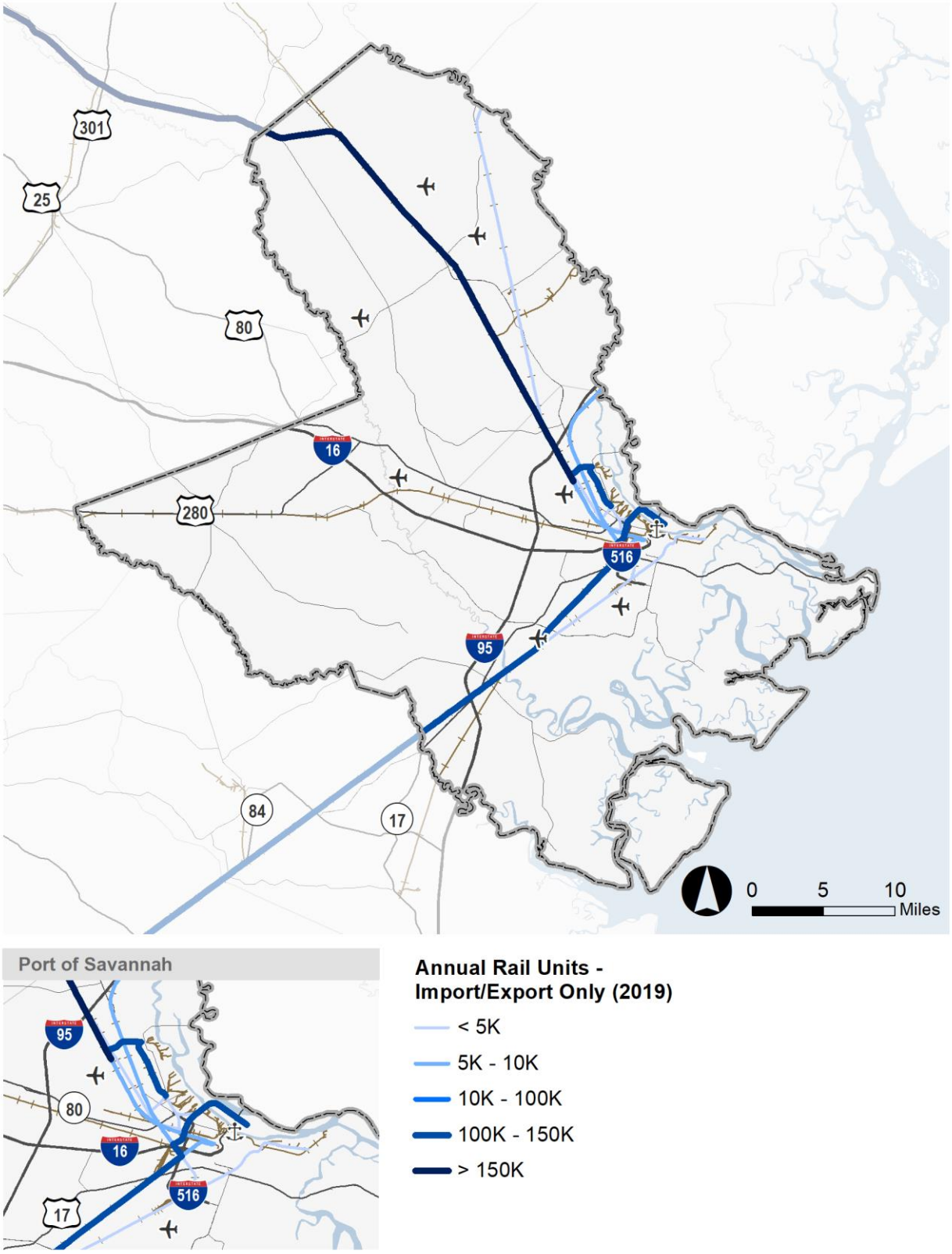
FIGURE 3.15 PORT OF SAVANNAH RAIL UNITS BY TRAFFIC TYPE, 2019 AND 2050



Source: TRANSEARCH; Cambridge Systematics, Inc. analysis.

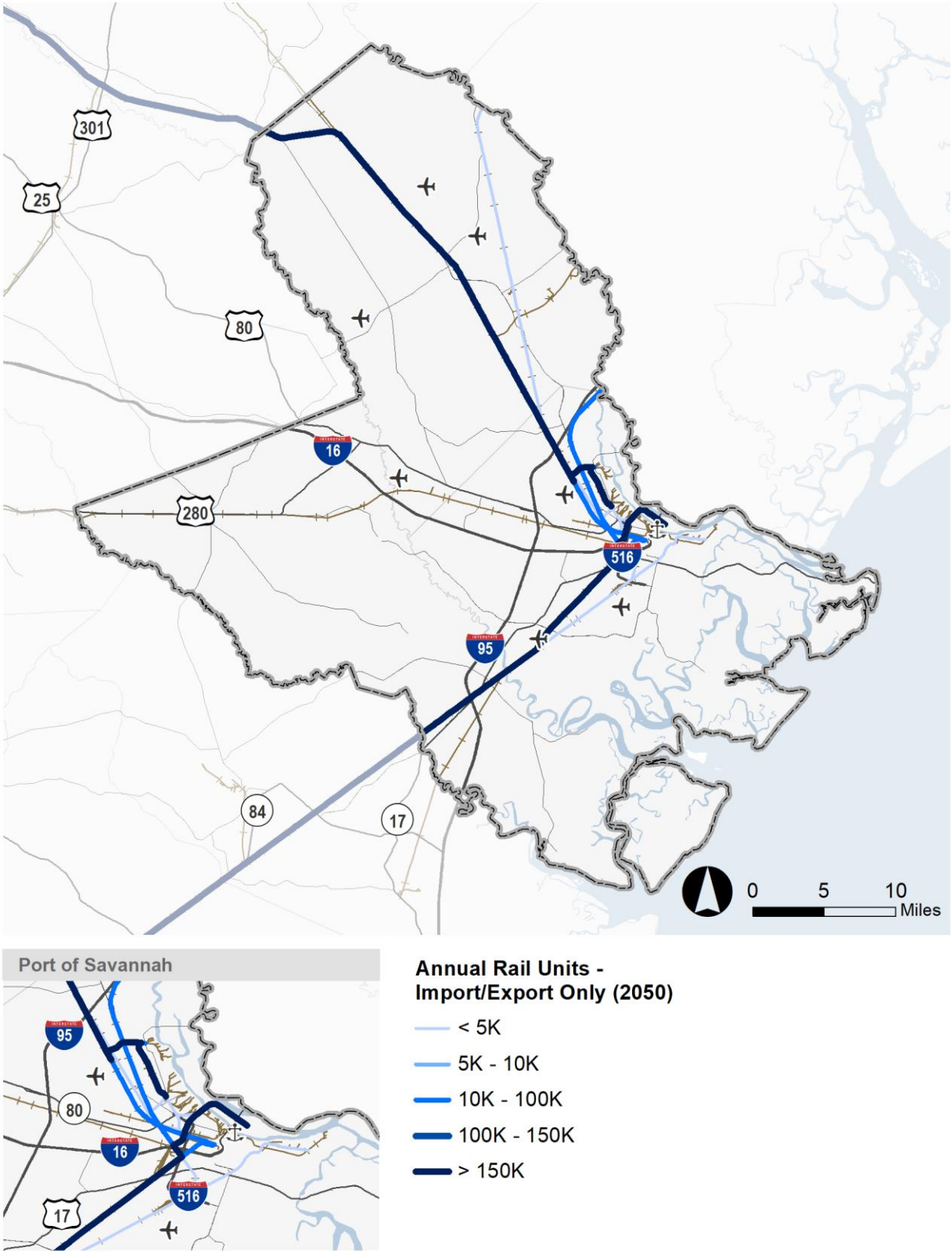
Figure 3.16 and Figure 3.17 show 2019 and 2050 annual rail flows that originate or end in Chatham County and are assumed to be attributed to activity at the Port of Savannah. The highest volume routes in the region for port rail traffic are similar to the overall highest volume routes in the previous set of figures. The highest-trafficked routes include: (1) the two Norfolk Southern and CSX Transportation spur lines directly into the western and eastern portions of the port, respectively, with over 150,000 annual units in 2019 and 2050; (2) the Norfolk Southern line northwest from the port with over 150,000 annual units in 2019 and 2050; and (3) the CSX Transportation southwest from the port with over 100,000 annual units in 2019 and 150,000 annual units in 2050. All of these lines are expected to increase in traffic by 2050.

FIGURE 3.16 INTERNATIONAL RAIL FLOWS IN THE CORE MPO REGION, 2019



Source: TRANSEARCH; Cambridge Systematics, Inc. analysis.

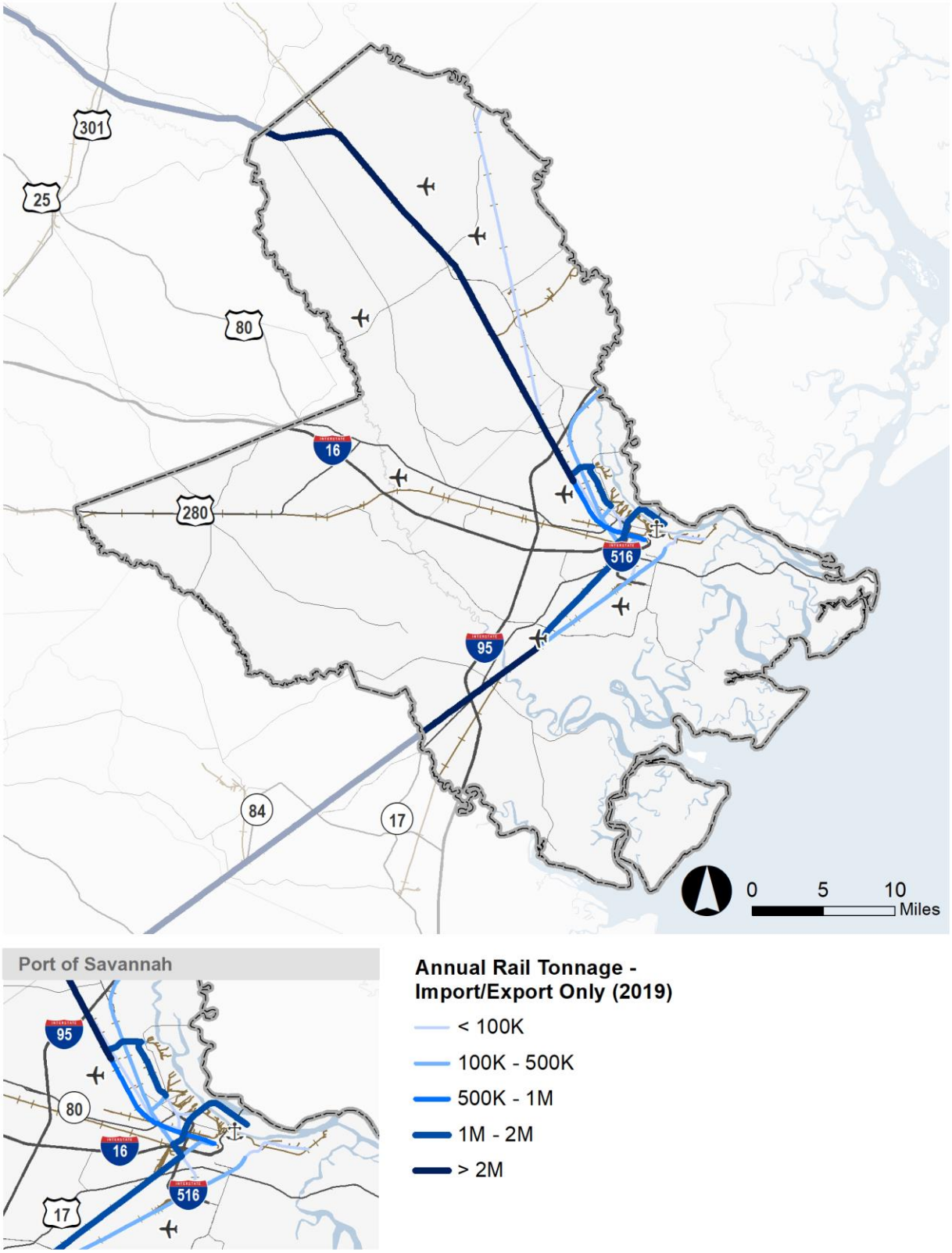
FIGURE 3.17 INTERNATIONAL RAIL FLOWS IN THE CORE MPO REGION, 2050



Source: TRANSEARCH; Cambridge Systematics, Inc. analysis.

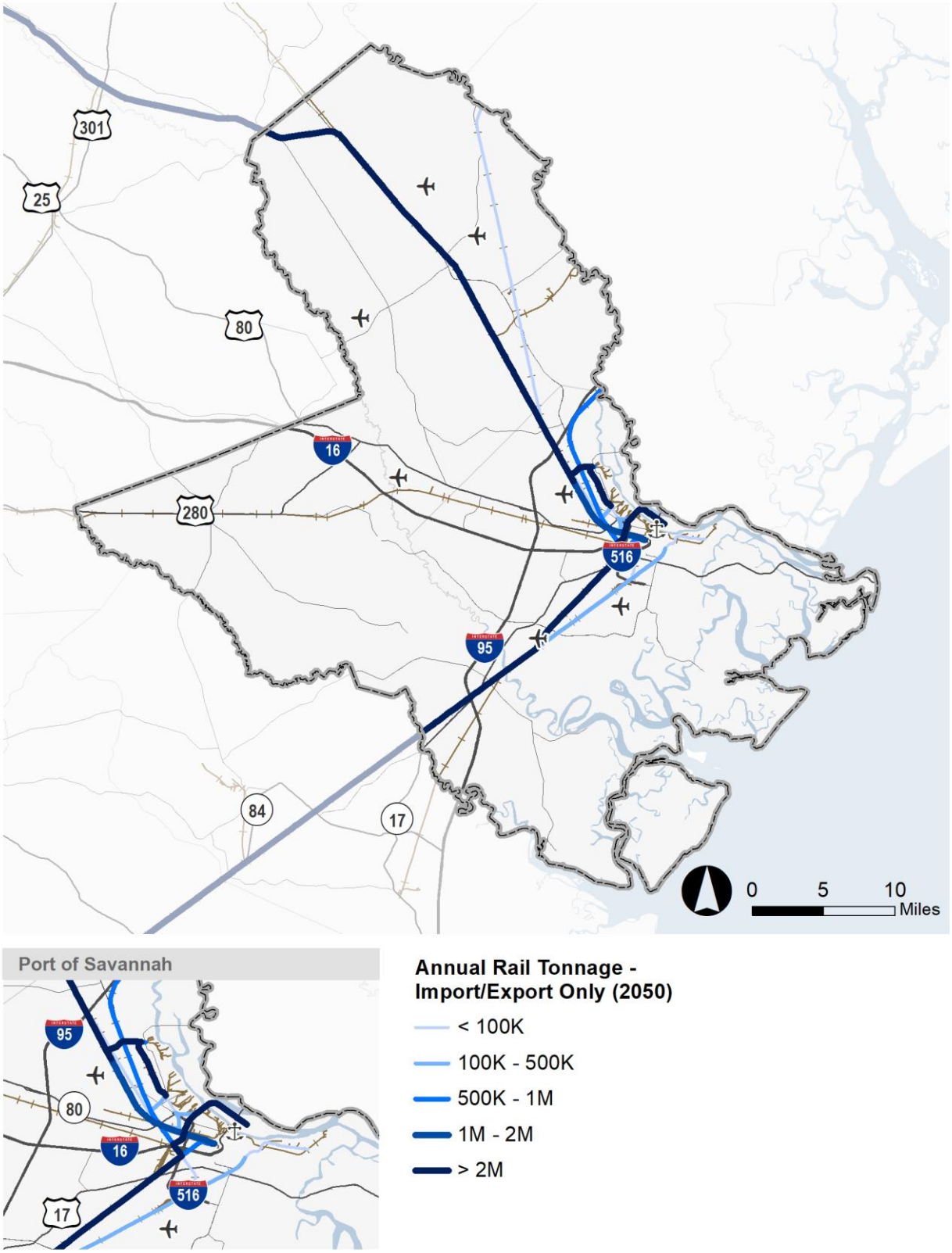
Figure 3.18 and Figure 3.19 display the same international rail shipments as the previous two figures, but display the annual tonnage as opposed to annual rail flows. The same routes – the Norfolk Southern route to the northwest, the CSX line to the southwest, and the two spurs directly into the port – have the highest amounts of tonnage in both analysis years, more than 1 million tons in 2019 and 2 million tons in 2050. When comparing the results of the TRANSEARCH data analysis for rail volumes attributed to the port to general rail volumes, there are two lines that exhibit high tonnages and volumes for general rail movements but not for those associated with the port. These include the CSX line north from downtown Savannah into South Carolina and the CSX line north-northeast from downtown Savannah into South Carolina. This suggests freight rail shipments serving the Port of Savannah are generally not routed through South Carolina.

FIGURE 3.18 INTERNATIONAL ROUTED RAIL TONNAGE IN THE CORE MPO REGION, 2019



Source: TRANSEARCH; Cambridge Systematics, Inc. analysis.

FIGURE 3.19 INTERNATIONAL ROUTED RAIL TONNAGE IN THE CORE MPO REGION, 2050



Source: TRANSEARCH; Cambridge Systematics, Inc. analysis.

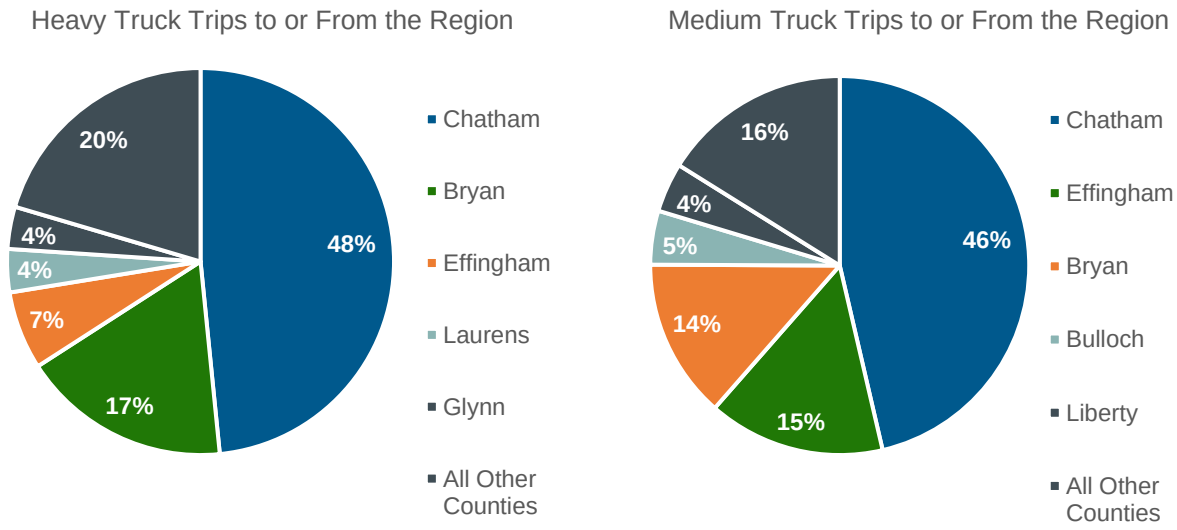
3.2 Truck Origin-Destination Patterns

In addition to commodity flow data, freight activity patterns were investigated using truck GPS data from INRIX. The GPS data provide information on the origins and destinations of medium and heavy-duty trucks in the state of Georgia for the months of February, August, and October of 2019. These data were analyzed to derive average daily weekday estimates of truck trip patterns for the region. While the data provide a real-world look at how trucks navigate the CORE MPO region, it is important to note that the data only represent a sample of trucks and not all trucks that operate in the region.

Truck Trips in the Study Area

The first component of the analysis examined the average daily origin-destination patterns of heavy and medium truck trips throughout the 3-county region. About 72 percent of heavy truck trips and 75 percent of medium truck trips began and ended in the region as shown in Figure 3.20. Outside of the region, Laurens, Glynn, Liberty, and Bulloch Counties were substantial generators of truck traffic into and out of the region.

FIGURE 3.20 AVERAGE DAILY TRUCK TRIPS BY COUNTY IN THE STUDY AREA, 2019

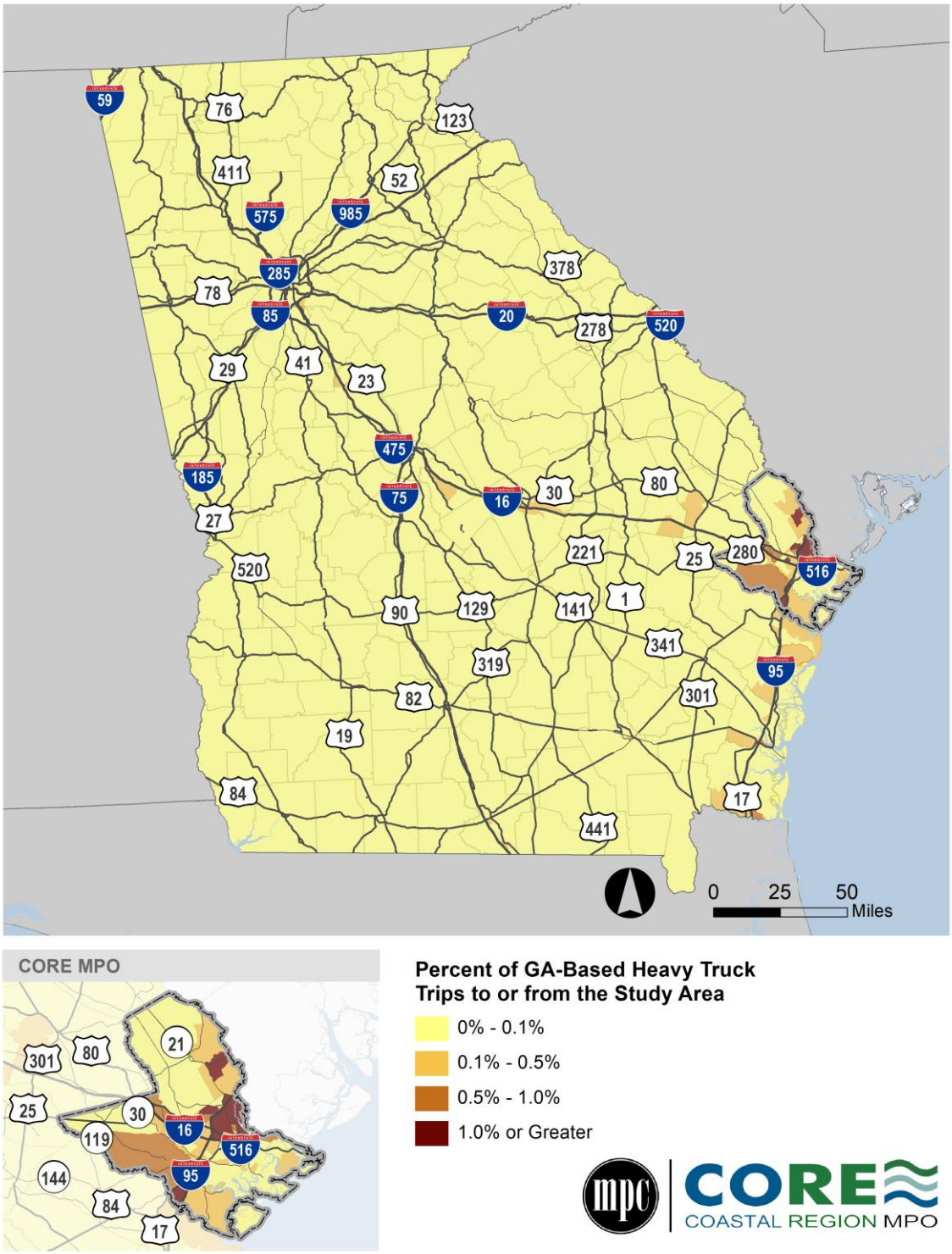


Source: INRIX; Cambridge Systematics, Inc. analysis.

Though outside of the 3-county region, Glynn, Liberty, and Bulloch Counties are proximate to the CORE MPO study area. Furthermore, major shippers (such as Target, SNF, Georgia Pacific) are located in those counties that rely on freight assets in the study area – namely the Port of Savannah and the CSX and Norfolk Southern intermodal rail terminals. Truck trips with and endpoint in Laurens County likely reflect the prevalence of truck parking facilities in the county, which are situated along I-16. There are at least 4 commercial truck stops providing more than 150 truck parking spaces in Laurens County. In addition, there are two rest areas along I-16 Eastbound and Westbound that provide 22 and 14 truck parking spaces, respectively.

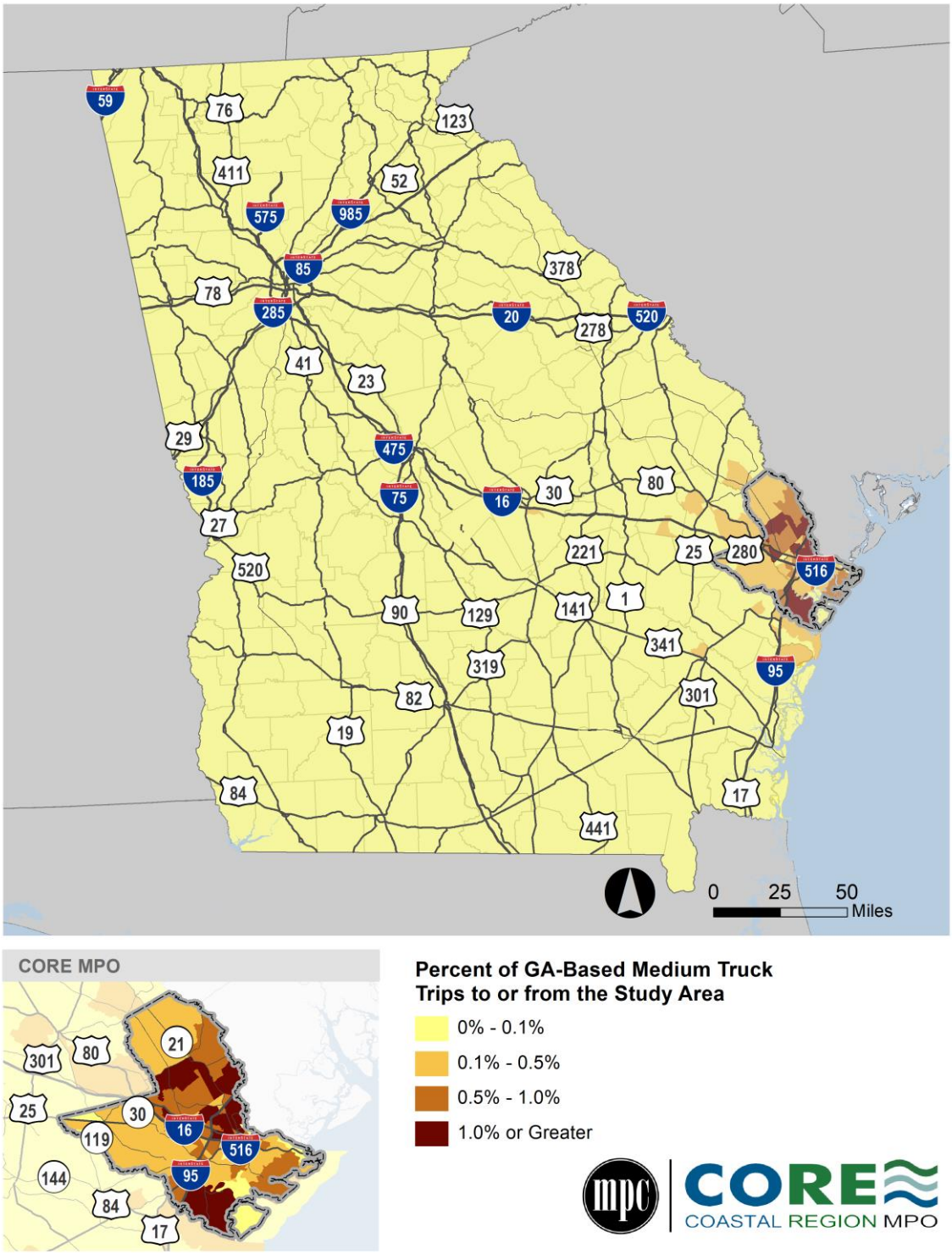
Figure 3.21 and Figure 3.22 show heavy and medium duty truck trips that have an endpoint in a traffic analysis zone (TAZ) in the study area. Both figures reflect the concentration of truck trip ends within the 3-county region. They also depict the prevalence of truck trips that begin or end along the I-95 corridor south of the CORE MPO region. Portions of Liberty, McIntosh, Glynn, and Camden Counties along I-95 were all found to generate truck trips to and from the CORE MPO study area. In addition, communities along the I-16 corridor (primarily Laurens and Bibb Counties) and the US 80 corridor (namely Bulloch County) show concentrations of truck trips to and from the study area.

FIGURE 3.21 HEAVY TRUCK TRIPS TO OR FROM THE STUDY AREA



Source: INRIX; Cambridge Systematics, Inc. analysis.

FIGURE 3.22 MEDIUM TRUCK TRIPS TO OR FROM THE STUDY AREA

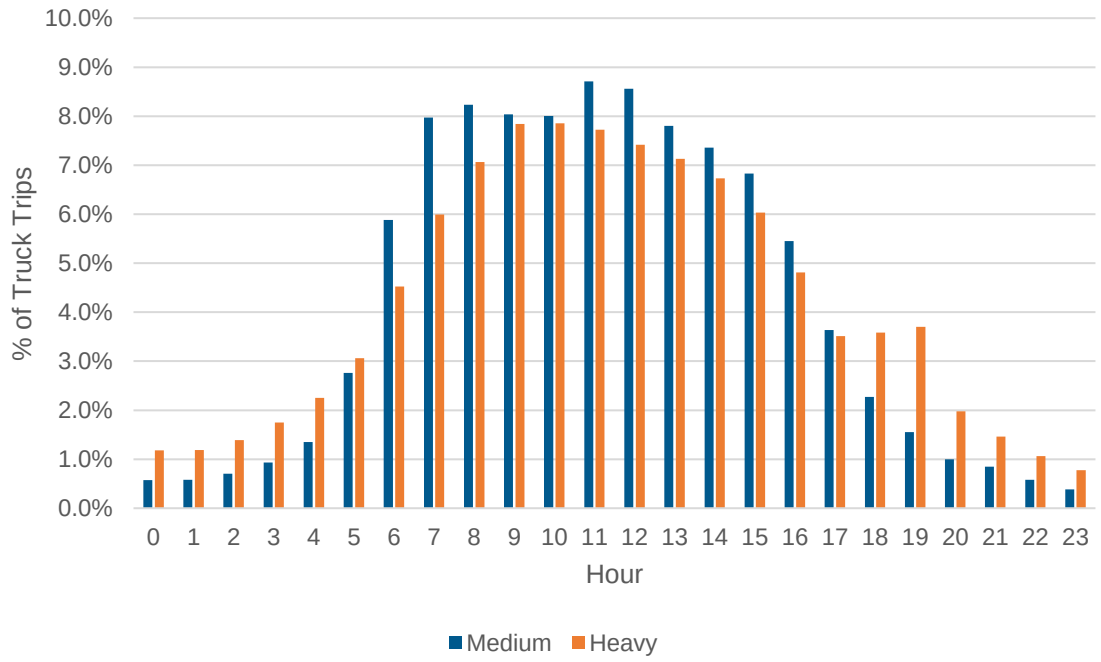


Source: INRIX; Cambridge Systematics, Inc. analysis.

The analysis also examined the time-of-day distribution of truck trips with an endpoint in the study area. Figure 3.23 shows that freight activity begins around 5 a.m. with about three percent of truck trips (both medium and heavy trucks) starting around this time. Activity quickly accelerates into the early morning hours

as about 25 percent of medium truck trips and 20 percent of heavy truck trips begin during the 5 – 8 a.m. hours. Activity continues to increase throughout the morning before beginning to recede around 11 a.m. Notably, heavy truck activity is substantially higher than activity for medium trucks from the evening to early morning hours (i.e., 5 p.m. – 4 a.m.). Multiple factors contribute to this including the use heavy trucks for longer distance trips which require longer operating hours. It also reflects the need for heavy trucks to find overnight parking during the evening hours. Medium duty trucks are primarily used for local trips and have a home base within or near the region to return to, obviating the need to find overnight parking in the evening.

FIGURE 3.23 TIME OF DAY DISTRIBUTION OF DAILY AVERAGE TRUCK TRIPS TO OR FROM THE STUDY AREA

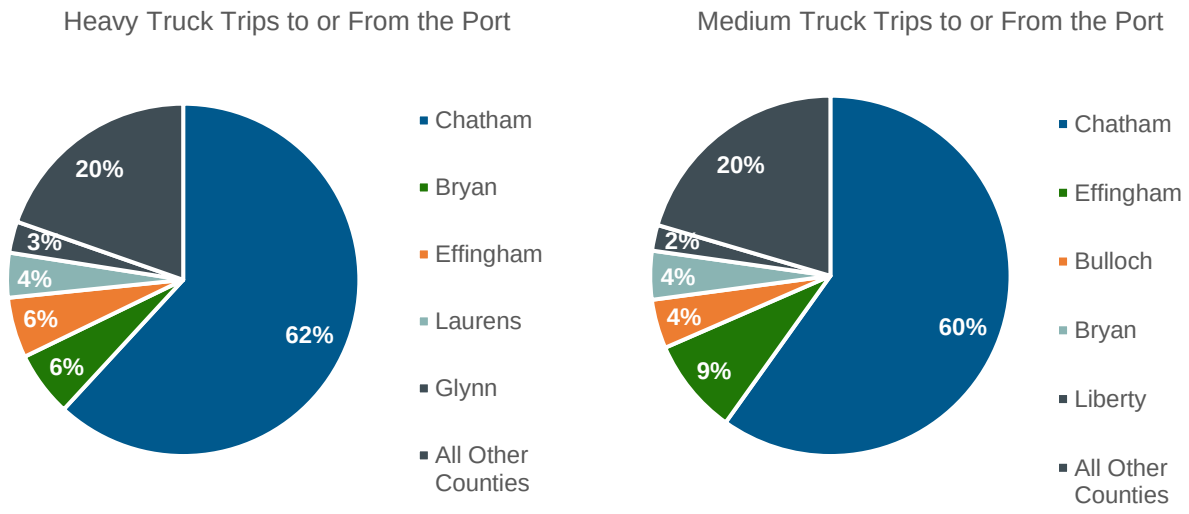


Source: INRIX; Cambridge Systematics, Inc. analysis.

Truck Trips at the Port of Savannah

While the previous analysis examined all truck trips with an endpoint in the study area, this analysis investigates only truck trips with an endpoint in a traffic analysis zone (TAZ) that includes the Port of Savannah. As shown in Figure 3.24, the results indicate that nearly 73 percent of heavy and medium truck trips that originate or terminate at the Port of Savannah have an endpoint in the region. Outside of the region, Laurens, Glynn, Liberty, and Bulloch Counties were substantial generators of truck traffic into and out of the port.

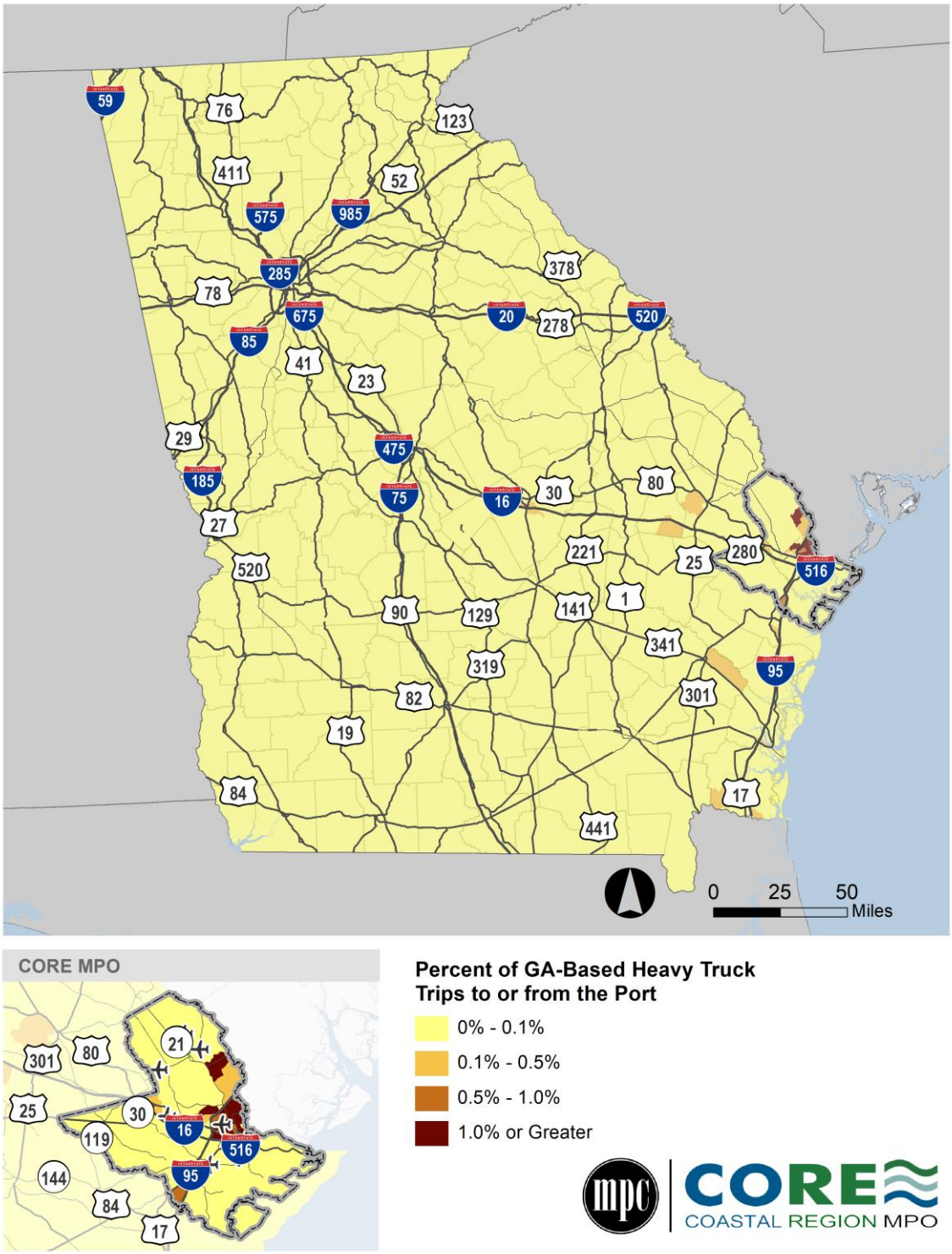
FIGURE 3.24 AVERAGE DAILY TRUCK TRIPS BY COUNTY TO AND FROM THE PORT



Source: INRIX; Cambridge Systematics, Inc. analysis.

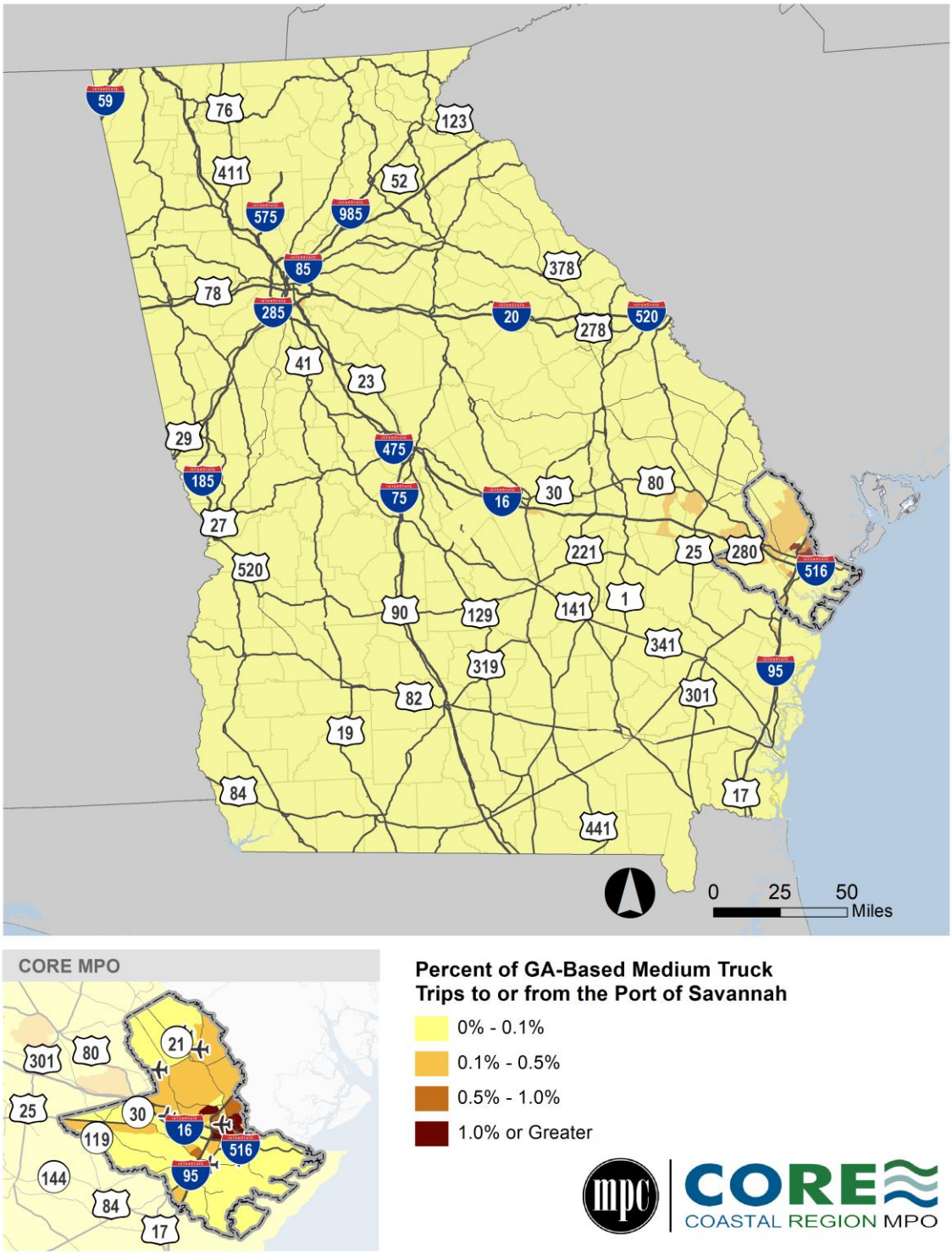
Similar to the truck trip end results for the entire study area, though Glynn, Liberty, and Bulloch Counties are outside the three-county region, they are proximate to the CORE MPO study area and contain major shippers that likely rely on the port. Figure 3.25 and Figure 3.26 show heavy and medium duty truck trips that have an endpoint at the port. Both figures reflect the concentration of truck trip ends in areas immediately north and west of the port, along the SR 21, SR 25, US 80, and Jimmy Deloach Pkwy. Several distribution centers serving retailers such as Walmart, Target, IKEA, and others are located in this area. This area also has a large truck parking facility with over 100 spaces. The figures also depict the prevalence of truck trips that begin or end along the US 80 corridor in Bulloch County.

FIGURE 3.25 HEAVY TRUCK TRIPS TO OR FROM THE PORT OF SAVANNAH



Source: INRIX; Cambridge Systematics, Inc. analysis.

FIGURE 3.26 MEDIUM TRUCK TRIPS TO OR FROM THE PORT OF SAVANNAH

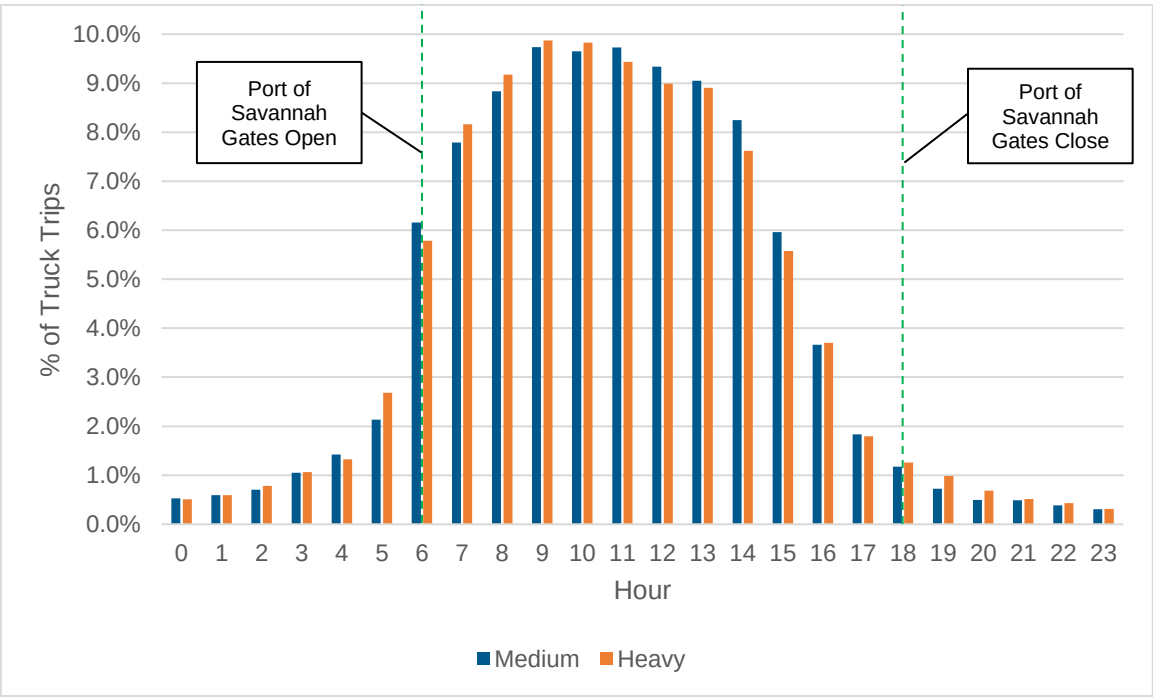


Source: INRIX; Cambridge Systematics, Inc. analysis.

The analysis also examined the time-of-day distribution of truck trips with an endpoint near the port. Overall, truck trip activity appears to follow the Port of Savannah's gate hours which are from 6 a.m. to 6 p.m. during weekdays. Figure 3.27 shows that there is a sharp increase in activity when the port gates open at 6 a.m.

Activity quickly accelerates throughout the morning before beginning to recede around midday. After 4 p.m., about two hours ahead of the gates closing, very little activity occurs.

FIGURE 3.27 TIME OF DAY DISTRIBUTION OF TRUCK TRIPS TO OR FROM THE PORT OF SAVANNAH



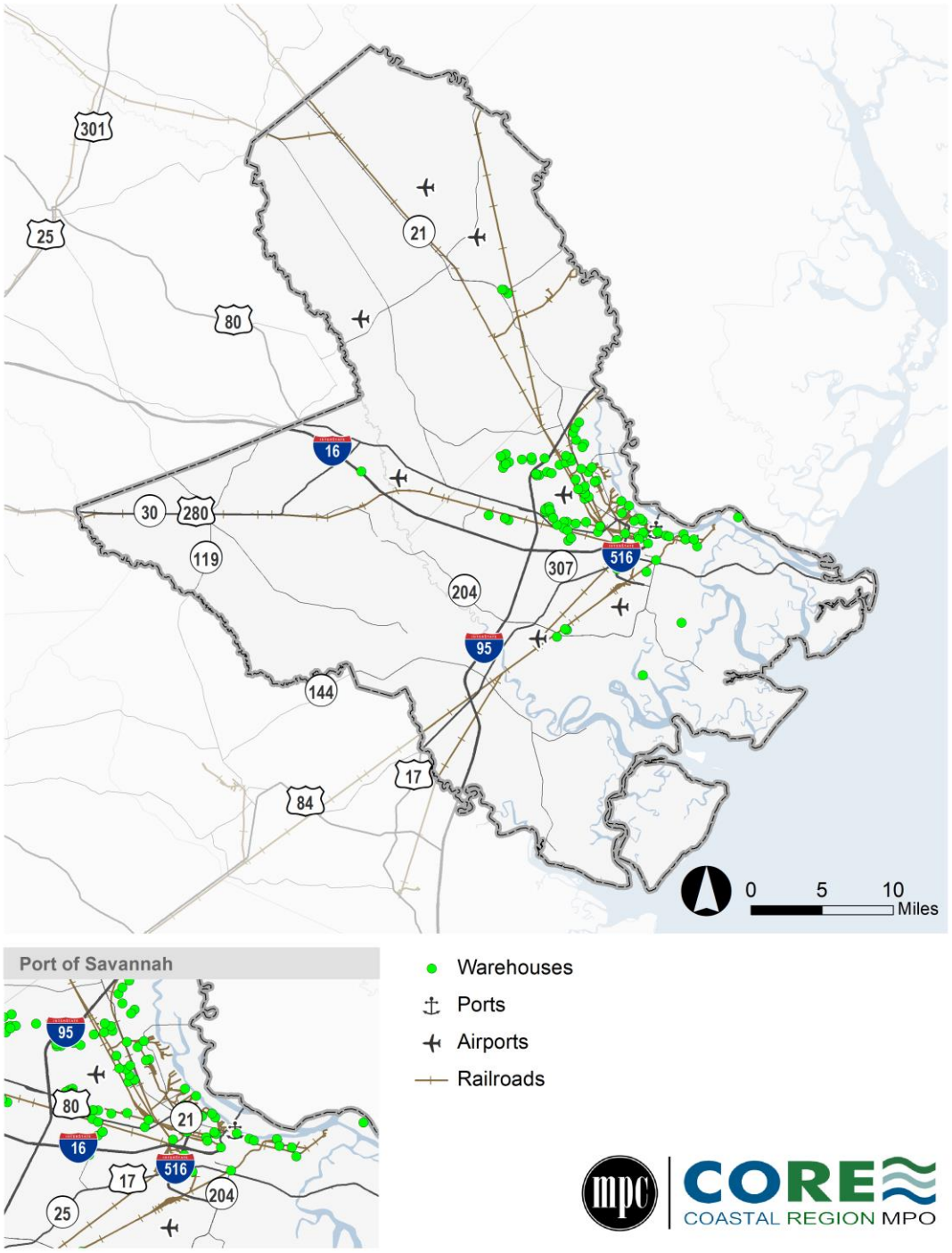
Source: INRIX; Cambridge Systematics, Inc. analysis.

4 FREIGHT TRANSPORTATION AND WAREHOUSING FACILITIES

Warehouses, distribution centers, truck terminals, and other logistics facilities are significant generators of freight traffic. Understanding where these facilities are located throughout the region provide insight into freight trip activity patterns. This analysis develops an inventory of the locations of businesses in the freight transportation and warehousing industry sector in the study area. It relies on data collected from the Savannah Economic Development Authority (SEDA) and U.S. Census Bureau's County Business Patterns database.

Figure 4.1 depicts warehouses in the CORE MPO region using data collected from the SEDA. It shows a heavy concentration of warehousing and logistics establishments north and west of the Port of Savannah. These establishments are primarily along the SR 21, SR 25, US 80, and Jimmy Deloach Pkwy. corridors. It also shows that there are numerous warehouses and other logistics facilities east of downtown Savannah. These facilities are concentrated in the area bounded by the Savannah River to the north and President Street to the south.

FIGURE 4.1 WAREHOUSES IN THE SAVANNAH REGION



Source: Savannah Economic Development Authority; Cambridge Systematics, Inc. analysis.

The data provided by SEDA was supplemented with County Business Patterns data from the U.S. Census Bureau in order to investigate the locations of businesses in the freight transportation and warehousing industry sector in the study area. This sector includes businesses that provide transportation of goods, warehousing and storage of goods, and support activities related to freight transportation. These businesses were identified at the zip code level according to the following 3-digit NAICS codes: 481 (Air Transportation),

482 (Rail Transportation), 483 (Water Transportation), 484 (Truck Transportation), 486 (Pipeline Transportation), 488 (Support Activities for Transportation), 492 (Couriers and Messengers), and 493 (Warehousing and Storage).

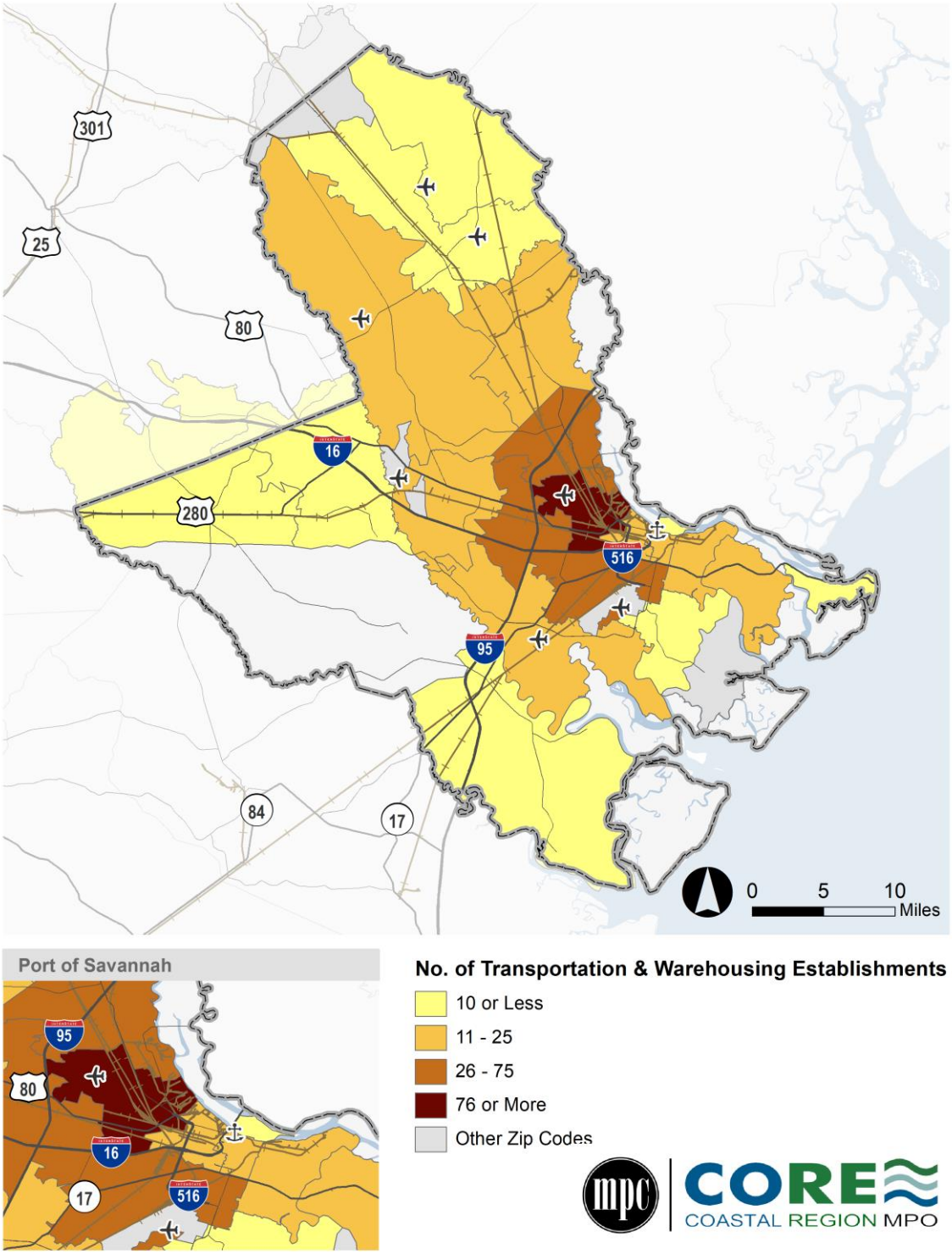
Table 4.1 and Figure 4.2 show the results of the analysis. The largest concentrations of transportation and warehousing establishments are in the 31408 (e.g., Garden City and west Savannah), 31407 (e.g., Port Wentworth), 31322 (e.g., Pooler), and 31405 (e.g., south Savannah) zip codes. These four zip codes contain over half of the region's freight transportation establishments. Other areas with concentrations of transportation and warehousing establishments include the 31326 (e.g., Rincon), 31415 (e.g., west Savannah including the areas west of US 17 along Louisville Road, Gwinnett St, and Chatham Pkwy. Towards US 80), and 31401 (e.g., areas of Savannah north of Victory Dr. including Hutchinson Island, west of Waters Ave., and east of Martin Luther King Blvd.).

TABLE 4.1 TRANSPORTATION AND WAREHOUSING IN THE CORE MPO REGION

Zip Code	Description	No. of Transportation and Warehousing Establishments	Percent of Total
31408	Garden City and West Savannah	108	24%
31407	Port Wentworth	64	14%
31322	Pooler	47	10%
31405	South Savannah	41	9%
31326	Rincon	25	5%
31415	West Savannah	24	5%
31401	Savannah – Historic District, Metropolitan, Thomas Square, Hutchinson Island, and Riverfront west of US 17	20	4%
31410	Whitemarsh Island, Wilmington Island	19	4%
31404	East Savannah, Thunderbolt, Elba Island	16	4%
31302	Bloomingdale	15	3%
31419	Coffee Bluff/ Rose Dhu, Gateway West, Georgetown	15	3%
31312	Guyton	12	3%
31324	Richmond Hill	10	2%
31406	Vernonburg	10	2%
31308	Ellabell	6	1%
31321	Pembroke	5	1%
31402	Savannah – Yamacraw Village	4	1%
31421	Hutchinson Island	4	1%
31303	Clyo	3	1%
31328	Tybee Island	3	1%
31329	Springfield	3	1%
31418	Garden City	3	1%
Total		**457**	**100%**

Source: U.S. Census Bureau, County Business Patterns; Cambridge Systematics, Inc. analysis.

FIGURE 4.2 TRANSPORTATION AND WAREHOUSING IN THE CORE MPO REGION

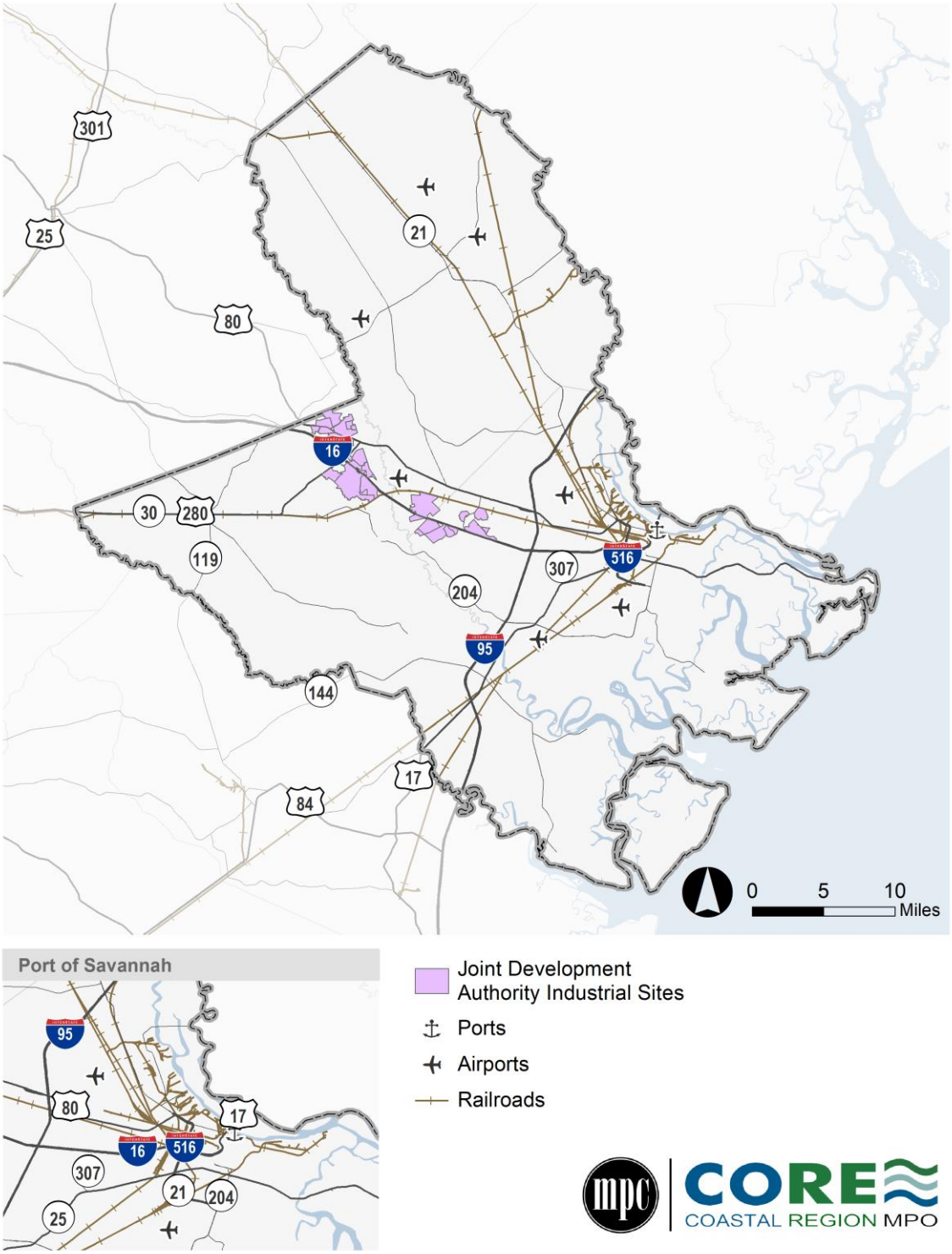


Source: U.S. Census Bureau, County Business Patterns; Cambridge Systematics, Inc. analysis.

While the analysis of SEDA and Census data provide an indication of where transportation and warehousing establishments are currently located, they do not provide an indication of where new facilities may be developed. The Savannah Harbor-Interstate 16 Corridor Joint Development Authority (JDA) includes the

development authorities of Bryan, Bulloch, Chatham, and Effingham Counties. The JDA combines the resources of its member counties to attract and facilitate regionally significant projects. Figure 4.3 shows the JDA industrial sites throughout the CORE MPO region. These sites comprise over 13,000 acres of land that is likely to be developed to include substantial volumes of warehouse, distribution, and other logistics space. As shown in Figure 4.3, these sites are concentrated along the I-16 corridor with much of the acreage being located in Bryan and Effingham Counties. It suggests that the I-16 corridor will facilitate much of the region's freight-oriented growth. A more detailed assessment of future land uses in the region will be performed as part of the land use assessment in Task 3.

FIGURE 4.3 JOINT DEVELOPMENT AUTHORITY INDUSTRIAL SITES IN THE CORE MPO REGION



Source: U.S. Census Bureau, County Business Patterns; Cambridge Systematics, Inc. analysis.

5 SUMMARY

This technical memorandum performed an assessment of existing and future freight movements throughout the three-county CORE MPO region. There were three main components to the assessment: (1) an analysis of commodity flows, (2) an analysis of freight activity patterns, (3) and an inventory of warehouses/distribution centers and freight transportation facilities. Some key insights from the memorandum are summarized below.

- About 163 million tons of freight worth $367 billion were transported to, from, within, or through the CORE MPO Region in 2019. By 2050, this is projected to more than double and grow to over 392 million tons of goods worth $895 billion.

- In 2019, almost 38 percent of all freight tonnage was moved through the region without making a stop. Through movements accounted for the largest share of tonnage. This is likely due to freight shipments traveling along I-95 as it provides access to Florida and major population centers along the east coast. By 2050, the proportions of tonnage by direction are projected to remain largely consistent with 2019 values.

- Food or kindred products, pulp and paper products, nonmetallic minerals, clay and stone, and lumber and wood products are among the top commodities by tonnage shipped in the CORE MPO region. Many of these commodities reflect major industry sectors in the coastal region and throughout Georgia such as forestry, wood processing, and paper and paper product manufacturing.

- Two of the CORE MPO region's top three in-state trading partners are in Metro Atlanta. Cobb and Fulton Counties collectively traded about 2.9 million tons with the CORE MPO region in 2019. By 2050, this is projected to more than double to over 7.8 million tons. Outside of Georgia, Florida is the region's top trading partner with other Southeastern states – namely South Carolina, North Carolina, and Tennessee – also contributing substantial volumes of freight.

- Over 70 percent of heavy-duty truck and medium-duty truck trips are estimated to begin and end in the region based on a 3-month sample of truck GPS data for the state of Georgia. Outside of the region, Laurens, Glynn, Liberty, and Bulloch Counties were substantial generators of truck traffic into and out of the region. This likely reflects interactions with major shippers located in those counties that rely on freight assets in the study area – namely the Port of Savannah and intermodal rail terminals. It also reflects the prevalence of truck parking facilities along I-16 and I-95 in nearby counties.

- There are over 450 freight transportation, warehousing, and distribution facilities in the CORE MPO region. These facilities are concentrated to the north and west of the Port of Savannah primarily along the SR 21, SR 25, US 80, and Jimmy Deloach Pkwy. corridors. There are also numerous warehouses and other logistics facilities east of downtown Savannah in the area bounded by the Savannah River to the north and President Street to the south. The I-16 corridor will be important for accommodating future freight-oriented growth as over 13,000 acres of developable land for industrial uses is located along the corridor, primarily in Bryan and Effingham Counties.