
Technical Report

South Carolina State Ports Authority Economic Impact Study

Prepared for:

South Carolina State Ports Authority

Prepared by:

Wilbur Smith Associates, Inc.

October 2008



Wilbur Smith Associates is a full-service transportation and infrastructure consulting firm providing a unique blend of planning, design, toll, economic and construction-related services to clients around the world. Completely employee owned, Wilbur Smith Associates has more than 1,000 associates in 56 offices in 8 countries. Since its founding in 1952, the firm has completed projects in all 50 U.S. states and 117 countries on six continents.

As a leading provider of economic and market analysis consulting services, Wilbur Smith Associates serves various governmental agencies, including federal, state, local and regional agencies, as well as private sector clients. We combine extensive industry knowledge, distinguished professionals and innovative analysis to help our clients make better decisions.

Table of Contents

- Executive Summary iii**
- 1. Economic Impact Methodology1-1**
 - 1.1. Study Overview.....1-1
 - 1.1.1. Study Area and Impact Regions.....1-1
 - 1.1.2. Port Operations1-2
 - 1.1.3. Impact Data1-4
 - 1.1.4. Charleston Harbor Tonnage1-5
 - 1.2. Impact Categories.....1-8
 - 1.2.1. Port Operations1-8
 - 1.2.2. Port Users.....1-9
 - 1.3. Impact Analysis.....1-9
 - 1.3.1. Impact Measures1-9
 - 1.3.2. Impact Types1-9
- 2. Demographic and Economic Profile2-1**
 - 2.1. Population.....2-1
 - 2.2. Employment.....2-2
 - 2.3. Income2-3
 - 2.4. Gross State Product2-5
- 3. SCSPA Economic Impacts3-1**
 - 3.1. Port Operation Impacts.....3-1
 - 3.1.1. Direct Port Operation Impacts3-1
 - 3.1.2. Total Port Operation Impacts.....3-2
 - 3.2. Port User Impacts3-3
 - 3.2.1. Port User Impacts by Trade Direction3-4
 - 3.2.2. Port User Impacts by Terminal Type3-6
 - 3.2.3. Port User Impacts by Region.....3-6
 - 3.3. Total Port-Related Impacts3-7
 - 3.3.1. Statewide Impact Summary.....3-8
 - 3.3.2. Regional Impacts.....3-8
 - 3.3.3. Industry Employment Impacts by Regional Sector3-12
 - 3.3.4. Tax Impacts3-13
 - 3.4. Conclusion3-14

References

Exhibits

<u>No.</u>	<u>Title</u>	<u>Page</u>
1-1	Port Impact Regions.....	1-3
1-2	International Shipments by Seaport Districts (2007).....	1-4
1-3	Major Port Users by Industry Size.....	1-6
1-4	Charleston Harbor Tonnage (Thousands) – 2007	1-7
1-5	Charleston Harbor Tonnage (Thousands) – 2002-2007	1-8
1-6	Charleston Harbor Tonnage and Value by Terminal Type – 2007.....	1-8
2-1	South Carolina Population Trends – 1990-2007	2-1
2-2	South Carolina Private Sector Employment – 2007.....	2-2
2-3	South Carolina Average Annual Wage Earnings per Employee – 2007	2-3
2-4	National and State Unemployment Rates – 2007	2-4
2-5	South Carolina Mean Household Income – 2007	2-4
2-6	South Carolina State GSP (Millions 2000\$) – 2002-2007.....	2-5
3-1	Direct Port Operation Impacts – 2007.....	3-2
3-2	Port Operation Impact Summary – 2007.....	3-3
3-3	Port User Impacts by Direction – 2007	3-4
3-4	South Carolina Export and Import Values – 2007.....	3-5
3-5	South Carolina Port Exports and Imports by Origin/Destination – 2007	3-5
3-6	Port User Impacts by Terminal Type – 2007.....	3-7
3-7	Port User Impacts by Region – 2007	3-7
3-8	Port-Related Impact Summary – 2007.....	3-8
3-9	Aiken Port-Related Impacts – 2007)	3-9
3-10	Lowcountry Port-Related Impacts – 2007	3-9
3-11	Midlands Port-Related Impacts – 2007	3-10
3-12	Pee Dee Port-Related Impacts – 2007	3-10
3-13	Piedmont Port-Related Impacts – 2007	3-11
3-14	Tri-County Port-Related Impacts – 2007.....	3-11
3-15	Employment Impacts by Region and Industrial Sector – 2007.....	3-13
3-16	Port-Related Tax Impacts by Region (\$Millions) – 2007.....	3-14

Executive Summary

The South Carolina State Ports Authority (SCSPA) facilitates cargo transport directly through the Ports of Charleston and Georgetown. In doing so, the SCSPA directly handles over 13.7 million tons of cargo annually, as well as facilitates 10.6 million private terminal tonnage movements. The imported and exported commodities span a wide spectrum, from raw materials used in construction to sophisticated electrical machinery and motor vehicles. To understand the current economic impact associated with the two ports, the SCSPA commissioned Wilbur Smith Associates to assess the port operation and port user impacts.

Impact Totals – The detailed study found that the SCSPA facilitates over \$44.8 billion in total economic output, annually, of which \$11.8 billion is paid in labor income to 260,800 employees in South Carolina. Of these total jobs, 24,700 (9%) are associated with the Port Operations, primarily at the Port of Charleston, versus the other 236,100 jobs (91%) that are associated with the Port Users who ship and receive cargo through marine terminals in Charleston and Georgetown.

Public and Private Terminal Impacts – A vast majority of the total 260,800 jobs are attributable to cargo movements across the Ports of Charleston and Georgetown publicly-owned terminals (246,800 jobs, 95%). However, an additional 14,000 port-related jobs arise through private terminal movements. Such movements and associated impacts are included in the analysis because of the essential harbor management and operations facilitated by the SCSPA, without which such private sector activities would be notably constrained.

Trade Flow Impacts – Breakdown of the port-user impacts between exports and imports found that both are essential to South Carolina manufacturing. While the export related impacts of 99,900 jobs (including both the direct and multiplier effects) is intuitive, the even larger import related impacts of 136,200 jobs emphasizes the State's economic dependence on trade and SCSPA operations.

Regional Impacts – The study also evaluated how the six distinct regions in the State benefit. In terms of jobs, the Piedmont's large manufacturing sector results in the highest share of port-related jobs (112,700), followed by the Midlands (51,800 jobs) and the Tri-County (50,700 jobs), respectively. While the Piedmont and the Midlands attribute over half of their port-related employment to the manufacturing sector, Tri-County employment is more diversified, including notable employment in the transportation and warehousing sector as well as manufacturing.

Tax Impacts – Combined, direct and multiplier impacts associated with port operation and port users generate \$1.5 billion annually in state and local taxes. The majority of these taxes (84%, \$1.25 billion) reflect the property, sales and excise taxes (as well as others) associated with indirect business taxes. Comparatively, the personal income taxes (\$212 million) and the corporate income taxes (\$27.3 million) only comprise 14% and 2%, respectfully, of the total port-related tax impacts.

Summary – Clearly, the SCSPA is an integral component to the State's economy. The 260,800 jobs represent 10.9% of the 2.4 million jobs statewide. The \$11.8 billion earned by these employees represents 13.6% of SC's total income. The tax impacts associated with port-related activities totals an estimated \$1.5 billion annually. And, the combined value-added impact, \$18.5 billion, associated with the SCSPA activities represents 12.1% of SC's gross state product.

1. Economic Impact Methodology

The economic impacts associated with the South Carolina State Ports Authority (SCSPA) operations are based on port data, tonnage flow data (both volume and value), regional firm data (employment and output), surveys of port users, and a multi-regional economic model. The study methodology is an "impact" approach: it measures the importance of the maritime ports as an industry, in terms of generated employment and earnings, and the impacts that arise from the production of goods shipped through the port. All impacts are expressed in annual terms, with all impact calculations based on the latest year for which data are available, namely 2007.

1.1. Study Overview

The SCSPA owns and operates facilities in the Port of Charleston and the Port of Georgetown. Handling the vast majority of cargo, the Port of Charleston serves a large geographic and economic region that extends beyond South Carolina, covering the entire southeastern United States. The mission of the SCSPA is to: *"contribute to the economic development of South Carolina by fostering and stimulating waterborne commerce and shipment of freight. In pursuit of this mission, the Authority will develop, operate and maintain competitive, cost-efficient, highly-productive cargo handling facilities in a fiscally responsible manner. The Authority will pursue economic opportunities that support & enhance its core business"*

This economic impact study quantifies the annual economic output, labor income (earnings), value added, and employment that the SCSPA facilitates within South Carolina, as well as the tax impact. The impacts addressed include on-terminal impacts associated with the provision of cargo handling services, as well as the impacts associated with off-terminal shippers/consignees that use the Port to transport materials and final goods and services.

1.1.1. Study Area and Impact Regions

The economic impact is considered from several perspectives. Firstly, the impacts that occur in the Tri-County area around the Port of Charleston, including Berkeley, Charleston, and Dorchester counties, are examined. The impacts consist primarily of those firms providing port services, such as the stevedores, freight-forwarders, trucking firms, etc. Additionally, impacts associated with port users statewide were identified; these impacts were identified for the Tri-County area as well as five other regions in the state, each of which comprise several counties.

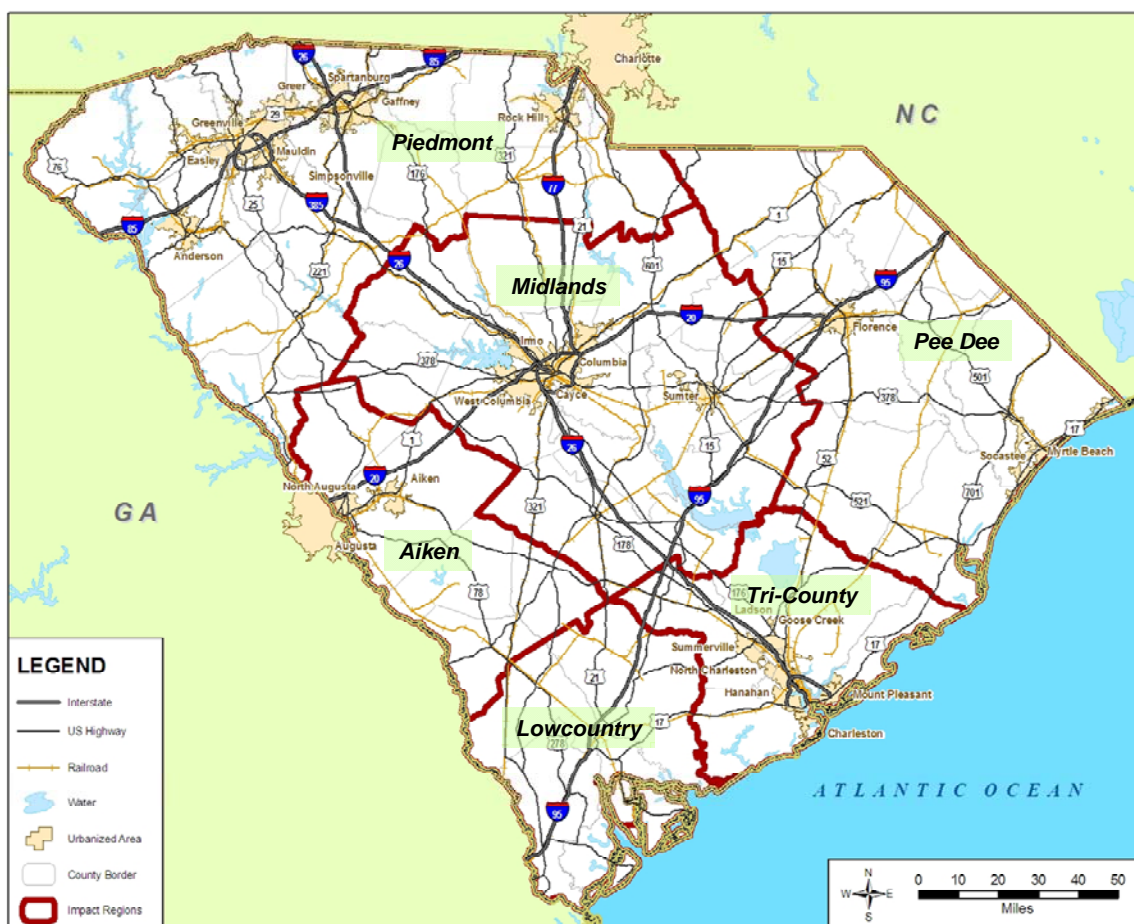
Impact Regions – The counties that comprise all six sub-state regions are summarized below and mapped in **Exhibit 1-1**:

1. *Tri-County* – Counties of *Berkeley, Charleston, and Dorchester*.
2. *Lowcountry* – Counties of *Beaufort, Colleton, Hampton, and Jasper*.
3. *Pee Dee* – Counties of *Chesterfield, Darlington, Dillon, Florence, Georgetown, Horry, Marion, Marlboro, and Williamsburg*.

4. *Aiken* – Counties of *Aiken, Allendale, Bamberg, Barnwell, and Edgefield*.
5. *Midlands* – Counties of *Calhoun, Clarendon, Fairfield, Kershaw, Lee, Lexington, Newberry, Orangeburg, Richland, Saluda, and Sumter*.
6. *Piedmont* – Counties of *Abbeville, Anderson, Cherokee, Chester, Greenville, Greenwood, Lancaster, Laurens, McCormick, Oconee, Pickens, Spartanburg, Union, and York*.

Statewide Impacts – Combined, the entire statewide impacts were assessed, representing a compilation of the six individual regions.

Exhibit 1-1
Port Impact Regions



1.1.2. Port Operations

The SCSPA provides a full range of cargo handling and storage services, directly employing over 550 people. In addition, hundreds of companies in South Carolina, from every county in the state, regularly ship cargo through Charleston, with hundreds of transportation companies

facilitating trade. These businesses include steamship lines, stevedores, longshoremen, truck lines, railroads, tugboat, customs house brokers, and freight forwarders.

SCSPA Terminal Operations – The SCSPA is an operating port, and hundreds of transportation companies conduct business on terminal within the SCSPA's jurisdiction. The SCSPA operates five public marine terminals in the Charleston area: Union Pier and Columbus Street terminals in Charleston; North Charleston and Veterans terminals in North Charleston; and the Wando Welch Terminal east of the Cooper River. In Georgetown, the SCSPA operates the Port of Georgetown.

Other Private Terminals – In addition, several private terminals which transport bulk cargo through private terminals in the Charleston Harbor benefit from the harbor dredging, maintenance, and overall associated water transport infrastructure and operations facilitated by the SCSPA.

Cargo Service Providers – Private firms facilitate the movement of imports/exports to and from port facilities for companies that ship or receive raw materials, component parts, and products. These firms are engaged in providing services such as freight forwarding, shipping agent services and customs house brokering.

Cargo Movements and Value – The SCSPA handled 1.75 million TEUs, or 20-ft equivalent units, in Charleston in 2007, as well as 646,000 tons of breakbulk cargo. Top commodities moved across Charleston's docks include agricultural products, consumer goods, machinery, metals, vehicles, chemicals, and clay products. As one of the busiest U.S. ports, the Port of Charleston handled \$60.9 billion worth of imports and exports in 2007 (see **Exhibit 1-2**). Comparatively, tonnage through the Port of Georgetown totaled 270,000 tons in 2007, valued at \$30.8 million.¹

Exhibit 1-2

International Shipments by Seaport Districts (2007)

Port District	Value (\$Billion)
LA/Long Beach	\$337.8
Houston/Galveston	\$169.6
New York/New Jersey	\$166.1
New Orleans	\$104.8
Seattle/Tacoma	\$77.8
Charleston	\$60.9
Savannah	\$55.9
Norfolk/Hampton Roads	\$54.6
Philadelphia	\$51.2
San Francisco/Oakland	\$51.2

Source: South Carolina Ports Fact Sheet, 2008; based on U.S. Census Bureau Trade Data Branch report FT920, Tables 1 & 6

Note: "Exports" are FAS value of U.S. exports of domestic and foreign merchandise by export district, and "Imports" are CIF & Customs value of U.S. general imports by unloading district

¹ SCSPA and U.S. Foreign Trade Division

1.1.3. Impact Data

In addition to the above mentioned data on tonnage movements, data were collected from SCSPA sources, as well as Consultant research and other external sources.

SCSPA Sources – A database of major port users and port service providers was obtained from the SCSPA. Port service providers include steamship lines, longshoremen, stevedores, truck lines, railroads, tug companies, Customs house brokers, freight forwarders, line handlers, docking and harbor pilots, etc. Port users include the thousands of firms that regularly import and/or export goods raw materials, component parts and products through port facilities. This database includes the business names, industry sectors, addresses/contact information, business employment, etc. Database sources include:

- 2007 Manufacturers Directory
- 2007 Directory of U.S. Exporters
- 2008 Harris InfoSource (a.k.a. Dunn & Bradstreet)
- SC Department of Commerce Marketing Map
- SC Industrial Directory (2006)

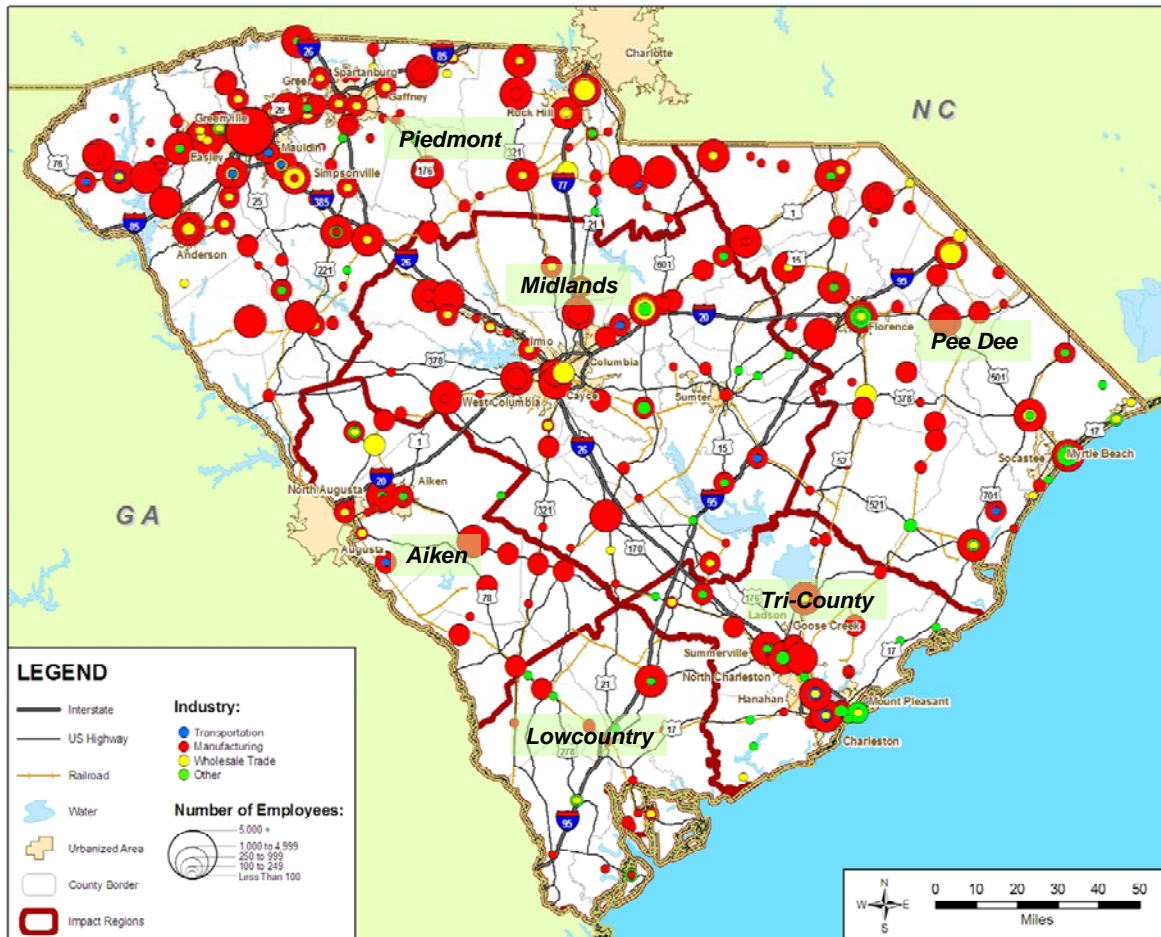
The businesses were mapped by size and major sector to understand the general location and density (i.e., employment levels) of the major port users in South Carolina. The result, shown in **Exhibit 1-3**, shows the high density of users in the Piedmont region relative to the rest of the State.

Consultant Research and Surveys – This database was further refined through web searches and other sources. A survey was also sent to the major port users to verify employment levels and port use/dependence. This effort included the identification of other major Charleston Harbor businesses with private piers. While the impacts associated with these other private terminals are comparatively small to that of the Port of Charleston, the other terminals do contribute significantly to the region's and overall state's economies. Further, the harbor services provided by the SCSPA facilitate these other business activities by enabling waterborne harbor transport.

Socioeconomic and Multiplier Impacts – The above mentioned data and research were bolstered with specific information for those sectors that are major port users and/or support transport service providers. Data sources used include *The Minnesota IMPLAN Group* (i.e., the IMPLAN model) and U.S. Bureau of Economic Analysis. The IMPLAN model, as described below, was also used to calculate the resulting multiplier impacts associated with port employment, expenditures, and operations. Additionally, the model provides industry specific import and export data, as well as employment.

Data Collection Summary – Information from these sources was used to generate a comprehensive understanding of the direct on terminal impacts associated with the provision of port cargo transport, as well as the impacts associated with the local shippers and consignees.

Exhibit 1-3
Major Port Users by Industry Size



1.1.4. Charleston Harbor Tonnage

Charleston Harbor port tonnage as reported by the United States Army Corps of Engineers (USACOE) includes any cargo movements occurring along the Ashley River, Cooper River, Wando River, Ship Yard River and Shem Creek. Tonnage movement was reviewed between the years 2002 and 2007 to understand the change in overall tonnage and containers moved, as well as the change in commodity type and directional flows. Container movement was also supplemented with American Association of Port Authority (AAPA) data. Further, commodity tonnage and value data by commodity type, direction, and cargo type (container versus bulk/breakbulk) was also supplemented with US Bureau of the Census data from the Foreign Trade Division, and from PIERS (Port Import/Export Reporting System).

Total Tonnage – At 18.1 million tons, imports dominated tonnage movements, comprising 66% of total tonnage in 2007, followed by exports, at 23% (6.3 million tons) and domestic movements, at 11%, (2.9 million tons). By commodity type, manufactured equipment/machinery/related products

comprised 6.2 million tons (23%), followed by primary manufactured goods (5.5 million tons) and crude materials (4.5 million). Imports, exports, and domestic tonnage movements are shown by commodity type in **Exhibit 1-4**.

Exhibit 1-4
Charleston Harbor Tonnage (Thousands) – 2007

Commodity	Imports	Exports	Domestic	Total
Coal (Private Terminals)	2,160	-	-	2,160
Petroleum	2,430	20	1,750	4,200
Chemicals & Related Products	1,185	1,325	680	3,190
Crude Materials (Except Fuels)	3,225	1,175	100	4,500
Primary Manufactured Goods	3,820	1,400	300	5,520
Food & Farm Products	460	750	-	1,210
Mfg. Equip., Mach. & Prod.	4,610	1,540	50	6,200
Unknown or NEC	<u>180</u>	<u>80</u>	-	<u>260</u>
Total	18,070	6,290	2,880	27,240

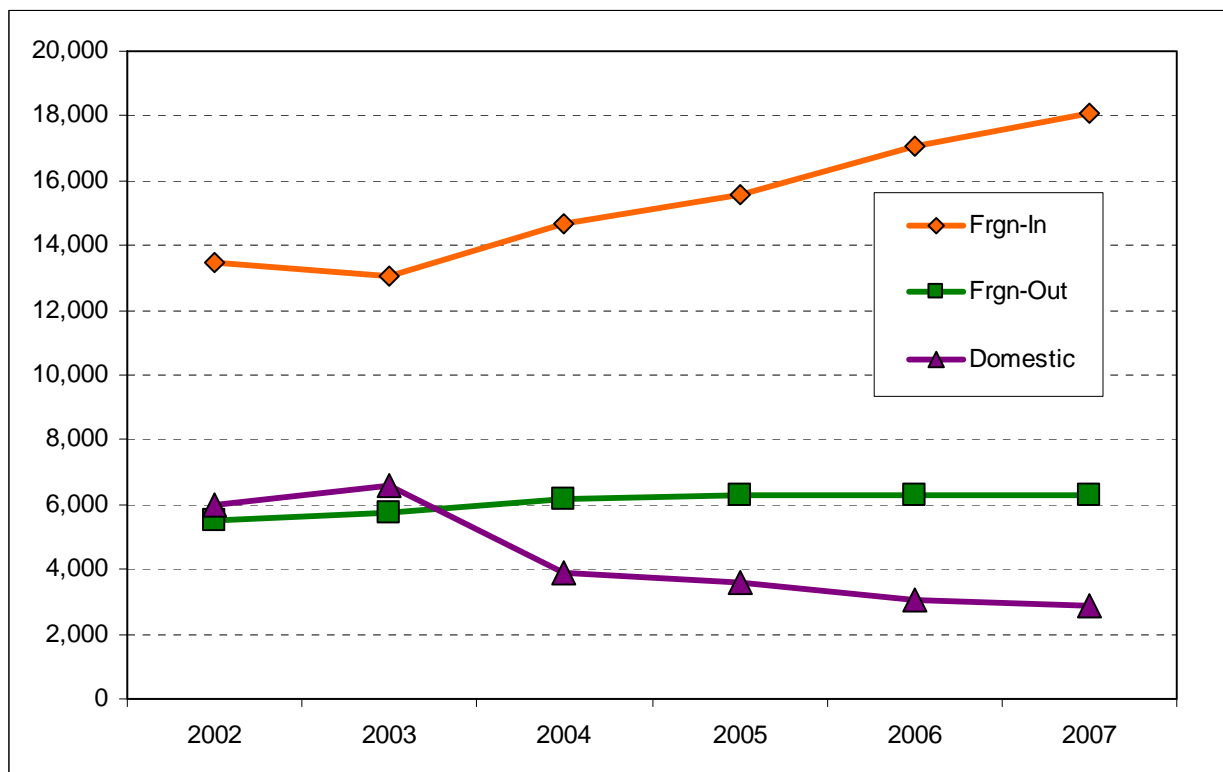
Source: USACOE

Tonnage Trend – Imports through the Charleston Harbor rose 34.2% from 2002 to 2007, from 13.5 to 18.1 million tons, respectively, as charted in **Exhibit 1-5**. Comparatively, exports rose modestly, from 5.5 to 6.3 million tons (13.6%). The 52.0% fall in domestic shipments through the harbor reflects a major decline in primary manufactured goods (from 6.0 to 2.8 million tons).

Port of Charleston and Private Terminal Flows – Data from the USACOE, the U.S. Bureau of the Census, the Foreign Trade Division, and PIERS provided information on cargo volume and value by cargo type (container versus bulk/breakbulk) and direction. The information was used to estimate the share of year 2007 international cargo that passed across public Port of Charleston terminals versus through the several private terminals that operate along the Charleston Harbor. Summary international cargo tons and values are shown in **Exhibit 1-6**.

The estimate suggests that 13.7 million tons of cargo pass across the public terminals at the Port of Charleston, valued at \$58.1 billion. While these Port of Charleston cargoes comprise slightly over half of the total tonnage (56%) compared to private terminals, they account for a vast majority of the total value (88%), with an average value per ton of \$4,230. The high value-to-weight ratio of the Port of Charleston public terminal cargoes versus private terminals (\$680) reflects the high value of containerized cargo and vehicles accommodated by the Port of Charleston's several terminals. Comparatively, many of the private terminals handle bulk and raw materials of less value per unit of weight than finished goods typical of containerized shipments.

Exhibit 1-5
Charleston Harbor Tonnage (Thousands) – 2002-2007



Source: USACOE

Exhibit 1-6
Charleston Harbor Tonnage and Value by Terminal Type – 2007¹

	Exports		Imports		Total	
	Amount	%	Amount	%	Amount	%
Tons (Thousands)						
Private Terminals	1,620	7%	9,000	37%	10,620	44%
Public Terminals	<u>4,670</u>	<u>24%</u>	<u>9,070</u>	<u>32%</u>	<u>13,740</u>	<u>56%</u>
Total Harbor	6,290	31%	18,070	69%	24,360	100%
Value (\$Millions)						
Private Terminals	\$3,191	5%	\$4,050	6%	\$7,241	12%
Public Terminals	<u>14,197</u>	<u>29%</u>	<u>43,899</u>	<u>60%</u>	<u>58,096</u>	<u>88%</u>
Total Harbor	\$17,388	34%	\$47,949	66%	\$65,337	100%
Value per Ton						
Private Terminal	\$1,970		\$450		\$680	
Public Terminal	\$3,040	-	\$4,840	-	\$4,230	
Total Harbor	\$2,760		\$2,650		\$2,680	

Source: Wilbur Smith Associates based on USACOE, U.S. Foreign Trade Division, PIERS and IMPLAN

¹Excludes domestic shipments

Nonetheless, cargoes of both the public terminal and private terminals can be attributed to the presence of the SCSPA in Charleston Harbor. This breakdown of cargo volumes and values between the public terminals at the Port of Charleston and the several other private terminals is used to estimate the total impacts by terminal type in the following sections.

1.2. Impact Categories

The SCSPA contributes to South Carolina's economic development by fostering waterborne commerce and facilitating trade through the operation of efficient marine terminals. In doing so, two distinct categories of impacts arise: (1.) port-operation impacts, and (2.) port-user impacts. These impact categories are defined below.

1.2.1. Port Operations

The port-operation impacts include a wide range of, primarily, on-terminal operations, but also include off-terminal operations associated with ground transport, and regional logistics support. The various port operation activities quantified in the study are discussed below.

Government – The SCSPA generates notable employment and expenditure impacts through the myriad of cargo-handling activities provided at the ports. Additional government operations, such as Customs & Border Protection and Coast Guard, generate jobs and economic activity. The combined impacts associated with these operations are summarized under government operations.

Water Transport – Other port and harbor operations, such as pilotage, towing and line handling, not provided by the SCSPA.

Freight Arrangement – Local ship agents, freight forwarders, and Customs house brokers in the region help consolidate smaller shipments to/from the port and facilitate cargo flows.

Rail – Rail service is provided to off-terminal shippers that transport containers and bulk materials. Port-related rail service includes both the South Carolina Public Railways as well as private sector rail carriers: CSX Transportation and Norfolk Southern Railway.

Trucking – Similarly, many trucking firms in the area serve both ports as well as many other non-port operations. Review of port data, combined with other socioeconomic data were used to generate an understanding of what share of total trucking in the county and overall region is directly attributable to Port of Charleston cargo movements.

Capital Improvements – The SCSPA coordinates major infrastructure improvement projects at the ports. In doing so, additional construction-related employment and expenditures are generated by off-terminal construction firms that conduct the various improvements. Since such annual expenditure and employment related impacts vary considerably by year, an average expenditure impact over the last ten years was calculated and used to estimate the capital improvement impacts.

1.2.2. Port Users

Shippers/consignees are categorized as port users, versus those firms that coordinate shipments, and/or handle cargo at, to, or from the ports. The port users have several options available to transport cargo and could possibly survive if port services at Charleston were unavailable. However, the choice to use the Port of Charleston and/or the Port of Georgetown to ship/receive cargo indicates cost and/or logistical advantages. Removal of such advantages would negatively affect port users. For this reason, the employment and expenditure impacts associated with firms that ship/receive major cargo movements through the ports are estimated. Further, several survey respondents indicated the ports as “essential” to their operations.

1.3. Impact Analysis

Different impact measures and impact types for the aforementioned geographic regions were used to estimate the economic impacts of port-operation and port-user impacts. All impacts generally reflect year 2007 activity levels. The following discussion defines the impact measures and types used to quantify the SCSPA’s economic impacts.

1.3.1. Impact Measures

The economic impacts associated with Port of Charleston are measured in five ways: economic output, income, value added, jobs, and taxes, as defined below.

- Output – The total dollar value of all final goods and services produced within a region.
- Value Added – The additional value of a commodity over the cost of commodities used to produce it from the previous stage of production; provides a gross-state-product (GSP) comparison.
- Income – The total dollar value of wages and salaries of employees and proprietors within a region.
- Jobs – The number of full-time-equivalent (FTE) jobs for all industries within a region.
- Taxes – The income and indirect business taxes associated with port operations and port users.

These five impact measures comprise two impact types (direct and indirect), as discussed below.

1.3.2. Impact Types

Two primary impacts types are considered: direct and multiplier impacts.

Direct Impacts – Measured in terms of employment, income, value added, and economic output, direct impacts are generated by firms or entities that ship and/or receive materials and goods through the Port of Charleston, or provide port-operation transport services. These activities include the SCSPA, other port-operation government entities, rail, marine services, shipping agents and freight forwarders, stevedores and terminal operators, trucking firms, construction firms, longshoremen, and shippers/consignees, as described above.

Multiplier Impacts – Multiplier economic impacts are derived using the IMPLAN Pro input-output model. The economic multiplier impacts typically include both “indirect” and “induced” impacts. *Indirect* impacts reflect support services and/or supplies provided to the firms/entities that generate direct impacts. The *induced* impacts reflect the expenditure effect of people employed directly or indirectly by port activities. For example, the induced impact measures how income circulates through a region as people spend their incomes on groceries, housing, entertainment, etc.

An input-output model is a structural mathematical matrix, representing the interrelations of industries within an economy. This model is used to estimate the economic impacts on an entire economy associated with expenditures in one or a group of industries. Input-output coefficients quantifiably measure the connections between industries and sectors. The coefficients are used in a mathematical structural matrix to solve a series of simultaneous equations to determine the total economic impact on an entire economy.

Multipliers are produced by an input-output model to determine the effect of a change to one industry on other industries and the economy. Multipliers are derived from the relations between industries, as the outputs of one industry are used as the inputs in other industries, or the earnings of employees from one industry are, in turn, spent within other industries (induced impact). Multipliers account for local industrial capacity to satisfy local demand while also accounting for leakages outside a regional economy. Economic multipliers are calculated for each of the economic impact measures: economic output, employment, value added, and income (earnings). Additionally, multipliers were derived for indirect business taxes, which include sales and excise taxes, federal non taxes, custom duties, motor vehicle licenses, property taxes, other state and local fees, etc.

IMPLAN – The IMPLAN model, produced by the Minnesota IMPLAN Group, Inc., provides two components; a software system and a socioeconomic database. The software provides the necessary calculations to estimate impact changes for an industry in a particular region. The socioeconomic database provides the information needed to populate the model. The IMPLAN data and industry-accounts closely follow the conventions used in the “Input-Output Study of the U.S. Economy” by the Bureau of Economic Analysis.

Total Impacts – Total economic impacts are the aggregation of the direct impacts and multiplier impacts derived from the input-output model and are measured in terms of output, earnings, value added, and jobs for the impact regions. These impacts are presented separately for port operations as well as for port users.

2. Demographic and Economic Profile

South Carolina's industry sectors, especially manufacturing, rely on transportation infrastructure to facilitate trade, sustain current growth trends, and to accommodate future economic expansion. The provision of water transport enables these key sectors, as well as others, to effectively compete in an increasingly challenging and competitive global commercial environment. This socioeconomic profiling section summarizes recent trends in population, employment, household income levels, and industry level production for South Carolina and six sub-state geographic regions. These data provide the context from which to compare the port economic impact findings presented in the subsequent sections.

2.1. Population

South Carolina is ranked as the 24th largest state in the Union in terms of resident population, as of the intercensal July 1, 2007 estimate, with 4.4 million residents². Between the years 1990 and 2007, South Carolina's population increased 26.4%, from 3.5 million to 4.4 million persons³, as shown below in **Exhibit 2-1**, or at an average per annum growth rate of 1.4%, modestly higher than the national growth over the same historical period. With 1.6 million people in 2007, the Piedmont region comprises the largest population share (37.2%), of the six sub-state regions, followed by the Midlands region, accounting for 22.7% (1.0 million) of the statewide total. One of the least populated regions, the Lowcountry region, with over 229,000 residents, is growing the quickest at 1.9% per annum between 2000 and 2007.

Exhibit 2-1
South Carolina Population Trends – 1990-2007

Geography	Population			Average Annual % Change		
	1990	2000	2007	1990 to '00	2000 to '07	1990 to '07
South Carolina						
Tri-County	506,877	549,033	630,100	0.8%	2.0%	1.3%
Lowcountry	154,475	201,265	229,382	2.7%	1.9%	2.4%
Pee Dee	534,669	620,572	680,769	1.5%	1.3%	1.4%
Aiken	188,273	218,494	226,644	1.5%	0.5%	1.1%
Midlands	815,074	932,115	1,000,368	1.4%	1.0%	1.2%
Piedmont	<u>1,286,942</u>	<u>1,490,533</u>	<u>1,640,446</u>	1.5%	1.4%	1.4%
Total	3,486,310	4,012,012	4,407,709	1.4%	1.4%	1.4%
United States	248,790,925	281,421,906	301,621,157	1.2%	1.0%	1.1%

Source: United States Bureau of Economic Analysis

² U.S. Census Bureau, Population Estimates Program.

³ Ibid.

2.2. Employment

South Carolina employment, in 2007, totaled almost 2.4 million, with average annual wage earnings of \$36,113, as shown below in **Exhibits 2-2 and 2-3**, respectively. Of the major industry sectors within the State, the public administration sector employs the most persons, with almost 380,000 employees. Within the private sector, retail trade and total manufacturing constitute a significant percentage of total industry employment, following closely behind public administration in total employed persons, with 282,000 and 258,000, respectively. Combined service industries, i.e., NAICS industries 54 through 81, are also noteworthy sectors within the State, with the health care and social assistance services and accommodation and food services industries employing the largest share of those aggregated sectors.

Sub-state region industry sectors yield employment distributions similar to the State total, with a few minor exceptions. In the Lowcountry region, manufacturing is not as predominate as other regions of the State; but retail trade, accommodation and food services are more highly concentrated. Construction within the Lowcountry is also relatively high as a percent of total industry employment, which may be attributable to the relatively higher population growth within that region.

Exhibit 2-2
South Carolina Private Sector Employment – 2007

NAICS Industry Sector	Tri-County	Low Country	Pee Dee	Aiken	Midlands	Piedmont	SC
11 Agr., Forestry, Fishing & Hunting	2,978	2,580	9,415	3,137	11,408	10,746	40,266
21 Mining	212	131	955	211	419	915	2,844
22 Utilities	795	648	1,744	634	4,231	4,380	12,432
23 Construction	29,434	13,610	29,519	10,395	38,981	58,590	180,532
31-33 Manufacturing	19,967	4,951	37,294	12,773	53,904	129,175	258,069
42 Wholesale Trade	9,195	1,798	9,580	1,750	21,768	32,476	76,567
44-45 Retail Trade	46,420	15,853	47,609	13,194	61,091	97,580	281,747
48-49 Transportation and Warehousing	15,973	4,089	8,931	3,360	17,880	27,517	77,754
51 Information	5,427	1,129	3,769	649	8,408	13,702	33,083
52 Finance and Insurance	13,294	2,783	12,486	2,240	33,577	27,092	91,472
53 Real Estate, Rental and Leasing	19,969	16,877	17,493	2,400	14,169	18,754	89,665
54 Professional and Technical Svcs.	25,473	5,467	10,930	3,626	29,654	38,007	113,153
55 Mgmt. of Companies & Enterp.	1,343	512	1,836	346	4,585	8,026	16,648
56 Administrative and Waste Svcs	26,890	6,711	17,840	10,796	33,494	67,104	162,836
61 Educational Services	4,890	2,036	2,050	943	8,457	14,260	32,636
62 Health Care & Social Assistance	28,287	7,128	28,188	6,774	46,319	59,098	175,792
71 Arts, Entertainment, and Recr.	8,072	2,871	10,779	1,448	5,574	12,121	40,865
72 Accommodation and Food Svcs	33,894	13,548	42,787	5,361	36,884	59,948	192,422
81 Other Svcs, Ex. Public Admin	21,946	8,230	18,446	4,967	31,304	48,839	133,731
92 Public Administration	<u>66,929</u>	<u>24,948</u>	<u>48,440</u>	<u>15,040</u>	<u>112,006</u>	<u>111,661</u>	<u>379,023</u>
Total	381,384	135,900	360,089	100,047	574,120	839,998	2,391,537

Source: IMPLAN

Exhibit 2-3
South Carolina Average Annual Wage Earnings per Employee – 2007

NAICS Industry	Tri-County	Low Country	Pee Dee	Aiken	Midlands	Piedmont	SC
11 Agr., Forestry, Fishing & Hunting	\$8,986	\$18,719	\$12,369	\$11,639	\$15,670	\$6,879	\$11,938
21 Mining	19,670	17,053	15,961	43,957	47,057	38,877	30,313
22 Utilities	74,015	70,498	70,838	67,098	82,557	105,382	86,992
23 Construction	37,342	34,786	31,075	37,249	32,524	32,401	33,475
31-33 Manufacturing	67,679	45,002	56,727	54,341	53,264	58,189	57,239
42 Wholesale Trade	59,299	57,087	48,156	49,177	53,296	57,506	55,154
44-45 Retail Trade	25,767	23,706	22,496	17,463	24,670	24,280	23,957
48-49 Transportation and Warehousing	41,160	30,007	34,818	22,747	39,904	42,877	39,366
51 Information	50,295	58,521	40,443	41,496	57,909	44,884	48,976
52 Finance and Insurance	36,514	51,369	47,897	48,105	50,823	47,576	47,332
53 Real Estate, Rental and Leasing	12,059	8,755	13,307	6,532	18,334	13,939	12,917
54 Professional and Technical Svcs.	41,627	45,902	35,314	48,871	35,450	42,882	40,260
55 Mgmt. of Companies & Enterp.	53,924	36,559	45,847	55,702	53,903	77,846	64,063
56 Administrative and Waste Svcs	22,429	22,666	18,855	77,213	19,950	21,664	24,854
61 Educational Services	27,081	14,179	16,330	15,520	20,901	23,211	21,974
62 Health Care & Social Assistance	39,747	38,053	36,584	30,453	39,200	38,662	38,305
71 Arts, Entertainment, and Recr.	12,383	22,073	15,750	17,666	13,072	12,933	14,397
72 Accommodation and Food Svcs	18,229	20,634	17,807	13,081	14,458	14,734	16,349
81 Other Svcs, Ex. Public Admin	19,809	21,696	15,781	15,862	19,810	17,375	18,334
92 Public Administration	56,300	58,797	45,361	48,327	55,020	45,966	51,328
Total	\$36,319	\$32,823	\$31,675	\$38,634	\$38,091	\$36,802	\$36,113

Source: U.S. Bureau of Labor Statistics, Quarterly Census of Employment and Wages (QCEW), obtained from the South Carolina Commerce Workforce

Of the private sector industries, paper manufacturing sector employees are paid the highest in average annual earnings, slightly over \$87,000, followed closely by employees within the utilities industry, both of which nearly double the average annual wage earnings across all industry sectors. Comparatively, the manufacturing sector, the major port user, generates average wages statewide of \$57,200, with a low of \$45,000 in the Lowcountry and a high of \$67,700 in the Tri-County region. Unfortunately, in 2007, South Carolina exhibited a high unemployment rate of 5.9%, higher than all but three other states in the Union (e.g. Alaska, Mississippi, and Michigan), as shown in **Exhibit 2-4**.

2.3. Income

Mean household income in 2007 is shown below in **Exhibit 2-5**, with the Lowcountry region showing the highest mean household income, followed by the Tri-County region (with mean household incomes of \$90,700 and \$83,400, respectively). Mean household income for the entire State of South Carolina in 2007 is \$76,000, about \$19,000 below the average for the entire United States.

Exhibit 2-4
National and State Unemployment Rates –2007

Rank	Geography	Rate	Rank	Geography	Rate
	United States	4.6%	25	Pennsylvania	4.4%
1	Hawaii	2.6%	27	Indiana	4.5%
2	Idaho	2.7%	27	Massachusetts	4.5%
2	Utah	2.7%	27	New York	4.5%
4	Nebraska	3.0%	27	Washington	4.5%
4	South Dakota	3.0%	31	Connecticut	4.6%
4	Virginia	3.0%	31	Minnesota	4.6%
4	Wyoming	3.0%	31	West Virginia	4.6%
8	Montana	3.1%	34	Maine	4.7%
9	North Dakota	3.2%	34	North Carolina	4.7%
10	Delaware	3.4%	34	Tennessee	4.7%
11	Alabama	3.5%	37	Nevada	4.8%
11	New Mexico	3.5%	38	Wisconsin	4.9%
13	Maryland	3.6%	39	Illinois	5.0%
13	New Hampshire	3.6%	39	Missouri	5.0%
15	Arizona	3.8%	39	Rhode Island	5.0%
15	Colorado	3.8%	42	Oregon	5.2%
15	Iowa	3.8%	43	Arkansas	5.4%
15	Louisiana	3.8%	43	California	5.4%
19	Vermont	3.9%	45	Kentucky	5.5%
20	Florida	4.0%	46	Ohio	5.6%
21	Kansas	4.1%	47	District Of Columbia	5.7%
22	New Jersey	4.2%	48	South Carolina	5.9%
23	Oklahoma	4.3%	49	Alaska	6.2%
23	Texas	4.3%	50	Mississippi	6.3%
25	Georgia	4.4%	51	Michigan	7.2%

Source: U.S. Bureau of Labor Statistics: Local Area Unemployment Statistics

Exhibit 2-5
South Carolina Mean Household Income – 2007

Geography	Household Income
South Carolina	
Tri-County	\$83,432
Low Country	\$90,694
Pee Dee	\$68,680
Aiken	\$75,606
Midlands	\$78,084
Piedmont	\$73,091
State Total	\$76,011
United States	\$94,884

Source: U.S. Bureau of Economic Analysis

2.4. Gross State Product

South Carolina's Gross State Product (GSP), broken down by major industry sector, is presented in **Exhibit 2-6**. Between 2002 and 2007, real GSP for the State increased 10.1%, with the largest real growth, by industry, occurring in the information sector (64.6%), followed by retail trade and professional and technical services, respectively. While *Transportation and Warehousing* grew at 21.9%, more than double the State's average growth rate, *Manufacturing* (the major port-user) fell 7.8% in real terms. By contrast, the United States GDP increased 14.9% between 2002 and 2007, from \$10.0 trillion in 1998 (2000\$) to \$11.5 trillion in 2007 (2000\$).⁴

Exhibit 2-6
South Carolina State GSP (Millions 2000\$) – 2002-2007

Industry	2002	2003	2004	2005	2006	2007	Change ('02 to '07)
11 Agr., Forestry, Fishing & Hunting	\$843	\$1,185	\$1,148	\$1,078	\$1,222	\$1,168	38.6%
21 Mining	168	182	198	196	207	127	-24.4%
22 Utilities	2,916	3,165	3,169	3,102	3,079	3,019	3.5%
23 Construction	5,903	5,844	5,720	5,945	5,718	4,996	-15.4%
31-33 Manufacturing	25,059	26,898	23,553	23,242	22,744	23,101	-7.8%
42 Wholesale Trade	6,668	6,663	7,157	7,532	7,650	7,872	18.1%
44-45 Retail Trade	9,667	10,156	10,578	11,331	11,965	12,646	30.8%
48-49 Transportation and Warehousing	2,701	2,774	2,948	3,123	3,264	3,292	21.9%
51 Information	3,169	3,331	3,823	4,400	4,884	5,217	64.6%
52 Finance and Insurance	5,423	5,511	5,485	5,745	6,179	6,178	13.9%
53 Real Estate, Rental and Leasing	12,577	12,241	12,770	12,690	13,098	13,671	8.7%
54 Professional and Technical Svcs.	4,777	4,943	5,486	5,773	6,097	6,494	35.9%
55 Mgmt. of Companies & Enterp.	620	749	1,021	896	909	841	35.6%
56 Administrative and Waste Svcs	3,961	4,337	4,290	4,517	4,492	4,800	21.2%
61 Educational Services	531	544	552	547	561	584	10.0%
62 Health Care & Social Assistance	6,222	6,444	6,610	6,866	7,166	7,416	19.2%
71 Arts, Entertainment, and Recr.	824	840	865	864	868	882	7.0%
72 Accommodation and Food Svcs	3,656	3,819	3,996	4,074	4,209	4,319	18.1%
81 Other Svcs, Ex. Public Admin	2,656	2,690	2,763	2,747	2,721	2,789	5.0%
99 Unclassified	<u>17,466</u>	<u>17,540</u>	<u>17,784</u>	<u>18,028</u>	<u>18,181</u>	<u>18,741</u>	<u>7.3%</u>
Total	\$115,713	\$119,631	\$119,865	\$122,542	\$124,874	\$127,358	10.1%

Source: Bureau of Economic Analysis, U.S. Department of Commerce

¹\$Millions

⁴ Source: Bureau of Economic Analysis

3. SCSPA Economic Impacts

The SCSPA affects an estimated 260,800 jobs across the state. The vast majority of the impacts arise from port users who ship goods through the SCSPA, with the balance, 24,700 (9%) jobs, directly and indirectly attributable to port operations. In terms of jobs, such users employ an estimated 236,100 people (91% of total jobs). These port-operation and port-user impacts include the direct and multiplier (i.e., indirect and induced) impacts associated with those firms that handle cargo and related port activities, as well as shippers/consignees that heavily depend on the ports.

These employment impacts, as well as the output, income, and value-added impacts are detailed below by impact category (port operation versus port user), as well as by impact type (i.e., direct and multiplier) and impact region.

3.1. Port Operation Impacts

The direct impact of Port of Charleston operations totals 6,800 jobs. The indirect and induced multiplier effect associated with Port of Charleston operations yield an additional 17,900 jobs throughout the State, a vast majority of which reside in the Tri-County Region. Combined, an estimated 24,700 people owe their jobs, directly or indirectly to the actual physical movement of cargo through the Port of Charleston. This excludes the impacts associated with the shippers/consignees that ship/receive goods, as quantified in the following subsection.⁵

3.1.1. Direct Port Operation Impacts

The direct impacts related to port service and capital improvements total \$1.57 billion annually, of which \$390 million is paid in the form of income to the 6,800 people directly employed as shown in **Exhibit 3-1**. These impacts typically occur at the port, although some are located off-port, as discussed below.

Port Service – The vast majority (6,300 or 93%) of the direct jobs result from port service. This includes stevedoring, longshoremen, cargo handling, marine services, docking and harbor pilots, and other related services that occur in the region to transport cargo to, from, and through the port. This also includes government related impacts associated with port management, Customs, etc. Combined, these employees earn an estimated \$365.8 million annually and generate \$1.51 billion in output.

⁵ Note the Port of Georgetown operation impacts are a small fraction of those at the Port of Charleston, for this reason the associated impacts are included in the Pee Dee impact summary under the Total Port Impacts (Section 3.3).

Exhibit 3-1
Direct Port Operation Impacts – 2007

	Jobs	Labor Income	Expenditures
Port Service			
Government ¹	850	\$71,060,000	\$142,500,000
Water Transport ²	2,020	135,410,000	1,009,320,000
Freight Transport Arrangement ³	1,420	74,680,000	94,130,000
Rail ⁴	100	\$8,980,000	28,640,000
Trucking ⁵	<u>1,910</u>	<u>77,640,000</u>	<u>236,930,000</u>
Subtotal	6,300	\$367,770,000	\$1,511,520,000
Port Capital Improvements⁶	<u>500</u>	<u>\$22,283,000</u>	<u>\$59,210,000</u>
Total Direct Impacts	6,800	\$390,053,000	\$1,570,730,000

Sources: Wilbur Smith Associates; U.S. Bureau of Labor Statistics, U.S. Census Bureau, IMPLAN

- ¹ SCSPA operations, Customs
- ² Other port and harbor operations, marine cargo handling, container repair
- ³ Freight forwarders, marine shipping agents, customs house brokers
- ⁴ Rail (public and private)
- ⁵ Local and long-distance – truckload and LTL
- ⁶ SCSPA Capital Improvement Plan

Capital Spending – The SCSPA also funds port development, such as the new Navy Base Terminal (NBT) in Charleston, other structures, equipment, security infrastructure, etc. Such activities include construction of wharf and dock improvements, port area road paving, security lighting and fencing. It also includes the purchase of cranes, container handlers, chassis rotators, etc. Over the previous ten years (1999 to 2008) the SCSPA spent approximately \$350 million on such capital improvements. Over the next five years, \$400 million is planned for the new NBT alone, averaging \$80 million per year (versus \$35 million per year over the previous ten years). Based on the historical and programmed capital expenditures by the SCSPA, an average annual capital spending impact of \$59.2 million is used in this economic impact analysis. This average reflects past trends as well as the major impact associated with the new NBT. This \$59.2 million average annual expenditure impact suggests an annual direct impact of 500 jobs and \$22.3 million in labor income.

3.1.2. Total Port Operation Impacts

The multiplier impacts include the indirect and induced impacts associated with the direct port-operation impacts. The indirect impacts reflect the activities associated with the supply of products and services, while the induced impacts reflect the re-spending of wages and earnings. Specifically, the job impacts total 24,700 with labor income of \$1.0 billion and output of \$2.7 billion, as shown in **Exhibit 3-2**. These estimates include the direct and multiplier effects associated with the port service and capital improvement aspects of port operation.

Exhibit 3-2
Port Operation Impact Summary – 2007

Impact Type and Measure	Port Service	Capital Improvements	Total
Direct			
Output ¹	\$1,512	\$59	\$1,571
Value Added ¹	\$506	\$23	\$529
Labor Income ¹	\$368	\$22	\$390
Employment	6,300	500	6,800
Multiplier			
Output ¹	\$1,096	\$25	\$1,121
Value Added ¹	\$908	\$26	\$934
Labor Income ¹	\$605	\$17	\$622
Employment	17,500	400	17,900
Total			
Output ¹	\$2,608	\$84	\$2,692
Value Added ¹	\$1,414	\$49	\$1,463
Labor Income ¹	\$973	\$39	\$1,012
Employment	23,800	900	24,700

Source: Wilbur Smith Associates

¹\$Millions

3.2. Port User Impacts

In addition to the port-operation impacts detailed above, many consignees and shippers in the State heavily depend on the Port of Charleston to receive and/or ship cargo. In doing so, they generate significant impacts as well. While these firms are not entirely dependent on the cargo shipments through the ports of Charleston and Georgetown, it is hard to envision their continued operation levels without such access, especially the Port of Charleston. In fact, the Port of Charleston is often instrumental in major manufacturing business location decisions. Utilization of the Port of Charleston as the port of choice is indicative of an advantage, without which, those consignees and shippers would be negatively impacted.

If the SCPSA were unable to accommodate demand, consignees and shippers could use other ports to transport their cargo, since the Port of Charleston is one of several ports in the Southeast. However, the use of other ports would likely entail higher ground transport costs (due to longer transport distances, price, logistics, etc.), and could increase overall demand (and resulting handling costs) at the other ports for all users (both the diverted Port of Charleston users as well as current users). The long-term result would be a migration of industry away from South Carolina to other locations with better port access.

The following analysis identifies the number of job and expenditure impacts associated with firms in South Carolina that rely on the Charleston Harbor and use the Port of Charleston. These job and expenditure impacts are presented in terms of the direct, multiplier (i.e. indirect and induced), and total impact components. Further, the impacts are separated for those

specifically associated with the public terminals at the Port of Charleston as well as the other private terminals that benefit from the harbor maintenance provided by (and coordinated through) the Port of Charleston. Lastly, these port-user impacts are presented by each of the six major regions in SC.

3.2.1. Port User Impacts by Trade Direction

The direct output of port user firms in South Carolina totals \$25.0 billion annually, of which \$4.7 billion is paid in the form of income to 81,900 people directly employed. The multiplier impacts associated with suppliers (e.g., “indirect”) and the respending of wages (e.g., “induced”) generate another \$17.1 billion in output, of which \$6.1 billion is paid in labor income to 154,200 jobs.

As shown below in **Exhibit 3-3**, a total of 236,100 jobs in South Carolina can be traced back to the firms that ship and or receive cargo through the SCSPA public terminals, as well as the other private terminals. Of these total 236,100 jobs, approximately 42% (99,900 jobs) are attributable to exports and 58% (136,200) are attributable to imports.

Exhibit 3-3
Port User Impacts by Direction – 2007

Impact Type and Measure	Trade Direction		
	Exports	Imports	Total
Direct			
Output ¹	\$13,041	\$12,031	\$25,072
Value Added ¹	\$3,037	\$4,426	\$7,463
Labor Income ¹	\$2,006	\$2,672	\$4,679
Employment	33,100	48,800	81,900
Multiplier			
Output ¹	\$5,922	\$11,134	\$17,056
Value Added ¹	\$4,202	\$5,384	\$9,586
Labor Income ¹	\$2,648	\$3,434	\$6,082
Employment	66,800	87,400	154,200
Total			
Output ¹	\$18,963	\$23,165	\$42,128
Value Added ¹	\$7,239	\$9,810	\$17,049
Labor Income ¹	\$4,654	\$6,106	\$10,760
Employment	99,900	136,200	236,100

Source: Wilbur Smith Associates
¹\$Millions

These impact estimates were derived based on the cargo volumes and values previously presented (Exhibit 1-6). However, not all of the cargo going through the Port of Charleston and the Port of Georgetown is destined to, or originates from South Carolina. Estimating the South Carolina share of trade volume is an essential component to estimating the State impacts associated with the SCSPA. To do so required a review of total imports and exports in South

Carolina via all modes and ports. The following discussion addresses these flows and the resulting breakdown of Port of Charleston cargo value by in-state versus out-of-state.

South Carolina Imports and Exports – Exports, with an estimated value of \$17.6 billion originated in South Carolina in 2007, and imports of an estimated value of \$16.1 billion were destined for the State. These exports and imports passed through the ports of Charleston and Georgetown as well as other ports along the east coast and by land. It is estimated that 74% of the exports (\$13.0 billion) and 77% of the imports (\$12.4 billion) flow through the Port of Charleston. These South Carolina trade flows are summarized in **Exhibit 3-4**.

Exhibit 3-4
South Carolina Export and Import Values – 2007

	Exports		Imports		Total Flows	
	Value ¹	%	Value ¹	%	Value ¹	%
South Carolina Ports	\$13,041	74%	12,414	77%	\$25,455	75%
Other Ports	<u>4,598</u>	<u>26%</u>	<u>3,734</u>	<u>23%</u>	<u>8,332</u>	<u>25%</u>
Total	\$17,639	100%	\$16,148	100%	\$33,787	100%

Source: Wilbur Smith Associates based on U.S Foreign Trade Division and IMPLAN

¹\$Millions

South Carolina Imports and Exports Through SC Ports – Since a primary study objective is to estimate the impact to the State of South Carolina, the various data sources were used to estimate the share of in- and outbound cargo that originates/terminates within the State. The \$13.0 billion in SC exports through the SC ports shown above comprise 75% of cargo values through the Port of Charleston; the other \$4.3 billion originates out-of-state. Regarding imports, the \$12.4 billion in South Carolina destined imports through the SC ports comprise 26% of SC port imports. The other \$35.5 billion (74%) of SC port imports are destined for other states. The breakdown between in- and out-of-state cargo value flows is shown in **Exhibit 3-5**.

Exhibit 3-5
South Carolina Port Exports and Imports by Origin/Destination – 2007

	Export Origin		Import Destination		Total Flows	
	Value ¹	%	Value ¹	%	Value ¹	%
South Carolina	\$13,041	75%	\$12,414	26%	\$25,455	39%
Other States	<u>4,347</u>	<u>25%</u>	<u>35,535</u>	<u>74%</u>	<u>39,882</u>	<u>61%</u>
Total	\$17,388	100%	\$47,949	100%	\$65,337	100%

Source: Wilbur Smith Associates based on USACOE, U.S. Foreign Trade Division, PIERS and IMPLAN

Note the vast majority of the tonnage moves through the Port of Charleston (both public and private terminals), with an estimated \$31 million moving through the Port of Georgetown.

¹\$Millions

Direct Export Impacts – The \$13.0 billion in SC exports shipped through the Port of Charleston were disaggregated by industry and applied to IMPLAN multipliers to estimate the associated

value added impact (\$3.0 billion), labor income (\$2.0 billion) and job impacts (33,100), as shown above in Exhibit 3-3.

Direct Import Impacts – The \$12.4 billion in South-Carolina-bound imports through the SC ports (Exhibit 3-5) are used by South Carolina manufactures, retailers and others to generate products and sales. To estimate the output value associated with such inputs and finished goods required a markup estimate for each industry. Specifically, output was divided by the intermediate outlays for each industry; the resulting markup value was then applied to SC bound imports to estimate the in-state production associated with the imports. The resulting output associated with imports was then compared with exports (especially in the trade-intensive transportation equipment manufacturing sector) to avoid any impact double-counting (i.e., some imports are used in the production process to develop goods that are, in turn, exported). This yields a direct import impact estimate of \$12.0 billion in output and 48,800 jobs. These direct jobs reflect those in-state jobs that use foreign imports that pass through the SC ports.

3.2.2. Port User Impacts by Terminal Type

The port-user impacts were also analyzed by terminal ownership; that is by cargo passing through the public Port of Charleston terminals versus that using Charleston Harbor's private terminals. While tonnage moving across the Port of Charleston public docks comprises 56% of total volume, the high-value-cargo (as discussed earlier) comprises 88% of total cargo value (see Exhibit 1-6).

Based on this relationship and the industries that they support, it is estimated that the public SCSPA terminals directly support \$23.6 billion of output and 77,000 jobs in South Carolina. The production and/or sale of these exports and imports through the public terminals generate another \$16.0 billion in multiplier output and 145,100 jobs. As seen in **Exhibit 3-6**, the impact associated with users of the public SCSPA terminals totals \$39.7 billion in output, of which \$10.1 billion is paid in labor income to 222,100 jobs statewide. Again, these impacts reflect off-terminal economic activity related to firms that ship cargo through the public SCSPA terminals.

The other private terminals in the Charleston Harbor support 4,900 additional direct port-user jobs, which in turn generate another 9,100 jobs (multiplier effect), for a total private terminal job impact of 14,000. These employees earn \$0.6 billion in total income and generate \$2.5 billion in total output. Without SCSPA harbor management and coordination, channel depths and maneuverability would suffer and the ability of private terminals to ship cargo through the harbor would be severely constrained.

3.2.3. Port User Impacts by Region

The port-user impacts are allocated by region in **Exhibit 3-7**. The Piedmont region generates the greatest impacts: in terms of jobs, 112,700 jobs in the Piedmont region are directly or indirectly related to South Carolina imports or exports through the SCPSA terminals and the other Charleston Harbor private terminals. The Midlands also generates 51,800 jobs, followed by the Pee Dee with 30,100 and the Tri-County region with 26,000.

Exhibit 3-6
Port User Impacts by Terminal Type – 2007

Impact Type and Measure	Terminal Type		
	Public SCSPA	Private	Total
Direct			
Output ¹	\$23,634	\$1,438	\$25,072
Value Added ¹	\$7,022	\$440	\$7,463
Labor Income ¹	\$4,404	\$275	\$4,679
Employment	77,000	4,900	81,900
Multiplier			
Output ¹	\$16,035	\$1,021	\$17,056
Value Added ¹	\$9,025	\$561	\$9,586
Labor Income ¹	\$5,726	\$356	\$6,082
Employment	145,100	9,100	154,200
Total			
Output ¹	\$39,669	\$2,459	\$42,128
Value Added ¹	\$16,047	\$1,002	\$17,049
Labor Income ¹	\$10,130	\$631	\$10,760
Employment	222,100	14,000	236,100

Source: Wilbur Smith Associates

¹\$Millions

Exhibit 3-7
Port User Impacts by Region – 2007

Region	Output ¹	Value Added ¹	Labor Income ¹	Employment
Aiken	\$1,758	\$652	\$406	9,600
Low Country	\$692	\$356	\$232	5,600
Midlands	\$9,019	\$3,750	\$2,362	51,800
Pee Dee	\$4,846	\$1,999	\$1,267	30,400
Piedmont	\$21,431	\$8,434	\$5,274	112,700
Tri-County	<u>\$4,382</u>	<u>\$1,858</u>	<u>\$1,219</u>	<u>26,000</u>
Total	\$42,128	\$17,049	\$10,760	236,100

Source: Wilbur Smith Associates

Note: includes direct and multiplier impacts associated with both imports and exports through the Charleston Harbor associated with both the Port of Charleston and private terminals

¹\$Millions

3.3. Total Port-Related Impacts

The total port-related impacts associated with the SCSPA totals \$44.8 billion in output, of which \$11.8 billion is paid in income to 260,800 jobs. These total port-related impacts include both the port-operation and port-user impacts detailed above, and are summarized below for the State and the individual impact regions.

3.3.1. Statewide Impact Summary

Clearly, the SCSPA is an integral component to the State's economy. The 260,800 jobs represent 10.9% of the 2.4 million jobs statewide. The \$11.8 billion earned by these employees represents 13.6% of South Carolina's total income. And, the combined value-added impact, \$18.5 billion, associated with the port operations and port users represents 12.1% of State gross state product (GSP). These impact summaries by type, measure, and category are shown in **Exhibit 3-8**. Notably, the total 236,100 port-user jobs comprise 91% of the total 260,800 job impacts associated with the SCSPA.

Exhibit 3-8
Port-Related Impact Summary – 2007

Impact Type and Measure	Impact Category		
	Port Operation	Port Users	Total
Direct			
Output ¹	\$1,571	\$25,072	\$26,643
Value Added ¹	\$529	\$7,463	\$7,992
Labor Income ¹	\$390	\$4,679	\$5,069
Employment	6,800	81,900	88,700
Multiplier			
Output ¹	\$1,121	\$17,056	\$18,177
Value Added ¹	\$934	\$9,586	\$10,520
Labor Income ¹	\$622	\$6,082	\$6,704
Employment	17,900	154,200	172,100
Total			
Output ¹	\$2,692	\$42,128	\$44,820
Value Added ¹	\$1,463	\$17,049	\$18,512
Labor Income ¹	\$1,012	\$10,760	\$11,772
Employment	24,700	236,100	260,800

Source: Wilbur Smith Associates

¹\$Millions

A vast majority of the total 260,800 jobs are attributable to cargo movements across publicly-owned terminals (246,800 jobs, 95%). However, an additional 14,000 port-related jobs arise through private terminal movements (see Exhibit 3-6). Such movements and associated impacts are included in the analysis because of the essential harbor management and operations facilitated by the SCSPA, without which such private sector activities would be notably constrained.

3.3.2. Regional Impacts

The total port-related (port operation and port user) impacts are presented by region for a local impact perspective of how the Ports of Charleston and Georgetown affect the State. These impacts include both the export and import trade flows for both the public and private terminals.

Since virtually all of the port-operation impacts associated with handling cargo at, to, and from the ports occur in the Tri-County region, they are primarily allocated to the Tri-County Region. For this reason, the impact totals for the other five regions only reflect port-user impacts.⁶

Aiken Region – Firms in the Aiken region that ship and/or receive cargo from the Port of Charleston's public and private terminals generate an estimated \$1.2 billion annually in direct output, of which \$213 million is paid in income to 4,300 employees. The multiplier effect associated with the direct output and jobs generate another \$559 million in output and 5,300 jobs. Combined, the local regional impact associated with the Port of Charleston totals \$1.8 billion in output of which \$406 million is paid in earnings to 9,600 jobs, as summarized below in **Exhibit 3-9**.

Exhibit 3-9
Aiken Port-Related Impacts – 2007

Impact Type	Output ¹	Value Added ¹	Labor Income ¹	Employment
Direct	\$1,200	\$341	\$213	4,300
Multiplier	<u>\$559</u>	<u>\$312</u>	<u>\$193</u>	<u>5,300</u>
Total	\$1,758	\$652	\$406	9,600

Source: Wilbur Smith Associates

¹\$Millions

Lowcountry – Firms in the Lowcountry region that ship and/or receive cargo from the Port of Charleston's public and private terminals generate an estimated \$389 million annually in direct output, of which \$110 million is paid in income to 2,500 employees. The multiplier effect associated with the output and jobs generate another \$303 million in output and 3,100 jobs. Combined, the local regional impact associated with the Port of Charleston totals \$692 million in output, of which \$232 million is paid in earnings to 5,600 jobs, as summarized below in **Exhibit 3-10**.

Exhibit 3-10
Lowcountry Port-Related Impacts – 2007

Impact Type	Output ¹	Value Added ¹	Labor Income ¹	Employment
Direct	\$389	\$165	\$110	2,500
Multiplier	<u>\$303</u>	<u>\$191</u>	<u>\$123</u>	<u>3,100</u>
Total	\$692	\$356	\$232	5,600

Source: Wilbur Smith Associates

¹\$Millions

⁶ Trucking firms and other cargo transport services generate economic impacts statewide. Such impacts are generally reflected in the multiplier impacts estimated for each region.

Midlands – Firms in the Midlands region that ship and/or receive cargo from the Port of Charleston’s public and private terminals generate an estimated \$5.2 billion annually in direct output, of which \$940 million is paid in income to 17,100 employees. The multiplier effect associated with the output and jobs generate another \$3.9 billion in output and 34,700 jobs. Combined, the local regional impact associated with the Port of Charleston totals \$9.0 billion in output of which \$2.4 billion is paid in earnings to 51,800 jobs, as summarized below in **Exhibit 3-11**.

Exhibit 3-11
Midlands Port-Related Impacts – 2007

Impact Type	Output ¹	Value Added ¹	Labor Income ¹	Employment
Direct	\$5,166	\$1,563	\$940	17,100
Multiplier	<u>\$3,853</u>	<u>\$2,187</u>	<u>\$1,422</u>	<u>34,700</u>
Total	\$9,019	\$3,750	\$2,362	51,800

Source: Wilbur Smith Associates

¹\$Millions

Pee Dee – Port-operation impacts at Georgetown combined with firms in the Pee Dee region that ship and/or receive cargo from the ports of Georgetown and Charleston generate an estimated \$2.9 billion annually in direct output, of which \$599 billion is paid in income to 11,700 employees. The multiplier effect associated with the output and jobs generate another \$1.9 billion in output and 18,700 jobs. Combined, the local regional impact associated with the Port of Charleston totals \$4.8 billion in output of which \$1.3 billion is paid in earnings to 30,400 jobs, as summarized below in **Exhibit 3-12**.

Exhibit 3-12
Pee Dee Port-Related Impacts – 2007

Impact Type	Output ¹	Value Added ¹	Labor Income ¹	Employment
Direct	\$2,925	\$914	\$599	11,700
Multiplier	<u>\$1,921</u>	<u>\$1,085</u>	<u>\$668</u>	<u>18,700</u>
Total	\$4,846	\$1,999	\$1,267	30,400

Source: Wilbur Smith Associates

¹\$Millions

Piedmont – The Piedmont generates the largest port-related impacts in the State due to its significant manufacturing base, especially the automobile sector that relies heavily on imported parts and components as well as for exports of finished vehicles. Firms in the Piedmont region that ship and/or receive cargo from the Port of Charleston’s public and private terminals generate an estimated \$12.8 billion annually in direct output, of which \$2.3 billion is paid in income to 37,800 employees. The multiplier effect associated with the direct output and jobs generate another \$8.6 billion in output and 74,900 jobs. Combined, the local regional impact

associated with the Port of Charleston totals \$21.4 billion in output of which \$5.3 billion is paid in earnings to 112,700 jobs, as summarized below in **Exhibit 3-13**.

Exhibit 3-13
Piedmont Port-Related Impacts – 2007

Impact Type	Output ¹	Value Added ¹	Labor Income ¹	Employment
Direct	\$12,820	\$3,720	\$2,321	37,800
Multiplier	<u>\$8,610</u>	<u>\$4,714</u>	<u>\$2,954</u>	<u>74,900</u>
Total	\$21,431	\$8,434	\$5,274	112,700

Source: Wilbur Smith Associates

¹\$Millions

Tri-County – While the Tri-County region's manufacturing base is not as extensive as that of the Piedmont or the Midlands, the combined impacts of the port users and the port operations generate total impacts of \$7.0 billion in output annually, of which \$2.2 billion is paid in wages and salaries to 50,700 people.

The port-operation impacts associated with the port employees and those who facilitate cargo transport at, to and from the SCSPA result in 6,800 direct jobs with earnings of \$0.4 billion and direct output of \$1.6 billion. These port activities generate additional multiplier impacts; 17,900 jobs and \$1.1 billion in output. Combined, the port-operation impacts total 24,700 regional jobs, with labor income of \$1.0 billion and \$2.7 billion in output.

Exhibit 3-14
Tri-County Port-Related Impacts – 2007

Impact Type	Output ¹	Value Added ¹	Labor Income ¹	Employment
Port-Operation Impacts				
Direct	\$1,571	\$529	\$390	6,800
Multiplier	<u>\$1,121</u>	<u>\$934</u>	<u>\$622</u>	<u>17,900</u>
Total	\$2,692	\$1,463	\$1,012	24,700
Port-User Impacts				
Direct	\$2,573	\$761	\$497	8,500
Multiplier	<u>\$1,809</u>	<u>\$1,097</u>	<u>\$722</u>	<u>17,500</u>
Total	\$4,382	\$1,858	\$1,219	26,000
Total Port Impacts				
Direct	\$4,144	\$1,290	\$887	15,300
Multiplier	<u>\$2,930</u>	<u>\$2,031</u>	<u>\$1,344</u>	<u>35,400</u>
Total	\$7,074	\$3,321	\$2,231	50,700

Source: Wilbur Smith Associates

¹\$Millions

Port users in the Tri-County region also ship and/or receive cargo from the Port of Charleston's public and private terminals. In doing so, they generate an estimated \$2.5 billion annually in

direct output, of which \$0.5 billion is paid in income to 8,500 employees. The multiplier effect associated with the output and jobs generate another \$1.8 billion in output and 17,500 jobs. Combined, the local regional impact associated with the SCSPA totals \$7.1 billion in output of which \$2.2 billion is paid in earnings to 50,700 jobs.

3.3.3. Industry Employment Impacts by Regional Sector

The total employment impacts are also evaluated on a sector perspective by region, as shown in **Exhibit 3-15**. Key observations include:

- The manufacturing sector in South Carolina is extremely dependent on the Ports of Charleston and Georgetown. Approximately 122,000 manufacturing jobs in SC are related to port imports and/or exports, which account for nearly half (47.3%) of all manufacturing jobs.
- This manufacturing dependence on the SCSPA, and particularly the Port of Charleston, is highlighted in the Piedmont region where 52,600 manufacturing jobs are dependent on waterborne imports and/or exports. Including all sectors, 112,700 jobs in the Piedmont region are related to SCSPA operations, which represent 43% of the total 260,800 port-related jobs. Further, these 112,700 regional jobs comprise 13.4% of the Piedmont's overall employment.
- Port affected jobs (50,700) in the Tri-County region also top 13% of the region's total, albeit smaller, workforce. Such Tri-County jobs also reflect a notable number of manufacturing jobs (16,600), but also include nearly 12,270 transportation and warehousing jobs (inclusive of both the direct and multiplier impacts).
- The large dependence of the Midlands manufacturing sector on SCSPA is also apparent. An estimated 27,500 manufacturing jobs are port related. Including all sectors, an estimated 51,800 jobs are port related, comprising 9.0% of the region's workforce.
- Led by the manufacturing sector, SCSPA affected jobs in the other three regions also comprise notable shares of their regional employment, ranging between 4.1% and 9.6%.
- The transportation and warehousing sector is also heavily dependent on SCSPA operations. Statewide, an estimated 35,140 sector jobs are directly or indirectly related to port movements, which represents approximately 45% of the sector's total employment.

Exhibit 3-15
Employment Impacts by Region and Industrial Sector – 2007

Industry Sector	Aiken	Low Country	Midlands	Pee Dee	Piedmont	Tri- County	State
Agriculture & Forestry	170	170	730	750	530	240	2,590
Mining & Extraction	20	40	70	380	150	70	730
Power	270	340	3,120	730	1,690	760	6,910
Construction & Maintenance	810	1,220	3,360	2,480	8,480	3,820	20,170
Manufacturing	6,300	1,800	27,500	17,200	52,600	16,600	122,000
<i>Food & Beverage</i>	<i>20</i>	<i>70</i>	<i>1,950</i>	<i>500</i>	<i>500</i>	<i>300</i>	<i>3,340</i>
<i>Textile, Apparel & Leather</i>	<i>1,490</i>	<i>350</i>	<i>2,070</i>	<i>1,640</i>	<i>1,100</i>	<i>790</i>	<i>7,440</i>
<i>Wood & Paper Products</i>	<i>370</i>	<i>230</i>	<i>2,860</i>	<i>3,210</i>	<i>5,180</i>	<i>2,750</i>	<i>14,600</i>
<i>Petro., Chem., Plastics & Rubber</i>	<i>2,260</i>	<i>700</i>	<i>6,530</i>	<i>3,740</i>	<i>9,870</i>	<i>2,050</i>	<i>25,150</i>
<i>Non Metal Mineral Mfg. Prod.</i>	<i>460</i>	<i>40</i>	<i>590</i>	<i>150</i>	<i>750</i>	<i>660</i>	<i>2,650</i>
<i>Primary & Fabr. Metal Prod.</i>	<i>110</i>	<i>20</i>	<i>1,390</i>	<i>1,820</i>	<i>6,640</i>	<i>2,250</i>	<i>12,230</i>
<i>Misc. Equip. & Machinery</i>	<i>940</i>	<i>40</i>	<i>2,440</i>	<i>1,050</i>	<i>4,710</i>	<i>1,420</i>	<i>10,600</i>
<i>Machinery & Electronics</i>	<i>180</i>	<i>10</i>	<i>3,620</i>	<i>1,780</i>	<i>9,260</i>	<i>500</i>	<i>15,350</i>
<i>Transportation Equipment</i>	<i>400</i>	<i>200</i>	<i>4,630</i>	<i>3,200</i>	<i>13,190</i>	<i>4,750</i>	<i>26,370</i>
<i>Furniture & Miscellaneous</i>	<i>70</i>	<i>140</i>	<i>1,420</i>	<i>110</i>	<i>1,400</i>	<i>1,130</i>	<i>4,270</i>
Transportation & Warehousing	310	210	3,560	1,490	17,300	12,270	35,140
Retail and Dealers	320	440	1,940	1,370	5,630	2,560	12,260
Media	60	50	480	240	1,210	540	2,580
FIRE	230	210	1,960	1,110	2,770	2,390	8,670
Miscellaneous Services	280	220	1,850	920	5,760	2,790	11,820
Education & Medical	160	150	1,610	870	4,030	1,810	8,630
Entertainment	20	20	100	90	370	250	850
Services	180	160	1,230	870	3,400	1,680	7,520
Gov't, Social, Religious & Misc.	470	570	4,290	1,900	8,780	4,920	20,930
Total	9,600	5,600	51,800	30,400	112,700	50,700	260,800
<i>Percent of Region Total</i>	<i>9.6%</i>	<i>4.1%</i>	<i>9.0%</i>	<i>8.4%</i>	<i>13.4%</i>	<i>13.3%</i>	<i>10.9%</i>

Source: Wilbur Smith Associates

3.3.4. Tax Impacts

Lastly, the tax impacts associated with port-related activities totals an estimated \$1.5 billion annually. These impacts include income and indirect business taxes. The income taxes include both personal and corporate taxes, while the indirect business taxes include sales and excise taxes, federal non taxes, custom duties, motor vehicle licenses, property taxes, other state and local fees, etc. These business taxes are calculated using the IMPLAN model. Conversely, the estimated income taxes are based on the calculation of an effective statewide income tax rate (both personal and corporate) per employee, which evaluated net income taxes paid (e.g., total payments less refunds). This ratio is then applied to the port-related employment impacts by region.

As shown in **Exhibit 3-16**, the Piedmont generates the largest share of port-related taxes, totaling over \$684 million, followed by the Midlands at \$324 million and the Tri-County at \$240 million. The largest share (\$1.25 billion, 84%) of these tax revenues is associated with the indirect business taxes, which comprise property, sales, and excise taxes.

Exhibit 3-16
Port-Related Tax Impacts by Region (\$Millions) – 2007

Region	Personal Income ¹	Corporate Income ¹	Indirect Business ²	Total
Aiken	\$7.3	\$1.0	\$40.7	\$49.0
Low Country	4.2	0.5	25.7	30.4
Midlands	42.5	5.5	275.9	324.0
Pee Dee	22.8	2.9	136.8	162.6
Piedmont	95.0	12.4	576.5	683.9
Tri-County	<u>40.2</u>	<u>4.9</u>	<u>195.2</u>	<u>240.3</u>
Total	\$212.0	\$27.3	\$1,250.7	\$1,490.0

Source: Wilbur Smith Associates
¹Net (Gross less refunds)
²Includes sales and excise taxes, federal non taxes, Custom duties, motor vehicle licenses, property taxes, other state and local fees, etc

3.4. Conclusion

This study clearly demonstrates that SCSPA activities directly and indirectly bolster South Carolina’s economy. The associated employment, income, output and tax impacts span all industries and reach every region of the State:

- In terms of employment, the 260,800 SCSPA-related jobs represent 10.9% of the 2.4 million jobs statewide.
- The \$11.8 billion earned by these employees represents 13.6% of SC’s total income.
- The tax impacts associated with port-related activities totals an estimated \$1.5 billion annually.
- And, the combined value-added impact, \$18.5 billion, associated with the port operations and port users represents 12.1% of the State’s gross state product (GSP).

These impacts highlight the dependence of manufacturers across the State, who export products and materials through the ports of Charleston and Georgetown, as well as manufacturers and retailers who import materials, component parts, and products. Increasingly, the globalization of trade and manufacturing require dependable and efficient access to transport facilities. Significantly, cheaper than highway and rail, the access to waterborne transport provided by the SCSPA provides cost and/or logistical advantages to SC manufacturers that enable the State to compete efficiently in the global market place.

References

- *BMW in South Carolina: The Economic Impact of a Leading Sustainable Enterprise*; Division of Research, Moore School of Business; September 2008
- *Container Movements & Traffic Mitigation Measures, Port of Charleston*; conducted for The South Carolina Department of Commerce by Wilbur Smith Associates, 2002
- *Economic Forecast: Charleston Region, South Carolina*; Charleston Metro Chamber of Commerce; 2008
- *Employment Related to Manufactured Exports, 2006*; Bureau of the Census, U.S. Department of Commerce; 2008
- *The Economic Impact of Georgia's Deepwater Ports on Georgia's Economy*; Jeffrey Humphreys, Selig Center for Economic Growth, Terry College of Business, The University of Georgia
- *The Local and Regional Economic Impacts of The US Deepwater Port System, 2007*; Prepared for the American Association Of Port Authorities by Martin Associates; June, 2008
- Port Directory; SC State Ports Authority
- *PIERS*, 2008
- South Carolina Department of Revenue Annual Report 2006-2007; <http://www.sctax.org/default.htm>
- *South Carolina Inland Container Port Study*; conducted for The South Carolina Department of Commerce by Wilbur Smith Associates, 2003
- Stat-USA, U.S. Census Bureau; Foreign Trade Statistics; 2008
- *TEU movements by Port*; American Association of Port Authorities; 2008
- *Trade and American Jobs: The Impact of Trade on U.S. and State Level Employment*; Business Roundtable; February, 2007
- U.S. Waterborne Container Traffic by Port/Waterway in 2004
- *The FY 2006 Economic and Fiscal Impacts of Virginia Port Authority Operations*; Prepared for The Virginia Port Authority by William & Mary, Mason School of Business; 2008
- *Waterborne Commerce of the United States - Calendar Year 2006*; U.S. Army Corps of Engineers, Waterborne Commerce Statistics Center
- *Wilbur Smith Associates*

Wilbur Smith Associates
<http://www.wilbursmith.com>

