

Economic Impact Study for Public Ports



Prepared by
Cambridge Systematics, Inc.
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16. Abstract The Missouri Department of Transportation (MoDOT) commissioned this study to assess the economic role of public ports and waterways in supporting and enhancing the state and local economy. The key objectives of the study are to profile the economic activity of the public port facilities in Missouri; identify and assess port-dependent and port-benefitted industries in Missouri; and evaluate the economic impact of ports and waterways on the state in terms of employment, tax revenue, economic output, and induced or multiplier effects. The study team used a combination of port/shipper interviews, site visits, analysis of commodity flow data, and economic modeling to accomplish these goals. The results of the study provide insight to MoDOT and other stakeholders to inform future investment decisions for Missouri's ports and waterways. See also separately published individual port brochures.					
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List of Acronyms

AHP	Above Head of Passes. Head of Passes refers to the terminus of the Mississippi River in Louisiana.
AIM	Advanced Industrial Manufacturing Zone, as part of the Advanced Industrial Manufacturing Zones Act, which is a funding program administered by the Missouri Department of Economic Development and the Missouri Department of Revenue. AIM zone is defined as an area identified through a resolution passed by the port authority board of commissioners that is being developed or redeveloped for any purpose so long as any infrastructure and building built or improved is in the development area.
BNSF	BNSF Railway, a Class I railroad.
BTS	Bureau of Transportation Statistics, part of the U.S. Department of Transportation.
COB	Container-on-Barge, a form of intermodal freight transportation where containers are stacked on a barge and towed to a destination on the inland waterway.
DDGs	Distiller's Dried Grains, a cereal byproduct of the distillation of grains such as corn, rice, and other grains.
ESN	Environmentally Safe Nitrogen, a controlled release nitrogen fertilizer product that protects the nitrogen from loss, and releases it in response to soil temperatures.
FAF	Freight Analysis Framework Version 4.3, as published by the Bureau of Transportation Statistics. The dataset has a base year of 2012 and provides forecasts for 2020 through 2045 in five year increments. Data is categorized by origin, destination, commodity type, mode, and other attributes. Origins and destinations are provided by state and metropolitan area.
FEMA	Federal Emergency Management Agency
LQ	Location Quotient, a statistic that measures a region's industrial specialization relative to the nation as a whole.
MoDOT	Missouri Department of Transportation
MPAA	Missouri Port Authority Association
MRT	Municipal River Terminal at City of St. Louis Port
NAICS	North American Industry Classification System, the standard used to classify business establishments.
NGA	National Geospatial-Intelligence Agency
OS/OW	Oversize/overweight, which refers to vehicles and loads that exceed legal size or weight limits.
PMSL	Port of Metropolitan St. Louis
Port KC	Port of Kansas City
SEMO	Southeast Missouri Regional Port
SPR	SEMO Port Railroad, a common carrier switching railroad that services SEMO and surrounding industrial areas.
TRRA	Terminal Railroad Association of St. Louis, a switching and terminal railroad that handles traffic in the St. Louis metropolitan area.
UP	Union Pacific Railroad, a Class I railroad.
USACE	U.S. Army Corps of Engineers

1.0 Introduction

Marine transportation is critical to the health of Missouri's economy. Missouri industries including agriculture, chemical manufacturing, aggregates, and metals rely on the state's extensive port and waterway network to receive raw materials and to move goods to market. As of 2013, Missouri's 1,050 inland waterway miles ranked tenth in the United States in terms of mileage. Barges traveling on the Mississippi River and Missouri River provide Missouri shippers with access to one of the most economical and environmentally-friendly transportation modes available. These waterways connect the state to the entire Mississippi River system and its tributaries, including the Ohio, Tennessee, and Illinois Rivers. They also provide connections to Gulf Coast ports such as New Orleans and Mobile, providing Missouri shippers with access to global markets.

1.1 Study Overview

The Missouri Department of Transportation (MoDOT) commissioned this study to assess the economic role of public ports and waterways in supporting and enhancing the state and local economy. The key objectives of the study are to:

- Profile the economic activity of the public port facilities in Missouri;
- Identify and assess port-dependent and port-benefitted industries in Missouri; and
- Evaluate the economic impact of ports and waterways on the state in terms of employment, tax revenue, economic output, and induced or multiplier effects.

The study team used a combination of port/shipper interviews, site visits, analysis of commodity flow data, and economic modeling to accomplish these goals. The role of ports in Missouri was documented using the following steps:

- **Step 1 – Literature Review and Data Collection:** MoDOT has some key resources and previous studies including the Missouri River Freight Development brochures, Missouri River Freight Corridor Assessment and Development Plan, studies conducted by the Missouri Port Authority Association (MPAA), U.S. Army Corp of Engineers (USACE) data, and available port-specific master plans.
- **Step 2 – Stakeholder Interviews:** The study team conducted primary data collection in the form of face-to-face and phone interviews with stakeholders, which provided input for developing the existing and future port market opportunities. The interviews were used in validating secondary data, filling data and information gaps, and providing the users' perspective. The final list of interviewees included:
 - Ports;
 - Shippers (major manufacturers in the State);
 - Local and regional economic development agencies; and
 - Industrial and commercial developers, including utility companies.
- **Step 3 – Summarize Port Economic Activity:** For each port, the study team examined essential statistics including size, governance, activity, tenants, on-site and off-site users, employment, budget,

revenue, and other data relevant to economic analysis. The study team developed an overview of each port and its activity, which served as a starting point for the port user profile and economic analysis.

- **Step 4 – Develop a Port User Profile:** The data gleaned from the first three steps served as input into the port user profile for each of the ports and for the State. The port user profile documents what types of businesses rely on what port services and port assets in the state. The profile categorizes port users as port-dependent and port-benefitted. This analysis is based on commodity flow data, stakeholder interviews, and consultant team expertise.

The results of the study provide insight to MoDOT and other stakeholders to inform future investment decisions for Missouri's ports and waterways.

1.2 Key Findings

Key findings of the study include:

- Nearly 4 million tons of freight was shipped through Missouri public ports in 2016, an increase of 78 percent since 2011. The commodities flowing at Missouri ports in 2016 were valued at over \$12 billion.
- Missouri's crop production, mining, nonmetallic mineral product manufacturing, and transportation equipment manufacturing industries are notably dependent on waterborne transportation in order to bring goods to market. In addition, chemical manufacturing and primary metal manufacturing are notably dependent on waterborne transportation in order to receive goods for processing.
- Missouri's public ports support nearly 290,000 jobs annually in the State of Missouri, resulting in nearly \$15.7 billion in labor income and over \$100.6 billion in annual economic activity, as measured by Gross State Product, or output.
- About 34 percent of Missouri's economy and one out of every ten jobs is supported by the ports. This economic activity results in expansion of the state and local tax base, and Missouri ports give rise to more than \$2.4 billion in state and local tax revenue annually.

1.3 Organization of the Report

The remainder of this report is organized as follows:

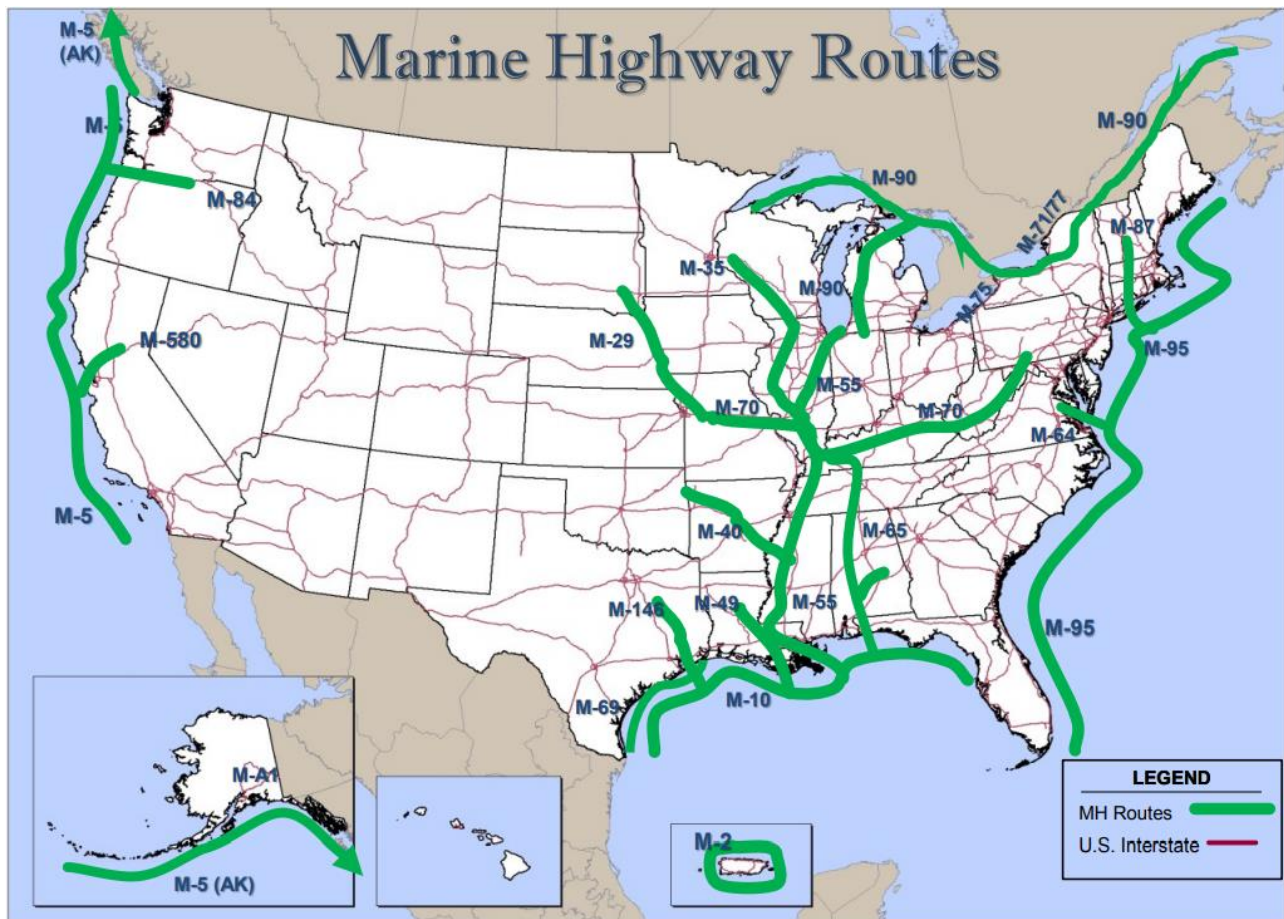
- **Section 2** presents an overview of the port system and marine transportation in Missouri;
- **Section 3** profiles key marine freight users (industries) in Missouri, and categorizes them as port-dependent and port-benefitted. Maps are provided to show the location of these key industries and their jobs in relation to the ports and waterways that serve them; and
- **Section 4** presents the findings from the economic impact analysis, and includes a summary of the methodology, data, and findings. The economic role is described from a statewide perspective and for individual ports.

2.0 Statewide Port System Overview

Missouri has two rivers supporting freight movement. The Missouri River forms the northwest border and bisects the state over the course of 550 miles. In addition, the Mississippi River marks the 500-mile eastern border between Missouri and Illinois, Kentucky, and Tennessee. The U.S. Department of Transportation has designated several marine highways for transporting cargo on water, as shown in Figure 2.1. Marine highways serving Missouri include:

- M-29 connecting the Upper Missouri River from Kansas City to Sioux City, Iowa;
- M-70 covering the Missouri River from Kansas City to St. Louis;
- M-35 recently approved and covering the Upper Mississippi River from the Twin Cities to St. Louis; and
- M-55 connecting the Illinois River from Chicago to St. Louis and then the Mississippi River from St. Louis to the Gulf of Mexico.

Figure 2.1 U.S. Marine Highway Routes



Source: U.S. Department of Transportation, Maritime Administration

The flow of the Missouri River is managed by the U.S. Army Corps of Engineers (USACE) and controlled by dams upstream, with the nearest dam being located at Gavin's Point in Yankton, South Dakota. This river officially has eight-months of navigation flow support from April 1 to December 1 each year, though it is often navigable during other times of the year depending on water levels. The Upper Mississippi River flow is controlled by locks and dams north of St. Louis, six of which are located in Missouri (not including the Chain of Rocks Lock and Dam). The section of the river south of St. Louis is rarely closed by ice, allowing port facilities to operate year-round.

Missouri ports give the state's businesses a logistical advantage over other states without port access. Transporting freight by water is often the lowest cost method of transportation, which provides Missouri businesses an advantage in negotiating freight rates between rail, truck, and barge modes. Public investment in Missouri's port assets leads to private investments, which in turn creates economic opportunities in the short- and long-term.

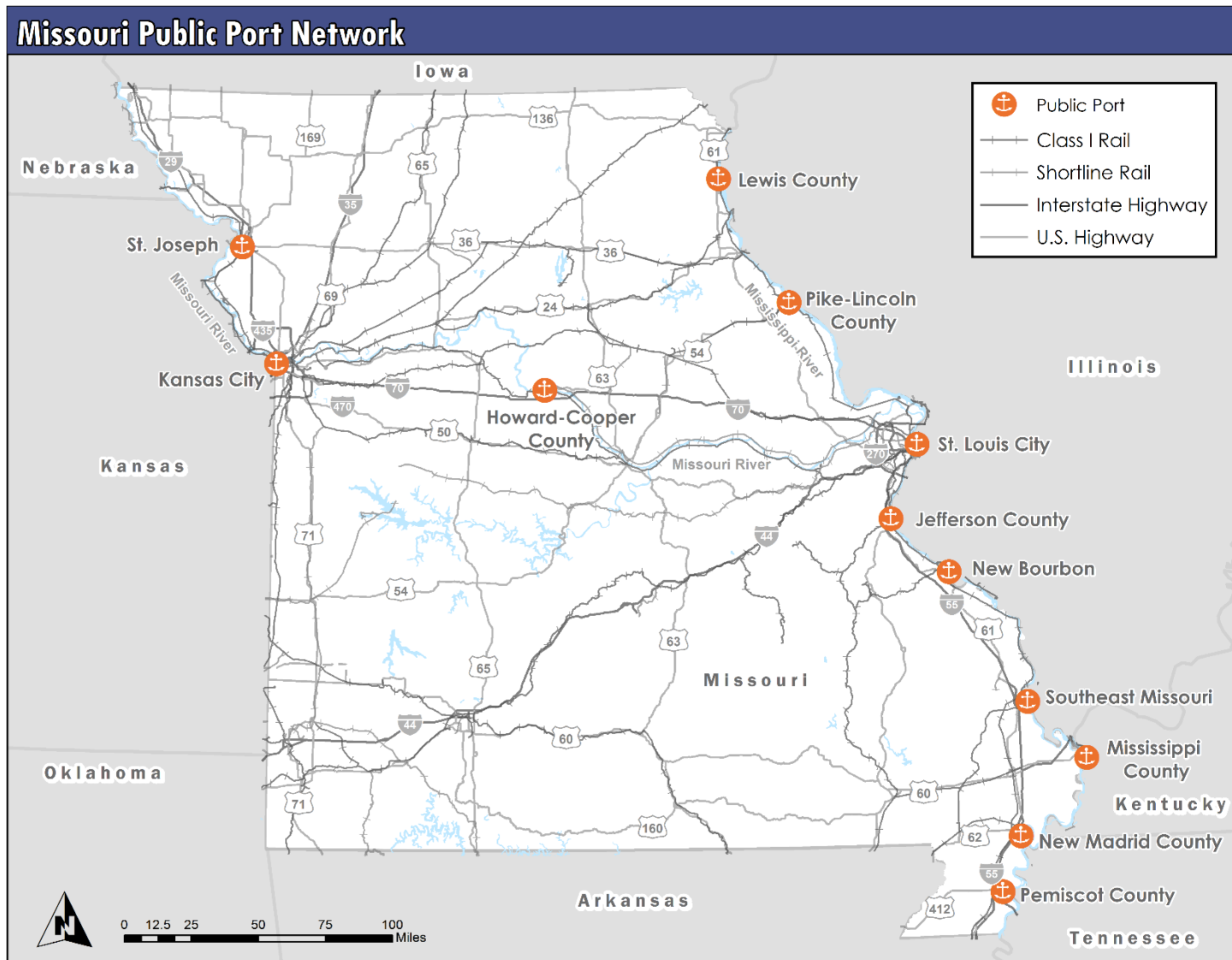
There are 12 public ports in Missouri, as shown in Figure 2.2. They include:

- **Missouri River ports** – St. Joseph, Kansas City, and Howard-Cooper County;
- **Upper Mississippi River ports** – Lewis County, Pike-Lincoln County, St. Louis City, Jefferson County, New Bourbon, and Southeast Missouri;
- **Lower Mississippi River ports** – Mississippi County, New Madrid County, and Pemiscot County.

The ports support significant employment and business spending in the state. In 2016, the ports employed 1,070 people in Missouri and paid out nearly \$70 million in payroll spending.¹

¹ Employment and payroll data from U.S. Bureau of Labor Statistics.

Figure 2.2 Missouri Public Port Network

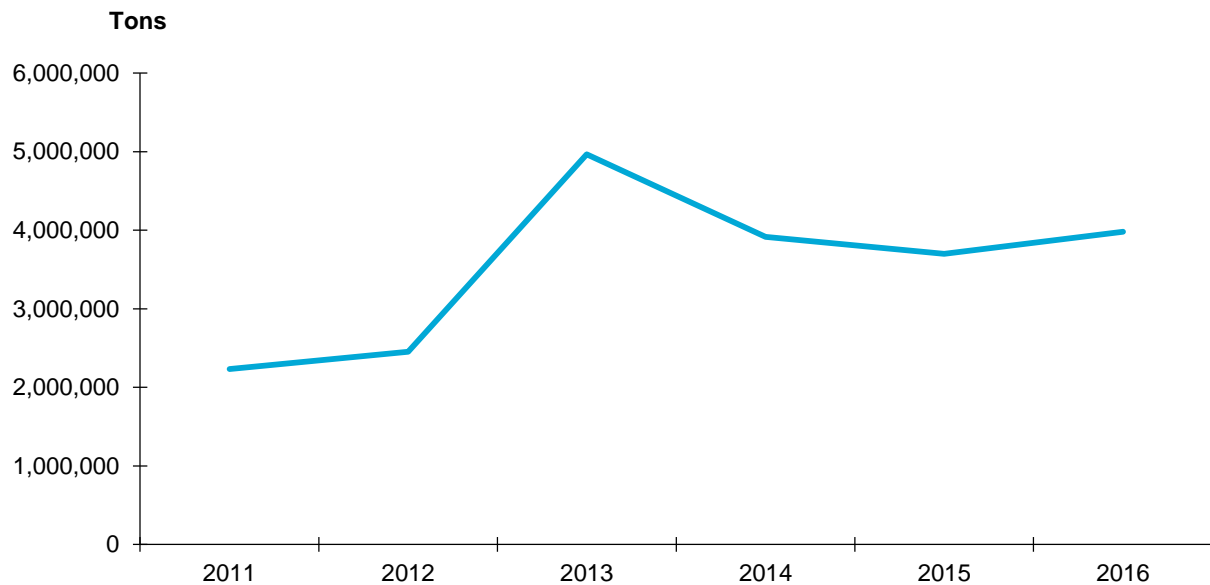


Source(s): Bureau of Transportation Statistics (BTS). Cambridge Systematics.

2.1 Volume of Port Commodities

A total of nearly 4 million tons of freight was shipped through Missouri public ports in 2016, as shown in Figure 2.3. Since 2011, total tonnage has increase by 78 percent, or an annual growth of 12 percent. Individual volumes at each port are discussed as part of the Port Profiles in Section 3.0.

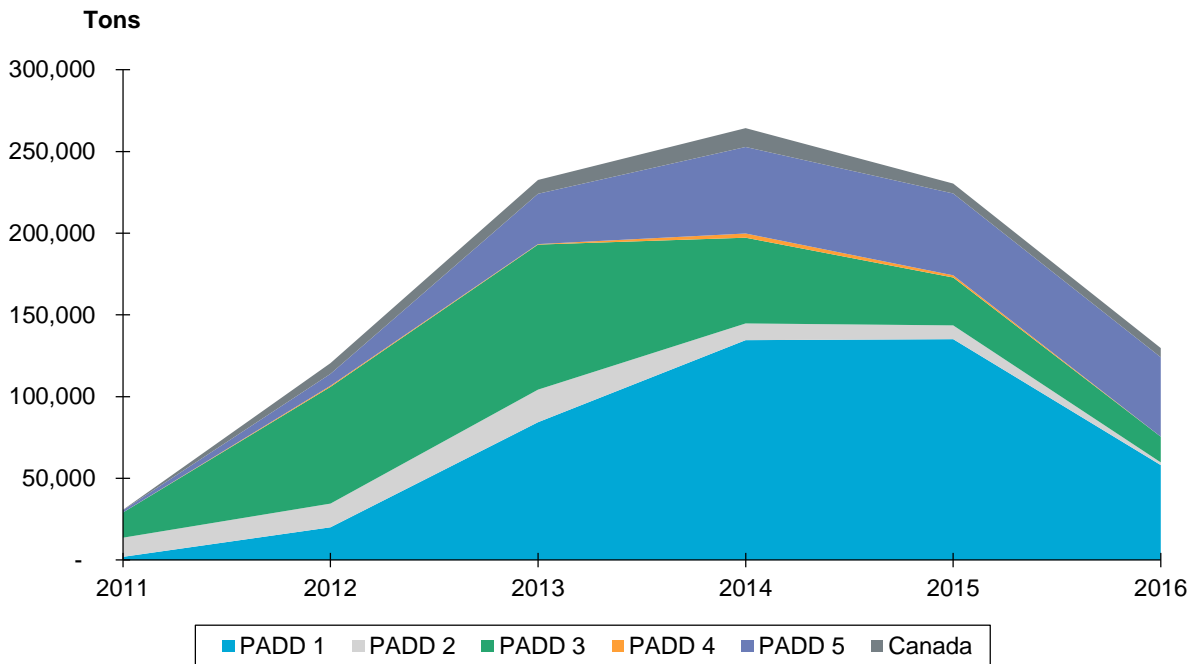
Figure 2.3 Total Tons at Missouri Public Ports
2011–2016



Source: MoDOT.

The spike in tonnage handled at Missouri's ports in 2013 is partially attributable to the surge in crude oil shipments by rail. This is especially the case at the Port of Pemiscot County, which experienced a substantial uptick in tonnage in 2013 due to crude oil shipments by rail to and from the port's facilities. The Petroleum Administration for Defense District 2 (PADD) includes 15 Midwestern states, including Missouri and North Dakota.² As shown in Figure 2.4, Bakken Formation crude heavily influenced total tonnage of crude oil by rail to and from PADD 2 in recent years. Tonnage of crude oil transported by rail to and from PADD 2 increased rapidly between 2011 and 2013, a total of 617 percent. Some of this tonnage was shipped to and from the Port of Pemiscot County as well as other Missouri ports. After 2014, the economics of transporting crude by rail became less favorable, and tonnage shipped to and from PADD 2 began to decrease after peaking in 2014. By 2016, volumes had decreased by 44 percent since 2013.

² PADD 1 includes 17 East Coast states from Maine to Florida. PADD 2 includes 15 Midwestern states. PADD 3 includes 6 Gulf Coast states from Alabama to New Mexico. PADD 4 includes 5 states in the Rocky Mountain region. PADD 5 includes 7 West Coast states, including Hawaii and Alaska. More information available via the U.S. Energy Information Administration website: <https://www.eia.gov/todayinenergy/detail.php?id=4890>.

Figure 2.4 Total PADD 2 Inbound and Outbound Movement of Crude Oil by Rail

Source: U.S. Energy Information Administration (EIA).

2.2 Value of Port Commodities

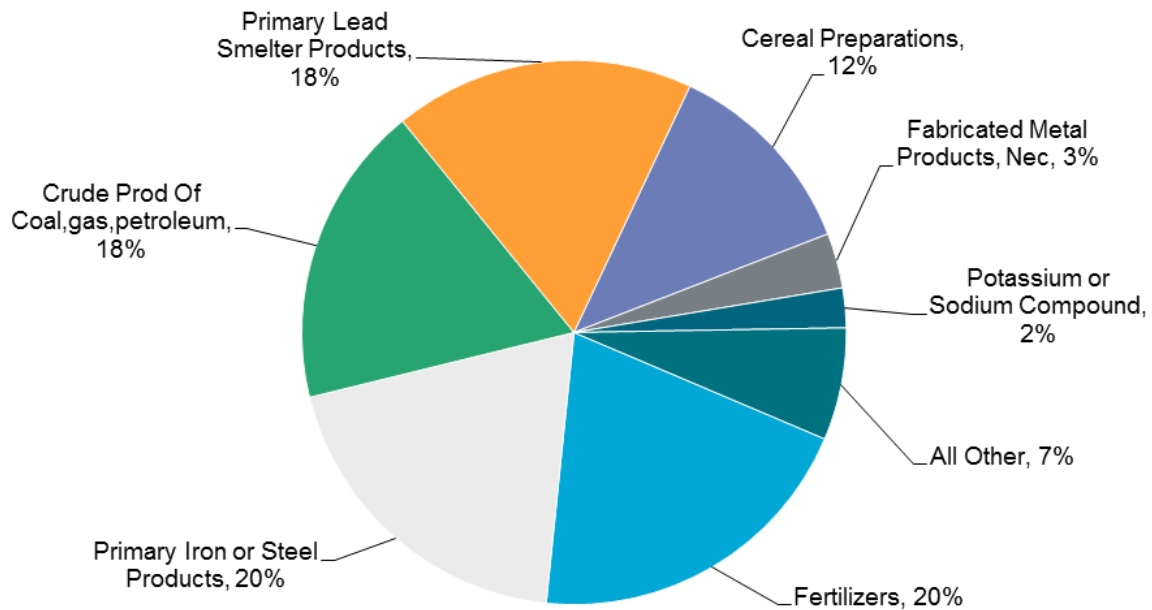
Value of Missouri's waterborne freight was calculated from the 2011 Transearch data, a commodity flow database secured by MoDOT from IHS Global Insight, and applying it to 2016 tonnage data from the U.S. Army Corps of Engineers. The commodities flowing at Missouri ports in 2016 were valued at over \$12 billion. Figure 2.5 displays the share of inbound value, which was valued at over \$4.5 billion. Fertilizers comprise a significant amount of inbound value (20 percent of total), followed by primary iron or steel products (20 percent). Including crude production of coal, gas, and petroleum, these top three commodities comprised 58 percent of inbound value.

Figure 2.6 displays the share of outbound value (valued at over \$7.2 billion). Grain and crude production of coal, gas, and petroleum represent the top two commodities by value, together comprising 55 percent. The remaining commodities comprise smaller proportions of total outbound value, including concrete products, crude petroleum, and various metal and energy products.

Figure 2.7 displays the share of intra-state value, which was valued at \$306 million. The majority of intra-state commodities were metal scrap or tailings, comprising 36 percent of total value. Other notable intra-state commodities include crude production of coal, gas, and petroleum, concrete products, and sand/gravel.

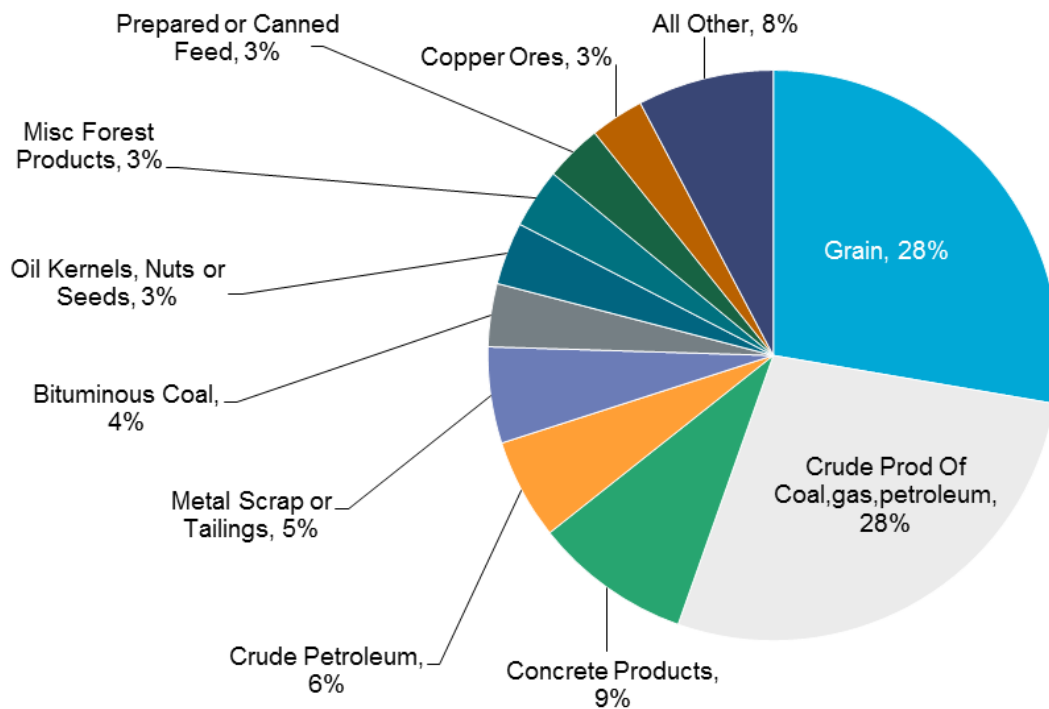
Overall, agricultural, aggregates, and energy products dominate commodity flow in terms of value in all three directions, and are critical products that are necessary to support key industries located throughout the state.

Figure 2.5 Top Inbound Commodities at Missouri Ports by Value
2016



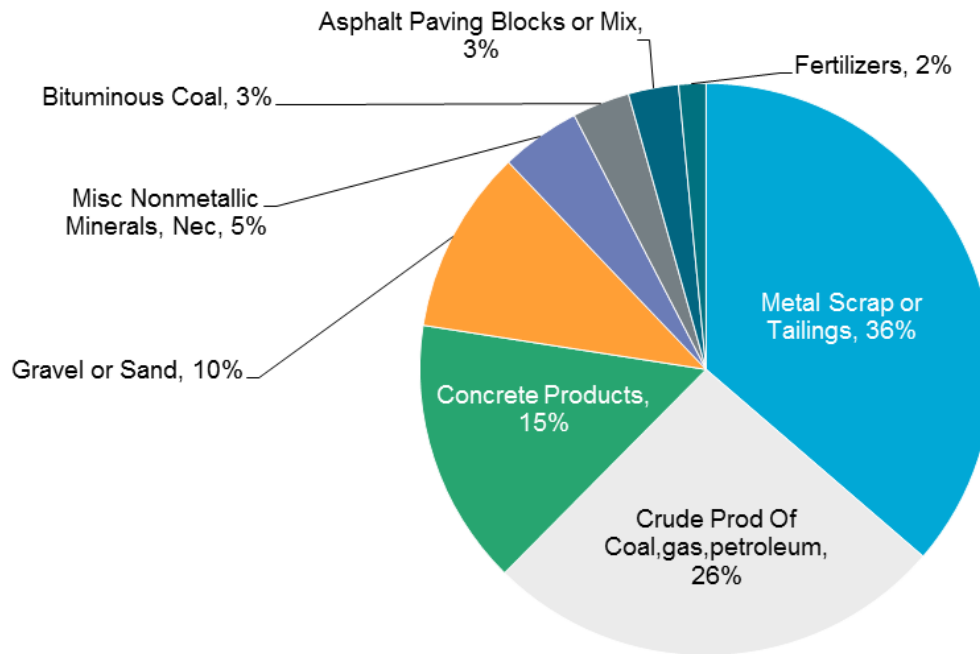
Source(s): IHS Transearch Data (2011) and USACE (2016).

Figure 2.6 Top Outbound Commodities at Missouri Ports by Value
2016



Source(s): IHS Transearch Data (2011) and USACE (2016).

Figure 2.7 Top Intra-State Commodities at Missouri Ports by Value
2016



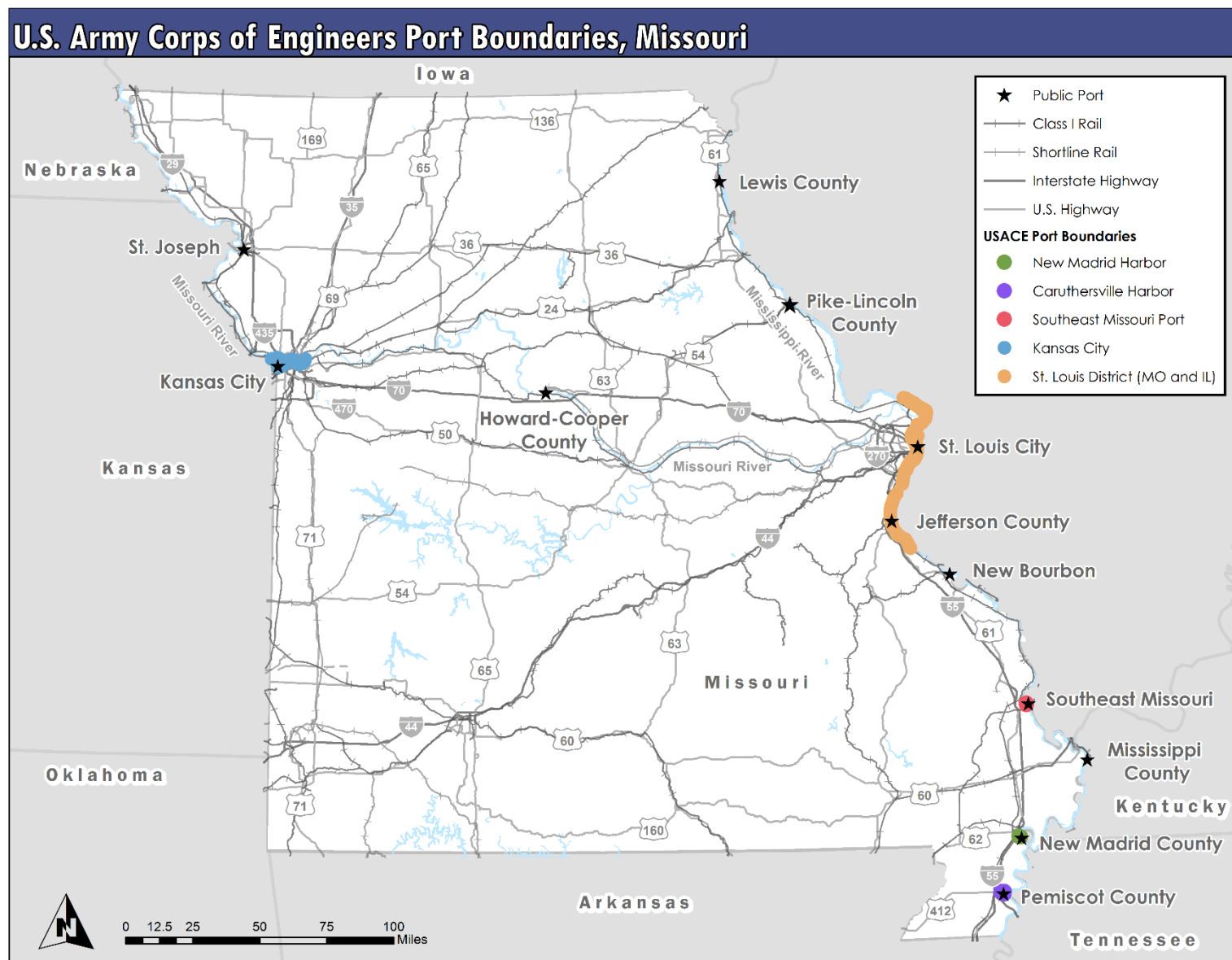
Source(s): IHS Transearch Data (2011) and USACE (2016).

2.3 Individual Port Profiles

The following sections provide an overview of each port facility in Missouri. The information is based on previous studies, stakeholder interviews, U.S. Army Corps of Engineers (USACE) data, and information submitted directly by the ports.

USACE tonnage and commodity data is available for five Missouri ports: Kansas City, St. Louis, Southeast Missouri, New Madrid County, and Pemiscot County. However, not all of the port authority districts and the USACE-defined port areas precisely align. Notably, the USACE district for St. Louis, known as the Port of Metropolitan St. Louis, is 70 miles long and includes both sides of the Mississippi River. In addition, the Port of Kansas City district is 21 miles long, from river mile 374.8 to 353.8. This means that the data may capture freight activity beyond each port's facilities. The USACE districts for Southeast Missouri, New Madrid County, and Pemiscot County (Caruthersville Harbor) include port facilities only. Figure 2.8 depicts Missouri ports in relation to the USACE boundaries.

Figure 2.8
U.S.
Army Corps of
Engineers
Port District
Boundaries in
Missouri

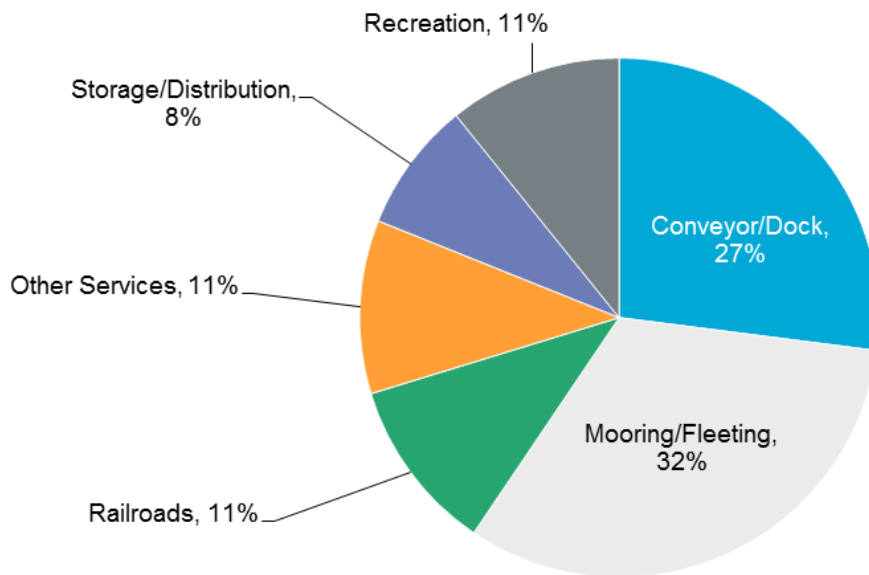


Source: U.S. Army Corps of Engineers, Bureau of Transportation Statistics (BTS), Cambridge Systematics.

2.3.1 City of St. Louis Port District

The Port of Metropolitan St. Louis (PMSL), as defined by the USACE, is 70 miles long and includes both sides of the Mississippi River. It is the third-largest inland water port by tonnage in the U.S. and the northernmost ice- and lock-free port on the Mississippi River. The City of St. Louis Port District, which is within the PMSL, covers 19 miles of riverfront and 6,000 acres of developable land, including the Municipal River Terminal (MRT). As of 2015, the Port Authority leases operations of this public dock to SCF Lewis and Clark Terminals (SCF). The 40-acre facility features a 2,000-foot dock with a rail spur into the yard from a local switching line, Terminal Railroad Association of St. Louis (TRRA), which facilitates access to six Class I railroads. Although one-third of the dock was constructed during the 1980s, it is in good condition and the remaining two-thirds was recently constructed. It has 1.3 million gallons of tank storage, a 90,000 square foot warehouse, and a 67-barge fleet area. SCF also has eight harbor tugs and over 1,000 barges in the St. Louis Harbor. In addition to owning the MRT, the Port Authority has negotiated nearly 40 leases for property along its 19 miles of riverfront. The different types of active leases are shown in Figure 2.9. More than half of the leases are conveyor, dock, mooring (i.e. permanent structure to which a vessel may be secured), or fleeting (i.e. barge parking) leases, with the remaining comprising leases with railroads (two Class I and two short line), recreation, storage/distribution, and other services.

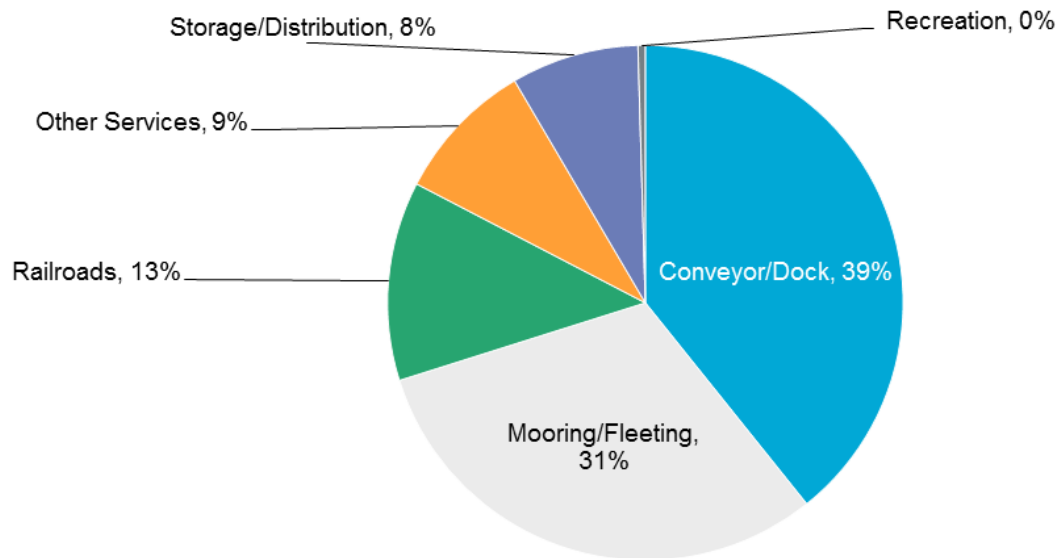
Figure 2.9 Lease Types at City of St. Louis Port District
2017



Source: City of St. Louis Port Authority.

These leases provide the Port Authority with nearly \$1.05 million in annual revenue from its tenants, as shown in Figure 2.10. Conveyor/dock leases provide the largest overall revenue, followed by mooring/fleeting and railroads. However, the Port Authority believes that the leases are undervalued, and it is in the process of reviewing agreements and determining more favorable rent structures for upcoming lease renewals. The Port Authority receives a per-ton royalty from SCF Lewis and Clark Terminals for users of the MRT facility.

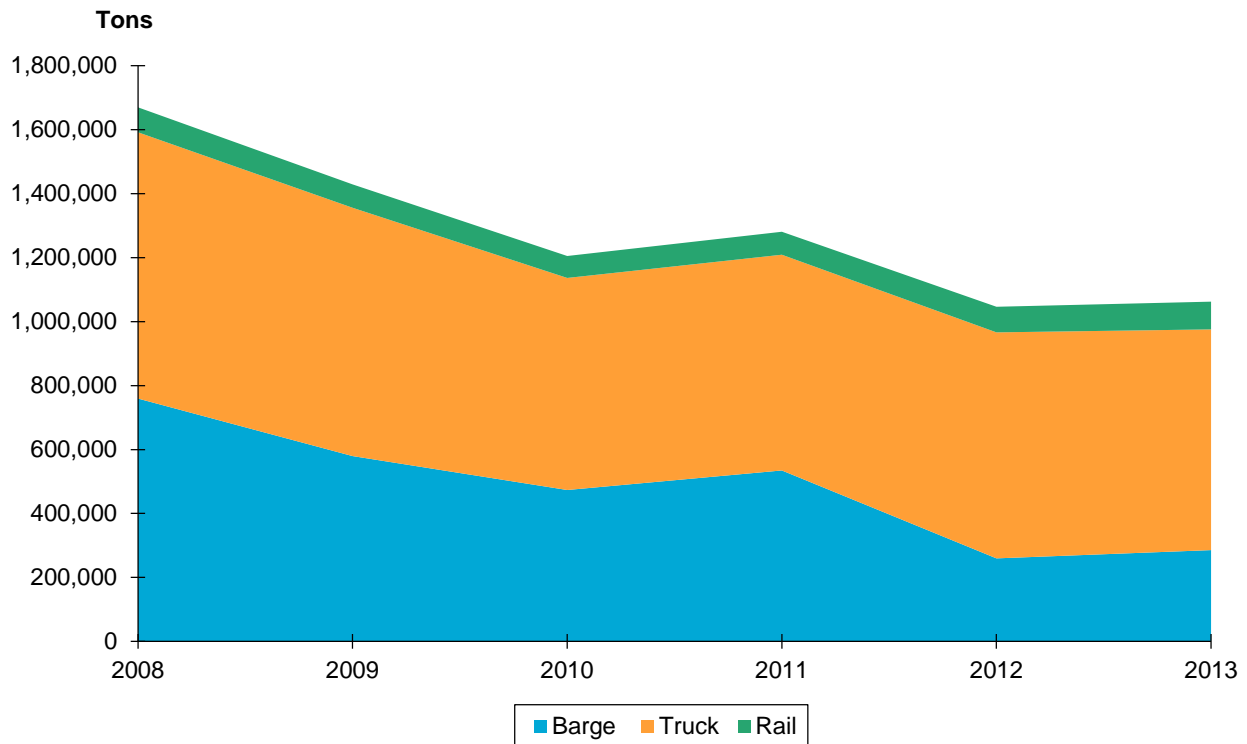
Figure 2.10 Annual Rent by Lease Type at City of St. Louis Port District
2017



Source: City of St. Louis Port Authority.

Overall tonnage handled at the MRT has declined in recent years. Figure 2.11 shows the tonnage trends from 2008 to 2013 for barge, truck, and rail modes. Trucks moved the greatest proportion of tonnage (65 percent in 2013). Barge tonnage has decreased by about two-thirds since 2008 and comprises 27 percent overall, and rail tonnage has increased overall tonnage slightly but only comprises eight percent. Tonnage for other port users is not available, as the Port Authority does not track tonnage or commodity information for its tenants.

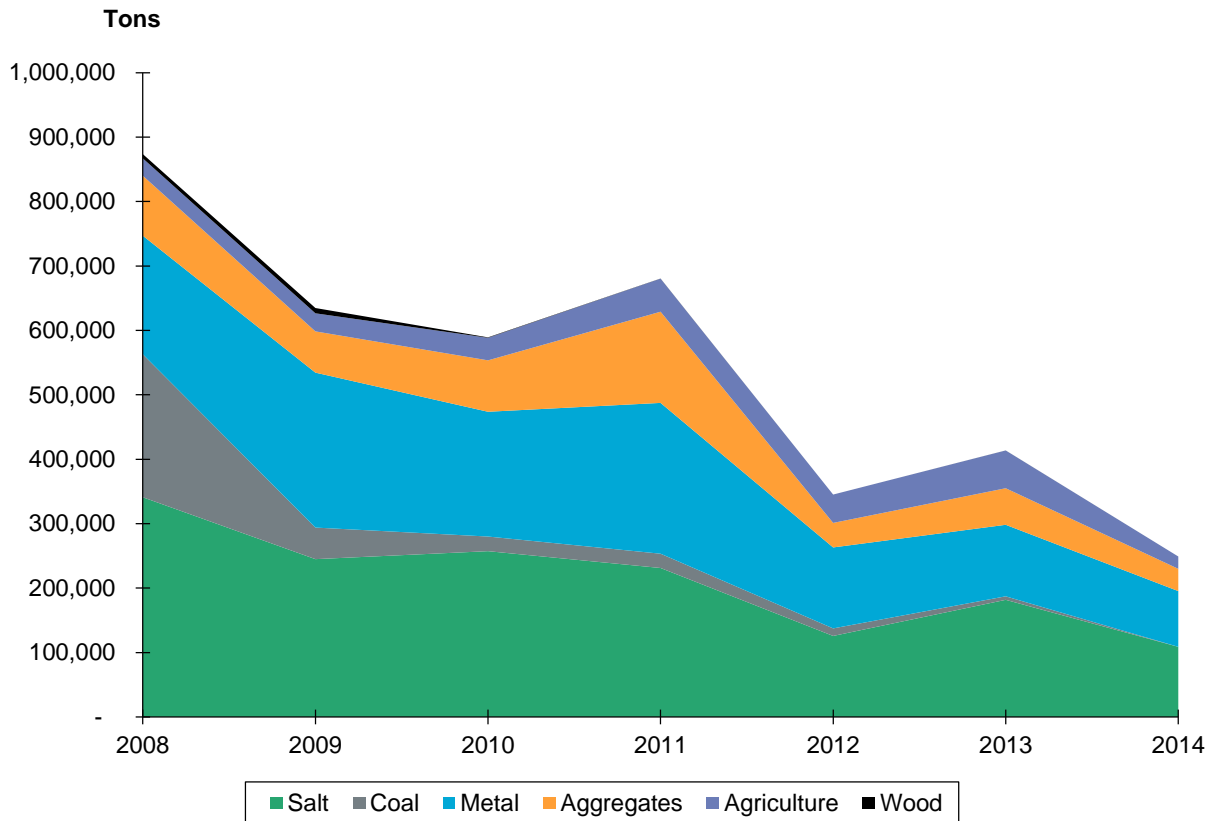
Figure 2.11 Total Tonnage by Mode at Municipal River Terminal
2008–2013



Source: City of St. Louis Port Authority.

The Port Authority also collects data on commodities handled at MRT, but not for the other port users beyond that facility. The MRT specializes in handling commodities such as aluminum, clay, corn, sand, scrap metal, sugar, wheat, and wood. Figure 2.12 shows the trend in outbound tonnage at the Port's Municipal River Terminal over a six-year period. Overall, outbound tonnage has decreased by 71 percent, which is an annual decrease of 19 percent. Coal and wood commodities have disappeared entirely, and there have been substantial decreases in salt, aggregates, and metal products. However, salt and metals comprised significant portions of outbound tonnage in 2014, 44 percent and 35 percent, respectively. The Port Authority does not collect similar data for inbound commodities handled at MRT.

Figure 2.12 Outbound Tonnage at Municipal River Terminal
By Commodity Category, 2008–2014

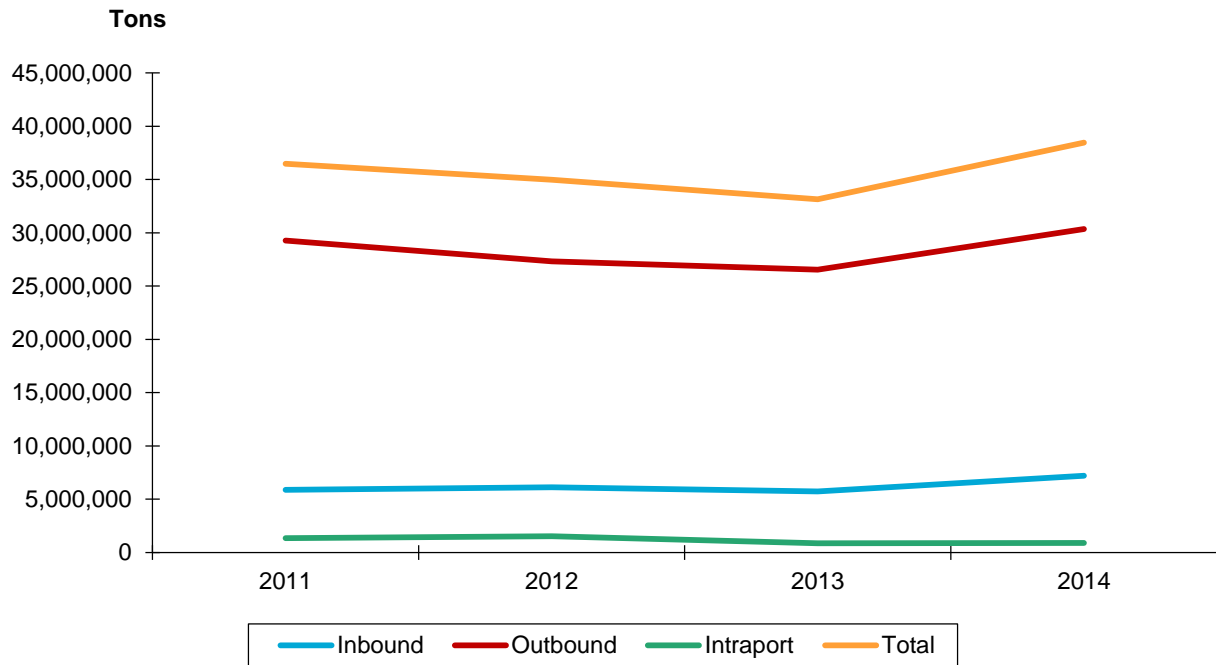


Source: City of St. Louis Port Authority.

Although the Port Authority does not track overall tonnage for the City of St. Louis Port District, information on tonnage and commodities is available from USACE for the Port of Metropolitan St. Louis, which comprises both banks of the Mississippi River (Illinois and Missouri) from river mile 138.8 through river mile 208.8, above the Ohio River junction. Figure 2.13 shows the waterborne freight tonnage moved through the St. Louis Port District from 2011 to 2014. The majority of tonnage was outbound (79 percent), which totaled just over 30 million tons in 2014. Nearly 40 percent of outbound tonnage was food and farm products, supporting Missouri's agricultural industries. In addition, 44 percent of outbound tonnage supported Missouri's energy industries, comprising products such as coal, lignite, petroleum, and petroleum products. There was some reported intra-district activity (two percent), and 19 percent was transported inbound.

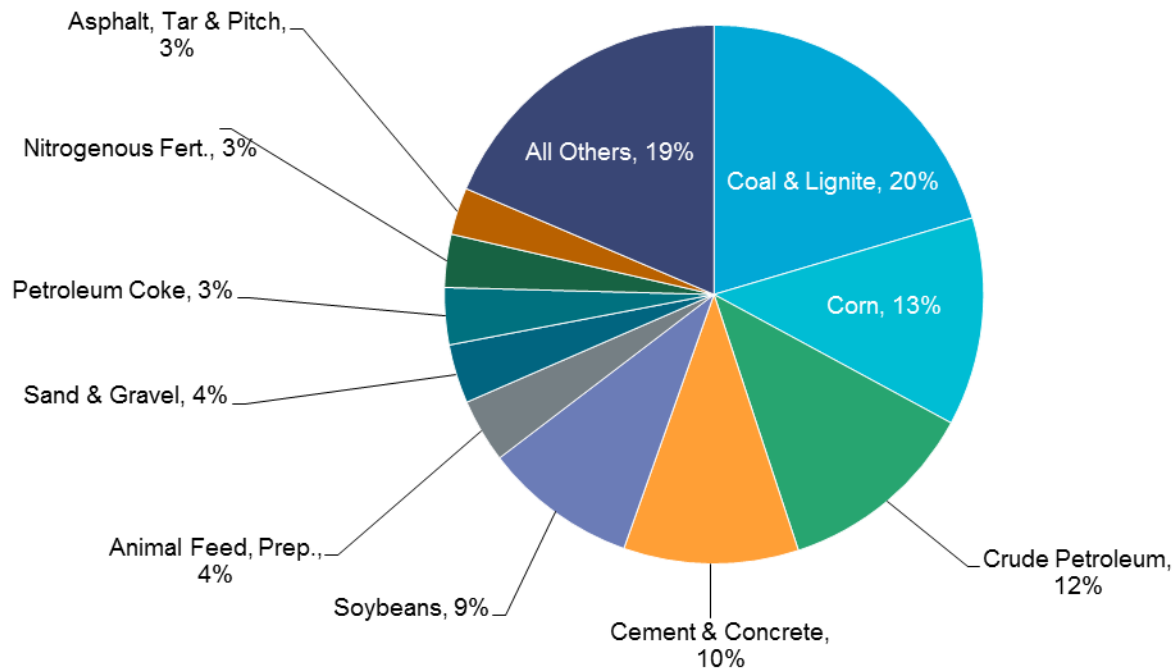
Figure 2.14 presents the breakdown of commodities moving through the St. Louis Port District. Overall, the three major commodity categories moved in all directions included food and farm products (29 percent), petroleum and petroleum products (22 percent), and coal products (21 percent). The top three individual commodities included coal and lignite (20 percent), corn (13 percent), and crude petroleum (12 percent). Missouri's ports strongly support the agriculture and energy industries by moving bulk goods at a low cost.

Figure 2.13 Tonnage Moved Through St. Louis Port District
2011-2014



Source: United States Army Corps of Engineers Waterborne Commerce Data, 2011-2014.

Figure 2.14 Top 10 Commodities Moved Through St. Louis Port District
2014



Source: United States Army Corps of Engineers Waterborne Commerce Data, 2014.

One of the most important priorities for the Port Authority at this time is to reevaluate leases that are due to expire within the next five years. Revenue from MRT activity is based on royalties from tonnage and fleeting, which gives the Port Authority the right to review tonnage and commodity information at that facility. The other individual leases along other parts of the riverfront are not structured in this way; the lease rates are generally undervalued and do not reflect relative merits. The 600 acres of riverfront is broken into smaller parcels, and although it is mostly built out, it is hard to assemble suitable developable sites. However, the City of St. Louis Port Authority intends to develop more last-mile intermodal support along the riverfront. An opportunity recently emerged for the Port Authority to potentially acquire the current National Geospatial-Intelligence Agency (NGA) building, as the railroads have expressed interest in using this site for intermodal activities. The site is adjacent to several rail tracks, a rail yard, and the Mississippi River waterfront. In addition, the Port Authority is seeking to improve Hall Street, which is a truck access route through the Port District, to be better protected from flooding and subsequent access issues.

At the MRT, there is not much vacant or developable land near to the facility, which limits additional storage for containerized freight needs. Branch Street, a local road and truck access road that leads up to the MRT, is in need of repair to level out the undulations, which limits truck access. Other planned upgrades include a \$600,000 grant to upgrade rail access onsite, repair the warehouse roof in the next 5-10 years (roughly \$500,000 in improvements), install a solar array (\$1 million), and acquire a large battery to charge electric fork lifts and other equipment. The Port Authority is working on the Rail Access Plan and has begun engineering for the rail improvements.

Overall, the Port Authority's goal is to increase the number of barges and tonnage handled at its facilities along the waterfront. In addition to taking advantage of available grant funding opportunities from MoDOT and federal sources, they are looking into designating the Port as an Advanced Industrial Manufacturing (AIM) Zone to capture state tax on net new jobs created at the Port. This would serve as a potential source of revenue for further expansion and development.

2.3.2 Port of Howard-Cooper County

The Port of Howard-Cooper County is located at Missouri River mile 196.1, which is north of and across the river from Boonville, MO. It is the only public port located in the center of the state, approximately 1 ½ hours by car from Kansas City and 2 ¼ hours from St. Louis. The site is situated near I-70, U.S. Highway 40, Missouri Route 5, and Missouri Route 87. UP operates rail service through Boonville, but it is located on the south side of the Missouri River, across from the Port of Howard-Cooper County. In 2016, the Port Authority received \$26,000 from MoDOT and \$6,000 in throughput (primarily soybeans) to cover rent (\$2,600/month) and payroll (\$3,000/month) expenses. The Port Authority currently employs one part-time employee.

The Howard-Cooper County Regional Port Authority operates a 0.3-acre site jointly with a private company. The dock has fallen into disrepair, and had not seen any freight activity in 6-8 years until October and November 2016, when MFA loaded 4 outbound barges with soybeans from trucks. In prior years it has handled coal, grain, and fertilizer products. However, planning is currently underway to develop a new facility on an 18-acre site just east/down river of the current site. The master plan includes an access road, loading/unloading dock, several storage buildings, truck staging area, and an on-site office building, among other improvements. The Port Authority has received a \$400,000 grant to begin the engineering, environmental permitting, and construction of the new entrance road. However, it is estimated that it will take between \$2-3 million to make the new facility operational. The Port Authority also sees potential for handling oversize/overweight (OS/OW) loads, such as wind turbines, but would need additional storage space.

The Port Authority has identified 60 grain elevators and 25 rock quarries within a 50-mile radius of the port facility that could be potential future users of the new site. MFA is a strong presence in the region, and the Port would benefit from increased competition from new agricultural companies locating in the area.

2.3.3 Port of Jefferson County

The Jefferson County Port Authority is currently working on the development of the Port of Jefferson County. The Port Authority completed a Phase I Feasibility Study (2010), a Phase II Master Plan (2011), and a Crystal City Port Access Report (2012) to help plan and explore the potential of three sites within the County. Out of the three port development sites under consideration – Herculeaneum, Crystal City, and Pevely – Crystal City is most viable, although there is not currently sufficient roadway access to the site. Beyond administrative funding from MoDOT, the only source of revenue for the Port Authority comes from two barge fleeting leases on two sites along the Herculeaneum riverfront, which generate a monthly revenue of \$2,500.

The Port Authority has identified two opportunities that could make the Port viable. The first involves constructing a corrosive material dock to handle commodities such as salt, which is currently barged up to Granite City and trucked to Jefferson County. A dock for this purpose would enable those products to be moved via barge directly to the County. The second opportunity involves developing new rail track to accommodate unit trains. Currently, although UP and BNSF Railway provide service in Jefferson County, there is no place to load a unit train. Constructing a loop track could help move grain or frack sand to and from the County.

Presently, the Jefferson County Port Authority's main focus is the relocation of the Delta Queen to Kimmswick, a city within the County that is approximately 25 miles south of St. Louis. The Delta Queen steamboat will become a tourist attraction in the historic town, and according to the St. Louis Regional Chamber, it is expected to create 281 direct and indirect jobs, support \$12.4 million in labor income, and generate \$36.4 million in economic output. So far the Port Authority has leveraged state funding to build a dock and access road at Kimmswick, and has plans to invest in fleeting construction, property acquisitions, and waterfront improvements in future years.

2.3.4 Port of Kansas City

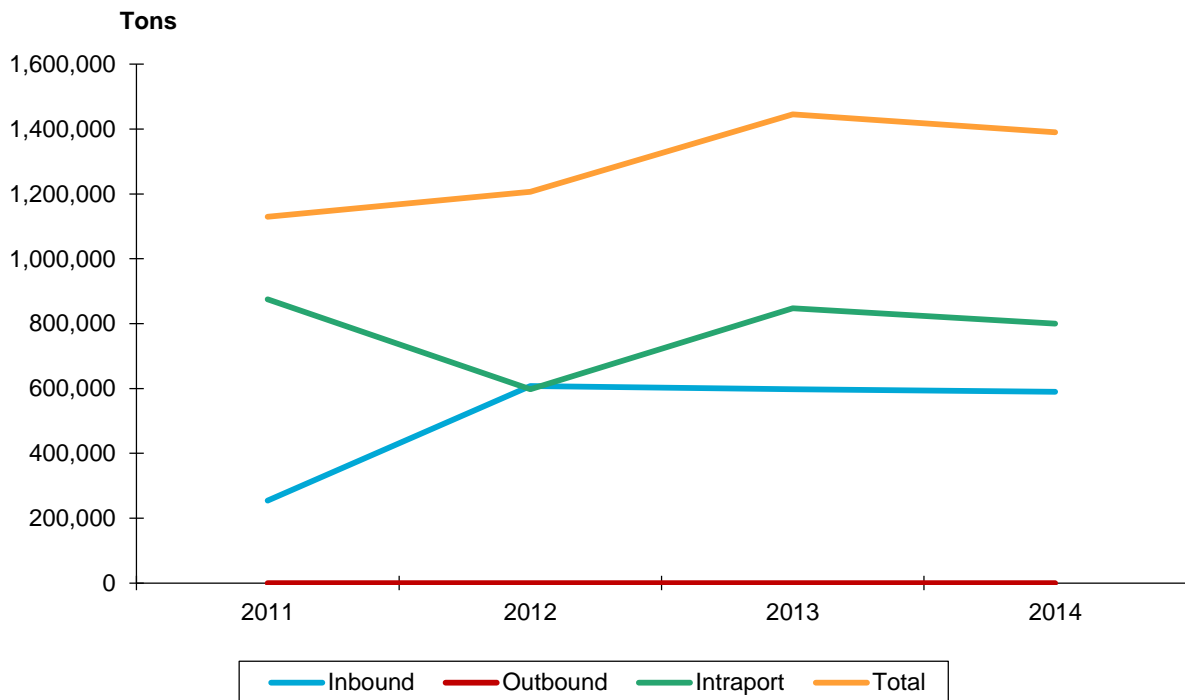
The Port of Kansas City (Port KC) is located at Missouri River mile 367.1, just southeast of the confluence with the Kansas River. Although Port KC was established in 1977, it ceased operations from 2007 until 2015, when operations were restarted. Kaw Valley Companies is Port KC's operator and sole tenant, and is capable of handling fertilizer, coal, scrap steel, sand, finished steel products, and other bulk commodities. Off-site users of the Port include a global food processing company, a cement production company, and a company that processes ferrous and non-ferrous metals. Port KC's partnership with Kaw Valley has been highly successful, as Port KC purchases and leases back equipment to offset large expenditures for Kaw Valley to grow and develop onsite. The infrastructure at the terminal is old and in subpar condition, and Port KC relies on funding from Missouri grant funding to make necessary upgrades. In addition to loading and unloading barges, the Port provides barge cleaning services, and can weigh and load trucks on-site. Port KC has five employees and generates \$80,000 annually in operating revenues.

Port KC's facilities handled 45,000 tons in 2015. Commodities handled include fertilizer, mill scale, rebar, and scrap steel. The Port Authority also expects to increase volumes of two phosphorus fertilizers, monoammonium phosphate (MAP) and diammonium phosphate (DAP), in 2018. They are typically shipped to and from northwest Missouri, northern and central Kansas, southern Iowa, Nebraska, and the Dakotas.

Port KC recently acquired another 3.5 acres of land to grow its footprint to 9.5 total acres and over 2,000 feet of river frontage. It projects that it will handle 83,000 tons in 2017, and 125,000 tons in 2018. This growth is dependent on expanding the dock for heavy lift cargo and barge staging. Port KC has also identified an opportunity to double the amount of fertilizer stored onsite after demolishing an obsolete warehouse.

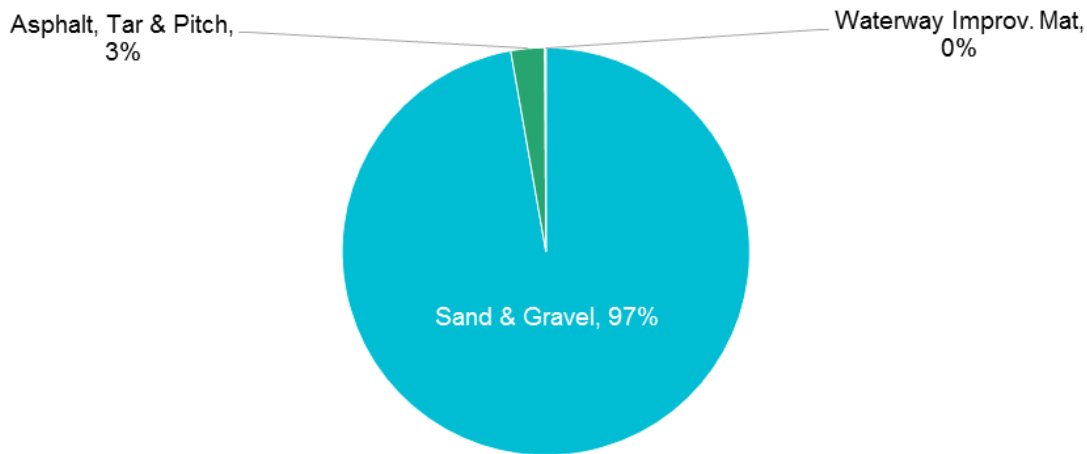
Tonnage estimates and commodity information from U.S. Army Corps of Engineers (USACE) is available for the 21-mile segment on the Missouri River, between river mile markers 374.8 and 353.8, as shown in Figure 2.15 and Figure 2.16. Total tonnage moved within the Kansas City port district has fluctuated somewhat between 2011 and 2014, with a total of nearly 1.4 million tons in 2014. The Kansas City port district had no outbound tonnage, while intraport tonnage was slightly higher than inbound tonnage. However, the amount of inbound and intraport tonnage was roughly equal in 2012, suggesting that some sand and gravel was transported inbound by water rather than moved intraport. Reported commodities included primarily sand and gravel (97 percent), with small amounts of asphalt, tar, and pitch (three percent) and waterway improvement materials (less than one percent).

Figure 2.15 Tonnage Moved in Kansas City Port District
2011–2014



Source: United States Army Corps of Engineers Waterborne Commerce Data, 2011-2014.

Figure 2.16 Commodities moved in Kansas City Port District
2011–2014



Source: United States Army Corps of Engineers Waterborne Commerce Data, 2014.

2.3.5 Port of Lewis County

The Port of Lewis County is located at Mississippi River mile 341.8, which is approximately a half-mile downstream from Lock and Dam 20 in Pool 21. The facility, which is owned by the Lewis County Regional Port Authority, is located near Business Highway 61 and U.S. Highway 61, and is approximately 35 miles north of U.S. Highway 36 which provides access to Chicago and Kansas City. BNSF Railway operates adjacent to the facility, situating the Port between the railroad and the Mississippi River. Its off-site users include an agrichemical company that uses the terminal to handle liquid products, and a grain cooperative that uses the facility to load barges with grain and ethanol by-products. In addition, there is an on-site marine towing company that serves as the Port's fleet master and provides tug boat building services. The Port Authority has two employees and \$7,000 in annual operating revenues.

The Port handled over 581,000 tons of commodities in 2015, and expects volumes to approximately double in 2016 to nearly 1.27 million tons. Approximately 60 percent of tonnage is corn, and between 20 percent and 30 percent is bulk soy and wheat shipments. The Port also handles rip rap (loose stone), distiller's dried grains (DDGs), and liquid fertilizer. The Port generally serves companies in northeast Missouri and southeast Iowa.

In October 2017 the Port Authority solicited proposals from engineering and consulting firms to develop a conceptual site plan for a port development site. Potential services for this site include: roadways, riverfront and in-river infrastructure, rail spur track and/or loop track, dry and liquid bulk material handling equipment and storage, roll-on/roll-off (RO/RO) ramp, container storage area, OS/OW storage area, utility connections (e.g., sewer, water, electric, natural gas), and barge fleeting areas.

Long term, the Port Authority prioritizes property acquisition, building critical infrastructure (such as access road and utilities), riverfront development (dock or mooring cells), and rail access. It envisions providing several key services, including the continuation of supporting loading and off-loading of bulk materials such as aggregates, rock salt, construction materials, and agricultural products not already handled at the facility. The Port Authority is particularly interested in supporting low volume container-on-barge (COB) traffic, river maintenance contracts, and the loading and off-loading of large equipment and other OS/OW shipments.

Because the Port Authority currently has just seven acres of land to work with, there is not enough space to create direct rail accessibility, but they are seeking to purchase property in the future.

2.3.6 *Port of Mississippi County*

The Port of Mississippi County is a 19-acre pie-shaped parcel located at river mile 949 Above Head of Passes (AHP) on the Lower Mississippi River, approximately four river miles downstream from the confluence of the Ohio and Mississippi Rivers. Head of Passes refers to the terminus of the Mississippi River in Louisiana. The Mississippi County Port Authority recently negotiated a sublease for the Port Authority's 99-year lease to a full-service barge repair company.

The Port Authority operates the Dorena-Hickman ferry, which provides passenger and vehicular ferry service between Missouri and Kentucky. It is often used by tourism groups, and can also transport farm products and equipment. The Port Authority collects \$135,000 annually in ferry fees in addition to grants from Missouri and Kentucky; any funds provided by Missouri are matched by Kentucky. MoDOT provides \$88,000 annually in operating subsidies.

The only freight currently moving through the Port is via trucks using the Dorena-Hickman ferry service. In the spring of 2011, the lower Mississippi River experienced record-setting flood stages that ultimately prompted the second ever activation of the Birds Point-New Madrid floodway. After the U.S. Army Corps of Engineers activated these planned flood control provisions, a substantial amount of riverfront farmland and roadway infrastructure in Mississippi County was flooded and damaged. In the aftermath of the 2011 flood, the USACE tweaked the floodway operation plan to incorporate the lessons learned during this activation. However, the possibility of having to activate the Birds Point-New Madrid floodway again in the future has generally discouraged infrastructure development in the floodplain.

2.3.7 *Port of New Bourbon*

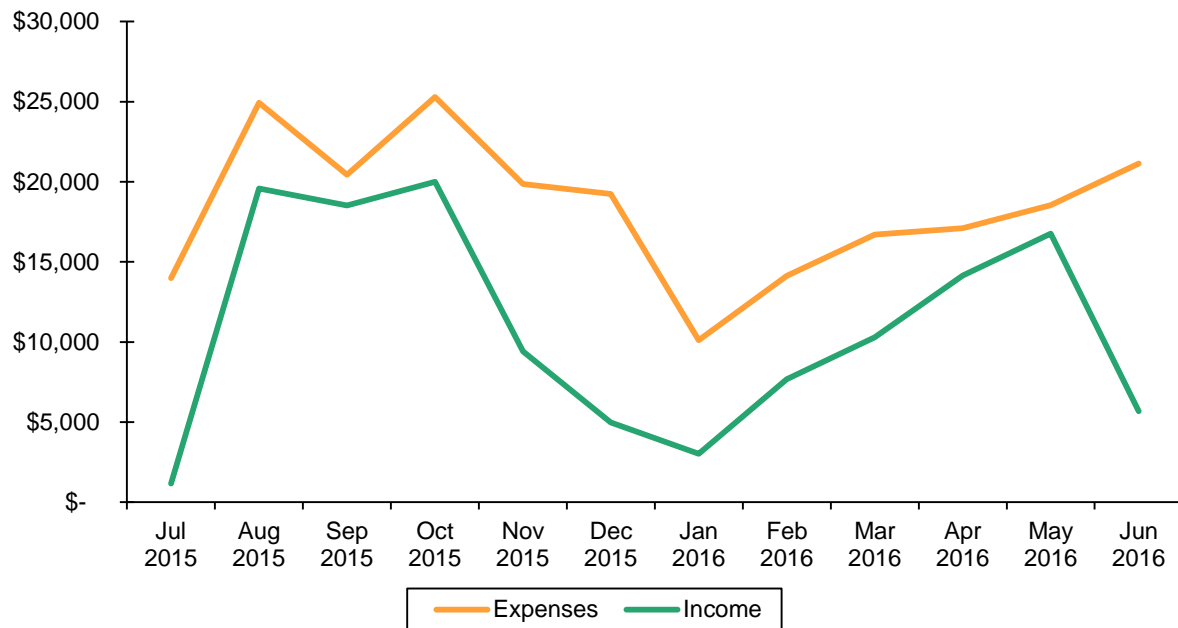
The Port of New Bourbon is located at mile 120.5 on the Mississippi River, which is about 50 miles south of the St. Louis metropolitan area. The facility has direct access to U.S. Highway 61, and is located 9 miles from I-55 and 54 miles from I-270/I-255. New Bourbon Regional Port Authority began developing plans for the Port in 1995, but did not acquire the property until 2000. Over the years, the Port Authority has constructed two dredge disposal areas (1997 and 2012), a ferry berthing area (2008), and a dock with electrical service (2012). Dredging occurs regularly and is currently underway to remove silt that has collected in the harbor. MoDOT constructed turn lanes on U.S. Highway 61 at the entrance of the port access road, and in 2015 the access road was paved from the entrance to the Port Authority's property to the harbor. The previous port operator was Beelman River Terminals, whose lease ended in May 2017. The Port is currently seeking a new port operator and new tenants. The Port Authority does not have any revenues or expenditures at this time, and relies on various funding sources, including MoDOT, Federal Emergency Management Agency (FEMA), Delta Regional Authority, and USACE, among others.

Currently, the only commodity moved through the Port is lime, which is shipped out by a national producer of calcium products including quicklime, hydrated lime, calcium carbonate and precipitated calcium carbonate. However, New Bourbon's dock is only utilized in these cases when the company's own riverfront dock cannot be used due to high water. There are significant mineral deposits in St. Francois and Ste. Genevieve Counties, which represents a significant opportunity for the Port to handle shipments of aggregates from area mining operations as well as locally produced agricultural products.

In addition to the ongoing dredging work, New Bourbon Regional Port Authority is working on the preliminary engineering to construct improvements to the dock, including installation of a sheet pile cell for the harbor winch (barge pulley) system, and pave the port road on both sides of the BNSF railroad crossing. Long-term, it is looking into enabling users to load directly from truck or barge onto rail. The Port Authority is in conversation with BNSF to acquire property and construct a rail siding from the railroad's mainline to the dock area of the Port. The Port Authority indicates another opportunity would be to construct a dual conveyor system from near the dock area to a spud barge located in the main channel, although additional storage facilities would be necessary to make this facility feasible for industrial use.

The Port Authority also owns and operates the Ste. Genevieve-Modoc Ferry, which provides ferry service across the Mississippi River from Ste. Genevieve to Illinois. In addition to pedestrians and bicyclists, the ferry also permits motor vehicles, buses, farm tractors/trucks, and semi tractor-trailers. In 2016, the ferry transported 272 farm tractors/trucks and 23 semi tractor-trailers. MoDOT provides an annual subsidy of \$88,000 to support the ferry's operating costs, as the Port Authority operates the ferry as a public service. However, the subsidy is not enough to cover the full scope of costs associated with ferry maintenance and operation. As shown in Figure 2.17, income from the ferry operations fluctuated significantly over the course of fiscal year 2016, depending on the season, and was consistently lower than ferry expenses.

Figure 2.17 Ferry Income and Expenses
2016



Source: New Bourbon Regional Port Authority

2.3.8 Port of New Madrid County

The Port of New Madrid is located on the Lower Mississippi River at river mile 885, approximately 175 miles south of St. Louis and 110 miles north of Memphis, TN. The facilities are accessible by barge, truck, and Union Pacific (UP) rail service. Access to I-55 is less than a mile from the Port. Operating revenues, including from MoDOT Capital Improvement Program, totaled \$665,000 in 2016, while non-salary expenditures totaled around \$656,000. The Port Authority has one full-time employee and 154 on-site tenant

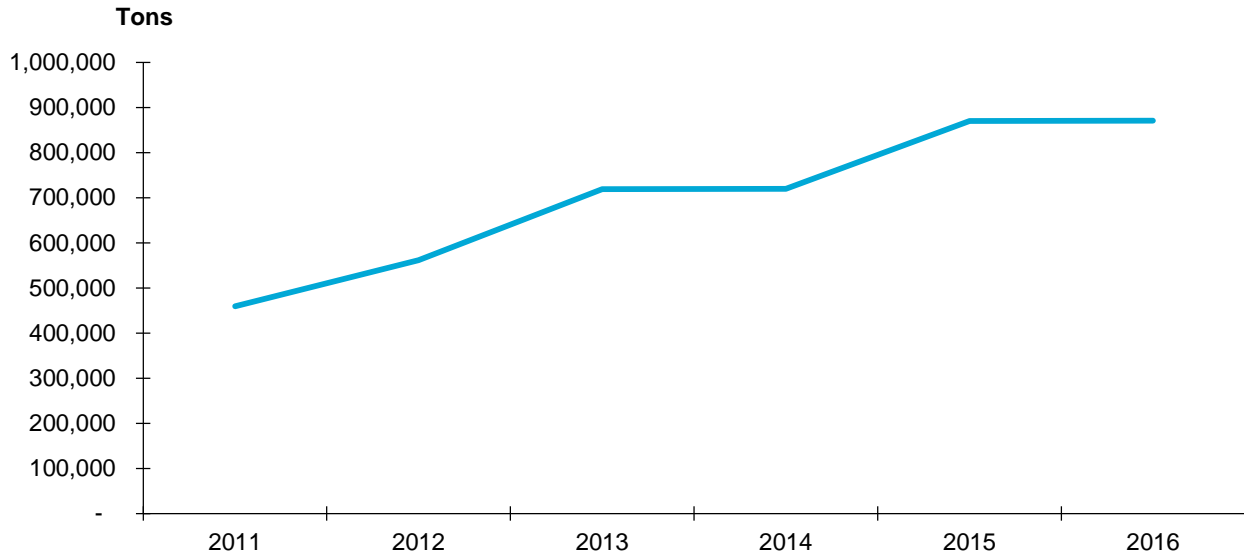
employees, and supports 1,386 indirect jobs. New Madrid County Port Authority relies on annual dredging services from U.S. Army Corps of Engineers (USACE); when USACE did not complete dredging in 2013, the Port had to shut down operations. The annual maintenance dredging typically costs between \$320,000 and \$450,000 and is supported by the USACE.

Currently the Port has three tenants: Riceland Foods, Crop Production Services, and Agrium. Barge fleetings is provided by St. Jude & New Madrid Harvest Services. Commodities moved include milled rice, fertilizers, Environmentally Safe Nitrogen (ESN)³, coke, corn, cotton seed, and rock/gravel, among others. Off-site port users include local farmers, other large-scale agribusinesses, and county/state users. Unlike most facilities in the area, the Port has barge off-load capabilities in addition to loading equipment. There is no dock operator on-site, but the dock is available for lower-weight farm commodities (lift capacity is 20 tons), as opposed to heavier commodities like coal or steel. The original site that the Port Authority acquired is 80 acres, which includes the harbor, and it recently acquired a 66-acre parcel north of the current site, including a 12-acre borrow pit. However, the additional acreage must be filled with 8-12 feet of material to be brought above the 100-year flood level before a tenant can locate on-site. Other necessary upgrades include road and rail construction, warehousing, sewer/water, electricity, concrete construction on the levee road, as well as clearance of trees and the borrow pit. The Port Authority has also acquired non-riverfront property to offer warehousing space to future tenants. In total it owns nearly 237 acres available for development. The Port Authority has applied for a number of grants over the years to support the aforementioned infrastructure projects, but it is limited to grants that do not require job creation projections because it does not have the resources to estimate this information. However, the Port Authority feels strongly that expanded port facilities with appropriate infrastructure and utility connections will help attract new port jobs and tenants.

The Port Authority notes that tonnage continues to increase each year, as well as both direct and indirect employment figures. Figure 2.18 presents the tonnage at the Port of New Madrid County from 2011 to 2016, according to Port Authority records. The three primary commodities handled over this period include rice, fertilizer, and ESN. The Port also handled coke in 2011, as well as corn in 2011-2012 and 2016-2017.

³ Environmentally Safe Nitrogen (ESN) is a controlled release nitrogen fertilizer product that protects the nitrogen from loss, and releases it in response to soil temperatures.

Figure 2.18 Tonnage at New Madrid County Port
2011–2016



Source: New Madrid County Port Authority.

2.3.9 Port of Pemiscot County

The Port of Pemiscot County is located on the Lower Mississippi River at river mile 849.9, which is about 85 miles north of Memphis, TN and 185 miles south of St. Louis. The site is located near to I-55 and I-155/U.S. Highway 412, and is within 60 miles of U.S. Highway 60 and I-57. In addition, the Port has access to BNSF rail service, including a 5-mile rail spur with a storage yard and four sidings that is capable of handling unit trains. The Port Authority has two employees, with 2016 operating revenues of \$695,000 and non-salary expenditures of \$429,000.

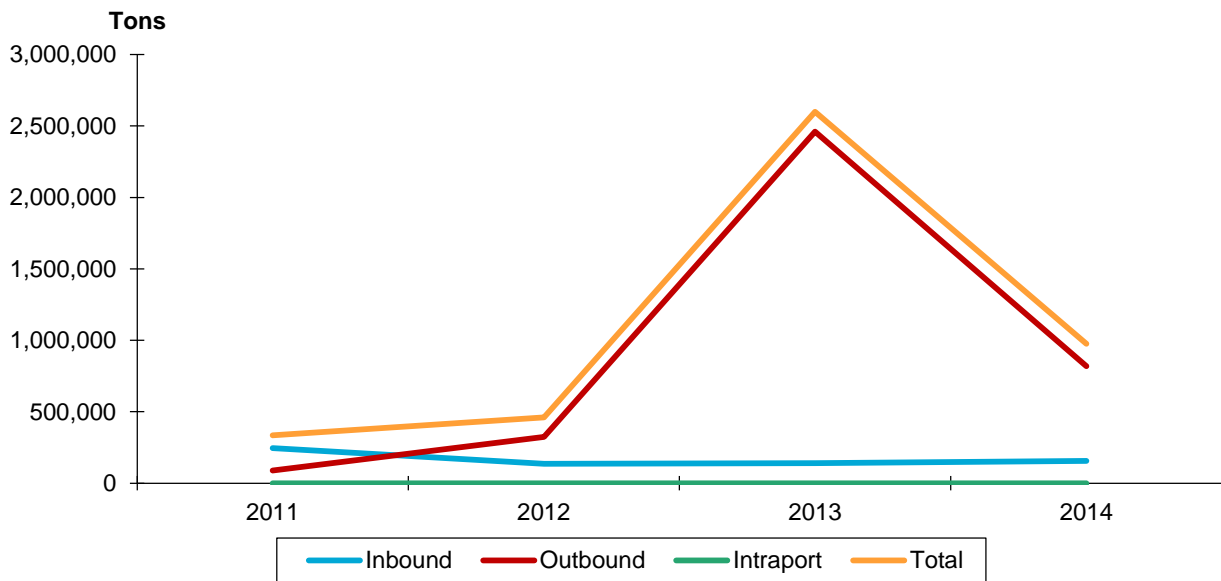
The Port has four riverfront tenants, including MFA's River Terminal, Consolidated Grain & Barge, Trinity Cover Fabrication, and Oakley Missouri. These users move a number of different types of commodities, including dry bulk fertilizer, liquid fertilizer, corn, soybeans, wheat, rice, barge covers, road salt, and diesel fuel. Marquis Missouri Terminals is an off-site tenant and fuel terminal.

The Port's location on the Lower Mississippi River, which is below the confluence of the Ohio and Mississippi Rivers, enables reliable operation in low water. It is also the southern-most slack water harbor in Missouri. Although declining population and workforce availability hinders the growth potential of both the local economy and the Port of Pemiscot County, the Port Authority has observed increases in tonnage and employment in recent years. Its two funding priorities include a loop track extension to load rail hopper cars with grain and other agricultural commodities, and a harbor widening project to reverse the accretion that has narrowed the harbor entrance. The Port Authority has 253 acres of land available for lease, as well as 75 additional acres from a neighboring tenant, but the property between the Port and the Trinity barge fabrication facility is significantly below flood level and will require fill material to raise site elevation.

Tonnage information for the Port of Pemiscot County from USACE is shown in Figure 2.19. The Port experienced a sharp increase in outbound tonnage in 2013 due to outbound crude oil, which comprised 85

percent of total tonnage (2.2 million tons). Crude oil transported by rail in the Midwest region peaked in 2014 after a sharp increase from 2011 (as shown in Figure 2.4). However, for the Port of Pemiscot County, the economics of transporting crude by rail weakened after 2013, and port volumes declined towards pre-spike levels by 2014. However, 2014 volumes were more than twice that of 2012 levels, suggesting continued growth.

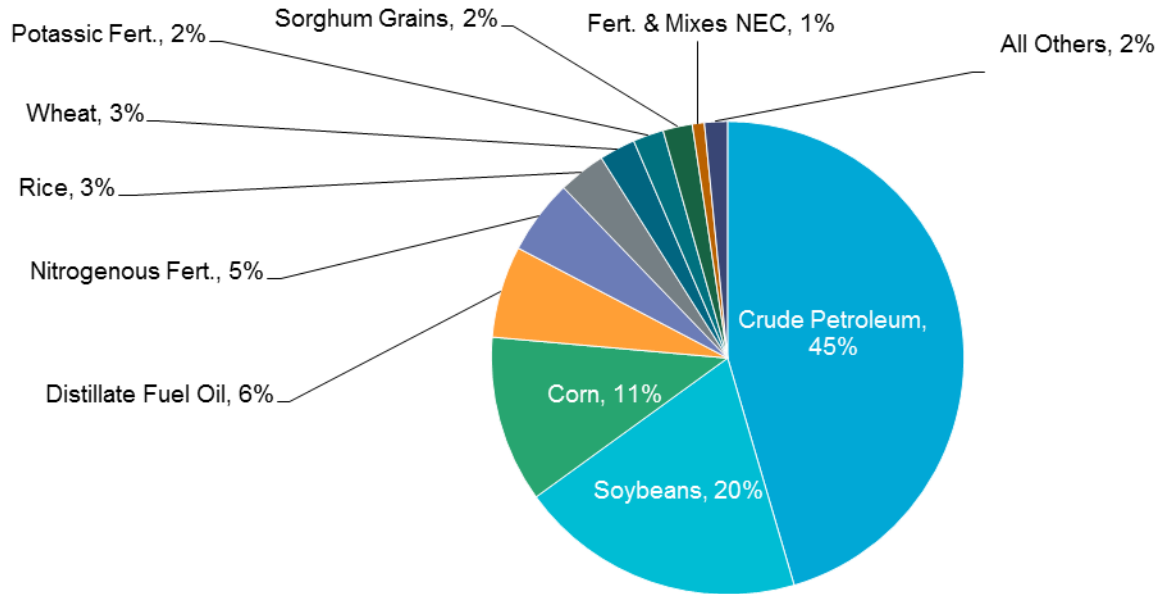
Figure 2.19 Tonnage at Pemiscot County Port
2011–2014



Source: United States Army Corps of Engineers Waterborne Commerce Data, 2011-2014.

Figure 2.20 presents the breakdown of commodities that moved through the Port according to USACE. Overall, 52 percent of tonnage was petroleum, 39 percent was food and farm products, and 9 percent was chemical products. The top three individual commodities included crude petroleum (45 percent), soybeans (20 percent), and corn (11 percent).

Figure 2.20 Top 10 Commodities Moved at Pemiscot County Port
2014



Source: United States Army Corps of Engineers Waterborne Commerce Data, 2014.

2.3.10 Port of St. Joseph

The Port of St. Joseph, owned by St. Joseph Regional Port Authority, is located on the Missouri River near river mile 448. It is situated near to I-29, I-229, and U.S. Highway 36, and has access to UP and BNSF rail service. There is a UP rail spur, dock, storage yard, truck scale, conveyor, and storage building with 5,000 tons of bulk capacity located on-site. The Port Authority has 2-3 administrative staff members on payroll and \$25,000 in non-salary expenditures, but it does not have any operating revenues at this time. The Port Authority recently came to an agreement to have Kaw Valley Companies to become the port's operator.

The Port has not handled any commodities since 2011, when it moved steel coils. Although it is well-situated in a major agricultural region that could benefit from increased barge access, the Port's location on the Missouri River makes it difficult to compete with other modes of transportation. Barge rates at this location on the river are comparatively high, which can become cost-prohibitive to companies that do not want to risk delays that can arise with waterborne shipments, such as during periods of drought or flooding. Another issue hindering growth is the Port's lack of storage space. The Port Authority is focused on increasing on-site storage to enable barges to be unloaded quickly, increasing efficiency. Although there is a UP rail spur on-site, it is in need of improvements. The Port Authority is also interested in developing a second rail spur if room is available. Target commodities include steel rod coils, inbound fertilizer and salt products, outbound DDGs, inbound biodiesel via pipeline to the Port, and possibly large equipment (such as wind turbines) if additional land can be acquired for storage and if dock equipment and dock weight capacity are sufficient.

2.3.11 Southeast Missouri Regional Port

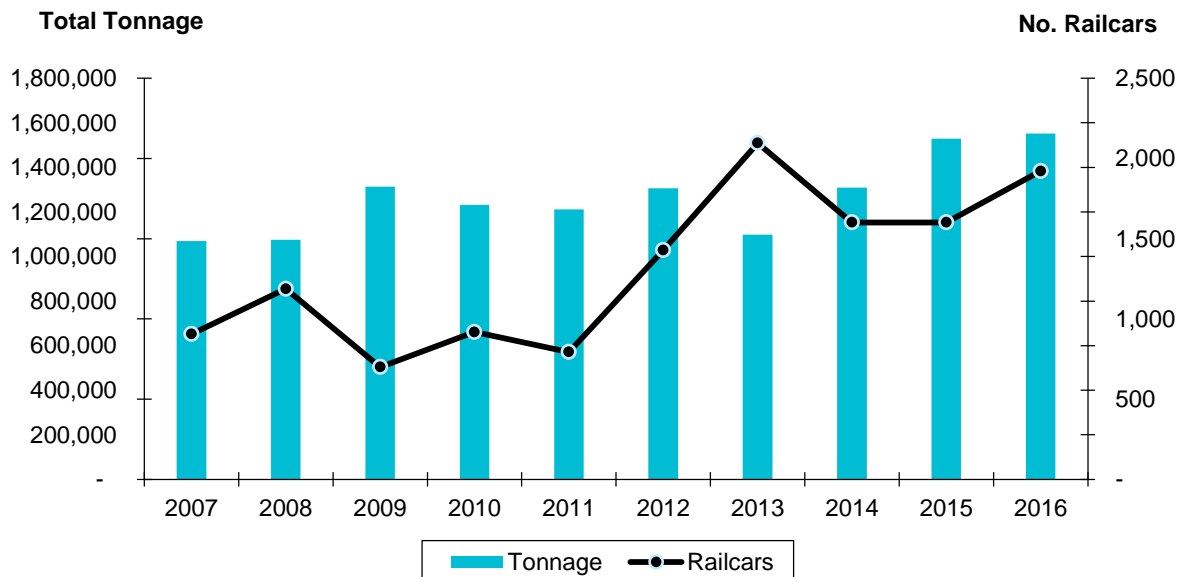
The Southeast Missouri Regional Port (SEMO) is located near Cape Girardeau in Scott City, MO at Upper Mississippi River mile 48, which is 48 miles upstream from the confluence of the Ohio and Mississippi Rivers and 147 miles downstream from St. Louis. The Port is within three miles of I-55, and approximately 30

minutes away from I-57 to Chicago and I-24 to Nashville, TN. SEMO has been in operation since November 1982, when it handled its first barge of empty containers. SEMO owns and services customers with SEMO Port Railroad (SPR), a common carrier switching railroad that operates seven miles of track between Scott City and Cape Girardeau, including a lead track to SEMO's harbor industrial area along the Mississippi River. SPR connects with BNSF in Cape Girardeau and UP in Scott City. SEMO also provides access to team tracks for businesses without a private spur track that require extra capacity on a daily or long-term basis. The track space provides businesses access to an end ramp for loading/unloading flatcars, areas for rail-truck transfers, paved trackside pads for dry bulk transfers, covered platform at truck/boxcar height, and lighting for nighttime operations. The UP also services SEMO three times per week. In addition, three pipelines are located within one mile of the Port. There are two products pipelines that serve Teppco's local truck terminal, which handle products such as gasoline, diesel, kerosene, aviation fuel, benzene, toluene, and other petroleum products. Duke Energy also operates a natural gas pipeline that links with Houston, Cincinnati, Chicago, Pittsburgh, Philadelphia, and Selkirk, New York. SEMO has six full-time employees on payroll, with 137 tenant employees on-site. Operating revenue in 2016 totaled \$751,000.

SEMO has 30 acres of available land for industrial use and 70 acres of land leased to existing facilities. Current tenants at SEMO include Girardeau Stevedores, the general cargo dock operator, Consolidated Grain & Barge, First Missouri Terminals, Tower Rock Stone, Missouri Fibre Corporation, Nestle Purina PetCare/SIMX, and SEMO Milling, all of which handle cargo with a combination of barge, truck, and rail modes. There are also a number of other off-site users of SEMO's facilities. Primary commodities moved include agricultural products (e.g., corn, wheat, soybean, fertilizers) and other bulk commodities such as sand and mulch chips.

Annual tonnage on both water and SRP rail modes has been increasing overall at SEMO, as shown in Figure 2.21. The number of railcars received at SEMO on UP and SRP has fluctuated over the years, with a significant spike in 2013.

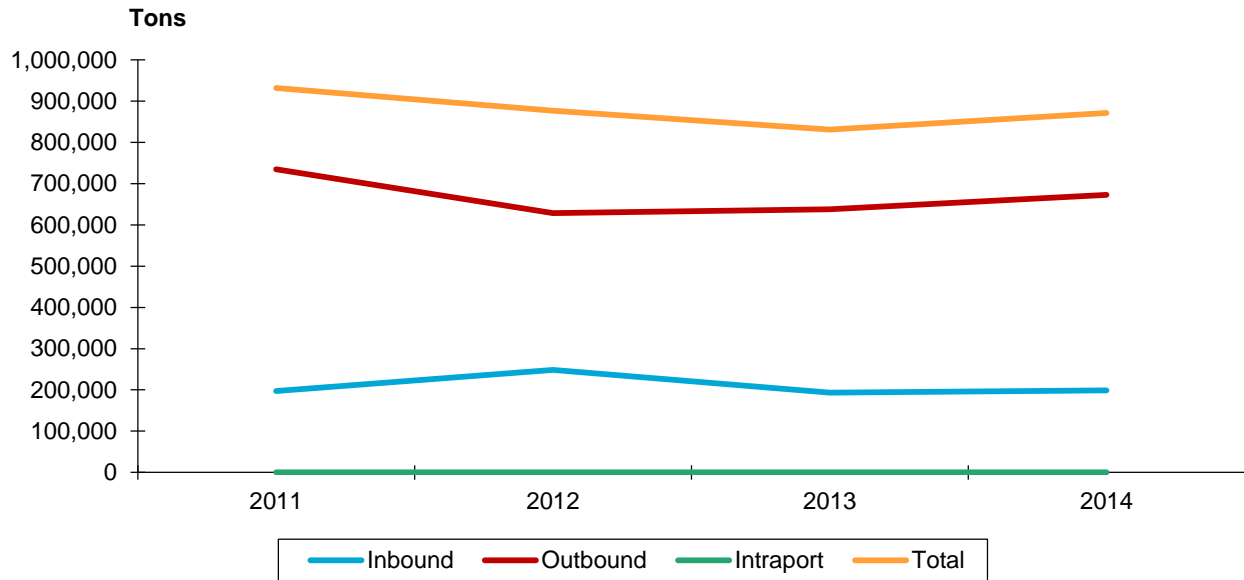
Figure 2.21 Tonnage (Waterborne and Rail) and Railcars at SEMO
2007–2016



Source: Southeast Missouri Regional Port Authority.

Waterborne-only tonnage at SEMO, as reported by USACE, is shown in Figure 2.22. Between 2011 and 2014, there has been significant more outbound tonnage than inbound, and volumes have remained relatively consistent.

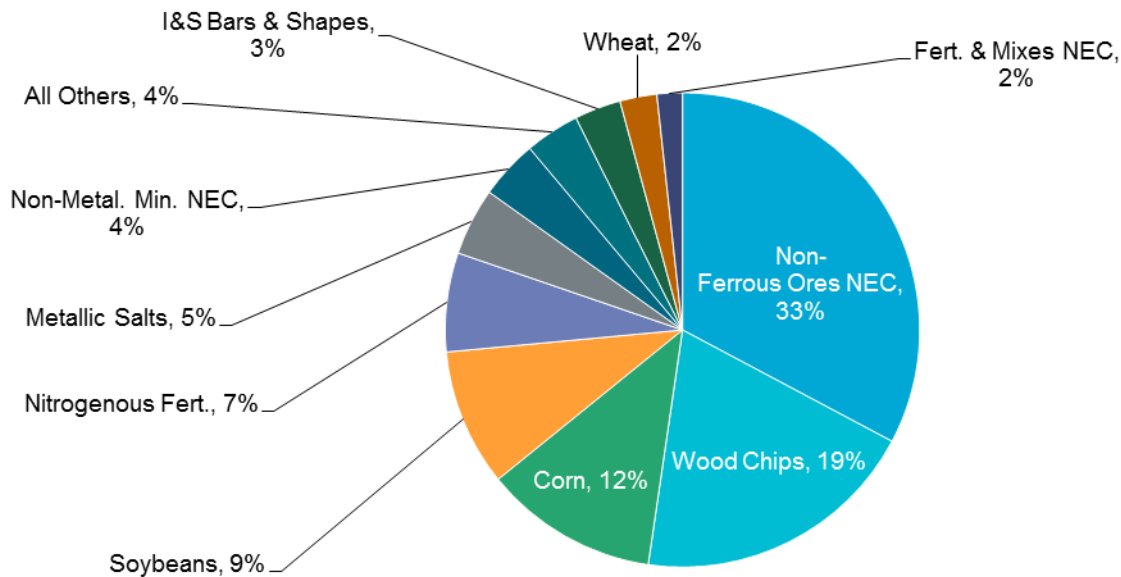
Figure 2.22 Waterborne Tonnage at SEMO
2011–2014



Source: United States Army Corps of Engineers Waterborne Commerce Data, 2011-2014.

Figure 2.23 presents the USACE breakdown of commodities that moved through the Port in 2014. Overall, 57 percent was crude materials (inedible except fuels), 25 percent of tonnage was food and farm products, and 15 percent was chemical products. The top three individual commodities included non-ferrous ores not elsewhere classified (33 percent), wood chips (19 percent), and corn (12 percent).

Figure 2.23 Commodities Moved at SEMO
2014

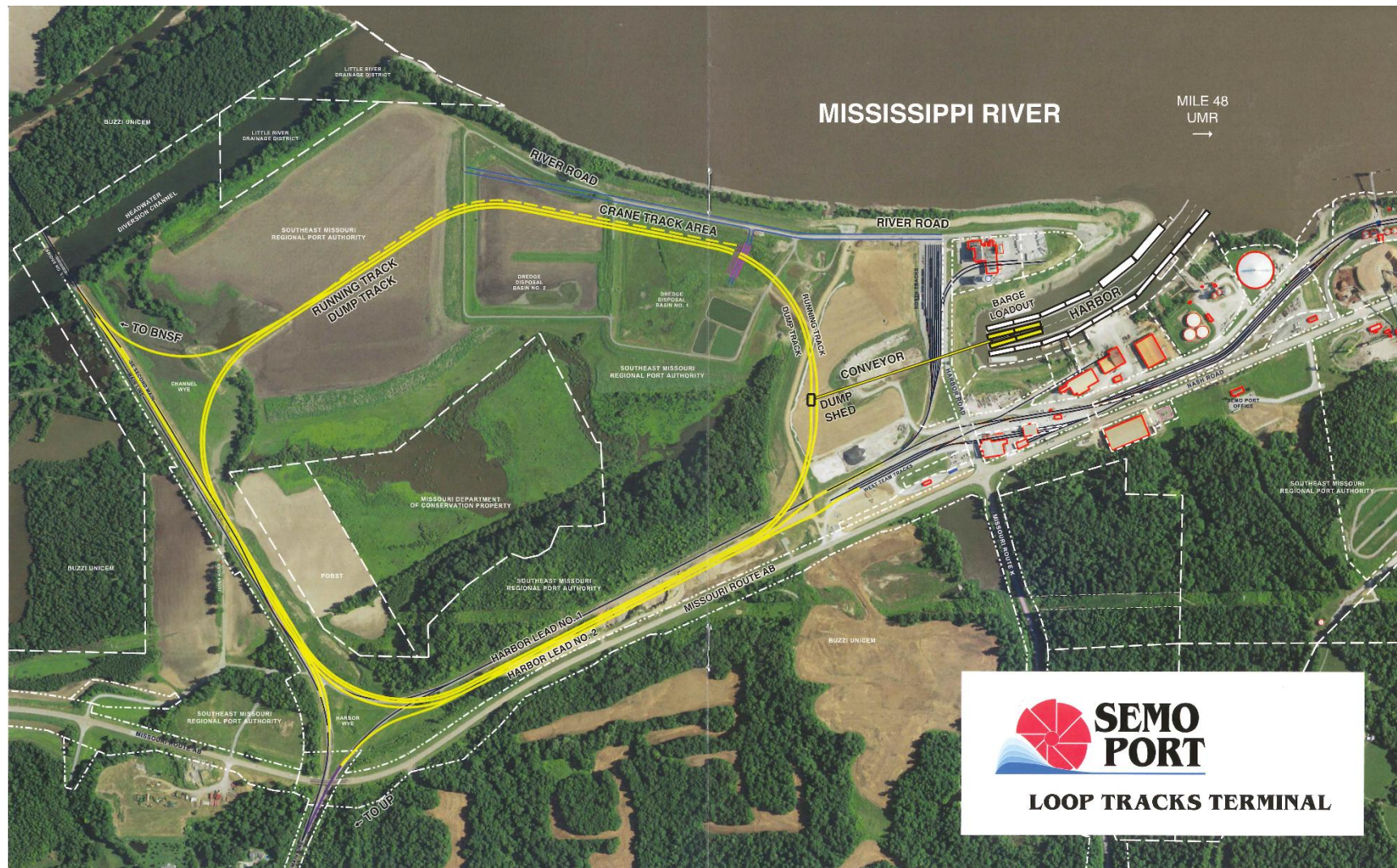


Source: United States Army Corps of Engineers Waterborne Commerce Data, 2014.

SEMO's top development priority is the Loop Tracks Terminal, which is intended to become a public facility to hold, load, and unload unit trains at the Port. Included in this project is rail siding to load and unload containers or other bulk products via a conveyor onto a barge loading facility. SEMO's existing rail infrastructure was intended to process carload traffic, and does not have enough track space to handle a unit train, which typically has upwards of 110 cars at a time. Currently, the Port's mainline track cannot be used to hold a unit train because it would hold up daily service between SEMO customers and UP/BNSF rail service. Construction costs are approximately \$32 million; although there is 60 acres of available space for the track, much of it requires infrastructure and fill to raise elevation. However, the Loop Tracks Terminal design has the potential to support up to eight train-length tracks, which allows for multiple products and multiple customers to be served at a time. Figure 2.24 features the plan for the Loop Tracks Terminal at SEMO in relation to its existing facilities.

Although SEMO has 30 acres of land available for industrial development, much of the land needs 25 feet of fill to raise elevation above the 500-year flood plain, allowing for limited immediate development potential. SEMO is also interested in potentially developing a second harbor on the northeast part of the port facility, which is currently underdeveloped, although no plans are in the works.

Figure 2.24 Plans for Loop Tracks Terminal at SEMO Port



Source: Southeast Missouri Regional Port Authority.

2.3.12 Other Missouri Port Authorities

There are three additional Port Authorities that are established but do not currently own or operate port facilities: Marion County Port Authority, St. Louis County Port Authority, and Pike-Lincoln County Port Authority. Of the three, only one port has plans to develop and operate a facility in the near future.

Both Marion County Port Authority and St. Louis County Port Authority do not currently own or operate a port facility. There are no plans to develop either port facility at this time. However, the St. Louis County Port Authority is engaged in economic development opportunities in the region, including encouraging general welfare, private capital investment, business development and activity, and the establishment of a foreign trade zone within the port district.⁴

The Pike-Lincoln County Port Authority was established in February 2011, and purchased property in the summer of 2017 in Pike County, south of the town of Louisiana, for future port development. Pike-Lincoln County Port Authority received funding from MoDOT for land acquisition, engineering, and site preparation for the Pike-Lincoln Industrial Park in fiscal year 2017 (\$208,000 total), and will also receive funding in fiscal year 2018. They have also requested funding to construct a warehouse, purchase more property, and construct a dry bulk storage facility. The total cost of these requests is \$8.7 million.

2.3.13 Notable Private Port Facilities

In addition to the public ports throughout Missouri, there are hundreds of private port facilities that contribute to freight traffic along the Mississippi and Missouri Rivers. These facilities were not included as part of the economic impact analysis, as they are privately held. The following sections discuss several notable private port facilities in Missouri.

Bunge North America

Bunge North America is a national agribusiness headquartered in St. Louis, MO. Its main businesses include grain origination, basic processing (e.g., soybeans, canola, other oilseeds for animal feed), and value-added processing of milled grain and edible oils, including grits, cereals, flours, cooking oils, and shortenings. Its primary customers include farmers, animal feed manufacturers, transportation companies, food processors/manufacturers, and retail stores, among others.

Bunge has several riverfront facilities in Missouri, along the Mississippi River. It has grain elevators in Caruthersville, La Grange, Hannibal, Louisiana, and Fairmont City. All of these facilities are located along the river for direct access to barge service.

Bussen Quarries

Bussen Quarries is a Missouri-based mining company. Primary commodities include riprap stone, crushed stone, and river sand. Operations comprise of Bussen Quarries, Bussen Terminal, and Bussen Underground Warehouse. Bussen Quarries has supplied crushed limestone for over 130 years, with three plant locations in the south St. Louis metropolitan area:

⁴ "St. Louis County Port Authority." STL Partnership. Accessed 08/22/17. Available from: <https://stlpartnership.com/who-we-are/board-of-directors/st-louis-county-port-authority/>.

- Jefferson Barracks, located south of the J.B. Bridge on the Mississippi River at I-255 and Koch Road in south St. Louis County, MO;
- Antire Quarry, located at I-44 and Antire Road in Eureka, MO, which is outside St. Louis; and
- Trautman Quarry, located at I-55 and Hwy Z in Pevely, MO, south of St. Louis.

The company also operates Bussen Terminal, which is a full service barge and rail facility located on upper Mississippi River at mile marker 167.8, just south of the Jefferson Barracks Bridge. Bussen Underground Warehouse is a climate controlled warehouse for lease in south St. Louis.

Capital Sand Company

Capital Sand Company, Inc. operates multiple terminals along the Missouri River for its sand and gravel operations. They also offer shipping and transloading services along the River's corridor via portable loading sites. Its largest terminal, the Jefferson City River Terminal, is located on the Missouri River and is designed to unload bulk cement from barges. This terminal has the capability to load and unload construction equipment and other bulk materials. Capital Sand Company owns a fleet of boats as well as hopper, deck and spud barges.

All of Capital Sand's facilities, except Springfield, are located near to rivers. The majority of facilities are situated along the Missouri River, including River Bend, Lexington, Brunswick, Glasgow, Boonville, Rocheport, Jefferson City, Wardsville, and Washington. There is also a facility along the Mississippi River in Cape Girardeau.

AgriServices of Brunswick

AgriServices of Brunswick, LLC operates as an agricultural retail and fertilizer wholesale company in North Central Missouri. The company sells and distribute wholesale fertilizer throughout the Midwest through its main location along the Missouri River in Brunswick, MO. The facility has access to rail, barge, and highway modes. AgriServices of Brunswick has retail locations in Brookfield, Mendon, and two locations in Brunswick to serve the local area with grain, agronomy, and feed services.

Holcim

Holcim is a leading supplier of cement and aggregates (e.g., crushed stone, gravel, sand) as well as ready-mix concrete and asphalt. It employs approximately 1,800 workers companywide. In 2009, Holcim opened a four-million-ton capacity production plant, known as the Ste. Genevieve Plant, in Bloomsdale, MO. The company also operates two production facilities in St. Louis, the Fenton Bagging Facility and St. Louis Terminal.

3.0 Missouri Port User Profile

This section identifies and examines Missouri's public port users. By evaluating the amount of waterborne freight moved by industry at the state and national levels, this analysis reveals the relative dependence of Missouri industries on the state's ports and waterways.

This analysis uses FAF4 data to evaluate the marine modal share for Missouri's industries for both inbound and outbound freight shipments.⁵ For comparison, FAF4 was also used to assess marine modal share by industry at the national level.

3.1 Missouri Marine Modal Dependence and National Modal Shares

This analysis estimates the mode share of marine freight transport in Missouri and the nation as a whole to determine which industries rely the most on waterborne modes as compared to the national average. FAF4 commodity flow data was processed to associate certain commodities with industries that are known to use or produce them. Although commodity groups are not the same as industries, the primary industry classification system known as North American Industry Classification System (NAICS) helps categorize industries according to the goods or services that they provide. The CS team used a crosswalk methodology to convert respective inbound (attraction) and outbound (production) tonnage by commodity from FAF4 by NAICS industry.

Table 3.1 presents the results for freight production, or outbound tonnage, and Figure 3.1 shows the results graphically. Missouri's crop production, mining, nonmetallic mineral product manufacturing, and transportation equipment manufacturing industries are notably dependent on waterborne transportation in order to bring goods to market. Over eleven percent of crop production produced in Missouri is transported by water, including commodities such as wheat, corn, and soybeans, which are frequently transported down the Mississippi River to Gulf Coast ports for export. This category includes MFA Agri Services' dozens of farm supply cooperative locations. Both mining (except oil and gas) and nonmetallic mineral product manufacturing sectors transported over eight percent of tonnage by water. The latter category includes Mississippi Lime Company, a major producer of calcium products based in Ste. Genevieve, MO. In total, just over four percent of tonnage in Missouri's freight production industries relies on barge transport, compared to slightly less than four percent nationwide.

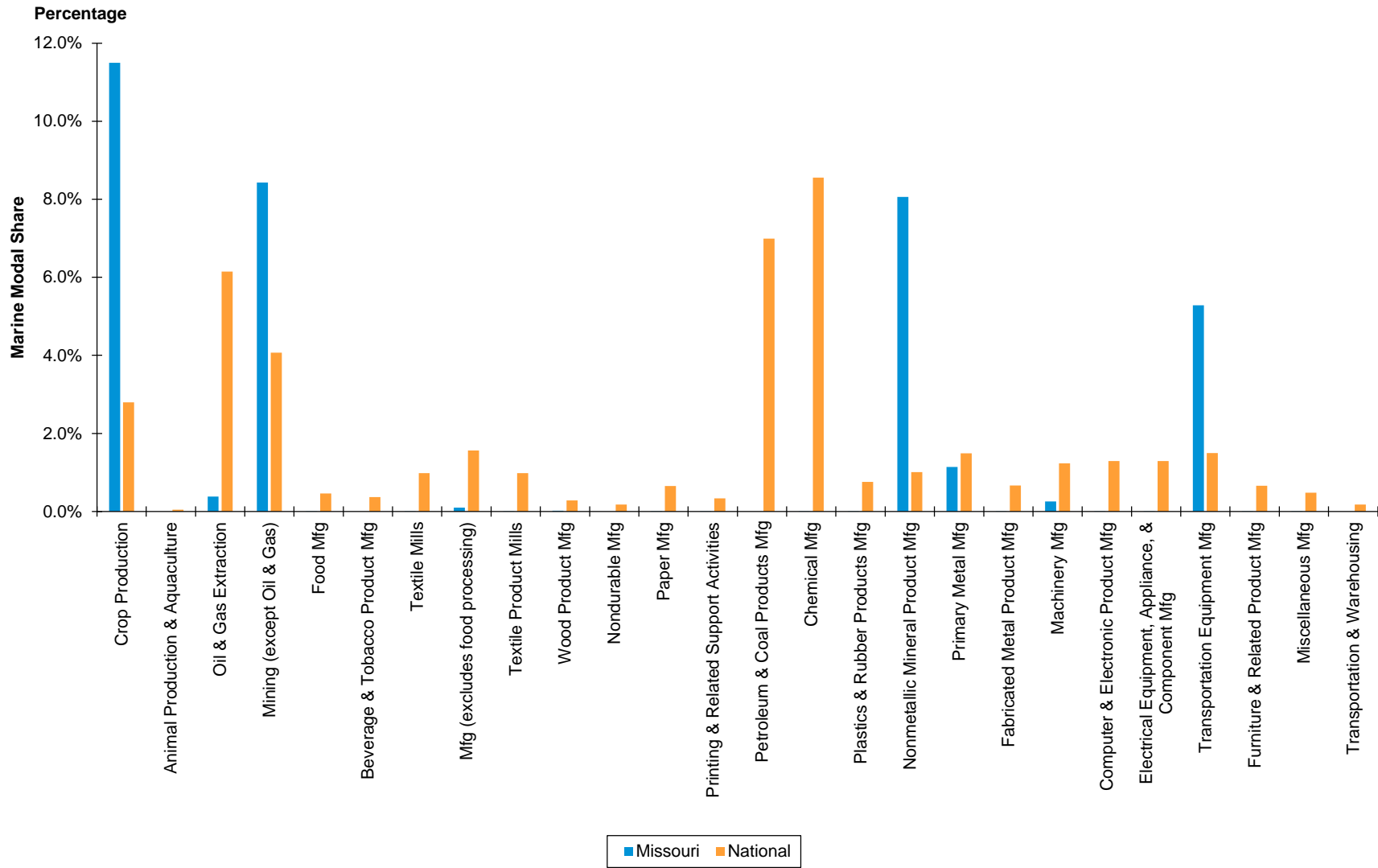
⁵ The Bureau of Transportation Statistics (BTS) Freight Analysis Framework version 4 (FAF4) dataset has a base year of 2012 and provides forecasts for 2020 through 2045 in five year increments. Data is categorized by origin, destination, commodity type, mode, and other attributes. Origins and destinations are provided by state and metropolitan area.

Table 3.1 State and National Marine Mode Share by Industry
2012 Freight Production Tonnage

NAICS	Industry Description	Missouri	National
111	Crop Production	11.5%	2.8%
112	Animal Production and Aquaculture	0.0%	0.0%
113	Forestry and Logging	0.1%	0.2%
115	Support Activities for Agriculture and Forestry	0.1%	0.2%
211	Oil and Gas Extraction	0.4%	6.1%
212	Mining (except Oil and Gas)	8.4%	4.1%
311	Food Manufacturing	0.0%	0.5%
312	Beverage and Tobacco Product Manufacturing	0.0%	0.4%
313	Textile Mills	0.0%	1.0%
31-33	Manufacturing (excludes food processing)	0.1%	1.6%
314	Textile Product Mills	0.0%	1.0%
321	Wood Product Manufacturing	0.0%	0.3%
321-327	Nondurable manufacturing	0.0%	0.2%
322	Paper Manufacturing	0.0%	0.6%
323	Printing and Related Support Activities	0.0%	0.3%
324	Petroleum and Coal Products Manufacturing	0.0%	7.0%
325	Chemical Manufacturing	0.0%	8.6%
326	Plastics and Rubber Products Manufacturing	0.0%	0.8%
327	Nonmetallic Mineral Product Manufacturing	8.1%	1.0%
331	Primary Metal Manufacturing	1.1%	1.5%
332	Fabricated Metal Product Manufacturing	0.0%	0.7%
333	Machinery Manufacturing	0.3%	1.2%
334	Computer and Electronic Product Manufacturing	0.0%	1.3%
335	Electrical Equipment, Appliance, and Component Manufacturing	0.0%	1.3%
336	Transportation Equipment Manufacturing	5.3%	1.5%
337	Furniture and Related Product Manufacturing	0.0%	0.7%
339	Miscellaneous Manufacturing	0.0%	0.5%
48-49	Transportation and Warehousing	0.0%	0.2%
Total		4.1%	3.9%

Source: CS Analysis of FAF4 data.

Figure 3.1 State and National Marine Mode Share by Industry
2012 Freight Production Tonnage



Source: CS analysis of FAF4 data.

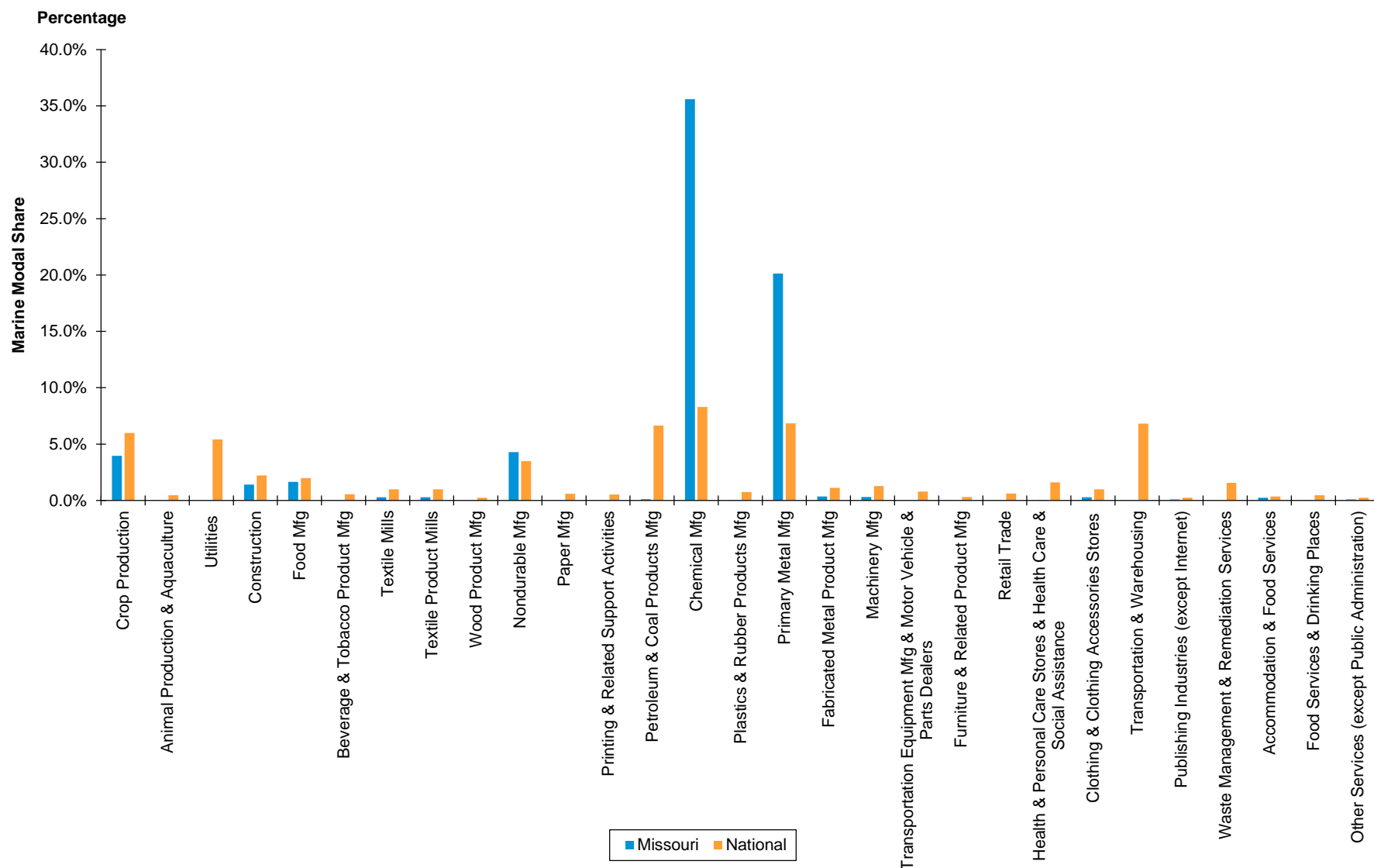
Table 3.2 presents the results for freight attraction, or inbound tonnage, and Figure 3.2 shows the results graphically. Two industries stand out: chemical manufacturing and primary metal manufacturing. Nearly 36 percent of chemical manufacturing products received in Missouri is transported by water, including commodities such as fertilizers, paint, adhesives, and cleaning compounds. This category includes Vi-Jon, a manufacturer of personal care products, such as Germ-X brand hand sanitizers, that is headquartered in St. Louis. Vi-Jon's products are supplied nationwide to retailers such as Target, Walgreens, and Kroger. In addition, 20 percent of primary metal manufacturing received in Missouri is transported by water, which includes commodities such as aluminum, steel, and iron. There is a high concentration of foundries in the St. Louis and Kansas City areas. In total, 2.4 percent of tonnage in Missouri's freight attraction industries relies on barge transport, compared to slightly less than 4 percent nationwide.

Table 3.2 State and National Marine Mode Share by Industry
2012 Freight Attraction Tonnage

NAICS	Industry Description	Missouri	National
111	Crop Production	4.0%	6.0%
112	Animal Production and Aquaculture	0.0%	0.5%
221	Utilities	0.0%	5.4%
23	Construction	1.4%	2.2%
311	Food Manufacturing	1.6%	2.0%
312	Beverage and Tobacco Product Manufacturing	0.0%	0.6%
313	Textile Mills	0.3%	1.0%
314	Textile Product Mills	0.3%	1.0%
321	Wood Product Manufacturing	0.0%	0.3%
321-327	Nondurable manufacturing	4.3%	3.5%
322	Paper Manufacturing	0.0%	0.6%
323	Printing and Related Support Activities	0.0%	0.5%
324	Petroleum and Coal Products Manufacturing	0.1%	6.6%
325	Chemical Manufacturing	35.6%	8.3%
326	Plastics and Rubber Products Manufacturing	0.0%	0.8%
331	Primary Metal Manufacturing	20.1%	6.8%
332	Fabricated Metal Product Manufacturing	0.3%	1.1%
333	Machinery Manufacturing	0.3%	1.3%
336, 441	Transportation Equipment Manufacturing and Motor Vehicle and Parts Dealers	0.0%	0.8%
337	Furniture and Related Product Manufacturing	0.0%	0.3%
44-45	Retail Trade	0.0%	0.6%
446, 62	Health and Personal Care Stores and Health Care and Social Assistance	0.0%	1.6%
448	Clothing and Clothing Accessories Stores	0.3%	1.0%
48-49	Transportation and Warehousing	0.0%	6.8%
511	Publishing Industries (except Internet)	0.1%	0.2%
562	Waste Management and Remediation Services	0.0%	1.6%
72	Accommodation and Food Services	0.2%	0.4%
722	Food Services and Drinking Places	0.0%	0.5%
81	Other Services (except Public Administration)	0.1%	0.2%
Total		2.4%	3.9%

Source: CS Analysis of FAF4 data.

Figure 3.2 State and National Marine Mode Share by Industry
2012 Freight Attraction Tonnage



Source: CS analysis of FAF4 data.

3.2 Comparison of Modal Dependence for Mississippi River States

This analysis compares the mode share of marine freight transport in Missouri with other Mississippi River states to determine which industries rely the most on waterborne modes as compared to other states with Mississippi River access.

Table 3.3 presents the results for freight production, or outbound tonnage. Compared to other Mississippi River states, Missouri has relatively high marine modal share in crop production (11.5 percent). This sector is more dependent on marine transportation compared to the crop production sectors in all Mississippi River states except for Kentucky and Tennessee. In addition, Missouri's nonmetallic mineral product manufacturing sector is also notably more dependent on marine modes compared to other states; only Kentucky has a higher modal share. Both sectors are further profiled in Section 3.4

Table 3.3 Mode Share by Industry: Comparison of Mississippi River States
2012 Freight Production Tonnage

NAICS	Industry Description	Arkansas	Illinois	Iowa	Kentucky	Louisiana	Minnesota	Mississippi	Missouri	Tennessee	Wisconsin
111	Crop Production	3.5%	7.4%	2.0%	20.2%	6.3%	2.0%	9.2%	11.5%	14.2%	0.2%
112	Animal Production and Aquaculture	0.0%	0.0%	0.0%	0.0%	0.2%	0.0%	0.0%	0.0%	0.0%	0.0%
113	Forestry and Logging	0.0%	0.1%	0.0%	0.0%	0.0%	0.0%	0.1%	0.1%	0.0%	0.0%
115	Support Activities for Agriculture and Forestry	0.0%	0.1%	0.0%	0.0%	0.0%	0.0%	0.1%	0.1%	0.0%	0.0%
211	Oil and Gas Extraction	0.3%	0.2%	0.0%	1.8%	7.0%	0.7%	0.1%	0.4%	0.0%	1.2%
212	Mining (except Oil and Gas)	0.0%	2.8%	1.0%	31.2%	17.6%	6.2%	10.9%	8.4%	0.0%	2.2%
311	Food Manufacturing	0.0%	1.3%	0.0%	1.6%	5.7%	0.0%	0.0%	0.0%	0.0%	0.0%
312	Beverage and Tobacco Product Manufacturing	0.0%	2.6%	0.3%	0.0%	2.0%	0.0%	0.0%	0.0%	0.0%	0.1%
313	Textile Mills	0.0%	12.4%	0.0%	0.0%	1.1%	0.1%	0.4%	0.0%	0.0%	2.3%
31-33	Manufacturing (excludes Food Processing)	0.8%	0.7%	0.0%	6.0%	10.2%	1.1%	2.3%	0.1%	1.1%	0.0%
314	Textile Product Mills	0.0%	12.4%	0.0%	0.0%	1.1%	0.1%	0.4%	0.0%	0.0%	2.3%
321	Wood Product Manufacturing	0.0%	1.0%	0.0%	0.0%	0.0%	0.0%	0.2%	0.0%	0.0%	0.1%
321-327	Nondurable Manufacturing	0.0%	0.1%	0.0%	0.0%	0.3%	0.0%	0.2%	0.0%	0.0%	0.0%
322	Paper Manufacturing	0.0%	1.0%	0.0%	0.0%	0.3%	0.0%	1.4%	0.0%	0.0%	0.0%
323	Printing and Related Support Activities	0.0%	0.7%	0.0%	0.0%	0.2%	0.0%	3.5%	0.0%	0.0%	0.0%
324	Petroleum and Coal Products Manufacturing	0.0%	0.7%	0.0%	0.7%	25.6%	0.0%	0.3%	0.0%	0.4%	0.5%
325	Chemical Manufacturing	0.0%	3.6%	0.0%	4.8%	31.3%	0.0%	3.5%	0.0%	0.0%	0.0%
326	Plastics and Rubber Products Manufacturing	0.1%	2.6%	0.0%	0.0%	2.2%	0.0%	0.1%	0.0%	0.0%	0.4%

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NAICS	Industry Description	Arkansas	Illinois	Iowa	Kentucky	Louisiana	Minnesota	Mississippi	Missouri	Tennessee	Wisconsin
327	Nonmetallic Mineral Product Manufacturing	0.0%	3.2%	0.0%	15.8%	0.5%	0.0%	0.1%	8.1%	0.0%	0.0%
331	Primary Metal Manufacturing	0.0%	1.4%	0.0%	1.4%	6.0%	7.4%	0.1%	1.1%	2.1%	1.4%
332	Fabricated Metal Product Manufacturing	0.0%	3.6%	0.1%	0.0%	2.1%	0.0%	0.9%	0.0%	0.0%	0.3%
333	Machinery Manufacturing	0.0%	4.0%	0.0%	0.7%	5.8%	1.6%	0.2%	0.3%	0.7%	0.7%
334	Computer and Electronic Product Manufacturing	0.0%	11.6%	0.0%	0.0%	2.1%	0.1%	0.1%	0.0%	0.0%	0.1%
335	Electrical Equipment, Appliance, and Component Manufacturing	0.0%	11.6%	0.0%	0.0%	2.1%	0.1%	0.1%	0.0%	0.0%	0.1%
336	Transportation Equipment Manufacturing	0.0%	5.4%	0.0%	0.0%	24.3%	0.0%	20.2%	5.3%	1.4%	0.0%
337	Furniture and Related Product Manufacturing	0.0%	6.7%	0.0%	0.0%	0.9%	0.0%	0.0%	0.0%	0.0%	0.1%
339	Miscellaneous Manufacturing	0.1%	2.3%	0.0%	0.0%	1.3%	0.0%	0.1%	0.0%	0.0%	0.0%
48-49	Transportation and Warehousing	0.0%	0.1%	0.0%	0.0%	0.3%	0.0%	0.2%	0.0%	0.0%	0.0%
Total		0.4%	2.7%	0.8%	16.6%	17.7%	2.0%	1.2%	4.1%	1.0%	0.7%

Source: CS Analysis of FAF4 data.

Note: Mode shares over 10% are featured in bold.

Table 3.4 presents the results for freight attraction, or inbound tonnage. Compared to other Mississippi River states, Missouri has relatively high marine modal share in chemical manufacturing and primary metal manufacturing. In fact, Missouri's chemical manufacturing sector is more dependent on marine transportation than any other Mississippi River state, over 35 percent of tonnage. The same is true for the state's primary metal manufacturing sector, which has a marine modal share of 20 percent. Both of these industries take advantage of Missouri's port network to transport bulk products by water. These industries are particularly dependent on port access and are profiled in Section 3.4.

Table 3.4 Mode Share by Industry: Comparison of Mississippi River States
2012 Freight Attraction Tonnage

NAICS	Industry Description	Arkansas	Illinois	Iowa	Kentucky	Louisiana	Minnesota	Mississippi	Missouri	Tennessee	Wisconsin
111	Crop Production	0.0%	1.2%	0.0%	0.0%	36.2%	29.5%	27.0%	4.0%	34.5%	0.0%
112	Animal Production and Aquaculture	0.0%	0.2%	0.0%	0.0%	7.0%	1.4%	0.0%	0.0%	0.0%	0.1%
221	Utilities	0.0%	0.0%	0.0%	37.4%	19.3%	0.0%	1.0%	0.0%	13.3%	2.4%
23	Construction	0.1%	2.6%	0.1%	5.4%	14.0%	3.8%	2.8%	1.4%	3.9%	5.3%
311	Food Manufacturing	1.7%	1.0%	0.3%	2.4%	26.9%	0.2%	1.0%	1.6%	1.2%	0.1%
312	Beverage and Tobacco Product Manufacturing	0.0%	2.3%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%
313	Textile Mills	11.7%	3.0%	1.0%	1.8%	0.9%	0.2%	0.7%	0.3%	0.1%	5.2%
314	Textile Product Mills	11.7%	3.0%	1.0%	1.8%	0.9%	0.2%	0.7%	0.3%	0.1%	5.2%
321	Wood Product Manufacturing	0.0%	0.4%	0.1%	0.0%	0.1%	0.0%	0.1%	0.0%	0.0%	0.1%
321-327	Nondurable Manufacturing	0.2%	5.7%	0.9%	9.6%	17.8%	17.2%	25.7%	4.3%	3.4%	11.0%
322	Paper Manufacturing	0.1%	0.4%	0.1%	0.0%	0.1%	0.0%	0.1%	0.0%	0.0%	0.2%
323	Printing and Related Support Activities	0.3%	0.4%	0.1%	0.1%	0.1%	0.0%	0.1%	0.0%	0.0%	0.2%
324	Petroleum and Coal Products Manufacturing	0.8%	0.5%	0.0%	12.8%	14.7%	0.2%	1.2%	0.1%	3.4%	1.0%
325	Chemical Manufacturing	0.3%	2.2%	0.6%	19.0%	29.2%	2.1%	12.6%	35.6%	1.9%	0.5%
326	Plastics and Rubber Products Manufacturing	1.4%	1.4%	1.0%	0.1%	2.1%	0.2%	0.3%	0.0%	0.1%	1.0%
331	Primary Metal Manufacturing	13.4%	0.9%	0.0%	14.5%	3.5%	0.0%	4.7%	20.1%	0.6%	0.1%
332	Fabricated Metal Product Manufacturing	9.6%	0.7%	0.4%	10.4%	1.1%	0.1%	0.9%	0.3%	0.5%	1.2%
333	Machinery Manufacturing	2.5%	0.7%	2.1%	8.4%	3.3%	0.1%	0.8%	0.3%	0.5%	3.8%
336, 441	Transportation Equipment Manufacturing and Motor	0.1%	3.8%	1.0%	0.2%	0.1%	0.1%	0.5%	0.0%	0.1%	1.5%

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NAICS	Industry Description	Arkansas	Illinois	Iowa	Kentucky	Louisiana	Minnesota	Mississippi	Missouri	Tennessee	Wisconsin
	Vehicle and Parts Dealers										
337	Furniture and Related Product Manufacturing	0.0%	0.5%	0.1%	0.0%	0.1%	0.0%	0.3%	0.0%	0.0%	0.2%
44-45	Retail Trade	2.3%	1.4%	0.5%	0.2%	3.9%	0.1%	2.4%	0.0%	2.4%	1.3%
446, 62	Health and Personal Care Stores and Health Care and Social Assistance	0.0%	1.3%	0.2%	0.0%	21.1%	0.0%	1.7%	0.0%	0.0%	0.1%
448	Clothing and Clothing Accessories Stores	11.7%	3.0%	1.0%	1.8%	0.9%	0.2%	0.7%	0.3%	0.1%	5.2%
48-49	Transportation and Warehousing	0.0%	0.0%	0.0%	14.4%	13.0%	0.0%	0.1%	0.0%	8.3%	1.0%
511	Publishing Industries (except Internet)	3.2%	0.2%	0.1%	0.2%	0.1%	0.1%	0.1%	0.1%	0.0%	0.1%
562	Waste Management and Remediation Services	15.0%	0.1%	0.9%	5.1%	6.3%	0.0%	1.9%	0.0%	0.0%	0.0%
72	Accommodation and Food Services	0.0%	0.8%	0.0%	0.0%	1.4%	0.2%	0.0%	0.2%	0.0%	0.9%
722	Food Services and Drinking Places	0.0%	0.6%	0.0%	0.0%	14.5%	0.0%	0.0%	0.0%	0.0%	0.1%
81	Other Services (except Public Administration)	3.2%	0.2%	0.1%	0.2%	0.1%	0.1%	0.1%	0.1%	0.0%	0.1%
Total		1.8%	1.1%	0.2%	11.1%	16.8%	2.2%	1.9%	2.4%	2.9%	2.1%

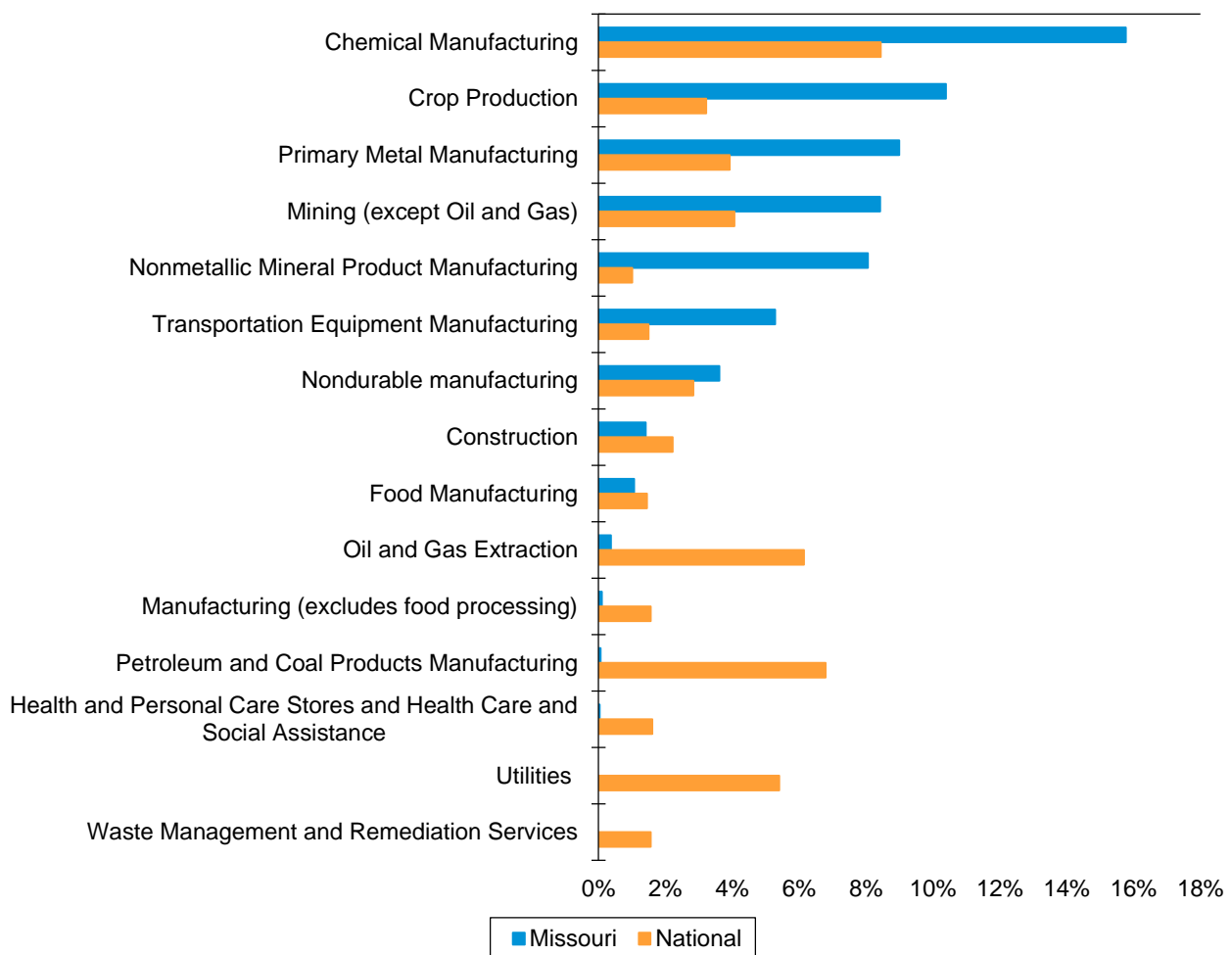
Source: CS Analysis of FAF4 data.

Note: Mode shares over 10% are shown in bold.

3.3 Total Marine Volumes by Industry

The Missouri industries that generate the most waterborne freight are summarized in Figure 3.3 in terms of marine freight modal share. Marine modal shares tend to be concentrated in a few key industries that are very dependent on marine transportation. Missouri's totals are compared to national statistics. Waterborne freight in Missouri is heavily concentrated in the chemical manufacturing, oil and gas extraction, crop production, petroleum and coal products manufacturing, and utilities industries. Missouri's construction, food manufacturing, oil and gas extraction, manufacturing (excludes food processing), petroleum and coal products manufacturing, and utilities firms all ship and receive less by water as compared to the rest of the country.

Figure 3.3 Total Marine Freight Modal Share by Industry

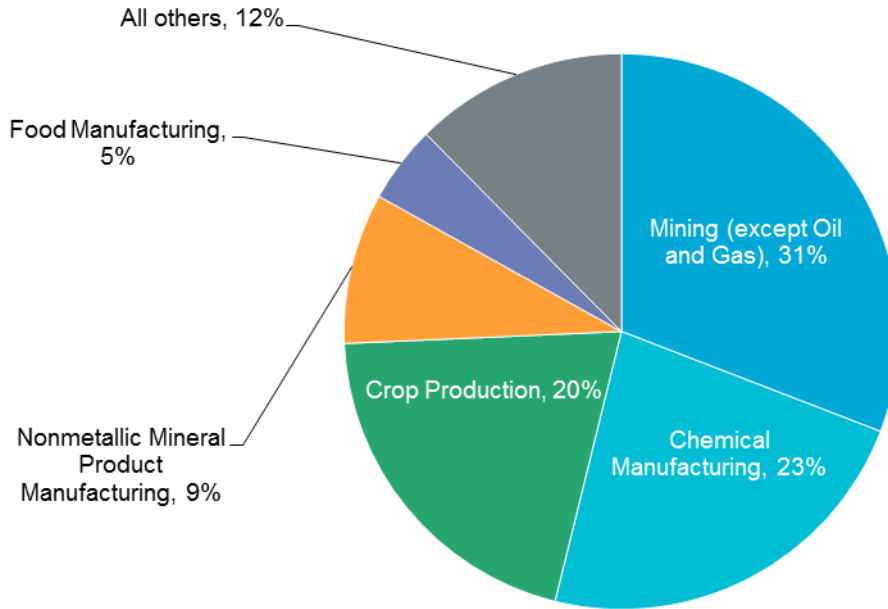


Source: CS Analysis of FAF4 data.

It is also important to consider the total tonnage of freight shipped by industry. Figure 3.4 highlights the top five marine freight-generating industries in Missouri by total tonnage. Mining (except oil and gas) is the dominant tonnage generator, accounting for nearly one-third of all tonnage moved by water, or 6.1 million tons in 2012. Chemical manufacturing accounts for 23 percent of the total, or 4.5 million tons, followed by

crop production (20 percent, or just over 4 million tons). Nonmetallic mineral product manufacturing and food manufacturing comprised nine percent and five percent of total tonnage, respectively.

Figure 3.4 Top Waterborne Freight-Generating Industries in Missouri by Weight
2012 Tonnage



Source: CS Analysis of FAF4 data.

3.4 Port-Dependent Industries

Based on interviews with shippers/receivers and economic developers and the benchmarking of marine freight in Missouri to the nation as a whole, this section identifies port-dependent industries. Port-dependent industries are those industries whose firms most likely could not be competitive in Missouri if not for the access and availability of marine transportation. Port-benefitted industries are those industries that benefit either directly or indirectly from the access to marine transportation through reduced freight costs. Missouri's top port-dependent industries are:

- Chemical manufacturing;
- Fabricated metal product manufacturing;
- Crop production;
- Mining;
- Non-metallic mineral product manufacturing;
- Transportation equipment manufacturing; and
- Primary metal manufacturing.

In total, port-dependent industries provide about 110,000 jobs for Missouri residents, giving rise to over \$4.7 billion in annual income. The following sections provide an overview of these industries, which are located throughout the state and not confined to counties with actual port facilities.

3.4.1 Chemical Manufacturing

In 2012, employment in the chemical manufacturing industry in Missouri was 17,520 with an average annual payroll of \$895 million. By 2016, the sector employed 19,130 with an average annual payroll of \$1.05 billion.⁶ Figure 3.5 displays the business locations and number of employees, Figure 3.6 shows the business locations and employment by county, and Figure 3.7 displays the types of chemical manufacturing businesses in Missouri. Chemical manufacturing firms are particularly concentrated in the St. Louis area, generating a substantial amount of employment compared to other parts of the state. There are also notable concentrations of chemical manufacturing employment clustered near the ports of Kansas City, St. Joseph, Southeast Missouri, and New Madrid County. Although chemical manufacturing firms tend to cluster, employment extends to counties surrounding these employment hubs. These firms focus on a variety of different chemicals, but primarily pesticides, fertilizers, and other agricultural chemical products.

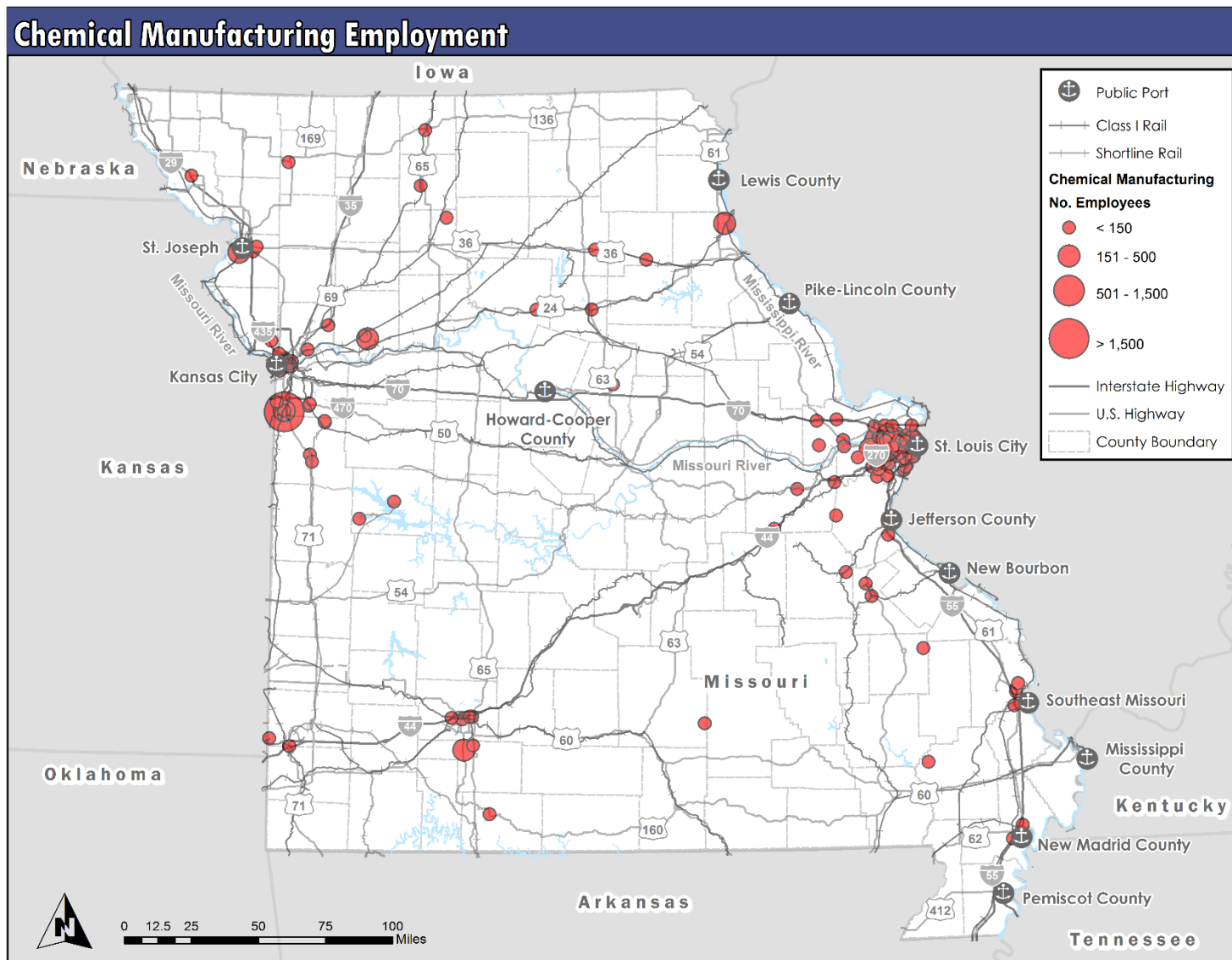
Overall, the chemical manufacturing industry has increased in real economic output⁷ from \$4.7 billion in 2005 to \$7.8 billion in 2015. This represents a growth of 66 percent in a 10-year period.

The chemical manufacturing industry is a basic industry in Missouri, meaning that it is a net exporter of products to international markets. The location quotient (LQ) of the chemical manufacturing industry was 1.22 in 2016, which is up from 1.05 in 2006. Location quotients compare the concentration of an industry within a specific geographical area to the concentration of that industry nationwide. If an LQ is equal to 1, then the industry has the same share of its area employment as it does in the nation. An LQ greater than 1 indicates an industry with a greater share of the local area employment than is the case nationwide, and an LQ less than 1 indicates an industry with a lesser share of local area employment than that nationwide.

⁶ Employment and payroll figures from U.S. Bureau of Labor Statistics.

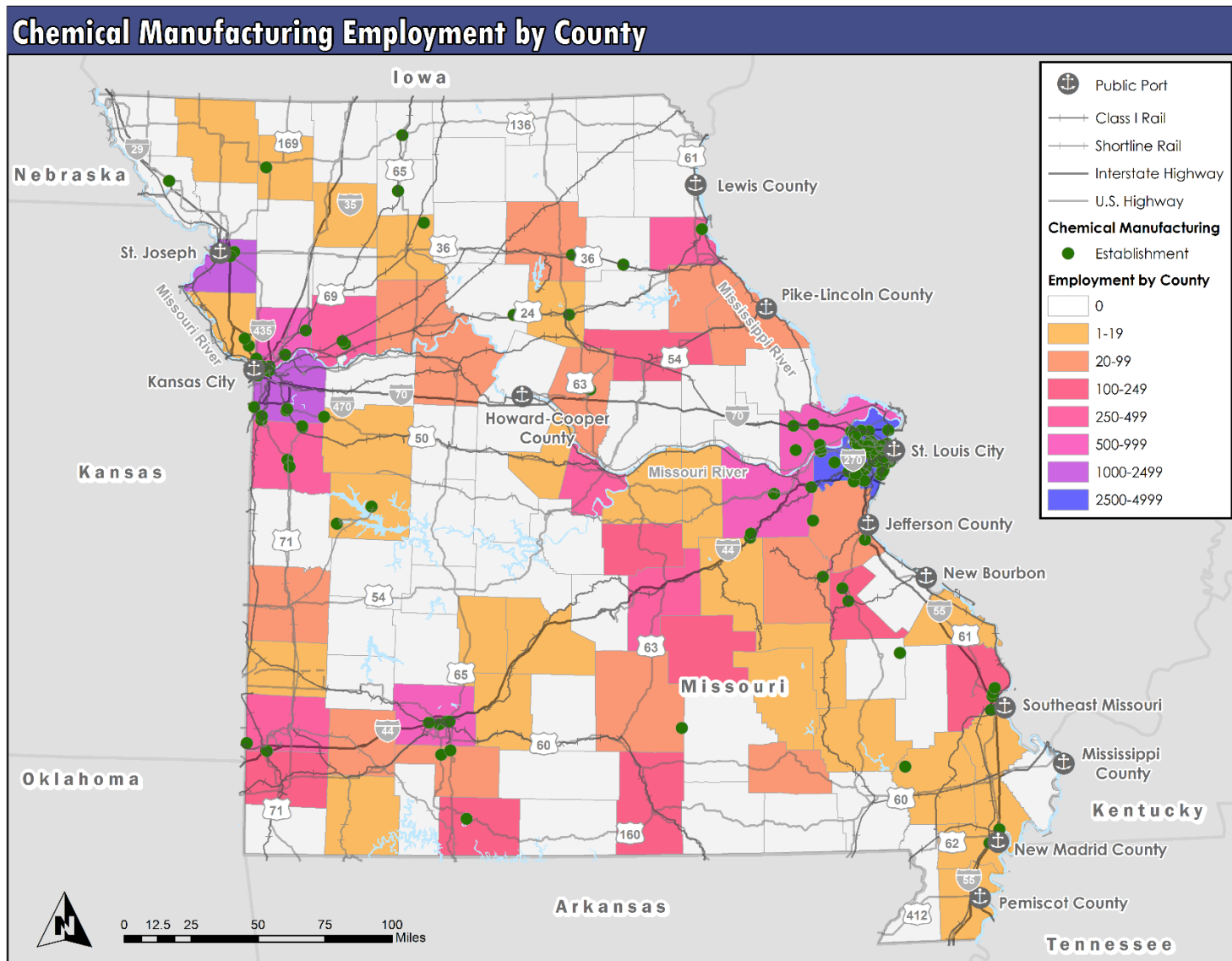
⁷ Real economic output from U.S. Bureau of Economic Analysis. Figures in current dollars.

Figure 3.5 Chemical Manufacturing Businesses and Employees in Missouri



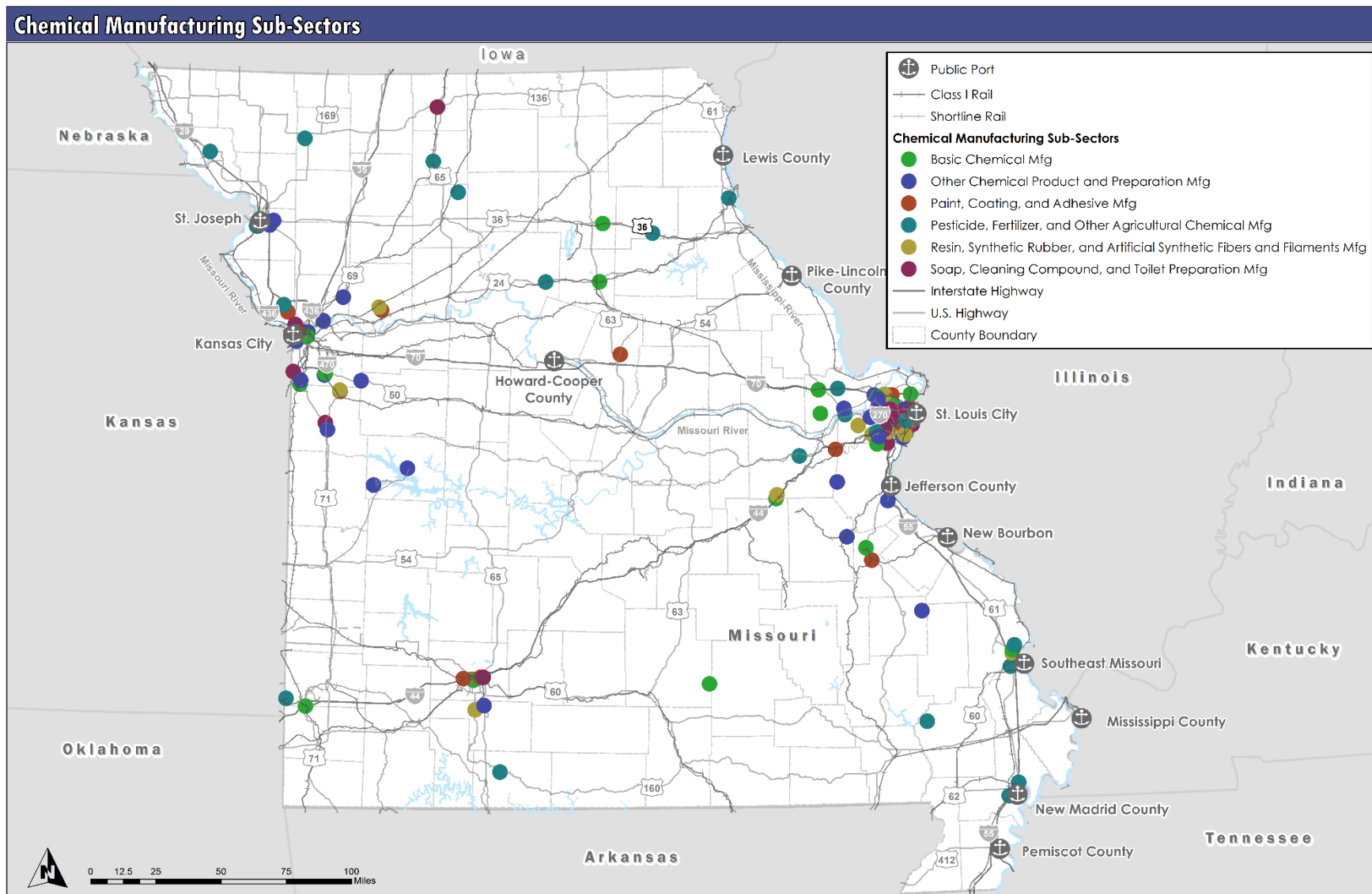
Source(s): BTS, Reference USA (2016). Cambridge Systematics.

Figure 3.6 Chemical Manufacturing Businesses and Employment by County in Missouri



Source(s): BTS, Reference USA (2016), U.S. Census (2015). Cambridge Systematics.

Figure 3.7 Chemical Manufacturing Business Types in Missouri



Source(s): BTS, Reference USA (2016). Cambridge Systematics.

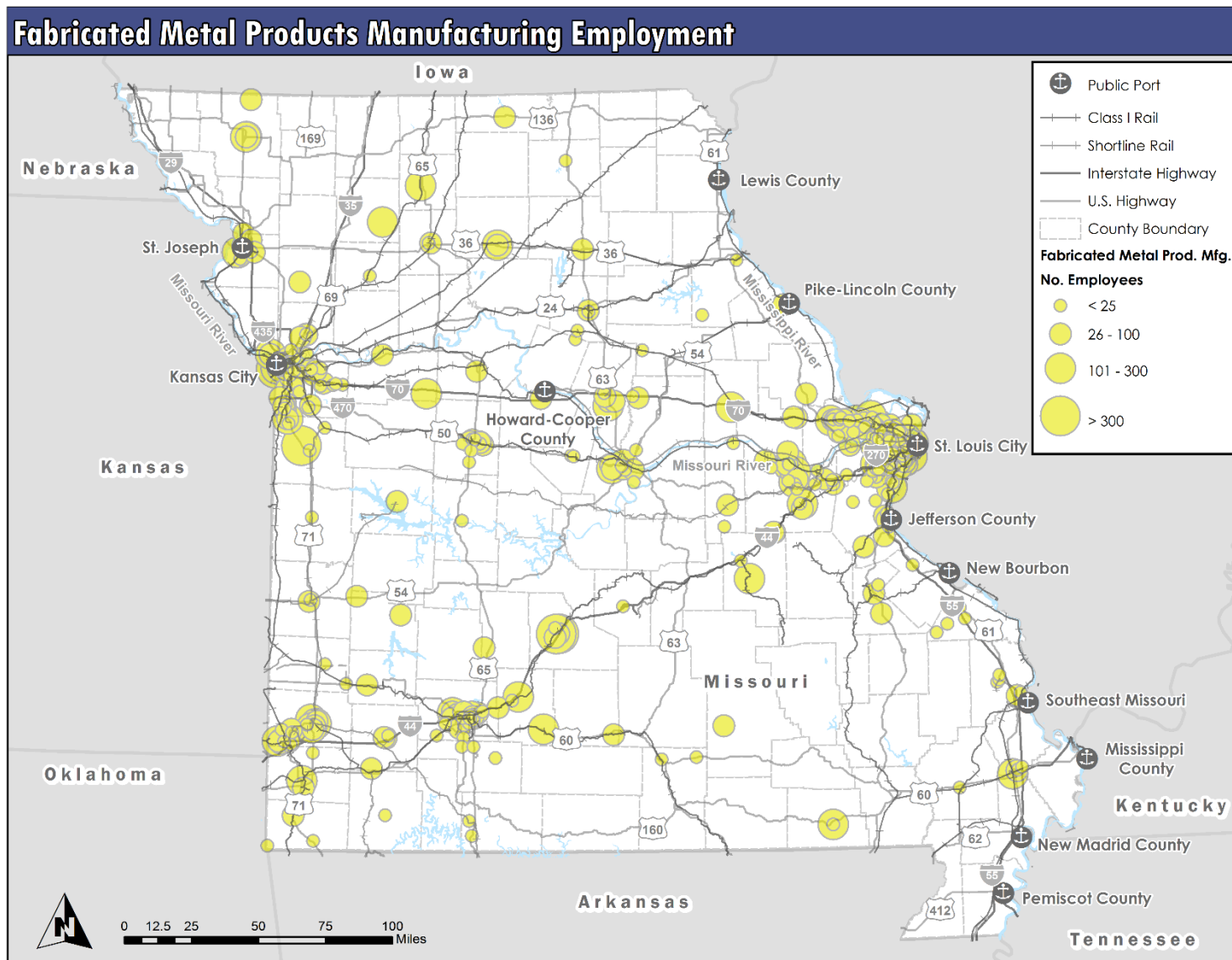
3.4.2 *Fabricated Metal Product Manufacturing*

In 2012, employment in the fabricated metal product industry in Missouri was 24,680 with an average annual payroll of \$1.05 billion. By 2016, the sector employed 24,390 with an average annual payroll of \$1.05 billion. Figure 3.8 displays the business locations and number of employees, Figure 3.9 shows the business locations and employment by county, and Figure 3.10 displays the types of fabricated metal product manufacturing businesses in Missouri. Fabricated metal product manufacturing firms tend to cluster near St. Louis, Kansas City, and St. Joseph ports, in addition to the southwest portion of the state, along I-44. Because of the distribution of businesses, fabricated metal product manufacturing employment extends to over 83 percent of Missouri counties.

Overall, the fabricated metal product manufacturing industry decreased in real economic output from \$2.7 billion in 2005 to \$2.5 billion in 2015. This represents a decline of six percent in a 10-year period.

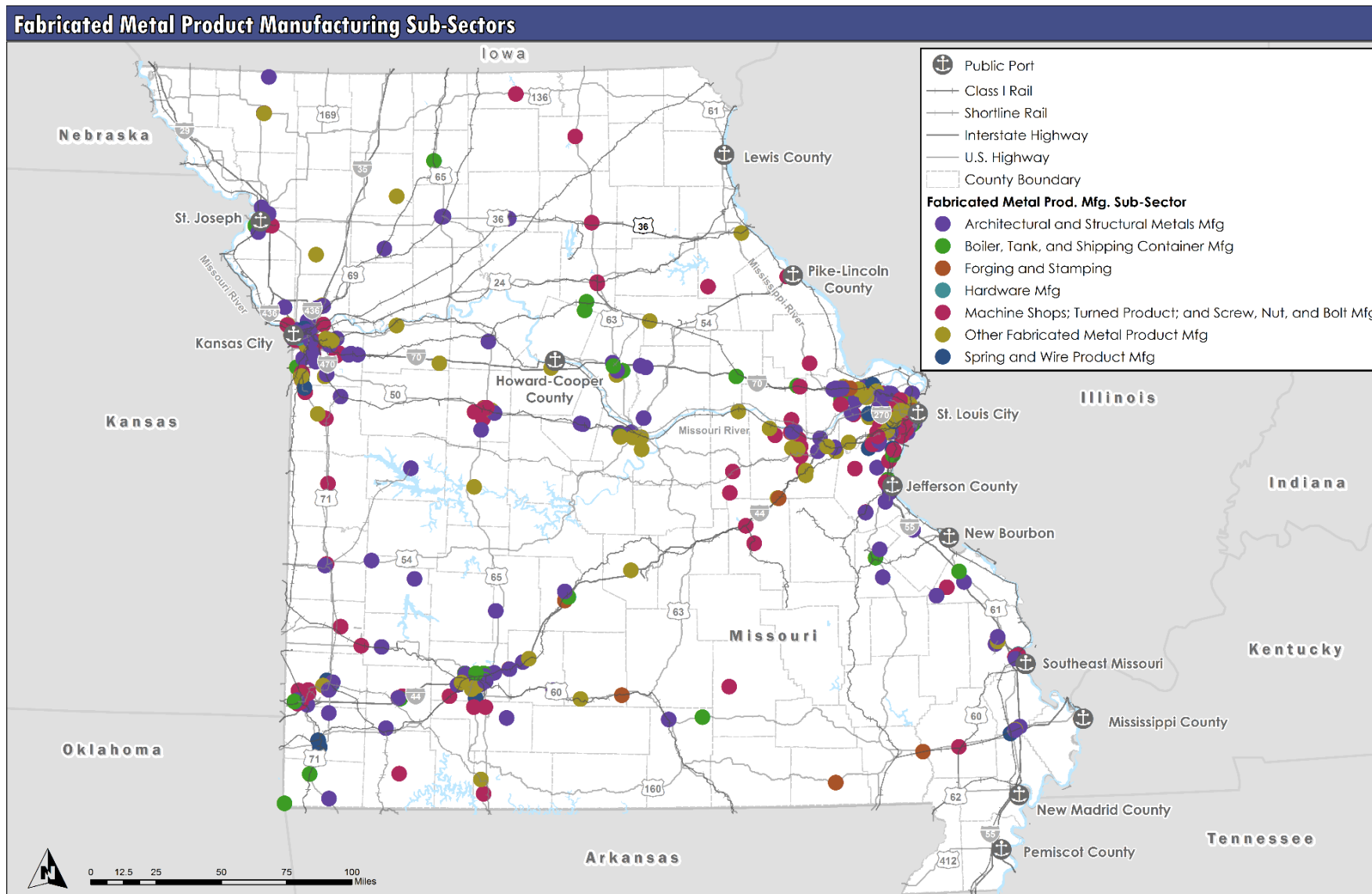
The fabricated metal product manufacturing industry is a basic industry in Missouri, meaning that it is a net exporter of products to international markets. The location quotient of the fabricated metal product manufacturing industry was 1.05 in 2016, which is slightly up from 1.04 in 2006.

Figure 3.8 Fabricated Metal Product Manufacturing Businesses and Employees in Missouri



Source(s): BTS, Reference USA (2016). Cambridge Systematics.

Figure 3.10 Fabricated Metal Product Manufacturing Business Types in Missouri



Source(s): BTS, Reference USA (2016). Cambridge Systematics.

3.4.3 Crop Production

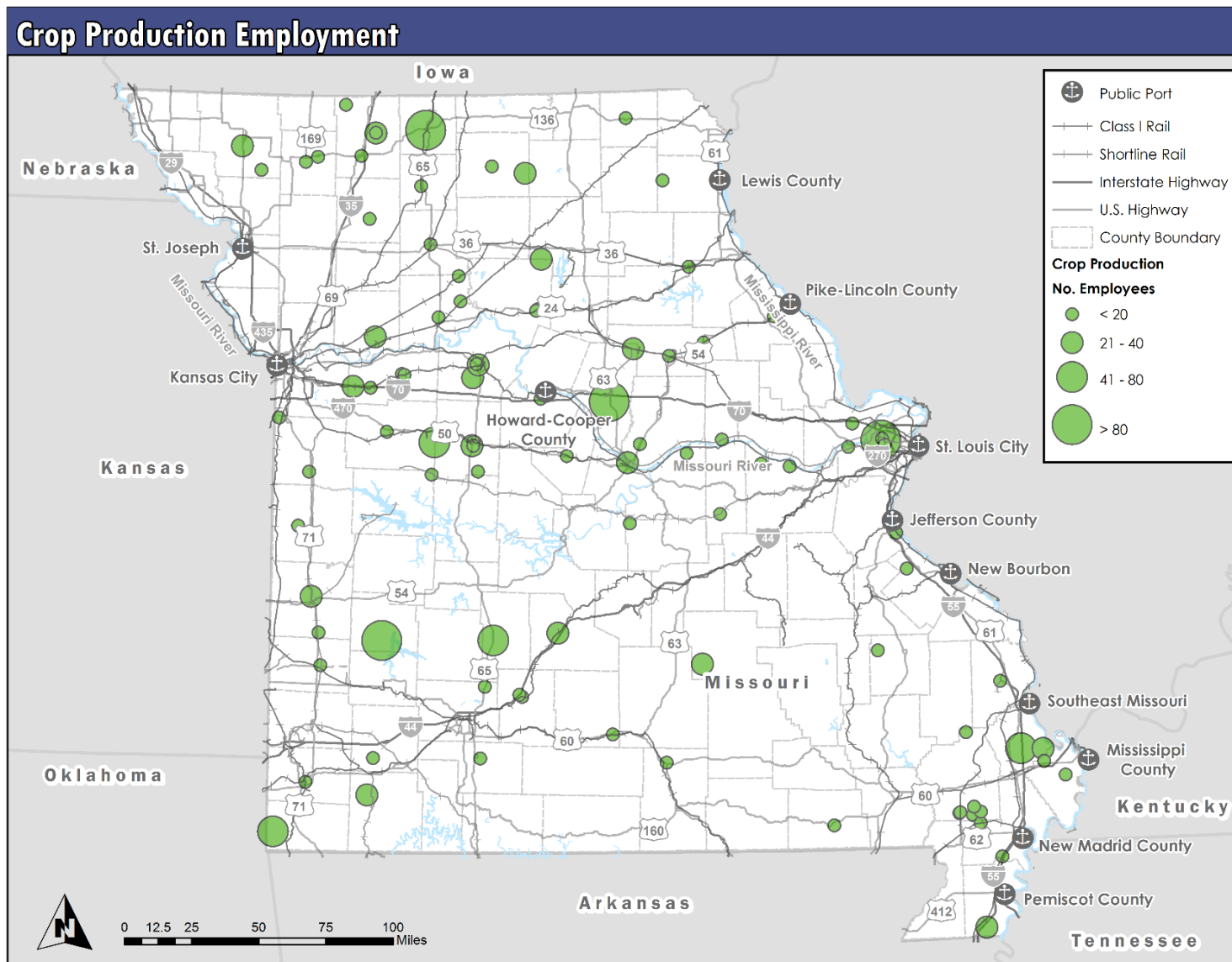
In 2015, employment in the crop production industry in Missouri was over 2,600 with an annual payroll of \$79.2 million.⁸ Figure 3.11 displays the business locations and number of employees, and Figure 3.12 displays the types of crop production businesses in Missouri. Crop production firms do not tend to cluster in any one area of the state; however, there are high-employing firms located in St. Louis, northern Missouri, central Missouri, and southwest Missouri. All of these businesses are classified as other crop farming, which may include crops such as cotton, tobacco, herbs and spices, fruit and tree nuts, and hay, among other commodities.

Overall, the farm industry increased real economic output from \$2.2 billion in 2005 to \$3.0 billion in 2015. This represents a growth of 39 percent in a 10-year period.

The crop production industry is a non-basic industry in Missouri, meaning that it is a net importer of products to international markets. The location quotient of the crop production industry was 0.44 in 2016, which is up from 0.38 in 2006. Missouri exports some crops, but importing more of other types of crops.

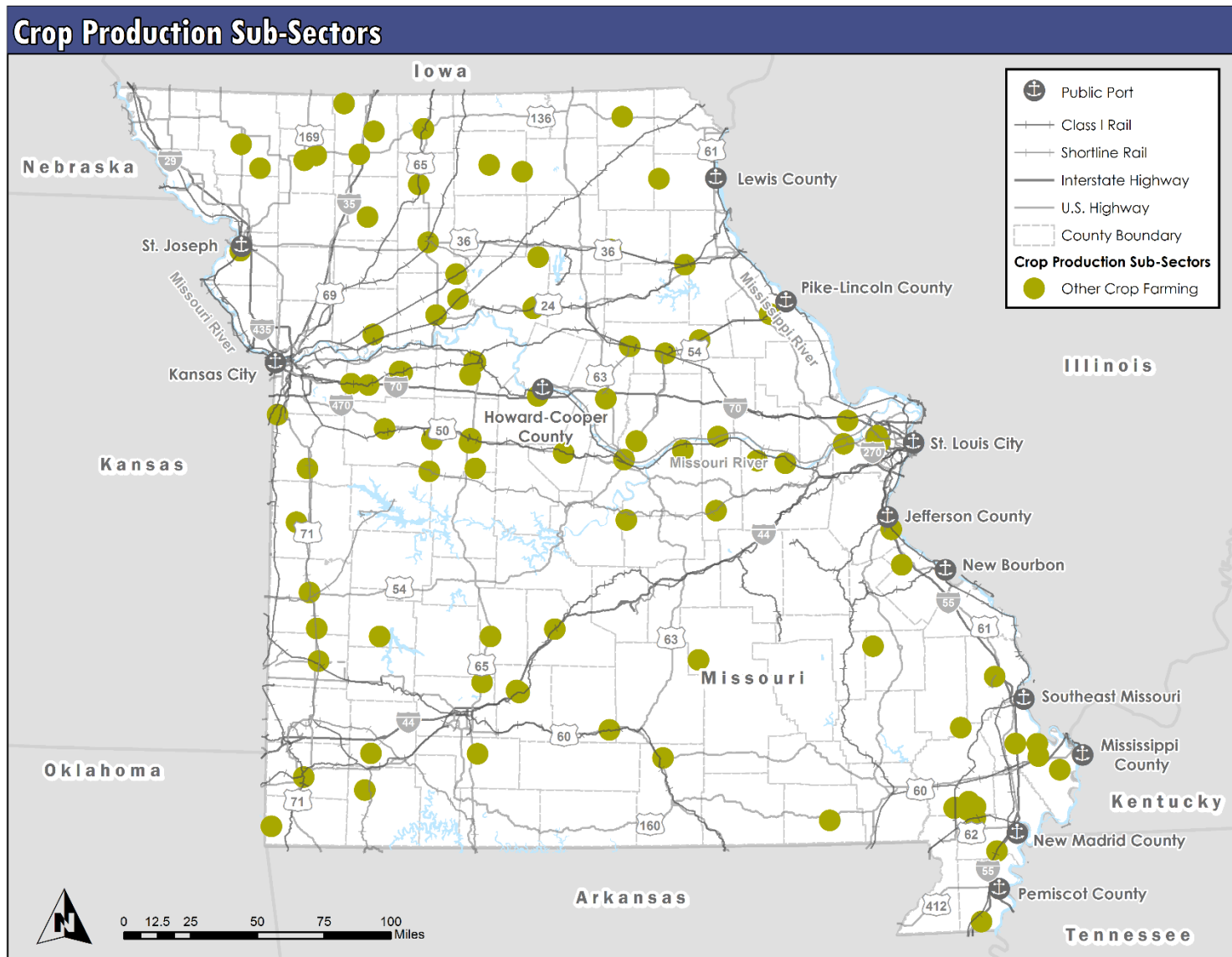
⁸ U.S. Census.

Figure 3.11 Crop Production Businesses and Employees in Missouri



Source(s): BTS, Reference USA (2016). Cambridge Systematics.

Figure 3.12 Crop Production Business Types in Missouri



Source(s): BTS, Reference USA (2016). Cambridge Systematics.

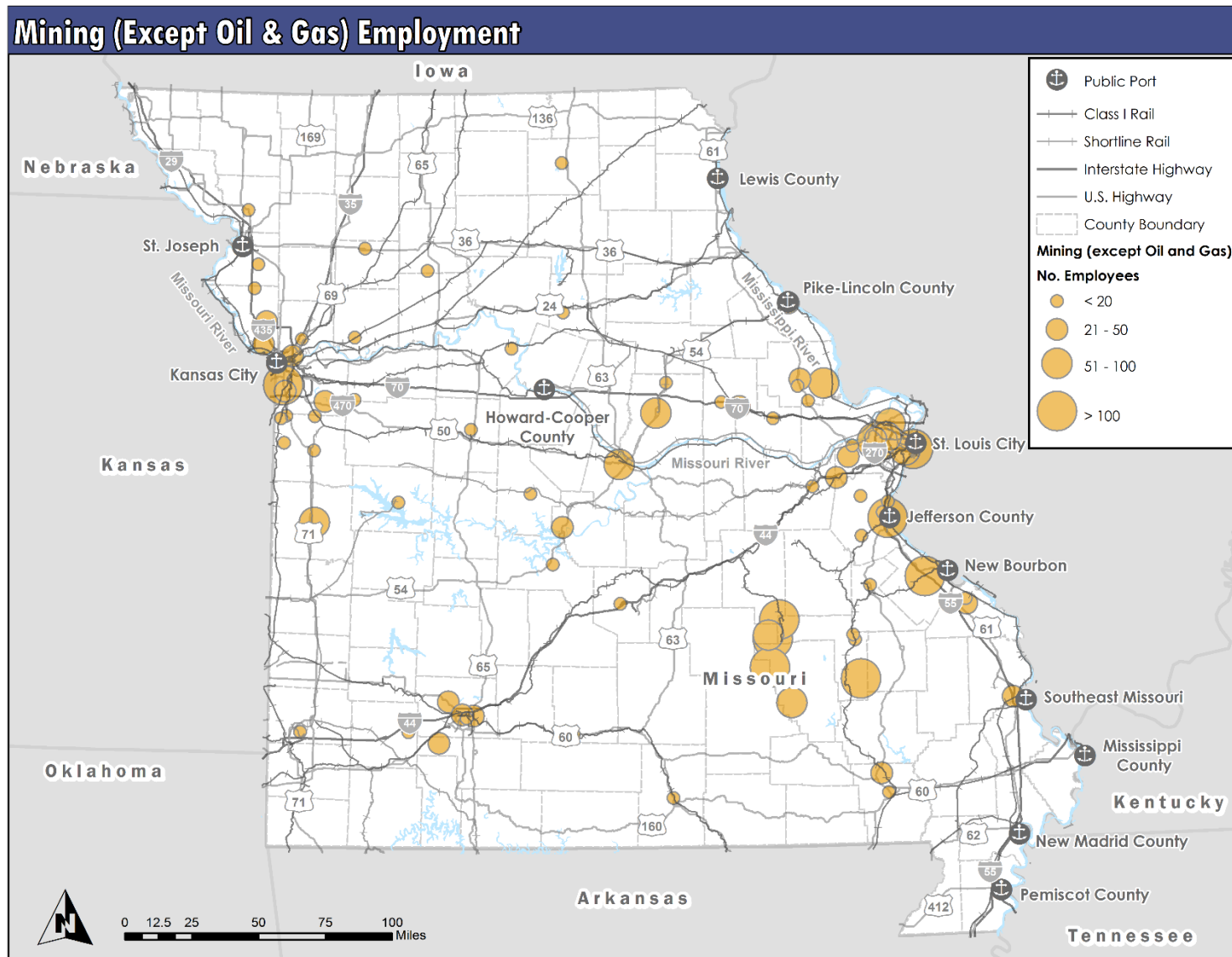
3.4.4 Mining (Except Oil and Gas)

In 2012, employment in the mining (except oil & gas) industry in Missouri was 2,740 with an average annual payroll of \$121 million. By 2016, the sector employed 2,770 with an average annual payroll of \$114.2 million. Figure 3.13 displays the business locations and number of employees, Figure 3.14 shows the business locations and employment by county, and Figure 3.15 displays the types of mining businesses in Missouri. Clusters of mining firms are located near St. Louis, Kansas City, New Bourbon, as well as south of I-44 in southeastern Missouri. Mining employment is present in nearly every county south of the Missouri River, as well as nearly every county bordering the Mississippi River. The vast majority of these businesses specialize in nonmetallic mineral mining and quarrying.

Overall, the mining industry has decreased in real economic output from \$1.2 billion in 2005 to \$930 million in 2015. This represents a reduction of 19 percent in a 10-year period.

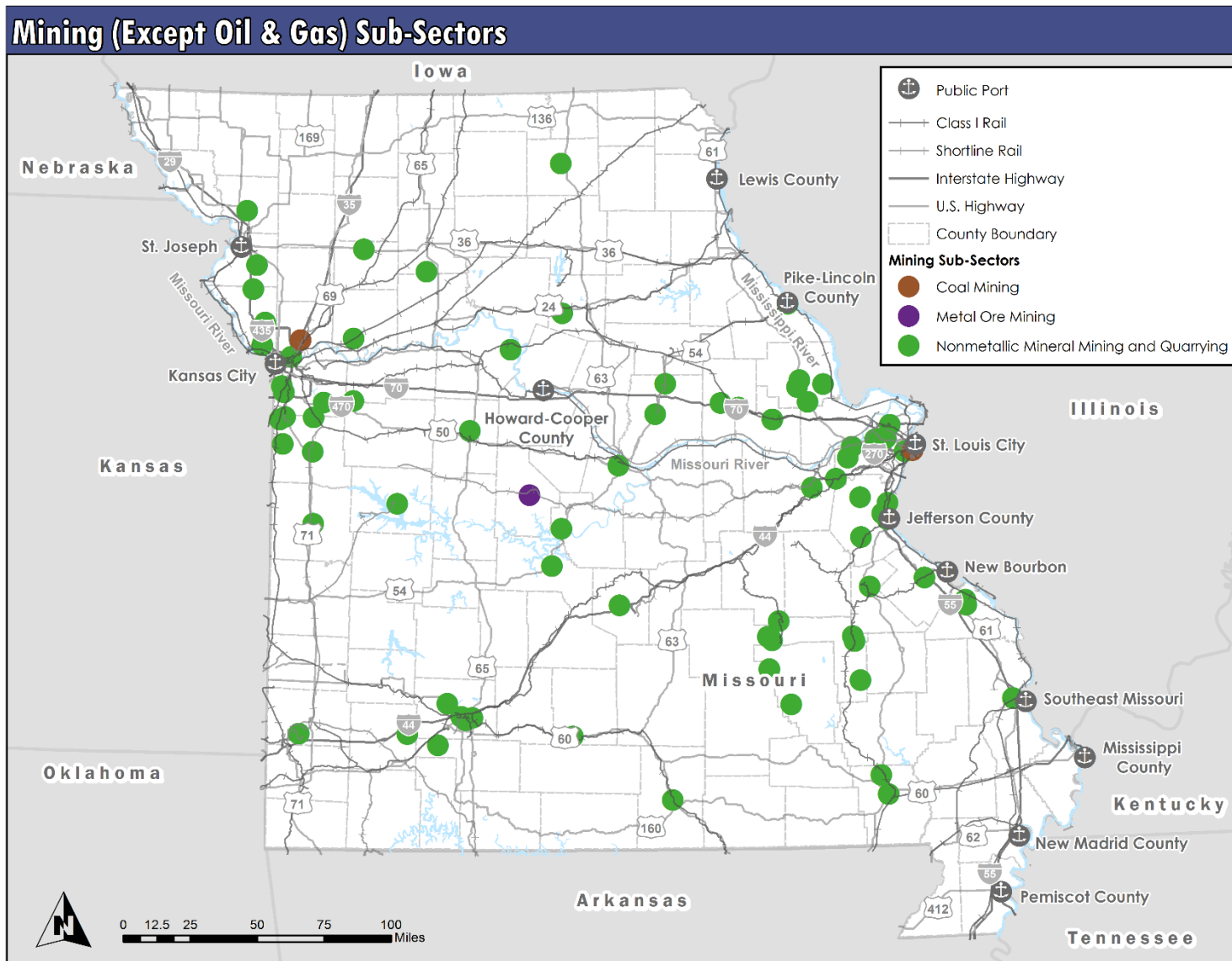
The mining industry is a basic industry in Missouri, meaning that it is a net exporter of products to international markets. The location quotient of the mining industry was 1.05 in 2016, which is down slightly from 1.09 in 2006.

Figure 3.13 Mining (Except Oil & Gas) Businesses and Employees in Missouri



Source(s): BTS, Reference USA (2016). Cambridge Systematics.

Figure 3.15 Mining (Except Oil & Gas) Business Types in Missouri



Source(s): BTS, Reference USA (2016). Cambridge Systematics.

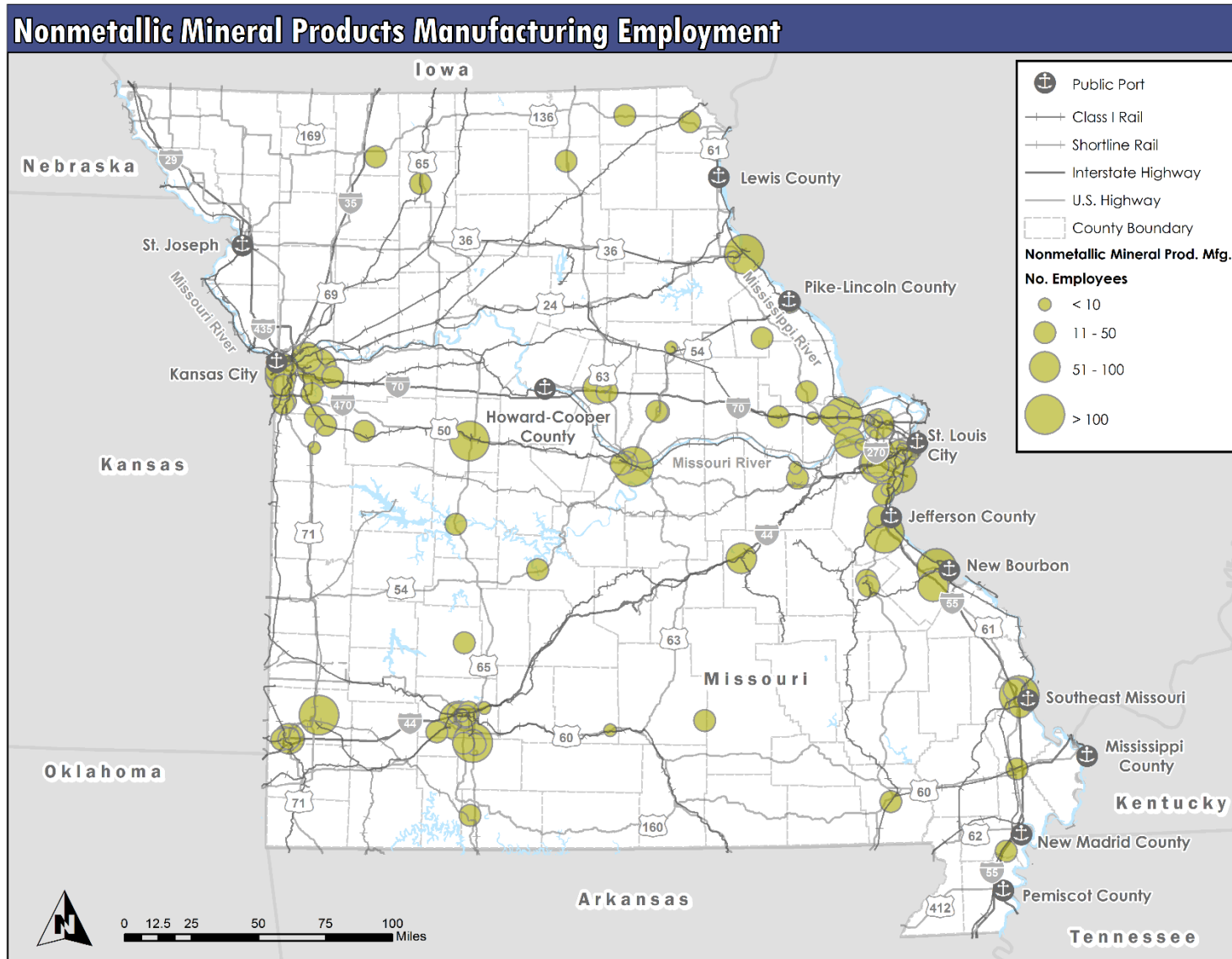
3.4.5 *Nonmetallic Mineral Product Manufacturing*

In 2012, employment in the nonmetallic mineral product manufacturing industry in Missouri was 6,970 with an average annual payroll of \$279.3 million. By 2016, the sector employed 7,300 with an average annual payroll of \$292.2 million. Figure 3.16 displays the business locations and number of employees, Figure 3.17 shows the business locations and employment by county, and Figure 3.18 displays the types of nonmetallic mineral product manufacturing businesses in Missouri. Businesses are concentrated in St. Louis and Kansas City, as well as portions of southeast and southwest Missouri. Nonmetallic mineral product manufacturing employment covers 83 percent of all Missouri counties. The majority of these businesses specialize in cement and concrete product manufacturing.

Overall, the nonmetallic mineral product manufacturing industry has decreased in real economic output from \$929 million in 2005 to \$776 million in 2015. This represents a decline of 16 percent in a 10-year period.

The nonmetallic mineral product manufacturing industry is a non-basic industry in Missouri, meaning that it is a net importer of products from external markets. The location quotient of the nonmetallic mineral product manufacturing industry was 0.96 in 2016, which is down from 0.97 in 2006.

Figure 3.16 Nonmetallic Mineral Product Manufacturing Businesses and Employees in Missouri



Source(s): BTS, Reference USA (2016). Cambridge Systematics.

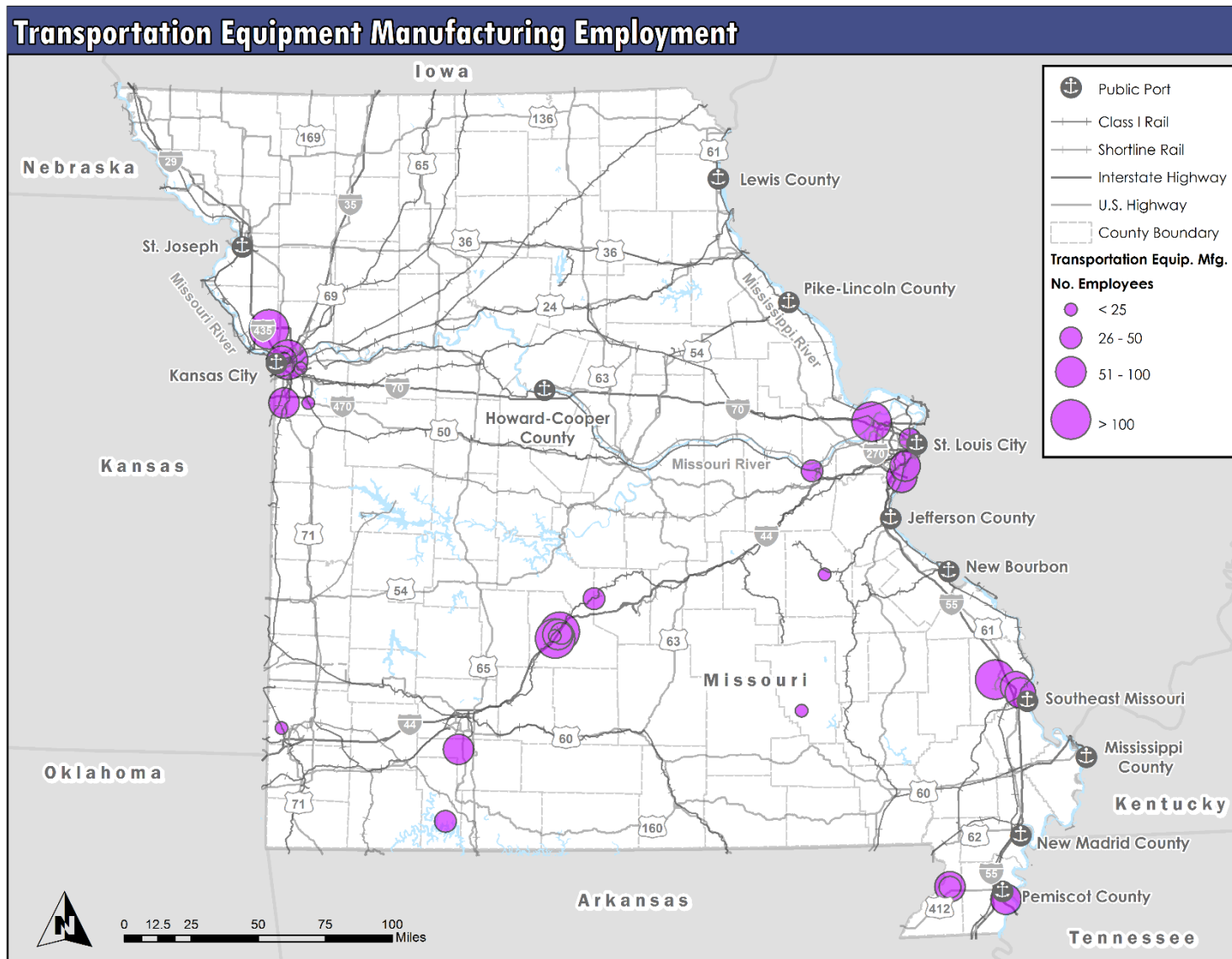
3.4.6 *Transportation Equipment Manufacturing*

In 2012, employment in the transportation equipment manufacturing industry in Missouri was 34,320 with an average annual payroll of \$1.2 billion. By 2016, the sector employed 46,190 with an average annual payroll of \$2.9 billion. Figure 3.19 displays the business locations and number of employees, Figure 3.20 shows the business locations and employment by county, and Figure 3.21 displays the types of transportation equipment manufacturing businesses in Missouri. These firms are concentrated near St. Louis, Kansas City, Southeast Missouri, and Pemiscot County ports, as well as parts of southern Missouri. These firms primarily specialize in ship and boat building and railroad rolling stock manufacturing.

Overall, the transportation equipment manufacturing industry has increased in real economic output from \$4.5 billion in 2005 to \$4.9 billion in 2015. This represents a growth of 11 percent in a 10-year period.

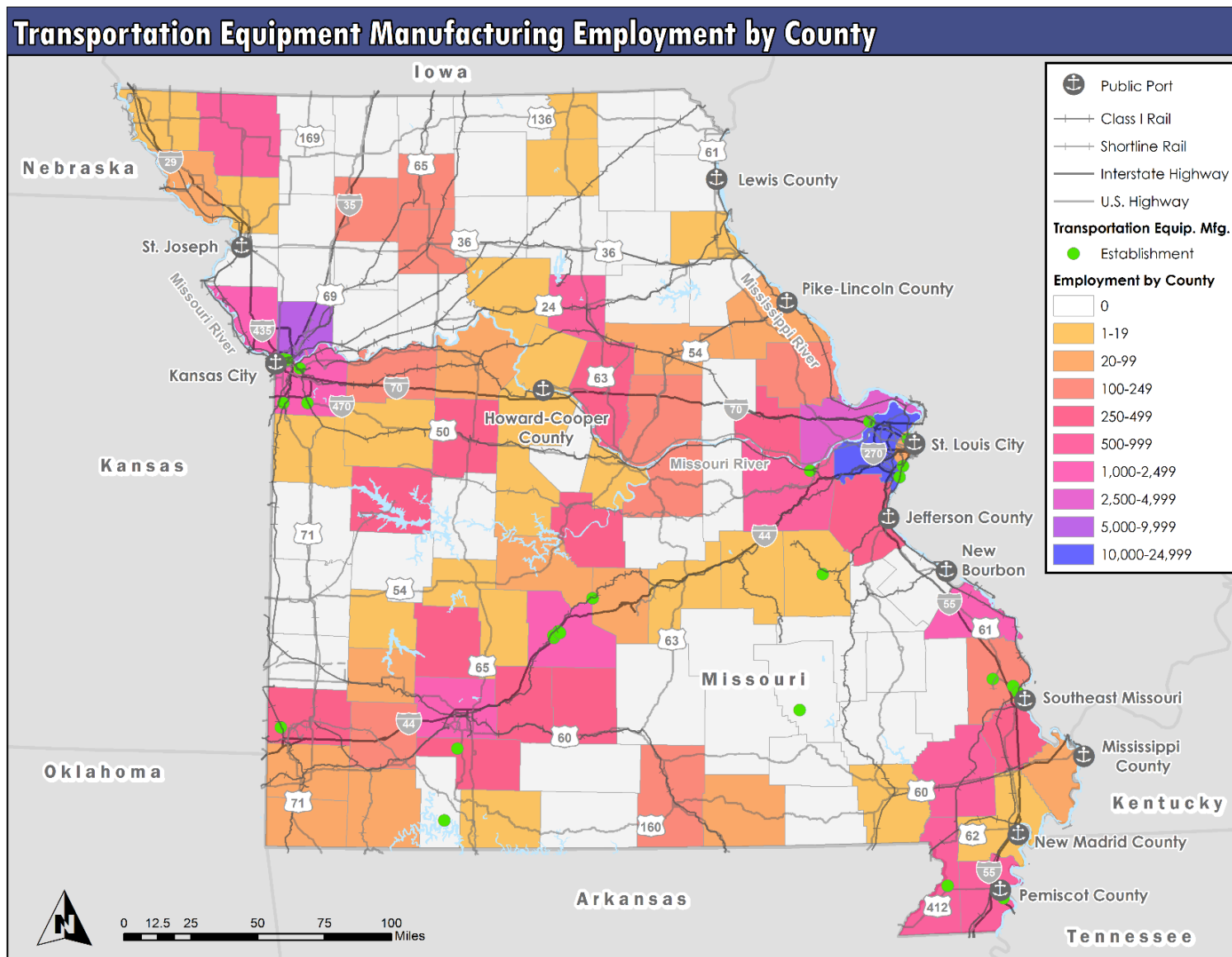
The transportation equipment manufacturing industry is a basic industry in Missouri, meaning that it is a net exporter of products to international markets. The location quotient of the transportation equipment manufacturing industry was 1.46 in 2016, which is the same location quotient as 2006.

Figure 3.19 Transportation Equipment Manufacturing Businesses and Employees in Missouri



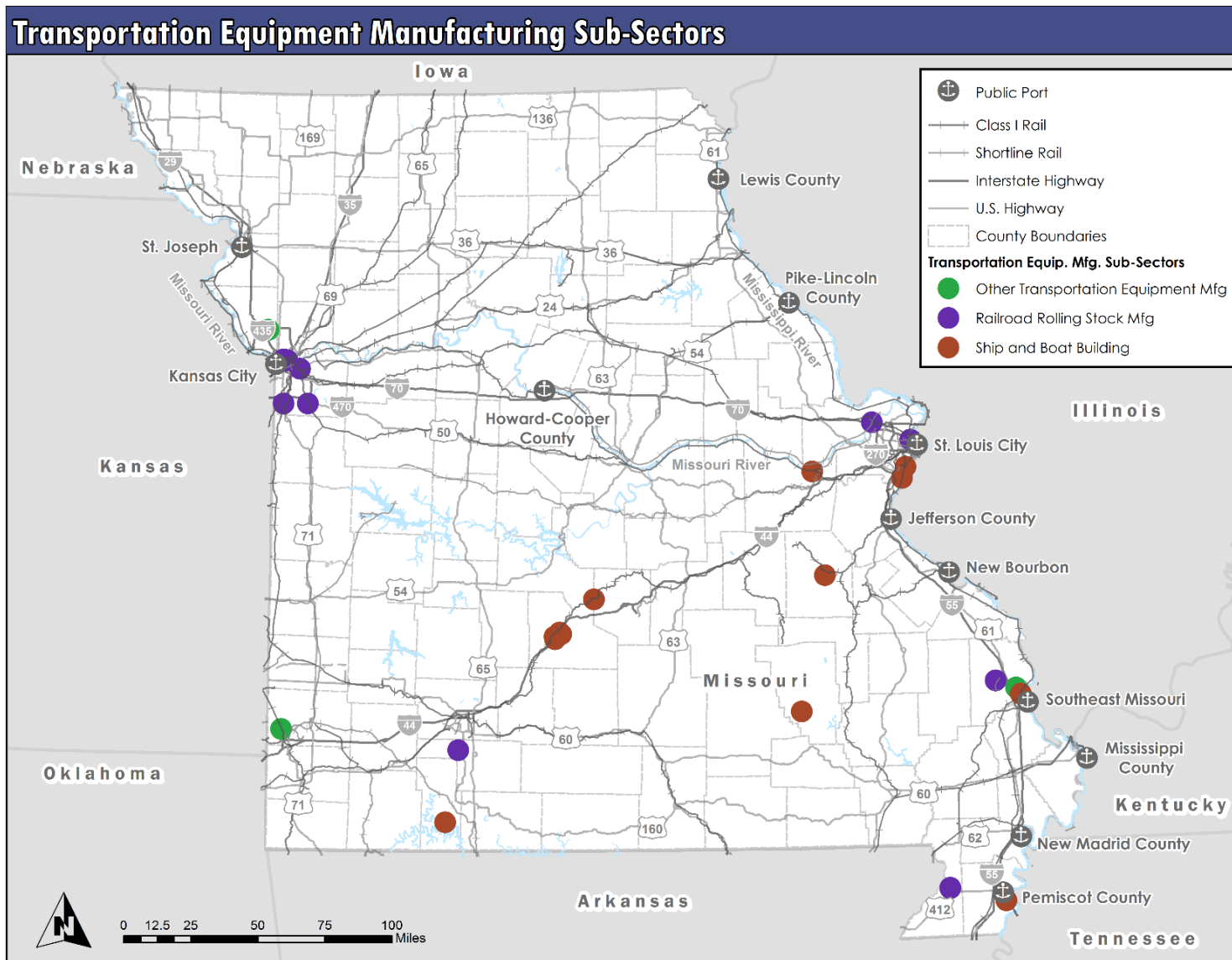
Source(s): BTS, Reference USA (2016). Cambridge Systematics.

Figure 3.20 Transportation Equipment Manufacturing Businesses and Employment by County in Missouri



Source(s): BTS, Reference USA (2016), U.S. Census (2015). Cambridge Systematics.

Figure 3.21 Transportation Equipment Manufacturing Business Types in Missouri



Source(s): BTS, Reference USA (2016). Cambridge Systematics.

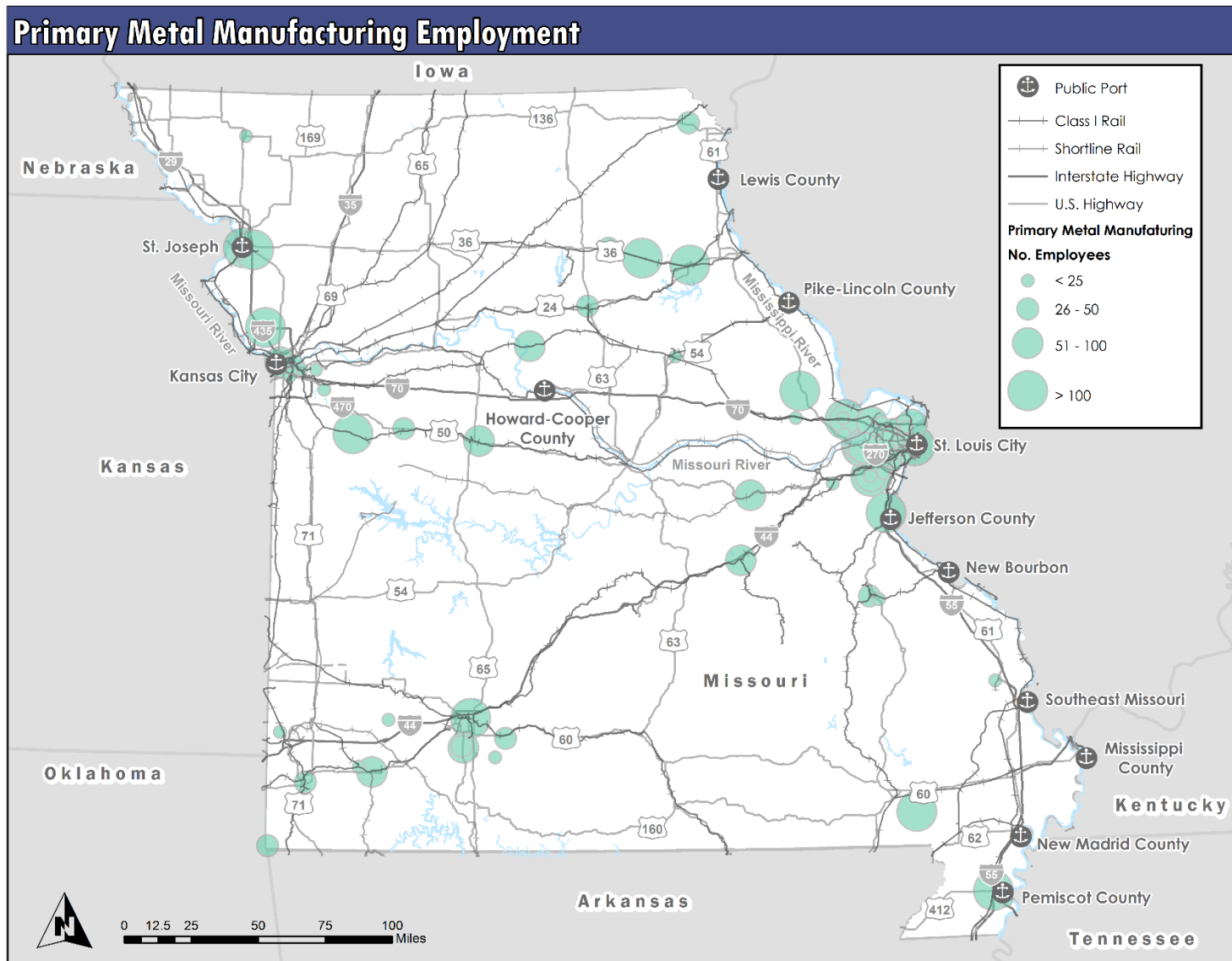
3.4.7 Primary Metal Manufacturing

In 2012, employment in the primary metal manufacturing industry in Missouri was 7,310 with an average annual payroll of \$311.9 million. By 2016, the sector employed 7,030 with an average annual payroll of \$296.2 million. Figure 3.22 displays the business locations and number of employees, Figure 3.23 shows the business locations and employment by county, and Figure 3.24 displays the types of primary metal manufacturing businesses in Missouri. St. Louis in particular is a major hub for primary metal manufacturing businesses and employment, though there is also a high amount of employment near New Madrid and Pemiscot County ports. The majority of these businesses are classified as foundries.

Overall, the primary metal manufacturing industry has decreased in real economic output from \$806 million in 2005 to \$730 million in 2015. This represents a decline of nine percent in a 10-year period.

The primary metal manufacturing industry is a non-basic industry in Missouri, meaning that it is a net importer of products from external markets. The location quotient of the primary metal manufacturing industry was 0.94 in 2016, which is down from 1.0 in 2006.

Figure 3.22 Primary Metal Manufacturing Businesses and Employees in Missouri



Source(s): BTS, Reference USA (2016). Cambridge Systematics.

Primary Metal Manufacturing Employment by County

Primary Metal Manufacturing

- Public Port
- Class I Rail
- Shortline Rail
- Interstate Highway
- U.S. Highway

Employment by County

Color	Employment Range
White	0
Yellow	1-19
Orange	20-99
Pink	100-249
Magenta	250-499
Blue	500-999

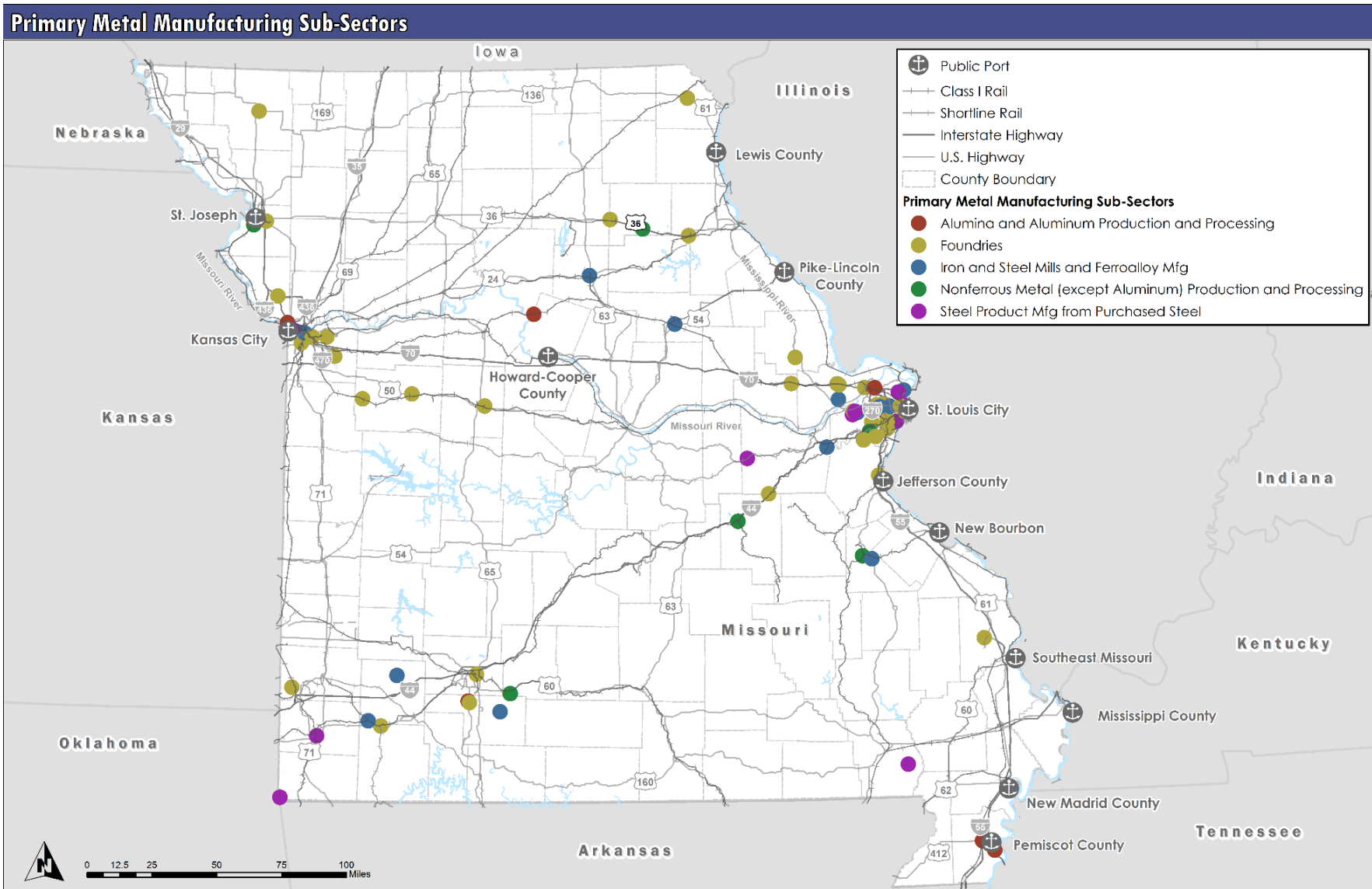
Establishment

- Green Dot

Map Labels: Iowa, Nebraska, Kansas, Oklahoma, Arkansas, Kentucky, Tennessee, St. Joseph, Kansas City, St. Louis City, Jefferson County, New Bourbon, Southeast Missouri, Mississippi County, New Madrid County, Pemiscot County, Howard-Cooper County, Pike-Lincoln County, Lewis County, Missouri River, Mississippi River, Missouri, Arkansas, Kentucky, Tennessee.

Source(s): BTS, Reference USA (2016), U.S. Census (2015). Cambridge Systematics.

Figure 3.24 Primary Metal Manufacturing Business Types in Missouri



Source(s): BTS, Reference USA (2016). Cambridge Systematics.

3.4.8 Summary of Port-Dependent Industries

A summary of the direct economic impacts of the seven port-dependent industries in Missouri is shown in Table 3.5. These sectors provide nearly 110,000 jobs, pay out \$5.8 billion in labor income annually, and contribute a total of \$20.6 billion in real economic output for the state. Although these businesses rely on Missouri's port sites, they provide employment opportunities in every county in the state. The geographic reach of these sectors highlights the importance of Missouri's port transportation network on the state economy and job market.

Table 3.5 Summary of Direct Impacts of Port-Dependent Industries

NAICS	Industry Description	Employment (2016)	Labor Income (2016)	Location Quotient (2016)	Real Economic Output (2015)
325	Chemical manufacturing	19,130	\$1.05 billion	1.22	\$7.8 billion
332	Fabricated metal product manufacturing	24,390	\$1.05 billion	1.05	\$2.5 billion
111	Crop production	2,600	\$79.2 million	0.44	\$3.0 billion
212	Mining (except oil and gas)	2,770	\$114.2 million	1.05	\$930 million
327	Nonmetallic mineral product manufacturing	7,300	\$292.2 million	0.96	\$776 million
336	Transportation equipment manufacturing	46,190	\$2.9 billion	1.46	\$4.9 billion
331	Primary metal manufacturing	7,030	\$296.2 million	0.94	\$730 million
Total		109,410	\$5.8 billion		\$20.6 billion

Source(s): IMPLAN economic model, U.S. Bureau of Labor Statistics, U.S. Bureau of Economic Analysis.

4.0 Economic Impact of Ports in Missouri

The port summaries and port user profile provide the foundation for documenting the economic role of Missouri's public ports. Using that information, this section describes the economic role and impacts of the public ports in Missouri on the state and local economy.

4.1 Overview of Approach

In general, ports and marine transportation impact economic development in the following ways:

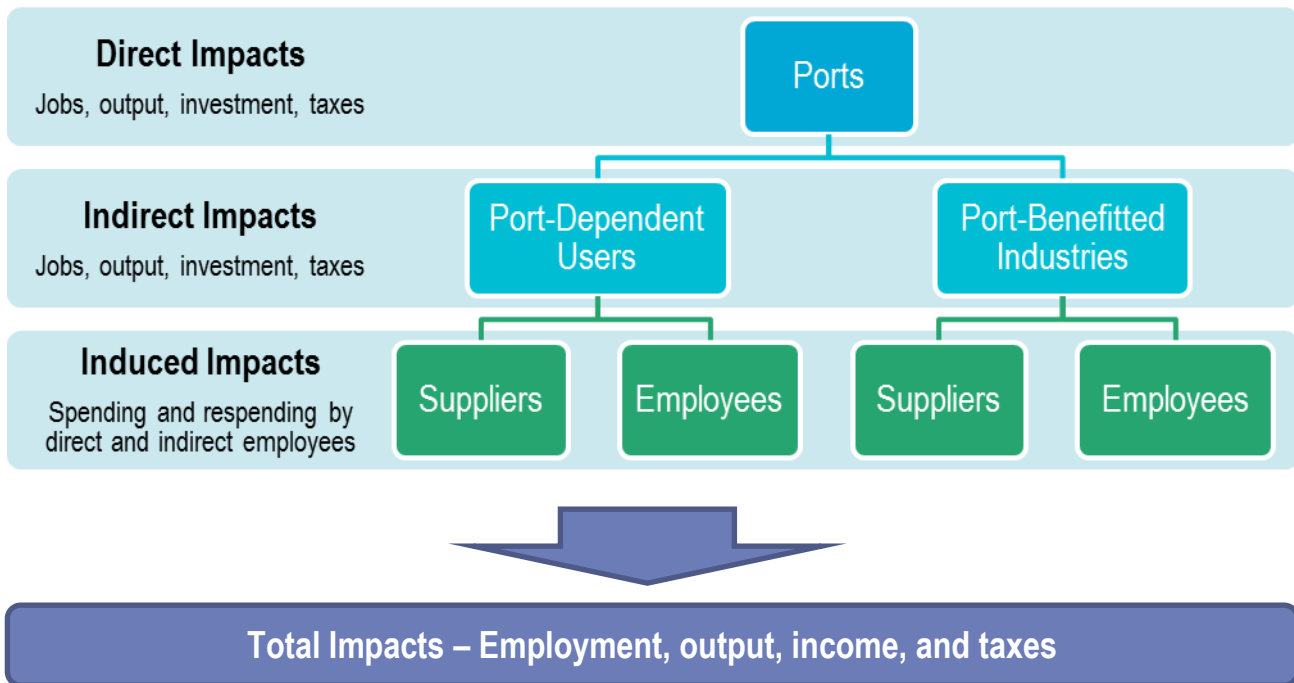
- **Direct impacts** are the result of opportunities to recruit industry, which in turn enables employment, added value, market growth, and reduced costs. Both port-dependent and port-benefitted companies seek the best place to do business at the lowest possible cost. Transportation is an important cost element for many companies.
- **Indirect and multiplier impacts** result from local purchases by port-dependent companies and their employees. As these firms and their employees make purchases from other Missouri businesses, they support additional jobs, generating additional income, output, and tax revenue.

For the purpose of this study, the economic role of the ports is viewed from the perspective of the industries that are reliant on their services. In other words, these businesses would not be operating in their current locations if not for the services provided by the ports. Therefore, the jobs at port-dependent businesses and direct port employment is used as the primary economic impact of ports. This data serves as the input in the economic model.

Figure 4.1 summarizes the approach to estimating the economic benefits of ports in Missouri. The process includes the following steps:

- Develop profiles of port-dependent and port-benefitted industries throughout the state and vet these findings with key stakeholders through in-person and phone interviews;
- Calculate direct employment of the ports and port-dependent users and the change in transportation costs absent marine transportation for port-benefitted industries; and
- Model the total economic impact based on increased transportation costs for port users if marine transportation service is lost at that user's port.

The economic modeling was conducted using IMPLAN, an economic model of the State of Missouri. The results of the economic modeling exercise represent the direct, indirect, and induced benefits arising from the availability of ports and marine transportation to Missouri businesses.

Figure 4.1 Summary Approach to Estimating Economic Importance of Ports

4.2 Findings

The economic analysis was conducted at the state level as well as the port level for the ports that submitted the required data. For the state-level analysis, the economic analysis focuses on the impact of marine transportation employment (direct employment at the ports) as well as the impact of port users. For the individual port analysis, the economic analysis examines the impact of direct port operations, including both employment and non-payroll spending (including capital improvements) on goods and services provided by Missouri businesses as well as employment of on-site port users.

4.2.1 Statewide Impact

The annual economic activity supported by ports in Missouri is presented in Table 4.1. Missouri's ports support nearly 290,000 jobs annually in the State of Missouri, resulting in nearly \$15.7 billion in labor income and over \$100.6 billion in annual economic activity, as measured by Gross State Product, or output. This means that about 34 percent of Missouri's economy and one out of every 10 jobs is supported by the ports. This economic activity results in expansion of the state and local tax base, and Missouri public ports give rise to more than \$2.4 billion in state and local tax revenue annually.

Ports Support:
1 out of every 10 jobs in Missouri
34% of the Missouri economy

Table 4.1 Summary of Annual Statewide Economic Impact of Missouri Ports
2016

Total Statewide Impact	
Employment	290,000
Income (in billions \$2016)	\$15.7
Gross State Product (in billions \$2016)	\$100.6
State and Local Tax Revenue (in billions \$2016)	\$2.4

Source: Cambridge Systematics Analysis using IMPLAN and data from U.S. Bureau of Labor Statistics.

The statewide impact of ports is estimated based on the employment associated with the port facilities and marine transportation in the state. The direct jobs reflect the number of people employed directly in marine transportation. Table 4.2 shows the breakdown of direct jobs in marine transportation sectors, which totaled 1,070 jobs in 2016. The majority of direct jobs are in support activities for water transportation (62 percent), which includes jobs in port and harbor operations, marine cargo handling, navigational services to shipping, and other support activities. The remaining proportion (38 percent) of direct jobs are in inland water transportation.

Table 4.2 Direct Employment in Marine Transportation in Missouri
2016

Sector	Total Employment	Average Weekly Wage	Average Annual Income Impact
Inland Water Transportation	410	\$1,234	\$26,308,880
Water Transportation Support Activities	660	\$1,262	\$43,311,840
Total	1,070	\$1,248	\$69,438,720

Source: U.S. Bureau of Labor Statistics (2016).

The direct employment in marine transportation is small; however, the employment at businesses that depend on the ports is significant. In total, port-dependent businesses provide 106,810 jobs in Missouri with an average weekly salary of \$845, which translates to nearly \$4.7 billion in personal income annually for Missouri residents. The breakdown of these jobs and salary by industry is shown in Table 4.3. Note that crop production is excluded from this analysis due to lack of employment and wage data.

Table 4.3 Employment and Income at Port-Dependent Businesses in Missouri
By Industry, 2016

NAICS Code	Industry	Total Employment	% of Total	Avg. Weekly Wage	Avg. Annual Income Impact
212	Mining (except Oil and Gas)	2,770	3%	\$793	\$114,223,720
325	Chemical Manufacturing	19,130	18%	\$1,060	\$1,054,445,600
327	Nonmetallic Mineral Product Manufacturing	7,300	7%	\$779	\$295,708,400
331	Primary Metal Manufacturing	7,030	7%	\$832	\$304,145,920
332	Fabricated Metal Product Manufacturing	24,390	23%	\$814	\$1,032,379,920
336	Transportation Equipment Manufacturing	46,190	43%	\$793	\$1,904,690,840
Total		106,810	100%	\$845	\$4,694,157,087

Source: U.S. Bureau of Labor Statistics (2016).

Note: Crop production is excluded from this analysis due to lack of employment and wage data.

Table 4.4 shows the impact of port-benefitted industries in Missouri. Port-benefitted industries are those industries that benefit either directly or indirectly from the access to marine transportation through reduced freight costs. In total, port-benefitted businesses provide over 97,500 jobs in Missouri with an average weekly salary of \$979, which translates to nearly \$5 billion in personal income annually for Missouri residents. The construction of buildings sector comprises the majority of port-benefitted employment (27 percent), followed by machinery manufacturing (26 percent), and heavy and civil engineering construction (20 percent).

Table 4.4 Employment and Income at Port-Benefitted Businesses in Missouri
By Industry, 2016

NAICS Code	Industry	Total Employment	% of Total	Avg. Weekly Wage	Avg. Annual Income Impact
236	Construction of Buildings	26,480	27%	\$1,030	\$1,418,268,800
237	Heavy and Civil Engineering Construction	19,690	20%	\$1,004	\$1,027,975,520
326	Plastics and Rubber Products Manufacturing	16,250	17%	\$807	\$681,915,000
333	Machinery Manufacturing	25,560	26%	\$932	\$1,238,739,840
334	Computer and Electronic Product Manufacturing	9,530	10%	\$1,121	\$555,522,760
Total		97,510	100%	\$979	\$4,963,024,976

Source: U.S. Bureau of Labor Statistics (2016).

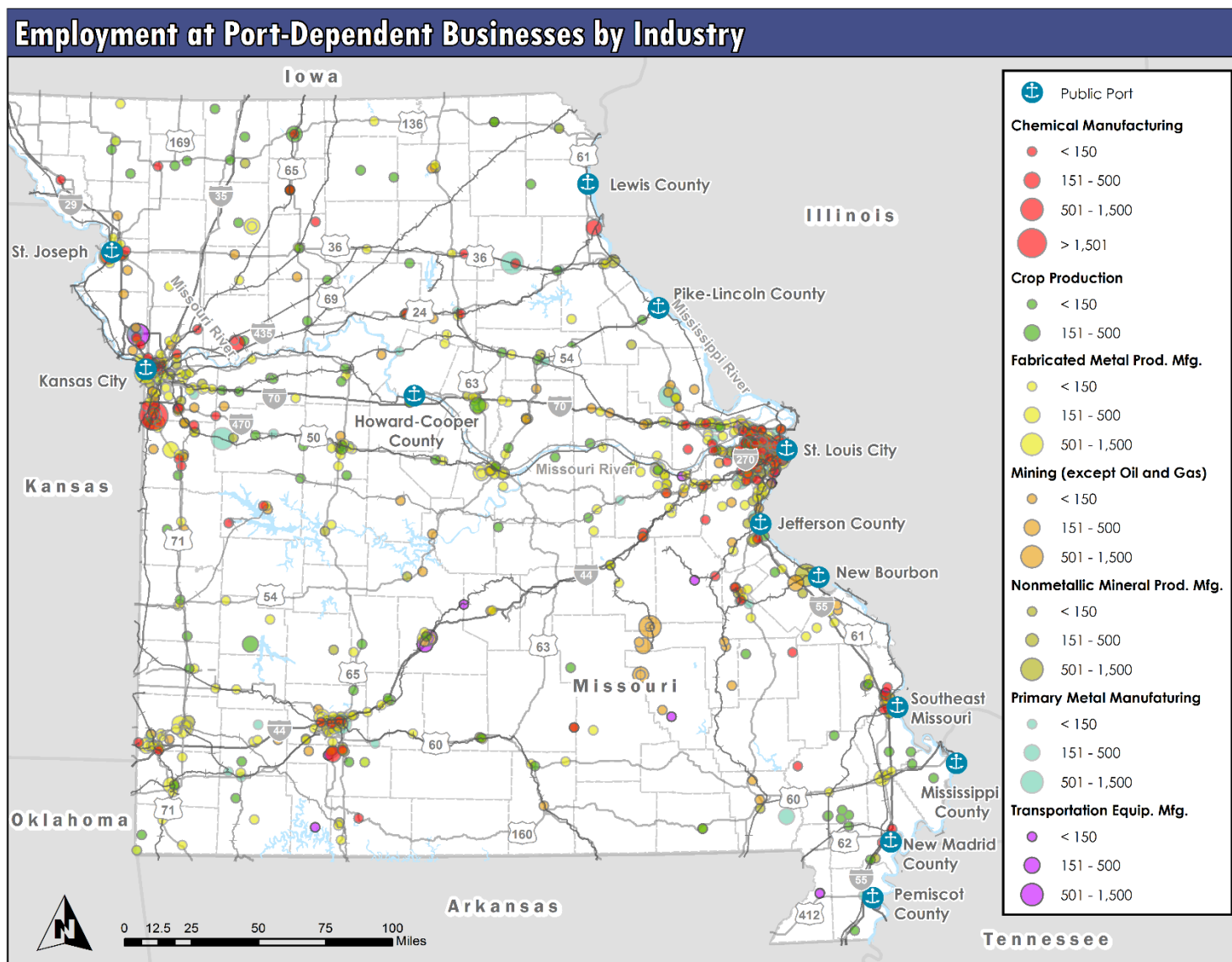
The total job impact of Missouri ports is shown in Table 4.5. Businesses that depend on or benefit from the ports are located throughout the state, as shown in Figure 4.2 and Figure 4.3. This emphasizes the fact that a port's benefit can be far reaching, and can extend well beyond the local jurisdiction in which it is located.

Table 4.5 Employment Impact of Missouri Ports by Source
2016

Source	Number of Jobs Supported
Direct Jobs	1,070
Inland Water Transportation	410
Water Transportation Support Activities	660
Jobs at Port-Dependent Businesses	109,410
Jobs at Port-Benefitted Businesses	97,510
Induced Jobs (IMPLAN model)	80,991
From direct jobs	234
From port-dependent businesses	80,757
Total Jobs Supported by Ports in Missouri	288,981

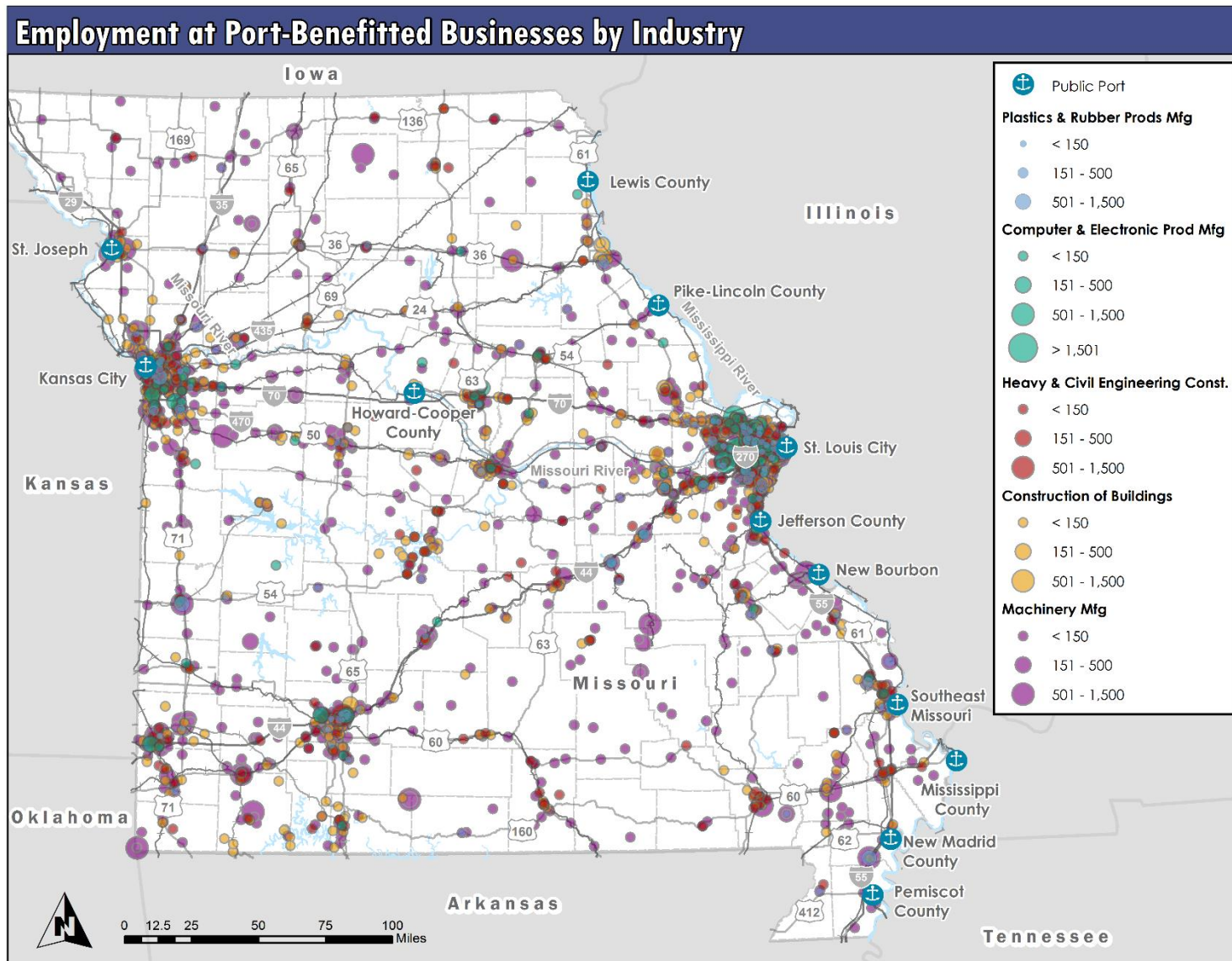
Source: Cambridge Systematics Analysis using IMPLAN and data from U.S. Bureau of Labor Statistics.

Figure 4.2 Location of Port-Dependent Businesses in Missouri by Industry and Employment



Source(s): BTS, Reference USA (2016). Cambridge Systematics.

Figure 4.3 Location of Port-Benefitted Businesses in Missouri by Industry and Employment



Source(s): BTS, Reference USA (2016). Cambridge Systematics.

As the maps illustrate, Missouri businesses that depend on or benefit from port or marine transportation involve nearly every county in the state. Engineering and construction firms tend to be located closer to the source of aggregates (e.g., cement, concrete, lime), which are then transported via rail or truck to port facilities. Similarly, machinery and computer/electronic manufacturing firms tend to locate near manufacturers of primary metals or metal components. Chemical manufacturing firms are likely to be located on or near port sites; in Missouri, they are particularly clustered around Kansas City, St. Louis, and Southeast Missouri ports.

4.2.2 Individual Port Analysis

This section examines the impacts of the ongoing public port operations, as well as the impact of direct port users located on or near port property.

To conduct the individual port analysis, each port was asked to provide data on port operations and on-site tenants. While many ports readily made this information available, some did not. Therefore, this analysis only includes those ports providing adequate data. Furthermore, it should be noted that some data were incomplete for some ports. For example, some ports had employment figures for some tenants, but not all tenants. For that reason, these estimates should be viewed as conservative estimates for the economic impact of these ports.

Table 4.6 presents the data requested and provided by the ports. Several ports do not track employment and revenue figures for their tenants, rendering the information unavailable. Although New Madrid has the highest reported port-based business employment, St. Louis likely has the largest direct impact in terms of employment, as it manages 45 leases but does not have record of tenant business information.

Table 4.6 Summary of Direct Economic Impacts of Individual Ports

Public Port	No. of Employees	Annual Port Operating Revenues	Non-Salary Expenditures	Number of Port Tenants	Employment at Port-Based Businesses
Howard-Cooper County	1	\$4,000	\$31,200	0	0
Jefferson County	2	\$30,000	N/A	2	N/A
Kansas City	5	\$80,000	\$4,200,000	1	N/A
Lewis County	2	\$7,000	N/A	1	N/A
Mississippi County	4	\$135,000	N/A	1	N/A
New Bourbon	2	\$131,249	\$219,845	0	0
New Madrid County	1	\$655,426 ¹	\$657,568	3	154
Pemiscot County	2	\$694,660	\$428,946	5	N/A
St. Joseph	3	\$0	\$25,000	0	0
St. Louis City	2	\$1,050,000	N/A	45	N/A
Southeast Missouri	6	\$751,147	\$209,188	9	137
Total	30	\$3,538,482	\$5,771,747	67	291

Source: Port-reported data.

¹ Includes funding from MoDOT Capital Improvement Program.

N/A = Not available.

The data on direct employment and spending were used as input into the IMPLAN model to estimate the indirect and induced impacts. Because St. Louis City Port does not keep track of tenant employment figures, the port-based business employment was estimated based on a combination of establishment data from ReferenceUSA as well as data on commodities moved at the port. For this reason, this is a conservative estimate of direct employment at the port. In addition, the impacts of St. Joseph port were estimated based off of target commodities and existing businesses located near the port site; the values reflect the potential impacts of a highly successful port facility. Table 4.7 presents the findings by port. The total job impact of these 11 ports is estimated to be about 51,700, or about 17 percent of the statewide impact total. Of the ports examined, St. Louis City has the most significant impact, which is not surprising given its 45 on-site tenants. Excluding the high estimate of St. Joseph's potential impact, Southeast Missouri, Pemiscot County, Kansas City, and New Madrid County round out the top five of the 11 ports examined in terms of total economic impact.

Table 4.7 Total Economic Impacts of Individual Ports in Missouri
2016

Port	Job Impact	Income Impact (in millions \$2016)	Gross State Product Impact (in millions \$2016)
Howard-Cooper County	270	\$4.9	\$11.8
Jefferson County	100	\$2.9	\$11.0
Kansas City	690	\$41.0	\$158.7
Lewis County	80	\$2.8	\$8.9
Mississippi County	10	\$0.17	\$0.71
New Bourbon	770	\$14.5	\$34.5
New Madrid County	370	\$13.5	\$103.1
Pemiscot County	890	\$39.5	\$202.2
<i>St. Joseph*</i>	2,920	\$117.8	\$1,159.5
St. Louis City	42,650	\$3,635.2	\$20,727.0
Southeast Missouri	2,930	\$174.5	\$834.0
Total	51,680	\$4,046.7	\$23,251.4

Source: Cambridge Systematics analysis using IMPLAN model.

*Note: Economic impacts for St. Joseph reflect an estimation of the high-potential economic impacts of the port facility once it is active.

4.3 Conclusion

Missouri's port transportation network is vital to the state's economy. It provides essential marine transportation and other services to some of the largest and most important industries in the state, including metal manufacturing, agriculture, construction, and chemical manufacturing sectors, among others.

Missouri's public ports support nearly 290,000 jobs annually. Those jobs result in nearly \$15.7 billion in income, and \$100.6 billion in economic output (measured as gross state product), and \$2.4 billion in state and local tax revenue each year. About 34 percent of Missouri's economy and one out of every 10 jobs is supported by the ports.

It is imperative that Missouri maintain its advantages to compete with markets around the world, particularly with regards to freight transportation and market access. Even modest investments in the port systems can yield even higher benefits to Missouri's economy, and most of the ports currently have multiple opportunities to do so. Businesses require cost-effective and efficient means of moving supplies, inputs, and finished goods to market, both domestically and internationally. Barges traveling on the Mississippi River and Missouri River provide Missouri shippers with access to one of the most economical and environmentally-friendly transportation modes available. Marine transportation is an important element of the global supply chain, and maintaining and enhancing the system is critical for continued economic vitality in Missouri.