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Making the Case for Freight Transportation

Today national, regional and local economies are increasingly reliant on international trade and the competition for trade has become increasingly global. Public transportation agencies are being challenged to support modern supply-chains through investments and policy actions. To succeed in the global trade environment planning agencies must foster integrated modal systems, infrastructure and info-structure that provide reliable transit times.

The Missouri Department of Transportation undertook the Missouri Statewide Freight Study as a precursor to an update of Missouri's Long Range Transportation Plan. Specifically, the primary objective of this study is:

> *"…to study the movement of freight through all modes of Missouri's transportation system in an effort to improve efficiency and safety throughout the system. This study will inventory the existing system, identify key components and needs, and identify current trends to forecast future needs. The study will serve as a starting point for developing a working model of Missouri's freight transportation system."*[1]

In the current business environment, cost effective, time sensitive transportation services have become a strategy for competitive advantage in manufacturing and service based industries. To support economic prosperity in this environment, planning agencies must understand and support new economy transportation needs. There are important changes currently taking place within the economy of the United States (U.S.) that have significant implications for long range transportation planning efforts at the statewide level:

- The globalization of trade
- Migration from a manufacturing economy to a service economy
- The evolution of business logistics

The global integration of the U.S. economy has grown at a rapid pace over the past several decades and U.S. manufacturers now shop the world for components and subassemblies to manufacturing processes. Advances in technology and management practices are also allowing U.S. firms to develop strategies that enable customized products for mass market distribution.

This evolving business environment and associated impacts on transportation networks also have significant implications for regional and local economic development, and Missouri lies squarely in the middle of this changing environment.

In the ten years since the North American Free Trade Agreement (NAFTA) went into effect, trade using surface transportation between the United States and its partners, Canada and Mexico, has grown more than 80 percent and as of September 2004, was valued at $54.9 billion. In 2000, Missouri's surface trade with Canada and Mexico totaled nearly $7 billion.[2] Surface transportation consists of freight

"As globalization continues to change the very climate in which all businesses operate, the pressure on Missouri businesses from international competitors – and from domestic competitors that take better advantage of the new global markets – will increase….We are actually located at the nation's cross-roads, close to markets and population centers throughout the country. This strategic position offers opportunities in a variety of areas, such as distribution and regional tourism…"*

***"A Blueprint for Prosperity and Jobs"** Missouri Department of Economic Development, Jan. 2003.*

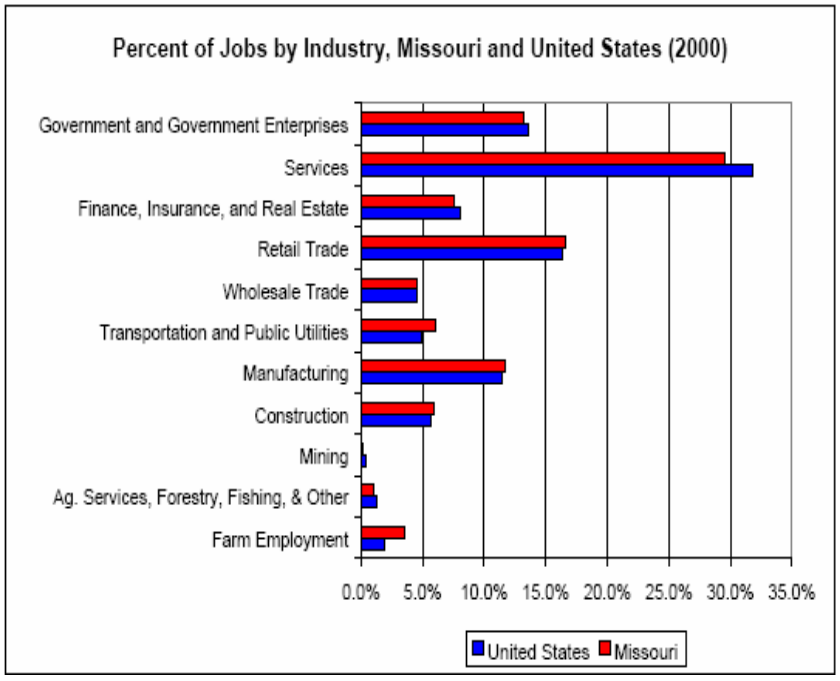
movements by truck, rail, and pipeline. About 90 percent of U.S. trade with Canada and Mexico moves by surface transportation.

Migrating from Manufacturing to a Service Economy

For more than two decades the services sector of the U.S. economy has been outpacing the manufacturing sector as a portion of U.S. Gross Domestic Product (GDP). At the beginning of the1980's, manufacturing was roughly equal to the services and "FIRE" (finance, insurance, and real estate) sectors combined. At the end of 2003 the services sector had increased its share of the national economy to account for 68.1 percent of current-dollar GDP.[3]

Exhibit 1 suggests that while the service sector in Missouri is comparatively less dominant than it is on the national level, services in Missouri still account for nearly 30 percent of the job base in the state. This changing economic base has implications for transportation system performance, as well as for the expectations of freight transportation stakeholders as customers today routinely demand service that is more flexible, time definite, and reliable.

Exhibit 1: Job Share by Industry; U.S. vs. Missouri



The Evolution of Business Logistics

As U.S. industries become increasingly reliant on international trade and the economy becomes more service orientated, U.S. companies are adopting modern supply chain management techniques that tailor their logistics systems so that it responds to the needs and potential profitability of each specific group of customers. Businesses now leverage integrated transportation services to improve customer service and to maximize the productivity of inventory, accounts receivable, and accounts payable.[4]

The "old" business logistics model was based on re-supplying stocks of inventory. The new integrated business model of supply chain management integrates transportation into strategic planning, marketing and sales. Businesses are employing just-in-time and other management approaches to reduce inventory overhead at all stages of production and distribution. Today's enterprises tend to have minimal "emergency" stockpiles and hence any shortages of inventory may lead to missed sales opportunities or temporary shutdowns. The freight, goods, and services transport system is vital to regional mobility and productivity, and ultimately economic development. Therefore, an efficient and cost effective transport system is vital to the competitive position of businesses and industries competing in a world market.

Ford Motor Company Logistics

Ford Motor Company reorganized it logistics by changing the way it distributes vehicles to its dealers. Traditionally, assembly plants would ship finished passenger vehicles directly to dealers, but only when a sufficient quantity of orders had been received to fill an entire railcar or truck. To shorten the average delivery time from the assembly plant to the dealer from 72 days to a goal of 15 days, Ford created what it calls "national mixing centers." These centers located in Chicago, IL; Shelbyville, KY; Kansas City MO; and Fostoria, OH; act as distribution centers by receiving all types of vehicles from assembly plants and then re-shipping the correct number and type of vehicles to the dealer. The mixing center distributes vehicles by rail or truck to dealers. It is estimated that a vehicle will be held at a mixing center for less than 24 hours before being shipped to a dealer.

- USDOT, FHWA, "The Freight Story" January 2002.

Study Process and Report Organization

Five primary tasks were conducted under the scope of the Missouri Freight Study:

- Inventory existing freight facilities and assets
- Analyze current and projected commodity flows, including software tools for continuing analysis
- Industry and carrier outreach
- Analyze Economic Impacts of Freight Activity
- Analyze Regional Advantages/Liabilities/Opportunities

A detailed technical memorandum was completed for each of the five tasks, and these technical reports are available as Appendices to this report. This final report presents a summary and highlights from each of the technical tasks undertaken for the study, culminating with a suggested freight planning framework that includes recommendations for short and long range planning initiatives. The final report is structured similarly to the flow of the study and the results and recommendations are presented in five major sections:

- Missouri's Freight Networks (supply)
- Missouri's Freight Movement Profile (demand)
- Freight's Impact on Missouri's Economy
- Transportation Challenges Facing Missouri
- A Freight Planning Framework and Recommendations

Missouri's Freight Network

An Extensive Highway Network

Missouri hosts the 11th largest Interstate Highway network in the nation and maintains 32,397 miles of state roadways.[5] For the Missouri Statewide Freight Analysis a "freight highway network" consisting of just over 22,000 miles was defined early in the study. **Table 1** presents mileage by functional class for the freight highway network and the routes are mapped in **Exhibits 2a** and **2b.**

- Kansas City and St. Louis provide key markets and intermodal connections for Missouri's highway transportation system. Highway constraints that limit mobility and/or access to these centers are especially important. **Exhibit 2b** provides a detailed view of the Freight Highway Network for the Kansas City and St. Louis Metropolitan Areas.
- Interstate 70 is a key route for freight travel in both St. Louis and Kansas City. The beltway surrounding St. Louis is also a major connection for freight in the city of St. Louis. Most of the major east-west thoroughfares crossing the St. Louis metropolitan area experience commercial vehicle traffic volumes of 100,000 vehicles or more on a daily basis.

Table 1: Freight Highway Mileage

Function Class	Total Mileage*
Expressway	1,513.2
Freeway	499.4
Interstate	3,121.5
Minor Arterial	8,253.5
Principal Arterial	8,639.6
Total	**22,027.2**

** Data is 2002 - centerline miles.*

Exhibit 2a: Missouri's Freight Highway Network

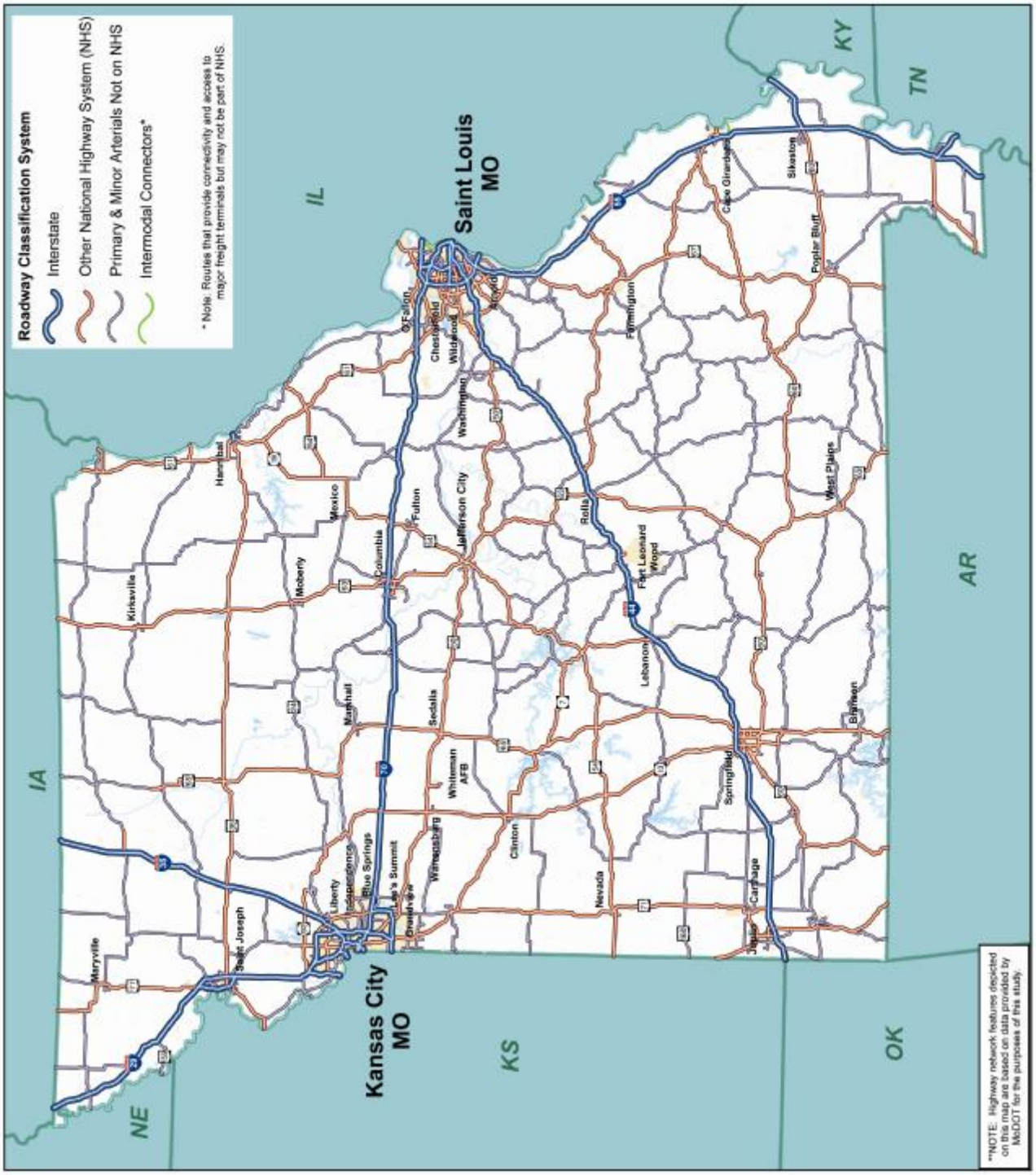
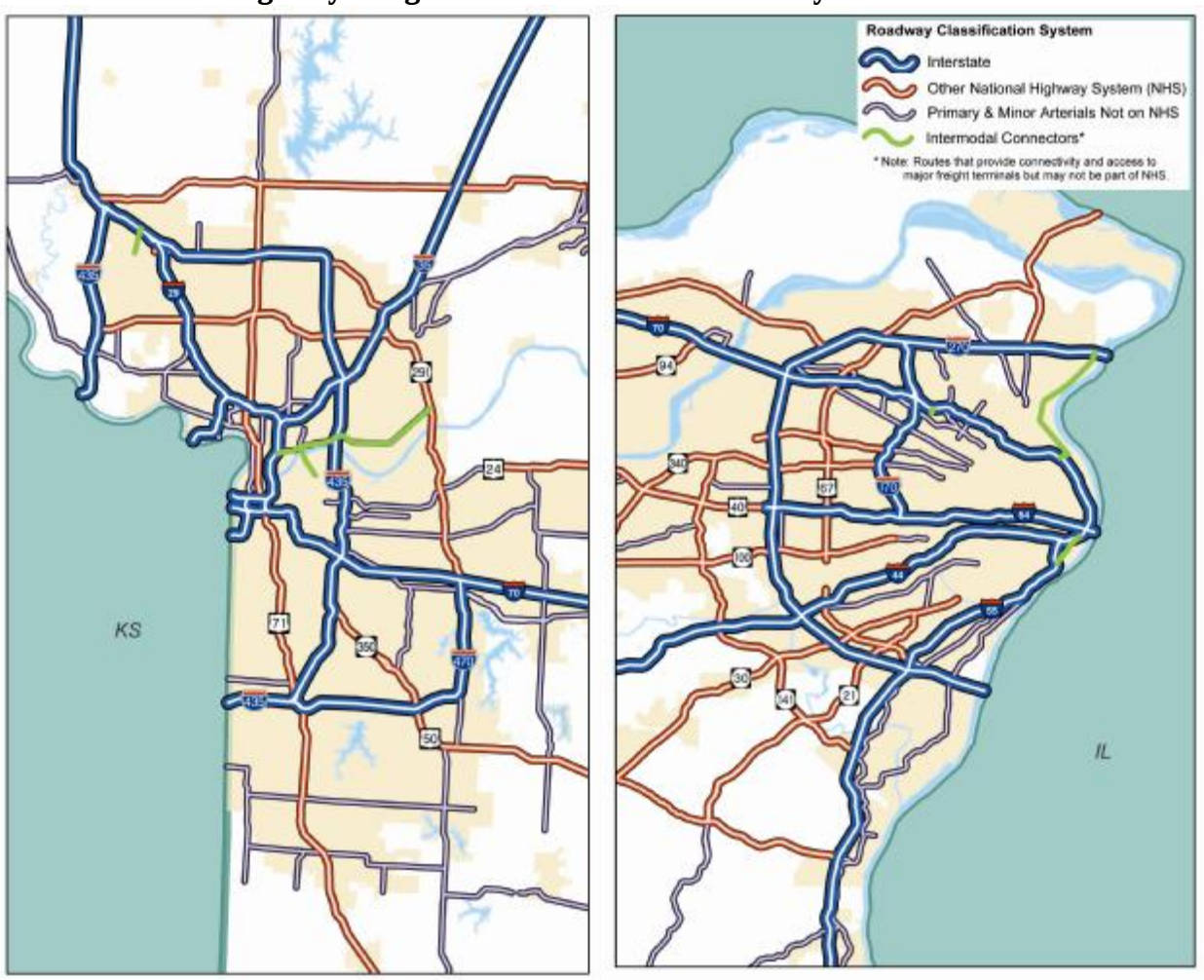


Exhibit 2b: The Highway Freight Network within Kansas City and St. Louis



Modal Networks - Rail

Missouri's existing railroad network consists of 4,168 main line miles of track, with the majority of the track owned and operated by Class I carriers.

The two largest rail carriers in Missouri are the Burlington Northern and Santa Fe (BNSF) and the Union Pacific (UP). Other Class I carriers include the Kansas City Southern Railway Company, the Norfolk Southern Corporation and CSX Transportation. There are two regional railroads in Missouri, I&M Rail Link and the Missouri and Northern Arkansas Railroad. In addition, there are three local railroads and seven switching and terminal railroads. **Exhibits 3a** and **3b** show the Missouri Rail Freight Network by line ownership.

The majority of Missouri's rail access facilities are located in the urban areas of St. Louis and Kansas City. St. Joseph, Springfield and southeastern Missouri also have a number of rail intermodal facilities. A map showing details of the Missouri Railroad Network for Kansas City and St. Louis appears in **Exhibit 3b.**

Exhibit 3a: Missouri's Rail Network - Statewide

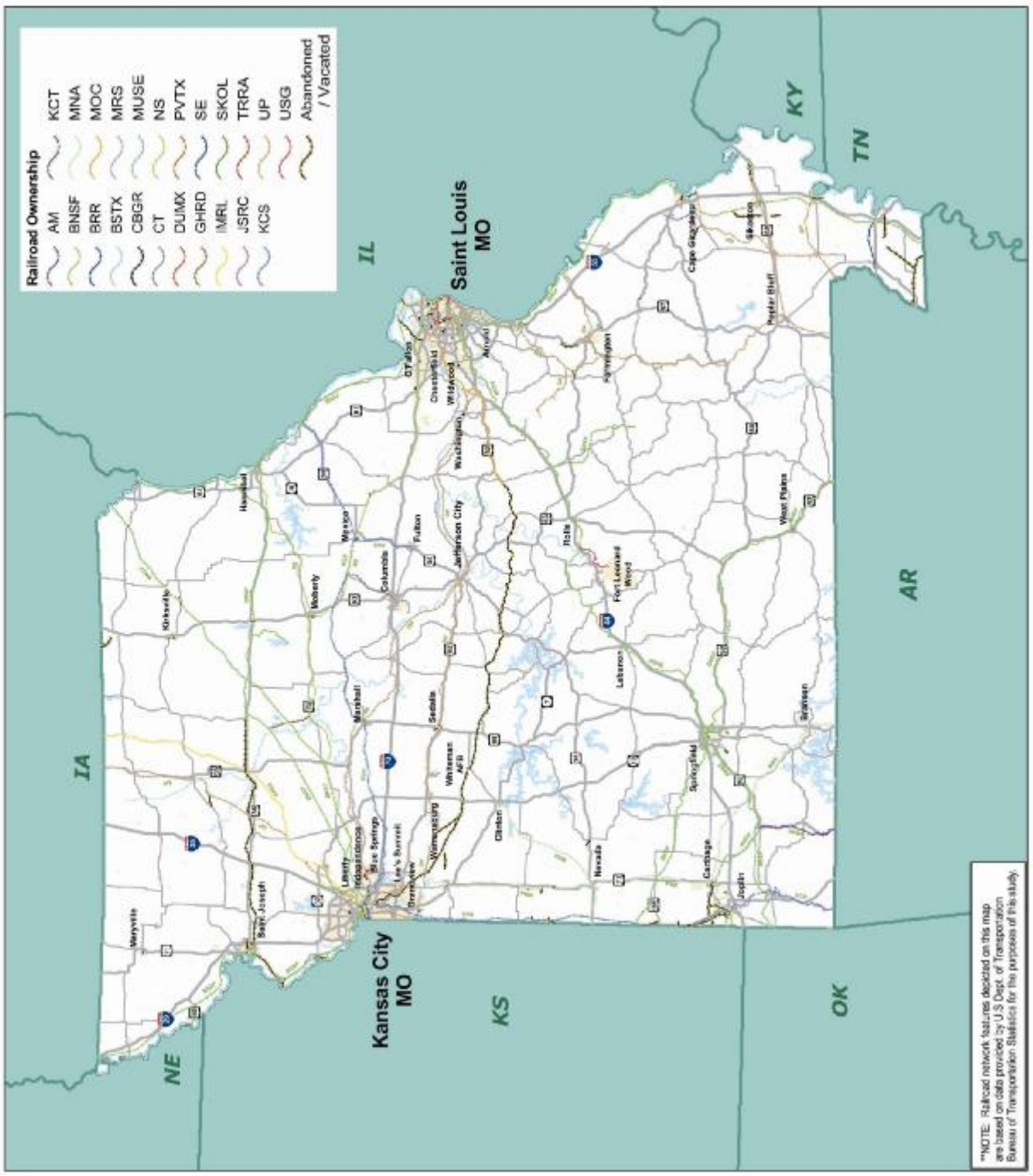
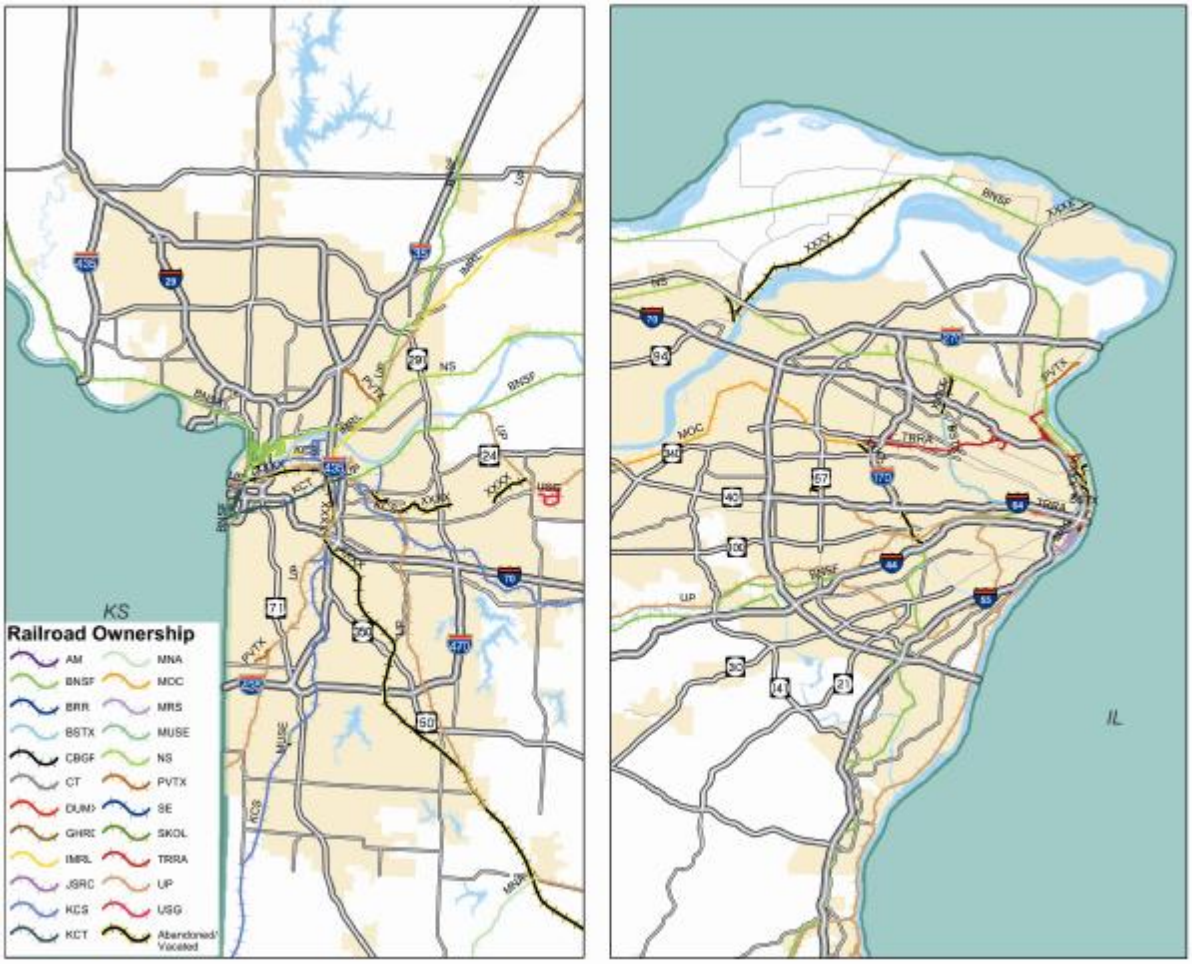


Exhibit 3b: Missouri's Railroad Freight Network - Regional Detail



Modal Networks - Waterways

According to the USACE, there are 1,050 miles of navigable waterways, seven locks on the Mississippi River and around 200 ports in the State of Missouri.

The inland waterway system throughout the State of Missouri is divided into two river systems, the Missouri River and the Mississippi River. Farm products, including corn, soybeans, and animal feeds, are the largest single commodity group transported on the Upper Mississippi River system. **Exhibit 4a** shows the breath of Missouri navigable river systems, lock and dam locations, and associated ports.

The largest nodes of water freight activity are located in Kansas City and St. Louis. Key inter-modal connections in these cities support barge to truck, rail and air access for commodities. Each of these major trade centers has many USACE ports, port facilities as well as lock & dam facilities. **Exhibit 4b** shows the barge infrastructure in these trade centers.

Exhibit 4a: Missouri's Waterway Systems - Statewide

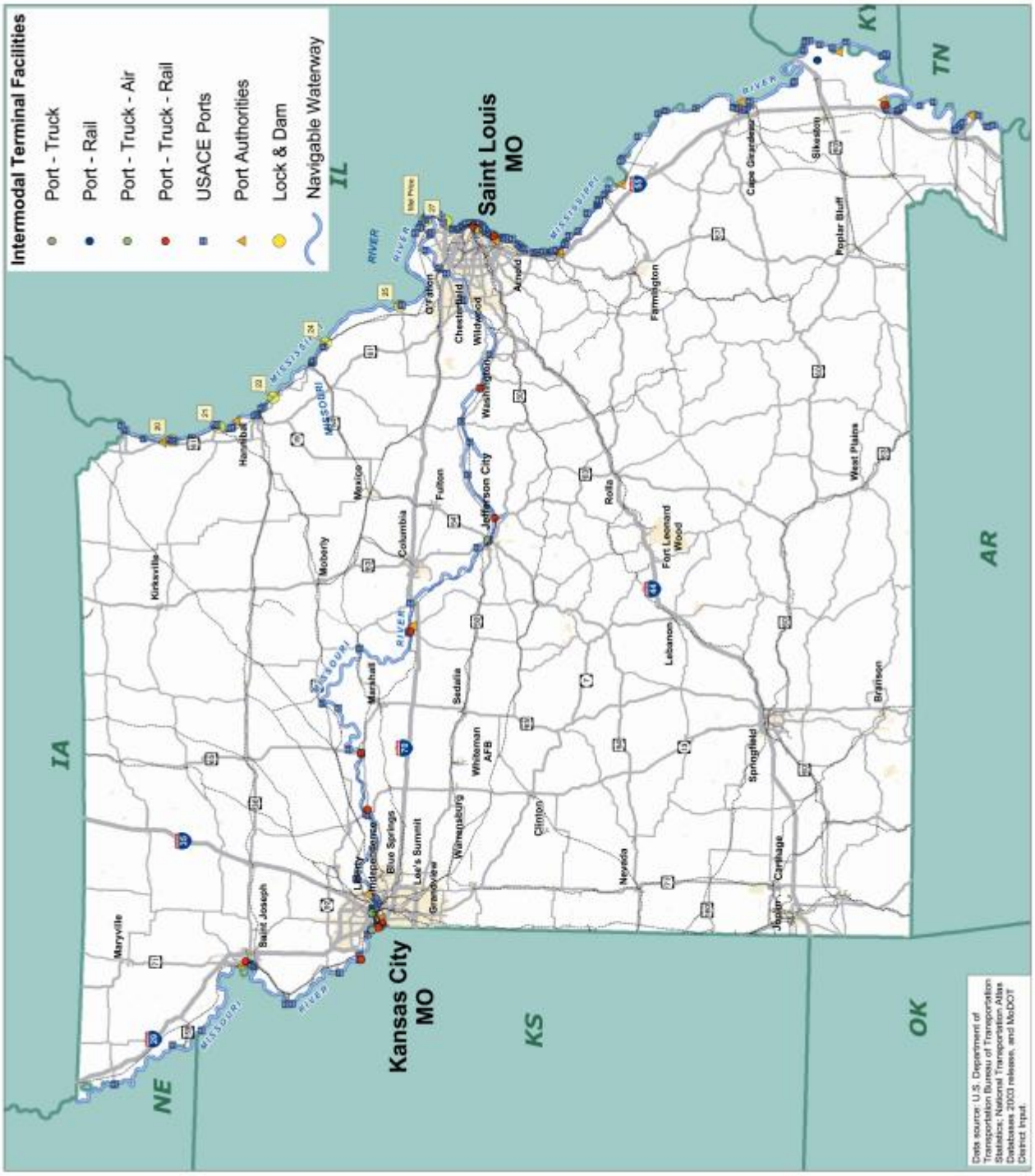
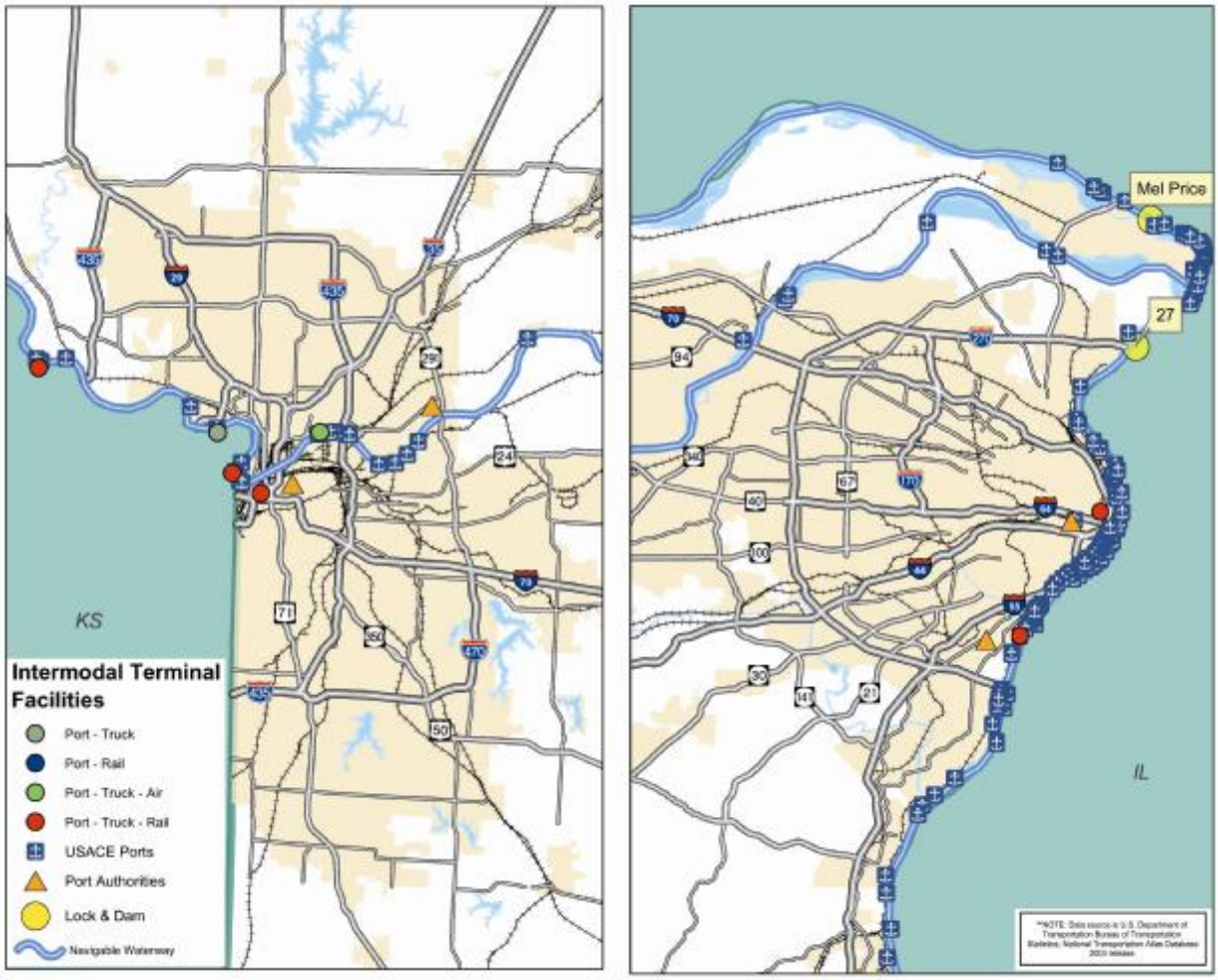


Exhibit 4b: Missouri's In-Land Waterway Network Regional Detail



Modal Networks - Air

There are 12 Missouri airports that support air cargo operations; seven conduct scheduled operations for integrated and all-cargo carriers, while five others support ad-hoc charter operations to varying degrees of volume and frequency.

These airports all act as local market stations, serving their respective surrounding market areas. Missouri's scheduled air cargo service airports include:

- Kansas City International Airport (MCI)
- St. Louis Lambert International Airport (STL)
- Springfield/Branson Regional Airport (SGF)
- Joplin Regional Airport (JLN)
- Kirksville Regional Airport (IRK)

- Dexter Municipal Airport (DXE)
- Columbia Regional Airport (COU)

In addition to scheduled service, the following airports offer "ad-hoc" or charter type air cargo service: Cape Girardeau Regional Airport (CGI); Spirit of St. Louis Airport (SUS); Macon-Fowler Memorial Airport (K89); Malden Regional Airport (MAW); and Sedalia Memorial Airport (DMO).

The twelve Missouri airports supporting scheduled air cargo operations in the state are shown in **Exhibit 5**. As would be expected, Kansas City International and St. Louis International Airports represent the state's largest markets and highest respective air cargo volume. The combined catchment area of these airports covers the majority of the state. There are currently no air cargo hub operations at Missouri airports.

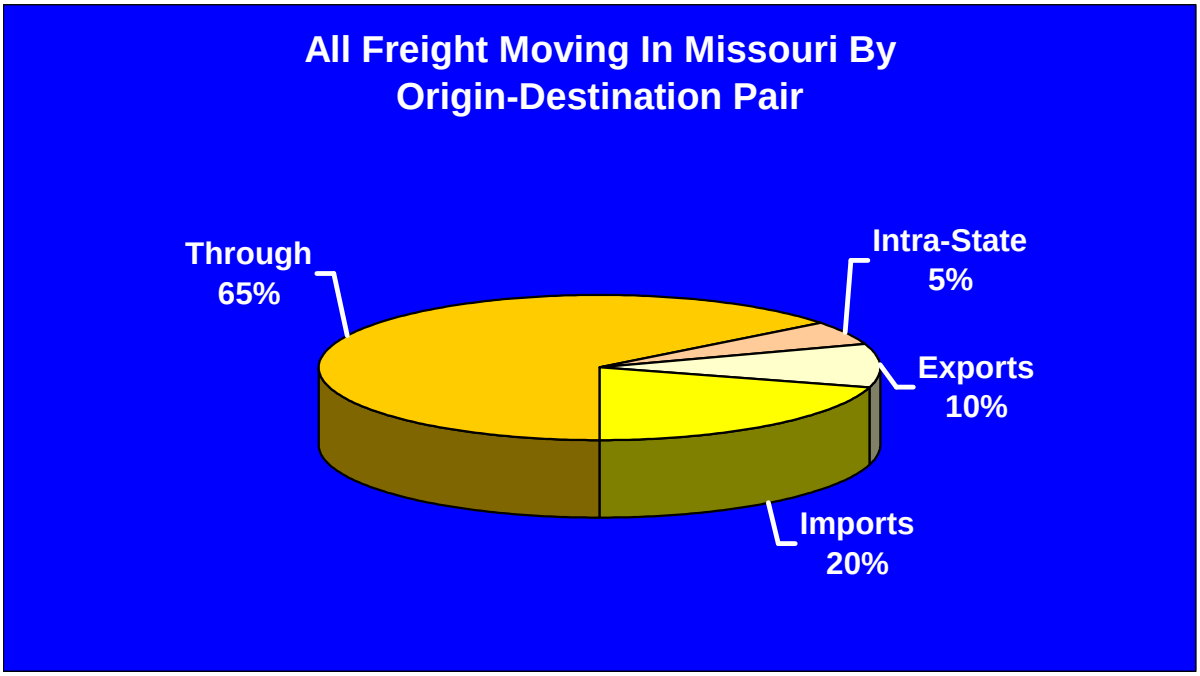
Exhibit 5: Missouri's Air Cargo Network

Missouri's Freight Movement Profile

In 2001, Missouri's transportation system facilitated the movement of approximately 1.1 billion tons of freight with an estimated value exceeding $1.3 trillion dollars.

By weight approximately 65 percent of all freight moving in, out, within and through Missouri moves by truck; 33 percent by rail; 2 percent by water; and less than 1 percent by air. By value, the significance of the truck mode increases even further, to nearly 80 percent. **Exhibit 7** below shows the relative distribution of freight flow patterns in the state of Missouri.

Exhibit 6: The Nature of Goods Movement in Missouri



Of all freight on Missouri's transportation system, the majority [approximately 719 million tons (64 percent by value)] moves through Missouri from origins outside of the state to destinations also outside the state. The remainder is comprised of imports to and exports from Missouri, and shipments where both the origin and destination are within the state of Missouri.

Missouri is a bridge state for both truck and rail movements to other parts of the U.S., as 74 percent of rail traffic by tonnage and 55 percent of truck traffic by tonnage has neither an origin nor destination in Missouri. A summary by tonnage and value, with and without through traffic for truck and rail is presented in **Table 2.**

Approximately 59.7 percent of the tons moved through Missouri are moved by truck. Of the approximately 409.6 million tons of freight that moves through Missouri by truck, the most common commodity types include Farm Products (17 percent), Food or Kindred Products (15 percent), Secondary Traffic (12 percent) and Nonmetallic Minerals (11 percent). **Exhibit 7** below shows the estimated flow densities of all commodities moving by truck on the highway system in Missouri.

Table 2: Missouri Freight Movements by Mode: Tonnage and Value

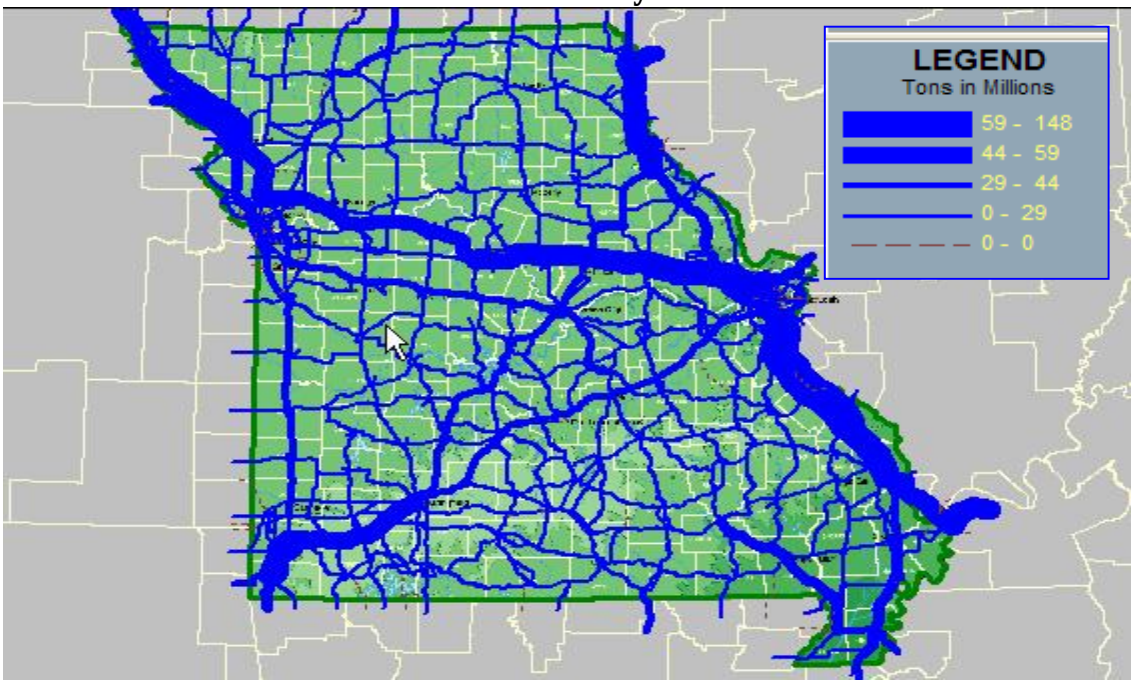
Summary Statistics Including Through Traffic for Truck and Rail

Mode	Tons	Tonnage Percent	Value	Value Percent
Truck	740,085,994	65.1%	$1,297,895,492,510	78.8%
Rail	372,643,710	32.8%	$340,387,354,245	20.7%
Water	24,092,707	2.1%	$4,921,787,993	0.3%
Air	437,410	0.04%	$3,838,112,826	0.2%
Total	1,137,259,820		$1,647,042,747,573	

Summary Statistics Without Through Traffic for Truck and Rail

Mode	Tons	Tonnage Percent	Value	Value Percent
Truck	330,460,671	73.3%	$487,549,273,699	83.1%
Rail	96,135,653	21.3%	$90,693,694,699	15.5%
Water	24,092,707	5.3%	$4,921,787,993	0.8%
Air	437,410	0.10%	$3,838,112,826	0.7%
Total	451,126,440		$587,002,869,217	

Exhibit 7: Network Flows - All Commodities by Truck



Source: 2001 TRANSEARCH Data, mapped using the Commodity Information Management System (CIMS)

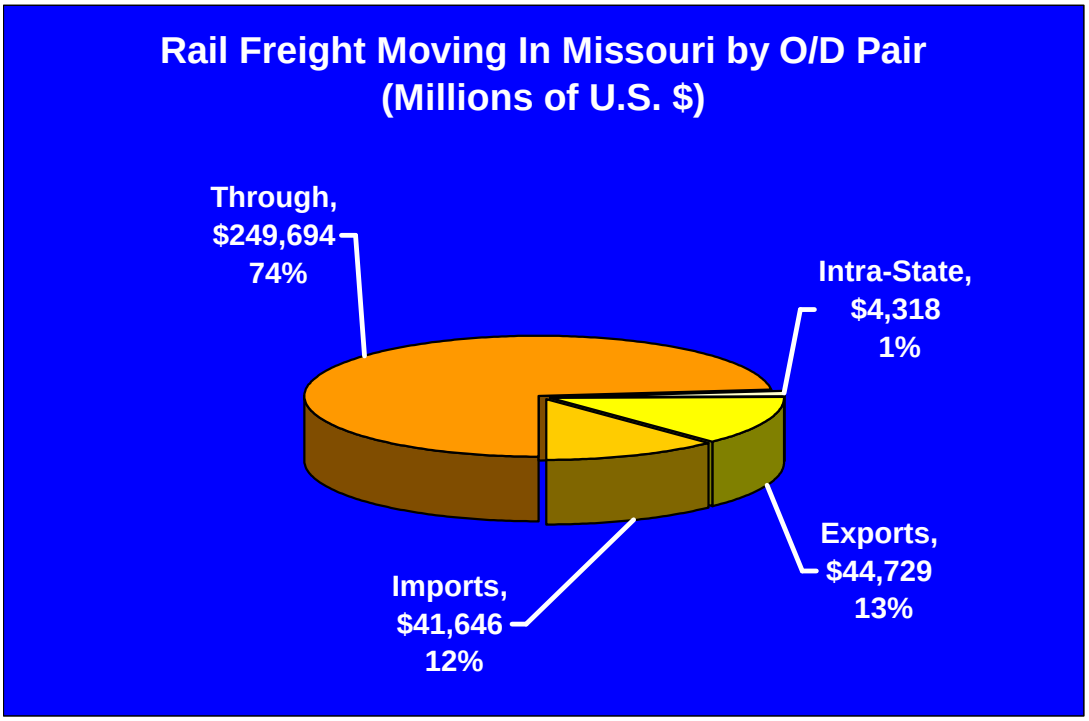
In 2001, there was over 370 Million tons of rail freight on Missouri's transportation network, with an estimated value exceeding $340 Billion.

Of the rail freight tons on Missouri's transportation system, 48 percent are Coal, 8.8 percent are Farm Products, 8.3 percent are Chemicals and Allied Products and 7.6 percent are Food and Kindred Products. These four commodities account for over 72 percent of the rail tonnage on

Missouri's rail network. Seventy-four percent of Missouri's rail tons pass through the state, 20.5 percent are commodities imported to the state, 5.3 percent are exports and only one percent are tons shipped point to point completely within Missouri.

By value, Missouri's imports and exports are more balanced. 73.4 percent of Missouri's rail freight by value is attributed to movements through the state. Rail imports by value make-up 12.2 percent of all rail movements and export share is 13.1 percent. **Exhibit 8** gives shows the relative distribution of rail freight movements by value for Missouri.

Exhibit 8: Railway Freight Movements in Missouri

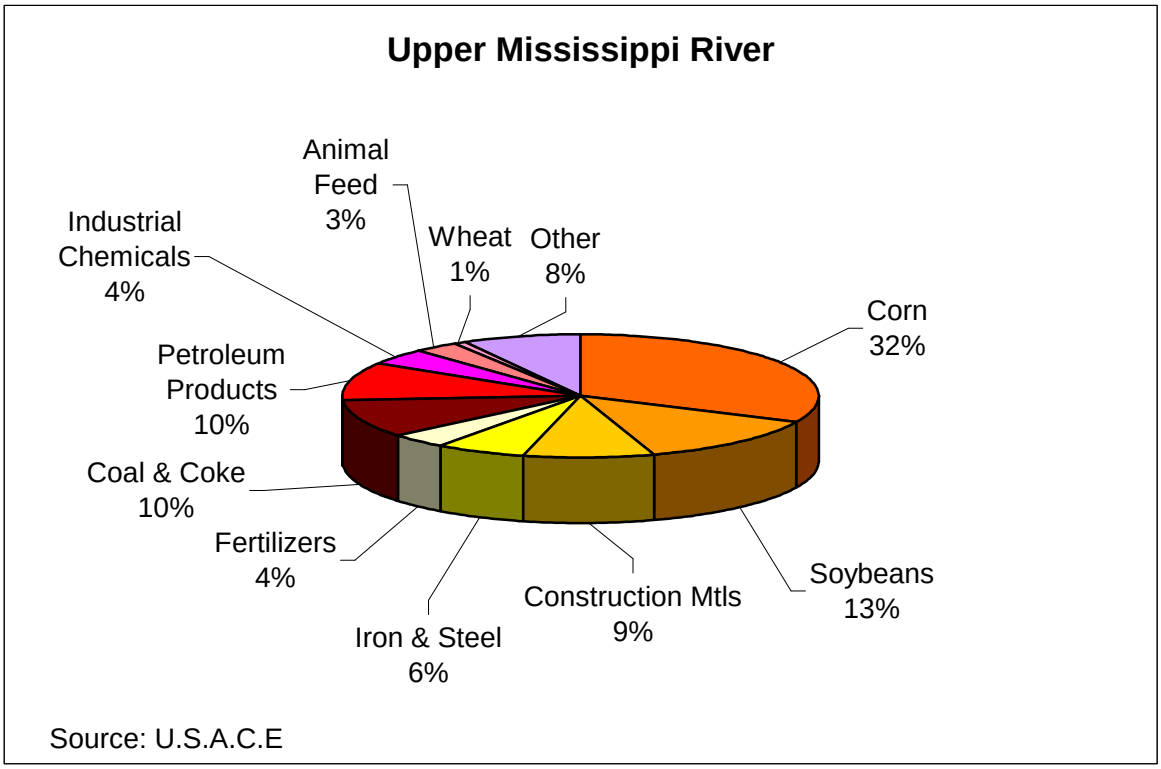


Source: 2001 TRANSEARCH Data

In 2001, over 190 Million tons of freight was carried by water in Missouri, valued at nearly $5 billion.

Major commodities transported by barge tow on the Missouri River includes agricultural products (farm and food products); chemicals, including fertilizers, refined and unrefined petroleum products, manufactured goods, including building materials and products (cement and lumber) and crude bulk commodities such as sand and gravel. Farm products, including corn, soybeans, and animal feeds, are the largest single commodity group transported on the Upper Mississippi River system. **Exhibit 9** shows the major commodities carried on the Upper Mississippi River system.

Exhibit 9: Major Commodities on the Upper Mississippi River

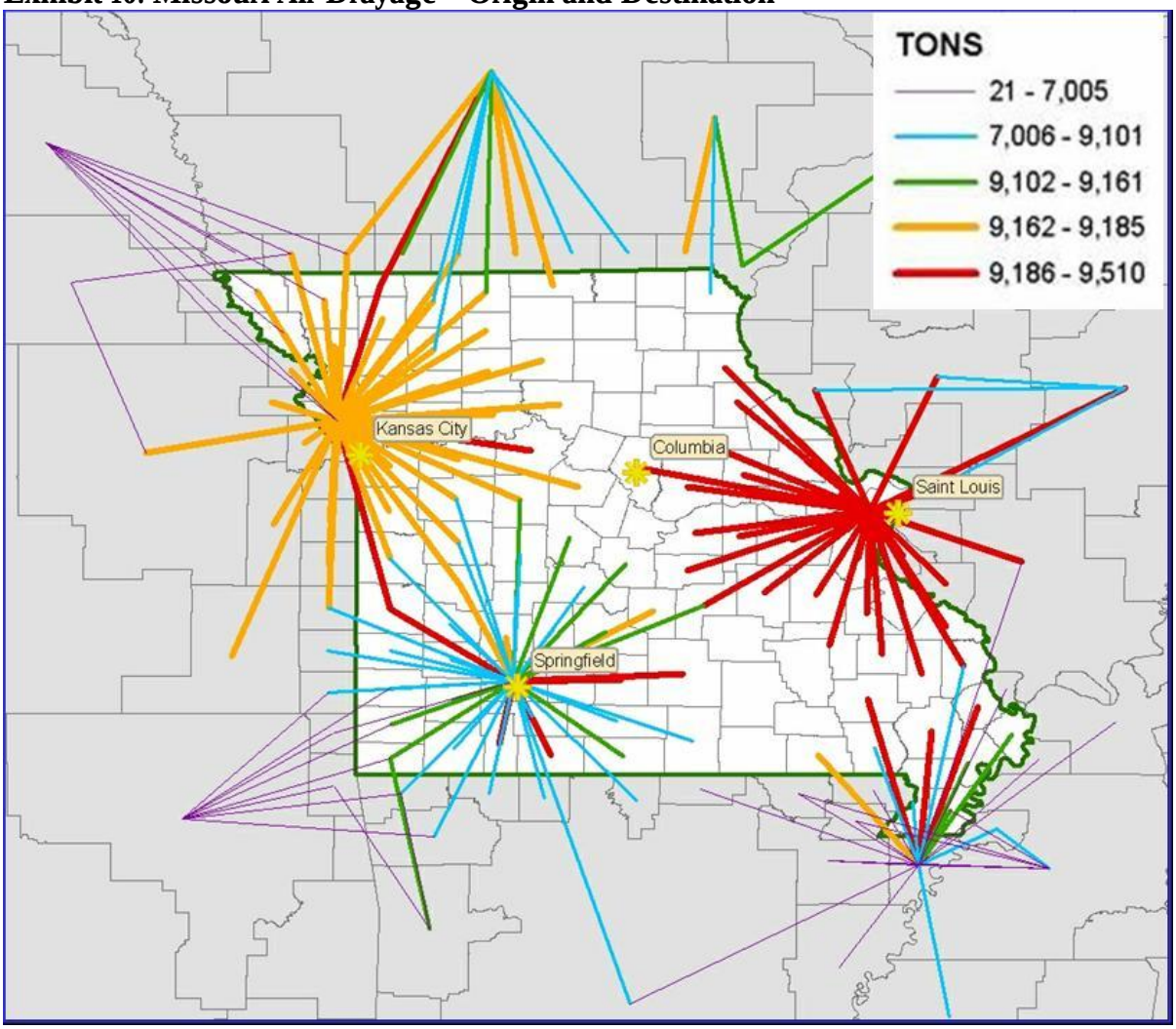


Kansas City International and St. Louis International Airports represent the state's largest markets and highest respective air cargo volume. The combined catchment area of these airports covers the majority of the State. Kansas City International Airport acts as a consolidation point for FedEx, UPS, Airborne, BAX Global, Emery and DHL feeder aircraft and trucks that serve smaller western Missouri and eastern Kansas local market stations, while St. Louis-Lambert International Airport performs the same function for eastern Missouri and western Illinois. These feeder aircraft and trucks transfer their cargo to larger "trunk-line" jets that fly direct to national or regional hubs. Kansas City International and St. Louis-Lambert International, however, are not considered hubs since there is no sorting, processing, or redirection of the cargo once it arrives; cargo is merely transloaded (transferred) and moved to a hub for sorting. There are currently no air cargo hub operations at Missouri airports.

The "catchment area" (i.e. the geographical region from which air cargo is trucked to a central air hub) for Springfield/Branson Regional Airport covers a significant portion of southwest Missouri; however, the volume totals in terms of annual tonnage are less than one-tenth of those of STL and MCI. Springfield/Branson Regional airport acts a consolidation point for a FedEx trunk-line jet, attracting air cargo volume from the surrounding region that other air cargo carriers would route via St. Louis or Kansas City.

Exhibit 10 shows the air drayage patterns (i.e., air cargo trucked to and from an air cargo airport) surrounding Missouri's four largest and most active scheduled service air cargo airports. Note that counties immediately surrounding the Missouri border are included to illustrate the intrastate nature of Missouri's air drayage. The catchment areas for Missouri airports extend beyond the State's borders.

Exhibit 10: Missouri Air Drayage – Origin and Destination



Source: Reebie TRANSEARCH, 2001

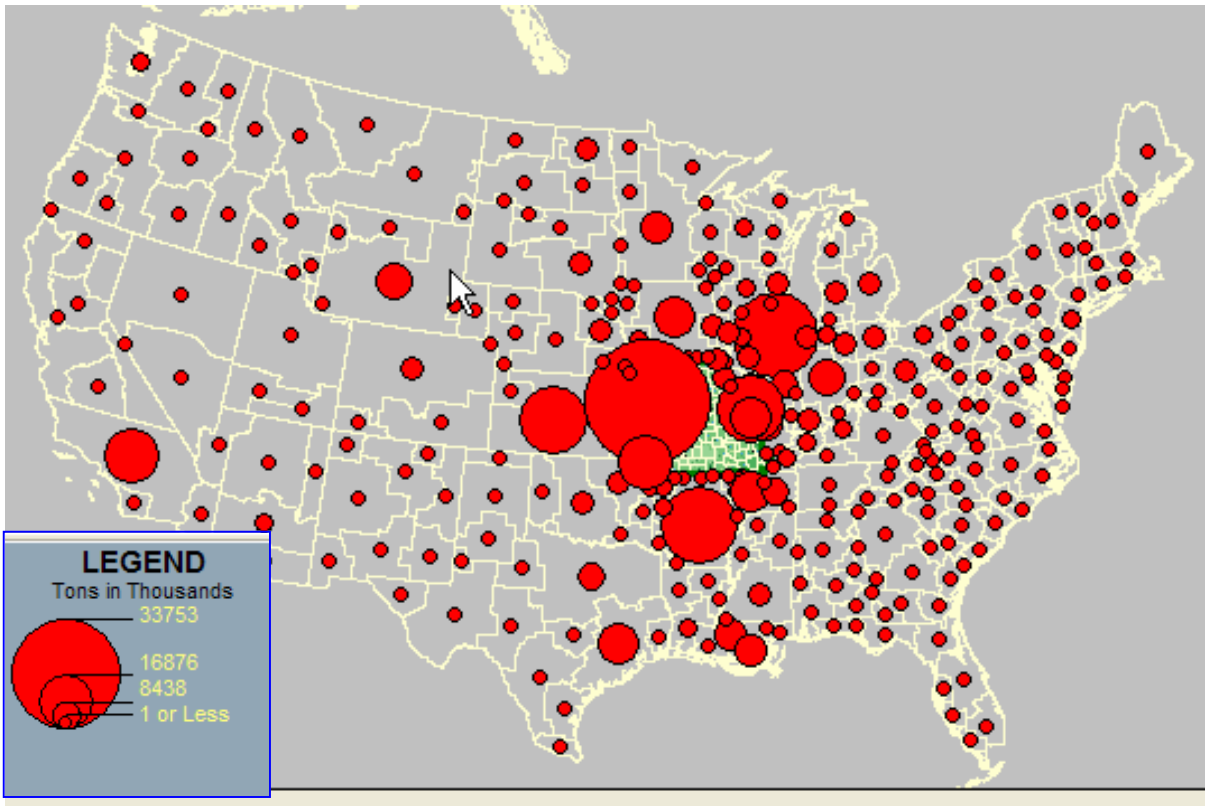
Missouri: A Central Location to National and International Markets

Missouri occupies a central location within North America's trade routes. It is within a day's truck drive to significant U.S. population centers, and sits at the nexus of major rail and water routes. Missouri's location has made it a transportation hub with a wide range of resources essential to moving products and people.

The graphics found in **Exhibits 11a** and **11b** show the origins and destinations of commodities flowing in and out of the state. **Exhibit 11a** shows the origins of commodities imported to the state (coal has been excluded due to the dominate nature of the tonnages). The red production icons suggest that businesses in Missouri take ready advantage of neighboring industrial/commercial centers in Kansas, Arkansas, and Illinois. More distant major suppliers of Missouri's economy include Ohio, Minnesota, Colorado and states along the Gulf Coast. Missouri's rail links with

Southern California result in the Ports of Los Angeles and Long Beach being a significant portal for goods flowing into Missouri.

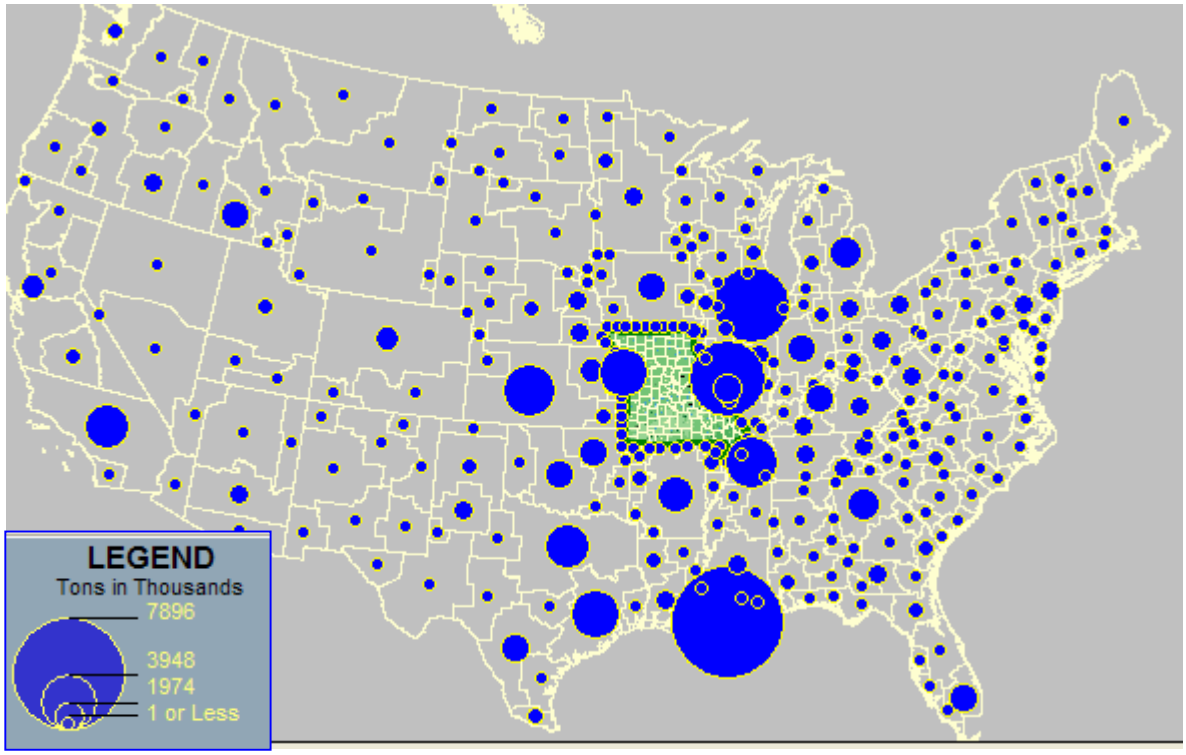
Exhibit 11a: Origin Locations for Commodity Imports to Missouri (Excludes Coal)



Source: 2001 TRANSEARCH Data, mapped using the Commodity Information Management System (CIMS)

The graphic in **Exhibit 11b** shows the destinations for Missouri's products. Trade with Latin America has burgeoned over the past decade, and at times exports have grown by as much as 10 percent per year.[6] As a result, the Gulf Coast states have become major portals for Missouri exports. The blue circle destination icon located at the termination of the Mississippi River is the dominate feature of the map. Chicago, with the nation's largest rail hub, is also a major recipient of commodities exported from the state.

Exhibit 11b: Destination Locations for All Commodity Exports from Missouri



Source: 2001 TRANSEARCH Data, mapped using the Commodity Information Management System (CIMS)

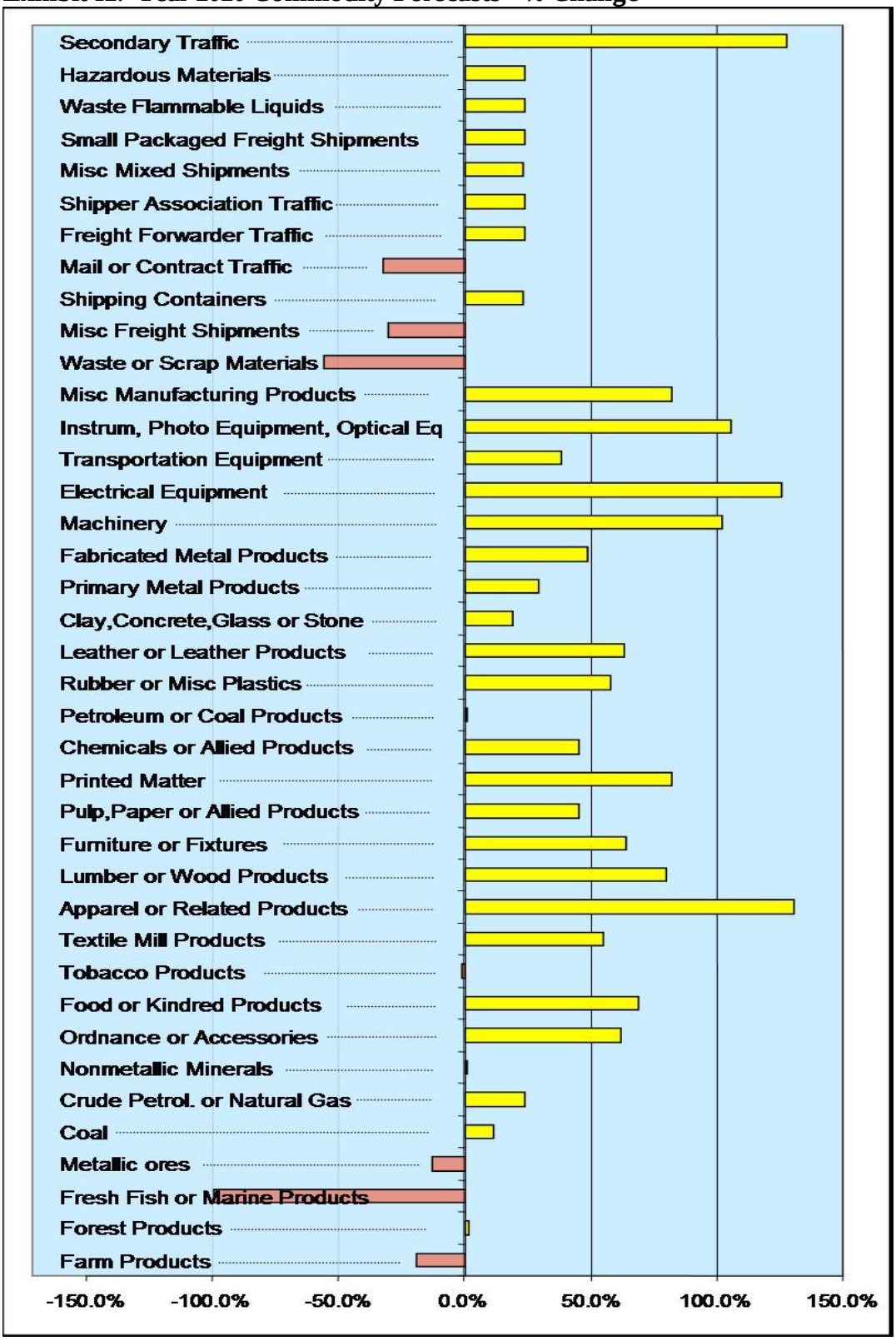
Freight Forecasts

One of the tools developed for the Missouri Statewide Freight Study project is a software application to assist transportation planners at MoDOT and other local units of government to analyze commodity movements. The Missouri Commodity Information Management System (MoCIMS) is an easy to use software application providing reporting and mapping capabilities to examine commodity flow data by origin-destination pair, mode, and commodity type.

The Missouri CIMS application developed also has the ability to report and map forecasted commodity flows. The freight forecasts are based on year 2001 TRANSERCH data for Missouri and forecasts obtained from the FHWA's Freight Analysis Framework (FAF).[7]

Exhibit 12 illustrates the forecasted percentage change in commodity tonnages for Missouri from the base year 2001 to 2020. The commodity forecasts are presented by industry at the two-digit Standard Transportation Commodity Code (STCC). Between 2001 to 2020, only seven commodity groups are projected to decline: Mail, Miscellaneous Freight, Waster or Scrap Materials, Tobacco, Metallic Ores, Fresh Fish and Farm Products.

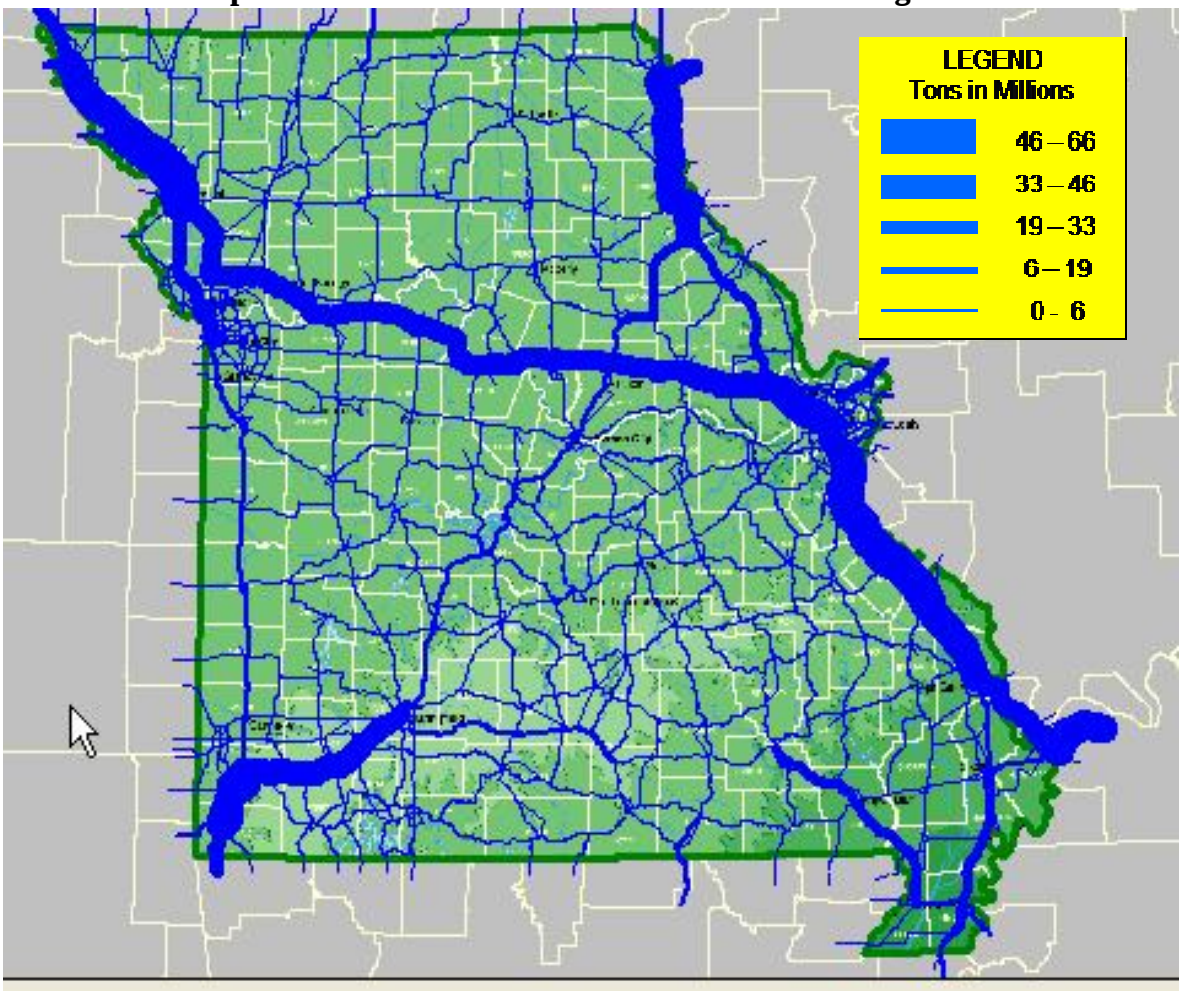
Exhibit 12: Year 2020 Commodity Forecasts - % Change



Several commodity groups are projected to grow by more than 100% including Secondary Traffic (intermodal drayage and movements between warehouses), Instruments, Photo Equipment or Optical Equipment, Electrical Equipment, Machinery, and Apparel.

For freight traversing Missouri's transportation system by truck, 128 million tons, over 17% of all truck tonnage, moves through Missouri from origins outside of the state to destinations also outside the state. The origins, destinations, and nature of through truck traffic in Missouri were examined using the CIMS application previously discussed. The Missouri CIMS mapping application also has the ability to map forecasted commodity flows and compare current year and forecasted commodity flow scenarios. The map in **Exhibit 13**, displays the tonnage difference between Year 2001 and Year 2020 resulting from through truck traffic. The results of the Compare Scenarios analysis for current and year 2020 through truck traffic suggests that some routes such as I-29 and I-55 will see in excess of 50 million tons of additional commodity flows each year in the future.

Exhibit 13: Comparison of Year 2001 and 2020 for Missouri Through Truck Traffic



Source: 2001 TRANSEARCH Data, mapped using the Commodity Information Management System (CIMS)

The Impact of Freight on Missouri's Economy

Freight activity on Missouri's transportation system supports $56.0 billion in output throughout the Untied States.

The national impact of Missouri's freight infrastructure accounts for $14.6 billion that is paid in wages to 455,600 employees. Of the jobs supported by Missouri's transportation system, 243,000 (53 percent) are located outside the state of Missouri.

Within Missouri, the transportation system supports $24.3 billion of output in the state's economy of which $6.4 billion is paid in earnings to 212,600 jobs.

In the freight industry, retail marketers (e.g.-Wal-Mart) are the influencing parties of how freight moves upon the national and international transportation system. To them, reliability and dependability of the logistics chain and how dollar investment impacts trip time to speed the delivery process from production to customer represents the key critical component to their industry. Therefore any freight investment consideration made by the public sector, should in some way positively impact private freight transport reliability, shorten trip time, and/or minimize loss and damage for the retail distribution chain. Trip time variance may be a key performance metric for future freight planning efforts.

According to the Federal Highway Administration' s Freight Benefit Cost Analysis Study (BCA Study) completed in February 2001, the effects of investments to improve freight transportation infrastructure is significant and can be explained by four types of benefits which are summarized in **Table 3**. Present methodologies for traditional benefit/cost analysis involving transportation planning typically compare total incremental benefits from project implementation with the associated total incremental costs of undertaking the project.

Table 3: Effects of Improved Freight Transportation

First-tier Benefits	Immediate cost reductions to carriers and shippers, including gains to shippers from reduced transit times and increased reliability.
Second-tier Benefits	Reorganization-effect gains from improvements in logistics. Quantity of firms' outputs changes; quality of output does not change.
Third-tier Benefits	Gains from additional reorganization effects such as improved products, new products, or some other change.
Fourth-tier Benefits	Effects that are not considered as benefits according to the strict rules of benefit-cost analysis, but may still be of considerable interest to policy-makers. These could include, among other things, increases in regional employment or increases in rate of growth of regional income.

Source: FHWA's Freight BCA Study, February 2001

First order benefits from improvements to freight infrastructure include cost savings to carriers and shippers from reduced transit times and more reliable service. Second order benefits result from

organizational changes that allow consolidation and other factors leading to more efficient supply chain systems. Third order changes can also occur from the ability to improve or change products as a result of the more efficient transportation.

The most recent research conducted for FHWA attempts to improve cost benefit models used by public agencies to make infrastructure investment decisions. The research examined the economic implications of first and second order benefits resulting from transportation improvements. Data about truck traffic and freight rates from thirty freight significant corridors was used to populate the model developed for the project. Although the model only examines the benefits accruing to carriers, "preliminary results of the phase II research suggest that benefits found in current cost-benefit models should be increased by about fifteen percent to account for newly measured effects."[8]

The greatest impacts Missouri enjoys from its transportation system result from the internal connectivity of the system for freight movements within the state. Over 60 percent of Missouri's jobs supported by freight transportation system are attributable to commodity flows for which both the origin and destination are within the state.

Freight movement through Missouri, as well as Missouri's imports and exports generate significant jobs, output, and earnings outside of Missouri. **Table 4** summarizes the ways in which different types of commodity flows into, out of, and through Missouri result in output, earnings and employment both within Missouri and throughout the United States.

Table 4: Economic Impacts of Missouri's Freight Transportation System

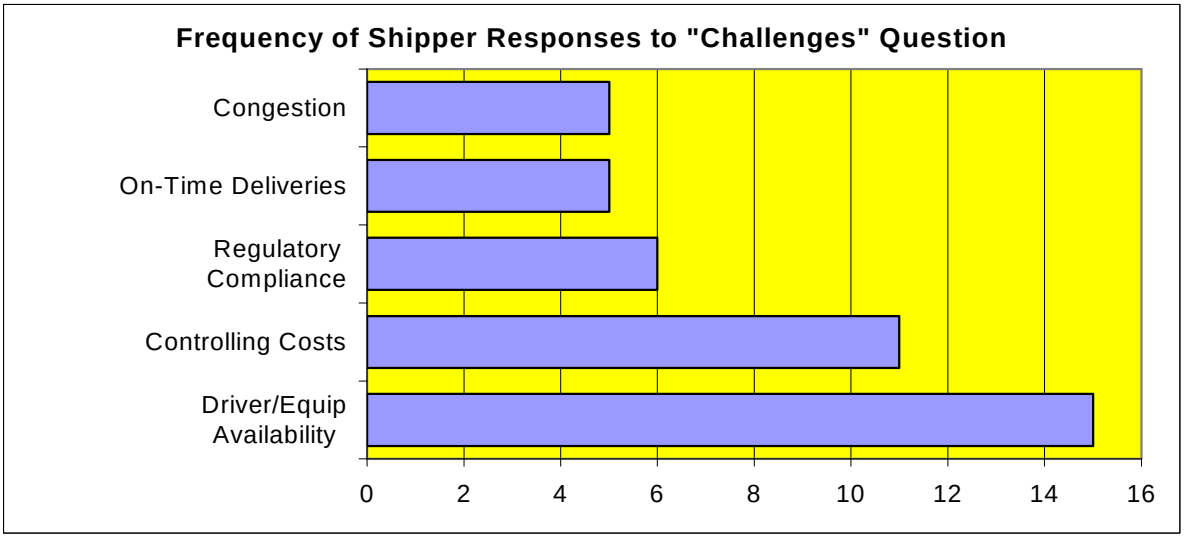
	Impact Type			
		Total		
Impact Region and Flow Direction	**Direct Exp. ($Million)**	**Output ($Million)**	**Earnings ($Million)**	**Jobs**
In-State Impacts (Missouri-only)				
Internal (Internal to Internal)	$6,616	$13,441	$3,895	128,600
Export (Internal to External)	2,410	4,948	1,205	41,700
Import (External to Internal)	2,853	5,840	1,322	42,300
Total In-State	$11,879	$24,229	$6,422	212,600
Out-of-State Impacts (US Only)				
Through (External to External)	5,828	16,801	4,289	127,700
Export (Internal to External)	$2,410	$6,664	$1,730	52,800
Import (External to Internal)	2,853	8,303	2,151	62,500
Total Out-of-State	$11,091	$31,768	$8,170	243,000
Total Impacts				
Internal (Internal to Internal)	$6,616	$13,441	$3,895	128,600
Through (External to External)	5,828	16,801	4,289	127,700
Export (Internal to External)	4,820	11,612	2,935	94,500
Import (External to Internal)	5,706	14,143	3,473	104,800
Total	$22,970	$55,997	$14,592	455,600

Freight Transportation Challenges Facing Missouri

As part of the freight study process, shippers in the state were asked about challenges they face in moving goods in, out, within and through Missouri. The interviews gathered responses on shipping decisions such as mode choices, time of day operations and access to a range of transportation services. About one half the interviews were conducted face to face for the sake of probing, wide-ranging conversations and the remaining interviews were conducted by telephone. Shipping decisions were explored in terms of purchase criteria, and respect to selection of mode, route, time of day, and staging locations. Related service patterns were investigated, covering temporal distribution, route reliance, truck loading profiles, and trip structure. A crucial facet investigated through the interview process was sensitivity to service performance, because this is substantially influenced by the condition of infrastructure.

The responses to the question gravitated toward five key areas: 1) driver and equipment availability, 2) maintaining costs, 3) compliance with regulations, 4) on-time deliveries and 5) traffic congestion. The overall frequency of shipper's indication of the problem areas is shown in the chart of **Exhibit 14.**

Exhibit 14: Missouri Shipper Response Frequency to "Challenges" Question



The driver/equipment availability concerns included seasonal and peak shipping times for the companies and finding drivers, especially qualified drivers with HazMat licenses. Missouri was described as an export state with more product going out than coming into the state, and at least one respondent speculated that the imbalance in certain transportation lanes leads to a shortage of truck equipment and drivers for back-hauls.

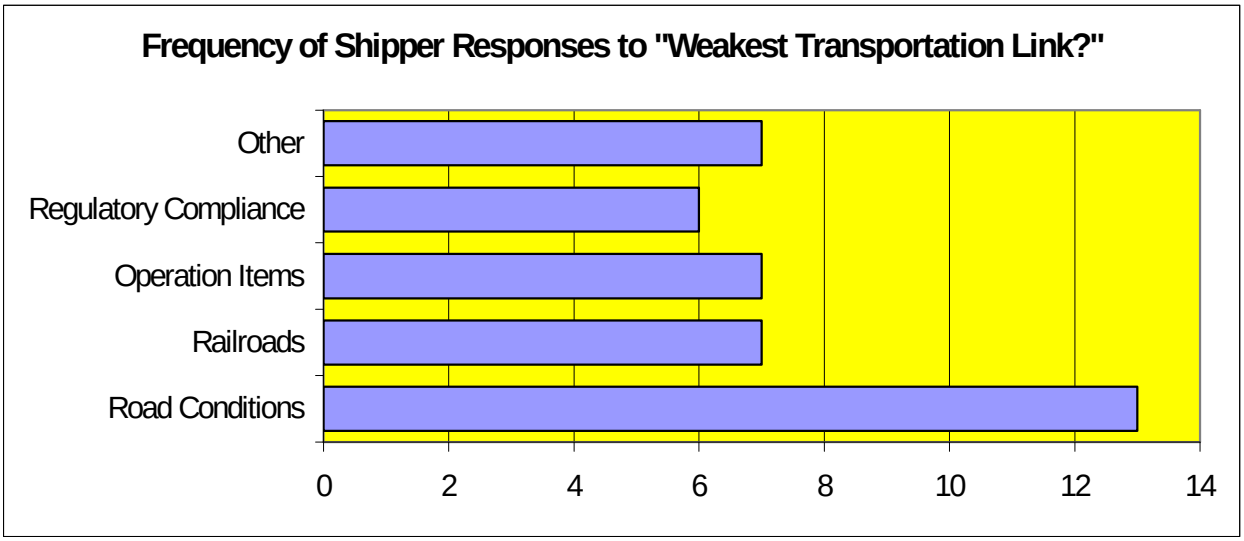
The congestion challenge was most notable in the St. Louis area as specific locations were mentioned. One comment indicated the back up at the scales/weigh stations was of major concern. The specific congested locations are:

- I-70 near Lambert and near I-55 south
- Bottleneck at the St. Louis bridges

- Near Earth City
- I-64/US 40

When asked what they viewed as the weakest link in Missouri's transportation system, shippers as previously mentioned, noted a generally high level of satisfaction with the access to services and transportation choices available to them. However, when presented with the question, shippers indicated the "weakest links" were road conditions, railroad services, a variety of operational issues (maintenance, etc.), regulations, and a handful of other items. The results of this question are summarized in **Exhibit 15.**

Exhibit 15: Missouri Shipper Responses to "Weakest Link" Question



The road conditions comments at times were very general (inadequate road conditions, need to improve/maintain roads), others were very specific (I-70, I-44, US-71, Hwy 60, Hwy 36), and some fell in between (need a better connection to Arkansas). The comments related to the railroad were similar to the road comments. Some were very general (rail is the weakest link, difficult to work with the railroads), others were specific (rail inhibits flexibility – only one carrier serves my part of the state), and others were somewhere in between (rail interchange laws, inconsistencies between rail carriers).

Comments regarding the operating issues facing shippers/carriers included the lack of carriers, lack of drivers, retaining quality employees, and back hauling concerns. The vast majority of the comments regarding regulations were concerning the new hours of service regulation for drivers. Other comments included: very satisfied with the transportation system, the State needs to be more business friendly, congestion, lack of toll roads, and the lack of tax incentives.

Road Conditions - A Closer Look at Key Highway Infrastructure

Total domestic freight flows are expected to grow an average of 3.4% from 1998-2010, and 2.4% from 2010-2020.[9]

While the extensive multi-modal network found in Missouri has played an important role in the State's economic growth and prosperity. Many elements of the freight movement system are now showing signs of fatigue.

Missouri's extensive surface transportation systems for moving freight are a key asset underlying Missouri's diverse economy, maintaining these assets presents a continuing challenge. In the analysis performed for this study, segments of Missouri's Freight Highway Network where analyzed and mapped to examine the following condition attributes:

- Pavement Condition
- Percent Truck Traffic
- Level of Service
- Bridge Condition Ratings
- Safety Index

The segment details and maps for each of these attributes were provided in Technical Memorandum #5: Missouri's Freight Advantages, Challenges and Opportunities. **Table 5** provides the composite listing of highway segments on the Missouri Freight Highway Network that scored low on several key traffic related attributes. The table presents segments by length for highway route designations on the network. All lengths were calculated bi-directionally within each segment.

It should also be noted that MoDOT has in recent years undertaken an aggressive program to rehabilitate many roadways, and that pavement condition and other information about traffic flows and congestion may change as resurfacing projects are completed or as pavement surface continues to deteriorate over time. The information provided is a snap shot of pavement, traffic, and safety conditions as of the year 2002.

Table 5: Traffic Attributes for the MO Freight Highway Network - Segment Length

	Percent of Commercial Truck Traffic		Safety Index Rating		Pavement Condition Rating		Level of Service (LOS)
Highway	**40% - 50%**	**50% +**	**Poor**	**Very Poor**	**Poor**	**Very Poor**	**"E" or "F"**
MO 10			7.4		11.4		1.4
SP 100					0.4	3.9	
MO 100					12.3	3.9	35.9
MO 105					0.5	0.7	
MO 109			2.4		10.0		13.7
MO 11					5.1		1.2
MO 110					1.0		
MO 111					11.0		
MO 114					3.6	0.9	
MO 115					8.2	0.7	6.5
MO 116					3.3		
MO 129					2.0	0.2	
MO 13			6.0		34.0	18.9	79.4
MO 131					0.1		
MO 136					85.4		
MO 137					0.8		
MO 139					14.3	1.9	
MO 14					70.2	6.7	19.4
MO 141					3.2		27.2

MO 142						0.0	
MO 149					0.7		
MO 15					27.0		
MO 150					18.9	0.1	3.2
MO 152				0.7	0.0		6.9
I-155	10.1						
MO 156					11.7		
US 159					22.8		
US 160					3.9		13.6
MO 163					1.1		8.2
US 169			3.0	1.1	28.7	14.1	15.6
MO 17					48.6	2.4	3.9
I-170			4.8	0.9	1.7	2.0	17.1
MO 171			2.3		5.0		
MO 180			0.1		1.3	4.3	0.2
MO 181					9.5		
MO 185					2.8	7.9	
MO 19					23.9	1.3	10.1
MO 2					4.9		
MO 20							1.8
MO 21					31.9	6.8	0.4
MO 210		0.5					37.4
MO 22					2.9		
I-229					5.6		
MO 231					8.3	0.3	0.7
US 24			2.0		81.6	14.9	0.4
MO 240					0.6	1.2	
MO 248					7.6		
I-255			1.6				
MO 25					4.7		
MO 265			3.0		13.9		14.8
MO 267			0.4		5.2		2.8
MO 269					2.7	0.3	1.5
I-270					2.1		38.2
MO 28					22.0		
MO 283					1.8	0.1	0.1
I-29	113.8		1.6		15.1		17.9
LP 29				1.2		1.2	
MO 291			2.8		15.7	0.9	21.3
MO 3					0.9		
MO 30					10.7	2.1	23.4
MO 32			0.6		16.3	3.4	6.8
MO 34			1.6		7.4	1.3	8.1
MO 340			0.6		13.8	4.1	19.1
I-35	39.4		2.2		60.9		16.3
MO 350			1.9		7.8	0.1	13.0
US 36					63.5	4.6	
MO 366					9.1		7.7
MO 367					0.7		6.9

MO 37					1.7		7.6
MO 370							8.6
MO 38							1.6
MO 39					3.2		0.7
US 40			29.8	3.6	39.0	20.2	54.8
US 412	10.3	2.0				0.8	2.6
MO 42					0.1		
MO 43	2.1				6.1		2.8
I-435			5.4		10.3	1.4	22.5
I-44	12.1		27.3		61.2		52.8
LP-44					9.9	10.6	0.9
MO 45					11.1		0.3
MO 46					4.2		44.0
MO 47			2.8		16.3	0.7	7.9
I-470			5.3		0.6		24.2
MO 49					1.8		
MO 5			1.2		45.9	18.5	134.1
US 50			23.6		58.9	1.4	0.5
MO 51					1.0	3.4	17.8
MO 52			2.4		35.2		
MO 53					2.1		
US 54			5.8		40.6		28.7
BUS 54					6.7	3.6	
I-55		99.6	15.4	2.2	16.3		1.5
I-57					1.2		
MO 58					29.9		25.0
US 59	8.5				8.0	0.5	
MO 59					2.5	2.9	4.1
MO 6			0.1		36.1	16.0	
BUS 60					3.6	2.2	
US 60			4.2		3.9		72.6
US 61		27.8	17.3		54.7	9.5	35.9
US 62					7.8	2.2	
US 63			4.0		28.7	9.1	45.9
I-635	1.5				4.5		22.0
I-64			2.9		1.1		48.7
US 65			10.6		17.8		1.2
BUS 65					3.1	15.9	
MO 66					8.1	1.2	
US 67			7.4		34.2	7.0	
BUS 67					5.0		5.5
I-670					2.3		1.2
MO 68					7.8	1.1	1.5
US 69					9.2	3.4	5.5
MO 7			3.1		10.7		40.0
I-70	166.2		35.8	5.8	62.4		82.1
LP 70					1.6	36.7	
US 71	7.1		5.2		32.5	0.4	86.4
MO 72					44.7	2.2	7.4

MO 74					1.0	1.0	
MO 740					1.3		1.0
MO 744			1.3		2.0		1.5
MO 752					1.8	4.2	
MO 76			3.1		18.4	0.1	27.1
MO 763					1.8	1.5	5.7
MO 765					0.1		
MO 77					1.7	0.4	
MO 78			4.4			0.1	
MO 79					1.3		19.4
MO 8					10.1	1.1	4.2
MO 84					2.1		9.1
MO 86							8.2
MO 87					1.2	0.8	
MO 9					3.2		3.5
MO 91					0.6		
MO 92					16.3		5.0
MO 94					11.1	0.6	27.2
MO 96					7.4		1.5

Defining a Framework for Freight Planning in Missouri

Missouri's existing Long-Range Transportation Plan (LRTP) was the product of a very comprehensive planning effort. The LRTP identifies transportation needs and sets the direction for making transportation investments across all modes of transportation. The intended outcome of the LRTP was to "look at the total system, lay a new planning foundation, incorporate information from previous needs studies, and plans, and give the department one clear direction to set the course for all modes of transportation."

The LRTP developed goods movement needs based primarily on prior modal planning assessments. Efforts being undertaken to update the existing LRTP raise the bar in terms of freight needs assessments by developing new tools for goods movement analysis, and engaging Missouri's primary freight stakeholders: businesses and industries that ship and receive freight. To truly assess long range freight needs, shippers and receivers need to be engaged as the primary and most important freight stakeholders, because it is their businesses – manufacturing plants, retail outlets, and distribution facilities that create the demand for truck, rail, barge and air cargo services. Ultimately, it is these shippers and receivers that support the underlying jobs and economic activity in Missouri.

In this context, Missouri's modal freight networks are necessary foundations of a prosperous economy. Future investments in these critical assets should be in accordance with the key economic development needs and long range direction of Missouri's economy.

Making sound transportation investments is critical and determining how to make those decisions is challenging. The LRTP presents eight goals developed in cooperation with a broad array of stakeholders representing rural and urban areas of Missouri:

- Ensure safety and security in travel, decreasing the risk of injury or property damage on, in, and around transportation facilities.

- Take care of the existing system of roads, bridges, public transportation, aviation, passenger rail and ports.
- Relieve congestion to ensure the smooth flow of people and goods throughout the entire system.
- Facilitate the efficient movement of goods using all modes of transportation.
- Ensure Missouri's continued economic competitiveness by providing a safe, reliable and efficient transportation system.
- Protect Missouri's environment and natural resources by making investments that are not only sensitive to the environment, but that also provide and encourage environmentally beneficial transportation choices.
- Enhance the quality of our communities through transportation.

Missouri's Strategic Economic Development Plan

In 2003, the Missouri Department of Economic Development issued what is essentially a long range economic development plan for the State of Missouri entitled "A Blueprint for Jobs and Prosperity." The report analyzes the challenges and opportunities facing Missouri toward a future path of economic prosperity. The "Blueprint" was developed under The Economic Prosperity Initiative: a broad-ranging effort launched by Governor Holden in the spring of 2001. The Initiative's goal was to:

> *"Produce measurable economic results for the people of Missouri by focusing the activities of government around outcomes that enable more prosperous families, communities and businesses. As part of the initiative, the Department of Economic Development hosted many meetings to gather public input, including a statewide summit with civic leaders, regional dialogue sessions in all parts of the state, and a series of industry roundtables in three key industry clusters (life sciences, advanced manufacturing, and information technology)."*

The Blueprint report presents six "areas of emphasis" with recommendations across these priority areas intended to guide state programs and the coordination of efforts to work with local entities. The priority areas and actions are:

- Build a 21st Century Economy
- Increase Investment in Education and Workforce Development
- Promote Better Communication and Coordination of State Economic Advantages, Progress, and Opportunities
- Encourage Balanced Growth and Investment in Communities
- Refine Tools and Resources for Economic Development
- Preserve and Strengthen High Quality of Life

A Freight Strategies Framework to Support Economic Development

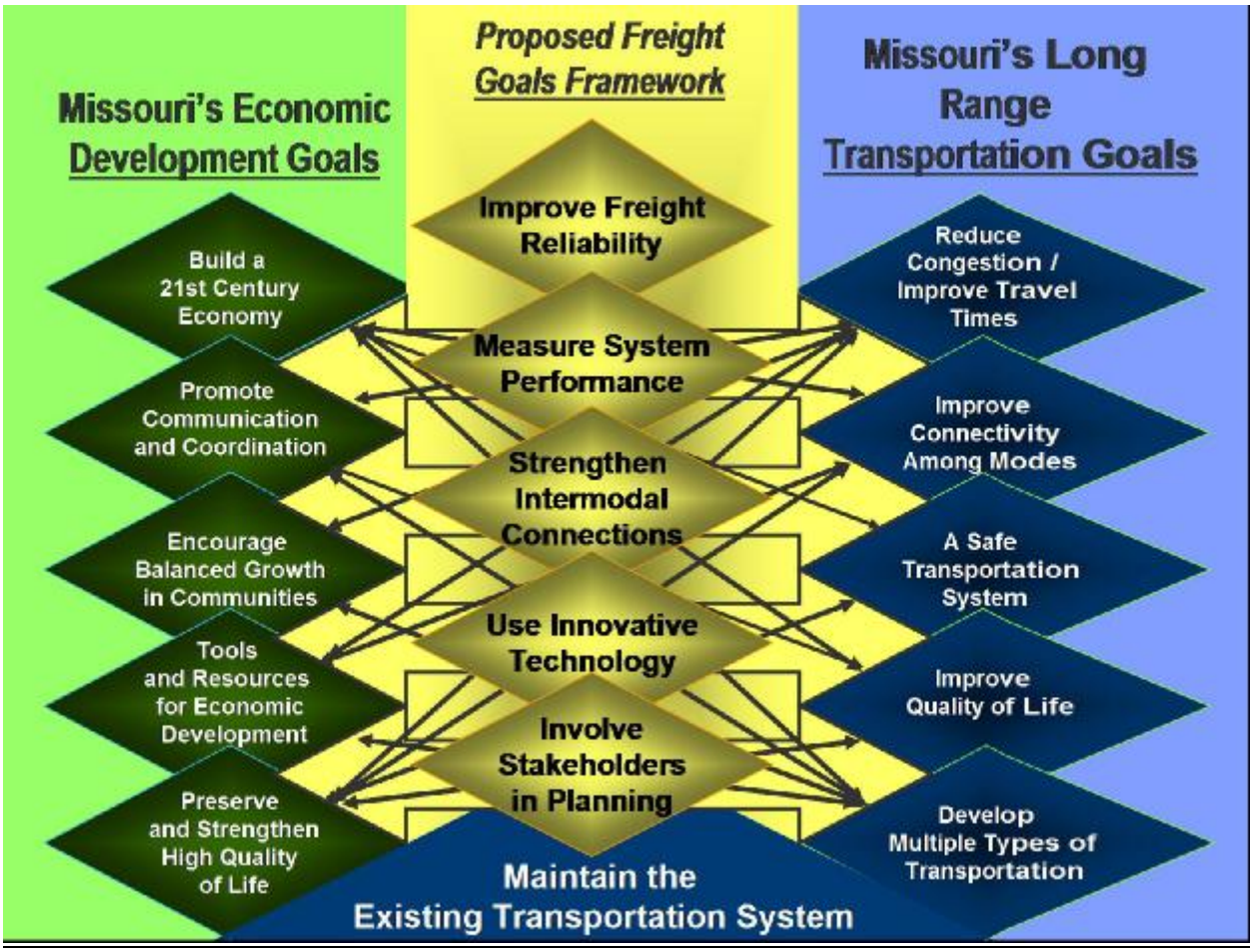
The Blueprint report acknowledges the link between transportation investment and economic development, and the increased business dependence on reliable transportation systems to support the evolving global trade economy:

> *"Economic development and physical development are closely tied to one another. Therefore, an economic development strategy must address physical development issues. The state should look both to investment in infrastructure – primarily information technology and transportation – across Missouri, and to reinvestment in urban areas and historic assets. Growth cannot occur without the infrastructure to support it, so smart state infrastructure investment decisions are fundamental to realizing the state's economic development potential….*
>
> *…States that are most successful in their transportation infrastructure investments will determine the areas of greatest impact in coming years and focus their limited resources in those areas – and will not be tied to old plans and concepts from the "old" economy. Missouri's central location makes it accessible from all parts of the nation. Our transportation infrastructure must be adequate to meet the potential this location creates. Multi-modal passenger and goods transfer (highway, air, river, rail) and passenger transit systems must share the stage and the budget with highway investments, just as maintenance and replacement of older facilities must be balanced with new investments."*

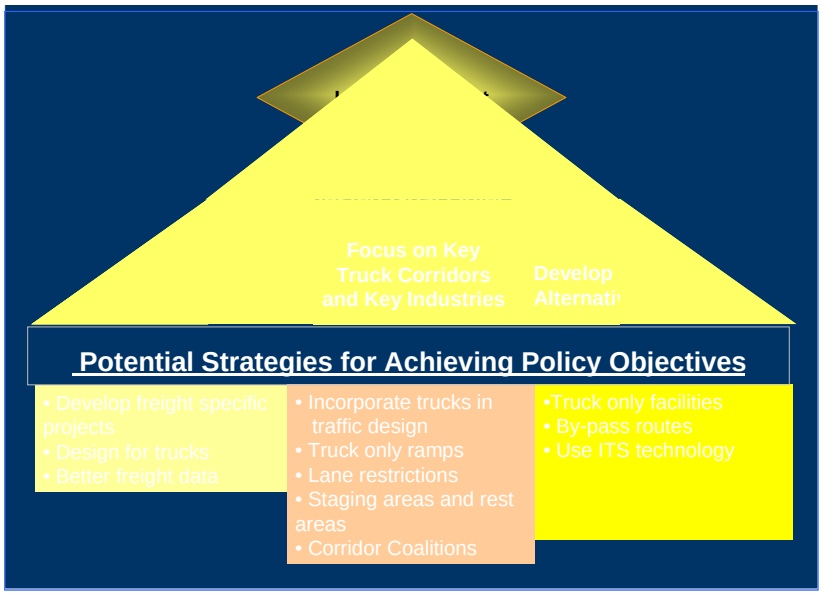
Historically, freight has not received the same level of attention in transportation planning as passenger transport initiatives. Yet, commercial transport is vital to the businesses generating and receiving freight and all facets of society benefit from efficient freight transport as end users of goods and services. Missouri's recognition of the important role of freight in the state's economy will help ensure the quality of life for future generations.

In developing a freight policy framework to address the challenges facing Missouri from increases in freight traffic, an effort was made to explicitly construct a bridge between the state's transportation goals and the state's economic development goals. The framework presented is a starting point for using freight planning as a link between the state's economic development and the transportation goals. The diagram in **Exhibit 16** also suggests that "Maintain the Existing Transportation System" is the foundation for future investments.

Exhibit 16: Proposed Freight Planning Strategies Framework



Freight Goal #1: Improve Freight System Reliability



Recommendation 1.1: Prioritize the Freight System Network

As MoDOT aptly points out in the departments planning framework: ***Your Voice:*** "*Missouri has more transportation needs than money to address them*." Missouri is a cross-roads state with tremendous volumes of freight moving across all modes of transportation. Data gathered for this study provides a foundation for moving forward with a process for establishing a hierarchy across the freight network for future investment priorities. The current effort provides information about volumes and values of freight moving across various portions of the surface transportation network, as well as information about the key generators and receivers of freight. This information, combined with an freight stakeholders outreach program should be used to prioritize the network which as been identified.

Recommendation 1.2 Link Key Truck Corridors to Centers of Economic Activity

Missouri's extensive roadway network is made-up of a hierarchy of routes that play specific roles in network distribution. From a freight movement standpoint, network roles should become a central part of planning for the future of the State's transportation system.

The level of freight mobility across Missouri, and especially in metropolitan areas should be a key consideration in future planning efforts. Highway congestion affects the cost and efficiency of truck transport, and subsequently the reliability required for just-in-time delivery. Through truck traffic in Missouri has been described as a significant portion of overall truck volumes. However, while through traffic is large, it does not overshadow the need to understand and plan for regional traffic development, which is the segment to likely have the most effect on the state's economy. The previous section of this report identified U.S. and Missouri State highway routes that carry a high percentage of truck traffic, examples include U.S. 59 near St. Joseph, U.S. 412 in Pemiscot County, and State Route 43 near Joplin.

Operationally these regional routes should be managed for freight, for instance traffic signals can be timed for truck movements from known freight generators and receivers. Relief routes can be pre-defined, so that incidents can be handled with diversion as well as intervention. Construction activity does not disrupt a route and its relief simultaneously, and construction as far as practical is coordinated with industry, avoiding commercially sensitive time periods (like month-end) and understanding the time patterns of line-haul and city freight schedules.

Truck Priority at Traffic Signals

Researchers at the Texas Transportation Institute (TTI) have developed a signal detection –control system that identifies the speed of approaching traffic, proximity of the vehicle to the intersection, whether the vehicle is a truck, and estimates the delay to drivers waiting at side roads. The new system uses vehicle speed and length information to predict the "best" time to end a signal cycle.

- *"Intelligent Detection-Control System for Rural Signalized Intersections" Texas Transportation Institute – Aug. 2002*

A simulation study conducted in Minnesota found signal retiming can reduce the number of trucks stopping at one intersection by 300/day and that adding passive truck detection technology to signal systems could have a benefit/cost ratio of 15:1

"Truck Priority at Traffic Signals" Minnesota DOT – Feb. 2001

Regional truck routes should also pay particular attention to key industry clusters with into the state. Missouri's economic development plan: "A Blueprint for Prosperity and Jobs" discusses the need to target and support key industries through public investments, specifically citing Plant and Life Sciences, Advanced Manufacturing and Information Technologies. The report goes on to say:

> *"Additional industry clusters have great promise in specific regions within the state, and the state should assist regions in identifying and capitalizing on these opportunities."*[10]

In analyzing the commodity flows for Missouri, imports and exports were interpreted in the context of Missouri's economic manufacturing base using a "location quotient." The location quotient is a ratio comparing the concentration of jobs in Missouri to that of the national economy by industry. When a location quotient exceeds 1, the local economy employs a larger share of the workforce in that industry than does the national economy. Location quotients for major industries in Missouri that exceed a quotient of "1" are provided in **Table 6**.

Table 6: Missouri Industry Quotients Greater than 1.0

NAICS	Industry	Missouri Employment	National Employment	Location Quotient
316	**Leather & allied product mfg**	**2,420**	**60,567**	**1.91198881**
335	**Electrical equip mfg**	**16,964**	**575,413**	**1.41076488**
311	**Food mfg**	**39,644**	**1,470,146**	**1.29039611**
323	**Printing & related support**	**21,037**	**784,520**	**1.28317483**
333	**Machinery mfg**	**35,588**	**1,332,854**	**1.27769456**
336	**Transportation equip. mfg**	**45,975**	**1,753,445**	**1.25468768**
312	**Beverage & tobacco prod mfg**	**4,216**	**170,864**	**1.1807449**
322	**Paper mfg**	**12,530**	**533,251**	**1.12441191**
325	**Chemical mfg**	**19,812**	**869,761**	**1.09001992**
331	**Primary metal mfg**	**12,887**	**572,512**	**1.07714279**
326	**Plastics & rubber prod. mfg**	**21,663**	**1,002,503**	**1.03404387**

"Industry cluster analysis" is an analysis methodology that examines the economic linkages between key industries in a region and the businesses with whom they interact for inputs to their process, or through the outputs they produce. Dr. Michael E. Porter, a widely published business strategist from Harvard University has suggested that there is a role for governments in fostering industry clusters and supporting regional economies:

> *"Government at all levels has an influence on the business environment and the innovative potential of clusters. Government's proper role is to improve the business environment rather than to intervene directly in the competitive process. …Improve the quality of basic inputs that firms draw upon, such as human resources, physical and technological infrastructure, and capital."* [11]

In the absence of a rigorous "industry cluster analysis" to explore the economic linkages between key industries in Missouri, maps of several manufacturing sectors in Missouri were mapped to provide a locational reference of where concentrated freight activity is likely to occur. The maps in **Exhibits 17a** and **17b** provide two examples of key industry groups that have been mapped.

Future analysis efforts should be undertaken to better understand the buyer / supplier relationships of these industries. A better understanding of the spatial concentration of manufacturers relative to supporting industries may affect the number of intra-regional truck trips occurring in support of key industries on a daily basis. Addition analysis of value-chain cluster relationships can lead to land-use policies that could encourage inter-related firms to cluster geographically reducing overall demands on Missouri's transportation networks.

Exhibit 17a: Missouri's Electrical Equipment Industry

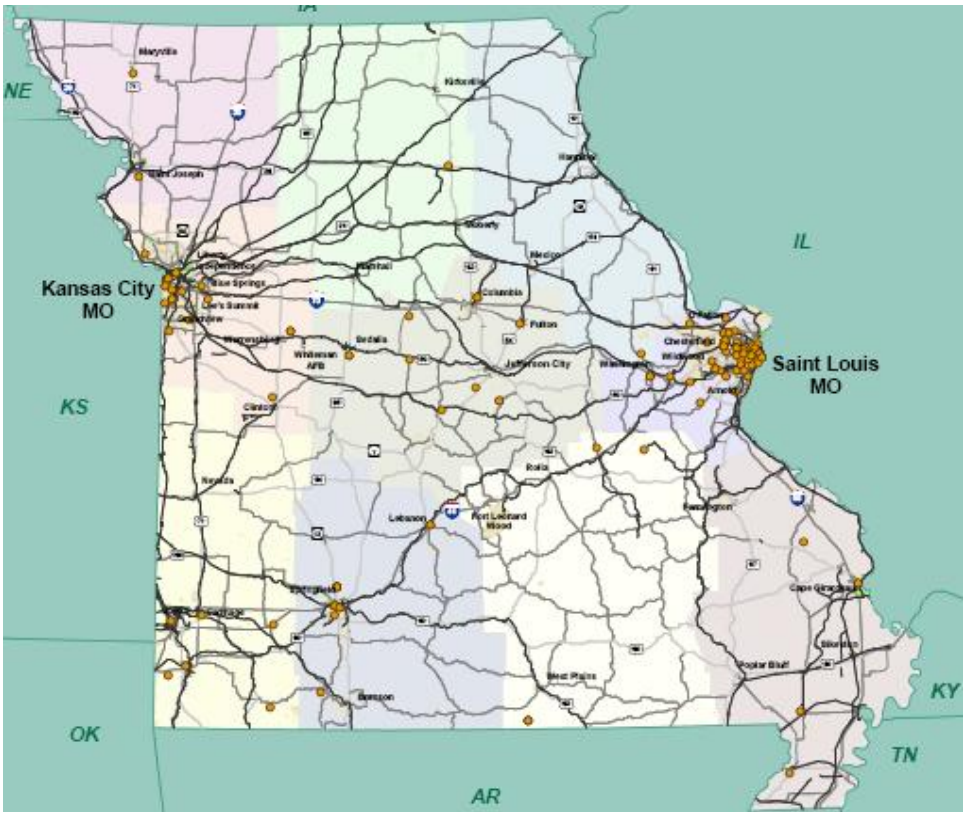
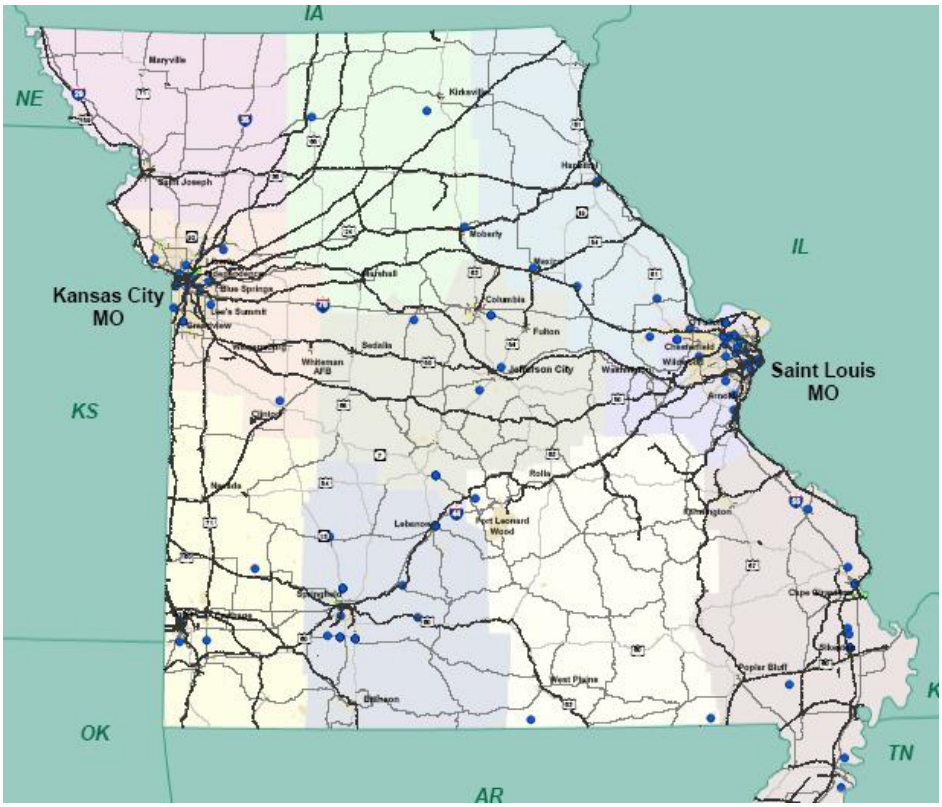
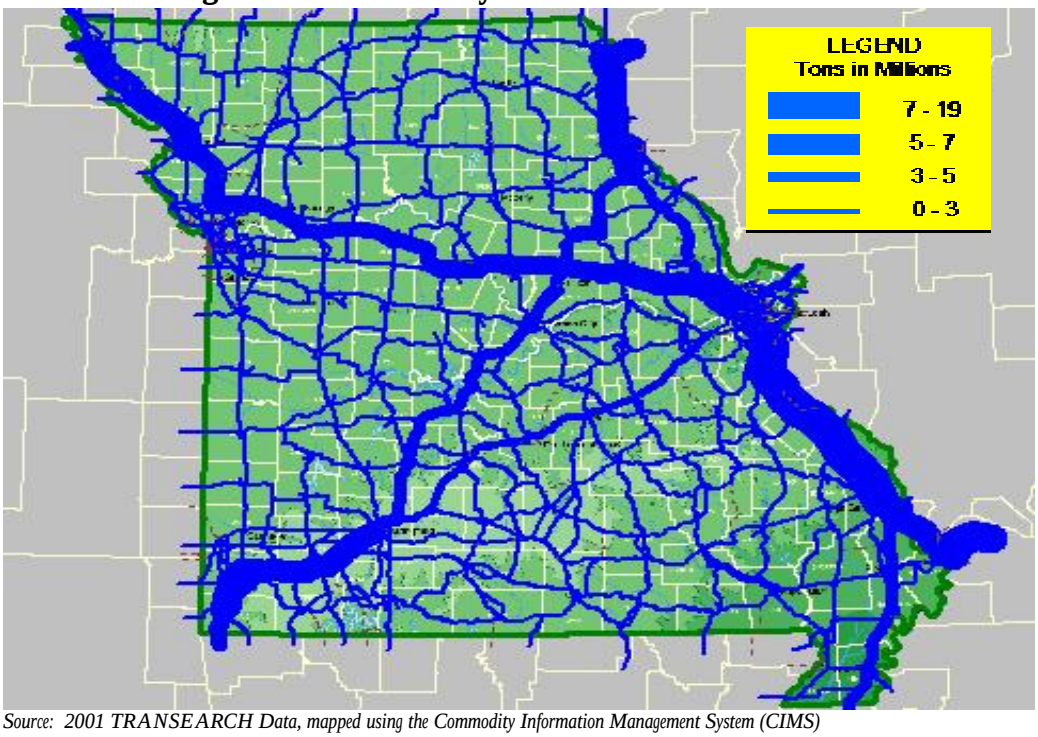


Exhibit 17b: Missouri's Transportation Equipment Industry



The ability to move freight efficiently between Missouri's key trade centers is critical to bringing new industry to the State. High-value industries are important in terms of economic impact and jobs, and these industries are likely to be service sensitive with regard to freight transportation. High-value industries are likely to require a high degree of reliability and flexibility in transport performance. **Exhibit 18** shows modeled output of key highway routes used in transporting high-value commodities from the Electrical, Chemical and Transportation Equipment Industries.

Exhibit 18: High-Value Commodity Movements in Missouri



Source: 2001 TRANSEARCH Data, mapped using the Commodity Information Management System (CIMS)

Recommendation 1.3: Consider Tolling High-Volume Through-Truck Routes

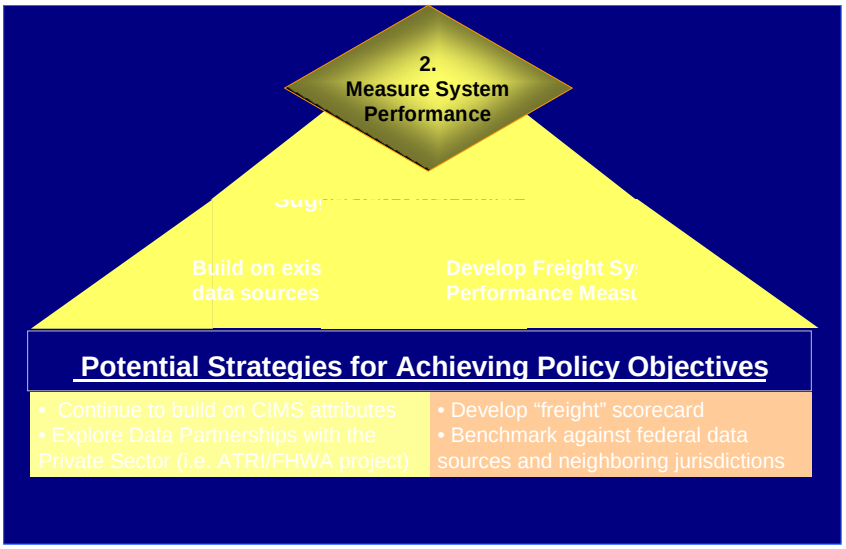
The commodity flow analysis using the CIMS/TRANSPLAN interface suggests that four of the five major Interstate Highways that traverse Missouri carry much of the through truck traffic in the state: I-70, I-44, I-29, and I-55 . U.S. highway 61 is also heavily used for pass-through truck traffic. Continued investment in these key through routes is important to sustaining Missouri's Highway Freight Network. Moreover, investing in routes that function as viable alternatives such as adjacent arterials, as well as the completion of circumferential bypasses (for through traffic), will help sustain these corridors. The volume and proportion of through truck traffic plainly is a significant contributor to highway congestion. Strategies that deal with these issues must contend with this traffic.

Toll roads currently are under investigation around the nation as a means of generating partial financing of infrastructure and influencing travel behavior. Several studies directed at commercial traffic are being advanced that make particular use of electronic toll collection as a means of reducing delay, muting resistance, and applying charges selectively. Federal flexibility on tolling is becoming greater than in the past, and although policy is not fixed, the option is justified for consideration. The trucking industry is generally opposed to tolls on existing facilities, but has expressed willingness to considering tolls on new capacity expansions. The recently passed SAFETEA-LU includes a provision for "Express Lanes Demonstration Program" allowing tolls on up to fifteen projects, including projects on the Interstate system to help reduce congestion. However, tolls must be on new lanes only, with the exception of HOV lanes. The bill also included the creation of a new "Interstate System Construction Program," which allows tolls on up to three Interstate Highway corridors.

Bypasses - A complete highway bypass system, integrated with growth plans and managed for freight accommodation should be considered a requisite part of the response to through truck traffic moving through metropolitan areas. Related to bypasses are methods of encouraging their use. Simple steps like route designation and signage can be effective, or traveler information channels can be applied to advertise the advantage of preferred routes to unfamiliar drivers. Some metropolitan areas have posted advisory signs upstream from bypass exits, encouraging through trucks to use them. Freight support services like fueling stations, rest areas and fully equipped truck stops affect routing choices, especially if they are available on the core network and on by-passes. Distance, time, and their cost implications are the principle criteria for motor carrier route selection. Since most bypass routes are likely to be longer, having variable message signs with the time implications of route choices may be one way to encourage their use under heavily congested conditions.

Truck Separation – Separating freight and passenger/commuter traffic is a relatively new traffic management strategy that is increasingly being examined in areas of high traffic density, where few alternatives exist. The most fundamental form of separation is to design roadways with sufficient lane widths, providing traffic sufficient maneuverability. Another form of separation is to restrict specific types of traffic along specific corridors. At least one version of the transportation reauthorization proposals called for the creation of a "truck-only" facility demonstration program. That provision was dropped from the final version of SAFETEA-LU, however under the creation of a National Cooperative Freight Research Program, Congress directs that a national research agenda be created that includes: "The use of technology applications to increase capacity of highway lanes dedicated to truck-only traffic, and development of physical and policy alternatives for separating car and truck traffic."

Freight Goal #2: Measure Freight System Performance



Recommendation 2.1: Build Upon Existing Freight Data Resources

Effective freight planning depends on the availability of good public and private sector data. The lack of data has been a major concern for states and metropolitan planning organizations. Planning agency performance measurement should reflect the concerns of both the public and private sectors – those concerns and the data required to address freight concerns often extend beyond state and local jurisdictions. When seeking to measure freight system performance it may be beneficial for public agencies to foster institutional relationships that encourage performance data partnerships between public and private sectors.

Obtaining better data on freight and commodity movements is a significant challenge for state and regional transportation planning agencies. Sound planning efforts require routine, periodic monitoring of transportation system performance. Monitoring activities provide the means for identifying system deficiencies, as well as performance driven improvements. At the system level, freight moving in trucks is traditionally treated no differently than persons in a car. However, freight trips (via truck or rail) are generally very different from passenger vehicle trips in a number of key areas: Distance, Time Sensitivity, Linkages and Temporal Distribution.

With the investments MoDOT has made in the TRANSEARCH database, along with the inventory data and tools developed during the course of this project, Missouri has an excellent foundation for building a comprehensive freight data program. Possible next steps in building off these tools could include:

- Integrating the CIMS tool with data and tools available from the Missouri Economic Research and Information Center
- Integrating CIMS data with MoDOT's Transportation Management System

Recommendation 2.2: Expand Freight Measures in MoDOT's "Tracker"

Measuring system performance to improve the programs, operations and investments made by transportation planning agencies is still an evolving practice, as is incorporating freight into the planning process. Many public agencies now use performance measurement as a means of improving programs and guiding investment decisions. Defining performance measures for freight can be especially challenging due to the often national and global context of freight movements, the intermodal or multi-modal nature typical of freight movements, and the fact that freight is often transported over public and private facilities. However, even with this set of challenges an increasing number of public agencies are defining and adopting freight related systems of performance measurement.

Tracker is a performance measurement tool recently developed by MoDOT to assess how well the department is delivering its products and services. ***Tracker*** measures have been identified around 18 desired outcomes, with "Efficient Movement of Goods" the most obvious and tangible outcome related to the current context of examining freight system performance in long range planning. Howver, several other outcomes such as Safe Transport System, Leverage Transportation to Advance Economic Development, and Easily Accessible Modal Choices are also likely to rely on freight related data, and will be monitored by private sector freight stakeholders. Under MoDOT's goal for Efficient Movement of Goods the following measures have been identified:

- Average speed traveled on selected section of roadway
- Percent of trucks using advanced technology at Missouri weigh stations
- Freight tonnage by mode
- Percent of satisfied motor carriers
- Average time for obtaining over-dimension/over-weight (OD/OW) permits

Data has been assembled for the first two measures identified under the efficient goods movement goal, while others are undergoing development. The **average speed traveled on selected sections of roadway** measure is intended to monitor whether travel speeds are increasing or decreasing as a result of congestion on key roadway sections. In the first edition of the Tracker performance report, the average speeds presented in **Table 7** were presented as bench-marks for future evaluations.

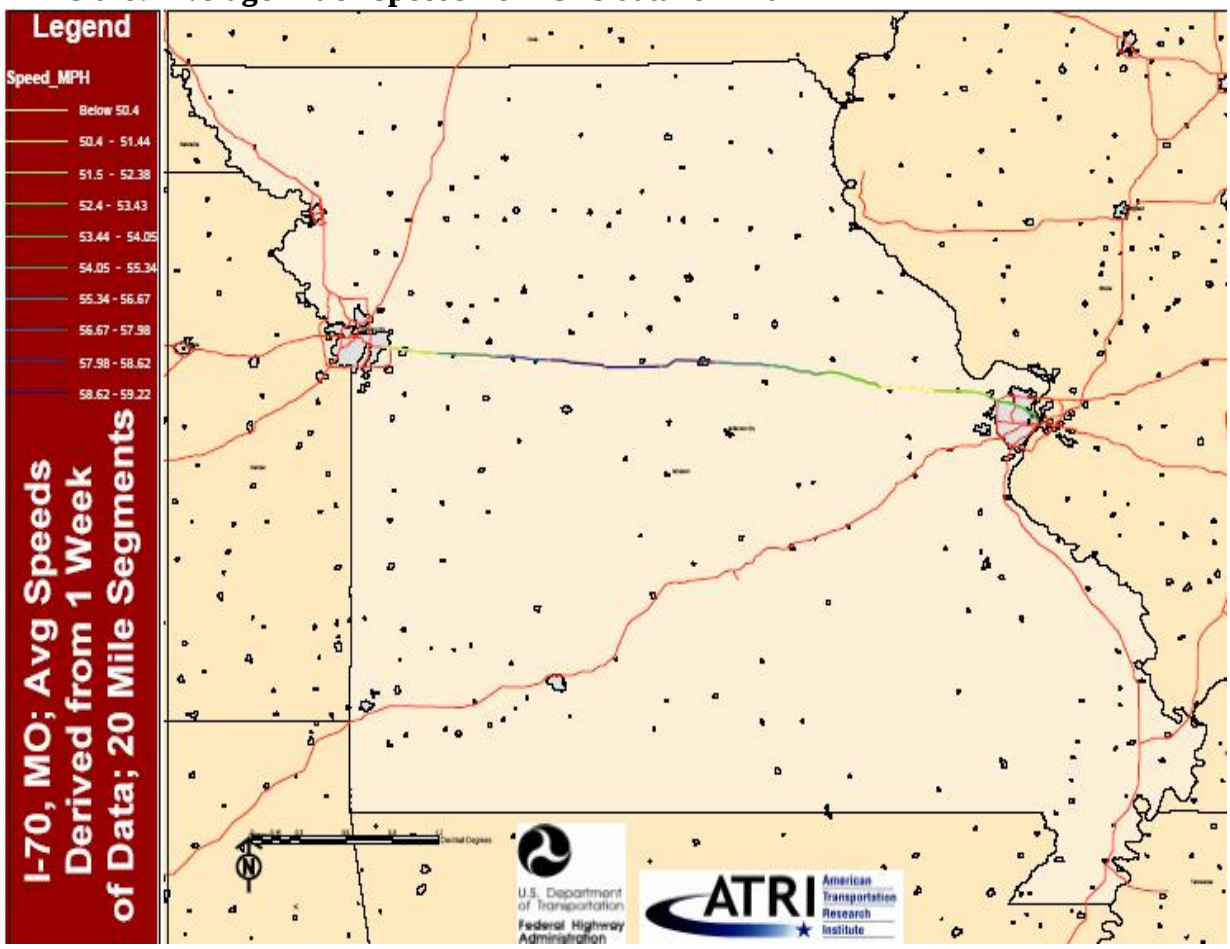
Table 7: Bench Mark Truck Speeds/Travel Time for Freight Significant Corridors

Freeway	Direction	Period	Average
St. Louis			
I-270, between I-64 & I-55	NB	AM Peak, Summer 2003	51 mph
	SB	PM Peak, Fall 2002	48 mph
I-64, between US-340 & US-67	EB	AM Peak, Summer 2003	51 mph
	WB	PM Peak, Spring 2003	39.9 mph
I-70, between US-370 & Earth City	EB	AM Peak, Summer 2003	47 mph
	WB	PM Peak, Summer 2003	56.7 mph
Kansas City			
I-435, Between K-10 & Grandview Triangle	EB	AM Peak, Summer 2002	61.3 mph
	WB	PM Peak, Summer 2002	51.9 mph
I-35, between I-435 & I-70	NB	AM Peak, Summer 2002	54.5 mph
	SB	PM Peak, Summer 2002	53.7 mph
I-70, between Lee's Summit & Prospect Ave	WB	AM Peak, Summer 2002	56.4 mph
	EB	PM Peak, Summer 2002	45.3 mph

Recommendation 2.3: Seek Partners to Improve Freight Data and Measures

Recently the FHWA and American Transportation Research Institute (ATRI) entered into a "partnership to explore methods and approaches for measuring freight performance on the nation's highways."[12] In Phase I of a study to evaluate methods for collecting real-time travel speeds on high volume freight corridor, the study team evaluated 5 methods for collecting data. The Phase I results were based on 3 months of data collected from satellite technology. I-70 between St. Louis and Kansas City was one of the corridors for which data was collected. **Exhibit 19** provides a graphic summary of the data collected on average speed through the corridor.

Exhibit 19: Average Truck Speeds from GPS data for I-70

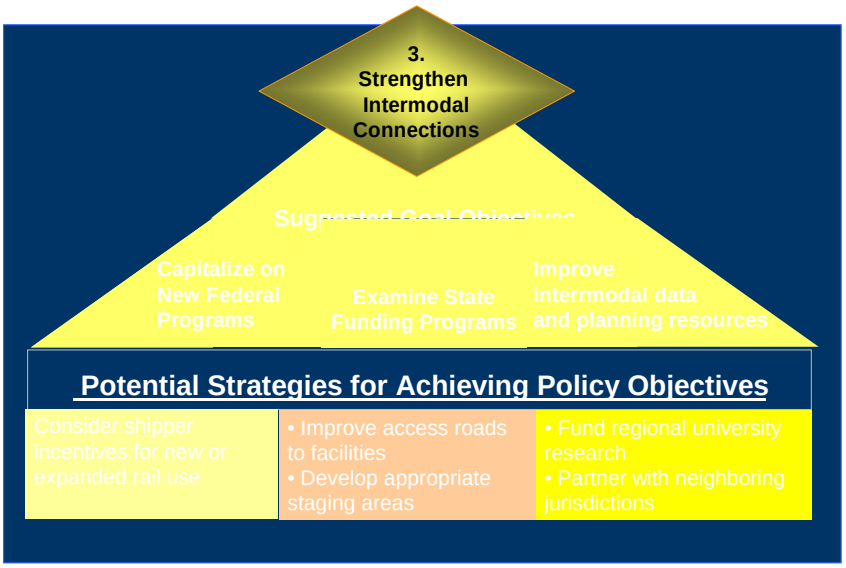


(Graphic provided by ATRI)

Recommendation 2.4: Benchmark Against Federal and Other State Performance

There are currently several initiatives underway at FHWA, and several states to continue improving freight performance measurement. MoDOT should keep a close watch on these performance measure developments and when possible benchmark complementary measures for the state against other state and national data.

Freight Goal #3: Strengthen Intermodal Connections



Recommendation 3.1: Develop a State Program for Funding Key Freight Connectors

Intermodal connectors impact the movement of freight in Missouri and elsewhere by affecting access to modes and often reducing overall transportation efficiency. The accessibility to the National Highway System (NHS) and other important transportation gateways is a significant factor which influences new business start-ups, new warehouse locations, and new freight terminals and facilities. Additional costs as a result of poor accessibility are often realized as lost driver time, equipment damage, and transit delays. Local congestion is often increased when trucks have to navigate inadequate turning lanes and narrow roadways to pick up or deliver freight off the NHS.

In 2000, FHWA completed a report to Congress on the role and condition of intermodal highway connectors to the NHS. The study found that freight connectors are typically located in older, industrialized and mixed land use areas that are subject to physical constraints. They usually average less than two miles in length and have lower design standards than mainline NHS routes (primarily Interstates and arterials). FHWA found that freight connectors are in poorer condition than NHS routes, which can slow freight movement, damage goods in transit, decrease efficiency, and negatively affect safety. Specifically, FHWA's NHS Intermodal Freight Connectors report found:

- Nearly one-third of total connector miles were judged to be in need of additional capacity.
- Approximately 38 percent of connector miles needed pavement work, which includes resurfacing and reconstruction of lanes and shoulders.
- Only 20 percent of total connector miles were considered to have adequate pavement and lane or shoulder width.
- A program to eliminate identified deficiencies is estimated to cost more than $2.5 billion (current 1996 $).

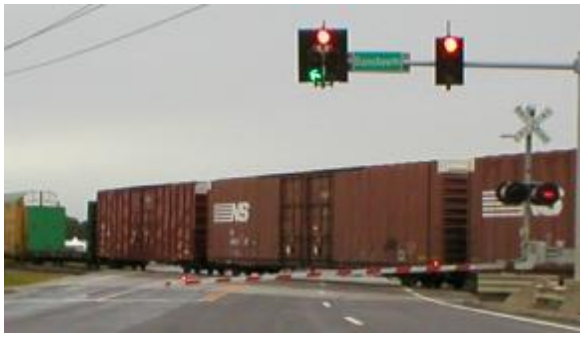
Given the needs identified and the critical role connectors play in efficient freight movement, it is anticipated that Congress will designate a connectors program in the next highway reauthorization. As already described, a significant effort has been made for this study to expand and document terminal and intemodal facilities that generate significant levels of truck traffic (50+ truck trips per day) in Missouri. The inventory of freight facilities developed during this study can assist MoDOT planners in identifying and prioritizing connector routes needed in Missouri. Some connector route needs have already been identified by MPOs in Missouri, for instance Kansas City undertook the Intermodal Freight Strategies Study that provided recommendations to improve access to several key industrial areas in the Kansas City region with large concentrations of freight terminals (Missouri River valley, the Blue River valley and at the junctions of major freeways). St. Louis in its long range transportation plan Legacy 202, identified terminal access issues related to the highway system, and also identified a Priority Goods Movement Network that encompasses highway, rail, water and air facilities considered to be essential to the efficient movement of freight in the region.

Through the interview / survey process undertaken with carriers and shippers in Missouri, other needs related to terminal access were also identified.

Terminal Access Needs Identified by Rail Carriers:

- Terminal infrastructure: Kansas City and Chicago threaten the ongoing vitality of the St. Louis gateway as a major connection point between the eastern and western rail networks. Improved fluidity of traffic at the alternative gateways may serve to reduce the flow of rail traffic through the St. Louis area to the possible detriment of St. Louis-area rail users.
- The St. Louis metro region should be seen in a bi-state context. Much of the developable land for rail-served clients is on the Illinois side of the river. Lack of adequate bridge capacity is hampering abilities to improve the overall level of terminal and through rail service.
- Highway improvement projects should be considered and designed in the context of an overall regional infrastructure plan that includes rail and transit modes. The needs of rail carriers and users appear to be treated as an afterthought by sections of the Illinois and Missouri DOT's.

Air Cargo Terminal Access Needs Identified by Airports and Air Carriers:



- **St. Louis Lambert International**: At-grade rail crossing to the north of the airport at James S. McDonnell Blvd. causing truck delays. James S. McDonnell Blvd. is the primary access road to STL air cargo facility for freight to the north and west of the airport (I-270, I-70). Frequent trains slow and often stop at the crossing causing delay to trucks entering and exiting STL's air cargo facilities. Airport construction at the northwest area of the airport is causing delays on James S. McDonnell Blvd., Banshee Rd. and N. Lindbergh Blvd.

- **Columbia Regional Airport:** Access to air cargo facilities is via Airport Rd., same passenger traffic (no dedicated freight access). The south entry road, Angel Lane, provides a more direct route to the cargo facility for freight arriving and departing to the south. However, truck traffic is prohibited on the road forcing all freight traffic to Airport Road.

Recommendation 3.2: Facilitate and Support Other MPO and Regional Development Commission Efforts Plan for Future Freight Movements within Their Jurisdictions

In today's global marketplace the need to "think globally and act locally," often is a heavy burden on urban transportation networks. Improving freight mobility within metropolitan transport networks can result in substantial cost savings to regional business and ultimately increase Missouri's economic competitiveness.

With the tremendous growth experienced in many metropolitan areas over the past several decades, urban planners are being challenged to incorporate sustainable development methods into their planning process. Sustainability with respect to freight implies the degree to which safety and economic benefits of freight transport are maximized, while at the same time minimizing travel delay and pollution. Sustainability with respect to freight is likely to be best addressed through efforts such as:

- Maximizing the efficiency of regional logistics systems;
- Facilitate freight consolidation and intermodal transfer facilities;
- Promoting safe and efficient infrastructure design; and
- Urban (corridor) planning and design.

Recommendation 3.3: Examine the Adequacy of the State's Freight Staging Areas

In today's "Just-in-time" environment many businesses have extremely tight delivery windows. Shippers will often not let truck drivers on their premises prior to the scheduled delivery time, and late deliveries are penalized. As a result, many truck drivers attempt to "stage" their vehicles in a position that allows them to achieve their destination with a high degree of precision even in congested condition. Increasingly, drivers use public-rest areas, highway shoulders, truck-stops and parking lots as staging areas. MoDOT should undertake investigations to determine the adequacy of staging areas in the state, especially in regions with time sensitive industries.

Goal #4: Use Technology to Enhance Freight Operations

Recommendation 4.1: Use ITS to Improve Freight Highway Network Reliability

ITS (Intelligent Transportation Systems) technologies have proven to be a relatively low-cost means of improving traffic operations, increasing safety and efficiently collecting traffic data. The USDOT developed a "National ITS Architecture" to provide a framework with a common reference for planning, defining and integrating ITS across jurisdictions. Another compelling reason to follow the National ITS Architecture is the TEA-21 requirement that any ITS project receiving funds from the highway trust fund "conform" to the National ITS Architecture and applicable standards. Some of the benefits of ITS include:

- reduced design costs and deployment times;
- orderly and efficient system expansion;
- better communication between people and systems;
- potential to reduce life-cycle costs;
- lower risk; and
- standard interfaces

Missouri ATIS: Missouri currently operates four traffic management centers (TMCs) in four of the state's largest population centers. Each TMC is designed to lessen traffic jams by improving rush-hour speeds, to increase safety by decreasing the number of rush-hour accidents, and to improve emergency response to traffic situations. The TMCs utilize ITS technologies such as in-pavement sensors, closed circuit television cameras, large electronic message boards, and Highway Advisory Radio systems to gauge traffic flows, monitor conditions and keep travelers informed of urgent traffic information. Kansas City Scout is a partnership between MoDOT and the Kansas Department of Transportation to manage freeway traffic in the Kansas City metro area. Gateway

Guide is a regional partnership between MoDOT, the Illinois Department of Transportation, East-West Gateway Council of Governments, and Metro (regional transit authority) for the St. Louis region. OzarksTraffic is a joint effort of the City of Springfield and MoDOT that provides the Springfield region with traffic information for the convenient, efficient and safe movement of people and goods throughout the Springfield region. Branson TRIP is a partnership between MoDOT, the Federal Highway Administration and private companies to provide traffic and traveler information for the Branson area.

Recommendation 4.2: Integrate New ITS Information to Serve Freight Stakeholders

Recently the KC Scout System began a project to look at integrating the region's intermodal operators into the real-time traffic monitoring. The *Request for Proposals* suggested the following guidance for the integration project:

> *"This project will provide for the analysis, design, implementation, and integration of an information system that shares information with the Kansas City metro area intermodal community… Information may be provided through the use of pagers, fax machines, web/internet, variable message signs or other identified modes. This Information can then assist the transportation user in making informed choices on trip departure times and routes at an individual level. The project may also include receiving and/or collecting of data from or about the intermodal community….Intermodal connection points which should be considered as potential targets for this information system include railroad terminals, intermodal yards, truck terminals, water ports, freight areas at the airport and other points of concentrated goods movement for the freight community.*[13]

This project should be closely monitored and benefits derived from the project should be marketed to freight stakeholders and other TMC's across the state.

Recommendation 4.3: Partner to Integrate ITS Systems in Long-Haul Freight Corridors

One of the key differences between commercial truck and passenger travel is the tendency for long distance, multi-jurisdictional trips required for freight movements. While the majority of passenger vehicle movements are made for home to work, or shopping trips within a single metropolitan region, the typical for-hire commercial truck travels long distances often across multiple local and state jurisdictions. According to the 2002 Vehicle Inventory and Use Survey, the typical "for-hire" truck in Missouri averages nearly 72,000 miles per year.[14]

A prominent goal of ITS integration strategies over the next 10 to 20 years is to significantly increase the efficiency of freight operations by making available accurate real time information to carriers and commercial vehicle drivers across heavily traveled corridors. The integration of public and private information systems along significant corridors such as I-70, I-44 and I-55 can also provide motor carrier enforcement agencies the opportunity to streamline safety and security assurance procedures. Public / private data exchange is also likely to become a hallmark of efficient intermodal operations. Electronic transactions supporting intermodal interchanges among trucks, railroads, ships, and air-freight lines can reduce wait times at terminals and staging areas.

Achieving the vision for future commercial transport operations in heavy use corridors will require the establishment of a corridor-wide architecture and communications infrastructure that enables future technology integration efforts.

In planning for ITS, it is common practice to develop a vision for how the ITS will operate in the future. To that end, the following is a "story" about how ITS might be deployed in heavily used

freight corridors and describes how ITS might affect future operations in prominent freight corridors. A horizon year was not specifically indicated, it was presumed that the applications discussed would be accomplished between now and 2030:

Traffic and Incident Management: *MoDOT has deployed and expanded multi-faceted freeway management systems in major metropolitan areas across I-70, I-44, I-55 and other freight significant corridors, and at additional key locations along the rural sections of these facilities. These systems provide the ability to quickly identify traffic accidents and other incidents, as well as adverse weather and pavement conditions, and convey this information to commercial vehicle drivers, other long distance travelers, and agencies with transportation management responsibilities. There is close coordination among freeway traffic management centers (TMCs) within individual jurisdictions as well as across neighboring state boundaries. Traffic management tools utilized along the corridor include ramp metering, dynamic message signs (DMS), traffic and incident detection technologies, and camera surveillance.*

Incident management activities have become much more sophisticated and efficient due to enhanced interagency incident response and coordination along with the use of ITS technologies to assist in incident detection, verification, response, and information dissemination. TMCs receive data about traffic conditions near incidents from electronic sensors in or along the roadway. Live video images of incident scenes are sent to TMCs and emergency management centers. Traffic probe technologies, consisting of automatic vehicle location devices on police and maintenance fleets, private vehicles equipped with transponders, and cellular phones assist in the detection, verification and clearance of incidents. Probes provide speed and location data continuously or at reader points along the roadway. As a result of these incident management tools, non-recurring congestion and secondary incidents have been reduced significantly.

Commercial Vehicle Operations (CVO): *It is envisioned that over the next 10 years, trucking and freight operations will become much more efficient along heavy use freight corridors, largely due to the availability of accurate information in electronic form. In addition, many carriers have equipped their vehicles with a variety of productivity and safety improvements such as mobile communications systems, navigation and tracking systems, on-board vehicle monitors, collision avoidance devices, crash restraints, and vision enhancement equipment.*

Most trucks are equipped with ITS vehicle to roadside (VRC) communication transponders, which transmit messages to and receive messages from the roadside. En-route delays at weigh stations have been dramatically reduced since the year 2005. Electronic screening is used to check the vast majority of vehicles at mainline speeds. A clearance message transmits vehicle, carrier, driver, and specially regulated load type identifiers to roadside readers. The identifiers are used to access status information stored in the information systems of commercial vehicle enforcement and credentialing agencies. Safety status, credential, tax, and permits are checked at mainline speeds. Carriers that participate in clearance programs operate trucks without keeping paper credentials on-board.

Carriers that voluntarily adopt driver alertness management programs and equipment are exempted from maintaining trip logs. Other carriers maintain trip logs electronically. International border crossing clearances occur with little or no delay. Routine shipments are cleared by use of electronic data interchange (EDI) well in advance of the vehicle approaching the border, and more often than not, the vehicle passes with less than a minute delay. When inspections occur, they are conducted quickly with the aid of automated safety inspection equipment.

Safety systems are used throughout Interstate and priority NHS corridors. One of the systems, called the Infrastructure Assisted Hazardous Warning System, is an advanced safety system that alerts drivers, via an in-dash display, when they approach potentially hazardous areas of the highway. MODOT has identified

these areas, such as known high-accident concentration locations, certain exit ramps, construction areas, etc. When a vehicle enters a hazardous zone, the on-board system notifies the driver and records pertinent information. Another system in use is an Automatic Collision Notification System. When this onboard system senses that an incident may be imminent, data is automatically recorded before and after the incident. The system then determines the location of the vehicle and automatically notifies fleet headquarters and the appropriate emergency response agencies.

Electronic transactions support intermodal interchange among trucks, railroads, ships, and air-freight lines. All trailers and containers are equipped with a standard intermodal tag. This tag can be read on highways, on rail lines, at truck and rail terminals, and at shipyards.

Motor carriers use fleet management systems to optimize schedules, routing, and maintenance. Accurate highway and traffic data is available to support routing. Carriers can choose to track vehicles throughout North America. Many carriers maintain databases of the location of each shipment. Standards are available to support cross carrier queries and tracking, so a shipper can find the location of a particular shipment via an electronic query. HAZMAT handling data, required by emergency responders to respond to HAZMAT incidents, is available on-line to emergency personnel.

CVO Traveler Information: *A Missouri information clearinghouse has been established to specifically focus on providing customized, subscription based, CVO related traveler information. Commercial vehicle customers use the information for:*

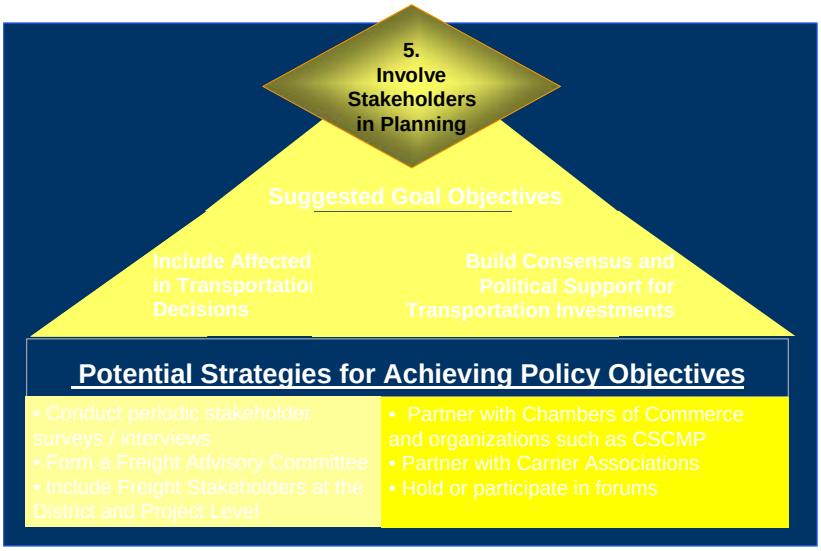
- *Pre-trip routing and dispatching*
- *En-route rerouting and rescheduling*
- *Asset tracking and management*
- *Monitoring driver performance variance versus schedules*
- *Notification to customers of updated driver ETAs*
- *Determining feasibility of new load opportunities*

Information is provided to commercial vehicle operators and fleet managers in multiple formats, through a variety of channels, including kiosks, in-vehicle equipment, and personal hand-held devices. Data sources include state and local traffic management centers, parking management systems, weather information providers, and construction and maintenance systems and databases.

MoDOT is making progress on broadening the availability of traveler information for the CVO community. Currently, work zone and construction delay information is made available at www.modot.org. As part of its "Drive Smart" campaign, MoDOT has implemented a Work Zones Locator Map. The map provides options for travelers to view work zones in several different ways. Viewers may choose by destination, route or region then click a work zone icon on the map for more info. Partnerships with KC Scout and Gateway Guide provide travelers with real-time information for the Kansas City and St. Louis metropolitan areas.

Heavy use freight corridors 511 Implementation: *In response to the Federal Communications Commission designation of 511 as the universal nationwide access number for traveler information (much the same way 911 is used to report emergencies), several multi-state efforts have initiated projects for providing real-time information on traffic and roadway conditions using the 511 phone number, websites, and e-mail services. An example in the Missouri region is the High Plains Corridor that includes I-80 and I-70. Developing systems cooperatively results in operational savings and provides the foundation for broader 511 statewide deployment in significant freight corridors.*

Goal #5: Involve Freight Stakeholders in the Process



Recommendation 5.1: Form a Statewide Freight Advisory Committee

Recently MoDOT completed the **Planning Framework** that emphasizes the importance of having a transparent planning process that merges public involvement with decision making.

The general public generally views freight, and the vehicles used to transport goods, as obstacles to their personal travel needs: i.e. large intimidating trucks or long annoying trains. However, the logistics revolution is changing the nature of business competition. The ability of state and local economies to compete and supply quality jobs is becoming increasingly dependent on the accommodation of business transportation needs. Transportation affects many facets of the private sector – but often they are affected differently than stakeholders using the transportation system for commuting, shopping or personal auto trips. When planning transportation systems, public agencies must also think about whom the system is serving, and there can be significant differences between facilities designed exclusively for passenger travel, versus a facility designed to move freight. For instance, while passengers are interested in smooth pavements and the ability to maintain speed, shippers and trucking companies will be more interested in whether the pavement or bridge is weight restricted.

Many freight trips involve long distance travel, and as a result, strategies that can help commercial vehicles avoid congested areas require different approaches and different technology than approaches appropriate for work to home commuters. In a similar fashion, the intermodal nature of freight often results in bottlenecks in and around terminal locations and other areas not frequented by passenger travelers. Unfortunately, experience has shown that the private sector does not often respond well to the typical means for gaining input such as public hearings/meetings.

While commercial transport is important to the business and industrial sectors generating and receiving freight, all facets of society benefit from efficient freight transport as end users of goods and services. Historically transportation planning agencies have fostered arms length relationships with modal representatives from trucking, rail and waterway carriers. Shippers and receivers, the real stakeholders in economic development and job creation, have typically not been involved in the

transportation planning process at all. This public sector attitude toward freight can be attributed to many factors, including the lack of communication between the public and private sectors, the attitude that investments in freight infrastructure is a public subsidy benefiting private business, fierce competitive between the freight modes, and the historical focus of public funds aimed towards passenger transport.

To engage private sector freight stakeholders requires different approaches, but remains simply another form of public involvement. Defining a successful program for engaging the private-sector might be modeled after the definitions for successful public involvement. Ultimately stakeholders affected by the process or project should be informed and to feel that they have had an opportunity for input. Virtually every guide to public involvement also emphasizes the need for a variety of approaches or techniques for getting the message out and for gathering stakeholder feedback.

Creating a formal freight advisory group has become a common first step for many public transportation agencies wanting routine, meaningful dialogue between planners and freight interests. While shippers, carriers and planners sometimes work together, more often than not the shippers and their customers (who are also key stakeholders) are not typically engaged in the transportation planning process, even though it may directly affect their business operations. Planners, carriers and shippers should all be included in meaningful, routine dialogues for creative problem-solving that is required of this unique type of transportation planning.

More recently state governments have also looked to the private sector to assist in project prioritization, and to assist their efforts to move freight projects forward.

Using freight advisory groups to provide policy guidance, and even provide direct input into the program prioritization is becoming a more common practice among state and MPO planning agencies.

The Transportation Equity Act for the 21st Century (TEA-21) reinforced the shift to more comprehensive passenger and freight planning efforts. Today's global markets and the need to "think globally and act locally," often is a heavy burden on state and metropolitan transportation networks. The advent of internet commerce as a means to market and sell products creates further demands that impact transportation network operations. Improving freight mobility in metropolitan transport networks can result in substantial cost savings to regional business and ultimately increase the region's economic competitiveness.

The federal transportation reauthorization package for instance further emphasizes freight in the planning process. For example, among the provisions in The Safe, Accountable, Flexible and Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU) reauthorization package:

- A requirement that freight transportation needs and projects be incorporated in statewide and urban plans and project development processes;
- Expansion of STP eligibility to include intermodal transfer facilities access to them;
- Expansion of TIFIA eligibility to include public or private freight rail projects.
- The creation of authority to issue private activity bonds to finance intermodal facilities and freight rail projects.
- The inclusion of a freight emphasis in a planning capacity building program

Philosophical approaches to planning in the public and private sectors are usually quite divergent. Often public transportation planners are looking for input to assist in formulating long range, 20 year plans. In the private sector, long-range may be seen as a matter of months or a few years. To create momentum early in the formation of an advisory group, it is often helpful to identify a number of "quick start" projects. Quick start projects can provide the sorts of tangible outcomes business interests expect and allow public agencies to educate freight stakeholders about the intricate and challenging transportation planning process.

It is often most effective to work with state or regional Chambers of Commerce and local Council of Logistics Management Area Roundtables to help get an advisory group up and running. Universities with a strong logistics or supply chain management program can also be great resources for identifying key industry players. A freight advisory group can assist MoDOT in identifying and prioritizing transportation projects that can have a positive impact on freight mobility.

There are many transportation venues where coordination can take place between the public and private sectors to create a more sustainable environment for freight movements. Perhaps no other area of transportation planning offers the number of opportunities for private sector considerations during the transportation planning process than freight and goods movement planning.

Recommendation 5.2: Support Local / Regional Efforts to Engage Freight Stakeholders

There are many transportation venues where coordination can take place between the public and private sectors to create a more sustainable environment for freight movements. Perhaps no other area of transportation planning offers the number of opportunities for private sector considerations during the transportation planning process than freight and goods movement planning.

During the literature review of freight related efforts that have been undertake by urban and regional governments in Missouri, several examples of freight stakeholder outreach were discovered. MoDOT should encourage the inclusion of freight stakeholders in the MPO and district planning processes. It is also important to be aware of local activities to prevent the same stakeholders being called upon repeatedly for the same information. Several examples of regional efforts are summarized below:

- **Freight Roundtable** – 2001, The East West Gateway Coalition of Governments (EWGCOG) conducted a variety of public engagement activities designed to elicit the issues and needs of those who lived and worked in the St. Louis region. In addition to the community meetings held around the region, staff also facilitated several topic-specific roundtables and committee work sessions. One of these was a freight roundtable held in 2001. Participants in the freight roundtable included Missouri Central Railroad, City of St. Charles Economic Development, Regional Chamber and Growth Association and the City of St. Louis, as well as EWGCOG staff. These professionals represented a broad range of freight interests in the region. The roundtable provided input and action items related to freight movement, safety, maintenance and future funding that were considered by EWGCOG in the development of Legacy 2025.
- **Goods Movement Committee –**MARC has established a standing Goods Movement Committee to address the need for input from the freight industry on issues related to the efficient movement of freight in the region. The committee provides ongoing input to the transportation planning process and helps identify and

prioritize needed transportation projects that affect the freight/goods movement sector.

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[1] Missouri Department of Transportation, *REQUEST FOR PROPOSAL:* Freight Movements on Missouri's Transportation System, March 6, 2003. pp.1.

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[3] BEA News, *"Gross Domestic Product by Industry for 2003"* www.bea.doc.gov/bea/newsrel

[4] LOGISTICS!, *"Supply Chain Economics: Making Your Shots Count,"* Mercer Management Consulting. Winter/Spring 1998 pp. 3.

[5] U.S. DOT, Bureau of Transportation Statistics; *State Transportation Statistics 2004*

[6] WilburSmith Associates, Latin American Trade and Transportation Study; Executive Summary March 2001.

[7] Federal Highway Administration (FHWA), Freight Analysis Framework. Web site accessed on 1/17/05 at: http://www.ops.fhwa.dot.gov/freight/documents/WebMeth/index.htm

[8] Ibid, USDOT, pp. 8

[9] Ibid. FHWA

[10] Missouri Department of Economic Development: *A Blueprint for Prosperity and Jobs*, Jan. 2003, pp. 22.

[11] Ibid. Michael E. Porter.

[12] *Methods of Travel Time Management in Freight Significant Corridors*, FHWA and ATRI, Paper Submission to the 2005 TRB Annual Meeting. January 2005. pp. 1

[13] MoDOT, Request for Proposals: *Consultant Services for Kansas City SCOUT Intermodal Integratoin*, Feb. 27, 2004.

[14] U.S. Census Bureau, 2002 Vehicle Inventory and Use Survey: Missouri. Table 2a, page 12.