1.0 Introduction

Over the last decade, the incorporation of freight issues into the transportation planning activities of state departments of transportation has received significant focus from Federal transportation agencies and entities, business and industry leaders, and other key stakeholders. This enhanced focus on integrating freight issues within statewide transportation planning and investment activities has been driven by several factors, including:

- Federal surface transportation legislation, which emphasized freight as a factor that states must consider in the transportation planning process;
- Recognition by business and community leaders that efficient freight transportation is a key factor in statewide and metropolitan economic competitiveness and vitality and an important consideration in business attraction and retention decisions;
- Globalization and international trade, which has heightened the importance of a safe, reliable, and secure transportation system;
- Escalating public safety, health, and environmental concerns, particularly those related to increasing truck and rail traffic; and
- Acknowledgment from private industry that public investments will be considered – and in many cases required – to meet increasing freight demands.

In response to these trends – as well as feedback from its most recent long-range transportation plan – the Kansas Department of Transportation (KDOT) initiated this Statewide Freight Study in order to develop a systems-level overview of the extent and performance of the State's freight system, the commodities that are moving across it, and the existing and emerging freight transportation, industry, and logistics trends that are affecting goods movement into, out of, through, and within Kansas.

The condition and performance of the Kansas multimodal freight transportation system is critically important to the State's existing and future economic competitiveness. In 2006 alone, $894 billion dollars of freight traveled across the system, supporting the operations of critical Kansas industries, producing jobs for its residents, and contributing millions of dollars of tax benefits to local communities. By 2030, over 1.2 billion tons of goods, valued at $1.7 trillion, will be transported into, out of, within, and through the State. Ensuring the safety, reliability, and efficiency of these movements will be critical in helping the State meet its long-term mobility and economic development goals.

This report summarizes our approach, key findings, and recommendations to KDOT to more effectively address critical statewide freight needs and issues. The remaining sections of this report include:

- **Section 2.0 – Approach**, which outlines the data sources, information, and stakeholder outreach process we used to describe the Kansas freight system and its users;

- **Section 3.0 – Kansas Statewide Freight System and Commodity Flows**, which provides a description of the extent of Kansas' multimodal freight system as well as a summary of the types, volume, and value of goods that are moving into, out of, within, and through the State;

- **Section 4.0 – Freight and Industry Trends**, which describes the key socioeconomic and industry factors driving freight demand in Kansas;

- **Section 5.0 – Key Challenges**, which provides a discussion of the key infrastructure, institutional, and policy issues facing current and future freight movements in Kansas;

- **Section 6.0 – Conclusions and Recommendations**, which provides recommendations that will allow KDOT to more effectively respond to and address freight issues and challenges, as well as specific action items KDOT can implement to get the process started; and

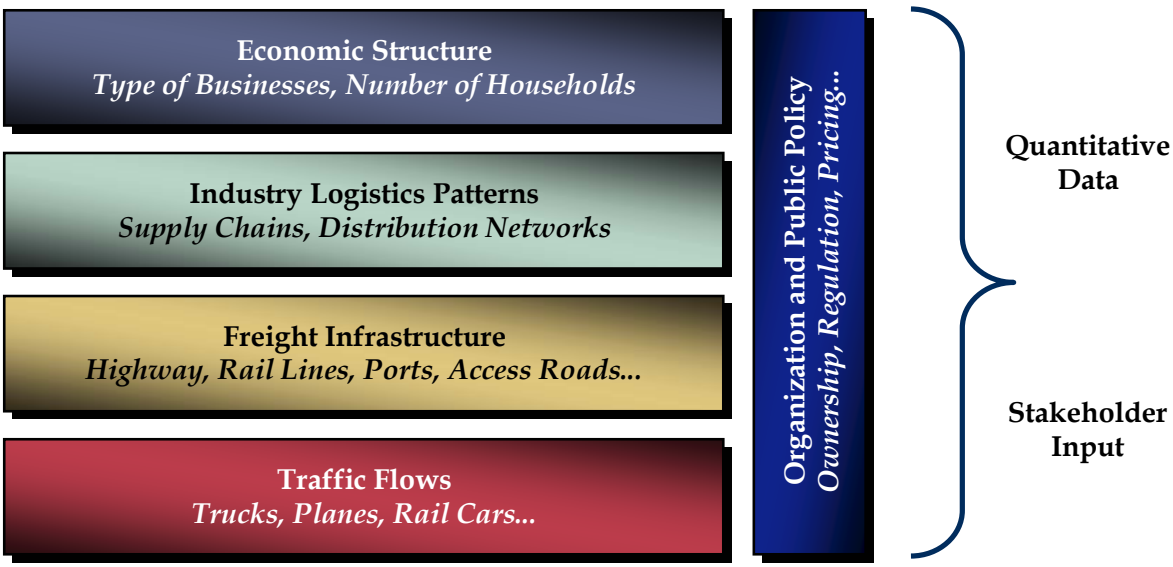
- **Technical Appendices**, which provide summaries of the full set of commodity flow, infrastructure, public policy, and stakeholder outreach analyses and activities conducted to support our findings and recommendations.

2.0 Approach

Our approach to this study consisted of collecting and analyzing data and information (both quantitative and qualitative) that describe the five key elements of Kansas' statewide system. These elements, shown in Figure 2.1, include:

- **Economic Structure,** which determines the types of freight moved into, out of, through, and within Kansas;
- **Industry Logistics Patterns,** which describes the existing and emerging industries in the State that most significantly drive demand for freight transportation;
- **Freight Infrastructure,** which describes the extent and physical characteristics of the freight system, including those elements that are owned and operated by private sector freight stakeholders;
- **Traffic Flows,** which describes the commodity flows moving along freight system, and how those flows are expected to change in the future; and
- **Organization and Public Policy**, which describes the political and institutional environment within which system planning, investment, and operational decisions are made.

Figure 2.1 Elements of the Kansas Statewide Freight Study



In implementing this approach, we analyzed both quantitative and qualitative data to produce a series of technical memoranda describing each of these elements. These technical memoranda, which are included as appendices to this report and described below, provided the analytical data and information required to inform our findings and recommendations:

- **Public Policy Profile** (Appendix A) identifies the most critical statewide and Federal policies, strategies, and initiatives impacting goods movement in Kansas;
- **Commodity Flow Profile** (Appendix B), describes the types, volume, and value of goods moving into, out of, through, and within Kansas now and in the future;
- **Industry and Economic Profile** (Appendix C), describes our analysis of industry and economic trends impacting the Kansas freight system, and included an identification of the State's most critical existing and emerging industries;
- **Infrastructure Profile** (Appendix D), describes the physical extent and individual components of the Kansas statewide freight system;
- **Data Collection Strategy** (Appendix E), describes the full set of data sources utilized in the study effort; and
- **Stakeholder Outreach** (Appendix F), describes the methods used to engage statewide freight stakeholders in the process.

The development of these technical memoranda was supported by a data collection strategy and a comprehensive public outreach strategy, described below.

2.1 Data Collection Strategy

A variety of current and forecast (2030) data and resources were required to support this freight study. Current data sources are essential to describe existing conditions on the State's freight system, describe current commodity flow patterns and modal shares, and identify physical or operational chokepoints impacting the performance of the system. Forecast data were gathered in order to understand future demand on the system, highlight potential performance issues and bottleneck locations, and identify changes in commodity flow patterns and modal usage patterns.

We used a mixture of public and private data sources, shown in Table 2.1 and described in more detail in Appendix E, to support the development of technical memoranda described above.

Table 2.1 Types of Data Used in the KDOT Freight Study

Type of Data	Data Sources	Use within the Study
Industry and Economic Data	• Woods & Poole • Moody's Economy.com • U.S. Census • U.S. Bureau of Economic Analysis • KS Department of Revenue	Describes the industries that make up the Kansas economy, their geographic distribution, and the contribution of each to the State's output. Describes the State's socioeconomic and labor profiles.
Freight System Data	• KDOT GIS files, including highway, rail, cargo airports, etc. • U.S. Army Corps of Engineers Waterborne Data	Describes the Kansas multimodal freight infrastructure, including its extent, performance, and operational characteristics.
Commodity Flow Data	• IHS/Global Insight TRANSEARCH multimodal dataset for Kansas • County Agricultural Production Profiles • Industry Data • National Agricultural Statistics Service	Describes the commodity type, volume, and value of freight moving into, out of, through, or within Kansas. Assigns freight movements to specific infrastructure.

2.2 Stakeholder Outreach

The Kansas Statewide Freight Study's public engagement efforts built upon the outreach used by KDOT to develop its recent Long-Range Transportation Plan. By strengthening and expanding relationships previously built with statewide freight stakeholders, the freight study made sure that appropriate stakeholders were brought into the statewide freight planning process to help build understanding and support around freight issues. The stakeholder engagement measures are summarized below, and discussed more thoroughly in Appendix F:

- **Kansas Freight Advisory Group –** This group, which consisted of key freight stakeholders from across the State and from a variety of industries, provided insight on freight issues in Kansas, reviewed all deliverables, and ensured Study recommendations were technically and politically feasible. Meetings were held at key milestones, giving the Advisory Group the opportunity to provide the study team with guidance on emerging and evolving freight issues, as well as the potential operational and political impacts of proposed strategies and tactics.

- **Study Coordination Team –** The Study Coordination Team included other organizations also studying state and regional freight issues within Kansas, including the Mid-America Regional Council (MARC), which is undertaking a regional freight plan in the Kansas City metropolitan area; the Wichita Area Metropolitan Planning Organization (WAMPO), which is undertaking a metropolitan freight study; and Kansas City SmartPort. Two meetings were held to ensure that the information and analysis activities being undertaken within all of these related freight study efforts were informed, coordinated, and consistent.

- **Stakeholder Interviews –** Over 60 stakeholder interviews were conducted with leaders of key Kansas business, community, law enforcement, economic development, and freight and logistics industry organizations. The interviews helped the study team understand Kansas freight issues, including bottlenecks, emerging corridors, industry trends, and commercial vehicle permitting issues.

- **Regional Meetings –** Eight regional freight meetings were held in September of 2008 in conjunction with the eight Transportation – Leveraging Investments in Kansas (T-LINK) Task Force[1] meetings across the State. The goal of the eight workshops was to share the region-specific preliminary findings developed through our technical analysis, interviews, and Study Coordination Team meetings and gather additional feedback from regional stakeholders across the state.

- **Statewide Freight Summit –** A Statewide Freight Summit was held in February 2009 to roll out the draft preliminary recommendations of the Statewide Freight Study to statewide freight stakeholders. Approximately 45 freight transportation stakeholders attended to hear the recommendations and discuss specific concerns around the implementation of the recommendations.

- **Project Web Site/FTP Site –** A web site and file transfer protocol (FTP) site containing regularly updated project information and reports was maintained throughout the duration of the project.

[1] The T-LINK Task Force was formed by Governor Sibelius in 2008 and charged with crafting a new strategic transportation approach for the State. Detailed information about the T-LINK Task Force is available at http://www.kansastlink.com/.

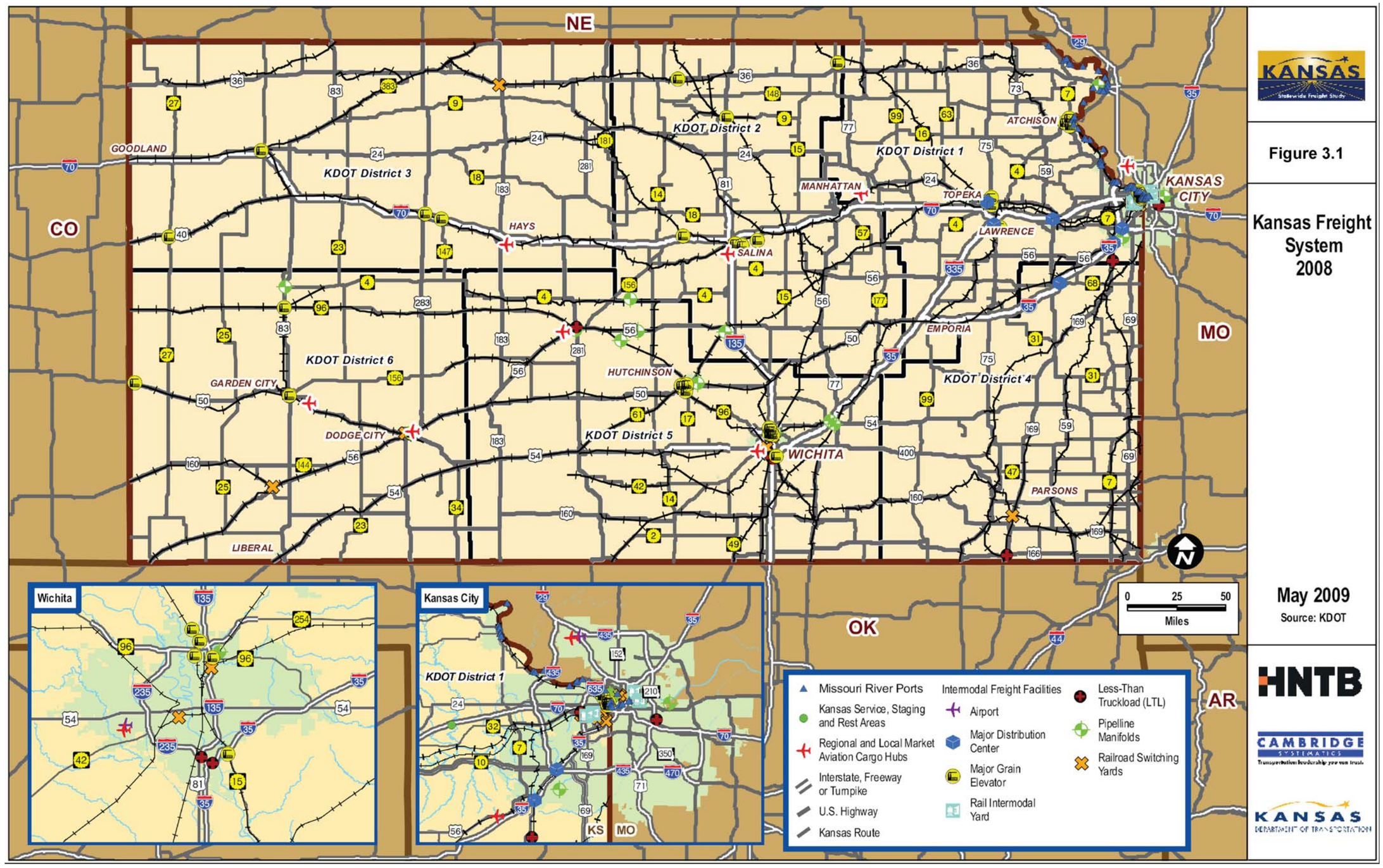
3.0 Kansas Statewide Freight System and Commodity Flows

Understanding the individual elements of the Kansas statewide freight system, as well as the commodity flow patterns along it, is critical to help KDOT better assess the ways in which freight vehicles are using the transportation system, and how freight movements contribute to system capacity and congestion, bridge stress, pavement consumption, economic development, and overall quality of life. This section describes the elements that make up the Kansas statewide freight system, the weight and value of the commodities moving in Kansas by mode and movement type (interstate, intrastate, and through), and the top commodities in the State by weight and value. Appendices B and D provide more detailed information about Kansas commodity flow patterns and the Kansas statewide freight system, respectively.

3.1 Freight System Overview

Kansas' goods movement system, shown in Figure 3.1, is fully multimodal, with infrastructure and facilities extending into all corners of the State. Major trade corridors, including Interstates 35 and 70, the Kansas Turnpike, the BNSF Trans-Continental (Transcon) line, and the Union Pacific (UP) mainline provide east-west and north-south connectivity across the State and provide access to major national and international markets. These trade corridors are fed by a number of national, state, and local roads, shortline railroads, and connecting facilities that serve to connect local population centers and industries to outlying markets. Finally, a series of public and private ports and docks on the Missouri River connect the State with the U.S. inland waterway system via the Mississippi River in St. Louis.

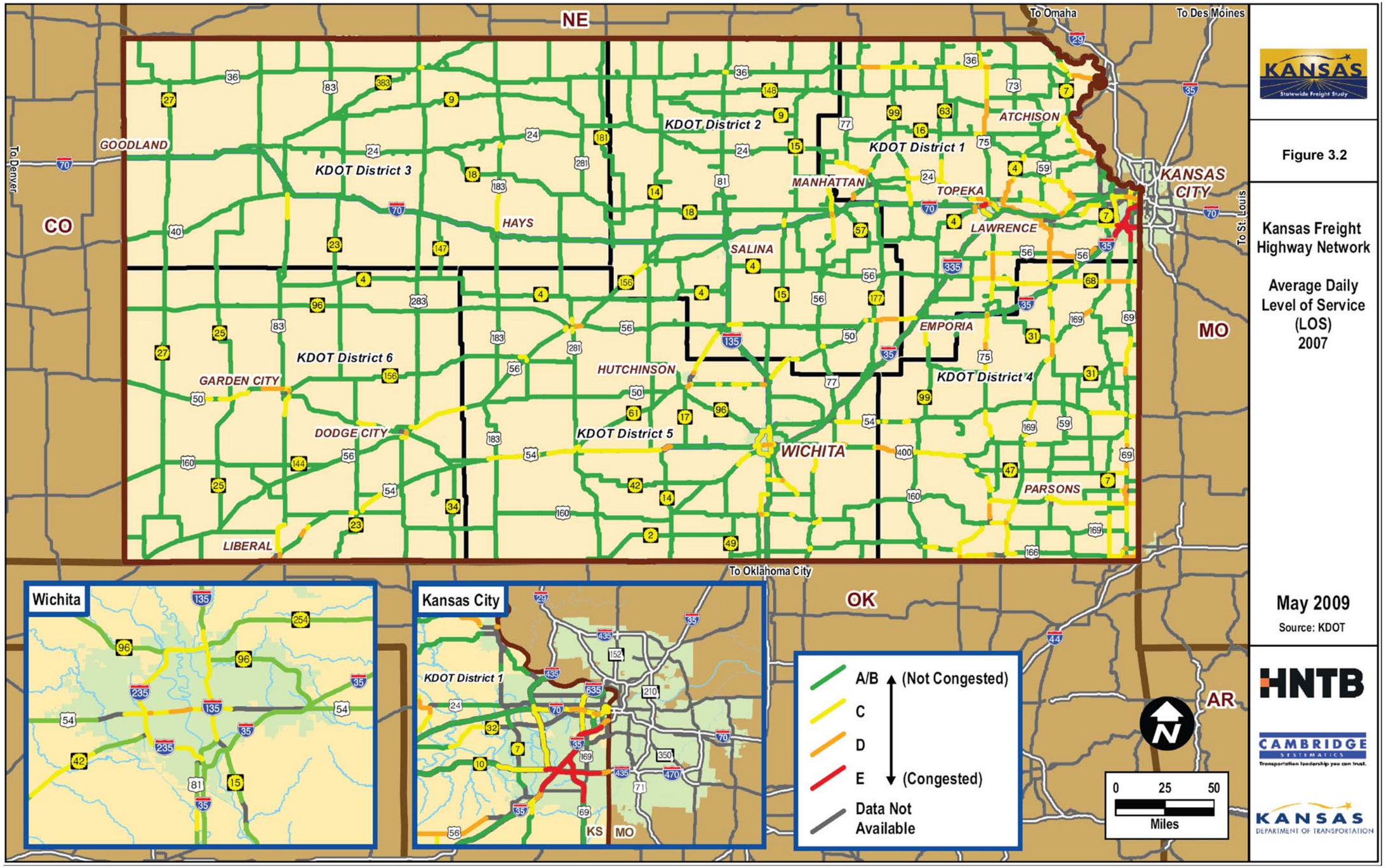
Though the air cargo and river port system offer critical services to some industries, the truck and rail modes carry the vast majority of goods moving into, out of, and through Kansas. In 2006, these two modes combined to handle approximately 99 percent of all shipments moving into, out of, through, and within the State (by weight).


NE
CO
MO
OK
AR
KS
GOODLAND
KDOT District 3
KDOT District 2
KDOT District 1
ATCHISON
MANHATTAN
TOPEKA
KANSAS CITY
LAWRENCE
HAYS
SALINA
EMPORIA
KDOT District 6
GARDEN CITY
HUTCHINSON
KDOT District 4
DODGE CITY
KDOT District 5
WICHITA
PARSONS
LIBERAL
Wichita
Kansas City
KDOT District 1
0 25 50
Miles
Missouri River Ports
Kansas Service, Staging and Rest Areas
Regional and Local Market Aviation Cargo Hubs
Interstate, Freeway or Turnpike
U.S. Highway
Kansas Route
Intermodal Freight Facilities
Airport
Major Distribution Center
Major Grain Elevator
Rail Intermodal Yard
Less-Than Truckload (LTL)
Pipelline Manifolds
Railroad Switching Yards
KANSAS
Statewide Freight Study
Figure 3.1
Kansas Freight System 2008
May 2009
Source: KDOT
HNTB
CAMBRIDGE SYSTEMATICS
KANSAS DEPARTMENT OF TRANSPORTATION

Highways

Kansas' highway network is, for the most part, efficient and free-flowing. Figure 3.2 shows the level of service (LOS) on the state highway network in 2007.[1] The vast majority of Kansas' highways operate at LOS A, B, or C, a designation which generally is associated with efficient movement of traffic with only minimal delays. Though some pockets of LOS D and E (more congested traffic) do exist, these areas are concentrated in the urbanized areas, notably Kansas City, Wichita, and Topeka.

[1] LOS is a commonly used service rating that compares total traffic volumes and percentage of trucks to the overall capacity of a given highway. LOS ratings are letter grades, with A representing free-flow conditions and F corresponding to gridlock and service breakdown.


NE
To Omaha
To Des Moines
KANSAS
Statewide Freight Study
Figure 3.2
Kansas Freight Highway Network
Average Daily Level of Service (LOS) 2007
May 2009
Source: KDOT
HNTB
CAMBRIDGE SYSTEMATICS
KANSAS DEPARTMENT OF TRANSPORTATION
GOODLAND
KDOT District 3
KDOT District 2
KDOT District 1
ATCHISON
MANHATTAN
TOPEKA
KANSAS CITY
LAWRENCE
HAYS
SALINA
EMPORIA
KDOT District 6
GARDEN CITY
HUTCHINSON
KDOT District 4
DODGE CITY
KDOT District 5
WICHITA
PARSONS
LIBERAL
To Denver
To St. Louis
To Oklahoma City
CO
MO
OK
AR
Wichita
Kansas City
KDOT District 1
KS
MO
A/B (Not Congested)
C
D
E (Congested)
Data Not Available
0 25 50
Miles

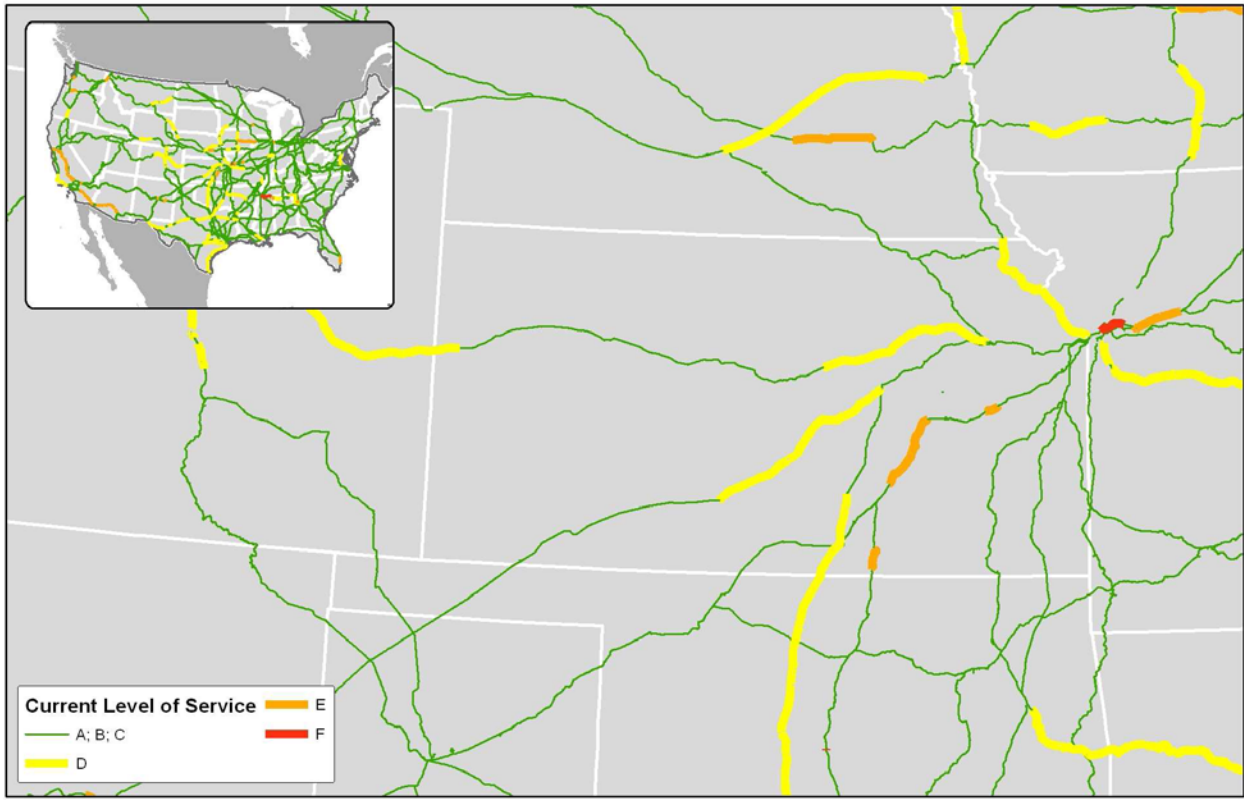
Rail

Kansas has a comprehensive rail network consisting of approximately 4,700 miles of railroad tracks, 2,790 of which are operated by the Class I railroads (primarily BNSF and UP). The remaining 1,910 miles of track are operated by shortline or regional railroads.

As shown in Figure 3.3, the primary corridors[2] of this rail network are operating at LOS A, B, or C, meaning those corridors have available capacity and can effectively recover from incidents or accommodate maintenance activities. A few corridors are already operating near capacity (yellow) or at capacity (orange), indicating only moderate or very limited ability to recover from delays or to absorb additional traffic. Only one link is currently operating above capacity, and although this link is actually located on the Missouri side of the Kansas City metro area, capacity constraints along this corridor can have implications that ripple across the rail network, including those portions in Kansas.

[2] Primary corridors are those that are operated primarily by the State's Class I railroads. They constitute about a third of the U.S. rail network and carry the majority of freight rail traffic. Shortline networks are not included.

Figure 3.3 Kansas Freight Rail Level of Service
2005

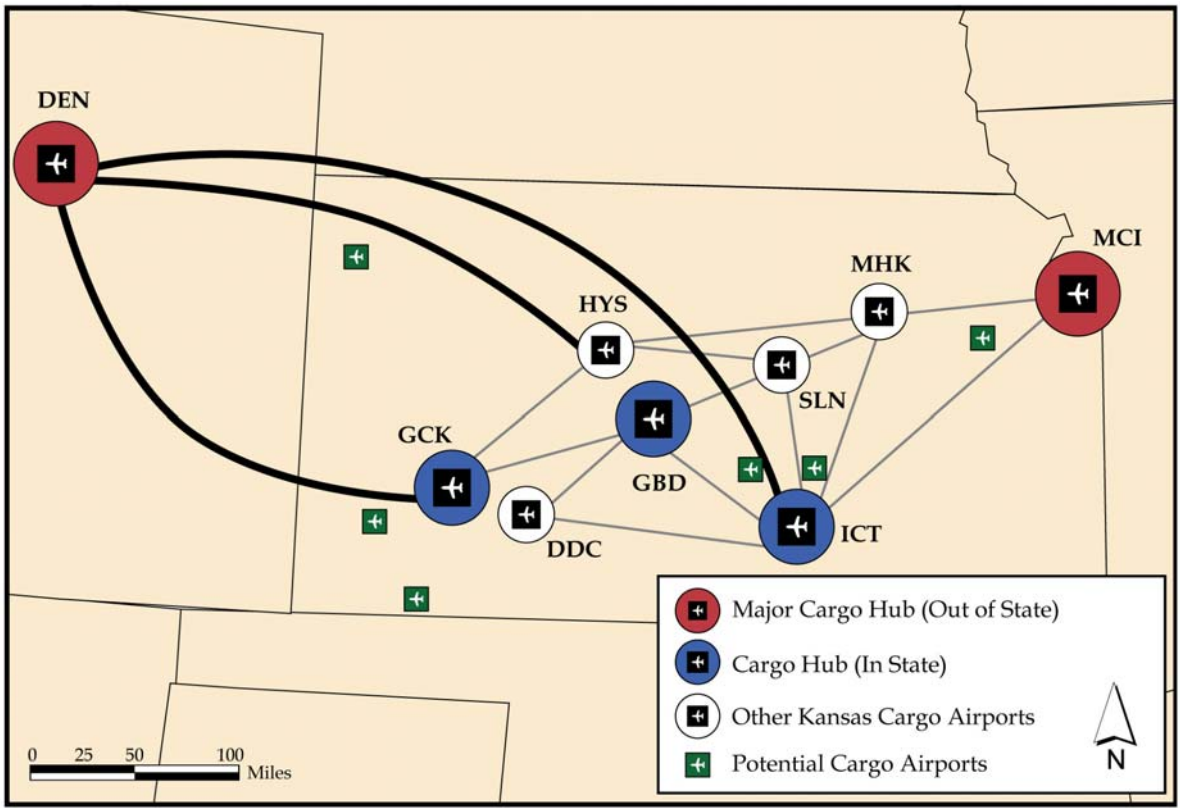


Source: National Rail Freight Infrastructure Capacity and Investment Study prepared for the Association of American Railroads by Cambridge Systematics, Inc.

Air

There are 14 Kansas airports that support air cargo operations in varying degrees of volume and frequency based. As shown in Figure 3.4, Wichita, Great Bend, and Garden City are the most critical air cargo hubs in Kansas, providing connections to major air cargo facilities in Denver and Kansas City, Missouri. These three major hubs also provide connections to the State's other airports, which primarily serve local markets.

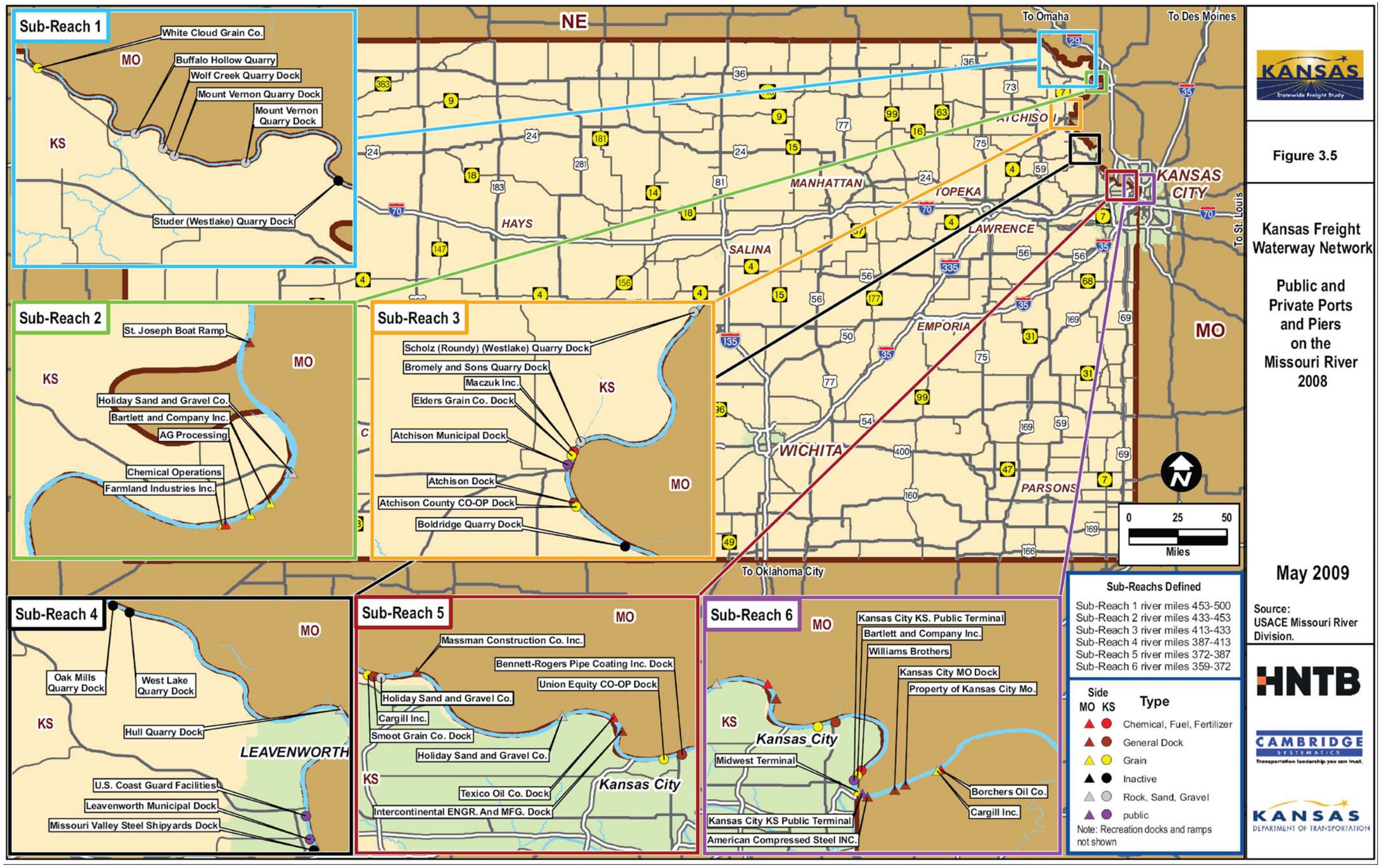
Figure 3.4 Kansas Air Cargo Hubs and Connections



Waterways

Water freight movements in Kansas are dominated by the Missouri River, which runs along a 140-mile stretch through the northeast corner of Kansas, where it forms the boundary between Missouri and Kansas. The Kansas River was considered commercially navigable for only a brief period during the early to mid-1800s. Today, the U.S. Coast Guard, which has jurisdiction for bridges over navigable waterways, has determined that the Kansas River is not a waterway over which it exercises jurisdiction for bridge administration purposes and due to dam and water intake constraints it is not navigable today.

Though there are numerous public and private ports, docks, launching ramps, and marinas along the Missouri River (shown in Figure 3.5), freight movements are negligible.


Sub-Reach 1
White Cloud Grain Co.
Buffalo Hollow Quarry
Wolf Creek Quarry Dock
Mount Vernon Quarry Dock
Mount Vernon Quarry Dock
Studer (Westlake) Quarry Dock
MO
KS
NE
To Omaha
To Des Moines
To St. Louis
To Oklahoma City
ATCHISON
KANSAS CITY
MANHATTAN
TOPEKA
LAWRENCE
HAYS
SALINA
EMPORIA
WICHITA
PARSONS
Sub-Reach 2
St. Joseph Boat Ramp
Holiday Sand and Gravel Co.
Bartlett and Company Inc.
AG Processing
Chemical Operations
Farmland Industries Inc.
Sub-Reach 3
Scholz (Roundy) (Westlake) Quarry Dock
Bromely and Sons Quarry Dock
Maczuk Inc.
Elders Grain Co. Dock
Atchison Municipal Dock
Atchison Dock
Atchison County CO-OP Dock
Boldridge Quarry Dock
Sub-Reach 4
Oak Mills Quarry Dock
West Lake Quarry Dock
Hull Quarry Dock
LEAVENWORTH
U.S. Coast Guard Facilities
Leavenworth Municipal Dock
Missouri Valley Steel Shipyards Dock
Sub-Reach 5
Massman Construction Co. Inc.
Bennett-Rogers Pipe Coating Inc. Dock
Union Equity CO-OP Dock
Holiday Sand and Gravel Co.
Cargill Inc.
Smoot Grain Co. Dock
Holiday Sand and Gravel Co.
Texico Oil Co. Dock
Intercontinental ENGR. And MFG. Dock
Kansas City
Sub-Reach 6
Kansas City KS. Public Terminal
Bartlett and Company Inc.
Williams Brothers
Kansas City MO Dock
Property of Kansas City Mo.
Midwest Terminal
Borchers Oil Co.
Cargill Inc.
Kansas City KS Public Terminal
American Compressed Steel INC.
0 25 50
Miles
Sub-Reaches Defined
Sub-Reach 1 river miles 453-500
Sub-Reach 2 river miles 433-453
Sub-Reach 3 river miles 413-433
Sub-Reach 4 river miles 387-413
Sub-Reach 5 river miles 372-387
Sub-Reach 6 river miles 359-372
Side MO KS
Type
Chemical, Fuel, Fertilizer
General Dock
Grain
Inactive
Rock, Sand, Gravel
public
Note: Recreation docks and ramps not shown
KANSAS Statewide Freight Study
Figure 3.5
Kansas Freight Waterway Network
Public and Private Ports and Piers on the Missouri River 2008
May 2009
Source: USACE Missouri River Division.
HNTB
CAMBRIDGE SYSTEMATICS
KANSAS DEPARTMENT OF TRANSPORTATION

3.2 Commodity Flow Patterns

Although Kansas' freight transportation system currently is able to handle existing freight demand, anticipated growth in freight movements may challenge system capacity in the future. As shown in Figures 3.6 and 3.7, approximately 801 million tons of freight valued at about $894 billion moved into, out of, through, or within Kansas in 2006. By 2030, total freight movements are expected to grow to almost 1.2 billion tons valued at $1.7 trillion, representing annual growth rates of 1.5 percent and 2.7 percent, respectively. While these growth rates are not extraordinary (they generally track with expected economic growth in the same period and are consistent with national projections), they do imply that freight movements will become a greater part of the traffic mix in Kansas in the coming years.

Figure 3.6 Kansas Freight Demand by Weight (All Modes)
2006 to 2030

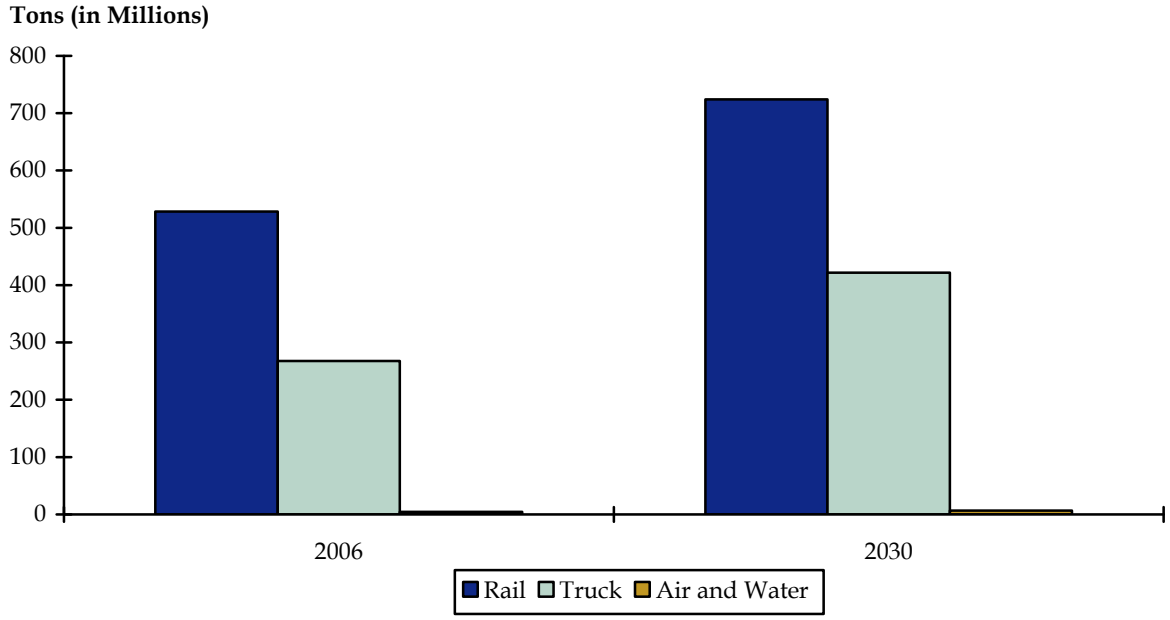
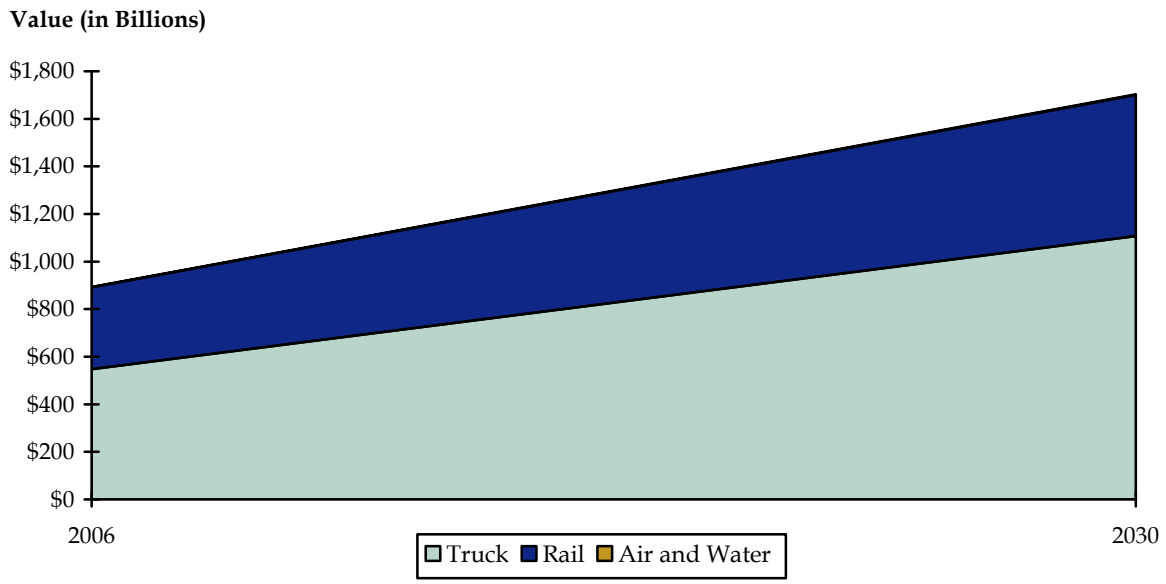


Figure 3.7 Kansas Freight Demand by Value (All Modes)
2006 to 2030



Movement Types

Figure 3.8 shows the total volume and value of shipments into, out of, through, and within Kansas for 2006 and 2030. These movements can be divided into three types:

- **Through movements** accounted for 54 percent ($476.3 billion) of all freight movements in Kansas by value in 2006; this share is expected to decline to 51 percent ($861.7 billion) by 2030;
- **Interstate and International movements** constituted 34 percent (or $306.3 billion) in 2006 but are expected to grow to 36 percent of the total ($618.5 billion) in 2030; and
- **Intrastate shipments** made up 12 percent of the total or $111.2 billion in 2006; this proportion is expected to increase to 13 percent or $224.1 billion by 2030.

Figure 3.8 Intrastate, Interstate, and Through Movements

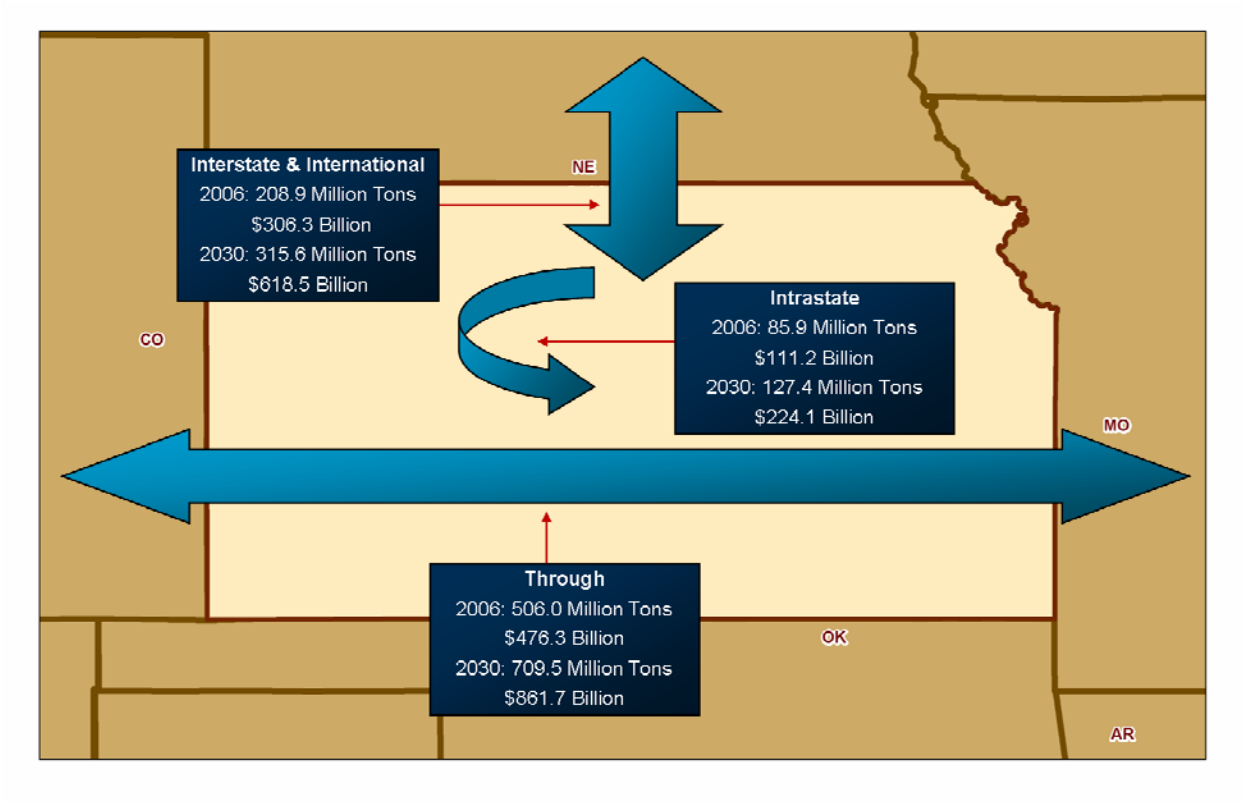
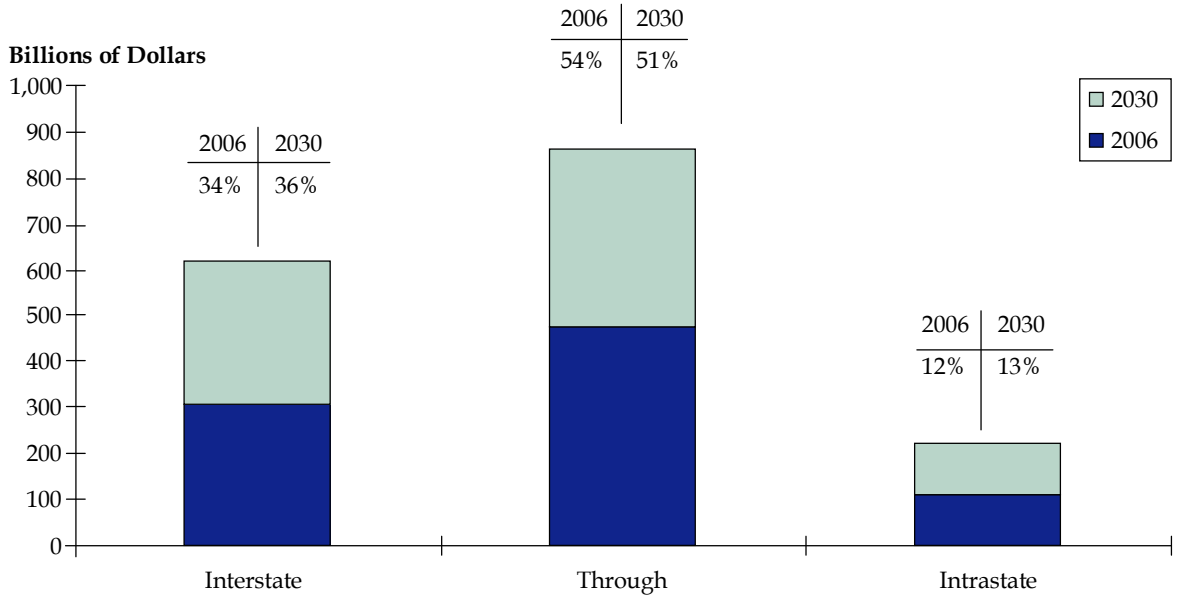


Figure 3.9 shows the current (2006) and forecast (2030) value of Kansas freight flows by type of movement, and associated shares of the total for each. Although the overall percentage of through movements is expected to decline slightly from 2006 to 2030 (54 to 51 percent), these movements (which are overwhelmingly concentrated on the State's major highway and rail trade corridors) will still dominate overall movements in the State. It is important to note that interstate movements are expected to grow significantly, making up 36 percent of total movements by 2030. This indicates that a greater portion of freight movements in Kansas will be directly related to economic activities within the State, a reflection of the general health of Kansas industries.

Figure 3.9 Value of Freight Flows in Kansas by Type of Movement
2006 and 2030



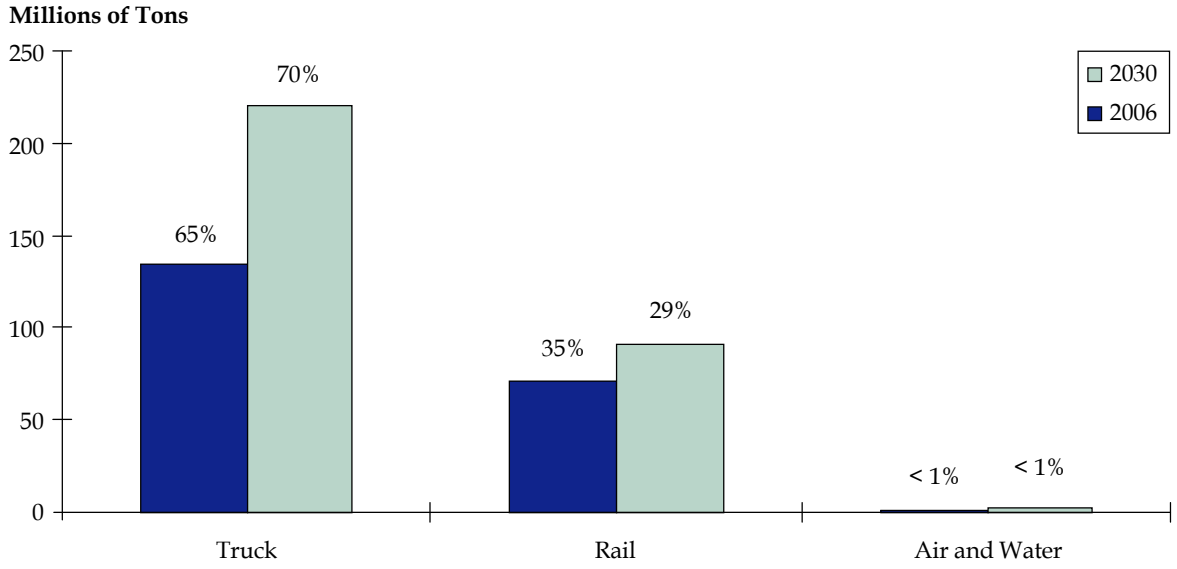
Mode Splits

By Weight

Figure 3.10 shows the mode splits by weight for all freight movements to and from Kansas in 2006 and 2030. Clearly, trucks are the dominant mode, handling nearly 135 million tons (65 percent of the statewide total). This is expected to grow to about 220 million tons, or 70 percent, by 2030. In other words, there were about 12 million interstate truck trips per year in Kansas in 2006 and it is predicted that there will be approximately 19.5 million in 2030.

Rail had a much smaller share of the market than trucks in 2006 (72 million tons, or 35 percent). Total rail volumes are expected to increase to about 91 million tons in 2030 but market share will decline to 29 percent. Other modes (air and marine cargo) currently account for less than 1 percent of total Kansas interstate freight volumes; this proportion is expected to remain unchanged through 2030.

Figure 3.10 Mode Shares by Weight for All Movements To and From Kansas
2006 and 2030



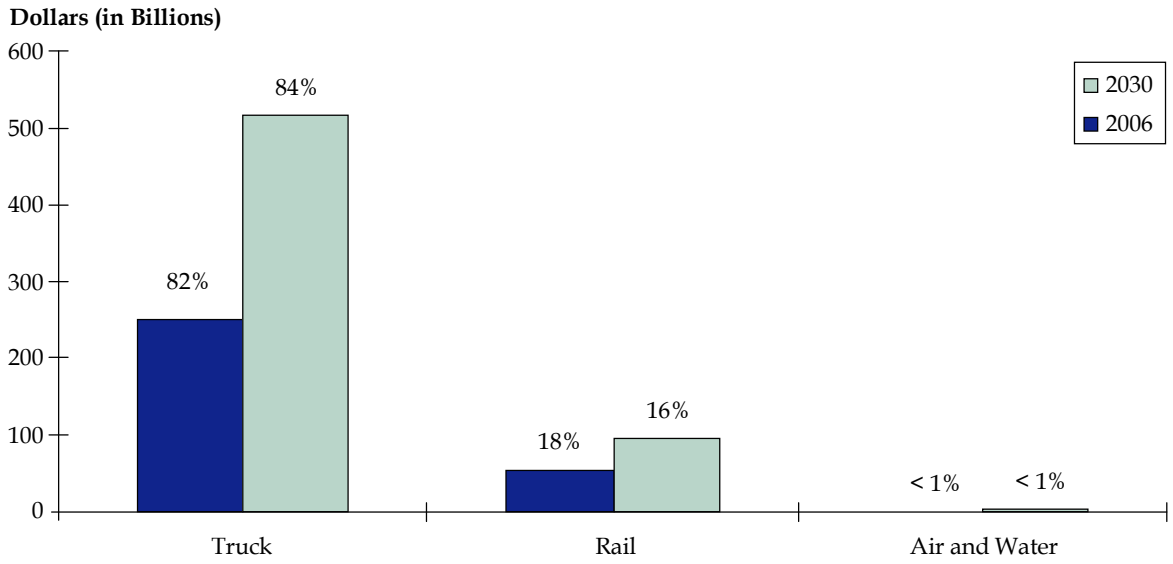
It is important to note that although rail's overall volume is expected to grow between 2006 and 2030, its market share is expected to decline from 35 to 29 percent. At the same time, truck's market share is expected to grow from 65 to 70 percent. This is an important finding, as increasing volume and decreasing market share indicate that the State's rail system may not have sufficient capacity to absorb expected growth. As a result, some of this traffic may shift to truck, further fueling growth in that mode.

By Value

Figure 3.11 shows mode splits for 2006 and 2030 by value. Again, trucks account for the largest share of the value of shipments to, from, and within Kansas, handling 82 percent of shipments, valued at $251 billion. Rail handles a lower share of overall value, approximately 18 percent of shipments in 2006, valued at $54 billion. Truck and rail market shares are expected to shift slightly to 84 percent ($743 billion, more than doubling by 2030) and 16 percent ($96 billion, an increase of 78 percent by 2030), respectively.

It is important to note that air and water modes handled approximately $1.3 billion worth of goods in 2006, and these movements are expected to more than double to $3 billion in 2030. Air movements account for the lion's share of this growth; air cargo movements are expected to nearly triple, from $838 million in 2006 to $2.2 billion in 2030. Although small in absolute terms, this growth in air cargo traffic can have significant impacts for the State, as all are handled by truck on the front and back ends. Continued growth in Kansas' high-tech manufacturing industries, which are heavily dependent on just-in-time shipments of light but high-value goods, will drive this growth.

Figure 3.11 Mode Shares by Value for All Movements To and From Kansas
2006 and 2030



Top Commodities

By Weight

Commodity movements in Kansas (when measured by weight) are currently dominated by coal, which represented 48 percent of all movements in Kansas by weight, or 383 million tons (see Figure 3.12). Agricultural production and livestock represented the next largest share, at 11 percent or 91 million tons. Nonmetallic minerals made up 8 percent (66 million tons), while food products (including beef and processed meats) and chemicals each constituted about 6 percent of the total (48 and 45 million tons, respectively). The remaining top commodities made up less than 4 percent each, while all others combined accounted for the remaining 7 percent.

This commodity mix is expected to remain roughly the same through 2030, as shown in Table 3.1. Coal will continue to be the dominant commodity, with volume growing by 42 percent (to about 485 million tons). Ninety-two percent of this tonnage will be through freight, primarily moving by rail from coal fields in Wyoming to power plants in the eastern half of the country. This has important implications for the statewide rail network, since through movements take up capacity on the network even though they do not stop in Kansas.

Figure 3.12 Top 10 Commodities in Kansas by Weight (All Modes)
2006

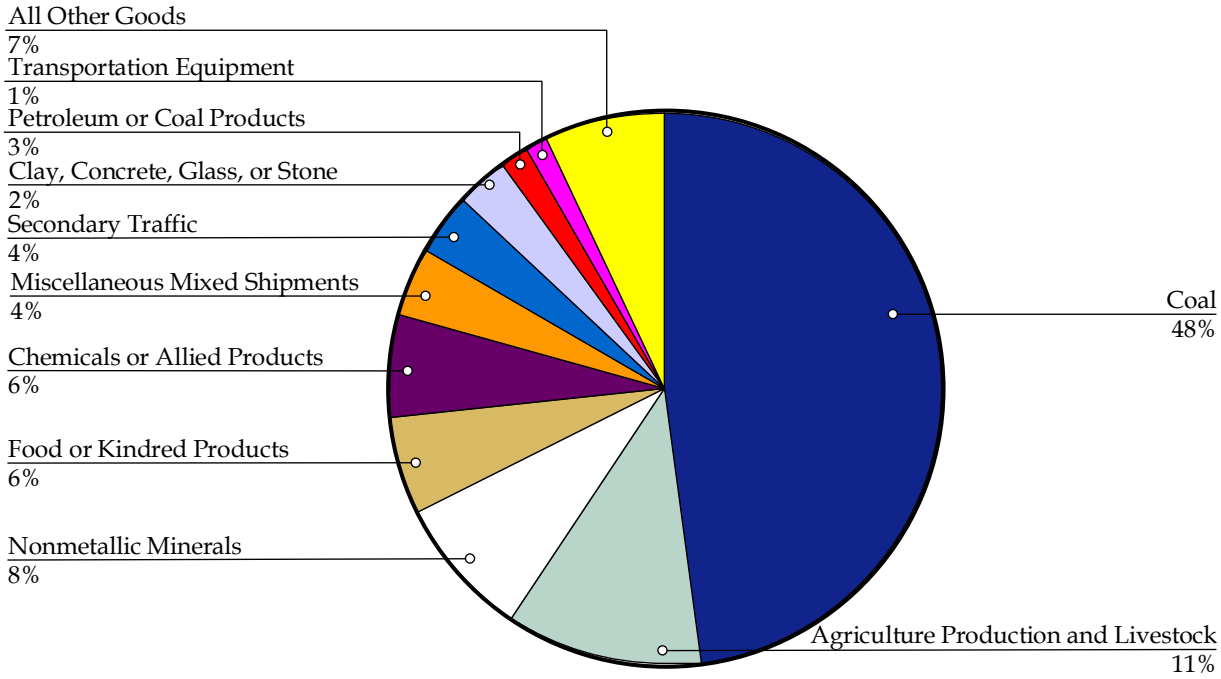


Table 3.1 Top 10 Commodities by Weight (All Modes)
2030 Projected

Commodity	Millions of Tons	Percent of Total	CAGR
Coal	484.9	42%	1.0%
Agriculture Production and Livestock	152.0	13%	2.1%
Nonmetallic Minerals	104.2	9%	1.9%
Miscellaneous Mixed Shipments	70.8	6%	2.9%
Secondary Traffic, i.e., Warehouse Moves	65.5	6%	3.6%
Food or Kindred Products	60.6	5%	1.0%
Chemicals or Allied Products	47.8	4%	0.3%
Petroleum or Coal Products	36.1	3%	1.8%
Clay, Concrete, Glass, or Stone	26.2	2%	2.4%
Transportation Equipment	14.2	1%	1.5%
All Other Goods	90.1	8%	2.0%
Total	**1,152.5**	**100%**	**1.5%**

By Value

Kansas' commodity mix is more diverse when measured by value. Figure 3.13 presents the top 10 commodities by value moving to, from, through, and within Kansas in 2006. Secondary traffic and miscellaneous mixed shipments, including intermodal containers, comprise the two largest commodity groups in terms of value, which is not surprising since these groups include many high-value consumer goods. Together secondary traffic and miscellaneous mixed shipments account for 44 percent of goods movement in Kansas by value (a total of $379 billion). Transportation equipment and chemicals each comprise 9 percent of the total value shipped on Kansas' freight network ($82 and $81 billion, respectively). Food products ($51 billion) and agricultural production and livestock ($48 billion) combined account for 11 percent of total freight value shipped in Kansas. Machinery and electrical equipment also were major commodities on Kansas' freight network in 2006, each representing about 4 percent of the total value on the system. The remaining top commodities, freight forwarder traffic and fabricated metals, each accounted for 2 percent of the freight value moving in the State and all other commodities combined to make up 15 percent.

It is interesting to note the absence of coal from the top 10 commodities by value, given that it represents nearly half of all movements by weight. This is due to coal's extremely low value per ton. Total coal shipments to, from, within, and through Kansas were valued at $4.7 billion in 2006, or about $12 per ton. By comparison, fabricated metal products (which only made up 2 percent of Kansas freight value in 2006) were valued at $18.5 billion, or about $3,800 per ton.

By 2030, the value of secondary shipments and miscellaneous mixed shipments are expected to account for 49 percent of the value of all freight moved in the State, as shown in Table 3.2. Electrical equipment ($118 billion), machinery ($117 billion), and transportation equipment ($113 billion) are each expected to account for about 7 percent of total freight value. Of these electrical equipment and machinery are among the fastest growing commodities with predicted annual growth rates of 5.2 and 4.6 percent, respectively. Computer and electronic product manufacturing is a growing industry in Kansas; its contribution to statewide economic output jumped by 1,350 percent from 1997 to 2007, to nearly $1.7 billion.[3] Chemicals are expected to make up 6 percent of all freight value ($98 billion). Agricultural production and livestock ($75 billion) and food products ($66 billion) are expected to remain important, each accounting for about 4 percent of total value. All other goods together are expected to make up approximately 14 percent of the value of all freight moving in Kansas in 2030.

[3] See Appendix C for a detailed analysis of Kansas industry trends.

Figure 3.13 Top 10 Commodities in Kansas by Value (All Modes)
2006

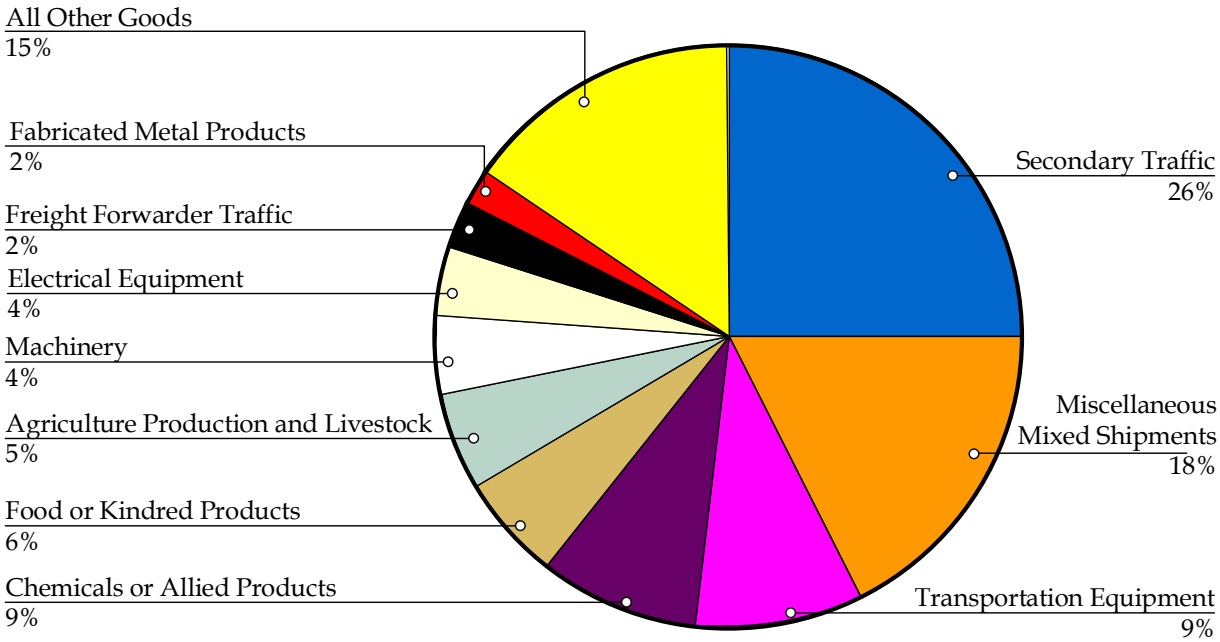


Table 3.2 Top 10 Commodities in Kansas by Value (All Modes)
2030 Projected

Commodity	Billions of Dollars	Percent of Total	CAGR
Secondary Traffic	520.8	31%	3.6%
Miscellaneous Mixed Shipments	309.4	18%	2.9%
Electrical Equipment	118.4	7%	5.2%
Machinery	116.7	7%	4.6%
Transportation Equipment	113.1	7%	1.3%
Chemicals or Allied Products	97.7	6%	0.8%
Agriculture Production and Livestock	76.0	4%	1.9%
Food or Kindred Products	65.9	4%	1.0%
Freight Forwarder Traffic	42.2	2%	3.0%
Miscellaneous Manufacturing Products	40.1	2%	4.7%
All Other Goods	204.1	12%	1.6%
Total	**1,704.3**	**100%**	**2.7%**

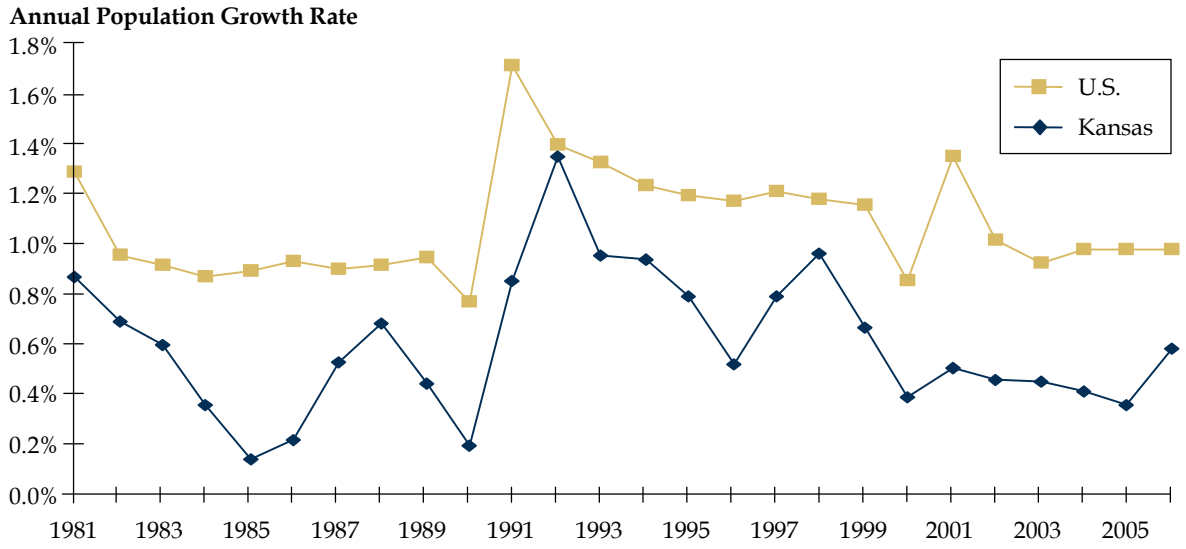
4.0 Freight and Industry Trends

Growth in goods-dependent industries, shifting population patterns, and growing incomes all contribute to statewide freight demand and influence how the statewide freight system is utilized. In addition, there are other issues, such as globalization, changing logistics patterns and supply chain practices, the relocation of manufacturing hubs, and the emergence of new industries, that will further influence demand for freight transportation, mode choice decisions made by shippers, and the overall types and volumes of goods moving into, out of, through, and within the State. This section describes the most critical trends influencing freight demand in Kansas: population growth and distribution patterns, rising per capita incomes, and growth within, modal dependencies of, and logistics practices utilized by key statewide industries. More detailed information about these and other trends is provided in Appendix C.

4.1 Population Change and Distribution Patterns

While Kansas' population has grown steadily since 1980, annual growth rates have been consistently lower than total U.S. population growth rates over the past 25 years, as shown in Figure 4.1. This is consistent with many other states in the Midwest and reflects a general shift of the U.S. population to the south and west. As a result, total Kansas population as a percentage of total U.S. population is slowly declining.

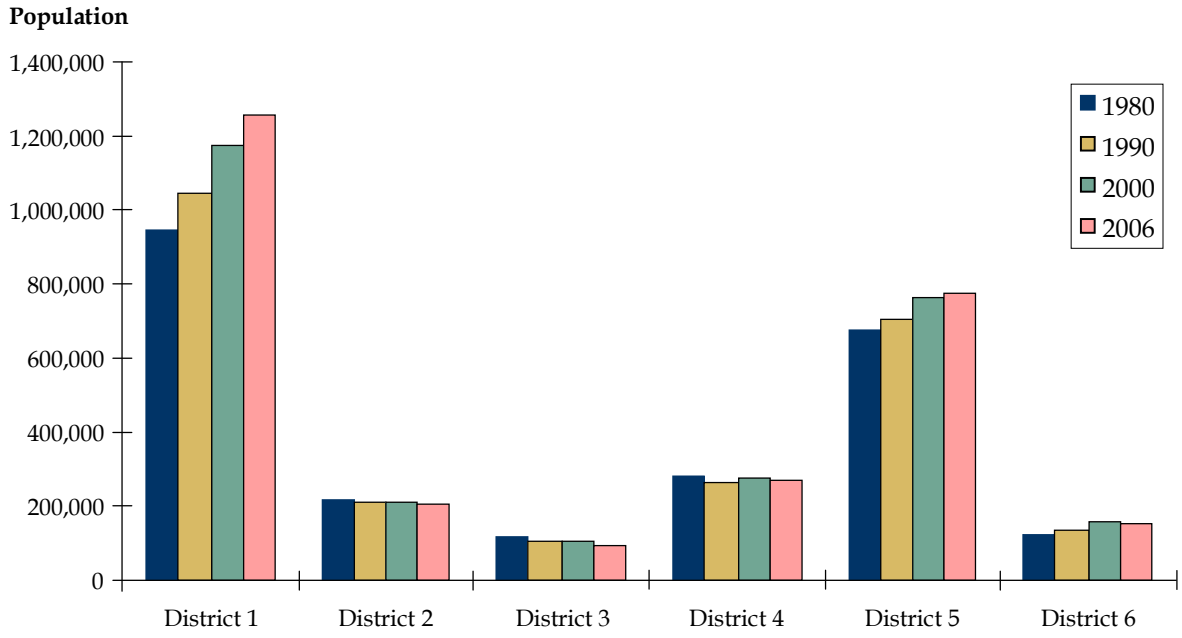
Figure 4.1 Kansas versus United States Annual Population Growth Rates



Source: U.S. Census Bureau.

This trend is not consistent throughout the State, however. Like many states, there are stark differences in population growth patterns between Kansas' rural and urban areas, as shown in Figure 4.2. District 1 includes 11 of the 16 largest cities in Kansas and is the most populated of the six KDOT districts. In 2006, the county populations in District 1 totaled 1.26 million, accounting for almost 46 percent of the state total. Between 1980 and 2006, District 1 was the fastest growing district, growing by over 33 percent and adding over 315,000 people. District 5, which includes Wichita – the largest city in Kansas – had the second highest population among the DOT districts and accounted for over 28 percent of the State total in 2006. It grew by almost 15 percent, adding over 100,000 people between 1980 and 2006.

Figure 4.2 Population Trends by District

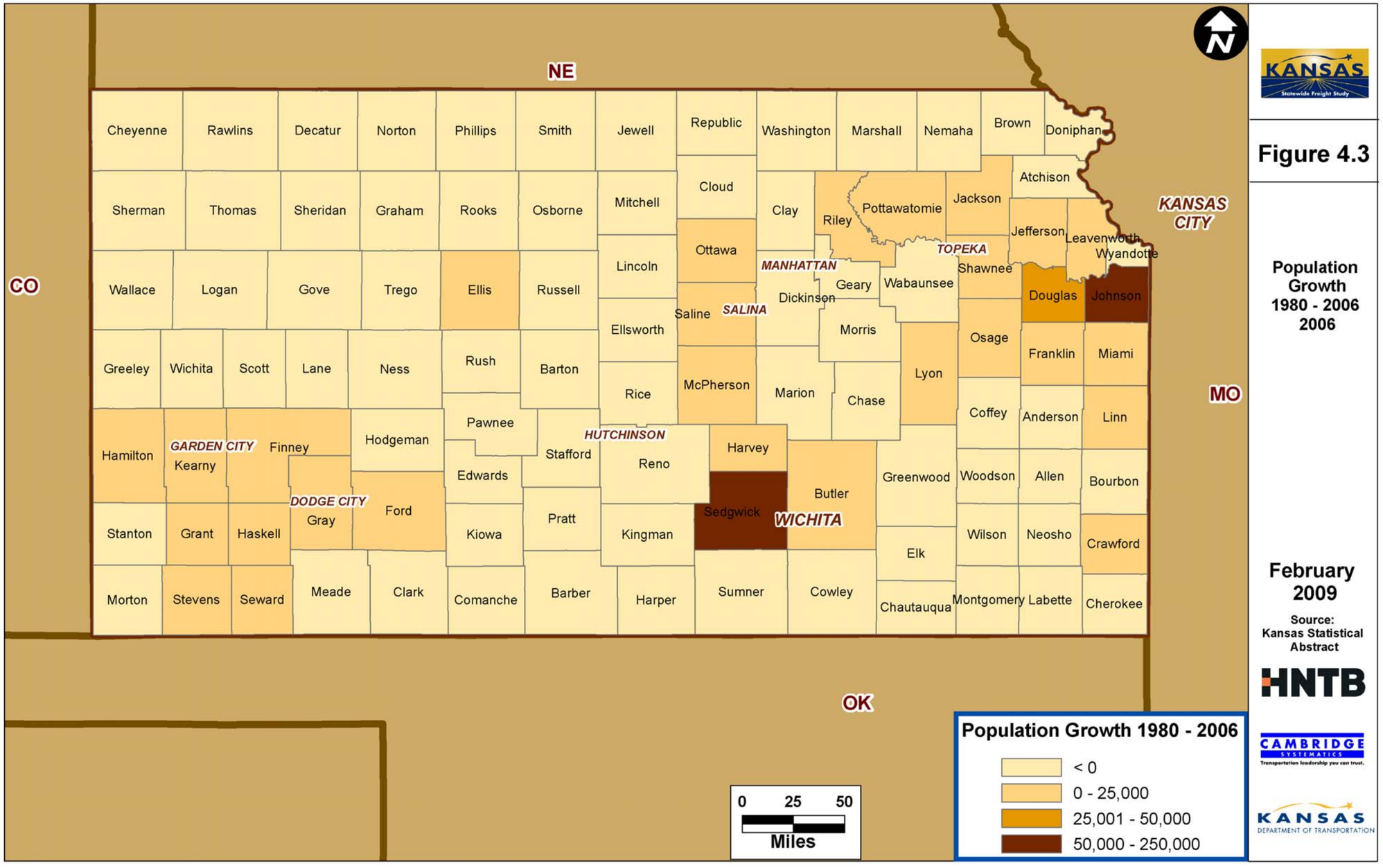


Source: U.S. Census Bureau.

The remaining 26 percent of the Kansas population is distributed among the four other districts. Districts 2, 3, 4, and 6 are primarily rural and do not contain any cities with populations over 50,000. Unlike the fast growing populations in Districts 1 and 5, the total population in Districts 2, 3, and 4 declined between 1980 and 2006. District 3 had the sharpest decline, losing over 19 percent of its population – amounting to over 22,000 people between 1980 and 2006. Unlike the other three rural districts, population in District 6 grew by over 20 percent during the 26-year period, representing the second highest population growth rate among the districts. However, District 6 is one of the least populated districts and has experienced a population decline since 2000.

Figure 4.3 shows population growth by county from 1980 to 2006. Clearly, population within Kansas has been shifting away from rural areas and towards the urbanized parts of the State, especially Sedgwick County (Wichita) and Johnson County (Kansas City metropolitan area). Each of those counties added more than 100,000 residents during that period. The counties surrounding the Kansas City metropolitan area and, to a lesser extent, Wichita have absorbed more modest population increases, as have several counties in southwestern Kansas.

This growth is creating new patterns of demand for freight transportation services as well as conflicts between freight and passenger traffic. Continued population growth and concentration in the State's urbanized areas may continue to fuel demand for regional distribution facilities along key highway corridors. This is already happening to some degree with the planned development of the new BNSF Gardner Intermodal Center and other developments. Careful planning in these and other areas is critical to ensure that these new facilities have adequate access to key elements of the State's multimodal freight infrastructure while minimizing freight/passenger conflicts.


NE
CO
MO
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KANSAS CITY
TOPEKA
MANHATTAN
SALINA
HUTCHINSON
GARDEN CITY
DODGE CITY
WICHITA
Cheyenne
Rawlins
Decatur
Norton
Phillips
Smith
Jewell
Republic
Washington
Marshall
Nemaha
Brown
Doniphan
Sherman
Thomas
Sheridan
Graham
Rooks
Osborne
Mitchell
Cloud
Clay
Riley
Pottawatomie
Jackson
Atchison
Jefferson
Leavenworth
Wyandotte
Wallace
Logan
Gove
Trego
Ellis
Russell
Lincoln
Ottawa
Geary
Wabaunsee
Shawnee
Douglas
Johnson
Saline
Dickinson
Ellsworth
Morris
Osage
Franklin
Miami
Greeley
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Scott
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Rush
Barton
Rice
McPherson
Marion
Chase
Lyon
Coffey
Anderson
Linn
Hamilton
Kearny
Finney
Hodgeman
Pawnee
Stafford
Reno
Harvey
Butler
Greenwood
Woodson
Allen
Bourbon
Edwards
Stanton
Grant
Haskell
Gray
Ford
Kiowa
Pratt
Kingman
Sedgwick
Elk
Wilson
Neosho
Crawford
Morton
Stevens
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Comanche
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Sumner
Cowley
Chautauqua
Montgomery
Labette
Cherokee
Population Growth 1980 - 2006
< 0
0 - 25,000
25,001 - 50,000
50,000 - 250,000
0 25 50
Miles
KANSAS
Statewide Freight Study
Figure 4.3
Population Growth 1980 - 2006
February 2009
Source: Kansas Statistical Abstract
HNTB
CAMBRIDGE SYSTEMATICS
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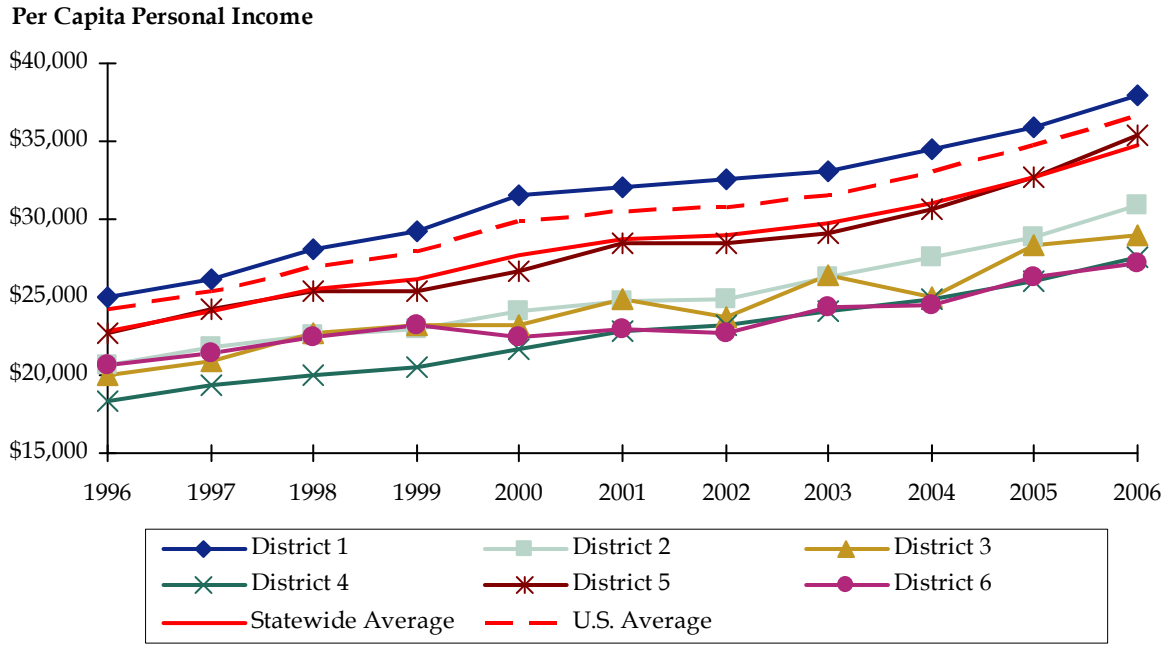
KANSAS DEPARTMENT OF TRANSPORTATION

4.2 Growth in Per Capita Income

As a measure of average wealth per person, per capita income reflects the relative economic well-being of the people in a region. This can translate to higher levels of health and education as well as more substantial government revenues available for infrastructure investments and other priorities. It is therefore a barometer of demand for goods and services, which in turn affects demand for freight transportation. As shown in Figure 4.4, per capita income has increased steadily in Kansas over the past 10 years. By 2006, statewide per capita income reached $34,800.

Figure 4.4 Kansas per Capita Income by KDOT District
1996 to 2006



Source: U.S. Bureau of Economic Analysis.

Similar to the population trends, Districts 1 and 5 have the highest per capita income. Per capita income in Districts 1 and 5 has exceeded or been approximately equal to the State average over the last 10 years. While District 1 had the highest annual per capita income ($37,957) in 2006 and has consistently exceeded the U.S. average, per capita income in District 5 had the largest percent increase since 1996, growing by 55.8 percent to $35,400. Per capita income in the primarily rural districts (Districts 2, 3, 4, and 6), however, have been consistently lower than the State average.

Continued growth in per capita income, particularly within District 1 and other urbanized areas, will fuel demand for freight movements, especially for low-weight, high-value consumer-related goods. Growth in these types of shipments, which rely heavily on

trucks and intermodal rail service, could have significant mobility, environmental, and livability impacts in these and other areas.

4.3 Growth in Existing and Emerging Industries

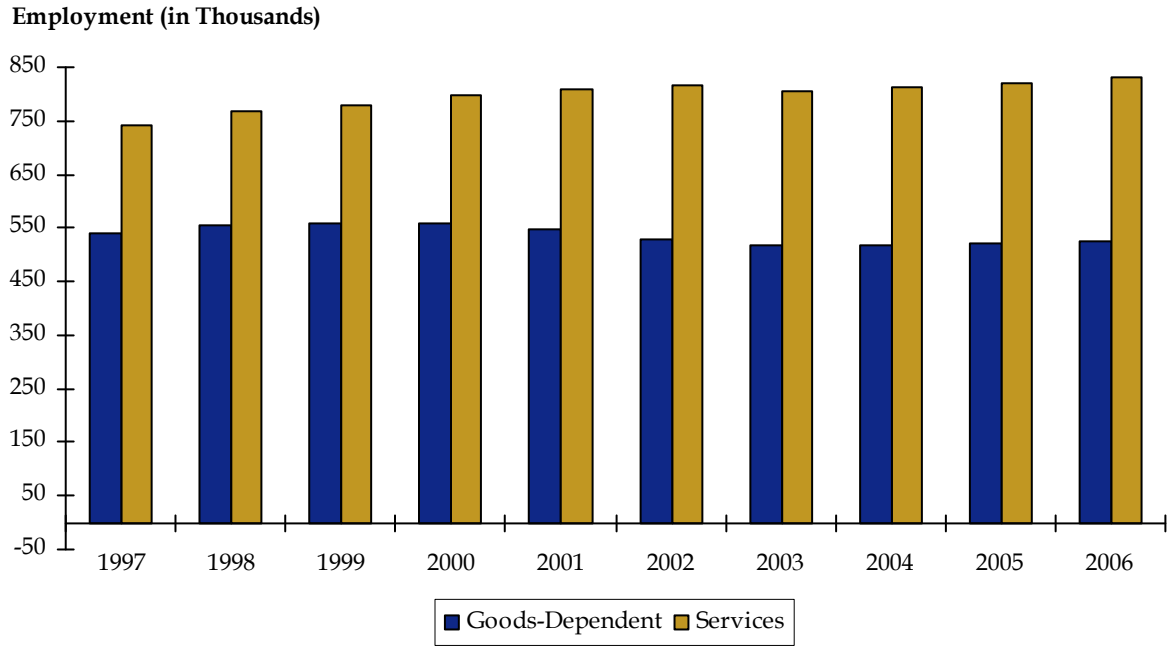
The efficient movement of freight is critical to the health of many important industries in Kansas, and it is important to understand industry employment and output trends to understand current and future freight transportation system needs. In general, Kansas industries fall into one of two categories:

1. **Goods-Dependent Industries,** or businesses that rely on transportation to receive raw supplies and manufactured goods and to send their refined/finished product to market (e.g., agriculture, manufacturing, transportation, and warehousing); and

2. **Service Industries,** or business that are not as dependent on movement of raw or manufactured materials, but do rely on shipments of materials, office products, or other small shipments of goods and supplies (e.g., government, education, health care).

Similar to the U.S. economy as a whole, the Kansas economy has been steadily transitioning from one that is heavily reliant on manufacturing to one that is driven by service-oriented industries. The average annual employment in Kansas between 1997 and 2006 was approximately 1.34 million, growing approximately 6.1 percent over that period. As shown in Figure 4.5, service-related industries led this growth, increasing by 12.4 percent over the last 10 years, while goods-dependent employment declined 2.6 percent during the same period.

Figure 4.5 Statewide Goods-Dependent versus Service Industry Employment Trends

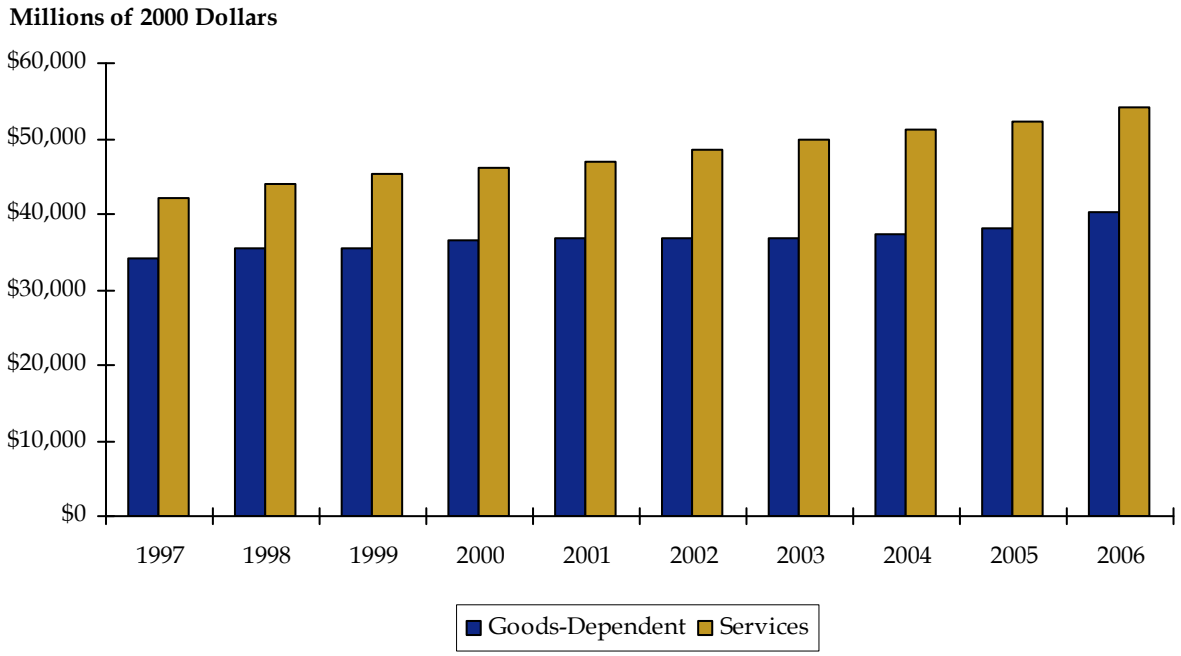


Source: Moody's Economy.com.

Although the service sector has been growing faster than the goods-dependent industries, both are contributing significantly to the State's economic output. As shown in Figure 4.6, goods-dependent industries accounted for almost 43 percent of Kansas' GSP in 2006. Manufacturing-related industries (including meat processing and aerospace), along with wholesale and retail trade, dominate the output of the State's goods-dependent industries, and both have been growing. And, although Figure 4.7 shows that goods-dependent industries will lose about 42,000 employees (8 percent) between now and 2030, while services will add 142,000 people (17 percent), productivity gains, particularly in agriculture-related activities, will allow output from both sectors to remain strong.

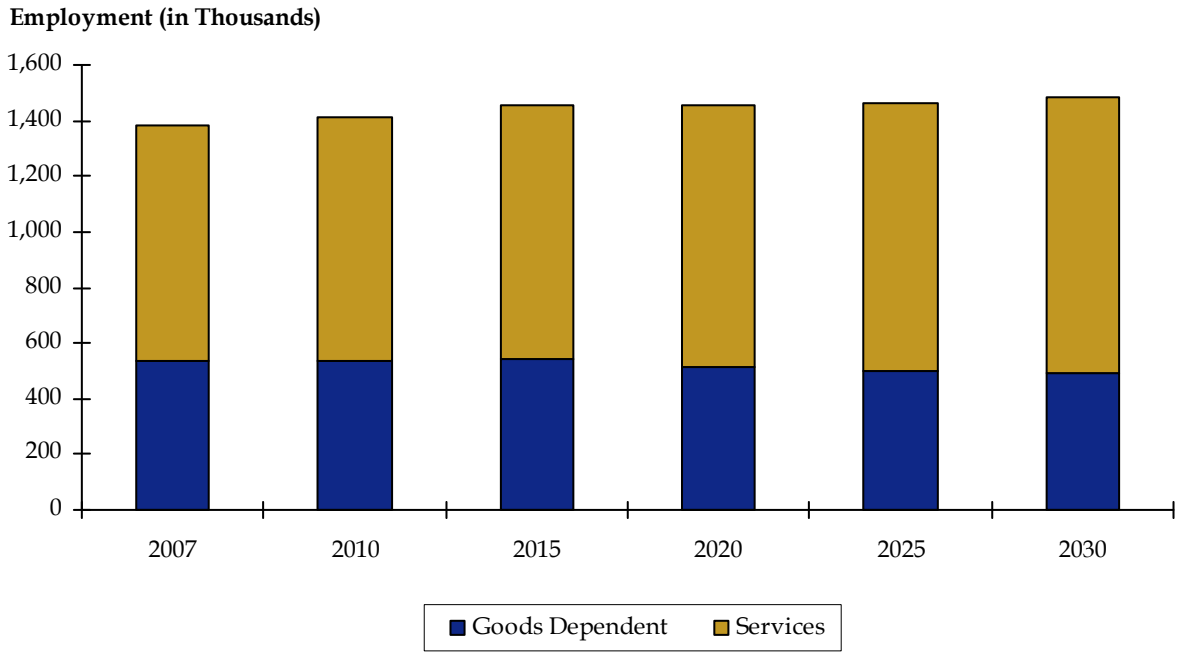
Despite the shift from goods-oriented businesses to service-oriented ones, there remain a number of goods-dependent industries that are critical to the State's economic vitality. These include transportation equipment manufacturing, crop production, and cattle production and processing. Using technological advances and other strategies, these industries have improved their productivity and are continuing to increase overall output even with fewer total employees. These and other industries will continue to be a major force in Kansas and a primary user of the State's freight transportation system.

Figure 4.6 Goods-Dependent versus Service Sector Contribution to GSP
1997 to 2006



Source: U.S. Bureau of Economic Analysis.

Figure 4.7 Projected Goods-Dependent and Service Sector Employment
2007 to 2030



Source: U.S. Bureau of Economic Analysis.

Freight Transportation Needs of Key Industries

Three key industries stand out as being particularly important to Kansas' future economic growth and prosperity: transportation equipment manufacturing, agriculture (crop and animal production), and food manufacturing (which also includes cattle production and processing). Like most industries, all three of these important industries are heavily dependent on trucks, though some also use the air and rail modes. Table 4.1 displays the modes on which these key industries typically depend. Agriculture, transportation equipment manufacturing, and food manufacturing all use rail to some extent. Air transportation is typically reserved for light but high-value goods, such as those produced by high-technology manufacturing industries (including aerospace manufacturing).

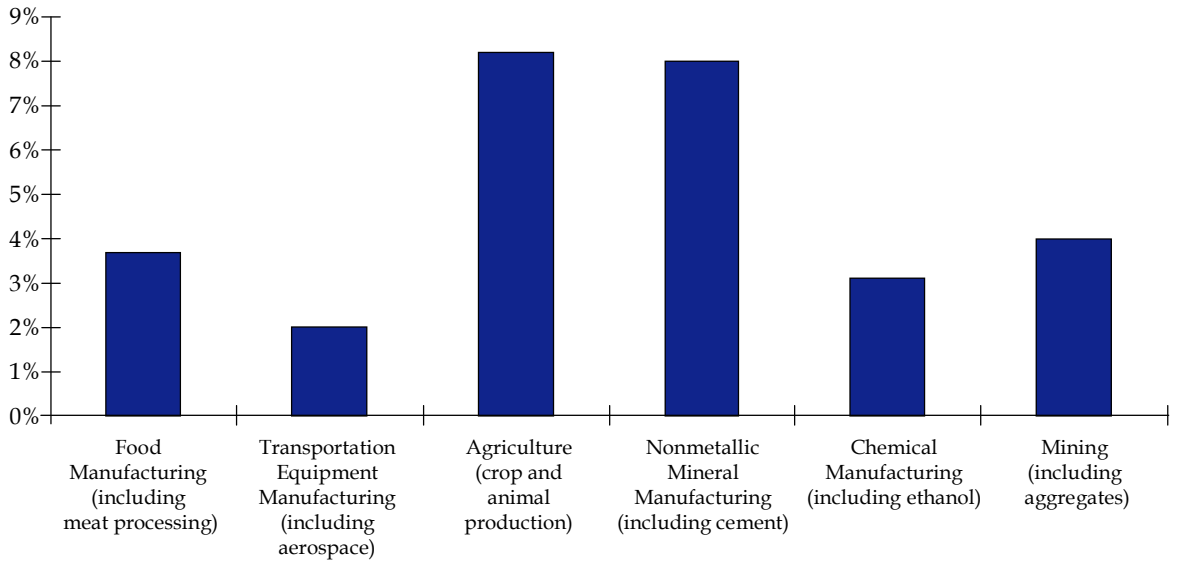
Table 4.1 Modal Dependencies of Key Kansas Industries

	Rail	Truck	Water	Air	Pipeline
Food Manufacturing	◑	●	○	◑	○
Transportation Equipment Manufacturing	◑	●	○	◑	○
Agriculture (Crop and Animal Production)	◑	●	○	○	○

Figure 4.8 quantifies the modal dependencies of key Kansas industries by describing the total output for each industry (Gross State Product) and the percentage of transportation inputs required to produce that output. Agriculture is the largest user of freight transportation – transportation costs make up 8.2 percent of the agricultural sector's output. Put another way, it takes nearly $82,000 of transportation inputs to produce $1 million of output in crop and animal production. Transportation costs make up a significant proportion of output in other critical Kansas industries, including food manufacturing, transportation equipment manufacturing, and cement manufacturing have significant freight transportation needs (3.7 percent, 2 percent, and 8 percent, respectively).

Figure 4.8 Transportation Dependence of Key Kansas Industries

Percentage of Business Costs Related to Transportation



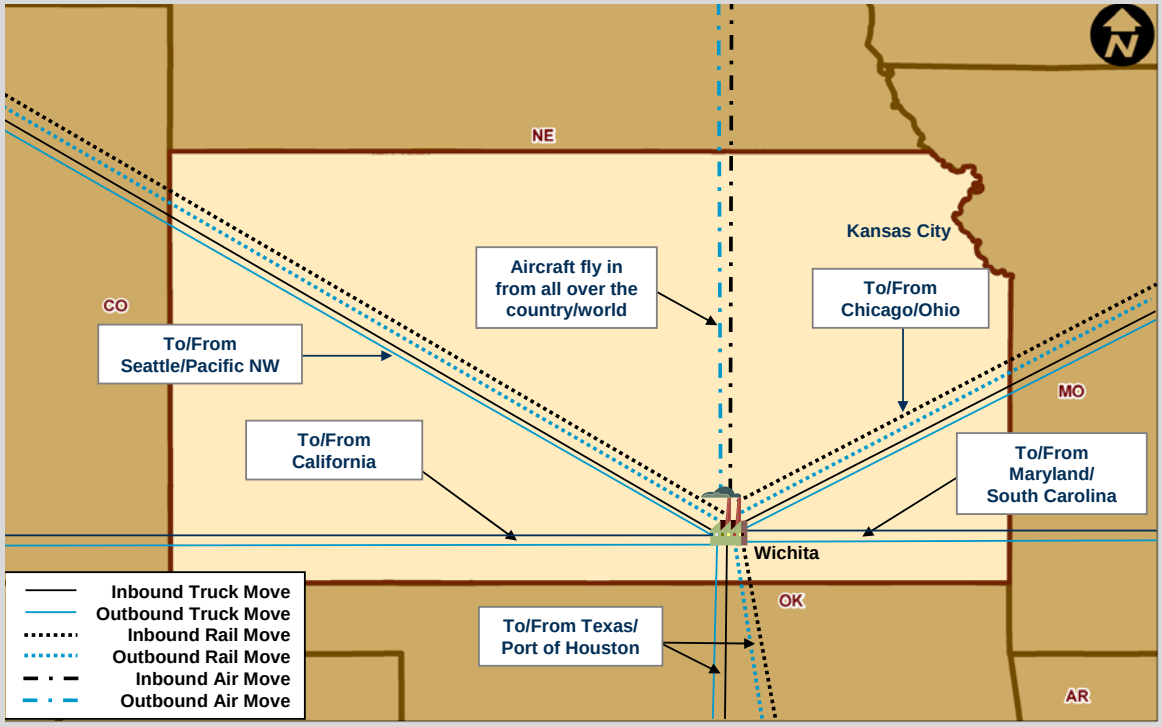
Source: Bureau of Economic Analysis, Transportation Satellite Accounts.

It is critical to understand not only the modal dependence of these key industries, but more precisely how they are using the State's freight transportation infrastructure. The following case studies describe in greater detail how the aircraft maintenance, repair, and overhaul industry and the ethanol production industry use the Kansas freight system. Taken together, they provide insights into system needs and potential bottlenecks.

Industry Snapshot – Transportation Equipment (Aircraft Maintenance, Repair, and Overhaul)

Aircraft maintenance, repair, and overhaul (MRO) activities are clustered in Sedgwick County (Wichita), where more than 36,000 people are employed. This reflects the presence of a large concentration of aircraft parts manufacturers in the area, which include Raytheon, Spirit, and Cessna.[1] Boeing, which recently sold most of its manufacturing to Spirit, still engages in military aircraft integration in Wichita. The industry relies on a reliable, multimodal transportation system to manage any number of supply chains, most of which use just-in-time logistics practices. Typical supply chains include:

- Engines that are removed from planes at the MRO facility, trucked to Ohio or California for overhaul, and then trucked back to the MRO facility for reinstallation;
- Couches and seats that are removed at the MRO facility, trucked to Texas or Seattle for rehabilitation, and then trucked back to Wichita for reinstallation at the MRO facility;
- Carpet that is removed from the aircraft at the MRO facility is trucked to South Carolina, California, or Maryland and then trucked back to the MRO facility for reinstallation; and
- Tanker parts that are removed from the aircraft at the MRO facility, sent via air (Chicago) or marine (Houston) to Italy, transported back to Wichita via air or marine through the same ports of entry, and reinstalled onto the aircraft at the MRO facility.



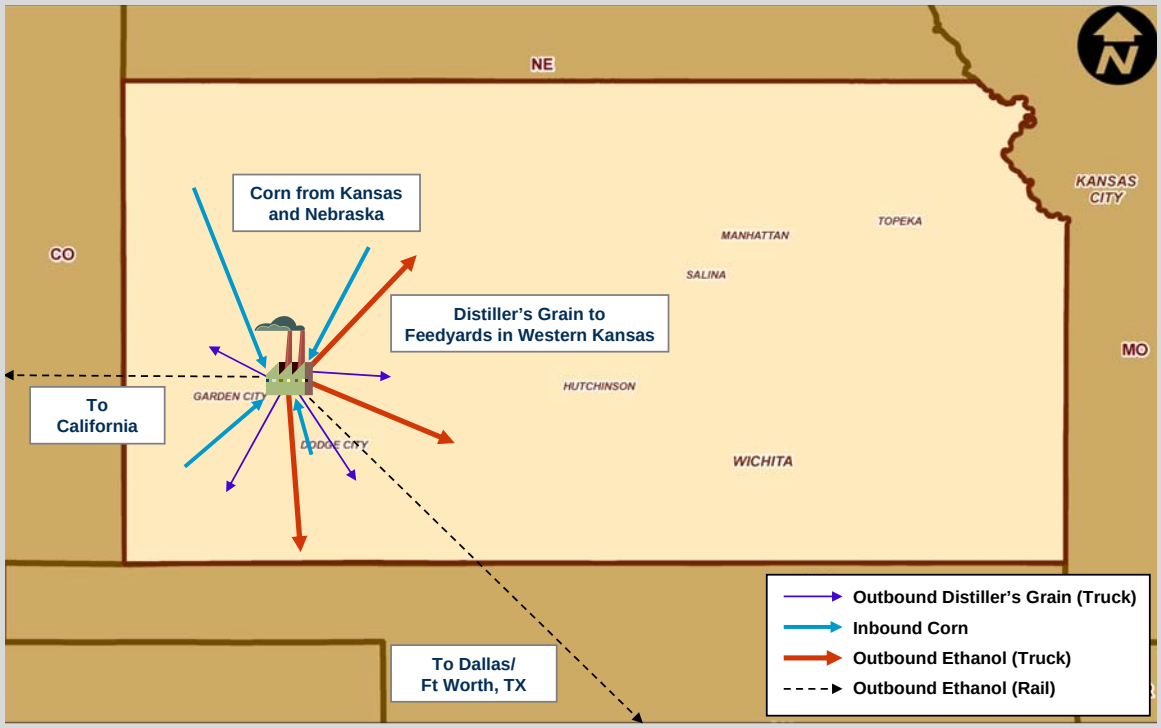
[1] U.S. Census Bureau County Business Patterns.

Industry Snapshot – Agriculture (Ethanol Production)

Ethanol is a fuel source made from biomass resources such as corn and grain sorghum. The ethanol production industry is closely tied to crop production in Kansas, since grain is the major input to ethanol manufacturing: one bushel of corn produces about 2.8 gallons of ethanol and one acre of corn can produce 400 to 450 gallons of ethanol per year.

The corn used to produce the ethanol tends to originate within a 90-mile radius of the plant, though it is occasionally brought in from Nebraska or other neighboring states depending on quantity and quality of local crops.[2] It is delivered by truck typically five days a week during non-harvest season and seven days a week during harvest. To support the plant's level of production, the plant requires over 100 truck shipments per day.[3]

Used as an additive to gasoline, the ethanol is sold to petroleum marketers for further distribution. The purchasers transport the ethanol from the plant themselves, relying mostly on trucks. Rail is used if the ethanol is being shipped farther away, usually either to California or Texas. Ethanol shipments are made 24 hours per day. Although pipeline would be an economical method of ethanol delivery, the decentralized locations of ethanol production facilities, insufficient volumes, and its unique viscosity characteristics, makes ethanol transport by pipeline logistically unfavorable. Ethanol production also yields two byproducts: distillers grains and carbon dioxide. The distillers grains are sold to nearby feed lots to be used as livestock feed, since they are a good source of energy and protein for animals. Distillers grains are transported from the plant by truck.



[2] Corn from Nebraska is often imported to cattle feedlots in southwest Kansas, particularly when the region is in a corn deficit.

[3] Other ethanol plants throughout Kansas are serviced by shortline rail services, and can use rail for a portion of the inbound goods shipment.

These descriptions of Kansas' aircraft maintenance, repair, and overhaul industry and its ethanol industry illustrates how this key Kansas industries are utilizing the State's freight transportation system and the importance of providing transportation options (particularly truck and rail options) for Kansas shippers. Both of these shippers utilize multiple modes of transportation to meet customer and supplier needs and are most interested in utilizing the mode or combinations of modes that provide the most reliable service at the best price. As KDOT continues to develop a freight planning program, it will be critical to keep in mind how the system is being used by these and other shippers and how transportation investments may influence mode choice decisions.

5.0 Key Challenges

Kansas' freight transportation system is managing current demand. Freight rail and truck movements (which comprise 90 percent of all goods movement in the State by weight) are, for the most part, efficient and uncongested. However, increasing freight traffic, changing population growth and distribution patterns, the rising transportation demands of key statewide industries, and the increasing attractiveness of Kansas for the location of freight, warehouse/distribution center, and intermodal facility developments, will create additional truck and rail traffic that will lead to accelerating deterioration of road and bridge infrastructure, congestion and safety issues, and community livability concerns. These and other factors, individually or collectively, will create safety, efficiency, and reliability challenges in two key ways:

1. **Infrastructure and operational challenges,** which impact the condition or performance of the system. These challenges are largely driven by the demographic, socioeconomic, commodity, and industry trends described earlier; and

2. **Institutional and policy challenges,** which affect the way KDOT plans for, manages, and invests in the freight transportation system. These challenges relate the way that KDOT is organized to conduct freight planning activities, the use of data and analytical tools to guide freight investment decisions, and statewide and Federal transportation policy actions that influence the Department's operations and focus areas.

5.1 Infrastructure and Operational Challenges

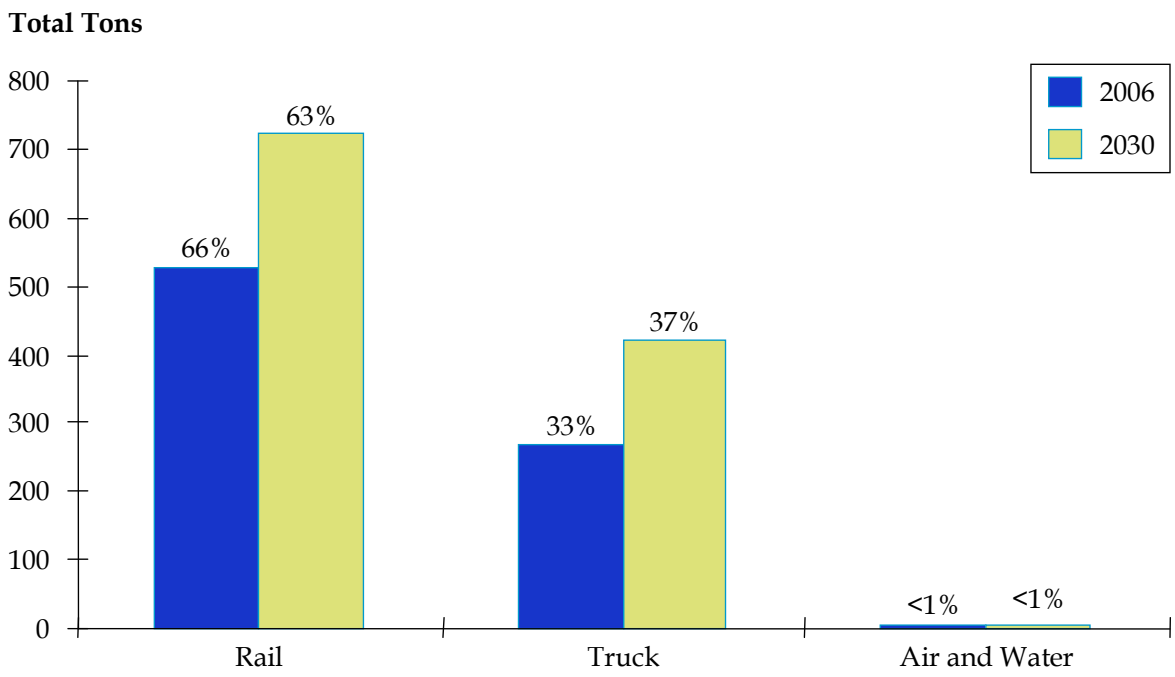
As described earlier, population growth, industry growth, and changing national and international trade patterns will exacerbate existing infrastructure issues (e.g., rail line and yard capacity, increasing demand on rural highway corridors, urban interchange bottlenecks, and geometric issues) and create new ones. In addition, growth in freight traffic, changing population patterns, and the development of new intermodal facilities will all change the way the system is used by shippers, carriers, and logistics providers, impacting mobility for both people and goods statewide. The most significant infrastructure and operational challenges facing the Kansas statewide freight system are described below.

The Capacity of the Rail System Will Be Strained

Rail transportation is a critical component of the Kansas freight transportation system. In fact, railroads – and the Class I railroads in particular – carried 66 percent of all freight

moved in Kansas in 2006, as measured by weight (530 million tons). However, it is estimated that rail's share of total freight in Kansas will drop to 63 percent by 2030, even though total volume will grow to almost 724 million tons (as shown in Figure 5.1).

Figure 5.1 Kansas Freight Mode Shares by Weight
2006 and 2030



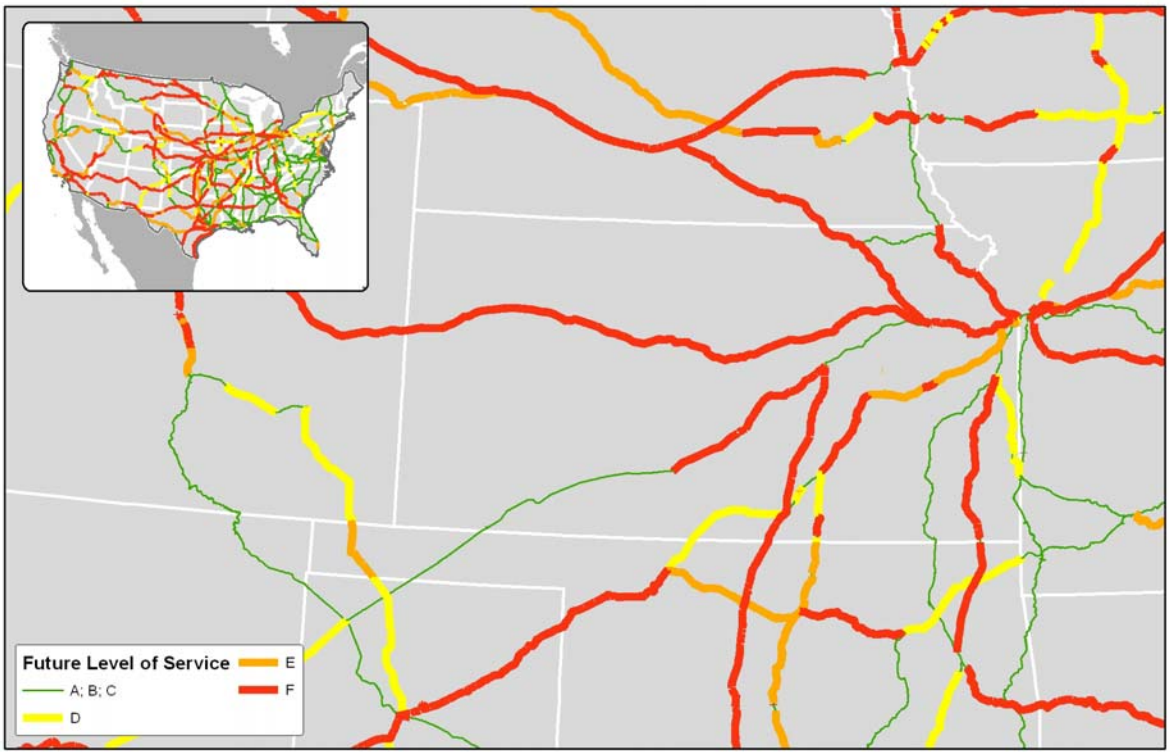
The combination of rising rail tonnage and declining market share will be influenced and/or exacerbated by a number of factors, which are outlined below.

Capacity Concerns along Major Rail Corridors

Class I railroads will experience significant growth in train volumes by 2035.[1] Figure 5.2 shows the expected future (2035) level of service on Kansas' major freight rail lines, assuming no new infrastructure investments on the part of the Class I railroads. Most of these primary rail freight corridors will be operating at LOS E or F, including the UP mainline and BNSF Transcon. This level of congestion, which also would be experienced along networks in neighboring states (see inset), will have severe mobility implications and will prevent the railroads from expanding their current market share for many types of commodities.

[1] Rail growth figures derived from the AAR Rail Investment and Capacity Study (2008), which uses a forecast year of 2035.

Figure 5.2 Future Freight Rail Level of Service
2035



Source: National Rail Freight Infrastructure Capacity and Investment Study prepared for the Association of American Railroads by Cambridge Systematics, Inc.

Of particular concern are the limited yard capacity constraints and delays in Wichita and the Kansas City metropolitan area, as well as chokepoints on the shortline system in Coffeyville and Cherryvale. These are listed in Table 5.1 and described below.

- **Wichita** is a critical rail hub for agriculture shipments moving from western Kansas to major eastern markets or to Gulf Coast ports. More than 100 trains per day travel through the Wichita area (centered in Sedgwick County)[2] and the Wichita Union Terminal (jointly owned by BNSF and UP).[3] There is some evidence that switching delays and capacity limitations in Wichita (not all of which are under the control of the railroads) are impacting the efficiency of rail movements statewide particularly in Western Kansas.

- **The Kansas City metropolitan area** is the second largest rail hub in the nation by number of car loads and the largest by tonnage. This is partially because of a large of amount of coal moving through the region. Coal and other through trains are often

[2] WAMPO Railroad Crossing Plan, 2007

[3] WAMPO.

delayed through the Kansas City terminal area because of slow track speeds (for example, due to the tight curves on either side of the BNSF Missouri River Bridge) and this has a negative impact on throughput capacity.

- **Shortline chokepoints** at switchyards in Coffeyville and Cherryvale. The shortline rail system in this part of Southeastern Kansas is handling increasing volumes of grain traffic, approximately 60,000 carloads annually. However, the yards in both Coffeyville and Cherryvale are served by single tracks that are located within the central business districts, which not only contributes to delays along the system for grain shipments, but also can result in safety and quality of life issues within these two communities. As grain shipments continue to grow, so too will these concerns.

Table 5.1 Kansas Freight Rail Chokepoints

Location	Issue
Kansas City	Through freight delays due to limited system capacity
Wichita	Limited yard capacity
Wichita	Limited shipper siding capacity
Wichita	Delays at grain loading facilities (esp. during harvest season)
Cherryvale	Restrictive yard access
Coffeeville	Restrictive yard access

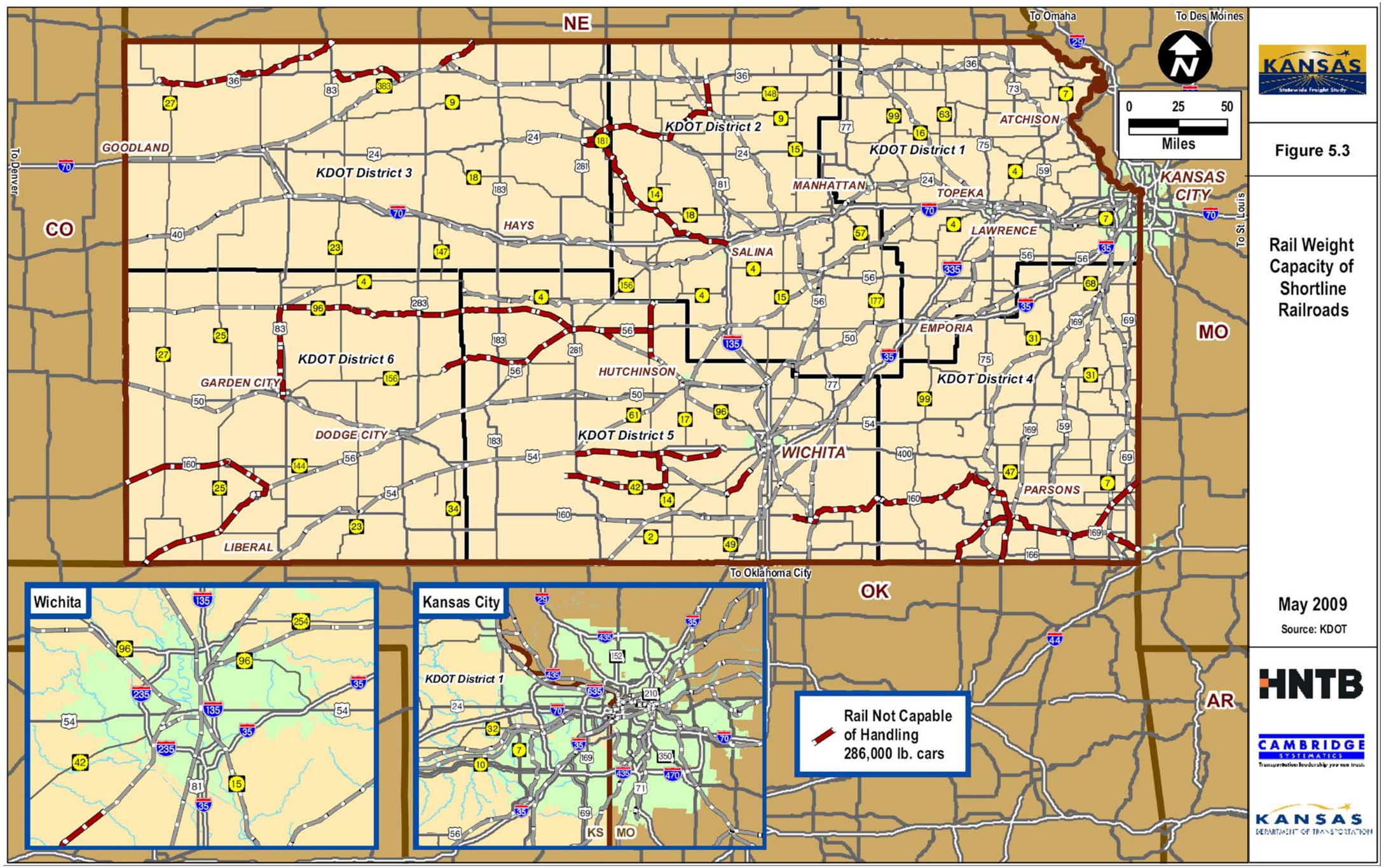
Limited Weight Capacity along Key Rural Corridors

The capacity of Kansas shortline and regional railroads – which serve critical industries in rural parts of the State – will also be constrained. In 2008, shortline railroads in Kansas originated more than 177,000 carloads throughout the State, making them a critical part of the overall rail freight system.[4] Much of the State's shortline rail infrastructure is not capable of accommodating the 286,000-pound railcars that are the current standard for the Class I railroads. These networks often suffer from thin ballast sections, limited tie maintenance, and old bridges. Upgrading tracks to handle 286,000-pound cars can be challenging, given that smaller railroads often do not have access to sufficient capital to make large-scale track improvements.

Figure 5.3 shows the portions of the Kansas rail network that cannot currently handle 286,000-pound rail cars. The inability to handle these heavier cars can have significant

[4] KDOT.

implications on transportation and economic competitiveness in several parts of the State. First, railroads that cannot handle 286,000-pound cars will find it increasingly difficult to interline with the Class I rail system, limiting access to that system by regional shippers and manufacturers. Some shippers may be forced to use trucks to access markets, exacerbating existing highway congestion, and contributing to environmental impacts and increased pavement wear. Finally, some shortlines may not be able to remain viable without a 286,000-pound upgrade, reducing transportation options in the region and hindering its ability to attract or retain businesses and jobs.


NE
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To Des Moines
To Denver
To St. Louis
To Oklahoma City
0 25 50
Miles
KANSAS
Statewide Freight Study
Figure 5.3
Rail Weight Capacity of Shortline Railroads
May 2009
Source: KDOT
GOODLAND
KDOT District 3
KDOT District 2
KDOT District 1
ATCHISON
MANHATTAN
TOPEKA
KANSAS CITY
LAWRENCE
HAYS
SALINA
EMPORIA
KDOT District 6
GARDEN CITY
HUTCHINSON
KDOT District 4
DODGE CITY
KDOT District 5
WICHITA
PARSONS
LIBERAL
Wichita
Kansas City
KDOT District 1
KS
MO
Rail Not Capable of Handling 286,000 lb. cars
HNTB
CAMBRIDGE SYSTEMATICS
KANSAS DEPARTMENT OF TRANSPORTATION

This problem is particularly acute for Kansas agricultural shippers. These shipments are particularly sensitive to conditions on Kansas' shortline railroads, since it is the shortlines that often link Kansas farms to the national freight rail network. In fact, Figure 5.4 demonstrates that many of the weight capacity limitations of Kansas' shortline railroads are concentrated in central Kansas (which grows most of the State's wheat) and western Kansas (which produces most of the corn crop). Because the Class I railroads are increasingly moving towards "hook and haul" operations, whereby they pick up and drop off large blocks of rail cars while leaving the assembly and disassembly of these blocks to the shortlines and shippers, these shortline weight limitations make it difficult for smaller railroads to interline with the Class I railroads, limiting mode choice options for many Kansas agricultural producers.

Growth in Truck Traffic Will Impact the Condition and Performance of the Highway System

Truck traffic into, out of, through, and within Kansas is expected to grow significantly. Figures 5.5 and 5.6 show total current and future truck volumes along Kansas roadways. As expected, the largest volumes are found on Interstates 35, 70, 335, and 135. As Kansas' major highway trade corridors, these facilities carry the bulk of truck freight movements. Many are expected to experience significant truck volume growth in the future, particularly I-35 from Emporia to Kansas City and I-70 between Salina and Kansas City. On some segments of I-70, daily truck volumes could exceed 14,000, while some parts of I-70 could average nearly 17,000 daily trucks. Similar growth patterns will likely occur along I-35, particularly in the Kansas City metropolitan area. While the types of commodities being handled by these trucks vary significantly, key commodities include transportation equipment (particularly around Wichita and Kansas City), food products, and aggregates.

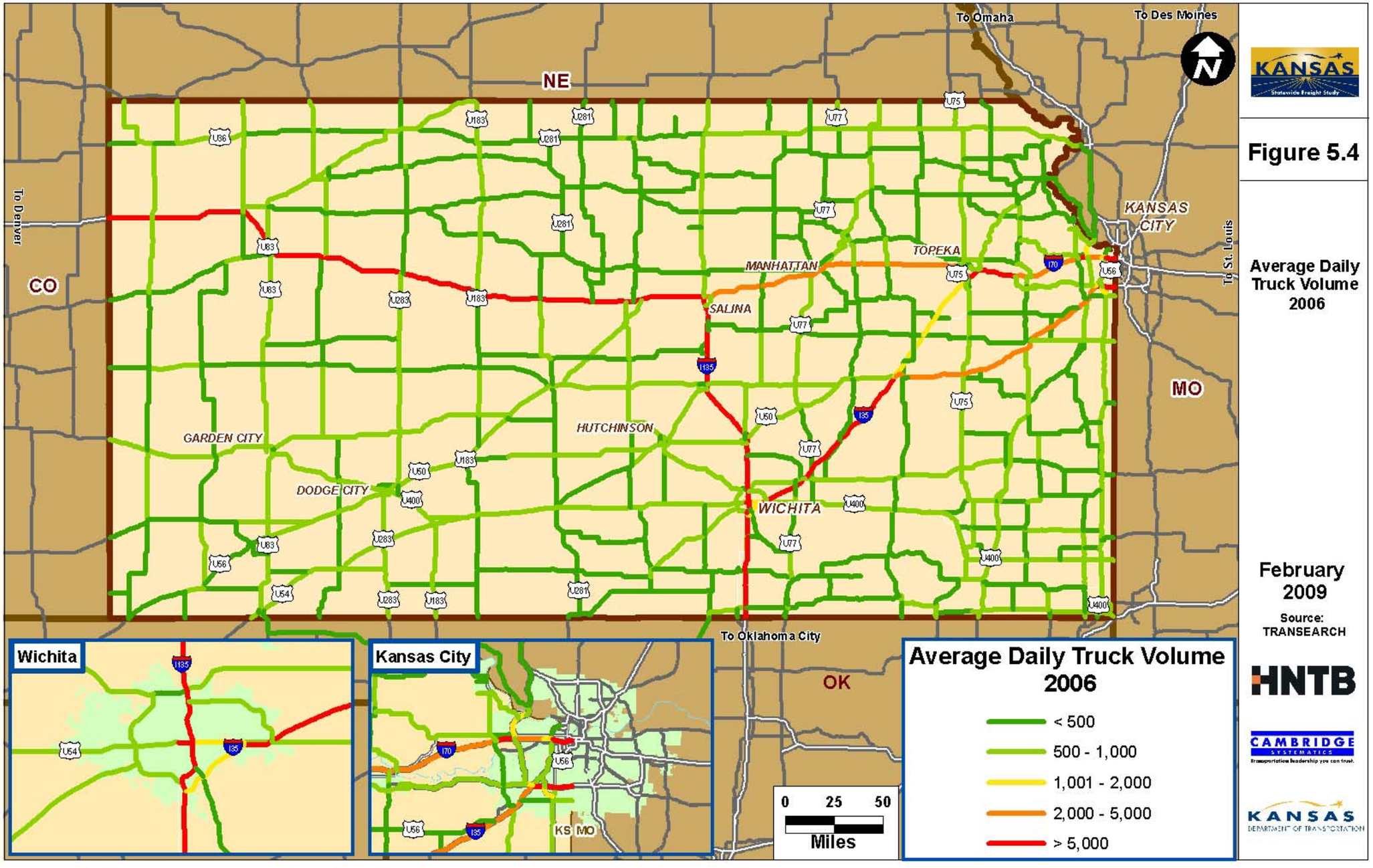
Figure 5.4
Average Daily Truck Volume 2006
February 2009
Source: TRANSEARCH
To Omaha
To Des Moines
To Denver
To St. Louis
To Oklahoma City
NE
CO
MO
OK
KS
KANSAS CITY
TOPEKA
MANHATTAN
SALINA
HUTCHINSON
WICHITA
GARDEN CITY
DODGE CITY
Wichita
Kansas City
Average Daily Truck Volume 2006
< 500
500 - 1,000
1,001 - 2,000
2,000 - 5,000
> 5,000
0 25 50
Miles

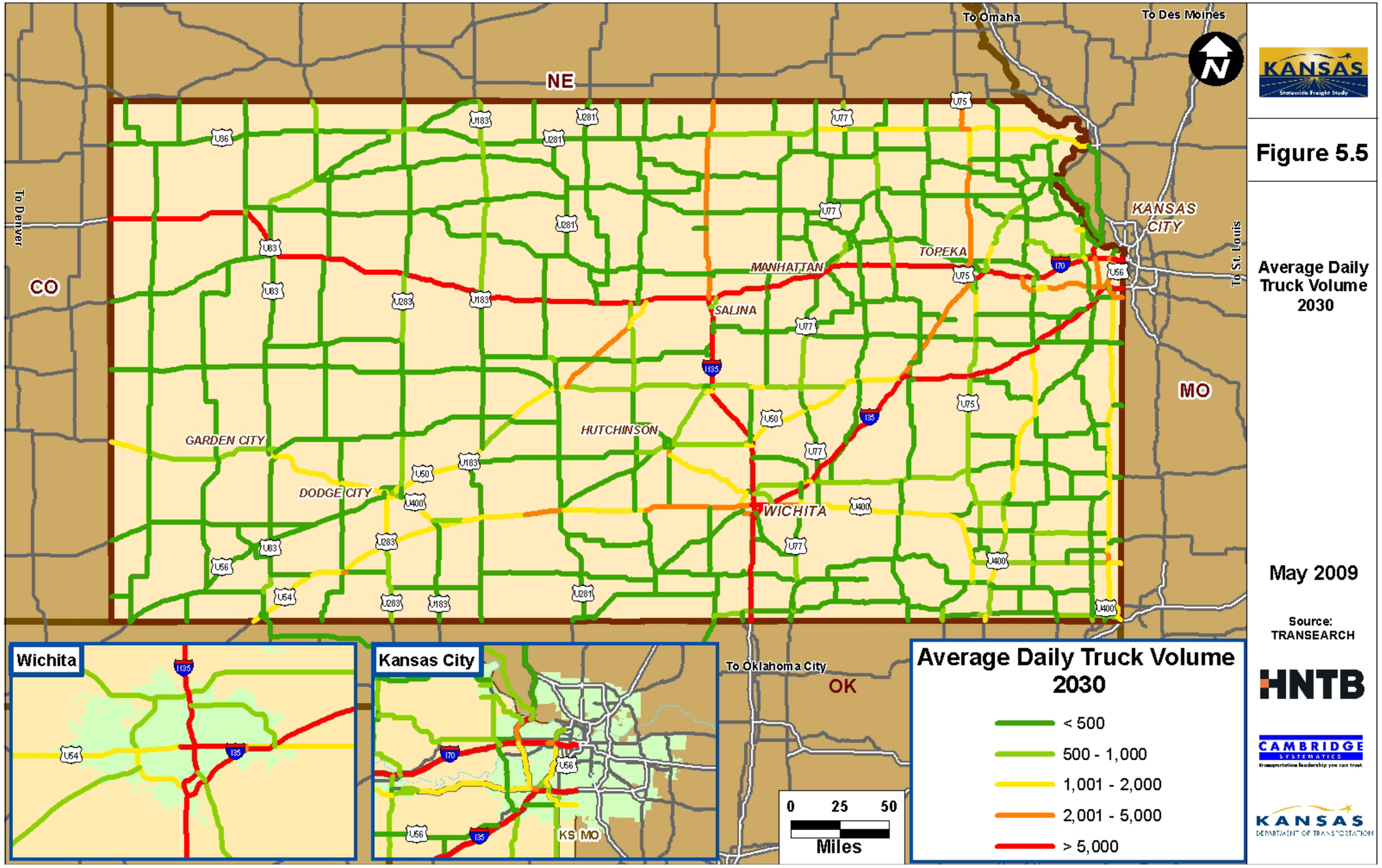

Figure 5.5

Average Daily Truck Volume 2030

May 2009

Source: TRANSEARCH

The BNSF Gardner Intermodal Terminal and Logistics Park, which is expected to break ground within the next several years, already has sparked a development boom in Johnson County and will likely continue to attract additional development as it comes on-line. Gardner is expected to handle about 400,000 20-foot equivalent units (TEU) annually and is expandable to one million TEUs. Most of this traffic will be east-west in nature, much of it originating at West Coast seaports and bound for consumer markets in the Eastern United States.[5] In addition, the Kansas City Southern CenterPoint Intermodal Terminal already handles NAFTA-related traffic with a direct rail link to the Port of Lazaro Cardenas in Mexico and is situated to take advantage of growth along this trade corridor. These and other developments will also contribute to truck traffic growth along the state's major trade corridors.

In addition to growth on major Kansas trade corridors, emerging freight corridors in rural parts of the State also will experience significant increases in truck volumes, particularly U.S. 81 north of the I-70 intersection, U.S. 50/U.S. 400 between Garden City and Dodge City, U.S. 283 between Dodge City and the Oklahoma State line, and U.S. 54/400 from the Oklahoma line, through Wichita, and eastward to Independence. These corridors are critically important to a number of Kansas industries and growth in these corridors will be driven primarily by increasing volumes of agricultural goods and food products. Southwest Kansas, for example, contains a thriving cluster of cattle feed lots and meat packing plants; it also grows more corn than any other part of the State, much of which is used as cattle feed or as an input for ethanol production. Similarly, wheat is primarily grown in the middle of the State (within KDOT Districts 2 and 5). Wheat typically moves by truck from farms to grain elevators, where it is then transferred to trains for distribution to more distant markets.

There is some concern that the existing highway infrastructure in these rural regions may not be capable of absorbing anticipated growth in freight traffic. KDOT classifies the Kansas highway network using a route classification system with five categories: A, B, C, D, and E. Classes A and B include the Interstate system (including the Kansas Turnpike) and major statewide routes (many of them on the National Highway System). These represent the State's major trade corridors and handle the lion's share of freight traffic. Classes C and D, by contrast, are arterial and arterial access routes that are critical for intercounty movements of agricultural goods and provide access to the major Class A and B routes. Many rural highways fall into these categories. As shown Figures 5.6 and 5.6a, significant growth in truck traffic will occur (on both a percentage and an absolute basis) on many of these corridors through 2030.

[5] One TEU represents a standard 20-foot shipping container and is a common measure of container capacity.

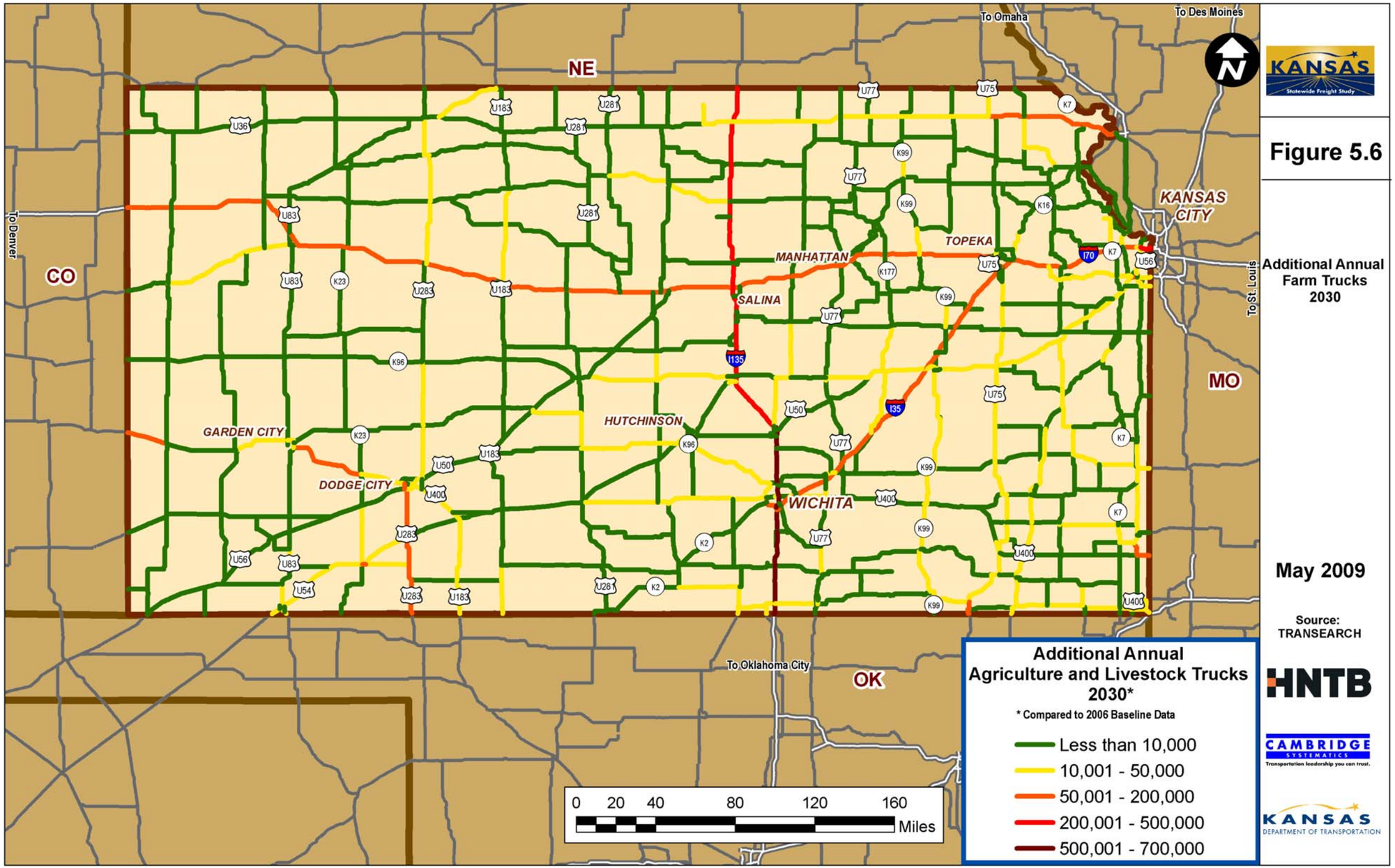
Figure 5.6
Additional Annual Farm Trucks 2030
May 2009
Source: TRANSEARCH
Additional Annual Agriculture and Livestock Trucks 2030*
* Compared to 2006 Baseline Data
Less than 10,000
10,001 - 50,000
50,001 - 200,000
200,001 - 500,000
500,001 - 700,000
0 20 40 80 120 160 Miles
NE
CO
MO
OK
To Omaha
To Des Moines
To Denver
To St. Louis
To Oklahoma City
KANSAS CITY
TOPEKA
MANHATTAN
SALINA
HUTCHINSON
WICHITA
GARDEN CITY
DODGE CITY
KANSAS
Statewide Freight Study
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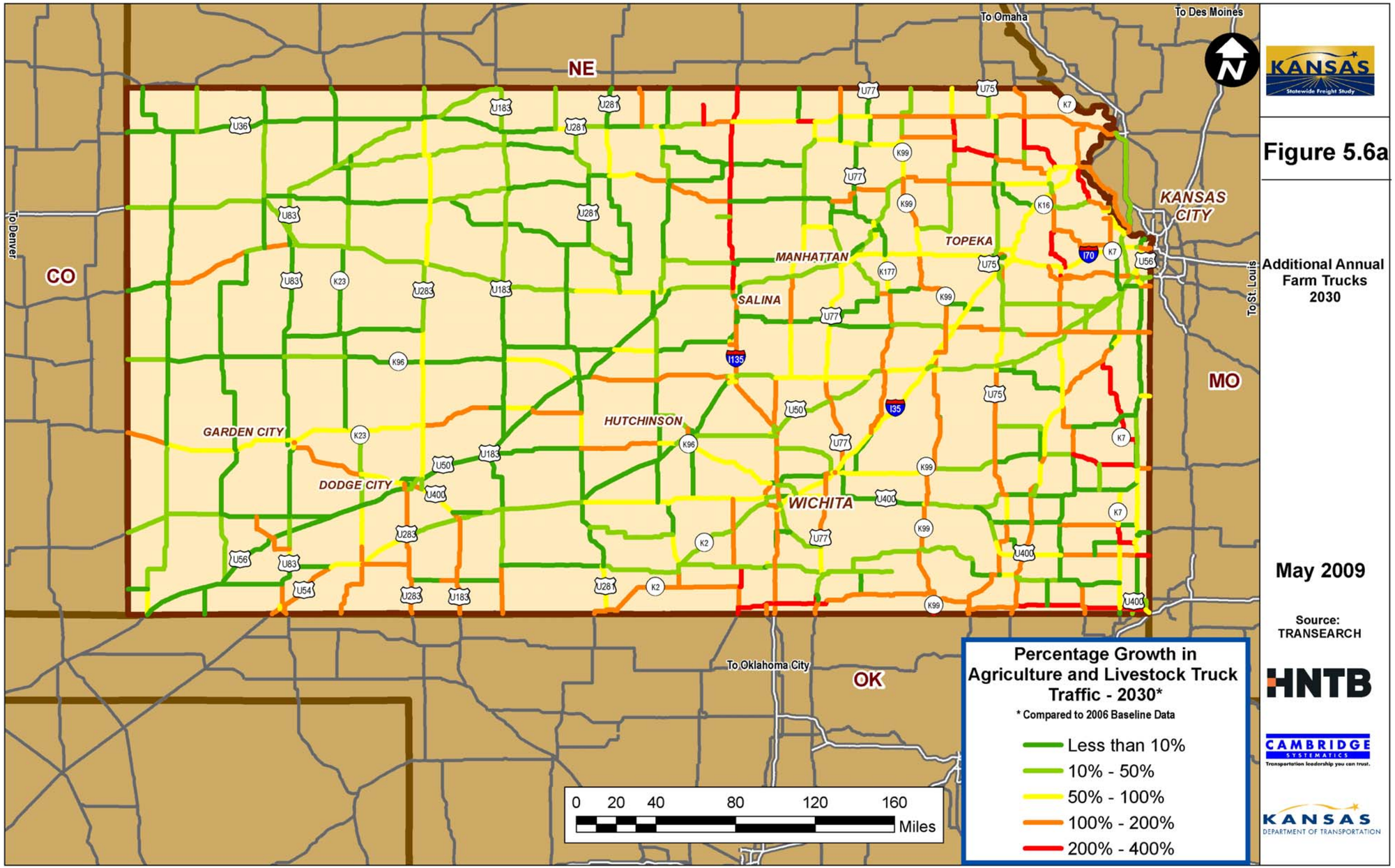
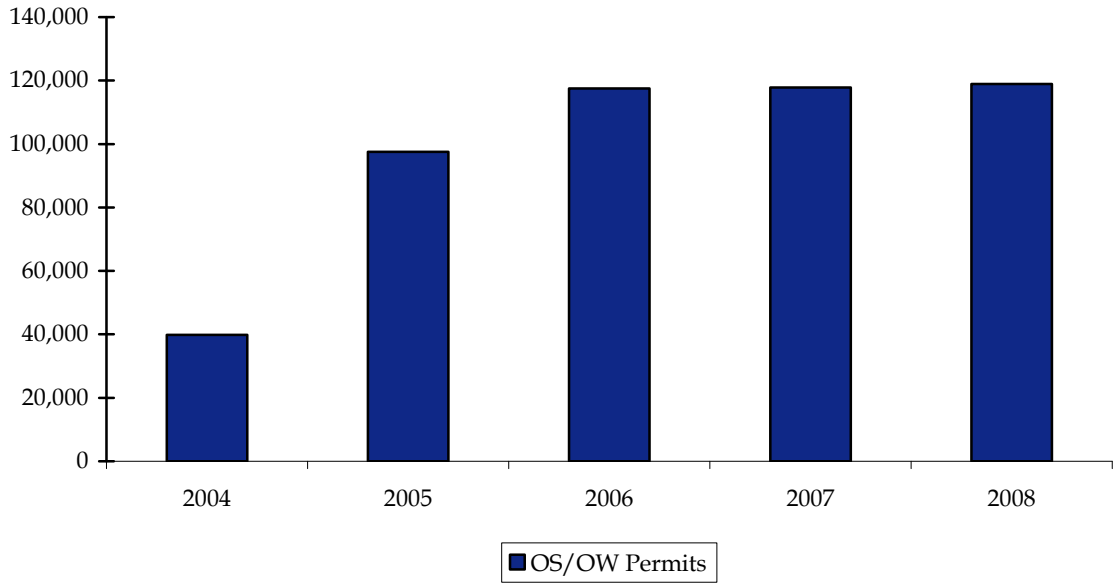


Figure 5.6a
Additional Annual Farm Trucks 2030
May 2009
Source: TRANSEARCH
Percentage Growth in Agriculture and Livestock Truck Traffic - 2030*
* Compared to 2006 Baseline Data
Less than 10%
10% - 50%
50% - 100%
100% - 200%
200% - 400%
0 20 40 80 120 160 Miles
NE
CO
MO
OK
To Omaha
To Des Moines
To Denver
To St. Louis
To Oklahoma City
KANSAS CITY
TOPEKA
MANHATTAN
SALINA
HUTCHINSON
WICHITA
GARDEN CITY
DODGE CITY
KANSAS Statewide Freight Study
HNTB
CAMBRIDGE SYSTEMATICS
KANSAS DEPARTMENT OF TRANSPORTATION

These maps also reveal significant growth in truck traffic on rural Class A and B routes like U.S. 50 near Dodge City and U.S. 81 north of Interstate 70. Although these roads are better equipped to handle heavy truck traffic, increasing freight demand on all rural roads in Kansas will increase travel times, lower reliability, and generally reduce mobility for both people and goods along these corridors.

Finally, as shown in Figure 5.7, the number of trucks operating in Kansas with oversize/ overweight (OS/OW) permits has been increasing dramatically. This increase is being driven by several factors, including the increased transportation of windmill blades, towers, and turbines to feed the growing wind energy industry in Western Kansas.

Figure 5.7 Growth in Oversize/Overweight Truck Permits
2004 to 2008



Source: Kansas Department of Revenue.

The growth in OS/OW trips has several implications for the Kansas freight system. First, because many of the trips are destined for rural parts of the State, they are traveling on infrastructure that might not be appropriate to handle these loads. And the requirement that limits permit fees ($5 for single trip permits, $125 for annual permits)[6] means that Kansas may not be recovering the full cost of pavement damage associated with these movements – a situation that will be exacerbated with continued growth. In addition, there is a lack of redundancy in terms of routes that are capable of accommodating OS/OW vehicles, including superloads. If more than one of these routes is under construction at the same time, it can significantly impact OS/OW truck movements. These trends will exacerbate existing chokepoints along the Kansas freight system, particularly those on Class C or D routes.

Existing Chokepoints Will Be Exacerbated

Kansas' urban areas have also experienced more congestion in recent years. Rapid population growth in cities places increasing demands on the roadway and rail infrastructure. Freight-intensive businesses also tend to cluster in urban areas, oftentimes near other large traffic generators. The result is generally declining transportation system performance, the formation of new or the exacerbation of existing bottlenecks, and congestion in and around the growing areas. Kansas' highway infrastructure has kept pace with growth in urban areas to date, but faces significant challenges due to these changing demographics and land use patterns.

Table 5.2 lists the key urban highway bottlenecks identified during the course of this study. In general, urban highway freight bottlenecks fall into two categories:

1. **Urban Interchange Bottlenecks –** Some intersections in the Kansas' urbanized areas are insufficient to handle current freight and passenger demand. Many bottlenecks are caused by rapidly growing population and passenger vehicle-miles-traveled (VMT). However, these chokepoints can represent a significant source of delay for trucks serving national and regional trade, as they often connect major freight facilities (intermodal terminals, distribution/warehouse facilities) and important regional and national trade corridors. Some of these intersections are designed in such a way that makes it challenging for trucks to navigate.

2. **Lack of Capacity/Recurring Congestion along Key Urban Highway Corridors –** These chokepoints represent capacity-constrained highway links in urban areas that are impacting truck movements. Delays are typically the result of recurring congestion.

[6] Kansas DOT Statutory Authority, Section 8-1911 (f) (1) and (2).

Table 5.2 Urban Highway Bottlenecks

Metropolitan Area	Location
Kansas City	I-35 between U.S. 69 and I-635
Kansas City	I-435 between K-10 and I-35
Kansas City	U.S. 69 between I-435 and I-35
Kansas City	I-70 (KS Turnpike)/K-7 Interchange
Kansas City	U.S. 56 through Gardner, KS (traffic from intermodal terminal)
Kansas City	I-35/K-10 Interchange
Kansas City	I-35/I-435 Interchange
Kansas City	I-70/U.S. 24
Wichita	I-135/I-235/K-254 Interchange
Wichita	I-235/U.S. 54 Interchange
Wichita	I-35/K-96 Interchange
Wichita	I-135/47th St. Interchange
Topeka	I-70/I-470 Interchange
Topeka	I-70/U.S. 75 Interchange
Topeka	I-70 through downtown
Lawrence	K-10/U.S. 40 Interchange
Lawrence	K-10/Massachusetts St. Interchange

5.2 Institutional and Policy Challenges

Institutional and policy challenges relate to how transportation planning and investment decisions are made and evaluated. There are a number of these challenges, described below, that will clearly influence future condition and performance of the statewide freight system.

Future Federal Transportation Funding Program Structure and Funding Levels Are Uncertain

The role of the Federal government in the freight sector currently is undergoing much debate and transformation. Traditionally, the Federal government has been fairly removed from freight planning discussions, choosing instead to let the state and local governments and the private sector manage, plan for, and implement freight

improvements. However, there is growing sentiment that the multistate and cross-jurisdictional nature of freight movements requires a strong Federal presence and potentially a dedicated funding source to effectively manage freight movements in a way that is beneficial to multiple stakeholders and to the nation's economy and competitiveness.

In what perhaps signals a paradigm shift for the Federal government, the National Surface Transportation Policy and Revenue Study Commission was created in the 2005 signing of the Safe, Accountable, Flexible, and Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU). As declared by the U.S. Congress, the Commission was created because "it is in the national interest to preserve and enhance the surface transportation system to meet the needs of the United States for the 21st century."[7]

Throughout 2006 and 2007, the Commission met with transportation experts and concerned citizens all across the Nation. Their final recommendations, summarized below in Table 5.3, called for Federal surface transportation investment to be focused into 10 program areas, including one dedicated to freight transportation. In addition, the Commission supported the creation and funding of a national freight transportation program that could be used to implement highway, rail, and other improvements to alleviate freight bottlenecks.

Table 5.3 National Surface Transportation Policy and Revenue Study Commission Freight Position and Recommendations

Position/Recommendations	National Surface Transportation Policy and Revenue Study Language
Consequences of Inaction	America's economic leadership in the world will be jeopardized when we cannot reliably and efficiently move our goods.
National Interest	Freight movement is explicitly valued. (Multiple options of private and public sector freight systems exist).
Condense Federal Investment	There should be 10 investment programs total (as opposed to 108). One of the 10 programs should be "Freight Transportation: A Program to Enhance U.S. Global Competitiveness."
The Role of the Federal Government	The Commission supports the creation and funding of a national freight transportation program.
The Role of the State	Multistate cooperation will be necessary to meet national freight planning goals.

However, despite this activity at the Federal level, much indecision remains as to the future role of the Federal government in the freight system- it may take a stronger role in freight planning, and it may chose to dedicate more resources and funding to supporting freight infrastructure. On the other hand, increasing awareness of environmental issues and global warming could lead to more stringent emissions regulations. This could have the effect of limiting funding for freight projects, particularly in nonattainment areas where transportation projects must conform to a State Implementation Plan (SIP) to meet air quality rules.

There Are Limited Funding Options for Freight Projects

Another development at the national level is a growing awareness of the lack of diversity of funding sources for freight projects, in particular those that are multimodal in nature. Some sources are simply closed to nonhighway sources. For example, highway agencies, much of the trucking industry, and portions of the construction industry are opposed to opening the Highway Trust Fund (HTF) for investments in nonhighway projects, fearing that this will aggravate the shortfall in investments in highways. Other Federal funding sources, including the U.S. Department of Commerce Economic Development Administration (EDA) funds, are available only for certain types of freight improvement projects, typically industrial access roads, port development and expansion, and railroad spurs and sidings.

SAFETEA-LU did include some new provisions for freight funding, including expanding the Transportation Infrastructure Finance and Innovation Act (TIFIA) loans, to allow funding of freight projects, and the creation of the National Corridor Infrastructure Improvement Program. However, many of the promising new programs (for example the Program for Projects of National and Regional Significance and the National Corridor Infrastructure Improvement Program) were fully earmarked by the U.S. Congress to specific state and local projects. The lack of a robust and reliable funding source for freight improvements continues to be an obstacle to funding rail, intermodal centers, or any other multimodal freight improvements.

Although public-private collaboration and cooperation has been held up as a way to expand the funding and financing options available for freight projects, as of November 2008, only 23 U.S. states and one U.S. territory (shown in Figure 5.8) have enacted statutes that specifically enable the use of various PPP approaches for the development of transportation infrastructure.

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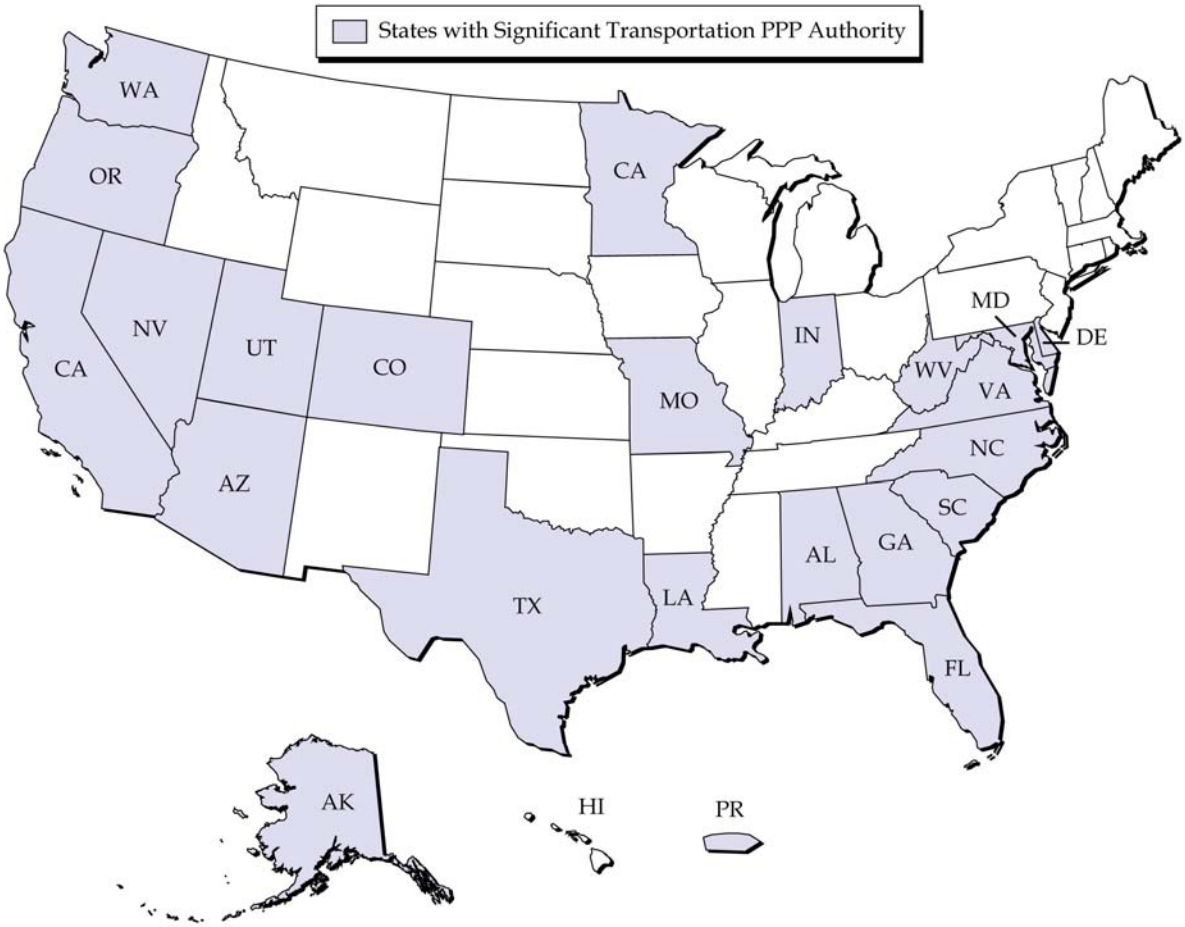
[7] http://www.transportationfortomorrow.org.

Figure 5.8 States with Significant Transportation PPP Authority
2008



Source: U.S. DOT FHWA.

Kansas is not one of the 23 states with PPP enabling language. In fact, the Kansas State Constitution includes an internal improvements clause that can hinder the State's ability to pursue public-private partnerships, and obtain innovative funding for critical freight projects. In order to protect public money, this clause states that Kansas "shall never be a party in carrying on any work of internal improvement except that: 1) it may adopt, construct, reconstruct, and maintain a state system of highways…etc."[8] In other words, the Kansas State Constitution limits the ability of the State to spend any money on infrastructure improvements unless they are highway improvements. Exceptions are granted on a case-by-case basis, and must be approved by two-thirds of the state legislature. Certainly, there are some examples of successful, nonhighway PPPs in Kansas, including

[8] Constitution of the State of Kansas. Article 11 – Finance and Taxation. Retrieved from http://www.ksrevenue.org/pdf/art11const.pdf.

the Rail Rehabilitation program. However, the lengthy time and legislative involvement required to gain approval for this type of funding arrangement could limit the use of PPP approaches in Kansas, especially for rail and intermodal projects.

Economic Benefits of Freight Projects Are Not Fully Understood or Measured

Currently, KDOT does not fully account for the unique, freight-specific economic benefits of a project, such as the enhanced ability to attract or retain industries or potential tax revenue increases, when choosing or prioritizing highway investments. Project selection is instead guided by the infrastructure level of performance, by population or use, or by maintenance standards of safety and comfort.[9] These types of criteria do not allow KDOT to determine which projects may result in economic benefit, in terms of job creation or retention, revenue growth, or other benefits. This link could be created by answering several key questions, including the following:

- What types of investments are appropriate and justifiable in the freight system?
- Where will the State realize the greatest public benefits from investments?
- How are public benefits quantified? Is it in terms of jobs and contribution of industries to Gross State Product (GSP)? Or are there other benefits, such as reduced congestion, reduced emissions due to congestion, and safety benefits that can be monetized?

Several states have developed methods and tools by which to answer these questions and quantify the potential public benefits of rail projects (including reduced truck traffic on roadways, reduced emissions from idling trucks, and safety and environmental features). This quantification not only helps solidify the link between freight transportation investments and economic benefits, it also has facilitated cost sharing discussions among different public and private sector beneficiaries.

Existing Oversize/Overweight Permitting Process Is Inefficient

As described earlier, Kansas has experienced a sharp increase in the number of OS/OW truck loads moving within and through the State. However, as the number of these loads have increased, the State's ability to effectively review and process OS/OW permits has not improved apace. In fact, the OS/OW permitting process can be complex and time-

[9] Although freight benefits are considered as part of the State Rail Improvement and Service Fund, overall funding is limited. In addition, while there is an Economic Development set-aside program within the Comprehensive Transportation Program, it is not freight specific; in any case, Economic Development projects have not been selected for implementation for Fiscal Year (FY) 2012 and subsequent years due to funding constraints.

consuming for users, particularly as compared to states that have automated their permitting systems.

Superloads (loads in excess of 150,000 pounds) and large structures (loads exceeding standard OS/OW dimensions) undergo a rigorous permitting process that involves a bridge analysis to ensure that their weight and dimensions do not exceed the operational parameters of bridges along the proposed route. This process necessarily involves permitting staff (from the Kansas Trucking Connection) and engineering staff from KDOT. However, the "workflow process" through which these analyses are completed and permits assigned is entirely manual can be sluggish. In addition, large structure loads must be approved separately by each individual KDOT district through which they are moving, which can lead to delays. In some cases, it takes more than a week for one of these loads to obtain the necessary permits. While these permits perform a necessary function, there is room for process improvement to reduce delays.

Further compounding this issue is the limited number of routes capable of handling OS/OW vehicles, and the fact that local or municipal truck routes or restrictions for OS/OW loads are sometimes not effectively communicated to KDOT or to permit applicants. As a result, trucks carrying OS/OW loads may encounter unnecessary delays when moving through local communities in Kansas or it may lead to confusion about the proper route to use prior to making the move.

KDOT Does Not Manage a Formal Freight Data Collection Program

Good freight planning and programming often starts with good freight data and it is important to collect and analyze freight-related data in support of the identification of needs and deficiencies. During the course of this study and other statewide planning efforts, KDOT has acquired a number of freight-related datasets, including:

- **TRANSEARCH Commodity Flow Database and Forecast**, which contains detailed commodity flow information for each of Kansas' 105 counties, for all modes, by weight, value, with a base year of 2006 and a forecast to 2030;

- **Transportation Economic Development Impact System (TREDIS)**, a web-based benefit/cost analysis and economic impact estimation tool for transportation projects and programs;

- **Moody's Economy.com Employment Data**, which has historic and forecast employment data for detailed industries in each Kansas County; and

- **Freight-Specific Geographic Information System (GIS) Data**, including the location of major freight generators (warehouses, distribution centers, and intermodal hubs), locations of existing and emerging industry clusters, and freight network attributes and operational characteristics;

However, like most states, KDOT has not yet fully assessed its freight data needs nor does it collect, review, and analyze freight-related data and information on a routine basis. Although KDOT does collect data regarding the condition and performance of the transportation system in general (including truck counts), this data collection program lacks a freight focus and makes it difficult for the DOT to conduct effective freight planning at the statewide level or to support its MPOs and Districts in understanding freight-specific issues and impacts. Developing and implementing a formal strategy to maintaining existing data sets and identify any additional data needs may be necessary to support future statewide freight planning activities.

There Are Few Performance Metrics to Measure the Effectiveness of Freight Projects

Development of freight performance measures can help KDOT evaluate how it is meeting the transportation goals and objectives already outlined in the LRTP, as well as help more effectively target investments to address identified freight performance issues by facilitating the monitoring of system performance to identify key problem areas. Although KDOT has not yet defined performance targets to measure the safety, efficiency, or maintenance needs of the freight system, existing programs and activities have indicated that there is interest in developing performance measures that can be tied to specific goals and programs. For example:

- **The SRSIF** is intended to maintain the shortlines at the FRA Class II standard, and to focus on those shortlines with a viable business plan. Performance measures to track the effectiveness of this program would be the number of miles of shortline track at the FRA Class II standard that are sufficient to handle 286,000 pound rail cars, and the percentage of customers using the track that have a viable, sustainable business plan.

- **The Highway-Rail Grade Crossing Safety Improvement Program** is intended to reduce the amount of highway-rail grade crossing incidents. Kansas, like many states, is under pressure to remove crossings in many locations statewide. Developing and tracking performance measures, such as reduced accident rates, increased train throughput or transit time, or the number of trains using the crossing, might help KDOT to better communicate the importance of this program.

These efforts provide a foundation that KDOT can use to develop and implement a full suite of relevant, measurable, and multimodal performance measures that can help the Department better link investments to desired outcomes.

6.0 Conclusions and Recommendations

6.1 Overview

Our conclusions were developed from our analysis of the trade and transportation trends driving freight growth in Kansas, key characteristics of the State's freight transportation system, the types of commodities moving over that system and how they are expected to grow in the future, and the existing and emerging industries that are likely to influence future freight demand in Kansas. These conclusions, along with our recommendations and "quick-start" action items, are designed to provide a foundation to allow KDOT to begin addressing specific systemwide issues and constraints on its freight transportation system as well as more comprehensively incorporate freight issues within its transportation planning and investment activities.

6.2 Conclusions

Kansas' trade corridors are critically important to the statewide, regional, and national economy

Kansas is situated along several important and growing trade corridors, including Interstates 35 and 70, the Kansas Turnpike, the BNSF Trans-Continental (Transcon) line, and the Union Pacific (UP) mainline, which provide east-west and north-south connectivity across the State and provide access to major national and international markets. These trade corridors are fed by a number of national, state, and local roads, shortline railroads, and connecting facilities that serve to connect local population centers and industries to outlying markets. Finally, a series of public and private ports and docks on the Missouri River connect the State with the U.S. inland waterway system via the Mississippi River in St. Louis.

These corridors are part of a system of national significance and their condition and performance impacts shippers and carriers not only in Kansas, but throughout the U.S. Approximately two-thirds of all shipments (by weight) and over half of total shipments (by value) are moving through the State along these corridors, and these through movements are expected to grow rapidly by 2030. Because of its proximity to major markets and key national and international trade corridors, Kansas – and the Kansas City

metropolitan area in particular – is already a major logistics and distribution hub. The region's importance within national and global supply chains will be strengthened by the development of the BNSF Gardner Intermodal Terminal and Logistics Park, which is expected to handle 400,000 20-foot equivalent units (TEU) annually when it comes on line; and the Kansas City Southern CenterPoint Intermodal Terminal, which already handles NAFTA-related traffic with a direct rail link to the Port of Lazaro Cardenas in Mexico. These and other developments put the region in an ideal position to capture and benefit from increasing global trade.

These corridors also serve an important statewide and regional function, connecting the State's major population centers, providing access to markets for the State's key industries, and connecting the State's rural areas to important statewide and regional centers. The condition and performance of these corridors is also critical to the strength of the State's economy, which grew by 23 percent between 1997 and 2006. Because much of this growth can be attributed to industries that are particularly reliant on the transportation system – food manufacturing, agriculture (crop and animal production), and aerospace manufacturing – maintaining the safety, efficiency, and reliability of these corridors will be critical to furthering this kind of economic growth.

There are a number of rural freight corridors that are serving key statewide industries

In addition to these major trade corridors, Kansas has a number of rural highway routes and shortline rail corridors that are important in linking the State's agriculture and manufacturing industries to statewide, regional, and national markets. Examples include U.S. 81 north of the I-70 intersection, U.S. 50/U.S. 400 between Garden City and Dodge City, U.S. 283 between Dodge City and the Oklahoma State line, and U.S. 54/U.S. 400 from the Oklahoma line, through Wichita, and eastward to Independence; U.S. 75, U.S. 69, and U.S. 36 in Southeast and Northeast Kansas; and portions of the shortline rail systems that serve central and western portions of the State. Many of the State's fastest-growing industries and establishments, including cattle feed lots and meat packing plants in southwest Kansas, and wheat production (Kansas is the number one producer in the country) in central Kansas rely heavily on these rural corridors to access domestic and international markets.

However, some of these rural corridors are beginning to suffer from the strain of increasing freight volumes. Exacerbating this issue is the fact that many high-growth highway corridors are designated as Class C or D routes (i.e., arterial and arterial access routes) that were not designed to handle large volumes of heavy trucks. Furthermore, much of the State's shortline rail infrastructure is not capable of accommodating the 286,000-pound railcars that are the current standard for the Class I railroads. The inability to handle these heavier cars will make it increasingly difficult for some shortlines to interline with the Class I rail system, limiting access to that system by regional shippers and manufacturers. Some shippers may be forced to use trucks to access markets, exacerbating existing highway congestion and contributing to environmental impacts and increased pavement wear. Finally, some shortlines may not be able to remain viable without a 286,000-pound upgrade, reducing transportation options in the region and hindering its ability to attract or retain businesses and jobs.

Growth in overall freight volumes will exacerbate existing system bottlenecks

Although Kansas' freight transportation system currently is able to handle existing freight demand, anticipated growth in freight movements may challenge system capacity in the future. Approximately 801 million tons of freight valued at about $894 billion moved into, out of, through, or within Kansas in 2006. By 2030, total freight movements are expected to grow to almost 1.2 billion tons valued at $1.7 trillion, representing annual growth rates of 1.5 percent and 2.7 percent, respectively. While these growth rates are not extraordinary (they generally track with expected economic growth in the same period and are consistent with national projections), they do imply that freight movements will become a greater part of the traffic mix in Kansas in the coming years.

Considering that 99 percent of all Kansas freight volume will be carried by trucks (70 percent) and rail (29 percent) by 2030, this growth will have particular ramifications for Kansas roadway and rail networks – rail's share of total freight in Kansas is expected to drop to 63 percent by 2030, even though total volume will grow to almost 724 million tons; and truck volumes on some segments of the State's highway system could average nearly 17,000 daily trucks by 2030. In addition, the number of trucks operating in Kansas with oversize/overweight (OS/OW) permits has more than doubled in the last five years. This increase is being driven by several factors, including the increased demand for and transportation of windmill blades, towers, and turbines to feed the growing wind energy industry in western Kansas. Complicating these trends is the fact that the State's population and employment growth will be overwhelmingly concentrated in the urban areas (primarily the Kansas City metropolitan area and Wichita), also home to many of the State's existing and emerging trade corridors. Continued growth in freight demand, coupled with continued population and employment growth in and around the State's existing and emerging freight corridors, will exacerbate existing freight bottlenecks and could impact the efficiency of the State's freight transportation system and its ability to attract and retain key industries.

KDOT has effective, productive relationships with the private sector freight community

The private sector freight community, as the primary users of the freight transportation system, is a critical resource for state DOTs when identifying freight needs and deficiencies and offering potential freight improvement projects. Effective private sector involvement is key to the success of a statewide freight planning and investment program. Through its outreach efforts related to the Long-Range Transportation Plan (LRTP), the Transportation – Leveraging Investments in Kansas (T-LINK) Task Force process, the State Rail Service Improvement Fund program, and other initiatives, KDOT has developed a solid relationship with key private sector freight stakeholders in the State, particularly trucking, freight rail, and shipper communities. By and large, these stakeholders understand the statewide planning and investment process and – more importantly – how to provide input to the process. Kansas' relationship with the private sector freight community provides a solid foundation on which to build a more comprehensive freight planning and programming process moving forward.

KDOT does not fully account for or measure potential economic benefits of freight improvement projects within its current practices

KDOT, like many of its counterparts across the country, has effectively incorporated freight issues within its long-range planning activities, including the LRTP and the T-LINK Task Force process, which has helped raise the profile of freight and emphasize the importance of incorporating freight into the statewide transportation planning process. However, like many other states, KDOT does not currently account for the unique, freight-specific economic benefits of proposed freight improvement projects, such the enhanced ability to attract or retain industries or potential tax revenue increases, when choosing or prioritizing highway investments. Project selection is instead guided by the infrastructure level of performance, by population or use, or by maintenance standards of safety and comfort.[1] These types of criteria do not allow KDOT to determine which projects may result in economic benefit, in terms of job creation or retention, revenue growth, or other benefits.

Several states have developed methodologies and tools by which to answer these questions and quantify the potential public benefits of rail projects (including reduced truck traffic on roadways, reduced emissions from idling trucks, and safety and environmental features). This quantification not only helps solidify the link between freight transportation investments and economic benefits, it also can facilitate cost sharing discussions among different public and private sector beneficiaries.

6.3 Recommendations

Our recommendations are designed to provide a foundation to allow KDOT to begin addressing specific systemwide issues and constraints on the Kansas freight transportation system as well as more comprehensively incorporate freight issues within KDOT transportation planning and investment activities.

Integrate freight, mobility, and economic development goals and strategies

An efficient Kansas freight transportation system is critical to the continued vitality and competitiveness of a number of important statewide industries, particularly agriculture and food manufacturing, chemical manufacturing, and transportation equipment manufacturing. However, the combination of increasing demand on key trade corridors (particularly rural corridors), rising maintenance/preservation and construction costs, and

[1] Although freight benefits are considered as part of the State Rail Improvement and Service Fund, overall funding is limited. In addition, while there is an Economic Development set-aside program within the Comprehensive Transportation Program, it is not freight specific; in any case, Economic Development projects have not been selected for implementation for Fiscal Year (FY) 2012 and subsequent years due to funding constraints.

declining overall transportation funding levels will strain the ability of the statewide freight system to provide efficient mobility for both people and goods, and hinder access to suppliers, distribution hubs, and key markets. And as noted above, KDOT currently lacks a formal method to evaluate freight projects that includes parameters such as job creation or retention, tax revenue growth, or other public benefits.

The recent completion of the LRTP, the continuing development a new strategic transportation approach for the State by the T-LINK Task Force, and the completion of this Freight Study provide a unique opportunity for KDOT to more explicitly link mobility and economic goals, more effectively evaluate modal tradeoffs, and more precisely understand the potential benefits of freight investments. KDOT should leverage these planning efforts to develop a coherent investment strategy that explicitly accounts for Kansas' mobility and economic development goals.

Identify and designate key freight corridors and facilities of statewide or regional significance

The majority of the freight traffic on the Kansas freight transportation system is confined to the regional, statewide, and national trade corridors that connect Kansas industries and population centers to regional, statewide, and national markets. Specifically designating those statewide corridors (e.g., I-70, I-35, U.S. 54, U.S. 56, BNSF Transcon), regional corridors (e.g., U.S. 69, U.S. 50, U.S. 83, Kyle Railroad System, the Kansas and Oklahoma Railroad, and the South Kansas and Oklahoma Railroad), and local connectors (e.g., K-61, U.S. 40, Cimarron Valley Railroad) that are most critical to freight movements can help KDOT to better focus potential investments on those corridors and facilities that have the greatest impact on economic competitiveness, mobility, or quality of life. While specific projects do not necessarily need to be identified right away, defining key freight corridors and outlining specific objectives for those corridors (e.g., improve access to intermodal facilities or elevators or implement ITS technologies to improve flow) can improve the ability of KDOT to identify freight-specific projects in the future and help ensure that those projects are consistent with statewide or regional goals.

Designation of freight corridors will also ensure that proposed corridor improvement strategies are sensitive to the geometric and operational needs of freight movements. Designated corridors should be held to design standards that facilitate the unique operational characteristics of freight vehicles, and be free of obstacles or large structures that can hinder the efficient movement of freight shipments. Operational considerations, including sufficient truck parking for short-term or overnight use, could also be targeted to these freight corridors. In addition, designation can provide statewide continuity for individual corridor plans developed by MPOs or other planning partners. Finally, identifying and designating key freight corridors and facilities can help emphasize freight's importance to regional economies and regional mobility, both within Kansas and among different states and jurisdictions. This information, in turn, can be used to develop advocates or champions for freight planning and project development within agencies and among other constituencies, helping to propel statewide or metropolitan freight planning efforts.

Address critical bottlenecks and link improvement strategies to economic benefits

It is critical to fully understand the potential benefits of transportation investments – particularly freight investments – not only in transportation terms (e.g., improved throughput, reduced delay, enhanced air quality), but also in economic terms (e.g., changes in jobs, increases in average personal income, enhanced ability to attract or retain industries). This Freight Study has helped identify key system bottlenecks and allow planners to understand how they are impacting key statewide industries.

A logical next step is for KDOT to work with its regional and local partners to identify improvement strategies to address these bottlenecks (rail and truck, rural and urban) and develop a methodology to evaluate the economic effects of freight investments on the State's economy. Fully understanding the potential costs and benefits – in terms of both transportation and the economy – can provide decision-makers with a complete picture of the impacts associated with different improvements and help them to prioritize projects.

Develop freight performance measures that link to existing planning activities

Development of freight performance measures can help KDOT evaluate how it is meeting the transportation goals and objectives already outlined in the LRTP, as well as more effectively target investments to address identified freight performance issues by facilitating the monitoring of system performance to identify key problem areas. Kansas should build on the performance measurement activities included within the State Rail Service Improvement Fund (SRSIF), the Highway Rail Grade Crossing Safety Improvement Program, and other activities to develop a portfolio of performance measures that can help the Department understand multimodal trade-offs, and better link investments to desired mobility, preservation, and economic development goals.

Just as important as identifying key performance measures for freight is the ability to mainstream these performance measures into existing transportation planning and programming processes. Linking freight data collection and performance measurement to existing processes can help ensure that freight issues become mainstreamed within KDOT and allow freight projects to compete more effectively in statewide prioritization and funding processes. Other states have developed a range of techniques to effectively link freight performance measurement with existing processes. Some develop freight "report cards" that help measure progress toward key freight-related goals and objectives included in the long-range plan. Others specifically link freight performance measures with policy statements, goals, and strategies outlined in LRTPs. KDOT should assess these and other best practices in order to develop its own strategies to link performance measures within existing processes.

Enhance rail planning efforts

Rail movements are critically important to Kansas from a transportation, economic development, and cultural/historical perspective. Clearly it is in the State's best interests to maintain a reliable and efficient rail system across the State and KDOT already has an active and effective rail planning program. However, the scope and scale of rail issues

impacting the statewide freight system, the increasing interest in dedicating public funds into rail improvements, the interest in expanding commuter and intercity passenger rail service across the State, and the new requirements of the Railroad Safety Enhancement Act of 2008 (HR 2095), will create the need to expand and enhance these current efforts. Specifically, KDOT should take the following steps.

- **Complete a statewide freight and passenger rail plan.** KDOT should consider conducting a statewide rail study to better define the State's role in freight and passenger rail development in Kansas. Although KDOT already does have an ongoing rail planning effort in the form of the Kansas Rail Plan (last updated in 2006), the plan serves primarily to comply with Federal Railroad Administration requirements governing Local Rail Freight Assistance to States. It does not provide broad policy guidance regarding the State's role in Kansas rail transportation, the scale of investment needed to attain certain performance goals (both passenger and freight), or the appropriate role of the State in planning for and investing in the system. A strategic rail plan would identify specific infrastructure, operational, and technology strategies that would enhance rail efficiency in Kansas, as well as the potential public benefits of investing public money in private rail infrastructure.

- **Expand eligibility for State Rail Service Improvement Fund assistance** There is latent demand for short-haul rail service in Kansas, but the high-capital requirements of the industry are preventing this demand from being met. The SRSIF program provides grants and loans to shortline railroads in Kansas to help them improve their service, but eligibility is limited to shortline railroads only, and program funding is set to expire on June 30, 2009.[2] KDOT should work to ensure it is reauthorized and funded appropriately in the next legislative session and should also explore the possibility of expanding the applicant pool to include other entities that make use of short-haul rail. Potential beneficiaries could include:

  - **Shippers who use a shortline,** for example a heavy industrial user with a rail spur; and
  - **Small communities and rural counties** that recognize the importance of shortline rail to their economies (e.g., locally sponsored development of an industrial park with a connection to a shortline).

  These applicants would be held to the same standards as the shortline railroads, i.e., proving that there is a viable business plan to ensure continued operation and economic benefit of the proposed project.

Maintain good communications with the private sector freight community

During the course of recent KDOT planning efforts such as the LRTP update and the T-LINK Task Force process as well as this Statewide Freight Study, KDOT has actively

[2] Kansas Statutes Annotated, Chapter 75, Article 50, Statute 75-5408.

engaged a variety of stakeholders including many from freight-intensive businesses and logistics companies. Most stakeholders reported that KDOT is sufficiently active in reaching out to the freight community for input. However, it may be useful for KDOT to develop a process to maintain this dialogue (through its existing planning and outreach activities) and receive continuous feedback on the freight transportation needs and concerns of key industries in Kansas.

Address oversize/overweight policies and streamline the permitting process

Recent growth in OS/OW truck loads moving on Kansas roads is leading to a number of safety and regulatory issues, including impacts on statewide travel times, pavement deterioration, economic development opportunities, fuel usage, safety, and total vehicle emissions. In addition, the OS/OW permitting process is overly complex and time consuming, requiring review and approval by a number of stakeholders both within and outside of the Department.

However, given that many of these loads involve commodities important to Kansas' existing and emerging industries (such as wind power generation), it is critical to ensure that the permitting process fulfills safety requirements while facilitating the efficient movement of these goods. As the number of OS/OW permit requests continues to rise, KDOT should work with its partners to automate this process in a way that improves customer service and response times but maintains a high degree of analysis and scrutiny of the safety, accessibility, and routing of OS/OW vehicles.

Currently, KDOT, the Kansas Corporation Commission, the Kansas Highway Patrol, and the Department of Revenue are meeting to discuss the creation of a new permitting system that is more consistent, faster, and more flexible than the existing system. It is anticipated that real progress towards planning and implementation of such a system will be made throughout 2009. As part of this new system planning, it is anticipated that KDOT, and its partner agencies should support raising the fee for OS/OW permits to better reflect the value of the service provided by the Kansas freight infrastructure and permitting system.

6.4 Quick Start Action Items

The following list of "quick-start" action items represent activities that KDOT can undertake immediately to implement a comprehensive, continuous statewide freight planning process that complements and enhances existing transportation planning and programming activities.

Formally designate a freight point-of-contact/technical lead

A freight point-of-contact/technical lead is a key element of successful integration of freight issues within a statewide transportation planning processes and KDOT's Bureau of

Transportation Planning should formally and specifically identify an individual to fill this role. Although responsibility for freight planning at KDOT has traditionally fallen within the Bureau of Transportation Planning, formal designation of a KDOT freight lead will help demonstrate a commitment to freight planning within KDOT, and emphasize freight's importance to overall transportation mobility and economic competitiveness. In addition, it will allow KDOT to continue to build and sustain relationships with key members of the private sector freight community, and effectively coordinate freight planning and programming activities between the private sector freight community and KDOT, among different KDOT divisions, bureaus, and districts, and between the DOT and other transportation partners, including MPOs, the Kansas Highway Patrol, the Kansas Corporation Commission, the Kansas Turnpike Authority, the Kansas Department of Revenue, local Chambers of Commerce, and others. In addition, the freight technical lead will help ensure that the recommendations made within this Study are acted upon, as deemed appropriate by KDOT. The technical lead would ideally be located within the Statewide Planning Unit,[3] as a freight lead that understands the statewide transportation planning process can more effectively facilitate moving potential freight projects and planning initiatives forward within the planning and programming pipeline.

Assess freight data needs and develop a freight data collection strategy

Prior to the development of this Statewide Freight Study, KDOT did not maintain the type of freight-specific data that can be used to fully support a statewide freight planning program or support Kansas MPOs in identifying and addressing freight issues. However, during the course of this study KDOT has acquired freight data resources (including a TRANSEARCH commodity dataset, a Moody's Economy.com economic and industry dataset, and a series of GIS shapefiles and supporting data) that can form the foundation of a freight data program. As a way to leverage investments in these datasets, and as a first step toward developing an ongoing freight data collection program, KDOT should conduct an assessment of its future freight data needs to ensure it can support future freight planning and policy needs.

As shown in Figure 6.1, that process starts with understanding the types of freight policy and planning questions that need to be answered as part of future Kansas transportation planning and programming efforts. For instance, KDOT may want to better understand current and future truck volumes on specific Class C or D routes to help target infrastructure investments. Alternatively, KDOT may wish to quantify the economic benefits of current or proposed freight improvements and/or evaluate the multimodal tradeoffs associated with different investment scenarios. Once those questions are known, KDOT can match them up against available data and tools at the state level (e.g., TREDIS economic impact data, truck counts, land-use data, agricultural shipment data, GIS data) and identify any potential data gaps. These gaps can be filled by additional, targeted, data collection activities, such as classification counts on key freight corridors.

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[3] One of the responsibilities of the Statewide Planning Unit is to perform studies and analyses on rail or other freight movements in Kansas for multi-modal or intermodal planning purposes.

Once data needs are understood, KDOT should develop an ongoing data collection program. Data collection activities can take many forms, including purchase of proprietary datasets (e.g., TRANSEARCH), use of publicly available freight data (e.g., FHWA's Freight Analysis Framework), or bottoms-up development of data (e.g., use of truck diaries to build a commodity flow dataset). Given that KDOT has devoted significant resources to acquiring some of the proprietary freight data sets used in this study, it may wish to update them on a routine basis so that they more accurately reflect dynamics in domestic and international economies, trade patterns, and supply chain practices and will be useful for identifying needs in the future. KDOT may wish to supplement proprietary data with publicly available commodity flow or industry information and truck counts on key corridors.

Figure 6.1 Basic Steps to Develop a KDOT Data Collection Program

No matter the type of data that are necessary to support the identification of needs and deficiencies, it is critical that KDOT develop a routine freight data collection program based on the available data as well as new opportunities identified through a data needs analysis. Such a routine data collection effort will ensure that KDOT has continuing access to the information necessary to support an ongoing freight planning program.

Track SAFETEA-LU reauthorization process and other pending legislation

SAFETEA-LU is set to expire on September 30, 2009, and Congress has already taken up debate on its reauthorization. The debates leading up to SAFETEA-LU reauthorization have focused on developing programs and strategies to allow the national transportation system to keep pace with economic growth, keep overall user costs reasonable, increase productivity, and contribute positively to national energy and climate goals. As part of these debates, four guiding principles have emerged:

- Maintaining capacity and connectivity;
- Improving metropolitan freight mobility;

- Ensuring funding diversity; and
- Addressing environmental uncertainty.

These principles will likely shape the types of Federal funding sources and programs developed within the SAFETEA-LU reauthorization process and a number of national organizations have issued recommendations regarding freight transportation funding and priorities. The National Surface Transportation Policy and Revenue Study Commission, the American Association of State Highway and Transportation Officials (AASHTO), the Coalition for America's Gateway and Trade Corridors, the U.S. Government Accountability Office, the National Surface Transportation Infrastructure Financing Commission, and the American Road and Transportation Builders Association (ARTBA) have all recognized the importance of reliable and efficient freight transportation to the national economy. Key recommendations of these organizations focus on the maintenance and improvement of the existing freight transportation system by:

- Directing more Federal funding towards freight projects and developing policy tools to encourage private investment in freight infrastructure, including public-private partnerships;
- Reducing the environmental impact of transportation;
- Increasing multistate cooperation so that funds can be directed towards the most critical bottlenecks; and
- Implementing freight user fees to help pay for system improvements.[4]

Although it is uncertain which of the findings and recommendations of these efforts will end up in the new transportation bill, it is critical for KDOT to monitor their results and the progress of the Federal debate. This will enable KDOT to position itself effectively to compete for any new freight funding that may come with reauthorization.

Develop a process to maintain communications with the freight private sector

As previously noted, this study relied on extensive involvement of numerous private-industry freight stakeholders, including the Class I and shortline railroads, trucking companies, shippers, logistics service providers, and other private sector freight stakeholders, most of whom reported that KDOT is sufficiently active in reaching out to the freight community for input. However, much of this effort occurs on an ad-hoc (e.g., plan-by-plan) basis.

There is a need to formalize relationships cultivated through this Freight Study, as well as the LRTP and T-LINK processes, through a freight advisory committee or other such group. Stakeholders who participated in this effort should be consulted as to their interest

[4] For a more thorough discussion of the recommendations made by these organizations, refer to Appendix A.

in serving as a point-of-contact for their industry. They (or their designee) could then be contacted (perhaps on a bi-yearly basis) by the KDOT freight point of contact, to ascertain if there have been any major developments or changes in their industry that should be reflected in the KDOT freight planning process. Continuously engaging the private sector in this way will have two important benefits. First, it will allow KDOT to continue to stay abreast of trends and issues affecting the statewide system from a freight perspective. Second, it will help support and build on existing relationships by allowing the private sector freight community better understand the public-sector planning process and provide them a voice in the development of transportation priorities and the allocation of resources.

Because traditional public outreach efforts, such as public hearings or meetings, often do not attract significant numbers of private sector stakeholders, it is important that KDOT develop specific outreach strategies to hear from this segment of the community. Examples of freight-specific outreach strategies include mail-out surveys or interviews with the private sector freight community; or focus groups with key constituencies (e.g., shippers, carriers, manufacturers, business owners). In between long-range plan updates, KDOT should also engage the private sector freight community "on their turf" by attending key private sector events, such as meetings of the Kansas Motor Carriers Association, railroad industry events, Chamber of Commerce activities, or other groups, and offering to provide updates on the transportation planning and investment process and how freight stakeholders can provide input.