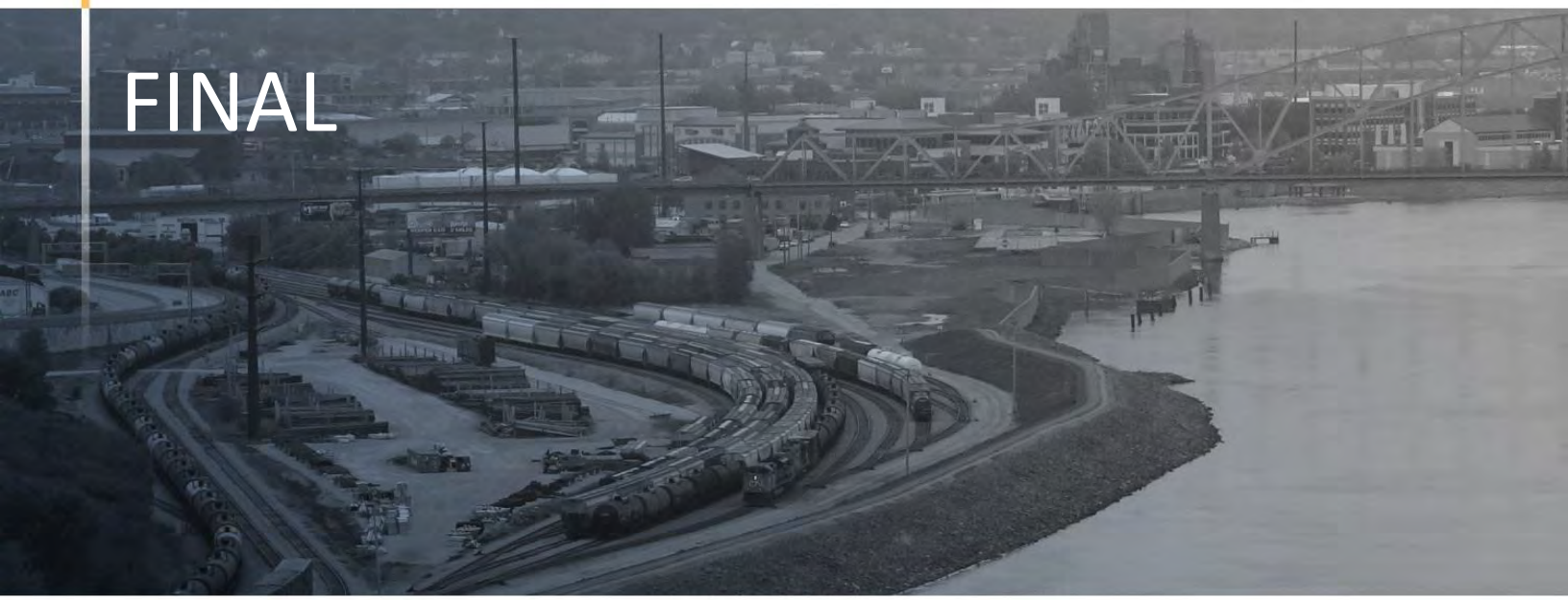
www.cpcstrans.com

FINAL



Eight County Freight Plan

Working Paper 3: Needs Assessment

Prepared for:

East Central Intergovernmental Association

Blackhawk Hills Regional Council

Prepared by:

CPCS Transcom Inc.

In association with:

WSP | Parsons Brinckerhoff

American Transportation Research Institute

Solutions for growing economies

CPCS Ref: 16153

February 20, 2018

Eight County Freight Plan

The objective of the Eight County Freight Plan is to develop a better understanding of the multimodal freight system in the bi-state region and to use that information to better inform policy and programming decisions.

Working Paper

This Working Paper is the third in a series of four that together inform the Plan. This Working Paper provides an overview of the Eight County's vision and goals for the future freight system and identifies needs and issues that should be addressed to meet them

Acknowledgments

The CPCS Team acknowledges and is thankful for the input of those consulted in the development of this Working Paper, as well as the guidance and input of representatives from ECIA, BHRC and their study partners.

Opinions

Unless otherwise indicated, the opinions herein are those of the authors and do not necessarily reflect the views of ECIA or BHRC.

Contact

Questions and comments on this Working Paper can be directed to:

Erika Witzke, PE
Project Manager
T: 614-537-5814
ewitzke@cpcstrans.com

Cover image source: CPCS

Table of Contents

Table of Figures

Acronyms / Abbreviations

BHRC	Blackhawk Hills Regional Council
BNSF	Burlington Northern and Santa Fe Railway
CN	Canadian National
CP	Canadian Pacific
CRANDIC	Cedar Rapids and Iowa City Railway
DOT	Department of Transportation
ECIA	East Central Intergovernmental Association
ELD	Electronic Log Device
FAST Act	Fixing America's Surface Transportation Act
FASTLANE	Fostering Advancements in Shipping and Transportation for the Long-term Achievement of National Efficiencies
GDP	Gross Domestic Product
HOS	Hours of Service
IA	Iowa
IADOT	Iowa Department of Transportation
IL	Illinois
ILDOT	Illinois Department of Transportation
JIT	Just in Time
NAFTA	North America Free Trade Agreement
NHFN	National Highway Freight Network
NHFP	National Highway Freight Program
NHS	National Highway System
NS	Norfolk Southern
PHFS	Primary Highway Freight System
Plan	Eight County Freight Plan
Region	Eight County Region
RVPR	Riverport Railroad
STEEP	Social, technological, environmental, economic, political
SWOT	Strengths, weaknesses, threats and opportunities
TEU	Twenty foot equivalent unit
UP	Union Pacific Railroad
UPS	United Parcel Service
US	United States
USACE	United States Army Corps of Engineers
WI	Wisconsin

Project Sponsors

Executive Summary

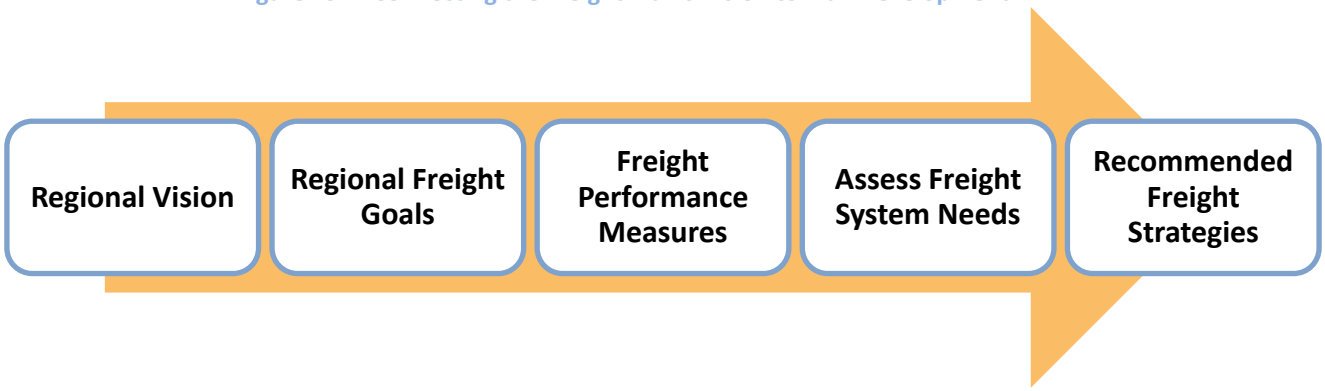
Eight County Freight System Vision

In order to appropriately assess the needs of the Eight County Region, the Eight County Freight Plan must first define the overall vision for the freight transportation system. The Eight County Freight System Vision is an aspirational future point for the transportation system, and guides the development of goals, performance measures and the assessment of transportation needs. The vision was formed through a collaborative process with the Project Steering Committee.

Eight County Freight System Vision: The Eight County Multimodal Freight System supports quality of life, growth and enables business retention and attraction, by providing safe, efficient, and reliable connections to regional, national, and global markets today and in the future.

As shown in Figure ES-1, the vision is the basis for key steps in the development of the freight plan, which ultimately lead to the development of recommendations and strategies to guide future policy and investment decisions. The vision highlights economic goals (growth, business retention and business attraction) and community goals (quality of life), which were used to develop freight system performance measures.

Figure ES-1: Connecting the Freight Plan's Vision to Plan Development

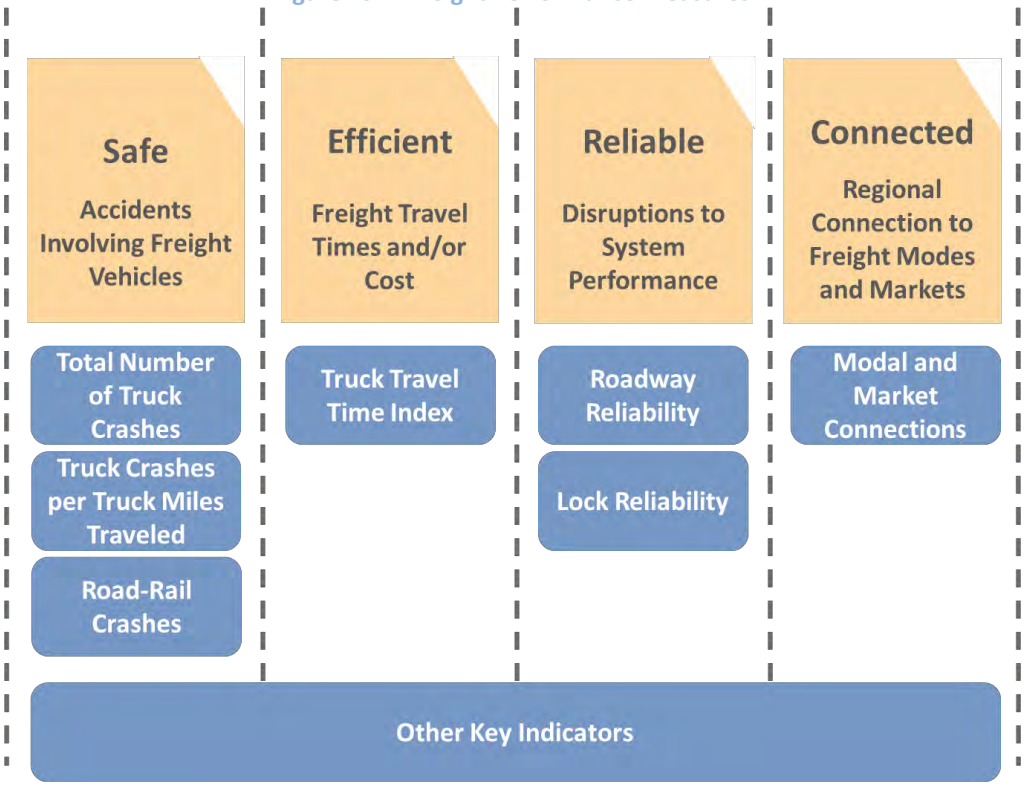


Freight System Performance Assessment

Applying Federal guidance and best practice, an assessment of the freight system was conducted using a performance based approach. Performance measures tied to freight system goals were established to assess the system in terms of safety, efficiency, reliability and connectivity, as

shown in Figure ES-2Figure ES-1. Each of these elements are within the public agencies purview to affect. Additional key indicators were identified as a means of understanding portions of the system that are outside public control but are important nonetheless.

Figure ES-2: Freight Performance Measures

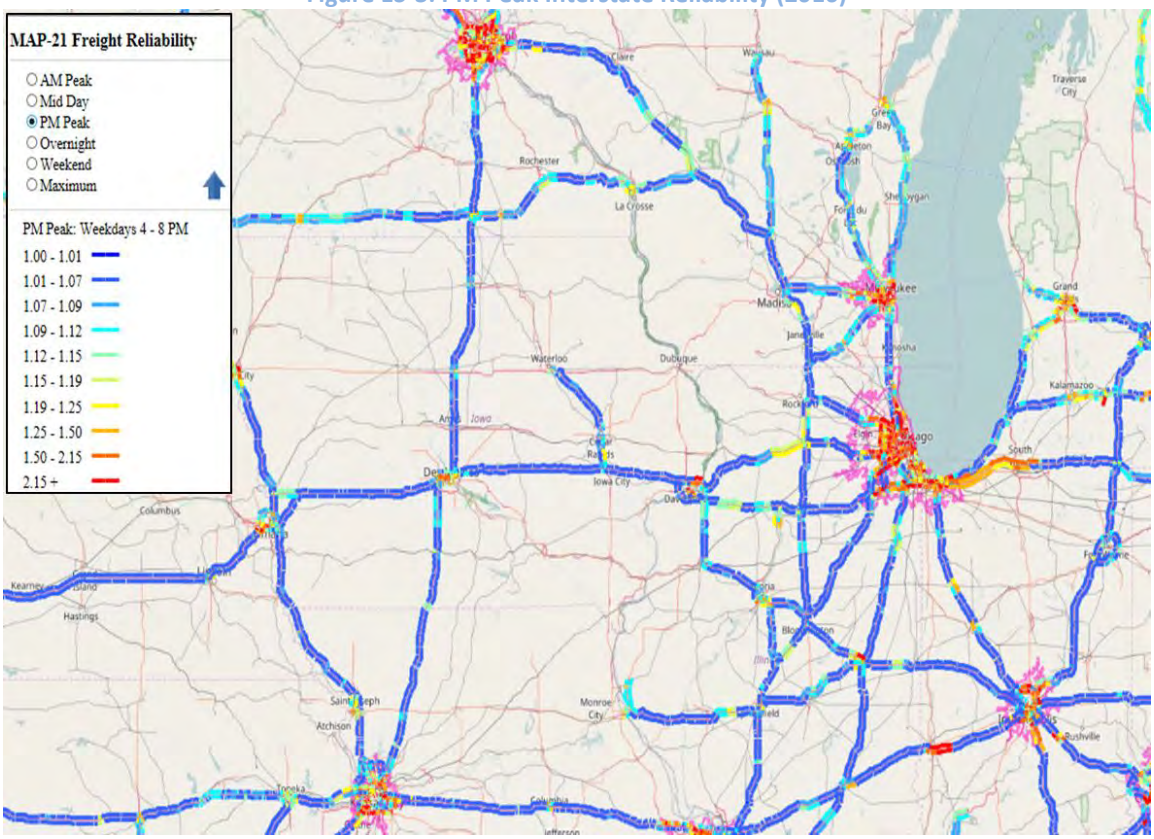


The data-driven freight performance assessment revealed that the safety of the highway system is generally improving, while incident occurrences at highway-rail crossings have remained flat over the past several years. Generally, the Region has little roadway congestion and truck trip times are reliable. Performance challenges do exist for freight system users once outside the Region. Figure ES-3 displays the reliability of the transportation system outside the Eight County Region from 4pm to 8pm on weekdays. Areas surrounding urban locations display the highest concentration of reliability issues.

Long-haul carriers going east encounter significant congestion on roadways surrounding Chicago. Unreliable roadways affect the ability of carriers to reach their destinations on time and increase the cost of business through lower capital utilization. Most key rail and air transfer points are also outside the Region and require trucks to use more congested and less reliable routes to access these facilities.

The waterway system is fairly reliable for the three locks and dams in the Region (Locks 11, 12 and 13). Over the past decade, performance of these locks, as measured by unavailable time, has improved. When compared against downstream locks and dams, the Region's three locks and dams perform favorably, but most barge trips do require transit through southern locks that have less reliability.

Figure ES-3: PM Peak Interstate Reliability (2016)



Source: Great Lakes Transportation Operations Coalition

Stakeholder Identified Needs Through Consultations

The Eight County Freight Plan used both quantitative and qualitative information to identify freight system needs and issues. Over 300 stakeholders representative of the industrial and modal mix present in the Region were consulted during the course of developing the Plan. These stakeholder perspectives were used to both validate data analysis, as well as identify additional needs or issues not previously revealed.

Stakeholder perspectives were generally consistent with data analysis, but additional needs and issues were identified. Most issues identified were related to the highway system – in particular along US 20 and US 30 – but were more focused on the safety and condition of the system than the performance. Pavement and bridge conditions were identified as a concern in that rough roads can damage both vehicles and cargo. Policy and regulatory issues related to trucking were also frequently mentioned, for example the lack of harmonized weight restrictions between Iowa and Illinois and a desire for the regulations in Illinois to match Iowa's seasonal 90,000lb limits to place handling facilities in Illinois on a level playing field.

Fewer freight issues were identified related to the rail, water and air modal components of the system. However needs still do exist. Challenges faced for these modes (and to some extent truck, too) relate to cost competitive service and access to transfer points outside the Region. For both rail and air, there is interest in more local services to bring cost down, however it will

be a challenge to influence this, as these systems are market driven and each of these modes have concentrated their operations in other neighboring counties/regions.

Potential Freight System Opportunities

Using the results of the needs assessment, a slate of preliminary strategic opportunities was identified, generally grouped within the "4 P" categories of 1) projects, 2) programs, 3) policies, and 4) partnerships, as shown in Figure ES-4. When stakeholders were asked how to make the Eight County Freight system more competitive, the top two most frequently cited improvements were project related – new/expanded roadways and pavement improvements.

While stakeholders often find project recommendations to be the most tangible, likely the most critically important category of opportunities is "partnerships." So much of the multimodal freight transportation system is outside of the public domain, and partnerships and collaboration will be critical to advancing any efforts off the highways system. And, in most cases even those projects on the highway system require partnership due to the myriad jurisdictions that have ownership and operations roles in the Eight County Region.

Figure ES-4: Preliminary Strategic Opportunities for the Eight County Region

Projects	Programs
• Strategic roadway upgrades (US 20 and US 30) • Pavement improvements • Bridge improvements • Other spot highway infrastructure improvements to address congestion and safety • New/improved intermodal and/or port facilities • Transload/consolidation facilities • Lock and dam improvements	• Programs focused on highway and railway safety • Programs focused on enhancing skills of local workforce • Programs focused on technology applications to the (freight) transportation system • Freight planning program to monitor needs, issues and progress
Policies	**Partnerships**
• Truck regulation harmonization between Iowa and Illinois • Illinois seasonal exemption for agricultural loads (up to 90,000lbs). • Truck route guidance • Prioritize pavement, bridge, and spot improvements. • Use smaller incremental improvements as a gateway to larger system improvements.	• State, county and local public agency partnerships • Federal transportation agencies, including USDOT and the USACE • Regional and local economic development agencies • Class I and short line railroads • Airports • Water ports • Other local private industry/businesses, especially those representing key freight industries of manufacturing and agriculture

This slate of preliminary strategic opportunities will be further explored with the Project Steering Committee to understand the completeness of opportunities identified. Opportunities may be added/deleted to this list prior to formalizing Plan recommendations.

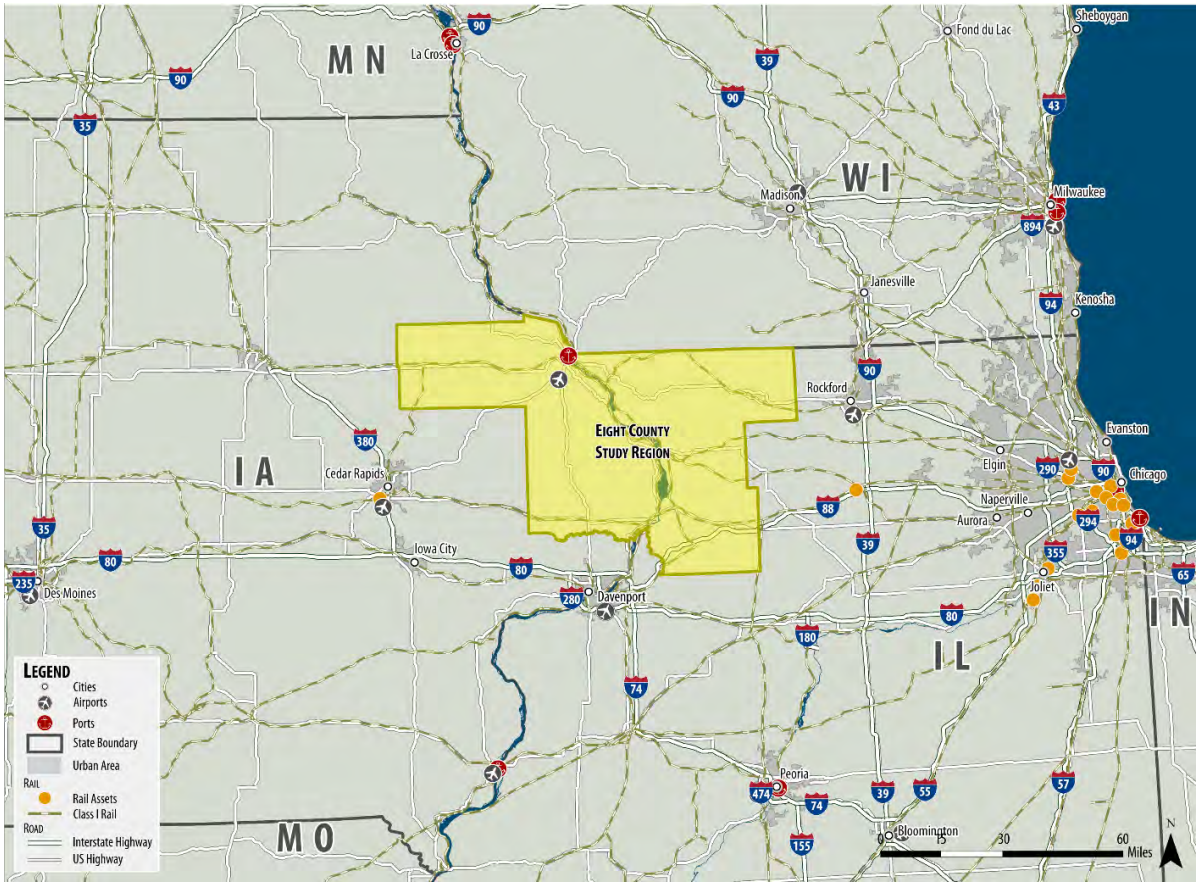
1 Introduction

1.1 Background

The Eight County Region, shown in Figure 1-1, is at the heart of US manufacturing and agricultural activity and includes the counties of Carroll, Jo Daviess, Stephenson, and Whiteside in Illinois, and Clinton, Delaware, Dubuque, and Jackson in Iowa. The Region relies on the area's multimodal system of roads, rails, air, and water ports to both supply production inputs and to transport goods to consumers inside and outside of the Region. Over half of the Region's businesses are freight-dependent.

The efficiency of the transportation system affects the competitiveness and growth potential of the Region. In order to enable the competitiveness of existing, as well as attract new business, the Region must understand how the freight transportation system is linked to the local economy, identify needs on the transportation system and define opportunities to improve freight transportation in local planning and policy decisions.

Figure 1-1: Eight County Region



Source: National Transportation Atlas Database. Bureau of Transportation Statistics. 2015

1.2 Objectives

The primary objective of the Eight County Freight Plan is

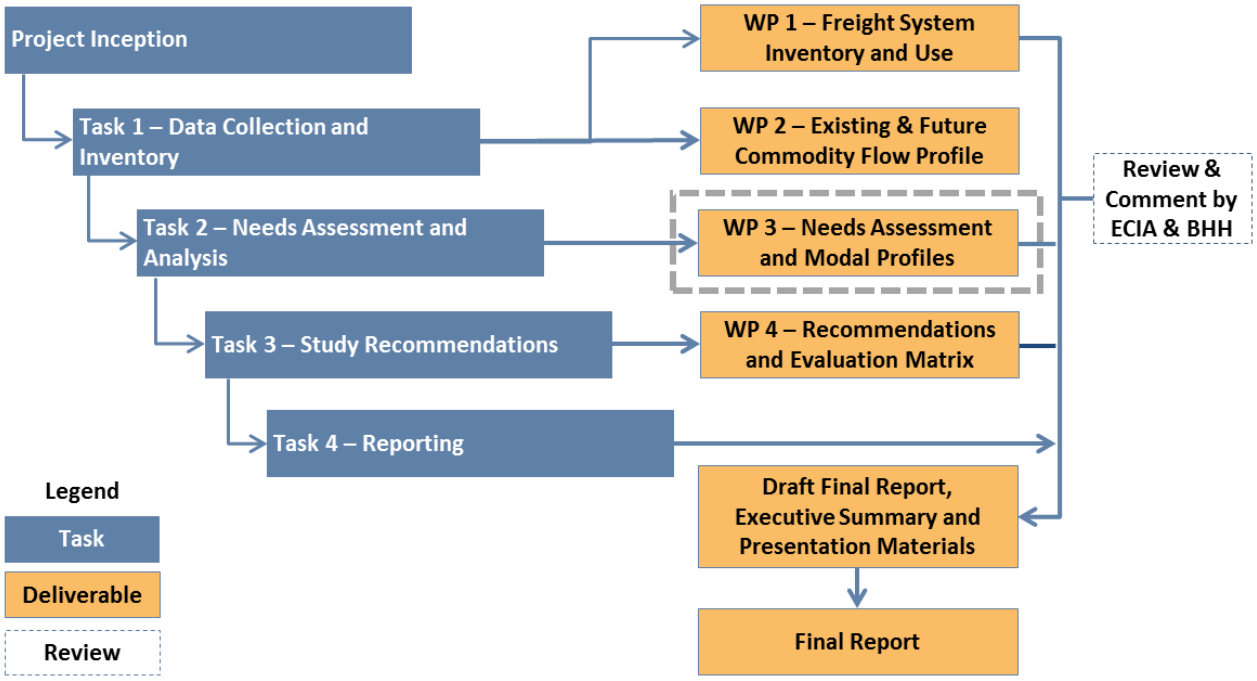
to develop a better understanding of the multimodal freight system in the Eight County Region and to use this information to better inform policy and programming decisions.

Thus, the central output of the study will be the identification of baseline freight movements across modes, the identification of the major freight transportation challenges including truck bottlenecks and how they may impact the performance of key economic sectors, as well as the formulation of recommendations on freight policy and projects that will provide the greatest benefit to the Region. This study will also provide the Region with a means of leveraging freight transportation data to help them make better, more informed investment decisions.

1.3 Project Structure

The project is to be developed through four broad tasks, as set out in Figure 1-2. The present Working Paper is the output of Task 2 – Needs Assessment and Analysis.

Figure 1-2: Project Approach



1.4 Purpose of this Working Paper

The purpose of this Working Paper is to provide insight into the overall needs of the Study Area's freight system. Specifically, it addresses the following key questions:

- What are the vision and goals for the Eight County freight system?
- What are the key performance areas the freight system should be measured against?
- Where are the Eight County's key freight system bottlenecks and other needs?

This Working Paper is also intended to provide an overview of progress to date and to solicit comments and other feedback on the structure and content of this component part of what will become the Final Report. Revisions to this Working Paper will be reflected in the Draft Final Report.

1.5 Methodology

This Working Paper was prepared using a combination of stakeholder inputs and empirical data. Stakeholder input was used to determine the vision and goals for the freight study, which drove the identification of performance measures. The system was assessed using the performance measures to determine system needs and issues. Extensive stakeholder consultation, including an online survey, one-on-one interviews, partnership with local economic development agencies and a Project Steering Committee provided additional insights on system needs and aided in the validation of the performance assessment.

1.6 Limitations

Some of the findings in this report are based on the analysis of third party data. While CPCS makes efforts to validate data, CPCS cannot warrant the accuracy of third party data.

2 Eight County Freight System Vision and Goals

Key Chapter Takeaway

The vision for the Eight County Region (shown below) provides an aspirational future point to guide the development of goals, performance measures, the identification of transportation system needs, and ultimately the recommendations of the plan.

Eight County Freight System Vision: *The Eight County Multimodal Freight System supports quality of life, growth and enables business retention and attraction, by providing safe, efficient, and reliable connections to regional, national, and global markets today and in the future.*

The vision highlights economic goals (growth, business retention and business attraction) and community goals (quality of life), which are used to develop the performance measures in this Working Paper.

2.1 Freight System Vision

In order to appropriately assess the needs of the Eight County Region, the freight plan must first define the overall vision for the transportation system. The vision is an aspirational future point for the transportation system, and guides the development of goals, performance measures and the assessment of transportation needs.

The vision focuses the plan by answering the strategic question: "What are the desired attributes of the future freight transportation system?"

The vision begins the process of assessing the current freight transportation system and identifying needs, by first defining the point the region wants to reach in the future. The vision is then separated into goals that define the component parts of achieving the vision. Goals may be advanced at different rates and could be at odds, depending on the proposed investment or policy.

The goals identify the desired outcomes of the plan.

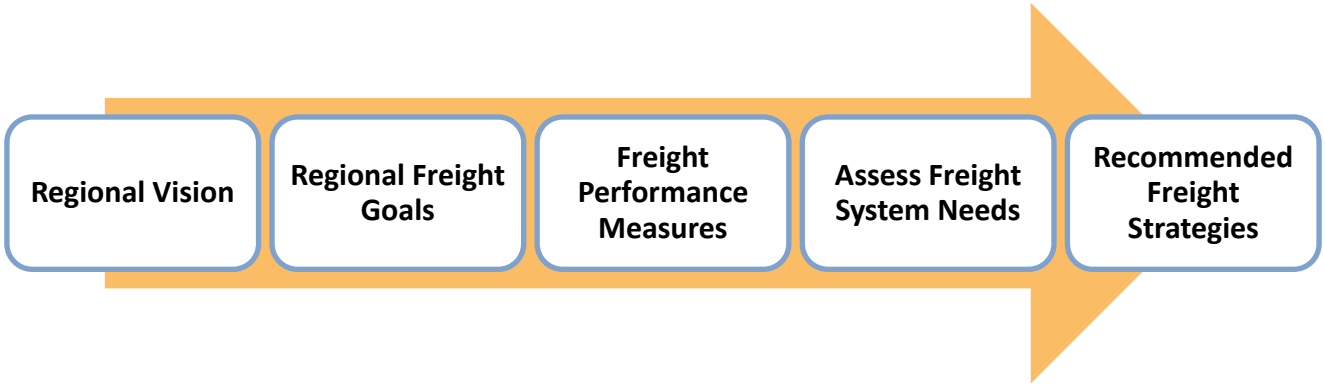
The goals are assigned performance measures that are used to assess the performance of the current freight transportation system and identify needs. Performance measures focus on

variables that the freight plan can affect, therefore making the information derived from the performance assessment actionable.

Performance measures focus on factors the freight plan can impact.

As shown in Figure 2-1, the vision is the basis for key steps in the development of the freight plan, which ultimately lead to the development of recommendations and strategies to guide future policy and investment decisions.

Figure 2-1: Connecting the Freight Plan's Vision to Plan Development



2.1.1 Developing the Freight System Vision

An iterative process was used, informed by the Project Steering Committee, to develop the vision for the Eight County Region's freight transportation system. First, existing visions and goals in established Regional and national plans were examined, including those from BHRC and ECIA, Dubuque Metropolitan Area Transportation Study, ILDOT, IADOT, and Federal Legislation. Figure 2-2 outlines freight-specific elements present in Comprehensive Economic Development Strategies (CEDS), Long-range Transportation Plans (LRTP), state freight plans, and the Fixing America's Surface Transportation (FAST) Act.

Figure 2-2: Freight Vision and Goals

Freight-Specific References in Visions and Goals:	FAST Act	Illinois LRTP	Illinois Freight Plan	Iowa Freight Plan	Iowa LRTP	DMATS LRTP	BHRC CEDS	ECIA CEDS
Year:	2015	2012	2012	2016	2014	2016	2014	2015
Economic Competitiveness								
Link transportation investments to economic competitiveness	✓	✓		✓	✓	✓	✓	
Support existing businesses, and/or new businesses	✓	✓	✓				✓	✓
Improve multimodal options/freight mobility	✓	✓	✓	✓				
Coordinate with freight stakeholders	✓	✓		✓		✓	✓	
System Performance								

Freight-Specific References in Visions and Goals:	FAST Act	Illinois LRTP	Illinois Freight Plan	Iowa Freight Plan	Iowa LRTP	DMATS LRTP	BHRC CEDS	ECIA CEDS
Improve safety and/or security	✓		✓	✓	✓			
Reduce congestion	✓	✓				✓		
Improve or maintain physical condition	✓				✓	✓		
Improve or maintain reliability	✓		✓			✓		
System Management								
Learn more about system needs, weaknesses, etc.	✓	✓	✓	✓	✓			
Prioritize maintenance over new construction		✓		✓		✓		
Use advanced technology	✓			✓	✓	✓		
Use performance measures/management	✓		✓	✓	✓			
Sustainability								
Reduce or understand environmental impacts	✓		✓					
Reduce or understand community impacts	✓	✓	✓					

Source: CPCS

After identifying reoccurring themes in existing vision documents, an initial vision was developed to guide a discussion with the Project Steering Committee. The vision for the Region was developed using an iterative process of receiving Project Steering Committee comments, revising the vision and presenting the updated vision to the Project Steering Committee for further comment. A selection of slides of this iterative process from the Project Steering Committees is included in **Appendix A.**

The output of the iterative development process is the vision statement shown below. The vision outlines both the desired outcomes used to define the goals (quality of life, growth, business retention, and business attraction) and categories for performance measures (safe, efficient, reliable and connected).

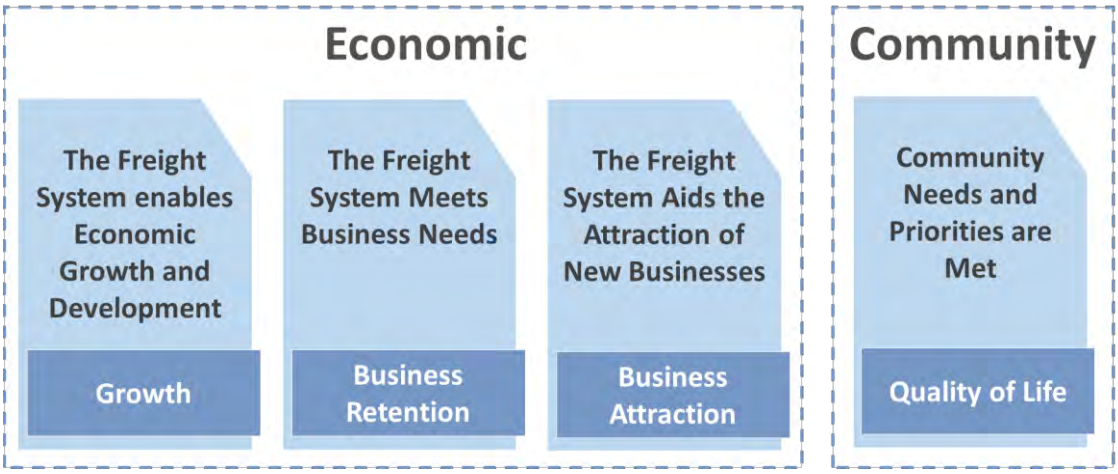
Eight County Freight System Vision: The Eight County Multimodal Freight System supports quality of life, growth and enables business retention and attraction, by providing safe, efficient, and reliable connections to regional, national, and global markets today and in the future.

2.2 Freight System Goals

The vision provides the ultimate point that the Region seeks to attain through the implementation of the freight plan recommendations. The vision identifies quality of life, growth, business retention, and business attraction as the goals for the freight plan. These goals provide intermediate targets to focus projects and policies that will advance the overall vision.

Figure 2-3 displays the goals of the Eight County Freight Plan. The goals identify that the freight transportation system should support economic activity and meet community needs in the Region.

Figure 2-3: Eight County Freight Plan Goals



The goals for the Region are focused on outcomes or outputs. For example, providing freight investment and implementing policies that meet the needs of the community results in higher quality of life. Similarly, enabling a freight transportation system that provides competitive transportation options will aid current businesses and advance the Region's economy. The goals of the Region are clearly enabled by good transportation investment and policy, but since transportation demand is affected by other non-transportation variables, the investments and policies must fit the needs of system users to be effective.

2.2.1 Economic

The economy was the primary focus of the Project Steering Committee, and they identified overall growth, business retention and business attraction as areas of specific focus. The economy is a natural focus of transportation goals because transportation a key facilitator to production, providing both materials to facilities, as well as transporting finished products. The goal statement for growth shown below recognizes this relationship by highlighting that the transportation system enables economic growth and development. A transportation system that provides a high level of service today and is managed to respond to and provide resilience for future changes in use will maximize the positive impact of transportation on growth.

Growth: The freight system enables economic growth and development.

Transportation enabled growth in the Region's economy could occur through business retention and/or business attraction. A key component of retaining the businesses in the Region is ensuring that the transportation system meets the needs of businesses. The Project Steering Committee focused specifically on retention because the vast majority of job growth comes from existing companies. A transportation system that connects businesses with the inputs needed and access to markets for finished products at a competitive price, will enable businesses in the Region to expand as needed. While the goal statement for business retention shown is simple, it highlights the critical need for decision makers to know businesses' freight system needs and to focus their effort on addressing those needs.

Business Retention: The freight system meets business needs and encourages private sector investment.

Building on the businesses already in the Region, business attraction focuses on providing a transportation system that meet the needs of businesses looking to build or relocate operations. While the transportation system is one factor for site selection, the Eight County Region should ensure that it both identifies the perceived weaknesses of the transportation system and communicates the attributes of the Region's transportation system to attract businesses exploring the Region.

Business Attraction: The freight system aids the attraction of new businesses.

Taken together, the goals for the Region seek to grow the Region's economy through the retention and attraction of businesses. These goals will be assigned performance measures and further explored in this working paper, specifically the needs of businesses.

2.2.2 Community

Community focuses on ensuring that freight users, policies and investments coexist with other roadway users and the communities they travel through. Quality of life identifies that the movement of freight has both positive and negative impacts. Quality of life seeks to ensure that freight corridors and facilities match community needs and priorities. For example, coordinating corridor investments and freight policy with land use planning. The goal statement below highlights that the freight system provides the access needed by the community (deliveries, business support, etc.) and matches the priorities of the community (land use planning, safety, regulation, etc.).

Quality of Life: The freight system meets community needs and priorities.

The focus of community and quality of life provide a balance to the economic goals, making sure that the both businesses and members of the community are considered in the Eight County Freight Plan.

3 Freight System Assessment

Key Chapter Takeaway

Applying Federal guidance and best practice, an assessment of the freight system was conducted using a performance based approach. Performance measures tied to freight system goals were established to assess the system in terms of safety, efficiency, reliability and connectivity. Each of these elements are within the public agencies purview to affect. Additional key indicators were identified as a means of understanding portions of the system that are outside public control but are important nonetheless.

The assessment revealed that the safety of the highway system is generally improving, while incident occurrences at highway-rail crossings have remained flat over the past several years. Generally, the Region has little roadway congestion and truck trip times are reliable. Performance challenges do exist for freight system users once outside the Region. Most key rail and air transfer points are outside the Region and require trucks to use more congested and less reliable routes to access these facilities. The waterway system is fairly reliable for the three locks and dams in the Region, but most trips require transit through southern locks that have less reliability.

3.1 Performance Measurement

3.1.1 Federal Guidance

The Moving Ahead for Progress in the 21st Century Act (MAP-21) created performance measurement requirements for state DOTs and Metropolitan Planning Organizations (MPOs). MAP-21 called for performance measures covering infrastructure, safety and system performance. The rulemaking finalizing the remaining MAP-21 performance measures was completed in January 2017. This multi-year process defined the approach used to measure performance, defined state DOT and MPO target setting, and outlines the timeline for implementation. Figure 3-1 displays the MAP-21 performance measure topics and the approach used to measure performance. The performance measure on carbon dioxide emissions on the National Highway System (NHS) has been frozen pending regulatory review.[1] Noteworthy in this figure is that a freight-specific measure has been identified to better understand the performance of the highway system for trucks – Truck Travel Time Reliability (TTTR) Index.

As Illinois and Iowa develop performance measures, MAP-21 requires that MPOs are engaged to set targets, calculate, and report performance measures. This target setting defines whether "significant progress" is made towards advancing performance of the transportation system.

[1] 82 Federal Register 22879 - National Performance Management Measures; Assessing Performance of the National Highway System, Freight Movement on the Interstate System, and Congestion Mitigation and Air Quality Improvement Program.

Figure 3-1: MAP-21 Performance Measures

Topic of Measure	Performance Measure
Safety	
Fatalities (all public roads)	Number: 5-year rolling average of the total number of fatalities
	Rate: 5-year rolling average of the State's fatality rate per VMT
Serious injuries (all public roads)	Number: 5-year rolling average of the total number of serious injuries
	Rate: 5-year rolling average of the State's serious injuries rate per VMT
Non-motorized fatalities and serious injuries (all public roads)	Number: 5-year rolling average of the total number of non-motorized fatalities and non-motorized serious injuries for each State
Infrastructure	
Interstate pavement	Percentage of pavements Good condition
	Percentage of pavements Poor condition
Non-Interstate NHS pavement	Percentage of pavements in Good condition
	Percentage of pavements in Poor condition
Bridges on NHS	Percentage of NHS bridges classified as in Good condition
	Percentage of NHS bridges classified as in Poor condition
Performance	
Reliability on Interstates	Percent of the person-miles traveled on the Interstate that are reliable
	Percent of the person-miles traveled on the non-Interstate NHS that are reliable
Freight Performance on the Interstate	**Truck Travel Time Reliability (TTTR) Index for interstate segments during AM Peak, Mid Day, PM Peak, Overnight and Weekend**
Delay on the NHS in urbanized areas	Annual hours of peak hour excessive delay per capita on the NHS*
Emissions in urbanized areas*	Percent of Non-Single Occupancy Vehicle Travel **
	Total Emissions Reduction: 2-year and 4-year cumulative emission reductions of PM2.5, PM10, CO, VOC, and NOx, for all projects funded by CMAQ funds nonattainment or maintenance area

Source: 23 CFR Part 490

* MPOs and with populations of more than 1 million with State DOTs establish a four year target by May 20, 2018 and report performance due October 1, 2018. After January 1, 2022, MPOs with populations more than 200,000 must also develop targets and submit reports.
** MPOs and with populations of more than 1 million with State DOTs establish two and four year targets by May 20, 2018 and report performance due October 1, 2018. After January 1, 2022, MPOs with populations more than 200,000 must also develop targets and submit reports.

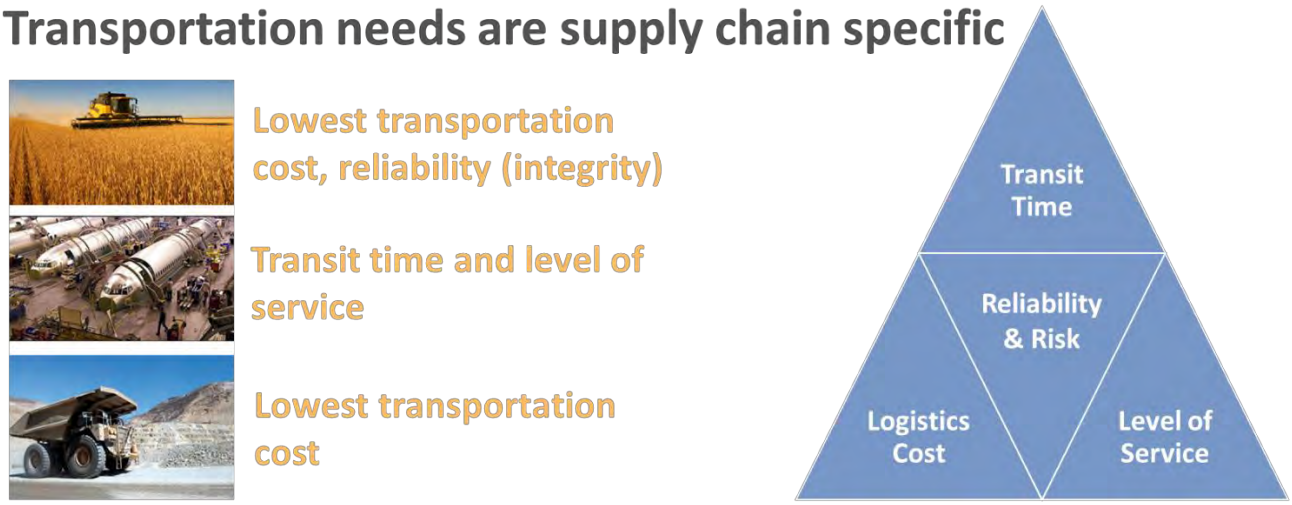
3.1.2 Private Sector Perspective

Transportation supports the movement of goods to and from producers and is a key input for businesses in the Eight County Region. The transportation needs of industries and in some cases of specific businesses are different. As shown in Figure 3-2, businesses generally consider transportation options in terms of four attributes: transit time, reliability/risk, logistics costs, and level of service. Businesses prioritize specific variables depending on variables such as production process or customer needs. For example, a manufacturing facility that uses Just-in Time (JIT) manufacturing methods has low inventory to both save money and free capital. JIT requires a transportation mode and supply chain that is highly reliable and offers a high level of service, otherwise there is a risk of shutting production down while waiting for inputs. While transit time and cost are also important, the method of production necessitates that inputs are

on site when needed. In contrast, agricultural supply chains favor low cost options, with identity-preserved crops requiring higher reliability and levels of service. The density and relatively low cost of agricultural products means transportation makes up a significant portion of landed cost, compared to a high value and low weight commodity such as computer processors.

Understanding the private sector perspective is critical when identifying performance measures that match the needs of businesses in the region (business retention). Additionally, the Region could make itself more attractive to specific types of businesses by targeting transportation improvements that improve the performance of the system in line with a new industry's needs (business attraction). By selecting performance measures that correspond with the considerations of business, the Region is positioned to assess transportation needs in terms of existing businesses and potential future businesses.

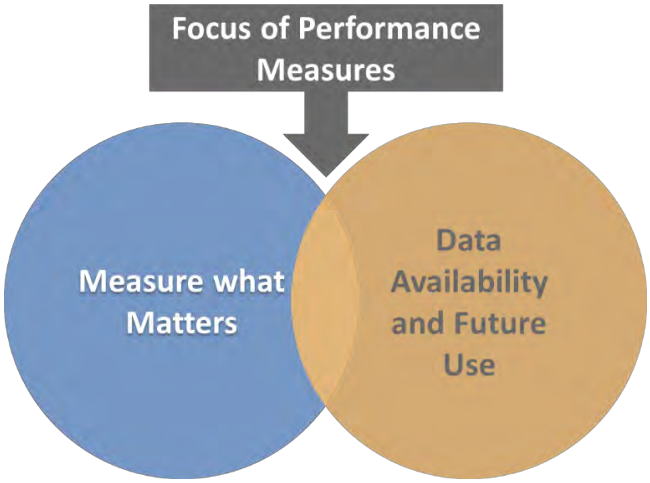
Figure 3-2: Supply Chain Variables



3.2 Freight System Performance Measures and Indicators

As shown in Figure 3-3, for the Eight County Freight Plan, the approach to performance measures focuses on measuring transportation performance in line with attributes that matter to the Region by linking measures to the goals articulated in Section 2.2. Additionally, the measures calculated in this Working Paper serve as a benchmark using available data, to the extent possible, allowing measures to be calculated on an on-going basis. Benchmarking will allow the Region to identify changes in transportation system performance in the future, as well as assess the impact of emerging trends. The plan positions the Region for future

Figure 3-3: Approach to the Identification of Performance Measures

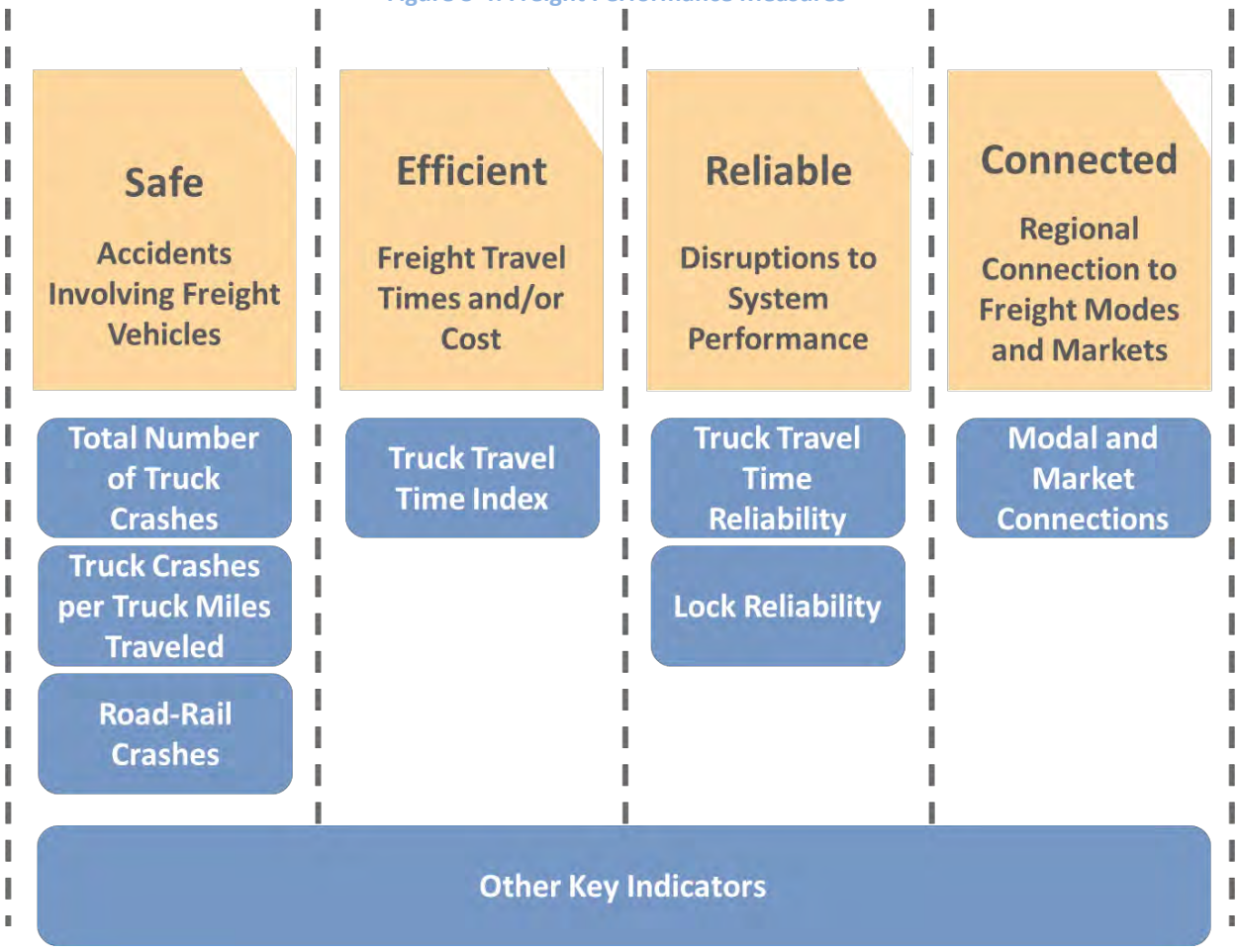


collaboration with Illinois and Iowa DOTs on target setting and freight corridor identification. Additionally, the Region can use performance measures required by MAP-21 as a resource to monitor the performance of the transportation system in the future.

The performance measures used in this plan focus on fewer measures that provide the region with insights into key issues rather than focusing on many measures, some of which would not provide actionable information for decision making.

The vision of the Eight County Region Freight Plan sets the stage for identifying performance measures, by naming safety, efficiency, reliability and connectivity as key components of the future Eight County Transportation System. Safety, efficiency, reliability and connectivity were used as categories to define performance measures. Figure 3-4 displays the performance categories and the measures that will be calculated to assess the performance of the transportation system. Other key indicators have also been included to provide context to the performance measures and to be used to describe and promote the freight system in the Region.

Figure 3-4: Freight Performance Measures



Safe: Accidents involving freight vehicles.

The safety of the transportation system is a primary focus of public agencies and is critical to ensuring that freight, other users and communities along freight corridors have a high quality of life. Additionally, accidents often cause physical harm to those involved, result in damage to property and the goods being carried, and can negatively impact the performance of a roadway. In order to measure safety, the project team selected three measures:

- Total Number of Truck Crashes – The total number of crashes seeks to identify the trend in the Region, namely is the transportation system getting more or less safe.
- Truck Crashes per Truck Miles Traveled – As the total number of truck crashes may be influenced by increases or decreases in truck traffic, truck crashes per truck miles traveled is a useful performance measure to monitor if the number of trucks on the road changes.
- Road-Rail Crashes – The number of road-rail crashes provides a multimodal component to the performance measures and aids in the identification of reoccurring unsafe road-rail crossings.

Efficient: Freight travel times and/or cost.

The efficiency of the transportation system underpins the growth of existing businesses. Similarly, the efficiency of the transportation system could be used to promote the Region in order to attract new businesses. In order to measure efficiency, the project team selected Truck Travel Time Index (TTTI).

- Truck Travel Time Index – Efficiency is measured by TTTI which compares the speed during peak traffic periods to the posted speed limit. Therefore, the TTTI indicates whether the roadway experiences congestion during heavy use periods. A TTTI equal to one indicates that roadway users experience normal travel times throughout the day, allowing carriers to better utilize assets and the limited hours a driver can operate their truck. A TTI greater than one indicates the degree to which peak speeds are slower than free-flowing speeds.

Reliable: Disruptions to system performance.

The reliability of the transportation system affects both shippers and carriers. For shippers, the inventory kept on hand is a direct result of whether they can count on their suppliers and the transportation system to provide inputs reliably. For carriers, an unreliable transportation system increases costs due to the extra time spent in traffic or waiting for unloading. The reliability of the transportation system in the Eight County Region is calculated for road and maritime.

- Truck Travel Time Reliability (TTTR) – The measure used for truck reliability compares truck speeds during peak with non-peak periods to define variation. Large differences in peak and non-peak speeds indicates lower reliability.
- Lock and Dam Unavailability – The measure for waterway reliability focuses on the availability of the locks and dams in and downstream of the Region. Unavailability is assessed by both planned and unplanned closures. Planned closures are scheduled, whereas unplanned closures are unknown. Both types of closures are important because they limit the use of the waterway system, but unplanned closures are particularly important because they cannot be accounted for and impose risk into a business's supply chain.

Connected: Regional connection to freight modes and markets.

Access to multiple modes and connection points between modes ensures that businesses can use the mode of transportation that meets their needs. Similarly, the availability of multiple modes increases price competition and makes the Region attractive to a greater variety of businesses and supply chains. Connectivity encompasses both connections to and between modes, as well as to the inputs and final users of products.

3.3 Freight System Assessment

To aid in assessment of the freight system, performance measures for road, rail, and water modes were developed, and preliminary results were calculated. For road measures, performance was calculated for a road network comprised of interstate, national, and state highways. City and county roads were not included in the road network used to create and evaluate measures. These roads were excluded for two reasons: first, observations of truck volumes were unavailable for most local roads, and second, the truck data provided by ATRI had limited observations of truck speeds on local roads, making estimates of average travel times for these roads unreliable. The freight moving on these local roads, particularly for agriculture, is very important for the region, so additional stakeholder consultation on agricultural shipments and local roads was performed. The results of this supplementary work are described in Section 4.

For rail and water measures, data available through the by the Federal Railroad Administration (FRA) and the US Army Corps of Engineers (USACE) was used.

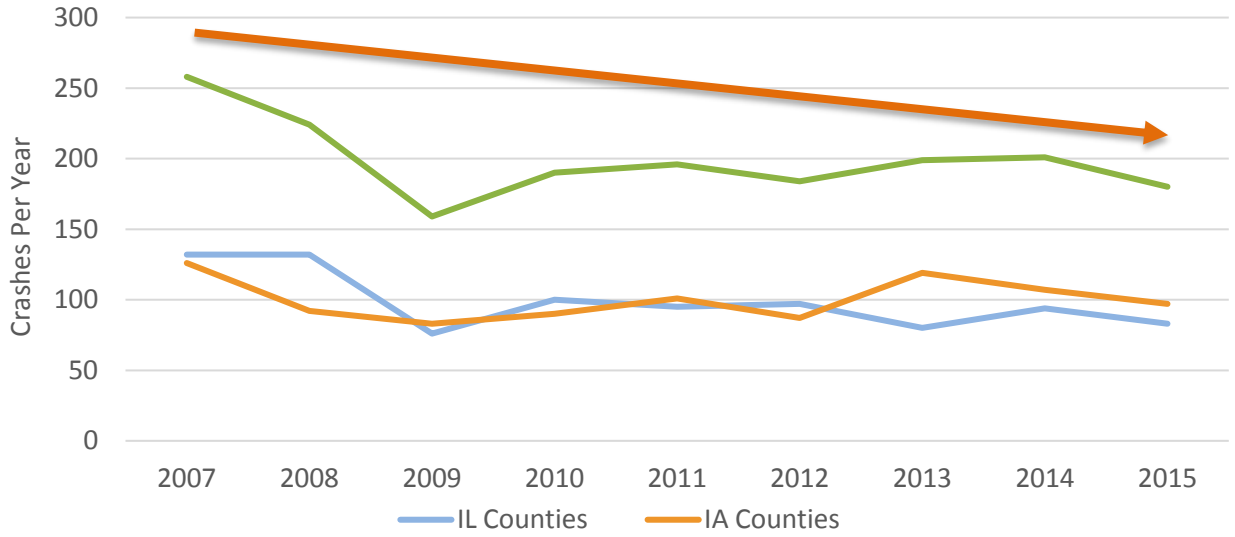
3.3.1 Safety

System safety was measured in two ways. First, by measuring the number of truck crashes per year and per vehicle miles traveled, which provides insight into road safety, and second by counting the number of accidents per year at publicly-owned railroad grade crossings. The second measure provides insight into both highway safety as well as rail safety, and measures performance on a part of the rail system (grade crossings) that can be improved by public agencies.

Truck Crashes per Year

Truck crashes per year were calculated using georeferenced crash data provided by the Iowa and Illinois DOTs. For this measure, a crash was considered a truck crash if any of the vehicles involved were classified as unit trucks or semi-trucks. Figure 3-5 shows the number of truck crashes on these roads between 2007 and 2015. As shown, the number of total truck crashed in the Region has generally trended downward.

Figure 3-5: Truck-Involved Crashes on Regional Interstates, National Highways, and State Highways



Sources: Illinois DOT, 2016; Iowa DOT, 2017

Truck Crashes per Truck Miles Traveled

In order to better understand truck crash trends, it is helpful to consider the crash rate relative to truck vehicle miles traveled (VMT). Controlling for truck VMT is important because a change in traffic volume may be associated with a change in overall crash rates; the presence of additional vehicles creates additional opportunities for accidents. Measuring the crash rate per truck VMT reveals better insight into whether or not a change in crashes is due to traffic volume changes, or more importantly, due to unsafe conditions on roads.

Truck crashes per 1 million truck vehicle miles traveled (VMT) were calculated using georeferenced crash data provided by the Iowa and Illinois DOTs. The rate of truck crashes is partially affected by the volume of trucks traveling through the network. To calculate an estimate of truck crashes per VMT for 2015, 2015 truck volume data from Illinois and Iowa DOTs were used. In 2015, the Region's truck VMT for interstates, state, and national highways was 505.8 million, and there were 180 truck crashes. Therefore, there were about 0.36 truck crashes per million miles of truck VMT. This crash rate is favorable in comparison to the US as a whole, which had about 415,000 large truck crashes in 2015,[2] and a rate of 1.84 crashes per million

[2] Large Truck and Bus Crash Facts 2015. Federal Motor Carrier Safety Administration. 2015

miles of truck VMT.[3] For this study, crashes per VMT were only calculated for one year because historic VMT data was unavailable. In the future, the Region could obtain and save truck count data for multiple years, to enable measurement of crashes per VMT over time.[4]

The Region's annual truck crash rate has been improving: between 2007 and 2015, the Region's annual truck crash rate on interstates, state, and national highways decreased by 30%. The lowest annual truck crash rate occurred in 2009, which was 29% lower than the truck crash rate in 2008. While this trend is positive, monitoring truck crashes per VMT in the future will help Regional decision makers understand if this decline was due to a true drop in crash rates, or simply a decrease in the Region's truck VMT.

Since 2007, the Region's overall truck crash rate per year has declined by 30%.

A declining annual crash rate is a favorable trend for all users of the system. Fewer crashes mean less delays for system users, less damaged products, and reduced potential for injuries or death. Together, these factors translate into potentially lower transportation costs for users of the system.

The Cost of Truck-Involved Crashes

For the years 2010 through 2015 Iowa and Illinois DOT truck crash data was further explored and visualized. Figure 3-7 illustrates the number of truck-involved crashes in the study area during this period. Crashes with animals have been removed from this analysis. This figure begins to highlight where more crashes occur, but does not provide insight into true problem areas due to crash severity. KABCO scale, developed by the National Safety Council, is one means of determining where crashes may be more problematic. The codes shown in Figure 3-6 were assigned to the truck-involved crashes and then mapped in Figure 3-8, on a per segment basis (not a per mile basis due to the availability of data). This figure shows that the most severe truck-involved crashes are on US 20. Other routes with issues are US 30, US 151, US 61 and I-84.

Figure 3-6: KABCO Injury Classification Scale

Injury Severity Level	Comprehensive Crash Cost
Fatality (K)	$4,008,900
Disabling Injury (A)	$216,000
Evident Injury (B)	$79,000
Fatal/Injury (K/A/B)	$158,200
Possible Injury (C)	$44,900
Property Damage Only (O)	$7,400

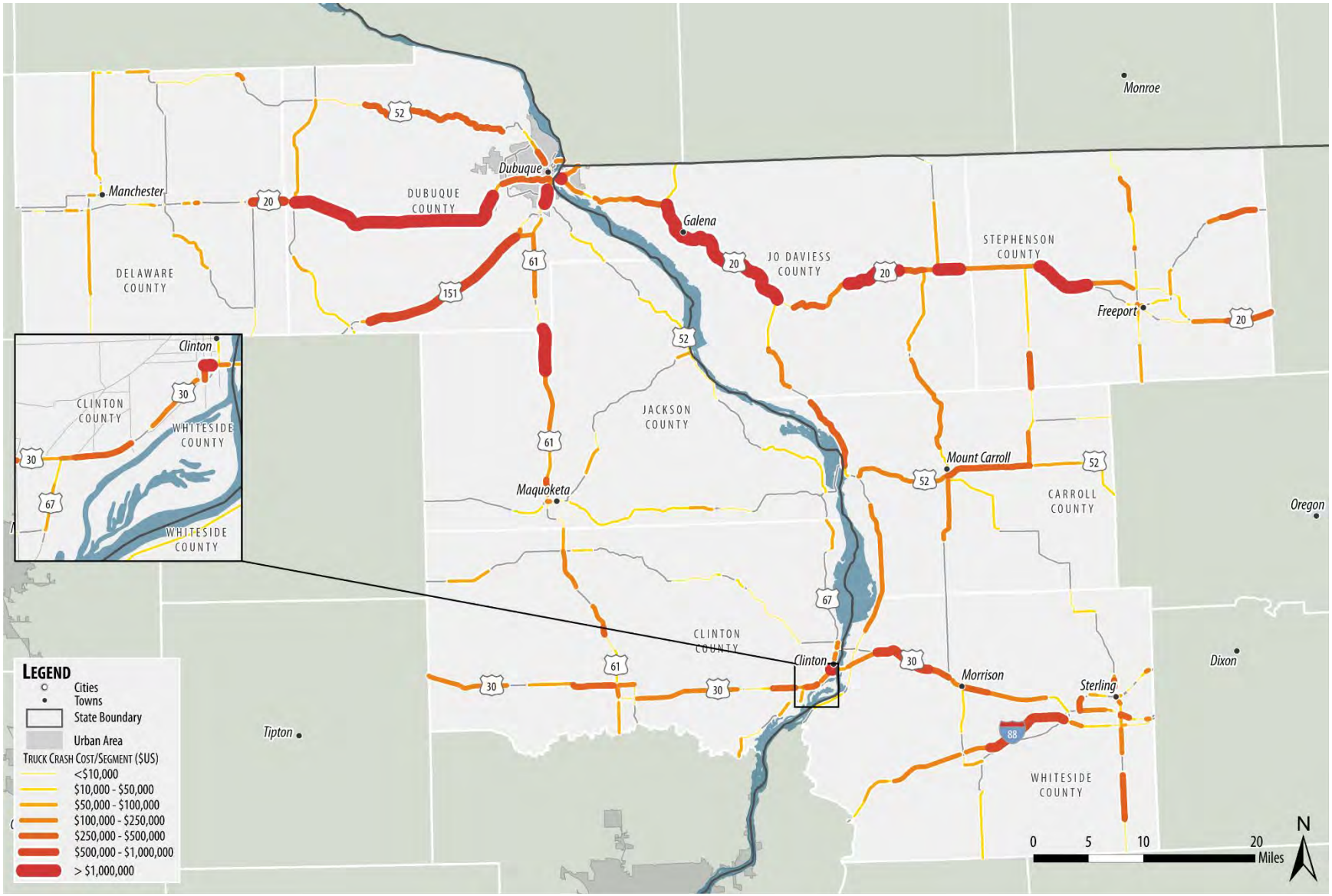
Source: Highway Safety Improvement Program Manual. Federal Highway Administration. 2010

[3] US Vehicle-Miles (Millions). Bureau of Transportation Statistics. 2016.
[4] This was a limiting factor, and the basis for why only the crash rate for 2015 was calculated.

Figure 3-7: Truck-Involved Crashes per Mile (2010-2015)

Sources: Illinois DOT, 2016; Iowa DOT, 2017.

Figure 3-8: Truck-Involved Crash Severity, Cost per Segment (2010-2015)

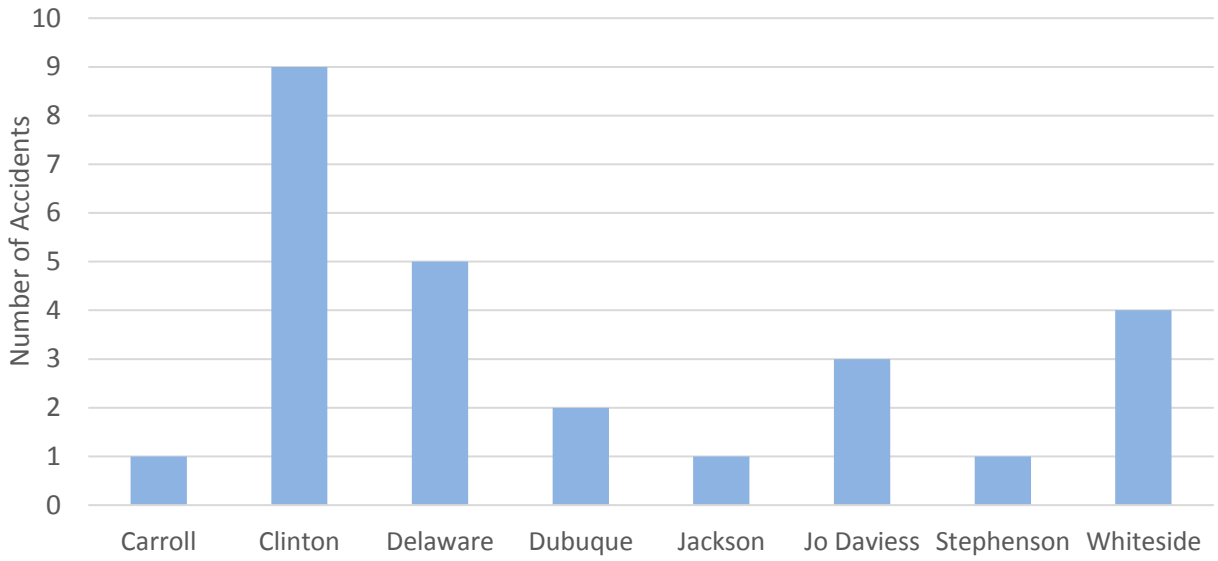


Sources: Illinois DOT, 2016; Iowa DOT, 2017. Note: Map shows crashes per segment, not per mile

Rail-Highway Crossing Incidents

The Region has 331 publicly-owned railroad grade crossings, and an additional 477 privately-owned crossings. These crossings are potential points of collision between road and rail modes, and measuring the number of incidents over time can help the Region's planners identify problematic crossings that impede the safe movement of freight and may require greater investment in safety devices. In the past ten years, 24 of the Region's 37 railroad-highway incidents occurred at publicly-owned grade crossings. Figure 3-9 shows the number of incidents at public grade crossings per county, in the ten years between April 2007 and April 2017. Figure 3-10 shows which counties had incidents resulting in deaths or injuries, and Figure 3-11 shows each incident's location in the Region.

Figure 3-9: Eight County Grade Public Crossing Incidents, April 2007- April 2017*



Source: Federal Railroad Administration, Office of Safety Analysis, 2017
*Includes two accidents not involving road vehicles in Clinton and Whiteside Counties.

Figure 3-10: Deaths and Injuries at Regional Public Grade Crossings, April 2007- April 2017

County	Killed	Injured
Clinton	1	3
Delaware	2	1
Jo Daviess	0	2
Whiteside	1	2

Source: Federal Railroad Administration, Office of Safety Analysis, 2017

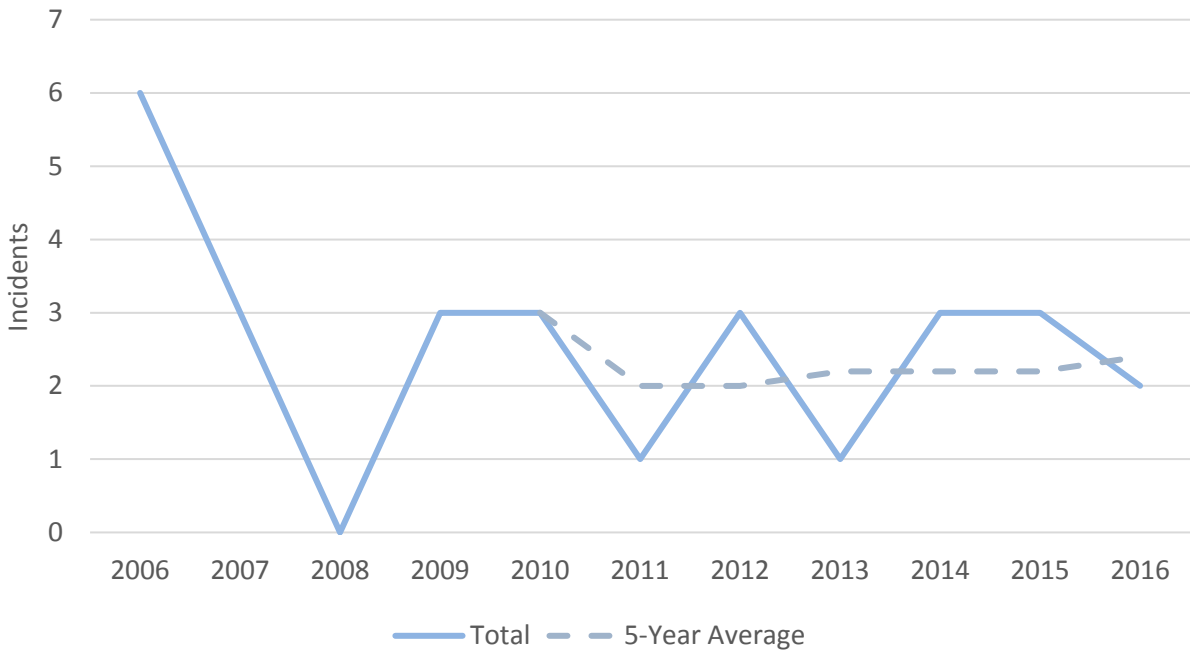
Figure 3-11: Eight County Public Grade Crossing Incident Locations, April 2007 to April 2017

Source: Federal Railroad Administration, Office of Safety Analysis, 2017

Notable clusters are three incidents along the Union Pacific line in Morrison, and five incidents on the Canadian Pacific line in Clinton. Two of the five incidents in Clinton occurred at the 17th Street North crossing, which serves a manufacturing plant close to the tracks. The severity of incidents in Clinton has been limited: only one of the five incidents resulted in an injury, and there have not been any fatalities in the past ten years. The three incidents in Morrison are centered on the city's downtown. In September 2010, one fatality was recorded at the Orange Street crossing, when a pedestrian was struck by a westbound train. None of the other reported incidents resulted in injuries or deaths.

Over the past five years, the rate of grade crossing incidents in the Region has increased slightly with between one and three incidents each year, and a five-year average that has risen from 2.0 to 2.4 incidents per year. Figure 3-12 shows the total number incidents per year, and the five-year incident per year average starting in 2010.

Figure 3-12: Public Grade Crossing Incidents per Year 2006-2016



Source: Federal Railroad Administration, Office of Safety Analysis, 2017

The Region's privately-owned crossings have had their own share of incidents. In the past ten years, 29 percent of all grade crossing incidents (11), 25 percent of fatalities (1), and 37 percent of injuries (3) occurred at privately-owned crossings. Further investigation of incidents at private crossings was not conducted as they are outside of the control of the Region's public agencies.

Without additional information, it is difficult to determine why the five year average rate of incidents per year has slightly increased. The increase could potentially be due to an increase in rail traffic, an increase in road traffic, changes to crossing protection equipment like lights, or by natural variation in accident rates from year to year. Currently, a lack of historic highway and rail traffic volume data makes it difficult to gain a deeper understanding of crossing incidents. If Regional agencies wish to understand rail-highway incidents in greater detail, yearly collection of crash data and rail volume data from the FRA, along with updates to estimates of Average Annual Daily Traffic counts could help determine what phenomena are driving changes in incident rates.

Another report to consider monitoring is the FRA's Web Accident Prediction System, which automatically generates predictions of how many incidents will occur per year at any given public intersection. These predictions are generated using two independent factors: 1) basic crossing physical and operational characteristics, such as road and rail as traffic volume, protective devices like lights and gates, crossing geometry, and traffic speed, and 2) five previous years of incident history. Figure 3-13 shows the top ten crossings in the Region where the Web Accident Prediction system estimates that incidents are most likely.

Figure 3-13: Predicted Incidents Per Year

Rank	Predicted Accidents Per Year	Road	Railroad	City	County
1	0.074	122nd Avenue	UP	Wheatland	Clinton
2	0.069	Jones Street	DME (CP)	Dubuque	Dubuque
3	0.050	S. 5th Street	DME (CP)	Clinton	Clinton
4	0.050	S. Williams Street	CC (CN)	Earlville	Delaware
5	0.049	190th Avenue	UP	Calamus	Clinton
6	0.048	Burrington Road	CC (CN)	Manchester	Delaware
7	0.044	Black Road	BNSF	Fenton	Whiteside
8	0.043	Mississippi Palisades State Park	BNSF	Savanna	Carroll
9	0.039	S. Fairview Drive	CC (CN)	Earlville	Delaware
10	0.038	Illinois Hwy 84	UP	East Clinton	Whiteside

Source: Web Accident Prediction System, Federal Railroad Administration, December 31, 2016

The relative safety of Region's crossings varies when compared to Illinois' and Iowa's state ranks. The top ranked crossing in the Iowa counties of the Region (122nd Avenue in Wheatland) was ranked 18th most likely for a crash in Iowa overall, and the top crossing in the Illinois counties (Black Road in Fenton) was ranked 436th in Illinois overall. This disparity in rankings between the two states likely reflects the fact that Illinois has hundreds of additional high-risk, high-traffic urbanized crossings relative to Iowa.

The Region's road-highway grade crossings are relatively incident free, and the current rate of 2.5 incidents per year has a negligible impact on freight operations.

The consequences of the slight increase in highway-rail incidents for public and private users are uncertain. Incidents have the potential to result in loss of life or injury, damage to equipment and goods, and slower travel times. However, 2.5 incidents per year across eight Counties, with an even smaller number of injuries or fatalities are unlikely to have any lasting impact on freight performance in the Region.

Public crossings are one of the few elements of rail infrastructure that the public sector can easily modify or influence, and the public agencies of the Eight County Region have options to improve crossing safety. The Illinois Commerce Commission and Illinois and Iowa DOTs administer crossing safety improvement programs which identify problematic crossings and provide funding for the installation of additional safety equipment.

In Iowa, railroads or road authorities can submit a request for crossing safety funding. IADOT's Office of Rail Transportation ranks project priorities using benefit-cost analysis, and ninety percent of approved projects are funded by the IADOT, with the remaining ten percent of project costs paid by local authorities, railroads, or some combination of the two. The Office of Rail Transportation also distributes funds from Federal safety programs.

In Illinois, the Commerce Commission administers a similar crossing improvement program. Crossing improvements on state roads are funded through the State Road Fund, and local road improvements are funded via the Grade Crossing Protection Fund (GCPF), which receives money from gas tax receipts. Local authorities can submit applications for GCPF assistance. Federal Rail Safety funds are also available via application to ILDOT's Bureau of Local Roads and Streets.

3.3.2 Efficiency

Truck Travel Time Index

To understand how efficiently trucks move throughout the region, Truck Travel Time Index (TTTI) was calculated to compare average truck travel times at peak hours (defined as 6:00-9:00 AM, and 4:00-7:00 PM) against free-flowing traffic times. For this measure, observations of truck speed were obtained from the American Transportation Research Institute (ATRI), and posted speed limits were used to represent free-flowing speeds. The peak and free-flow travel time for each segment was calculated using segment length and the speeds noted above.

An index value (average peak time divided by free-flow time) was calculated for each segment of the Region's interstate, national, and state highways. To obtain a regional index value, a weighted average index was derived using the truck VMT associated with each road segment. The formula for the Region's TTTI is presented in Figure 3-14.

Figure 3-14: Truck Travel Time Index Formula

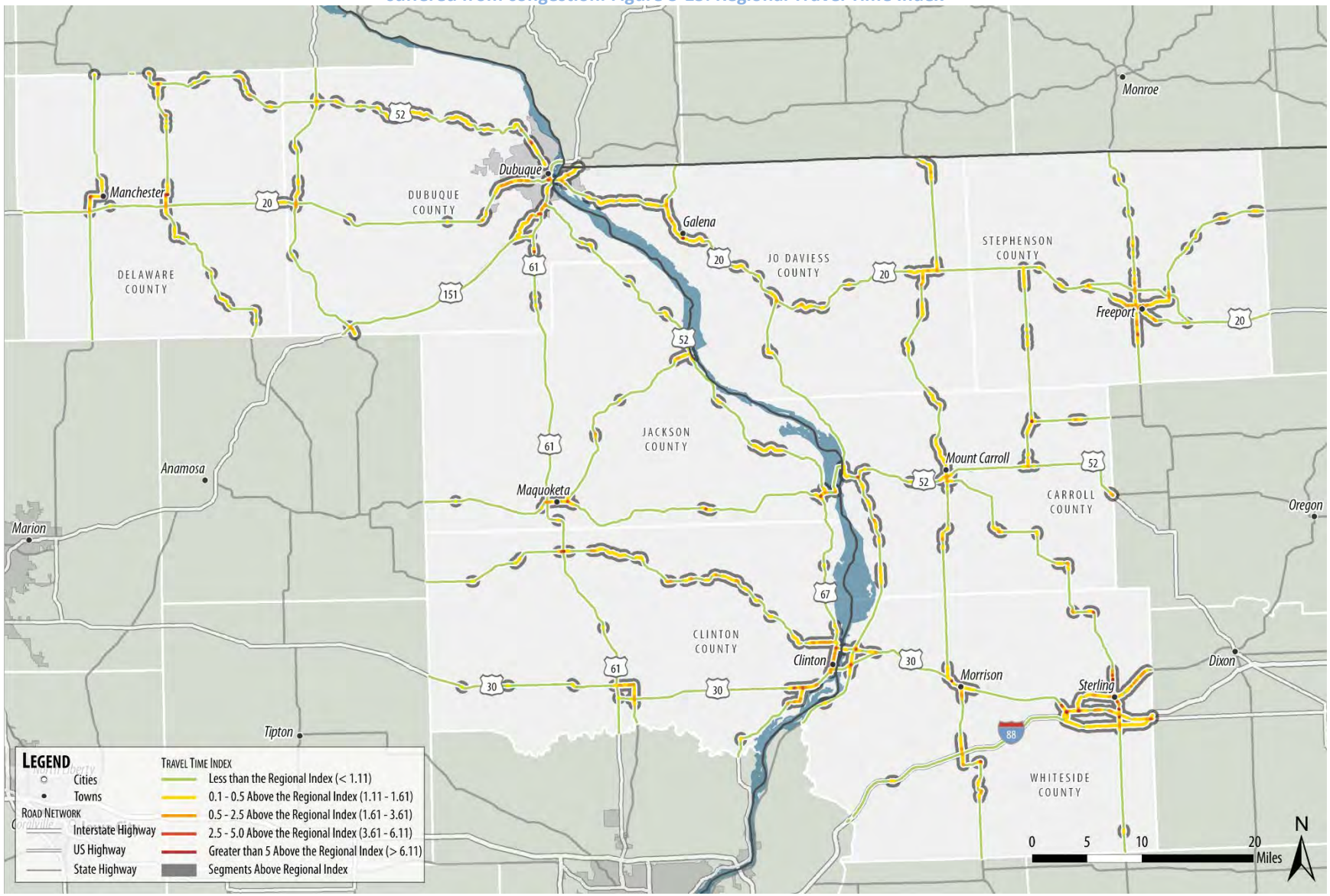
$$TTTI_{Region} = \frac{\sum \left(\frac{Average\ Peak\ Hour\ Travel\ Time}{Free\ Flowing\ Travel\ Time} \times VMT \right)_{for\ each\ segment}}{Total\ VMT\ for\ select\ network}$$

The Region's TTTI value is 1.11, which means a truck trip that takes 1 hour in free-flow conditions would take an additional 6.6 minutes at peak times. This value compares favorably to the US as a whole, which had an overall Travel Time Index of 1.22 in 2014.[5]

At peak times, truck trips on interstate, national, and state highways in the Region take 11% longer than they would during optimal free-flowing traffic conditions. The national average is 22% longer.

[5] Urban Mobility Scorecard 2015. Texas A&M Transportation Institute. 2015.

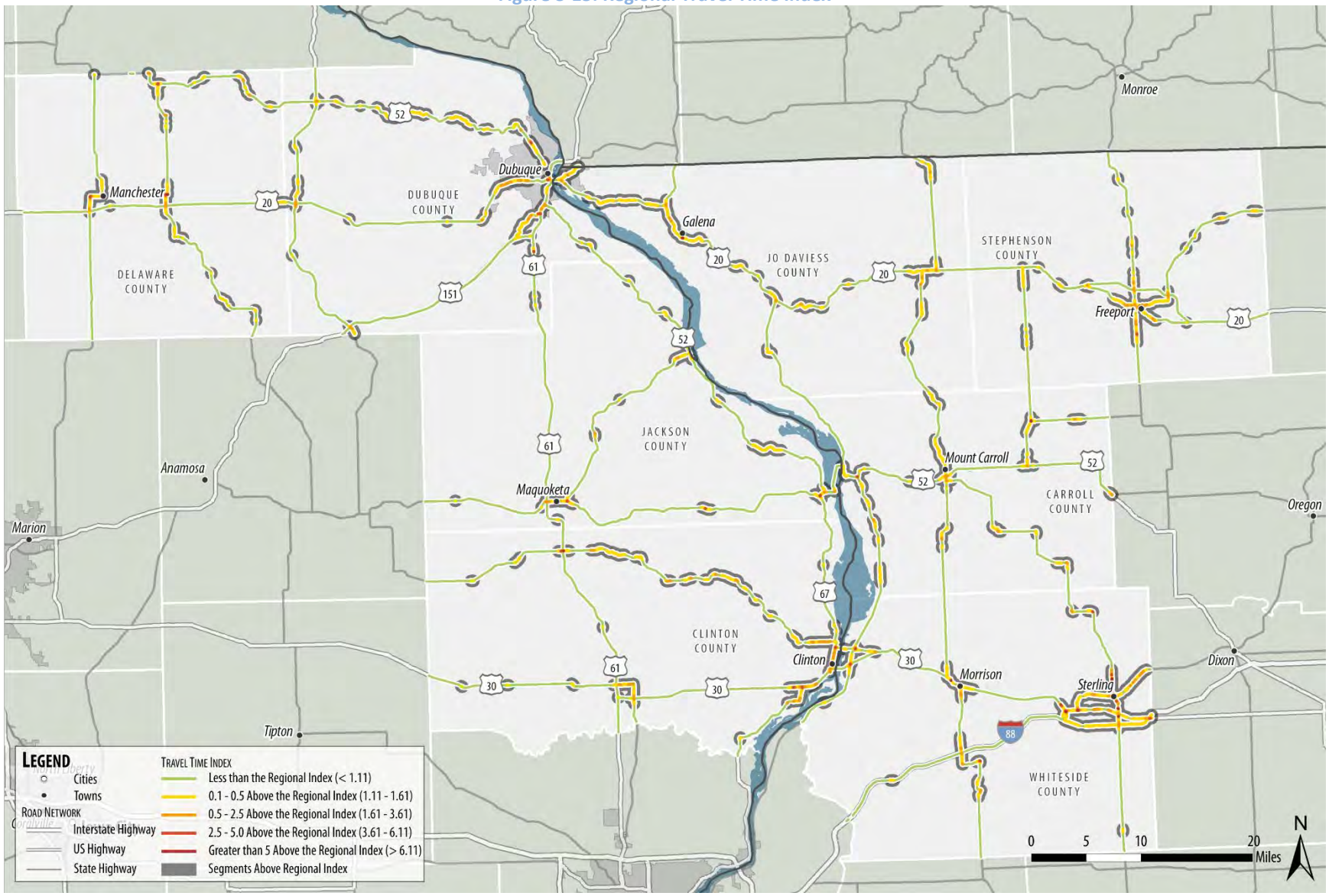
The Region's low level of congestion is favorable, as firms operating in the Region will lose less money to shipping inefficiencies created by congestion. However, this measure does not mean that the region is completely free from congestion; stakeholders noted that portions of US 20, US 30, and Dubuque suffered from congestion. Figure 3-15: Regional Travel Time Index



Sources: ATRI FPM Program, American Transportation Research Institute, 2016; National Transportation Atlas Database, Bureau of Transportation Statistics, 2015

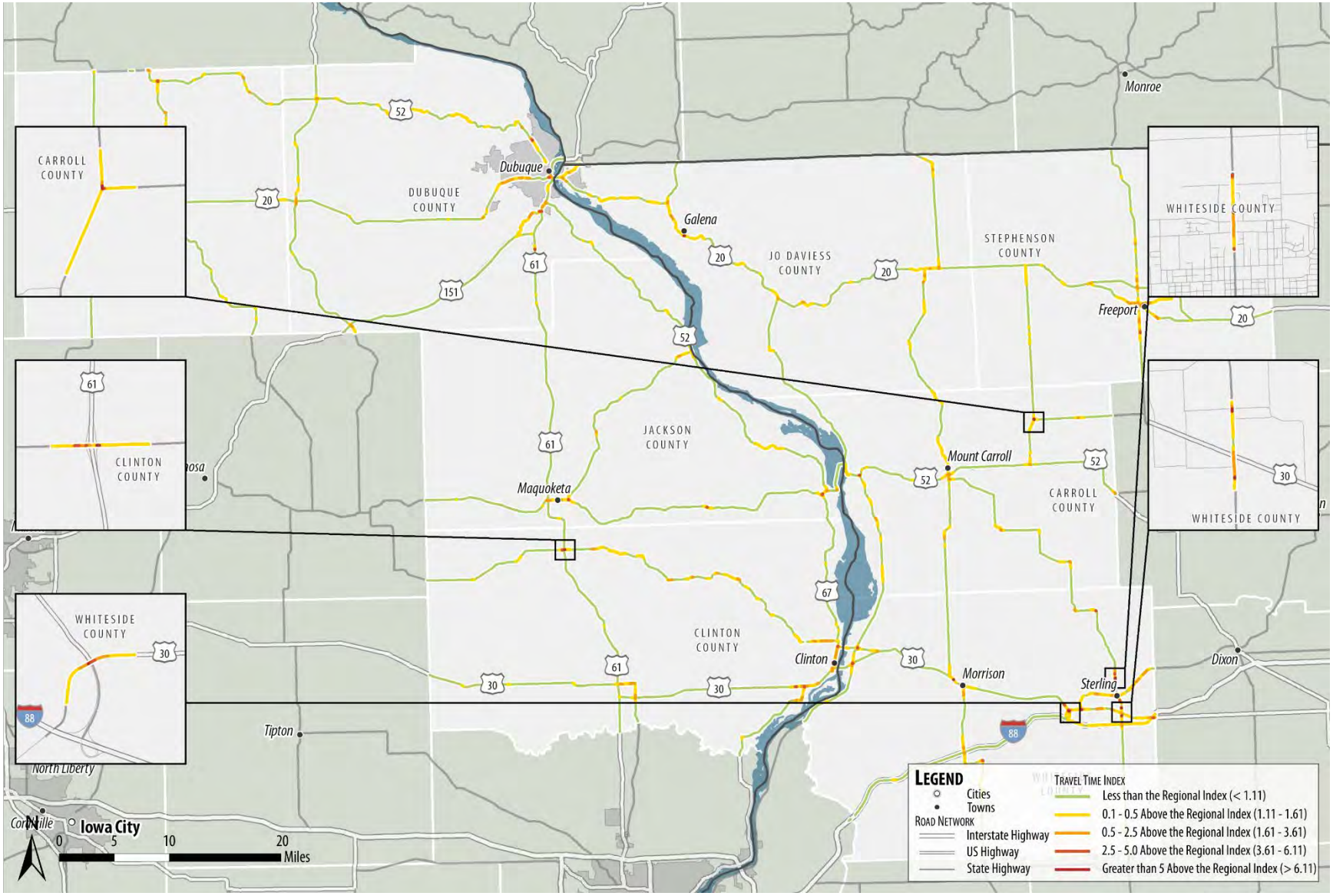
Figure 3-16 shows which areas of the Region's highways may be more congested, as indicted by the gray shaded segments that are above the Region's Travel Time Index. However, a further examination of the data that shows the region has generally low congestion, and many of the segments above the average TTI are a result of spot geometric issues. Figure 3-16 highlights areas that could in fact have spot congestion issues and warrant further exploration – for example, truck congestion may be an issue surrounding the Walmart distribution center in Whiteside County.

Figure 3-15: Regional Travel Time Index



Sources: ATRI FPM Program, American Transportation Research Institute, 2016; National Transportation Atlas Database, Bureau of Transportation Statistics, 2015

Figure 3-16: Regional Travel Time Index – Spot Issues



Sources: ATRI FPM Program, American Transportation Research Institute, 2016; National Transportation Atlas Database, Bureau of Transportation Statistics, 2015

3.3.3 Reliability

Truck Travel Time Reliability

Overall travel time usually varies throughout the day, and uncertainty in travel times can lead companies to plan for "worst case" scenarios when shipping their goods. This worst case planning method helps ensure that shipments arrive on time, but may result in inefficiencies in shipping practices when travel times are lower than the "worst case." For example, drivers may arrive before scheduled delivery times, and have to wait to deliver or pick up goods. Therefore, an understanding of variability in travel times is important to understanding and describing congestion as a whole.

To track variability in travel time, planners use measures such as a buffer index (comparing 95th percentile travel time and average travel time), or a planning time index (comparing 95th percentile travel time and free-flow travel time). Both of these measures require identification of a 95th percentile travel time, which was not possible with the ATRI data obtained for this Plan. Instead, a modified measure of reliability was used, which compared peak travel times (from 6:00-9:00 AM, and from 4:00-7:00 PM) against non-peak travel times to investigate how times varied throughout the day. The formula used for this measure is shown in Figure 3-17.

Figure 3-17: Travel Time Reliability Formula

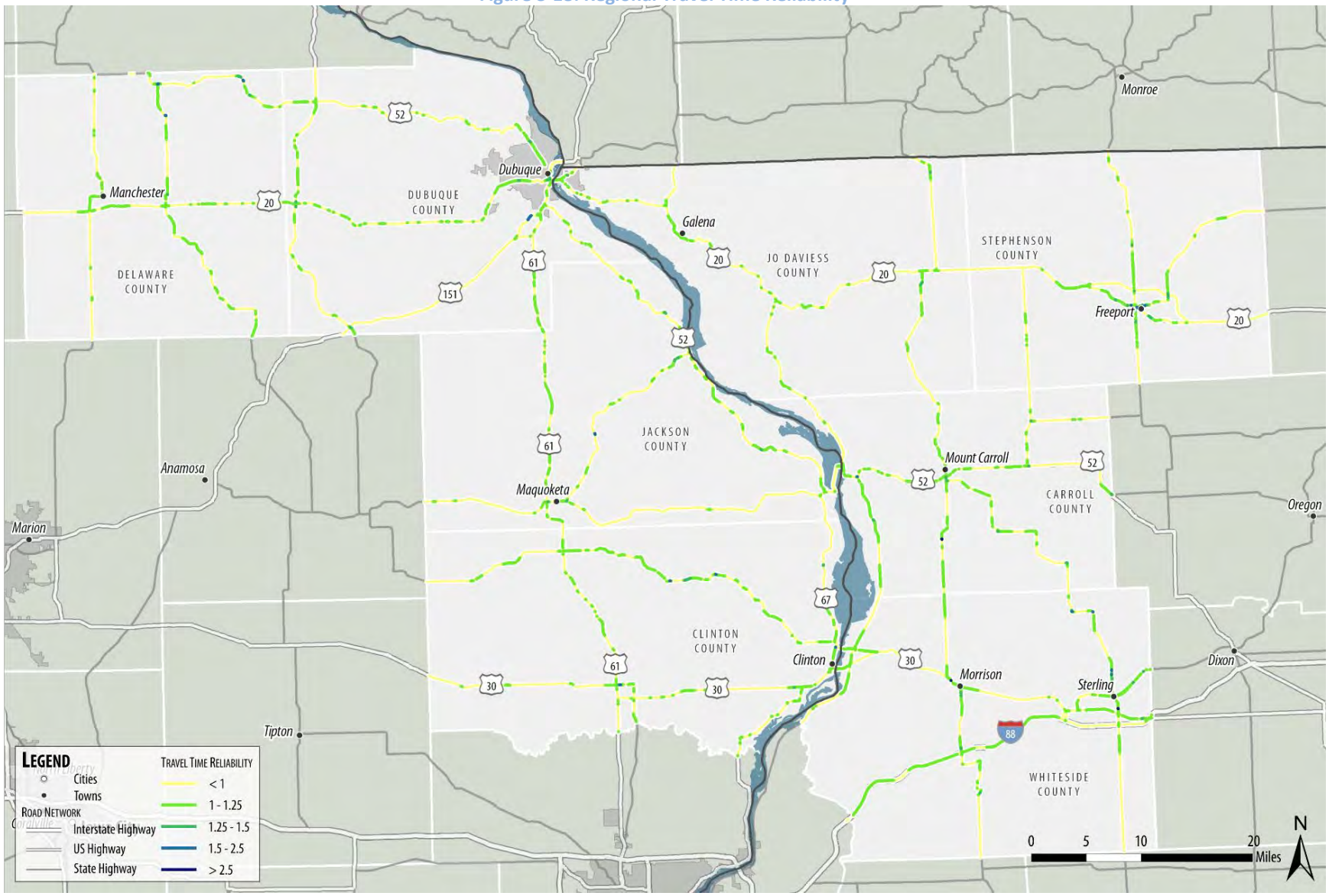
$$TTTR_{Region} = \frac{\sum\left(\frac{Average\ Peak\ Travel\ Time}{Average\ Non-Peak\ Travel\ Time} \times VMT\right)_{for\ each\ segment}}{Total\ VMT\ for\ select\ network}$$

The Region's TTTR as calculated by the formula above is 1.00. This means that on average, truck travel times are identical between peak and non-peak hours. This consistency, along with the low congestion measured by the previously calculated TTTI, shows that the Region's road network is largely uncongested, and travel times do not vary throughout the day. These two factors are favorable for businesses that use the road network to ship and receive goods, particularly businesses that rely on on-time delivery to support their operations.

For the region as a whole, truck travel times between peak and non-peak hours are almost identical.

Looking towards the future, the Region's governments should continue to monitor these two measures to determine how they change over time. Doing so will also help agencies identify areas where infrastructure investment may improve congestion or travel time.

Figure 3-18: Regional Travel Time Reliability



Sources: ATRI FPM Program, American Transportation Research Institute, 2016; National Transportation Atlas Database, Bureau of Transportation Statistics, 2015

Waterway Reliability

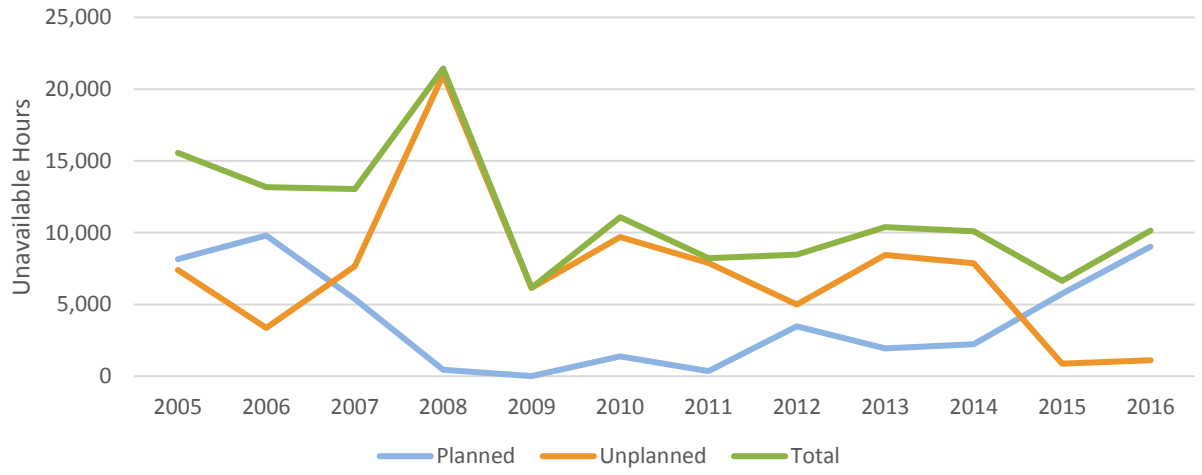
Figure 3-19: Mississippi River Locks

The Mississippi River plays a vital role in carrying large quantities of heavy and bulk products at a low cost. However, commercial navigation is only possible due to a system of 26 locks and dams (shown in Figure 3-19) between St. Louis and Minneapolis that maintain a water depth sufficient to accommodate loaded barges. Almost all of these locks and dams were constructed in the 1930s, and they have reached the end, or exceeded their service lives. When lock facilities or equipment fail, river shutdowns can halt the flow of traffic and negatively impact freight shippers and receivers who rely on river service. Therefore, the Region should monitor lock and dam reliability.

To evaluate waterway reliability, two measures collected by the USACE were examined: 1) unplanned unavailable hours per year, and 2) planned unavailable hours per year. Unavailable hours are important because lock closures impede freight movements, and unplanned unavailable hours are particularly important because they may be especially disruptive to freight shippers, who would otherwise be able to accommodate planned closures.

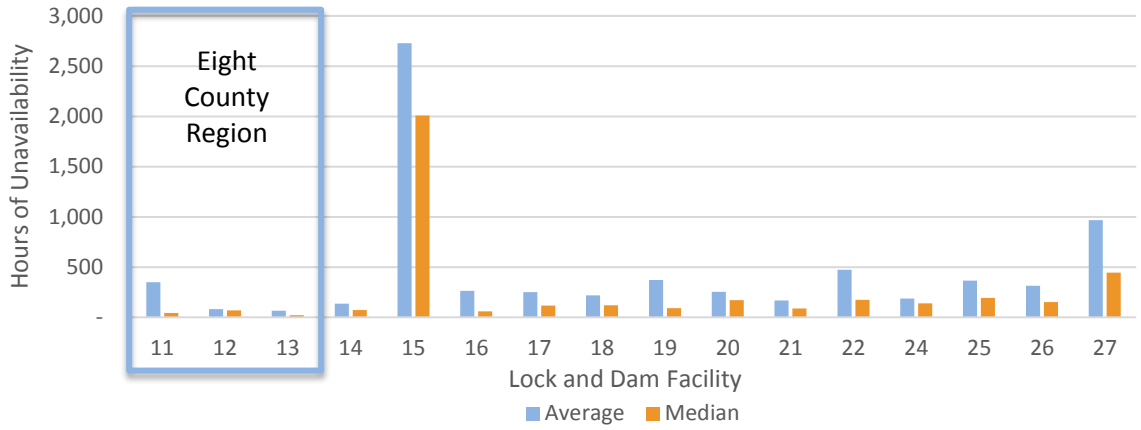
The Region is home to Locks 11 through 13, and is most affected by the performance of downstream Locks 14 through 26 because the majority of the Region's waterborne trade is conducted with downstream areas. Figure 3-20 shows unavailability of Locks 11 through 27 over the past decade, and Figure 3-21 and Figure 3-22 show each lock and dam's individual performance over the same period. Locks in the Region are noted in the blue outline.

Figure 3-20: Unavailable Hours per Year, Locks 11 Through 27



Source: USACE

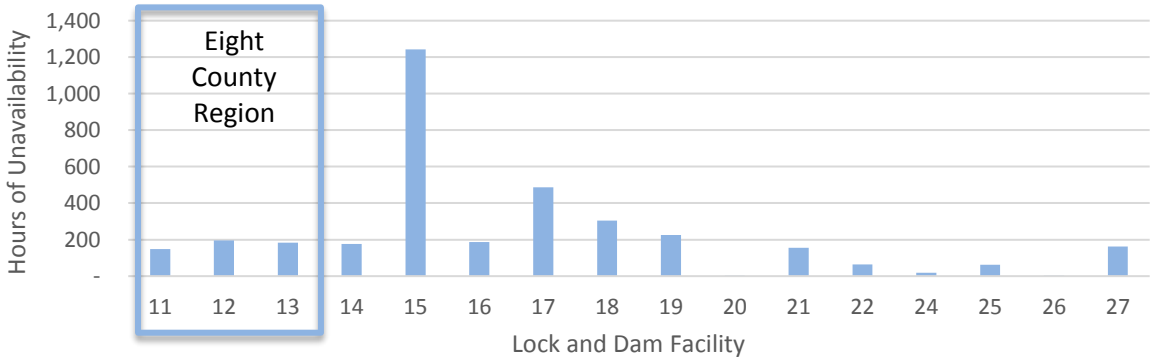
Figure 3-21: Average and Median Unscheduled Unavailable Time Per Lock and Dam Facility*



Source: US Army Corps of Engineers. 2017.

*Lock and Dam Facilities 15, 26, and 27 have two lock chambers, a large main chamber, and a shorter auxiliary chamber. The USACE reports unavailable time for these facilities as the sum of unavailable hours for both lock chambers.

Figure 3-22: Average Scheduled Unavailable Time Per Lock and Dam Facility*



Source: US Army Corps of Engineers. 2017.

*Lock and Dam Facilities 15, 26, and 27 have two lock chambers, a large main chamber, and a shorter auxiliary chamber. The USACE reports unavailable time for these facilities as the sum of unavailable hours for both lock chambers.

Over the past decade, the performance of the river's locks and dams as measured by unavailable time has improved. Since 2006, total unavailability has decreased by 22%, unplanned unavailability has decreased by 66%, and planned unavailability has decreased by 8%. However, in the past five years, planned unavailability has increased by 159%. This increasing trend in planned unavailability may reflect the fact that as lock and dam infrastructure continues to age, more shutdowns for maintenance will be required. A notable spike in unavailable hours in 2008 was associated with severe flooding, which necessitated the closure of the lock system.

When compared to downstream locks and dams, the Region's three locks and dams perform favorably. Lock and Dam 11 had the highest average delays and Lock 12 had the highest median delay of the Region's locks and dams. In the greater Mississippi River system, Lock and Dam 15 had particularly poor performance. This poor performance was due to seven years of combined shutdowns in excess of 2,000 hours, including a combined 9,700 hours of shutdown of the facility's two lock chambers in 2008.

In theory, a decrease in unavailable time is a favorable change for system users. However, the system is continuing to deteriorate, and there is an estimated $1 billion backlog in maintenance for the system.[6] As the system continues to age, and if maintenance needs are not addressed in a timely manner, it is likely that unplanned unavailability and total unavailability will increase as well.

While the unavailability of locks and dams serving the region has decreased, continued disinvestment in the lock system threatens future performance.

Deterioration in the performance of the river system would have a negative impact on a number of aspects of trade and transportation in the Region. The supply chain disruptions caused by lock delays can increase the price of products that are shipped by barge to the region. For example, one grain farmer in the Region noted that when river service is disrupted, the price of fertilizer (normally transported upstream by barge) increases to reflect limited supplies. Producers of outbound barge shipments, such as grain farmers may also be negatively affected, as they must pay more to have their product shipped via rail or truck. Diverting shipments from barge to truck or rail has additional negative impacts for the transportation system as a whole, as additional trucks increase road congestion and damage.

Unfortunately, the governments of the Region have little control over the maintenance and operations of the river system, which are handled by the US Army Corps of Engineers. Funding for maintenance and operations is allocated by Congress, so the most effective means of improving the system may be participating in lobbying efforts meant to improve funding for river infrastructure, or other outreach to local US representatives and senators.

3.3.4 Connectivity

Connectivity to multiple modes for businesses within the Region provides access to modal options, which enables the potential for greater competition between modes and overall improved system resilience. Additionally, the Eight County Region is outward facing, in that it trades heavily with businesses outside the Region. Therefore connectivity to markets beyond the eight counties is critical.

Highway

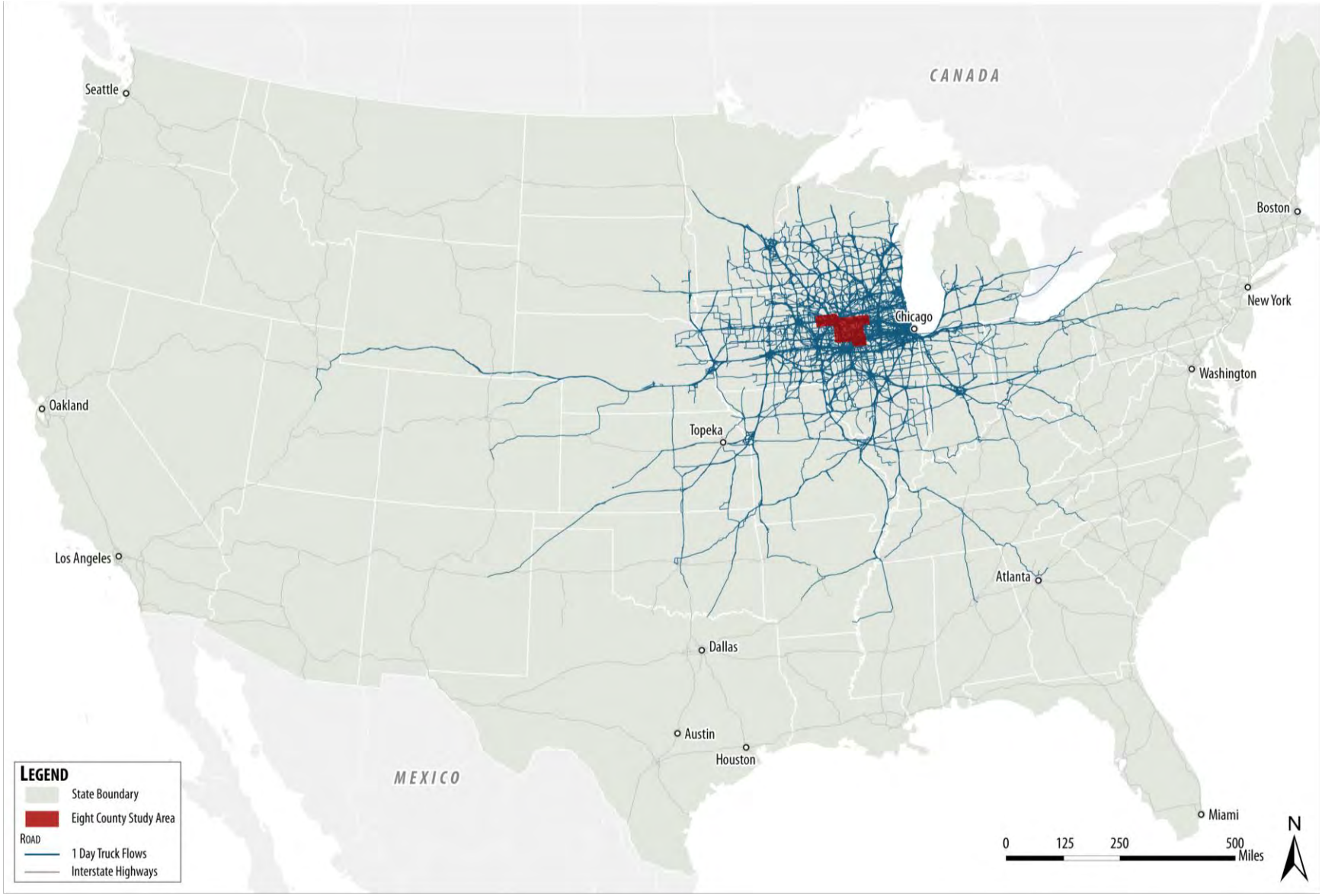
Trucks provide first and last mile connection to other modes and in cases where time is critical, can be used to haul freight long distances. Figure 3-17 displays the truck flows one day after leaving the Region. The Region has strong trucking connections to Chicago, Atlanta, Detroit,

[6] "Locks and Dams have $1 Billion in Repair Backlog," KCRG Cedar Rapids, June 15, 2017

Minneapolis, Denver and St. Louis comprising six of the top twenty population centers in the US.[7]

[7] Annual Estimates of the Resident Population: April 1, 2010 to July 1, 2016, US Census Bureau, Population Division, Release Date: March 2017

Figure 3-23: Truck Flows One Day after Leaving the Region



Source: ATRI FPM Program, American Transportation Research Institute, 2017

Waterway

During the development of Working Paper 1, a list of all barge terminals in the Region was developed. During stakeholder consultations, many stakeholders noted that access to the river was desirable, as modal choice could drive shipping costs down. Currently, the Region has 19 barge terminals, listed in Figure 3-24.

Figure 3-24: Regional Barge Terminals (North to South)

Name	City	Commodity Handled	Modes Connected
Cargill AgHorizons	Dubuque	Grain	Truck
Flint Hills Resources (Koch)	Dubuque	Liquid Petroleum	Truck
Peavey Co	Dubuque	Mixed	Truck, Rail
Dubuque River Terminal	Dubuque	Mixed	Truck
Newt Marine Service Dock	Dubuque	Mixed	Truck
IEI Barge Services	East Dubuque	Mixed	Truck, Rail
Aggregate Materials Co	East Dubuque	Mixed	Truck, Rail
Consolidated Grain and Barge	East Dubuque	Grain	Truck
East Dubuque Nitrogen Fertilizer	East Dubuque	Chemicals	Truck, Rail
Consolidated Grain and Barge	Savanna	Grain	Truck
Fulton River Terminal	Fulton	Mixed	Truck
Bunge Grain	Fulton	Grain	Truck, Rail
ARTCO Fleeting	Clinton	Mixed	Truck, Rail
Clinton Municipal dock	Clinton	Mixed	Truck, Rail
ADM Growmark	Clinton	Grain	Truck
ADM Corn Processing	Clinton	Grain	Truck, Rail
Vertex Chemical	Camanche	Chemicals	Truck, Rail
Bunge Grain	Albany	Grain	Truck
ARTCO Camanche	Camanche	Mixed	Truck, Rail

Sources: Blackhawk Hills Regional Council; Freight Map Files, Iowa DOT, https://gis.iowadot.gov/public/rest/services/Systems_Planning/Freight/MapServer; US Army Corps of Engineers

Railway

Most of the Region's rail terminals are built for the transfer of bulk materials. Figure 3-25 displays a collection of the nearby intermodal facilities firms could use to transport non-bulk goods by rail. Firms looking for more choice in rail shippers, or connections to the eastern US must send their products to the Chicago area.

Figure 3-25: Travel Time (hours) and Mileage to Nearby Rail Intermodal Facilities from Select Locations

Intermodal Facility - Railroad	Dubuque		Clinton		Freeport	
	Miles	Time	Miles	Time	Miles	Time
Global III (Rochelle) - UP	123	2.25	67	1.25	60	1.00
Cedar Rapids - CRANDIC	73	1.25	84	1.50	137	2.50
Bedford Park (Chicago) - CSX	188	3.50	142	2.50	5	2.25
Joliet - UP, CN, BNSF	202	3.50	150	2.25	140	2.25

Source: Google Maps

Long distances required to truck intermodal freight to a rail connection increases costs and decreases the likelihood that companies will use these facilities. The development of intermodal facilities in the Region, especially Cedar Rapids will be important to future freight investments as it could change the flows of goods out of the Region – and the distance and time to market.

Aviation

The Region currently does not have any air cargo service, requiring the Region to utilize nearby airports in Cedar Rapids, Rockford, and Moline for air cargo service.

Figure 3-26 lists the public airports in the Region. Two of these airports, Dubuque Regional and Whiteside County have runways long enough to accommodate the Boeing 757 and 767 jet aircraft commonly used by FedEx and UPS.[8] Albertus and Clinton Municipal may also be able to accommodate jet aircraft subject to weight and weather conditions.

Figure 3-26: Regional Public Airports and Maximum Runway Length

Airport	Location	Approx. Max Runway Length (feet)
Albertus	Freeport, IL	5,500
Clinton Municipal	Clinton, IA	5,200
Dubuque Regional	Dubuque, IA	6,500
Manchester Municipal	Manchester, IA	3,500
Maquoketa Municipal	Maquoketa, IA	3,300
Tri-Township	Savanna, IL	4,000
Whiteside County	Morrison, IL	6,500

Source: FAA Airport Data and Contact Information, 2017

Intermodal

As noted in the barge terminal section, some of the Region's stakeholders felt that modal choice was an important asset, as the choice of shipping options could reduce shipping prices. The Region is home to 33 specific facilities that can transfer goods between modes (intermodal facilities), and these facilities are listed in Figure 3-27. Facilities listed as "rail transload" have the capability support the ground-level movement of goods between rail cars and trucks, such as unloading and loading of a railcar using a forklift. Most of the Region's intermodal facilities are designed to move bulk materials, such as agricultural products, chemicals, and minerals like gravel.

[8] Airplane Characteristics for Airport Planning. Boeing. 2011.

Figure 3-27: Eight County Intermodal Facilities

Facility Name	Facility Type	Commodities Handled	City	Nearest Road
ADM Corn Processing	Barge Terminal	Agricultural	Clinton	Beaver Channel Pkwy.
ADM Growmark	Barge Terminal	Agricultural	Clinton	South 4th St.
Aggregate Materials Co	Barge Terminal	Mixed Bulk	East Dubuque	US 20
ARTCO Fleeting	Barge Terminal	Mixed Bulk	Clinton	15th Ave. S.
ARTCO Camanche	Barge Terminal	Mixed Bulk	Camanche	North Washington Blvd.
Bunge Grain	Barge Terminal	Agricultural	Fulton	3rd St.
Bunge Grain	Barge Terminal	Agricultural	Albany	East Main St.
Cargill AgHorizons	Barge Terminal	Agricultural	Dubuque	Kerper Blvd.
Carroll Service	Rail Transload	Mixed Bulk	Milledgeville	Dutchtown Road
Clasen Warehousing	Warehouse	Mixed Bulk	Clinton	South 2nd St.
Clinton Municipal dock	Barge Terminal	Mixed Bulk	Clinton	15th Ave. South
Consolidated Grain and Barge	Barge Terminal	Agricultural	East Dubuque	US 20
Consolidated Grain and Barge	Barge Terminal	Agricultural	Savanna	Broderick Dr.
Consolidated Grain and Barge	Grain Elevator	Agricultural	Freeport	Hancock Ave.
Dubuque River Terminal	Barge Terminal	Mixed Bulk	Dubuque	Jones St.
Economy Coating Systems	Warehouse	Mixed Bulk	Camanche	21st St.
Farmer's Shipping Association	Grain Elevator	Agricultural	Dyersville	Beltline Rd.
Flint Hills Resources	Barge Terminal	Petroleum	Dubuque	Koch Ct.
Riverport Railroad	Rail Transload	Mixed Goods	Savanna	Main Avenue
Rock River Lumber and Grain	Rail Transload	Mixed Bulk	Sterling	Lincoln Hwy.
Fulton River Terminal	Barge Terminal	Mixed Bulk	Fulton	11th Ave.
Gavilon Grain Warren	Grain Elevator	Agricultural	Warren	IL-78
IEI Barge Services	Barge Terminal	Mixed Bulk	East Dubuque	US 20
Innovative Ag Services	Grain Elevator	Agricultural	Farley	Jamesmeier Rd.
Midwest 3PL	Rail Transload	Mixed Bulk	Savanna	Shinske Rd.
Milledgeville Farmers Elevator	Grain Elevator	Mixed Bulk	Milledgeville	Railroad Ave.
Newt Marine Service Dock	Barge Terminal	Mixed Bulk	Dubuque	Jones St.
Pearl City Elevator	Grain Elevator	Agricultural	Lena	US 20
Peavey Co	Barge Terminal	Mixed Bulk	Dubuque	East 7th St.
East Dubuque Nitrogen Fertilizers	Barge Terminal	Agricultural	East Dubuque	US 20
Ryan Cooperative	Grain Elevator	Agricultural	Ryan	Union St.
Sterling Logistix	Rail Transload	Mixed Bulk	Sterling	Ave. G
Vertex Chemical	Barge Terminal	Chemicals	Camanche	Industrial Park Dr.

Sources: Iowa DOT, US Army Corps of Engineers, Blackhawk Hills Regional Council.

3.4 Other Key Indicators

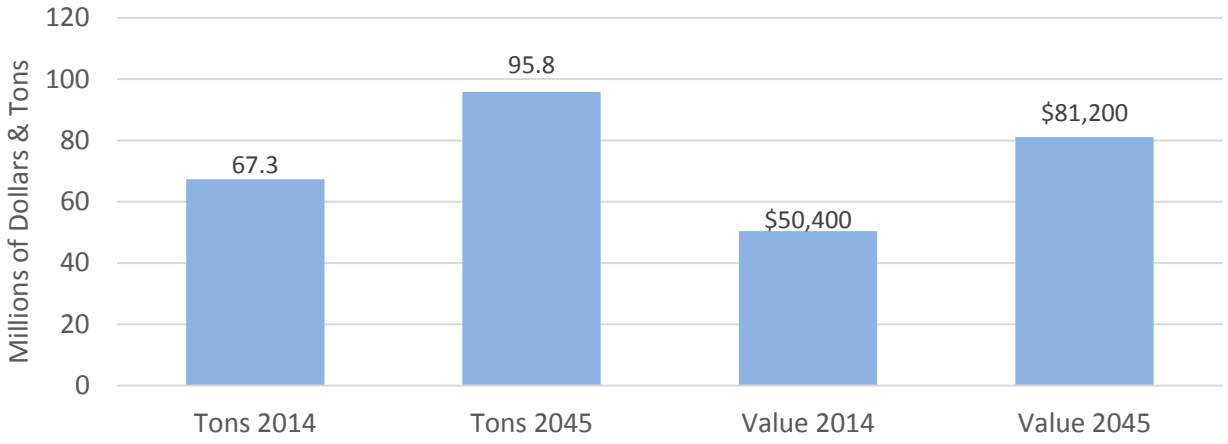
Throughout the course of this study, other data has been collected that falls into the category of indicators of the freight system's performance or capacity. These performance indicators may be more difficult to obtain or are well outside the control of the Region's governments. However, occasionally monitoring or tracking these indicators can help provide a greater understanding of the freight system's performance, and could be used to promote the region's

transportation assets for economic development. This key indicators section holds a variety of facts that are relevant to the Region, but do not qualify as performance measures, or may not directly add value to identifying system needs.

3.4.1 Economy

Between 2014 and 2045, the Eight County Region is projected to add 28.5 million tons of freight (a 42 percent increase based on a Compound Annual Growth Rate of 1.1 percent per year) worth almost $30.8 billion dollars (a 61 percent increase based on a CAGR of 1.5 percent per year). In 2045, the region will handle nearly 96 million tons of freight worth over $81 billion dollars. Figure 3-28 illustrates the magnitude of these changes.

Figure 3-28: Forecasted Tonnage and Value, 2014 and 2045



Source: WSP|PB Analysis of Freight Analysis Framework

Freight moving in the Region is forecasted to increase to $81.2 billion and 95.8 million tons by 2045.

As part of analyzing the Freight Analysis Framework data for the Region, an estimate of the Region's freight costs was made. Figure 3-29 shows the costs associated with each mode. A full breakdown of the assumptions and calculations for this figure is provided in section 5.4.5 of Working Paper 2. This regional "freight bill" could be updated as newer versions of the Freight Analysis Framework are published.

Figure 3-29: Order-of-Magnitude Freight Transportation Costs for the Eight County Region, 2014

	Rate per Ton-Mile	Ton-Miles, 2014	Estimated Transportation Cost
Truck	$0.108	13,056,538,943	$1,410,106,206
Rail	$0.083	6,159,485,019	$511,237,257
Multiple	$0.097	1,012,159,822	$98,179,503
Water	$0.050	385,064,490	$19,253,224
Total			$2,038,776,190

Source: WSP|PB analysis of Freight Analysis Framework data.

In 2014, the Region's freight transportation costs were just over $2 billion.

3.4.2 Highway

For this study, ATRI data was used to develop a series of maps illustrating the roads driven by trucks leaving the Region. The maps included roads used one-day after leaving the Region to three-days after leaving the Region, and show the geographic coverage of the Region's outbound shipments. In addition to rail traffic volume data, information was collected on the number of public and private intersections by county, which are listed in Figure 3-32.

Figure 3-32, Figure 3-34 and Figure 3-35 show the extent of these truck flows by day.

In addition to these maps, origin-destination pairs in the Freight Analysis Framework were used to generate estimates of the average lengths of freight haul from the Region, as shown in Figure 3-30. The Region's length of haul for trucks and water exceeds the national average, while rail and multiple mode haul lengths are shorter. Future analysis of updated FAF data could provide insight into how these lengths of haul are changing over time.

Figure 3-30: Eight County Region and US Average Trip Lengths by Mode (Provisional), 2014

	Eight County Average Miles per Trip	US Total Average Miles per Trip
Truck	265	177
Rail	399	802
Multiple	557	811
Water	540	453

Source: WSP|PB analysis of Freight Analysis Framework data

3.4.3 Railroad

During research for Working Paper 1, information was collected on the Region's rail system that could serve as the base for future performance indicators. This information includes the number of railroads operating and the number of trains running through the Region on each line per day. Figure 3-31 lists the Region's railroads, as well as their subsidiaries, and the estimated number of trains per day on each rail line.

Figure 3-36 provides a visual reference of train volumes in the region, as derived from railroad crossing data maintained by the FRA. Among the Region's railroads, the Riverport Railroad near Savanna is unique; it is a short line operating on the grounds of the former Savanna Army Depot, and does not operate trains outside of the Region. However, it receives trains at least two days each week via BNSF.

Figure 3-31: Regional Railroads and Estimated Rail Traffic Volumes

Parent Railway	Trains Per Day
Burlington Northern Santa Fe	35-50
Canadian National – includes subsidiary Chicago Central and Pacific (CC)	8
Canadian Pacific - Includes subsidiaries: Dakota, Minnesota, and Eastern (DME), and Iowa, Chicago, and Eastern (ICE).	7
Riverport	<1
Union Pacific	40-100

Source: Highway-Rail Crossing Inventory Data, Federal Railroad Administration, 2017

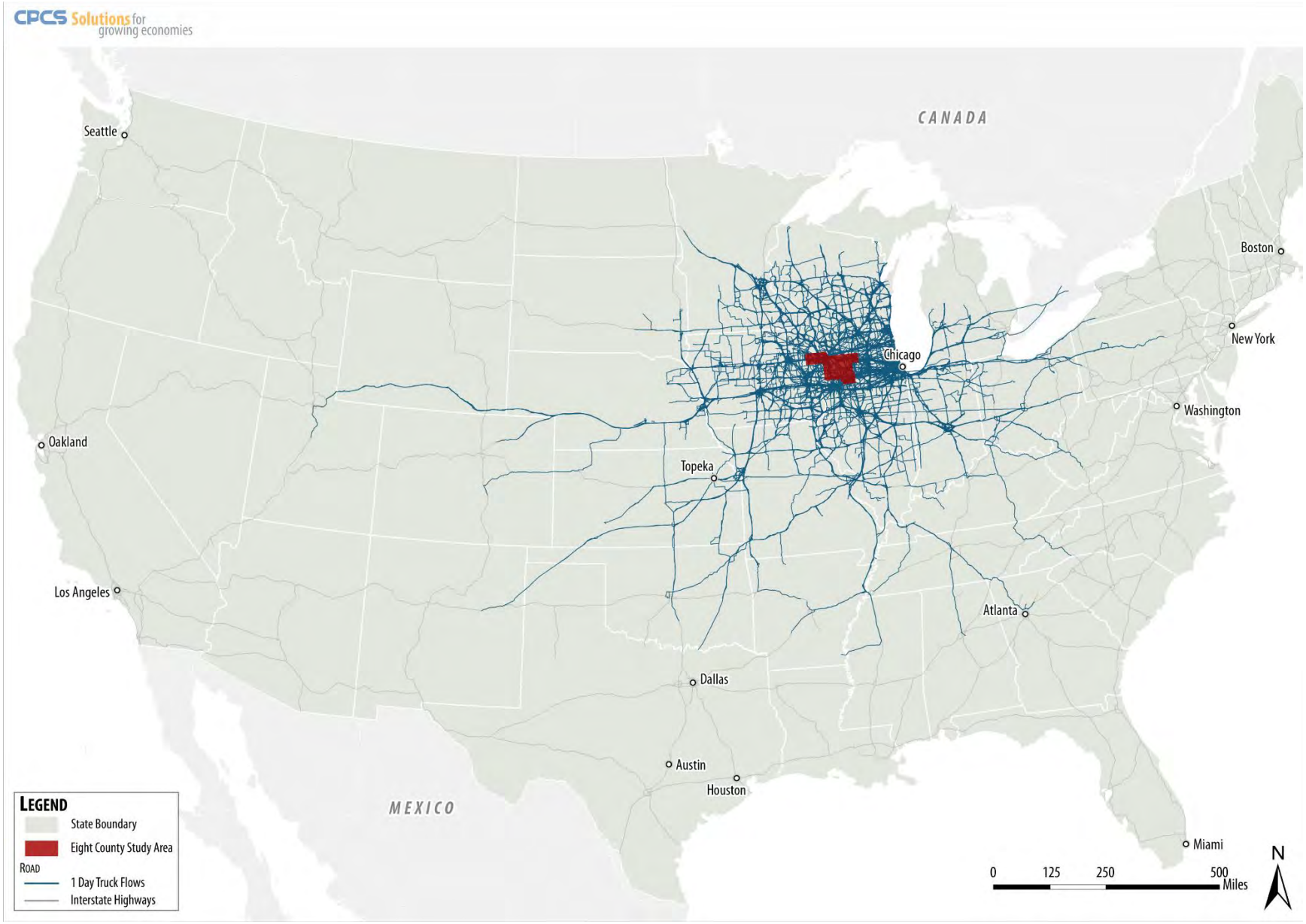
In addition to rail traffic volume data, information was collected on the number of public and private intersections by county, which are listed in Figure 3-32.

Figure 3-32: Regional Highway-Rail Grade Crossings.

County	Public			Private
	Controlled	Uncontrolled	Total	Total
Carroll	44	9	53	53
Clinton	43	36	79	69
Delaware	17	27	44	37
Dubuque	25	15	40	46
Jackson	3	17	20	34
Jo Daviess	25	1	28	40
Stephenson	19	5	24	69
Whiteside	33	10	43	129
Total	209	120	331	477

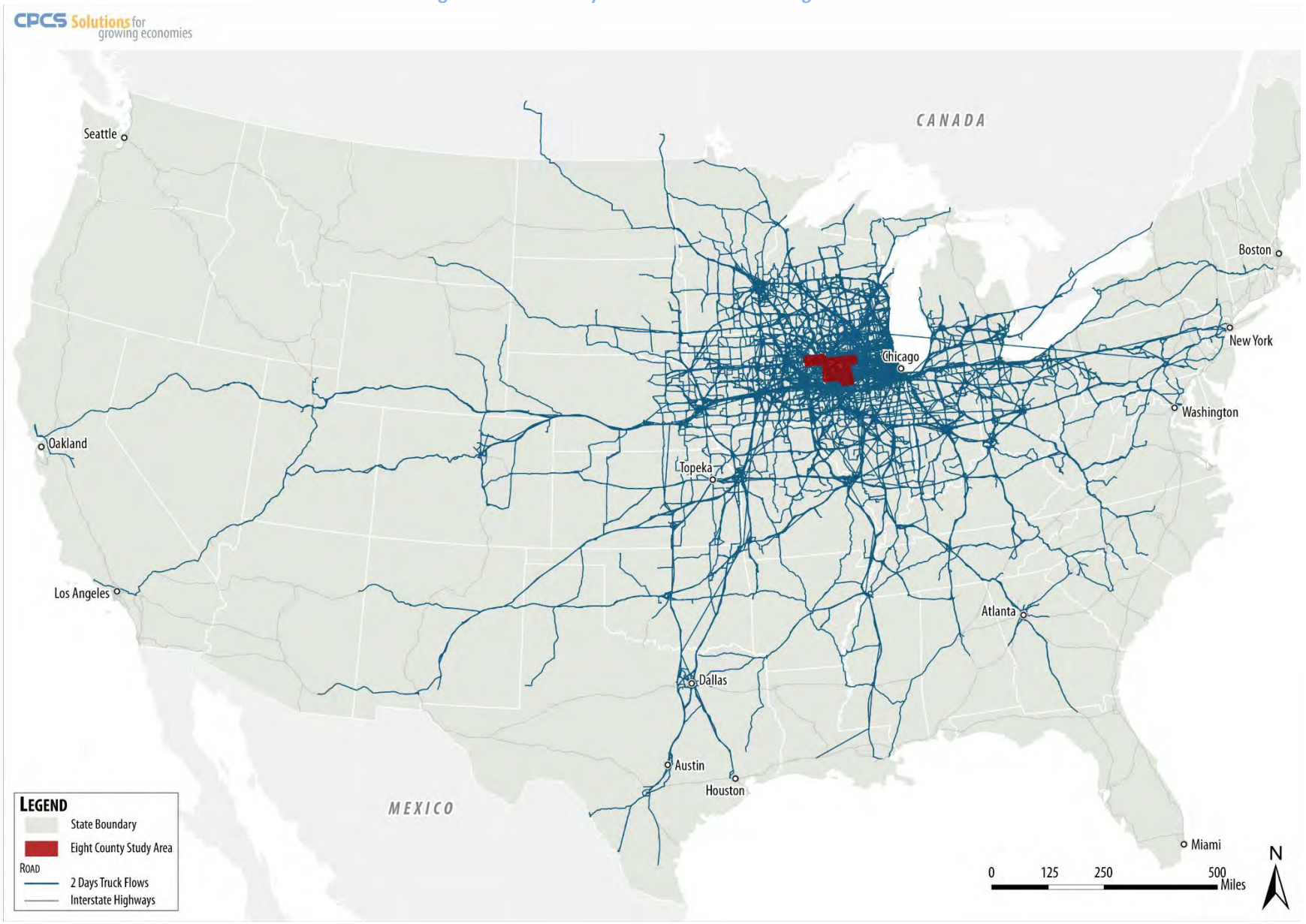
Source: Highway-Rail Crossing Inventory Data, Federal Railroad Administration, 2017

Figure 3-33: One Day of Truck Flows from Region



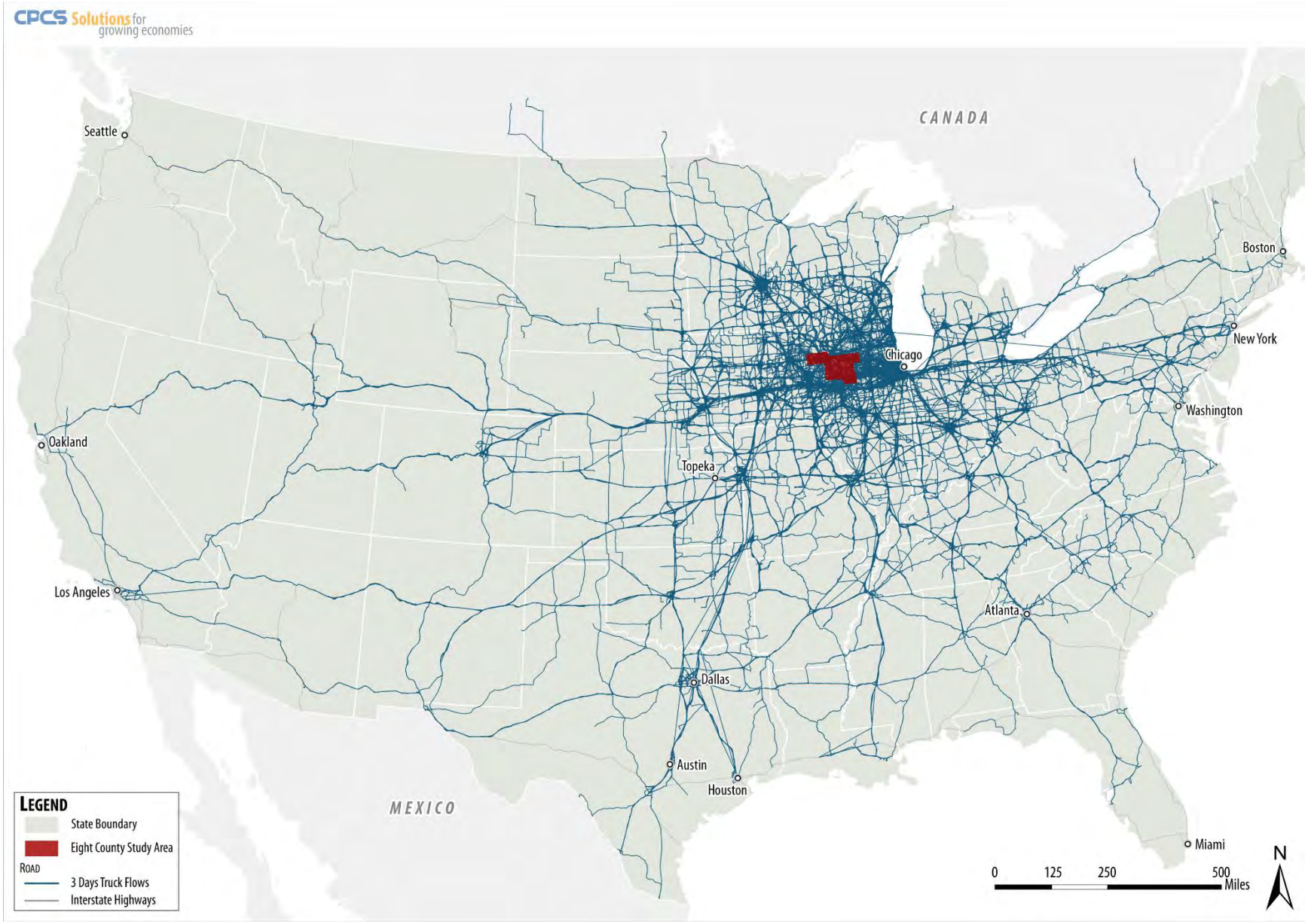
Source: ATRI FPM Program, American Transportation Research Institute, 2017

Figure 3-34: Two Days of Truck Flows from Region



Source: ATRI FPM Program, American Transportation Research Institute, 2017

Figure 3-35: Three Days of Truck Flows from Region



Source: ATRI FPM Program, American Transportation Research Institute, 2017

Figure 3-36: Regional Rail Traffic Volumes

Sources: Highway-Rail Crossing Inventory Data, FRA 2017; National Transportation Atlas Database. Bureau of Transportation Statistics, 2015

4 Stakeholder Consultations

Key Chapter Takeaway

The Eight County Freight Plan used both quantitative and qualitative information to identify freight system needs and issues. Over 300 stakeholders representative of the industrial and modal mix present in the Region were consulted during the course of developing the Plan. These stakeholder perspectives were used to both validate data analysis, as well as identify additional needs or issues not previously revealed.

Stakeholder perspectives were generally consistent with data analysis, but additional needs and issues were identified. Most issues identified were related to the highway system – in particular along US 20 and US 30 – but were more focused on the safety and condition of the system than the performance. Pavement and bridge conditions were identified as a concern in that rough roads can damage both vehicles and cargo. Policy and regulatory issues related to trucking were also frequently mentioned, for example the lack of harmonized weight restrictions between Iowa and Illinois and a desire for the regulations in Illinois to match Iowa's seasonal 90,000lb limits to place handling facilities in Illinois on a level playing field.

Fewer freight issues were identified related to the rail, water and air modal components of the system, however needs still do exist. Challenges faced for these modes (and to some extent truck, too) relate to cost competitive service and access to transfer points outside the Region. For both rail and air, there is interest in more local services to bring cost down, however it will be a challenge to influence this, as these systems are market driven and each of these modes have concentrated their operations in other neighboring counties/regions.

4.1 Overview

Analysis of performance data reveals only part of the Region's freight story. Feedback from public and private freight stakeholders who use and operate the freight system is necessary to fully understand the Region's network and to assess its needs. For the Eight County Freight Plan, collection of stakeholder feedback took several forms including:

- Stakeholder consultations completed by staff from ECIA, BHRC and local economic development agencies (169)
- Online Survey Monkey platform (96 responses)
- Consultant phone and email consultations with transportation and agricultural stakeholders (25)
- A business roundtable meeting in Clinton County
- Written and verbal feedback from the Project Steering Committee

Stakeholder respondents were representative of the industrial and modal mix present in the Eight County Region. Summary information on stakeholder profile and system needs from the Survey Monkey platform is provided in **Appendix B**. These responses revealed some of the most common needs and issues as:

- Need for access to competitive modes and services,
- Need for low cost of shipping goods,
- Need for improved road and bridge conditions,
- Need for improved or harmonized regulatory issues such as weight limits and vehicle registration, and
- Concerns about highway safety in specific areas.

These issues and others are discussed in more detail in the following section.

4.2 Key Freight System Needs and Issues by Mode

4.2.1 Highway and Truck Related

Freight shipments by truck comprise the majority of the Region's freight by tonnage and value. Stakeholder responses reflected this fact, as road infrastructure and policy issues were the most common mode-specific issues mentioned. From outreach, four major categories of highway and truck needs and issues emerged:

1. Road and bridge conditions
2. Weight-related policy issues, including weight limits and designated truck routes
3. Safety concerns related to infrastructure design
4. Congestion

In addition to these major areas, select roadways were commonly mentioned as problematic or in need of improvement. Concerns about specific roadways and locations are included in Section 4.2.2.

Road and Bridge Conditions

During outreach, one of the top issues mentioned by stakeholders was the poor condition of the Region's roads and bridges. While most responses simply noted that poor pavement was an issue, some stakeholders noted specific concerns such as damage to vehicles and cargo from rough roads, and the need to improve the state of maintenance of key bridges. One stakeholder advocated for the region to take care of current roadways before expanding, specifically ensuring highways and bridges are in good condition. Concerns associated with specific roadways are included in Section 4.2.2.

> *Condition of the Region's roads and bridges is "high poor," that is a little better than "poor." This affects deliveries, speed, wear and tear on trucks and drivers.*
>
> – Regional trucking company

Iowa and Illinois maintain datasets of pavement conditions, and these records of conditions do reflect stakeholder feedback, particularly for urban roads. As noted in Section 3.1.1, infrastructure condition is a measure of system performance, and the FHWA requires DOTs to measure condition. To support this, ILDOT has a series of applications to monitor and manage pavement condition. ILDOT's 2016 Condition Rating Survey reported that 23.6% of the state-managed road mileage in District 2 needed immediate improvement.[9] An additional 27.8% of the state-managed road mileage in the District would need improvement in the next six years. District 2 contains the four Illinois study counties and five additional counties in northwestern Illinois, and only measures conditions on roads managed by the State of Illinois, but paints a broad picture that confirms stakeholder comments about poor road conditions in Illinois.

Iowa's Pavement Condition Index (PCI) dataset tracks the condition of many urban roads, and some rural roads in the study area.[10] The dataset is available for download, as well as through Iowa's online mapping application. Figure 4-1 shows a sample view from the application, with roads in poor condition marked in red, and roads in moderate condition marked in orange. This sample shows how the Region's national and state highways are in good condition, but local may require improvement.

Stakeholder concerns about poor road conditions are reflected in data available from Illinois and Iowa. However, additional research is needed to determine the scope and location of particularly poor road segments.

[9] Condition Rating Summary Report FY2016. Illinois Department of Transportation. 2017.
[10] https://data.iowa.gov/Transportation-Utilities/Pavement-Condition-Index-PCI-/abih-ptb9

Figure 4-1: Iowa DOT PCI Mapping Application Sample

Source: Pavement Condition Index Dataset, Iowa DOT, 2017

Weight Limits, Truck Routes, and Truck Registration

Policy issues associated with truck weight, including road weight limits and truck routes, were another frequently mentioned topic. These issues included the need for more designated truck routes in Illinois, the need for higher weight capacity bridges, and a desire for harmonized weight regulations in Illinois that matched Iowa's seasonal 90,000lb limits.

The primary concern with truck routes was a lack of designated routes in the Illinois counties, which meant that shippers, especially agricultural producers had to route their trucks along circuitous routes in order to follow truck routes. This feedback was confirmed by a mapping of Illinois truck routes, which shows a limited number of routes available in the Region. Local producers suggested designating additional roads as truck routes to improve freight travel times.

> *A lack of seasonal exemptions (in Illinois) for 90,000-pound truck weights is a barrier to efficient operation…we would see benefits from harvest time weight exemptions.*
>
> – Illinois grain farmer

Concerns about low road and bridge weight limits were common, and similar to concerns about a lack of designated truck routes – that is to say stakeholders were concerned that low limits meant freight, especially agricultural freight, had to take overly-long routes to reach major roadways in the Region.

Firms in both states expressed a desire for harmonization of weight regulations. In particular, agricultural producers noted that Illinois' lower weight limits relative to Iowa and Wisconsin, and lack of seasonal allowances for higher limits at harvest season were a barrier to more efficient operation. This issue affected producers who shipped products to both sides of the river, as Illinois' lower limit became the *de facto* limit for any inter-state shipments. Lesser-mentioned regulatory issues included the possibility of harmonizing weight regulations as they relate to the quantity and spacing of truck and trailer axles.

Increasing weight limits or designating truck routes on certain segments of the Region's road infrastructure could improve freight mobility, especially for agricultural producers.

Safety

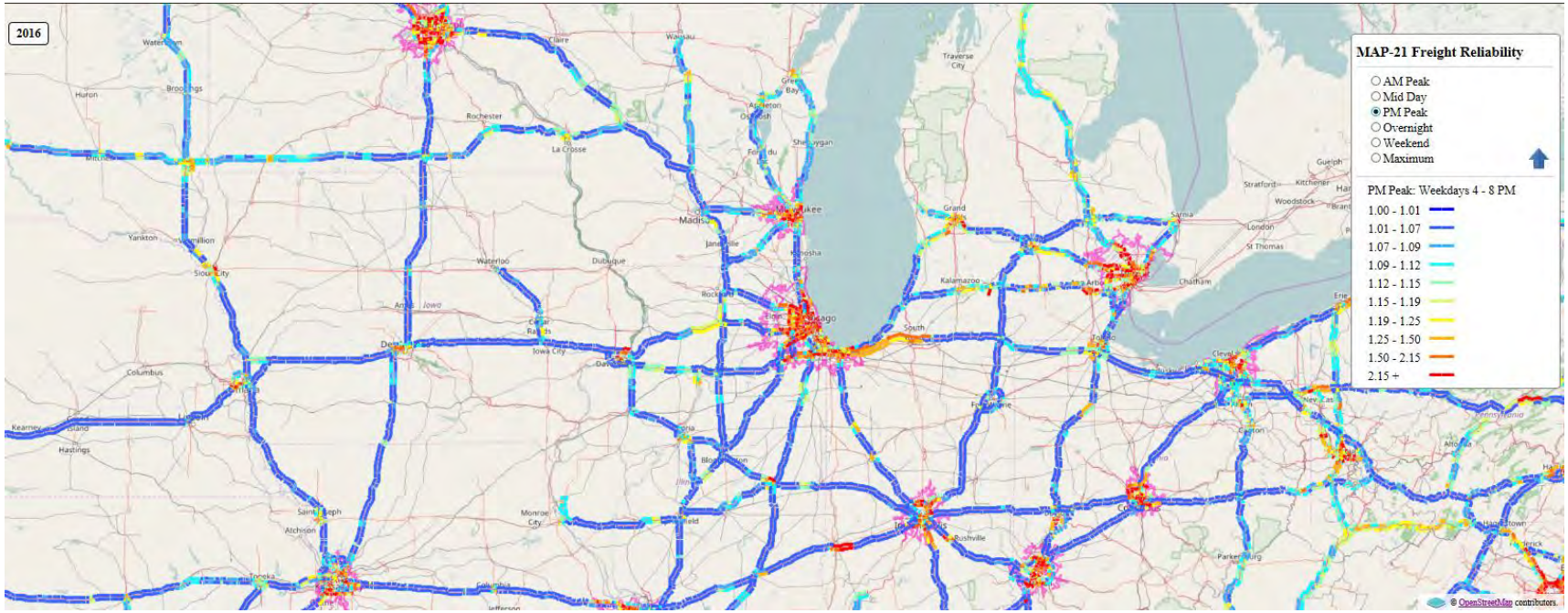
Safety is a key concern for many users of the freight system, and safety concerns focused primarily on the design of roads, including lines of sight, shoulders, turning lanes, and turning geometry at corners and intersections. Most safety concerns were mentioned in relation to specific roads, discussed later in this section, such as US 20.

Congestion

Stakeholders frequently mentioned congestion as a general problem in the Region. However, ATRI truck speed data, and analysis for truck travel time index and truck travel time reliability suggest that congestion in the Region as a whole is highly favorable. The average peak-time truck trip takes 11% longer than it would with free-flowing traffic, and there is almost no variability in truck travel times between peak and non-peak times. The two measures suggest that congestion is not a significant issue in the Region, and travel time is highly consistent across the day. However, congestion on local roads may be higher; as an example, stop-and-go traffic in Dubuque due to traffic lights was mentioned as a congestion-related issue.

Long-haul carriers noted that the congestion experienced in the Region is localized to Dubuque and relatively minor compared to areas surrounding the Region. Figure 4-2 displays the reliability of the transportation system outside the Eight County Region from 4pm to 8pm on weekdays. Areas surrounding urban locations display the highest concentration of reliability issues. Long-haul carriers going east encounter significant congestion on roadways surrounding Chicago. Unreliable roadways affect the ability of carriers to reach their destinations on time and increase the cost of business through lower capital utilization.

Figure 4-2: PM Peak Interstate Reliability (2016)



Source: Great Lakes Transportation Operations Coalition

4.2.2 Specific Roadway Needs

US 20

US 20 runs east-west through Freeport, IL, Dubuque, IA, and Manchester, IA. It connects the Region to I-39 and I-90 in Rockford, IL, and I-380 near Waterloo, IA. The majority of the route (92 percent) is considered rural and most is four lanes. However, 47 miles between Galena, IL and Freeport, IL is two lanes, as well as the Julien Dubuque Bridge crossing the Mississippi River. Aside from I-88, US 20 has the highest truck volumes in the Eight County Region, including segments where trucks exceed 25 percent of total traffic. Truck traffic is heaviest around Dubuque, IA and Freeport, IL. A variety of freight-reliant businesses (e.g., agricultural, construction, manufacturing, transportation and warehousing) are located adjacent to US 20.

During consultations US 20 was frequently mentioned as a concern. Stakeholders' primary concern was the limited capacity of the route, particularly on its two lane sections between Freeport and northern Galena, and the two lane Julien Dubuque Bridge. Safety associated with both capacity, and roadway design was another major concern. In particular, stakeholders noted a need for shoulders – poorly maintained shoulders, and outdated road geometry, reduced visibility on hills and curves. A third issue was congestion, particularly in the Dubuque area, and during peak tourist season in Illinois.

> *"Today I do not use US 20 due to safety issues, slow zones, narrow should, etc. costing my business countless additional hours and costs because I have to take a longer route to get to my destinations. If the region would make improvements (spot safety, geometric, pavement, add lane, etc.) improvements to US 20 I would use the route and save my business time and money."*
>
> – Prairie Farms

Illinois DOT has studied fully converting US 20 to four lanes and improving alignment and visibility. Studies and environmental impact statements for the corridor were completed in the mid-2000s, but recent progress has been limited. Preliminary planning for the first portion of the corridor, a 6.5 mile section of 4-lane freeway called the Galena Bypass, was completed in 2013, but additional funding is needed to advance work.[11] To supplement Illinois DOT's US 20 work, additional issues on this corridor were examined through a "freight safety lens."

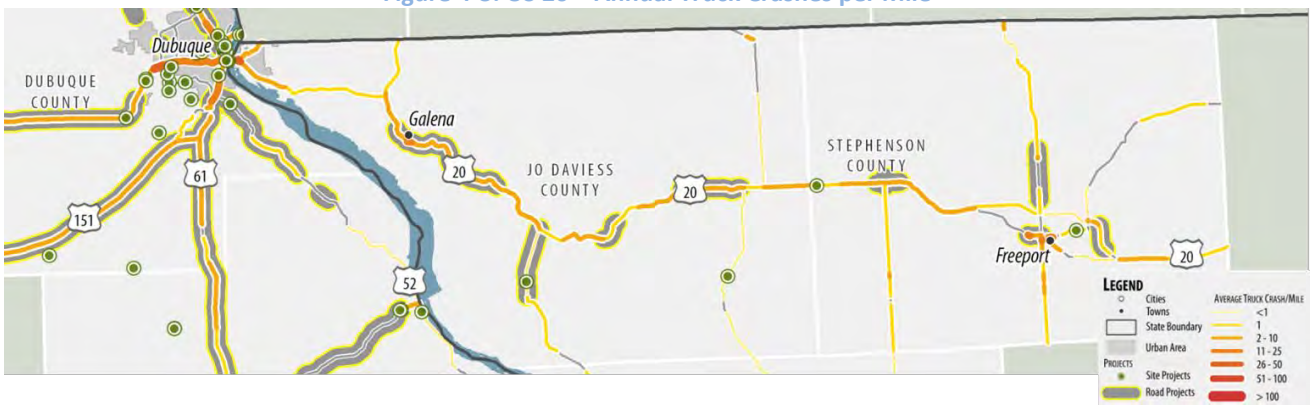
Between 2010 and 2015 US 20 had 2,534 crashes in total of which 44 percent were in Illinois, 56 percent were in Iowa. 324 (13 percent) of these crashes were truck-involved. 160 (49 percent) of truck-involved crashes occurred in Illinois. 164 in Iowa. Figure 4-3 presents US 20 crash data in terms of annual truck crashes per mile by roadway segment.

As shown in Figure 4-4 between 2010 and 2015 US 20 total crash costs exceeded $148.5 million, 75 percent were in Illinois, 25 percent were in Iowa. Truck involved crashes cost $31.8 million

[11] US-20 Galena Bypass. Illinois DOT. http://www.idot.illinois.gov/projects/us-20-galena-bypass

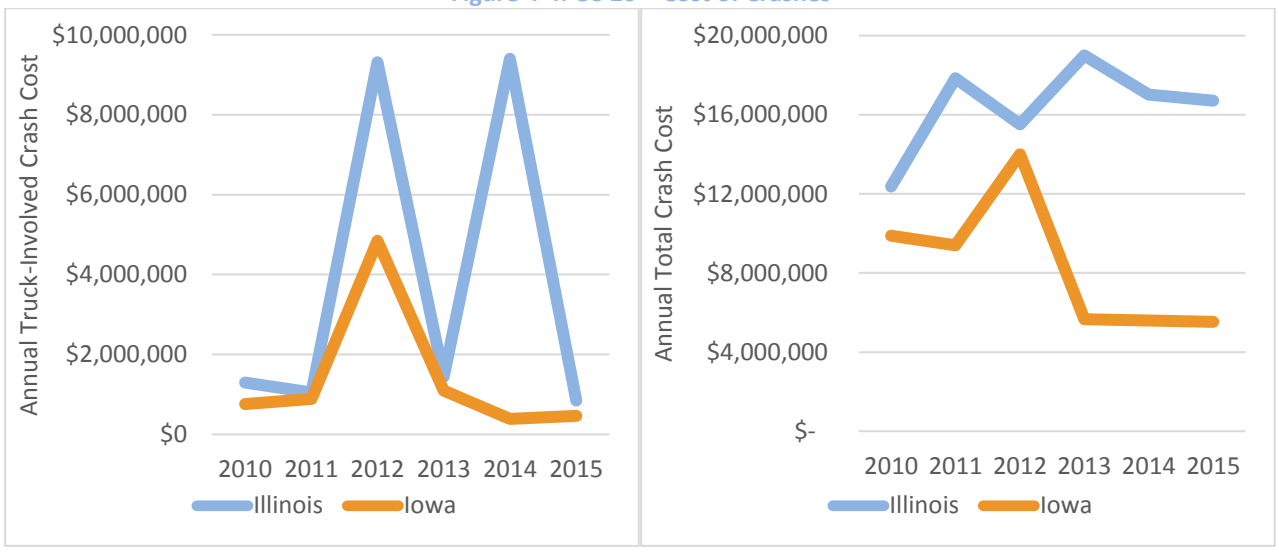
(21 percent were in Illinois). Illinois had 73 percent were in Illinois of truck crash costs ($23 million). Figure 4-5 presents US 20 cost of crash data by roadway segment.

Figure 4-3: US 20 – Annual Truck Crashes per Mile



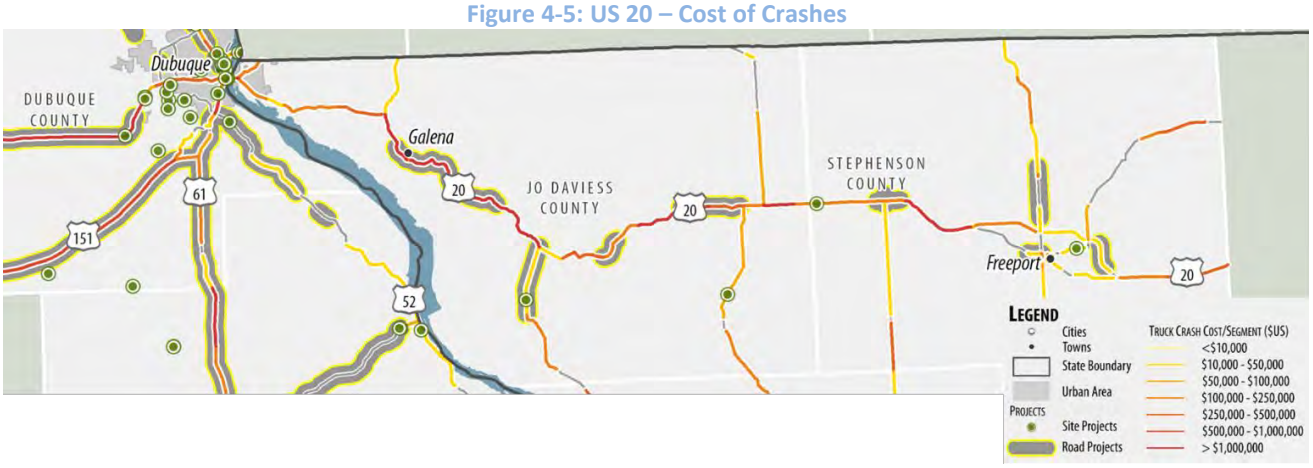
Source: CPCS analysis of Illinois DOT and Iowa DOT data

Figure 4-4: US 20 – Cost of Crashes



Source: Illinois DOT; Iowa DOT

Figure 4-5: US 20 – Cost of Crashes



Source: CPCS analysis of Illinois DOT and Iowa DOT data

US 30

US 30 runs east-west and serves the communities of DeWitt, IA, Clinton, IA, Morrison, IL and Sterling, IL. It provides direct access to I-88 near Sterling, and I-380 near Cedar Rapids. The route, shown in Figure 4-6, is mostly two-lane, with the exception of a 20 mile, four-lane expressway between DeWitt, IA and Clinton, IA. Illinois DOT has studied the possibility of expanding US 30 to four lanes between Fulton, IL and Rock Falls, IL. However, expansion plans were shelved in 2017 due to a decline in traffic, and local opposition.[12] A key asset for the US 30 corridor is the Gateway Bridge, which only has two lanes and crosses the Mississippi River.

Figure 4-6: US 30 Corridor

Source: CPCS analysis of Reference USA data.

Truck traffic on US 30 is highest in Camanche, IA, and from Fulton, IL to I-88. Truck percentage is higher in these same areas, as well as around DeWitt, IA. Stakeholders such as manufacturers, warehouses, and shippers noted problems with US 30, specifically mentioning the need for four lanes in Illinois (including connecting to Cedar Rapids and a new transload facility being developed there), and safety issues with the corridor.

> *"The completion of the four-lane Hwy 30, between Cedar Rapids and Sterling, is the most important aspect for the health of our local transportation system and economy."*
>
> – Wendling Quarries

In January 2018 a roundtable was held in Clinton, IA to further understand business needs and their requirements for US 30. The dominant comments during the discussion related to the Region's inability to attract and maintain businesses, in part due to transportation system condition, safety and connectivity. As noted by the Clinton Regional Development Corporation, they are unable to compete for new businesses, as site selector criteria includes being 15 minutes from a 4-lane road. Additionally, that employees are willing to drive an additional 10 minutes to work if they are driving on a 4-lane road. Currently, many trucking

[12] David, John. "IDOT to Discuss Decision to Scrap Major Renovation on US Route 30." WQAD 8 News. http://wqad.com/2017/03/15/idot-to-discuss-decision-to-scrap-major-renovation-on-u-s-route-30/

companies accessing the Region are routed only on 4-lane roads, adding time and cost to all trips that are destined for communities such as DeWitt.

Other Roadways

A handful of other state and local roadways were also mentioned by stakeholders as requiring improvements:

- Illinois Route 73 was noted in poor condition and needing passing lanes to improve safety.
- Illinois Route 64 was noted in poor condition with narrow shoulders, which may be a safety hazard.
- Iowa Route 136 was noted in poor condition with narrow shoulders.
- Iowa Route 64 was noted in poor condition.
- One carrier used Illinois Route 40 to reach I-80 and noted slowdowns due to farm equipment and accidents.

Agricultural Stakeholder Feedback

In order to better understand how agricultural producers and shippers use the system, and what problems they encounter, consultations were conducted with seven agricultural firms in the Region, including two grain farmers, a dairy farmer, a livestock farmer, a dairy transporter, a barge terminal operator and a grain elevator operator. The major concerns voiced by these specific stakeholders echoed those received from different industrial sectors.

Weight Limits and Truck Routes

All agricultural stakeholders mentioned that differences between Iowa and Illinois' weight limits were barriers to efficient operations. Stakeholders on both sides of the river said that if they were shipping their goods inter-state, for example an Illinois farmer shipping to an ADM facility in Clinton, or an Iowa farmer shipping to a grain elevator in Savanna, Illinois' lower weight limit became the *de facto* limit for their trucks.

The desire for exemptions or exceptions to weight limits was often related to the strongly seasonal nature of agricultural operations. The grain farmers noted that if Illinois allowed for a seasonal 90,000-pound weight limit at harvest times, they would be able to increase the amount shipped in each truckload, and use less truck trips to move their goods. A similar request was for emergency exemptions for weight limits and hours of service in the fall, when time-sensitive chemicals such as anhydrous ammonia can only be applied when the ground is cold (but not frozen), and it is not raining. At these specific weather-dependent times, demand for product is high across the region, and meeting demand within a limited time window is difficult. Figure 3-4 provides an example of a seasonal weight limit sign in Illinois.

Figure 4-7: Illinois Seasonal Weight Limit Sign

Source: Illinois Farm Bureau, 2017

A third concern related to weight limits and truck routes was the effect of limited truck routes and weight restrictions on trip routing. Many farmers are not located adjacent to major highways or truck routes, and in order to reach these main corridors, they must drive on local roads. Roads and bridges with low weight limits serve as obstacles, and require heavy trucks to take longer, winding routes to reach main roads. These circuitous routes were mentioned in CPCS' consultations with Illinois farmers as well as in online survey responses from other agricultural shippers. Many of these local weight limits are set by township authorities, so adjusting them, or improving targeted sections of roads or bridges to improve freight flows may be within the control of the Region's governments.

Another concern expressed by a dairy carrier was the protection of truck routes from roundabouts. Specifically, ensuring that trucks be taken into consideration when choosing whether to use a roundabout and designing roundabouts to accommodate off-tracking of trailers when making turns. The carrier noted that roundabouts were not an issue currently, but highlighted them preemptively as they have been problematic in other states.

Figure 4-8: Typical Grain Elevator

Source: Eastland Feed and Grain at the old Savanna Army Depot, Ray Kasal, flckr, March 2015

Modal Choice

The second most common comment was a desire for additional choice in modes. The grain elevators operator noted that improved access to other modes, especially water, was general associated with lower shipping costs. With lower shipping costs, an elevator could pay farmers more, and therefore attract farmers from a large geographic area, as a price difference of just a few cents is enough to entice farmers to truck their goods farther. This elevator stakeholder also noted that the "truck-in, truck-out" status quo for many elevator was not as price effective as rail or water shipments. This feedback with confirmed by other grain and livestock farmers in the region, who said they carefully monitored prices offered by different elevators and other grain purchasers. An example of one of the Region's grain elevators is shown in Figure 4-8.

Other Issues Noted by Agricultural Stakeholders:

- Permitting in Illinois is burdensome – one dairy producer noted their trucks needed to be permitted for state, county, township, and city governments, which was both a cost and administrative burden.
- Mississippi River locks and dams must be maintained to ensure access for agricultural shipments.
- Road condition was less of a concern for agricultural producers, especially when considered in relation to weight limit concerns.
- Traffic problems around grain elevators and other unloading facilities have been decreasing because it is cost effective for farmers to build their own on-site storage.
- Concern over the Federal requirement for Electronic Logging Device (ELD) combined with changes to the Hours of Service (HOS) reducing driving time and increasing the cost of transportation.

4.2.3 Railroad

Overall, stakeholders noted few issues associated with railroads in the Region. Consultations with Canadian National, Canadian Pacific, and Union Pacific found that they had no major issues or problems within the Region. Union Pacific noted that their double-track railroad bridge in Clinton was a chokepoint, as it had to be opened for barge traffic, but plans for a new, higher railroad bridge are underway. One terminal operator noted that this chokepoint was a particular problem when rail volumes due to hydraulic fracturing were high.

Regional freight users also had few comments on the Region's system itself. Two stakeholders noted that the nearby intermodal facility in Rochelle was "not very useful," and that access to the facility needed to be improved; instead they send their products to Chicago to obtain good intermodal service.

A more general theme from stakeholders relates to a frequently-mentioned desire for more access to alternate modes. In the context of rail, some stakeholders mentioned wanting more railroad sidings with frequent service, and a public transload facility where they could move their goods from truck to rail.

4.2.4 Waterway

A few companies consulted indicated they carry goods via barge. The comments on the waterway were in relation to the desire for modal choice in shipping goods, and the need for continued maintenance of the lock and dam system. Additionally, one terminal noted an imbalance between inflows and outflows. Specifically, there is an issue with grain leaving the region and barges traveling upriver empty, resulting in higher costs.

Two factors that may explain a lack of waterway system comments: 1) the waterway works reasonably well in Region, and 2) lock unreliability due to aging infrastructure and disinvestment exists at a national level and is not exclusive to this Region.

4.2.5 Aviation

The Eight County Region does not have any direct air cargo service, therefore there was little feedback on the air system. The only identified issue was a lack of air cargo service, particularly for Dubuque Regional Airport (DBQ). Opinions on air cargo capacity were conflicting, one stakeholder noted that DBQ could be handling small package air cargo via propeller plane, and that the airport could not handle larger jets. However, Boeing's own technical literature, and another stakeholder noted that physical infrastructure is not an issue at DBQ. Regardless of differing opinions on capacity, a shared thought was that lack of air cargo service was a problem. There is significant air cargo service being consolidated at Rockford International airport. As of September 2016, this airport now has two daily flights by ABX Air which handles Amazon cargo, and in 2016 UPS moved its cargo operations from Des Moines, IA to Rockford. Additionally, Cedar Rapids is the local hub for FedEx.

Despite the lack of cargo service, DBQ does provide a valuable service to the Region's businesses in the form of 3 daily flights to Chicago O'Hare Airport. This service operated by American Airlines provides quick access to the north-central portion of the Region. Other nearby airports

such as Rockford, Quad City (Moline), and Eastern Iowa (Cedar Rapids) also provide regularly scheduled passenger service that may be useful to the Region's business community.

5 Freight System Opportunities

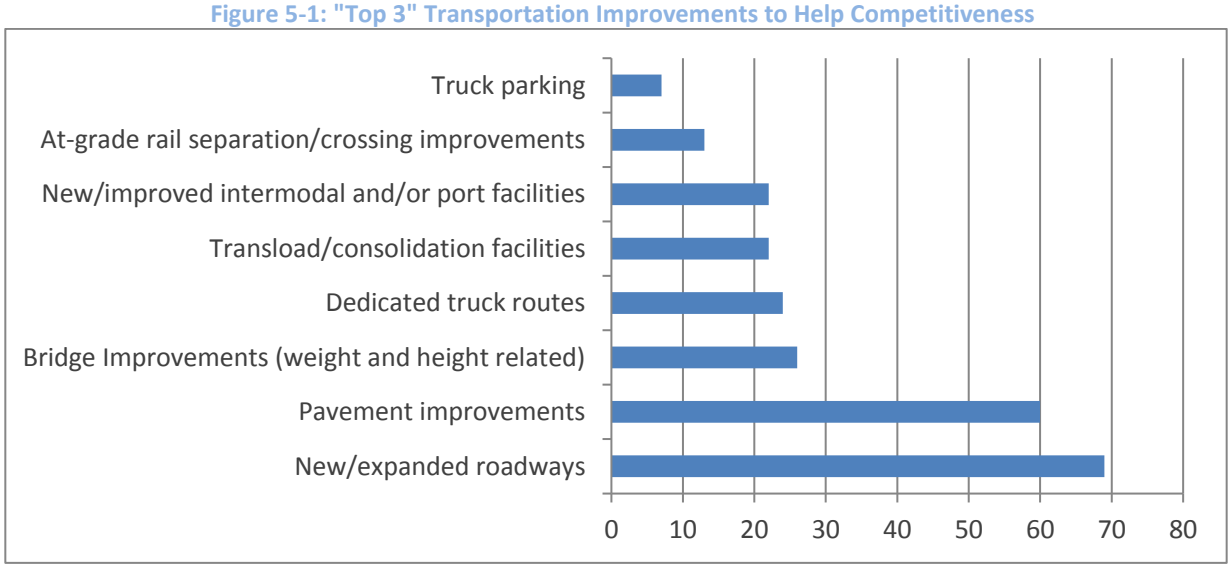
Key Chapter Takeaway

Using the results of the needs assessment, a slate of preliminary strategic opportunities was identified, generally grouped within the "4 P" categories of 1) projects, 2) programs, 3) policies, and 4) partnerships. When stakeholders were asked how to make the Eight County Freight system more competitive, the top two most frequently cited improvements were project related – new/expanded roadways and pavement improvements. While stakeholders often find project recommendations to be the most tangible, likely the most critically important category of opportunities is "partnerships." So much of the multimodal freight transportation system is outside of the public domain, and partnerships and collaboration will be critical to advancing any efforts off the highways system. And, in most cases even those projects on the highway system require partnership due to the myriad jurisdictions that have ownership and operations roles in the Eight County Region.

5.1 Freight System Opportunities

The stakeholders consulted during the development of the Eight County Freight Plan were not only asked their perspectives on overall freight system needs, but also how this Plan should consider addressing these needs to improve the Region's overall competitiveness. Figure 5-1 highlights the feedback received from the online survey.

Figure 5-1: "Top 3" Transportation Improvements to Help Competitiveness



Source: Survey Monkey results. Note. Respondents were able to provide multiple responses.

Using the information presented in this Working Paper, the Eight County Freight Plan will develop a slate of strategic recommendations for the freight system. These strategies will be generally grouped within the "4 P" categories of 1) projects, 2) programs, 3) policies, and 4) partnerships. As shown the top two most frequently cited improvements are project related – new/expanded roadways and pavement improvements.

As shown in Figure 5-2, a slate of preliminary strategic opportunities have been identified for the Eight County Region. While stakeholders often find project recommendations to be the most tangible, likely the most critically important category of opportunities is "partnerships." So much of the multimodal freight transportation system is outside of the public domain, and partnerships and collaboration will be critical to advancing any efforts off the highways system, and in most cases also those on the highway system due to the myriad jurisdictions that have ownership and operations roles in the Eight County Region.

Figure 5-2: Preliminary Strategic Opportunities for the Eight County Region

Projects	Programs
• Strategic roadway upgrades (US 20 and US 30) • Pavement improvements • Bridge improvements • Other spot highway infrastructure improvements to address congestion and safety • New/improved intermodal and/or port facilities • Transload/consolidation facilities • Lock and dam improvements	• Programs focused on highway and railway safety • Programs focused on enhancing skills of local workforce • Programs focused on technology applications to the (freight) transportation system • Freight planning program to monitor needs, issues and progress
Policies	**Partnerships**
• Truck regulation harmonization between Iowa and Illinois • Illinois seasonal exemption for agricultural loads (up to 90,000lbs). • Truck route guidance	• State, county and local public agency partnerships • Federal transportation agencies, including USDOT and the USACE • Regional and local economic development agencies • Class I and short line railroads • Airports • Water ports • Other local private industry/businesses, especially those representing key freight industries of manufacturing and agriculture

This slate of preliminary strategic opportunities will be further explored with the Project Steering Committee to understand the completeness of opportunities identified. Opportunities may be added/deleted to this list prior to formalizing Plan recommendations.

6 Conclusions and Next Steps

6.1 Conclusions

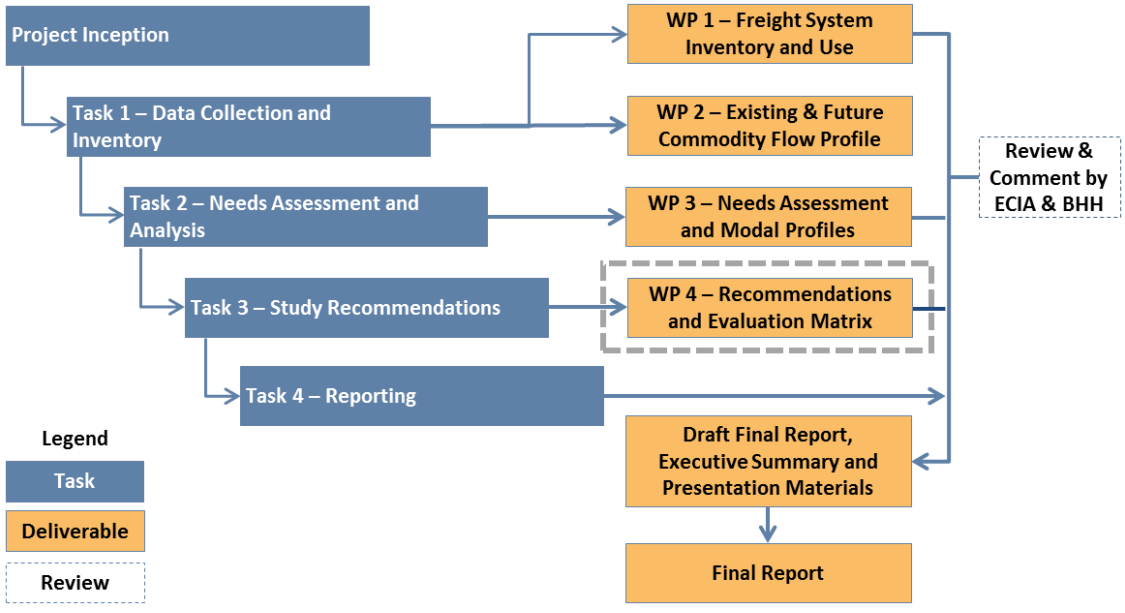
The Eight County Region's freight system has both condition and performance issues that stakeholders believe contribute to higher transportation costs and an overall less competitive system. These are issues that will need to be overcome in order for the Eight County Freight Plan to help spur economic growth in the Region.

A preliminary slate of strategic opportunities for the freight system has been identified, generally grouped within the "4 P" categories of 1) projects, 2) programs, 3) policies, and 4) partnerships. These will be further explored with the Project Steering Committee to understand the completeness of opportunities identified. Opportunities may be added/deleted to this list prior to formalizing Plan recommendations.

6.2 Next Steps

The present Working Paper is the output of Task 2 and is provided for review and comment by ECIA and BHRC and their stakeholders. A revised Working Paper will be provided in due time, based on comments and updates based on future consultations and research. The next Working Paper (Working Paper 4 – Recommendations) will reflect Task 3 and identify project, policy and other strategic recommendations to address the Region's freight system needs. Included in the recommendations information will be an indication of the benefits and costs of advancing different types of freight projects.

Figure 6-1: Project Approach

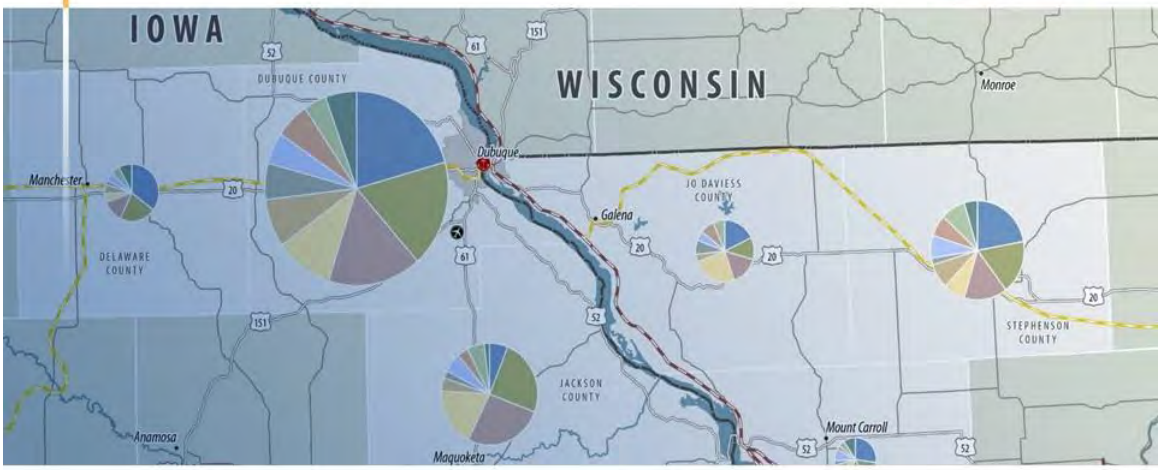


Appendix A – Freight System Visioning Discussion

Appendix A provides the slides used to develop the vision for the Eight County Region. Presentations occurred during three Project Steering Committee meetings, each of which provided input on the vision, goals and/or performance measures. The project team appreciates the substantial input received from the Project Steering Committee.

CPCS

www.cpcstrans.com



Eight County Freight Plan

East Central Intergovernmental Association & Blackhawk Hills Regional Council

CPCS Team
March 27, 2017
Dubuque, IA

Presentation Map

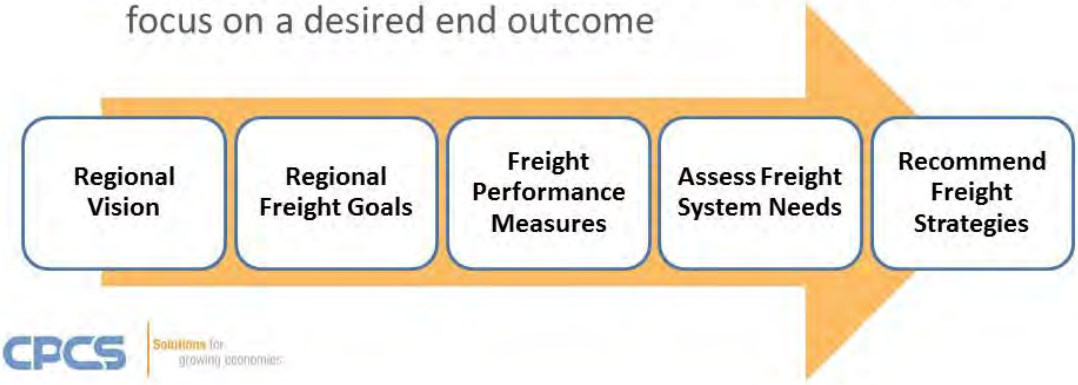
- Eight County Local Economy
- Freight System Inventory
- **Visioning**
- Stakeholder Perspectives
- Questions & Discussion

CPCS Solutions for growing economies

Why the Vision Matters

The Vision Underpins Freight Plan Next Steps

- Current performances
- Future needs
- Recommended strategies
- Ultimately the vision unifies understanding and keeps focus on a desired end outcome



CPCS Solutions for growing economies

Building a Vision – Alignment

Assessed Existing Freight Vision and Goals

- Federal Legislation
- State Freight Plans
- State/Local Long-Range Transportation Plans
- Comprehensive Economic Development Strategy

CPCS Solutions for growing economies

Common Themes

Vision

- Enable business attraction, retention and expansion
- Provide a reliable and efficient freight system
- Leverage existing freight assets
- Provide connection between modes and with regional and national freight systems
- Collaborate with public and private stakeholders

CPCS

Approaches to Freight Vision Statements

- **Example #1 – Full Meal Deal**
  - The Eight County freight system provides safe, efficient, and competitive services that connect the region's businesses and industries with domestic and international markets, and support statewide economic development activities.
- **Example #2 – Transportation & Economics Focus**
  - The Eight County freight system provides for the reliable movement of goods, while improving overall transportation system efficiency and promoting economic growth.
- **Example #3 – Short and Sweet**
  - The Eight County freight system successfully moves products and enhances state and local economic growth.

CPCS

Eight County Freight Vision for Discussion

The Eight County multimodal freight system enables economic growth by meeting the transportation needs of local businesses and providing efficient and reliable access to the region, nation, and globe

CPCS Solutions for growing economies

Group Discussion – Vision

Does the Vision make sense and does it link to what you have been hearing from businesses?

- Are the key elements captured?
- Are there concepts that deserve more or less emphases?
- Does this appropriately describe the desired outcome for the Regions freight future?
- Is the statement bold enough (i.e., inevitable or visionary future)?

CPCS Solutions for growing economies

Next Steps

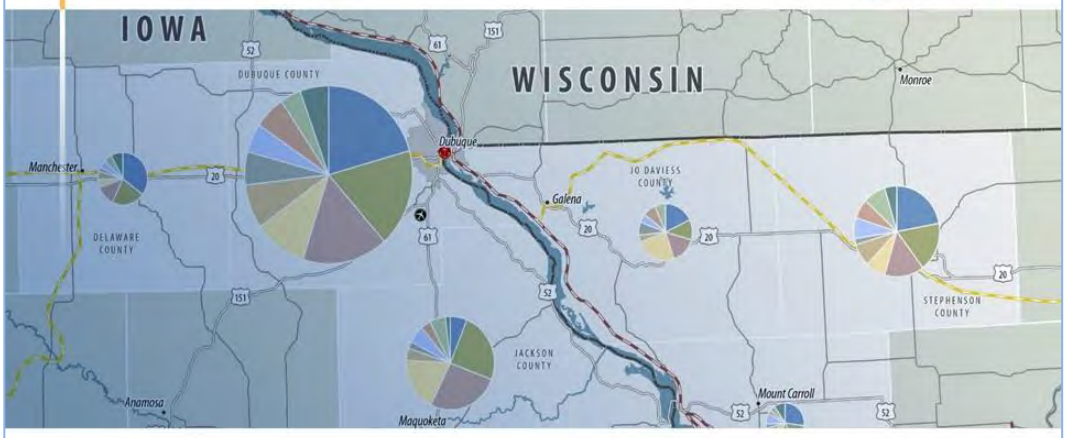
Incorporate Comments and Implement Vision

- Develop supporting goals
- Use vision and goals to define performance measures

CPCS Solutions for growing economies

CPCS

www.cpcstrans.com



Eight County Freight Plan

East Central Intergovernmental Association &
Blackhawk Hills Regional Council

CPCS Team
May 9, 2017
Dubuque, IA

Presentation Map

- Visioning – Updates since March Meeting
- **Freight System Goals and Performance Measures**
- Existing and Future Commodity Flows
- Stakeholder Perspectives
- Questions & Discussion

CPCS Solutions for growing economies

Introduction to Freight plan Goals

Implementing the Vision

- The goals flow from the vision reflecting key factors in the vision
- Goals define the performance measures

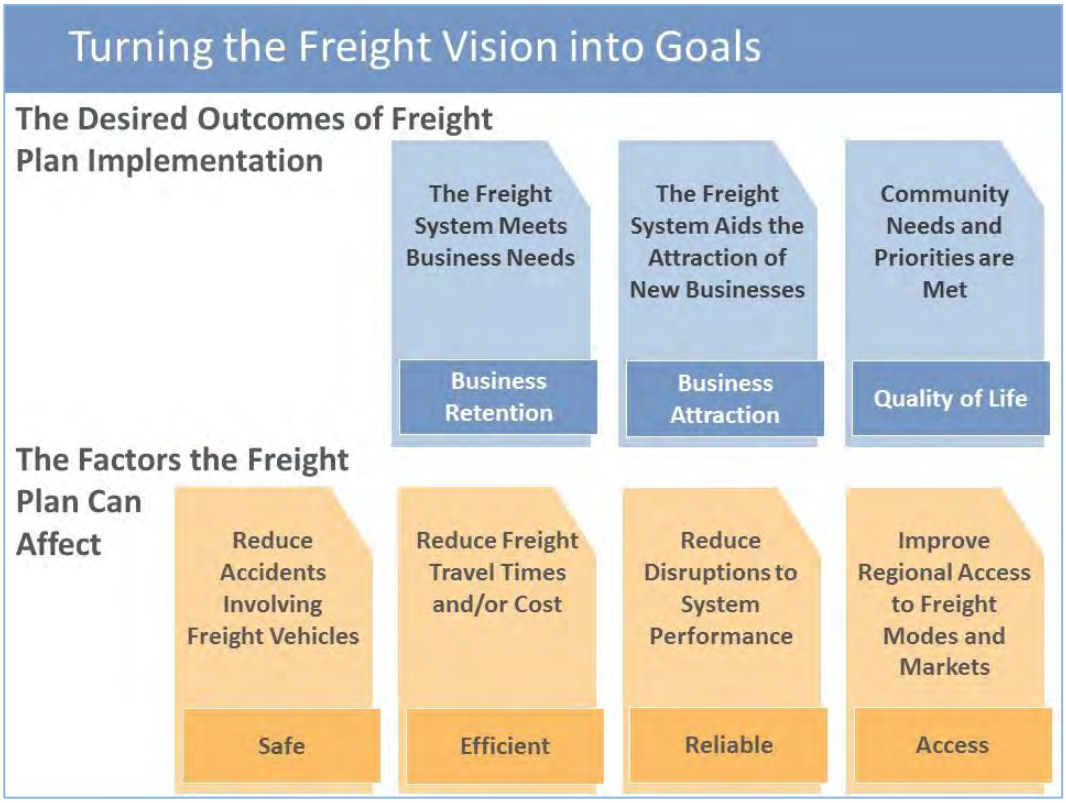
CPCS Solutions for growing economies

Turning the Freight Vision into Goals

Outcomes **Impact Categories**

The Eight County Multimodal Freight System supports **quality of life** and enables **business attraction** and **retention**, by providing **safe**, **efficient**, and **reliable access** to regional, national, and global markets today and in the future.

CPCS Solutions for growing economies


Turning the Freight Vision into Goals
The Desired Outcomes of Freight Plan Implementation
The Freight System Meets Business Needs
Business Retention
The Freight System Aids the Attraction of New Businesses
Business Attraction
Community Needs and Priorities are Met
Quality of Life
The Factors the Freight Plan Can Affect
Reduce Accidents Involving Freight Vehicles
Safe
Reduce Freight Travel Times and/or Cost
Efficient
Reduce Disruptions to System Performance
Reliable
Improve Regional Access to Freight Modes and Markets
Access


Freight Plan Goals
Where we want to Go (Long-Term)
Vision
What we want to Achieve (Medium-Term)
The Freight System Meets Business Needs
Business Retention
The Freight System Aids the Attraction of New Businesses
Business Attraction
Community Needs and Priorities are Met
Quality of Life
Goals
What we Measure in the Freight Plan (Short-Term)
Reduce Accidents Involving Freight Vehicles
Safe
Reduce Freight Travel Times and/or Cost
Efficient
Reduce Disruptions to System Performance
Reliable
Improve Regional Access to Freight Modes and Markets
Access

Questions

Do the goals make sense?

- Are the key elements captured?
- Are there concepts that deserve more or less emphases?
- Does this appropriately describe the key transportation factors impacting the Region's freight future?

CPCS Solutions for growing economies

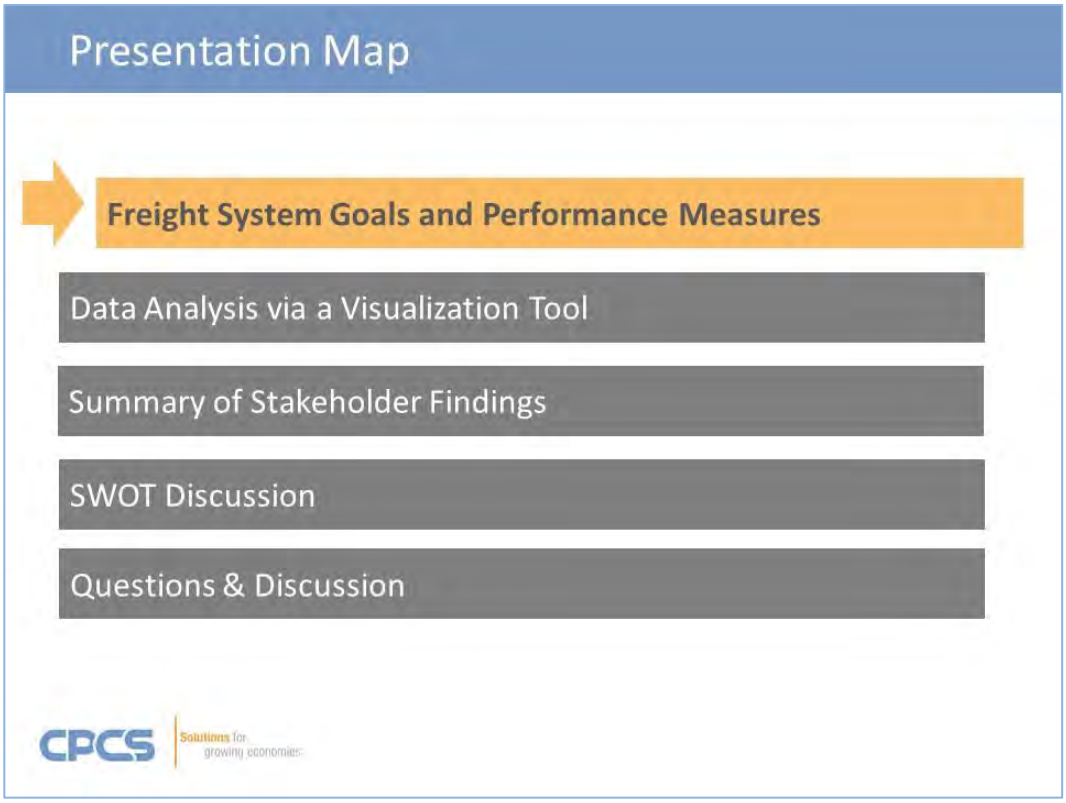
CPCS

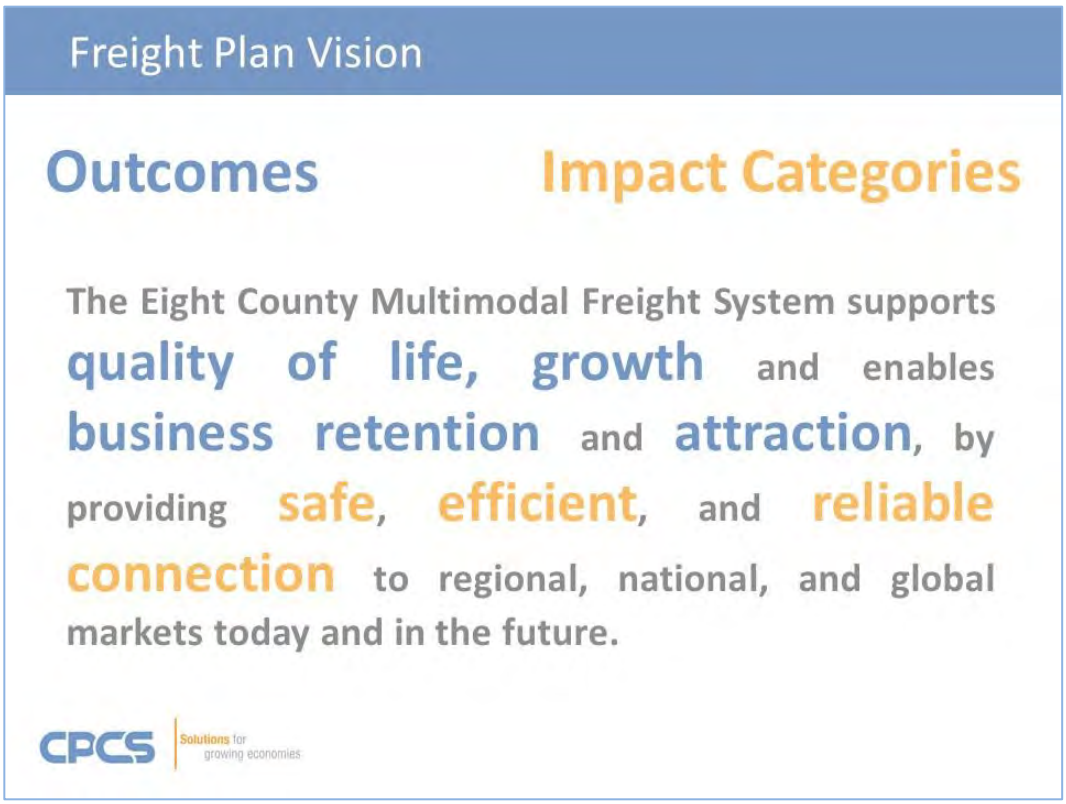
www.cpcstrans.com

Eight County Freight Plan

East Central Intergovernmental Association & Blackhawk Hills Regional Council

CPCS Team
July 10, 2017
Ingersoll Wetlands Learning Center
Thomson, IL


Presentation Map
Freight System Goals and Performance Measures
Data Analysis via a Visualization Tool
Summary of Stakeholder Findings
SWOT Discussion
Questions & Discussion
CPCS
Solutions for growing economies


Freight Plan Vision
Outcomes
Impact Categories
The Eight County Multimodal Freight System supports quality of life, growth and enables business retention and attraction, by providing safe, efficient, and reliable connection to regional, national, and global markets today and in the future.
CPCS
Solutions for growing economies

Freight Plan Goals

Vision

The Eight County Multimodal Freight System supports quality of life, growth and enables business retention and attraction, by providing safe, efficient, and reliable connection to regional, national, and global markets today and in the future.

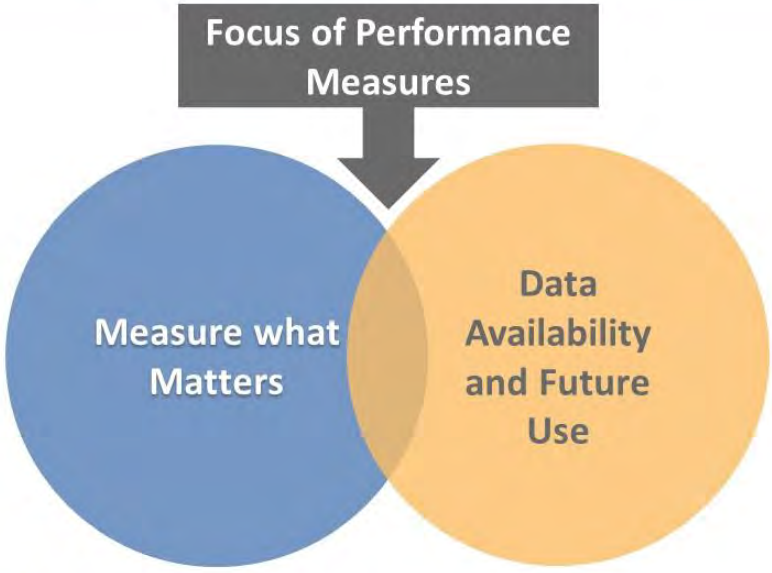
Goals

The Freight System enables Economic Growth and Development	The Freight System Meets Business Needs	The Freight System Aids the Attraction of New Businesses	Community Needs and Priorities are Met
Growth	Business Retention	Business Attraction	Quality of Life

Performance Measures

Reduce Accidents Involving Freight Vehicles	Reduce Freight Travel Times and/or Cost	Reduce Disruptions to System Performance	Improve Regional Connection to Freight Modes and Markets
Safe	Efficient	Reliable	Connection

Selecting Performance Measures

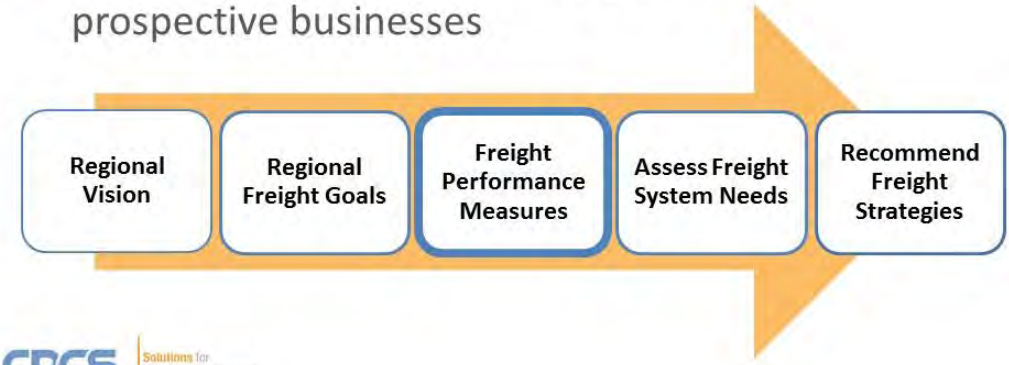


CPCS Solutions for growing economies

Freight Plan Performance Measures

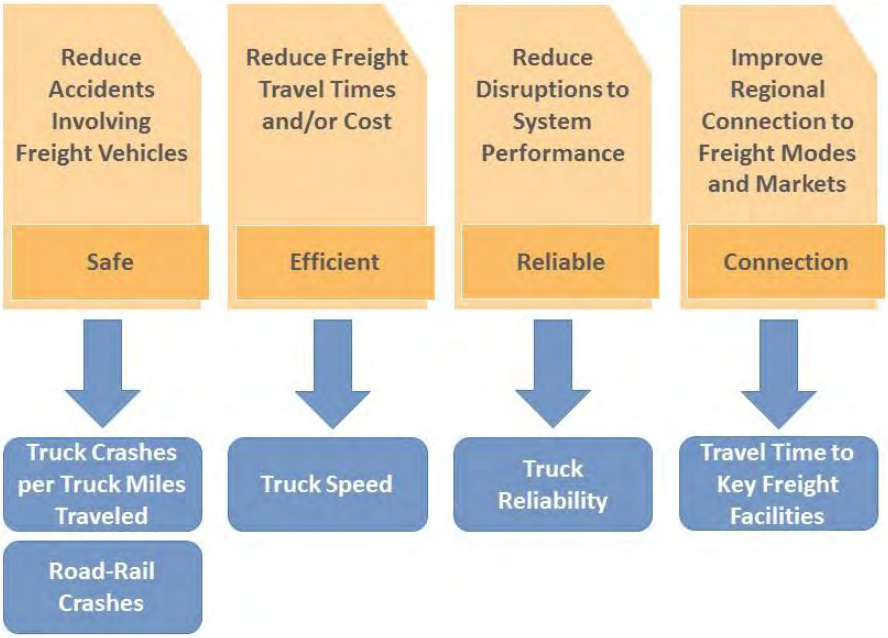
Key Consideration of Performance Measures

- Establish a baseline
- Inform transportation needs assessment
- Demonstrate transportation system to prospective businesses



CPCS Solutions for growing economies

Proposed Performance Measures



Discussion

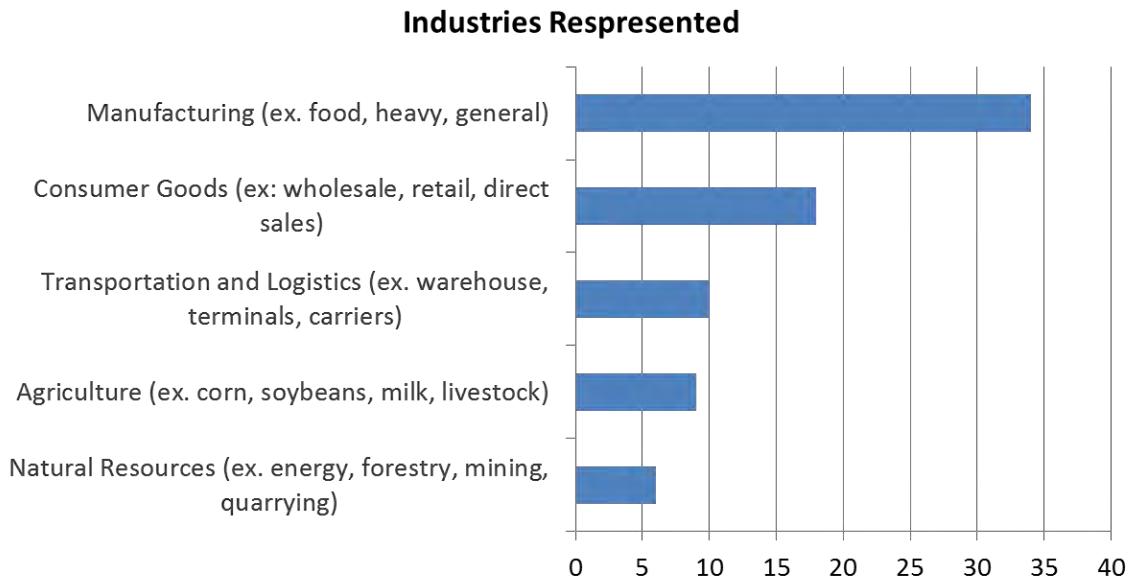
Performance Measures

- What uses do you envision for performance measures beyond the freight plan?
- Do performance measures help fill data gaps to promote the region?
- Have we missed key performance measures?

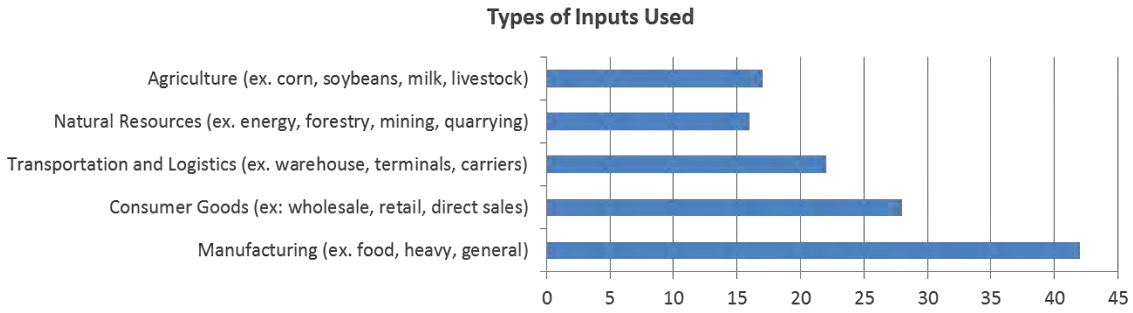
CPCS Solutions for growing economies

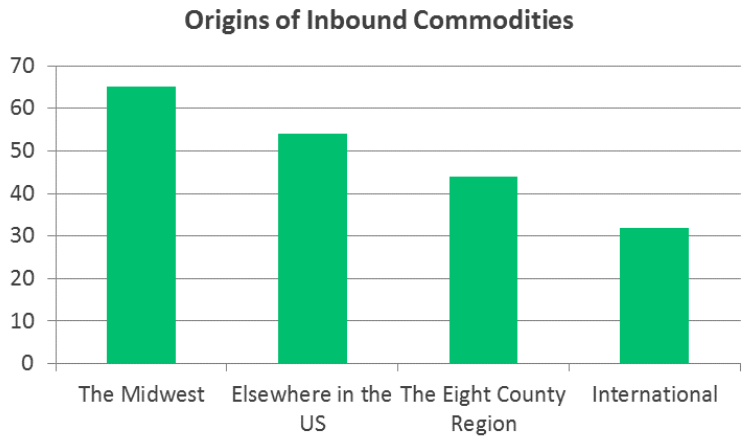
Appendix B – Results of Online Survey

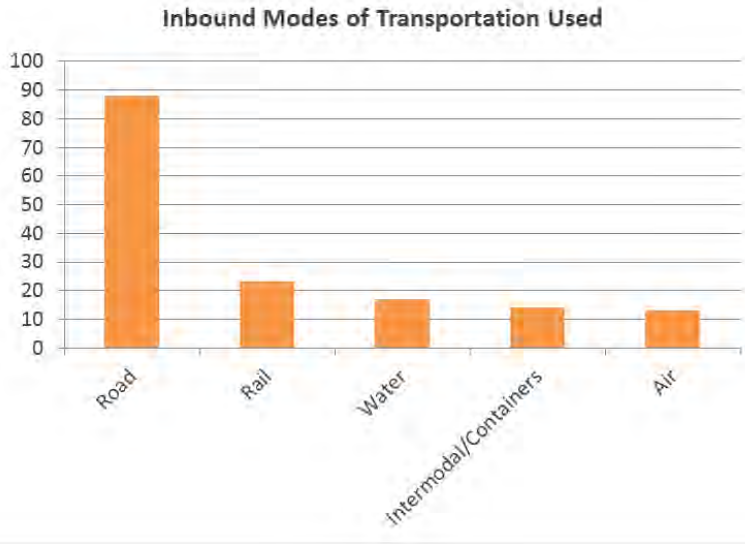
Industries Represented



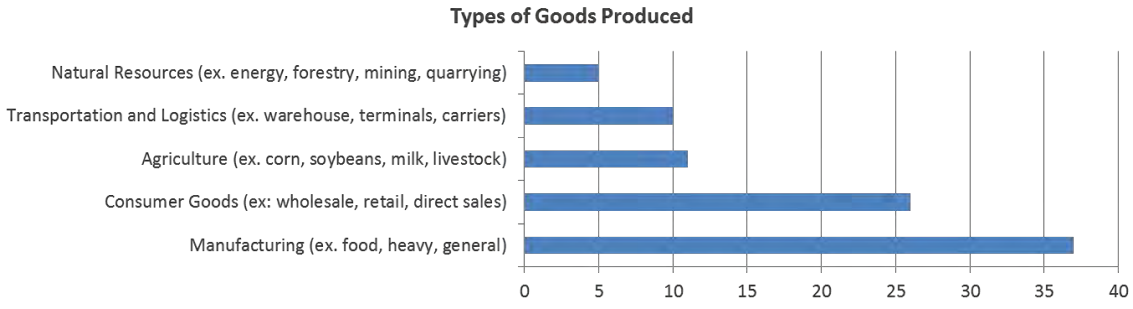
Profiles of Inbound Flows

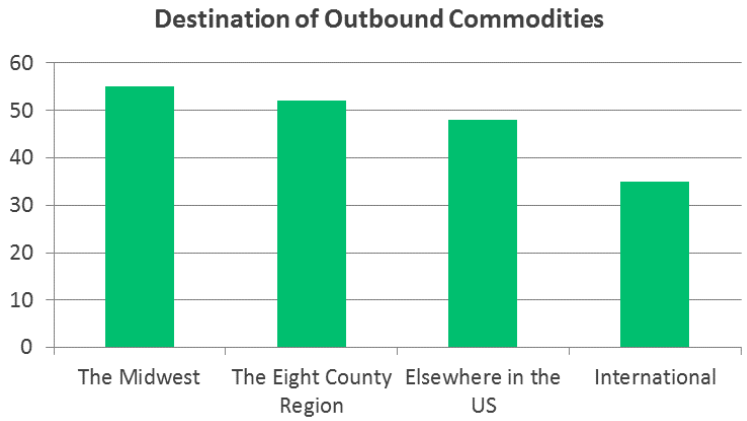


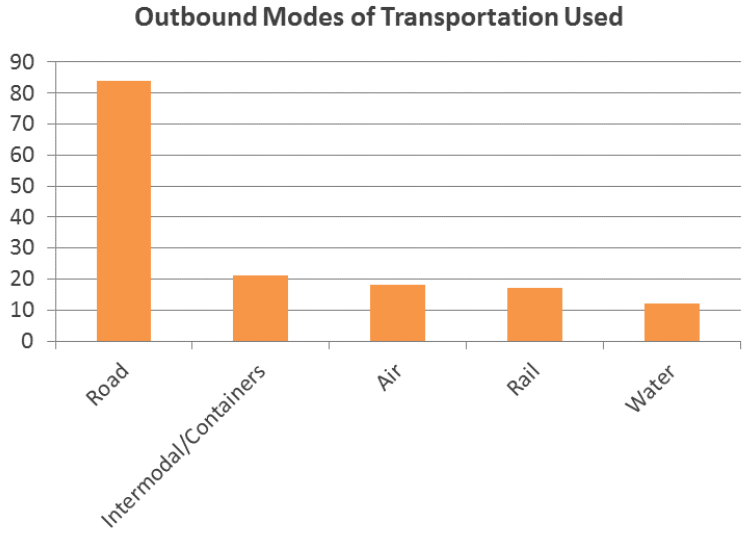




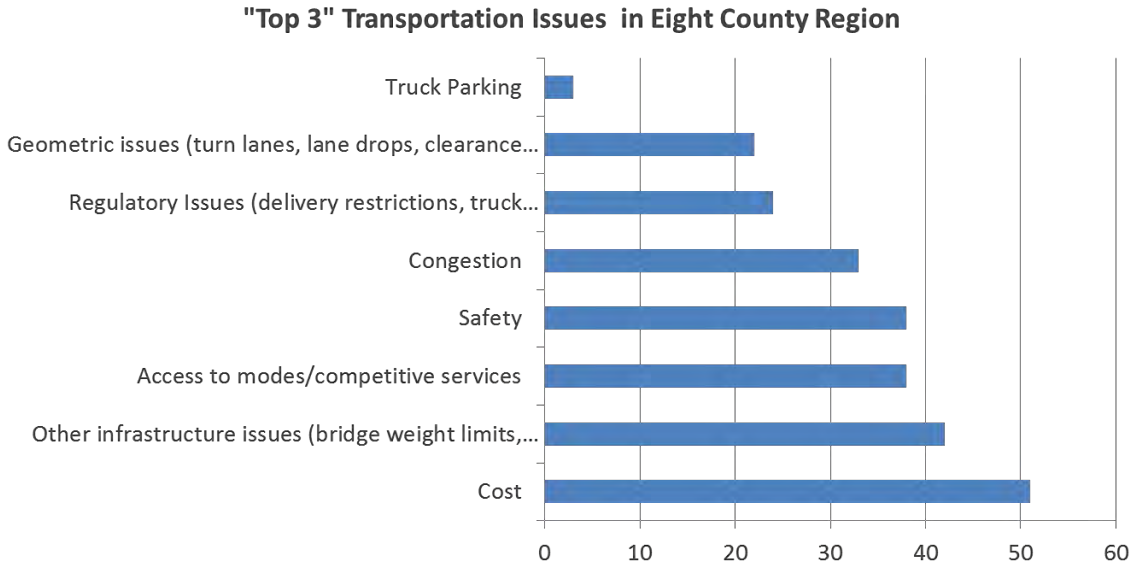
Profiles of Outbound Flows



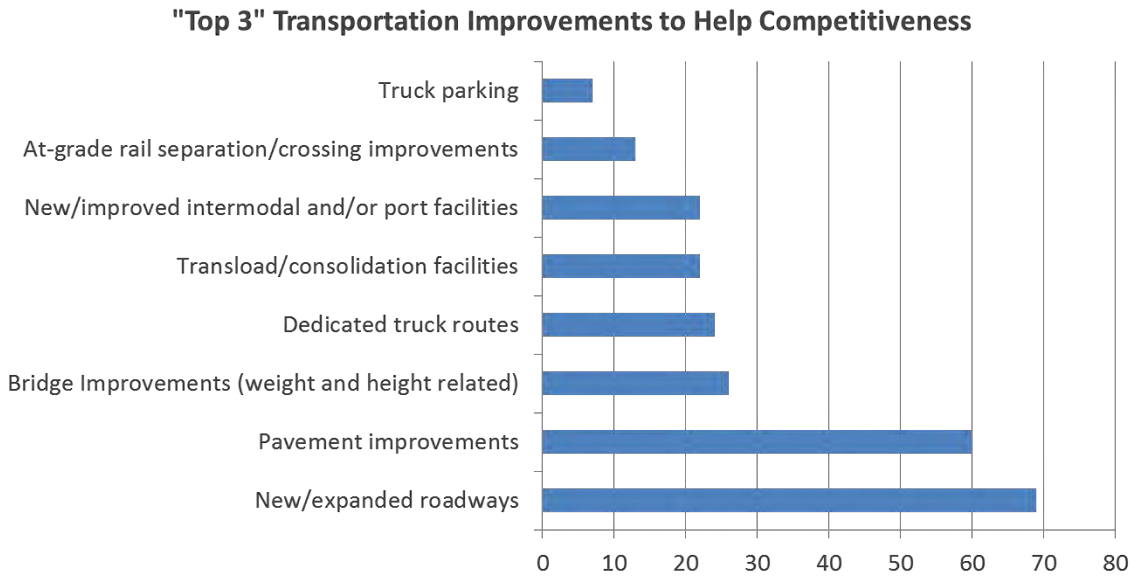




Transportation System Performance



Note: Companies were able to provide multiple replies



Note: Companies were able to provide multiple replies