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FINAL

Eight-County Freight Study

Summary Report

Prepared for:

East Central Intergovernmental Association
Blackhawk Hills Regional Council

Prepared by:

CPCS Transcom Inc.

In association with:

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American Transportation Research Institute

Solutions for growing economies

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Eight-County Freight Study

The objective of the Eight-County Freight Study 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.

Summary Report

This report summarizes the work conducted over the 2016-2018 study period that is documented in a series of four separate technical Working Papers.

- Working Paper 1 – Freight System Inventory and Use
- Working Paper 2 – Existing and Future Commodity Flow Profile
- Working Paper 3 – Needs Assessment
- Working Paper 4 – Recommendations

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.

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1 Eight-County Freight System Vision, Goals and Objectives

Key Takeaway

The Eight-County Freight System Vision is an aspirational future point for the transportation system. This Vision, developed in collaboration with the Freight Study Steering Committee, was used to guide the development of goals, performance measures used to assess freight system needs, and ultimately inform freight project, program, policy, and partnership recommendations. These recommendations are aimed at improving the freight system safety, efficiency, reliability and connectivity to the benefit of the Region's economy and community quality of life.

1.1 The Eight-County Region and Freight Study Need

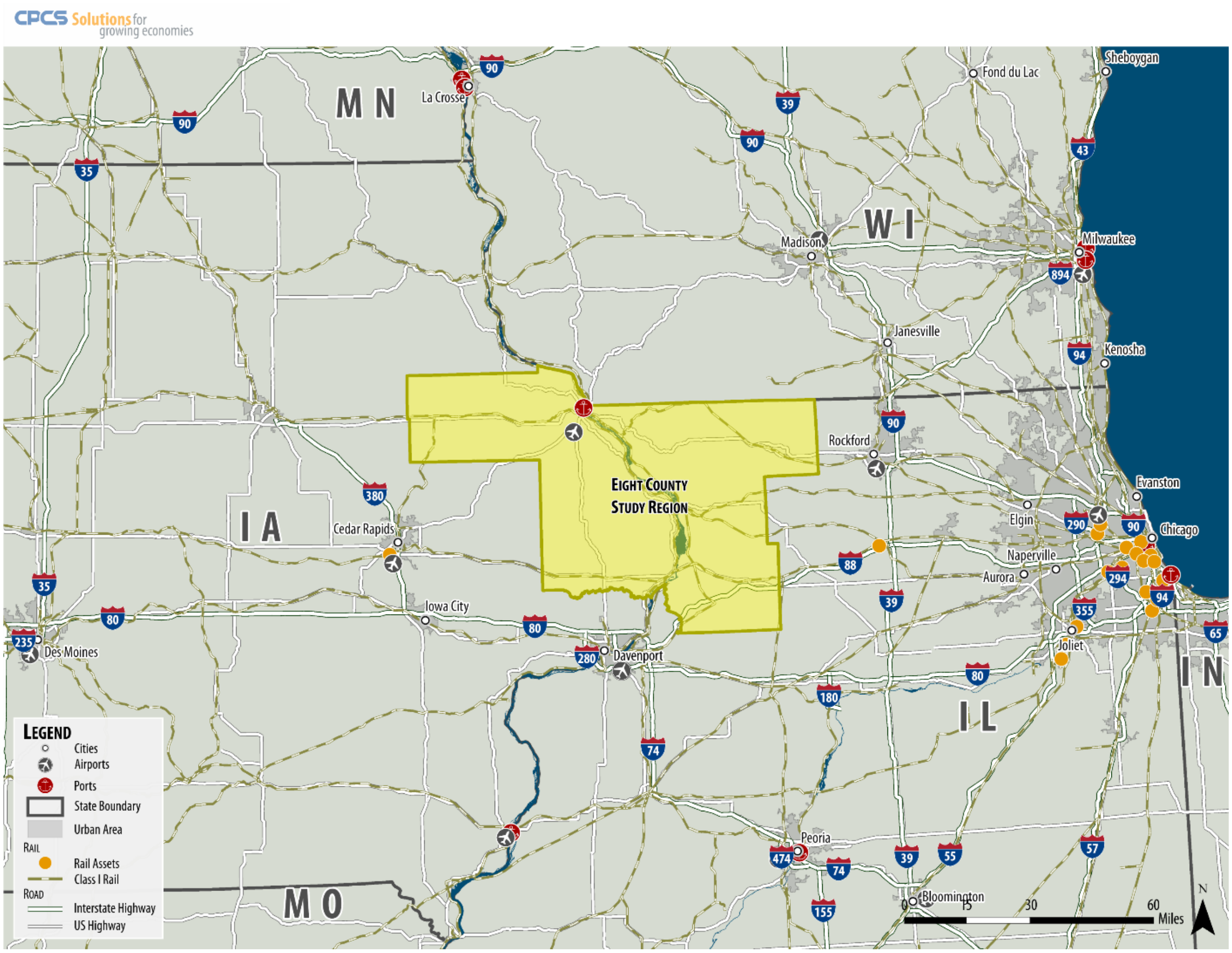
The Eight-County Region is at the heart of major US manufacturing and agricultural activity, and is comprised of Carroll, Jo Daviess, Stephenson, and Whiteside counties in Illinois, and Clinton, Delaware, Dubuque, and Jackson counties in Iowa. This Region, shown in Figure 1-1, relies on the multimodal transportation system of roads, rails, air, and water ports to both supply the inputs needed for production and to transport goods to consumers inside and outside of the Region – driving the local economy

The state of the transportation system affects the competitiveness and growth potential of the Region. In order to maintain existing and attract new business it was important for local stakeholders to understand how goods movement is linked to the local economy and how public sector stakeholder actions could impact private sector businesses. Therefore, the primary objective of the Eight-County Freight Study was:

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.

The key outputs of this Study included (1) description of key freight system assets and how they are used, (2) identification of freight-related challenges in the Region, (3) outreach to stakeholders to vet and validate an assessment of freight system needs and opportunities, (4) formulation of a slate of project, policy and program recommendations, and (5) guidance on freight funding and project investments that could provide the greatest benefits to the Region.

Figure 1-1: Eight-County Region



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

1.2 Freight System Vision, Goals and Objectives

The Eight-County Freight System Vision describes an aspirational future point for the freight transportation system. The Vision was formed over a series of discussions by the Freight Study 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.

The Vision identifies quality of life, growth, business retention, and business attraction as critically linked to the freight system. These concepts have been formalized as the goals of this Study. These goals reinforce the point that the freight system should support economic activity and meet community needs in the Region.

The **economy** is a natural focus for freight-related goals as there is a clear relationship between the transportation system and the economy. For example, without transportation goods could not get to production to be manufactured, or to market to be sold. A transportation system that provides a high level of service today and is managed to respond to, provide resilience for, future demand will have a positive impact on the economy.

The concept of **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.

Goal 1 – Business Retention: The freight system meets business needs and encourages private sector investment.

Goal 2 – Business Expansion: The freight system enables economic growth and development.

Goal 3 – Business Attraction: The freight system aids the attraction of new businesses.

Goal 4 – Quality of Life: The freight system meets community needs and priorities.

The Vision identifies safety, efficiency, reliability and connectivity as attributes the freight system will have in the future. These attributes have been formalized as the objectives of this Study. Defining these objectives was important, as the aspirational Vision and goals cannot easily and directly be quantified based on, for example, investments made to the transportation system. These objective areas embody key aspects of the Vision and goals, and provide a quantifiable means of evaluating the transportation system. These objectives in turn were used to develop measures, so that the condition and performance of the system could be assessed and improved. The basis for formalizing these objectives is provided below.

Objective 1 – Safe: Reduce crashes involving freight vehicles.

The safety of the transportation system is the primary focus of public agencies to preserve local quality of life, but it is also critical to ensuring goods arrive at their destinations free from damage. Crashes may result in damage persons, to property and goods being carried, and may negatively impact roadway performance.

Objective 2 – Efficient: Reduce freight travel times and/or cost.

The efficiency of the transportation system underpins the success of existing businesses. And, similarly, influences a Regions' ability to promote itself to attract new businesses. Key to system efficiency is reducing travel time and reducing costs; two concepts very much related to each other.

Objective 3 – Reliable: Reduce disruptions to system performance.

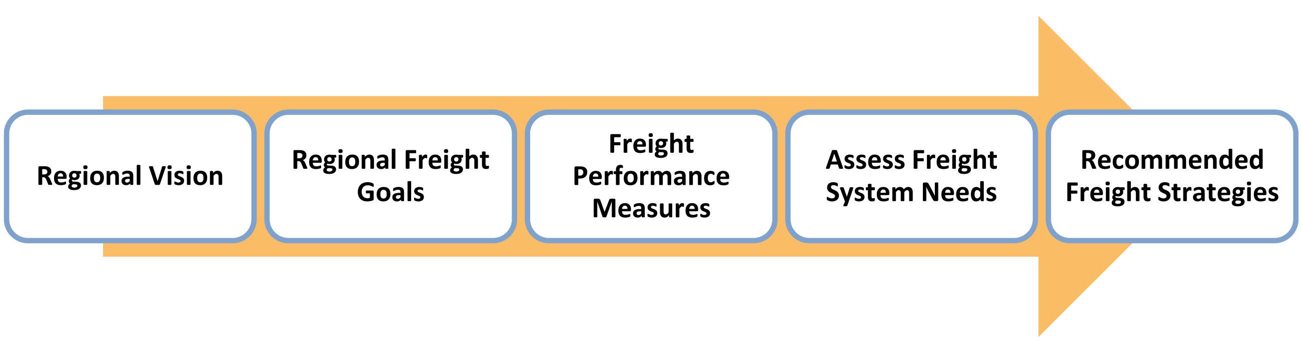
The reliability of the transportation system affects both shippers and carriers. For shippers, the amount of inventory kept on hand is directly related to whether suppliers are able to use the transportation system to provide inputs on-time. For carriers, an unreliable system increases costs due to time spent in traffic or waiting for unloading.

Objective 4 – Connected: Improve regional connection to freight modes and markets.

Access to multiple modes and intermodal connections ensures that businesses can use the mode of transportation that best meets their shipping requirements (time, cost, etc.). Similarly, the availability of multiple modes increases price competition and makes a Region attractive to a greater variety of businesses.

As shown in Figure 1-2, the Vision was the starting point for all Study tasks, and was used to guide the development of goals, objectives, and performance measures used to assess system needs. This process led to the development of recommendations directly tied to advancing the Vision.

Figure 1-2: Study Development Framework



2 Eight-County Freight System Assets and Use

Key Takeaway

The Eight-County, bi-state region has a diverse population and economy, but faces economic challenges related to a shrinking population and a potential shortage of medium- and high-skill workers. Freight transportation is extremely important to the Region; almost 50 percent of the Region's workers are employed by firms that rely on the movement of freight to support their operations. Key freight-related industries for the Region are agriculture, which generated over 31 million tons of freight in 2014, and manufacturing, which employs 18 percent of the Region's workforce.

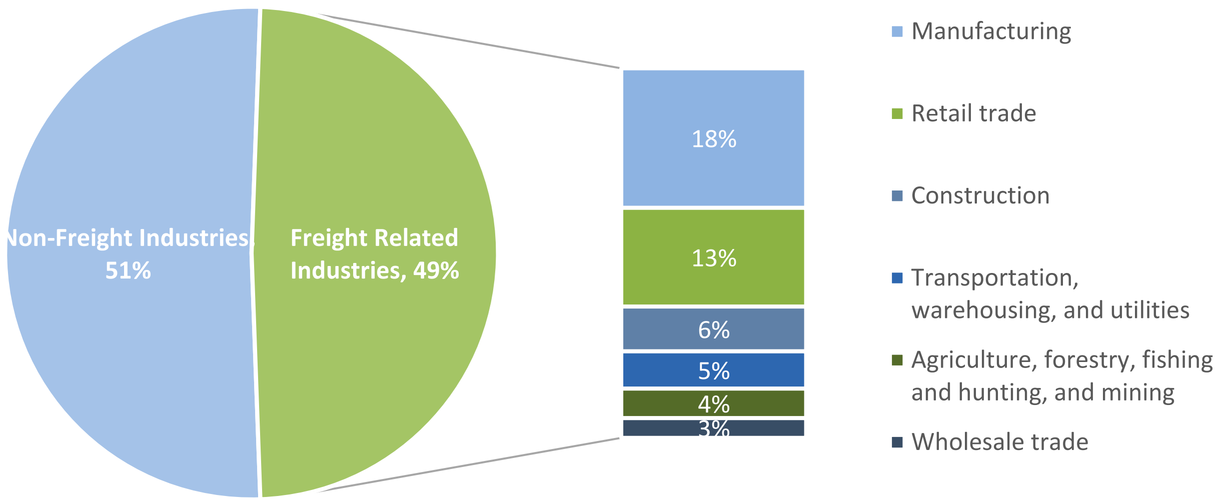
The Region has a multimodal freight transportation system, with each mode serving a distinct role in transporting goods produced by the Region's manufacturers and consumed by the Region's residents. Trucks carry the majority of the freight in terms of both value and tonnage, but the Region also has extensive rail lines, and major barge facilities. Generally, the Region's transportation assets are aligned for the movement of bulk goods. Locals that produce/consume other types of goods (non-bulk) must truck their products to neighboring areas like Rockford or Chicago for access to rail and air freight options.

2.1 Eight-County Freight-Related Industries

Freight-related industries are those that rely heavily on the shipment of physical goods to support their operations. These industries include natural resources (agriculture and mineral extraction), manufacturing, retail, construction, transportation, and warehousing. Many of these industries, particularly, natural resources, agriculture, and transportation are often location-dependent (agricultural fields, mines, railroads, and rivers cannot be moved like factories), and thus they are reliant on the performance of the freight system to remain competitive. Freight-related industries as a whole are especially relevant to the Eight-County Region because they employ about 77,600 people. Figure 2-1 shows how these freight-related industries make up the Region's total employment.

About 50 percent of the Region's labor force is employed by firms that are reliant on the freight transportation system.

Figure 2-1: Relative Employment by Industry



Source: CPCS Analysis of 2015 American Community Survey Data, US Census Bureau

Figure 2-2 lists the number of firms, by employee size, in each industry area. The figure only lists firms with more than 20 employees, which means that the agricultural sector's firms (which usually have less than 20 employees) are underrepresented. The Region's freight-related industries are clustered around Dubuque, IA, Clinton, IA, Freeport, IL, and Sterling, IL. Manchester, IA, Dyersville, IA, Maquoketa, IA, DeWitt, IA, and Morrison, IL have smaller, but noticeable concentrations of firms.

Figure 2-2: Freight-Relevant Firms

	Firms with 20-49 Employees	Firms with 50-99 Employees	Firms with 100+ Employees
Agriculture, Forestry, Fishing, and Hunting	3	2	1
Mining, Quarrying, Oil and Gas Extraction	5	2	2
Utilities	5	0	5
Construction	87	12	24
Manufacturing	144	49	92
Wholesale Trade	69	24	117
Retail Trade	191	44	52
Transportation and Warehousing	81	16	10

Source: CPCS Analysis of Reference USA, 2016.

The Region is home to relatively high concentrations of employment for nearly all freight-related industries, and manufacturing stands out as especially important for all counties. Figure 2-3 shows the location quotient of each freight-related industry for each county. Location quotients are calculated by the Bureau of Labor Statistics, and measure the proportion of workforce employed in a certain industry relative to other areas or industries. In the figure, values greater than 1.0 indicate an employment proportion in a specific industry higher than the national average. For example, each county's manufacturing quotient is greater than 1.0, which means each county has a greater proportion of people employed in manufacturing than the national average.

Figure 2-3: Location Quotients of Freight-Related Businesses

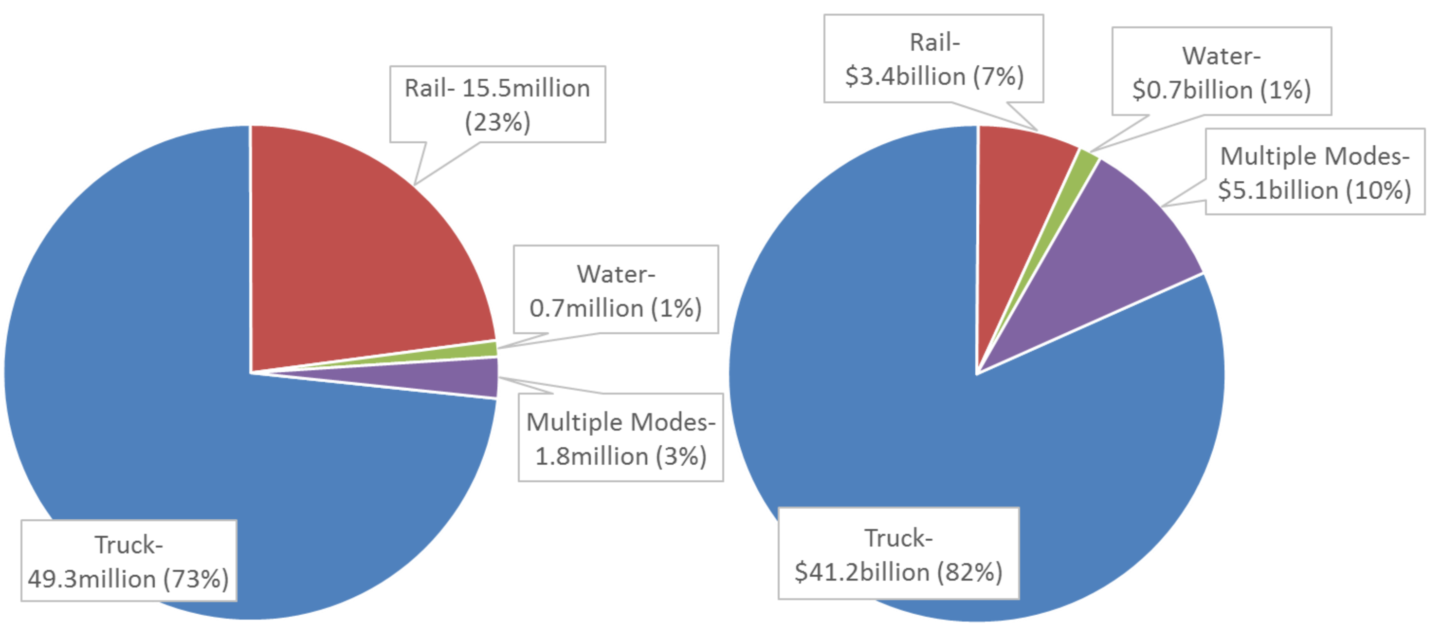
Industry	Carroll	Clinton	Delaware	Dubuque	Jackson	Jo Daviess	Stephenson	Whiteside
Agriculture	ND	ND	1.58	ND	1.97	ND	2.66	ND
Mining, Quarrying, Oil and Gas Extraction	ND	ND	NC	ND	NC	ND	NC	ND
Utilities	ND	1.11	ND	0.66	ND	ND	ND	0.33
Construction	0.9	0.9	1.25	0.86	0.97	1.3	1.36	0.6
Manufacturing	2.13	2.28	3.18	1.68	1.65	1.6	2.3	2.02
Wholesale trade	2.15	0.5	1.9	1.16	1.33	ND	0.67	0.96
Retail trade	1.24	0.98	0.95	0.98	1.35	1.14	0.89	1.16
Transportation, Warehousing	ND	ND	ND	2.07	1.17	ND	1.06	ND

Source: CPCS Analysis of Bureau of Labor Statistics, 2015. Based on the location quotients, a number of industries stand out as particularly important to the Eight-County Region in terms of employment and economic impact. These industries include manufacturing and agriculture, which are described in the following sections.

2.2 Eight-County Multimodal Freight System Use

In 2014, the Eight-County Region's freight system carried 67.3 million tons of freight worth $50.4 billion. Trucking was the most commonly-used mode, carrying 73 percent of the region's freight by tonnage, and 82 percent of its freight by value. Rail carried the second largest tonnage (23 percent), and multiple-mode shipments (such as truck to barge or truck to rail, or containerized shipments), carried the second largest share of value (10 percent). A comparison of tonnage and value by mode is provided in Figure 2-4.

Figure 2-4: Freight System Tonnage (left) and Value (right) by Mode (2014)



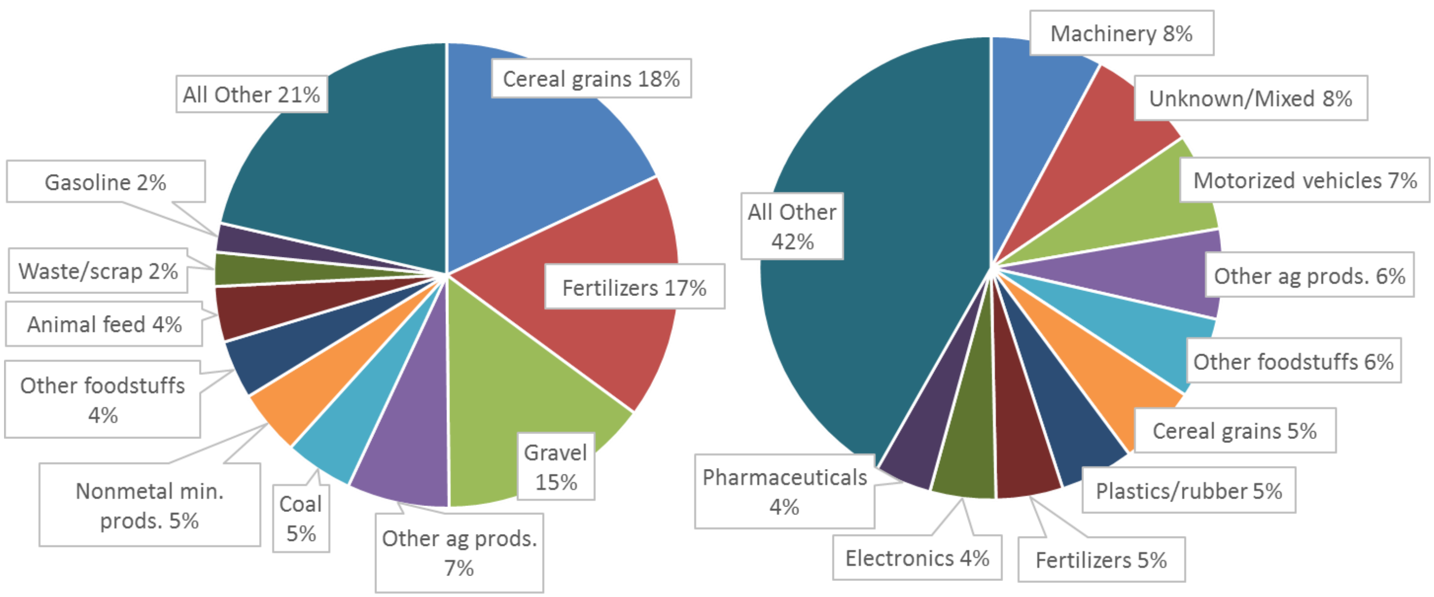
Source: WSP | PB Analysis of FHWA Freight Analysis Framework version 4 (FAF4) data.

Trucks carry the greatest share of the Region's freight by both tonnage and value.

The share of freight value carried by truck (82 percent) is greater than the share of freight tonnage (73 percent), suggesting that trucks are being used to carry the Region's higher-value, lower weight manufactured goods. Rail serves a different purpose, carrying 23 percent of the Region's tonnage, but only seven percent of its value, which suggests rail shipments are being used for relatively high-weight, low-value commodities like agricultural products. The multiple mode category includes intermodal container shipments, which are often used to carry higher-value goods with low to medium weights, carried only three percent of tonnage, but accounted for 10 percent of value.

In terms of specific commodities, cereal grains (such as corn) are the number one commodity by tonnage (18 percent percent), and machinery is the number one commodity by value (eight percent). Figure 2-5 provides a visual of the top ten commodities by tonnage and value. Modal and commodity tonnage and value information is detailed by county in Working Paper 2 – Existing and Future Commodity Flow Profile.

Figure 2-5: Freight System Tonnage (left) and Value (right) by Commodity (2014)



Source: WSP | PB Analysis of FHWA Freight Analysis Framework version 4 (FAF4) data.

2.3 Eight-County Freight System Assets

2.3.1 Highway System

The Region's road network is made up of different sub-networks including Interstate highways, national highways, state highways, and county roads. Figure 2-6 provides a visual overview of the routes within the system and Figure 2-7 lists the mileages of some elements of the Region's roads. Of note is the small number of interstate miles in the Region, and the reliance on US and State Routes.

Figure 2-6: Eight-County Highway System

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

Figure 2-7: Regional Road Mileages by Network or Classification

	Illinois	Iowa	Total
Interstate	46.3	0	46.3
US Highway	103.4	278.0	381.4
State Highway	117.8	98.7	216.5

Source: National Highway Planning Network. Federal Highway Administration. 2014.

Key Roadway Corridors and Connections

The Eight-County Region has relatively limited direct access to the Interstate Highway System; the only direct interstate connections are on I-88 in Whiteside County. Therefore, national highways such as US 20, US 30, US 52, US 151, and US 61 serve as important road corridors for freight movement in the Region.

In addition to these noted corridors, the five road bridges over the Mississippi River are critical transportation assets the Region. Two bridges are located in Dubuque, IA, and two are located in Clinton, IA / Fulton, IL. The remaining bridge links Savanna, IL, and Sabula, IA, in the center of the Region. These bridges are the only road links between the two halves of the Region, and all but one (the Dubuque-Wisconsin Bridge) are two- lanes. Because of their limited traffic capacity, and the long distances between them, these bridges have the potential to be regional chokepoints. For example, the oldest of the crossings, the Savanna-Sabula Bridge, has recently been replaced by the Dale Gardner Veterans Memorial Bridge – a bridge with wider lanes and shoulders, and expected to bring safety benefits to the region. While planned to open in November 2017, the Dale Gardner Veterans Memorial Bridge likely will not open until September 2018 due to safety issues with the adjacent causeway. As a result, drivers face a 30+mile detour reroute and cross the river near Clinton, IA.[1] Figure 2-8 provides reference information for each of the Region's bridge connections.

Figure 2-8: Regional Highway Bridges over the Mississippi River

Bridge	Routes Carried	City	Lanes	Year Opened
Dubuque-Wisconsin Bridge	US 61, US 151	Dubuque, IA	4	1982
Julien Dubuque Bridge	US 20	Dubuque, IA & East Dubuque, IL	2	1943
Savanna-Sabula Bridge	US 52, IL 64, IA 64	Savanna, IL & Sabula, IA	2	1932*
Dale Gardner Veterans Memorial Bridge	US 52, IL 64, IA 64	Savanna, IL & Sabula, IA	2	Oct. 2017
Mark Morris Memorial Bridge	IL 136, IA 136	Fulton, IL & Clinton, IA	2	1975
Gateway Bridge	US 30	Fulton, IL & Clinton, IA	2	1956

Source: National Bridge Inventory. Federal Highway Administration. 2016. *The Dale Gardner Veterans Memorial Bridge was constructed as a replacement for the Savanna-Sabula Bridge. The Savanna-Sabula Bridge is being dismantled.

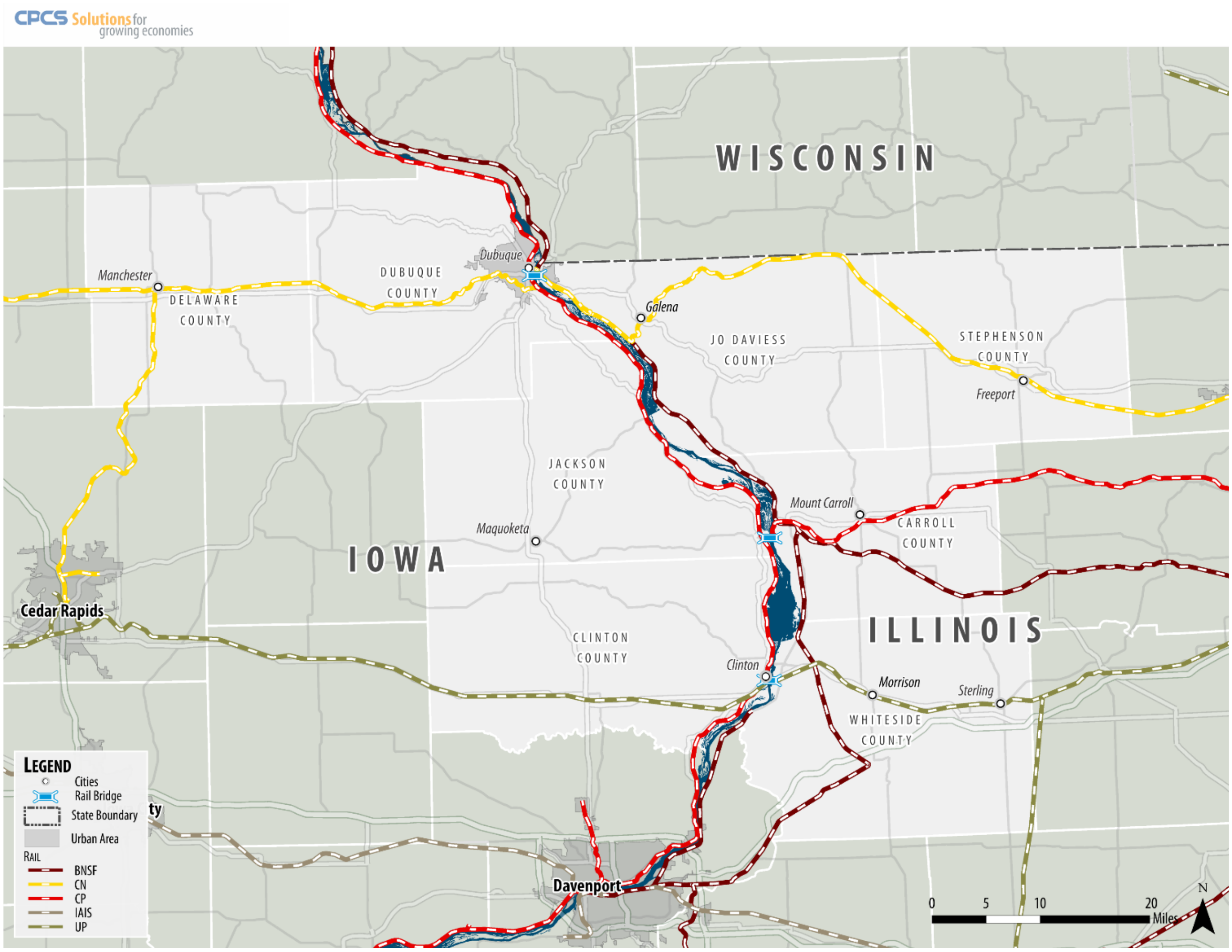
2.3.2 Railroad System

The Region is served by five railroads, which operate over 580 miles of mainline track in the Region. In 2014, these railroad carried 15.5 million tons of goods (15 percent of the Region's total tonnage) worth $3.4 billion (7 percent of the Region's total value).[2] These disparate values reflect the fact that rail is often used to haul bulky, low value commodities, such as corn, crude oil, and minerals such as sand. Since these types of goods are low value, but heavy, the value-to-weight ratio of rail freight movements in the Region is low.

Four Class I railroads serve the Region, providing access to a wide range of locations throughout the western and southern US. The Burlington Northern and Santa Fe Railway (BNSF) provides access to the Twin Cities, Chicago, and St. Louis. The Union Pacific Railroad (UP) connects to Chicago and Des Moines, the Canadian National (CN) connects to Chicago, and Omaha, and the Canadian Pacific (doing business as the Dakota, Minnesota, and Eastern) connects to the Twin Cities, Chicago, and Kansas City. The Region is also home to a short line, the Riverport Railroad, which provides switching service, transloading, car maintenance, and railcar storage near Savanna, IL. Figure 2-9 shows the Class I railroads in the Region. Figure 2-10 provides information on each railroad's miles of track and trackage rights.

[1] "Opening of Savanna-Sabula bridge delayed again," saukvalley.com, May 10, 2018.
[2] WSP Analysis of Freight Analysis Framework Data. Preliminary.

Figure 2-9: Eight-County Railroad System



Source: National Transportation Atlas Database. USDOT. 2015.

Figure 2-10: Railroad System Miles by Operator

Railroad	System Miles (Owned)	Trackage Rights (Miles)	Number of Mainline Tracks	Road Crossings
BNSF	125	UP – 1.7, CN – 15.2, CP – 23.5	2 from East Dubuque to Savannah, 1 for rest of Region	130
UP	129	0	2	105
CN	168	0	1	258
CP (Dakota, Minnesota, and Eastern)	162	CN – 1.3, UP – 1.7, BNSF – 15.4	1	177

Source: National Transportation Atlas Database. Bureau of Transportation Statistics, 2015; Public Crossing Inventory Detail Report. Office of Safety Analysis, Federal Railroad Administration.

Rail Bridges

In addition to hundreds of miles of track, the Region is home to three rail bridges across the Mississippi River, shown in Figure 2-11. These bridges are important goods movements in the Region, as well as nationally. As example, the double-track Clinton Rail Bridge carries 40+ trains per day on the UP mainline between Chicago and the West.

Figure 2-11: Mississippi River Railroad Bridges

	Tracks	Owner	Trains per Day	Year Opened
Dubuque Rail Bridge	1	CN	8	1899
Sabula Rail Bridge	1	CP	7	1906
Clinton Rail Bridge	2	UP	40	1909

Sources: "Iowa's Railroad Profiles." Iowa Department of Transportation. https://iowadot.gov/iowarail/iowa-freight-rail/profiles; Google Maps; "Dunleith and Dubuque Bridge". Encyclopedia Dubuque; Weeks, John A. "Sabula Rail Bridge."

The Region's railroad bridges are potential chokepoints for both rail and water traffic. Each of the three bridges are too low for barges to pass underneath, and each bridge was constructed with a rotating span that can move to allow barges to pass. Therefore only one mode can pass through a bridge site at one time, which can create delays and congestion for both barges and trains. Furthermore, the central "island" that supports the swinging motion of the bridge creates a very narrow navigable channel, and is a hazard to barge navigation. Figure 2-12 provides an example with the Clinton Rail Bridge, which must rotate to allow barges to pass through the narrow central channel.

Figure 2-12: Clinton Rail Bridge

Source: Google Streetview. 2017.

In the event of a barge-bridge collision, rail and river navigation can be shut down for hours or days as accidents are cleaned up, and bridge structures are inspected and repaired. In addition to their potential hazards and inefficient operations, the Region's swing bridges are over 100 years old, and require staff on hand at all times to operate the bridge. Given these inefficiencies and problems, and the extremely high volume of rail traffic on its mainline, the UP is studying options for the construction of a new, higher bridge with a fixed span as a replacement for its aging Clinton Rail Bridge.[3]

[3] Source: Dahlstrom, Katie. "UP Eyes South Clinton Land." Clinton Herald. April 4, 2013.

At-Grade Rail Crossings

Railroad-road grade crossings may serve as another type of potential chokepoint relevant to the Region's freight system. The Region has 331 publicly-owned crossings, and 477 private crossings. 63 percent of the 331 public crossings had some form of protection such as gates, or lights, while the remaining 37 percent only had stop signs or cross bucks. Information on controls and protection at private crossings was not available. Figure 2-13 provides a breakdown of the types and number of crossings by county. Controlled crossing are equipped with active warning devices like gates, flashing lights, or bells, while uncontrolled crossings are only protected by a static sign such as a stop sign or cross bucks.

Figure 2-13: Eight-County Rail At-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.

2.3.3 Inland Waterway System

The Mississippi River flows for 93 miles through the center of the Region, providing a direct waterways connection to the Gulf of Mexico and international markets. The river's flow is controlled by three locks and dams in the region, which maintain a nine foot river channel depth needed to support barge traffic. Each of these locks has a 110 by 600 foot lock chamber, which means that barge tows often must be divided into smaller groups to pass through the lock. Figure 2-14 provides basic information on the size and age of the Region's locks and dams, which maintain a nine foot river channel depth needed to accommodate barge traffic. Figure 2-15 provides a visual overview of the river's path through the Region and the location of locks and dams.

Figure 2-14: Regional Locks and Dams

	Nearest City	Lock Size	Year Opened*	Average Lift
Lock and Dam 11	Dubuque	110' x 600'	1937	9.4'
Lock and Dam 12	Bellevue	110' x 600'	1935	9.0'
Lock and Dam 13	Fulton	110' x 600'	1936	8.6'

Source: Upper Mississippi River Locks & Dams. US Army Corps of Engineers. 2017.
*Year opened refers to the year the lock was completed. Dams were often completed after locks.

Figure 2-15: Eight-County Inland Waterway System

Source: National Transportation Atlas Database. USDOT. 2015.

In 2016, between 17,000 and 19,000 individual barges made up 3,000 to 3,300 barge tows passed through the Region. Combined, these movements carried about 20 million tons of goods. Figure 2-16 provides information on how many barges passed through each lock in the Region in 2016. Commercial lockages refers to the number of times the locks were operated for commercial vessels. Commercial flotillas indicates the number of barge tows that passed through the locks, and barges is the number of individual barges that passed through the locks.

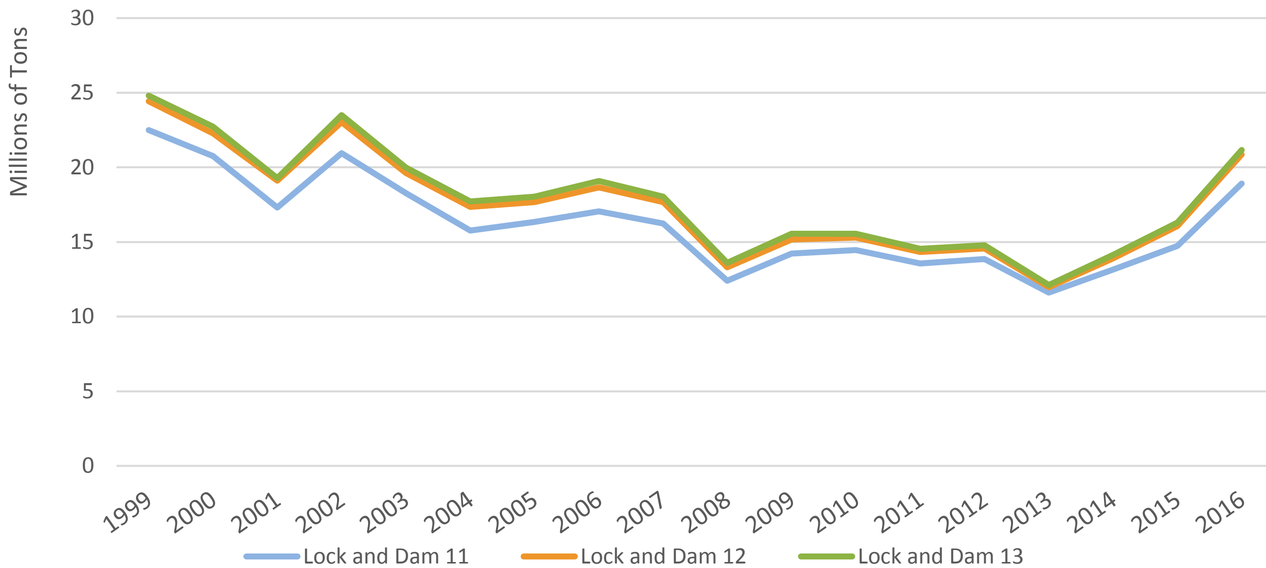
Figure 2-16: Regional Annual Commercial Lock Traffic, 2016

	Commercial Lockages	Commercial Flotillas	Barges (Empty and Loaded)
Lock and Dam 11	2,995	1,193	16,989
Lock and Dam 12	3,299	2,169	18,746
Lock and Dam 13	3,393	2,222	19,179

Source: Lock Performance Management System, US Army Corps of Engineers. 2017.

The river carries one percent of the Region's freight volume and value, and its slow-moving, but fuel-efficient barges are well-suited for extremely bulky lower-value commodities like grain, oil, fertilizer, and minerals. In fact, one barge can carry the equivalent dry cargo tonnage of 16 railcars, or 70 semi-trucks.[4] Barge tonnage in the Region reached a low in 2013, but has increased by about 70 percent in the last three years. This growth may be attributed to recovery in agricultural production after a severe drought in 2013, and high agricultural production in following years. Figure 2-17 shows barge shipment trends over time.

Figure 2-17: Regional Waterborne Tonnage



Source: Lock Performance Management System, US Army Corps of Engineers. 2017.

The Region's barge system is affected by the seasons; for about three months during the winter, the river freezes and barges cannot operate. The system's operation is also affected by the state of repair of lock facilities, which are over 75 years old. These facilities may experience shutdowns when lock equipment fails, and these shutdowns can halt river traffic for days or weeks. As the locks and dams continue to age, breakdowns, and disruptions to barge traffic may become more common. The potential for delays or shutdowns is a threat to the economic competitiveness of Regional firms that rely on the waterway for shipping.

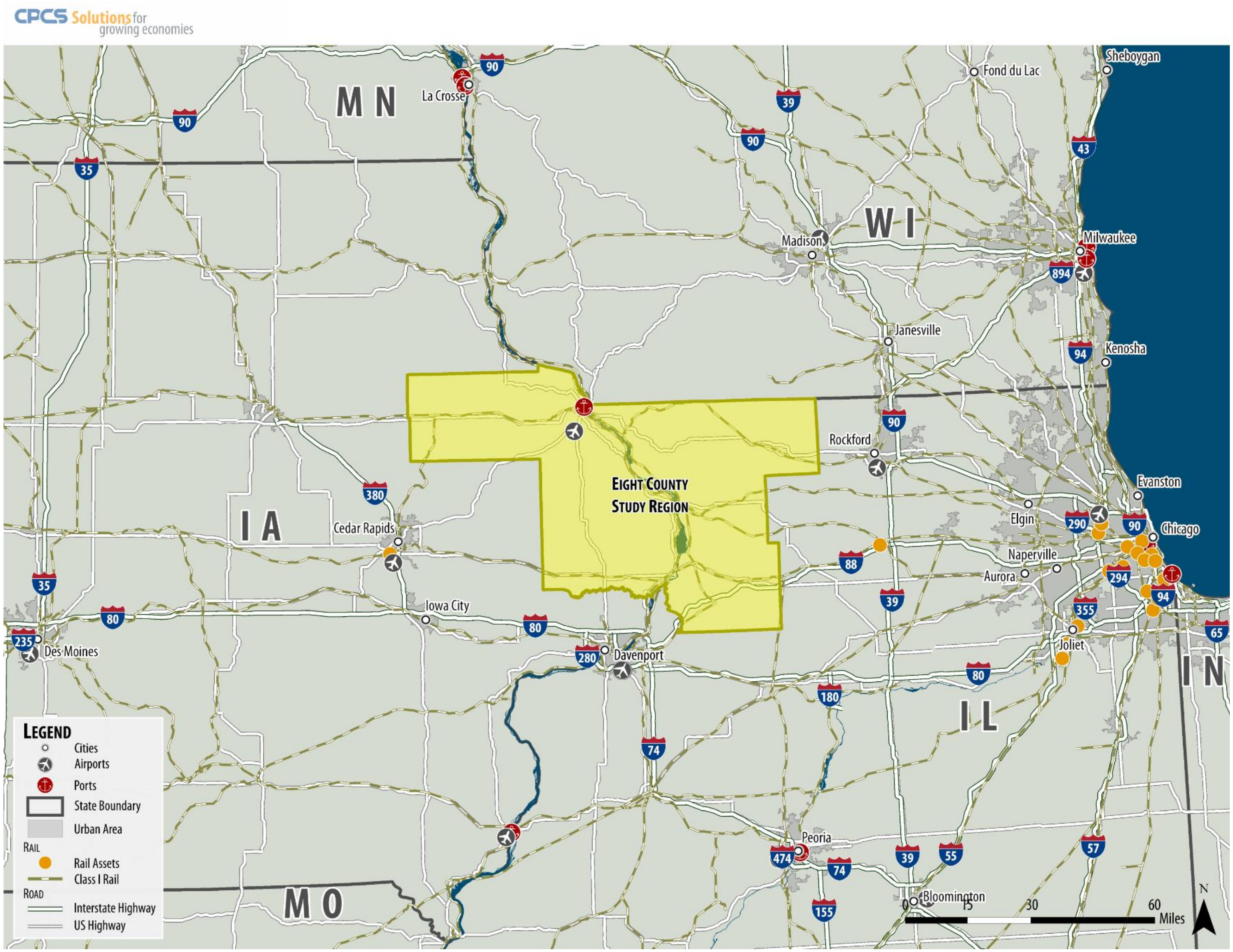
2.4 Regional, National and Global Connectivity

2.4.1 Regional Connectivity

The Region is very dependent on connections to points outside the eight counties to distribute goods within the Midwest and beyond. Figure 2-18 provides an overview of the Region's proximity to some of the Upper Midwest's key freight facilities. Local companies that ship their goods outside of the Region may need to dray their goods to these major consolidation and distribution hubs for transport to final destinations. Figure 2-19 provides a list of mileages and travel times from major cities to nearby freight facilities such as airports, intermodal terminals, and interstate connections. The range of mileages and times suggests that while the Region lacks certain types of freight facilities (e.g., intermodal container facilities, air cargo facilities, and extensive interstate highway connections), there are options within a 1+ hour drive.

[4] A Modal Comparison of Domestic Freight Transportation Effects on the General Public. Texas A&M Transportation Institute. 2017.

Figure 2-18: Eight-County Proximity to Key Freight Facilities Beyond the Region



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

Figure 2-19: Travel Time to Regional Transportation Facilities

Key Regional Transportation Facilities	Dubuque		Clinton		Freeport	
	Distance (miles)	Time (hours)	Distance (miles)	Time (hours)	Distance (miles)	Time (hours)
Davenport (I-80 link, air cargo)	71	1.25	41	0.75	100	2.00
Cedar Rapids (air cargo, intermodal terminal)	73	1.25	84	1.50	137	2.50
Rochelle (intermodal terminal)	123	2.25	67	1.25	60	1.00
Rockford (air cargo)	95	1.75	75	1.50	30	0.50
Chicago Area	175	3.25	144	2.50	144	2.00

Source: Google Maps. 2017 Preliminary data. Subsequent performance analysis will use truck-specific data.

For Figure 2-19, Davenport, IA, was selected because it provides a link to the major I-80 east-west corridor, a southbound link to I-74, and air cargo service at the Quad City Airport. Cedar Rapids, IA, was selected because it will soon be home to Iowa's second intermodal rail terminal, and has air cargo service. Rochelle, IL, was selected for a similar reason, it is home to Union Pacific's Global III intermodal yard, which can provide rail connections to Chicago, the western US, and foreign markets. Rockford, IL, was selected because it provides air cargo service, and provides access to I-90 and I-39. Time and distance to the Chicago area was also calculated due to Chicago's role as an international freight hub.

And, despite the presence of five railroads and nine railyards, the Region's businesses have relatively limited rail access, as rail sidings are required for their direct access, and most of the Region's rail terminals are built for the transfer of bulk materials, such as grain or fertilizer. Because of this orientation towards bulk shipments, few rail connections are available for producers of non-bulk commodities such as manufactured goods. Companies that would like to use rail may have to ship their products by truck to the rail intermodal facilities listed in

Figure 2-20. The closest rail intermodal container facilities for the Region are UP's Global III terminal in Rochelle, IL, and an intermodal yard in Cedar Rapids, IA, which is under construction. Firms that would like rail shipper choice and direct connection to the eastern US must send their products to the greater Chicago area.

Figure 2-20: 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	125	2.25
Joliet - UP, CN, BNSF	202	3.50	150	2.25	140	2.25

Source: Google Maps

In this figure Rochelle, IL, was selected because it is the nearest currently operating intermodal facility, and is located directly on the UP mainline that passes through Fulton, IL and Clinton, IA. Cedar Rapids, IA, was selected because it will provide an additional intermodal facility near to the Region. Bedford Park, IL, was selected because regional firms that would like to ship goods to eastern markets, or Europe may need to access eastern Class I railroads like CSX or NS in Chicago. CSX's Bedford Park, IL yard is the nearest terminal operated by a Class I railroad that serves the eastern US and travel distance and time to Bedford Park, IL, will be similar to time and distance for other intermodal facilities in the Chicago area. Joliet, IL, was selected because it has some of Illinois' newest and most advanced intermodal facilities, such as the BNSF logistics park, and UP's Global IV yard. Using intermodal facilities in Joliet, IL, can also help firms avoid traffic congestion closer to Chicago.

The need to move goods by truck to intermodal rail facilities increases a business' cost of transportation, as they must pay to have freight transferred between modes (from truck and rail). The new terminal in Cedar Rapids, IA, may mean that in the future the Region's businesses will have relatively quick and low-cost access to intermodal services, and national and international markets. Based on data analysis and stakeholder consultation, today many businesses choose to truck goods entirely from origin to destination instead of doing a multimodal transfer outside the Region. As shown in Figure 2-21, the average truck trip length in the Region is nearly 100 miles longer than the National average.

Figure 2-21: Eight-County Region and US Average Trip Lengths by Mode (Provisional), 2014

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

Source: WSP | PB Analysis of FHWA Freight Analysis Framework version 4 (FAF4) data.

2.4.2 Eight-County Multimodal and Transload Facilities

The Region is home to 31 specific facilities that can transfer goods between modes, and these facilities are listed in Figure 2-22. These facilities are mapped in Figure 2-23, which shows barge terminals and land terminals, such as rail transload facilities, grain elevators, and rail-served warehouses. Most of the Region's intermodal facilities are designed to move bulk materials, such as agricultural products, chemicals, and minerals like gravel.

Figure 2-22: Eight-County Intermodal Facilities (List)

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 Camanche	Barge Terminal	Mixed Bulk	Camanche	North Washington Blvd.
ARTCO Fleeting	Barge Terminal	Mixed Bulk	Clinton	15th Ave. S.
Bunge Grain	Barge Terminal	Agricultural	Fulton	3rd St.

Facility Name	Facility Type	Commodities Handled	City	Nearest Road
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.
Frary Lumber	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	Blackhawk	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.
Rentech Nitrogen	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.

Figure 2-23: Eight-County Intermodal Facilities (Map)

Sources: National Transportation Atlas Database. Bureau of Transportation Statistics. 2015; 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

3 Eight-County Freight System Needs and Opportunities

Key Takeaway

The Eight-County Freight Study 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 Study. 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 the US 20 and US 30 corridors – and were focused on the safety and condition of the system, rather 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.

3.1 Stakeholder Outreach

Analysis of performance data reveals only part of the Region's freight story. Feedback from stakeholders familiar with the freight system is necessary to fully assess the Region's needs and opportunities. For the Eight-County Freight Study, outreach took several forms including:

- Stakeholder consultations completed by staff from ECIA, BHRC and local economic development agencies (169 responses),
- Online Survey Monkey platform (96 responses),
- Consultant phone and email consultations with transportation and agricultural stakeholders (25 responses),
- A business roundtable meeting held in Dubuque,
- A business roundtable meeting held in Clinton County,
- Verbal feedback from the Freight Study Steering Committee during seven meetings, and

- Written feedback from project sponsors and other stakeholders on interim deliverables.

In total, over 300 stakeholders representing a cross-section of public stakeholders, local industries and other private freight stakeholders who use, operate and maintain the freight system were consulted during this Study. Several general themes emerged from this outreach, including:

- 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 regulations such as weight limits and vehicle registration, and
- Concerns about highway safety in specific corridors.

These issues and others are discussed in more detail in the following section, organized by mode.

3.2 Key Freight System Needs and Issues by Mode

3.2.1 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, three 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, and
3. Safety and design concerns on specific corridors.

In addition to these, select local roadways were mentioned as problematic or in need of improvement. Also, congestion issues in downtown Dubuque due to the presence of traffic signals was a concern, as was congestion outside the Region for truckers headed to major intermodal or distribution facilities.

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. Another stakeholder, a regional trucking company, noted the "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." Concerns associated with specific roadways are included in Section 3.2.2.

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. During consultations an Illinois grain farmer noted "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." 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.

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.

Companies in both Iowa and Illinois 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.

3.2.2 Specific Roadway Needs (Safety and Design)

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. A representative from Prairie Farms noted "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."

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.[5] To supplement Illinois DOT's US 20 work, additional issues on this corridor were examined through a "freight safety lens."

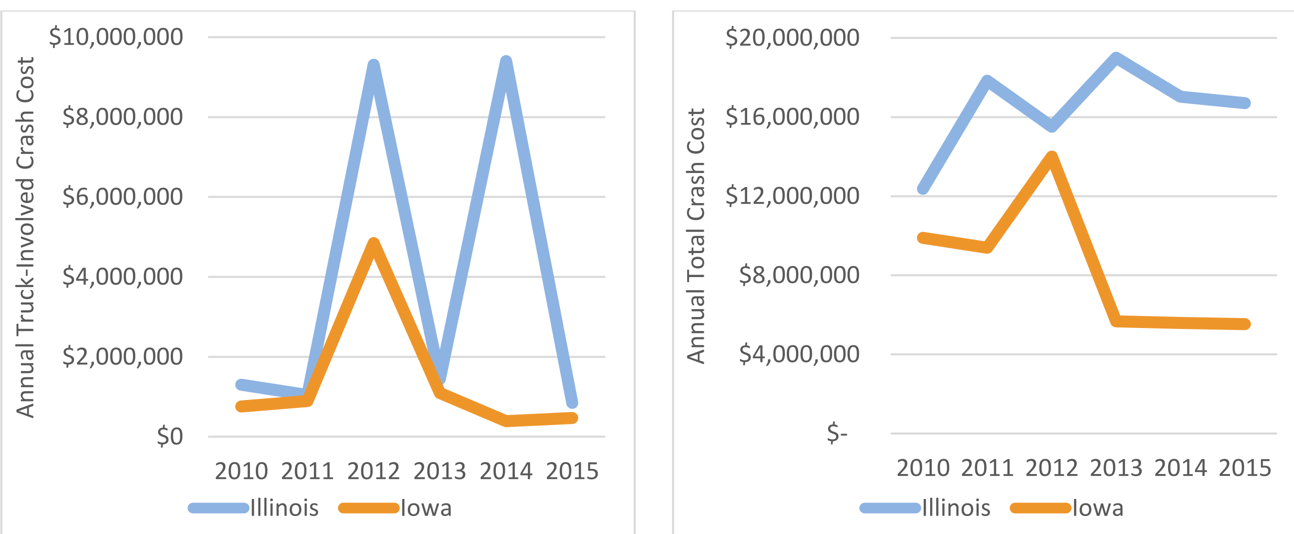
Between 2010 and 2015 US 20 had 2,534 crashes in total of which 44 percent were in Illinois, 56 percent were in Iowa. 324 (13 percent) of these crashes were truck-involved. 160 (49 percent) of truck-involved crashes occurred in Illinois. 164 in Iowa. Figure 3-1 presents US 20 crash data in terms of annual truck crashes per mile by roadway segment.

As shown in Figure 3-2 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 (21 percent were in Illinois). Illinois had 73 percent were in Illinois of truck crash costs ($23 million). Figure 3-3 presents US 20 cost of crash data by roadway segment.

Figure 3-1: US 20 – Annual Truck Crashes per Mile

Source: CPCS analysis of Illinois DOT and Iowa DOT data

Figure 3-2: US 20 – Cost of Crashes (Chart)



Source: Illinois DOT; Iowa DOT

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

Figure 3-3: US 20 – Cost of Crashes (Map)

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/Rock Falls, IL. It provides direct access to I-88 near Sterling, and I-380 near Cedar Rapids. The route, shown in Figure 3-4, 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.[6] A key asset for the US 30 corridor is the Gateway Bridge, which only has two lanes and crosses the Mississippi River.

Figure 3-4: 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

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[6] 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/

connecting to Cedar Rapids and the Cedar Rapids Logistics Park being developed there), and safety issues with the corridor.

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 keep 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. Currently, many trucking 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. In the online survey, Wendling Quarries noted that "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."

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 3-5 provides an example of a seasonal weight limit sign in Illinois.

Figure 3-5: 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 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 3-6: 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 3-6.

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.

3.2.3 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.

3.2.4 Waterway

Only a few companies consulted indicated they transport goods via barge. The comments related to 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. As shown in Figure 3-7, while the Mississippi River cuts through the Region, it represents just over one percent of the total tonnage transported on the freight system, and a fraction of the average tonnage transported on the water in other parts of the US. This are at least two ways this could be explained; 1) there are insufficient marine facilities to transport local goods on the water in the Region, or 2) lock unreliability due to aging infrastructure may be a deterrent for businesses in the Region to ship via the waterway.

Figure 3-7: Eight-County Region Modal Quotient, 2014

	Eight-County Region 2014 Tonnage Share	US Total Tonnage Share (excluding Air, Pipeline, Other)	Eight-County "Modal Quotient"
Truck	73.3%	79.6%	0.92
Rail	23.0%	12.4%	1.85
Multiple Modes	2.7%	3.1%	0.88
Water	1.1%	5.0%	0.21

Source: WSP | PB Analysis of FHWA Freight Analysis Framework version 4 (FAF4) data.

3.2.5 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), and airport that does have the capacity to accommodate propeller planes, regional and larger jets. 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.

3.3 Freight System Opportunities

Based on both quantitative analysis and stakeholder consultations, a slate of strategic opportunities were identified for the Eight-County Region, as shown in Figure 3-8. These strategies will be generally grouped within the "4 P" categories of 1) projects, 2) programs, 3) policies, and 4) partnerships. These opportunities were used to craft the Eight-County Freight System Recommendations outlined in the following section.

Figure 3-8: Strategic Opportunities for the Eight-County Region

Projects	Programs
• Spot highway improvements to address congestion and safety • Pavement improvements • Bridge improvements • New/improved intermodal, transload and/or port facilities • Lock and dam improvements	• Freight planning program to monitor needs, issues and progress • Programs focused on highway and railway safety (including grade separations) • Programs focused on technology applications to the (freight) transportation system • Programs focused on enhancing skills of local workforce
Policies	**Partnerships**
• Truck regulation harmonization between Iowa and Illinois • Freight-appropriate design standards	• Establish key partnerships to better understand freight system needs and work toward advancing strategies to improve the Eight-County Regional freight system and its connections

4 Eight-County Freight System Recommendations

Key Takeaway

The Eight-County Freight Study recommends that ten (10) strategic actions be taken as result of the thorough quantitative and qualitative analysis conducted. These recommendations support and advance the Vision established for the freight system, and directly address the freight system needs, issues and challenges identified during Study development.

The Eight-County Freight Study recommends that ten (10) strategic actions be taken as result of the thorough quantitative and qualitative analysis conducted. These recommendations support and advance the Vision established for the freight system, and directly address the freight system needs, issues and challenges identified during Study development. These recommendations have been grouped within the categories of projects, programs, policies and partnerships.

- **Projects.** Projects represent infrastructure-related recommendations.
- **Programs.** Programs represent recommendations where infrastructure projects have not been identified, but where a thoughtful, methodical approach should be considered in making investments.
- **Policies.** Policies support both project and program recommendations, as often the full benefits of those may not be achieved absent a guidance to ensure all parts of the system work together. This is particularly important in this bi-state Region that has policies established by multiple parties, and in some cases these policies are not harmonized.
- **Partnerships.** Stakeholders often find infrastructure-related recommendations to be the most tangible, however likely the most important category of recommendations is "partnerships." As much of the multimodal freight transportation system is not within the public (or ECIA's or BHRC's) domain, partnerships and collaboration will be critical to advancing any efforts off the highway system, or where the highway system intersects with other modes and developments. And, in most cases, even projects on the highway system require partnership due to the multiple jurisdictions that have interest, ownership or operations roles in a given project.

A summary of recommendations is provided in the following subsections, additional detail can be found on each recommendation in Working Paper 4 – Recommendations.

4.1 Project Recommendations

Infrastructure investments that could benefit freight system users were identified through data analysis, review of established state and local planning documents, and then validated through stakeholder consultations. The majority of infrastructure investments identified relate to simply ensuring that the existing system is well maintained and that spot improvements are made to improve safety. There is the potential need in the future for major new investments along two key east-west corridors that connect the Region to centers of transload and consolidation activity, including existing centers of Rockford, Rochelle, and Greater Chicago, and the burgeoning development in Cedar Rapids (i.e., Cedar Rapids Logistics Park). Three key project-related recommendations have been identified that ensure strategic infrastructure investments are made and to ensure that funding is available to advance those investments.

Recommendation 1: Advance roadway projects that provide benefits to freight users.

Recommendation 2: Advocate for multimodal improvements to the Eight-County freight transportation system.

Recommendation 3: Advocate for adequate funding and investment to maintain and improve the freight transportation system.

4.2 Program Recommendations

Neither ECIA nor BHRC construct, own, operate or maintain any part of the freight transportation system, therefore it is important that these agencies advance transparent processes that include outside freight perspectives in their daily activities that influence the system. This will not only produce a more comprehensive assessment and understand of the freight system and what is needed, but also helps ensure that the solutions that are ultimately advanced are ones that work in the "real world" for freight users. An inclusive approach to freight planning where both public and private sector voices are heard will help minimize opposition to projects and form a foundation of trust for expanded public and private sector partnerships in the future. Three key program-related recommendations have been identified to continue with the collaborative process established during the development of this Eight-County Freight Study. These recommendations provide an opportunity for long-term engagement within key areas including freight planning, safety, and design. While it is recommended that each ECIA and BHRC take these steps independently, they should also continue to coordinate with each other, across planning boundaries.

Recommendation 4: Formalize a freight planning program as part of activities to identify and address freight system needs, and to ensure freight system stakeholders are an ongoing and integral part of regional transportation planning processes.

Recommendation 5: Ensure that highway and railway safety is considered as part of all freight planning activities.

Recommendation 6: Establish and incorporate freight guidelines to ensure infrastructure improvements consider all users of the transportation system.

4.3 Policy Recommendations

Truck regulation harmonization between Iowa and Illinois is important to this freight study, as when the system is "harmonized" trucks are allowed unencumbered operations within and beyond the Region, to the benefit of the local economy. While a variety of regulatory barriers exist between Iowa and Illinois, the Eight-County stakeholders have identified inconsistent truck weight limits as the biggest issue and one that keeps companies in Iowa and Illinois on an uneven playing field.

Each of the policy recommendations made go beyond the jurisdiction of ECIA and BHRC and will require close partnership with the states of Iowa and Illinois to advance, as well as advocacy groups such as American Association of State Highway and Transportation Officials (AASHTO) and others.

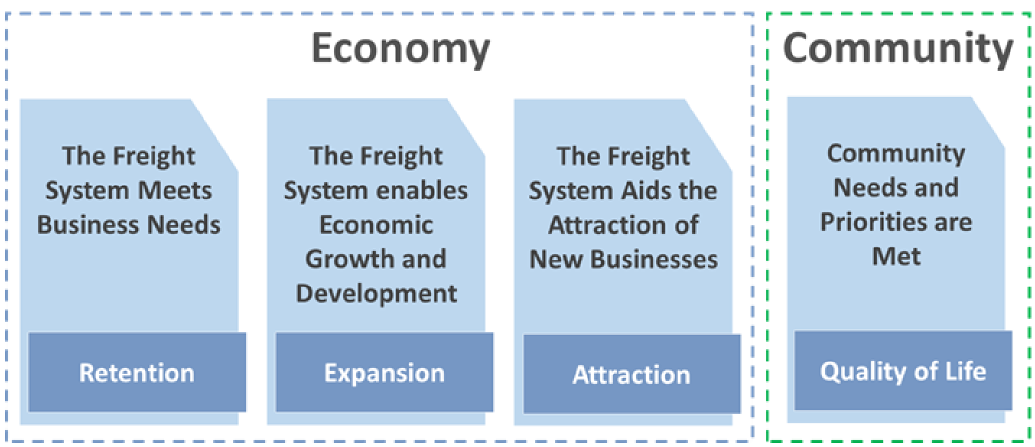
Recommendation 7: Harmonize overall trucking regulations between Iowa and Illinois for seamless freight operations between the states.

Recommendation 8: Harmonize truck weight limits between Iowa and Illinois.

4.4 Partnership Recommendations

The Eight-County Freight Study was sponsored by a consortium of public and private stakeholders that each has an interest in improving the Region. Four goals, shown in Figure 4-1, were established that underpin the Vision for the Eight-County freight system, and align with what is most important to those stakeholders. While the Eight-County Freight Study is focused on making improvements to the transportation system, these goals underscore that the movement of freight should support and enable the economy while not having adverse impacts on the communities in the Region. As such, not only do the transportation planners of the Region (ECIA and BHRC) have a role in advancing the recommendations of this Study, but so too does each project sponsor, as well as other public and private stakeholders at the local, regional and state level. Only through working together will the full benefits of Eight-County Freight Study recommendations be realized.

Figure 4-1: Eight-County Freight Study Goals



Recommendation 9: Coordinate with local public sector and industry partners to advocate for and improve the transportation system in the Eight-County Region

Recommendation 10: Support workforce development programs to ensure local businesses have access to skilled employees.

5 Benefit-Cost Analysis of Key Project Recommendations

Key Takeaway

Three project concepts were identified by the study stakeholders as potentially offering significant benefit to the study region and surrounding states: the US 20 Safety/Performance Corridor, the US 30 Multimodal Access Corridor, and the Dubuque/East Dubuque Marine Terminal. Each concept was evaluated using Benefit-Cost Analyses models and methods developed for, and consistent with, USDOT guidance for competitive grant applications. Spreadsheet models were created for each project, and were populated with the best available empirical data and – in cases where detailed information has not yet been developed – reasonable interim estimates to be modified or confirmed through future planning.

All three project concepts offer positive and substantial public benefit. The US 20 and US 30 projects have the highest levels of expected benefits, and each warrant significant capital investments. The Dubuque/East Dubuque Area Marine Terminal Enhancements offer lower levels of benefit, but could be beneficial if the necessary improvements can be accomplished at modest cost. The results support further investigation and potential advancement of all three project concepts.

5.1 Introduction to Benefit-Cost Analysis

To help the Eight-County stakeholders better understand the importance of comparative investments, as well as understand how projects may score in competitive grant solicitations, benefit cost analyses (BCAs) were prepared for three potential freight projects. Normally, BCAs are prepared for "shovel ready" freight projects that have advanced to a significant level of completion, where project definition, engineering design/cost factors, environmental issues and responses, travel/market demand, and other critical factors are known with a relatively high level of confidence.

An alternative use of BCAs is to look at freight projects that are not yet fully defined, to get a sense of what kinds of projects would yield better or worse BCA results, and understand the critical relationships between factors – principally project cost and volume of benefiting traffic. This kind of "parametric" or relational BCA analysis develops a wide range of scores, based on the input assumptions. Given that the study stakeholders have not identified "shovel ready" projects to be tested, the "parametric" BCA approach was followed.[7] The primary value of BCA development at this stage in the project planning process is to determine:

- The type of benefits each project should aim to achieve,
- The nature and definition of each project necessary to achieve those benefits,

[7] It should be understood that many of the critical input factors – including project description and definition, site / route information and attributes, amount of benefiting traffic, likely cost range, etc. – are conceptual in nature, and have not yet been supported by engineering, environmental, or market analysis.

- The appropriate cost of each project based on the value of its benefits, or
- The potential eligibility of each project for discretionary grant funding, or for ranking within applicable prioritization mechanisms.

Each of these will help the Eight-County Region decide whether a project should be further developed and advanced. The detailed BCA methodology used is provided in Working Paper 4 – Recommendations.

5.2 Benefit-Cost Analysis Results

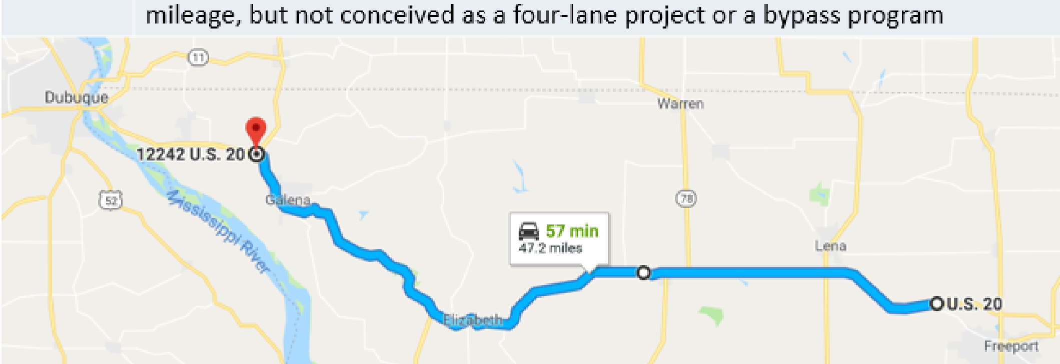
5.2.1 US 20 Safety/Performance Corridor (IL)

Improvements to US 20 have been identified by stakeholders as a top priority, especially the possibility of improving the roadway and Julien Dubuque Bridge to 4-lanes. The Eight-County Freight Study has determined that there are safety issues dotted throughout the corridor. While a full 4-lane improvement may not be warranted (given cost, loss of farmland, disruption to economically productive businesses, cost of maintaining new infrastructure and old at the same time),[8] safety improvements (shoulder widening, improved geometrics, intersection improvements) should be pursued in the near-term horizon.

The US 20 Safety/Performance Corridor concept analyzed in this study would provide various improvements at multiple locations to reduce the number and severity of truck-related crashes and improve overall performance along a 47-mile section of US 20, as described in Figure 5-1. The specific improvements have not yet been identified.

Figure 5-1: US 20 Concept-Level Project Definition

	Concept-Level Project Definition
Purpose	Reduce the number and severity of truck-related crashes and improve overall corridor performance for users; reduce the need for truckers to use longer and more expensive alternative routings (US-61/I-88, et al.)
Mode	Highway
Location	US 20 two-lane section between Freeport IL and Galena IL
Type and Extent	Improvements at multiple locations potentially addressing geometry, grade, speed, traffic controls, traffic conflicts; possibly including some limited new lane mileage, but not conceived as a four-lane project or a bypass program



The primary transportation effects of the project are summarized in Figure 5-2, and include:

[8] RECORD OF DECISION – US Route 20 (FAP 301) Jo Daviess and Stephenson Counties, FHWA-IL-EIS-00-03-F, September 22, 2005.

- **Distance.** Trucks may experience slight changes in distance if parts of US 20 are realigned, but for analysis purposes we assume no change. Trucks currently using US-61 and I-88 for trips including segments between Dubuque and Chicago (236 miles) would benefit from reduced travel distance on US-20 and I-90 (178 miles). Trucks currently using US-61 and I-88 for trips between Dubuque and Rochelle (159 miles) would benefit from reduced travel distance on US-20 and I-90 (116 miles).
- **Travel Time.** The analysis assumes current US 20 trucks would see an increased average speed of approximately 20 percent, with segment travel times dropping from 65 minutes to 54 minutes. Trucks currently using US-61 and I-88 for trips including segments between Dubuque and Chicago (4:20) would benefit from reduced travel time on US-20 and I-90 (3:27). Trucks currently using US-61 and I-88 for trips including segments between Dubuque and Rochelle (2:40) would benefit from reduced travel time on US-20 and I-90 (2:17).
- **Crashes.** This segment of US 20 experiences an average of 29 truck involved crashes per year and 263 non-truck involved crashes per year. The improvements aim to achieve a 30 percent reduction in truck crash rates and a 15 percent reduction in non-truck crash rates.

Figure 5-2: US 20 Transportation Effects

Performance Factors	Current Condition	Improved US-20
Distance • US-20 Segment • Dubuque-Chicago • Dubuque-Rochelle	 47 miles 236 miles (US-61/I-88) 159 miles (US 61/I-88)	 47 miles 178 miles (US-20/I-90) 116 miles (US-20/I-90/I-39)
Travel Time (AM Peak, Max) • US-20 Segment • Dubuque-Chicago • Dubuque-Rochelle	 1:05 (44 mph) 4:20 (US-61/I-88) 2:40 (US-61/I-88)	 0:52 (54 mph) 3:27 (US-20/I-90) 2:17 (US-20/I-90/I-39)
Crashes • Truck-Involved • Non-Truck Involved	 175 / 6 years = 29 per year 1575 / 6 years = 263 per year	 30% reduction 15% reduction
Time and Cost Savings (2016$) • US-20 Segment Users • Dubuque-Chicago Users • Dubuque-Rochelle Users • Avoided Crash Savings	 $5.90 per one-way truck trip $79.70 per one-way truck trip $51.70 per one-way truck trip $8.4 million per year	

Based on monetization factors from current USDOT Benefit-Cost Analysis guidance, current US 20 segment users would see travel time and vehicle operating cost savings of $5.90 per truck trip; Dubuque-Chicago users would see benefits of $79.70 per truck trip; Dubuque-Rochelle users would see benefits of $51.70 per truck trip; and the avoided crash savings based on current traffic levels would be $8.4 million per year.

The amount of traffic benefiting from the improvements is described in Figure 5-3 following.

- **Current traffic levels** over the extent of the improved segment are assumed equal to the lowest truck AADT segment volume. Future growth in this baseline traffic is assumed at 1.1 percent per year, based on Freight Analysis Framework (FAF)[9] forecasts.
- **Diverted** traffic that would shift from US-61 / I-88 routings to the improved corridor is estimated at half of the baseline traffic, assuming half to/from Chicago and half to/from Rochelle. These interim estimates are considered reasonable for purposes of this analysis, but need to be verified by more detailed network analysis and modeling before the findings are conclusive. Diverted traffic would also grow at 1.1 percent per year.
- **Total demand** is estimated at 1,420 trips per year and generates travel time/cost savings and vehicle miles of travel savings. Safety savings are calculated only from baseline traffic, because the diverted traffic would shift from routes that already have relatively low crash rates.

Figure 5-3: US 20 Travel Demand

Project Demand	Value	Comment
Truck AADT, Current US 20 Users (2015)	• Lowest Segment = 710 • Average Segment = 1264 • Highest Segment = 2400	Assume lowest AADT segment is most representative
Truck AADT, Diverted US 20 Users	Assume diversion from US-61 / I-88 could be half of current US 20 volume; split between Chicago and Rochelle	Conservative working assumption, should be verified by network modeling
Total Demand	1420 trips per day • 710 existing • 178 Chicago diversion • 178 Rochelle diversion No induced demand assumed	Safety benefit applies only to existing demand
Growth	1.1% / year AADT growth for trucks; same for autos	Truck rate from FAF
Phasing	First analysis year = 2021 Full diversion = 2023	Assumed for BCA purposes

Benefit-Cost Analysis results are presented in Figure 5-4. Over 30 years, the benefit totals are:

- $603 M (0% discount);
- $361 M (3% discount); and
- $204 M (7% discount).

Approximately 53 percent of the benefit is from safety benefits, and 45 percent of the benefit is from travel time/cost savings. At a target BCR of 1.5, the supported level of project investment would be $136 M (7% discount) to $240 M (3% discount). These funds could be allocated towards any and all types of projects necessary to achieve the performance gains assumed in the analysis.

[9] The Freight Analysis Framework (FAF) is a publicly available commodity flow database developed by the FHWA. This resource is described in detail in Working Paper 2 – Existing and Future Commodity Profile.

Figure 5-4: US 20 Benefit-Cost Analysis Summary

Benefit Summary (0% Discounting)

Economic Competitiveness	$	271,931,268	45.1%
State of Good Repair	$	6,270,851	1.0%
Sustainability	$	7,799,216	1.3%
Safety	$	316,737,937	52.5%
Total Benefit	**$**	**602,739,272**	100.0%
Project Cost	**$**	**401,826,181**	
BCR		**1.50**	

Benefit Summary (3% Discounting)

Economic Competitiveness	$	161,470,284	44.8%
State of Good Repair	$	3,715,008	1.0%
Sustainability	$	5,076,327	1.4%
Safety	$	190,426,895	52.8%
Total Benefit	**$**	**360,688,515**	100.0%
Project Cost	**$**	**240,459,010**	
BCR		**1.50**	

Benefit Summary (7% Discounting)

Economic Competitiveness	$	90,186,077	44.2%
State of Good Repair	$	2,066,932	1.0%
Sustainability	$	3,180,035	1.6%
Safety	$	108,558,524	53.2%
Total Benefit	**$**	**203,991,569**	100.0%
Project Cost	**$**	**135,994,379**	
BCR		**1.50**	

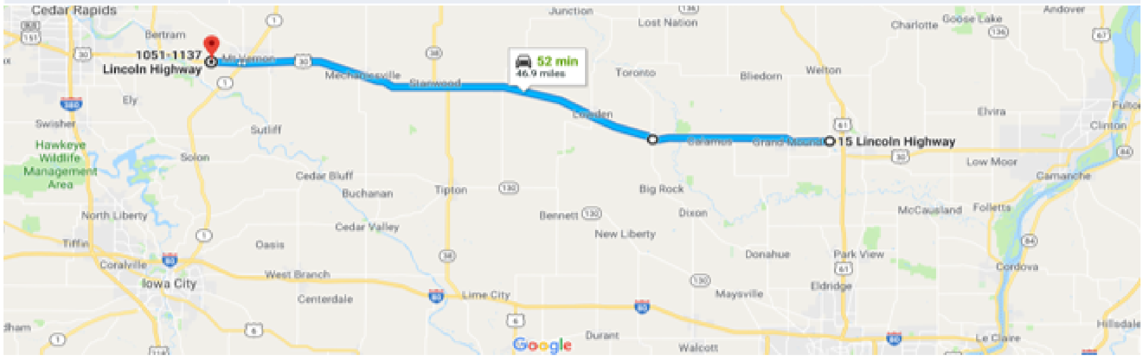
5.2.2 US 30 Multimodal Access Corridor (IA)

New investments in multimodal freight handling capacity in Cedar Rapids offer the opportunity for improved freight access to/from the Region, but this will depend on efficient connectivity between the Region and Cedar Rapids. Future development of barge terminal capacity in the Clinton area could provide additional demand for this corridor.

The US 30 Multimodal Access Corridor concept analyzed in this Study would provide improvements along the two-lane section of US 30 between Dewitt, IA, and Mt. Vernon, IA – a 47-mile segment partially within and partially west of the Region. The goal is to improve access between the Region, new multimodal facilities being developed at Cedar Rapids, and potential future marine terminals at or near East Clinton IL. See Figure 5-5.

Figure 5-5: US 30 Concept-Level Project Definition

	Concept-Level Project Definition
Purpose	Improve access between the Study Area, new multimodal transfer facilities being developed at Cedar Rapids IA, and potential future marine terminal at or near East Clinton IL; reduce the need for truckers to use longer and more expensive alternative routings (US-61/I-80, et al.)
Mode	Highway
Location	US 30 two-lane section between Dewitt IA and Mt. Vernon IA (within and west of the Study Area)
Type and Extent	Selected performance improvements, TBD, possibly including additional lane mileage



The primary transportation effects of the project are summarized in Figure 5-6, and include:

- **Distance**. Current US 30 trucks might see slight changes in distance if parts of US 30 are realigned, however for analysis purposes no change was assumed. Trucks currently using US-61 and I-80 for trips including segments between Clinton and Cedar Rapids (112 miles) would benefit from reduced travel distance via US-30 (84 miles).

- **Travel Time**. The analysis assumes current US 30 trucks would see an increase of roughly 20 percent in average speed, with segment travel times dropping from 55 minutes to 44 minutes. Trucks currently using US-61 and I-80 for trips including segments between Clinton and Cedar Rapids (1:47) would benefit from reduced travel time via US-30 (1:24).

- **Crashes**. Within the Study Area, this segment of US 30 experiences an average of 23 truck involved crashes per year and 86 non-truck involved crashes per year. The improvements aim to achieve a 30 percent reduction in truck crash rates and a 15 percent reduction in non-truck crash rates.

Figure 5-6: US 30 Transportation Effects

Performance Factors	Current Condition	Future with Improvements
Distance • US-30 Segment • Clinton to Cedar Rapids	47 miles 112 miles (US-30/US-61/I-80)	47 miles 84 miles (US-30)
Travel Time (AM Peak) • US-30 Segment • Clinton to Cedar Rapids	0:55 (51 mph) 1:47 (US-30/US-61/I-80)	0:44 (64 mph) 1:24 (US-30)
Crashes • Truck-Involved • Non-Truck Involved	136 / 6 years = 23 per year 517 / 6 years = 86 per year	30% reduction 15% reduction
Time and Cost Savings (2016$) • US-30 Segment • Alt Route Users • Avoided Crash Savings	$4.99 per one-way truck trip $37.30 per one-way truck trip $2.6 million per year	

Based on monetization factors from current USDOT Benefit-Cost Analysis guidance, current US 30 segment users would see travel time and vehicle operating cost savings of $4.99 per truck trip; Clinton-Cedar Rapids users would see benefits of $37.30 per truck trip; and the avoided crash savings based on current traffic levels would be $2.6 million per year.

The amount of traffic benefiting from the improvements is described in Figure 5-7 .

- **Current traffic levels** over the extent of the improved segment are assumed equal to the lowest truck AADT segment volume. Future growth in this baseline traffic is assumed at 1.1 percent per year, based on FAF forecasts.

- **Diverted** traffic that would shift from US-61 / I-80 routings to the improved corridor is estimated to be equal to baseline traffic. This interim estimate is considered reasonable for purposes of this analysis, but needs to be verified by more detailed network analysis and modeling before the findings are conclusive. Diverted traffic would also grow at 1.1 percent per year.

- **Induced demand** might occur on the improved corridor due to business expansion/relocation decisions, to take advantage of better access. However, because such decisions would likely be shifts in freight movement between different current or potential locations within Iowa, we do not claim credit for this effect in the BCA.

- **Total demand** is estimated at 1,118 trips per year. Travel time/cost savings and vehicle miles of travel savings are generated by 894 of these trips. Safety savings are calculated only from baseline traffic, because the diverted traffic would be shifting from routes that already have relatively low crash rates.

Figure 5-7: US 30 Travel Demand

Project Demand	Value	Comment
Truck AADT, Current US 20 Users	• Lowest Segment = 447 • Average Segment = 493 • Highest Segment = 720	Assume lowest segment is most representative
Truck AADT, Diverted US 30 Users	Assume diversion from US-61 / I-80 is equal to current US 30 volume; all for Cedar Rapids	Working assumption, should be verified by network modeling
Truck AADT, Induced Demand, US 30 Users	Assume add'l growth equal to half of current traffic is driven by Cedar Rapids and US 30-served barges	Assume this traffic would otherwise be accommodated on IA roads with comparable VMT and crash impacts, so no effect on BCA
Total Demand	1118 trips per day • 447 existing • 447 diverted • 224 induced	Safety benefit applies only to existing demand
Growth	1.1% / year AADT growth for trucks; same for autos	Truck rate from FAF
Phasing	First analysis year = 2021 Full diversion = 2023 Full induced growth = 2025	Assumed for BCA purposes

Benefit-Cost Analysis results are presented in Figure 5-8. Over 30 years, the benefit totals are:

- $272 M (0% discount);
- $162 M (3% discount); and
- $91 M (7% discount).

Approximately 28 percent of the benefit is from safety benefits, and 69 percent of the benefit is from travel time/cost savings. At a target BCR of 1.5, the supported level of project investment would be $61 M (7% discount) to $108 M (3% discount). These funds could be allocated towards any and all types of projects necessary to achieve the performance gains assumed in the analysis.

Figure 5-8: US 30 Benefit-Cost Analysis Summary

Benefit Summary (0% Discounting)

Economic Competitiveness	$	186,246,541	68.6%
State of Good Repair	$	4,365,668	1.6%
Sustainability	$	5,429,691	2.0%
Safety	$	75,639,189	27.8%
Total Benefit	**$**	**271,681,089**	100.0%
Project Cost	**$**	**181,120,726**	
BCR		**1.50**	

Benefit Summary (3% Discounting)

Economic Competitiveness	$	110,534,957	68.2%
State of Good Repair	$	2,586,330	1.6%
Sustainability	$	3,534,059	2.2%
Safety	$	45,475,247	28.0%
Total Benefit	**$**	**162,130,593**	100.0%
Project Cost	**$**	**108,087,062**	
BCR		**1.50**	

Benefit Summary (7% Discounting)

Economic Competitiveness	$	61,684,262	67.6%
State of Good Repair	$	1,438,966	1.6%
Sustainability	$	2,213,891	2.4%
Safety	$	25,924,519	28.4%
Total Benefit	**$**	**91,261,637**	100.0%
Project Cost	**$**	**60,841,092**	
BCR		**1.50**	

5.2.3 Dubuque/East Dubuque Area Marine Terminal Enhancement (serving IA, IL, and WI)

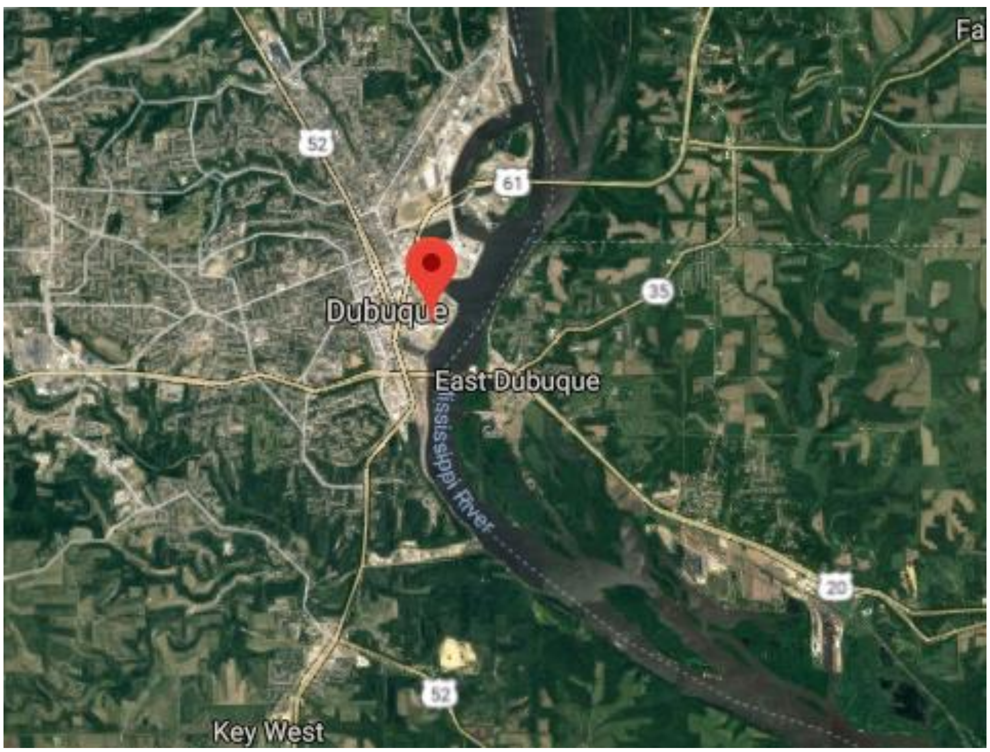
The Eight-County Freight Study has shown that the maritime system in the region is underutilized. This facility concept aims to build on what the Region currently does well (manufacturing) and shift some products that today are shipped via road and rail to the maritime system. The enhancement of barge terminal capacity at multiple locations in Dubuque and East Dubuque (and as far south as Savanna, IL) has been contemplated.

The Dubuque/East Dubuque Area Marine Terminal Enhancement concept would provide improvements to existing barge terminal(s) in the region to accommodate new types of cargo. The focus would be on commodities other than liquid bulk or dry bulk (things like coal, grain, fertilizer, fuels, oils, etc.) that can be handled at existing terminals; and it would not target containerized commodities, given the undetermined market for such a service as well as potential competition from Muscatine, IA, for whatever demand exists. Even with these exclusions, the terminal(s) could handle a broad range of important and high-value goods: steel, dimensioned lumber, machinery and parts, transportation equipment, bagged organic and inorganic materials and products, construction equipment and fabricated shapes, etc. See Figure 5-9.

The Study Team held discussions with area barge operators to validate market and operational assumptions used in the analysis. Market projections were generated using the FAF. Note that the results do not address comparisons between possible alternative sites for a barge terminal. Understanding the strengths and weaknesses of different sites requires a higher level of market analysis and engineering/environmental investigation. The market analysis is valid for any single terminal site, or functional combination of terminal sites, in the region, within a roughly 25-mile radius of the Julien Dubuque Bridge.[10] Importantly, the market analysis is based on the diversion of existing truck traffic to barge, and does not assume or rely on attracting existing barge traffic from other river terminals.

Figure 5-9: Dubuque/East Dubuque Area Marine Terminal Concept-Level Project Definition

	Concept-Level Project Definition
Purpose	Improve Marine Terminal capacity in the Dubuque/East Dubuque area to accommodate a broad range of higher-value ro-ro, break-bulk, and project cargo; does not include containers, liquid bulk, or dry bulk
Mode	Marine
Location	Dubuque/East Dubuque Area
Type and Extent	Improvements to existing terminal(s) to attract new cargo types/customers



The primary challenge in evaluating truck to barge modal diversion potential is understanding the service trade-offs between the two modes, and the conditions under which barges are likely to be most and least attractive for current truck users. Key variables and considerations include the following.

[10] While Savanna, IL, also presents a maritime-related opportunity, the site is at a different stage of development, as well as over 45 miles from Dubuque/East Dubuque; therefore the benefit-cost results in this Working Paper should not be generally applied to the Savanna location.

- **Market Sheds and Drayage.** From previous experience, we assume the likely "market shed" for potential users of the terminal would be within a 75-mile radius. This includes areas as distant as Cedar Rapids, Davenport, Rockford, and Madison. Within this radius, users could truck to and from the terminal (known as "drayage"); at greater distances, they would likely truck to alternative barge locations, or to rail terminals, or utilize all-truck routings.

- **Partner Markets.** The main trading partner markets for the Dubuque/East Dubuque facility would be Minneapolis/St. Paul; St, Louis; Memphis; and Baton Rouge/New Orleans/South Louisiana. Each of these partner market areas offers large production capacity, a large consuming population, well-developed barge infrastructure, and strong truck and rail connectivity. The physical extent of each market was assumed at 75 miles.

- **Market Attraction Factors.** On a per ton-mile basis, barge is far less expensive than trucking – provided the commodities being moved are not highly sensitive to time. Barge is much slower than truck or rail, so commodities that are perishable or time-sensitive, or represent high inventory holding costs, are unlikely to use barge under any circumstances. The commodities that take best advantage of barge's cost efficiencies tend to be heavy bulk materials and products – rock, coal, etc. – where maintaining a regular delivery schedule is more important than how fast a single shipment moves. However, other higher-value commodities can potentially take advantage of the cost efficiencies offered by barge, under the right conditions. Namely, there has to be a significant supply chain advantage, where the cost of the barge and associated truck drayage is less than the cost of an all truck or truck/rail move, and the delivery speed difference is not burdensome to the customer.

- **Load Factors.** A particularly attractive market is oversize-overweight commodities, which may require special permits or multiple truck trips to move over the road, but are easily accommodated on water. This analysis assumes performance and market demand based on fully-loaded truckload equivalents (22 tons), but with larger loads, the attractiveness of barge services is increased.

- **Cost Comparison.** This analysis looked at each of the four market area pairs and estimated truck costs versus potential costs through improved Dubuque/East Dubuque terminal(s). All-truck costs were estimated using national per-truckload averages recently updated by the American Trucking Association, considering the 'centroid to centroid' mileage between the markets plus or minus 75 miles from each centroid. Barge service costs were estimated reflecting assumed costs for barge operations, barge-to-terminal-to-truck transfer and handling, and truck drayage. Barge costs assumed average drayage of 37.5 miles at each end of the trip, with trucks loaded in one direction and empty in the other; inventory costs were not considered, since time-sensitive commodities are assumed not to be interested in barge service.

Based on these considerations, the primary transportation effects of the project (in this case, transport cost differences) are summarized in Figure 5-10.

- The cost of a **Dubuque-Minneapolis/St. Paul barge service is likely to be higher** than the average cost of all-trucking service, although barge could be competitive for a small portion of the market where trucking is at the high end of the cost range. This indicates the analysis should assume that only a small percentage of truck traffic could be diverted to barge service (e.g., a low "diversion rate").

- The cost of a **Dubuque-St Louis barge service is generally comparable** with the average cost of trucking with barge costs being comparable. Around half of trucking customers will have a lower cost by truck, and will probably not be interested in barge; the other half will have a higher cost by truck, and may be interested in barge. This suggests a moderate diversion rate is appropriate. Often, barge studies assume – in the absence of detailed demand studies and modeling – diversion rates of 5 to 10 percent. In our opinion the 5 percent rate is a fair representation of market attraction under conditions where average pricing between truck and barge services is equivalent.

- The cost of a **Dubuque-Memphis barge service is likely to be just below the lowest price** offered by trucking for this market pair. This suggests a relatively aggressive diversion rate should be used in the analysis.

- The cost of a **Dubuque-South Louisiana barge service is likely to be substantially below the lowest price** offered by trucking for this market pair. This suggests an aggressive diversion rate should be used in the analysis.

Figure 5-10: Dubuque/East Dubuque Area Marine Terminal Comparative Pricing

Performance Factors	Current (All Truck)	Future (Truck/Barge)
Dubuque Market Shed-MSP • Transport Cost, 22-ton unit	253 miles +/- 150 miles $184-**$452**-$720	**$593**
Dubuque Market Shed-St Louis • Transport Cost, 22-ton unit	335 miles +/- 150 miles $330-**$598**-$866	**$610**
Dubuque Market Shed-Memphis • Transport Cost, 22-ton unit	619 miles +/- 150 miles $838-**$1106**-$1374	**$723**
Dubuque Market Shed-South LA • Transport Cost, 22-ton unit	1000 miles +/- 150 miles $1518-**$1786**-$2054	**$975**

Next, the market demand for a potential expansion of barge service was estimated according to the following process. Results are summarized in Figure 5-11.

- The analysis boundaries of each market area were determined. For Dubuque, this included 27 counties in IL, IA, and WI largely within a 75-mile radius of the Julien Dubuque Bridge. For partner markets, the census-defined Business Economic Area region was deemed representative for estimating commodity demand.

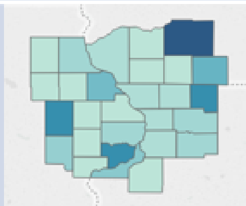
- The target relevant commodity groups were specified, based on the choices provided by the USDOT Freight Analysis Framework. Obvious liquid bulk and dry bulk commodities were excluded, as were high-value commodities known to be very-time sensitive, and/or known to prefer movement in containers or "dry van" trucks.

- Using the county-level FAF disaggregation developed by WSP for Illinois DOT, we tabulated the tonnages for target commodities moving between each of the four defined market pairs in year 2014. The total market consists of more than 1.8 million tons; the highest tonnage is to/from Minneapolis-St. Paul (1.1 million tons) and the lowest tonnage is to/from South Louisiana (less than 0.1 million tons).

- Next, we developed a simplified market capture model, assuming potential market demand would be captured at rates of 2.5 percent for MSP; 5.0 percent for St. Louis; 7.5 percent for Memphis; and 10.0 percent for South Louisiana.

- Summing all the model components, the total demand in year 2014 is estimated at just over 68,000 tons per year. This is equivalent to around 73 fully-loaded truck trips per week. Volume growth was assumed at 1.1 percent per year, based on FAF.

Figure 5-11: Dubuque/East Dubuque Area Marine Terminal Market Demand

<table>
<tr><th>Project Demand</th><th colspan="2">Freight Analysis Framework (2014)</th></tr>
<tr><td>75-mile radius
27 counties
IA, IL, WI
</td><td colspan="2">Articles of Base Metal; Chemical Products; Machinery; Misc. Manufactured Products; Motorized Vehicles; Newsprint/Paper; Nonmetallic Mineral Products; Paper Articles; Plastics/Rubber; Precision Instruments; Printed Products; Transportation Equipment; Wood Products</td></tr>
<tr><td>Partner Market (BEA Level)
• Minneapolis-St. Paul
• St. Louis
• Memphis
• Baton Rouge/New Orleans
Total</td><td colspan="2"><u>Current Truck Tons (2014)</u>
1,148,548
521,047
73,430
78,741
1,821,776</td></tr>
<tr><td>Market Capture Model
• Minneapolis-St. Paul
• St. Louis
• Memphis
• Baton Rouge/New Orleans
Total</td><td><u>Potential Capture</u>
28,184 (2.5%)
26,053 (5.0%)
5,507 (7.5%)
7,874 (10.0%)
68,148 (3.7%)</td><td>3,786 truckloads / year
73 truckloads / week
First analysis year = 2021; full market absorption = 2023
Growth = 1.1% / year
(FAF Truck Growth)</td></tr>
</table>

The Benefit-Cost Analysis then considered the likely effects of capturing this level of tonnage through Dubuque/East Dubuque area facilities. The main transportation effects were:

- Lower costs for barge service users compared to all-truck costs,
- Substantially reduced truck mileage, based on the elimination of long-haul truck trips and their replacement with short-distance drayage trips to and from the barge terminal, and
- Reduced highway maintenance needs, reduced tailpipe emissions, and reduced highway crashes associated with reduced truck mileage.

Benefit-Cost Analysis results are presented in Figure 5-12. Over 30 years, the benefit totals are:

- $32.2 M (0% discount);
- $19.2 M (3% discount); and
- $10.8 M (7% discount).

Approximately 63 percent of the benefit is from economic competitiveness, in the form of cost savings to freight shippers who shift from truck to barge; note that USDOT guidance currently does not allow this to be counted as benefit, but for purposes of analysis it makes sense to provide the information. At a target BCR of 1.5, the supported level of project investment would be $7.2 M (7% discount) to $12.8 M (3%

discount). These funds could be allocated towards any and all types of projects necessary to achieve the performance gains assumed in the analysis.

Figure 5-12: Dubuque/East Dubuque Area Marine Terminal Enhancement Benefit-Cost Analysis Summary

Benefit Summary (0% Discounting)

Economic Competitiveness	$	20,210,988	62.7%
State of Good Repair	$	2,008,075	6.2%
Sustainability	$	1,736,445	5.4%
Safety	$	8,272,992	25.7%
Total Benefit	**$**	**32,228,500**	100.0%
Project Cost	**$**	**21,485,667**	
BCR		**1.50**	

Benefit Summary (3% Discounting)

Economic Competitiveness	$	11,973,493	62.4%
State of Good Repair	$	1,189,633	6.2%
Sustainability	$	1,130,122	5.9%
Safety	$	4,901,127	25.5%
Total Benefit	**$**	**19,194,375**	100.0%
Project Cost	**$**	**12,796,250**	
BCR		**1.50**	

Benefit Summary (7% Discounting)

Economic Competitiveness	$	6,661,734	61.9%
State of Good Repair	$	661,881	6.2%
Sustainability	$	707,892	6.6%
Safety	$	2,726,857	25.3%
Total Benefit	**$**	**10,758,364**	100.0%
Project Cost	**$**	**7,172,243**	
BCR		**1.50**	

5.3 Findings of Benefit-Cost Analysis

As analyzed, each project concept offers benefits, but support very different levels of investment: 1) US 20 and US 30 projects have high benefits, and could support high costs; this is good news, since these projects are likely to be expensive, and 2) barge terminal improvements have modest benefits, but would be beneficial if they can be accomplished with modest expenditures. In order to advance these projects additional funding will be required to execute next steps, including to:

- Further define the location, type, and extent of project improvements,
- Further develop/confirm the demand estimates and estimate construction and operating costs,
- Revisit, revise, and finalize the benefit cost analysis based on updated inputs, and
- “Value engineer” the program concepts to maximize BCA and ROI metrics.

6 Next Steps for the Eight-County Region

Key Takeaway

To advance the Eight-County Freight Study recommendations, an action agenda has been developed that provides guidance on who should lead each recommendation and what the recommendation priority should be. Key to most actions is both ECIA and BHRC expanding their facilitator roles to include public and private sector freight stakeholders in their planning processes, so the Region can work together to improve its economy and community quality of life.

6.1 Freight Action Agenda for the Eight-County Region

The Eight-County Freight Study recommends that ten (10) strategic actions be taken as result of the quantitative and qualitative analysis conducted during the study period. The recommendations are listed in Figure 6-1, and additional detail is provided on each in Working Paper 4 – Recommendations. As shown in the figure, a lead agency has been suggested for each recommendation, as well as an estimated timeframe to begin recommendation-related activities.

The **lead agency** was suggested based on current roles of Regional stakeholders, and consideration of what may be logical roles in the future. Note that ECIA and BHRC have a lead role in most actions, but to be effective they will need to coordinate with the other stakeholders and agencies noted.

In order to effectively advance these steps, both a mandate and funding should be available for ECIA and BHRC. ECIA (through DMATS – Dubuque Metropolitan Area Transportation Study) is a federally-designated MPO tasked with regional planning and stakeholder engagement, receiving sub-allocated funding from Iowa DOT, combined with local dollars, to conduct transportation planning activities. ECIA should ensure that freight remains an integral part of agency activities, and that funding is allocated so that the bulled steps above may be incorporated in ongoing transportation planning. BHRC is not a federally-mandated MPO, and does not have the same transportation planning mandate or funding resources as ECIA, limiting its ability to explore freight/transportation issues on an ongoing basis. BHRC must receive both a mandate and adequate funding from sponsoring county agencies to ensure that freight/transportation planning continues, but also to support advancement of the overall recommendations contained in this Eight-County Freight Study.

The **timing of each activity** – short- (0-1 years), mid- (2-4 years), or long-term (5 years, or beyond) – was determined based on any work already in progress, as well as the complexity of the activity. Those recommendations suggested for short-term action ensures that key infrastructure recommendations advance, as does continued engagement of Regional public and private sector stakeholders.

Activities that are more complex and are expected to take longer to start-up include those not led by ECIA or BHRC, as there will need to be discussions locally on if the suggested lead(s) choose to be engaged on the topic. Additionally, recommendations that reflect changes to policy are generally more complex and require additional to prepare for, as well as to execute.

Figure 6-1: Freight Action Agenda for the Eight-County Region

Recommendation	Suggested Lead	Timing
Projects		
Recommendation 1: Advance roadway projects that provide benefits to freight users.	ECIA and BHRC in partnership with county engineers, and DOTs	Short-term
Recommendation 2: Advocate for multimodal improvements to the Eight-County freight transportation system.	ECIA and BHRC in partnership with Regional freight stakeholders	Short-term
Recommendation 3: Advocate for adequate funding and investment to maintain and improve the freight transportation system.	ECIA and BHRC in partnership with Regional freight stakeholders	Mid-term
Program		
Recommendation 4: Formalize a freight planning program as part of activities to identify and address freight system needs, and to ensure freight system stakeholders are an ongoing and integral part of regional transportation planning processes.	ECIA and BHRC, to dovetail with efforts underway by Iowa and Illinois DOT	Short-term
Recommendation 5: Ensure that freight highway and railway safety is considered as part of all planning activities.	ECIA and BHRC in partnership with county engineers, and DOTs	Mid-term
Recommendation 6: Establish and incorporate freight-appropriate guidelines to ensure infrastructure improvements consider all users of the transportation system.	County engineers, and Iowa and Illinois DOTs	Long-term
Policy		
Recommendation 7: Harmonize overall trucking regulations between Iowa and Illinois for seamless freight operations between the states.	Iowa and Illinois DOTs	Long-term
Recommendation 8: Harmonize truck weight limits between Iowa and Illinois.	Iowa and Illinois DOTs	Long-term
Partnership		
Recommendation 9: Coordinate with local public sector and industry partners to advocate for and improve the transportation system in the Eight-County Region.	ECIA and BHRC in partnership with Regional freight stakeholders	Short-term
Recommendation 10: Support workforce development programs to ensure local businesses have access to skilled employees to maintain and grow.	ECIA and BHRC in partnership with Regional freight stakeholders and educational institutions	Mid-term

6.2 Next Steps

As described, short-term recommendations are intended to continue the momentum of this Study. **Recommendation 1: Advance roadway projects that provide benefits to freight users** generally relates to the advancement of key infrastructure projects identified in the Study, and is specifically focused on taking next steps required for improving US 20, US 30 and enhancing an existing barge terminal in the Region.

The benefit-cost analysis conducted for these three key project showed that there is "something there" to be explored further. Each project demonstrated benefits that could be commensurate with varying levels of cost. The US 20 and US 30 projects have high benefits, and could support high costs, and the barge terminal improvements have modest benefits, but could probably be accomplished with very modest expenditures.

Securing funding to advance these projects and other projects in the Region is important but could pose challenges. There is a continuous need for transportation funding for the essentials, such as the ongoing maintenance bridges and pavement in the Eight-County Region. These projects will benefit the freight users of the system, but lack the cachet of major new capital programs leaving little room in tight budgets for system expansion or innovation. New, freight-specific funding sources may provide opportunities to address freight system needs, however many of the current federal grant programs that could be used to supplement local resources (e.g., TIGER or INFRA) are highly competitive.

The Eight-County Region is very fortunate, as there are funding opportunities for each of the three key projects that underwent benefit-cost analysis:

- **US 20 Safety Performance Corridor.** In January 2018, ECIA and BHRC met with the Illinois DOT Secretary and District 2 staff to present the findings of the Eight-County Freight Study US 20 safety analysis, and stress the need for increased attention to, and investment in, the corridor. Following that meeting, Illinois DOT noted that in the coming year they would fund a Road Safety Audit of the US 20 corridor to better understand where key safety issues exist, as well as identify and advance appropriate countermeasures. While this project was identified to benefit trucks and goods movement, the next steps taken by Illinois DOT will provide benefits to all users of the corridor.
- **US 30 Multimodal Access Corridor.** As part of this study a roundtable was held in Clinton, IA, to better understand key issues and needs in the US 30 corridor. With major development occurring along the corridor to the west of the Eight-County Region (i.e., Cedar Rapids Logistics Park), preserving and enhancing mobility in the corridor was noted as a concern. In January 2018, ECIA discussed next step options for the corridor, and the Iowa DOT agreed to advance a US 30 Corridor Planning and Environmental Linkages (PEL) study to ensure that needs/issues arising due to the development are proactively addressed.
- **Dubuque/East Dubuque Area Marine Terminal.** The enhancement of barge terminal capacity at multiple locations in Dubuque and East Dubuque (and as far south as Savanna, IL) has been contemplated. As the Eight-County Freight Study was being completed, Illinois DOT announced the new, Illinois Competitive Freight Program. The program solicits applications from public sector entities, and aims to fund studies and projects focused on reducing bottlenecks, improving freight safety, improving intermodal access and the deployment of technology. ECIA is in the process of submitting an application for future funding for next steps (a planning study) related to further study of this opportunity, in collaboration with Iowa partners.

While the Eight-County Region has considerable momentum related to key Study recommendations, it will be important for other planning and policy related recommendations to not sit idle. From a transportation perspective, the major roles of ECIA and BHRC relate to the coordination of long range transportation system planning, forming regional transportation policy, and making programming decisions to best apply federal, state and local transportation dollars to regional needs. In these roles both ECIA and BHRC have a history of coordinating with local stakeholders. To advance the Eight-County Freight Study recommendations, their natural facilitator role should be expanded to include key public and private sector stakeholders that have an interest in advancing these recommendation to the benefit of the Region's economy and community quality of life.