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Infrastructure and Market Assessment: Ports of La Crosse and Prairie du Chien

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The Port of La Crosse
The Port of Prairie du Chien

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EXECUTIVE SUMMARY

Waterborne commerce has always played an essential role in Wisconsin's economy. Wisconsin's commercial ports on the Mississippi River and the Great Lakes continue to play a vital role, moving commodities between producers and markets within the state and throughout the nation and world. Maritime shipping provides and essential complement to trucks and railroads, moving commodities too heavy and bulky to be efficiently moved by other modes and is a viable alternative to these modes for a range of other products. Growing concerns over the condition and capacity of road and rail infrastructure to meet future needs and increased and environmental concerns associated with these modes further underscore the value of Wisconsin's ports and navigation infrastructure. Yet role played by waterborne shipping is often overshadowed by that of highways and railroads. There are growing concerns that a lack of understanding of the existing and potential value of inland waterway shipping to local and state economy has led to neglect of river and port infrastructure by both the private and public sector. Competition from other freight modes and competition for space at ports and waterfronts necessary for the efficient handling of freight and vessels pose additional threats.

This report provides a baseline assessment of infrastructure and markets at Wisconsin's two largest commercial Mississippi River ports at La Crosse and Prairie du Chien. The assessments are used to identify strengths, weaknesses, opportunities and threats facing Wisconsin reports. In general, investment at these two river ports is substantial and the condition of port infrastructure is generally good. The level of local government support or commercial river shipping at both ports varies from facility to facility but generally speaking, both communities try to balance the need for commercial navigation with other waterfront uses and environmental protection. For example, the Port of La Crosse Joint Board of Harbor Commissioners and member communities have been particularly proactive in working with local shipping industries to identify which commercial port facilities should be allowed to expand, remain the same, or relocated. The results of our market assessment reveal that waterborne freight continues to play a large role for western Wisconsin grain farmers, particularly those exporting to foreign markets via Louisiana ports. River ports also continue to provide a cost efficient means of moving cement, fertilizer, chemicals, salt, aggregates and other commodities that would otherwise place additional demands on roads and railways. Expansion of port activities to include new commodities faces various challenges but should not be ruled out. The primary strengths of river shipping (low cost, low environmental impact) and of the ports themselves (good locations, good access to other freight modes, and proximity to agricultural producers) continue to be somewhat offset by primary weaknesses (winter closure of the Upper Mississippi, relatively small local markets). Significant opportunities for commercial river ports include rising costs of competing modes and the opportunity to expand market share; while threats come in the form of underinvestment in river infrastructure away from ports and competition for both mode share and riverfront property.

1 INTRODUCTION

Bordered by two Great Lakes and the Mississippi River, Wisconsin enjoys prime water to access regional, national, and global markets. Wisconsin's two largest Mississippi River port communities, Prairie du Chien and La Crosse, serve as multimodal freight hubs, with good railroad and highway access to ports. Compared to the Wisconsin's larger Great Lake commercial ports, the commercial river ports in Prairie du Chien and La Crosse handle much less volume, but still play a vital role in the local and State economy, particularly the agricultural sector. The tonnage of commodities shipped by barge varies over time but remains significant for some commodities. In order to assure continued success, an assessment of port infrastructure and markets is a potentially useful tool to identifying opportunities and threats to the economic health of waterborne commerce, and could point the way to improving policies and investments essential to continued success.

Source: MAFC, US Census, ESRI 2013

Figure 1: Commercial ports of Wisconsin and neighboring states

Private port owners and operators in La Crosse and Prairie du Chien have invested considerable resources in their facilities, indicating confidence in the future of waterborne shipping in spite of threats of underinvestment in public infrastructure. Similarly, local port authorities in both La Crosse and Prairie du Chien have committed resources and effort to harbor and waterfront planning for all purposes, including commercial freight movement. However, these investments could be undermined if local, state, and federal policies are not aligned and investment in the entire inland waterway system is insufficient. Increased competition from railroads and trucks and the greater attention that these modes may receive from by policy makers pose a threat.

This report is intended to summarize the condition of facilities of two Wisconsin river ports as well as the condition of vital public river, rail, and road infrastructure necessary for efficient commercial port operations. It also provides a brief overview of the patterns of trade between Wisconsin's commercial river ports and the rest of the nation; how well Wisconsin's ports are faring compared to neighboring Upper Mississippi River ports in Minnesota and Iowa; and how well barge shipping is faring against other freight modes.

The project is sponsored by a partnership between Wisconsin Commercial Ports Association (WCMP) (WPCA) and four public agencies. The four public agencies are the Wisconsin Economic Development Corporation (WEDC), the Wisconsin Department of Transportation (WISDOT), the Wisconsin Department of Administration (WDA) as part of its Wisconsin Coastal Management Program (WCMP), and the National Center for Freight Infrastructure Research and Education (CFIRE) at the University of Wisconsin - Madison. CFIRE is part of a consortium of US DOT sponsored University Transportation Centers, and the project team will consist of UW Madison Graduate Students working toward their Transportation Management and Policy Certificate.

The project was part of conducted by team a team of graduate student enrolled in the Transportation Management and Policy Certificate Program at the University of Wisconsin – Madison. Dr. Teresa Adams, CFIRE Director, and Dr. Dr. Ernie Perry, a Program Manager for the Mid-America Freight Coalition and Maritime Freight Specialist for CFIRE, acted as the project advisors. The project is intended to serve as a prototype for future research on Wisconsin's commercial ports.

2 REPORT OBJECTIVES

The purpose of this report is to develop a baseline assessment of port infrastructure and markets at the commercial river ports and terminals in La Crosse and Prairie du Chien. The information gathered and presented in this report is intended to serve as a basis for more in-depth analysis of infrastructure investment and market opportunities.

The main objectives of this study are to:

- Create a comprehensive inventory and assessment of the port infrastructure (including local road and railroad infrastructure necessary to connect ports to the region)
- Summarize current commodity flows, shipping facilities, and markets trends
- Summarize strengths, weaknesses, market opportunities and threats.

In addition, this report is intended to serve the following secondary objectives:

- Raise awareness the importance of commercial ports to local and state economies
- Suggest ways to use the baseline information in the report for more detailed market analyses and investment decisions.

This report is also intended to communicate the importance of these ports to the communities and industries that they serve. An assessment of port infrastructure can help determine the health of public and private commercial activity at ports and identify infrastructure that is most in need of repair. An assessment of private infrastructure can communicate to public policy makers the need for investment in public infrastructure. Federally maintained locks, dams and channels are aging and there is a growing maintenance backlog for these facilities. The report also highlights the importance of waterways and ports to other community and State objectives: recreation, tourism and environmental protection. Both port communities have developed harbor and waterfront plans intended to balance the needs of river shipping with other uses. These plans can further assist industry and community direct scarce funds to where they are most appropriate.

3 IMPORTANCE OF THE MISSISSIPPI RIVER SYSTEM

The Ports of La Crosse and Prairie du Chien are located on the east bank of the Upper Mississippi River. The Upper Mississippi River System flows approximately 1,300 miles from the headwaters of Lake Itasca in northern Minnesota to the southern tip of Illinois, accounting for more than half of the entire length of the Mississippi River.

Since before European settlement, the Upper Mississippi has been vital to commerce. The Cities Prairie du Chien and La Crosse were both initially settled by Native Americans and French traders because of the efficient access to markets provided by water. Later settlers also recognized the value of commercial shipping. U.S interest in the Upper Mississippi River System for its commercial uses dates back to the 1820s when Congress authorized construction of a canal connecting Lake Michigan and the Illinois River, opening Chicago to the Mississippi River (Upper Midwest Environmental Sciences Center, 2013).

Commercial freight movement by barge provides many benefits to shipper and port communities. For shippers, freight movement by river barge is cost and energy efficient. For ports, commercial shipping directly and indirectly support local jobs, provide several environmental benefits compared to competing freight modes, and give regional manufactures and employers competitive advantages in accessing international and national markets. Though conflicts with other water and water front users arise, and commercial shipping creates environmental impacts of its own, maintenance of port and channel infrastructure can also indirectly benefit river-based recreation and tourism.

The needs and benefits of commercial shipping must be weighed against the other benefits of the river system. The U.S. Army Corps of Engineers (USACE) is the federal government's lead agency for managing the Mississippi River and other inland waterways. The USACE is tasked by Congress to manage the nation's inland waterways not only for commercial navigation, but also flood control, hydroelectric power, irrigation, municipal water supplies, fish and wildlife, recreation, and general water quality. State and local governments also seek to strike a balance between these various needs. In some cases, these various goals are incompatible. In other cases, engineering and water management solutions have been used to overcome incompatibilities or at least accomplish an acceptable compromise. Prioritizing needs to identify the most desirable solutions is an ongoing challenge for all river stakeholders.

The Mississippi River and associated waterways form an enormous and complex ecosystem. The Upper Mississippi is home to 127 species of fish and 30 species of freshwater mussels (Upper Mississippi River Basin Association, 2013).There are three national refuges along the river corridor including Upper Mississippi River National Wildlife and Fish Refuge, Trempealeau National Wildlife Refuge, and Mark Twain National Wildlife Refuge (Upper Midwest Environmental Sciences Center , 2013).

Due to increased human activity of all types, the Upper Mississippi River System is experiencing increasing rates of erosion leading to sedimentation and eutrophication and experts anticipate a significant loss in wildlife diversity over the next several years (Upper Mississippi River Basin Association, 2013). In the Water Resources Development Act of 1986 (WRDA), Congress recognized the Upper Mississippi River System as "a nationally significant ecosystem and a nationally significant commercial

navigation system." (Upper Mississippi River Basin Association, 2013). The Water Resource Development Act established the Environmental Management Program (EMP) to address Upper Mississippi River System's ecological needs in combining monitoring with scientific research (U.S. Army Corps of Engineers, 2013). The EMP is led by the U.S. Army Corp of Engineers and is a collaborative effort involving organizations like the U.S. Geological Survey's Upper Midwest Environmental Sciences Center.

In 2008, the U.S. Army Corps published a comprehensive study on the Upper Mississippi River-Illinois River Waterway System recommending $2.6 billion in navigation efficiency improvements and another $5.7 billion in ecosystem restoration activities. The Wisconsin Department of Transportation endorsed these recommendations. (WISDOT, 2009). However, increased federal funding necessary for funding all these improvements has not materialized.

3.1 THE INLAND WATERWAY AND MISSISSIPPI RIVER SYSTEM

The Upper Mississippi River is part of the much larger Mississippi River and U.S. Inland Waterway Systems. This Inland Waterway system consists of 12,000 miles of river and oceanic coastal waterways linking domestic ports, including the deep water commercial ports of the Great Lakes and coasts. The 9,000 mile Mississippi River System (MRS) is by far the most extensive part of the inland waterways and includes the entire Mississippi River, the Ohio River and all of its tributaries, the Illinois River, the Missouri River as far as Sioux City, Iowa, and several more rivers in the southern states. The MRS directly connects 20 states and maintenance of the entire system is absolutely essential to the viability of commercial ports in La Crosse and Prairie du Chien. The MRS and Great Lakes are illustrated in Figure 2.

Figure 2: Mississippi River System and Great Lakes. (Source: USACE).

3.2 COMMERCIAL SIGNIFICANCE TO REGION, STATE, AND NATION

Linking five states (Illinois, Iowa, Missouri, Minnesota, and Wisconsin), the Upper Mississippi River System is vital to providing cargo to domestic and foreign markets. Agriculture remains a large part of regional economies in the counties around Upper Mississippi Ports, in Wisconsin and other Upper Mississippi states. 70-85 million tons of cargo are shipped annually between Minneapolis and the mouth of the Missouri River (Upper Midwest Environmental Sciences Center, 2013). In 2010, the Upper Mississippi shipped over 14 million tons of farm products to Louisiana coastal ports and another 700,000 tons to southern states throughout the MRS, primarily for use in the poultry and livestock industries. Over half of the nation's corn and 41% of the nation's soybean export is transported via the Mississippi River System (Upper Mississippi River Basin Association, 2013). Fertilizers, other chemicals, and petroleum products are shipped upstream gulf states. Over 2,000 farmers within 50 miles of the Port of La Crosse depend on barges to move product to markets and barge is the second most important freight mode in La Crosse County as measured in tonnage (Port of La Crosse Harbor and Waterfront Plan, 2011).

Coal, which remains an important source of power in western Wisconsin, is shipped to Upper Mississippi River power plants from Illinois and Ohio. Shipment of cement, salt, primary metals, and aggregates by water reduces the cost of these commodities for Upper Mississippi River firms and communities and reduces damage and traffic congestion on local roads and railroads.

Though the significance of commercial shipping on U.S. inland waterways has declined over the last 100 years relative to other modes, the MRS retains importance not only because the efficiencies it currently provides to existing industry and the relief it provides to other parts of the U.S. freight network, but also its untapped potential for shipping existing commodities to new domestic and foreign markets. The role of river shipping could also expand to include manufactures produced in western Wisconsin, but currently shipped by other modes. Finally, the U.S. Department of Transportation has recognized the role that maritime shipping on the Mississippi River basin and other U.S. inland waterways could play in reducing the congestion on overburdened highways and railways, and in reducing the global environmental foot print of freight movement.

Primary threats to commercial navigation on Wisconsin's inland waterways include underinvestment river infrastructure, competition from competing modes, and competition for waterfront property (whether for economic or environmental reasons). The locks and dams constructed in the early 1900s were not engineered to handle the large size of commercial tows preferred by modern shippers and carriers, so agricultural and other industries have advocated for expansion of some Mississippi locks to help deal with some of the river traffic (Committee to Review the Upper Mississippi River-Illinois Waterway Navigation System Feasibility Study, Water Science and Technology Board, Transportation Research Board, & National Research Council, 2001). At peak times, commercial freight River traffic congestion has gotten worse over the years, while during other periods, locks are underutilized. These issues are addressed in greater detail in Section 5.3.

4 PORT COMMUNITY OVERVIEW

4.1 LA CROSSE

The City of La Crosse and surrounding communities were founded on river trading and water front development. Located at the confluence of the Black and Mississippi River, the city grew to become one of the State's largest cities between its incorporation in 1956 and the end of the 19th century. The City of La Crosse is still the largest Mississippi river community in Wisconsin. In 2010, the population of the City of La Crosse was 51,320; in the City of Onalaska: 17,736 and in La Crosse County: 114,638 (U.S. Census Bureau, 2013)

Figure 3 shows the communities in and around the Port of La Crosse and the location of other major transportation infrastructure. The Port of La Crosse includes several commercial freight terminals interspersed along the shore from French Island to the Isle La Plume. The freight terminals are described in greater detail in Section 5.1.

Figure 3 shows the convergence of Interstate Highway 90, US Highway 14/61, Wisconsin Highway 53, and Wisconsin Highway 35 in La Crosse. In addition, rail connections include Canadian Pacific Railway (CPR) and Burlington Northern & Santa Fe (BNSF) Railroad with access to Chicago & Eastern (IC&E) Railroad across the Mississippi River in La Crescent, Iowa. The La Crosse Municipal Airport at the north end of French Island adds the potential for freight movement by air. Thus, the City offers a full spectrum of freight alternatives, ranging from low-value-to-weight commodities transported by water to high-value, low-weight commodities transported by air (La Crosse Area Planning Committee, 2005).

Although agriculture, manufacturing and transportation have declined in relative importance to the area economy, these sectors remain important in both the absolute and relative sense. Each year approximately 11-13 million tons of commodities carried on 12,000 barges pass flow through the Mississippi River adjunct to the port. Of this total, about 2 million tons of commodities are loaded or off loaded at the Port of La Crosse. (Port of La Crosse Joint Board of Harbor Commissioners, 2011).

The Port of La Crosse spans several communities including the City of La Cross, the City of Onalaska, the Town of Campbell, and other parts of La Crosse County. The regional economy is diverse and includes transportation, agriculture, manufacturing, and energy that benefit directly from commercial port activities. The economy also depends on health care, education, government, other services and tourism that place a higher value on other waterfront uses.

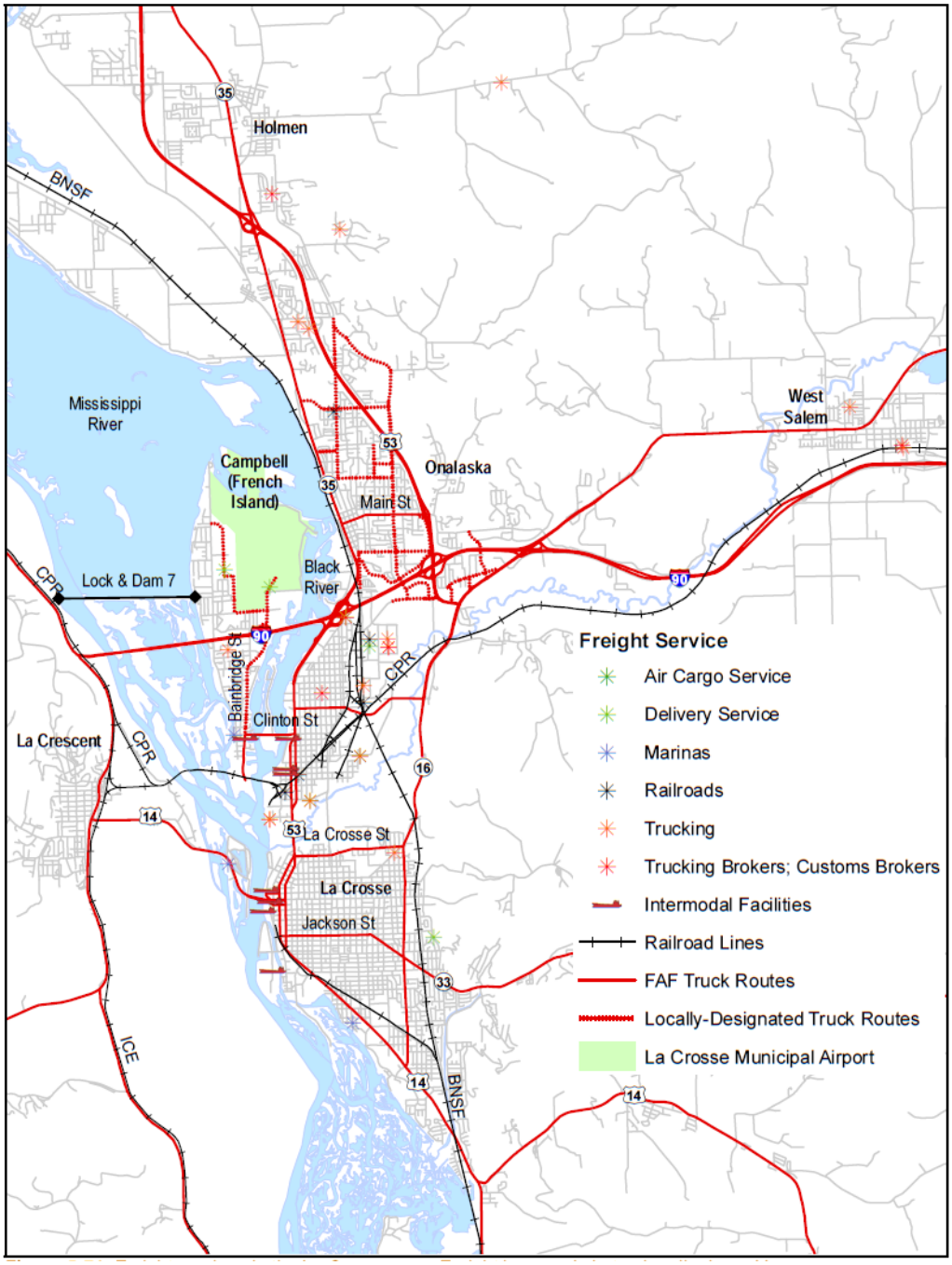


Figure 3: Communities and Freight Infrastructure near the Port of La Crosse (La Crosse Area Planning Committee, 2005)

4.2 PRAIRIE DU CHIEN

Prairie du Chien and Crawford County are advantageously located just north of the confluence of the Mississippi River and Wisconsin River. In 2010, the population of the City was 5,911 and the population of Crawford County 16,644 (U.S. Census Bureau, 2013). Like La Crosse, the port has been used to ship furs and other goods since settlement by Native Americans and later French traders. While primary role of the lower Wisconsin River has shifted from commercial shipping to recreation and tourism, the Mississippi River remains an important shipping corridor for local agricultural and receipt of other products.

Figure 4 shows the City of Prairie du Chien. St. Feriole Island located at the upper left side of the photo dominates the City's port. In 1958 and 1960, the U.S. Army Corps of Engineers created the deep commercial port at the northeast end of St. Feriole Island and a shallower recreational port immediately to the south. These facilities have since been maintained by local governments and private firms and are paid for in part by a local tax on commercial freight shipments. Today, the primary commercial port terminals are owned by the Prairie Sand & Gravel and are divided between an island terminal at the north end of St. Feriole Island and a mainland terminal in the Town of Prairie du Chien and northern end of the City of Prairie du Chien.

Over the years, the island has been home to range of uses including shipping, food processing manufacturing, residential, and tourism. In part because the island is within a flood plain, the City has largely converted the island to recreational and tourism uses. The City's comprehensive plan promotes tourism waterfront development including park, recreational trails, recreational boating docks, and a cultural/ visitors center. Riverfront residential and commercial development is allowed on the mainland shore. The City allows maintenance and upgrading – but not the expansion – of the commercial port terminal at the north end of the island. Expansion of the mainland terminal is possible, subject to agreement between the port owner, the City, and Crawford County.

Between 500,000 and 750,000 tons are loaded onto barges every year, accounting for dry-bulk commodities such as corn, soybeans, and scrap metal. A total of 5 docks and 2 grain elevators account for this inbound and outbound traffic (Mississippi River Regional Planning Commission, 2010b).

Prairie du Chien has access to multiple modes of transportation. Two railroads serve the city. The Wisconsin & Southern Railroad Co. (WSOR) provides a direct connection to the Prairie Sand & Gravel terminal on St. Feriole Island. On the mainland, Prairie Sand & Gravel owns rail spurs connected to the Burlington Northern-Santa Fe Railroad (BNSF), providing indirect access to its two mainland docks across County Highway K. Designated truck routes in the city include US Highway 18, State Highway 35 and State Highway 27. Parts of Main Street, West Blackhawk Avenue and North Villa Louis Road are designated intermodal connectors providing truck access from the port terminal on St. Feriole Island to US Highway 18.

Figure 4: Freight Infrastructure in Prairie du Chien

5 COMMERCIAL PORT INFRASTRUCTURE ASSESSMENT

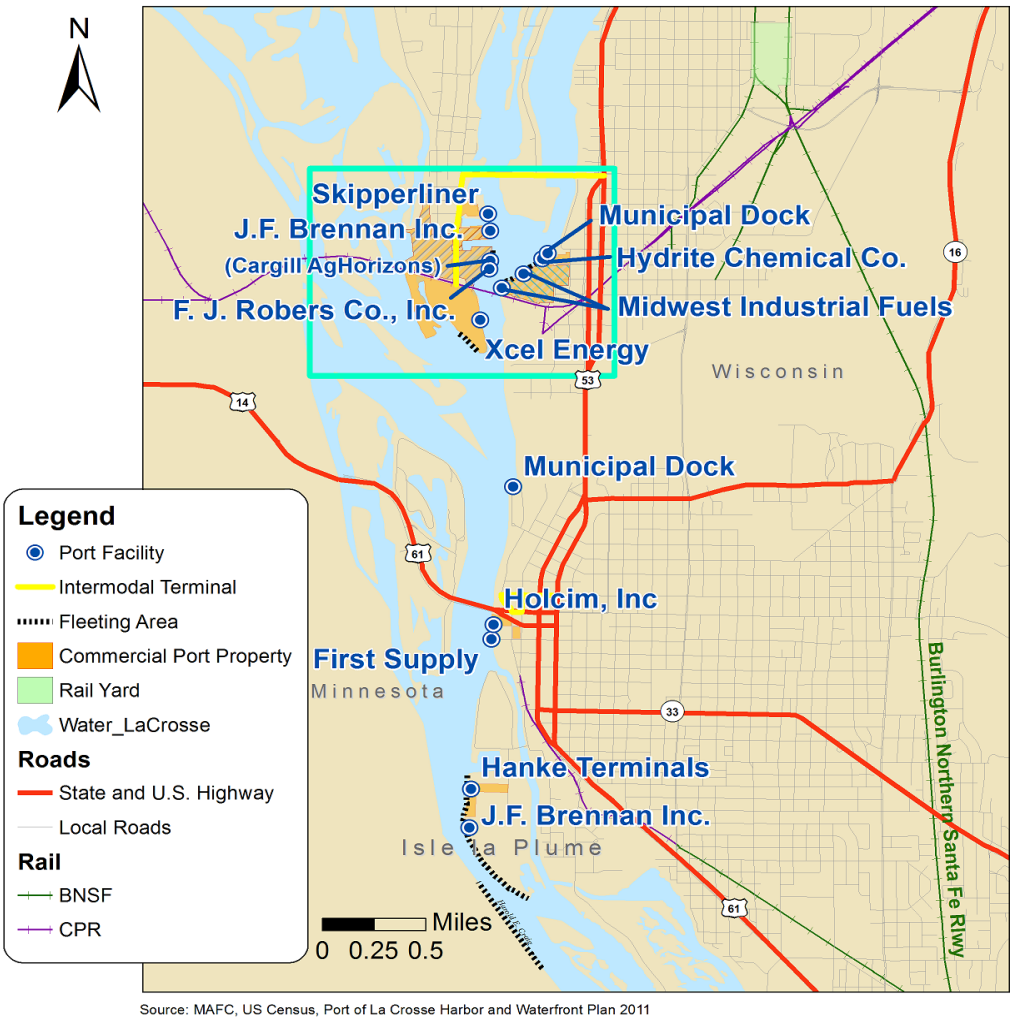
The infrastructure assessment for both communities was limited to commercial terminals: those used for handling of freight or those used to support firms that provide towing, fleeting, barge maintenance or harbor maintenance services. The report did not include recreational boating marinas, waterfront industries that primarily serve recreational boating, or docks that primarily serve commercial passenger craft such as ferries. The information gathered for this report is based largely on information provided by port terminal owners and operators through in-person interviews, phone interviews and site visits. Additional information was provided by Port of Harbor Joint Harbor Commission, the City of Prairie du Chien, the U.S. Army Corps of Engineers and other public information. The assessment for each covers the following topics:

- **Layout:** A description of the general layout of the site.
- **Docks**: Construction, condition, and barge capacity of the docks.
- **Outdoor and Dry Bulk Storage**: Description of open storage areas and their capacity.
- **Covered storage**: Description of covered storage areas (storage buildings, silos, storage tanks) and their capacity.
- **Equipment:** Description of loading, unloading and other relevant equipment and its condition.
- **Construction Projects and Plans:** Recent or future plans of improvement.
- **Connecting or Existing Highway or Roads:** Listing of on-site or nearby highways and roads
- **Connecting or Existing Rails:** Listing of on-site or nearby rail connections.
- **Operations Information:** Description and quantification of operational capacity
- **Other Facilities:** Description of off-site terminals, fleeting areas, and other infrastructure important to port operations but not visited.

Due to time and availability restrictions, the authors visited only three of eight commercial terminals in La Crosse. The authors also visited both the mainland and St. Feriole Island facilities owned by Prairie Sand & Gravel in Prairie du Chien. Assessments for port facilities not visited are based on a literature review of recent documentations such as Harbor and Waterfront plans, regional planning proposals, and city comprehensive plans. Supplementary information was also provided by municipal officials and the University of Wisconsin Extension in La Crosse County.

5.1 EXISTING PORT FACILITIES – PORT OF LA CROSSE

Figure 5 shows the port terminals and fleeting areas most relevant to commercial shipping. The three private terminals visited for this report are located in the northern part of the port outlined in green. The Port of La Crosse stretches for nearly four miles from the mouth of the Black River east of French Island near the City of Onalaska south to the Harold E. Craig Fleeting site adjacent to the Isle la Plum. Other waterfront uses within this area include recreational boating marinas, parks, residential, commercial, and industrial development; and municipal services such as waste water treatment. There are several significant ecological features environmentally sensitive wild life areas within and near the port boundaries. These areas are described in greater detail in the 2011 Port of La Crosse Harbor and Waterfront Plan. Commercial port terminals and fleeting areas are located in several clusters: at the south end of French Island on the western shore of the Black River; a mainland cluster on the eastern shore of Black River, immediately south of US Highway 14/61; and a terminal / fleeting facility on Isle La Plume.



Source: MAFC, US Census, Port of La Crosse Harbor and Waterfront Plan 2011

Figure 5: Port of La Crosse commercial terminals and fleeting areas

Figure 6 shows the portion of the Port of La Crosse visited for this report. Specific sites visited include: Brennan Marine Professionals (a subsidiary of J.F. Brennan Incorporated); F.J. Robers Company, , and Midwest Industrial Fuels (a subsidiary of Petro Energy LLC). Findings from these three terminals are found in Section 5.1.1 – 5.1.3. Section 5.1.4 contains some remarks on the La Crosses other commercial shipping terminals and fleeting areas, not inspected for this report.

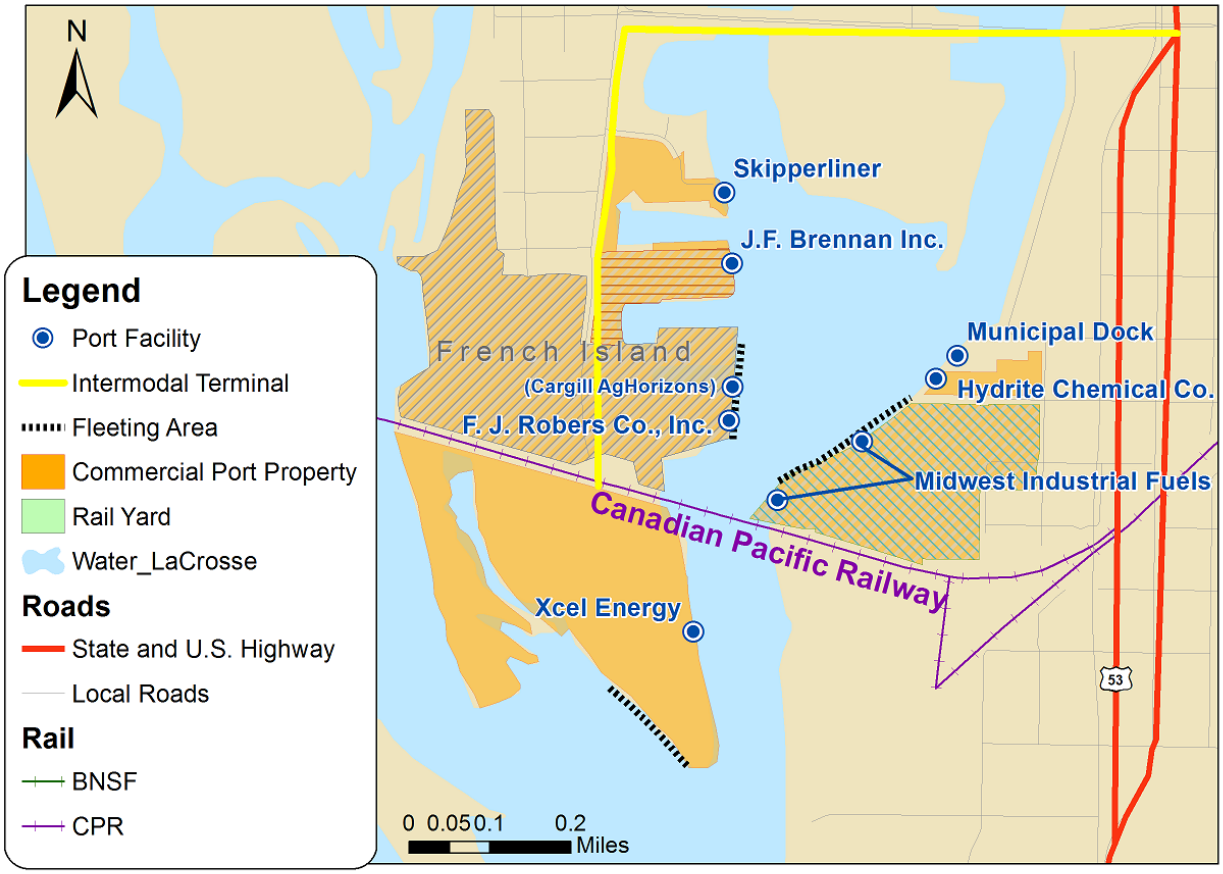


Figure 6. Facilities visited in the Port of La Crosse

5.1.1 BRENNAN MARINE, INC

Brennan Marine Incorporated, a subsidiary of J.F. Brennan Company, is a barge transportation company specializing in fleeting, switching services within inland waterway ports, barge cleaning, vessel repair services, and port management. Figure 7 shows the layout of the company's primary facility on French Island in the Town of Campbell. The company also leases and manages the City's large fleeting area at the south end of Isle La Plume (See Figure 5). While Brennan Marine does not handle commodities at its own port, the services provided by the company and its competitors elsewhere in the Upper Mississippi are absolutely essential to the continued economic health of commercial shipping.

- **Layout:**

Figure 7 shows the full extent of the 7.8-acre facility. The site has direct access to the Black River on both the west and south sides of the property. The recreational boat slips at the north are owned by another company. The property is bound on the west side by Bainbridge Street. Because the facility does not handle commodities, the buildings, open areas, and docks are laid out to facilitate the efficient movement of equipment and construction materials necessary to service barges and other river construction equipment. Approximately, 60% of the site is utilized for storage of different types of equipment including small dredges, boats, cranes, containers, and parts (See Figure 7 notation 4). The rest of the area is occupied by office facilities (See Figure 7 notation 5) and a workshop (See Figure 7 notation 6) of approximately 13,000 square feet. Most of the equipment located on the site is being rented from its Brennan Marines sister company J.F. Brennan.

Figure 7 J.F. Brennan Company port layout. (Picture taken from Google maps)

Figure 8 J.F. Brennan Company's south shore and open storage. Rock riprap and dolphins.

- **Docks**: A 600-foot steel-sheet-pile bulkhead with solid fill protects most of the sites dock face (See Figure 7 notation 1). This dockwall received major repairs and was dredged in 2008. A 70-foot platform at the northeast end of the dockwall allows heavy equipment access to the water front (See Figure 7 notation 2). About 320 feet of the port's dock wall on the south side is constructed of rock riprap that is not intended for loading of barges but protects the six steel mooring dolphins located there against erosion and damage that can be caused by surrounding activities (See Figure 7 notation 3). The site has a total berthing length of 680 feet, used for mooring barges and a floating dry dock used for maintenance and repair of barges and towboats.
- **Outdoor and Dry Bulk Storage**: Outdoor storage area is mostly used by equipment owned by J.F. Brennan Company. If space is needed, Brennan Marine Inc. rents it from its sister company. Since dry bulk storage services are not offered there is not any area assigned for this purpose.
- **Covered storage**: Commodity storage is not available at the Brennan Marine site.
- **Equipment:** Brennan Marine Inc. owns and operates a dry dock purchased in 1987. It has an approximate length of 100 ft and area of 7000 ft^2. It was originally designed to support up to 1000 tons but due to unexpected malfunctions it is currently used to hoist up to 300 tons. This dry dock can support several vessel sizes such as hopper barges, line boats, harbor tenders, and commercial vessels and is currently used for services such as vessel repair, inspection, and hull painting. It is constantly inspected based on manufacturer recommendations and in-house procedures.

Figure 9 Brennan Marine's Dry Dock.(Right side picture taken from Brennan's web page)

Two tug boats are currently used to provide barge transportation services. One of them was purchased in 2012 and has a power rating of 1200 horsepower (HP) while the other was acquired in 1988 and its engine produces 1,000 Hp. Both boats are in service and are consistently inspected based on manufacturer recommendations and in-house procedures. Small vehicles are also owned by Brennan Marine Inc. Approximately, 4 to 6 automobiles are used mainly to mobilize personnel.

Figure 10 Brennan Marine Inc's Tug Boats.(Right side picture taken from Brennan's web page)

- **Construction Projects and Plans**

As noted above, the latest repair and upgrade of the dock wall and harbor channel took place in 2008. Fifty foot pile sheet walls were constructed along the dock as well as channel dredging was performed. The project was done under a public-private partnership with the Wisconsin Department of Transportation (WisDOT) in which $2,256,800 was allocated to J.F. Brennan from WisDOT's Harbor Assistance Program.

A new three story building of approximately 7200 ft^2 was opened in 2013. This building will house new equipment for barge tracking. Services such as real time communication and real time tracking will be additionally offered. Funding for this expansion project was entirely private.

Figure 11. J.F. Brennan's new office building.

- **Connecting or Existing Highway or Roads:** Bainbridge Street provides access to Interstate Highway 90 to the north and other truck routes.
- **Connecting or Existing Rails:** The site does not have direct access to freight rail lines. The nearest rail access is the private rail spur located on the neighboring F.J. Robers property**.**
- **Operations Information:** Brennan Marine, Inc. is currently authorized to move 64 barges at this time but there is enough infrastructure and capability to move up to 88 barges.
- **Other facilities:** In addition to the facilities used at the location visited, Brennan Marine Inc. operates on the Isle La Plume fleeting area and the Harold E. Craig fleeting area. Located at the south of the Port of La Crosse, these facilities are owned by the city and are equipped with multiple mooring dolphins and 50 foot mooring cells. Isle La Plume fleeting area has a capacity for 32 barges arranged in 8 tiers, each 4 barges wide, and the Harold E. Craig fleeting area has capacity for 15 barges arranged in 5 tiers, each 3 barges wide.

Figure 12 Isle la Plume and Harold E. Craig Fleet Locations.

5.1.2 F.J. ROBERS COMPANY, INC

The F. J. Robers Company established its La Crosse marine terminal in 1983, and the operation has since expanded to include bulk warehousing, barge unloading, and break bulk unloading[1]. The company owns a total of 55 acres on French Island in the Town of Campell. A total of 38 acres are useable as "back lands" for port operators. Several other companies operate under contract at the terminal, including Cargill Ag Horizons, La Farge Cement, Westway Trading Company and Cottonseed LLC.

Figure 13. F.J. Robers Company, Inc[2]

- **Layout:** Figure 13 and Figure 14 illustrate the general layout and major features of the property. The dock facilities are located on 23 acres east of Bainbridge Street adjacent to the Black River and the remaining 32 acres are located west of Bainbridge Street. Angular steel-sheet-pile bulkhead with solid fill surrounds the docking side of this facility (See Figure 14 notation 2). (See Figure 14 notation 1). Bainbridge Street divides the property and is a designated intermodal connector to I-90 to the north and US Highway 53 to the east. Two rail spurs extend from the Canadian Pacific Rail road to the east and west sides of the property, allowing for easy on-site

[1] *History*. (n.d.). Retrieved on March 4, 2013 from http://fjrobers.com/history.html
[2] John H. Noyes. (March 10, 2013). [personal communication] *F.J. Robers Company, Inc. Port Layout*.

transfer of goods between barge, rail, and truck. (See Figure 14 notation 3).

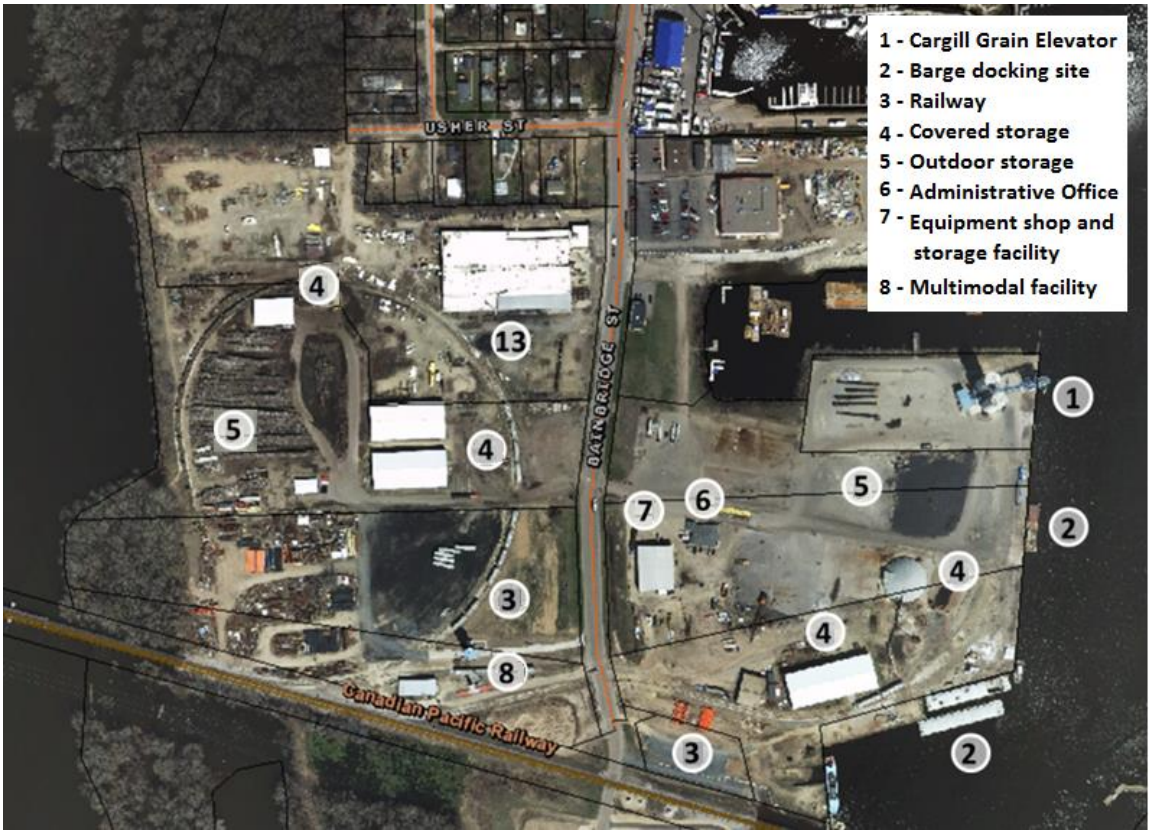


Figure 14. F.J. Robers Company general port layout (Picture taken from Google maps)

- **Docks:** The dockface consists of six connected sheet pile sections, constructed between 1985 and 2002. All are in good repair. The combined berthing length of the north, east, and south docks is 710 feet. The three docks have a combined load/unload capacity of three barges, while the terminal's barge holding capacity is eight barges. The north dock (Figure 1, notation 1) is reserved for Cargill Ag Horizons for loading grain. The east and south dock areas (Figure 1, notation 2) are used for unloading and loading of general cargo. The south dock is used for heavy loads. A 150-foot marine ramp is located along the southern dock face (Figure 1, notation 3).

- **Outdoor and Dry Bulk Storage:** The property has a combined total of 38 -acres of open storage, including 10 plus acres of paved storage pads (Figure 1, notation 5).

Figure 15. Fertilizer dome and outdoor dry bulk storage, F.J. Robers Company, Inc.

- **Covered storage:** (Figure 1, notation 4) Consists of 44,000 square feet of flat inside storage for dry bulk materials and a 6,000 ton dome for fertilizer. A 1,000 ton cement silo is located on the west half of the site. The two Cargill Ag Horizon grain silos were constructed in 2005. Located at the northeast end of the property the silos hold total of 140,000 bushels (70,000 bushels each) and are equipped with a tower and grain conveyor with a loading capacity of 48,000 bushels per hour. At present, the terminal facility is not able to store liquids, but the company has indicated interest in adding liquid storage at point in the future.

Figure 16. Covered dry bulk storage, F.J. Robers Company, Inc.

- **Loading/ Unloading Equipment:** Other than the grain conveyor noted above, the marine terminal has no is fixed loading and unloading equipment. The site is equipped with three seven-yard end loaders, 2-5 mobile cranes (with a 100 ton capacity), two bulk rail dump pits, a truck scale, and various other moving equipment. The terminal has its own equipment maintenance facility. (Figure 1, notation 7).

Figure 17. Loading and Unloading Equipment, F.J. Robers Company, Inc

Figure 18. Grain Silos, F.J. Robers Company, Inc

- **Construction Projects and Plans**: Repairs and maintenance of the docks and other permanent facilities are conducted annually. Tentative plans to add liquid storage and equipment to increase efficiency of on-site freight movement

- **Connecting or Existing Highway or Roads:** Bainbridge Street is a designated intermodal connector. This terminal is located 1.8 miles south of Interstate Highway 90 . U.S. Highways 53, 14, 61, and 35 are also within two miles.

- **Rail Connections:** (Figure 1, notation 3, 8). The terminal is equipped with two rail road spurs/ sidings providing direct access to the Canadian Pacific Railroad. The east rail spur reaches the south and east docks can store or load 16 cars. The west rail spur can store or load 35 cars. The rail spurs are owned by the port and have a combined length of 2,500 feet. The CPR inspects the rails and request repairs as needed. The terminal is not currently equipped with for intermodal transfer or trans-loading of containerized freight.

Figure 19. Rail road spurs, F.J. Robers Company, Inc

Figure 20. Equipment Maintenance Facility F.J. Robers Company, Inc

5.1.3 MIDWEST INDUSTRIAL FUELS, INC

Located on the eastern shore of the Black River, Midwest Industrial Fuels, as subsidiary of Petro Energy LLC, supplies energy for residential, business, agricultural and industrial use. Midwest Industrial Fuels Incorporated owns two docks with a total back area of 22 acres. The two docks are used for the receipt and shipment of liquid bulk and dry-bulk materials, fueling towboats, and a mooring point for barges fleeting.

Figure 21. Aerial view of Midwest Industrial Fuel (Aerial from Bing, 2012)

- **Layout:** The 26-acre site is fully developed. Docks are located at the west end of the property expansion of Midwest is constrained by physical limitations. Existing development and wetlands hinder expansion to adjacent properties while intensification of the site is limited by City regulations (LAXH&WP). A Canadian Pacific Railroad spur reaches the east end of the property. Local streets are necessary for truck access to nearby US Highway 53.
- **Docks:** There are two docks: the north dock, with a mooring length of 85 feet, and the south dock, with a mooring length of 180 feet. Built in 2012, the north dock face is steel plate. The dock can load or unload a single barge and hold six. Unloading and loading of barge loading is accomplished by a pneumatic pipeline with a capacity of 3,000 barrels an hour. The south dock was built in 1947 and is constructed of timber pile, timber-decked offshore wharf with two steel- and-timber breasting dolphins in line with face. Its last major rehabilitation occurred in 1995 and the dock is in fair condition. This dock is currently used as a stand-by service and is no longer equipped with and extendable pipeline.
- **Outdoor and Dry Bulk Storage:** None.
- **Covered storage:** Storage includes one shed with an area of 5,000 feet^2, two 10,000 gallon tanks, sixty-four storage tanks with a total volume of 747,600 barrels, and one 11.2 million gallon tank creating a total holding a combined capacity of 13 million gallons. Tanks can be moved to adapt according to port or customer demand. Several miles of piping ranging from 8 to 12 inches in diameter connect the various on-site storage, loading, and unloading points.

Figure 22. Midwest Industrial fuel tanks

The tanks are in good conditions and well maintained. Inspection on theses tanks are followed by API 653 Protocol since 1989 while inspection cycles vary individually per tank depending on its condition. Internal temperatures are measured on a daily basis. The external tank casings are checked every five years and the internal tank casings every eight years. Another safety operation is the inclusion of emergency tanks for immediate liquid clean-up, as well as green containers holding oil booms at multiple locations on the property.

- **Equipment:** One hand-operated mast-and-boom derrick with a 25-foot boom is used for barge unloading or loading of petroleum products including asphalt.

- **Construction Projects and Plans:** Midwest currently plans to expand their on-site rail spur. Over the long term, city and port planning documents indicate a willingness to allow expansion of the site or relocate the entire facility if the latter becomes necessary.
- **Connecting or Existing Highway or Roads:** Midwest has nearby access to two highway corridors.
- **Connecting or Existing Rails:** There is on-site rail with a track length of 320 feet with a five rail car capacity. Also an additional 650 feet of adjacent track with a 17 rail car capacity is leased from and maintained by Canadian-Pacific Rail.
- **Operations Information:** When docks are unoccupied, temporary barge fleeting is available and the space is rented to Brennan Marine, Inc. The Wisconsin Department of Natural Resources permits temporary fleeting of up a nine barges at a time.

  Other Notes: Overall, representatives at Midwest are satisfied with the reliability of the public navigation lock, dams and channels maintained by the U.S. Army Corps of Engineers. Port officials noted that, on average, locks are shut down about once every five years accounting for a total closing of 6 weeks.

5.1.4 OTHER PORT TERMINALS AND FACILITIES

Table 1 summarizes commercial terminals, fleeting areas, and other facilities that were not visited due to time and scheduling restrictions.

The Port of La Crosse also includes numerous other public and private non-freight facilities such as marinas, public parks, camping areas and conservation areas are also available in La Crosse's waterfront.

Several recreational boat marinas are located within the port area. Between Navigation Locks 7 and 8, there are five full service recreational boat marinas with 50 or more slips each that provide permanent, seasonal moorage of recreational vessels, and several more local marinas with 25 -50 slips each. The total slip count between locks including individual private docks is approximately 1,300.

Table 1. Other commercial facilities[3]

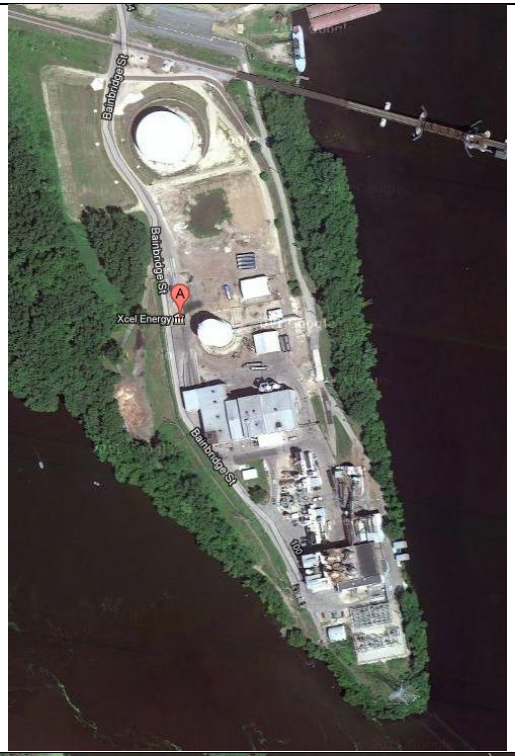
Name	Location	Description	Berthing &Capacity	Layout[4]
City of La Crosse North Side Municipal Dock	On the Black River (mile 1.4); southern end Copeland Park at the western terminus of St. Cloud Street, City of La Crosse.	The general purpose dock is owned by the City of La Crosse which leases the facility to firms through the Department of Public Works. Hanke Terminals is the main user of the facility. Truck access provided by local streets.	Total Berthing distance of 205 ft. Approximately 2 acres of open storage area is located at rear, with an additional 4 acres at Island Street rail siding. The latter has capacity for 45,000 tons of pig iron or equivalent.	
Hydrite Chemical	On Black River (mile 1.3); Sumner Street, City of La Crosse.	Receives liquid chemical (caustic soda). It serves approximately 20 barges per year). Truck access is provided by local streets. Rail access from CPR rail spur.	Total Berthing distance of 200 ft. One 8-inch pipeline extends from wharf to two steel storage tanks at terminal in rear; total capacity 2,100,000 gallons.	

[3] Adapted from the Port of La Crosse Harbor and Waterfront Plan 2011. Joint Board of Harbor Commissioners. City of La Crosse and La Crosse County. November 15, 2011

[4] Pictures taken from Google Maps

Name	Location	Description	Berthing &Capacity	Layout[4]
Holcim Trading, Inc.	On Mississippi River (mile 697.5); Cross Street, City of La Crosse.	Receives cement by barge and ships it out by truck. It receives about 100 barges per year. Truck access to intermodal connector streets. No direct rail access (BNSF rail spur to south).	Total Berthing distance of 325 ft. Cement loading/ unloading via a 14-inch pneumatic pipeline extending to two 25-ton surge silos and to three steel storage silos at terminal in rear, total capacity 11,900 tons.	
First Supply Plumbing (Division Street Dock)	On Mississippi River (mile 697.4); End of Division Street, City of La Crosse	Formerly used as a general commodity dry freight facility, and for the shipment of large pipes for First Supply Plumbing. Currently. It has barge and truck access. No rail access.		

Name	Location	Description	Berthing &Capacity	Layout[4]
Hanke Terminals	On Mississippi River (mile 696.4); west side of Isle La Plume, City of La Crosse.	Facility has 2 acres of open storage capable holding approximately 100,000 tons of dry bulk such as coal, road salt, pig iron, and aggregate. Truck access via local streets. No rail access.	Total Berthing length of 210 feet. Site has a two-acre open storage area with the capacity for approximately 100,000 tons of bulk materials.	

Name	Location	Description	Berthing &Capacity	Layout[4]
Xcel Energy	On French Slough Black River (mile 0.7R) at south end of French Island, City of La Crosse.	Formerly used for receipt of fuel oil for the power plant. Primarily used for overflow temporary storage of up to 9 barges, and seasonal storage of local excursion boats. Joint Harbor Commission is seeking to expand fleeting area west of property Truck access via intermodal connector streets to National Highway system.	Total Berthing distance of 675 feet.	
Harold E. Craig Fleeting Site (also known as Hintgen Island or Broken Arrow)	On the west side of main channel of the Mississippi (mile 696.4), opposite Isle La Plume fleeting site, owned by La Crosse County, in the State of Minnesota.	Completed in 1998. State of Minnesota environmental laws apply. Operated by Brennan Marine Inc. under lease with the Joint Harbor Commission Board.	Capacity to hold 15 barges arranged in five tiers. Has space for 15 additional barges.	

Name	Location	Description	Berthing &Capacity	Layout[4]
Isle La Plume Fleeting Site	On the east side of main channel of the Mississippi (mile 696.4); west of Isle La Plume, south of Municipal Dock-Isle La Plume, across main channel from Harold E. Craig fleeting site, City of La Crosse.	Operated by Brennan Marine Inc. under lease with the Joint Board.	WisDNR permit allows a capacity of 32 barges arranged in 8 tiers.	

Name	Location	Description	Berthing &Capacity	Layout[4]
City of La Crosse Municipal Dock and Fleeting Area - Isle La Plume	Directly north of the Isle La Plume fleeting site. On the east side of main channel of the Mississippi River (mile 696.4) across from Harold E. Craig fleeting site; south end of Isle La Plume, City of La Crosse.	Publicly owned public dock. No rail access. Site no longer used for cargo handling. Waterfront used for barge fleeting. Four permitted fleeting berths. Riparian rights and fleeting area leased to Brennan Marine, Inc.	These facilities are owned by the city and are equipped with multiple mooring dolphins and 50 foot mooring cells. Isle La Plume fleeting area has a capacity for 32 barges arranged in 8 tiers, each 4 barges wide.	

5.2 EXISTING PORT FACILITIES – PORT OF PRARIE DU CHIEN

Figure 23 shows the location of the river freight terminals in Prairie du Chien. The Prairie Sand & Gravel Company owns the two active commercial freight terminals at the Port of Prairie du Chien. The first is located on the mainland at the north end of the City. The actual docks and back port area west of County Highway K are located in the Town of Prairie du Chien, while the larger ready mix plant and other freight facilities are located within City limits east of County Highway K. The second river freight terminal is located on St. Feriole Island. The City owns and manages much of the rest of the Island. A dock capable of serving barges is located on City land, but the City does not intend to use it for commercial purposes. A recreational boat marina is located south of the commercial port between the island and the mainland. City policy is to redevelop the island south of the Prairie Sand & Gravel facility primarily for recreational, cultural, and nature based tourism purposes.

Figure 23 Port of Prairie du Chien Commercial Terminals

5.2.1 MAINLAND TERMINAL

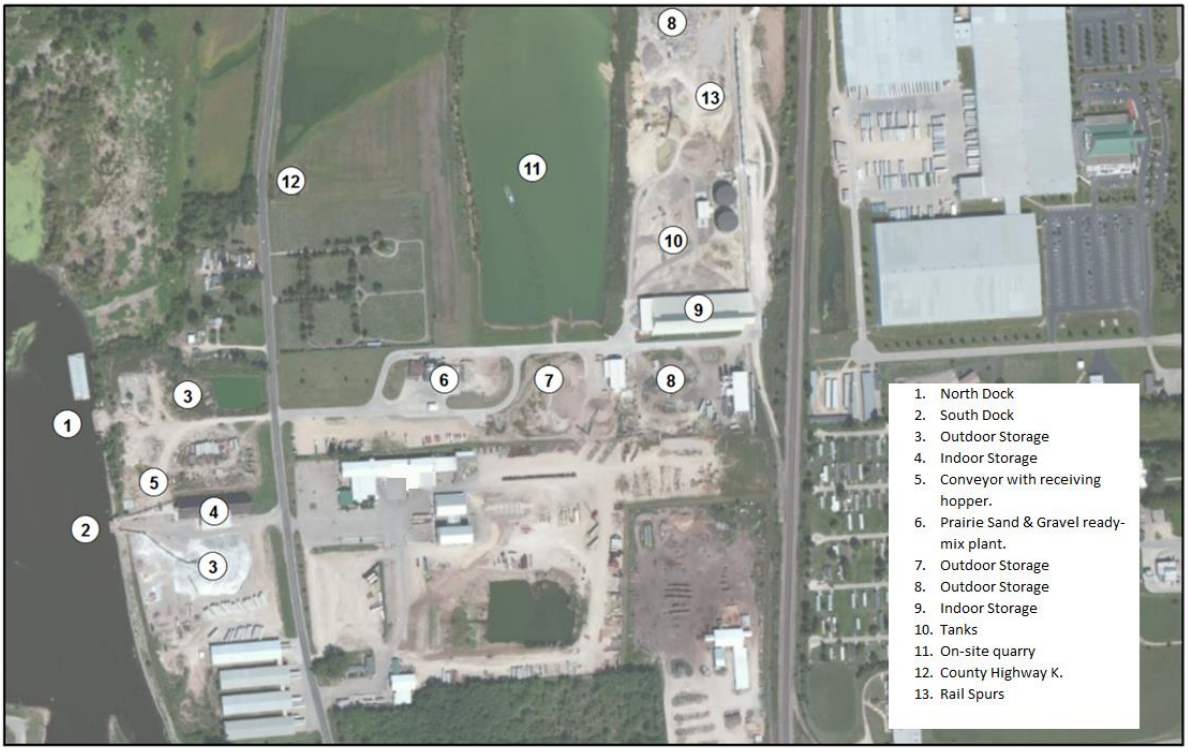


Figure 24. Prairie Sand & Gravel's Company's Mainland Terminal, Prairie du Chien (MAFC, 2012)

- **Layout:** Prairie Sand & Gravel Company's mainland terminal is located at the north end of the City and consists of two separate parcels divided by County Highway K. The river terminal consists of two docks on approximately 13 acres of land. The property to the west includes the company's ready mix plant and various other commodity storage and handling facilities, most oriented toward shipment by rail rather than water.
- **Docks**: The terminal has two docks with a channel depth of 12 feet. The north dock (Figure 24, notation 1) has a total berthing length of 800 feet, and is equipped with a 100 foot dock platform and mooring dolphins. It has been in-service since 2005. Its primary purpose is to offload liquids fertilizer via pipeline to Grow Mart Storage Tanks adjacent to the rail siding located on the Companies east property. The south dock (Figure 24, notation 2) has a platform length of 60 feet with mooring dolphins to either side and has been in-service since 1995. Its primary use is to offload dry bulk commodities such as dry bulk fertilizer, salt and aggregates. Both dock platforms are in good condition. Each dock and load or unload a single barge.
- **Outdoor Storage** Total dock area west of CTH K is approximately 13 acres ((Figure 24, notation 3). Commodities such as salt, dry bulk fertilizer, dredged material, concrete, and pulverized plastic are among the commodities be offloaded and stored in this area. Additional outdoor storage areas are located east of County Highway K (Figure 24, Notation 7, 8)

- **Covered storage**: There are two dry bulk storage structures. One of the buildings (Figure 23, (Figure 24, notation 4) has a total area of 20,000 ft^2 and is currently used for storage of Solid Fertilizer (Urea). The second structure (Figure 24, notation 9) has a total area of approximately 70,000 square feet and is used for bulk fertilizer storage that is transported to the site via rail and some by barge. A pipeline used for off-loading liquid fertilizer extends from Dock 1 the two 1.5 million gallon tanks (Figure 24, Notation 10) located at the east end of the property adjacent to the BNSF rail road.
- **Equipment:** The south dock (is equipped with a conveyor with receiving hopper movement of fertilizer from the south dock to the dry bulk structure. Barges are unloaded via excavator with 4 cubic yard clam shell bucket. The north dock is equipped with a pipeline for off-loading of liquid fertilizer. Various other vehicles are used for movement of commodities around the port.
- **Construction Projects and Plans:** The owner plans on adding up to 20,000 square feet of additional indoor dry bulk fertilizer storages at next to the existing structure west of County Highway K. In addition, the company plans to expand third spur (see "Connecting Railroads" below) there is plans for a port/rail yard expansion
- **Connecting or Existing Highway or Roads:** County Highway K. Connects to the Federal Highway System (USH 18) via the Intermodal Connector streets indicated in Figure 24.
- **Connecting Railroads:** The port owner owns three rail spurs (Figure 24, notation 13) providing direct connection to the BNSF railroad. Total rail loading/ holding capacity is 32 rail cars.
- **Operations Information:** The Prairie Sand & Gravel Company owns the terminal between the river and County Highway K and all facilities on it. The Company also owns the asphalt plant, rail spurs, and various other structures on its property east of County Highway K. Various tenants/operators are located on the property. The owner is responsible for maintenance of docks, port channels, and related infrastructure.

5.2.2 ST. FERIOLE ISLAND TERMINAL

Figure 25. Prairie Sand & Gravel's Company's St. Feriole Island Terminal, Prairie du Chien (MAFC, 2012)

- **Layout:** Prairie Sand & Gravel's St. Feriole Island freight terminal is located at the north end of the island and has a total area of approximately 40 acres. Three loading (Figure 25, notes 1-3) and unloading docks are located on the west and north end of the terminal. The deep water harbor (Figure 25, note 4) created by the U.S. Army Corp of Engineers in 1960 lies off the east bank of the island and is used for holding barges and other commercial vessels. Villa Louis Drive, other local streets, and two local bridges provide truck access to the island. The terminal is equipped with a railroad spur owned by the port that connects directly to the Wisconsin and Southern Railroad.
- **Docks:** (Figure 25, notes 1-3) The terminal has three loading docks. All three have been in service since 1995 and are in good condition. The South Dock is a general purpose dock with a 300 foot berth equipped with two steel-breasting dolphins on each side of the 75 foot solid form dock platform. The West Dock has 320 foot loading berth and is equipped with a 100 foot dock platform with steel-breasting dolphins in line with dockface. The dock is also equipped for loading grain by conveyor (400 tons per hour) and can also be loaded and unloaded by crane/ vehicle. The North Dock has a berthing length of 800 feet with four steel- breasting dolphins on each side of the dockface. Grain loading is done via 36 inch conveyor (400 tons per hour) extending to an adjacent grain silo and overhead truck and rail loaders. The primary commodity

loaded is corn. In addition to these docks, the east dockface is approximately 1,200 feet long; is equipped with 9 mooring dolphins and fronts a 9-acre harbor that can hold up to 75 barges.

- **Outdoor and Dry Bulk Storage:** (Figure 25, notation 5) At least 13 acres of the site is potentially useable for outdoor storage.
- **Covered storage:** Two 45,000 bushel silos (Figure 25, notes 6, 7) equipped with elevators and barge loading conveyors at located on the site, one for each grain dock. A smaller liquid storage tank (Figure 25, notation 8) is located on the island but not directly connected to the docks.

Figure 26: View of north and west dock grain silos, St. Feriole Island

- **Equipment:** In addition to the grain conveyors at the west and north docks, the terminal is equipped with front end loading vehicles to facilitate the efficient movement of bulk commodities. The north elevator is equipped also with an overhead conveyor for direct elevator to barge, truck, or rail transfers. Overhead rail loading is currently inoperable
- **Construction Projects and Plans:** Plans for repair and restoration of existing structures and the private rail track are subject of negotiations between owner, operator and WSOR. Dock, harbor, and channel maintenance are the responsibility of the owner, and are in generally good condition. The island lies within the 100 year flood plain and the City of Prairie du Chien discourages expansion of the commercial port beyond its current extent. Prairie Sand & Gravel has no plans to expand the St. Feriole Island commercial facility. The City is responsible for maintenance of the dock face elsewhere on the island.
- **Connecting or Existing Highway or Roads:** Road access to the National Highway system is provided by local streets. The nearest NHS highway is U.S. Highway 18 (1.2 miles away). The local streets connecting to the highway are designated intermodal connectors.
- **Connecting or Existing Rails**: The Wisconsin and Southern Railroad owns a rail spur that connects to the facility, while Prairie Sand and Gravel owns the 4,400 feet of track on the terminal property (Figure 25, notation 11). The WSOR spur can handle the largest grain rail cars currently in use. The on-site rail car capacity is currently 16 rail cars, with a total capacity of 32 cars. WSOR inspects the line annually and has requested upgrades to the privately owned track.
- **Operations Information**: The port owner, Prairie Sand & Gravel owns and maintains the port facilities, harbor and channels. Gavilon Grain LLC is the primary tenant/operator.

5.3 LOCKS, DAMS, CHANNELS, SUPPORTING SERVICES

The viability of commercial navigation on the Upper Mississippi depends on twenty-nine navigation locks and dams like the one illustrated in Figure 27 needed to navigate from north of Minneapolis Minnesota and St. Louis Missouri. In addition, the entire navigation channel needs periodic dredging to maintain a minimum depth of 9 feet. While private and municipal ports are typically responsible for maintenance of port facilities, maintenance of Locks and Dams and dredging of navigaton channels is the responsibility of the U.S. Army Corps of Engineers. Table 2 lists key characteristics of all locks in the Upper Mississippi River including those in the studies market area (Locks 5 through 11). The age of Lock and Dams on the Upper Mississippi River is a growing concern. The majority of these facilities were constructed prior to World War II and have exceeded their 50 year design life. The size of most locks is half the size needed for modern commercial barge tows and is also a potential constraint during busy shipping seasons. Failure of a anywhere in the system, particurarly downstream, can affect the efficiency of the entire system (ASCE, 2013a).

Figure 27. A ten-barge tow passes through Lock & Dam 9 (Lynxville, WI). Source: USACE

The American Society of Civil Engineers (ASCE) gives the U.S. Inland Waterway System a grade of D minus. The greatest threats to the performance of the nation's inland waterway system including the Upper Mississippi River are delays caused by insufficient funds for proper operation, maintenance, and replacement of inland waterway facilities. In 2009, ninety percent of locks and dams on the U.S. inland waterway system experienced some type of unscheduled delay or service interruption, averaging 52 delays a day. For 2011, the total number of hours of delay experienced by barges throughout the entire inland waterway system reached the equivalent of 25 years (American Society of Civil Engineers ASCE, 2013a). Figure 28 and Figure 29 show the trend toward increasing delays on U.S. inland waterways.

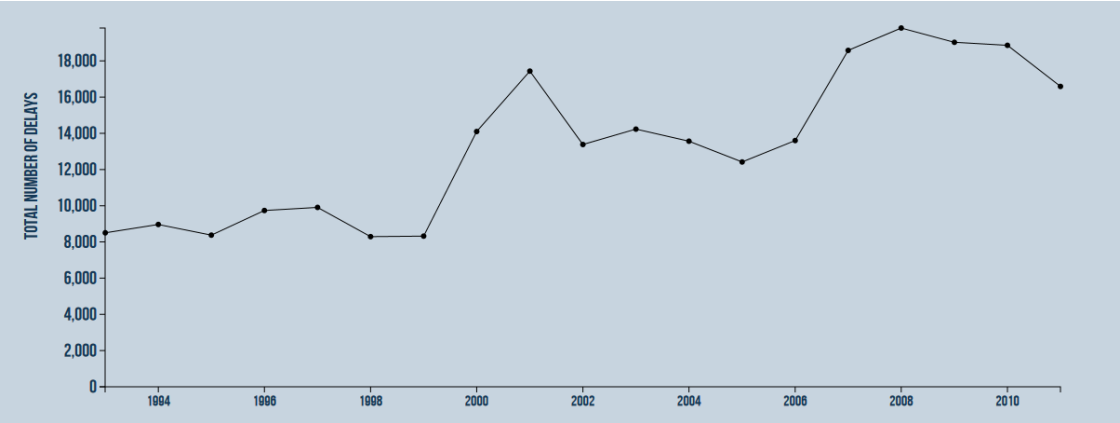


Figure 28. Total Number of Scheduled and Unscheduled Delays on U.S. Inland Waterways (ASCE, 2013b).

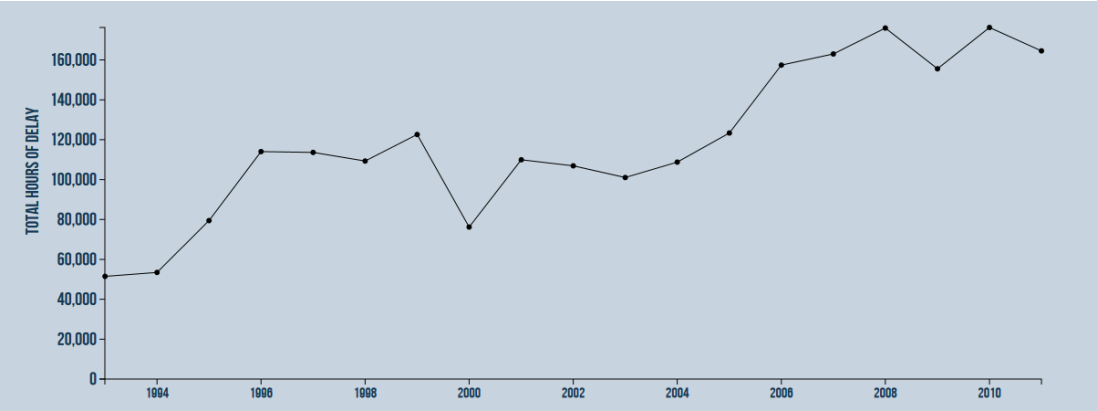


Figure 29. Total Hours of Scheduled and Unscheduled Delays on U.S. Inland Waterways (ASCE, 2013b).

The Upper Mississippi River system has a disproportionate share of delays compared to other rivers elsewhere in the Mississippi River System country. As of 2010, the Upper Mississippi River accounted for half of the 36 most delayed locks in the country (IMTS, 2010).

The navigation locks and dams are susceptible to both scheduled and unscheduled closures. When locks or dam are in poor condition, barges have to stop more often to allow for scheduled maintenance and for unscheduled delays due to equipment failure. In addition, unscheduled delays at locks are most often the result of high traffic volumes at peak seasons, which in turn is partly due to smaller lock sizes associated with older locks. Many of the inland waterway locks - including Locks 1-25 on the Upper Mississippi River - are too small for modern barge tows. Increased delays and operational complexity result in increased operating costs.

Another related threat is delays in dredging of navigation channels. Channels with navigation depths of less than 9 feet require barges to carry less cargo or “light load”. This increases the cost per ton-mile and reduces commercial river freight’s main advantage. While many instances of reduced depth are a result of drought and water management (as evidenced by the drought of 2012, maintaining funding for routine dredging is also a concern).

Port operators interviewed for this report did not report serious ongoing issues or threats to shipping resulting from lock closures. Delays at lock due to congestion during the busiest season were minor. However, low water levels in 2012 due to drought and the need for supplementary dredging has caused "light loading" of barges and delays in the lower Mississippi River.

In order to maintain the public infrastructure and private channels, docks, and barges, commercial river ports rely on a supporting network of service providers. These services in the Upper Mississippi are provided by a number of entities. The location of some of these service providers is indicated in Figure 30 The U.S. Army Corps of Engineers maintains a harbor in Fountain City, Wisconsin (north of Lock 5a) for the maintenance of vessels dedicated to channel and other infrastructure maintenance. Brennan Marine in La Crosse and ARTCO fleeting service in Cassville Wisconsin (north of Dam 11) are among a number of firms that provide fleeting, towing, and barge maintenance services. In Prairie du Chien, Prairie Sand & Gravel contracts for dredging of the commercial harbor.

Public port owners and authorities can play a vital role in the maintenance of commercial river ports and their infrastructure. In the City and County of La Crosse, the Joint Harbor Commission and other public agencies work closely with private port owners in order to balance the needs of commerce with other community development goals such as tourism, recreation, and services. In addition to owing two municipal terminals, the City maintains a fleeting site at the Isle La Plume, and the County another to the north. The Joint Commission is also working to expand another fleeting site adjacent to the Xcel Energy property at the south end of French Island (Port of La Crosse Joint Board of Harbor Commissioners, 2011). In Prairie du Chien, the City is responsible for maintenance of waterfront structures on publically owned portion of St. Feriole Island.

Long-term funding for Lock & Dam rehabilitation or replacement is of greater concern. The primary means of funding for new inland waterway infrastructure is the Inland Waterway Trust Fund (IWTF). Revenues come from a $0.20 per gallon tax on barge fuel, and expenditures cannot exceed revenues in a given year. The IWTF is used to help fund inland waterway construction and rehabilitation projects, including the locks. Construction and rehabilitation costs are split between users funding the IWTF and federal government general funds. Operations and maintenance costs for inland waterways are currently covered in full by the federal government general funds (ASCE, 2013a).

The Inland Waterways Trust Fund has been depleted in recent years due to insufficient revenues (about $85 million per year) due in part to a failure to index the fuel tax to inflation. Cost overruns, project delays and the long lead time it takes to complete any project have also created an enormous backlog, further driving up the costs. If current levels of funding and cost over runs continue, the 22 planned major construction and rehabilitation projects would not be completed until the year 2090 (ASCE, 2013a).

Current funding levels are expected to be just $7 billion through 2020, insufficient for even rehabilitation of existing facilities. According to the U.S. Army Corps of Engineers, maintaining existing levels of unscheduled delays on inland waterways, and not further exacerbating delays, will require more than $13 billion by that year. Roughly 27% of these needs entail the construction of new lock and

dam facilities, and 73% are estimated for the rehabilitation of current facilities. The total capital investment needs over the next 20 years are projected to be $18 billion, or nearly $900 million per year (ASCE, 2013a).

To shorten the backlog of major rehabilitation and construction projects in the U.S. inland waterway system, Congress created the Inland Waterways User Board (IWUB), a consortium of waterway users such as shippers and barge owners. The Board facilitates cooperation between the private sector and the U.S. Army Corps of Engineers. The Board's capital development plan includes a proposal an increase in the diesel fuel tax by $0.06–$0.08. However, the IWUB's proposal to shift a greater share of construction and rehabilitation costs to the federal government has met with counter proposals by both the Bush and Obama administrations to increase revenue through additional user fees. At this writing, there has been no change in funding or management of the IWTF (ASCE, 2013a).

Figure 30. Commercial ports and Locks over the Mississippi

Table 2. Upper Mississippi River Navigation Locks & Dams.

LOCK & DAM	Auxilary Lock?	Length & Width (Primary Lock)	Status	Year Constructed
Upper St. Anthony	No	400' x 56'	Seasonal	1963
Lower St. Anthony	No	400' x 56'	Seasonal	1959
1	Yes	400' x 56'	Seasonal	1930
2	No	600' x 110'	Seasonal	1930
3	No	600' x 110'	Seasonal	1938
4	**No**	**600' x 110'**	**Seasonal**	**1935**
5	**No**	**600' x 110'**	**Seasonal**	**1935**
5a	**No**	**600' x 110'**	**Seasonal**	**1936**
6	**No**	**600' x 110'**	**Seasonal**	**1936**
7	**No**	**600' x 110'**	**Seasonal**	**1937**
8	**No**	**600' x 110'**	**Seasonal**	**1937**
9	**No**	**600' x 110'**	**Seasonal**	**1938**
10	**No**	**600' x 110'**	**Seasonal**	**1936**
11	**No**	**600' x 110'**	**Operational**	**1937**
12	No	600' x 110'	Operational	1939
13	No	600' x 110'	Operational	1938
14	Yes	600' x 110'	Operational	1922
15	Yes	600' x 110'	Operational	1934
16	No	600' x 110'	Operational	1937
17	No	600' x 110'	Operational	1939
18	No	600' x 110'	Operational	1937
19	No	600' x 110'	Operational	1957
20	No	600' x 110'	Operational	1936
21	No	600' x 110'	Operational	1938
22	No	600' x 110'	Operational	1938
24	No	600' x 110'	Operational	1940
25	No	600' x 110'	Operational	1939
Melvin Price	Yes	1200' x 110'	Operational	1990
27	Yes	1200' x 110'	Operational	1953

Locks in Wisconsin Port Market Area Bold.
Source: U.S. Army Corps of Engineers

5.4 RAIL SYSTEMS

Rail access to ports affects the viability and the relative competitive advantage of waterborne freight in various ways. Barges excel the long (500 miles or more) movement of commodities with relatively low value to weight, simple storage requirements, and are not time sensitive. Railroads both compete with and complement barges for movement of these bulk commodities.

On the one hand, railroads compete or substitute for barges in the shipment of high and low value bulk commodities, reducing the viability of river ports. Although rail operational costs are greater per ton mile than movement by barge, railroads are faster and can reach both inland and river markets. Railroads often provide more direct routes to markets, further reducing costs associated with time. Crucially for the Upper Mississippi River region, they are not subject to winter closure and are less affected by extreme weather events such as drought and flooding.

On the other hand railroads can complement barge service because it is more space- and cost- effective means of moving these same bulk commodities from water front to inland areas than trucks. In order to fully capitalize on the efficiencies of both, it is essential that both the railroad and port infrastructure are adequately designed and maintained.

Another potential advantage of rail access is the potential for further integration between railroads and ports, enabling the latter to expand the range of commodities shipped by river to include products farther up the value chain. To realize this potential, sufficient space and equipment must exist at ports or nearby rail yards for the intermodal transfer of sealed standardized containers and/or trans-loading of goods between containers and other vehicles.

The following section summarizes of the condition and capacities of railroads serving Wisconsin's river port communities. It is derived from the Wisconsin Department of Transportation's 2009 "Draft Wisconsin Rail Plan 2030." Descriptions of the condition of rail lines and port-owned spurs with direct access to ports are found in the analysis of port infrastructure. This document also provides descriptions of railroads operating in and near La Crosse and Prairie du Chien.

5.5 CONDITION OF MAJOR RAIL LINES

As of 2008, the rail lines in Wisconsin and serving La Crosse and Prairie du Chien were rated to carry rail cars of up to 286,000 pounds, sufficient to accommodate large modern grain cars (See Figure 31) Most lines were also rated as Federal Railroad Administration (FRA) Class 4, able to accommodate speeds of up to 60 mph (See Figure 32). The exception is the WSOR line, which allowed a maximum speed of 25 mph as of 2009. Compared to barges, the WSOR still provides a relatively fast, direct and year around connection to Milwaukee and Chicago. Figure 33 illustrates the importance of bridges to railroads serving the market area.

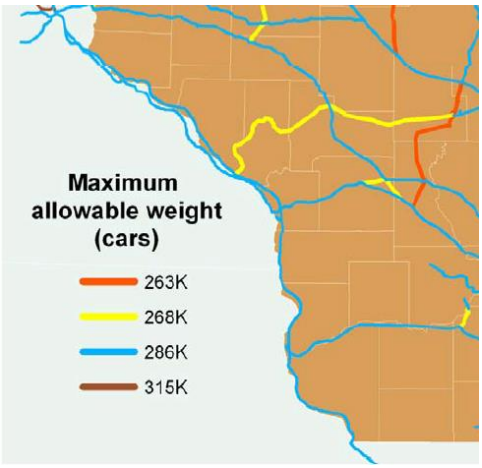


Figure 31. Rails by maximum allowable weight

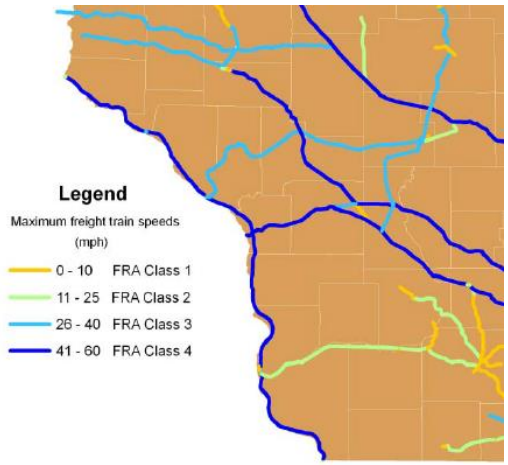


Figure 32. Federal Railroad Administration (FRA) Class 4

Figure 33. WSOR Bridges serving the market area

5.6 LOCATION OF RAIL INTERMODAL FACILITIES, TRANSLOAD FACILITIES, AND YARDS

Figure 34 shows the locations of rail yards in Wisconsin riverport communities. Rail yards offer rail car storage, loading, and unloading capablities, and limited train assembly/switching capabilities. Figure 35 shows ports with rail access and/or transload facilities. Transload facilities include infrastructure and equipment such as ramps, cranes, and storage that permit commodities other than those in sealed standard containers to be loaded from one mode to another (WisDOT, 2010).

Figure 34. Rail yards in Wisconsin river port communities

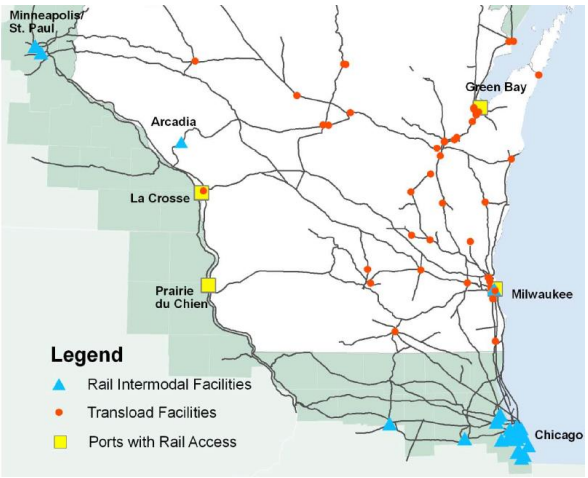


Figure 35. Rail access and/or transload facilities

In La Crosse,Canadian Pacific Railway (CPR) and Burlington Northern – Sante Fe (BNSF) railway each maintain a major rail yard inland from the water ports with existing or potential rail connectivity to minor yards at the ports. CPR's major rail yard lies approximately two miles to the east of its direct port connections to F.J. Robers and the rail spur adjacent to Midwest Industrial Fuels. BNSF operates a major rail yard one mile east of the CP rail yard. Though it currently lacks trackage directly to an operating river port, it maintains a rail spur that is in close proximity to Holcim Chemical, First Supply, and Hanke Terminals at the south end of the City.

In Prairie du Chien, Prairie Sand & Gravel owns two small yards, each connecting to a different rail road. The St. Feriole Island port facility is directly connected to the Wisconsin and Southern Railroad (WSOR). On the mainland side, the yard adjacent to the BNSF yard does not have direct access to the dock, but transloading is possible via truck and pipeline (for liquid fertlizer) across CTH K.

5.7 ROAD SYSTEM

5.7.1 THE NATIONAL HIGHWAY SYSTEM

In order to extend the market reach of waterborne ports, truck access is a vital part of port operations. La Crosse and Prairie du Chien are both served directly by highways that are officially part of the U.S. National Highway System (NHS); roadways important to the nation's economy, defense, and mobility. The NHS carries approximately 75% of commercial truck vehicle miles of travel. In 1997, trucks moved 58% of total U.S. freight tonnage, representing almost 70% of U.S. freight value (U.S. DOT, 2010).

The two communities are also served by major arterial routes important to Wisconsin. Interstate Highway 90 through La Crosse is designated as a "backbone" route and US Highway 18 in Prairie du Chien is a backbone "connector" route. Backbone routes denote the highest value multi-lane divided highways in the state. Connector routes are carry less traffic but connect other valued destinations (WISDOT, 2007)

The National Highway System (NHS) includes five subsystems of roadways:

- **Interstate:** The Eisenhower Interstate System.
- **Other Principal Arterials:** US, State, County, and Municipal arterial roads which provide access between another arterial and a major port, airport, public transportation facility, or other intermodal transportation facility.
- **Intermodal Connectors:** These local roads and highways provide access between major intermodal facilities such as ports and rail terminals and the other four subsystems making up the National Highway System.
- **Strategic Highway Network (STRAHNET)**
- **Major Strategic Highway Network Connectors:**

In addition, both communities have highway bridges spanning the Mississippi River, expanding the market reach for both shippers and customers. La Crosse has two highway bridges. The four lane I-90 bridge between La Crosse and Dresbach, Minnesota was constructed 1967. It is scheduled for major repairs in 2013- 2016 at a cost of $175-225 million. The project is intended to address the following issues that could affect the viability of La Crosse's ports (MnDOT, 2013):

- Bridge Structural Deficiencies
- Narrow Bridge Shoulders
- Traffic Congestion
- Riverfront Access
- Regional River Access (nearest crossings are five miles south and 24 miles north).

The USH 14/61 bridge is actually two bridges collectively called "The Mississippi River Bridge." The Cameron Avenue bridge was rehabilitated in 2004 and the Cass Street bridge in 2005-2006. Both are both in good condition. In Prairie du Chein the Marquette-Joliet Bridge spans the river at U.S. Highway 18 between the City and Marquette, Iowa.

5.7.2 INTERMODAL CONNECTORS

Most of Wisconsin's commercial river port facilities do not have direct access to Interstate or other principal arterial roads that are part of the National Highway System (NHS). Adequate Intermodal Connectors - local roads and highways which provide access between major intermodal facilities at port terminals, rail terminals and the other four subsystems of the NHS – are therefore essential. These roads also provide connections to railyards.

Intermodal Connectors represent less than 1 percent of total NHS mileage. While the geometries, weight capacities, and overhead clearances of Interstate and other highways are typically designed for efficient movement of trucks, the short local, county or city roads or segments of road that constitute intermodal connectors generally have lower design standards than mainline NHS routes. Yet they are the "front door" to the freight community for a broad array of intermodal transport services and options and inadequate local intermodal connections over the "last mile" to a port or other freight facility can effectively sever or restrict connections with ports (U.S. DOT, 2013).

Designated NHS Intermodal Connectors between NHS highways and port terminals in La Crosse and Prairie du Chien are described in Table 3 below and illustrated in Figure 4 and Figure 5.

Table 3 Designated NHS Intermodal Connectors between NHS highways and port terminals in La Crosse and Prairie du Chien

Ports Connected	Length (miles)	Description
La Crosse		
Holcim Trading Inc., First Supply	0.1	Front Street between Cass Street and Port Facility
Holcim Trading Inc., First Supply	0.2	King Street between Front Street and USH 53. USH 53 connects to USH 14/61 and I-90 to the north
F.J. Robers, Brennan Marine, Xcel Energy	1.2	Bainbridge Street south of Rose Avenue and County Highway B/ Clinton Avenue to U.S. Highway 53. (Bainbridge Street also becomes Dawson Street, which connects to I-90 in the north.
Prairie du Chien		
Prairie Sand & Gravel (St. Feriole Island)	0.9	Main Street, Blackhawk Avenue and bridge, Villa Louis Street and Villa Louis Street between US Highway 18 and Feriole Island port terminal
Prairie Sand & Gravel (St. Feriole Island)	0.5	Main Street / Highway K between US Highway 18 and Mainland Port terminal
U.S. Department of Transportation Federal Highway System website "Intermodal Connectors." Accessed on May 1, 2013 at http://www.fhwa.dot.gov/planning/national_highway_system/intermodal_connectors/wisconsin.cfm		

6 MARKET ASSESSMENT

The purpose of this market assessment is to provide information to port owners, operators, and shippers that may be useful in guiding future investment and business decisions. An understanding of commodity flows through Wisconsin commercial river ports, the Upper Mississippi River, and the rest of the inland waterway can provide insights into the importance of ports to the regional economy. Comparisons of Wisconsin ports to competing ports in their market area can help identify which attributes contribute to port success or decline. The assessment may provide insights as to why shippers move some commodities by barge rather than other modes. Together with the infrastructure assessment, the market assessment is intended to provide a basis for a more detailed SWOT Analysis

Our research included the following steps:

- Identify inbound and outbound commodity flows at the Ports of La Crosse and Prairie du Chien Wisconsin and the Upper Mississippi River and the rest of the U.S. Inland Waterway System (Appendix C).
- Identify market area for shippers using Wisconsin Commercial River Ports based on primary commodities shipped from each port.
- Conduct commodity flow analysis of other ports in the market using Navigation Pool data from the U.S. Army Corps of Engineers.
- Identify factors at local ports that affect commodity flows from Wisconsin ports and market area ports.
- Identify inbound and outbound commodity flows between the Upper Mississippi River and the Rest of the Inland Waterway System (Appendix C).
- For trade routes and commodities served by barge, conduct a mode share analysis to help determine the strengths and weaknesses of river shipping compared to railroad and truck.
- Identify regional, national, and international trends in commodities that could affect volume of barge shipping and the viability of ports in the future.

6.1 METHODOLOGY

Commodity flows at the national, state, waterway and navigation lock and dam level were obtained from public domain data collected by the U.S. Army Corps of Engineers.

Inbound and Outbound commodity flows at Wisconsin ports were obtained from municipal agencies and the Wisconsin Department of Transportation.

We estimated commodity flows handled at other ports within the market area using USACE data collected at each navigation lock in the Upper Mississippi River. Each river segment between navigation locks is known as a “navigation pool”. The pools are numbered using the number of the downstream lock. For example, the ports in La Crosse are located upstream of Navigation Lock 8 and is therefore located in Navigation Pool 8. By taking the difference between up and down flows of commodities between each lock, we could estimate the volume of each major commodity type loaded or unloaded within the pool. In most navigation pools, there is at most one major port, so attributing loaded and

unloaded tonnage to the port is reasonable. One exception occurred in Pool 10 which is shared by the port facilities of Prairie du Chien, Wisconsin, McGregor, Iowa and Clayton, Iowa. Because we have port data for Prairie du Chien, this posed less of a problem than it might have.

After using USACE data to establish the major origins and destinations for commodities shipped to and from Wisconsin ports, we then conducted a mode share analysis to ascertain the relative strength of barges compared to other modes for these particular origin-destination pairs. We used the Federal Highway Administration's Freight Analytic Framework data tabulation tool to estimate total volumes carried by all modes between states bordering the Upper Mississippi River north of the Illinois River and destination (or origin) states.

General regional, national and global trends for specific commodity groups were derived from various sources.

6.2 MARKET AREA DESIGNATION

We chose a 60-mile radius around each port as our selected market area. The radius is based on the maximum distance from a river that shippers of the dominant commodities in the market area will typically travel to a river port to ship commodities by barge. Grain and Soybean shipments constitute the vast majority of commodities shipped from La Crosse, Prairie du Chien and the Upper Mississippi River to other parts of the U.S. Inland Waterway system. Beyond 40-60 miles, grain shippers select other modes. This radius is based on information from local ports and confirmed by other freight literature. The same holds true for the ports of La Crosse and Prairie du Chien. The majority of other commodities handled in Wisconsin's commercial river ports is inbound from other areas and will be firm specific.

Figure 36 shows the 60 mile market area for La Crosse and Prairie du Chien. The market areas include potential competing ports in Minnesota and Iowa. Figure 36 also shows the location of grain elevators that are the potential shippers of corn, soybeans and other crops. The amount of commodities shipped by river is also affected by local demand for crops that could potentially divert them from ports. This map includes corn ethanol plants, but could have included livestock, dairy, and food processing operations. While this baseline assessment does not include all of the economic activity affecting the flow of food and farm products handled at La Crosse and Prairie du Chien, it is illustrative of an approach that would be essential to a more detailed market analysis.

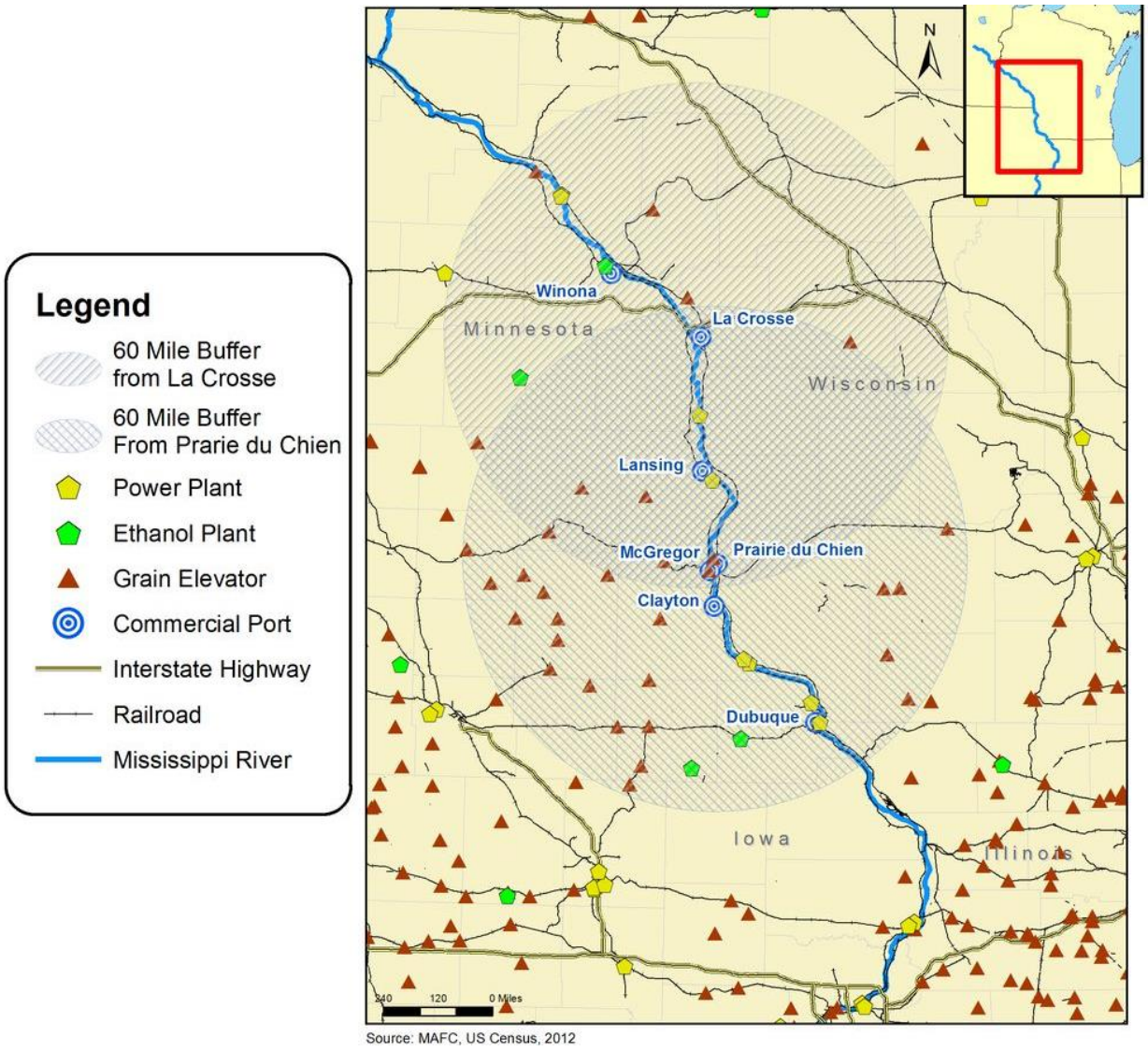


Figure 36: Wisconsin Commercial River Port Market Area

6.3 COMMODITY FLOWS AT LA CROSSE AND PRAIRIE DU CHIEN

Data on for total commodities handled, commodities loaded and commodities unloaded on barges at La Crosse and Prairie du Chien are summarized in the series of charts below. The data provide some indication relative importance, and suggest which commodities should be given particular attention by firms and policy makers. Figure 37 and Figure 38 compare the total amount of commodities handled at each port for two comparison years. We compared to the years 2007 and 2011 to control somewhat for the effects of the recession, flooding and droughts in the intervening years.

In both port communities, the largest commodity category both handled and loaded is farm products, specifically corn, soybean, distillers grains and a few others. Most are destined for export via Louisiana ports. A small portion was sent to southern states as animal feed. Nearly all of the remaining commodities were shipped to the Wisconsin ports from elsewhere in the Upper Mississippi or the other parts of the inland waterway system.

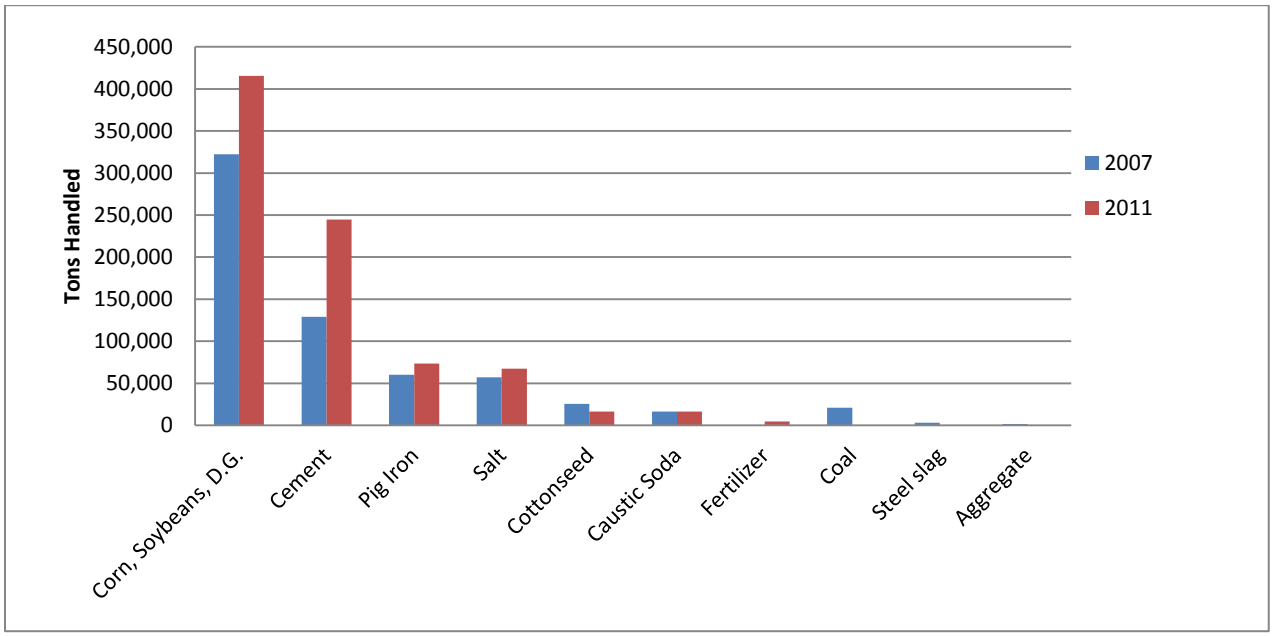


Figure 37. Total commodities handled at La Crosse Ports 2007 & 2011.

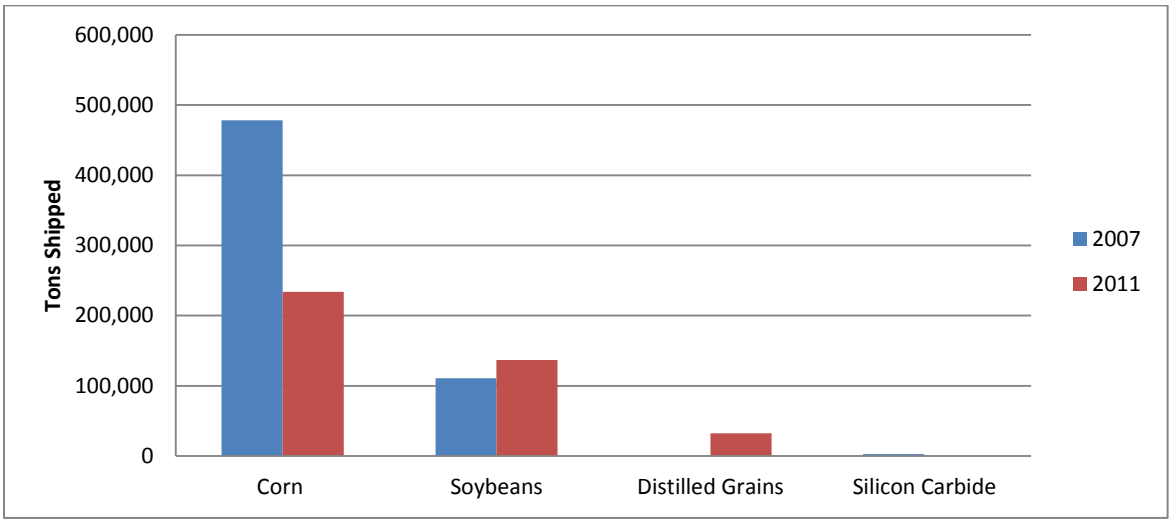


Figure 38: Total commodities handled at Prairie du Chien (St. Feriole Island 2007 & 2011).

Figure 39, Figure 40, and Figure 41 provide more detailed summaries of flows from the two ports. The data show the effects of the recession and other factors. In La Crosse, the most significant inbound commodity by weight is cement, most of which is sent to the Holcim Company. Crops are the dominant commodity shipped from both ports. Data for Prairie du Chien was obtained by the Wisconsin Department of Transportation from the City of Prairie du Chien and includes only the portion of the Prairie Sand & Gravel facility within the City's taxing authority on St. Feriole Island. These figures include all of the farm products shipped from Prairie du Chien but do not include materials offloaded at the mainland facility.

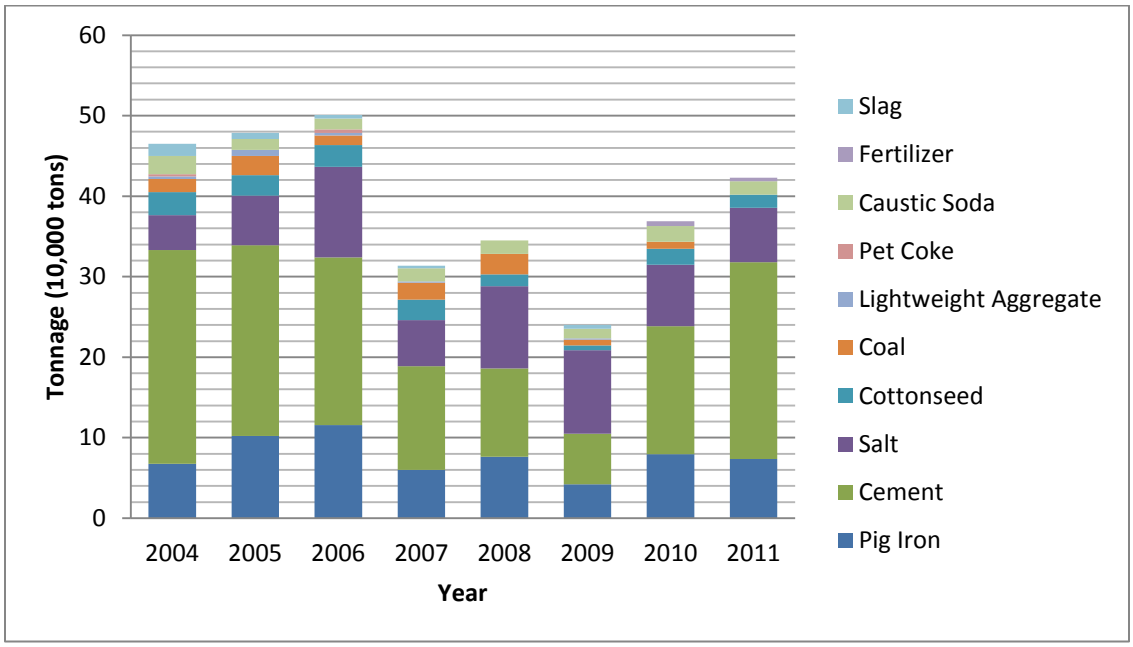


Figure 39: Barge Unloadings in La Cross, 2004-2011 (WISDOT)

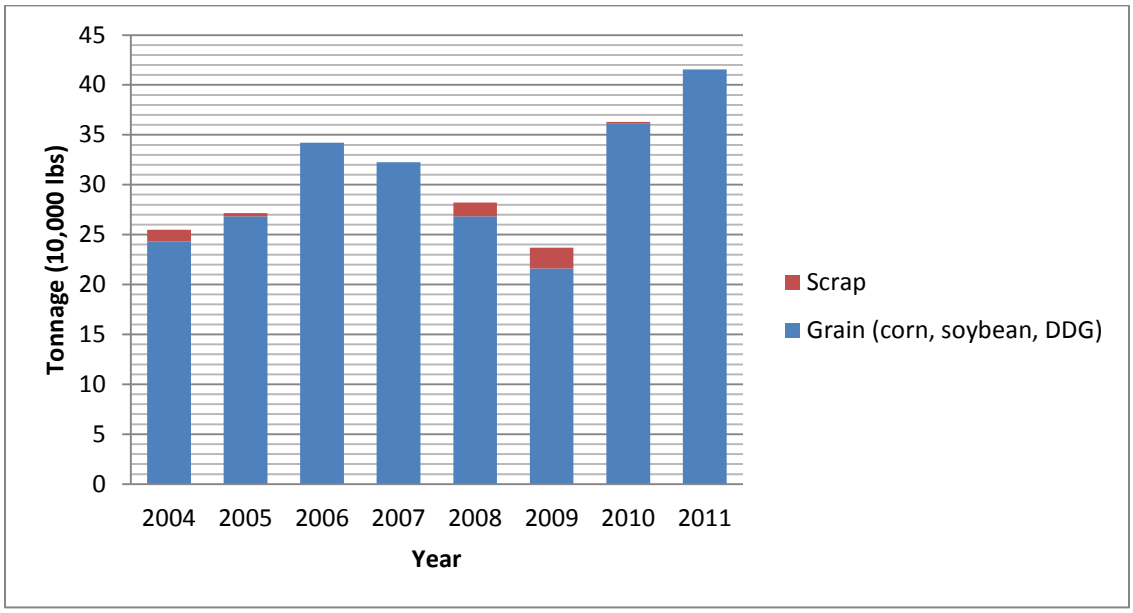


Figure 40: Barge Loadings in La Crosse, 2004-2011 (WISDOT)

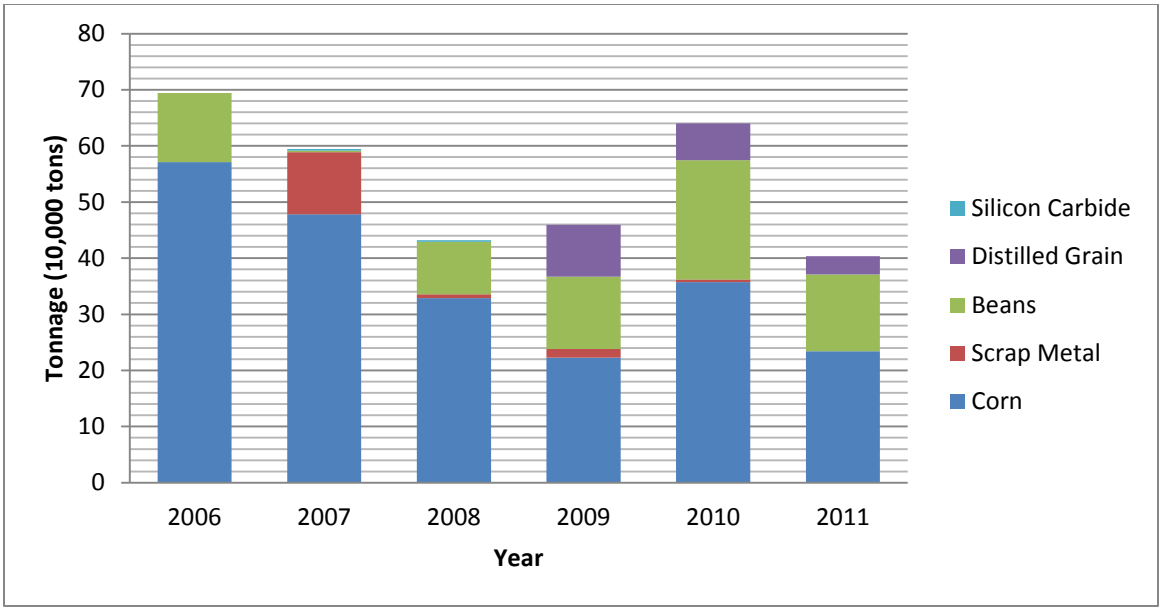


Figure 41: Barge Loadings in Prairie du Chien (St. Feriole Island), 2006-2011

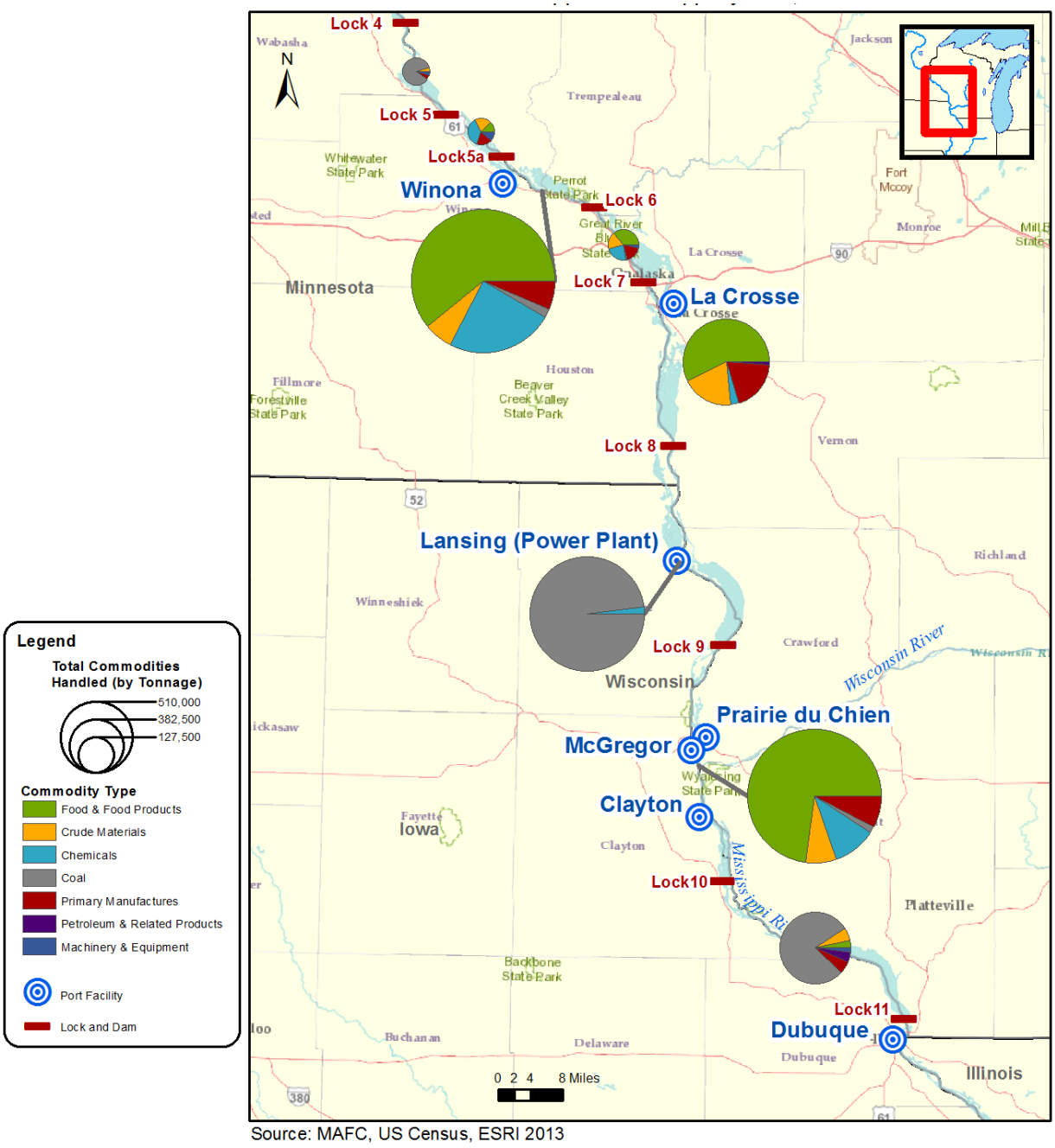
6.4 MARKET AREA COMMODITY FLOW ANALYSIS

In order to gain an understanding of the scale of activity Wisconsin's Commercial River Ports relative to ports elsewhere in the market area. We conducted an analysis by navigation pool as described in Section 6.1. Figure 42 below shows which port communities and facilities correspond to the eight navigation pools in our market area. La Crosse is the most significant port in Pool 8. Prairie du Chien shares Pool 10 with another significant port in McGregor, Iowa, and several others.

The total commodity volumes handled (inbound and outbound) by navigation pool are illustrated using pie charts. The size of the chart is scaled to reflect total volume. Both La Crosse and Prairie du Chien are relatively diversified ports that specializes in shipment of corn, soybeans. Other significant agricultural and /or diversified ports include Winona, Minnesota(Pool 6); McGregor, Iowa (Pool 10); Clayton, Iowa (Pool 10); and Dubuque, Iowa (Pools 11 and 12). The map in Figure 42 does not depict the full extent of commodities handled in Dubuque because it only includes Pool 11. The majority of Dubuque commercial river terminals are located in Pool 12. The large volume of grain handled in Pool 10 reflects the combined volumes of both Prairie du Chien; McGregor, Iowa; and Clayton, Iowa.

Agricultural and diversified port communities share several important attributes. With the exception of Clayton, Iowa, ports in these communities have direct or nearby access to the National Highway System, at least one active freight rail road, and at least one bridge over the Mississippi River. The port terminal at Clayton is an interesting exception. It primarily ships agricultural products and may actually benefit from the lack of efficient shipping alternatives available to farmers.

The data reveal another significant commodity for ports in this study's market area: coal. Neither La Crosse nor Prairie du Chien handle significant quantities of coal. The major receiving ports include power plants located on or near the river near Alma, Wisconsin, Lansing, Iowa, and north of Dubuque Iowa. U.S. Army Corps data indicates that most coal shipped in the Upper Mississippi River originates in southern Illinois and Ohio.



Source: MAFC, US Census, ESRI 2013

Figure 42. Commodities handled in the upper Mississippi 2011 (US Army Corps of Engineers Navigation Information Connection website, 2011)

6.5 MODE SHARE ANALYSIS

The viability of ports is affected not only by the competitiveness of the port facilities compared to other river ports, but also the competitiveness of waterborne freight movement compared to other modes. While truck and rail complement barge service, railroads in particular also compete with barges for long haul shipments of bulk commodities. Identifying the commodities, routes, and markets for which barges compete successfully with other modes is the first step in analyzing what if anything can be done to retain current market share and possibly expand market share to new locations and /or products.

Waterborne shipping has several advantages over competing modes. It is typically the most energy efficient form of transportation based on ton-miles travelled. Barges require fewer crew per ton carried. These efficiencies translates into lower costs and fewer emissions. Barges offer significant cost benefits on a ton-mile and fuel consumption basis over even the most efficient grain unit trains (trains consisting of 100+ specialized grain rail cars). Additionally, there have historically been fewer accidents per ton mile with water than competing modes (Kruse, 2007).

The major disadvantages of shipping by barge include slower travel speeds (typically 11 mph versus 25-60 mph for trains), fewer opportunities for direct connections between origins and destinations, and the unreliability of the network owing to flooding, drought, and winter closure. The fixed location of inland water routes are fixed and sites suitable for ports is further limited by natural constraints and competition from other river uses such as fishing, tourism, recreation, and residential uses. Waterborne freight's advantages in cost per ton-mile can be negated if a river route is significantly longer than a truck or rail trip to the same destination. Cost also increases if the trucks or rail car carrying a commodity to port must travel out of the way to reach the port. That is why shippers rarely choose to ship by barge if the crops are harvested farther than 60 miles from a river. In the Upper Mississippi River, some barge carriers apply a surcharge for the extra cost and liability of moving through navigation locks. Finally, the cost of trans-loading freight from on vehicle to another vehicle and increased complexity this brings to the supply chain means that shippers will often try to eliminate or minimize these costs.

As the value per ton of a commodity increases and as the relative cost of transporting the product compared to the value of the commodity decreases; most shippers will prefer to pay a premium for the speed, reliability, and directness of shipment by truck or rail. This may be true even if the water route is a relatively direct one and the cost per ton-mile is less. Figure 43 illustrates the typical relationship tradeoff between speed and cost and the subsequent modal choice.

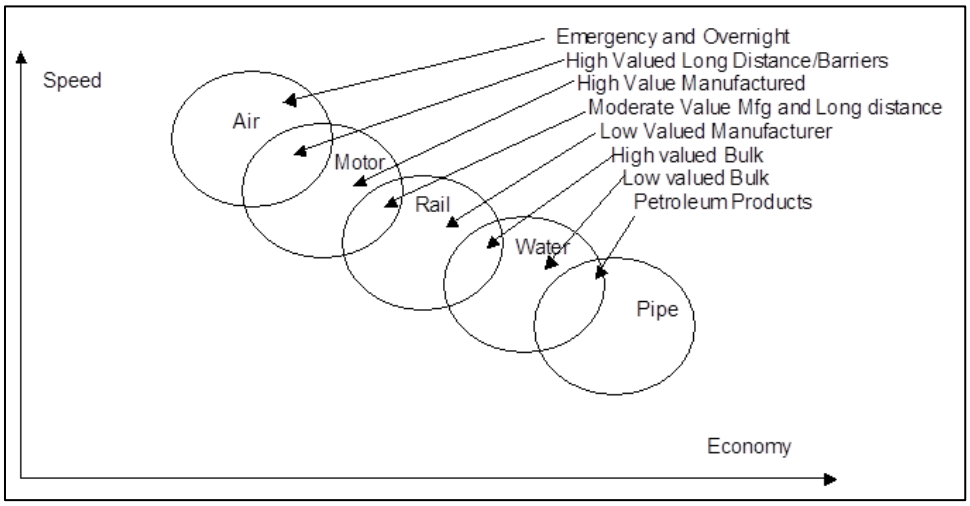


Figure 43. Typical mode choice for various classes of commodity based on speed and cost (Harmatuck, 2012)

The factors above mean that freight traffic on the U.S. Inland Waterway System and the Upper Mississippi in particular has historically been limited to relatively bulky, low value-per ton-commodities traveling long distances and for which speed and special storage are not important considerations. Analysis of data on domestic waterborne commerce provided by U.S. Census Commodity Flow Survey and the U.S. Army Corps of Engineers and summarized in Appendix C bear out this pattern. Commodities moving on the Upper Mississippi River hold to this pattern. Table 4 shows the average value per ton of various commodity classes in 2007. The majority of commodities shipped on the Upper Mississippi River are cereal grains, animal feed, fertilizers, basic chemicals, coal, crude materials, and primary manufactures such as cement. These commodity categories correspond to lower value per ton commodities in Table 4. High value manufacturers constitute a very small portion of commodities moved in the Upper Mississippi river, and are limited to a few types such oversize equipment.

Table 4. Average Value per Ton of Commodity - 2007 (U.S. DOT Federal Highway Administration, 2013)

	Value Per Ton (2007 $)		Value Per Ton (2007 $)
HIGH VALUE MANUFACTURES		**FARM AND FOOD PRODUCTS**	
Precision instruments	51,988	Alcoholic beverages	1,360
Pharmaceuticals	42,089	Live animals/fish	1,356
Transport equipment	27,325	Milled grain prods.	1,167
Tobacco prods.	20,491	Other foodstuffs	1,027
Electronics	18,307	Other Ag. Prods.	614
Textiles/ leather	9,919	Animal feed	357
Machinery	9,464	Cereal grains	133
Motorized vehicles	6,647	*AVERAGE*	*$859*
Misc. mfg. prods.	6,192		
Furniture	4,665		
Printed prods.	3,711	**PETROLEUM AND RELATED**	
AVERAGE	$18,254	Gasoline	685
		Fuel oils	561
PRIMARY MANUFACTURES		Crude petroleum	437
Plastics/rubber	2,578	*AVERAGE*	*$561*
Paper articles	1,359		
Base metals	1,318	**CRUDE MATERIALS**	
Newsprint/ paper	828	Metallic ores	267
Wood prods.	556	Building stone	170
Nonmetal min. prods.	178	Waste/scrap	99
AVERAGE	*$1,136*	Nonmetallic minerals	55
		Logs	43
CHEMICALS		Natural sands	14
Chemical prods.	2,725	Gravel	10
Basic chemicals	735	*AVERAGE*	*$94*
Fertilizers	259		
AVERAGE	*$1,240*	**Coal**	*$28*

Source: Freight Analysis Framework Tool Data Tabulation Tool Version 3 developed by the Center for Transportation Analysis (Oak Ridge National Laboratory) with funding from the Federal Highway Administration. Data set was taken from "Total Commodity Flows (import, export, domestic)" for the entire U.S. Data is based on 2007 Commodity Flow Survey conducted every five years by the U.S. Census Bureau.
Averages value per ton is expressed in 2007 dollars and was calculated by dividing total tonnage by total 2007 dollar value for each commodity group.

Just as the types of commodities shipped by barge is relatively specialized, so are the origin-destination movements within the Inland Waterway System. U.S. Army Corps Data from 2010 reveals that 14 million tons of food and farm products were shipped from the Upper Mississippi River north of the Illinois River to Gulf ports in Louisiana, while the next largest receiving area, states adjacent Tennessee River received only 700,000 tones (Appendix C). The amount of crops shipped from the Upper Mississippi to other parts of the Inland Waterway system was insignificant. USACE State-to-State data and interviews with Wisconsin Commercial port operators corroborate this assessment. Similarly, coal shipped to Wisconsin Commercial River Ports and other ports in the market area via barge originates in just two states, Illinois and Ohio.

The next step of our analysis turned to the relative strength of barges compared to other modes for the routes and commodities where barges operate. For this modal analysis, we relied on Federal Highway Administration's Freight Analysis Framework (FAF) Data Tabulation Tool. This tool uses data from the U.S. Census Bureau Commodity Flow Survey. This is survey is conducted every five years and 2007 data used by tool at the time of this study. The 2011 figures are projections made by the model.

This approach had some limitations. Unlike the U.S. Army Corp of Engineers Waterborne Commerce statistics, data is collected for all modes of freight and is based on surveys and estimates. Figures for 2011 are projections based on 2007 so therefore may not accurately reflect actual waterborne tonnages reported by the river ports or the USACE. Another problem with the use of FAF data is that a significant amount of freight is classified as "Multiple Mode" which could indicate that a trip was taken by various combinations of modes (truck-barge, truck-rail, rail-barge, etc.). This means that some waterborne commerce may not appear in the FAF tabulations. Another significant limitation of FAF is the large size of zones used for analyzing movements between origins and destinations. FAF zones can encompass most or entire states. Wisconsin is divided into only two zones: the Milwaukee metro area and the rest of the state. Minnesota is similarly divided between the twin cities, and the rest of the state. Iowa is a single FAF zone. For purposes of this report, we elected to use entire states as the unit of analysis. Further confusing matters, FAF uses a slightly different terminology of classifying commodities than the USACE.

Owing to the relatively small amount commodities other than farm products and coal moved by barge in the Upper Mississippi and the aforementioned problem with the "multiple mode" category, only categories of food and farm products shipped from our three market area states to Louisiana returned significant shares shipped by water. The results of this analysis are shown in Table 5. For this particular origin-destination pair and commodity (bulk farm commodities shipped to Louisiana), water is the preferred mode. Interestingly, the share of the same products shipped from these same states to all other states by water is small and/or submerged in the "multiple mode" category. The fact that the figures for Iowa and Minnesota are so much greater than those of Wisconsin is due to a variety of factors including total grain production and share of state production destined for export.

Table 5. Farm Products Shipped to Louisiana by Mode - 2011

Selected Upper Mississippi Farm Products* Shipped to Louisiana by Mode - 2011 (thousands of tons)					
	Wisconsin	**Minnesota**	**Iowa**	**Mode Total**	**Percent of Total**
Water	72	6,479	4,085	10,636	72%
Rail	16	7	184	208	1%
Truck	41	9	21	72	0%
Multiple Modes	219	0	3,599	3,818	26%
State Total	**349**	**6,495**	**7,890**	**14,733**	**100%**

* cereal grains, milled grains, animal feed, other food stuffs.

Source: Federal Highway Administration Freight Analysis Framework Data Tabulation Tool projections for 2011 based on 2007 US Commodity Flow Census Data.

The high percentages of state grain production moved by water from the three market area states to *Louisiana* must not be mistaken for a high percentage of *total* state farm output shipped by water. Most of total farm output produced in the three market area states to the rest of the country is moved by truck and rail to domestic customers. For instance, much of Wisconsin's output is grown in the eastern part of the state and is shipped elsewhere in the state and the U.S. for livestock feed, ethanol, and other uses. Wisconsin's total projected production and shipment of the same selected farm products listed in Table 5 above is found in Table 6 below.

Table 6. Farm Products Shipped from Wisconsin to Entire US by Mode - 2011

Selected Wisconsin Farm Products* Shipped to Entire U.S. by Mode - 2011 (thousands of tons)				
	Total (Thousands of Tons	**Value (Millions of Dollars)**	**Percent of Total Tons**	**Percent of Total Value**
Truck	80,675	49,237	94.3%	94.5%
Rail	3,022	892	3.5%	1.7%
Water	75	24	0.1%	0.0%
Air	0	3	0.0%	0.0%
Multiple Modes	1,361	1,006	1.6%	1.9%
Pipeline	0	0	0.0%	0.0%
Other-Unknown	425	961	0.5%	1.8%
State Total	**85,558**	**52,123**	**100.0%**	**100.0%**

* cereal grains, milled grains, animal feed, other food stuffs.

Source: Freight Analysis Framework Data Tabulation Tool projections for 2011 based on 2007 US Commodity Flow Census Data.

6.6 MARKET ASSESSMENT OF CURRENT COMMODITIES

6.6.1 FOOD AND FARM PRODUCTS

(Corn, Soybeans, Wheat, Distillers Grains, Cottonseed, Other Specialty Grains)

Shipment of Food and Farm Products constitute the largest commodity group shipped from the Upper Mississippi River States, whether by barge, rail, or truck. In 2010, 14.8 million tons were shipped by barge to deep water ports in Louisiana and another 776,000 tons were shipped to the Tennessee-Mobile River System in Tennessee and Alabama (See Appendix C). Most of the nation's corn and soybeans are grown in the "corn belt" that stretches from the Dakotas through southern Minnesota, Iowa, Missouri, Illinois, and Indiana. Some wheat from the upper plains states also reaches Upper Mississippi River ports. Specialty crops and distillers grains used for animal feed make up most of the remaining tonnage. The vast majority of the grains and beans shipped by barge from Upper Mississippi River ports are destined for export from Louisiana and other Gulf coastal ports. Some shipped for domestic use is used animal feed and ethanol plants are shipped to states along the Lower Mississippi, Tennessee River, and other inland waterways.

Table 7 shows the shows the total food and farm products handled in the market area by navigation pool. The mix of crops shipped from Wisconsin river ports is largely reflective of the mix shipped from other ports in the market area are region. The Cargill Ag Horizons ships grain from the F.J. Robers facility in La Crosse and Gavilon Grain LLC ships grain from the Prairie Sand & Gravel facility in Prairie du Chien. The facility at F.J. Robers also handles Cottonseed oil, as specialty crop. Other major grain shippers in the market area include Winona, Minnesota (Pool 6) , McGregor, Iowa (Pool 10), and Clayton, Iowa (Pool 10). Dubuque, Iowa is another large shipper but loads most of its grain south of Dam 11. All of the major grain ports in the market area benefit from Mississippi River bridges and active rail lines and yards. Shippers benefit from the potential competition between freight modes and port facilities provided at these locations. They also benefit from access to production areas on both sides of the river.

Table 7 Food and Farm Products by Market Area Navigation Pool.

Navigation Pool	2007 Net Total Tonnage			2011 Net Total Tonnage			Change 2007-2011
	Down Tons	Up Tons	Total	Down Tons	Up Tons	Total	
5	0	0	0	0	0	0	------
5a	13,500	28,500	42,000	9,400	0	9,400	-78%
6	**1,385,419**	**25,256**	**1,410,675**	**1,239,300**	**8,189**	**1,247,539**	**-12%**
7	13,500	0	13,500	-16,000	18,079	34,079	152%
Pool 8	**274,200**	**16,899**	**291,099**	**403,829**	**17,465**	**421,294**	**45%**
9	15,100	1,000	16,100	-12,500	0	12,500	-22%
Pool 10	**2,038,100**	**6,161**	**2,044,261**	**1,269,500**	**24,200**	**1,293,700**	**-37%**
11	9,300	4,500	13,800	-1,868	15,000	16,868	22%

Note: "Down tons" that are positive indicate that net tonnage originating in the pool and moving downriver exceeded that of tonnage offloaded in the pool from upstream. If negative, the converse is true. For "up tons," a positive number indicates that tonnage received by the pool from downstream exceeds up tons originating in the pools and shipped north, while a negative number indicates the converse. The net estimate of total tons is a sum of absolute values.

Source: Derived from US Army Corps of Engineers Navigation Information Connection website "Report 15 - Commodity Series (0,10,20,30,40,50,60,70,80,90) for Years 2007-2011" Accessed on March 19, 2013 at http://www2.mvr.usace.army.mil/omni/webrpts/omni_gr/rpt15oc.cfm?.

Key to Market Area Commercial River Ports by Navigation Pool

Pool 5 includes Alma and Fountain City, Wisconsin
Pool 6 includes Winona, MN
Pool 8 includes La Crosse, WI
Pool 9 includes Lansing, IA power plant
Pool 10 includes Prairie du Chien, WI; Marquette, IA; McGregor IA; and Clayton, Iowa.
Pool 11 includes upper portions of Dubuque IA (most Dubuque port facilities are in Pool 12 to the south), and Cassville, WI.

Several factors could limit or threaten the shipment of these commodities by barge. The limited capacity of Upper Mississippi navigation locks is such that congestion occurs during peak shipping season for farm products. Though shippers interviewed for this study didn't consider these delays prohibitive, it does suggest that the capacity of locks may be a limiting factor to growth of freight movement in the Upper Mississippi River. Finally, aging lock and dam infrastructure is increasing the duration and frequency of planned and unplanned lock closures, potentially causing further delays.

Longer term trends that could adversely affect shipment of agricultural commodities by barge include the growing competition from rail for the grain export market. Another adverse trend (from the barge industries point of view) may come from increased local demand by ethanol plants food processors, and other value-added processes. Livestock raised for dairy and meat production in the region competes with other regions and export markets for bulk bean and grain production, reducing the amount available to barge carriers. Unless domestic firms that use farm products as inputs locate in communities

within 60 miles of the inland waterway system, barges may not be the preferred mode, especially for distances less than 500 miles. Proximity to farms or large markets (cities) may be a more important factor in the location of these firms than location near a river.

In spite of the threats noted above, the long term outlook for farm products produced in the region and shipped by river is generally good. Both domestic and global demand depends in large part on population, which will continue to grow for decades. The U.S. Department of Agriculture predicts record acreages planted in corn and related crops for 2013. Poultry production in southern states is expected to remain strong. While global demand for corn and soybeans is expected to grow fastest in East Asia, the Gulf ports of Louisiana will remain a major exporter in the future, and may benefit from expansion of the Panama Canal.

6.6.2 CHEMICALS

(Fertilizers (Urea, Nitrates, Phosphates), Caustic Soda , etc.)

Chemicals include both fertilizers and non-fertilizers. Nearly all chemicals shipped in the Upper Mississippi inbound from Louisiana and other Gulf States. In 2010, over 2 million tons of fertilizer and over 400,000 tons of other chemicals were shipped from deep water ports in Louisiana and other Gulf States.

In La Crosse, the primary recipients of chemicals are Hydrite Chemical (caustic sodas) and F.J. Robers. In Prairie du Sac, Prairie Sand & Gravel receives both urea and liquid fertilizers. Table 8 shows that Winona, MN (Navigation Pool 6) receives more chemicals than any other port in the study market area, but all navigation pools in the study area receive some.

Demand for fertilizer in the Upper Mississippi is likely to remain stable or because the acreage of arable land in agricultural production is near maximum. Demand for non-fertilizer chemicals will depend on local industry.

Table 8. Chemicals by market area navigation pool.

Navigation Pool	2007 Net Total Tonnage			2011 Net Total Tonnage			Change 2007-2011
	Down Tons	Up Tons	Total	Down Tons	Up Tons	Total	
5	0	11,396	11,396	0	161	161	-99%
5a	0	1,500	1,500	0	27,066	27,066	1704 %
6	**-3,000**	**327,325**	**330,325**	**-4,500**	**490,476**	**494,976**	**50%**
7	0	0	0	0	22,032	22,032	-----
Pool 8	**-1,500**	**15,132**	**16,632**	**0**	**23,009**	**23,009**	**38%**
9	1,600	19,249	20,849	-500	25,411	25,911	24%
Pool 10	**-25,600**	**104,903**	**130,503**	**-16,200**	**167,311**	**183,511**	**41%**
11	-1,600	3,100	4,700	0	3,117	3,117	-34%

Note: "Down tons" that are positive indicate that net tonnage originating in the pool and moving downriver exceeded that of tonnage offloaded in the pool from upstream. If negative, the converse is true. For "up tons," a positive number indicates that tonnage received by the pool from downstream exceeds up tons originating in the pools and shipped north, while a negative number indicates the converse. The net estimate of total tons is a sum of absolute values.

Source: Derived from US Army Corps of Engineers Navigation Information Connection website "Report 15 - Commodity Series (0,10,20,30,40,50,60,70,80,90) for Years 2007-2011" Accessed on March 19, 2013 at http://www2.mvr.usace.army.mil/omni/webrpts/omni_gr/rpt15oc.cfm?.

Key to Market Area Commercial River Ports by Navigation Pool

Pool 5 includes Alma and Fountain City, Wisconsin
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Pool 10 includes Prairie du Chien, WI; Marquette, IA; McGregor IA; and Clayton, Iowa.
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6.6.3 CRUDE MATERIALS

Crude materials cover a wide range of common and typically low value quarried minerals (sand, stone, gravel, dredged river material) to salt, raw lumber, slag, and scrap metal. The majority of crude materials shipments in the Upper Mississippi (nearly 2 million tons in 2010) both originate and terminate in the Upper Mississippi, while another 1 million tons are shipped from the Gulf Coast.

Table 9 shows that La Crosse (Pool 8), Prairie du Chien (Pool 10), and Winona, Minnesota (Pool 6) are the largest handlers of crude materials in the study's market area. Salt is offloaded for road maintenance. Most stone, gravel and sand is used in infrastructure and other construction projects.

Some crude materials are materials dredged from harbors and navigation channels in order to maintain navigable depths.

Supply and demand for these basic materials will likely remain stable. "Frac sand" or sand suitable for use hydraulic fracture mining of natural gas - is not is not currently shipped from Wisconsin river ports and is discussed in greater detail in Section 6.7.1.

Table 9. Crude Materials by Navigation Pool

Navigation Pool	2007 Net Total Tonnage			2011 Net Total Tonnage			Change 2007-2011
	Down Tons	Up Tons	Total	Down Tons	Up Tons	Total	
5	0	0	0	750	-2,500	3,250	-----
5a	0	-4,500	4,500	0	-13,517	13,517	200%
6	-1,500	12,895	14,395	12,030	121,433	133,463	827%
7	0	-1,300	1,300	-30	16,500	16,530	1172%
Pool 8	**3,000**	**173,107**	**176,107**	**-7,500**	**132,099**	**139,599**	**-21%**
9	0	-8,992	8,992	1,500	-3,000	4,500	-50%
Pool 10	**0**	**7,018**	**7,018**	**2,250**	**131,789**	**134,039**	**1810%**
11	0	9,100	9,100	4,611	24,800	29,411	223%

Note: "Down tons" that are positive indicate that net tonnage originating in the pool and moving downriver exceeded that of tonnage offloaded in the pool from upstream. If negative, the converse is true. For "up tons," a positive number indicates that tonnage received by the pool from downstream exceeds up tons originating in the pools and shipped north, while a negative number indicates the converse. The net estimate of total tons is a sum of absolute values.

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6.6.4 PRIMARY MANUFACTURES

This category of commodity includes non-metallic (cement, lime, glass, lumber and paper) and metallic (pig iron, metal sheet, and pipe, etc.) that serve as intermediary inputs in various industries.

Holcim Incorporated's Cement Terminal in La Crosse (Pool 8) is specially equipped to store, mix, and ship cement. It is the largest handler of cement in the market area. Other types handled at other ports in the market areas include pig iron, and primary wood products. Other ports in the study area receive handle little cement.

Table 10. Primary Manufactures by Navigation Pool

Navigation Pool	2007 Net Total Tonnage			2011 Net Total Tonnage			Change 2007-2011
	Down Tons	Up Tons	Total	Down Tons	Up Tons	Total	
5	0	0	0	0	-2,854	2,854	-----
5a	0	-4,500	4,500	0	0	0	-100%
6	-1,500	12,895	14,395	0	14,800	14,800	3%
7	0	-1,300	1,300	0	0	0	-100%
Pool 8	**3,000**	**173,107**	**176,107**	**0**	**233,177**	**233,177**	**32%**
9	0	-8,992	8,992	0	5,900	5,900	-34%
Pool 10	**0**	**7,018**	**7,018**	**0**	**7,091**	**7,091**	**1%**
11	0	9,100	9,100	-1,500	13,983	15,483	70%

Note: "Down tons" that are positive indicate that net tonnage originating in the pool and moving downriver exceeded that of tonnage offloaded in the pool from upstream. If negative, the converse is true. For "up tons," a positive number indicates that tonnage received by the pool from downstream exceeds up tons originating in the pools and shipped north, while a negative number indicates the converse. The net estimate of total tons is a sum of absolute values.

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6.6.5 OTHERS (COAL, PETROLEUM, MACHINERY, AND EQUIPMENT)

6.6.5.1 PETROLEUM AND RELATED PRODUCTS (Fuels, Oils, Asphalt, Tar, Waste fuel)

Petroleum and Petroleum related products such as asphalt, tar, and waste fuel represent a small share of freight moving on the Upper Mississippi River and handled within the Wisconsin ports market area. Much of the tonnage – 227,000 tons in 2010 - originated and ended at ports within the river north of the Illinois River. The region received an additional 29,000 tons from the Lower Mississippi south of the Ohio River (Appendix C).

Dubuque, Iowa ports (Pool 11) are the largest handler of petroleum in our study's market area, followed by Midwest Industrial Fuels in La Crosse, WI (Pool 8), and Winona, MN (Pool 6).

The market area outlook for the medium term is relatively stable. Domestic demand for petroleum products is a function of population, incomes, price, and availability of substitutes. Asphalt will is a staple of road maintenance. The population of Upper Mississippi States of Iowa, Wisconsin, and Minnesota are expected to increase, but slower than the national average. Average incomes in the market area range from relatively low in the southern part of the market area to relatively high in La Crosse and Minneapolis. Increased fuel efficiency and alternative fuels could offset increased demand for petroleum products

From a national perspective, pipelines and rail compete with barges for long haul traffic of petroleum products. Most petroleum products travel via pipeline where they exist. New production from North Dakota and Western Canada could be routed through the Upper Mississippi River ports and to refineries downstream, but pipelines from these relatively new production regions exist or are planned. Upper Mississippi River ports are at a long term competitive disadvantage owing to the seasonality and unreliability of river traffic. Niche markets such as shipping of asphalt, tar, and waste oil will likely remain.

6.6.5.2 COAL

Coal moving on the Upper Mississippi River is shipped to the region from coal producing states such as Illinois, Kentucky, West Virginia, and the western states of Wyoming and Montana. In 2010, Upper Mississippi ports north of the Illinois River received at total of 2.3 million tons from other part of the Inland Waterway System (mostly from Illinois and Ohio) and moved an additional 1.7 million tons within the system.

The ports at La Crosse area (Navigation Pool 8) and Prairie du Chien (Navigation Pool 10) receive little or no coal by water, but some is off-loaded elsewhere in their respective navigation pools. . Much of the coal reaching the Upper Mississippi is shipped directly to power plants nearest the river, including the Alliant Energy powerplant in Lansing, Iowa (Pool 9). Others include the Dairlyland Power Coop in Genoa, WI (Pool 8) and the Dairyland Power Coop in Alma Wisconsin, (Pool 5). Quantities received by all ports decreased markedly between 2007 and 2011.

The long term domestic and market area outlook for this commodity is decline, while national exports are expected to grow. Domestic power plants and industries are reducing reliance on coal in favor of

natural gas and other sources owing to restrictions on emissions from coal and the decreasing prices of competitors. Coal exports are expected to increase, but are unlikely to be loaded or unloaded within the market area owing to location. Coal produced in the eastern United States and shipped to Gulf Coast or Eastern ports would bypass the Upper Mississippi region completely. Coal produced in the western states of Montana and Wyoming are more likely to be moved by rail to west coast ports to meet growing demand for China.

There is a possibility that western coal could be exported from Gulf Coast ports via the Wisconsin Commercial Port market area. Coal arriving at Upper Mississippi River Ports could be trans-loaded to barges to complete the journey. However, several factors work against this possibility. Upper Mississippi River Ports are closed in winter. Substantial freight rail infrastructure between western coal fields and year-round river Mississippi and Missouri River ports farther to the south would be more direct and reliable. Even if the Upper Mississippi were considered desirable by shippers, geography would favor Iowa and Minnesota ports, and large scale coal storage and loading in or near cities is likely to face local opposition.

Table 11. Coal by Market Area Navigation Pool

Navigation Pool	2007 Net Total Tonnage			2011 Net Total Tonnage			Change 2007-2011
	Down Tons	Up Tons	Total	Down Tons	Up Tons	Total	
5	0	631,965	631,965	0	63,500	63,500	-90%
5a	0	0	0	0	0	0	------
6	0	119,373	119,373	0	38,541	38,541	-68%
7	0	1,500	1,500	0	-1,500	1,500	0%
Pool 8	**30,000**	**59,854**	**89,854**	**0**	**6,000**	**6,000**	**-93%**
9	-19,500	2,273,868	2,293,368	0	1,261,660	1,261,660	-45%
Pool 10	**0**	**37,147**	**37,147**	**13,500**	**16,240**	**29,740**	**-20%**
11	-63,000	642,069	705,069	10,957	382,500	393,457	-44%

Note: "Down tons" that are positive indicate that net tonnage originating in the pool and moving downriver exceeded that of tonnage offloaded in the pool from upstream. If negative, the converse is true. For "up tons," a positive figure indicates number indicates that tonnage received by the pool from downstream exceeds up tons originating in the pools and shipped north, while a negative number indicates the converse. The net estimate of total tons is a sum of absolute values.

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6.6.5.3 MANUFACTURED EQUIPMENT AND MACHINERY

Very little manufacture equipment and machinery is shipped or received as measured in tonnage. However, this category has by far the highest value by ton of any commodity. Types of machinery typically shipped by river include large equipment needed for river maintenance; large vehicles such as agricultural and construction vehicles, large industrial machines and components difficult to move by rail or highway. Movement by barge allows oversized cargo to bypass height, weight, and width constraints of road and rail, making preservation of a water borne alternative attractive regardless of year-on-year trade volumes.

The ports of La Crosse and Prairie du Chien handle relatively little manufactured equipment and machinery. The low and variable tonnage handled between 2007 and 2011 in all of the market area navigation pools indicates that shippers do not view the river as a standard mode choice on par with others.

Rail and truck both compete with barges for traffic. Because this category tends toward a high value per ton, shippers will often value speed and reliability over cost of shipment, putting barges at a disadvantage. Nevertheless, barges retain a competitive advantage for large manufactures particularly those where lead delivery times are long and/or other alternatives are less practical.

Long term outlook for this commodity category will depend on the growth and locational decisions of industries equipment manufacturing, particularly in large equipment categories. Expansion of the panama canal may result in more imports of high value equipment moving through gulf and east coast ports.

6.7 POTENTIAL NEW MARKETS

In addition to the commodities traditionally shipped from Wisconsin Commercial River Ports and the Upper Mississippi River, our team researched several commodities that could potentially be shipped by river but currently are not. We chose these commodities based on one or more of the following: the commodities have characteristics similar to those currently moved by barge; producers and/or markets for the commodities are close to Wisconsin and other inland waterway ports; domestic or global demand is expected to rise; or the value of the commodities would contribute significantly to the economic development of the communities.

6.7.1 FRAC SAND & NATURAL GAS

The boom in domestic natural gas production from hydraulic fracturing or "fracing" has resulted in high demand for a particular kind of sand needed as part of the mixture of water and chemicals needed for the process. This type of sand is relatively abundant in western Wisconsin (See Figure 44). Many existing or potential natural gas mines are accessible by inland waterway (See Figure 45). Once produced, shipment of natural gas in either compressed or liquefied state by barge is another potential market if more efficient pipelines are not available.

In spite of the proximity of frac sand mines near Wisconsin's Commercial River ports, shipment of frac sand by water has not materialized. For example, frac sand quarried in nearby McGregor, Iowa moves through Prairie du Sac by rail despite the fact that the McGregor quarry is immediately adjacent to Mississippi River docks there.

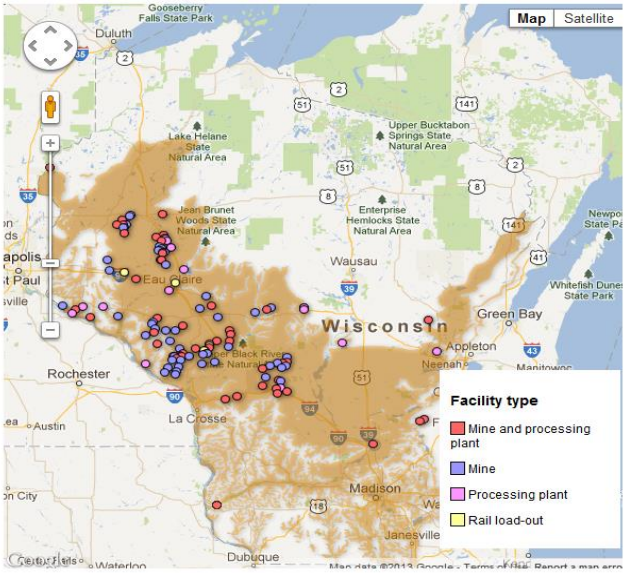

Figure 44. Location of Frac Sand Mines and/or Processing Facilities in Wisconsin (Wisconsin Department of Natural Resources, 2013)

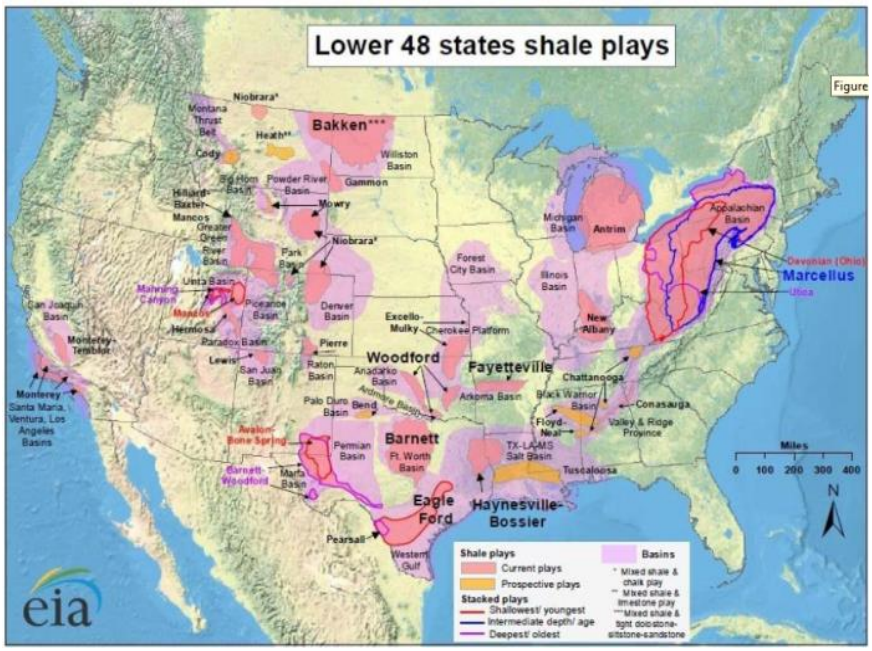

Figure 45. Shale Gas and Oil Plays, Lower 48 States (U.S. Energy Information Administration, 2013)

6.7.2 WOOD CHIPS, LUMBER, WOOD MANUFACTURES

Forest products have historically been a large part of Wisconsin's economy, as has shipment of raw lumber, other wood products, and paper products by river. Over the past few decades, Wisconsin has lost significant market share to southeastern states and foreign producers. Nevertheless, production of wood related products ranging from low value wood chips (used by Europe and other markets as a form of renewable energy) to high value manufactures such as furniture or prefabricated buildings.

6.7.3 HIGH VALUE MANUFACTURES INDUSTRIAL, AGRICULTURAL, ENERGY PRODUCTION

Waterways are a natural for shipping objects too large or heavy to ship conveniently by road or rail. Historically, rivers have been used to ship large manufactures. For example, First Supply Company in La Crosse used to off load over size pipe by river. Large equipment such as floating cranes needed for river infrastructure construction and maintenance are frequently moved by water. Movement of large farm and construction vehicles manufactured in Upper Mississippi States (such as those manufactured by John Deere in Moline, Illinois) could be moved by water to 20 states or to the Gulf of Mexico for export. Components of wind energy systems are another example. The potential for these markets in the Upper Mississippi River will depend on trends on the health of manufacturing in near port town.

6.7.4 CONTAINERIZED FREIGHT

As discussed in Section 6.3, few shippers elect to ship high value commodities on domestic waterways. However, the enormous growth in movement of these commodities by standardized shipping containers has raised interest in the potential of moving these containers by river. "Container on Barge" The America's Marine Highways Program was established by the Energy Independence and Security Act of 2007. U.S. Department of Transportation established the Marine Highways Program to better integrate the inland waterway system with the Interstate Highway System and the rest of the U.S. surface

transportation infrastructure. The vision is to establish tug and shipping services that are reliable, frequent, and competitive enough to make them a routine choice coequal with other modes. The operating theory is that this service will leverage the fuel efficiency and emissions benefits inherent with barges and to reduce increasing congestion and time delays in railroads and freeways.

To accomplish this vision, the Marine Highways Program has designated major water routes that roughly parallel Interstate Highways. For example, the M-90 corridor is the designated waterway reliever route for I-90. These water corridors are depicted in Figure 46 . Waterways designated as Marine Highways are eligible for federal funds designated for the program.

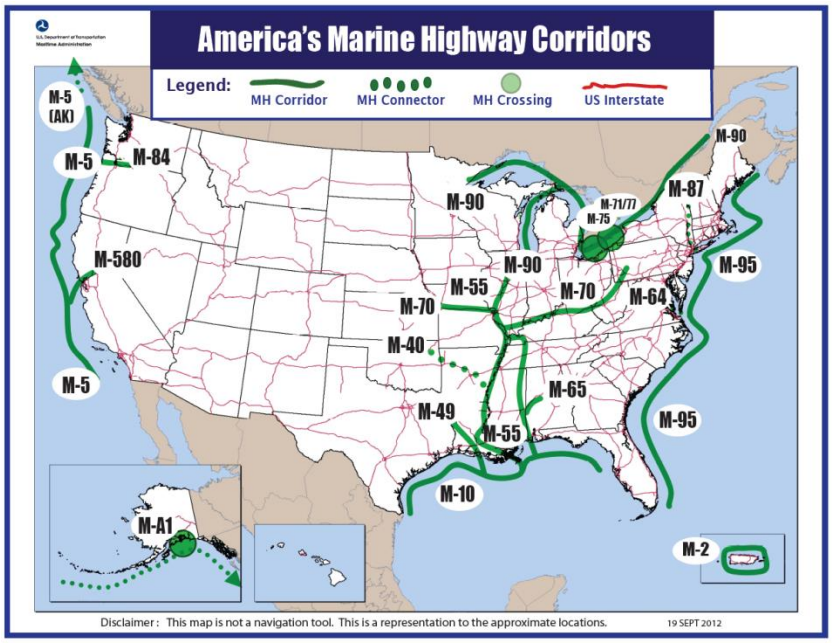

Figure 46. Marine Highway Corridors (USDOT, 2013)

Unfortunately, the Upper Mississippi River does not lie within a primary freight corridor. The twin Cities in Minnesota provide the only large market within the market area and north of the Wisconsin River ports. The Mississippi River Regional Planning Commission undertook a study for the feasibility study for an intermodal freight facility near La Crosse and determined that demand would likely be insufficient to warrant such a facility in the foreseeable future (Port of Lacrosse Harbor and Waterfront Plan, 2011).

7 SWOT ANALYSIS

This section provides a concise summary of some of the strengths, weaknesses, opportunities, and threats facing commercial shipping at the Ports of La Crosse and Prairie du Chien. Table 12 summarizes our findings. Because this summary combines observations concerning two ports and multiple port terminals, the topics do not apply equally to each. Some observations apply to all ports and terminals in our study. Others may apply to specific port terminals but not others. For instance, local investment may be strong at one terminal, but lack of similar investment in a nearby terminal may be a weakness. Each is explained in greater detail in the following sections. Some of the topics were gleaned from the port communities themselves. Others are derived from a survey of sources pertaining to barge shipping and economic trends generally.

Table 12 SWOT summary table

SWOT	
Strength	**Opportunity**
Energy, cost efficiencies of barge shipping Stable Existing Markets (Agriculture, Fertilizer) Adjacency or proximity to National Highway System, freight rail yards Owner, operator and community investment in advanced technology (Brennan) and basic infrastructure. Product diversity Space to grow	Supportive local policies Federal and State Infrastructure Funding Programs Expanding domestic and export markets Potential Future Markets: • Frac Sand and Natural Gas • Other Petroleum (North Dakota, Western Canada) • Wood Chip Exports (Used for Energy, Paper) • Oversize Manufactures (Farm, Renewable Energy Systems) • Intermodal (Container)
Weakness	**Threat**
Slow travel time, indirect routes Limited space to grow (i.e. Midwest Fuels, Other La Crosse) Small local markets Condition of rail connection Lack of rail access (applies only to some terminals)	Seasonal Operations / Climate-related Uncertainty (floods, droughts) Local public policies restricting commercial ports and favoring other land uses / economic development strategies in port communities Underinvestment in related infrastructure (local streets, rail lines, locks, etc.) Local demand for commodities (reduces long haul opportunities) Competition from other ports Competition from Rail, Truck, Pipeline

7.1 STRENGTHS

Energy and cost efficiencies of barges: Barges are the most efficient mode of freight transportation in terms of energy and cost needed to move a given amount of product over a given distance. This is typically expressed as tons per mile or "ton-miles". Barges typically can move 576 ton-miles of freight per gallon of fuel, while trains can move 413 ton miles per gallon and truck only 155 ton-miles per gallon. In terms of reducing congestion and deterioration of roads and railways, a single barge can replace 16 rail cars or 70 semi-tractor trucks when carrying dry bulk cargo or 46 rail cars or 144 trucks carrying liquids (TTI, 2009).

Adjacency or proximity to the railroads and the National Highway System: While highways and railroads can and do compete with water shipping, healthy ports require convenient and reliable access to truck and/ or rail service. Direct connections to inland markets extend the potential market reach of barge carriers and efficient multi-modal facilities offer the possibility of shipping a wider range of products. Access to multiple modes also provides shippers with flexibility and local price competition.

Both La Crosse and Prairie du Chien are located at the junction of national highways, railroads, and waterways. In cases where national highways and railroads to not reach a port terminal, the cities and the Federal Highway Administration have identified local streets needed for intermodal connections.

Stable existing businesses: Port operators interviewed for this report do not anticipate changes to local or national market conditions that would detrimental to their business operations at the port.

Investment in local port facilities: Most of the facilities visited in this report were in good repair, and some terminal owners and operators have made recent substantial investments in rehabilitating or expanding infrastructure and equipment. Brennan Marine's investment in modern fleet and barge tracking hardware and software is an indication of company health and optimism for the future of waterborne commerce in the Upper Mississippi River.

Product diversity: Product diversity is an indication of a ports ability to survive and adapt to changing market conditions. A major decline in any one business or commodity is less likely to threaten the economic health of the port as a whole. Product diversity also can reflect and contribute to a robust local economy. Taken as a whole, the Port of La Crosse serves a wider range of businesses than most port communities in the market area. F.J. Robers and its tenants/operators handle a wide range of commodities at a single terminal. However, product diversity at each terminal is not necessary to achieve diversity for the port as a whole. In La Crosse, Midwest Industrial Fuels, the Holcim Company, and Hydrite Chemical are examples of terminal specialization appropriate to their business. In Prairie du Chien, the Prairie Sand & Gravel company, two terminals are equipped to handle various solid and liquid commodities.

Space to grow: Space to grow can affect the long term viability of ports and the shippers who rely on them. If a freight facility cannot grow to meet increasing demand, affected firms may be likely to look elsewhere. From a community development perspective, space for port expansion can be a tool for attracting new shipping businesses to an area. Both port communities have identified undeveloped land

areas where future maritime freight would be appropriate. At the level of individual terminals, this strength applies to some port terminals than others. In La Crosse, F.J. Robers has the most unutilized or underutilized space to grow. In Prairie du Chien, the Prairie Sand & Gravel company owns property on the mainland suitable for expanded multi-modal freight operations. Port terminals that lack space to grow are discussed in "threats."

7.2 WEAKNESSES

Slow speeds, indirect routes: Rivers don't always flow between origins and destinations that shippers are interested in and they don't always do so in a straight line. Barges are typically the slowest freight mode, averaging just 11 miles per hour. Passage through navigation locks imposes additional time costs. The location of La Crosse and Prairie du Chien on the Upper Mississippi means that these ports are somewhat peripheral to the larger inland waterway system and access requires passage through numerous navigation locks. All of these factors limit the types and amounts of products that shippers move by barge to and from the Upper Mississippi River.

Small local markets: In large metropolitan ports, there are large numbers of producers, consumers, and intra-port freight movements; creating additional jobs. The population and economic base in La Crosse and Prairie du Chien are relatively small by comparison.

Limited space to grow: Some (but not all) port businesses that could grow do not have access to additional land to expand. Midwest Industrial Fuels is one example of a business that has expressed interest in growth but is hemmed in by residential and other development. In Prairie du Chien, the ability to expand the St. Feriole Island is restricted by local, state, and policy that discourages development in the flood plain and the City's plan to use adjacent property for open space, recreation, and tourism related activities.

Condition of rail tracks: While most of the port rail facilities are well maintained, the condition of tracks, whether owned by the port or connecting track owned by the railroad, is an ongoing concern.

Lack of rail access (applies only to some terminals): Lack of rail access limits potential growth of existing and possible future multi-modal freight handling.

7.3 OPPORTUNITIES

Supportive local policies: Both the Port of La Crosse and the Port of Prairie du Chien are located in communities with plans in place that acknowledge the needs of commercial freight movement, including commercial ports. In La Crosse, the Joint Board of Harbor Commissioners and the municipalities they represent have worked actively with port businesses to balance the competing needs of various user groups. While the City has promoted redevelopment of some current and former commercial terminals to other uses, it has actively supported preservation, relocation or expansion of others.

Federal and State Infrastructure Funding Programs: As noted in Section 5.3, federal revenues and expenditures on inland waterways are currently not sufficient to address the growing backlog of maintenance and rehabilitation of federal river infrastructure. However, there are several state and federal programs available to public can private port operators that are designed to leverage investment dollars. For example, the Wisconsin Department of Transportations' Harbor Assistance Program (HAP) assists harbor communities and businesses located on the Mississippi River and the Great Lakes in maintaining and improving waterborne commerce. Projects that receive HAP grants include harbor dredging, dredged material disposal, bank erosion repair, and dockwall construction, repair, maintenance or rehabilitation. Applicants must be located on a harbor facility that handles 1,000 tons of commercial cargo per year, builds vessels, carries passenger or vehicle-service ferries, or unloads fish from commercial fishing vessels. Since the creation of the program, the La Crosse (city, county, and private) has received a total of $12.4 million to fund thirteen projects The Prairie du Chien area (city, county, private) has received at least $3.2 million (WisDOT, 2013). The proposed state budget for 2013-2014 would provide $10.7 million in matching grants to communities and businesses along the Great Lakes and Mississippi River (McCollum, 2013).

Other programs of potential interest to port communities include:

State of Wisconsin Transportation Economic Assistance (TEA) Program - Created in 1987, this program provides state grants for harbor, road, rail, and airport projects. Governments and private businesses are eligible or 50% matching grants. The goal is retain and attract businesses. Since its creation, the State has awarded over $81 million in grants to 305 businesses and 187 communities. (WisDOT, 2010).

Wisconsin Freight Rail Infrastructure Improvement Program – Created in 1992, this program allows the State to make loans to railroads, local governments, and businesses. Eligible projects include improvements that enhance intermodal freight movement, rail line improvements, safety, and efficiency. They can also be used to connect a business to the national railroad system or expand a business. The program is currently self –sustaining with revenue coming from repayment of loans from a $8.5 million segregated fund. A total of 79 loans valued at $93 million were made between 1993 – 2009 (WisDOT, 2010).

Expanding domestic and export markets for grain (Southern States, Gulf): Local production and global demand for agricultural products produced and shipped from Wisconsin's river ports is likely to remain strong or grow. Domestic demand for grain by southern poultry industries and other customers could also grow. High energy costs, truck driver shortages, congestion on both rail roads and highways, and more stringent vehicle emissions will likely improve the competitive position of barges in markets which they currently serve.

Potential Future Markets: Although significant barriers exist to expansion of barge shipping to new routes and commodities, changing conditions in the freight transportation sector and national freight flows may allow Wisconsin's river ports to expand their businesses. Section 6.7 discusses some of these in greater detail.

7.4 THREATS

Seasonal Operations / Climate-related Uncertainty (floods, droughts): Winter closure of the Upper Mississippi River has long been a constraint to growth of river shipping. It is a barrier to shippers requiring reliable and simplified supply chains. Seasonal flooding and droughts also affect predictability and reliability important to shippers of time-sensitive products. If climate change results in increasingly severe floods and droughts, even existing markets could be are threatened.

Local public policies restricting commercial ports and favoring other land uses / economic development strategies in port communities: Port operations, like other types of operations, often generate truck traffic, noise, smells, and dust that local residents oppose. In order for commercial ports to thrive, local policies must continue to acknowledge the needs of commercial shippers as well as other interests. While both La Crosse and Prairie du Chien have reached varying degrees of accommodation with commercial port owners and operators, some friction between user groups is inevitable.

Underinvestment in related infrastructure (local streets, rail lines, locks, etc.): Like the condition of the ports themselves, related public and railroad infrastructure in the river port communities is in generally good condition. However, failure to preserve and maintain truck routes, bridges, and tracks necessary for delivery of heavy freight would undermine commercial shipping. As noted in Section 5.3 the greatest long term threat to commercial shipping on the Upper Mississippi may be underinvestment in the federally owned and managed navigation locks and dams.

Local demand for commodities (reduces long haul opportunities): As noted in the market assessment, local demand for products – specifically grains and soybeans – can divert these products from river ports. Ethanol plants, dairy, livestock, and food processors fall into this category. (Note: this analysis focuses on threats to ports and shipping. These value-added activities may provide more net economic benefit to local communities than shipping.)

Competition from other ports : Several ports within sixty miles of both ports could become attractive alternatives to shippers should the infrastructure or operating conditions at Wisconsin's ports deteriorate.

Competition from Rail, Truck, Pipeline: As discussed in the modal analysis, waterborne freight represents a relatively small share of total freight movement, but can compete successfully in certain niches such as long haul shipping of heavy commodities. Barge's advantages could be negated by competition, particularly railroads. Railroads have invested heavily in unit trains (trains with 100 or more cars) and large, specialized grain cars. Similar investments in barge shipping may be necessary to retain or expand market share.

8 DECISION MAKING FRAMEWORK

A great deal of valuable information has been collected during this project. Although the main objective of this research project was to perform a market and infrastructure assessment of the port of La Crosse and the port of Prairie Du Chien, it was considered essential to understand the importance of this information in the context of the decision making process when choosing the best investment alternative.

When taking a decision, intangible measurement of priorities is done based on what is important to the decision maker or stake holders of a particular project. Multiple theories and strategies of decision measurement have been proposed to formalize decision making. One of these theories proposes that decision making can be measured from different angles such as the optimistic, pessimistic, and the average efficiency (Wang, 2007). Process frameworks are also very popular in the decision making measurement community, Tanck (2008) suggested that with a process or framework, managers have the right tool to warrant the quality of their decisions. The Analytic Hierarchy Process (AHP) is one of the theories that can be applicable to determine the best investment alternative. This theory proposes pairwise comparisons and relies on the judgments of experts to derive priority scales. It is these scales that measure intangibles in relative terms (Saaty, 2008).

Saaty's AHP method can be employed translating Strengths, Weaknesses, Opportunities and Threats identified during the SWOT analysis into: the benefits (B), that the decision brings, the opportunities (O) it creates, the costs (C) that it incurs and the risks (R) that it might have to face. These merits together are referred as BOCR (Saaty, 2008). Each of the alternatives considered for the analysis can be ranked based on these standpoints to obtain a single overall ranking. Besides quantifying and obtaining the best alternative, priorities can be determined based on the rating given to the merits.

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10 APPENDICES

APPENDIX A: Summary of Market Area Ports, Terminals, and Navigation Locks (Lock & Dams 4 to 12).

APPENDIX B: 2010 Commodity Flows on the Mississippi River System and Great Lakes.

APPENDIX A: Summary of Market Area Ports, Terminals, and Navigation Locks (Lock & Dams 4 to 12).

The following table is a compilation of public and private facilities in the vicinity of Wisconsin's two largest commercial river ports in La Crosse and Prairie du Chien. The data includes information on ports in Minnesota and Iowa. The information is organized by geographic location; north to south based on the river mile marker. Taken together, they represent a more complete picture of the infrastructure and capacities of river borne commerce in the study market area.

Mississippi River Port Terminal & Support Facilities - Wisconsin River Port Study Market Area (Dam 4 (mm 752.8) to Dubuque, Iowa (mm 579.5)

Name/Owner	Mile Marker	Commodities Handled and Stored	Truck Access	Rail Access/ Capacity	Equipment Available	Barge Capacity (load/store)	Total Storage
Dam 4 (mm 752.8 L) Alma, WI (608) 685-4421							
Fountain City, WI							
USACE Service Base							
Dam 5 (mm 738.1 R) Minnesota City, MN (507) 689-2101							
Dam 5A (mm 728.5 R) Fountain City, WI (507) 452-2789							
Winona, MN							
Archer Daniels Midland (ADM - BQ)	727.1 R	Corn, Soybeans Non-GMO Grains	Riverview Drive	UP, CP	Conveyor, Loading Spout	Not Available	309,000 bushels
CD Corp. of Winona	727.0 R	Coal, Fertilizers, Salt	Riverview Drive	UP	Yard Crane, Clam Shell Bucket	Not Available	92,924 tons
CHS Inc.	726.7 R	Grain	Riverview Drive	UP	Conveyor, Loading Spout	Not Available	611,000 bushels
Modern Transport Terminal, Inc.	724.4 R	Dry Fertilizer, Corn, Soybeans, Cottonseed, Salt, Manganese Oxide	East Front Street	UP, CP	Conveyors, Loading Spout Loaders, Locomotive, Trucks (To and from Barge)	Not Available	147,310 tons-dry bulk
Andersons Inc.	724.1 R	Liquid Fertilizer	East 2nd Street	CP	Mast and Boom Derrick	Not Available	54,800 tons
CHS Winona River Rail	724.0 R	Fertilizer	East 3rd Street	UP, CP, DME	Conveyors, Loaders	Not Available	125,000 tons
ARTCO Fleeting Service – Winona (ADM subsidiary)							
Dam 6 mm 714.1 L Trempealeau, WI (608) 534-6424							
Dam 7 mm 702.0 R La Crescent, MN (507) 895-2170							
La Crosse, WI							
Brennan Marine, Inc. Barge Maintenance Fleeting Services, Harbor and Port Maintenance mm 697							
F.J. Robers (Owner) Tenants: Conagra; Cottonseed LLC	698	Grain, dry bulk, coal, salt, aggregates, pipe, cotton seed, pig iron, scrap metal, lumber, wood chips	816 Bainbridge Street	CP	Grain Conveyor, Cranes to 100 tons	3 worked ; 8 held	16 acres opens; covered dry; 2 grain silos total 140,000

Mississippi River Port Terminal & Support Facilities - Wisconsin River Port Study Market Area (Dam 4 (mm 752.8) to Dubuque, Iowa (mm 579.5)

Name/Owner	Mile Marker	Commodities Handled and Stored	Truck Access	Rail Access/ Capacity	Equipment Available	Barge Capacity (load/store)	Total Storage
							bushels
City of La Crosse North Municipal Dock	698	Various		None	None	1 barge worked	Outdoor
Hydrite Chemical	698	Liquid Chemicals	701 Summer Street	CP	Pipeline	1 barge worked	2 million gallons liquid
Midwest Industrial Fuels, Inc.	697	Oil, asphalt	615 Summer Street	CP	Pipeline	2 barges worked	16 million gallons liquid storage
Holcim Trading Inc.	631	Cement	618 La Crosse Street	BNSF	14 inch pneumatic pipeline	1 barges worked	3 steel storage silos; total 11,900 tons
Hanke Terminals	696	General Cargo	1700 Marco Drive, Isle La Plume, La Crosse, WI	None	Cranes up to 400 tons, 400 tons per hour	3 worked; 24 held at City Fleeting area	15 acres of open storage
Dam 8 mm 679.2 L Genoa, WI (608) 689-2625							

Mississippi River Port & Support Facilities
Wisconsin River Port Study Market Area
(Dam 4 (mm 752.8) to Dubuque, Iowa (mm 579.5)

Name/Owner	Mile Marker	Commodities Handled and Stored	Truck Access	Rail Access/ Capacity	Equipment Available	Barge Capacity (load/store)	Total Storage
Lansing, IA Power Station (Alliant Energy)	660.3	Coal and Fly Ash	Power Plant Drive	DME	Not Available		600,000 tons
Dam 9 mm 647.9 L Eastman, WI (608) 874-4311							
Prairie du Chien, WI							
Prairie Sand & Gravel (Owner/ Operator)	636	Liquid Fertilizer, Dry Fertilizer, Salt, Aggregates, Scrap Metal; liquid fertilizer	County Hwy K	BNSF 16 cars	Dry Bulk Conveyor, Clam Shell bucket 5 yard 75 ton Crane; pipeline to adjacent property	2 worked 75 stored	20,000 s.f dry bulk structure; outdoor storage;
Gavilon Grain LLC (Operator); Prairie Sand & Gravel (Owner/ Operator)	636	Corn, Beans, Distillers Grains, Liquid Fertilizer, Aggregates	N. Villa Louis Road	WSOR 32 Grain cars	Grain Conveyor (2)	3 worked	70,000 bushels (2 bins) Two liquid fertilizer tanks, outdoor storage
McGregor, Iowa (Across from Prairie du Chien)							
Agri-Bunge, LLC (Bunge North America & AGRI Industries)	633.4	Corn, beans	East B Street	DME	Not Available	1 worked, 8 stored	1 million bushels
ARTCO Fleeting Services – McGregor, IA (Cassville, WI Office, ADM subsidiary) mm 634 634.0							
Clayton, Iowa							
Consolidated Grain and Barge (CGB) (since 2007)	623.0 624.0	Corns, beans, specialty grains, dry fertilizer, liquid fertilizer, coal, salt,	1st Street	DME 150 rail cars	Not Available	3 worked 100 stored	7 mil. dry-inside, 600,000 bushels outside, 4,800 tons liquid.

Mississippi River Port & Support Facilities
Wisconsin River Port Study Market Area
(Dam 4 (mm 752.8) to Dubuque, Iowa (mm 579.5)

Name/Owner	Mile Marker	Commodities Handled and Stored	Truck Access	Rail Access/ Capacity	Equipment Available	Barge Capacity (load/store)	Total Storage
Pattison Sand Co. – LLC South	623.0	Silica sand, limestone, concrete stone	1st Street	"	"	"	"
Dam 10 mm 615 R Guttenberg, IA 563-582-1204							
Cassville, WI							
ARTCO Fleeting Services – Cassville (ADM subsidiary)							
DAM 11 mm 583 R Dubuque, IA 563-582-1204							
Dubuque, Iowa							
Peavey Company (ConAgra)	581.0	Corn,urea, DAP, MAP,DDG beans, fertilizer, coal, lumber, ammonium sulphate, steel re-bar	East 7th Street	CN, BNSF, DME 45 rail cars	Not Available	2 worked 15 stored	320,000 bushels dry – inside, 1.7 million bushels outside, 35,000 tons dry bulk
Peavey Company (ConAgra)	580.3	Steel, twine, salt, liquid nitrogen	12th Street	None	Not Available	1 worked 1 stored	7,200 tons dry bulk, 2 million gallons liquid
Flint Hills Resources LP	580.1	Asphalt, Cement	Koch Court	Various, 8 rail cars	Not Available	2 worked	Liquid Storage
Cargill Ag Horizons	580.0	Corn, beans, fertilizer, salt	Kerper Blvd	CN 40 rail cars	Not Available	2 worked, 1 stored	60,000 bushels-grain, 35,000 tons - fertilizer
Dubuque Power Plant (Alliant Energy)	580.0	Coal	Kerper Blvd.	None	Not Available	1 worked 2 stored	130,000 tons dry storage

Mississippi River Port & Support Facilities
Wisconsin River Port Study Market Area
(Dam 4 (mm 752.8) to Dubuque, Iowa (mm 579.5)

Name/Owner	Mile Marker	Commodities Handled and Stored	Truck Access	Rail Access/ Capacity	Equipment Available	Barge Capacity (load/store)	Total Storage
Dubuque River Terminal (Gary Newt)	579.4	Steel, dry fertilizer, lignin liquor	Jones Street	CN and BNSF 15 cars	Not Available	2 worked 2 stored	5 acres dry outdoor, 3.4 million gallons liquid
Dubuque Barge and Fleeting Service Co./ Newt Marine	579.5		Jones Street	CN, BNSF 15 Rail Cars	Marine Construction, Barge Rental	100 stored	4 acres
ARTCO Fleeting Services –Dubuque (Cassville, WI Office - ADM subsidiary) mm 579.0 579.0							

Sources:
Minnesota Department of Transportation "Minnesota's River Terminals" March 2011.
Iowa Department of Transportation, "River Barge Terminal Directory" Revised 2011.
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APPENDIX B: 2010 Commodity Flows on the Mississippi River System and Great Lakes.

The tables on the following pages illustrate the patterns of trade within the portion of the U.S. Inland Waterway System that includes Mississippi River System and Gulf Coast. They also include the Great Lakes, which is not technically part of the Inland Waterway System but is nonetheless relevant to Wisconsin's maritime and transportation economy. The segments of the Mississippi River were designated by the U.S. Army Corps of Engineers and are useful for evaluating patterns of trade between in the Upper Mississippi River north of the Illinois River and the rest of the system.

The data reveals the vital role that inland waterways play in moving food and farm products from the Upper Mississippi's agricultural states to export ports in the Lower Mississippi River. Additional farm products are shipped to southern livestock and poultry industries. Another significant portion of river traffic is made up of shipments of fertilizers and other chemicals shipped from the energy and chemical producing states in the Gulf.

Coal is significant inbound commodity, brought to the region by barge from the south and east. Petroleum products are shipped from the Gulf, while waste oils are sent down stream for processing.

The data was collected by the U.S. Army Corps of Engineers and was available only in terms of tonnage, not dollar value. Dollar value for commodities shipped can be estimated using Table 4 in Section 6.5.

For reasons of confidentiality, the U.S. Army Corps of Engineers cannot disclose all specific commodity data. Where data reporting would reveal tonnages for a specific firm, tonnages are included in the "other" or "unknown" commodity category. This means that some of the reported tonnages for specific commodity categories may be undercounted.

Total Domestic Mississippi River System and Great Lake Commodity Flows – 2010													
	Shipped To (Millions of Tons)												
Shipped from (Millions of Tons)	**Great Lakes System (U.S.)**	**Mississippi River – MN to Illinois R.**	**Illinois Waterway**	**Mississippi River: Illinois R. to Ohio R.**	**Missouri River**	**Ohio River System**	**Mississippi River: Ohio R. to Baton Rouge**	**Arkansas River**	**Mississippi River: Baton Rouge to Gulf**	**Tennessee River**	**Mobile River System**	**Gulf Coast East**	**Gulf Coast West**
Great Lakes System (U.S)	83.24	0.13	0.64	0.06	0	0.36	0.07	0.02	0.71	0.07	0.02	0.22	0.07
Mississippi River – MN to Illinois R.	0.02	**4.55**	0.13	0.24	0.07	0.20	0.50	0.02	**15.09**	0.75	0.04	0.00	0.03
Illinois Waterway	1.29	0.04	5.70	0.24	0	0.73	0.53	0.08	14.64	0.29	0.10	0.02	0.54
Mississippi River: Illinois R. to Ohio R.	0.05	**2.64**	1.35	1.59	0.12	8.18	11.83	0.29	17.36	0.42	0.31	0.36	1.45
Missouri River	0	0.07	0	0.05	4.23	0	0	0.04	0.04	0.03	0	0	0
Ohio River System	0.16	0.38	0.31	1.92	0	148.8	2.66	0.21	25.95	2.03	1.36	0.98	2.34
Mississippi River: Ohio R. to Baton Rouge	0.03	0.10	0.12	0.13	0	0.55							
Arkansas River	0.04	0.01	0.15	0.01	0	0.23							
Mississippi River: Baton Rouge to Gulf	1.10	**2.89**	3.71	1.91	0.06	10.80							
Tennessee River	0.08	0.20	0.11	0.06	0	4.84							
Mobile River System	0.01	0.01	0.11	0.02	0	0.76							
Gulf Coast East	0.00	0.12	0.11	0.07	0.00	0.90							
Gulf Coast West	0.37	**1.31**	1.58	0.78	0.00	5.01							

Source: USACE. "Region to Region Public Domain Data Base by Origin -2010" and "Region to Region Public Domain Data Base by Destination-2010." http://www.ndc.iwr.usace.army.mil//wcsc/pdf/pdrgod10.pdf.

Domestic Mississippi River System and Great Lake Commodity Flows: Food and Farm Products - 2010									
	Shipped To (Thousands of Tons)								
Shipped from ('000 Tons)	**Great Lakes System (U.S.)**	**Mississippi River – MN to Illinois R.**	**Illinois Waterway**	**Mississippi River: Illinois R. to Ohio R.**	**Missouri River**	**Ohio River System**	**Mississippi River: Ohio R. to Gulf***	**Tennessee- Mobile River System**	**Gulf Coast East and West**
Great Lakes System (U.S)	305	0	0	0	0	0	318	0	0
Mississippi River – MN to Illinois R.	0	**181**	0	4	0	**60**	**14,781**	**776**	0
Illinois Waterway	0	0	128	0	0	0	**12,759**	166.6	0
Mississippi River: Illinois R. to Ohio R.	0	8	0	0	0	7	**12,319**	106	32
Missouri River	0	0	0	0	0	0	41	30.3	0
Ohio River System	14	0	0	0	0	130	**12,198**	592	0
Mississippi River: Ohio R. to Gulf*	51	**141**	165	83	0	290			
Tennessee-Mobile River System	0	0	0	0	0	0			
Gulf Coast East and West	0	0	0	0	0	0			

Note: Owing to data confidentiality considerations, the listed commodity may be classified as "Unknown and Not Elsewhere Classified."

*Includes "Mississippi River: Ohio River to Baton Rouge", "Mississippi River: Baton Rouge to Gulf", and "Arkansas River."

Sources: USACE. "Region to Region Public Domain Data Base by Origin -2010" and "Region to Region Public Domain Data Base by Destination-2010." http://www.ndc.iwr.usace.army.mil//wcsc/pdf/pdrgod10.pdf

Domestic Mississippi River System and Great Lake Commodity Flows: Chemical Fertilizers - 2010									
	Shipped To (Thousands of Tons)								
Shipped from ('000 Tons)	**Great Lakes System (U.S.)**	**Mississippi River – MN to Illinois R.**	**Illinois Waterway**	**Mississippi River: Illinois R. to Ohio R.**	**Missouri River**	**Ohio River System**	**Mississippi River: Ohio R. to Gulf***	**Tennessee- Mobile River System**	**Gulf Coast East and West**
Great Lakes System (U.S)	0	**0**	0	0	0	0	0	0	0
Mississippi River – MN to Illinois R.	**0**	**123**	**77**	**26**	**0**	**100**	**40**	**0**	**0**
Illinois Waterway	0	**0**	0	0	0	0	0	0	0
Mississippi River: Illinois R. to Ohio R.	0	**17**	49	4	0	42	66	11	0
Missouri River	0	**0**	0	0	0	0	0	0	0
Ohio River System	0	**0**	32	5	0	189	138	32.6	0
Mississippi River: Ohio R. to Gulf*	0	**2,036**	1,097	1,030	59	1,674			
Tennessee-Mobile River System	0	**0**	0	0	0	0			
Gulf Coast East and West	0	**131**	88.7	61	0	79			

Note: Owing to data confidentiality considerations, the listed commodity may be classified as "Unknown and Not Elsewhere Classified."
*Includes "Mississippi River: Ohio River to Baton Rouge", "Mississippi River: Baton Rouge to Gulf", and "Arkansas River."
Sources: USACE. "Region to Region Public Domain Data Base by Origin -2010" and "Region to Region Public Domain Data Base by Destination-2010." http://www.ndc.iwr.usace.army.mil//wcsc/pdf/pdrgod10.pdf.

Domestic Mississippi River and Great Lake Commodity Flows: Chemicals, Excluding Fertilizers - 2010									
	Shipped To (Thousands of Tons)								
Shipped from ('000 Tons)	**Great Lakes System (U.S.)**	**Mississippi River – MN to Illinois R.**	**Illinois Waterway**	**Mississippi River: Illinois R. to Ohio R.**	**Missouri River**	**Ohio River System**	**Mississippi River: Ohio R. to Gulf***	**Tennessee- Mobile River System**	**Gulf Coast East and West**
Great Lakes System (U.S)	0	**0**	21	0	0	0	0	0	0
Mississippi River – MN to Illinois R.	**0**	**32**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Illinois Waterway	0	**0**	153	0	0	143	671	0	253
Mississippi River: Illinois R. to Ohio R.	0	**0**	0	0	0	244	426	116	394.2
Missouri River	0	**0**	0	0	0	0	0	0	0
Ohio River System	0	**0**	27	0	0	1,099	12	0	82
Mississippi River: Ohio R. to Gulf*	0	**367**	962	313	0	1,781			
Tennessee-Mobile River System	0	**20**	0	0	0	159			
Gulf Coast East and West	0	**56**	755	16	0	1,302			

Note: Owing to data confidentiality considerations, the listed commodity may be classified as "Unknown and Not Elsewhere Classified."
*Includes "Mississippi River: Ohio River to Baton Rouge", "Mississippi River: Baton Rouge to Gulf", and "Arkansas River."
Sources: USACE. "Region to Region Public Domain Data Base by Origin -2010" and "Region to Region Public Domain Data Base by Destination-2010." http://www.ndc.iwr.usace.army.mil//wcsc/pdf/pdrgod10.pdf.

Domestic Mississippi River System and Great Lake Commodity Flows: Sand, Gravel, Clay, Salt, etc. - 2010									
	Shipped To (Thousands of Tons)								
Shipped from ('000 Tons)	**Great Lakes System (U.S.)**	**Mississippi River – MN to Illinois R.**	**Illinois Waterway**	**Mississippi River: Illinois R. to Ohio R.**	**Missouri River**	**Ohio River System**	**Mississippi River: Ohio R. to Gulf***	**Tennessee- Mobile River System**	**Gulf Coast East and West**
Great Lakes System (U.S)	20,658	0	0	0	0	0	0	0	0
Mississippi River – MN to Illinois R.	0	**1,898**	0	0	0	0	0	0	0
Illinois Waterway	0	0	0	0	0	41	0	0	0
Mississippi River: Illinois R. to Ohio R.	0	64	0	698	0	505	2,619	22	419
Missouri River	0	0	0	0	4,226	0	0	0	0
Ohio River System	0	0	0	363	0	26,144	550	15	1,849
Mississippi River: Ohio R. to Gulf*	65	**135**	50	188	0	4,087			
Tennessee-Mobile River System	0	6	0	0	0	104			
Gulf Coast East and West	219	**1,196**	501	311	0	2,286			

Note: Owing to data confidentiality considerations, the listed commodity may be classified as "Unknown and Not Elsewhere Classified."
*Includes "Mississippi River: Ohio River to Baton Rouge", "Mississippi River: Baton Rouge to Gulf", and "Arkansas River."
Sources: USACE. "Region to Region Public Domain Data Base by Origin -2010" and "Region to Region Public Domain Data Base by Destination-2010." http://www.ndc.iwr.usace.army.mil//wcsc/pdf/pdrgod10.pdf

Domestic Mississippi River System and Great Lake Commodity Flows: Primary Non-Metal Manufactures (Cement, Lime, Wood, etc.) - 2010									
	Shipped To (Thousands of Tons)								
Shipped from ('000 Tons)	**Great Lakes System (U.S.)**	**Mississippi River – MN to Illinois R.**	**Illinois Waterway**	**Mississippi River: Illinois R. to Ohio R.**	**Missouri River**	**Ohio River System**	**Mississippi River: Ohio R. to Gulf***	**Tennessee- Mobile River System**	**Gulf Coast East and West**
Great Lakes System (U.S)	2,791	**0**	0	0	0	0	0	0	0
Mississippi River – MN to Illinois R.	**0**	**334**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Illinois Waterway	0	**0**	0	0	0	0	0	0	0
Mississippi River: Illinois R. to Ohio R.	0	**551**	0	0	0	538	1,285	0	463
Missouri River	0	**0**	0	0	0	0	0	0	0
Ohio River System	0	**0**	0	0	0	2,815	151	0	0
Mississippi River: Ohio R. to Gulf*	0	**0**	0	0	0	0			
Tennessee-Mobile River System	0	**0**	0	0	0	0			
Gulf Coast East and West	0	**0**	0	0	0	0			

Note: Owing to data confidentiality considerations, the listed commodity may be classified as "Unknown and Not Elsewhere Classified."
*Includes "Mississippi River: Ohio River to Baton Rouge", "Mississippi River: Baton Rouge to Gulf", and "Arkansas River."
Sources: USACE. "Region to Region Public Domain Data Base by Origin -2010" and "Region to Region Public Domain Data Base by Destination-2010." http://www.ndc.iwr.usace.army.mil//wcsc/pdf/pdrgod10.pdf.

Domestic Mississippi River System and Great Lake Commodity Flows: Petroleum and Related Products- 2010									
	Shipped To (Thousands of Tons)								
Shipped from ('000 Tons)	**Great Lakes System (U.S.)**	**Mississippi River – MN to Illinois R.**	**Illinois Waterway**	**Mississippi River: Illinois R. to Ohio R.**	**Missouri River**	**Ohio River System**	**Mississippi River: Ohio R. to Gulf***	**Tennessee - Mobile River System**	**Gulf Coast East and West**
Great Lakes System (U.S)	767	**0**	235	0	0	57	269	28	16
Mississippi River – MN to Illinois R.	**0**	**227**	**0**	**0**	**0**	**0**	**293**	**0**	**0**
Illinois Waterway	0	**0**	709	212	0	406	1,651	101	237
Mississippi River: Illinois R. to Ohio R.	0	**0**	0	266	0	386	462	323	48
Missouri River	0	**0**	0	0	0	0	0	0	0
Ohio River System	0	**0**	26	63	0	7,944	455	425	271
Mississippi River: Ohio R. to Gulf*	10	**29**	831	291	0	1,726			
Tennessee-Mobile River System	0	**0**	0	0	0	0			
Gulf Coast East and West	0	**0**	312	425	0	631			

Note: Owing to data confidentiality considerations, the listed commodity may be classified as "Unknown and Not Elsewhere Classified."
*Includes "Mississippi River: Ohio River to Baton Rouge", "Mississippi River: Baton Rouge to Gulf", and "Arkansas River."
Sources: USACE. "Region to Region Public Domain Data Base by Origin -2010" and "Region to Region Public Domain Data Base by Destination-2010." http://www.ndc.iwr.usace.army.mil//wcsc/pdf/pdrgod10.pdf

Domestic Mississippi River System and Great Lake Commodity Flows: Coal - 2010									
	Shipped To (Thousands of Tons)								
Shipped from ('000 Tons)	**Great Lakes System (U.S.)**	**Mississippi River – MN to Illinois R.**	**Illinois Waterway**	**Mississippi River: Illinois R. to Ohio R.**	**Missouri River**	**Ohio River System**	**Mississippi River: Ohio R. to Gulf***	**Tennessee- Mobile River System**	**Gulf Coast: East and West**
Great Lakes System (U.S)	19,170	-	0	0	0	0	0	0	0
Mississippi River – MN to Illinois R.	-	**1,730**	-	-	-	-	-	-	-
Illinois Waterway	0	-	3,750**	0	0	0	24	0	0
Mississippi River: Illinois R. to Ohio R.	0	**1,972**	0	277	0	6,201	2,040***	0	0
Missouri River	0	-	0	0	0	0	0	0	0
Ohio River System	0	**325**	177	1,918	0	108,962	11,054	111	430
Mississippi River: Ohio R. to Gulf*	0	**42**	0	0	0	179			
Tennessee-Mobile River System	0	**0**	0	0	0	4,372			
Gulf Coast: East and West	0	**0**	0	0	0	0			

Note: Owing to data confidentiality considerations, the listed commodity may be classified as "Unknown and Not Elsewhere Classified."
*Includes "Mississippi River: Ohio River to Baton Rouge", "Mississippi River: Baton Rouge to Gulf", and "Arkansas River."
Sources: USACE. "Region to Region Public Domain Data Base by Origin -2010" and "Region to Region Public Domain Data Base by Destination-2010." http://www.ndc.iwr.usace.army.mil//wcsc/pdf/pdrgod10.pdf. **USACE 2010 WCUS Waterways and Harbors Part 2 – Mississippi River System and Part 3- Great Lakes Cargo by Port. (http://www.ndc.iwr.usace.army.mil/wcsc/wcsc.htm). ***USACE 2010 WCUS State to State Public Domain Data Base by Origin indicate that approximately 8-10 million additional tons of coal are shipped, but are "Not Classified" in the Region to Region database.

WISCONSIN INTERSTATE WATERBORNE COMMERCE ON INLAND WATERWAYS 2010 (EXCLUDES GREAT LAKES)

	Food and Farm		Coal		Crude Materials		Chemical Fertilizer		Primary Metal		Other*		STATE TOTALS		
	Shipped To	Received From	Shipped To	Received From	Shipped To	Received From	Shipped To	Received From	Shipped To	Received From	Shipped To	Received From	Shipped To	Received From	TOTAL
Iowa	0	0	0	0	0	0	0	0	0	0	0	93,950	**0**	**93,950**	**93,950**
Minnesota	0	0	0	0	0	0	0	0	0	0	0	92,495	**0**	**92,495**	**92,495**
Louisiana	689,480	0	0	0	0	77,064	0	44,437	0	83,452	1,594	28,952	**691,074**	**233,905**	**924,979**
Tennessee	41,540	0	0	0	0	0	0	0	0	0	0	0	**41,540**	**0**	**41,540**
Alabama	6,279	0	0	0	0	0	0	0	0	0	0	6,459	**6,279**	**6,459**	**12,738**
Illinois	0	0	0	1,737,465	0	0	0	0	0	0	67,847	217,125	**67,847**	**1,954,590**	**2,022,437**
Ohio	0	0	0	339,193	0	0	0	0	0	0	0	0	**0**	**339,193**	**339,193**
Missouri	0	0	0	0	0	0	0	0	0	0	0	173,156	**0**	**173,156**	**173,156**
Indiana	0	0	0	0	0	0	0	0	0	0	0	108,225	**0**	**108,225**	**108,225**
Texas	0	0	0	0	0	0	0	0	0	10,997	0	0	**0**	**10,997**	**10,997**
Kentucky	0	0	0	0	0	0	0	0	0	0	0	9,215	**0**	**9,215**	**9,215**
Arkansas	0	0	0	0	0	0	0	0	0	0	4,570	2,560	**4,570**	**2,560**	**7,130**
Mississippi	0	0	0	0	0	0	0	0	0	0	0	1,521	**0**	**1,521**	**1,521**
	737,299	**0**	**0**	**2,076,658**	**0**	**77,064**	**0**	**44,437**	**0**	**94,449**	**74,011**	**547,213**	**811,310**	**2,839,821**	**3,651,131**

*"OTHER" includes commodities with standard classification codes but were not released to the public due to USACE regulations concerning disclosure of data. NOTE: Source: U.S. Army Corps of Engineers. 2010 "State to State Public Domain Data Base by Commodity." Waterborne Commerce Statistics Center, New Orleans, LA. 2010 (Accessed at http://www.ndc.iwr.usace.army.mil/wcsc/pdf/pdstcm10.pdf

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