Leveraging our Comparative Advantage, Phase II: Identification and Development of Wisconsin Port Market Scenarios

NATIONAL CENTER FOR FREIGHT & INFRASTRUCTURE RESEARCH & EDUCATION

Phase II Final Report

CFIRE 10-02

October 2016

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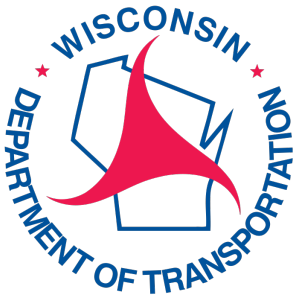
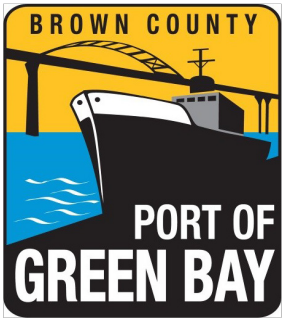
Funded in part by the Wisconsin Coastal Management Program and the National Oceanic and Atmospheric Administration, Office of Ocean and Coastal Resource management under the Coastal Zone Management Act, Grant # NA13NOS4190043.





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CFIRE

Leveraging our Comparative Advantage, Phase II: Identification and Development of Wisconsin Port Market Scenarios

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October 2016

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Technical Report Documentation

1. Report No. CFIRE 10-02	2. Government Accession No.	3. Recipient's Catalog No. **CFDA 20.701**	
4. Title and Subtitle Leveraging our Comparative Advantage, Phase II: Identification and Development of Wisconsin Port Market Scenarios		5. Report Date **October 2016** 6. Performing Organization Code	
7. Author/s Ernie Perry, Eric Oberhart, Ben Zietlow, Teresa Adams		8. Performing Organization Report No. **CFIRE 10-02**	
9. Performing Organization Name and Address National Center for Freight and Infrastructure Research and Education (CFIRE) University of Wisconsin-Madison 1415 Engineering Drive, 2205 EH Madison, WI 53706		10. Work Unit No. (TRAIS) 11. Contract or Grant No. T002688	
12. Sponsoring Organization Name and Address Wisconsin Department of Transportation Research and Library Services Section Division of Business Management 4802 Sheboygan Ave., Room 104 Madison, WI 53705		13. Type of Report and Period Covered **Final Report 07/15/2015–8/30/2016** 14. Sponsoring Agency Code	
15. Supplementary Notes Project completed by CFIRE with support from the Wisconsin Department of Transportation, Wisconsin Economic Development Corporation and Coastal Management, DOA.			
16. Abstract This report documents the identification and development of four marine highway corridors on the Great Lakes and Mississippi River that serve the state of Wisconsin. A market shed and commodity analysis, a corridor feasibility analysis, and a modal diversion assessment were conducted for the four corridors and four comparable highway corridors. For all marine corridors, shipping costs could be reduced for Wisconsin business and industry by shipping on the marine mode rather than on the highway. And in all cases, the resource use and environmental impacts per unit of freight moved favor the marine mode over truck movements. Recommendations to continue the WCPDI effort and implement research results are presented in Chapter 6. Appendix A and B provide commodity diversion profiles by corridor and commodity and business listings near each of the ports respectively. ...			
17. Key Words Marine freight, ports, modal diversion, marine highways, OSOW, Great Lakes, Mississippi River	18. Distribution Statement **No restrictions. This report is available through the Transportation Research Information Services of the National Transportation Library.**		
19. Security Classification (of this report) **Unclassified**	20. Security Classification (of this page) **Unclassified**	21. No. of Pages 100	22. Price **-0-**

Form DOT F 1700.7 (8-72) Reproduction of form and completed page is authorized.

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List of Abbreviations

CFIRE – National Center for Freight and Infrastructure Research and Education

CGLSLGP – Conference of Great Lakes and St. Lawrence Governors and Premiers

DATCP – Department of Agriculture, Trade, and Consumer Protection

DNR – Department of Natural Resources

DOA – Department of Administration

DOT – Department of Transportation

FEU – Forty Foot Equivalent Unit

ITIC – Intermodal Transportation and Inventory Cost Model

MAASTO – Mid-America Association of State Transportation Officials

MAFC – Mid-America Freight Coalition

MARAD – US Maritime Administration

OSOW – Over Size Over Weight

OSV – Offshore Supply Vessel

RO-RO – Roll-On Roll-Off

SCTG – Standard Classification of Transported Goods

TEU – Twenty Foot Equivalent Unit

UMRBA – Upper Mississippi River Basin Association

USACE – United States Army Corps of Engineers

USCG – United States Coast Guard

USDOT – United States Department of Transportation

WCPA – Wisconsin Commercial Ports Association

WCPDI – Wisconsin Commercial Ports Development Initiative

WEDC – Wisconsin Economic Development Corporation

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Executive Summary

Wisconsin's marine freight capabilities, with access to two Great Lakes and the Mississippi River system, offers a cost-effective and environmentally friendly solution for growing waves of freight that are predicted. Phase I of the multi-agency Wisconsin Commercial Ports Development initiative began in October 2013 with the goal to support increased freight movement and logistics development at the state's commercial ports. As an outcome of increased freight movement at the ports, communities and the state anticipate increased employment, increased economic development, an increased logistics focus on Wisconsin ports, along with a greater sense of a port community.

After the initial development of a strategic plan, infrastructure and market inventory and planning review in phase I, WCPDI Phase II was initiated as, Leveraging our Comparative Advantage, Phase II: Identification and Development of Wisconsin Port Market Scenarios. The purpose and objectives of "Identification and Development of Wisconsin Port Market Scenarios" are to identify the commodities, project cargo, corridors and new markets with the greatest potential for maritime movement that are not currently serviced by a maritime route, and then evaluate the routing, feasibility, costs, time, and consequences of current landside routes and a comparable marine delivery.

For phase II, the project team identified market sheds within the reach of Wisconsin by water, evaluated the availability and movement of commodities, containerized cargoes and OSOW cargoes, and then identified four marine highway corridors that connected Wisconsin to its trading partners. The corridors align with the existing MARAD marine highways of M55 and M35 corridors as well as with several variants of the M90 corridor. The named corridors for the purposes of this project are: M35/55 Mississippi River Corridor, the I41/M90 corridor, the International M90 corridor and I94/M90 Corridor.

The M35/M55 Mississippi River Corridor encompasses the Mississippi River system and provides global access beginning in La Crosse and terminating at the Gulf. The route also provides access to the entire Mississippi System through the Ohio, Missouri, Arkansas, and Tennessee-Tombigbee waterway. The I-41/M90 corridor is intended to capture containerized freight moving along the eastern border of Wisconsin via Lake Michigan and into Chicago. The ports of Marinette, Manitowoc, Green Bay and Milwaukee as well as the Port of Chicago at the Illinois International Port District are serviced by this corridor. This corridor is driven by the large volume of containers moving between Chicago and the Fox Valley and Green Bay area. The I94/M90 corridor is intended to reduce or eliminate delays and costs associated with traffic congestion in and around Chicago and Northwest Indiana. A combined marine and landside route from Milwaukee to Muskegon then on I-96 to Detroit is compared to an all landside corridor following I-94. Two options are explored with I-94/M90: using a freighter, or using an offshore supply vessel (OSV). The M90 international corridor is intended to service all of Wisconsin's Great Lakes ports to provide extended inter-lake shipping as well as serve as an export hub for shipping through the St. Lawrence Seaway to east coast and international markets. For purposes of this analysis, a comparison of all marine and highway-marine moves from Superior, Wisconsin to Antwerp is evaluated.

For each of the highway and marine highway corridor sets, comparisons between the routes were based on distance, transit time, travel cost for one FEU, fuel use and emissions. These factors were then used to determine the cost of equivalent moves across the modes as the capacity in one trip is greater on a barge or freighter than that of a single truck move. This feasibility analysis demonstrated that the marine corridors were, in fact, cost competitive and generated substantial environmental benefits over the truck moves.

Also, for each corridor pair, a modal diversion analysis was conducted to provide commercial port stakeholders a baseline estimate to the volumes of freight leaving their respective regions within

the state, as well as volumes of freight that could potentially utilize the marine highways instead of traditional highways. To support the use of the information to develop these marine highway corridors, a list of commodities and shipping businesses in proximity to each of the commercial ports is provided. This information can be used identify potential cargoes and customers.

Importantly, a multi-agency team has continued to support the WCPDI process. A diverse group of agencies including WEDC, WisDOT, DOA-Coastal Management, WisDNR, DATCP, as well as Brown County and the Port of Green Bay and the Port of Milwaukee have worked with CFIRE at UW–Madison to generate the momentum and actions to move Wisconsin's commercial port ahead. There is certainly more work to do and the dynamics of the economy will continue to change and bring additional challenges to all of the modes. It is important to develop and support the marine freight system to provide for economic development, provide resiliency to shipping in the state, and to minimize the environmental impacts of moving freight.

Chapter 1: Introduction

The Wisconsin Commercial Ports Development Initiative (WCPDI) began in October, 2013 with the goal of supporting increased freight movement and logistics development at the state's commercial ports. Anticipated outcomes of increased freight movement at the ports include: higher employment in port communities, increased economic development, a sharper focus on logistics at Wisconsin ports, and a stronger sense of community for the ports.

Phase I of the WCPDI consisted of a partnership team, comprised of multiple agencies and a university, that assessed and developed a baseline inventory of Wisconsin port infrastructure, completed a market and commodity assessment of Wisconsin ports, and examined institutions, programs, and policies along with their role in port development. The WCPDI development process continued with the integration of port, agency, business, and industry stakeholder input. The inventory, market analysis, stakeholder input and analysis culminated in a WCPDI strategic master plan.

The strategic master plan is based on a systems approach to transportation and economic development. In this approach, the factors and processes that support marine freight and port development are categorized by their function: infrastructure, system reliability, market economics, speed to market, advocacy and awareness, and agency action. These categories are then viewed as areas that can be influenced to create a more favorable environment for port development and marine freight. To assist in the implementation of the strategic plan, stakeholder-defined strategic initiatives were consolidated across four broad areas defined as: 1) Awareness and Advocacy, 2) Planning, 3) Markets, and 4) Infrastructure and Access. These four system areas are then supported by 22 distinct, stakeholder-defined initiatives. This systems approach allows for a broad range of actions and resources to be applied across a variety of areas to advance marine freight development at the ports. This approach also takes into account that there is no single "fix" that will increase logistics activities at ports. Freight movement is affected by a wide range of factors. Similarly, a wide range of factors can be adjusted or addressed to provide a more favorable climate for marine freight.

At the close of the Phase I project, the project team met to decide how to proceed with the Wisconsin Commercial Ports Strategic Plan. The project team and sponsors acknowledged that continued development of marine freight and the development of Wisconsin ports as logistics hubs would be an ongoing effort that would require work from both of the agencies represented on the project team as well as from the ports and logistics sector. Of the four strategic areas and 22 distinct initiatives to move Wisconsin ports forward, the market development area was selected for implementation and action to continue the port development effort. The WCPDI strategic approach is portrayed in Figure 1.1 below.

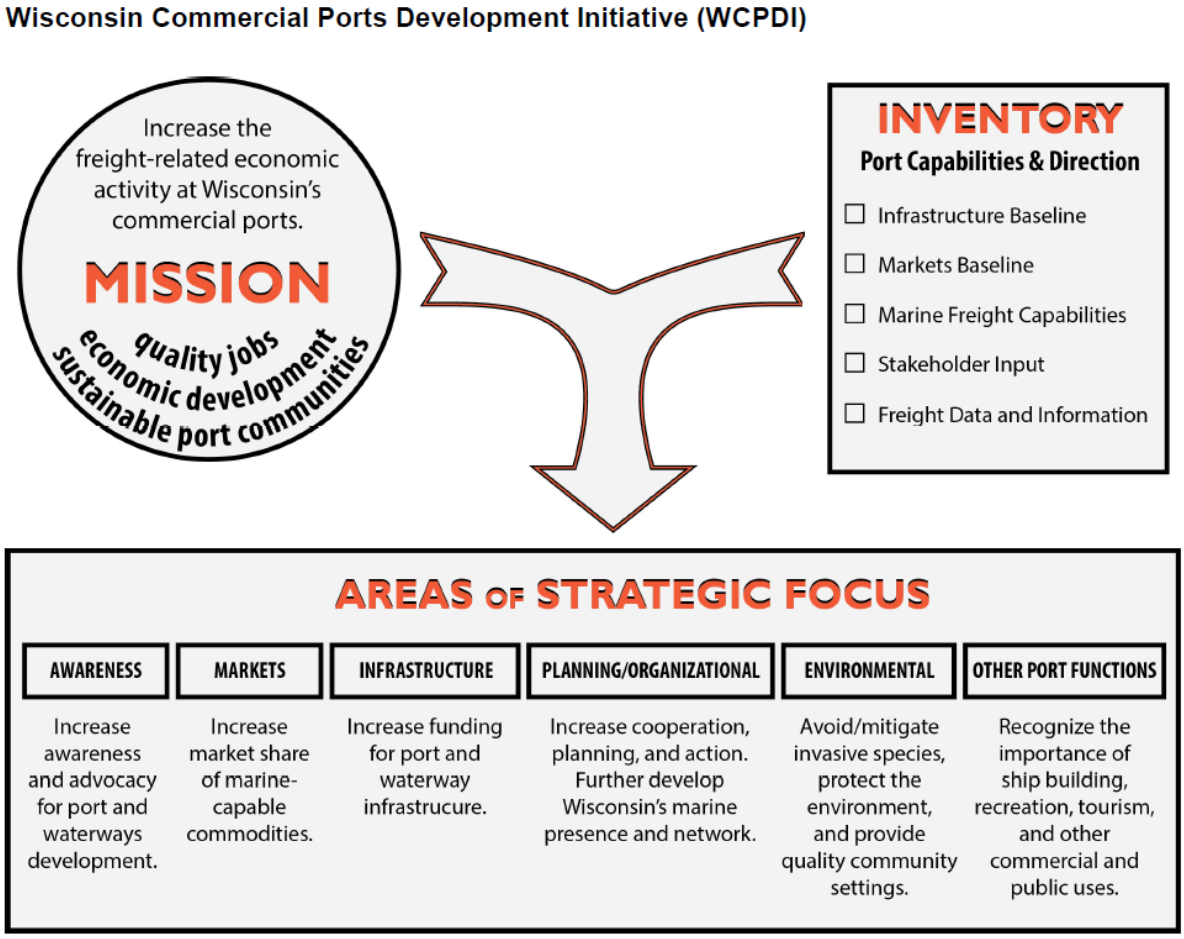


Figure 1.1: Wisconsin Commercial Ports Development Initiative Strategic Approach

Under the market development approach, Phase II of the WCPDI was scoped and defined as, *Leveraging our Comparative Advantage, Phase II: Identification and Development of Wisconsin Port Market Scenarios*. The purpose and objectives of "Identification and Development of Wisconsin Port Market Scenarios" are to identify the corridors and new markets with the greatest potential for maritime movement that are not currently serviced by a maritime route, and then evaluate the routing, feasibility, costs, time, and consequences of current landside routes and a comparable marine delivery.

This project also includes a feasibility approach to marine markets that compares variables such as time to delivery, costs, routing, intermodal connections, fuel, and greenhouse gas (GHG) implications as well as subjective areas such as permitting complications, delays, and infrastructure concerns of each alternative route. This information will provide the basis for the business case for multimodal freight shipments incorporating Wisconsin Great Lakes and Mississippi River ports. The business case will include:

1. Development of an approach to corridors, commodities, project cargo, and new markets that demonstrates total landed costs for moving goods by available modes.
2. Planning information, program and policy justification for agencies to support multimodal development and freight corridor development.
3. Educational information to increase awareness of alternate transportation considerations along with their costs and benefits, especially for business, industry, and logistics professionals.
4. Anticipated increased market interest in ports based on awareness of the availability and costs of marine modes.
5. Increased coordination among Wisconsin's marine industry and enabling agencies and development of the marine professional community.

Phase II began in July, 2015 and was supported by a multi-agency and multi-port project team. Agencies sponsoring and directing the research team include Wisconsin Department of Transportation (WisDOT), the Wisconsin Economic Development Corporation (WEDC), and Wisconsin Coastal Management Program (WCMP) at the Wisconsin Department of Administration (DOA). The Wisconsin Department of Natural Resources (DNR) and the State of Wisconsin Department of Agriculture, Trade, and Consumer Protection (DATCP) also participated on the project team. Further, representatives from the Wisconsin Commercial Ports Association, the Port of Green Bay and the Port of Milwaukee were involved with the project team. The Transportation Development Association of Wisconsin also participated. The University of Wisconsin, Center for Freight & Infrastructure Research & Education (CFIRE) research staff completed the project.

In the Phase I report, factors driving an increasing reliance on the state's ports as logistics hubs were documented and included increasing traffic congestion on roads, inadequate transportation funding, and the availability of the ports and marine system. These trends continue as does the anticipation that freight tonnages will increase. The most recent USDOT 30-year freight tonnage estimates, 2015–2045, place growth in freight tonnage at 40 percent, reaching 25 billion tons by 2045 (United States Department of Transportation, 2016).

While the increasing tonnages, and the relevance and urgency of increasing the use of our ports as logistics hubs is well documented in the Phase I report, it is also imperative that the state identify market development efforts to capture a portion of these increasing overall freight tonnages in the marine sector.

With limited resources to invest in transportation infrastructure, the significance of the ports in replacing truck and rail moves is very relevant. Congestion and safety issues, as well as highway

infrastructure damage can be expected to increase as freight volumes increase and more trucks use the roads. The 2014 WisDOT report on the economic impact of the ports states that more than 30 million tons of freight moved through Wisconsin ports each year—an equivalent of 1.2 million truckloads of goods on the state's highways (Lichtman-Bonneville, 2014). Looking at a six-year average, the Wisconsin marine freight system moved an average of 47 million tons (the equivalent of 1.9 million fully loaded trucks) per year during the period of 2006–2012. The state and the nation do not have the highway capacity, time, or available truck drivers to manage the projected amount of additional freight. Compounding this issue is the state's rail capacity, which is already challenged by a high volume of energy products. The additional 433,082 rail cars that would be needed to move this marine cargo would further stress an already congested rail system.

Wisconsin's interest in marine navigation and maritime freight movement is further warranted by its geographic location. The state is bordered by, and has access to, over 200 miles of Mississippi River shoreline and more than 800 miles of Great Lakes coastline. More than a third of Wisconsin's population lives in the 11 counties forming its Lake Michigan coast ("Wisconsin Water Facts," 2014). According to WisDOT, the commercial ports of Wisconsin generate over $1.6 billion in economic activity and support almost 10,000 jobs. These benefits are derived from a range of activities including the movement of freight, project cargo, and generally higher weight, lower value products such as coal, aggregates, cereals and grains. Cement, energy, and petroleum products are also shipped on Wisconsin waterways.

The opportunities and benefits available across the state related to increased port activity and marine navigation and freight movement seem apparent. Yet, there is tremendous underutilized capacity at the ports and on the waterways today with only a small portion of Wisconsin products moving on the water. According to USDOT data, less than four percent of the total freight in the surrounding 10-state DOT administrative region (the region supported by the Mid America Association of State Transportation Officials (MAASTO) and the Mid-America Freight Coalition (MAFC)) moves on waterways (MAFC "Commodity Movements," 2014). Further, based on Wisconsin DOT Transearch data, slightly less than five percent of Wisconsin's total freight by tonnage, and less than 0.4 percent by value moves on the waterways. There is clearly room for additional volumes (MAFC, "Appendix: Commodity Movements," 2014). Overall, even with our tremendous marine assets, Wisconsin ranks 22nd nationally in tonnage moved on waterways and 7th out of the 10 states in the region (MAFC "Water," 2014).

With the continued interest and support of the port community and important state agencies, Phase II of the WCPDI has worked to develop, assess and present marine corridors and commodity options that will increase the freight tonnage moving across Wisconsin's ports and ultimately support increased economic activity. Chapter two of this report lays out the methodological approach used to identify corridors and commodity options for freight movement across Wisconsin ports. Chapter three examines the factors determining mode selection, commodity and freight movements, and market sheds that could be supported by marine freight movement. In chapter four, the market analyses, research, and literature on modal diversion, stakeholder input and market shed approach are combined to identify four marine freight corridors across the state. Chapter four also provides a feasibility and economic comparison of the four marine corridors as compared to their parallel highway corridors. These same four corridors for development have also been identified as Marine Highways by MARAD. Chapter five provides an analysis of the mode selection and market diversion based on total shipping costs, and chapter six concludes the report with recommendations to support development of these corridors and to increase freight movement on the state's waterways. Appendix A provides potential diverted commodities by port that can be used to develop business leads to attract marine freight. Appendix B provides a listing of manufacturers and shippers listed by port, commodity group, and county. Port directors, developers and business directors can use this appendix to identify potential freight sources by commodity then identify the businesses in their geographic area that handle that commodity.

Chapter 2: Research and Development Approach to Marine Market Development

The purpose and objectives of “Identification and Development of Wisconsin Port Market Scenarios” are to identify the corridors and markets with the greatest potential for increased maritime movement and then evaluate the routing, feasibility, costs, time, and consequences of current routes and a comparable marine delivery. Based on Phase I findings, seven ports across Wisconsin actively engage in freight movement. On Lake Superior this includes the Port of Superior and on Lake Michigan the ports included are Marinette, Manitowoc, Green Bay and Milwaukee. On the Mississippi River, the ports included are La Crosse and Prairie Du Chien. These ports, and the existing and potential trade lanes serviced by them, are the focus of this research.

This project consists of six steps to develop the analytic approach, results, and implementation plan for the project. The research activities included commodity flow data analysis, GIS mapping, stakeholder interviews and port visits, and network modeling comparative assessments of freight corridors. The progression of the project included:

Step 1: Development of the Project Team

Based on the effectiveness of the project team in the phase I research process, it was continued into phase II and included additional port stakeholders and advocacy groups. The project team provided oversight in all stages of the project from the initial development of the scope of the work to reviewing analysis of commodity movements and potential corridors. The project team is a critical component of the work to ensure representation of the port and industry interests, as well as to provide for vested participation by the agencies that can support the proposed market and advocacy initiatives. This team approach supports the continued development of a community of port professionals and a statewide push toward Wisconsin leadership in marine freight across the Mississippi River and Great Lakes regions. This approach also helps align planning and program activities at WisDOT, WEDC, DOA and DNR related to ports. Agencies can then leverage and pool resources for investments that provide benefits across a range of areas.

Step 2: Identification Evaluation Factors

The research team worked with the project oversight team, port operators, and logistics operators to identify the commodities, project cargo, and new markets and corridors to include in the evaluation. Previous literature and research on mode diversion and marine freight development at ports was also reviewed for trends and opportunities in commodities and corridors. Identifying the markets and corridors was driven by USDOT and WisDOT freight data, industry awareness of potential markets, and specialized market information such as oversize and overweight project cargo and permitting data.

Step 3: Development of Commodity Corridors

The project team collaborated with port stakeholders and industry professionals to identify the distinct routes, nodes, origins, and destinations of the selected commodities to develop commodity corridors. The project team assisted with the acquisition of data and industry and business contacts to ensure high-quality assessment of these commodities and corridors.

Of special note in Steps 2 and 3 are the contributions of data and freight planning expertise from WisDOT staff, and site selection and commodity development expertise from WEDC staff.

Step 4: Construction of Feasibility Scenarios

Feasibility scenarios for current highway routing as well as the most likely Great Lakes and Mississippi River ports and marine routing were constructed. The feasibility analysis compared variables such as time to delivery, costs, routing, intermodal connections, fuel and greenhouse gas (GHG) implications, as well as subjective areas such as permitting complications, delays, and infrastructure concerns of each alternative route. This information provides the justification for the business case for multimodal freight shipments incorporating Wisconsin's Mississippi River and Great Lakes ports.

The final analysis of the WCPDI Phase II continues with a systems approach to marine freight development. How a freight corridor functions from landside access, the cargo movement across the port and onto the next port, and its attractiveness to the logistics and freight sector, can be modeled as dependent on several factors, or system areas. Based on the factors likely to affect the use or attractiveness of a marine freight corridor identified in the research process, this project includes three system areas for evaluation and implementation. These system areas, or factors for comparing the different mode choices, provide the framework for the feasibility assessment. The factor areas have been identified as: (1) infrastructure suitability, operations, and needs; (2) economic and market factors; and (3) social and environmental factors. Table 2.1, Table 2.2, and Table 3 below outlines these overarching systems and the underlying factors that can be assessed to compare the attractiveness and feasibility of highway and marine freight corridors.

Table 2.1: Feasibility Assessment – Infrastructure Suitability, Operations, and Needs Factors for Comparison Across Highway and Marine Freight Corridors

Port and Marine Corridor Factors	Highway Corridor Factors
Port Access	Congestion
Port Equipment	OSOW Permit Needs
Port Space	Driver Availability
Seasonality	Hours of Service Limits
Infrastructure, Lock and Dam, and Dredging Needs	Truck Staging and Parking
Ship Availability	

Table 2.2: Feasibility Assessment – Economic and Market Factors for Comparison Across Highway and Marine Freight Corridors

Port and Marine Corridor Factors	Highway Corridor Factors
Costs per Mile	Cost per mile
Cost for Intermodal Transfer	Cost for intermodal Transfer
Fuel Costs	Fuel Costs
Time Costs	Time Costs
Investment Cost to Maintain System	Investment Cost to Maintain System

Table 2.3: Feasibility Assessment – Social and Environmental Factors for Comparison Across Highway and Marine Freight Corridors

Port and Marine Corridor Factors	Highway Corridor Factors
Air Quality	Air Quality
Accident Rate	Accident Rate
Fuel Usage	Fuel Usage
ROW Impacts	ROW Impacts
Job Impacts	Job Impacts

Combined, the above factors provide for a broad based feasibility assessment of the marine and highway corridors under comparison. To further understand the tradeoffs and impacts to shipping based on shipping costs and mode choice, a modal diversion analysis is provided by port and corridor. This provides estimates of the potential tonnage or trailer loads that could be diverted to the marine mode.

Implementation Phase

With market corridor scenarios developed for selected commodities, project cargo, and new markets, the project team will call upon agencies and port and industry stakeholders to assist with the implementation phases of this project. Implementation includes steps five and six described below:

Step 5: Development of Reports and Presentations

Based on the research findings, the project team will develop reports and presentations that demonstrate the feasibility and benefits of multimodal transportation choices for Wisconsin business and industry. To gather further input on the refined corridors, the research team hosted a project workshop at the 2016 WCPA meeting. At this meeting the corridors and commodity options were presented and a broad range of stakeholders provided input and assist with prioritization of the corridors for future action and investment. And to increase the level of input and sense of a port community, as stakeholders have been contacted regarding the project, they have been encouraged to attend the WCPA annual meeting so they can provide additional input as well as see how the information and overall project can lead to great corridor and port development.

Step 6: Identification of Informational and Educational Conduits

The project team will identify information and educational conduits to distribute this information to Wisconsin business and industry, logistics professionals, and agency leadership—especially in those commodity areas included in the research. Project team members will actively support the project through presentations of project results and incorporation of findings into agency policy and programs as appropriate. This will include development of a profile of constraints and opportunities for marine corridor development for each of the selected corridors. This component will also include a market development and network resource assessment for each of the corridors that identifies the major stakeholders for each corridor in the areas of: state and federal agencies, logistics operators, ports, industry representatives, and development agencies and groups.

In the next chapter, the commodity analysis, stakeholder interviews, market shed analysis and previous research findings on modal diversion are assessed to support identification of the four marine highway corridors selected for analysis.

Chapter 3: Mode Choice, Wisconsin Marine Market Sheds, and Commodity Movements

The need for a more balanced use of all freight transportation modes has been demonstrated in the WCPDI Phase I project. The increasing freight loads, traffic congestion, and environmental impacts of the highway freight system, combined with low marine volumes, less environmental impact, and opportunities for economic growth at harbor and port communities suggest that greater use of Wisconsin's ports would provide a viable and beneficial alternative mode for many of the cargos currently on the highways. Further, there are a range of systems and factors that influence the mode of transportation that is selected to move cargoes. Factors affecting mode choice that were identified in previous literature and in our stakeholder interviews include: proximity of the cargo and the move to the corridor/mode, cargo volume, density and velocity, cargo weight and value, quality and reliability of mode and service, perceptions of lack of reliability, speed to market, and others. In the Florida DOT analysis of mode choice shown below, the range of overarching factors includes total logistics costs, types of cargoes, logistics patterns and modal characteristics with 20 distinct subcategories (The Center for Urban Transportation Research, 2016).

Table 3.1: Factors that Affect Freight Mode Choice

Total Logistics Costs	Order and handling costs Transportation charges Loss and damage costs Capital carrying cost in transit Inventory carrying cost at destination Unavailability of equipment costs Service reliability costs Intangible service costs (e.g. billing processes)
Physical Attributes of Goods	Shipment size Package characteristics Shipment shelf life Shipment value Shipment density
Flow and Spatial Distribution of Shipments	Shipment frequency Distance of Shipment
Modal Characteristics	Capacity Trip time and reliability Equipment availability Customer Service Handling Quality – Damage Loss Reputation

To understand and identify potential cargoes, commodities, and corridors for analysis in WCPDI Phase II, five sources of information and data were used. These sources were previous research for marine market development, commodity flow data, freight analysis framework data, interviews with ports and industry experts, and OSOW state permit data. The findings from these data sources are discussed below to provide background on the feasibility and market analysis provided in chapters 5 and 6.

From previous research, over 20 different studies were reviewed to understand the factors to consider when working to move freight currently on highways to the marine mode. Many of the diversion and market studies reviewed were specific to the Mississippi and Great Lakes systems. They are listed below to provide a snapshot of the recent development efforts.

Table 3.2: Previous Studies Reviewed Specific to the Mississippi and Great Lakes Systems

Report/Study Title	Author/Agency	Mode	Region/Corrid	Year
Brown County Container Survey	Rail Committee	Rail, Intermodal	NE Wisconsin	2013
Container Pooling Options	UW–Superior	Intermodal	MN, WI, UP, MI	2013
Multimodal Freight Transportation	National Cooperative Freight Research Program	All	Great Lakes Basin	2012
Missouri River Market Potential	Hanson Professional Services	Water	Missouri/Mississippi River	2011
Rail to Truck Modal Shift	Midwest Regional University Transportation Center	Rail, Truck	MN, WI, MI	2008
St. Lois Regional Freight Study	MoDOT/IDOT	All	SE Canada	2008
Potential Hub and Spoke Container Transshipment	CPCS Transcom Limited	Water	SE Canada	2008
New Cargoes/New Vessels Market Assessment Report	MARAD	Water	Great Lakes St. Lawrence Seaway	2007
Great Lakes Marine Transportation System	Stewart, R.	Water	Great Lakes	2006
Parameters for a Roll-On Roll-Off Marine Intermodal Service	Stewart, R.	Water, Intermodal	Lake Superior	2003
Twin Ports Intermodal Terminal	Midwest Regional University Transportation Center	Water, Intermodal	Great Lakes	2003

Even with the previous efforts to understand and influence marine freight, marine freight shipments constitute less than five percent of the freight shipments in Wisconsin. The literature clearly describes how modal diversion could be beneficial. Based on these studies, it can be summarized that short-haul and long-haul water routes are feasible when the expected future growth in freight and the limited highway and rail capacity are taken into account. The greatest potential for new water cargo lies in the domestic and international shipment of containers to and from the Midwest as the greatest growth in trade is expected in containers. Leveraging the access that the Mississippi and Illinois Rivers together with the Great Lakes give to the heart of the nation's hinterland will help to alleviate future congestion on the capacity constrained highway and rail networks. However, studies agree unanimously that any greater utilization of the waterways depends on proper vessel utilization and modernization and the proper landside and seaside maintenance and capital improvements that are required to ensure the reliability and efficiency of the inland waterway system.

Most of these studies focus on regional trade volumes (Great Lakes, Mississippi River Basin, Saint Lawrence Seaway, etc) rather than pinpointing specific corridors serving specific commodities. Some studies have looked at short-haul inter- and intra-lake Roll-On Roll-Off (RORO) corridors, such as the Superior-to-Thunder Bay and Wisconsin-to-Michigan corridors. Long-haul corridor

studies are primarily concerned with traditional bulk cargos or with supplementing rail-intermodal import/export volumes moving through major ports in Canada or the Gulf Coast. There is little mention of OSOW and project cargo/corridors as those shipments are assumed to be sporadic. However, with identified and efficient corridors and connections, combined with the trend toward more and bigger OSOW moves, these marine highways could very well be the heavy lift corridors of the future.

Further, in terms of operations, the relevant literature surveyed suggests that, on routes where it can be feasibly used, marine freight offers improved efficiency in its operations, reduced social and environmental impacts, and a net cost savings when compared to rail and, especially, highway trucking. Marine vessels have a significantly higher weight and volume carrying capacity than standard trains or freight trucks (Propotapas et al, 2013) while avoiding traffic delays (Kruse et al, 2007) and offering high delivery reliability (Rae and Connor, 2003). Moving cargo via waterways also offers a host of environmental and social benefits: increased per-unit fuel efficiency (631 ton-miles/gallon for marine freight compared to 91 for trucks; (English and Hackston, 2013)), reduced per-unit greenhouse gas emissions (0.1096 grams/ton mile for truck compared to 0.0172 grams/ton mile for marine; (Asariotis et al, 2010)), reduced contributions to traffic congestion (US DOT FHWA, 2015), and reduced impact on public transportation infrastructure (Kruse et al, 2007; Williams et al, 2007). Marine has also proven itself as an extremely safe mode of transportation. There are about 0.009 marine fatalities per 1 million miles of travel, and only 0.017 injuries per 1 million miles (Kruse et al, 2007). By comparison, there is one marine fatality for every 155 truck fatalities, and 1 marine injury for every 2,171 truck injuries (Federal Motor Carrier Safety Administration, 2012). Finally, the aforementioned efficiencies and benefits have direct and indirect cost savings for shippers, consumers and the public. Use of marine freight is estimated to offer $11 in savings per ton (Kruse et al, 2007). Gross savings from rail investment to divert freight from highways results in a cost:savings ratio of 1:4, suggesting a similar benefit from diversions to marine freight (Bryan et al, 2006). Hypothetical diversions from marine or rail freight to highways (or potential ones from service closures or lock/dam delays) threaten huge costs that hurt trade, jobs and GDP.

According to the model of freight diversion developed by Economic Development Research Group (EDR Group), if all freight were diverted to highways, one million trucks would be added to current traffic, causing three million hours of delays and creating tens or hundreds of millions of dollars in costs in delays, damage and accidents to infrastructure, shippers, consumers. Delay costs due to observed infrastructure underinvestment in marine freight infrastructure alone could amount $49 billion in 2020 and $68 billion in 2040 (EDR Group, 2012). This is especially true as projected population, economic, and trade growth require an improved and expanded cargo transportation system.

While there are efficiencies to be gained with the use of marine freight systems, trucks have dominated and can be considered a logistics habit given that trucks carry approximately 70 percent of the nation's freight tonnage. Based on the previous research on decision making in mode choice, there are at least 20 variables for consideration in the areas of total logistics cost, cargo attributes, flow and distribution of shipments, and modal and corridor characteristics.

Market Sheds and Corridors for Commodity Movement

In order to conduct a meaningful commodity flow analysis that will determine which goods or products could be served by the Inland Waterway System and Great Lakes, states and markets with direct water access to Wisconsin were identified. The US Army Corps of Engineers' (USACE) navigable waters GIS data was used to map which states have access to the Mississippi either directly or through a navigable tributary.

As shown in Map 3.1 below, there are three geographically distinct corridors along the waterways that Wisconsin has access to. The states of Michigan, Indiana, Ohio, Pennsylvania, and New York

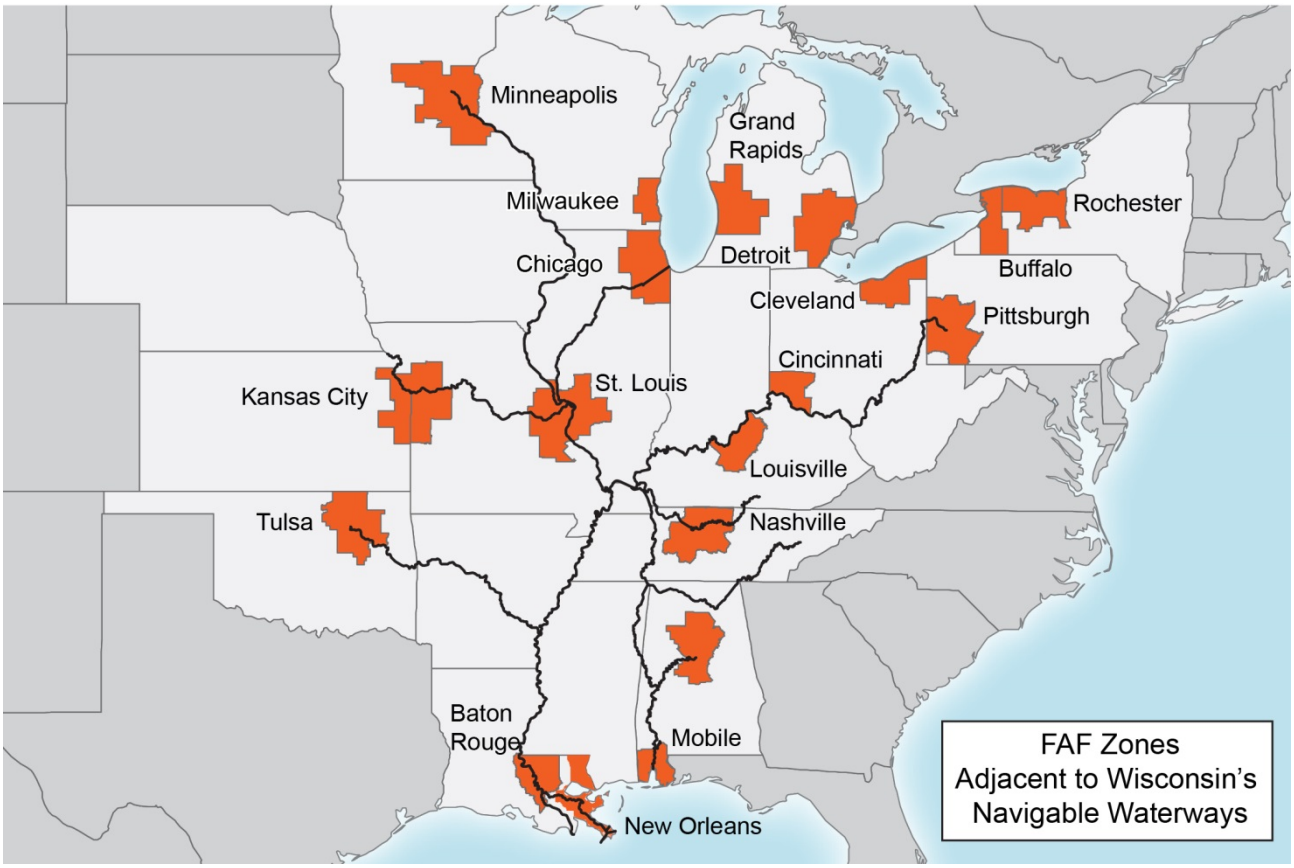
make up the Great Lakes short-sea shipping corridor. States adjacent to the Mississippi River and its navigable tributaries are split into two regions. The West Mississippi Region reaches to the states along the Missouri and Arkansas Rivers: Nebraska, Missouri, Kansas, Arkansas, Oklahoma, and Louisiana. The East Mississippi Region reaches to the states along the Ohio River and Tennessee-Tombigbee Waterway: Kentucky, Indiana, Ohio, Pennsylvania, West Virginia, Tennessee, Mississippi, and Alabama. States that share a border with Wisconsin are analyzed separately due to the disproportionate amount of cross-border freight movement where water transportation is not feasible.

Map 3.1: Wisconsin's Domestic Direct Inland Water Access

Given the reach provided by these expansive marine corridors, the available markets clearly exist. Importantly, most of the region's metro areas, the areas with the most concentrated economic activity, are also located along these waterway corridors. As shown in Map 3.2 below, there are 20 metropolitan Freight Analysis Framework zones (FAF) adjacent to navigable waterways that Wisconsin has access to, including the major markets of St Louis, Detroit, the East Coast, and Chicago. While these markets are predominantly served by trucks, it is conceivable to have marine delivery to major urban areas for congestion relief, efficiency, and environmental reasons as the road and rail systems exceed acceptable congestion and delay.

It is advantageous to look at metropolitan FAF zones because these areas concentrate both container and bulk cargos and they have existing origin and destination pairs with other major metro areas in the region. For analysis purposes, the data is less aggregated than at the state level and each metropolitan area is adjacent to only one waterway. For example, shipments to Cincinnati (Ohio River-East Mississippi Region) and Cleveland (Lake Erie-Great Lakes Region)

can be analyzed separately. The metropolitan areas on the Missouri River, Arkansas River, and western bank of the Mississippi include Kansas City, St. Louis, Tulsa, Baton Rouge, and New Orleans. The metropolitan areas on the Ohio River, with access to the Tennessee-Tombigbee Waterway, and on the Eastern bank of the Mississippi include Memphis, Nashville, Louisville, Cincinnati, Pittsburgh, Birmingham, and Mobile. Finally, metropolitan areas on the Great Lakes include Grand Rapids, Detroit, Cleveland, Buffalo, and Rochester. These metro areas concentrate demand and production making them key nodes along any of the possible corridors. Map 3.1 and Map 3.2 show the reach of waterway connections through the Mississippi and Great Lakes systems. With direct access to 16 states and 20 major metropolitan areas the connectivity to move goods on the marine mode is clear.



Map 3.2: FAF Zones Adjacent to Wisconsin's Navigable Waterways

Commodities and Cargoes

The commodity analysis will focus on commodities and cargoes moving between the states with direct waterway connections to Wisconsin as shown in the proceeding maps. The United States Census Bureau's Commodity Flow Survey provides the baseline data for analysis of Wisconsin exports and imports with those states. The states are broken into four regions: West-Mississippi, East-Mississippi, Great Lakes, and Border States. The states of Minnesota, Iowa, and Illinois are considered "border states" and analyzed separately due to their close proximity to Wisconsin and large tonnages compared to the other states.

While most cargoes can be moved on the water, some are less appropriate for generalized freight shipments by the marine mode. Given the range of possible products, the Standard Classification

of Transported Goods (SCTG) two-digit major industry classes were examined and those selected for specific focus in this study are include the commodities in Table 3.3, below. In this analysis, the focus is on commodities and cargoes not on the Mississippi or Great Lakes marine systems, or existing marinecargoes where there is room to expand the tonnages on waterways. For a detailed examination of existing marine cargoes refer to the WCPDI Phase I report at: http://www.wistrans.org/cfire/research/projects/09-02/.

Table 3.3: Selected Commodities for Analysis.

SCTG Class	Description
02	Cereal Grains (including seed)
04	Animal Feed and Products of Animal Origin, n.e.c.
07	Other Prepared Foodstuffs, and Fats and Oils
10	Monumental or Building Stone
11	Natural Sands
12	Gravel and Crushed Stone
13	Non-Metallic Minerals, n.e.c.
14	Metallic Ores and Concentrates
15	Coal
16	Crude Petroleum Oil
17	Gasoline and Aviation Turbine Fuel
18	Fuel Oils
19	Coal and Petroleum Products, n.e.c.
20	Basic Chemicals
22	Fertilizers
23	Chemical Products and Preparations, n.e.c.
24	Plastics and Rubber
25	Logs and Other Wood in the Rough
26	Wood Products
31	Non-Metallic Mineral Products
32	Base Metal in Primary or Semi-Finished Forms and in Finished Basic Shapes
33	Articles of Base Metal
34	Machinery
35	Electronic and Other Electrical Equipment and Components, and Office Equipment
36	Motorized and Other Vehicles (including parts)
37	Transportation Equipment, n.e.c.
39	Furniture, Mattresses, Lamps, Lighting Fittings, and Illuminated Signs
40	Miscellaneous Manufactured Products
41	Waste and Scrap
43	Mixed Freight

This list of commodities was further refined by examining the top 10 commodities moved by truck by weight. Truck moves are examined here as the corridors selected for the feasibility analysis all fall within MARAD defined Marine Highways. Keeping with the Marine-Highways approach of focusing on attracting freight from parallel highway corridors, we specifically examine freight currently moving by truck. In Table 3.4 below, the top 10 exports by weight are presented.

Table 3.4: Top 10 Wisconsin Export Commodities by Weight

SCTG Commodity Category	Total Weight (Truck Only)	Average Shipment Weight
Other prepared foodstuffs (07)	50,925,499	19,121
Base metal in primary… (32)	29,075,141	12,316
Articles of base material (33)	23,547,401	9,834
Wood products (26)	21,648,986	13,581
Nonmetallic mineral products (31)	19,627,054	19,642
Mixed Freight (43)	18,856,186	12,080
Plastics and rubber (24)	18,124,362	7,389
Other Chemical Products… (23)	17,010,857	11,195
Animal feed and products… (04)	15,269,294	23,886
Basic Chemicals (20)	12,902,985	21,418

Many of the products within these categories are appropriate for movement on traditional marine corridors. Examples include metal pipe, structures, animal feeds, oils, plastics, wood products, or nearly any of the non-perishable or mixed freight, if containerized.

In looking at the top five commodities by weight exported to the three market sheds, the same commodities appear in the data but in a different order across the regions.

Table 3.5: Domestic Exports - West Mississippi Region

West Mississippi								
	Arkansas	Kansas	Louisiana	Missouri	Nebraska	Oklahoma	S. Dakota	Grand Total
Food Stuffs (07)	1,072,660	261,816	1,073,067	3,300,326	280,064	146,315	909,748	7,043,996 (17,980)
Wood Products (26)	3,610	593,467	224,563	958,164	581,711	125,433	544,644	3,031,592 (13,103)
Chemical Products (23)	326,531	183,977	688,801	456,288	851,372	205,513	136,995	2,849,477 (12,319)
Plastics and Rubber (24)	250,146	430,291	331,838	978,371	352,380	266,580	61,386	2,670,992 (7,832)
Base Metal (32)	433,422	431,281	24,951	537,554	820,613	60,653	352,896	2,661,370 (10,589)
2012 CFS top five commodities (in pounds) shipped by truck only. (Average shipment weight)								

Table 3.6: Domestic Exports - East Mississippi Region

East Mississippi						
	Alabama	Kentucky	Mississippi	Tennessee	West Virginia	Grand Total
Food Stuffs (07)	230,952	500,554	291,313	1,532,487	10,599	2,565,905 (16,631)
Base Metal (32)	444,093	1,064,051	153,760	673,420	624	2,335,948 (11,937)
Wood Products (26)	328,714	384,661	44,854	1,317,857	104,223	2,180,309 (18,915)
Plastics and Rubber (24)	196,094	332,828	93,816	394,989	431,983	1,449,710 (9,070)
Chemical Products (23)	285,706	409,437	35,463	491,053	40,788	1,262,447 (8,894)
2012 CFS top five commodities (in pounds) shipped by truck only. (Average shipment weight)						

Table 3.7: Domestic Exports - Great Lakes Region

Great Lakes						
	Indiana	**Michigan**	**New York**	**Ohio**	**Pennsylvania**	**Grand Total**
Food Stuffs (07)	2,792,668	2,571,779	2,150,089	3,912,342	4,687,171	16,114,049 (19,820)
Base Metal (32)	1,928,872	4,269,758	1,472,610	2,272,320	375,174	10,318,734 (13,945)
Motorized and Other Vehicles (36)	1,156,379	3,713,580	533,585	1,195,225	2,031,156	8,629,925 (13,009)
Plastics and Rubber (24)	1,089,722	1,954,659	1,274,441	1,828,670	1,182,179	7,329,671 (6,486)
Chemical Products (23)	653,316	1,201,532	1,786,491	2,078,442	486,069	6,205,850 (12,648)
2012 CFS top five commodities (in pounds) shipped by truck only. (Average shipment weight)						

Table 3.8: Domestic Exports - Border States

Border States				
	Illinois	**Iowa**	**Minnesota**	**Grand Total**
Food Stuffs (07)	14,496,726	2,022,739	8,682,084	25,201,549 (22,392)
Articles of Base Material (33)	3,877,298	2,972,590	7,547,797	14,397,685 (18,997)
Mixed Freight (43)	6,285,251	671,155	7,055,600	14,012,006 (11,482)
Base Metal (32)	4,372,533	2,505,789	6,880,767	13,759,089 (13,053)
Nonmetallic Mineral Products (31)	1,320,065	2,387,490	8,029,414	11,736,969 (23,561)
2012 CFS top five commodities (in pounds) shipped by truck only. (Average shipment weight)				

Based on this data, commodities traditionally considered appropriate for marine movement were examined and selected for state-to-state assessment. The states receiving Wisconsin exports and the commodities moved are listed below. This analysis included products moving both by truck and rail to examine the extent of the possible connections to each of the states. The SCTG product code, the import state and product examples are listed below.

Table 3.9: Destination States of Wisconsin Exports by Commodity Classification

SCTG Classification	Import State	Examples
02 – Cereal Grains	IN	Wheat, corn, rye, barley, oats, grain sorghum, others
04 – Animal Feed and Products of Animal Origin	NE*	
07 – Other Prepared Foodstuffs, Fat, Oils	MO*, NY*, PA*, OH, IN, MI	
11 – Natural Sands	OK*, LA*	Silica sands and quartz sands for construction use Silica sands and quartz sands for industrial use, and other sands
20 – Basic Chemicals	MI	Organic chemicals, inorganic chemicals
23 – Other Chemical Products and Preparations	OH	SC Johnson, Spectrum Brands
31 – Nonmetallic Mineral Products	KS*, OH*, IN*, MI*	
32 – Base Metal in Primary or Semi-Finished Forms and Finished Basic Shapes	OH, MI	Ferro-alloys, iron and steel, copper, aluminum, lead, and others
36 – Motorized and Other Vehicles	PA, MI	
41 – Waste and Scrap	OH, IN	Metals, wood, paper, glass, non-metallic

Based on this data, there is a tremendous opportunity to move these commodities on the Great Lakes and on the Mississippi system. And, for ten of the state-to-state moves, the commodity group represents the top import from Wisconsin for the importing state as noted by the asterisk in the import state name column.

To further encourage connectivity along these trade lanes, the data was also examined for imports from these same directly connected states. The top ten imports to Wisconsin by weight across the region are listed in Table 3.10, below.

Table 3.10: Top 10 Imports to Wisconsin by Weight Across the Region

SCTG Commodity Category	Total Weight (Truck Only)	Average Shipment Weight
Food Stuffs (07)	60,361,097	25,055
Base Metal (32)	42,926,479	15,984
Wood Products (26)	32,726,348	22,219
Nonmetallic Mineral Products (31)	24,341,618	21,636
Plastics and Rubber (24)	22,949,260	8,965
Waste and Scrap (41)	18,507,174	40,516
Articles of base material (33)	16,983,786	6,567
Animal Feed and Products… (04)	15,892,792	29,539
Basic Chemicals (20)	13,865,500	21,879
Mixed Freight (43)	13,324,910	8,505

To further refine the data, it was mapped to the market sheds and then to the connected states. Table 3.11, Table 3.12, Table 3.13, and Table 3.14 document the truck-based imports from these market sheds. As with Wisconsin exports, the imports are generally appropriate for waterway movement or containerization for marine movement. Others, such as perishable foods, are less appropriate.

Table 3.11: Imports from West Mississippi Region

West Mississippi								
	Arkansas	Kansas	Louisiana	Missouri	Nebraska	Oklahoma	S. Dakota	Grand Total
Food Stuffs (07)		342,596	50,042	928,858	238,542	114,668	3,677,424	5,352,130 (31,538)
Plastics and Rubber (24)	175,405	348,578	197,442	644,883	1,244,291	403,600	146,887	3,161,086 (6,239)
Nonmetallic mineral products (31)	256,481	801,531	370,438	424,700	474,793	727,087		3,055,030 (20,958)
Basic Chemicals (20)	57,016	296,397	636,099	1,255,477	587,311	46,736		2,879,036 (29,555)
Wood products (26)	605,643	185,758	170,327	594,930	22,972	174,183	885,068	2,638,881 (25,617)
2012 CFS top five commodities (in pounds) shipped by truck only by region. (Average shipment weight)								

Table 3.12: Imports from East Mississippi Region

East Mississippi						
	Alabama	Kentucky	Mississippi	Tennessee	West Virginia	Grand Total
Base Metal (32)	208,816	1,620,531	182,164	1,482,869	806,249	4,300,629 (19,994)
Plastics and Rubber (24)	695,747	1,130,741	971,321	1,113,773	268,683	4,180,265 (16,941)
Waste and Scrap (41)		296,442		3,168,736		3,465,178 (39,431)
Wood Products (26)	805,126	993,929	643,786	545,119	73,062	3,061,022 (30,187)
Basic Chemicals (20)	111,364	527,682	38,904	1,352,119	467,170	2,497,239 (28,693)
2012 CFS top five commodities (in pounds) shipped by truck only by region. (Average shipment weight)						

Table 3.13: Imports from Great Lakes Region

Great Lakes						
	Indiana	Michigan	New York	Ohio	Pennsylvania	Grand Total
Base Metal (32)	6,874,494	2,541,742	257,977	4,734,474	2,241,664	16,650,351 (16,264)
Wood Products (26)	979,700	14,039,277	67,261	606,425	458,272	16,150,935 (18,520)
Food Stuffs (07)	2,773,624	1,877,070	1,404,333	2,274,038	2,169,949	10,499,014 (22,419)
Plastics and Rubber (24)	2,595,885	1,259,549	219,353	4,921,097	1,034,234	10,030,118 (9,138)
Waste and Scrap (41)	738,165	4,804,398	910,052	967,775	37,692	7,458,082 (44,007)
2012 CFS top five commodities (in pounds) shipped by truck only by region. (Average shipment weight)						

Table 3.14: Imports from Border States

Border States				
	Illinois	Iowa	Minnesota	Grand Total
Food Stuffs (07)	8,573,078	12,101,179	23,339,433	44,013,690 (30,402)
Base Metal (32)	15,653,538	2,021,563	2,733,664	20,408,765 (15,791)
Nonmetallic Mineral Products (31)	6,385,113	3,831,355	4,394,704	14,611,172 (33,456)
Animal Feed and Products (04)	2,187,139	2,666,117	7,806,460	12,659,716 (30,774)
Wood Products (26)	1,320,065	546,417	8,029,414	10,875,510 (15,981)
2012 CFS top five commodities (in pounds) shipped by truck only by region. (Average shipment weight)				

Based on this data, commodities traditionally considered appropriate for marine movement were examined. Cargoes and commodities were included if it is one of the top ten commodities for at least one state included in the market sheds for either the river or lake system. The states exporting to Wisconsin and the commodities moved are listed below. This analysis included products moving both by truck and rail to examine the extent of the possible connections to each of the states. The SCTG product code, the import state and product examples are listed below.

Table 3.15: Top Imports to Wisconsin from Market Shed States

Product	States	Examples
07 – Other Prepared Foodstuffs, and Fats and Oils	SD*, PA, OH, IN	
15 – Coal	KY*, WV*	
19 – Other Coal and Petroleum Products	AL	Lubricating oils, liquefied natural gas, propane, butane, coke, semi-coke of coal, or lignite, petcoke, petroleum asphalt, asphaltic mixtures
20 – Basic Chemicals	MO*	Organic/Inorganic
24 – Plastics and Rubber	LA*, OH*, IN	Primary forms, articles of plastic, articles of rubber
26 – Wood Products	AL*, LA, MI*	
31 – Non-metallic Mineral Products	IN	Hydraulic cements, ceramic products, glass, glass products
32 – Base Metal in Primary or Semi-Finished Forms, and in Finished Basic Shapes	PA*, OH, IN*, MI	Ferro-alloys, iron and steel, copper, aluminum, lead, others
33 – Articles of base metal	AR*, OH	
40 – Miscellaneous Manufactured Products	IN	
41 – Waste and Scrap	TN*, MI	Metals, wood, paper, glass, non-metallic

In all cases across these market sheds there are significant quantities of import and export commodities that are appropriate for marine movements. In twelve states, the identified commodity is that state's top export to Wisconsin. An * denotes a top import by weight from Wisconsin.

To supplement the commodity flow data in identifying possible commodities, the research team conducted interviews with the logistic-oriented ports, exporting industries and manufacturers, and economic development specialists. During interviews with specialized carriers who move OSOW loads, one major carrier indicated that they have several moves entering the gulf region and

moving north to Minnesota, the Dakotas and Nebraska. They expressed that they were unable to use the inland river system for these moves due to lack of adequate port facilities as well as landside bridge and geometric limitations at the northern end of the Mississippi system. To assess these cargoes and moves, WisDOT OSOW permit data was requested and analyzed. Additionally, there is anecdotal data on the interest in northern moves that would utilize the Great Lakes system including, recently, a news article about wind tower blades moving from Manitowoc, WI to Ohio [1].

In the Manitowoc case, the article states:

> "The load is the first of six or so slated to set sail this summer out of the Illinois-based company's Manitowoc plant. Company officials said the shipment tops a million pounds and will be riding aboard a barge that's almost as long as a football field.
>
> 'The barge is massive,' said Matt Boor, OEM program manager at Broadwind, before the shipment was loaded. 'A dozen of these things on one barge … I'm sitting here now trying to visualize that.' The shipment is likely one of the largest to travel on the water in years from the Manitowoc port, which has traditionally been known more for ship-building than cargo, said Caitlin Clyne, registrar at the Wisconsin Maritime Museum."

Wind tower components continue to be one of the more common OSOW moves. With manufacturing in Manitowoc, and Wisconsin's central geographic location in wind field development, OSOW marine moves of wind tower components look to be one of the promising cargoes for increased marine shipping on the Great Lakes and the Mississippi system.

Based on Wisconsin overall OSOW permit data, there are a tremendous number of permitted loads. In total for 2013 and 2014, there were 40,905 and 42,862 permits issued, respectively. The table below shows the seasonal distribution of the moves and the type of move. There are more Wisconsin exports than imports and through trips. The moves are distributed throughout the year so they can be marine moves for nearly 10 months each year.

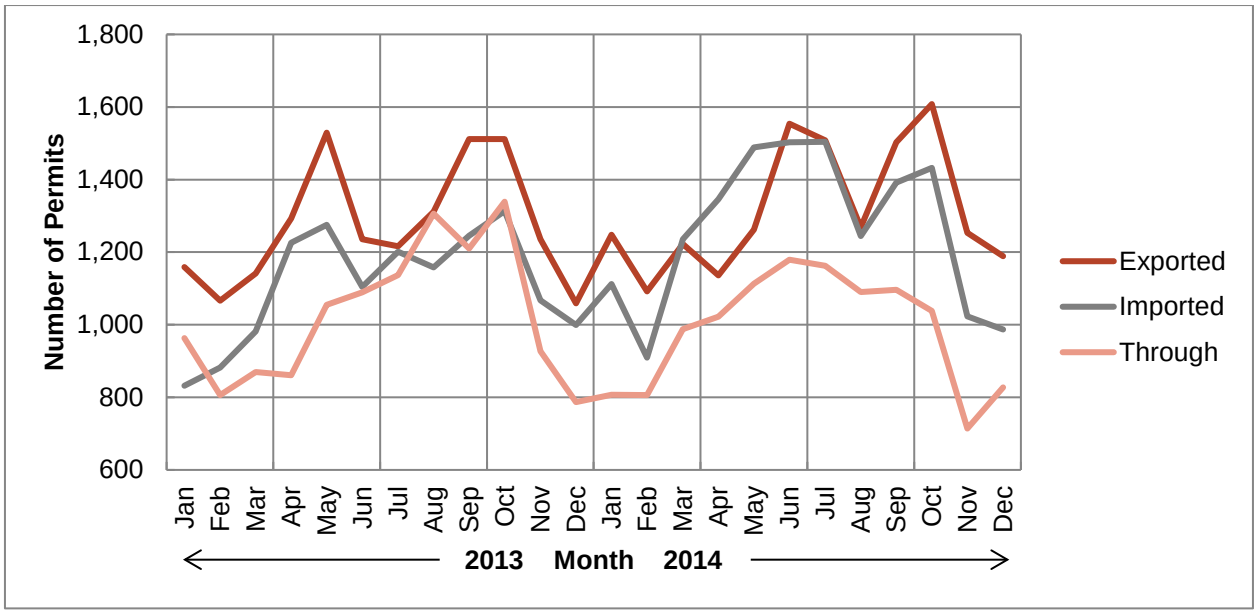


Figure 3.1: Permit Totals by Month and by Type: Exported, Imported, and Through

[1] "Wind towers setting sail in Manitowoc." Herald Times Reporter. Web. June 19, 2016. http://www.htrnews.com/story/news/2016/06/18/broadwind-wind-towers-setting-sail-manitowoc/86035942/

In summary of the commodity flow data and OSOW permit data, four major categories of freight appear to be good candidates for increased levels of marine shipping. OSOW cargoes on the Mississippi system and Great Lakes, traditional bulk cargoes such as grains, metals, wood and wood products, chemicals and fertilizers, and ore, specialized sands and containerized mixed freight.

Also in the interviews, the researchers were repeatedly encouraged to look closely at the corridors and trade lanes to ensure connectivity, adequate infrastructure, and awareness of their availability and feasibility. The point was made both in Phase I interviews and again in Phase II that the commodities and cargoes will come where the "system is working."

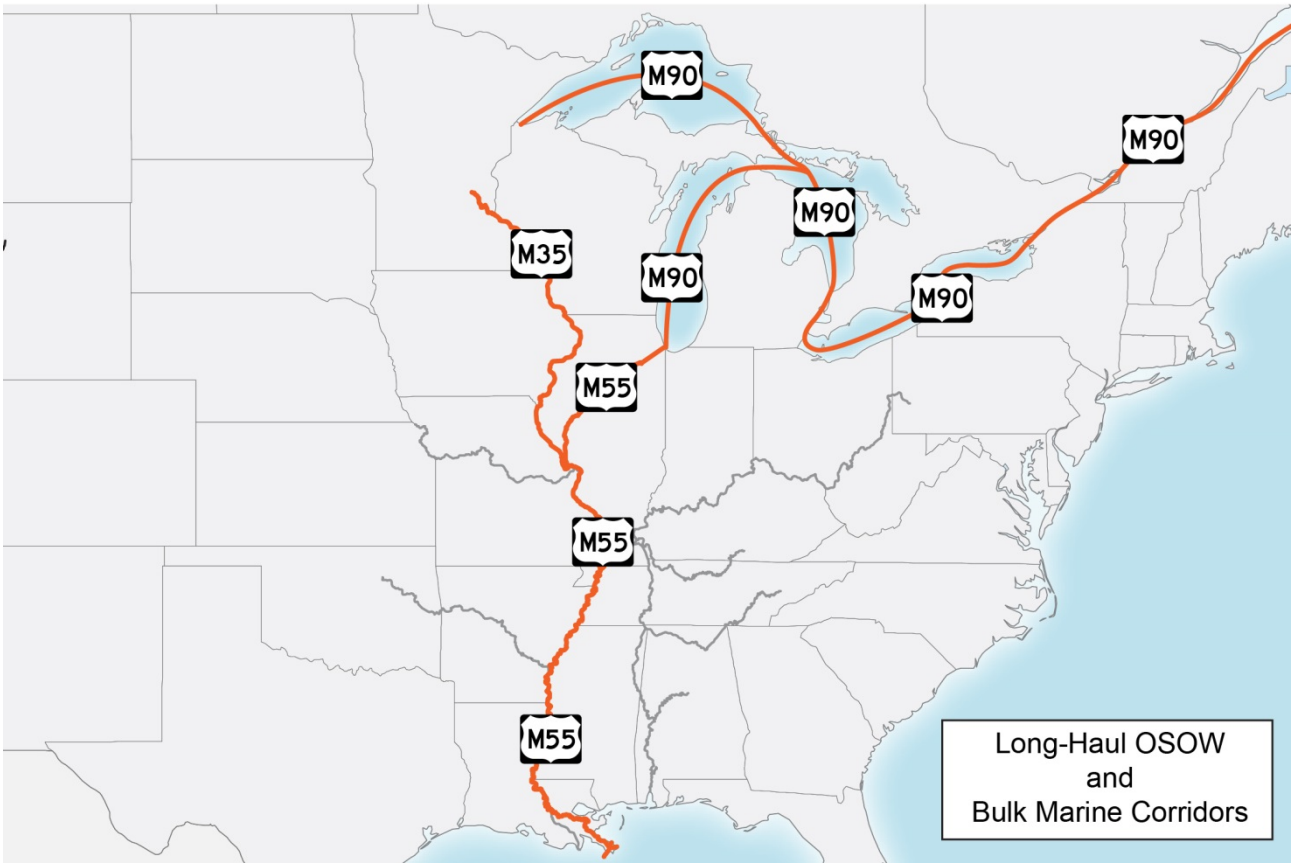
Based on the data, apparent trade lanes and market sheds, and potential market development, four corridors were presented to the project team for evaluation. The corridors align with the existing marine highway corridor, M55 and M35, as well as with several variants of the M90 Corridor. The named corridors for the purposes of this project are: M35/55 Mississippi River Corridor, the I41/M90 Corridor, the International M90 Corridor and I94/M90 Corridor. The corridors are mapped and potential cargos identified in chapter 4. Chapter 4 also provides a feasibility assessment of the marine and parallel highway corridors.

Chapter 4: Marine Corridors and Comparative Feasibility Analysis

This chapter compares the operational, economic and environmental performances of parallel marine and highway freight corridors. Based on freight flows to and from Wisconsin, the stakeholder interviews, and existing work on marine corridors on the Great Lakes and Mississippi systems, the research team identified and presented the project team with four marine freight corridor options for feasibility evaluation. The project team reviewed the commodity data and results from stakeholder interviews and decided that all four corridors should be further evaluated and compared to similar landside, highway corridors.

All four corridors fall within the identified marine highways of M35 and M55, and several variants of M90. The named corridors for the purposes of this project are: M35/55 Mississippi River Corridor, the I-41/M90 Corridor, the International M90 Corridor and the I-94/M90 Corridor. According to MARAD, America's Marine Highway System consists of over 29,000 nautical miles of navigable waterways including rivers, bays, channels, the Great Lakes, the Saint Lawrence Seaway System, coastal, and open-ocean routes. The mission of the program is, "To lead the development and expansion of America's Marine Highway system and to facilitate its integration into the U.S. surface transportation system." The vision of the Marine Highway Program is, "The full integration of Marine Highway vessels and ports into the surface transportation system to ensure that reliable, regularly scheduled, competitive, and sustainable services are a routine choice for shippers." The program was established by Section 1121 of the Energy Independence and Security Act of 2007 and amended in Section 405 of the Coast Guard and Maritime Transportation Act of 2012 [2]. Map 4.1 below depicts the M35, M55 and M90 corridors.

[2] Refer to MARAD at: http://www.marad.dot.gov/ships-and-shipping/dot-maritime-administration-americas-marine-highway-program/ for a complete description of the marine highway program.



Map 4.1: Long-Haul OSOW and Bulk Marine Corridor

The following maps, tables and narrative describe the four selected corridors, provide a comparative transit time and impact analysis, an analysis of possible modal diversion from highway to marine corridors for these routes, and a matrix of corridor and market development resources and networks. This portion of the analysis is considered a feasibility assessment and an operational and environmental comparison of the parallel marine and highway routes.

Methodology

The comparisons between highway and marine based trips were performed using the assumption that forty-foot containers would be shipped. Shipping a combination of fifty-three-, forty- and twenty-foot containers would introduce additional variation into the estimates of truck cost and mileage, and if twenty-foot containers were included in the analysis, additional road trips would be required and truck mileages and costs would be higher. Therefore, the estimates presented here for trips that involve trucking are biased downward. In a real-world situation with a mix of containers, road shipping costs would likely be higher. Information about the capacity of vessels and cost per move were obtained from stakeholder interviews and shipping company websites. The range of costs for certain options reflect the range of road travel times. One-way trips are the basis of the analysis. The mileage, time, and costs of return trips or backhauls are not included in these analyses.

The “Cost of Equivalent Move” entry of each table compares the cost, mileage, and environmental impacts associated with moving equivalent numbers of Forty-foot Equivalent Units (FEUs) by truck and marine modes. For example, in our case assessment, one barge tow accommodates 288 FEUs, but a truck would need 288 trips to produce an equivalent move. These entries compare the

impacts of one marine trip against the impact produced by multiple truck trips to carry the equivalent amount of freight.

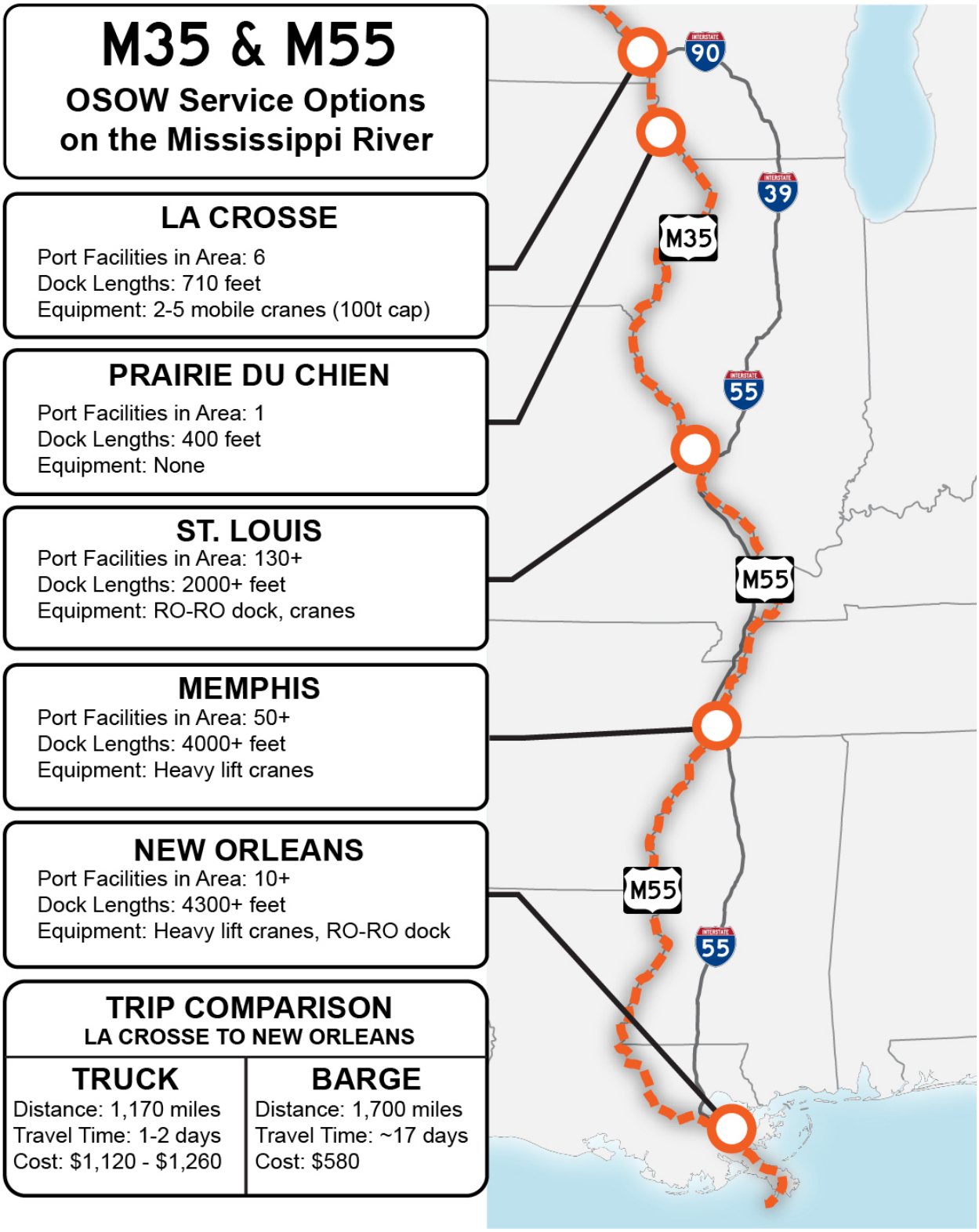
M35/M55 Mississippi River Corridor

Highway Corridor Versus Marine Corridor Comparison

The M35/M55 Mississippi River Corridor encompasses the Mississippi River system and provides global access beginning in La Crosse and terminating at the Gulf of Mexico. The route also provides access to the entire Mississippi System as shown in the market shed analysis through the Ohio, Missouri, Arkansas, and Tennessee-Tombigbee waterways. The table below provides a comparative analysis of the highway corridor and M35/M55 marine corridor in terms of distance, time, cost and environmental factors. Importantly, the Port of La Crosse has the only dry dock for barges and line boats between the Twin Cities and St. Louis.

Table 4.1: M35/M55 Mississippi River Corridor Comparison

	Truck Option **La Crosse to New Orleans via I-90, I-39, and I-55**		**Marine Option** **La Crosse to New Orleans via Mississippi River**
Distance (miles)	1,170		1,700
Transit Time for One Load	16.5 – 18.5 hours (not including 14-hour break)		14 – 22 days (average 17)
Capacity per Vehicle	1 FEU		48 FEU per barge 6 barges per tow 288 FEU total
Travel Cost for One FEU	$1,120 – 1,260		$580
Trips Needed for Equivalent Move	288		1
Cost of Equivalent Move	$322,560 – $362,880		$132,000
Mileage for Equivalent Move	316,000		1,700
Fuel Economy (gallons per ton for trip distance)	12.86		2.95
Emissions (grams per ton for trip distance)	CO_2	128,431	28,900
	Nitrogen Oxide	856.44	328.35
	Hydrocarbons	23.40	12.16
	Particulate Matter	21.06	8.15



Map 4.2: M35/M55 Mississippi River Corridor OSOW Service Options

In terms of fuel efficiencies and environmental factors, maritime transport on the M35/M55 corridor is more efficient than truck transport. However, greater travel time for maritime moves may put them at a disadvantage for certain time-sensitive industries. One particularly promising type of

cargo for this corridor is oversize-overweight (OSOW) loads. Moving heavy or large equipment south-to-north through the Midwest by road is a difficult process because of varied state regulations that govern transportation of OSOW loads and because physical infrastructure, like bridges and ramps, places limitations on where OSOW loads may be moved. The result is that moving OSOW loads by road is a slow, expensive process. By shipping OSOW loads on the Mississippi River, shippers avoid the time and expense associated with obtaining road OSOW permits and transport. The Mississippi River holds great potential to capture some of these loads, reducing costs for shippers and reducing stress on infrastructure.

Port and Corridor Specifics

Port of La Crosse: The Port of La Crosse has six port facilities that could possibly accommodate the loading and unloading of OSOW loads, with a combined dock length of 710 feet. Among these six facilities, there are 2-to-5 cranes, each with a 100t capacity. However, modifications to dock infrastructure may be required to support the heavy weights associated with OSOW loads and cranes.

Port of Prairie du Chien: This area has limited port facilities, with one facility with 400 feet of dock, and no lift equipment.

Port of St. Louis: This area is home to more than 130 port facilities, at least 2000 feet of dock, and multiple heavy-lift cranes as well as RORO loading docks. St. Louis would be a major stopping point for non-expedited shipments on the Mississippi River, as it serves as a point where large barge tows from the southern section of the river are broken into smaller barge tows for the northern sections, and vice versa. OSOW loads may be stopped for up to three days at a time as tows are recombined.

Port of Memphis: Memphis has more than 50 port facilities, with a combined dock length in excess of 4000 feet, and heavy-lift cranes. It is also known for container moves as well as oversized load capacity.

Port of New Orleans: A likely major origin and destination for potential OSOW barges on the Mississippi, New Orleans has more than 10 OSOW-capable facilities with over 4300 feet of dock, as well as heavy-lift cranes and RORO docks. Additional access to cargoes and markets continues from the Gulf and includes the Port of Houston via the coastal shipping channels.

Marine Corridor Trip Information: Travel from New Orleans to La Crosse is 1,700 miles and trip time ranges from 14 to 22 days, the average being 17. Time can be saved if OSOW loads are shipped by themselves, eliminating the need for waiting in St. Louis. However, shipping loads by themselves, and not as part of a larger tow would make shipping more expensive. It is important to note that many OSOW loads require multiple barges to move all of the components and therefore might provide full or multiple tows eliminating the increased costs associated with moving less-than-full tows.

Highway Corridor Trip Information: OSOW loads travelling from New Orleans to La Crosse would likely travel on interstate highways I-55, I-39, and I-90 because interstate corridors have wider and heavier accommodations for OSOW loads. This route would take about 16.5 to 18.5 hours of driving, at a cost of $1,120 to $1,260. However, federal law requires that truckers must not drive more than 11 hours at once, and must rest for 14 hours, after the 11-hour limit is reached. This means that loads with one driver would take at minimum 30.5 hours to travel between New Orleans and La Crosse. Given the characteristics of many OSOW mega loads, changes in OSOW regulations across state borders as well as the need to travel at reduced speeds can drastically increase the amount of travel time needed.

Fuel Economy: In this scenario, a barge uses almost 80 percent less fuel than a truck. 12.86 gallons per ton are required to travel from La Crosse to New Orleans by truck, while only 2.95 gallons per ton are required for the river trip.

Air Quality and Emissions: Marine transport had major benefits stemming from its inherent efficiencies the greater number of truck moves required. . Marine transport emitted 77 percent less carbon dioxide, 61 percent less nitrogen oxide, 48 percent fewer hydrocarbons, and 61 percent less particulate matter than the truck option.

Summary: The M35/M55 Mississippi River Corridor shows great promise for OSOW and container movements, especially if advanced planning and shipping is used to negate time sensitivity of certain cargoes. Additional equipment may be required in either La Crosse or Prairie du Chien to accommodate extremely large or more frequent loads. Further, this corridor is also underused for traditional commodities such as agricultural products, sands and aggregates. Frac sands, while somewhat controversial, are a prime candidate for barge movement and the increased southerly moves could induce additional cargoes moving northerly.

Table 4.2, below, establishes a contact matrix of people, agencies and entities that should be encouraged to collaborate on corridor development. All are either currently working in support of increased navigation and markets, or have a direct stake in their successful development.

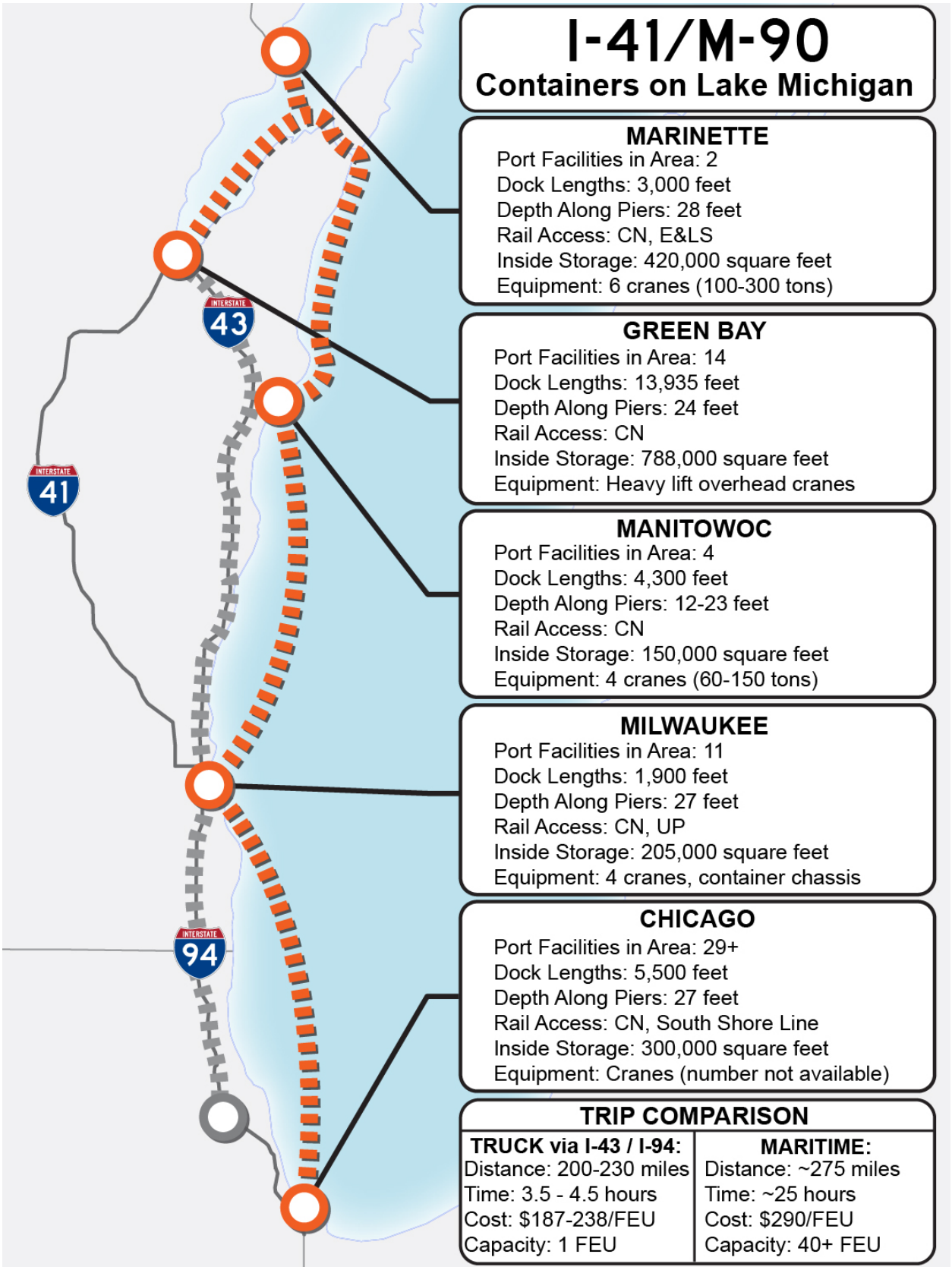
Table 4.2: M35/M55 Mississippi River Market and Corridor Development Resources and Networks

State and Federal Agencies	Logistic Operators	Ports	Manufacturing/ Agriculture/Natural Resources	Development Entity/Agency
MARAD USCOE WisDOT WEDC Wisconsin Coastal Management Program MnDOT IowaDOT MoDOT Illinois DOT USCG	Brennan Rovers Ingram CHS Perkins Heavy Haul Mineral Logistics Operator	La Crosse Prairie Du Chein St Louis Memphis New Orleans	Cargill Kinder Morgan ADM Compass Minerals Industrial Sand Heavy equipment manufacturers	La Crosse Economic Development City of La Crosse MRCTI UMRBA MAFC STL Freight District

I-41/M90 Corridor

Highway Corridor Versus Marine Corridor Comparison

The I-41/M90 corridor is intended to capture containerized freight moving along the eastern border of Wisconsin via Lake Michigan and into Chicago. The ports of Marinette, Manitowoc, Green Bay and Milwaukee as well as the Port of Chicago at the Illinois International Port District are serviced by this corridor. This corridor is driven by the large volume of containers moving between Chicago and the Fox Valley and Green Bay areas. And, it is important to note that the Port of Milwaukee can run barges to Chicago and points south for the entire year, circumventing the seasonal limitations of much of the Great Lakes.



Map 4.3: I-41/M90 Corridor Container Options

Table 4.3: I-41/M90 Corridor Comparison

	Truck Option Green Bay to Chicago via I-43, I-94		Marine Option Green Bay to Chicago (Lake Calumet) via Manitowoc and Milwaukee using OSV
Distance (miles)	220		275
Transit Time (hours)	3.5 – 5.5		19
Capacity per Vehicle (FEU)	1		42
Travel Cost for One FEU	$238 – $374		$289
Trips Needed for Equivalent Move	42		1
Cost of Equivalent Move	$9,996 – $15,708		$12,138
Fuel Economy (gallons per ton for trip distance)	2.42		0.44
Emissions (grams per ton for trip distance)	CO_2	24,149	4,741
	Nitrogen Oxide	161.04	128.99
	Hydrocarbons	4.40	4.78
	Particulate Matter	3.96	3.20

The movement of containers on offshore supply vehicles (OSVs) along the Lake Michigan coastline has the potential to remove trucks from the congested I-41, I-43, and I-94 corridors, and reduce costs for shippers with less time-sensitive loads. An established service could also support the availability of empty containers for Eastern Wisconsin industries.

Port and Corridor Specifics

Port of Marinette: The Port of Marinette has two port facilities, with a combined dock length of 3,000 feet, and a depth at dock of 28 feet. The city has rail access to the Canadian National, and Escanaba and Lake Superior railroads. The port area, home to shipbuilder Marinette Marine, has six cranes with capacities between 100 and 300 tons, and 420,000 square feet of indoor storage space.

Port of Green Bay: The Port of Green Bay and surrounding area are well-equipped to host container movements. The city is home to 14 port facilities with a combined 13,935 feet of dock capable of supporting container-on-barge operations. The depth at these docks is 22–24 feet. The port has rail access to the Canadian National Railway, heavy overhead lift cranes, and 788,000 square feet of indoor storage for temperature- or security-sensitive shipments.

Port of Manitowoc: The Port of Manitowoc includes four container-possible port facilities, with 4,300 feet of dock, and pier depths ranging from 12 to 23 feet. Equipment in the port includes four cranes with a capacity ranging from 0 to 150 tons, and 150,000 square feet of indoor storage. Rail access is provided by both the Canadian National.

Port of Milwaukee: The Port of Milwaukee hosts 11 facilities with possible container capabilities and its 1,900 feet of dock has a depth of 27 feet. Rail access to the Canadian Pacific and Union

Pacific is available. On site, there are four cranes and storage for container chassis as well as 205,000 square feet of indoor space. Barge operations from the Port of Milwaukee to Chicago and points south are available all year.

Port of Chicago: The potential terminus of the I41/M90 run, the Port of Chicago at Lake Calumet has over 29 port facilities that could accommodate container movements. Facilities on Lake Calumet have 5,500 feet of dock with a depth of 27 feet. Cranes are available. Rail service is available from the Canadian National and South Shore Line. There is one rail intermodal facility on site (Calumet Intermodal), with three more in the immediate area.

Seasonality: The shipping season for Lake Michigan is Mid-March to November, with variance based on weather.

Transit Time and Distance: The distance from Green Bay to Chicago, via the Sturgeon Bay canal is about 275 miles. Transit time, not accounting for loading, is estimated to be about 25 hours for a ship traveling at 9.5 knots. Cost of transit could range from $21 to $84 per TEU, and drayage is not included.

Highway Corridor Comparison: Driving from Green Bay to intermodal terminals around Chicago would take between 3.5 and 5.5 hours, depending on traffic. Using the estimate from the American Transportation Research Institute (ATRI) , $68.09 hourly trucking costs, the cost of shipping a forty-foot container from Green Bay to the Chicago area is estimated to be in the range of $238 to $374.

Fuel economy: The maritime route uses 81 percent less fuel than the truck route. 2.42 gallons of fuel per ton are needed to move freight on the truck route, while, only 0.44 gallons per ton are needed for the water route.

Emissions and Air Quality: In this scenario, maritime shipping emits 80 percent less carbon dioxide per ton than the truck option. Twenty percent less nitrogen oxides and 20 percent less particulates are emitted by the OSV. However, shipping by OSV emits 8 percent more hydrocarbons than the truck option.

Summary: Container service to Chicago intermodal facilities has the potential to be competitive with trucking under certain conditions. However, this corridor's container service has additional benefits in that it will potentially provide Wisconsin's eastern industrial centers with a regular stream of low-cost, empty containers from Chicago, which has the potential to lower shipping costs further. This operation has the added benefits of reduced congestion on I-41, I-43, and I-94, and reduced air pollution along these corridors. Much of the infrastructure required for container movements is already in place, making this an attractive near-term option for improved use of Wisconsin's Lake Michigan ports.

Table 4.3, below, establishes a contact matrix of people, agencies and entities that should be encouraged to collaborate on corridor development. All are either currently working in support of increased navigation and markets, or have a direct stake in their successful development.

Table 4.4: I41/M90 Corridor Market and Corridor Development Resources and Networks

State and Federal Agencies	Logistic Operators	Ports	Manufacturing/ Agriculture/Natural Resources	Development Entity/Agency
MARAD USCOE WisDOT WEDC Wisconsin Coastal Management Program Illinois DOT USCG	CHS Perkins Heavy Haul Mineral Logistics operator KK Logistics KBX Logistics Railroads Schneider Trucking Chicago based Trucking companies	Milwaukee Green Bay Manitowoc Marinette Chicago	Cargill Kinder Morgan ADM Compass Minerals Manufactures and shippers along east coast of Wisconsin	Green Bay Milwaukee Fox Valley CMAP Chicago MAFC CGLSLGP

I-94 / M-90 Corridor

Highway Corridor Versus Marine Corridor Comparison

The I-94/M90 Corridor is intended to reduce or eliminate delays and costs associated with traffic congestion in and around Chicago and Northwest Indiana. A combined marine and landside route from Milwaukee to Muskegon then on I-96 is compared to an all landside corridor following I-94 in the tables and narrative below. Two options are explored with I-94/M90: using a freighter, or using an offshore supply vessel (OSV).

Table 4.5: M90/I-94 Corridor Comparison

	Truck Option Detroit to Milwaukee via I-94 through Chicago		Marine Option Detroit to Milwaukee via I-96, Crossing at Muskegon to Milwaukee	
Distance: (miles)	284		Road: Marine: **Total:**	200 80 **280**
Transit Time for One Load (hours)	5.5 – 7		Road: Marine: **Total:**	2.75 – 3.5 4.75 **7.25 – 8.25**
Travel Cost for One FEU	$375 - $475		Road: Marine: **Total:**	$180 – 230 $42 – $169 **$222 – $399**
Fuel Economy (gallons per ton for trip distance)	3.12		Road: Marine: **Total:**	2.20 0.13 **2.33**
Emissions (grams per ton for trip distance)	CO_2	31,175	Road: Marine: **Total:**	21,954 1,379 **23,333**
	Nitrogen Oxide	207.89	Road: Marine: **Total:**	146.40 37.52 **183.92**
	Hydrocarbons	5.68	Road: Marine: **Total:**	4.00 1.39 **5.39**
	Particulate Matter	5.11	Road: Marine: **Total:**	3.60 0.95 **4.55**

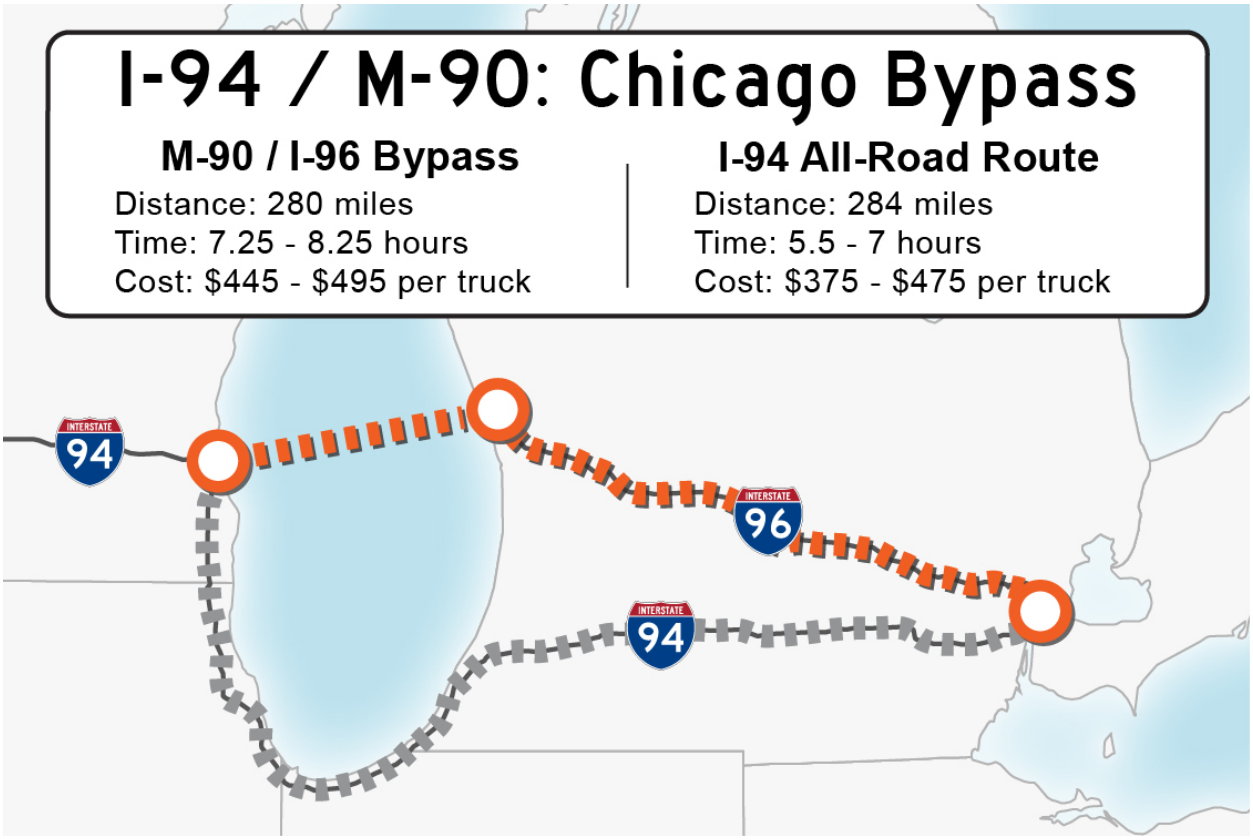


Figure 4.1: M90/I-96 Bypass Comparison to All-Road Route

Equivalent Moves: Table 4.6, below shows the comparison of truck and OSV options to a lake freighter option carrying 390 forty foot containers in one trip across Lake Michigan are provided below.

Table 4.6: Comparison of Truck and OSV to a Lake Freighter Carrying 390 Forty-Foot Containers in One Trip Across Lake Michigan

	Truck	OSV	Freighter
Capacity per Vehicle (FEU)	1	42	390
Number of Moves Needed to Equal One Freighter Move	390	9.29	1
Cost to Move One Container	$375-475	$349 - $399	$222 - $272.5
Cost of Equivalent Move	$146,250 - $185,250	$136,110 - $155,610	$86,580 - $106,275
Mileage for Equivalent Move (one-way, no backhaul)	110,760	Road: 78,000 Marine: 743 Total: 78,743	Road: 78,000 Marine: 80 Total: 78,080

A truck ferry service or a shipping service between Milwaukee and Muskegon could serve as a valuable shortcut for truck traffic travelling on I-94, as it eliminates road mileage and congestion

through Chicago. Both ports are home to Lake Express Ferry terminals, as well as commercial docking facilities. Based on a potential container service between Milwaukee and Muskegon under development in Muskegon, the developers are exploring year-round lake service using re-purposed, off-shore oil rig platform vessels. In the proposed business case, half of the available freight moving between these markets comprises containerizable exports including manufactured goods and chemical and paper products. The oil field platform vessels proposed for use in this service can carry 35–40 FEU with some liquid and break-bulk stowage below deck. From discussions with the developer, it costs an estimated $84.52 per container for an off-shore vessel. With 40 containers per run, total costs would be approximately $3,380 per move. As a comparison, 40 truck trips would cost over $17,000 at an average of $425 per trip.

Based on commodity flow data for Milwaukee and the state, shifting a quarter of Milwaukee tonnages from truck or rail to water and 10 percent from the rest of the state would support one vessel per day, Monday through Friday.

Table 4.7: Shifting Tonnages from Truck or Rail to Water to Support One Vessel Per Day

	Tons (thousand)	TEU Equivalent	TEUs Shifted from Truck/Rail to Water	Lifts per Year	Lifts per Week
Milwaukee					
Inbound	683	41,922	10,480 (25%)_	5,240	101
Outbound	961	58,944	14,736 (25%)	7,368	142
Rest of Wisconsin					
Inbound	1,016	62,354	6,235 (10%)	3,118	60
Outbound	1,666	102,206	10,221 (10%)	5,110	98

Ports and Corridor Specifics

Port of Milwaukee: The Port of Milwaukee sits immediately adjacent to I-794, a local spur of I-94 with easy truck access to the rest of the Interstate system. The port is home to the Lake Express Ferry terminal, as well as heavy lift facilities. Given this access and equipment, the port is well-equipped to accommodate truck ferry traffic.

Port of Muskegon: The Port of Muskegon is much smaller than the Port of Milwaukee, and, as a result, is less accommodating. The Port of Muskegon is home to a companion Lake Express terminal, but lacks the heavy lift capabilities of Milwaukee. For truck access, the Lake Express Ferry terminal is almost two miles from a major arterial road (Business US-31), and seven miles from the junction of Business US-31 and I-96. If the existing Lake Express terminal were used for truck ferry service, trucks would have to travel upon residential collector streets to reach an arterial road. However, there are industrial waterfront sites with better arterial access located farther inland on Muskegon Lake, which could be attractive options for a firm considering creation of a new truck ferry dock.

Seasonality: The current average shipping season for Milwaukee-Muskegon ferry service runs from Mid-March to November, with variance based on weather. The proposed Milwaukee-Muskegon platform vessel service is planned as a year-round service with the continuous service disrupting ice blockage. The full-season approach is intended to increase customer attraction and retention.

The distance between Milwaukee and Muskegon is about 82 miles, with a transit time of about 4.75 hours for a vessel travelling at 15 knots. A container travelling from Detroit to Milwaukee via ferry would spend between 7.25 and 8.25 hours in transit; 2.75–3.50 driving from Detroit to Muskegon, and an additional 4.75 across the lake. Road mileage between Detroit and Muskegon is approximately 200

miles. Cost of container shipment across the lake varies widely, based on the vessels in use; an OSV with smaller capacity, but sailing more frequently could charge up to $169 per container, while a larger lake freighter sailing less frequently could charge as little as $42. Trucking costs between Detroit and Muskegon also vary between $180 and $230 due to potential delays. As a result, the cost of moving a container on the maritime route ranges between $220 and $400 dollars. A more detailed breakdown of costs by option is available in Table 4.6, above.

Highway Corridor Comparison: A truck traveling on I-94 from Detroit to Milwaukee would cover the 384-road-mile distance in 5.5 to 7 hours, depending on congestion in Chicago and Northwest Indiana. OSOW loads traveling on I-94 would also have to pull permits for both Illinois and Indiana, which could add to the administrative burden associated with the highway route. Another consideration is hours of service: the road route uses 5.5 to 7 hours of a driver's daily maximum of 11 hours of driving each day, while the lake route uses just 2.75 to 3.5 hours of driving, freeing up drivers to cover more distance after reaching Milwaukee. Using ATRI's estimate of hourly operating cost, the cost of this option ranges from $375 to $475.

Fuel Economy: 3.12 gallons of fuel per ton are needed to move goods on the road-only route, while only 2.33 gallons per ton are required for the marine option.

Emissions and Air Quality: Emissions for the marine option are less than those of the truck option. The marine option emits 25 percent less carbon dioxide, 11 percent less nitrogen oxide, 5 percent fewer hydrocarbons, and 11 percent fewer particulates than the all-road option. The marine option also has the benefit of removing trucks and their pollution from the heavily populated areas around Chicago.

Summary: Travelling from Detroit to Milwaukee via I-94 takes between 5.5 and 7 hours, and costs between $375 and $475. Travelling by I-96 and then ferry would take between 7.25 and 8.25 hours, and would cost between $450 and $500. While this option is more expensive, it does mean that drivers have a longer amount of time available to drive after crossing the lake.

The I-94/M90 Resources and Networks table below establishes a contact matrix of people, agencies and entities that should be encouraged to collaborate on corridor development. All are either currently working in support of increased navigation and markets, or have a direct stake in the successful development.

Table 4.8: I-94/M90Corridor Market and Corridor Development Resources and Networks

State and Federal Agencies	Logistic Operators	Ports	Manufacturing/ Agriculture/Natural Resources	Development Entity/Agency
MARAD USCOE WisDOT WEDC Wisconsin Coastal Management Program Wisconsin Department of Agriculture, Trade and Consumer Protection Illinois DOT Michigan DOT USCG	CHS Perkins Heavy Haul Mineral Logistics operator KK Logistics KBX Logistics Schneider Trucking and Trucking companies	Milwaukee Green Bay Manitowac Marinette Muskegon	Cargill Kinder Morgan ADM Compass Minerals Industrial Sand Manufacturers and shippers	Muskegon Milwaukee Detroit CGLSLGP MAFC

International M90 Corridor

The M90 international corridor is intended to service all of Wisconsin's Great Lakes ports to provide extended inter-lake shipping as well as serve as an export hub for shipping through the St. Lawrence Seaway to East Coast and international markets. For purposes of this analysis, a comparison of all marine and highway-marine moves from Superior, Wisconsin to Antwerp is evaluated.

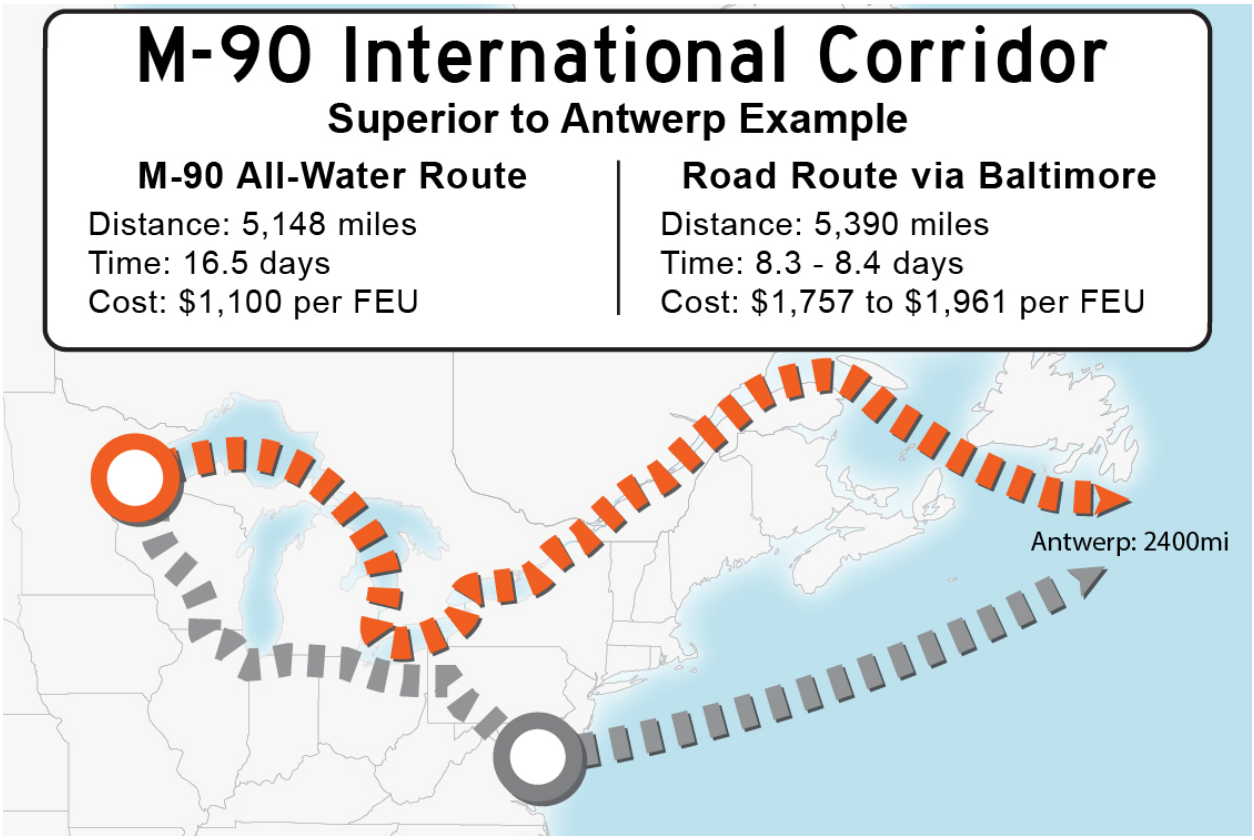


Figure 4.2: International M90 Corridor All-Water vs. Road Route Comparison

As shown in the table below, the all-marine routing option is very competitive to the road-based move and offers access to international markets.

Table 4.9: M90 International Corridor Comparison

	Truck Option Superior to Port of Baltimore, Marine to Antwerp	Marine Option Superior to Antwerp Using Freighter
Distance (miles)	Road: 1,160 Marine: 4,230 **Total: 5,390**	5,148
Transit Time (not including break)	Road: 17 – 20 hours* Marine: 7.6 days **Total: 8.3 – 8.4 days**	16.5 days
Travel for One FEU	Road: $1,157 – $1,361 Marine: $600 **Total: $1,757 – $1,961**	$1,100
Capacity per Vehicle (FEU)	Road: 1 Marine: 1,000+	332
Trips Needed for Equivalent Move	332	1
Cost of Equivalent Move	Road: $384,124 –$451,852 Marine: $199,200 **Total: $583,324–$651,052**	$365,200
Fuel Economy: (gallons per ton for trip distance)	Road: 12.7 Marine: 6.4 **Total: 19.1**	8.15
Emissions: (grams per ton for trip distance)	CO_2 — Road: 127,331 Marine: 72,925 **Total: 200,256**	88,752
	Nitrogen Oxide — Road: 849.12 Marine: 1,984.12 **Total: 2,833.24**	2,414.77
	Hydrocarbons — Road: 23.20 Marine: 73.48 **Total: 96.68**	89.42
	Particulate Matter — Road: 20.88 Marine: 49.23 **Total: 70.11**	59.92

*not including legally-required 14-hour break.

The Port of Cleveland has had success with container service to Europe demonstrating the potential success of this corridor. This Wisconsin scenario compares shipping costs from Superior to Antwerp, Belgium, and finds that direct marine service is cost competitive with intermodal shipping to East Coast ports for shipment to Europe.

Ports and Corridor Specifics

Port of Superior: This port has 11 terminals and leans toward service for grain and aggregates but facilities are available for OSOW and containerized moves. This does not include the facilities and capacities at Superior's twin port in Duluth.

Port of Antwerp: The Port of Antwerp in Belgium is an important entry point for the European Union, and has all the facilities necessary to facilitate transload of containers.

Travel from Superior directly to Antwerp is possible via the Great Lakes and St. Lawrence Seaway. This route takes 16.5 days, and covers 5,148 miles, and would cost about $1,100 for a forty-foot container based on discussions with the port director at Duluth, MN.

Highway Corridor Route: As comparison to the all-water route, the routing feasibility was examined for containers from Superior if they were shipped by road to the Port of Baltimore, and then shipped to Antwerp. Road travel of the 1,160 miles to Maryland would take 17–20 hours, with an additional 14-hour break required by law (if there is only one driver). From Baltimore, it is another 4,230 miles to Antwerp, which takes about 7.6 days travelling at 20 knots. Total travel time is about 8.5 days. Trucking expenses make up the majority of the cost at $1,157 to $1,361 per trip, while shipping a container from Baltimore to Antwerp is estimated at $600. Thus, total cost to move one FEU for this scenario is about $1,750 to $1,960.

Fuel Economy: All-marine shipping on this route requires 8.15 gallons per ton, while a combined road and marine trip uses almost two-and-a-half times more fuel, 19.1 gallons per ton.

Air Quality and Emissions: In this scenario, shipping by marine produces the lowest amount of emissions; 56 percent less carbon dioxide, 14 percent less nitrogen oxide, 7 percent fewer hydrocarbons, and 14 percent less particulate matter than the road option.

Summary: Container service to Europe has already been established in Cleveland, and this analysis demonstrates that similar service between Superior and Europe could easily compete with multimodal transportation and shipping from East Coast ports.

The M90 Internal Corridor Resources and Networks table below establishes a contact matrix of people, agencies and entities that should be encouraged to collaborate on corridor development. All are either currently working in support of increased navigation and markets, or have a direct stake in the successful development.

Table 4.10: M90 International Corridor Market and Corridor Development Resources and Networks

State and Federal Agencies	Logistic Operators	Ports	Manufacturing/ Agriculture/Natural Resources	Development Entity/Agency
MARAD USCOE WisDOT WEDC Wisconsin Coastal Management Program Wisconsin Department of Agriculture, Trade, and Consumer Protection MnDOT USCG	CHS Perkins Heavy Haul Mineral Logistics operator KK Logistics KBX Logistics	Superior Milwaukee Green Bay Manitowoc Marinette	Cargill Kinder Morgan ADM Compass Minerals Industrial Sand Manufacturers and shippers	City of Superior and Duluth Cleveland Milwaukee Green Bay CGLSLGP

Conclusion

All four of the corridors evaluated here provide economic and/or operational and environmental benefits. Based on industry data, most commodities can be shipped at a lower cost, with lower environmental impact on the inland river system and Great Lakes. However, increasing the market share will be challenged by perceived issues with reliability, seasonality and time sensitivity for certain cargoes. As transportation policy in the U.S. starts to reflect and manage the increasing congestion and environmental damage of the existing system, the environmental and economic benefits of marine freight transportation will become a more welcome asset with state transportation agencies, economic developers, manufacturers, shippers and logistics companies. Chapter 5 advances the evaluation of these four corridors by examining estimated trip diversions to marine or highways corridors based on total logistics costs.

Chapter 5: Modal Diversion Analysis

A modal diversion analysis was conducted to provide commercial port stakeholders with a baseline estimate of the volumes of freight leaving their respective regions within the state, as well as volumes of freight that could potentially utilize the marine highways instead of traditional highways. Variables affecting the costs associated with moving goods continuously fluctuate, so the analysis here should not be considered definite but rather a snapshot in time among many possibilities. Simplifying assumptions have been made in order to expand the analysis beyond a single shipper or port to cover a number of shippers, ports and regions of the state, commodities, and end markets. The analysis is intended to provide port officials, economic development professionals, industry associations, private businesses and other interested parties a starting point and reference to either begin or expand conversations focused on increasing the volumes of freight utilizing the marine mode.

The modal diversion analysis was conducted across 13 commodity groups (separated into two load types as shown in Table 5.1) for 1,718 Wisconsin businesses [3] (shown in Figure 5.1). The businesses are located in close proximity to commercial ports situated on lakes Michigan and Superior with access to seven metro areas via marine highways: Chicago, Grand Rapids, Detroit, Cleveland, Buffalo, Rochester, and Toronto. While OSOW and bulk commodities have proven to be viable marine freight, and interest in container shipping and repositioning by barge has begun to emerge on the lower Mississippi, researchers' inability to identify exact origins/destinations of OSOW freight and the substantial disadvantages in total travel time when compared to truck precluded the M35/M55 Corridor from the modal diversion analysis [4].

Table 5.1: Commodity Groups in the Modal Diversion Analysis

Commodity	Load Type
Nonmetallic Minerals	Tons
Clay, Concrete, Glass	Tons
Misc. Non-Durables	53' Loads
Food	53' Loads
Paper	53' Loads
Rubber & Plastics	53' Loads
Misc. Durables	53' Loads
Fabricated Metals	53' Loads
Machinery	53' Loads
Transportation Equipment	53' Loads
Lumber	Both
Chemicals	Both
Metals	Both

[3] These businesses were originally included in an inventory of the state's driver industries in WEDC's 2011 "Wisconsin Economic Future Study." The inventory was then updated for the 2016 CFIRE report: "The Potential for Mode Conversion to Rail Service in Wisconsin." Per the WEDC report, driver industries are "relatively concentrated in a region and produce more goods than can be consumed locally. These companies sell their products outside of the region, thereby bringing new monies back into the region. Thus, they drive regional economic growth."

[4] Recent efforts by WisDOT and the University of Wisconsin–Milwaukee to map the state's OSOW moves and potential proof of concepts from the private sector moving containers via barge on the Lower Mississippi may allow for and engender future diversion analysis.

Estimating the potential number of annual loads to be diverted from trucks to vessels traveling on marine highway corridors was a function of two questions: 1) Which mode is cheaper, road or marine? And 2) How much freight is being moved?

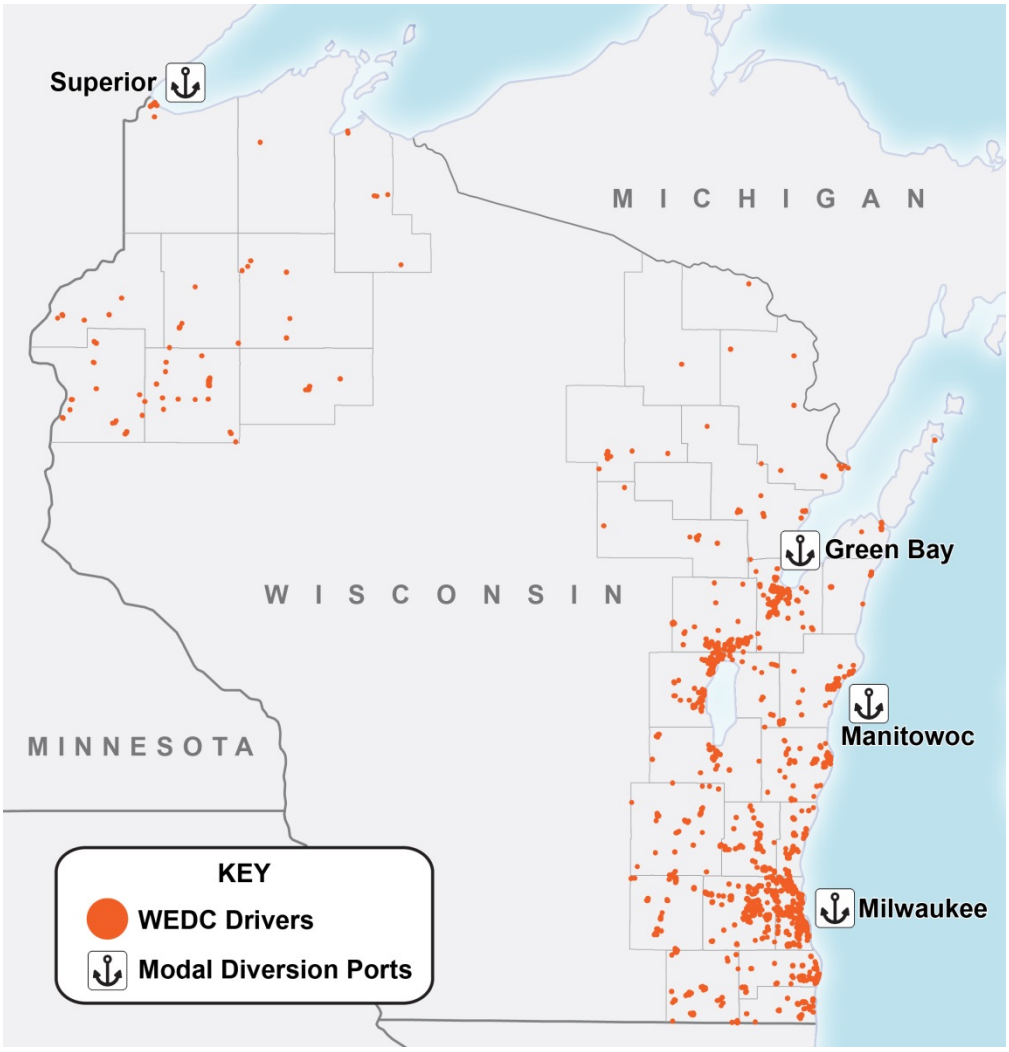


Figure 5.1: Wisconsin Businesses and Commercial Ports Included in Modal Diversion Analysis

Modal Cost Comparison

A trucking cost and a marine cost were calculated for each origin-to-destination pair (shipper-to-metro area) to determine which mode was more cost effective. The trucking costs were determined by multiplying the number of miles between each shipper and each metro area by the trucking costs per mile. The number of miles was figured by using each shipper's geographic location, the geographic center for each of the metro area's associated FAF Zone, and ESRI's *Network Analyst Tool*. Table 5.2 shows the trucking costs per mile by metro area.

Table 5.2: Trucking Costs per Mile, by Metro Area

Metro Area	Trucking Cost per Mile
Chicago	$3.14
Grand Rapids	$3.68
Detroit	$3.68
Cleveland	$3.62
Buffalo	$3.62
Rochester	$3.62
Toronto	$4.67

The marine cost varies depending on whether a Great Lakes Freighter (freighter) or Offshore Supply Vessel (OSV) was being used to transport the freight (and the associated vessel characteristics summarized in Table 5.3), as well as which metro area was being serviced. The total marine cost was figured as the sum of four separate pieces: the charter rate per unit, the fuel rate per unit, a Wisconsin dray rate, and a metro area dray rate.

The charter rate per unit (container or ton) was figured by first multiplying the vessel's daily charter rate by the total travel time from port of origin in Wisconsin to port of destination in one of the metro areas including the loading and unloading of the vessel (measured as a percentage of days). This was then divided by the vessel's full capacity (either tons or containers). It should be noted that although the two vessels under consideration have similar rates of velocity, the differences in carrying capacity resulted in different total travel times due to different loading and unloading times. The fuel rate per unit was equal to the transit time (measured in hours), multiplied by the cost of fuel (the vessel's fuel consumption per hour multiplied by the cost of fuel set at $3.00 per gallon), and then divided by the vessel's full capacity. The Wisconsin dray rate was figured as the sum of a $125 flat fee and a variable rate of $2.385 per mile (measured as the distance between the shipper and Wisconsin port using a Network Analyst Tool). A $315 charge was used for the metro area dray rate.

Table 5.3: Vessel Characteristics Used to Determine Marine Costs*

Vessel Type	447' Great Lakes Freighter	205' Offshore Supply Vessel
Daily Charter Rate	$23,000	$15,000
Fuel Consumption	300 gallons per hour	100 gallons per hour
Draft (fully loaded)	22'	14'
Velocity	13-15 knots	13-15 knots
Container Capacity (TEU/FEU/53')	780 / 390 / 294	84 / 42 / 31
Dry Bulk Capacity	7,850 tons	1,220 tons
*Vessel characteristics obtained from Supply Chain Solutions.		

Annual Freight per Shipper

The second part of the modal diversion analysis was to figure an amount of freight and, if it is a containerized commodity, figure an associated number of loads to assign to each of the shippers on an annual basis. First, the Freight Analysis Framework was queried to get an estimate of the total amount of a particular commodity shipped by truck from Wisconsin to each of the metro areas under analysis [5]. Second, the commodity's annual truck tonnage from the first step was multiplied by the shipper's county's percentage of the state's total commodity production [6]. Finally, for bulk commodities, the number from step two was divided by the number of businesses within the county shipping the particular commodity and, for containerized commodities, the number from step two was divided by the product of the number of businesses within the county shipping the commodity and the commodity's average tonnage per Fifty-Three-Foot trailer.

For example, the number of annual shipments from Brown County paper manufacturers to the Detroit metro area can be used. FAF estimated the tonnage of finished paper products shipped from Wisconsin to Detroit by truck to be 81,620 tons annually. The WisDOT Freight Model estimated Brown County to be responsible for 26 percent of Wisconsin's total finished paper product production, and an average fifty-three-foot container load to weigh about 24.15 tons. Within the dataset, there are 34 businesses producing paper products in Brown County. This would result in an estimated 26 annual loads of finished paper products per Brown County paper manufacturer to the Detroit metro area.

$$\frac{(81{,}620\ tons \times 26\%)}{(34\ businesses \times 24.15\ tons)} = 26\ annual\ 53'loads$$

Table 5.4 shows the aggregated freight flows for each of the four commercial ports under analysis. The tonnage and number of fifty-three-foot loads determined to divert from truck to the marine mode are listed in the *OSV* and *Freighter* columns, while the total estimated tonnage and number of fifty-three-foot loads produced by the shippers under analysis is presented in the *Potential* columns. For the most part, increased capacity associated with the use of freighters produces cost advantages resulting in larger amounts of diverted freight: roughly 81 percent versus 36 percent of the bulk commodities and 84 percent versus 29 percent of the containerized commodities for the Port of Green Bay; 85 versus 34 percent of bulk and 68 versus 27 percent of containerized for Manitowoc; 35 percent of bulk for both vessels and 33 versus 22 percent of containerized for Milwaukee; and 100 versus 46 percent of bulk and 100 versus 29 percent for Superior. The Port of Milwaukee's smaller diversion rates can be attributed to the proximity of the Chicago metro market resulting in an increased competitiveness for trucking.

[5] For the Toronto metro region, the FAF commodity truck flow estimates destined for Canada exiting the Detroit and Buffalo FAF regions were combined.

[6] WisDOT freight model

Table 5.4: Modal Diversion Results per Port: Tons and Fifty-Three-Foot Loads

Port	Bulk (tons)			Containerized (fifty-three-foot loads)		
	OSV	*Freighter*	*Potential*	*OSV*	*Freighter*	*Potential*
Green Bay	96,742	217,035	268,364	31,993	91,188	109,151
Manitowoc	18,314	45,194	53,425	4,850	12,113	17,753
Milwaukee	181,190	181,867	520,383	30,176	45,845	138,312
Superior	36,335	78,824	78,824	3,430	11,695	11,695

The rest of this chapter provides the modal diversion results presented on a corridor basis: the I-94/M90 Corridor, the I-41/M90 Corridor, and the M90 International Corridor. Results for each of the corridors are shown by port, and are aggregated by the commodity types: bulk or containerized. Please see Appendix A for results of the modal diversion drilled down to the individual origin-destination pairs, Wisconsin ports-to-metro areas, by the individual commodity groups.

I-94/M90 Corridor Results

The I-94/M90 Corridor connects Wisconsin shippers with the Grand Rapids metro area via the highway corridor of Interstate 94 and via the marine corridor utilizing the Port of Muskegon. Our modal cost comparison methodology produced average cost savings across all four ports for both types of vessels and commodities when compared to trucking (shown in Table 5.5). The minimum per ton savings realized by a shipper was $8.49 using an OSV and $11.42 using a freighter (both out of the Port of Milwaukee), while the maximum savings was $66.50 and $91.43 respectively (both out of the Port of Superior). On a per fifty-three-foot load basis, all but 24 shippers utilizing an OSV out of the Port of Superior would realize a cost savings, while the minimum cost savings utilizing a freighter would be $281.68 (out of the Port of Milwaukee). The maximum cost savings realized from an OSV would be $976.91, and from a freighter would be $2,069.l87 (both out of the Port of Superior).

Table 5.5: Average Cost Advantage for Vessel Over Truck Servicing the I-94/M-90 Corridor

Port	Bulk (per ton)		Containerized (per fifty-three-foot load)	
	OSV	*Freighter*	*OSV*	*Freighter*
Green Bay	$25.17	$36.03	$323.03	$791.13
Manitowoc	$28.82	$31.83	$545.88	$687.21
Milwaukee	$19.65	$22.57	$344.48	$481.54
Superior	$35.78	$60.71	$197.22	$1,290.18

These cost savings are associated with the tonnage and fifty-three-foot load totals presented in Table 5.6. The ports of Milwaukee and Green Bay's service areas produce the highest volumes of freight destined for the Grand Rapids metro area. Assuming a 100 percent conversion rate from highway to marine corridors, containerized freight volumes from Milwaukee would produce 216 full OSV vessels and 22 full freighters, while Green Bay would fill 143 OSV vessels and 15 freighters. Bulk commodity conversions would manage to fill just 27 OSV vessels and four vessels from Milwaukee, and 10 OSVs and 1.5 freighters from Green Bay.

Table 5.6: Diverted Tons and Fifty-Three-Foot Loads from Truck to Vessel for the I-94/M90 Corridor

Port	Bulk (tons)		Containerized (fifty-three-foot loads)	
	OSV	*Freighter*	*OSV*	*Freighter*
Green Bay	12,298	12,298	4,443	4,443
Manitowoc	3,101	3,101	842	842
Milwaukee	32,839	32,839	6,720	6,720
Superior	2,525*	2,525	317	477

*Only the OSV vessel servicing Superior did not result in all available loads being diverted to the marine corridor

I-41/M90 Corridor Results

The I-41/M90 Corridor connects Wisconsin shippers with the Chicago metro area. Our modal cost comparison methodology only produced average cost savings (Table 5.7) for those shippers in closest proximity to the ports of Green Bay and Superior when utilizing freighter vessels.

Digging deeper, only three of the 55 Green Bay bulk commodity shippers would realize per-ton cost savings using an OSV vessel (maxing out at $3.13), versus 40 of the 55 using a freighter (maximum being $14.73). None of the 414 containerized shippers would realize cost savings using an OSV (the closest being -$288.90). However, 298 shippers would realize an average cost savings of $95.20 if a freighter vessel was used with the savings ranging from $0.61 to $215.09 per fifty-three-foot container. Looking at Table 5.8 and again assuming 100 percent conversion rates, the per-ton cost savings associated with an OSV vessel would result in 15,947 tons (or 13 full OSV vessels) and 135,823 tons associated with freighter vessel cost savings (or 17 full freighters), while the 58,943 diverted loads due to per fifty-three-foot load cost savings would fill 200 freighters.

Table 5.7: Average Cost Advantage for Vessel over Truck Servicing the I-41/M90 Corridor

Port	Bulk (per ton)		Containerized (per fifty-three-foot load)	
	OSV	*Freighter*	*OSV*	*Freighter*
Green Bay	($7.71)	$3.88	($453.77)	$50.21
Manitowoc	($6.48)	($0.40)	($290.67)	($24.80)
Milwaukee	($11.33)	($8.36)	($327.64)	($188.44)
Superior	($10.07)	$20.41	($961.42)	$371.37

The Port of Manitowoc would offer cost savings to some businesses by shipping their products on freighters: seven of the 19 shippers of bulk commodities with savings ranging from $2.90 to $5.68 per ton, and 50 of the 135 shippers utilizing containers with savings ranging from $11.19 to $94.52 per fifty-three-foot container. The resulting diverted freight, 26,880 tons and 6,185 loads, would fill just 3.5 and 21 freighters respectively. None of the 90 bulk commodity or 1,057 container shippers in closest proximity to the Port of Milwaukee would realize cost savings when their destination market is the Chicago metro region. The closest to cost parity across the commodity and vessel types would be -$6.28 for bulk via an OSV and -$3.31 via a freighter, and -$221.62 for a fifty-three-

foot load via an OSV and -$82.42 via a freighter. Nine of the 33 bulk commodity shippers in closest proximity to the Port of Superior would realize cost savings (ranging from $4 to $12.44) when using an OSV vessel. These shippers' 18,454 tons would fill 15 OSV vessels. If a freighter was used instead, all 33 shippers would realize savings ranging from $3.15 to $42.93. The 60,943 tons produced would fill seven and three quarters of a freighter. All 66 shippers moving products via containers would benefit monetarily by utilizing the marine highway. The cost savings would range from $89.20 to $1,030.86 per fifty-three-foot load, and fill 27.5 freighters.

Table 5.8: Diverted Tons and Fifty-Three-Foot Loads from Truck to Vessel for the I-41/M90 Corridor

Port	Bulk (tons)			Containerized (53' loads)		
	OSV	*Freighter*	*Potential*	*OSV*	*Freighter*	*Potential*
Green Bay	15,947	135,823	187,570	0	58,943	76,906
Manitowoc	0	26,880	35,111	0	6,185	11,826
Milwaukee	0	0	338,516	0	0	92,467
Superior	18,454	60,943	60,943	0	8,104	8,104

M90 Domestic and International Corridor Results

The M90 International Corridor connects Wisconsin shippers with a number of metro markets: Detroit, Cleveland, Buffalo, Rochester, and Toronto. The modal cost comparison produced average cost savings (shown in Table 5.9) for all of the port-to-metro area pairs for both commodity and vessel types except for containerized goods shipped via an OSV from Manitowoc to Detroit and containerized goods shipped via an OSV from Milwaukee to Detroit and to Cleveland. While none of the Milwaukee shippers (1,057) realized costs savings, 37 of the 135 Manitowoc shippers did, ranging from $1.66 to $54.09 while averaging $17.02.

Table 5.9: Cost Advantage for Vessel Over Truck Servicing the M90 Domestic and International Corridor

	Green Bay				Manitowoc				Milwaukee				Superior			
	Bulk (per ton)		Container (per fifty-three-foot)		Bulk (per ton)		Container (per fifty-three-foot)		Bulk (per ton)		Container (per fifty-three-foot)		Bulk (per ton)		Container (per fifty-three-foot)	
	OSV	*Freighter*	*OSV*	*Freighter*	*OSV*	*Freighter*	*OSV*	*Freighter*	*OSV*	*Freighter*	*OSV*	*Freighter*	*OSV*	*Freighter*	*OSV*	*Freighter*
Detroit	$33	$51	$326	$1,135	$21	$45	($89)	$931	$12	$35	($316)	$717	$55	$80	$638	$1,739
Cleveland	$33	$57	$200	$1,252	$28	$52	$25	$1,090	$18	$43	($199)	$879	$55	$85	$498	$1,842
Buffalo	$52	$82	$519	$1,834	$49	$79	$343	$1,671	$40	$71	$119	$1,461	$75	$112	$830	$2,428
Rochester	$62	$93	$760	$2,075	$60	$90	$585	$1,913	$51	$82	$361	$1,702	$86	$122	$1,071	$2,669
Toronto	$82	$113	$1,191	$2,523	$76	$108	$927	$2,310	$66	$97	$684	$2,042	$116	$153	$1,729	$3,352

In general, the Toronto metro area provides the highest potential volumes of diverted freight for the Wisconsin commercial ports, followed by Detroit, Cleveland, Buffalo, and Rochester (Table 5.10). In particular, the Port of Green Bay could potentially ship 34,835 tons of aggregated bulk commodities (roughly 28.5 full OSV vessels) and 16,050 fifty-three-foot containers of aggregated manufactured products (517 full OSV vessels or 54 full freighters) on an annual basis to Toronto,

21,875 tons (roughly 18 full OSV vessels) and 6,046 fifty-three-foot containers (195 full OSV vessels) to Detroit, and 4,149 fifty-three-foot containers (133 full OSV vessels) to Cleveland. The Port of Manitowoc could aggregate enough fifty-three-foot containers (2,889) to fill 93 full OSV vessels to the Toronto metro area.

The Port of Milwaukee has a number of opportunities to divert freight from trucking despite having no shippers realizing cost savings when using OSV vessels to ship containerized products to Detroit or Cleveland. The 54,281 tons of bulk commodities would fill 44 full OSV vessels headed to Detroit while the 9,735 fifty-three-foot containers would fill 33 freighters. The 21,913 tons destined to Cleveland would fill just about 18 full OSV vessels. The 732 53' containers going to Buffalo would fill 23 OSV vessels while the 1,307 containers to Rochester would fill 42 OSV vessels. The 67,975 tons of bulk commodities destined for Toronto would fill 55 OSV vessels, and the 21,417 53' containers would fill 690 OSV vessels or 72 freighters. The Port of Superior could potentially fill roughly 19 OSV vessels with 587 fifty-three-foot containers for Detroit, 14 OSV vessels with 441 fifty-three-foot containers for Cleveland, and 61 OSV vessels with 1,890 containers to Toronto.

Table 5.10: Diverted Tons and Fifty-Three-Foot Loads from Truck to Vessel for the M90 Domestic and International Corridor

		Green Bay		Manitowoc		Milwaukee		Superior	
		OSV	*Freighter*	*OSV*	*Freighter*	*OSV*	*Freighter*	*OSV*	*Freighter*
Bulk (tons)	Detroit	21,875	21,875	5,782	5,782	54,281	54,958	2,023	2,023
	Cleveland	7,888	7,888	2,158	2,158	21,913	21,913	905	905
	Buffalo	2,407	2,407	208	208	1,378	1,378	1,781	1,781
	Rochester	1,492	1,492	348	348	2,804	2,804	182	182
	Toronto	34,835	34,835	6,716	6,716	67,975	67,975	10,466	10,466
Container (fifty-three-foot)	Detroit	6,046	6,046	334	1,088	0	9,735	587	587
	Cleveland	4,149	4,401	495	819	0	5,872	441	441
	Buffalo	574	574	97	97	732	794	111	111
	Rochester	731	731	193	193	1,307	1,307	85	85
	Toronto	16,050	16,050	2,889	2,889	21,417	21,417	1,890	1,890

Aggregated Results by Commodity

Aggregating the modal diversion results by commodity across the four ports gives us an idea as to which industries provide the greatest potential to fill the volume requirements associated with marine transportation (Table 5.11). For the benefit of a more straightforward analysis, the results provided in the table below assume a conversion rate of 100 percent.

The 21,518 and 51,585 fifty-three-foot containers of food and beverage products represent, by far, the highest volume of freight among the industries under analysis, and are heavily concentrated in the markets serviced by the ports of Milwaukee and Green Bay, which have roughly 48 and 37 percent of the OSV load share and 31 and 49 percent of the freighter load share, respectively. The paper industry and the rubber and plastic industry are both quality candidates for moving freight from the highway corridors to the marine corridors. Eighty percent of the paper industry's product diverted to OSVs, and 87 percent diverted to freighters can be found in the Port of Green Bay's

market. Looking at the location of diverted rubber and plastic industrial output to the marine corridor, the Port of Green Bay would host 47 and 52 percent of the OSV and freighter load share respectively while 40 and 31 percent of the OSV and freighter load share would utilize the Port of Milwaukee. It appears from aggregating the results across the four ports, that bulk commodities are more likely to play an ancillary role versus providing the major impetus to institute marine transportation for these corridors (Table 5.12). In the end, considerable effort will be needed to identify and secure loads across all the analyzed industries in order to piece together regularly scheduled containers to fill vessels.

Table 5.11: Aggregated Modal Diversion Results by Containerized Commodity

Commodity	OSV		Freighter	
	53' Containers	Monthly Vessels	53' Containers	Monthly Vessels
Food	21,518	13.3	51,585	3.4
Paper	12,786	7.9	40,717	2.7
Rubber & Plastics	11,495	7.1	20,958	1.4
Misc. Non-Durables	7,388	4.6	14,419	0.9
Machinery	5,366	3.3	7,120	0.5
Fabricated Metals	3,647	2.3	6,345	0.4
Chemicals	2,563	1.6	4,027	0.3
Primary Metals	2,339	1.5	5,767	0.4
Transportation Equipment	1,264	0.8	3,214	0.2
Lumber	1,172	0.7	5,351	0.4
Misc. Durables	912	0.6	1,337	0.1
GRAND TOTAL	**70,450**	**43.7**	**160,841**	**10.5**

Table 5.12: Aggregated Modal Diversion Results by Bulk Commodity

Commodity	OSV		Freighter	
	Tons	Monthly Vessels	Tons	Monthly Vessels
Primary Metals	102,729	1.6	143,047	0.4
Clay, Concrete, & Glass	95,269	1.5	128,043	0.3
Chemicals	77,770	1.2	83,957	0.2
Lumber	47,028	0.7	136,818	0.3
Nonmetallic Minerals	9,785	0.2	31,054	0.1
GRAND TOTAL	**332,581**	**5.2**	**522,920**	**1.3**

Chapter 6: Conclusions and Implementation Strategies

In chapter 6, three major points of the Wisconsin Commercial Ports Development Initiative are discussed and then a range of implementation strategies are presented that will increase marine freight moving across Wisconsin's commercial ports.

Point 1

The WCPDI has been active since 2013 and has been overseen by farsighted agencies and entities across the state. The Wisconsin agencies including WEDC, WisDOT, Wisconsin Coastal Management Program, Department of Natural Resources, and DATCP have all supported the effort with project oversight and or funding. Additionally, Brown County and the Port of Green Bay, the Port of Milwaukee and the Wisconsin Commercial Ports Association have all provided project oversight and access to port resources across the state to facilitate the development efforts. These agencies and entities have partnered with the University of Wisconsin's CFIRE group to complete a strategic development plan and, now, a market development assessment based on marine highway corridors and potential freight diversion to the marine mode.

The work, ideas and actions from the WCPDI strategic plan are a long-term proposition, and based on the work in the strategic plan, actions are already taking place to move Wisconsin ports forward. WEDC has developed and published a transportation assets map to support business attraction and increased logistics activities at the state's transportation hubs. Phase II of WCPDI is complete with recommendations for immediate as well as long-term actions to increase freight moving through ports. There has been increased attendance and participation at port events across the state including the Port of Green Bay's annual Port Symposium as well as the annual WCPA meeting. At these meetings, WCPDI workshops have not only provided important feedback for the project, but also opened and furthered discussions with the industry on port development needs and strategies, and alternative cargoes such as containers. WCPA has also updated its web presences and is actively interacting with the legislature.

The participating agencies and ports should be commended for their actions and support in the development of this important State asset.

Point 2

This Phase II report demonstrates that the use of these four marine highway corridors can provide competitive, if not reduced, costs in moving freight for Wisconsin manufactures and shippers. By far, the marine highway corridors offer more energy-efficient moves, can reduce traffic congestion, and provide a more environmentally friendly shipping option. With ports on the Mississippi River, Lake Superior and Lake Michigan, nearly all of the state's economic sectors can benefit from increased usage of the ports. As demonstrated in the market diversion analysis and in Appendix A and Appendix B, there are bulk, OSOW and containerized freight that are in proximity to the ports and would ship at a lower cost on a marine highway than on the parallel highway facility.

Point 3

Even with agency support, increased awareness of maritime shipping and of cost-competitive and environmentally friendly moves, ports and maritime freight development face an array of perceived and real constraints. At WCPDI workshops and in the industry literature, common constraints listed are: factors such as time-sensitive cargoes, lack of or failing infrastructure, unknown access, lack of reliability, seasonality, too many product transfers, and cargo visibility. The strategic plan in WCPDI Phase 1 provides some grounding to addressing these issues though the systems approach that provides for development efforts in the areas of awareness and advocacy, market attraction and development, infrastructure and operations, and planning and institutions. This same

systems approach and system categories are used to organize the implementation strategies presented below that will support the development of additional markets for Wisconsin ports.

WCPDI Phase II - Strategies to Increase Market Development at the State's Ports.

The following strategies will support increased marine freight market development, and increased use of Wisconsin's commercial ports along with the four identified marine highway corridors. The strategies provide immediate action items as well as longer term strategies and follow the themes identified in WCPDI Phase I.

Awareness and Advocacy

A communications plan is outlined below that includes actions and strategies designed to increase the awareness, education and support for Wisconsin commercial ports and marine freight movement.

- Continue the new "Ports Day" with the Governor and Legislators. WCPA and 28 marine representatives are meeting with the Governor and Legislators September 27 and 28th. This should become an annual event with a strategic message. This could begin with specific issues or funding advocacy and grow to a strategic, long-term activity. The Missouri Ports Association has had tremendous success with state funding, in part due to their working relationship and familiarity with the state legislature.
- The routing, feasibility and market diversion information for the four marine highway corridors should be condensed into four pamphlets and distributed to the state legislature and to business associations. They should also be made available across marine and port websites. The pamphlets would describe the feasibility, cost, and environmental benefits, and the potential markets for these ports and corridors. They would also provide contact information for the ports.
- Special emphasis on the "green" benefits of the proposed corridors should be included in the corridor pamphlets.
- CFIRE will share this final report with media including the University of Wisconsin system, Great Lakes trade publications, and inland waterways publications, as well as the partner associations of UMRBA and CGLSLGP. Partner agencies and the ports should also be encouraged to post the report on their websites.
- WCPA should encourage the ports to call their local media's attention to the Phase II report.
- WCPA should encourage the ports to report any and all new customers and services to their local media, social media and websites. Manitowoc's new wind blade shipments cited earlier in the report is a fine example.
- Wisconsin DOT has incorporated port and marine representatives and sessions into their freight advisory committee meetings. They are also including marine freight considerations into their freight plan. Where possible, agencies such as WEDC and DATCP should explicitly include transportation and marine transportation goals and actions in their strategic plans, commissions and programs.
- As the Wisconsin freight plan evolves, consideration should be given to integration of the WCPDI strategic plan and the four marine highways outlined in this report into the state freight plan.

Planning and Institutions

This area includes actions and strategies designed to support effective planning and to encourage agency support and funding.

- The WCPDI and project team agencies should consider supporting a ramp-up of strategic plans at all seven commercial ports to provide a link to the statewide plan. This approach supports individual port development and the effort could provide resources to all ports to complete the planning. It also provides an opportunity to link local port initiatives to the statewide strategies. Initial opportunities could include collaborative planning to apply for EDA, Coastal Management or HUD funding to support infrastructure improvements at these ports. This was cited as a needed strategy in the Phase I workshop and again in the 2016 Phase II stakeholder workshop at the annual WCPA meeting.
- WCPA and the state's Great Lakes representatives should expand work with the CGLSLGP and continue to align planning activities and participate in legislative action.
- WCPA and the project agencies should officially partner with UMRBA and the five MAASTO states bordering the Mississippi River to advocate for funding for the Upper Mississippi lock system.
- WCPA, ports and project agencies should identify a priority list of major marine freight improvement projects and develop grant applications for the MARAD Marine Highways Program as well as FASTLANE grants.
- MAFC/CFIRE will work with WCPA, State DOTs and the CGLSLGP to develop a marine highway project proposal for 2017 MARAD Marine Highway funding.
- Similar to the benefits of having dedicated staffing for ports and harbors, or economic development, the DOT should consider a position dedicated to modal systems integration to work towards greater intermodal connections and development. This position would also support a multimodal approach for freight movement to capture the efficiencies each of the modes can offer Wisconsin business and industry.
- WCPA and project agencies should seek out collaborative efforts and projects with other states and port associations. The Ohio DOT actively seeks partnerships and the state is home to the Cleveland-Europe Express Service. Groups such as MAFC can provide support in these efforts through their affiliations with both groups.
- Where possible, the state should consider assimilating the WCPDI planning results into DOT port planning and continue a planning affiliation between the groups.

Infrastructure and Operations

This area includes actions and strategies to identify, improve and fund marine freight infrastructure and operations.

- WCPA and the State's Great Lakes representatives should expand work with the CGLSLGP and continue to align planning activities and participate in legislative action.
- WCPA and the project agencies should officially partner with UMRBA and the five MAASTO states bordering the Mississippi River to advocate for funding for the Upper Mississippi lock system.
- Project agencies and ports should identify specific highway OSOW routes to key ports, clear these routes of obstructions to OSOW moves, and market the highway, marine corridor and port as a heavy-lift system. This benefits the DOT by concentrating OSOW traffic to specific corridors that can be managed for heavy, high and wide loads. Simultaneously, this should limit damage to other roadways that could be damaged by

heavy moves. This could be proposed as an innovative freight, multimodal and multistate grant idea to several federal agencies. WisDOT has worked to develop a similar corridor approach for the Port of Milwaukee. WCPA, the agency team, Great Lakes Ports and the Port of La Crosse should meet with Perkins Heavy Haul and discuss how Wisconsin Great Lakes and Mississippi River ports can work with the specialized carrier industry to increase waterborne OSOW loads. Additionally, ports should consider attending MAASTO OSOW committee meetings and meetings for Specialized Carriers and Rigging operators and presenting or hosting a booth at these meetings. Educational materials and materials such as the mode comparison tool kit mentioned below would prove useful for these events. As an immediate action, project agencies, CFIRE and WCPA should arrange a meeting and/or tour of the Minnesota-based, and industry leader, Perkins Heavy Haul (https://www.perkinsstc.com/). Specifically, personnel from the ports of La Crosse, Manitowoc, Milwaukee and Green Bay should attend.

- WCPA along with port representatives and the agency team should identify alternative funding sources such as the EDA or EPA to support infrastructure improvement at the ports.
- Both the Harbor Maintenance Tax and Pilotage fees were mentioned in the working session as making the cost of marine shipping less competitive. Stakeholders suggested that legislation and coordination should be used to reduce fees.

Market Development

This area includes actions and strategies that support development of marine freight markets and increased freight movement across the ports.

- WCPA and project agencies should work with state business associations to conduct a transportation-focused market development survey of the state's manufacturers and businesses. The survey could focus on their awareness of modes, mode preferences, priority shipping services, shipping history and willingness to work with multi-modes. WisDOT has begun work with Minnesota DOT on manufacturing surveys. WisDOT ports and Harbors should see if there is compatibility or the possibility of including marine considerations in these surveys.
- WCPA should have a yearly industry or mode focus at the annual meeting. WCPA and the project team could select an industry such as heavy machinery manufacturing and invite key company personnel or their logistics specialists to the annual meeting. Similarly, rail or truck representatives could be invited. They would be noted during the introduction and sit at the head table. This provides an opportunity for interaction with potential port customers and allows them to better understand how they could incorporate ports and marine corridors in their business.
- WCPA and project agencies should create a "Mode Comparison Tool Kit" for ports and businesses so there can be a clear discussion on shipping options. The tool kit should include information on costs, shipping times, available services, port connections and contact names and information as well as information on resource use and environmental impacts.
- Consider adopting a "green shipping" program to use as a marketing tool to companies with verified green shipping. EPA currently has a Ports Initiative (https://www.epa.gov/ports-initiative) and there is also the Green Marine initiative at https://www.green-marine.org/program/. WCPA should then market the State's ports and vessels as certified "green".

- Ports should be encouraged to review the diversion analysis in Chapter 5 as well as Appendix A and Appendix B. Combined, this will allow ports to identify potential cargoes and commodities in their area, and then the businesses manufacturing and handling that commodity. Marketing materials and a personal visit from port operators could then be used to market marine services.
- Ports should be made aware that additional Coast Guard rules and inspections may be necessary with new cargoes such as hazardous waste and containerized materials. As such, the Coast Guard should be involved as the new market is advancing so there is no critical failure near the end.

Conclusion

Progress has been made since 2013 kickoff of the WCPDI. There has been increased awareness of the importance of freight at our ports and increased participation by ports and industry at port meeting and project workshops. The WCPA, project agency team and ports are certainly out of the gate on implementing their strategic plan and already showing progress. However, market development and diversion, as well as policy changes and infrastructure funding and building, do not happen overnight. The project agencies and WCPA should continue their successful partnership and continue to advance these actions. It is a partnership not seen in many other states and, with continued commitment, there will be more freight moving across Wisconsin's commercial ports and there will be more quality transportation and logistics jobs.

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Appendix A: Modal Diversion Analysis Results by Port and by Commodity

TABLE A1: Modal Diversion Results: Green Bay to Chicago

Green Bay to Chicago	Bulk (tons)			Containerized (53' loads)		
	OSV	*Freighter*	*Potential*	*OSV*	*Freighter*	*Potential*
Chemicals	0	0	12,468	0	0	598
Clay, Concrete, & Glass	15,947	36,335	36,335			
Fabricated Metals				0	1,289	1,667
Food				0	17,237	21,062
Lumber	0	54,346	58,520	0	2,116	2,296
Machinery				0	520	800
Misc. Durables				0	93	143
Misc. Non-Durables				0	5,583	6,738
Nonmetallic Minerals	0	14,472	21,996			
Paper				0	25,130	32,162
Primary Metals	0	31,088	58,250	0	1,253	2,348
Rubber & Plastics				0	5,586	8,882
Transportation Equipment				0	135	210
TOTAL	15,947	136,240	187,570	0	58,943	76,906

TABLE A2: Modal Diversion Results: Green Bay to Grand Rapids

Green Bay to Grand Rapids	Bulk (tons)			Containerized (53' loads)		
	OSV	*Freighter*	*Potential*	*OSV*	*Freighter*	*Potential*
Chemicals	1,389	1,389	1,389	67	67	67
Clay, Concrete, & Glass	4,753	4,753	4,753			
Fabricated Metals				180	180	180
Food				1,332	1,332	1,332
Lumber	2,295	2,295	2,295	90	90	90
Machinery				148	148	148
Misc. Durables				3	3	3
Misc. Non-Durables				670	670	670
Nonmetallic Minerals	395	395	395			
Paper				1,232	1,232	1,232
Primary Metals	3,465	3,465	3,465	140	140	140
Rubber & Plastics				558	558	558
Transportation Equipment				24	24	24
TOTAL	12,298	12,298	12,298	4,443	4,443	4,443

TABLE A3: Modal Diversion Results: Green Bay to Detroit

Green Bay to Detroit	Bulk (tons)			Containerized (53' loads)		
	OSV	*Freighter*	*Potential*	*OSV*	*Freighter*	*Potential*
Chemicals	1,485	1,485	1,485	71	71	71
Clay, Concrete, & Glass	2,436	2,436	2,436			
Fabricated Metals				329	329	329
Food				1,318	1,318	1,318
Lumber	2,041	2,041	2,041	80	80	80
Machinery				180	180	180
Misc. Durables				20	20	20
Misc. Non-Durables				230	230	230
Nonmetallic Minerals	13	13	13			
Paper				1,742	1,742	1,742
Primary Metals	15,901	15,901	15,901	641	641	641
Rubber & Plastics				976	976	976
Transportation Equipment				459	459	459
TOTAL	21,875	21,875	21,875	6,046	6,046	6,046

TABLE A4: Modal Diversion Results: Green Bay to Cleveland

Green Bay to Cleveland	Bulk (tons)			Containerized (53' loads)		
	OSV	*Freighter*	*Potential*	*OSV*	*Freighter*	*Potential*
Chemicals	760	760	760	36	36	36
Clay, Concrete, & Glass	2,639	2,639	2,639			
Fabricated Metals				44	49	49
Food				1,369	1,505	1,505
Lumber	766	766	766	30	30	30
Machinery				133	175	175
Misc. Durables				19	19	19
Misc. Non-Durables				109	110	110
Nonmetallic Minerals	5	5	5			
Paper				1,633	1,633	1,633
Primary Metals	3,718	3,718	3,718	94	150	150
Rubber & Plastics				643	654	654
Transportation Equipment				39	39	39
TOTAL	7,888	7,888	7,888	4,149	4,401	4,401

TABLE A5: Modal Diversion Results: Green Bay to Buffalo

Green Bay to Buffalo	Bulk (tons)			Containerized (53' loads)		
	OSV	*Freighter*	*Potential*	*OSV*	*Freighter*	*Potential*
Chemicals	88	88	88	4	4	4
Clay, Concrete, & Glass	0	0	0			
Fabricated Metals				5	5	5
Food				197	197	197
Lumber	2,122	2,122	2,122	83	83	83
Machinery				8	8	8
Misc. Durables				4	4	4
Misc. Non-Durables				117	117	117
Nonmetallic Minerals	0	0	0			
Paper				125	125	125
Primary Metals	197	197	197	8	8	8
Rubber & Plastics				21	21	21
Transportation Equipment				0	0	0
TOTAL	2,407	2,407	2,407	574	574	574

TABLE A6 Modal Diversion Results: Green Bay to Rochester

Green Bay to Rochester	Bulk (tons)			Containerized (53' loads)		
	OSV	*Freighter*	*Potential*	*OSV*	*Freighter*	*Potential*
Chemicals	10	10	10	0	0	0
Clay, Concrete, & Glass	0	0	0			
Fabricated Metals				56	56	56
Food				395	395	395
Lumber	209	209	209	8	8	8
Machinery				9	9	9
Misc. Durables				2	2	2
Misc. Non-Durables				34	34	34
Nonmetallic Minerals	0	0	0			
Paper				41	41	41
Primary Metals	1,273	1,273	1,273	51	51	51
Rubber & Plastics				125	125	125
Transportation Equipment				8	8	8
TOTAL	1,492	1,492	1,492	731	731	731

TABLE A7: Modal Diversion Results: Green Bay to Toronto

Green Bay to Toronto	Bulk (tons)			Containerized (53' loads)		
	OSV	*Freighter*	*Potential*	*OSV*	*Freighter*	*Potential*
Chemicals	2,662	2,662	2,662	128	128	128
Clay, Concrete, & Glass	11,933	11,933	11,933			
Fabricated Metals				613	613	613
Food				3,425	3,425	3,425
Lumber	8,617	8,617	8,617	338	338	338
Machinery				1,130	1,130	1,130
Misc. Durables				84	84	84
Misc. Non-Durables				1,482	1,482	1,482
Nonmetallic Minerals	5,655	5,655	5,655			
Paper				5,437	5,437	5,437
Primary Metals	5,969	5,969	5,969	241	241	241
Rubber & Plastics				3,048	3,048	3,048
Transportation Equipment				125	125	125
TOTAL	34,835	34,835	34,835	16,050	16,050	16,050

TABLE A8 Modal Diversion Results: Manitowoc to Chicago

Manitowoc to Chicago	Bulk (tons)			Containerized (53' loads)		
	OSV	*Freighter*	*Potential*	*OSV*	*Freighter*	*Potential*
Chemicals	0	6,187	7,488	0	297	359
Clay, Concrete, & Glass	0	9,553	9,553			
Fabricated Metals				0	228	563
Food				0	4,261	6,680
Lumber	0	2,866	2,866	0	112	112
Machinery				0	102	386
Misc. Durables				0	14	40
Misc. Non-Durables				0	388	721
Nonmetallic Minerals	0	0	0			
Paper				0	161	548
Primary Metals	0	8,274	15,204	0	334	613
Rubber & Plastics				0	287	1,803
Transportation Equipment				0	0	0
TOTAL	0	26,880	35,111	0	6,185	11,826

TABLE A9: Modal Diversion Results: Manitowoc to Grand Rapids

Manitowoc to Grand Rapids	Bulk (tons)			Containerized (53' loads)		
	OSV	*Freighter*	*Potential*	*OSV*	*Freighter*	*Potential*
Chemicals	834	834	834	40	40	40
Clay, Concrete, & Glass	1,250	1,250	1,250			
Fabricated Metals				61	61	61
Food				422	422	422
Lumber	112	112	112	4	4	4
Machinery				72	72	72
Misc. Durables				1	1	1
Misc. Non-Durables				72	72	72
Nonmetallic Minerals	0	0	0			
Paper				21	21	21
Primary Metals	905	905	905	36	36	36
Rubber & Plastics				113	113	113
Transportation Equipment				0	0	0
TOTAL	3,101	3,101	3,101	842	842	842

TABLE A10 Modal Diversion Results: Manitowoc to Detroit

Manitowoc to Detroit	Bulk (tons)			Containerized (53' loads)		
	OSV	*Freighter*	*Potential*	*OSV*	*Freighter*	*Potential*
Chemicals	892	892	892	18	43	43
Clay, Concrete, & Glass	640	640	640			
Fabricated Metals				25	111	111
Food				140	418	418
Lumber	100	100	100	4	4	4
Machinery				18	87	87
Misc. Durables				2	5	5
Misc. Non-Durables				8	25	25
Nonmetallic Minerals	0	0	0			
Paper				4	30	30
Primary Metals	4,150	4,150	4,150	91	167	167
Rubber & Plastics				24	198	198
Transportation Equipment				0	0	0
TOTAL	5,782	5,782	5,782	334	1,088	1,088

TABLE A11: Modal Diversion Results: Manitowoc to Cleveland

Manitowoc to Cleveland	Bulk (tons)			Containerized (53' loads)		
	OSV	*Freighter*	*Potential*	*OSV*	*Freighter*	*Potential*
Chemicals	457	457	457	18	22	22
Clay, Concrete, & Glass	694	694	694			
Fabricated Metals				9	17	17
Food				377	477	477
Lumber	38	38	38	1	1	1
Machinery				30	85	85
Misc. Durables				2	5	5
Misc. Non-Durables				8	12	12
Nonmetallic Minerals	0	0	0			
Paper				8	28	28
Primary Metals	970	970	970	21	39	39
Rubber & Plastics				21	133	133
Transportation Equipment				0	0	0
TOTAL	2,158	2,158	2,158	495	819	819

TABLE A12: Modal Diversion Results: Manitowoc to Buffalo

Manitowoc to Buffalo	Bulk (tons)			Containerized (53' loads)		
	OSV	*Freighter*	*Potential*	*OSV*	*Freighter*	*Potential*
Chemicals	53	53	53	3	3	3
Clay, Concrete, & Glass	0	0	0			
Fabricated Metals				2	2	2
Food				63	63	63
Lumber	104	104	104	4	4	4
Machinery				4	4	4
Misc. Durables				1	1	1
Misc. Non-Durables				13	13	13
Nonmetallic Minerals	0	0	0			
Paper				2	2	2
Primary Metals	51	51	51	2	2	2
Rubber & Plastics				4	4	4
Transportation Equipment				0	0	0
TOTAL	208	208	208	97	97	97

TABLE A13 Modal Diversion Results: Manitowoc to Rochester

Manitowoc to Rochester	Bulk (tons)			Containerized (53' loads)		
	OSV	*Freighter*	*Potential*	*OSV*	*Freighter*	*Potential*
Chemicals	6	6	6	0	0	0
Clay, Concrete, & Glass	0	0	0			
Fabricated Metals				19	19	19
Food				125	125	125
Lumber	10	10	10	0	0	0
Machinery				4	4	4
Misc. Durables				1	1	1
Misc. Non-Durables				4	4	4
Nonmetallic Minerals	0	0	0			
Paper				1	1	1
Primary Metals	332	332	332	13	13	13
Rubber & Plastics				25	25	25
Transportation Equipment				0	0	0
TOTAL	348	348	348	193	193	193

TABLE A14 Modal Diversion Results: Manitowoc to Toronto

Manitowoc to Toronto	Bulk (tons)			Containerized (53' loads)		
	OSV	*Freighter*	*Potential*	*OSV*	*Freighter*	*Potential*
Chemicals	1,599	1,599	1,599	77	77	77
Clay, Concrete, & Glass	3,137	3,137	3,137			
Fabricated Metals				207	207	207
Food				1,086	1,086	1,086
Lumber	422	422	422	17	17	17
Machinery				546	546	546
Misc. Durables				23	23	23
Misc. Non-Durables				159	159	159
Nonmetallic Minerals	0	0	0			
Paper				93	93	93
Primary Metals	1,558	1,558	1,558	63	63	63
Rubber & Plastics				619	619	619
Transportation Equipment				0	0	0
TOTAL	6,716	6,716	6,716	2,889	2,889	2,889

TABLE A15: Modal Diversion Results: Milwaukee to Chicago

Milwaukee to Chicago	Bulk (tons)			Containerized (53' loads)		
	OSV	*Freighter*	*Potential*	*OSV*	*Freighter*	*Potential*
Chemicals	0	0	131,705	0	0	6,317
Clay, Concrete, & Glass	0	0	82,437			
Fabricated Metals				0	0	3,795
Food				0	0	41,194
Lumber	0	0	852	0	0	33
Machinery				0	0	1,622
Misc. Durables				0	0	1,145
Misc. Non-Durables				0	0	12,725
Nonmetallic Minerals	0	0	0			
Paper				0	0	9,112
Primary Metals	0	0	123,522	0	0	4,980
Rubber & Plastics				0	0	10,786
Transportation Equipment				0	0	758
TOTAL	0	0	338,516	0	0	92,467

TABLE A16 Modal Diversion Results: Milwaukee to Grand Rapids

Milwaukee to Grand Rapids	Bulk (tons)			Containerized (53' loads)		
	OSV	*Freighter*	*Potential*	*OSV*	*Freighter*	*Potential*
Chemicals	14,672	14,672	14,672	704		704
Clay, Concrete, & Glass	10,784	10,784	10,784			
Fabricated Metals				409		409
Food				2,605		2,605
Lumber	33	33	33	1		1
Machinery				301		301
Misc. Durables				25		25
Misc. Non-Durables				1,265		1,265
Nonmetallic Minerals	0	0	0			
Paper				349		349
Primary Metals	7,349	7,349	7,349	296		296
Rubber & Plastics				678		678
Transportation Equipment				88		88
TOTAL	32,839	32,839	32,839	6,720	0	6,720

TABLE A17: Modal Diversion Results: Milwaukee to Detroit

Milwaukee to Detroit	Bulk (tons)			Containerized (53' loads)		
	OSV	*Freighter*	*Potential*	*OSV*	*Freighter*	*Potential*
Chemicals	15,684	15,684	15,684	0	752	752
Clay, Concrete, & Glass	5,526	5,526	5,526			
Fabricated Metals				0	750	750
Food				0	2,578	2,578
Lumber	0	30	30	0	1	1
Machinery				0	365	365
Misc. Durables				0	156	156
Misc. Non-Durables				0	435	435
Nonmetallic Minerals	0	0	0			
Paper				0	494	494
Primary Metals	33,071	33,718	33,718	0	1,359	1,359
Rubber & Plastics				0	1,185	1,185
Transportation Equipment				0	1,661	1,661
TOTAL	54,281	54,958	54,958	0	9,735	9,735

TABLE A18 Modal Diversion Results: Milwaukee to Cleveland

Milwaukee to Cleveland	Bulk (tons)			Containerized (53' loads)		
	OSV	*Freighter*	*Potential*	*OSV*	*Freighter*	*Potential*
Chemicals	8,031	8,031	8,031	0	385	385
Clay, Concrete, & Glass	5,988	5,988	5,988			
Fabricated Metals				0	111	111
Food				0	2,943	2,943
Lumber	11	11	11	0	0	0
Machinery				0	356	356
Misc. Durables				0	154	154
Misc. Non-Durables				0	207	207
Nonmetallic Minerals	0	0	0			
Paper				0	463	463
Primary Metals	7,884	7,884	7,884	0	318	318
Rubber & Plastics				0	794	794
Transportation Equipment				0	140	140
TOTAL	21,913	21,913	21,913	0	5,872	5,872

TABLE A19: Modal Diversion Results: Milwaukee to Buffalo

Milwaukee to Buffalo	Bulk (tons)			Containerized (53' loads)		
	OSV	*Freighter*	*Potential*	*OSV*	*Freighter*	*Potential*
Chemicals	0	930	930	44	45	45
Clay, Concrete, & Glass	0	0	0			
Fabricated Metals				11	11	11
Food				343	385	385
Lumber		31	31		1	1
Machinery	0			15	16	16
Misc. Durables				33	35	35
Misc. Non-Durables				216	221	221
Nonmetallic Minerals	0	0	0			
Paper				33	35	35
Primary Metals	0	417	417	16	17	17
Rubber & Plastics				21	26	26
Transportation Equipment				1	1	1
TOTAL	0	1,378	1,378	732	794	794

TABLE A20: Modal Diversion Results: Milwaukee to Rochester

Milwaukee to Rochester	Bulk (tons)			Containerized (53' loads)		
	OSV	*Freighter*	*Potential*	*OSV*	*Freighter*	*Potential*
Chemicals	101	101	101	5	5	5
Clay, Concrete, & Glass	0	0	0			
Fabricated Metals				128	128	128
Food				773	773	773
Lumber	3	3	3	0	0	0
Machinery				18	18	18
Misc. Durables				17	17	17
Misc. Non-Durables				64	64	64
Nonmetallic Minerals	0	0	0			
Paper				12	12	12
Primary Metals	2,700	2,700	2,700	109	109	109
Rubber & Plastics				152	152	152
Transportation Equipment				29	29	29
TOTAL	2,804	2,804	2,804	1,307	1,307	1,307

TABLE A21: Modal Diversion Results: Milwaukee to Toronto

Milwaukee to Toronto	Bulk (tons)			Containerized (53' loads)		
	OSV	*Freighter*	*Potential*	*OSV*	*Freighter*	*Potential*
Chemicals	28,119	28,119	28,119	1,349	1,349	1,349
Clay, Concrete, & Glass	27,073	27,073	27,073			
Fabricated Metals				1,396	1,396	1,396
Food				6,699	6,699	6,699
Lumber	126	126	126	5	5	5
Machinery				2,293	2,293	2,293
Misc. Durables				673	673	673
Misc. Non-Durables				2,799	2,799	2,799
Nonmetallic Minerals	0	0	0			
Paper				1,540	1,540	1,540
Primary Metals	12,657	12,657	12,657	510	510	510
Rubber & Plastics				3,701	3,701	3,701
Transportation Equipment				452	452	452
TOTAL	67,975	67,975	67,975	21,417	21,417	21,417

TABLE A22: Modal Diversion Results: Superior to Chicago

Superior to Chicago	Bulk (tons)			Containerized (53' loads)		
	OSV	*Freighter*	*Potential*	*OSV*	*Freighter*	*Potential*
Chemicals	0	0	0	0	0	0
Clay, Concrete, & Glass	483	3,317	3,317			
Fabricated Metals				0	215	215
Food				0	2,406	2,406
Lumber	16,527	49,076	49,076	0	1,925	1,925
Machinery				0	229	229
Misc. Durables				0	0	0
Misc. Non-Durables				0	381	381
Nonmetallic Minerals	1,444	8,242	8,242			
Paper				0	1,631	1,631
Primary Metals	0	309	309	0	12	12
Rubber & Plastics				0	1,291	1,291
Transportation Equipment				0	13	13
TOTAL	18,454	60,943	60,943	0	8,104	8,104

TABLE A23: Modal Diversion Results: Superior to Grand Rapids

Superior to Grand Rapids	Bulk (tons)			Containerized (53' loads)		
	OSV	*Freighter*	*Potential*	*OSV*	*Freighter*	*Potential*
Chemicals	0	0	0	0	0	0
Clay, Concrete, & Glass	434	434	434			
Fabricated Metals				18	23	23
Food				67	152	152
Lumber	1,925	1,925	1,925	52	76	76
Machinery				29	43	43
Misc. Durables				0	0	0
Misc. Non-Durables				28	38	38
Nonmetallic Minerals	148	148	148			
Paper				57	62	62
Primary Metals	18	18	18	0	1	1
Rubber & Plastics				64	81	81
Transportation Equipment				0	2	2
TOTAL	2,525	2,525	2,525	317	477	477

TABLE A24: Modal Diversion Results: Superior to Detroit

Superior to Detroit	Bulk (tons)			Containerized (53' loads)		
	OSV	*Freighter*	*Potential*	*OSV*	*Freighter*	*Potential*
Chemicals	0	0	0	0	0	0
Clay, Concrete, & Glass	222	222	222			
Fabricated Metals				43	43	43
Food				151	151	151
Lumber	1,711	1,711	1,711	67	67	67
Machinery				52	52	52
Misc. Durables				0	0	0
Misc. Non-Durables				13	13	13
Nonmetallic Minerals	5	5	5			
Paper				88	88	88
Primary Metals	84	84	84	3	3	3
Rubber & Plastics				142	142	142
Transportation Equipment				28	28	28
TOTAL	2,023	2,023	2,023	587	587	587

TABLE A25: Modal Diversion Results: Superior to Cleveland

Superior to Cleveland	Bulk (tons)			Containerized (53' loads)		
	OSV	*Freighter*	*Potential*	*OSV*	*Freighter*	*Potential*
Chemicals	0	0	0	0	0	0
Clay, Concrete, & Glass	241	241	241			
Fabricated Metals				6	6	6
Food				172	172	172
Lumber	643	643	643	25	25	25
Machinery				50	50	50
Misc. Durables				0	0	0
Misc. Non-Durables				6	6	6
Nonmetallic Minerals	2	2	2			
Paper				83	83	83
Primary Metals	20	20	20	1	1	1
Rubber & Plastics				95	95	95
Transportation Equipment				2	2	2
TOTAL	905	905	905	441	441	441

TABLE A26: Modal Diversion Results: Superior to Buffalo

Superior to Buffalo	Bulk (tons)			Containerized (53' loads)		
	OSV	*Freighter*	*Potential*	*OSV*	*Freighter*	*Potential*
Chemicals	0	0	0	0	0	0
Clay, Concrete, & Glass	0	0	0			
Fabricated Metals				1	1	1
Food				23	23	23
Lumber	1,780	1,780	1,780	70	70	70
Machinery				2	2	2
Misc. Durables				0	0	0
Misc. Non-Durables				7	7	7
Nonmetallic Minerals	0	0	0			
Paper				6	6	6
Primary Metals	1	1	1	0	0	0
Rubber & Plastics				3	3	3
Transportation Equipment				0	0	0
TOTAL	1,781	1,781	1,781	111	111	111

TABLE A27: Modal Diversion Results: Superior to Rochester

Superior to Rochester	Bulk (tons)			Containerized (53' loads)		
	OSV	*Freighter*	*Potential*	*OSV*	*Freighter*	*Potential*
Chemicals	0	0	0	0	0	0
Clay, Concrete, & Glass	0	0	0			
Fabricated Metals				7	7	7
Food				45	45	45
Lumber	175	175	175	7	7	7
Machinery				3	3	3
Misc. Durables				0	0	0
Misc. Non-Durables				2	2	2
Nonmetallic Minerals	0	0	0			
Paper				2	2	2
Primary Metals	7	7	7	0	0	0
Rubber & Plastics				18	18	18
Transportation Equipment				0	0	0
TOTAL	182	182	182	85	85	85

TABLE A28: Modal Diversion Results: Superior to Toronto

Superior to Toronto	Bulk (tons)			Containerized (53' loads)		
	OSV	*Freighter*	*Potential*	*OSV*	*Freighter*	*Potential*
Chemicals	0	0	0	0	0	0
Clay, Concrete, & Glass	1,089	1,089	1,089			
Fabricated Metals				79	79	79
Food				391	391	391
Lumber	7,226	7,226	7,226	284	284	284
Machinery				324	324	324
Misc. Durables				0	0	0
Misc. Non-Durables				84	84	84
Nonmetallic Minerals	2,119	2,119	2,119			
Paper				276	276	276
Primary Metals	32	32	32	1	1	1
Rubber & Plastics				443	443	443
Transportation Equipment				8	8	8
TOTAL	10,466	10,466	10,466	1,890	1,890	1,890

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Appendix B: Modal Diversion Analysis Results by Port, by Commodity, by County, and by Company

Appendix B provides a listing of businesses/shippers and county location sorted by nearest commercial port and commodity group. These businesses were originally included in an inventory of the state's driver industries in WEDC's 2011 Wisconsin Economic Future Study. The inventory was then updated for the 2016 CFIRE report: The Potential for Mode Conversion to Rail Service in Wisconsin.

Port officials, economic development professionals, industry associations, private businesses and other interested parties can use this appendix to identify potential freight sources by commodity then identify the businesses in their geographic area that handle that commodity.

Table B1: Port of Green Bay Companies by Commodity by County

Chemicals

Winnebago
- HYDRITE CHEMICAL CO. 2

Clay, Concrete, & Glass

Brown
- COUNTY MATERIALS CORP. 3
- OLDCASTLE BUILDINGENVELOPE, INC.
- THERMO FISHER SCIENTIFIC

Marinette
- SINTEX HOLDING USA INC
- SPECIALTY GRANULES

Oconto
- SINTEX

Shawano
- COUNTY MATERIALS CORP

Winnebago
- COUNTY MATERIALS CORP. 4

Fabricated Metals

Brown
- ACE MANUFACTURING INDUSTRIES, INC.
- ASTRO INDUSTRIES INC
- BEST MACHINE AND REPAIR INC
- CENTERLINE MACHINING & GRINDING, INC.
- EMT INTERNATIONAL, INC.
- FEECO INTERNATIONAL, INC.
- GREEN BAY PACKAGING
- GRIFFIN INDUSTRIES CORP.
- INDUSTRIAL ENGRAVING & MANUFACTURING CORPORATION
- LMC
- MACHINE SERVICE, INC.
- NELSON MACHINE & WELDING CORP
- NEW TECH METALS
- PIONEER METAL FINISHING, LLC
- RENCO MACHINE CO INC
- RENCO MACHINE CO., INC.
- ROLAND MACHINERY COMPANY
- TOSCA LIMITED
- ULTRA PLATING CORPORATION
- VELOCITY MACHINE, INC.

Door
- C & S MANUFACTURING CORP
- MOORE MANUFACTURING
- WIRETECH FABRICATORS, INC.

Fond du Lac
- AGROMATIC
- F. ZIEGLER ENTERPRISES LTD.

Kewaunee
- D & S MACHINE
- PRECISION MACHINE, INC.

Langlade
- AMRON ANTIGO BRANCH
- INNOVATIVE INDUSTRIES INC
- WAUKESHA BEARINGS CORPORATION

Marinette
- ALLIANCE INDUSTRIES
- GRAETZ MFG., INC.
- PATZ CORPORATION

Oconto
- MIRROCRAFT
- S & M MACHINE SERVICE
- TEC LINE MANUFACTURING CORP

Outagamie
- A TO Z MACHINE COMPANY, INC.
- ADVANCE INDUSTRIAL MACHINE A WISCONSIN LIMITED PARTNERSHIP
- ALL LIFT SYSTEMS, INC.
- BLACK DOG MACHINE LLC
- CLASSIC GEARS & MACHINING, INC.
- ENERPIPE SYSTEMS INC
- FOX MACHINING, INC.
- FOX VALLEY STEEL AND WIRE COMPANY
- FOX VALLEY TOOL & DIE, INC.
- LUVATA

MANUFACTURING
METAL PRODUCTS, INCORPORATED
MID VALLEY INDUSTRIES, LLC
OEC GRAPHICS, INC. APPLETON
ONVOY DIVISION
PINNACLE MACHINE LLC
PIPING SYSTEM INC
PIPING SYSTEMS, LLC
R E & D INC
SPECIALTY MACHINE INC
STEEL KING INDUSTRIES, INC.
TEAM INDUSTRIES, INC.
TRIPLE E MACHINE & TOOL INC

Shawano

J & R MACHINE INC.
MOD TECH INDUSTRIES, INC.

Winnebago

AP WESTSHORE INC.
BRICKHAM MACHINING COMPANY, INC.
CRESCENT BRONZE
DUO SAFETY LADDER CORPORATION
FOX RIVER TOOL CO., INC.
FOX VALLEY HEAT TREAT, INC.
HAFEMEISTER MACHINE CORP
IDEAL PRODUCTS INC
INNOVATIVE MACHINING, LLC
J. STADLER MACHINE, INC.
MATHFAB LLC
OSHKOSH COIL SPRING, INC.
OSHKOSH DIV
OSHKOSH MARINE SUPPLY COMPANY
PROTO 1 MANUFACTURING, LLC
SMC METAL FABRICATORS, INC.
STORM EQUIPMENT
WALD WIRE & MANUFACTURING

Food

Brown

ALIVE & KICKIN' PIZZA CRUST
ALLENS, INC
AMERICAN FOODS GROUP, LLC
AMERICAN FOODS GROUP, LLC 2
BELGIOIOSO CHEESE, INC. 3
BELGIOIOSO CHEESE COMPANY
BIRDSEYE DAIRY INC
BREADSMITH 2
EARTHGRAINS BAKERY GROUP, INC.
GREEN BAY CHEESE COMPANY, INC.
JBS CARRIERS
LAND O'LAKES 2
MORNING GLORY DAIRY DISTR
NOT BY BREAD ALONE LTD
PORT CITY BAKERY INC.
SALM PARTNERS, LLC

Calumet

BELGIOIOSO CHEESE, INC. 2
FOX VALLEY ALFALFA MILLS, INC.
THIEL CHEESE & INGREDIENTS

Door

GRANDMA'S SWEDISH BAKERY

Fond du Lac

BONDUELLE USA
CROSS & BLACKWELL
FARIS GOURMET POPCORN & TREATS
RIPON PICKLE COMPANY, INC.

Langlade

ANTIGO CHEESE

Oconto

SENECA FOODS CORPORATION 3
SPRINGSIDE CHEESE CORP.

Outagamie

ALTO DAIRY BLACK CREEK DIV
BELGIOIOSO CHEESE, INC. 1
BREADSMITH
FOREMOST FARMS U S A
LAND O'LAKES
MORNING GLORY DAIRY PRODUCTS APPLETON AREA DISTRIBUTOR
ORV'S PIZZA
PROVIMI FOODS, INC.
SIMPLE SIMON QUALITY BAKERY
THE HILLSHIRE BRANDS COMPANY

Winnebago

EARTHGRAINS BAKERY GROUP, INC. 2
SCHOENBERGER'S PASTRY SHOP

Lumber

Brown

DUFECK WOOD PRODUCTS
LA FORCE, INC.
MIDWEST MOULDING & DOOR INC.
PRESTIGE CUSTOM CABINETRY INC
ROL TEC, INC.
TOWER PALLET CO

Florence

PRIDE MANUFACTURING

Forest

NICOLET HARDWOODS CORP.

Kewaunee

ALGOMA HARDWOODS

Langlade

KRETZ TRUCK BROKERAGE
LINCOLN WOOD PRODUCTS
WHITE BEAR LUMBER LLC
YAWKEY BISSELL HARDWOOD FLRG
ZELAZOSKI WOOD PRODUCTS INC.

Marinette

GOODMAN VENEER & LUMBER CO.

Oconto

CUSTOM PALLETT & CRATE INC

Outagamie

FOX VALLEY WOOD PODUCTS INC.
KONZ WOOD PRODUCTS
VALLEY PLANING MILL

Shawano
- WISCONSIN VENEER & PLYWOOD INC
- WOODLINE MANUFACTURING, INC.
- WOODPORT DOORS

Winnebago
- ALBANY INTERNATIONAL CORP.
- ARCWAYS, INCORPORATED
- CORRIM FIBRGLS DOORS & FRAMES
- CTI PAPER USA INC.
- EGGERS INDUSTRIES, INC.
- FRONTLINE PRODUCTS INC
- MILLWORK DISTRIBUTORS INC.
- MORGAN MFG DIV
- NEVAMAR COMPANY, LLC
- OSHKOSH DESIGNS
- OSHKOSH DOOR COMPANY
- VOITH PAPER ROLLS CENTRAL INC.

Machinery

Brown
- AMERIDRIVES POWER TRANSMISSION
- CATERPILLAR
- CLYBOURN CARTONER
- DRI TEC MANUFACTURING GROUP LLC
- E.D.L. PACKAGING ENGINEERS, INC.
- ENGLEWOOD ELECTRICAL SUPPLY
- FOSBER AMERICA, INC.
- INFINITY MACHINE & ENGINEERING CORPORATION
- KADANT GRANTEK INC.
- KADANT GRANTEK INCORPORATION
- KOSS INDUSTRIAL INC
- LAWTON MACHINERY GROUP
- MECA
- MILLWOOD INC
- OPTIMA MACHINERY CORPORATION
- PAPER CONVERTING
- RETROFLEX INC
- SUMMIT PUMP, INC.

Door
- HATCO CORPORATION
- MARINE TRAVELIFT, INC.
- TTX ENVIRONMENTAL

Fond du Lac
- ALH HOLDING INC.
- ALLIANCE LAUNDRY HOLDINGS LLC
- ALLIANCE MANUFACTURING, INC.

Kewaunee
- ALGOMA NET COMPANY DIVISION

Langlade
- HYDRATIGHT OPERATIONS
- MERIT GEAR LLC

Oconto
- NEROCO ENGINEERING AND MFG DIV

Outagamie
- ABB INC
- B & H PATTERN, INC.
- CMD EXPORT
- L & S ELECTRIC INC
- METSO PAPER USA INC
- MILLER ELECTRIC MFG. CO.
- NEW LONDON ENGINEERING
- PARKER HANNIFIN CORPORATION
- PERFECT PATTERNS, INC.
- QCOMP TECHNOLOGIES INC
- RICHMARK PATTERNS INC
- TITAN INDUSTRIES, INC.
- VALLEY TISSUE PACKAGING INC
- VOITH
- VOITH MERI ENVIRONMENTAL SOLUTIONS, INC.
- VOITH PAPER FABRIC & ROLL SYSTEMS INC.
- WAUPACA ELEVATOR COMPANY, INC.
- WELDCRAFT PRODUCTS

Shawano
- TIMBERPRO, INC.
- VALUE ADDED DISTRIBUTORS, LLC

Winnebago
- ARROWHEAD CONVEYOR CORPORATION
- K KRANSKI & SONS INC
- KEENLINE CONVEYER SYSTEMS
- METSO PAPER USA, INC.
- MULTI CONVEYOR, LLC
- PACK AIR INC.
- SPENCER JOHNSTON CO
- TRIANGLE MANUFACTURING COMPANY
- U S SLING & SUPPLY DIVISION
- WEBEX INC
- XDS HOLDINGS, INC.

Misc. Durables

Outagamie
- BIG PULLEY

Winnebago
- GENERAC POWER SYSTEMS INC. 3

Misc. Non-Durables

Brown
- BEST CRAFT FURNITURE INCORPORATED
- COLORTECH OF WISCONSIN, INC.
- COUNTRYSIDE CABINETS
- G B EMBOSSING INC
- GRANITE CO
- H C MILLER COMPANY
- HARPER CORPORATION OF AMERICA
- HEYRMAN PRINTING, LLC
- INDEPENDENT PRINTING COMPANY, INC.
- KI, OEI
- OAK FRONT CUSTOM CABINETRY
- R R DONNELLEY 6
- RENEW A KITCHEN
- ROMO DURABLE GRAPHICS
- SEAWAY PRINTING COMPANY INC.
- VALLEY CABINET, INC.

VAN LANEN INC.
WILCO CABINET MAKERS INC

Calumet
R R DONNELLEY 5

Fond du Lac
BASIC AMERICAN METAL PRODUCTS

Kewaunee
QUALI T INC

Oconto
GRAPHIC MANAGEMENT SPECIALTY PRODUCTS

Outagamie
APPLETON COATED LLC
CRYSTAL PRINT, INC.
GRAPHIC COMPOSITION, INC.
HEARTLAND BUSINESS SYSTEMS
J P GRAPHICS INC
NATIONAL GRAPHIC SOLUTIONS LLC
PRO LABEL, INC.
R R DONNELLEY 1
SCHOOL SPECIALTY, INC.
SIMMONS JUVENILE FURNITURE
ZEBRA TECHNOLOGIES CORPORATION

Shawano
SHAWANO EVENING LEADER
STONE CREATIONS OF WISCONSIN, INC.

Winnebago
CALEY CORP
CASTLE PIERCE
DIGIPRINT BUSINESS CENTRE INCORPORATED
MENASHA CORPORATION 2
MILES KIMBALL CO
NEENAH PRINTING WIDE WEB FLEXO
OUTLOOK GROUP HOLDINGS, LLC
PRINTCO INC
PRINTED SYSTEMS
PRINTRON ENGRAVERS INC.
R R DONNELLEY 2
R R DONNELLEY 3
R R DONNELLEY 4
SERVICE LITHO PRINT
SYNERGY KITCHEN & BATH
WERNER ELECTRIC SUPPLY CO.
WINNEBAGO COLOR PRESS

Nonmetallic Minerals

Brown
DAANEN & JANSSEN INC.

Calumet
MURPHY CONSTRUCTION COMPANY

Door
DOOR COUNTY CUSTOM STONE INC.

Outagamie
MCC
MCC, INC.

Winnebago
MCC INC

Paper

Brown
A C C
ALWIN MANUFACTURING CO INC
BAY FIBERS
BAYSIDE MACHINE CORP
BELMARK
COATED PRODUCTS DIVISION
DE PERE SHIPPING CONTAINER DIV
EXPERA SPECIALTY SOLUTIONS 2
FOX CONVERTING, INC.
FOX RIVER FIBER CO
GEORGIA PACIFIC 4
GEORGIA PACIFIC 5
GEORGIA PACIFIC 6
GRAHAM MEDICAL PRODUCTS
GREEN BAY CONVERTING, INC. 1
GREEN BAY CONVERTING, INC. 2
GREEN BAY MILL DIVISION
GREEN BAY PACKAGING INC. 1
GREEN BAY PACKAGING INC. 2
HATTIESBURG PAPER CO LLC
IDEAL PAPER TUBES & CORES
LITTLE RAPIDS CORP
MULTI COLOR CORP
N P S CORP
PROCTER & GAMBLE PAPER PRODUCTS
SIERRA COATING TECHNOLOGIES, LLC
SOFIDEL AMERICA CORP GREEN BAY
STEEN MACEK PAPER CO., INC.
STRAUBEL COMPANY, INC.
THE STRAUBEL PAPER COMPANY
TUFCO TECHNOLOGIES, INC.
VALLEY PACKAGING SUPPLY CO., INC.
VIBRANT IMPRESSIONS
WISCONSIN CONVERTING INC

Calumet
KIMBERLY CLARK 9

Kewaunee
WS PACKAGING GROUP, INC
WS PACKAGING INC.

Langlade
VOLM COMPANIES, INCORPORATED

Marinette
APPLETON PAPERS INC.
BPM, INC.
KIMBERLY CLARK 10

Oconto
ST PAPER, LLC

Outagamie
APPVION INC.
CONTRACT CONVERTING, LLC
CURWOOD, INC. 2
CURWOOD NEW LONDON
EXPERA SPECIALTY SOLUTIONS
KERWIN CBC

KIMBERLY CLARK 1
KIMBERLY CLARK 3
NATIONAL ENVELOPE
NEENAH PAPER FR, LLC 2
NICHOLS PAPER
PACON CORP.
PERFECSEAL, INC.
PRECISION PAPER CONVERTERS LLC
PROGRESSIVE CONVERTING INC
RESOURCE ONE INTERNATIONAL LLC
ROLLGUARD
SONOCO PRODUCTS COMPANY
US PAPER CONVERTERS INC

Shawano

RADCO
SHAWANO SPECIALTY PAPERS

Winnebago

AMERICAN PAPER CONVERTERS INC
APPLETON MANUFACTURING DIV
ATLAS TAG & LABEL, INC.
AVALON PAPERS, LLC
BEMIS COMPANY INC.
BEMIS FLEXIBLE PACKAGING
C B C
CURWOOD, INC.
CURWOOD WISCONSIN, LLC
EXOPACK, LLC
GEORGIA PACIFIC 2
GEORGIA PACIFIC 3
GRAPHIC PACKAGING INTERNATIONAL, INC.
HOFFMASTER GROUP INC
INTERTAPE POLYMER CORP.
KIMBERLY CLARK 2
KIMBERLY CLARK 4
KIMBERLY CLARK 5
KIMBERLY CLARK 6
KIMBERLY CLARK 7
KIMBERLY CLARK 8
MENASHA CORPORATION
MONDI PACKAGING AKROSIL, LLC
NEENAH PAPER FR, LLC
NEWARK PAPER BOARD
NEWARK PAPERBOARD PRODUCTS
OUTLOOK GROUP CONVERTING
PACON CORP
PERFECSEAL, INC. 2
ROCKTENN CP, LLC 3
SCA TISSUE NORTH AMERICA, LLC
SCA TISSUE NORTH AMERICA, LLC 2
SCA TISSUE NORTH AMERICA, LLC 3
SONOCO HAYES PLANT
SONOCO US MILLS
STRATAGRAPH LLC
SWANSON WIPER CORPORATION
WAREHOUSE SPECIALISTS
WHITING PAPER CO

Primary Metals

Brown

FORT HOWARD STEEL INCORPORATED
POWER TRAIN SERVICES, LLC

Fond du Lac

A. F. K. CORP.

Outagamie

ROLOFF

Shawano

AARROWCAST INC

Winnebago

NEENAH FOUNDARY COMPANY

Rubber & Plastics

Brown

G & K SERVICES
GEMINI PLASTICS, INC.
GREEN BAY PLASTICS, INC.
MIDLAND PLASTICS, INC.
OMNOVA SOLUTIONS INC
THE BELSON COMPANY
WISCONSIN PLASTICS INC

Fond du Lac

ALPHATEC EXTRUSIONS DIV
SPARTECH PACKAGING TECH

Kewaunee

N.E.W. PLASTICS CORP
RENEW PLASTICS

Oconto

LETOURNEAU PLASTICS, INC.
N P I

Outagamie

DENNIS BAHCALL RUBBER COMPANY, INC.
DRAINAGE INDUSTRIES
EAGLE SUPPLY & PLASTICS INC
HI TECH PLASTICS INC.
PRESTO PRODUCTS COMPANY
VALLEY ROLLER COMPANY, INC.

Shawano

WISCONSIN FILM & BAG
WORLD WIDE SIGN SYSTEMS, INC.

Winnebago

BECHER ENGINEERING, INC.
CURWOOD INC
EVCO PLASTICS
LAKESIDE PLASTICS, INC.
PRECISION PLASTICS, LLC
PRO EX EXTRUSION, INC.
STOWE WOODWARD
UNITED PLASTIC FABRICATING, INC.
WISCONSIN TUBING, INC.

Transportation Equipment

Door

BAY SHIPBUILDING CO

Marinette
- MARINETTE MARINE CORP
- PIERBURG PUMP TECHNOLOGY US, LLC

Outagamie
- APPLETON MARINE INC
- CASPERS' TRUCK EQUIPMENT
- UTILITY SALES & SERVICE

Winnebago
- AXLETECH INTERNATIONAL, LLC
- CUSTOM MARINE ACQUISITION, INC.
- OSHKOSH CORPORATION

Table B2: Port of La Crosse Companies by Commodity by County

Clay, Concrete, & Glass

Monroe
- CARDINAL IG

Fabricated Metals

Jackson
- D & S MAN

La Crosse
- CROWN CORK & SEAL COMPANY INC
- ENERGY AND CHEMICALS GROUP
- MID-CITY STEEL, INC.
- RIVER STEEL, INC.
- TED MANNSTEDT & SON, INC.

Monroe
- NORTHERN ENGRAVING CORPORATION

Trempealeau
- GLOBAL FINISHING SOLUTIONS, LLC

Food

Buffalo
- FOREMOST FARMS USA
- LA CROSSE MILLING COMPANY
- LAKESIDE FOODS, INC.

Jackson
- FOREMOST FARMS USA

La Crosse
- AGROPUR INGREDIENTS
- BAKALARS SAUSAGE COMPANY, INC.
- GREAT LAKES CHEESE WISCONSIN
- SWISS VALLEY FARMS

Monroe
- FOREMOST FARMS USA
- OCEAN SPRAY CRANBERRIES, INC.

Trempealeau
- A M P I
- GNP COMPANY

Vernon
- ORGANIC VALLEY CROPP COOPERATIVE
- WESTBY CO-OP CREAMERY OFFICE
- WHITEHALL SPECIALTIES, INC.

Lumber

Jackson
- HART TIE & LUMBER CO., INC.
- LEVIS CREEK FOREST PRODUCTS

La Crosse
- BEYER CABINETS
- CREATIVE LAMINATES, INC.
- SELECT TRUSSES & LUMBER

Monroe
- LAKE STATES LUMBER INC
- MACDONALD & OWEN VENEER AND LUMBER CO., INC.
- UFP WARRENS, LLC

Trempealeau
- KOXLIEN BROTHERS WOOD PRODUCTS INC
- PIGEON CREEK HARDWOODS, INC.

Vernon
- WESTBY HARDWOODS

Machinery

La Crosse
- L. B. WHITE
- LASER PRODUCT TECHNOLOGIES INC
- PTM, INC.
- VENTURE MACHINE & TOOL INC

Monroe
- CNH AMERICA
- NORBCO INDUSTRIES, INC.

Trempealeau
- GEA FARM TECHNOLOGIES
- STELLAR MOLD & TOOL, INC.
- TITAN AIR, INC.
- UNIVERSAL TRUCK EQUIPMENT, INC.

Misc. Non-Durables

Jackson
- FLASH4.COM, LLC
- SPACE SAVER STORAGE

La Crosse
- A T K ONALASKA OPERATIONS
- CARROLL CHAIR COMPANY
- COULEE REGION ENTERPRISES INC
- CREATIVE SCREEN PRINT INC
- CRESCENT PRINTING CO., INC.
- DURATECH INDUSTRIES, INC.
- EMPIRE SCREEN PRINTING, INC.
- EVERBRITE LLC

- INLAND LABEL & MARKETING SERVICES
- LA CROSSE GRAPHICS, INC.
- LA CROSSE SIGN CO., INC.
- MCLOONE
- NORTHERN ENGRAVING CORP
- NORTHERN MICROGRAPHICS
- OLYMPUS MEDIA LLC
- RIVERFRONT INC
- SERIGRAPHICS SCREEN PRINT INC
- WALZCRAFT

Monroe
- CARLISLE SANITARY MAINTENANCE PRODUCTS INC
- HANDISHOP INDUSTRIES INC

Trempealeau
- ASHLEY FURNITURE
- ASHLEY FURNITURE INDUSTRIES
- NORTH AMERICAN FLY AND TRADING
- NORWINN COMPANY, INC.
- SUPREME SCHOOL SUPPLY

Nonmetallic Minerals

Jackson
- ATLAS RESIN PROPPANTS LP
- NORTHERN FRAC PROPPANTS

Monroe
- HI-CRUSH OPERATING

Trempealeau
- PREFERRED SANDS LLC

Rubber & Plastics

Monroe
- EXOPACK

Table B3: Port of Manitowoc Companies by Commodity by County

Chemicals

Sheboygan
- BINKOWSKY INC.
- FASSE DECORATING CENTER
- FASSE DECORATING CENTER, INC.
- MOMENTIVE SPECIALTY CHEMICALS INC.
- NORTH WOODS CHEMICAL
- PROFESSIONAL SUPPLY
- SACO POLYMERS, INC.
- SHEBOYGAN PAINT COMPANY

Clay, Concrete, & Glass

Manitowoc
- VALDERS STONE & MARBLE INC.

Fabricated Metals

Calumet
- A 1 POLISHING & FINISHING INC
- PROFESSIONAL PLATING INC.

Fond du Lac
- MERCURY RACING

Kewaunee
- KEWAUNEE FABRICATIONS LLC

Manitowoc
- A H STOCK MANUFACTURING CORP.
- CONTEMPORARY INC.
- FORMRITE
- G T MACHINE
- GKN SINTER METALS INC
- HERESITE PROTECTIVE COATINGS
- JAGEMANN PLATING COMPANY
- JAGEMANN STAMPING COMPANY
- RHINE MACHINING & FABRICATING, INC.
- STECKER MACHINE CO. INC.

Sheboygan
- ECLIPSE MANUFACTURING CO.
- HTT, INC.
- KALLISTA, INC.
- KEES INC.
- MILLENNIUM TECHNOLOGIES
- PLYCO CORP.
- TAURUS TOOL & MACHINE INC
- WATRY INDUSTRIES, LLC

Food

Calumet
- CENTRAL AVIAN & SMALL ANIMAL
- FOREMOST FARMS USA
- MILK PRODUCTS, LLC

Fond du Lac
- BAKER CHEESE FACTORY, INC.
- PARK CHEESE COMPANY, INC.

Manitowoc
- BEERNTSEN CONFECTIONARY INC.
- LAKESIDE FOODS, INC. 4
- LAKESIDE FOODS, INC. 5
- RED ARROW PRODUCTS
- RIVERSIDE FOODS, INC.
- SMOKEY VALLEY MEAT PRODUCTS CO

Sheboygan
- AMERICAN DAIRY BRANDS
- CASCADE CHEESE
- JOHNSONVILLE SAUSAGE, LLC
- MIESFELD'S TRIANGLE MARKET
- MSC NUTRITIONAL INGREDIENTS
- OLD WISCONSIN SAUSAGE COMPANY
- SARGENTO FOODS INC.
- SARTORI COMPANY
- VERIFINE DAIRY PRODUCTS OF SHEBOYGAN, LLC

Lumber

Manitowoc

- EGGERS INDUSTRIES

Machinery

Calumet

- PARKER CO

Fond du Lac

- CONVERTING LABORATORIES
- FIVES GIDDINGS & LEWIS

Manitowoc

- AMEREQUIP CORPORATION
- INDUSTRIAL DISTRIBUTION GROUP
- KAUFMAN
- LDI INDUSTRIES, INC.
- MANITOWOC CRANES, LLC
- MANITOWOC TOOL & MACHINING LLC
- MILLER ST. NAZIANZ
- OIL RITE CORPORATION
- SCHWARTZ MANUFACTURING COMPANY
- STOELTING
- THE MANITOWOC COMPANY INC 2
- WEBER HG & CO.

Sheboygan

- ALAARK TOOLING & AUTOMATION, INC.
- CURT G. JOA, INC.
- ELENCO CARBIDE TOOL CORP
- FELDMANN ENGINEERING & MANUFACTURING CO., INC.
- GARDNER DENVER
- J & L GREENHOUSE, INC
- JENKINS SYSTEMS
- PEMCO INC.
- VOLLRATH CO. LLC
- ZIAJA MACHINING

Misc. Durables

Manitowoc

- ARISTO MANUFACTURING
- NESCO/AMERICAN HARVEST
- ORION ENERGY SYSTEMS, INC.

Sheboygan

- KOHLER CO.
- MANNING LIGHTING, INC.

Misc. Non-Durables

Calumet

- BRILLION NEWS

Fond du Lac

- BCI BURKE COMPANY, LLC
- ROTO GRAPHIC PRINTING, INC.

Manitowoc

- A. A. LAUN FURNITURE CO.
- ENQUATICS INC.
- FOSTER NEEDLE CO. INC.
- MANITOWOC FOODSERVICE GROUP
- SEWING SEEDS EMBROIDERY
- SHOTO CORPORATION

Sheboygan

- FRANZEN GRAPHICS
- MAS INDUSTRIES INC
- MAYLINE COMPANY, LLC
- NEMSCHOFF INC
- PRIORITY SIGN, INC.
- RICHARDSON BROS CO DIVISION
- RICHARDSON WOOD PRESERVING
- ROTARY GRAPHICS CORPORATION
- TIFFANY INDUSTRIES, INC
- UNIVERSAL LITHOGRAPHERS
- WIND MILL SLATWALL PRODUCTS
- ZIMMERMANN PRINTING COMPANY

Paper

Manitowoc

- CK CUTTERS
- UNITED PACKAGING, INC.

Sheboygan

- AMERICAN EXCELSIOR COMPANY
- GEORGIA PACIFIC 1
- PAPER BOX & SPECIALTY COMPANY
- SHEBOYGAN PAPER BOX CO.

Primary Metals

Calumet

- BREMER MANUFACTURING CO., INC.
- BRILLION IRON WORKS INC

Manitowoc

- ECK INDUSTRIES, INC.
- MANITOWOC GREY IRON FOUNDRY, INC.

Sheboygan

- AUSTIN GRAY IRON FOUNDRY CORP
- J L FRENCH AUTOMOTIVE CASTINGS
- WILLMAN INDUSTRIES, INC.

Rubber & Plastics

Manitowoc

- IRONWOOD PLASTICS, INC.
- KAYSUN
- MANITOWOC CUSTOM MOLDING
- SPARTECH POLYCOM CMD

Sheboygan

- BEMIS MANUFACTURING
- CRAFTED PLASTICS INC.
- DUTCHLAND PLASTICS CORP.
- DUTCHLAND PLASTICS CORP. 2
- JIFRAM EXTRUSIONS, INC.
- NORTHLAND PLASTICS INC
- PLYMOUTH FOAM PRODUCTS
- POLY VINYL CO., INC.
- POLY VINYL CO., INC.
- POLYFAB CORP.
- SCANDIA PLASTICS, INC.
- SPARTECH PLASTICS
- VPI CORPORATION

Transportation Equipment

Sheboygan

- LAKELAND SPORTS CENTER, INC. 2

Table B4: Port of Milwaukee Companies by Commodity by County

Chemicals

Milwaukee
- ALDRICH CHEMICAL CO. LLC 2
- BOSTIK, INC.
- BRENNTAG GREAT LAKES, LLC
- HELWIG CARBON PRODUCTS, INC.
- HI MAR SPECIALTY CHEMICALS, LLC
- HOFFCO LEATHERCARE
- HYDRITE CHEMICAL CO.
- KLEEN TEST PRODUCTS
- MILPORT ENTERPRISES, INC.
- PPG 5514
- VAN WATERS AND ROGERS INC

Ozaukee
- GUY & O'NEILL, INC.
- KLEEN TEST PRODUCTS 2

Racine
- ARMCO CHEMICAL CO.
- DIVERSEY, INC.
- DIVERSEY, INC. 2
- DIVERSEY, INC. 3
- RACINE INDUSTRIES, INC.
- S C JOHNSON WAX
- VON SCHRADER CO

Walworth
- STO COTE PRODUCTS, INC.

Washington
- CAMBRIDGE MAJOR LABORATORIES, INC.
- ELLSWORTH ADHESIVS SPCLTY CHEM
- GLUE DOTS INTERNATIONAL
- KITPACKERS

Waukesha
- ESSENTIAL INDUSTRIES, INC.
- PALMER COMPANY, INC.
- PRIME COATINGS
- UNIVAR USA INC.

Clay, Concrete, & Glass

Dodge
- MICHELS CORP.

Fond du Lac
- MICHELS CORPORATION

Jefferson
- FIBERDOME INCORPORATED

Kenosha
- MONARCH PLASTICS INC

Milwaukee
- CENTRAL GARDEN & PET CO

Walworth
- USG

Washington
- WYND STAR DOORS

Waukesha
- COUNTY MATERIALS CORP. 2
- HALQUIST STONE COMPANY INC.
- LANNON STONE PRODUCTION INC
- MONACELLI STONE CO INC
- PERMAY PROTYPES & COMPOSITES INC
- STONE DIMENSIONS, INC.
- THERMO FISHER SCIENTIFIC INC

Fabricated Metals

Dodge
- APACHE STAINLESS EQUIPMENT CORPORATION
- BULLSEYE INDUSTRIES, INC.
- GARDNER MANUFACTURING COMPANY
- GLEASON REEL
- MAYVILLE ENGINEERING CO INC
- MAYVILLE PRODUCTS CORP.
- MIDWEST GENERAL REPAIR
- NATIONAL RIVET & MANUFACTURING CO.
- NORTON BURGESS MFG CO
- PHOENIX COATERS, INC
- RUMAR MFG. CORP.
- TRADE TECH, INC.

Fond du Lac
- MUTHIG TOOL & DIE
- R B ROYAL INDUSTRIES INC.
- RUNDLE SPENCE MANUFACTURING CO.
- TOBIN MACHINING, INC.

Jefferson
- AD TECH INDUSTRIES
- ANDERSON MACHINING SERVICE, INC.
- CHAPTER 2, INC.
- CONSOLIDATED INDUSTRIES INC
- COUPLING NUT SUPPLY
- DIAMOND PRECISION PRODUCTS CO
- FISHER BARTON SPECIALTY PRODUCTS, INC.
- HOPPE NORTH AMERICA
- K&S TOOL DIE & MANUFACTURING, INC.
- K&S TOOL DIE & MANUFACTURING, INC. 2
- SUSSEK MACHINE CORPORATION
- WESTERN INDUSTRIES, INC.

Kenosha
- ANDERSON MANUFACTURING CO., INC.
- BOTHE ASSOCIATES INC.
- BRANKO PERFORATING FWD, INC.
- FAMCO MACHINE
- FINISHING & PLATING SERVICE INC
- GEM MANUFACTURING

GEM MANUFACTURING 2
GERDAU PLEASANT PRAIRIE
HORIZON SYSTEMS MACHINING INC
IEA INC.
IRVING POLISHING AND MANUFACTURING CO., INC.
KIRSAN ENGINEERING INC
LAKESIDE STEEL & MFG. CO.
MIDWEST THERMAL VAC INC.
SNAP ON INDUSTRIAL

Milwaukee

A & E CLEAING AND GRINDING INC
AAA SALES & ENGINEERING, INC.
ACME GALVANIZING, INC.
ACOUSTECH
ADAC STRATTEC DE MEXICO LLC
ADVANCE SCREW PRODUCTS INC
ADVANCED PLATING TECHNOLOGIES
ARROW TOOL & STAMPING CO., INC.
ASTRO TOOL & DIE COMPANY, INC.
BADGER METAL FINISHING INC.
BALL
BUSCH PRECISION, INC.
C R INDUSTRIES, INC.
CHARTER WIRE
COLUMBIA GRINDING, INC.
CUSTOM MOLD ENGINEERING INC.
EAGLE METAL FINISHING LLC
ELITE FINISHING, LLC
ELWOOD CORP.
F P M, LLC
FALL RIVER MANUFACTURING
FRENTZEL PRODUCTS INCORPORATED
FUSION BABBITTING COMPANY, INC.
GAMFG PRECISION, LLC
GRAFF FAUCETS CO.
HENTZEN COATINGS INC.
HERDEMAN CORPORATION
HOWARD G HINZ COMPANY INC
HUDAPACK METAL TREATING, INC.
HYDRO PLATERS, INC.
IMPREGLON CELLRAMIC
IMPREX, INC.
IN PLACE MACHINING CO., INC.
INTEGRATED TOOL & MACHINE, LLC
ITW SHAKEPROOF GROUP
JORDAN MACHINERY CORPORATION
KEMPSMITH MACHINE CO.
KINETIC CO.
KITZINGER COOPERAGE CORP.
KMC STAMPING
LADISH FORGING, LLC
LAKESIDE MANUFACTURING INC.
LEBAL INDUSTRIES CO. INC.
LENARD TOOL & MACHINE, INC.
LIPPMANN
LUCAS MILHAUPT INC
MASTER LOCK
MASTER LOCK CO LLC
MATENAER CORPORATION 2
MAYBAR MANUFACTURING COMPANY, INC.
MECHANICAL INDUSTRIES LLC
METAL SURGERY MILWAUKEE LTD.
METALCUT PRODUCTS, INC.
MID AMERICA STEEL DRUM CO., INC.
MIDWESTERN ANODIZING CORP
MILWAUKEE FORGE
MILWAUKEE MACHINE WORKS
MILWAUKEE PLATING COMPANY
NATIONAL TECHNOLOGIES INC.
NORTHERN GEAR & MACHINING
OWENS INDUSTRIES, INC.
PLASTIC COATINGS
RELIABLE PLATING WORKS, INC
RES MANUFACTURING CO. INC.
REXNORD
SAFEWAY SLING USA INC.
SERVICE HEAT TREATING INC.
SNAP ON INC.
SUPREME CORES, INC.
T BIRD CLUB OF WISCONSIC
TREAT ALL METALS INC.
UNIT FORGINGS
UNIVERSAL BRIXIUS INC.
W T WALKER GROUP
WISCONSIN NIPPLE & FITTING

Ozaukee

ACI INDUSTRIES, INC.
D D SLING & SUPPLY, INC.
DICKMANN MANUFACTURING CO. INC.
FEDERAL TOOL & ENGINEERING, LLC
GENERAL METALWORKS CORP.
JOHNSON LEVEL & TOOL MFG. CO., INC.
JOR MAC INC.
KAPCO, INC.
MACHINING CONCEPTS
P. D. PETERKA & ASSOCIATES, INC.
PRISM MANUFACTURING GROUP
RAYBAR, INC
STANDARD MACHINE CO., INC.
SULLIVAN MANUFACTURING CORPORATION
WAUKESHA METAL PRODUCTS

Racine

ACCU BEND INC.
ACE STAMPING & MACHINE COMPANY, INC.
AMERICAN METAL TECHNOLOGIES LLC
AMERICAN ROLLER CO.
BEERE PRECISION PRODUCTS
DIVERSIFIED TOOLING INNOVATION
E. C. STYBERG ENGINEERING COMPANY
ECKMANN PRESSED METAL COMPANY, INC.
HYPRO, INC.
JENSEN METAL PRODUCTS, INC.

LAVELLE
MARINI MANUFACTURING, INC.
MASTER APPLIANCE CORP.
MICHAELS MACHINE COMPANY
MODINE
MOERKE DISPLAY & MANUFACTURING CO.
PIONEER PRODUCTS, INC.
R & B GRINDING CO., INC.
RACINE HEAT TREATING CO INC
RETAIL FIXTURE, LLC
RITE ENGINEERING COMPANY
SETROK LLC
SUMMIT PACKAGING SYSTEMS INC.
SUPERIOR INDUSTRIAL COATING, INC.
T & K SPECIALTY PRODUCTS INC
THERMAL TRANSFER PRODUCTS
WISCONSIN METAL PRODUCTS COMPANY
WISCONSIN PLATING WORKS OF RACINE, INC.
WISCONSIN PLATING WORKS OF RACINE, INC.

Walworth

BLISS MACHINE LTD.
BRUNK INDUSTRIES, INC.
ELECTRICAL MATERIALS CO.
HUDAPACK METAL TREATING INC.
HUSCO INTERNATIONAL, INC.
HYPRO, INC. 2
INTERNATIONAL PRODUCTION SPECIALISTS, INC.
ISELI CO.
ITW SHAKE PROOF AUTO DIVISION
JENINGA BROS. METAL FORMING, INC.
LAVELLE INDUSTRIES, INC
MICRO PRECISION INC
PRECISION PLUS, INC.
SPINDUSTRIES, LLC
STA RITE
SWISS TECH, LLC

Washington

A.C. TOOL & MACHINE CO., INC.
ACCORD MANUFACTURING INC.
ADVANCED COATINGS INC.
BOHR PRECISION MACHINING, INC.
DAVE'S JOB SHOP INC
ENGINEERED METAL PRODUCTS LLP
FASTRAC INTERNATIONAL CORP
GKN SINTER METALS GERMANTOWN, INC. 2
HELGESEN INDUSTRIES, INC.
KETTLE MORAINE COATINGS, INC.
MATENAER CORPORATION
QUALITY STAMPING & TUBE CORP.
STEEL CRAFT CORP.
U.S.A. BUTTONS, INC.
ZINC INC

Waukesha

A. S. PINDEL CORP.
ACCU STAMPING
ACE PRECISION
ACE PRECISION MACHINING CORP
ALLISTER FABRICATING INC
ALLOY PRODUCTS CORP.
AMERICAN FRICTION WELDING, INC.
ATLAS METAL PARTS COMPANY, INC.
BADGER WIRE INC
BECKER MACHINE CO. INC.
BEVCO ENGINEERING
BRADLEY CORPORATION
BURRIE SANDBLASTING
CARBIDE SPECIALISTS
COMPONENTS COMPANY INCORPORATED
CUSTOM PRODUCTION GRINDING, INC.
D & H INDUSTRIES, INC.
DEFINOX INC.
DENCO MANUFACTURING, INC.
DIAMETERS INC.
DYNAMIC STAMPING INC.
DYNEX/RIVETT INC.
EFCO
FLUID POWER ENERGY INC.
FORTRESS MANUFACTURING
FORTRESS MANUFACTURING INC.
FRANTZ MACHINE PRODUCTS, INC.
GKN SINTER METALS, LLC
GKN SINTER METALS GERMANTOWN, INC.
GORTITE
HANEL CORPORATION
HARKEN YACHT FITTINGS
HUSCO INTERNATIONAL, INC. 2
HYSTRO PRODUCTS, INC.
INSTRUMENT DEVELOPMENT CORPORATION
ITW SHAKEPROOF INDUSTRIAL DIV
LUITANK MFG
MANTEL MACHINE PRODUCTS, INC.
MATHISON METALFAB INC
MCKEY PERFORATING CO., INC.
METRO WELDING & FABRICATING INC
MIDDLE WEST MFG. CORP.
MILWAUKEE BEARING AND MACHINING, INC.
MILWAUKEE CHAPLET & MANUFACTURING CO. INC.
MINCO RICEHULL
N H MACHINING, INC
NEOSHO TROMPLER INC.
OCONOMOWOC MFG. CORP.
PARAMETERS INDUSTRIES, INC.
PERKINS ENGINEERING CO. INC
QUEST SPECIALTY CHEMICALS, INC.
QUEST TECHNOLOGIES, INC.
RAY INDUSTRIES, INC.
RESOURCE MACHINING & WELDING CORP
REYNOLDS MACHINE CO., INC.
ROBAND CORP.
ROLLED THREADS UNLIMITED, LLC

RUNDLE SPENCE MFG. CO.
SHARPE PRODUCTS
SILGAN
SILGAN 2
SJOBERG TOOL AND MFG CORP
SOUTHWEST METAL FINISHING, INC.
SPINCRAFT
SPIRIT MANUFACTURING INC.
SULLIVAN CORP.
T LON PRODUCTS INC.
T 'N S MACHINING FACILITIES, INC.
TAPE MACHINING CORP.
TECHNICAL METAL SPECIALTIES
THERM TECH OF WAUKESHA, INC.
TRACE A MATIC CORPORATION
TRACE A MATIC CORPORATION 2
ULTRA TOOL AND MANUFACTURING INC
UNITEX UNIVERSAL MOLD TEXTURE
URBAN MANUFACTURING, INC.
V & L TOOL INC.
VOLATILE FREE, INC.
W/S MACHINE & TOOL, INC.
WAUKESHA BEARINGS CORP.
WAUSAU EQUIPMENT COMPANY, INC.
WESCO MACHINE PRODUCTS, INC.
WINCO STAMPING, INC.
WISCONSIN COIL SPRING, LLC
WISCONSIN INDUSTRIAL MACHINE SERVICE INC
WISMARQ CORPORATION
WRICO STAMPING CO OF WISCONSIN

Food

Dodge
CRAVE BROTHERS FARM LLC
GRANDE CSTM INGREDIENTS GROUP
SENECA FOODS CORPORATION 1
SENSIENT TECHNOLOGIES CORP
VEGETABLE OPERATIONS
WILLOW FOODS

Fond du Lac
GRANDE CHEESE COMPANY
LAKESIDE FOODS, INC. 3
SENECA FOODS CORPORATION 2

Jefferson
CREATE A PACK FOODS INC
DAYBREAK FOODS, INC.
EMIL'S PIZZA INC
FOOD SERVICE PRODUCTS DIVISION
JONES DAIRY FARM
LD FOODS
MULLEN'S DAIRY
ON COR FROZEN FOODS REDI SERV
TYSON FOODS INC
VAN HOLTEN

Kenosha
BIRCHWOOD FOODS
FAIR OAKS FARMS L.L.C
LAKEVIEW FARMS, INC.
OCEAN SPRAY CRANBERRIES, INC.
PLEASENT PRAIRIE PACKING
TRUE TASTE LIFE
VISTA INTERNATIONAL PACKAGING LLC

Milwaukee
ALTERRA BAKING COMPANY
BAPTISTA'S BAKERY
CAMPBELL SOUP SUPPLY COMPANY LLC
CARGILL MEAT SOLUTIONS CORPORATION
CHOCOLATE HOUSE INC
JOSEPH CAMPIONE, INC.
KING JUICE COMPANY, INC.
KLEMENT SAUSAGE CO., INC.
KRAFT FOODS
LESAFFRE YEAST CORPORATION
OMANHENE COCOA BEAN CO.
PALERMO'S PIZZA
PATRICK CUDAHY LLC
RITT BEYER INC.
SENSIENT TECHNOLOGIES CORPORATION
STRAUSS BRAND INC.
SUPREME MEATS INC.
THE MASTERSON COMPANY INC
THE PORKIE CO OF WISCONSIN INC
USINGER'S FAMOUS SAUSAGE
WIXON INDUSTRIES, INC.

Ozaukee
CEDAR CREST ICE CREAM
CEREAL BYPRODUCTS COMPANY
FEARN NATURAL FOODS
JENEIL BIOTECH
LAKESIDE FOODS, INC. 1

Racine
BROSSMAN'S MEAT MARKET & CATERING
KERRY SEASONINGS
NESTLE CONFECTIONS & SNACKS

Sheboygan
KRIER FOODS, INC.
LAKESIDE FOODS, INC. 2

Walworth
ANDES CANDIES
BIRDS EYE FOODS INC.
CGI
KIKKOMAN FOODS, INC.
SAWYER'S AMUSEMENT
SORG'S QUALITY MEATS & SAUSAGE

Washington
GEHL FOODS, INC.
KERRY'S INGREDIENTS
KEWASKUM SNOW CHIEFS INC
MASTER
SCHREIBER FOODS, INC.

Waukesha
ADM COCOA DIV CHOCOLATE PLANT

AVOCA
DANISCO
DENALI INGREDIENTS, LLC
HOLSUM FOODS
LCFMGF
MANNY'S PRODUCTS
OLD DUTCH SNACKS
PABST FARMS COMMERCE UNIT 1 LLC

Lumber

Walworth

WESTERN BUILDING PRODUCTS

Machinery

Dodge

BUSSE BROS, INC.
EYE COMMUNICATION SYSTEMS, INC.
GARDNER BARN EQUIP.
GARDNER EQUIPMENT COMPANY, INC.
GLASFLOSS INDUSTRIES, INC.
GLENN HEPFNER, INC.
INDUSTRIAL SERVICES
JOHN DEERE
KONDEX CORPORATION
MAYVILLE DIE & TOOL, INC.
MILLER TOOL & DIE CO., INC.
MYERS MANUFACTURING INC.
ROLAIR SYSTEMS
SCAG POWER EQUIPMENT DIV
TNT RESCUE SYSTEMS, INC.
TRANSPORT CRANES LLC
X CEL TOOLING, INC.

Fond du Lac

J. F. AHERN CO.

Jefferson

EVALD MOULDING COMPANY, INC.
HEATTEK, INC.
KUSEL EQUIPMENT COMPANY
SCHILLER GROUNDS CARE, INC.
TALARIS INC.

Kenosha

AIR FLOW TECHNOLOGY, INC.
ALFA LAVAL INC.
BECKART ENVIRONMENTAL, INC.
ENCYCLON INC
MILWAUKEE SLIDE & SPINDLE
WETOSHA TOOL CO.

Milwaukee

AC EQUIPMENT SERVICES
ACCESS ELEVATOR
ACRO AUTOMATION SYSTEMS, INC.
AIR LOGIC POWER SYSTEMS, LLC
ALLIS TOOL SYSTEMS LLC
APPLE STEEL RULE DIE CO., INC.
BRIGGS & STRATTON 3
BRIGGS & STRATTON 4
BRIGGS & STRATTON 5
CATERPILLAR 2
CATERPILLAR GLOBAL MINING LLC
CLEAVER BROOKS INC.
DAN KRALL & CO. INC.
DANFOSS POWER ELECTRONICS
DINGS CO
DORAL CORPORATION(WISCONSIN)
DOUGLAS DYNAMICS INC.
FELINS INC.
FMS/MAGNACRAFT INC.
GALLAND HENNING NOPAK INC.
HYPNEUMAT, INC.
INTERNATIONAL THERMAL SYSTEMS
IVARSON, INC.
JOY GLOBAL, INC.
KABELSCHLEPP
KEY PRODUCTS, INC.
KRONES, INC.
KRUEGER BEARINGS, INC.
LOGEMANN BROTHERS COMPANY
MILSCO MANUFACTURING COMPANY
MILWAUKEE CYLINDER
MORRIS MATERIAL HANDLING, INC.
NORDCO INC.
NOVACOIL ZOPPAS INDUSTRIES
OUTLOOK SHOPPE
OVERHEAD MATERIAL HANDLING
PAPER MACHINERY CORP.
PERLICK CORP.
PFLOW INDUSTRIES INC.
RBS GLOBAL, INC.
REXNORD LLC 2
ROCKWELL AUTOMATION, INC. 3
ROCORE THERMAL SYSTEMS, LLC
RUEMELIN MANUFACTURING CO.
SCHAEFER TOOL AND MANUFACTURING CO. INC.
SPRAYING SYSTEMS CO.
STROH PRECISION DIE CASTING LLC
SUPERIOR DIE SET CORP
THE MILWAUKEE GEAR COMPANY INC
TOOLING TECHNOLOGIES INCORPORATED
TRIANGLE TOOL CORPORATION
VECTOR TECH LTD
VILTER MANUFACTURING LLC
W.S.A. ENGINEERED SYSTEMS, INC.
WISCONSIN LIFTING SPECIALISTS
YASKAWA ELECTRIC
ZENAR CORPORATION

Ozaukee

ADVANCED MANUFACTURING TECHNOLOGIES, INC.
BRIGGS & STRATTON 6
CARLSON TOOL & MANUFACTURING CORP
CONSTRUCTION FORMS INC.
DEHUMIDIFIER CORPORATION OF AMERICA, INC
GROB, INC.

JADAIR INTERNATIONAL INC.
MATRIX PACKAGING MACHINERY, INC.
MILWAUKEE NC MACHINING CO.
MODERN EQUIPMENT CO.
RAM TOOL, INC.
REXNORD INDUSTRIES, LLC
ROCKWELL AUTOMATION, INC. 2
SCOT PUMP
SHARON CUTWELL CO. INC
SKF PRECISION TECHNOLOGIES
SNIDER TOOLING SERVICES
TELSMITH, INC.
THE MANITOWOC COMPANY INC
TRIMEN INDUSTRIES, INC.
VOELLER INC.
WEIL PUMP
YAMATO CORPORATION

Racine

AMERICAN BIN & CONVEYOR INC.
CORNERSTONE DESIGN LTD
DREWCO CORPORATION
EDSTROM INDUSTRIES, INC.
FISCHER PRECISE USA, INC.
GROVE GEAR ELECTRA GEAR
JONCO TOOL CO LLC
LETSCH MANUFACTURING, INC.
MAMCO CORPORATION
POCLAIN USA
QUADRA INC.
REXCON, LLC
SPEE DEE PACKAGING MACHINERY, INC.
TITAN, INC.
W.M. SPRINKMAN CORPORATION
WYCO TOOL CO.

Walworth

INTERTRACTOR AMERICA CORPORATION
PENTAIR WATER GROUP, INC
PROVISUR TECHNOLOGIES
SCHENCK ACCURATE INC.
SCOT INDUSTRIES INC.
U.S. TANKER FIRE APPARATUS, LLC
WHITEWATER MANUFACTURING CO.

Washington

A.J. TOOL CO. INCORPORATED
BANNER WELDER INC.
BESTECH TOOL CORP.
BROAN NU TONE LLC
CDM TOOL & MFG. CO., INC.
DACO PRECISION, INC.
DESERT AIRE CORP.
DOCK SYSTEMS INC.
DRILLMASTER TOOL LLC
DYNACAST TOOLING DIVISION
ENER CON, INC.
FINANCIAL EQUIPMENT COMPANY INC.
FJR MANUFACTURING, INC.
FUREY FILTER & PUMP, INC.
GEHL COMPANY
GROMAX PRECISION DIE & MANUFACTURING
GRUBER TOOL & DIE, INC.
INFINITIVE INC
KRENZ & COMPANY, INC.
MAHUTA TOOL CORP.
MANTZ AUTOMATION, INC.
MILL TOOL AND MFG CORP
PCC PROFESSIONAL CONTROL
PLASTICRAFT MOLDS INC
STROHWIG INDUSTRIES, INC.
TOOLCRAFT CO., INC.
TRU FIT STEEL RULE DIES OF WISCONSIN, INC.
WILLER TOOL CORPORATION

Waukesha

ABB INC. 2
ACTUANT CORPORATION
ADRON EDM
ALADDIN ENGINEERING & MANUFACTURING INC.
BABUSH MATERIAL HANDLING
BALAX INC.
BRIGGS & STRATTON 2
BRUNO INDEPENDENT LIVING AIDS, INC.
BUSHMAN EQUIPMENT INC.
BUTLER GEAR CO. INC.
BUTLER TOOL, INC.
CAPITOL ENGINEERING
CROWN LIFT TRUCKS
DEMATIC CORP.
DIEBOLD, INCORPORATED
DORNER MANUFACTURING CORP.
DYNAMIC TOOL & DESIGN, INC.
ENERPAC CORPORATION
ENHANCED AUTOMATION
ENTRUST TOOL & DESIGN CO.
EUTECTIC CORPORATION
FILTRATION SYSTEMS, INC.
GUHRING
HADER INDUSTRIES, INC.
HAMMERHEAD TRENCHLESS EQP
HERKER INDUSTRIES
HILMOT CORP.
HYDRO THERMAL
INFRATROL MANUFACTURING CORP.
INVENTIX MANUFACTURING
J & L FIBER SERVICES, INC.
KAR TECH, INC.
KHS USA INC.
KUHLMAN INC.
MAGNETEK MATERIAL HANDLING
MAGNETEK UNCOMMON POWER
MECHTRIX CORPORATION
MIDWEST CUTTING TOOLS INC.

MILWAUKEE BROACH COMPANY, INC.
MILWAUKEE ELECTRIC TOOL CORPORATION
MILWAUKEE SPRAYER MFG. CO., INC.
MIRO TOOL & MFG., INC.
MIXER SYSTEMS, INC.
NORMAN EQUIPMENT COMPANY
OMEGA TOOL
PILLAR INDUCTION
PINEWOOD TOOL CORP
PLASTIC MOLDED CONCEPTS, INC.
PRECISION GEARS, INC.
PRODUCTION SERVICE CO. INC.
QUAD METALWORKS
R. J. ZEMAN TOOL & MFG. CO., INC.
RAM PAC INTERNATIONAL, INC.
REICH TOOL & DESIGN, INC
REPETE CORPORATION
REXNORD LLC
SIEMENS WATER TECHNOLOGIES CORP.
STANEK TOOL
STAR AUTOMATION, INC.
SUMITOMO ELECTRIC CARBIDE MANUFACTURING, INC.
SUPER PRODUCTS LLC
SUPERIOR CRANE CORP.
T & A INDUSTRIAL DISTRIBUTORS INC.
TOOLS, INCORPORATED
TRI PHASE AUTOMATION
TRICO
UEMSI
VERSEVO INC.
WACKER NEUSON PRODUCTION AMERICAS, LLC
WATERS INDUSTRIAL SUPPLY CO., INC.
WATERTRONICS, LLC
WAUKESHA MACHINE & TOOL CO., INC.
WEIMER BEARING & TRANSMISSION INC.
WISCONSIN METAL PARTS, INC.
YALE EQUIPMENT & SERVICE INC.
ZERAND CORP

Misc. Durables

Dodge

AFFILIATED PRODUCTS, INC.
HYDRO ELECTRONICS DEVICES INC.

Jefferson

AMERICAN CABLE & HARNESS LLC
GENERAC POWER SYSTEMS, INC.
GENERAC POWER SYSTEMS INC.
HAMLIN INC.

Kenosha

GENESIS CABLE

Milwaukee

CARLISLE INTERCONNECT TECHNOLOGIES
CONNTEK ISI
COOPER POWER SYSTEMS
DEL CITY WIRE CO., INC.
EXCEL CONNECTION USA
INDUSTRIAL CONTROLS DISTRIBUTORS LLC
JOHNSON CONTROLS
MARSHALL W NELSON & ASSOCIATES INC.
MELTRIC CORPORATION
ROCKWELL AUTOMATION, INC. 1
S & C ELECTRIC COMPANY
U LINE CORPORATION
VISA LIGHTING

Ozaukee

LS RESEARCH LLC
SPI LIGHTING INC

Racine

ELWOOD CORP GETTYS GROUP
GARDTEC INC
KRAMER LIGHTING
MULTI PRODUCTS COMPANY, INC.
NORCO INDUSTRIAL DOORS
RELIANCE CONTROLS CORPORATION
TWIN DISC, INCORPORATED
TWIN DISC, INCORPORATED

Walworth

PROFESSIONAL POWER PRODUCTS, INC.

Washington

REGAL WARE, INC.
REGAL WARE, INC.
REGAL WEAR INC
WEASLER ENGINEERING, INC.

Waukesha

ABB INC.
ACME ELECTRIC CORP.
AMERICAN CABLE AND ELECTRONICS, INC.
CIM PRODUCTS, INC.
COOPER POWER SYSTEMS 2
COOPER POWER SYSTEMS 3
COOPER POWER SYSTEMS 4
DUCT O WIRE CO.
ELECTRIC WIRE PROCESSING CORP
EMTEQ
GENERAC POWER SYSTEMS INC. 2
GENERAC POWER SYSTEMS, INC.
HOLT ELECTRIC SUPPLY CO.
IFM EFECTOR INC.
ITW ARK LES
LAMPLIGHT FARMS INCORPORATED
MCIVER ENGINEERING & CONTROLS
PRECISION CABLE ASSEMBLIES LLC
SCHUNK OF NORTH AMERICA, INC
SPX TRANSFORMER SOLUTIONS, INC.
TARTAN SUPPLY COMPANY, INC.
WORLD CLASS WIRE AND CABLE, INC.
ZERO ZONE, INC.

Misc. Non-Durables

Dodge

PIVOT POINT, INCORPORATED

Fond du Lac

D & G MANUFACTURING INC
E P DIRECT
SILESTONE OF WISCONSIN
TECRE CO., INC.
TRU FIRE CORPORATION

Jefferson

AFFIRMATIVE INDUSTRY
BADGER GROUP, THE
DIGI STAR HOLDINGS, INC.
INNOVATIVE PICKING TECH INC.
SYMBOL MATTRESS OF WISCONSIN
W D HOARD & SONS CO

Kenosha

AMERICAN GIRL INC.
BADGERLAND PRODUCTS, INC.
BEAUTI VUE PRODUCTS CORP.
DOHENY ENTERPRISES INC.
EXPANDED TECHNOLOGIES CORP.
FACE FUND RAISING
GOLF GIFTS & GALLERY
LMI PACKAGING SOLUTIONS INC.
OEMMCCO INC

Milwaukee

AAA DISCOUNT SIGNS
ACCENTS UNLIMITED INC.
ADAPTIVE MICRO SYSTEMS, LLC
ADVANCE BOILER & TANK CO., LLC
AMERICAN LITHO
ARENA AMERICAS
BCT, INC.
BRADY WORLDWIDE, INC.
BRIGGS & STRATTON
BURMEISTER WOODWORK CO.
CENTRIFUGAL CASTING LLC
CHARTER MANUFACTURING
CHIMERX
CHISHOLM GAPHICS
CHR HANSEN
CHRYSPAC
CITY SCREEN PRINT & EMBROIDRAY
COAKLEY TECH, LLC
COATED PRODUCTS DIVISION 2
DELTROL CONTROLS
DILLON BINDERY INC
ECONO PRINT
EGX GROUP
EVERBRITE, LLC
EVERBRITE, LLC 2
FIRST EDGE SOLUTIONS
GLOBAL FULFILLMENT SERVICES
GLOBAL POWER COMPONENTS
GRAPHICS DISTRIBUTION, INC.
HAMILTON MANUFACTURING COMPANY LLC
HEINN CO
HM GRAPHICS INC.
HOPPMANN PRINTING
INDUSTRIES FOR THE BLIND, INC.
INTERIOR SYSTEMS, INC.
KOPFMANN CO. INC.
KUBIN NICHOLSON CORPORATION
LA LUNE COLLECTION
LAKESIDE STONEWORKS LLC
LANGE BROS. WOODWORK CO., INC.
M & M QUALITY SOLUTIONS, INC. 2
MCADAMS GRAPHICS INC.
MCP CO., INC.
MIDWEST TOPS INC
MULTI PACK LLC
NEON LIGHT WORKS
OLYMPUS FLAG BANNER
PAK TECHNOLOGIES, INC.
PEN & INC OF MILWAUKEE
POBLOCKI SIGN COMPANY LLC
PRECISION COLOR GRAPHICS
PRINT N PRESS DIGITAL COLOR
RCS SYSTEMS INC.
REPACORP LABEL PRODUCTS
RITE HITE PRODUCTS CORPORATION
RR DONNELLEY 1
SEDIA, INC.
SEIDEL TANNING CORPORATION
SHUR LINE
T SHIRT INTERNATIONAL
TERMINAL HOBBY SHOP
TEUTENBERG INCORPORATED
THE FOX CO INC
THE OILGEAR COMPANY
THE SIGN FACTORY INC
THIELE TANNING CO
TRACKSIDE SERVICES, INC.
TROYK SCREEN PRINTING CORPORATION
UNITED VISUAL PRODUCTS COMPANY, INC.
VISUAL IMPRESSIONS, INC.
WETZEL BROTHERS
WETZEL BROTHERS, INC.
WITTCO FOODSERVICE EQP INC

Ozaukee

ALLEN EDMONDS CORPORATION
CCS INC
ECKER ENVELOPE, INC.
HOLIDAY TRIMS, INC.
INDUSTRIAL GRAPHICS CORPORATION
PHILIPP LITHOGRAPHING CO.
WOODLORE

Racine

ANDIS COMPANY
BEI ELECTRONICS
BURLINGTON GRAPHIC SYSTEMS INC
CAREER INDUSTRIES, INC.
DESIGN HOUSE STOCKHOLM, INC
DURACOLOR, LLC
E & R MFG

JOHNSON OUTDOORS
LAKESIDE CURATIVE SERVICES
MID CENTRAL CORP.
QUAD/GRAPHICS COMMERCIAL
RUUD LIGHTING, INC.
TAILORED LIVING
THE GARVEY GROUP
TMS INC
TRIPLE CROWN PRODUCTS
TRU LINE LITHOGRAPHING, INC.
WISCONSIN SCREEN PROCESS INC

Sheboygan

BADGER TAG AND LABEL CORPORATION
TIMES PRINTING CO. INC.
TWC OF AMERICA, INC

Walworth

ADVANCE PRINTING INC
CENTRAL PRINTING CORPORATION
EVERBRITE INDOOR SIGN
GETZEN MUSICAL INSTRUMENTS INC.
INTEGRA SEATING
MONARCH MCLAREN LTD
NICERINK
PALMER HAMILTON LLC
PFI FASHIONS, INC.
ROYAL BASKET TRUCKS
SADDLEWORTH SILVERSMITHS
VYMAC CORPORATION

Washington

COST OF WISCONSIN, INC.
CUSTOM PAK PRODUCTS, INC.
DIXON/MRD & COMPANY
FRABILL, INC.
KEY LOGO INC
LITHO CRAFT CO., INC.
PERMAR LTD
QUAD/GRAPHICS, INC. 2
RR DONNELLEY 2
SERVER PRODUCTS, INC.
SPIROS INDUSTRIES, INC.

Waukesha

4FRONT ENGINEERED SOLUTIONS
ADVANTECH
AEROSHADE INC.
ALADDIN LABEL INC.
BADGER LIGHTING & SIGNS, INC.
BAIRD DISPLAY
BURTON & MAYER, INC.
CCI/COAKLEY TECH
CITY PRESS, INC.
CMK ENTERPRISES, INC.
COLOR INK
CROSSMARK GRAPHICS, INC.
DELZER LITHOGRAPH CO.
EMPIRE LEVEL MANUFACTURING CO.
EXACTA GRAPHICS INC.
FIBERESIN INDUSTRIES, INC.
FLEXO GRAPHICS, LLC
G GASKET & SUPPLY, INC.
G&M ASSEMBLY LLC
HERITAGE QUALITY PRINTING
ID TECHNOLOGY LLC
INLAND GRAPHICS
J.B. KENEHAN, LLC
K. G. STEVENS INC.
LETTERHEAD PRESS, INC.
LITHOPRINT COMPANY, INC.
M & M QUALITY SOLUTIONS, INC.
METSO MINERALS INDUSTRIES INC
METSO MINERALS MUELLER ENGRG
MILCUT INC.
NCL GRAPHIC SPECIALTIES, INC.
NEVS INK, INC.
PRECISION WOODWORK INC
PRIME LABEL & SCREEN INC
QUAD SYSTEMS LLC
QUAD/GRAPHICS, INC.
QUAD/GRAPHICS INC.
QUADTECH INTERNATIONAL
R E NEUMANN CO INC
RALLYE PRODUCTIONS
RIES GRAPHICS LTD.
RIPON PRINTERS
SCHAEFER BRUSH MFG. CO., INC.
STAY LITE LIGHTING
THE MAREK GROUP
THE PRINTERY
WARD ADHESIVES
WISCONSIN WEB OFFSET, LLC
WOOD SPECIALTIES INC
WRISTBAND RESOURCES, INC.

Paper

Dodge

IRA L HENRY COMPANY, INC
POLYFIRST PACKAGING, INC.

Jefferson

NORTHSTAR PRINT GROUP, INC
WISCONSIN PACKAGING CORP.

Kenosha

ENVELOPE DIVISION

Milwaukee

AD TAPE AND LABEL
BENTLEY WORLD PACKAGING LTD.
BENTLEY WORLD PACKAGING, LTD. 2
CONVERTED PRODUCTS, INC.
INTEGRATED FILING SOLUTIONS
LUETZOW INDUSTRIES, L.L.P.
MILWAUKEE JOBS
PACKAGING SOLUTIONS, INC.
PAK RITE LTD
PCA/FRANKLIN 330
PCA/MILWAUKEE 367

PROTEUS PACKAGING CORPORATION
ROCKTENN
ROCKTENN 2
ROCKTENN CP, LLC 1
ROCKTENN CP, LLC
SERVICE CONTAINER COMPANY
SEVILLE FLEXPACK CORPORATION
WISCONSIN PAPERBOARD CORPORATION

Racine
CORDSTRAP USA INC.
GRAHAM PACKAGING COMPANY INC.
GREAT NORTHERN CORPORATION
MIDLAND PACKAGING & DISPLAY
PCA/BURLINGTON 313
SPECIALTY TAPES DIV

Walworth
ROYAL GROUP

Washington
BADGER PACKAGING CORPORATION
GLP TRANSPORT COMPANY LLC
HARTFORD PLANT
ROCKTENN CP, LLC 2
ROCKTENN CP LLC 4
SUPPLYONE WISCONSIN, LLC

Waukesha
ABC BOX COMPANY, INC.
AMERICAN PRINTPAK, INC.
BERENZ PACKAGING CORPORATION
CALLENOR CO.
CL&D GRAPHICS, INC.
CRATERS & FREIGHTERS MILWAUKEE
HENSCHEL COATING & LAMINATING
INNOWARE PAPER HOLDING COMPANY, INC.
K G MARKETING & BAG CO., INC.
KDV LABEL CO., INC.
MAIL ADVERTISING SUPPLY CO
SCHREIBER SPECIALTIES
SHARP PACKAGING SYSTEMS, LLC
SUMMIT
WESTERN STATES ENVELOPE LABEL

Primary Metals

Dodge
KIRSH FOUNDRY INC.
SIGNICAST LLC
SPUNCAST INC.

Jefferson
LOEB METAL RECYCLING COMPANY
WISCONSIN INVEST CAST

Kenosha
ALBANY CHICAGO
KENOSHA STEEL CASTINGS, INC.

Milwaukee
ADVANCE DIE CASTING COMPANY, LLC
BADGER ALLOYS, INC.
CASTING SERVICES
COMPO STEEL PRODUCTS, INC.
DIVERSIFIED MACHINE, MILWAUKEE LLC
GREDE
GREDE VASSAR INC
MAYNARD STEEL CASTING COMPANY INC
MID CITY FOUNDRY CO.
MILWAUKEE PRECISION CASTING, INC.
MOTORCASTING, INC
POLCO METAL FINISHING
SIGNICAST LLC 2

Ozaukee
IPS BELGIUM FOUNDRY
JOHNSON CENTRIFUGAL TECHNOLOGY
ROSTAD ALUMINUM
UNITED FOUNDRY DIVISION

Racine
PREMIER ALUMINUM, LLC
WOODLAND ALLOYS

Walworth
BERGAMOT BRASS WORKS INC.
NORTHERN PRECISION CASTING CO. INC.
SHARON FOUNDRY, INC.
WISCONSIN PRECISION CASTING CORPORATION

Washington
ALLCAST, INC.
CRAFT CAST COMPANY, INC.
RHEOCAST COMPANY
SLINGER MANUFACTURING COMPANY, INC.

Waukesha
A.F.W. FOUNDRY, INC.
ACCURATE SPECIALTIES INC.
AMERICAN IRON & ALLOYS, LLC
CASTALLOY INC
GREDE II LLC
HAWTHORNE INDUSTRIES
NAVISTAR
NORTHERN STAINLESS CORPORATION
NORTHWEST ALUMINUM & BRASS FOUNDRIES, INC.
QUALITY CASTINGS
WAUKESHA FOUNDRY, INC.

Rubber & Plastics

Dodge
CENTRO INC.
LAKE COUNTRY CORPORATION

Fond du Lac
ACH FOAM TECHNOLOGIES, LLC

Jefferson
CITO PRODUCTS, INC.
MASTER MOLD LLC
REISS INDUSTRIES LLC
SELJAN TOOL COMPANY, INC.
WIISCONSIN PLASTIC DRAIN TILE CORP.

Kenosha
ALLIED PLASTICS INC
AMCOR RIGID PLASTICS USA, INC.

PARKER PLASTICS, INC.
REHRIG PENN LOGISTICS, INC.
XTEN INDUSTRIES LLC

Milwaukee

ABSOLUTE CUSTOM EXTRUSIONS INC.
AMALGA COMPOSITES, INC.
AMCOR FLEXIBLES, INC.
APPLIED PLASTICS COMPANY, INC.
BARDES PLASTICS, INC.
BAY VIEW INDUSTRIES INC.
BILSONS INDUSTRIES, INC.
EMP OF FRANKLIN, INC
FREDMAN BAG COMPANY
GENERAL PLASTICS, INC.
GOSSEN CORP.
IMPERIAL TOOL AND PLASTICS CORPORATION
KLEEN TEST PRODUCTS CORP
KRACOR, INC.
PCI PLASTICS
PERELES BROS., INC.
PLASTICS UNLIMITED, INC.
TULIP CORP.
ULTRA INCORPORATED
WISCONSIN THERMOSET MOLDING, INC.

Ozaukee

GATEWAY PLASTICS, INC.
PRODUCTION PLASTICS
REXNORD CORP

Racine

AIR LOGIC DIVISION
E S PLASTIC PRODUCTS LLC
PLASTIC PARTS INC.

Walworth

BROGAN MANUFACTURING, INC
CONTINENTAL PLASTIC CORP.
CUSTOM SERVICE PLASTICS, INC.
ITW FILTRATION PRODUCTS
J.B. JENSEN & SON, MFG., INC.
MEDPLAST ELKHORN, INC.
MINATURE PRECISION COMPONENTS
MVS POLYMER TECHNOLOGIES
ONVOY
PLASTI COIL INC.
POLY FLEX, INC.
VISION PLASTICS, INC.

Washington

L. T. HAMPEL CORP.
MGS MFG. GROUP, INC.
MORAINE PLASTICS CO.
PLASTIC COMPONENTS, INC.
SUNLITE PLASTICS INC.
TECSTAR MANUFACTURING CO.

Waukesha

APTAR MUKWONAGO
BADGER COLOR CONCENTRATES INC
DICKTEN MASCH PLASTICS, LLC
DIELECTRIC CORPORATION
GLENROY INC.
GRAYLINE, INC.
J K DISPLAY INC
MARIAN INC.
MIDLAND INDUSTRIAL PLASTICS
NEW BERLIN PLASTICS, INC.
ORBIS CORP.
P M PLASTICS.
PILLAR TECHNOLOGIES
PLASTOCON, INC.
PREMOLD CORP.
RETLAW INDUSTRIES INC.
SCHOENECK CONTAINERS, INC.
SUSSEX INJECTION MOLDING
TEKRA CORPORATION
TOTAL QUALITY PLASTICS, INC.

Transportation Equipment

Milwaukee

HARLEY DAVIDSON
HARLEY DAVIDSON 2
LAKELAND SPORTS CENTER, INC.

Racine

LDV INC.

Walworth

TREK BICYCLE CORPORATION

Washington

TRITON CORPORATION

Table B5: Port of Prairie du Chien Companies by Commodity by County

Fabricated Metals

Grant
- HYPRO, INC.
- ITW SHAKEPROOF AUTO DIV

Food

Grant
- FOREMOST FARMS USA
- SCHURMAN'S WISCONSIN CHEESE COUNTRY INC

Richland
- FOREMOST FARMS USA

Machinery

Crawford
- WOLF MACHINE, INC.

Grant
- SCOT INDUSTRIES INC.

Richland
- LOWE MANUFACTURING CO INC
- ROCKWELL AUTOMATION, INC.

Transportation Equipment

Richland
- S&S CYCLE

Table B6: Port of Superior Companies by Commodity by County

Clay, Concrete, & Glass

Barron
- TODD'S REDI MIX CONCRETE LLC

Polk
- CARDINAL GLASS INDUSTRIES INC
- CEMSTONE READY MIX
- CEMSTONE READY MIX, INC
- CEMSTONE READY MIX, INC 2

Fabricated Metals

Barron
- HOMESHIELD
- KOSER IRON WORKS INC.
- LAKELAND CO
- WISCONSIN STRUCTURAL STEEL COMPANY

Bayfield
- S & S SPECIALTY SYSTEMS, LLC

Burnett
- MCNALLY INDUSTRIES INC.

Polk
- COLONIAL CRAFT INC
- POLARIS INDUSTRIES
- SCIENTIFIC MOLDING CORPORATION LTD.
- SPECIALTY COATING SYSTEMS, INC.

Sawyer
- CONCOR TOOL & MACHINE INC.

Washburn
- QUALITY TOOL SERVICE INC.
- XACT TOOL, INC.

Food

Barron
- COMSTOCK CREAMERY, LLC
- MCCAIN SNACK FOODS
- PRIMERA FOODS CORPORATION
- SAPUTO CHEESE USA INC.
- VEGETABLE OPERATIONS 2

Polk
- AFP ADVANCED FOOD PRODUCTS LLC
- F & A DAIRY PRODUCTS, INC.
- FOREMOST FARMS USA 2

Lumber

Ashland
- BIRD'S EYE VENEER
- COLUMBIA FOREST PRODUCTS, INC.
- NORTH COUNTRY LUMBER COMPANY, INC.

Barron
- BIRCHWOOD MANUFACTURING COMPANY INC
- HOLIDAY KITCHEN DIV

Burnett
- K WOOD TRUSS RAFTERS
- NORTH STATES INDUSTRIES, INC.
- NORTHERN MANUFACTURING COMPANY, INC.

Douglas
- SUPERIOR WOOD SYSTEMS, INC.

Rusk
- BESSE LUMBER CO
- WEATHER SHIELD MFG. INC.

Sawyer
- LOUISIANA PACIFIC CORP
- TRUSSWORKS INC.
- WALTERS BROTHERS LUMBER MANUFACTURING INCORPORATED

Washburn
- BIRCHWOOD BEST
- SHELL LAKE FURNITURE

TRI STATE LUMBER & LAND INC.

Machinery

Ashland

C.G. BRETTING MANUFACTURING CO., INC.

Barron

RICE LAKE

Burnett

D.R. TECH, INC.

Douglas

DUTCHESS BAKERS MACHINERY CO INC

SUPERIOR STEEL INC

Polk

UNIPUNCH PRODUCTS

Washburn

DOBOY PACKAGING MACHINERY

Misc. Non-Durables

Douglas

ARROWHEAD PRINTING INC.

Polk

BISHOP FIXTURE & MILLWORK INC

WOOD GOODS INDUSTRIES

Rusk

ARTISANS SCREEN PRINTING & EMB

CONWED DESIGNSCAPE

Sawyer

HIDDEN BAY GRAPHICS

Nonmetallic Minerals

Ashland

MILESTONE MATERIALS

SUPERIOR KILNS

Barron

CHIEFTAIN SAND

GREAT NORTHERN SAND

SUPERIOR SILICA SANDS LLC

SUPERIOR SILICA SANDS LLC 2

Burnett

HOPKINS SAND & GRAVEL, INC

Douglas

GRAYMONT WI INC.

JOHNSON MATERIALS CO.

Paper

Barron

AMERICAN EXCELSIOR COMPANY 2

SHADOW PLASTICS, INC.

Rusk

CLEARWATER PAPER CORP.

Sawyer

DOMTAR INDUSTRIES INC

Primary Metals

Barron

HENRY WISCONSIN, LLC

Rubber & Plastics

Barron

F G PRODUCTS INC.

ROMA TOOL & PLASTICS, INC.

Douglas

CHARTER NEX FILMS

FENTECH INC.

Polk

INDUSTRIAL TOOL & PLASTICS, INC.

MPP CORPORATION

TDI MOLDING

THE BEAUDRY COMPANY

Rusk

ADF, INC.

Transportation Equipment

Barron

BIG BIKE PARTS

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CFIRE

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