

Minnesota  
A Collaborative Vision  
for Transportation



# Statewide Ports & Waterways Plan




SEPTEMBER 2014







Minnesota **GO**  
A Collaborative Vision  
for Transportation



# Statewide Ports & Waterways Plan

September 2014

Dear Citizens of Minnesota,

I am pleased to share with you the Minnesota Statewide Ports and Waterways Plan for 2013-2033. This plan was developed by the Minnesota Department of Transportation's Office of Freight and Commercial Vehicle Operations, with extensive input from Minnesotans like you. I want to thank everyone who took the time to provide input on the development of this plan. The success of Minnesota's marine freight transportation system depends on the coordinated efforts of many public and private partners and users of the system. I am confident that this plan will guide us to continue to meet the needs of the marine freight transportation system, and strengthen the benefits of the system to enhance economic competitiveness in Minnesota.

The Statewide Ports and Waterways Plan follows the Guiding Principles and Objectives outlined in the Minnesota GO Vision and Statewide Multimodal Transportation Plan. It identifies challenges and opportunities for freight infrastructure, system operations, economic competitiveness, planning integration, and communication and coordination. This Plan presents several specific marine freight strategies to help meet the stated objectives and provides a framework for our joint efforts to maintain and enhance our marine freight resources.

Namely, it promotes:

- The continuation and enhancement of the system's role of providing the global, national, statewide, regional, and local transportation connections essential for Minnesotans' prosperity and quality of life;
- Maintaining and improving ports and waterway connections in order to maximize return-on-investment for freight shipping, especially in an era of constrained resources;
- New connections to national and international markets made possible by technological and infrastructural improvements.

This first-ever Statewide Ports and Waterways Plan is the outcome of participation from system users and coordination with our transportation partners. MnDOT will continue to welcome the involvement of citizens, stakeholders and partners, both as this plan is implemented and in future investment and policy decisions. Through continued collaboration, we can together build and maintain a marine freight transportation system that enhances quality of life, environmental health, and economic competitiveness for all Minnesotans.

Sincerely,



Commissioner of Transportation

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# Executive Summary

The Minnesota Statewide Ports and Waterways Plan is an effort to help achieve the goals set forth in the Minnesota Department of Transportation (MnDOT)'s Minnesota GO 50-Year Vision and the objectives of the Statewide Multimodal Transportation Plan. In an era of constrained resources, Minnesotans benefit from the unique capabilities and competitive advantages offered by the state's ports and waterways—particularly increased shipping options, cost savings, less congested highways, reduced environmental impact, and access to distant markets.

This Plan is the result of input from system users and coordination with partner organizations. Numerous interviews were conducted with marine system terminal operators and port authority staff. In addition, three open house meetings were held in June 2013 to provide input on the draft plan. A steering committee met regularly to guide the collection of data and the identification of system issues. The steering committee consisted of members from the Duluth Seaway Port Authority, Duluth-Superior Metropolitan Interstate Council, City of Minneapolis, Saint Paul Port Authority, Metropolitan Council, Red Wing Port Authority, and Port Authority of Winona, as well as staff from MnDOT's District 1 (Duluth), District 6 (Rochester), Metro District, Policy Planning, and Freight offices.

Principally, the Statewide Ports and Waterways Plan promotes:

- Continued enhancement of the ports and waterways system's role in providing the global, national, statewide, regional, and local transportation connections essential for Minnesotans' prosperity and quality of life, and taking advantage of technological, logistical, and infrastructural advancements;
- Improved and maintained ports and waterway connections, in order to maximize return-on-investment for freight shipping, especially in an era of constrained resources;
- Better integrated planning within MnDOT and greater coordination with transportation partners.

## Key Opportunities, Challenges, and Strategies

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### PORT INFRASTRUCTURE CONDITION AND CAPACITY

**Aging port infrastructure.** The future success of the ports and waterways system is contingent on having a solid and reliable infrastructure base – docks, slips, locks and dams, shipping channels, etc. – that can respond to changing market conditions. Accelerating funding to a level that consistently matches system conditions and needs will improve the safety and efficiency of the ports and waterways system in Minnesota. Port authorities and private terminal operators will continue to improve infrastructure condition and capacity in public port areas and private terminals. MnDOT will assist with the Minnesota Port Development Assistance Program (PDAP) to support replacements of and upgrades to existing infrastructure as needed, thereby improving efficiency and providing a foundation for new waterway-based business opportunities. In addition to funding assistance, MnDOT can assist public ports and private terminals in the collection, organization, and dissemination of data related to ports and waterways infrastructure and conditions.

**Shipping channel maintenance.** The need for periodic dredging – the removal of built-up underwater sediment – remains a key concern, along with maintaining water levels at an adequate navigable depth. A related concern is the safe and cost-effective management (i.e., disposal and storage) of dredge materials. US Army Corps of Engineers (USACE) will continue to maintain and improve the marine navigation channels on the river and lake systems. MnDOT can support the USACE in their channel maintenance dredging program by identifying beneficial uses for dredged material in state road building projects.

**Lock and dam maintenance.** There is currently a backlog of projects maintained by the USACE to improve the lock and dam system. Specified maintenance projects will need to be undertaken to preserve system integrity and to avoid unplanned (emergency) maintenance. USACE will maintain the federal marine navigation system to an acceptable level of service. MnDOT and transportation partners will pursue funding for lock and dam maintenance on the federal marine navigation system.

## MARINE SYSTEM OPERATIONS

**Minnesota Ports Association review and expansion.** The Minnesota Ports Association is comprised of the five public ports in the state. MnDOT can consider developing a new, statewide marine freight forum that includes broad stakeholder representation from the public and private sectors. This group could provide information sharing within an expanded body of users, support local port authorities and operators in the public arena, and coordinate advocacy and education efforts.

**Technological improvements.** Technology-driven advancements – such as electronic data interchange between freight carriers, shippers, and receivers – have significantly improved how ports operate and have allowed for greater focus on the important issues of safety and security. Taking full advantage of this available technology is essential to the overall worldwide competitiveness and longevity of the ports and waterways system. Marine system fleet and harbor operators can continue to improve operations by taking advantage of technological advancements.

**Environmental concerns.** Efforts to inhibit the spread of invasive species throughout the marine system may affect navigation and freight movement on the rivers and lakes. In addition to interagency collaborations to control the expansion of Asian carp, zebra mussels, and other known invasive species, the US Coast Guard and the Environmental Protection Agency can continue ballast water exchange and flushing to reduce the risk of further invasive species introduction. The EPA can encourage the federal government to set new national ballast water standards. Universities and other institutions can continue to improve decontamination methods for ballast water through research. Finally, MnDOT can advocate for a balanced use of the state's marine system, taking into consideration environmental and economic ramifications.

## ECONOMIC COMPETITIVENESS

**New markets.** Because shipping tonnage is trending downward or fluctuating year-to-year for traditional commodities like coal, taconite, and grain, the marine system in Minnesota needs to adapt to new market opportunities. Ports and waterways may thus have a future role in the movement of crude oil, natural gas, and petroleum products to refineries and facilities located on the Great Lakes, Mississippi River, East Coast, or Gulf Coast. MnDOT can continue to work with ports and terminal operators to identify opportunities for expanding freight movement and can coordinate investments to support the development of port infrastructure.

**Logistical improvements.** A potential high-benefit opportunity for improving the efficiency of marine transportation is to increase two way traffic on the system, also known as reverse hauling. Extending the length of the shipping season by adjusting seasonal opening and closing dates would also increase the effectiveness of ports and waterways transportation. MnDOT can work with transportation partners to identify opportunities to improve logistics, including origin-destination pairs that allow for reverse hauling and potential lengthening of the shipping season.

**Containerization.** Currently, shipping container services available in Minnesota are limited in both geography and capacity. Port operators on both the Mississippi River system and the Lake Superior system see opportunities for the development of container shipping along the state's waterways. Transportation partners can investigate opportunities to establish and expand use of containers on the marine system.

## PLANNING INTEGRATION

**Land use compatibility.** Land in and near port areas that is considered ideal for freight shipping purposes is increasingly in competition with residential, commercial, and recreational land uses. Decisions regarding the potential closure of freight facilities on Minnesota waterways should consider a broad range of community and regional impacts, including transportation and job impacts, as well as alternative preservation, mitigation, and relocation strategies. MnDOT can encourage and assist with the incorporation of marine freight transportation planning into local land use and transportation plans.

**Intermodal connectors.** Existing intermodal links between the marine system and the road and rail freight systems are, in some cases, in poor condition and in need of repair. In other cases, additional links are needed. MnDOT and transportation partners will ensure that intermodal connectors are adequate for rail track and road pavement condition, travel lane width, turning radii, and vertical and horizontal bridge clearance.

**Marine system planning within MnDOT.** Statewide planning efforts concerning the marine system are critical to ensuring that the needs of system users are recognized and considered at all stages of the planning process. Improvements are needed in MnDOT's multimodal planning activities to more comprehensively include the marine system in plan development, programming, and project selection. MnDOT will formally integrate ports and waterways planning into future iterations of the Minnesota Statewide Freight Plan; will increase the visibility of marine freight planning within future iterations of the Statewide Multimodal Transportation Plan; will coordinate and support applications to TIGER, TED, and other programs to enhance funding for marine freight projects; and will report on marine system performance measures.



## COMMUNICATION AND COORDINATION

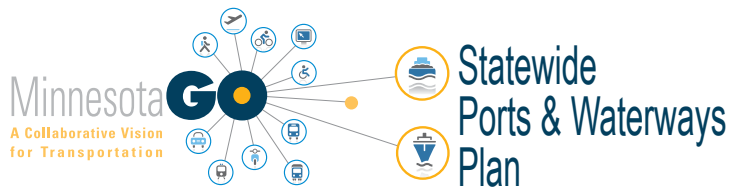
**Outreach and education.** Broadly communicating the maritime sector's positive contributions to Minnesota's economic competitiveness, natural environment, and quality of life will advance understanding and appreciation of the marine system. MnDOT and transportation partners will support the approval and implementation of state and federal legislation for funding of the marine system by educating legislators as to the importance of a robust freight transportation system.

**The Great Lakes-St. Lawrence River Maritime Initiative.** The Great Lakes-St. Lawrence River Maritime Initiative is a representative group of elected officials in the US and Canada that have agreed to cooperate to advance marine freight shipping on the system. The Great Lakes-St. Lawrence River Maritime Task Force was created to carry out the mission of the Initiative. MnDOT will continue to participate on the Task Force to advance the objectives of the Initiative.

**America's Marine Highway Program.** America's Marine Highway Program was initiated by the US Department of Transportation, in coordination with local sponsors, to expand the role and use of waterborne transportation. The program is anticipated to provide a seamless transition across freight modes by leveraging marine services and locations to complement landside surface transportation routes. MnDOT can continue to support the definition and recognition of the M-90 corridor between Duluth-Superior and Albany, New York via the Great Lakes and Erie Canal and can advance the designation of the M-35 corridor between Minneapolis-St. Paul and St. Louis, Missouri along the Mississippi River.

Ports and waterways in Minnesota play a critical role in the economic health of both the state and local communities, promoting efficiency and connections to global markets. Statewide planning and programming efforts concerning the marine system are critical to ensuring that the statewide ports and waterways system in and serving Minnesota remains a valuable asset into the future.

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# Chapter 1

## MOVING FORWARD: MINNESOTA'S MULTIMODAL DIRECTION

## MOVING FORWARD: MINNESOTA'S MULTIMODAL DIRECTION

Minnesota is effectively positioned with access to two commercially navigable waterway systems that provide access for shippers to markets throughout North America and around the world. The Mississippi River System provides direct access to river ports to the south and, via New Orleans, to the Gulf of Mexico. The Great Lakes-St. Lawrence Seaway provides access to ports along the Great Lakes and, beyond, to the Atlantic Ocean. Being situated at the head of navigation of both these systems affords Minnesota important economic advantages and opportunities.

The ports and waterway systems in Minnesota are significant transportation assets. The navigable lakes, rivers, commercial ports, and terminals support regional and international trade by providing a safe, efficient, and cost-effective transportation option for shippers. Along with ground transportation and air options, the existing ports and waterways system provides a robust and truly multimodal freight network, and gives shippers another competitive option for moving their products.

The Minnesota Department of Transportation created this Statewide Ports and Waterways Plan, the first of its kind, in an effort to help achieve the goals set forth in the Minnesota GO 50-Year Statewide Vision and the objectives of the Statewide Multimodal Transportation Plan. As the marine component of the freight system in Minnesota, the state's ports and waterways are an important and necessary mode of transportation, requiring careful and deliberate planning and maintenance so they remain a useful asset to the state. As a member of MnDOT's "Family of Plans," the Statewide Ports and Waterways Plan is both influenced by and helps to realize the agency's broader goals and objectives.

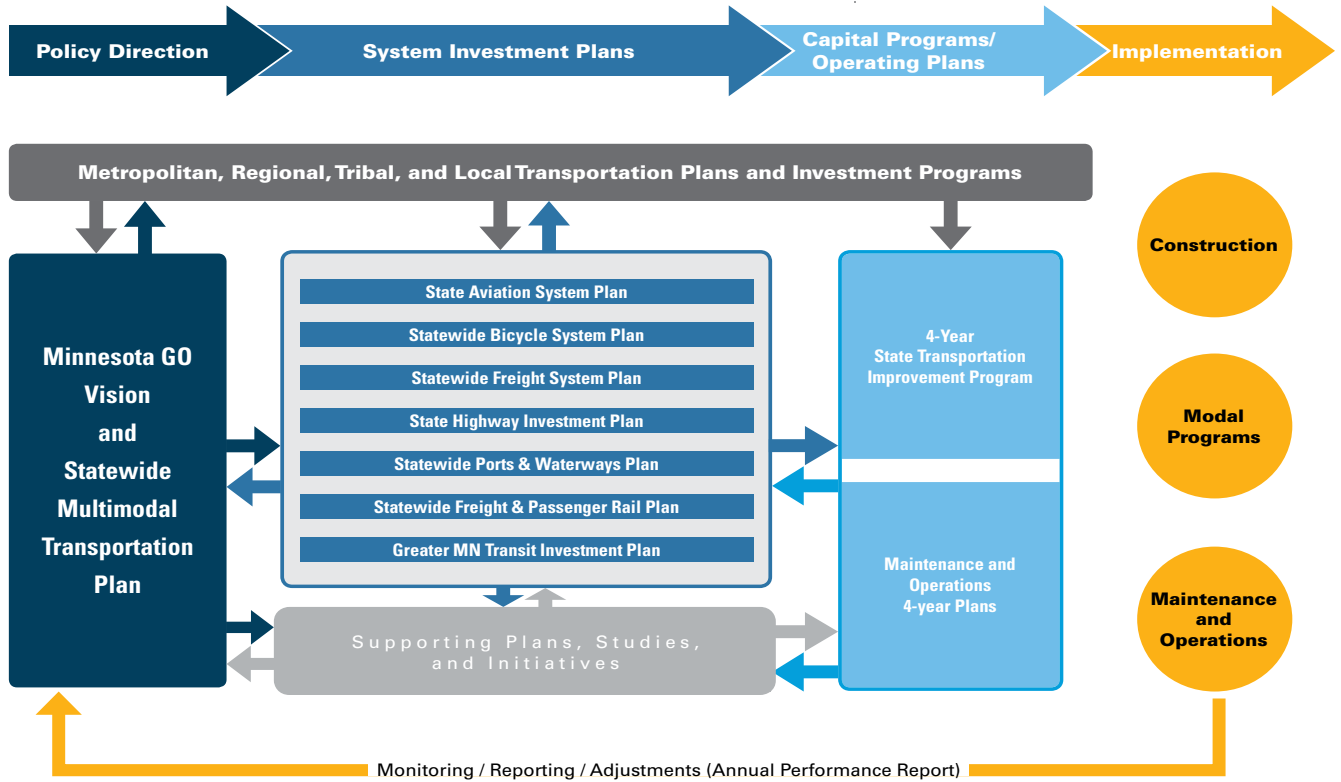
While waterways in Minnesota are also used for passenger and recreational purposes and are a valuable part of the natural ecosystem, this plan focuses on commercial navigation, including port facilities and the navigable waterways (the "marine system") that connect them. Future iterations of the Statewide Ports and Waterways Plan may include sections pertaining to recreational use of the system and its role in providing habitat and aesthetic benefit.

### MINNESOTA GO 50-YEAR VISION

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The Minnesota GO 50-Year Vision for transportation was adopted in November 2011. This long-range transportation vision is complemented by the 20-year Statewide Multimodal Transportation Plan, adopted in September 2012, to achieve the desired outcomes of the 50-Year Vision (see [Figure 1.1](#)). Together, these two documents provide direction for each of the state's modal system plans, including the Statewide Ports and Waterways Plan.

Figure 1.1: MnDOT Plans and Programs



The Minnesota GO Vision is summarized as follows:

Minnesota’s multimodal transportation system maximizes the health of people, the environment and our economy. The system:

- Connects Minnesota’s primary assets—the people, natural resources and businesses within the state—to each other and to markets and resources outside the state and country;
- Provides safe, convenient, efficient and effective movement of people and goods;
- Is flexible and nimble enough to adapt to changes in society, technology, the environment and the economy;
- Recognizes and respects the importance, significance and context of place—not just as destinations, but also where people live, work, learn, play and access services;
- Is accessible regardless of socioeconomic status or individual ability;
- Is designed in such a way that it enhances the community around it and is compatible with natural systems;
- Minimizes resource use and pollution;

- Enhances and supports Minnesota’s role in a globally competitive economy as well as the international significance and connections of Minnesota’s trade centers;
- Attracts human and financial capital to the state.

The following Minnesota GO Vision principles will guide future policy and investment decisions for all forms of transportation throughout the state. These are listed in no particular order. The principles are intended to be used collectively.

- **Leverage public investments to achieve multiple purposes:** The transportation system should support other public purposes, such as environmental stewardship, economic competitiveness, public health and energy independence.
- **Ensure accessibility:** The transportation system must be accessible and safe for users of all abilities and incomes. The system must provide access to key resources and amenities throughout communities.
- **Build to a maintainable scale:** Consider and minimize long-term obligations—don’t overbuild. The scale of the system should reflect and respect the surrounding physical and social context of the facility. The transportation system should affordably contribute to the overall quality of life and prosperity of the state.
- **Ensure regional connections:** Key regional centers need to be connected to each other through multiple modes of transportation.
- **Integrate safety:** Systematically and holistically improve safety for all forms of transportation. Be proactive, innovative and strategic in creating safe options.
- **Emphasize reliable and predictable options:** The reliability of the system and predictability of travel time are frequently as important as or more important than speed. Prioritize multiple multimodal options over reliance on a single option.
- **Strategically fix the system:** Some parts of the system may need to be reduced while other parts are enhanced or expanded to meet changing demand. Strategically maintain and upgrade critical existing infrastructure.
- **Use partnerships:** Coordinate across sectors and jurisdictions to make transportation projects and services more efficient.

## STATEWIDE MULTIMODAL TRANSPORTATION PLAN

To help guide the state toward the future outlined in the Minnesota GO Vision, the Statewide Multimodal Transportation Plan adopted/produced a series of six objectives and related strategies. The Minnesota GO Vision and Guiding Principles provided the basis for the objectives and strategies, which were crafted having considered the key elements of the Vision—Minnesota’s quality of life, environmental health, and economic competitiveness—as well as federal and state requirements. The objectives include:

- **Accountability, Transparency, and Communication:** Make transportation system decisions through processes that are open and supported by data and analysis; provide for and support coordination, collaboration, and innovation; and ensure efficient and effective use of resources.
- **Traveler Safety:** Safeguard travelers, transportation facilities, and services; apply proven strategies to reduce fatalities and serious injuries for all travel modes.
- **Transportation in Context:** Make fiscally responsible decisions that respect and complement the natural, cultural, and social context; and integrate land uses and transportation systems to leverage public and private investments.
- **Critical Connections:** Identify global, national, statewide, regional, and local transportation connections essential for Minnesotans’ prosperity and quality of life; maintain and improve these connections by maximizing return-on investment, given constrained resources; and consider new connections.
- **Asset Management:** Strategically maintain and operate transportation assets; rely on system data, partners’ needs, and public expectations to inform decisions; put technology and innovation to work to improve efficiency and performance; and recognize that the system should change over time.
- **System Security:** Reduce system vulnerability and ensure system redundancy to meet essential travel needs during emergencies.

## STATEWIDE PORTS AND WATERWAYS PLAN

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The Statewide Ports and Waterways Plan is intended to help achieve the Minnesota GO Vision and Guiding Principles and Statewide Multimodal Transportation Plan. The Statewide Ports and Waterways Plan presents mode-specific strategies to help achieve the stated objectives using approaches recommended in the Statewide Multimodal Transportation Plan. The marine system is particularly valuable with regard to the following long-term goals:

***“Connecting Minnesota’s primary assets—the people, natural resources and businesses within the state—to each other and to markets and resources outside the state and country.”***

- Minnesota’s ports and waterways system offers shippers reliable transportation connections in the state, as well as to domestic and international destinations.

***“Providing safe, convenient, efficient, and effective movement of people and goods.”***

- The marine transportation system provides cost-effective, fuel-efficient, and safe movement of freight. Water transport of goods also reduces demand on the highway system, thereby reducing both congestion and pavement deterioration.

***“Having a transportation system flexible and nimble enough to adapt to changes in society, technology, the environment and the economy.”***

- The capacity of the ports and waterways system can accommodate future demand and growth, increasing modal share relative to truck and rail and expanding intermodal container traffic.

***“Designing a system in such a way that it enhances the community around it, is compatible with natural systems, and minimizes resource use and pollution.”***

- The marine system allows Minnesota’s communities to access distant markets. Maritime shipping of bulk goods is not only more cost-effective than other modal options, but is also more energy-efficient and more environmentally friendly.

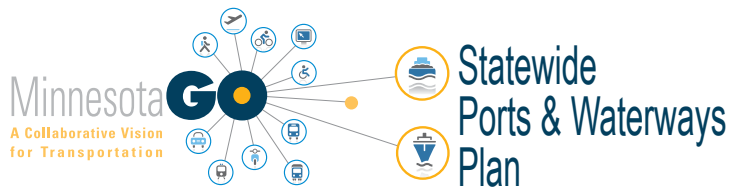


The Statewide Ports and Waterways Plan helps to accomplish the Vision's long-term goals by working in concert with the Statewide Multimodal Transportation Plan's approaches. Namely, the Statewide Ports and Waterways Plan advocates:

- The continuation and enhancement of the system's role of providing the global, national, statewide, regional, and local transportation connections essential for Minnesotans' prosperity and quality of life;
- Maintaining and improving ports and waterway connections in order to maximize return-on-investment for freight shipping, especially in an era of constrained resources;
- New connections to national and international markets made possible by technological and infrastructural improvements.

This first-ever Statewide Ports and Waterways Plan is the result of collaboration with system users, partner organizations and other stakeholders. Numerous interviews were conducted with marine system terminal operators and port authority staff. In addition, three open house meetings were held in June 2013 to allow for public input on the draft plan. A steering committee met regularly to guide the data collection and identification of system issues. The steering committee consisted of members from the Duluth Seaway Port Authority, Duluth-Superior Metropolitan Interstate Council, City of Minneapolis, Saint Paul Port Authority, Metropolitan Council of the Twin Cities, Red Wing Port Authority, Port Authority of Winona and MnDOT's Duluth, Metro, Rochester, Multimodal Planning, and Freight offices.

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## Chapter 2

### THE MARINE SYSTEM IN MINNESOTA: PAST AND PRESENT

# THE MARINE SYSTEM IN MINNESOTA: PAST AND PRESENT

Minnesota’s communities enjoy access to two commercially navigable waterway systems that provide water-based connections to economic marketplaces throughout North America and around the world: The Mississippi River System and the Great Lakes-Saint Lawrence Seaway (See **Figure 2.1**). Despite being located in the middle of the North American continent, Minnesotans benefit from the unique capabilities and advantages offered by marine transportation – particularly, increased shipping options, cost savings, and access to distant markets. The marine system provides Minnesota with increased modal freight opportunities, and therefore greater market access, and an advantage in economic competitiveness.

Figure 2.1: Ports and waterways systems



## MARINE SYSTEM RESPONSIBILITIES

The waterway transportation system is a shared responsibility between public and private interests. Much of the system maintenance, safety, and security are the responsibility of the public sector (e.g., the commercial navigational channels on the Mississippi River and the Great Lakes are federally owned and maintained). Most day-to-day facility operational decisions are the responsibility of the private sector (e.g., some terminals are owned by municipal governments, while most terminals are privately owned and operated). Specific examples are provided below.

- The main river and lake navigation channels are maintained by the US Army Corps of Engineers (USACE), which is responsible for channel dredging and also for maintenance of the locks and dams (see **Figure 2.2** and **Figure 2.3**, and **Table 2.1**). The US Coast Guard provides for safety and security of the marine system.

Table 2.1: Lock and Dam Infrastructure in Minnesota

LOCK AND DAM FACILITY	LOCATION	WIDTH CAPACITY	LENGTH CAPACITY	VERTICAL LIFT	YEAR OPENED
Upper St. Anthony Falls	Minneapolis, MN	56 feet	400 feet	49 feet	1963
Lower St. Anthony Falls	Minneapolis, MN	56 feet	400 feet	25 feet	1959
Lock and Dam 1	St. Paul, MN	56 feet	400 feet	38 feet	1917
Lock and Dam 2	Hastings, MN	110 feet	600 feet	12 feet	1930
Lock and Dam 3	Red Wing, MN	110 feet	600 feet	8 feet	1938
Lock and Dam 4	Alma, WI	110 feet	600 feet	7 feet	1935
Lock and Dam 5	Minnetonka, MN	110 feet	600 feet	9 feet	1935
Lock and Dam 5A	Winona, MN	110 feet	600 feet	5 feet	1936
Lock and Dam 6	Trempleau, WI	110 feet	600 feet	6 feet	1936
Lock and Dam 7	Dresbach, MN	110 feet	600 feet	8 feet	1937
Lock and Dam 8	Genoa, WI	110 feet	600 feet	11 feet	1937

Source: <http://www.mvp.usace.army.mil/Missions/Navigation/LocksDams.aspx>

- The Duluth Seaway Port Authority is an independent, public agency not part of the Duluth municipal government. DSPA owns the land and terminals but leases the operations to private business.
- The St. Paul Port Authority is not part of the municipal government of St. Paul. It is a stand-alone, economic development entity with some taxing authority, but leases the operation of its port facilities to private businesses.

Figure 2.2: Illustration of lock and dam process

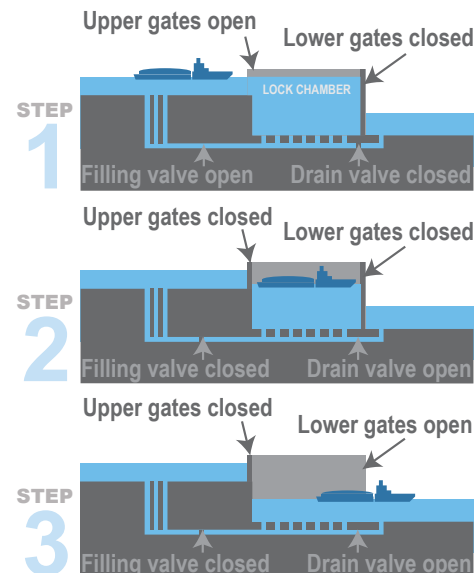
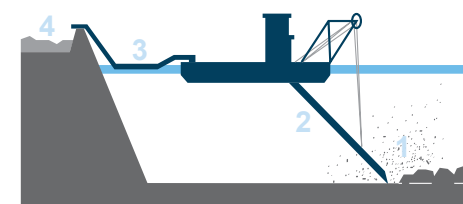


Figure 2.3: Illustration of hydraulic dredging process



### STEPS

- Excess sediment is loosened
- Dredged material is brought to the surface
- Dredged material is moved to disposal site
- Dredged material is placed in disposal site or further treated



- In Red Wing and in Winona, the port areas are part of municipal government. The municipalities own the land and terminal facilities within each harbor, and lease the operation of the various facilities to private businesses.
- The City of Minneapolis owns a terminal in Minneapolis and leases the operations to a private business. That lease is set to expire in December of 2014. There are also two privately owned and operated terminal in Minneapolis
- In all other port areas on Lake Superior and the Mississippi river system in Minnesota, the ports and terminals are privately owned and operated.

While MnDOT does not directly own or oversee construction, maintenance, or operations of the port or waterway facilities, MnDOT does financially support infrastructure improvement of port authority facilities. Due to the importance of the marine transportation system to the state's economic competitiveness, the Minnesota Legislature provided funding in 1996 to the Port Development Assistance Program (PDAP). This program allows MnDOT to financially support the movement of commodities and passengers on the marine freight system, as well as enhance the commercial vessel construction and repair industry in Minnesota. MnDOT also identifies waterway system needs and coordinates with a variety of stakeholders at local, state and national levels to advance solutions that address these needs.

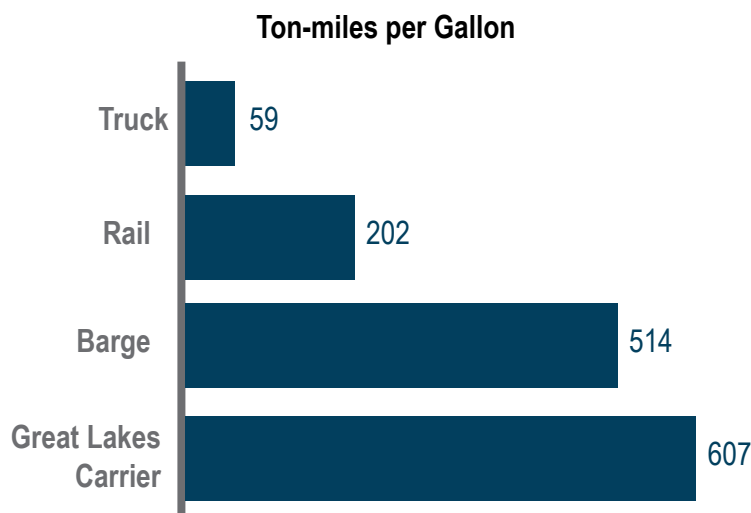
Table 2.2: System Ownership by Mode

MODE	SYSTEM OWNERSHIP	TERMINALS	FLEET
Trucking	Public Roads	Private Terminals	Private Truck Fleets
Rail	Private Track and Structures	Private Terminals	Private Rolling Stock
Waterways	Public Waterways	Public Ports and Private Terminals	Private Barge and Shipping Fleets
Air Cargo	Public Airports	Private Cargo Terminals	Private Aircraft

## BENEFITS OF MARINE TRANSPORTATION

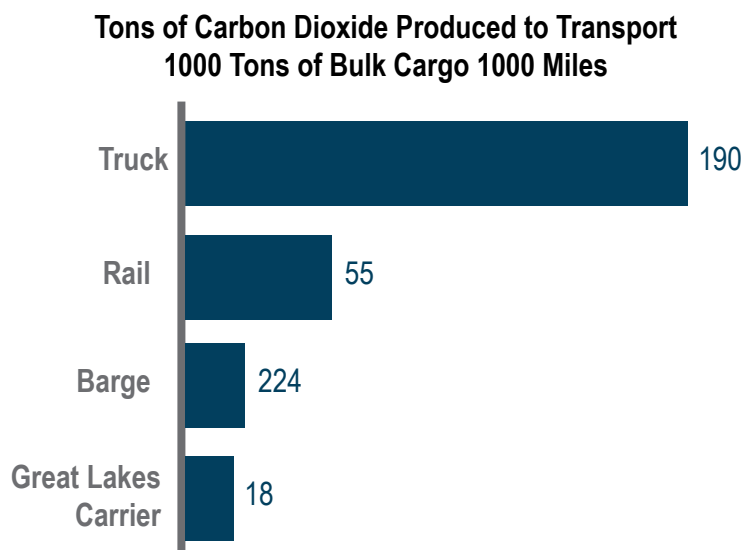
Compared to other modes of freight transportation, marine transportation carries the most freight per vessel (Figure 2.4), is the most fuel efficient (Figure 2.5), and produces the lowest emissions (Figure 2.6). In terms of cargo capacity, one typical barge, carrying 1,575 tons, is equivalent to about 68 truck trips. A typical Great Lakes vessel, carrying 62,000 tons, is equivalent to 2,696 truck trips. Diversion of freight from roadways reduces road wear, traffic congestion, and potential roadway safety concerns. Enough freight is moved on the river system in Minnesota each year to equal 464,000 trucks on the highways and local roads in Minnesota.

Figure 2.5: Fuel Efficiency by Mode



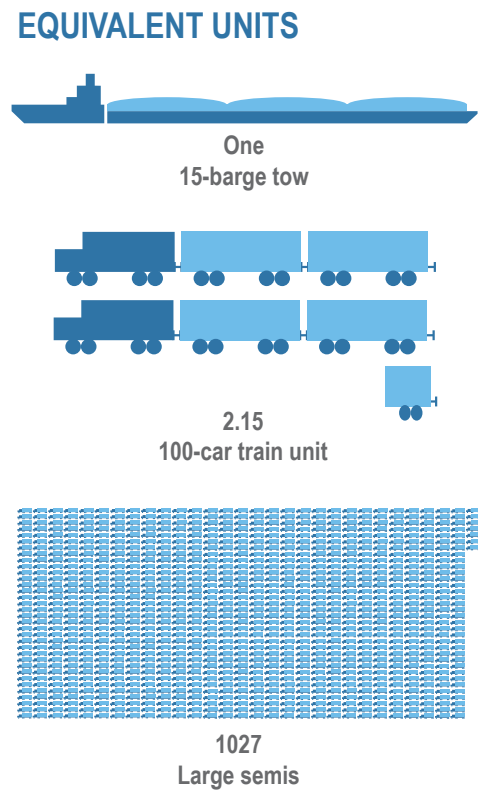
Source: <http://www.lcaships.com/wp-content/uploads/2012/07/Great-Lakes-Navigation-Economic-Strength-to-the-Nation.pdf>

Figure 2.6: Environmental Impact by Mode



Source: <http://www.lcaships.com/wp-content/uploads/2012/07/Great-Lakes-Navigation-Economic-Strength-to-the-Nation.pdf>

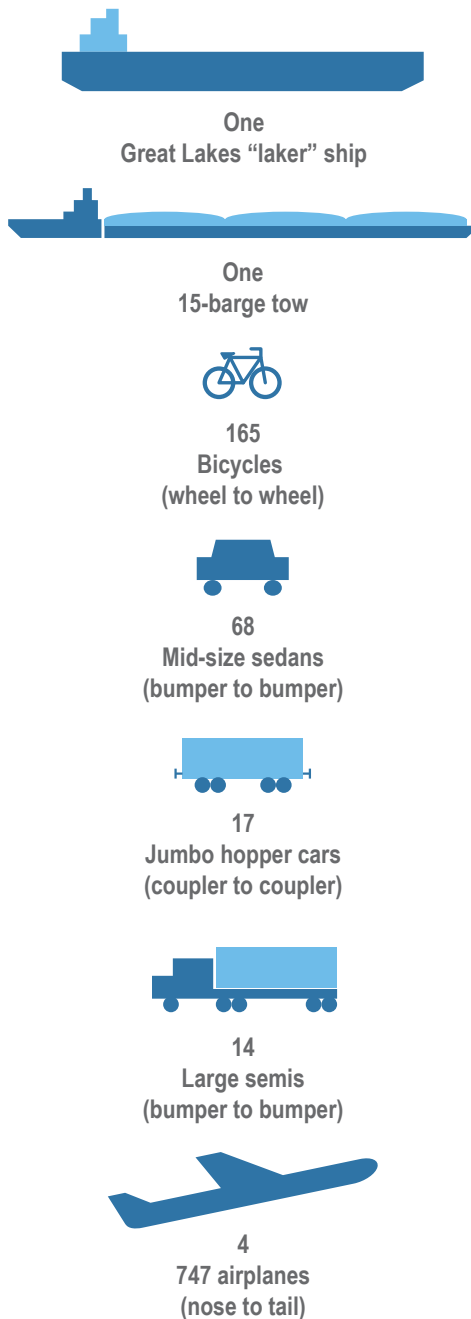
Figure 2.4: Comparison of freight modes by capacity



Source: <http://www.iowadot.gov/compare.pdf>

Figure 2.7: Comparison of shipping vessels by size

## EQUIVALENT LENGTHS



## A HISTORY OF MARINE FREIGHT TRANSPORTATION IN MINNESOTA

The ports and waterways system has been an important and influential asset throughout the state's history. Previously dominant in the transportation of people and goods, marine transport has evolved as part of a much larger and more diverse transportation system. While it serves more of a niche role today – primarily for moving heavy, less expensive bulk freight – it remains an important part of the state's multimodal transportation system.

Initially, most goods handled by newly-established ports were imports, as few goods were manufactured in the area and little was exported. Export of goods began as businesses and industries expanded beyond providing goods and raw materials locally to serve markets outside of their local areas. Discovered minerals, harvested resources, and agricultural surpluses led the growth in exports on the marine system.

Establishment of the ports was generally followed by the creation of a town site with a localized road network centering on the port, which provided a means of transporting goods to and from the docks. Local businesses and industries depended on this basic road network to perform this task. Most of the initial port sites became the locations of new towns such as Duluth, St. Paul, Red Wing, and Winona.

As Minnesota began to develop beyond the port areas, other methods of transporting goods were developed. Railroads linking people, communities, and services were built throughout Minnesota and connected the state with the overall rail network in the United States and Canada. As railroads became the dominant form of transportation in the state in the early 1900s, the usage and importance of river ports for freight commerce diminished.

Usage of the lake ports continued during this period, but became predominantly export-oriented as manufactured products were increasingly imported via rail. The commodity mix also shifted, in favor of bulk raw materials, such as lumber, iron ore, and grain, shipped eastward and southward along the Great Lakes and the Mississippi River systems.

In the early twentieth century, the development of the internal combustion engine and the rise of automobiles and trucks led to the expansion of the nation's road networks. After World War II, trucks became the preferred and predominant method of land transport for most goods and materials originating from or terminating at the state's lake and river ports. Massive expansion of the highway system made truck transport faster, more flexible, and more cost-effective than rail transport for trips of 300 to 500 miles.



Meanwhile, improvements to river ports and waterways facilities – such as the completion in 1940 of an extensive lock-and-dam network by the US Army Corps of Engineers on the Upper Mississippi River – led to a revival in the movement of freight on the state’s navigable rivers. Completion of additional locks and dams at the Lower and Upper St. Anthony Falls in 1956 and 1963, respectively, created a consistently deep and reliable channel that allowed river commerce to return to Minneapolis.

In 1959, the joint US-Canadian St. Lawrence Seaway navigation project was completed-- directly linking the Lake Superior ports and the remainder of the Great Lakes region to global markets by water. The St. Lawrence Seaway permitted the movement of bulk mineral and agricultural products by ship directly to ports beyond the Great Lakes Region and also allowed for the direct import of finished goods by ship to Duluth for redistribution by road or rail. This led to resurgence in commercial ship traffic through the Twin Ports and paved the way for expansion of the other Lake Superior ports.

Today, lake and river port users still rely on truck and rail modal access and connectivity as essential links in their commodity transportation chains. However, much of the ports and waterways infrastructure that they continue to operate on was designed and built between 50 and 75 years ago. This has created barriers and challenges to fully integrating the existing marine mode with today’s freight network. These challenges will be discussed in **Chapter 3**.

## CURRENT STATE OF MARINE FREIGHT TRANSPORTATION IN MINNESOTA

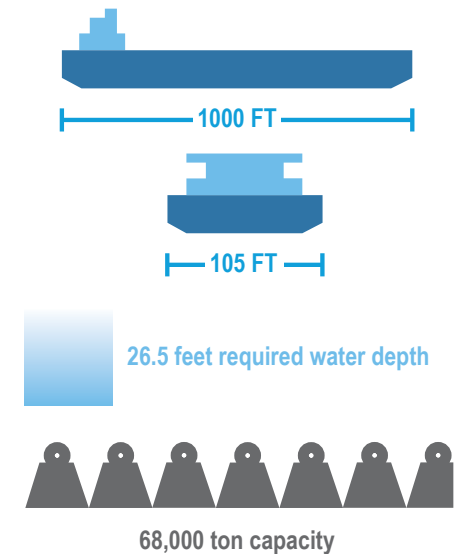
### MISSISSIPPI RIVER SYSTEM

Within Minnesota, there are 183.8 miles of commercially navigable channel on the Mississippi River, 24.5 miles on the Saint Croix River, and 14.7 miles on the Minnesota River, for a total of 223 miles. In 2012, the five public port areas imported and exported a combined 10.7 million tons of freight.

The Mississippi River Navigation System is maintained by the US Corps of Engineers. The USACE dredges the river to create a channel that can accommodate barges up to nine feet deep, and operates the 29 locks and dams on the Upper Mississippi. Commercial barge operators on the river pay a user fee of 20 cents per gallon on fuel purchased, which is used to offset half of the cost of major federal lock structure improvements. To achieve the present nine-foot channel in the Upper Mississippi River, the construction of a system of navigation locks and dams was authorized in 1930.

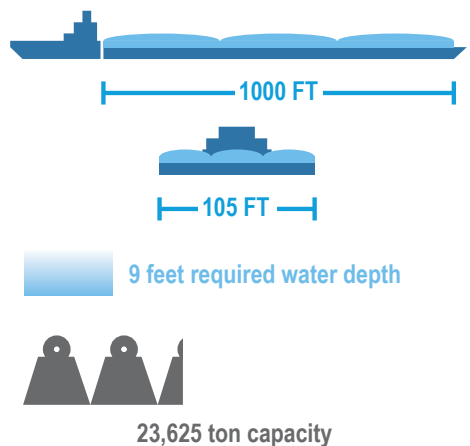
Figure 2.8: Waterway shipping depth, capacity, and mode share

### GREAT LAKES “LAKER” SHIP



**65%** Lake Superior tonnage carried by “lakers” (other tonnage carried by smaller vessels)

### INLAND WATERWAY 15-BARGE TOW



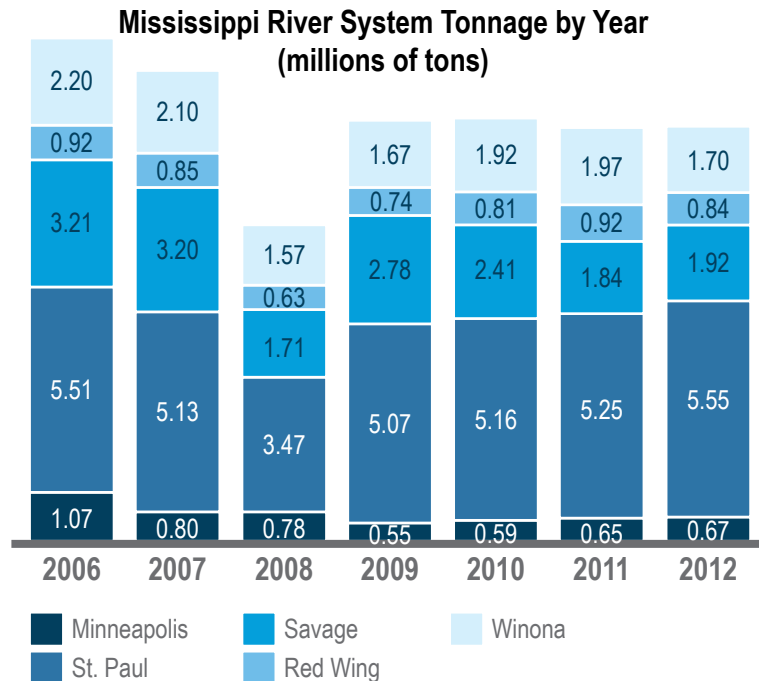
**100%** River tonnage carried by barge (maximum vessel size is 15-barge tow)

Dams were built on the Mississippi River to hold back water and form deeper navigation 'pools,' most of which are maintained at a minimum water depth to accommodate nine foot deep vessels for safe navigation. Dams allow river vessels to use a series of locks to 'step' up or down the river from one water level to another. Importantly, the USACE operates the locks and dams on the Mississippi River primarily for commercial navigation (freight transportation), not flood control or hydroelectric power generation.

On the Mississippi River, the 2011 through 2013 seasons were plagued with floods and drought along the entire system. Major fluctuation of water levels negatively affected the movement of goods on the waterway. Although exports through the Gulf were consistent relative to trends, ports and terminals on the Upper Mississippi River did not participate as much as in previous years because of the early floods and later dry conditions in the fields and low water levels. Local ethanol production is still taking much of the excess corn production in Minnesota away from foreign markets and will continue to do so. With increased foreign demand for agricultural products, Minnesota farmers are planting more corn and soybeans to take advantage of these market opportunities.

On Minnesota's portion of the Mississippi River in 2013, almost 9.2 million tons of freight valued at nearly \$2 billion were moved. In 2012, barges moved more than 10.6 million tons, at a value of over \$2.5 billion.

Figure 2.9: Mississippi River System Tonnage by year



Source: MnDOT

## GREAT LAKES – ST. LAWRENCE SEAWAY SYSTEM

Minnesota has four ports on Lake Superior: Duluth-Superior, Two Harbors, Silver Bay, and Taconite Harbor. These ports give shippers in the state ready access to markets along the Great Lakes and, via the St. Lawrence Seaway, to the Atlantic and throughout the world. Their combined waterway tonnage for 2012 was just over 61 million tons – about 1.2 million tons more than 2011. The combined “Twin Ports” of Duluth, Minnesota and Superior, Wisconsin are the largest freshwater port in the Great Lakes Seaway, by tonnage. On Minnesota’s portion of the Lake Superior in 2013, 58 million tons of freight valued at nearly \$7.2 billion was moved. In 2012, 61 million tons were moved, at a value of over \$6.7 billion.

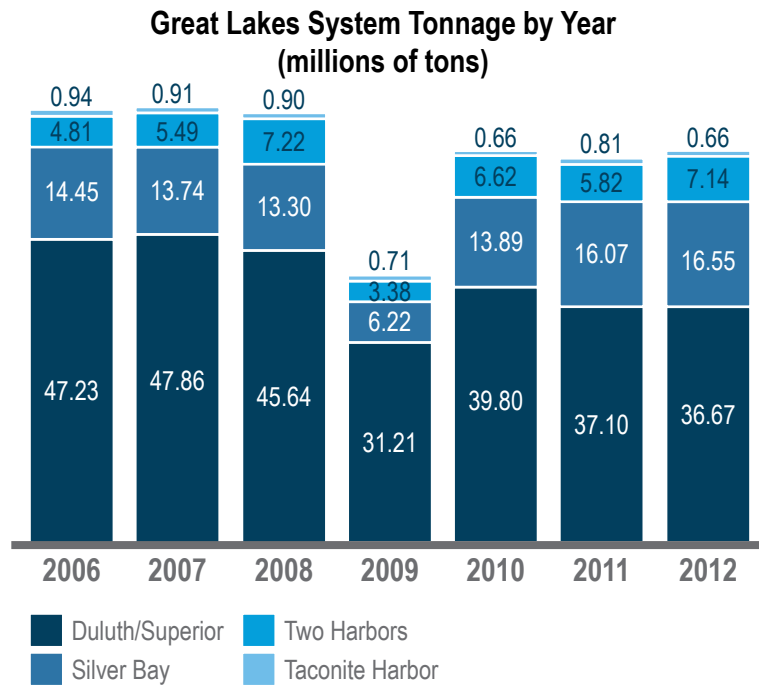
Ships that operate only on the Great Lakes are called “Lakers.” Some Lakers range to over 1000 feet in length, 105 feet wide, and have a capacity of 65,000 to 70,000 net tons. Fully loaded, these ships have a 26.5-foot draft (depth below the waterline), the maximum draft allowed. These vessels are not certified for ocean passage, and many were built too large to fit through the Welland Canal and St. Lawrence Seaway locks to get to the Atlantic Ocean.

Ships that travel across the oceans that serve Minnesota ports are called “Salties” because they navigate, in part of their journey, through salt water. They are generally less than 740 feet in length and 78 feet wide, small enough to fit through the Welland Canal and St. Lawrence Seaway. These vessels move less than 10 percent of the cargo on the lake system.

The Corps of Engineers operates three of the sixteen sets of locks on the Great Lakes-St. Lawrence Seaway and maintains a 29-foot deep channel throughout this system. The Canadian government operates and maintains the other thirteen locks.

In 2012, Lake Superior shipping levels of taconite increased by 2.3 million tons to more than 40.8 million tons. However, total grain tonnage dropped 0.5 million tons and coal shipments dropped 1.3 million tons. These shifts reflect current supply and demand changes in domestic and foreign markets. Foreign demand for products made with taconite and Minnesota agricultural products are expected to improve. In addition, wind generator components stored at the Duluth Port Authority facilities have been trucked or shipped to their construction sites, clearing the way for major redevelopment of the dock area.

Figure 2.10: Great Lakes System Tonnage by year



Source: MnDOT

## INTERMODAL CAPABILITIES

Intermodal terminals are key nodes in the regional freight system where freight is transferred between the marine system and other modes such as rail and truck. All commercial facilities on the marine system are connected to the statewide transportation system by both road and rail. Trucking of products is generally used for shorter trips – commodities that have less than 400 miles to travel to or from the port – including raw or finished goods such as agricultural products, forest products, scrap metal, pig iron, steel, and twine. Rail-moved products are generally those that must travel 400 miles or more.

Truck and rail freight rates, changing market conditions or locations, and seasonal (winter) shutdowns of lake and river ports cause shippers to change or modify shipping modes. Companies that have sufficient storage terminals often receive additional shipments and store the products on-site during the non-shipping season in order to avoid the higher transportation costs of comparable rail shipments. Companies that do not have this luxury will divert their traffic to rail from barge or ship during the non-shipping season, and must therefore pay more for their overall freight transportation costs.



Minnesota is served by four of the seven major (Class 1) railways in North America – BNSF Railway, Canadian Pacific Railway, Canadian National Railway, and Union Pacific Railroad. These connect and interchange with smaller (short line) railways within the state, such as the North Shore Mining Railroad (NMCZ), an independent railroad owned and operated by the Cleveland Cliffs Mining Company, which moves crude iron ore from the Cliffs' mines to Silver Bay.

All port terminals along the river system use more than one mode of transportation, and most have access to three types: barge, railroad, and truck – though connections are still needed at some locations. One terminal also uses a pipeline to transport goods. Ports on Lake Superior also use up to three modes of transportation: cargo vessels, railroad, and truck. The mode used is dependent on the commodity being hauled and its destination. Maintaining intermodal connectedness is an important part of the larger strategy for the marine system, reflective of and in line with the Minnesota GO Vision and the objectives of the Statewide Multimodal Transportation Plan.

Currently, containerization of freight is not used on the marine system in Minnesota, although containers are used in the port areas, and trucked to a container yard on the rail system. As the fastest growing sector of rail freight for many years, containerization can provide seamless and efficient movement between modes. Containers are used to move many different commodities, even grain.

The Port of Duluth-Superior, for example, does not currently have intermodal container service established between domestic or international vessels and railroads or trucks serving the port. The Duluth area does, however, generate container shipments from local industries – primarily from paper producers in Duluth and Cloquet. These shipments are then required to be transported to the Twin Cities or to Chippewa Falls to be loaded onto railcars. Container shipments to Duluth must similarly be transported from intermodal terminals in the Twin Cities. In 2003, the University of Wisconsin-Superior published a study which examined the potential for an intermodal freight terminal in the Duluth-Superior Twin Ports area. The study concluded that a Twin Ports intermodal terminal would attract additional and diverse international marine cargo to the port. The Duluth Seaway Port Authority remains committed to the local development and operation of railroad intermodal facilities in its ports area.

## COMMODITIES

A wide variety of commodities are both imported and exported at the ports on the Mississippi River System and the Great Lakes -St. Lawrence Seaway System. The lists in the table below are extensive, but not exhaustive.

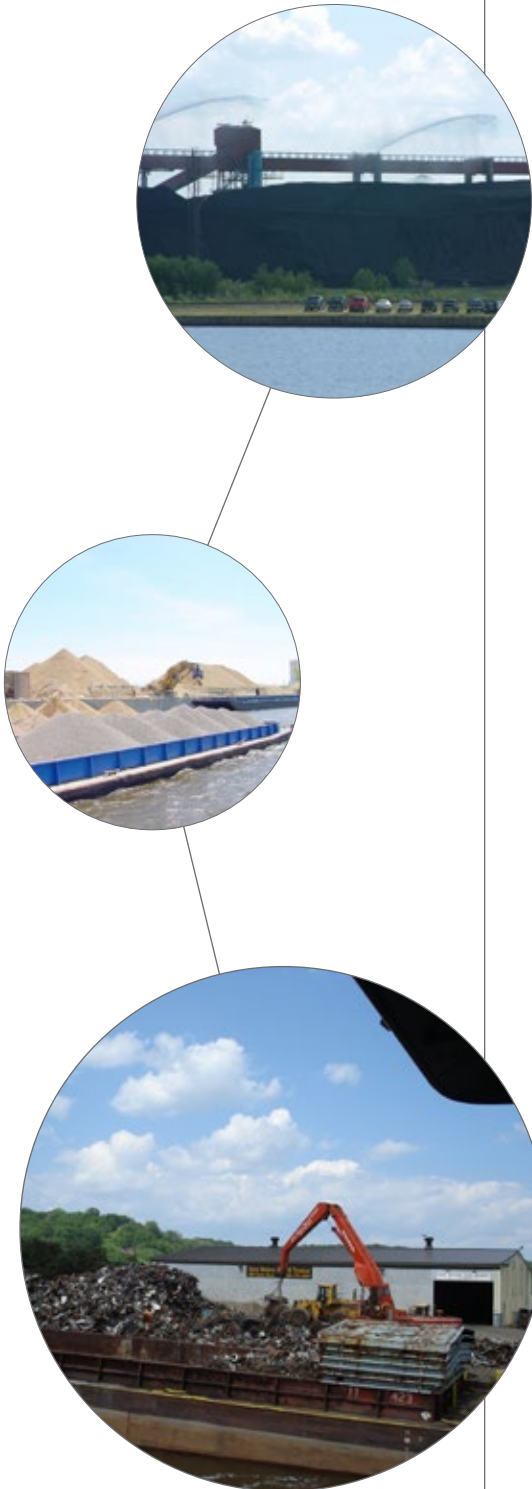
Table 2.3: Commodities and products shipped on the marine system in Minnesota

MISSISSIPPI RIVER SYSTEM	GREAT LAKES-ST. LAWRENCE SEAWAY SYSTEM
Grain	Iron or (taconite)
Aggregate	Coal
Fertilizer	Grain
Cement	Limestone
Salt	Salt
Iron	Bentonite
Coal	Kaolin clay
Limestone	Bituminous aggregate
Petroleum products	Oil field equipment
Animal feed products	Project cargo
Slag	Break-bulk
Steel	Aggregate
Twine	Sinter ore
Urea	Wind energy components

Iron ore in the form of taconite is the principal commodity shipped from Lake Superior ports, amounting to 64 percent of tonnage on Lake Superior in 2013. Mined in northeast Minnesota – on the Iron Range – and shipped via the Great Lakes to steel mills in Indiana, Ohio and Pennsylvania, iron ore’s surge in production is primarily due to the recent growth of steel manufacturing worldwide (iron ore pellets are a primary ingredient in steel production). Iron ore shipped from Minnesota amounted to over 37 million tons in 2013.<sup>1</sup> The Port of Two Harbors is the leading iron ore export dock in the state, with a 2013 net tonnage of over 16.8 million tons.<sup>2</sup> More than 75 percent of iron ore shipped on the Great Lakes System originates from Minnesota ports.<sup>3</sup>

Western coal was the second most common commodity shipped via Duluth-Superior in 2012. At just over 15.5 million net tons, this is down about four million tons from 2010, reflecting a switch to natural gas by some regional power plants in the system. This trend will likely continue, though it will be offset by coal that is shipped to meet overseas demand. More than 75 percent of coal shipped in the system is loaded in Duluth/Superior.<sup>4</sup>

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- 4 MnDOT



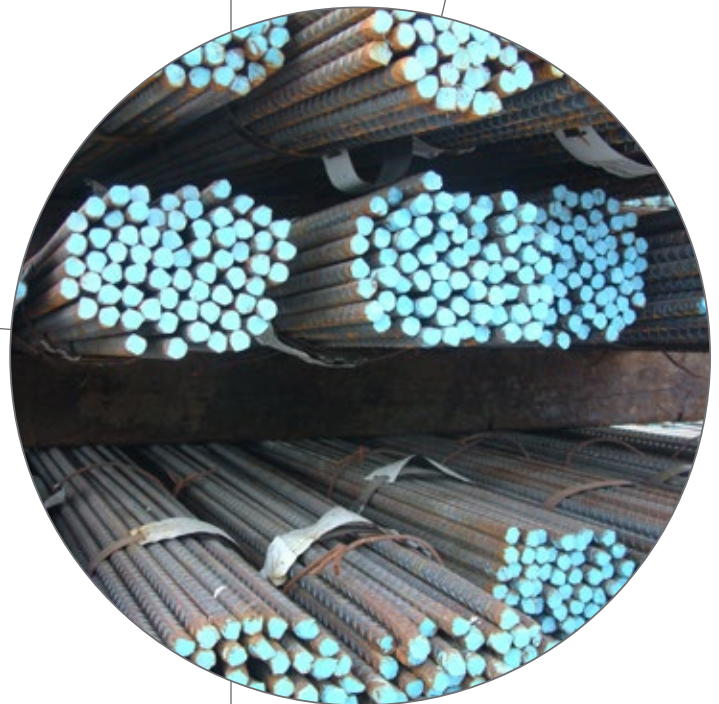
Other commodities passing through the Port of Duluth/Superior include grain, cement, salt, steel, limestone and, more recently, wind generator components and other large manufactured equipment. Nearly half of all grain shipped on the system, for example, is shipped from the Duluth/Superior port.<sup>5</sup>

Primary river-borne freight commodities in Minnesota are agricultural products such as corn, soybeans, and wheat. In total, the Mississippi River ports and waterways system accounts for over half of all Minnesota agricultural exports. More than 4.4 million tons of grain was shipped downriver in 2012.<sup>6</sup> The river ports also handle other dry commodities – including fertilizer, cement, sand and gravel, salt, coal, scrap metal (for recycling), and steel. Liquid commodities include petroleum, caustic soda, vegetable oils, molasses, anhydrous ammonia, and asphalt.

Some commodities originate by ship and are loaded on barges at the Port of New Orleans and other Gulf Coast ports for shipment upriver. On arrival at river ports in Minnesota, these products are transloaded to trucks or rail for movement to their final destination. Products such as grain and soybeans, destined for overseas markets, are loaded onto barges in the Mississippi River and Minnesota River ports and then shipped to the Port of New Orleans and other Gulf Coast ports, ultimately bound for overseas destinations.

Many of the bulk products that are handled by barges on the river systems – silica (frac) sand, dried distiller grains, aggregates, and salt – are trucked to their barge terminal, as well as from their destination terminal to the distribution point. Few of these types of commodities are loaded on rail cars for any of these moves due to the relatively short distance of land travel required between the port and the destination point.

5 MnDOT  
6 MnDOT



## COMMODITY FLOW MAPS

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MnDOT has a direct interest in monitoring and improving freight traffic flows in Minnesota, including on the marine system. The figures on the following pages show commodity tonnages and directionality on the marine system, as well as for other modes.

**Figure 2.9** shows coal movements and port activity throughout the state. While Minnesota has no coal production, it is a key transit point for coal from the Powder River Basin production area in Montana and Wyoming.

**Figure 2.10** shows iron ore movements throughout the state. Rail and marine are the major modes of transportation involved in moving Minnesota iron ore. Railways either move iron ore to integrated steel mills within the region, or directly to ports along the Great Lakes.

**Figure 2.11** shows the movement of grain throughout the state. From Minnesota, the key export corridor is through the Gulf ports, via rail transportation or barge transportation on the Mississippi River.

**Figure 2.12** shows the movement of other agricultural products throughout the state. These flows include animal feed, eggs, honey and soybeans, with soybeans being the largest of these commodities. Key production areas are in northwestern, central and southern Minnesota.



Figure 2.9: Diagram of coal movement

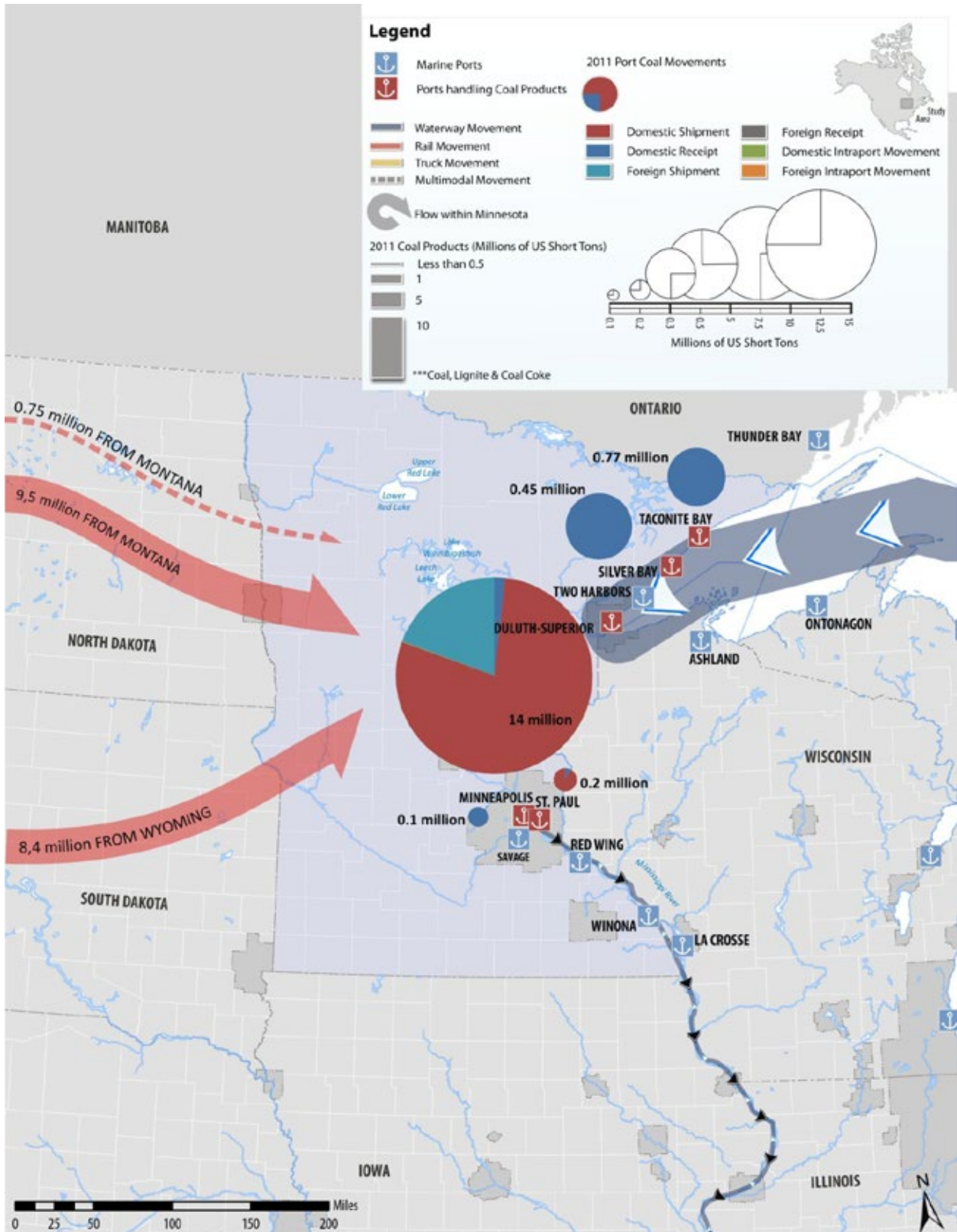


Figure 2.10: Diagram of iron ore movement

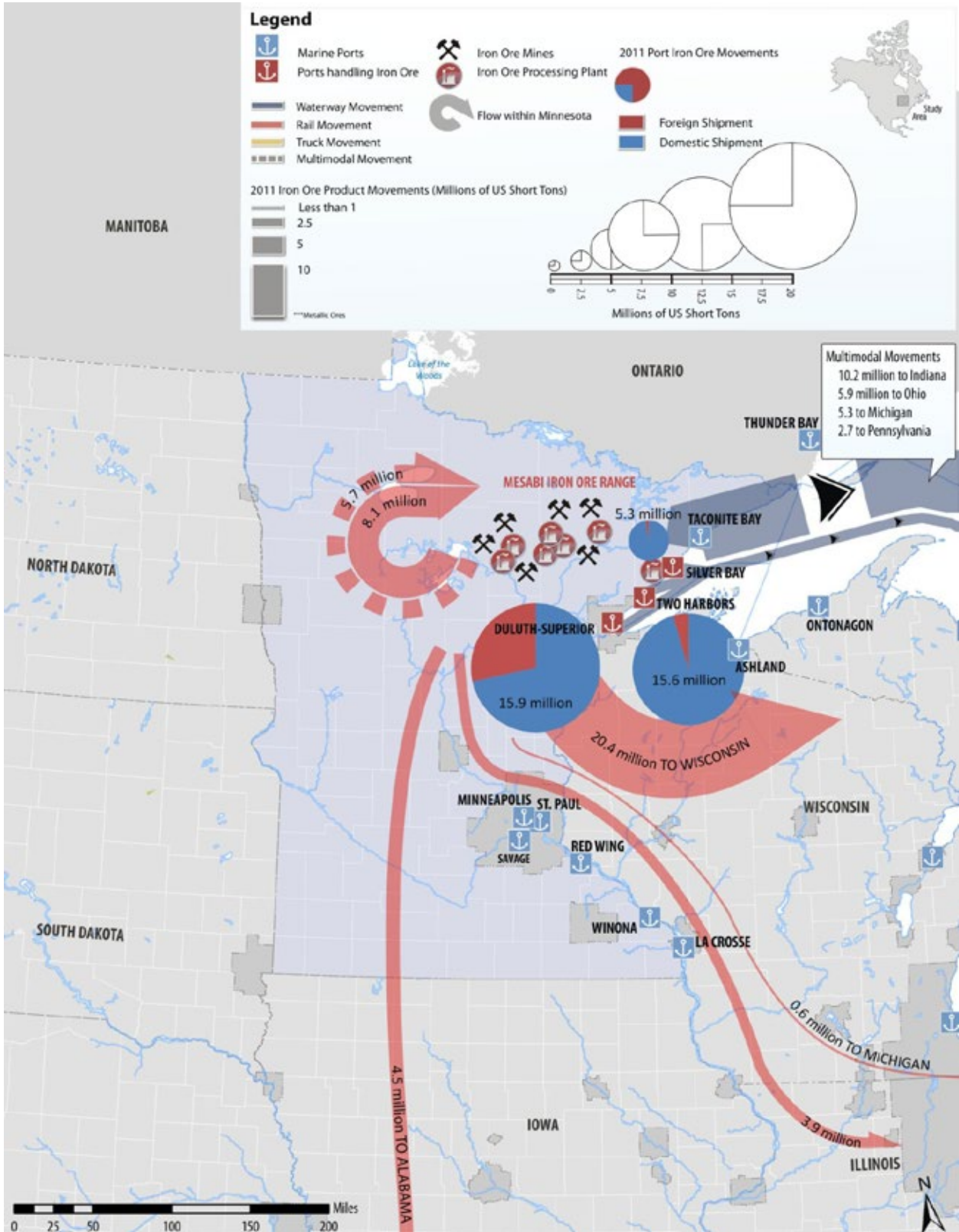


Figure 2.11: Diagram of grain movement

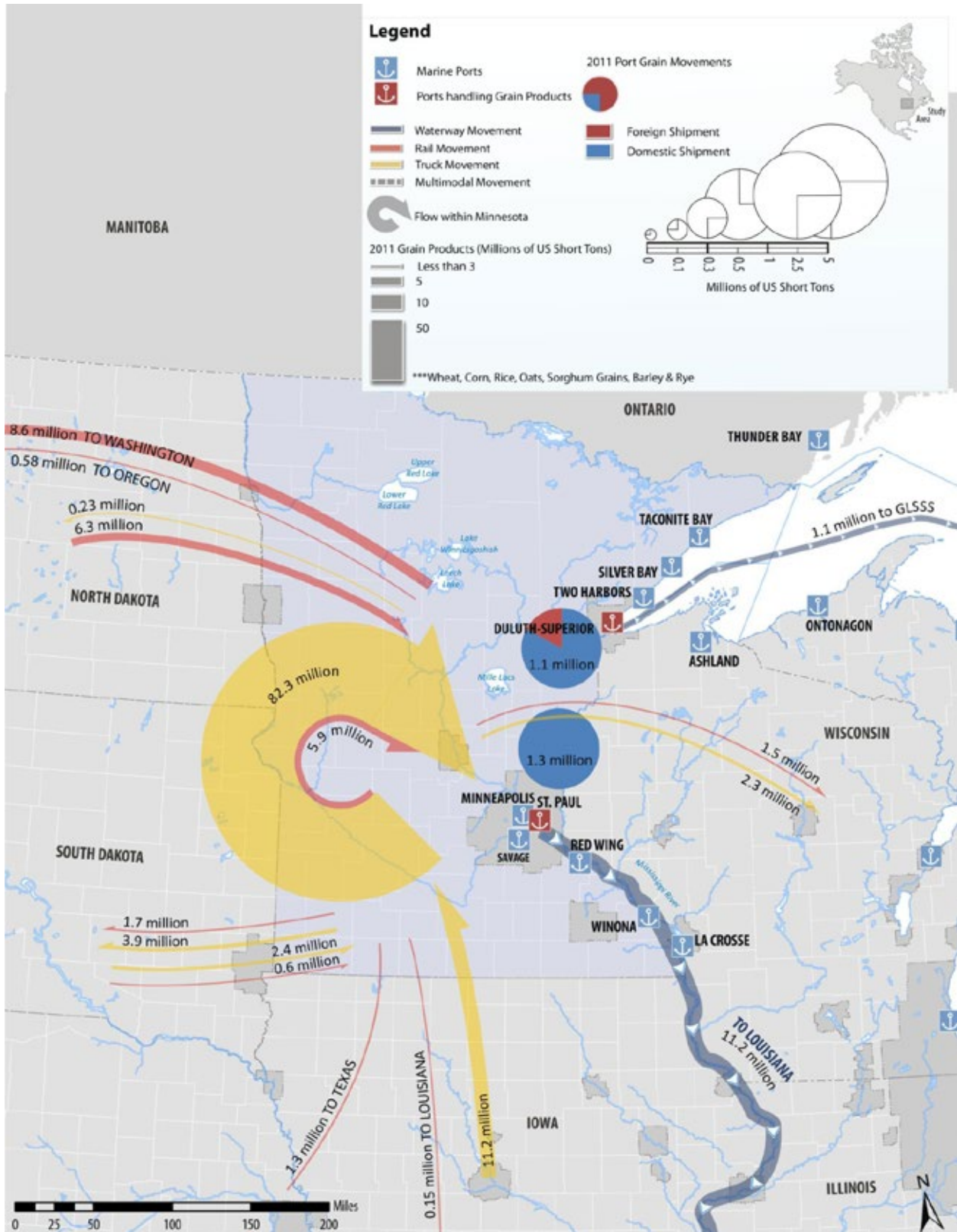
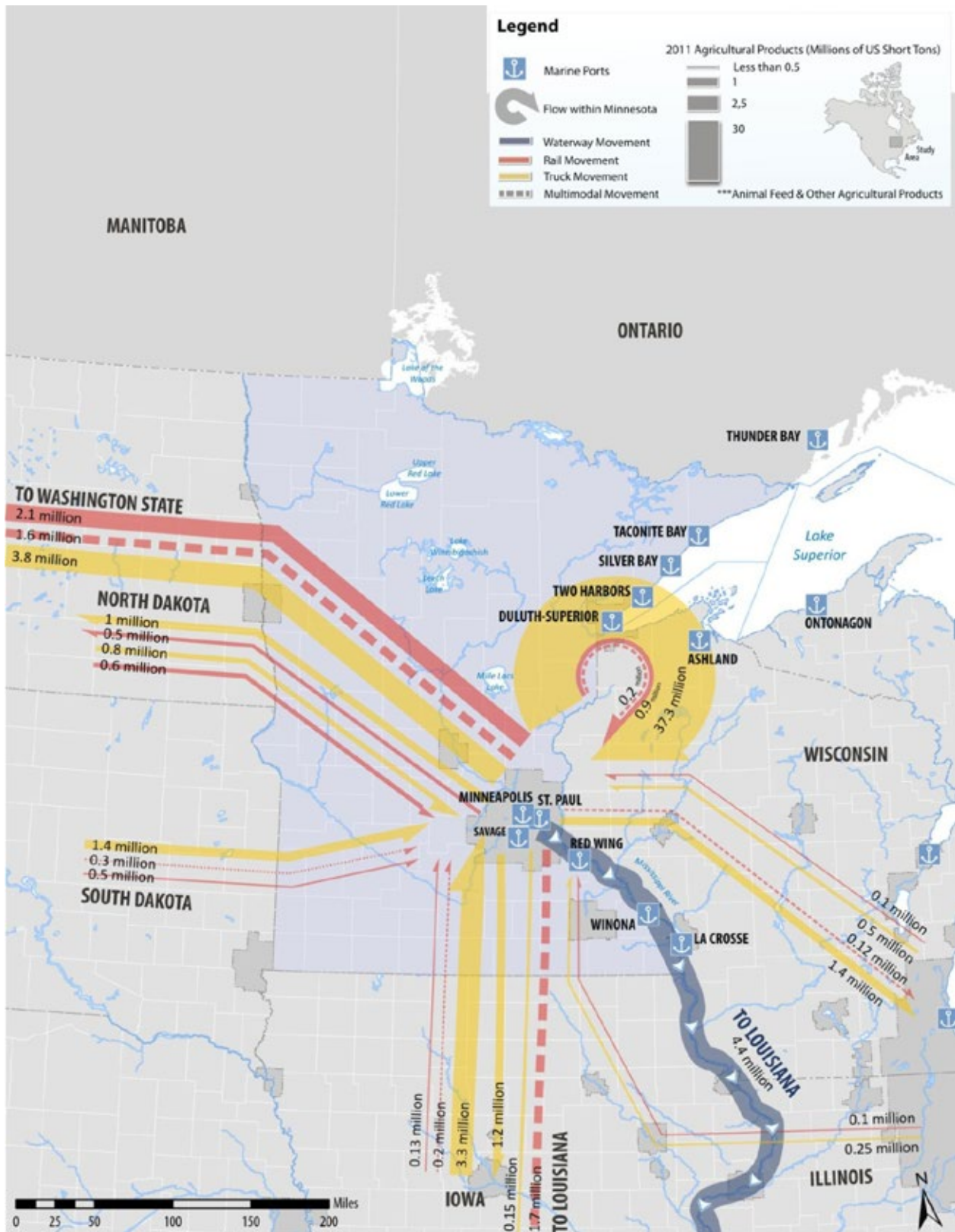


Figure 2.12: Diagram of other agricultural products movement





# FINANCIAL SUPPORT FOR THE MARINE SYSTEM

MnDOT's primary means of support for the marine system is through its administration of Minnesota's Port Development Assistance Program (PDAP). Port authorities and municipalities provide funding generated from tax levies, land leases, storage and dockage fees, project-specific federal grants, economic development investments, and related financing activities. Much of the financing for the marine system, however, is from private investment. After an assessment of the port facility and navigation channel needs, this chapter describes each of these programs and discusses the ways ports and waterways investments impact Minnesota's economic competitiveness.

## PORT AREA NEEDS

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Capital investments are important to all port operations in order to sustain and grow business. The four public ports in Minnesota seeking funds from the PDAP have current project needs in excess of \$34 million. Project needs include:

- Dredging in the dock areas
- Dock wall construction
- Creation of new storage facilities
- Building/road rehabilitation/construction
- Improving road/rail access to port areas
- Upgrading to meet safety codes

These needs are representative of projects eligible for PDAP funding to the four ports that are members of the Minnesota Ports Association. This list does not include needs of private terminals, nor projects outside the parameters of PDAP legislation.

## NAVIGATION CHANNEL NEEDS

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The US economy relies on low transportation costs for its exports to offset higher wages and costs of production when compared with its competitors. Greater costs to export goods will affect the nation's ability to compete in global markets for goods produced in the US. If the USACE merely maintains its current level of investment in these systems, efficiency losses will increase shipping costs annually.

Major factors in the performance of the marine system are scheduled and unscheduled delays. Unscheduled delay is most often due to high volumes at transit points, as well as occasional failures in equipment, resulting in increased operating costs. Unscheduled delays are especially costly because vessel operators are unable to anticipate and offset the costs of these incidents.<sup>1</sup>

These delays are the result of insufficient funding for operation and maintenance needs of the locks on the nation's inland waterways system. A full 90 percent of locks and dams on the U.S. inland waterway system experienced some type of unscheduled delay in 2009. According to the USACE, simply maintaining existing levels of unscheduled delays on inland waterways (not allowing more) will require almost \$13 billion in cumulative investment needs by 2020.

Another major factor in marine system performance is the maintenance of adequate water depth. Dredging will continue to be required to maintain existing navigable channels and waterways on the marine system. Fluctuating water levels on both waterway systems in Minnesota have recently required special dredging attention. Hydraulic and mechanical dredging is usually partly or completely paid for by the Army Corps of Engineers. For this reason, shortfalls in the USACE capital programs pose a significant threat to the performance of the marine system.

In 2012, the USACE St. Paul District Office, covering the river from Minneapolis to Guttenberg, IA, spent almost \$27 million on navigation maintenance, including \$8.3 million for the construction and maintenance of dredge material disposal facilities, \$9.3 million for dredging, and \$9.2 million for maintenance of locks and dams. The St. Paul District has a backlog of maintenance needs on the lock and dam system totaling over \$110 million. Dredging needs for the Mississippi River in the St. Paul District total \$12.7 million. If any one of these locks does not function because of lack of maintenance or rehab, or if the river channel is not deep enough to navigate, river transportation is adversely impacted for Minnesota shippers.

The USACE Detroit District, which controls work on the Great Lakes-St. Lawrence Seaway on Lake Superior, Lake Michigan, and Lake Huron, spent approximately \$6.6 million on navigation and maintenance work in Minnesota in 2012. The breakout of expenses is as follows: \$5.0 million for dredging, \$1.1 million for repair to structures and facilities, \$500,000 for Lake Superior Maritime Visitor Center Operations, and \$70,000 for condition surveys.

<sup>1</sup> <http://www.infrastructurereportcard.org/a/#p/inland-waterways/conditions-and-capacity>



To reduce the risk of lock down time and vessel delays at the Soo Locks (between Lake Superior and Lake Huron) the Detroit District has developed a Soo Locks Asset Renewal Plan that outlines the work necessary to maximize reliability and reduce the risk of catastrophic failure at the Soo Locks. As of fiscal year 2013, \$35.9 million had been funded, with a remaining need of \$69 million over the next five years. The Great Lakes also have a \$200 million backlog of dredging needs, a portion of which is located at federal harbors in Minnesota waters. For the federal harbors located in Minnesota, the backlog dredging need is approximately \$3 million.

## MINNESOTA PORT DEVELOPMENT ASSISTANCE PROGRAM (PDAP)

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MnDOT's active role in the upkeep and enhancement of ports in Minnesota began in the 1990s. In 1991, the Minnesota Legislature established the Port Development Assistance Program, recognizing that the physical infrastructure of river and lake port terminals in the state were in need of rehabilitation and expansion. While ports and terminals are still primarily funded by local governments and private sources, PDAP assists with the funding of public ports, providing a maximum state contribution of 80 percent, with a local match of at least 20 percent, for each public port improvement project. Funding for the PDAP began in 1996.

The PDAP provides the state's public port authorities with funding assistance using grants under conditions established and revised by the Minnesota Legislature. Funding from the PDAP is used for facility and infrastructure upgrading and rehabilitation, facility expansion, capacity expansion, and systems upgrades. It cannot be used for maintenance projects.

At least twice each year the port authorities and MnDOT discuss infrastructure project needs. MnDOT then puts a priority needs project list together for the Legislature to consider at the next legislative session. A second needs list is put together to identify long term needs of the port authorities in order to show the Legislature and all concerned that there are on-going infrastructure needs of the ports. If the Legislature appropriates funding for PDAP, each port authority then submits their priority project list to MnDOT of projects they would like funded from this appropriation. MnDOT then determines which projects are to be funded with the Legislative appropriation and drafts agreements for each project and port authority involved.





Project funding is prioritized using five factors: movement or volume of cargo; enhancement of boat construction and repairs; economic development benefits; local and regional benefits; and ability to repay the loan. The program provides a combination of grants and loans for projects that may not produce an increase in revenue, and loans for those that produce an increase in revenue that could be used to fund the project, although to date this program has used grants exclusively. MnDOT and the port authorities then enter into contracts for the approved projects. The entire process typically takes about four months, and each port authority is responsible for construction of the project under the terms of the contract.

This program is a vital part of infrastructure funding for ports in the state. For the Winona, Red Wing and St. Paul Port Authorities, this funding represents the entirety of the capital improvement budget (excepting their 20 percent local match). Since its inception, the PDAP has accounted for roughly half of the capital improvement budget for the Duluth Seaway Port Authority.

Marine system stakeholders benefit from consistency in investment programs, eligibility criteria, and program categories. In particular, funding consistency enables the ports to more accurately plan for investments.

Table 3.2: PDAP Allocations

YEAR	AMOUNT
2001	\$1,000,000
2002	\$0
2003	\$2,000,000
2004	\$0
2005	\$2,000,000
2006	\$3,000,000
2007	\$0
2008	\$500,000
2009	\$3,000,000
2010	\$0
2011	\$3,000,000
2012	\$1,000,000
2013	\$0

## FEDERAL FUNDING FOR THE MARINE SYSTEM

The Water Resources Development Act of 2013 (S. 601) (WRDA) is new legislation passed last year by the United States Senate that authorizes the USACE to construct water projects of federal interest, such as mitigating storm damage, restoring ecosystems, and reducing erosion on inland and intracoastal waterways. To address such operations and maintenance needs on a consistent basis, the bill includes language guaranteeing funding each fiscal year.

WRDA calls for an evaluation of the Inland Waterways Trust Fund, the federal finance source for these projects. The Inland Waterways Trust Fund is financed through a fee assessed to inter- and intrastate commercial barge operators of \$0.20 per gallon on fuel. Language in WRDA acknowledges that the funding balance of the Inland Waterways Trust Fund has declined significantly in recent years, while estimating the financial need for construction and major rehabilitation projects on the inland waterways system through 2030 to be approximately \$18 billion. Existing revenue sources to cover the costs of inland waterways system construction and rehabilitation activities are insufficient and will need to be addressed.

Most users of the inland waterways system are supportive of increasing revenue sources for inland waterways system construction and major rehabilitation activities. There is support to expedite the most critical of those projects to better accommodate the approximately 546 million tons of freight moved on the system each year.

Furthermore, WRDA would direct USACE to prioritize navigation projects funded with appropriations from the Harbor Maintenance Trust Fund (HMTF), making the federal government responsible for all operation and maintenance costs for harbors. The primary use of the HMTF is for maintaining the constructed widths and depths of commercial ports and harbors of the United States. Language in the Act indicates these functions should be given first consideration in the budgeting of HMTF allocations.

It is estimated that implementing WRDA would cost approximately \$5.7 billion over the period 2014-2018 and \$6.5 billion over the period 2019-2023. It is expected that the legislation would authorize the appropriation of \$500 million for 2014-2016 under the Innovative Financing Pilot Projects Program (Title X of the document).



The companion bill in the House of Representatives, the Water Resources Reform and Development Act of 2013 (H.R. 3080), which passed last fall, includes additional items such as a grant programs to assist locals with levee safety, a loan guarantee program for water infrastructure projects, and provisions to streamline environmental review.

Other existing bills could also benefit the marine system, including the Reinvesting in Vital Economic Rivers and Waterways Act of 2013 (RIVER Act), which would create a 20-year program of capital investments on inland and intracoastal waterways.

## TRANSPORTATION INVESTMENT GENERATING ECONOMIC RECOVERY (TIGER) DISCRETIONARY GRANT PROGRAM

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The federal TIGER program began in 2010, as a means for the US Department of Transportation to invest in critical projects across the country that showed economic benefits for communities, regions, or the nation. TIGER grants are particularly well-suited for projects that are multi-modal, multi-jurisdictional, or otherwise challenging to fund under existing programs.

In the first round of TIGER grant awards, port-related infrastructure projects received seven percent of the original \$1.5 billion. In the second and third rounds, port-related infrastructure fared better, garnering approximately 17 percent and 12 percent, respectively, in available capital grant funds. Eight of 47 approved projects were for port projects as part of TIGER 2012. These eight project grants totaled more than \$79 million, or about 16 percent of the capital grant funds available.

TIGER 2013 provided approximately \$474 million for Department of Transportation national infrastructure investments. Like the four previous rounds, TIGER 2013 grants are awarded on a competitive basis. The Port of Duluth applied for a \$16 million project that included stabilizing the docks with the installation of new steel pilings, dredging adjacent waters to seaway depth, better securing the area, and installing turnouts onto the property from the adjacent Canadian National and Burlington Northern rail lines. A TIGER grant of \$10 million was awarded to rebuild and expand Docks C and D at the port and to improve existing road and rail connections. These docks are currently used to store large equipment – notably, wind power equipment – that comes through the port. Minnesota's PDAP will provide an additional \$2.75 million to help complete the project, with the remaining \$3.25 million contributed by the port authority as a local match. The improved docks will likely be put to use handling materials for the region's evolving paper and mining industries, among other tasks.



To date, the TIGER program has provided more than \$3.6 billion to 270 projects throughout all 50 states, the District of Columbia, and Puerto Rico. While seen as a great success, demand for the program nevertheless outweighed available funds; through five rounds, the Department of Transportation has received more than 5,200 applications requesting more than \$114.2 billion for transportation projects across the country. That said, TIGER has proven to be an important example of federal funding helping to improve the marine system in Minnesota.

## OTHER FUNDING PROGRAMS

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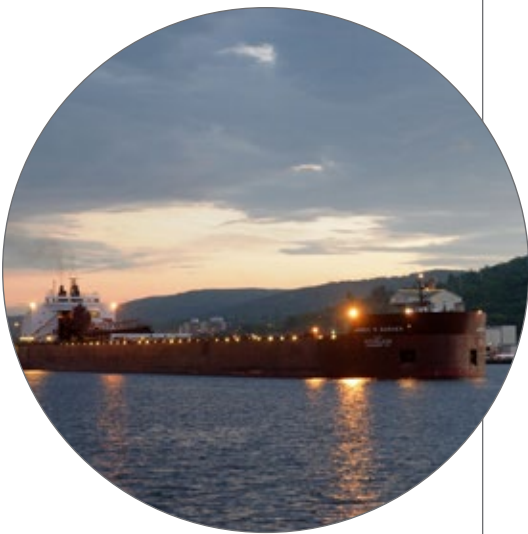
Other funding programs that can be used on the statewide ports and waterways system to enhance marine freight transportation include:

- Minnesota Department of Employment and Economic Development (DEED) – Redevelopment Grant Program
- DEED – Minnesota Investment Fund
- FEMA/Homeland Security – Port Security Grant Program (PSGP)
- US Congress – Surface Transportation Program (STP)
  - Congestion Mitigation and Air Quality Improvement Program (CMAQ)
  - Transportation Infrastructure Finance and Innovation Act (TIFIA)

## PDAP INVESTMENT IMPACTS ON THE MINNESOTA ECONOMY

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Investments in port infrastructure benefit the state's economy, primarily by improving efficiency and market connectivity for Minnesota shippers. The investments described above affect Minnesota and the broader regional economy, through construction benefits, operating benefits, and as the market responds to the availability of the service provided through the investment. The following analyses focus specifically on PDAP investments.



## CONSTRUCTION BENEFITS

The economic impacts from construction are temporary, lasting only for the duration of the building cycle. Impacts are primarily local, as labor and supplies are purchased from the local economy as much as possible to minimize supply costs and the risk of disruption due to shipment delays. Approximately 20 “job years” of work are generated in the Minneapolis-St. Paul metropolitan area economy for every \$1 million spent on construction, according to data from the Bureau of Economic Analysis (one job year is the equivalent of one job, for one person, for one year).



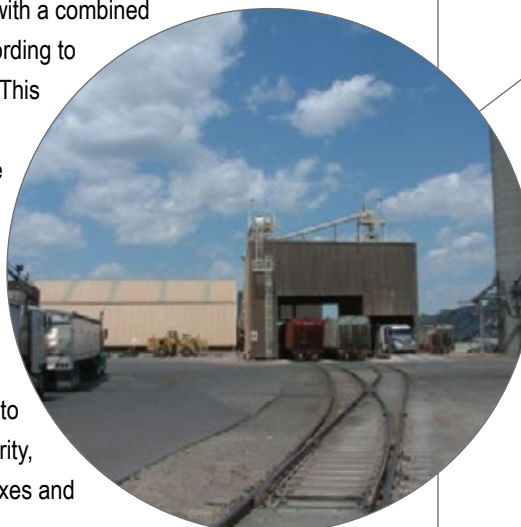
## OPERATING BENEFITS

Operating impacts are recurring and last as long as the facility remains in operation. These impacts are primarily local as labor and supplies are purchased to serve the sites. PDAP and other investments help to both retain and create new employment.

As an example, investments at St. Paul's Barge Terminal #1 and at the Peavey Red Rock Barge Terminal focused on maintaining essential components of the river terminal operations, keeping the facility in a state of good repair and allowing the tenants – Northern Metals (formerly Great Western Recycling), Peavey Co., and others – to remain at their current location. Northern Metals employs 250 personnel at numerous locations across the state. The total market value of the Barge Terminal #1 site was \$12.8 million in 2010, according to Ramsey County and the St. Paul Port Authority, and it generated just over \$207,000 in taxes and special assessments in that year.



The Red Rock Barge Terminal, an important loading site for agricultural operations in the region, serves eight firms with a combined employment of just under 600 workers, according to information from the St. Paul Port Authority. This figure includes jobs in direct operations and employment in firms that have located at the site to be in close proximity to the terminal (the market response, see below). It is likely, however, that the direct operating labor will be a small fraction of the total. The Red Rock Terminal and Industrial site were worth \$19.5 million in 2010, according to Ramsey County and the St. Paul Port Authority, generating just over \$500,000 annually in taxes and special assessments.



The combined PDAP investment in the two terminals – \$2,150,000 – thus represents less than three years of the generated gross public revenues, and the useful life of such investments is estimated at 50 years. The Saint Paul harbor investments outlined here provide a good example of operating benefits of the PDAP.

## MARKET RESPONSE TO INVESTMENTS

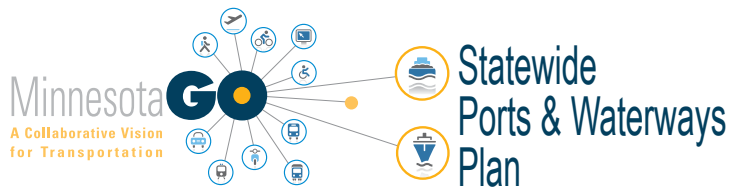
As a current example of the market response to port investment, following the recent completion of a new dock wall at St. Paul's Southport facility, there is greater capacity for barges to load and unload at this location. In response, the Form-A-Feed company is constructing a 60,000 square foot transport facility for its feed and fertilizer operations. An estimated 40,000 to 50,000 tons of product (at \$0.10 per ton) will be shipped into the Southport Barge Terminal during the first year of operation, and manufacturing operations may be added at the site in the future. Total private investment in this venture is expected to be \$5-7 million. The direct employment impact will be a total expected job gain of up to 20 jobs). Form-A-Feed signed a 15-year lease (with two 5-year renewal options) that is anticipated to generate \$800,000 to the Port Authority in the first 15 years. This site has been extremely useful to the USACE, through the Port Authority allowing river dredged material to be stored in this area. Over the past couple of years, the Port Authority has experienced greater demand from the private sector for this terminal area along the new dock wall, and the USACE storage area has been consolidated into a smaller footprint to allow for this additional development.

## BROADER ECONOMIC IMPACTS OF THE MARINE SYSTEM

Investments in the marine system provide benefits to the overall economy in direct and indirect ways. Jobs and wages are one way to calculate direct benefit to individuals in the industry, while secondary jobs, Gross Domestic Product, and exports are indirect. For example, the Great Lakes-St. Lawrence Seaway system has far-reaching direct and indirect impacts on the national economy. In 2010, it was responsible for 129,000 direct, induced, and indirect jobs, as well as for over \$18 billion in revenues and nearly \$10 billion in personal income. It also accounted for almost \$3 billion in state, local and federal taxes. Overall, cargo shipments on the system generate \$33.5 billion of economic activity, annually.

Costs attributable to delays in the nation's inland waterways system were \$33 billion in 2010, and are expected to increase to nearly \$49 billion annually by 2020. With an additional investment of \$15.8 billion between now and 2020, the US can protect \$270 billion in exports, \$697 billion in GDP, 738,000 jobs, and \$872 billion in personal income.





## Chapter 4

### OPPORTUNITIES, CHALLENGES AND STRATEGIES

## OPPORTUNITIES, CHALLENGES, AND STRATEGIES

The preservation and enhancement of a robust ports and waterways system is critical to the transportation future proposed by the Minnesota GO Vision and Statewide Multimodal Transportation Plan. However, opportunities and challenges exist and are emerging, regarding the maintenance and improvement of the system. The Statewide Ports and Waterways Plan offers strategies to address these opportunities and challenges that reflect many of the desired accessible, efficient, and multimodal goals and objectives put forth in the broader plans mentioned previously.

Many of the opportunities and challenges facing the statewide ports and waterways system are described in this chapter, grouped into five categories: Infrastructure Condition, Marine System Operations, Economic Competitiveness, Planning Integration, and Communication and Coordination. Corresponding to each opportunity or challenge is at least one strategy designed to preserve and enhance freight movement on the marine freight system in Minnesota.

### INFRASTRUCTURE CONDITION AND CAPACITY

Maintenance and upkeep of ports and waterways infrastructure – docks, slips, locks and dams, shipping channels, etc. – is critical to the effective, efficient, and reliable functioning of the marine freight system. Many opportunities and challenges exist related to Aging Port Infrastructure, Shipping Channel Maintenance, and Lock and Dam Maintenance. These are discussed in the following section, along with suggested strategies to address them.

#### AGING PORT INFRASTRUCTURE

##### Opportunities and Challenges

The infrastructure for which marine freight transportation partners are responsible requires sufficient, consistent, annual funding to remain functional. Much of the port infrastructure on the marine system in Minnesota is reaching advanced age. In particular, terminal operators and port authority staff are concerned about the growing number of docks, jetties, pier heads, walls, and breakwaters in need of maintenance or replacement. The rate of infrastructure improvement on the ports and waterways system has not kept pace with the aging rate of the assets.



While much of the infrastructure on the system (e.g. locks and dams, port infrastructure) is quite old, life expectancy can be extended with proper maintenance and rehabilitation. Traffic delays on the system can be addressed by small-scale and non-structural improvements, including guide wall extensions, scheduling, and helper boats. Changes like these can also generate significant cost savings to operators at a lower cost to taxpayers.

Currently, each port authority has a number of unfunded projects. Consistent and adequate funding would improve the reliability of the system and would provide private owners and operators with incentives to maintain and expand their operations in Minnesota. Funding should support replacements and upgrades to existing infrastructure, as needed, to improve efficiency in current operations and provide a foundation for new waterway-based business opportunities.

Gaps in information are also a concern. No comprehensive inventory or assessment currently exists for marine system infrastructure. This lack of robust data inhibits effective management of the system and makes communicating the marine system's needs to decision-makers challenging. More complete information on infrastructure condition would provide decision-makers with a more complete understanding of the system conditions and investment needs, allowing for more effective selection of projects to fund through the PDAP. MnDOT can assist public ports and private terminals in the collection, organization, and dissemination of data related to ports and waterways infrastructure and conditions.

Existing data, however, confirm that dock walls on the system are particularly vulnerable. Some are more than 70 years old, far exceeding the 50-year typical asset life for such structures, and are in need of major reconstruction. Unexpected failure of a dock wall would interrupt commercial navigation business on the system, in addition to potentially affecting human safety. A recent example is the failure of a major section of dock in the St. Paul Harbor which caused a sinkhole, major safety issues, and the closure of that part of the dock for over a year.

Port improvement projects are capital-intensive, increasingly requiring funding from multiple sources as rehabilitation and expansion needs outpace growth in program revenues. PDAP funding, provided by the Minnesota Legislature, is available to public ports to supplement rehabilitation and new construction funding. Currently, despite the successes of the PDAP program, public port authorities continue to face a steady deterioration of their infrastructure.





An assessment of the age and condition of facilities in public ports on the marine system in Minnesota identified a need of \$10-12 million annually for rehabilitation and replacement of infrastructure over the next 5-10 years. This level of investment would return facilities and connections to a state of good repair, which in turn would ensure the safety and reliability of these vital components of the marine freight system.

The future success of the ports and waterways system is contingent on having a solid and reliable infrastructure base that can respond to changing market conditions. Accelerating the program to a level matching system conditions and needs, and on a consistent funding cycle, will improve the safety and efficiency of the marine system and will encourage marine-based businesses to expand their enterprises as opportunities for growth arise.

To address port infrastructure condition needs, MnDOT will work with port authorities and the Minnesota Ports Association to coordinate and facilitate long range planning and the proper investment levels for PDAP.

### Strategies

- Improve infrastructure condition and capacity in public port areas and private terminals.
  - **Who Will Act?** Port authorities; private terminal operators.
- Continue to address aging and inefficient infrastructure in public ports in Minnesota through the Minnesota Port Development Assistance Program.
  - **Who Will Act?** MnDOT.
- Pursue consistent, adequate, and predictable funding for the Minnesota Port Development Assistance Program.
  - **Who Will Act?** Minnesota Ports Association.
- Continue to conduct infrastructure inventories and needs assessments for each port and terminal.
  - **Who Will Act?** Port and terminal owners and operators.
- Compile infrastructure inventories, and be a champion for infrastructure needs, of public ports in Minnesota.
  - **Who Will Act?** MnDOT.

## SHIPPING CHANNEL MAINTENANCE

### Opportunities and Challenges

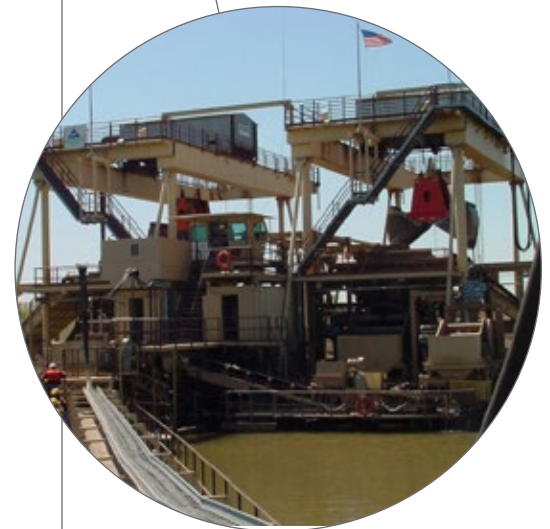
A key concern across both the Mississippi River System and the Great Lakes-St. Lawrence Seaway system is the maintenance of shipping channels. Over time, sediment accumulates along the bottom of river channels and harbors. Periodic dredging, or removal of this built-up sediment, is necessary in order to maintain an adequate navigable depth that allows for the free flow of fully-laden barges or ships. Dredging entails mobilizing and operating equipment to excavate material and then transporting this material to a disposal site.

Regular dredging keeps channels open, ensures that ships and barges can be loaded to full capacity –thereby maximizing efficiency – and ensures that ports remain fully accessible, even in dry years when water levels are lower than normal. Preservation of navigable channels by regular dredging is an ongoing activity of the USACE. To keep marine traffic moving, a channel must be sufficiently wide and deep to accommodate modern vessels.

On the river system, yearly water levels have been fluctuating due to drought. After a particularly dry 2012, low water levels are currently a major concern. Water levels on the Great Lakes have also been low, primarily due to drought and evaporation, since 1999. This has restricted ship tonnage by as much as 6,000 tons per trip, as a result of light-loading. Less tonnage per trip results in higher freight costs per ton for both carrier and shipper.

Lake Superior harbors in Minnesota are presently in need of dredging to lower their harbor-bottoms from 12 to 60 inches. The USACE listed 26 nation-wide candidates for dredging in priority order, including Duluth (No. 6), Taconite Harbor (No. 12), Silver Bay (No. 13), and Two Harbors (No. 14). These harbors were identified as possible candidates for deepening based on preliminary economic analyses, but USACE can only maintain these harbors to their current congressionally authorized depths. When lake levels are running low (as has been the case for some time now) USACE can still only perform maintenance dredging to that authorized depth, forcing shippers to load light.

Also of concern regarding dredging is the safe and cost-effective management of dredged materials. Complicating factors include concerns with dredged material disposal and related environmental regulations. Finding adequate storage facilities – or, preferably, alternative beneficial uses – for dredged material is needed. Reuse of such materials in land development and transportation projects is one potentially low-cost and win-win solution which would provide permanent locations for continually-accumulating sedimentation in the navigation channels.





MnDOT can support the USACE in their channel maintenance dredging program by identifying beneficial uses for dredged material in state road building projects. Examples of dredged material reuse that MnDOT has undertaken include the use of dredged material in road construction projects in the Duluth, Twin Cities, and Rochester areas. Dredged material is also temporarily stored on MnDOT land under the I-35W Bridge in Minneapolis.

### Strategies

- Maintain and improve the marine navigation channels on the river and lake systems.
  - **Who Will Act?** US Army Corps of Engineers (USACE).
- Support the continued maintenance and improvement of the navigation channels, particularly through offering or helping to find dumping locations or beneficial reuse opportunities for dredged material.
  - **Who Will Act?** MnDOT.

## LOCK AND DAM MAINTENANCE

### Opportunities and Challenges

Shippers rely on the locks being consistently in service during the shipping season to maintain their freight transportation services for customers. The vast majority of locks and dams on the marine system are more than 50 years-old, though, leading to concerns about their condition and reliability. Closures for repairs are becoming increasingly frequent, leading to disruptions in service and inefficiencies in shipping. Some locks do not have redundant lock chambers; in these cases, emergency maintenance results in a complete stoppage of freight shipping through that lock. Outages result in costly delays to marine traffic that, in many cases, are unrecoverable. In some cases, extended delays have forced barge shippers to use alternate, more expensive transportation options (such as rail) to move their freight. Small-scale measures such as guide-wall extensions to accommodate larger vessels and barge tows could be used to create efficiency gains.

Specified lock and dam projects will need to be undertaken to preserve system integrity and to avoid unplanned (emergency) maintenance. The USACE regularly maintains the lock and dam system for the benefit of commercial navigation, recreation and other uses, but there is currently a backlog of USACE projects to maintain and enhance the lock and dam system.

Spending shortfalls in the Harbor Maintenance Trust Fund (HMTF) have led to deferred maintenance of the marine system, and insufficient revenues in the Inland Waterways Trust Fund (IWTF) have led to delays in construction and major rehabilitation projects. Additional funding allocation will allow USACE to accelerate maintenance and repair of the lock and dam system serving shippers in Minnesota. MnDOT can provide support in the form of memos and letters, and through participation on the USACE Economic Coordinating Committee and the Upper Mississippi Waterway Association to relay the importance of the marine channel and infrastructure for economic competitiveness in Minnesota, as needed.

### Strategies

- Pursue funding for lock and dam maintenance on the federal marine navigation system.
  - **Who Will Act?** USACE; MnDOT; Transportation Partners.
- Maintain the federal marine navigation system to an acceptable level of service.
  - **Who Will Act?** USACE.
- Support USACE in maintaining the federal marine navigation system (by writing memos, letters of support, and participating on committees and associations).
  - **Who Will Act?** MnDOT; Upper Mississippi Waterway Association (UMWA); Terminal Owners/Operators.



## MARINE SYSTEM OPERATIONS

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From funding to administration to regulation, the operations of the marine freight system are constantly evolving. The following sections address the Minnesota Ports Association, Technological Improvements and Environmental Concerns, and the opportunities and challenges related to each for the state's marine system. This section discusses each of these categories, and includes strategies to address the opportunities and challenges.

### MINNESOTA PORTS ASSOCIATION REVIEW AND EXPANSION

#### Opportunities and Challenges

The Minnesota Ports Association currently consists of the five public ports in the state, and acts as an ad hoc body to coordinate legislative requests and policy positions. When first formed in 1994 by the Duluth Seaway Port Authority, the City of Minneapolis, the St. Paul Port Authority, the Red Wing Port Authority, and the Winona Port Authority, the association hired a lobbyist to present their port infrastructure rehabilitation and improvement needs to the Legislature at each legislative session.

The Ports Association meets several times each year to discuss each port's infrastructure needs and to develop a priority list of projects to present during the next legislative session. As the administrator of the PDAP, MnDOT is invited to each meeting to discuss available funding and to obtain a priority list of projects from each port authority. When the PDAP receives money from the legislature, MnDOT publishes a Request for Proposals in the State Register for port projects. After reviewing the applications, MnDOT then determines which projects can be funded with the dollars available and drafts agreements for the projects.

With the current interest in freight across the public and private sectors, MnDOT could consider developing a new, statewide marine freight forum with a fuller set of objectives and an expanded association, including broad stakeholder representation from the public and private sectors. This group could provide a forum for information sharing within an expanded body of users, could support local port authorities and operators in the public arena, and coordinate advocacy and education efforts. Closer investigation of efforts in Oregon, Wisconsin, Florida and the Duluth/Superior HTAC would be useful in identifying best practices. Metropolitan Planning Organizations and Regional Development Organizations would be appropriate partners in this effort and may be instrumental in facilitating this development. The Wisconsin Commercial Ports Association, for example, includes public and privately operated terminals, and port related service providers including engineering firms, construction companies, state and federal government agencies, and port service providers.



MnDOT can investigate the need for expansion of the Minnesota Ports Association, modeled on the best practices of peer states, as well as local organizations such as the Duluth Superior HTAC, to facilitate collaboration, advocacy, and regular communication.

### Strategies

- Continue to support the Minnesota Ports Association.
  - **Who Will Act?** MnDOT.
- Consider developing a new marine freight forum to advance marine system issues, integrated with ports of entry and other freight issues and modes.
  - **Who Will Act?** MnDOT.

## TECHNOLOGICAL IMPROVEMENTS

### Opportunities and Challenges

Technology-driven advancements – such as electronic data interchange between freight carriers, shippers, and receivers – have significantly improved how ports operate and have allowed for greater focus on the important issues of safety and security. For example, port operators no longer have to wait until an inbound barge or ship arrives at the port before determining the load type, when it will be released by customs, where it is going, and other important information. Port operators can also obtain real-time data regarding when the ship, barge, truck or rail car they require is going to arrive at their site, which allows them to plan their operations to perform at maximum efficiency and to react quickly to delays or obstacles. More information results in better planning and execution, thereby reducing transportation costs. Advances like hands-free mooring and navigation technology incorporating real-time draft information are also improving the safety and efficiency of maritime trade.

Marine fleet operators are currently replacing engines and generators with more fuel-efficient models. On the Great Lakes, propulsion engines on the Motor Vessels Edwin H. Gott and Paul R. Tregurtha were replaced. Three additional U.S. flag ships converted from steam to diesel, reducing fuel use by 50 percent. On the Mississippi River, all eight towboats in St. Paul's have had new engines and generators installed since 1993, increasing fuel efficiency by over 30 percent. These fuel savings are expected to cover the cost for replacement engines and generators in a few years.



The conversion of vessels to a natural gas propulsion system, a process beginning to gain traction across the industry, would reduce fuel costs and further cut emissions for the marine fleets. The M/V Mesabi Miner, a laker calling at Lake Superior ports, will likely be the first of its kind to have liquefied natural gas tanks installed, allowing the ship to use this less expensive, less emitting fuel source. Converting the entire US fleet with natural gas engines would save over \$38 million.

Taking full advantage of available technology is essential to the overall worldwide competitiveness and longevity of the marine freight system. Technological improvements will continue to be needed to keep the marine system competitive. Marine system fleet and harbor operators can continue to improve operations through the advancement of technology.

### Strategies

- Continue to improve the fleet and terminals through engine efficiency improvements and conversion to natural gas for propulsion.
  - **Who Will Act?** Marine Fleet; Port and Terminal Operators; Minnesota Pollution Control Agency (MPCA).
- Continue technological upgrading of ports (e.g. radar, GPS).
  - **Who Will Act?** Port operators.

## ENVIRONMENTAL CONCERNS

### Opportunities and Challenges

Efforts to inhibit the spread of invasive species through the marine system may affect commercial navigation and freight movement on the rivers and lakes. Proposals to close locks may impact industries that are dependent on such means of transportation. In addition, some state ballast water standards differ from federal standards, complicating regulations on marine transport.

Potential new national standards for ballast water management to discourage the introduction of foreign species into US water bodies are being closely watched by ports and waterways stakeholders. Water is pumped in and used as ballast (weight) to help stabilize and improve the maneuverability of marine vessels at sea. While ballast water is essential for safe and efficient modern shipping operations, it has also introduced nonindigenous aquatic species into the marine system including the zebra mussel, round goby, and Eurasian Ruffe.



Foreign ships coming into the Great Lakes must exchange their ballast water with salt water 200 miles off the Atlantic coast to kill organisms that may have been picked up in foreign ports. This successful policy, enforced by the US Coast Guard and the Environmental Protection Agency, has eliminated the introduction of any new exotic species into the Great Lakes. New technologies are being tried to further improve ballast water management for exotic species at test sites in Superior, Wisconsin.

These new technologies could also be applied to vessels that do not travel out of the Great Lakes. Although Lakers do not transit this Seaway or leave the freshwater of the Great Lakes, some authorities are concerned that they could foster the spread of already-introduced species within the Great Lakes because they must take on and discharge large quantities of ballast water when unloading and loading cargoes at ports, potentially contributing to the spread of nonindigenous aquatic species. Technologies and practices are available and currently used to kill or remove organisms in ballast water, such as ballast water treatment systems, saltwater flushing, and ballast water exchange. This may also eliminate the concern that Lakers may contribute to the spread of nonindigenous aquatic species

Asian carp are an invasive species of particular concern to the inland waterway commercial marine system use. Efforts to inhibit the spread of Asian carp and other species through the marine system include electrified, sound, and bubble barriers. Some have also called for lock closures in Minneapolis to prevent the species from spreading further up the Mississippi. Doing so would effectively close the Minneapolis port. In 2012, the Upper St. Anthony Lock in Minneapolis handled 594 commercial lockages. If closed, an equivalent amount of freight would be added to the already congested road and rail system in the metro area.

Closing locks and waterways to prevent the migration of exotic species may affect efforts to enhance global trade, the cost of moving goods, air pollution emissions, traffic safety and congestion, and economic competitiveness. The marine system is especially important in providing for a low-cost, environmentally friendly way to export heavy, bulk commodities such as agricultural products produced in many parts of Minnesota and import products we need from other areas. Although the marine system has a smaller impact on the natural environment compared to other modes, commercial use of the waterways does have an impact on natural systems. Transportation partners will need to continue to work together to improve the responsible use and management of our natural marine resources.

## Strategies

- Continue regulating ballast water exchange and flushing to reduce the risk of further invasive species introduction.
  - **Who Will Act?** US Coast Guard; Environmental Protection Agency (EPA).
- Continue improving decontamination methods for ballast water through research.
  - **Who Will Act?** University of Minnesota; University of Wisconsin; other institutions.
- Encourage the federal government to set new national ballast water standards.
  - **Who Will Act?** EPA Region V, with assistance from the Minnesota Pollution Control Agency and members of the Minnesota Ports Association.
- Control expansion of Asian carp, zebra mussels, and other known invasive species.
  - **Who Will Act?** Minnesota Department of Natural Resources; US Fish and Wildlife Service; EPA.
- Advocate for a balanced-approach use of the state's marine system, taking into consideration environmental and economic considerations.
  - **Who Will Act?** MnDOT; Minnesota Department of Natural Resources; US Fish and Wildlife Service, Upper Mississippi Waterway Association

## ECONOMIC COMPETITIVENESS

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Economic competitiveness in both domestic and international markets is very important to our economic future. Moving bulk freight by water is cheaper, less polluting, and safer than other modes, and therefore should be utilized to the greatest extent possible, while minimizing potential negative environmental effects. Many shippers would not be able to compete in their domestic or international markets, or develop new markets, if the ports and waterways system was not available for use. In addition, the marine freight system also currently operates at a capacity surplus, meaning there is opportunity for increased use and, therefore, greater efficiency. Opportunities and challenges also exist regarding New Markets, Logistics Improvements, and Containerization. These are explored in the following section, along with potential strategies to address them.

### NEW MARKETS

#### Opportunities and Challenges

The marine system needs to adapt to new market opportunities because tonnage is trending downward or fluctuating year-to-year for traditional commodities like coal, taconite, and grain. Discussions have begun in the industry concerning use of the Port of Duluth-Superior as a potential location for the shipboard movement of crude oil and petroleum products from the oil refinery in Superior, Wisconsin. Additional heavy lift cargo can likely be handled with self-unloading equipment on ships. Similar discussions are underway with shippers that have access to the Mississippi River System in St. Paul.

Petroleum products are already being handled by ships on the Upper Great Lakes, primarily supplying fuel to the ships. Given the dramatic recent changes in North American oil and gas production and impacts to the supply chains for these commodities, potential exists for transportation via the marine system in the near future. These products can be safely and economically transported by water on both the Great Lakes system and the Mississippi River system using available vessel capacity.

In the past five years, shipments of crude oil from origins in the developing Bakken and Williston Basin and other new oilfields of North Dakota, Montana, Manitoba and Saskatchewan, and from the Alberta oil sands, have consumed much of the excess capacity in the existing pipeline networks. Expansion of the pipeline system has not kept up with the quantities of product being transported, and in order to accommodate the growth in commodity shipments, most of the additional crude oil is being moved by rail to refineries located throughout the United States. The railroads are making long-term investments in crude oil transport by increasing their network capacity and capabilities. There may be a limit to the level of support that the railway industry can provide to the oil and gas industry, however.



The marine system may therefore have a future role in the movement of crude oil and petroleum products to refineries and facilities located on the Great Lakes, Mississippi River, East Coast, or Gulf Coast. MnDOT regularly tracks freight commodity movements on the marine system and emerging freight trends. The agency can continue to work with ports and terminal operators to identify opportunities for expanding freight movement on the marine system and can coordinate investments through the PDAP or other funding sources to support the development of port infrastructure (e.g., loop tracks, transloading facilities, lift equipment) needed to take advantage of these new opportunities.

### Strategies

- Identify new market opportunities on the marine system, including new and expanding commodity markets.
  - **Who Will Act?** Ports and Terminal Operators; MN Ports Association members.
- Coordinate investment to support the development of needed port infrastructure.
  - **Who Will Act?** MnDOT.

## LOGISTICS IMPROVEMENTS

### Opportunities and Challenges

A potential high-benefit opportunity for improving the efficiency of marine transportation is to increase two way traffic on the system, also known as reverse hauling. This relatively simple concept relies on newly developed business opportunities that create opportunities for more two way flows of loaded barges on the river system. Examples of such reverse hauling opportunities might include exporting more grain or silica sand by barge while importing aggregates, fertilizer, salt, or animal feed (such as cottonseed) – all using the same facility. This reduces wasteful one-way movements of freight on ships and barges that often return empty.

Another logistics-related opportunity to increase the effectiveness of marine transportation would be to extend the length of the shipping season – a possibility dependent on shifting climate and ice trends. Dates for opening and closing the shipping season may be adjusted, creating a longer season, and maintenance schedules for the lock system may be altered as a result.

MnDOT can work with transportation partners to identify opportunities to improve logistics, including origin-destination pairs that allow for reverse hauling and potential lengthening of the shipping season.



## Strategies

- Identify new logistical efficiencies on the marine system, including expanding two-way shipping and extension of the shipping season.
  - **Who Will Act?** Shippers, Carriers; MnDOT; USACE.

## CONTAINERIZATION

### Opportunities and Challenges

An increasing percentage of global trade goods are now moved by container – standardized steel shipping boxes that can be easily transferred between modes (from ship to train to flatbed truck). Currently, though, container services available in Minnesota are limited in both geography and capacity. The two existing terminals are both located in the Twin Cities, and the only direct services available connect to Chicago and the Pacific Northwest. There is strong desire from shippers for access to intermodal container service in other parts of the state as well as for additional terminal capacity in the Twin Cities. Container shipping in Minnesota is currently limited to rail and truck transport; containers are concentrated in Chicago and along the coastal ports and must be transported to Minnesota to become available for export use.

Intermodal container service is driven by density. Given that direct access is provided only to a few major markets, sufficient demand must exist in those shipping lanes to justify daily service.

A major influence on the competitiveness of a terminal is the availability of containers for shippers in smaller, lower density markets. Empty containers are generally concentrated in major markets such as Chicago, but are also available in the Twin Cities. In many cases, relocating containers away from major market centers is cost-prohibitive. That said, port operators on both the Mississippi River system and the Lake Superior system see opportunities for the development of container shipping along the state's waterways, especially as soon-to-be completed expansion of the Panama Canal will allow for easier access to Asian markets for Great Lakes and Gulf Coast ports.

Containerization would also expedite two-way shipping, further increasing productivity on the system. Currently, ports are able to load containers on site, but they must be trucked to or from existing rail terminals. In addition, containers are not currently carried on ships or barges in Minnesota. To date, no port facilities on the marine system in Minnesota have been built or retrofitted to take advantage of container shipping. Marine freight partners should collaborate to expand intermodal containerization options on the marine system in Minnesota.



Photo of loading containers, from truck or rail, on to British ship Federal Tyne. (1968)

Source: MNHS

## Strategies

- Investigate opportunities to establish and expand use of containers on the marine system.
  - **Who Will Act?** Transportation Partners.

## PLANNING INTEGRATION

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The importance of the ports and waterways system to Minnesota's overall multimodal transportation system is not presently widely understood. To better integrate waterway planning into Minnesota's multimodal planning efforts, Land Use Compatibility, Intermodal Connectors, and Marine System Planning within MnDOT must be addressed. Discussions of and response strategies for opportunities and challenges within these areas are included in the following section.

### LAND USE COMPATIBILITY

#### Opportunities and Challenges

Land in and near port areas that is considered ideal for freight shipping purposes is increasingly in competition with residential, commercial, and recreational land uses. Focus has shifted in recent decades from industrial land use to commercial, residential, and recreational land uses, which has led to the displacement of freight terminals from the waterways and to reduced availability of land for marine freight transport. In these cases, freight has been forced to shift to less efficient road and rail modes.

In 2013, the Minnesota Legislature approved a rulemaking process for the DNR-led Mississippi Critical River Corridor (from Dayton to Hastings). The resulting rules should be consistent with 2013 Critical Corridor legislative language, which indicates that "commercial and industrial development in the corridor are priorities, on par with residential and natural resources." This will serve as guidance to communities in the corridor to protect marine freight assets from encroachment.

Encroachment of non-freight land uses is especially pronounced in Minneapolis, where it is further complicated by the potential to close locks and dams in an effort to prevent the spread of invasive species. Should the Minneapolis port and locks be closed, a number of commodities – including coal, fertilizer, scrap metal, pig iron, steel coils, agricultural twine, salt, sand, gravel, and limestone – would be forced to move by truck at greatly increased cost.



Consider, for example, the economic impact of the closure of a lock in downtown Minneapolis. In a 2012 study by the Metropolitan Council of the Twin Cities, Assessment of Economic Impact of Potentially Discontinuing Operation of the Upper St. Anthony Falls Lock, it would entail the permanent loss of 72 jobs in the Minnesota economy (44 are employed directly on the river). The shift in transportation from barge to truck would cost Minnesota's economy \$21.5 million by 2040, with the majority of these costs attributable to truck operations, additional highway travel time, and the logistics cost of commodity delivery times. The long term net effects of discontinuing lock operations (the direct, indirect/induced losses attributable to business operations, offset by the direct, indirect/induced increase attributable to greater use of trucking) results in an annual loss of approximately 84 jobs, \$5.3 million in wage income, \$9.3 million in value-added and \$14.4 million in economic output each year after the outlays for material handling and warehouse construction capacity stimulus is completed.

Decisions regarding the potential closure of freight facilities on the waterways in Minnesota should consider a broad range of community and regional impacts, including transportation and jobs impacts, as well as alternative preservation, mitigation and relocation strategies.

Freight transportation operates across and within industrial sites that are part of municipal, county, and regional jurisdictions. Local communities are in the best position to shape the land use decisions necessary for continued use and expansion of the commercial waterfront, which benefits local and statewide tax bases. MnDOT can encourage and assist with the incorporation of marine freight transportation planning into local land use and transportation plans, including developing policies and strategies to support and enhance marine freight transportation. These efforts will ensure appropriate land use planning for port areas and terminals.

### Strategies

- Preserve existing water-adjacent port land for the water-dependent industry.
  - **Who Will Act?** Local Governments; Port Authorities; Metropolitan Planning Organizations.
- Collaborate with local governments to preserve waterfront land with strategic importance for the marine freight system in existing or new locations.
  - **Who Will Act?** MnDOT; MN Ports Association.

## INTERMODAL CONNECTORS

### Opportunities and Challenges

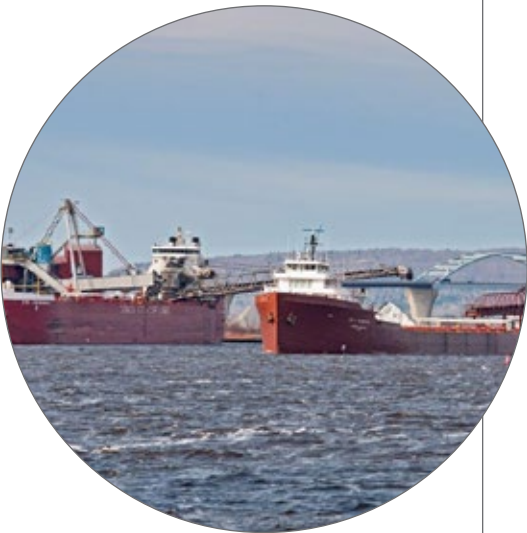
Intermodal connections are very important to the efficient and cost-effective flow of freight throughout the state. Connections include road and rail links, both within port areas and connecting them to the rest of the transportation system. Rail track condition and road pavement condition, travel lane width, turning radii, and vertical and horizontal bridge clearance are all important factors in adequately accessing the marine system by land. In some cases, existing intermodal links are in poor condition and in need of repair; in other cases, new links are needed.

Multimodal connections provide options and access for freight and reduce truck demand on the highway and rail system. When designed, maintained, and operated adequately, connector routes facilitate the best use of the marine system, and improve the overall efficiency of the road and rail system. Keeping road and rail connections in good repair is important to ensuring that marine freight can remain economically competitive by efficiently transferring to the road and rail systems.

There is some concern, however, regarding the condition of intermodal links within and connecting to ports in Minnesota. Expanding the capacity and availability of such links would particularly benefit local businesses, but the benefits extend far beyond the port areas by creating cost-saving multimodal freight transportation options for all shippers. MnDOT, local governments, port authorities, and other partners can work together to ensure intermodal connector routes are adequate.

### Strategies

- Ensure that intermodal connectors between the marine system and the road and rail freight systems are adequate.
  - **Who Will Act?** MnDOT; Transportation Partners.





## MARINE SYSTEM PLANNING WITHIN MNDOT

### Opportunities and Challenges

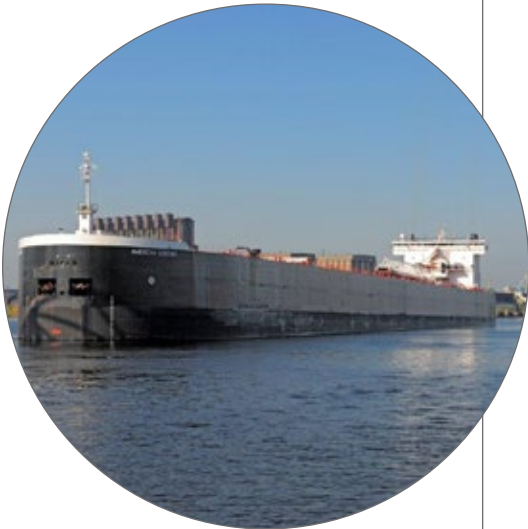
Ports and waterways system-based enterprises play a critical role in the economic health of the state and of local communities, promoting efficiency, and connections to global markets. Statewide planning efforts for maintenance of the marine system are critical to ensuring that the needs of commercial users of the system are recognized and considered at all stages of the planning process. As an important freight mode, marine transport should be fully considered as the Statewide Multimodal Transportation Plan, State Highway Investment Plan, and Statewide Rail Plan are developed and implemented. Marine issues should also be incorporated into specific programs and initiatives, such as criteria identification and project selection in the Transportation Economic Development Program and applications for federal programs like TIGER.

Minnesota's Statewide Multimodal Transportation Plan is used to shape planning for the state's entire transportation system, including the marine system, and serves as a framework to provide guidance for our partners. The plan is updated every four years, which means an opportunity exists to enhance marine planning by greater inclusion of issues and recommendations. The State Highway Investment Plan and the Minnesota Statewide Rail Plan can both integrate marine system planning by considering opportunities for modal diversion to reduce congestion and provide access between systems for efficient multimodal transfers.

The Transportation Economic Development (TED) program is a collaborative effort between the Minnesota Department of Employment and Economic Development (DEED) and MnDOT. Depending on the funding source, port projects could be advanced under this program. The US Department of Transportation's TIGER program has been used as a source of funding for the marine transportation system. This program can continue to be utilized, if available, for projects that are multi-modal, multi-jurisdictional, or otherwise challenging to fund under other programs.

MnDOT can improve multimodal planning activities to more comprehensively include the marine system in the development of plans, programming, and project selection. In addition, MnDOT currently monitors tonnage on the marine freight system annually; system performance measures allow MnDOT to assess the overall effectiveness of the system as it relates to other freight modes, including system efficiency and use and infrastructure condition.





### Strategies

- Formally integrate ports and waterways planning into future iterations of Minnesota's Statewide Freight Plan.
  - **Who Will Act?** MnDOT.
- Increase the visibility of marine freight planning within future iterations of Minnesota's Statewide Multimodal Transportation Plan.
  - **Who Will Act?** MnDOT.
- Coordinate and support applications to TIGER, TED, and other programs to enhance funding for marine freight projects.
  - **Who Will Act?** MnDOT.
- Report on marine system performance measures.
  - **Who will Act?** MnDOT.

## COMMUNICATION AND COORDINATION

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As with Planning Integration, Communication and Coordination are important facets of improving the ports and waterways system and advertising its advantages. Opportunities and challenges related to Outreach and Education, The Great Lakes-St. Lawrence River Maritime Initiative, and America's Marine Highway Program must be addressed in order to advance the marine freight transportation system in Minnesota. Various strategies to help do so are presented following discussions of each category.

### OUTREACH AND EDUCATION

#### Opportunities and Challenges

The marine system moves freight more cheaply, uses less fuel per ton-mile, produces less pollution and traffic congestion, and has a better safety record when compared to any other freight mode. For example, if the rail system was to move all the grain and oil seeds that are transported on the Mississippi River system in one year, an additional 122,000 rail cars and over 1,000 locomotives would be needed.

The system is an essential component of efficient freight movement that keeps Minnesota's exports globally competitive and saves consumers money. Ports are critical nodes of a globalized supply chain and provide intermodal transportation interchanges between the marine freight system and the road and rail freight systems. Waterway corridors relieve surface transportation congestion and provide fuel savings and reduced greenhouse emissions. Notably, the marine system also currently operates at a capacity surplus, meaning further benefits can be achieved through greater use of the system.

Broadly communicating the maritime sector's positive contributions to Minnesota's economic competitiveness, natural environment, and quality of life will advance understanding and appreciation of the marine system. In addition, federal legislation is needed to fund and authorize the USACE to study and construct water infrastructure projects on the marine system – including locks, dams, and dredging. A better understanding of the utility of the marine system will aid in advancing federal funding to improve the marine system. MnDOT can communicate the marine freight message both within MnDOT and with external transportation planning partners.

Acknowledgment should also be given to the fact that the waterways in Minnesota are a shared resource, and shippers and carriers should continue to be good stewards of the system, preserving the system for social and economic needs, and advocating for the responsible use of natural resources.

### Strategies

- Communicate the benefits of the marine system as part of a sustainable transportation system.
  - **Who Will Act?** MnDOT; Transportation Partners.
- Strengthen partnership and coordination with key stakeholders in ongoing planning activities, including conservation and environmental stewardship partners.
  - **Who Will Act?** MnDOT; Transportation Partners.
- Support the approval and implementation of federal legislation for and funding of the marine system by educating legislators as to the importance of a robust freight transportation system.
  - **Who Will Act?** MnDOT.

## THE GREAT LAKES–ST. LAWRENCE RIVER MARITIME INITIATIVE

### Opportunities and Challenges

The Great Lakes-St. Lawrence River Maritime Initiative is a representative group of elected officials in the US and Canada that have agreed to cooperate to advance marine freight shipping on the system. A number of barriers and challenges prevent the Great Lakes-St. Lawrence River maritime system from being utilized to its full potential, including: regulatory hurdles; aging and dilapidated infrastructure; dropping water levels that result in shallow harbors remaining undredged; the winter closure of the Seaway; and other obstacles to achieving a seamless transportation system that coordinates rail, highway and maritime shipping across the region. A wide variety of opportunities and structural arrangements exist to fund improvement of the Great Lakes-St. Lawrence River maritime infrastructure network, including governmental investment, private capital, public-private partnerships and creative financing mechanisms.

As part of the Initiative, the Great Lakes-St. Lawrence River Maritime Task Force was created and is charged with developing recommendations to improve the system, including the following issues:

- The current Great Lakes-St. Lawrence River governance and infrastructure funding system and how it could be improved;
- Current trends and developments in Great Lakes shipping, current investment levels in ports, ships and system maintenance;
- Regulatory hurdles that exist and how they should be modified to improve the Great Lakes-St. Lawrence River maritime transportation system;
- How to improve the Great Lakes-St. Lawrence River Maritime system so that it can be more fully integrated with and complement existing freight transportation systems, creating a seamless transportation system for the benefit of the region's citizens and economy;
- Reasons that rail and truck shippers do not make better use of marine transportation today and what changes would be required for them to do so;
- The impacts of changing worldwide trade patterns on how the Great Lakes-St. Lawrence River maritime transportation system is used; and
- What changes should be made to ensure that the region is in the best position to take advantage.

MnDOT can provide assistance by participating on the Task Force to advance the Great Lakes-St. Lawrence River Maritime Initiative.



## Strategies

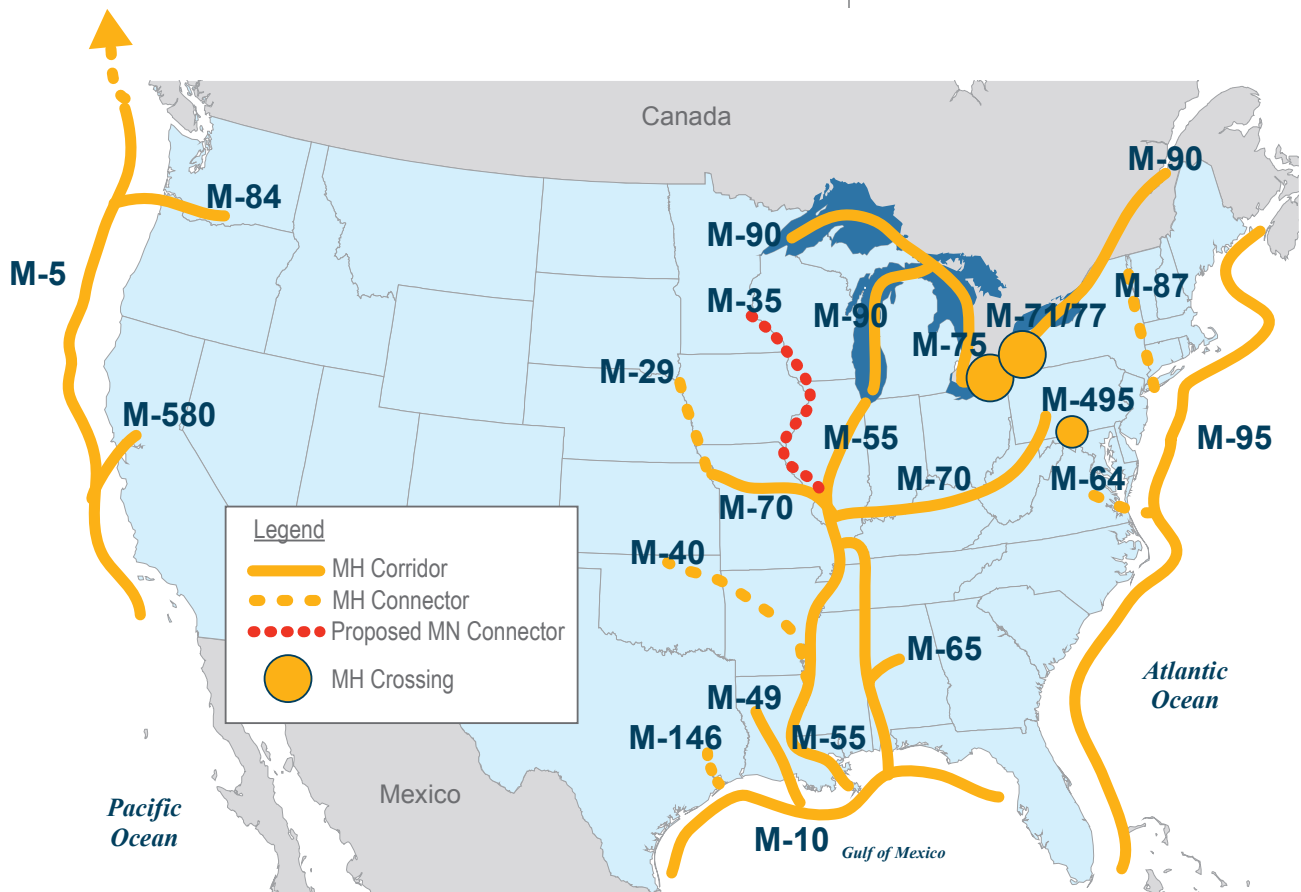
- Champion the activities identified by the Great Lakes-St. Lawrence River Maritime Initiative.
  - **Who Will Act?** Great Lakes-St. Lawrence River Maritime Initiative Task Force.
- Continue to participate on the Great Lakes-St. Lawrence River Maritime Initiative Task Force.
  - **Who Will Act?** MnDOT.

## AMERICA'S MARINE HIGHWAY PROGRAM

### Opportunities and Challenges

America's Marine Highway Program (MHP) was initiated by the USDOT, in coordination with local sponsors, to expand the role and use of waterborne transportation. The program is anticipated to provide a seamless transition across freight modes by leveraging marine services and locations to complement landside surface transportation routes.

Figure 4.1 America's Marine Highway Routes





Marine highways have been designated along routes parallel to interstate roadways to help meet congestion and emissions objectives. The marine freight system has a unique commercial advantage as it connects to both the M-90 and M-55 Marine Highway Corridors, with excellent intermodal connections between the two corridors. The Middle and Lower Mississippi River sections are also part of the M-55 corridor that runs from Chicago to New Orleans.

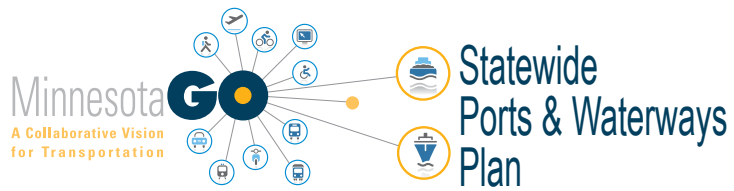
The M-90 Corridor connects the commercial navigation channels, ports, and harbors from Albany, NY to Chicago, IL and Duluth, MN. It provides benefits to both I-90 and I-80 and offers virtually unlimited capacity from Western Lake Superior to the East Coast via the St. Lawrence Seaway. New and expanded waterborne services present the opportunity to absorb some of the future traffic congestion forecast for the corresponding landside corridor.

The M-35 corridor is defined as the Upper Mississippi Connector, stretching from St. Louis, Missouri to Minneapolis - St. Paul on the Mississippi River. Unfortunately, M-35 is not currently officially designated. MnDOT formally applied to MARAD and the designation is in progress, but a study is needed to ensure that the benefits of marine freight can be realized on this corridor. Securing this designation from MARAD would help ports all along the corridor use the marine system to reduce freight on congested highways and railways and would expand Minnesota shippers' ability to distribute freight to the region and the world. For the Upper Mississippi River, continued coordination with adjacent cities and state departments of transportation will increase the opportunity for designation and improved system performance.

MnDOT can continue to support the definition and recognition of the M-90 corridor between Albany, New York and Duluth-Superior and can advance the designation of the M-35 corridor between St. Louis, Missouri to Minneapolis - St. Paul on the Mississippi River. MnDOT can continue cooperative support of and participation in the program as the Marine Highway Corridor concept advances and projects are developed.

### Strategies

- Continue to champion establishment of America's Marine Highway System.
  - **Who Will Act?** United States Maritime Administration (MARAD).
- Continue to work with MARAD and the Mid-America Freight Coalition to advance the M-90 and M-35 Marine Highway corridors.
  - **Who Will Act?** MnDOT.



# Chapter 5

## NEXT STEPS



## NEXT STEPS

Domestic maritime transportation has the potential to reduce highway, bridge, and rail maintenance costs by diverting freight from congested landside modes to underutilized water transportation services. However, for these services to be competitive, the ports where intermodal transfers occur need to be integrated well with the surface transportation system. Currently, many port owners are unaware of how to engage in local- and state-level transportation planning processes. Since there are no dedicated federal funding sources for land side port infrastructure or for Marine Highway development, integration of marine freight into state transportation plans is now vital to ensure the future prosperity of the US maritime sector.

Coordination with federal initiatives and industry associations is vital to the success of any statewide involvement, in terms of both operations and funding. Due to the complex nature of ports and waterways management in Minnesota, investment strategies require various funding sources, including the private sector and local, state, and federal investment.



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