Northern Minnesota / Northwestern Wisconsin Regional Freight Plan

Minnesota Department of Transportation
Wisconsin Department of Transportation
And
Duluth-Superior Metropolitan Interstate Council

Final Report
November, 2009

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SUMMARY

INTRODUCTION

The Northern Minnesota and Northwest Wisconsin Freight Plan is a multimodal transportation planning effort that includes highway (commercial vehicle operations), rail, waterway, air cargo, pipeline, and intermodal transportation. The study was sponsored by the Minnesota Department of Transportation (Mn/DOT), the Wisconsin Department of Transportation (WisDOT), and The Duluth-Superior Metropolitan Interstate Council (MIC).

This freight planning effort builds upon prior planning activities by the Metropolitan Planning Organizations (MPOs), Regional Development Commissions (RDCs), Area Transportation Partnerships (ATPs), Mn/DOT District 1, 2, 4, & 8 Offices, WisDOT, and Mn/DOT's Office of Freight and Commercial Vehicle Operations (OFCVO). This study is intended to increase the understanding of the demands from freight being placed on the regional transportation infrastructure and provide a framework to:

- Document the existing freight transportation system in the region, including facilities, service levels and current and projected commodity flows. Identify significant existing and projected needs, bottlenecks, infrastructure and regulatory issues, and other constraints in the region's freight transportation and their implications;
- Examine regional and local issues not captured in previous freight transportation study/planning attempts, including freight issues specific to the region. The primary focus will include but is not limited to agriculture, energy, bulk commodities, minerals, timber, manufacturing, global gateways including intermodal and oversize/overweight cargo movements (e.g., super routes), interregional truck routes, and last mile connections.
- Plan for improvements to freight movements specific to the regions, through a combination of operating and program efficiencies, infrastructure upgrades and investments, public/private initiatives and innovative funding, regulatory initiatives, and communications;

The region includes counties within Mn/DOT District 1 (Aitkin, Carlton, Cook, Itasca, Koochiching, Lake, Pine, and Saint Louis), Mn/DOT District 2 (Beltrami, Clearwater, Hubbard, Kittson, Lake of the Woods, Marshall, Norman, Pennington, Polk, Red Lake, and Roseau), and northwest Wisconsin counties (Ashland, Bayfield, Burnett, Douglas, Iron, Price, Rusk, Sawyer, Taylor, and Washburn). Characteristics such as the Duluth-Superior ports, the Iron Range, and the strong presence of the timber and agriculture industries create a unique region with unique freight issues.

REGIONAL FREIGHT INFRASTRUCTURE

Roadways: Trucks are an essential transportation mode for moving high-value goods throughout the region. The roadway system is comprised of interstate, state, county, city, and township roads that allow freight to be transferred effectively.

Rail: The rail network is important for moving a variety of commodities, especially heavy bulk goods. Nearly 1500 miles of active railroad track in Minnesota and nearly 500 miles of track in Wisconsin is located in the region.

Waterways: The Great Lakes/Saint Lawrence Seaway system connects ports in the region such as Duluth-Superior to ports worldwide. Roadway and railroad connections provide intermodal opportunities.

Air Freight: High-value and/or time-sensitive goods are shipped via the aviation system, especially when moving over long distances. Major airports, including Duluth International, have scheduled air cargo service with jet aircraft.

Pipelines: The pipeline system moves a significant tonnage of gas and hazardous liquids to and throughout the region, including the transportation of more than 75 different types of crude oil and natural gas. Several storage facilities are in the region and a small refinery is located in Superior.

Intermodal: Intermodal terminals represent key nodes in the regional freight system where freight is transferred from one mode of transportation to another. Intermodal terminals include truck/rail, container (containers on flat cars, trailers on flat cars, bi-modal), pipeline terminals, air cargo terminals, grain shuttle terminals, and lake terminal/ports. Intermodal terminals in the region are most often lake terminal/ports and air cargo facilities serving grain, iron ore, metals, salt, oil, and general cargo. There are no intermodal container terminals within the study area.

FREIGHT FLOWS

The largest commodity group exported out of the region is *Metallic Ores*, which accounts for 65 percent of all outbound tonnage or 66.8 million tons. The second largest commodity group exported out of the region is *Lumber or Wood Products* with 11 percent or 9.8 million tons of all outbound tonnage. The remaining top three exported commodities are *Non-Metallic Minerals, Farm Products*, and *Waste or Scrap Materials*.

Ohio is the top market for goods leaving the region, receiving 20 percent or 13.6 million tons. The second largest export market is Indiana with 17 percent, followed closely by Wisconsin with 16 percent. The remaining top export markets are Illinois, other areas of Minnesota, and Canada. This reflects the movement of taconite to steel mills.

UNIQUE REGIONAL ISSUES

Iron Ore and Taconite: The Mesabi Iron Range is the chief deposit of iron ore in the United States, providing more than 80% of all iron ore mined in the US today. Taconite is transported by rail to Lake Superior ports, where taconite pellets are produced. At these locations, it is shipped by lake freighters to steelmaking plants on the Great Lakes.

Steel Plant: Plans to construct an integrated steel plant on the western edge of the Mesabi iron range in northeast Minnesota include a taconite-to-steel facility with an annual capacity of 1.5 million tons in annual slab steel-making capacity.

Non-Ferrous Mining: The large-scale mining of non-ferrous metals may be on the horizon for the region, including platinum, palladium, and nickel, as well as gold, silver, and copper. It is currently estimated that more than 4 billion tons of crude, non-ferrous ore are deposited in the region, perhaps the largest deposits of these base and precious metals in the United States.

Taconite Tailings: The use of taconite tailings, or waste rock, as an alternative aggregate source presents the region with a new opportunity, due to abundance and low cost. Transporting taconite tailings to other locations in the region and to more distant locations remains a challenge.

Athabasca Oil Sands Development: The Athabasca Oil Sands are large deposits of extremely heavy crude oil, located in northeastern Alberta. Currently, over 80% of oil used in Minnesota originates in this deposit and new production will necessitate mining equipment transport, pipelines, and refinery expansion.

Wind Generation Equipment: As wind farms are developed in western Minnesota and the Dakotas, shipment of oversize/ overweight wind turbine components on the roadways, railways, and waterways has been steadily increasing.

Timber Industry and Paper Manufacturing: Lumber, wood and paper products are key industries in the region. Raw pulpwood is generally brought by truck from surrounding forests, and combined with long fiber pulp from Canada for paper production. Access to a network of heavy-haul routes is critical for the industry.

Coal Transportation: Bituminous coal mined in the Powder River Basin of Wyoming is transported by rail to Superior, where it is transloaded into Great Lakes bulk cargo ships and distributed to utility plants located all along the St. Lawrence Seaway. This is the most abundant commodity moved in the Duluth-Superior ports.

Port Capacity: Currently, there are no intermodal container terminals in the region, although demand exists. Therefore, access to national, international markets via intermodal containers is inefficient. In addition, constraints exist at the Duluth-Superior ports for existing and new commodities (e.g., slab steel, wind equipment, pulp) and new berths, dock space, and backlands are needed. Oversize/overweight constraints exist for truck and rail around the port as well.

RECOMMENDATIONS

Several interviews and a regional freight forum were conducted with key businesses representing the major industries in the region. This outreach assisted in identifying key commodities, industry trends, and system deficiencies. Analysis was conducted, resulting in several recommendations for improving freight mobility and the economy competitiveness of the region.

1. Duluth-Superior Intermodal Container Terminal Feasibility

Develop an implementation plan for a new Truck/Rail/Water container terminal at the port, including:

- Continue discussions with the CN Railway about the possibility of using a business model similar to that in Auburn, ME where CN's commitment in terms of investment and terminal operations is low.
- Continue to study whether shippers in the Twin Cities could feasibly be served through a Prince Rupert-Twin Ports-Twin Cities service.
- Discuss with CP and BNSF the possibility of establishing a virtual terminal (i.e., "paper ramp") in the Twin Ports area, where containers could be delivered and received, but ultimately drayed to the Twin Cities for rail transloading.

2. Dilworth Intermodal Container Service Expansion

Steps to improve service conditions at the BNSF Dilworth Intermodal Ramp could include coordination activities with the North Dakota Department of Transportation, and regional entities such as the Greater Fargo/Moorhead Economic Development Corporation and the Fargo Moorhead Council of Governments.

3. Expand Port Capacity by Developing Garfield C & D Dock

New berths, dock space, and backlands are needed for existing and new commodities such as slab steel, wind energy generation equipment, oil sands equipment, and pulp.

4. Promote Port Development, Planning and Research Coordination

Explore opportunities to improve coordinated planning efforts in Duluth-Superior regarding planning, port facilities, and access. Create a working agreement between the Duluth Seaway Port Authority and the Superior Harbor Commission, and encourage continued participation in HTAC planning activities by port stakeholders.

5. Designate a Tiered Truck Network

Mn/DOT should refine the identified Tiered Truck Network of roadways using established road design parameters, truck volumes, and strategic importance. Projects could be prioritized into the ATP/STIP process as elements of highway investment that directly impact the competitiveness and access for local businesses.

6. Designate Super-Haul Truck Corridors

Mn/DOT and WisDOT should refine the identified Super-Haul Truck Corridors and designate the system with the goal to handle an increasing number of over-dimension and overweight loads. The designation will preserve existing routes for wind and oil sands equipment and others from further degradation (turning radii, low bridges).

7. Identify Commercial Commodity Corridors

Mn/DOT should continue to map commodity-specific origin to destination routes that could serve as information for investment decision-making as well as benefit from routinely permitted loads for greater productivity without any liability to the overall highway network condition or any change in wear factors.

8. Improve Regional Truck Size and Weight Uniformity

Mn/DOT and WisDOT should examine legislation to create reciprocity across state lines for certain commodity exemptions or variations in truck size and weight laws, particularly on non-NN highway segments, which are the routes with the most flexibility. In addition, initiatives of cooperation and coordination in WINNDOT should be continued and expanded.

9. Undertake a Number of Quick Start Projects (Less than $500,000)

A series of relatively low-cost freight projects and initiatives were identified that can be completed in a short time frame and/or at low cost, such as regional transportation information, promotion, bridge and intersection geometrics, signage, and pavement markings.

CONCLUSION

The Northern Minnesota and Northwest Wisconsin region has unique freight issues and opportunities. The region is a top producer in the timber and agricultural sectors of the economy, and a large quantity of coal is transported through the region. Mining is particularly significant in the region. In addition, the Duluth-Superior ports serve as an international gateway, carrying national and international goods to and from the area and driving the regional economy.

The Plan serves as an evolving blueprint to focus the region's efforts on freight transportation and the economy. This multimodal transportation planning effort emphasizes heightened inter-agency coordination and critical investment making. The Plan assists the Northern Minnesota and Northwest Wisconsin region in providing a vision for maintaining and improving the intermodal freight system, laying the groundwork for a stronger economy.

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- Examine regional and local issues not captured in previous freight transportation study/planning attempts, including freight issues specific to the region. The primary focus will include but is not limited to agriculture, energy, bulk commodities, minerals, timber, manufacturing, global gateways including intermodal and oversize/overweight cargo movements (e.g., super routes), interregional truck routes, and last mile connections.
- Document the existing freight transportation system in the region, including facilities, service levels and current and projected commodity flows. Identify significant existing and projected needs, bottlenecks, infrastructure and regulatory issues, and other constraints in the region's freight transportation and their implications;
- Identify industry- and region-specific issues and trends as they relate to freight transportation and their solutions;
- Plan for improvements to freight movements specific to the regions, through a combination of operating and program efficiencies, infrastructure upgrades and investments, public/private initiatives and innovative funding, regulatory initiatives, and communications;
- Strengthen freight considerations in public project planning and investment decision-making.

BACKGROUND

In 2005, the Minnesota Department of Transportation completed its first ever Statewide Freight Plan, developing an overview of commodities movement across all industries and modes that began to define the importance of commercial goods movements to the economy and quality of life of the State of Minnesota and its residents. It demonstrated the volumes and values of raw materials and finished goods entering and exiting the state, as well as movements within and across the state, by road, rail, water, and air. This groundbreaking effort brought to light several recommendations to improve the State's efficiency and competitiveness.

One of these recommendations was recognition that the state was composed of a diverse set of regions with unique assets, industries, and issues, and that regional freight studies would be

productive in revealing localized situations and opportunities for improvements. These regional studies were intended to develop detailed information on the transportation needs and operational workings of local business, and to document through reports, forecasts, and interviews how, where, and why freight transportation is delivered. The goal was to form a current and future picture of commodity flows “where the rubber meets the road”.

The first of these regional freight studies was completed in 2007, covering southwestern Minnesota. It succeeded in reporting on the needs and trends of traditional industries including farming and manufacturing in the area, as well as unveiling emerging trends in areas such as ethanol and DDGS, swine production, private farm-controlled heavy trucking operations, and the ongoing effects of improving crop genetics and farm management. Key to the outcomes and information gathering were a series of targeted personal interviews with key transportation decision makers from small manufacturing firms to farmers to major processors and cooperatives. The analysis and findings served to drive a series of initiatives and ultimately investments in safety, major trunk highway improvements, and development plans for the local 10-ton road system.

The new information revealed in the regional study and its implications and results led to a demand for similar investigations into other distinct regions within the state. The direct result is the next two regional freight transportation plans, the Northern Minnesota and Northwestern Wisconsin Regional Freight Plan, and the Western Minnesota Regional Freight Plan.

Prior to this Final Report, two working papers and two technical memorandums were produced, forming the basis if this report:

Working Paper #1: Regional Freight System Inventory: This working paper describes the freight transportation networks in the region. The working paper provides a descriptive narrative supported by tables, graphs, and maps of the physical supply, condition and high-level performance of freight networks for the relevant modes in the region.

Working Paper #2: Regional Freight System Analysis: This working paper describes the nature and characteristics of trade by analyzing commodity flows by mode to, from, through and within the region. The profiles will also describe the economic basis of the region, workforce characteristics and discuss those industries in the region that are highly dependent on transportation, as well as which of those industries likely to grow in the future. The "freight profiles" contained in the working papers are high-level descriptions of the following attributes in the region:

- Major commodity origin/source markets by mode, weight, and value in the region;
- Key destination nodes within the region by mode, weight, and value;
- Predicted high-growth industries/commodities;
- A description of the key economic linkages between the region and the rest of North America; and
- Maps showing key commodity flow attributes in relation to the primary freight transportation network.

Technical Memorandum #1 summarized the key findings from the two Working Papers, and complemented the economic and commodity data with extensive stakeholder outreach. Through the data analysis and stakeholder outreach key issues surrounding freight infrastructure needs or operational improvements were identified in the study region. These issues and opportunities were then summarized in several ways:

- "Quick Start Projects" - relatively low cost (less than $50,000) infrastructure, operational and/or institutional improvements that can benefit freight mobility, reliability or security
- Transportation Improvement Program Projects - possible projects suitable for inclusion in the next MPO TIP or District STIP
- Policy or institution issues that require additional research or planning will be presented in the form of problem statements

Technical Memorandum #2 addresses the study goals of analyzing improvements to freight movements specific to the regions by examining an array of operating and program efficiencies, infrastructure upgrades and investments, regulatory initiatives, and public/private initiatives. Tech memo #2 also makes recommendations for strengthening freight considerations in public project planning and investment decision-making.

THE STUDY REGION

The entire land area examined in this report covers 19 counties in northern Minnesota (Mn/DOT Districts 1 and 2), and 10 counties in northwest Wisconsin for a total of 29 counties. In addition, to this regional study, a concurrent study was conducted for western MN. The Western MN Regional Freight Plan examined freight related planning issues in Mn/DOT Districts 2, 4, and 8. Mn/DOT District 2 was considered a transitional economic area between the timber intensive economy of northern Minnesota and the agriculture intensive economy of western Minnesota.

The region includes counties within Mn/DOT District 1 (Aitkin, Carlton, Cook, Itasca, Koochiching, Lake, Pine, and Saint Louis), Mn/DOT District 2 (Beltrami, Clearwater, Hubbard, Kittson, Lake of the Woods, Marshall, Norman, Pennington, Polk, Red Lake, and Roseau), and northwest Wisconsin counties (Ashland, Bayfield, Burnett, Douglas, Iron, Price, Rusk, Sawyer, Taylor, and Washburn). A map displaying the boundaries of each study region is presented in **Figure 1.** Characteristics such as the Duluth-Superior ports, the Iron Range, and the strong presence of the timber and agriculture industries create a unique region with unique freight issues.

A majority of this region is characterized as Laurentian Mixed Forest, dominated by aspen, pine, spruce, and fir, with pockets of northern hardwoods. The Eastern Broadleaf Forest is also located to a much lesser extent in this region, which consists of oaks, hickories, maples, and basswood. The timber industry is primarily located within the region due to the abundance of woodlands, and Minnesota and Wisconsin are top producers of timber, wood products, and paper products.

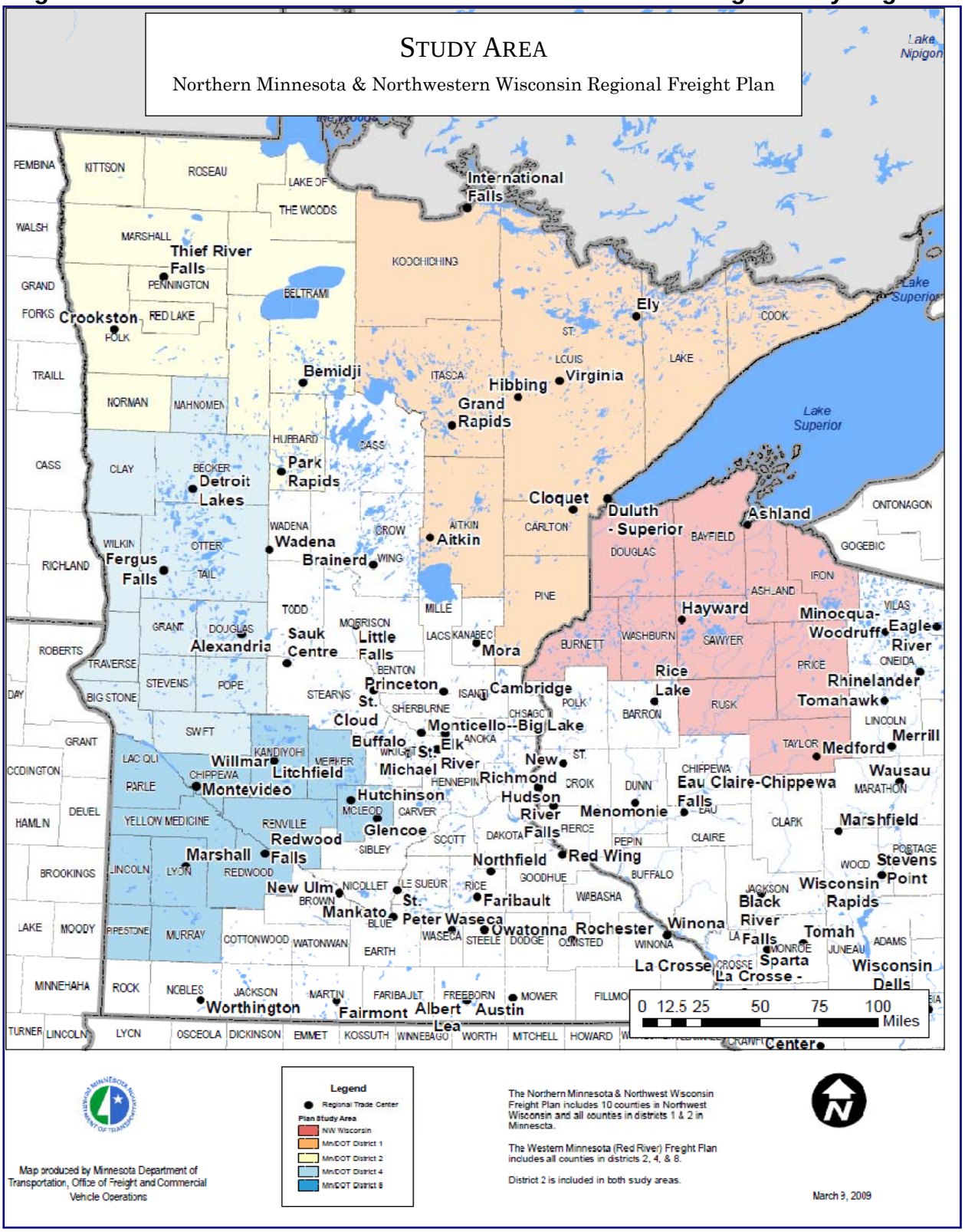
Fertile agricultural land in northwestern Minnesota is due to the deposit of Mollisols, a type of soil that was formed under grassland and created deep, high organic matter, nutrient-enriched surface soil. They are very productive soils, especially when excess water is removed, and produce small grains, sunflowers, potatoes and sugar beets in northwestern Minnesota. This sub-region of Minnesota is a top agricultural producer and exporter in the U.S.

Minnesota's Iron Range, located mostly in Itasca and St. Louis Counties, is the primary deposit of iron ore in the United States, where nearly 80 percent of all iron ore mined in the U.S. originates. The Iron Range includes four major iron deposits: the Mesabi Range, the largest iron range, in Itasca and St. Louis counties; the Vermilion Range in St. Louis and Lake Counties; the Gunflint Range in Cook County; and the Cuyuna Range in Crow Wing County. In addition, deposits of copper, nickel, cobalt, platinum, palladium, and gold are under exploration or are planned to be mined in the near term.

The Duluth-Superior harbor is located on the St. Louis River, where a sheltered, natural harbor contains 19 square miles of fresh water. The Duluth-Superior ports were developed there with iron ore docks, coal docks, grain elevators and specialized cargo facilities lining the industrial waterfronts of both Duluth and Superior. The ports serve as an international gateway, allowing shippers and receivers throughout the Midwest and the Great Plains to reach distant markets across the globe. The Duluth-Superior port is by far the largest port on the Great Lakes and is one of the premier bulk cargo ports in all of North America.

Major employers in cities in the region have very deep, interdependent, and synergistic relationships with their local communities. There is a significant economic and employment base by large and historically profitable manufacturing and processing plants, and there are very strong historic, cultural, and family links between business and community in the region.

Figure 1: Northern MN/Northwestern WI and Western MN Freight Study Regions



REGIONAL FREIGHT INFRASTRUCTURE

ROADWAY NETWORKS

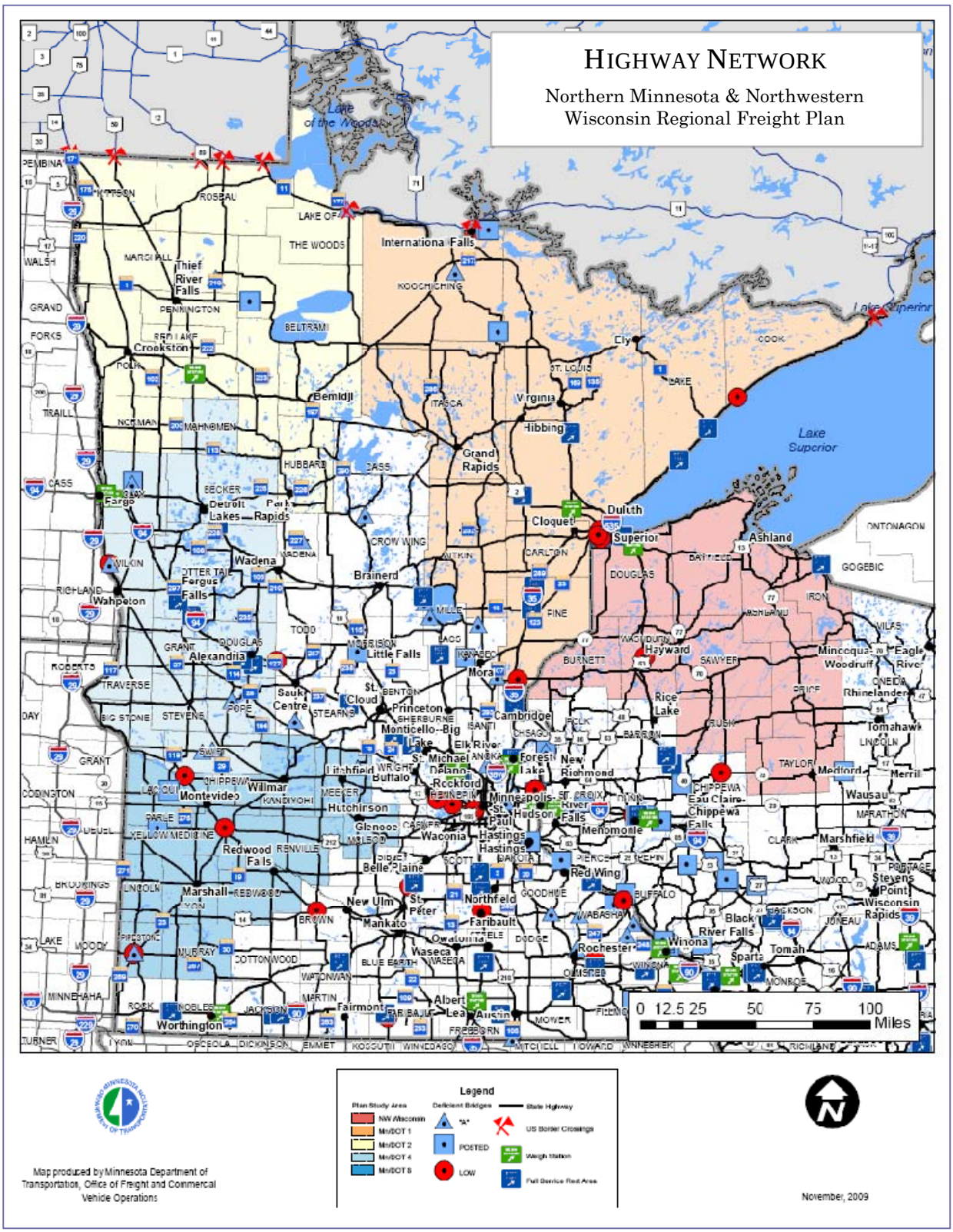
Trucks are an essential transportation mode for moving high-value goods throughout Minnesota, Wisconsin, and the United States. Designated roadway networks play an integral part in helping move goods throughout the states as they permit trucks to access regions that other transportation modes could not. The roadway system is comprised of interstate, state, county, city and township roads that allow freight to be transferred effectively.

Existing designated transportation networks were used as a basis to designate the new Minnesota truck network. The routes were selected because of their designation for existing truck use and for the specific purpose each serves in the overall transportation network. The networks include:

- Interstate/National Highway System/Strategic Highway Network
- National Network and Minnesota Twin Trailer Network
- Interregional Corridor (IRC) System
- 10-Ton Roadways
- Local Roadways (less than 10 tons)
- Minnesota Tiered Roadway Network (Designated State Trunk Network)

The roadway networks are shown in **Figure 2**. The following sections describe the components of the roadway system and the networks identified above.

Figure 2: Roadway Network for Northern MN/WI and Western MN



National Highway System/Strategic Highway Network

The National Highway System (NHS) was developed by the United States Department of Transportation in cooperation with states, municipalities and metropolitan planning organizations. The NHS includes the Interstate Highway System and the Strategic Highway Network (STRAHNET), which is a system of public highways that provides access, continuity and emergency capabilities for military personnel and equipment. Other principal arterials and connector routes are also part of the NHS. Within the region, two interstate highways are part of the NHS and STRAHNET system and run through its borders. These include I-35 in Minnesota and I-535 in Wisconsin. **Table 1** shows the distribution of NHS and STRAHNET miles in the region.

Table 1: NHS and STRAHNET System Miles

District	NHS Miles	STRAHNET Miles
NW WI	519	0
ATP 1	732	247
ATP 2	174	0
Northern Region	1,425	247

National Network and Minnesota Twin Trailer Network

The National Network (NN) consists of designated roadways throughout the United States that allow truck access including long combination vehicles (LCV), semi-trailer trucks with two trailers and single-trailer trucks with an extra-long trailer. In Minnesota, 4,904 miles of roadway are part of the NN. The NN is supplemented by Minnesota's Twin Trailer Network (TTN), a system of other trunk and local highways on which LCVs may also operate. These networks permit oversize and overweight movements, usually within specific routes and travel times defined by a permit. The region is welled served by the NN and TTN. Western MN is also well served by the NN and Twin Trailer Network, as many trunk and local highways help supplement the NHS. **Table 2** shows the distribution of NN and TTN miles in the region.

Table 2: NN and Twin Trailer Network System Miles

District	NN Miles	MN TTN Miles
NW WI	488	274
ATP 1	711	198
ATP 2	625	214
Northern Region	1,824	587

Interregional Corridor (IRC) System

A statewide Interregional Corridor (IRC) system was first designated by Mn/DOT in 1999 to enhance the economic vitality of the state by providing safe, timely, and efficient movement of goods and people. The 2,939-mile IRC system is a subset of Minnesota's trunk highway system,

consisting of the corridors of greatest significance for interregional travel. The system is grouped into two categories: high-priority and medium-priority interregional corridors.

High-priority IRCs connect the Twin Cities Metropolitan Area (TCMA) with primary Regional Trade Centers (RTCs) throughout the state, and medium-priority IRCs connect secondary RTCs to each other, to the TCMA, and to the primary RTCs. **Figure 3** displays the IRC system along with primary and secondary RTCs.

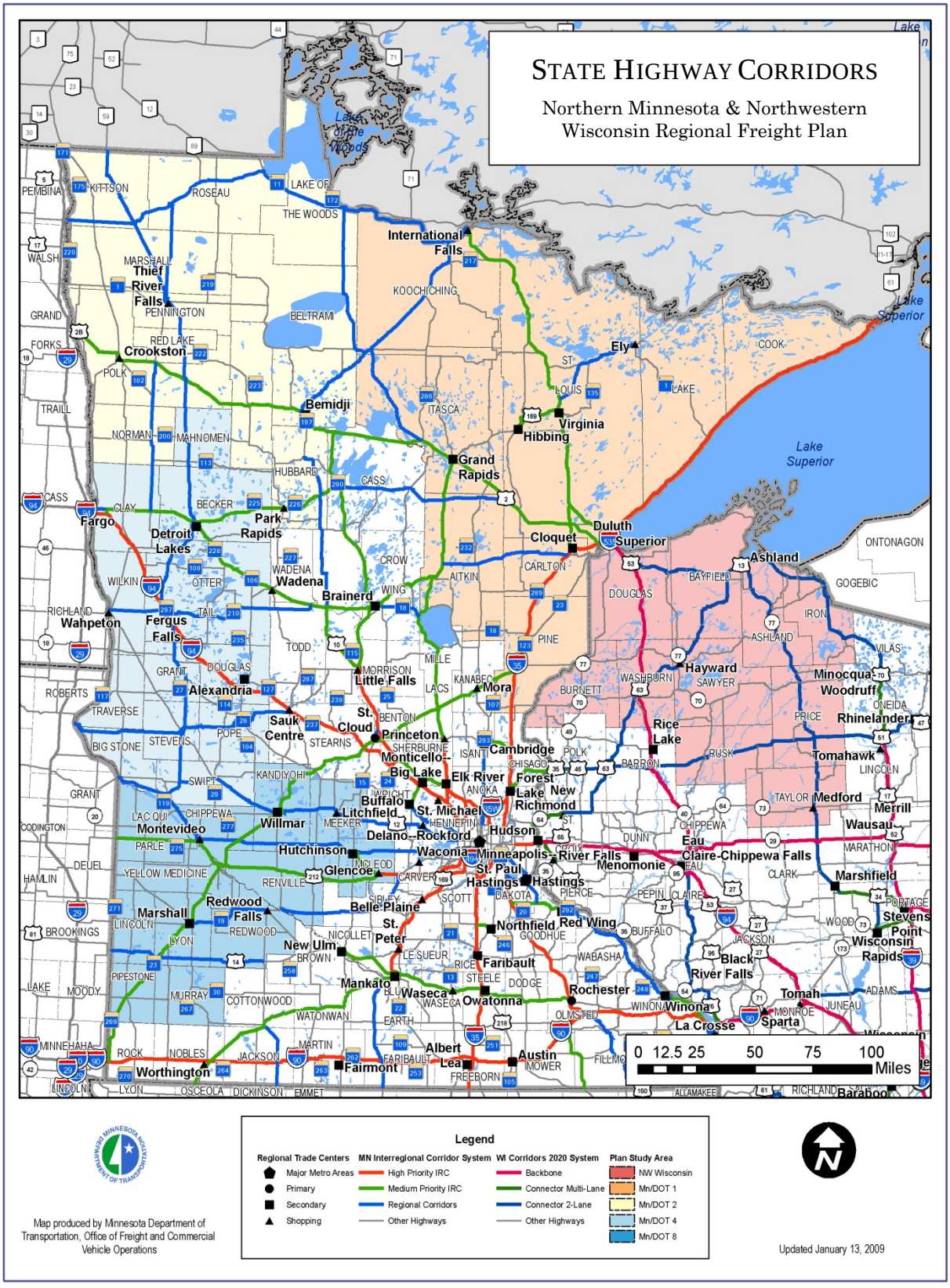
Duluth-Superior is the only primary RTC located in the region. Secondary RTCs in this region include Bemidji, Cloquet, Grand Rapids, Hibbing, and Virginia. High-priority IRCs within the region include I-35 and MN 61. Medium-priority IRCs in this area include US 2, US 53, US 169, MN 371, and MN 33. In general, the region is well served by the Interregional Corridor system.

In 2000, WisDOT identified 3,650 miles of roadways in its state truck highway network that are critical to the mobility and economic vitality of the state. These roadways, collectively called the Corridors 2020 Highway Network, are composed of two major subsystems. Backbone routes are key multi-lane routes that connect major population and employment centers and provide economic links to national and international markets. Connector routes are two- and four-lane highways that connect key communities and regional economic centers to backbone routes.

US 53 is the only backbone route in the northwest WI portion of the region. This route connects Duluth-Superior with the secondary RTCs of Rice Lake and Eau Claire. Additionally, several connector routes radiate from Ashland, and US 8 traverses the southern end of the region. More information can be found at the following two sites:

- *http://www.dot.wisconsin.gov/projects/state/hwy2020.htm*
- *http://www.dot.wisconsin.gov/business/econdev/corridors.htm*

Figure 3: Minnesota Interregional Corridor (IRC) and Wisconsin 2020 System



TEN-TON ROADWAYS

Ten-ton roadways provide important connections between intermodal freight facilities/major freight generators and the IRC system. These roadways generally include city and county routes that receive state aid funding, as well as trunk highways, interstates and some local roads. Year-round 10-ton roadways make up virtually all of state and federal trunk highways and major county and local paved arterials. These provide a predictable core freight roadway network. Although recent Minnesota legislation named all paved county roads as nominally 10-ton rated, bridge ratings remained unchanged, and local counties have the authority to down-post any roads they deem necessary. As a result, a significant percentage of local paved roadways and essentially all unpaved roads have axle load limitations below 10 tons, especially when factoring in seasonal load restrictions. Mn/DOT State Aid in partnership with the Minnesota County Engineers Association is currently identifying an approach to develop an upgraded statewide network of year-round local 10-ton roadways to improve freight movements throughout the state and to limit routes with load restrictions. **Figure 4** displays this conceptual upgraded 10-ton roadway system throughout Minnesota.

Mn/DOT has identified Tier 1 and Tier 2 routes within the conceptual 10-ton roadway system. Tier 1 roads are those that currently are 10-ton with minor gaps, light bridges, or deficiencies that can be improved with relatively limited investments. The Tier 2 routes represent roads that would essentially complete a comprehensive year-round local 10-ton network, but which will require a more significant and longer-term investment strategy. In general, northern MN has a fair amount of local 10-ton roadways identified for these system upgrades. The current 10-ton paved local roads in the study area do not consistently connect with one another, resulting in routing challenges, and these system discontinuities are significantly worsened by extended spring thaw restrictions in the north. An expanded year-round 10-ton system would better serve freight movements throughout the region and the state. In Wisconsin, this is not as great an issue, due in part to a rather extensive paving program for local roads.

LOCAL ROADWAY SYSTEM (LESS THAN 10-TONS)

Local roadways, such as unpaved county roads, township roads, and village and city streets, play an important role in freight movement, as a large volume of freight shipments either begins or ends on this local roadway system. This is especially true in agricultural, forest, and other rural areas. Many local roads may have posted maximum axle load ranges from five to nine tons, based upon design capacity and materials, and are not intended to consistently handle 10-ton shipments. Mn/DOT and local jurisdiction authorities can impose temporary limitations on local roadways due to seasonal variations and special circumstances. Variations in actual weight capacity in roadbeds or road surfacing caused by ground thawing and water incursion can prohibit 10-ton freight, due to severe road damage or total failure that can result. However, local roadways with lower design strengths can function satisfactorily under heavy loads in periods of dry weather and with good substructure conditions.

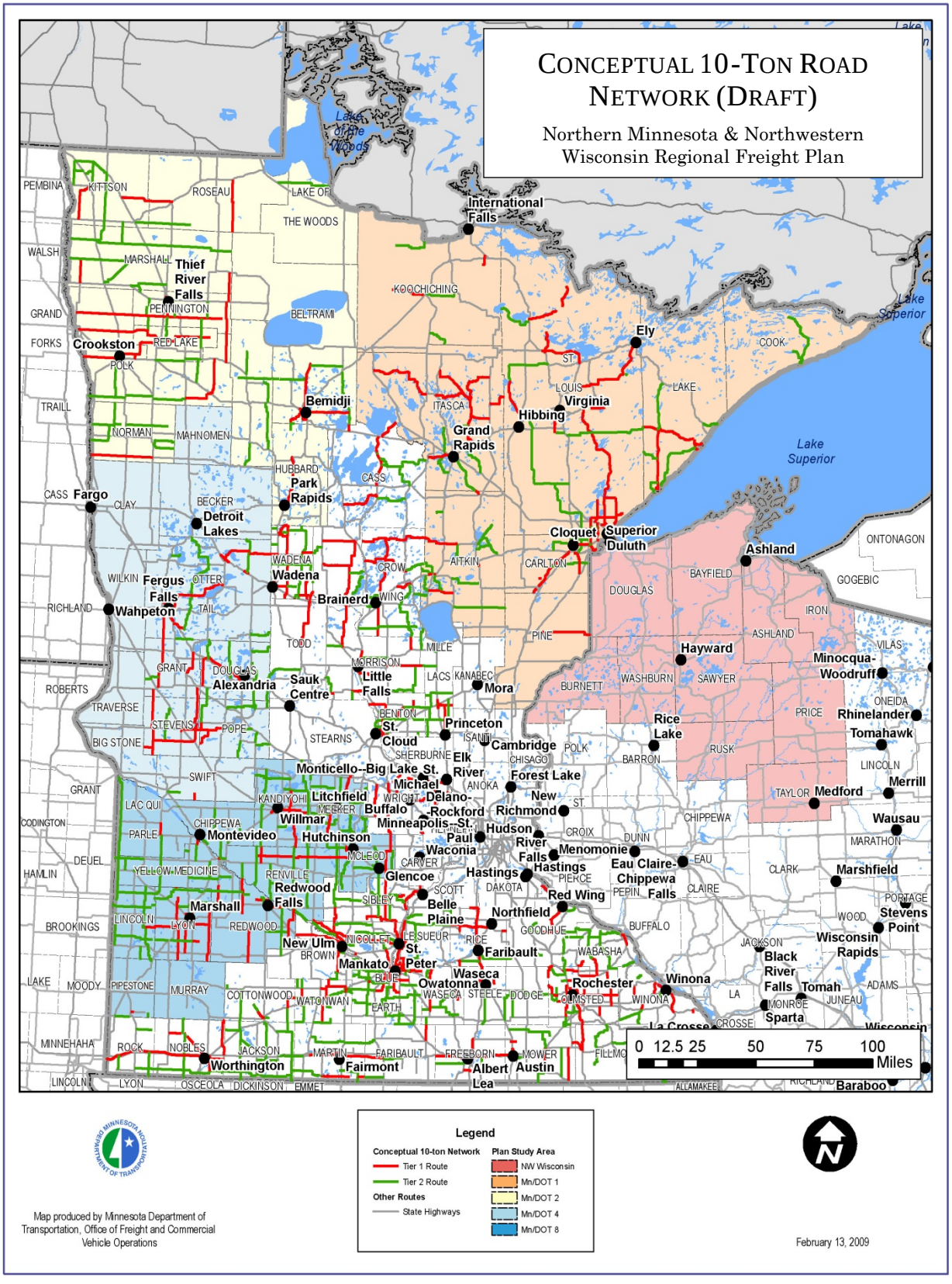
The low weight capacity of these local roadways limits the ability to efficiently move freight across the region. Additionally, seasonal and other load limits have a notable impact on freight mobility, particularly timber access in the region. Expansion of the year-round 10-ton roadway

network is widely recognized as a need to better serve freight movements, especially agriculture and forestry, within and between regions.

WISCONSIN SYSTEM

In Wisconsin, state and local routes are designated as Class A or Class B roadways with regard to vehicle size and weight limitations. The term class “A” highway” includes all state trunk highways and connecting highways. It also includes any county trunk highways, town highways, and city and village streets, or portions of those highways or streets, that have not been designated as Class “B” highways by local authorities. Maximum limitations are set on the weight imposed on the highway for various parts or configurations of a vehicle, and the vehicle must comply with all of the weight limitations. The allowable weight for a vehicle operating on a class “B” highway is generally 60% of the weights authorized for Class “A” highways.

Figure 4: Ten-Ton Roadways in Minnesota



Tiered Roadway Network

As described above, there are many different roadway networks, with differing levels of importance/significance to truck freight movement. Taken in combination, this roadway network proved too large to provide any specific and useful investment guidance. In May 2008, Mn/DOT began an analysis to identify trunk highways in Minnesota that are significant to the movement of freight. Developed as part of the 2008 Statewide Transportation Plan, this network was to be designated as a truck network that would supplement the Interregional Corridor (IRC) system. Therefore, Mn/DOT's Tiered Roadway Network identifies the roadways that are most important to truck traffic. The tiered approach combines truck traffic and roadway design characteristics to help identify the roadways essential to the efficient movement of freight. The Tiered Roadway Network is shown in **Figure 5.**

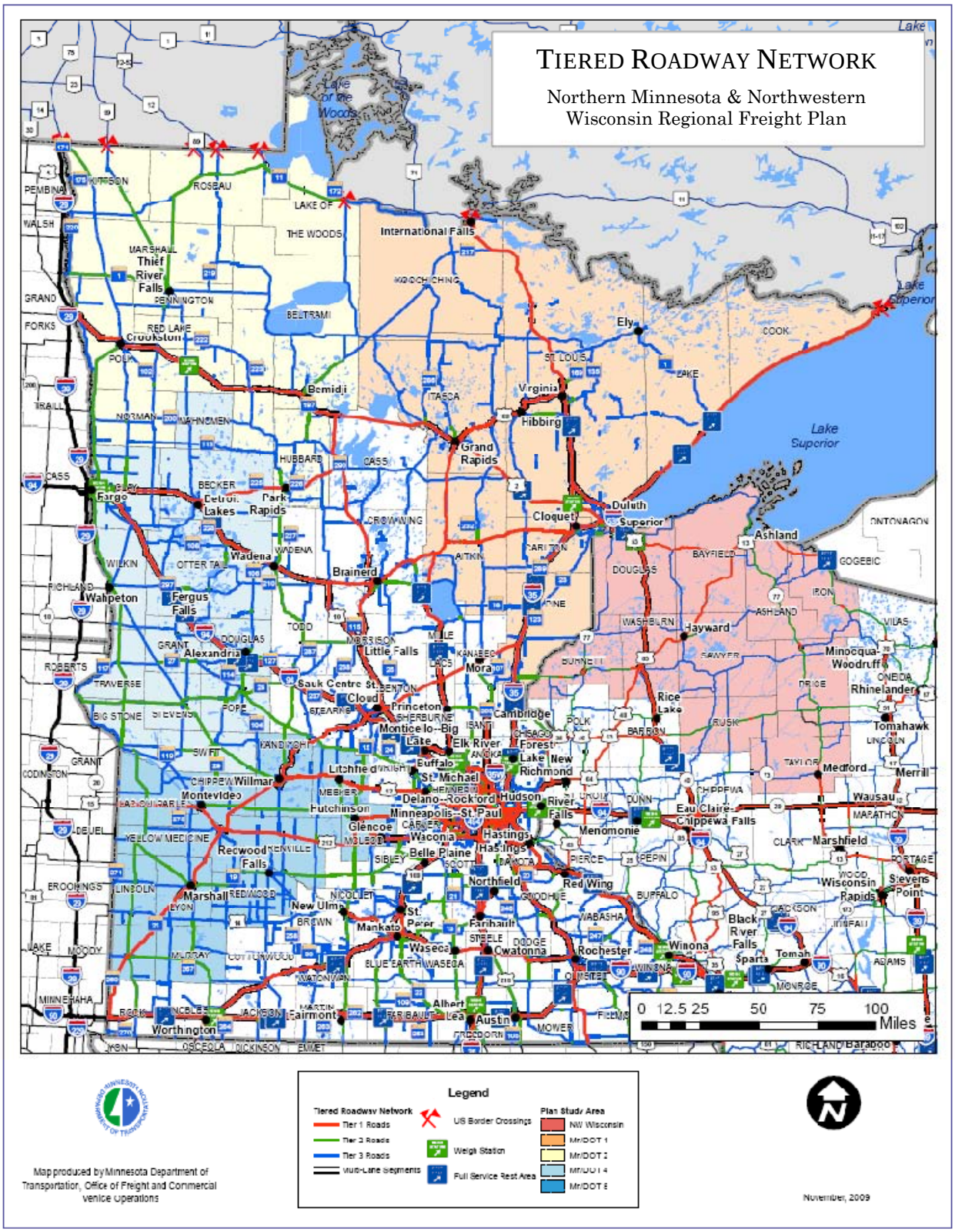
Heavy commercial annual average daily traffic (HCAADT) was used to validate the existence of elevated levels of HCAADT on the existing systems. HCAADT is an estimate of the total number of vehicles with at least two axles and six tires, using a specific segment of roadway on any given day of the year. Heavy Commercial vehicles include trucks only. Based on observed statewide data, tiers were classified based on breaks of 650 and 300, resulting in the following tiers:

- Tier 1: Roads on the network with HCAADT greater than 650
- Tier 2: Roads on the network with HCAADT between 301 and 650
- Tier 3: Roads on the network with HCAADT less than 300

The three tiers together form the State's Designated Truck Network. Roadway design characteristics were used to verify appropriate design for each tier and to identify network deficiencies. Multi-lane segments of roadways provide a safe route for a vehicle envelope of 14 feet tall, 14 feet wide and 67 feet long. Almost all segments of multi-lane roadways are on Tier 1. In addition, shoulders of at least 10 feet in width provide a similar safety benefit. Roadway segments with shoulder width less than 10 feet are sporadically distributed across the network.

In general terms, major truck corridors (e.g. Tier 1) in Minnesota include I-35, I-94, US 2, US 10, US 12, US 53, US 59, US 169, MN 33, MN 61, and MN 210. The Tier 1 network in northern MN supports adequate movements throughout the region as routes link major cities together allowing freight to be shipped in all directions. Major truck corridors in Wisconsin include I-535, US 53, and US 2.

Figure 5: Tiered Roadways in Minnesota and Wisconsin



RAIL NETWORK

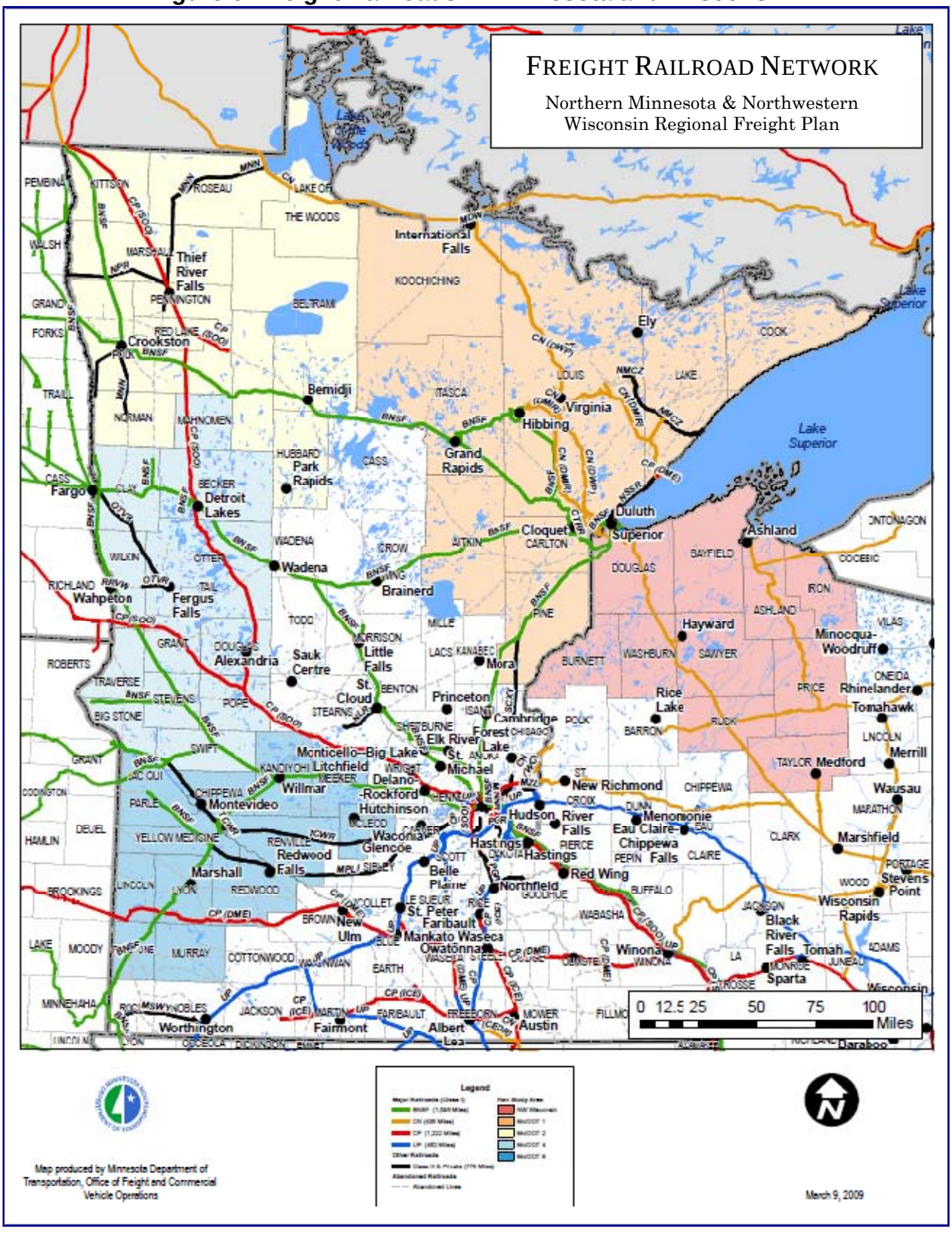
The rail network is important for moving a variety of commodities, especially heavy bulk goods. Rail companies are divided into three classes which are established by the federal Surface Transportation Board (STB). These classes are based upon a railroad company's gross operating revenues and generally reflect the type of service provided: long haul, regional, and local.

Class I carriers have annual gross operating revenues over $346.8 million (2006 dollars). In general, they are considered long-haul carriers. Class III railroads, also referred to as shortline or regional railroads, have gross operating revenues of less than $27.7 million (2006 dollars). Four Class I carriers operate in the region: BNSF Railway, Canadian National, Canadian Pacific, and Union Pacific.

All Northern Railroads			District 1 Railroads			District 2 Railroads			NW WI Railroads	
Class I	**Miles**		**Carrier**	**Miles**		**Carrier**	**Miles**		**Carrier**	**Miles**
BNSF	638		BNSF	355		BNSF	224		BNSF	58
CN	803		CN	387		CN	44		CN	372
CP	158		CP	2		CP	147		CP	10
UP	10		UP	0		UP	0		UP	10
Total Class I	**1,609**			**744**			**415**			**450**
Class III	**Miles**		**Carrier**	**Miles**		**Carrier**	**Miles**		**Carrier**	**Miles**
CODX	5		CODX	5						
CTRR	4		CTRR	4						
MDW	4		MDW	4						
MNN	173					MNN	173			
NMCZ	54		NMCZ	54						
NPR	46					NPR	46			
SCXY	22		SCXY	22						
SLLX	28		SLLX	28						
WGN	19								WGN	19
Total Class III	**354**			**117**			**219**			**19**
Total Rail Miles All Carriers	**1,963**			**861**			**634**			**469**

Statewide, Minnesota claims 4,481 miles of active railroad track in the state which ranks 8th in the nation. About one-third of the state's total rail miles fall within the Minnesota portions of the study region. Wisconsin claims 3,401 miles of active railroad track, ranking it 15th in the nation for total miles of railroad, with 469 miles of track running through the Wisconsin portion of the region. A map displaying the railroad networks is illustrated in **Figure 6**.

Figure 6: Freight Railroads in Minnesota and Wisconsin



WATERWAYS

The only commercially navigable waterway in the region is the Great Lakes/Saint Lawrence Seaway. This seaway is marketed as Highway H2O and is comprised of the St. Lawrence River, St. Lawrence Seaway and the Great Lakes. It is a 2,400 mile marine highway that runs between Canada and the United States and transports goods into and out of the Duluth-Superior Port. The waterway connects over 41 ports with roadways and rail lines, allowing freight to be shipped worldwide. **Figure 7** shows the existing ports on Lake Superior in Minnesota and Wisconsin.

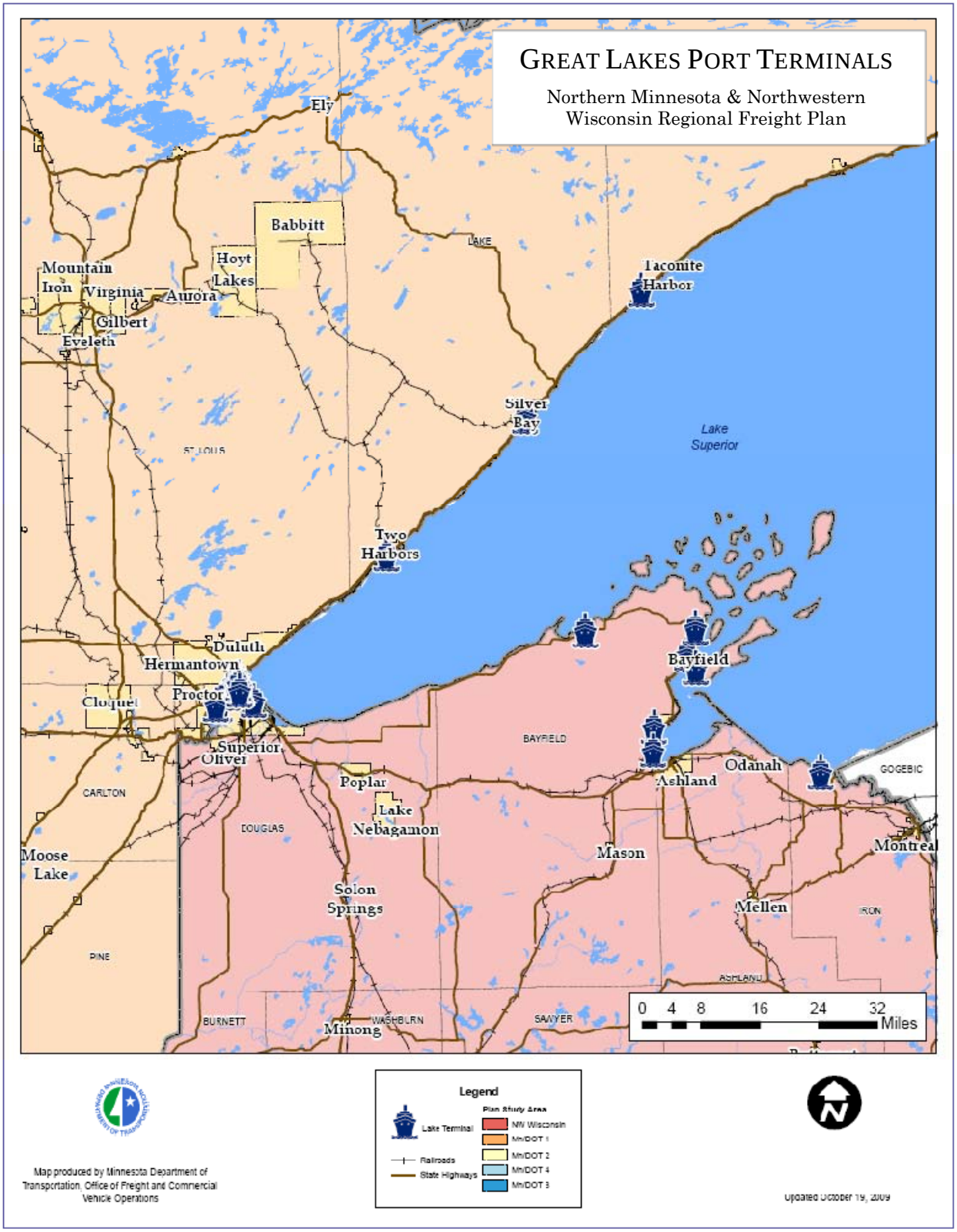
Duluth-Superior is by far the largest port on the Great Lakes, and the 21st largest total tonnage port in the United States. Located on the St. Louis River, the port is shared by Minnesota and Wisconsin. With iron ore docks, coal docks, grain elevators and specialized cargo facilities lining the industrial waterfronts of both Duluth and Superior, the port primarily serves shippers and receivers throughout the Midwestern U.S., but also serves distant locations worldwide. More than 20 acres of local waterfront have been designated by the U.S. Department of Commerce as a Foreign Trade Zone with the goal to promote international trade. U.S. duty payment is deferred on items until they are brought out of the FTZ for sale in the U.S. market. The port is served by CN, CP, UP, and BNSF Railway and I-35, US 2, and US 53.

Other ports in the region include: Two Harbors, Silver Bay, and Taconite Harbor in Minnesota, and Washburn, Ashland, and Hurley in Wisconsin. These ports provide connections for businesses within the region as well as numerous businesses outside the region

The Great Lakes/Saint Lawrence Seaway is currently being utilized at only 50 percent of its capacity and has the potential to serve expanding worldwide markets as global trade continually increases. The waterway is accessed in Minnesota and Wisconsin via Lake Superior. The U.S. Corps of Engineers operates three of the locks on the Great Lakes/St. Lawrence Seaway system and maintains a 28-foot deep navigational channel. The Canadian government operates 13 locks on this system. The lake port system in Minnesota is typically open for service nine months of the year, from March 25 to January 15, when it closes due to ice.

Lake bulk carriers, also known as lakers, are the most common large commercial ship operating on the Great Lakes. Some of these lakers range in size to over 1,000 feet long, 105 feet wide and have a carrying capacity of 69,000 net tons. Any ship operating on the Great Lakes can load to no more than 26' 6" draft in normal conditions. The large bulk lakers remain within the upper four Great Lakes (Superior, Huron, Michigan, and Erie) because they are too large to enter the Welland Canal portion of the seaway system that will give them access to Lake Ontario. Ocean bulk freighters and ocean cargo vessels are used to carry freight from the Great Lakes to destinations around the world. Ocean bulk freighters and ocean cargo vessels are limited in size by the length and width of locks on the seaway portion of the system.

Figure 7: Lake Terminals



AIR CARGO

High-value and/or time-sensitive goods are shipped via the aviation system, especially when moving over long distances. Freight airports fall into three categories: major, local/regional and on-demand air cargo service airports. Major airports, including Duluth International, have scheduled air cargo service with jet aircraft. Other major freight airports include Minneapolis-Saint Paul International, Hector International in Fargo/Moorhead and the Grand Forks International Airport. These airports provide a time-efficient and direct link to global destinations.

A large share of international air cargo travels in the baggage compartment of passenger aircraft. Air cargo services are provided by several types of carriers that are differentiated by the services they offer for a wide range of customer demands. There are four basic industry segments in the air cargo industry: Integrated express operators; All-cargo carriers; Commercial service passenger airlines; and, On-demand cargo charter carriers.

In 2005 there were nine air cargo airports in the region that support scheduled air cargo operations for integrated and all-cargo carriers. These airports act as local market stations, serving their respective surrounding market areas, or as consolidation points for feeder aircraft and trucks. The region has several scheduled service air cargo airports:

- Duluth International Airport (DLH)
- Bemidji-Beltrami County Airport (BJI)
- Eveleth-Virginia Municipal Airport (EVM)
- Grand Rapids-Itasca County Airport (GPZ)
- Thief River Falls Regional Airport (TVF)

Several airports in the region offer on-demand charter operations to varying degrees of volume and frequency, ranging from one to 15 percent of total airport operations. They include:

- Chisholm-Hibbing Municipal Airport (HIB)
- Two Harbors-Helgeson Airport (TWM)
- Baudette International Airport (BDE)
- International Falls Airport (INL)
- Roseau Municipal Airport (ROX)
- Warroad International Airport (RRT)

Note that all of Minnesota's commercial passenger service airports also have air cargo service via scheduled passenger airline aircraft. Airports in the study region include:

- Bemidji Beltrami County Airport (BJI)
- Chisholm-Hibbing Municipal Airport (HIB)
- Duluth International Airport (DLH)
- International Falls Airport (INL)
- Grand Rapids/Itasca Co Airport (GPZ)
- Thief River Falls Regional Airport (TVF)

Figure 9 shows the location of Minnesota and Wisconsin air cargo airports by service type. Each airport listed may provide multiple air cargo services. For example, Duluth International provides scheduled all-cargo service, on-demand service, and scheduled commercial carrier (belly-space) capacity. Wisconsin currently lists no airports in the study area with air cargo service.

Within the Minnesota and Wisconsin air cargo system, feeder aircraft are used to serve communities on intrastate routes. Feeder aircraft also serve larger market airports such as Duluth International within the state on routes where the distance is too great to truck. At these large market (or primary) airports, cargo from feeder aircraft is transferred onto a mix of narrow-body and wide-body aircraft that connect to cargo hub airports across the nation. Duluth International supports a mix of wide-body and narrow-body all-cargo aircraft. FedEx operates an airbus A300 (wide-body) daily from Duluth and Airborne operates a daily DC9-15 (narrow-body) aircraft.

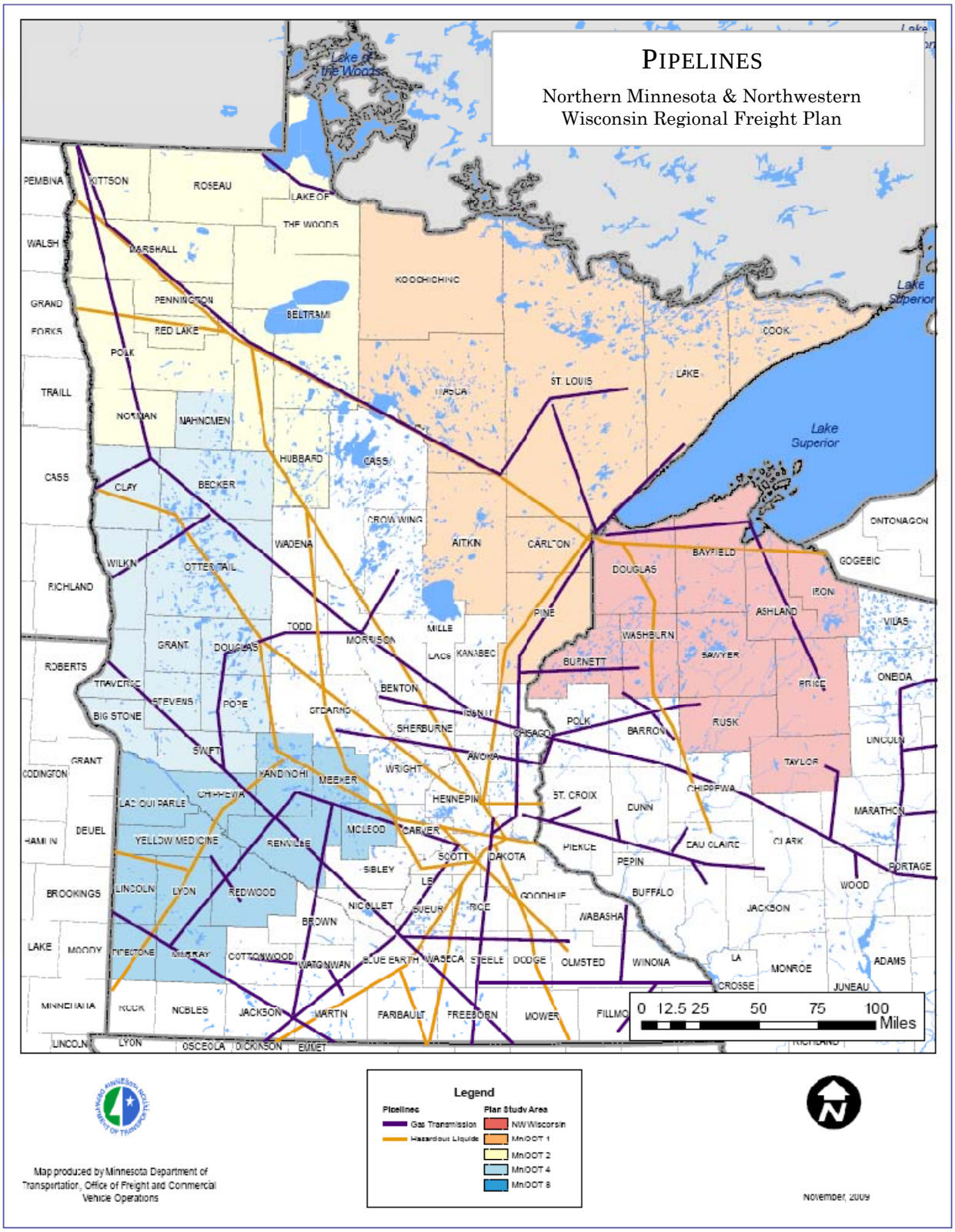
Of the Minnesota airports in the study region supporting scheduled air cargo service, only the primary runways at Minneapolis-St. Paul International (MSP) and Duluth International (DLH) are long enough to support fully loaded and fueled wide-body aircraft typically used on transcontinental and international routes. Other Minnesota airports supporting scheduled air cargo service typically handle turbo-prop feeder aircraft, though several are capable of accommodating small narrow-body jets such as the Boeing B727 or the DC-9. Runway lengths at Bemidji-Beltrami County (BJI), Brainerd Lakes Regional (BRD), and Thief River Falls Regional (TVF) are currently sufficient to handle these aircraft.

PIPELINES

The pipeline system moves a significant tonnage of gas and hazardous liquids to and throughout the region, including the transportation of more than 75 different types of crude oil and natural gas. The end user receives the majority of this product ranging from power plants to private residences. Several power and transmission companies account for line ownership and operation including Great Lakes Gas Transmission Limited Partnership, Enbridge Energy, Magellan Midstream Partners L.P., and Minnesota Pipe Line Company as well as many other private providers. Additionally, other pipelines in the region also carry crude oil to and from the two Twin Cities refineries as well as to Superior.

Magellan operates two terminals within Minnesota including one in Duluth. Additional pipelines are operated by the Great Lakes Gas Pipeline, Enbridge Energy, Magellan Midstream and Murphy Oil, which transport gas as well as crude and refined petroleum products from Canada and the Dakotas to Duluth and Superior. Murphy Oil’s Lake Superior Refinery is located in Superior is connected to Enbridge's Lakehead System of liquids pipelines, which transport crude oil from Western Canada to the region. The 35,000 barrels per day refinery produces gasoline, kerosene, diesel, fuel oils, asphalt, and liquefied petroleum gas (LPG) for the Upper Midwest market. **Figure 8** shows the pipeline network in the region.

Figure 8: Pipelines in Minnesota



INTERMODAL

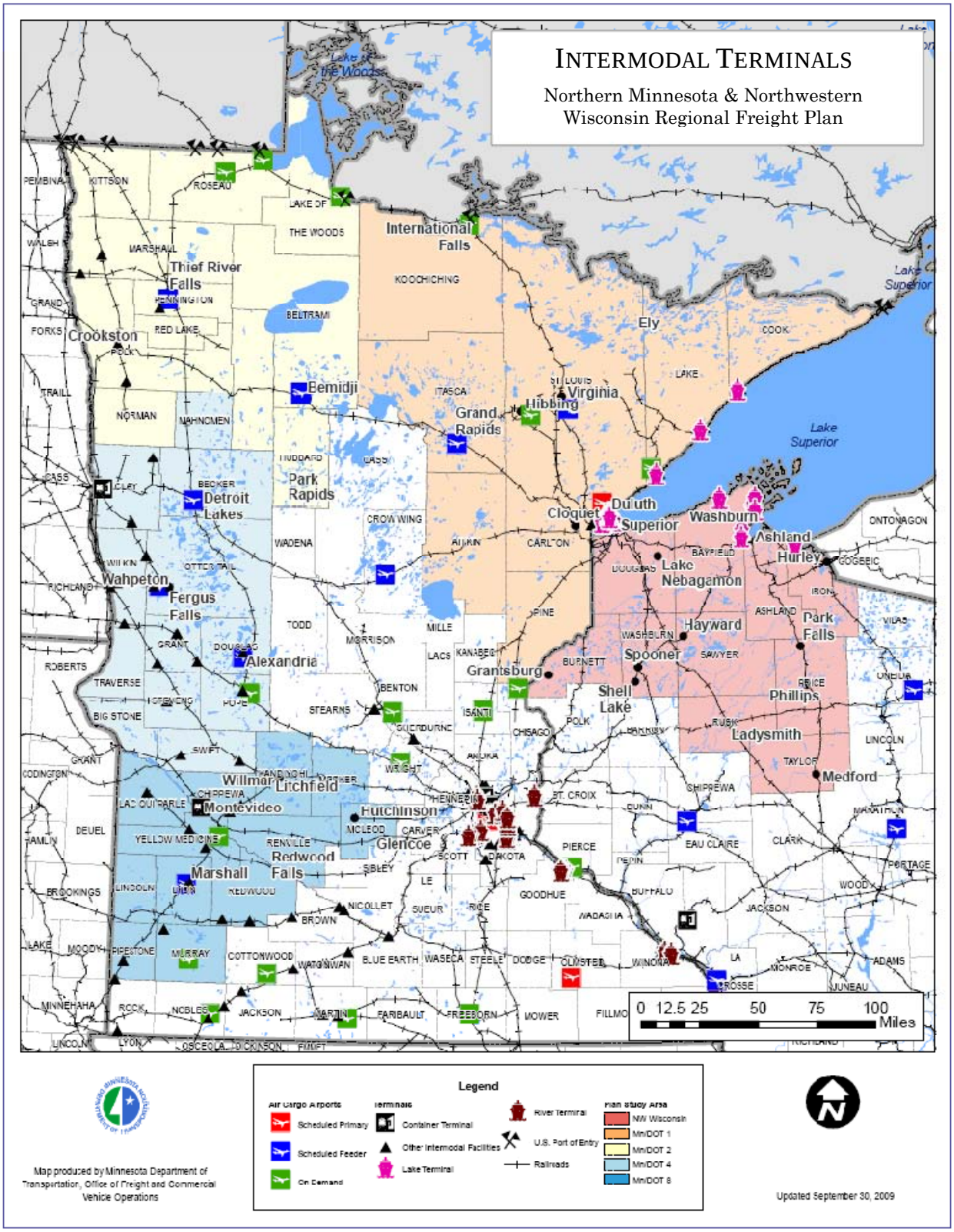
Intermodal terminals represent key nodes in the regional freight system. The definition of what constitutes an intermodal terminal can take on different meanings in some contexts. For example, in the railroad industry an intermodal terminal refers specifically to terminals where containerized cargos are received via trucks, consolidated, and loaded or unloaded from trains. For the purposes of this regional freight inventory, intermodal terminals are defined as locations where freight is transferred from one mode of transportation to another. Intermodal terminals include truck/rail, container (containers on flat cars, trailers on flat cars, bi-modal), pipeline terminals, air cargo terminals, grain shuttle terminals, and lake terminal/ports. A majority of the intermodal terminals in the region are located in urban centers. **Figure 9** and **Table 3** identify the intermodal terminals in the region. Intermodal terminals in the region are most often lake terminal/ports and air cargo facilities serving grain, iron ore, metals, salt, oil, and general cargo. Notably, there are no intermodal container terminals within the study area.

Table 3: Intermodal Terminals in Northern MN/Northwestern WI

Company Name	Type	Location	Commodities
Cutler-Magner Co. Salt Dock	Lake	Duluth	Bulk: Rock Salt, Evaporated Salt, Solar Salt
General Mills Elevator A	Lake	Duluth	Grain
Whitebox Storage (South)	Lake	Duluth	Grain
Whitebox Storage (North)	Lake	Duluth	Grain
AGP Grain, Ltd	Lake	Duluth	Grain
Azcon Corporation	Lake	Duluth	Scrap Iron and Metals
Northland Bituminous	Lake	Duluth	Asphalt, Concrete, Class 5, Limestone
Garfield Docks C & D	Lake	Duluth	To be developed
Terminal Berths 1 & 2	Lake	Duluth	General Cargo, Finished Steel, Scrap Iron
Terminal Berth 3	Lake	Duluth	Fuel Oil, Waste Oil
Terminal Berths 4, 5, & 6	Lake	Duluth	General Cargo
Holcim, Inc	Lake	Duluth	Cement
CN Railway Ore Dock 5	Lake	Duluth	Inactive
CN Railway Ore Dock 6	Lake	Duluth	Iron Ore and Ore Pellets, Coal, Limestone
Hallett Dock 5	Lake	Duluth	Bulk Material
C. Reiss Coal Co.	Lake	Duluth	Coal, Limestone, Salt, Petroleum Coke
Magellan Pipeline Co.	Pipeline	Proctor	Crude Oil
Hallett Dock 8	Lake	Superior	Bulk Materials
Midwest Energy	Lake	Superior	Coal
Great Northern Elevators	Lake	Superior	Grain
CHS Inc No. 1 Elevator	Lake	Superior	Grain
CHS Inc No. 2 Elevator	Lake	Superior	Grain
Connors Point Properties	Lake	Superior	Cold Storage
Peavey Connors Point Elevator	Lake	Superior	Grain
Graymont Manufacturing	Lake	Superior	Limestone, Coal

LaFarge North America	Lake	Superior	Cement
Con Agra Elevator M	Lake	Superior	Grain
BNSF Taconite Ore Dock No. 5	Lake	Superior	Taconite
Enbridge Pipeline Terminal	Pipeline	Superior	Crude Oil
Canadian National Railway Co. Ore Dock No. 2	Lake	Two Harbors	Iron Ore, Taconite Pellets
Canadian National Railway Co. Ore Dock No. 1.	Lake	Two Harbors	Iron Ore, Taconite Pellets
Northshore Mining Co	Lake	Silver Bay	Iron Ore, Taconite Pellets
Cliff's Erie	Lake	Taconite Harbor	Iron Ore and Ore Pellets, Coal, Fluxstone
Magellan Pipeline Co.	Pipeline	Crookston	Crude Oil
Beltrami Farmers Elevator	Shuttle	Beltrami	Wheat, soybeans, corn
Enbridge Pipeline Terminal	Pipeline	Clearbrook	Crude Oil
Erskine Grain Terminal LLC	Shuttle	Erskine	Soybeans, wheat
Farmers Elevator of Alvarado	Shuttle	Alvarado	Wheat, barley, soybeans, sunflower seed, corn
Markit County Grain, LLC	Shuttle	Argyle	Corn, soybeans, wheat
Mid Valley Grain Co-Op	Shuttle	Crookston	Corn, soybeans, wheat
Northwest Grain	Shuttle	Hazel	Wheat, soybeans, corn
Magellan Pipeline	Pipeline	Crookston	Oil Products
C. Reiss Coal Co. 7th Avenue West Dock	Lake	Ashland	Aggregate
C. Reiss Coal Co. Clarkson Coal Dock	Lake	Ashland	Coal
Soo Line Ore Dock	Lake	Ashland	Iron Ore
Xcel Energy bayfront Generating Station Coal Dock	Lake	Ashland	Coal
C. Reiss Coal Co. Dock	Lake	Washburn	Coal

Figure 9: Intermodal and Air Cargo Terminals in Minnesota and Wisconsin



FREIGHT TRENDS AND ISSUES

In the modern global economic environment, cost-effective, time-sensitive transportation services are increasingly a strategy for competitive advantage in manufacturing, mining, agriculture, and service-based industries. Businesses shop the world for raw materials, parts, and labor; managing widely dispersed supply chains; using real-time information integrated with reliable, efficient, and responsive transportation services.

Globalization of the U.S. economy has grown at a rapid pace over the past several decades and virtually all areas of economic activity are part of the globalization trend. Advances in technology and management practices allow U.S. firms to employ strategies that enable customized products for mass-market distribution. In the business environment that has evolved, many companies today use transportation as a competitive advantage against competitors both domestically and internationally. As a result, the ability of state and regional infrastructure managers to deliver robust transportation systems is directly tied to the economic competitiveness.

STRUCTURAL CHANGES TO THE U.S. ECONOMY

Developed countries, including the US have seen structural changes in their economies that include an aging population, technology developments and improvements, and a shifting from a manufacturing base to a service base economy. Developing countries, by definition, are changing the structure of their economies as well, moving towards manufacturing and striving to become globally competitive with developed countries. In general, the US economy is continuing to shift from basic, resource-oriented industries, such as agriculture, mining and basic manufacturing, toward a more diverse industry mix including high value-added industries such as microelectronics and aerospace. In turn, demand for moving goods is shifting from bulk movements via rail, truckload and water to small, higher-value shipments via air freight, courier and less-than-truckload. This is particularly true in high-tech industries.

In the early 1980s, manufacturing was the leading sector of the U.S. economy, roughly equal in economic contribution to the Services and "FIRE" (finance, insurance, and real estate) sectors combined. However, over the course of the past two decades the services sector of U.S. economy has significantly outpaced manufacturing growth as a percentage of Gross Domestic Product. By 2005, the service industries sector had increased its share of the national economy to account for 68 percent of current-dollar GDP. [i] This transition to a service based economy has implications for transportation and logistics:

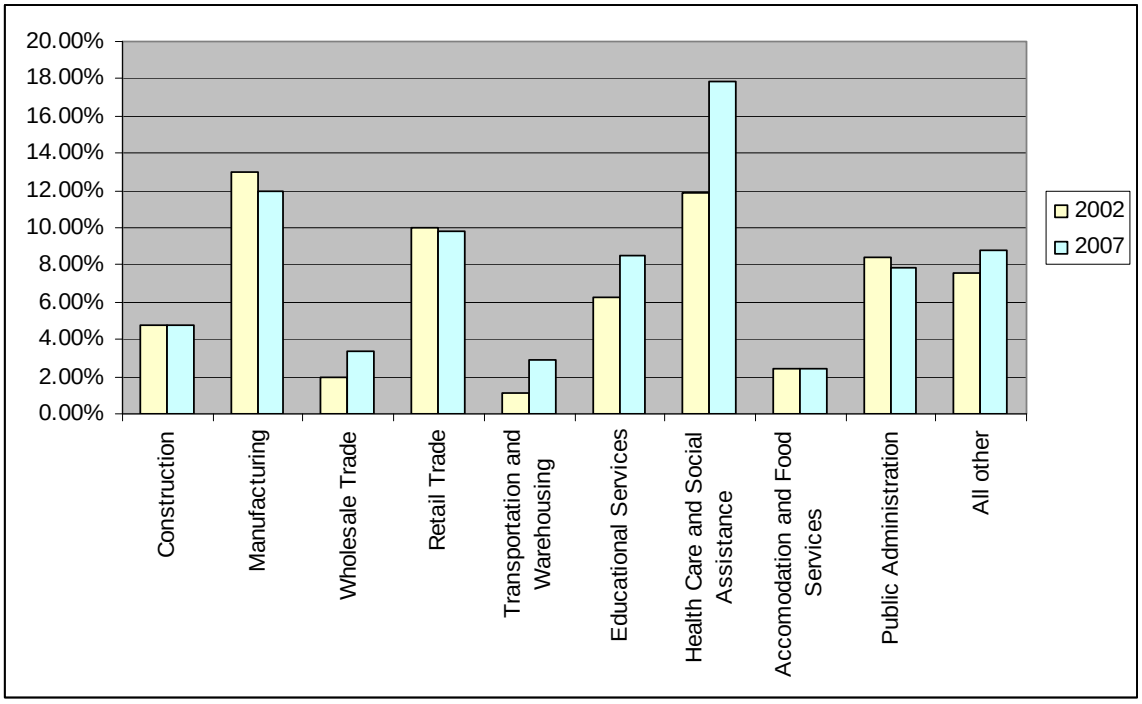
> *"The changes at work in the American economy are profound. The agricultural and manufacturing economy of the 20th Century has evolved. Services are now the fastest-growing sector of the economy. Logistics and transportation sectors are second…The American economy demands increasing volumes of trade if it is to continue to grow. The economic sectors that remain robust will require far more trade and travel per unit of output than was required 30 years ago."*[ii]

ECONOMIC CHANGES IN THE STUDY REGION

Employment by industry, average wages by industry, unemployment, and employment projections data were collected for the years 2002 and 2007 from the Wisconsin Department of Workforce Development and the Minnesota Department of Employment and Economic Development. Data collected from the Wisconsin Department of Workforce Development was collected for the ten counties that are part of the study region. Data collected from the Minnesota Department of Employment and Economic Development was collected by Economic Development Regions (EDR) and Pine County that are part of the region. The average age of the labor force data was collected from the United States Census Bureau, Census 2000.

In 2002 the largest employment sector in the region was *Manufacturing* with approximately 36,000 employees or 13 percent of total regional employment. In 2007 *Manufacturing* became the second largest employer in the region, approximately 12 percent of total employment. In 2007, the *Healthcare and Social Assistance* service sector was the largest employer in the region with approximately 50,000 employees or 17.8 percent of the total employment. From 2002 to 2007 regional employment in the *Healthcare and Social Assistance* industry grew approximately 52 percent. **Figure 10** shows the employment by industry for the region. It should also be noted that three industries in the region experienced significant increases in employment from 2002 to 2007; however they comprise only a small share of the total employment. The three industries are: *Information* which grew 390 percent; *Utilities* which grew approximately 387 percent; and *Transportation and Warehousing* which grew approximately 153 percent.

Figure 10: Northern MN/Northwestern WI Employment by Industry



The average weekly wage for all industries in the region was $580 in 2007, an increase from 2002 when it was $506. Both of these figures are lower than the average weekly wages for the

state of Minnesota and Wisconsin for the same time periods. The highest paid industries in the region in both 2002 and 2007 were; *Utilities*, *Mining*, and *Management of Companies and Enterprises*. The average weekly wages by industry are shown in **Table 4**. The majority of the labor force in the region is 35 to 44 years old, approximately 27 percent. Approximately 24 percent of the labor force is 45 to 54 years old.

Table 4: Average Weekly Wage by Industry

NAICS Code	Industry	Minnesota		Wisconsin		Northern MN/WI	
		2002	2007	2002	2007	2002	2007
0	Total, All Industries	$720	$853	$667	$792	$507	$580
11	Ag, Forestry, Fishing & Hunting	$443	$516	$433	$508	$457	$537
21	Mining	$952	$1,262	$843	$941	$828	$1,030
22	Utilities	$861	$973	$1,140	$1,361	$956	$1,279
23	Construction	$854	$1,005	$763	$913	$651	$746
31	Manufacturing	$1,295	$1,481	$749	$861	$613	$713
42	Wholesale Trade	$1,014	$1,242	$834	$984	$536	$669
44	Retail Trade	$418	$453	$379	$415	$335	$364
48	Transportation & Warehousing	$802	$874	$648	$755	$553	$670
51	Information	$897	$1,116	$748	$932	$460	$685
52	Finance and Insurance	$1,155	$1,511	$840	$1,058	$539	$668
53	Real Estate & Rental Leasing	$643	$806	$488	$601	$299	$387
54	Professional & Technical Services	$1,091	$1,342	$895	$1,082	$532	$615
55	Mgmt of Companies & Enterprises	$1,531	$1,991	$1,264	$1,580	$781	$1,015
56	Administrative and Waste Services	$493	$564	$398	$460	$359	$392
61	Educational Services	$680	$771	$665	$764	$611	$683
62	Health Care & Social Assistance	$665	$793	$640	$760	$523	$562
71	Arts, Entertainment, & Recreation	$438	$509	$394	$455	$269	$289
72	Accommodation & Food Services	$238	$272	$195	$223	$166	$190
81	Other Services, Ex. Public Admin	$437	$498	$375	$424	$300	$338
92	Public Administration	$739	$855	$649	$767	$604	$673

Source: Wisconsin Department of Workforce Development, Quarterly Census of Employment and Wages Data, 2002 and 2007, www.worknet.wisconsin.gov; Minnesota Department of Employment and Economic Development, Quarterly Census of Employment and Wages Data, 2002 and 2007, www.deed.state.mn.us.

THE GROWTH IN GLOBAL TRADE

Over the last several decades, economic activity has been shifting from industrialized countries to developing countries such as China, India, Russia, and other emerging economies throughout Asia and South America. The growing importance of trade in the US economy is a reflection of world economic trends. Between 1960 and 1999, world merchandise trade (exports and imports) grew at an average annualized rate of over 10 percent (in 2002 dollars).[1] Globalization has been a significant element of the growth in the US economy until recently. Growth in trade, its

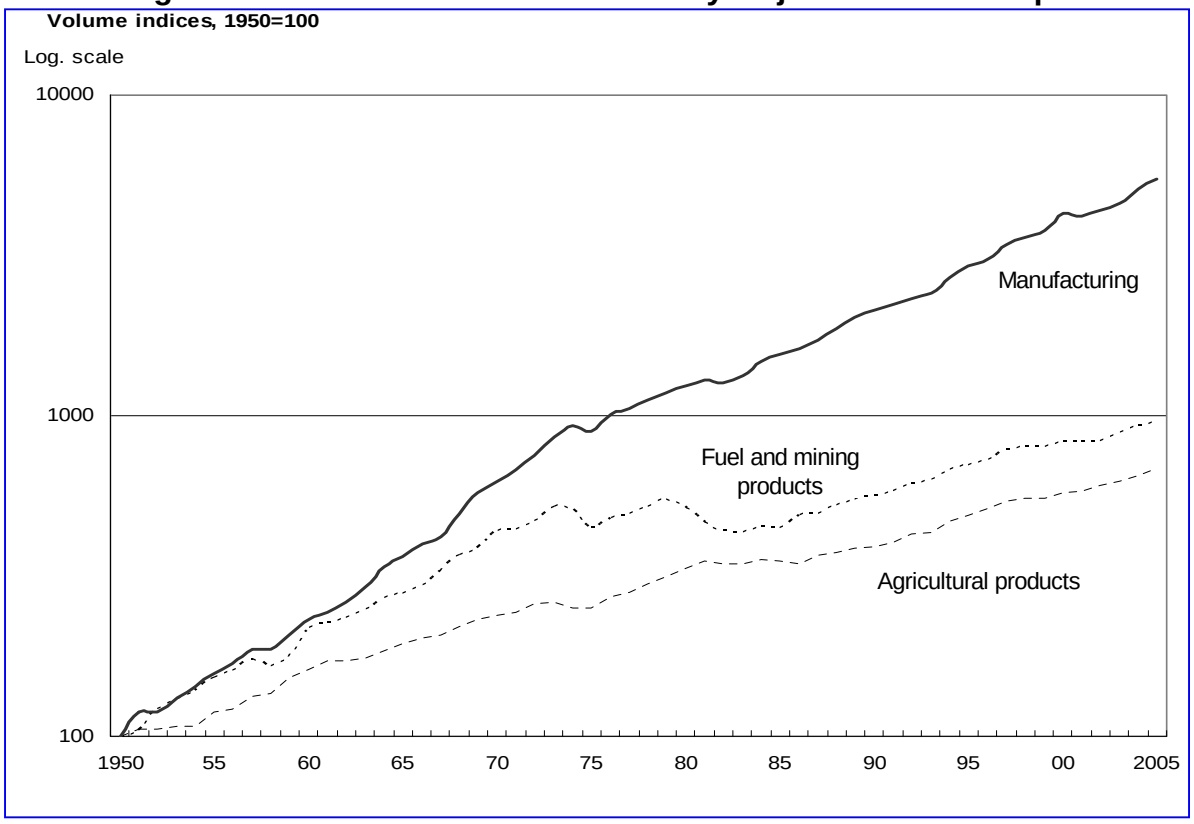
[1] Merchandise Trade Section, Statistics Division, World Trade Organization

significance in the economy, and the changing characteristics of trade partnerships can be traced to a number of factors, including:

- Liberalization of world trade policies;
- Growth of multinational trade blocks and multinational corporations; and
- Accelerated adoption of advanced information technologies.

Figure 11 summarizes the growth in trade by major product group. As shown, there has been significant growth in *Agricultural Products* and *Fuels and Mining Products.* However, the most dramatic increased has been in the trade of *Manufacturing Goods*.

Figure 11: World Merchandise Trade by Major Product Group[iii]



For the U.S., following the global trend of increasing trade has resulted in significant growth in the trade of goods and services. A significant portion of the growth in international trade can be attributed to trade within North America between the US and its neighbors Mexico and Canada. NAFTA has been a pivotal driver of trade increases since its implementation in 1994. Total two-way trade between the US and NAFTA partners grew a remarkable 111 percent between 1993 and 2003, while total two-way trade between the US and the rest of the world grew by 79 percent.[iv]

Table 5 demonstrates that the growth in global trade, as well as the strong influence of NAFTA on U.S. and regional trade between 2004 and 2008. The top half of Table 5 shows the growth in NAFTA for the U.S., Minnesota and Wisconsin. The table shows Minnesota's growth in trade with Canada has been more than double the national growth rate, having increased by nearly 75% in five years. Wisconsin's trading relationship with Mexico however has also shown significant growth, exceeding a 66 percent increase between 2004 and 2008.

The lower half of Table 5 shows the growth in global exports for Minnesota and Wisconsin, as well as the share of total exports bound to Canada. For Minnesota, exports to Canada made up nearly 30% of the State's total exports by value in 2008. For Wisconsin, exports to Canada made up nearly 32% of total exports by value.

Table 5: Growth in Trade – U.S., Minnesota and Wisconsin (Millions of $)

Trade Partners	2004	2005	2006	2007	2008	% Change 2004-2008
US/Canada	$445,029	$499,291	$533,673	$561,548	$596,470	34.0%
MN/Canada	$11,459	$13,697	$14,182	$15,813	$20,348	77.6%
WI/Canada	$9,460	$10,047	$10,696	$10,905	$11,458	21.1%
US/Mexico	$266,618	$290,247	$332,426	$347,340	$367,453	37.8%
MN/Mexico	$1,626	$1,788	$1,949	$2,214	$2,469	51.8%
WI/Mexico	$2,633	$3,219	$4,163	$4,340	$4,381	66.4%
US/NAFTA	$711,647	$789,537	$866,099	$908,888	$963,923	35.4%
MN/NAFTA	$13,085	$15,485	$16,132	$18,027	$22,817	74.4%
WI/NAFTA	$12,093	$13,266	$14,860	$15,245	$15,838	31.0%
Note: For figures about The value of all surface modes is not equal to the sum of truck, rail, pipeline mail, foreign trade zones, other and unknown modes of transportation. For additional detail refer to the metadata. SOURCE: U.S. Department of Transportation Bureau of Transportation Statistics TransBorder Freight Data. Report created: Fri May 29 2009						
Export Partners	**2004**	**2005**	**2006**	**2007**	**2008**	**% Change 2004-2008**
MN/World	$12,698	$14,736	$16,349	$18,062	$19,159	50.9%
MN/Canada	$3,238	$3,610	$4,130	$5,100	$5,625	73.7%
WI/World	$12,705	$14,961	$17,174	$18,825	$20,553	61.8%
WI/Canada	$4,887	$5,259	$5,459	$5,896	$6,498	33.0%
Export data source: Foreign Trade Division, U.S. Census Bureau						

A major factor in facilitating global trade has been the development and accelerated adoption of new information technologies. By reducing the cost of communication, information technology can assist in globalizing production and capital markets. Companies seek to outsource their operations around the world to take advantage of low-cost labor markets, raw material supplies, high-skill labor markets and access to distribution infrastructure, wherever these resources may present the greatest competitive advantage. This pattern of dispersed operations may occur through growth in multinational corporations with operating units throughout the world, or it may occur through alliances among firms in different parts of the world. In either case, advanced information technology facilitates the process by improving and speeding the information flow across global and corporate boundaries.

Perhaps the one area where the advancement of information technology has had the greatest impact is supply chain management. The integration of information and transportation has allowed companies to disperse their operations to take advantage of competitive conditions throughout the world while reducing inventories and meeting higher service requirements.

KEY TRADE FLOWS AND MARKETS FOR THE STUDY REGION

The largest commodity group exported out of the region is *Metallic Ores*, which accounts for 65 percent of all outbound tonnage or 66.8 million tons. The second largest commodity group exported out of the region is *Lumber or Wood Products* with 11 percent or 9.8 million tons of all outbound tonnage. The remaining top three exported commodities are *Non-Metallic Minerals*, *Farm Products*, and *Waste or Scrap Materials*.

Ohio is the top market for goods leaving the region, receiving 20 percent or 13.6 million tons. The second largest export market is Indiana with 17 percent, followed closely by Wisconsin with 16 percent. The remaining top export markets are Illinois, other areas of Minnesota, and Canada. This reflects the movement of taconite to steel mills.

COMMODITY FLOWS FOR MN/DOT DISTRICT 1

The total amount of freight moving on the District 1 transportation system is estimated at 120 million tons. Over 48 million of these tons originate in District 1 and have destinations outside of the area. These outbound goods have a value of over 8 billion dollars. District 1's key export commodity categories are shown in **Table 6**. The largest commodity group originating in the District is *Metallic Ores* at 62.3 million tons. All of the tonnage in this group constitutes *Iron Ore* tonnage. This number may appear misleading because of the transshipment that occurs in the District. About 40 million tons of iron ore originates from mines throughout the district and is shipped to its next destination by rail. Of this 40 million tons, about 19 million tons head out of the district by rail, and the remaining 21 million tons head to the Ports of Duluth, Two Harbors, and Silver Bay to be transloaded to water. Just over 22 million tons of iron ore are shipped out of the district by water, much of which has arrived there by rail from within the district, resulting in a total of 62.3 million tons of iron ores movement in the district. Additionally, about 12 million tons of the 19 million tons exported out of the district by rail goes to the Port of Superior to continue on its journey by water.

Of the 40 million tons of iron ore originating in the district by rail, about 33 million tons are transloaded to water within 100 miles of the Iron Range. This waterborne ore then heads to destinations such as Chicago, Ill., Cleveland, Ohio, and Ontario, Canada. The remaining 7 million tons of iron ore travel longer distances by rail to destinations such as St. Louis, Mo. and Birmingham, Ala.

Non-Metallic Minerals are the next largest export from District 1 totaling 6.6 millions tons. Top commodities in this category include broken stone or riprap and gravel or sand.

Table 6: Key Export Commodities District 1, 2007

STCC	Commodity Tonnage Rank	Total Tons
10	Metallic Ores	62,342,495
14	Non-metallic Minerals	6,661,112
1	Farm Products	1,782,835
26	Pulp, Paper, or Allied Products	1,354,622
20	Food or Kindred Products	490,212

Four modes are present for freight transportation out of District 1. Rail is the predominant mode of transportation out of the District. By tonnage, it accounts for 57 percent of all outbound movements. Water is the second most important transportation mode out of District 1. It accounts for 33 percent of the total outbound tonnage. Trucks account for 10 percent of the total outbound tonnage and air freight is a minor mode accounting for less than 0.1 percent of the total outbound tonnage.

District 1's key import groups are shown in **Table 7**. The largest commodity group imported into the District is *Metallic Ores* at 21 million tons. Most of these tons are iron ore that the Port of Duluth receives by rail from mines within the district on the Iron Range. The Port then transships this by water. *Nonmetallic Minerals* are the next largest import into District 1 totaling 6.3 million tons. Top minerals in this group include broken stone or riprap and gravel or sand.

Table 7: Key Import Commodities District 1, 2007

STCC	Commodity Tonnage Rank	Total Tons
10	Metallic Ores	21,311,402
14	Non-metallic Minerals	6,344,985
11	Coal	5,497,183
30	Rubber	2,697,148
1	Farm Products	2,186,769

Similar to the outbound movements, four modes are present and rail is the predominant mode of transportation into the District. By tonnage, it accounts for 70 percent of all inbound movements. Trucking is the second most important transportation mode into the District. It accounts for 18 percent of the total inbound tonnage. Waterborne traffic accounts for nearly 12 percent of the total inbound tonnage and air freight is again a minor mode accounting for less than 0.1 percent.

Water is an important mode into and out of District 1 because it is adjacent to Lake Superior and the Port of Duluth-Superior is located in the District. In 2008, the Port of Duluth-Superior imported and exported approximately 46 million tons of waterborne freight.

COMMODITY FLOWS FOR MN/DOT DISTRICT 2

The total amount of freight moving on the District 2 transportation system is estimated at 21.7 million tons. District 2's key export groups are shown in **Table 8**. The largest commodity group exported from the District is *Farm Products* at 6.2 million tons. This commodity group consists mostly of grain, with oil kernels, nuts or seeds and miscellaneous field crops also producing significant tonnage. *Non-Metallic Minerals* are the next largest export from District 2 totaling 2.8 millions tons. Nearly all of the tonnage in this commodity group consists of gravel or sand.

Table 8: Key Export Commodities District 2, 2007

STCC	Commodity Tonnage Rank	Total Tons
1	Farm Products	6,169,309
14	Nonmetallic Minerals	2,830,981
20	Food Or Kindred Products	1,059,189
24	Lumber Or Wood Products	816,197
28	Chemicals Or Allied Products	306,033

Two modes are present for freight transportation out of District 2. Truck is the predominant mode of transportation out of the District. By tonnage, it accounts for 69 percent of all outbound movements. Rail is the second most important transportation mode out of District 2. It accounts for 31 percent of the total outbound tonnage.

District 2's key import groups are shown in **Table 9**. The largest commodity group imported into the District is also *Farm Products* at nearly 6 million tons. These commodities include miscellaneous field crops, grain, and oil kernels, nuts or seeds. *Nonmetallic Minerals* is the next largest import into District 2 totaling 2.9 million tons. Top minerals in this group include gravel or sand and broken stone or riprap.

Table 9: Key Import Commodities District 2, 2007

STCC	Commodity Tonnage Rank	Total Tons
1	Farm Products	5,934,093
14	Nonmetallic Minerals	2,885,268
29	Petroleum Or Coal Products	332,322
24	Lumber Or Wood Products	271,505
28	Chemicals Or Allied Products	180,610

Similar to the outbound movements, only two modes are present for inbound movements into the District with trucks as the predominant mode of transportation. By tonnage, trucks account for more than 93 percent of all inbound movements. Rail is the second most important transportation mode into the District. It accounts for almost 7 percent of the total inbound tonnage.

COMMODITY FLOWS IN NORTHWEST WISCONSIN[2]

The total amount of freight moving on the northwest Wisconsin transportation system is estimated at 71.5 million tons. Approximately 49% of outbound tonnage is destined for Michigan. Northwestern Wisconsin's key export groups are shown in **Table 10**. The largest commodity group exported from the District is *Coal* at 11.7 million tons. This reflects the large coal shipments through Midwest Energy in Superior on laker vessels. *Lumber/Wood Products* are the next largest export from the region, totaling 6 million tons. Most of the tonnage in this group consists of primary forest materials.

Table 10: Key Export Commodities NW Wisconsin, 2007

STCC	Commodity Tonnage Rank	Total Tons
11	Coal	11,745,725
24	Lumber/Wood	6,036,429
1	Farm Products	1,764,606
10	Metallic Ores	1,682,126
32	Clay/Concrete/Glass/Stone	1.017,893

Northwestern Wisconsin's key import groups are shown in **Table 11**. Approximately 30% of inbound tonnage originates in Minnesota, and approximately 27% originates in Montana
. The largest commodity group imported into the region is also *Coal* at more than 22 million tons, most of which is shipped through Midwest Energy. *Metallic Ores* are the next largest import into the region, totaling 12 million tons. Most of this tonnage consists of iron ores brought in by train from the Iron Range in Minnesota.

Table 11: Key Import Commodities NW Wisconsin, 2007

STCC	Commodity Tonnage Rank	Total Tons
11	Coal	22,087,834
10	Metallic Ores	12,057,795
1	Farm Products	3,678,139
32	Clay/Concrete/Glass/Stone	1,854,910
14	Non-metallic Minerals	1,254,186

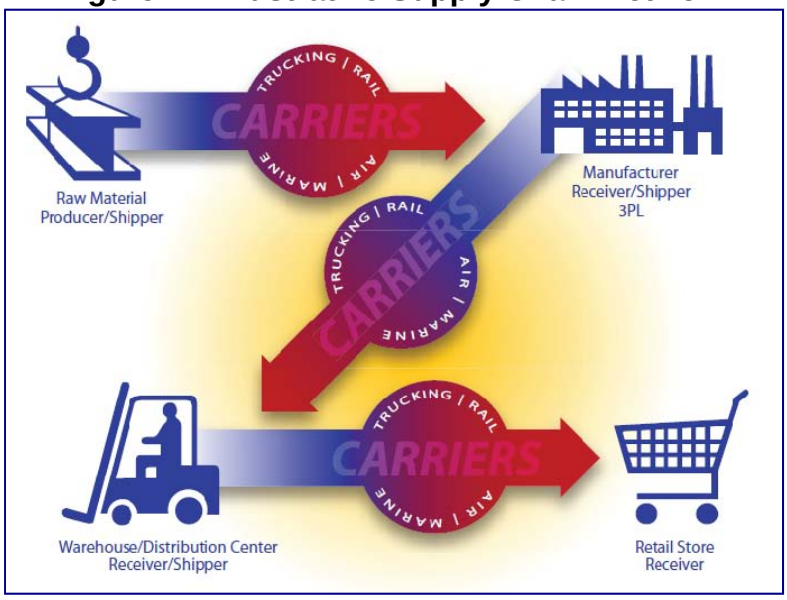
THE LOGISTICS REVOLUTION

The integration of information and transportation to accommodate global supply chains has given rise to a logistics revolution in private sector business practices. Just-in-time (JIT) inventory practices, electronic shipment tracking, the use of multiple modes, the optimization of distribution facilities, and e-commerce are just some of the changes that have occurred, and are still occurring, in the economy. **Figure 12** depicts a simplistic supply chain illustrating the multiple parties and close coordination required to make the system work smoothly and

[2] Wisconsin commodity data is presented at the four-digit STCC level.

efficiently. Many companies now outsource coordination tasks to freight forwarders or third-party logistics (3PL) firms.

Figure 12: Illustrative Supply Chain Network



Just-in-time inventory is a supply chain system designed to maximize delivery and inventory efficiency. In many cases, JIT systems allow producers to deliver products and services directly to the customers based on their specified demands, typically bypassing intermediate distributors; thus, trucks on the highways and the containers on the rails have become moving warehouses in the new economy.

As the U.S. economy becomes more service oriented and U.S. producers focus on more high-value or value-added products that are expensive to stock as inventory, companies are adopting modern supply chain management techniques with the following attributes:

- *Demand Pull Supply Chains*: The movement of product triggered by the consumer as opposed to the producer (supply-push).
- *Customer-Focused Logistics*: Tailoring logistics networks to respond to the unique needs and profitability requirements of each specific group of customers.
- *Transportation Effectiveness*: Leveraging the ability of integrated transportation to improve customer service and total supply chain cost performance.

In short, the logistics revolution has several implications for the region: 1) population centers will see increasingly higher levels of freight activity and truck traffic, as product movements are triggered by consumer consumption; 2) as highway congestion grows, alternative product movement strategies like transloading in regional centers like Duluth will impact regional land use strategies; and 3) to remain competitive in the new global economy, businesses will seek environments where transportation systems allow integrated supply chain strategies to succeed - namely transportation networks must support reliability, agility, dependability, and to some

extent redundancy to meet the JIT expectations of consumers and larger receivers in commercial, industrial, and retail sectors of the economy.

Unique Regional Issues and Supply Chain Examples

Unique characteristics such as the Iron Range, the strong presence of the timber and agriculture industries, and development of the energy industry create a unique region with unique freight issues. Many of these issues are directly related to the Duluth-Superior port, where commodities such as iron ore/taconite, coal, agricultural products, energy equipment, and many others are dependant on waterway transport to access distant markets. This section highlights several of the key issues and provides illustrative examples of several supply chains.

Iron Ore and Taconite

The discovery of high-grade iron ore over 100 years ago led to the development of the iron mining industry in northeastern Minnesota. The Mesabi Iron Range, the largest of four major iron ranges in the region collectively known as the Iron Range, is the chief deposit of iron ore in the United States, providing more than 80% of all iron ore mined in the US today. The deposit is located in Itasca and St. Louis Counties. **Figure 13** identifies the locations of iron deposits and mines in the region.

Iron deposits were extensively mined in the earlier part of the 20th century, and by the mid 1950s, most of the highest grade iron ore was depleted. Taconite, a lower grade ore considered at one time an uneconomic waste product, has become the primary source of iron. By 1967, processed taconite shipments surpassed that of natural ore. In northern Minnesota today, seven ore plants, representing a combined capital investment of $4 billion, all produce taconite pellets used in the steel making process.

To manufacture taconite pellets, iron is separated from crushed waste rock by using strong magnets. Powdered iron concentrate is combined with bentonite clay and limestone as a flux and rolled into pellets about one centimeter in diameter that are approximately 65% iron.

Rail transportation is critical for the taconite industry, not only for taconite pellets but for flux stone as well. Taconite is transported by the CN to Two Harbors and Duluth, and BNSF Railway to Superior. The Northshore Mining Railroad hauls mined material to Silver Bay, where taconite pellets are produced. At these locations, taconite is shipped by lake freighters to steelmaking plants on the Great Lakes such as Gary, IN, Cleveland, OH and other steel-making towns.

Taconite pellet production declined throughout the mid-1970s and rebounded in the mid 2000s. Growing international demand for iron from developing nations has increased taconite production, by reopening and expanding mining operations on the Mesabi. Although a recent drop in demand and production occurred in conjunction with the worldwide 2009-2010 recession, it is likely that once the economy improves, global demand for iron ore will return to previous levels.

Figure 13: Iron Ore Deposits and Mines

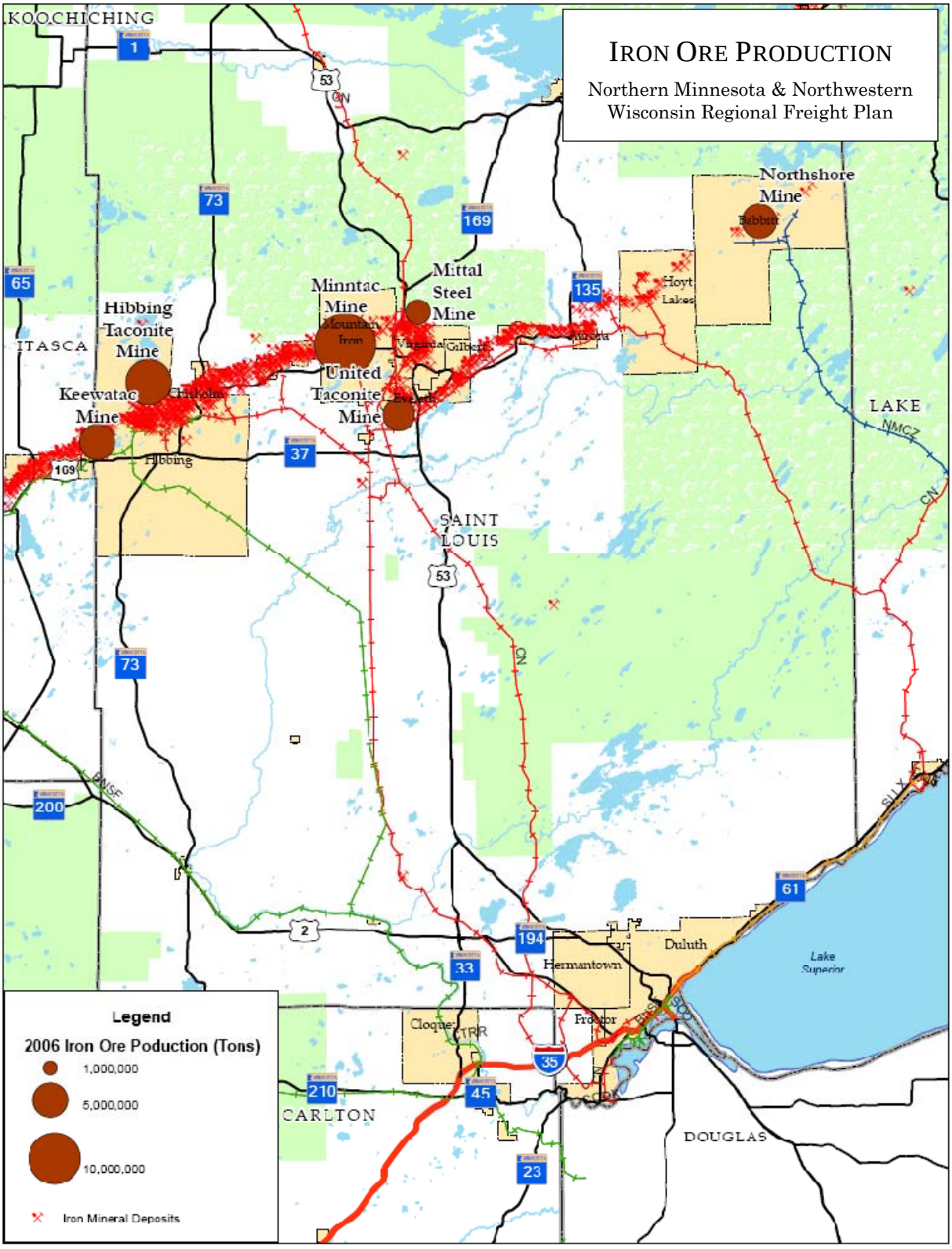
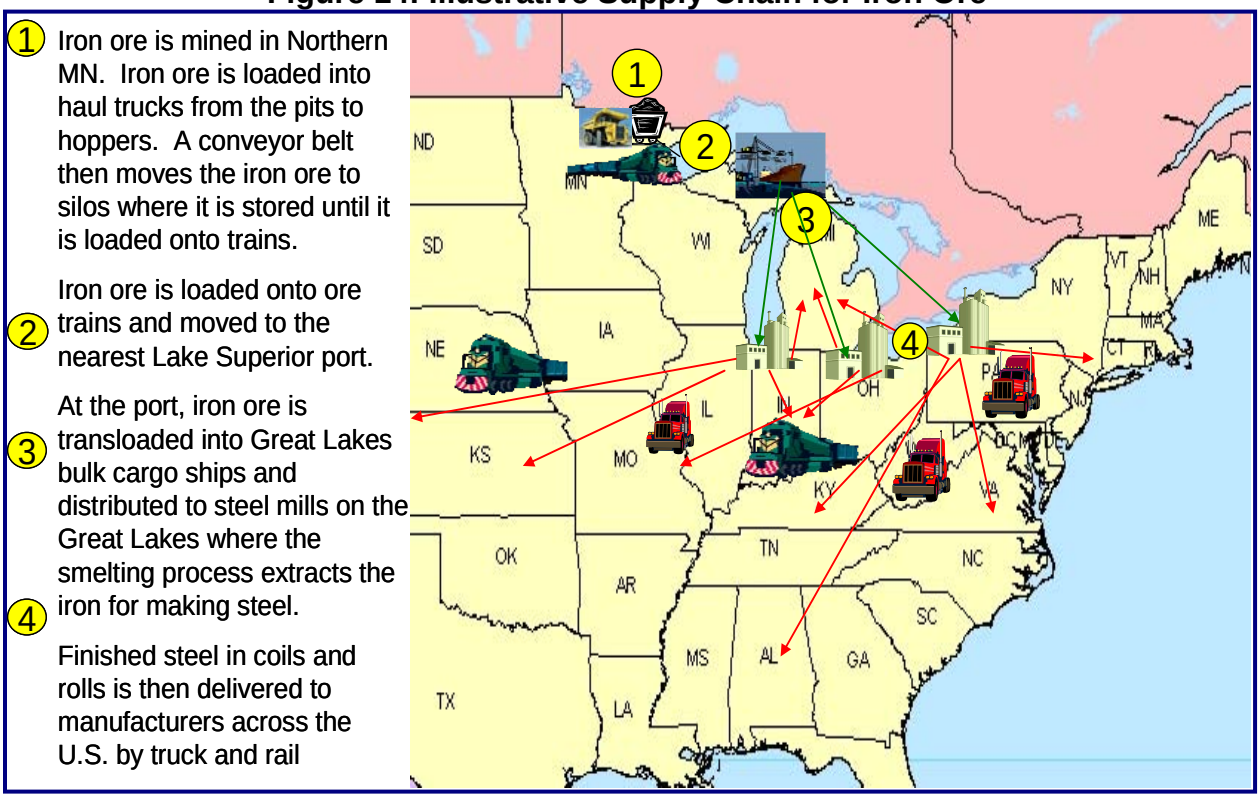


Figure 14 depicts a typical supply chain for iron ore mined in northern Minnesota. The mining process for iron ore is very similar to the process for coal, except that in this case the rail portion of the supply chain is much shorter. Typically, the rail portion is 100 miles or less because the iron ore is moved to the nearest port along Lake Superior. After being transloaded in to ore carriers on Lake Superior and transported to steel mills on the lower Great Lakes.

Figure 14: Illustrative Supply Chain for Iron Ore



STEEL PLANT

Essar Steel Minnesota plans to construct and operate an integrated steel plant on the western edge of the Mesabi iron range in northeast Minnesota. To be located north of Nashwauk at the cost of $1.65 billion, the taconite-to-steel facility will have an annual capacity of 1.5 million tons in annual steel-making capacity when completed.

The plant is considered to be a long-term investment in the iron industry in the region. Although it won't be fully operational for at least five years, it will have a 4.1 million ton annual pellet plant capacity and is expected to employ nearly 500 people. Once operational, it will be the only facility in North America to include open pit iron ore mining, ore processing, direct reduced iron processing, and steel slab casting on a single site.

Slab steel is used in highly demanding consumer sectors, such as automotive, white goods, construction, engineering and shipbuilding. With access to trucking, rail, and waterways, the Nashwauk location provides multiple options for transportation. Much of the manufactured steel

slab will likely be transported by rail to the port of Duluth/Superior for national and international distribution. The C and D docks are currently available, although the public port areas have been operating over capacity for several years. Currently, plans are in place to develop necessary shipping facilities for this product.

NON-FERROUS MINING

The large-scale mining of non-ferrous metals may be on the horizon for the region. These metals, which include platinum, palladium, and nickel, as well as gold, silver, and copper were discovered in the region and initially explored in the 1950s and 1960s. However, due largely to lack of a viable processing technology to economically and effectively treat these ores, the mines could not be fully developed. It is currently estimated that more than 4 billion tons of crude, non-ferrous ore are deposited in the region, perhaps the largest deposits of these base and precious metals in the United States. One recently proposed project to develop non-ferrous mining is expected to cost $600 million and could create 400 permanent jobs in the region.

Within the last 15 years, changes have occurred in the mining industry which may lead to full-scale non-ferrous mining in the region, particularly copper and nickel. They are deposited in rock that also holds sulfide minerals, which can turn to sulfuric acid. This potential environmental hazard may be mitigated by advanced technology and a hydrometallurgical processes, which subject the concentrates produced from the crude ore to a medium-high temperature and pressure in a sealed steel vessel. This closed extraction process is expected to result in virtually no air and water emissions, and with the buffering of limestone, will allow non-ferrous mining in the region to be compliant with environmental regulations. The process is also more energy-efficient than traditional smelting, using only about half the amount of energy to produce copper. In addition, a residue by-product of the hydrometallurgical process is gypsum, which is used in drywall as gypsum plaster. This presents an additional opportunity for the region beyond the non-ferrous metals.

TACONITE TAILINGS

The use of taconite tailings, or waste rock, as an alternative aggregate source presents the region with a new opportunity. Using explosives, taconite is blasted into pieces that are then crushed into smaller pieces at a processing plant. After the iron ore is separated from the taconite, the tailings are the remaining by-product. Tailings are either placed in tailings basins or held in reserve for some other purpose. One-half to two-thirds of all processed ore-bearing rock ends up as tailings.

There are benefits to using taconite tailings over traditional aggregates. For example, taconite tailings have high strength and hardness, providing a durable road surface or base material. Asphalt mixes using coarse taconite tailings have higher friction values, providing higher skid resistance for safety. In addition, the costs of production are much lower than for traditional aggregate mining, since taconite tailings are being produced as a by-product of ongoing taconite mining. This leads to energy savings over production of new sources of aggregate and reduces the pressure to expand existing or develop new traditional aggregate sources. Lastly, traditional aggregate sources for crushed stone, sand, and gravel although located in virtually every county in the region, are becoming scarce, while taconite tailings are abundant. In the Twin Cities metro area, demand for aggregate will exceed supply in the next 10 to 15 years. Conversely, almost 33

million tons of taconite tailings were produced on the Iron Range in 2002, and mining companies have been stockpiling coarse taconite tailings for years.

Taconite tailings have been successfully used in several road construction projects in the region, including:

- On US 169 from Virginia to Chisholm, taconite tailings were used as a 15 percent blend;
- On MN 135 from Virginia to Aurora, taconite tailings were used as 100 percent of the aggregate; and,
- On US 53 around Virginia, taconite tailings were used as the granular backfill in the subgrade.

Transporting taconite tailings to other locations in the region and to more distant locations remains a challenge. Any potential means of transportation would need to take into account that taconite tailings are up to 10 percent denser than traditional aggregates, a disadvantage in terms of shipping weight per unit volume. For this reason, bulk rail or rail/barge service will be the main mode of transportation. Hallett Dock in Duluth is able to transload taconite tailings and barge transport can be made to markets on the Great Lakes, such as Chicago, where traditional aggregates are scarce and of softer material. To reduce costs, backhaul commodities have been explored, including: limestone for neutralization at non-ferrous mining projects; fluxstone from southeast Minnesota for use in taconite pellet production; biomass for energy production at Mesabi Range power generation facilities; grain and other agricultural products; and dredge material from the harbor.

ATHABASCA OIL SANDS DEVELOPMENT

The Athabasca Oil Sands are large deposits of extremely heavy crude oil, located in northeastern Alberta. These oil sands consist of a mixture of semi-solid crude oil, silica sand, clay minerals, and water. It is estimated that at least 173 billion barrels of crude oil are economically recoverable, and at a production rate of 3 million barrels per day, the reserves would last over 170 years. Currently, a majority (80%) of oil used in Minnesota originates in this deposit, creating implications for the region.

Since the early 1980s, global oil discoveries have failed to keep up with the rate of consumption, which in 2008 reached 31 billion barrels of oil. To offset the imbalance, companies have expanded production by finding new and innovative ways of getting more oil out of existing fields, or producing oil through unconventional sources, such as the Athabasca Oil Sands. As oil prices have risen in recent years, and new technologies have been developed, the prospect of producing oil at a more competitive rate has improved. However, it also has resulted in new discoveries elsewhere. Globally, more than 200 new oil discoveries have been reported in 2009, spanning five continents, and in dozens of countries, including northern Iraq's Kurdish region, Australia, Israel, Iran, Brazil, Norway, Ghana and Russia. The market value of oil will ultimately determine the feasibility of expanding commercial production in Alberta.

Most of the Athabasca oil can only be produced using more recently developed technology such as steam-assisted gravity drainage, in which steam is pumped into the reservoir, making the oil thin enough to flow to the surface in a pipeline. The cost of production can be prohibitive, depending on trade value in the global market. Some estimates suggest that $60 - $80 a barrel is

needed for new oil sands projects to be viable. Oil futures have recently been trading near $70 a barrel, and the recent rises in global oil prices have improved feasibility of further development and expansion of mining activities.

Large equipment required for extraction is needed, and a shortage of skilled workers in Alberta is resulting in the need to assemble equipment into larger components in larger labor markets, primarily Duluth. This could lead to additional jobs in the port area such as pipefitters, welders, laborers, electricians, and insulators. Equipment such as gas plants, upgraders, power plants, steam-assisted gravity drainage plants are expected to be needed once production picks up. This presents an economic development and employment opportunity for the Duluth-Superior area.

The transport of these large components to Alberta or other large, single pieces of equipment has been a challenge. There has been interest from several oil companies in designating a roadway corridor for this purpose. A roadway option is potentially feasible, with innovative financing needed to improve a predetermined route. This option has not been fully explored with oil industry representatives. Several routes are under consideration, with the goal of finding the most safe and efficient route out of the Duluth area and through the rural areas of Minnesota on roadways with geometric constraints (height, width, length, weight). There has been discussion of incorporating signal turners (ball bearing signal base that can be rotated 90 degrees) into the design/manufacture of the US 53 signal replacements near the Miller Hill Mall and of specific bridge issues (e.g., at Clementson and Warroad). Also, there has been discussion of truck pull-off areas on two lane roads with narrow shoulders located every 6 to 8 miles for traffic movement and safety reasons, although possible site locations, design, and cost estimates have not been determined. Further analysis of the most appropriate route is needed. Once cost estimates are determined for the route, all cost sharing options can be explored.

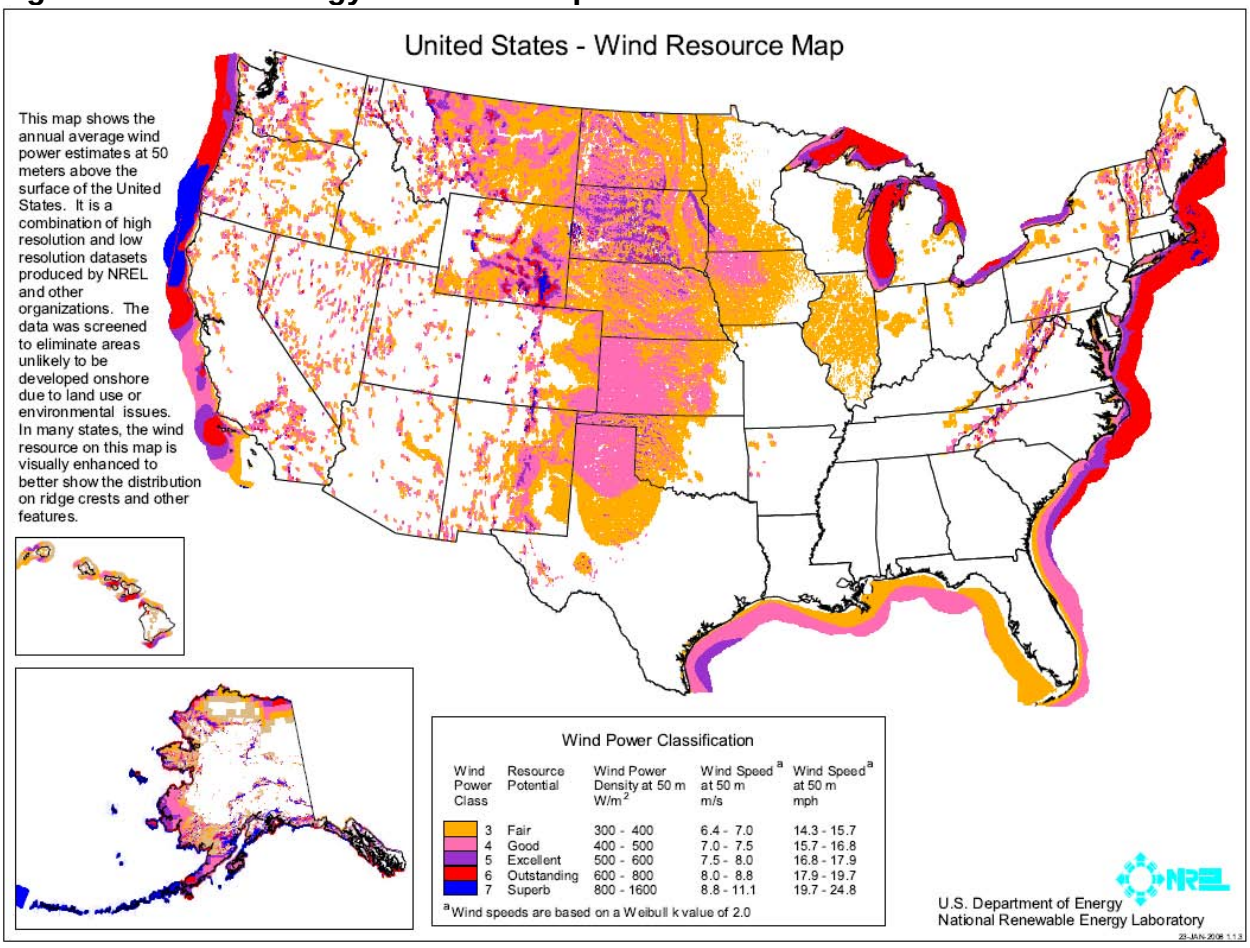
Lake Superior Warehousing in Duluth is able to transload large equipment from ship to the 36-axle Schnabel car, the largest railroad car in the world. The Schnabel car has hydraulics which allows equipment to be raised and lowered by as much as 3 feet and shifted from side to side 2 feet. The equipment is carried northwest with relatively direct rail access to Alberta and has a clearance sufficient to accommodate 15-foot-diameter equipment. Previous proposals to allow roadway transport of equipment as large as 24-feet in height and width were denied last year, when it was decided that a maximum of 14 feet in width is the safest and most practical dimension. For this reason, any equipment currently must be manufactured and assembled to meet that specification or travel by rail.

With increased production of oil in Alberta, there is a need for new pipelines and increased refinery capacity. Several pipelines have been proposed or approved, such as the Gateway pipeline to supply China via Kitimat, British Columbia and the recently approved, almost 1,000 mile long Alberta Clipper pipeline that will connect to Superior, WI. The pipeline will be capable of carrying up to 450,000 barrels of crude oil a day from the Athabasca Oil Sands to U.S. refineries, including Murphy Oil Refinery in Superior. The Superior plant is already located at a major shipping hub off Enbridge's crude oil pipeline from Canada. The tentative plan is to expand the refinery from 35,000 barrels a day to 235,000, a $6.2 billion investment. Construction would not be completed for several years, but could lead to numerous new jobs in the region.

WIND GENERATION EQUIPMENT

In 2005, the Minnesota Legislature passed a bill calling on the Minnesota Public Utilities Commission to conduct a Wind Integration Study to examine the impacts on reliability and cost if Minnesota were to rely more heavily on wind generation for its electricity supplies. The results of the study showed that this regional electric power system can reliably accommodate the addition of wind generation to supply up to 25% of Minnesota retail electric energy sales if sufficient transmission investments are made to support it.[v] Wind is a readily available energy resource across the Upper Great Plains and along the North Shore of Lake Superior (**Figure 15**)

Figure 15: Wind Energy Resource Map for the United States



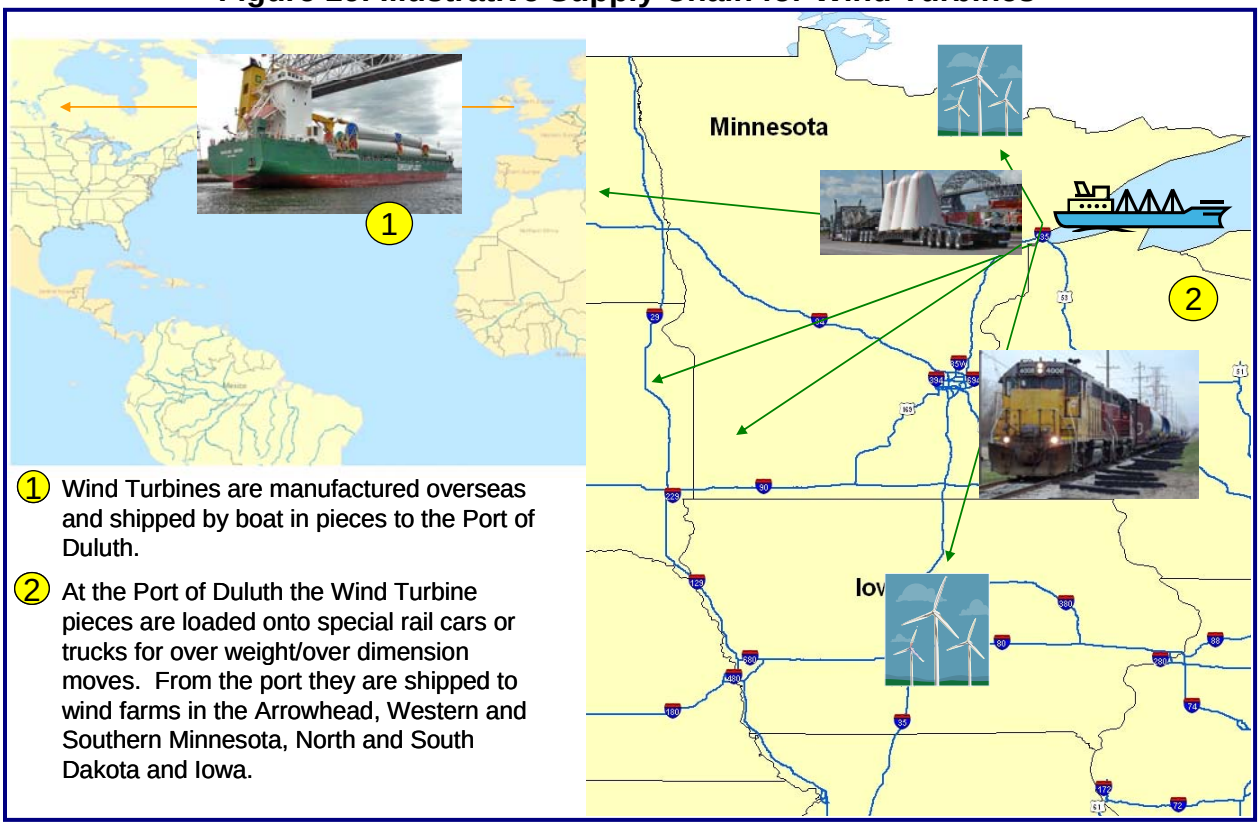
As wind farms are developed in western Minnesota and the Dakotas, demand for wind turbines has been steadily climbing. According to the American Wind Energy Association, Minnesota moved from fourth to third in the U.S. for states generating the largest amount of wind power in 2007.

The turbines are often manufactured in Europe and are increasingly shipped into the Port of Duluth in pieces because of their oversize and heavy nature. At the Port of Duluth they are loaded onto special rail cars or trucks that are outfitted for over weight/over dimension moves.

Wind components are also manufactured in locations such as Pipestone, MN, Cedar Rapids, IA, and in Grand Forks, ND, shipped via Duluth/Superior, with final destinations such as Spain in 2007, to Brazil in 2008 and to Chile in 2009. **Figure 16** depicts a typical supply chain for wind turbines.

In 2008, the Twin Ports handled 302,000 tons of wind equipment in the form of more than 2,000 components. The average loaded dimensions of wind moves are:
Blades: 10' wide; legal height & weight; 160-170' long
Base section: 15' wide; 15'6" high; 185' long; 260,000 GVW
Nacelles: 11' wide; 15'6-15'8" high; 199' long; 375,000 GVW on 19 axles.

Figure 16: Illustrative Supply Chain for Wind Turbines



TIMBER INDUSTRY AND PAPER MANUFACTURING

Lumber, wood and paper products are key industries in the region. Wisconsin is currently the #1 paper making state in the nation, producing more than 5.3 million tons of paper and 1.1 million tons of paper board annually.[vi] The value of Wisconsin's paper shipments exceeds $12 billion on an annual basis.

There are also five pulp and paper mills, and three recycled pulp and paper mills operating in Minnesota. The value of Forest Products Manufacturing shipments from Minnesota in 2007 was estimated at between $6 and $7 billion.[vii] However, due to computerization and electronic media the paper industry is in decline. Since 1990, dozens of paper mills in Wisconsin and Minnesota have closed, resulting in thousands of lost jobs. Minnesota has been particularly hard hit due to high stumpage fees (bid rates on private and public standing timber ready for harvest) and other local costs when compared to Canadian and southeast U.S. sources.

As part of the stakeholder outreach effort for this study, several paper mills were contacted and interviewed regarding their transportation supply chains and associated issues with sourcing raw materials and moving finished products to market. Because pulp and paper are heavy products during highway transport wood and paper products typically "weigh-out" before they "cube-out." That is to say, most wood and paper product shipments by truck reach the allowable weight limits of the truck before they reach the volume capacity of the truck trailer or semi-trailer. As a result, timber haulers in both Minnesota and Wisconsin have petitioned their

respective state legislatures for extra-weight during pulp wood harvest seasons – typically during the winter when the forest floor is frozen. For example:

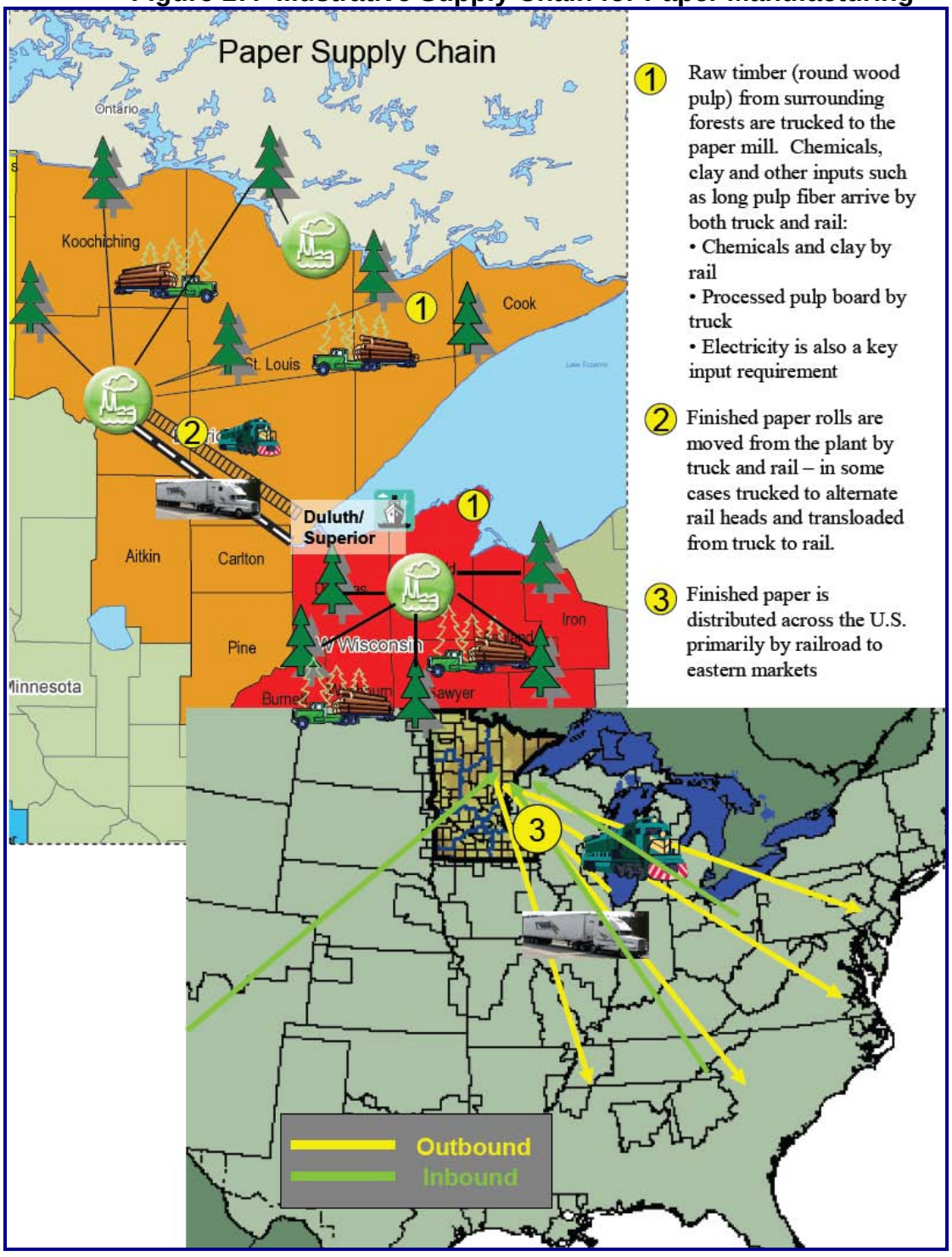
- In Minnesota forest products haulers may purchase a special permit during winter haul seasons. Vehicles must be a 6 or more axle combination, consisting of a truck tractor with a minimum 3 axles and a semi trailer with minimum 3 axles or 4 axle truck with 2 axle pup trailer. During Winter Weight Increase period potential GVW is 99,000 lbs with proper axle spacing. Permits do not include travel on Interstates. Permits also include finished forest products such as paper, pulp, oriented strand board, laminated strand lumber, hardboard, treated lumber, untreated lumber, and barrel staves.

- In Wisconsin, *Forest Products* – (348.15(3)(br)) Loads of forest products are allowed to be transported on Class A highways with the following axle weights:
    - Gross weight imposed on the highway by the wheels of any one axle may not exceed 21,500 pounds;
    - For two axles 8 or less feet apart, 37,000 pounds; and
    - For groups of three or more consecutive axles more than 9 feet apart, 4,000 pounds more than is usually allowed (depending on the distance between foremost and rearmost axles in a group) is allowed.
    - Total weight cannot exceed 80,000 pounds. This does not apply to any Wisconsin highway, except a portion of US 51 between Wausau and WI 78 and that portion of WI 78 between US 51 and the I-90/I-94 interchange near Portage upon their federal designation as I-39 that is a part of the national system of interstate and defense highways.

Figure 17 depicts a typical supply chain for the paper industry in the region. While specific types of paper production may have varying sources of input, generally raw pulpwood is brought by truck from surrounding forests to the paper mill. Increasingly, mills also use long pulp fiber, a processed pulp similar in appearance to wafer board. Long fiber pulp can be stacked in rail cars or semitrailers and, due to almost no water content, is lighter to transport. A major wood pulp mill in Terrace Bay, ON produces about 1,000 tons of pulp a day. To reduce transportation costs, the company transports the pulp to Duluth-Superior in a barge about the size of a soccer field, initially loaded to barge directly from the plant. It can carry about 5,500 tons of pulp per load and is towed or by a tug via Lake Superior to Duluth. It is then transloaded and shipped to paper mills in Minnesota and Wisconsin via both rail and truck as is appropriate for a given mill.

Kaolin clay, an input of the paper industry, is used in the filling and coating of paper. It is a very common mineral, and the most common type of clay used for coated paper to achieve certain qualities, including weight and surface gloss, smoothness, and ink absorbency. Kaolin clay is transported mostly via rail to the region. Due to rising rail costs, there is growing regional interest in alternate transportation means, such as receiving kaolin clay from ships at the Duluth-Superior ports.

Figure 17: Illustrative Supply Chain for Paper Manufacturing



A growing issue among paper shippers has been service and rates charged by Class I Railroads. There is a persistent feeling that while some competitive rail rates have improved due to deregulation, "captive" shippers bound geographically to only one Class I railroad have seen declining service and higher rates. These shippers consider themselves disadvantaged in

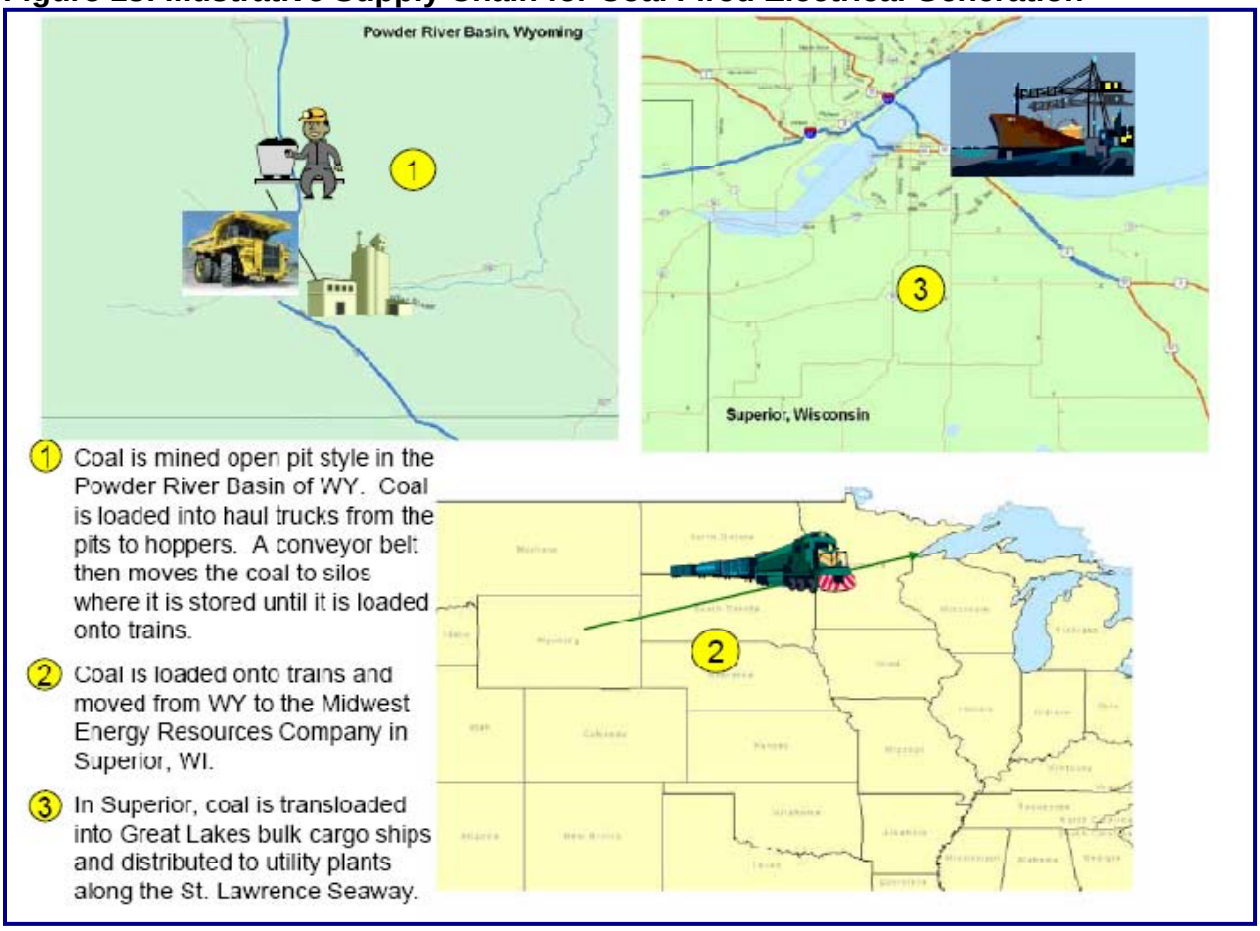
contractual rate negotiations with the major rail carriers, and instead have looked at various legislative initiatives to provide equity between regions and markets. Shipper groups have organized to pursue lobbying efforts at the federal level to produce these regulatory or legislative solutions. A prime group pursuing re-regulation and anti-trust action against the railroads is Consumers United for Rail Equity (CURE). Both Minnesota and Wisconsin have state chapters of CURE.

> *Consumers United for Rail Equity (CURE) is a coalition of freight rail customers seeking changes in federal law and policy that would require railroads to provide more competitive pricing and reliable service. CURE's goal is to hold railroads accountable to their customers and the public.*
>
> *Currently, CURE is working for two major changes in law. First, the coalition supports legislation that will improve the Surface Transportation Board, which is failing in its mission to ensure competition and protect rail customers from railroad monopoly power. Second, CURE supports legislation that removes current railroad exemptions from the nation's antitrust laws.*
>
> *An umbrella membership organization, CURE includes large trade associations that represent more than 3,500 electric, utility, chemical, manufacturing and forest and paper companies and their customers.*[viii]

COAL TRANSPORTATION

Figure 18 depicts the supply chain for coal used by utilities along the Great Lakes in generating electricity. Bituminous coal is mined in open pit mines in the Powder River Basin of Wyoming. When an area has been approved and is ready to be mined, topsoil and subsoil, also known as overburden, are removed. The top soil is stripped down two to five feet after drilling and blasting breaks up the dirt. Shovels, draglines, and trucks are used to remove the overburden exposing the coal. The area cleared of overburden is then drilled and blasted again to break up the coal.

Figure 18: Illustrative Supply Chain for Coal Fired Electrical Generation



Shovels excavate and load coal into haul trucks. From there, the trucks haul the coal to the hoppers. This is the area where the trucks dump the coal into a checker-board system that allows large chunks of coal to enter a grizzly feeder. From the grizzly feeder the coal travels to crushers where it is broken in to pieces approximately two-inches by two-inches. A conveyor belt then takes the crushed coal to silos where it is stored until it is loaded onto a train.

An average coal silo holds approximately 15,000 tons of coal. Each coal unit train can haul an average of 12,000 to 13,000 tons of coal. Each unit train consists of 110 to 115 hopper cars. Each car is capable of holding 110 to 120 tons of coal. Each ton of coal provides enough energy to heat one home for one month. Two types of loading techniques are used. One automatically loads the exact amount of coal that the train is capable of holding. The other, called the top-off system, partially loads the car. Before the train car leaves the silo, another area tops off the car with the amount needed to fill each car to its capacity. From loading points in Wyoming, trains transport the coal to Midwest Energy Resources Company in Superior, where it is transloaded into Great Lakes bulk cargo ships and distributed to utility plants located all along the St. Lawrence Seaway.

ANALYSIS AND RECOMMENDATIONS

Based on the freight issues and trends previously described, a set of key issues was identified for additional investigation. These key issues are listed below. Outreach was critically important to the development of this section. Several interviews were conducted with key businesses within each of the major industries in the region. In addition, a freight forum was held to further discuss key issues in the region, including key commodities, industry trends, and system deficiencies. The key issues are categorized into four groups:

MINING INDUSTRY

Growing international demand for iron; rail transportation is critical for the taconite industry
Steel plant on the Iron Range to manufacture slab steel
Non-ferrous mining (nickel and silver)
Taconite tailings as alternative aggregate source

ENERGY DEVELOPMENT

Assembly and transport of large equipment from Duluth to Athabasca Oil Sands
New pipeline(s) and potential refinery capacity in Superior
Oversize/overweight movements for wind generation equipment
Storage capacity at port is limited

TIMBER INDUSTRY AND PAPER MANUFACTURING

Oversize/overweight movements, 10-ton local system
Pulp from British Columbia via rail, and Ontario via barge

TRANSPORTATION CAPACITY

Port constraints
Oversize/overweight constraints for truck, rail
Access to national, international markets via intermodal containers is inefficient

1. Duluth / Superior Intermodal Container Terminal Feasibility

Many Study participants expressed interest in establishing intermodal container services in the Duluth/Superior Area, as well as improving service from the Dilworth terminal in northwestern MN. This section explores feasibility of a containerized intermodal terminal in the Duluth/Superior Area, and examines potential operating models as examples.

There is a growing interest in developing new intermodal container terminals in the U.S. to expand local access to national and international markets in an attempt to remain competitive. Diverting more freight from trucks onto rail also reduces the number of trucks on highways, which helps to preserve pavement, reduces energy consumption, and reduces vehicle emissions.

In the past, Class I railroads have been reluctant to develop new terminals midway between two major destinations because it reduces the efficiency of their overall operations. Fewer stops on a route allows for maximization of velocity, and a minimization of empty moves. Although it is most efficient to move a fully-loaded container train between a major coastal port and major inland destination, such as Chicago, even that efficient model can be problematic due to the imbalance between imports and exports in the U.S.

Although it remains difficult to establish new intermodal terminals, there are several recently-announced new terminals that will be developed to handle new demand. A $129 million facility near Memphis, TN will be able to annually handle 327,000 containers and trailers annually when complete, and a $112 million facility near Birmingham, AL will be able to handle 165,000 containers and trailers. Those projects are projected to open in 2012. In Joliet, IL outside of Chicago, construction just began on a $327 million terminal that will handle 500,000 containers and trailers per year. These recent examples show that new opportunities may be available for establishing a new intermodal container terminal at intermediate route locations such as in the Duluth-Superior area, and new terminals near major rail centers where facilities are over capacity, such as in the Twin Cities.

During stakeholder outreach sessions a suggestion was made for exploring the creation of a container yard in the Duluth Port Terminal Area in combination with short sea shipping to move freight from coastal ports to lower great lakes states for the purpose of bypassing rail congestion in Chicago. Such a terminal could be usable by several different classes of shippers, including local manufacturers shipping supplies and manufactured goods to and from international markets, marine transshipments of containerized cargo, and transshipment of local truck traffic to long-distance rail moves domestically. However, stakeholders were also cognizant of potential issues, such as the suspension of water services in winter due to ice on the Great Lakes/St. Lawrence Waterway, likely problems with container availability, container handling infrastructure at the port, and regional volume requirements to develop financially feasible volumes.

Successful railroad intermodal facilities benefit both regional shippers and the railroads providing service. In most instances, terminal facilities built in the U.S. have been funded by

private enterprises with local assistance. Recent freight intermodal facility/logistics center developments suggest several common factors that contribute to their success:

- **Significant base load market**: Access to a large industrial, commercial or agricultural market is essential to the success of a logistics facility. Freight density is the most important factor when considering the financial feasibility of a facility. Logistics facilities are capital intensive due to the amount of land required and the need to develop or improve supporting infrastructure. Consequently, volume is critical in amortizing the costs of the facility through acceptable user fees.
- **Network access:** Access to a Class I-railroad mainline track is another critical success factor as facilities benefit from more frequent train service and expedited transit times. Connections to a mainline either through a Class I branch line, or a short-line rail road are acceptable alternatives under certain circumstances. Branch line connections should have frequent service with no delays on the mainline train operation and short-line interchanges with a Class I-railroad must be fluid.
- **Primary highway system access:** Proximity to the highway network and ability to easily connect to the network is imperative to the success of a logistics facility. Motor carrier travel times and low trucking costs are required to make a facility attractive as a modal transfer center. In addition, locating adjacent to an interstate highway makes it easier to divert intercity traffic passing through the area.
- **Railroad cooperation**: In addition to top location in proximity, the cooperation of the Class I-railroad is also important. The railroad must offer the service required by the facility users to the location that users ship to or receive traffic from. The railroad must also offer freight rates that are competitive with motor carrier freight rates. Railroad interest is based on the traffic volumes generated by the facility, the ability to accommodate service to the facility into its operating plan, and reduce operating costs. The latter issue is attributed to the current railroad business model favoring the operation of point-to-point dedicated trains, and movement away from serving individual shippers.

Generally, railroads prefer to locate intermodal terminals in large metropolitan areas. Big cities generate sufficient economic activity for generating enough traffic to operate intermodal terminals efficiently. **Table 12** displays the metropolitan areas that are host to Union Pacific (UP), Canadian National (CN) and BNSF railroad intermodal terminals (paper/virtual ramps are excluded). The Duluth/Superior Metropolitan Area in 2008 had a population of 274,571 (which includes all of St. Louis, Carlton, and Douglas counties) people and is considered a relatively small metropolitan area for an intermodal terminal. Adding to the low population base are forecasts for low population growth in the area. Wood & Poole Economics, Inc., for example, expects the Duluth/Superior Metropolitan Area to grow by just 3.5 percent between 2007 and 2030.

Some metropolitan areas on the list in Table 12 are smaller than Duluth/Superior, for instance Laredo, TX is smaller, but it is also the primary KCS/KCSM cross-border point, so traffic is not wholly dependent upon the metropolitan area. The Billings, MT terminal is considered marginal and only remains open because United Parcel Service (USP), a key BNSF customer, has a significant operation located there.[ix] The intermodal terminal in Auburn, ME is owned by the city and leased to a short line railroad, the Saint Lawrence and Atlantic Railway, in a somewhat

unconventional arrangement. Excluding Laredo, the Duluth/Superior metropolitan area ranks 32nd of the 35 sites on the list. Based on population criterion alone, an intermodal terminal in Duluth/Superior would be at the low end of what is feasible, but not out of the question. Other factors influence the feasibility of an intermodal terminal, such as rail access (i.e., proximity to a Class I railroad main line), locations of major manufacturing production, or appropriate geography/circumstances for a major transportation hub.

Table 12: Locations of CN, BNSF, UP Intermodal Terminals,
(Ranked by Metro Area Population)

Population Rank	Metropolitan Area	Carrier(s)	2007 Population (000s)
1	Los Angeles, CA	UP, BNSF	12,876
2	Chicago, IL	UP, BNSF, CN	9,525
3	Dallas/Ft. Worth, TX	UP, BNSF	6,145
4	Houston, TX	UP, BNSF	5,628
5	Detroit, MI	CN	4,468
6	San Francisco Bay Area, CA	UP, BNSF	4,204
7	Phoenix, AZ	BNSF	4,179
8	San Bernardino, CA	BNSF	4,081
9	Seattle/Tacoma, WA	UP, BNSF	3,309
10	Minneapolis/St. Paul, MN	BNSF	3,208
11	St. Louis, MO	UP, BNSF	2,828
12	Denver, CO	UP, BNSF	2,434
13	Portland, OR	UP, BNSF	2,175
14	San Antonio, TX	UP	1,991
15	Kansas City, MO	UP, BNSF	1,985
16	Las Vegas	UP	1,836
17	Memphis, TN	UP, BNSF, CN	1,281
18	Birmingham, AL	BNSF	1,108
19	Salt Lake City, UT	UP	1,100
20	New Orleans, LA	UP, BNSF, CN	1,030
21	Tucson, AZ	UP	967
22	Fresno	BNSF	899
23	Albuquerque, NM	BNSF	862
24	Omaha, NE/Council Bluffs, IA	UP, BNSF	804
25	Worcester, MA	CN	781
26	El Paso, TX	UP, BNSF	735
27	Stockton, CA	UP, BNSF	671
28	Jackson, MS	CN	534
29	Spokane, WA	BNSF	456
30	Reno, NV	UP	419
31	Peoria, IL	CN	371
32	Amarillo, TX	BNSF	242

33	Laredo, TX	UP	233
34	Billings, MT	BNSF	150
35	Auburn, ME	CN (SLR)	107

THE TWIN PORTS INTERMODAL TERMINAL FEASIBILITY STUDY

In 2003, researchers at the University of Wisconsin-Superior, and the Tioga Group, a consulting firm, conducted a study to investigate whether a truck/trail container terminal would be feasible in the Duluth/Superior (Twin Ports) metropolitan area.[x] The study concluded that a truck/rail container terminal would be feasible based on estimated cargoes volumes into and out of the Twin Ports region. Rail yards are also available in the area, which could be used for an intermodal container terminal. The report also analyzed the feasibility of a roll-on/roll-off (RO/RO) marine service between the Twin Ports and Thunder Bay, concluding the service is feasible and would support the truck/rail intermodal terminal. Data gathered for the Twin Ports Study and subsequent developments suggest the feasibility of a truck/rail intermodal terminal, unattached to any marine service could face significant challenges.

Case Studies of Comparable Intermodal Terminals – The University of Wisconsin-Superior team looked at seven relatively low volume intermodal terminals in other locations around the U.S. and determined that small terminals can be successful. However, of the seven terminals, Fort Smith, AR at the time was a virtual, "paper ramp" (providing intermodal container service where a shipment can originate with a truck movement to another rail intermodal terminal) and Thief River Falls, MN had been closed. Not surprising, terminals located in metropolitan areas the size of the Twin Ports were found to focus more on handling manufactured goods and raw materials than on handling the imports of consumer products, typical of terminals in larger metropolitan areas. All of the terminals analyzed except for the terminal in Auburn, ME and Mobile, AL are closed today. The Port of Montana stopped intermodal container operations in 2002 when the volume of containers handled dropped to about 1,200 per year.[xi] CN has since closed its intermodal facilities in Neenah and Green Bay, WI. UP no longer quotes rates for the paper ramp at Fort Smith, AR. The subsequent closure of these intermodal ramps suggests that the long-term viability of small intermodal facilities may now be more difficult than it was when the report was written.

Stakeholder Interviews – The University of Wisconsin-Superior team interviewed shippers, intermodal marketing companies, truckers, drayage companies, and steamship companies. While shipper surveys suggested significant quantities of intermodal-compatible freight shipped into and out of the Twin Ports Area, other stakeholder interviews suggested establishing a truck/rail intermodal ramp may be a significant challenge.

Most intermodal traffic is marketed to customers by intermodal marketing companies (IMCs) or ocean carriers (steamship lines). IMCs contract with railroads, drayage companies, and other providers to provide customers with a door-to-door transportation solution. These providers gave the Duluth/Superior market only a 20 to 50 percent chance of success in the 2002 operating environment. The cooperation of steamship lines is vital to the success of intermodal terminals. Yet, steamship lines interviewed for the Twin Ports Study expressed misgivings about serving

the Duluth/Superior market, expressing concerns about too little inbound demand, impacting the likelihood they could offer competitive service to the Twin Ports market.

Analysis of TRANSEARCH Data – The University of Wisconsin-Superior team also quantified the likely market for a Twin Ports using TRANSEARCH™ data from Global Insight (formerly Reebie Associates). The minimum number of lifts generally considered feasible for an intermodal terminal development was estimated to be between 12,000 and 24,000 lifts per year. Generally, when analyzing the potential market of intermodal terminals, it is insufficient to assess the aggregate amount of traffic that could flow through the terminal to all origin/destination markets. Small intermodal terminals are typically served by a single train in each direction, resulting in service being provided to one origin/destination gateway in each direction. In the case of Duluth/Superior, service would likely be provided to a port in the Pacific Northwest and to Chicago, IL. At Chicago, containers could be transferred to eastern rail carriers and shipped to any number of destinations. The Twin Port Study analysis of TRANSEARCH™ did not reveal adequate traffic for the Duluth/Superior terminal to generate adequate freight to be feasible. However, the study team justified that traffic through a Duluth/Superior terminal may be higher because some carload rail traffic would switch to rail intermodal. The shipper survey also suggested a higher portion of truck traffic diverting to intermodal than originally assumed, because the presence of an intermodal terminal would increase the quantities of break bulk products entering the port and transloading to intermodal.

After reviewing the study methodology and supporting data, the evidence gathered in the Twin Ports Intermodal Freight Terminal Study and subsequent events created some doubts as to the feasibility of a truck/rail intermodal terminal in the Twin Ports Area as a stand-alone entity.

UPDATED PROPOSALS FOR A RECONFIGURED INTERMODAL CONTAINER TERMINAL

Northern MN/Northwest WI Stakeholder Interviews - Multiple interviews with marine operators, rail representatives, Blandin Paper, the Port of Duluth, and Lake Superior Warehousing as described previously, suggested current and potential intermodal container, marine, and rail developments that demonstrate an expanded potential for the viability and utility of an intermodal terminal in the Twin Ports. The earlier intermodal study concluded that a land-locked intermodal terminal at CN's Pokegama Yard would be the most advantageous site for use by the railroad, based on an assumption that truck hauls of containers to and from the yard would be virtually the only intermodal transfer to be handled. The location also limited its most efficient use only to CN traffic to and from Pacific Northwest ports, without access for the other Class 1 railroads. The interviews outlined the concept of an intermodal terminal directly adjacent to Lake Superior berths that would allow the option of rail-to-marine container transfers. This could efficiently bypass Chicago all-rail congestion on trips to lower Great Lakes port cities, a key principle of the Highway H2O concept. This terminal could still be fully accessible to trucks, and made accessible to all four Class 1 railroads serving the Twin Ports. A near-dock site would also offer more opportunities for operation by non-railroad labor, such as longshoremen or industrial workers, removing a labor liability from the host railroad and providing scheduling flexibility in alternate labor assignments for the designated operator. Public/private or private terminal operation would present the railroads with a simple hook-and–haul operation to deliver

container stack trains or blocks of container cars to any number of route destinations, including the PNW, Twin Cities, and Chicago for both domestic and international containers.

Yard Configuration and Approaches - This portside location would enhance the flexibility of Berth C & D upgrades needed for port capacity improvements for energy, steel slab, and pulp shipments. Use of the existing CP yard trackage, upgraded and imbedded in pavement, would allow multiple uses including loading of containers by top-handlers and double-stack railcar inspection and running repairs. Remote-control switches and on-site air compressors for air brake charging would streamline rail operations further. This would be a relatively low-capital startup configuration. The proximity of the dockside cranes would aid in container loading to marine vessels with in-yard sorting and drayage of the boxes. Container repositioning, storage, and chassis storage issues would be mitigated in part by the centralized yard location and the ready availability of open backlands beyond the tracks. Truck gates on-site would facilitate change-of-custody transactions and load inspections, but off-site services could also be integrated into the operation.

A future infrastructure investment fully complementary to this intermodal yard could provide a major enhancement of Twin Ports-area rail transportation, in the form of a new railroad lift bridge at the south edge of the proposed intermodal yard. This new bridge would be in essentially the same alignment and location as the old International Road/Rail Toll Bridge, which was retired and partly dismantled after the completion of the Blatnik Highway Bridge above this site. A new lift bridge would have fourfold benefits. First, it could serve as a direct replacement for the Grassy Point rail swing bridge, which is in poor condition and limited as to train speed and length. Second, it could give direct access to Rice's Point BNSF and CP yards and CN routing through Duluth directly from Superior facilities, with trains able to run through the terminal and utilize storage in neighboring yards. Third, it would offer a much more direct and higher speed route for intercity passenger trains such as the proposed NLX high-speed intercity service into downtown Duluth at the St. Louis County Union Depot. Fourth, the bridge deck could be configured to handle intermittent truck traffic including oversize and overweight loads heading southbound out of the Port for destinations in Wisconsin, southern Minnesota, and Iowa. The multi-modal impact of the new structure would justify funding from a number of rail freight, rail passenger, marine, and highway sources.

POTENTIAL BUSINESS MODELS FOR A RECONFIGURED INTERMODAL CONTAINER TERMINAL

The Auburn CN Terminal: A business model that maybe feasible for Duluth/Superior might be similar to the SLR Intermodal terminal operation in Auburn, ME. The construction of SLR terminal was primarily financed by public funds. It was created as a partnership between the St. Lawrence & Atlantic Railroad Company (SLR),[xii] a regional carrier, local jurisdictions, the State of Maine, and the Federal Highway Administration. The terminal is owned by the Town of Auburn and is leased to the SLA. The service is part of the CN intermodal network. The terminal handled 6,000 containers during its first year of operation in 1994 and was handling 15,000 containers by 2001. The SLA terminal receives inbound consumer goods, including goods marketed by the L.L. Bean Company in Freeport, ME, as well as inputs for the paper industry. Outbound, it ships lumber, fiberboard, and Poland Spring Water. Trains are interchanged with

the CN at Richmond, QC, and service is provided to Vancouver, BC, Halifax, NS, and other points. The terminal is located adjacent to the local airport and has on-site customs inspectors.

Several factors likely contribute to the success of the terminal. Because the terminal is owned by the city and direct service is provided by a regional railroad, it is relatively easy for the CN to serve. Secondly, it does not compete with other CN terminals. While the Lewiston-Auburn Metropolitan area is small, the terminal provides the closest intermodal access point for the Portland-Biddeford metropolitan area, which is much larger with about 500,000 inhabitants. This surrounding population base, combined with the presence of L.L. Bean in Freeport provides base of inbound traffic demand to balance against outbound shipments of forestry and paper products. The SLR Intermodal terminal could serve as a model for a Twin Ports terminal, since it requires relatively little investment and effort on the part of CN. It is likely that the carrier is willing to support the terminal because it requires a relatively low level of commitment.

Reliever Service for Minneapolis/St. Paul - A research paper by the lead author of the Twin Ports Intermodal Freight Terminal Study also raised the idea that a CN terminal in Twin Ports could serve the Minneapolis/St. Paul area.[xiii] Two scenarios were presented by which the Twin Ports terminal could capture intermodal traffic to/from the Twin Cities area. Based upon the capacity of the two existing terminals in Minneapolis/St. Paul and forecasts of intermodal traffic, an estimated 175,000 lifts will need to move through alternate routes because the two existing terminals in the Twin Cities will not have sufficient capacity. A Twin Ports terminal could pick up some of this shortfall.

Much of the traffic flowing through the CP Shoreham Yard in Minneapolis consists of trans-Pacific trade moving through Vancouver, onto the CP, and to the Twin Cities area. Much of the traffic that flows through the BNSF St. Paul - Midway Intermodal Yard consists of trans-Pacific trade that travels through the Port of Seattle/Tacoma, onto the BNSF, and to the Twin Cities. Were CN to establish a terminal in Duluth/Superior, the other services would compete with service through Prince Rupert, onto the CN, and to the Twin Cities by way of the Twin Ports. The economics of the Prince Rupert service are considered to be favorable compared to competing services through Seattle or Vancouver because the trans-Pacific transit times are shorter. Therefore, a CN service through the Twin Ports would be competitive despite the truck drayage between the Twin Ports and the Twin Cities. The proposed service was contemplated under two scenarios:

Scenario 1: This scenario is based on a response to the "not-in-my-backyard" (NIMBY) opposition major railroad developments sometimes encounter. Some rail carriers have been so stymied by local opposition and NIMBY that they chose to move intermodal capacity to alternative metropolitan areas. However, the example of the Memphis area provides an alternate scenario not entirely consistent with the experience of other metropolitan areas.

Memphis is the nation's second largest inland intermodal market, with the number of containers flowing into and out of the area second only to Chicago. Several years ago, Memphis was predicted to have a dramatic shortfall in container handling capacity. Since that time, BNSF expanded its intermodal ramp at the Tennessee Yard to handle almost twice as many lifts. The expansion included the addition of new "super gantries" allowing the yard to handle more

containers within the same footprint. With public support, CN and CSXT established an intermodal terminal at the Memphis Gateway with a 200,000 lift capacity. In addition, UP expanded its intermodal terminal three times between 1998 and 2007, and NS is nearing agreement to replace its Forrest Yard intermodal ramp which has a capacity of 123,000 lifts with a new intermodal ramp, which will eventually have a capacity of 535,000 lifts.

Each of the carriers believes that once their projects are completed, they will have ample capacity to handle near term increases in demand. On the other hand, zoning restrictions and public opposition may be more severe within the Twin Cities area than in Memphis.

Scenario 2: Perhaps a more intriguing possibility, some industry observers believe that the CN intermodal service through Prince Rupert is a "game changer." The service allows shippers to trim about a day off of their trans-Pacific transit times when compared to service through Seattle or Vancouver.

When comparing the cost of CN service to Prince Rupert via the Twin Ports to that of the BNSF service to Seattle or CP service to Vancouver (both via the Twin Cities), one would need to balance the benefits of the time savings and any rail cost savings against the additional cost of drayage. Publicly available drayage rates suggest that the cost of draying a container to the Twin Ports, as compared to draying a container within the Twin Cities area carries a cost premium of about $270.[xiv] Assuming a container cargo value of $75,000 (as the research paper assumed), the savings in inventory carrying cost resulting from a one-day shorter transit time would not likely recoup the $270 cost premium to dray a container to the Twin Ports. On the other hand, some shippers may be receiving containers with cargo valued at much more than $75,000. To gain that business CN might charge lower rail rates and the addition Twin Cities cargoes could render a truck/rail intermodal facility in the Twin Ports feasible, whereas the local traffic volumes would otherwise have been inadequate to support the terminal.

The most likely scenario for intermodal service in the Twin Ports likely rest with whether the CN is interested in providing the service.

RAIL/TRUCK/MARINE INTERMODAL TERMINAL

Maritime container service on the Great Lakes has received a large amount of attention over the past several years. The Tennessee Valley Authority (TVA) predicted a large expansion of container service on the Great Lakes/Saint Lawrence Seaway system in a report prepared in 2001.[xv]

Containership Service - A significant challenge for container services on the Great Lakes Navigation System (GLN) using a traditional containership is the size of ships that can currently operate on the system. Containerships are heavily dependent upon economies of scale. As ships become larger, the cost per container decreases. The 2002 U.S. Army Corps of Engineers Reconnaissance Report indicated that the locks and channels of the GLN can currently accommodate a ship able to carry 500 twenty-foot equivalent unit (TEU) containers. However, some harbor dredging would be necessary for these ships to operate.[xvi] Under existing capacity limitations, a Great Lakes container ship would be able to handle roughly the same number of

containers as a large double stack intermodal train, which can handle as many as 280 forty-foot containers, or 560 TEUs. However, the typical intermodal train is manned by two crew members, a conductor and an engineer. By contrast, the typical Great Lakes vessel is manned by a crew of 21 or more. Because of the manning requirements, as well as high capital costs and other factors, the cost of operating a Great Lakes vessel is somewhere between $20,000 and $30,000 per day.

The example of a hypothetical container service is illustrative. Vessel schedules found on the Midwestern Energy Resource Center's (MERC) website suggests that the typical lake vessel operates at about 11.5 miles per hour, including time at locks, entering and leaving harbors, etc.[xvii] In this hypothetical example, a container service is established between the Twin Ports and Detroit, MI. Containers travel by rail between Seattle and the Twin Ports and then move by container ship over the GLN to Detroit, MI. Detroit is about 750 miles from the Twin Ports by water, so the total transit time would be 65 hours or about 2.7 days. If one assumes that the loading/unloading requires half a day on each end of the voyage, the total requirement would be 3.7 days. **Table 13** below lists evidence collected regarding the typical operating expense per day of container ships. The results are not indexed to today's dollars, so the results would likely be higher when indexed to 2009. The data suggests that the typical operating expense for a Great Lakes container ship with the capacity of about 500 TEUs would be at least $20,000 to $30,000 per day.

Table 13: Estimated Operating Expense of Great Lakes, Short Sea Ships

Source	Operating Expense per Day
2002 U.S. Army Corps of Engineers U.S. Flag Containership, 600 TEU Domestic Trade	$29,557 at sea, $27,161 at port
FY 2008 Rand Logistics, Inc. (Operator of Bulk Lakes Vessels) Financial Results	$24,228
Paul F. Richardson Associates, Inc. Transportation Research Board "Cost and Regulatory Challenges to U.S. Short Sea Shipping," January 11, 2004, $40M container vessel of 400 – 600 TEU	$20,700
U.S. Army Corps of Engineers June 2002 Reconnaissance Report, synthetic rates for GLN/SLS bulk fleet	$21,418 (Class I) $28,366 (Class X)

Data from the Association of American Port Authorities (AAPA) suggests that the ratio of containers to TEUs at the Port of Seattle in 2007 was about 59 percent. If one assumes that the container ship is at 75 percent capacity, the number of revenue containers per ship would be about 221. Therefore, the ship operating cost per container would be about $334 to $502 for the 3.7 days. At seaports, the amount charged to transfer containers between ship and shore varies considerably. The lift charges at the Port of New York/ New Jersey are among the least expensive of the East Coast ports, at $56 per lift. Assuming comparable handling costs, the total cost per container including lift charges would be between $446 and $614.

Rail intermodal rates would compare favorably. Data from the U.S. Surface Transportation Board Public Use Waybill Sample suggests that the rate per unit-mile for intermodal units originating in Seattle is about $0.51. Given that the distance between the Seattle and Detroit by

rail is 856 miles longer than the distance from Seattle to the Twin Ports, the incremental cost of rail is estimated to be about 856 miles at $0.51/mile or $437. This is less than the cost of using marine container service, even using optimistic assumptions about marine rates and equipment utilization. This also assumes that rail pricing is a function of distance. In reality it is a function of a number of factors, including the density of the lane. For example, the cost of shipping a container between Seattle/Tacoma to Chicago may be less than the cost of shipping the container to an intermediate spot, given the density of shipments to Chicago.

Barge Service – One alternative could be to provide container on barge service instead. Because barges have shallower draft, larger barges could operate on the GLN than would be possible for containerships. For example, the largest ocean barge currently operated by Columbia Coastal, which provides feeder barge service along the East Coast, has a capacity of 912 TEUs. The dimensions of this barge would allow it and a tugboat to pass through the Poe Lock at Sault Ste. Marie.

However, there are tradeoffs between containership and container on barge service. Barges are slower, providing service at an average of around 7 miles per hour.[xviii] Open water barges are also less fuel efficient than container ships and are unable to operate under heavy weather conditions. The process of lashing the containers to the deck of the barge is time-consuming. One solution to some of these problems could be to establish a service using articulated tug/barge combinations (ATBs). With ATBs, the tugboat pushes the barge from within a notch cut into the barge's stern. The tug and barge are connected with a hinged connection, the "intercom connector." In many ways, the combination of tug and barge operate like a self-propelled ship. However, the barge and tugboat are also seaworthy when separated and operating separately. ATBs can operate at speeds up to 16 miles per hour. They are much less constrained by the weather than conventional towed barges and can withstand similar weather conditions to a standard ship. ATBs are more fuel efficient than conventional towed barges, although they are still about 20 percent less fuel efficient than a container ship of the same size, operating at the same speed.[xix] The manning requirements of ATBs are less than that of container ships, requiring a crew of 9 to 11 for a large ATB.[xx] According to the OSG America, LP first quarter 2009 financials, the time charter equivalent (TCE) rate per day for Jones Act ATBs in first quarter 2009 was $31,118. This company's barges deliver petroleum and dry bulk cargoes, so the economics may differ significantly from that of a container barge operation.

If one assumes the same Twin Ports to Detroit service described above with the listed assumptions (ATB with a 912 TEU capacity; Ratio of containers to TEUs of 59 percent per AAPA statistics for Port of Seattle; 75 percent capacity utilization; OSG America Average Daily TCE rate of $31,118; and $56.00 per lift), the resulting cost per container is $397.30, potentially lower than the comparable rail rate.

Duluth/Superior Rail Intermodal Recommendations

With four Class 1 railroads passing through the Duluth/Superior Area, as well as Interstate-35, the Duluth/Superior area ranks high with regard to railroad network access and primary highway system access. The analysis of intermodal services in the Duluth/Superior Area examined several intermodal service options that are currently working in other smaller U.S. markets.

Generally the analysis found that the marine/rail intermodal services at this time are only marginally feasible based on cost and potential customers may also be dissuaded by services that could be disrupted by winter weather. Nonetheless, it is suggested that Mn/DOT and regional entities continue to play an advocacy role in exploring better options for intermodal service for shippers and manufacturers in the region. It is recommended that if an intermodal terminal were located in the Duluth/Superior Port Area, the location should have common access by more than one railroad. Specific steps that Mn/DOT may wish to consider for improving services in the Duluth Superior Region include:

- The Metropolitan Interstate Council (MIC) and regional representatives should continue discussions with the Canadian National Railway about the possibility of an intermodal terminal in the Twin Ports. One approach to re-initiate discussions is to propose a business model similar to that in Auburn, ME where CN's commitment in terms of investment and terminal operations is low. Since CN is familiar with the Auburn concept it may help ease uncertainty surrounding a Duluth/Superior facility.
- Continue to study whether shippers in the Twin Cities could feasibly be served through a Prince Rupert-Twin Ports-Twin Cities service. Interview ocean carrier, intermodal marketing company, and shipper representatives for their views of whether such a service would be viable. Even if a Twin Ports terminal only takes a small share of intermodal traffic from the Twin Cities market, this incremental traffic could help to make a Twin Ports intermodal terminal feasible.
- Discuss with CP and BNSF the possibility of establishing a virtual terminal (i.e., "paper ramp") in the Twin Ports area, where containers could be delivered and received, but ultimately drayed to the Twin Cities for rail transloading. Such a service has the possibility of reducing costs through economies of scale. It could also help to test the viability of direct intermodal service to the region.

2. Dilworth Intermodal Service Expansion

The BNSF Railway (BNSF) Dilworth, MN intermodal terminal occupies about seven acres. When it was operating as an active intermodal terminal, it included one side loader to lift containers onto or off of trains and one hostler to move equipment around the yard. It has 1,700 feet of loading/unloading tracks, 100 parking spots, and 20 loading/unloading car spots.

During interviews and at freight forums for this project, a number of stakeholder expressed concern over the intermodal service at the Dilworth terminal. Among the concerns are a lack of a container pool at the facility and the cost of repositioning empty containers to Dilworth. Respondents also noted an insufficient number of parking spaces at the terminal and insufficient room to grow or for related facilities such as warehousing.

The terminal is currently a virtual terminal, or "paper ramp." BNSF markets the facility as an intermodal hub, but is actually no longer rail-served. Instead, all containers are trucked to the BNSF terminal in the St. Paul, and the containers are loaded onto BNSF intermodal trains in the St. Paul. This adds costs to shippers who use Dilworth. Containers are drayed twice: once to the

Dilworth terminal and a second time to the BNSF terminal in St. Paul. BNSF only quotes rates outbound from Dilworth to Seattle, WA, so all containers must be drayed 241 miles eastward, so that the same containers can later pass through Dilworth on intermodal trains bound for Seattle, WA.

Between 1999 and 2003, the number of lifts at the Dilworth intermodal facility hovered at around 11,000 per year. A "lift" refers to the movement of a container onto or off of a train. If terminals loaded to empty ratio is 1:1, there are two lifts for every loaded container handled. In 2003, the number of lifts declined to 8,900 and then to 8,100 lifts in 2004. The level of traffic soon after plunged, so that there were only 2,000 lifts in 2006.[xxi] The traffic decline was primarily caused by a dramatic increase in repositioning charges, which made it uneconomical for shippers to use the terminal. Export shippers do not negotiate directly with railroads for international intermodal service. Rather, they negotiate with ocean carriers who quote combined rail and water rates. The ocean carriers negotiate with the railroads.

It is uncertain whether the high rates were caused by the BNSF charges to ocean carriers or the unwillingness of ocean carriers to reposition containers to Dilworth. As of 2007, ocean carriers were reporting repositioning costs of $350 - $750 per container, with a tendency toward the high end of this range.[xxii] At the time, BNSF published tariff rates for reposition containers to Dilworth were $670 from St. Paul and $900 from Chicago for a twenty foot international container. This pricing effectively closed the Dilworth facility.

In 2008, the North Dakota governor's office intervened and negotiated with BNSF to equalized rates for repositioning empty containers from Chicago to Minot/Dilworth versus St. Paul. Currently, the BNSF published tariff rate for reposition a 20 foot container from Chicago to Dilworth or Minot is $386 per container, the same rate charged to reposition an empty container from Chicago to St. Paul. If an ocean carrier has containers available in St. Paul, the shipper in the Twin Cities will not need to pay the $386.

The level of traffic at the Dilworth facility has not been sustainable since at least 1999. Intermodal facilities must maintain a minimum level of traffic to be financially feasible. Intermodal customers expect frequent service (at least three trains per week), or the facility will not be used. The number of cars per train must also be of sufficient quantity, so that the railroad can provide efficient service. Generally, intermodal is provided as point-to-point service, so intermodal units travel in unit trains directly between terminals. In 2006 the average BNSF intermodal train carried 163 units (trailers and containers), although the company prefers to operate larger trains of 250 units.[xxiii] The willingness of railroads to pick up and drop off less than trainload quantities of intermodal units varies by carrier and mitigating factors, such as equipment balance. The traffic volume must also be able to defray the fixed costs associated with intermodal terminals, such as the lifting equipment, the personnel, the scales, etc. Ocean carriers are also hesitant to supply containers to low volume terminals, preferring to concentrate their container supply in larger markets. The minimum traffic volume needed to sustain an existing terminal is often cited at somewhere between 15,000 to 25,000 lifts per year.

Because these traffic levels were unsustainable and because shippers in North Dakota would like to have access to an intermodal facility in Minot, ND, the State of North Dakota presented a

potential solution in 2007. Under the "co-load" proposal, a second intermodal terminal would be constructed in Minot, ND. Trains bound for the Pacific Northwest would be partially loaded at Dilworth, MN. The partial trains would be consolidated with additional intermodal cars at Minot. Trains with complete trainload quantities of intermodal containers would then proceed to the Pacific Northwest.

Much of the Minot facility has been built, in part with a $1.5 million grant from the U.S. Commerce Department's Economic Development Administration. The terminal is on a 180 acre site and is called the Port of North Dakota. BNSF agreed to test the co-load concept for a period of six months, provided that a third party operator market the facility, establish a customer base, and make the co-load concept into a viable business. This effort is currently stalled. Meanwhile, the Port of North Dakota is being used to transload petroleum products.

A more detailed analysis of the Dilworth intermodal container service expansion, including rates, market overlap, volume, product flow, market growth, and service type was conducted as part of the Western Minnesota Regional Freight Plan. Also included are the recommendations for the Dilworth site. That plan can be referenced at Mn/DOT's website.

3. Expand Port Capacity By Developing Garfield C & D Dock

The Duluth Seaway Port Authority (DSPA) is a public agency created by State of Minnesota statute in 1955. It is charged with the responsibility of developing and promoting maritime trade and regional industrial development. DSPA currently owns and operates the Arthur M. Clure Public Marine Terminal (Clure Terminal) and the Airpark Industrial Park and has also acquired strategic tracts of land for future development and maritime use.

The Clure Terminal, owned by DSPA, is the only breakbulk maritime facility in the Duluth-Superior harbor. It was designed and developed in the late 1950s to handle all the general cargo needs of the Midwest anticipated with the opening of the St. Lawrence Seaway in 1959. After almost 50 years, the terminal is reaching the limits of its capacity and future growth is severely limited by land constraints.

General cargo activity has increased to the point where all of the port's available cargo lay-down area has been consumed. Project cargo forecasts for the next five years indicate a significant increase in activity. New Minnesota Iron Range mines, U.S. and Canadian wind turbine projects, Canadian oil sands developments, major new pipelines and oil refinery expansions along with Great Lakes short-sea shipping opportunities are requiring the construction of additional docks and slips in the Duluth-Superior harbor.

In 1989, DSPA acquired two idle grain elevators near the Clure Terminal. The complex comprised nearly 28 acres of industrial waterfront – 1,800 feet long by 680 feet wide. Constructed in the late 1890s and early 1900s, the three dock walls are composed of wood timber or steel piling with intermittent concrete caps. The facility is located directly across a 300-foot wide slip from the Clure Terminal. This property is commonly known as Garfield C & D Dock.

In 2009, DSPA contracted with an engineering firm to assess the Garfield C & D Dock. The engineering firm concluded that C&D Dock provides a significant platform from which to consider the development of a transshipment facility. The conclusion is that the facility will be designed as an all-purpose facility capable of handling known project cargo (i.e., steel slabs, steel pipe, large wind turbine blades, wind tower sections), and future cargoes such as paper pigments, containers and other large ship-borne products. The preliminary design includes upgrading the dock faces, a loop road system and three rail spurs.

Recommendations for Supporting Duluth Port Capacity Expansion

Support the development of C & D Dock: The development of C & D Dock will be the first expansion and redevelopment of a general cargo facility since the construction of the original Clure Public Marine Terminal nearly fifty years ago. Regional economic activity is driving the need for additional dock and storage at the port. A properly designed facility will aid in maintaining competitive maritime shipping rates which in turn will support the development of maritime capability in the Great Lakes to handle general and break-bulk cargos. The development of this facility could potentially change shipping in the Duluth-Superior port. The port currently moves very large amounts of bulk commodities such as coal and taconite. This new proposed facility could offer the flexibility to ship varied commodities and accommodate new ships and barge combinations, as well as a potential roll-on/roll-off (RO/RO) marine service between the Twin Ports and Thunder Bay. According to DSPA staff, this development has the potential to be a "game changer" for shipping in and out of Duluth-Superior. Mn/DOT should consider supporting this development through a TIGER Grant Application.

TIGER Discretionary Grants (Transportation Investment Generating Economic Recovery) are part of a new Recovery Act program, wherein up to $1.5 billion was made available through September 30, 2011, for the Secretary of Transportation to make grants on a competitive basis for capital investments in surface transportation infrastructure projects that will have a significant impact on the Nation, a metropolitan area, or a region. Projects eligible for funding provided under this program include, but are not limited to, highway or bridge projects, public transportation projects, passenger and freight rail transportation projects, and port infrastructure investments.

4. Promote Port Development, Planning and Research Coordination

There is a long history of joint planning and cooperation between the Duluth Port and the Superior Port, which is evident by the following quote in the opening paragraph of the *Duluth-Superior Port Land Use Plan*. "There is a desire to update that plan and also to examine the harbor as a whole – although it is located in two states, the working waterfront functions as a single harbor." Both the *Duluth Port Land Use Plan* and the *Superior Port Land Use Plan* state, "The Duluth-Superior port functions as one port even though it is located in two cities and two states."

The following documents illustrate the history of cooperation and joint planning. These are listed in both the Duluth and Superior Land Use Plans.

- 1978 Land Use and Management Plan for the Duluth-Superior Harbor
- Dredged Material Management Plan – 1998
- Harbor Partnering Agreement – 1999
- Duluth-Superior Landside Port Access Study – 2000
- Twin Ports Intermodal Freight Terminal Study – 2003

The planning process sought to engage a broad cross section of freight transportation stakeholders to engage them in addressing current and future freight issues. There is a desire to continue this dialogue with the completion of this plan. This planning effort also recognizes the planning and development efforts of a number of agencies, jurisdictions and groups that are currently taking place. The Duluth Seaway Port Authority, City of Superior, MIC, and the Great Lakes Maritime Research Institute are currently working on many port related initiatives.

The Duluth Seaway Port Authority (DSPA) is an independent public agency created by the Minnesota Legislature in 1955. It fosters regional maritime and trade development and serves as an advocate for port interests. It strives to protect and increase maritime commerce through marketing, promotional and legislative initiatives and serves as an economic development agency. Its mission is to build and improve the Port of Duluth and create environmentally sound economic development opportunities while protecting and generating international and domestic commerce. More information is available at *http://www.duluthport.com/*.

Port Division of the City Of Superior: The Port Division within the Planning Department is responsible for providing the public infrastructure for harbor maintenance and port issues, in order to allow the private sector to operate on the Lake Superior waterfront. Key issues continue to be maintenance dredging and the placement of dredged material at acceptable, upland sites. The Planning and Port Director is an active member of the MIC Harbor Technical Advisory Committee and other harbor and port-related organizations. More information is available at *http://www.ci.superior.wi.us/index.aspx?nid=173*.

Duluth-Superior Metropolitan Interstate Council: Currently the Metropolitan Interstate Council (MIC), the MPO for the Duluth-Superior region has a Harbor Technical Advisory Committee (HTAC), an assemblage of stakeholders for the Duluth-Superior port that advises the MIC on harbor-related issues. The HTAC's mission is to provide a forum for the discussion of harbor-related issues and concerns, promote the harbor's economic and environmental importance to the community, and provide sound planning and management recommendations to the MIC. More information is available at *http://www.dsmic.org/htac*.

Great Lakes Maritime Research Institute (GLMRI): The research institute was established in 2004 to pursue research efforts in marine transportation, logistics, economics, engineering, environmental planning, and port management. The US Maritime Administration designated GLMRI as a National Maritime Enhancement Institute on June 1, 2005. GLMRI is a partnership of the University of Wisconsin-Superior and the University of Minnesota Duluth. Their mission is dedicated to developing and improving economically and environmentally sustainable maritime commerce on the Great Lakes through applied research. More information is available at *http://www.glmri.org*.

Regional Freight Advisory Committee: In 1997, Mn/DOT formed the first statewide freight advisory committee. The Minnesota Freight Advisory Committee (MFAC) continues to meet 3-4 times each year to advise Mn/DOT and others primarily on policy and research issues. Although membership fluctuates annually, many of the member businesses are located in Minneapolis-St. Paul, and a lesser number of members located in other various parts of the state.

Mn/DOT Districts 1 and 2 have a long history of engaging specific industry segments such as timber haulers and the sugar beet industry in meetings to exchange information and discuss upcoming projects that may impact hauling operations. Duluth/Superior has also had groups in the past such as traffic clubs and shippers associations that have worked to improve commerce and bring about infrastructure investments in the region. However, one of the key issues related to freight planning is that freight does not recognize geo-political boundaries. One goal of establishing a regional advisory committee is to create a bi-state advisory committee with public representatives from a variety of transportation planning authorities and private sector representatives from a variety of industries and modes, with the common goal of improving regional freight mobility.

To facilitate greater participation in state and metropolitan transportation planning, federal legislation encourages States and Metropolitan Planning Organizations (MPOs) to provide opportunities for various interested parties to provide input into the development of transportation plans and programs. For example, the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA LU) stipulates that MPOs and States shall provide freight shippers and providers of freight transportation services with reasonable opportunities to comment on transportation plans and programs.

For the benefit of the region, important planning and coordination work is done by the MIC, Arrowhead Regional Development Commission, and other groups. Mn/DOT and WisDOT would benefit by new and continued interest in freight planning being done in the region. Issues and trends discussed in the region could influence planning and programming at the state level by establishing and participation on a regional freight committee. A district-level FAC could also be closely coordinated with MFAC and the Arrowhead Regional Development Commission's Regional Transportation Advisory Committee, through cross-membership. Many of the stakeholders contacted through the course of the planning process were eager to share comments and ideas, and would provide a ready opportunity for an initial contact list.

Recommendations for Port Development and Coordination

- **Create A Working Agreement Between The Duluth Seaway Port Authority And The Superior Harbor Commission:** The City of Superior should re-establish its Board of Harbor Commissioners, which would be comprised of a locally elected official, maritime-based business owners and local citizens. The Harbor Commission would guide land use, policy, and planning activities related to maritime commerce, waterfront development and redevelopment and waterfront natural resource protection and conservation. A working relationship between DSPA and the Superior Harbor Commission could consider development opportunities, land acquisition needs,

marketing and lobbying at the state and national levels. This working relationship should be based on a spirit of cooperation that recognizes that the Duluth-Superior port is one port that is located in two cities and two states and would also recognize what benefits one side of the port also benefits the other side. The goal here would be enhanced economic development that would market the port assets from both cities. For example, coordination would allow Duluth and Superior to collectively address the issues related to the U.S. Harbor Maintenance Tax. The tax currently acts as an economic disincentive to shipping in general, as well as an impediment to expanding short sea shipping opportunities, including moving slab steel through the port.

- **Encourage Continued Participation In HTAC Planning Activities By Port Stakeholders:** The HTAC has a history of 40 years of planning in the Duluth-Superior harbor. This effort should have continued support of the MIC, which provides funding and staffing. Major partners on the HTAC should also provide funding and in-kind support. The HTAC should continue to engage all port stakeholders including government, industry and citizen representatives. The HTAC should work toward implementation of recent planning documents that guide land use and development along the working waterfronts of Duluth and Superior. These plans include the Duluth-Superior Port Land Use Plan, Landside Port Access Study, and the Erie Pier Management Plan. The HTAC should continue to work toward solutions in the management of dredged materials, port infrastructure development and the remediation of contaminated sediments in the Duluth-Superior harbor.
- **Continue Support For Research Projects Funded By The Great Lakes Maritime Research Institute:** GLMRI brings together the strengths of two host universities along with the research capabilities of its affiliated Great Lakes Universities. GLMRI maintains an open and continuous dialog between affiliates to address evolving issues regarding maritime commerce. Research affiliates are encouraged to leverage GLMRI resources to secure independent and joint funding opportunities for Great Lakes maritime research. GLMRI is dedicated to developing and improving economically and environmentally sustainable maritime commerce on the Great Lakes through applied research.
- **Establish a regional freight advisory committee:** Many of the issues affecting the freight community extend across borders, and some times are caused by state and/or municipal boundaries. Forming a regional Freight Advisory Committee (FAC) is likely to provide a good platform for pursuing many of the other recommendations that follow in this report. Mn/DOT Districts 1 and 2, in conjunction with WisDOT NW District should spearhead the formation of a Regional Freight Advisory Committee. The purpose of a Regional FAC would be to facilitate strategic information exchange and coordination among regional business leaders and other diverse freight stakeholders regarding freight needs and potential solutions to help build a better transportation system and quality of life in the region. A number of other recommendations resulting from this study may also provide an initial work plan for the group, including: **(1) Regional Truck Size and Weight Harmonization:** Differences in cross-border truck size and weight issues, was repeatedly raised by stakeholders that were engaged for this study. The formation of a Regional FAC could provide a platform for actions to address regional differences; **(2) Serve as a forum:** Some freight stakeholders felt that the FAC should start on an informal basis by serving as a discussion forum to provide Mn/DOT with input regarding regional freight issues and to educate the public and private sectors about their respective

needs; **(3) Set criteria for selecting projects:** While Mn/DOT has not involved the MFAC in this role to date, several other states and MPOs involve freight stakeholders in setting criteria for selecting projects. An FAC would not necessarily prioritize projects, but would help determine criteria to consider when evaluating projects; and, **(4) Prioritize projects:** Currently Minnesota has several non-highway programs for making loans for rail or waterway improvements. Historically, bonded loan programs in the state have been structured on a "first-come, first-served" basis. However, without a prioritization structure these resources are not likely being allocated as efficiently or as effectively as they might be. Starting at a regional level, Mn/DOT could seek guidance from freight stakeholders to identify those projects most important for improving regional freight mobility.

5. Designate a Tiered Truck Network

For the Minnesota Regional Freight Study project, the team developed a three tiered roadway network. The tiered roadway network highlights the roadways that are most important to truck traffic. The prevailing criteria in developing the tiered truck network was Heavy Commercial Annual Average Daily Traffic (HCAADT), however consideration was also given to factors such as established road design parameters and strategic importance. An effort was also made to incorporate existing Mn/DOT activities with regard to 10-ton route designations.

Combining the existing designated systems together results in a system that was too large to provide any investment guidance. The tiered approach combines truck traffic and roadway design characteristics to identify the roadways essential to the efficient movement of freight. **Figure 19** shows the tiered highway system for Mn/DOT District 1 and Northwest Wisconsin, and **Figure 20** shows the tiered network for Mn/DOT District 2**.**

Figure 19: Tiered Truck Network for Mn/DOT District 1 and Northwest Wisconsin

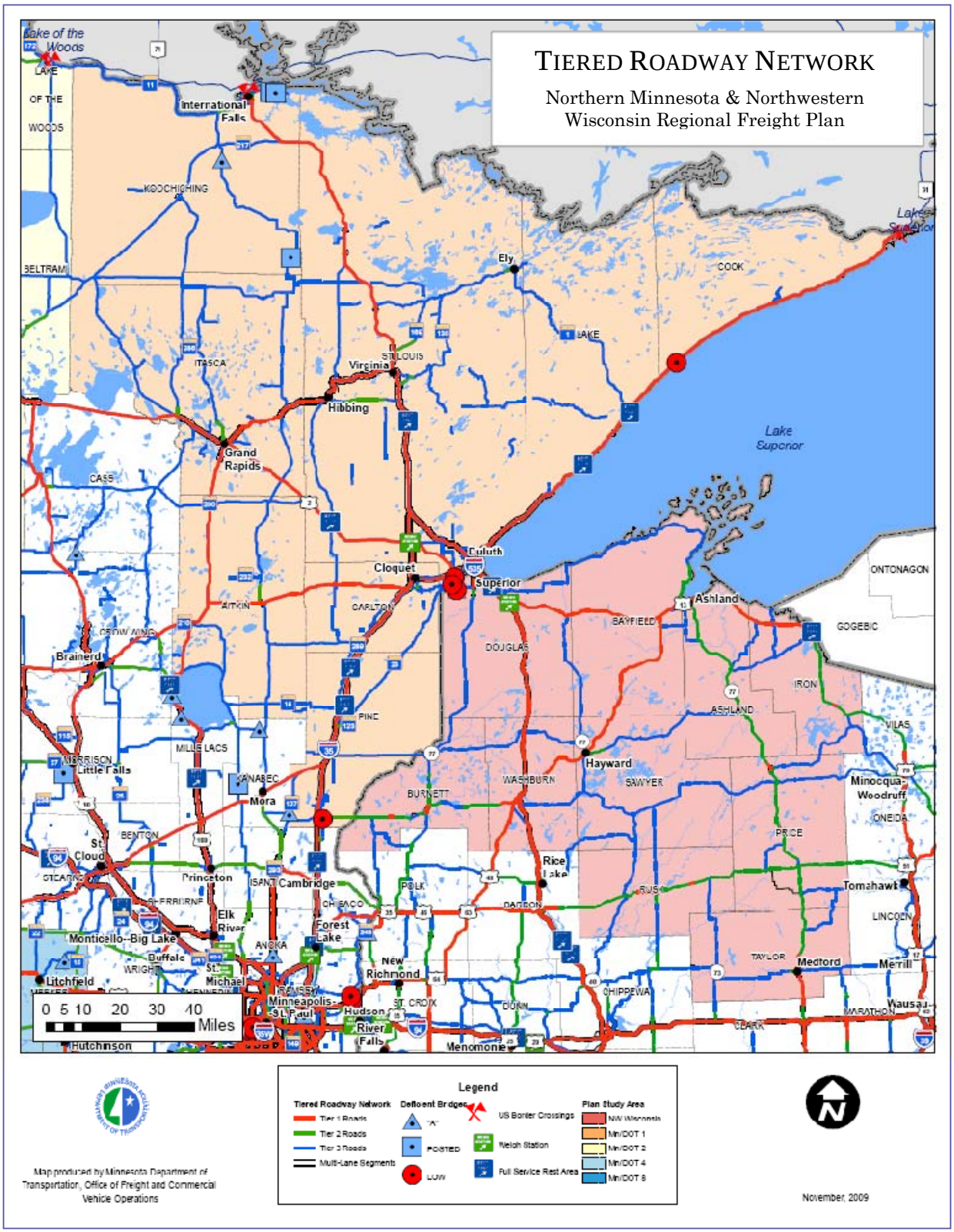
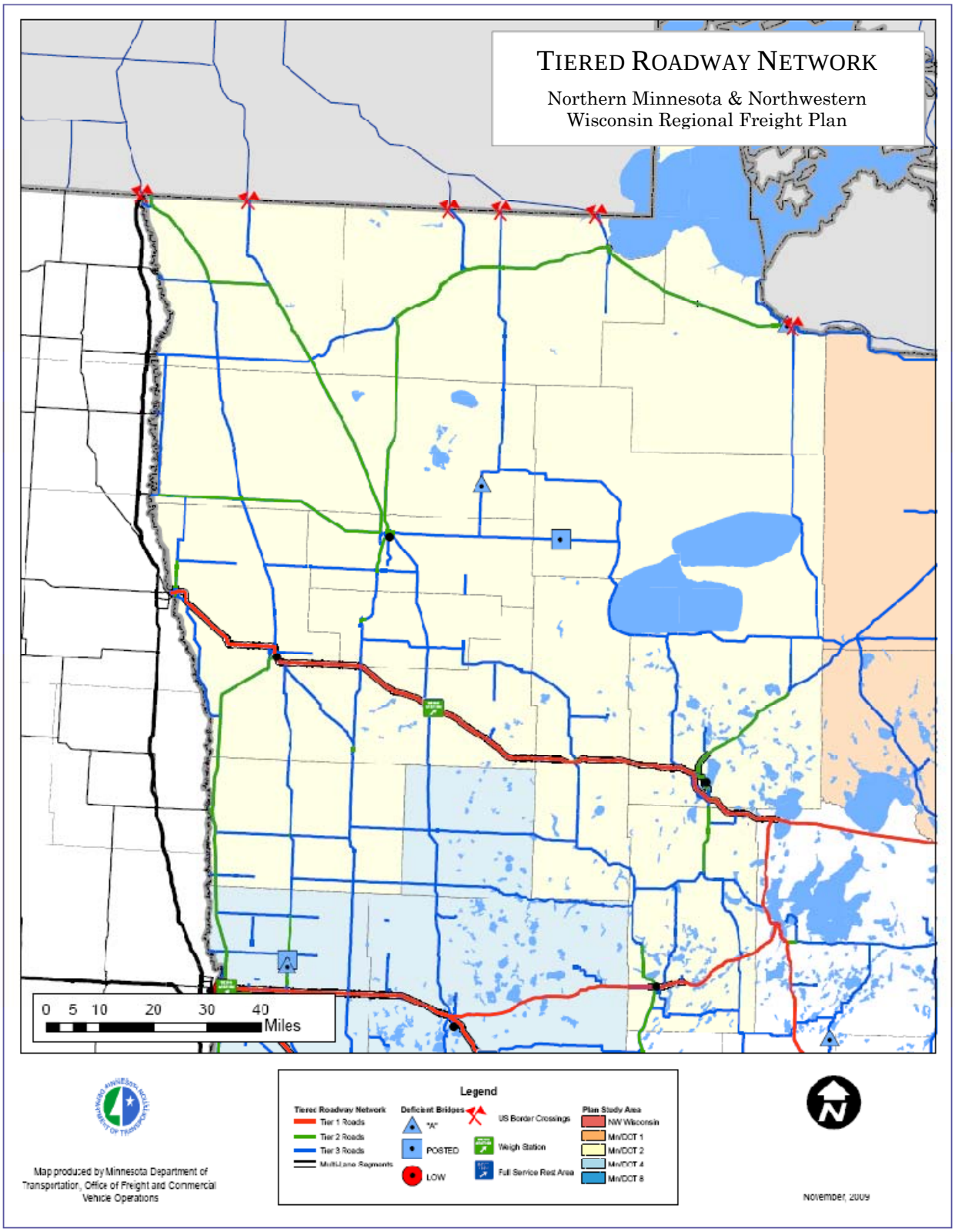


Figure 20: Tiered Truck Network for Mn/DOT District 2



Heavy commercial annual average daily traffic (HCAADT) was used to validate the existence of elevated levels of HCAADT on the existing systems. HCAADT is an estimate of the total number of vehicles with at least two axles and six tires, using a specific segment of roadway on any given day of the year. Heavy commercial vehicles include trucks only. Based on observed statewide data, tiers were classified based on breaks of 650 and 300, resulting in the following tiers:

- Tier 1: Roads on the network with HCAADT greater than 650
- Tier 2: Roads on the network with HCAADT between 301 and 650
- Tier 3: Roads on the network with HCAADT less than 300

The three tiers together form the designated truck network, with top two tiers suggesting the highest priorities for future investment. Heavy commercial vehicle characteristics were used to verify appropriate design criteria for each tier and to identify network deficiencies. Multi-lane segments of roadways provide a safe route for a vehicle envelope of 14' tall, 14'wide and 67'long. Almost all segments of multi-lane roadways are on the Tier 1 network. Roadway shoulders of at least 10' in width provide a similar safety benefit.

ROADWAYS WITH SHOULDERS LESS THAN 6 FEET

One of the safety issues raised in discussions throughout the state is related to shoulder width. Large trucks do not have as much flexibility to pull-off the roadway in emergency situations as easily as smaller vehicles. In addition, wide shoulders provide greater flexibility for oversize loads. Wide shoulders was a highway characteristic most often cited by shippers and haulers as a desired safety improvement, based on stakeholder input during the study process. Commercial carriers and fleet operators prefer a 10-foot minimum shoulder.

In discussions with District staff, a six-foot shoulder was identified as an implementable intermediate goal. However, every project needs to be evaluated on a case-by-case basis to determine its feasibility. For example, widening shoulders on a route that has extensive bog or peat sections may not be cost effective on lower volume routes. Figures 22, 23 and 24 present the locations along the Minnesota Truck Route Tier System that have shoulders less of than six feet.

Table 14 displays information on the total number of miles by Tier that have shoulder widths of less than six feet for the combined northern and western Minnesota regions. The number of Tier 1 routes with shoulders less than six feet is less than Tier 2, which is subsequently less than Tier 3 roadways. It is clear that the vast majority of MN and US trunk highways, especially the Tier 1 and Tier 2 routes, do currently have shoulder widths greater than six feet.

Table 14: Shoulder Widths Less Than Six-Feet, Northern and Western Minnesota

	Total Miles	Miles of Shoulders < 6 feet	Percent of Miles < 6 feet
Tier 1	1,479	163	11%
Tier 2	1,742	273	16%
Tier 3	3,210	2,032	63%

Figure 21 shows the Tier 1 system in northern Minnesota and the majority of the network has shoulder widths over six feet, with District 1 having more Tier 1 roads with shoulders less than six feet than District 2. In District 1, MN 61 appears to have the longest sections of narrow shoulder widths due to terrain features (i.e. proximity to Lake Superior). Segments of MN 210 and US 169, and spot locations along US 53 also have shoulder widths less than six feet. District 2 only has three small sections along US 2 that have shoulders less than six feet.

Figure 22 shows Tier 2 roadways with shoulders less than six feet in northern Minnesota. The majority of the Tier 2 system appears to meet six feet shoulder widths, with the bulk of routes not meeting the threshold located in District 2 along US 75, US 59, MN 11, MN 32, and MN 1. District 1 only has a small portion of US 71 with shoulders less than six feet wide.
Figure 23 displays shoulders less than six feet along the Tier 3 system. Over half of all Tier 3 roadways do not have shoulder widths of at least six feet.

Figure 21: Shoulder Widths on Tier 1 Roadways

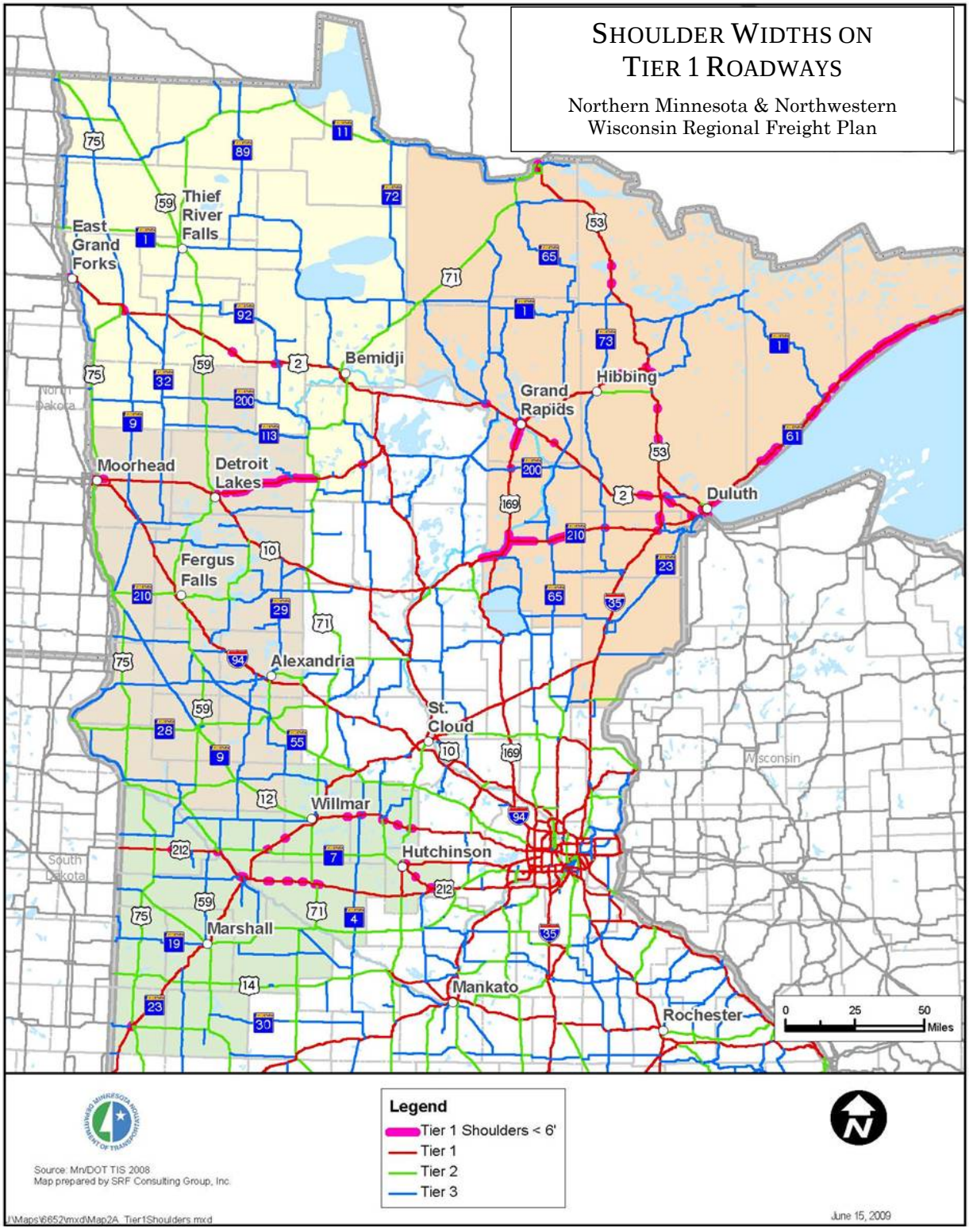


Figure 22: Shoulder Widths on Tier 2 Roadways

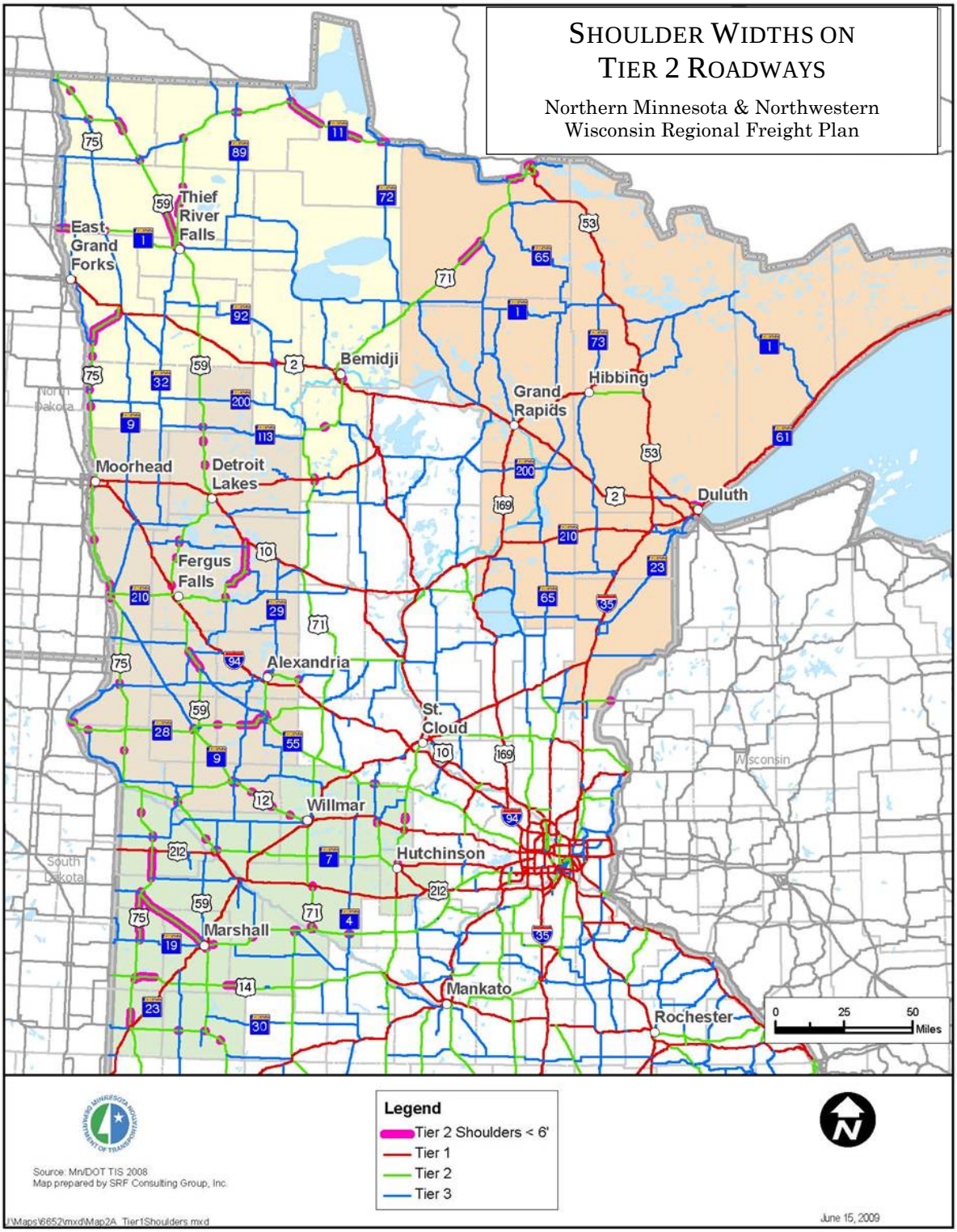
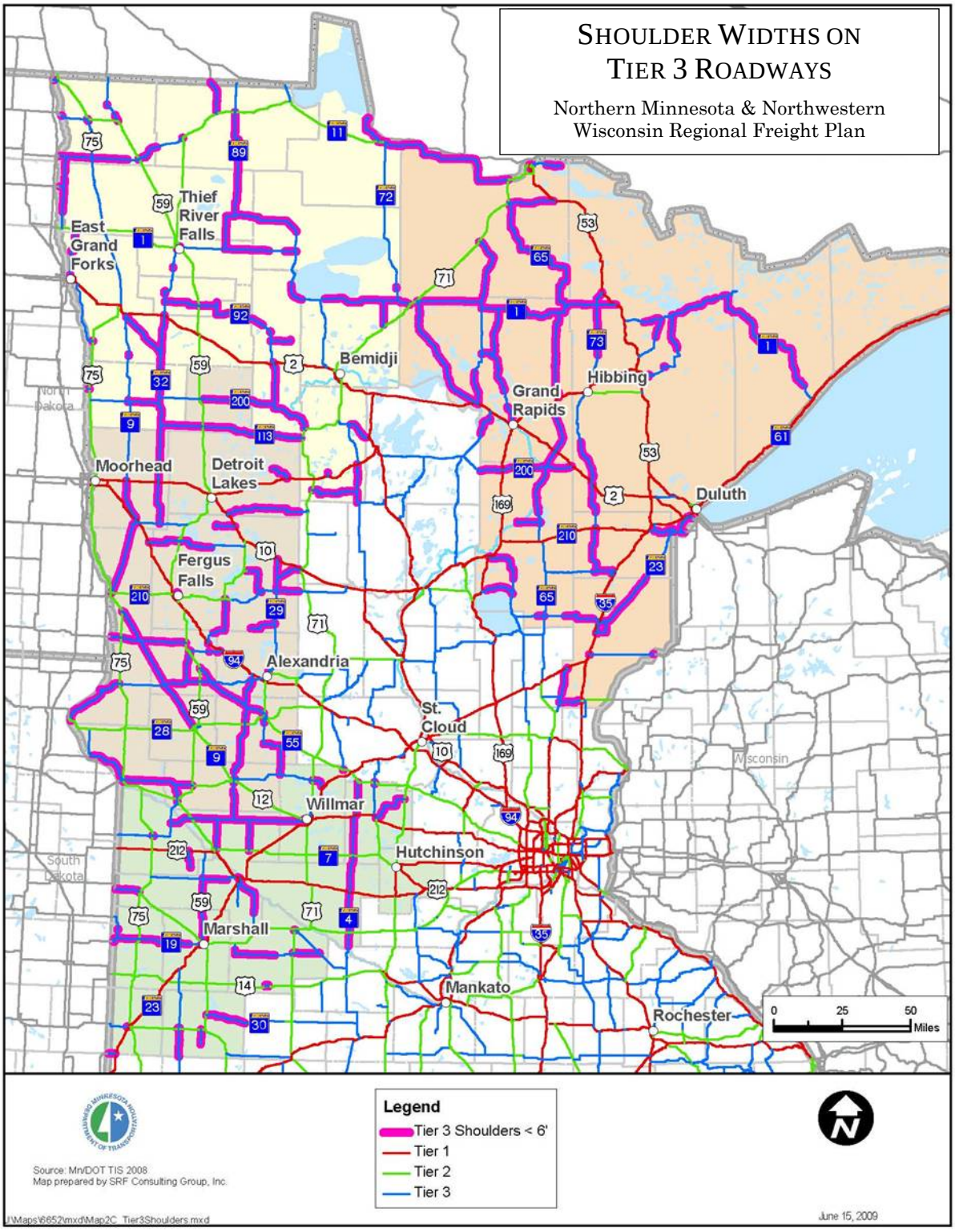


Figure 23: Shoulder Widths on Tier 3 Roadways



ROADWAYS WITH AADT OVER 11,200

Significant discussion took place during the development of Mn/DOT's Statewide Transportation Plan with respect to safety on high-volume, high-speed, rural two-lane routes. As volumes increase, passing opportunities are limited; slower vehicles can inhibit flow and frustrate drivers. Mn/DOT has established a performance threshold of 11,200 vehicles per day for identifying when potential rural routes could be considered for going from two lanes to four lanes.

Table 15 displays the total number of Tier 1 miles in northern and western Minnesota as well as the number of miles on rural two-lane roadways with ADT over 11,200. The number of miles listed below would be eligible for the expansion of a two-lane roadway to a four-lane roadway.

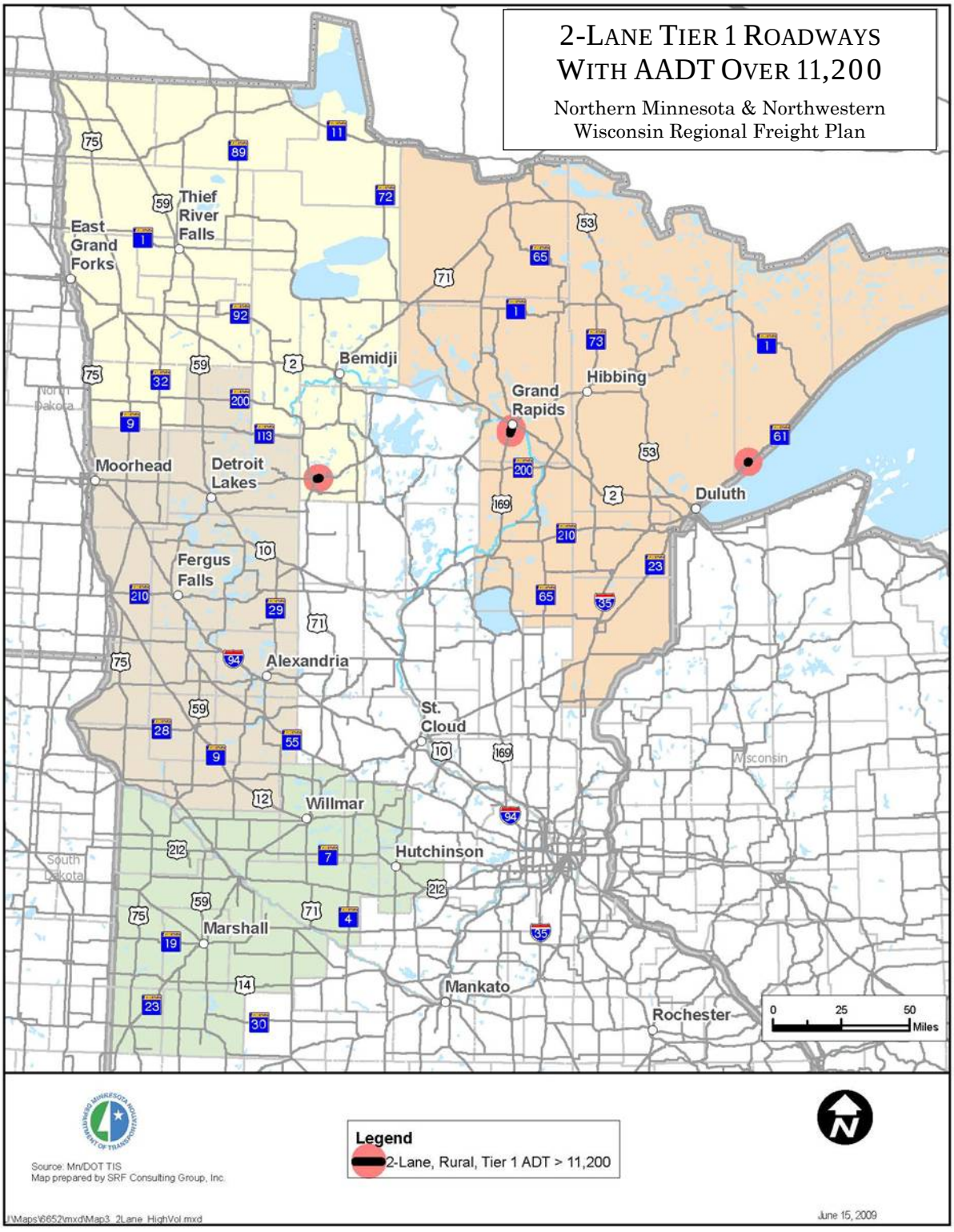
Table 15: Two-Lane Roadway Miles with greater than 11,200 Vehicles per Day

	Total Miles	Two-Lane Rural Roadway Miles with ADT > 11,200	Percent of Two-Lane Rural Roadway Miles with ADT > 11,200
Tier 1	1,479	3	0.2%

Northern Minnesota has few areas that would meet the safety threshold. As presented in **Figure 24**, District 1 has two areas including a small segment along MN 61, north of Duluth-Superior and an area just south of Grand Rapids, on US 169, that meet the safety threshold of ADTs greater than 11,200. District 2 has one segment along MN 34, near Park Rapids that meets the threshold.

Most Tier 1, rural, two-lane highways within the state provide good safety and mobility. As volume change occurs over time, and as Mn/DOT monitors safety information by segment and intersection, Districts should continue to track key freight routes and their ability to continue to fulfill needs.

Figure 24: Tier 1 AADT



RIDE QUALITY INDEX

The Ride Quality Index (RQI) is used to measure pavement conditions on the state highway system. The RQI is a Mn/DOT assessment of ride smoothness and is measured on a scale of five to zero with five being the best. As stated in the State Transportation Plan, "The objective is to provide a smooth ride (good condition = rating of three or better) for a large percentage of the state highway system and limit the number of miles that have a rough ride (poor condition = two or less)." Shippers and carriers desire smooth pavements to ensure that goods arrive undamaged. The RQI measure has been shown for the Tier 1 and Tier 2 freight system to identify routes that have good pavement conditions for freight movements versus those that have poor pavement conditions. Sections of roadway that are not highlighted in Figures 25, 26 and 27, delineate "fair" conditions (rating of 2.1 – 2.9).

Table 16 presents the number of miles in "good" condition and the number of miles in "poor" condition for the combined northern and western Minnesota regions. As documented, the majority of all Tier system roadways have an RQI rating of "good" (three or above), while only a small percentage of roadways are rated "poor."

Table 16: Ride Quality Index Rating for Northern and Western Minnesota Regions

	Total Miles	Miles Rated "Good"	Percent of Miles Rated "Good"	Miles Rated "Poor"	Percent of Miles Rated "Poor"
Tier 1	1,479	1,148	78%	12	1%
Tier 2	1,742	1,245	71%	32	2%
Tier 3	3,210	2,176	68%	89	3%

Figure 25 displays the ride quality for the Tier 1 system in the study area. Overall, the system in northern Minnesota functions very well, as the vast majority of Tier 1 roadways have a "good" rating. District 1 has a few roadway segments that are in "poor" condition, all of which are located along US 53 or centered around the Duluth-Superior metropolitan area. District 2 has no segments with a "poor" rating. In fact, all Tier 1 routes within District 2 have a "good" and/or "fair" rating.

Figure 26 displays the ride quality for the Tier 2 system in the study area. Overall, the pavement conditions for the Tier 2 system in northern Minnesota show few problems. A small segment of roadway near Duluth-Superior is rated "poor," otherwise all other roadways have a "good" or "fair" rating. The bulk of Tier 2 roadways in District 2 also have a RQI rating of "good" or "fair." A portion of US 75 has a "poor" rating located south of East Grand Forks.

Pavement conditions for Tier 3 networks are shown in **Figure27.**

Figure 25: Pavement Condition Tier 1

Figure 26: Pavement Condition Tier 2

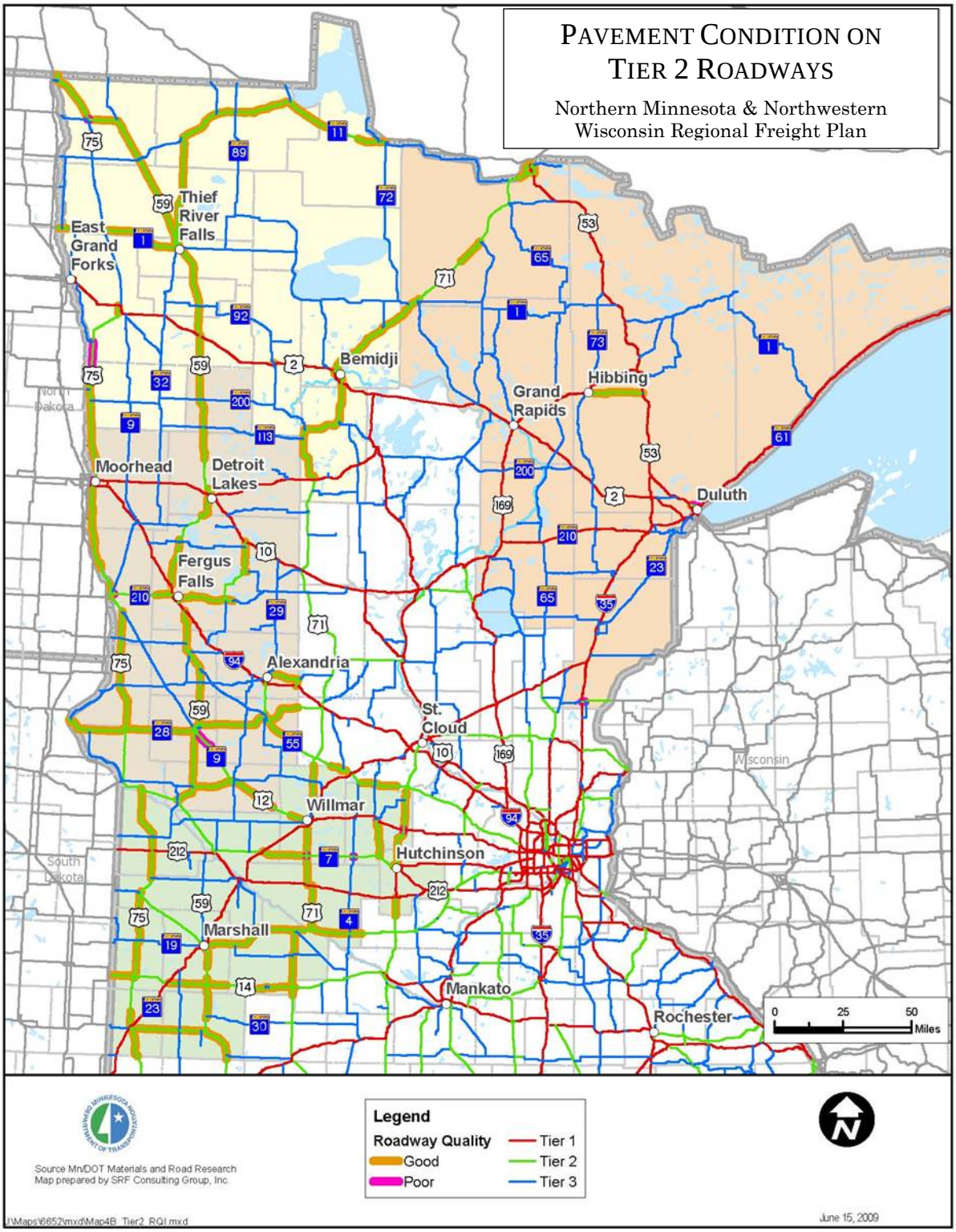
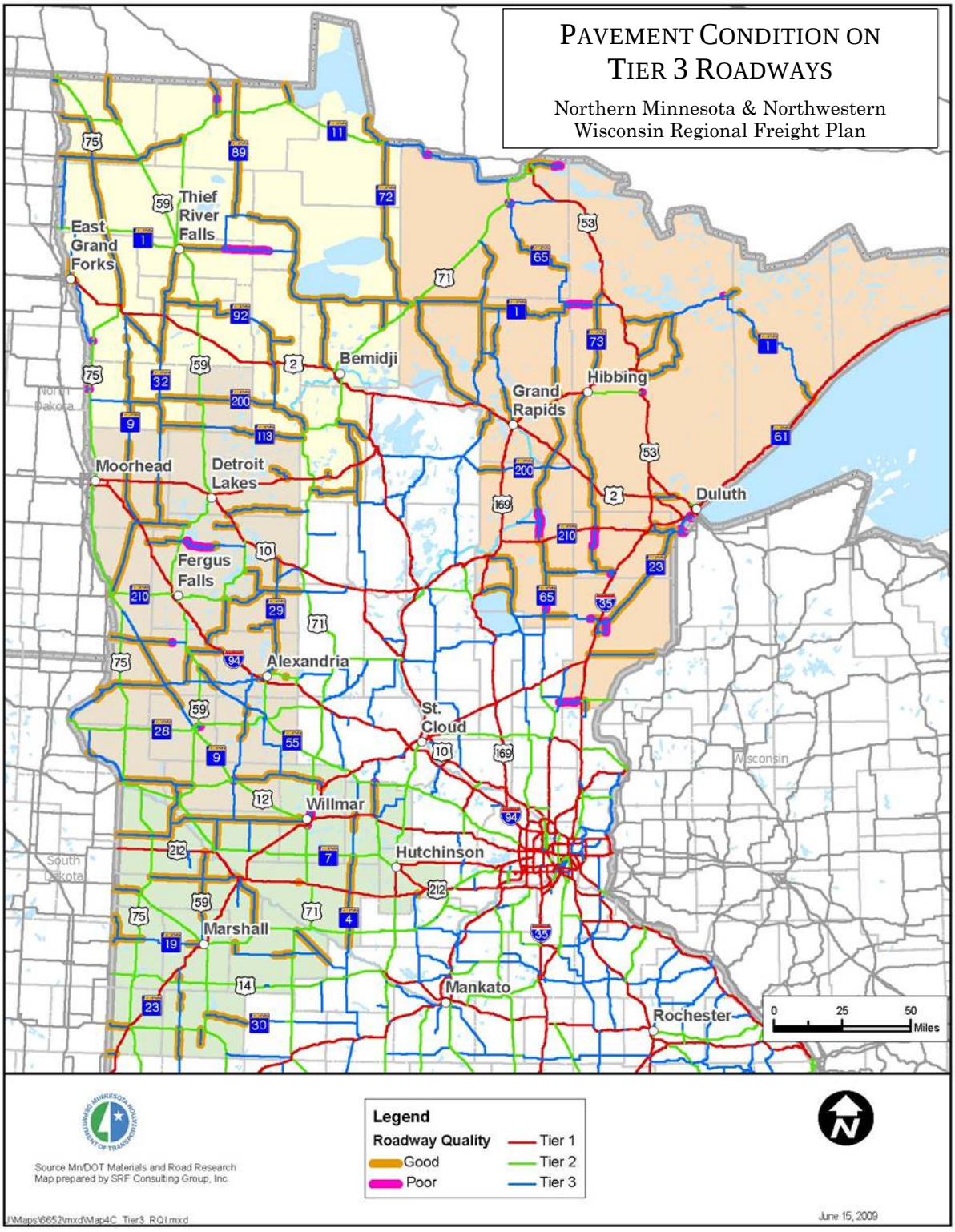


Figure 27: Pavement Condition Tier 3



Proximity of Freight Generators to Tier 1 Corridors: The freight system that has been identified should provide good accessibility to most of the key freight generators. To assess this, the major freight generators, which were defined by Mn/DOT, were identified and 10, 20, and 30 mile buffers were generated from all Tier 1 corridors.

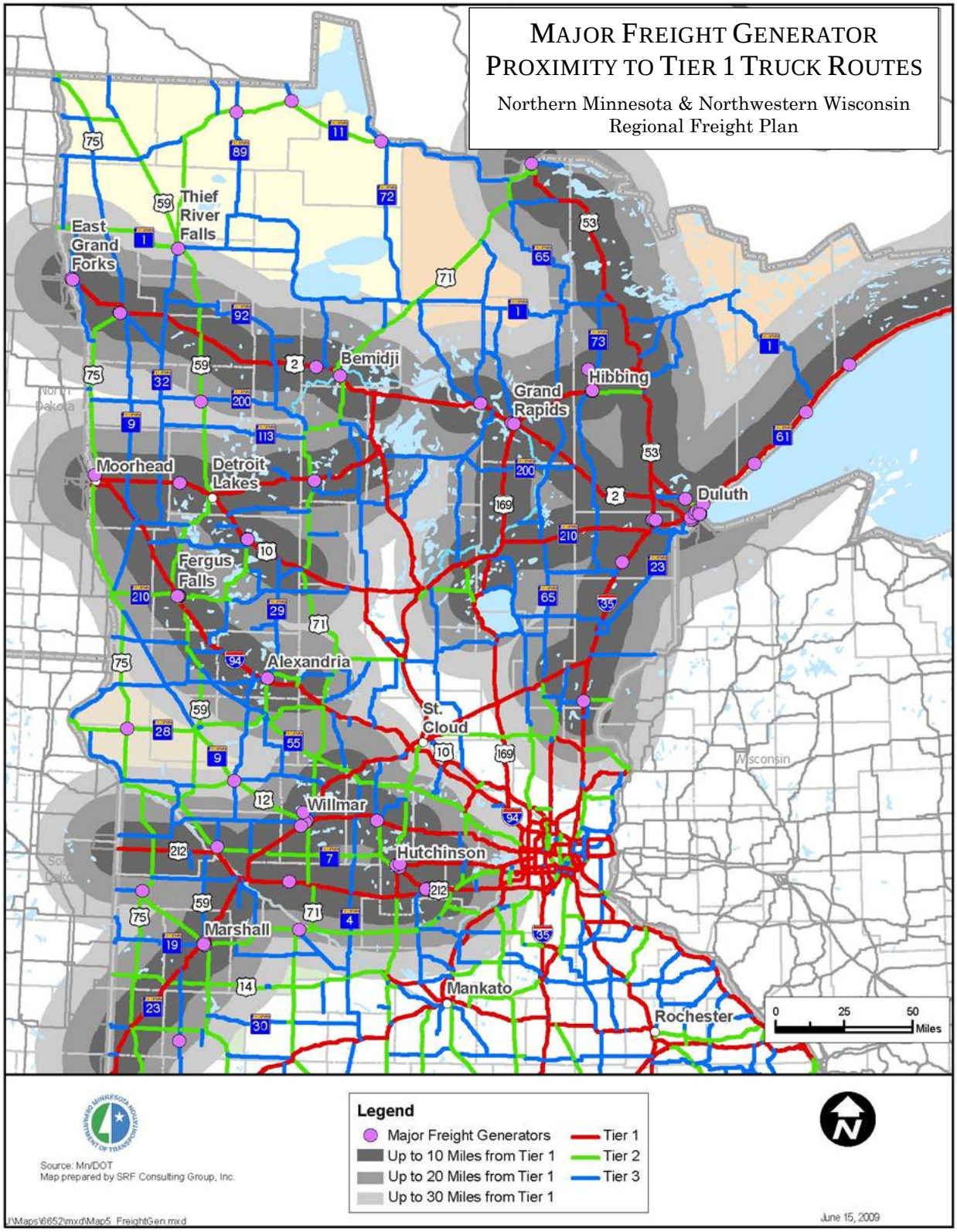
Table 17 displays the number of major freight generators in the combined regions of northern and western Minnesota. As presented in the table below, 72 percent of the current freight generators are located within ten miles of a Tier 1 roadway and less that 5 percent (4 generators) are beyond 30 miles from a Tier 1 roadway.

Table 17: Freight Generator Locations along the Tier 1 System

	Freight Generators within 10 Miles of Tier 1 Roadways	Freight Generators within 10-20 Miles of Tier 1 Roadways	Freight Generators within 20-30 Miles of Tier 1 Roadways	Freight Generators outside 30 Miles of Tier 1 Roadways
Tier 1	72	3	3	4

Figure 28 displays the location of major freight generators and their proximity to Tier 1 truck routes. (The major freight generators were first presented in Tech Memo #1. Major generators were determined from commercially available business database and included the relative output of a facility based on gross annual sales, total employment, and steering committee input). The vast majority of freight generators in the region are located within ten miles of a Tier 1 route. In District 1, all major freight generators are located within ten miles of a Tier 1 route. In District 2, some freight generators are located with ten miles of a Tier 1 route, yet several others are located within thirty miles of Tier 1 roadway. Further, District 2 does have some freight generators (3) that are not located within thirty miles of a Tier 1 roadway. These locations are in the northern part of District 2 (in Roseau, Warroad and Baudette, all along MN 11). It is important to note that these freight generators use Tier 2 and Tier 3 routes to move freight shipments. Along this section of MN 11, there are segments of roadway with shoulders less than six feet wide, but the corridor does have a good RQI rating.

Figure 28: Freight Generator Proximity to Tier 1 Truck Routes



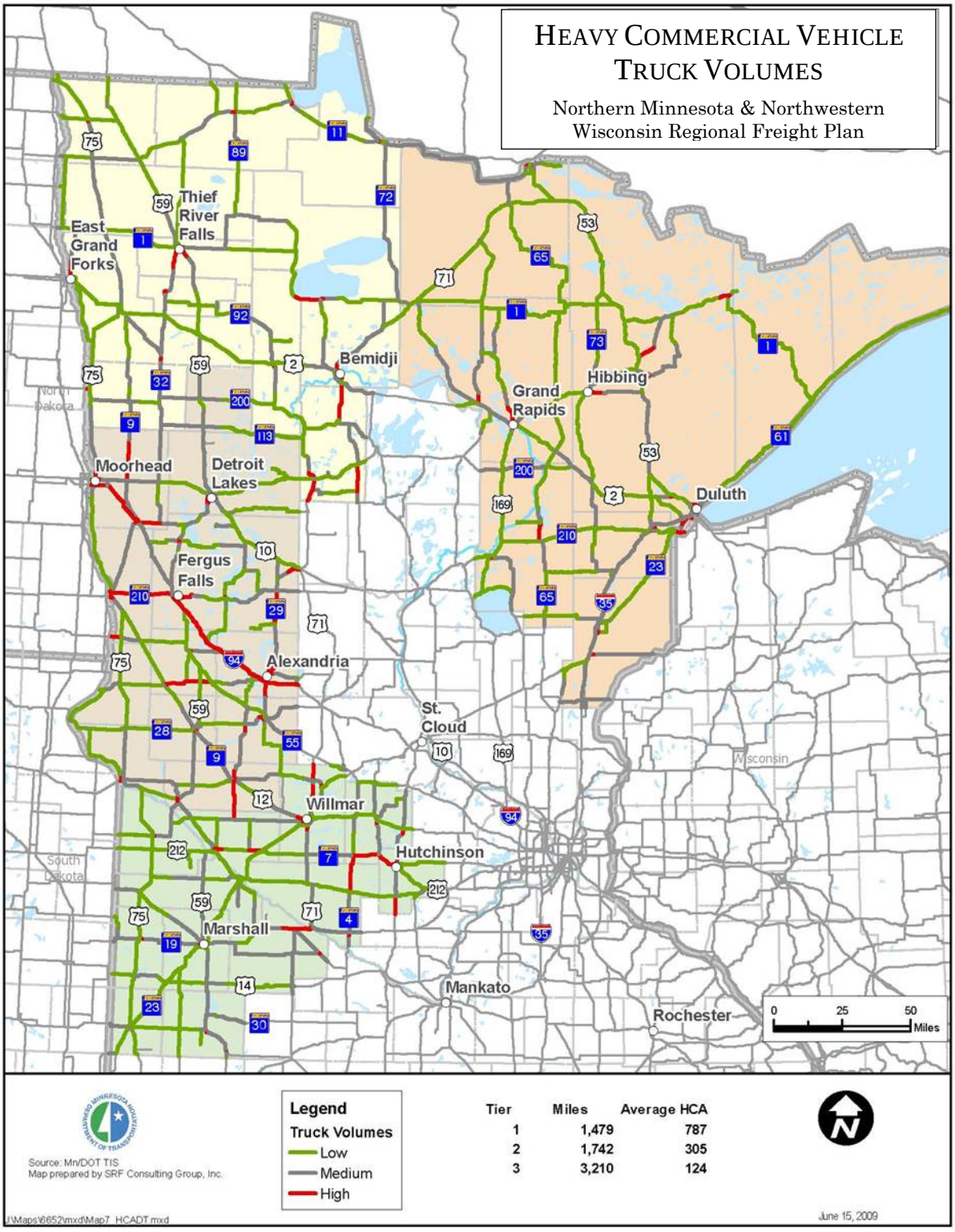
Heavy Commercial Truck Volumes: Truck volumes were calculated along the Tier 1, 2, and 3 systems to determine the number of heavy commercial trucks using the system and to identify where Heavy Commercial Average Daily Traffic appeared to be the highest. **Table 18** displays the number of Tier roadways within both study areas (Districts 1, 2, 4 and 8) with the average HCADT for each Tier system. As can be seen in **Figure 29**, many of the high truck volumes appear around cities, which consequently have major freight generators.

Table 18: Average HCADT along the Tier Freight System

Tier	Miles	Average HCADT
1	1,479	787
2	1,742	305
3	3,210	124

High truck volumes in District 1 are centered around the Duluth-Superior metropolitan area as well as Hibbing and Grand Rapids. Areas with high truck volumes in District 2 are also centered around cities such as Bemidji, Thief River Falls and Park Rapids. The areas with high and medium truck volumes in the region are also located near major agricultural/timber processing or manufacturing operations, suggesting such facilities do in fact generate large truck volumes needed for shipping freight materials.

Figure 29: Heavy Commercial Annual Average Daily Traffic (HCAADT)



SUMMARY OF TIERED TRUCK NETWORK CHARACTERISTICS

The mapping exercise for the Tiered Truck Network indicates that most of the key truck routes in Minnesota do have shoulder widths that meet a reasonable level of safety in the case of emergency or other needs. The analysis found that only 11% of proposed Tier 1 Truck Route highways do not meet a standard of at least a six-foot shoulder width. Given that Tier 1 routes generally have more truck volumes than Tier 2 or Tier 3 routes; any shoulder remedies should be focused on Tier 1 routes with higher truck volumes. A longer term goals should be considered for developing a minimum 10 foot shoulder width on Tier 1 highway, however an analysis should also be conducted regarding the feasibility and benefit-cost of shoulder improvements in relationship to other needs in each District.

There are a few generators that are not served well by the Tier 1 network; two Tier 2 routes serve these facilities. Districts may want to consider elevating priorities on key Tier 1 routes that broaden the reach of the freight network to these areas (e.g. Thief River Falls, Roseau, and Warroad). Districts may also consider providing improved maintenance of these routes to ensure quality service.

RECOMMENDATIONS FOR A TIERED TRUCK NETWORK

Mn/DOT and the Districts may wish to adopt the tiered network metrics as a means to identify, consider and/or integrate commercially advantageous freight-related improvements into the project prioritization process. Projects on the Tier 1 network in particular could be prioritized into their ATP/STIP process as an element of highway investment that directly impacts the competitiveness and access for local businesses that are significant freight generators. Districts should focus on Tier routes due to their higher freight volumes and higher cost effectiveness for identified freight improvements. Tier 2 and 3 routes also may exert some influence in project prioritization to a much lesser degree, with the logical exception of short segments that may be directly influenced by the activities of specific industrial site. A list of freight related evaluation criteria examined in Tech Memo #2 (Program Analysis) is provided below:

- Heavy Commercial Average Daily Traffic for the Tier 1 freight network
- Proximity of key freight generators to the Tier 1 freight network
- Pavement conditions on key Tier 1 freight routes
- Roadways with shoulders less than 10 feet
- Two lane rural roadways with daily volumes over 11,200

For the analysis and mapping elements, roadways with shoulders less than 6 feet were analyzed to comply with the Statewide Transportation Policy Plan 2009-2028. However, for Tier 1 roadways, Districts should strive to incorporate shoulder improvements on Tier 1 routes that have shoulders less than 10 feet, which will improve safety and increase efficiency along these routes, as Tier 1 roadways generally provide the greatest benefit to shippers when moving freight.

As part of the Tiered Truck Network, 10-ton roadways provide important connections between intermodal freight facilities, major freight generators and other key freight destinations throughout the state. These roadways generally include city and county routes that receive state

aid funding, as well as trunk highways, interstates and some local roads. Year-round, 10-ton roadways also provide a predictable freight roadway network, whereas all other roadways are subject to axle load limitations, including seasonal load restrictions.

6. Designate Super-Haul Truck Corridors

Mn/DOT and WisDOT permit offices coordinate the permitting and routing of over-dimensional loads on trunk highways throughout the region. These permits are processed with the intent to find the most appropriate route, based on the particular size and weight characteristics for each load. Hundreds of thousands of permits are reviewed and evaluated for routing each year, and many of these permits are for loads that significantly exceed standard dimensions. Some of these include mobile homes, wind generation equipment, oil sands equipment, and other large equipment and machinery. Providing some ability to move these oversized and over-weight loads north-south and east-west through the state and connect to the Duluth-Superior ports encourages continued economic activity of the port as well as provides ability for manufactures and/or businesses within the state to ship large equipment.

For example, a significant amount of wind turbine components (towers, blades, nacelles, hubs, and spinners) are moved into and out of the Duluth-Superior ports regularly, originating and destined for locations across the Midwest and overseas via the port. These movements are difficult due to their oversize and overweight characteristics: the nacelles alone weigh 180,000+ pounds; tower sections are over 100 feet long; and, blades measure up to 150 feet long. For these reasons, permits to haul the majority of these loads require at least one escort vehicle and a police officer (licensed peace officer), which may be a local officer, a sheriffs deputy or a state trooper. Nearly every day in the summer of 2008, one manufacturer alone contributed to four permitted, escorted loads leaving Duluth carrying nacelles and tower sections, plus an additional six “smaller” trucks loaded with hubs and spinners. And recently, there have been more than 200 wind turbine moves out of the Duluth-Superior port in a year

It is the responsibility if permit staff in Mn/Dot and WisDOT to determine the safest, most expedient routes to accomplish three goals: to protect the motoring public, to move product most efficiently, and to protect the state’s infrastructure. Major concerns related to a permanently designated route are safety (e.g., loads over the centerline, trailer damaging the road shoulders, 45 mph travel speed and limited opportunities to pass, opposing traffic safety concerns on 2-lane highways) and route limitations (e.g., narrow or no shoulders, road signs and mailboxes in the way).

The purpose of identifying Super-Haul truck routes is to acknowledge that certain routes are currently being used to move oversized and over-weight loads within the region, and these routes should be a primary consideration when planning improvements to the route (i.e., improvements should not limit continued use of this route as a moving route for these types of loads). When permitting oversized and over-weight loads, there are four main parameters of concern: weight; width; length; and height. When permits deal with any two of these parameters it is relatively easy to accommodate or find routes for the movement of the load. When permits deal with three or more of these parameters the number of routes that can accommodate the move is more

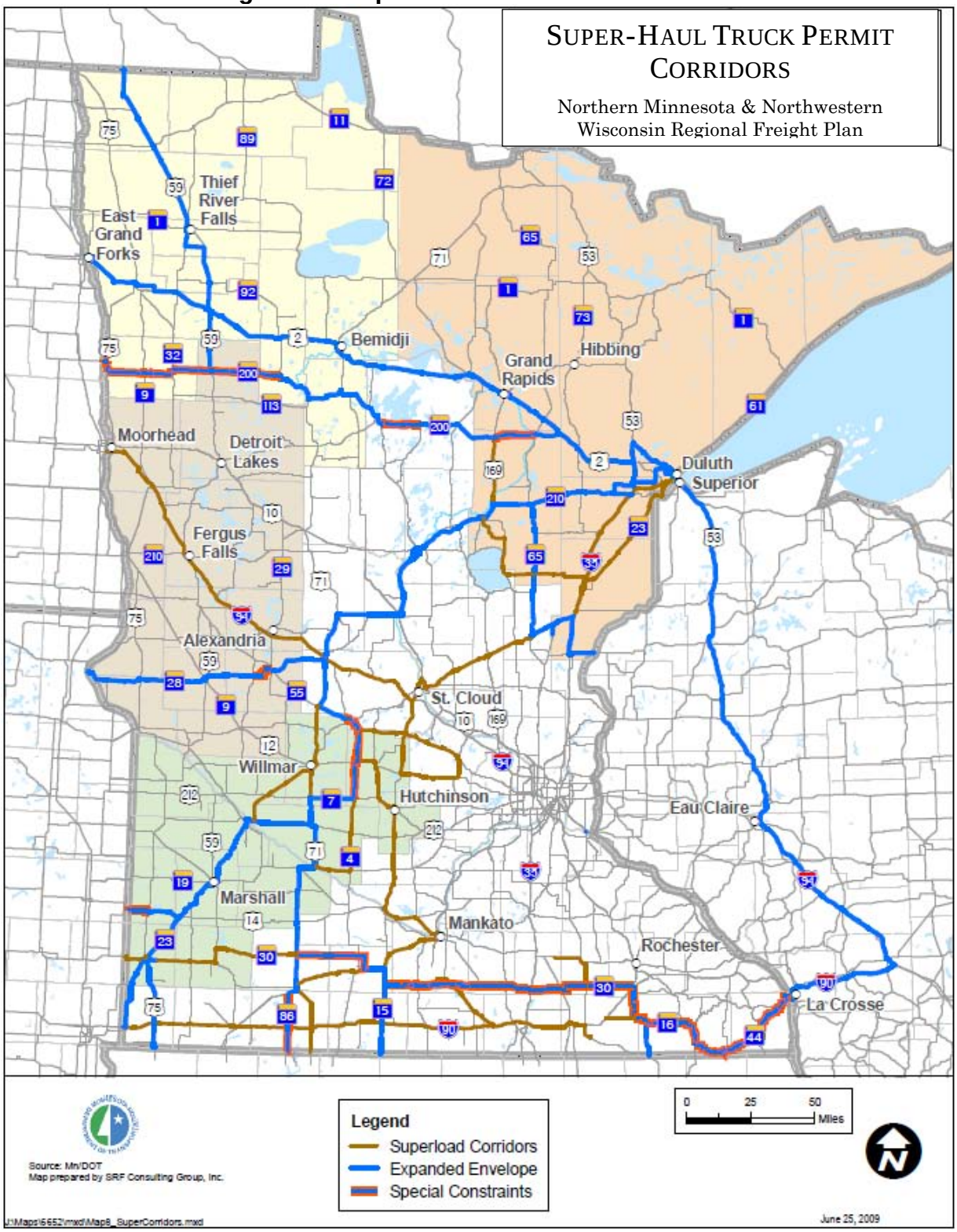
restricted. The two most restrictive elements are weight and height. These are typically limited by bridges.

As part of developing a Super-Haul truck route system, key characteristics for these routes were identified. The design criteria included roadways that can generally accommodate a loaded vehicle with a 16-foot height limit, a 16-foot width limit with an 8-foot wide axle, a 130-foot length limit and a 235,000 lbs weight limit. To protect these routes for future use, interchanges should be designed as diamonds, which allow for easier movements for over-size loads when transferring from one roadway to another or passing through. In addition, whenever possible, roundabouts should not be constructed along the identified Super-Haul truck routes. Also, it was important to note that counties/cities should provide adequate notice of at least two weeks for road closures along portions of the routes in order to provide adequate time for permit staff to re-route loads. These recommendations will help improve efficiency along the Super-Haul truck routes and will provide shippers/truckers a reliable route to use when hauling over-size loads.

One of the more difficult permitting issues to address is height. Mn/DOT currently designs bridges for 16' 4". It also requires that a safety margin of six inches on all moves to account for maintenance overlays and sag verticals. As a result, to move a load that is 16' high the permit office requires all vertical clearances to be at least 16' 6". This policy means that all new bridges that are being built fail to meet this requirement. It is important to note that most height permits are less than 16 feet and in fact, almost all trunk highways can accommodate moves for heights up to 15' 4. For example, a load that is 15'4" only has to avoid one bridge structure traveling on I-35 from Duluth to Iowa. A load that is 15'6" has to avoid eight low clearance bridges, whereas a load that is 15'8" has to avoid twenty-two structures.

The Super-Haul truck routes map shown in **Figure 30** is reflective of routes that that can support a 16'x16'x130' envelope and a weight of 235,000 lbs. These routes were chosen based on geometric attributes and safety history, including: turning radii, shoulder width, sight distance, AADT, and crash rate. Expanded envelope routes shown in blue are Super-Haul routes that can carry vehicles above and beyond the identified criteria in at least one dimension (e.g., height, width, length, or weight). Special constraints may include any of the following: restricted travel hours; higher level of escort (LPA, civilian, police); or, more escorts required (e.g., two rather than only one). In addition, travel on any local roadway requires a permit from the local government. When planning improvements and/or changes along these routes, District staff should try and preserve the ability to accommodate these characteristics and/or improve upon them if feasible.

Figure 30: Super-Haul Truck Permit Corridors



RECOMMENDATIONS FOR SUPER-HAUL TRUCK PERMIT CORRIDORS

Mn/DOT Districts 1 and 2 and WisDOT may also wish to consider designating "Super-Haul truck routes" that would be developed to handle an increasing number of over-dimension and overweight loads. A large number of the over-dimension loads originate in the Port Terminal area in Duluth. Lake Superior Warehousing has the capability and reputation to accommodate almost any size shipment and have moved some of the largest pieces of industrial equipment in North America. To accommodate the continued movement of these pieces, it is important to monitor area roadway designs to make sure that new obstructions are not created. Incorporating signal turners (ball bearing signal bases that can be rotated 90 degrees) into the design of signal replacements along heavy haul routes is an example. Other examples are to raise power lines (or bury them) when opportunities arise. Area roadway jurisdictions should consider the movement of over-size freight movements when designing roadway reconstruction projects. Being aware of over-size freight movement needs will continue to keep the area's freight friendly reputation intact.

Photo: MIC

Advanced Notification: Another step in support of the "Super-Haul truck route" concept could be the creation of web-based communication and scheduling applications notifying specialized carriers when weather, road maintenance or incidents result in road closures or restrictions along the Super-Haul truck routes. For example, Mn/DOT may consider publishing a web-based map

of Super-Haul truck routes allowing carriers and shippers to effectively plan out a route that allows them to best transport over-size loads to a specified destination, supplemented with email communication.

Design for Super-Haul truck routes: In addition, special roadway design policies could be adopted for Super-Haul truck routes to limit new restrictions from being developed. Features such as roundabouts/traffic circles and other intersection geometry, low bridge clearances, or any other design features that would limit or prohibit the ability to move super loads should not be developed on designated Super-Haul Routes.

7. Identify Commercial Commodity Corridors

There are specific routes from significant freight generators to transload facilities, production destinations, or border crossings onto higher capacity freight routes in neighboring jurisdictions that would directly benefit the competitiveness and market viability of specific businesses and employment sites. This class of freight routes, dubbed 'Commercial Commodity Corridors', are commodity-specific origin to destination routes that could benefit from routinely permitted loads to achieve greater productivity without any liability to the overall highway network condition or any change in wear factors.

The prototype route is the Blandin Paper permitted overweight route from their Grand Rapids paper mill to Lake Superior Warehousing in the Port of Duluth. At Lake Superior Warehousing, their product accesses local storage and distribution services, water transport, for Great Lakes regional and international marine shipments, and transloading to all four Class I railroads serving Duluth, insuring low-cost competitive shipping rates. In 2005, the City of Duluth designated the route to the port via US 53 to S 21st Avenue, to W 1st Street, to Piedmont Ave, to Garfield Avenue, and into the Port. This route required converting W 1st Street from a one way street into a two way street. The city also had to designate the route as a truck route. This corridor was accomplished through a combination of Mn/DOT overweight permitting, a custom-designed fleet of seven-axle trucks, and local cooperation in determining a specified routing on Highway 2 and local streets that could accommodate the traffic without damage or constraints. The result was a per-truck payload improvement, which translates into a directly related lower transportation cost per ton for their products on this truck haul, and better cost-effective access to markets.

An analysis was conducted to examine the trunk highways in the region to determine their capability to function as commercial truck routes. Designation of such roads could allow for special permitting to increase efficiency and competitiveness. The analysis documents the characteristics of trunk highways using a number of different factors which are presented in different maps including:

- Access to non-National Network
- Roadways with shoulder widths less than six feet
- Two-lane rural roadways with daily volumes over 11,200
- Pavement conditions on Tier 1, 2 and 3 freight networks

- Proximity of key freight generators to the Tier 1 freight network
- Heavy Commercial Average Daily Traffic for the Tier 1 freight network

The information presented in this document, especially in reference to the previously discussed Tiered Truck Network, is intended to assist the District offices in further evaluating potential improvement on the trunk highway system from a freight perspective. This information should be weighted with other information as improvements and priorities are developed through the ATP and District plan process.

Recommendations for Commercial Commodity Corridors

Based on industry interviews and regional freight forums, initial steps were taken to outline several key industry supply chains in the region. In addition, the trunk highway system was mapped by design characteristics and other factors that can assist in deciding what routes might be considered under a commerce corridor designation. As a next step, possibly working through a regional freight advisory committee, Mn/DOT and WisDOT should map commodity-specific origin to destination routes that could benefit from routinely permitted loads for greater productivity without any liability to the overall highway network condition or any change in wear factors. The agencies, target business sites, and local jurisdictions should then actively work to implement the identified corridor, as in the Blandin Paper permitted overweight route.

8. Improve Regional Truck Size & Weight Uniformity

Across the upper Midwest there are a variety of truck size and weight regulations that greatly influence the productivity of highway freight movements. The regulatory environment commercial motor vehicles face is complicated because different truck configurations are allowed for some commodities and differing designated roadways across jurisdictions (national, state and provincial). Harmonizing regulations between Minnesota and Wisconsin and other neighboring jurisdictions could have significant impacts on freight efficiency and would foster seamless interoperability between the road networks in the study region.

General Network Limitations

The highway networks in the region are comprised of federal, state, county, city, or township roadways that are designated differently according to their intended purpose, and are governed differently regarding truck size and weight.

Federal Truck Size and Weight Limits: At the federal level, Congress and the Federal Highway Administration (FHWA) have defined a primary network from a policy standpoint for encouraging interstate commerce and heavy truck travel. The National Network of Highways includes: (1) the Interstate Highway System and (2) other highways designated by the states in response to the Surface Transportation Assistance Act (STAA) of 1982. The National Network, sometimes referred to as the National Truck Network, consists of highways submitted to FHWA as being capable of safely handling larger commercial motor vehicles. The criteria provided to states for guidance in designating NN routes is found in Chapter 23 of the Code of Federal Regulations (CRF), Section 658.9:

(1) The route is a geometrically typical component of the Federal-Aid Primary System, serving to link principal cities and densely developed portions of the States.
(2) The route is a high volume route utilized extensively by large vehicles for interstate commerce.
(3) The route does not have any restrictions precluding use by conventional combination vehicles.
(4) The route has adequate geometrics to support safe operations, considering sight distance, severity and length of grades, pavement width, horizontal curvature, shoulder width, bridge clearances and load limits, traffic volumes and vehicle mix, and intersection geometry.
(5) The route consists of lanes designed to be a width of 12 feet or more or is otherwise consistent with highway safety.
(6) The route does not have any unusual characteristics causing current or anticipated safety problems.
(7) For those States where State law provides that STAA authorized vehicles may use all or most of the Federal-Aid Primary system, the National Network is no more restrictive than such law.

In Minnesota, 4,904 miles of roadway are part of the National Network, which is further supplemented by Minnesota's Twin Trailer Network, a system of other trunk and local highways on which tractor, semitrailer-trailer combinations may also operate. **Table 19** displays the size regulations that apply to National Network Highways. It is important to note that while federal law imposes a gross vehicle weight limit on Interstate Highways of 80,000 pounds, the federal weight limitation does not extend to other highway elements of the National Network. However, many states including Minnesota and Wisconsin have adopted the federal bridge formula to govern gross vehicle weight on non-interstate highways.

Table 19: National Network Commercial Vehicle Size Standards

Dimension	Regulatory Standard
Overall vehicle length	No federal length limit is imposed on most truck tractor-semitrailers operation on the National Network. Exception: On the National Network, combination vehicles (truck tractor plus semitrailer or trailer) designed and used specifically to carry automobiles or boats in specially designed racks may not exceed a maximum overall vehicle length of 65 feet, or 75 feet, depending on the type of connection between the tractor and trailer.
Trailer length	Federal law provides that no state may impose a length limitation of less than 48 feet (or longer if provided for by grandfather rights) on a semitrailer operating in any truck tractor-semi trailer combination on the National Network. (Note: A state may permit longer trailers to operate on its National Network highways.) Similarly, federal law provides that no state may impose a length limitation of less than 28 feet on a semitrailer or trailer operating in a truck tractor-semitrailer-trailer (twin-trailer) combination on the National Network.
Vehicle width	On the National Network, no state may impose a width limitation of more

	or less than 102 inches. Safety devices (e.g., mirrors, handholds) necessary for the safe and efficient operation of motor vehicles may not be included in the calculation of width.
Vehicle height	The federal vehicle height limit of 13.6 feet is imposed.

The total National Network system is about 200,000 miles. National Network highway segments in the region area shown in **Table 20**.

Table 20: National Network Segments in Northern MN and NW WI

Route	From	To	District
US 2	I–35/535 Duluth	US 169 S. Int. Virginia.	1
US 10	I–35 Duluth	CH 2 Two Harbors.	1
US 12	US 2 Grand Rapids	US 53 S. Int. Virginia.	1
US 14	I–35 Cloquet	US 53 Independence.	1
US 53	US 10 Motley	I–35 Carlton.	1
US 59	ND State Line E. Grand Forks	I–35 Duluth.	1
US 59	CH 11 E. of Moorhead	I–694 Arden Hills.	2
US 59	I–90	US 2 Crookston.	2
US 61	MN 175 Hallock	Canadian Border.	2
US 75	ND State Line	US 59/MN 32 Thief River Falls.	2
US 75	MN 32 Greenbush	MN 72 Baudette.	2
US 169	US 59/MN 1 Thief River Falls	MN 11 Greenbush.	2
US 212	US 71 Park Rapids	MN 371 Walker.	2
MN 1	US 75 Hallock	US 59.	2
US 2	I–535/US 53 Superior	MI State Line Hurley.	WI
US 8	US 63 Turtle Lake	MI State Line Norway MI.	WI
US 51	WI 78 N. of Portage	US 2 Hurley.	WI
US 53	I–94 Eau Claire	I–535/US 2 Superior.	WI
US 63	MN State Line Red Wing MN	US 2 W. of Ashland.	WI
WI 13	WI 21 Friendship	US 2 Ashland.	WI

State Truck Size and Weight Limits: One of the key issues that businesses brought forward during the study was the lack consistency between truck size and weight regulations in states/provinces that border Minnesota. Minnesota and Wisconsin have similar truck size and weight regulatory schemes on high level state network routes, but size and weight limits become more divergent on lower level networks, and as special exemptions to state laws are crafted by competing industries.

In Wisconsin, state and local routes are designated as Class A or Class B roadways with regard to vehicle size and weight limitations. In Minnesota, highways are “designated” as 10-ton Routes, or non-designated, however three weight schemes exists for “non-designated” highways.

Table 21A presents a summary of the truck size and weight regulations for Minnesota and Wisconsin. Between Minnesota and Wisconsin there also exists a variety of special commodity exemptions that allow size and/or weight limits to be exceeded. In most cases a routine special permit is required to take advantage of special operating limits. In some instances, however, a special permit is not required to exceed standard truck size and weight regulations. **Table 21B** provides a summary of some of the most common truck size and weight exemptions in Minnesota and Wisconsin.

Table 21A: General State Size and Weight Limits WI and MN

Wisconsin	Minnesota
Class A Highways: Include all state trunk highways and connecting highways and those county trunk highways, town highways, and city and village streets, or portions that have not been designated as Class B highways pursuant to s. 349.15. The weight limits on Class A highways are: 80,000 lb. GVW, for any vehicle combination with 5+ axles 20,000 pounds GW for any single-axle; 34,000 lbs. GW for consecutive sets of tandem axles, 11,000 lbs. GW for wheel(s) supporting one end of an axle.	**10-Ton Roadways** Ten ton roads include Interstates, U.S. Highways, Minnesota State Trunk Highways and paved local highways, except where posted by local jurisdictions at lower limits. The weight limits on this system are: 80,000 GVW, for any vehicle combination with 5+ axles; 20,000 GW for any single-axle; and 10,000 GW for any single wheel. Under the current law all unpaved roads are 9-ton roads.
Class B Highways: Include those county trunk highways, town highways and city and village streets, or portions thereof, which have been designated as Class B highways by the local authorities pursuant to s. 349.15. The weight limits on Class B highways are 60% of those imposed on Class A highways (348.16(2)). Thus, the weight limits on Class B highway are: 48,000 lbs. GVW; 12,000 lbs. GW for any single axle; 20,400 lbs. GW for tandem axles; and 6,600 lbs. GW for a wheel or wheels supporting one end of an axle.	**Non-10-Ton Roadways:** Except during Spring Load Restrictions, the system is broken into two categories: 10-ton paved roadways and 9-ton unpaved roads. During Spring Load Restrictions, these same roadways are 10-ton paved and 5-ton unpaved, unless the road authority posts to a lower weigh limit. The weight limits on this system are: 80,000 GVW, for any vehicle combination with 5+ axles; 18,000 GW for any single-axle; and 9,000 GW for any single wheel
Tire Load: None	**Tire Load:** Tire weight limits are universally applicable over all highway systems in the state. No tire may exceed 600 lbs per inch width on a steer axle (maximum two steer axles) or more than 500 lbs. per inch on non-steer axles.
For more information visit: *http://www.legis.state.wi.us/rsb/stats.html* Search for Chapter 348.15	For more information visit: *https://www.revisor.leg.state.mn.us/pubs/* Search for Chapter 169.80

Table 21B: Select Special Provisions - State Size and Weight Limits WI and MN

Commodity or Vehicle	Wisconsin	Minnesota
First haul agriculture or raw timber	Allows GVW limitations to be exceeded by 10,000 lbs., with a maximum of 90,000 lbs. GVW, for raw forest products, fruits or vegetables. The transport for this permit must be from field to storage/processing facilities. Annual permit required	There is an exception to the relevant evidence required for vehicles transporting the first haul of unprocessed or raw farm products (including milk) or raw and unfinished forest products as long as the weight recorded does not exceed the maximum allowable weight by 10 percent.
Forest Products	By annual or consecutive permit allows gross weight limitations (depending on the distance between foremost and rearmost axles in a group) to be exceeded by 18,000 lbs. for the transport of raw forest products. The following conditions apply: The vehicle combination must have 6 or more axles; The gross weight imposed on the highway by the wheels of any one axle of the vehicle combination cannot exceed 18,000 lbs.; The gross weight imposed on the highway by the wheels of any steering axle on the power unit may not exceed 13,000 lbs. or the manufacturer's rated capacity, but not to exceed 18,000 lbs.; In order to be counted as an axle, the axle must impose at least eight percent of the gross weight of the vehicle on the highway; This permit is not valid on the national system of interstate highways, any highway or bridge with a posted weight limitation that is less than the vehicle's gross weight, and any state trunk highway system on which the DOT has determine that this permit is not valid; and The maximum gross weight allowed under this permit is 98,000 lbs.	Allowed a weight exception to 90,000 GVW maximum for combination vehicles with six axles (with brakes) hauling specific commodities, including forest products under the following conditions: Must operate on the most direct route to the nearest highway; Must obtain an annual permit ($300); Must comply with bridge load limits postings; Must obey all road postings; Single-axle cannot exceed 20,000 GW; Timber haulers also are allowed a winter weight increase to 99,000 GVW (see "seasonal exemptions and exclusions" below); and Timber haulers also may exceed the legal axle weight limits listed in the Minnesota Table of Axle Weights (169.824) by not more than 12.5 percent; except during the Winter Weight Increase, wherein legal axle weights may be exceeded by not more than 23.75 percent.
Livestock	On Class A roads are allowed to exceed the axle weight limits by 15%. This is allowable as long as the gross weight does not exceed the weight specified for that vehicle.	88,000 lbs. for any vehicle or combination of vehicles with six or more axles while exclusively engaged in hauling livestock on all state trunk highways other than Interstate highways, if the vehicle has a permit under section 169.86, subdivision 5, paragraph (k). (169.824)

HARMONIZING SIZE AND WEIGHT AND PERMITTING REGULATIONS

While the differences between Minnesota and Wisconsin are complicated enough, at a broader **Table 22A** show the size and weight limits for Minnesota and Wisconsin, as well as other neighboring jurisdictions for trucks in regular operations. States to the west of Minnesota and the Canadian Provinces generally allow larger and heavier trucks. **Table 22B** displays the limits for Minnesota, Wisconsin and neighboring jurisdictions for routine issuance of overweight and/or over-dimension truck operations.

Many national and regional studies have concluded that increased commercial vehicle productivity can be achieved while reducing infrastructure impacts, and maintaining high safety standards. These studies are summarized in the final section of this report. However, among the key findings of the recent 2006 Mn/DOT Truck Size and Weight Project are the following:

- The complexity of TS&W laws results in added cost to industry and complicates compliance. TS&W laws need to be simplified and industry training provided;
- Lack of consistency among states creates barriers to cross-border freight movement; and
- There needs to be increased flexibility of weight limits and vehicle configurations to allow greater payloads.

The regulatory differences between Minnesota and Wisconsin often put businesses operating near the border at a competitive disadvantage with similar businesses located just across the border. One approach to harmonization would be to seek truck size and weight harmony on routes with the most flexibility. States do have the flexibility to allow heavier vehicles on non-Interstate elements of the National Network, and greater size and weight on routes that not part of the National Network.

Another approach to harmonization would be to seek reciprocity on similar size and weight operations across borders. For example, Wisconsin and Michigan currently deal with differences in length and weight regulations for commercial vehicles operating near the Wisconsin/Michigan border through a form of reciprocity. The following is taken from Wisconsin Statutes Section 348.27(9):

Transportation of loads near the Michigan-Wisconsin state line - 348.27 (9).
(a) The department may issue annual or consecutive month permits for the transportation on a vehicle or combination of vehicles of loads exceeding statutory length or weight limitations over any class of highway for a distance not to exceed 11 miles from the Michigan-Wisconsin state line, except that a vehicle or combination of vehicles transporting exclusively peeled or unpeeled forest products cut crosswise, wood chips, or forestry biomass may operate under such a permit anywhere upon USH 2 in Iron County or Ashland County or upon USH 2 in Bayfield County from the Ashland County line through Hart Lake Road if the vehicle or combination of vehicles is traveling between this state and Michigan and does not violate length or weight limitations established, as of April 28, 2004, under Michigan law. If the roads desired to be used by the applicants involve streets or highways other than those within the state trunk highway system, the application shall be accompanied by a written statement of route approval by the officer in charge of maintenance of the other highway.

(b) For a vehicle or combination of vehicles the weight of which exceeds any of the provisions of s. 348.15 (3), the fee for an annual permit under this subsection shall be one of the following:

1. If the gross weight is 90,000 pounds or less, $100.
2. If the gross weight is more than 90,000 pounds but not more than 100,000 pounds, $175.
3. If the gross weight is greater than 100,000 pounds, $175 plus $50 for each 10,000-pound increment or fraction thereof by which the gross weight exceeds 100,000 pounds.

(c) The fee for a consecutive month permit under this subsection for a vehicle or combination of vehicles the weight of which exceeds any of the provisions of s. 348.15 (3) shall be determined in the manner provided in s. 348.25 (8) (bm), except that the applicable fee for an annual permit under par. (b) Shall be used in the computation.

Table 22A: Regional Regulations for Truck Size and Weight – Regular Operations

State or Province	Height	Length Interstate and Designated Routes (and State/Province Routes)			Gross Vehicle Weight (lbs)	Maximum GVW Other Highways (lbs)	Single Axle (lbs)	Tandem axle (lbs)
		Semi-Trailer in TST Comb	Full Trailer	Double Trailer				
IA	13’6”	53’ (53’)	28’6”	NS (28’6”)	80,000	80,000	20,000	34,000
MN	13’6”	53’ (53’)	45’ (45’)	NS (NS)	80,000	80,000	20,000	34,000
ND	14’	53’ (53’)	53’ (53’)	110’ (75’, 95’, 110’)	80,000	105,500	20,000	34,000
SD	14’	53’ (53’)	53’ (28’6”)	81’6” (81’6”)	80,000	129,000	20,000	34,000
WI	13’6”	53’ (48’)	48’ (48’)	NS (NS)	80,000	80,000	20,000	34,000
MB	13’6”			(114’9” and 75’5”)	87,082	76,059	20,062	37,477
ON	13’6”	(48’-53’)	(41’)	(114’9” and 75’5”)	87,082	76,059	20,062	37,477
SK	13’6”	(53’)		(114’9” and 75’5”)	87,082	76,059	20,062	37,477

Table abbreviations:
NS = Not Specified
TST = Tractor Semi-trailer
GVW = Gross Vehicle Weight
Comb = Combination

Table 22B: Regional Regulations for Truck Size and Weight – Permit Operations

State	"Routine" Permit Maximum GVW (lbs)	"Routine" Permit Maximum Single Axle /Tandem Axle	Special Review Permit Highest GVW with sufficient axles
IA	100,000	20,000/ 40,000	160,000
MN	92,000	20,000/ 40,000	144,000
ND	103,000	24,000/ 45,000	150,000
SD	116,000	31,000/ 52,000	NS
WI	90,000		
Province			
MB	137,788	20,062/ 37,478	NS
ON	139,993	20,062/ 37,478	NS
SK	137,788	20,062/ 37,478	NS

RECOMMENDATIONS FOR TRUCK SIZE AND WEIGHT UNIFORMITY

State and provincial regulations are continually changing. By identifying and working toward a harmonized set of truck size and weight regulations, and a uniform permitting system, the upper Midwest's economic competitiveness can be improved. There are several opportunities identified through this research where the state could investigate the potential for modifying size and weight restrictions on freight intensive highways, especially those that are in close proximity to large freight generating clusters participating in significant cross border trade. An ever-increasing volume of intra-state and intra-provincial regional trade creates a sense of urgency for states and provinces to begin a dialog that will result in a more efficient and economically competitive truck transportation system through truck size and weight harmonization. Inefficiencies exist because of the differences between state and provincial permitting processes. For the region to become more competitive, policy makers and transportation departments in the region should work together to provide a uniform permit system.

- **Consider Size and Weight Reciprocity Agreements with Neighboring States**: On state routes where Mn/DOT has the flexibility to examine more productive trucking options, Mn/DOT could examine legislation to create reciprocity across state lines for

certain commodity exemptions or variations in truck size and weight laws were producers in a neighboring state enjoy more productivity through a more advantageous regulation. For instance, in Minnesota the first haul of raw agricultural or timber products can exceed normal gross vehicle weight. Timber products are allowed 90,000 pounds on six axles, while agricultural products are allowed 90,000 pounds on six axles or 97,000 pounds on seven axles. In Wisconsin, the first haul of agriculture or timber can exceed the normal gross vehicle weight by 10,000 pounds for a total maximum weight of 90,000. Currently Michigan and Wisconsin have a form of a reciprocity agreement, which allows trucks operating in Michigan at higher weights than allowed in Wisconsin in normal operations, to be granted an annual or consecutive month permit to operate at higher weight near the border. The Minnesota Legislature could seek a similar agreement with surrounding states where commodity exceptions are similar, but not the same.

- **Seek truck size and weight harmony on the routes with the most flexibility:** Minnesota, may wish to work with Wisconsin and North Dakota to determine the continuity of non-NN highway segments across state boundaries. Where non-NN routes from a bordering state connects to a NN route in Minnesota, Minnesota could petition to remove the NN designation within its border. The advantage to removing a NN designation would be to allow wider or longer combinations that what is allowed on the NN. The so-called "ISTEA Freeze" which limited the overall length of twin-trailer combinations to what existed in a state as of June 1, 1991, does not apply to non-NN routes. As a result, if allowed to operate longer combinations carriers can increase their gross weight without violating state or federal bridge laws. The maps in **Figures 31** and **32** display Minnesota trunk highways leading up to the state's borders that are not designated as elements of the National Network. The National Network imposes federal restrictions on truck size, but does not impose federal weight restrictions off the interstate. Non-National Network segments provide opportunities for more efficient trucking configurations for businesses located near borders, where changes to state laws could create greater cross-border uniformity. Minnesota and Wisconsin and other surrounding jurisdictions could focus future planning efforts on evaluating non-National Network border crossings and the potential to modify size and weight regulations on these routes; especially those that are in close proximity to large clusters of freight generators.
- **WINNDOT cross-border initiative:** Mn/DOT and WisDOT formed the WI‐MN Transportation Cooperative Agreement, "WINNDOT," to identify areas of cooperation and coordination. Cooperation is standard practice in many areas including project management for border bridges, bridge inspection, and traveler information. Key elements of this initiative are Cross-Border Collaboration and Reciprocity. The goal is to look for ways to create a "seamless border" for oversize/overweight permitting. Representatives form both states have been meeting to define the purpose, expectations, and scope of this initiative, and having open discussions on individual permitting procedures, review of statutory limits and exceptions, and a listing of areas/topics to consider as project tasks that will help move us towards a reciprocal arrangement. Currently, approximately a third of oversize/overweight permits issued in either Wisconsin or Minnesota are destined for or originating in the other state. If Wisconsin and Minnesota can streamline the system to allow carriers to get one permit for both states, it could save the industry over $2 million annually. In addition, Minnesota and

Wisconsin are discussing sharing inspection for milk tankers and issuing stickers that cover both states.

Figure 31: Mn/DOT District 1 Non-National Network Route Segments

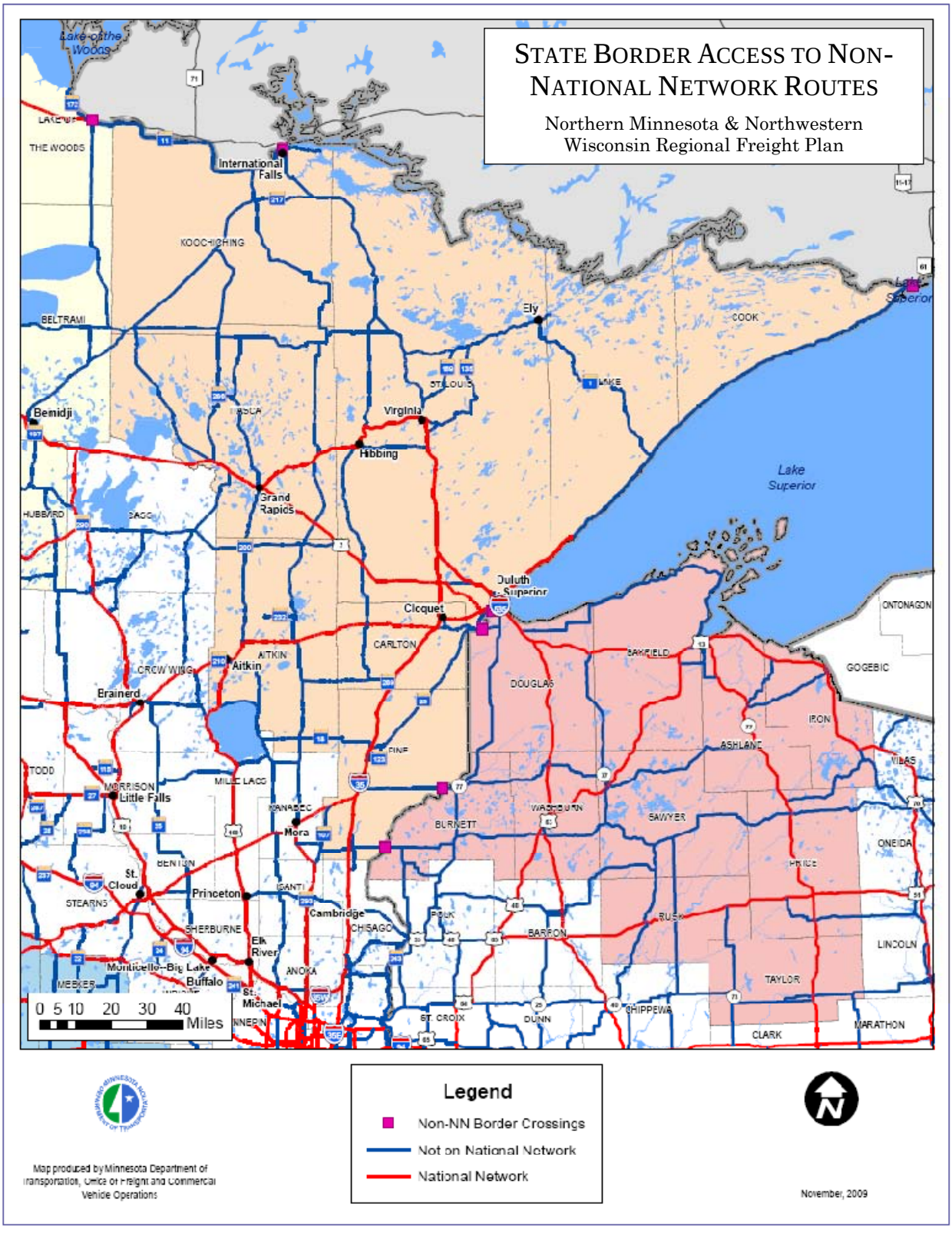
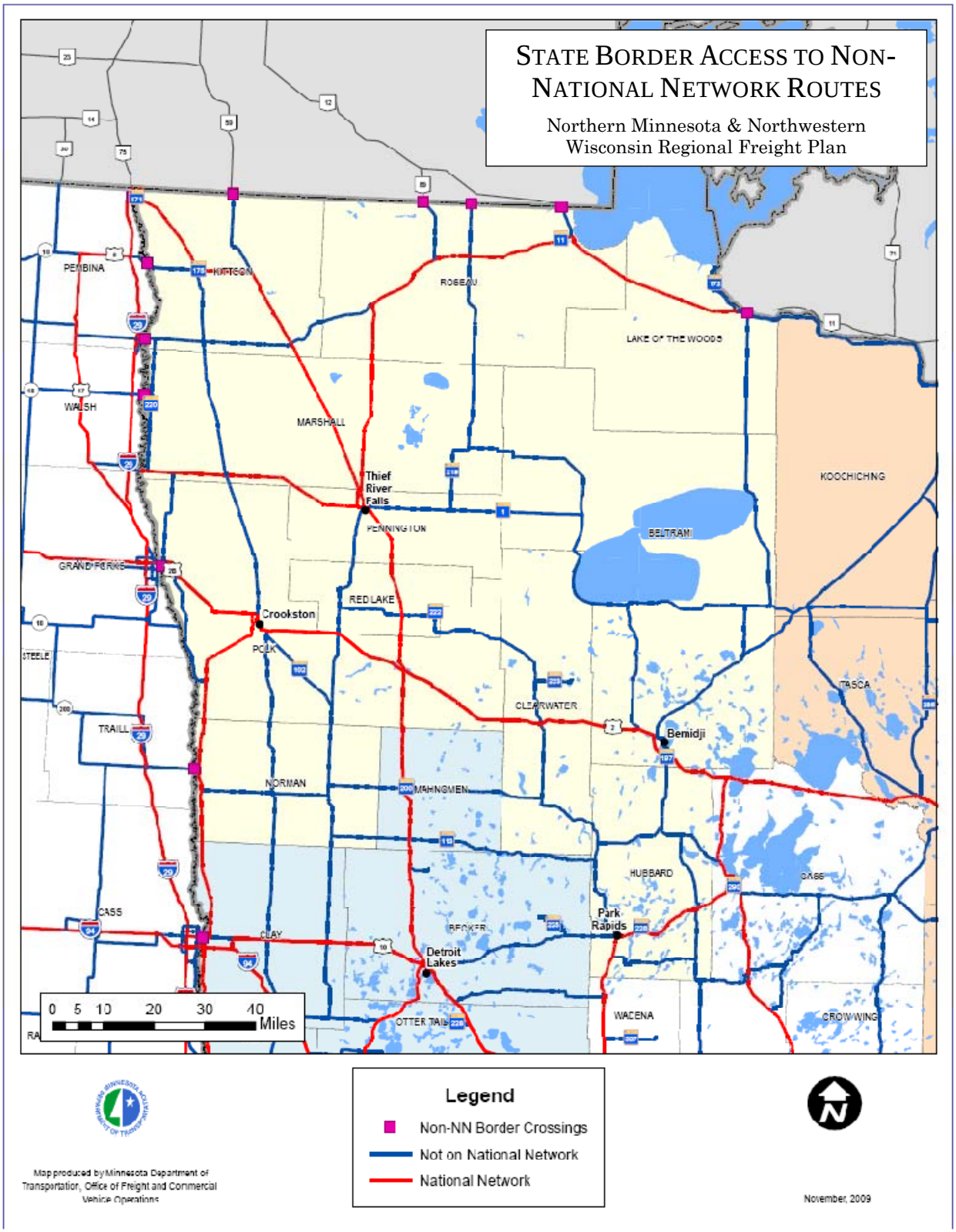


Figure 32: Mn/DOT District 2 Non-National Network Routes Segments



- **Join a regional permitting compact:** Another form of truck size and weight reciprocity has become a common practice in some parts of the U.S. More than one-half of all states in the U.S. belong to multi-state permitting compacts. Under a multi-state compact, carriers can receive extra-dimension and/or overweight operating permits, provided the requested permit operation falls within a regional permit "vehicle envelope." The vehicle envelope defines the limits of overweight or over-dimension operations all states in the Regional Permit Compact are willing to allow. Currently no regional permit compact exists in the Midwestern U.S. North Dakota currently belongs the regional compact developed by the Western Association of State Highway and Transportation Officials (WASHTO). Some of the limits established by the WASHTO vehicle envelope for extra-legal operations includes:

  Weight
  - 600 pounds per inch of tire width.
  - 21,500 pounds per axle.
  - 43,000 pounds per tandem axle.
  - 53,000 pounds per tridem (wheelbase more than 8 feet and less than 13 feet).
  - 160,000 pounds gross weight.

  Length:
  - 110 feet overall. The Agreement does not authorize permits for a semi-trailer longer than 53 feet to carry more than one item, or for any unladen semi-trailer longer than 53 feet used in a truck-tractor and semi-trailer combination.
  - Movement of unladen vehicles must comply with the limitations of the jurisdiction being traveled through (i.e. loading jeep and/or booster onto trailer when semi-trailer exceeds 62 feet in Oregon).

  Width:
  - 14 feet

  Height:
  - 14 feet

In the past, North Dakota has encouraged Minnesota to also enter such a compact. This would help create a routine permitting procedure to expedite freight movements from Minnesota to as far as the West Coast. During the study process, some carriers and shippers expressed interest in creating a uniform permitting procedure throughout the Upper Midwest states (MN, WI, ND, SD, and IA) to maximize efficiency, and minimize paperwork and delays caused by the permitting process.

9. Undertake a number of Quick Start Projects (less than $50,000):

Information about this regional freight study was broadly disseminated to the business community in the region via freight forum invitations and a Mn/DOT website. In addition, businesses were contacted and many took time out of their busy schedules to participate in interviews. In general, one of the difficulties identified in getting the private sector to participate in public planning processes is the significant difference in planning horizons between the public and private sectors. Many businesses consider long term planning horizons to be 2 to 5 years,

whereas public sector transportation agencies consider long term planning to be 10 to 20 years. In other parts of the country, state DOTs and MPOs that have worked to engage the private sector in their planning efforts have suggested that "quick start" type projects can be invaluable to gaining and holding the interest and input of private sector carriers and shippers.

Recommendations for Quick Start Projects

During the public outreach efforts for this project a number of issues were raised that could be addressed through relatively inexpensive means that can be done in a relatively short period of time. These types of projects are sometimes referred to as “Quick Start Projects.” Completing a number of Quick Start projects in direct response to the input provided by the private sector for this project can help keep regional businesses involved in similar efforts in the future and provide tangible evidence of responsive government. The following list is provided only as an example of Quick Start Projects for the region, and should not be considered an actual list of approved or endorsed projects:

- Develop a regional marketing campaign aimed at businesses and carriers to inform them about agency resources. Many comments were received regarding web resources for presenting permitting, construction, and other route or regulatory information. Both Minnesota and Wisconsin have statewide information about road posting, permitting and construction. However, sometimes the information is presented on an agencies “home” website, and in other cases data may be presented on district websites. An effort could be undertaken to identify the most requested information from private sector stakeholders and seek ways to consolidate pertinent information in a single location, or provide links. This web site should then be advertised and links to it distributed to chambers of commerce and other business organizations.
- Re-stripe the centerlines on MN 32 in northwest Minnesota, between MN 11 and US 10. This will increase night visibility and result in improved safety.
- Install additional intersection warning lights along US 59 between the US-Canadian Border & I-94. Warning lights are provided at some controlled intersections, but not at others on the route; the inconsistency was a safety concern raise by some truck drivers.
- Conduct sketch-level engineering analysis for building left turn lanes at the intersection of MN 113 and US 59 in Waubun, Minnesota.
- Remove the abandoned rail bridge over Jenswold Street near West Michigan Street in Duluth if it does not have a future use for rail or trails. The bridge's removal will provide an alternative over-dimension truck route parallel to I-35 southbound out of Duluth.
- Improve the intersection of Piedmont Ave. and West 1st Street in Duluth. Level the intersection to allow for efficient movement of oversize loads to and from the port.
- Increase the turning radius on the 40th Avenue West Bridge over I-35. Currently the south side of the bridge near the intersection of Oneota Street has a difficult turning radius for east bound trucks turning north onto 40th Avenue West.
- Improve access to I-35 and US 53 from the Duluth-Superior ports. This will involve interchange reconstruction. A new study is underway and Mn/DOT should seek public comment from the trucking industry on ways to improve port access.

Most of these identified projects fall outside existing resources of Mn/DOT, WisDOT, and the MIC, and they must compete with a range of other non-freight related projects for limited resources. However, given the relatively modest cost of many of these ideas, there are opportunities through local partnerships, such as the ATPs, and as part of the federally funded Highway Safety Improvement Program where they may be addressed. Mn/DOT, WisDOT, and the MIC should seek all opportunities to promote and program these Quick Starts projects.

CONCLUSION

The Northern Minnesota and Northwest Wisconsin region has unique freight issues and opportunities. The region is a top producer in the timber and agricultural sectors of the economy, and a large quantity of coal is transported through the region. Mining is particularly significant in the region, where nearly 80 percent of all iron ore mined in the U.S. originates, and new opportunities in copper and nickel mining exist. In addition, the Duluth-Superior ports at the center of the region serve as an international gateway, carrying national and international goods to and from the area and driving the regional economy.

These regional freight issues and trends are discussed in the Plan with a set of recommendations to address regionally-specific issues through a combination of public and private initiatives and innovative funding, regulatory initiatives, operating and program efficiencies, communications, and infrastructure upgrades and investments.

The Plan serves as an evolving blueprint to focus the region's efforts on freight transportation and the economy. This multimodal transportation planning effort emphasizes heightened inter-agency coordination and critical investment making. The Plan assists the Northern Minnesota and Northwest Wisconsin region in providing a vision for maintaining and improving the intermodal freight system, laying the groundwork for a stronger economy.

BIBLIOGRAPHY

[i] BEA News, *"Gross Domestic Product by Industry for 2003"* www.bea.doc.gov/bea/newsrel

[ii] *Transportation Invest in Our Future: America's Freight Challenge.* American Association of State Highway and Transportation Officials (AASHTO) May 2007.

[iii] *Developing Countries' Goods Trade Share Surges to 50 Year Peak. World Trade Organization Press Release: April 14, 2005*

[iv] NAFTA 10 Years Later. Overview. U.S. Department of Commerce, International Trade Administration, Office of Industry Trade Policy.

[v] *http://www.ssesco.com/page/1/library-MN-wind-integration-studies.jsp*

[vi] Wisconsin Paper Council at: *www.wipapercouncil.org/industry.htm*

[vii] *Minnesota's Forest Resources*, Minnesota Department of Natural Resources, Division of Forestry, December 2008.

[viii] *http://www.railcure.org/about/about.asp*

[ix] The Tioga Group for the Southern California Association of Governments, *Inland Port Feasibility Study: Inland Port Case Studies*, June 30, 2006.

[x] Richard D. Stewart et. al. of the University of Wisconsin, *Twin Ports Intermodal Freight Terminal Study*, July 15, 2003.

[xi] The Tioga Group for the Southern California Association of Governments, *Inland Port Feasibility Study: Inland Port Case Studies*, June 30, 2006.

[xii] Subsidiary of Genesee & Wyoming, Inc.

[xiii] Richard D. Steward, Xiubin Wang, and Adolph Ojard, *Prince Rupert to the Twin Cities: the Potential Value Added of the New Intermodal Freight Service*, presented at the 86th Annual Meeting Transportation Research Board, January 24, 2007.

[xiv] Rates from Aurora Transport, including an 18 percent fuel surcharge. If regular service were established between the Twin Cities and the Twin Ports, the rates could be a little less.

[xv] Tennessee Valley Authority for the U.S. Army Corps of Engineers Huntington District, *Great Lakes and St. Lawrence Seaway*, November 2001.

[xvi] U.S. Army Corps of Engineers, Reconnaissance Report: Great Lakes Navigation System Review, June 2002.

[xvii] http://www.midwestenergy.com/reports/05-22-2009v02.htm

[xviii] Ocean Tug and Barge Engineering

[xix] Ibid.

[xx] OSG America, LP

[xxi] Wilbur Smith Associates and TranSystems Corporation for the North Dakota Department of Transportation, *Regional Intermodal Freight Project*, August 8, 2007.

[xxii] Ibid.

[xxiii] 2007 Peak Season Plans, Patrick Kinne, BNSF General Director of International Marketing, March 27, 2007.

Appendix A: TOP FIVE COMMODITIES BY COUNTY

DISTRICT 1 OUTBOUND FREIGHT: TONNAGE AND VALUE

Cook County

COMMODITY DESCRIPTION	TONNAGE
Farm Products	1,238,439
Nonmetallic Minerals	332,614
Food Or Kindred Products	256,141
Waste Or Scrap Materials	100,530
Petroleum Or Coal Products	48,553

Cook County

COMMODITY DESCRIPTION	VALUE
Farm Products	$287,009,953
Food Or Kindred Products	$109,937,491
Petroleum Or Coal Products	$32,209,705
Fresh Fish Or Marine Products	$20,505,589
Waste Or Scrap Materials	$16,433,909

Lake County

COMMODITY DESCRIPTION	TONNAGE
Metallic Ores	7,645,779
Nonmetallic Minerals	1,763,113
Waste Or Scrap Materials	924,195
Chemicals Or Allied Products	335,956
Lumber Or Wood Products	39,476

Lake County

COMMODITY DESCRIPTION	VALUE
Waste Or Scrap Materials	$445,310,983
Metallic Ores	$418,043,482
Chemicals Or Allied Products	$126,248,404
Lumber Or Wood Products	$61,684,485
Machinery	$28,156,973

St Louis County

COMMODITY DESCRIPTION	TONNAGE
Metallic Ores	48,265,401
Nonmetallic Minerals	3,042,560
Primary Metal Products	633,362
Lumber Or Wood Products	624,990
Pulp,Paper Or Allied Products	507,403

St Louis County

COMMODITY DESCRIPTION	VALUE
Metallic Ores	$2,030,408,352
Primary Metal Products	$1,956,029,942
Lumber Or Wood Products	$781,850,291
Pulp,Paper Or Allied Products	$733,519,359
Machinery	$303,351,885

Carlton County

COMMODITY DESCRIPTION	TONNAGE
Nonmetallic Minerals	1,019,374
Pulp,Paper Or Allied Products	217,538
Lumber Or Wood Products	152,772
Misc Manufacturing Products	71,097
Farm Products	26,637

Carlton County

COMMODITY DESCRIPTION	VALUE
Lumber Or Wood Products	$311,345,515
Pulp,Paper Or Allied Products	$260,990,500
Misc Manufacturing Products	$19,631,044
Farm Products	$19,430,858
Nonmetallic Minerals	$16,893,830

Pine County

COMMODITY DESCRIPTION	TONNAGE
Food Or Kindred Products	160,394
Farm Products	113,955
Clay,Concrete,Glass Or Stone	2,838
Machinery	632
Lumber Or Wood Products	474

Pine County

COMMODITY DESCRIPTION	VALUE
Food Or Kindred Products	$80,919,551
Farm Products	$49,305,621
Machinery	$2,088,962
Fabricated Metal Products	$1,221,430
Clay,Concrete,Glass Or Stone	$355,384

Aitkin County

COMMODITY DESCRIPTION	TONNAGE
Nonmetallic Minerals	99,435
Lumber Or Wood Products	32,645
Farm Products	23,837
Food Or Kindred Products	5,973
Fabricated Metal Products	1,061

Aitkin County

COMMODITY DESCRIPTION	VALUE
Lumber Or Wood Products	$87,464,599
Farm Products	$13,725,862
Food Or Kindred Products	$12,115,337
Fabricated Metal Products	$3,893,025
Machinery	$2,108,162

Itasca County

COMMODITY DESCRIPTION	TONNAGE
Metallic Ores	6,419,956
Pulp,Paper Or Allied Products	242,950
Nonmetallic Minerals	199,351
Clay,Concrete,Glass Or Stone	26,558
Fabricated Metal Products	24,691

Itasca County

COMMODITY DESCRIPTION	VALUE
Pulp,Paper Or Allied Products	$574,748,756
Metallic Ores	$218,580,769
Fabricated Metal Products	$79,254,764
Lumber Or Wood Products	$65,430,099
Printed Matter	$35,202,099

Koochiching County

COMMODITY DESCRIPTION	TONNAGE
Pulp,Paper Or Allied Products	385,217
Nonmetallic Minerals	203,741
Lumber Or Wood Products	200,984
Farm Products	14,062
Waste Or Scrap Materials	10,634

Koochiching County

COMMODITY DESCRIPTION	VALUE
Pulp,Paper Or Allied Products	$910,108,375
Lumber Or Wood Products	$413,583,134
Farm Products	$11,054,950
Primary Metal Products	$6,470,774
Machinery	$5,843,482

KEY

Orange = Commodities > 1 MillionTons

Yellow = Commodities > 100 Thousand Tons

KEY

Orange = Value > $1 Billion

Yellow = Value > $100 Million

DISTRICT 1 INBOUND FREIGHT: TONNAGE AND VALUE

Cook County

COMMODITY DESCRIPTION	TONNAGE
Chemicals Or Allied Products	823,770
Nonmetallic Minerals	358,615
Clay,Concrete,Glass Or Stone	259,212
Waste Or Scrap Materials	163,369
Coal	144,970

Cook County

COMMODITY DESCRIPTION	VALUE
Chemicals Or Allied Products	$250,612,545
Primary Metal Products	$59,321,029
Waste Or Scrap Materials	$31,711,287
Clay,Concrete,Glass Or Stone	$25,198,285
Transportation Equipment	$23,412,873

Lake County

COMMODITY DESCRIPTION	TONNAGE
Metallic Ores	13,566,526
Rubber Or Misc Plastics	2,694,672
Nonmetallic Minerals	1,763,303
Waste Or Scrap Materials	1,190,948
Clay,Concrete,Glass Or Stone	53,131

Lake County

COMMODITY DESCRIPTION	VALUE
Rubber Or Misc Plastics	$8,119,378,982
Metallic Ores	$1,714,903,720
Waste Or Scrap Materials	$580,127,416
Primary Metal Products	$125,306,325
Clay,Concrete,Glass Or Stone	$53,428,346

St Louis County

COMMODITY DESCRIPTION	TONNAGE
Metallic Ores	7,744,876
Nonmetallic Minerals	2,780,782
Farm Products	2,154,631
Coal	1,056,776
Clay,Concrete,Glass Or Stone	644,045

St Louis County

COMMODITY DESCRIPTION	VALUE
Farm Products	$864,176,939
Metallic Ores	$785,609,255
Clay,Concrete,Glass Or Stone	$613,117,090
Primary Metal Products	$610,647,699
Chemicals Or Allied Products	$419,237,188

Carlton County

COMMODITY DESCRIPTION	TONNAGE
Nonmetallic Minerals	670,351
Clay,Concrete,Glass Or Stone	98,960
Chemicals Or Allied Products	98,295
Lumber Or Wood Products	79,635
Food Or Kindred Products	47,384

Carlton County

COMMODITY DESCRIPTION	VALUE
Chemicals Or Allied Products	$296,521,293
Clay,Concrete,Glass Or Stone	$81,871,690
Pulp,Paper Or Allied Products	$58,402,562
Food Or Kindred Products	$48,289,204
Nonmetallic Minerals	$35,790,414

Pine County

COMMODITY DESCRIPTION	TONNAGE
Nonmetallic Minerals	260,365
Food Or Kindred Products	42,360
Petroleum Or Coal Products	26,140
Lumber Or Wood Products	4,975
Clay,Concrete,Glass Or Stone	4,326

Pine County

COMMODITY DESCRIPTION	VALUE
Food Or Kindred Products	$29,193,747
Petroleum Or Coal Products	$21,817,944
Transportation Equipment	$4,161,368
Chemicals Or Allied Products	$3,933,126
Primary Metal Products	$2,904,328

Aitkin County

COMMODITY DESCRIPTION	TONNAGE
Lumber Or Wood Products	39,122
Nonmetallic Minerals	27,652
Petroleum Or Coal Products	23,269
Food Or Kindred Products	9,182
Chemicals Or Allied Products	7,505

Aitkin County

COMMODITY DESCRIPTION	VALUE
Leather Or Leather Products	$112,281,789
Lumber Or Wood Products	$72,925,032
Chemicals Or Allied Products	$27,855,123
Petroleum Or Coal Products	$15,385,835
Food Or Kindred Products	$12,155,942

Itasca County

COMMODITY DESCRIPTION	TONNAGE
Coal	4,295,438
Nonmetallic Minerals	461,069
Clay,Concrete,Glass Or Stone	321,479
Petroleum Or Coal Products	45,212
Food Or Kindred Products	31,189

Itasca County

COMMODITY DESCRIPTION	VALUE
Clay,Concrete,Glass Or Stone	$421,535,777
Coal	$223,574,940
Primary Metal Products	$149,218,812
Chemicals Or Allied Products	$127,913,694
Petroleum Or Coal Products	$41,828,544

Koochiching County

COMMODITY DESCRIPTION	TONNAGE
Petroleum Or Coal Products	56,890
Lumber Or Wood Products	28,202
Nonmetallic Minerals	22,848
Food Or Kindred Products	16,224
Chemicals Or Allied Products	12,251

Koochiching County

COMMODITY DESCRIPTION	VALUE
Petroleum Or Coal Products	$39,135,233
Machinery	$36,952,544
Food Or Kindred Products	$13,868,004
Primary Metal Products	$9,114,907
Chemicals Or Allied Products	$8,697,854

KEY

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TOP FIVE COMMODITIES BY COUNTY

DISTRICT 2 OUTBOUND FREIGHT: TONNAGE AND VALUE

Kittson County

COMMODITY DESCRIPTION	TONNAGE
Farm Products	625,664
Chemicals Or Allied Products	205,378
Transportation Equipment	15,048
Clay,Concrete,Glass Or Stone	8,000
Waste Or Scrap Materials	4,262

Kittson County

COMMODITY DESCRIPTION	VALUE
Farm Products	$149,925,796
Chemicals Or Allied Products	$110,632,662
Transportation Equipment	$84,164,544
Lumber Or Wood Products	$1,313,761
Pulp,Paper Or Allied Products	$1,024,707

Roseau County

COMMODITY DESCRIPTION	TONNAGE
Farm Products	403,087
Transportation Equipment	121,208
Lumber Or Wood Products	55,000
Clay,Concrete,Glass Or Stone	39,783
Chemicals Or Allied Products	25,948

Roseau County

COMMODITY DESCRIPTION	VALUE
Transportation Equipment	$1,190,317,605
Farm Products	$124,865,419
Lumber Or Wood Products	$112,289,525
Clay,Concrete,Glass Or Stone	$49,763,477
Fabricated Metal Products	$13,548,826

Lake of the Woods County

COMMODITY DESCRIPTION	TONNAGE
Chemicals Or Allied Products	32,840
Farm Products	28,480
Clay,Concrete,Glass Or Stone	76
Waste Or Scrap Materials	65
Machinery	52

Lake of the Woods County

COMMODITY DESCRIPTION	VALUE
Chemicals Or Allied Products	$258,893,570
Farm Products	$12,389,324
Machinery	$837,126
Waste Or Scrap Materials	$9,753
Clay,Concrete,Glass Or Stone	$5,661

Marshall County

COMMODITY DESCRIPTION	TONNAGE
Farm Products	1,322,915
Nonmetallic Minerals	190,347
Chemicals Or Allied Products	26,565
Food Or Kindred Products	12,458
Machinery	1,012

Marshall County

COMMODITY DESCRIPTION	VALUE
Chemicals Or Allied Products	$259,345,806
Farm Products	$242,117,352
Machinery	$4,556,424
Food Or Kindred Products	$2,969,839
Nonmetallic Minerals	$916,395

Pennington County

COMMODITY DESCRIPTION	TONNAGE
Farm Products	825,564
Nonmetallic Minerals	153,175
Transportation Equipment	64,738
Machinery	35,907
Pulp,Paper Or Allied Products	27,985

Pennington County

COMMODITY DESCRIPTION	VALUE
Transportation Equipment	$536,732,856
Farm Products	$204,171,094
Machinery	$201,541,819
Chemicals Or Allied Products	$15,411,151
Pulp,Paper Or Allied Products	$3,258,563

Beltrami County

COMMODITY DESCRIPTION	TONNAGE
Lumber Or Wood Products	601,963
Farm Products	128,944
Food Or Kindred Products	66,309
Printed Matter	1,249
Waste Or Scrap Materials	1,156

Beltrami County

COMMODITY DESCRIPTION	VALUE
Lumber Or Wood Products	$1,294,543,597
Farm Products	$61,926,162
Food Or Kindred Products	$54,854,749
Printed Matter	$7,320,191
Fabricated Metal Products	$723,091

Red Lake County

COMMODITY DESCRIPTION	TONNAGE
Farm Products	237,969
Lumber Or Wood Products	5,279
Waste Or Scrap Materials	292
Nonmetallic Minerals	242
Machinery	58

Red Lake County

COMMODITY DESCRIPTION	VALUE
Farm Products	$61,375,079
Lumber Or Wood Products	$20,667,074
Waste Or Scrap Materials	$45,286
Machinery	$40,487
Chemicals Or Allied Products	$35,654

Polk County

COMMODITY DESCRIPTION	TONNAGE
Nonmetallic Minerals	2,485,749
Farm Products	1,793,946
Food Or Kindred Products	937,994
Clay,Concrete,Glass Or Stone	119,324
Primary Metal Products	45,717

Polk County

COMMODITY DESCRIPTION	VALUE
Food Or Kindred Products	$494,395,279
Farm Products	$377,864,388
Primary Metal Products	$169,017,903
Transportation Equipment	$109,547,307
Rubber Or Misc Plastics	$31,531,176

Norman County

COMMODITY DESCRIPTION	TONNAGE
Farm Products	547,746
Food Or Kindred Products	1,560
Waste Or Scrap Materials	459
Nonmetallic Minerals	242
Chemicals Or Allied Products	47

Norman County

COMMODITY DESCRIPTION	VALUE
Farm Products	$109,163,415
Food Or Kindred Products	$373,064
Chemicals Or Allied Products	$89,991
Waste Or Scrap Materials	$72,911
Nonmetallic Minerals	$20,248

Clearwater County

COMMODITY DESCRIPTION	TONNAGE
Farm Products	215,472
Lumber Or Wood Products	14,586
Food Or Kindred Products	322
Waste Or Scrap Materials	269
Nonmetallic Minerals	242

Clearwater County

COMMODITY DESCRIPTION	VALUE
Farm Products	$76,390,088
Lumber Or Wood Products	$52,872,774
Food Or Kindred Products	$174,916
Waste Or Scrap Materials	$40,537
Nonmetallic Minerals	$19,760

Hubbard County

COMMODITY DESCRIPTION	TONNAGE
Lumber Or Wood Products	136,196
Farm Products	39,519
Food Or Kindred Products	32,699
Clay,Concrete,Glass Or Stone	30,307
Pulp,Paper Or Allied Products	460

Hubbard County

COMMODITY DESCRIPTION	VALUE
Lumber Or Wood Products	$146,997,666
Farm Products	$17,139,080
Food Or Kindred Products	$16,363,745
Clay,Concrete,Glass Or Stone	$3,759,925
Pulp,Paper Or Allied Products	$479,273

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DISTRICT 2 INBOUND FREIGHT: TONNAGE AND VALUE

Kittson County

COMMODITY DESCRIPTION	TONNAGE
Farm Products	314,787
Lumber Or Wood Products	172,172
Nonmetallic Minerals	42,200
Machinery	21,483
Chemicals Or Allied Products	18,764

Kittson County

COMMODITY DESCRIPTION	VALUE
Machinery	$1,150,101,359
Lumber Or Wood Products	$282,644,139
Fabricated Metal Products	$130,680,194
Farm Products	$114,738,197
Chemicals Or Allied Products	$72,481,927

Roseau County

COMMODITY DESCRIPTION	TONNAGE
Farm Products	189,198
Nonmetallic Minerals	40,271
Lumber Or Wood Products	36,787
Petroleum Or Coal Products	26,359
Clay,Concrete,Glass Or Stone	15,135

Roseau County

COMMODITY DESCRIPTION	VALUE
Chemicals Or Allied Products	$58,403,810
Farm Products	$29,648,618
Petroleum Or Coal Products	$18,520,253
Lumber Or Wood Products	$17,883,852
Pulp,Paper Or Allied Products	$2,140,232

Lake of the Woods County

COMMODITY DESCRIPTION	TONNAGE
Petroleum Or Coal Products	9,088
Pulp,Paper Or Allied Products	3,560
Chemicals Or Allied Products	2,899
Clay,Concrete,Glass Or Stone	2,576
Nonmetallic Minerals	1,252

Lake of the Woods County

COMMODITY DESCRIPTION	VALUE
Petroleum Or Coal Products	$5,374,663
Chemicals Or Allied Products	$4,629,622
Pulp,Paper Or Allied Products	$1,985,130
Machinery	$1,842,172
Primary Metal Products	$1,490,288

Marshall County

COMMODITY DESCRIPTION	TONNAGE
Farm Products	592,088
Nonmetallic Minerals	492,324
Chemicals Or Allied Products	19,462
Petroleum Or Coal Products	17,100
Lumber Or Wood Products	5,872

Marshall County

COMMODITY DESCRIPTION	VALUE
Farm Products	$150,273,989
Chemicals Or Allied Products	$58,431,219
Petroleum Or Coal Products	$11,927,568
Lumber Or Wood Products	$4,315,767
Nonmetallic Minerals	$3,696,524

Pennington County

COMMODITY DESCRIPTION	TONNAGE
Farm Products	285,985
Nonmetallic Minerals	103,375
Petroleum Or Coal Products	20,306
Chemicals Or Allied Products	17,755
Pulp,Paper Or Allied Products	7,860

Pennington County

COMMODITY DESCRIPTION	VALUE
Machinery	$444,789,539
Chemicals Or Allied Products	$74,863,497
Farm Products	$43,465,955
Petroleum Or Coal Products	$14,124,817
Primary Metal Products	$10,845,854

Beltrami County

COMMODITY DESCRIPTION	TONNAGE
Nonmetallic Minerals	1,258,944
Petroleum Or Coal Products	47,651
Lumber Or Wood Products	45,494
Primary Metal Products	30,777
Food Or Kindred Products	27,082

Beltrami County

COMMODITY DESCRIPTION	VALUE
Primary Metal Products	$177,150,116
Petroleum Or Coal Products	$34,827,420
Transportation Equipment	$26,720,791
Food Or Kindred Products	$22,240,070
Fabricated Metal Products	$21,389,449

Red Lake County

COMMODITY DESCRIPTION	TONNAGE
Nonmetallic Minerals	193,156
Chemicals Or Allied Products	10,377
Petroleum Or Coal Products	6,780
Transportation Equipment	3,246
Pulp,Paper Or Allied Products	1,687

Red Lake County

COMMODITY DESCRIPTION	VALUE
Chemicals Or Allied Products	$37,259,208
Transportation Equipment	$25,153,772
Petroleum Or Coal Products	$4,288,949
Pulp,Paper Or Allied Products	$2,015,631
Primary Metal Products	$1,672,132

Polk County

COMMODITY DESCRIPTION	TONNAGE
Farm Products	4,263,409
Nonmetallic Minerals	400,787
Petroleum Or Coal Products	129,637
Chemicals Or Allied Products	93,689
Clay,Concrete,Glass Or Stone	34,518

Polk County

COMMODITY DESCRIPTION	VALUE
Farm Products	$2,370,155,884
Chemicals Or Allied Products	$253,819,388
Petroleum Or Coal Products	$249,714,836
Transportation Equipment	$119,691,744
Food Or Kindred Products	$32,652,874

Norman County

COMMODITY DESCRIPTION	TONNAGE
Farm Products	150,420
Nonmetallic Minerals	33,506
Petroleum Or Coal Products	13,297
Clay,Concrete,Glass Or Stone	3,582
Primary Metal Products	2,942

Norman County

COMMODITY DESCRIPTION	VALUE
Farm Products	$22,733,236
Petroleum Or Coal Products	$9,102,104
Primary Metal Products	$5,405,733
Food Or Kindred Products	$1,784,766
Clay,Concrete,Glass Or Stone	$1,568,477

Clearwater County

COMMODITY DESCRIPTION	TONNAGE
Farm Products	137,070
Nonmetallic Minerals	32,924
Petroleum Or Coal Products	22,466
Primary Metal Products	2,811
Chemicals Or Allied Products	1,613

Clearwater County

COMMODITY DESCRIPTION	VALUE
Farm Products	$20,827,461
Petroleum Or Coal Products	$17,161,164
Primary Metal Products	$5,023,230
Electrical Equipment	$2,771,629
Crude Petrol. Or Natural Gas	$1,253,477

Hubbard County

COMMODITY DESCRIPTION	TONNAGE
Nonmetallic Minerals	286,528
Petroleum Or Coal Products	29,368
Food Or Kindred Products	17,581
Clay,Concrete,Glass Or Stone	7,880
Primary Metal Products	7,513

Hubbard County

COMMODITY DESCRIPTION	VALUE
Petroleum Or Coal Products	$21,903,349
Food Or Kindred Products	$15,058,871
Primary Metal Products	$13,193,859
Chemicals Or Allied Products	$2,293,508
Nonmetallic Minerals	$1,763,820

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