CAMBRIDGE SYSTEMATICS

Minnesota Statewide Freight System Plan

Task 2.3 - Freight System Assets and Use

draft report

prepared for

Minnesota Department of Transportation

prepared by

Cambridge Systematics, Inc.

with

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February 2015

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date

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Table of Contents

List of Tables

List of Figures

1.0 Introduction

This report builds on information already developed at the state and regional levels through previous MnDOT work and FHWA Freight Analysis Framework (FAF) data on commodity flows to sketch out a picture of current and future freight flows. This report includes:

- **An inventory** of Minnesota's highways, port facilities, major distribution centers, air cargo facilities, rail facilities, and waterborne system elements using information readily at hand. This includes maps of the facilities and descriptions of their key attributes (e.g., traffic volumes, capacity, types of commodities moved, and intermodal connections), as information was available.
- **A profile of current and future freight system demand** using data from the FAF to describe freight transportation demands affecting Minnesota by mode, commodity classification, and origin/destination movements. The base year for the study is 2012 and the future projections are for 2040. While the FAF version 3.5 (FAF3.5) provides current and future multimodal freight demand information, it does have some geographic shortcomings in Minnesota, e.g., the State is divided into just two regions—one representing the greater Minneapolis-St. Paul region, and the other the remainder of the State. Therefore, this data was used to assess which freight flows are growing and declining, and will be supplemented by stakeholder interviews.

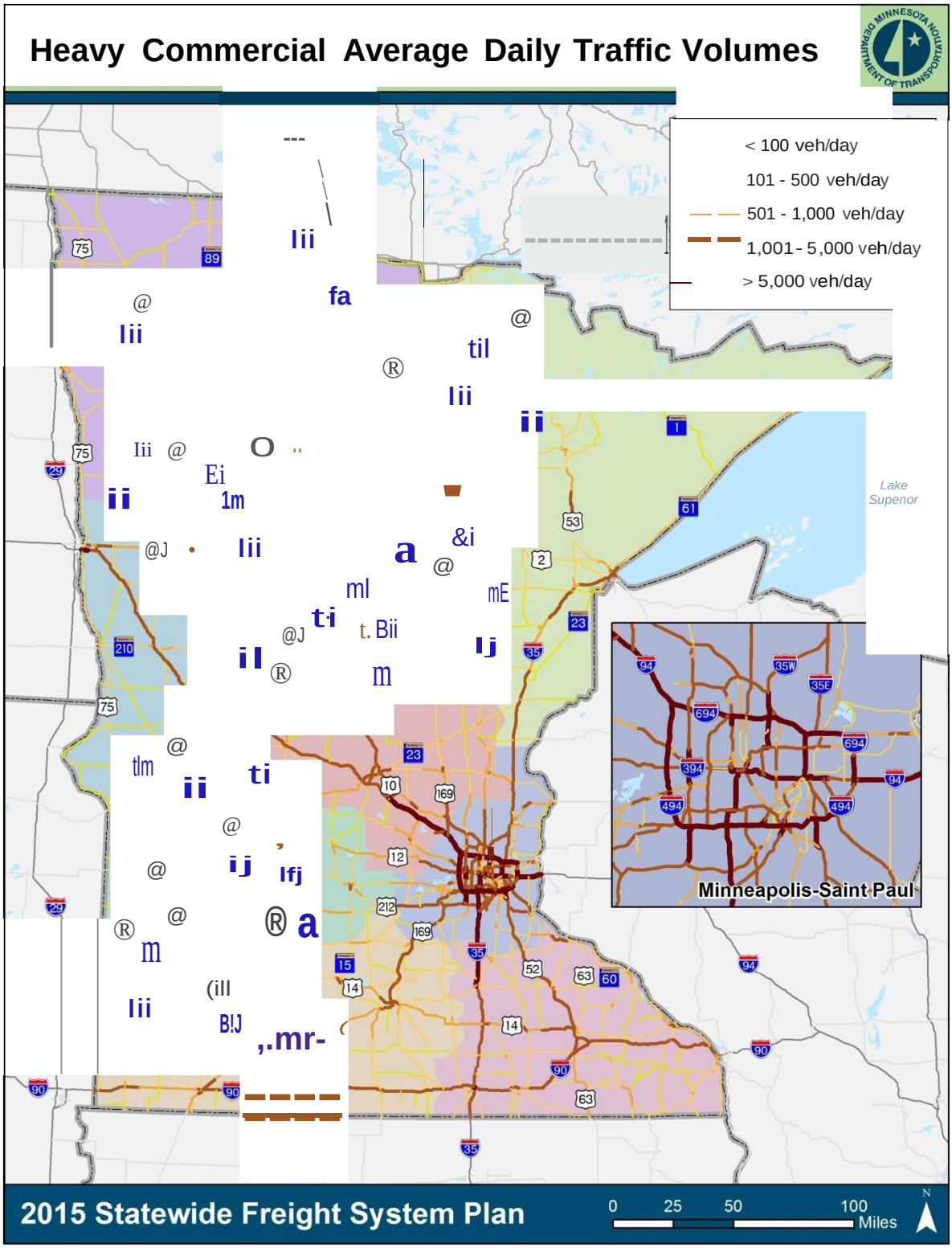
2.0 Minnesota Freight System Inventory

Minnesota's freight network encompasses multiple modes of transportation that work together to ensure a smooth flow of goods throughout the state. This section provides an overview of the current inventory of the multimodal freight system in Minnesota.

2.1 HIGHWAY INVENTORY

Trucks are an important mode for moving all types of goods in Minnesota, and nationally. As shown in Figure 2.1, many highways in Minnesota carry over 5,000 truck trips per day on average. For long trips, trucks typically use designated highway networks to transport goods from point to point. In addition to these state and federally designated roadways, local roadways also serve as important connectors between freight generating and receiving facilities (farms, processing plants, manufacturing centers, and distribution centers) and the primary roadway network.

Figure 2.1 Average Daily Traffic Volumes for Heavy Commercial Vehicles (2012)



The National Highway System

The National Highway System (NHS) was developed by the United States Department of Transportation (U.S. DOT) in cooperation with states, municipalities, and Metropolitan Planning Organizations (MPOs). The NHS includes the following roadway categories:

- **Interstate:** The Eisenhower Interstate System of highways retains its separate identity within the NHS.
- **Other Principal Arterials:** These highways in rural and urban areas provide access between arterials and major ports, airports, public transportation facilities, or other intermodal transportation facilities.
- **Strategic Highway Network (STRAHNET):** This network of highways is important to U.S. strategic defense policy and provides defense access, continuity, and emergency capabilities for defense purposes.
- **Major Strategic Highway Network Connectors:** These highways provide access between major military installations and highways that are part of the Strategic Highway Network.
- **Intermodal Connectors:** These highways provide access between major intermodal facilities and the other four subsystems making up the National Highway System.

The NHS system in Minnesota is approximately 4,120 miles long and includes intermodal connectors at the following locations: Minneapolis-St. Paul International Airport, Rochester International Airport, Duluth International Airport, and the Port of Duluth. Minnesota's NHS is shown in Figure 2.2

National Truck Network and Minnesota Twin Trailer Network

The National Truck Network consists of designated roadways throughout the U.S. that allow long combination vehicles (LCVs), semi-trailer trucks with two trailers, and single-trailer trucks with an extra-long trailer. The National Truck Network is supplemented by Minnesota's Twin Trailer Network, a system of other trunk and local highways on which LCVs may operate. These roadway networks are shown in Figure 2.3.

Figure 2.2 Minnesota's National and State Highway System

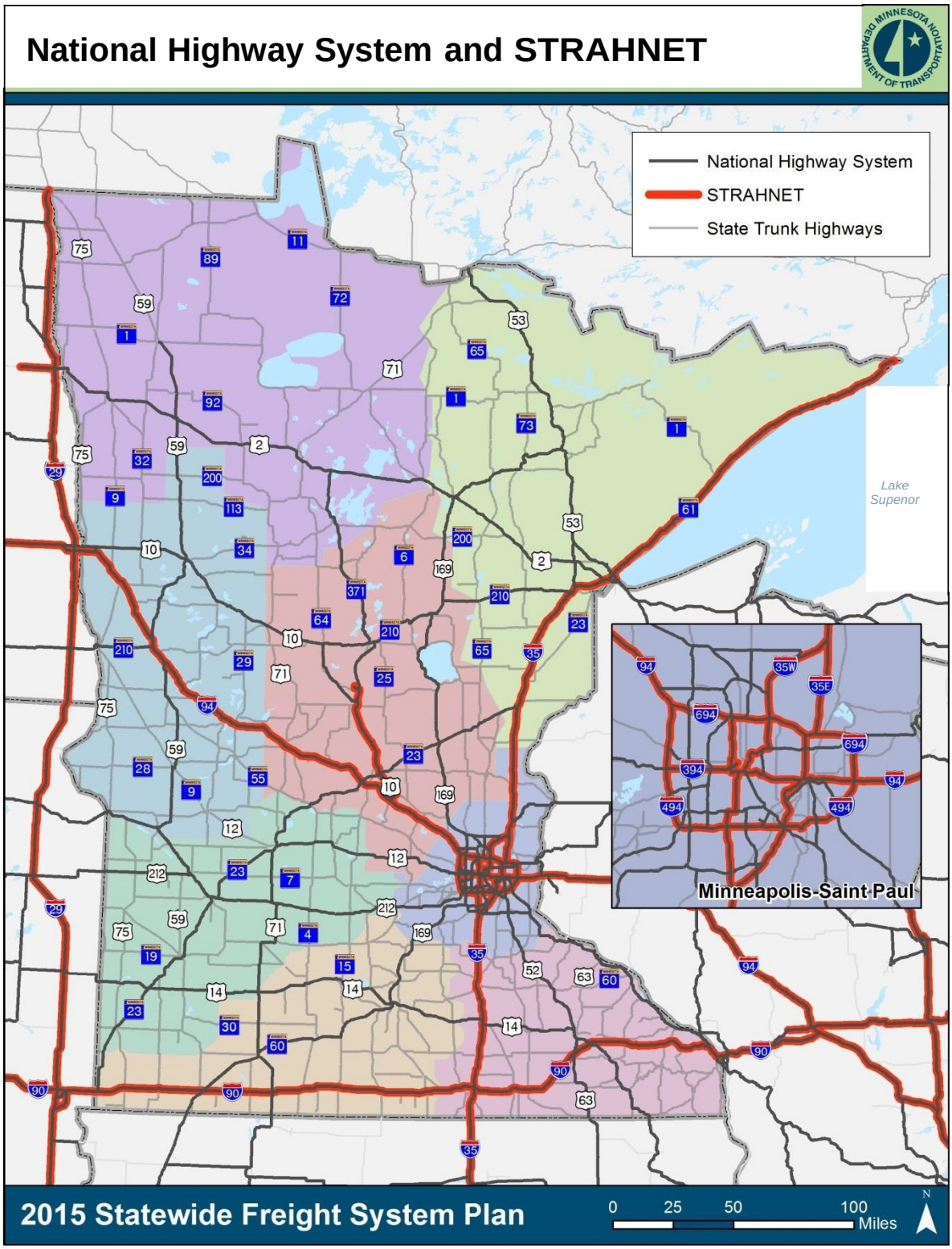
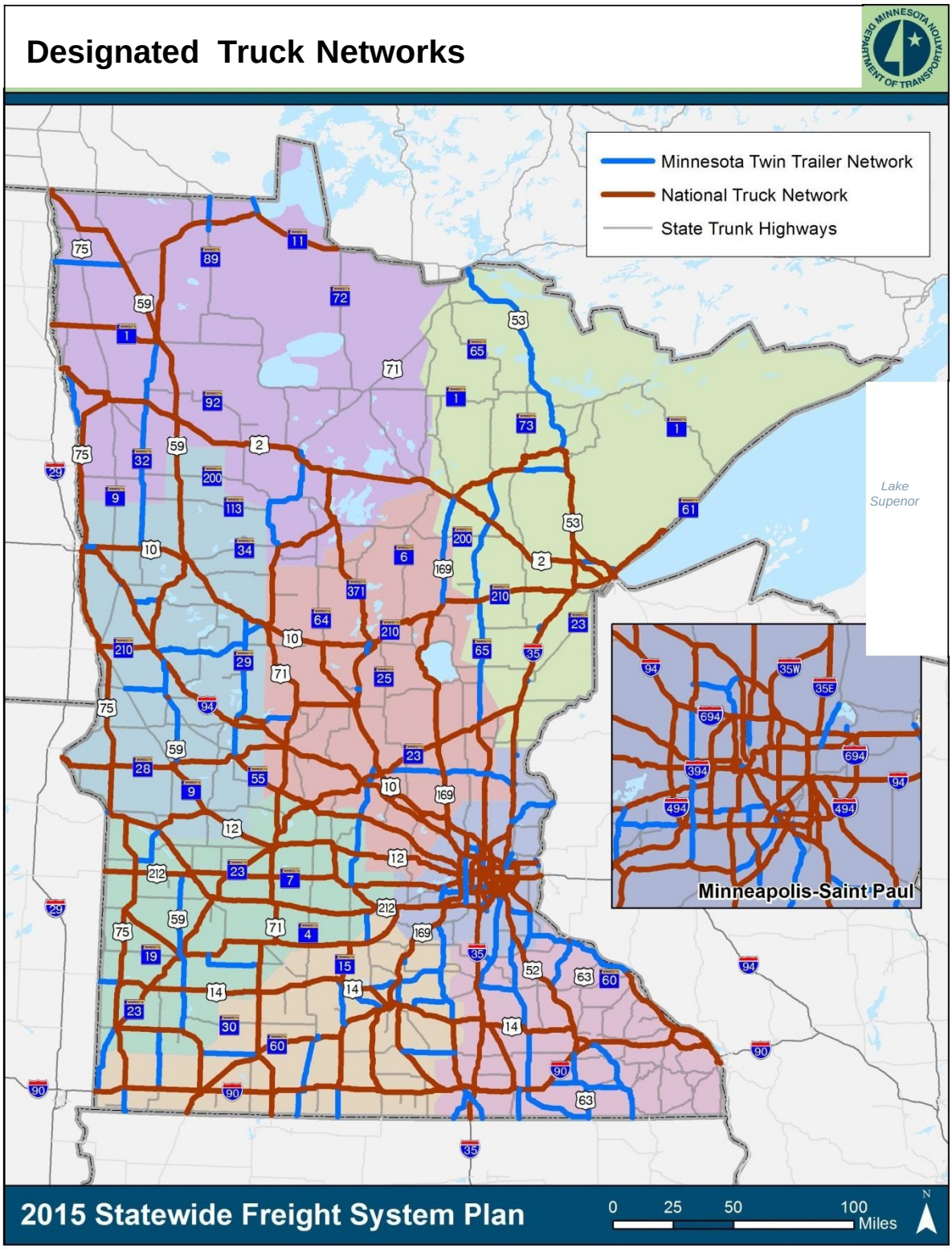


Figure 2.3 Minnesota's Nationally and State-Designated Truck Networks

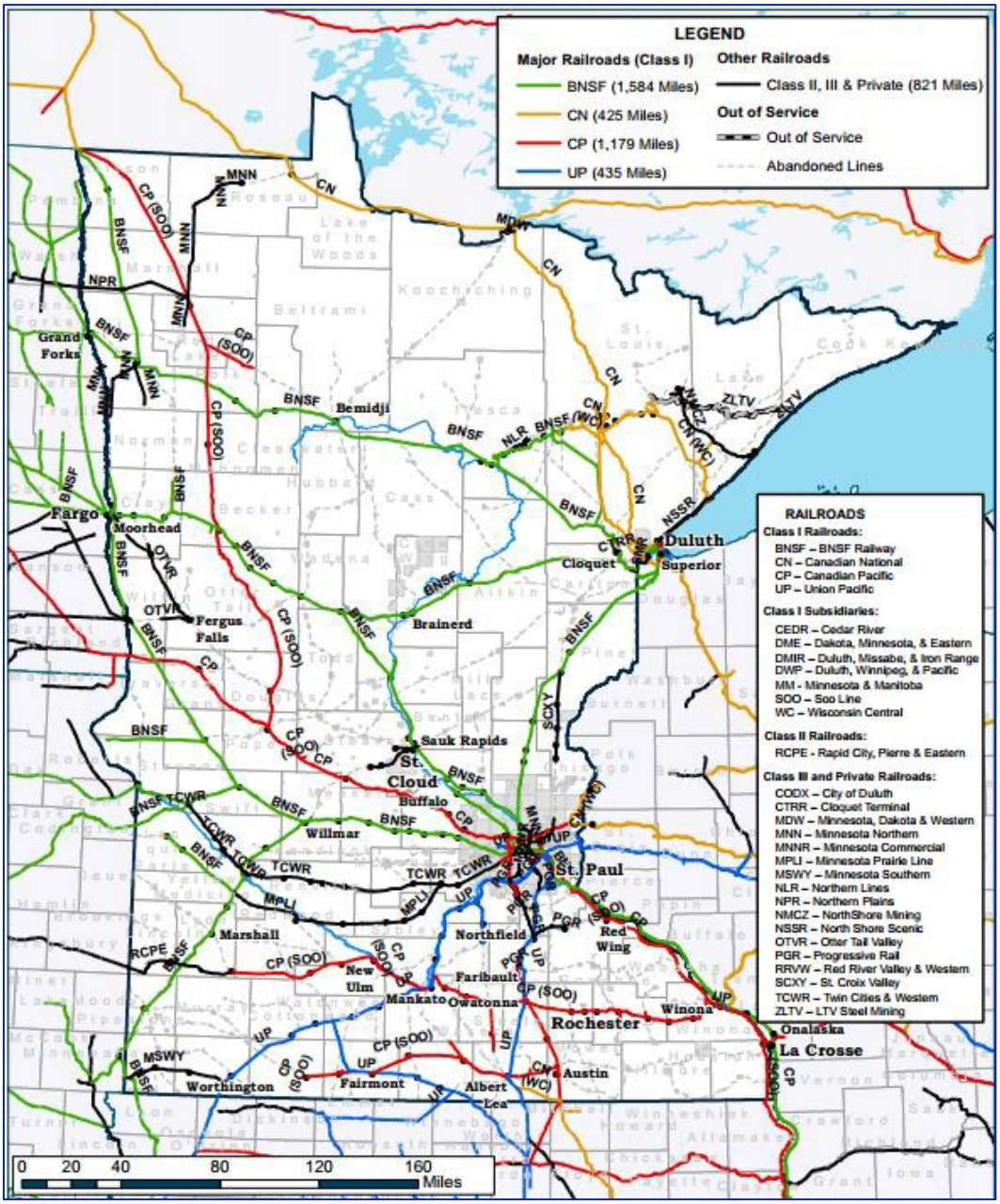


2.2 RAILWAY INVENTORY

The railway network in Minnesota is comprised of a significant number of rail operators serving both passenger and freight traffic.. Two of the seven Class I railroads of the United States maintain operations within the state.[1] These two railroads are BNSF and Union Pacific (UP). Both Canadian National (CN) and Canadian Pacific (CP) also operate in the state; however, as these are Canadian railroads they are not technically classified as Class I railroads. By revenue, both CP and CN would be considered Class I railroads if they were U.S. railroads and are generally classified with the U.S. Class I railroads. Figure 2.4 displays the interconnectivity of these various rail lines within the State of Minnesota.

[1] In order to be classified as a Class I railroad, they must have an operating revenue of at least $467.0 million annually. The operating revenue is the requirement for 2013. This number is adjusted for inflation annually using the Railroad Freight Price Index developed by the Bureau of Labor Statistics.

Figure 2.4 Rail Lines in Minnesota



Source: Minnesota Department of Transportation, Active Rail July 2014.

Class I Operators

BNSF is the largest railroad in Minnesota based on track mileage and the second largest freight railroad in North America based on operating revenue. Total mileage for this railroad in Minnesota is 1,636, or about 5 percent of BNSF's 32,000 national miles. In addition, BNSF maintains an intermodal facility in St. Paul. Recently, delays on the Class I system have caused significant headaches

and lost profits for farmers across Minnesota. Winter weather and substantial increases in demand from western North Dakota have resulted in increased shipping costs and fewer available services. To combat this issue, BNSF has worked to add at least 375 new locomotives and 5,000 new employees to ease congestion.[2] BNSF also has $1 billion in improvements planned for the Northern Corridor, of which $120 million will be spent in Minnesota. Expansion projects in the state include parking expansions at the St. Paul Intermodal Facility, track extensions in Gunn, and new siding and interchange tracks near the Canadian border in St. Vincent. Maintenance projects include surfacing and undercutting more than 600 miles of track, replacing 72 miles of track, and replacing over 340,000 ties.[3] Canadian Pacific is the next largest railroad in Minnesota. Unlike BNSF, CP's trackage is maintained by subsidiaries, namely Dakota, Minnesota, & Eastern (DM&E) and the Soo Line Railroad (SOO). In total, 1,157 miles are operated by CP in Minnesota. This track mileage is down slightly from prior accounts as of January 2, 2014 when CP reached an agreement with Genesee & Wyoming, Inc. (G&W) in which CP will sell the west end of the DM&E line to G&W. This portion includes a total of 660 miles of trackage.[4] For Minnesota, this includes a portion of track between Tracy, Minnesota and the border of South Dakota of roughly 46 miles. This new railroad is called the Rapid City, Pierre, & Eastern Railroad (RCPE). Approximately 52,000 carloads of goods are shipped annually over this line, including grain, bentonite clay, ethanol, and fertilizer. In addition to this trackage, CP's U.S. headquarters are located in Minneapolis, recently relocated from the historic Soo Line Building, as well as a rail yard in St. Paul which employees 800 people.

Union Pacific is the third largest railroad in the state with 477 miles of trackage. This trackage is all owned and operated by UP and not through subsidiaries. For the most part, operations are concentrated in the southern portion of the state. Top commodities transported by UP to and from the state include non-metallic minerals, corn and feed grains, and coal.[5] Most recently, UP has been working to strengthen its infrastructure between Minnesota and Iowa. Announced in April 2014, UP has invested $17.5 million in the rail line between Butterfield, Minnesota and Mason City, Iowa. This included replacing 119,300 railroad ties and installing 50,775 tons of rock ballast. In addition, crews renewed surfaces at 168 road crossings.

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2 http://www.mprnews.org/story/2014/03/26/business/train-delays

3 http://www.bnsf.com/media/news-releases/2014/may/2014-05-01a.html

4 http://www.railwayage.com/index.php/freight/short-lines/cp-to-sell-dme-right-of-way-to-gwi.html

5 http://www.up.com/cs/groups/public/documents/up_pdf_nativedocs/pdf_minnesota_usguide.pdf

Lastly, Canadian National is the smallest of the Class I railroads in the state by just a few miles. CN operates on 448 miles of trackage in Minnesota, a small fraction of the 21,000 miles encompassed by this railroad company. As with CP, the majority of these operations are through subsidiaries: Duluth, Missabe, and Iron Range Railway (DMIR), Duluth, Winnipeg, and Pacific Railway (DWP), Minnesota, Dakota, and Western Railway (MDW), Cedar River Railroad (CEDR), and Wisconsin Central (WC). Of these, DMIR and DWP represent the largest portion of CN's Minnesota presence with 232 and 156 miles of trackage, respectively.

Other Rail Operators

Beyond the Class I operators, there are numerous other shortline railroads as well as the one Class II railroad created through the sale of a portion of DM&E as discussed previously. These railroads are typically much smaller than their Class I counterparts with Minnesota Northern as the largest Class III railroad in the state with 158 miles of trackage. Table 2.1 details all of the railroad operators in the state along with their class, subsidiary status, and mileage.

Table 2.1 Railroad Operators in Minnesota

Rail Company	Call Number	Class	Subsidiary	Mileage
BNSF Railway	BNSF	I	BNSF	1,636
Cedar River	CEDR	I	CN	19
Canadian National	CN	I	CN	44
Cloquet Terminal Railroad	CTRR	III		4
Dakota, Minnesota, & Eastern	DME	I	CP	447
Duluth, Missabe, and Iron Range	DMIR	I	CN	232
Duluth, Winnipeg, and Pacific	DWP	I	CN	156
Lake Superior & Mississippi RR Co.	LSMR	III		5
Minnesota, Dakota, and Western	MDW	I	CN	4
Minnesota Northern	MNN	III		158
Minnesota Commercial	MNNR	III		47
Minnesota Prairie Line	MPLI	III		95
Minnesota Southern	MSWY	III		41
Minnesota Zephyr, Ltd.	MZL	III		5
Northern Lines	NLR	III		26
NorthShore Mining	NMCZ	III		54
Northern Plains	NPR	III		46
NorthShore Scenic	NSSR	III		28
Otter Tail Valley	OTVR	III		72

Rail Company	Call Number	Class	Subsidiary	Mileage
Progressive Rail	PGR	III		59
Rapid City, Pierre, & Eastern Railroad	RCPE	II		46
Red River Valley & Western	RRVW	III		3
St. Croix Valley	SCXY	III		36
Soo Line Railroad	SOO	I	CP	707
Twin Cities & Western	TCWR	III		154
Union Pacific	UP	I	UP	477
Wisconsin Central Ltd.	WC	I	CN	22

Source: Minnesota Department of Transportation, Active Rail July 2014.

Railroad Grade Crossings

Due to the expansiveness of the railway network of Minnesota, there are numerous instances where these rail lines intersect with highways and local roadways. There are over 7,400 railroad crossings in the state, 32 percent of which are on private roadways, whether for residential, industrial, farm, recreational, or commercial purposes. With such a high number of crossings, this allows for significant opportunities for vehicles and trains to interact. As a result, in 2013, there were 53 highway-rail crossing collisions resulting in six fatalities and 26 injuries. This places Minnesota at 15th in the nation for highest number of crashes and 12th for fatalities.

Rail grade crossings have received significant attention of late due to the large increase in crude oil trains passing through the state (discussed in the following section). Minnesota has to reduce the number of train related crashes through improvements at grade crossings as well as educating the community. In 2014, MnDOT upgraded 40 locations throughout the state using $7.9 million in federal and state funding.[6] The new law signed by Governor Dayton in 2014 has also appropriated $2 million for new rail grade crossings along key oil routes. MnDOT has a study underway, to be completed in October 2014, to prioritize these investments. Improvements will then be made in 2015.

Education on the dangers of grade crossings and trespassing on railroad right of way is also provided through Operation Lifesaver. A joint program between MnDOT and railroads, this is aimed primarily at elementary school children. MnDOT currently contributes $30,000 annually to this program.

[6] http://www.dot.state.mn.us/newsrels/14/06/5train.html

Crude Oil Trains

One of the more recent endeavors for the railroads is to ship crude oil by train through Minnesota. With the recent oil boom in North Dakota sending product to refineries on the East Coast, roughly 50 million gallons on oil passes through Minnesota on a train. This equates to 50 trains per week. Figure 2.5 shows the route taken by the trains along with frequency of service. This route is of particular concern given that is passes through the heavily populated Twin Cities area. In order to prevent an incident similar to the Lac- Mégantic accident in July 2013 which claimed 47 lives, Minnesota lawmakers and transportation workers have been working quickly to ensure that the crude oil makes a safe transit through the state. This has included hiring more inspectors to scrutinize the tracks as well as mapping the safety risks of all 500 grade crossings along the routes.[7] Coupled with this traffic from North Dakota are Canadian crude oil movements. Higher quantities of this commodity are being moved through the northern part of the state. CN reported an 82 percent increase in crude oil shipments in the three months ending in June 2014. With Canadian crude production expected to increase nearly 40 percent by 2020, the safe transportation of this commodity will continue to be a concern moving forward.[8]

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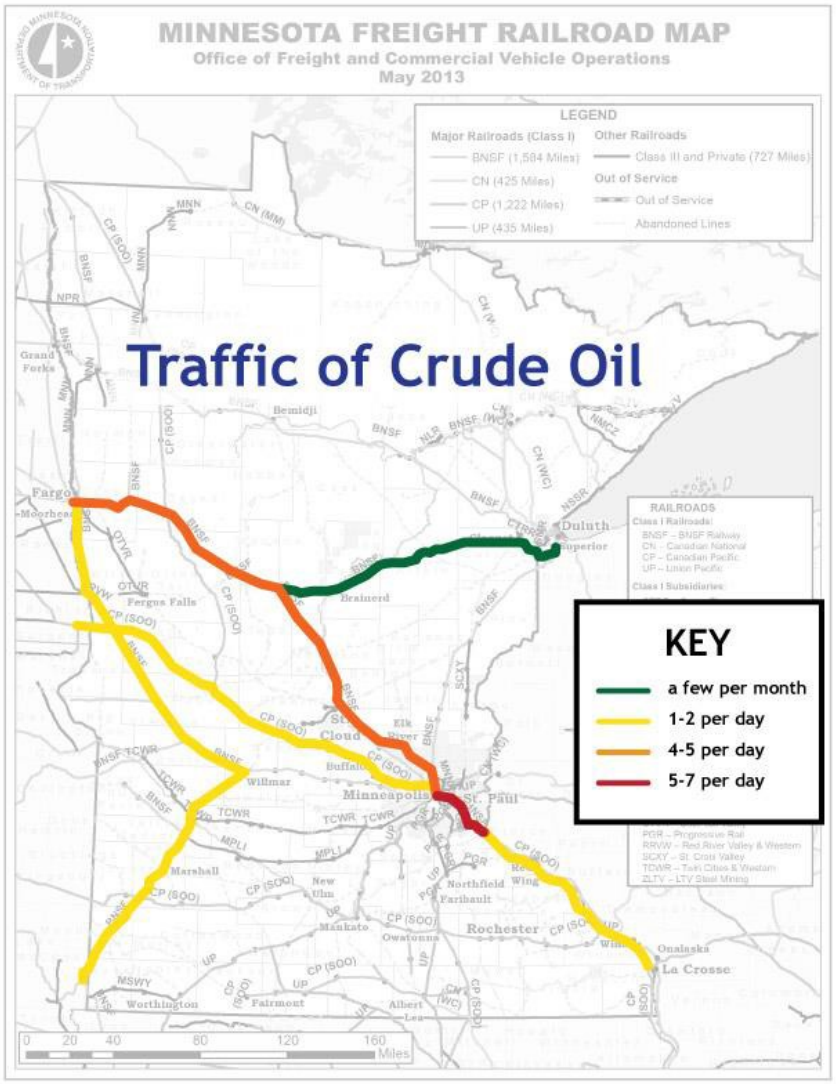
[7] http://www.mprnews.org/story/2014/08/07/safety-worries-rise-as-twin-cities-oil-train-traffic-jumps

[8] http://www.startribune.com/business/269913051.html?page=all&prepage=1&c=y#continue

Figure 2.5 Volume of Crude Trains Traveling Through Minnesota



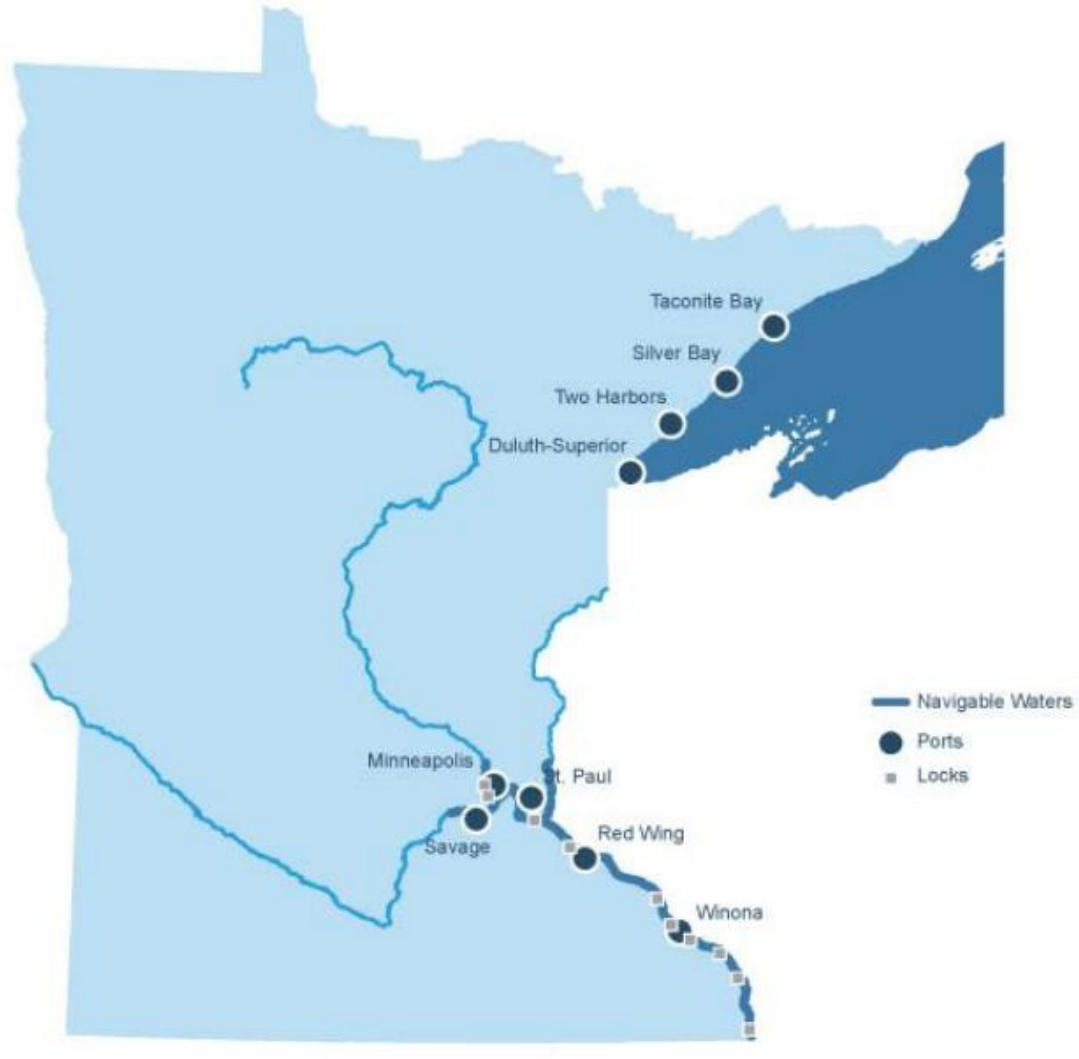
Source: Twin Cities Daily Planet, January 2014.[9]

[9] http://www.tcdailyplanet.net/blog/conrad-defiebre/where-oil-trains-run-through-minnesota

2.3 WATERWAY INVENTORY

Minnesota has one of the more unique positions in the country for waterway movements as it is located on both the Mississippi River and the Great Lakes via Lake Superior. The Mississippi River provides access to river ports to the south as well as the Gulf of Mexico via New Orleans. The Great Lakes-St. Lawrence Seaway provides access to other ports along the Great Lakes through to the Atlantic Ocean. Due to this, Minnesota has numerous public ports in operation: five along the Mississippi River and four along Lake Superior. The locations of these ports are shown in Figure 2.6.

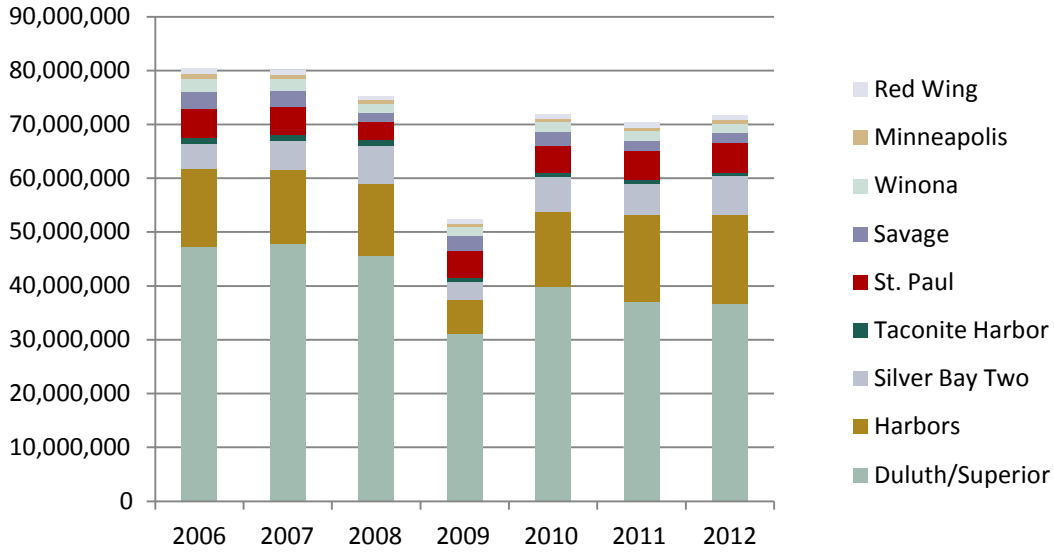
Figure 2.6 Navigable Waters and Ports of Minnesota



Source: Minnesota Statewide Ports & Waterways Plan, 2013.

Annual tonnages at these nine ports is in excess of 70 million per year, as shown in Figure 2.7. While lower than the 80 million annual tons seen in the mid-2000's, tonnages rebounded after a sharp decline in 2009. Of this total volume handled today, Duluth-Superior handles the majority at 51 percent. The next highest volume public port is Two Harbors, also on the Great Lakes, with 23 percent. Overall, the Great Lakes ports handle 85 percent of this tonnage (61 million tons), with the remainder handled on the Mississippi River.

Figure 2.7 Annual Tonnage at Minnesota's Public Ports



Source: Minnesota Statewide Ports & Waterways Plan, 2013.

Ports of the Great Lakes

Port of Duluth/Superior

The Port of Duluth/Superior is managed by the Duluth Seaway Port Authority, created by the Minnesota State Legislature to foster regional maritime commerce and promote trade development. This port is the farthest inland freshwater seaport in the U.S. and one of the leading bulk cargo ports in all of North America. Terminals located at this port, detailed in Tables 2.2 and 2.3, have a distinct advantage of direct access to I-35 as well as rail service provided by four Class I railroads: BNSF, CN, CP, and UP. As a result, this port handles over 36 million tons of cargo from nearly 1,000 vessel visits.[10] While this tonnage is the result of a wide range of commodities, many of these terminals have a sole focus on grain. Of the terminals listed below, nine focus on grain movements and have

[10] http://www.duluthport.com/authority-about.php

a combined capacity of over 61 million bushels. Another of the more unique commodities handled at this port is wind turbine components. These components are transhipped for manufacturers from both Europe and North Dakota. As of July 2014, this port had received its 15th ship bearing this equipment bound for Minnesota Power's renewable energy installation in North Dakota, helping Minnesota Power to reach the goal of 25 percent renewable energy 11 years ahead of schedule.[11]

Table 2.2 Duluth Marine Terminals

Dock	Commodities	Capacity	Rail Service	Dock (ft)
North American Salt Co	Solar Salt, Granulated Salt, Rock Salt	300,000 tons	BNSF	1,000
General Mills Elevator A	Grain	3,500,000 bushels and 25,000 tons in bagging plant	BNSF	1,900
Duluth Storage (South)	Grain	2,340,000 bushels	CP	1,560
Duluth Storage (North)	Grain	12,000,000 bushels	CP	1,700
Duluth Lake Port	Grain	4,189,000 bushels	BNSF, CP	930
Azcon Metals	Scrap Iron and Metals	20 acres	BNSF, CP	1,586
Northland Pier	Asphalt, concrete, Class 5, Limestone	35 acres	BNSF, CP	1,950
Arthur M. Clure Public Marine Terminal – Garfield Docks C & D		28 acres	BNSF, CP	1,200 (C)/ 1,000 (D)
Arthur M. Clure Public Marine Terminal Berths 1 & 2	General Cargo, Heavy Lift Cargo, Finished Steel, Forest Products, Wind Turbine Generator Components	360,000 sq. ft., 11,000 sq. ft. FTZ	CP Switch	1,620
Terminal Berth 3 – Calumet Duluth Marine Terminal	Fuel and Waste Oil Services	560,000 gallons	CP	1,200
Arthur M. Clure Public Marine Terminal Berth 4	General Cargo, Forest Products, Wind Turbine Generator Components	350,000 sq. ft.	CP Switch	1,000

[11] http://www.duluthport.com/media-news-detail.php?id=69

Dock	Commodities	Capacity	Rail Service	Dock (ft)
Arthur M. Clure Public Marine Terminal Berths 5 & 6	General Cargo, Forest Products, Wind Turbine Generator Components		CP Switch	500 (5)/ 696 (6)
Holcim U.S. Inc.	Cement	43,000 tons	BNSF, CN, CP, UP	839
CN Railway Ore Dock 5	INACTIVE		CN	2,416
CN Railway Ore Dock 6	Natural Iron Ore and Iron Ore Pellets, Coal, Limestone	5,600,000 tons	CN	1,090 (East)/ 1,348 (West)
Hallett Dock No. 5	Bulk Material	20,000 tons	BNSF, CN	2,000 (back dock)/ 2,300 (paved)
C. Reiss Coal Co. Duluth Dock	Coal, Limestone, Petroleum Coke	800,000 tons	BNSF	2,854

Source: Minnesota's Lake Superior Terminals, 2014.

Table 2.3 Superior Marine Terminals

Dock	Commodities	Capacity	Rail Service	Dock (ft)
Hallett Dock 8	Bulk Material	2,100,000 gallons and 800,000 tons	BNSF	2,300
Midwest Energy Resources Co,. Superior Midwest Energy Terminal	Western Coal	5,000,000 tons	BNSF, UP	1,200
General Mills Superior-Elevators S&X	Grain	12,700,000 bushels	BNSF	1,800
CHS No. 1 and Gallery	Grain	8,000,000 bushels	BNSF	1,250
CHS No. 2	Grain	10,000,000 bushels	BNSF	700
Connors Point Properties	INACTIVE		BNSF, CP, UP	1,500
Gavilon Grain LLC	Grain	8,000,000 bushels	BNSF	790
Graymont (Wi) LLC	Limestone, Coal	510,000 tons	BNSF	1,250
LaFarge North America	Cement	8,500 tons	BNSF	400/900
Hansen-Mueller-Superior	Grain	3,750,000 bushels	BNSF, CN, CP, UP	800
BNSF Ore Dock No. 5	Taconite	5,273,156 tons	BNSF	1,470

Source: Minnesota's Lake Superior Terminals, 2014.

Two Harbors

Two Harbors is the largest port outside of the Duluth/Superior region and is located 27 miles to the northeast of this area along MN-61 in Lake County. While only composed of two marine terminals, detailed in Table 2.4, the Port of Two Harbors plays a significant role in Minnesota's transportation system. A major commodity transported via the Great Lakes is taconite. This product is mined in northeastern Minnesota and shipped via the Great Lakes to steel mills in Indiana, Ohio, and Pennsylvania. In 2012, over 40 million tons of taconite was shipped from Minnesota through the Great Lakes, amounting to 67 percent of total Great Lakes tonnage. Two Harbors in particular is responsible for a large portion of this commodity. Both marine terminals in operation at this port focus on natural iron ore. As such, all of the 16.5 million tons shipped through Two Harbors in 2012 was taconite, making Two Harbors the leading taconite export dock in Minnesota.

Table 2.4 Two Harbors Marine Terminals

Dock	Commodities	Capacity	Rail Service	Dock (ft)
DMIR Railway Dock No. 2	Natural Iron Ore and Iron Ore Pellets	2,500,000 tons	DM&IR	1,368
DMIR Railway Dock No. 1	Natural Iron Ore	56,000 tons	DM&IR	1,344

Source: Minnesota's Lake Superior Terminals, 2014.

Silver Bay

Silver Bay is located 28 miles northeast of Two Harbors and is also within Lake County along MN-61. The sole marine terminal in operation at this location is detailed in Table 2.5. This terminal is owned by the Northshore Mining Company which is a producer of taconite pellets for producing steel. Annually, this company ships six million tons of iron ore pellets. Due to an increase in demand for iron ore, Cliffs Natural Resources is expected to re-open two idled production lines which closed in January 2013 after signing a new contract with A-K Steel. Iron ore sale projections are expected to increase from 20 million tons in 2013 to 23 to 24 million tons in 2014.[12]

[12] http://www.northlandsnewscenter.com/news/local/Cliffs-to-reopen-production-lines-at-Northshore-Mining-in-Silver-Bay--229327011.html

Table 2.5 Silver Bay Marine Terminal

Dock	Commodities	Capacity	Rail Service	Dock (ft)
Northshore Mining Company	Iron Ore & Taconite Pellets	5,450,000 tons	Northshore Mining Co.	2,485

Source: Minnesota's Lake Superior Terminals, 2014.

Taconite Harbor

Taconite Harbor is the port located the furthest north in Minnesota along the Great Lakes at an additional 23 miles northeast of Silver Bay, placing it 78 miles from Duluth. Located in Cook County, Taconite Harbor is an unincorporated community with minimal business or residential activity. The one marine terminal located here, detailed in Table 2.6, is maintained by Cliff's Erie LLC and Minnesota Power. With only 657,700 tons moved through this marine terminal in 2012, Taconite Harbor is by far the smallest of the Great Lake Ports. Owned by LTV Steel Mining Company until its bankruptcy in 2000, Taconite Harbor is used by the Minnesota Power Company to receive coal used by the plant.

Table 2.6 Taconite Harbor Marine Terminal

Dock	Commodities	Capacity	Rail Service	Dock (ft)
Cliff's Erie LLC. & Minnesota Power	Iron Ore, Iron Ore Pellets, Coal, Fluxstone	100,000 tons (Iron Ore) and 300,000 tons (Coal)	Cliff's Erie	2,332

Source: Minnesota's Lake Superior Terminals, 2014.

Ports of the Mississippi River

Saint Paul

Managed by the Saint Paul Port Authority, the Harbor in Saint Paul is the largest port along the Mississippi River in Minnesota. With 5.5 million tons passing through these river terminals, Saint Paul is the fourth largest port in the state. The river terminals associated with this port, detailed in Table 2.7, focus on a wide range of commodities. Unlike many of the ports along the Great Lakes, this port does not focus on iron ore nor grain movements to a large extent. The largest operators located here are the two Westway terminals, capable of handling a combined capacity of 14 million gallons of molasses and vegetable oil, and the two Hawkins Inc. terminals, capable of handling 8.7 million gallons of liquid caustic soda.

Table 2.7 Saint Paul River Terminals

Terminal	Milepoint	Commodities	Capacity	Rail Service
Aggregate Industries - Larson Plant	826.6L	Crushed Limestone	1,000,000 tons	-
Northern Tier Energy	830.0L	Asphalt Petroleum & Lights Oils	160,823,000 gallons	CP
Dakota Bulk Terminal	831.6R	Grain, Feed, Steel & Bulk	380,000 tons	UP
Holcim (US) Inc.	831.6R	Bulk Cement	73,000 tons	UP
Hawkins Inc., Red Rock Terminal #3	833.2L	Liquid Caustic Soda	1,500,000 gallons	CP
LaFarge North America	833.3L	Cement	44,000 tons	-
AMG Dock	833.4L	Steel and Scrap	3 acres	CP
Peavey Red Rock Elevator	833.5L	Grain, Fertilizer, Coal, Feed, Steel, Potash	260,000 bushels and 128,000 tons	CP
Alter Metal Recycling	836.0R	Scrap Metal		UP
Alter River Terminal	836.0R	Fertilizers, Salt, Steel, Ore, Twine	220,000 tons	UP
Hawkins Inc. - Terminal #2	836.3R	Liquid Caustic Soda, Liquid Caustic Potash	4,000,000 gallons	UP
Westway Terminal Co. #2	836.5L	Molasses, Vegetable Oil, Biodiesel	6,000,000 gallons	UP
Westway Terminal Co. #1	836.8L	Molasses, & Vegetable Oil, Propylene Glycol, Caustic Soda, Asphalt, Biodiesel	8,000,000 gallons	UP
Aggregate Industries - Yard A	837.1L	Sand, Aggregates & Crushed Stone	265,000 tons	UP
Hawkins Inc. - Terminal #1	837.2L	Liquid Caustic Soda	4,700,000 gallons	UP
Nothern Metal Recycling	837.3L	Steel Products, Coal, Salt Coke, Slag Fertilizer, Pig Iron	150,000 tons	UP
CHS Corp Nutrients	838.6R	Bulk Fertilizer and Phosphate	12,500 tons	UP
Archer Daniels Midland St. Paul Elevator D (ADM)	841.7L	Grain	2,000,000 bushels	UP

Source: Minnesota's River Terminals, 2013.

Savage

The Savage river terminals are located along the Minnesota River, a tributary of the Mississippi River, in Scott County. These terminals, detailed in Table 2.8 below, are mostly focused on the movement of grain and corn. Total capacity for these two products is over 24 million bushels, with Port Cargill representing over half of this capacity with its two river terminals. Other commodities passing through this area include fertilizer, salt, and aggregates. Combined these terminals handle nearly 2 million tons annually.

Table 2.8 Savage River Terminals

Terminal	Milepoint	Commodities	Capacity	Rail Service
U.S. Salt (Burnsville)	11.1R MN	Salt, Light Weight Aggregate, Cotton Seed	55,000 tons	-
Port Cargill – East	12.9R MN	Corn	10,000,000 bushels	UP
Mosaic Crop Nutrition	13.0R MN	Fertilizer, Salt	121,000 tons	UP
Superior Minerals Co	14.4R MN	Aggregates	500,000 tons	UP, CP
Riverland Ag. Corp	14.6R MN	Grain	8,750,000 bushels	UP, CP, TC&W
CHS Inc.	14.7R MN	Grain	560,000 bushels	UP
Port Cargill – West Elevator	14.8R MN	Grain	4,800,000 bushels	UP

Source: Minnesota's River Terminals, 2013.

Winona River Terminals

The Winona river terminals are located in Winona County and are detailed in Table 2.9. While these six terminals have noticeably smaller capacities, they still handle about 1.7 million tons of goods each year. Commodities handled through this area are primarily focused on farm products, such as grain and corn, and fertilizers. The highest capacity terminal at this location is maintained by CHS Inc., capable of handling 611,000 bushels of grain.

Table 2.9 Winona River Terminals

Terminal	Milepoint	Commodities	Capacity	Rail Service
CHS Winona River Rail	724.0R	Fertilizer	125,000 tons	UP, CP, DME
Andersons, Inc.	724.1R	Liquid Fertilizer	54,800 tons	CP
Modern Transport Terminal Inc.	724.4R	Dry Fertilizer, Corn, Soybeans, Cottonseed, Salt, Magnesium Oxide	147,310 tons	UP, CP
CHS Inc.	726.7R	Grain	611,000 bushels	UP
CD Corp. of Winona	727.0R	Coal, Fertilizers, Salt	92,924 tons	UP
Archer Daniels Midland (ADM - BQ)	727.1R	Corn, Soybeans, Non-GMO Grains	309,000 bushels	UP, CP

Source: Minnesota's River Terminals, 2013.

Red Wing River Terminals

Moving less than a million tons per year, the Red Wing port is the second smallest port in Minnesota. Located in Goodhue County, just three terminals make up this port. Main commodities processed at this port include grain and other food products. The largest terminal is Red Wing Grain LLC, capable of handling 2,500,000 bushels of grain.

Table 2.10 Red Wing River Terminals

Terminal	Milepoint	Commodities	Capacity	Rail Service
Archer Daniels Midland (ADM)	790.7R	Sunflower Meal Pellets, Linseed Meal Pellets, Crude Sunflower Oil, Refined Linseed Oil, Crude Canola Oil	650,000 bushels and 12,000 tons (oil)	CP
Red Wing Grain, LLC	791.5R	Grain	2,500,000 bushels	CP
Red Wing Municipal Dock #1	789.3R	Slag & Coke	50,000 tons	-

Source: Minnesota's River Terminals, 2013.

Minneapolis River Terminals

The Minneapolis river terminals, located, as the name suggests, in Minneapolis, process under 600,000 tons each year, making this the smallest port in the state. At present, there are three river terminals operated at facilities on the Mississippi River, as detailed in Table 2.11. Compared to the facilities maintained at St. Paul, both Aggregate Industries' and Northern Metal Recycling's operations at this location are relatively small. Aggregate Industries only has a capacity of 120,000 tons compared to the two terminal capacity of 1.3 million tons at St. Paul. Likewise, Northern Metal Recycling only has a capacity of 60,000 tons at this port compared to 150,000 tons at St. Paul. The third river terminal is owned by the city of Minneapolis and operated by River Services Inc. This port has continually lost the city money with City Council budgets again putting 2014 in the red. As such, the terminal has begun to tell customers that operations will cease in December 2014. The city is currently examining plans to redevelop this 48 acre site into parkland and office space while dealing with the ramifications of additional trucks on the roadway due to the lack of barge accessibility.[13]

[13] http://www.startribune.com/local/minneapolis/243879841.html

Table 2.11 Minneapolis River Terminals

Terminal	Milepoint	Commodities	Capacity	Rail Service
Aggregate Industries - Yard D	855.9R	Sand, Aggregate, Crushed Stone	120,000 tons	-
Northern Metal Recycling	856.3R	Recycled Metals	60,000 tons	CP
River Services, Inc	856.8R	Fertilizer, Coal, Aggregate, Steel, Twine, Pipe	320,000 bushels and 200,000 tons	CP, TC&W

Source: Minnesota's River Terminals, 2013.

Locks and Dams along the Mississippi River in Minnesota

In addition to the public ports other infrastructure considerations along the Mississippi River include the system of locks and dams. The St. Paul District of the U.S. Army Corps of Engineers (USACE) oversees the operations of 13 locks along the Mississippi River, 11 of which are either within the state of Minnesota or along the border of Minnesota and Wisconsin. Table 2.12 details the characteristics of these 11 locks most pertinent to Minnesota, however the operations of all locks along the Mississippi River impact the State's access to downstream ports and the Gulf of Mexico.

Table 2.12 Key Lock and Dam Characteristics, Minnesota

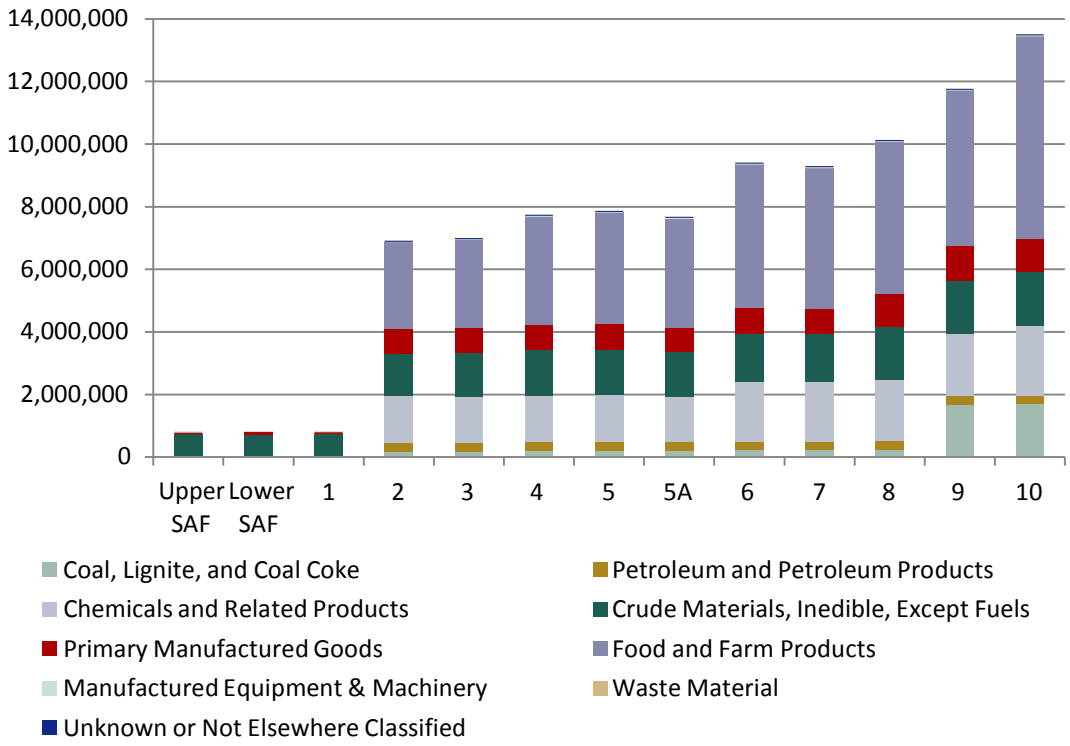
Lock	Mile	Open	Length	Width	Lift
Upper Saint Anthony Falls	853.9	1963	400	56	49
Lower Saint Anthony Falls	853.3	1959	400	56	25
1	847.6	1930	400	56	38
2	815.2	1930	500	110	12
3	796.9	1938	600	110	8
4	752.8	1935	600	110	7
5	738.1	1935	600	110	9
5A	728.5	1936	600	110	5
6	714.3	1936	600	110	6
7	702.5	1937	600	110	8
8	679.2	1937	600	110	11

Source: U.S. Army Corps of Engineers, 2014.

With the exception of Upper and Lower Saint Anthony Fails (SAF) and Lock 1, all of the locks within the St. Paul District handle at least seven million tons annually. Individual annual tonnage for each lock are shown in Figure 2.8. The drop off between Lock 1 and Lock 2 is understandable given two considerations:

the location of the Harbor of St. Paul and the dimensions of the locks. The Harbor of St. Paul is located between Locks 1 and 2, with Lock 2 being the more southern movement. As the Harbor of St. Paul accounts for roughly 5.5 million tons of commodities each year and with a majority headed south along the Mississippi River, Lock 1 simply does not have this cargo passing through its system. Lock 1 and other upstream locks are not designed to process the volume of commodities moving through the lower locks. In looking at the Lock and Dam characteristics, it is clear that the dimensions for these last three locks along the Mississippi River are very different from their southern counterparts. The Upper and Lower Saint Anthony Falls Locks and Lock 1 only have a length of 400 feet, a width of 56 feet, and a nominal lift ranging from 25 to 49 feet. In contrast, the remaining locks have more standard dimensions of length 600 feet (with the exception of Lock 2 at 500 feet), width 110 feet, and nominal lifts of 12 feet or less.

Figure 2.8 Mississippi River System Tonnage in Minnesota, 2012



Source: U.S. Army Corps of Engineers Lock Data, 2012.

Unlike the significant iron ore movements seen on the Great Lakes, commodities along the Mississippi River are predominately food and farm products. Comprising 40 percent of all movements, food and farm products are an

important asset to the state of Minnesota as one in every four workers is employed through agriculture and related industries.[14] While Figure 2.8 shows 2012 volumes to be consistent with reported volumes for other modes, 2013 shows a very abrupt change in these movements. The tonnage for food and farm products nearly halved in 2013, resulting in lock tonnages decreasing at least 10 percent between Lock 2 and Lock 10.

Extreme weather conditions have had a pronounced impact on farm products over the course of the last few years. In the instance of soybeans, crop production estimates in September 2013 predicted an average of 39 bushels per acre, a decrease of two bushels from the prior month. This reduction signifies a $175 million loss to the state's economy.[15] Excessive droughts in Minnesota have diminished crop yields both per acre and per plant, thus reducing the amounts moved on the waterway system.

In contrast, recent weather conditions have caused navigational problems. Excessive rain shut down the Upper and Lower St. Anthony Falls locks and Lock 1 as flows were above 40,000 cubic feet per second. In total, between April and July 7, 2014, the three Minneapolis Locks were closed to commercial navigation four times for a total of 47 days. Emergency maintenance dredging has also been required to maintain the nine foot channel depth. The high waters caused sediments to be carried into the Mississippi River and as flows are reduced, these sediments settle out of the water. Dredging has been required at both Pool 4 (near Almy, Wisconsin) and Pool 6 (near Winona, Minnesota) and has shut the channel to commercial navigation.[16]

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[14] http://mn.gov/maelc/about.html

[15] http://www.mprnews.org/story/2013/09/12/drought-damages-minnesota-soybean-crop

[16] http://www.mvp.usace.army.mil/Media/NewsReleases/tabid/9473/Article/488790/corps-is-performing-emergency-dredging-to-reopen-the-mississippi-river-navigati.aspx

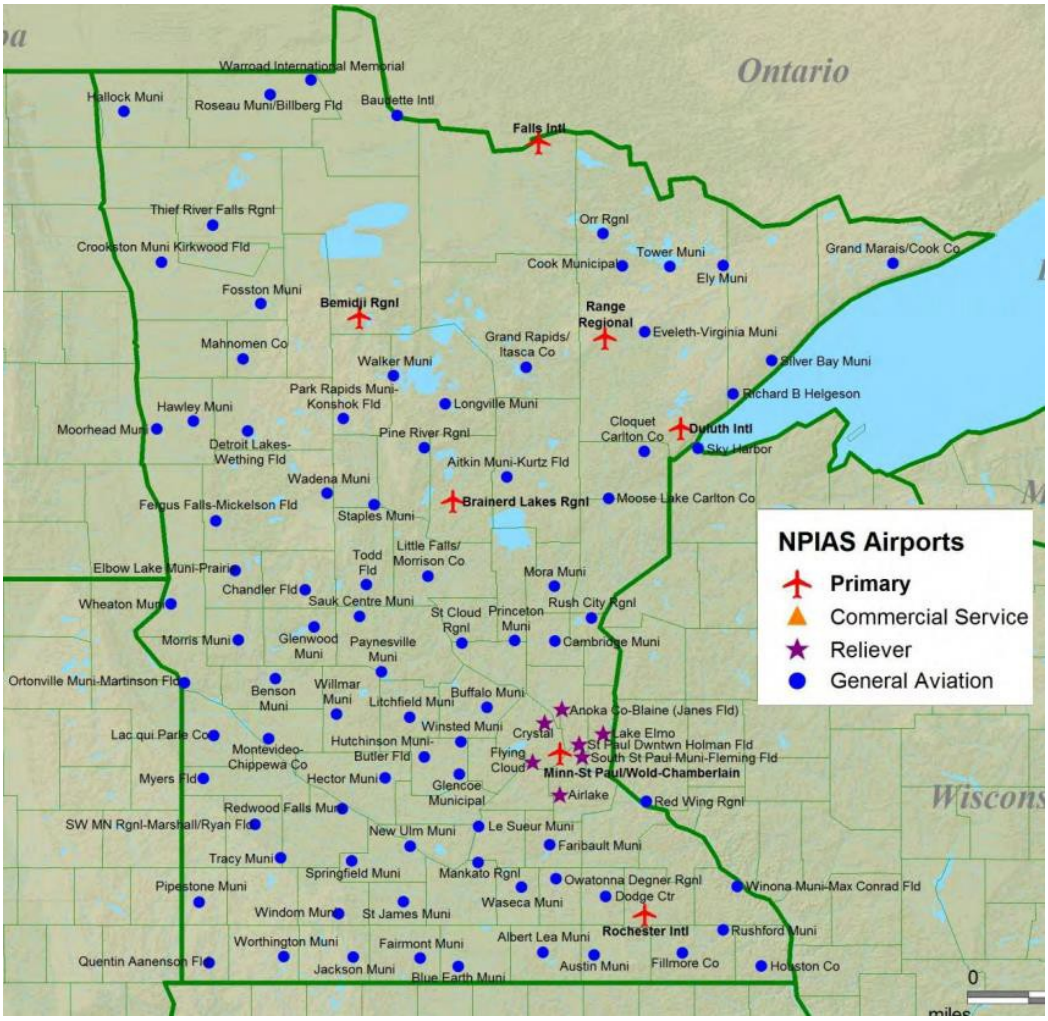
2.4 AIRPORT INVENTORY

Minnesota is home to 97 airports listed in the Federal Aviation Administration's (FAA) National Plan of Integrated Airport Systems (NPIAS). This list is updated every two years to identify existing and proposed airports that are considered significant to national air transportation. Of these, seven are primary airports with another seven serving as relievers, all located near Minneapolis - St. Paul International Airport. The seven primary airports are as follows:

- Bemidji Regional Airport (BJI)
- Brainerd Lakes Regional Airport (BRD)
- Duluth International Airport (DLH)
- Falls International Airport (INL)
- Minneapolis – St. Paul International Airport (MSP)
- Range Regional Airport (HIB)
- Rochester International Airport (RST)

Identification in this manner allows airports to receive Federal grants under the Airport Improvement Program (AIP). These seven are considered primary airports due to the volume of passenger boardings (at least 10,000 per year). Most would not meet the criteria for primary airport status based on the air cargo threshold of total annual landed weight by cargo aircraft (at least 100 million pounds). The locations of airports in Minnesota included as part of NPIAS are shown in Figure 2.9.

Figure 2.9 NPIAS Airports in Minnesota



Source: 2013-2017 FAA NPIAS Report.

Minneapolis – St. Paul International Airport

In terms of airport operations, Minneapolis–St. Paul (MSP) in the Metro District dwarfs the other air service providers. From the 2013 State Aviation System Plan, Table 2.13 details the respective cargo tonnage and passenger boardings at each of these primary airports. Cargo service consists of annual tonnage (tons of cargo shipped) and annual cargo operations (number of cargo specific aircraft leaving the airport).

Table 2.13 Base Year (2010) Passenger and Cargo Activity Level

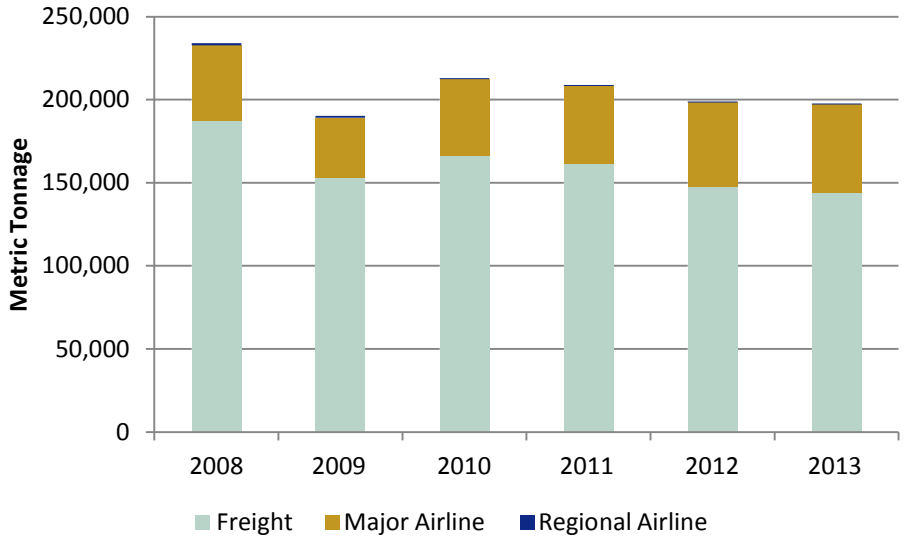
Airport	Passenger		Cargo	
	Enplanements	Aircraft Departures	Tonnage	All-Cargo Operations
Bemidji	21,563	1,294	628	743
Brainerd Lakes	15,583	880	1	4
Duluth	155,955	4,434	1,626	693
Falls International	13,924	820	1	-
Minneapolis - St. Paul	16,267,639	197,255	246,903	13,642
Range Regional*				
Rochester	124,601	4,315	8,144	547
Total	16,599,265	208,998	257,303	15,629
Percent of Traffic at MSP	98%	94%	96%	87%

*Range Regional not provided

Source: Minneapolis State Aviation System Plan.

By processing 96 percent of total cargo tonnage in the State, MSP is a vital component of the state freight infrastructure. Nestled among the cities of Minneapolis, St. Paul, Bloomington, Eagan, Mendota Heights, and Richfield in the Metro District, the 3,400 acres encompassed by MSP serves as a major economic generator for both local businesses and the state at large. Cargo operators currently utilizing this airport include FedEx, UPS, DHL, and Mountain Air Cargo. Cargo Operators account for 73 percent of the nearly 200,000 metric tons handled at MSP each year. Figure 2.10 illustrates how cargo arrives and departs MSP by type of aircraft. Over the past few years, tonnage levels have remained relatively flat. However, the composition of air carriers has evolved. In 2009, cargo operators accounted for 81 percent of total tonnage. Since then, tonnage handled by these operators has fallen by six percent. Meanwhile, tonnage transported by major airlines, such as Delta, Southwest, and US Airways, has increased 49 percent. Regional Airlines also used to account for 1,000 metric tons of this traffic, but dwindled to a mere 2 metric tons in 2013.

Figure 2.10 Cargo Tonnage by Carrier Type at Minneapolis – St. Paul



Source: Minneapolis – St. Paul International Airport Year End Operations Reports (2008-2013).

Rochester International Airport

Rochester International Airport (RST) is located in Olmsted County just outside of the city of Rochester on I-90 in District 6. This airport is operated by the Rochester Airport Company as a wholly owned subsidiary of the Mayo Clinic. Serving over 62,000 admissions and performing over 70,000 surgeries, the Mayo Clinic is a worldwide leader in healthcare. This relationship with the airport was a key component of the addition of customs and immigration facilities back in the 1990's. This is particularly important as the Mayo Clinic also includes the Mayo Medical Laboratories which perform nearly 20 million tests per year for 4,000 hospitals as well as clients in 130 countries.[17] RST plays a key role in helping the Clinic provide the quality of care it has become known for.

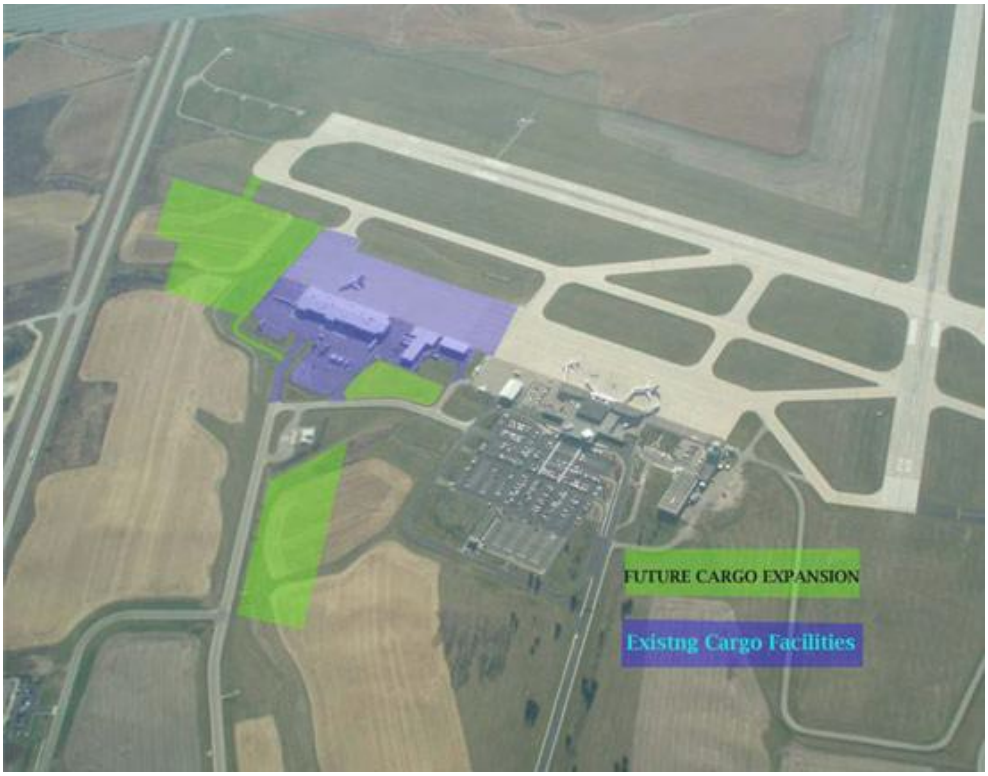
While this airport has substantially fewer operations than MSP, two major air carriers have scheduled daily services as well as one major cargo carrier (FedEx Express). Encompassing 2,300 acres, there are two runways located at this airport: 13R/31L of length 9,033 feet and 2/20 at 7,300 feet in length. RST was recently awarded $1.4 million from the U.S. DOT to add 850 feet of runway to Taxiway E.[18] While underutilized for cargo operations today, RST has much room to grow. There are over 330,000 square feet of usable cargo space currently

[17] http://www.mayomedicallaboratories.com/about/

[18] http://www.rochesterhomepage.net/story/d/story/rep-slaughter-announces-14-million-grant-for-great/34508/JxZo_thXfE6NWmRFRWhYXA

available. Future cargo expansions will include 730,000 square feet of building and ramp space as shown in Figure 2.11.

Figure 2.11 Cargo Facilities at Rochester International Airport



Source: Rochester International Airport.

Duluth International Airport

Duluth International Airport (DLH) is located in St. Louis County to the northwest of Duluth in District 1. As the third busiest airport in the state, DLH covers a span of over 3,000 acres and has two runways. At present, DLH is served by two cargo companies: FedEx and UPS. The primary runway at this airport is just over 10,000 feet in length, while the secondary runway is 5,718 feet long. Within ten years, the primary runway will need to be reconstructed. In order to maintain commercial flights, the secondary runway must be 8,000 feet in order to continue operations during the time of reconstruction. The total cost of reconstructing both runways is estimated at $31.2 million, 90 percent of which would be provided by the Federal Aviation Administration (FAA), but would also require re-zoning some of the surrounding land.[19]

[19] http://www.fox21online.com/news/article/officials-lobby-runway-extension-duluth-international-airport

2.5 PIPELINE INVENTORY

Pipeline data is available through the National Pipeline Mapping System (NPMS), maintained by the Pipeline and Hazardous Materials Safety Administration. Available data details the pipeline network by mileage, diameter, and commodities carried. This is summarized by District in Table 2.14. District 2 contains the greatest mileage due to the location of the Great Lakes Gas Transmission and Viking Gas Transmission Lines. Diameters range significantly based on the volumes of commodities moved. District 1 and 2 have the largest pipes as they contain some of the major pipelines used for Canada-U.S. gas movements.

Table 2.14 Pipeline Mileage by District

District	Pipeline Mileage[20]	Percent of Mileage	Largest Diameter (in)	Commodities
1	1,009	11%	48	Crude Oil, Diluent, Great Lakes Gas Interconnect, Natural Gas, Natural Gas Liquids
2	2,282	24%	48	Biogas Methane, Crude Oil, Diluent, Natural Gas, Natural Gas Liquids
3	966	10%	24	Crude Oil, Natural Gas, Products
4	808	9%	12.75	Natural Gas, Products, Propane
Metro	1,269	14%	34	Butane, Isobutane, Natural Gasoline, Crude Oil, Natural Gas, Nitrogen, Products, Propane
6	1,231	13%	18	Crude Oil, Natural Gas, Propane
7	909	10%	42	Butane, Isobutane, Natural Gasoline, Natural Gas, Nitrogen, Propane
8	873	9%	42	Crude Oil, Natural Gas, Products

Source: Pipeline and Hazardous Materials Safety Administration.

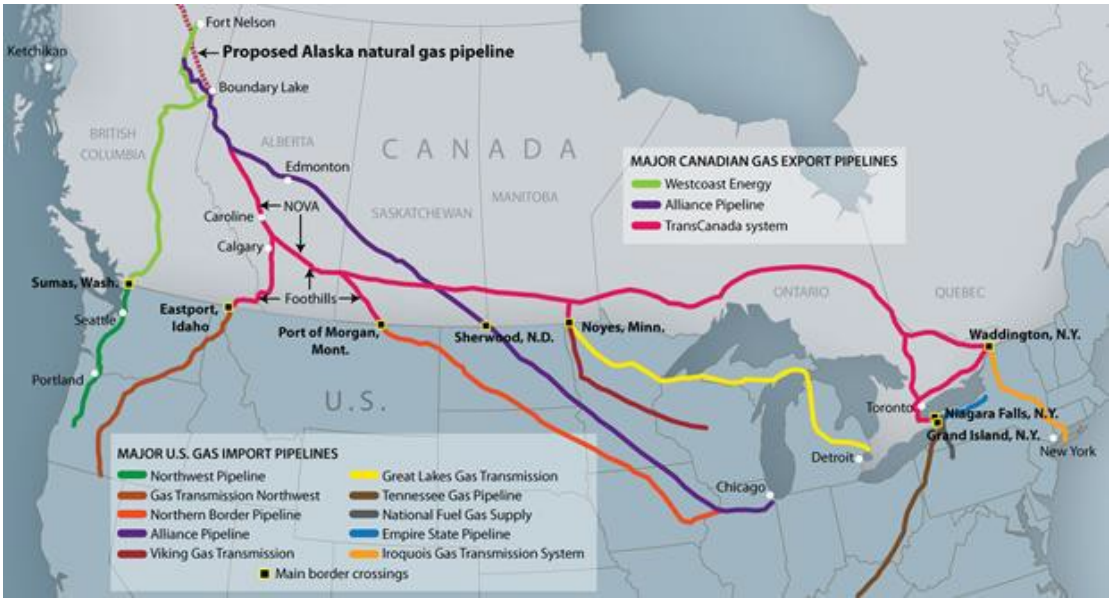
Due to the sensitive nature of this mode, data for pipelines is restricted and can only be distributed on a case by case basis. Although some data has been obtained for this freight planning effort, however some limitations in data presentation apply. Any maps that are distributed outside of the state government may only display NPMS data for one county at a scale no larger than 1:24,000. These maps are already readily available online through the NPMS Public Map Viewer. Only maps with restricted access for state government

[20] Note, mileage represented here does not represent 100 percent of the pipeline network in Minnesota. Some sections of the network span multiple districts or are on the border of two districts.

employees may display NPMS data at a scale larger than 1:24,000 and with more than one county.

With that in mind, some maps of major pipelines are publicly available. Figure 2.12 shows the major Canada – U.S. Export-Import gas pipelines, four of which pass through Minnesota: Alliance Pipeline, Northern Border Pipeline, Great Lakes Gas Transmission, and Viking Gas Transmission. The border crossing of Noyes, Minnesota serves as the main border crossing for both the Great Lakes Gas Transmission and the Viking Gas Transmission.

Figure 2.12 Major Canada – U.S. Export-Import Gas Pipelines



Source: Office of the federal Coordinator, Alaska Natural Gas Transportation Projects – May 2011.

Other supporting infrastructure for this mode includes Liquid Natural Gas (LNG) Plants and Breakout Tanks. There are currently three LNG Plants in the state, two in the county of Dakota (Metro District) and one located in District 1 in Carlton County. Breakout tanks are located throughout the state, typically concentrated in one central area of each district. These are used to hold commodities in the event of a sudden surge or to store a commodity for a length of time before re-injecting it into the network for further movement. A total of 130 breakouts tanks are located throughout the state, as detailed in Table 2.15.

Table 2.15 Support Infrastructure for the Pipeline Network

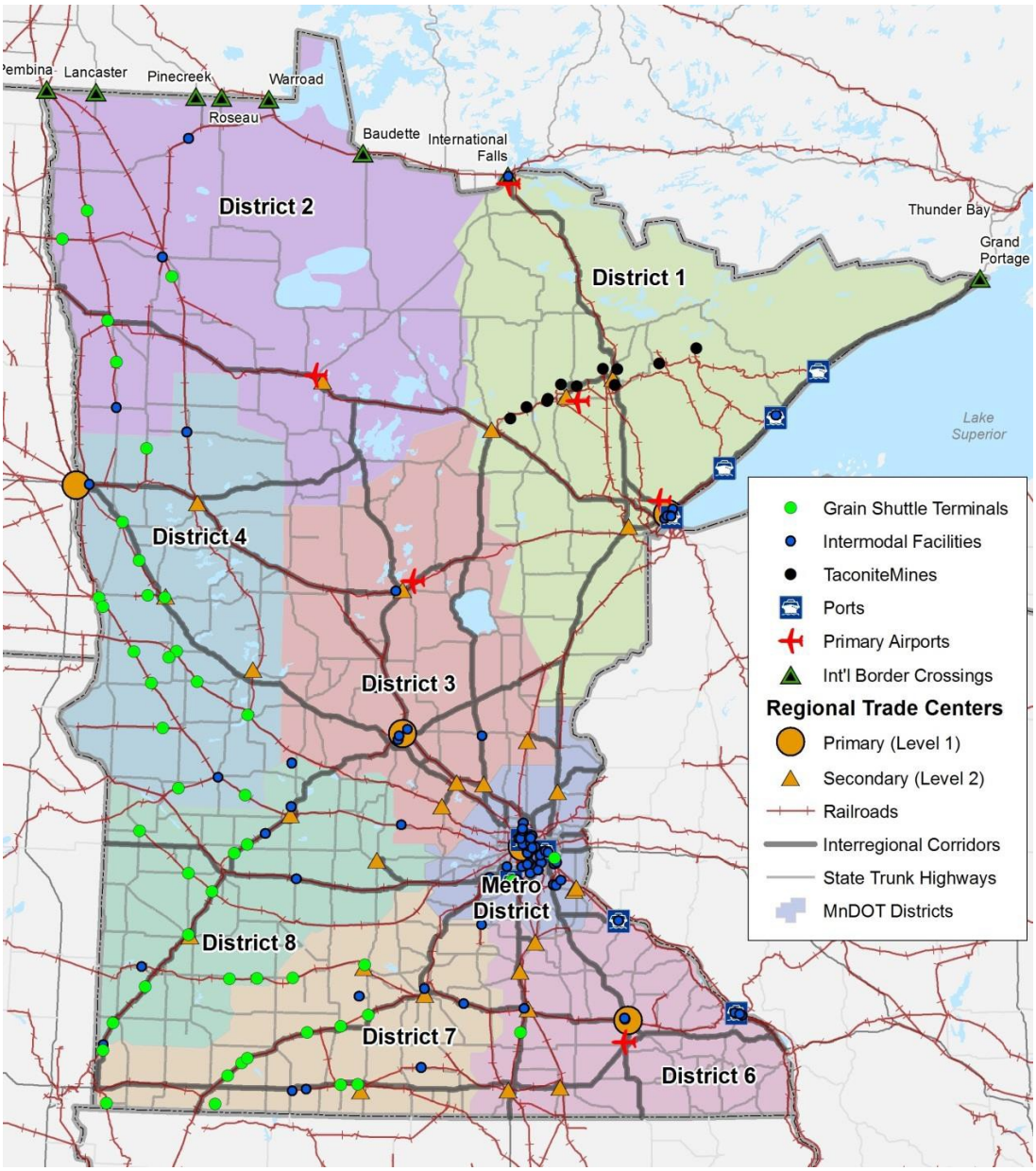
District	LNG Plants	Breakout Tanks
1	1	2
2	-	20
3	-	-
4	-	36
Metro	2	57
6	-	1
7	-	1
8	-	13
Total	3	130

Source: Pipeline and Hazardous Materials Safety Administration.

2.6 DISTRIBUTION/WAREHOUSING INVENTORY

While the various freight hubs and major transportation infrastructures within the state offer ingress and egress points for goods movements, without other supporting infrastructure such movements would not be possible in an efficient manner. This section describes major support facilities and freight generators within Minnesota. These types of facilities include International Border Crossings, Taconite Mines, Grain Shuttle Terminals, and other intermodal facilities. The locations of these facilities are shown in Figure 2.13.

Figure 2.13 Major Support Facilities in Minnesota



International Border Crossings

International border crossings are a crucial component for Minnesota's trade with other countries. These locations provide U.S. Customs and Border Protection facilities in order to conduct monitored, legal trade with foreign entities. Given Minnesota's location in the country, the majority of border crossings in the state are shared along the border of Canada. In total, there are ten international border crossings in Minnesota. The Chicago Field Operation Office oversees three of these border crossings: Duluth/Superior, Minneapolis, and Rochester. The remainder are affiliated with the Seattle Field Operation Office: Baudette, Grand Portage, International Falls, Lancaster, Pinecreek, Roseau, and Warroad.

Each of these border crossings has unique features including modal access, hours of operation, and days of operations. These characteristics are detailed in Table 2.16. Of note, the largest border crossing is International Falls in District 1. Operating 24 hours a day, seven days a week, this crossing is the largest for all truck, rail, and passenger movements.

Table 2.16 International Border Crossing Characteristics

Port of Entry	Operating Hours	Days of Operations	Rail	Agriculture Specialist	Field Operation Office
Baudette	8:00 AM - 10:00 PM	Seven Days a Week	Y		Seattle
Duluth, MN and Superior, WI	8:00 AM - 4:30 PM	Weekdays			Chicago
Grand Portage	12:00 PM - 12:00 PM	Seven Days a Week		Y	Seattle
International Falls	12:00 PM - 12:00 PM	Seven Days a Week	Y	Y	Seattle
Lancaster	8:00 AM - 10:00 PM	Seven Days a Week			Seattle
Minneapolis	8:00 AM - 4:30 PM	Weekdays			Chicago
Pinecreek	9:00 AM - 5:00 PM	Seven Days a Week			Seattle
Rochester	8:00 AM - 4:30 PM	Weekdays			Chicago
Roseau	8:00 AM - 12:00 AM	Seven Days a Week			Seattle
Warroad	12:00 PM - 12:00 PM	Seven Days a Week	Y		Seattle

Source: U.S. Customs and Border Protection.

Tied into these international border crossings are also Foreign Trade Zones (FTZs). At present there are three active FTZs in the state; they are as follows:

- FTZ No. 51 Duluth – Duluth Seaway Port Authority
- FTZ No. 119 Minneapolis-St. Paul – Greater Metropolitan Area FTZ Commission
- FTZ No. 259 Koochiching County – Greater Koochiching Economic Development Authority

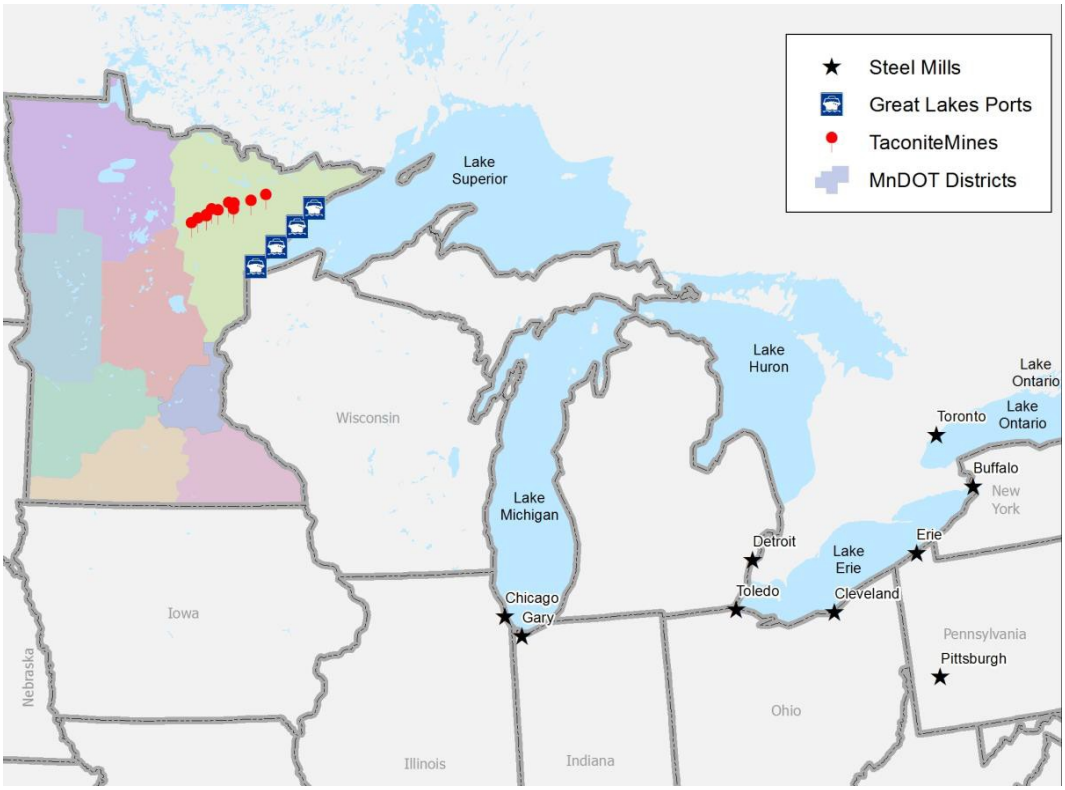
The advantage of FTZs are that they allow for goods to be brought into the U.S., reworked in some fashion, and then re-exported without ever being subject to U.S. duties and tariffs. In this case, the state benefits because local jobs may be created to modify the goods (for instance, assembly of parts) without adding extra costs to the shipper. FTZs may also hold the goods until they are officially imported at a later point, thus allowing the shipper to delay the payment of duties and tariffs.

Taconite Mines

As briefly mentioned when discussing rail and waterway movements, taconite is an important commodity for the state of Minnesota. Once considered a low grade iron ore, this was viewed as a waste rock and not used when high-grade natural iron ore was still plentiful. Today, a process has now been developed to extract iron ore from the taconite. Statewide, the Iron Mining Association of Minnesota (IMA) is comprised of nine iron ore producing mines in the Mesabi Iron Range of northeastern Minnesota, capable of producing more than 40 million tons of taconite annually and directly contributing $1.8 billion into the state's economy.[21] The world's largest open pit iron ore mine is located in Hibbing, Minnesota in St. Louis County. The Hull Rust Mahoning Mine has been in operation since 1895 and produces 8.2 million tons of taconite pellets each year. Essar Steel Minnesota and Magnetation currently have projects under construction to mine and produce iron ore products in the immediate future, thereby increasing both the possible tonnage processed by the state as well as the economic output. This commodity is transported efficiently via rail to the various ports along Lake Superior. From there, taconite is shipped throughout the Great Lakes region to steel mills for processing, as shown in Figure 2.14.

[21] http://www.taconite.org/mining-industry

Figure 2.14 Taconite Mine and Steel Mill Locations



Grain Shuttle Terminals

To help facilitate the movement of grains, there are 47 grain shuttle terminals located throughout the state as of 2012. For the most part, these facilities Additional facilities have been developed since this timeperiod. The Crystal Valley Cooperative Grain Shuttle Terminal in Hope, Minnesota is currently under development. With a projected completion date of September 2014, this facility will allow for 110-car train loading to handle the 6.6 million bushels which can be stored here. Looking at existing grain terminal locations, shown in Figure 2.13, it is clear that the majority of grain terminal facilities are located in the western portion of the state. This development in Hope, located south of Minneapolis along I-35, will help Crystal Valley serve the eastern side of its trading area.

Intermodal Facilities

Other supporting infrastructure is provided by the Class I railroads. Three intermodal facilities are located in the state. These locations allow for the transfer of freight between modes without any handling of the freight itself. This allows for reduced costs over roadway trucking alone. In addition, it improves security, reduces damage, and allows for goods to transported faster. These three facilities are concentrated in the Twin Cities area of Minnesota. BNSF operates one out of

St. Paul, which is open 24 hours a day, seven days a week. CN and CP both maintain facilities in Minneapolis with slightly more limited hours of operation.

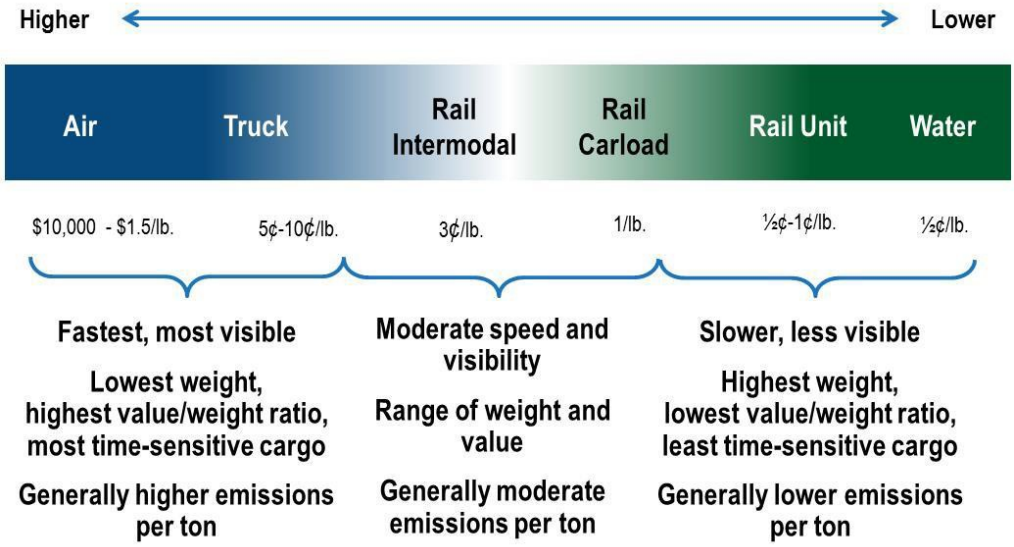
3.0 Minnesota System Demand

This section describes freight demand utilizing multiple sources to best reflect the magnitude of the freight industry within Minnesota. System demand is described on a modal basis to illustrate the strengths and weaknesses of each mode and how they complement one another. Key information includes tonnage, value, commodity type, directional flow, and key trading partners in 2012, and projected to 2040 when possible. Demand information was developed using Federal Highway Administration's (FHWA) Freight Analysis Framework 3.5 (FAF3.5). Although this data does provide a picture of commodities moving to, from, and within the state, it is limited in that it does not include traffic moving through the state. .

3.1 Freight Spectrum and Overall Multimodal System Demand

Within the freight spectrum, each mode plays a pivotal role in moving goods efficiently. In Minnesota, these major modes are highway, rail, water, air, and pipeline. Each of these modes has unique characteristics which in turn affect the types of goods which are transported. Figure 3.1 provides an overview of the goods movement continuum with respect to cost and service. This figure illustrates, from left to right, that while air cargo is costly, it provides the most reliable service for time-sensitive transport. Truck, rail, and water are used to move goods at a lower cost for less time-sensitive or bulk commodities, with water transport being on the far right of the continuum as the slowest, least costly, and also the least reliable.

Figure 3.1 Goods Movement Service Spectrum

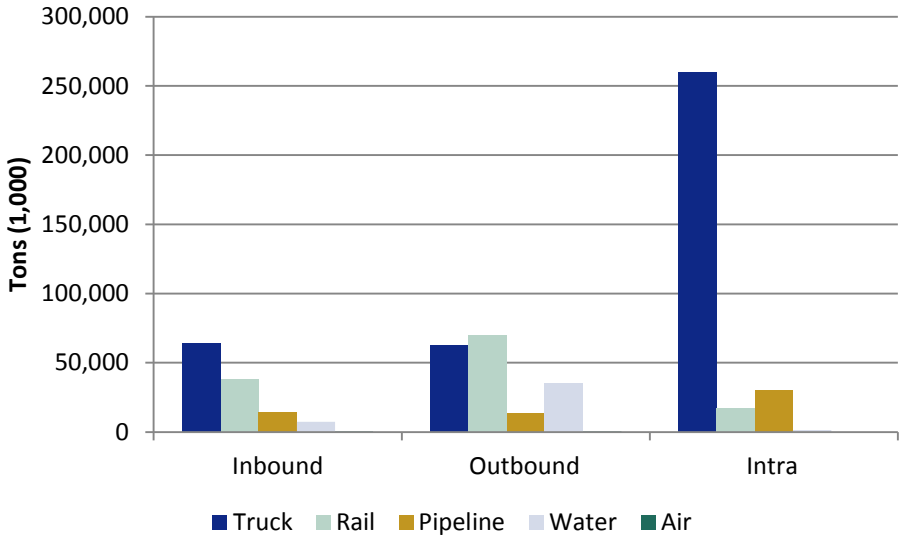


Source: Cambridge Systematics, 2014

State Level System Tonnages and Value

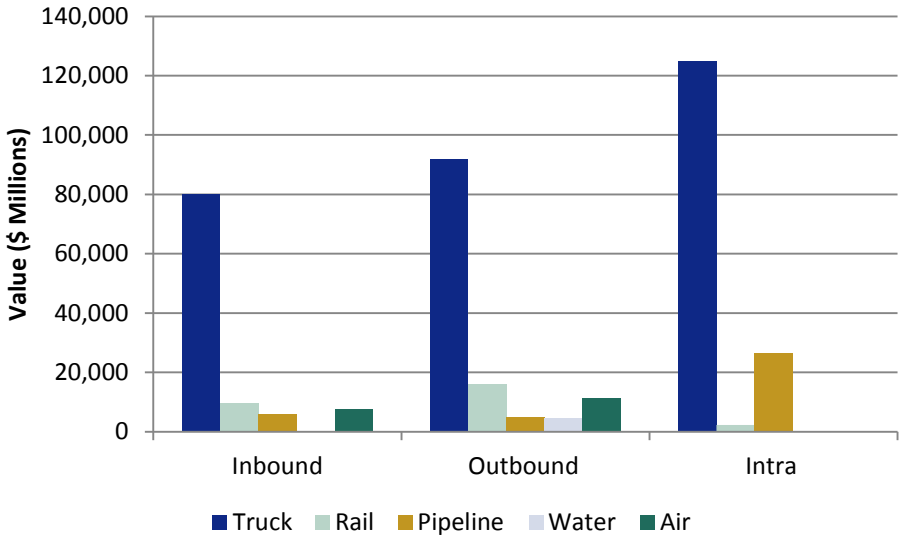
This relationship between overall tonnage and value of goods is well demonstrated in Minnesota. Figures 3.2 and 3.3 display the tonnage and value of commodities by both mode and direction (inbound, outbound, and intra). In looking at air, for instance, it has an almost negligible effect on the overall state tonnage. However, for overall value, air represents almost five percent. This confirms the general statement that air cargo is typically lower weight, higher value goods. These relationships between tonnage share and value share by mode and direction are further detailed in Table 3.1. Some of the more significant differences between value and tonnage by direction are due to the very nature of the mode. Rail is typically only economical over longer distances, thus explaining why it has such a large share of outbound and inbound movements of 31 and 39 percent, respectively, and a relatively small share of intra-state movements at 6 percent.

Figure 3.2 Statewide Tonnage of Commodities by Mode and Direction, 2012.



Source: FAF 3.5, Waterborne Commerce Statistics Center, Minneapolis – St. Paul International Airport Year End Operations Reports (2008-2013), Minneapolis State Aviation System Plan.

Figure 3.3 Statewide Value of Commodities by Mode and Direction, 2012.



Source: FAF 3.5, Waterborne Commerce Statistics Center, Minneapolis – St. Paul International Airport Year End Operations Reports (2008-2013), Minneapolis State Aviation System Plan.

Table 3.1 Statewide Modal Share by Tonnage and Value, 2012.

Tons (1,000)								
Mode	Inbound	Percent	Outbound	Percent	Intra	Percent	Total	Percent
Truck	63,640	52%	62,385	35%	259,935	84%	385,961	63%
Rail	38,242	31%	69,854	39%	17,053	6%	125,149	20%
Pipeline	14,089	11%	13,302	7%	29,877	10%	57,268	9%
Water	7,184	6%	34,859	19%	1,204	0%	43,246	7%
Air	87	0%	120	0%	0	0%	207	0%
Total	123,242		180,519		308,069		611,829	
Value (Millions)								
Mode	Inbound	Percent	Outbound	Percent	Intra	Percent	Total	Percent
Truck	80,168	78%	91,699	71%	124,762	81%	296,629	77%
Rail	9,582	9%	16,144	13%	2,170	1%	27,896	7%
Pipeline	5,811	6%	4,813	4%	26,358	17%	36,982	10%
Water	120	0%	4,675	4%	3	0%	4,798	1%
Air	7,564	7%	11,269	9%	0	0%	18,833	5%
Total	103,244		128,601		153,293		385,138	

Source: FAF 3.5, Waterborne Commerce Statistics Center, Minneapolis – St. Paul International Airport Year End Operations Reports (2008-2013), Minneapolis State Aviation System Plan.

3.2 STATE-LEVEL FREIGHT TONNAGE AND VALUE, BY COMMODITY

This section presents the tonnages and value of freight moving throughout the state by commodity. The most currently available data across modes is for 2012. Forecasts are projected to 2040 based on FAF data. Data in this section focuses on freight moving to, from, and within the state, and does not include through movements. While the focus of commodity movements is on the standard modes, statewide volumes also include commodities moved via unknown or multiple modes.

Major Freight Commodities by Tonnage

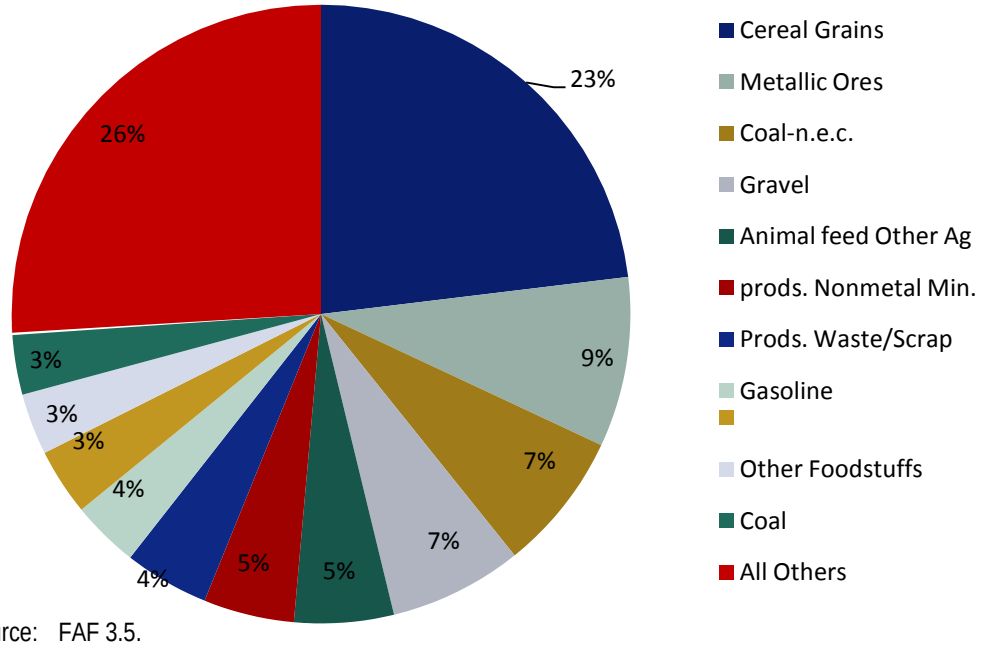
At the statewide level, Cereal Grains are by far the prime commodity representing 23 percent of total tonnage, as detailed in Table 3.2 and displayed in Figure 3.4. The next largest commodity, while nearly a third by volume, is Metallic Ores at 57.4 million tons. This is primarily due to taconite mining in District 1.

Table 3.2 Major Freight Commodities, Total Tonnage, 2012

Commodity Type	Tons	Percent
Cereal Grains	149,160,433	23%
Metallic Ores	57,419,046	9%
Coal-n.e.c.	47,056,862	7%
Gravel	45,015,712	7%
Animal Feed	33,561,073	5%
Other Agricultural Products	30,651,709	5%
Nonmetal Mineral Products	28,664,120	4%
Waste/Scrap	22,795,326	4%
Gasoline	22,554,794	3%
Other Foodstuffs	20,731,657	3%
Coal	20,089,044	3%
All Others	168,606,391	26%

Source: FAF 3.5.

Figure 3.4 Major Freight Commodities by Tonnage, 2012



Source: FAF 3.5.

Looking to 2040, cereal grains will continue to play a large role in the state's economy. Tonnage is anticipated to increase at an annual rate of 2 percent, resulting in overall tonnage nearly doubling by 2040. As detailed in Table 3.3 and illustrated in Figure 3.5, agricultural products will continue to play a large role in the state's economy. Other Agricultural Products, Animal Feed, and Milled Grain Products are all anticipated to at least double in tonnage by 2040. A key point to make, however, is that Metallic Ore movements are expected to be relatively stagnant. With an overall decrease of 9 percent, Metallic Ores will drop from the second highest commodity in the state to sixth. Some of this may be due to environmental concerns regarding the operations of such mines or the overall capacity of each of the existing mines.

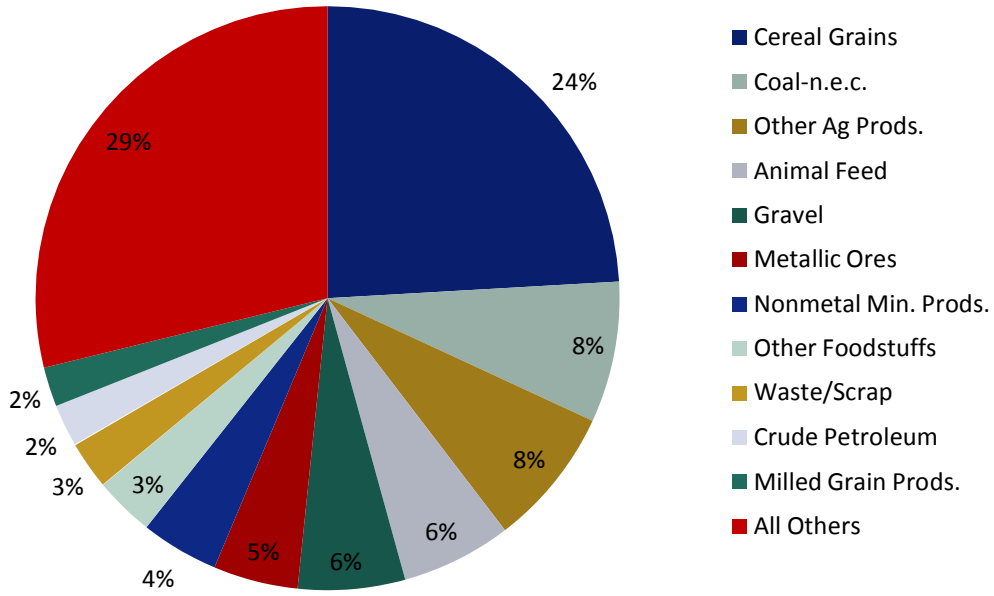
Table 3.3 Major Freight Commodities, Total Tonnage, 2040

Commodity Type	Tons	Percent	Rank Change	Total Increase	Annual Increase
Cereal Grains	267,631,606	24%	-	79%	2%
Coal-n.e.c.	86,804,497	8%	+1	84%	2%
Other Agricultural Products	85,637,043	8%	+3	179%	4%
Animal Feed	67,792,231	6%	+1	102%	3%
Gravel	65,888,310	6%	-1	46%	1%
Metallic Ores	52,047,569	5%	-4	-9%	0%

Commodity Type	Tons	Percent	Rank Change	Total Increase	Annual Increase
Nonmetal Mineral Products	48,031,863	4%	-	68%	2%
Other Foodstuffs	36,730,289	3%	+2	77%	2%
Waste/Scrap	29,356,005	3%	-1	29%	1%
Crude Petroleum	26,479,603	2%	+5	108%	3%
Milled Grain Products	24,284,160	2%	+6	165%	4%
All Others	320,298,553	29%			

Source: FAF 3.5.

Figure 3.5 Major Freight Commodities by Tonnage, 2040



Source: FAF 3.5.

Major Freight Commodities by Value

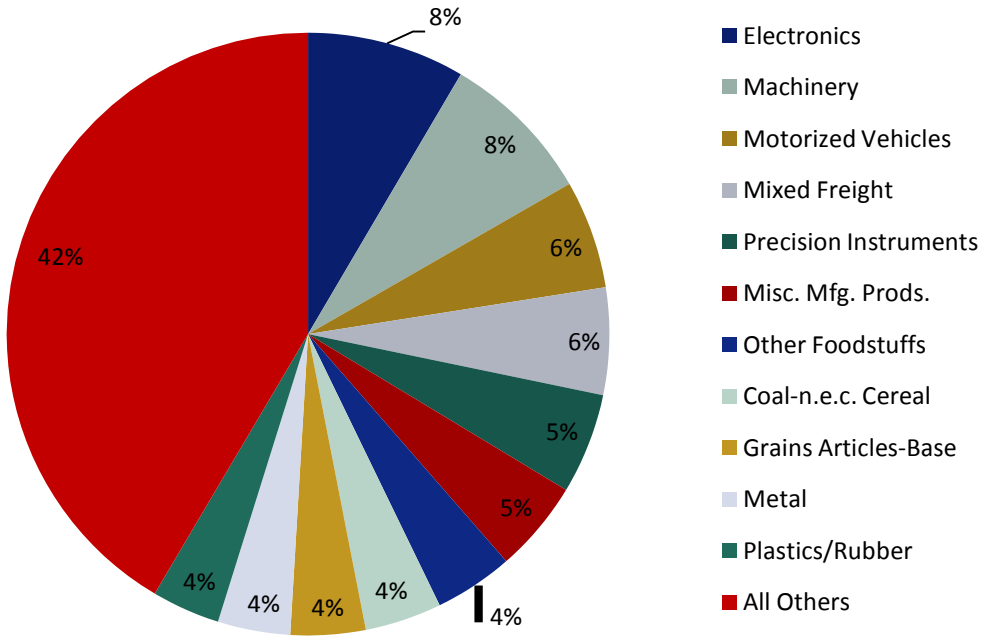
By value, the list of important commodities changing significantly. Whereas Cereal Grains represent 23 percent of all tonnage, this only comprises 4 percent of the total value of commodities moved throughout the state. As detailed in Table 3.4 and displayed in Figure 3.6, higher value goods such as Electronics and Machinery contribute more to the overall value of goods moved. At 8 percent, each, these commodities are not nearly as dominate as Cereal Grains were by tonnage. Relatively, each of these top ten commodities have an equal share of value, ranging from 4 to 8 percent of the total. Some low value goods, such as Cereal Grains and Coal-n.e.c., only appear here due to the sheer volume of goods moved whereas most of the others did not appear on the list of top 10 commodities by tonnage at all.

Table 3.4 Major Freight Commodities, Total Value, 2012

Commodity Type	Value ($M)	Percent
Electronics	38,191	8%
Machinery	37,194	8%
Motorized Vehicles	26,241	6%
Mixed Freight	25,898	6%
Precision Instruments	24,355	5%
Miscellaneous Manufactured Products	22,260	5%
Other Foodstuffs	19,103	4%
Coal-n.e.c.	18,573	4%
Cereal Grains	18,143	4%
Articles-Base Metal	17,543	4%
Plastics/Rubber	16,529	4%
All Others	187,373	42%

Source: FAF 3.5.

Figure 3.6 Major Freight Commodities by Value, 2012



Source: FAF 3.5.

By 2040, Precision Instruments are anticipated to have tremendous growth. With a growth of nearly 1000 percent (9 percent annually), this commodity will

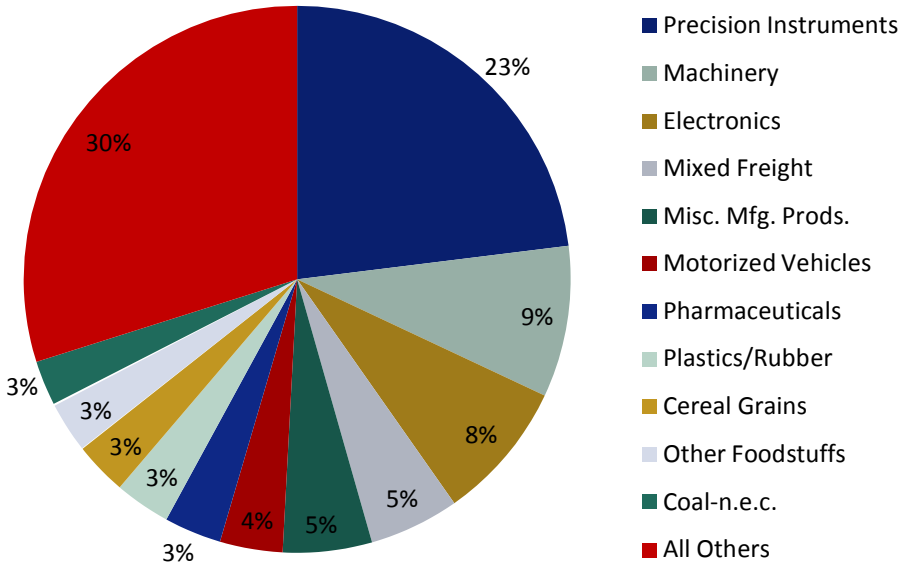
represent 23 percent of the total value of commodities moved to, from, and within Minnesota. The next highest commodities will be Machinery and Electronics at 9 percent and 8 percent, respectively, similar to what they are today. As Table 3.5 and Figure 3.7 show, most of the other commodities have more moderate growth between 2 and 5 percent annually. The other commodity with the next most significant movement is Pharmaceuticals. Presently, these goods do not even appear on the top 10 list by value yet move up to seventh place by 2040 due to an annual growth of 5 percent.

Table 3.5 Major Freight Commodities, Total Value, 2040

Commodity Type	Value ($M)	Percent	Rank Change	Total Increase	Annual Increase
Precision Instruments	261,861	23%	+4	975%	9%
Machinery	101,731	9%	-	174%	4%
Electronics	93,978	8%	-2	146%	3%
Mixed Freight	60,555	5%	-	134%	3%
Miscellaneous Manufacturing Products	59,760	5%	+1	168%	4%
Motorized Vehicles	42,123	4%	-3	61%	2%
Pharmaceuticals	38,507	3%	+10	247%	5%
Plastics/Rubber	37,541	3%	+3	127%	3%
Cereal Grains	35,393	3%	-	95%	2%
Other Foodstuffs	34,046	3%	-3	78%	2%
Coal-n.e.c.	31,389	3%	-3	69%	2%
All Others	339,654	30%			

Source: FAF 3.5.

Figure 3.7 Major Freight Commodities by Value, 2040



Source: FAF 3.5.

3.3 MINNESOTA'S TRADING PARTNERS

The state of Minnesota is well positioned to take advantage of a variety of trade partners. The most convenient, of course, are other states within the U.S. with international goods passing through ports of entry by land, air, and water. This section will detail Minnesota' largest trading partners for both domestic and international goods.

Domestic Trading Partners

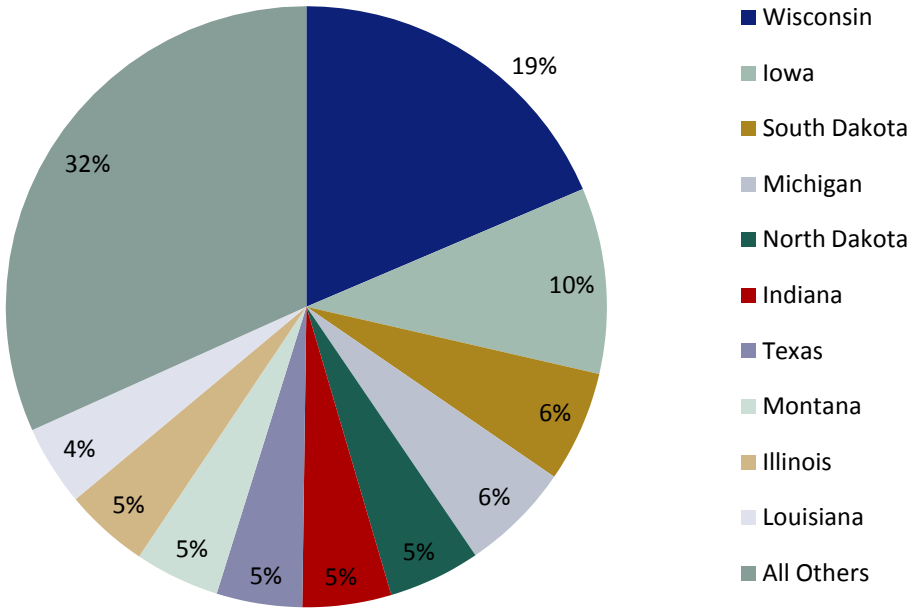
In regards to where domestic commodities are coming from or going to, it is unsurprising that the largest trading partners are Minnesota's neighboring states, as shown in Table 3.6 and illustrated in Figure 3.8. Those states sharing a border with Minnesota (Wisconsin, Iowa, South Dakota, and North Dakota) make up 40 percent of total trade with other states. Not shown in these summaries is Minnesota itself. Based on FAF 3.5 data, 53 percent of all goods are traded within Minnesota, severely dwarfing the next largest tonnage traded with Wisconsin.

Table 3.6 Major Domestic Trading Partners by Total Tonnage, 2012

State	Tons	Percent
Wisconsin	49,434,966	19%
Iowa	26,589,114	10%
South Dakota	15,893,421	6%
Michigan	15,739,056	6%
North Dakota	13,149,525	5%
Indiana	12,713,168	5%
Texas	12,240,417	5%
Montana	12,151,645	5%
Illinois	12,069,480	5%
Louisiana	11,541,460	4%
All Others	84,357,358	32%

Source: FAF 3.5.

Figure 3.8 Major Domestic Trading Partners by Total Tonnage, 2012



Source: FAF 3.5.

Looking ahead to forecasted growth, Wisconsin is poised to lose its number one spot on Minnesota's list of domestic trade partners. North Dakota is anticipated to experience a drastic increase in tonnage moved with the State. This growth is almost singularly related to a significant growth in cereal grains imported into Minnesota from North Dakota. Current volumes for this commodity are estimated at 1,740,944 tons. By 2040, this grain tonnage is expected to grow to 58,816,522, representing an annual growth of 12 percent, driving up the overall commodity trade growth to a level of 7 percent annually. While this growth seems significantly large, crop developments are already underway to justify this expected growth. Winter wheat in North Dakota is growing by 264 percent between 2013 and 2014 alone. Other types of grains, such as durum wheat, spring wheat, and flaxseed, are all anticipating significant growth.[22]

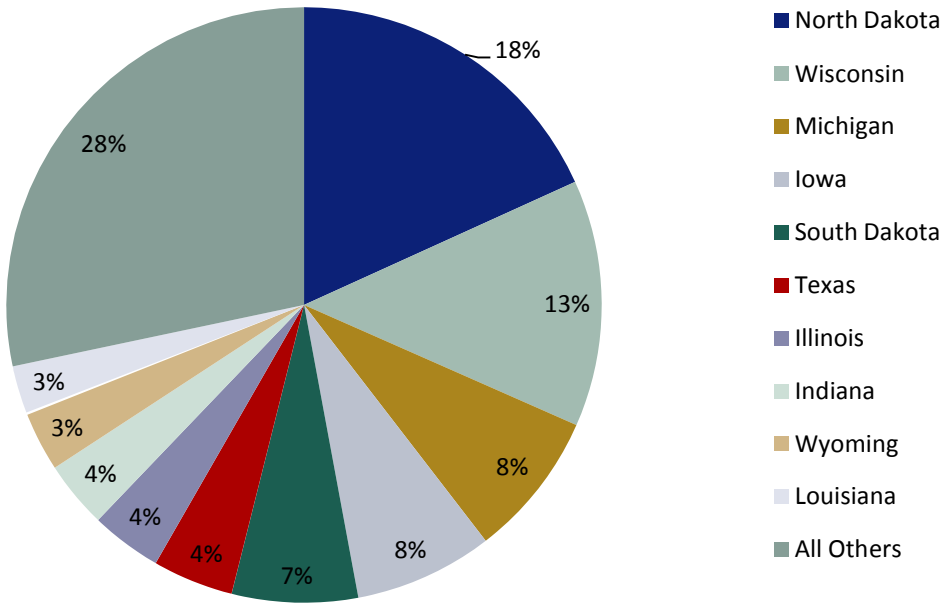
[22] http://www.farmandranchguide.com/news/crop/prospective-plantings-report-yields-no-big-surprises-for-cereal-grains/article_d4b9f6c4-b9e9-11e3-867e-001a4bcf887a.html

Table 3.7 Major Domestic Trading Partners by Total Tonnage, 2040

State	Tons	Percent	Rank Change	Total Increase	Annual Increase
North Dakota	79,273,828	18%	+4	503%	7%
Wisconsin	58,289,084	13%	-1	18%	1%
Michigan	34,536,498	8%	+1	119%	3%
Iowa	32,759,600	8%	-2	23%	1%
South Dakota	29,780,275	7%	-2	87%	2%
Texas	19,100,453	4%	+1	56%	2%
Illinois	16,768,971	4%	+2	39%	1%
Indiana	15,829,995	4%	-2	25%	1%
Wyoming	13,899,947	3%	+2	32%	1%
Louisiana	11,752,999	3%	-	2%	0%
All Others	123,199,536	28%			

Source: FAF 3.5.

Figure 3.9 Major Domestic Trading Partners by Total Tonnage, 2040



Source: FAF 3.5.

International Trade Partners

Minnesota trades with a variety of foreign nations, particularly Canada. Minnesota's trade with international partners is summarized in this section, but

this discussion only includes imports and exports from Minnesota and does not include commodities which pass through Minnesota's ports as either imports or exports from other states.

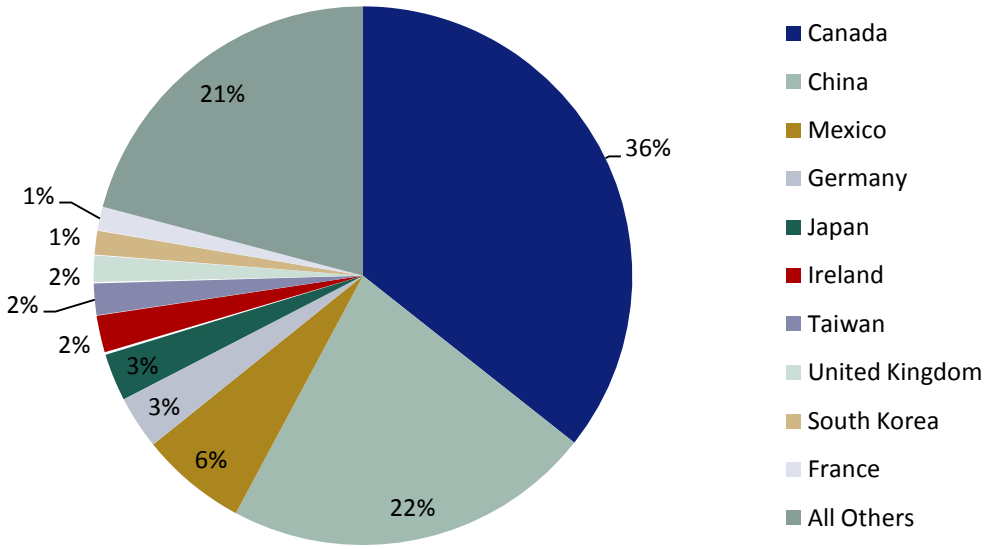
Based on FAF data, international movements are relatively low, even though Minnesota has multiple points of entry. Some high-level state trade data is available through the U.S. Census Bureau. Available as a yearly overview, state trade data is available as an annual summation of trade value, with breakouts for the top 25 trading partners for each state. Table 3.8 details Minnesota's top 10 trading partners based on total imports and exports with Figure 3.10 illustrating each country's share of the total trade for 2013. Each of these countries is in the top 25 for both imports and exports. Other countries not listed here, such as Belgium which is ranked sixth by exports, only represent significant movements in one direction.

Table 3.8 Minnesota's Major Foreign Trading Partners by Total Value, 2012 and 2013

Country	2012 Value ($M)	2013 Value ($M)	2012 Share	2013 Share
Canada	$19,528	$19,170	36%	36%
China	$12,343	$11,929	23%	22%
Mexico	$3,415	$3,438	6%	6%
Germany	$1,580	$1,708	3%	3%
Japan	$1,685	$1,539	3%	3%
Ireland	$1,248	$1,272	2%	2%
Taiwan	$1,100	$1,036	2%	2%
United Kingdom	$879	$892	2%	2%
South Korea	$884	$791	2%	1%
France	$551	$782	1%	1%
All Others	$10,500	$11,226	20%	21%

Source: U.S. Census Bureau.

Figure 3.10 Minnesota's Major Foreign Trading Partners by Total Value, 2013



Source: U.S. Census Bureau.

Unsurprisingly, Canada is Minnesota's greatest foreign trading partner across the board. Trade with this country makes up 28 percent of total exports, 41 percent of total imports, and 36 percent of overall trade. The close proximity of this country to Minnesota, combined with the numerous ports of entry located on the border between Minnesota and Canada allow for easy access between markets. The Bureau of Transportation Statistics (BTS) maintains data on this trade through the North America Transborder Freight Data, providing state data with Canada and Mexico through a specific port. Goods traded between these Minnesota and Canada are transferred through other states in addition to Minnesota. Table 3.9 details the top states facilitating trade between Canada and Minnesota based on a combined total value of truck, rail, water, and air movements. At 42 percent, North Dakota represents the largest portion of these movements. Overall, the top five states of North Dakota, Michigan, Minnesota, New York, and Washington represent 94 percent of all trade with Canada for this state. This data is also represented in Figure 3.11.

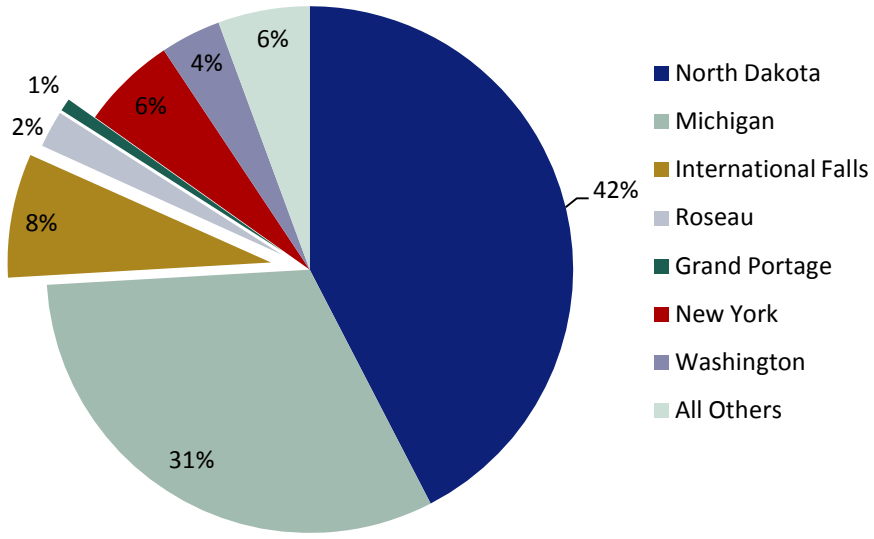
Table 3.9 Top Border Crossings for Minnesota-Canada Trade ($1,000), 2013[23]

State	Truck ($)	Rail ($)	Water ($)	Air ($)	Total ($)	Percent of Total
North Dakota	2,815,902	1,210,497	0	3,558	4,029,956	42%
Michigan	2,451,951	545,313	3,019	9,166	3,009,448	31%
Minnesota	391,340	661,279	38,871	20,085	1,111,575	12%
International Falls	*64,410*	*658,785*	*0*	*0*	*723,195*	*8%*
Roseau	*223,335*	*0*	*0*	*0*	*223,335*	*2%*
Grand Portage	*73,924*	*68*	*0*	*0*	*73,992*	*1%*
Warroad	*19,996*	*1,301*	*0*	*0*	*21,297*	*0%*
Baudette	*3,268*	*55*	*0*	*0*	*3,323*	*0%*
Pinecreek	*592*	*0*	*0*	*0*	*592*	*0%*
Lancaster	*2,245*	*0*	*0*	*0*	*2,245*	*0%*
Other MN ports/airports	*3,570*	*1,071*	*38,857*	*20,012*	*63,510*	*0%*
New York	372,650	18,730	152,140	11,456	554,976	6%
Washington	214,859	125,668	304	11,541	352,373	4%
All Others	172,804	20,258	12,926	329,144	535,133	6%

Source: Bureau of Transportation Statistics.

[23] This table does not include the significant pipeline movements between Canada and Minnesota which account for roughly 48 percent of trade by value.

Figure 3.11 Top Border Crossings for Minnesota-Canada Trade ($1,000), 2013



Source: Bureau of Transportation Statistics.

Other Trade Moving through Minnesota

While Table 3.7 previously highlighted the states with the highest trade flows with Minnesota, it did not include freight moving through Minnesota to other international or domestic destinations Likewise, Table 3.9 showed trade with Canada to and from Minnesota using Minnesota ports of entry, but it did not detail the total amount of trade through Minnesota's ports, as trade from or destined to other states was not included.

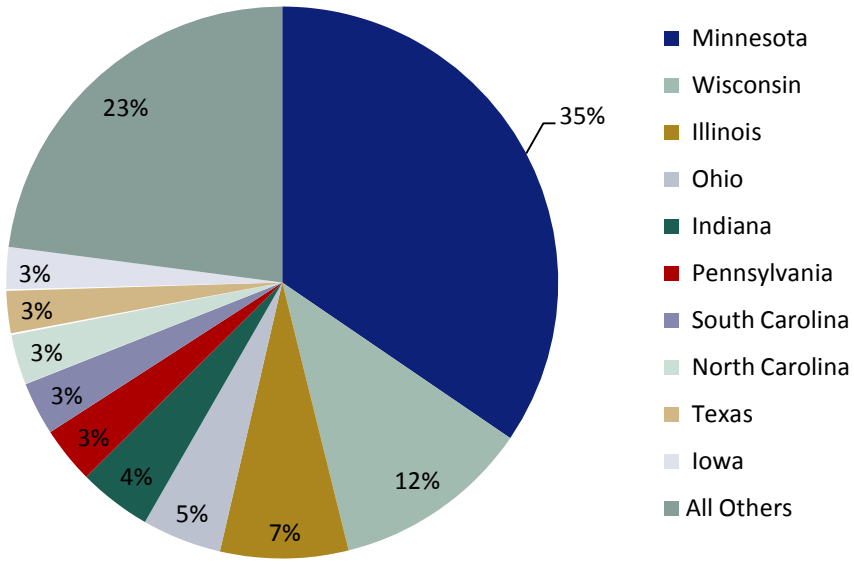
Significant volumes of goods are traded between the U.S. and Canada, many which pass through Minnesota on the way to their final destination. Total annualized truck volumes were obtained for 2013 for Minnesota's ports of entry. International Falls, Roseau, and Grand Portage make up the largest portions of total trade through ports of entry based on truck movements with 91 percent of all truck traffic. The remaining ports of entry, Warroad, Baudette, and Minneapolis, make up the remaining 9 percent. Table 3.10 details the top states trading with Canada through Minnesota by truck with Figure 3.12 illustrating this relationship. Minnesota is the largest trading partner with Canada through Canadian ports. The state has an advantage due to the ports not only being located within the state, but also the shorter distance between the two trading partners. Trucks typically have the cost advantage over shorter distances, which is why states closer to Minnesota and Canada, such as Wisconsin and Illinois, have significantly higher volumes than states located further away, such as Texas and Iowa.

Table 3.10 Top States Utilizing Minnesota's Ports of Entry for Truck Movements by Value ($1,000), 2013

State	International Falls	Roseau	Grand Portage	Others	Total	Percent of Total
Minnesota	64,410	223,335	73,924	26,776	388,445	35%
Wisconsin	76,235	3,131	45,064	6,054	130,485	12%
Illinois	24,777	23,813	17,865	17,907	84,361	7%
Ohio	14,487	26,698	8,605	2,670	52,459	5%
Indiana	14,675	9,062	19,108	5,265	48,110	4%
Pennsylvania	12,819	1,573	22,064	863	37,318	3%
South Carolina	26,463	626	6,943	922	34,953	3%
North Carolina	28,358	306	1,284	3,253	33,201	3%
Texas	14,973	103	10,648	3,275	28,999	3%
Iowa	8,974	247	15,231	4,212	28,664	3%
All Others	91,399	45,779	86,975	33,852	258,005	23%

Source: Bureau of Transportation Statistics.

Figure 3.12 Top States Utilizing Minnesota's Ports of Entry for Truck Movements by Value, 2013



Source: Bureau of Transportation Statistics.

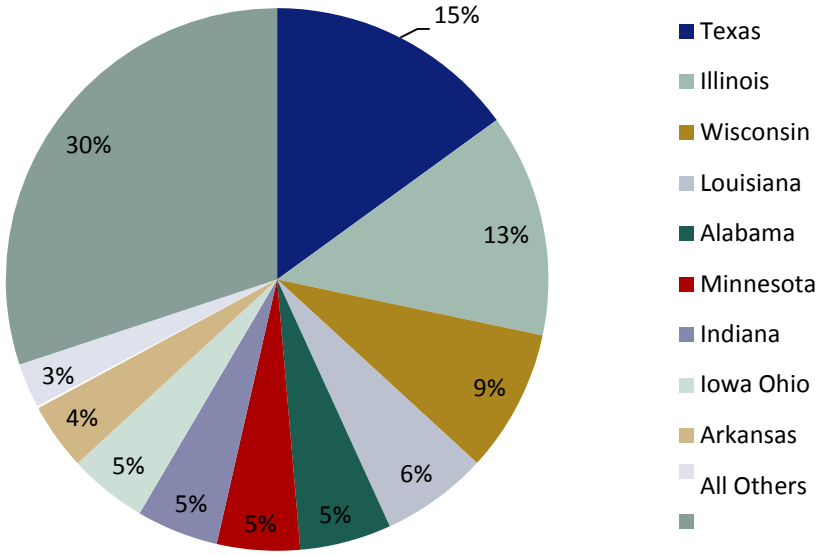
While truck movements with Canada through Minnesota represent over a billion dollars in trade, this pales in comparison to rail movements through these ports of entry. A very small portion of rail is indicated at Minneapolis but the majority of movements are concentrated at International Falls. Three miles to the east of International Falls lies the port of entry for CN rail for the Vancouver to Chicago route. As the geographic center of CN's North American network and the second busiest rail port in North America, this explains the high volumes seen here. Table 3.11 details the top states trading with Canada through Minnesota for rail movements, with an illustration of this information shown in Figure 3.13. In this case, Minnesota is not the largest trading partners by rail which is expected due to the mode of transport. Typically, rail movements are more cost effective when moved over longer distances, resulting in some areas of Canada being more accessible by truck for Minnesota. These rail movements also heavily favor imported goods over exports. With the exception of Arkansas, all of the top 10 states show a trade imbalance tilted toward imports. Overall, these movements accounted for 420,956 loaded rail containers and 140,282 empty containers for a total of 561,238 rail containers passing through International Falls in 2013.

Table 3.11 Top States Utilizing Minnesota's Ports of Entry for Rail Movements by Value, 2013

State	Total ($)	Percent of Total	Percent Imports
Texas	2,003,874,574	15%	66%
Illinois	1,776,590,967	13%	53%
Wisconsin	1,136,784,845	9%	76%
Louisiana	849,121,652	6%	56%
Alabama	728,640,842	5%	75%
Minnesota	659,709,666	5%	66%
Indiana	652,911,790	5%	87%
Iowa	624,443,661	5%	70%
Ohio	532,670,455	4%	73%
Arkansas	372,790,761	3%	28%
All Others	4,016,452,024	30%	69%

Source: Bureau of Transportation Statistics.

Figure 3.13 Top States Utilizing Minnesota's Ports of Entry for Rail Movements by Value, 2013



Source: Bureau of Transportation Statistics.

3.4 CURRENT FREIGHT SYSTEM DEMAND BY MODE

This section focuses on freight system demand by the highway, rail, waterway, and air modes, and highlights the key commodities utilizing each. When broken down by commodity, distinctions between modes, discussed in previous sections, become even more pronounced. For the tonnages of commodities supported by each mode, only those goods with an origin or destination within Minnesota are included in the totals. Through movements are not included in this section.

Highway Demand

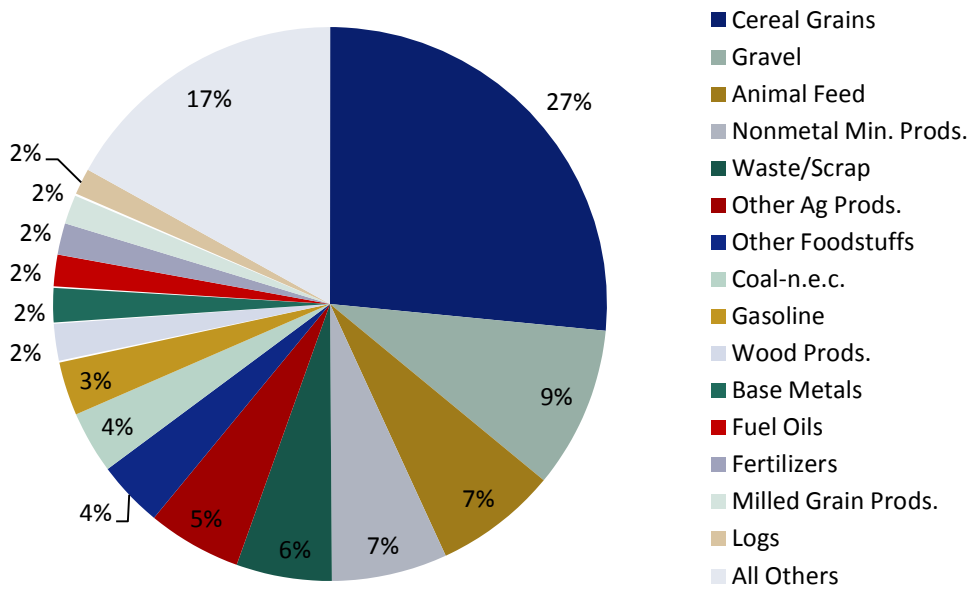
Highway movements account for the largest tonnage of all of the transportation modes. Table 3.12 details the top commodities moved on the state's highway system and is illustrated in Figure 3.14. A wide range of commodities are shipped via the highway mode. Even goods shipped primarily using another mode utilize trucks for last-mile connections to and from their origins and destinations. Cereal Grains, Gravel, and Animal Feed reflect the largest tonnages of goods shipped via truck, consistent with the state's farm culture and raw material production.

Table 3.12 Major Highway Commodities, Total, 2012

Commodity Type	Tons	Percent
Cereal Grains	102,444,952	27%
Gravel	36,411,736	9%
Animal Feed	27,660,293	7%
Nonmetal Mineral Products	26,059,761	7%
Waste/Scrap	21,527,179	6%
Other Agricultural Products	21,194,640	5%
Other Foodstuffs	14,968,912	4%
Coal-n.e.c.	14,024,837	4%
Gasoline	12,075,671	3%
Wood Products	8,705,138	2%
Base Metals	7,974,647	2%
Fuel Oils	7,470,600	2%
Fertilizers	7,127,865	2%
Milled Grain Products	6,512,195	2%
Logs	6,413,718	2%
All Others	65,388,376	17%

Source: FAF 3.5.

Figure 3.14 Major Highway Commodities, 2012



Source: FAF 3.5.

Looking ahead to 2040, agricultural products are anticipated to play an even more significant role for the highway infrastructure. Table 3.13 details the major commodities anticipated to move over Minnesota's highway system in 2040 and is likewise illustrated in Figure 3.15. Cereal Grains will maintain its position as the highest tonnage commodity moved via truck but will lose some of its market share, decreasing from 27 percent to 25 percent. This is due to higher growth seen in other commodities. Animal Feed will move up from the third largest tonnage to second largest, with total tonnage more than doubling to 56 million from 27.7 million in 2012. Other Agricultural Products will overtake Gravel to round out the top three commodities, fueled by an annual growth of 3 percent.

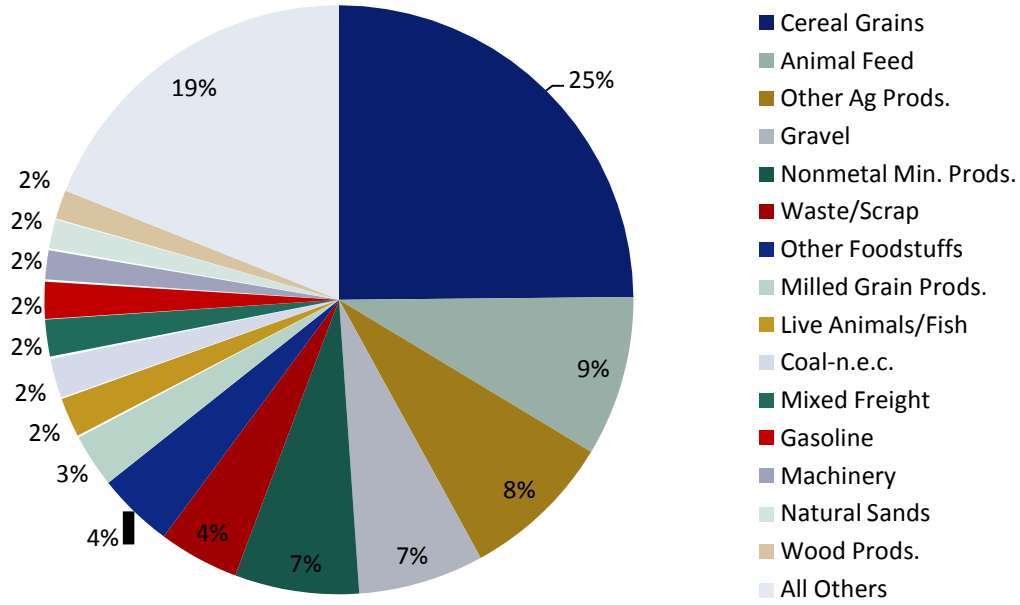
Table 3.13 Major Highway Commodities, Total, 2040

Total	Tons	Percent	Rank Change	Total Change	Annual Change
Cereal Grains	159,337,502	25%	-	56%	2%
Animal Feed	56,369,940	9%	+1	104%	3%
Other Agricultural Products	53,667,516	8%	+3	153%	3%
Gravel	44,214,491	7%	-2	21%	1%
Nonmetal Mineral Products	43,748,163	7%	-1	68%	2%
Waste/Scrap	28,309,040	4%	-1	32%	1%
Other Foodstuffs	26,844,150	4%	-	79%	2%

Total	Tons	Percent	Rank Change	Total Change	Annual Change
Milled Grain Products	18,761,563	3%	+6	188%	4%
Live Animals/Fish	14,596,918	2%	+9	173%	4%
Coal-n.e.c.	14,361,904	2%	-2	2%	0%
Mixed Freight	13,835,631	2%	+6	136%	3%
Gasoline	13,174,338	2%	-3	9%	0%
Machinery	10,999,433	2%	+9	168%	4%
Natural Sands	10,898,664	2%	+2	83%	2%
Wood Products	10,563,900	2%	-5	21%	1%
All Others	121,564,450	19%			

Source: FAF 3.5.

Figure 3.15 Major Highway Commodities, 2040



Source: FAF 3.5.

Railway Demand

Fewer products move over the railway network than the highway network and fewer goods make up a larger percentage of overall tonnage. Table 3.14 details the major commodities moving over this system, with an illustration shown in Figure 3.16. Metallic Ores, Cereal Grains, and Coal are the three largest commodities moved via this mode. Representing 62 percent of the total tonnage

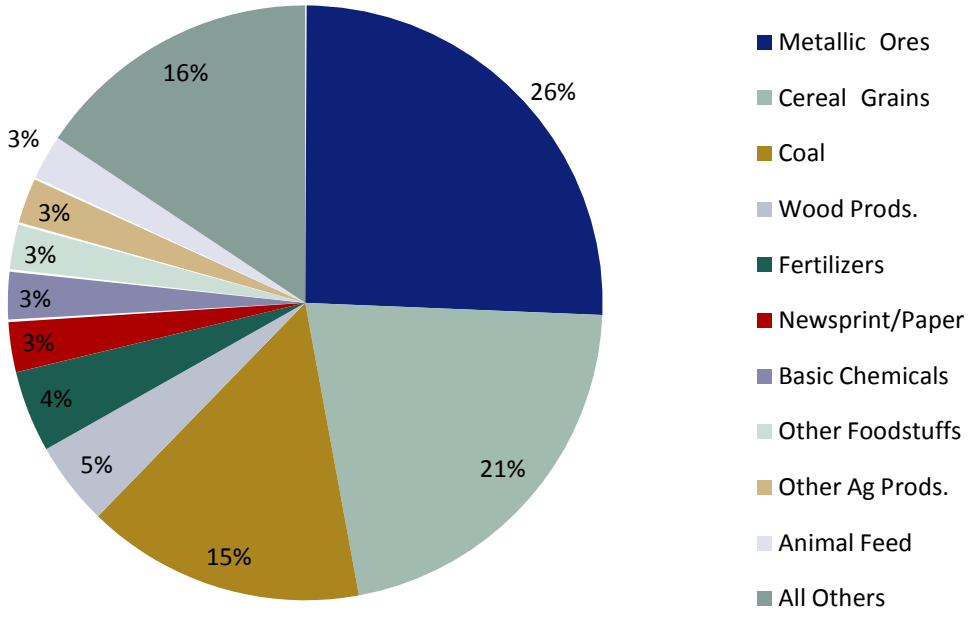
moved by rail, these commodities are critical for maintaining a competitive rail service in the state. Note that pass-through rail movements are not included.

Table 3.14 Major Railroad Commodities, Total, 2012

Commodity Type	Tons	Percent
Metallic Ores	32,096,696	26%
Cereal Grains	26,859,784	21%
Coal	18,971,778	15%
Wood Products	5,692,697	5%
Fertilizers	5,540,779	4%
Newsprint/Paper	3,406,449	3%
Basic Chemicals	3,387,139	3%
Other Foodstuffs	3,214,103	3%
Other Agricultural Products	3,205,917	3%
Animal Feed	3,197,388	3%
All Others	19,575,796	16%

Source: FAF 3.5.

Figure 3.16 Major Railroad Commodities, 2012



Source: FAF 3.5.

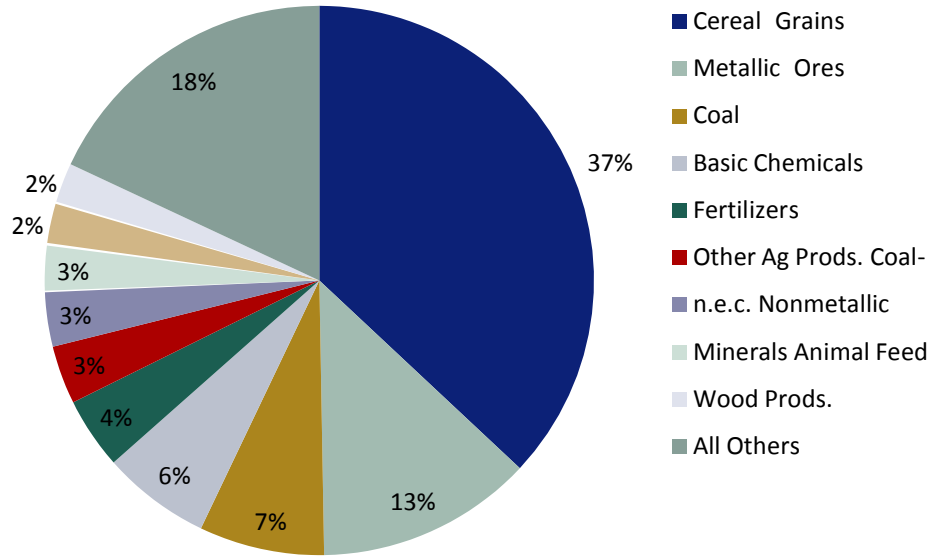
Unfortunately, these three commodities are not projected to have high growth through 2040. While Cereal Grains are anticipated to grow at a rate of 4 percent annually, volumes for both Metallic Ores and Coal are expected to decrease slightly. Other commodities, such as Basic Chemicals and Nonmetallic Minerals, are anticipated to fill some of this void left by these commodities. Table 3.15 details the anticipated commodity mix and tonnages in 2040 for railroad movements, with an illustration of this market share seen in Figure 3.17.

Table 3.15 Major Railroad Commodities, Total, 2040

Commodity Type	Tons	Percent	Rank Change	Total Change	Annual Change
Cereal Grains	89,294,595	37%	+1	232%	4%
Metallic Ores	30,782,670	13%	-1	-4%	0%
Coal	17,805,883	7%	-	-6%	0%
Basic Chemicals	15,411,006	6%	+3	355%	6%
Fertilizers	10,167,477	4%	-	84%	2%
Other Agricultural Products	8,303,144	3%	+3	159%	3%
Coal-n.e.c.	7,698,022	3%	+5	159%	3%
Nonmetallic Minerals	6,578,648	3%	+5	255%	5%
Animal Feed	5,963,228	2%	+1	87%	2%
Wood Products	5,918,011	2%	-6	4%	0%
All Others	43,575,765	18%			

Source: FAF 3.5.

Figure 3.17 Major Railroad Commodities, 2040



Source: FAF 3.5.

Waterway Demand

Commodities shipped via waterways are usually cheaper, bulk materials. This is evident in the types of commodities shipping via Minnesota's waterways, detailed in Table 3.16 and illustrated in Figure 3.18. The largest commodity by tonnage is Iron Ore, Iron, and Steel Waste and Scrap at 68 percent of overall tonnage, and as previously discussed, a majority of this is comprised of taconite shipping on the Great Lakes. Food and Foods Products are also among the top three commodities shipped via this mode, consistent with both highway and railway movements.

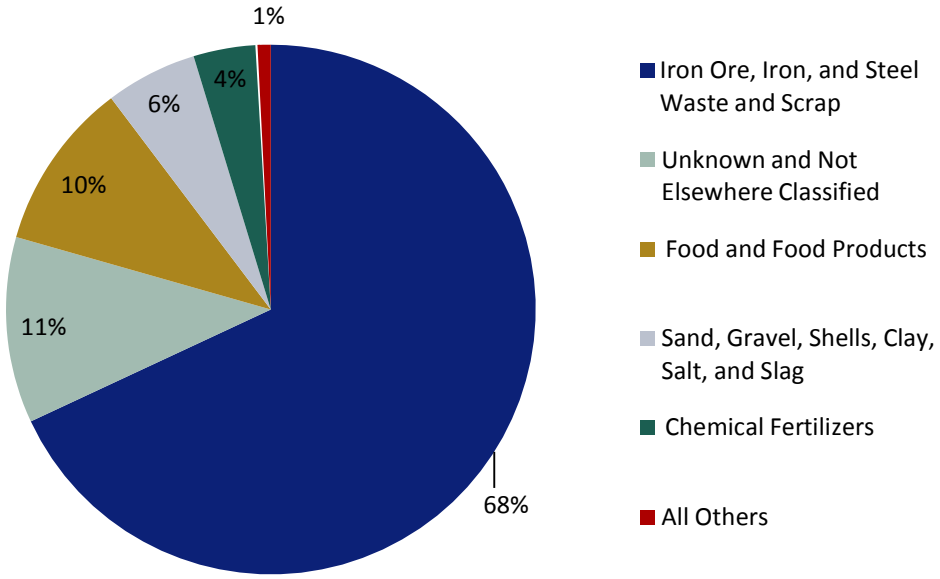
Table 3.16 Major Waterway Commodities, Total, 2012

Commodity Type	Tons	Percent
Iron Ore, Iron, and Steel Waste and Scrap	29,431,604	68%
Unknown and Not Elsewhere Classified	4,912,147	11%
Food and Food Products	4,448,456	10%
Sand, Gravel, Shells, Clay, Salt, and Slag	2,416,665	6%
Chemical Fertilizers	1,633,038	4%
Primary Non-Metal Products	129,223	<1%
Chemicals Excluding Fertilizers	106,413	<1%

Commodity Type	Tons	Percent
Primary Metal Products	86,120	<1%
Lumber, Logs, Wood Chips and Pulp	71,352	<1%
Manufactured Goods	10,854	<1%
Petroleum Products	19	<1%

Source: U.S. Army Corps of Engineers Waterborne Commerce Data, 2012.

Figure 3.18 Major Waterway Commodities, 2012



Source: U.S. Army Corps of Engineers Waterborne Commerce Data, 2012.

One point of note is that these volumes are significantly lower than the reported combined volumes of the ports along the Mississippi River and Great Lakes. Different reporting metrics typically result in these inconsistencies. FAF was not used for these commodities as it does not accurately reflect the commodities moved via the waterways nor the tonnages. FAF only estimates 28 million tons moved on the waterways, compared to the 43 million reported by the USACE and the 71 million reported by the ports. The most severely underrepresented commodity is Metallic Ores at only 2.7 million tons, only one tenth of what is reported by the Waterborne Commerce Data. Due to the inconsistencies in this data, 2040 forecast volumes are not detailed here for waterborne commodities.

Air Demand

Air movements account for relatively the lowest tonnage volumes in the state among all of the transportation modes. However, the commodities shipped via air are typically low weight but high value goods. Products shipped via this

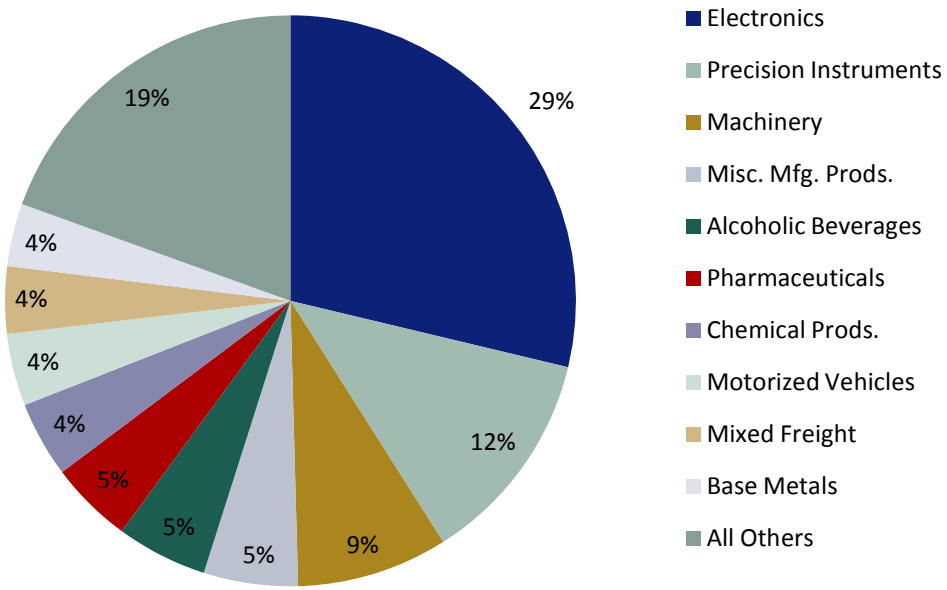
mode are significantly different than those using other modes, as detailed in Table 3.17 and shown in Figure 3.19. As with waterway movements, FAF does not accurately reflect the magnitude of air movements. However, in this case, there are no additional data sources which detail the types of commodities moved via air. As such, the percent of total tonnage of each commodity was derived from FAF and scaled to the appropriate tonnage level as reported by the Minnesota airports. From this, it can be determined that Electronics, Precision Instruments, and Machinery are the dominant commodities moved via this mode, accounting for 62 percent of total tonnage.

Table 3.17 Major Air Commodities, Total, 2012

Commodity Type	Tons	Percent
Electronics	59,473	26%
Precision Instruments	25,404	21%
Machinery	17,713	15%
Miscellaneous Manufacturing Products	11,059	5%
Alcoholic Beverages	10,659	4%
Pharmaceuticals	9,718	3%
Chemical Products	8,884	3%
Motorized Vehicles	8,466	3%
Mixed Freight	7,882	3%
Base Metals	7,358	3%
All Others	40,346	16%

Source: FAF 3.5, Minneapolis – St. Paul International Airport Year End Operations Reports (2008-2013), Minneapolis State Aviation System Plan.

Figure 3.19 Major Air Commodities, 2012



Source: FAF 3.5, Minneapolis – St. Paul International Airport Year End Operations Reports (2008-2013), Minneapolis State Aviation System Plan.

To produce 2040 forecasts, data was scaled using the methodology described above. In examining the results, the three dominant commodities moved via air today will continue to be the largest contributors in 2040 as seen in Table 3.18 and Figure 3.20. Each of these products is anticipated to at least double in tonnage with Precision Instruments quadrupling, resulting in this commodity overtaking Electronics as the highest tonnage. Other products with significant growth are focused on the chemical industry with an 11 percent annual growth in Basic Chemicals and a 5 percent annual growth of Chemical Products.

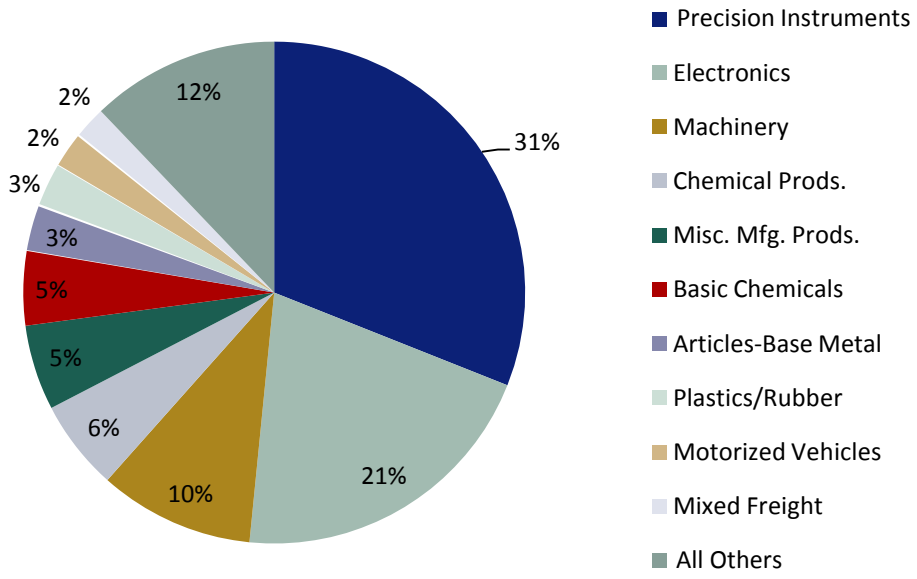
Table 3.18 Major Air Commodities, Total, 2040

Total	Tons	Percent	Rank Change	Total Change	Annual Change
Precision Instruments	202,395	31%	+1	697%	8%
Electronics	134,068	21%	-1	125%	3%
Machinery	65,260	10%	-	268%	5%
Chemical Products	37,974	6%	+3	327%	5%
Miscellaneous Manufacturing Products	35,808	5%	-1	224%	4%
Basic Chemicals	31,135	5%	+12	1623%	11%
Articles-Base Metal	19,081	3%	+4	193%	4%
Plastics/Rubber	18,661	3%	+4	190%	4%

Total	Tons	Percent	Rank Change	Total Change	Annual Change
Motorized Vehicles	14,749	2%	-1	74%	2%
Mixed Freight	14,105	2%	-1	79%	2%
All Others	79,142	12%			

Source: FAF 3.5, Minneapolis – St. Paul International Airport Year End Operations Reports (2008-2013), Minneapolis State Aviation System Plan.

Figure 3.20 Major Air Commodities, 2040



Source: FAF 3.5, Minneapolis – St. Paul International Airport Year End Operations Reports (2008-2013), Minneapolis State Aviation System Plan.

Pipeline Demand

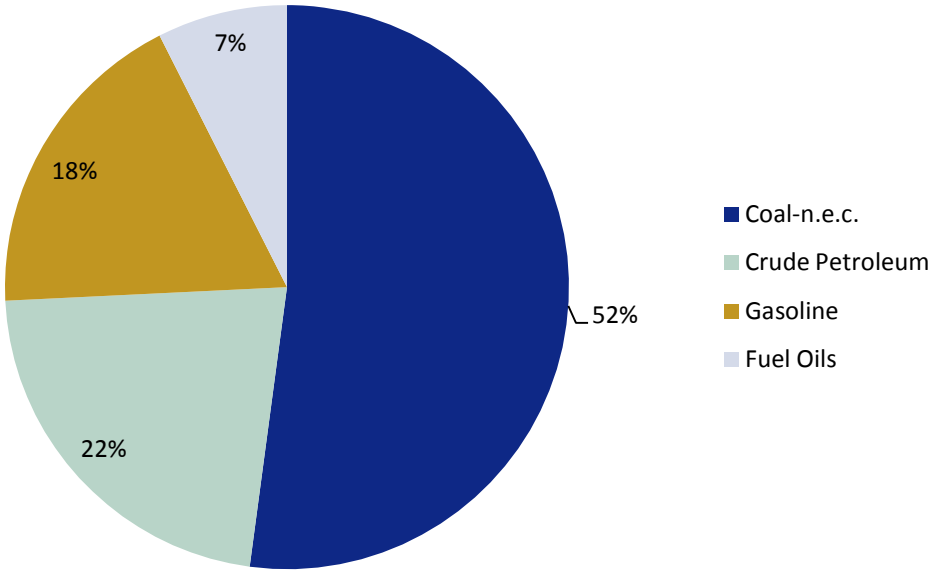
Due to very nature of the pipeline infrastructure, only limited commodities can be shipped via this mode. In fact, FAF only details four commodities moving via Minnesota's pipeline network, as seen in Table 3.19 and Figure 3.21. At 52 percent, Coal-n.e.c. is by far the dominant commodity utilizing this mode. Crude Petroleum and Gasoline have a relatively equal share at 22 percent and 18 percent, respectively.

Table 3.19 Major Pipeline Commodities, Total, 2012

Commodity Type	Tons	Percent
Coal-n.e.c.	29,831,986	52%
Crude Petroleum	12,665,688	22%
Gasoline	10,479,117	18%
Fuel Oils	4,272,454	7%

Source: FAF 3.5.

Figure 3.21 Major Pipeline Commodities, 2012



Source: FAF 3.5.

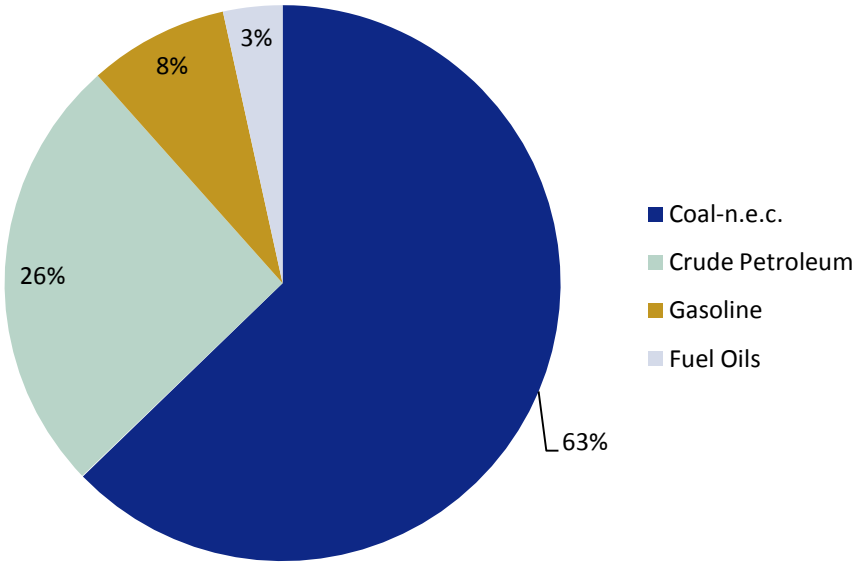
By 2040, the total tonnage moved via this mode is anticipated to roughly double as seen in Table 3.20. Coal – n.e.c. and Crude Petroleum are anticipated to increase at a rate of 3 percent per year, resulting in the tonnages of these commodities to more than double. On the other hand, Gasoline and Fuel Oils are expected to decrease at a rate of 1 percent per year, reducing total tonnage by 20 percent and 17 percent, respectively. Due to the decrease in these commodities, Coal-n.e.c. will increase its share of tonnage via this mode from 52 percent to 63 percent, as detailed in Figure 3.22.

Table 3.20 Major Pipeline Commodities, Total, 2040

Commodity Type	Tons	Percent	Rank Change	Total Change	Annual Change
Coal-n.e.c.	64,674,269	63%	-	117%	3%
Crude Petroleum	26,447,999	26%	-	109%	3%
Gasoline	8,386,049	8%	-	-20%	-1%
Fuel Oils	3,552,178	3%	-	-17%	-1%

Source: FAF 3.5.

Figure 3.22 Major Pipeline Commodities, 2040

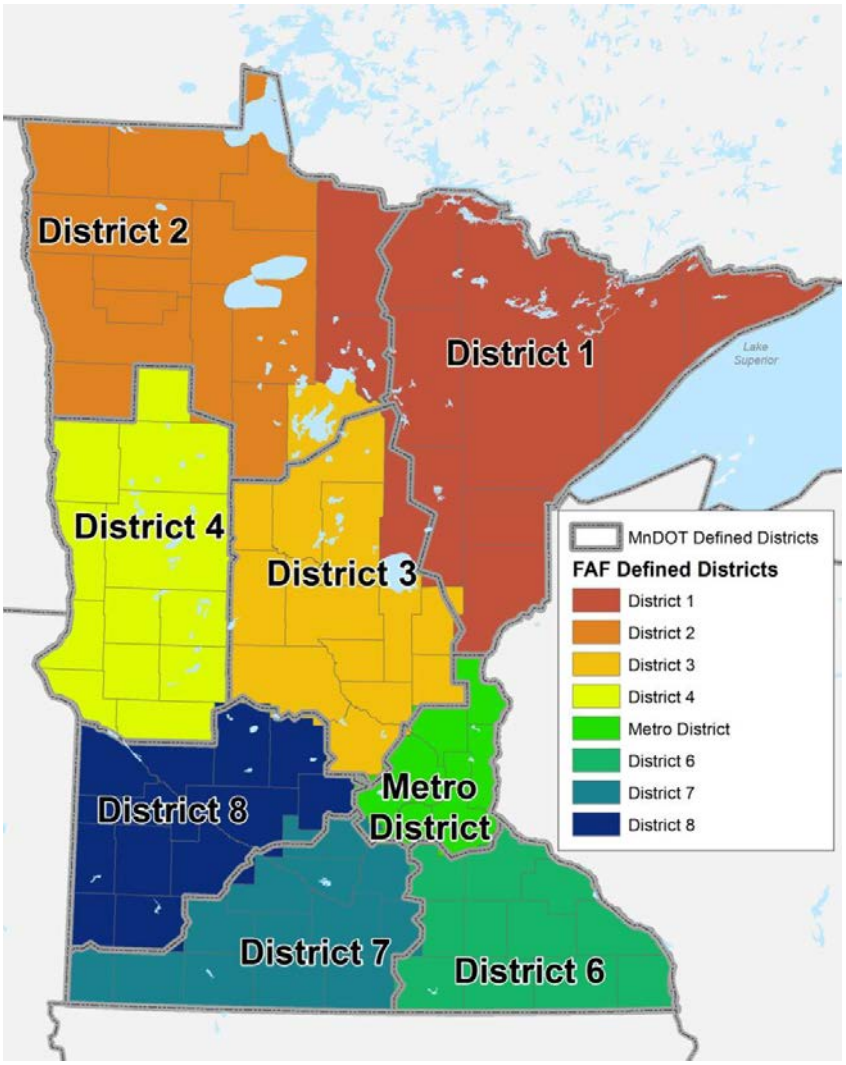


Source: FAF 3.5.

3.5 DISTRICT-LEVEL TRUCK FREIGHT TONNAGE, BY COMMODITY

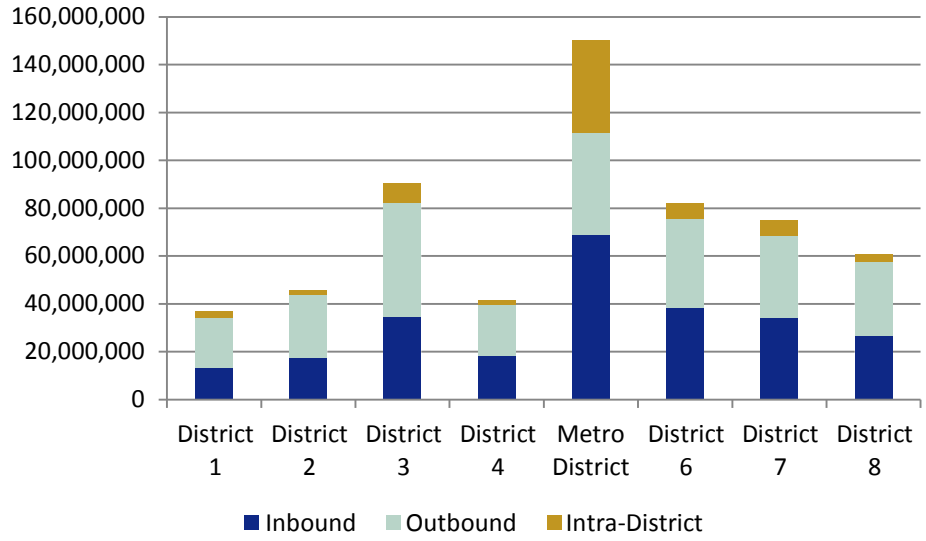
This section profiles freight truck movements for each district, presenting the tonnages of freight moving within the state, by commodity, for each district. As the FAF only designates two areas in Minnesota: Minneapolis-St. Paul and the Remainder of Minnesota this data was disaggregated down to the county level. The county-level data were then aggregated into Districts. The designated Districts in Minnesota are not defined along county lines. Figure 3.23 shows how the District definitions in this disaggregation differ from the existing District boundaries. The largest differences are in Districts 1, 2, and 3. District 1, as defined by this disaggregation, includes some portions of District 2 and 3. District 3 also includes some portion of District 2.

Figure 3.23 District Designations for FAF Disaggregation



For this focus on freight by District, tonnages are only inclusive of highways movements associated with domestic highway moves and highway moves associated with import and export activity through the ports of entry and ports. Total tonnage movements are divided between inbound, outbound, and intra-district tonnages and do not include through movements. This data, shown in Figure 3.24, reflects the volume of commodities moving by truck that are produced and consumed in each District.

Figure 3.24 Truck Freight Flows by Direction, Tons, by District, 2012



Source: Freight Analysis Framework Data, Disaggregated by Cambridge Systematics, 2012.

A detailed look at each District, examining key commodities produced and consumed in these regions, follows.

District 1

District 1 is defined as the combined counties of Aitkin, Carlton, Cook, Itasca, Koochiching, Lake, Pine, and St. Louis. This District also includes the international ports of entry of International Falls and Grand Portage as well as the ports of Duluth-Superior, Two Harbors, and Silver Bay. Commodities associated with this region are detailed in Table 3.21 and with tonnage share illustrated in Figure 3.25. Inconsistent with statewide commodities and other regions, Gravel represent 26 percent of all tonnage moved to, from, and within this region, with 70 percent originating in this District. Cereal Grains, in this case, only comprise 7 percent of total tonnage. Other key commodities produced in this region include Live Animals/Fish and Annual Feed with outbound movements of 97 percent and 86 percent, respectively, of total tonnage. The remainder of goods not falling into the top 10 list are weighted more toward to the inbound side. Note that District 1 contains the Mesabi Iron Range yet Metallic

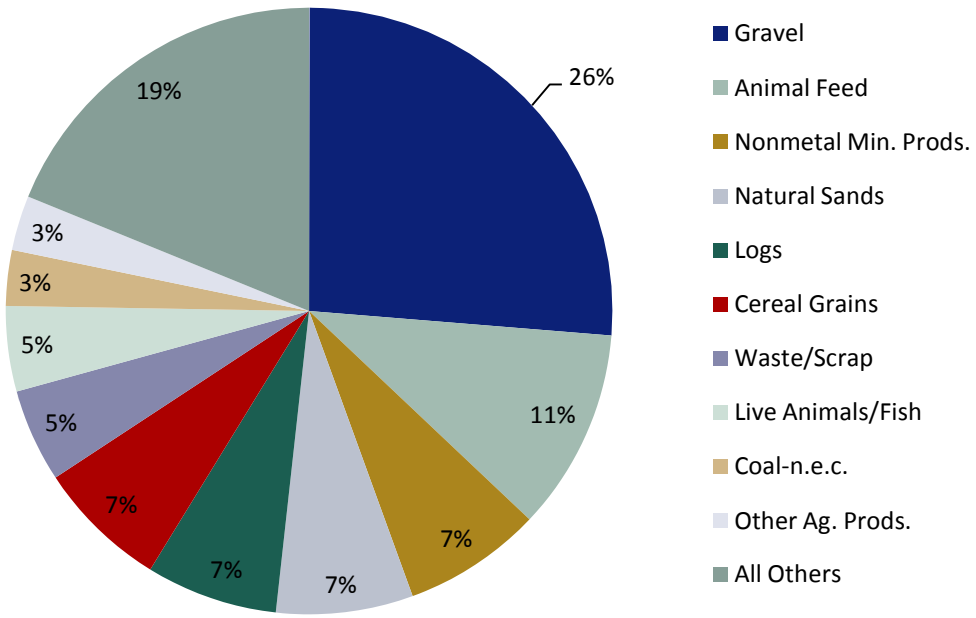
Ores are not seen here. This is because taconite is shipped via rail to the port of the Great Lakes and is thus not moved by truck and therefore not included here.

Table 3.21 District 1 Major Commodities by Total Truck Tonnage, 2012

Name	Tons	Percent	Percent Origin
Gravel	8,823,326	26%	70%
Animal Feed	3,615,966	11%	86%
Nonmetal Mineral Products	2,484,173	7%	53%
Natural Sands	2,448,661	7%	83%
Logs	2,355,326	7%	31%
Cereal Grains	2,344,533	7%	56%
Waste/Scrap	1,669,910	5%	33%
Live Animals/Fish	1,525,623	5%	97%
Coal-n.e.c.	994,631	3%	63%
Other Agricultural Products	982,729	3%	17%
All Others	6,324,515	19%	41%

Source: Freight Analysis Framework Data, Disaggregated by Cambridge Systematics, 2012.

Figure 3.25 District 1 Major Commodities by Total Truck Tonnage, 2012



Source: Freight Analysis Framework Data, Disaggregated by Cambridge Systematics, 2012.

District 2

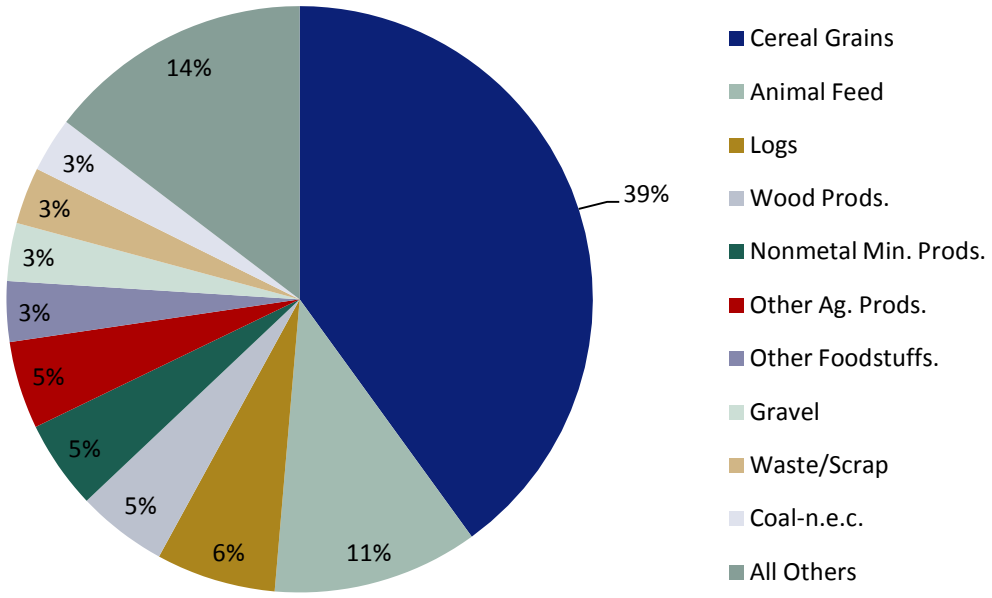
District 2 is defined as the combined counties of Beltrami, Clearwater, Hubbard, Kittson, Lake of the Woods, Marshall, Norman, Pennington, Polk, Red Lake, and Roseau. This District also includes the international ports of entry of Lancaster, Pinecreek, Roseau, Warroad, and Baudette. Cereal Grains are by far the largest commodity in this District at 39 percent of total tonnage, well above the statewide average of 23 percent. However, only 55 percent of this commodity leaves the District, with 41 percent being inbound from other regions. With five grain shuttle terminals located in this District, some of this commodity may be stored here from other areas to then be shipped to other parts of the country. This District is also a large producing region of Animal Feed, representing 11 percent of all tonnage associated with this District. The remaining 50 percent of tonnage is comprised of all other commodities all with a relatively equal balance of production and consumption as shown by Table 3.22 and Figure 3.26.

Table 3.22 District 2 Major Commodities by Total Truck Tonnage, 2012

Name	Tons	Percent	Percent Origin
Cereal Grains	16,554,967	39%	55%
Animal Feed	4,694,925	11%	78%
Logs	2,732,711	6%	62%
Wood Products	2,058,977	5%	57%
Nonmetal Mineral Products	2,022,439	5%	16%
Other Agricultural Products	2,000,345	5%	52%
Other Foodstuffs.	1,378,780	3%	70%
Gravel	1,320,853	3%	6%
Waste/Scrap	1,298,390	3%	61%
Coal-n.e.c.	1,246,794	3%	59%
All Others	6,064,271	14%	52%

Source: Freight Analysis Framework Data, Disaggregated by Cambridge Systematics, 2012.

Figure 3.26 District 2 Major Commodities by Total Truck Tonnage, 2012



Source: Freight Analysis Framework Data, Disaggregated by Cambridge Systematics, 2012.

District 3

District 3 is defined as the combined counties of Benton, Cass, Crow Wing, Isanti, Kanabec, Mille Lacs, Morrison, Sherburne, Stearns, Todd, Wadena, and Wright. This District is also heavily reliant on Cereal Grains at 19 percent of total tonnage, yet the majority is imported into the region, rather than produced here. The commodity with the largest origination percentage in this District is Gravel, as shown by Table 3.23. At 13 percent of overall tonnage, Gravel is the second largest commodity in this region by tonnage. Less than 60 percent of all other products are produced in this region and destined for other areas of the state and country. Intra-district movements account for 9 percent of total tonnage with the remainder affiliated with inbound movements. The tonnage share of commodities for District 3 is shown in Figure 3.27.

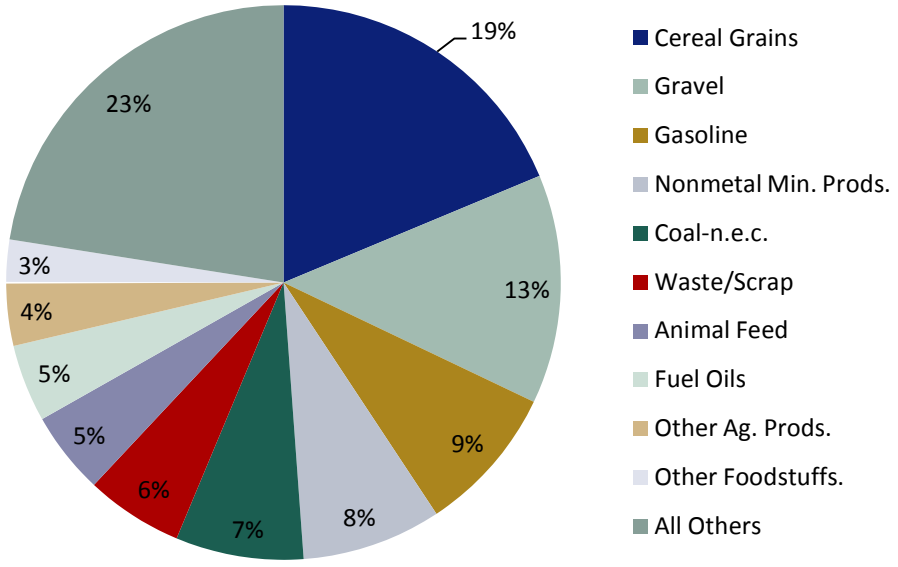
Table 3.23 District 3 Major Commodities by Total Truck Tonnage, 2012

Name	Tons	Percent	Percent Origin
Cereal Grains	16,745,669	19%	35%
Gravel	11,948,847	13%	67%
Gasoline	7,712,208	9%	38%
Nonmetal Mineral Products	7,277,515	8%	53%
Coal-n.e.c.	6,666,788	7%	52%

Name	Tons	Percent	Percent Origin
Waste/Scrap	5,080,953	6%	56%
Animal Feed	4,319,481	5%	59%
Fuel Oils	4,042,860	5%	44%
Other Agricultural Products	3,232,690	4%	56%
Other Foodstuffs.	2,277,405	3%	55%
All Others	20,139,366	23%	60%

Source: Freight Analysis Framework Data, Disaggregated by Cambridge Systematics, 2012.

Figure 3.27 District 3 Major Commodities by Total Truck Tonnage, 2012



Source: Freight Analysis Framework Data, Disaggregated by Cambridge Systematics, 2012.

District 4

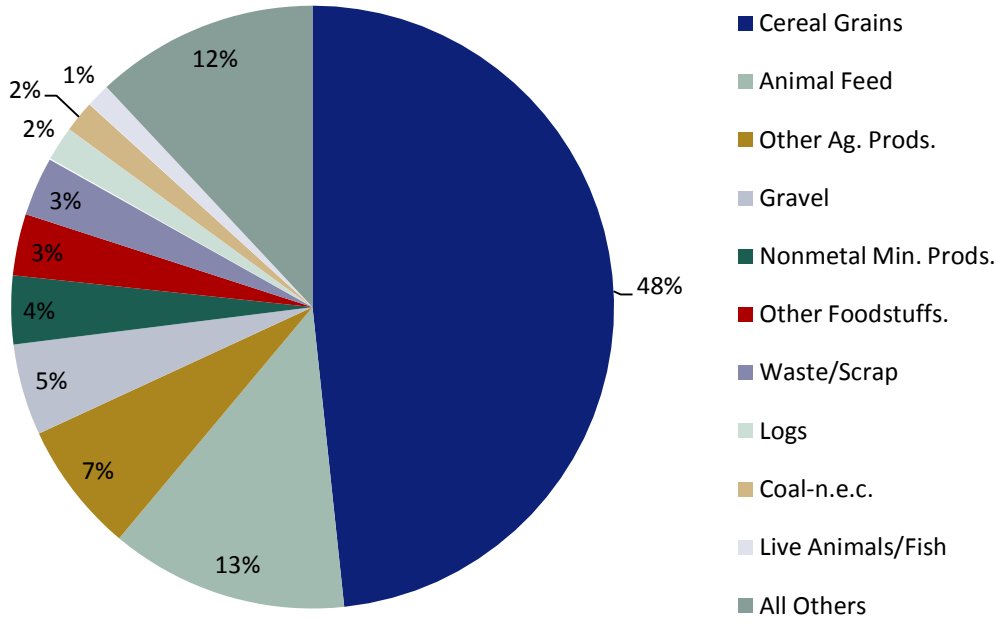
District 4 is defined as the combined counties of Becker, Big Stone, Clay, Douglas, Grant, Mahnomen, Otter Tail, Pope, Stevens, Swift, Traverse, and Wilkin. Cereal Grains are the dominant commodity in this District with nearly 20 million tons representing 48 percent of all tonnage. While only 54 percent of this commodity originates in the District, there are 16 grain shuttle terminals located here to store and ship cereal grains from other regions. Other agricultural products and animal feed also represent a significant portion of the total tonnage associated with this district. As detailed in Table 3.24 and shown in Figure 3.28, these top three commodities represent 68 percent of total tonnage.

Table 3.24 District 4 Major Commodities by Total Truck Tonnage, 2012

Name	Tons	Percent	Percent Origin
Cereal Grains	19,766,628	48%	54%
Animal Feed	5,216,948	13%	63%
Other Ag. Prods.	2,875,199	7%	49%
Gravel	2,004,475	5%	11%
Nonmetal Min. Prods.	1,500,773	4%	44%
Other Foodstuffs.	1,351,070	3%	50%
Waste/Scrap	1,289,740	3%	42%
Logs	776,216	2%	44%
Coal-n.e.c.	692,646	2%	59%
Live Animals/Fish	529,852	1%	77%
All Others	4,898,214	12%	44%

Source: Freight Analysis Framework Data, Disaggregated by Cambridge Systematics, 2012.

Figure 3.28 District 4 Major Commodities by Total Truck Tonnage, 2012



Source: Freight Analysis Framework Data, Disaggregated by Cambridge Systematics, 2012.

Metro District

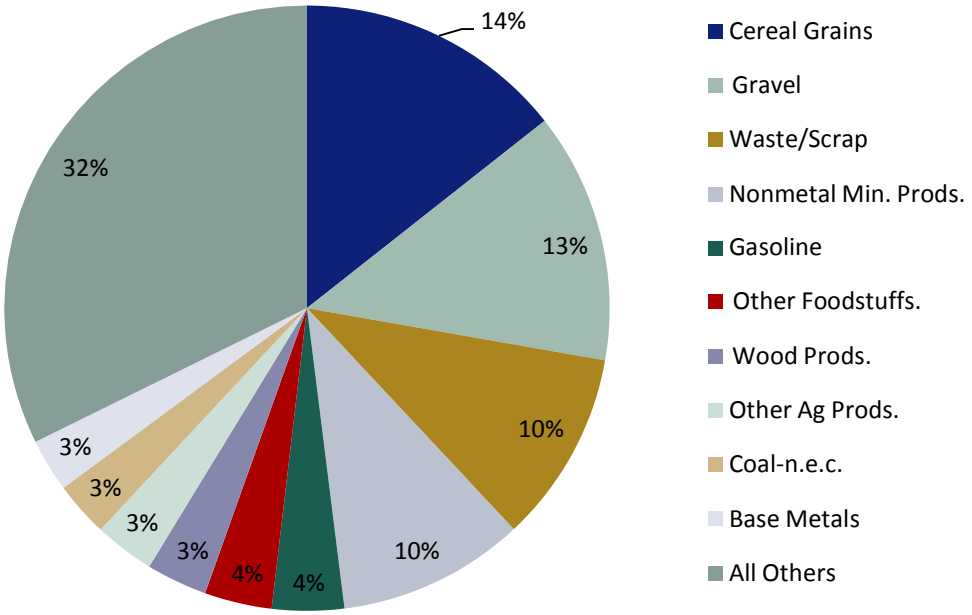
The Metro District is defined as the combined counties of Anoka, Carver, Chisago, Dakota, Hennepin, Ramsey, Scott, and Washington. This District also includes the port of St. Paul. Unlike the other Districts, the Metro District is not a large producer of any single commodity, by tonnage. While a significant amount of goods are traded to, from, and within this region, the consuming market of Minneapolis puts a greater focus on intra-district and inbound goods, rather than outbound shipments. This relationship can be seen in Table 3.25 as well as Figure 3.29.

Table 3.25 Metro District Major Commodities by Total Truck Tonnage, 2012

Name	Tons	Percent	Percent Origin
Cereal Grains	22,532,705	14%	20%
Gravel	20,969,685	13%	12%
Waste/Scrap	16,104,251	10%	24%
Nonmetal Mineral Products	15,650,478	10%	28%
Gasoline	6,020,686	4%	36%
Other Foodstuffs.	5,646,362	4%	41%
Wood Products	5,107,882	3%	34%
Other Agricultural Products	5,036,820	3%	55%
Coal-n.e.c.	4,612,167	3%	45%
Base Metals	4,446,171	3%	31%
All Others	50,591,059	32%	42%

Source: Freight Analysis Framework Data, Disaggregated by Cambridge Systematics, 2012.

Figure 3.29 Metro District Major Commodities by Total Truck Tonnage, 2012



Source: Freight Analysis Framework Data, Disaggregated by Cambridge Systematics, 2012.

District 6

District 6 is defined as the combined counties of Dodge, Fillmore, Freeborn, Goodhue, Houston, Mower, Olmsted, Rice, Steele, Wabasha, and Winona. This district also has a large concentration of cereal grains. Other agricultural products and animal feed also make up a significant amount of tonnage at 9 and 7 percent, respectively, of overall volume. There is a relative balance between inbound and outbound movements with 47 percent of all commodities being shipped out of the district. The relationship between tonnage and the direction of goods is detailed in Table 3.26 and shown in Figure 3.30.

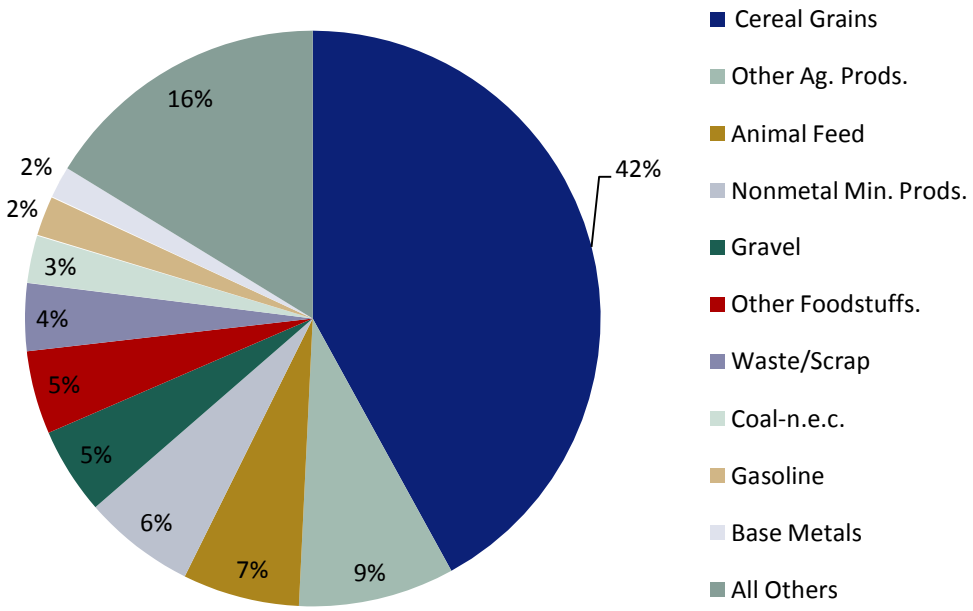
Table 3.26 District 6 Major Commodities by Total Truck Tonnage, 2012

Name	Tons	Percent	Percent Origin
Cereal Grains	35,149,906	42%	45%
Other Ag. Prods.	7,339,773	9%	47%
Animal Feed	5,492,256	7%	42%
Nonmetal Min. Prods.	5,266,532	6%	63%
Gravel	4,077,800	5%	15%
Other Foodstuffs.	3,918,080	5%	55%
Waste/Scrap	3,174,251	4%	49%

Name	Tons	Percent	Percent Origin
Coal-n.e.c.	2,234,727	3%	58%
Gasoline	1,898,308	2%	45%
Base Metals	1,528,679	2%	58%
All Others	13,606,083	16%	51%

Source: Freight Analysis Framework Data, Disaggregated by Cambridge Systematics, 2012.

Figure 3.30 District 6 Major Commodities by Total Truck Tonnage, 2012



Source: Freight Analysis Framework Data, Disaggregated by Cambridge Systematics, 2012.

District 7

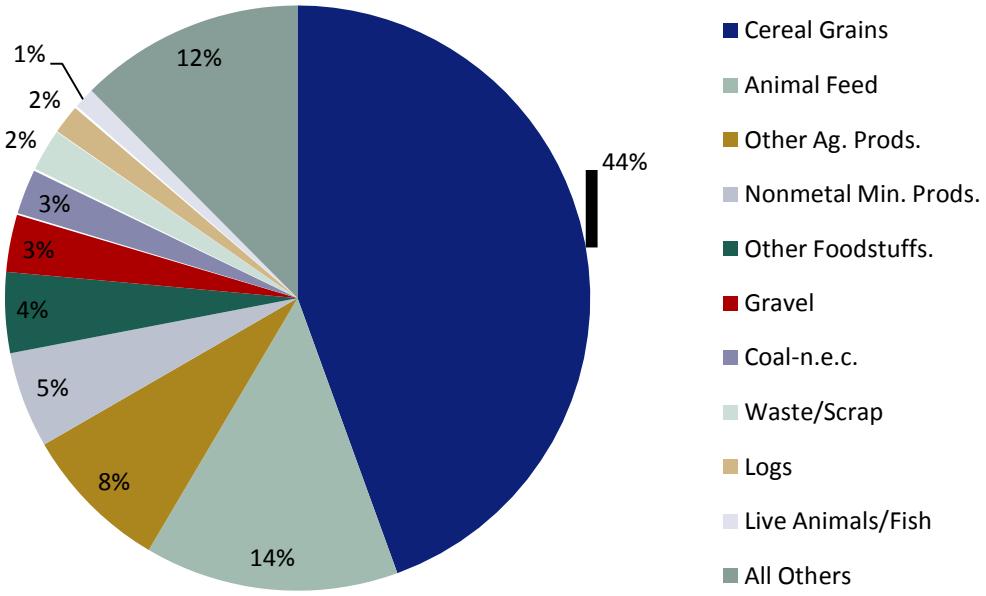
District 7 is defined as the combined counties of Blue Earth, Brown, Cottonwood, Faribault, Jackson, Le Sueur, Martin, Nicollet, Nobles, Rock, Sibley, Waseca, and Watonwan. This district has a similar profile to other grain-focused areas of the state. The top three commodities by tonnage are cereal grains, animal feed, and other agricultural products. Combined, these three commodities comprise 66 percent of all tonnage associated with this district. In total, the top ten commodities represent 88 percent of all tonnage associated with this district. Other top commodities and their associated tonnage and directional share are shown in Table 3.27 and Figure 3.31.

Table 3.27 District 7 Major Commodities by Total Truck Tonnage, 2012

Name	Tons	Percent	Percent Origin
Cereal Grains	33,350,820	44%	51%
Animal Feed	10,528,479	14%	28%
Other Agricultural Products	6,126,797	8%	46%
Nonmetal Mineral Products	3,988,514	5%	49%
Other Foodstuffs.	3,338,627	4%	59%
Gravel	2,372,954	3%	10%
Coal-n.e.c.	1,929,426	3%	58%
Waste/Scrap	1,834,849	2%	52%
Logs	1,231,442	2%	35%
Live Animals/Fish	975,659	1%	76%
All Others	9,339,594	12%	48%

Source: Freight Analysis Framework Data, Disaggregated by Cambridge Systematics, 2012.

Figure 3.31 District 7 Major Commodities by Total Truck Tonnage, 2012



Source: Freight Analysis Framework Data, Disaggregated by Cambridge Systematics, 2012.

District 8

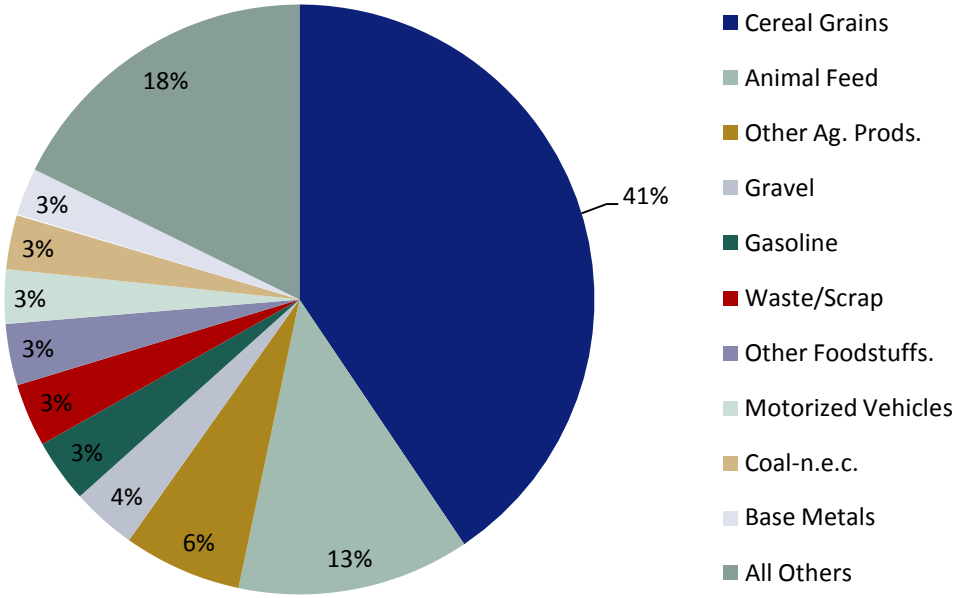
District 8 is defined as the combined counties of Chippewa, Kandiyohi, Lac qui Parle, Lincoln, Lyon, McLeod, Meeker, Murray, Pipestone, Redwood, Renville, and Yellow Medicine. This district is also heavily focused on agricultural products with cereal grains, animal feed, and other agricultural products representing 60 percent of all commodities. Other high tonnage commodities include gravel, gasoline, and waster/scrap. The details of the top ten commodities associated with this region are shown in Table 3.28 and Figure 3.32 for both tonnage and directional split.

Table 3.28 District 8 Major Commodities by Total Truck Tonnage, 2012

Name	Tons	Percent	Percent Origin
Cereal Grains	25,181,939	41%	51%
Animal Feed	7,916,521	13%	43%
Other Agricultural Products	4,027,701	6%	51%
Gravel	2,210,740	4%	26%
Gasoline	2,156,431	3%	50%
Waste/Scrap	2,146,823	3%	66%
Other Foodstuffs.	2,090,693	3%	63%
Motorized Vehicles	1,845,853	3%	84%
Coal-n.e.c.	1,838,020	3%	58%
Base Metals	1,646,764	3%	73%
All Others	11,010,578	18%	52%

Source: Freight Analysis Framework Data, Disaggregated by Cambridge Systematics, 2012.

Figure 3.32 District 8 Major Commodities by Total Truck Tonnage, 2012



Source: Freight Analysis Framework Data, Disaggregated by Cambridge Systematics, 2012.