





WISCONSIN STATE
Freight Plan





April 2018

WISCONSIN DEPARTMENT OF TRANSPORTATION



THIS PAGE INTENTIONALLY LEFT BLANK

Wisconsin Department of Transportation

www.wisconsindot.gov

Scott Walker
Governor

Dave Ross
Secretary

Office of the Secretary
4822 Madison Yards Way
Room S903
Madison, WI 53705

Telephone: 608-266-1113
FAX: 608-266-9912
E-mail: sec.exec@dot.wi.gov

April 2018

Dear Transportation Partner:

I am pleased to announce that the Wisconsin Department of Transportation (WisDOT) has adopted the first-ever Wisconsin State Freight Plan (SFP). Completion of the SFP marks the end of a collaborative and complex effort to develop a multimodal strategy that enhances freight mobility throughout Wisconsin.

Freight movement is critical to Wisconsin's economic competitiveness at regional, national, and global scales. A network of roadways, airports, harbors, pipelines, and railroads link Wisconsin businesses and consumers to the global economy. As stewards of federal and state funding, it is WisDOT's responsibility to ensure investment priorities yield a safe, reliable, and efficient freight system. To successfully guide investment decisions, the SFP defined the following vision for freight mobility in Wisconsin:

"WisDOT envisions a multimodal freight transportation system that enhances the state's economic productivity, competitiveness, and quality of life through the movement of goods safely, reliably, and efficiently, while minimizing impacts to the natural environment."

Completion of the SFP was a collaborative effort and the product of extensive outreach to stakeholder groups. I want to personally thank all the individuals and organizations who participated in the planning process, especially the members of Wisconsin's Freight Advisory Committee. Your input is critical when developing statewide long-range transportation plans and ensures the interests of Wisconsin residents are reflected.

We are excited about the future of freight in Wisconsin and look forward to fostering a thriving economy that supports business success and a high quality of life for all Wisconsin residents.

Sincerely,

Dave Ross
Secretary

THIS PAGE INTENTIONALLY LEFT BLANK

APPROVAL

System-plan Environmental Evaluation (SEE)
for
State Freight Plan

Submitted by the
State of Wisconsin, Department of Transportation

4-24-18
Signature Date

Donna Brown-Martin, Director
Bureau of Planning and Economic Development
Wisconsin Department of Transportation
P.O. Box 7913
Madison, WI 53707
donna.brownmartin@dot.wi.gov
(608) 286-8066

4/26/2018
Signature Date

Steve Krebs, Deputy Administrator
Division of Transportation System Development
Wisconsin Department of Transportation
P.O. Box 7913
Madison, WI 53707
steven.krebs@dot.wi.gov
(608) 220-2278

Comments for the State Freight Plan and SEE were accepted from December 9, 2016 until January 23, 2017.

Public Hearings for the State Freight Plan were held on December 13, December 14, and December 15, 2016.

THIS PAGE INTENTIONALLY LEFT BLANK

The State Freight Plan was prepared by the Wisconsin Department of Transportation, Division of Transportation Investment Management.

Under Governor Scott Walker's leadership Wisconsin's economic competitiveness has grown stronger. Innovative research and ongoing stakeholder engagement will ensure Wisconsin is well-positioned to address freight-related challenges, now and in the future.

We express our gratitude for those who provided guidance and feedback throughout the drafting of the plan. This includes private sector representatives on the Freight Advisory Committee, as well as Department leadership and staff. We are also grateful for the assistance of the Wisconsin Economic Development Corporation and our partner agencies throughout the state.

Lastly, we would like to thank the citizens of Wisconsin who brought forth issues which helped ensure the plan addressed topics important to the public.

WISCONSIN DEPARTMENT OF TRANSPORTATION

wisconsindot.gov/freightplan

Table of Contents

Chapter 1: Introduction		1
1.1	State Freight Plan Vision, Goals and Strategies	1
1.2	FAST Act Compliance	2
1.3	Wisconsin Freight Plan Link to National Freight Goals and Policy	3
1.4	Wisconsin SFP Chapter Structure	5
1.5	State Freight Plan Development Process	5
Chapter 2: Transportation Stakeholders and Institutions		7
2.1	Introduction	7
2.2	Federal Organizations	7
2.3	Wisconsin Organizations	10
2.4	Regional and Local Partners Within Wisconsin	14
2.5	Local Government	18
2.6	Private Sector and Stakeholder Partners	20
2.7	Multi-State Freight-Focused Organizations	21
Chapter 3: Public Involvement		25
3.1	WisDOT's Public Involvement Process	25
3.2	Phase 1: Pre Draft Plan and SEE Development and Needs Identification	26
3.3	Phase 2: Draft Plan	36
3.4	Phase 3: Final Plan	39
Chapter 3, Appendix 3-1 – Public Hearings		42
Chapter 4: Economic Context of Freight on Wisconsin's Transportation System		43
4.1	Introduction	43
4.2	Wisconsin's Economy	43
4.3	Wisconsin's Freight-Dependent Economic Sectors	45
4.4	Wisconsin's Regional Economies and Freight Movement	56
4.5	Wisconsin's Connections to the Global Economy	61
4.6	State and Province Trading Partners	63
Chapter 5: Wisconsin's Transportation System Assets		67
5.1	Background on Wisconsin's Use of Freight Modes	67
5.2	Wisconsin's Roadways	69
5.3	Wisconsin's Railroads	89
5.4	Wisconsin's Intermodal and Transload Facilities	98
5.5	Wisconsin's Airports	101
5.6	Wisconsin's Ports, Waterways, and Ferries	103
5.7	Wisconsin's Pipelines	110
5.8	National Transportation Networks in Wisconsin	122
Chapter 6: Transportation System Condition and Performance		129
6.1	About Performance Measures	129
6.2	Freight Operations, Mobility, and Reliability	132
6.3	Transportation Accountability	136

6.4 Transportation System Safety 138
6.5 Transportation System Condition 154
6.6 Transportation System Performance 182
6.7 Performance Using Federally Available Data Sets 194

Chapter 7: Freight Transportation Trends, Issues, and Forecasts 203
7.1 Changing Global Economy 203
7.2 Growth in Energy Production 208
7.3 Changing United States Economy 213
7.4 Wisconsin Modal Trends, Issues, and Forecasts 216
7.5 Wisconsin Rail Trends, Issues, and Forecasts 224
7.6 Wisconsin Highway/Truck Trends, Issues, and Forecasts 239
7.7 Wisconsin Waterway (Port/Harbor) Trends, Issues, and Forecasts 254
7.8 Wisconsin Pipelines Trends, Issues, and Forecasts 261
7.9 Wisconsin Air Cargo/Freight Trends, Issues, and Forecasts 266
7.10 Wisconsin Populations Trends 272

Chapter 8: Freight Policies and Strategies 277
8.1 Introduction and Background 277
8.2 Highway Policies and Strategies 278
8.3 Local Roads Policies and Strategies 293
8.4 Railroad Policies and Strategies 295
8.5 Ports and Waterways Policies and Strategies 302
8.6 Air Policies and Strategies 306
8.7 Pipeline Policies and Strategies 307
8.8 Factors Influencing and Supporting Freight Policies and Strategies 312

Chapter 9: Investment and Implementation 317
9.1 National Initiatives Informing State Freight Plan Implementation 317
9.2 Funding and Freight Plan Investment 326
9.3 Freight Plan Implementation 352
Chapter 9, Appendix 9-1 – Freight Projects 372
Chapter 9, Appendix 9-2 – Freight Projects Programmed to Use NHFP Funds 372

Chapter 10: Environmental Justice Analysis 373
10.1 Introduction 373
10.2 Summary of Wisconsin's Population Demographics 374
10.3 Demographic Analysis of Populations Adjacent to Freight Transportation System 394
10.4 Environmental Justice Impacts of State Freight Plan Policies 402
10.5 Public Involvement 404
10.6 Discussion and Next Steps 405

Chapter 11: System-Plan Environmental Evaluation 407
11.1 Introduction 407
11.2 Modal Comparison of Base Case and State Freight Plan 411
11.3 Qualitative Assessment 425
11.4 Impact Avoidance, Minimization, and Mitigation Strategies 448
Chapter 11, Appendix 11-1 – Environmental Resource Agency Input 451

THIS PAGE INTENTIONALLY LEFT BLANK

1 – Chapter 1: Introduction

Wisconsin has a robust multimodal transportation system that supports over five million people, 230,000 businesses, and nearly 109,000 shippers, all of whom rely on a safe and efficient transportation system daily. The state's transportation system supports economic, recreational, and personal travel in its $300 billion economy (2015).[1,2]

Overview of Chapter 1

- Describes the vision, goals, and strategies for the Wisconsin State Freight Plan
- Articulates links to the national freight strategic goals identified in federal legislation
- Provides an overview of the plan's structure
- Outlines the development of the State Freight Plan

As a subset of the overall multimodal transportation system, Wisconsin's multimodal freight transportation system underpins Wisconsin's economy by providing efficient transportation of goods. Wisconsin's multimodal freight transportation system includes roadways, railways, waterways, intermodal facilities (including truck-rail), airports, and pipelines.

1.1 State Freight Plan Vision, Goals, and Strategies

To guide the development of the State Freight Plan (SFP), the Wisconsin Department of Transportation (WisDOT) developed a freight-specific vision and goals. The vision and goals are carried through each chapter and inform key decision points, and most importantly are underpinned by strategies used to identify policies and investments.

Vision

Wisconsin's quality of life and economic growth depends on a safe, efficient, and coordinated multimodal freight transportation system that provides choices for the movement of goods to, from and within the state.

To help meet the state's freight mobility demands, WisDOT has developed the SFP to define policy direction, inform future transportation investment, and provide an implementation plan to advance the safety and efficiency of freight movements in the state. As the state's first long-range multimodal freight plan, the SFP links freight transportation needs to department policy, programming, and investment activities.

***Connections 2030* Vision for Multimodal Transportation**

WisDOT envisions an integrated multimodal transportation system that maximizes the safe and efficient movement of people and products throughout the state, enhancing economic productivity and the quality of Wisconsin's communities while minimizing impacts to the natural environment.

-Connections 2030

[1] U.S. Census Bureau, "Annual Estimates of the Resident Population: April 1, 2010 to July 1, 2015."
[2] U.S. Bureau of Economic Analysis, "Wisconsin."

Adapted from WisDOT's long-range multimodal transportation plan *Connections 2030*, the vision for the SFP emphasizes those elements most important to goods movement in the state. The SFP vision is as follows:

WisDOT envisions a multimodal freight transportation system that enhances the state's economic productivity, competitiveness, and quality of life through the movement of goods safely, reliably, and efficiently, while minimizing impacts to the natural environment.

Key SFP Goals and Strategies

The foundational goals developed to support WisDOT's vision for the multimodal freight transportation system have been adapted from *Connections 2030*. These goals form the basis for policy and other strategy recommendations contained in the SFP. SFP goals are as follows:

- Enhance Safety, Security, and Resiliency
- Ensure System Preservation and Enhancement
- Enhance System Mobility, Operations, Reliability, Efficiency, and Connectivity

In support of these goals, WisDOT developed the following strategic approaches to guide policy development:

- Position WisDOT to facilitate the safe and efficient movement of freight – provide convenient and accessible avenues to receive and address stakeholder concerns, challenges, and emerging trends to enable the safe and efficient movement of freight
- Integrate freight data and information into WisDOT investment decisions – integrate freight data and stakeholder input into WisDOT's planning, policies, programming, and operational decisions
- Promote statewide multimodal freight access and connection – promote adequate rural and urban access to regional and national markets and enable multimodal connections to freight facilities and services

1.2 FAST Act Compliance

The Fixing America's Surface Transportation (FAST) Act is a federal funding and authorization bill that governs federal spending on transportation. The bill was signed by President Obama on December 4, 2015, providing $305 billion for federal fiscal years 2015 to 2020. The FAST Act requires state freight plans in order to be eligible for National Highway Freight Program funding. State freight plans have to be developed in compliance with the FAST Act and must be updated every five years.

As specified in the FAST Act, effective two years after the date of enactment of the FAST Act, a state may not use and allocate National Highway Freight Program funds for freight-related projects unless the state has developed a freight plan in accordance with the FAST Act (Table 1-1). Adoption of the Wisconsin SFP will take place in advance of the FAST Act requirement for states to adopt a state freight plan. Table 1-1 identifies the FAST Act State Freight Plan requirements and lists the chapters of the Wisconsin SFP that address these requirements.

Table 1-1: FAST Act State Freight Plan Requirements

FAST Act – State Freight Plan – Requirements	Wisconsin State Freight Plan Compliance
Identification of freight system trends, needs, and issues with respect to the state	• Chapter 7, *Freight Transportation Trends, Issues, and Forecasts*
Description of the freight policies, strategies, and performance measures that will guide freight-related transportation investment decisions of the state	• Chapter 6, *Transportation System Condition and Performance* • Chapter 8, *Freight Policies and Strategies* • Chapter 9, *Investment and Implementation*
When applicable, a listing of – multimodal and critical rural and urban freight corridors designated within the state	• Chapter 9, *Investment and Implementation*
Description of how the plan will improve the ability of the state to meet national multimodal freight goals and national highway freight program goals	• Chapter 1, *Introduction* • Chapter 6, *Transportation System Condition and Performance* • Chapter 8, *Freight Policies and Strategies* • Chapter 9, *Investment and Implementation*
Description of how innovative technologies and operational strategies, including freight intelligent transportation systems, that improve the safety and efficiency of freight movement, were considered	• Chapter 5, *Wisconsin's Transportation System Assets* • Chapter 8, *Freight Policies and Strategies* • Chapter 9, *Investment and Implementation*
In the case of roadways on which travel by heavy vehicles is projected to substantially deteriorate the condition of the roadways, a description of improvements that may be required to reduce or impede the deterioration	• Chapter 6, *Transportation System Condition and Performance* • Chapter 8, *Freight Policies and Strategies* • Chapter 9, *Investment and Implementation*
Inventory of facilities with freight mobility issues, such as bottlenecks, within the state, and for those facilities that are state owned or operated, a description of the strategies the state is employing to address freight mobility issues	• Chapter 6, *Transportation System Condition and Performance* • Chapter 9, *Investment and Implementation*
Consideration of any significant congestion or delay caused by freight movements and strategies to mitigate that congestion or delay	• Chapter 6, *Transportation System Condition and Performance* • Chapter 9, *Investment and Implementation*
Freight investment plan that includes a list of priority projects and describes how funds made available would be invested and matched	• Chapter 9, *Investment and Implementation*
Consultation with the state freight advisory committee, as applicable	• Chapter 3, *Public Involvement* • Chapter 8, *Freight Policies and Strategies* • Chapter 9, *Investment and Implementation*

1.3 Wisconsin Freight Plan Link to National Freight Goals and Policy

In line with requirements of the FAST Act, the goals and strategies of the Wisconsin SFP reflect and incorporate the national multimodal freight policy goals and the national highway freight program goals established in the FAST Act. The following section outlines the goals of the national multimodal freight policy and the national highway freight program, as well as discusses how the Wisconsin SFP advances these goals.

National Multimodal Freight Policy Goals

- Identify infrastructure improvements, policies and operational innovations that:
  - Strengthen the contribution of the National Multimodal Freight Network to the economic competitiveness of the United States
  - Reduce congestion and eliminate bottlenecks on the National Multimodal Freight Network
  - Increase productivity, particularly for domestic industries and businesses that create high-value jobs

- Improve the safety, security, efficiency, and resiliency of multimodal freight transportation
- Achieve and maintain a state of good repair on the National Multimodal Freight Network
- Use innovation and advanced technology to improve the safety, efficiency, and reliability of the National Multimodal Freight Network
- Improve the economic efficiency and productivity of the National Multimodal Freight Network
- Improve the reliability of freight transportation
- Improve the short- and long-distance movement of goods that:
    - Travel across rural areas between population centers
    - Travel between rural areas and population centers
    - Travel from the nation's ports, airports and gateways to the National Multimodal Freight Network
- Improve the flexibility of states to support multi-state corridor planning and the creation of multi-state organizations to increase the ability of states to address multimodal freight connectivity
- Reduce adverse environmental impacts of freight movement on the National Multimodal Freight Network
- Pursue the goals in a manner that is not burdensome to state and local governments

The Wisconsin SFP is a multimodal document that identifies policies, strategies, and projects to improve the state's economic productivity, competitiveness, and quality of life through the movement of goods safely, reliably, and efficiently. These policies, strategies, and projects are developed by identifying the condition and performance, as well as the trends and issues facing Wisconsin's multimodal freight transportation system through data and stakeholder outreach. The multimodal and statewide focus of the Wisconsin SFP ensures that the analysis covers freight transportation in rural and urban contexts, short- and long-distance movements, and connections between modes.

Through this approach, the Wisconsin SFP will advance the economic competitiveness of the United States by addressing bottlenecks and improving safety, security, efficiency, and resiliency, while minimizing impacts to the natural environment. The Wisconsin SFP identifies the state's critical multimodal freight facilities, enabling freight coordination between states through Wisconsin's membership in multi-state organizations such as the Mid-America Freight Coalition.

National Highway Freight Program Goals

- Invest in infrastructure improvements and implement operational improvements on the highways of the United States that:
    - Strengthen the contribution of the National Highway Freight Network to the economic competitiveness of the United States
    - Reduce congestion and bottlenecks on the National Highway Freight Network
    - Reduce the cost of freight transportation
    - Improve the year-round reliability of freight transportation
    - Increase productivity, particularly for domestic industries and businesses that create high-value jobs
- Improve the safety, security, efficiency, and resiliency of freight transportation in rural and urban areas;
- Improve the state of good repair of the National Highway Freight Network
- Use innovation and advanced technology to improve the safety, efficiency, and reliability of the National Highway Freight Network
- Improve the efficiency and productivity of the National Highway Freight Network
- Improve the flexibility of states to support multi-state corridor planning and the creation of multi-state organizations to increase the ability of states to address highway freight connectivity
- Reduce the environmental impacts of freight movement on the National Highway Freight Network

Similar to the national multimodal freight policy goals, the national highway freight program goals are advanced in the Wisconsin SFP through the plan's approach and recommendations. The Wisconsin SFP identifies policies, strategies, and projects that advance WisDOT's vision of a multimodal freight transportation system that enhances the state's economic productivity, competitiveness, and quality of life through the movement of goods safely, reliably, and efficiently, while minimizing impacts to the natural environment. By advancing Wisconsin's vision for freight in the state, the Wisconsin SFP will advance the economic competitiveness of the United States through the reduction of congestion and cost, and increase the reliability, safety, security, resiliency, and overall competitiveness of domestic industries. The Wisconsin SFP identifies the state's critical highway facilities, enabling freight coordination between states through Wisconsin's membership in multi-state organizations such as the Mid-America Freight Coalition.

1.4 Wisconsin SFP Chapter Structure

Part One – Chapters 1-4: Plan Overview and Context

- **Chapter 1 –** Introduces the Wisconsin State Freight Plan
- **Chapter 2 –** Provides an overview of freight-related roles and responsibilities for WisDOT and its partners
- **Chapter 3 –** Reviews public involvement activities that helped shape the plan
- **Chapter 4 –** Provides an overview of the economic importance of freight transportation in Wisconsin

Part Two – Chapters 5-7: System Inventory and Needs

- **Chapter 5 –** Provides an inventory and assessment of the condition of state transportation assets that support freight movement
- **Chapter 6 –** Reviews operational, safety and security elements associated with freight transportation
- **Chapter 7 –** Describes some of the key trends and issues facing the state's transportation system

Part Three – Chapters 8-9: Freight Plan Implementation

- **Chapter 8 –** Describes WisDOT's implementation strategy focusing on freight-related policy elements and provides a basic overview of the state's transportation funding structure
- **Chapter 9 –** Provides an implementation plan, strategies, and freight-related performance measures

Part Four – Chapters 10-11: Estimated Impact of Freight on Communities and Environment

- **Chapters 10 & 11 –** Documents the system-plan environmental evaluation and the environmental justice analysis of the potential impacts of the plan on the state's natural, cultural, minority, low income, senior, young, and zero-vehicle populations.

1.5 State Freight Plan Development Process

The SFP was developed by incorporating several factors, including legislation and national/regional emphasis, in accordance with the state's trends, challenges, opportunities, and with a special focus on public involvement.

Legislation and National/Regional Emphasis

The SFP was developed in accordance with FAST Act freight planning requirements. The SFP identifies the strategies and performance measures that will guide freight-related transportation investment decisions in Wisconsin. As required, the SFP includes a freight investment plan that outlines a list of priority projects and describes how dedicated freight funds are invested and matched.

Focus on Transportation Investments and Economic Development

The SFP meets the challenge of defining freight-specific policies that address system demands and reflect industry needs within the context of a fiscally-constrained environment.

Needs, Trends, Challenges and Opportunities

The SFP identifies the needs of the Wisconsin economy, current and emerging freight trends, challenges Wisconsin's transportation is facing or will face in the future, and opportunities for increasing efficiency going forward. WisDOT developed the SFP policies to address these trends and challenges.

Public Involvement

Public involvement activities that shaped the SFP included public outreach efforts that helped guide the development of the plan. Based on federal guidance regarding environmental justice considerations, a special focus was placed on soliciting stakeholder input and assessing the impact on environmental justice populations. Additional outreach activities during the draft plan public review effort helped to refine the SFP's policies.

Providing an Implementation and Performance Monitoring Strategy

To meet future freight mobility demands, the SFP provides a systematic way to measure system performance via the implementation of policies and the identification of prioritized networks for highways and the state-supported rail system.

2– Chapter 2: Transportation Stakeholders and Institutions

2.1 Introduction

Overview of Chapter 2
• Overview of the roles and responsibilities for government and the private sector in the management and operation of the state's freight transportation system.

Responsibility for the safety, maintenance, operation, planning, and funding of the state's multimodal freight transportation system is shared by a full range of stakeholders and institutions, including the federal government, state government, local governments, and private entities. As a result, the operation of a seamless transportation system requires coordination, collaboration, communication, and cooperation.

Understanding the roles of entities involved helps to further identify the parameters for the development and implementation of freight-specific policies and actions. This chapter provides an overview of freight-related roles and responsibilities for federal agencies, state agencies, local jurisdictions, and private-sector participants. This chapter also describes the Wisconsin Department of Transportation's (WisDOT) role in freight transportation relative to public and private organizations.

2.2 Federal Organizations

The United States Department of Transportation

The mission of the United States Department of Transportation (U.S. DOT) is to serve the United States by ensuring a fast, safe, efficient, accessible and convenient transportation system that meets vital national interests and enhances the quality of life of the American people, today and into the future.[1] The Office of the Secretary at U.S. DOT oversees the formulation of national transportation policy and promotes intermodal transportation, which is critical to the reliable transport of freight. U.S. DOT has many operating administrations (listed below) that support the multimodal needs of the country's transportation system.

Federal Aviation Administration

The Federal Aviation Administration (FAA) oversees the safety of civil aviation. Safety is the FAA's primary mission and includes the issuance and enforcement of regulations and standards related to the manufacture, operation, certification and maintenance of aircraft.[2] In addition, the agency is responsible for the rating and certification of airmen as well as the certification of airports serving air carriers. It also regulates a program to protect the security of civil aviation, and enforces regulations under the Hazardous Materials Transportation Act for shipments by air.[3]

[1] U.S. Department of Transportation, "About Us."
[2] U.S. Department of Transportation, "Administrations."
[3] Ibid.

FAA operates a network of airport towers, air route traffic control centers, and flight service stations. It also develops air traffic rules, allocates the use of airspace, and provides for the security control of air traffic to meet national defense requirements. Other responsibilities include the construction or installation of visual and electronic aids to air navigation and promotion of aviation safety internationally.[4] Additionally, FAA provides funding to Wisconsin to support needed airport improvement and maintenance projects.

Federal Highway Administration

The Federal Highway Administration (FHWA) coordinates national highway transportation programs in cooperation with states and other partners to enhance the country's safety, economic vitality, quality of life, and the environment.[5] FHWA also manages a comprehensive research, development, and technology program. Major program areas administered by FHWA include:

- The Federal-Aid Highway Program, which provides federal financial assistance to states to construct and improve the National Highway System (NHS), urban and rural roads, and bridges.[6] This program provides funds for general improvements and development of safe highways and roads.
- The Federal Lands Highway Program provides access to and within national forests, national parks, Indian reservations and other public lands by preparing plans and contracts, supervising construction facilities, and conducting bridge inspections and surveys.[7]

Federal Motor Carrier Safety Administration

The Federal Motor Carrier Safety Administration's (FMCSA) primary mission is to prevent commercial motor vehicle-related fatalities and injuries. FMCSA activities contribute to:

- Ensuring safety in motor carrier operations through strong enforcement of safety regulations, targeting high-risk carriers and commercial motor vehicle drivers
- Improving safety information systems and commercial motor vehicle technologies
- Strengthening commercial motor vehicle equipment and operating standards
- Increasing safety awareness[8]

To accomplish these activities, FMCSA works with federal, state, and local enforcement agencies, the motor carrier industry, labor safety interest groups, and others.[9] FMCSA's initiatives ensure that motor carriers remain safe alongside the general traveling public while delivering goods to their final destination.

Federal Railroad Administration

The Federal Railroad Administration (FRA) promotes safe and environmentally sound rail transportation. With the responsibility of ensuring railroad safety throughout the nation, the FRA employs safety inspectors to monitor railroad compliance with federally mandated safety standards including track maintenance, inspection standards and operating practices.[10] The FRA conducts research and development tests to evaluate projects in support of its safety mission and to enhance the railroad system as a national transportation resource. Public education campaigns focused on highway-rail grade crossing safety and the danger of trespassing on rail property are also administered by FRA.[11]

---

[4] U.S. Department of Transportation, "Administrations."
[5] Ibid.
[6] Ibid.
[7] Ibid.
[8] Ibid.
[9] Ibid.
[10] Ibid.
[11] Ibid.

Pipeline and Hazardous Materials Safety Administration

The Pipeline and Hazardous Materials Safety Administration (PHMSA) oversees the safety of more than 800,000 daily shipments of hazardous materials in the United States and 64 percent of the nation's energy that is transported by pipelines. PHMSA is dedicated solely to safety by working toward the elimination of transportation-related deaths and injuries in hazardous materials and pipeline transportation, and by promoting transportation solutions that enhance communities and protect the natural environment.[12]

Maritime Administration

The Maritime Administration (MARAD) promotes development and maintenance of an adequate, well-balanced, United States merchant marine, sufficient to carry the nation's domestic waterborne commerce and a substantial portion of its waterborne foreign commerce. Efforts also are focused on ensuring the merchant marine is capable of serving as a naval and military auxiliary in time of war or national emergency. MARAD also seeks to ensure that the United States has adequate shipbuilding and repair service, efficient ports, effective intermodal water and land transportation systems, and reserve shipping capacity in times of national emergency.[13]

Surface Transportation Board

The Surface Transportation Board (STB) is an independent adjudicatory and economic-regulatory agency. The agency has jurisdiction over railroad rate and service issues and rail restructuring transactions (mergers, line sales, line construction, and line abandonments); certain trucking company, moving van, and non-contiguous ocean shipping-company rate matters; and rates and services of certain pipelines not regulated by the Federal Energy Regulatory Commission.[14] The agency has authority to investigate rail service matters of regional and national significance.

The United States Department of Defense

United States Army Corps of Engineers

The United States Army Corps of Engineers (USACE) delivers engineering services to customers in more than 130 countries. With environmental sustainability as a guiding principle, USACE works diligently to strength the nation's security by building and maintaining America's infrastructure and providing military facilities where service members train, work and live.[15] The USACE energizes the economy by dredging America's waterways to support the movement of critical commodities.

The United States Department of Energy

Federal Energy Regulatory Commission

The Federal Energy Regulatory Commission (FERC) is an independent agency that regulates the interstate transmission of electricity, natural gas, and oil.[16] FERC also reviews proposals to build liquefied natural gas terminals and interstate natural gas pipelines as well as licensing hydropower projects.

[12] U.S. Department of Transportation, "Administrations."
[13] Ibid.
[14] Surface Transportation Board, "About STB > Overview."
[15] U.S. Army Corps of Engineers, "About Us."
[16] Federal Energy Regulatory Commission, "About FERC > What FERC Does."

The United States Department of Homeland Security

United States Coast Guard

The United States Coast Guard (USCG) is one of the five armed forces of the United States and the only military branch within the Department of Homeland Security. The USCG protects system users, the marine transportation system and infrastructure, natural and economic resources, and the territorial integrity of the nation from both internal and external threats.[17] The USCG protects these interests in United States ports and inland waterways, along the coasts and on international waters.

The USCG is a military, multi-mission maritime force with military, law enforcement, humanitarian, regulatory, and diplomatic capabilities.[18] These capabilities underpin the USCG's three broad roles: maritime safety, maritime security, and maritime stewardship. Wisconsin is home to eight USCG stations located along Lake Michigan and Lake Superior.

United States Customs and Border Protection

United States Customs and Border Protection (CBP) has a complex mission at national ports of entry with broad law enforcement authority tied to screening all foreign visitors, returning American citizens and imported cargo entering the United States at more than 300 land, air, and sea ports. Each year, more than 11 million maritime containers arrive at United States seaports. At land borders, another 11 million arrive by truck and 2.7 million by rail.[19]

An important part of the CBP mission includes the facilitation of legitimate trade. In addition to its own regulations, CBP enforces over 400 laws on behalf of over 40 other United States government agencies. A large number of these import restrictions and requirements are designed to protect the American people from dangerous and illegal goods. CBP has undertaken a number of initiatives, such as the use of non-intrusive inspectional technology, to increase its ability to examine cargo effectively without slowing the flow of trade, which plays a significant part in the United States economy.[20]

2.3 Wisconsin Organizations

Office of the Governor

The governor, as Wisconsin's chief executive officer, represents all the people of the state. Because of this, the Office of the Governor is the focal point for receiving suggestions and complaints about state affairs. Administratively, the governor exercises authority through the power of appointment, consultation with department heads, and execution of the executive budget after its enactment by the legislature. The governor plays a key role in the legislative process through drafting the initial version of the biennial budget, which is submitted to the legislature in the form of a bill. Other opportunities to influence legislative action arise in the chief executive's state of the state message and special messages to the legislature about topics of concern. The governor also shapes the legislative process through the power to veto bills, call special sessions of the legislature, and appoint committees or task forces to study state problems and make recommendations for changes in the law.

[17] U.S. Coast Guard, "Homepage."
[18] Ibid.
[19] U.S. Customs and Border Protection, "Cargo Security and Examinations."
[20] Ibid.

Wisconsin Legislature

The legislative branch consists of the bicameral Wisconsin Legislature made up of the senate with 33 members and the assembly with 99 members, together with the service agencies created by the legislature and the staff employed by each house. The legislature's main responsibility is to make policy by enacting state laws. Its service agencies assist it by performing fiscal analysis, research, bill drafting, auditing, statute editing, and information technology functions.

Wisconsin Department of Transportation

The Wisconsin Department of Transportation's (WisDOT's) core mission is to provide leadership in the development and operation of a safe and efficient transportation system. WisDOT is responsible for maintaining, preserving, and improving the statewide multimodal transportation system. WisDOT's role varies depending on the mode and jurisdiction. Table 2-1 highlight WisDOT's roles and responsibilities for each freight transportation mode.

Freight Transportation Modes
A mode of transport is a term used to distinguish the different ways freight can be transported. The most common forms of modal freight transport in Wisconsin are road, rail, maritime, air, and pipeline.

Table 2-1: WisDOT Roles and Responsibilities by Freight Mode

Mode	WisDOT Roles and Responsibilities
Roadways and Bridges	• Maintains and preserves the state's highway system, including Interstate highways • Manages available federal and state funding for local roads and bridges, and provides technical assistance and resources to local governments when needed • Organizes highway system operations, such as specialized traffic engineering, oversize-overweight permits, preventive roadway maintenance, and winter maintenance operations • Regulates and enforces motor carrier safety and oversees commercial motor vehicle credentialing (e.g. licenses, permits, etc.)
Railroads	• Provides funding and support for rail preservation and improvements on designated publicly supported lines • Works to maintain, improve, and increase freight rail service through acquisition and coordination with Rail Transit Commissions (RTCs) • Coordinates with the Office of the Commissioner of Railroads (OCR) on rail-highway crossing safety issues • Works with railroads operating in the state
Maritime	• Communicates with the Wisconsin Commercial Ports Association, port owners, and port operators to address port and waterway issues • Provides funding and support for harbor and port improvements (including dredging and channel maintenance)
Air	• Coordinates with the FAA when there is a potential for substandard airway-highway clearances • Offers planning and funding assistance to maintain and improve infrastructure and air service at Wisconsin's airports • Develops and maintains the State Airport System Plan and prepares and maintains the Five-Year Airport Improvement Program
Pipelines	• Operates with the private sector and other state and federal agencies in response to disruptions in service, but does not have a direct role in pipeline planning and development

Department of Agriculture, Trade and Consumer Protection

The Department of Agriculture, Trade and Consumer Protection partners with other state agencies and the citizens of Wisconsin to grow the economy by promoting quality food, healthy plants and animals, sound use of land and water resources, and a fair marketplace.[21] Agricultural products are among the top commodities moving from and through Wisconsin each year. Agricultural producers, processors, and distributors rely on the transportation system to move equipment used to plant and harvest crops, apply nutrients, deliver milk, or transport agricultural products to market.

Department of Military Affairs

The Department of Military Affairs (DMA) provides military and emergency management capability and includes Joint Force Headquarters-Wisconsin, the Wisconsin Army and Air National Guard, and the Wisconsin Division of Emergency Management. DMA's Office of Wisconsin Emergency Management (WEM) coordinates with local, tribal, state, and federal agencies, as well as the volunteer and private sectors, to plan for, prepare for, and respond to natural disasters or man-made emergencies. WEM's programs include disaster planning and response, training and exercising, radiological emergency preparedness, hazard mitigation, emergency fire and police services, the State Disaster Fund, and the Emergency Planning and Community Right to Know Act.[22] WEM has six regional offices to provide local support, and is a lead coordinator when significant transportation incidents occur.

Department of Natural Resources

The Wisconsin Department of Natural Resources (DNR) works with other state agencies, citizens, and businesses to preserve and enhance the natural resources of Wisconsin. DNR staff manage fish, wildlife, forests, parks, air, and water resources while promoting a healthy, sustainable environment and economy.[23] DNR issues permits for source specific construction or operation. DNR works with WisDOT to ensure minimal impacts to the environment, administer permits to government and private entities for development that impacts natural areas, and manage Wisconsin's natural resources.

Public Service Commission

The Public Service Commission of Wisconsin (PSC) is an independent regulatory agency dedicated to serving the public interest. PSC is responsible for the regulation of Wisconsin public utilities, including those that are municipally owned. The types of utilities regulated include electric, natural gas, water, combined water and sewer utilities, and certain aspects of local telephone service. More than 1,100 utilities are under the agency's jurisdiction. Most of these must obtain PSC approval before setting new rates, issuing stocks or bonds, and undertaking major construction projects such as power plants, water wells, and transmission lines.[24]

The PSC is responsible for all major aspects of the regulation of Wisconsin's natural gas utilities, such as pipeline safety, construction related to the natural gas distribution system, and monitoring federal regulatory policy. The PSC inspects Wisconsin's eleven natural gas utilities for compliance with state and federal pipeline safety codes.[25]

---

[21] Wisconsin Department of Agriculture, Trade and Consumer Protection, "Mission, Vision and Core Values."
[22] Wisconsin Department of Military Affairs, "About Us."
[23] Wisconsin Department of Natural Resources, "About the DNR."
[24] Public Service Commission of Wisconsin.
[25] Ibid.

Office of the Commissioner of Railroads

The Office of the Commissioner of Railroads (OCR) has primary jurisdiction for the safety of public roadway-railway crossings, regardless of whether the crossing is at-grade or separated. In partnership with private rail firms, local governments and citizens, OCR oversees a variety of highway/rail crossing issues including:

- Replacement or enhancement of passive and active warning devices at highway/rail crossings
- Repair of rough highway/rail crossing surfaces
- Installation of highway/rail crossings at new locations
- Alteration of existing highway/rail crossings
- Closing or consolidating existing highway/rail crossings[26]

At-Grade and Separated Railroad Crossings

An at-grade railroad crossing is the intersection of a railway line and a road or path at the same level. A separated railroad crossing is a railway line that crosses over or under a road or path using a bridge or tunnel.

OCR is also responsible for ensuring the proper drainage in railroad rights of way, maintaining sight clearance at crossings, and regulating train crews.

Wisconsin Economic Development Corporation

The Wisconsin Economic Development Corporation (WEDC) leads economic development efforts for the state by advancing and maximizing opportunities in Wisconsin for businesses, communities, and people to thrive in a globally competitive economy. WEDC provides resources, operational support, and financial assistance to companies, partners, and communities in Wisconsin. WEDC achieves its mission through initiatives driven by five strategic pillars: business development; community and economic opportunity; strategic economic competitiveness; state brand management and promotion; and operational and fiscal excellence.[27] Working with more than 600 regional and local partners, WEDC develops and delivers solutions representative of a highly responsive and coordinated economic development network.

[26] State of Wisconsin Office of the Commissioner of Railroads, "Homepage."
[27] Wisconsin Economic Development Corporation, "In Wisconsin."

2.4 Regional and Local Partners Within Wisconsin

Native American Indian Tribal Nations

Wisconsin is home to eleven federally-recognized Native American Indian Tribal Nations. The reservations of these eleven sovereign nations occupy more than 500,000 acres across Wisconsin.[28] Wisconsin's Native American Tribes are responsible for the planning, construction, maintenance, and management of their transportation systems. As sovereign nations, the Tribes work with the state and federal government regarding transportation funding needs. Tribes also coordinate project development and construction in partnership with state and local jurisdictions for roads and other modal connections within or providing access to reservations, Tribal communities, and Tribal gaming and entertainment venues.

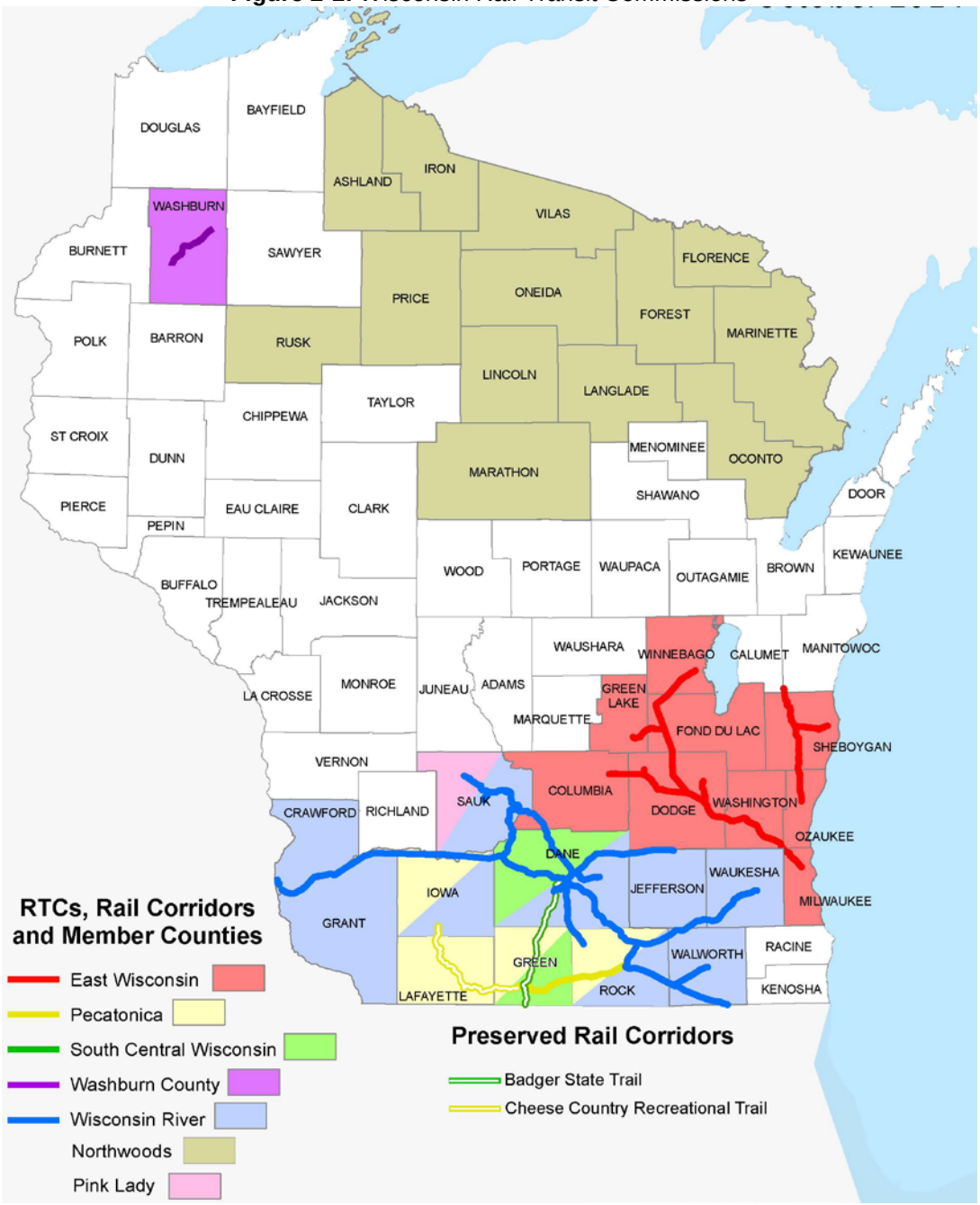
Wisconsin's Native American Indian Tribes	
There are eleven federally-recognized Tribes in Wisconsin. Listed below are all Tribes in Wisconsin (alphabetically):	
• Bad River Band of Lake Superior Tribe of Chippewa Indians • Forest County Potawatomi Community • Ho-Chunk Nation • Lac Courte Oreilles (LCO) Band of Lake Superior Chippewa • Lac du Flambeau (LdF) Band of Lake Superior Chippewa	• Menominee Nation • Mohican Nation, Stockbridge-Munsee Band • Oneida Tribe of Indians of Wisconsin • Red Cliff Band of Lake Superior Chippewa • St. Croix Band of Chippewa Indians • Sokaogon Chippewa Community

Rail Transit Commissions

Rail Transit Commissions (RTCs) were created under Wisconsin Statutes 59.968 and 66.30 to help preserve rail service or the potential for rail service, and to influence policies on the future use of rail corridors if existing rail service is proposed to be discontinued.[29] RTCs originally emerged as a mechanism to provide state funding in support of railroad improvements when the state was constitutionally prohibited from directly funding rail improvements through railroad operators. Even though the 1992 passage of an amendment to the constitution allows state funds to be used for railroad improvement purposes, the mechanism of public ownership with the RTCs remains. Grant agreements between WisDOT and RTCs determine how the lines can be used. There are seven RTCs currently operating in Wisconsin. They are responsible for the oversight and management of the state's publicly-supported 718 miles of rail lines. The state's publicly-owned lines and the corresponding RTCs are depicted in Figure 2-1.

[28] Native American Tourism of Wisconsin, "About Us."
[29] Wisconsin River Rail Transit Commission, "Rail Transit Commissions."

Figure 2-1: Wisconsin Rail Transit Commissions



Source: Wisconsin Department of Transportation, Bureau of Planning and Economic Development

The commissions are staffed by their member municipalities and, in some cases, by regional planning commission staff. The level of activity and scope of efforts varies between Wisconsin's RTCs. The commissions continue to be an important partner with WisDOT in preserving rail service. In this partnership arrangement, WisDOT provides resources, information, staff support, general oversight, and funding. The commissions provide matching funds and coordinate with shippers, freight rail operators, and local governments.

While WisDOT has the ability to purchase rail lines, RTCs have the ability to enter into partnership arrangements with railroads and WisDOT to manage the rail service. RTCs provide matching funds for the purchase and

rehabilitation of rail corridors. They also contract with a private operator to provide freight rail service. Wisconsin's publicly-supported rail lines are jointly owned by the state and a combination of RTCs, consortia and/or transit authorities.

Metropolitan Planning Organizations

Metropolitan Planning Organizations (MPOs), established under 23 CFR 450, are federally mandated transportation planning organizations comprised of private citizens, state and federal representatives, and representatives from local government and governmental transportation authorities. MPOs are responsible for the planning and programming decisions within their designated urbanized areas (50,000 or more population).[30] Federal funding for transportation projects and programs within the urbanized planning areas are channeled through the MPO planning process. Wisconsin's fourteen MPOs are responsible for transportation planning in the state's eighteen metropolitan areas (Figure 2-2). Five MPOs – Beloit, Dubuque, Duluth-Superior, La Crosse, and Southeastern Wisconsin – represent areas that cross a state border and thus require coordination with neighboring states.

Transportation Improvement Program (TIP)

The TIP is the detailed, near-term program to implement an MPO's long-range transportation plan. The TIP must contain all scheduled projects scheduled for the next six-years that are:

- Federally funded highway, transit, bicycle, pedestrian, and other transportation projects
- Regionally significant projects scheduled for implementation regardless of funding source

TIPs are incorporated into the Statewide Transportation Improvement Program (STIP). TIPs must be consistent with the State Long Range Transportation Plan. TIP projects can be implemented only after inclusion in the STIP. FHWA and the FTA must formally approve a TIP before it can be included in the STIP. A TIP approved by FHWA and FTA after the STIP production date must wait for a STIP amendment. STIP amendments are processed monthly.

The metropolitan planning process includes the development of a transportation plan, with at least a 20-year planning horizon, that includes both long- and short-range strategies leading to the development of an integrated, multimodal transportation system. MPOs also develop a Transportation Improvement Program (TIP). A TIP is a six-year financial program of projects that describes the schedule for obligating federal funds to state and local projects. The TIP contains funding information for all modes of transportation, including highways as well as transit capital and operating costs. A TIP must also contain all projects utilizing federal transportation funds, as well as any regionally significant projects in the area covered by the MPO, regardless of funding source.

Regional Planning Commissions

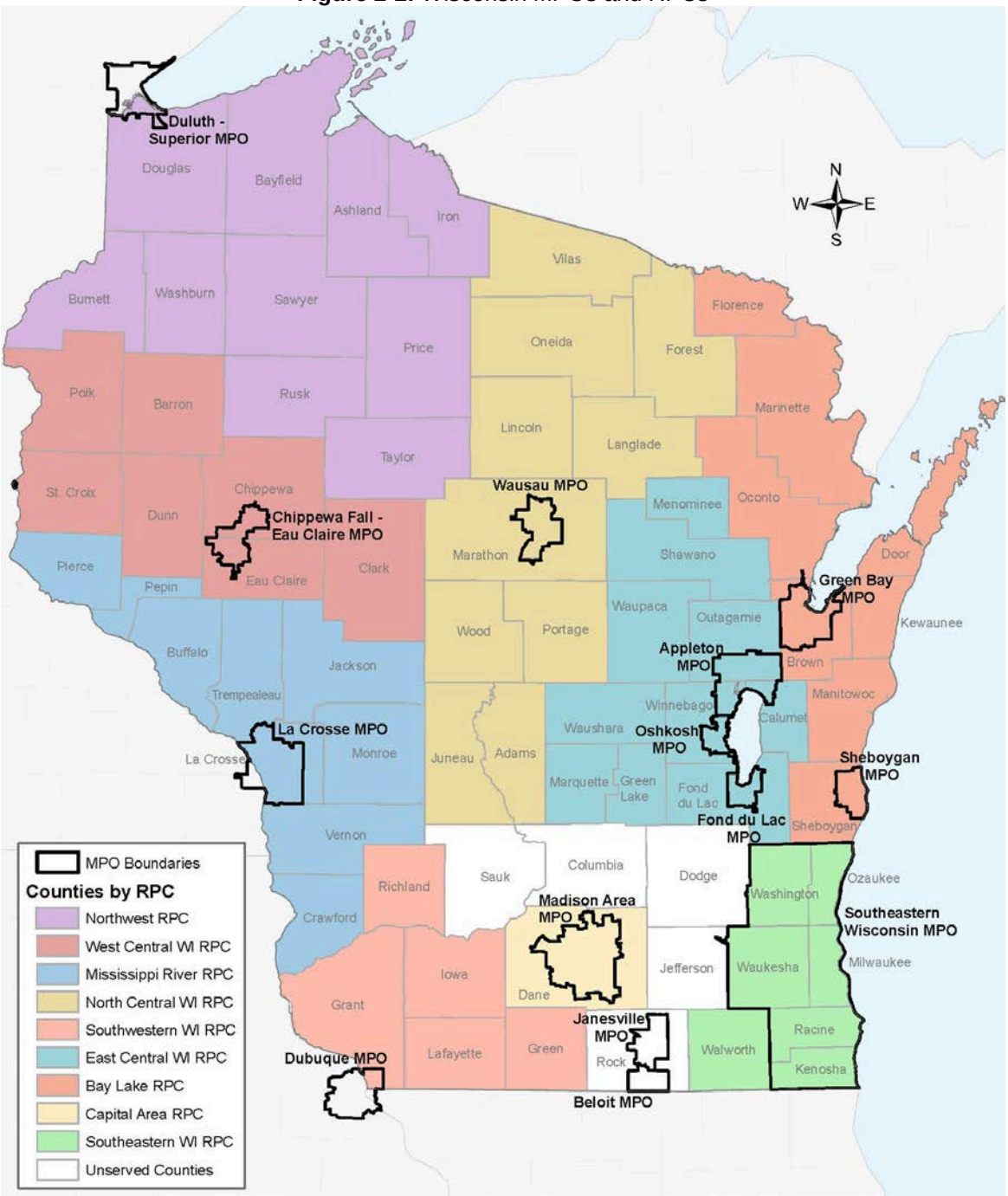
Wisconsin has nine Regional Planning Commissions (RPCs), created under the provisions of Wisconsin State Statute 66.0309. In Wisconsin, RPCs are formed by executive order of the governor and provide intergovernmental planning and coordination for the physical, social and economic development of a region. An RPC board, typically appointed by existing county boards and the governor, directs commission activities. All but five counties in the state – Columbia, Dodge, Jefferson, Rock and Sauk – are served by an RPC (Figure 2-2).

[30] 23 USC §§ 134-135.

RPCs provide planning assistance on regional issues, assist local interests in responding to state and federal programs, act as a coordinating agency for programs and activities, and provide planning and development assistance to local governments.

Wisconsin's RPCs are clearinghouses for reviewing federal grant applications for conformance with adopted regional and local plans and development priorities.

Figure 2-2: Wisconsin MPOs and RPCs



Source: Wisconsin Department of Transportation, Bureau of Planning and Economic Development

Wisconsin Regional Economic Development Organizations

All 72 counties in Wisconsin are served by one of nine designated regional economic development organizations. Together these nine regions comprise the Regional Leadership Council whose objective is to support mechanisms and communication capacities to better connect regional leadership to one another, the state and other partners that help to grow Wisconsin's economy.

Table 2-2: Wisconsin Regional Economic Development Organizations and Location

Wisconsin Regional Economic Development Organizations	Counties
Prosperity Southwest Wisconsin	Crawford, Richland, Grant, eastern half of Green, and Lafayette
Madison Regional Economic Partnership	Columbia, Dane, Dodge, west half of Green, Iowa, Jefferson, Rock, and Sauk
Milwaukee 7	Kenosha, Milwaukee, Ozaukee, Racine, Walworth, Washington, and Waukesha
7 Rivers Alliance	Jackson, Juneau, La Crosse, Monroe, Trempealeau, and Vernon
Centergy	Adams, south half of Lincoln, Marathon, Portage, and Wood
New North	Outagamie, Winnebago, Calumet, Waupaca, Brown, Shawano, Oconto, Marinette, Door, Kewaunee, Sheboygan, Manitowoc, Fond du Lac, Green Lake, Marquette, Florence, Menominee, and Waushara
Momentum West	Barron, Chippewa, Clark, Dunn, Eau Claire, Pepin, Pierce, Polk, Rusk, and St. Croix
Grow North	Forest, north half of Lincoln, Langlade, Oneida, and Vilas
Vision Northwest	Ashland, Bayfield, Burnett, Douglas, Iron, Price, Sawyer, Taylor, and Washburn

Source: Forward Wisconsin

2.5 Local Government

Wisconsin's local governments include counties, cities, villages, and towns. There are 1,924 communities that are units of general-purpose local government. Wisconsin is considered a "home rule state." Local governments in home rule states are free to pass laws and ordinances as they see fit to further their operations, within the bounds of the state and federal constitutions. WisDOT coordinates with local units of government on a wide array of transportation-related matters (e.g. roadway construction, oversize-overweight vehicle routing, etc.).

Wisconsin's Constitutional "Home Rule"
The Wisconsin Constitution provides that cities and villages "may determine their local affairs and government, subject only to this constitution and to such enactments of the legislature of statewide concern as with uniformity shall affect every city or every village." Under this provision, the method for a city or village to determine its own affairs is to be prescribed by the legislature [Art. XI, s. 3 (1), Wis. Const.].[31] This provision is known as "constitutional home rule," and means that if a policy is entirely a matter of a city or village's local affairs and government, a city or village is authorized to regulate that matter, and the legislature is prohibited from enacting a law that would preempt the local regulation of that matter. However, if a matter is exclusively a statewide concern or a legislative enactment applies uniformly to every city or village, the legislature may prohibit a city or village from enacting an ordinance on the matter and may regulate the matter through state laws. The constitutional home rule authority is granted only to a city or village. Other units of local government such as counties, towns and school districts do not have constitutional home rule authority.

[31] Wisconsin Legislative Council Information Memorandum, Constitutional Home Rule.

Counties

The county is the primary political subdivision of Wisconsin. Every county has a county seat, often a populous or centrally located city or village, where the government offices for the county are located. Within each county are cities, villages, and towns. Counties are generally responsible for social services, such as child welfare, job training and care of the elderly; and public land management, such as care of parks. Counties have full responsibility for county roadways. Counties are responsible for managing transportation and county highway work with WisDOT, cities, and towns. In addition, law enforcement is administered by the county, in conjunction with local municipalities. Wisconsin has 72 counties.

Cities

In Wisconsin, a city is an autonomous incorporated area within one or more counties. Cities provide almost all services to their residents and have the highest degree of home rule and taxing jurisdiction of all municipalities. Cities are generally more urbanized than towns. Cities have responsibility for their transportation facilities (e.g. roadways, transit facilities, etc.). Law enforcement is also administered by cities. Wisconsin has 190 cities.

Villages

In Wisconsin, a village is an autonomous incorporated area within one or more counties. It provides various services to its residents and has a degree of home rule and taxing jurisdiction over them. In order to incorporate as a village, a community must have at least 150 citizens if it is in a rural area or 2,500 residents if it is in an urban area. The home rule authority granted to villages allows them to make their own decisions about their affairs, administration, and much of their public policy, subject to state law. Wisconsin has 407 villages.

Towns

In Wisconsin, a town is an unincorporated jurisdiction within a county; Wisconsin towns are similar to civil townships in other states. All areas in the state that have not been incorporated as cities or villages are parts of towns. Towns provide a limited number of services to their residents. Wisconsin has 1,255 towns.

Towns have less authority than villages and cities; they do not, for instance, have home rule granted to them by the state, but instead have only the specific powers granted to them under state statute. Towns are responsible for the planning, construction, maintenance, and management of their roadways. In addition to their roadway responsibilities, town governments carry out a variety of functions and, in some instances, choose to provide more services. Some towns have been authorized to exercise village powers, increasing their authority.

2.6 Private Sector and Stakeholder Partners

A diverse set of private sector stakeholders is engaged in freight transportation. This set of stakeholders includes shippers (ranging from retailers to manufacturers to distributors), carriers (across all physical and economic modes such as full truckload, less than truckload, parcel, national rail, short-haul rail, air, barge and pipeline), and third-party firms (such as brokers, forwarders and third-party logistics providers). Professional specializations and the number of diverse stakeholders creates "silo-ing" within freight transportation. For example, each stakeholder group tends to hold its own conferences, belong to group-specific professional organizations, and lobby independently. For this reason, WisDOT has committed to forging strategic partnerships with the freight industry to facilitate efforts among multiple stakeholder groups (see Chapter 3, *Public Involvement*). WisDOT's hosting of the Governor's Freight Industry Summits is one example of the department's efforts to bring multiple stakeholder groups together to discuss complex freight transportation issues, problems and opportunities.

Governor's Freight Industry Summits

The purpose of the Governor's Freight Industry Summit is to provide a forum to generate targeted feedback on industry needs, understand issues of greatest importance to industry, strengthen relationships with industry, and develop a base for WisDOT actions and initiatives moving forward. WisDOT sponsored Governor's Freight Industry Summits each year from 2011 to 2014 and in 2016.

Firms

According to the United States Census Bureau, in 2012 there were 432,980 firms in Wisconsin.[32] Included are all non-farm businesses filing Internal Revenue Service tax forms as individual proprietorships, partnerships, or any type of corporation, and with receipts of $1,000 or more. A company or firm is a business consisting of one or more domestic establishments that the reporting firm specified under its ownership or control.

Establishments

An establishment is a single physical location at which business is conducted or where services or industrial operations are performed. It is not necessarily identical to a company or enterprise, which may consist of one establishment or more. When two or more activities are conducted at a single location under a single ownership, all activities are generally grouped together as a single establishment and classified on the basis of its major activity. Establishments with paid employees include all locations with paid employees any time during the year. In 2015, according to the United States Census Bureau, there was a total of 139,500 employer establishments in Wisconsin.[33]

Trade Associations

Wisconsin is home to hundreds of trade associations. A trade association, also known as an industry trade group, business association, or sector association, is an organization founded and funded by businesses that operate in a specific industry. An industry trade association participates in public relations activities such as advertising, education, lobbying, and publishing, but its focus is collaboration between companies. Associations may offer other services, such as producing conferences, networking, charitable events, classes, or educational materials. Many associations are non-profit organizations governed using bylaws and directed by officers who are also members.

[32] U.S. Census Bureau QuickFacts, "Wisconsin."
[33] Ibid.

Chambers of Commerce

A chamber of commerce is a form of business network, for example, a local organization of businesses whose goal is to further the interests of businesses. Business owners in towns and cities form these local societies to advocate on behalf of the business community. Local businesses are members, and they elect a board of directors or executive council to set policy for the chamber. Wisconsin is home to more than 350 local chambers of commerce.

Wisconsin Freight Advisory Committee

Wisconsin's 45-member Freight Advisory Committee (FAC) was established at Wisconsin's 2014 Governor's Freight Industry Summit. The role of the FAC is to help inform WisDOT on issues that impact freight mobility and to provide a voice for the freight sector on the development of freight-related policies, processes, and projects. The FAC held its inaugural meeting on April 23, 2015. Additional information about the FAC is provided in Chapter 3, *Public Involvement*.

Wisconsin's Freight Advisory Committee

The organizations represented on the FAC as of May 16, 2017 include (*italics = ex officio members*):

- American Chemistry Council
- Commercial Real Estate Development Association of Wisconsin
- Council of Supply Chain Management Professionals
- Duluth-Superior Metropolitan Interstate Council (National Association of MPOs)
- *Federal Highway Administration*
- *Federal Motor Carrier Safety Administration*
- *Federal Railroad Administration*
- Great Lakes Inter-Tribal Council
- Great Lakes Timber Professionals
- Lake States Lumber Association
- League of Wisconsin Municipalities
- Logistics Council of Milwaukee
- Madison International Trade Association
- Midwest Assembly, Warehouse & Distribution (Wisconsin Warehouse Association)
- Midwest Food Processors Association
- Milwaukee Water Council
- National Center for Freight & Infrastructure Research & Education
- National Electrical Manufacturers Association
- *Office of the Commissioner of Railroads*
- Owner-Operator Independent Drivers Association
- Specialized Carriers & Rigging Association
- Southeast Wisconsin Regional Planning Commission (Wisconsin Association of RPCs)
- The Kammer Group (Association of American Railroads)
- Transportation Development Association
- University of Wisconsin - Superior
- Urban Economic Development Association
- *U.S. Army Corps of Engineers*
- US Silica (Wisconsin Industrial Sand Association)
- WATCO Companies, LLC (American Short Line & Regional Rail Association)
- Wisconsin Agri-Business Association
- Wisconsin Builders Association
- Wisconsin Commercial Ports Association
- Wisconsin Counties Association
- *Wisconsin Department of Agriculture, Trade & Consumer Protection*
- *Wisconsin Department of Natural Resources*
- Wisconsin Economic Development Association
- *Wisconsin Economic Development Corporation*
- Wisconsin Farm Bureau Federation
- Wisconsin Manufacturers & Commerce
- Wisconsin Motor Carriers Association
- Wisconsin Paper Council
- *Wisconsin Public Service Commission*
- Wisconsin River Rail Transit Commission
- Wisconsin Security Research Consortium
- Wisconsin Towns Association

2.7 Multi-State Freight-Focused Organizations

The movement of freight often involves multiple transportation modes and routes that cross several states. To move freight efficiently, either regionally, nationally, or globally, freight must cross jurisdictional boundaries with

as few impediments as possible. Multi-state freight organizations provide a venue to plan and invest where the benefits of coordination and communication accrue to several states and stakeholder groups. WisDOT actively participates in several multi-state freight-focused organizations that have missions aimed at improving freight safety and mobility.

Mid-America Freight Coalition

The Mid-America Freight Coalition, formerly known as the Mississippi Valley Freight Coalition, is a regional organization that cooperates in the planning, operation, preservation, and improvement of transportation infrastructure in a manner that supports the reliable, efficient and safe movement of freight in the Midwest. This region includes 10 states (Illinois, Indiana, Iowa, Kansas, Kentucky, Michigan, Minnesota, Missouri, Ohio, and Wisconsin) that share key interstate corridors, inland waterways and the Great Lakes. These states signed a Memorandum of Understanding in October 2006 establishing the Mississippi Valley Freight Coalition. The name of the coalition changed on October 25, 2010, to match the naming convention of the Mid-America Association of State Transportation Officials, the board that oversees this pooled-fund program.[34]

Great Lakes Regional Transportation Operations Coalition

The Great Lakes Regional Transportation Operations Coalition (GLRTOC) collaborates to improve cross-regional transportation operations in support of economic competitiveness and improved quality of life.[35] This is a mega-region transportation operational approach that can lead to addressing the challenges of economic competitiveness, quality of life, traffic congestion and aging transportation infrastructure. The members of the coalition include ten states (Illinois, Indiana, Iowa, Kansas, Kentucky, Michigan, Minnesota, Missouri, Ohio, and Wisconsin) and one Canadian province (Ontario).

The goal of this collaboration is to leverage joint funding, compete more effectively for national resources and funding, share and expand best practices to improve travel time and economic competitiveness of the region, benchmark efficient operating models, and, ultimately, improve transportation operations for freight movement and travelers throughout the Great Lakes region.[36]

Lake Michigan Interstate Gateway Alliance

The Lake Michigan Interstate Gateway Alliance (LMIGA) is a voluntary organization with active member participation from WisDOT, the Illinois Department of Transportation, the Illinois Tollway, the Indiana Department of Transportation, the Indiana Toll Road Concession Company LLC, the Michigan Department of Transportation, and the Skyway Concession Company LLC.[37] The goal of LMIGA is to focus on operations along major corridors to ensure that traffic moves safely and efficiently. This goal is realized by interagency communication and coordination, improvement projects, training efforts, and region-wide planning. The LMIGA Intelligent Transportation System (ITS) Priority Corridor Program operates through a structure of working groups and subcommittees that meet on a regular basis.[38]

[34] Mid-America Freight Coalition, “About.”
[35] Great Lakes Regional Transportation Operations Coalition, “About.”
[36] Great Lakes Regional Transportation Operations Coalition, "Partnership Statement." (May 9, 2017).
[37] Lake Michigan Interstate Gateway Alliance, “Homepage.”
[38] Travel Midwest, “Travel Midwest - History.”

Upper Mississippi River Basin Association

The Upper Mississippi River Basin Association (UMRBA) is a regional interstate organization formed by the governors of Illinois, Iowa, Minnesota, Missouri, and Wisconsin to coordinate river-related programs and policies, and work with federal agencies that have river responsibilities. UMRBA is involved with programs related to commercial navigation, ecosystem restoration, water quality, aquatic nuisance species, hazardous spills, flood risk management, water supply, and other water resource issues.[39]

American Great Lakes Ports Association

Founded in 1977, the American Great Lakes Ports Association (AGLPA) represents the interests of commercial ports and port users on the United States side of the Great Lakes. AGLPA works to influence public policies with the goal of fostering maritime commerce and related employment in the Great Lakes region. Through its common voice, it works to educate policy makers, media, and the general public regarding the critical role of Great Lakes and St. Lawrence Seaway shipping in the region's economy. [40]

American Great Lakes Ports Association Members	
• Duluth Seaway Port Authority	• Port of Superior, Wisconsin
• Port of Green Bay, Wisconsin	• Port of Milwaukee, Wisconsin
• Illinois International Port District	• Ports of Indiana – Burns Harbor
• Detroit-Wayne County Port Authority	• Port of Monroe, Michigan
• Toledo-Lucas County Port Authority	• Cleveland-Cuyahoga County Port Authority
• Erie-Western Pennsylvania Port Authority	• Port Authority of Oswego, New York

Mid America Association of State Transportation Officials

The Mid America Association of State Transportation Officials' (MAASTO) goal is to foster the development, operation and maintenance of an integrated and balanced transportation system that adequately serves the transportation needs of its 10 Midwestern member states.[41] MAASTO's states are part of the American Association of State Highway and Transportation Officials (AASHTO), which divides its member departments into four geographical regions. MAASTO consists of Illinois, Indiana, Iowa, Kansas, Kentucky, Michigan, Minnesota, Missouri, Ohio, and Wisconsin.

[39] Upper Mississippi River Basin Association, "Homepage."
[40] American Great Lakes Port Association, "Homepage."
[41] Mid America Association of State Transportation Officials (MAASTO), "Homepage."

THIS PAGE INTENTIONALLY LEFT BLANK

3– Chapter 3: Public Involvement

A comprehensive public involvement process helps ensure that long-range plans and recommendations reflect interests, issues, and concerns from the state's transportation system users. Early and continuous public engagement involves gathering input from a variety of stakeholders and the general public throughout the plan development process. Wisconsin is home to a variety of freight stakeholders including private industry, transportation users, and government interests at all levels – local, state and federal. (For more information see Chapter 2, *Transportation Stakeholders and Institutions*).

Overview of Chapter 3

- This chapter summarizes stakeholder and public outreach efforts conducted in support of the Wisconsin State Freight Plan
- This chapter also describes several key inputs into the state's decision-making process for making freight investments

In addition to general public involvement, federal regulations require states to consult with key stakeholder interests early and often throughout the State Freight Plan's (SFP's) development effort.[1] The public participation process for the State Freight Plan and System-plan Environmental Evaluation (SEE) sought and considered input from groups included in these requirements, including but not limited to, Metropolitan Planning Organizations (MPOs), Regional Planning Commissions (RPCs), environmental resource agencies, statewide trade and economic development organizations, minority and low income populations (environmental justice groups), Indian Tribal governments, freight industry (including operators, shippers and carriers), and other interested parties. WisDOT also engaged the Freight Advisory Committee (FAC), which is comprised of stakeholders from public and private sectors, throughout the development of the SFP. The FAC provided guidance during the planning process, helped to identify potential issues to be considered in the plan, and promoted a shared vision for the state's freight transportation network.

This chapter summarizes Wisconsin's freight stakeholder engagement efforts, conducted in the development of the SFP, and describes how WisDOT has incorporated the input received.

3.1 WisDOT's Public Involvement Process

The public involvement process for the plan focused on encouraging participation and soliciting feedback from all Wisconsin residents. The goals of the plan's public involvement process are to:

- Ensure an open and inclusive process
- Educate the public about Wisconsin's freight transportation system
- Provide opportunities for the public to participate in the planning process
- Facilitate dialogue between WisDOT, the general public, and stakeholders to identify the critical issues facing the state's freight system and develop policies to address these issues
- Hold public involvement meetings at times and locations that are both convenient and accessible to all Wisconsin residents including ethnic minority and low-income populations and Tribal governments
- Utilize social media and Internet-based public involvement applications, including a web-based sign-up form, Facebook, and other social media outlets, as appropriate

[1] 49 USC 70202.

Development of the plan included a comprehensive three phase process to gather input early and continuously throughout the development of the plan:

- Phase 1: Pre Draft plan and SEE development and needs identification
- Phase 2: Draft plan and SEE review
- Phase 3: Final plan and SEE adoption

Early efforts prior to the initial development of the draft plan helped to inform and shape the plan, including:

- Governor's Freight Industry Summits
- Connections 2030
- Truck Size and Weight Study

Federal Consultation
• 23 CFR 450 requires WisDOT to: o Establish early and continuous public involvement that provides timely information about transportation issues and the decision making process o Include a wide range of people, including (but not limited to) individuals, public agencies, public ports, freight shippers, and providers of freight transportation services o Demonstrate explicit consideration and response to public input during the development of the long-range statewide transportation plan[2]

3.2 Phase 1: Pre Draft Plan and SEE Development and Needs Identification

The State Freight Plan is Wisconsin's first multimodal freight plan. Early plan development built on information received in prior efforts and described above, as well as feedback from multiple sources including stakeholder meetings, consultation with non-metropolitan groups, and environmental resource agencies.

Freight Plan Public Involvement Plan
The Freight Plan Public Involvement Plan (PIP) describes the public involvement process for the Plan. **http://wisconsindot.gov/Documents/projects/sfp/pip.pdf** The PIP describes public involvement strategy, including a consultation process with the public, stakeholders, environmental resource agencies, environmental justice communities, and Tribal governments about plan policies.

In order to provide greater context to the freight planning process, this section describes both early discussions that started with the development of the department's multimodal long-range plan *Connections 2030*, the *Wisconsin Truck Size and Weight Study,* and Governor's Freight Industry Summits, as well as additional stakeholder outreach used to help define the plan's focus and content. Outreach through these forums and efforts helped connect WisDOT to the freight industry, and provided WisDOT with viewpoints on how enhancements to Wisconsin's transportation system could improve the state's business climate, create jobs, open new markets, and grow the state's economic base.

WisDOT held many face-to-face meetings and teleconferences with stakeholders, including representatives from freight shipping companies, local governments, and engineering trade groups. Outreach and discussions are summarized later in the chapter.

[2] 23 CFR 450.210.

Governor's Freight Industry Summits

Between 2011 and 2016, Governor Scott Walker sponsored five annual freight industry summits, which gather public and private officials with a common interest in our economically-vital freight industry. The purpose of the Governor's Freight Industry Summits is to:

- Understand issues of great importance to the industry
- Generate targeted feedback on industry needs
- Strengthen relationships with high-level industry leaders
- Develop a base for WisDOT actions and initiatives moving forward

WisDOT has held annual Governor's Freight Industry Summits from 2011 through 2014 and in 2016. Table 3-1 summarizes the key topics discussed at each of the five Governor's Freight Industry Summits.

Table 3-1: Topics Discussed at the Governor's Freight Industry Summits

Date	Location	Topics Discussed
November 9, 2011	Appleton, WI	• Multimodal Freight Network and Investment Priorities • Freight Policy and Regulations • Freight System Efficiency and Resiliency for Operators • Safety and Security of the Transportation System in Wisconsin • Streamlining Regulatory Processes and Bureaucracy
November 28, 2012	Madison, WI	• Intermodal Opportunities and Access to Asian Markets • Intermodal Challenges and Opportunities in Wisconsin • Ports Challenges and Opportunities in Wisconsin • Shortline Rail Challenges and Opportunities in Wisconsin • CNG Opportunities in Wisconsin for Trucking and Rail • Truck Weights Study and Legislative Initiatives in Minnesota
November 5, 2013	Milwaukee, WI	• Manufacturing and Logistics Options in Wisconsin • Challenges and Opportunities of Wisconsin's Motor Carriers • Successes, Opportunities and Challenges of Wisconsin's Ports • Balancing of Container Opportunities and Challenges • Chippewa Falls Intermodal Facility Successes
August 14, 2014	Appleton, WI	• Transportation and Business Site Selection o Factors that Influence Site Selection in Wisconsin • Logistics and Supply Chains in Wisconsin o Supply Chain Challenges in Wisconsin o Wisconsin's Proactive Partnerships with Industry
October 13, 2016	Wausau, WI	• Autonomous Vehicles and Advances in Multimodal Technologies • Wisconsin State Freight Plan Comments and Feedback

On average, approximately 110 freight stakeholders participate in each Governor's Freight Industry Summit. Over 260 individuals, representing 160 different organizations, have participated in at least one summit since 2011. Information and feedback received by industry attendees have been helpful to establishing policy directions and guiding new initiatives for freight in Wisconsin.

Connections 2030

When WisDOT's multimodal long-range plan, *Connections 2030*, was released in 2009, no formal department-hosted forum existed to support the exchange of ideas and discussion of freight issues between the public and private sectors. In response, a policy was established to partner with stakeholders to ensure that freight movements are safe, reliable, and that they provide positive environmental and community impacts.

Connections 2030 recommended that WisDOT should engage in freight advocacy by facilitating discussions that focus on efforts to address challenges and opportunities on a statewide and regional basis. Coordination between stakeholders and the department helps to facilitate prioritization of investments by targeting improvements to meet infrastructure needs, thereby supporting economic growth. As a result of *Connections 2030*, efforts focused on creating forums for the department to build and maintain relationships with the freight industry to better understand freight needs, markets, and issues.

Truck Size and Weight Study

In 2005, Wisconsin Act 167 mandated the creation of a Joint Legislative Council study committee on Wisconsin highway weight limits.[3] The Joint Legislative Council study committee recommended WisDOT contract for a comprehensive *Truck Size and Weight Study*, which was completed in June 2009, focusing on economic benefits, infrastructure protection, and safety. The *Truck Size and Weight Study* recommended WisDOT establish a "Freight Reform Initiative."[4]

The Freight Reform Initiative was developed in part to align WisDOT actions and priorities with freight-related industry needs and Wisconsin's economy. Cooperation between the public and private sectors relative to freight decision-making was recognized as part of the Freight Reform Initiative. This recognition supported the notion that freight-related decisions are interconnected among freight modes and that the cooperation between the public and private sector leads to improved freight planning and mobility. In addition, compromises must be achieved between the public sector's goal to provide infrastructure to help reach the potential of the entire economy and the private sector's goal to use publicly-provided infrastructure to optimize time and cost functions for its own gain. As a result, the development of strategic partnerships between WisDOT and freight stakeholders became a component of the Freight Reform Initiative. The Freight Reform Initiative also recommended that WisDOT invite those in freight-related industries to participate in annual Governor's Freight Industry Summits, focus on "freight friendly" regulations and develop a multimodal freight network. Through these efforts, WisDOT was able to align actions to industry needs, respond to and create growth opportunities, forge partnerships with industry, and take proactive steps regarding regulations that impact businesses.

[3] Wisconsin State Legislature, 2005 Wisconsin Act 167.
[4] Wisconsin Department of Transportation, "Wisconsin Truck Size and Weight Study."

Efforts to Drive Content Development of the Plan

During this pre-draft plan phase of development, public and stakeholder input was used to help drive content development of the plan and draft System-plan Environmental Evaluation (SEE). Early efforts to define the scope and focus of the plan and identify freight needs and issues included:

- Holding FAC and stakeholder meetings
- Consultation with Environmental Resource Agencies
- Outreach to low-income and minority groups
- Consultation with Tribal governments

Wisconsin's Freight Advisory Committee

At the direction of Governor Walker, WisDOT announced the establishment of a Freight Advisory Committee (FAC) at the 2014 Governor's Freight Industry Summit. Wisconsin's FAC was created as a forum for the exchange of ideas to help WisDOT better understand the complexities associated with freight movements in order to more effectively guide public investment to address freight transportation needs. The FAC assists WisDOT in addressing a wide array of freight movement issues and serves as a discussion and advisory forum for:

- Developing the SFP and other relevant state plans, as appropriate
- Providing feedback and advice to the Secretary's Office and WisDOT Freight Policy Administrators Group on freight transportation policies and processes, including but not specifically limited to:
    - Identifying obstacles, challenges, and opportunities in Wisconsin for more efficient freight movement in the state, national, and global economy
    - Seeking opportunities within the freight industry to improve freight movement to, from, through, and within Wisconsin
    - Identifying potential governmental initiatives that could enable Wisconsin firms to move goods more efficiently
    - Facilitating education among freight stakeholders and the state
    - Providing feedback and advice on governmental planning and project initiatives that impact Wisconsin's multimodal freight system

The FAC includes representatives from the rail, trucking, waterways, warehouse/distribution, energy, and agri-business industries, as well as supply chain and academic groups, MPOs, RPCs, and a variety of local, state, and federal agencies.

All of these individuals provide input on specific topics and/or issues addressed at each meeting. The FAC meets on a biannual basis to discuss topics to improve Wisconsin's freight transportation system. A summary of the topics discussed at each FAC meeting is included in Table 3-2. More information about the FAC, including detailed reports which capture their recommendations, can be found on WisDOT's website at: http://wisconsindot.gov/Pages/doing-bus/freight/fac.aspx.

Table 3-2: Topics Discussed at the 2015-2017 Wisconsin Freight Advisory Committee Meetings

Date	Location	Topics Discussed
April 23, 2015	Madison, WI	• Survey Tool to Rank Priority Topics for Future Meeting • Intermodal Facilities in Wisconsin
September 16, 2015	Madison, WI	• Federal and State Legislative/Budget Overview and Outlook • Wisconsin's Connections to the World Economy o Local Roads, First/Last Mile and Intermodal Connections • Rail Access/Service and Competition/Options in Wisconsin
April 14, 2016	Madison, WI	• Oversize-Overweight Vehicles and the Local Infrastructure Impacts • Supply Chain and Logistics in Wisconsin
October 12, 2016	Wausau, WI	• Wisconsin State Freight Plan Comments and Feedback • Ports/Harbors and Waterways in Wisconsin
May 16, 2017	Madison, WI	• Proposed Policies From State Freight Plan • Legal Weight Trucking in Wisconsin

To assist in the development of meeting content for the inaugural FAC meeting on April 23, 2015, and subsequent meetings, FAC members completed an online survey designed to rank a series of freight-related transportation topics. The list of topics were generated as a result of the 2014 Governor's Freight Industry Summit. The results of the online survey, which garnered a 100 percent response rate, were useful in understanding which topics were of most interest to the FAC as compared to the attendees of the Governor's Freight Industry Summit. The feedback from the FAC on these various topics are included in Chapter 7, *Freight Transportation Trends, Issues, and Forecasts* and Chapter 8, *Freight Policies and Strategies*.

The FAC was also engaged to provide input on the development of the SFP. WisDOT provided updates at each FAC meeting regarding the development of the draft plan. Additional presentations were given to relevant associations and organizations representing FAC members. Examples of themes and input received by FAC members covered a variety of topics, including: vehicle weights and heights, alternative fuels, first/last mile connections, rail service and accessibility, agricultural equipment, transportation funding, performance measures, prioritization of funding, port access, and corridor preservation. The full list of topics and analysis of each topic is included in Chapter 7, *Freight Transportation Trends, Issues, and Forecasts*.

Freight Stakeholder Meetings

As part of the outreach effort, WisDOT presented to a number of freight stakeholders groups. Stakeholders include groups with an interest in freight generation, movement, and investments that could be impacted by the policies and recommendations in the SFP. Presentations were provided following requests from stakeholders to present information regarding the SFP at an upcoming meeting. These meetings were an opportunity to discuss the plan, identify an organization's need and interests, and to focus discussions on stakeholder opportunities and concerns, as well as ask questions. A summary of presentations given to various freight stakeholder groups is provided in Table 3-3. The input received was invaluable in helping to clarify the draft plan's vision and policies.

Table 3-3: Wisconsin State Freight Plan Presentations Given to Freight Stakeholders

Date	Organization/Meeting	Topics Discussed
January 21, 2016	Wisconsin Manufacturers and Commerce	• Vehicle heights and weights • Alternative fuels (CNG and LNG) • Role of future technology including autonomous vehicles
March 7, 2016	Wisconsin Towns Association*	• Transportation funding levels • Enforcement of Implements of Husbandry laws
March 10, 2016	Transportation Development Association	• Transportation funding levels • First/Last Mile connections
March 24, 2016	Wisconsin Motor Carriers Association	• Freight performance measure development status • Intermodal facility needs • Transportation funding levels
March 29, 2016	Wisconsin County Highway Association*	• Transportation funding levels • First/Last Mile connections
April 4, 2016	Wisconsin Transportation Builders Association	• Benefit of providing freight volumes/value by corridor • Consistency with other states' freight plans
April 12, 2016	League of Wisconsin Municipalities*	• First/Last Mile connections • FAST Act funding • OSOW corridor preservation • Community and neighborhood impacts as a result of freight • Role of future technology including autonomous vehicles
April 15, 2016	Northeast Wisconsin Truck Expo	• Transportation funding
May 2, 2016	Wausau Chamber of Commerce	• First/Last Mile connections • Rail service and accessibility • Intermodal connections
May 3, 2016	American Council of Engineering Companies of Wisconsin	• OSOW corridor preservation • Prioritization of funding (projects outnumber funding)
June 1, 2016	Metropolitan Interstate Commission – Harbor Technical Advisory Committee	• Wisconsin's proximity to Chicago and the Twin Cities (impact of freight movements)
August 4, 2016	Wisconsin Commercial Ports Association	• Port accessibility and corridor preservation
October 24- 25, 2016	Mid-Continent Research Symposium	• Freight Factors • Bottleneck Analysis • Freight Policy
November 15, 2016	WisDOT Annual Railroad Conference	• Class I Rail • Shortline Rail
November 16, 2016	Milwaukee Region OSOW Working Group	• Freight Factor Scoring • Implementation

**Non-metropolitan groups representing local officials*

Stakeholder Consultation

The Code of Federal Regulations (Section 450.210(c) of 23 CFR 450) defines consultation requirements with environmental resource agencies and Tribal governments when preparing long-range transportation plans.[5] WisDOT's consultation process is designed to inform environmental resource agencies and Tribal governments about plan policies and to get their feedback. The consultation process also includes a discussion of potential impacts resulting from plan recommendations along with identification of potential mitigation strategies. Specifically, consultation includes a comparison of the SFP with conservation plans or maps, and inventories of natural and historic resources, if available.[6] Federal legislation requires the discussion of possible mitigation activities in consultation with the agencies described in this chapter.

WisDOT held consultation meetings with environmental resource agencies, Tribal governments, MPOs and RPCs, and non-metropolitan planning areas. WisDOT also conducted outreach to minority and low-income groups. The following sections describe this outreach in greater detail.

Environmental Resource Agencies

WisDOT held two meetings with environmental resource agencies during the pre-draft plan development phase of the planning process, one in February 2016 and one in August 2016. WisDOT sought input from state and federal environmental resource agencies in February in preparation for the SEE as part of the State Freight Plan. Pursuant to Administrative Code Trans 400, the SEE qualitatively evaluates the potential environmental impacts resulting from the policies and actions defined within the Freight Plan. The goal of the consultation meetings was to gather input regarding the concerns, programs, and policies from various federal and state regulatory agencies. The input received helped inform the Environmental Justice Analysis (Chapter 10) and System-plan Environmental Evaluation (SEE) (Chapter 11) chapters of the plan. Those invited to participate are shown below; those with an asterisk participated in the meetings:

- Pipeline and Hazardous Materials Safety Administration*
- United States Environmental Protection Agency, Region 5*
- FHWA Wisconsin Division*
- Wisconsin State Historical Society*
- Wisconsin Department of Natural Resources*
- Office of the Commission of Railroads*
- Federal Motor Carrier Safety Administration*
- Wisconsin Department of Agriculture, Trade and Consumer Protection*
- Wisconsin Department of Health Services, Bureau of Environmental and Occupational Health*
- National Park Service*
- Wisconsin Department of Military Affairs, Division of Hazard Mitigation and Emergency Management*
- United States Army Corps of Engineers*
- Public Service Commission
- United States Coast Guard

[5] 23 CFR 450.
[6] 23 CFR 450.214(i).

The meeting discussions included a series of discussion topics ranging from wetland impacts to traffic congestion. Highlights and themes resulting from the discussions included:

- Secondary impacts resulting from the development of large distribution centers should be considered.
- Concerns of congestion relative to loading facilities for all modes (i.e. transload, intermodal, etc.).
- Idle reduction technologies and alternative fuels for trucks and trains are gaining popularity in Wisconsin; while similar technologies for boats and planes are still being explored.
- Multiple state and nationwide programs are in place regarding air quality, mitigation, and climate variability (i.e. CMAQ, SmartWay, and Green Tier).
- Emergency incident response is of concern for local first responders. Locals should be equipped with the resource and training to respond to an incident.
- Impacts to historic and cultural resources need to be factored into the process.
- Historic bridges need to be considered, especially when re-establishing rail lines.
- Wetlands are impacted by a variety of actions. The United States Army Corps of Engineers (USACE) has regulations in place.
- The Coast Guard is involved with the handling of ballast water.
- Disposal of dredge material from ports is a concern. The Wisconsin Department of Natural Resources and USACE have regulations in place.
- Public health impacts and including measurement.
- Railroad crossings and related challenges to communities.

WisDOT used this input during the development of the draft plan's vision and policies and to evaluate the potential impacts considered in the SEE and environmental justice analysis. See Appendix 3-1, Public Hearings, for detailed information regarding the Environmental Resource Agency meetings. Comments received during the Draft Plan Public Comment period relating specifically to the SEE and environmental justice chapters were considered as well. Revisions were made to the Draft Plan where appropriate and included topics such as air quality, agriculture, prime farmland, and water resources.

Consultation with Metropolitan Planning Organizations and Regional Planning Commissions

As required for all statewide long-range plans, WisDOT reviews regional transportation plans to ensure that local and state plan recommendations are aligned.[7] During development of the State Freight Plan, WisDOT staff met with the state's fourteen MPOs and eight RPCs (which represent non-metropolitan planning areas), to discuss their long-range transportation plan policies and recommendations, and how they could be incorporated into the State Freight Plan. They were an integral part of the discussions through quarterly meetings. A summary of the presentations given to MPOs and RPCs is found in Table 3-4.

[7] 23 CFR 450.208.

Table 3-4: Wisconsin State Freight Plan Presentations Given to MPOs and RPCs

Date	Organization/Meeting	Topics Discussed
October 27, 2015	Annual MPO/RPC Conference, Green Bay	• Interest in regional, multi-state, and national components of freight movement • Freight's impact on local roads and related funding • Need to show first/last mile connections
April 24, 2016	WisDOT MPO/RPC Directors Meeting, Madison	• Importance of rail connections • Opportunities for economic development due to freight improvements • Data needed to address performance measures
July 27, 2016	North Central Wisconsin RPC Meeting, Wausau	• Rail needs for industries • Economic development opportunities in the region
August 25, 2016	Annual MPO/RPC Conference, Appleton	• How the plan will discuss job opportunities related to freight • How environmental justice impacts will be measured
September 19, 2016	Brown County RPC/Green Bay MPO Joint Meeting, Green Bay	• How WisDOT will designate Critical Urban and Rural Freight Corridors • Interest in specific project (Southern Bridge) being included in the plan to qualify for federal funding
October 24, 2016	WisDOT MPO/RPC Directors Meeting, Madison	• Review of State Freight Plan • Discussed data and use of the freight bottleneck mapping in regional planning

Feedback from these discussions included:

- Transload facilities are needed in the Green Bay area
- Funding is needed for first/last mile connections
- Interest in accessing funding through the FAST Act for key freight infrastructure
- Intermodal connections are important to economic development
- Data sharing will be important, particularly for tracking performance

The feedback received during this effort was integrated into the final draft plan.

Consultation with Non-Metropolitan Groups

In addition to the RPCs discussed above, WisDOT also consulted with three groups representing non-metropolitan local officials: the Wisconsin Towns Association, the Wisconsin County Highway Association, and the League of Wisconsin Municipalities. The input received from these groups was important for understanding freight issues in non-metropolitan areas. These are shown with an asterisk in Table 3-3.

Outreach to Low-Income and Minority Groups

WisDOT is committed to environmental justice throughout its planning and outreach activities. The specific environmental justice goals for the State Freight Plan outreach included:

- Identifying minority and/or low-income populations across the state
- Conducting environmental justice analyses to determine if any of the plan's policies or actions result in significantly disproportionate impacts on environmental justice populations
- Conducting outreach to engage environmental justice populations in discussions regarding the SFP
- Building relationships with environmental justice populations

A summary of presentations and discussions with environmental justice communities and advocates are included in Table 3-5. These groups and individual were selected based on their proximity to major freight generators and facilities. In addition, they provided WisDOT with a perspective regarding how freight transportation impacts low-income and minority groups. The meetings were a mix of public meetings and standing meetings of organizations such as the National Association for the Advancement of Colored People (NAACP) in Beloit. The meetings typically included a presentation and open forum. The number of participants varied from 2 to approximately 50. Additional outreach is planned in other areas of the state for future phases of the process.

Table 3-5: Wisconsin State Freight Plan Presentations Given to Low-Income and Minority Groups

Date	Organization/Meeting	Topics Discussed
December 5, 2015	Southeastern Wisconsin RPC's Environmental Justice Task Force	• Impacts from railroads traveling through neighborhoods • How the plan will increase job opportunities
March 30, 2016	City of Milwaukee Commercial Corridor Manager	• Economic development for Business Improvement Districts (BIDs) on the North Side of Milwaukee and freight access • Century City BID and access from Capitol Drive from truck and rail • Rail spur access to Century City • How the Transportation Economic Assistance (TEA) program can help
April 13, 2016	Pastors United, Milwaukee	• How the plan will increase job opportunities
April 14, 2016	Century City 1 Open House, Milwaukee	• How TEA can assist with freight access
April 18, 2016	Harley Davidson Neighborhood of Neighborhoods, Milwaukee	• More connections to the port needed • Better freight connections off of Marquette Interchange and I-94 E/W
September 8, 2016	NAACP, Beloit	• How maintenance and reconstruction impacts the church • I-39/90 truck freight • Opportunities to economic development for their community
October 17, 2016	Hmong Wisconsin Chamber of Commerce, Milwaukee	• How freight is important to small businesses across the state

Input from these meetings informed Chapter 10, *Environmental Justice*, including the analysis and consideration of mitigation in locations of future freight activities to ensure consistency with environmental justice principles.

Consultation with Tribal Governments

WisDOT is committed to government-to-government consultation with Wisconsin's eleven federally-recognized Tribes on actions that affect identified Tribal rights and issues. During the pre-draft phase of plan development, WisDOT presented information regarding the SFP at multiple Tribal meetings. Outreach efforts were focused on sharing information and obtaining feedback through consultation with Wisconsin's eleven federally-recognized Tribes and seven Tribal governments having a historic interest in Wisconsin. As part of these efforts, WisDOT sent a letter to the eleven federally-recognized Tribes and Tribes with a historic interest in Wisconsin that included information about the plan and an offer to meet individually. No requests for individual meetings were received.

Additionally, WisDOT developed freight movement maps for each federally-recognized Tribe in Wisconsin and distributed them at the May 12, 2016 Great Lakes Inter-Tribal Council and reviewed them at the June 16, 2016 Inter-Tribal Task Force. The maps were informational and depicted freight movement by tonnage for highways and railroads. Table 3-6 includes the Tribal meetings where WisDOT presented information on the State Freight Plan and requested feedback.

Table 3-6: Wisconsin State Freight Plan Presentations Given to Tribal Governments

Date	Organization/Meeting	Topics Discussed
December 2, 2015	Great Lakes Inter-Tribal Council	• How the plan could support Tribal businesses
May 12, 2016	Great Lakes Inter-Tribal Council	• Movement of hazardous materials through Tribal lands
June 16, 2016	Inter-Tribal Task Force	• Overview of State Freight Plan
November 1-2, 2016	Wisconsin Tribal Transportation Conference	• Overview of State Freight Plan

The feedback received included how the plan will support Tribal businesses and the request for more information regarding the movement of hazardous materials through Tribal lands.

3.3 Phase 2: Draft Plan

Phase 2 (Draft Plan) began with the release of the draft version of the Wisconsin State Freight Plan for public comment on September 29, 2016. The public comment period concluded on November 14, 2016. During this time, WisDOT conducted public involvement meetings and meetings with minority, low-income, and senior citizen groups. WisDOT was also available to meet with various stakeholder groups, at their request, to discuss the draft plan. Throughout the public comment period, WisDOT accepted feedback on the draft plan via the Internet, e-mail, phone, United States mail and in-person at the meetings. The comments received during this time were compiled and analyzed to determine if and how the plan would be revised to reflect the public's opinions. This input is critical for clarifying existing policies to better explain them to the public, and refining existing policies so that they better address the public's needs.

Release of the Draft Plan

WisDOT used a variety of methods to publicize the release of the draft plan, the times and locations of public involvement meetings, and methods available for obtaining information and providing feedback, including:

- Published legal notice in the Wisconsin State Journal
- Sent press releases to media outlets
- Posted information via the department's social media channels
- Posted plan documents and accompanying information on WisDOT's website
- Provided copies of the draft plan for review at WisDOT's central office, eight region offices, and Wisconsin document depository libraries in Madison[8]
- Delivered information on the draft freight plan in the lobby of the WisDOT Central Office

Learning More About the Wisconsin State Freight Plan

WisDOT employed a variety of tools to share information about the draft State Freight Plan and provide opportunities for stakeholders and the public to 1) ask questions and 2) provide input on the draft plan and planning process:

- Freight Plan Website
- Display Boards
- Social Media: Twitter and Facebook
- Press releases
- Presentations
- Public involvement meetings
- Focused outreach meetings
- Public Hearings

Comment Period

The release of the draft SFP was accompanied by a 45-day public comment period and a series of public involvement meetings - one in each WisDOT region. Meetings with minority and low-income groups and with freight stakeholders were also held. At the end of the 45-day public comment period, WisDOT compiled the information received and developed changes to be incorporated in the final plan. These are summarized later in this chapter.

Public Involvement Meetings

Conducted as open houses, the five public involvement meetings were scheduled on weeknights from 4:30 PM to 6:30 PM to allow attendees to review the materials, ask questions and provide comments at their own pace. Table 3-7 outlines the dates and locations of the public involvement meetings.





[8] Wisconsin Department of Public Instruction, Wisconsin Document Depository Program.

Table 3-7: Public Involvement Meetings Held for the Draft State Freight Plan

City	Location	Date
Eau Claire	Eau Claire City Hall, 203 S. Farwell Street	October 5, 2016
Appleton	Appleton Public Library, 225 N. Oneida Street	October 6, 2016
Wausau	Longfellow Administration Center, 415 Seymour Street	October 11, 2016
Middleton	Kromrey Middle School, 7009 Donna Drive	October 18, 2016
West Allis	Tommy G. Thompson Youth Center, 640 S. 84th Street	October 20, 2016

Social Media Outreach

WisDOT employed social media - Twitter and Facebook, specifically - to generate interest in the draft SFP, as well as to provide information about the release of the draft plan for public comment and the times and locations of public involvement meetings.

Data Compilation and Analysis



During the public comment period for the draft plan, WisDOT collected over 280 comments from interested individuals and groups. Over 150 comments were submitted by stakeholders during the FAC meeting and Governor's Freight Industry Summit held in October 2016. WisDOT also received more than 130 comments via email and from attendees of the public involvement meetings. In compiling comments, individual ideas or suggestions within a single communication were separated and sorted by theme to aid analysis. These themes, as well as specific ideas or suggestions, were reviewed by WisDOT, with recommended changes to policy and actions provided in the final draft plan. All comments were compiled and analyzed to develop a complete picture of stakeholder interests and concerns. Comments promoting significant additions, deletions, or revisions were reviewed and carefully considered. The following provides a compilation of themes from SFP comments.

Modal Issues

- Ports need to be recognized as a critical asset and need a multimodal freight network to function.
- The state needs to take a more active role working with the rail providers, notably the Class I rail providers, to improve freight rail service.
- WisDOT needs to determine its role in establishing intermodal facilities in the state.
- Commenters suggested that there is a lack of harmony between states on oversize/overweight permitting.
- Commenters proposed configurations for changing truck size and weight for legal and oversize loads.

Freight Projects

- Comments were received regarding the priority project list in the State Freight Plan. Commenters asked if there would be an opportunity to add local street and highway projects to the priority project list in the State Freight Plan.
- Including local streets in the priority project list would recognize the importance of first mile/last mile connections.

Safety

- Concerns of movement of crude oil and hazardous materials by all modes of transportation.

Draft Plan Changes

Based on the analysis of comments received during the draft plan stage, WisDOT developed several changes to the draft plan to address key issues identified. Comments received ranged from general comments to policy recommendations. The general comments identified potential changes to the State Freight Plan. These changes include enhancements, clarifications, providing more detail, correcting possible inaccuracies, and documenting follow up and additional implementation strategies. The comments that identified policy recommendations were considered for the plan. The review of these comments identified several topics that the State Freight Plan should address. These topics include:

- Improve the Multimodal Freight Network
- Development of Intermodal Facilities
- Improve Freight Rail Service
- Safe Movement of Hazardous Materials
- Commitment to First Mile/Last Mile Freight Connectors

Proposed New Policies Resulting From Comments Received

The following proposed policies were developed in response to the comments received and have been incorporated into the freight plan chapters where appropriate:

1. WisDOT will continue to coordinate with state, regional, and international partners, as well as explore the development of a maritime strategy for Wisconsin, to support maritime transportation as part of a safe, efficient, and seamless freight transportation system.
2. WisDOT will work with stakeholders to facilitate a discussion to develop an intermodal strategy for Wisconsin.
3. WisDOT will review the department's project development process and design standards to incorporate the needs of freight system users.
4. WisDOT will provide information to communicate and educate industry and the general public on pertinent freight topics and issues.
5. WisDOT will leverage the data, tools, and methods developed through the freight plan to inform project prioritization and investment decisions, as well as provide them for DOT partners.
6. WisDOT will continue to work with other states to identify harmonization opportunities.
7. WisDOT will investigate ways to simplify, streamline, and provide more permitting options.
8. WisDOT will continue its efforts to promote safe rail crossings throughout the state.
9. WisDOT will monitor national best practices and other initiatives related to reducing freight's impact on the environment.

3.4 Phase 3: Final Plan

Release of the Final Draft Plan

During Phase 3, the final phase of plan development, WisDOT released the final draft of the State Freight Plan and SEE for a 45-day comment period, issued legal notices, conducted three public hearings, compiled all oral and written testimony on the final draft plan, and made final revisions to the plan.

WisDOT issued press releases and information via social media channels to publicize the release of the final draft plan, public review period, and public hearings, as well as published the final draft plan and related plan materials on the State Freight Plan website.

Comment Period

A legal notice for the release of the final draft plan and SEE and accompanying 45-day public review period was published in the Wisconsin State Journal on December 9, 2016. A legal notice for the three public hearings on the final draft plan and SEE was published in the Wisconsin State Journal on November 28, 2016, fifteen days prior to the first hearing, in accordance with Trans 400 of the Wisconsin Administrative Code. The legal notice included the dates, locations, time, and format of the public hearings.

The public hearings were held in De Pere on December 13, in West Allis on December 14, and in Madison on December 15. Each hearing employed a hybrid format, including 1) an open house area where people could talk to WisDOT staff and view the final draft plan and plan-related information at their leisure, 2) a presentation on the final draft plan, and 3) a formal public hearing that offered the opportunity for attendees to provide oral testimony in an open setting.

Table 3-8: Public Hearings Conducted for the Final Draft State Freight Plan

City	Location	Date
De Pere	Brown County Library-Kress Family Branch, 333 N. Broadway	December 13, 2016
West Allis	Tommy G. Thompson Youth Center, 640 S. 84th Street	December 14, 2016
Madison	WisDOT SW Region office, 2101 Wright Street	December 15, 2016



The open house portion of each public hearing began at 4:30 pm. Information about the final draft plan was presented to attendees at approximately 5:45 pm, followed by commencement of the formal hearing at 6:00 pm. The public hearings ended at 7:30 pm. Details on the location of each hearing were available on WisDOT's State Freight Plan website: www.wisconsinfreightplan.gov.

Attendees had the opportunity to provide oral testimony in a private setting during the entire length of each public hearing. Testimony in the form of written comments was also accepted during the hearings and through the end of the public review period on January 23, 2017. Materials presented at the public hearings, as well as sign-in sheets and transcripts are provided in Appendix 3-1, Public Hearings.

Data Compilation and Analysis

In total, WisDOT received 20 comments during the second review period, bringing the total number of comments received during the two comment periods to over 300. A total of eight people attended the public hearings. The comments received during the public comment period requested additional detail be added about the waterway system, expressed support for specific projects, suggested changes to online motor carrier permitting, recommended stylistic changes to the plan, and expressed agreement with specific policies in the freight plan. The following list includes a summary of comments:

- The importance of the Southern Bridge and Arterial Streets Corridor to economic growth. Brown County Executive Streckenbach requested that the Southern Bridge be included in the State Freight Plan's list of priority projects.
- Lake Carriers' Association expressed interest in the development of a strategy specific to Wisconsin's maritime transportation sector to build upon the Regional Maritime Strategy released by the Conference of Great Lakes Governors and Premiers in June 2016. [9] In addition, they provided text edits to the document.
- The need for new rail corridors in Wisconsin.
- The need to upgrade the four-lane section of I-41 between Green Bay and the Fox Cities to a six-lane facility.
- Comments regarding the online motor carrier office services.

Final Draft Plan Changes

WisDOT has reviewed the comments and made the suggested edits to the plan on the waterway system and implemented stylistic recommendations, as appropriate. No new edits to the freight plan were made as a result of comments related to project inclusion, freight corridor designations or the motor carrier online services.

Regarding the designation of Critical Urban Freight Corridors (CUFCs) and Critical Rural Freight Corridors (CRFCs), Chapter 9 discusses that after the State Freight Plan has been published, WisDOT will consult with stakeholders, including MPOs, RPCs, and freight industry representatives, prior to making final a determination on the designation of CUFCs and CRFCs in Wisconsin.

[9] Conference of Great Lakes and St. Lawrence Governors and Premiers, "Strategy for the Great Lakes-St. Lawrence River Maritime Transportation System." (June 15, 2016).

Chapter 3, Appendix 3-1 – Public Hearings

1. Wisconsin State Freight Plan Public Hearing Overview

2. Completed Sign-In Sheets

3. Public Hearing Handout

4. Public Hearing Open House Boards

5. Public Hearing Presentation

6. De Pere Public Meeting Transcript

7. West Allis Public Meeting Transcript

8. Madison Public Meeting Transcript

Wisconsin State Freight Plan Public Hearing Overview

Following the December 9, 2016 release of the final draft of the Wisconsin State Freight Plan, three public hearings were held throughout the State, and provided the public with a second opportunity to ask questions and provide comments on the plan. The hearings were held in De Pere, WI (December 13), West Allis, WI (December 14), and Madison, WI (December 15). Hearings were held within the 45-day comment period on the final draft, which concluded on Monday, January 23, 2017.

Each public hearing was held from 4:30 to 7:30 p.m., utilizing a hybrid-style hearing. This style of hearing allowed for both an open house and formal hearing within the three hour timeframe. The open house was available throughout the entire meeting, providing attendees an opportunity to review materials and ask questions of staff. A presentation was given at 5:45, prior to opening the public hearing at 6:00 p.m. Attendees were invited to provide oral testimony at this time. Transcripts of each of the public hearings are included within this appendix. A private testimony room was also available for attendees to provide comments in a separate setting, however, no attendees utilized the room during the three hearings.

The open house portion of the public hearing, afforded attendees an opportunity to review highlights of the final draft plan. A total of 26 boards and a handout were available for review. WisDOT staff was also on hand to answer questions. A copy of the boards and handout are available within this appendix.

The formal presentation also provided a high level review of the final draft plan for attendees, including a review of the new polices added following the draft comment period. A copy of the presentation is available within this appendix.

Two people provided oral testimony at the De Pere public hearing. Nobody provided oral testimony at either the Madison or West Allis public hearing.

Completed Sign-In Sheets

Wiscsonsin Department of Transportation - State Freight Plan

Public Hearing

Date: 12/13/16 Location: BROWN CO. LIBRARY, DEPERE, WI

Note: The information in this document (names, addresses, phone numbers, and email addresses) is not confidential, and may be subject to disclosure upon request, pursuant to the requirements of the Wisconsin open records law, sections 19.31—19.39 of the Wisconsin Statutes.

Full Name (Please Print)	**Full Address** (house number, street, city, state, zip)	**Representing** (if applicable)	**Phone** (optional)	**Email** (optional)
Brian Brock	944 VanderPerren Way Green Bay, WI 54304	WisDOT	920 492 5740	brian.brock@dot.wi.gov
Jeff Agee-Aguayo	425 S. Adams St, Suite 201 Green Bay, WI 54301	Bay-Lake RPC	(920) 448-2820	jagee@baylakerpc.org
Mike Berg	480 Pilgrim Way, G.B.	Patrick Engr	(920)655-0291	mberg@patrickco.com
Walt Raith	400 Ahnaip, Suite 100 Menasha WI 54952	ECWRPC	920-751-4770	wraith@ecwrpc.org
DAVID WHEELER	3663 HALF CROWN RUN DE PERE	INTERESTED PARTY	920-425-4779	
Joe Hallister	1705 E Vista Circle Green Bay	ME		

Wiscsonsin Department of Transportation - State Freight Plan

Public Hearing

Date: 12-14-16 Location: TOMMY THOMPSON CENTER, WESTALLIS, WI

Note: The information in this document (names, addresses, phone numbers, and email addresses) is not confidential, and may be subject to disclosure upon request, pursuant to the requirements of the Wisconsin open records law, sections 19.31—19.39 of the Wisconsin Statutes.

Full Name (Please Print)	**Full Address** (house number, street, city, state, zip)	**Representing** (if applicable)	**Phone** (optional)	**Email** (optional)
James Bramm	217 W. Main St., Brownsville	Michels Corp.		jbramm@michels.us
LEIF OTTESON	421 S. 6th St. Milw, WI	Gateway to Milw./ AEROTROPOLIS	414-364 0486	LEIF@gatewaytomilwaukee.com

Public Hearing Handout

Wisconsin State Freight Plan Highlights

What is a freight plan?

The Wisconsin State Freight Plan is the state's first long-range multimodal freight plan. It provides the policy framework to guide investment decisions relative to freight mobility. The freight plan provides a comprehensive overview of Wisconsin's freight transportation system, analyzes potential investment strategies, recommends performance measures and discusses an implementation strategy.



Plan development so far

The draft plan was developed with input from environmental resource agencies, tribal governments, environmental justice communities, freight stakeholder groups, Metropolitan Planning Organizations (MPOs), and non-metropolitan area representatives. The draft plan and SEE were released for a 45-day public comment period in September 2016, followed by five public involvement meetings. WisDOT presented the draft plan at the Freight Advisory Committee meeting and Governor's Freight Industry Summit in October 2016. WisDOT also presented the draft to a range of stakeholders and hosted multiple consultation meetings with MPOs and environmental groups. WisDOT received more than 280 comments from these events and the general public. This feedback led to changes in the final draft plan (as outlined on page 8).

How can you participate?

The draft final plan is available for a 45-day comment period, starting December 9, 2016 ending on January 23, 2017. WisDOT is holding three public hearings for the public to provide formal comments on the final draft of the State Freight Plan and its System-plan Environmental Evaluation (SEE).

What is the State Freight Plan?

The State Freight Plan creates a framework to:

- Link transportation investments to economic development activities
- Inform decision making by understanding Wisconsin's economic characteristics and the importance of the transportation system within a national and global context

- Engage and reflect the interests of a wide array of freight stakeholders
- Consider freight friendly activities throughout WisDOT's business activities—from planning to project development to programming and permitting
- Monitor system performance to ensure responsible management of state government assets
- Harmonize freight policy and goals between:
  - Federal and state freight initiatives
  - Wisconsin and its neighboring states
  - Local, regional, and metropolitan-level freight goals and state freight goals
- Establish direct connection between freight movement investments and economic benefits to the state

Freight Factor Analysis Scoring

All freight transportation modes were evaluated to identify the facilities important to freight movement. Freight factor scores were generated based on criteria to compare one freight facility with another. The highway and port scores are shown on the maps on page 3 and 4. The other modes are in the plan.

Highways (State Trunk Network) Scoring Criteria

- Trucks and truck percentage
- Commodities by weight and value
- Oversize overweight permit frequency
- Intermodal connections to airports and ports

Local Roads (including County Highways) Scoring Criteria

- Trucks and truck percentage
- Commodities by weight and value
- Connections to freight shippers and receivers
- Connections to railroads through intermodal and transload facilities
- Connections to ports and airports

Railroads Scoring Criteria

- Commodities by weight and value
- Connection to a port or intermodal container facility
- Connection or proximity to a rail yard
- Connection or proximity to a transload facility

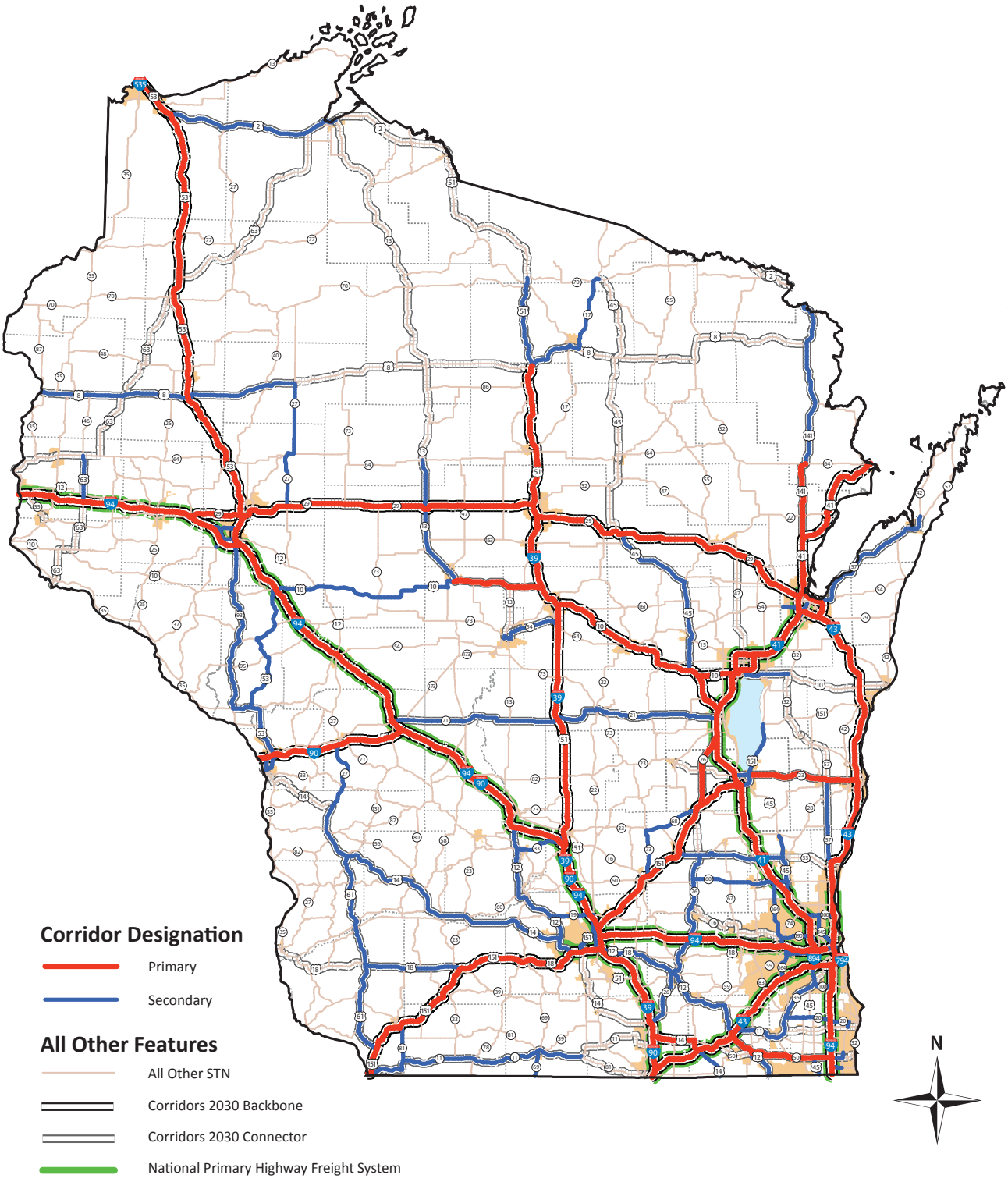
Ports Scoring Criteria

- Commodities by weight and value
- Connection to a railroad
- Ferry service
- Distance to/from a state trunk highway

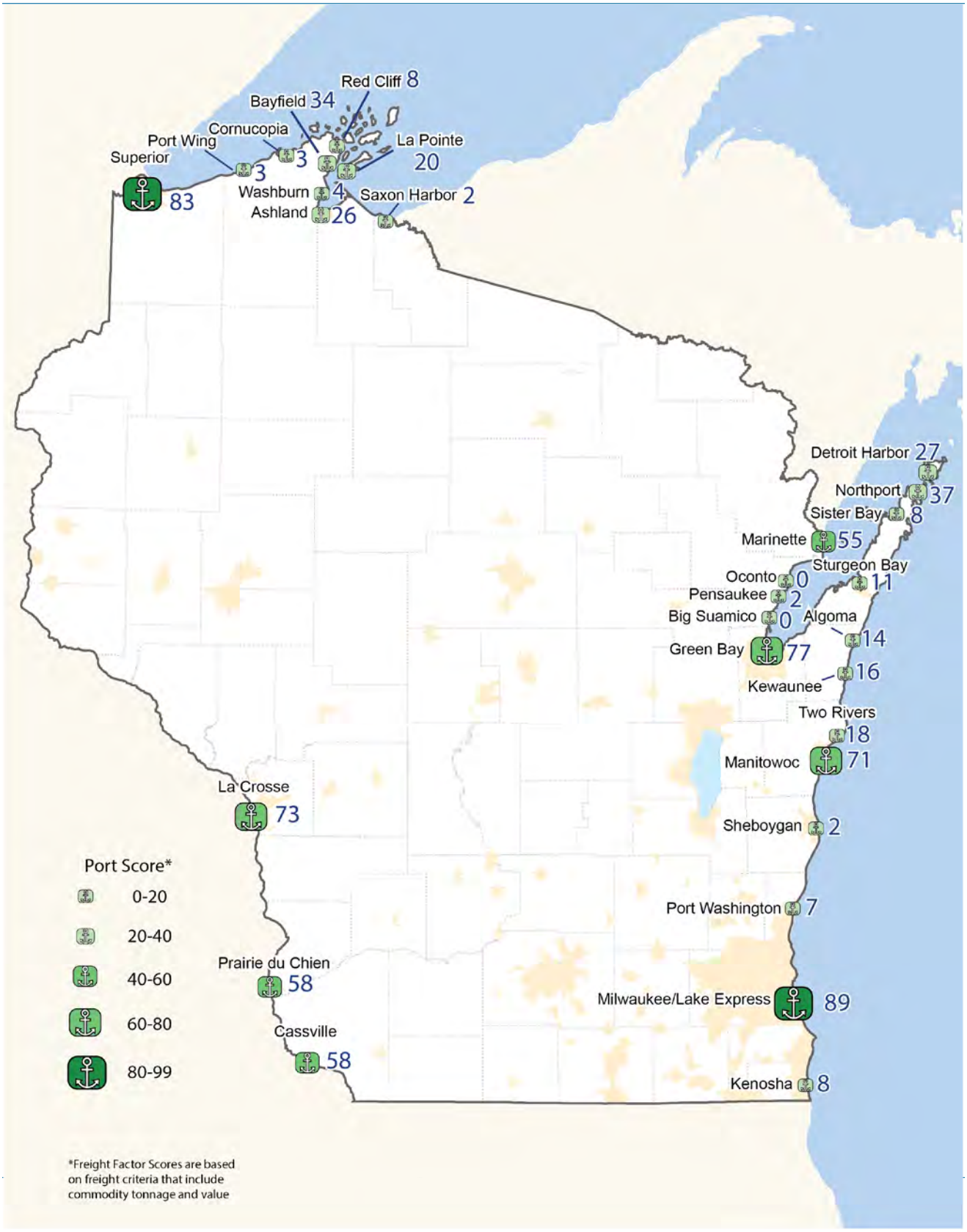
Airports Scoring Criteria

- Commodities by weight and value

2016 Highway Freight Mobility Analysis



2016 Port and Waterway Freight Mobility Analysis



Freight Plan Policies

Highway safety

- Improve standards for infrastructure
- Improve emergency response
- Identify freight-specific safety concerns and develop strategies for solutions

State trunk highway system preservation

- Continue using a performance-based approach to identify state trunk highway system preservation needs, including development of a bridge asset management system
- Refine and expand a state-of-the-art process for prioritizing needs and identifying cost-effective state trunk highway construction alternatives
- Seek sufficient federal and state funding to address state trunk highway system preservation needs
- Revise the Facilities Development Manual to more clearly include freight considerations in project development guidance
- Identify and preserve a sub-system of state highways that accommodate over-height (up to 20 feet), over-weight and over-size loads
- Maintain a formal, ongoing preventive maintenance process
- Implement proven maintenance management practices

Major highway development program

- Complete the currently enumerated Major Highway Development projects (including the Southeast Wisconsin Freeway Megaprojects Program) and study approved corridors

Highway technology and operations

- Continually monitor the state trunk highway network and respond to operational needs
- Improve motor carrier efficiency and enforcement
- Support communications along state highway corridors of freight significance, to ensure drivers can remain informed of changing conditions
- Support greater use of technologies to improve the safety and efficiency of operations on high freight movement corridors
- Support an increase in the availability of truck parking at state-owned facilities and the awareness of its availability

State trunk highway system maintenance

- Monitor existing state trunk highway conditions, identify deficiencies and set priorities
- Improve existing maintenance management tools
- Implement work zone and lane-closure management strategies and tools to maintain safety and minimize impacts on travelers

Waterway maintenance and improvement

- Continue state assistance programs for harbor improvements
- Advocate for federal funding of navigation and environmental improvements for the Upper Mississippi River-Illinois River Waterway and improvements to the Soo Lock System
- Encourage comprehensive harbor and waterfront land use planning
- Examine roadway issues at ports

Freight rail preservation and vitality

- Preserve rail corridors, including rights-of-way, for freight service
- Maintain state-owned rail lines to allow service levels to continue uninterrupted, and without additional restrictions
- Acquire rail lines into public ownership, when appropriate, to preserve essential railroad service
- Fund track upgrades for publicly-supported rail lines to meet changing industry standards

Local roads preservation and safety

- Assist in providing asset management strategies and tools for local governments to ensure selected system preservation improvements provide cost-effective service life extension
- Work with local entities to identify and address key safety issues on the local system
- Partner with local governments to manage and invest in the local road and bridge network

Pipelines

- Continue to apply the Utility Accommodation Policy to all types of pipelines in Wisconsin
- Limit the negative impacts of crude oil movements via pipelines on other transportation users
- Support natural gas pipeline construction and participate in emergency response
- Enable modal connections, diversity and to provide system resiliency for petroleum product pipelines

Air cargo

- Use the Airport Improvement Program to help airports accommodate business planes
- Support the needed airport system infrastructure, including inclement weather capability, for jet aircraft and related activity
  Instrument approach systems
  - » Runway lighting
  - » Visual landing aids
  - » Expansion of taxiways and aprons
  - » Fuel storage
  - » Hanger space
  - » On-site weather information
  - » Terminal buildings
  - » Waiting areas
  - » Ground transportation
  - » Security

System-plan Environmental Evaluation (SEE)

The SEE analysis is a qualitative review of the potential environmental impacts of the draft plan.

- Trans 400 defines the process to review and evaluate the potential environmental impacts in accordance with the Wisconsin Environmental Policy Act
- Required when a long range plan includes recommendations that are deemed to have potentially major and significant impacts to the natural environment
- Contributes to WisDOT's policy of meeting transportation needs while also minimizing environmental impacts

SEE analysis

The SEE analyzed potential qualitative impacts in the following eight areas:

- Traffic congestion
- Energy consumption
- Air quality
- Agriculture
- Economic development
- Communities
- Sensitive land resources
- Sensitive water resources

The SEE also identified mitigation activities WisDOT uses to avoid, minimize and mitigate environmental impacts.

WisDOT activities to avoid, minimize or mitigate impacts

- Wetlands mitigation and banking
- Native plant and prairie program
- Long-range transportation plan policies
- Project level activities as directed by the facilities development manual
  - Agriculture
  - Air quality
  - Cultural resources (archeology, history and tribes)
  - Endangered species
  - Noise
  - Erosion control and storm water quality habitat evaluation
  - Hazardous materials
  - Indirect and cumulative impacts

Highlights: Changes to the draft plan

Key issues

Key issues identified by the public and stakeholders during the draft plan public involvement process:

- Improvement needs on the multimodal freight network
- The need for intermodal facilities
- Improved freight rail service
- Safe movement of hazardous materials
- Commitment to first mile/last mile freight connectors

Proposed new policies

WisDOT will:

- Continue to coordinate with stakeholders and explore the development of a freight maritime strategy
- Work with stakeholders to discuss an intermodal strategy
- Review its project development process and design standards to include freight system user needs
- Provide tools/materials to communicate and educate about freight topics and issues
- Leverage the data, tools and methods developed through the freight plan to inform project prioritization and investment decisions
- Continue to work with other states to identify harmonization opportunities
- Investigate ways to simplify, streamline and increase vehicle permitting options
- Continue efforts to promote safe rail crossings
- Monitor national best practices and other initiatives related to reducing freight transportation's impact on the environment

We welcome your input

Join the discussion on the future of Wisconsin's freight network.
Comment period ends January 23, 2017.

Wisconsin Department of Transportation,
Bureau of Planning and Economic Development,
PO Box 7913,
Madison, WI 53707-7913
Phone: (608) 266-9476
Web site: wisconsinfreightplan.gov
E-mail: freightplan@dot.wi.gov

Public Hearing Open House Boards

Wisconsin State Freight Plan

Your input wanted

Welcome!

Public Hearing

December 2016

Open house: 4:30 pm to 7:30 pm
Presentation: 5:45 pm to 6:00 pm
Formal hearing 6:00 pm to 7:30 pm







Wisconsin State Freight Plan

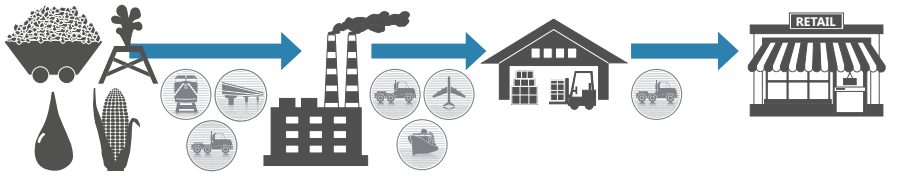
Wisconsin's state freight transportation plan:

- is the state's first long-range freight plan
- includes all modes: pipeline, roadway, rail, water, and air
- provides a comprehensive overview of Wisconsin's transportation system
- analyzes potential investment strategies
- recommends performance measures
- discusses an implementation strategy
- includes an environmental evaluation

What is freight movement?

Freight movement is the transport of goods, including commodities or cargo. Goods may be transported by truck, train, boat, airplane or pipeline. Wisconsin's economy is heavily dependent on the movement of freight for agriculture, forestry, mining, manufacturing and other key industries.

How freight moves



How will the plan be used?

The Wisconsin Department of Transportation will use the plan's final recommendations to:

- define policy direction
- inform future transportation investment
- provide an implementation plan to advance the safety and efficiency of freight movements in the state
- define performance measures to monitor system performance

Environmental justice

WisDOT's actions and decisions are guided by the three fundamental principles of environmental justice, which are:

- to avoid, minimize or mitigate disproportionately high and adverse human health and environmental effects, including social and economic effects on minority populations and low-income populations
- to ensure the full and fair participation by all potentially affected communities in the transportation decision-making process
- to prevent the denial of, reduction of or significant delay in the receipt of benefits by minority populations and low-income populations

How the analysis was done

- The freight system includes: active rail lines, 20 lake and river ports with freight service; the air cargo airports; backbone highway system
- People living within one-quarter mile of the freight system are close enough to be impacted by noise, vibration, and air pollution
- A buffer analysis was used to see to what extent these populations were within one-quarter mile of the freight system
  - » Racial minorities
  - » Low income
  - » Seniors
  - » Youth
  - » People without cars
  - » People with disabilities

Some populations live closer to the freight system than everyone else

- Hispanic or Latino populations are 21% more likely to live next to some part of the freight system
- Asians are 30% more likely to live near the road part of the system
- Zero vehicle households are 21% more likely to live near the freight rail system
- American Indian or Alaskan natives are 25 times more likely to reside near ports

Wisconsin State Freight Plan

System-plan Environmental Evaluation (SEE), part 1

The SEE analysis is a qualitative review of the potential environmental impacts of the draft plan

- Trans 400 defines the process to review and evaluate the potential environmental impacts in accordance with the Wisconsin Environmental Policy Act
- Required when a long range plan includes recommendations that are deemed to have potentially major and significant impacts to the natural environment
- Contributes to WisDOT's policy of meeting transportation needs while also minimizing environmental impacts
- Supports WisDOT's mission of providing leadership in the development and operation of a safe and efficient transportation system

How potential environmental impacts are addressed

Traffic congestion:

Forecast freight growth for all modes may lead to congestion

Addressed by:

- improving freight efficiency and decreasing delays
- permitting and communication improvements
- reducing barriers in freight connections

Energy consumption:

Some modes are more fuel efficient; congestion and idling increases fuel consumption

Addressed by:

- encourage modal choices via alternatives fuel promotion and fuel reduction strategies
- investment in freight infrastructure which supports alternative fuel use, like CNG
- congestion and idling reduction investments

Wisconsin State Freight Plan

System-plan Environmental Evaluation (SEE), part 2

Air quality:

Forecast freight growth for all modes may result in expansions of truck fleets, frequency of trips or increase in loads

Addressed by:

- policies to improve efficiencies, modal choices and seamless freight movement
- development of new fuel technologies and efficiency standards

Agriculture:

Improve the ability to efficiently move agricultural goods and products; new or expanding transportation project impacts; potential congestion on existing corridors

Addressed by:

- special attention at the project level to minimize agricultural access impacts of projects
- policies aimed at improving maintenance strategies for many modes

Economic development:

The plan supports further economic growth

Addressed by:

- policies that diversify modal choice and seamless freight movement
- making freight movement by each mode more cost effective and efficient

Communities and cultural resources:

Construction projects can support potential impacts to natural and built environments

Addressed by:

- policies to improve safety along freight corridors
- project level mitigation such as wetland banking

Sensitive land resources:

The plan may have the potential to impact habitat and publicly-owned lands

Addressed by:

- project level review to identify, minimize and mitigate negative impacts
- improved preventative maintenance approaches may reduce impacts

Sensitive water resources:

Impacts may be caused by potential construction projects for all modes

Addressed by:

- project level review to identify, minimize and mitigate potential negative impacts

Wisconsin State Freight Plan

System-plan Environmental Evaluation (SEE), part 3

Highlights of WisDOT activities to avoid, minimize or mitigate impacts

WisDOT avoids, minimizes or mitigates environmental impacts of transportation projects through programs and policies.

- Wetlands mitigation and banking
- Native plant and prairie program
- Long-range transportation plan policies
- Project level activities as directed by the facilities development manual
  - Agriculture
  - Air quality
  - Cultural resources (archeology, history and tribes)
  - Endangered species
  - Noise
  - Erosion control and storm water quality habitat evaluation
  - Hazardous materials
  - Indirect and cumulative impacts

WisDOT Native Plant and Prairie Program

Many prairie remnants exist on WisDOT's rights of way. These plant communities are often relatively intact, undisturbed by agricultural and construction activities.

WisDOT maintains prairie remnants and tries to re-establish native plants along roadsides by using special native seed mixes. The Department's maintenance policy preserves native vegetation existing along the roadside.

Wisconsin State Freight Plan

Plan implementation, part 1

Strategies

- Support existing state performance measures
- Freight relevant MAPSS measures
  - Mobility: delay, reliability, incident response, winter response
  - Accountability: TEA grants, on-time performance
  - Preservation: state highway pavement condition (backbone and non-backbone), state bridge condition, state-owned rail line condition, airport pavement condition, state highway maintenance
  - Safety: fatalities, injuries, crashes, safety belt use
  - Service: high quality and accurate products
- Implementation of federal freight performance measures
  - Percent of the Interstate system mileage providing for reliable truck travel time
  - Percent of the Interstate system mileage uncongested
- Utilize data and tools to identify a state multimodal freight network
  - State highway data analysis identified an interim network
  - Local road data analysis
  - State-owned rail data analysis identified an interim network
  - Port and waterways data analysis
  - Air data analysis
- Integration of federal freight corridor designations
- Continuing stakeholder partnerships
- Plan 5 year update cycle

Funding sources to implement the plan

- Federal and state funding
- Bonding
- Local, service and other funds, program and general purpose revenue

Wisconsin State Freight Plan

Plan implementation, part 2

State funding for freight transportation

- Major Highway Development Program
- State Highway Program
- Southeast Wisconsin Freeway Megaprojects Program (Southeast Megaprojects)
- Local Roads Improvement Program
- General Transportation Aids
- Surface Transportation Program – Rural
- Surface Transportation Program – Urban
- Surface Transportation Program – Freight
- Freight Rail Infrastructure Improvement Program
- Freight Rail Preservation Program
- Harbor Assistance Program
- Airport Improvement Program
- General obligation bonds
- Transportation revenue bonds

Federal funding for freight transportation

- Highway Safety Improvement Program
- Airport Improvement Program
- Congestion Mitigation and Air Quality Improvement Program
- Surface Transportation Program
- Fostering Advancements in Shipping and Transportation for the Long-term Advancement of National Efficiencies (FASTLANE) Grant Program

Wisconsin State Freight Plan

Plan recommendations, part 1

Highway safety

- Improve standards for infrastructure
- Improve emergency response
- Identify freight-specific safety concerns and develop strategies for solutions

State trunk highway system preservation

- Continue using a performance-based approach to identify state trunk highway system preservation needs, including development of a bridge asset management system
- Refine and expand a state-of-the-art process for prioritizing needs and identifying cost-effective state trunk highway construction alternatives
- Seek sufficient federal and state funding to address state trunk highway system preservation needs
- Revise the Facilities Development Manual to more clearly include freight considerations in project development guidance
- Identify and preserve a sub-system of state highways that accommodate over-height loads (up to 20 feet), over-weight and over-size loads
- Maintain a formal, ongoing preventive maintenance process
- Implement proven maintenance management practices

Wisconsin State Freight Plan

Plan recommendations, part 2

Major highway development program

- Complete the currently enumerated Major Highway Development projects (including Southeast Wisconsin Freeway Megaprojects Program) and study approved corridors

Highway technology and operations

- Continually monitor the state trunk highway network and respond to operational needs
- Improve motor carrier efficiency and enforcement
- Support communications along state highway corridors of freight significance, to ensure drivers can remain informed of changing conditions
- Support greater use of technologies to improve the safety and efficiency of operations on high freight movement corridors
- Support an increase in the availability of truck parking at state-owned facilities and the awareness of its availability

State trunk highway system maintenance

- Monitor existing state trunk highway conditions, identify deficiencies and set priorities
- Improve existing maintenance management tools
- Implement work zone and lane-closure management strategies and tools to maintain safety and minimize impacts on travelers

Wisconsin State Freight Plan

Plan recommendations, part 3

Waterway maintenance and improvement

- Continue state assistance programs for harbor improvements
- Advocate for federal funding of navigation and environmental improvements for the Upper Mississippi River-Illinois River Waterway and improvements to the Soo Lock System
- Encourage comprehensive harbor and waterfront land use planning
- Examine roadway issues at ports

Freight rail preservation and vitality

- Preserve rail corridors, including rights-of-way, for freight service
- Maintain state-owned rail lines to allow service levels to continue uninterrupted, and without additional restrictions.
- Acquire rail lines into public ownership, when appropriate, to preserve essential railroad service
- Fund track upgrades for publicly-supported rail lines to meet changing industry standards

Local roads preservation and safety

- Assist in providing asset management strategies and tools for local governments to ensure selected system preservation improvements provide cost-effective service life extension
- Work with local entities to identify and address key safety issues on the local system
- Partner with local governments to manage and invest in the local road and bridge network

Wisconsin State Freight Plan

Plan recommendations, part 4

Pipelines

- Continue to apply the Utility Accommodation Policy to all types of pipelines in Wisconsin
- Limit the negative impacts of crude oil movements via pipelines on other transportation users
- Support natural gas pipeline construction and participate in emergency response
- Enable modal connections, diversity and to provide system resiliency for petroleum product pipelines

Air cargo

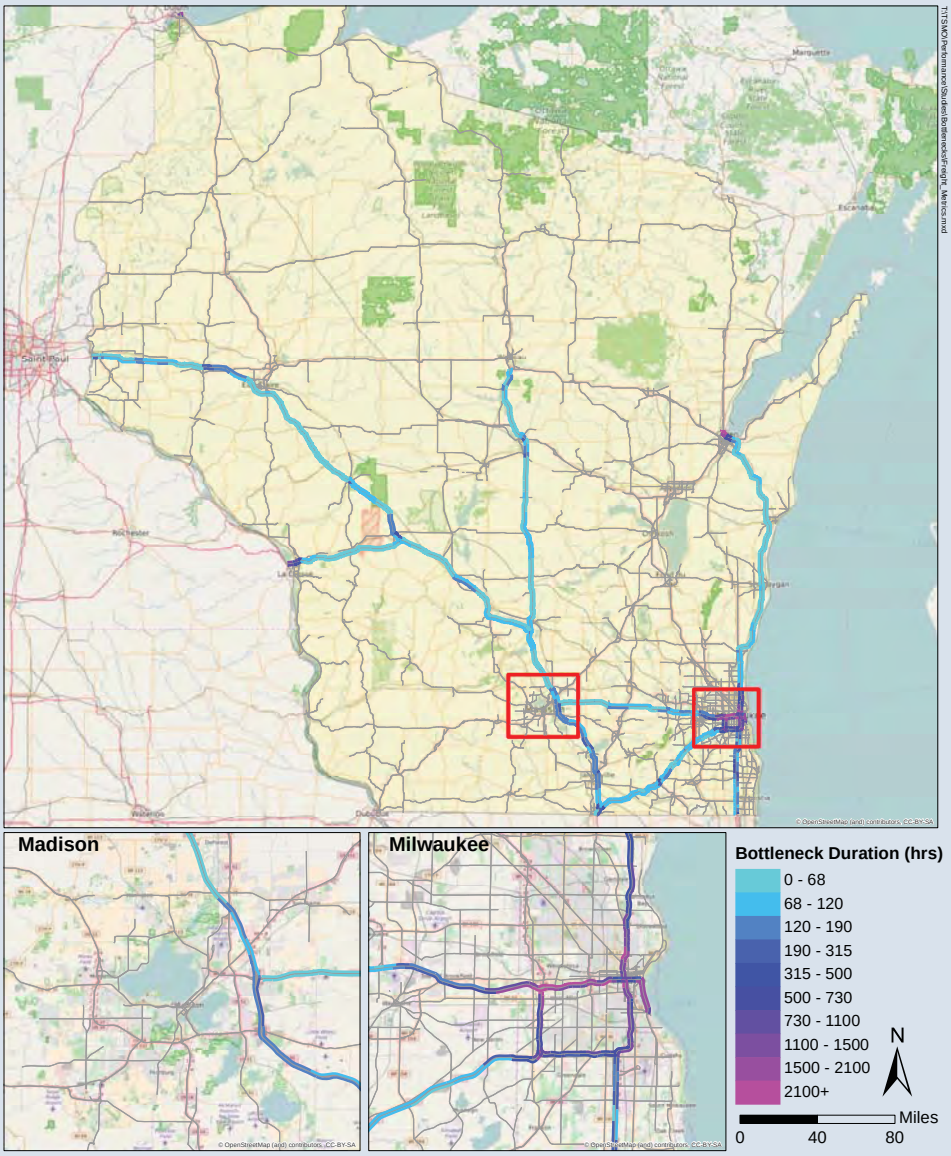
- Use the Airport Improvement Program to help airports accommodate business planes
- Support the needed airport system infrastructure, including inclement weather capability, for jet aircraft and related activity
  - Instrument approach systems
  - Runway lighting
  - Visual landing aids
  - Expansion of taxiways and aprons
  - Fuel storage
  - Hanger space
  - On-site weather information
  - Terminal buildings
  - Waiting areas
  - Ground transportation
  - Security

Wisconsin State Freight Plan

Measuring freight bottlenecks

Bottleneck duration

Total number of hours (annually) truck speed is below 50 mph



The bottleneck duration is the total of all hours over the year where the truck speed is below 50 mph. This is limited to interstates and is related to the MAP-21 proposed rule for reporting average truck speed.

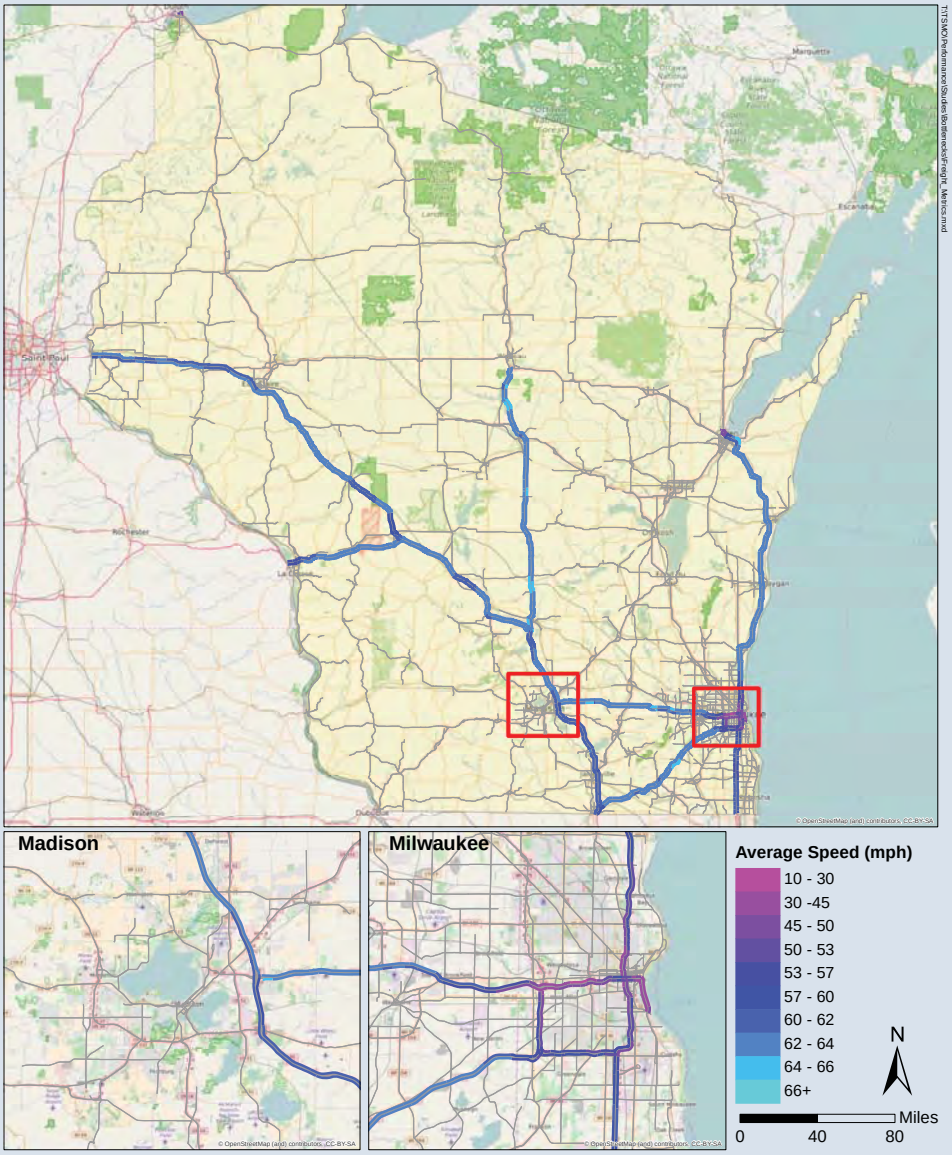
NPMRDS 2015 Data
Printed: 9/12/2016

Wisconsin State Freight Plan

Measuring freight bottlenecks

Average truck speed

Average speed observed over the entire year



Average truck speed is calculated per the MAP-21 System performance proposed rule. This applies only to interstates and is the average speed observed over the entire year. The proposed rule uses 50 mph as the threshold for reporting mileage as congested or not.

NPMRDS 2015 Data
Printed: 9/12/2016

Wisconsin State Freight Plan

Highlights: changes to draft plan

Key issues

Key issues identified by the public and stakeholders during the draft plan public involvement process:

- Improve the Multimodal Freight Network
- Development of intermodal facilities
- Improve freight rail service
- Safe movement of hazardous materials
- Commitment to first mile/last mile freight connectors

Proposed new policies

WisDOT will:

- Continue to coordinate with stakeholders and explore the development of a freight maritime strategy
- Work with stakeholders to discuss developing an intermodal strategy
- Review its project development process and design standards to include freight system user needs
- Provide tools/materials to communicate and educate about freight topics and issues.
- Leverage the data, tools and methods developed through the freight plan to inform project prioritization and investment decisions, as well as provide them to WisDOT partners.
- Continue to work with other states to identify harmonization opportunities.
- Investigate ways to simplify, streamline and increase vehicle permitting options.
- Continue efforts to promote safe rail crossings
- Monitor national best practices and other initiatives related to reducing freight transportation's impact on the environment.

Freight Factor Analysis Scoring

All freight transportation modes were evaluated to prioritize the facilities important to freight movement. Freight factor scores were generated based on criteria to compare one freight facility with another.

Highways (State Trunk Network) scoring criteria

- Trucks and truck percentage
- Commodities by weight and value
- Oversize overweight permit frequency
- Intermodal connections to airports and ports

Local roads (including County Highways) scoring criteria

- Trucks and truck percentage
- Commodities by weight and value
- Connections to freight shippers and receivers
- Connections to railroads through intermodal and transload facilities
- Connections to ports and airports

Railroads scoring criteria

- Commodities by weight and value
- Connection to a port or intermodal container facility
- Connection or proximity to a rail yard
- Connection or proximity to a transload facility

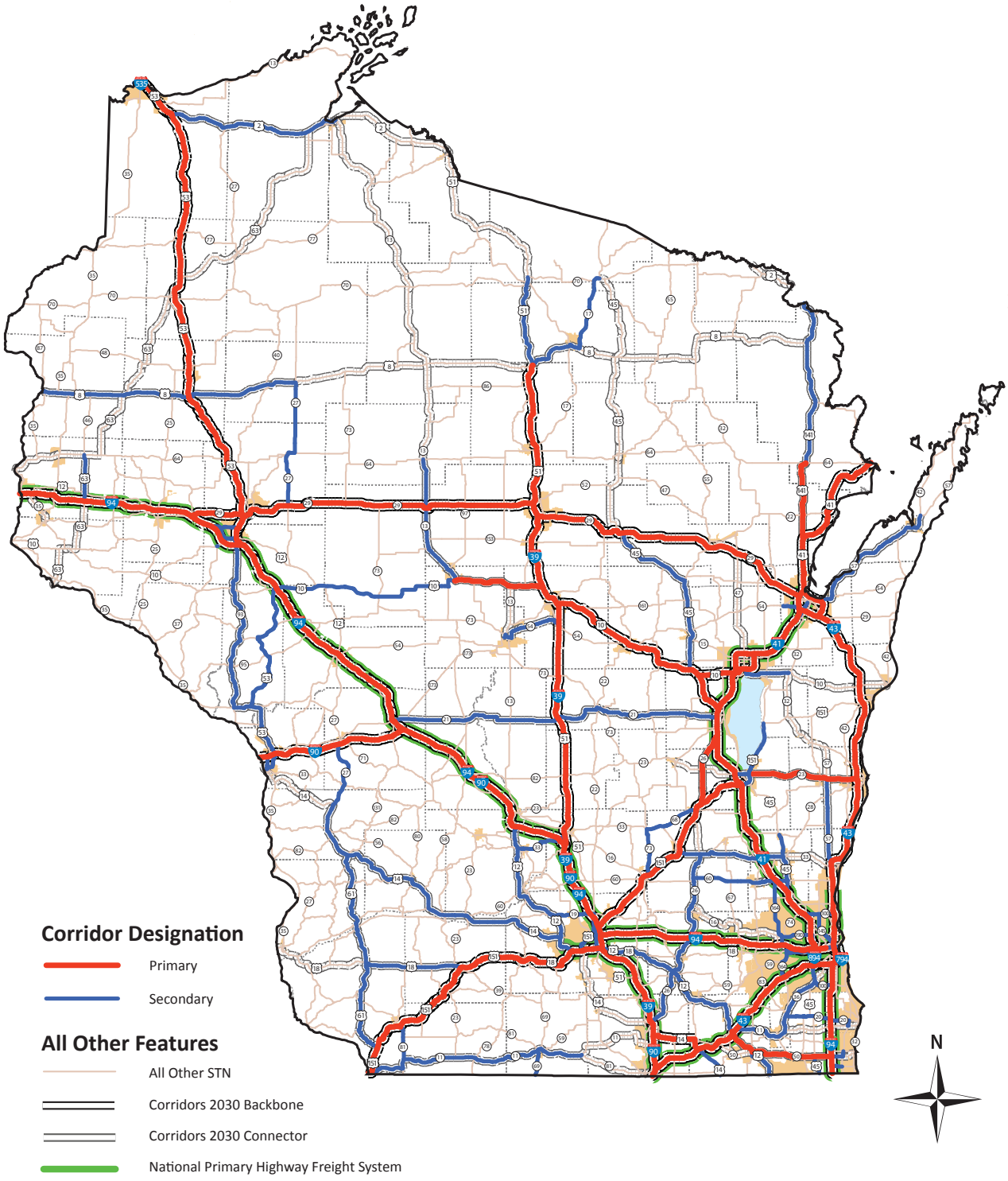
Ports scoring criteria

- Commodities by weight and value
- Connection to a railroad
- Ferry service
- Distance to/from a state trunk highway

Airports scoring criteria

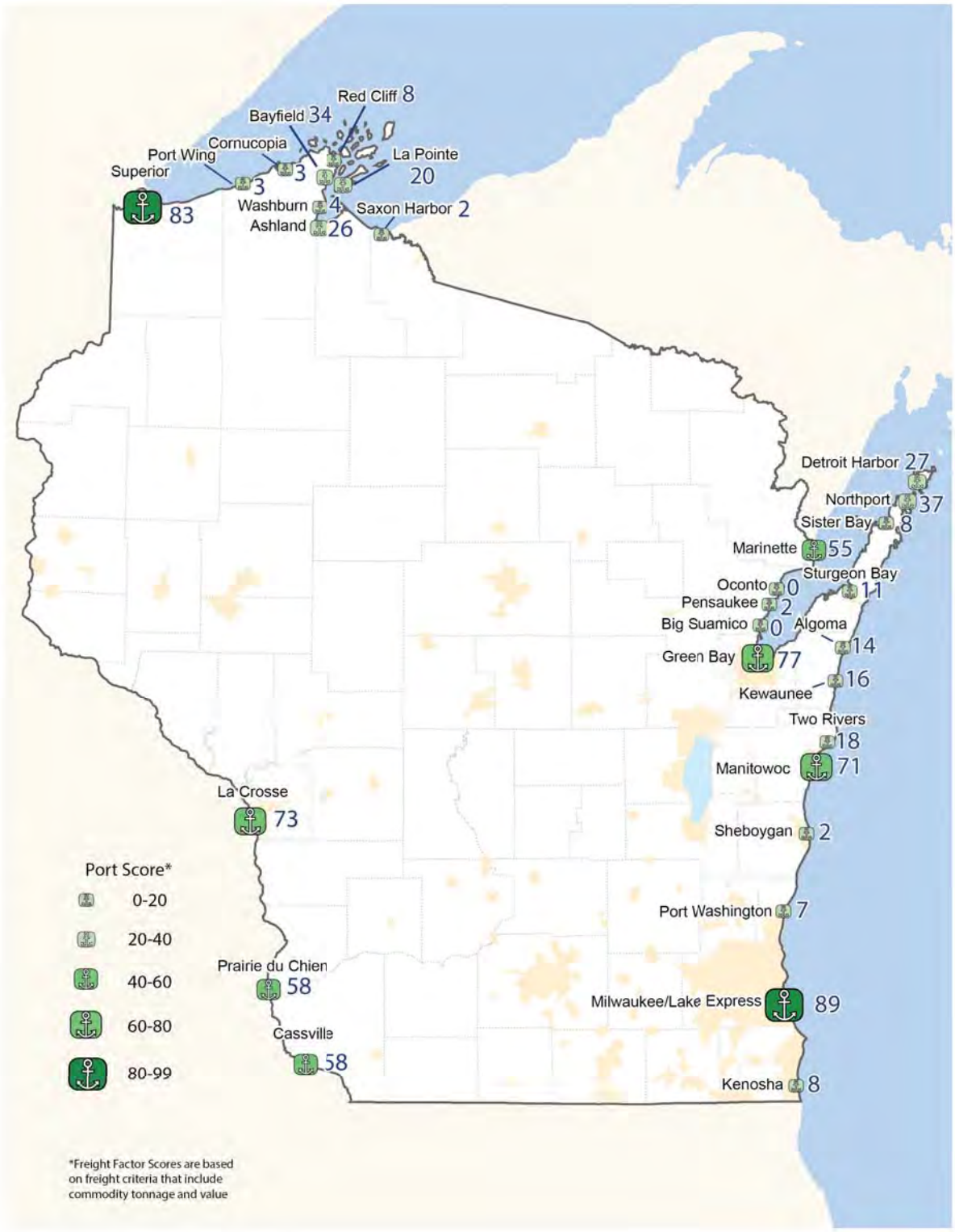
- Commodities by weight and value

2016 Highway Freight Mobility Analysis



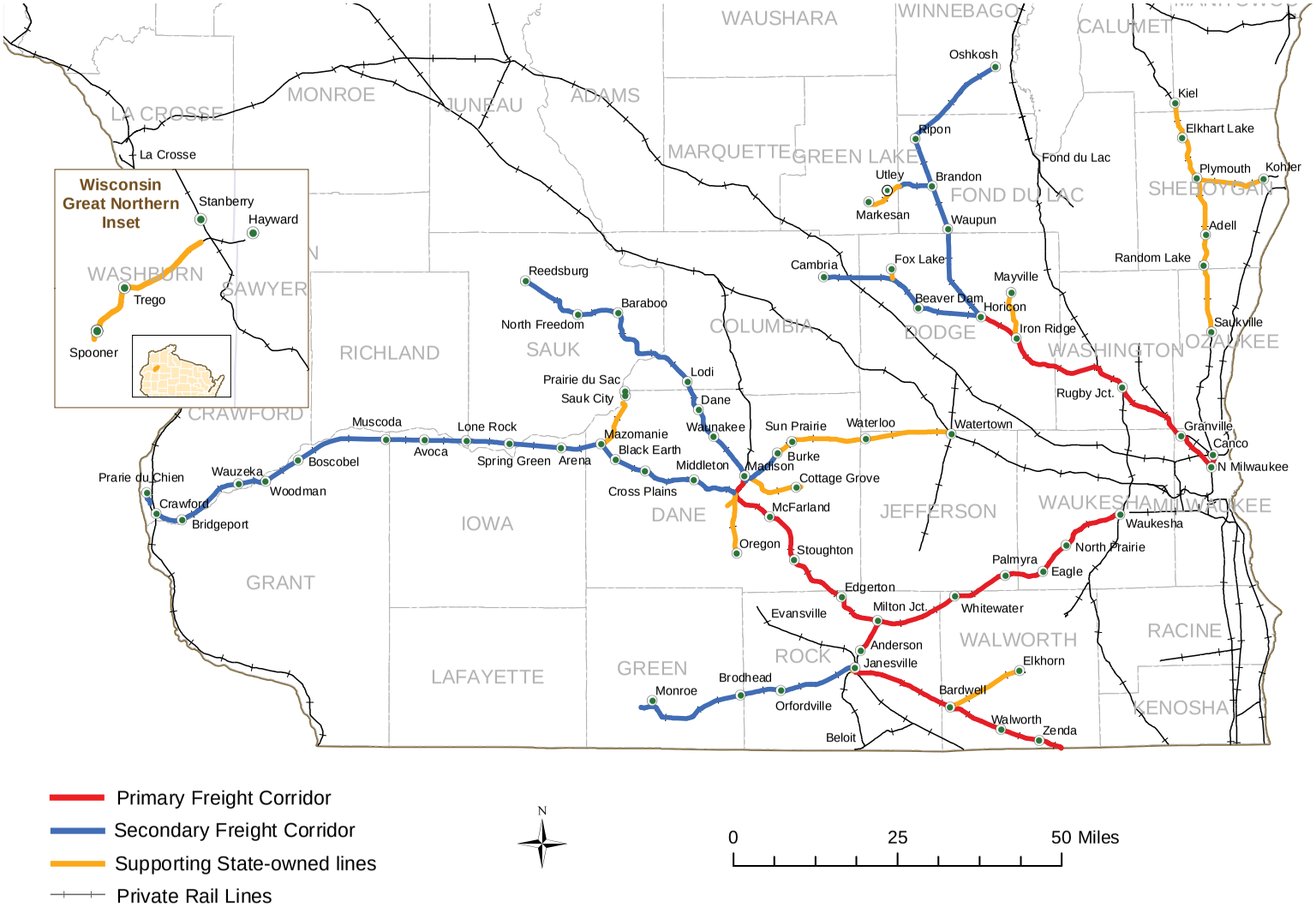
2016 - Map mobility 1

2016 Port and Waterway Freight Mobility Analysis



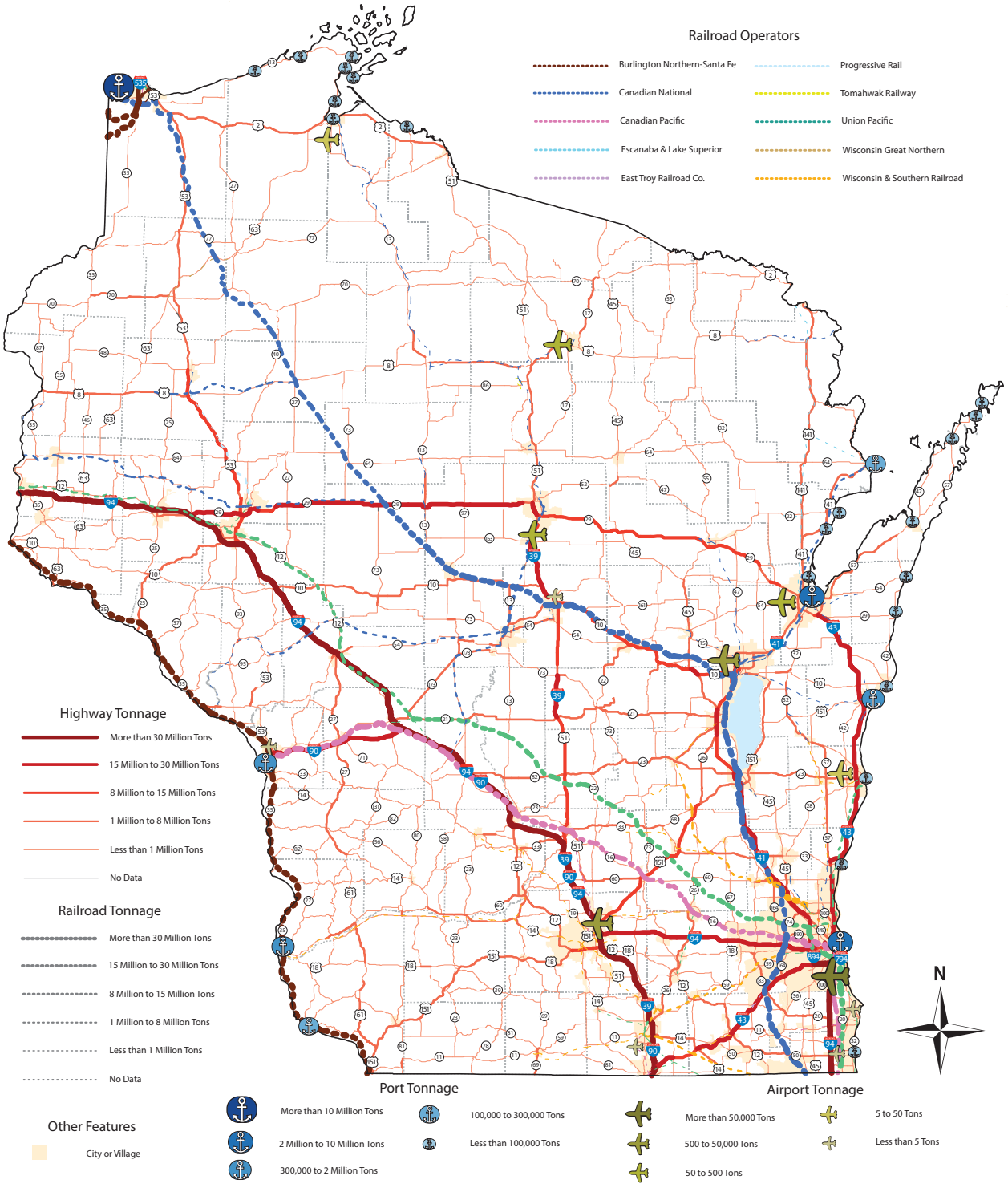
2016 - Map mobility 2

2016 Railroad Freight Mobility Analysis



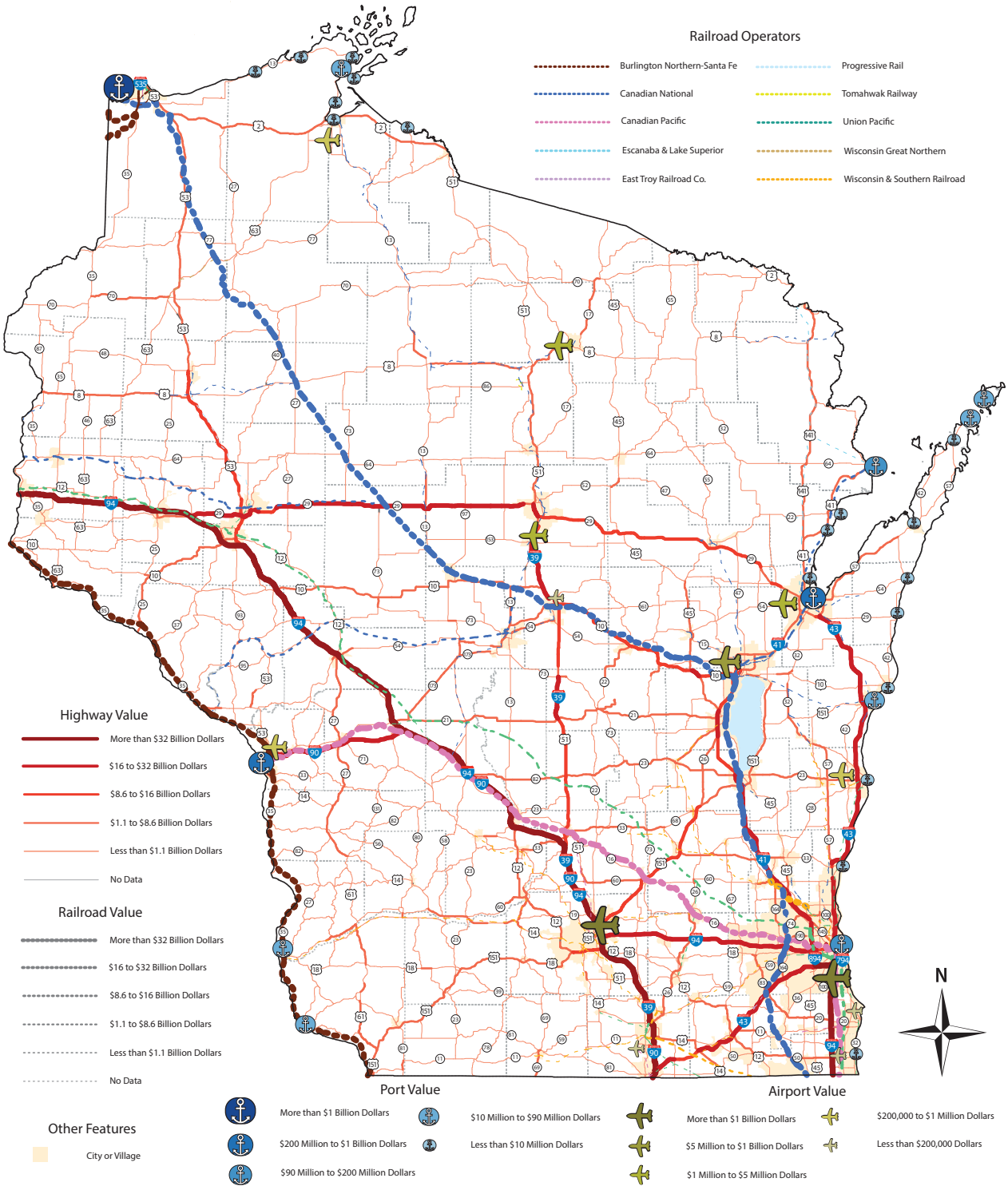
State map 3 of 4

Wisconsin Freight Flow- Statewide Tonnage



State map 1 of 4

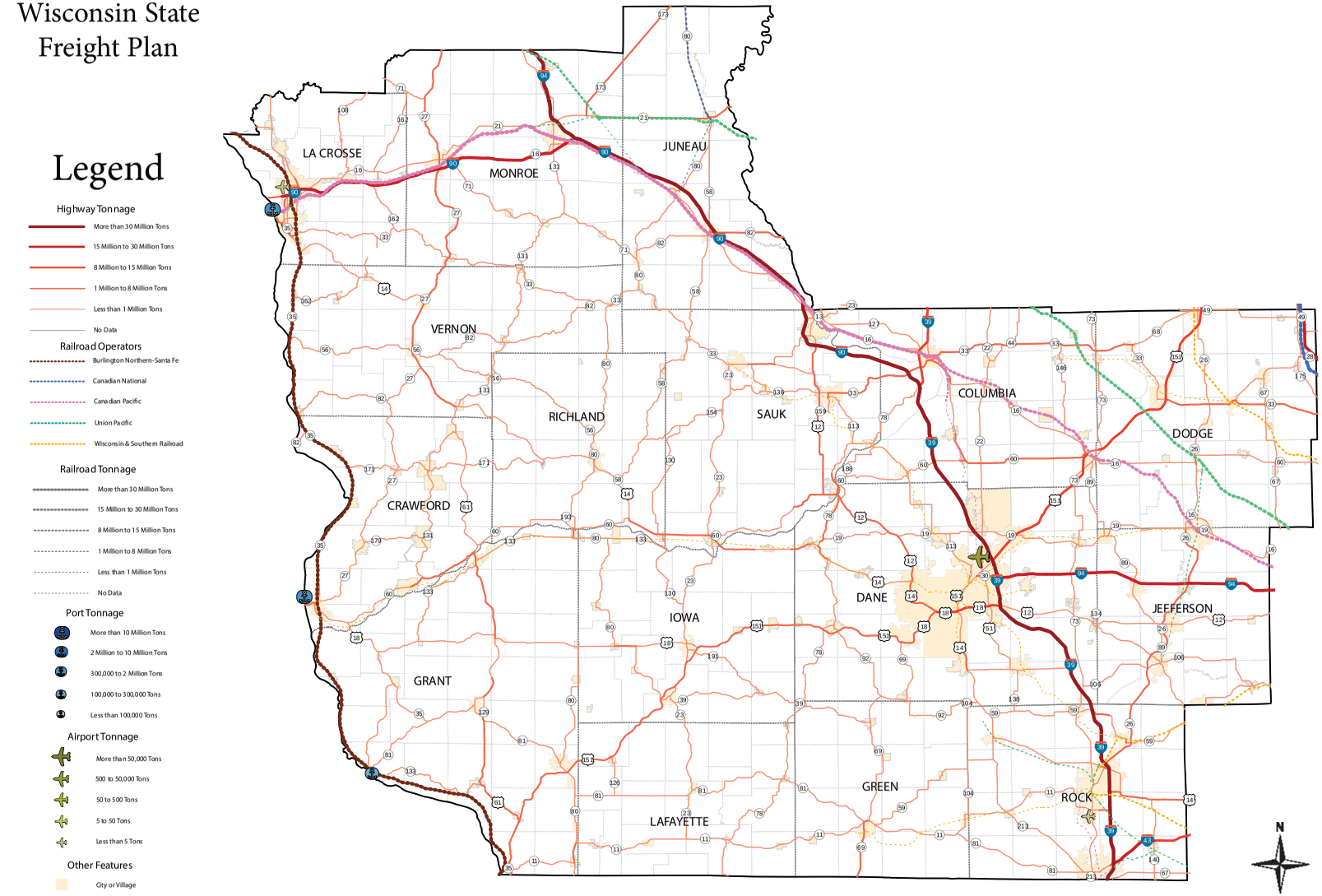
Wisconsin Freight Flow- Statewide Value



State map 2 of 4

Wisconsin Freight Flow- Southwest Region Tonnage

Wisconsin State Freight Plan



Legend

Highway Tonnage
- More than 30 Million Tons
- 15 Million to 30 Million Tons
- 8 Million to 15 Million Tons
- 1 Million to 8 Million Tons
- Less than 1 Million Tons
- No Data

Railroad Operators
- Burlington Northern-Santa Fe
- Canadian National
- Canadian Pacific
- Union Pacific
- Wisconsin & Southern Railroad

Railroad Tonnage
- More than 30 Million Tons
- 15 Million to 30 Million Tons
- 8 Million to 15 Million Tons
- 1 Million to 8 Million Tons
- Less than 1 Million Tons
- No Data

Port Tonnage
- More than 10 Million Tons
- 2 Million to 10 Million Tons
- 300,000 to 2 Million Tons
- 100,000 to 300,000 Tons
- Less than 100,000 Tons

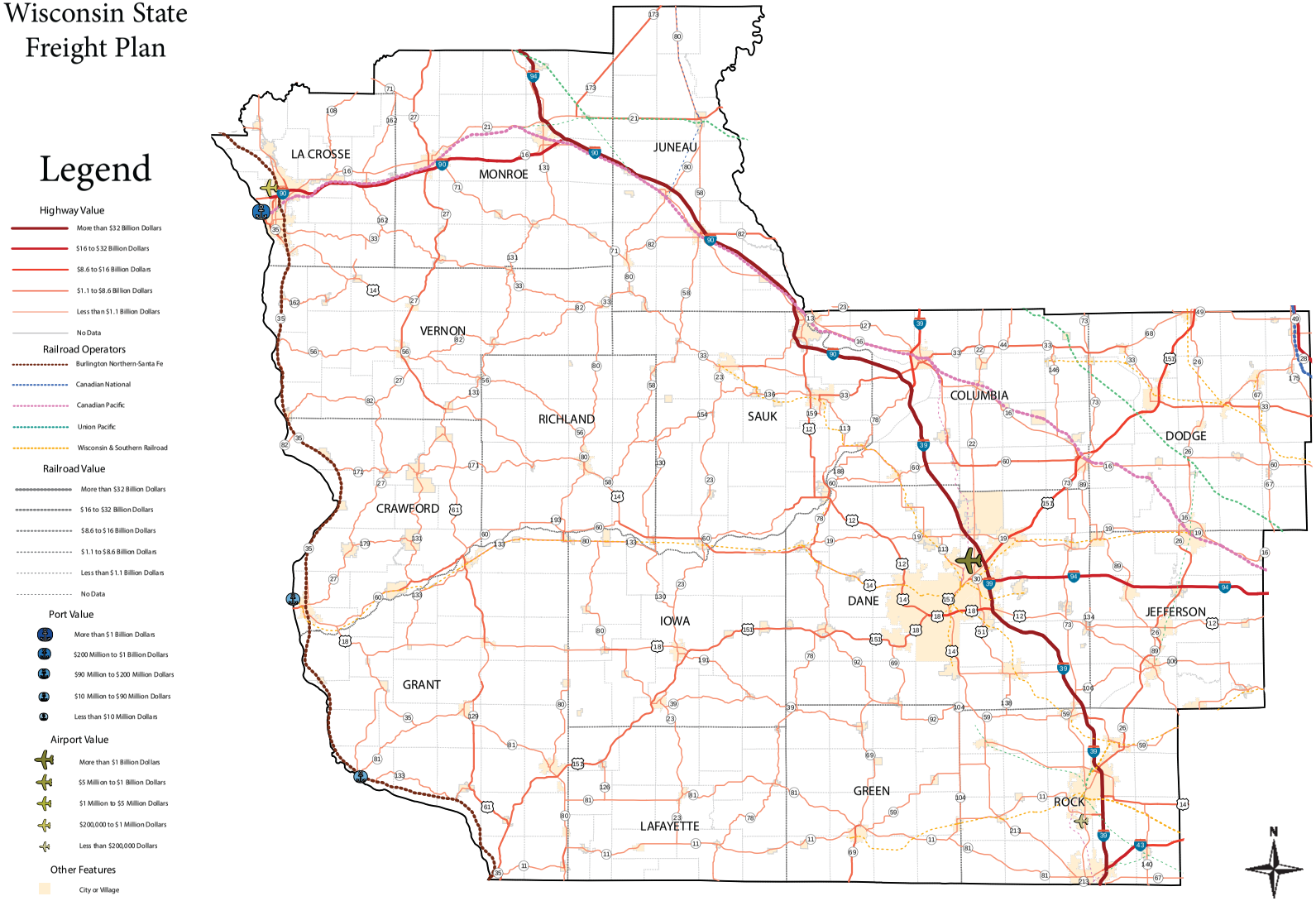
Airport Tonnage
- More than 50,000 Tons
- 500 to 50,000 Tons
- 50 to 500 Tons
- 5 to 50 Tons
- Less than 5 Tons

Other Features
- City or Village

SWR map 1 of 2

Wisconsin Freight Flow- Southwest Region Value

Wisconsin State Freight Plan



Legend

Highway Value
- More than $32 Billion Dollars
- $16 to $32 Billion Dollars
- $8.6 to $16 Billion Dollars
- $1.1 to $8.6 Billion Dollars
- Less than $1.1 Billion Dollars
- No Data

Railroad Operators
- Burlington Northern-Santa Fe
- Canadian National
- Canadian Pacific
- Union Pacific
- Wisconsin & Southern Railroad

Railroad Value
- More than $32 Billion Dollars
- $16 to $32 Billion Dollars
- $8.6 to $16 Billion Dollars
- $1.1 to $8.6 Billion Dollars
- Less than $1.1 Billion Dollars
- No Data

Port Value
- More than $1 Billion Dollars
- $200 Million to $1 Billion Dollars
- $90 Million to $200 Million Dollars
- $10 Million to $90 Million Dollars
- Less than $10 Million Dollars

Airport Value
- More than $1 Billion Dollars
- $5 Million to $1 Billion Dollars
- $1 Million to $5 Million Dollars
- $200,000 to $1 Million Dollars
- Less than $200,000 Dollars

Other Features
- City or Village

SWR map 2 of 2

Wisconsin Freight Flow- Southeast Region Tonnage

Wisconsin State Freight Plan

Legend

Highway Tonnage

- More than 30 Million Tons
- 15 Million to 30 Million Tons
- 8 Million to 15 Million Tons
- 1 Million to 8 Million Tons
- Less than 1 Million Tons
- No Data

Railroad Operators

- Canadian National
- Canadian Pacific
- East Troy Railroad Co.
- Union Pacific
- Wisconsin & Southern Railroad

Railroad Tonnage

- More than 30 Million Tons
- 15 Million to 30 Million Tons
- 8 Million to 15 Million Tons
- 1 Million to 8 Million Tons
- Less than 1 Million Tons
- No Data

Port Tonnage

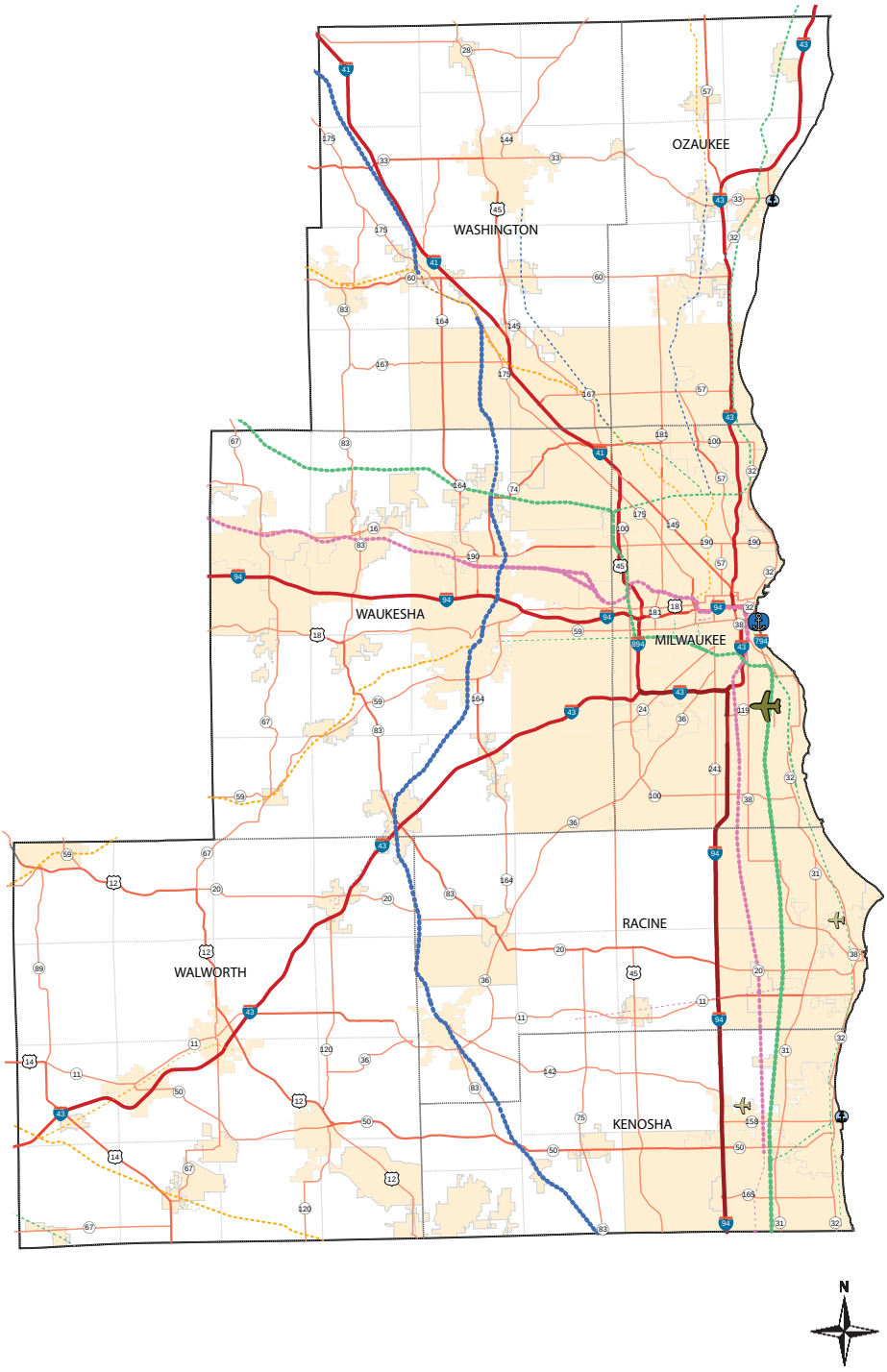
- More than 10 Million Tons
- 2 Million to 10 Million Tons
- 300,000 to 2 Million Tons
- 100,000 to 300,000 Tons
- Less than 100,000 Tons

Airport Tonnage

- More than 50,000 Tons
- 500 to 50,000 Tons
- 50 to 500 Tons
- 5 to 50 Tons
- Less than 5 Tons

Other Features

- City or Village



Wisconsin Freight Flow- Southeast Region Value

Wisconsin State Freight Plan

Legend

Highway Value
- More than $32 Billion Dollars
- $16 to $32 Billion Dollars
- $8.6 to $16 Billion Dollars
- $1.1 to $8.6 Billion Dollars
- Less than $1.1 Billion Dollars
- No Data

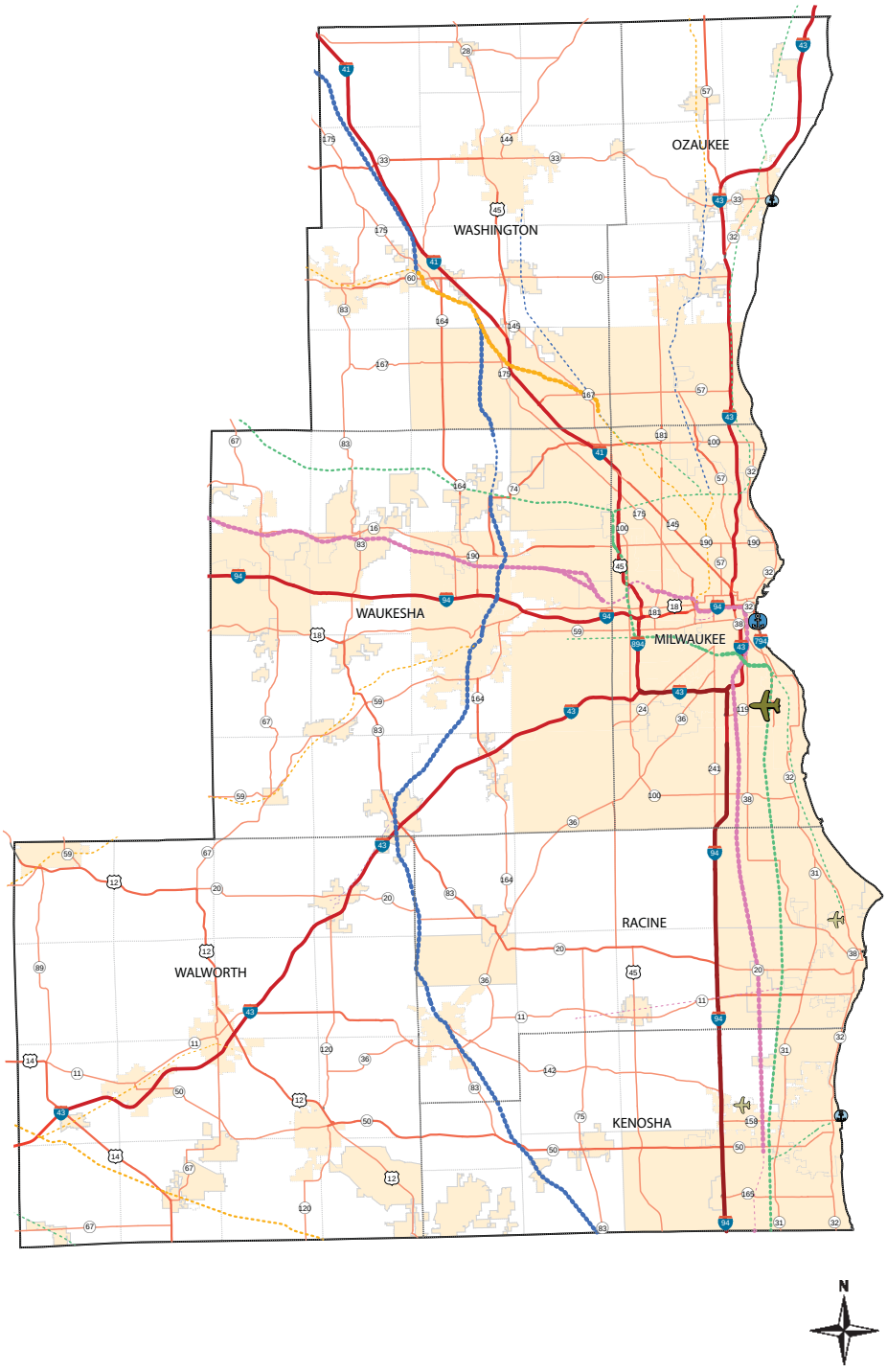
Railroad Operators
- Canadian National
- Canadian Pacific
- East Troy Railroad Co.
- Union Pacific
- Wisconsin & Southern Railroad

Railroad Value
- More than $32 Billion Dollars
- $16 to $32 Billion Dollars
- $8.6 to $16 Billion Dollars
- $1.1 to $8.6 Billion Dollars
- Less than $1.1 Billion Dollars
- No Data

Port Value
- More than $1 Billion Dollars
- $200 Million to $1 Billion Dollars
- $90 Million to $200 Million Dollars
- $10 Million to $90 Million Dollars
- Less than $10 Million Dollars

Airport Value
- More than $1 Billion Dollars
- $5 Million to $1 Billion Dollars
- $1 Million to $5 Million Dollars
- $200,000 to $1 Million Dollars
- Less than $200,000 Dollars

Other Features
- City or Village

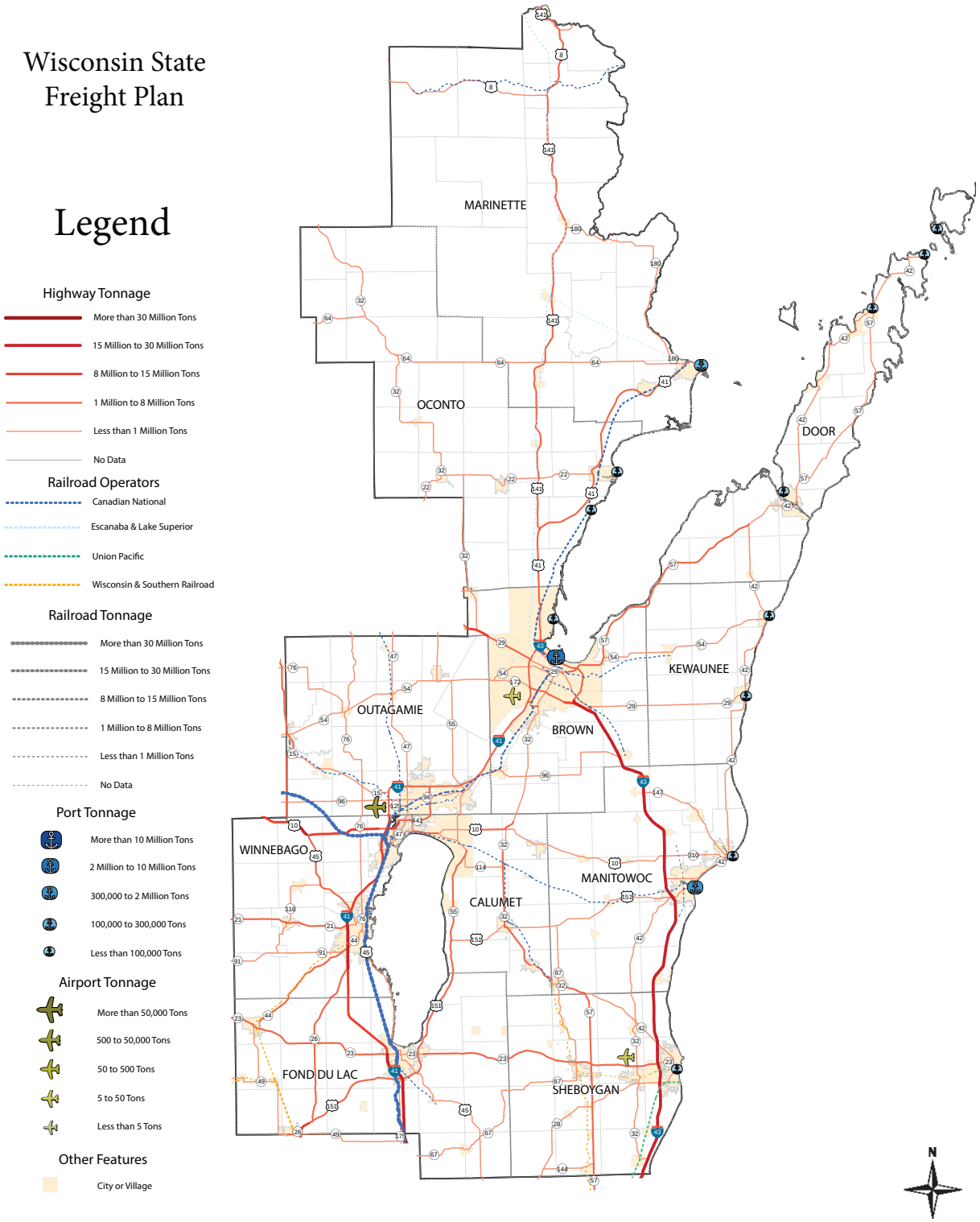


SER map 2 of 2

Wisconsin Freight Flow- Northeast Region Tonnage

Wisconsin State Freight Plan

Legend



Wisconsin Freight Flow- Northeast Region Value

Wisconsin State Freight Plan

Legend

Highway Value
- More than $32 Billion Dollars
- $16 to $32 Billion Dollars
- $8.6 to $16 Billion Dollars
- $1.1 to $8.6 Billion Dollars
- Less than $1.1 Billion Dollars
- No Data

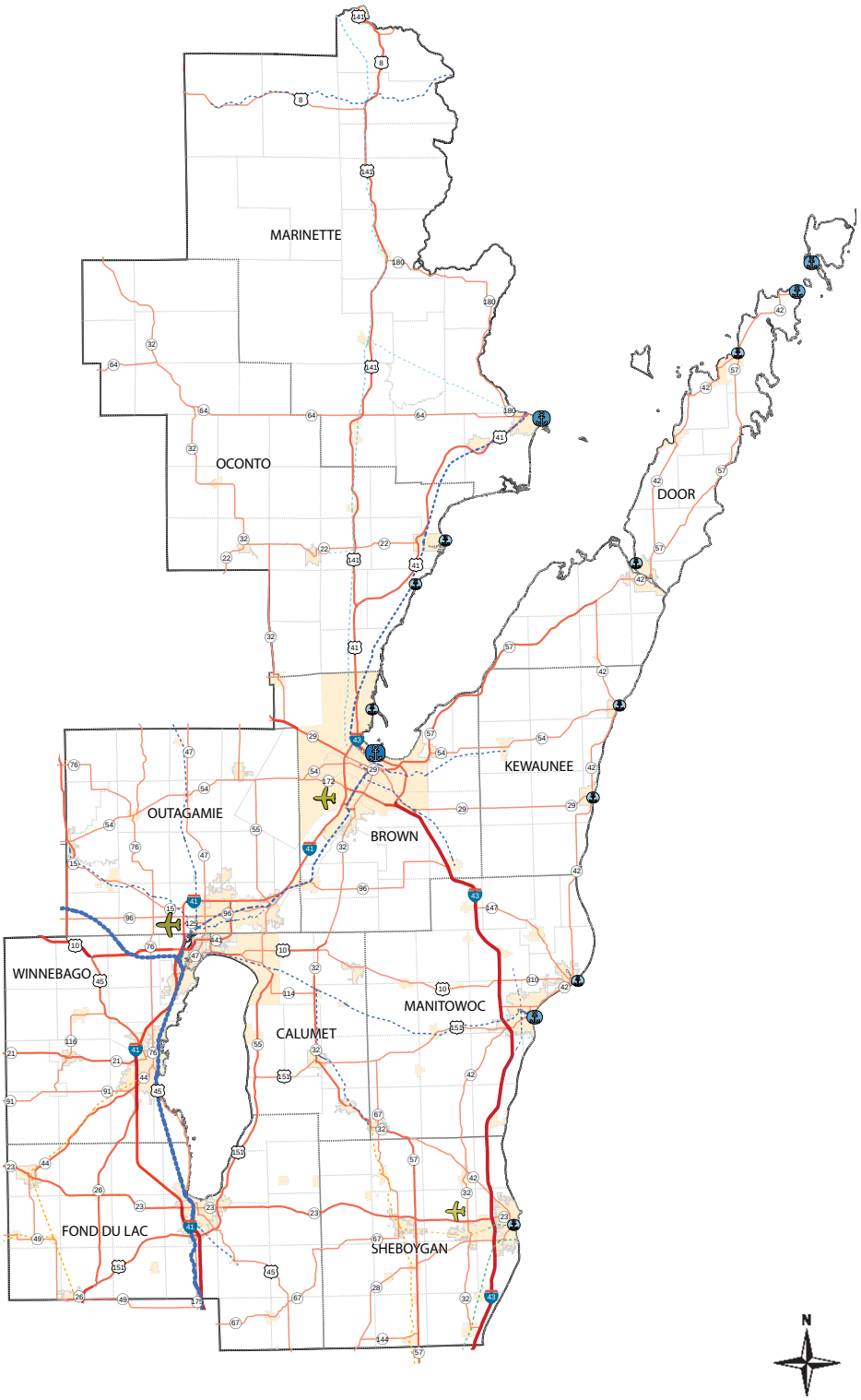
Railroad Operators
- Canadian National
- Escanaba & Lake Superior
- Union Pacific
- Wisconsin & Southern Railroad

Railroad Value
- More than $32 Billion Dollars
- $16 to $32 Billion Dollars
- $8.6 to $16 Billion Dollars
- $1.1 to $8.6 Billion Dollars
- Less than $1.1 Billion Dollars
- No Data

Port Value
- More than $1 Billion Dollars
- $200 Million to $1 Billion Dollars
- $90 Million to $200 Million Dollars
- $10 Million to $90 Million Dollars
- Less than $10 Million Dollars

Airport Value
- More than $1 Billion Dollars
- $5 Million to $1 Billion Dollars
- $1 Million to $5 Million Dollars
- $200,000 to $1 Million Dollars
- Less than $200,000 Dollars

Other Features
- City or Village



Public Hearing Presentation

State Freight Plan

Public Hearings
December 13 - 15, 2016

Donna Brown-Martin, Director
Bureau of Planning and Economic Development

Overview of Today's Presentation

- Why the State Freight Plan is Important to You
- Vision, Goals, Purpose
- State Freight Plan Strategy
- Draft Plan process review
- Importance of Input
- Freight Modes
- Performance Measurement
- Final Draft Plan Overview
- System-plan Environmental Evaluation
- Overview Selected State Freight Plan Policies
- Emerging Themes
- New Policies from Comments

State Freight Plan

- **Why is this Important to you?**
  - Freight transportation assets are an important economic driver
  - Freight movement is forecasted to increase by 2040
  - Public Involvement helps shape the State Freight Plan
  - WisDOT strives to be stewards of the state transportation system
  - Trends
  - Multimodal approach

State Freight Plan Vision

- WisDOT envisions a multimodal freight transportation system that enhances the state' s economic productivity, competitiveness and quality of life through the movement of goods safely, reliably, and efficiently, while minimizing impacts to the natural environment






State Freight Plan Goals

- Enhance Safety, Security, and Resiliency
- Ensure System Preservation and Enhancement
- Enhance System Mobility, Operations, Reliability, Efficiency, and Connectivity





Purpose

- The State Freight Plan links freight specific transportation policy to planning and investment decisions.
- The plan also provides a framework to guide freight-focused improvements aimed at supporting the condition and performance of the state's multimodal transportation system.

State Freight Plan Strategy

- In support of the goals, WisDOT developed the following strategic approaches to guide policy development:
  - Position WisDOT to Facilitate the Safe and Efficient Movement of Freight Integrate Freight Data and Information into WisDOT Investment Decisions – Integrate freight data and stakeholder input into WisDOT's planning, policies, programming and operational decisions

Draft Plan

- The Draft State Freight Plan was released in September and was accompanied by a 45 day public comment which ended on November 14, 2016
- WisDOT held 5 Public Involvement Meetings throughout the State in October
- Obtained comments from Freight Advisory Committee and Governors Freight Industry Summit in October
- WisDOT received over 280 comments
  - 150 from FAC and GFIS
  - 130 from E-mail and PIM's

Importance of Input

- Establishing policies that advance statewide direction and meet WisDOT's mission
- Fully understand the challenges faced throughout the state
- Make recommendations resulting in positive benefits and alignment with WisDOT priorities

Freight Modes

- Road
- Rail
- Airport
- Water
- Pipeline









Performance Measurement

Freight related metrics already measured by WisDOT

MAPSS Performance Improvement

Mobility	Accountability	Preservation	Safety
• **Delay** • **Incident response** • **Winter response**	• TEA Grants • On-time Performance	• State highway pavement condition (backbone and non-backbone) • State bridge condition • State-owned rail line condition • Airport pavement condition • State highway maintenance	• Fatalities • Injuries • Crashes • Safety belt use

Federal Performance Measures

- "Freight Movement on the Interstate System"
  - MAP-21 Required FHWA to Propose 2 Specific Performance Measures:
    - Percent of the Interstate System Mileage Providing for Reliable Truck Travel Time
    - Percent of the Interstate System Mileage Uncongested

Final Draft Plan Overview

- Chapter 1: Introduction
- Chapter 2: Transportation Stakeholders and Institutions
- Chapter 3: Public Involvement
- Chapter 4: Economic Context of Freight on Wisconsin's Transportation System
- Chapter 5: Wisconsin's Transportation Assets
- Chapter 6: Transportation System Condition and Performance
- Chapter 7: Freight Trends, Issues and Forecasts

Final Draft Plan Overview

- Chapter 8: Freight Policies and Strategies
- Chapter 9: Investment Plan
- Chapter 10: Environmental Justice
- Chapter 11 : System-plan Environmental Evaluation

System-plan Environmental Evaluation (SEE)

- The SEE analysis is a qualitative review of the potential environmental impacts of the draft plan
  - Trans 400 defines the process to review evaluate the potential environmental impacts in accordance with the Wisconsin Environmental Policy Act
  - Required when a long range plan includes recommendations that are deemed to have potentially major and significant impacts to the natural environment
  - Contributes to WisDOT's policy of meeting transportation needs while also minimizing environmental impacts

Selected State Freight Plan Policies

- Highway
  - Continue using a performance-based approach to identify state trunk highway system preservation needs, including development of a bridge asset management system
  - Identify and preserve a sub-system of Wisconsin's State Highways that accommodate over-height loads (up to 20 feet), over-weight and over-size loads
  - Support greater use of technologies to improve the safety and efficiency of operations along corridors with high freight movement frequencies
- Local Roads
  - Assist in providing asset management strategies and tools for local governments to ensure that selected system preservation improvements provide cost-effective service life extension

Selected State Freight Plan Policies

- Rail
  - Maintain state-owned rail lines to allow service levels to continue uninterrupted, and without additional restrictions.
- Ports and Waterways
  - Continue state assistance programs for harbor improvements
- Airports
  - Use the Airport Improvement Program to help Wisconsin airports accommodate business planes
- Pipelines
  - Strategic approach includes limiting the negative impacts of crude oil movements on other transportation users

Emerging Themes

Modal Issues

- Ports need to be recognized as a critical asset and need a multimodal freight network to function.
- The state needs to take a more active role working with the rail providers, notably the class 1 rail providers, to improve freight rail service.
- WisDOT needs to determine its role in establishing intermodal facilities in the state.
- Commenters suggested that there is a lack of harmony between states on oversize/overweight permitting.
- Commenters proposed configurations for changing truck size and weight for legal and oversize loads.

Emerging Themes

Freight Projects

- Comments were received regarding the priority project list in the state freight plan. Commenters asked if there would be an opportunity to add local street and highway projects to the priority project list in the state freight plan.
- Including local streets in the priority project list would recognize the importance of first mile/last mile connections.

Safety

- Concerns of movement of crude oil and hazardous materials by all modes of transportation.

New Policies from Comments

1. WisDOT will continue to coordinate with state, regional and international partners, as well as explore the development of a maritime strategy for Wisconsin, to support maritime transportation as part of a safe, efficient and seamless freight transportation system.
2. WisDOT will work with stakeholders to facilitate a discussion to develop an intermodal strategy for Wisconsin.
3. WisDOT will review project development process and design standards to incorporate the needs of freight system users.
4. WisDOT will provide tools/materials that communicate and educate industry and the general public on pertinent freight topics and issues.
5. WisDOT will leverage the data, tools and methods developed through the freight plan to inform project prioritization and investment decision, as well as provide them for DOT partners.

New Policies from Comments

6. WisDOT will continue to work with other states to identify harmonization opportunities.
7. WisDOT will investigate ways to simplify, streamline and provide more permitting options.
8. WisDOT will continue its efforts to promote safe rail crossings throughout the state.
9. WisDOT will monitor national best practices and other initiatives related to reducing freights impact on the environment.

Send us your input

Mail: Wisconsin State Freight Plan
4802 Sheboygan Avenue - Room 901
PO Box 7913
Madison, WI 53707-7913

Online: http://wisconsinfreightplan.gov

Email: freightplan@dot.wi.gov

Phone: 608-266-9476

De Pere Public Meeting Transcript

State Freight Plan Public Hearing

Brown County Library - Kress Family Branch

December 13, 2016

Page 2

(December 13, 2016)

MS. BROWN-MARTIN: We will begin the process for the public hearing. There are two of us. I'm Donna Brown-Martin. I'm the bureau director for planning and economic development. I am the chairperson for the public hearing today.

Jennifer Sarnecki-- Do you want to tell them--

MS. SARNECKI: Hi. I'm Jennifer Sarnecki, statewide planning chief with the Wisconsin Department of Transportation.

MS. BROWN-MARTIN: Okay. The court reporter for us tonight is Beth Goral. She is the court reporter, and she'll be taking down the text and information as you read your statement officially tonight.

Starting off with the formal hearing opening statement. This public hearing is being conducted on behalf of the Department of Transportation as part of the comprehensive public outreach for the State Freight Plan.

The objective of this public hearing is to give you full opportunity to express your opinions about the State Freight Plan. You may also present questions as part of your testimony for the department's consideration.

Page 3

We want to ensure that we capture the complete expression of public opinion and your individual viewpoints so that they can be considered by the department before the final plan is adopted.

Those of you wishing to provide open testimony should have completed a registration slip with your name, city of residence, and, if applicable, the organization you represent.

The registration slips were numbered in the order they were received. The moderator will use these registration slips to call people up to the microphone to speak. And Jennifer is the moderator.

If you have not filled out a registration slip and wish to speak, raise your hand and a WisDOT representative will give you one. Fill it out and return it to a WisDOT representative who will number it and give it to the moderator.

If you would rather not make an oral statement at the microphone, you may provide oral testimony in private to a court reporter through the conclusion of the hearing. You may also submit a written statement, which will also become part of the official record.

The hearing is scheduled to end at 7:30. Everybody wishing to provide oral testimony at the microphone will have the opportunity to do so, even if

Page 4

we go beyond the official end time. Each person's turn will last three minutes.

Once everyone who desires to speak has had their turn, round one will be concluded. If there is no time remaining or if we have gone beyond the official end time of 7:30, the hearing will conclude with one round.

If there's time remaining after round one, we will conduct a second round of turns at the microphone until time runs out. People will be called upon in the same order as in round one. We will determine then whether or not to extend the end time of the formal hearing slightly or reduce the amount of time per turn in round two.

Anyone wishing to provide additional testimony after the conclusion of the formal hearing is welcome to submit written testimony to WisDOT. Written testimony will be part of the official record, as long as it is received before the end of the formal comment period, January 23rd, 2017.

Any questions on the format?

THE PUBLIC: (No response.)

MS. BROWN-MARTIN: Okay. We now invite you to provide open oral testimony on the State Freight Plan.

Page 5

MS. SARNECKI: The first person to speak is Walt Raith, followed by David Wheeler.

MR. RAITH: Thank you. I'm Walt Raith with the East Central Wisconsin Regional Planning Commission. I'm the assistant director of the Metropolitan Planning Organization. We serve as the metropolitan planning agency for the Fox Cities, Oshkosh, and Fond du Lac area.

I just want to commend the Department of Transportation on the job that they've done on the freight plan. And more importantly, that their plans to move forward with-- This isn't over yet. We're going to keep working on this and we're going to put new tools in place to improve freight conditions in Wisconsin.

I think from our perspective that the freight capacity on our system are in good shape. We have a very good highway system in place. We have a lot of rail infrastructure and a lot of opportunities out there for building on to the freight system that we already have.

The one suggestion that I'd like--and I think would go a long way is, we have kind of a four-lane section of I-41 between Green Bay and the Fox Cities with a six-lane portion between the Fox Cities and

Page 6

Fond du Lac to the south; I think it's really important, in the long-term, that--that that facility needs to be upgraded to six lanes.

And with--with the--now with the freight plan and the policies for consideration of the multimodal work that you do, that facility would have--freight, obviously, would be a big part of what you'd construct with that in using the new federal regulations and the emphasis on freight to help Wisconsin fund that, to some degree.

But that's the--the primary thing. And we've been involved with this, and no one can say that they didn't have an opportunity to comment on the freight plan. There's-- They can't.

So I just wanted to thank you for being here and working with us and working closely with the Department of Transportation and want to continue to do so. Thank you.

MS. SARNECKI: Thank you.

Mr. Wheeler.

MR. WHEELER: Hi. My name is David Wheeler, and I am a citizen that travels the interstate highways. And I've--I've lived here for over 40-some years. And I've witnessed all the changes that have--that I've observed on the highway system before

Page 7

the interstate--43 Interstate and Interstate 41.

I commend you for the work that you're doing and hope that I could contribute in this way of saying that the study should--should be--the scope of the study should be of--take into account the traffic volumes from 2020 and beyond.

I believe that--it's my feeling that we need new conduits of freight movement capacity in the--in the context of rail corridors that need to be invested in Wisconsin.

It's my observations that more intermodal is happening from Chicago to Green Bay, which, back in the mid-'90s when the corridors were taken out of service, specifically, the Milwaukee Road and the Chicago North Western, that was before globalization, before a lot of freight was moved from overseas ports.

Well, that capacity was taken out and, of course, was transferred to the highways, which, I think that the wear and tear on the highways and congestion are impeding the--such as the things that you've mentioned in your--in your performance measurement freight analysis that the--that you've done.

I hope that those numbers reflect the metrics from the mid-'90s up until the present time, because I think that needs to be accommodated.

Page 8

I think that Wisconsin is not collecting enough revenue from--from truck and railroad freight traffic. The railroads are operating intermodal, you know, with freight. You know, that's their--their door to door service.

I don't think that--you know, that they are in the fund development or the-- And so I think that the north, south routes that were taken out of service, like the Milwaukee Road and the Chicago North Western that followed the--followed the lakeshore, I think they need to be long-term put back into service for 2020 and beyond as a reliable conduit for freight capacity.

And I'd like to--to also, within that scope, say that--or, mention that when we talk about putting lines back into service, that--of course, the lines do have bridges. Well, I--and bridges are expensive. But I think the cost of--of rebuilding a bridge should be equated with the cost per mile of interstate highway, and I think that there would be--you know, to put it in perspective.

And once the bridge is done, you know, it's--it's good--you know, it's service is 60 years or 80 years plus, versus a highway that's only good for maybe ten years. So that's--that's all I would like to contribute at this time. Thank you.

Page 9

MS. SARNECKI: Thank you.

MS. BROWN-MARTIN: Thank you.

I think I know the answer to this, but is there anyone else?

THE PUBLIC: (No response.)

MS. BROWN-MARTIN: Okay. Well, we are--we are here officially until 7:30, so we'll still be here and we'll wait for--for more comments. Thank you.

I do want to read into the--just make notice into the record. We received written testimony to the department regarding the importance of including the Southern Bridge and Arterial Streets Corridor on the state freight plan's priority project list. This is being submitted by Brown County executive, Troy Streckenbach. So we would submit this written statement into the record.

(Off the record.)

Chairperson announces that the hearing is concluded, thanks the assembly for taking time to participate in this public hearing, and reminds them that they are free to submit written testimony, which much be received by WisDOT on or before Monday, January 23rd, 2017.

(Hearing concludes.)

STATE OF WISCONSIN)
)SS.
COUNTY OF BROWN)

I, Beth M. Goral, Court Reporter and Notary Public in and for the state of Wisconsin, do hereby certify that I have carefully compared the foregoing 9 pages with my stenographic notes, and that the same is a true and correct transcript.

I further certify that I am not a relative or employee or attorney or counsel of any of the parties, or a relative or employee of such attorney or counsel, or financially interested in said action.

Dated at Green Bay, Wisconsin, on this 16th day of December 2016.

Beth M. Goral
Court Reporter
Notary Public

My commission expires January 1, 2017.

West Allis Public Meeting Transcript

* * * * * * * * * * * * * * * *

WISCONSIN STATE FREIGHT PLAN

WisDOT Public Hearing

* * * * * * * * * * * * * * * *

Tommy G. Thompson Youth Center

Milwaukee, WI

December 14, 2016

REPORTED BY ANITA FOSS

REGISTERED PROFESSIONAL REPORTER

* * * * * * * * * * * * * * * *

MILWAUKEE COURT REPORTERS

262-210-6215

TRANSCRIPT OF PROCEEDINGS

MS. BROWN-MARTIN: We will get started with the public hearing. So I'm going to call up the folks for the table here. So again, my name is Donna Brown-Martin; I'm the chairperson for the public hearing. I have Jennifer Sarnicky.

MS. SARNICKY: I'm the statewide planning chief of the Wisconsin Department of Transportation.

MS. BROWN-MARTIN: And Andrew levy.

MR. LEVY: Good evening, I'm one of the planning supervisors in the southeast region at the Wisconsin Department of Transportation.

MS. BROWN-MARTIN: He's the timekeeper. Okay. And then we have a court reporter. Your name?

COURT REPORTER: Anita Foss.

MS. BROWN-MARTIN: Anita Foss is our court reporter for tonight's testimony. She's capturing the testimony presented for the official record. Okay. So to start off, the formal hearing is now beginning. It is 6:15. We are 15 minutes behind because we started a little late; we didn't have folks to begin the process before now. So officially at about 6:16 we're starting the formal

hearing process. And I'll read an opening statement to the group.

This public hearing is being conducted on behalf of the Department of Transportation as part of the comprehensive public outreach for the state freight plan. The objective of this public hearing is to give you full opportunity to express your opinions about the state freight plan. You may also present questions, as part of your testimony, for the Department's consideration. We want to ensure that we capture the complete expression of public opinion and your individual viewpoints so that they can be considered by the Department before the final plan is adopted.

Those of you wishing to provide open testimony should have completed a registration slip with your name, city of residence, and, if applicable, the organization you represent. The registration slips were numbered in the order they were received. The moderator will use these registration slips to call people up to the microphone to speak. If you have not filled out a registration slip and wish to speak, raise your hand, and a WisDOT representative will give you

one. Fill it out and return it to a WisDOT representative, who will number it and give it to the moderator.

If you would rather not make an oral statement at the microphone, you may provide oral testimony in private to a court reporter through the conclusion of the hearing. You may also submit a written statement, which will also become part of the official record. The hearing scheduled to end -- is scheduled to end at 7:30. Everybody wishing to provide oral testimony at the microphone will have the opportunity to do so, even if we go beyond the official end time.

Each person's turn will last three minutes. Once everyone who desires to speak has had their turn, round one will be concluded. If there is no time remaining, or if we have gone beyond the official end time of 7:30, the hearing will conclude with one round. If there is time remaining after round one, we will conduct a second round of turns at the microphone until time runs out. People will be called upon in the same order as in round one.

We will determine then whether or not to extend the end time of the normal hearing

slightly or reduce the amount of time per turn in round two. Anyone wishing to provide additional testimony at the conclusion of the formal hearing is welcome to submit written testimony to Wisconsin DOT. Written testimony will be part of the official record as long as it is received before the end of the formal comment period, which is January 23, 2017.

Are there any questions about the speaking format? Okay. We now invite you to provide open, oral testimony on the state freight plan.

(Pause in proceedings.)

MS. BROWN-MARTIN: We had no commenters at the end of the allotted time. The hearing is concluded at 7:30.

STATE OF WISCONSIN)
) ss.
COUNTY OF MILWAUKEE)

I, ANITA KORNBURGER-FOSS, Registered Professional Reporter and Notary Public in and for the State of Wisconsin, do hereby certify that the preceding hearing was recorded by me and reduced to writing under my personal direction.

I further certify that said hearing was taken at 640 South 84th Street, Milwaukee, Wisconsin, on December 14, 2016.

I further certify that I am not a relative or employee or attorney or counsel of any of the parties, or a relative or employee of such attorney or counsel, or financially interested directly or indirectly in this action.

In witness whereof, I have hereunto set my hand and affixed my seal of office at Milwaukee, Wisconsin, this 31st day of December, 2016.

ANITA KORNBURGER-FOSS, RPR - Notary Public

My commission expires May 13, 2017.

ANITA KORNBURGER-FOSS
Notary Public
State of Wisconsin

Madison Public Meeting Transcript

STATE FREIGHT PLAN

PUBLIC HEARING

=======

State Freight Plan Public Hearing held at Wisconsin Department of Transportation Southwest Region Office, 2101 Wright Street, Madison, Wisconsin 53704, on December 15, 2016 commencing at 4:30 in the afternoon.

=======

(No Witness Appeared at Hearing)

NOTARY PUBLIC MINDLA C. ROTHMAN STATE OF WISCONSIN

Notary Public, State of Wisconsin

State Freight Plan

Public Hearing Chairperson's Guide

(Adapted from DTSD's Public Hearing Chairperson's Packet)

Formal Hearing portion of hybrid public hearing:

General outline of the formal hearing for oral testimony in an open setting:

1. Welcome
2. Presentation
3. Opening Statement
4. Invitation of Testimony
5. Closing Statement

1) WELCOME by Chairperson

The Chairperson introduces herself, title, and explains that she will be serving as the Hearing Chairperson. She thanks the assembly for attending this public hearing on the State Freight Plan.

The Chairperson introduces other WisDOT people at front table—names and titles, and roles as **Moderator** and **Timekeeper**.

She introduces court reporter and explains that he/she will be capturing the testimony presented for the official record.

She states that the formal hearing will begin immediately following a short presentation. There will be a very short time for any burning questions and explains that the Q/A will not be part of the official proceedings and not considered as oral testimony. [This was how DTSD described it in their documentation.] She can remind the assembly that speakers can ask questions as part of their oral testimony.

> NOTE: WisDOT public hearings are structured but largely informal events, held at the convenience of the majority of potential attendees and for the purpose of receiving and documenting citizen input. Cross examination of witnesses is not permitted. A determination of whether to answer questions as part of the formal hearing testimony or to answer them after the formal hearing (not as part of the official record) is left to the discretion of the Hearing Chairperson. Questions of a more general nature and which may be of interest to those in attendance could be addressed during the Q/A session after the presentation. Questions that may be of interest only to the particular individual are typically answered by staff at the "back of the room" or during the informal session following the traditional-style portion of the hybrid-style hearing adjournment. The Hearing Chairperson's preference and the atmosphere of the public hearing will generally dictate the manner of handling questions; **however, it has usually proven the best approach is to publicly answer questions to the best of staff ability without subjecting staff to cross examination**.

If the presentation is to be part of the official hearing, have the court reporter transcribe the presentation. If the presentation (and Q/A) is to conclude before the formal hearing, exclude the presentation from the formal transcript.

MR
EXHIBIT 1
12-15-16

2) PRESENTATION

Chairperson gives the presentation and conducts the very brief Q/A session [for any burning questions].

3) FORMAL HEARING OPENING STATEMENTS

The **Chairperson** announces that the formal hearing will begin; she gives the opening statement and describes the process by which people will be called upon to speak:

"This public hearing is being conducted on behalf of the Department of Transportation as part of the comprehensive public outreach for the State Freight Plan.

The objective of this public hearing is to give you full opportunity to express your opinions about the State Freight Plan. You may also present questions as part of your testimony for the Department's consideration. We want to ensure that we capture the complete expression of public opinion and your individual viewpoints so that they can be considered by the Department before the final plan is adopted.

Those of you wishing to provide open testimony should have completed a registration slip with your name, city of residence, and, if applicable, the organization you represent. The registration slips were numbered in the order they were received. The moderator will use these registration slips to call people up to the microphone to speak. If you have not filled out a registration slip and wish to speak raise your hand and a WisDOT representative will give you one. Fill it out and return it to a WisDOT representative who will number it and give it to the moderator.

If you would rather not make an oral statement at the microphone, you may provide oral testimony, in private, to a court reporter through the conclusion of the hearing. You may also submit a written statement, which will also become part of the official record.

The hearing scheduled to end at 7:30. Everybody wishing to provide oral testimony at the microphone will have the opportunity to do so—even if we go beyond the official end time. Each person's turn will last three minutes. Once everyone who desires to speak has had their turn, Round One will be concluded.

If there is no time remaining or if we have gone beyond the official end time of 7:30, the hearing will conclude with one round. If there is time remaining after Round 1, we will conduct a second round of turns at the microphone until time runs out. People will be called upon in the same order as in Round 1. We will determine then whether or not to extend the end time of the formal hearing slightly, or reduce the amount of time per turn in Round 2.

Anyone wishing to provide additional testimony after the conclusion of the formal hearing is welcome to submit written testimony to WisDOT. Written testimony will be part of the official record as long as it is received before the end of the formal comment period, January 23, 2017."

Are there any questions about the speaking format?

We now invite you to provide open oral testimony on the State Freight Plan.

4) INVITATION OF TESTIMONY

The **Moderator** begins the call for testimony. Names will be called from the numbered registration slips he or she is holding. The Moderator calls the name of the person to speak and the name of the person who is "on deck" to speak next. The Moderator explains that the person "on deck" may proceed to the mic and stand behind the current speaker. This will keep things moving with little delay, enabling more time for testimony.

The **Moderator** again reminds the assembly that we are asking speakers to limit oral testimony to 3 minutes so that everyone has an opportunity to present their testimony. [If the person is reading a written statement, they should conclude after 3 minutes, even if they have not completed the statement. They may resume where they left off during their second turn—OR—provide the remainder of the statement to the court reporter in the private testimony area before the hearing ends—OR—submit the remainder of their statement as written testimony.]

The **Moderator** explains the **Timekeeper's role**, to monitor the time and notify the speaker of the time remaining in their turn. The **Timekeeper** will hold up a sign at the one-minute-remaining mark, when there are 15 seconds remaining (optional), and when time is up. The moderator should ask that speakers heed the time limit to allow everyone a chance to speak.

The **Moderator** will call the first two people to the microphone and ask the first person to state their name, city of residence, and organization they represent, if any, before beginning their testimony.

This will continue until the formal hearing has concluded.

5) CLOSING STATEMENT

At the end of the allotted (extended) time, the **Chairperson** announces that the hearing is concluded, thanks the assembly for taking time to participate in this public hearing, and remind them that they are free to submit written testimony which must be received by WisDOT on or before Monday, January 23, 2017.

THIS PAGE INTENTIONALLY LEFT BLANK

4– Chapter 4: Economic Context of Freight on Wisconsin's Transportation System

4.1 Introduction

Businesses throughout Wisconsin use the transportation system to obtain the inputs needed to produce their goods and get them to market. A safe and efficient transportation system supports the economy by providing access to inputs and markets at a low cost, potentially reducing the overall cost of doing business and increasing competitiveness. Predictable and reliable travel times are important for manufacturing and other industries using just-in-time delivery. A safe, integrated, and seamless network of roadways, airports, harbors, pipelines, and railroads link Wisconsin businesses and consumers to the global economy. Without investment in the transportation system, the link to the global economy could degrade, resulting in lost productivity and competitiveness.

Overview of Chapter 4

- Describes the critical link between Wisconsin's transportation system and the state's economy
- Explores how freight movement in Wisconsin creates jobs and supports economic development
- Reviews freight-dependent sectors in Wisconsin
- Identifies Wisconsin's relationship to the Midwest, connections to the global economy, and the required transportation assets needed to support regional and global trade

The connection between the transportation system and the economy makes transportation investment and policy choices not only about transportation, but also about facilitating economic development and growth.

In order to provide a transportation system that meets the needs of the state economy, an understanding of the current and future needs of the state's freight-dependent industries is critical. In addition, understanding the driving forces that could significantly affect those industries over the next 20 years allows decision makers to anticipate and invest in improvements that enable economic growth in Wisconsin. This chapter discusses the state's economy, composite industries and sectors.[1]

4.2 Wisconsin's Economy

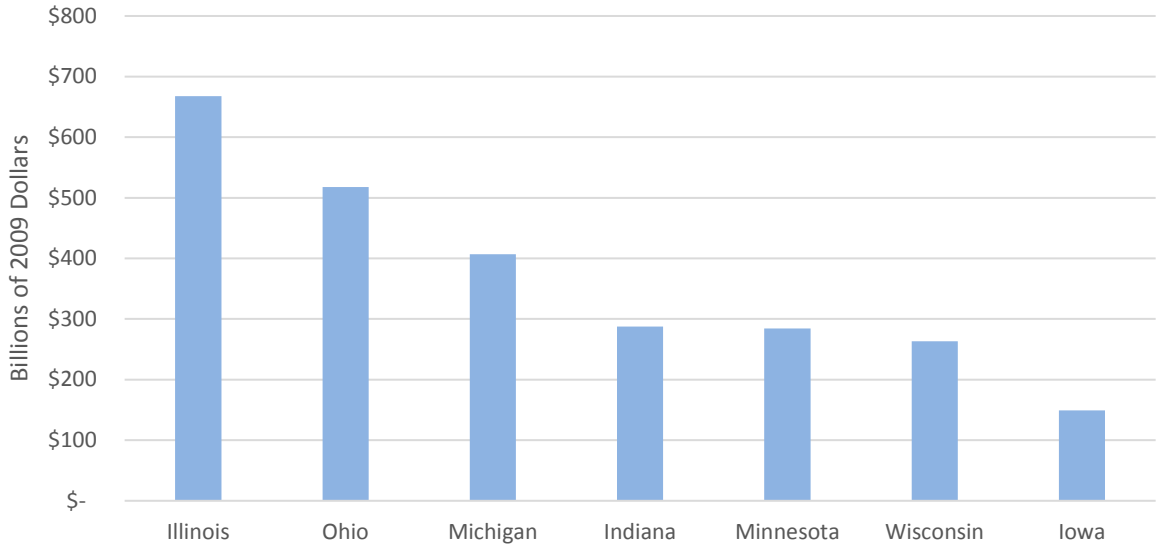
Gross Domestic Product

GDP is an economic statistic measuring the value of the goods and services produced by the state economy over a given time period. It is an indicator of the health of the state's economy.

According to the United States Bureau of Economic Analysis (BEA), Wisconsin's Gross Domestic Product (GDP) was $281.6 billion in 2013, ranking it 20th by state, at about 1.7 percent of the nation's total GDP.[2] Figure 4-1 displays the GDP of Midwestern states. Wisconsin has the second-smallest economy compared to other states in the region.

[1] Due to the limited availability and adequacy of freight and economic data, multiple sources and data from 2009 through 2013 was used to support the analysis provided within this chapter.
[2] U.S. Bureau of Economic Analysis, "Annual Gross Domestic Product (GDP) By State."

Figure 4-1: Comparison of Midwestern State Regional Real GDP, 2013

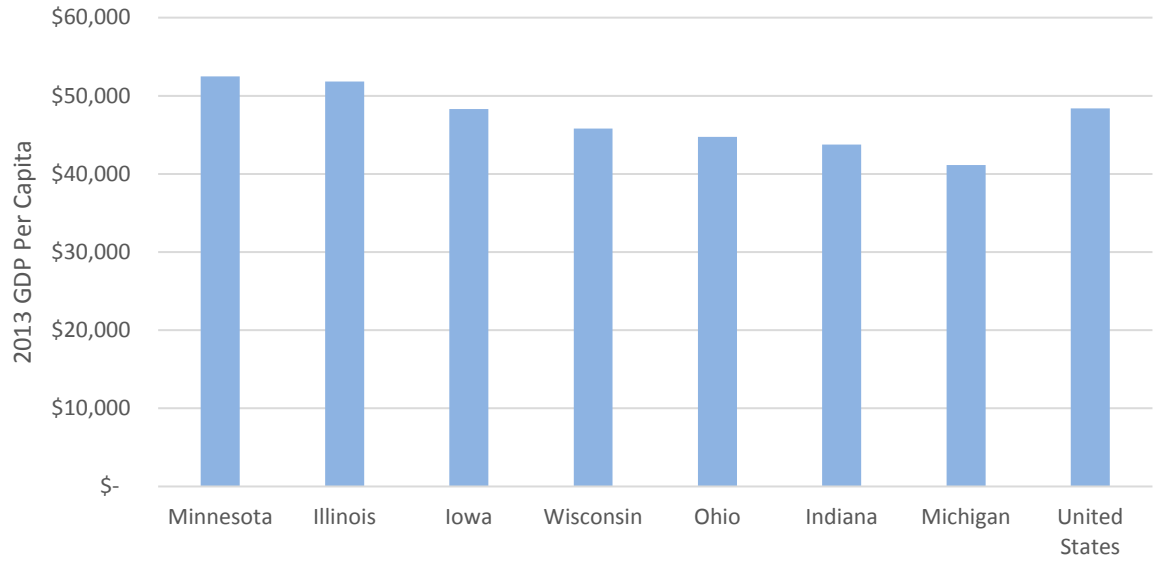


Billions of 2009 Dollars

Source: U.S. Bureau of Economic Analysis, "Annual Gross Domestic Product (GDP) By State"

Figure 4-2 displays the 2013 GDP per capita, which controls for differences in population between states. Wisconsin measures in the middle of the referenced regional states, with a per capita GDP of $45,811 in 2013.

Figure 4-2: Comparison of Midwestern Regional GDP per Capita, 2013



Billions of 2009 Dollars

Source: U.S. Bureau of Economic Analysis, "Annual Gross Domestic Product (GDP) By State"

Wisconsin's GDP Outlook

Wisconsin's GDP has rebounded from the 2008-2009 recession and is growing. By 2040, Wisconsin's GDP is forecast to grow to $448.8 billion,[3] at a compound annual rate of two percent, for an estimated 71 percent increase. As shown in Table 4-1, Wisconsin's forecast growth mirrors that of the United States over the same time period.

Table 4-1: Summary Real GDP for Wisconsin and the United States, 2013-2040

	2013	2040	2013-2040 Compound Annual Growth Rate
Wisconsin GDP	$263.3	$448.8	2.0%
United States GDP	$15,526.7	$26,853.4	2.0%

Billions of 2009 Real Dollars

Source: U.S. Bureau of Economic Analysis; Regional Economic Models, Inc.

4.3 Wisconsin's Freight-Dependent Economic Sectors

Wisconsin's diverse economy is supported by many prominent sectors, including agriculture, forestry, manufacturing, retail and wholesale trade, construction, mining, energy, and transportation services. Wisconsin's economic production and manufacturing base are geographically diverse, occupying both urban and rural areas. Wisconsin's diversity of industry and geography helps make the economy strong and resilient, but it also places high demands on the state's transportation infrastructure. To grow the economy, these sectors rely on a reliable, safe and efficient multimodal transportation system.

Industries Comprising Wisconsin's Freight-Dependent Sectors

While Wisconsin's economy is forecasted to grow, not all sectors are expected to have the same rate of growth. Additionally, the freight transportation needs of Wisconsin's sectors vary depending on the resources and the production processes used to create the final product, the location of the firm relative to suppliers, and the distance from production facilities to the end consumer of the products, among other factors. The plan defines the sectors of Wisconsin's economy that are freight-dependent (those that produce and sell goods). The remainder of this section is dedicated to identifying Wisconsin's freight-dependent industries and their associated transportation needs.

Sectors vs Industries

Sectors – A large segment of the economy comprised of many industries (e.g. agriculture and construction).

Industries – Includes more specific groups of companies or businesses that comprise a sector.

Example – Manufacturing is a sector that is composed of industries such as high tech, food, chemical or metal.

As of 2012, the six freight-dependent sectors and their composite industries shown in Table 4-2 and Table 4-3 comprised almost 40 percent of Wisconsin's employment and 44 percent of the state's GDP. Wisconsin's service sectors or non-freight-dependent sectors, which include finance, government, education, healthcare, social assistance, and food service, comprise 60 percent of Wisconsin's employment and 56 percent of Wisconsin's GDP.

[3] Regional Economic Models, Inc., 2014

Table 4-2: Wisconsin's Freight-Dependent Sectors and Industries

Freight-Dependent Sector	Industries
Wholesale & Retail Trade	Durable goods: Electronics Non-durable goods: Apparel and grocery goods
Manufacturing	Durable goods: Fabricated metals, machinery, electrical and transportation equipment Non-durable goods: Products which are immediately used by a consumer or have an expected lifespan of three years or less
Agriculture & Forestry	Agriculture: Produce, vegetables, and milk Forestry: Wood and paper products
Construction	Buildings (commercial and residential), highways, streets, bridges, and trade contractors (e.g. electrical, plumbing, heating and cooling)
Transportation, Information, & Utilities/Energy	Transportation: Truck, rail, water, air and pipeline Information: Broadcasting, telecommunications and data processing Utilities/Energy: Coal, oil and gas
Mining	Clay, concrete, glass, stone, metallic ore, and non-metallic mineral mining

Source: IMPLAN 2012

Wisconsin's transportation system supports the movement of a wide variety of products and supplies produced and sold by each sector and industry depicted in Table 4-2. Transportation provides an efficient means of shipping raw materials to factories and job sites; transporting products to market; and transporting people to work, school, marketplaces, medical facilities or other destinations where they can participate in the economy.

The Multiplier Effect

The multiplier effect is a measure of the economic consequences of a change in one sector upon other sectors. It incorporates the direct effects of activities in one sector (such as construction jobs), plus those supported through purchases of goods and services (indirect jobs), plus the effects on the rest of the economy due to household spending (induced jobs).

The significance of goods-dependent or freight-dependent sectors within Wisconsin's economy is clear. Job gains or losses in these sectors impact the rest of the economy, multiplying their impact. Employment gained or lost in these industries, whether due to transportation infrastructure or other factors, results in additional economy-wide gains or losses. When new jobs are created, the employees who fill these jobs spend their wages on goods and services, supporting jobs in housing, retail, restaurants, and other industries. This has a cumulative effect on the state and ultimately impacts the state's GDP.

Table 4-3: Wisconsin's Sector Employment and GDP Comparison, 2012

Freight-Dependent Sector	Employment	% of Total WI Employment	GDP (current billion USD)	% of Total WI GDP
Manufacturing	467,121	13.4%	$68.2	23.9%
Wholesale & Retail Trade	496,403	14.3%	$31.4	11.0%
Transportation, Information & Utilities/Energy	145,903	4.2%	$12.3	4.3%
Construction	155,399	4.5%	$8.8	3.1%
Agriculture, Forestry, Fishing & Hunting	112,290	3.2%	$4.5	1.6%
Mining	6,030	0.2%	$0.7	0.3%
Total of Freight-Dependent Sectors	1,383,146	39.7%	$125.9	44.2%
All Sectors	**3,481,773**	**100.0%**	**$284.9**	**100.0%**

Source: IMPLAN, 2012

Manufacturing

As shown in Table 4-3, Wisconsin's manufacturing sector, with 467,121 jobs and $68.2 billion in GDP, accounted for 13 percent of the state's employment and almost 24 percent of its GDP in 2012. The sector is particularly important in terms of employment. Of the other Midwestern states, only Indiana has a higher concentration of manufacturing jobs. Nationally, just nine percent of all employment was in manufacturing.[4]

Table 4-4: Manufacturing Sector Economic Impact Analysis, 2013

WI GDP Compound Annual Growth Rate		GDP Forecast 2013-2040 ($ in Billions)	WI Employment Compound Annual Growth Rate		Job Outlook 2013-2040
2009-2013 Real GDP	2013-2040 Forecasted GDP		2009-2013 Employment	2013-2040 Forecasted Employment	
4.2%[5]	1.9%[6]	$33.9[7]	1.2%[8]	-0.9%[9]	-104,421[10]

Source: U.S. Bureau of Economic Analysis; Regional Economic Models, Inc.

Manufacturing is divided into durable and non-durable categories. The manufacturers of durable goods (products that last more than three years) represent the largest group of industries in the manufacturing sector, accounting for almost 60 percent of the sector's overall GDP in 2012. Wisconsin's major durable manufacturing categories include fabricated metal products, machinery, motor vehicles and other transportation equipment, electrical equipment, and computer and electronic products. The manufacturing of non-durable goods (products which are immediately used by a consumer or have an expected lifespan of three years or less) accounted for more than 40 percent of manufacturing GDP in 2012. Key non-durable manufacturing categories in Wisconsin include food products, paper products, printing, plastics, rubber products, and chemical products.[11]

Manufacturing typically relies on all modes of transportation for both the receipt of raw materials for production and for the delivery of finished goods. The sector's warehousing and logistics functions rely primarily on the highway system to make "lean inventory" and just-in-time processes operate at optimum efficiency. Technological advances in manufacturing also contribute to efficiency, which enhances production and reduces costs.

Just-in-Time Delivery

Goods are produced based on consumer demand and delivered just-in-time for the next phase of production or consumption. Eliminating warehousing costs and reducing inventory costs have resulted in greater efficiency and productivity gains. As a result, trucks, railcars, and ship containers, as well as the state's transportation system, have become the new warehouses. Just-in-time shipping practices have created a greater reliance on a transportation system and requiring predictable travel times.

Due to enhanced production and automation processes, as well as investments in technology, manufacturing jobs are projected to decline by approximately 104,000 jobs between 2013 and 2040 (Table 4-4). Despite the loss of jobs in the manufacturing sector, the sector is projected to experience a nearly two percent GDP growth rate from 2013 to 2040, which translates into almost $34 billion added to the economy. The projected increase in production and decrease in

[4] Wisconsin Taxpayers Alliance and Local Government Institute, "Filling Potholes: A New Look at Funding Local Transportation in Wisconsin." (2014).
[5] U.S. Bureau of Economic Analysis, "Annual Gross Domestic Product (GDP) By State."
[6] Regional Economic Models, Inc., 2014.
[7] Ibid.
[8] U.S. Bureau of Economic Analysis, "Annual State Personal Income and Employment."
[9] Regional Economic Models, Inc., 2014.
[10] Ibid.
[11] U.S. Bureau of Economic Analysis, "Annual Gross Domestic Product (GDP) By State."

employment suggest companies will improve productivity through enhancements, allowing them to meet demand using existing workers, rather than by creating new jobs.[12]

Wholesale Trade and Retail

The wholesale trade sector is made up of businesses that purchase large quantities of goods which they resell to other businesses or directly to retailers. Wholesalers move products to and from distribution centers and are heavy users of transportation, particularly trucking. In 2012, wholesale trade accounted for six percent ($15.6 billion) of the state's GDP and three percent (125,837 jobs) of the total employment. The combined wholesale and retail trade sector supports 496,403 jobs in Wisconsin.

GDP growth within this sector will average nearly three percent from 2013 to 2040 in Wisconsin. This growth rate, however, is dependent upon the products and sectors of the economy with which individual wholesale trade firms are involved. For example, because of Wisconsin's aging population, growth is expected to be higher than average for wholesale trade firms that distribute pharmaceuticals and medical devices.[13] Despite the projected GDP growth, the wholesale sector is projected to lose approximately 3,000 jobs from 2013 to 2040 due to greater efficiencies and technological advances (Table 4-5).

Table 4-5: Wholesale Trade Sector Economic Impact Analysis, 2013

WI GDP Compound Annual Growth Rate		GDP Forecast 2013-2040 ($ in Billions)	WI Employment Compound Annual Growth Rate		Job Outlook 2013-2040
2009-2013 Real GDP	2013-2040 Forecasted GDP		2009-2013 Employment	2013-2040 Forecasted Employment	
1.9%[14]	2.7%[15]	$31.4[16]	0.7%[17]	-0.1%[18]	-2,809[19]

Source: U.S. Bureau of Economic Analysis; Regional Economic Models, Inc.

Like wholesale trade, retail trade relies heavily on transportation (primarily trucking), as retail establishments complete the typical supply-chain cycle from manufacturer to distributor to retail establishment. Larger retailers often bypass the distributor (middleman) and purchase directly from the manufacturer. The retail trade sector represents a broad spectrum of the economy, from the small individual proprietor to department stores to mega warehouse-type stores. Catalog sales, mail order sales, and Internet transactions are also considered retail trade. In 2012 retail trade comprised about five percent ($15.8 billion) of the state's GDP and 10 percent (370,566 jobs) of the total employment in 2013.

Alternative retail outlets, such as electronic commerce companies that sell products exclusively over the Internet, will continue to take some business away from traditional retail stores. The rise of Internet sales will likely contribute to the loss of approximately 14,000 jobs in the retail trade sector (Table 4-6). However, this trend will be minimized as traditional retailers increase their presence on the Internet. Although retail Internet sales are expected to grow, sales at traditional retail stores are projected to continue to account for a major portion of total retail sales.

[12] U.S. Bureau of Labor Statistics, "Career Outlook."
[13] Ibid
[14] U.S. Bureau of Economic Analysis, "Annual Gross Domestic Product (GDP) By State."
[15] Regional Economic Models, Inc., 2014.
[16] Ibid.
[17] U.S. Bureau of Economic Analysis, "Annual State Personal Income and Employment."
[18] Regional Economic Models, Inc., 2014.
[19] Ibid.

Table 4-6: Retail Trade Sector Economic Impact Analysis, 2013

WI GDP Compound Annual Growth Rate		GDP Forecast 2013-2040 ($ in Billions)	WI Employment Compound Annual Growth Rate		Job Outlook 2013-2040
2009-2013 Real GDP	2013-2040 Forecasted GDP		2009-2013 Employment	2013-2040 Forecasted Employment	
1.0%.[20]	2.2%.[21]	$11.69[22]	-0.3%[23]	-0.1%[24]	-14,022[25]

Source: U.S. Bureau of Economic Analysis; Regional Economic Models, Inc.

Transportation and Warehousing[26]

The transportation and warehousing sector, comprised of air, water, rail, and truck transportation, is by its nature freight-dependent. In 2012, this sector accounted for over two percent ($6 billion) of GDP and three percent (113,734) of the state's employment. Truck transportation, with more than 55,000 jobs, or almost half of all transportation and warehousing employment, is critical to the agriculture, construction, trade, and manufacturing industries.

Table 4-7: Transportation and Warehousing Sector Economic Impact Analysis, 2013

WI GDP Compound Annual Growth Rate		GDP Forecast 2013-2040 ($ in Billions)	WI Employment Compound Annual Growth Rate		Job Outlook 2013-2040
2009-2013 Real GDP	2013-2040 Forecasted GDP		2009-2013 Employment	2013-2040 Forecasted Employment	
3.7%[27]	2.1%[28]	$5.55[29]	0.3%[30]	-0.03%[31]	-1,023[32]

Source: U.S. Bureau of Economic Analysis; Regional Economic Models, Inc.

At almost two percent of total employment, trucking claimed a larger share of jobs in Wisconsin than nationally (one percent).[33] From 2013 to 2040, the transportation and warehouse sector is projected to lose approximately 1,000 jobs (Table 4-7). The decline in jobs can be attributed to the retirement and shortage of truck drivers (see Chapter 7, *Freight Transportation Trends, Issues, and Forecasts*). The shortage of truck drivers is a national issue and is not necessarily reflective of Wisconsin. Even with a potential decrease in the number of truck drivers, the transportation and warehousing sector will see economic growth. Growth is attributed to the demand for goods.

[20] U.S. Bureau of Economic Analysis, "Annual Gross Domestic Product (GDP) By State."
[21] Regional Economic Models, Inc., 2014.
[22] Ibid.
[23] U.S. Bureau of Economic Analysis, "Annual State Personal Income and Employment."
[24] Regional Economic Models, Inc., 2014.
[25] Ibid.
[26] IMPLAN data from 2012 combines information from the Transportation and Warehousing sector, Information sector, and Utilities and Energy sector. The Bureau of Economic Analysis and Regional Economic Models, Inc., from 2013, does not combine data from these sectors into one sector. Analysis in this section of the plan is provided separately on the Transportation and Warehousing sector and the Utilities and Energy sector. The Information sector, vital to Wisconsin's economy, is not a freight-dependent sector and is not included in the analysis of this plan. The information sector represents 21,169 jobs (0.7%) and $2 billion in GDP (0.8%) – IMPLAN, 2012.
[27] U.S. Bureau of Economic Analysis, "Annual Gross Domestic Product (GDP) By State."
[28] Regional Economic Models, Inc., 2014.
[29] Ibid.
[30] U.S. Bureau of Economic Analysis, "Annual State Personal Income and Employment."
[31] Regional Economic Models, Inc., 2014.
[32] Ibid.
[33] Wisconsin Taxpayers Alliance and Local Government Institute, "Filling Potholes: A New Look at Funding Local Transportation in Wisconsin." (2014).

GDP growth in the transportation and warehousing sector reflects the ups and downs experienced not only in Wisconsin, but also nationally. As the state and national economies grow and the production and sales of goods increase, demand for transportation services to move goods from producers to consumers also increases. During economic downturns, the truck transportation and warehousing sector often is one of the first to slow down as orders for goods and shipments decline.[34] The forecasted GDP growth from 2013 to 2040 is projected to be approximately two percent, which suggests that the transportation and warehousing sector will be in demand.

Utilities and Energy

The utilities and energy sector in Wisconsin is highly dependent on the transportation system, particularly on its waterways and railroads. In 2012, this sector's share of GDP was $4.3 billion (one percent of total GDP) and was the source for more than 11,000 jobs (less than one percent of total Wisconsin jobs). The utility and energy sector's statewide growth rates are provided in Table 4-8.

Table 4-8: Utilities and Energy Sector Economic Impact Analysis, 2013

WI GDP Compound Annual Growth Rate		GDP Forecast 2013-2040 ($ in Billions)	WI Employment Compound Annual Growth Rate		Job Outlook 2013-2040
2009-2013 Real GDP	2013-2040 Forecasted GDP		2009-2013 Employment	2013-2040 Forecasted Employment	
1.5%[35]	1.5%[36]	$2.61[37]	-1.2%[38]	-2.9%[39]	-5,989[40]

Source: U.S. Bureau of Economic Analysis; Regional Economic Models, Inc.

Wisconsin's electricity needs are generally met through coal as an energy source. In 2016, coal supplied more than 50 percent of the state's net electricity generation.[41] The other major fuel sources of electricity in Wisconsin are natural gas, nuclear power, and hydropower, known as a renewable resource. In 2013, ten percent of retail sales of electricity in Wisconsin were from renewable resources.[42]

Although electric power and natural gas continue to be essential to everyday life, the increased size and efficiency of new power plants will lead to an overall decline in employment (a projected loss of 6,000 jobs between 2013 and 2040). Water, sewage, and other system segments of the industry, however, will continue to grow as the population of Wisconsin and the rest of the country increases and urban areas expand.[43]

Although the demand for electricity continues to increase over time, deregulation has led to greater cost-cutting measures that will allow power generation companies to be profitable in a competitive marketplace. As older, less-efficient plants are retired, they are being replaced with facilities that have higher capacities and require fewer workers.

[34] U.S. Bureau of Labor Statistics, "Career Outlook."
[35] U.S. Bureau of Economic Analysis, "Annual Gross Domestic Product (GDP) By State."
[36] Regional Economic Models, Inc., 2014.
[37] Ibid.
[38] U.S. Bureau of Economic Analysis, "Annual State Personal Income and Employment."
[39] Regional Economic Models, Inc., 2014.
[40] Ibid.
[41] U.S. Energy Information Administration, "Wisconsin State Energy Profile."
[42] Public Service Commission of Wisconsin, "2013 Renewable Portfolio Standard Summary Report."
[43] U.S. Bureau of Labor Statistics, "Career Outlook."

Construction

Construction is defined as those businesses engaged in building activities related to new construction, additions, alterations, and repairs. Historically, the construction industry has mirrored the economic cycles of the general economy. The sector is subdivided into three categories:[44]

- Construction of buildings (including residential)
- Heavy and civil engineering construction (including highways, streets, and bridges)
- Special trade contractors (including electrical, plumbing, heating, and air-conditioning)

In 2012, construction comprised 3.1 percent ($8.8 billion) of Wisconsin's GDP and accounted for 4.5 percent (155,399 jobs) of its overall employment (see Table 4-9).

Table 4-9: Construction Sector Economic Impact Analysis, 2013

WI GDP Compound Annual Growth Rate		GDP Forecast 2013-2040 ($ in Billions)	WI Employment Compound Annual Growth Rate		Job Outlook 2013-2040
2009-2013 Real GDP	2013-2040 Forecasted GDP		2009-2013 Employment	2013-2040 Forecasted Employment	
0.2%[45]	4.0%[46]	$16.82[47]	-1.0%[48]	2.3%[49]	136,882[50]

Source: U.S. Bureau of Economic Analysis; Regional Economic Models, Inc.

The construction sector is projected to have the largest sector increase in employment in Wisconsin. While the construction sector is rebounding from the 2008-2009 recession, employment in this sector is not expected to reach pre-recession levels until 2024.[51] A net of approximately 137,000 jobs will be added in the construction sector from 2013 to 2040.

In terms of GDP, a growth rate of four percent is projected for the construction sector from 2013 to 2040. The growth will be driven largely by residential construction as it is expected to grow moderately over the decade to meet the needs of a growing population. Demand for housing by the oldest children of the baby boomers is expected to grow as they reach their peak house-buying years in the coming decade.[52] Demand by an expanding older population for senior housing and healthcare residences will also lead to growth in these areas. The renovation and expansion of older homes should prove relatively constant over the same period. Millennials (as a demographic cohort are people born between the early 1980s and mid-to-late 1990s) will influence the construction sector by their home buying patterns and preferences. In the near term, Millennials may delay home purchases due to financial and economic constraints, such as student loan debt.

Agriculture, Forestry, Fishing, and Hunting

As of 2012, the agriculture, forestry, fishing, and hunting sector represented $4.5 billion of Wisconsin's GDP (nearly two percent of the state) and 112,290 jobs (approximately three percent of the state). This sector has a strong economic impact on the Northern and Southwestern Regions of Wisconsin.

[44] U.S. Census Bureau, "Introduction to NAICS."
[45] U.S. Bureau of Economic Analysis, "Annual Gross Domestic Product (GDP) By State."
[46] Regional Economic Models, Inc., 2014.
[47] Ibid.
[48] U.S. Bureau of Economic Analysis, "Annual State Personal Income and Employment."
[49] Regional Economic Models, Inc., 2014.
[50] Ibid.
[51] U.S. Bureau of Labor Statistics, "Career Outlook."
[52] Construction Today, "In Demand." (December 21, 2016).

Table 4-10: Agriculture, Forestry, Fishing, and Hunting Sector Economic Impact Analysis, 2013

WI GDP Compound Annual Growth Rate		GDP Forecast 2013-2040 ($ in Billions)	WI Employment Compound Annual Growth Rate		Job Outlook 2013-2040
2009-2013 Real GDP	2013-2040 Forecasted GDP		2009-2013 Employment	2013-2040 Forecasted Employment	
5.9%[53]	1.1%[54]	$1.49[55]	0.2%[56]	-1.9%[57]	-43,921[58]

Source: U.S. Bureau of Economic Analysis; Regional Economic Models, Inc.

Wisconsin's agriculture sector is directly linked to the state's food processing industry, which relies heavily on the transportation system. Wisconsin is "America's Dairyland," but more is produced and processed in our state than just milk and cheese. Wisconsin ranks first in the nation for snap beans for processing, cheese, cranberries, ginseng, mink pelts, dry whey for humans, milk goats, and corn for silage.[59]

Wisconsin is second in the nation for total production, acres harvested, and value of production of the major processing vegetables. Specifically, in 2015, Wisconsin grew 329,530 tons of snap beans, 97,730 tons of carrots for processing, 32,890 tons of cucumbers for pickles, and 81,120 tons of green peas. The state ranks third in the nation in potato production, harvesting potatoes on 62,500 acres in 2015.[60]

Wisconsin cranberry production for 2015 totaled 4.86 million barrels. Growers harvested 20,200 acres.[61] Wisconsin produces 57 percent of the nation's crop, making us the top cranberry-producing state in the country. The state also produces a large tart cherry crop, producing 9.3 million pounds in 2015. Wisconsin boasts many apple orchards, producing 51.5 million pounds of apples in 2015.[62]

Wisconsin is home to more than 9,000 dairy farms, more than any other state, and 1.28 million cows.[63] The dairy industry itself contributes $43.4 billion to Wisconsin's economy each year.[64] In terms of cheese, Wisconsin's nearly 1,200 licensed cheesemakers produce over 600 types, styles, and varieties of cheese – nearly double the number of any other state. Wisconsin cheese makers produce a quarter of the nation's cheese, more than 3 billion pounds.[65]

County, state, and national forests are extremely important to Wisconsin's forest products industry and economy. Each year, county forests generate anywhere from $25 to $30 million in timber revenues for counties and towns. Approximately 16,000 jobs and $4.6 billion in forest products production result from the timber harvested from county forests. Wisconsin's forests also provide recreational and tourism opportunities.[66]

---

[53] U.S. Bureau of Economic Analysis, "Annual Gross Domestic Product (GDP) By State."
[54] Regional Economic Models, Inc., 2014.
[55] Ibid.
[56] U.S. Bureau of Economic Analysis, "Annual State Personal Income and Employment."
[57] Regional Economic Models, Inc., 2014.
[58] Ibid.
[59] Wisconsin Department of Agriculture, Trade and Consumer Protection, "Wisconsin Agricultural Statistics."
[60] Ibid.
[61] Ibid.
[62] Ibid.
[63] Ibid.
[64] The data from DATCP differ from the BEA data in several important respects, including using a more expansive definition of agriculture to include food processing, using sales rather than GDP data, and using an industry sales multiplier to account for impacts on other sectors in the economy. Thus the data from the two sources should not be directly compared.
[65] Wisconsin Department of Agriculture, Trade and Consumer Protection, "Wisconsin Agricultural Statistics."
[66] Wisconsin Department of Natural Resources, "County forests."

Markets for wood products, primarily destined for the construction sector in Wisconsin and the rest of the United States, are also projected to grow over the next several years as the construction sector grows.

The pulp and paper industry has and will continue to face rapid change as a result of new production capacities outside the United States and Canada, rapid rising consumption in Asia, declining use of paper, and growth in the use of recycled fiber in manufacturing. The net effect of these changes is to limit the nation's wood pulp production recovery from the recently low levels.[67]

As indicated in Table 4-10, the agriculture, forestry, fishing, and hunting sector will lose approximately 44,000 jobs between 2013 and 2040. Among other factors, technological enhancements in agriculture and forestry will contribute to the reduction in jobs. This sector is projected to experience just over one percent GDP growth from 2013 to 2040.

Mining

Wisconsin's mining sector, dominated by the production of nonmetallic minerals such as sand, gravel, stone, and lime, comprised the smallest sector of the state's economy in 2012 – less than one percent of both the total employment and GDP (6,030 jobs and $700 million, respectively).

Table 4-11: Mining Sector Economic Impact Analysis, 2013

WI GDP Compound Annual Growth Rate		GDP Forecast 2013-2040 ($ in Millions)	WI Employment Compound Annual Growth Rate		Job Outlook 2013-2040
2009-2013 Real GDP	2013-2040 Forecasted GDP		2009-2013 Employment	2013-2040 Forecasted Employment	
7.9%[68]	1.2%[69]	$374.4[70]	12.0%[71]	0.9%[72]	2,074[73]

Source: U.S. Bureau of Economic Analysis; Regional Economic Models, Inc.

The mining sector is closely linked to the construction sector and is dependent on road and highway construction. In 2013, Wisconsin was the nation's largest industrial sand and gravel producer.[74] The construction sector, as previously mentioned, is projected to see strong employment and GDP gains. As such, the mining sector is projected to experience an increase of just over 2,000 new jobs and $374.4 million in GDP growth (Table 4-11).

Despite growth through 2013, the mining sector will experience slower growth through 2040. From 2009 through 2013, Western Wisconsin experienced growth in the mining and processing of silica sand, a key ingredient used in hydraulic fracturing, or "fracking." Fracking is a process in which sand and fluids are injected into oil and natural gas wells, allowing pressurized oil and gas to reach the surface. Sand is transported primarily by rail from mines and processing plants to shale basins nationwide. Since 2013, mining of silica sand has decreased as the expansion of "fracking" has slowed.

[67] United Nations Economic Commission for Europe, "The North American Forest Sector Outlook Study." (2012)
[68] U.S. Bureau of Economic Analysis, "Annual Gross Domestic Product (GDP) By State."
[69] Regional Economic Models, Inc., 2014.
[70] Ibid.
[71] U.S. Bureau of Economic Analysis, "Annual State Personal Income and Employment."
[72] Regional Economic Models, Inc., 2014.
[73] Ibid.
[74] U.S. Geological Survey, "Sand and Gravel (Industrial)." (2015).

The growing United States and world economies will continue to demand larger quantities of the raw materials produced by mining, but the increased output will be able to be met by new technologies and extraction techniques that increase productivity but likely require fewer workers.[75]

Summary of the Freight-Dependent Sectors

During the 2009-2013 period, the freight-dependent sectors' employment grew at a compound annual rate of 0.4%, while the non-freight-dependent sectors' (such as finance, insurance, healthcare, and professional services) employment compound annual growth rate during the same period was 0.8% (Table 4-12). Over the 2013-2040 analysis period, the freight-dependent industry sectors' employment is forecast to decline by a compound annual rate of -0.09%. By contrast, the remaining non-freight-dependent sectors' employment is forecast to grow at a compound annual rate of 0.49%. Employment increases in non-freight-dependent sectors is largely due to the needs of the aging baby boomer population. Only the agriculture, forestry, fishing, and hunting, information and utilities/energy freight-dependent sectors are projected to decrease employment in Wisconsin by more than one percent from 2013 to 2040 (see Chapter 7, *Freight Transportation Trends, Issues, and Forecasts*). The construction and mining sectors are the only two freight-dependent sectors that will experience job gains from 2013-2040.

[75] U.S. Bureau of Labor Statistics, "Career Outlook."

Table 4-12: Comparison of GDP and Employment Between Freight-Dependent and Non-Freight-Dependent Sectors

Sector Description	WI GDP Compound Annual Growth Rate		WI Employment Compound Annual Growth Rate	
	2009-2013 Real GDP[76]	2013-2040 Forecasted GDP[77]	2009-2013 Employment[78]	2013-2040 Forecasted Employment[79]
Freight-Dependent (Good Dependent) Sectors				
Wholesale Trade	1.9%	2.7%	0.7%	-0.1%
Retail Trade	1.0%	2.2%	-0.3%	-0.1%
Manufacturing	4.2%	1.9%	1.2%	-0.9%
Agriculture, Forestry, Fishing & Hunting	5.9%	1.1%	0.2%	-1.9%
Construction	0.2%	4.0%	-1.0%	2.3%
Transportation and Warehousing	3.7%	2.1%	0.3%	-0.03%
Information	2.1%	2.7%	-0.1%	-1.0%
Utilities and Energy	1.5%	1.5%	-1.2%	-2.9%
Mining	7.9%	1.2%	12.0%	0.9%
Total – Freight-dependent Sectors	**NA***	**NA***	**0.4%**	**-0.09%**
Non-Freight-Dependent (Service) Sectors				
Finance, Insurance, Real Estate, Rental and Leasing	1.0%	1.7%	0.1%	0.2%
Government	-0.8%	0.5%	-0.3%	-0.2%
Educational Services, Healthcare and Social Assistance	0.9%	1.9%	1.1%	1.3%
Professional and Business Services	3.7%	2.3%	2.5%	1.0%
Arts, Entertainment, Recreation, Accommodation and Food Services	2.4%	1.3%	0.9%	0.2%
Other Services, Except Government	-1.0%	2.0%	0.5%	-0.1%
Total – Non-Freight-dependent Sectors	**NA***	**NA***	**0.8%**	**0.49%**

*2009-2013 and 2013-2040 real GSP compound annual growth rates are not readily computable because real dollar GDP estimates are not additive across industry sectors.

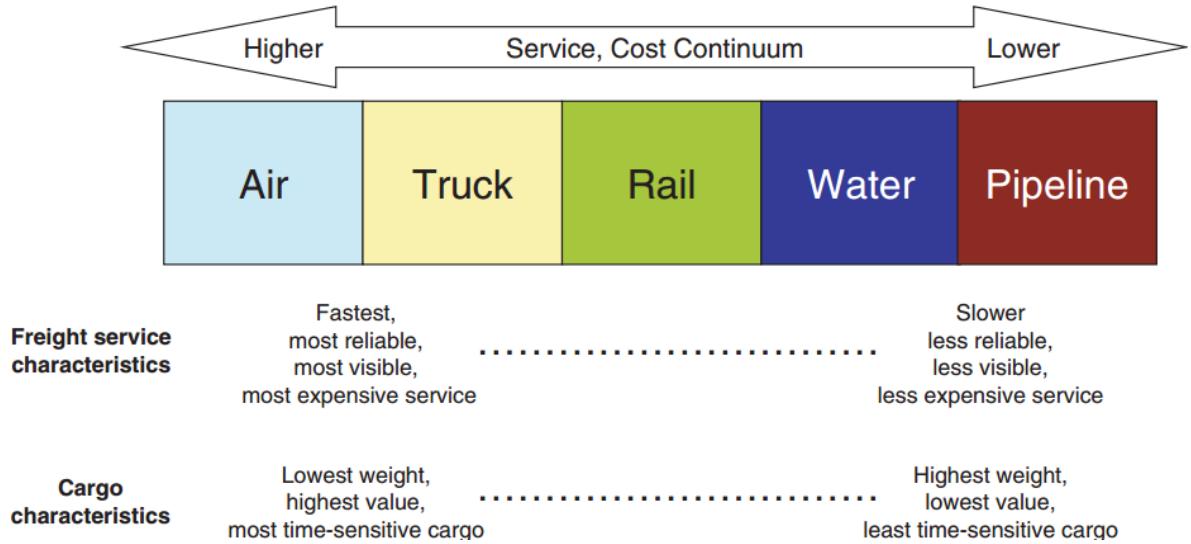
Source: 2009-2013: U.S. Bureau of Economic Analysis; 2013-2040: Regional Economic Models, Inc.

[76] U.S. Bureau of Economic Analysis, "Annual Gross Domestic Product (GDP) By State."
[77] Regional Economic Models, Inc., 2014.
[78] U.S. Bureau of Economic Analysis, "Annual State Personal Income and Employment."
[79] Regional Economic Models, Inc., 2014.

4.4 Wisconsin's Regional Economies and Freight Movement

Decisions regarding the movement of freight products are predisposed to use a particular mode above others, based on commodity type, value, weight or size, origin and destination location, and urgency. Figure 4-3 displays the service and cost tradeoffs between different modes of transportation relative to freight transport. Carriers provide several "tiers" of service tied to price, speed and service guarantees.

Figure 4-3: Service Cost Continuum by Mode



Source: NCFRP REPORT 6: Impacts of Public Policy on the Freight Transportation System

As mentioned, economic activity is geographically dispersed between urban and rural areas in Wisconsin. Within urban and metropolitan areas in Wisconsin, population density is one of the primary drivers of freight demand. Urban areas are characterized by high densities of residents and employment centers for service industries, warehouses, distribution centers, retail establishments, hospitals, and institutions. Goods intended for personal consumption account for a large number of urban freight movements. The shipment or movement of goods between warehouses, distribution centers, retail stores and, ultimately, to residents who consume the goods contributes heavily to area traffic.

Urban and Rural Classification[80]

The Census Bureau identifies two types of urban areas:

- Urbanized Areas (UAs) of 50,000 or more people
- Urban Clusters (UCs) of at least 2,500 and less than 50,000 people

"Rural" encompasses all population, housing, and territory not included within an urban area.

Global market competitiveness increases the pressure on manufacturers and producers located within urban and metropolitan areas to reduce the costs of transporting inbound raw materials and outbound finished products. As a result, many businesses and industries are concentrated in Wisconsin's metropolitan areas. This is not because they rely solely on truck, rail, air, and water transportation to receive raw materials and ship finished products around the world, but because these are the locations where multiple modes of transportation come together and connect Wisconsin to other Midwestern states and countries.

At some point, the movement of materials and goods must traverse the "first or last mile," which often includes local roads. The first or last mile describes the movement of materials and goods from the point of production or

[80] U.S. Census Bureau, "Urban and Rural."

"first mile," typically accessed by a local road, to a transportation hub, such as a highway, railroad, or port, and then to the "last mile" or final destination, also accessed by a local road, where the materials and goods are consumed. These "first and last mile" connections are located in both urban and metropolitan areas, as well as rural areas.

An efficient transportation system provides critical social and economic connections in rural areas. Commodities including timber, fuel, and agricultural products must be moved from rural areas where they are produced to urban areas where they are consumed, processed or sent out of the state or country. Ultimately, transportation is a rural community's essential connection to the nation and the world.

Economic activity in rural areas includes the full range of economic sectors spread throughout Wisconsin. Forestry dominates the landscape in the northern part of the state, while agriculture (field and row crops) and dairy farming are found predominantly in the south. Both forestry and agriculture require a wide range of transportation services. Raw forest products and lower value and bulk agricultural products, such as grain and fertilizer, require low-cost transportation options, such as rail. Perishable and high-value items such as fruits, vegetables, cheese, and meats require specialized handling and equipment, and rely on a dependable local roadway and highway system.

For the purposes of this discussion, the following analysis of Wisconsin's regional economies is based on WisDOT's defined five regions: Southeast, Southwest, Northwest, North Central, and Northeast (Figure 4-4). As of 2010, Wisconsin's total population was 5.7 million people. Table 4-13 provides a summary of the state's population by region.

Figure 4-4: WisDOT Regions

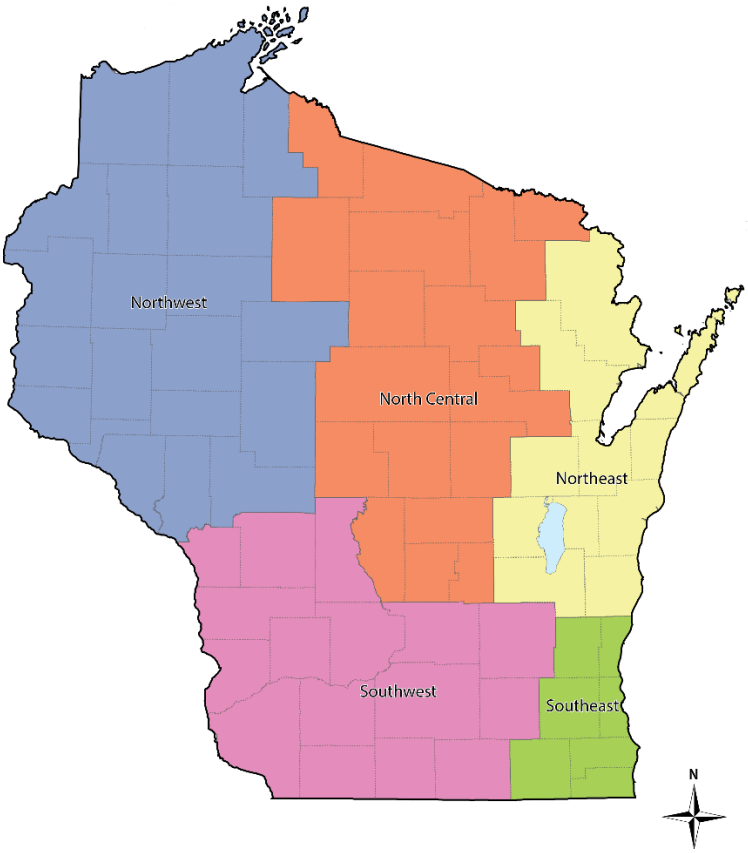


Table 4-13: Wisconsin Population by Region

Wisconsin Region	Population (2010 US Census)
North Central	598,601
Northeast	1,068,417
Northwest	685,557
Southeast	2,021,375
Southwest	1,313,036
Total – Wisconsin Population	**5,686,986**

Regional Domestic Product (RDP)

Regional domestic product (RDP) is the monetary value of all of the finished goods and services produced within a region of a state in a given specific time period.

For the state, value-added is referred to as GDP, which is the monetary value of all the finished goods and services produced within a state's borders in a specific time period.

For the purposes of this plan, RDP is discussed in the context of WisDOT's five regions of Wisconsin: Southeast, Southwest, Northwest, North Central, and Northeast (see Figure 4-4).

Each region contributes to Wisconsin's overall economy through RDP, which is the monetary value of all of the finished goods and services produced within a region of a state in a given specific time period. Similar to GDP, manufacturing is the largest contributor to RDP, followed by wholesale and retail trade. In general, manufacturing has a larger output-to-employment ratio (a measurement of the proportion of the state's working-age population that is employed) than other sectors due to the large-scale mechanical nature of industrial businesses.

Southeast Region

The largest economic/demographic region in Wisconsin is the Southeast (SE) region, which contains seven counties, including the state's largest city, Milwaukee. Of the freight-dependent sectors, SE Wisconsin's largest sector in terms of employment is wholesale and retail trade, followed closely by manufacturing. Together, these two sectors make up nearly 77 percent of the SE region's employment and 84 percent of its RDP (see Table 4-14). The smallest sector in the SE region is mining, which employs less than one percent of the region's employees and comprises less than one percent of the region's GDP.

Table 4-14: Southeast Region's Freight-Dependent Sector Employment and RDP, 2012

Freight-Dependent Sectors	Employment	RDP (current billion USD)
Wholesale & Retail Trade	169,211	$11.8
Manufacturing	157,263	$26.6
Agriculture, Forestry, Fishing & Hunting	6,358	$0.3
Construction	39,318	$2.7
Transportation, Information & Utilities/Energy	52,702	$3.9
Mining	1,560	$0.3
Total	**426,412**	**$45.7**

Source: IMPLAN, 2012

Northeast Region

The Northeast (NE) region is comprised of eleven counties and is the second-largest economic region in Wisconsin in terms of RDP. Its largest employment and RDP sector is manufacturing, which comprises 41 percent of the jobs in the freight-dependent sectors in the region (Table 4-15). The manufacturing RDP is nearly 61 percent of all freight-dependent sectors. The smallest sector in the NE region is mining, which employs less than one percent of the region's employees and less than one percent of the region's GDP.

Table 4-15: Northeast Region's Freight-Dependent Sector Employment and RDP

Freight-Dependent Sectors	Employment	RDP (current billion USD)
Wholesale & Retail Trade	99,385	$5.9
Manufacturing	126,946	$17.8
Agriculture, Forestry, Fishing & Hunting	19,003	$0.9
Construction	33,794	$2.0
Transportation, Information & Utilities/Energy	27,556	$2.6
Mining	1,151	$0.1
Total	**307,835**	**$29.3**

Source: IMPLAN, 2012

Southwest Region

The Southwest (SW) region is comprised of sixteen counties, and includes the state capital, Madison. As the third-largest economic region in Wisconsin in terms of RDP, the SW region's wholesale & retail trade sector is the largest employer at nearly 40 percent of the freight-dependent sectors, with manufacturing as its heaviest producer, contributing 45 percent of its freight-dependent sectors' RDP (Table 4-16). The smallest sector in the SW region is mining, which employs less than one percent of the region's employees and less than one percent of the region's GDP.

Table 4-16: Southwest Region's Freight-Dependent Sector Employment and RDP

Freight-Dependent Sectors	Employment	RDP (current billion USD)
Wholesale & Retail Trade	123,296	$8.0
Manufacturing	88,722	$12.2
Agriculture, Forestry, Fishing & Hunting	39,244	$1.5
Construction	41,774	$2.4
Transportation, Information & Utilities/Energy	27,634	$2.9
Mining	1,564	$0.2
Total	**322,233**	**$27.1**

Source: IMPLAN, 2012

Northwest Region

The Northwest (NW) region is comprised of 20 counties and is the largest geographic region in the state. The NW region includes St. Croix County, which is the fastest growing county in the state. The NW region also includes several other large urban areas including the cities of Eau Claire, Chippewa Falls, and Superior. Within the freight-dependent sectors, the wholesale and retail trade sector is the largest employer (53,973 jobs) and the manufacturing sector has the largest RDP ($5.5 billion) (Table 4-17). The smallest sector in the region is mining, which employs less than one percent of the region's employees and less than one percent of the region's GDP.

Table 4-17: Northwest Region's Freight-Dependent Sector Employment and RDP

Freight-Dependent Sectors (FIS)	Employment	RDP (current billion USD)
Wholesale & Retail Trade	53,973	$2.9
Manufacturing	47,267	$5.5
Agriculture, Forestry, Fishing & Hunting	28,836	$1.0
Construction	23,526	$1.0
Transportation, Information & Utilities/Energy	22,526	$1.5
Mining	1,293	$0.1
Total	**177,422**	**$12.0**

Source: IMPLAN, 2012

North Central Region

The North Central (NC) region, comprised of eighteen counties, is the smallest economic region in Wisconsin. The wholesale and retail trade sector is the largest employer in the region, followed closely by manufacturing, together which comprise 65 percent of all freight-dependent employment for the region (Table 4-18). The smallest sector in the region is mining, which employs less than one percent of the region's employees and less than one percent of the region's GDP.

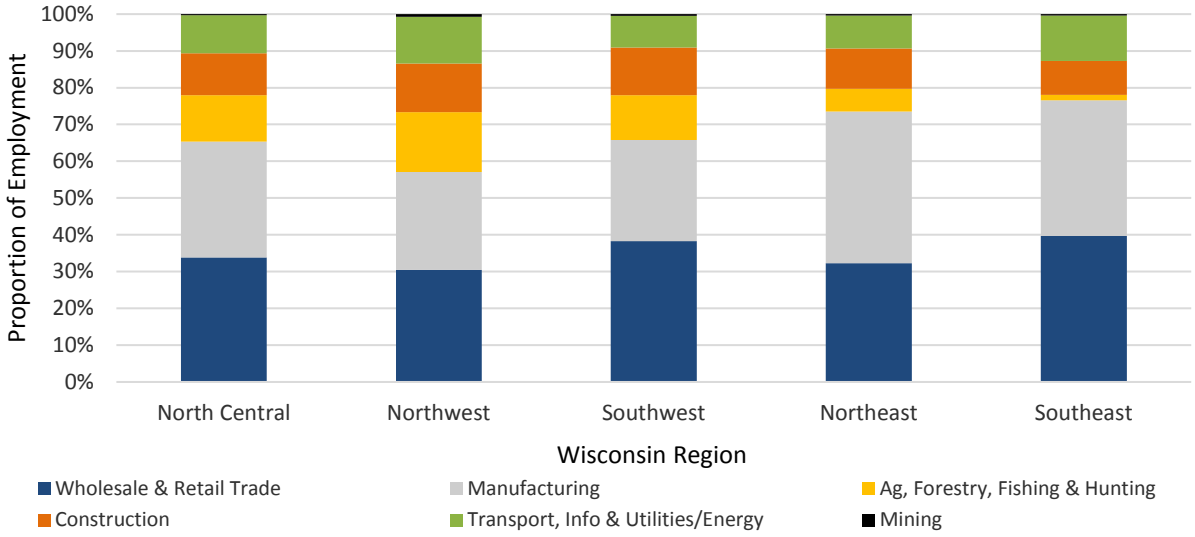
Table 4-18: North Central Region's Freight-Dependent Sector Employment and RDP

Freight-Dependent Sectors	Employment	RDP (current billion USD)
Wholesale & Retail Trade	50,538	$2.8
Manufacturing	46,924	$6.2
Agriculture, Forestry, Fishing & Hunting	18,848	$0.8
Construction	16,987	$0.7
Transportation, Information & Utilities/Energy	15,484	$1.3
Mining	462	$0.0
Total	**149,243**	**$11.8**

Source: IMPLAN, 2012

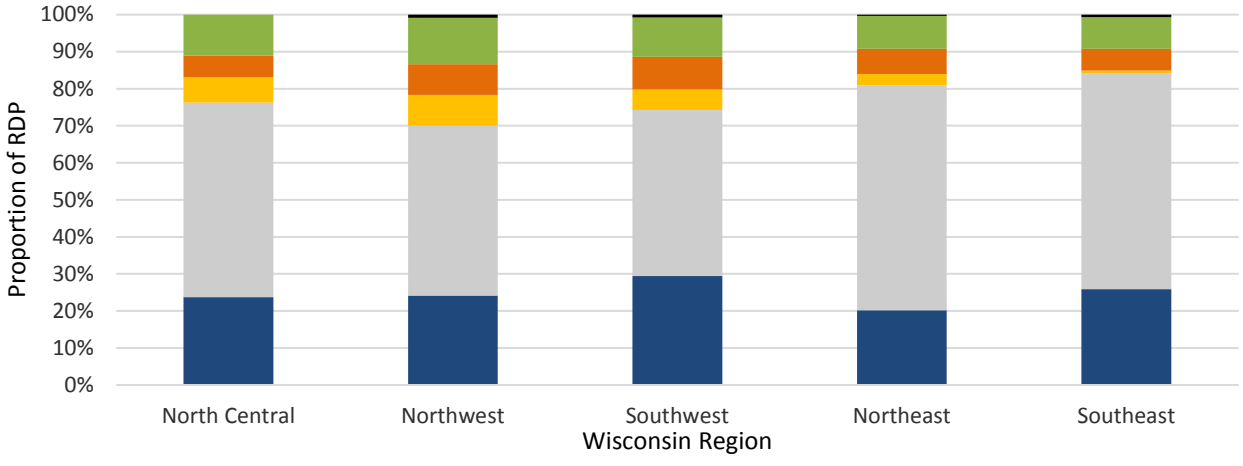
Each of Wisconsin's five regions are important to the overall economic health of the state. Figure 4-5 compares the proportion of freight-dependent sector employment for each region in the state. Figure 4-6 shows the comparison of regional RDP for each region in Wisconsin.

Figure 4-5: Proportion of Employment Based On Sectors Statewide



Source: IMPLAN, 2012

Figure 4-6: Wisconsin Regional Proportion of RDP Based on Sectors



Source: IMPLAN, 2012

4.5 Wisconsin's Connections to the Global Economy

Wisconsin businesses conduct international trade with companies around the world, both importing and exporting goods. The scale and scope of globalization has created an environment where the transportation sector must adapt. This is particularly the case for North America because of the scale and scope of production, distribution and consumption taking place, and the large distances involved. Global trade routes for several major industries flow through Wisconsin on roadways, railways, and waterways. For example, wholesale goods and raw materials flow from Asia to the Port of Prince Rupert in western Canada, then on railroads, often through Wisconsin, to major United States markets in Chicago and the Northeast. Agricultural products travel down the Mississippi River, and goods bound for Europe travel from Wisconsin's Great Lakes ports to the Atlantic Ocean via the St. Lawrence Seaway. Wisconsin's highways connect the state to major truck, air, and rail transportation hubs in Chicago and Minneapolis-St. Paul.

Exports

A total of 8,737 companies exported from Wisconsin locations in 2013. Of those, 7,592 (87 percent) were small and medium-sized firms with fewer than 500 employees. Small and medium-sized firms generated over one-quarter (27 percent) of Wisconsin's total exports of merchandise in 2013.[81] In 2014, goods exports from the state supported nearly 125,000 jobs.[82]

Net Positive Exports
Positive net exports contribute to economic growth. More exports mean more output from factories and industrial facilities, as well as a greater number of people employed in these factories. Foreign consumption of Wisconsin export also represents an inflow of funds to the state, which stimulates consumer spending and contributes to economic growth.

In 2013, Wisconsin exported freight valued at more than $23 billion. Table 4-19 displays the main destinations and the percentage of total Wisconsin exports in 2013 as measured by value. Wisconsin's top export trading partners are Canada, Mexico, and China. 44 percent of Wisconsin's total exports are exported to Canada (33 percent) and Mexico (11 percent).

Table 4-19: Wisconsin's Top Export Destinations Ranked by Value, 2013[83]

Country	Export Value (millions)	% of Total WI Exports
Canada	$7,527	32.6%
Mexico	$2,517	10.9%
China	$1,659	7.2%
Japan	$934	4.0%
Germany	$701	3.0%
United Kingdom	$679	2.9%
Australia	$676	2.9%
Brazil	$477	2.1%
Chile	$474	2.0%
France	$460	2.0%
All Other Countries	**$7,006**	**30.3%**
Total All Countries	**$23,110**	**100.0%**

Source: U.S. Census Bureau, "USA Trade Online"

[81] U.S. Department of Commerce, International Trade Administration, "Wisconsin Exports, Jobs, and Foreign Investment."
[82] Ibid.
[83] U.S. Census Bureau, "Exports: Origin of Movement - Based on Origin State."

The state's top commodities exported in 2013 (Table 4-20) were industrial machinery ($6.8 billion), agricultural products including food products ($2.6 billion), medical equipment ($2.3 billion), electrical machinery ($2.2 billion), vehicles ($1.9 billion), and plastics ($953 million).

As the state's top export commodity in 2013, industrial machinery accounted for nearly 30 percent of the state's total exports that year. As with other top commodities, the state's top agricultural export markets include Canada, Mexico, and China. Dairy products were Wisconsin's most valuable agricultural export category in 2013, at $397 million.

Table 4-20: Wisconsin's Top Export Commodities, 2013[84]

Product	Export Value (millions)	% of Total WI Exports
Industrial Machinery	$6,837	29.6%
Agricultural Products	$2,606	11.2%
Medical & Scientific Instruments	$2,263	9.8%
Electrical Machinery & Devices	$2,220	9.6%
Vehicles / Not Railway	$1,937	8.4%
Plastics	$953	4.1%
Paper, Paperboard	$928	4.0%
Iron / Steel Products	$440	1.9%
Printed Materials	$396	1.7%
Furniture and Furnishings	$348	1.7%
All Other Products	**$4,182**	**18.1%**
Total All Products	**$23,110**	**100.0%**

Source: U.S. Census Bureau, "USA Trade Online"

Imports

Imports represent an inflow of goods from places external to the state, and an outflow of funds from the state since they are payments made by local companies (importers) to overseas entities (exporters). Imports are a vital component of the economy, allowing state economies to specialize in the production of goods, rather than producing all consumed goods within the state.

Over the last decade, trade with Asian and South American countries have impacted the Wisconsin transportation system by increasing traffic to the state. Specifically, many of the imports from China are transported to the air cargo hubs in either Chicago or Minneapolis-Saint Paul and to major seaports located along the western United States and Canada. Once in the United States or Canada, imports from China are usually transferred to rail or truck and then transported to Wisconsin.

In 2013, Wisconsin imported freight valued at approximately $22 billion. Table 4-21 displays the main origins of Wisconsin imports in 2013. China, Canada, and Mexico were the top origins of Wisconsin's imports, followed by Germany and Vietnam.

[84] U.S. Census Bureau, "Exports: Origin of Movement - Based on Origin State."

Table 4-21: Top Origins of Wisconsin Imports, 2013[85]

Country	Import Value (millions)	% of Total WI Imports
China	$5,854	26.3%
Canada	$4,213	19.0%
Mexico	$2,452	11.0%
Germany	$1,212	5.5%
Vietnam	$736	3.3%
Japan	$733	3.3%
Italy	$697	3.1%
India	$639	2.9%
Taiwan	$487	2.2%
France	$451	2.0%
All Other Countries	**$4,749**	**21.3%**
Total – All Countries	**$22,223**	**100.0%**

Source: U.S. Census Bureau, "USA Trade Online"

Table 4-22 shows the major commodities being imported into Wisconsin in 2013, ranked by value. The state's top commodities imported in 2013 were industrial machinery ($3.9 billion), electrical machinery and devices ($2.6 billion), knit apparel ($1.7 billion), medical and scientific instruments ($1.5 billion), vehicles ($1.2 billion), and agricultural products including food products ($1.1 billion).

Table 4-22: Wisconsin's Top Import Commodities by Value, 2013[86]

Product	Import Value (millions)	% of Total WI Imports
Industrial Machinery	$3,919	17.6%
Electrical Machinery & Devices	$2,617	7.7%
Apparel / Knit	$1,715	6.9%
Medical & Scientific Instruments	$1,530	5.2%
Vehicles / Not Railway	$1,159	4.5%
Agricultural Products	$1,089	4.9%
Apparel / Woven	$996	4.3%
Plastics	$958	3.9%
Furniture, Furnishings	$874	2.6%
Footwear	$584	2.2%
All Other Products	**$6,782**	**30.5%**
Total All Products	**$22,223**	**100.0%**

Source: U.S. Census Bureau, "USA Trade Online"

4.6 State and Province Trading Partners

While Wisconsin's international trading partners were identified in the previous section, this section identifies Wisconsin's United States-based and Canadian Province trading partners. Table 4-23 and Table 4-24 detail Wisconsin's projected top six trading partners in 2040 for freight originating in and destined for Wisconsin. Wisconsin's immediate neighbors and other states in the upper Midwest, generally receive the largest share of freight from Wisconsin. The states from which Wisconsin receives its largest share of freight are more disperse.

[85] U.S. Census Bureau, "Imports: State of Destination (SD) Series."
[86] Ibid.

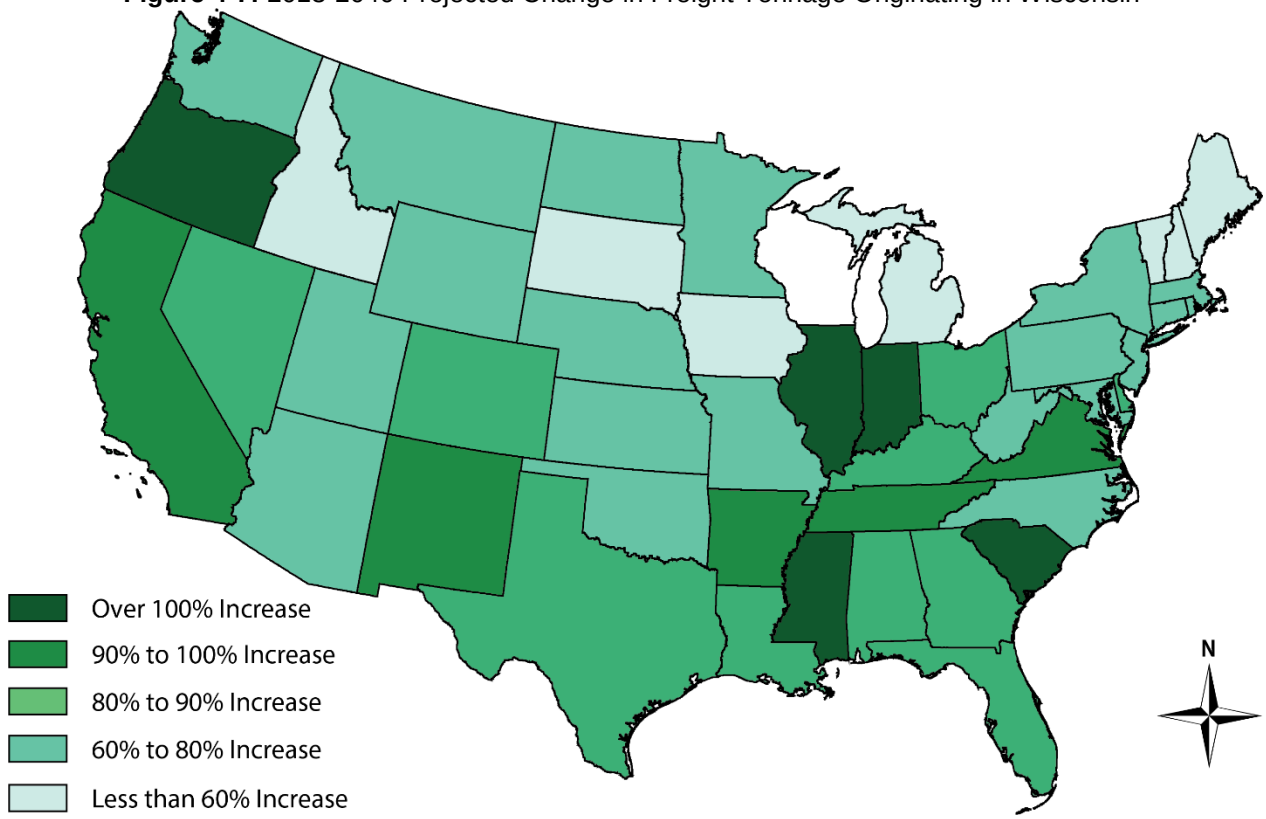
Table 4-23: 2013-2040 Top Six Destinations of Freight Originating in Wisconsin by Tonnage

Destination	2013 Tons	2013 % of Total	2021 Tons	2021 % of Total	2040 Tons	2040 % of Total	% Change, 2013-2021	% Change, 2021-2040	% Change, 2013-2040
Illinois	77,725,756	13.6%	103,751,590	14.9%	165,562,946	16.6%	33.5%	59.6%	113.0%
Minnesota	34,904,263	6.1%	41,866,992	6.0%	58,403,473	5.8%	19.9%	39.5%	67.3%
Michigan	27,489,879	4.8%	30,187,068	4.3%	36,592,893	3.7%	9.8%	21.2%	33.1%
Indiana	15,602,921	2.7%	20,522,087	2.9%	32,205,107	3.2%	31.5%	56.9%	106.4%
Ontario	10,630,847	1.9%	16,864,467	2.4%	31,669,314	3.2%	58.6%	87.8%	197.9%
Texas	14,089,253	2.5%	17,664,158	2.5%	26,154,557	2.6%	25.4%	48.1%	85.6%

Source: 2013 IHS Transearch Database

Given Illinois's neighboring proximity to Wisconsin and Chicago's status as a continental transshipment center, it is not surprising that Illinois is expected to see a 113 percent increase in freight tonnage originating in Wisconsin. Texas will likely receive a larger freight share mostly because it is forecasted that there will be a 75 percent increase in the amount of sand and/or gravel shipped there by rail. Figure 4-7 shows the anticipated change in shipping patterns by tonnage between Wisconsin and its trading partners between 2013 and 2040.

Figure 4-7: 2013-2040 Projected Change in Freight Tonnage Originating in Wisconsin



As shown in Figure 4-8, Wisconsin is expected to see a decrease in freight traffic originating in Wyoming and Montana by 2040. Wyoming and Montana supply Wisconsin with coal, which is expected to decrease in volume because of fewer coal-burning facilities. All other states are forecasted to see an increase in the amount of freight they ship to Wisconsin.

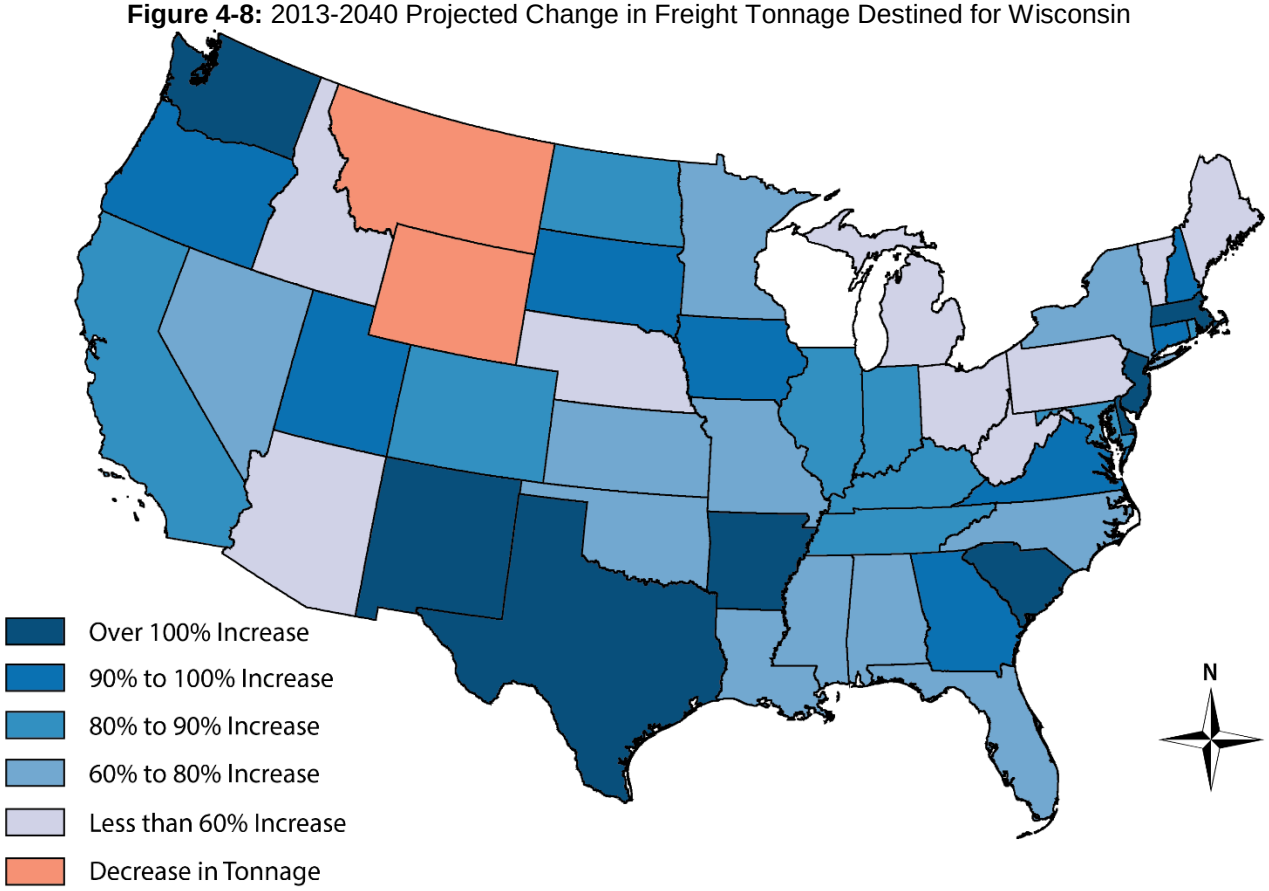
Table 4-24: Top Six Origins of Freight Destined for Wisconsin by Tonnage

Origin	2013 Tons	2013 % of Total	2021 Tons	2021 % of Total	2040 Tons	2040 % of Total	% Change, 2013-2021	% Change, 2021-2040	% Change, 2013-2040
Minnesota	58,344,705	10.2%	71,744,772	10.3%	103,569,930	10.4%	23.0%	44.4%	77.5%
North Dakota	36,516,978	6.4%	45,190,037	6.5%	65,788,555	6.6%	23.8%	45.6%	80.2%
Illinois	28,966,060	5.1%	35,983,932	5.2%	52,651,377	5.3%	24.2%	46.3%	81.8%
Wyoming	31,710,032	5.6%	31,451,118	4.5%	30,836,197	3.1%	-0.8%	-2.0%	-2.8%
Iowa	13,978,522	2.4%	17,705,775	2.5%	26,557,999	2.7%	26.7%	50.0%	90.0%
Washington	12,002,232	2.1%	15,926,915	2.3%	25,248,038	2.5%	32.7%	58.5%	110.4%

Source: 2013 IHS Transearch Database

Figure 4-8 shows the anticipated changes in shipping patterns by tonnage between Wisconsin and its trading partners from 2013 to 2040.

Figure 4-8: 2013-2040 Projected Change in Freight Tonnage Destined for Wisconsin



THIS PAGE INTENTIONALLY LEFT BLANK

5– Chapter 5: Wisconsin's Transportation System Assets

Wisconsin's multimodal transportation system carries both people and goods from their origin to destination. It provides the critical infrastructure needed to support and enhance the state's economy by moving goods on the state's roadways, railways, waterways, airports, pipelines, and through intermodal facilities (including truck-rail).

Overview of Chapter 5
• Provides an inventory of Wisconsin's freight-related transportation assets

This chapter provides an in-depth review of each transportation mode, including system assets and the relative magnitude of freight flows using each transport option.

5.1 Background on Wisconsin's Use of Freight Modes

A summary of the tonnage and value transported by rail, truck, water, and air is provided to place each mode in the context of its overall use in the state. The summary also includes the types of freight flows each mode supports. The following types of freight flows are used to categorize the movement of commodities on Wisconsin's multimodal freight transportation system:

- **Inbound Freight Flows –** Commodities originating in another state or country and destined for Wisconsin. Inbound commodities are not made in Wisconsin; these commodities may be used by Wisconsin industries to produce other goods, which contribute to economic activity. Alternatively, the inbound commodities may be consumed by residents of the state, satisfying consumer demand.
- **Outbound Freight Flows –** Commodities produced in Wisconsin and destined for another state or country. These flows support jobs within the state and the sale of outbound commodities brings money into the state from other states or countries.
- **Within Freight Flows –** Commodities that both originate and are destined for Wisconsin. Within freight flows are both produced and consumed in Wisconsin, supporting jobs at the origin of the commodity and at the destination. For example, within freight flows may serve as an input for manufacturing or production, which supports jobs at the destination site.
- **Overhead Freight Flows –** Commodities moving through Wisconsin, having neither an origin nor destination within the state. Overhead commodities simply use the state's freight transportation system and confer minimal benefits to the state.

Categorizing flows according to their origin and destination provides insight into benefits that the Wisconsin economy receives from a commodity movement. Understanding the types of freight flows, mode, and infrastructure used allows for infrastructure investment decisions to target projects that enable flows tied to economic output and jobs.

Overall, almost 577 million tons of freight were moved to, from or through Wisconsin in 2013.[1] Table 5-1 puts Wisconsin's multimodal freight transportation system assets within the context of modal distribution of freight

[1] 2013 IHS Transearch Database.

flows in the state. In terms of tonnage, trucking carried nearly 60 percent of freight, followed by rail at 36 percent, and water at five percent, with the remainder attributable to air and other modes of transportation.

Freight demand can be measured by using freight flow data to identify outbound (originated), inbound (terminated), within (originated and terminated), and overhead (pass through) freight traffic. Almost as much tonnage passed through (overhead) Wisconsin compared with the amount that entered or left the state as inbound or outbound traffic. Overhead freight does not add value to Wisconsin's economy in terms of job creation or economic activity. Much of this pass through freight originates and terminates in surrounding states and cities, such as Minneapolis and Chicago.

To support Wisconsin's freight movements in terms of tonnage, the state has multiple access points for shipping via truck, rail, and water. There is a significant amount of freight tonnage that is shipped overhead by rail. This can create a challenge for shippers that wish to access rail because railroads are not stopping in the state to pick up freight. In many cases, shippers have to rely on other modes, such as trucking, to ship freight to truck-rail intermodal facilities where rail can be accessed, unless shippers have an opportunity to utilize shortline or regional railroads, which can be used to connect to Class I railroads.

Table 5-1: 2013 Wisconsin Freight Shipments by Tonnage (millions)

Mode	Outbound	Inbound	Within	Overhead	Total*	Percent of Total*
Rail	24.7	57.9	3.4	120.9	206.9	35.9%
Truck	98.2	80.2	112.0	50.8	341.1	59.2%
Water	19.0	9.3	-	-	28.3	4.9%
Air	<0.1	<0.1	<0.1	-	0.1	0.02%
Other	<0.1	0.1	-	-	0.1	0.02%
Total*	**142.0**	**147.6**	**115.4**	**171.6**	**576.6**	**100%**

Source: 2013 IHS Transearch Database

**Totals may not add up due to rounding*

Table 5-2 displays freight flows measured by value, offering another perspective of Wisconsin's freight flows. The modal distribution and type of freight flow (outbound, inbound, within, and overhead) may differ between value and tonnage due to different value to weight ratios. For example, pharmaceuticals and gravel have very different value to weight ratios, making one stand out more in tonnage (gravel) and the other in value (pharmaceuticals).

As shown in Table 5-2, the value of the nearly 577 million tons of freight transported in Wisconsin is estimated at nearly $638 billion.[2] Commodities moved by truck made up nearly 70 percent of that total, followed by rail at almost 30 percent. Although the air mode shipped less than one percent of the state's tonnage, the commodities moved were typically high value and made up almost two percent of the state's total value.

[2] 2013 IHS Transearch Database.

Table 5-2: 2013 Wisconsin Freight Shipments by Value (Millions $)

Mode	Outbound	Inbound	Within	Overhead	Total*	Percent of Total*
Rail	$6,712.4	$13,156.8	$1,256.0	$158,103.7	$179,228.9	28.1%
Truck	$140,496.6	$108,924.5	$70,497.6	$125,750.2	$445,669.0	68.8%
Water	$1,259.5	$894.0	$43.8	-	$2,197.4	0.3%
Air	$5,468.9	$4,417.6	$549.7	-	$10,436.2	1.6%
Other	$26.2	$140.9	-	-	$167.2	0.03%
Total*	**$153,963.7**	**$127,533.8**	**$72,347.2**	**$283,853.9**	**$637,698.7**	**100%**

Source: 2013 IHS Transearch Database
**Totals may not add up due to rounding*

The remainder of this chapter outlines the assets that comprise Wisconsin's multimodal freight transportation system, organized by mode.

5.2 Wisconsin's Roadways

Freight shipments by truck dominated the state's goods movement in 2013 with nearly a 60 percent share by weight and 70 percent by value. Over 341 million tons of freight, valued at more than $445 billion were transported to, from, within, or through Wisconsin by truck in 2013 on Interstates and state highways. The top roadway commodities by weight included farm products, nonmetallic minerals (sand/rock/gravel), food or kindred products, petroleum and coal products, secondary traffic (primarily commodities moving from warehouse/distribution centers to retail locations), and clay, concrete, glass, and stone.[4]

Wisconsin's Roadways

- More than 341 million tons of freight moved annually by truck, valued at more than $445 billion in 2013 on Interstates and state highways
- State roads
  - Approximately 11,800 miles of state, federal and Interstate highways
  - Carry about 58 percent of Vehicle Miles Traveled (VMT)[3]
- Local roads
  - More than 103,000 miles of county highways, town roads and municipal streets

Wisconsin bridges are critical infrastructure assets of the transportation system. Wisconsin has a known inventory of more than 14,000 bridges that are maintained by their respective jurisdictional agencies.[5] While bridges do provide critical connections across the state, the issues surrounding bridges are discussed in detail in Chapter 6, *Transportation System Condition and Performance*. This section focuses on Wisconsin's roadways.

Table 5-3 and Table 5-4 display total truck tonnage and value by flow type. Overall, both tonnage and value show a relatively even distribution of flows outbound, inbound, within, and overhead traffic. In comparison to other modes, truck traffic is less likely to be overhead traffic, suggesting that trucking facilitates more Wisconsin-centric travel because shippers might not be able to easily access the other modes, such as rail and water.

[3] Wisconsin Department of Transportation, Bureau of Planning and Economic Development.
[4] 2013 IHS Transearch Database, 2 digit STCC Codes used.
[5] Wisconsin Department of Transportation, Bureau of Structures, "Annual Bridge Report." (April 2016).

Table 5-3: 2013 Truck Tonnage by Flow Type (million tons)

	Outbound	Inbound	Within	Overhead	Total
Truck Tonnage	98.2	80.2	112.0	50.8	341.1
Proportion of Truck Flows	(28.8%)	(23.5%)	(32.8%)	(14.9%)	(100.0%)
All Modes	**142.0**	**147.6**	**115.4**	**171.6**	**576.6**
Proportion of All Flows	**(24.6%)**	**(25.6%)**	**(20.0%)**	**(29.8%)**	**(100.0%)**

Source: 2013 IHS Transearch Database

Table 5-4: 2013 Truck Value by Flow Type (millions $)

	Outbound	Inbound	Within	Overhead	Total
Truck Value	$140,496.6	$108,924.5	$70,497.6	$125,750.2	$445,669.0
Proportion of Truck Flows	(31.5%)	(24.4%)	(15.8%)	(28.2%)	(100.0%)
All Modes	**$153,963.7**	**$127,533.8**	**$72,347.2**	**$283,853.9**	**$637,698.7**
Proportion of All Flows	**24.1%**	**20.0%**	**11.3%**	**44.5%**	**100.0%**

Source: 2013 IHS Transearch Database

Carrying much of the freight and supporting the majority of VMT, the remainder of this section describes the assets that comprise Wisconsin's State Trunk Highway System (STH).

State Trunk Highway System

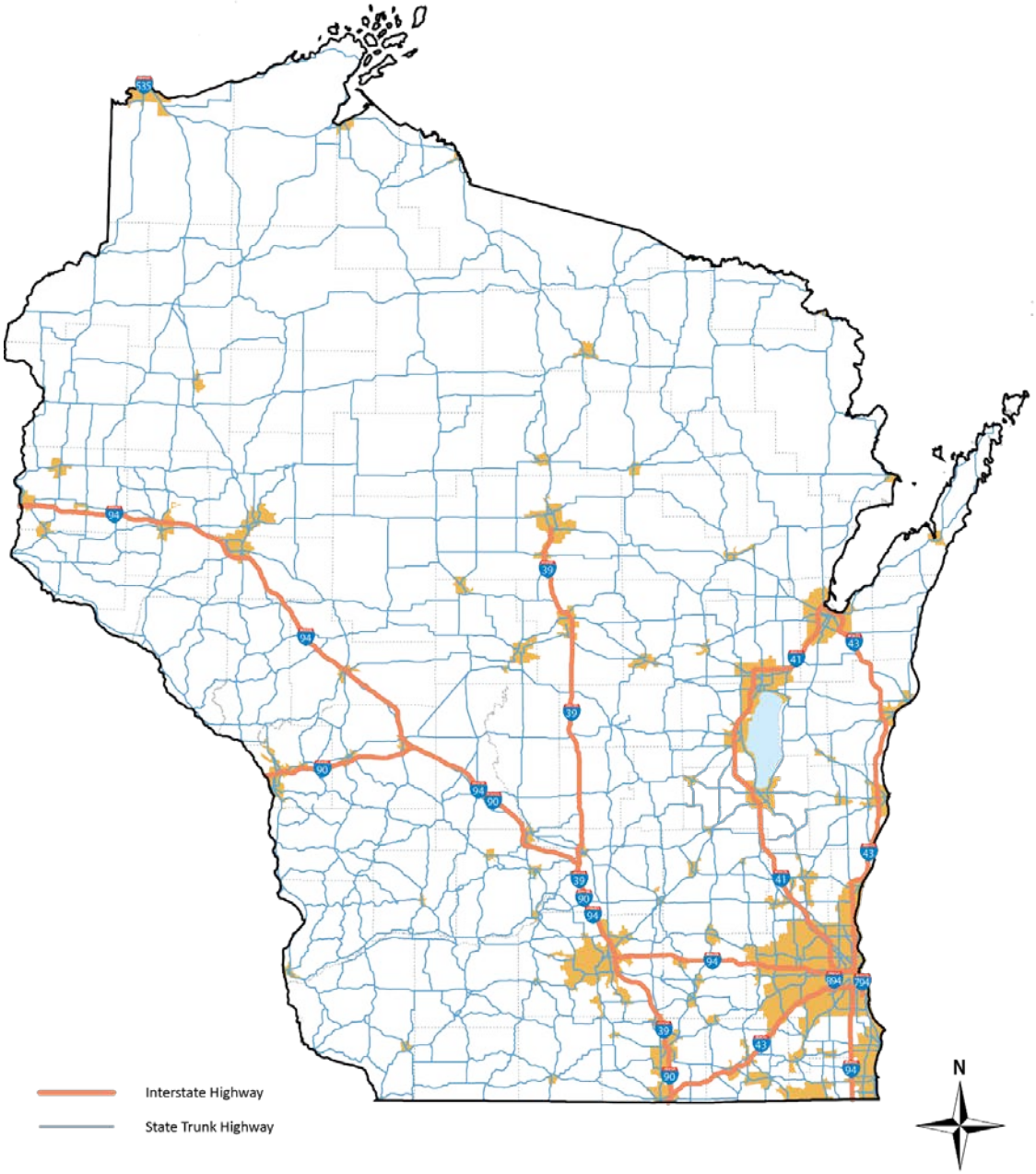
Wisconsin's STH consists of approximately 11,800 centerline miles of Interstate highways,[6] United States highways, and state trunk highways, including more than 5,200 bridges (Figure 5-1).[7] The STH system handles 58 percent of the VMT while comprising just over 10 percent of the total roadway network.[8] The STH system includes the National Highway System (NHS) and Wisconsin's designated Corridors 2030 network. Each subsystem of the STH is described below.

Centerline Miles

Centerline miles are used to measure the length of roadways. Centerline miles represent the total length of a given road from its starting point to its end point. The number and size of the lanes on that road are not considered when calculating its centerline mileage.

[6] Wisconsin Department of Transportation, Bureau of State Highway Programs.
[7] Wisconsin Department of Transportation, Bureau of Structures, "Annual Bridge Report." (April 2016).
[8] Wisconsin Department of Transportation, Bureau of Planning and Economic Development.

Figure 5-1: State Trunk Highway System



Source: Wisconsin Department of Transportation, Bureau of Planning and Economic Development

The National Highway System

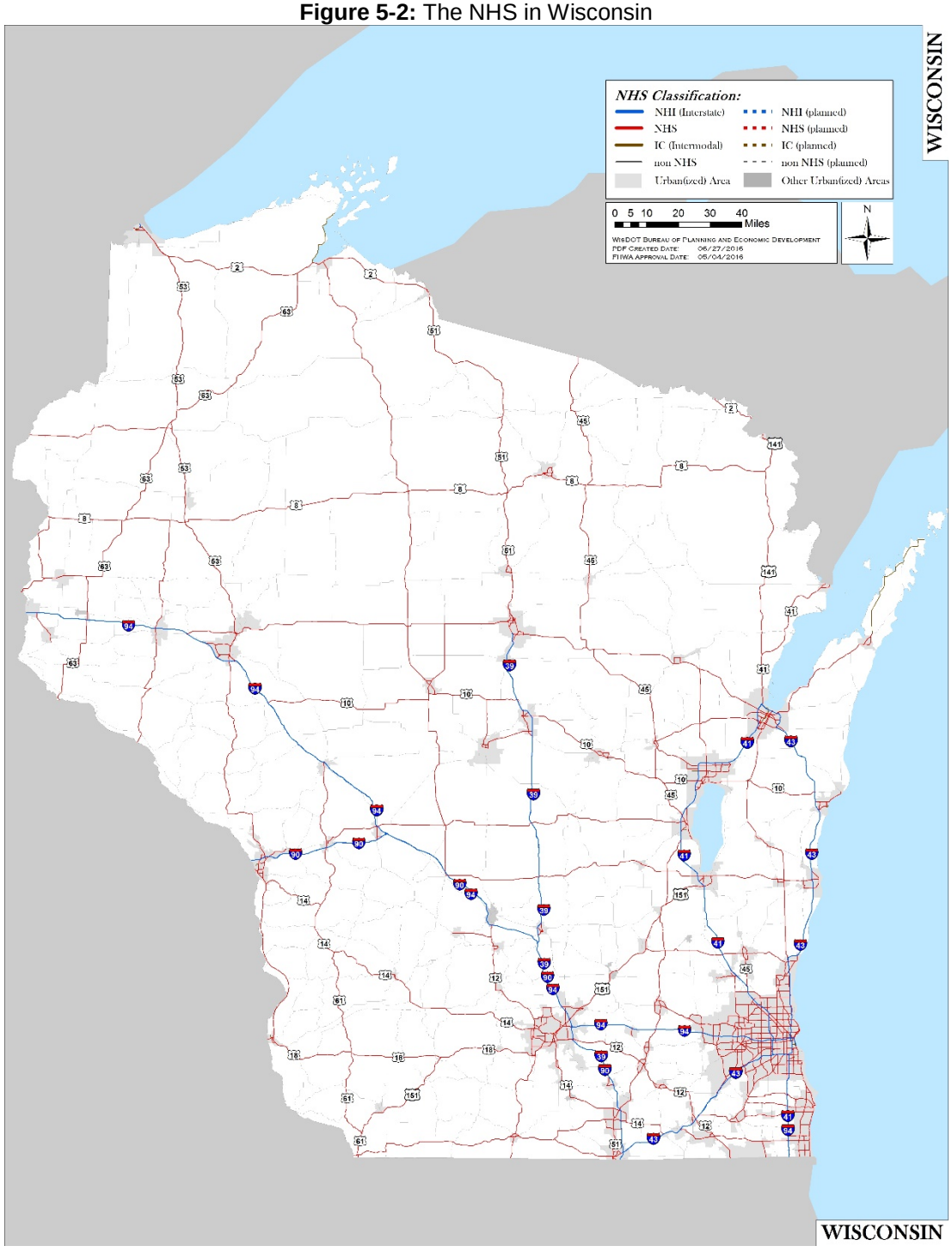
Officially designated in 1995 and expanded in the federal legislation Moving Ahead for Progress in the 21st Century Act (MAP-21), the enhanced National Highway System (NHS) includes approximately 220,000 centerline miles of roadway important to the nation's economy, defense, and mobility.[9] Roads under the NHS designation can be improved with federal-aid funds, but must adhere to Federal Highway Administration (FHWA) design criteria. The NHS roads are designated to reflect and support interstate commerce by focusing federal investments on a selection of roadways important to the movement of goods. The NHS is composed of five main roadway networks:[10]

- **Interstate –** highways important to national mobility, providing state to state connections and facilitating trade throughout the United States, as well as connecting the United States to neighboring countries. The Eisenhower Interstate System of highways retains its separate identity within the NHS.
- **Other Principal Arterials –** highways in rural and urban areas that provide access between an arterial and a major port, airport, public transportation facility, or other intermodal transportation facility.
- **Strategic Highway Network (STRAHNET) –** highways important to the United States' strategic defense policy and providing defense access, continuity, and emergency capabilities for defense purposes.
- **Major Strategic Highway Network Connectors –** highways that provide access between major military installations and highways part of the STRAHNET.
- **Intermodal Connectors –** highways that provide access between major intermodal facilities and the other four subsystems making up the NHS.

Figure 5-2 displays Wisconsin's 5,955 miles of NHS roadway as of 2016, including 876 miles of Interstate highways and 92 miles of intermodal connector roadways.[11] The Interstate and NHS route components are critical to the movement of goods, while connector roads are important freight linkages between modes. FHWA evaluates and approves NHS connector designations that meet primary criteria, including annual passenger volumes, annual freight volumes, or daily vehicular traffic on one or more principal routes that serve an intermodal facility. Secondary criteria for intermodal connector designation include factors that underscore the importance of an intermodal facility within a state.[12]

[9] Federal Highway Administration, "Public Road Length - 2015."
[10] U.S. Bureau of Transportation Statistics, "Passenger Travel Facts and Figures 2015."
[11] Wisconsin Department of Transportation, Bureau of Planning and Economic Development.
[12] Federal Highway Administration, "Appendix A NHS intermodal connector selection criteria."

Figure 5-2: The NHS in Wisconsin



Source: Wisconsin Department of Transportation, Bureau of Planning and Economic Development

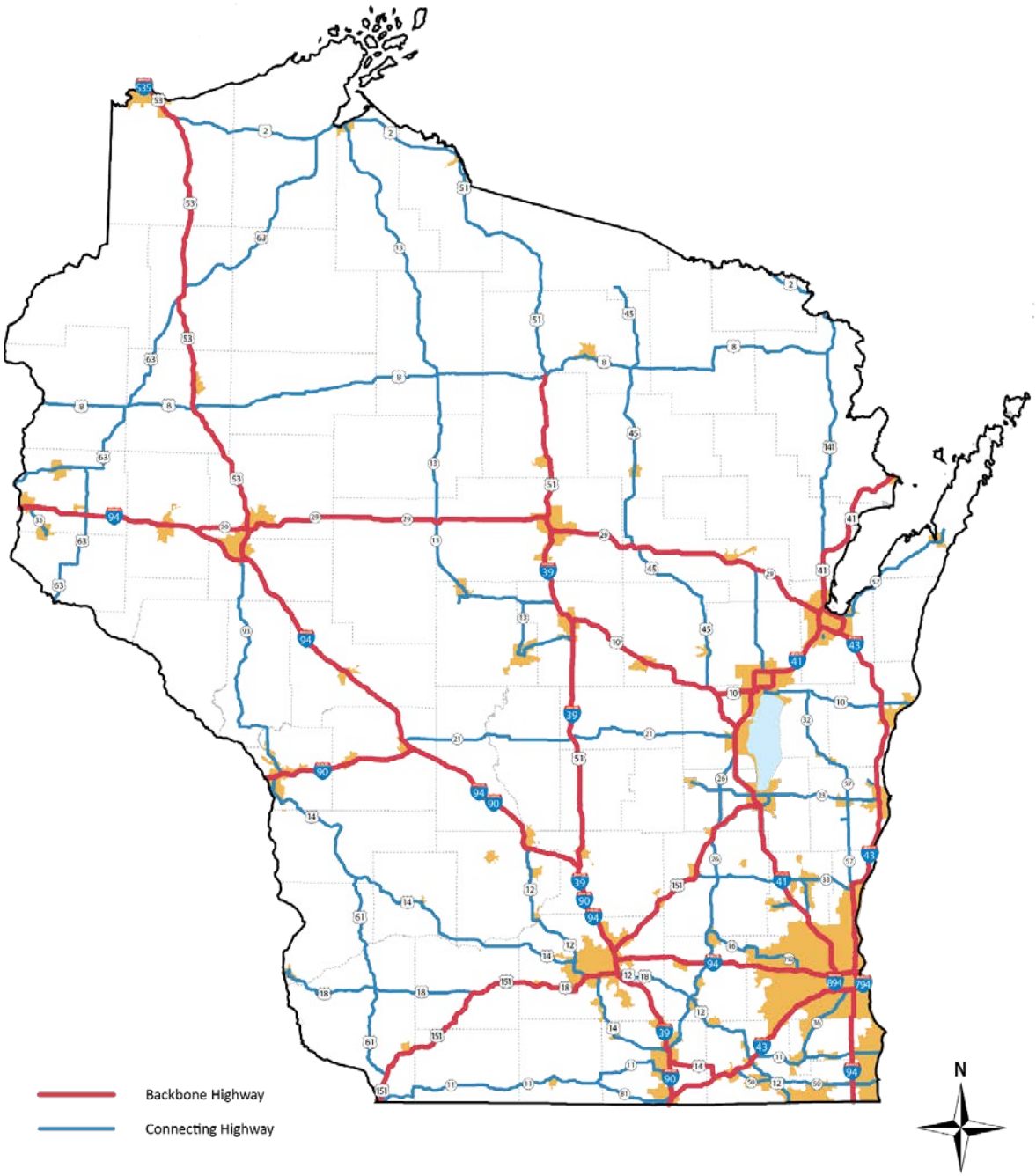
Corridors 2030

First designated as Corridors 2020 in 1988 and more recently updated as part of the state's long-range multimodal plan *Connections 2030* in 2009, Corridors 2030 is a state designation of critical highways statewide. As of 2016, these highways encompass approximately 3,930 centerline miles of federal and state highways that link all Wisconsin communities with populations greater than 5,000 (Figure 5-3).[13] These roads are considered vital to mobility and economic development in the state. The Corridors 2030 system is divided into two route types:

- **Backbone Routes** – include approximately 1,590 miles of Interstate and other multi-lane divided highways interconnecting all regions and major state economic centers, with links to the national system outside Wisconsin. Routes include: Interstates 39, 41, 43, 90, and 94; US Highways 10, 41, 51, 53, and 151; and State Highway 29.[14]
- **Connectors Routes** – include approximately 2,340 miles of predominantly two-lane highways connecting all other significant economic centers to the Backbone system.[15]

[13] Wisconsin Department of Transportation, Bureau of Planning and Economic Development.
[14] Ibid.
[15] Ibid.

Figure 5-3: Corridors 2030 Roadway System

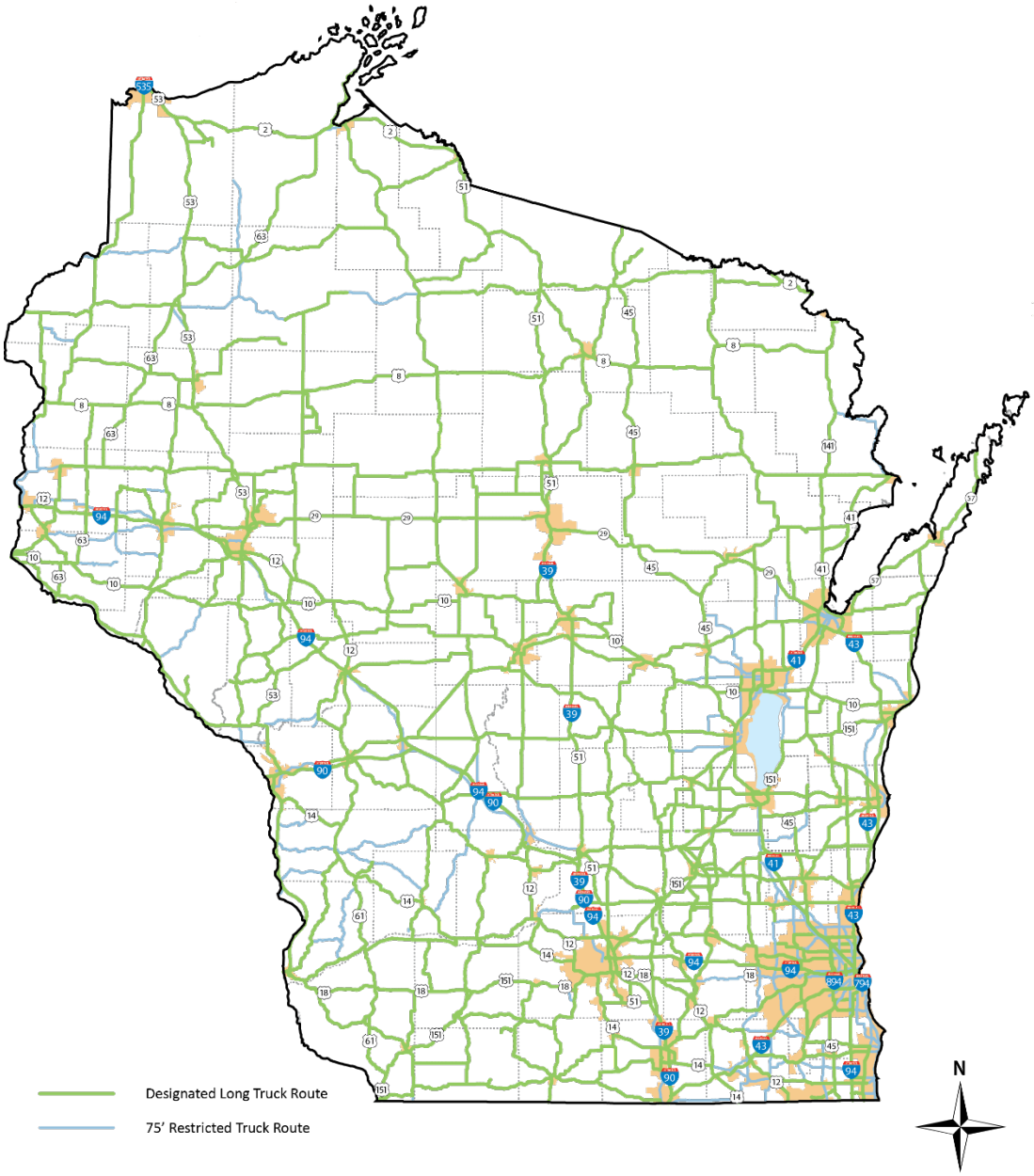


Source: Wisconsin Department of Transportation, Bureau of Planning and Economic Development

Wisconsin Long Truck Routes

Related to the Federal Long Truck Routes, Figure 5-4 displays Wisconsin Long Truck Operators map. The Long Truck Operators map identifies Wisconsin highways for the operation of vehicles and combinations of vehicles – the overall lengths of which cannot be limited. Wisconsin Administrative Code, specifically Trans 276, clarifies other statutory provisions or federal rules affecting the weight, width, and length of vehicles and combinations of vehicles and the number of vehicles in combination. The Wisconsin Long Truck Operators map conforms to Highways and Transportation Laws and Rules, Chapter Trans 276, Size and Weight of Vehicles and Vehicle Combinations.

Figure 5-4: Wisconsin Long Truck Operators



Source: Wisconsin Department of Transportation, Bureau of Planning and Economic Development

Oversize/Overweight Routes

The size and frequency of oversize/overweight (OSOW) vehicles and loads increase the stress on bridges and pavements and produces highway operational considerations specific to OSOW movements. Wisconsin, along with many other states, has made significant strides in developing a transportation system that accommodates OSOW loads. The following section describes what an OSOW load is and the designated roadway network to facilitate their movement.

As examined in Chapter 7, *Freight Transportation Trends, Issues, and Forecasts*, care must be taken to identify appropriate routes to safely and efficiently accommodate OSOW loads, such as wind tower components and construction equipment. The routing of OSOW trucks on a transportation system that was designed without the ability to predict the future of load sizes and dimensions limits the number of available primary highway routes for these movements. Although unintentional, there have been roadway designs that have limited the movement of OSOW loads. However, WisDOT has been working with industry and other stakeholders to identify barriers in order to route OSOW loads around identified impediments. Addressing these needs helps to enhance the reliability of freight movement.

Removing Barriers to OSOW Freight Movement in Wisconsin
At times, roadway designs unintentionally create barriers to the movement of large trucks and OSOW vehicles. Over the last few years, WisDOT identified several key facilities that were barriers to the movement of these types of loads. In response to industry concerns, WisDOT completed five freight mitigation projects from Manitowoc, Wisconsin to the Illinois and Iowa borders. A total of $1.5 million was invested to widen interchange loop ramps and the turn radius of a few key intersections in the state.[16] These five projects are estimated to save $300,000 annually from the Division of State Patrol's OSOW vehicle escort budget.[17] These savings benefit carriers, manufacturers, and industry. Overall, the improvements will reduce traffic congestion and improve public safety.

Wisconsin's highways support the movement of regular and OSOW loads in accordance with state and federal statutes. OSOW loads are trucks whose dimensions and/or weight exceed the legal limits and, with some exceptions, cannot be split into multiple smaller loads. A vehicle that exceeds the legal statutory dimensions usually requires an OSOW permit and must pay associated additional fees to legally travel on designated roadways. An OSOW permit typically includes conditions such as:

- Route specifics
- Dates of load travel
- Times of load travel
- Escort vehicles

The vehicle is routed to avoid permanent or temporary physical constraints of the transportation infrastructure. Some of the most referenced general maximum motor vehicle size and weight restrictions in Wisconsin are shown in Table 5-5.

[16] State of Wisconsin, Department of Transportation, "2013-2015 Biennial Report."
[17] Ibid.

Table 5-5: General Maximum Dimensions for Legal Loads in Wisconsin

Dimensions	
Width	8 feet, 6 inches
Height	13 feet, 6 inches
Length –	
Single vehicle and load	45 feet
Combination of 2 vehicles	70 feet
Truck/tractor and semi-trailer	75 feet[18]
Weight –	
Any one wheel or wheels supporting one end of an axle	11,000 pounds
Truck tractor steering axle	13,000 pounds
Single axle	20,000 pounds
Tandem axles	34,000 pounds
Maximum gross vehicle weights on all axles	80,000 pounds

Source: Wisconsin Department of Transportation, Bureau of Vehicle Services

Vertical and horizontal clearances, bridge and pavement structure strength, seasonal roadway weight restrictions, and roadway geometry and infrastructure (fixed signalized monotubes, low-hanging utility cables and signal lights, roundabouts, median geometrics, utility placement, etc.) are a few factors that may influence OSOW routing in Wisconsin.

Identifying the need to keep provide access to key OSOW roadways, WisDOT developed OSOW Truck Routes (OSOW-TR) shown in Figure 5-5. Roadways on the OSOW-TR have design guidance for intersections using five representative vehicles to test infrastructure design against the turning characteristics of OSOW vehicles. The following representative vehicles are used by WisDOT:

- 5-axle expandable-deck lowboy (DST Lowboy)
- Wind Tower 80 M MID
- Wind Tower 205'
- 55 Meter Wind Blade
- 165’ Bridge Girder

[18] Must adhere to the appropriate axle spacing to achieve a maximum gross vehicle weight of 80,000 lbs. [348.15].

Figure 5-5: OSOW Truck Routes



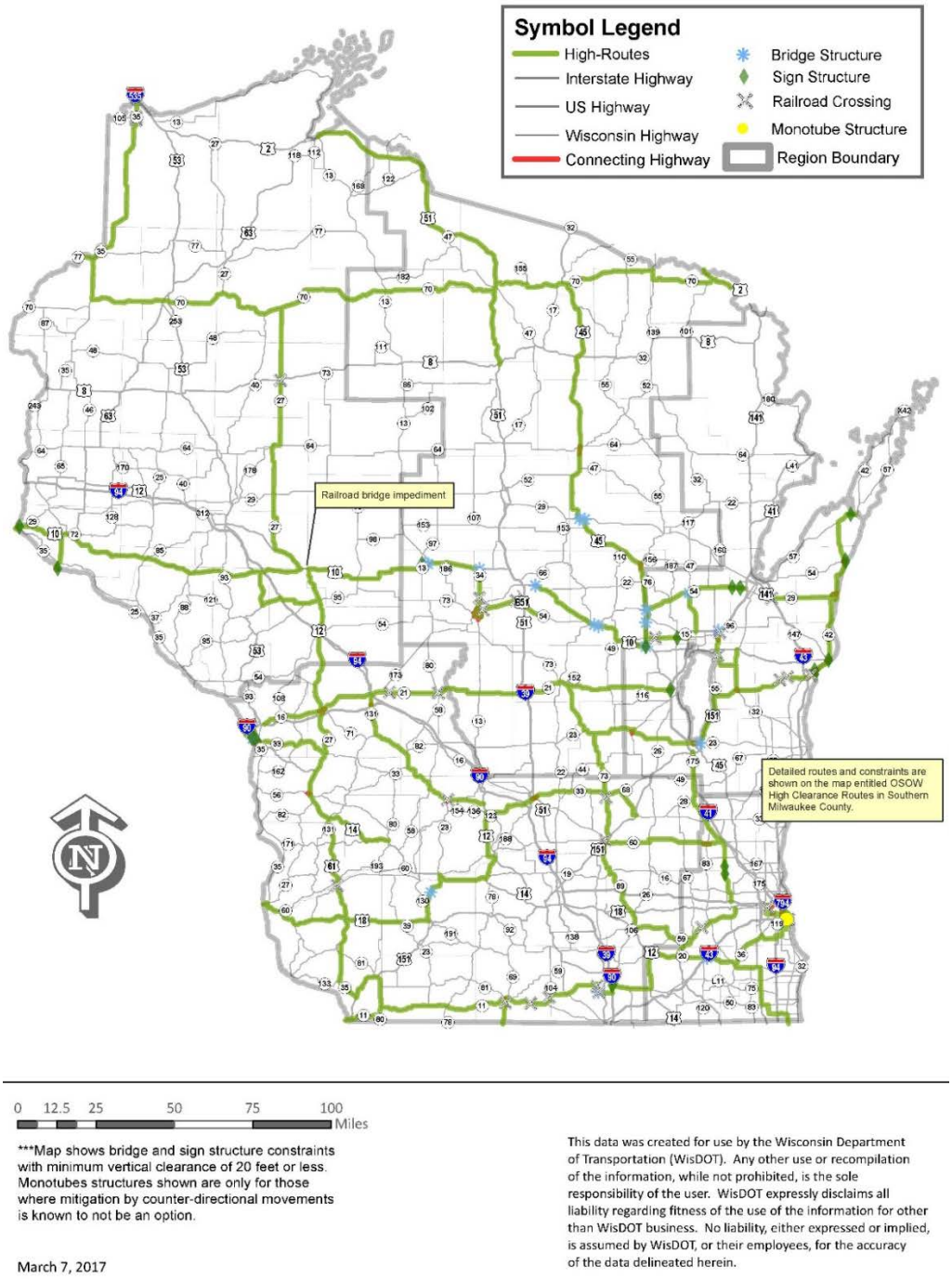
Source: Wisconsin Department of Transportation, Bureau of Highway Maintenance

WisDOT also developed the High Route Freight Corridors Task Force aimed at addressing physical constraints leading to OSOW congestion and delay. WisDOT staff reviewed frequently used high routes and selected preferred corridors based on origin/destination pairs, permit history, local knowledge, connecting highway designation, infrastructure constraints, funding constraints, and connectivity to important terminals. An iterative process was

used to align regional concerns and establish connected corridors. WisDOT's high clearance routes are shown in Figure 5-6. Similarly, Figure 5-7 displays an example of how OSOW High Clearance Routes are defined.

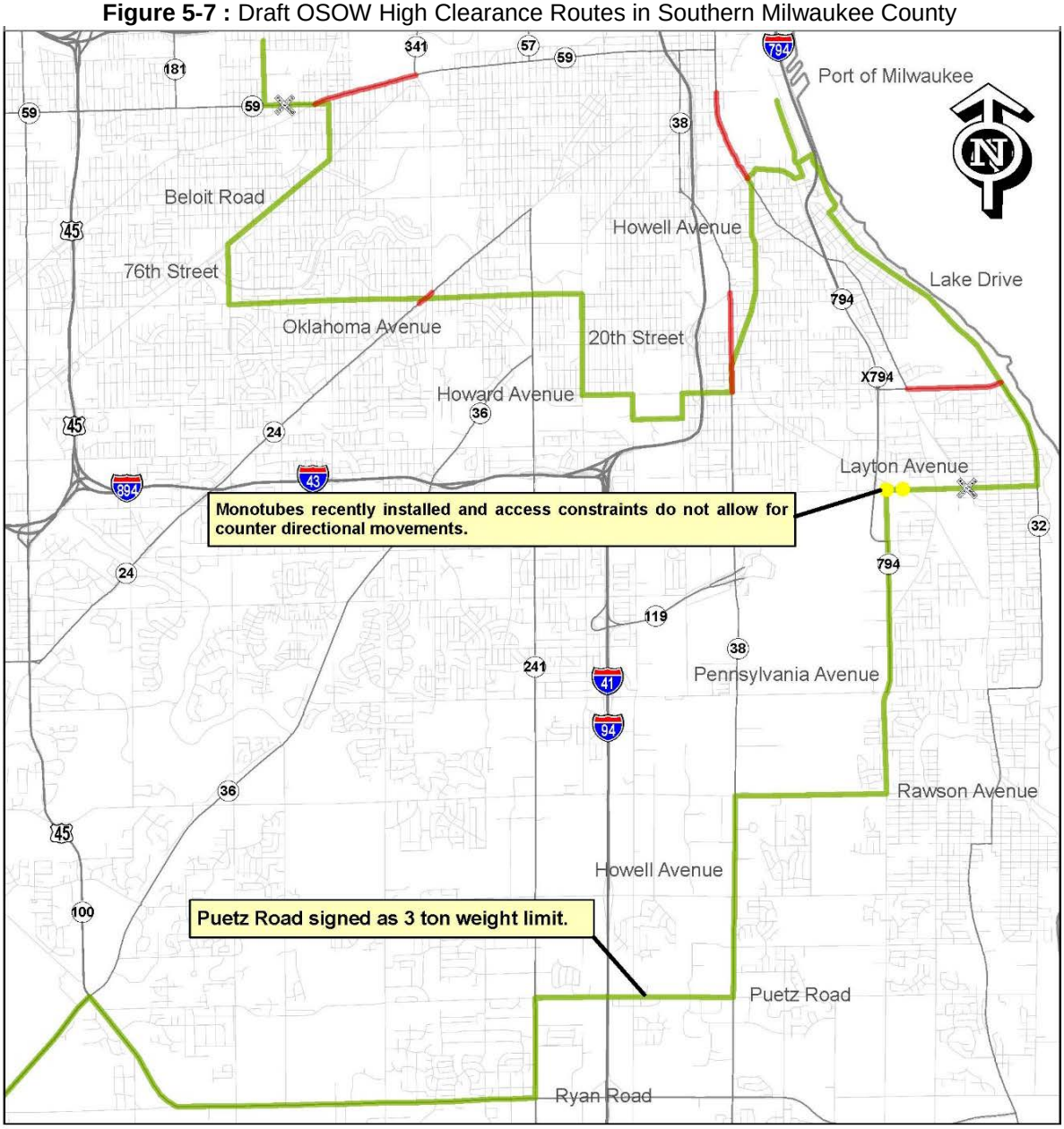
OSOW stakeholders have indicated that simply identifying the dimensional standards for state highways helps market transportation services. Essentially, this level of transparency reduces the logistical complexity of OSOW transport making state roadways capable of accommodating to OSOW freight.

Figure 5-6: Draft OSOW High Clearance Routes



Source: Wisconsin Department of Transportation, Bureau of Highway Maintenance

Figure 5-7 : Draft OSOW High Clearance Routes in Southern Milwaukee County



Source: Wisconsin Department of Transportation, Southeast Region Planning

Other Supporting Roadway Infrastructure

Wisconsin's roadway network includes supporting infrastructure that facilitates the movement of freight via truck. The remainder of this section describes truck parking facilities, Safety Weight Enforcement Facilities (SWEFs), Intelligent Transportation Systems (ITS), and the State Traffic Operations Center (STOC), which support the movement of freight via truck.

Truck Parking

In Wisconsin, truck parking is available at 30 public rest areas, which are located near Interstates and state highways.[19] Truck parking is also available at private facilities, such as gas stations or truck stops, located near Interstates and state highways. Truck parking facilities play an important role in freight operations, safety, and security in Wisconsin, and are needed for many reasons, including:

- Respite for over the road truckers
- Adherence to federal motor carrier safety standards
- Use for logistics purposes, such as staging (awaiting dispatch instructions)
- Pickup points for deliveries
- Safe areas during inclement weather conditions

A challenge for commercial truck operators is a shortage of areas near the Interstates to safely park their vehicles and rest. In lieu of available truck parking, some commercial truck drivers have parked illegally on Interstate interchange ramps or on the right shoulders of the Interstate, posing a major safety risk, potentially causing traffic bottlenecks and pavement deterioration.

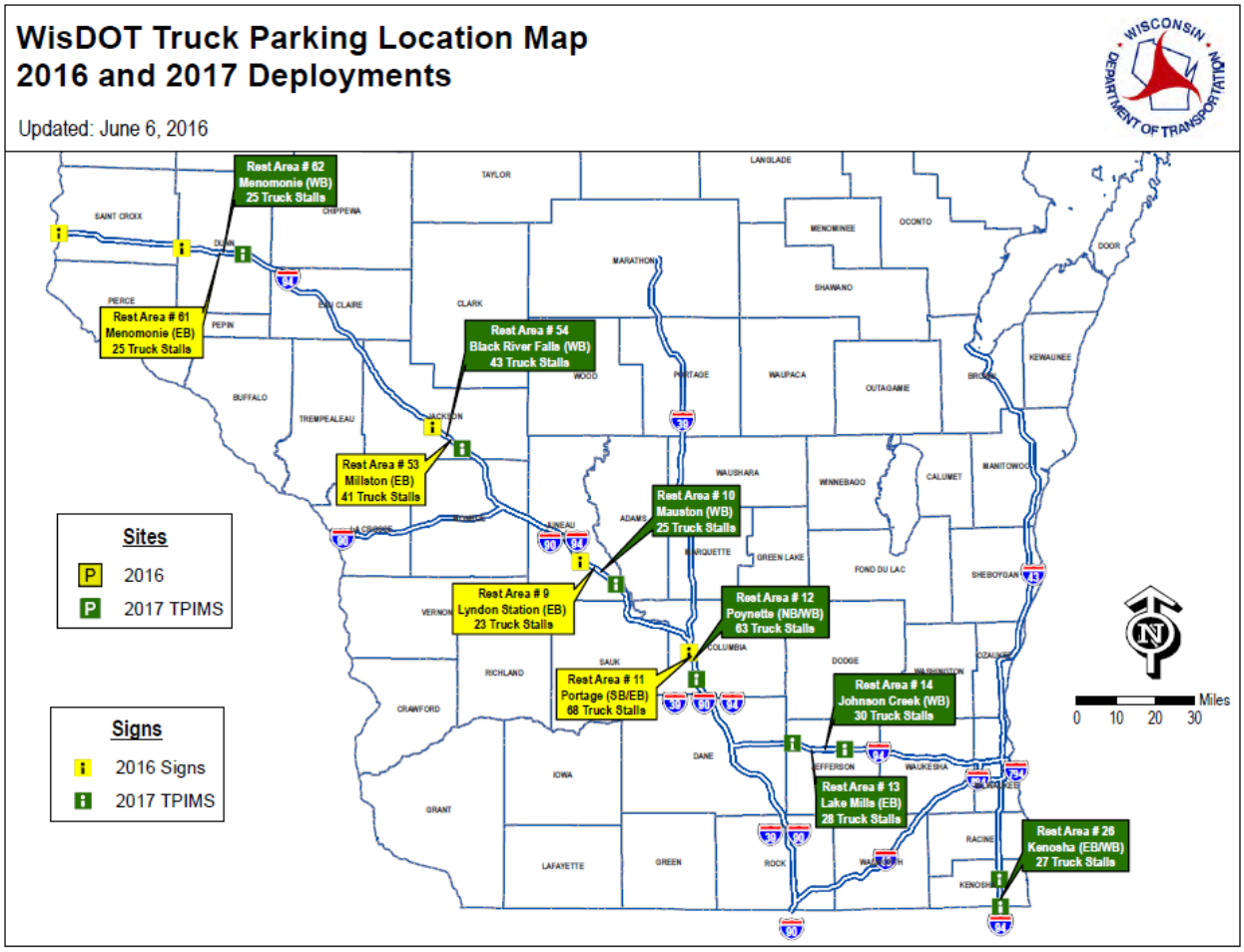
The shortage of suitable truck parking spaces presented WisDOT with an opportunity to both develop new truck parking facilities at strategic locations in the state, and to utilize new technologies to develop a more efficient way to communicate current parking availability to commercial truck drivers.

In 2014, WisDOT received a $1 million grant from FHWA to pilot a truck parking availability system in the state. The system was deployed in 2016 at four public rest areas on I-94 eastbound from Dunn County to Columbia County, which are the yellow sites in Figure 5-8. Hybrid Dynamic Message Signs (HDMS) will be installed along the corridor showing truck parking availability information.

In 2015, Wisconsin, along with seven other Midwestern states, was awarded a $25 million grant from the United States DOT through the Transportation Investment Generating Economic Recovery (TIGER) program to build a regional truck parking information management system. Wisconsin's portion of the $25 million grant is $3 million. Using HDMS, this system will include seven public rest areas along the I-94 corridor, east and westbound from the Illinois to Minnesota state lines, which are the green sites in Figure 5-8. This system will be constructed between 2016 and 2018.

[19] Wisconsin Department of Transportation, Bureau of Highway Maintenance.

Figure 5-8: 2016 WisDOT Truck Parking TIGER Grant Electronic Sign Locations



Source: Wisconsin Department of Transportation, Bureau of Highway Maintenance

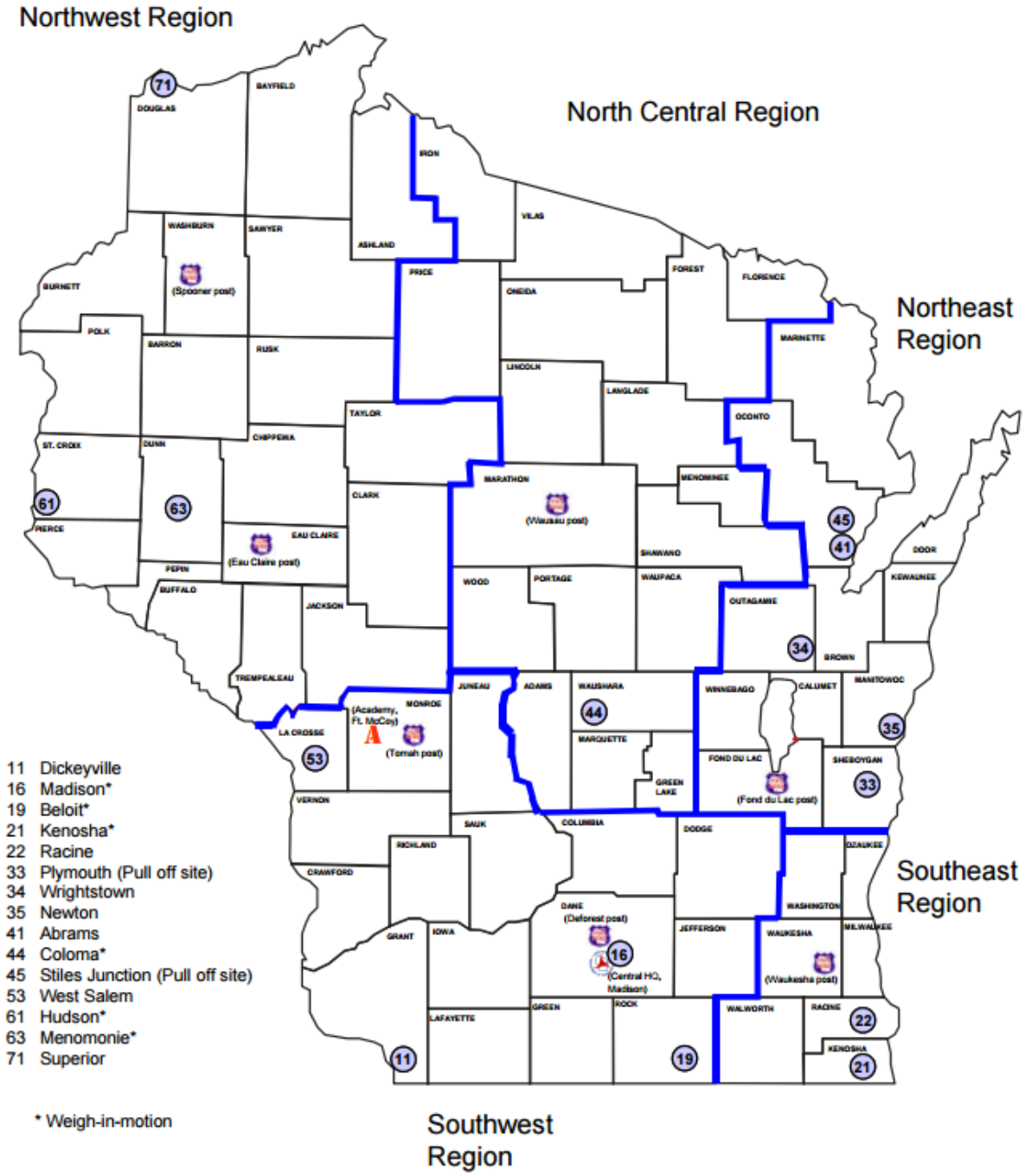
Safety and Weight Enforcement Facilities

WisDOT's State Patrol inspectors ensure that commercial carriers operate within statutory or permitted size and weight limitations while operating in Wisconsin. They inspect carriers to ensure they have proper registration, as well as insurance and authority credentials. Enforcement activities occur at SWEFs as well as through mobile enforcement using portable scales. As shown in Figure 5-9, Wisconsin has thirteen SWEFs with a scale on site and two SWEFs that require the commercial vehicle operator to pull off site to be weighed.[20]

Use of Commercial Vehicle Information Systems and Networks
WisDOT leverages Commercial Vehicle Information Systems and Networks (CVISN, pronounced "see-vision"), which provides the department with tools to improve motor carrier safety and enforcement, as well as enhance the state's revenue collection. The majority of the department's CVISN tools and technologies are housed at each of the state's thirteen SWEFs, commonly called weigh stations. WisDOT's Motor Carrier Enforcement Unit in the Division of State Patrol uses CVISN technology to monitor and enforce commercial truck operations in Wisconsin. Specifically, they monitor the legal weight, length, and height of loads. They also identify the registration, insurance, authority/permits, and fuel tax collection for the operators.

[20] Wisconsin Department of Transportation, Bureau of Highway Maintenance.

Figure 5-9: 2012 WisDOT's Safety Weight Enforcement Facilities



Source: Wisconsin Department of Transportation, Division of State Patrol

Weigh-in-motion (WIM) technology has improved commercial motor vehicle (CMV) weighing efficiency; however, WIM can only be used when the SWEF is open and law enforcement is present. The number of CMV inspections increases as a SWEF is open for longer periods of time; on average, one additional hour of operation yields approximately two additional inspections. Increasing the number of operation hours and inspections improves traffic safety as more unsafe CMVs and drivers are taken off the road.

Wisconsin Traffic Incident Management Enhancement (TIME) Program

Crashes, spilled loads, and stalled vehicles are all examples of traffic incidents. In Wisconsin and throughout the nation, these situations and the traffic congestion caused by them account for approximately one-fourth of delays on our highway system.[21] Traffic incidents also significantly impact the safety of both motorists and emergency responders.

Traffic Incident Management (TIM), a collaborative effort of public safety and transportation agencies, consists of a planned and coordinated multi-disciplinary process to detect, respond to, and clear traffic incidents so that traffic flow may be restored as safely and quickly as possible. Effective TIM reduces the duration and impacts of traffic incidents and improves the safety of motorists, crash victims, and emergency responders.

Wisconsin recognizes the importance of TIM in maintaining the operational safety and efficiency of the state's roadways. The Traffic Incident Management Enhancement (TIME) Program is a comprehensive multi-agency, multi-discipline program, led by WisDOT, dedicated to:

- Improving responder safety
- Enhancing the safe, quick clearance of traffic incidents
- Supporting prompt, reliable, interoperable communications

The program, initiated in 1995, is a sustained initiative for assessing needs, developing solutions and strategies, and fostering the transportation-public safety partnerships that are essential for effective TIM.[22] Members of the partnership make up the TIME Coalition.[23]

Intelligent Transportation Systems (ITS)

WisDOT's ITS technologies include numerous tools to help manage highway system traffic flow from detection and response to data collection. Most of the traffic management technologies used by the department to detect and respond to transportation incidents are ITS applications such as variable message signs, ramp meters, closed circuit cameras, microwave vehicle detection, BlueTooth readers, and third party probe data.

Intelligent Transportation Systems Technologies
Detection • Roadway sensors detect vehicles moving on the highway system and are the primary source of data used to understand traffic patterns • Traffic condition cameras provide live video of traffic on the highway network • Third party probe data show real time and historic traffic volumes for select segments Response • Variable message signs inform travelers about current travel times to various destinations and locations of lane and ramp closures • Ramp meters (traffic signals) on freeway entrance ramps disperse the volume of vehicles entering the freeway to minimize congestion • Highway Advisory Radio is a network of low-power radio transmitters that provide prerecorded messages in areas with high highway construction projects and high volumes of traffic due to special events

[21] Wisconsin Department of Transportation, Statewide Traffic Operations Center.
[22] Wisconsin Department of Transportation, "Programs - Traffic Incident Management Enhancement."
[23] Wisconsin Time Coalition, "About the Coalition."

WisDOT has expanded the use of ITS to key intercity corridors statewide. WisDOT also uses mainstream ITS as a tool for other types of routine highway operations activities, including winter weather activities and work zone management. WisDOT currently uses web-based technologies for the Wisconsin Lane Closure System and the OSOW truck permitting processes. WisDOT continues to monitor the use and expansion of technologies for future use, such as connected and autonomous vehicle technologies, to further enhance the state's multimodal transportation system.

While technology is crucial to real-time operational data needs, monitoring data over time helps analyze potential trends. Storing data in a logical and accessible way for long-term analysis and future planning will aid the department in assessing changes and opportunities on the transportation system.

Measures of technological performance can take place on several levels. First is the ability of the technology system to collect and store appropriate, uncorrupted data. Second is the ability to put the right people and processes in place to access, understand, and ultimately make sound business decisions based on analysis of the data. Table 5-6 provides examples of traffic management technology and WisDOT's use of those technologies.

Table 5-6: Examples of Traffic Management Technologies

Technology	Status	Description
511 National Travel Information	Currently in use	• State-federal cooperative effort to provide real-time, route-specific information on construction zones, weather conditions, weather-related road conditions, congestion, detours, bus schedules, and numerous other items • System is active in Wisconsin and has received funding through the 511 Planning Assistance Program
Highway Advisory Radio	Currently in use	• Provides recorded information via dedicated low-power AM radio frequencies • Implemented in specific locations across the state
Wisconsin Lane Closure System	Currently in use	• Provides standard interface for lane closure operations, closure tracking, and data retrieval • Facilitates data-sharing with other WisDOT applications such as the 511 Traveler Information program, State Traffic Operations Center incident management system, and the oversize/overweight permitting system • Archives data for future analysis, as well as integration with other traffic engineering applications
GPS Traffic Tracking	Currently in use	• Monitors and addresses real-time traffic conditions and enhances the current and future state trunk highway system by archiving traffic activity • Public-private cooperative effort • Uses cell phone and fleet-based GPS traffic tracking technology to collect traffic data flow • Eliminates all personally identifiable information • Sends anonymous vehicle position to State Traffic Operations Center
Vehicle Infrastructure Integration	Under development and testing	• Requires cooperative effort among private-sector companies and federal and state agencies in multiple states • Allows vehicles equipped with vehicle infrastructure integration to communicate with embedded roadway technology and other vehicles in real-time

Source: Wisconsin Department of Transportation, Bureau of Traffic Operations

State Traffic Operations Center

In response to increasing demands on Wisconsin's STH system, WisDOT uses a wide range of technologies to manage the growing volume of traffic, provide real-time traffic information to system users and first responders, and assess existing and future operational and infrastructure needs.

The State Traffic Operations Center (STOC) is a centralized facility located in Milwaukee responsible for monitoring highway operations and managing traffic on the network. The center manages traffic on the highway system by detecting and coordinating operational activities among partner agencies, and responding through the compilation and dissemination of information to numerous users and audiences.

- Detection: The center monitors and collects information from numerous sources such as traffic detectors, closed-circuit TV cameras (in Milwaukee, Madison, Green Bay, and Wausau), computer-aided dispatch, and local law enforcement radio.
- Response: The center coordinates response activities among partner agencies, compiles and disseminates information to numerous users and audiences.

The STOC implements the following response actions:

- Manage traffic control activities in response to expected traffic congestion such as special events or traffic incidents in work zones.
- Disseminate real-time traffic information including incident location and construction-related closures, and anticipated or known delays to other WisDOT personnel, emergency service providers, public safety agencies, media, and the public. Variable message signs, Highway Advisory Radio, and ramp meters are examples of WisDOT response to delays.
- Coordinate state highway network emergency response activities via a toll-free telephone number available to law-enforcement agencies.

With the aid of cameras, road sensors, and area responders throughout the state, the STOC staff work with others to identify and track incidents and initiate appropriate responses. Currently, the STOC has cameras and direct responsibility to monitor and coordinate responses to incidents in Southeast Wisconsin, Madison, Green Bay, and Wausau. To serve statewide needs, the center coordinates incident response with local emergency providers and contacts via a toll-free number.

The center provides information to the public using direct communication, social media, variable message signs, Highway Advisory Radio, and weather displays at rest areas. The STOC plays an important role in highway safety by coordinating statewide emergency response. With the traffic control and monitoring systems operated by STOC, trucks and other commercial vehicles are able to reduce the amount of delay they encounter while traveling in Wisconsin, which helps freight carriers lower shipping costs. These systems can also allow agencies to respond faster and more efficiently to interruptions in travel caused by emergencies, accidents, breakdowns, weather, and increased congestion.

Local Roads in Wisconsin

Wisconsin's locally owned and maintained road and bridge system serves as a critical link in the state's total transportation network. With over 100,000 miles of county, town, and municipal roads and nearly 9,000 bridges,

the local road network accounts for approximately 90 percent of Wisconsin's public road mileage.[24,25] Typically, local roads are owned and operated by local jurisdictions.

As a critical adjunct to the STH system, the local road system offers connections not only to local activity centers, but also to state and national facilities of importance such as ports and economic business centers. Local roads connect to the STH, airports, rail stations, and bus and ferry terminals. They are the first and usually last link in the state's farm-to-market commerce and offer critical links for area businesses and tourists. Finally, many trips made by Wisconsin citizens, businesses, and tourists take place entirely on the local system.

In contrast to decisions made for the STH system, WisDOT does not have a direct role in the planning, construction, maintenance, or operation of the local road system. However, the department is responsible for managing and distributing local program funding. Local governments identify and prioritize infrastructure needs according to established guidelines for various state and federal funding sources.

National Highway System - Local

As of 2016, there are about 650 miles of local roads that are part of the NHS.[26] They are part of the NHS because they provide access to intermodal facilities or they are considered principal arterial roads.[27]. In some instances, these roads have not been designed to carry higher traffic volumes or heavier weight vehicles relative to their purpose as connection between intermodal facilities as the highway system.

In addition, the road network sometimes does not adequately serve OSOW trucks traveling to and from ports and intermodal facilities. This can result in trucks traveling farther distances to avoid bridges with weight limits, areas with reduced clearances, or roadways with insufficient turning radii.

While these local roads are part of the NHS, local governments are responsible for maintaining them. As part of WisDOT's freight planning and local roads coordination efforts, the department continues to work with local governments and Wisconsin's ports and intermodal facilities to identify solutions that address roadway issues for port areas and intermodal facilities.

[24] Wisconsin Department of Transportation, Bureau of Structures, "Annual Bridge Report." (April 2016).
[25] Wisconsin Department of Transportation, Bureau of Planning and Economic Development.
[26] Ibid.
[27] In 2012 MAP-21 directed FHWA to incorporate roads classified as principal arterials into the NHS.

5.3 Wisconsin's Railroads

Wisconsin's approximate 3,300 miles of railroad system make up about two percent of the nation's rail network.[30] The state's rail system is owned and operated by ten active, privately-owned freight railroads and the State of Wisconsin. The private railroads each hold Surface Transportation Board (STB) freight carrier certificates and operate over a network of mainlines, branches, industrial leads, spurs, rail yards, and terminals.

In 2013, nearly 207 million tons of freight (36 percent of the state total), valued at nearly $180 billion (28 percent of the state total) were transported into, out of, within, and through Wisconsin by rail. Primary commodities by weight, moved by rail included coal, crude and petroleum oil, natural gas, chemicals and allied products, nonmetallic minerals, and farm products.[31]

Table 5-7 and Table 5-8 display the total rail tonnage and value by flow type for Wisconsin. Overall both tonnage and value show the majority of rail traffic is traveling through the state. Overhead traffic flows via rail are almost double the proportion of tonnage and value traveling through the state on all modes.

Wisconsin's Rail System

- Wisconsin's railroad system includes more than 3,300 miles of track
- Wisconsin has 718 miles of state-assisted rail corridors, of which approximately 624 miles are publicly-owned and operated primarily by Wisconsin and Southern Railroad (WSOR)
- Wisconsin has over 700 miles of lines in Rails-to-Trails status[28]
- More than 360 publicly-owned railroad bridges
- Ten active, privately-held railroad companies operate in Wisconsin
- Ports in Milwaukee, Superior, Ashland, Marinette, Green Bay, Manitowoc, Sheboygan, Prairie du Chien, and La Crosse have freight rail access
- Arcadia and Chippewa Falls have truck-rail intermodal connection
- Coal is the top shipped commodity by rail
- By 2030, freight rail tonnage shipped to and from Wisconsin is forecasted to nearly double[29]

Table 5-7: 2013 Wisconsin Rail Tonnage by Flow Type (millions)

Mode	Outbound	Inbound	Within	Overhead	Total
Rail Tonnage	24.7	57.9	3.4	120.9	206.9
Proportion of Rail Flows	(12%)	(28%)	(2%)	(58%)	(100%)
All Modes	**142.0 (24.6%)**	**147.6 (25.6%)**	**115.4 (20.0%)**	**171.6 (29.8%)**	**576.6 (100.0%)**

Source: 2013 IHS Transearch Database

[28] Wisconsin Department of Transportation, Bureau of Planning and Economic Development.
[29] Ibid.
[30] Class I Data: Surface Transportation Board, 2014 R-1 Report; Shortline Data: Wisconsin Department of Transportation, Bureau of Transit, Local Roads, Railroads and Harbors.
[31] 2013 IHS Transearch Database, 2 digit STCC Codes used.

Table 5-8: 2013 Wisconsin Rail Value by Flow Type (millions $)

Mode	Outbound	Inbound	Within	Overhead	Total
Rail Value	$6,712.4	$13,156.8	$1,256.0	$158,103.7	$179,228.9
Proportion of Rail Flows	(4%)	(7%)	(1%)	(88%)	(100%)
All Modes	**$153,963.7 (24.1%)**	**$127,533.8 (20.0%)**	**$72,347.2 (11.3%)**	**$283,853.9 (44.5%)**	**$637,698.7 (100.0%)**

Source: 2013 IHS Transearch Database

Active rail lines serve 59 of Wisconsin's 72 counties.[32] The state's rail network also includes inactive lines still in private rail company ownership and former rail corridors that have been preserved for possible future transportation use. These corridors are protected under rail banking agreements, or they are currently being used as trails under the protection of the National Trails System Act.

Rail Transit Commissions (RTCs) have played a critical role in the preservation of freight rail service and rail corridors in Wisconsin since their inception in the late 1970s and early 1980s. RTCs help preserve rail service (or the potential for rail service), and influence policies on the future use of specific rail corridors if service is discontinued. The State of Wisconsin and RTCs jointly own over 700 miles of the state's 3,300 miles of rail.[33]

Usage Agreements

Among the large rail carriers, the industry is highly concentrated, with seven Class I railroads serving long-distance and trans-continental rail freight shipments. These companies, however, are limited by their own networks. In general, Burlington Northern Santa Fe (BNSF) and Union Pacific (UP) occupy the western part of the country. The eastern United States is served by Norfolk Southern and CSX. Kansas City Southern is concentrated in the south. Canadian National (CN) and Canadian Pacific (CP) span the continent across Canada, but both have extensive networks within the United States, structured under subsidiary companies. CN's purchases of Wisconsin Central Limited and Illinois Central added a unique north-south service corridor across the middle part of the United States to its system. Consequently, railroads have developed cooperative use arrangements to extend their reach over each other's lines. These arrangements include the following types.

Joint Rate/Route Agreements

Two railroads establish one route (and rate) from an origin on the first rail line to a destination on the second rail line. Each railroad remains individually responsible for providing locomotives and crews over its lines, as well as loss and damage to the freight while in its possession. Joint rate/route agreements are subject to STB regulation and are a matter of public record.

Lease

A railroad or other entity (such as a RTC) retains ownership of a corridor, while an operator provides the equipment and staff to give service to the customers along that corridor. In Wisconsin, this structure has been used with frequency to maintain service on lower-density lines in the southern and eastern parts of the state. Several RTCs have signed operational agreements with WSOR. In another example from northwestern Wisconsin, Progressive Rail, Inc. (PGR) has leased a line between Chippewa Falls and Cameron from UP.

[32] Wisconsin Department of Transportation, Bureau of Planning and Economic Development.
[33] Wisconsin Department of Transportation, Bureau of Transit, Local Roads, Railroads and Harbors.

Trackage Rights

The railroad that owns a rail corridor retains all rights but may allow another railroad to operate over certain sections of its track. Trackage rights can be "full service," where the tenant has the right to serve shippers on the owner's line, or "overhead" or "bridge" meaning that the tenant cannot carry freight to and from the owner's customers. In Wisconsin, WSOR has bridge rights over CN, allowing connectivity between its southern and northern systems.

Trackage rights can be temporary or long-term. Temporary rights agreements are typically made when a disaster affects one railroad while a parallel line is fully operational. Long-term agreements can be made to allow competing railroads access to potentially profitable shippers or to act as a bridge route between otherwise disconnected sections of another railroad. Unlike joint route/rate agreements, trackage rights agreements specify that the tenant railroad is solely responsible for serving the shipper and for loss and damage to the freight. Trackage rights agreements are subject to STB regulation and are a matter of public record.

Under trackage rights, the track shared by the railroads is labeled as a Joint Facility. One special type of Joint Facility is a Union Terminal. A Union Terminal is typically owned by all the railroads operating out of the terminal, frequently as a separate company. Associated trackage is typically owned by this company, with the railroads that use it given the authority to operate into and out of the terminal by trackage rights. A noteworthy example of this is the Belt Railway Company of Chicago, which operates its clearing yard and industrial switching operations on behalf of the six Class I companies that co-own it.

Haulage Rights

Unlike trackage rights, a railroad granted haulage rights contracts with the customer over the entire route. It also supplies the cars and is responsible for loss and damage. The railroad granting the haulage rights retains direct control over operations, providing the track, train crews, dispatching services, and sometimes the locomotives. In return, the host railroad gets a cents-per-unit payment for each car moved, but is not privy to the haulage contracts with the shippers. Haulage rights are not subject to STB regulations.

Joint Use

On occasion, a rail corridor is owned by one entity that hosts its own operations, but also cooperatively allows operations by another rail company or companies. This is the operational structure for most Amtrak service outside of the Northeast Corridor, as the freight rail companies that own the lines manage the shared-use by passenger lines.

Railroad Abandonments and Rails-to-Trails

As examined in Chapter 7, *Freight Transportation Trends, Issues, and Forecasts*, rail line abandonments and efforts to preserve rail right-of-way often go hand-in-hand in Wisconsin. WisDOT has historically tried to preserve freight rail service where feasible. If preservation is not feasible, the department works with the Wisconsin Department of Natural Resources (DNR) to preserve the rail corridor for future rail transportation use by using the 1983 National Trails System Act (NTSA). The NTSA gives interested parties the opportunity to negotiate voluntary agreements with railroads to use railroad corridors for trails in the interim.

While abandonments do occur, they have differed from earlier abandonments of the late 1970s and early 1980s where entire corridors were abandoned. Over the last 23 years, thirteen abandonment applications have been approved by the STB in Wisconsin. Six of those lines were short stub-ended spurs of only a few miles in length; others occurred on Native American tribal lands.[35]

Since 1987, railroads in the state have submitted over 40 applications to the STB to abandon more than 400 miles of rail lines. Over 70 percent of the miles have been preserved or are in negotiations to be preserved for future transportation use.[36] Many of the lines are used as trails in the interim. Lines preserved under the NTSA are not abandoned. These lines retain their character as rail corridors and may be reactivated in the future. Negotiation efforts can sometimes take years in order to preserve a rails-to-trails segment.

Rails-to-Trails

The Rails-to-Trails program preserves rail corridors for future transportation uses. WisDOT works with the Wisconsin DNR to preserve out-of-service rail corridors by using the 1983 NTSA. The NTSA gives interested parties the opportunity to negotiate voluntary agreements with railroads to use railroad corridors for trails until the rail lines are rehabilitated for railroad use. As of January 2016, Wisconsin has over 700 miles of lines in Rails-to-Trails.[34]

Railroads in Wisconsin

The Association of American Railroads (AAR) and Surface Transportation Board classify United States railroads based on a combination of operating revenues and carrier characteristics. The railroads currently operating in Wisconsin are as follows:

- **Class I** – United States-based, line-haul railroads with operating revenue exceeding $447.6 million (as of 2017)[37]
- **Regional (Class II)** – line-haul railroads below the Class I revenue threshold that operate at least 350 miles of road and earn at least $20 million in revenue, or earn revenue between $40 million and the Class I revenue threshold regardless of mileage; note: AAR and the STB define Regional/Class II railroads' revenue levels differently[38]
- **Short Line (Class III)** – railroads with operating revenue of less than $35.8 million (as of 2017)[39]

[34] Wisconsin Department of Transportation, Bureau of Planning and Economic Development.
[35] Wisconsin Department of Transportation, Bureau of Transit, Local Roads, Railroads and Harbors.
[36] Ibid.
[37] Surface Transportation Board, "FAQs."
[38] American Short Line and Regional Railroad Association, "Railroad Definitions."
[39] Surface Transportation Board, "FAQs."

Table 5-9 lists each of Wisconsin's active freight railroads, their parent companies, and the total number of miles operated. In the case where the railroad property is owned by a public entity, the owning agency and parent company of the operator are both indicated. Due to the privately-held structure of railroads, information and data are limited.

Table 5-9: Railroad Mileage by Classification

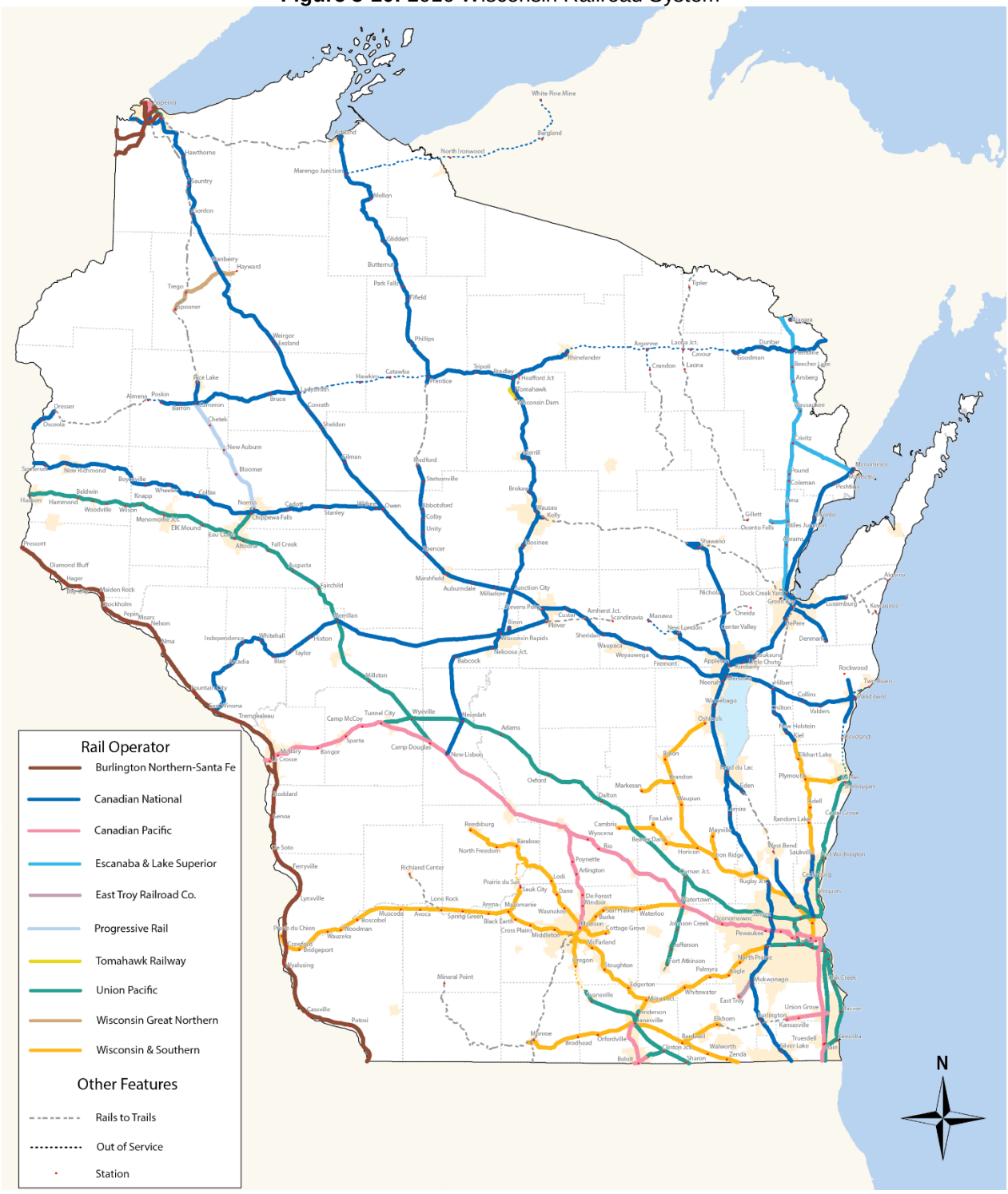
Railroad	Industry Acronym	Parent Company / Owning Agency	Miles of Track in Wisconsin[40]	Miles Operated in Wisconsin[41]	Percent of Total
Class I Railroads					
Burlington Northern Santa Fe Railroad Company	BNSF	Berkshire Hathaway	267	273	8%
Canadian Pacific[42]	CP	N/A	315[43]	621	9%
Union Pacific Railroad Company	UP	N/A	596[44]	927	18%
Canadian National[45]	CN	N/A	1,419	1,426	43%
Regional & Local Railroads (Class II & III)					
Escanaba & Lake Superior Railroad Company	ELS	N/A	114	114	3%
Municipality of East Troy Wisconsin	METW	N/A	7	7	< 1%
Progressive Rail, Inc.	PGR	N/A	38	38	< 1%
Tomahawk Railway Limited Partnership	TR	Genesee & Wyoming	4	6	< 1%
Wisconsin & Southern Railroad Company	WSOR	State RTCs; WATCO	604	686	18%
Wisconsin Great Northern Railroad, Inc.	WGN	N/A	19	19	< 1%
Total Miles Owned/Operated			**3,383**	**4,117**	**100%**

Source: Class I Data: Surface Transportation Board, 2014 R-1 Report; Shortline Data: Wisconsin Department of Transportation, Bureau of Transit, Local Roads, Railroads and Harbors. Additional out of service rail corridors exist that have been converted to a multi-use trail through the Rails-to-Trails Program. As of January 2016, Wisconsin has over 700 miles of lines in Rails-to-Trails. Operated mileage includes trackage rights, leases, and other operating arrangements.

[40] Surface Transportation Board, 2014 R-1 Reports.
[41] Ibid. Operated mileage includes trackage rights, leases, and other operating arrangements.
[42] Soo Line Railroad is the legal operating name in Wisconsin.
[43] Surface Transportation Board, Soo Line Railroad Company 2014 R-1 Report.
[44] Ownership data for 2013 includes 37-mile Chippewa Falls – Cameron line leased by Progressive Rail Inc., and 70-mile Reedsburg – Cottage Grove segment (including spurs around Madison) that had been leased to Wisconsin and Southern Railroad (WSOR). The latter lines were sold in December 2014 to WisDOT and the Wisconsin River Rail Transit Commission. WSOR will continue to operate these lines.
[45] Wisconsin Central Ltd., Sault Ste. Marie Bridge Company, Duluth, Missabe and Iron Range Railway Company are the legal operating entities in Wisconsin.

Figure 5-10 shows the Wisconsin rail system by operator.

Figure 5-10: 2016 Wisconsin Railroad System



Source: Wisconsin Department of Transportation, Bureau of Planning and Economic Development

Rail Terminals or Yards

Terminals and yards originate, terminate, and exchange traffic by building outbound trains and breaking down inbound trains, or by transferring control over unit trains. These yards include general carload classification yards, intermodal yards handling trailers and containers on flatcars, and small switching yards. Yards may also have refueling, crew change, storage, and maintenance functions. Given this key role in the rail network, a significant amount of rail capacity is impacted by the size and efficiency of the terminals and yards. The capacity of a yard is often described in terms of daily cars, containers, or trailers handled.

Major yards in Wisconsin are located in the Milwaukee metro area, Madison, Janesville, Neenah, Green Bay, North Fond du Lac, Stevens Point, La Crosse, Chippewa Falls, Altoona, and Superior. Smaller yards are located throughout the state (Figure 5-11).

Figure 5-11: 2017 Major and Minor Yards in Wisconsin



Source: Wisconsin Department of Transportation, Bureau of Planning and Economic Development

Railway-Roadway Crossings

Railway-roadway crossing safety has historically been, and remains, a concern. As shown in Table 5-10, there are over 7,100 rail crossings in Wisconsin. Rail crossings can be either at-grade or grade-separated. At-grade crossings are the most common type of crossing in Wisconsin, accounting for nearly 90 percent of all crossings in the state. At-grade crossings occur wherever a railway and highway physically intersect. Grade-separated crossings occur when the railway and roadway are physically separated by an overpass or underpass.

Table 5-10: Railroad Crossings by Type

Crossing Type	Public	Private	Pedestrian	Total
At-grade	4,001	2,267	85	6,353
Separated	678	52	31	761
Total	**4,679**	**2,319**	**116**	**7,114**

Source: Wisconsin Department of Transportation, Railroad Crossing Information System

Rail Bridges

There are approximately 400 bridges on the state-supported railroad system. Bridge structures on the rail system are evaluated by weight per rail car at a set speed metric (Figure 5-12). Bridge conditions fall into three distinct capacities:

- 286,000 pounds per car at 25 miles per hour
- 286,000 pounds per car at 10 miles per hour
- Less than 286,000 pounds per car

As shown in Table 5-11, of WSOR's 361 bridges, 70 percent are capable of bearing rail cars each carrying 286,000 pounds up to 25 miles per hour (MPH). Over a quarter (27 percent) of WSOR's bridges are in the second weight-speed category (structures capable of carrying 286,000 pounds up to 10 MPH), and less than 1 percent are in the third weight-speed category (structures not capable of carrying 286,000 pounds). There are five remaining WSOR bridges that are not categorized.

Escanaba and Lake Superior (E&LS) is a privately-owned railroad that operates 347 miles of track in Northeastern Wisconsin and the Upper Peninsula of Michigan.[46] E&LS's tracks include 40 rail bridges in Wisconsin. In 2015, 73 percent of E&LS's bridges operated at 286,000 pounds at 25 miles per hour, while 28 percent were limited to 263,000 pounds at 10 miles per hour.[47]

The state also owns one bridge on the Wisconsin Great Northern Railroad (WGNR) line that is adequate for the 286,000 pounds at 10 miles per hour.

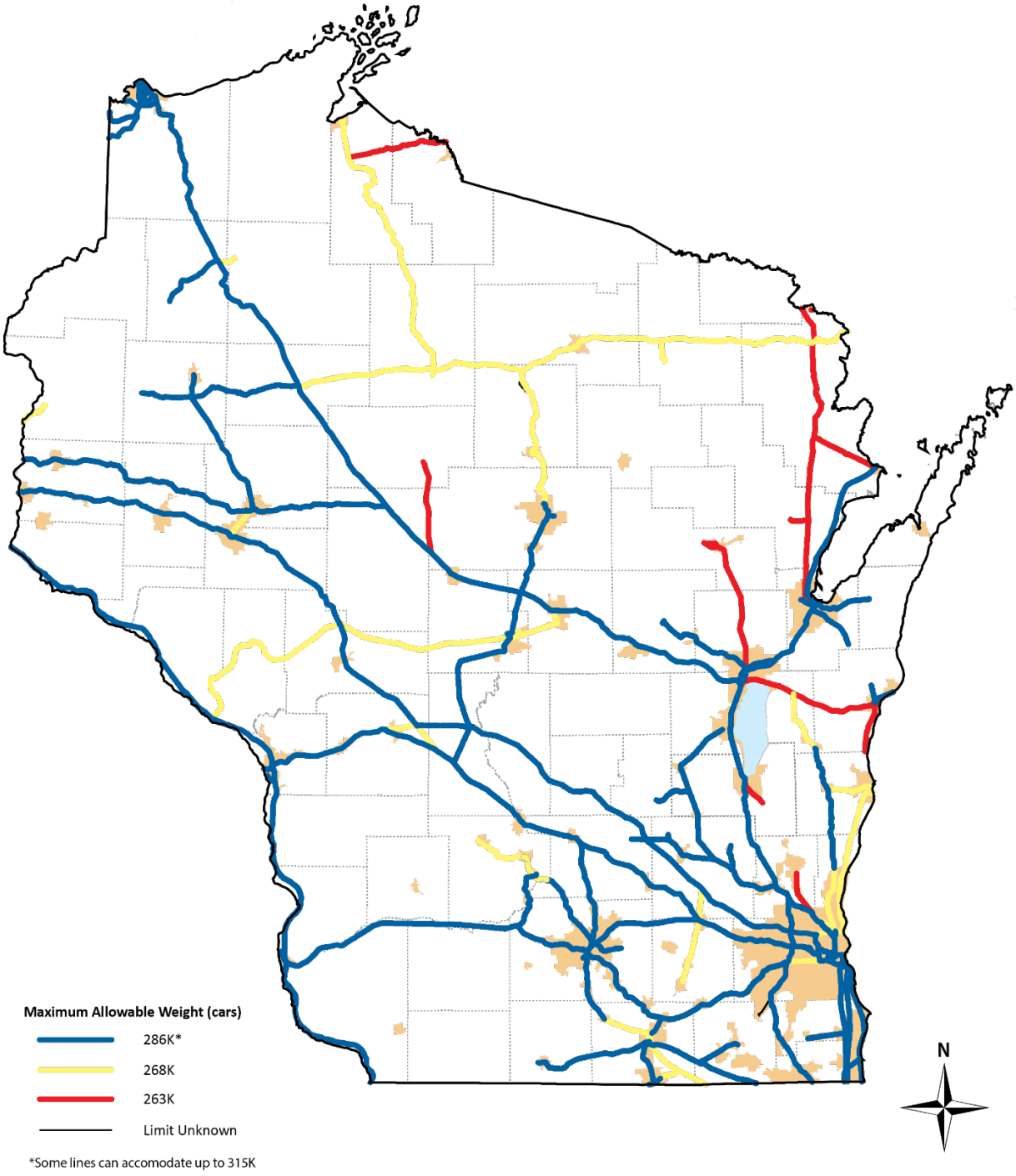
Table 5-11: 2015 Wisconsin State-Supported Bridge Capacity

	Total System Structures	Total System Structures in Lineal Feet	Structures 286,000 lbs. Capable at 25 mph	Structures 286,000 lbs. Capable at 10 mph	Structures Not 286,000 lbs. Capable
WSOR	361	31,004	254 (70%)	99 (27%)	3 (1%)
E&LS	40	N/A	29 (73%)	11 (28%)	0 (0%)
WGNR	1	N/A	0 (0%)	1 (100%)	0 (0%)

Source: Wisconsin Department of Transportation, MAPSS; note: totals do not equal 100% due to rounding

[46] Glischinski, Steve. Regional Railroads of the Midwest.
[47] Wisconsin Department of Transportation, MAPSS.

Figure 5-12: 2016 Maximum Allowable Weight per Rail Car



Source: Wisconsin Department of Transportation, Bureau of Planning and Economic Development

5.4 Wisconsin's Intermodal and Transload Facilities

Wisconsin's Intermodal & Transload Facilities
• Two intermodal facilities (Arcadia and Chippewa Falls) • More than 100 transload facilities

In its broadest sense, intermodal freight is any freight load that is transferred at least once between transportation modes during shipping. This could cover bulk (unpackaged commodities such as iron ore, gravel, corn, etc.) or containerized loads (commodities shipped in a container) transported by truck, rail, air, vessel, and/or pipeline from origin to final destination. The freight sector has adopted a narrower definition as the transport of shipping containers and truck trailers by rail.[48] The advantage of intermodal freight is that the same standardized container can be sealed in one location, moved by truck and/or rail to a port, loaded onto a vessel, shipped to another continent, then placed on a train and hauled hundreds or thousands of miles before being transferred to a truck chassis for delivery to its final destination. In this way, the economies of scale (large container ships and long dedicated trains of containerized cargo) can be maximized, while still providing last-mile delivery to a customer.

The standard measurement for intermodal freight is expressed in 20-foot equivalent units, or TEUs. Typical containers used for international shipping are 40 feet in length, or two TEUs per container.[49] These containers are part of a global freight system that utilizes large vessels, dock facilities, and inland terminals. Many vessels in operation have capacities that exceed 12,000 TEUs. By comparison, domestic intermodal service usually uses 53-foot length containers (the standard maximum length that does not require special permits). Because of its versatility, containerized shipping has almost completely replaced "piggyback" (semi-trailers on flat cars) shipping.

The critical locations for intermodal freight are the large-scale transfer facilities, which are dockside (vessel-rail or sometimes vessel-truck) or inland, usually near major urban areas and/or highway corridors (rail-truck). Intermodal facilities have gained a reputation as a reliable and economical transportation option that connects multiple transportation modes. Containerized cargo and large commodity shipments utilize rail for the longest ground portion of a movement. The freight carried by rail is then transferred to a truck at an intermodal facility, which is then delivered to a place of distribution (warehouse) or a place of final consumption.

Determining what freight can be shipped as intermodal depends on many factors, including the type of commodity, a commodity's final destination, and the length of haul. The convenience of trucking may be overshadowed by cost as the length of haul increases. Historically, the distance at which intermodal becomes financially viable has been about 700 miles. Intermodal shippers typically use a combination of modes to take advantage of each mode's strengths in order to maximize speed and service and to minimize cost.

By comparison, transload freight may follow part or all of the same route between origin and destination points, but it is not containerized. Transload freight may include:

- Rail carloads being unloaded at a warehouse to be distributed via truck to customers
- Bulk ores or grains transferred from rail car to vessel
- Petroleum products shipped via pipeline to terminals where specialized trailers are loaded and trucked to gasoline stations or other customers

[48] Association of American Railroads, "What We Haul - Intermodal."
[49] Hofstra University, "The Geography of Transport Systems - Intermodal Transportation and Containerization."

Intermodal Facility Types

Intermodal moves can be classified as direct or intermediate. A direct intermodal move usually involves truck trailers or containers:

- Trailer on Flatcar (TOFC) – a standard truck trailer on a chassis loaded onto a flat rail car and hauled to an intermodal facility where it is unloaded and hauled by truck to its final destination.
- Container on Flatcar (COFC)– a standardized/international container loaded onto a flat car or stack car where it is moved by rail to an intermodal facility and unloaded, placed on a rubber-tired truck chassis, and hauled to its final destination.

Typically, the trailer or international container remains closed or sealed. Containers are more flexible in that they can be transferred between rail, truck, and water. COFC is common at water intermodal facilities and is more fuel-efficient than TOFC for the rail portion of the move. In rail corridors that accommodate higher clearances, double stack container movements provide increased efficiencies.

An intermediate transfer, also known as transloading, occurs when goods may be stored or handled (unloaded and reloaded) before exchange to a different mode, typically between rail and truck. Transloading provides flexibility for those shippers that do not have direct rail access. By using this combination of rail and truck, customers receive the cost advantages of shipping their products by rail together with the service advantages of truck delivery.

Wisconsin's Intermodal Facilities

In Wisconsin, private sector developers generally carry out the construction and operation of intermodal facilities. Sites are selected based on the level of economic activity in the area. Two intermodal facilities are in operation in Wisconsin. Canadian National serves a facility owned by Ashley Furniture in Arcadia, and CN operates its own facility in Chippewa Falls.

Arcadia

The Arcadia intermodal facility was opened in 1994 by Wisconsin Central Railroad. The facility is dedicated to shipments to and from Ashley Furniture's large assembly plant there. The inbound containerized loads appear to be almost exclusively from Asia; outbound loads appear destined for consumer markets, likely through a transloading facility.

Chippewa Falls

Canadian National opened an 8.5-acre facility in Chippewa Falls in 2012. Community leaders had first proposed this location in 2006 after CN closed its regular freight rail yard there. The community envisioned containerized freight volumes would increase as a result of the opening of the terminal in Prince Rupert. Despite the unlikely location for a terminal (this corridor branches off the CN main at Owen, WI), this stop became feasible when paired with an intermodal stop in Minneapolis. The facility is open six days per week. Cargo contents are primarily consumer products inbound (mostly destined for Menards stores); outbound loads include grain and manufactured goods.

CN, in collaboration with the adjacent River Country Co-op, established an onsite grain transfer facility for exports. As of early 2016, this arrangement accounted for 3,000 exported containers of grain products annually. By making the transfer 'across the fence' rather than using public roads, River Country is free to load the containers above highway weight limits; recent construction added the ability to weigh containers as they are being loaded. Loads are primarily dried distiller's grain (from ethanol plants) and soybeans. Other businesses have also used the empty containers to load grains and hardwoods for export to Asian markets, including Wheaton Grain (approximately

1,500 containers per year) and hardwood timber and lumber exporters.[50] The agreement between River Country and CN was made in 2013; at that time, River Country Co-op expected to ship 15 to 20 containers per day, with 29 tons per container.[51]

Freight Advisory Committee Input on Wisconsin Intermodal Facilities
There are many factors that drive development and retention of intermodal facilities. At the April 23, 2015 Wisconsin Freight Advisory Committee (FAC) meeting, FAC members identified several factors that influence the development and retention of intermodal facilities. These include: • The presence and demand of diverse driver industries to draw sufficient volumes for shipping • Access to global markets and long-term sustainability of market accessibility • Connection of transportation modes and the balance of exports and imports • The cost of intermodal service relative to single modes, such as rail or truck • The existing infrastructure that connects intermodal facilities with state and interstate highway systems • Population, zoning, and environmental considerations • Capacity, efficiency, and technology supply-chain considerations According to the FAC, due to the demand for containerized cargo, the addition of a third intermodal facility in Wisconsin could spur economic development or encourage businesses to "cluster" within a geographical area to establish the demand threshold needed to establish an intermodal facility.

Intermodal Challenges in Wisconsin

Wisconsin's location between two major freight hubs – Chicago and the Twin Cities – places it at a competitive disadvantage for attracting and retaining true intermodal freight facilities. Over the past two decades, at least four intermodal facilities in Wisconsin have been closed, forcing shippers to use truck containers to and from higher-volume facilities in Illinois and Minnesota. The remaining two facilities – Chippewa Falls and Arcadia – retain their operations due to their major customers (Menards and Ashley Furniture, respectively).

Wisconsin's geographic location may limit the number and size of truck-rail intermodal facilities in the state.

- Wisconsin is north of many of the mainline routes of the UP and BNSF. These two railroads connect the southwest and western U.S. and Mexico to the Class I railroads serving eastern Canada and northeastern and southeastern U.S.
- Neither CSX Transportation (CSXT) nor Norfolk Southern (NS) directly serves Wisconsin. These two railroads are the principal providers of freight rail service east of the Mississippi River. Wisconsin freight traffic carried by either railroad must be interchanged in Chicago.
- Large railways strongly favor dedicated trainload movement of international container traffic and seldom promote locations that are not capable of loading an entire train for movement to a single port.
- The southern part of Wisconsin is in close proximity to about 20 truck-rail intermodal facilities in northeastern and north central Illinois. Because Chicago is the major interchange location for all of North America's Class I railroads, the Class I railroads operate multiple intermodal facilities in Northeast Illinois.
- The northwestern part of Wisconsin is in close proximity to two truck-rail intermodal facilities located in the Minneapolis-St. Paul metropolitan area.

[50] Chippewa Herald, "Chippewa Falls rail terminal opens world markets to area businesses." (January 27, 2016).
[51] WQOW, "Long grain headed overseas thanks to new facility in Chippewa Falls." (September 27, 2013).

Because of these factors, Wisconsin shippers seeking access to long-haul intermodal service for export must move their commodities by truck across state lines to freight-rail intermodal facilities that have dedicated service to and from major U.S. ports. Many shipments with origins or destinations in Wisconsin are currently trucked to the intermodal facilities located in either northeast Illinois or the Twin Cities in Minnesota.

Wisconsin's Transload Facilities

Over the past decade, transload facility – sites where non-containerized goods are transferred between modes, typically truck-rail or rail-barge – usage has increased in Wisconsin. There are over 100 transload facilities interspersed throughout the state. Many of these facilities are large, privately operated warehouse structures, with docks for rail cars and semi-trailers. Some of these facilities are climate-controlled, offering refrigerated and/or freezer storage. Other facilities use covered or uncovered outdoor locations to hold bulk loads such as sand, stone, and salt. Still others feature specialized storage/transfer areas, such as cement and grain towers.

5.5 Wisconsin's Airports

Wisconsin businesses use air freight to ensure the availability and freshness of products with short shelf lives to aid in just-in-time manufacturing and expand market reach. In 2013, almost 105,000 tons of air freight cargo was shipped via planes, with a total value exceeding $10 billion.[52] Wisconsin has six airports offering regular air cargo service, shown in Figure 5-13:

- Appleton International, Appleton
- Austin Straubel International, Green Bay
- Dane County Regional, Madison
- General Mitchell International, Milwaukee
- Central Wisconsin, Mosinee
- Rhinelander-Oneida County, Rhinelander

Wisconsin's Air Freight/Cargo

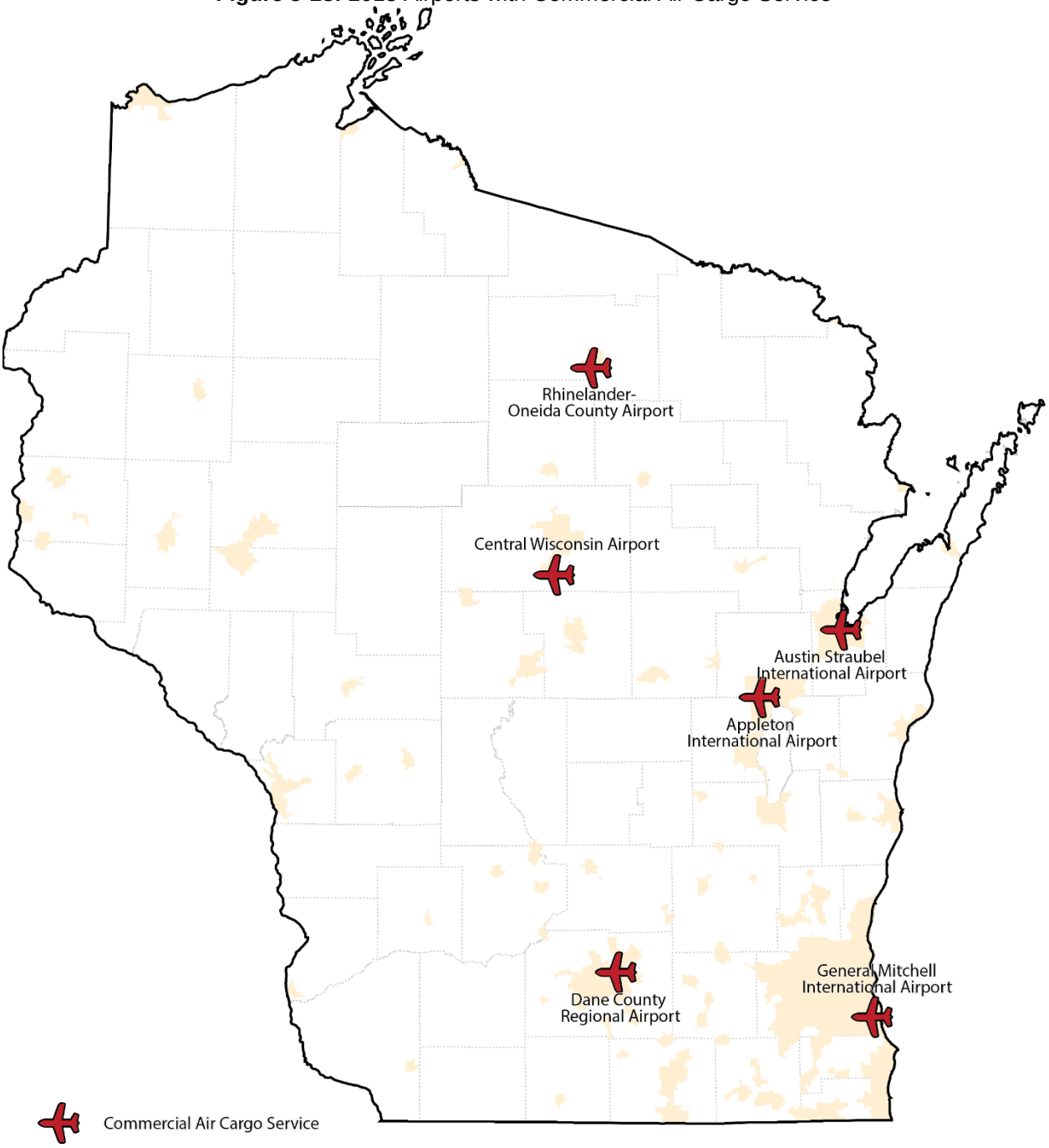
- Six airports provide regular air cargo services
- In 2013, almost 105,000 tons of cargo was shipped via planes with a total value of exceeding $10 billion

Cargo that moves by air tends to be items that are high-value, low weight/bulk, time-sensitive or highly specialized. The most common commodity types include small packaged freight, transportation equipment, electrical equipment, machinery, instruments, photo equipment, optical equipment, miscellaneous manufacturing products, and chemicals and allied products.[53]

General Mitchell International Airport (GMIA) in Milwaukee is Wisconsin's dominant air cargo airport, handling approximately 70 percent of the state's total air cargo in 2013.[54] GMIA also serves as a hub for air cargo shipments from other parts of the state. Nearly all of the remaining 30 percent of air cargo moved in the state is routed through Madison and Appleton.[55]

[52] 2013 IHS Transearch Database.
[53] 2013 IHS Transearch Database, 2 digit STCC Codes used.
[54] Wisconsin Department of Transportation, Bureau of Aeronautics.
[55] Ibid.

Figure 5-13: 2013 Airports with Commercial Air Cargo Service



Source: Wisconsin Department of Transportation, Bureau of Planning and Economic Development

Express carriers also use feeder services originating at seven other public airports in Wisconsin. Rather than maintain and operate a fleet of small aircraft, the integrated express carriers contract for on-demand service with a variety of aircraft operators. Contracted feeder services are provided from the following airports:

- Baraboo-Wisconsin Dells, Baraboo
- Rice Lake Regional-Carl's Field, Cameron
- Chippewa Valley Regional, Eau Claire
- Rock County, Janesville
- La Crosse Municipal, La Crosse
- Menomonie Municipal-Score Field, Menomonie
- Iowa County, Mineral Point

5.6 Wisconsin's Ports, Waterways, and Ferries

In 2013, more than 28 million tons, or approximately five percent of Wisconsin's freight by weight, worth over $2 billion (less than one percent of the total state freight value) was transported by and through ports and waterway facilities.[56]

The primary commodities at Wisconsin ports by weight included coal, metallic ores, nonmetallic minerals, and clay, concrete, glass, and stone. Other important products include petroleum and coal products, heavy machinery, bagged and canned cargo, wind energy components, and other goods.[57]

Water transportation is the most efficient method for moving bulk commodities. A Great Lakes freighter can move a ton of freight approximately 607 miles on one gallon of fuel. In contrast, a freight train travels only 202 miles on one gallon of fuel per ton of cargo and a truck travels a mere 59 miles on one gallon of fuel per ton of cargo.[58]

Wisconsin is directly connected to two major waterway systems: the Great Lakes Navigation System and the Upper Mississippi River System.

Wisconsin's Ports, Waterways and Ferries

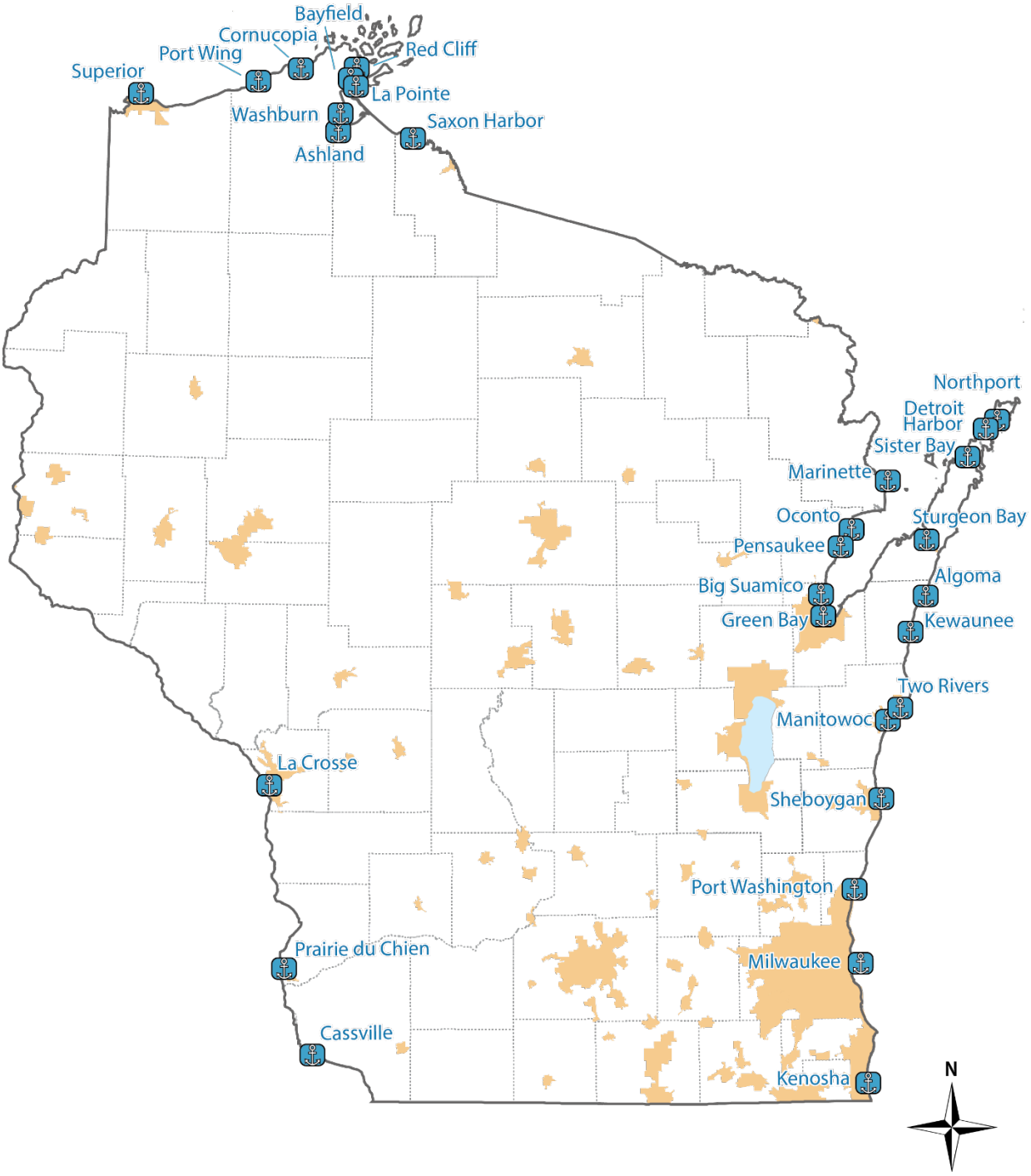
- Gateway ports include: Milwaukee, Green Bay, Marinette, Duluth-Superior, La Crosse, and Prairie du Chien
- Diversified Cargo Ports: Marinette – Menominee and Manitowoc
- Limited Cargo Ports: Ashland, Bayfield, Washburn, Port Washington, Sturgeon Bay, and Washington Island
- More than 28 million tons of cargo, worth over $2 billion was shipped to and from Wisconsin's ports in 2013
- International connections through the St. Lawrence Seaway via the Great Lakes
- The Mississippi River provides access to the Gulf of Mexico
- Many ports provide intermodal connections to rail

Wisconsin Ports

Using WisDOT's eligibility criteria from the Harbor Assistance Program,[59] there are 29 commercial ports in Wisconsin (Figure 5-14).

[56] 2013 IHS Transearch Database.
[57] 2013 IHS Transearch Database; individual Wisconsin ports' officials.
[58] U.S. Army Corps of Engineers, "Great Lakes Navigation System: Economic Strength." (2009).
[59] Wisconsin Department of Transportation, Bureau of Transit, Local Roads, Railroads and Harbors.

Figure 5-14: 2015 Commercial Ports in Wisconsin



Source: Wisconsin Department of Transportation, Bureau of Planning and Economic Development

As shown in Table 5-12, Wisconsin's ports vary substantially in size of operation, volumes and the types of cargo handled. The twin ports of Duluth-Superior dominate the Great Lakes for the volume of cargo, due to the large quantities of western coal, northern Minnesota iron ore, and Upper Great Plains grain they handle. These bulk commodities are shipped through the twin ports to other destinations along the Great Lakes and overseas. Between 2010 and 2014, the twin ports combined averaged almost 38 million tons of transported cargo per year; 86 percent of which was outbound.[60] Milwaukee and Green Bay comprise the next tier of ports based on tonnage amounts. These facilities also move bulk goods, but between 2010 and 2014, 95 percent of each port's freight was inbound.[61]

Table 5-12: Cargo at Wisconsin's Major Commercial Ports

Port	Volume in Short Tons* (Year Reported)	Cargo Types[62]
Duluth-Superior	37,552,802[63] - (2014)**	Asphalt, calcium chloride, cement, coal, concrete, dry bulk, general cargo/break bulk, fertilizer, finished steel, forest products, grain, iron ore, limestone, liquid bulk, salt, scrap iron and metals, slag, steel coil, stone and aggregate, wind turbine components, wood products, and other heavy equipment for energy-related projects
Green Bay	2,543,414[64] - (2014)	Cement, coal, gypsum, limestone, liquid asphalt, miscellaneous bulk, petroleum coke, petroleum products, salt, sand, and pig iron
La Crosse	757,500[65] - (2014)	Caustic soda, cement, coal, highway construction materials, cottonseed, dried distillers grain, fertilizer, finished goods, other grains, gypsum, pig iron, potash, and salt
Manitowoc	296,424[66] - (2014)	Cement, coal, flexible pipe for oil and gas mining, newly constructed yachts, passenger and commercial vehicles, rock, stone, wind turbine towers and parts, and wood
Marinette	203,606[67] - (2013)***	Limestone, pig iron, road salt, and high-tech vessels
Milwaukee	3,331,909[68] - (2014)	Asphalt, cement, coal, fertilizer, general cargo, grain, out-of-gauge machinery, limestone, vehicles, salt, scrap metal, steel, and wind energy components
Prairie du Chien	380,170[69] - (2013)	Corn, soybeans, dried distillers grain, scrap metal, and wheat
Sturgeon Bay	35,017[70] - (2013)	Cement, coal, concrete, iron and steel products, vessels under construction or repair, and waterway improvement materials

Source: Wisconsin Department of Transportation, Bureau of Planning and Economic Development

** Tonnage is in short tons. A short ton is equal to 2,000 pounds (907.18474 kilograms) and is often called a "ton" without distinguishing it from the metric ton (1,000 kilograms).*

*** Includes Duluth, MN tonnage*

**** Includes Menominee, MI tonnage*

[60] Duluth Seaway Port Authority.
[61] Wisconsin Department of Transportation, Bureau of Planning and Economic Development.
[62] 2013-2014 data from individual port officials.
[63] Port of Duluth Superior, 2015.
[64] Port of Green Bay, 2015.
[65] Brennan Marine, Inc., 2015.
[66] City of Manitowoc, Engineering Department, 2015.
[67] U.S. Army Corps of Engineers.
[68] Port of Milwaukee, 2015.
[69] Prairie Sand and Gravel, Inc., 2014.
[70] U.S. Army Corps of Engineers.

Wisconsin Commercial Ports Development Initiative
In 2013, the Wisconsin Commercial Ports Association began development of a statewide strategic plan to support increased freight movement and logistics development for Wisconsin's commercial ports. WisDOT and other state agencies have supported this planning effort with staff time, data, and financial contributions. Phase I of the initiative developed a strategic plan, infrastructure and market inventory, and planning review. Phase II identified and developed port market scenarios. Together, the two phases outline the assets and importance of Wisconsin's ports and waterways, define strategies to increase the movement of freight through Wisconsin's ports to drive economic development and identify market scenarios where shipping costs could be reduced. WisDOT has identified a need for a maritime strategy, outlined in Chapter 8, *Freight Policies and Strategies*. Additional information on port assets and strategies can be found in Phase 1[71] and Phase 2[72] reports.

Wisconsin's port facilities serve as multimodal distribution centers linking waterborne vessels (ships and barges) with an extensive network of highways, railroads, and airports. As centers of economic activity, Wisconsin's ports and harbors include the operations of local and municipal government agencies; federal agencies such as the Coast Guard and United States Army Corps of Engineers (USACE); and private companies that contract with these agencies.

Businesses that are attracted to a region because of the presence of a port are not always located at the port itself. These companies typically fall into two groups: exporters of commodities and importers of raw materials for assembly or distribution. The presence of a port can also benefit other industries by providing export options that extend their market reach.

Wisconsin's Waterway Connections

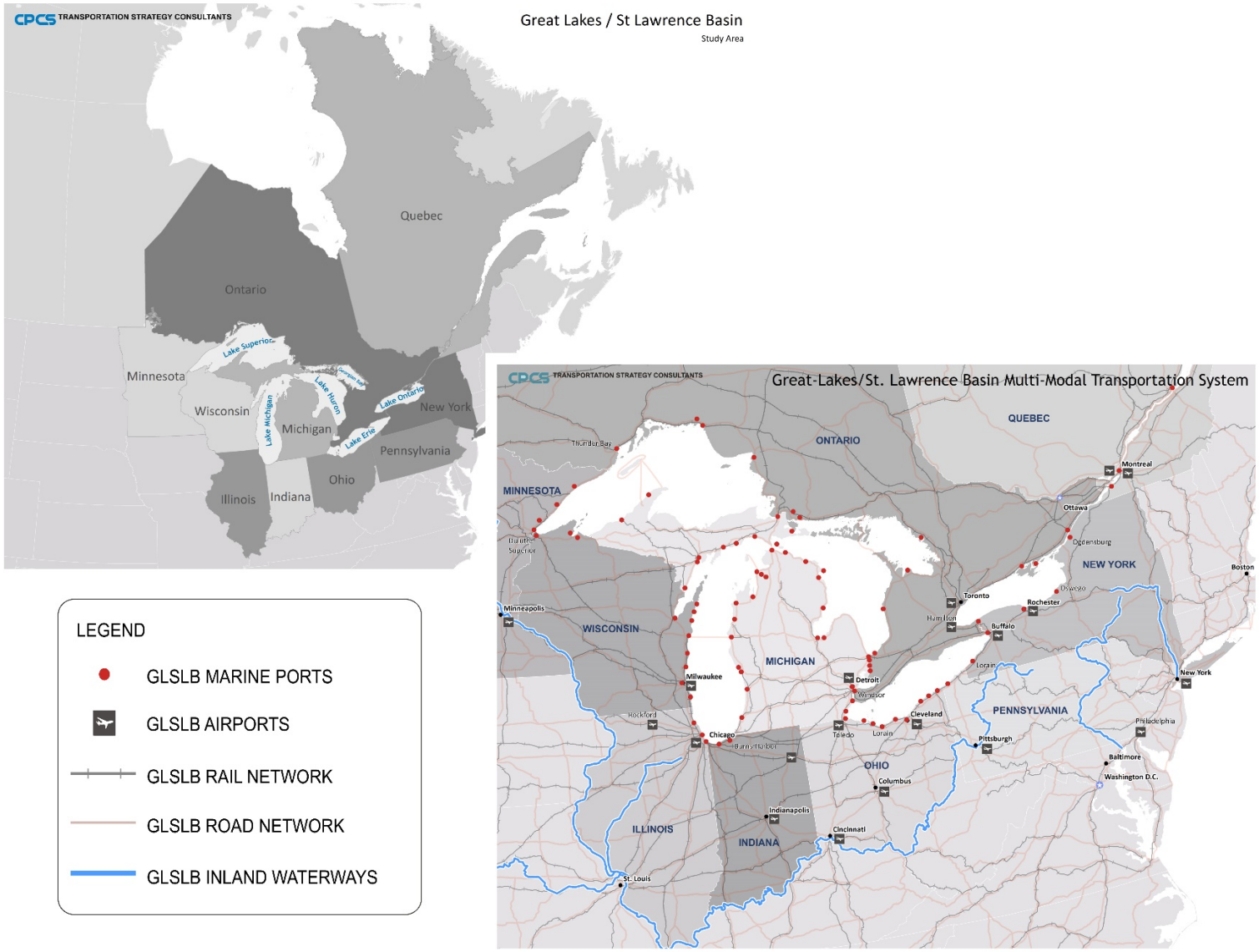
The following waterways provide Wisconsin businesses access to regional, national, and international destinations.

Great Lakes Navigation System

The Great Lakes Navigation System (GLNS) is a continuous 27-foot deep draft waterway that extends from the western end of Lake Superior at Duluth, Minnesota, to the Gulf of St. Lawrence on the Atlantic Ocean, a distance of over 2,400 miles.[73] As shown in Figure 5-15, this bi-national resource is comprised of the five Great Lakes, the connecting channels of the Great Lakes, the St. Lawrence River, and the Gulf of St. Lawrence. The United States portion of the system includes 140 harbors (60 commercial; 80 recreational), two operational locks, 104 miles of breakwaters and jetties, and over 600 miles of maintained navigation channels.[74] In addition, the GLNS is connected to several other shallow-draft waterways (Illinois Waterway, New York State Barge Canal, etc.) to form an important waterborne transportation network, reaching deep into the continent.

[71] National Center for Freight & Infrastructure Research & Education, "Wisconsin Commercial Ports Development Initiative." (December 2014).
[72] National Center for Freight & Infrastructure Research & Education, "Leveraging our Comparative Advantage, Phase II: Identification and Development of Wisconsin Port Market Scenarios." (October 2016).
[73] U.S. Army Corps of Engineers, "Great Lakes Navigation System."
[74] Ibid.

Figure 5-15: Great Lakes and St. Lawrence Basin (GLSLB) Transportation System



Source: CPCS Analysis developed for NCFRP Report 17: Multimodal Freight Transportation Within the Great Lakes–Saint Lawrence Basin

Upper Mississippi River System

The Upper Mississippi River System is a 1,300-mile waterway extending from Minnesota to Illinois, linking Wisconsin, Minnesota, Iowa, Illinois, and Missouri to the lower Mississippi River and to the import/export facilities of the Gulf Coast. From 2009 to 2013, an annual average of 107 million tons of cargo was transported between Minneapolis and the mouth of the Ohio River (near the southern tip of Illinois).[75]

Age of Upper Mississippi River Infrastructure

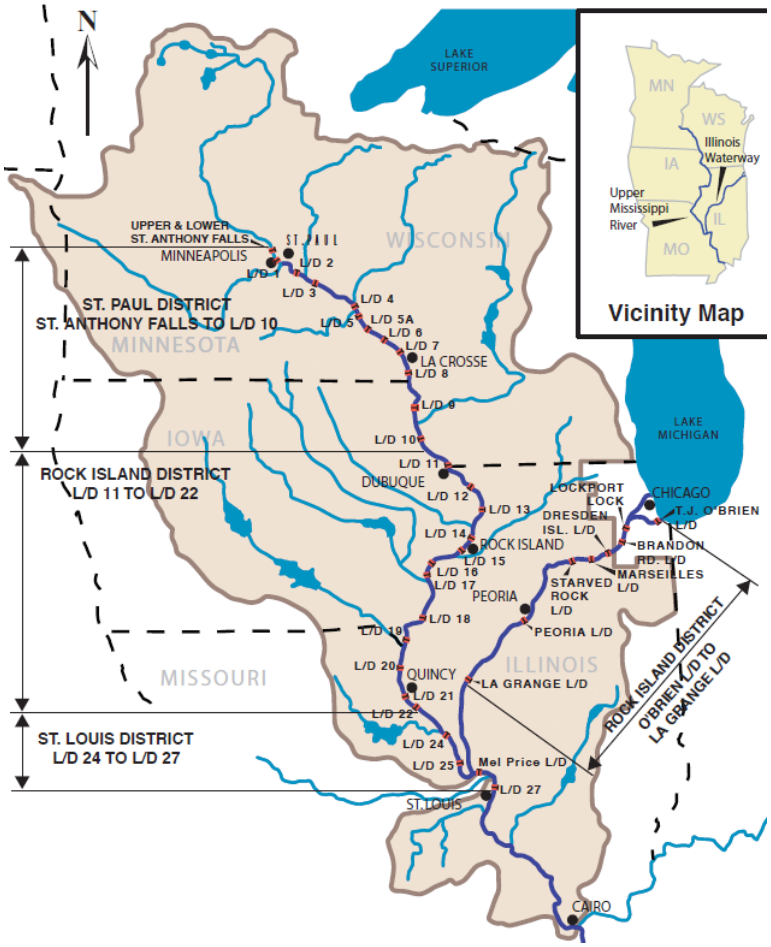
The current nine-foot channel lock and dam system was built in the 1930s with an estimated lifespan of 50 years. The structures have long outlived their life expectancy but continue to operate.

USACE maintains a nine-foot navigation channel on the Upper Mississippi River and builds breakwaters or jetties to protect public property from shoreline erosion. Channels with navigation depths of less than nine feet require barges to carry less cargo or "light load," which increases the cost per ton-mile and reduces commercial river freight's cost-effective advantage. Sedimentation in the channel is caused by the normal cycle of silt movement, erosion from high water or heavy rains and changes in river currents. To maintain the nine-foot navigation channel, material that settles in the channel area must be removed via mechanical or hydraulic dredging methods. Unfortunately, many of these navigational channels cannot be dredged as often as recommended by USACE due to a lack of funding or environmental constraints, which contributes to travel delays, decreased reliability, and increased cost.

Twenty-nine locks and dams and a nine-foot navigation channel accommodate the safe and efficient movement of barge and recreational boat traffic along the approximately 670 miles of the Upper Mississippi River between Minneapolis-St. Paul in Minnesota and St. Louis in Missouri (Figure 5-16).[76] Locks and dams allow river vessels to "step" up or down the river from one water level to another. Additional benefits from the locks and dams include adding river recreational areas for public use, providing a water supply for several river communities, and serving as nesting grounds for migratory birds.

[75] U.S. Army Corps of Engineers, "Waterborne Commerce of the United States, Calendar Year 2013, Part 2–Waterways and Harbors, Gulf Coast, Mississippi River System and Antilles."
[76] Upper Mississippi River Basin Association, "River and Basin Facts."

Figure 5-16: Upper Mississippi River Locks and Dams



Source: U.S. Army Corps of Engineers

Location of Mississippi River Locks and Dams

Wisconsin-Minnesota Border

- Lock and Dam No. 3 – Red Wing, MN
- Lock and Dam No. 4 – Alma, WI
- Lock and Dam No. 5 – Winona County, MN
- Lock and Dam No. 5A – Fountain City, WI
- Lock and Dam No. 6 – Trempealeau, WI
- Lock and Dam No. 7 – La Crescent, MN
- Lock and Dam No. 8 – Genoa, WI

Wisconsin-Iowa Border

- Lock and Dam No. 9 – Lynxville, WI
- Lock and Dam No. 10 – Guttenberg, IA
- Lock and Dam No. 11 – Dubuque, IA

5.7 Wisconsin's Pipelines

Wisconsin is not a producer of natural gas or crude oil, but it relies on natural gas and refined petroleum products to fuel economic activity. Wisconsin's privately-owned pipeline system is used primarily for the transmission and distribution of natural gas, petroleum products, and to move crude oil through the state. Wisconsin's over 74,800 miles of pipelines transported more than 29 million tons of natural gas and petroleum products, valued at almost $16 billion in 2012.[78] Table 5-13 displays the distribution of mileage in Wisconsin based on the type of commodity transported.

Wisconsin's Pipelines
• Over 74,800 miles of pipelines • Carry more than 29 million tons of natural gas and petroleum products, valued at almost $16 billion in 2012[77]

Table 5-13: Total Wisconsin Pipeline Miles by Type

Commodity/Pipeline Type	Miles	Percent of the Total
Natural Gas	**72,377**	**97%**
Natural Gas Mainline Distribution Pipelines	38,419	51%
Natural Gas Transmission Pipelines	4,482	6%
National Gas Service Distribution Pipelines	29,476	39%
Petroleum Liquids	**2,455**	**3%**
Crude Oil Pipelines	1,181	2%
Petroleum Product (non-HVL) Pipelines	1,036	1%
Highly Volatile Liquids (HVL)* Pipelines	238	0%
Total	**74,832**	**100%**

**HVLs include ethane, ethylene, propane, propylene, butylene, and anhydrous ammonia*

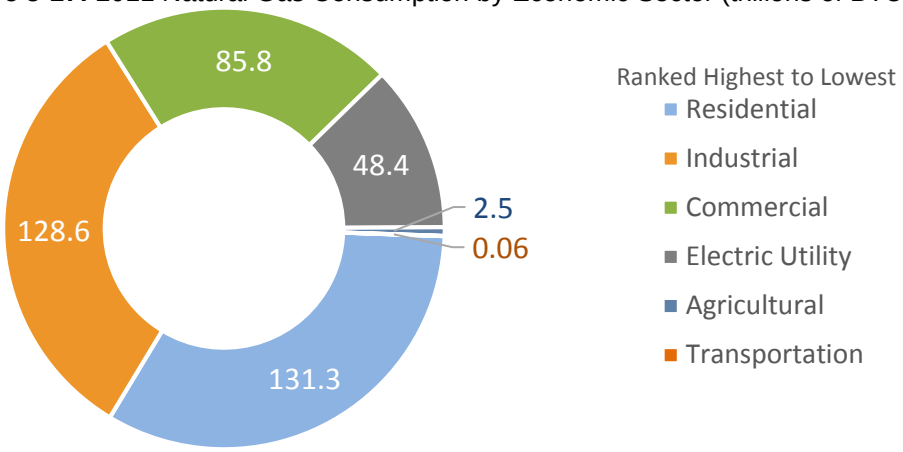
Source: CPCS, "Wisconsin State Freight Plan - Wisconsin Pipelines: Draft Final Report." (February 2016).

Pipeline commodities are a key economic input into Wisconsin's economy. Pipelines are the preferred method to transport large volumes of liquids and gases over longer distances, due in part to lower costs relative to rail or trucking. Commodities transported via Wisconsin pipelines (e.g., crude oil, natural gas, propane, gasoline, fuel oil, and petroleum products) are key inputs for transportation, commercial and residential heating, energy production, manufacturing, refining, petroleum-derived products, and agricultural sectors.

Figure 5-17 displays the breakdown of natural gas and petroleum use in Wisconsin by sector. Wisconsin residents are heavily dependent on natural gas for heating, with 70 percent of all residents relying on it as their heat source.[79] While residential is a significant consumer of natural gas, industrial, commercial, and electric sectors are also heavy users, demonstrating the economic importance of pipelines to these sectors.

[77] CPCS, "Wisconsin State Freight Plan - Wisconsin Pipelines: Draft Final Report." (February 2016).
[78] Ibid.
[79] U.S. Energy Information Administration, "Household Energy Use in Wisconsin." (2009).

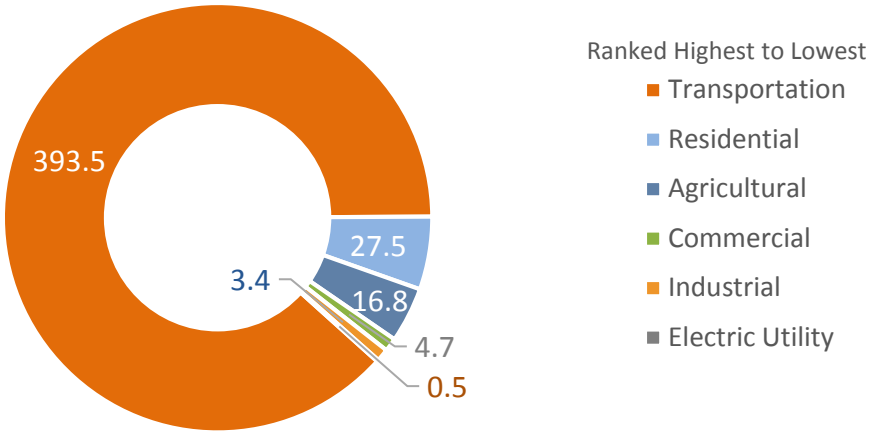
Figure 5-17: 2011 Natural Gas Consumption by Economic Sector (trillions of BTU)



Source: CPCS, "Wisconsin State Freight Plan - Wisconsin Pipelines: Draft Final Report." (February 2016).

Figure 5-18 displays petroleum consumption heavily concentrated in the transportation sector. Petroleum is not used in commercial and industrial applications to the same degree as natural gas.

Figure 5-18: 2011 Petroleum Consumption by Economic Sector (trillions of BTU)



Source: CPCS, "Wisconsin State Freight Plan - Wisconsin Pipelines: Draft Final Report." (February 2016).

United States Pipeline Transportation System

The nation's pipelines are also a critical component of the country's transportation system. Pipelines enable the safe movement of extraordinary quantities of energy products to industry and consumers, literally fueling the economy and way of life. The pipelines are the arteries of the nation's energy infrastructure, as well as one of the safest and least costly ways to transport energy products. United States oil and gas pipelines provide the resources needed for national defense, household heating and cooling, and power generation for business and fuel.

Almost three million miles of pipelines safely deliver trillions of cubic feet of natural gas and hundreds of billions of ton/miles of liquid petroleum products each year.[80] Pipelines are essential as the volume of energy products they move are well beyond the capacity of other forms of transportation. It would take a constant line of tanker trucks, about 750 per day, loading up and moving out every two minutes, 24 hours a day, seven days a week, to move the

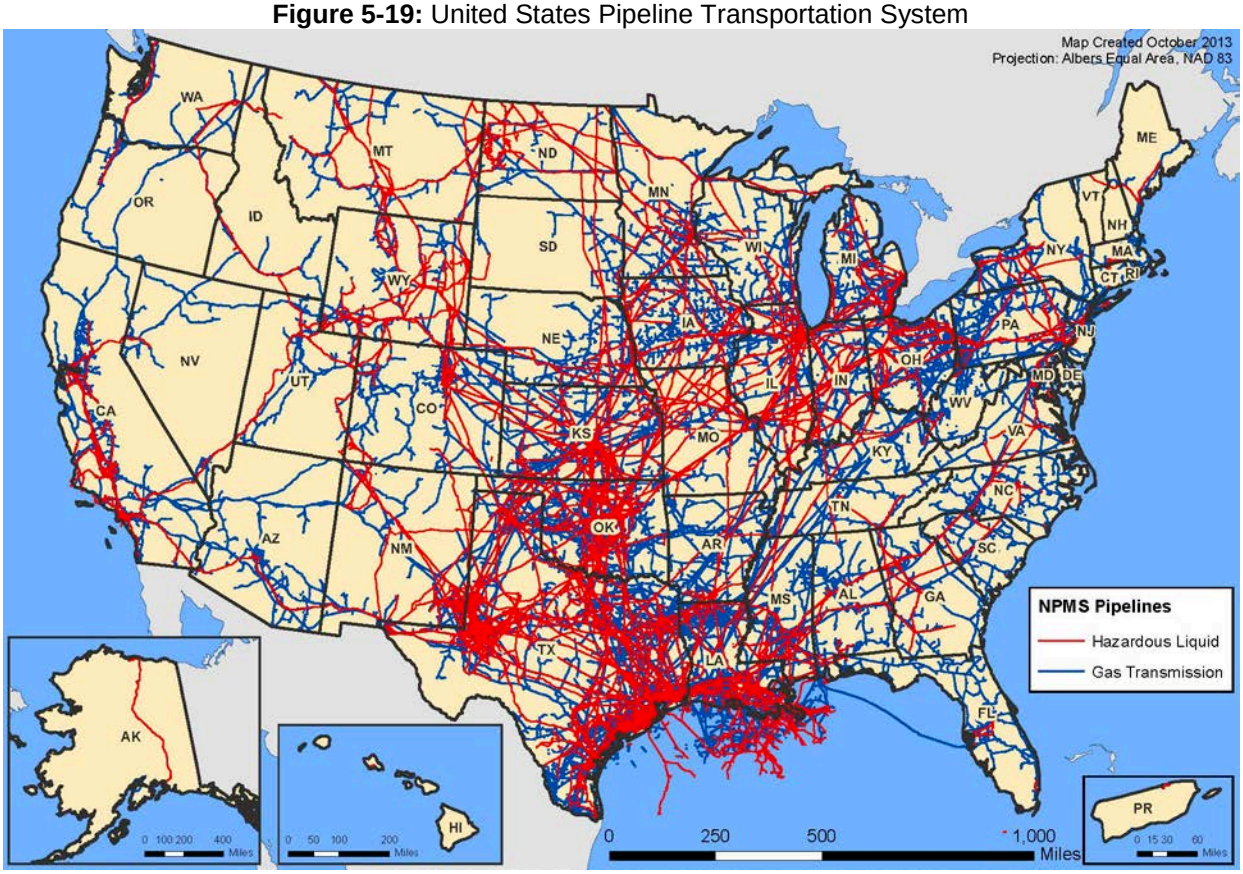
[80] CPCS, "Wisconsin State Freight Plan - Wisconsin Pipelines: Draft Final Report." (February 2016).

volume of even a modest pipeline. The railroad-equivalent of this single pipeline would be a train of 75 2,000-barrel tank rail cars every day.[81]

As identified in Chapter 2, *Transportation Stakeholders and Institutions*, the federal authority for pipeline safety is the Pipeline and Hazardous Materials Safety Administration (PHMSA) of the United States DOT. PHMSA's Office of Pipeline Safety is responsible for regulating the safety of design, construction, testing, operation, maintenance, and emergency response of United States oil and natural gas pipeline facilities.

Figure 5-19 identifies the over two million miles of pipelines in the United States carrying natural gas and hazardous liquids (chiefly petroleum and refined petroleum products, as well as chemicals and hydrogen).

Figure 5-19: United States Pipeline Transportation System



Source: U.S. Department Of Transportation

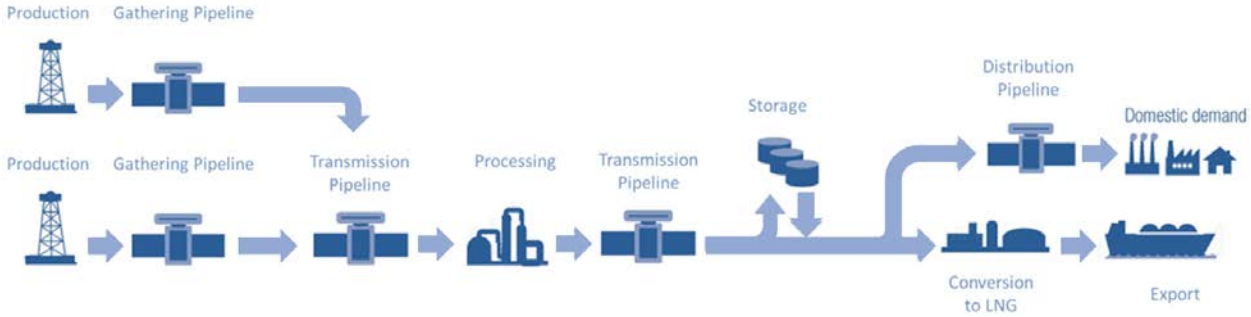
Natural Gas Pipelines

Natural gas is transported almost exclusively by pipeline. Natural gas utilizes a very extensive network of pipelines of diminishing size, pressure, and capacity as the gas approaches the final consumer. There are an estimated two and a half million miles of underground natural gas pipelines in the nation.[82] As a consumer rather than producer of natural gas, Wisconsin relies on transmission and distribution lines to receive natural gas. Figure 5-20 shows the

[81] Pipeline and Hazardous Materials Safety Administration, "General Pipeline FAQs."
[82] CPCS, "Wisconsin State Freight Plan - Wisconsin Pipelines: Draft Final Report." (February 2016).

role of transmission lines bringing natural gas to processing facilities and eventually to distribution lines that feed users of natural gas.

Figure 5-20: Role of Each Pipeline Type in the Natural Gas Supply Chain



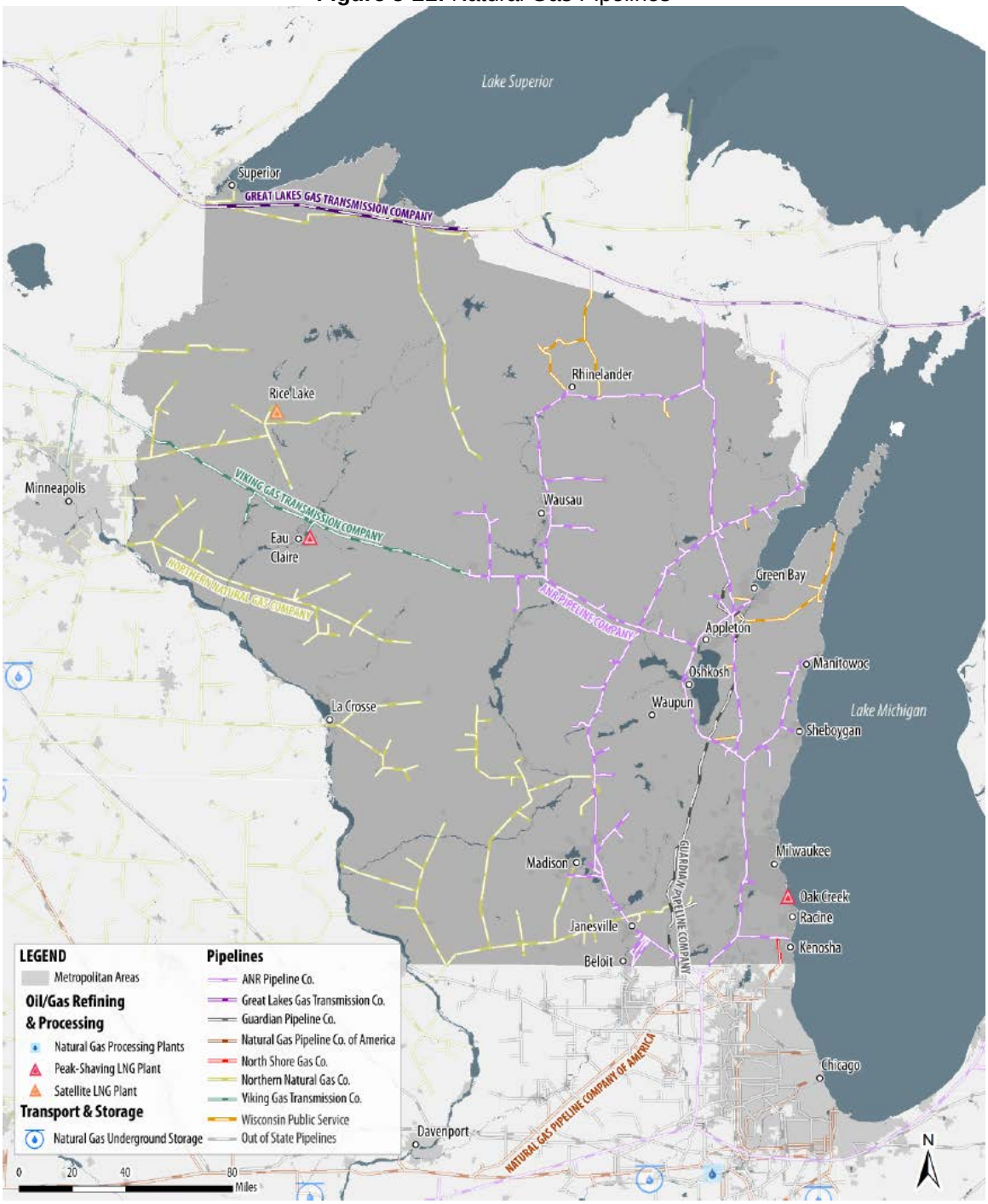
Source: CPCS

The United States has been at the center of increased production of natural gas over the past ten years following the increased use of hydraulic fracturing to extract oil and natural gas from shale formations. Even though Wisconsin does not produce oil or natural gas, the state is affected by domestic production trends. The total number of natural gas customers in Wisconsin has increased steadily over time. The proportion of residential relative to commercial and industrial users has stayed relatively stable over time, with residential consumption comprising about 91 percent of all customers. In terms of total consumption, residential users consumed an average of 34 percent of all natural gas from 1995-2012.[83] Consumption varies significantly year to year, based partially on the temperatures during winter. Additionally, Wisconsin has continued to increase both the capacity and the proportion of electricity generated from natural gas.

[83] CPCS, "Wisconsin State Freight Plan - Wisconsin Pipelines: Draft Final Report." (February 2016).

Figure 5-21 displays Wisconsin's natural gas transmission lines, which bring natural gas into the state for consumption.

Figure 5-21: Natural Gas Pipelines



Source: CPCS

Crude Oil Pipelines

Enbridge Energy is the sole operator of crude oil pipelines in Wisconsin. Figure 5-22 displays Enbridge's United States Mainline or Lakehead System, which is comprised of a series of pipelines that moves crude oil from Canada and North Dakota to Minnesota, Wisconsin, Illinois, Indiana, Michigan, and New York. The United States Mainline connects with various refineries along its route, including Wisconsin's sole refinery in Superior.

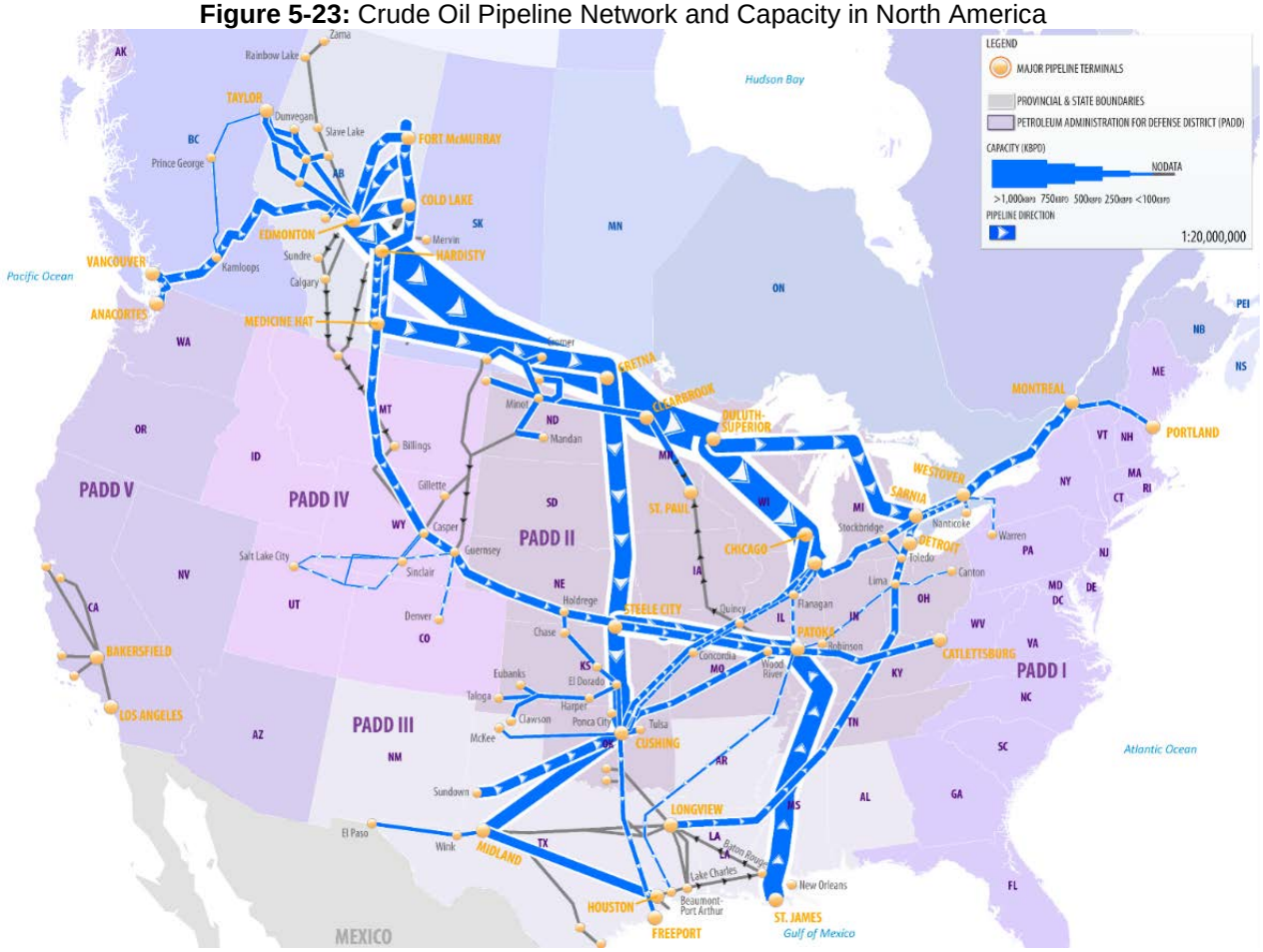
Figure 5-22: Wisconsin's Crude Oil Pipelines



Source: CPCS

Figure 5-23 and Figure 5-24 display Wisconsin within the national context for the production and flow of crude oil. Figure 5-23 displays Wisconsin's role as a pass-through state for crude oil; the majority of crude oil entering the state passes through without stopping. Enbridge Energy's Lakehead pipeline travels through Wisconsin, delivering crude oil to the Calumet Superior Refinery in Superior on its way to refineries in Illinois, Indiana, and Minnesota.

Figure 5-23: Crude Oil Pipeline Network and Capacity in North America



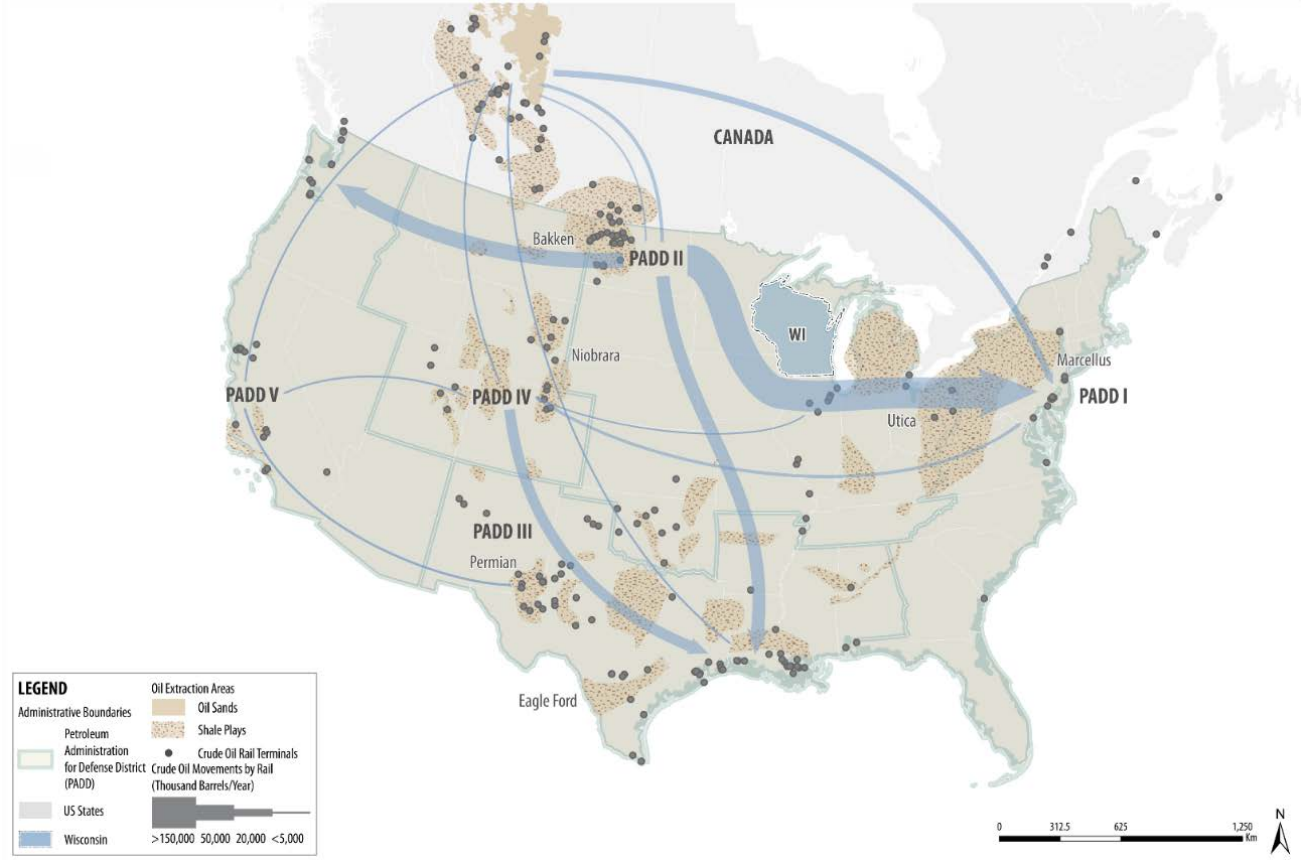
Source: CPCS

Additionally, Wisconsin's rail system is impacted by crude oil flows when the origin or destination of crude oil is not connected to a pipeline, showing how pipelines impact other modes of transportation. Figure 5-24 displays crude oil by rail volumes, including flows from Texas (Eagle Ford and Permian), Colorado (Niobrara), North Dakota (Bakken), and Canada (oil sands and northern extent of the Bakken). The largest flows are from PADD II to PADD I, i.e. flows that originate in the Bakken shale and are destined for East Coast refineries. According to United States Energy Information Administration (EIA) data, these flows averaged roughly 400,000 barrels per day in 2015, or approximately six unit trains per day.[84,85] These flows would impact Wisconsin, as they would be routed over the

[84] U.S. Energy Information Administration, "Movements of Crude Oil and Selected Products by Rail between PAD Districts."
[85] This conversion is based on approximately 60,000 barrels per train. Cairns notes that "CP has found that crude from the Bakken shale deposit is moved with 600 to 650 barrels per tank car." Assuming an average train length of 100 cars results in approximately 60,000 to 65,000 barrels per train. The estimate developed using this methodology corresponds well with information gathered by the Wall Street Journal in December 2014, which found that approximately 38 crude oil trains per

BNSF and CP lines through the state. Flows from Canada to PADD I and II, and intra-PADD-II flows could also flow through Wisconsin, though these flows are much smaller than the PADD II to I flows.

Figure 5-24: 2015 Crude Oil by Rail Movements in the United States



Source: CPCS

Petroleum Product Pipelines

Refined from crude, petroleum products are key to fueling the Wisconsin economy. Refined petroleum products utilize terminals throughout the state to store and distribute their products. Terminals have geographic coverage over much of the state, but tend to cluster around population centers and places where petroleum product pipelines converge (see Figure 5-25).

Wisconsin is served by a number of petroleum product pipelines. PHMSA identifies petroleum products as either highly volatile liquids (HVL)[86] or non-HVL petroleum products. Table 5-14 displays the operators, commodity type carried, and the total number of miles of Wisconsin's petroleum pipelines. Enbridge Energy and Koch Pipeline Company are the two largest operators of HVL and non-HVL petroleum product pipelines in Wisconsin.

week pass through Wisconsin on BNSF and CP lines. Cairns, M. 2013. Crude Oil by Rail: Part II: Potential for the Movement of Alberta Oil Sands Crude Oil and Related Products by Canadian Railways. Presentation to the Canadian Transportation Research Forum.

[86] HVLs are liquids that undertake a gaseous form when they are at atmospheric pressure and temperature; examples include ethane, ethylene, propane, propylene, butylene, and anhydrous ammonia.

Table 5-14: Wisconsin Petroleum Product Pipeline Operators by Commodity and Mileage

Operator	Commodity Type	Miles
Total Hazardous Liquid Pipelines	**HVL**	**238**
Koch Pipeline Company	HVL	154
Enbridge Energy	HVL	13
Enterprise Products Operating	HVL	71
Total Petroleum Products Pipelines	**Petroleum Products**	**1,036**
Koch Pipeline Company	Petroleum Products	363
Enbridge Pipelines (Southern Lights)	Petroleum Products	358
West Shore Pipeline Co	Petroleum Products	213
Magellan Pipeline Company	Petroleum Products	94
Calumet Superior	Petroleum Products	6
Shell Pipeline Co.	Petroleum Products	2
Total	**All Commodities**	**2,455**

Source: CPCS, "Wisconsin State Freight Plan - Wisconsin Pipelines: Draft Final Report." (February 2016).

Wisconsin is fortunate to be near a number of large refineries in Illinois, Indiana, and Minnesota with direct pipeline connections to Wisconsin. Table 5-15 displays Midwestern refineries, their location and their overall refining capacity.

Table 5-15: Midwest Refineries Supplying Wisconsin with Petroleum Products

Refinery Name	Location	Processing Capacity
BP	Whiting, IN	413,000
Flint Hills / Koch	Rosemount, MN	339,000
ExxonMobil	Joliet, IL	250,000
PDV / Citgo	Lemont, IL	180,000
Northern Tier	St Paul, MN	90,000
Calumet	Superior, WI	45,000

Source: CPCS, "Wisconsin State Freight Plan - Wisconsin Pipelines: Draft Final Report." (February 2016).

Each pipeline in Figure 5-25 provides a connection to products refined throughout the United States. Furthermore, each pipeline serves various parts of Wisconsin along its path. The following provides an overview of Wisconsin's petroleum product pipelines and the connections along their route.

West Shore Pipeline: West Short Pipeline is a stock company owned by Buckeye, Shell, Citgo, Sunoco Logistics, and ExxonMobil. West Shore receives refined products from Citgo, BP, and ExxonMobil, as well as from the Explorer Pipeline, which connects West Shore to refiners in Houston. Explorer is also a stock company owned by Marathon, Shell, Phillips66, and Sunoco Logistics. Following an initial closure in March 2016, in April 2017 the company informed Wisconsin officials that the West Shore Pipeline between Milwaukee and Green Bay would be permanently shut down and would not be replaced.[87]

Koch Pipeline: The Koch Pipeline is owned by Flint Hills Resources and accesses both the Pine Bend refinery and the Flint Hills terminals in Waupun, Milwaukee, and Madison. The pipeline transports propane from the Minnesota

[87] Milwaukee Journal Sentinel, "Company won't replace only fuel pipeline to Green Bay." (April 21, 2017).

border to the Junction City Terminal. Koch also has another pipeline in the same area that transports refined products from Minnesota to Junction City then onto Waupun, Milwaukee, and McFarland terminals.

Enbridge Pipeline (Southern Lights): The Enbridge Southern Lights pipeline, which came into service in 2010, extends from its origin in Chicago to Edmonton, Alberta. The Southern Lights pipeline has a capacity of 180,000 barrels per day and delivers diluent to Alberta for use in moving heavy Canadian crude oil.[88]

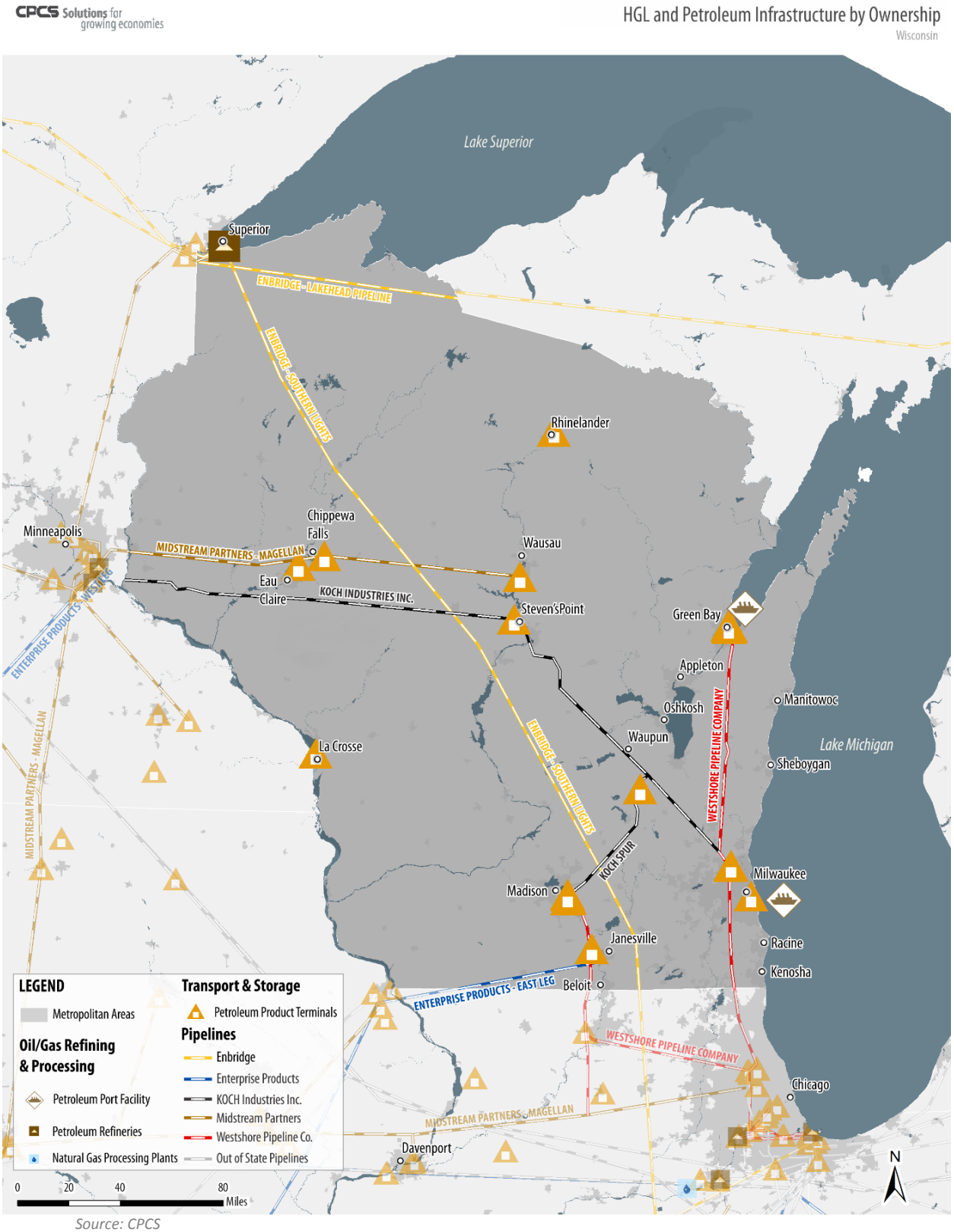
Enbridge Pipeline (Lakehead Line 5): The Enbridge Lakehead Line 5 has a capacity of 540,000 barrels per day, moving Natural Gas Liquids (NGL) and light crude from Superior to Sarnia, Ontario.[89]

Magellan Pipeline: The Magellan Pipeline connects Minnesota's Northern Tier Refinery to Wisconsin to market petroleum products they do not sell through the company-operated SuperAmerica convenience stores. Northern Tier supplies the majority of Marathon fuels in Wisconsin.[90]

Enterprise Products East Leg: The Enterprise Products pipeline transports propane from Conway, Kansas and delivers products to terminals near Janesville.

[88] Alberta Infrastructure and Transportation, "Capital Region Integrated Growth Management Plan Final Report on Core Infrastructure."
[89] Enbridge, "2016 Economic Impact and Benefits in the State of Wisconsin."
[90] Note that though the Magellan pipeline is operable to Wausau, the pipeline ends operation at Chippewa Falls' terminals and is filled with nitrogen from Chippewa Falls to Wausau. Nitrogen is used to protect the integrity of the pipeline while not in use.

Figure 5-25: Petroleum Product Pipelines and Terminals



Source: CPCS

Other Pipeline Assets

The other pipeline assets in Wisconsin that are relevant to other modes of transportation include a refinery in Superior, Wisconsin and the petroleum product terminals throughout the state.

The Calumet Superior refinery, located in Superior, has a capacity of 45,000 barrels per day, producing gasoline, diesel, asphalt, and heavy fuel. The refinery receives its crude by pipeline (Enbridge) and rail car. The products from the refinery are delivered via the Magellan pipeline, tank truck, and rail car.[91] The Calumet Superior refinery has not had an accident in the last five years and disruption in the refineries function is most often due to a loss in power, maintenance or other causes.

Wisconsin relies on petroleum product terminals to serve as the connection between pipelines and the end consumer of the petroleum product. Product terminals also enable modal interchange between pipeline, roadway, water, and rail. Figure 5-25 shows the location and Table 5-16 notes the products they store and the pipelines connected to each terminal. Wisconsin's terminals are concentrated in areas with a significant population. As expected, the majority of terminals focus on providing transportation fuels such as ultra-low sulfur diesel (ULSD), gasoline, and aviation gas or jet fuel. Other products include propane, fuel oil, conventional blendstock for oxygenate blending (CBOB), and reformulated gasoline blendstock for oxygenate blending (RBOB).

[91] Calumet Specialty Products Partners, L.P., "Calumet Superior Refining - Superior, Wisconsin."

Table 5-16: Petroleum Product Terminals

Wisconsin City	Terminal Operators	Products	Access
Chippewa Falls	**US Oil**	**ULSD, Gasoline**	**Pipeline and Truck**
Chippewa Falls	US Oil	ULSD, Gasoline	Magellan PL, Truck
Green Bay	**Citgo, Marathon, US Oil**	**ULSD, Gasoline, Aviation Gas, Jet Fuel**	**Pipeline, Truck, Rail and Water**
Green Bay	Citgo	ULSD, Gasoline	West Shore PL*, Truck
Green Bay	Marathon	ULSD, Gasoline, Aviation Gas	West Shore PL*, Truck
Green Bay	US Oil – Fox River	ULSD, Gasoline	Barge, ship, West Shore PL*, Truck, CN RR
Green Bay	US Oil – Buckeye	ULSD, Gasoline	West Shore PL*, Truck
Green Bay	US Oil – Prods	Gasoline, Jet Fuel	West Shore PL*, Truck
Junction City	**Flint Hills**	**ULSD, Gasoline, Propane**	**Pipeline and Truck**
Junction City	Flint Hills	ULSD, Gasoline, Propane,	Flint Hills PL, Truck
Madison / McFarland	**Citgo, Flint Hills, US Oil**	**ULSD, Gasoline, Jet, Refined Products**	**Pipeline and Truck**
Madison	Citgo	ULSD, Gasoline	West Shore PL, Truck
McFarland	Flint Hills	ULSD, Gasoline	West Shore PL, Flint Hills PL, Truck
McFarland	US Oil – Buckeye	ULSD, Gasoline	West Shore PL, Truck
McFarland	US Oil – Madison	ULSD, Gasoline, Jet Fuel	West Shore PL, Flint Hills PL, Truck
Milwaukee	**Flint Hills, Shell, US Oil, Wolfe Lake, Citgo, Marathon, Buckeye**	**ULSD, Gasoline, RBOB, CBOB Refined Products, Fuel Oil, Kerosene**	**Pipeline, Truck, Rail and Water**
Milwaukee	Flint Hills	Refined products	West Shore PL, Flint Hills PL, Truck
Milwaukee	Shell - Mitchell Field	Refined Products	West Shore PL
Milwaukee	US Oil - Central	ULSD, RBOB, CBOB	West Shore PL, Truck
Milwaukee	US Oil - North	ULSD, RBOB	West Shore PL, Truck
Milwaukee	US Oil - South	ULSD, RBOB, Gasoline	West Shore PL, Truck
Milwaukee	Wolfe Lake Term	Fuel Oil	Ship, barge, UP, CP, Truck
Milwaukee	Citgo	Refined products	West Shore PL, Truck
Milwaukee (Granville)	Marathon	ULSD, Gasoline, Kerosene	West Shore PL, Truck
Milwaukee (Granville)	Buckeye	ULSD, Gasoline	West Shore PL, Truck
Waupun	**Flint Hills**	**Refined products**	**Pipeline and Truck**
Waupun	Flint Hills	Refined products	Flint Hills PL, West Shore PL, Truck

Source: International Liquid Terminals Association

* The West Shore Pipeline has not serviced Green Bay since March 2016

5.8 National Transportation Networks in Wisconsin

The United States transportation system is a vast, complex network of almost seven million miles of highways, local roads, railways, navigable waterways, and pipelines. The components of this system are linked to each other through thousands of seaports, airports, and intermodal facilities. This system accommodates the movement of goods, cargo, raw materials, and finished products from the entire spectrum of the agricultural, manufacturing, and wholesale and retail trade sectors of our economy.

Multiple modes (multimodal transport) are used to carry freight. The largest percentage of United States freight (by tonnage) is carried by trucks (70 percent), railroads (9 percent), pipeline (8 percent), ship (4 percent), and airplanes (1 percent).[92] Other modes of transportation, such as parcels and intermodal freight account for the remaining eight percent. Thus, multimodal transportation offers an advanced platform for the efficient, reliable, safe, flexible, and resilient movement of freight. The multimodal United States transportation system connects Wisconsin's key gateways and corridors to the nation and plays an important role in linking Wisconsin to the global economy. The economic productivity of Wisconsin is dependent on the overall transportation performance of the United States transportation system as well as its own transportation system. Therefore, it is important to examine the connections of the United States transportation system to Wisconsin.

National Multimodal Freight Network

Recognizing the importance of multimodal connections, the Fixing America's Surface Transportation (FAST) Act directed the United States DOT to establish National Multimodal Freight Network (NMFN) (Figure 5-26). This interim network is comprised of the following components: [93]

- National Highway Freight Network (NHFN)
- Class I railroads
- Large public ports
- Inland and intercoastal waterways
- Great Lakes and St. Lawrence Seaway
- The 50 largest airports
- Other strategic freight assets

National Multimodal Freight Network

The FAST Act directs the United States DOT to establish a NMFN designed to:

- Assist states in strategically directing resources toward improved system performance for the efficient movement of freight on the network
- Inform freight transportation planning
- Assist in the prioritization of federal investment
- Assess and support federal investments to achieve the goals of the National Multimodal Freight Policy and of the National Highway Freight Program

The United States DOT was directed to consult with freight stakeholders, including state DOTs, to develop the final NMFN by December of 2017. States may propose additional designations to the network after considering nominations from Metropolitan Planning Organizations (MPOs), freight advisory committees, ports, airports, and rail and pipeline operators. The United States DOT must redesignate the network at least every five years.

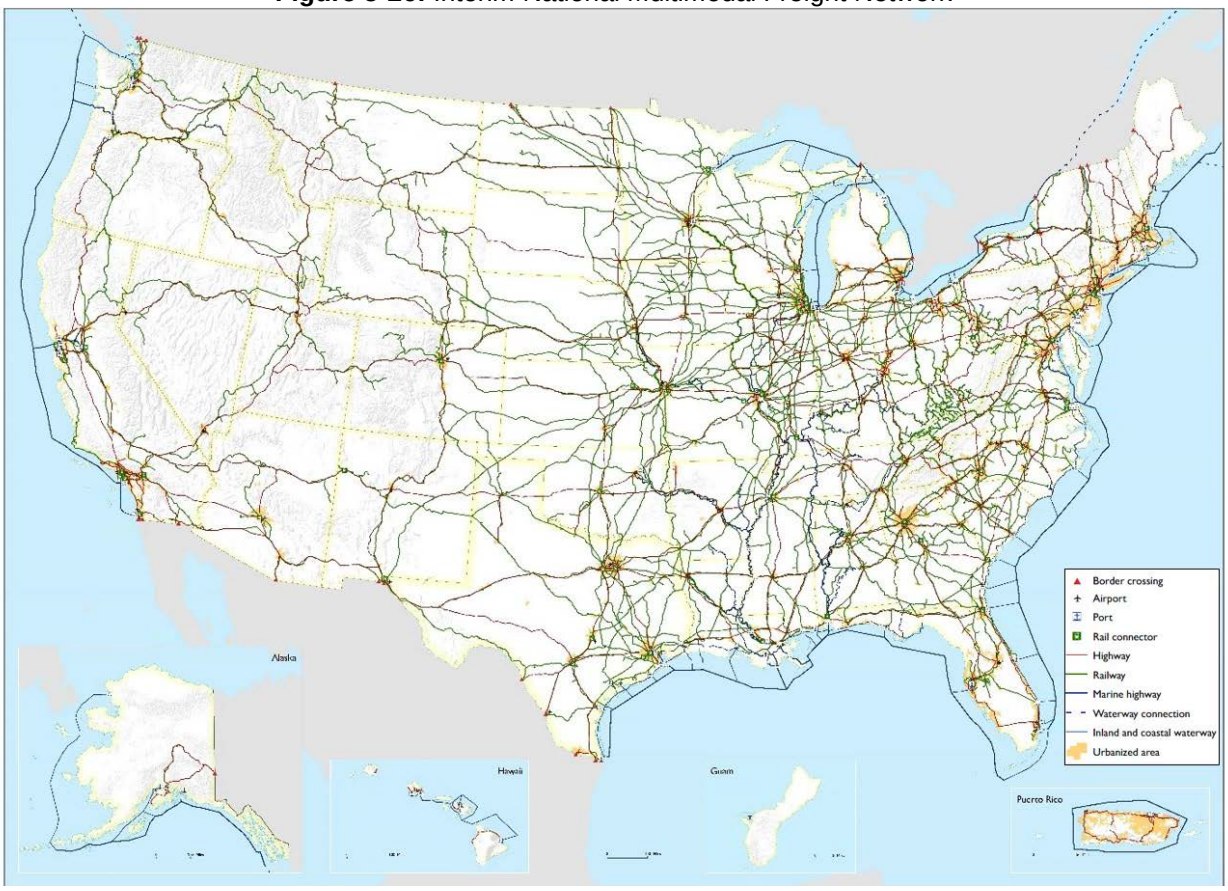
The purpose of the NMFN map is to inform planners and the public of national interest relative to major freight flows and direct special attention to freight issues as warranted. Many important freight opportunities, however, will occur off the NMFN routes, including in first- and last-mile links in urban and rural areas. However, the proposed version of the NMFN does not reflect the importance of Wisconsin's key corridors and connecting roads that are essential for multimodal freight mobility. With some small exceptions, the NMFN only includes Interstate Highways. The NMFN does not include much of non-interstate highway Corridors 2030 Backbone routes, including US 53 (Eau Claire – Superior), US 151 (Dubuque – US 12/18 in Madison and I-94 in Madison to Fond du Lac), US 10 (Menasha – Stevens Point), US 41 (north of Green Bay), and STH 29 (entire length from Chippewa Falls to Green Bay). As currently proposed, the NMFN includes only one percent of the state's highway mileage.

In addition, the current version of the NMFN includes all Class I Railroads (including those out-of-service), General Mitchell International Airport, the Mississippi River and Great Lakes Marine Highways, and the Ports of Superior,

[92] U.S. Bureau of Transportation Statistics, "Freight Facts and Figures, 2015."
[93] Federal Highway Administration, "Fixing America's Surface Transportation Act or 'FAST Act'."

Green Bay, and Milwaukee. It does not include any Class II or Class III lines (no Wisconsin & Southern lines are included) and it does not include either of Wisconsin's rail-truck intermodal facilities (Chippewa Falls or Arcadia).

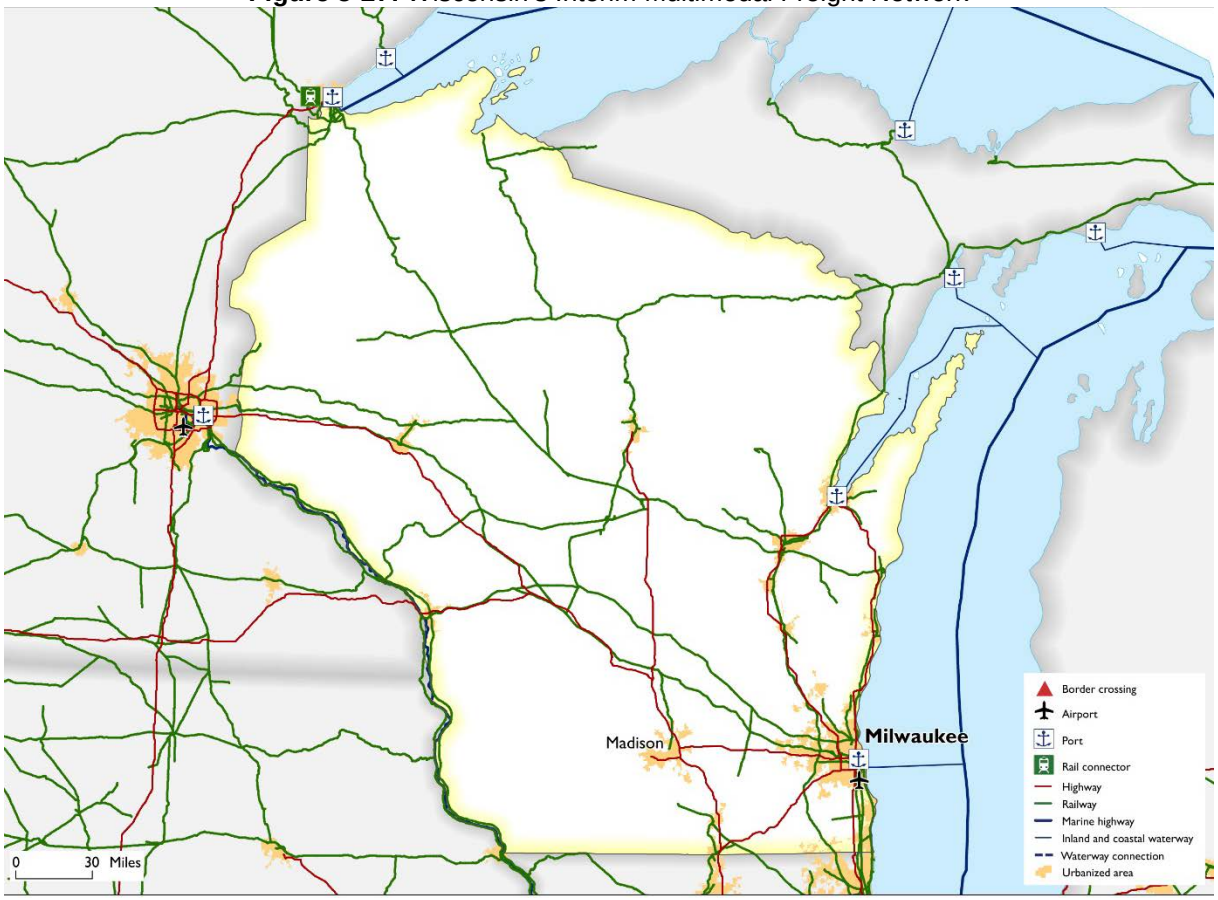
Figure 5-26: Interim National Multimodal Freight Network



Source: U.S. Department Of Transportation

Figure 5-27 displays the portions of the interim NMFN in Wisconsin.

Figure 5-27: Wisconsin's Interim Multimodal Freight Network



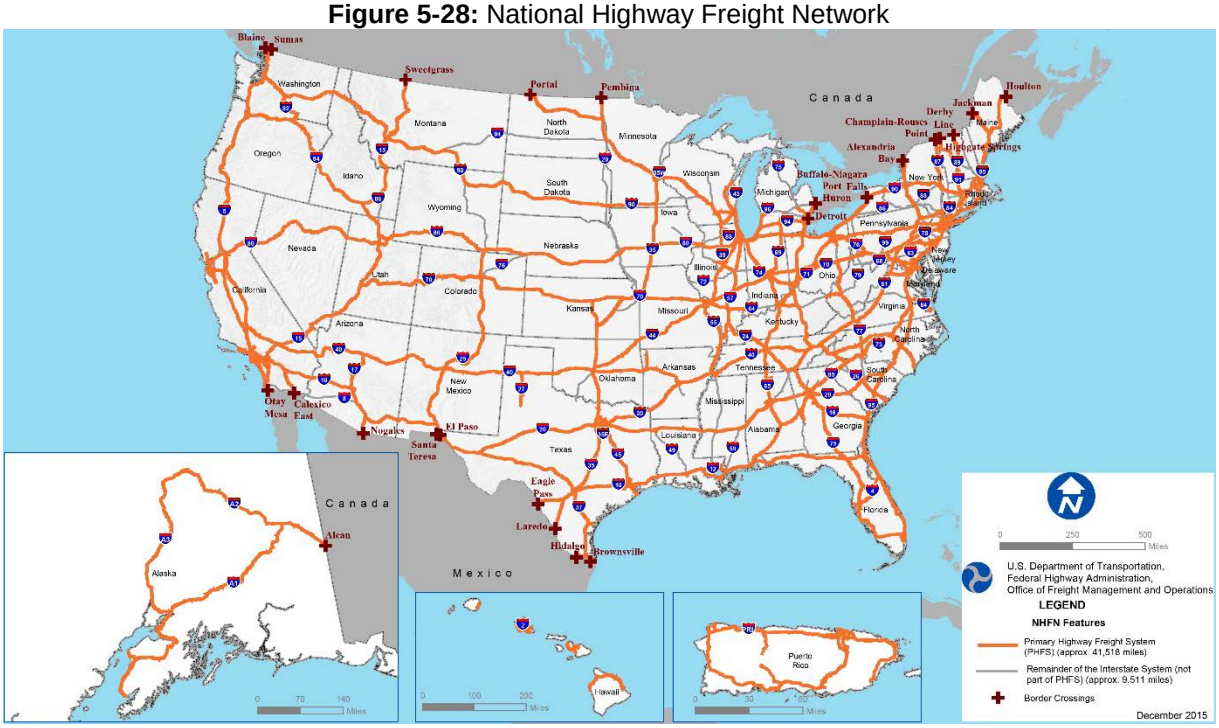
Source: U.S. Department Of Transportation

National Highway Freight Network

In addition to the NMFN, the FAST Act directed the FHWA Administrator to establish a National Highway Freight Network (NHFN) to aid in strategically directing federal resources and policies toward improved performance of highway portions of the United States freight transportation system.[94] The NHFN identifies roadways to help direct resources towards improving system performance for efficient movement of freight on highways.[95] In Wisconsin, over 900 miles are under this designation, which includes all of Wisconsin's Interstates and a limited number of state highways.[96] The NHFN is shown in Figure 5-28.

[94] Federal Highway Administration, "National Highway Freight Network."
[95] Ibid.
[96] Ibid.

Figure 5-28: National Highway Freight Network



Source: U.S. Department Of Transportation

The NHFN includes the following subsystems of roadways:

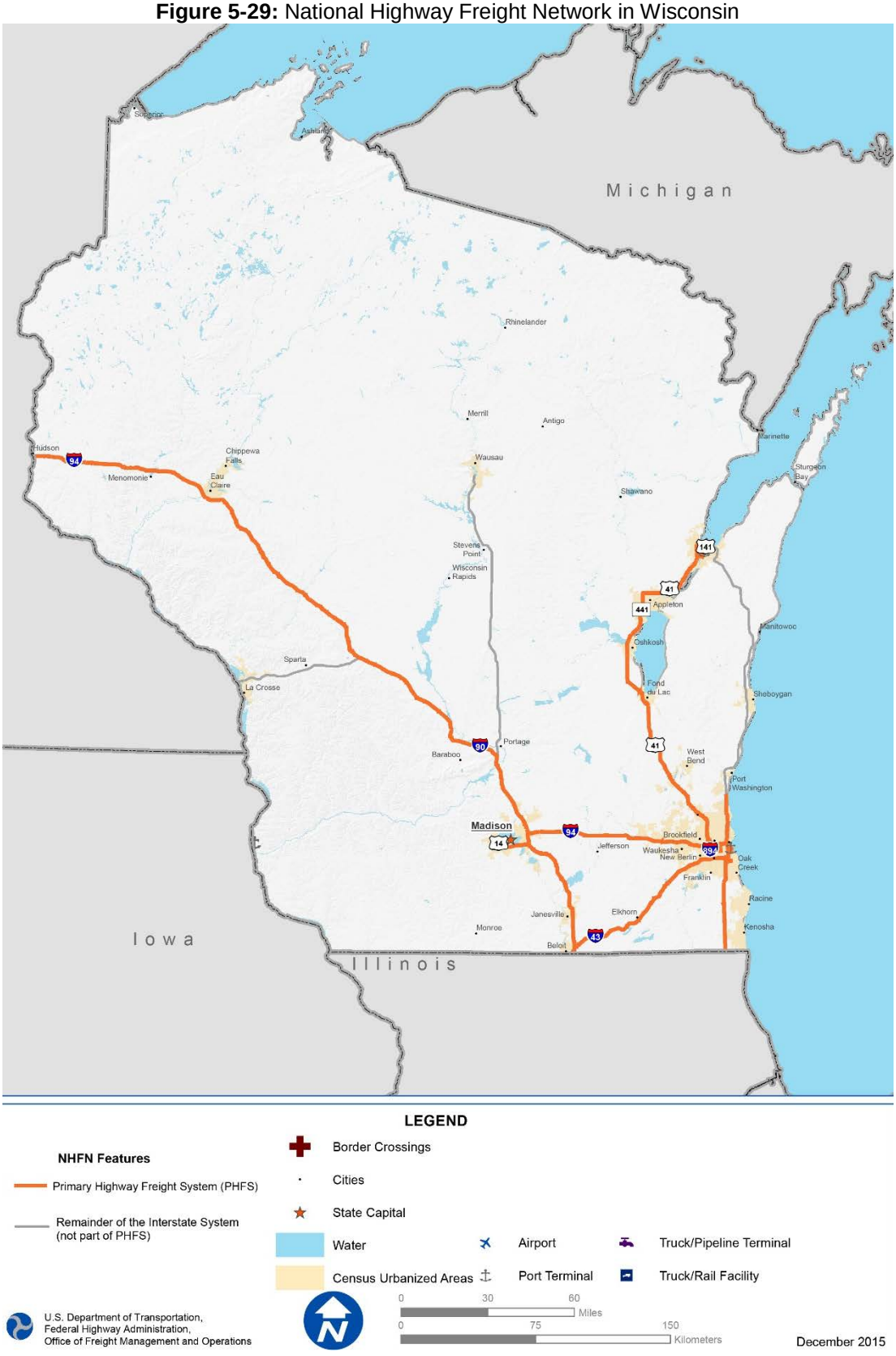
- **Primary Highway Freight System (PHFS):** A network of highways identified as the most critical highway portions of the United States freight transportation system determined by measurable and objective national data. The network consists of 41,518 centerline miles, including 37,436 centerline miles of Interstate and 4,082 centerline miles of non-Interstate roads.
- **Other Interstate portions not on the PHFS:** Highways consisting of the remaining portion of Interstate roads not included in the PHFS. These routes provide important continuity and access to freight transportation facilities. These portions amount to an estimated 9,511 centerline miles of Interstate nationwide, and will fluctuate with additions and deletions to the Interstate Highway System.
- **Critical Rural Freight Corridors (CRFCs):** Public roads not in an urbanized area that provide access and connection to the PHFS and the Interstate with other important ports, public transportation facilities, or other intermodal freight facilities.
- **Critical Urban Freight Corridors (CUFCs):** Public roads in urbanized areas that provide access and connection to the PHFS and the Interstate with other ports, public transportation facilities, or other intermodal transportation facilities.

States, and in certain cases MPOs, are responsible for designating public roads for the CRFCs and CUFCs in accordance with section 1116 of the FAST Act. State designation of the CRFCs is limited to a maximum of 150 miles of highway or 20 percent of the PHFS mileage in the state, whichever is greater. State and MPO designation of the CUFC are limited to a maximum of 75 miles of highway or 10 percent of the PHFS mileage in the state, whichever is greater.

Figure 5-29 displays Wisconsin's PHFS and non-PHFS interstate roadways. Wisconsin has a total of 652 miles of PHFS and 257 miles of non-PHFS interstate in the state.[97] The FAST Act allows a maximum of 150 miles of CRFC and 75 miles of CUFC in Wisconsin.[98] Southeastern Wisconsin Regional Planning Commission (SEWRPC) is the one metropolitan planning organization (MPO) in the state (population > 500K) with the ability to designate its corridors, in collaboration with WisDOT. WisDOT and MPOs (for urbanized areas over 500,000) are responsible for jointly determining how to distribute the CUFC mileage among the urbanized areas. WisDOT must consult with SEWRPC on CUFC designation, however, WisDOT will facilitate CUFCs designation with all Wisconsin MPOs to determine the appropriate distribution of mileage (and subsequent funds) to all urban areas in the state. In terms of the 150 miles of CRFCs, three critical routes from the Corridors 2030 Backbone – US 53, US 151, and STH 29 – together comprise around 500 miles, more than three times the mileage available for designation. As a result, WisDOT will work with MPOs, RPCs, the FAC, and other stakeholders to designate CUFCs and CRFCs. The designation of these corridors will occur after the State Freight Plan has been published.

[97] Federal Highway Administration, "National Highway Freight Network Map and Tables for Wisconsin."
[98] Federal Highway Administration, "FAST Act, Section 1116 National Highway Freight Program (NHFP) Guidance: Designating and Certifying Critical Rural Freight Corridors and Critical Urban Freight Corridors."

Figure 5-29: National Highway Freight Network in Wisconsin



Source: U.S. Department Of Transportation

6– Chapter 6: Transportation System Condition and Performance

Management of the transportation system requires comprehensive data, appropriate measures, and a consistent method for assessment. The following discussion assesses the safety, condition, and performance of the state's transportation system in achieving the goals of this freight plan:

- Enhance Safety, Security, and Resiliency
- Ensure System Preservation and Enhancement
- Enhance System Operations, Reliability, Efficiency, and Connectivity

A key component of this assessment is the development and application of performance measures. WisDOT has several measures that facilitate this analysis. The state's transportation measures impacting freight are focused, measurable, and drive performance improvement. This chapter inventories the relevant performance measures already used by WisDOT and compares them with the federal requirements. The gaps in the department's existing measures and requirements are considered, and additional measures are proposed. The freight plan then uses existing measures to assess the condition and performance of Wisconsin's multimodal transportation system.

Overview of Chapter 6

Chapter 6 includes the following topics:

- **Performance** - This chapter considers significant congestion or delay caused by freight movements
- **Safety** - This chapter presents information and analysis of safety and security challenges in moving freight by highway, rail, port, air, and pipeline in Wisconsin
- **Condition** - This chapter describes possible improvements to reduce or impede the substantial deterioration of roadways caused by heavy vehicles
- **Bottlenecks** - This chapter presents an inventory of freight bottlenecks and a description of strategies to mitigate them on the state-owned and operated transportation system

6.1 About Performance Measures

The department has a long history of using data to monitor and analyze system performance to ensure timely and appropriate investments. Several of WisDOT's existing measures support analysis of freight-specific mobility needs by providing a comprehensive, objective, and consistent set of metrics to assess system condition, identify issues, prioritize investments, and measure the effectiveness of actions.

Recognizing that performance measures are both key to identifying projects and are required by federal legislation, the remainder of this section identifies freight performance measures required by the United States Department of Transportation (U.S. DOT) and describes WisDOT's performance improvement program to set the stage for an in-depth discussion of the performance of Wisconsin's multimodal transportation system.

Federal Performance Measures

The Moving Ahead for Progress in the 21st Century Act (MAP-21) requires states to establish performance measures that assess the condition and performance of the transportation system. MAP-21 requires performance measures focused in the following 12 areas:[1]

- Serious injuries per vehicle miles traveled (VMT)
- Fatalities per VMT
- Number of serious injuries
- Number of fatalities
- Pavement condition on the Interstate System
- Pavement condition on the non-Interstate National Highway System (NHS)
- Bridge condition on the NHS
- Traffic congestion
- On-road mobile source emissions (i.e. pollution caused by vehicles)
- Freight movement on the Interstate System
- Performance of the Interstate System
- Performance of the non-Interstate NHS

Federal Transportation Legislation

MAP-21

- MAP-21 is a funding and authorization bill to govern federal spending on transportation. The bill was signed into law by President Barack Obama on July 6, 2012. The bill provided $105 billion for federal fiscal years 2013 and 2014.

Fixing America's Surface Transportation (FAST) Act

- The FAST Act is a funding and authorization bill to govern federal spending on transportation. The bill was signed by President Barack Obama on December 4, 2015. The bill provided $305 billion for federal fiscal years 2015 to 2020.

Federal Freight Performance Measure

On January 18, 2017, FHWA published the final rule for implementing the national performance management measure regulations to assess Freight Movement on the Interstate Systems that states must address:
Percent of the Interstate System Mileage providing for Reliable Truck Travel Time

In accordance with MAP-21, FHWA will determine a state's progress toward meeting the performance targets related to freight movement. If progress is not made, FHWA will provide a written description of the actions the state will take to achieve the targets.

WisDOT's Mobility, Accountability, Preservation, Safety, and Service (MAPSS) performance improvement program includes measures that meet MAP-21 requirements.

[1] 23 USC 150(c)

WisDOT's Performance Improvement Program

WisDOT's MAPSS performance improvement program focuses on five core goals: Mobility, Accountability, Preservation, Safety, and Service. The performance measures associated with each core goal guide WisDOT in achieving the department's mission *to provide leadership in the development and operation of a safe and efficient transportation system*.

The quarterly publication reports on 23 (shown in Table 6-1) separate measures that define and monitor the direction and degree with which WisDOT is meeting the goals. There are fifteen measures that, either in full or in part, reflect factors that affect freight movement (bolded).

Table 6-1: WisDOT MAPSS Performance Improvement Program Measures

Mobility	Accountability	Preservation	Safety	Service
• **Delay** • **Reliability** • Transit availability • Bicycling conditions on rural highways • **Incident response** • **Winter response**	• **TEA Grants** • Timely scheduling of contracts • **On-time performance** • On-budget performance • Surplus property management	• Program effectiveness • **State highway pavement condition (backbone and non-backbone)** • **State bridge condition** • **State-owned rail line condition** • **Airport pavement condition** • **State highway maintenance** • Material recycling	• **Fatalities** • **Injuries** • **Crashes** • **Safety belt use**	• DMV wait times • DMV electronic services • DMV driver license road test scheduling • DMV phone service

Source: Wisconsin Department of Transportation, MAPSS

The remainder of this discussion focuses on these fifteen measures (bolded measures in Table 6-1), which will be used to assess how Wisconsin's transportation system is current performing relative to freight movement.

For the purposes of the discussion, the following sections group each of the fifteen department MAPSS performance measures into thematic areas that relate to the goals of the plan:

- Freight operations, mobility, and reliability
- Transportation accountability
- Transportation system safety
- Transportation system condition
- Transportation system performance

6.2 Freight Operations, Mobility, and Reliability

State trunk highway reliability – or predictability – is a basic user expectation and necessary for a robust economy. People who travel on Wisconsin's highways expect to reach their destinations within a reasonable and predictable period of time. Shippers and businesses require a reasonable level of system reliability to support their efforts to compete and, where possible, expand.

Highway Operations

Effective, coordinated, and economical operations are part of an efficient transportation system that helps maximize traffic flow. This can reduce travel delays for freight and people and improve safety.

The primary goal is to maximize the reliability of the highway system. Highway operations activities focus on traffic flow on the roadway. WisDOT's efforts to improve daily highway operations include implementing and integrating traffic control devices and other applicable technology, as well as facilitating real-time traveler warnings and information.

A wide range of daily events or incidents can disrupt the safe and efficient flow of traffic and affect overall system operation. Vehicle crashes, work zones, natural disasters, special events, and the number and distance of access points such as cross streets or driveways can disrupt system reliability.

WisDOT developed several measures to monitor system operations and assess system operations, mobility and reliability. These include: delay, reliability, incident response, and winter response. Each measure compares recent data to the performance measure target and indicates how the department is doing relative to that goal. As each measure matures, WisDOT assesses opportunities to improve or enhance the quality of the metric and its value in enhancing system performance.

Delay (Hours of Vehicle Delay)

Measuring the amount of delay users experience on the state's highway system provides an indicator of how a highway is impacted by events such as traffic incidents, work zones, and weather. There are three parts to the delay measure:

- Delay
- Hours of vehicle delay
- User delay cost

Travel Time Delay

Highway congestion occurs when traffic demand exceeds the available capacity of the highway system. Congestion can be:

- Recurring (regular peak periods)
- Non-recurring (incidents and bad weather)

Whatever the cause, congestion results in slower speeds, longer trip times, higher levels of harmful emissions, and increased costs for auto, bus, and freight.

Delay is defined as the extra time spent driving in congested road conditions, as compared to free-flowing travel conditions. Hours of delay is calculated by measuring the number of vehicles on a corridor, and then comparing actual travel times to the amount of time it would take to travel the same corridor at the posted speed limit.

Finally, user delay cost is split into two categories: passenger cars and freight vehicles. It is calculated by multiplying user value of time, vehicle delay, and vehicle occupancy rates. Delay is reported on the state's ten Interstate corridors and 28 highway segments.

The department's goal is to reduce vehicle delay and user delay cost. Reducing the annual total hours of vehicle delay and its resulting user delay cost on a corridor provides a positive user traveling experience, and supports regional economic productivity and development.

Vehicle delay is comprised of recurrent and non-recurrent delay. Recurrent delay is caused by normal fluctuations in traffic demand such as morning and evening commuter traffic. Non-recurrent delay differs by seasons and areas of the state. Factors include: traffic surges from weekend holidays and special events, weather-related delays and incidents, and work zone impacts such as road closures, lane restrictions, and traffic detours.

Efforts to improve overall delay have focused on deploying more advanced Intelligent Transportation System technologies, maximizing roadway space to match peak period demands, publicizing travel information through electronic message boards and the 511 Traveler Information System, deploying rapid responses to clear incidents quickly, encouraging drivers to use alternate routes, providing efficient timely winter weather management, and expanding highway capacity through highway improvement projects.

Travel Time Reliability (Planning Time Index)

Travelers expect to arrive at their destination both safely and on-time. Their confidence level and certainty of on-time arrival are intuitive measures of transportation system reliability. The Planning Time Index (PTI) expresses that same value mathematically to help travelers more precisely budget travel time (displayed on variable message signs) and helps transportation planners better measure system performance.

Travel time reliability measures the variability of congestion. A wide variation in the recorded travel time indicates low reliability and a high planning time index. Traffic incidents, weather conditions, special events, holiday travel, sporadic demands, and work zones are all dynamic components of traffic congestion that may adversely affect travel time reliability. Reducing or mitigating the impact of these factors improves travel time reliability.

Planning Time Index (PTI) Value

WisDOT wants travelers to arrive at their destinations both safely and on-time. Having a high level of confidence and certainty of on-time arrival are measures of the reliability of the transportation system.

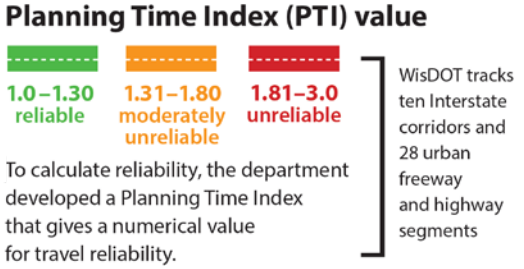
The statewide travel time reliability performance measure tracks the reliability of ten Interstate corridors and 28 urban freeway and highway segments. This provides a precise way to budget travel time and measure system performance.

Sample Travel Scenario:
20 minutes x 1.5 PTI = 30 minutes

A PTI of 1.5 means travel is moderately unreliable. A traveler going for a 20 minute trip during a peak period would be assured of completing the trip in 30 minutes or less 95 percent of the time.

Travel Time Reliability is reported on the state's ten Interstate corridors and 28 urban freeway and highway segments. The Planning Time Index is calculated from two basic measures: (1) travel time at the posted speed limits, and (2) the 95th percentile travel time, marking the most extreme travel delay in a period (the worst of 20 trips). The ratio of these two measures make up the index. This measure is represented by direction and by weekday, non-holiday peak periods. Travel time information for this measure was acquired from an FHWA-sponsored national data set.

The statewide PTI increased slightly in the spring quarter of 2016 as compared to spring 2015. All corridors saw an increase in PTI. The 70 mph speed limit increase led to slight performance reductions; however, larger changes from the previous quarters are attributed to factors like construction and weather. Work zones that either began or ended during this period influenced the results. Peak hour urban reliability has decreased in new work zones and improved for recently completed improvement projects. Three fewer urban segments were in the reliable category than in the 2015 spring quarter. The number of unreliable segments decreased, while



the number of moderately unreliable segments increased. Drivers in the Milwaukee urban corridor continue to experience the least reliable travel times. [2]

Efforts to improve Travel Time Reliability have included the expanded messaging of 511 Wisconsin through Twitter to include photos, graphics, and videos. Followers are able to receive instant updates on excessive delays, incidents, work zones, and detour information to help alter their routes and avoid congestion. Travel times for alternate routes are displayed during incidents resulting in severe freeway delays. The Madison area work zones also have alternate route travel times displayed to provide drivers opportunities to avoid congestion during peak hours and holiday traffic surges.

Incident Response

Incidents happen on the state's highway system every day. Incidents may range from minor property damage to serious traffic crashes. WisDOT's Incident Response measure focuses on the amount of time it takes to clear intermediate and major traffic incidents on the Interstate and state highways. The department's efforts to monitor incidents on the state trunk highway network are conducted primarily through close coordination of law enforcement, first responders, other agencies, the media, and staff at WisDOT's State Traffic Operations Center (STOC).

Statewide Traffic Operations Center

The WisDOT STOC handles traffic management for Wisconsin. It is staffed 24 hours per day, seven days per week and communicates regularly with sheriffs, fire and police departments, the Wisconsin State Patrol, media outlets, and construction project managers. The actual operations center is located in southeastern Wisconsin in the City of Milwaukee. From the STOC, it is possible to use various traffic management tools such as closed circuit television units, ramp meters, variable message signs, highway advisory radio, roadway sensors, and other tools. It is designed to improve the safety and efficiency of the freeway system by reducing incidents and relieving traffic congestion.

Intermediate traffic incidents typically affect travel lanes and usually require traffic control on the scene to divert roadway users past the blockage. Major traffic incidents usually involve hazardous material (HAZMAT) spills, overturned tractor-trailers, fatalities, multiple vehicles, and/or other natural or man-made disasters. Major incidents can result in closing all or part of a roadway. Regardless of severity, restoring the roadway to full operation as quickly as possible helps reduce secondary incidents, minimize delay for people and freight, and decreases the associated economic impact of traffic delays.

The department's goal is to reduce the length of time traffic flow is disrupted by long-term incidents on the Interstate and state highway system. The goal is to clear 90 percent of all intermediate incidents in less than two hours and to clear 80 percent of all major incidents in less than four hours.[3]

The department's coordination in this area continues to improve both the intermediate and major incident clearance goals. In 2015, the department achieved the lowest incident clearance time in the last five years with an average clearance of 77 minutes. There were eight major incidents on the Interstates that involved either a HAZMAT spill, significant infrastructure damage, multiple tractor-trailer crashes, or fire, each taking over eight hours to clear.[4]

[2] Wisconsin Department of Transportation, MAPSS.
[3] Ibid.
[4] Ibid.

The department will continue to conduct after-action reviews on significant incidents across the state in order to help identify strengths, weaknesses, and opportunities for improvement associated with clearance activities. In 2015, 1,300 first responders took Traffic Incident Management (TIM) training on responder safety, safe and quick clearance, and improved communication—all to aid in quick restoration of traffic flow. Through a partnership with the Department of Justice, TIM training became mandatory for all new law enforcement officers in 2016. The department is also working with the state's technical colleges to incorporate formal TIM training into their fire service and tow operator programs. WisDOT will continue to host Traffic Incident Management Enhancement (TIME) meetings and promote TIM trainings across the state for responders from local law enforcement, fire departments, public works and highway departments, towing companies, and other responder disciplines. The meetings are dedicated to improving communication between responder disciplines, identifying and executing best practices at incident scenes, and improving the overall safety of an incident scene for all responders.[5]

Wisconsin TIME Program

Crashes, spilled loads, and stalled vehicles are all examples of traffic incidents. These situations and the traffic congestion caused by them account for approximately one-fourth of all delays on the highway system.[6] Traffic incidents also significantly impact the safety of both motorists and emergency responders.

Traffic Incident Management (TIM), a collaborative effort of public safety and transportation agencies, consists of a planned and coordinated multi-disciplinary process to detect, respond to, and clear traffic incidents so that traffic flow may be restored as safely and quickly as possible. Effective TIM reduces the duration and impacts of traffic incidents and improves the safety of motorists, crash victims, and emergency responders.

Wisconsin recognizes the importance of TIM in maintaining the operational safety and efficiency of the state's roadways. The Traffic Incident Management Enhancement (TIME) Program is a comprehensive multi-agency, multi-discipline program, led by the Wisconsin Department of Transportation (WisDOT), dedicated to:

- Improving responder safety
- Enhancing the safe, quick clearance of traffic incidents
- Supporting prompt, reliable, interoperable communications

The program, initiated in 1995, is a sustained initiative for assessing needs, developing solutions and strategies, and fostering the transportation-public safety partnerships that are essential for effective TIM.[7]

Winter Response

Returning roads to the condition they were in before a winter storm (reaching bare or wet pavement) restores the capacity of the system to move traffic safely. This allows safe travel to work, school, and other destinations. Clear roads also meet the needs for emergency travel and restore travel time reliability, which is important to the movement of freight.[8]

State roads are grouped into two categories: roads maintained 24 hours a day or 18 hours a day. Roads maintained 24 hours a day are to be cleared within four hours, and roads that are maintained 18 hours a day are to be cleared

[5] Wisconsin Department of Transportation, "Programs - Traffic Incident Management Enhancement."
[6] Wisconsin Department of Transportation, Statewide Traffic Operations Center.
[7] Wisconsin Department of Transportation, "Programs - Traffic Incident Management Enhancement."
[8] Wisconsin Department of Transportation, MAPSS.

within six hours of the end of a storm. Eighteen-hour roads have lower traffic counts, are concentrated in peak travel time periods, and are not serviced between 10 p.m. and 4 a.m. The department's goal is to achieve these targets 70 percent of the time.[9]

Each county provides weekly reports covering each storm event. They record the time at two points: (1) when each storm event ends and (2) when roads were restored to bare/wet pavement. For each storm event, the time to bare/wet pavement is calculated as the elapsed time between these two points. The performance measure is the average percent for all storm events that bare/wet pavement conditions are met for 18-hour roads (within six hours) and on 24-hour roads (within four hours). Winter severity is calculated each year based on a set of weather factors including the number of snow and freezing rain events, total duration of all storms, total snow accumulation, and number of incidents (blowing snow, drifting, ice and frost). The index is the gauge by which the department measures the impact of winter on our roads with a typical winter rating of 100.[10]

For the winter of 2015-2016, both the 24-hour and 18-hour roads measures improved over the winter of 2014-2015, with both roads exceeding the 70 percent goal. The winter of 2015-2016 was rated a little below a typical winter, or 90 on the severity scale, compared to the 2014–2015 rating of 100. Milder temperatures enabled salt to be more effective, and spring 2016 was also milder.[11]

Efforts to improve overall winter response are focused on ensuring appropriate materials and resources are available to address conditions during and after each storm event. In addition, the department has begun to implement a route optimization strategy to route trucks based on locations of shops, salt, and fuel supplies to minimize downtime for snowplow operators.[12]

6.3 Transportation Accountability

WisDOT is the steward of the transportation system and manages the state's transportation funding to deliver a safe and efficient transportation system. The continuous effort to use public dollars in the most efficient and cost-effective way requires accountability. Although accountability does not directly support freight movement, it promotes overall efficiency, which positively impacts freight. The two performance measures associated with accountability are:

- Transportation Economic Assistance (TEA) grants
- On-time performance

Transportation Economic Assistance Grants

TEA grants support the creation and retention of jobs through the award of grants for transportation projects that support business development. The TEA program provides state matching grants of up to 50 percent, or $5,000 maximum per job. The grants aid governing bodies supporting local private businesses and consortiums for road, rail, harbor, and airport projects that help attract employers to Wisconsin, or encourage business and industry to remain and expand within Wisconsin. The program strives to increase the number of jobs statewide by responding to the transportation needs of an economic development project contingent on a transportation facility

[9] Wisconsin Department of Transportation, MAPSS.
[10] Ibid.
[11] Ibid.
[12] Ibid.

improvement. The goal is to attract and retain business in Wisconsin, which increases the number of local job opportunities, improves the local tax base, and boosts spending in the local economy.

WisDOT developed a performance measure to monitor the success of the program in awarding grants to businesses in the state. The performance measure target for TEA grants is to achieve $50 of capital investment for every $1 of grant funds awarded. From 2013 to 2015, almost $11 million in grants were awarded. During this same time period, for every $1 of grant funds awarded an average of $53.16 in capital investments were made.[13]

WisDOT conducts extensive outreach at business/industry functions, the Governor's Small Business Summit, and region-sponsored local program symposiums, and it partners with state agencies like the Wisconsin Economic Development Corporation and Department of Administration to promote the TEA Program. WisDOT has streamlined the environmental clearance process and published resources to help guide sponsors and consultants on how to complete the programmatic environmental review. WisDOT is also working to streamline the delivery process to speed-up and ease the burden of moving a project from application to construction.

On-Time Performance

WisDOT's on-time performance measure indicates the department's ability to estimate and manage the amount of time it will take to complete a highway construction project. The better the department is at determining project completion time, the better WisDOT is able to schedule future projects to effectively utilize contractor and department resources. The general public and businesses are affected by construction projects. When the department adheres to a schedule, the better everyone can plan for the impact. The department's goal is to meet the project time frame specified in the construction contract 100 percent of the time.[14]

This measure reports the percent of construction projects that were completed within the original project time frame specified. The numbers are calculated by identifying construction projects that had work completed during the calendar year and then comparing the actual date/days the project took to complete with the date/days that were specified in the contract.

Factors affecting this measure include adverse weather, plan changes during construction, material delays or shortages, utility work delays, and contractor scheduling. The on-time performance is also affected by the quality and completeness of project designs.

The department is focusing on three areas to improve this measure:

- Work with contractors to improve communications and resolve issues that may impact the schedule in a timely manner; the department will also be expanding the deployment of mobile devices to foster timely decision making in the field
- Release larger and more complex construction contracts out for bid in the fall or early winter to ensure that contractors have adequate time to schedule the resources and staffing needed to complete the project on time
- Continue to use historic project data to develop more accurate project schedules

[13] Wisconsin Department of Transportation, MAPSS.
[14] Ibid.

6.4 Transportation System Safety

Transportation system safety is a fundamental mission of WisDOT. The department emphasizes safety in all its efforts, from education and enforcement to engineering and emergency response. WisDOT remains committed to a multidisciplinary philosophy that safety "is everybody's business" and continues to coordinate efforts across the entire department.

As the steward of the state's transportation system, WisDOT is responsible for addressing safety for all transportation modes and systems. The department's ability to influence safety varies depending on who has ownership or jurisdiction over the particular system or mode. For example, WisDOT has direct responsibility for state trunk highways. For the local system, which is owned and operated by local government, WisDOT provides funding, data, and technical assistance. For transport of freight via rail, water, and air, WisDOT supports safety by:

- Coordinating activities with the Office of the Commissioner of Railroads (OCR) regarding rail crossing investments
- Working with railroads when designing and constructing crossing improvements
- Investing in programs that improve railroad tracks and roadbeds; railroad crossings on state-supported rail corridors; tracking the Railroad Crossing Information System (RCIS); working to address safety concerns at crossings; and working with railroads and their police during derailment incidents
- Assisting the Federal Aviation Administration (FAA) and local airport owners with infrastructure improvements and equipment for improved navigation and communications
- Supporting engineering improvements ranging from technical improvements, such as landing and navigational aids, weather monitoring equipment, and rescue and firefighting equipment, to simpler treatments, such as runway lighting, land acquisition for protection zones, and fencing to prevent wildlife incursions onto runways
- The United States Department of Homeland Security's Transportation Safety Agency (TSA) is a major influence guiding the policy of air cargo safety and security. The TSA has a strict policy on how outgoing cargo is stored at its point of origin, requiring that the cargo be sealed before shipped via air. This has led to commercial airports in Wisconsin using an increasing variety of technology to screen outgoing and incoming cargo, while smaller general aviation airports continue a more "cargo in, cargo out" based policy. Many larger commercial airports also have a significant law enforcement presence enforcing this security policy, including local county sheriffs, customs agents, and private security companies.
- Working with the United States Army Corps of Engineers and the United States Coast Guard on port and waterway safety efforts
- For all modes, WisDOT hosts conferences and reviews draft state and federal legislation in order to ensure transportation safety is a focal point

Railroad Police

Railroad police are certified state law enforcement officers that are responsible for the protection of railroad properties, facilities and personnel. Railroad police are employed by the major Class I railroads in the United States and respond to incidents on railroads.

One of WisDOT's goals is to move towards minimizing the number of deaths, injuries, and crashes on the transportation system. The following sections discuss the department's efforts to monitor, measure, and address safety concerns in terms of roadways and railroads.

Roadway Safety

Protecting the safety of motorists and pedestrians is an integral part of the mission of WisDOT, which is reflective in the MAPSS Performance Improvement program. WisDOT's performance metrics measure traffic fatalities, traffic injuries, traffic crashes, and seat belt use on the state highway system.

In 2013, there were over 25,000 total crashes involving light and heavy trucks in Wisconsin. Over 22,000 of which involved light trucks and about 3,200 involved heavy trucks. In addition, 108 crashes involving light trucks were fatal, while 27 crashes involving heavy trucks were fatal. Table 6-2 displays vehicle crashes by truck type and severity in 2013. Some of these crashes can be attributed to unsafe vehicle operating weights, hazardous driving conditions, impaired drivers (including lack of rest), traffic congestion and human error.[15]

WisDOT's Safety Performance Measures

Traffic fatalities: For each calendar year, the department seeks to reduce traffic fatalities by five percent from the prior five-year rolling average. This supports the department's over-arching safety goal of zero deaths on Wisconsin roads (Zero in Wisconsin is the department's safe driving campaign).

Traffic Injuries: The goal of this measure is to reduce the number of personal injuries from traffic crashes by five percent from the prior five-year rolling average.

Traffic crashes: The goal of this measure is to reduce traffic crashes on Wisconsin roads by five percent from the prior five-year rolling average.

Seat belt use: The goal of this measure was to increase safety belt use to 86 percent for all passenger vehicle occupants by 2016. The goal was met, with 88.4 percent usage.

Table 6-2: 2013 Light and Heavy Trucks in Crashes by Plate Type and Severity

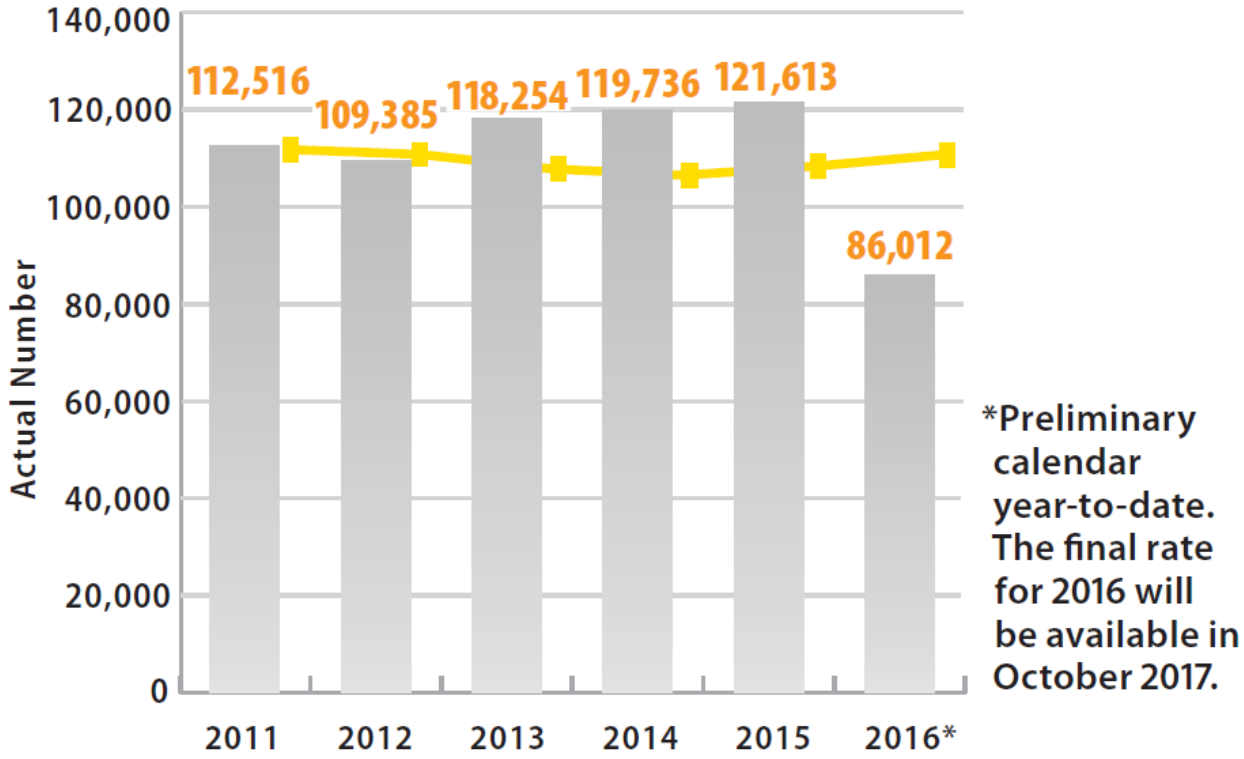
License Plate Type	Crash Severity			Total
	Fatal	Injury	Property Damage	
Light Truck	108	5,476	16,935	**22,519**
Heavy Truck	27	678	2,510	**3,215**
Total	**135**	**6,154**	**19,445**	**25,734**

Source: Wisconsin Department of Transportation, "2013 Wisconsin Traffic Crash Facts"

[15] Wisconsin Department of Transportation, "2013 Wisconsin Traffic Crash Facts."

In terms of all traffic crashes (passenger vehicles and commercial motor vehicles) in Wisconsin, the state experienced a rise in the number of crashes each year from 2012 (109,385 crashes) to 2015 (121,613 crashes), which is shown in Figure 6-1. Each crash potentially creates a loss of life, debilitating injuries, or lost income and productivity for crash victims. Crashes on the road system also impact traffic flow and the timely movement of goods and people to their destinations. WisDOT's goal is to reduce traffic crashes on Wisconsin roads by five percent from the prior five-year rolling average.

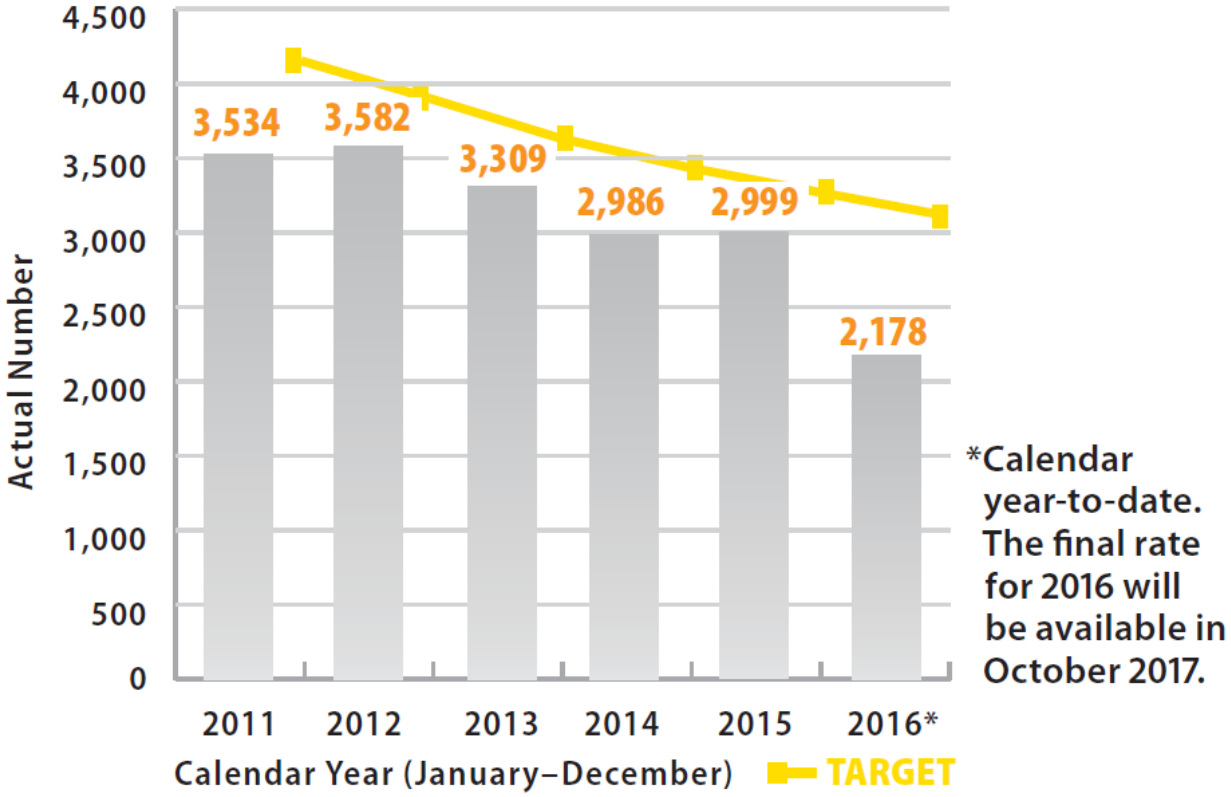
Figure 6-1: 2011-2016 Total Number of Crashes



Source: Wisconsin Department of Transportation, MAPSS

Just like traffic crashes, WisDOT has a goal to reduce the number of personal injuries from traffic crashes by five percent from the prior five-year rolling average. As shown in Figure 6-2, the number of personal injuries from traffic crashes has dropped from 3,582 in 2012 to 2,999 in 2015.

Figure 6-2: 2011-2016 Total Number of Incapacitating Injuries from Traffic Crashes



Source: Wisconsin Department of Transportation, MAPSS

For each calendar year, the department seeks to reduce traffic fatalities by five percent from the prior five-year rolling average. This supports the department's over-arching safety goal of zero deaths on Wisconsin roads (Zero in Wisconsin).[16]

From 2011 to 2015, Wisconsin has averaged 549 traffic fatalities per year. Figure 6-3 shows that the state had 601 fatalities in 2012, but experienced a drop in traffic fatalities in 2013 (527 fatalities) and 2014 (498 fatalities). However, the state has experienced a rise in traffic fatalities in 2015 with 555 fatalities. The state had 99 fatality-free days in 2012, 107 fatality-free days in 2013, 116 fatality-free days in 2014, and 99 fatality-free days in 2015. Even though Wisconsin has had some fatality-free days in recent years, there are still far too many needless and preventable deaths on our roadways. In many instances, drivers and passengers have been ejected from the vehicle because they were not wearing safety belts. The department uses a combined strategy of engineering, education, enforcement, and emergency response to prevent traffic fatalities, including designing safer roads and maintaining the highway infrastructure.[17]

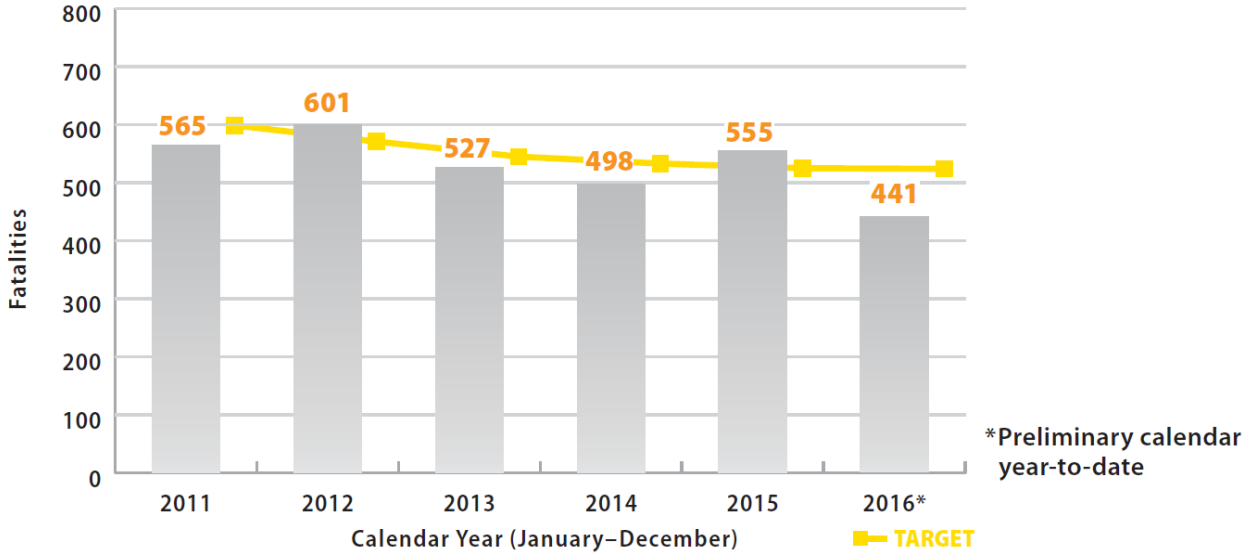
Zero in Wisconsin

WisDOT, working with its traffic safety partners, launched the Zero In Wisconsin campaign. The campaign demonstrates how simple changes in driving behavior and habits, will prevent motorists from injuring and killing themselves or others.

Simply put, in Wisconsin, the only acceptable number of traffic deaths is ZERO.

[16] Wisconsin Department of Transportation, MAPSS.
[17] Ibid.

Figure 6-3: 2011-2016 Number of Traffic Fatalities



Source: Wisconsin Department of Transportation, MAPSS

Highway Safety Improvement Program

The Highway Safety Improvement Program (HSIP) funds highway and local road safety projects at sites that have experienced a high crash history. Emphasis is on low-cost options that can be implemented quickly. Projects typically include intersection safety improvements, improving site distance issues, eliminating roadside obstacles, and installing guardrails and barriers. The overall objective of HSIP is to fund, on a continuing basis, stand-alone safety projects designed to reduce the number and severity of crashes on all streets and highways (state and local).[18]

HSIP also includes a high risk rural road subprogram, which focuses on:

- Rural minor and major collector corridors
- Run-off-the-road crashes
- Areas that have experienced fatal and serious injury crashes
- Low-complexity, low-costs treatments that can be implemented in under three years

FHWA published HSIP and Safety Performance Management Measures rules in April 2016. WisDOT complies with the federal Performance Management Measures rule by submitting annual targets for the five Safety Performance Management Measures to FHWA by the annual deadline.

Enforcement and Emergency Response

WisDOT has expanded the use of multi-jurisdictional High Visibility Enforcement task forces around the state to address impaired driving, speed, pedestrian safety, and safety belt use. Speed and aggressive driving are targeted through increased use of aerial enforcement in partnership with agencies across the state (additional information is provided in the following section).

Using guidelines developed by the National Highway Traffic Safety Administration (NHTSA), the department conducts an annual seat belt use survey in conjunction with the annual Click It or Ticket seat belt enforcement mobilization conducted each spring. The survey data presents a statistically representative sample of the

[18] Wisconsin Department of Transportation, Bureau of State Highway Programs.

percentage of safety belt use in Wisconsin. Safety belt use reached 88.4 percent in 2016, an all-time high for safety belt usage in Wisconsin. That means that approximately one in eight motorists is still not buckling up, putting themselves and others at risk of serious injury or death in the event of a crash. Wisconsin is approaching the 88.5 percent national average for safety belt use but still lags behind the safety belt use of neighboring states like Illinois and Michigan, which estimate safety belt use rates of more than 90 percent.[19]

WisDOT's vision for security is to be able to prevent, prepare for, or coordinate response to any incident, whether caused by natural or human events. By the end of the plan period, WisDOT envisions a state transportation system that will be less vulnerable to incidents, whether caused by natural or human events.

Security considerations have been a part of WisDOT's policies for many years. Hurricanes along the eastern and Gulf Coasts of the United States raised additional concerns about the transportation sector's ability to handle emergencies. More recently, flooding and blizzard events in Wisconsin have affected travelers, businesses, and communities. These experiences have resulted in the public expecting transportation agencies and providers to make the transportation system more resilient. In response, WisDOT has implemented a 511 Traveler Information system, increased the STOC's statewide monitoring and emergency response capabilities, and has developed a fully operational Emergency Transportation Operations (ETO) plan.

WisDOT's role in security and incident management complements the roles of other agencies, from management of disruptive local incidents such as crashes blocking interstate highways, to incidents of regional concern such as HAZMAT spills and fires. In general, incidents are handled by the appropriate agency, depending on the scale and duration of the event. Local law enforcement personnel and emergency crews typically handle incidents of smaller scale and shorter duration; incidents of larger scale and longer duration require broader state and federal oversight.

In addition, within WisDOT's Division of State Patrol's (DSP), the Motor Carrier Enforcement section implemented a Security Contact Review, which thoroughly examines commercial motor carriers' security measures and has a particular focus on vehicles that transport HAZMAT. HAZMAT includes explosives, various types of compressed gases, solids, flammable and combustible liquid, select agents and toxins, and other materials. Because of the risks involved and the potential consequences these risks impose, the handling of HAZMAT is very heavily regulated by all levels of government. WisDOT's DSP enforces Hazardous Materials Regulations (HMR) and regulations for commercial driver license (CDL) operation to ensure safety and security on Wisconsin's roadways.

To enhance safety for all highway users, the Wisconsin State Patrol conducts over 30,000 large-truck inspections and weighs more than 4.5 million trucks in an average year. In addition, State Patrol Inspectors conduct about 13,000 school bus inspections and more than 2,300 inspections of commercial vehicles carrying HAZMAT materials each year. While most operators and trucking firms understand and abide by federal and state regulations, some 7,000 unsafe trucks and 2,300 unsafe drivers are placed out of service in Wisconsin each year.

Education

WisDOT provides ongoing educational outreach to high school students to promote safe driving, use of safety belts, and eliminating driving distractions. The department works to encourage drivers to stay within the speed limit, drive sober, buckle their safety belts, and eliminate driving distractions.

[19] Wisconsin Department of Transportation, MAPSS.

Increased safety belt use is a major component of Wisconsin's Zero in Wisconsin message. WisDOT promotes safety belt use through education and enforcement. The nationwide Click It or Ticket effort, in conjunction with NHTSA, utilizes paid advertising and enforcement to promote public awareness. Much of the educational efforts are targeted at younger drivers whose safety belt use is much lower than other age groups. WisDOT also supports car seat fitting stations to ensure that parents and providers are instructed on how to properly install child car seats and booster seats to keep small children safe in vehicles and training instructors on safety seat installment. By buckling their safety belt every time they get in a vehicle, motorists ensure their own personal safety, as well as the safety of passengers.

WisDOT also participates in a Drive Sober or Get Pulled Over campaign. To save lives and prevent injuries, law enforcement officers from all over Wisconsin and throughout the nation are patrolling in greater numbers and for longer hours to arrest impaired drivers and get them off the road. The goal is not to arrest more impaired drivers. The goal is to deter drunken driving, so that we can reach the ultimate goal of zero preventable traffic deaths.



In 2015, 190 people were killed and nearly 2,900 injured in alcohol-related crashes in Wisconsin. In addition, there were nearly 24,000 convictions for drunken driving in Wisconsin in 2015.[20] Drunken driving is 100 percent preventable, but too many people are still being killed or injured because of the irresponsible decision to drive while impaired.

Engineering

In many ways safer road design can make transportation safer for motorists, bicyclists and pedestrians. Aesthetic, scenic, historic, cultural resources and the physical characteristics of an area are also important factors in designing a road because they help give a community its identity and sense of place, and are a source of local pride.

Highway design standards are continually researched, reviewed and updated to ensure characteristics such as speed, lane width, shoulder width and slope, and stopping-sight distance meet current traffic requirements. Roadway engineering improvements during the past several decades have changed the mix of causal factors and injury outcomes for traffic crashes. Design tools such as guard rails, divided highways, cable barriers, clear zones, and shoulder rumble strips help to minimize the impact of driver error, roadway characteristics, and environmental factors. These tools help keep vehicles on the road, and minimize the consequences of leaving the road – two key department safety goals.

Roadway engineers apply both proactive and reactive tools in their efforts, such as designing facilities, including roundabouts, to modify driver speed behaviors. This requires engineers to anticipate potential problems and determine how drivers could avoid them, while at the same time identifying existing problems and designing facilities to eliminate or reduce their impacts. Examples of specific safety treatments that are considered during road design include:

- Turn lanes
- Flashing yellow arrow left turn signals
- High friction surface treatments
- High tension cable barrier
- Reduced conflict interchange and intersection design
- Pedestrian hybrid beacons

[20] Wisconsin Department of Transportation, Bureau of Transportation Safety.

- Roadway reconfigurations - "road-diet"
- Roundabouts
- Rumble strips
- Safety edge treatment
- Signal head per lane
- Traffic calming road design

Federal and state transportation guidelines stress the importance of good design that is both safe for road users and sensitive to the surrounding environment. For example, the United States DOT adopted guidelines developed by the American Association of State Highway and Transportation Officials (AASHTO) on how to modify roadways to safely accommodate senior drivers and pedestrians as well as other users. Ideas range from larger roadway signs to roadway lighting. WisDOT integrates the AASHTO recommendations on engineering, operations, and maintenance into its activities. WisDOT also continues to increase investments in roadway engineering and operational improvements that reduce the negative influences of roadway design, roadway condition, or environmental factors, and minimize the impact of driver error. The challenge for today's highway designers is to find design solutions, as well as mobility options, that result in a full consideration of these sometimes-conflicting objectives.

In addition to roadway engineering and safety, WisDOT continues to make safety improvements for other modes, such as railroads and aviation. On state-owned rail corridors, WisDOT invests in programs that improve railroad tracks and roadbeds, and railroad crossings (see the Railroad Safety section of this Chapter for more specific details).

On privately-owned corridors, WisDOT works with the OCR and private companies to identify potential needs for improved rail-crossing safety measures such as signals, gates, grade separations, and crossings that should be closed, and it will discourage trespassing by installing fencing.

In terms of aviation, WisDOT supports engineering improvements ranging from technical improvements such as landing and navigational aids, weather monitoring equipment, and rescue and firefighting equipment, to simpler treatments such as runway lighting, land acquisition for protection zones, and fencing to prevent wildlife incursions onto runways.

Air Support for Traffic Enforcement

Speed continues to be a contributing factor in approximately 30 percent of traffic fatalities in Wisconsin. Using a consistent air enforcement presence through the DSP Air Support Unit (ASU), along with dedicated law enforcement vehicles, is an effective method of enforcing speed and aggressive driving. Ensuring ASU is used periodically on traffic corridors helps law enforcement agencies conduct high visibility enforcement efforts and provides a deterrent effect even when air support is not present. Since 2012, the department's goal has been to conduct 80 ASU traffic enforcement deployments per year. In 2017 WisDOT will evaluate and report on results of research into the impact of aerial speed enforcement on selected corridors.[21]

Depending upon the number of law enforcement cars participating in deployments, DSP considers six to eight traffic stops per hour as optimal performance. Each traffic stop does not necessarily lead to a citation.

There are multiple uses for state planes that impact how often the planes are available for traffic enforcement, including: surveillance for criminal investigations, photo flights to document a scene for evidentiary purposes,

[21] Wisconsin Department of Transportation, MAPSS.

search missions, construction work zone enforcement, and use by other agencies such as the Department of Natural Resources (DNR).

Considering how effective aerial enforcement can be as a law enforcement tool, WisDOT has recommitted to planning and funding additional ASU deployments. DSP has dedicated additional federal funds to deployments in cooperation with local law enforcement agencies on high-volume corridors and is looking for ways to attract trained pilots. Consistent deployment of the ASU, along with a highly visible law enforcement presence on the ground, will encourage drivers to stay within speed limits, curb aggressive driving, provide safer work zones, and prevent crashes.

Local Road Safety

As WisDOT continues its efforts to improve the safety of the state's roadway network, including Wisconsin's local roads and bridges, WisDOT coordinates with local governments to manage available safety funding and to program safety improvements. In addition, WisDOT coordinates with locals on data sharing, providing technical assistance and addressing safety issues.

Local governments may use WisDOT data and technical assistance related to safety issues to prioritize applications for funding through WisDOT local programs. WisDOT local programs primarily rely on local governments and metropolitan planning organizations to prioritize and, in some cases, select projects based on safety and other locally determined criteria within funding limitations set by WisDOT for certain programs, project types, or geographical areas. This process allows local governments to consider safety improvements as part of an eligible project in any WisDOT local program.

Rural Road Minor and Major Collector Definitions

Rural Major Collector: Major collectors provide service to smaller-to-moderate sized places and other intra-area traffic generators, and link those generators to nearby larger population centers (cities, villages, and towns) or higher function routes. These routes generally serve places with populations of 100+.

Rural Minor Collector: Minor collectors provide service to all remaining smaller places, link the locally important traffic generators with their rural hinterland, and are spaced consistent with population density in order to collect traffic from local roads and bring all developed areas within a reasonable distance of a collector road. These routes generally serve places with populations of 50+.

WisDOT oversees the HSIP and can use data software that identifies "hot spots" for crashes. A portion of HSIP funds are used for local road safety project needs. Other projects include developing speed management guidelines for roadways, conducting intersection studies for major corridors, and analyzing cross-median crash data. These studies fold into other tools, including the FHWA's urban demand models and the Decision Support System for WisDOT.

Railroad Safety

The safe operation of rail lines is critical to Wisconsin's transportation system. There are many organizations, such as private railroad companies, OCR, WisDOT, and others, that contribute to railroad safety in the state. In addition, there are many safety regulations that these organizations must adhere to. This section further explores some of the roles for some of the organizations involved in rail safety and some of the safety regulations that impact freight movement on the railways.

Railroad Safety Roles

Wisconsin OCR is the state agency with primary jurisdiction for the safety of public roadway-railway crossings, regardless of whether the crossing is at-grade or separated. In carrying out its responsibilities, this office works closely with WisDOT on rail safety issues. The OCR's duties include:

- Authorizing installation, alteration, repair, and consolidation of roadway-railway crossings
- Making determinations on petitions for closures and establishment of new crossings, and on the adequacy of warning devices at railroad crossings
- Making determinations on railroad fencing and railroad track clearance laws

WisDOT is the primary state agency responsible for statewide roadway-railway crossing improvements. WisDOT regularly improves crossings as part of highway projects. These improvements typically address crossing surfaces and active warning devices. Several WisDOT efforts address the security of roads, bridges, buildings, and other transportation assets including rail corridors and stations. Because railroads are typically owned and operated by private interests, WisDOT's enforcement efforts are focused on road traffic at grade crossings. WisDOT also promotes rail safety and security through its website and educational programs such as Operation Lifesaver. At the planning level, WisDOT coordinates with local jurisdictions, metropolitan planning organizations, regional planning commissions, railroads, and rail transit commissions in considering rail safety improvements.

Railroad companies are private entities that typically own the rail lines on which they operate. They are subject to safety and security regulations, primarily at the federal government level. At the state level, they are subject to the regulations of OCR. The responsibilities of railroads, in terms of safety and security, include:

- Maintaining all public roadway-railway crossing surfaces in good repair and in safe condition for public travel (Section 86.12 and Section 86.13, Wis. Stats.)
- Providing advance railroad crossing warning signs for town and county rail crossings (local authority installs the signs)
- Maintaining all installed warning devices, both active and passive, at public at-grade roadway-railway crossings, including interconnecting signals to traffic signals
- Providing safety and security preparedness and emergency response efforts on their rail lines

Amtrak is responsible for ensuring the safety and security of its passenger operations. Examples of the measures it uses include Amtrak police officers and security teams, onboard security checks and canine (K-9) units.

Metra is responsible for ensuring the safety and security of its commuter rail operations. Like Amtrak and private railroad companies, it has its own police department, which provides security for all its lines and stations. Metra also provides training and education on emergency preparedness to its staff and to emergency responders serving communities in which it provides service.

Due to the number of groups having a role in rail safety and security, coordination and communication is very important in ensuring that safety and security issues are addressed quickly and efficiently.

Rail Safety Regulations

Most rail safety rules and regulations fall under the jurisdiction of the Federal Railroad Administration (FRA). The 2008 Rail Safety Improvement Act requires stronger rail safety measures affecting grade crossings, train operations, crews, and hours of service, and calls for the improvement of automatic train stop technologies. Railroads operating in Wisconsin are subject to these federal rules and regulations. As a result of federal preemption, Wisconsin has limited autonomy with regard to rail safety issues. While WisDOT can make the FRA aware of particular issues, the department cannot force a railroad to act.

There are three key safety concerns with rail transportation:

- Crossings
- Quiet zones
- Collisions and derailments

In addition, there are two concerns that impact both safety and security:

- Trespassing
- Shipment of HAZMAT

Rail Crash Data

Rail incidents, such as collisions or derailments, can cause property damage, injuries and fatalities. Crash data is collected from the FRA's Office of Safety Analysis and Wisconsin's OCR. Table 6-3 identifies freight railroad injuries and fatalities in Wisconsin between 2012 and 2015. The number of fatal and injury incidents increased from 2012 to 2014, but has experienced a decline in both categories in 2015. One possible factor in the rise of incidents in Wisconsin is attributed to increased train traffic, which can be attributed to recent booms in sand mining in Wisconsin and crude oil from shale in North Dakota. Fewer shipments of these commodities occurred in 2015 in Wisconsin and thus may have contributed to the decrease in incidents.

In an effort to mitigate passenger vehicle and train incidents, the OCR spends over $4 million a year upgrading rail crossings. Through the Six-year Highway Improvement Program, WisDOT schedules rail crossing projects that occur on state highways (see Chapter 9, *Investment and Implementation*).

Table 6-3: 2012-2015 Railroad Crashes in Wisconsin

Category	CY 2012	CY 2013	CY 2014	CY 2015
TOTAL FREIGHT ACCIDENTS/INCIDENTS	122	156	180	148
--- Total fatalities	4	5	15	7
--- Total nonfatal conditions	68	103	110	90
--- Employee On Duty (EOD) deaths	.	.	.	.
--- Nonfatal Employee On Duty (EOD) injuries	47	67	80	63
--- Nonfatal Employee On Duty (EOD) illnesses	1	2	3	.
--- Total Employee On Duty (EOD) cases	48	69	83	63
--- Cases with days absent from work	28	52	56	48
--- Trespasser deaths, not at Highway-Rail Crossing (HRC)	1	3	4	5
--- Trespasser injuries, not at Highway-Rail Crossing (HRC)	1	3	2	3
FREIGHT TRAIN ACCIDENTS	25	15	34	30
--- Train accident deaths	.	.	.	.
--- Train accident injuries	.	1	3	1
--- Human factor caused	8	5	18	14
--- Track caused	9	6	8	9
--- Motive power/equipment caused	6	2	7	4
--- Signal caused, all track types	.	.	.	1
--- Signal caused, main line track	.	.	.	.
--- Miscellaneous caused	2	2	1	2
--- Collisions	.	.	1	3
-------- Collisions on main line track	.	.	1	1
--- Derailments	18	11	20	20
--- Other types, e.g., obstructions	7	4	13	7
--- Train accidents on main line	8	7	12	10
--- Accidents on yard track	15	4	18	12
--- HAZMAT RELEASES	.	.	1	2
--- Cars carrying HAZMAT	140	87	205	222
--- HAZMAT cars damaged/derailed	3	1	7	32
--- Cars releasing	.	.	1	6
--- Accidents with reportable damage over $100K	2	7	9	11
..... PERCENT of all train accidents	8.0	46.7	26.5	36.7
--- Accidents with reportable damage over $500K	1	2	2	3
..... PERCENT of all train accidents	4.0	13.3	5.9	10.0
--- Accidents with reportable damage over $1M	1	1	1	2
..... PERCENT of all train accidents	4.0	6.7	2.9	6.7
FREIGHT HIGHWAY-RAIL INCIDENTS	42	59	52	34
--- Highway-rail incidents deaths	3	2	10	2
--- Highway-rail incidents injuries	12	22	17	10
--- Incidents at public crossings	35	54	47	33
..... PERCENT of total Highway-rail incidents	83.3	91.5	90.4	97.1
OTHER FREIGHT ACCIDENTS/INCIDENTS	55	82	94	84
--- Other incidents deaths	1	3	5	5
--- Other incidents injuries	56	80	90	79

Source: Federal Railroad Administration, Office of Safety Analysis[22]

[22] Freight operation data reflected are based on the type of equipment reported by railroads to FRA. Casualty data are solely those reported to the FRA that are related to the type of equipment associated with Freight Operations. Total freight Accidents/Incidents are the sum of Train Accidents, Crossing Incidents, and Other Accidents/Incidents. Other Freight Accidents/Incidents are events other than Train Accidents or Crossing Incidents that cause physical harm to persons. The related report numbers are included in the TOTAL FREIGHT ACCIDENTS/INCIDENTS section numbers. Freight Operation data does not support rates based on Freight train miles being calculated when freight or both Region and/or State are selected.

Rail-Highway Crossings

Over 7,100 rail-highway crossings are located in Wisconsin. Rail-highway crossings can be either at-grade or grade-separated. At-grade crossings are the most common type of crossing in Wisconsin, accounting for approximately 6,300 open crossings or over 89 percent of all crossings in the state. At-grade crossings occur wherever a railway and highway physically intersect. Grade-separated crossings, approximately 800 in Wisconsin, occur when the railway and roadway are physically separated by an overpass or underpass.[23]

Since 1990, crashes at highway-railway grade crossings have declined by more than 50 percent nationally. Even with this decline, railway-roadway crossing safety remains a concern.[24]

At-grade lights and gates are the most prevalent safety features that warn vehicles and pedestrians crossing Wisconsin railroads. Table 6-4 indicates the prevalence of these features in both publicly and privately-owned railroads.

Table 6-4: At-Grade Warning Devices

Warning Device Type	Public	Private	Pedestrian	Total
Passive	2,136	1,708	68	3,912
Lights (no gates)	924	275	13	1,212
Lights & Gates	941	284	4	1,229
Total	**4,001**	**2,267**	**85**	**6,353**

Source: Railroad Crossing Information System
A passive railroad crossing is a crossing without an active warning device (lights and/or gates), but contains passive warning devices, such as a crossbuck, yield, or stop sign.

[23] Railroad Crossing Information System.
[24] Wisconsin Department of Transportation, "Wisconsin Rail Plan 2030."

At-grade crossings are equipped with warning devices to alert vehicles and pedestrians of the presence of a rail crossing. These warning devices may be either passive or active. Passive devices do not change when a train is approaching. Examples of passive devices include:

- Circular advance warning signs
- Stop signs
- Crossbucks (the familiar X-shaped signs)
- Pavement markings
- Median barriers

In comparison, active devices activate as a train approaches. For example, lights may flash and gates may be lowered. Examples of active devices include:

- Two quad gates
- Four quad (full barrier) gates
- Flashing lights (cantilevered or mast-mounted)
- Bells
- Yield signs
- Highway traffic signals
- Special warning devices such as flagmen

WisDOT and local governments use both active and passive devices.

Crossing safety may also be increased through changes to the roadway or to the area near the crossing. For example, the design of the roadway may be changed to improve sight distances. Likewise, clearing brush or trees can also improve sight distances.

Safe Transportation of Energy Products Grant Award

In 2016, WisDOT was awarded $3 million from the FRA's Safe Transportation of Energy Products (STEP) grant program. The funding supports department and OCR efforts to improve grade crossing safety needs in Western Waukesha County.

The project corridor applies to a "sealed corridor concept." The project corridor is a 10-mile stretch going through the communities of Pewaukee, Hartland, and Delafield. On average, every day two Amtrak trains travel the corridor at speeds up to 79 mph, along with 23 daily freight trains traveling up 60 mph - carrying ethanol, Bakken crude oil and other products.

The sealed corridor concept will improve safety at 11 consecutive crossings, including a pedestrian crossing, by providing geometric and warning device upgrades and providing the corridor with up-to-date train detection circuitry.

WisDOT's rail crossing data is maintained in the Railroad Crossing Information System. The data is used to analyze the physical characteristics of rail crossings. The department uses this database as a tool to assist decision makers in prioritizing crossing improvements. In terms of improvements, WisDOT and local governments regularly improve roadway-railway crossings as part of roadway projects. Any project that crosses a rail line or ends near a rail line must include a review of whether any crossing improvements are needed. WisDOT and local governments cannot ignore any railway crossing-related improvements when completing a roadway improvement project. In some instances, WisDOT or a local government may improve a roadway-railway crossing even though a project is not planned. In all instances, crossing improvements are coordinated with the railroad company.

With approximately 6,300 at-grade crossings in the state, rail crossing safety remains a challenge and a priority. Actions that can be taken to improve rail crossing safety include minimizing the installation of new crossings of rail lines, increasing education about the dangers of rail crossings, constructing grade-separated crossings, or closing existing crossings.

Educational efforts can increase public awareness of the dangers at roadway-railway crossings and emphasize the need for motorists, pedestrians, and bicyclists to respond properly to crossing warning devices. *Connections 2030*

stated that WisDOT will continue to support the Operation Lifesaver program that teaches safe behavior while crossing railroad tracks.

As noted earlier, grade-separated crossings are safer than at-grade crossings because they physically separate vehicles, pedestrians, and bicyclists from trains. Grade-separated crossings also:

- Eliminate the need for signs, barriers, or other safety devices and technologies to warn roadway users of oncoming trains
- Reduce traffic congestion caused by vehicles waiting at a crossing for a train to pass, and as a result may also improve air quality and reduce energy consumption

However, grade-separated crossings are expensive to build and maintain. Typically, these crossings are built in locations with higher volumes of vehicle and train traffic. Construction may be hindered by physical limitations such as existing land uses and topography.

The most effective way to improve crossing safety is to close crossings. While closing a crossing can positively impact crossing safety, it can result in hardships to those directly affected by the crossing. For example, eliminating a crossing may result in greater travel times for drivers, bicyclists, and pedestrians. It can also result in increased emergency response time for emergency vehicles. Closed crossings may also function as barriers, preventing easy or convenient movement within a community and between neighborhoods. As a result, WisDOT and the OCR consider many factors when deciding whether to close a crossing. They include:

- Amount of vehicle and pedestrian traffic
- Response time for emergency vehicles
- Physical conditions and visibility
- Feasibility of rerouting traffic to adjacent crossings
- Crash history and predicted crash frequency rate
- Improvement in livability in the area near the proposed closure

Rail line abandonment can result in the closure of large numbers of crossings. However, rail line abandonments typically occur on low-volume railway corridors. As a result, the derived safety benefit may be minimal. In addition, the bulk of rail line abandonments occurred during the 1980s. While railroads still abandon low-volume corridors, these abandonments occur less often than in the past. Of the 49 crossings closed in the state from 2000 to 2009, none were due to rail line abandonment.

Where possible, WisDOT and OCR target crossing closures in areas with multiple adjacent crossings, concentrating safety improvements at the remaining crossings. By focusing on these areas, many of the negative impacts associated with closures can be minimized.

WisDOT will continue to work with OCR and private railroad companies to identify potential rail crossing safety improvements such as signals, gates, grade separations, or closing crossings. In addition, for rail corridors with intercity passenger rail service, WisDOT will continue to work with OCR to discourage new at-grade crossings of the corridors. WisDOT will work to equip federally-designated high-speed rail corridor crossings with appropriate warning devices.

Collisions and Derailments

While derailments may occur when a train collides with a vehicle, the chances for a derailment increase significantly if a train collides with another train. This section focuses on train-to-train collisions. These collisions may result from natural events, human error, or from a range of other potential causes. Examples of technologies used to minimize or avoid collisions and derailments are depicted in Table 6-5.

Table 6-5: Description of Rail Safety Technology Designed to Reduce Train Collisions and Derailments

Technology	Description
Positive train control	• Enables computers to override human workers in emergency situations • Helps prevent train-to-train collisions, over speed derailments, and casualties or injuries to railway workers • Required for all Class I railroads and Amtrak by the end of 2018 at the earliest
Electronically controlled pneumatic brakes	• Results in shorter stopping distances, fewer derailments and collisions, and reduced severity of collisions that do occur • Allows each car to be braked simultaneously — in comparison to current braking systems which apply power car-to-car from the front of the train to the rear • Allows engineers to "back off" braking efforts to match track grade and curvature without completely releasing the brakes
Distributed power	• Results in improved handling, demonstrated by an average 22 percent reduction in stopping time and a 30 percent reduction in braking distance • Occurs when multiple locomotives, controlled by the lead locomotive, are spaced throughout long trains • Uses radio-signal remote technology to serve as communication link between the locomotives

Source: Wisconsin Department of Transportation, Bureau of Transit, Local Roads, Railroads and Harbors

Trespassing

Trespassing presents both safety and security concerns. Even as roadway-railway crossing-related fatalities have declined, the number of trespassing-related fatalities has risen. Since 1997, trespassing fatalities have become the leading cause of rail-related fatalities in the United States. In Wisconsin, there were sixteen trespassing-related fatalities between 2007 and 2009. Trespassing also presents rail security concerns. Since the events of September 11, 2001, trespassers are now considered a potential security threat.

The public is generally indifferent to trespassing, with some even finding it socially acceptable. Since rail facilities are private property, trespassing is illegal and subject to local and state laws. (Note: There is an exception to the trespassing laws for private crossings, whereby a person who owns the property on each side of a railroad can drive across the railroad on that property.)

Railroads, local jurisdictions, and state and federal agencies rely on a variety of measures to prevent and restrict trespassing. Education is one measure. The FRA sponsors and carries out public education related to the dangers of trespassing on rail facilities. Railroad police departments play a crucial role in monitoring trespassing. These departments work closely with public enforcement agencies. Fencing, lighting, gates and barricades can be installed to discourage trespassing. WisDOT will continue to work with the OCR and private railroad companies to discourage trespassing by installing fencing.

Hazardous Materials Transport

The United States DOT defines HAZMAT as substances or materials capable of posing an unreasonable risk to health, safety, or property when transported in commerce. HAZMAT shipments present a unique safety and security concern. In the absence of a collision, derailment, or security threat, these shipments present little risk. However, if a collision or derailment were to occur, or if a terrorist were to use a HAZMAT shipment as a weapon, the potential consequences would be considerable.

The Office of Wisconsin Emergency Management (WEM) coordinates security concerns in Wisconsin, including coordinating emergency response efforts. WEM contracts with eight regional HAZMAT response teams to provide a high level of response capability to the state's communities. These teams may be activated for an incident involving a HAZMAT spill, leak, explosion, injury, or the potential of immediate threat to life, property, or the environment. County-level response teams respond to lower-level HAZMAT incidents that exceed the capabilities of standard fire departments. In terms of transportation security, WisDOT's role is limited. Currently, WisDOT enhances the security of the transportation system by reducing vulnerability and improving incident response.

WisDOT continues to work with WEM, railroad companies, and other agencies to discuss rail-related security issues. WisDOT also expects rail carriers to comply with regulations related to the transportation of any HAZMAT and work with the appropriate agencies if a spill occurs.

Waterway Safety

As shown in Table 6-6, maritime transportation on inland waterways has the lowest injury and fatality rates compared to highway and rail transportation. Comparing fatality and injury rates between modes shows a ratio of 18.1 fatalities on rail and 132 fatalities on highways per fatality on the inland river system. Similarly, there is one injury on the inland river system for every 95.3 rail and 1,609.6 highway injuries.[25] While these data are not specific to Wisconsin, they do suggest the inland waterway system is substantially safer than highway and rail.

Table 6-6: Fatality and Injury Rate from 2001 – 2009 by Mode

Mode	Fatality Rate (per billion ton-miles)	Injury Rate (per billion ton-miles)
Highway	3.829	87.534
Railroad	0.525	5.183
Inland Towing	0.029	0.054

Source: National Waterways Foundation, "A Modal Comparison of Domestic Freight Transportation Effects on the General Public: 2001-2009"

On the Great Lakes, the injury and fatality rate for maritime transportation is the lowest in comparison to rail traffic. From 2002 to 2011, there were 0.15 injuries per 100 billion ton-miles on the waterways compared to 2.59 injuries on Canadian railroads and 10.2 injuries on Class I freight railroads. Additionally, there were zero fatalities due to vessel collisions/strikings or groundings.[26]

6.5 Transportation System Condition

WisDOT uses a comprehensive asset management approach to identify and address the state's transportation system needs. This asset management approach allows WisDOT to analyze transportation system conditions such as pavement, bridge, and rail line condition, and to identify preservation needs using data based on the physical infrastructure, safety, operation, function, and connectivity of the facility. It also allows WisDOT to consider a range of funding and construction alternatives, which results in a systematic and objective approach to cost-effective transportation system preservation. WisDOT uses comprehensive data to monitor the conditions of key infrastructure statewide including highway pavements and bridges. Infrastructure condition is used to identify

[25] National Waterways Foundation, "A Modal Comparison of Domestic Freight Transportation Effects on the General Public: 2001-2009."
[26] Great Lakes St. Lawrence Seaway System, "Safety Profile of the Great Lakes-St. Lawrence Seaway System Executive Summary." (March 2014).

system needs and recommend appropriate treatments to achieve or preserve the state's transportation infrastructure. For the state-owned railroad system, WisDOT collects system data to monitor condition and address capital improvement needs with the rail line operator. Use of this data for each mode helps WisDOT to develop cost-effective preservation and maintenance strategies, which, in turn, maximizes prior and current investments.

State Trunk Highway System Pavement and Bridge/Structures Condition

Pavement that is in good condition promotes the safe and efficient movement of people and products throughout Wisconsin. Comprehensive pavement condition data is necessary to determine cost-effective maintenance and improvement strategies that extend the life and serviceability of the state trunk highway system.

Highway maintenance activities focus on the infrastructure along the highway right of way, including, but not limited to, roadway pavement and shoulders, bridges, rest areas, signs, drainage, and pavement markings, which is further discussed in this section. WisDOT maintains nearly 11,800 miles of highway infrastructure, over 5,200 bridges and more than 150,000 acres of roadside adjacent to state trunk highways.[27,28,29] WisDOT prioritizes infrastructure investments based on the state's backbone and non-backbone roadway system. This section provides an overview of the performance of the state's backbone and non-backbone highway system.

Pavement Condition Data
Comprehensive pavement condition data is used to determine cost-effective maintenance and improvement strategies that extend the life of the state highway system. Pavement conditions are impacted by material quality, adequacy of pavement design, traffic loading, improvement and maintenance history, age, and environmental factors such as temperature and moisture. The department considers all of these factors when using asset management tools and strategies to determine investment levels and steward highway improvement funding provided through the state budget.

Highway Pavements

Engineers design roads to accommodate projected vehicle loads; in particular, heavy vehicle axle loads. The life of a pavement is related to the magnitude, number of repetitions and spacing of heavy axle loads. There are instances where heavy vehicles can exceed Wisconsin weight laws. The width of pavement can impact the design of roadways. The average width of paved roadways in Wisconsin ranges from 18 feet to 24 feet from edge of pavement to edge of pavement with most town roads between 20 feet and 22 feet.

Pavement preservation activities usually follow a standard process. Assuming timely preservation improvements, state highways are designed to last 50 to 60 years before they need to be reconstructed. However, several factors influence pavement life, such as the timing and type of maintenance and preservation activities, weather, traffic volumes, vehicle weight, and soil conditions.

To achieve a 50- to 60-year roadway life, resurfacing or reconditioning activities are typically necessary 15 to 25 years after initial construction and several more times before the end of the 50- to 60-year time span. It is at this point that a roadway will likely need complete replacement.

[27] Wisconsin Department of Transportation, Bureau of Planning and Economic Development
[28] Wisconsin Department of Transportation, Bureau of Structures, "Annual Bridge Report." (April 2016).
[29] Wisconsin Department of Transportation, Bureau of Highway Maintenance, "Highway Maintenance Manual." (June 2015).

WisDOT's Pavement Management System
The development of Wisconsin's pavement management system began in 1987. Wisconsin has a geographic information system that provides spatial and mapping capabilities. The pavement management system uses pavement inventory data and a decision support system to develop preservation and maintenance programs. The system also provides a database for complex pavement modeling efforts and statewide planning efforts. Pavement sections with identified needs are aggregated into improvement sections (a section whose length is generally more typical of preservation or maintenance projects), with low-, nominal-, and high-level treatment strategies recommended for the entire section. The final treatment selected is based on the relative impacts of five factors: improvement in ride, improvement of distress rating, user inconvenience, initial cost, and life cycle cost. The final product is WisDOT's Six-Year Highway Improvement Program.

WisDOT uses the Pavement Condition Index (PCI) methodology to rate pavement condition and monitor performance. This methodology relies on visual signs of pavement distress (e.g., cracks, ruts, or potholes) to determine the underlying mechanics impacting the pavement structure and rates it accordingly. PCI is a numerical rating that ranges from 0 to 100, where 100 represents pavement in excellent condition and 55 represents a minimum rating for pavement in fair condition. Specialized pavement data collection vehicles gather data on the state trunk highway system on a two-year statewide collection cycle. Determining when to schedule preservation or maintenance work is a complex task. WisDOT analyzes pavement condition data to determine where and when repairs are needed, and to determine viable alternatives. In addition, the department assesses the metropolitan planning organization recommendations published in each organization's long-range transportation plan when assessing priority needs.

Pavement Design and Heavy Vehicle Considerations

Pavement designers consider the amount, type and weight of traffic using the road. This data is used to calculate an equivalent single-axle load (ESAL – pronounced "easel") factor; this factor is a way of measuring the impact that a vehicle will have on a pavement.

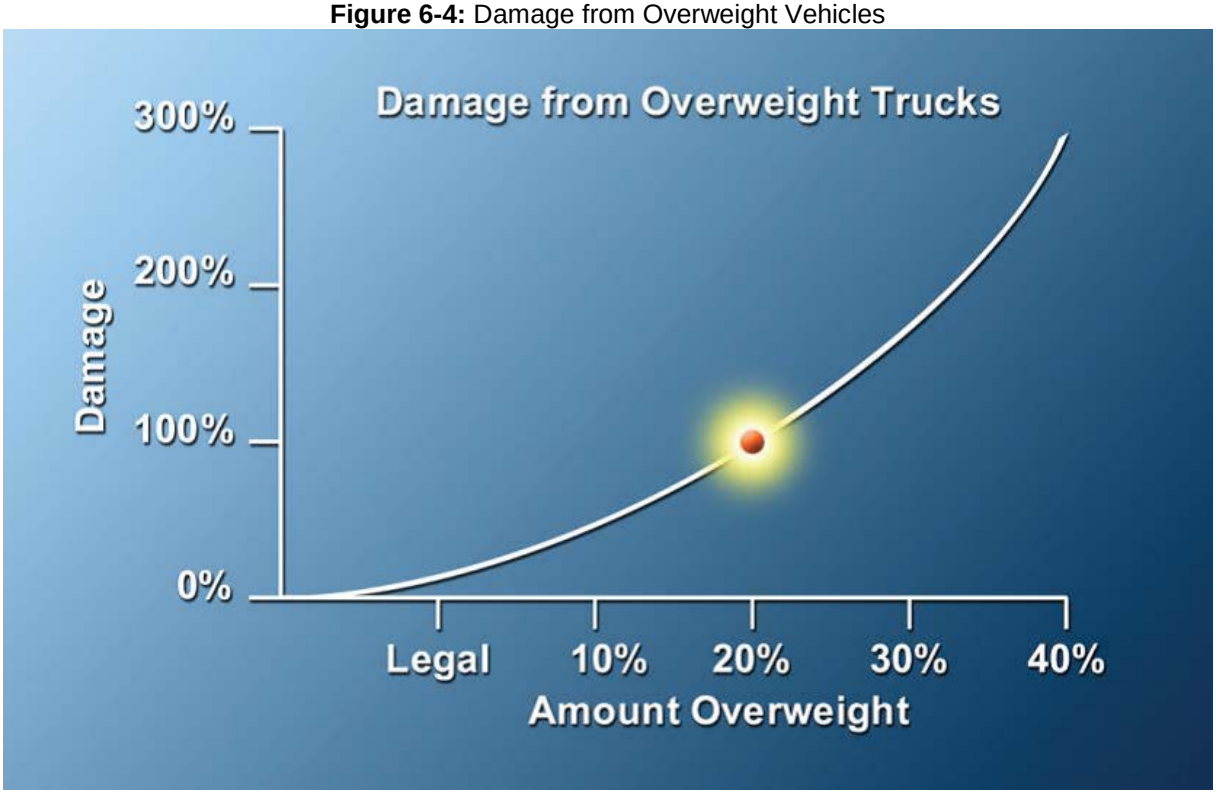
Pavements should be viewed as a "consumable" and are designed to carry an estimated number of ESALs over their design life. As a heavy load passes over a pavement, a portion of its life is consumed. Eventually, a pavement's life is expended, and it needs to be reconstructed.[30]

Engineers forecast traffic that will travel over a roadway during its design life. This traffic is then used to calculate a design ESAL. If the actual traffic volume and/or vehicle weights exceed forecasts, then the roadway's "actual" life will be less than its design life. Over the past decades, both traffic volumes and vehicle weights have increased dramatically.

If vehicles are overloaded, the damage to pavement can be severe and exponential. This results in a reduced pavement life. As shown in Figure 6-4, if all vehicles were 20 percent overweight, pavement life is cut in half.

[30] Local Road Research Board, "Roads & Loads: Finding a Balance."

Figure 6-4: Damage from Overweight Vehicles



Source: Local Road Research Board

"The load equivalency factor increases approximately as a function of the ratio of any given axle load to the standard 18 kip single axle load raised to the fourth power."[31]

The effect of large and heavy equipment on pavements is not constant throughout the year.[32] During the winter, when the ground is frozen, a truck carrying a given load causes less damage to pavements than at other times of the year. During the spring, the inverse is true: pavement structure layers are generally in a saturated, weakened state due to partial thaw conditions and trapped water, causing greater pavement damage by the same truck. During spring thaw, Wisconsin restricts heavy loads greater than 80,000 pounds on roadways.

In Wisconsin, weight limits have been written into state statute (Chapter 348.15) in an effort to protect the significant investment in transportation infrastructure. All roadways are class "A," unless the maintaining authority has posted it as class "B." Class A roadways have a maximum single axle weight allowance of 20,000 pounds when the vehicle has appropriate axle spacing – meaning a distance of 10' between foremost and rearmost axles of a group. Class B roadways allow 60 percent of axle weight allowed on class A roadways. Other weight restrictions might be imposed by local and municipal roadways (348.17 & 349.16).

Backbone Pavement Condition

Good condition pavement promotes the safe and efficient movement of people and products throughout Wisconsin. Comprehensive pavement condition data is necessary to determine cost-effective maintenance and improvement strategies that extend the life and serviceability of the state trunk highway system. The goal is to

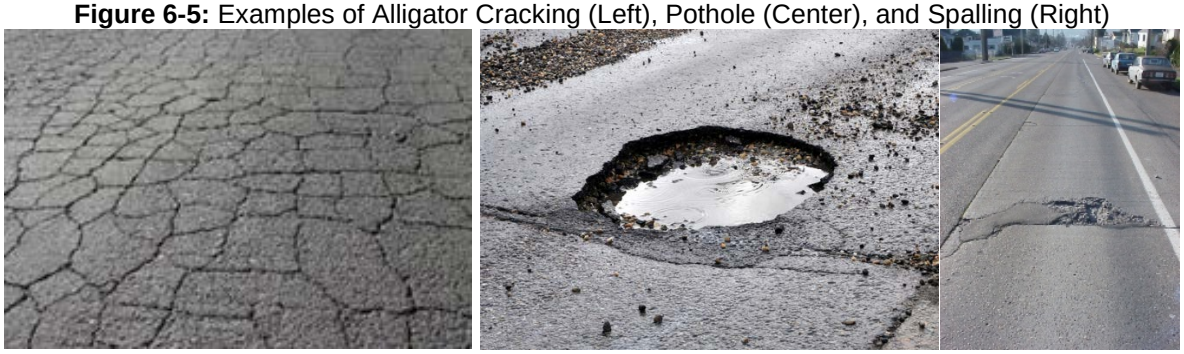
[31] American Association of State Highway and Transportation Officials, "AASHTO Guide for Design of Pavement Structures, 1993."
[32] Local Road Research Board, "Roads & Loads: Finding a Balance."

have 90 percent of backbone highway pavement rated fair or above using the most cost-effective pavement improvement methods available (Figure 6-6).

A pavement is considered in fair or better condition if it has a Pavement Condition Index (PCI) of 55 or more. WisDOT follows PCI, the national standard (ASTM D 6433) for evaluating pavement condition based on visual observation of various distresses, in assessing the state of repair of sections of highways (backbone and non-backbone). Each distress is categorized by type, severity, and quantity. The severity and quantity of each distress type is used to calculate a deduct value to quantify its effect on pavement condition. For the state highway system, distress deducts are combined to generate a numeric rating between 0 and 100, with 100 representing a pavement in perfect condition. The most common classified distresses include the following (Figure 6-5):

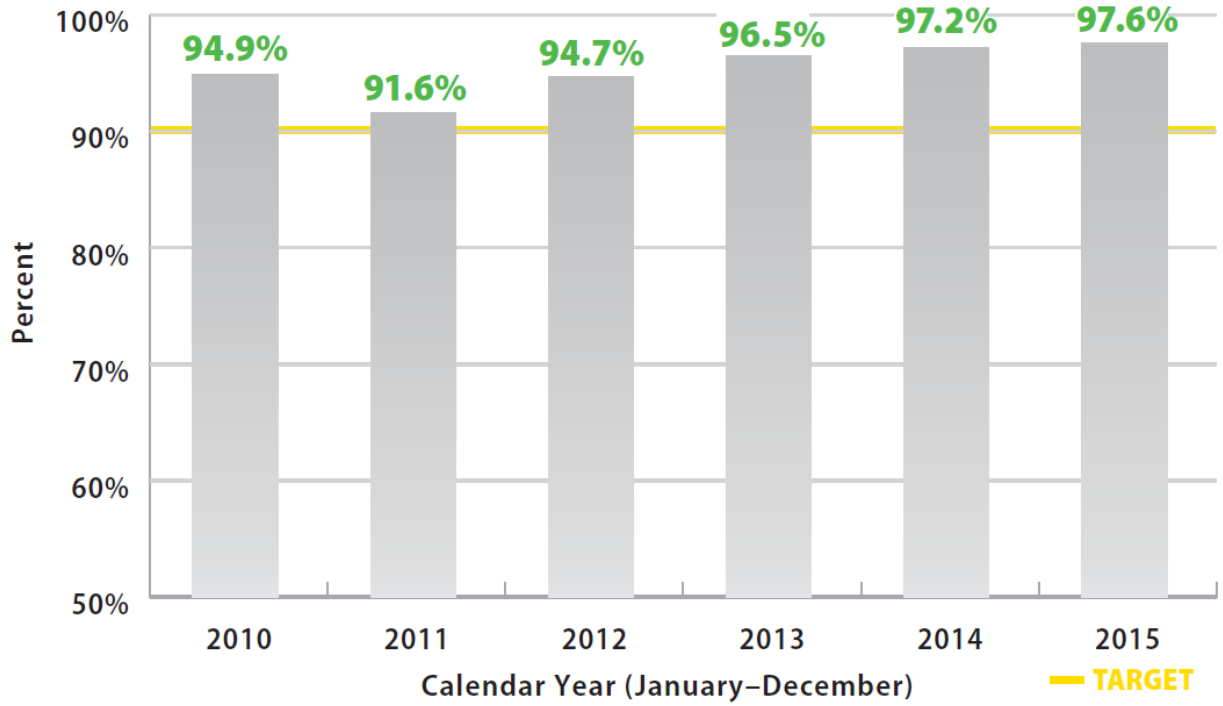
- **Asphalt Pavements –** alligator cracking, block cracking, bleeding, edge cracking, joint reflective cracking, longitudinal and transverse cracking, patching, potholes, rutting, weathering, and raveling.
- **Portland Cement Concrete (PCC) Pavements –** corner breaks, divided slabs, durability cracking, faulting, linear cracking, patching, scaling, joint spalling, and corner spalling.

Figure 6-5: Examples of Alligator Cracking (Left), Pothole (Center), and Spalling (Right)



Source: Wisconsin Department of Transportation, Bureau of State Highway Programs

Figure 6-6: 2010-2015 Percent of State Backbone Highway Pavement Rated Fair or Above



Source: Wisconsin Department of Transportation, MAPSS

The 2015 data shows 97.6 percent of the backbone system is in fair or above condition, a slight improvement over the previous year. Backbone highways typically rate higher than non-backbone highways because backbone pavement needs are prioritized due to their importance to overall system function. While backbone highways represent only 13.5 percent of state trunk highway miles, they carry 49 percent of highway traffic and approximately 85 percent of the freight ton-miles traversing Wisconsin's state trunk highways.

As noted earlier, generally, backbone pavement needs are prioritized above non-backbone pavement needs due to their importance to overall system function. Pavement condition is affected by material quality, adequacy of pavement design, traffic loading, improvement and maintenance history, age, and environmental factors such as temperature and moisture. The department considers all of these factors when using asset management tools and strategies to determine investment levels and steward highway improvement funding provided through the state budget.

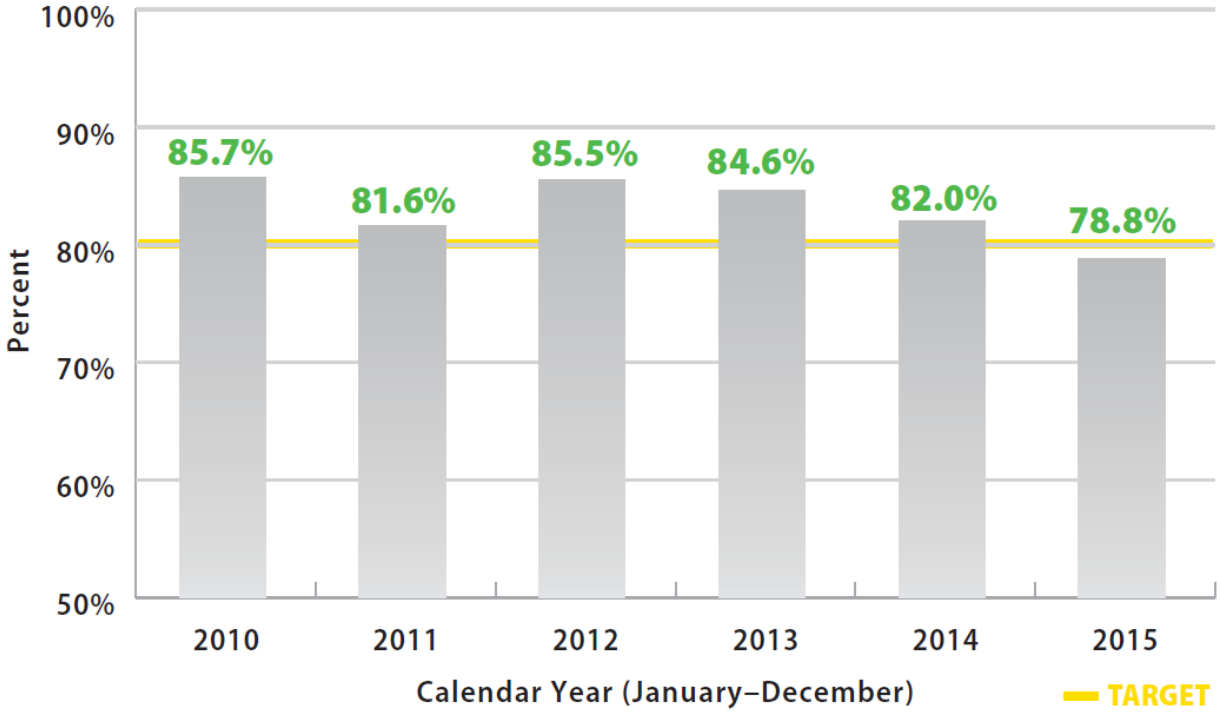
The department continues to research, develop, and implement pavement rehabilitation and maintenance processes that maximize the long-term health of the highway system. This includes researching and testing new materials, as well as enhancing asset management strategies with improved data, analysis tools, and prioritization to make sound investment decisions. The improved collection methodology enhances the effectiveness of the Pavement Management Decision Support System (PMDSS). PMDSS uses pavement data to assist engineers, planners, and analysts in determining which segments of roadway to include in the six-year improvement program.

Non-Backbone Pavement Condition

The majority of the 11,800 miles of state trunk highway is on the state's non-backbone highways. Referred to as the 3R (resurfacing, restoration, and rehabilitation) system internally to WisDOT, these highways comprise over 10,000 miles of the entire system, and provide critical system connections to the state's backbone routes. The goal

for 3R routes is to have 80 percent of pavements rated fair or above using the most cost-effective pavement improvement methods available (Figure 6-7).

Figure 6-7: 2010-2015 Percent of State 3R/Non-Backbone Highway Pavement Rated Fair or Above



Source: Wisconsin Department of Transportation, MAPSS

The 2015 data shows 78.8 percent of the non-backbone system in fair or above condition, a reduction of about 3.2 percentage points from 2014. Non-backbone highways carry 51 percent of all state trunk highway traffic and approximately 15 percent of the freight ton-miles traversing Wisconsin's state trunk highways.

Similarly to the backbone condition performance measure, the department continues to research, develop, and implement pavement rehabilitation and maintenance processes that maximize the long-term health of the highway system.

Structures and Bridges

The state trunk highway system includes over 5,200 bridges and similar structures, as well as a variety of ancillary structures such as retaining walls, culverts, sign structures, noise barriers, and high-mast light structures.

By FHWA definition, a bridge has a minimum clear span length of 20 feet between the faces of abutments. A culvert can resemble a bridge with similar features and characteristics, but is less than 20 feet long from abutment to abutment. Culverts can also be fixed metal or precast/concrete pipes or chutes. Culverts, unlike bridges, are not inventoried or even inspected in the same manner as state, county, and local bridges.

Most bridges are designed to have a life expectancy of up to 75 years. To achieve this, bridge decks, girders, trusses, and substructures must be regularly maintained. WisDOT performs regular inspections on all bridges, and stores the inspection data in the department's Bridge Management System. Bridge inspections are key to helping the department decide whether future bridge construction or repair is needed.

WisDOT continually monitors and applies emerging technologies to further complement the department's strong asset management philosophy. This enables the department to continually analyze bridge data, monitor bridge conditions, identify potential future problems, and recommend preservation activities. For planning purposes, WisDOT measures bridge performance using two ratings:

- Deck condition – evaluates the riding surface and other deck components on a scale of 0 to 9. A lower score indicates a need for ongoing maintenance and eventual deck replacement.
- Sufficiency rating – rates a bridge's sufficiency (or capability). Factors include the bridge's adequacy, safety, serviceability, and functional obsolescence, as well as how essential the bridge is for public use. Ratings range from 0 to 100. Lower scores indicate a deficiency.

WisDOT developed performance thresholds to rate bridges and structures regarding deck condition, infrastructure quality, and load-carrying capacity. WisDOT uses these performance measures to identify bridges that need preservation or maintenance improvements. The department also uses these performance measures to supplement bridge inspection reports. Both bridge inspections and the performance measures help extend the useful life of the facility and delay structural deterioration that may result in the need for weight limits.

WisDOT has developed a robust asset management program for structures. The program includes defined inspection cycles, replacement, and maintenance strategies.

State-Owned Bridge Condition

Wisconsin's bridges are critical infrastructure assets of the transportation network. Inspecting and evaluating bridges is a key component of meeting the department's transportation safety and efficiency goals. An accurate inventory of the state's bridges allows for planning and prioritizing limited resources to address deterioration concerns and operational needs.

Wisconsin has a known inventory of more than 14,000 bridges that are maintained by the state and local governments. The department performs bi-annual safety inspections and condition assessments of bridges. This is the designated frequency in National Bridge Inspection Standards (NBIS). Through these inspections, condition rating data is collected and reported to WisDOT for the deck, superstructure, and substructure, and an overall rating of good, fair, or poor condition is assigned each calendar year. The final bridge rating is based on the lowest rating a bridge received for any of its components.

Wisconsin Bridges[33]

- 14,116 Bridges (over 20' in length)
  - 5,259 State owned (37 percent)
  - 8,857 Locally owned (63 percent)

Bridge Component Definitions

Deck – the portion of a bridge that carries traffic.

Superstructure –the portion of the bridge that supports the deck and connects one substructure element to another.

Substructure – the portion of the bridge that supports the superstructure and distributes all bridge loads to below-ground bridge footings.

[33] Wisconsin Department of Transportation, Bureau of Structures, "Annual Bridge Report." (April 2016).

Wisconsin bridges are an important infrastructure asset for the vitality of the highway transportation network. Ensuring safety for the traveling public is a top priority for the department. Inspecting and evaluating bridges is a key component to meeting this objective.

National Bridge Inspection Standards

The NBIS requires inspection of all publicly-owned highway bridges longer than 20 feet.

The NBIS establishes minimum qualifications for inspection personnel, identifies which bridges to inspect, and defines the information to be collected and reported as part of the inspection process.

As of 2015, 96.8 percent of Wisconsin's more than 5,200 state-owned or maintained bridges had a good rating or fair rating (Figure 6-8), while 3.2 percent of state bridges had a poor condition rating.[34] Figure 6-8 also shows that Wisconsin has been exceeding the goal of 95 percent in good/fair condition in recent history. When including Wisconsin's 8,857 local bridges, the good/fair bridge condition rating drops to 91.8 percent, which is better than the national average of approximately 89.5 percent.[35]

The increasing average age of the state bridge inventory is a significant factor in the overall percentage of bridges rated fair or above. The average age of state system bridges is more than 34 years,[36] and 1,171 state bridges were over 50 years old as of 2015. Wisconsin puts a high emphasis on maintaining and improving its bridges through its rehabilitation and replacement improvement programming. Bridges receive the highest priority in the project selection process. Wisconsin spends additional state money above the federal dollars it receives from the bridge program to maintain its bridges.

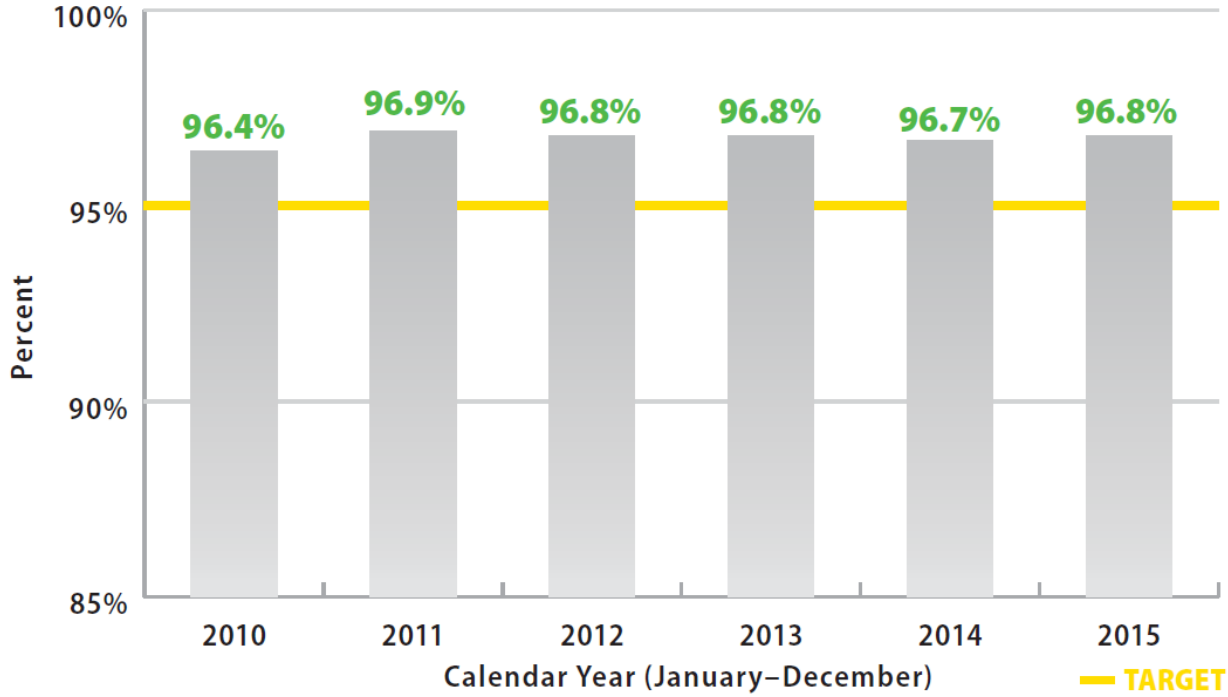
Highway Structure Information System

The Highway Structure Information System (HSIS) is a systematic approach to effectively manage state and local structures through a responsive, efficient online system. When state and local program managers are equipped with real-time performance data, they can make better-informed decisions on resource allocation. HSIS also incorporates the concept of structural data life cycle; this allows management of the structure from the planning phase through design, construction, maintenance, and the eventual replacement of the structure.

WisDOT continues to improve bridge inspection and bridge management programs by utilizing new technology and innovative management practices. In 2015, the department deployed mobile device technology for structure inspections and incorporated Highway Structure Information System asset management upgrades to improve the timeliness and accuracy of the state's structural data. Additionally, the department introduced a bridge preservation policy that includes and promotes lower-level treatments and actions to extend the long-term performance of the bridges on state highways.

[34] Wisconsin Department of Transportation, MAPSS.
[35] Ibid.
[36] Ibid.

Figure 6-8: 2010-2015 Percent of Bridges Rated Fair or Above



Source: Wisconsin Department of Transportation, MAPSS

Bridges rated good and fair are safe. Bridges with a poor condition rating and open to traffic are also safe; however, these structures may need corrective action to ensure continued operation. An accurate understanding of the condition of the inventory of bridges allows for planning and prioritization of limited resources to address operational needs.

Good, Fair, Poor Condition Rating
Good – a range from zero problems to some minor deterioration of structural elements. **Fair –** all primary structural elements are sound but may have deficiencies such as minor deterioration, cracking, spalling, or scour. **Poor –** advanced deficiencies such as deterioration, cracking, spalling, scour, or seriously affected primary structural components. Bridges rated in poor condition may be posted with truck weight restrictions.

There were 44 state-owned bridges with weight restrictions in 2015; an improvement from 57 state-owned weight restricted bridges in 2013.[37] There were 305 state-owned bridges that have less than 16 foot vertical clearance in 2015.

[37] Wisconsin Department of Transportation, MAPSS.

Bridge Design and Heavy Vehicle Considerations

The current standard design life of a bridge is 75 years. In order to keep bridges in a good or fair condition, bridges must be designed responsibly in order to maximize the design life of the bridge.

Axle spacing is as important as axle weight in designing bridges. The Federal Bridge Formula was created in an effort to protect roadways and structures, which accounts for axle spacing. The Federal Bridge Formula has two key components:

- The Federal Bridge Formula establishes the maximum weight any set of axles on a motor vehicle may carry on the Interstate highway system.
- It identifies and limits the weight-to-length ratio of a vehicle crossing a bridge. This is accomplished either by spreading weight over additional axles or by increasing the distance between axles.

Maintenance and Preservation of Wisconsin's Transportation System

WisDOT's efforts to protect, maintain, and operate the state's transportation system include using appropriate maintenance and preservation strategies to maximize state investments. Ongoing routine maintenance refers to the daily activities that help maintain and preserve the system so that it provides a satisfactory level of service. While maintenance activities help address immediate system needs, eventually they are insufficient to address underlying infrastructure deterioration. At that point, preservation strategies are used to appreciably extend the infrastructure's useful life.

WisDOT's preservation and maintenance strategies foster:

- Ongoing routine and preventive maintenance
- Long-term preservation
- Continued availability of transportation services statewide

Highway Maintenance Activities

Ongoing routine maintenance refers to the daily activities that help maintain and preserve the system so that it provides a satisfactory level of service. Maintenance activities typically focus on system parts such as roadway shoulders, pavement markings, bridge railings, pavement cracks, and traffic signals. Examples of maintenance activities include:

- Patching potholes on roadways
- Maintaining and repairing publicly-owned rail lines
- Maintaining traffic signals
- Repairing dock walls
- Routinely inspecting bridges
- Repairing damaged bridges

Examples of Highway Maintenance Activities

- Pavement and bridge spot treatments
- Shoulder repair
- Repair and replacement of signs and pavement markings
- Roadside vegetation control
- Repair and restoration of state trunk highway facilities and structures after crashes, natural disasters, and vandalism
- Maintenance of rest areas, waysides and some park and ride lots

To effectively maintain state trunk highway system infrastructure, WisDOT works to:

- Initiate a formal, ongoing preventive maintenance process
- Promote and implement sound environmental practices for all highway maintenance activities
- Implement proven maintenance management practices

Preventive maintenance is the periodic application of relatively inexpensive roadway treatments (for example, filling the pavement cracks on roadways) that help extend the life of the system by delaying deterioration. Postponing preventive maintenance ultimately results in larger repair projects that take longer to complete and, as

a result, can cause such consequences as greater disruption to traffic flow. An effective preventive maintenance process includes:

- Monitoring existing state trunk highway conditions, identifying deficiencies, and setting priorities
- Developing a plan to carry out maintenance activities and address deficiencies

WisDOT addresses the most critical maintenance needs of the state trunk highway system infrastructure, including (not in order of priority):

- Repair needs of bridges and other structures
- Pavement and shoulders
- Pavement cracks
- Signs and markings
- Guardrails and other roadside safety features
- Drainage elements such as culverts, including restoration and replacement
- Traffic signals and other traffic management devices

In addition, WisDOT works to perform numerous other preventive maintenance activities, including:

- Keeping shoulders in good condition and free of debris
- Ensuring visibility at intersections by mowing and using plant growth retardants
- Controlling woody plants within the clear zone using herbicides and mowers
- Keeping rest facilities clean and in good repair
- Providing highway lighting where necessary

To monitor system performance and address deficiencies throughout the year, WisDOT uses a Maintenance and Operations Decision Support System (an extension of the current Maintenance Decision Support System (MDSS) that focuses on winter operations). This decision support system is a computerized information system that supports organizational decision-making activities and is intended to help decision makers compile useful information from raw data, documents, personal knowledge, and/or business models to identify and solve problems and make decisions. This system helps highway maintenance staff identify and recommend specific treatments and timing strategies to complete necessary maintenance work. Moreover, WisDOT's regional maintenance field staff monitors county performance, specifically in the areas of establishing work plans, setting priorities and assuring compliance with maintenance standards. In terms of maintenance, WisDOT works to:

- Improve the department's existing maintenance management tools
- Research and evaluate new, cost-effective highway maintenance technologies
- Implement work zone and lane-closure management strategies and tools to maintain safety and minimize impacts on travelers
- Emphasize cost-effective strategies in county maintenance contracts

WisDOT continues to expand and refine its existing management system tools, including the Compass program. Compass is a decision-making tool that helps establish work priorities and allocate resources. A critical input for this program is an annual condition assessment of the state trunk highway system. The assessment provides condition information about shoulders, drainage, roadsides, traffic devices, bridges and winter operations. Over the long term, WisDOT works toward developing and implementing a comprehensive maintenance management system for all highway assets.

In addition to improving existing tools, WisDOT researches and evaluates new, cost-effective highway maintenance technologies and identifies best management practices that leverage existing resources and maximize efficiencies. Emphasis is placed on developing tools that not only pinpoint specific areas that need preventive maintenance, but prioritize the identified needs.

WisDOT emphasizes cost effectiveness in managing contracts with Wisconsin's counties. The department creates and tracks appropriate benchmarks and service delivery outcomes. The department works with counties as they define and provide a comprehensive suite of services.

Also, conducting highway maintenance activities can sometimes disrupt traffic flow. Work zone management strategies help minimize disruption and maintain state trunk highway system reliability. Oftentimes, work zone management requires creativity and flexibility. In response, WisDOT performs more and more of its maintenance work during non-peak traffic hours, including nighttime hours when traffic volumes are typically lower.

Roadside Maintenance Performance

Many factors affect the safety, efficient operation, and longevity of our highway system. Effective and consistent maintenance efforts preserve our investment in the highway system, enhance economic productivity, and minimize the impact to the natural environment.

The department's goal is to maintain a 3.0 out of 4.0 grade point average (GPA) of 28 features evaluated including roadway shoulders, drainage features, roadside elements, and traffic control and safety devices (Figure 6-9).[38]

Condition data is collected each fall as part of a field review process. Rating teams composed of region maintenance coordinators and county patrol superintendents rate a random sample of 1,200 one-tenth mile segments around the state. The condition of elements such as warning signs, markings, shoulder, and roadside litter are assessed and documented. Grading curves are established to help identify areas for improvement, such as reducing gravel shoulder drop-off, removing hazardous debris from shoulders, maintaining visible center line and edge line markings, and providing more visible, longer-lasting traffic signs. The grading curves, developed from maintenance criteria, are used to develop an average GPA.

The criteria for identifying an average GPA comes from five "contribution categories" that have been developed to describe how various roadway elements function with drivers and the overall highway infrastructure.

Critical safety is the first category. Critical safety features are those that require immediate action and remedy a problem situation. Critical safety features include emergency repair of regulatory/warning signs, hazardous debris, drop-off or buildup on paved/unpaved shoulders, centerline markings, protective barriers, and edge line markings.

Safety and mobility features, the second category, are highway attributes and characteristics that protect users against, and provide them with a clear sense of freedom from, danger, injury, or damage. Features include woody vegetation control, mowing for vision, fences, special pavement markings, culverts, storm sewer, cross slope on unpaved shoulders, delineators, and routine placement of regulatory/warning signs.

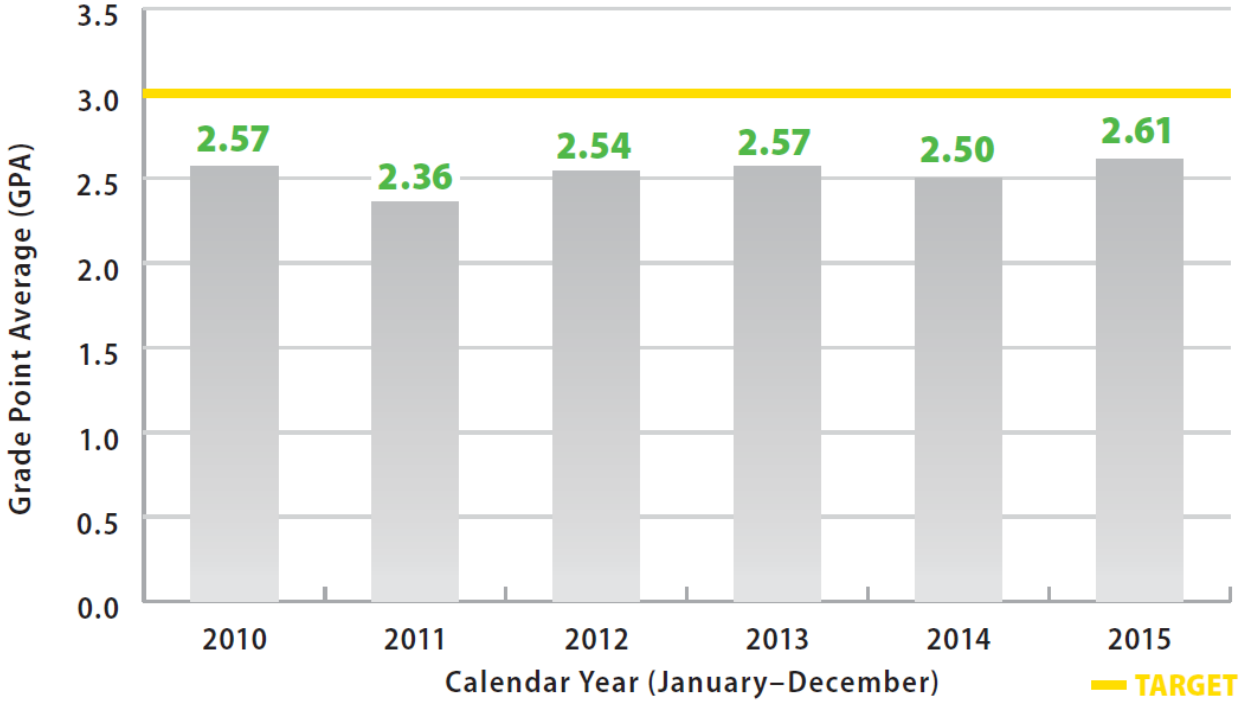
The third category, stewardship, captures performance on routine and preventive maintenance activities that preserve investments and ensure function for their full expected service life or longer. Features include ditches, drains, curb and gutter, flumes, cracking on paved shoulders, and erosion on unpaved shoulders.

Ride quality and comfort features provide a state of ease and quite enjoyment for highway users. Ride/comfort features include potholes/raveling on paved shoulders, emergency repair of "other" signs, and routine replacement of "other" signs.

[38] Wisconsin Department of Transportation, MAPSS.

The last category is aesthetic, which is concerned with the display of natural or fabricated beauty along highway corridors, including landscaping and architectural features, litter, and mowing.

Figure 6-9: Grade Point Average for the Maintenance Condition of State Highway Roadsides



Source: Wisconsin Department of Transportation, MAPSS

Overall conditions improved slightly between 2014 and 2015. The statewide grade point average increased 0.11 in 2015, to its highest level in the last six years. Four features improved their condition one grade level (drop-off/build-up on paved shoulders, delineators, flumes, and potholes/raveling). Three of the four improved grades were the result of minor backlog changes, while one feature (flumes) had a significant improvement. However, one feature (routine replacement of regulatory/warning signs) fell a grade level as a result of a one percentage point change.

The annual GPA is impacted by baseline conditions, maintenance budget levels and policies, winter maintenance costs, and improvement program investments. The highway maintenance condition largely depends on funding from routine maintenance agreements and improvement projects. The department's first priority is snow and ice removal while the balance is spent on non-winter activities. Historically, about three-quarter of maintenance dollars are programmed to winter, pavement and structure maintenance activities, with the balance used on system needs associated with the 29 Compass features. As stated earlier and described in more detail on the following page, Compass is a decision-making tool that helps establish work priorities and allocate resources. A critical input for this program is an annual condition assessment of the STH. The assessment provides condition information about shoulders, drainage, roadsides, traffic devices, bridges, and winter operations.

The department employs innovative strategies to address highway maintenance needs. These approaches include focusing on cost-efficient delivery of winter maintenance services, improved reporting of Compass results to the regions, and linking targets to county routine maintenance agreement activities. A $50 million appropriation increase went into effect in fiscal year 2015 and increased the routine maintenance base program to $170 million annually. At this higher level, the department can effectively respond to annual variability in winter maintenance

cost demands while sustaining a viable annual level of financial commitment to non-winter routine maintenance demands. In addition, alternate contracting methods and broader-based delivery options are being piloted to test enhancements to the long standing county-based routine maintenance delivery model. Efficiency gains from these pilot efforts may help to meet the 3.0 target GPA. It is estimated it will take three to five years of investment at current levels to see a sustained impact on the Compass GPA results. The 2015 condition data represents only the second year of increased maintenance funding at the $170 million level.

Compass
Compass is WisDOT's highway operations quality assurance and asset management program. Launched in 2001, it plays a critical role in educating and communicating maintenance needs to WisDOT stakeholders. Compass uses existing WisDOT data and statistical sampling to gather information on existing highway conditions and to explain the relationship between those conditions and the maintenance budget. Annual Compass reports provide information about the conditions of shoulders, drainage, roadsides, selected traffic devices, traveled ways, bridges, and winter maintenance. Compass also works with operations managers to set annual targets for highway operations conditions under current budget levels. Compass will complement the Maintenance and Operations Decision Support System. While the system will help optimize decisions about specific treatment types and the timing for completion of the work, the Compass program will provide information about the extent of work needed and will help WisDOT consider trade-offs among various work priorities.

Preservation Activities

While maintenance activities help address immediate system needs, eventually they are insufficient to address underlying infrastructure deterioration. At that point, preservation strategies are used to appreciably extend the infrastructure's useful life. Preservation requires cost-effective strategies that enhance the long-term performance of the system while improving safety and striving to meet user expectations. These activities may include:

- Rehabilitating bridges and structures
- Resurfacing or reconstructing highways, local roads, and airport runways
- Dredging harbors and shipping channels

State preservation activities, such as retaining current passenger and freight services, also ensure continued availability of critical transportation options. The availability of transportation options to move people and goods enhances Wisconsin's quality of life and economic well-being.

Highway Preservation Activities
• Resurfacing – placing a new surface on existing pavement to provide a better riding surface and to extend or renew pavement life. Generally requires no capacity increase or change in roadway characteristics (such as width, curves or slope). • Replacement – removing all existing pavement layers and replacing with new pavement. Occurs when deterioration is severe. Generally, no capacity or roadway characteristics changes are made. • Reconditioning – work done in addition to resurfacing or replacing pavement. Minor work may include pavement widening and shoulder paving. Major work involves improvement to site-specific roadway characteristic deficiencies, such as isolated grade, curve, or safety issues related to sight distance problems. • Reconstructing – total rebuilding of an existing highway to improve maintainability, road characteristics and traffic safety. Usually completed on existing alignment. Normally requires some right of way acquisition.

WisDOT works to preserve the existing STH infrastructure. To accomplish this, WisDOT uses a performance-based approach to identify state trunk highway system preservation needs, including using a bridge asset management system. In addition, WisDOT continues to refine and expand a state-of-the-art process for prioritizing needs and identifying cost-effective state trunk highway construction alternatives.

Preventive maintenance, resurfacing and reconditioning strategies have extended the useful life of the system. However, infrastructure deterioration – due to increased traffic volumes, freight movements, and typical wear and tear – has resulted in the need for significant improvements, including reconstruction and replacement. Overall, ensuring the continuation of system preservation is critical to maintaining the safety and quality of the state's roadways.

Preventive Maintenance
Preventive maintenance is the periodic application of relatively inexpensive roadway treatments (for example, filling the pavement cracks on roadways) that help extend the life of the system by delaying deterioration. Postponing preventive maintenance ultimately results in larger repair projects that take longer to complete and, as a result, can cause such consequences as greater disruption to traffic flow. An effective preventive maintenance process includes: • Monitoring existing state trunk highway conditions, identifying deficiencies, and setting priorities • Developing a plan to carry out maintenance activities and address deficiencies

Local Roads Pavement and Bridge/Structures Condition

As identified in Chapter 5, *Wisconsin's Transportation System Assets*, Wisconsin's locally-owned and maintained road and bridge system serves as a critical link in the state's total transportation network. With over 100,000 miles of county, town and municipal roads and 8,857 bridges, the local road network accounts for approximately 90 percent of Wisconsin's public road mileage. For freight, local roads are important because they usually carry the "first mile" and "last mile" of a shipment before it reaches its destination.

Centerline Miles
Centerline miles are used to measure the length of roadways. Centerline miles represent the total length of a given road from its starting point to its end point. The number and size of lanes on the road are not considered when calculating its centerline mileage.

As a critical adjunct to the STH, the local road system offers connections not only to local activity centers, but also to state and national facilities of importance such as ports and economic business centers. Local roads connect to the state trunk highway network, airports, rail stations, and bus and ferry

terminals. They are the first and usually last link in the state's farm-to-market commerce and offer critical links for area businesses and tourists.

Some of the state's local roads and bridges are not designed to carry heavier loads. Overweight trucks may accelerate deterioration of highways and bridges, and can result in the need for additional infrastructure investment. Allowing oversize and overweight vehicles on Wisconsin's roadways requires a balance between increasing freight movements to meet economic development goals and minimizing impacts to local roads, highways, and bridges.

Local Road Pavement Condition

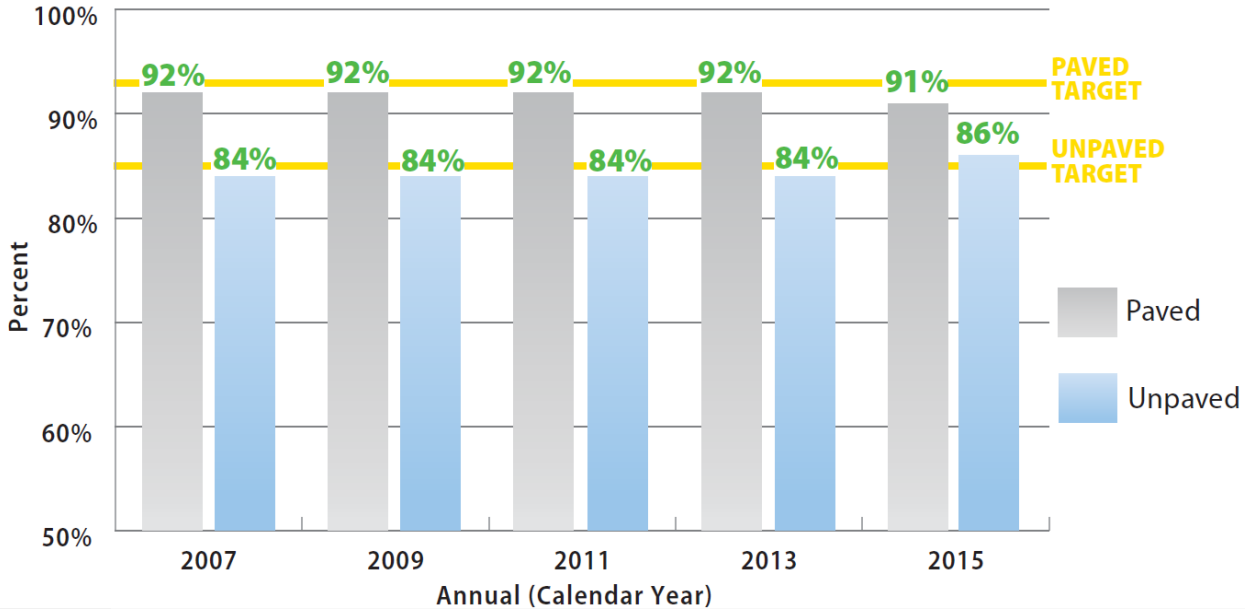
Every two years, municipalities and counties are required, under state statute, to report pavement condition ratings of roads under their jurisdiction to WisDOT. Most local governments collect data for all local roads under their jurisdiction by using the Pavement Surface Evaluation and Rating (PASER) system, a tool designed by UW-Madison's Transportation Information Center to collect pavement data and rate roads. They then may use WisDOT's Wisconsin Information System for Local Roads (WISLR) to manage and analyze the pavement data. WISLR is an Internet-accessible system that helps local governments and the department manage local road data to improve decision-making, and to meet state statute requirements. WISLR is a receptacle for local road information, such as width, surface type, surface year, shoulder, curb, road category, functional classification, and pavement condition ratings. The department's goal is to have 93 percent of all paved, and 85 percent of all unpaved, local pavements in fair or better condition.

The rating scale ranges from 10 (excellent condition) to 1 (failed). In general, most pavements will deteriorate through the phases listed in the rating scale. However, it is common for pavements to skip several levels when major defects appear or when the pavement is repaired. The time it takes to go from an excellent (10) to a very poor condition (1) depends largely on the quality of the original construction and the amount of heavy traffic loading.

As of 2015, 91 percent of Wisconsin's paved local roads are rated fair and above, and 86 percent of the unpaved local roads are rated fair and above (Figure 6-10).[39]

[39] Wisconsin Department of Transportation, MAPSS.

Figure 6-10: 2007-2015 Local Road Pavement Condition – Percent with Rating of Fair or Better



Source: Wisconsin Department of Transportation, MAPSS

Pavement condition is impacted by material quality, adequacy of pavement design, environmental factors such as temperature and moisture, traffic loading, improvement and maintenance history, and pavement age. All of these factors must be considered when determining what rehabilitation strategies will provide cost-effective service life.

Wisconsin makes funding available through a number of programs to help support the transportation infrastructure needs of local governments, including General Transportation Aids (GTA), the Local Roads Improvement Program (LRIP) and the Surface Transportation Program (STP). The department evaluates and compiles condition data to inform state and local decision makers. The department also publishes program guidelines, meets with various partners, and provides training to help local units of government.

WisDOT works with its local partners to define statewide expectations specific to local road network goals and priorities, ensuring development and maintenance of a quality network. WisDOT also develops an appropriate framework within which to promote sound investment decisions at the local level. This is accomplished through the use of available data and asset management tools, such as the pavement analysis tools provided by WISLR. Currently, local road network system performance monitoring is limited to pavement and bridge condition analyses; however, the data and tools offered by WISLR provide a critical starting point for both the state and local governments.

WisDOT continues to analyze local road pavement conditions using WISLR. The department assists local governments by doing system level analysis to identify priority areas and measure progress in addressing local road needs.

Locally-Owned Bridge Condition

Local units of government perform bridge inspections for all local bridges every two years. This is the designated frequency in the NBIS. Through these inspections, condition rating data is collected and reported to WisDOT for the deck, superstructure, and substructure, and an overall rating of good, fair, or poor condition is assigned each calendar year. The final bridge rating is based on the lowest rating a bridge received for any of its components.

Although local bridges are maintained through local decision, there are state programs that provide funding to help offset this expense. Table 6-7 lists the conditions of the locally-owned bridges.

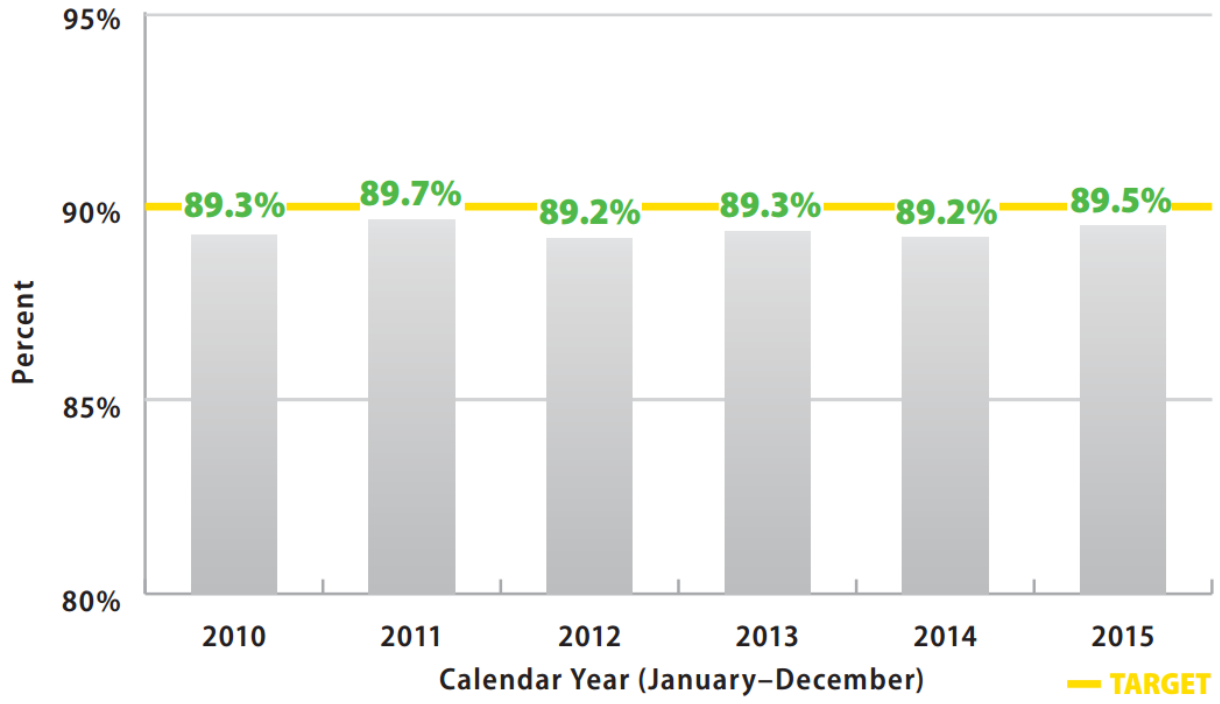
Table 6-7: 2015 Locally Owned Bridge and Deck Conditions

Rating	NBI Condition Rating by # of Bridges	NBI Condition Rating by Deck Area	Deck Condition Rating by # of bridges	Deck Condition Rating by Deck Area
Good	50 %	50 %	61 %	62%
Fair	39 %	41 %	33 %	32%
Poor	11 %	9 %	6 %	6%

Source: Wisconsin Department of Transportation

The department's goal is to have 90 percent of Wisconsin's locally-owned or maintained bridges rated fair or above. As of 2015, 10.5 percent of Wisconsin's locally-owned or maintained bridges have a poor condition rating, leaving 89.5 percent of Wisconsin's 8,857 locally-owned or maintained bridges have a good or fair rating. Local bridge condition saw a 0.3 percent improvement from 2014. Additionally, over the last six years the percentage of good and fair condition bridges has been relatively constant (Figure 6-11).[40]

Figure 6-11 : Percent of Local Bridges Rated Fair or Above



Source: Wisconsin Department of Transportation, MAPSS

Local bridge conditions are affected by the increasing age of bridges; bridge damage caused by corrosion, vehicle collision, and other environmental factors; changing traffic counts; completion of bridge rehabilitation and replacement projects; and funding availability on a state and local level. Decisions on rehabilitating or replacing locally-owned bridges are the sole responsibility of the local units of government.

[40] Wisconsin Department of Transportation, Bureau of Structures, "Annual Bridge Report." (April 2016).

The Local Bridge Improvement Assistance Program, per state statute, was established to rehabilitate or replace, on a cost-shared basis, deficient existing public bridges on Wisconsin's local highway and road systems. WisDOT publishes a list of deficient bridges, and WisDOT regional staff work with counties and local governments by assisting in the application process to identify rehabilitation or replacement bridge projects for funding consideration under the local bridge program. The department also works with partners to implement a change management process to help manage local bridge funding and keep projects on schedule. In addition, the department continues to develop tools to aid local governments in estimating costs and prioritizing eligible projects.

Load Postings in Wisconsin 2015
State – 44 Bridges (0.8 percent) Local – 808 Bridges (9.1 percent)

An area of concern related to structures is the number of bridges already posted on secondary roads. These local bridges are load restricted because of condition and obsolescence.

In many cases, heavy vehicles (mining, agricultural, energy cargo or equipment, and some timber-related vehicles) are not designed to meet the local road and bridge size and weight requirements found in Wisconsin statutes. However, these oversize-overweight (OSOW) vehicles may be eligible for a multi-trip or single-trip permit to traverse state roadways and bridges. Fees collected from these permits do not necessarily generate enough revenue to supplement the damage caused by heavy vehicles. Thus, it is important for the state and local municipalities to have an asset management program to mitigate, reduce, or impede the deterioration of their respective bridges.

Culverts

Over 50,000 culverts are located on the state system, with another 86,000 culverts on the local system. A culvert can resemble a bridge with similar features and characteristics, but is less than 20 feet long from abutment to abutment. Culverts can also be fixed metal or precast/concrete pipes or chutes. Culverts, unlike bridges, are not inventoried or even inspected in the same manner as state, county, and local bridges.

Culverts
Culverts are simply defined as a structure that is less than 20' in length. • State System – Rough estimate would be 50,000+ structures • Local System – Rough estimate would be 86,000+ structures

Rail Line and Bridge Condition

As discussed previously, Wisconsin has more than 3,300 miles of rail corridors in the state, owned by both public and private organizations. In total, approximately 2,600 track miles (over 75% of Wisconsin's track miles) are privately owned, with the remaining being publicly-owned rail lines. WisDOT works in partnership with the railroad operators on the 718 miles of state-assisted lines to review condition, discuss capital improvement needs, and schedule projects.

In 2015, 55 miles were improved to meet FRA Class 2 standards through WisDOT-funded projects and 12.05 miles of rail line deteriorated to below FRA Class 2 standards due to poor tie conditions. A total of 453 of the 700-plus miles of track (63 percent) met the department goal. This is a 43 mile increase from 2014 to 2015 in the number of miles that meet the standard.

Because WisDOT has limited information on the condition of private rail lines, the state's primary focus is on monitoring system performance on state-supported rail lines. WisDOT uses speed and weight data to measure rail line and bridge condition. Therefore, the focus of this section is speed (maximum allowable for a section) and weight (maximum allowable for a section), primarily applied to publicly-owned rail lines.

Rail Line Operating Standards[41]

The FRA sets the operating standards for rail lines. The maximum allowable speed for freight trains by track type is:

- Class 1 - Up to 10 MPH
- Class 2 - Up to 25 MPH
- Class 3 - Up to 40 MPH
- Class 4 - Up to 60 MPH
- Class 5 - Up to 80 MPH

The industry standard for maximum allowable speeds is Class 2. WisDOT uses this information to set goals for operation on the state-support rail lines. Also, achieving Class 2 standards enhances the competitiveness with other rail lines.

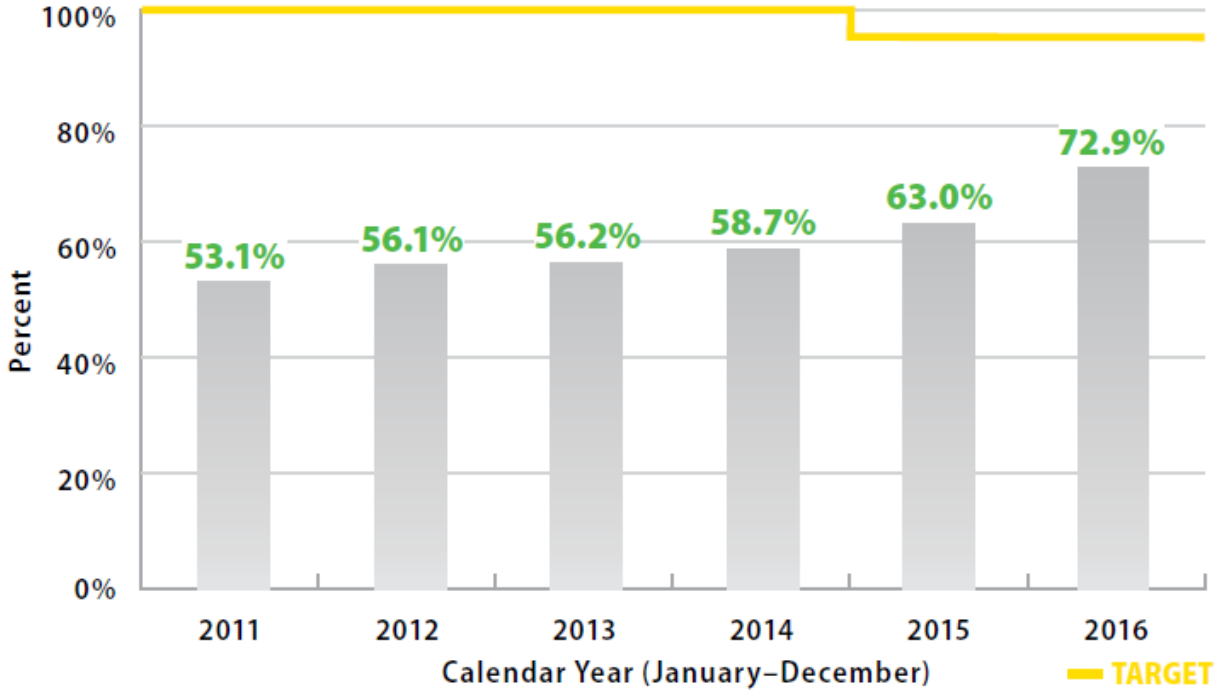
Track Speeds

The department's goal, is to have 95 percent of the system operating at FRA Class 2 operating speed standards. From 2011 through 2014, the department's goal was to have 100 percent of the system operational at Class 2 operating speed standards (Figure 6-12), but was dropped to 95 percent to focus on the state-owned system. The FRA Class 2 standards include tracks capable of operating loaded 286,000 pound rail cars above 10 miles per hour and not exceeding 25 miles per hour (see Figure 6-12).

The track is evaluated based on the percent of track miles operating at speeds allowed by the FRA's Class 2 Track Safety Standards. The percent of miles of rail line meeting the standard is calculated by dividing the amount of track meeting or exceeding FRA Class 2 standards by the total amount of state-owned rail lines. By 2015, 63 percent of the system was operating at Class 2 operating speed standards. The latest quarterly update of this measure reported 73 percent of state-owned rail line miles met or exceeded Class 2 standards in 2016.

[41] Federal Railroad Administration, Office of Railroad Safety, "Track and Rail and Infrastructure Integrity Compliance Manual: Volume II - Chapter 1 - Classes 1 through 5."

Figure 6-12: Percent of Miles of State-Owned Rail Line Meeting FRA Class 2 Standard (10-25 MPH)



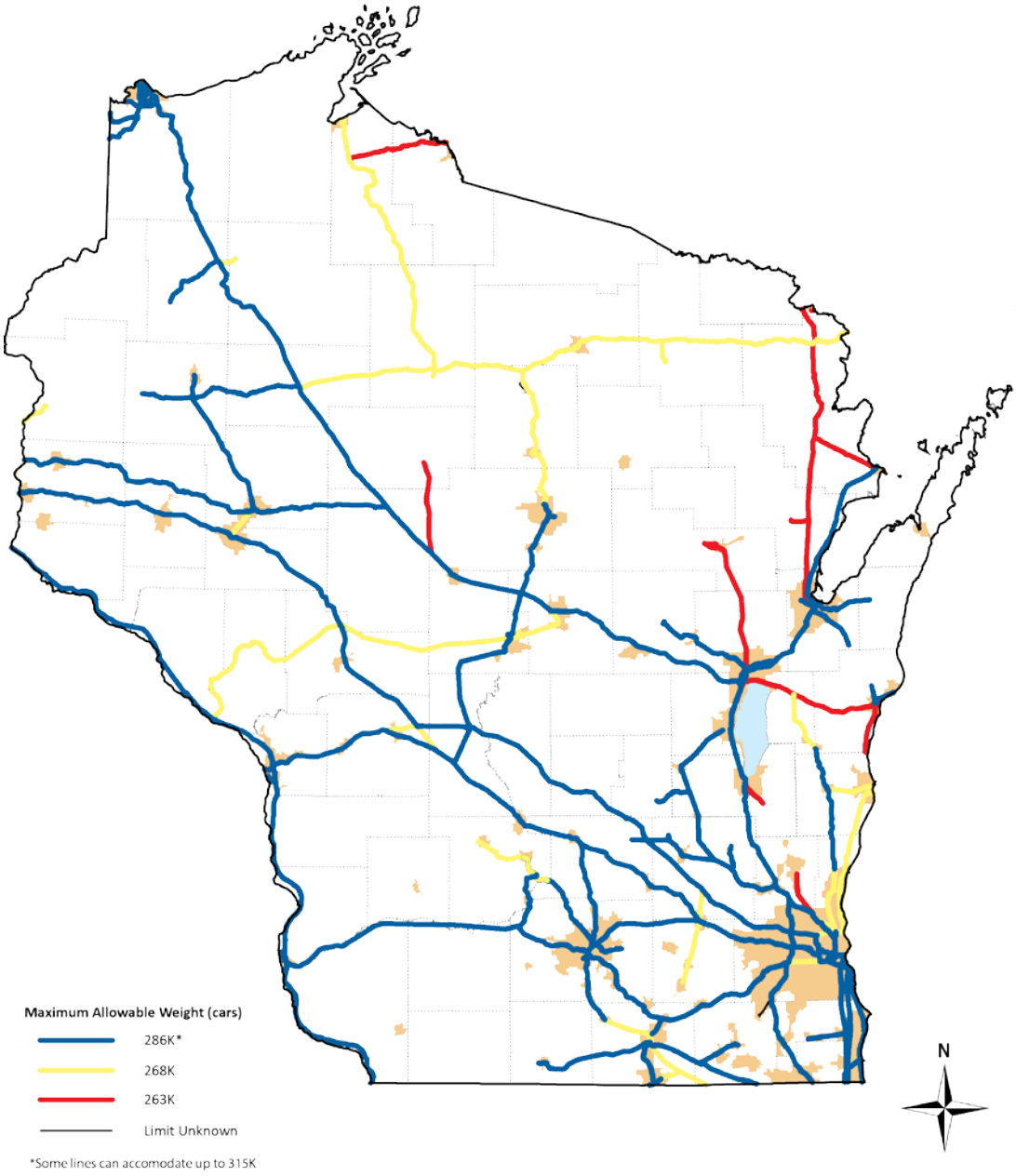
Source: Wisconsin Department of Transportation, MAPSS

The department reviews the annual maintenance plans of companies operating on state-owned railroad track and discusses opportunities to upgrade rail track and structure conditions. The department's rail grant and loan programs help fund railroad infrastructure rehabilitation projects to improve track structure and increase operating speeds each year. Annual compliance inspections are done by WisDOT to ensure that railroads properly maintain state-owned rail lines. Ongoing investment in the state's rail lines and enforcement of maintenance standards have facilitated the upward trend in the percent of miles meeting FRA's Class 2 operating standards (able to handle 286,000 pounds between 10 and 25 MPH) since 2011.

Maximum Allowable Weight

Examining maximum allowable car weights is another way of looking at Wisconsin's rail network capacity, not only in terms of what commodities can be carried, but also the ability of short lines to service local freight that needs a connection to the long-haul (Class I) market. Key condition measures for rail are speed (maximum allowable for a section) and weight (maximum allowable for a section). Figure 6-13 depicts the full system of rail lines and their known maximum allowable weights as of 2016. In Wisconsin, the rail industry will likely maintain the 286,000 pound standard for the near term.

Figure 6-13: 2016 Maximum Allowable Weight per Rail Car



Source: Wisconsin Department of Transportation, Bureau of Transit, Local Roads, Railroads and Harbors

Continuous Welded Rail

Continuous Welded Rail (CWR) refers to the way in which rail is joined to form track. Through CWR, rails are welded together to form one uninterrupted rail that may be several miles long. Although CWR is normally one continuous rail, it may contain joints for one or more reasons (such as insulated joints that electrically separate track segments for signaling purposes).[42]

Regulations governing the installation and maintenance of CWR were first issued in 1971 as part of the Federal Track Safety Standards. Over the subsequent decades driven by legislative mandates together with knowledge

[42] Federal Railroad Administration, Office of Railroad Safety, "Continuous Welded Rail."

gathered from industry, the CWR regulations have expanded. Today railroads are required to adopt and comply with CWR programs that cover procedures for installing, adjusting, inspecting, and maintaining CWR, as well as inspecting joints in CWR track.

Upgrading track on state-owned lines with 115-lb. CWR—replacing legacy rail that is often more than 100 years old—has virtually eliminated rail defects and breakages and reduced the occurrence of derailments wherever CWR has been installed. As a result, new 115-lb. CWR improves transportation efficiency and reliability for Wisconsin shippers.

Rail Bridge Condition

State-owned bridge structures on the rail system are evaluated similar to rail lines. Namely, the weight per rail car at a set speed. The following classifications are used to define the capacity of Wisconsin's state-owned rail bridges:

- 286,000 pounds per car at 25 miles per hour
- 286,000 pounds per car at 10 miles per hour
- Less than 286,000 pounds per car

Many rail bridges in Wisconsin are original and date back to the late 1800s and early 1900s. They were built of varying materials including timber, concrete, and stone. Like other information regarding railroads, condition data on bridges is proprietary.

Bridges can have capacity issues if they cannot support heavier cars or provide enough clearance to accommodate doublestack movements. On the state-owned rail system operated by Wisconsin & Southern Railroad (WSOR), there are 139 timber bridges, 106 steel structures, eighteen concrete bridges, seven stone bridges, and seven highway bridges for a total of 277 bridges. Findings from a recent study concluded that the steel structures could sustain 286,000 pound car traffic. Timber bridges however, if exposed to 286,000 pound traffic, would have at most a life of five years.

WSOR also operates over trackage leased from the Class I railroads, which includes an additional 87 bridges of which the majority are steel structures.

Wisconsin currently has no capacity issues with regard to tunnels or bridges. If, however, UP would run intermodal doublestack containers through Wisconsin there are several bridges on the Milwaukee and Adams subdivisions that would need modifications to support doublestack traffic.

Table 6-8 shows the number of state-supported structures on which Wisconsin and Southern Railroad (WSOR), Escanaba and Lake Superior (E&LS), and Wisconsin Great Northern Railroad (WGNR) operate on.

Table 6-8: 2015 Wisconsin Railroad Bridge Capacity

	Total System Structures	Total System Structures in Lineal Feet	Structures 286,000 lbs. Capable at 25 mph	Structures 286,000 lbs. Capable at 10 mph	Structures Not 286,000 lbs. Capable
WSOR	361	31,004	254 (70%)	99 (27%)	3 (1%)
E&LS	40	N/A	29 (73%)	11 (28%)	0 (0%)
WGNR	1	N/A	0 (0%)	1 (100%)	0 (0%)

Source: Wisconsin Department of Transportation, MAPSS

Waterway Condition

Wisconsin is bordered by, and has access to, more than 200 miles of Mississippi River shoreline and more than 800 miles of Great Lakes coastline. The commercial ports of Wisconsin generate more than $1.6 billion in economic activity and support almost 10,000 jobs. These benefits are derived from a range of activities including the movement of freight and project cargo—most often higher weight, lower-value products such as coal, aggregates, and grains. Cement, energy, and petroleum products are also shipped on Wisconsin waterways.

The waterways that surround Wisconsin, the Mississippi River and the Great Lakes, are underutilized as a means to move freight. Recent estimates indicate that the Great Lakes System is operating at about half its potential capacity. Reasons for this underutilization relate to the type of commodities traditionally transported by water and the lack of intermodal connections. Additional information available in Chapter 7, *Freight Transportation Trends, Issues, and Forecasts.*

Bulk commodities (grain, fertilizer, iron ore) have different service requirements than goods shipped by trucks or air, which typically need to be shipped faster. While Wisconsin's waterways are connected to an extensive waterway network, that network is not necessarily well integrated into the road and rail systems.

Wisconsin Commercial Ports Development Initiative

The Wisconsin Commercial Ports Development Initiative is an overarching vision and multifaceted strategic plan for the development of Wisconsin's commercial ports and Inland River system to more fully utilize and develop Wisconsin's port facilities.

The development effort will support sustainable market attraction and growth at ports as well as economic and community development that contributes to the overall well-being and quality of life in the State of Wisconsin. Phase 1 completed in December 2014 included an asset inventory and assessment of priorities. Phase 2 was completed October 2016 and includes identification of goods that could be more efficiently moved by water instead of other modes.

Roadway Connections to Wisconsin's Ports

The road network that connects to the state's ports is a critical, but sometimes-overlooked, part of Wisconsin's transportation system. Typically, these are locally-owned and operated roads. Even though they are local roads, many are part of the NHS because they provide access to intermodal facilities. In some instances, maintenance needs are deferred because they typically do not serve high volumes of passenger traffic.

In addition, the road network can have difficulty serving oversize or overweight trucks traveling to and from the ports. This can result in trucks traveling farther distances to avoid bridges with weight limits, areas with reduced clearances, or roadways with insufficient turning radii.

Since many of these local roads are part of the NHS, the state and local governments typically share responsibility for maintaining them. As part of WisDOT's freight planning and local roads coordination efforts, the department will work with local governments and Wisconsin's ports to identify solutions that address roadway issues for port areas.

Condition of the Great Lakes Navigation System in Wisconsin

Each year, more than 300 million tons of freight moves through Great Lakes ports. Wisconsin has captured less than 10 percent of that volume. Averaging tonnage data between 2006 and 2012 for the ports of Superior, Marinette, Green Bay, Manitowoc, and Milwaukee shows that 96 percent of the cumulative freight tonnage is represented by only six commodities: coal, iron ore, limestone, non-metallic minerals, cement and concrete, and wheat. Overall, roughly 80 percent of the tonnage moved is out-bound from Wisconsin ports.[43]

Federal funding to support waterways has typically been limited, with the majority coming from the United States Army Corps of Engineers (USACE). Historically, a small portion of USACE annual estimated required funds for harbor maintenance are appropriated. In many cases, the needs assessed by USACE exceed available funding. For example, for federal fiscal year 2015, USACE estimated the total project need for eight of Wisconsin's commercial harbors on the Great Lakes Navigation System (GLNS) at $33 million; however, the total amount allocated for the region was $11.4 million, approximately 35 percent of the amount USACE had estimated.[44,45]

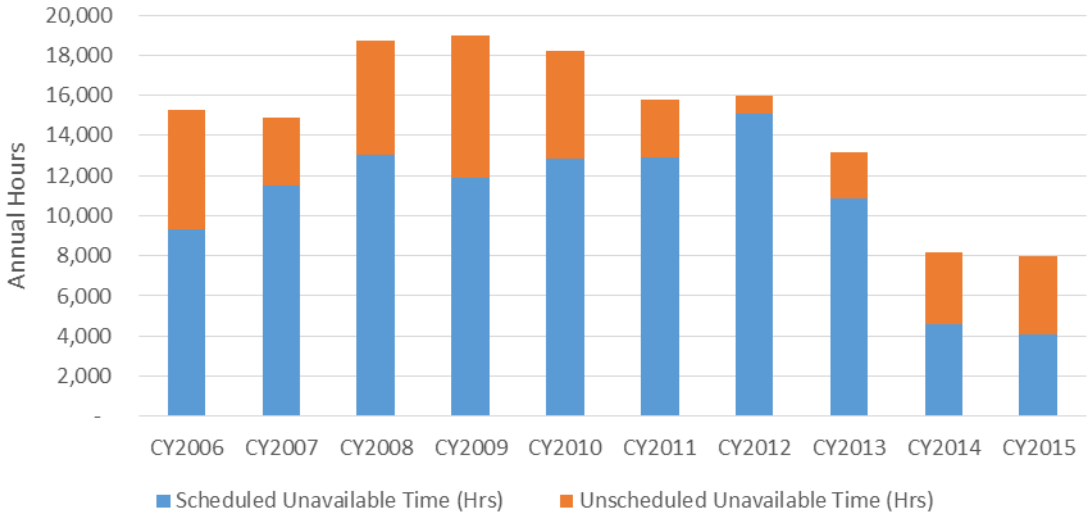
USACE uses a structural index for condition classification for coastal structures, which grades structures on an A through F scale (no E), where A is adequate and F is failed. The USACE assesses the condition of the GLNS, and in 2013 reported that 33 percent of Wisconsin's ports conditions reported and over 40 percent of coastal structures reported were rated C or worse. By USACE's internal measures, an A grade indicates unlikely failures, B carries a low risk of failure, C is medium risk of failure, D is high risk of failure, and F is a failed structure.

USACE also measures the annual hours of scheduled and unscheduled closures of locks on the Great Lakes. Unreliability could result in lower utilization of waterways or necessitate greater inventory, resulting in increased costs. Figure 6-14 displays both scheduled and unscheduled unavailability. Scheduled unavailability is attributable to seasonal as well as mechanical issues. USACE defines delay as any waiting greater than zero.

While the total annual hours of delay impacts the ability of shippers and carriers to use waterways to move freight, unscheduled closures are especially detrimental as they decrease the reliability of the waterway. A 2015 United States Department of Homeland Security study found that an unexpected six-month closure of the Poe Lock at Sault Ste. Marie could have a $1.1 trillion negative affect on GDP and could result in 10.9 million jobs being lost.[46]

[43] National Center for Freight & Infrastructure Research & Education, "Wisconsin Commercial Ports Development Initiative." (December 2014).
[44] Includes Ashland Harbor, Green Bay Harbor, Manitowoc Harbor, Milwaukee Harbor, Port Washington, Sturgeon Bay Harbor and Lake Michigan Ship Canal, Duluth-Superior Harbor, and Menominee Harbor.
[45] U.S. Army Corps of Engineers, "Summary of Appropriations - FY2015."
[46] U.S. Department of Homeland Security, "The Perils of Efficiency: An Analysis of an Unexpected Closure of the Poe Lock and Its Impact." (October 2015).

Figure 6-14: Soo Lock Unavailability



Source: CPCS analysis of U.S. Army Corps of Engineers Lock Usage Report

Condition of Upper Mississippi Lock and Dams

Wisconsin has two commercial ports located on the Mississippi River: La Crosse and Prairie du Chien. The primary commodities for the Mississippi River ports are more highly concentrated than the Great Lakes ports with the top four commodities representing 95 percent of the cumulative freight tonnage moved: grains (69 percent), cement (82 percent), salt (89 percent), and pig iron (95 percent). Overall, there is a 70/30 outbound-to-inbound split with grains accounting for the majority of outbound tonnage.

The system of locks and dams on the Mississippi and Illinois Rivers allow barge transportation along Wisconsin's western boundary, as well as from Milwaukee to the Gulf of Mexico. The majority of commodities transported out of Wisconsin ports via river barges are agricultural-related items.

In 2014, between 12 percent and 35 percent of vessels traveling through the Wisconsin portion of the Upper Mississippi River locks and dams experienced delays. The Upper Mississippi River system has a disproportionate share of delays compared to other rivers in the Mississippi River System. In 2010, the Upper Mississippi River experienced half of the 36 most delayed locks in the United States. Many of the inland waterway locks, including locks numbered 1 to 25 in the upper Mississippi River (see Chapter 5, *Wisconsin's Transportation System Assets*) are too small for modern barge tows, increasing delays and operating costs. Table 6-9 depicts the locks and dams on the Upper Mississippi connected to Wisconsin and the delays experienced.

Table 6-9: Wisconsin Locks and Dams in Upper Mississippi River

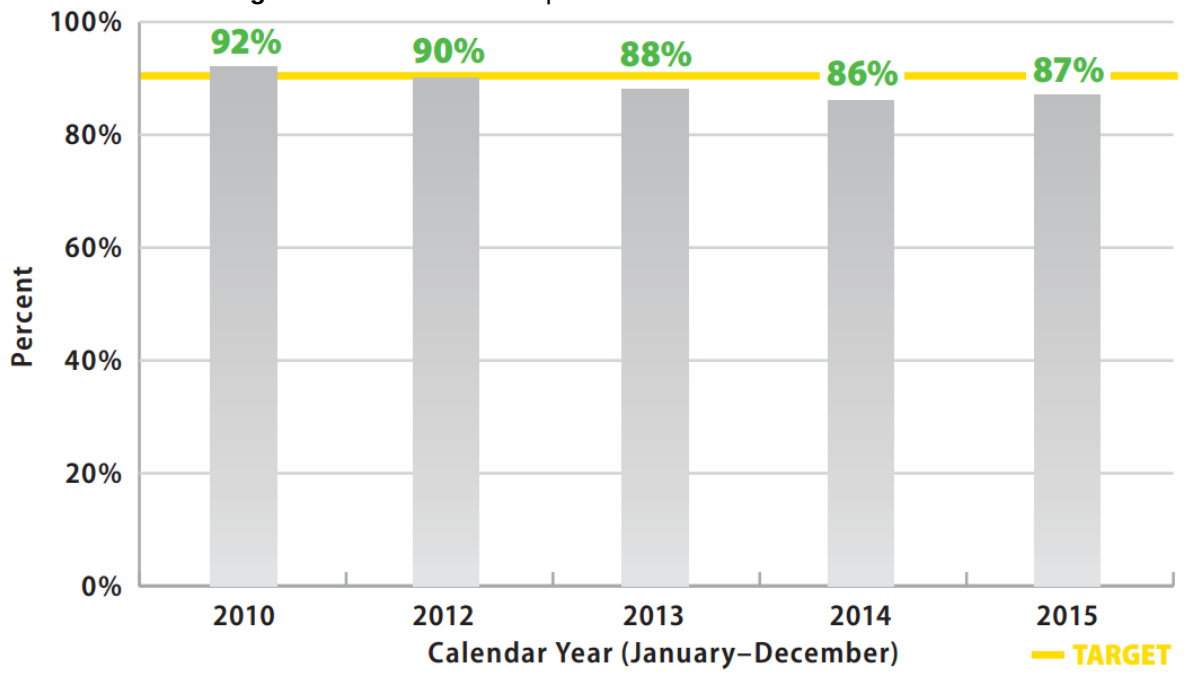
Lock and Dam Number	Wisconsin or Neighboring State City	Year of Construction	Year of last Major Rehabilitation	2014 % of Vessels Delayed
3	Red Wing, MN	1938	1991	24%
4	Alma, WI	1935	1994	12%
5	Winona County, MN	1935	1998	26%
5A	Fountain City, WI	1936	2000	30%
6	Trempealeau, WI	1938	1999	22%
7	La Crescent, MN	1937	2002	23%
8	Genoa, WI	1937	2003	33%
9	Lynxville, WI	1937	2006	35%
10	Guttenberg, IA	1937	2006	27%
11	Dubuque, IA	1937	2012	43%

Source: U.S. Army Corps of Engineers, Rock Island District

Airport Pavement Condition

Airport pavement condition ratings are a primary indicator of the long-term structural health of the state's airport system. Like the condition measures for highways, airport pavement is rated using PCI. The department evaluates pavement conditions at 98 publicly-owned airports in the State's Airport System Plan (SASP), of which 83 are airports listed in the National Plan of Integrated Airport Systems that qualify for federal funds. This encompasses airports of all sizes including the state's largest, General Mitchell International Airport. Eight airports are classified as "Air Carrier/Air Cargo." The department's goal is to have 90 percent of airport pavement with a rating of fair or above as determined by airport classification and pavement function (Figure 6-15).

Figure 6-15: Percent of Airport Pavement Rated Fair or Above



Source: Wisconsin Department of Transportation, MAPSS

Approximately one-third of the 98 SASP airports are inspected each year. The average is calculated and compiled for each calendar year and includes an assessment of all runways, taxiways, and aprons at the 98 SASP airports. The measure includes an analysis of both runway and taxiway pavements, as well as aircraft parking aprons.

Airports are locally-owned and decisions regarding improvements are handled at the local level. Investment decisions can be challenging when a pavement needs rehabilitation but other projects (typically safety-focused) must be addressed first. As high priority safety projects are completed, airports are again shifting their focus to pavement rehabilitation needs. In addition, as runway pavement needs are met, WisDOT anticipates that taxiway and apron pavement rehabilitation will become a higher priority that will result in a rebound in the overall rating at or near the target level in the coming years.

The department established minimum PCI levels that provide a threshold value for pavements according to use and airport classification. These thresholds provide the department and local authorities with the ability to prioritize projects and the capability to budget and program future pavement rehabilitation projects. The goal is to keep these pavements at or slightly above their minimum values when construction work occurs.

In order to encourage the local authorities to preserve proper pavement conditions, the airport must have pavements above the minimum PCI value before airports can receive federal or state aid for any other airport improvement project.

6.6 Transportation System Performance

A comprehensive, objective, and consistent set of freight-related performance measures for Wisconsin's transportation system is important for assessing the condition of that system, identifying its problems, prioritizing actions to resolve those problems, and measuring the effectiveness of the remedial actions. Performance measures are an important tool because they help ensure resources are used in the most strategic, effective, and efficient way possible.

Transportation system performance affects economic productivity in several ways. For example, traffic bottlenecks can increase the cost and time associated with the movement of freight traffic, which can affect economic growth. Measuring and targeting bottlenecks is key to ensuring freight moves efficiently in the state.

The performance of transportation affects economic productivity and freight movement in several ways. American businesses require more operators and equipment to deliver goods when shipping takes longer, more inventory when deliveries are unreliable, and more distribution centers to reach markets quickly when traffic is slow.[47] Likewise, both businesses and households are affected by sluggish traffic on the ground and in the air. The growth in freight is a major contributor to congestion in urban areas and on intercity routes, and congestion affects the timeliness and reliability of freight transportation.[48] A significant contributor to local congestion is long-distance freight movements. Local congestion can impede freight, which could reduce local and distant economic activity.

Growing freight demand increases recurring congestion at freight bottlenecks, places where freight and passenger service conflict with one another, and where there is not enough room for local pickup and delivery.[49] Congested freight hubs include international gateways such as ports, airports, and border crossings, and major domestic

[47] Federal Highway Administration, "Freight and Congestion."
[48] Ibid.
[49] Ibid.

terminals. Bottlenecks between freight hubs are caused by converging traffic at highway intersections and railroad junctions, steep grades on highways and rail lines, lane reductions on highways and single-track portions of railroads, and locks and constrained channels on waterways.[50]

Railroad bottlenecks can occur when passenger trains (such as Amtrak) and freight trains compete for space on the railroad network.

Bottlenecks can cause recurring, predictable congestion in selected locations, whereas the temporary loss of capacity, or nonrecurring congestion, is widespread and less predictable. Sources of nonrecurring delay on roadways include incidents, weather, work zones, and other disruptions. Weather, maintenance activities, and incidents have similar effects on aviation, railroads, pipelines, and waterways. Aviation is regularly disrupted by local weather delays, and inland waterways are closed by regional flooding and droughts.[51]

Additionally, freight congestion is caused by other factors that are considered either recurring if they are systemic problems or non-recurring if they represent an isolated event. Recurring and non-recurring sources of freight congestion include equipment shortages, short-term labor disruptions, and long-term shortages in key occupations such as truck drivers, inefficient operating practices at terminals and border crossings, and traffic backups at toll booths.

The next sections will assess the performance, which includes a bottleneck assessment, of Wisconsin's multimodal transportation system by mode.

Air Performance

As identified in Chapter 5, *Wisconsin's Transportation System Assets*, Wisconsin businesses use air freight to ensure the availability and freshness of products with short shelf lives, aid in just-in-time manufacturing and expand market reach. In 2013, almost 105,000 tons of air freight cargo was shipped by planes, with a total value exceeding $10 billion.[52]

Air Bottlenecks

Air freight coming into and out of Wisconsin is not limited by the capacity of any of the state's airports. Even with higher amounts of air freight being shipped within the past decade, there are no capacity issues. Wisconsin's airports have the capacity to accommodate growth in air freight. No specific bottlenecks were identified for air freight in Wisconsin.

[50] Federal Highway Administration, "Freight and Congestion."
[51] Ibid.
[52] 2013 IHS Transearch Database.

Roadway Performance

As of 2015, the state's highways were the most common transportation method of all freight within and through Wisconsin. One of the primary and common operational constraints affecting highway freight distribution is congestion, which can create bottlenecks (locations where truck traffic experiences recurring slow speeds due to an operational or network deficiency) on the system and results in reduced predictability for system users. As identified in Chapter 7, *Freight Transportation Trends, Issues, and Forecasts*, traffic volume on Wisconsin's highways is projected to increase during the next 30 years, including on several key freight corridors in Wisconsin. Increased traffic presents a significant operational challenge for highway freight vehicles and the distribution of commodities. Therefore, the primary performance measure applied to roadways is the identification of bottlenecks. The remainder of this section will assess the performance of Wisconsin's roadways.

Traffic Movement and Congestion

As stated earlier, safety and traffic movement performance thresholds determine whether infrastructure improvements are needed. WisDOT measures traffic movement or congestion levels using a level of service (LOS) performance threshold. LOS compares the amount of traffic on a road to its capacity. It takes into consideration traffic conditions (number of vehicles, vehicle types, and directional distribution) as well as roadway conditions (lane width, shoulder width, passing opportunities, and design speed). LOS is measured on a scale of A to F and ranges from "no congestion" to "extreme congestion." WisDOT developed traffic movement performance thresholds for the state trunk highway system using the level of service categories (Table 6-10). The thresholds differ according to road classification and function.

Roadway Capacity

Roadway capacity is defined as the number of vehicles a roadway can carry. Capacity is determined by several factors, including the number of lanes; width of lanes and shoulders; traffic signal timing; intersection controls; number and type of access points such as interchanges, driveways and intersections; and speed and alignment points such as grades and curves.

Enhanced roadway capacity should improve mobility, traffic flow, and safety.

The thresholds also vary for highways in urbanized and non-urbanized areas. A need is not triggered on a Corridors 2030 Backbone road located in a non-urbanized area until Level D is reached. For Corridors 2030 routes located in urbanized areas, the level of service trigger varies depending on whether or not the route is a Backbone road. Backbone routes have a lower level of service threshold because they function as higher-level roadways carrying traffic at higher speeds between communities.

Table 6-10: Level of Service Performance Thresholds

Level of Service	Description	Characteristics
A	No congestion; traffic flows smoothly	On both two-lane and four-lane highways • Free-flow operating speeds can be maintained • Vehicles can maneuver freely within traffic • Vehicles can enter the highway with little problem
B	No congestion; traffic flows smoothly	On both two-lane and four-lane highways • Speeds generally can be maintained • Vehicles can maneuver within traffic with only slight restrictions
C	Minimal congestion; traffic flow and speeds are slightly restricted	• Drivers must be more vigilant changing lanes on a four-lane highway • Minor incidents along the roadway can be absorbed, but tie-ups may form behind any significant blockage
D	Moderate congestion; speeds and distance between vehicles are reduced, constricting traffic flow	• Freedom of drivers to maneuver within the traffic stream or entering the highway is more noticeably limited • Minor incidents can result in traffic jams because the traffic stream has little space to absorb disruptions • Passing slow-moving vehicles on two-lane highway becomes very difficult because gaps in traffic occur less frequently • Turning vehicles and roadside distractions cause major shock waves in the traffic system
E	Severe congestion; vehicle speeds and spacing severely restricted	• The roadway is reaching capacity • Vehicles are closely spaced leaving little room to safely accommodate vehicles changing lanes or entering the roadway • Even minor incidents can impact traffic flow, resulting in extensive traffic back-ups • Passing vehicles on two-lane highway is virtually impossible, as slower vehicles or other interruptions are encountered
F	Extreme congestion; stop-and-go, bumper-to-bumper traffic	• Traffic demands exceeds the carrying capacity of the roadways • Serious delays in travel occur when congestion reaches this level

Source: Wisconsin Department of Transportation, Bureau of State Highway Programs

Highway Congestion

WisDOT's vision for optimizing traffic movement on the state trunk highway system is to improve the system to reduce congestion, improve safety, and support economic growth in Wisconsin. To achieve this vision, WisDOT uses tools and strategies to improve capacity on existing facilities and construct new facilities to increase capacity, where appropriate and warranted.

The efficiency and reliability of Wisconsin's STH is impacted by several factors such as traffic volume, roadway design, bad weather, and incidents such as crashes, stalled vehicles, and construction. These factors can result in increased congestion. A safe, efficient, and reliable highway system requires routine monitoring, maintenance, and preservation to meet established performance thresholds and reduce highway bottlenecks. As identified earlier, WisDOT's delay and travel reliability performance measures help to enhance mobility and reliability on the state's highway system. The next section addresses highway bottlenecks, which can cause congestion. Identifying and reducing bottlenecks can reduce highway congestion.

Highway Bottlenecks

Bottlenecks typically result from roadway design limitations. This may happen when there is a reduction in the number of lanes, or at interchanges or intersection locations. Traffic bottlenecks can quantifiably increase the cost and time associated with the movement of freight traffic, which in turn can affect economic growth.

Bottlenecks tend to be found on highways that serve high volumes of trucks, specifically in areas considered to be domestic freight hubs, or urban areas where national freight lanes intersect urban freight routes. Trucks do not necessarily cause bottlenecks, rather bottlenecks may be caused by a roadway that isn't properly designed to handle the demand of freight trucks. In this instance, a bottleneck is defined as a localized section of highway that experiences reduced speeds and delays due to a recurring operational influence or a nonrecurring event, such as an incident or bad weather. A bottleneck is on a shorter portion of the facility and not along an entire corridor. Highway-specific bottlenecks can be further broken down into recurring and nonrecurring:

- **Recurring Bottlenecks –** Can be caused by fixed facility constraints such as interchanges, sharp hills or curves, narrow lanes, lack of shoulders, signalized intersections, or lane drops.
- **Nonrecurring Bottlenecks –** Can be caused by a temporary loss in capacity, such as a lane closure from an incident or bad weather, or a temporary increase in demand such as a special event

Bottlenecks on highways that serve high volumes of trucks are freight bottlenecks. A truck bottleneck is defined by a combination of three features: the type of constraint, the type of roadway, and the type of freight route. A truck bottleneck may be caused by congestion at an interchange on a freeway serving as an intercity truck corridor, or a truck bottleneck may be caused by poorly timed traffic signals at intersections on an arterial road that serves as an urban truck corridor.

As a part of the Freight Performance Measures initiative (FPM), the FHWA Office of Freight Management and Operations collaborated with the American Transportation Research Institute (ATRI) to identify and quantify the impact of bottlenecks on truck-based freight at 250 specific locations nationwide using 2014 data.[53] This data of truck congestion is collected via truck based GPS data points utilizing customized software tools, developed specifically for the FPM program. The 250 specific locations were identified based on surveys of public and private stakeholders, as well as past analysis of freight flow congestion. A "total congestion value" at each specific site is derived by measuring several factors including:

- **Free-Flow Speed –** the speed at which congestion has no constraint on mobility, and is assumed to be greater than 50 mph on the Interstate System
- **Average Truck Speed –** collected via FPM program and subtracted from free-flow speed to determine the total mph below free flow
- **Hourly Freight Congestion Value –** a multiplication of the total mph below free-flow speed (on an hour by hour basis) by the total number of commercial trucks in each hour block

Table 6-11 identifies bottleneck type and potential performance measures to alleviate bottleneck congestion in the state.

[53] American Transportation Research Institute, "Congestion Impact Analysis of Freight-Significant Highway Locations - 2015."

Table 6-11: Bottleneck Type and Potential Performance Measures

Bottleneck Type	Potential Performance Measures
Slow Speed	• Number of hours spent in interstate traffic below the posted speed • Percent of time that travel speeds are less than 75% of the free-flow speed • More than 50% of sampled trucks traveling below 60 percent of the posted speed
Reliability	• Travel time index: average peak period travel time/non-peak hour travel time • Planning Time Index: 95th percentile travel time/non-peak hour travel time
Resiliency	• Disruptions caused by severe weather that have had at least one full closure lasting longer than 24 hours over the last 20 years
Restricted Access for Legal Loads	• Highway facility has a posted weight limit below the current legal limit, or it does not allow overweight loads
Clearance Restrictions for OSOW Loads	• Highway facility has a height clearance of less than 17 feet

The FAST Act mandates that "an inventory of facilities with freight mobility issues, such as bottlenecks…" are included in state freight plans, additionally requiring "a description of the strategies the State is employing to address the freight mobility issues" on all facilities that are state owned. Table 6-11 gives an inventory of the specific types of bottlenecks seen on major highways in Wisconsin.

WisDOT, through its programming of projects (see Chapter 9, *Investment and Implementation*), seeks to address identified highway bottlenecks in Table 6-14 to facilitate the safe and efficient movement of freight statewide. WisDOT's data, relative to system performance and condition, as well as feedback from stakeholders and system users, serve as indicators of the progress made on highway freight bottlenecks.

Table 6-14 includes a list of identified Interstate System and non-Interstate NHS bottlenecks in Wisconsin, in accordance with MAP-21 and the FAST Act, based on travel time reliability, average speed, bottleneck duration, and bottleneck frequency. The bottlenecks are ranked using a normalized mathematical calculation called a "z-score," which is based on travel time reliability, average speed, bottleneck duration, and bottleneck frequency.

Figure 6-23 includes analysis on truck travel time reliability. Truck travel time reliability is calculated per the MAP-21 System Performance rule. This applies only to interstates and is the ratio of the 95th percentile over the 50th percentile (median) travel time over the entire year. The minimum value is 1. If no value is provided it was not calculated for that segment.

Figure 6-24 evaluates average truck travel speed. Average truck speed is calculated per the MAP-21 and FAST Act System performance proposed rule. The final rule removed average truck speed as a required performance measure, but the measure was included in the SFP to further show the performance of roadways. The proposed rule used 50 mph as the threshold for reporting mileage as congested or not.

The bottleneck duration, as established in Figure 6-25, is the total of all hours over the year where the truck speed is below 50 mph. A bottleneck is deemed to occur when speeds drop below a threshold for a given duration. The threshold used for this analysis was 60% of the free flow speed; calculated as the greater of 70 MPH or the 85th percentile speed over the year. An event was flagged as a bottleneck if the speed was below that threshold for 15 minutes or longer and ended by an uninterrupted period of 15 minutes above the threshold speed (Figure 6-26).

As identified earlier in this chapter, the performance measures in this chapter will be adapted and used to establish baselines for the MAP-21 and FAST Act performance measure for "Freight movement on the Interstate System:"

- Truck Travel Time Reliability Index on the Interstate System

FHWA requires states to monitor and report on the performance metrics for freight movement, along with other performance measures identified under the other generalized or non-freight specific areas. The first four-year performance reporting period for the freight-related measure begins January 1, 2018 and extends through December 31, 2021. In 2020, WisDOT may adjust targets and will report on progress to FHWA as required by MAP-21 and the FAST Act. WisDOT will provide FHWA a full reporting period report in 2022.

In accordance with MAP-21 and the FAST Act, FHWA will determine a state's progress toward meeting the performance targets related to freight movement. If progress is not made, WisDOT will provide a written description of the actions the state will take to achieve the targets.

Local Road Bottlenecks

Many of the state's bottlenecks occur on state highways. However, bottlenecks do occur on local roads. As identified previously, WisDOT's assesses local road pavement and bridge condition. Assessing local road pavement and bridge condition can help to reduce bottlenecks on local roads.

A strong local road network can provide sufficient property access and reduce the number of access points to the STH. When developed, these networks encourage drivers to use local roads for short local trips instead of state trunk highway system.

Wisconsin administers funding for several programs to help support the transportation infrastructure needs of local governments, including General Transportation Aids, the Local Roads Improvement Program, and the Surface Transportation Program. The funding could be used to reduce bottlenecks on the local system.

WisDOT's regional staff works with counties and local governments to identify and prioritize rehabilitation projects for consideration of funding under the Local Bridge Program. The department has also worked with various state and local partners to implement a process to help keep bridge projects on schedule, which can help reduce bottlenecks.

Railroad Performance

As identified in Chapter 5, *Wisconsin's Transportation System Assets*, Wisconsin's approximate 3,300 miles of railroad system makes up about 2 percent of the nation's rail network. As a subset of the 3,300 miles of railroad, Wisconsin has 718 miles of state-assisted rail corridors, of which approximately 624 miles are publicly-owned and operated primarily by Wisconsin and Southern Railroad Co. (WSOR).

The state's rail system is owned and operated by ten active, privately-owned freight railroads and the State of Wisconsin. The private railroads each hold Surface Transportation Board (STB) freight carrier certificates and operate over a network of mainlines, branches, industrial leads, spurs, rail yards, and terminals.

Railroad Bottlenecks

Railroads carry the second highest amount of freight tonnage in Wisconsin, which makes identifying locations with freight mobility issues on rail lines extremely important. The importance is intensified by the fact that the efficient

movement of products on railroads provides many economic benefits to the state. Wisconsin's railroad freight bottlenecks are identified in Table 6-12.

Table 6-12: Railroad Freight Bottlenecks on Wisconsin's Publicly-Supported System

Railroad Freight Bottlenecks on Wisconsin's Publicly-Supported System
Limited rail access and no intermodal container service at Port of Milwaukee: • Wisconsin & Southern Railroad (WSOR) not able to access Port without trackage rights over Canadian Pacific • UP does not have sufficient clearance under eleven bridges through South Milwaukee to access port with double-stack container cars
Madison–Prairie du Chien (Prairie Subdivision) train speeds limited to 10 mph due to: • Class 1 track on most of subdivision • Several bridges restricted to 10 mph for 286,000-pound carloads
WSOR must use UP-owned track segment (and await UP dispatching) in Janesville to move between the Waukesha or Madison subdivisions and the Monroe Subdivision, Fox Lake Subdivision, and Chicago.
Merrimac Bridge (Reedsburg Subdivision) limited to 263,000-pound carloads at 10 mph. Shippers in Baraboo and Reedsburg are thus limited to 263,000-pound carloads.
WSOR limited to one train per day (each way) over Metra track to interchange with other railroads at Belt Railway yard at Clearing, IL (Chicago).

Table 6-12 includes bottlenecks identified on Wisconsin's publicly-supported system and does not contain any bottlenecks that might be associated with Class I railroads. Class I railroads are private companies and these companies invest in their own rail lines. However, Wisconsin's Freight Rail Infrastructure Improvement Program (FRIIP) and Freight Railroad Preservation Program (FRPP) are resources that can be used to enhance freight mobility on rail lines (see Chapter 9, *Investment and Implementation*).

Waterway Performance

Wisconsin's ports and waterways are an important component of Wisconsin's freight infrastructure. The remainder of this section outlines the performance measures used to assess the Upper Mississippi River and Wisconsin's ports. The Inland waterway system has a number of sources of delay, including lock operations, aging infrastructure, number of vessels, tonnage, average daily delay time, and lock closures. USACE data on the proportion of vessels delayed and average delay on the Upper Mississippi River Locks will be used to define performance.

As shown in Table 6-13, between 12 percent and 35 percent of vessels traveling through the Wisconsin portion of the Upper Mississippi River locks and dams experienced delays in 2014.

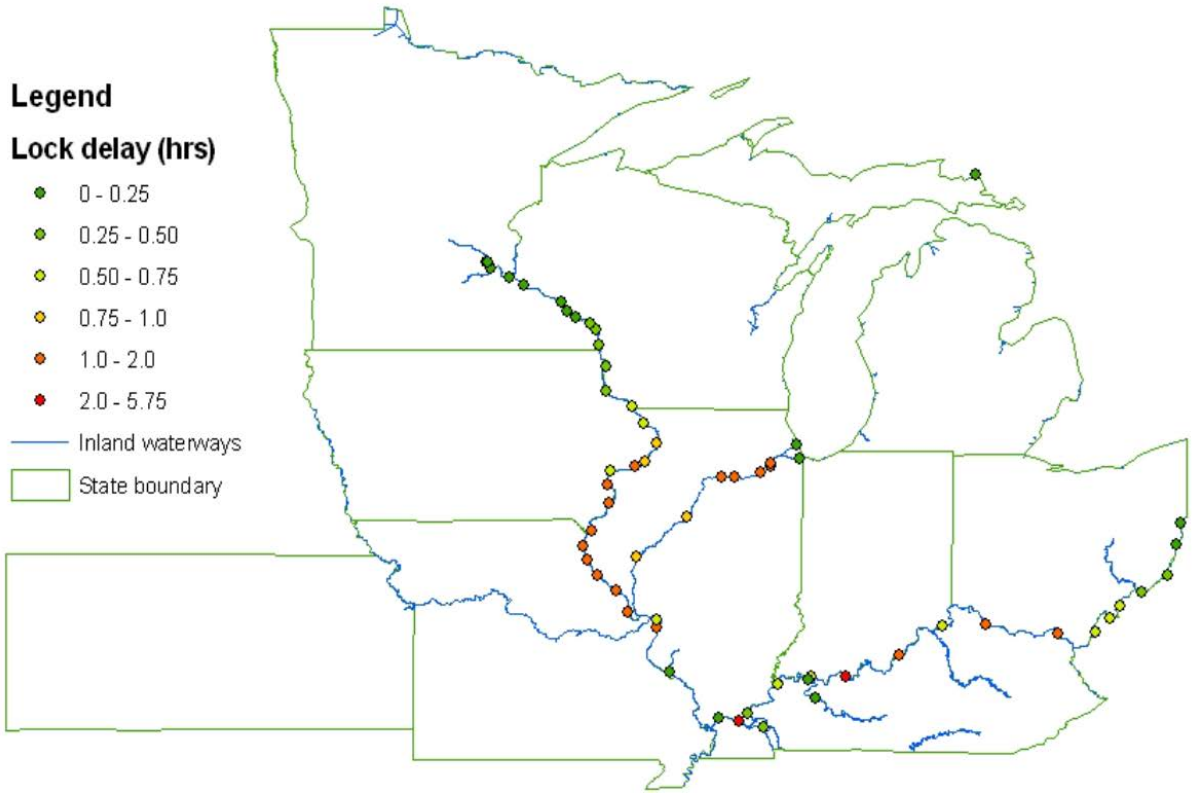
Table 6-13: 2014 Upper Mississippi River Locks and Dams Average Delays

Lock and Dam Number	Lock Location	Average Delay (Hours)	% Vessels Delayed
3	Red Wing, MN	1.35	24%
4	Alma, WI	1.60	12%
5	Winona County, MN	1.13	26%
5A	Fountain City, WI	1.12	30%
6	Trempealeau, WI	1.01	22%
7	La Crescent, MN	0.64	23%
8	Genoa, WI	1.28	33%
9	Lynxville, WI	1.10	35%
10	Guttenberg, IA	1.02	27%
11	Dubuque, IA	1.04	43%

Source: U.S. Army Corps of Engineers, Rock Island District

Figure 6-16 puts the Upper Mississippi River system within the context of the larger Inland waterway system. Overall, the Upper Mississippi River system has a disproportionate share of delays compared to other inland waterways. In 2010, the Upper Mississippi River experienced half of the 36 most-delayed locks in the U.S.

Figure 6-16: Midwestern Lock Delays



Source: U.S. Army Corps of Engineers

Waterway Bottlenecks

Given the condition, size, and average delay of the locks bordering Wisconsin, all are considered freight bottlenecks. It is clear that a lack of repairs, maintenance, and modernization will continue to have a negative impact and the deterioration of the infrastructure will go on. Failure or closure of a lock could be catastrophic for

the region. Commodities would still need to be transported, inadvertently leading to the long-term transport of goods shifting to highways and railroads. Deterioration of road and rail infrastructure would occur at an increased rate. Additionally, it would cause increased costs to shippers, resulting in decreased cost advantages to Midwestern producers and missed economic opportunities available through the expansion of the Panama Canal.

In 2014, the United States DOT's Maritime Administration approved designation of the Upper Mississippi River from St. Louis, MO to St. Paul, MN as the M-35 Marine Highway Corridor. This designation, cosponsored by WisDOT, is a necessary step toward planning for an integrated, multimodal regional transportation system. WisDOT is working with the Upper Mississippi River Basin Association, a group formed by the Governors of the five states along the Upper Mississippi – Iowa, Illinois, Minnesota, Missouri, and Wisconsin – to assess the current state of river navigation and evaluate ways to increase the efficiency and reliability of the lock and dam system, and identify opportunities to increase utilization of the Upper Mississippi River.

In terms of bottlenecks at Wisconsin's commercial ports along the Great Lakes, many of the ports are operated by either private entities or municipalities. Like railroads, the ports operated by private entities and municipalities are responsible for responding to bottlenecks. However, many organizations such as the USACE, United States Coast Guard, municipalities, private and public entities, and WisDOT have been working cooperatively to address issues at the commercial ports in Wisconsin.

In addition, member of the Conference of Great Lakes and St. Lawrence Governors and Premiers Regional Maritime Task Force has developed a strategic plan to improve the efficiency and competitiveness of the Great Lakes maritime transportation system. Action items have been developed to increase maritime transportation efficiency and reduce costs, build new markets, increase economic activity, and plan for the future.

Created in 1979, the Harbor Assistance Program (HAP) assists port communities along the Great Lakes and Mississippi River in maintaining and improving waterborne commerce (see Chapter 9, *Investment and Implementation*). Port projects typically include dock reconstruction, mooring structure replacement, dredging, and the construction of facilities to hold dredged material. HAP program funds may also be used to reduce bottlenecks at Wisconsin's ports.

In order to further enhance freight mobility, in 2014, the Maritime Administration granted the five Upper Mississippi River States' request to designate the Upper Mississippi River as the M-35 Marine Highway Corridor. Since this designation, the states of Illinois, Iowa, Minnesota, Missouri, and Wisconsin continue to work with industry and other stakeholders to enhance freight mobility by integrating strategic approaches, and promoting the inland waterways as a means to relive landside transportation congestion. Although no funding is associated with the M-35 Marine Highway Corridor, the designation underscores the importance of freight mobility on the Upper Mississippi River.

Pipeline Performance

Data on condition and performance of pipelines is difficult to get at a segment level. Additionally, WisDOT does not have a role in the inspection or repair of pipelines. Therefore, the focus of the condition and performance of the pipeline system is on the frequency of incidents on the system in Wisconsin. The following section presents the condition and performance of Wisconsin's pipeline assets.

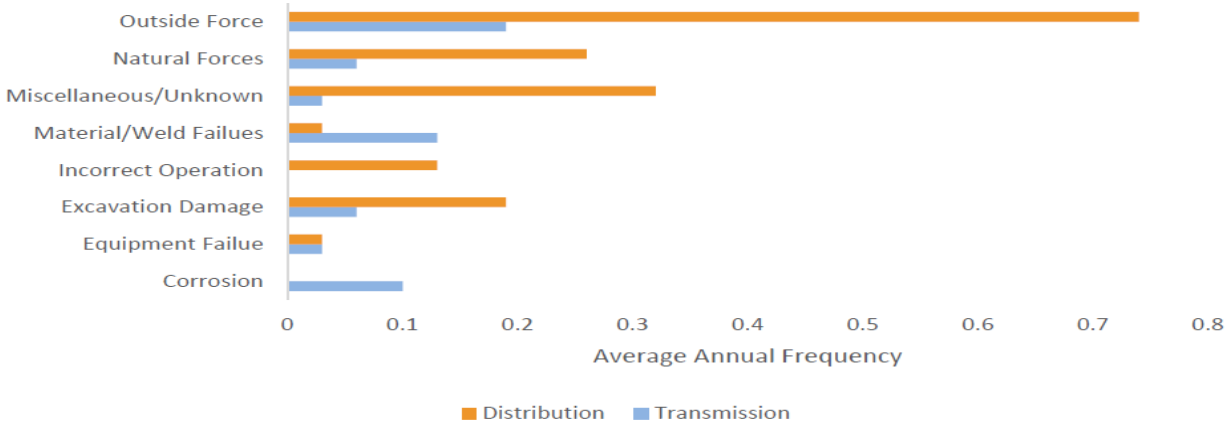
Natural Gas Pipeline Performance

According to the United States Department of Energy's energy sector risk profile, the most frequent type of event impacting both natural gas transmission and distribution pipelines in Wisconsin is outside force, which is an event

due to a car accident, sabotage, or vandalism (Figure 6-17). Outside forces, along with natural force and excavation damage are not due to the condition of the pipelines, whereas material/weld failures, incorrect operation, equipment failure, and corrosion could be related to the condition and/or performance of the pipeline system. Of the events that a pipeline company has control over, corrosion and material/weld failure are significant issues for transmission lines, whereas incorrect operation is the largest issue for distribution lines.

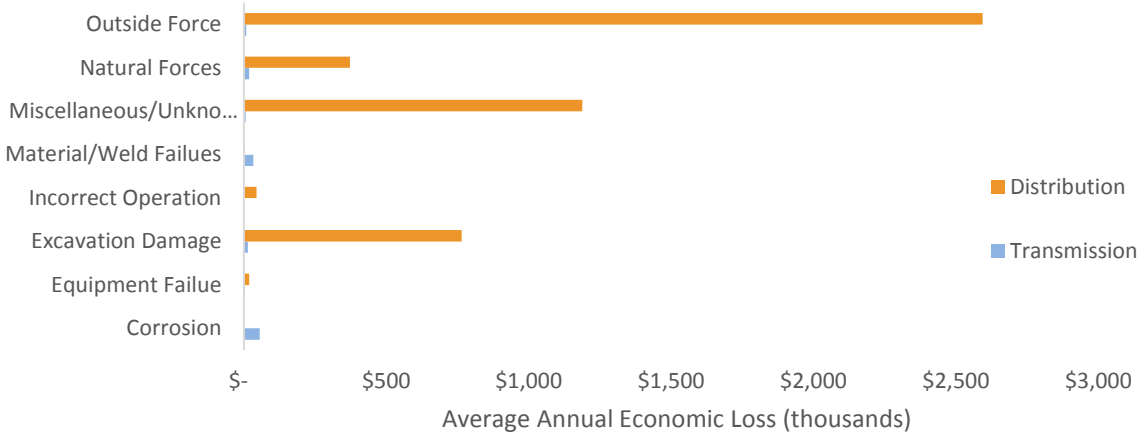
The Wisconsin Public Service Commission noted that Wisconsin's natural gas pipeline system functions well and has fewer leaks compared to other states. The condition of Wisconsin's pipelines is partially due to Wisconsin's cold climate forcing leaked natural gas into basements where it is detected by home owners.[54] Home owners will then contact their gas provider and the leak will be fixed. This contrasts with warmer climates where unfrozen ground allows the natural gas to escape from pipelines, sometimes occurring without those in close proximity noticing. Figure 6-17 and Figure 6-18 display the frequency and cost of natural gas pipeline events from 1986-2014.

Figure 6-17: 1986-2014 Annual Frequency of Events Impacting Natural Gas Pipelines



Source: U.S. Department of Energy, "State of Wisconsin Energy Sector Risk Profile"

Figure 6-18: 1986-2014 Annual Economic Cost of Events Impacting Natural Gas Pipelines



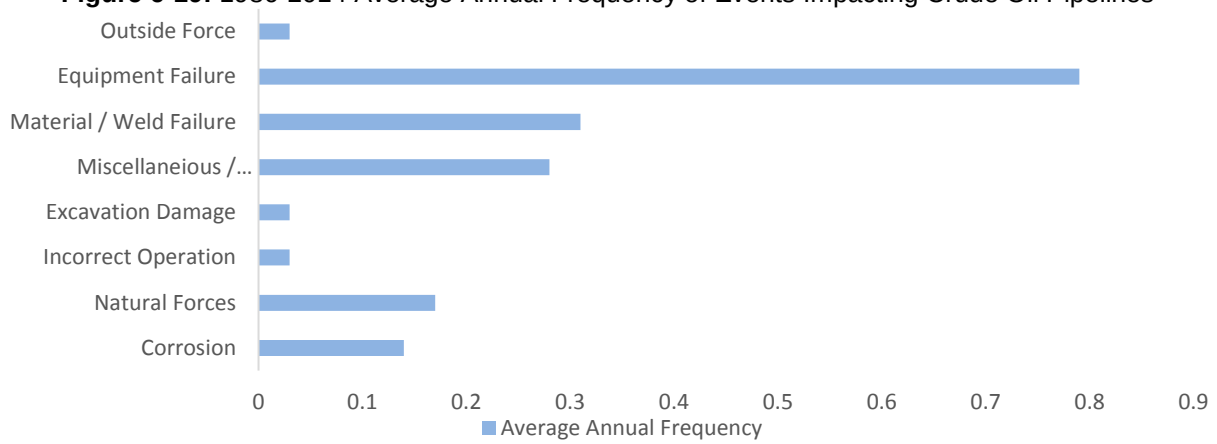
Source: U.S. Department of Energy, "State of Wisconsin Energy Sector Risk Profile"

[54] Mercaptan is added to natural gas producing a distinct rotten egg odor to make it detectable by smell.

Crude Oil Pipeline Performance

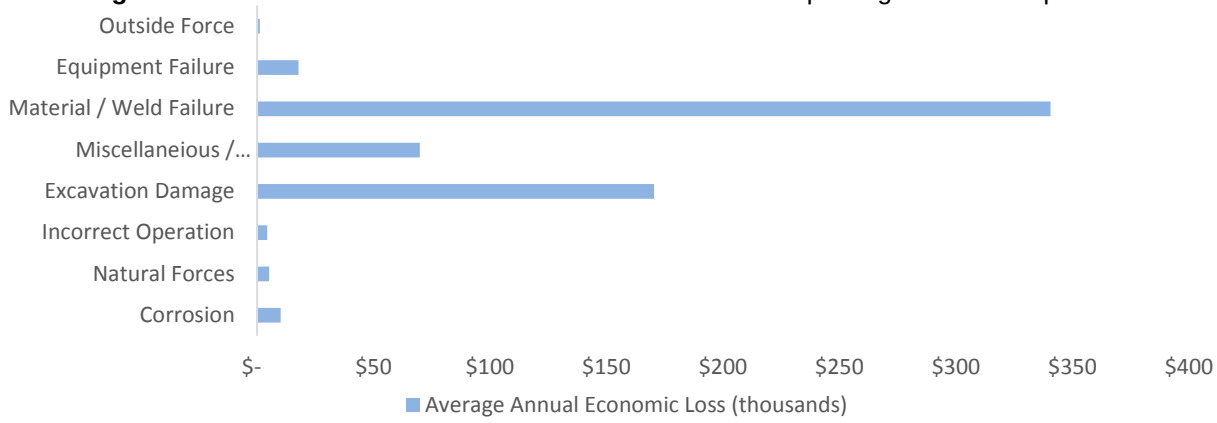
Unlike natural gas pipelines in Wisconsin, the mostly frequent event affecting crude oil pipelines from 1986-2014 was equipment failure, but the most costly were material/weld failures, with much of the cost related to the clean-up following a rupture (See Figure 6-19 and Figure 6-20).

Figure 6-19: 1986-2014 Average Annual Frequency of Events Impacting Crude Oil Pipelines



Source: U.S. Department of Energy, "State of Wisconsin Energy Sector Risk Profile"

Figure 6-20: 1986-2014 Annual Economic Cost of Events Impacting Crude Oil Pipelines



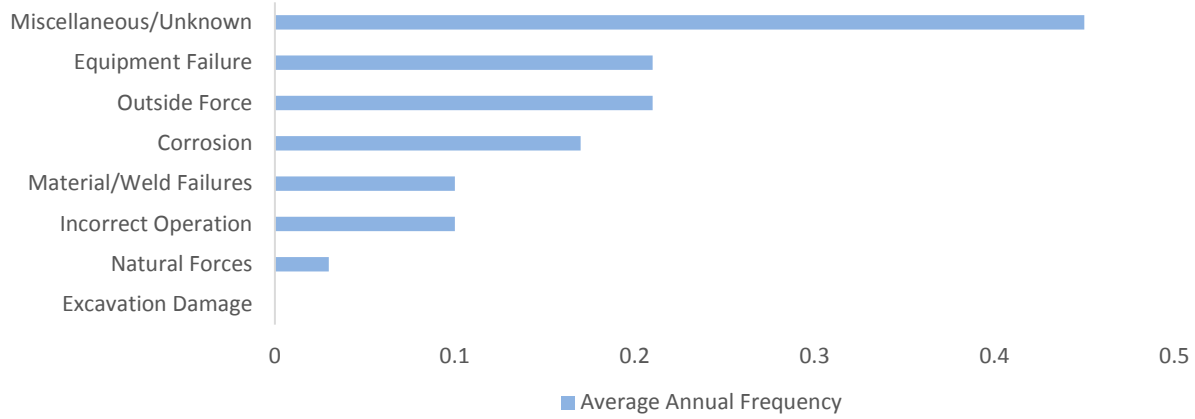
Source: U.S. Department of Energy, "State of Wisconsin Energy Sector Risk Profile"

Petroleum Product Pipeline Performance

Figure 6-21 and Figure 6-22 display the annual frequency and annual average cost per event (rupture, damage, or some other incident), on a petroleum product pipeline. Events are most frequently classified as "miscellaneous or unknown," with equipment failure and outside force comprising the next two most frequent events. Consultations with industry suggest that the frequency of shutdowns on some of the state's petroleum product pipelines are increasing. The West Shore Pipeline was specifically mentioned as experiencing recurring issues. Over time these issues have affected not only the Green Bay area, but also Northeast Wisconsin and Michigan's Upper Peninsula, which are served by the Green Bay Terminal. This is due to the fact that the Green Bay Terminal was exclusively served by the West Shore Pipeline while other parts of Wisconsin are served by multiple pipelines. The most recent incident affecting the West Shore Pipeline occurred in March 2016, which removed the pipeline from service north

of Milwaukee. In April 2017 the owners decided to permanently close the pipeline.[55] The closure has resulted in both truck and waterway transportation of petroleum products to Green Bay.

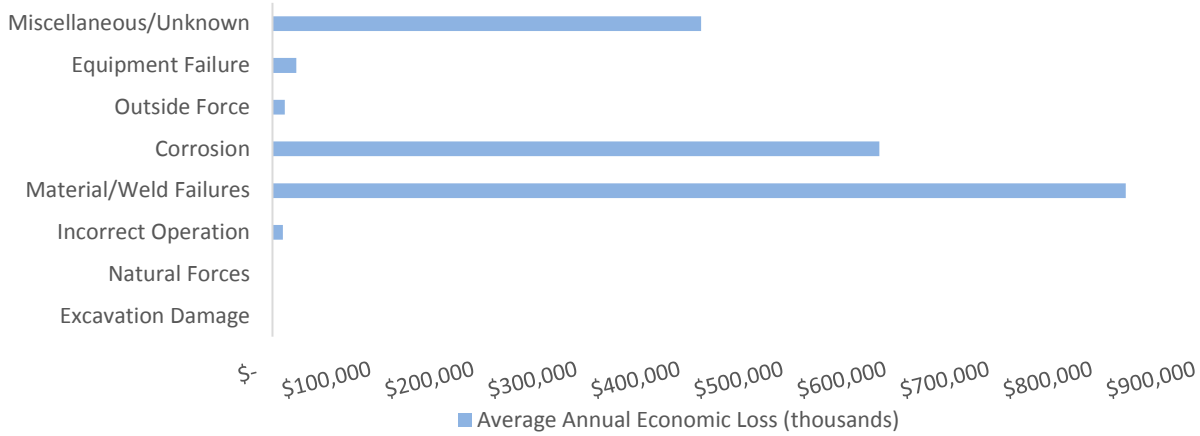
Figure 6-21: 1986-2014 Average Annual Frequency of Events Impacting Petroleum Product Pipelines



Source: U.S. Department of Energy, "State of Wisconsin Energy Sector Risk Profile"

The economic loss attributable to petroleum product events is more than twice as costly for most events, compared to the losses resulting from a crude oil rupture. Overall, the economic losses for petroleum products are significantly higher than those for natural gas and crude oil.

Figure 6-22: 1986-2014 Annual Economic Cost of Events Impacting Petroleum Product Pipelines



Source: U.S. Department of Energy, "State of Wisconsin Energy Sector Risk Profile"

6.7 Performance Using Federally Available Data Sets

As noted in this chapter, a critical component of the freight plan is the identification of roadway segments with poor performance relative to reliability, speed and bottlenecks. Figures 6-23 through 6-27 display roadway segment performance, measured by reliability, average speed, bottleneck duration, bottleneck frequency, and aggregate Z score. The bottlenecks in the table below are ranked using a normalized mathematical calculation called a "Z score," which is based on a combination of travel time reliability, average speed, bottleneck duration, and bottleneck frequency.

[55] Milwaukee Journal Sentinel, "Company won't replace only fuel pipeline to Green Bay." (April 21, 2017).

Table 6-14: 2014-2015 Highway Freight Bottleneck Segments (Ranked by Aggregate Z-Score)

County	Route	Direction	Distance (mi)	Reliability (95th/50th)	Average Speed (mph)	Bottleneck Duration (hours)	Bottleneck Frequency (count)	Composite (Z-Score)
Milwaukee	I-94	WB	0.42	5.47	29.0	4,323	538	15.62
Walworth	US-14	NB	1.73	13.16	44.1	1,568	200	15.22
Milwaukee	I-94	EB	0.61	4.73	29.3	4,274	577	15.14
Milwaukee	I-94	WB	0.43	5.06	29.0	4,183	489	15.00
Dane	US-18	WB	0.57	3.79	29.4	4,839	725	14.95
Dane	US-18	EB	0.96	5.15	39.8	3,516	624	14.66
Milwaukee	I-94	WB	0.38	4.33	29.3	4,170	448	14.06
Milwaukee	I-94	WB	0.65	4.27	36.0	4,243	520	13.80
Milwaukee	US-45	SB	1.11	3.86	38.9	2,316	503	12.59
Milwaukee	US-45	SB	0.43	4.46	40.6	1,802	429	12.49
Wood	US-10	EB	5.86	9.55	48.3	1,027	109	12.26
Dane	US-18	WB	1.25	2.70	33.4	4,881	493	11.99
Milwaukee	I-43	SB	0.32	5.60	41.4	1,107	231	11.75
Crawford	US-18	EB	3.90	4.39	41.6	2,165	290	11.56
Dane	US-18	EB	0.75	2.53	27.6	5,035	367	11.53
Rock	US-14	SB	1.98	3.09	35.2	2,499	329	10.98
Milwaukee	I-43/I-94	SB	0.61	3.67	40.6	2,409	281	10.88
Milwaukee	US-45	SB	0.93	3.33	43.0	1,726	410	10.85
Milwaukee	I-43	SB	0.28	4.61	41.4	1,059	228	10.85
Ashland	US-2	EB	20.92	2.62	44.6	2,466	547	10.66
Dane	US-51	SB	3.38	2.88	42.7	2,710	424	10.64
Milwaukee	I-94	EB	0.51	1.89	41.0	4,004	700	10.62
Milwaukee	I-94	WB	0.33	3.09	41.9	3,273	308	10.42
Milwaukee	US-41	SB	1.48	2.28	25.6	2,998	280	10.33
Dane	US-14	EB	4.59	2.75	44.3	2,569	432	10.30
Rock	US-14	NB	0.67	2.03	22.3	2,941	295	10.21
St Croix	US-63	SB	2.23	1.84	27.6	2,996	435	10.19
Milwaukee	I-43	SB	0.74	3.70	43.1	1,210	268	10.14
St Croix	US-12	WB	1.05	2.85	22.1	1,718	146	10.11
La Crosse	US-14	EB	2.03	2.20	28.5	3,101	301	10.07
Marinette	US-141	SB	8.85	2.86	47.5	2,012	410	9.89
Milwaukee	US-45	SB	1.09	2.77	45.5	1,673	422	9.88
Milwaukee	US-41	NB	1.48	2.28	25.5	2,935	204	9.73
Milwaukee	I-94	WB	0.96	2.00	39.3	4,692	382	9.49
Milwaukee	I-894	NB	0.42	2.81	46.6	1,090	406	9.46
Marinette	US-41	NB	1.63	1.70	25.2	2,883	339	9.46
Waukesha	I-94	EB	0.42	2.00	49.6	2,857	606	9.43
Dane	US-151	NB	0.82	2.45	32.3	2,751	208	9.41
Dane	US-151	NB	1.37	2.33	27.6	2,850	175	9.36
La Crosse	US-14	WB	1.60	2.25	26.3	3,336	150	9.20
Waukesha	US-18	WB	0.85	2.24	33.4	2,997	230	9.17
Waukesha	I-94	EB	2.63	2.17	46.2	1,656	497	9.16
Dane	US-51	NB	1.75	2.29	41.0	3,246	301	9.15
Milwaukee	I-43	SB	0.63	2.44	48.0	1,155	470	9.10
Milwaukee	I-43	NB	0.84	2.30	47.2	1,766	447	9.10
Milwaukee	I-94	EB	0.76	2.11	42.7	4,196	340	9.08
Milwaukee	US-45	NB	1.58	2.17	36.2	3,449	258	9.07
Milwaukee	I-894	NB	0.97	2.16	45.9	2,097	440	9.00
Milwaukee	I-94	EB	1.03	1.81	40.8	5,076	378	8.95
Milwaukee	I-43	SB	0.74	2.36	47.6	1,308	428	8.85
Milwaukee	US-45	SB	1.10	1.73	42.9	4,997	415	8.77

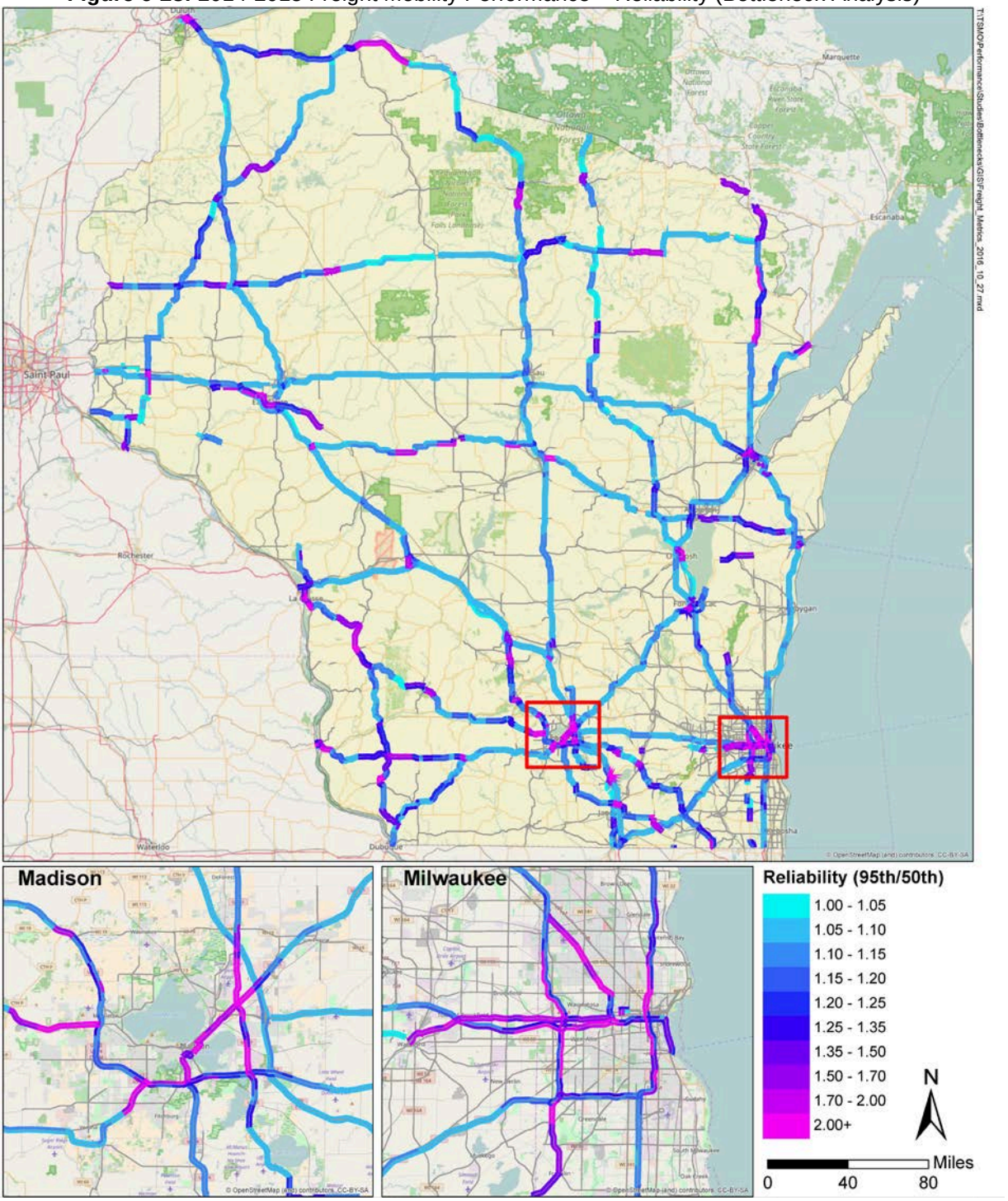
Dane	US-151	SB	0.91	2.11	30.4	3,436	160	8.66
Dane	US-51	NB	0.53	2.67	41.0	2,120	184	8.62
Milwaukee	I-43	NB	0.69	2.36	46.5	1,391	365	8.60
Milwaukee	I-894	NB	0.56	2.49	48.0	1,086	368	8.55
Dane	US-151	SB	0.95	2.24	33.3	2,939	158	8.53
Portage	US-10	WB	3.64	2.26	42.0	3,821	223	8.53
Rock	US-14	SB	0.49	2.71	29.3	2,057	68	8.45
Dane	US-14	WB	4.47	2.42	45.6	2,295	252	8.37
Milwaukee	I-43/I-94	SB	0.60	2.38	46.8	1,410	321	8.36
Dane	US-51	SB	0.42	2.33	31.5	2,477	114	8.31
Marinette	US-41	NB	2.68	2.04	46.2	2,166	358	8.27
Grant	US-18	WB	9.16	1.94	49.3	1,907	458	8.26
Milwaukee	I-43	SB	0.94	2.24	44.1	2,396	254	8.22
Milwaukee	US-41	NB	0.25	2.62	27.8	1,550	66	8.21
Milwaukee	I-894	NB	0.28	2.05	46.4	2,579	326	8.18
Dane	US-18	WB	0.67	2.24	48.9	878	415	8.16
Dane	US-51	SB	1.76	2.18	41.4	3,209	197	8.09
Dane	US-18	WB	0.88	1.95	49.4	1,214	478	8.08
Milwaukee	I-43/I-94	SB	0.43	2.21	47.6	1,469	333	8.07
Milwaukee	US-45	SB	1.21	2.04	32.8	3,263	138	8.06
Grant	US-61	SB	2.40	2.89	35.1	1,482	73	8.04
Douglas	US-53	SB	1.44	2.41	42.3	3,153	151	8.02
Dane	US-151	SB	0.70	2.20	30.7	2,861	97	8.02
Dane	US-151	NB	0.94	2.07	32.2	3,065	127	8.00
Dane	US-151	NB	0.69	2.01	30.7	2,759	130	7.99
Trempealeau	US-10	WB	1.65	2.23	35.2	2,205	140	7.97
Dane	US-151	SB	1.04	1.93	29.4	3,015	129	7.96
Marinette	US-141	SB	8.33	2.51	52.2	1,242	300	7.86
Dane	US-18	EB	1.23	1.93	34.9	5,084	130	7.85
Calumet	US-10	WB	0.29	2.12	26.5	1,691	90	7.80
Milwaukee	I-94	EB	0.54	1.75	43.1	3,745	285	7.77
Crawford	US-18	EB	1.40	3.39	45.0	1,620	56	7.66
Dane	US-151	NB	0.86	1.82	31.7	3,301	131	7.59
Dane	US-51	NB	0.52	2.36	36.9	1,893	105	7.57
Rock	US-14	NB	0.40	2.21	27.3	1,716	63	7.55
Dane	US-51	NB	0.55	1.98	30.2	3,775	77	7.55
Portage	US-10	EB	4.01	2.19	44.1	3,667	151	7.55
Milwaukee	I-43/I-94	SB	0.68	2.14	49.7	1,153	329	7.54
Dane	US-151	SB	0.83	2.01	33.6	2,420	109	7.40
Milwaukee	US-18	EB	2.03	1.92	35.0	2,684	131	7.37
Manitowoc	US-151	SB	0.66	2.06	31.0	1,925	91	7.36
Dane	US-51	NB	3.32	2.29	44.8	2,299	152	7.36
Dane	US-51	SB	0.27	2.95	40.2	1,703	46	7.36
Eau Claire	US-12	WB	2.25	2.23	40.5	3,019	107	7.35
Milwaukee	I-894	NB	0.81	2.02	49.2	901	347	7.28
Brown	US-141	NB	0.91	2.04	31.6	2,220	83	7.27
Dane	US-151	SB	0.47	1.82	27.3	2,508	85	7.26
Rock	US-14	NB	1.97	2.19	38.1	2,140	108	7.26
Milwaukee	I-94	EB	0.72	1.64	44.5	4,056	263	7.26

Source: Wisconsin TOPS Lab (NPMRDS 2015 Data)

Roadway Reliability

Figure 6-23 displays truck travel time reliability, which is similar to the performance measure proposed under MAP-21, but with the addition of non-Interstates. Truck travel time reliability is the ratio of the 95th percentile over the 50th percentile (median) travel time over the entire year.

Figure 6-23: 2014-2015 Freight Mobility Performance – Reliability (Bottleneck Analysis)

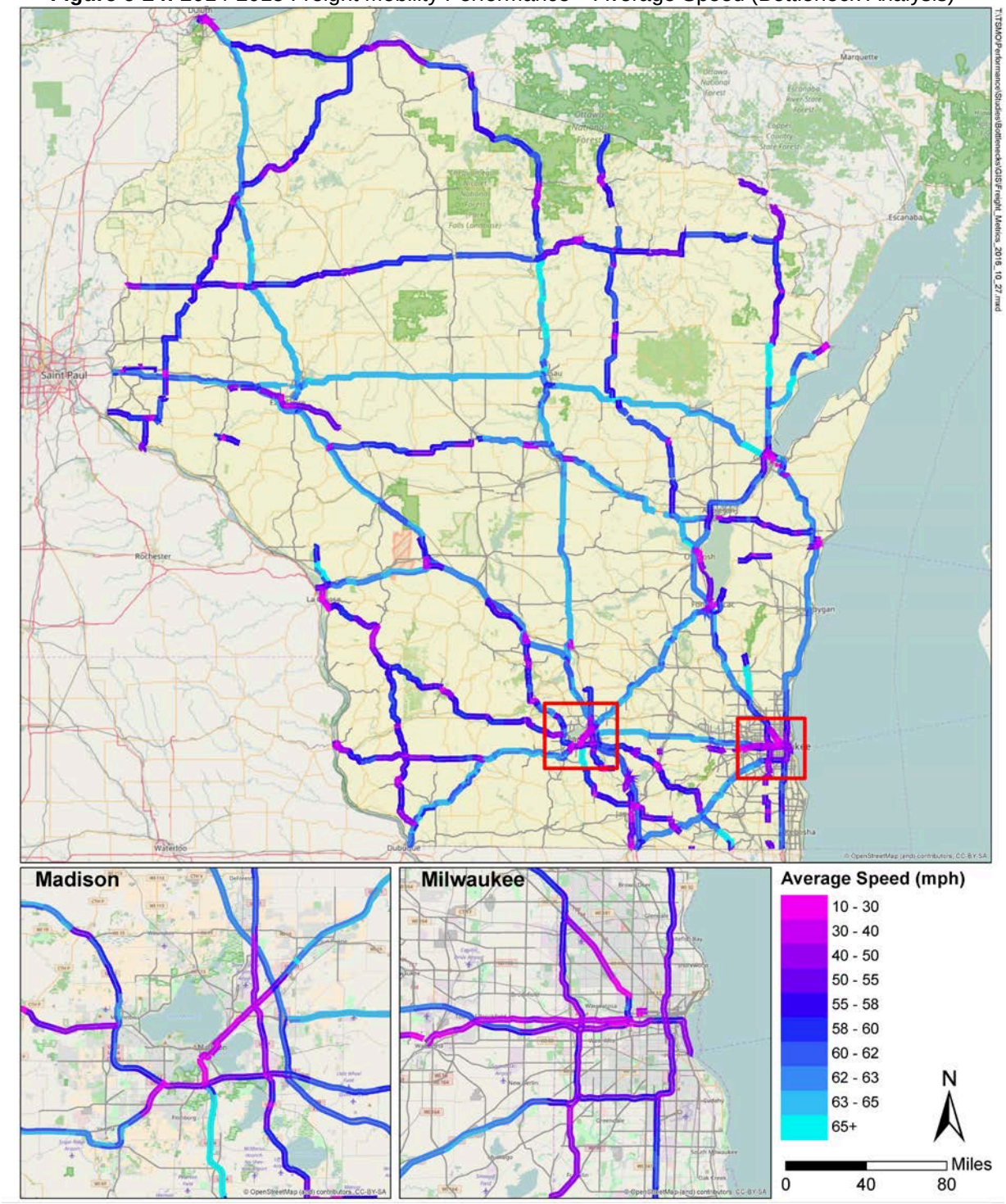


Source: Wisconsin TOPS Lab (NPMRDS 2015 Data)

Average Truck Speed

Figure 6-24 displays the average truck speed, similarly to the MAP-21 System Performance proposed rule, but with the addition of non-Interstates. Figure 6-24 displays the average speed observed over the entire year.

Figure 6-24: 2014-2015 Freight Mobility Performance – Average Speed (Bottleneck Analysis)

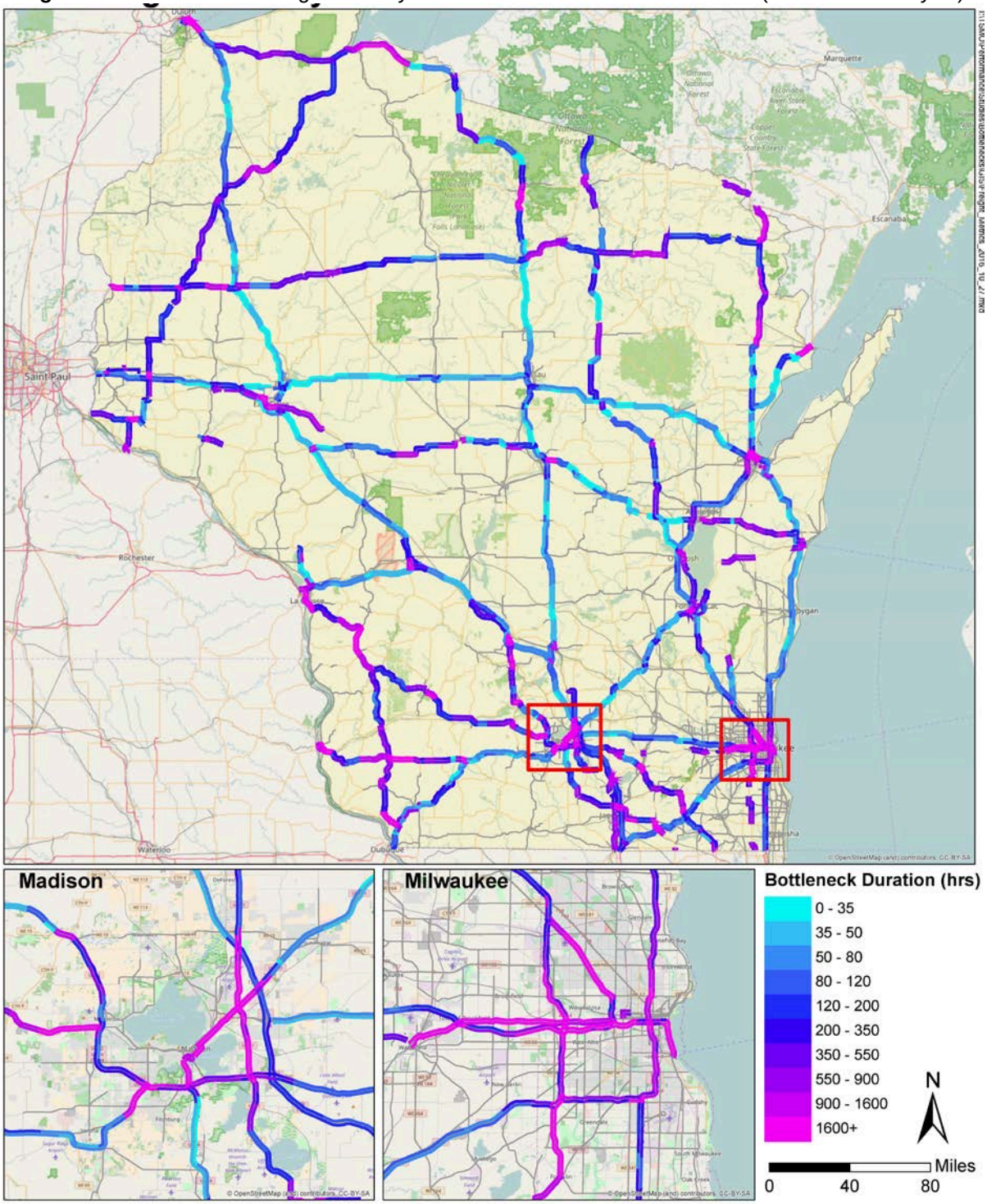


Source: Wisconsin TOPS Lab (NPMRDS 2015 Data)

Bottleneck Duration

Figure 6-25 displays bottleneck duration, the total time throughout the year where truck speed is below 50 mph.

Figure 6-25: 2014-2015 Freight Mobility Performance – Bottleneck Duration (Bottleneck Analysis)

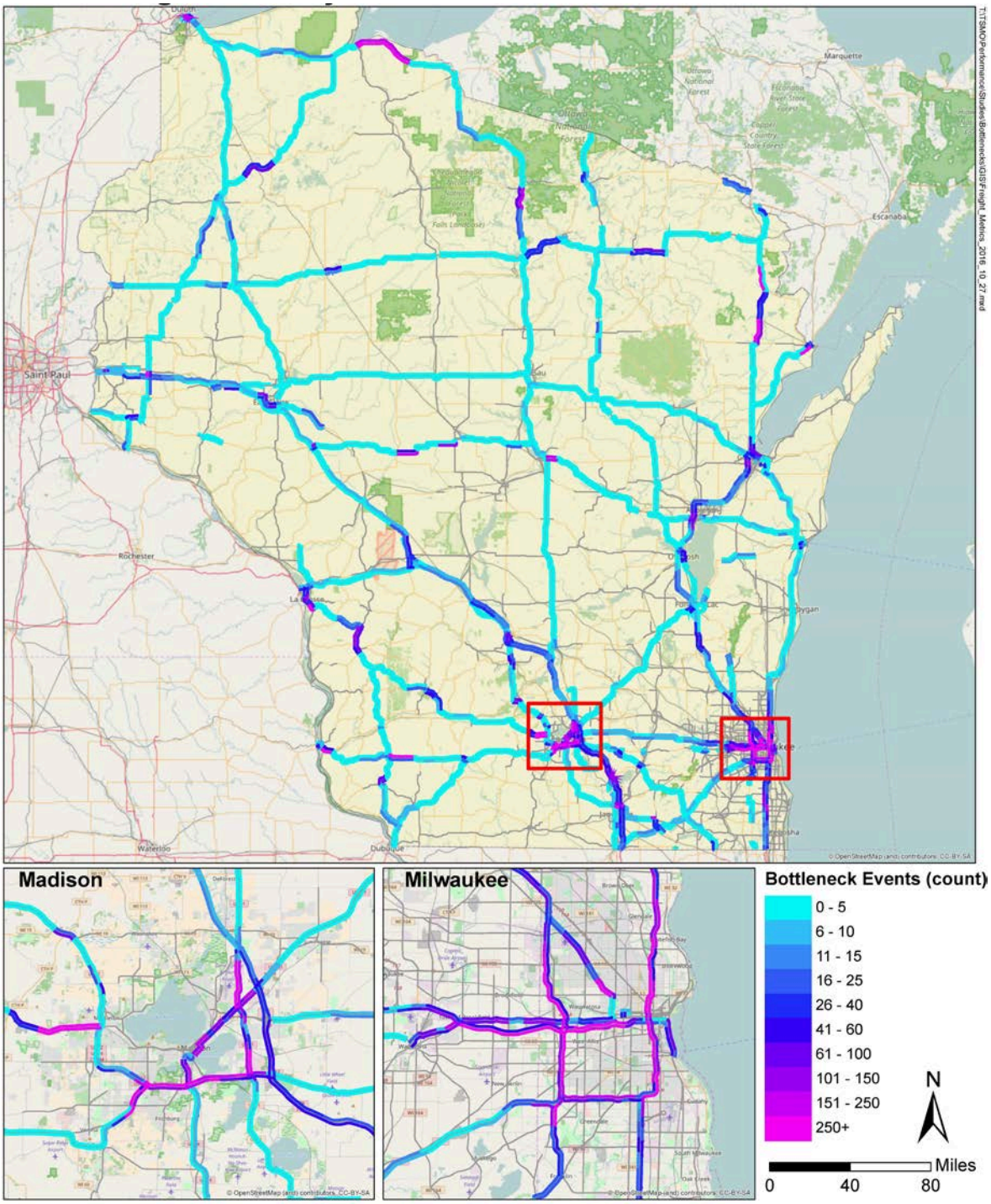


Source: Wisconsin TOPS Lab (NPMRDS 2015 Data)

Recurring Bottlenecks

Figure 6-26 displays recurring bottlenecks throughout Wisconsin. A bottleneck event is defined as a segment's speeds dropping below 60% of the free flow speed, defined as the 85th percentile speed over the year and capped at 70 MPH, for 15 minutes or longer. The bottleneck ends when it encounters a segment with uninterrupted period of 15 minutes above the threshold speed.

Figure 6-26: 2014-2015 Recurring Bottlenecks in Wisconsin (Bottleneck Analysis)

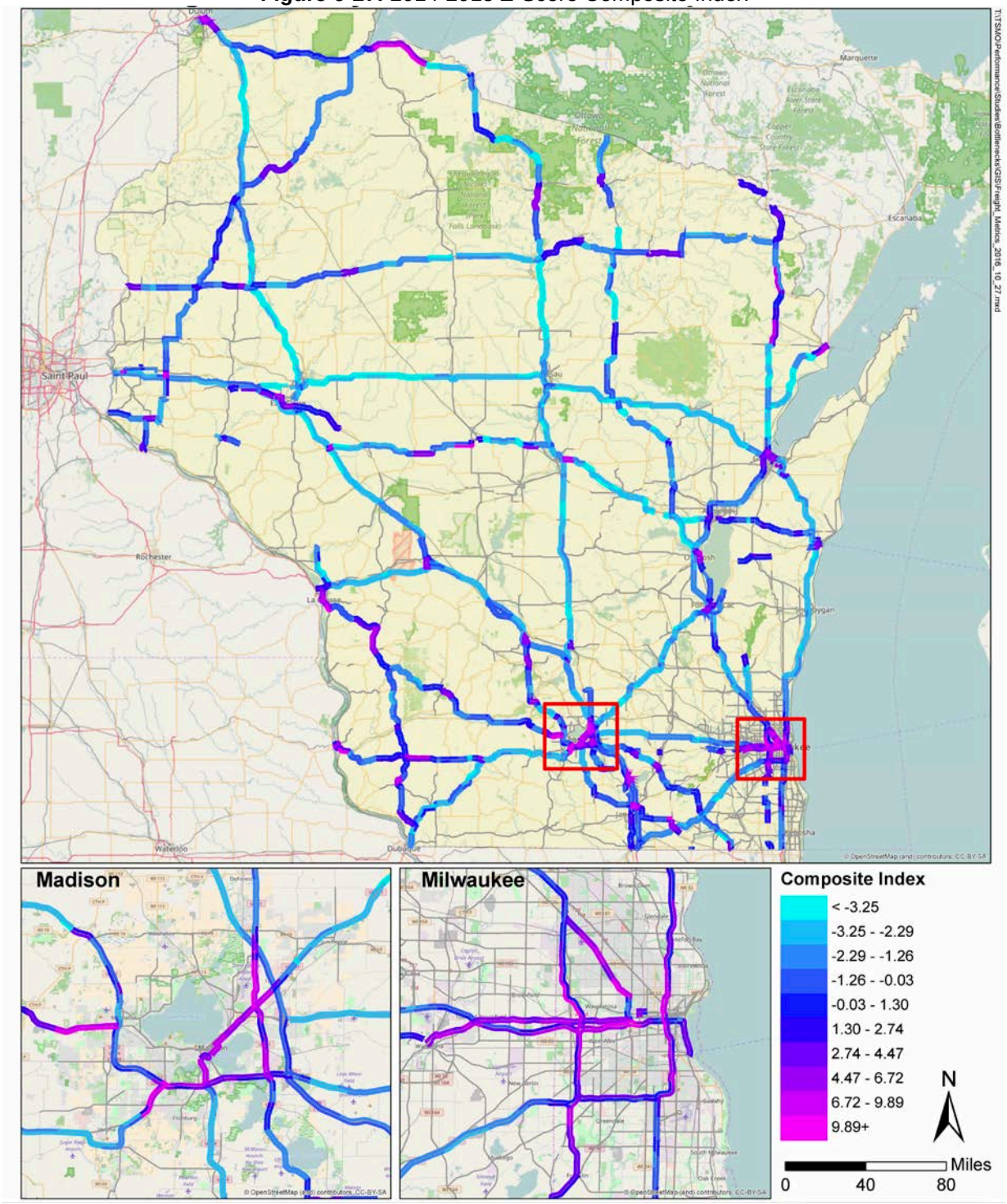


Source: Wisconsin TOPS Lab (NPMRDS 2015 Data)

Z Score

Figure 6-27 displays the Z score for Wisconsin roadways. The Z score is a combination of the four metrics (Reliability, Average Speed, Bottleneck Duration, and Bottleneck Count), where each measure is transformed to a standard normal distribution and segments are compared to the average. The lower the overall score, the better that segment is performing.

Figure 6-27: 2014-2015 Z-Score Composite Index



Source: Wisconsin TOPS Lab (NPMRDS 2015 Data)

THIS PAGE INTENTIONALLY LEFT BLANK

7 – Chapter 7: Freight Transportation Trends, Issues, and Forecasts

Several major trends and issues impact freight flow volume, routing, and the economic value of the commodities shipped in Wisconsin over the near- and long-term.

Overview of Chapter 7

- This chapter provides an overview of global, national, and Wisconsin-specific freight trends and issues that helped to shape the Wisconsin State Freight Plan.

This chapter provides an overview of global, national, and state freight trends and emerging issues that shaped the development of freight-related policies in the Wisconsin State Freight Plan (SFP).

7.1 Changing Global Economy

The changing and expanding global transportation system has and will continue to dramatically affect Wisconsin's transportation system and economic growth. This is particularly the case for North America because of the scale and scope of production, distribution and consumption taking place, and the large distances involved. Global trade routes for several major industries flow through Wisconsin on roadways, railroads, and waterways. This section identifies global freight-related trends and emerging issues that may influence freight movement in Wisconsin.

This section focuses on three areas influencing global freight movement:

- Shipping Patterns – The identification of patterns of the physical process of transporting freight (commodities, merchandise goods, and cargo) via roadways, railroads, waterways, air, and pipeline.
- Containerization – A system of intermodal freight transport using intermodal shipping containers.
- Trade Agreements – Agreements reached between two or more sovereign nations that dictate the terms of the acceptable exchange of goods and services between the parties.

Shipping Patterns

Prior to 2006, the majority of Asian goods entering North American markets were imported through west coast ports and then moved via double-stack intermodal trains to the Midwest and eastern United States markets. The San Pedro Bay ports of Los Angeles and Long Beach dominated this trade, in part because of a large local consuming market that complemented volumes destined for inland markets (Figure 7-1). Other domestic ports in Oakland, Seattle, and Tacoma also handled significant volumes of imports and exports.

However, labor disruptions and ongoing congestion at these ports prompted shippers and consignees to search for alternatives that diversify the risk of importing the majority of freight through San Pedro Bay. Among structural changes, the two most important results are the expansion of the Panama Canal and the build out of the Canadian Port of Prince Rupert.

Figure 7-1: Shipping Routes between Asia and the United States East Coast Markets



Source: Panama Canal Authority

Panama Canal Capacity Expansion

The Panama Canal expansion project, also called the Third Set of Locks Project, doubled the capacity of the Panama Canal in 2016. Key expansion components include the creation of a new traffic lane and the ability to accommodate more and larger ships. The increase in the size and depth of the locks will enable most of the larger container ships to use the canal and will more than double its throughput capacity.

Panama Canal Capacity and Expansion

Prior to expansion, about 14,000 vessels per year could transit the canal. These container ships (cargo ships that carry intermodal containers using a technique called containerization), classified as "Panamax" vessels, could carry approximately 4,500 twenty-foot-equivalent units (TEUs) of cargo.[1]

The original locks were about 110 feet wide. Between 2007 and 2016, one-third of the locks were reconstructed. The expanded canal began commercial operation in June 2016. The new locks allow transit of larger, "New-Panamax" ships, which have a cargo capacity of about 12,500 TEUs. In addition to larger ships, the expansion allows for about 2,000 additional trips per year.[2]

A portion of the imported/exported freight currently moving through western United States ports, bound for or originating in the east coast, may bypass the western ports entirely. Instead, the cargo would be diverted through the Panama Canal, thus avoiding the cross-country overland journey. Several United States east coast and Gulf of Mexico ports are dredging their harbors to accommodate the larger ships and to capture some of the potential increase in container cargo activity. Two-thirds of the United States population lives east of the Mississippi River, and up to 70 percent of containers imported through United States Pacific Northwest ports in the past decade were destined for the Midwest and eastern seaboard. In the near term, there will be substantial changes as international shipping lines try to manage their excess capacity as larger ships are put into service targeting the Asia to Europe trade.

[1] Hofstra University, "Comparative Characteristics of the Panama Canal Expansion."
[2] Ibid.

Although the amount of trade shifting from west coast ports to the all-water route through the Panama Canal is uncertain, it will increase competition for market share between the west coast ports. Excess port terminal capacity on the west coast of North America will put pressure on port and terminal operators' pricing power. Terminal operators will be driven towards increased productivity as a means to lower their operating costs, so they can hold their market share or attract new shipping lines.

For Wisconsin, passage through the Panama Canal means that the state's agricultural goods, as well as oil and natural gas from the upper Midwest, will have a dramatically shorter trip from the Gulf Coast to ports in eastern Asia. This could also increase demand for shipping by railroads that move cargo from the Midwest south toward the Gulf.

Port of Prince Rupert

First served by rail in 1914, the Port of Prince Rupert in British Columbia, Canada has experienced major growth over the past two decades led by the opening of the Fairview Container Terminal in 2007. The Canadian government, Province of British Columbia, Canadian National Railway (CN), and Prince Rupert Port Authority have funded projects at the port in anticipation of greater demand.[3,4,5] Its location on the coast of British Columbia allows cargo ships from northern Asia to unload two days earlier than the next closest location on the North American Pacific coast, speeding vessel cycle times and productivity.

The Port of Prince Rupert has highly efficient rail connections and 95 percent of imported containers leave Prince Rupert by rail.[6] CN has invested in its main line from Canada's west coast to Chicago, making improvements to allow for faster and more reliable service. Using CN's primary corridor through Wisconsin, containers are moved via expedited double-stack trains to Harvey, Illinois (just south of Chicago), Memphis, and New Orleans.[7] This inbound service was designed with an emphasis on speed to expedite the transport of consumer freight. The average transit time for moving containers from Prince Rupert to Chicago is just over four days.[8] Additionally, according to the *Journal of Commerce*, it cost less to ship a container from Asia to Chicago through Prince Rupert versus other West Coast ports.[9]

In 2013, the Prince Rupert Port Authority and CN proposed expanding its existing Fairview Container Terminal in Prince Rupert Harbor to increase the facility's capacity of 500,000 twenty-foot equivalent units (TEUs) per year. Completed in August 2017, the Port of Prince Rupert's expansion will accommodate 1.3-1.4 million TEUs per year.[10]

CN has aggressively sought "matchback" (return) traffic for containers on this lane, especially grains. This strategy was important in the company's agreement to establish the Chippewa Falls intermodal facility.[11,12] Unused westbound capacity could provide a cost-effective shipping option for other Wisconsin exporters, provided that service model with CN and the affiliated steamship lines continues to operate efficiently. Of note, Wisconsin

[3] Government of Canada, "Major Investment in Prince Rupert Port Expansion." (April 15, 2005).
[4] Market Wired, "Canada and Prince Rupert Port Authority Announce Three New Infrastructure Projects." (November 28, 2009).
[5] Port of Prince Rupert, "Joint Infrastructure Investment Unlocks Growing Canadian Trade Opportunities." (May 19, 2015).
[6] Port of Vancouver, "Container Traffic Forecast Study - Port of Vancouver, 2016."
[7] Journal of Commerce, "CN aims to replicate Prince Rupert model with Mobile." (July 24, 2015).
[8] Port of Prince Rupert, "Rail Connectivity."
[9] Journal of Commerce, "More Asian imports drip away from US West Coast."
[10] CanadianShipper.com, "Port of Prince Rupert completes Fairview Terminal expansion." (August 29, 2017).
[11] Journal of Commerce, "Match-Back Key to Growth in US Containerized Agricultural Exports." (September 20, 2013).
[12] Chippewa Herald, "Chippewa Falls rail terminal opens world markets to area businesses." (January 27, 2016).

shippers are likely to be in direct competition with shippers in other states and the western Canadian provinces for "matchback" operations.

St. Lawrence Seaway

The Saint Lawrence Seaway is a system of locks, canals, and channels in Canada and the United States that permit ocean-going vessels to travel from the Atlantic Ocean to the Great Lakes, as far inland as the western end of Lake Superior.

Great Lakes and Seaway shipping generates $18.1 billion in business revenue annually in the United States.[13] International changes have affected shipping through the Seaway. Europe is no longer a major grain importer, and big United States export shipments are now going to South America, Asia, and Africa. These destinations make Gulf and west coast ports more critical to 21st-century grain exports.

Containerization

Containerization involves loading non-bulk cargo into large shipping containers, which are then transferred between modes – truck, train, or ship – without unloading the cargo. Instead of being sorted and shipped separately in smaller groupings from the point of origin, the cargo is combined into one shipment and sorted when the container reaches its destination. Among the many advantages of containerization are standardization (containers can be shipped globally), flexibility (contents can include bulk or finished goods), and cost (up to 20 times less than bulk transport).[14] As shown in Table 7-1, of all the United States' containerized cargo that is bound for or is received from foreign countries, about two-thirds is routed through just five large United States coastal ports. Of those five ports, the twin Ports of Los Angeles and Long Beach handle over 40 percent of the total.

Containerization Trends
Forecasts indicate a continued upward trend of container traffic. Globalization of markets is influencing the increase in container traffic. A surge in container traffic places new demands on container or intermodal terminals, such as adding facility capacity and reorganizing transport schemes ('hub-and-spoke') at the facility. Hub-and-spoke refers to the collection site of containerized cargo (intermodal facility) from its point of origin (the tips of the spokes) and transport from the intermodal facility to a central processing facility (the hub). The shipment is then either warehoused or distributed directly from the heart of the network.

As an example, after arriving in the United States, containerized cargo is then shipped by rail to cities, such as Chicago, where the containerized cargo is loaded onto a truck. The containerized cargo is then transported to its final destinations in Wisconsin.

[13] Great Lakes St. Lawrence Seaway System, "The Economic Impacts of the Great Lakes - St. Lawrence Seaway System." (October 18, 2011).
[14] Hofstra University, "Advantages and Drawbacks of Containerization."

Table 7-1: 2006-2011 United States-Foreign Container Trade by United States Port (millions of metric tons)

Port	2006	2007	2008	2009	2010	2011	*% Change '06-'11*
Los Angeles/ Long Beach, CA	66.5	69.7	69.8	57.5	66.2	69.2	3.9%
New York, NY	27.8	29.9	31.9	27.8	31.5	34.3	23.3%
Savannah, GA	14.5	17.1	18.7	15.7	19.6	20.7	43.5%
Houston, TX	16.3	17.6	17.4	16.3	17.0	19.6	20.2%
Seattle/Tacoma, WA	17.6	18.9	17.9	15.3	17.8	18.1	2.7%
San Francisco, CA	11.4	11.7	11.8	11.6	12.9	13.7	20.3%
Norfolk, VA	11.9	12.3	12.9	10.5	11.1	11.4	-4.4%
Charleston, SC	11.2	11.3	10.9	7.7	9.3	10.0	-10.7%
Miami, FL	9.3	8.8	8.3	7.6	8.2	8.7	-6.9%
New Orleans, LA	5.5	6.0	537	5.2	5.7	7.3	31.7%
Top 5	142.7	153.2	156.7	132.6	152.1	161.9	13.4%
Top 10	192.2	203.3	206.2	175.1	199.3	213.0	10.8%
Total, Container	**220.6**	**231.6**	**235.1**	**200.6**	**227.4**	**242.8**	**10.0%**
Total, Non-Container	**1,160.0**	**1,144.3**	**1,141.4**	**1,001.4**	**1,078.0**	**1,100.3**	**-5.1%**

Source: U.S. Census Bureau, Foreign Trade Division

Some commodities, agricultural products in particular, which have traditionally been shipped in bulk, are shifting to containerized transport. A good example is grain for international destinations. The trend is to load containers directly at the production site to eliminate the expense of transloading from trucks to ships. As identified in Chapter 5, *Wisconsin's Transportation System Assets*, to support Wisconsin's freight movements in terms of tonnage, the state has many access points for shipping via truck and water. There is a significant amount of freight tonnage that is shipped through the state by rail. This can create a challenge for shippers that wish to access rail. In many cases, shippers have to rely on other modes, such as trucking, to ship freight to truck-rail intermodal facilities where rail can be accessed, unless shippers have an opportunity to utilize short line or regional railroads, which can be used to connect to Class I railroads.

Recent Developments for Container-on-Barge

In 2014 and 2015, the United States Department of Transportation's (DOT) Maritime Administration designated the Upper Mississippi and Illinois Rivers as the M-55 and M-35 Marine Highways, connecting Chicago and Minneapolis to New Orleans. These routes are being evaluated for new container-on-barge service being developed by communities along the rivers. The Illinois, Iowa, Minnesota, Missouri, and Wisconsin transportation departments have primary responsibility for implementing activities on the M-35 Marine Highway Route, with the administrative assistance of the Upper Mississippi River Basin Association (UMRBA).

In fall 2016, the United States DOT's Maritime Administration awarded a $96,000 planning grant to the City of St. Louis Port Authority, along with three partners: Inland Rivers Ports & Terminals, Inc. (IRPT), Mississippi Rivers Cities & Towns Initiative (MRCTI), and UMRBA to support planning efforts focused on the development of containerized shipping along the Mississippi River, between New Orleans, LA, Minneapolis, MN, and Chicago, IL. With a twenty percent match shared among the St. Louis Port Authority, MRCTI, IRPT, and UMRBA, the total money available is $120,000.

The America's Marine Highway Program, administered by the United States DOT, was authorized in 2007 to achieve full integration of marine highway vessels and ports into the nation's surface transportation system, ensuring that reliable, regularly scheduled, competitive, sustainable services are routine choices for shippers.

Trade Agreements

Global production and distribution are affected by international trade agreements, quotas, and tariff restrictions. The dynamics of the global marketplace have driven the formation of numerous large regional trading blocs, including the European Union (EU), the ASEAN Free Trade Area (AFTA), and the North American Free Trade Agreement (NAFTA).

The United States currently has free trade agreements in force with 20 countries, which accounted for $12.6 billion (56 percent) of Wisconsin's exports in 2015. Since 2005, exports from Wisconsin to these markets grew by 57 percent, with NAFTA countries, South Korea, Peru, Chile, and Australia showing the largest dollar growth during this period.[15]

NAFTA

NAFTA is an agreement between Canada, Mexico, and the United States. The agreement went into effect on January 1, 1994. A major goal of NAFTA was to lower total costs (i.e. distribution and logistics costs) of North American businesses exporting goods within the North American market. NAFTA eliminated many barriers to trade and investment between the United States, Canada and Mexico. Most United States-Canada trade was already duty-free when the agreement was signed. Some of NAFTA's most significant changes occurred between Mexico and the United States. Specifically, the implementation of NAFTA brought the immediate elimination of tariffs on more than one-half of Mexico's exports to the United States and more than one-third of United States exports to Mexico. NAFTA eliminated all tariffs on goods qualifying as North American under its rules of origin. For most goods, existing customs duties were eliminated immediately or phased out after five or ten years after implementation. For certain sensitive items, such as United States agricultural exports, tariffs were phased out over a fifteen-year period. NAFTA also sought to eliminate non-tariff trade barriers and to protect the intellectual property rights on traded products.

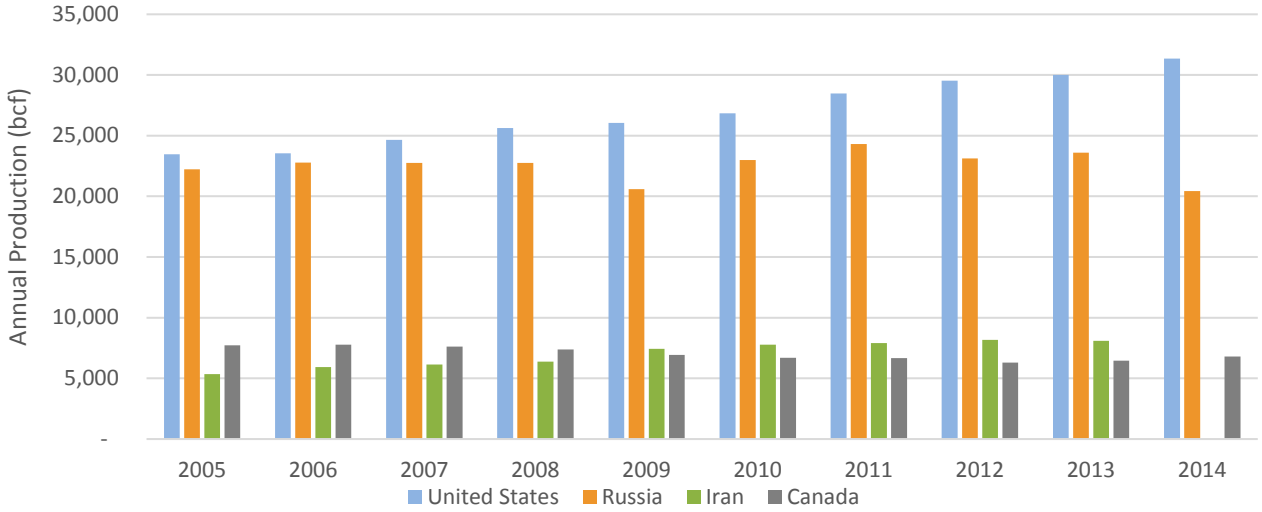
As discussed in Chapter 4, *Economic Context of Freight on Wisconsin's Transportation System*, in 2013 approximately 44 percent of Wisconsin's exports went to Canada and Mexico. Wisconsin's strong trade ties to Canada and Mexico can be attributed to trade agreements, transportation linkages and manufacturing relationships. Canada, which accounts for about one-third of Wisconsin's international shipments, continues to be Wisconsin's top export destination. Mexico's share of Wisconsin's exports has grown in recent years. Wisconsin's exports to Mexico increased by nearly five percent in 2015, and now accounts for approximately 13 percent of Wisconsin's international shipments. This is up from 12 percent in 2014 and 11 percent in 2013.

7.2 Growth in Energy Production

The United States has been at the center of increased production of natural gas and oil over the past ten years following the increased use of hydraulic fracturing (fracking) to extract oil and natural gas from shale formations. Figure 7-2 and Figure 7-3 show the growth trend and the position of the United States as a world leader in the gross production of natural gas and petroleum. United States production has increased by 33 percent from 2005 to 2014 and in 2014 the United States accounted for over 20 percent of the world's gross production of natural gas.

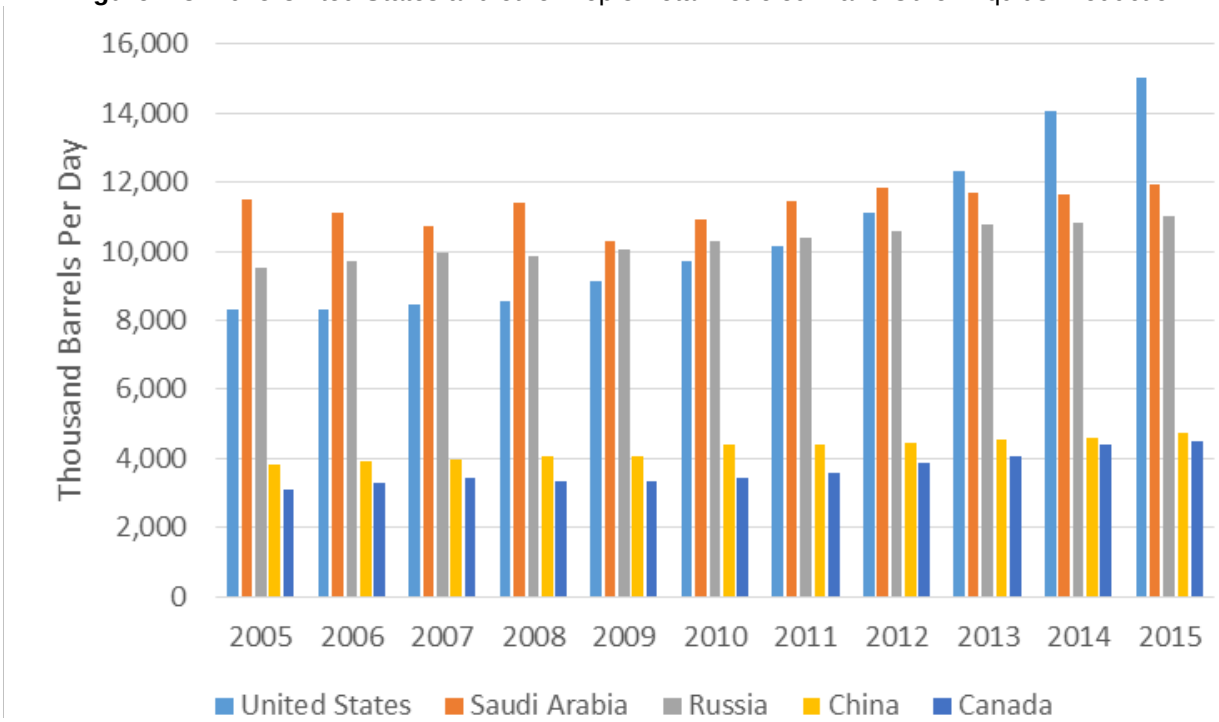
[15] U.S. Department of Commerce, International Trade Administration, "Wisconsin Exports, Jobs, & Foreign Investment." (October 2016).

Figure 7-2: Natural Gas Production (Billion Cubic Feet)



Source: CPCS, "Wisconsin State Freight Plan - Wisconsin Pipelines: Draft Final Report." (February 2016).

Figure 7-3: 2015 United States and other Top 5 Total Petroleum and Other Liquids Production



Source: CPCS, "Wisconsin State Freight Plan - Wisconsin Pipelines: Draft Final Report." (February 2016).

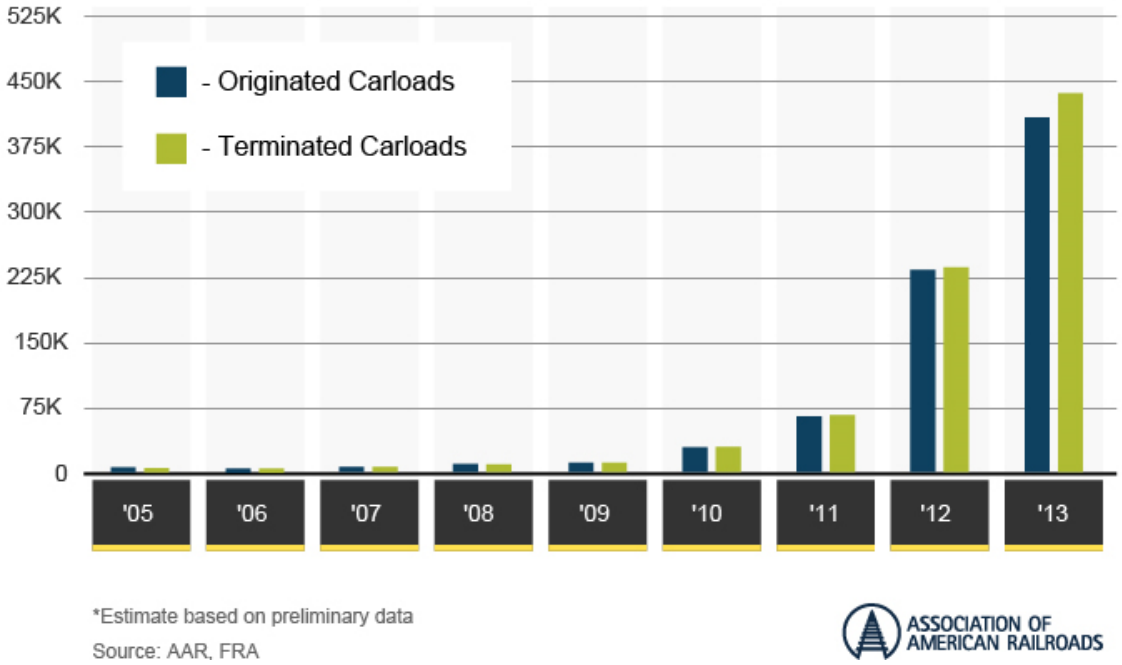
Fracking has resulted in large amounts of gas and oil being extracted in the Midwest and Upper Great Plains, particularly from the Bakken region of North Dakota, Montana, and parts of Canada. This has produced greater freight traffic in two ways: product being shipped from the region and materials used for fracking (i.e., sand and chemicals) being shipped to the region.

Much of these freight movements to and from the area are by rail, due to production increasing at a rate that exceeds the capacity and availability of the nation's pipelines. In the first half of 2014, between 60 percent and 70

percent of the more than 1 million barrels per day of oil produced in North Dakota was transported to refineries by rail.[16] Destinations for oil include oil refineries on the east coast (Pennsylvania and Delaware) and the Gulf Coast (Louisiana and Texas).

As shown in Figure 7-4, in 2009 rail shipments of crude oil on United States Class I railroads amounted to fewer than 25,000 carloads per year nationally. By 2013, shipments had increased to nearly 450,000 carloads. Additionally, crude imports by rail from Canada to the United States increased more than 20-fold since 2011.

Figure 7-4: 2005-2013 Number of Crude Oil Carloads on United States Class I Railroads



In terms of Wisconsin, Class I railroads are most likely to ship oil from the Bakken region through (overhead) Wisconsin. From an oil refining standpoint, only one oil refinery operates in Wisconsin. Indiana-based Calumet Specialty Products (Calumet Superior Refinery) owns the former Murphy Oil refinery in Superior, Wisconsin. It receives western oil via the Enbridge pipeline system, and its primary products are fuels, such as gasoline, and blacktop material. Calumet Superior Refinery has aggregate crude oil throughput capacity of approximately 45,000 barrels per day (bpd).

Hydraulic Fracturing

Hydraulic fracturing (fracking) has been active in the United States for decades, but since 2005 its use has become more sophisticated and cost-effective when combined with horizontal drilling techniques. The combination of these two technologies has been at the forefront in the extraction of gas and oil from deposits outside of the traditional Gulf States and Alaska regions.

In addition to the outputs of the fracking process, the inputs, namely sand, also require the use of Wisconsin's transportation infrastructure. The increased use of hydraulic fracturing technologies requires substantial amounts of a special type of sand used in the process. Deposits of this silica or "frac sand" are common in certain parts of Wisconsin, making the state the primary source of the sand in the nation. Before 2006, there were fewer than six

[16] Oilprice.com, "Oil Shipments By Rail Declining." (July 20, 2015).

industrial sand mining operations in the state. As of May 2016, there were a total of 128 industrial sand facilities conducting either mining, processing, or rail loading operations in Wisconsin, most of which are directly related to the frac sand industry.[17] The transport of frac sand may involve several modes. Where facilities are not co-located, trucks transport sand from mines to processing plants and intermodal shipping facilities. From there, trains or barges ship the sand long distances. Processed sand is generally shipped to the end user via rail.

Natural Gas as a Transportation Fuel

Compressed Natural Gas (CNG) is a readily available alternative to gasoline that is made by compressing natural gas to less than one percent of its volume at standard atmospheric pressure. Consisting mostly of methane, CNG is odorless, colorless, non-corrosive, and has lower air emissions than gasoline.[18] Although vehicles can use natural gas as either a liquid (LNG) or a gas (CNG), most vehicles use the gaseous form compressed to pressures above 3,100 pounds per square inch. CNG vehicles have been introduced in a wide variety of commercial applications, including commercial motor vehicles, taxi cabs, UPS delivery vans, postal vehicles, transit buses, waste management trucks, and school buses. Natural gas is produced both worldwide and domestically at relatively low cost and is cleaner burning than gasoline or diesel fuel. CNG and LNG are being explored and adopted by both the trucking and railroad industries.

CNG is a legitimate option for investment as future projections show prices remaining steady. Typically, trucking companies will add CNG vehicles to their fleet allowing for greater diversification and the ability to switch between diesel and natural gas for higher-mileage routes, depending on the lower-cost option.

Additional reasons for CNG investment may include branding opportunities for a “greener” fleet, greater stability over fuel prices, and possible competitive advantages with businesses, customers, and/or suppliers that favor natural gas fleets. However, making the move to natural gas requires companies to invest more upfront. The return on that investment comes from the savings on the fuel cost. Additionally, creating the infrastructure needed for long-haul trucking is another challenge deterring the adoption of CNG. LNG faces similar challenges, such as establishing public LNG fuel stations every 400 miles on major truck corridors. LNG market penetration will advance slowly in the near term due to these hurdles.

Railroads are also beginning to adopt technology that will allow locomotives to run on natural gas in addition to diesel, primarily LNG rather than CNG. Retrofitting existing machines to burn a mix of diesel and natural gas is the quickest and easiest way to adopt the new technology, and will offer advantages to using natural gas alone. The diesel can provide the spark needed to ignite natural gas without redesigning engines, and the diesel helps provide horsepower. Advantages include reducing emissions and reducing fuel costs for the railroads.

Since 2011, the use of CNG and LNG has been increasing (see Table 7-2) in Wisconsin. In 2013, on-road diesel consumption was 726 million gallons and on-road gasoline consumption was 2.47 billion gallons in the state. Recognizing the growth in CNG and LNG consumption, more and more gas stations in the state are selling CNG and LNG fuel. However, only 60 gas stations provide CNG and LNG as fuel.[19]

[17] Wisconsin Department of Natural Resources, “Locations of industrial sand mines and processing plants in Wisconsin.”
[18] CNGNOW!, “What is CNG?”
[19] Wisconsin State Energy Office, “Natural Gas for Transportation Roundtable.”

Table 7-2: 2013 Wisconsin Alternative Motor Fuel Consumption (Millions of Gallons)

	2011	2012	2013
CNG	0.55	1.42	3.64
LNG	0.00	0.09	0.22

Source: Wisconsin State Energy Office

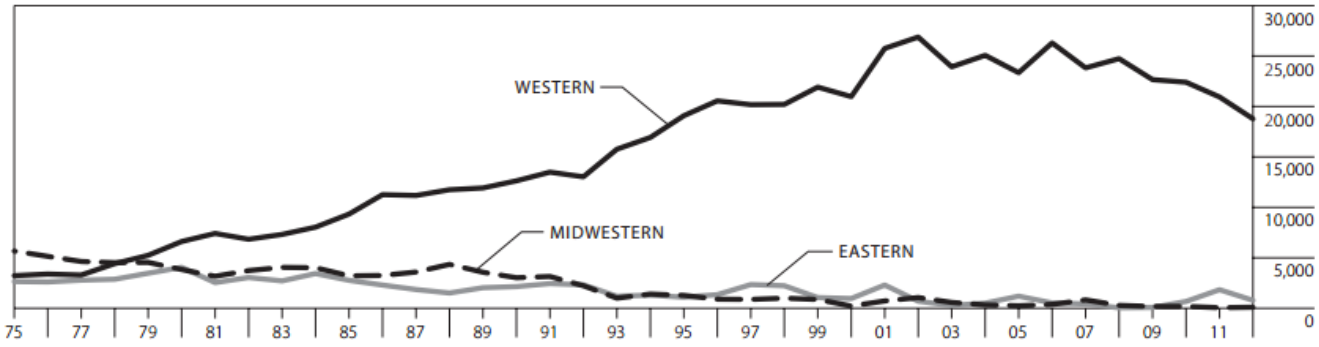
Coal Movement by Rail and Ship

Coal supplied more than 50 percent of Wisconsin's net electricity generation in 2016.[20] It is moved from mines to coal-powered power plants predominantly by rail and ship. Two trends are impacting the traditional routing of those shipments: 1) the increased use of coal from deposits in the Powder River Basin, and 2) conversion of coal-powered electricity-generating plants to other energy sources.

There has been continual growth in traffic from the Powder River Basin coal fields in Wyoming and Montana over the past 30 years. The Basin's lower-sulfur coal has gained market share as federal and state environmental laws have sought to reduce the effects on air quality caused by coal-burning plants. This has resulted in changes to the supply chains, with less coal moving out of Pennsylvania and West Virginia. The Powder River Basin now supplies around 40 percent of the nation's roughly one billion tons-per-year total coal use.[21] It is responsible for the electricity that lights one-fifth of the nation's homes and businesses.

Wisconsin's experience with Powder River Basin coal mirrors that of much of the country. Coal from western states is Wisconsin's largest inbound rail commodity. It includes trans-loaded volumes moved by ship from the Port of Superior to power plants bordering the Great Lakes, and tonnage delivered to Wisconsin's power plants by rail (see Figure 7-5).

Figure 7-5: Coal Deliveries to Wisconsin Power Plants, by Region of Origin



Source: Wisconsin State Energy Office, "2013 Wisconsin Energy Statistics Book"

As new domestic supplies of abundant and relatively inexpensive natural gas are developed, demand for coal from western states may be reduced in the future. Other factors that could affect demand for coal include further development of alternative energy sources (solar, wind, geothermal, etc.) and improvements in the electric grid, which may reduce the need for electricity produced by fossil fuel-fired power plants.

The resultant loss of coal traffic could have a dramatic financial impact on the large western railroads, particularly the Union Pacific and BNSF. Conversely, the main line capacity freed up by such a change would position these

[20] U.S. Energy Information Administration, "Wisconsin State Energy Profile."
[21] U.S. Energy Information Administration, "Annual Coal Report 2015 - Coal Production and Number of Mines by State and Mine Type, 2015 and 2014."

railroads to more aggressively pursue domestic intermodal markets that are seen today as too short haul or marginal in profitability. Railways' relative fuel efficiency is seen as a powerful tool in capturing truck volumes.

United States natural gas prices have been consistently lower than other major manufacturing countries in recent years, which provides a competitive advantage to the nation's energy-intensive industries.[22] This is driving new investment in plants that use natural gas as their energy source. As companies invest to capitalize on lower energy costs, heavy manufacturing is likely to grow, with outbound rail and waterway freight transportation access a key to siting these plants. As these conversions become more widespread, the resulting decreases in coal demand will impact rail and port traffic.

7.3 Changing United States Economy

The United States transportation system moved an average of approximately 54 million tons of freight per day in 2012, valued at nearly $48 billion. After recessionary declines in 2008 and 2009, the tonnage and value of freight moved in 2012 exceeded the previous highs reached in 2007 by just over four percent.[23] The value of freight moved is forecast to increase faster than its weight, rising from $882 per ton in 2007 to $1,377 per ton in 2040, adjusted for inflation. United States exports and imports are forecast to make up an even greater share of freight flows, reaching 19 percent (up from 11 percent in 2007) of the tonnage and 31 percent (up from 19 percent in 2007) of the value by 2040.[24]

United States exports totaled a record of nearly $2.3 trillion in 2013, which is a 44 percent increase in the dollar value of exports from the most recent low point in 2009. Adjusted for inflation, exports increased by 27 percent over this time period.[25] In addition, nearly 30 percent of gross domestic product (GDP) growth in recent years has been the result of export growth. This is particularly impressive given that exports of late have accounted for nearly fourteen percent of GDP.[26] Jobs supported by total exports were 11.3 million in 2013. Also, the United States' population is projected to increase from 314 million in 2012 to 400 million in 2050, an increase of 27 percent.[27] The expansion of the economy and projected increases in population will result in increased stress on the transportation system. The following section discusses the trends impacting the United States economy and their impact on freight transportation nationally and in Wisconsin.

Intermodal Shipment of Goods

Intermodal (sometimes referred to as "multimodal") refers to the shipping of goods using more than one transportation mode. The classic forms of rail intermodal transportation are truck trailer-on-flatcar (TOFC) and container-on-flatcar (COFC). The largest concentrations are on routes between Pacific Coast ports and Chicago (sometimes passing through Wisconsin), between California and Texas, and between Chicago and New York. Other typical mode pairings include truck to ship and rail to ship. Some of these transfers involve containers, while others are bulk products like coal or grain. Freight providers are becoming more multimodal and are developing strategic alliances across modes, which has the effect of increasing demand for efficient intermodal connections and near-constant supply chain optimization.

---

[22] BP, "Energy economics > Statistical Review > Natural gas > Natural gas prices."
[23] Federal Highway Administration, "Freight Facts and Figures 2013."
[24] Ibid.
[25] U.S. Department of Commerce, "The Role of Exports in the United States Economy." (2014).
[26] Ibid.
[27] U.S. Census Bureau, "An Aging Nation: The Older Population in the United States." (May 2014).

Global supply chains have driven freight handling and logistics innovations to increase efficiencies and reliability. Examples include just-in-time delivery, radio frequency identification (RFID) tags, computerized inventory management systems at warehouses, global positioning system (GPS) delivery tracking from origin to destination, and third-party logistics (3PL) providers.

Domestic Containers

A growing emphasis on energy efficiency, sustainable transport, and transportation's effects on the environment has led many states to explore possible strategies to shift highway truck traffic to rail. In response, the nation's large railways have expanded their offerings for movement of domestic intermodal freight, including large, multi-lane service contracts with some of the nation's largest trucking firms. For example, Wisconsin-based Schneider National is one of the country's largest users of rail intermodal services.

The railways' engagement with domestic intermodal traffic is heavily targeted to corridors that exceed 1,000 miles, with traffic moving in containers rather than standard over-the-road trailers. Double-stacked containers maximize payload per train. The operation of the cranes and other elements of the rail/highway interface at the intermodal ramps are expensive. As a result, the long-haul cost-efficiencies of rail movement must be significant to produce an economically feasible service package to the targeted clients.

Wisconsin suffers major impacts from freight shippers moving goods over its highway system to access large railroad intermodal facilities in Chicago. Freight traffic destined for both east and west coasts, Minnesota, and the Dakotas often travels east by truck on I-94 and I-90 through Wisconsin before it is transferred in Chicago (considered overhead traffic). 2012 data suggests that almost 30 percent of tonnage and almost 45 percent of the value of freight traveling in Wisconsin is overhead traffic, originating and destined for points outside the state.

Carrier Level of Service

Changes in the production, purchasing, and consumption habits of consumers have changed the way freight carriers must operate. The following provides an overview of key trends impacting freight carriers.

Just-in-Time Delivery

In the past, manufacturers maintained large inventories in warehouses. Today, most goods are produced based on consumer demand and delivered just-in-time (JIT) for the next phase of production or consumption, thereby minimizing the time required to source, handle, produce, transport, and deliver products in order to meet customer requirements. By eliminating warehousing costs and reducing inventory carrying costs, efficiency and productivity have increased. JIT is also an inbound manufacturing strategy that helps to regulate material flow to manufacturing plants and other production facilities. This strategy seeks to minimize inventory investment by scheduling delivery of raw material or components to the point where they are needed, at the precise time they are required.

Therefore, trucks (as well as rail cars and ship containers) have become "mobile warehouses" residing on the transportation system. JIT shipping practices have created a greater reliance on a transportation system that provides predictable travel times, but have also made supply chains more vulnerable to disruptions by suppliers or along transportation routes.

E-Commerce

E-commerce continues to grow more rapidly across the country than overall retail growth. United States e-commerce sales increased by roughly seventeen percent from 2012 to 2013, while total retail sales only increased

by 4.2 percent.[28] This trend is shifting freight distribution towards more point-to-point shipments from warehouses to homes, and this will create more short trips in urban areas via parcel trucks. To meet the increasing consumer demands for quicker product delivery, nationwide distribution centers will become smaller, but there will be more of them and they will be located closer to major metropolitan areas. Companies will demand efficient, reliable and safe systems to transport merchandise on a predictable timetable. Distribution centers that are smaller in size and larger in number will allow for precise delivery schedules.

There will continue to be significant pressure on shippers and goods receivers to lower inventory costs. Retailers and manufacturers will continue to streamline their processes, dropping smaller amounts at more frequent intervals at stores and factories. This will drive ever-increasing demand for on-time truck deliveries in very short appointment windows (to the minute). This level of service will depend on reliable highway freight corridors in congested urban areas.

Urbanization

Urban truck deliveries will grow faster than other freight modes due to the development of high-density urban population centers. Land-use regulations preventing large trucks from entering cities will put more small trucks into operation in urban areas. Shippers will implement operational strategies to improve reliability. For example, retail distributors' delivery hours to urban centers will continue to shift to off-peak (midnight to 5 a.m.) hours. This is unlikely to decrease congestion in the peak morning delivery hours as the total number or truck trips are expected to grow.

Megaregions

Megaregions of the United States are clustered networks of American cities, the population of which currently ranges or is projected to range from about 57 to 63 million by the year 2025.

The Great Lakes Megalopolis (Figure 7-6) consists of the group of North American metropolitan areas which surround the Great Lakes region and Saint Lawrence Seaway. It lies mainly within the Midwestern United States but extends into western Pennsylvania and Upstate New York, as well as Southern Ontario and the southern part of Quebec in Canada. It is the largest and most populated megalopolis in North America.

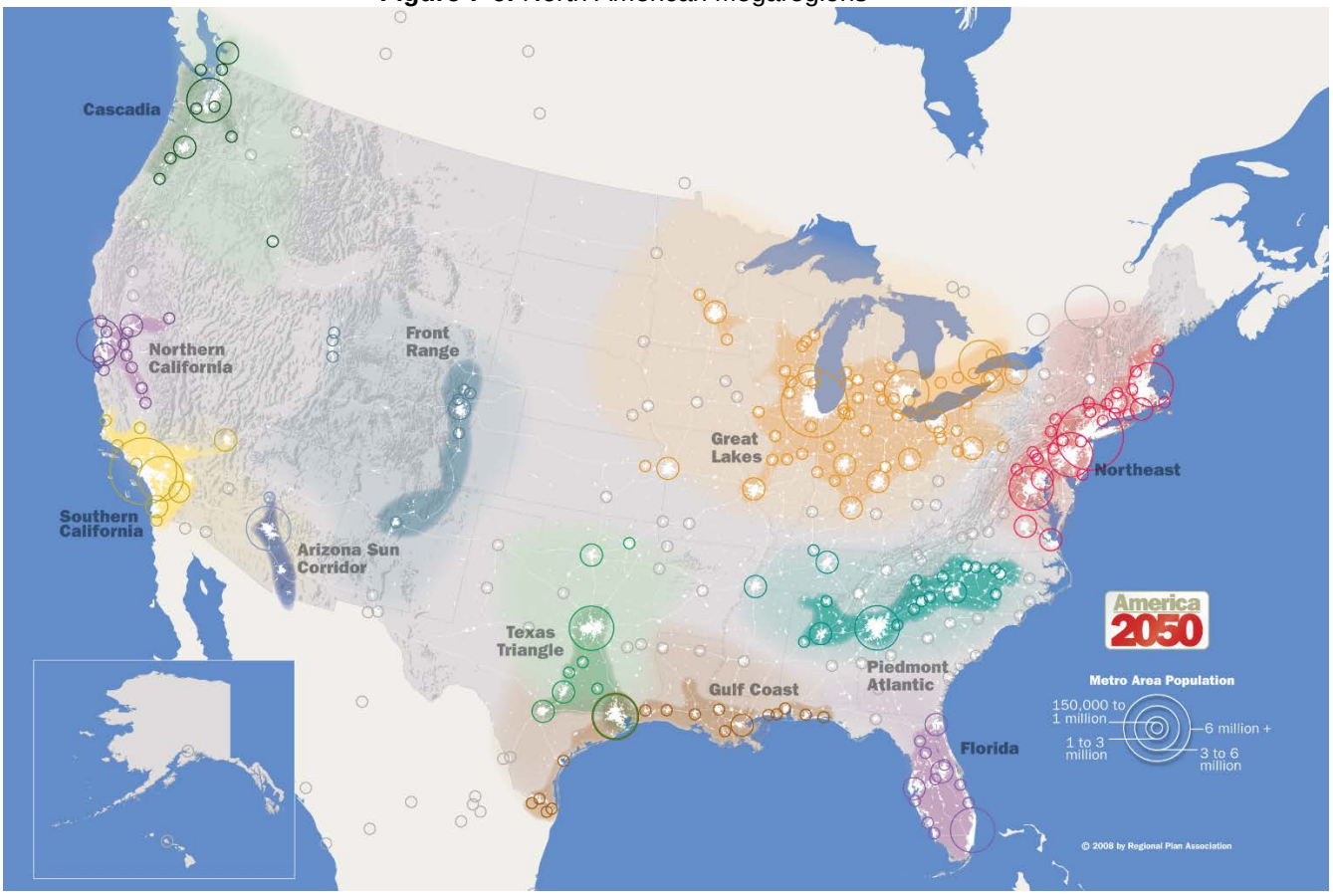
The cities of the Great Lakes Megaregion are more dispersed in a "hub and spoke" network. At the geographic and economic center of this network is Chicago. Behind only New York, Chicago has the second densest business district in the nation with more than a half million jobs "downtown."[29] The Great Lakes Megaregion has four of the top 25 cities in population, including Chicago, Detroit, Minneapolis, and Milwaukee.

At its most inclusive, the region cuts a wide swath from the Twin Cities in Minnesota to Pittsburgh, Pennsylvania and Rochester, New York. On the Canadian side, it extends as far east as Quebec City. Further south, the region is commonly considered to include Kansas City, Missouri; Cincinnati, Ohio; Indianapolis, Indiana; Louisville, Kentucky; and Columbus, Ohio. Within this broad region, there is a smaller core area that includes Chicago, Illinois; Detroit, Michigan; and Pittsburgh, Pennsylvania. The larger region, including fringe areas, had an estimated population of about 59 million as of 2011. It is projected to reach a population of approximately 65 million by 2025. The

[28] eMarketer, "Total US Retail Sales Top $4.5 Trillion in 2013, Outpace GDP Growth." (April 10, 2014).
[29] Demographia, "United States Central Business Districts (Downtowns), 3rd Edition." (March 2014).

population centers of Chicago, Minneapolis-Saint Paul, Milwaukee, Madison, Fox Cities, and Green Bay are located within the Great Lakes Megalopolis.[30]

Figure 7-6: North American Megaregions



Source: Regional Plan Association, "America 2050 - Megaregions."

7.4 Wisconsin Modal Trends, Issues, and Forecasts

Wisconsin businesses conduct international trade with a large number of countries, exporting goods throughout the world. Global trade routes for several major industries flow through Wisconsin on roadways, railroads, and waterways. The state's ability to respond and adapt to the transportation system demands remains critical.

Understanding the driving forces that could significantly affect state's freight dependent industries over the next 20 years provides decision makers data to anticipate and invest in improvements that enable economic growth in Wisconsin. For example, implementation of positive train control and tracking the potential for expanded use of autonomous and connected vehicles will have an impact on the transportation system. This section investigates modal trends that suggest indicators of each mode's status relative to freight movement.

As identified in Chapter 4, *Economic Context of Freight on Wisconsin's Transportation System*, GDP is an indicator of economic vitality and is an economic statistic measuring the value of the goods and services produced by the state economy over a given time period. According to the United States Bureau of Economic Analysis (BEA),

[30] Regional Plan Association, "America 2050 - Megaregions."

Wisconsin's GDP was $281.6 billion in 2013, ranking it 20th by state, at about 1.7 percent of the nation's total GDP.[31] Addressing transportation trends may enhance economic productivity in Wisconsin, which could influence the state's GDP.

Forecasts for Freight in Wisconsin

By 2040, the movement of freight in Wisconsin is projected to grow 74 percent across all transportation modes in terms of tonnage. Freight forecasting, for the purposes of this plan, is the process of estimating future commodity tonnage, future commodity value, and future transportation affects relative to commodities.

This chapter provides the context for freight today and anticipated freight traffic in 2021 and 2040. The forecasts display changes to flows, freight partners, locations, and commodities, detailed by highway, railroad, water, and air freight modes. This information provides an understanding of anticipated growth across modes. Forecasts, along with several other factors developed in the freight plan, help provide the context to develop policies, strategies, and investment recommendations to proactively address future freight needs. The decisions made today about mode choice are based on factors such as cost, congestion, and transportation business models, among others. As these and other factors change over time, there are changes in the supply chain decisions that can impact the commodities transported, modes used and flow patterns.

The following section provides an overview of the two modeling tools used in the development of the freight forecasts presented in this chapter.

- **Transearch Database –** this database from IHS Inc. provides forecasts for commodity tonnage and value. The database includes commodity origins and destinations at the Wisconsin county level and at the BEA[32] zone level outside of Wisconsin. IHS Inc. uses an economic, trade and industry forecasting model to develop the database estimates.
- **WisDOT's Statewide Travel Demand Model (TDM) –** created by WisDOT, this model provides forecasts for trucks on Wisconsin roadways. The database estimates the tonnage productions based on the employment within the traffic analysis zone (a geographic area used in traffic modeling that is based on census data) level in Wisconsin, and at a larger aggregate zone level outside of the state using estimated trip attraction rates from Transearch.

[31] U.S. Bureau of Economic Analysis, "Annual Gross Domestic Product (GDP) By State."
[32] The Bureau of Economic Analysis Economic Areas, often called BEA regions, are groupings of U.S. counties into 179 regions for statistical purposes. These are periodically updated, most recently in 2004.

Transearch Database

The Transearch database provides freight forecasts for the year 2040, by transportation mode, commodity tonnage and value, and origin and destination location.[33] Forecasts for 2040 provide an understanding of future growth relative to the 2013 base year. The Transearch database utilizes a multitude of mode-specific data sources to create a picture of the nation's freight traffic flows on a market-to-market commodity basis. The Transearch database is created using:

- The Annual Survey of Manufacturers (ASM), which provides sample estimates of statistics for all manufacturing establishments with one or more paid employee, and was used to estimate production levels by state and industry
- The Surface Transportation Board (STB) Rail Waybill Sample, which is used to develop all market-to-market rail activity by industry
- The Army Corps of Engineers Waterborne Commerce Database, which is used to develop all market-to-market water activity by industry
- Federal Aviation Administration (FAA) Enplanement Statistics and airport-to-airport cargo volumes

The determination of zonal detail in the Transearch data is based on commodity exchanges between regions at the BEA geography encompassing the entire United States, Canada, and Mexico. Over 200 commodities are classified, exchanged, and forecast in the Transearch model. When developing this data for use, WisDOT has assumed that trending data has been captured by the metrics within the model itself.

For example, Transearch trip attraction data was used as a primary input to the statewide Travel Demand Model. Transearch's county-to-county market detail is developed through the use of Global Insight's Motor Carrier Data Exchange inputs and Freight Locator database of shipping establishments. The Motor Carrier Data Exchange provides information on actual market-to-market trucking industry movements. The Freight Locator database provides information about the specific location of manufacturing facilities, along with measures of facility size (both in terms of employment and annual sales), and a description of the products produced.

WisDOT Statewide Travel Demand Model (TDM)

In addition to Transearch data, detailed employment information by location and industry sector figure prominently in the use and application of the state's TDM. WisDOT uses the TDM to estimate future-year truck travel on Wisconsin's roadways and to evaluate transportation policies, plans, programs, and projects. By quantifying the passenger and freight traffic flows along Wisconsin's roadways, the TDM determines how changes in the economy, investments, or traffic operations affect roadway demand and system performance. The output from the WisDOT statewide TDM, in conjunction with Transearch data, was used to develop the highway freight forecasts.

Forecasts from both Transearch and the WisDOT Statewide TDM will be used, along with several other factors developed in the freight plan, to provide the context for developing policies, strategies, and investments to proactively address future freight needs.

[33] Wisconsin Department of Transportation, Transearch database.

Statewide Travel Demand Model Inputs and Outputs for Freight
The Wisconsin statewide TDM was developed using a variety of data sources including: • Transportation network characteristics • Business locations (including the origins and destinations of commodities) • Commodity flows • Household information • Number and type of jobs The TDM input data influences how the TDM functions when it is run to develop outputs. Changing the inputs will change the outputs. Changing the inputs and comparing them to the outputs of the TDM allows WisDOT to assess transportation system demands and new infrastructure. Freight outputs can include: • Percent truck • Growth in truck volumes relative to total vehicle volumes • Origin and destination tables for truck freight • Commodity assumptions on specific roadways

The following section provides the context for overall freight flows in Wisconsin. It includes total commodity forecasts, for each transportation mode, showing changes over time.

The forecasts presented here assume a horizon year of 2040 consistent with the context of the long-range freight plan-year horizon. At the same time, the FAST act requires state freight plans to address a five-year forecast period. As such, select data is presented for the five-year component of this freight plan – 2021.

Commodity Flow Forecasts

Transearch 2040 Multimodal Forecasts

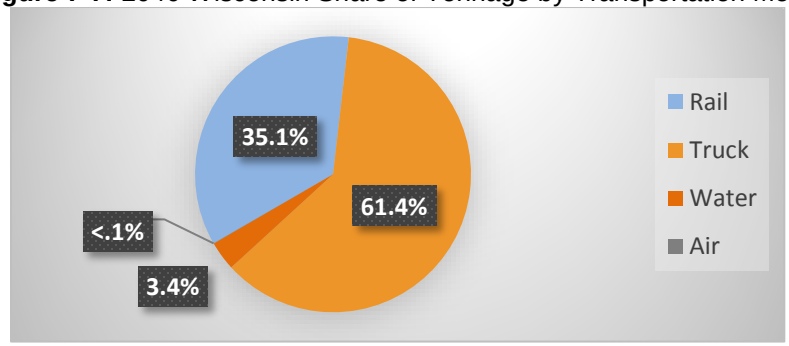
As previously mentioned, Wisconsin freight tonnage is forecast to increase 74 percent across all transportation modes from 2013 to 2040 (Table 7-3), with the economic value of this freight increasing more than 134 percent (Table 7-4). As shown in Table 7-3 and Table 7-4, over one billion tons of freight is estimated to move statewide in 2040 with an approximate value nearly $1.5 trillion.

Table 7-3: 2013-2040 Wisconsin Commodity Tonnage Forecast

Mode	2013 Tons	2021 Tons	2040 Tons	% Change in Tons, 2013-2021	% Change in Tons, 2021-2040	% Change in Tons, 2013 - 2040
Rail	206,923,449	249,791,581	351,603,396	20.72%	40.76%	69.92%
Truck	341,103,976	421,927,066	613,881,906	23.69%	45.49%	79.97%
Water	28,318,795	30,076,586	34,251,339	6.21%	13.88%	20.95%
Air	104,838	183,546	370,477	75.08%	101.84%	253.38%
Other[34]	105,137	135,803	208,634	29.17%	53.63%	98.44%
Total	**576,556,194**	**702,114,582**	**1,000,315,752**	**21.78%**	**42.47%**	**73.50%**

Source: 2013 IHS Transearch Database

Figure 7-7: 2040 Wisconsin Share of Tonnage by Transportation Mode



Source: 2013 IHS Transearch Database

[34] The "Other" mode category largely represents flows where the mode is either mixed, and therefore not a single mode, or the mode cannot be completely determined based on the reported information.

Table 7-4: 2013-2040 Wisconsin Commodity Value Forecast (000s Dollars)

Mode	2013 Value	2021 Value	2040 Value	% Change in Value, 2013-2021	% Change in Value, 2021-2040	% Change in Value, 2013-2040
Rail	$179,228,925	$243,758,096	$397,014,876	36.00%	62.87%	121.50%
Truck	$445,668,962	$629,567,308	$1,066,325,879	41.26%	69.37%	139.30%
Water	$2,197,422	$2,554,337	$3,402,009	16.24%	33.19%	54.80%
Air	$10,436,239	$15,242,492	$26,657,344	46.05%	74.89%	155.40%
Other	$167,173	$238,137	$406,675	42.45%	70.77%	143.30%
Total	**$637,698,721**	**$891,360,369**	**$1,493,806,782**	**39.78%**	**67.59%**	**134.20%**

Source: 2013 IHS Transearch Database

Transportation Mode Split

As outlined in Table 7-3, by 2040, freight tons will grow across all transportation modes. The total share of freight tons per mode in 2040 percentages is reflected in Figure 7-7. Truck tonnage will grow 80 percent (Table 7-3) relative to 2013, and its overall share of freight across all modes will be over 60 percent. Rail tons will grow 70 percent and will constitute 35 percent of the total tons across modes. Despite a 21 percent increase in water tonnage from 2013 to 2040, water's mode share of total freight tonnage will be small at 3.4 percent in 2040. Although air has the largest projected percentage increase in tonnage (253 percent), it will constitute less than 0.1 percent of Wisconsin's total freight tonnage. Total truck tons continue to increase faster than other modes and a larger percentage of freight will move on truck over other modes.

Table 7-5 through Table 7-8 display the tonnage forecasts for each mode and for each of the following commodity flow types[35]:

- **Outbound Freight Tonnage –** commodities originating in Wisconsin and terminating in another state or country
- **Inbound Freight Tonnage –** commodities originating in another state or country and terminating in Wisconsin
- **Intrastate Freight Tonnage –** commodities that both originate and terminate in Wisconsin
- **Overhead Freight Tonnage –** commodities moving through Wisconsin, having neither an origin nor termination within the state

[35] *Originating* freight refers to freight beginning its trip at a given location. *Terminating* freight refers to freight ending its trip at a given location.

Table 7-5: 2013-2040 Outbound Tonnage

Mode	2013 Outbound	2021 Outbound	2040 Outbound	% Change, 2013-2021	% Change, 2021-2040	% Change, 2013-2040
Rail	24,738,407	30,998,186	45,865,160	25.30%	47.96%	85.40%
Truck	98,183,043	125,477,934	190,303,301	27.80%	51.66%	93.80%
Water	19,015,241	20,454,088	23,871,350	7.57%	16.71%	25.50%
Air	48,830	110,243	256,100	125.77%	132.30%	424.50%
Other	2,577	5,595	12,762	117.10%	128.11%	395.20%
Total	**141,998,097**	**177,046,046**	**260,308,674**	**24.69%**	**47.02%**	**83.30%**

Source: 2013 IHS Transearch Database

Table 7-6: 2013-2040 Inbound Tonnage

Mode	2013 Inbound	2021 Inbound	2040 Inbound	% Change, 2013-2021	% Change, 2021-2040	% Change, 2013-2040
Rail	57,938,271	60,702,738	67,268,348	4.77%	10.82%	16.10%
Truck	80,180,520	95,840,807	133,033,987	19.53%	38.81%	65.90%
Water	9,288,121	9,603,760	10,353,402	3.40%	7.81%	11.47%
Air	46,873	61,273	95,474	30.72%	55.82%	103.69%
Other	102,559	130,207	195,872	26.96%	50.43%	90.98%
Total	**147,556,345**	**166,338,786**	**210,947,083**	**12.73%**	**26.82%**	**43.00%**

Source: 2013 IHS Transearch Database

Table 7-7: 2013-2040 Intrastate Tonnage

Mode	2013 Within State	2021 Within State	2040 Within State	% Change, 2013-2021	% Change, 2021-2040	% Change, 2013-2040
Rail	3,380,956	4,001,573	5,475,537	18.36%	36.83%	62.00%
Truck	111,979,389	138,039,165	199,931,134	23.27%	44.84%	78.50%
Water	15,432	18,737	26,587	21.42%	41.89%	72.30%
Air	9,136	12,030	18,903	31.68%	57.13%	106.90%
Other	-	-	-	-	-	0.00%
Total	**115,384,913**	**142,071,505**	**205,452,161**	**23.13%**	**44.61%**	**78.10%**

Source: 2013 IHS Transearch Database

Table 7-8: 2013-2040 Overhead Tonnage

Mode	2013 Overhead	2021 Overhead	2040 Overhead	% Change, 2013-2021	% Change, 2021-2040	% Change, 2013-2040
Rail	120,865,815	154,089,085	232,994,350	27.49%	51.21%	92.80%
Truck	50,751,024	62,562,123	90,613,484	23.27%	44.84%	78.50%
Water	-	-	-	-	-	0.00%
Air	-	-	-	-	-	0.00%
Other	-	-	-	-	-	0.00%
Total	**171,616,839**	**216,651,208**	**323,607,835**	**26.24%**	**49.37%**	**88.60%**

Note: Overhead air freight is not tracked because aircraft traveling through a state's airspace is not tracked. Overhead water freight does not exist in Wisconsin since there is no single body of water that traverses the entire state.
Source: 2013 IHS Transearch Database

Inbound tonnage is not expected to grow as much as other flow types. The largest increase (88.6 percent) is expected to be seen in overhead (pass-through) shipments. Also, Table 7-5 to Table 7-8 show that trucks are Wisconsin's predominant mode of freight transport for inbound, outbound, and internal flows. Wisconsin's Interstate highways currently carry the largest proportion of freight tonnage and will continue to in the future. These facts highlight the primary importance of roadway infrastructure to freight transportation in Wisconsin.

Rail, Truck, Port/Harbor, Pipeline, and Air Freight Forecasts

The commodity forecasts for specific freight transportation modes in Wisconsin will be discussed in each of the next few sections. The forecasts include future summaries for highway, rail, port/harbor, pipeline, and air:

- 2040 forecasted commodity tonnage
- 2040 forecasted commodity value
- 2040 forecasted daily trucks
- Forecast percent change in tons/value, 2013-2040
- Forecast percent change in trucks, 2013-2040
- Percent change in originating tonnage, 2013-2040
- Percent change in terminating tonnage, 2013-2040
- Percent change in total tonnage by commodity, 2013-2040

In accordance with the FAST Act, state freight plans must include a five-year forecast period. In response, forecasts are provided to the year 2021. However, because the year 2040 is the planning horizon of the Wisconsin State Freight Plan, the forecasts also extend from the year 2013 to the year 2040.

7.5 Wisconsin Rail Trends, Issues, and Forecasts

The following section briefly describes critical trends and issues, as well as forecasts impacting rail transportation in Wisconsin.

Trends in Railroad Regulation

United States railroads operate in a legal and regulatory environment that is distinct from most other enterprises. Railways have powers of eminent domain, granted by Congress, to acquire rights of way and extend their operations. Facilities needed to support railway operations are similarly held by the courts to be largely exempt from local zoning and regulatory controls. Labor relations in the railroad industry are governed under the Railway Labor Act, which triggers a federal review and possible public intervention whenever major labor disputes threaten significant disruptions to either freight or passenger service.

Positive Train Control

The Rail Safety Improvement Act of 2008 mandated that Positive Train Control (PTC) be implemented across a significant portion of the nation's rail industry by December 31, 2015. PTC is required on Class I railroad main lines that handle poisonous-inhalation-hazardous materials and any railroad main lines over which regularly scheduled intercity passenger or commuter rail services are provided. PTC is advanced technology designed to automatically stop or slow a train before an accident occurs. In particular, PTC is designed to prevent train-to-train collisions, overspeed derailments, incursions into established work zone limits, and the movement of a train through a main line switch in the wrong position.[36] There were many unresolved technical and regulatory issues regarding the full implementation of PTC mandated by Congress. Congress approved an agreement to extend the full implementation of PTC to the end of 2018 at the earliest. Under the new agreement, railroads would have an extra three years to work on the automated train conversion. They will also have the option of requesting an extra two years to work on the installation if they submit plans for doing the work by December 31, 2018. The requests would have to be approved by the United States DOT on a case-by-case basis.[37]

Operation and Infrastructure Needs

As identified in Chapter 6, *Transportation System Condition and Performance*, today's rail network in Wisconsin consists of less mileage (from approximately 7,600 miles in 1920 to 3,300 miles in 2016), while the total amount of tonnage handled annually has slowly increased with a few variable years. Since 1985, total rail movements have increased by roughly 23 million tons in Wisconsin.

Growth in rail movements has resulted in longer freight trains, which places a higher demand on the railroad infrastructure to carry longer carloads. Long-distance freight trains are generally longer than passenger trains, with greater length improving efficiency. The length of a freight train may be measured in the number of railcars (for bulk loads such as coal and iron ore) or in feet for general freight. Train lengths and loads on electrified railways, especially lower voltage 3,000 V DC and 1,500 V DC, are limited by traction power considerations. Drawgear and couplings can be a limiting factor, tied in with curves, gradients, and crossing loop lengths. Conventional freight trains in the United States can average nearly 6,600 feet or 1.25 miles in length. Freight trains with a total length of three or four times that average are possible with the advent of distributed power units, or additional locomotive engines between or behind long chains of freight cars (referred to as a "consist"). These distributed power units enable much longer, heavier loads without the increased risks of derailing that stem from the stress of pulling very

[36] Federal Railroad Administration, Office of Railroad Safety, "Positive Train Control."
[37] The Hill, "Lawmakers Agree to Extend Automated Train Deadline by 3 Years." (October 21, 2015).

long chains of train-cars around curves. Nationally, freight trains are limited by air brake capability (electronically controlled pneumatic braked), which is usually approximately 180 wagons (nearly 10,000 feet or 1.9 miles in length).

The current industry standard for rail line carload carrying capacity is 286,000 pounds. With increased competition, railcar loads are expected to get heavier in order to keep rail lines competitive. To accommodate those increases, several railroad companies are upgrading their infrastructure to accommodate modern rail cars designed to carry heavier loads. As discussed in Chapter 6, *Transportation System Condition and Performance*, Wisconsin's state-owned rail network has a carload weight goal of 286,000 pounds. As of 2016, about 73 percent of track met the FRA standards (capable of operating loaded 286,000 pound rail cars above 10 miles per hour and not exceeding 25 miles per hour). The BNSF corridor that runs along the western edge of Wisconsin has been upgraded with rail capable of handling 310,000 pounds - a weight not considered to be needed just ten years ago. To accommodate increasing rail line carload carrying capacity standards, the state will continue to evaluate the most cost-effective approach to rail line improvements.

Trends in Regional Railroad Freight Movements

Metropolitan Chicago's rail network plays a key role in moving goods and people throughout the region and nation. Approximately one-quarter of all freight trains and one-half of all intermodal trains in the nation pass through Chicago, which serves as the continent's main interchange point between western and eastern railroads.[38]

The Chicago region contains an extensive freight rail network, handling the movement of nearly 1,300 trains each day, including 500 freight and 760 passenger trains for a total of 37,500 railcars.[39] The Chicago region contains an estimated 3,865 track-miles of rail -- greater mileage than nearly 40 other states -- as well as both passenger and freight rail facilities, including more than 50 freight rail yards.[40] Nearly 1,400 of the region's track-miles are shared by both passenger and freight trains. The density of the rail network in Chicago provides unparalleled opportunities to make connections among the railroads, as well as connections to trucking and other modes, providing choices and access to markets for shippers in our region.

However, this concentration of rail activity presents some challenges to the region, such as causing motorist delay at highway-rail grade crossings, transit delays where freight and passenger trains share track, and a reduction in speeds and productivity as trains navigate the region's congested rail network.

Chicago Region Environmental and Transportation Efficiency Program

The Chicago Region Environmental and Transportation Efficiency Program (CREATE) is a partnership between the State of Illinois, City of Chicago, Metra, Amtrak, Association of American Railroads, and the United States DOT. A project of regional and national significance, CREATE includes 70 critically-needed rail and highway infrastructure improvements in Northeast Illinois.[41] The CREATE program aims to enhance the efficiency of freight and passenger rail service throughout the region.

Because of the manner in which train tracks currently intersect with each other and with roads, and because regional freight railroads defer to Amtrak and Metra in track utilization, it can take up to 30 hours for freight trains to pass through the Chicago region.[42] Delays in rail freight threaten the economic vitality of the region, lead to

[38] Chicago Metropolitan Agency for Planning, "Update on Freight Rail Activity." (October 9, 2015).
[39] Ibid.
[40] Ibid.
[41] Chicago Region Environmental and Transportation Efficiency Program, "About CREATE."
[42] Ibid.

increased traffic congestion on roadways, generate higher levels of air pollution, raise safety concerns, adversely affect the reliability and speed of rail passenger service, and make it harder for shippers to make a profit. At-grade rail crossings negatively impact communities and cause chronic traffic delays on roadways. With funding from the State of Illinois, the City of Chicago, the United States Department of Transportation, Metra, Amtrak, and the nation's major freight railroads, CREATE has begun to alleviate these problems.

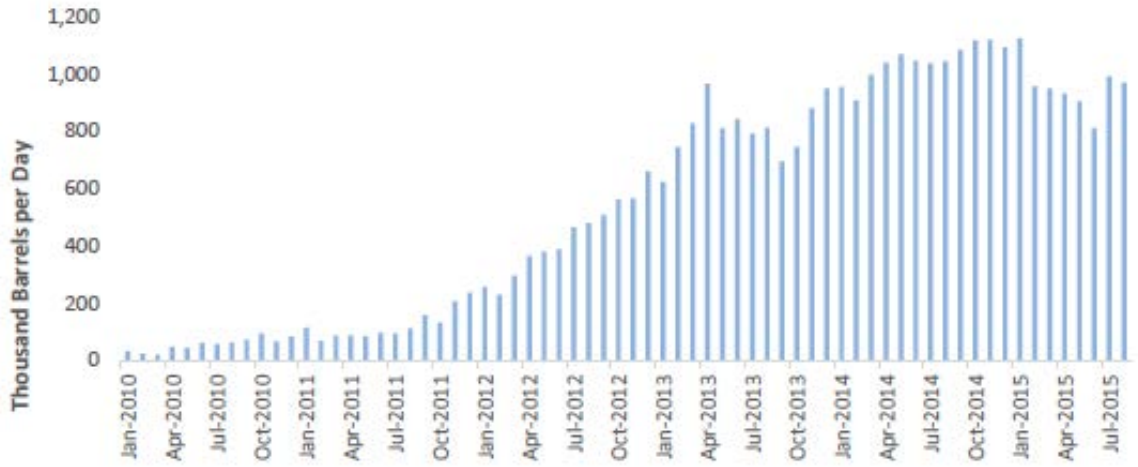
Great Lakes Basin Railroad

In 2016, Great Lake Basin Transportation Inc. (GLBT) filed a request with the STB for authority to construct and operate over 260 miles of new railroad extending from Wisconsin, into Illinois, around Chicago and finally into Indiana.[43] STB asked GLBT to propose multiple alternatives for evaluation, leading to a preferred alternative railroad corridor bypassing the Chicago metropolitan area. Instead, GLBT proposed one preferred alternative which ends near Milton, WI. Subsequent submissions by GLBT to the STB were found to be insufficient for approval. On August 31, 2017 the STB rejected GLBT's application to build and operate its proposed railroad line.[44] WisDOT will continue to monitor any future proposals.

Trends in Crude by Rail

The goal of this section is to identify trends related to rail transportation that have been driven by or have implications on pipelines in Wisconsin. As shown in Figure 7-8, crude oil by rail movements have increased from nearly zero in 2010 to just under one million barrels per day in August 2015. Since a peak of 1.1 million barrels per day in January 2015, there has been a softening of crude oil by rail movements, partially driven by the fall in oil prices from approximately $100 per barrel in August 2014 to $48 per barrel in October 2015.

Figure 7-8: 2010-2015 Crude by Rail Movements in the United States*



*Includes movement to and from Canada
Source: CPCS summary of U.S. Energy Information Administration data

The increased acceptance and use of railroads to transport crude is generally related to limited pipeline capacity and rail's flexibility to serve a greater number of origins and destinations. The resulting increase in crude by rail shipments has contributed to capacity constraints on some rail corridors. A recent study by the University of Minnesota concluded that rail delays cost Minnesota corn, soybean and wheat growers $100 million in the spring

[43] Surface Transportation Board, "Environmental Matters > Great Lakes Basin."
[44] Chicago Tribune, "Federal agency decision derails bid for 261-mile freight line from Indiana to Wisconsin." (August 31, 2017).

of 2014.[45,46] The competition and connections between modes ensure that capacity constraints, inefficiency, or challenges in one mode will impact other modes and in turn the economy.

Since the 2013 accident involving an oil-laden unit train in Lac-Mégantic, Quebec, Canada, there has been increased scrutiny of the transport of crude oil by rail. The train involved in the Lac-Mégantic incident had originated in the Bakken-shale region of North Dakota, which had seen production significantly increase from under 200,000 barrels per day in 2008 to over 1,200,000 barrels per day in 2015.[47]

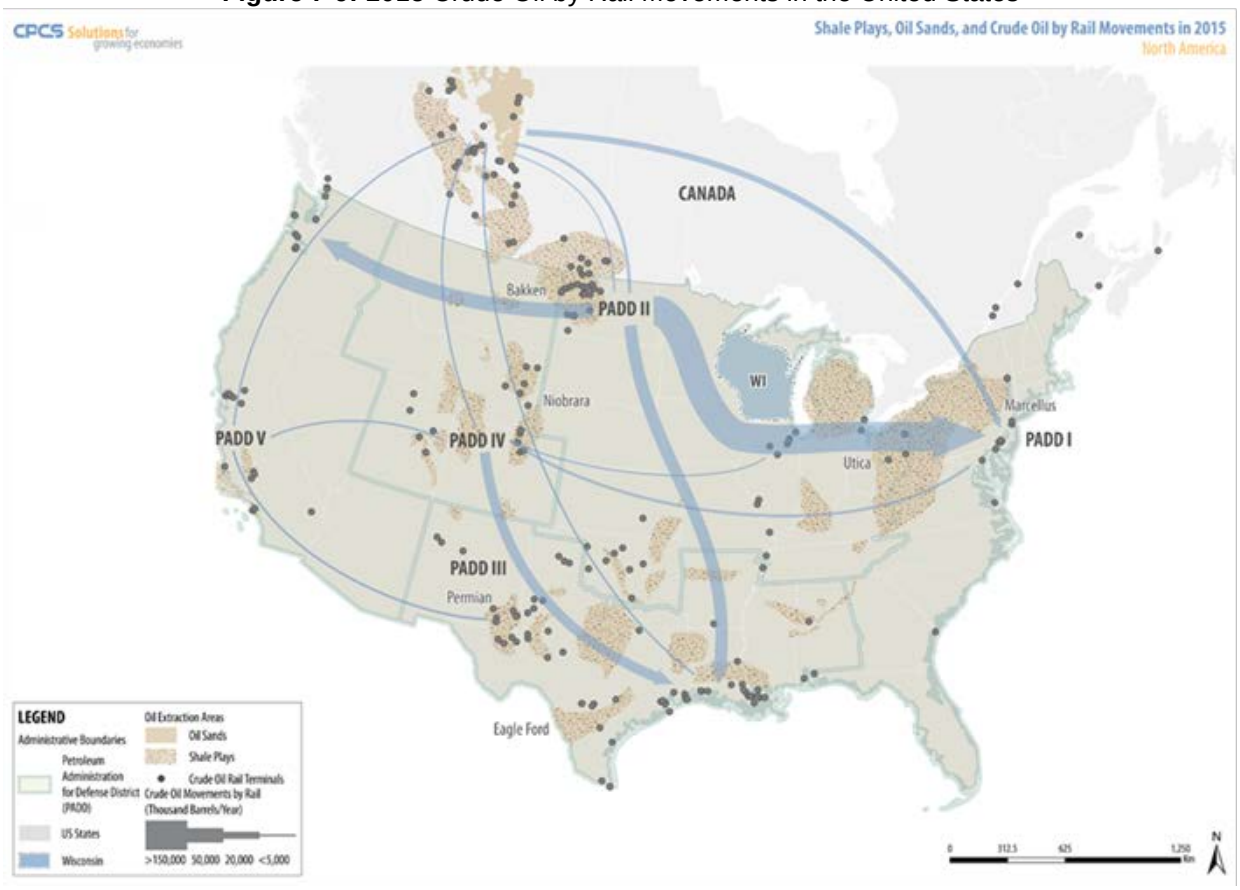
National Crude by Rail Flows

Though there has been a significant increase in crude oil movements, they nonetheless represent a relatively small share – approximately 2.6 percent and 3.7 percent – of overall Class I movements by tonnage and revenues, respectively, in 2014.[48] However, there are several key routes of crude oil by rail movements. Figure 7-9 shows crude oil by rail flows disaggregated by origin-destination within each of the Petroleum Administration for Defense Districts (PADD) in the United States,[49] as well as flows to/from Canada, superimposed on major shale oil plays and the oil sands.

Crude oil by rail volumes include flows from Texas (Eagle Ford and Permian), Colorado (Niobrara), North Dakota (Bakken), and Canada (oil sands and northern extent of the Bakken). The largest flows are from PADD II to PADD I, i.e. flows that originate in the Bakken shale and are destined for east coast refineries. According to EIA data, these flows averaged roughly 400,000 barrels per day in 2015, or approximately six unit trains per day.[50,51] These flows would impact Wisconsin, as they would be routed over the BNSF and Canadian Pacific lines through the state. Flows from Canada to PADD I and II and intra-PADD-II flows could also flow through Wisconsin, though these flows are much smaller than the PADD II to I flows.

[45] Minnesota Department of Agriculture, "Minnesota Basis Analysis - Final Report for the Minnesota Department of Agriculture." (July 10, 2014).
[46] Minnesota Farm Guide, "Minnesota crop farmers lose $100 million due to transportation delays." (July 31, 2014).
[47] U.S. Energy Information Administration, "Bakken Region Drilling Report." (2015).
[48] Association of American Railroads, "2015 Class I Railroad Statistics."
[49] From 2010 onwards, the EIA has collected data on crude oil by rail movements in the US and publishes them at the PADD level.
[50] U.S. Energy Information Administration, "Movements of Crude Oil and Selected Products by Rail between PAD Districts."
[51] This conversion is based on approximately 60,000 barrels per train. Cairns notes that "CP has found that crude from the Bakken shale deposit is moved with 600 to 650 barrels per tank car." Assuming an average train length of 100 cars results in approximately 60,000 to 65,000 barrels per train. The estimate developed using this methodology corresponds well with information gathered by the Wall Street Journal in December 2014, which found that approximately 38 crude oil trains per week pass through Wisconsin on BNSF and CP lines. Cairns, M. 2013. Crude Oil by Rail: Part II: Potential for the Movement of Alberta Oil Sands Crude Oil and Related Products by Canadian Railways. Presentation to the Canadian Transportation Research Forum.

Figure 7-9: 2015 Crude Oil by Rail Movements in the United States



Source: CPCS analysis of U.S. Energy Information Administration data

PADD II to PADD I is a key market for crude by rail as the North American pipeline system historically developed as a north-to-south system, leaving no crude oil pipelines running from PADD II to the east coast. As a result, if refineries on the east coast wish to source crude oil from the midcontinent, they need to use rail (or another non-pipeline mode) to source the crude.

Though the lack of pipelines explains why crude oil by rail flows from PADD II to PADD I, it is the price differential between crude oil produced in PADD II and the international markets that explains why refineries source crude from the Bakken region. Essentially, when the price of Bakken crude falls below the price of Brent crude, an international crude oil benchmark, refineries will try to source crude oil from PADD II, provided the price differential is large enough to offset the price of rail transport. In late 2013, the American Petroleum Institute reported that this spread was over $20 per barrel of oil, double the estimated rail rate of approximately $9 to $10 per barrel.[52] However, oil prices (and hence the spread) are constantly in flux.

Additionally, between 2007 and 2015, North Dakota refining and pipeline export capacity increased three-and-a-half fold to 830,000 barrels per day, with plans to double refining/pipeline capacity again by 2020.[53] Based on estimates presented to the Rail Energy Transportation Advisory Committee Surface Transportation Board in April

[52] Genscape, "Taking the Train: North American Crude-by-Rail Outlook as Seen at the Argus Crude Transportation Summit." (June 5, 2014).
[53] North Dakota Pipeline Authority, "US Williston Basin Crude Oil Export Options." (2015).

2015, this proposed pipeline/refinery capacity could accommodate most if not all of the crude oil coming out of the Bakken, should it proceed.[54]

Economic Considerations

Though most of the trends driving crude by rail are governed by external forces, there are some transportation links within Wisconsin that could be impacted by crude oil by rail. For example, in the winter of 2014 there were several reports regarding crude oil by rail traffic impacting other industries (notably the flow of agricultural commodities).[55] At the time, crude oil traffic was approaching its peak, and a particularly harsh winter caused a reduction in rail capacity (due to the need to run shorter trains).[56] According to these reports, BNSF, which runs through Wisconsin, was particularly impacted.

Rail Service Issues

The capacity of Class I railroads to provide the needed and agreed to rail service is often cited as a concern by freight shippers. Consolidation of rail companies and paring back of rail lines have left little capacity available when "surge" markets such as the increased demand to ship crude-by-rail, and/or frac sand emerge. Concentrations and capacity constraints have led to a lack of car availability in some areas, challenging businesses to identify other shipping options that may be more costly.

Service Thresholds

Rail companies noted that service thresholds, or a minimum amount of carloads, dictate whether or not a siding or spur line can be retained. According to the Wisconsin Freight Advisory Committee (FAC) members who attended the September 16, 2015 FAC meeting (see Chapter 2, *Transportation Stakeholders and Institutions,* for a discussion about the FAC), for a Class I railroad to consider making an additional stop on its rail lines, 100 carloads per mile per year are required in order to reach the minimal demand needed to make service viable and profitable. The capital-intensive nature of railroads was noted as a reason for such high thresholds. Overall customer service, service to smaller businesses, and more consistent/available delivery/pickup schedules were noted as areas where improvements were needed.

Wisconsin businesses face the difficulty of generating enough traffic for Class I service or getting those lines to be operated by short line operators. Generating enough traffic for Class I service usually requires a large business demanding regular deliveries via rail. Wisconsin tends to have a larger concentration of small businesses, making regular service demands unpredictable and less desirable to Class I railroads.

According to FAC members who attended that same September 16, 2015 FAC meeting, private sector businesses need to do a better job expressing their need for rail service through sharing of data that would indicate the level of service needed to satisfy demand. Regular service would be a requirement for short line and Class I railroads, so businesses need to be able to demonstrate need with actionable data. Volatility in markets is a critical concern of the railroads when they determine long-term capital investments. Large capital investments will typically be located in predictable markets that minimize the risk of negative return on investment. Volatile markets do not offer reliable service demand. Overall, the use of rail is seen as an important consideration as the trucking industry faces driver shortages and other challenges.

[54] Tamborski, Jerry, "Oil Industry Segment Update - Presentation to the Rail Energy Transportation Advisory Committee of the Surface Transportation Board, April 14, 2015."
[55] The Wall Street Journal, "Surge in Rail Shipments of Oil Sidetracks Other Industries." (March 13, 2014).
[56] Policy Magazine, "Winter's Impact on Canadian Railway Operations: Fact and Fantasy." (January/February 2015).

Lack of rail service typically results in shippers relying more heavily on trucking, which has its own challenges including current and projected driver shortages and pavement/bridge deterioration. In addition, when heavy loads cannot go by rail, increased wear-and-tear on roadways may be caused by increases in truck volume.

Overall, demand drives service; without sufficient demand, service won't be provided, but that demand is limited by rail car availability, lack of access to rail service, and Class I business models, which are usually designed for multi-car, long-haul shipments. As a result, some Wisconsin businesses seek alternative transportation options to accommodate their full range of business and shipping needs.

Rail Freight Flows

As identified in Chapter 5, *Wisconsin's Transportation Assets*, there is a significant amount of freight tonnage that is shipped overhead by rail (Table 7-9). This can create a challenge for shippers that wish to access rail. In many cases, shippers have to rely on other modes, such as trucking, to ship freight to truck-rail intermodal facilities where rail can be accessed, unless shippers have an opportunity to utilize short line or regional railroads, which can be used to connect to Class I railroads.

Table 7-9: 2013 Wisconsin Rail Shipments by Tonnage (Millions) and Value (Millions $)

Rail Shipments	Outbound	Inbound	Within	Overhead	Total
Tons	24.7	57.9	3.4	120.9	**206.9**
Value	$6,712.4	$13,156.8	$1,256.0	$158,103.7	**$179,228.9**

Source: 2013 IHS Transearch Database

Wisconsin's Publicly-Owned Railroad Condition

As discussed in Chapter 5, *Wisconsin's Transportation Assets*, Wisconsin supports over 700 miles of railroad statewide. The Staggers Act of 1980 marks the beginning of the modern United States rail industry. This legislation deregulated the rail industry, allowing railroads to shed unprofitable and duplicative lines. Many lines in Wisconsin were abandoned. In response, the state partnered with a number of counties to purchase rail lines to maintain freight rail service to local communities. This policy is still in place today.

WisDOT will continue efforts to preserve rail freight service when the service is judged essential, cost effective, and financially viable based on transportation efficiency cost-benefit analyses.

Staggers Act

The passage of the Staggers Rail Act of 1980 and its implementation by the Interstate Commerce Commission (ICC, now the Surface Transportation Board (STB)), meant that many regulatory restraints on the railroad industry were removed. This provided industry increased flexibility to adjust their rates and tailor services to meet shipper needs and their own revenue requirements. It also led to major service and network cutbacks. Since passage of the Act, there has been a significant increase in freight rail productivity, resulting in lower shipping costs for rail users and increased use of the remaining rail network. However, this increase in rail freight has been primarily focused on a few key commodity markets and shipping lanes, such as coal from the Powder River Basin and long-distance import/export container traffic from coastal ports.

The Staggers Act was expected to give railroads the flexibility to make operational and infrastructure changes that would improve their financial standing. By itself, this may have occurred. However, in 1980 Congress also passed the Motor Carrier Act, which reduced regulations on the trucking industry, making it easier for new trucking firms to enter the shipping market. Together, these two acts changed the face of the freight industry. Major railroads were able to raise some shipping rates, while lowering others based on market demand. Railroads also began increasing their intermodal shipments, a trend that continues today. Staggers also simplified the regulatory process associated with railroad mergers, line sales, and abandonments. Remaining economic regulation of the carriers was vested in the STB. The Act also allowed for easier abandonment of light-density rail lines, which led to significant changes among carriers as larger railroads "spun off" their less-productive lines to newly created short line and regional railroads. The primary changes to the regulatory rail system under the Act included:

- Rail carriers could charge any given rate for services unless the STB determined no competition for such services existed.
- Industry-wide rate adjustments were removed.
- Access must be given by one railroad to another's rails in the case where a single railroad had "bottleneck" control of the rail traffic.

Abandonment allows railroads to cease to operate service over a line. Once abandoned, Wisconsin state law gives WisDOT the first right to acquire for present or future transportation any property used in operating a railroad. WisDOT can exercise its right of first acquisition, or, assign this right to any other state agency, any county or city, or any transit commission for acquisition for future transportation or recreational purpose. However, most filings in Wisconsin are actually "exemptions to the abandonment process," which require that a railroad has not carried traffic over the said line segment for two years.

While the state is committed to maintaining essential freight rail service for Wisconsin communities, this must be balanced with preservation of the existing system. WisDOT will continue to work with communities and shippers to assess opportunities to acquire railroad lines if they are deemed essential to maintaining the state's short line rail service. Historically, Wisconsin's focus for short line/regional rail service needs has focused on two components: preservation of key rail corridors through acquisition or rail banking, and infrastructure improvements to meet industry standards. WisDOT's Freight Rail Preservation Program helps to fund rail line acquisitions. The program is also the primary funding source used to preserve and improve the infrastructure of state-owned lines. The department is focused on preserving the existing publicly-owned network to ensure stewardship of the system. Acquisitions remain a secondary focus and are considered on a case-by-case basis. The rail transit commissions contract with the Wisconsin and Southern Railroad to operate the majority of this network for a period of 40 years (operating agreements expire in 2047). A number of smaller railroads operate over other rail lines.

Rail Preservation

WisDOT works with railroads to maintain, improve and increase service in Wisconsin. Efforts are focused on monitoring railroad activity and creating partnerships among businesses and railroads to increase the use of rail. At times rail lines are taken out of service or are abandoned.

Rail Line Abandonments

WisDOT has the ability to preserve rail corridors for uses ranging from a recreational trail to full service rail corridors. Between 1987 and 2010, nearly 97 miles of rail lines were abandoned and railroads in the state submitted over 40 applications to the STB to abandon more than 400 miles of rail lines. Over that period, thirteen abandonment applications were approved by the STB in Wisconsin. Six of those lines were short stub-ended spurs only a few miles in length; others occurred on Native American tribal lands. Over 70 percent of the rail miles proposed for abandonment in that timeframe were preserved or were in negotiations to be preserved for current or future transportation use (as of January 2010). Many of the lines have been used as trails in the interim. Lines preserved under the 1983 National Trails System Act (NTSA) are not abandoned. These lines retain their character as rail corridors and hence may be reactivated at any time in the future. In other words, should there be a need, rail lines in rails-to-trails service are available to bring back into rail service.

Funding for track renewal typically comes from a combination of local, state, and private sources, as well as the Federal Local Rail Freight Assistance Program. Traditionally, rail corridors have been acquired when there is a local interest, sufficient local funding, potential shippers on the line, sufficient state funding, and a willing short line operator.

As of January 2010, there were 11.93 miles of rail that were still in negotiation for sale to the state to be preserved as a rails-to-trails segment (Table 7-10). Rail negotiations can sometimes take years because of the complexities in ownership, land titles, and records that need to be reviewed. Some corridors were acquired decades ago on a parcel-by-parcel basis with each acquisition using a different method of conveyance.

Table 7-10 summarizes rail abandonment activity from 1987 to 2010. During that time span, nearly 97 miles of rail lines were abandoned, 329 miles were classified as preserved lines, 37 miles were service preserved, and nearly 12 miles were pending abandonment.

Table 7-10: 1987-2010 Rail Abandonment Activity

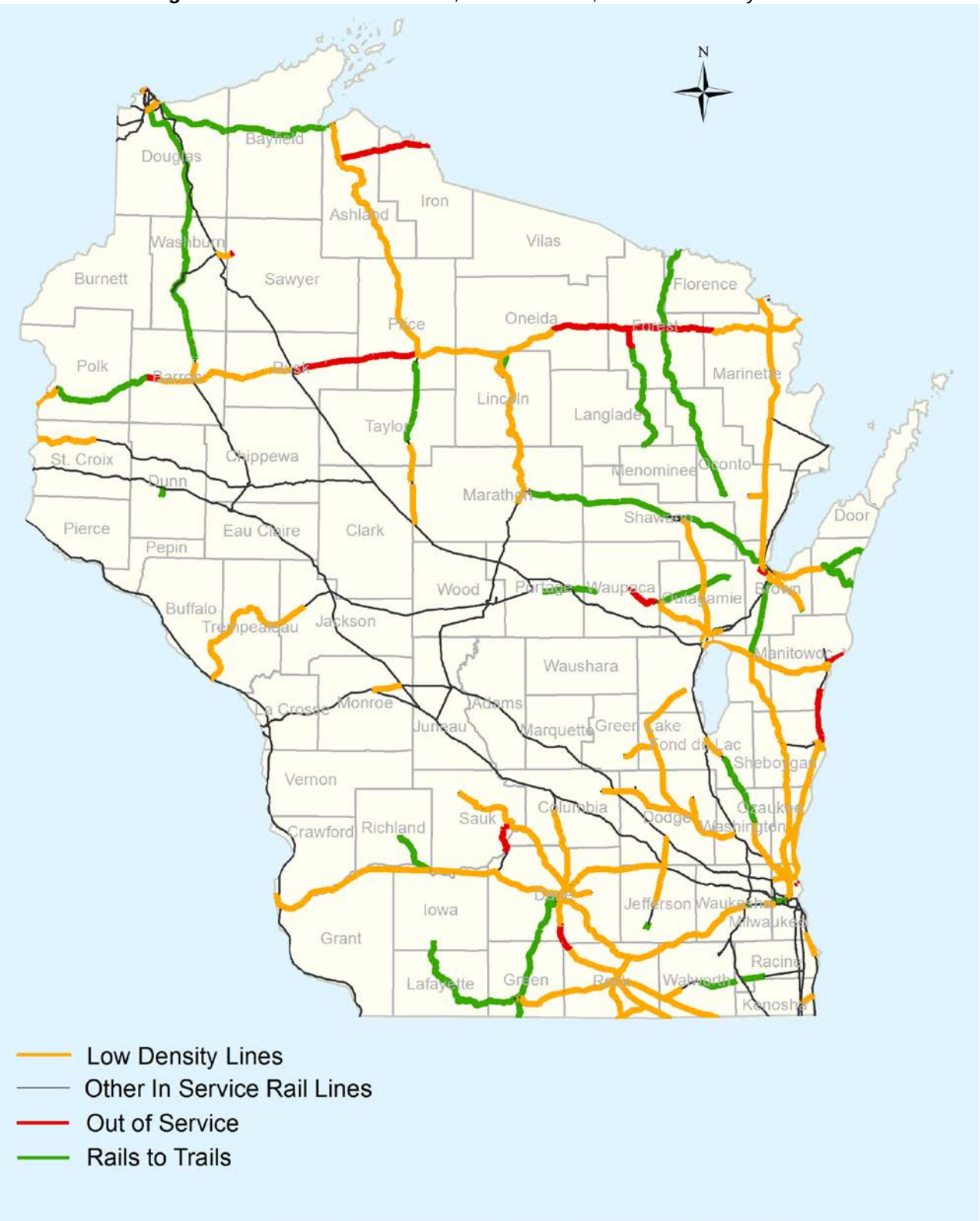
Type of Activity	Miles	Proportion of Total
Abandoned Lines	96.6	20%
Preserved Lines (rail bank and rails-to-trails)	329.1	69%
Service Preserved	37	8%
Pending Abandonment (as of January 2010)	11.9	3%

Source: Wisconsin Department of Transportation, Bureau of Transit, Local Roads, Railroads and Harbors

Out-of-Service Rail Lines

Rail lines that are not abandoned, but taken out of service by the operating railroad, are also of interest to the state (see Figure 7-10) because these line segments represent underutilized economic development assets, but will see no capital investment into the infrastructure, which increases the cost of rehabilitation over time. Some have been out of service for many years. In Wisconsin, there has not been a strong correlation between out-of-service lines and abandonment filings.

Figure 7-10: 2014 Out of Service, Rails-to-Trails, and Low-Density Lines



Source: Wisconsin Department of Transportation, Bureau of Planning and Economic Development

Low-Density Rail Lines

Rail lines that carry less than 5 million gross tons per year (a typical Class I line will carry 10 million gross tons annually) are considered low density and may be at risk for abandonment in the future (Figure 7-10). The economic viability of the state's low-density lines is more susceptible than higher-volume lines to changing market conditions (e.g. losing a customer's business) or increased operating costs. According to the FRA, there are 858 miles of low-density lines in the state. Some of the low-density lines identified in 2007 are now out of service.

Track and Bridge Upgrades for Publicly-Supported Rail Corridors

A critical business need for the Wisconsin short line system (serving local business freight needs), is the ability to accommodate heavier car loadings that are becoming prevalent on Class I railroads. Two types of infrastructure improvements that will meet this need are:

- Track upgrades to industry standards
- Bridge upgrades to handle heavier car weights

The state-owned system was rehabilitated to Federal Railroad Administration Class 2 Track Safety Standards after it was acquired in the 1980s. Market standards have since changed. To improve their carrying capacity, railroads are increasingly hauling heavier loads in each rail car – moving from 263,000-pound cars to 286,000-pound cars.

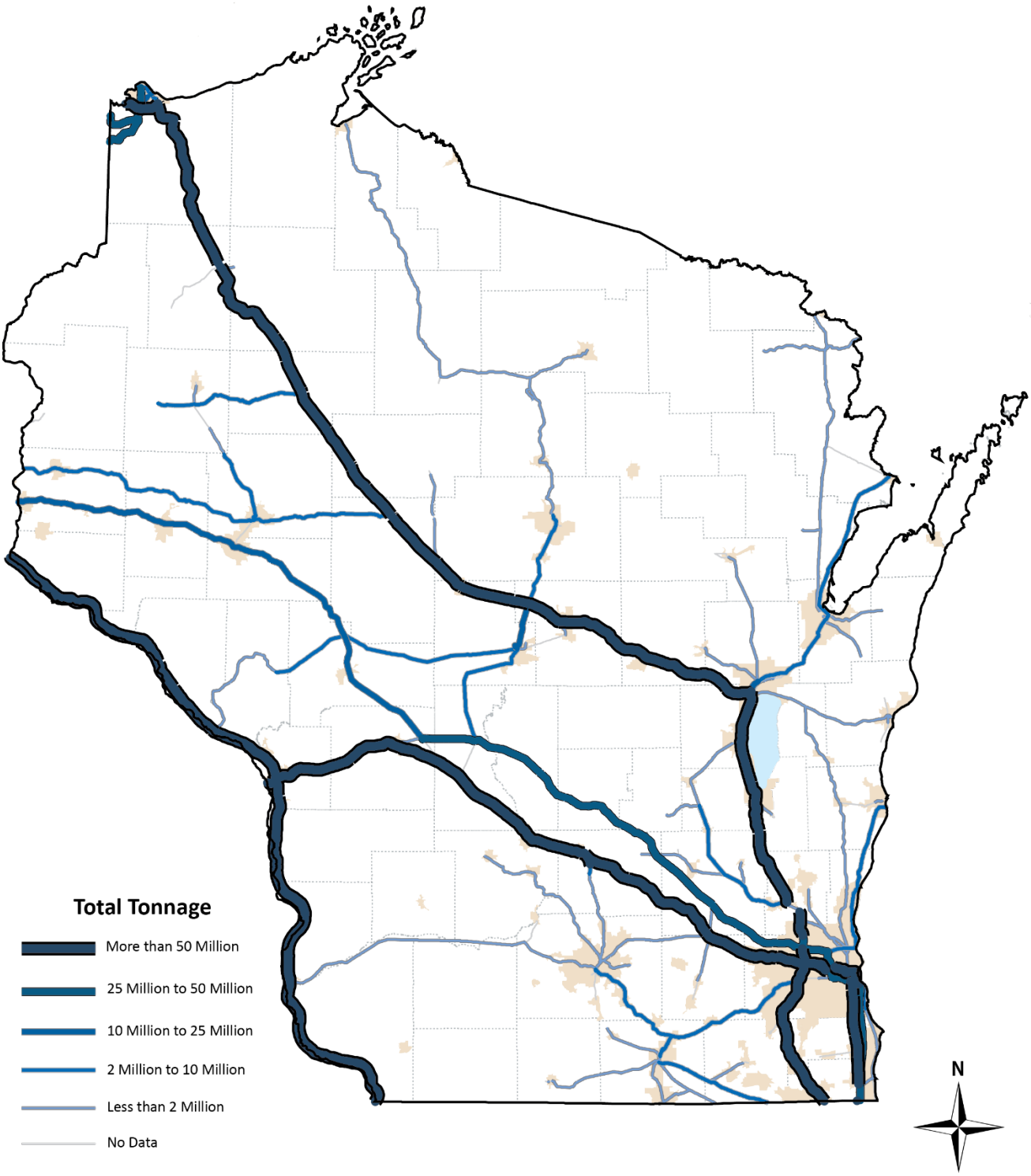
Department efforts have focused on system improvements that not only preserve essential freight rail service but also accommodate heavier car loadings prevalent on Class I railroads. This helps meet industry demands and provides a competitive component of the overall rail network. While approximately 73 percent of the state-owned system can accommodate 286,000 pound cars, there are tracks and bridges that have not been upgraded. System preservation that supports efficient short line freight rail service is a department focus (see Chapter 9, Investment and Implementation). WisDOT will continue to work with rail transit commissions, Wisconsin and Southern Railroad, other operators, and stakeholders to study the economic impacts of the publicly-owned rail system and the opportunity costs to accommodate heavier car loadings.

In addition, Class I railroads are aggressively moving to maximize double-stacked intermodal trains. On routes with this service, railroads have been increasing clearances by raising bridges and lowering trackage to accommodate these containers. It is unclear whether other car heights will also be expanded in the future. Were that to occur, the railroads and WisDOT would need to work together to accommodate this larger equipment on state-owned corridors, as carload weights would increase and geometric clearance issues would become more prevalent.

Rail Freight Forecasts

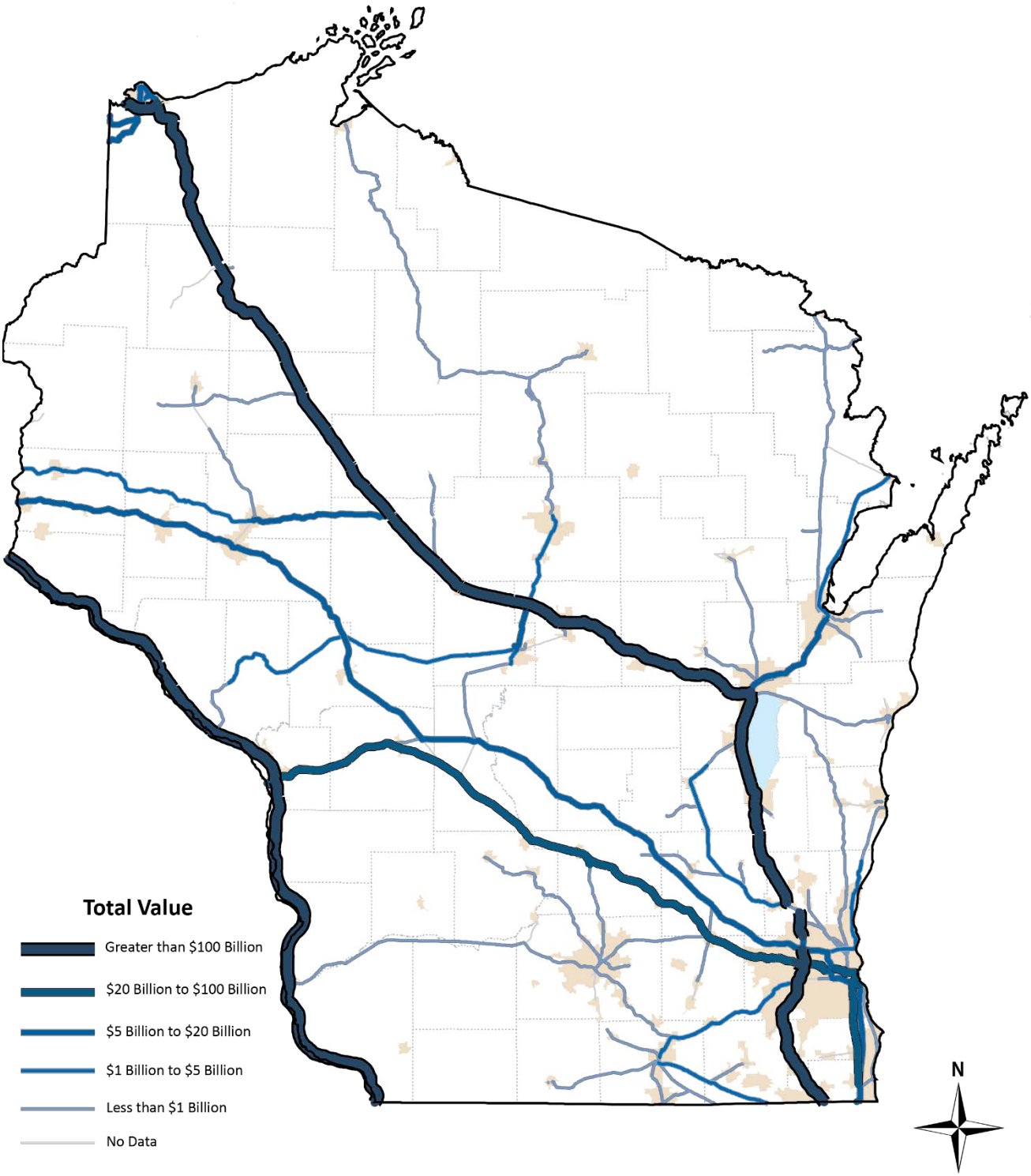
Overall railroad tonnage is predicted to increase by 70 percent statewide between 2013 and 2040. In addition, the value of this tonnage is expected to increase by 122 percent. Figure 7-11 and Figure 7-12 show the rail lines that are expected to carry the 352 million tons of railroad cargo, valued at more than $397 billion, in 2040.

Figure 7-11: Railroad Forecasted 2040 Commodity Tonnage



Source: 2013 IHS Transearch Database

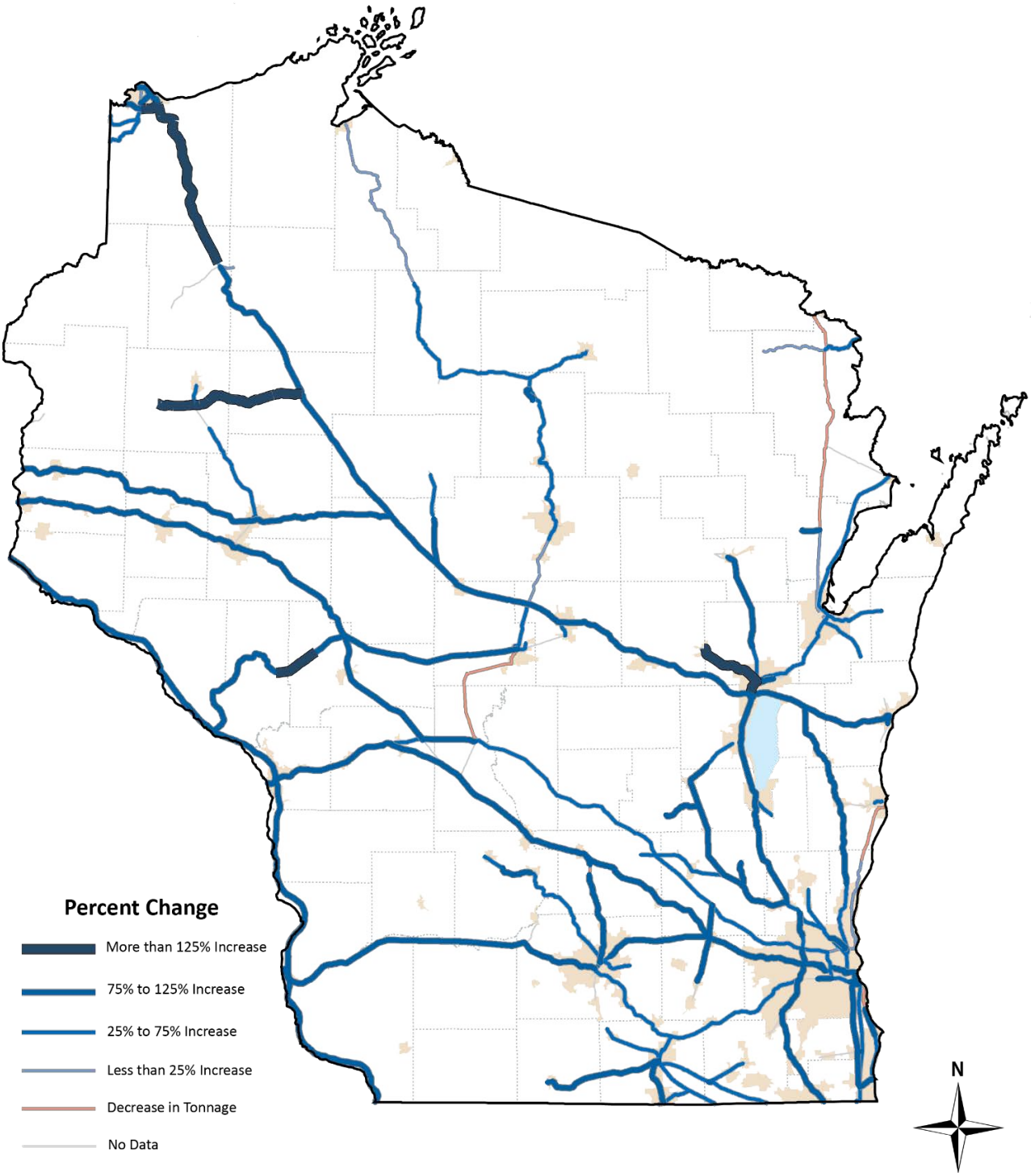
Figure 7-12: Railroad Forecasted 2040 Commodity Value



Source: 2013 IHS Transearch Database

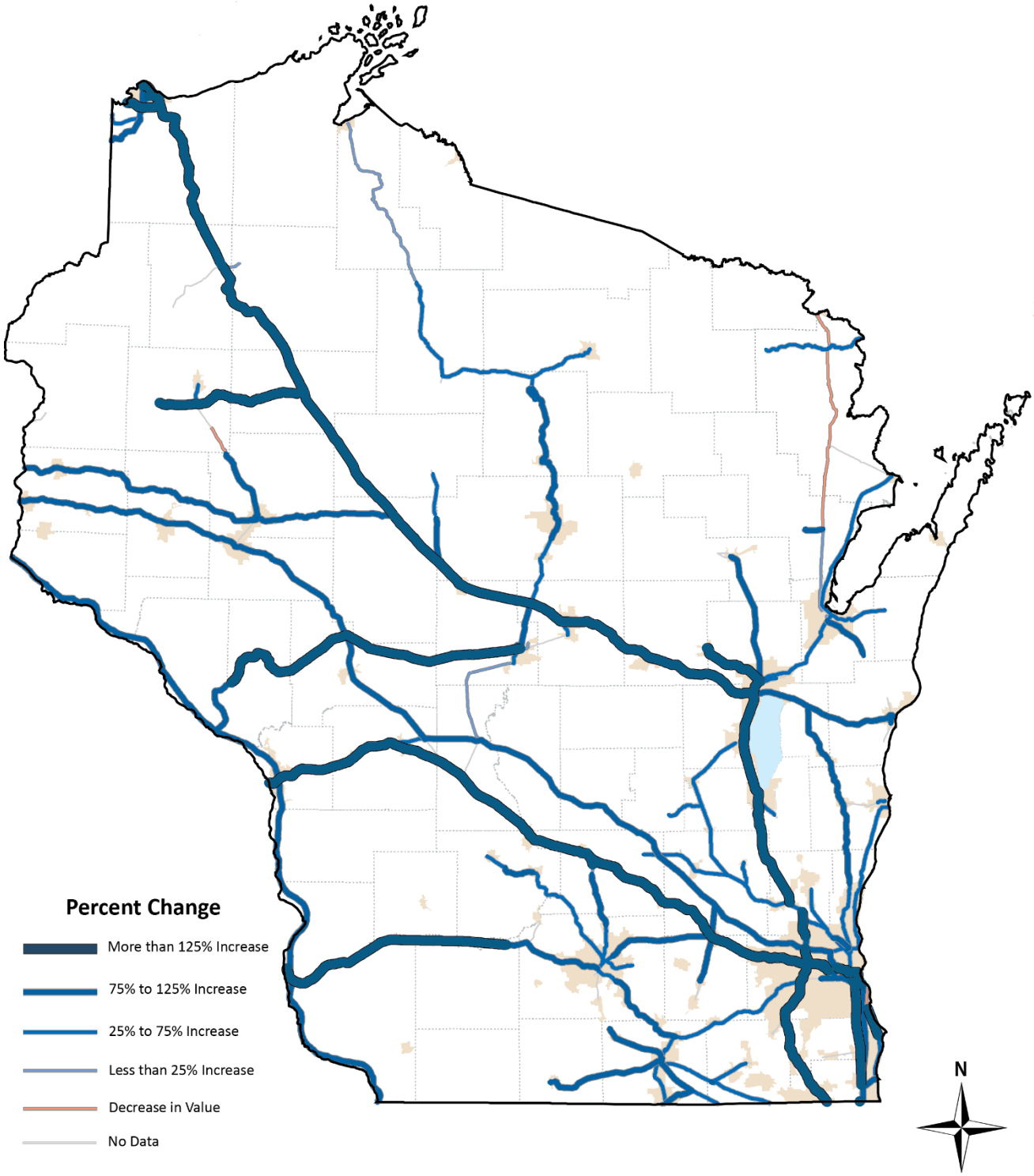
Figure 7-13 and Figure 7-14 show the railroad lines that are projected to see the most growth by 2040. Figure 7-13 shows the percent change in tonnage and Figure 7-14 shows the percent change in the value of the railroad commodities.

Figure 7-13: 2013-2040 Railroad Forecast Percent Change in Tons



Source: 2013 IHS Transearch Database

Figure 7-14: 2013-2040 Railroad Forecast Percent Change in Value



Source: 2013 IHS Transearch Database

Railroad – Origins/Destinations[57]

Commodities that travel by rail may have localized economic benefits for communities or counties (at a larger economic scale). Increases and decreases are most likely due to projected changes in employment by industry sector. The counties expected to see the largest growth (more than 125 percent) in originating tonnage are:

- Barron
- Clark
- Dodge
- Trempealeau

The growth in Barron, Clark, and Trempealeau counties is due to a large forecasted increase in outbound sand and gravel. Much of this increase has already occurred and has then leveled off since 2013. The counties expecting to see the largest growth in terminating tonnage (more than 125 percent) are:

- Monroe
- Pierce
- Walworth
- Washburn

Monroe, Pierce, and Washburn counties are expected to receive many more railroad cars (and are considered by the Transearch model as commodities), accounting for the growth in terminating tonnage. The increase for Walworth County is because of an anticipated increase in terminating food and farm products.

Railroad – Commodities[58]

The five commodity groups forecast to see the greatest rail tonnage in 2040 are:

- Crude Petroleum or Natural Gas (52,387,430 tons, 86.5 percent growth)
- Chemicals or Allied Products (45,055,110 tons, 109.8 percent growth)
- Nonmetallic Minerals (38,641,868 tons, 83.4 percent growth)
- Coal (35,578,950 tons, -14.2 percent growth)
- Farm Products (34,724,587 tons, 91.4 percent growth)

Crude petroleum or natural gas is forecast to see the most rail tons in 2040 (52,387,430), representing a change of 86.5 percent over the forecast period of 2013-2040. Issues that could affect the forecasts developed for Wisconsin's railway mode include increases in national truck size and weight limits and the continued decline of coal as an energy resource.

7.6 Wisconsin Highway/Truck Trends, Issues, and Forecasts

Trucks continue to be the dominant mode for freight movement in the state. Following some recent declines due in part to macro-economic factors, statewide travel is again trending upward. Freight demand fluctuates with economic conditions and is affected by long-term trends in consumer demand. Demographics, globalization and

[57] 2013 IHS Transearch Database.
[58] Ibid.

other macro factors all influence the flow of goods in and through Wisconsin. In addition, conditions in Chicago and the Twin Cities can have a substantial impact on Wisconsin's shipping patterns.

Increases in truck freight movement throughout the state may accelerate the need for enhanced facility maintenance and preservation activities. Accurate forecasts of potential truck freight movement and associated facility impacts will ensure the allocation of existing resources addresses system priorities.

While the trucking industry has grown on pace with the growth of overall freight transportation, its future capabilities will be shaped by opportunities and challenges arising from the public and private sectors. Some of the most critical issues include the following topics.

Truck Parking

A major challenge for commercial truck operators is a shortage of areas near the Interstates to safely park their vehicles and rest. In lieu of available truck parking, some commercial truck drivers have parked illegally on Interstate interchange ramps or on the right shoulders of the Interstate, posing a major safety risk, potentially causing traffic bottlenecks, and causing pavement deterioration.

The shortage of suitable truck parking spaces presented WisDOT with an opportunity to both develop new truck parking facilities at strategic locations in the state and to utilize new technologies to develop a more efficient way to communicate current parking availability to commercial truck drivers.

As discussed in Chapter 5, *Wisconsin's Transportation Assets*, in Wisconsin, truck parking is available at 30 public rest areas which are located near Interstates and state highways in Wisconsin. Truck parking is also available at private facilities, such as gas stations or truck stops, located near Interstates and state highways. Truck parking facilities play an important role in freight operations, safety and security in Wisconsin, and are needed for many reasons, including:

- Respite for over the road truckers
- Adherence to federal motor carrier safety standards
- Use for logistics purposes, such as staging (awaiting dispatch instructions)
- Pickup points for deliveries
- Safe areas during inclement weather conditions

In 2014, WisDOT received a $1 million grant from the Federal Highway Administration (FHWA) to pilot a truck parking availability system in the state. The system was deployed in 2016 at four public rest areas on I-94 eastbound from Dunn County to Columbia County. Hybrid Dynamic Message Signs (HDMS) were installed along the corridor showing truck parking availability information.

In 2015, Wisconsin, along with seven other Midwestern states, was awarded a $25 million grant from the United States DOT through the Transportation Investment Generating Economic Recovery (TIGER) program to build a regional truck parking information management system. Wisconsin's portion of the $25 million grant is $3 million. This system, also using HDMS, will include seven public rest areas along the I-94 corridor, east and westbound from the Illinois to Minnesota state lines. This system will be constructed between 2016 and 2018.

Trends Impacting Driver Hours of Service

Driving hours of service (HOS) are regulated by federal rules and are designed to prevent truck/commercial vehicle-related crashes and fatalities by prescribing on-duty and rest periods for truck drivers. Generally, federal safety regulations require that drivers of heavy duty trucks rest ten hours for every eleven hours that they drive.

In December 2010, the United States DOT's Federal Motor Carrier Safety Administration (FMCSA) issued a proposed rule to revise HOS requirements for commercial truck drivers. This rule would retain the "34-hour restart" provision, allowing drivers to restart the clock on their weekly 60 or 70 hours by taking at least 34 consecutive hours off-duty. However, the restart period would have to include two consecutive off-duty periods from midnight to 6 a.m. Drivers would be allowed to use this restart only once during a seven-day period. The FMCSA reviewed five provisions in the current rules related to driving a commercial motor vehicle (CMV):

- **Limitations on minimum "34-hour restarts" –** there is no current rule on "34-hour restarts." The new ruling states that a restart must include two periods between 1 a.m. and 5 a.m. (home terminal time) and it may be used only once per week.
- **Rest breaks –** there is no current rule on rest breaks. The new ruling states that a driver may drive only if eight hours or less have passed since the end of the last off-duty period of at least 30 minutes.
- **On-duty time –** the current rule considers "on-duty time" to be any time in a CMV except in a sleeper-berth. The new ruling does not consider time spent in a parked CMV, or up to two hours as a passenger before or after eight consecutive hours in a sleeper-berth, as "on-duty time." This provision also applies to passenger-carrying drivers.
- **Penalties –** the current rule states that penalties will be issued for "egregious" hours of service violations, but these are not specifically defined. The new ruling defines driving, or allowing a driver to drive, three or more hours beyond the driving-time limit as an egregious violation subject to maximum civil penalties. This also applies to passenger-carrying drivers.
- **Oilfield exemption –** the current rule requires that drivers waiting at oilfields record "waiting time," off-duty time that does not extend a 14-hour duty period, and make those records available to FMCSA, but there are no standards for recordkeeping. The new ruling requires that drivers record their "waiting time" on a log book or electronic equivalent and indicate this time is "off duty" in annotations in "remarks" or a separate line added to "grid".

Trends in Truck Technology

Communication technology will continue to evolve and be applied to all aspects of truck freight movement, from the cab to the trailer. Technological advances in communication will enable the trucking industry to communicate more effectively. For goods being shipped, point-of-purchase information will have a greater role in driving warehouse orders and just-in-time delivery demands. RFID tagging will increasingly be adopted to track goods movement to improve tracking. Warehouse management systems will allow real-time awareness of inventory location, including items in transit. Electronic Data Interchange (EDI) systems will become more and more sophisticated and integrated across larger supply chains.

Drivers will also witness more technology in their cabs. GPS tracking will be used to monitor speed, service hours, location and anticipated delivery time. Transponders and satellite systems will allow truckers to bypass weigh inspection stations and freight brokers. The remainder of this section outlines technologies affecting the trucking industry.

Freight Broker

Although many shippers have contracts with trucking companies to transport their goods, a significant amount of truck transport in North America is handled by freight brokers. A freight broker is an intermediary between a shipper who has goods to transport and a carrier who has the capacity to move that freight.

Building Efficiencies, Reliability, and Resilience

Effective, coordinated and economical operations are part of an efficient transportation system that helps maximize traffic flow. This can reduce travel delays for freight and people, and improve safety. WisDOT and other transportation providers achieve efficiencies through traditional actions, technologies, and partnerships. Traditional actions such as using larger aircraft or expanding highways can make the system operate more efficiently.

Efficiencies are increasingly gained through the use of technologies like Intelligent Transportation Systems (ITS) or programs like Transportation Systems Management and Operations (TSM&O). ITS makes real-time travel information accessible to all users and can help travelers make decisions before or during their trips if incidents or travel slow-downs occur. Encouraging the use of other transportation modes can help to improve system efficiencies. Driving at lower speeds and reducing vehicle and train idling time can improve fuel efficiency and potentially improve air quality (See Chapter 5, *Wisconsin's Transportation Assets*).

WisDOT also achieves efficiencies by collaborating among business areas, with federal and state agencies, local governments, Native American tribes, regional planning commissions, metropolitan planning organizations, and other stakeholders. These collaborations encourage up-front communication, technical assistance, coordination and planning, and cooperative efforts to reduce administrative barriers.

Achieving efficiencies and ensuring strong collaboration across WisDOT business areas and between WisDOT and other jurisdictions is critical to incident management, emergency response preparedness planning, and traffic management.

Continuing to provide a reliable transportation system enables the department and other transportation providers to meet changing user needs. A reliable transportation system ensures that users can plan their schedules around basic assumptions of travel times. Many Wisconsin businesses require a reliable transportation system. For example, a food processing plant may schedule bulk cheese to be delivered at the time it will be needed for processing and packaging — so the cheese arrives just-in-time. The finished cheese product may then be shipped just-in-time to distribution centers and grocery stores to replenish store shelves. Just-in-time shipping reduces warehousing costs and is especially useful for producing and distributing perishable goods.

Transportation Systems Management & Operations

TSM&O as defined in MAP-21 as integrated strategies to optimize the performance of existing and proposed infrastructure through the implementation of multimodal and intermodal, cross jurisdictional systems, services, and projects designated to preserve capacity and improve security, safety, and reliability of the transportation. TSM&O is expected to enable better evaluation of transportation projects in terms of cost effectiveness, benefit to the public, safety, and ability to integrate into the infrastructure system.

Unexpected delays in delivery of items such as cheese, corn or potatoes can add to production costs and can cause possible spoilage or contamination of the perishable food. Delays can also affect the shelf life of the finished products in grocery stores.

A resilient transportation system is able to quickly respond to unexpected conditions and return to its usual operational state. For example, in the case of a crash or scheduled road construction, alternate route options may be provided.

Providing seamless connections focuses not only on connecting Wisconsin's transportation system to local, regional, national, and international networks, but also in facilitating convenient movement among different transportation modes. This requires investments in a multimodal transportation system that integrates both physical and technological infrastructure.

Specific Technologies Used by WisDOT

In response to increasing demands on Wisconsin's state trunk highway system, WisDOT uses a wide range of technologies to manage the growing volume of traffic, provide real-time traffic information to system users and first responders, and assess existing and future operational and infrastructure needs.

WisDOT's ITS applications consist of numerous tools to help manage highway system traffic flow from detection and response to data collection. Most of the traffic management technologies used by the department to detect and respond to transportation incidents are ITS applications such as variable message signs and portable changeable message signs, ramp meters, closed circuit cameras, and telephone and Internet information systems.

Commercial Vehicle Information Systems and Networks (CVISN, pronounced "see-vision") provide the department with tools to improve motor carrier safety and enforcement, as well as enhance the state's revenue collection. There are numerous CVISN applications designed to improve the efficiency of traffic flow and enforcement of motor carrier regulations. Primary regulatory components addressed using CVISN technology include monitoring truck weight and size, and ensuring that each truck has proper insurance and necessary safety equipment.

The majority of the department's CVISN tools and technologies are housed at the state's thirteen Safety and Weight Enforcement Facilities (SWEF), commonly called weigh stations. WisDOT's Motor Carrier Enforcement unit in the Division of State Patrol uses CVISN technology to monitor and enforce commercial truck operations in Wisconsin. Specifically, they monitor the legal weight, length, and height of loads. They also identify the registration, insurance, authority/permits, and fuel tax collection for the operators. Currently, weigh stations are located along the state's Interstates, United States Highways and at entry points to the state.

Drivewyze allows commercial motor vehicles to bypass SWEFs by using electronic weight detection and Automatic Vehicle Identification technologies. This technology allows safety and enforcement inspections to focus on commercial motor vehicles most likely to be in violation of statutory requirements.

The Wisconsin State Patrol deploys virtual scales that can detect approximate vehicle weights. Commercial motor vehicle images are captured, which can identify overweight commercial motor vehicles attempting to bypass SWEFs or avoid detection by driving in the opposite lane or on the shoulder. This technology is accessible via laptop computers in State Patrol squad cars. In addition, this technology is currently located along two routes bypassing the Kegonsa SWEF and near Lake Butte des Morts in Winnebago County. Another location is proposed near the Beloit SWEF.

Weigh-in-Motion technology is also utilized by the Wisconsin State Patrol. Weigh-in-Motion technology can detect the approximate weight of commercial motor vehicles via inductance loops, axle sensors, and load cell scales beneath the pavement. Information is transmitted to SWEFs and instructs (via changeable message signs) vehicles measured as oversize-overweight to exit the roadway for additional measures. This allows vehicles that are not oversize-overweight to continue without stopping and allows State Patrol staff to focus on vehicles most likely to be in violation of statutory limits.

Autonomous and Connected Vehicles

New developments in autonomous vehicle technology, including driverless trucks, have been in prototype testing since 2014. Recent investment in both commercial and consumer applications suggests these technologies are viewed as emerging by the private sector. Implementation of this technology could take a variety of forms, one of which is "cooperative trucks" that use Dedicated Short Range Communications (DSRC) to communicate vehicle-to-vehicle (V2V) and/or vehicle-to-infrastructure (V2I). Fuel savings, increases in lane capacity and enhanced traffic flow stability are just a few of the benefits that will attract trucking companies, drivers, equipment manufacturers and DOTs to systems that provide V2V and V2I communication and cooperation.

Through WisDOT's Advanced Traffic Management System (ATMS), the department would be able to integrate data from roadside ITS and vehicle communications from V2I and V2V. By integrating this data along with systems already in place, WisDOT will have better information about the real-time conditions experienced on its highways. As next generation systems and communications are proven effective, WisDOT's ATMS would likely need upgrades to be able to use the data produced.

The largest motivating factor for truck operators to adopt cooperative trucks is the drag reduction found when trucks can safely and closely cluster together. Researchers have measured significant fuel savings - as much as 20 percent - which has economic implications for long-haul truck operations.[59,60] Cooperative trucks may help mitigate the truck driver shortage in the longer term, but there are many legal and regulatory issues to resolve.

Another innovation, intelligent cruise control, may greatly reduce congestion and incidents, thereby reducing non-recurring congestion and improving system reliability and safety. This can be effective for trucks since they take longer to accelerate on a highway after slowing down in traffic.

Trends Impacting Fuel Efficiency

Trucking is particularly vulnerable to fuel costs, since it is generally less fuel efficient than rail or water. For many trucking companies, fuel costs are nearly the same as labor costs on a per mile basis.[61] The trucking industry is highly competitive, with companies typically operating on thin margins. For every dollar in revenue, there are 95.2 cents in costs. When fuel costs rise, this has the potential to alter many aspects of freight movement, especially if high costs are sustained over an extended period of time. Even though major carriers can pass along some costs though fuel surcharges to customers, rising fuel costs are very problematic for the trucking industry.

Federal Regulation

Government regulations will also accelerate innovative technologies. In 2014, the President directed the Environmental Protection Agency (EPA) and the United States DOT to produce a rule by March 2015 to tighten fuel

[59] MIT News, "Driverless platoons." (December 20, 2016).
[60] Truckinginfo.com, "Truck Platooning, Past, Present, and Future." (April 2016).
[61] American Transportation Research Institute, "An Analysis of the Operational Costs of Trucking: 2015 Update." (September 2015).

efficiency standards for post-2018 model-year trucks. The rule went into effect in March 2016. To achieve greater fuel efficiency, the White House hoped the plan would "spur manufacturing innovation and lead to the adoption of new fuel-efficient technologies on trucks and semi-trailers." The EPA and United States DOT hope to emphasize improvements in engine and powertrain efficiency, aerodynamics, weight reduction, tire rolling assistance, hybridization, and automatic engine shutdown, among others. The following technologies have been identified as already being under implementation or consideration by the trucking industry.

Conversion to Natural Gas and Hybrid Delivery Trucks

This change would be reinforced by federal fuel efficiency standards for heavy-duty trucks as well as concerns. Other potential changes include redesigned internal combustion engines, with micro turbines and other efficiency-increasing engineering.

Electrification of Truck Stops and Rest Areas

While resting at truck stops, most drivers allow their engines to idle so that they can continue to use their heaters, air conditioners, and other accessories. Idling diesel trucks burn about 1 gallon of fuel an hour, releasing significant amounts of air pollutants.

Equipment Changes

Changes to improve the operational efficiency of trucks include soft-sided trailers to reduce weight, more aerodynamic design to reduce fuel consumption, low-rolling-resistance tires, and computer-controlled automatic transmissions that optimize shift points for fuel efficiency.

Both private fleets owned by shippers and for-hire trucking companies are using the latest technology to deliver goods in a more environmentally sustainable way, and this trend will continue. Freight carriers will adopt more sophisticated routing optimization software to maximize truck capacity, increase efficiency, and minimize the number of trucks on the road.

Increased Weight and Options for Vehicle Configuration

Many shippers and carriers have advocated for higher vehicle weights, and/or longer tandem trailers, which would allow more freight to be shipped per driver/cab unit. While states have authority to make changes in the State Highway System, the Interstate Highways remain under federal authority and weight changes on that system would need to be federally designated.

Issues in Oversize-Overweight Movements

The size and dimensions of oversize-overweight (OSOW) loads, such as wind components or mining/drilling equipment, continue to grow. Not only is it difficult to find efficient routes to accommodate the loads, but these movements also lead to accelerated damage of roadways and bridge structures. Planning for OSOW transportation needs and providing safe and efficient routing is an ever-increasing challenge that requires considerable time and resources. With an increase in permitting to accommodate the movement of oversized loads, many state DOTs are studying the impacts on their highway systems, specifically infrastructure, safety, and operational efficiencies (See Chapter 5, *Wisconsin's Transportation Assets*).

In addition to the challenge of finding efficient routes, drivers of these loads are often challenged by inconsistent rules and regulations across states. Most states have different size and weight restrictions for OSOW loads, making the process of moving through multiple states with an OSOW load very complex.

As lowering transportation costs continue to be a top priority for freight movement, the exploration and testing of different axle and wheel configurations has taken place. The intent is to decrease the number of trips taken by trucks to make transportation more efficient for businesses; this may lead to further increases in the number of OSOW loads in Wisconsin.

Issues in Truck Driver Shortage

Due to worker retirements in an aging workforce, stricter safety regulations, and higher costs, a shortage of experienced drivers has developed into a chronic problem in the trucking industry nationwide. Changes in HOS rules impact delivery schedules and distribution areas for most shippers, and will likely require shippers to hire additional drivers to cover the same geographic area. It is also resulting in more firms shipping cross-country to choose freight rail combined with last-mile urban delivery by truck.

The persistent shortage of qualified long-haul truck drivers will cause more firms shipping cross-country to choose freight rail combined with last-mile urban delivery by truck. Long-haul truck routes are getting shorter; this is partly caused by regionalization of distribution centers, as retailers find it easier to provide the right products at the right time to their stores from regional, not national, warehouses. The exceptions to this rule are shippers sending smaller amounts via Less-than-Truckload (LTL) carriers and high-value goods requiring truck team drivers for security. The shortage of qualified truck drivers in all sectors will likely lead to higher prices for trucking services, which could be passed along as increased prices for consumer goods.

Preservation Challenges

Wisconsin's existing transportation system was developed over many decades using both private and public investment. It includes extensive infrastructure and services ranging from highways, local roads, and airports, to railways, harbors, sidewalks, and transit systems. The existing transportation system is the foundation on which future investments will be made. However, this foundation faces several challenges:

- Aging highway system infrastructure
- Increasing costs
- Increasing user demand
- Maintenance and Technology
- Local road challenges, including heavier loads

Highway System Infrastructure

Much of Wisconsin's Interstate highway system was constructed in the 1950s and 1960s, and bridges on the state trunk highway system (which includes the Interstate highway system) can date back to the 1930s and 1940s. Since then, user demands have increased, and in some cases, designs that were applied to address anticipated travel demands are now outdated. In response, WisDOT's efforts continue to focus on maintaining and preserving the system, along with addressing safety deficiencies, traffic flow concerns, and critical design features. If pavement replacement continues over the typical lifespan of the infrastructure, roads can last up to 60 years (prior to complete reconstruction), and bridges can last up to 75 years. However, keeping pace with both emerging and existing needs remains a challenge.

Funding and Costs

Financing Wisconsin's freight infrastructure utilizes prioritization methodologies to ensure the most cost-effective improvements are implemented. As the system ages, maintenance and preservation activities typically change and costs tend to increase – particularly those related to real estate, energy, and construction materials. Anticipating

these trends and maintaining a fiscally responsible budget will allow WisDOT to address these challenges appropriately.

User Demand

Increased user demand can present challenges. Freight traffic will place increased pressure on the state's transportation system as commercial annual Vehicle Miles Traveled continues to increase. In 2013, truck traffic accounted for 5.7 billion vehicle-miles; by 2040 truck traffic is forecast to account for 6.9 billion vehicle-miles, an increase of 21 percent.[62] In some cases, state and local roadways are not designed to handle the number of trucks, or the heavy loads associated with truck shipping.

Maintenance and Technology

Maintaining and improving the efficiency of Wisconsin's transportation system is crucial to supporting economic growth; however, transportation providers, including WisDOT, are facing several challenges:

- Balancing cost-effective strategies with efficiency and safety
- Increasing costs
- Changing technology
- Balancing highway access needs with economic growth initiatives

Balancing cost-effective strategies with efficiency and safety is a significant challenge. For example, many transit systems are receiving requests for expanded service areas at the same time costs are increasing. As a result, many transit systems have either reduced existing service to keep pace with current costs or increased fares to try to expand service into new areas.

In addition, projected demographic changes suggest transportation demands are likely to go up as Wisconsin continues to experience increases in the overall population and as the aging population stops driving and turns to public transit and other transportation options for their mobility. This will further necessitate the need for cost-effective strategies that maximize efficiency and safety.

Technology presents challenges and opportunities. Keeping pace with ongoing updates and improvements in technology can be expensive. A technological system that may have been state-of-the-art five to ten years ago may no longer be used or supported today. In addition, using technology for data collection to monitor traffic flow, and identify system needs and potential improvements has raised questions about individual privacy concerns and data storage requirements. Ensuring that the technologies are available during an emergency or incident requires system redundancy or backups. For example, many signalized intersections also have stop signs that can be uncovered if the traffic signals malfunction.

Finally, balancing transportation and land use continues to be a challenge. By protecting the safety, capacity and traffic flow on state trunk highways, public investment can also be preserved. Through sound access management techniques, the public and local governments can work with WisDOT to preserve the state's roadway investments and promote investment in the local economy through safe access points. In addition, providing increased access to transit provides more options for individuals, particularly those who do not or cannot drive.

Local Roads

At the local level, governments face challenges related to increasing costs – particularly those related to real estate, energy, and construction materials. As identified in Chapter 6, *Transportation System Condition and Performance*, the road network is typically not designed to adequately serve oversize or overweight trucks

[62] Wisconsin Statewide Travel Demand Model, August 2017.

traveling to and from freight generators like ports. This can result in trucks traveling farther distances to avoid bridges with weight limits, areas with reduced clearances, or roadways with insufficient turning radii.

Highway Freight Forecasts

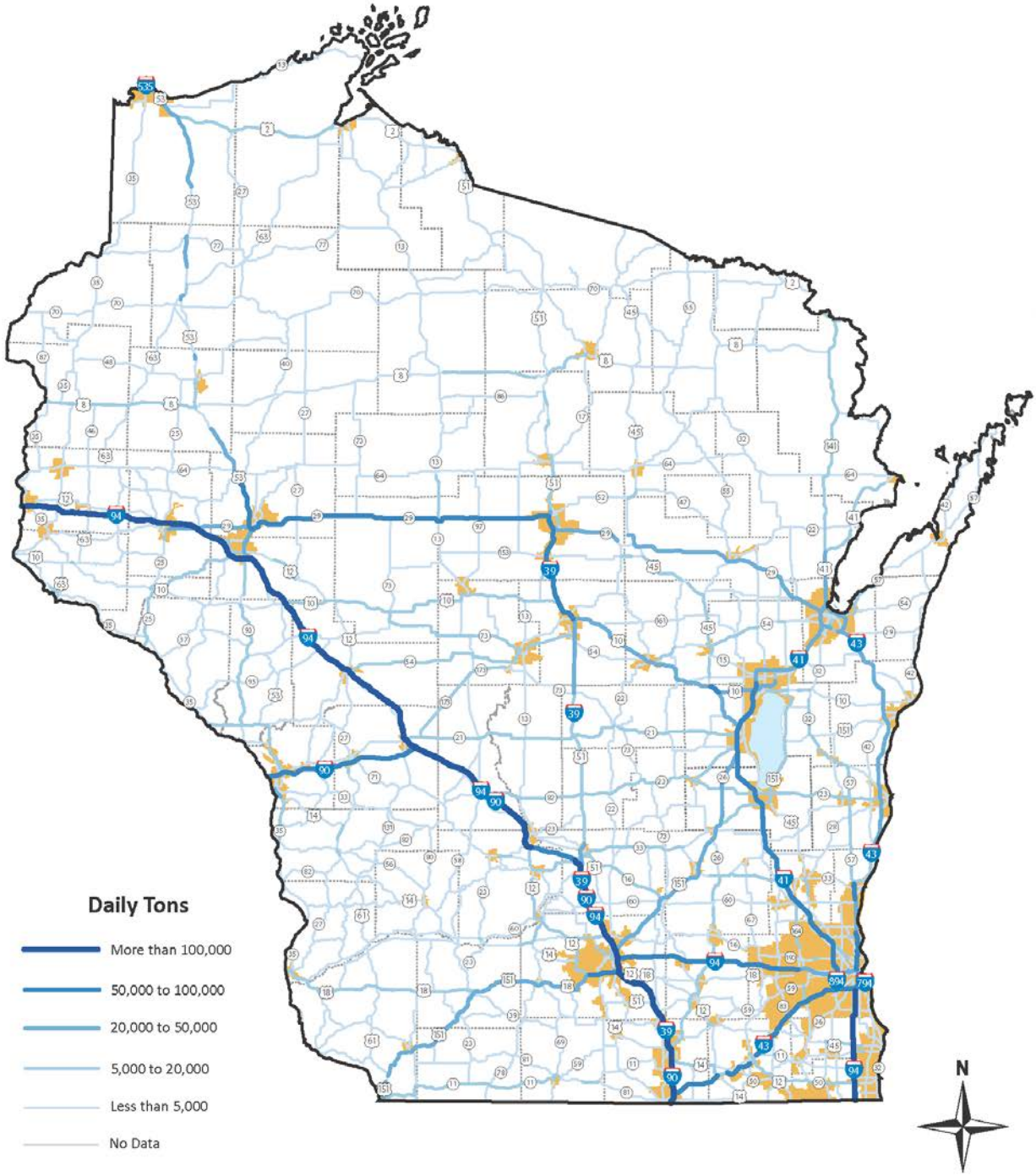
WisDOT prepares roadway traffic forecasts to project what might happen 20 to 30 years in the future. Forecasts identify total traffic volumes for roadways. Different vehicle classifications (such as light vs. heavy vehicles or trucks) are also forecast. The vehicle classifications are further broken down into percentages for different types of trucks, such as single trailer trucks and multi-trailer trucks. Because trucks are the heaviest vehicles on the roadway, roadway engineers use truck traffic information to help determine the design parameters of the pavement to be constructed and the roadway's adequacy over the life of the pavement.

Figure 7-15 displays the highway network based on the anticipated percent change by 2040 in tons, while Figure 7-16 displays the percentage change in value. Figure 7-17 displays the 2040 forecast for daily trucks. Figure 7-18 displays the percentage change in tons or value, and Figure 7-19 shows the percentage change in daily trucks. The highways expected to see the most growth include:

- WIS 15 (East Wisconsin)
- WIS 26 (SW Wisconsin)
- WIS 35 (NW Wisconsin)
- WIS 60 (South Wisconsin)
- WIS 64 (NW Wisconsin)
- US 12 (West Wisconsin)

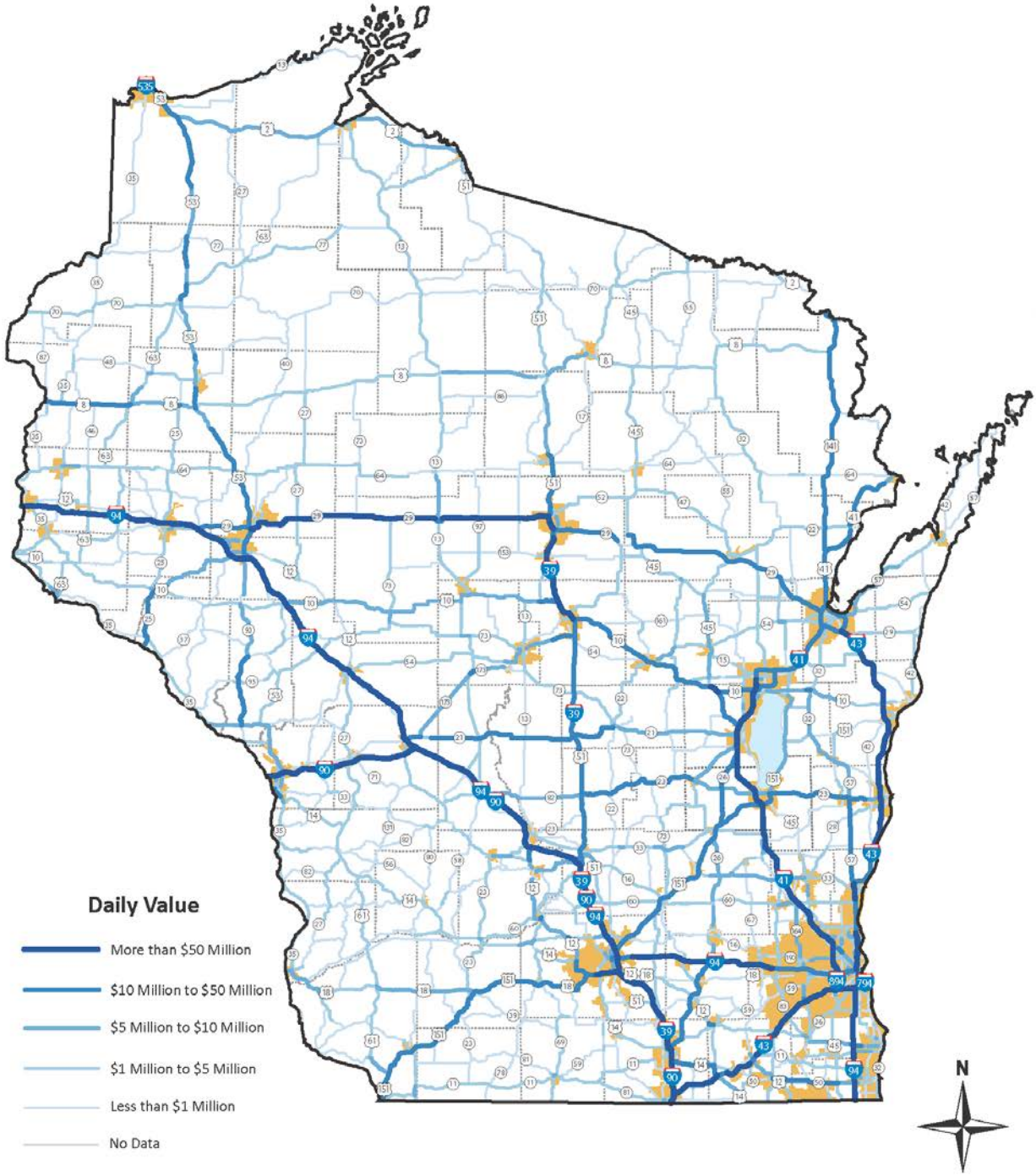
Wisconsin highways that carry bulk commodities are the facilities expected to see the increase in tonnage. With overhead (pass-through) traffic expected to increase, the trucks that carry valuable shipments to/from distribution centers will increase traffic on our Interstate system.

Figure 7-15: Highway Forecasted 2040 Commodity Tonnage



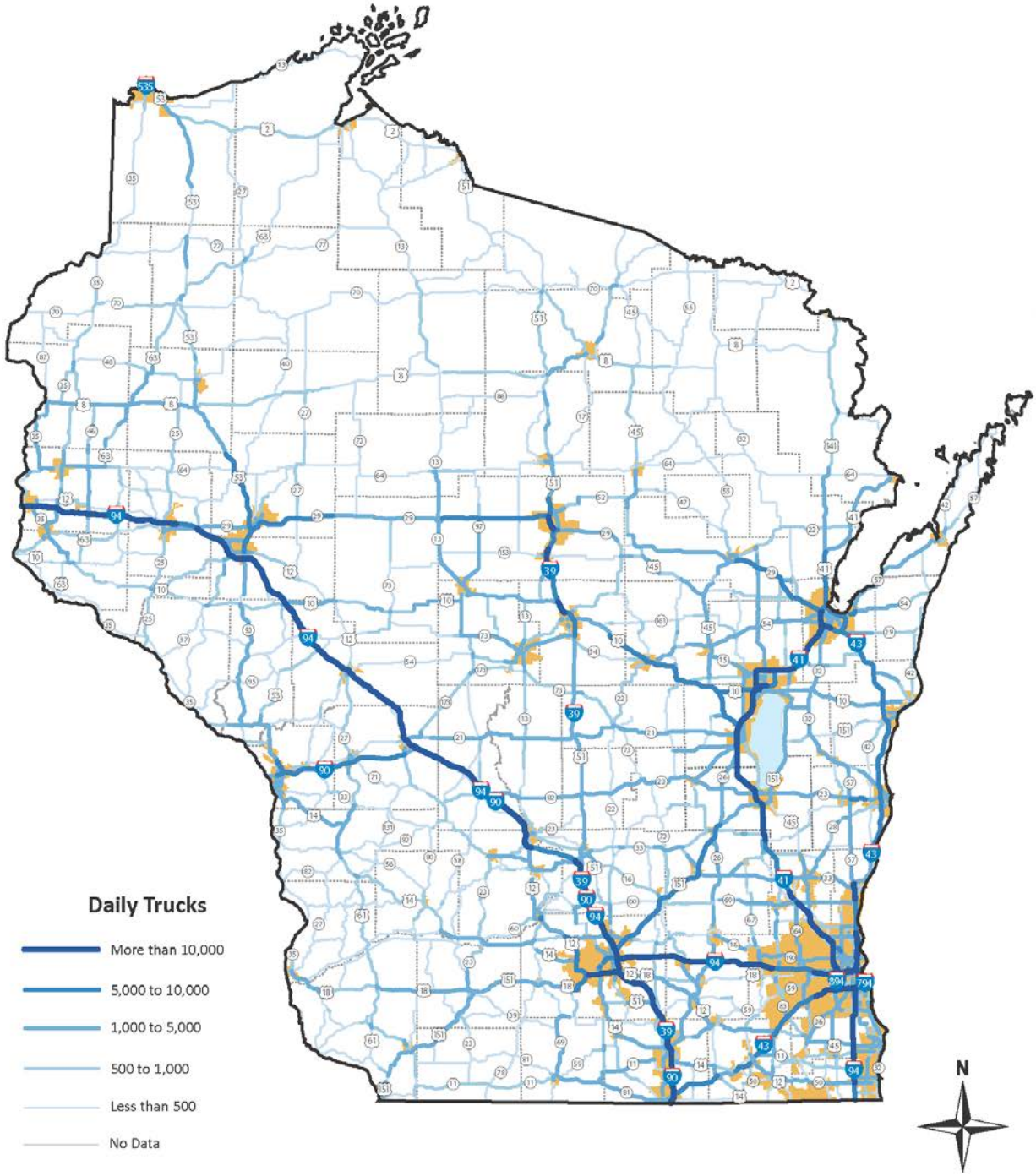
Source: Wisconsin Department of Transportation, Statewide Travel Demand Model

Figure 7-16: Highway Forecasted 2040 Commodity Value



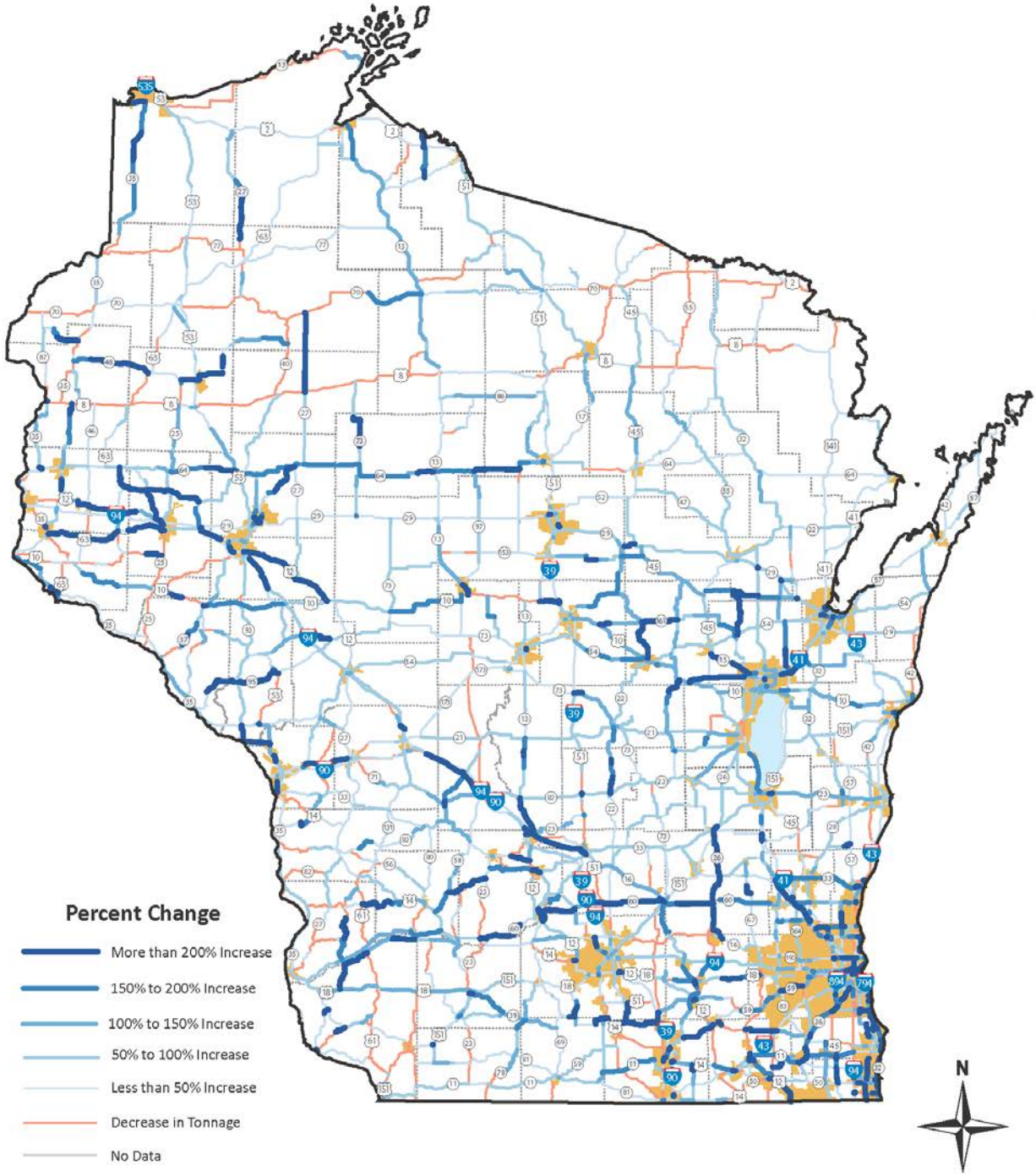
Source: Wisconsin Department of Transportation, Statewide Travel Demand Model

Figure 7-17: Highway Forecasted 2040 Daily Trucks



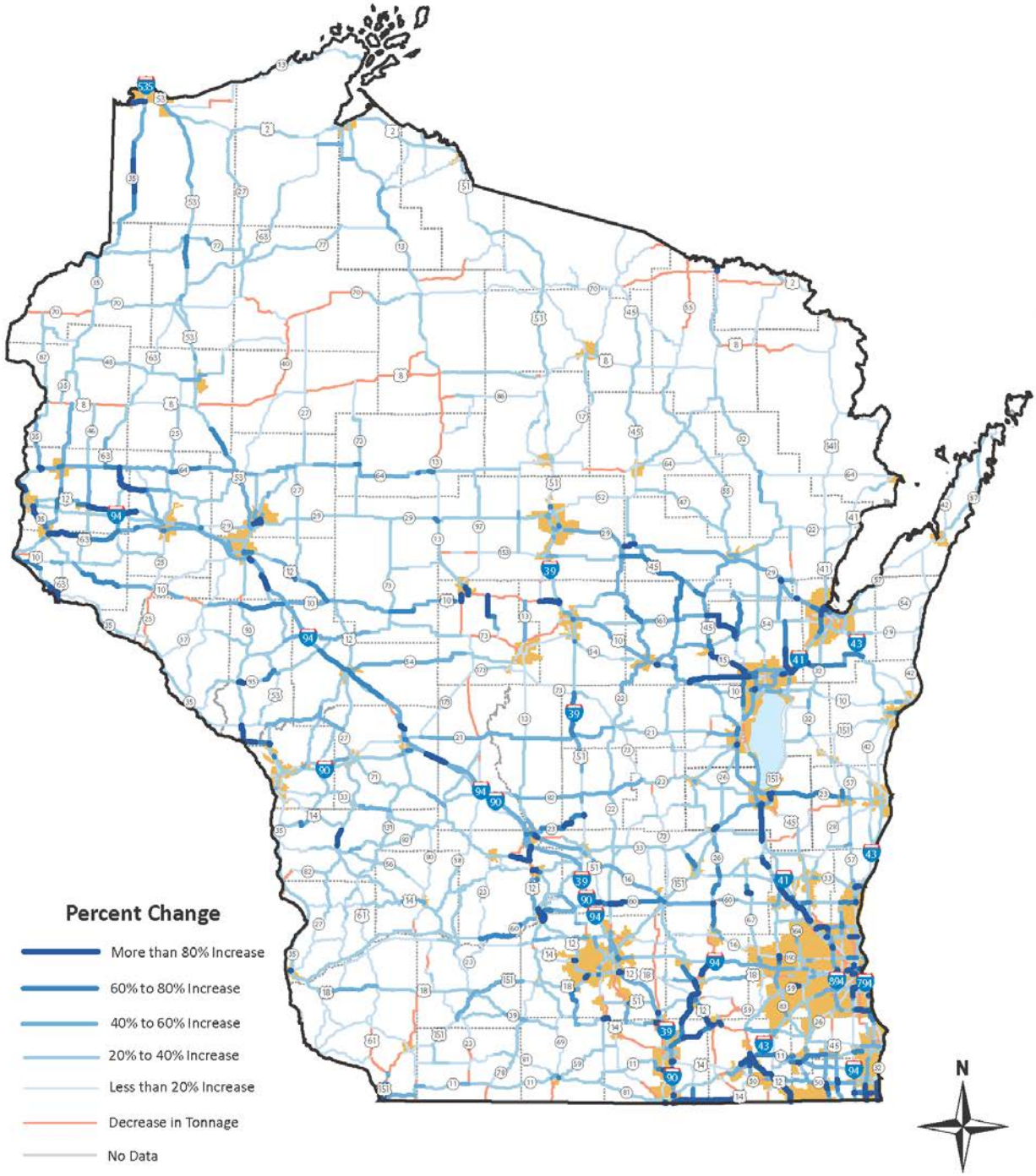
Source: Wisconsin Department of Transportation, Statewide Travel Demand Model

Figure 7-18: 2013-2040 Highway Forecast Percent Change in Tons/Value



Source: Wisconsin Department of Transportation, Statewide Travel Demand Model

Figure 7-19: 2013-2040 Highway Forecast Percent Change in Trucks



Source: Wisconsin Department of Transportation, Statewide Travel Demand Model

Highway - Origins/Destinations[63]

Commodities that travel by truck may have localized economic benefits for communities or counties (at a larger economic scale). Economic forecasts are the basis for growth or decline in originating or terminating tonnage amounts over time. Increases and decreases are most likely due to projected changes in employment by industry sector. The counties expected to see the largest growth in originating tonnage (more than 100 percent) in 2040 are:

- Calumet
- Douglas
- Eau Claire
- Waupaca

The counties expecting to see the largest growth in terminating tonnage are:

- Richland
- Rock
- Sawyer
- Washington

Highway - Commodities[64]

Over time, commodities change relative to the economy. In Wisconsin, many of the top commodities today are anticipated to remain the top commodities for highway transport in the future. The five commodity groups forecasted to have the greatest quantity of tonnage transported via truck in 2040 are:

- Nonmetallic Minerals (125,445,249 tons, 72.8 percent growth)
- Farm Products (118,571,860 tons, 52.7 percent growth)
- Secondary Traffic (66,235,217 tons, 192.7 percent growth)
- Food or Kindred Products (58,113,096 tons, 74.7 percent growth)
- Clay, Concrete, Glass, or Stone (43,337,557 tons, 138.7 percent growth)

Two of the top five commodities, secondary traffic and clay, concrete, glass, or stone, are growing substantially faster than the average growth rate of the top 50 Wisconsin commodities. Farm products are growing substantially slower than the average growth rate of the top 50 commodities.

Nonmetallic minerals are forecasted to see the most truck tons in 2040 (125,445,249), representing a change of 72.8 percent over the forecast period of 2013-2040. Issues that could affect the forecasts developed for Wisconsin's highway mode include the fluctuation of fuel prices and increases in national truck size and weight limits.

7.7 Wisconsin Waterway (Port/Harbor) Trends, Issues, and Forecasts

Wisconsin relies on access to the Great Lakes and Mississippi River system for shipping transportation, drinking water, recreation, and fishing. Key state industries such as agriculture, forestry, and mining rely on the efficient movement of freight via the waterway to drive competitiveness. Freight shipments by water face several

[63] 2013 IHS Transearch Database.
[64] Ibid.

challenges including seasonal water limitations, winter lock closures, aging lock systems, lack of dredging, and fluctuating water levels.[65]

Any increases of freight activity at Wisconsin ports is expected to provide economic benefits in the forms of jobs and business development, while also helping to mitigate the burgeoning demand on the region's highways and rail systems. In conjunction with the results of the Wisconsin Commercial Ports Development Initiative (WCPDI), a number of current trends and issues present opportunities or challenges to increasing the amount of freight shipped through Wisconsin ports.

Jones Act

Coastwise Shipments
Coastwise is the term used to describe a voyage that begins and ends within the United States and delivers a type of commercial cargo

The Jones Act refers to federal statute 46 USC section 883, which regulates maritime commerce between "points in the United States to which the coastwise laws apply."[66] Points may include docks, vessels, drilling rigs, windmills, or other facilities. The Act requires that goods and passengers transported by water between United States ports be done in ships made in the United States, owned by United States citizens, and crewed by United States citizens. The Jones Act also provides sailors with additional rights, including the ability to seek damages from the crew, captain, or ship owner in the case of injury. This is also the act that controls coastwise trade within the United States and determines which ships may lawfully engage in that trade and the rules under which they must operate.[67]

Generally, the Jones Act prohibits any foreign-built or foreign-flagged vessel from engaging in coastwise trade within the United States. A number of other statutes affect coastwise trade, including the Passenger Services Act, 46 USC section 289, which restricts coastwise transportation of passengers, and 46 USC section 12108 restricts the use of foreign vessels to commercially catch or transport fish in United States waters.

Various cases have extended the definition of merchandise to include anything of a commercial value, including dredged materials used for landfill. The federal district courts have ruled that the transportation of sewage sludge is not "merchandise" because it is a valueless commodity.

Trends Changing Energy Transport via Waterway

The following section outlines the trends in the movement of energy products via the waterway, organized by product.

Petroleum Products

About 3.2 million tons of petroleum products were carried on the Great Lakes to/from United States destinations/origins in 2013.[68] Nearly two-thirds of these flows were composed of asphalt, tar, and pitch, as well as petroleum coke. As such, these products are not ideal candidates for pipeline transportation.

Petroleum product flows are composed of distillate fuel oil, gasoline, and residual fuel oil. The ports of Chicago, Indiana Harbour, Toledo, and Detroit are major shipping and receiving facilities for these products, which are

[65] National Center For Freight & Infrastructure Research & Education, "Wisconsin Commercial Ports Development Initiative - Final Project Report." (December 2014).
[66] 46 USC 883.
[67] Maritime Law Center, "The Jones Act."
[68] U.S. Army Corps of Engineers, Waterborne Commerce Statistics Center.

shipped to/from other Great Lake ports and into the United States river system. In Wisconsin, petroleum products were shipped from Green Bay prior to the 2016 closure of the West Shore Pipeline, although in limited amounts (25,000 tons in 2013). Now, the Port of Green Bay receives petroleum products (see below).

As recently as 2015, the department provided Harbor Assistance Program (HAP) funding for projects that enable liquid bulk loading at ports in Green Bay, Milwaukee, and Marinette. These locations add redundancy to the petroleum products supply chain should an incident such as the West Shore Pipeline closure occur (see Chapter 6, *Transportation System Condition and Performance*).[69]

Consultations with industry suggest that the frequency of shutdowns on some of the state's petroleum product pipelines are increasing. The West Shore Pipeline was specifically mentioned as experiencing recurring issues, with the most recent incident occurring in March 2016. The incident removed the pipeline from service north of Milwaukee; in April 2017 the owners decided to permanently close the pipeline.[70] The closure has resulted in both truck and waterway transportation of petroleum products to Green Bay, with the Port of Green Bay importing up to two barges per week of gasoline and diesel through the Great Lakes in summer 2016.[71]

Liquid Bulk Vessels
Supplying Wisconsin petroleum products from United States ports would require United States-flagged vessels. Currently, U.S. Oil operates a 70,000-barrel barge and U.S. Shipping operates another products barge. U.S. Shipping also operates a fleet of United States-flagged products ships which deliver products to the east, west and Gulf coast states, and could potentially redeploy some capacity into the Great Lakes. Also, Interlake Steamship, a major ore carrier, has a subsidiary, Moran Towing, which operates several integrated tug-barge units on the east coast, some of which could possibly be redeployed to the Great Lakes. Supplying Wisconsin from Canadian ports would be most cost effective – this would not require United States-flagged vessels. Currently Algoma Central operates seven refined products tankers on the Great Lakes to deliver from Sarnia and Nanticoke refineries to the geographically dispersed Canadian markets. Currently operating on the Great Lakes, these ships could make deliveries to Wisconsin on relatively short notice. Also, McKeil Marine is a Canadian barge operator which has looked at such projects in the past.

Crude Oil

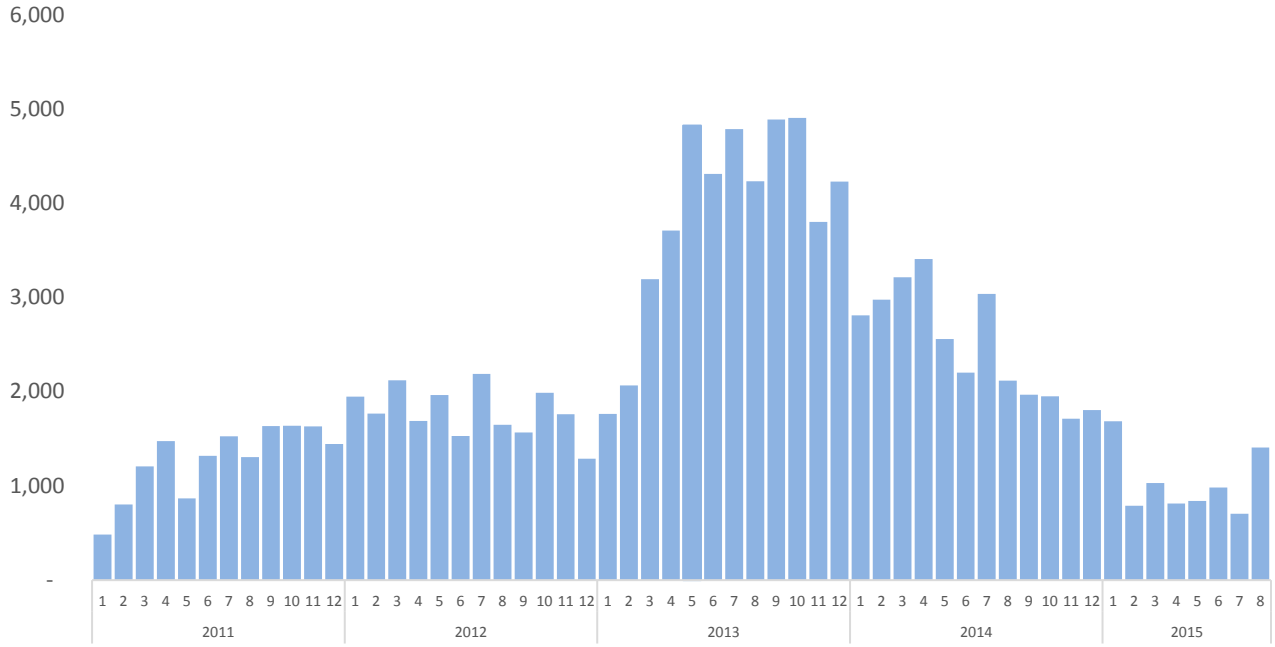
In the case of crude oil, United States Army Corps of Engineers (USACE) data indicates that tonnages carried on the Great Lakes in 2013 reached 14,000 tons.[72] These volumes consisted of intraport traffic that occurred in the port of Chicago. However, up to 220,000 tons of crude oil were loaded in Chicago and shipped on the Illinois River to the south. The total amount of crude carried on the Illinois Waterway in 2013 reached nearly 400,000 tons, of which over 90 percent was heading south. Such flows are relatively recent and were limited to 10,000-20,000 tons before 2012. According to Platts, the recent surge in crude-by-barge carriage on United States inland water systems mirrors crude-by-rail trends. [73]

However, recent improvements in pipeline capacity towards the south and the decreasing price spread between Western Crude Select (WCS) and West Texas Intermediate (WTI) in recent months clearly impacted Gulf Coast

[69] The West Shore Pipeline still serves a major distribution terminal in Milwaukee.
[70] Milwaukee Journal Sentinel, "Company won't replace only fuel pipeline to Green Bay." (April 21, 2017).
[71] S&P Global, Platts, "Port of Green Bay becomes importer of refined products as pipeline shuts." (July 8, 2016).
[72] U.S. Army Corps of Engineers, Waterborne Commerce Statistics Center.
[73] S&P Global, Platts, "US crude-by-barge industry faces rough waters in oil markets: Petrodollars." (August 24, 2015).

(PADD 3) refinery interest in North Dakota and Canadian crude deliveries by barge. Figure 7-20 illustrates this situation by presenting deliveries of crude by barge from PADD 2 to PADD 3.

Figure 7-20: Gulf Coast (PADD 3) Receipts by Tanker and Barge from Midwest (PADD 2) of Crude Oil (Thousand Barrels)



Source: CPCS summary of U.S. Energy Information Administration data

Figure 7-20, however, underestimates total volumes transiting between PADD 2 and PADD 3 because it does not include all Utica condensate volumes that flow down the Ohio River to Gulf Coast refineries.[74]

For Wisconsin, this situation tends to confirm that the extreme volatility in North American crude markets makes it difficult for any port in the state, notably Superior, which is the only one in proximity to a crude pipeline, to position itself as a crude by barge hub. Refiners will continue to prioritize pipeline deliveries when possible and existing barge shipping capacity from the Illinois Waterway appears to be meeting demand, although supply was considered tight in the summer of 2015.[75] Data for 2013 from the USACE also indicates that some petroleum products are shipped from the Upper Mississippi River in the Minneapolis area. These flows essentially consisted of petroleum coke.

In Canada, there have been initial discussions of the possibility to ship crude from a Great Lake port to a port on the St. Lawrence for eventual export to offshore markets. This would mirror some grain export logistics. The economics of such logistical solutions are however different for crude because freight rates for the carriage of grains from the Great Lakes to the St. Lawrence reflect the possibility for lakers to carry iron ore as back-haul. There are no known back-haul cargoes for tankers which would sail down the Great Lakes St. Lawrence Seaway System with crude and this would certainly translate into higher freight rates. With the reversal of Enbridge's Line 9B to Montreal, there is also possibility to ship crude directly to the St. Lawrence by pipeline for export to offshore. There have notably been such exports from Montreal to Italy in 2014, even before the reversal of Enbridge's Line 9B.

[74] RBN Energy, LLC, "Down To The River - Growing Crude-By-Barge Traffic On The Ohio River." (July 14, 2015).
[75] Ibid.

Port Movement of Oversize-Overweight Freight

OSOW loads, such as wind turbine towers and blades, are big business opportunities for Wisconsin's commercial freight ports. The integration of the marine transportation system with the road transportation system when moving OSOW shipments can provide many benefits, including improved safety and fuel efficiency and decreased congestion and pollution. This requires close coordination among shippers, carriers, port authorities, terminal operators, and transportation agencies at the local and state levels, as well as a streamlined permitting process and a properly connected and designed OSOW route to move the load from the port to the ultimate inland destination. Although WisDOT issues permits for OSOW loads, impediments such as low-clearance bridges and tight turning radiuses on the transportation system can hinder OSOW movements from the port inland. Thus, many port authorities encourage OSOW loads to follow the path of least resistance through Wisconsin. As OSOW loads get larger, it is important to ensure that intermodal connections and the state's "last mile, first mile" connections can accommodate these OSOW loads.

In 2016, Broadwind Towers began moving wind tower segments by lake barges from Manitowoc, Wisconsin to Ohio. Approximately six barges were used, each holding over a million pounds of freight on a barge almost as long as a football field. Shipping by water from the deep-water port was lower in cost compared to a truck haul.[76]

Milwaukee to Muskegon Ferry
A new year-round, daily freight ferry service between Milwaukee, WI and Muskegon, MI is in the planning stages and is anticipated starting operations in the near term. The Port of Milwaukee is partnering with ECO ships, Supply Chain Solutions and the Port of Muskegon to establish and improve short sea shipping, trailer, container, and intermodal services for shippers in the Upper Midwest. The initial focus is on loaded containers and trucks with a goal of adding oversize freight, bulk freight and rail intermodal. Backup trucking service may be provided in the event that the ferry can't operate. Initial cross-lake service could expand to inter-lake and international service. The planners are assessing various types of vessels for lease and purchase, establishing market demand and determining infrastructure needs.

Issues with Safe Harbor Distance

Barges are currently being used to ship grain and Wisconsin-manufactured flexible oil pipeline, which is used in deep sea oil drilling, from Milwaukee to the Illinois River. However, the use of river barges on the Great Lakes is restricted by the United States Coast Guard to ensure safe harbor access. Shippers may apply to the United States Coast Guard for a load-line exemption to use river barges on the Great Lakes. There are three current load-line exemptions: 1) Burns Harbor route between Burns Harbor, IN and Calumet, IL; 2) Milwaukee, WI to Calumet, IL; and 3) Muskegon route up to 119 miles past Burns Harbor, IN. If operating past Burns Harbor, river barges must obtain a special load-limit for the route, issued by the American Bureau of Shipping (ABS). In 2015, the United States Coast Guard denied a request from the Michigan Agri-Business Association for a load-line exemption to allow river barges along eastern Lake Michigan as far north as Muskegon to move products on river barges to and from the Mississippi-Illinois River system. The shippers had sought a complete exemption from ABS load-level certification.[77] This exemption would allow the carrier to use river barges without needing to first apply for a load-limit from ABS. Without a load-line exemption, the carrier would need to apply and receive permission from ABS or use a different vessel type.

[76] Manitowoc Herald Times Reporter, "Wind Towers Setting Sail in Manitowoc." (June 18, 2016).
[77] Great Lakes/Seaway Review, "Load-line exemption denied." (April-June, 2015).

Soo Lock System

Located along the St. Mary's River in Sault Ste. Marie, Michigan, the Soo Lock System provides the only water connection between Lake Superior and the rest of the Great Lakes system. About 86 million tons of freight pass through the lock system each year, of which iron ore, coal, and grain are the primary commodities. These commodities account for approximately 90 percent of the total freight transported into and out of the Port of Duluth-Superior.

The Soo Lock system is operated by USACE and consists of two functioning locks. Currently, the Poe lock is the only Soo lock capable of handling the largest vessels in the Great Lakes fleet. Failure of this lock would prevent these large vessels from traveling between Lake Superior's ports and other Great Lakes ports. For this reason, USACE recommends constructing a new Poe-sized lock. The new lock would provide needed capacity and redundancy to ensure reliable service to Lake Superior's ports in the future. However, full funding for the construction of this lock has not been included in any recent USACE budgets.

A 2015 study by the United States Department of Homeland Security found that should the Poe lock unexpectedly cease operations for an extended period of time due to maintenance or terrorism, unemployment would spike to numbers far worse than during the Great Recession of 2008-2009.[78] The closure of the MacArthur lock in 2015 for three weeks to undergo emergency maintenance forced ships to be rerouted through the larger-sized Poe lock. During this emergency maintenance, 103 ships were delayed a combined 166 hours while repairs were underway by USACE. Nearly 1.9 million tons of cargo was overdue, causing untold losses in economic activity throughout the Midwestern United States.[79] The closure of the MacArthur lock for just three weeks underscores the importance of the Poe lock. The Poe lock is a potential single point of failure in this supply chain. An unexpected six-month closure of the Poe lock would have consequences for the national economy. Specifically, a Poe lock closure is estimated to result in a nearly 100 percent closure of North American appliance, automobile, construction equipment, farm equipment, mining equipment, and railcar production industries. Wisconsin could see a nine percent drop in economic activity and a loss of 301,000 jobs due to prolonged closure, as well as an increase in freight traffic through its ports and on its rail lines.[80]

Port and Harbor Preservation

Wisconsin is surrounded on three sides by commercially navigable waterways. The commercial ports and harbors that line its shores are the state's most direct link to world markets. Cargo that funnels through Wisconsin's ports includes high value metallic ores bound for the steel industry, coal for power plants, heavy machinery, salt and asphalt for roads, concrete for the construction industry, and agricultural products for the world.

Historically, Wisconsin projects have not competed well for federal funding, which tends to go to high-volume harbors in other regions of the United States. From 2012 through 2016, for example, Great Lakes harbors reported only one percent of port and private capital expenditures compared with high-volume harbors. While the state does not own any harbors, the department administers the Harbor Assistance Program (HAP) for commercial ports (see below for more information on HAP). Maintenance and rehabilitation projects such as repairing a dock wall collapse are generally prioritized.

[78] U.S. Department of Homeland Security, "The Perils of Efficiency: An Analysis of an Unexpected Closure of the Poe Lock and Its Impact." (October 2015).
[79] Cleveland.com, "New Great Lakes lock must be built to keeping manufacturing humming in Cleveland." (March 7, 2016).
[80] U.S. Department of Homeland Security, "The Perils of Efficiency: An Analysis of an Unexpected Closure of the Poe Lock and Its Impact." (October 2015).

Harbor investments support Wisconsin's commercial ports and maintains the state's ability to attract and retain industries that rely on efficient bulk freight movement. Continued and coordinated investment strategies will identify commercial ports serving as sources of economic development and evaluate financing capabilities that ensure infrastructure conditions remain acceptable.

Harbor Assistance Program (HAP)

Created in 1979, the HAP assists port communities along the Great Lakes and Mississippi River in maintaining and improving waterborne commerce. Port projects typically include dock reconstruction, mooring structure replacement, dredging, and the construction of facilities to hold dredged material.

From 1980 to 2015, WisDOT has contributed over $121.6 million in matching funds for 99 port projects. Since 2014, WisDOT has invested $39.77 million in HAP funds into the state's waterways and ports.[81]

While the HAP recognizes and serves economic diversity at Wisconsin ports, the focus of the program has been on projects that support freight at larger commercial ports that predominantly move freight. In looking at the entire program life, 67 percent of projects have supported freight at these ports. Projects supporting shipbuilding (12 percent of all projects), ferries (13 percent of all projects), and projects supporting commercial fishing (8 percent) round out the program. Further, 73.2 percent of the funds associated with these projects were invested in freight-supporting projects.[82]

Based on the 2013 corrected dollars of $140 million, approximately 60 percent of the HAP funding has been directed to gateway ports, 18 percent has been invested in diversified cargo ports, 15 percent to limited cargo ports, and approximately 6 percent of the funding has gone to other ports in Wisconsin. The HAP supports and enables their port as an economic development resource, as well as a local and state transportation resource.[83]

Port and Harbor Freight Forecasts

Water Origins and Destinations[84]

Total water tonnage is predicted to increase by 21 percent statewide between 2013 and 2040. The value of this tonnage is expected to increase by 55 percent. Ports are expected to ship or receive 34 million tons of water freight, valued at more than $3.4 billion, in 2040.

The counties expected to see the most growth in originating water freight by 2040 are Crawford, Door and Milwaukee. La Crosse County is predicted to ship less freight than it does now. This is because gravel and sand currently shipped from the port is instead forecasted to move by rail in 2040.

The counties forecasted to see the most growth in terminating water tonnage are Ashland, Bayfield, Manitowoc, and Marinette. This is mostly due to more salt and fertilizer being shipped to these locations. Brown, Grant, and Vernon counties are predicted to receive less freight by water in 2040 than they do now because of the forecasted lower demand for coal. Some ports in Wisconsin are eligible for the HAP and some are not. HAP eligible activities include waterborne freight movement of at least 1,000 tons, commercial fishing, shipbuilding, cruise vessel, and

[81] Wisconsin Department of Transportation, Bureau of Transit, Local Roads, Railroads and Harbors.
[82] Ibid.
[83] Ibid.
[84] 2013 IHS Transearch Database.

ferry operations. Some counties, like Vernon County, do not have a municipal harbor, but may have more or less tonnage or value because they have other types of private waterborne freight facilities, like coal docks.

Water Commodities[85]

Several commodity types move by water and will see growth in the future. The five commodity groups forecast to see the greatest water tonnage in 2040, are:

- Metallic Ores (15,274,564 tons, 161.6 percent growth)
- Coal (8,624,454 tons, -40.7 percent growth)
- Nonmetallic Minerals (5,767,407 tons, 17.5 percent growth)
- Clay, Concrete, Glass or Stone (2,180,374 tons, 49.2 percent growth)
- Farm Products (1,212,585 tons, 86 percent growth)

Metallic ores are forecast to see the most water tons in 2040 (15,274,564), representing a change of 161.6 percent over the forecast period of 2013-2040. Issues that could affect the forecasts developed for Wisconsin's waterborne mode include the continued decline of coal as an energy resource, increased truck size and weight limits, and the status of subsidies for wind turbines.

7.8 Wisconsin Pipelines Trends, Issues, and Forecasts

Wisconsin is not a producer of crude or natural gas and contains very little refining capacity to produce petroleum products, but Wisconsin relies on pipeline commodities as a key economic input to the economy. Commodities such as natural gas, propane, gasoline, diesel, fuel oil, and other petroleum products support transportation, commercial and residential heating, energy production, manufacturing, and agricultural sectors. Therefore, WisDOT should consider the trends and issues impacting pipelines.

WisDOT should focus on trends and issues based on the state's consumption of the commodity transported and the impact pipeline transportation has on other modes. The critical variables that influence the relevance of pipeline trends and issues for WisDOT are as follows:

- **In-State Consumption** – the commodity is used by individuals and businesses in Wisconsin. The importance of a commodity increases as state consumption increases.
- **Impact on Other Modes of Transportation** – crude oil, natural gas, and petroleum products may travel via non-pipeline modes, which has the potential to increase congestion. The greater the congestion imposed on another mode, the greater the importance of efficient pipeline transportation.

The remainder of this section provides an overview of the trends and issues impacting Wisconsin, organized by pipeline type.

Trends in Crude Oil Pipeline Capacity

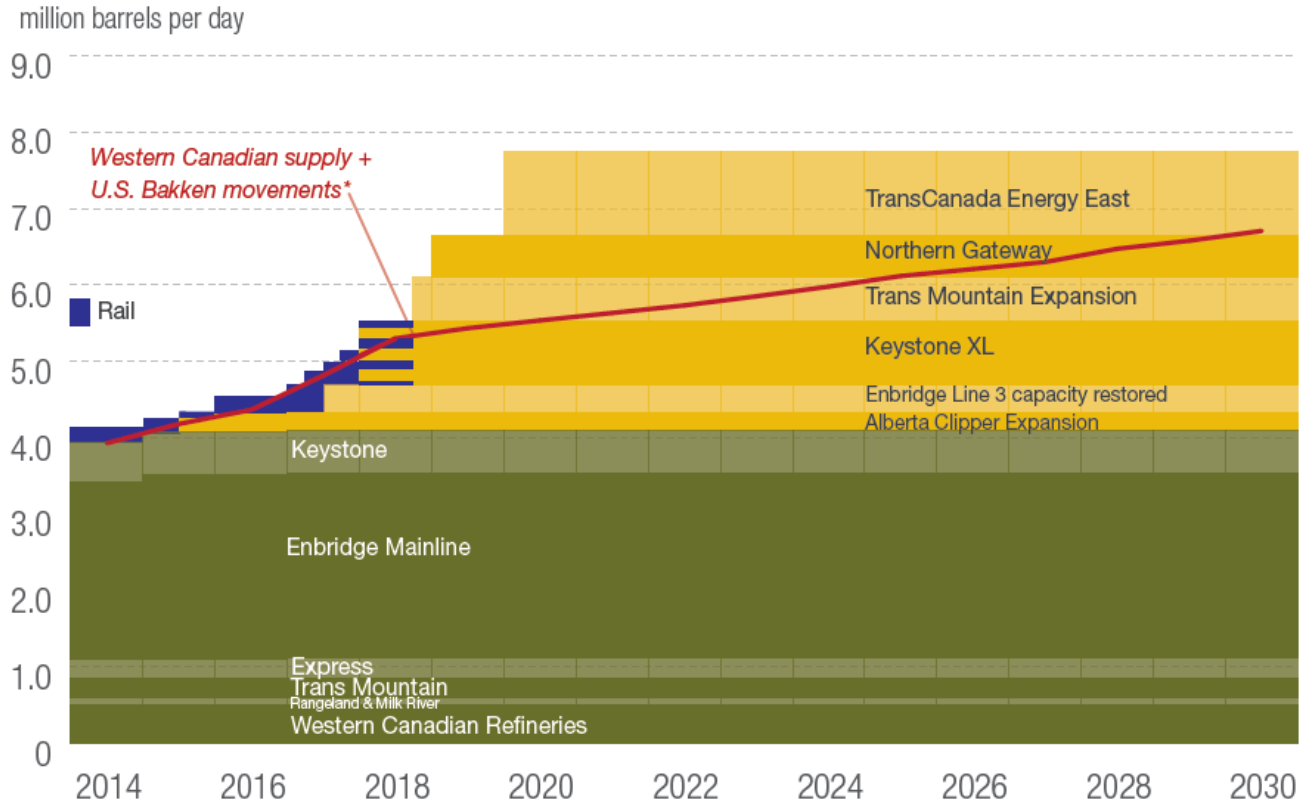
Pipelines are the preferred method to transport large volumes of liquids and gasses because they are less costly and more efficient relative to rail or truck for large volumes. Where volumes do not justify a pipeline, when a pipeline is not economically feasible, or when, "surge capacity" is needed to accommodate additional volumes, other modes of transport such as barge, rail, and truck may be used. In addition to increased domestic and Canadian production, a number of trends are impacting the capacity of crude oil pipelines in the United States.

[85] 2013 IHS Transearch Database.

Crude Oil Production and Pipeline Development

The development of crude oil pipelines within and outside of Wisconsin is critical to the understanding of future implications of growing domestic crude oil production on Wisconsin's transportation system. The amount of crude oil shipped via rail is a function of the availability and capacity of pipelines to serve these flows. Figure 7-21 displays estimates from the Canadian Association of Petroleum Producers (CAPP) for the capacity of crude oil pipeline projects, Canadian and United States Bakken production projections, and the likely timing for completing announced crude oil pipeline projects. A key takeaway for WisDOT from Figure 7-21 is the role of rail in making up the difference between pipeline capacity and crude oil production. The recent decline in crude oil prices calls into question the rate at which oil will be extracted from the more expensive shale and oil sands, which affects the near-term viability of proposed of crude oil pipelines. That said, complex market factors and operational differences in extraction methods may cause oil sands producers to continue production and development due to the sunk cost and a long-term view of rebounding prices.[86,87]

Figure 7-21: Projected Western Canadian and United States Bakken Oil Production and Transportation Capacity



**Refers to the portion of U.S. Bakken production that is also transported on the Canadian pipeline network. Capacity shown can be reduced by temporary operating and physical constraints.*

Source: Canadian Association of Petroleum Producers

Similarly, Figure 7-22 displays the pipelines that deliver crude oil from Western Canada to markets throughout North America as well as recently completed, underway and proposed pipeline projects. Taken together, Figure 7-21 and Figure 7-22 display how the timing and capacity of United States and Canadian crude oil pipeline projects

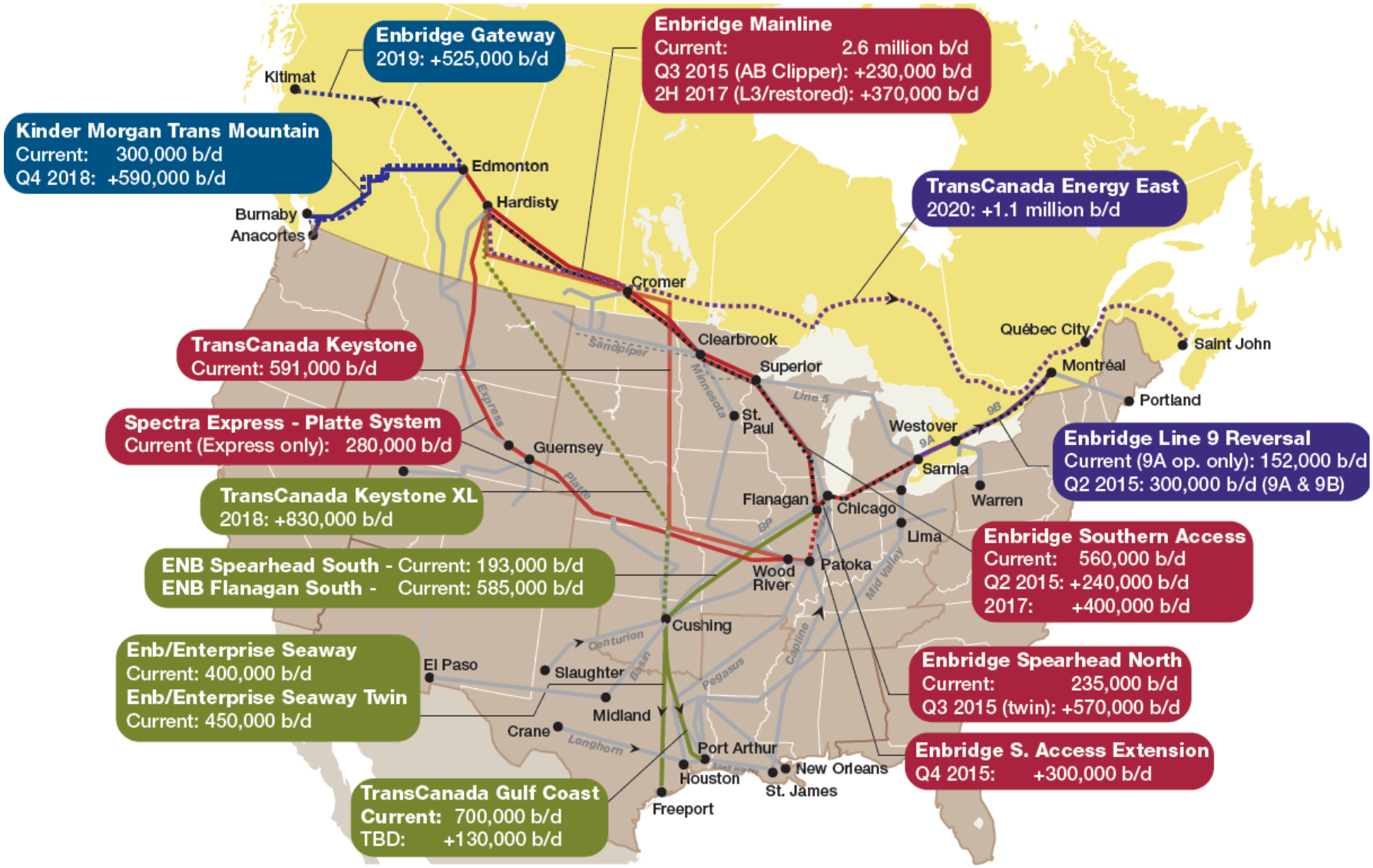
[86] Reuters, "Canadian energy companies sell 'jewels' to keep oil sands afloat." (February 9, 2016).
[87] Bloomberg, "Crude at $10 Already a Reality for Canadian Oil-Sands Miners." (January 13, 2016).

and production affects crude by rail flows in terms of quantity and destination. Additionally, some producers have found themselves bound by take-or-pay contracts or with significant capital costs in rail terminals and tank cars, resulting in a slower reduction in crude by rail than might otherwise be expected.[88]

Many variables will impact the flow and quantity of crude oil traveling through Wisconsin, including the final form of the projects shown in Table 7-11. As such, Table 7-11 focuses on projects likely to have a direct impact on Wisconsin. The impacts listed suggest increased pipeline throughput leading to a decrease in crude traveling through Wisconsin via rail.

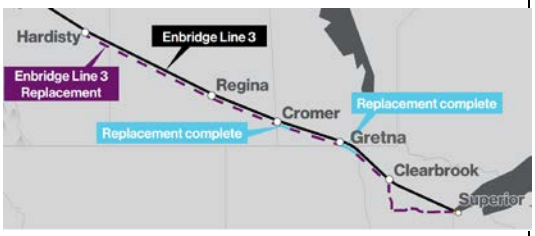
[88] RBN Energy, LLC, "Slow Train Coming - Crude By Rail Decline Picks Up Pace." (February 2, 2016).

Figure 7-22: Canadian and United States Crude Oil Pipelines under Construction and Proposed



Source: Canadian Association of Petroleum Producers

Table 7-11: Crude Oil Projects Impacting Wisconsin

Project	Origin / Destination	Capacity and (Estimated Completion)	Wisconsin's Interest
Enbridge Sandpiper (Yellow Line) 	Tioga, ND to Superior, WI	New: 375,000 barrels per day (2017) Awaiting Wisconsin and Minnesota Permit Decision	Delivers Bakken crude to Superior, WI, replacing rail shipments in the region.
Enbridge Line 3 (Purple Dotted Line) 	Hardisty, AB to Superior, WI	Total: 760,000 barrels per day New: 370,000 barrels per day (2017) Awaiting Wisconsin and Minnesota Permit Decision	Additional capacity to move crude via pipeline to Superior, WI.
Enbridge Line 61: Phase 2 	Superior, WI to Pontiac, IL	Total: 1.2 million barrels per day New: 640,0000 barrels per day (2016)	Additional capacity to move crude through the state.

Source: Enbridge Energy

Table 7-11: Crude Oil Projects Impacting Wisconsin (continued)

Project	Origin / Destination	Capacity and (Estimated Completion)	Wisconsin's Interest
Enbridge Line 9 (Yellow and Red Line) 	Sarnia, ON to Montreal, QC	Total: 300,000 barrels per day New: 60,000 barrels per day Reverse flow: Moves crude East (Complete)	Provides access to North American crude, which is connected to Enbridge pipelines traveling through Wisconsin.

Source: Enbridge Energy

Pipeline Freight Forecasts

Pipeline infrastructure and data are owned and maintained by private entities. Further, today's heightened security environment has resulted in pipeline-related data being highly inaccessible to the public. The Freight Analysis Framework does attempt to estimate flows by pipeline, using a synthetic process. These estimates are very crude, and while perhaps acceptable for estimating petroleum pipeline movements between large regions, they are not suitable for determining county-to-county flows of the type that are reported in Transearch.

7.9 Wisconsin Air Cargo/Freight Trends, Issues, and Forecasts

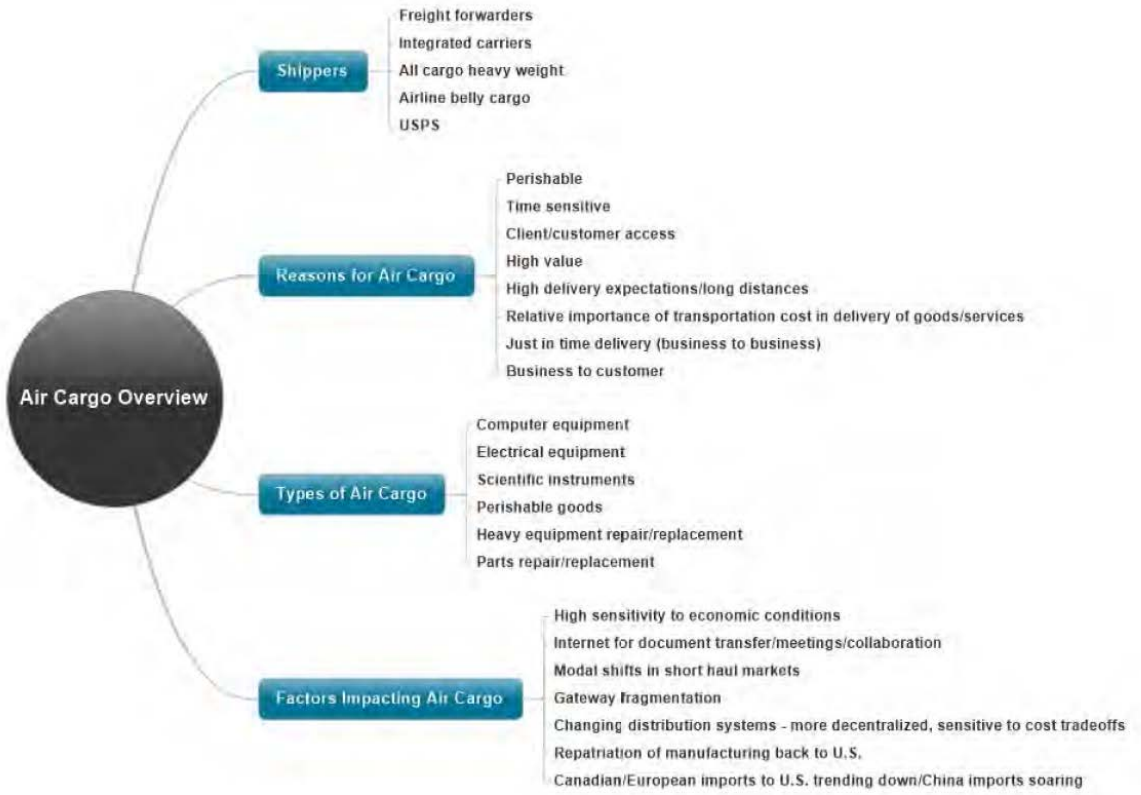
In the last decade, the aviation industry has experienced positive and negative changes related to security, the economy, the cost of aircraft operation, and changes in aircraft and navigational options. Declines in enplanements and cargo transport reflect these changes. In addition, the primary air cargo users in the state, FedEx and UPS Inc., have reduced their use of the mode and moved cargo to truck.

Air cargo is shipped into and out of commercial service airports and some general aviation airports in Wisconsin. Typical airport users engaged in air cargo lift include:

- The airlines that carry mail or freight in the cargo hold of commercial aircraft
- Integrated carriers such as FedEx and UPS
- Dedicated all-cargo heavyweight carriers that operate unscheduled charters
- Freight forwarders and logistics companies
- United States Postal Service (USPS)

Figure 7-23 provides an overview of types of shippers, reasons for use of air cargo lift, types of air cargo, and factors that influence air cargo lift demand and how it is provided.

Figure 7-23: Air Cargo Overview



Source: Kramer Aerotech Inc.

Trends Impacting Air Cargo Nationally

Shipment by air is typically the most expensive mode of freight transport. Usually, goods are sent by air if they are perishable, of high value, delivery is time sensitive, or the product is shipped from or going to another country. Air cargo is highly sensitive to economic conditions. During the recession of 2008-2009, air cargo shipments decreased as demand disappeared and/or other less expensive modes were substituted.

A number of trends have shifted demand in the United States away from air transport to either ground transport for packages or to electronic transfer of information and money. The technology that powered express air service has been replicated by ground transport services. Many packages that were once shipped by air are transported by truck and tracked at a much lower cost. Often, a shipper is concerned that a package arrives on schedule and is indifferent about how the package is transported.

Both the USPS and the integrated carriers have responded to shifts in demand and modes of transport. In 2011, UPS and FedEx increased their ground capacity. FedEx reported an 11 percent expansion of ground operations; while express services were flat. Short haul markets are frequently served by ground transportation. Some cargo in Wisconsin that was previously shipped by air is now trucked to Minneapolis-Saint Paul or Chicago for consolidation and further transport.

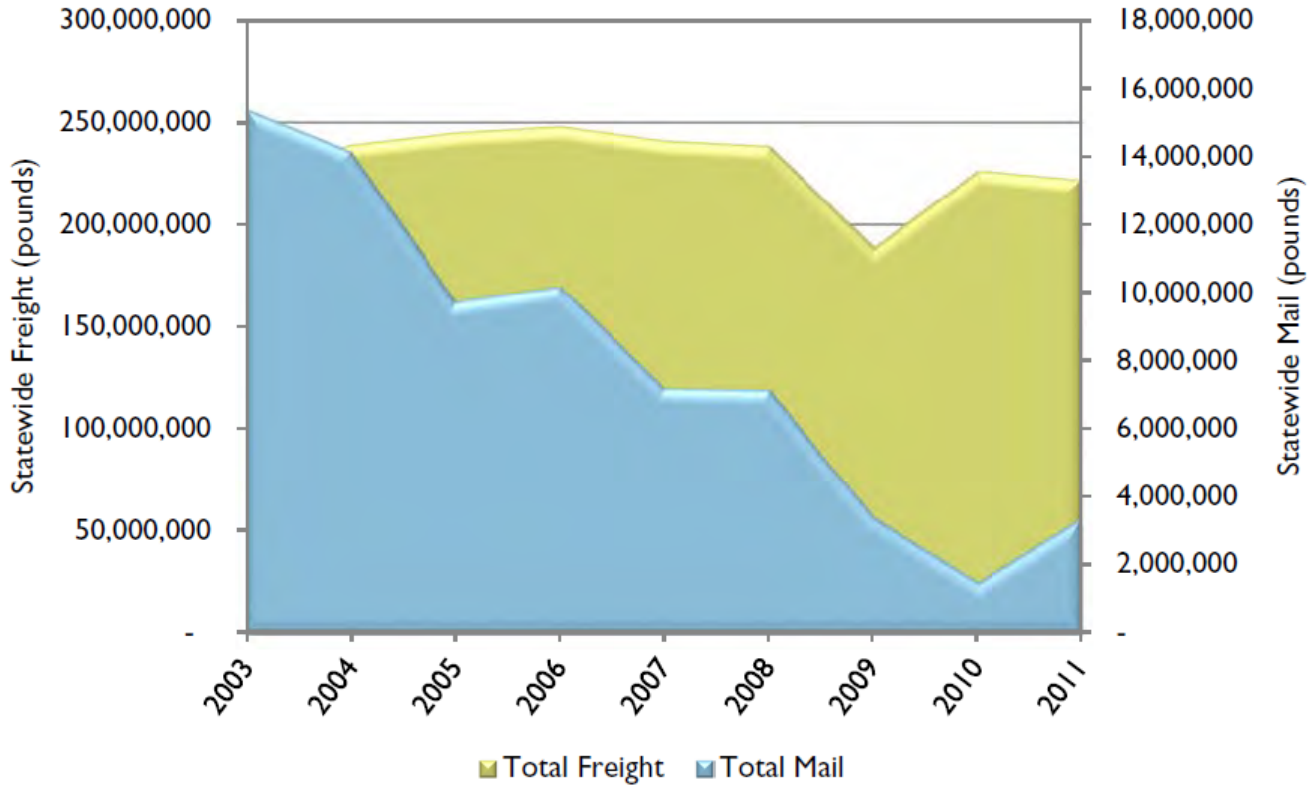
Trends in Air Cargo Use in Wisconsin

Since 2003, commercial air carriers and all cargo carriers report information such as pounds of air freight and mail, airport origin and destination, and the aircraft used for transport directly to the United States DOT. However, the data set is incomplete. Some smaller carriers that transport cargo for a larger carrier do not always report this information. Also, FedEx has held a USPS contract for more than a decade to carry USPS first class, priority, and express mail. FedEx does not report mail separately. To construct a reasonable estimate of air cargo shipped to and from Wisconsin, three data sources were used:

- United States DOT T-100 market and segment data (air carrier reports)
- Wisconsin airport reports on enplaned and deplaned pounds of cargo
- Interviews with air cargo airlines operating in Wisconsin.

Figure 7-24 and Table 7-12 present Wisconsin air freight and mail from 2003 to 2011. Air freight has remained above 225 million pounds per year statewide, except during the 2008-2009 recession and subsequent recovery years. What has changed dramatically is the percentage of air freight versus mail. In 2011, there were 227.2 million pounds of enplaned and deplaned freight and mail handled at Wisconsin airports. Ninety-eight percent was reported as freight, versus two percent as air mail. Looking back to 2003, air mail represented six percent of total air freight.

Figure 7-24: 2003-2011 Enplaned/Deplaned Air Freight and Air Mail at Commercial Service Airports



Source: Wisconsin Department of Transportation, "Wisconsin State Airport System Plan 2030"

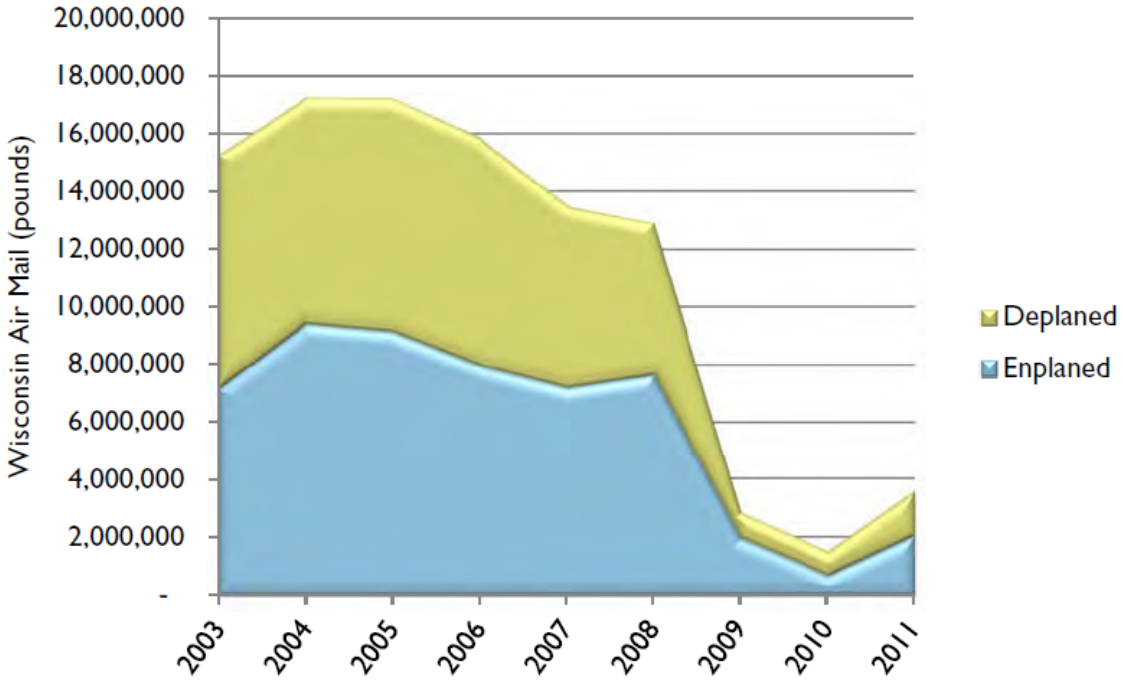
Table 7-12: 2003-2011 Enplaned/Deplaned Air Freight and Mail at Commercial Service Airports

Year	Pounds		
	Mail	Freight	Total
2003	15,389,220	225,343,590	240,732,810
2004	14,152,230	239,160,170	253,312,400
2005	9,746,280	245,097,810	254,844,090
2006	10,195,610	248,174,570	258,370,180
2007	7,216,320	241,092,700	248,309,020
2008	7,161,190	238,528,300	245,689,490
2009	3,382,860	189,015,160	192,398,020
2010	1,470,620	226,735,590	228,206,210
2011	3,361,210	221,945,990	225,307,200

Sources: U.S. DOT T-100 and Individual Airport Reports

The trend for mail in Wisconsin mirrors national trends. In October 2011, the United States Government Accountability Office (GAO) examined USPS data and reported a substantial decline in mail volumes due to the rise in e-commerce, electronic billing and payment transactions, and online communications.[89] First class mail, a major component of air mail, is projected to decrease by 50 percent. In 2010, fewer than 50 percent of all bills were paid by mail. These trends also appear in Wisconsin and there is reason to anticipate a more diminished role for mail as a component of air cargo in the future. The surviving components of air mail include express, priority and international mail. Figure 7-25 shows historical trends for enplaned and deplaned mail at Wisconsin airports.

Figure 7-25: 2003-2011 Enplaned/Deplaned Mail at Wisconsin Commercial Service Airports



Source: Wisconsin Department of Transportation, "Wisconsin State Airport System Plan 2030"

[89] U.S. Government Accountability Office, "U.S. Postal Service: Mail Trends Highlight Need to Fundamentally Change Business Model." (October 20, 2011).

Despite steady volumes of air freight since 2003, the airlift of cargo has shifted from a competitive multi-provider environment to a highly concentrated provider market. Integrated carriers have dominated, but in 2003 nearly one-quarter of air cargo was carried in the cargo hold of passenger aircraft. Air freight and mail was a stable product of every airline, including the regional carriers. By 2011, cargo lift by airlines represented three percent of all cargo lift, with the integrated carriers hauling 97 percent. The integrated carriers serve all of the commercial service airports except Eau Claire and La Crosse. Air cargo out of La Crosse and Eau Claire is carried by the airlines or otherwise trucked to Rochester, Minneapolis-Saint Paul or Chicago.

The lack of growth in air cargo can be attributed to a number of factors. Some existing barriers to growth include:

- Wisconsin's excellent surface transportation infrastructure (i.e., highways, railroads, and waterways), as well as a terrain that makes it the overwhelming choice for cargo movement.
- The state is bordered by large cargo airports in Minneapolis, Minnesota; Rockford, Illinois; and Chicago, Illinois. The current business model involves trucking cargo to these larger air cargo hubs.
- The price of aircraft fuel, in recent years, has made surface transportation a more affordable choice.
- A looming pilot shortage makes it challenging for airlines to stay fully staffed.
- Current airline business models include using regional jets with less room for cargo.

Unmanned Aircraft Systems (UAS)

A new industry is emerging in unmanned aircraft systems (UAS) and a continued increase in commercial UAS applications is expected to be significant in the coming years. At the same time, pilot flight training and recreational flying have decreased. Increases in business aviation and growth in the UAS sector could influence the facilities and services needed at airports in the future.

The number of people and where they live is related to economic activity. People, or a population, and the location of the population are demographic factors that influence economic activity, such as the demand for food, fuel, consumer goods, and other needs. A sound transportation system connects this economic activity to populated areas throughout the state. Demographic factors often overlap with economic factors when a percentage of people within populated areas become members of the labor force, which provides the means of production, cultivation, and extraction of other freight that must be transported.

FAA Modernization and Reform Act of 2012

The FAA Modernization and Reform Act of 2012, a four-year federal authorization act, capped the federal match for the AIP at 90 percent, down from 95 percent of the previous ten years. Many airport owners are challenged to meet the larger cost-share requirement.

FAA is implementing the Next Generation Air Transportation System (NextGen), a ten-year federal initiative to move the nation's air traffic control system from ground-based radar to a modern satellite-based system.

NextGen's long-term objective is to achieve a more efficient and precise air traffic control system yielding increases in fuel economy, utility and safety. The FAA is systematically establishing global positioning system-based runway approaches around the country. Funding to clear runway approaches of obstructions, such as trees, will need to come from federal, state, or local aid.

Airport owners are responsible for making their airports compatible with NextGen. Wisconsin's Air Carrier airports have most of the needed infrastructure in place, but many General Aviation airports do not. Some airports need to acquire land in their runway approaches. Other requirements will surface as the system is further developed. All aircraft participating in the National Airspace System (NAS) under NextGen will need updated electronics on board by January 1, 2020.

Air Freight Forecasts

While air cargo movement represents a relatively small percentage by volume of overall trade, relatively low-weight, time-sensitive, and high-value freight is important to Wisconsin's economy. The forecasted increase in air freight movement reflects a continuing business trend toward adopting just-in-time logistics practices where time-definite transactions, as well as production flexibility and speed of relatively low-weight and high-value items, are paramount in meeting the requirements of modern manufacturing supply chains. Smaller quantities, for example, are being shipped more frequently. Shipping via air can mean more quick and reliable business over long distances.

Air Origins/Destinations[90]

Total air tonnage is forecast to increase by 253 percent statewide between 2013 and 2040. The value of this tonnage is expected to increase by 155 percent. Airports are forecast to ship or receive 370,000 tons of air freight, valued at more than $26.6 billion, in 2040. Despite the largest forecasted increase in tonnage of all the modes, freight moving by air will still be less than 1 percent of all Wisconsin freight shipments in 2040.[91]

The counties that are expected to see the most growth in originating airport freight shipments are Milwaukee, Marinette, Manitowoc, and Racine. The counties that are forecasted to see the most growth in terminating airport freight shipments are Brown, Dane, Milwaukee, and Marathon. Small amounts of freight move to and from general aviation airports to the areas in the state that do not have general aviation.

Air Commodities[92]

The five commodity groups forecast to see the greatest air tonnage in 2040 are as follows:

- Small Freight Shipments (233,757 tons, 364.7 percent growth)
- Miscellaneous Mixed Shipments (33,877 tons, 203.5 percent growth)
- Transportation Equipment (23,623 tons, 156.9 percent growth)
- Electrical Equipment (19,886 tons, 230 percent growth)
- Instruments and Optical Equipment (13,153 tons, 179.1 percent growth)

Small freight shipments are forecast to see the most air tons in 2040 (233,757), representing a change of 364.7 percent over the forecast period of 2013-2040. Issues that could affect the forecasts developed for Wisconsin's airborne mode include the continued growth in just-in-time logistics and e-commerce, as well as the continued dominance of Chicago's O'Hare International Airport for air cargo shipments within the region.

[90] 2013 IHS Transearch Database.
[91] Air forecasts do not include possible new types of delivery, including the use of drones or automated delivery.
[92] 2013 IHS Transearch Database.

7.10 Wisconsin Populations Trends

Population growth has a direct impact on freight demand and freight movement. As populations grow, more trips and services are required. Wisconsin's population in 2040 is projected to be nearly 6.5 million, an increase of more than 800,000 people, or 14 percent, from 2010.[93]

Age Distribution of Wisconsin's Population

Although the state's total population is expected to grow by 14 percent - more than 800,000 residents - over the 30-year projection period, the change will be much greater in certain age groups. Shifts in the age distribution will be heavily concentrated in the 65-84 and 84-and-over age groups (Table 7-13).

Table 7-13: Wisconsin Population, 2010 Census and 2040 Projection, by Age Groups

Age Group	Census 2010	Projected 2040	Numeric Change	Percentage Change
0-4	358,443	373,940	15,497	4.3%
5-17	981,049	1,007,370	26,321	2.7%
18-24	549,256	563,995	14,739	2.7%
25-44	1,447,360	1,493,595	46,235	3.2%
45-64	1,573,564	1,517,370	-56,194	-3.6%
65-84	658,809	1,251,765	592,956	90.0%
84 and Over	118,505	283,600	165,095	139.3%
Total	**5,686,986**	**6,491,635**	**804,649**	**14.1%**

Source: UW-Madison Applied Population Laboratory, "Wisconsin's Future Population."

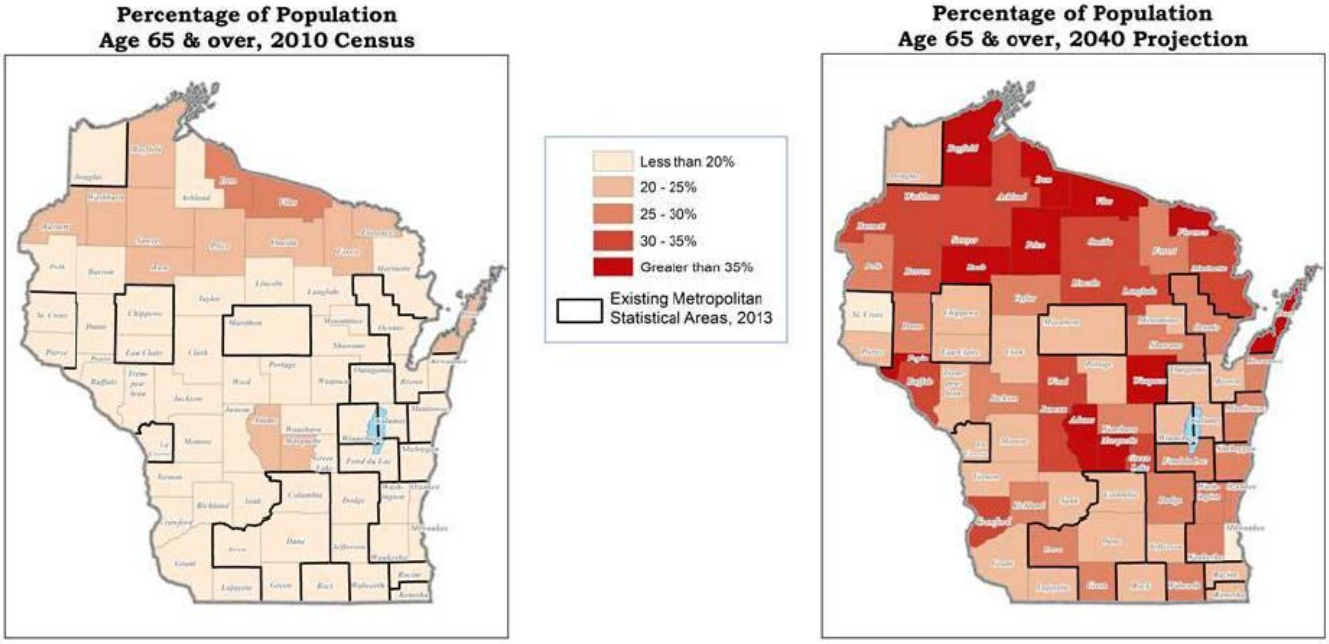
Table 7-13 depicts the Census 2010 and projected 2040 residents by discreet age categories, and the projected numeric and percentage change of each group. The 0-4, 5-17, 18-24, 25-44, and 45-64 age groups will be relatively flat between 2010 and 2040, whereas the 65-84 age group will almost double and the 84-and-over age group will more than double in size. All counties in the state of Wisconsin will experience growth in the 64-84 and 84-and-over age groups. The decline in the 45-65 age group from 2010 to 2040 may be attributed to people relocating and seeking jobs out-of-state.

Nearly half of Wisconsin's counties had fewer than 15 percent of their populations age 65-and-over in 2010, and none had greater than 30 percent (the highest being 26 percent); by 2040 no county will have fewer than 15 percent of its population being age 65-and-over, and one-third will have age 65-and-over populations greater than 30 percent.

Figure 7-26 compares the change in the 65-and-over population of each county between 2010 and 2040. Counties in the far northern part of the state, in general, are projected to have more than three out of every 10 residents being age 65-and-over.

[93] Wisconsin Department of Administration, Demographic Services Center, "Wisconsin's Future Population: Projections for the State, Its Counties and Municipalities, 2010-2040." (December 2013).

Figure 7-26: Comparison of Percentage of Population Age 65 and Over, 2010 Census and 2040 Projection



Source: UW-Madison Applied Population Laboratory, "Wisconsin's Future Population."

The traditional full-time (40-hour work week) working-age population - ages 18 through 64 - will rise modestly from 3,570,000 in 2010 to 3,603,000 in 2020, then begin a slow decline during the 2020s and 2030s to 3,575,000 in 2040, resulting in a 0.1 percent increase across time. Employers in northern Wisconsin and those in counties with higher 65-and-over populations may face a worker shortage due to the slow decline in the traditional full-time working-age population from 2020 to 2040.

However, Wisconsinites are living longer and healthier lives and they are retiring later in life. Over the next 30 years, older Wisconsinites may work later in their lives and travel for work and leisure more often. The 65-and-over age population may also choose to remain in the workforce but in part-time (less than 40-hour work week) capacities.

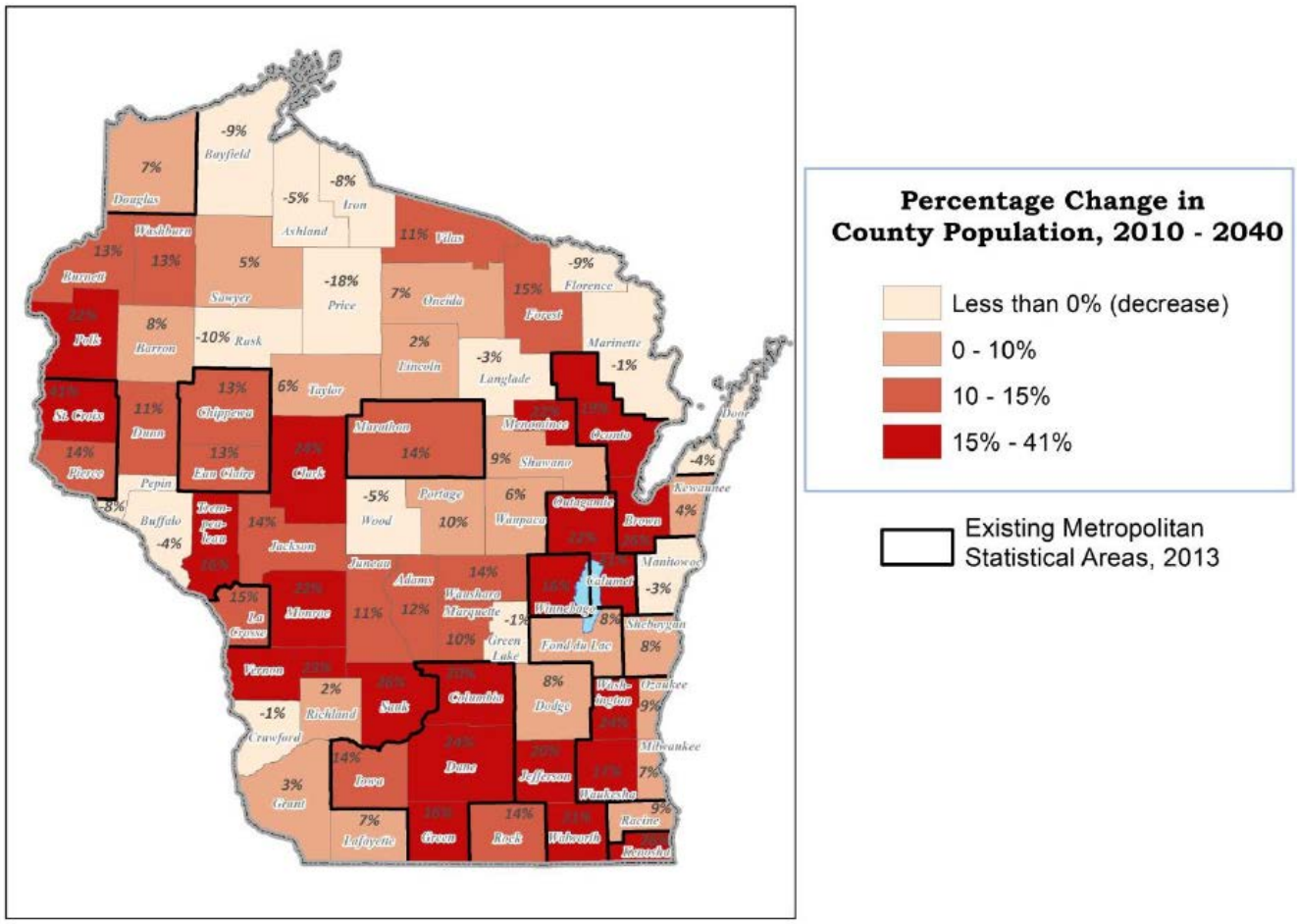
Despite gradual increases in retirement age, as the population ages, the proportion of Wisconsinites in the workforce is expected to shrink, which may have an impact on freight movement. In the future, an aging population, continued decline in the proportion of families with children, and changing settlement preferences could increase the demand for more walkable, transit-friendly development in urbanized areas. Also, a declining workforce participation may slow growth in rush-hour traffic, which may lessen some freight bottlenecks.

Trends in the Geographic Distribution of Wisconsin's Population

Freight demand is expected to increase in rural areas of the state, particularly in northern Wisconsin. Freight demand will still be concentrated in the large urban and metropolitan areas where Wisconsin's population is changing the most. With an aging population, online shopping will drive up demand for small-package home delivery, which could soon substitute for many household shopping trips. Autonomous vehicles may also contribute to the safe and efficient movement of people and freight.

Across the full 30-year period of these projections, it is predicted that 57 of Wisconsin's 72 counties will have a population at 2040 that is higher than it was at 2010 (Figure 7-27).

Figure 7-27: 2010-2040 Percentage Change in County Population



Source: UW-Madison Applied Population Laboratory, "Wisconsin's Future Population."

Counties with Population Growth

Most of the fastest growing counties are ones that adjoin in-state metropolitan areas (e.g., Jefferson, Walworth), out-of-state metropolitan areas (e.g., Kenosha, Polk, Rock, St. Croix) or are projected to have a strong natural increase (e.g., Clark, Menominee, Trempealeau, Vernon).

Metropolitan Statistical Area

A metropolitan statistical area (MSA) is a geographical region with a relatively high population density at its core and close economic ties throughout the area. Such regions are neither legally incorporated as a city or town would be, nor are they legal administrative divisions like counties or separate entities such as states. As such, the precise definition of any given metropolitan area can vary with the source.

In general, Wisconsin cities and suburban areas are growing and the population in rural areas, particularly in northern Wisconsin, is declining. Wisconsin's population has grown increasingly suburban over the past couple of decades. Most of Wisconsin's population and job growth have been and are occurring in cities and more suburban areas of the state.

Despite signs of change in settlement patterns, Wisconsin's population is likely to continue growing in suburban areas. While cities have become more desirable to many Wisconsinites, and the rate of population growth in cities

has increased, the majority of Wisconsinites continue to move to areas with lower density, cheaper housing and more jobs.

Saint Croix County is projected to be the fastest-growing county (Table 7-14), in terms of percentage change, through 2040, increasing by 41 percent. As part of the Minneapolis-Saint Paul metropolitan area, it also ranked as Wisconsin's top-growing county from 1980 to 2010. Many of Saint Croix County's residents commute to jobs in the Minneapolis-Saint Paul metropolitan area.

Calumet County – containing much of the suburban growth southeast of Appleton – is predicted to be the second-fastest growing county, increasing by 31 percent by 2040. Job growth in the city of Appleton is projected to grow by 35 percent over the next ten years.[94]

Dane County, projected to be the sixth-largest gainer in percentage terms, is expected to experience the highest numeric growth in the state through 2040. Madison's unemployment rate has been the lowest in the state since the great recession of 2008-2009 and future job growth over the next ten years is predicted to be close to 40 percent.[95]

Among the state's largest counties, Milwaukee will continue its position as the most populous in the state and is projected to gain about 70,000 additional residents, increasing to more than one million residents. The four largest counties - Milwaukee, Dane, Waukesha, and Brown - are predicted to maintain their ranked position, but Outagamie County is expected to pass Racine to become the fifth largest. In addition, Kenosha County is likely to exchange places with Winnebago, and Washington County will increase over time to surpass Marathon and become the 10th largest county.

Table 7-14: 2010-2040 Fastest Growing Counties (%)

County Name	Census 2010	Projected 2040	Numeric Change	Percent Change
Saint Croix	84,345	119,010	34,665	41.1%
Calumet	48,971	64,210	15,239	31.1%
Kenosha	166,426	209,670	43,244	26.0%
Brown	248,007	312,320	64,313	25.9%
Sauk	61,976	77,815	15,839	25.6%
Dane	488,073	606,620	118,547	24.3%
Washington	131,887	163,890	32,003	24.3%
Clark	34,690	42,980	8,290	23.9%
Vernon	29,773	36,520	6,747	22.7%
Menominee	4,232	5,170	938	22.2%

Source: UW-Madison Applied Population Laboratory, "Wisconsin's Future Population."

With both population and employment moving to suburban areas of the state, commuting is not simply about moving people from suburban homes to jobs in urbanized areas. Population and job growth in Wisconsin's suburban areas has serious implications for the state's transportation policy. Congestion may worsen as more Wisconsinites might have to drive further to get to jobs. Also, as noted earlier, this commuting pattern also presents challenges for age 65-and-over populations and lower-income Wisconsinites to jobs and social services, such as healthcare facilities.

[94] Sperling's Best Places, "Appleton, Wisconsin."
[95] Sperling's Best Places, "Madison, Wisconsin."

Counties with Declining Population

At least 10 counties are projected to lose population between 2010 and 2040 in Wisconsin. The 10 with the predicted greatest percentage decline are shown below in Table 7-15. Population losses, which are predominately located in northern Wisconsin, will be due to both rising natural decrease (i.e., the number of deaths exceeding births) and reduced net in-migration, or actual out-migration. The decline in population in these areas may reduce economic productivity within these areas (see Chapter 4, *Economic Context of Freight on Wisconsin's Transportation System*).

Table 7-15: 2010-2040 Counties with Greatest Percent Decline

County Name	Census 2010	Projected 2040	Numeric Change	Percent Change
Door	27,785	26,620	-1,165	-4.2%
Buffalo	13,587	13,000	-587	-4.3%
Wood	74,749	71,150	-3,599	-4.8%
Ashland	16,157	15,315	-842	-5.2%
Pepin	7,469	6,885	-584	-7.8%
Iron	5,916	5,420	-496	-8.4%
Bayfield	15,014	13,725	-1,289	-8.6%
Florence	4,423	4,030	-393	-8.9%
Rusk	14,755	13,310	-1,445	-9.8%
Price	14,159	11,645	-2,514	-17.8%

Source: UW-Madison Applied Population Laboratory, "Wisconsin's Future Population."

As suburbs have expanded, rural populations have declined, birth rates in rural areas have declined, and retirees and job-seekers have moved to suburban areas in Wisconsin. Areas with shrinking populations face challenges maintaining existing infrastructure and preserving access to economic opportunities and social services.

8– Chapter 8: Freight Policies and Strategies

8.1 Introduction and Background

This chapter presents the Freight Plan's policies, followed by discussion of how each policy has a bearing on improving freight functionality in Wisconsin. The policies and strategies address highways, local roads, railroads, ports and waterways, air, and pipelines. The policies, strategies and data analysis presented in this chapter are designed to meet the goals and objectives identified in Chapter 1, *Introduction*.

Overview of Chapter 8

The intent of this chapter is to:

- Present multimodal policies and strategies to address freight transportation trends and issues
- Summarize the factors influencing the development of freight policies and strategies

Chapter 9, *Investment and Implementation*, focuses on implementing the policies, strategies and data analysis presented in this chapter in an effort to achieve the plan's goals of:

- Enhancing safety, security, and resiliency
- Ensuring system preservation and enhancement
- Enhancing system mobility, operations, reliability, efficiency, and connectivity

The policies presented in this chapter were developed using previous planning documents such as *Connections 2030,* stakeholder feedback, input from the Freight Advisory Committee (FAC), and data analysis by Wisconsin Department of Transportation (WisDOT) staff. The Freight Plan defines policies for all modes and develops a data-based analysis method to define critical infrastructure for each mode.

WisDOT's Freight Advisory Committee and Stakeholder Involvement

WisDOT's FAC advises and is responsible for assisting the department in the development of, and subsequent updating of, the Wisconsin State Freight Plan (SFP). As WisDOT identifies and modifies its freight recommendations and policies, the department will continue to convene the FAC as a forum for developing consensus on policies and projects, and to identify future projects and policies for consideration. The information and feedback provided by WisDOT's FAC has provided valuable insight into the full range of issues and interests of the freight industry.

As a result of the public involvement process outlined in Chapter 3, *Public Involvement*, this chapter and Chapter 9, *Investment and Implementation* include new policies and specific actions WisDOT will explore in the implementation of the SFP. Specific policies and actions include the development of maritime and intermodal strategies, freight considerations in the development of projects, communication with industry and the general public, the use of tools and data in WisDOT and its stakeholders' decision-making, rail safety and investment, and reducing the environmental impacts of freight and oversize-overweight (OSOW) freight.

Data Analysis

During development of the SFP, WisDOT began advancing various data, tools, and methods that will continue to be used, refined, and shared with WisDOT's partners to aid in identifying freight mobility needs and support data-driven investment decisions.

WisDOT leveraged transportation data to define Wisconsin's critical corridors and facilities and develop a freight-orientated system where the infrastructure promotes the safe, efficient, and reliable movement of goods through the entire supply chain. The network will streamline logistics and enhance efficiency - especially the "first and last mile" connection between facilities and corridors.

Freight shippers are unique transportation system users in that modal choice is often driven by characteristics not common to the general traveling public. Often the cost, speed, and reliability of a particular mode of freight transportation is considered. Multimodal data was compiled by mode to better analyze freight mobility needs and demands. The data was then analyzed to assess strategies to maximize the return to freight shippers.

WisDOT has primary responsibility for the maintenance and performance of the state's highway system. The department supports rail, water, and air with administration of funding, technical assistance, and data collection and dissemination.

One way in which that data was analyzed was through development of the freight data analysis framework that was used to identify Wisconsin's critical freight corridors and other facilities. In order to evaluate the importance of an asset to freight movement, a set of criteria was established and weighted. In addition to using key data sets for freight tonnage and value, factors such as connectivity to important freight facilities, including intermodal and transload locations, were also used. The scores were then normalized over a scale from 1 to 99, the higher number indicating facilities with the greatest importance to freight-related movements. This framework is further detailed in Chapter 9, *Investment and Implementation*.

Wisconsin's critical corridors and facilities were identified so that a freight-orientated system could be defined where the infrastructure promotes the safe, efficient, and reliable movement of goods through the entire supply chain. The freight data analysis framework will serve as an aid for the department to facilitate connections between key economic centers and major freight generators. It will assess the "first and last mile" connectivity between facilities and corridors. In the future, the framework may also be used to analyze freight transportation needs statewide and define a method to inform freight policy and recommended investment decisions.

8.2 Highway Policies and Strategies

Identified in Chapter 5, *Wisconsin's Transportation System Assets*, Wisconsin's State Trunk Highway System (STH) consists of approximately 11,800 centerline miles of Interstate highways, U.S. highways and state trunk highways, including more than 5,200 bridges.[1,2] The STH system handled 58 percent of the vehicle miles traveled (VMT) in 2015, while comprising just over 10 percent of the total statewide roadway network.[3] The state's Backbone System, a subset of the STH, represents 13.5% of STH centerline miles, and carries half of the traffic using the STH; in addition, 85% of truck-born freight traversing Wisconsin's STH uses the Backbone System.

Table 8-1 and Table 8-2 display the total truck tonnage and value by flow type. Overall, both tonnage and value show a relatively even distribution of flows outbound, inbound, within, and overhead traffic. In comparison to other modes, truck traffic is less likely to be overhead traffic, suggesting that trucking facilitates more Wisconsin-centric travel because shippers might not be able to access the other modes, such as rail and water, as easily.

[1] Wisconsin Department of Transportation, Bureau of Planning and Economic Development.
[2] Wisconsin Department of Transportation, Bureau of Structures, "Annual Bridge Report." (April 2016).
[3] Wisconsin Department of Transportation, Bureau of Planning and Economic Development.

Table 8-1: 2013 Truck Tonnage by Flow Type (millions)

	Outbound	Inbound	Within	Overhead	TOTAL
Truck Tonnage	98.2	80.2	112.0	50.8	**341.1**
Proportion of Truck Flows	(28.8%)	(23.5%)	(32.8%)	(14.9%)	**(100.0%)**
All Modes	**142.0**	**147.6**	**115.4**	**171.6**	**576.6**
Proportion of All Flows	**(24.6%)**	**(25.6%)**	**(20.0%)**	**(29.8%)**	**(100.0%)**

Source: 2013 IHS Transearch Database

Table 8-2: 2013 Truck Value by Flow Type (millions)

	Outbound	Inbound	Within	Overhead	TOTAL
Truck Value	$140,496.6	$108,924.5	$70,497.6	$125,750.2	**$445,669.0**
Proportion of Truck Flows	(31.5%)	(24.4%)	(15.8%)	(28.2%)	**(100.0%)**
All Modes	**$153,963.7**	**$127,533.8**	**$72,347.2**	**$283,853.9**	**$637,698.7**
Proportion of All Flows	**24.1%**	**20.0%**	**11.3%**	**44.5%**	**100.0%**

Source: 2013 IHS Transearch Database

In general, freight shipments by truck dominated the state's goods movement in 2013 with nearly a 60 percent share by weight and 70 percent by value. Over 341 million tons of freight, valued at more than $445 billion were transported to, from, within, or through Wisconsin by truck in 2013 on Interstates and state highways.[4]

Funding

As the system ages, maintenance and preservation activities typically change. Costs tend to increase, particularly those related to real estate, energy, and construction materials. This is a factor for both WisDOT's and local governments' investment decisions regarding maintaining and preserving existing infrastructure.

In some cases, state and local roadways are not designed to handle the number of trucks or the heavy loads associated with trucking. As a result, the timing required to address pavement deterioration and system capacity issues may be accelerated.

WisDOT and local governments must apply asset management strategies to make needed improvements at the appropriate times over the life of all transportation modes. Applying appropriate asset management strategies enables transportation providers to keep pace with both emerging and existing needs.

Asset Management

Asset management considers the entire life cycle of transportation decisions, including planning, programming, construction, maintenance, and operations. It emphasizes integration across these functions, reinforcing the fact that actions taken across this lifecycle are interrelated. It also recognizes that investments in transportation assets must be made with consideration of a broad set of objectives, including physical preservation, congestion relief, safety, security, economic productivity, and environmental stewardship.

WisDOT is committed to providing the safest, most efficient, and highest quality transportation system that best serves the needs of the state. In order to maximize return-on-investment, WisDOT is working to make the best use of funding available by establishing performance measures that can inform investment decisions (see Chapter 9, *Investment and Implementation*).

[4] 2013 IHS Transearch Database.

As discussed in Chapter 9, *Investment and Implementation*, throughout the 20-year plan implementation period, WisDOT is developing and will implement an asset management approach to evaluate the broad range of priorities and analyze potential trade-offs among the actions to address system needs that maintain system health.

Technology

As discussed in Chapter 7, *Freight Transportation Trends, Issues, and Forecasts*, technology presents challenges and opportunities. Keeping pace with ongoing updates and improvements in technology can be expensive. A technological system that may have been state-of-the-art five to ten years ago may no longer be used or supported today. In addition, using technology for data collection to monitor traffic flow and identifying system needs and potential improvements has raised questions about individual privacy concerns and data storage requirements.

Finally, ensuring that technologies are available during an emergency or incident requires system redundancy or backups. For example, many signalized intersections also have stop signs that can be uncovered if the traffic signals malfunction.

State Trunk Highway System Preservation Policies and Strategies

The Backbone System includes the highest value multi-lane (or planned multi-lane) divided highways, which connect all regions and major economic centers in the state and are tied to the national transportation network. These include Interstates and critical higher volume state highways across the state. Continuing investments in the Backbone System is important for the reliable movement of goods throughout Wisconsin.

The State Highway Rehabilitation (SHR) subprogram involves three components:

- Existing highways
- State bridges
- Backbone rehabilitation

The existing highways component of the SHR subprogram deals with improvements to the non-backbone portion of the state highway system. It funds "3R" improvements—resurfacing, reconditioning, and reconstructing existing roadways—and the minor addition of lanes, traffic and safety improvements, and minor realignments of roadway.

The types of improvement are categorized as resurfacing, reconditioning, pavement replacement, and reconstruction:

- **Resurfacing** - rehabilitating the surface of a pavement to provide a smoother ride and to extend the pavement's structural life. This can also include pavement widening and/or shoulder paving to improve safety and reduce shoulder maintenance costs.
- **Reconditioning** - resurfacing and, in addition, improving an isolated grade, curve or intersection.
- **Pavement replacement** - the highest type of "resurfacing" whereby the existing pavement structure is replaced with a new one. This does not include widening of the roadway.
- **Reconstruction** - total rebuilding of the highway to provide a safer facility, to improve geometrics (i.e., longer passing and stopping sight distances, broader turning radii, or additional lanes at intersections) and increased traffic-handling capabilities. Other benefits include a smoother ride, reduced travel time, and lower maintenance costs.

WisDOT uses several different systems to monitor the conditions of its facilities, including a Bridge Management System and a Pavement Management System. These are brought together in a comprehensive tool, the Meta-

Manager database. With truck weights and volumes now at higher levels than when many structures and roads were built, WisDOT must continue to monitor the routes most heavily used for freight. Where freight traffic increases are documented, projects to improve the durability and safety of the corridors should be considered. Project cycles that incorporate anticipated resurfacing may need to be supplemented with reconditioning or even spot replacement and reconstructing to address geometric and infrastructure deficiencies. To support preservation activities, WisDOT will:

- Use a performance-based approach to identify state trunk highway system preservation needs, including development of a bridge asset management system
- Refine and expand a state-of-the-art process for prioritizing needs and identifying cost-effective state trunk highway construction alternatives
- Monitor national best practices and other initiatives related to reducing freight's impact on the environment
- Review and revise the Facilities Development Manual (FDM) to include freight considerations

Use a performance-based approach to identify state trunk highway system preservation needs, including development of a bridge asset management system

WisDOT will continue to use a comprehensive asset management approach to identify and address state trunk highway system needs. This allows WisDOT staff to analyze preservation needs using data based on physical condition, safety, operation, function, and connectivity. It also allows WisDOT staff to consider a range of funding and road construction alternatives, which results in a systematic and objective approach to cost-effective state trunk highway system preservation.

This policy divides state trunk highway system preservation activities into three categories:

- Structures and bridges
- Pavements
- Interchanges

Meta-Manager Management System Database

Meta-Manager, a comprehensive data repository for WisDOT, was developed by the Division of Transportation Investment Management's Bureau of State Highway Programs to meet the data requirements for a variety of needs and performance analyses.

The Meta-Manager database is an excellent resource for assessing system condition, analyzing need and performance, and supporting project development. It geographically integrates a variety of data, including pavement information, system deficiencies, safety, congestion, and other information. The database also includes future projections of physical condition data.

Refine and expand a state-of-the-art process for prioritizing needs and identifying cost-effective state trunk highway construction alternatives

As stated earlier, WisDOT will continue to use pavement condition data and performance thresholds to identify highway segments that need reconditioning, rehabilitation, or reconstruction.

WisDOT continues to enhance its prioritization methods using asset management tools such as the department's Meta-Manager Management System Database. This prioritization process will include using thresholds for pavement, bridges, and safety (for more information, see Chapter 6, *Transportation System Condition and Performance*).

As mentioned previously, the department's maintenance and preservation efforts address system needs and help extend the system's life. Wisconsin's highest preservation priority continues to be the structural preservation of bridges. For this reason, structural bridge needs will continue to receive priority funding. For the remaining STH system, WisDOT will prioritize preservation needs using state-of-the-art methods. The process applied will include

a dual-priority approach that selects projects based on both the cost-effectiveness of the preservation strategy and the importance of the roadway to the overall system function. Establishing a functional priority will enable WisDOT to better prioritize needs.

The department will also continue to emphasize proactive pavement preservation actions to extend service life and minimize the life-cycle cost of other system needs.

In addition, roadway maintenance costs can be expensive over the life of a highway. These costs should be recognized before the roadway is constructed. As part of monitoring existing system conditions and setting priorities for new roadways, WisDOT will incorporate freight into its long-term investment plan (see Chapter 9, *Investment and Implementation*).

Monitor national best practices and other initiatives related to reducing freight's impact on the environment

Central to both the vision for the plan and goal of the National Highway Freight Program is the need to reduce the environmental impacts of freight movement on the National Highway Freight Network. Additionally, grant programs available to freight projects such as FASTLANE have required that applicants consider how enhancements to critical infrastructure help protect the environment.

In developing transportation plans, WisDOT already considers the range of federally-required planning factors, which includes protecting the environment, promoting energy efficiency, and the connectivity between different transportation modes. For many highway projects, the design stage includes environmental studies and mitigation.

The process of considering the natural environment and sensitive populations has already been initiated. Chapter 10, *Environmental Justice Analysis*, evaluates potential adverse impacts of addressing freight mobility needs on minority populations and low-income populations. This analysis provides a qualitative review of potential disproportionately high and adverse effects to groups identified in Executive Order 12898 resulting from implementing the plan's recommendations. Similarly, Chapter 11, *System-Plan Environmental Evaluation* (SEE), provides a qualitative review of the potential natural environmental impacts resulting from recommendations identified in this plan. The results of these analyses inform WisDOT on the potential impacts of implementing the plan's recommendations and assessing mitigation strategies to minimize adverse impacts. The analyses provided in both chapters are long-range, high-level assessments and do not replace project-specific analyses required by the National Environmental Protection Act (NEPA) or the Wisconsin Environmental Protection Act (WEPA). WisDOT will also monitor national best practices and other initiatives related to reducing freight transportation impacts on the natural and human environments and assess how they may be applied to Wisconsin.

Review and revise the Facilities Development Manual to include freight considerations

WisDOT's professional engineers adhere to the department's Facilities Development Manual (FDM). The FDM provides policy, procedures, design standards, and general guidance on the facilities development process required by WisDOT. It is applicable to all types of highway improvements on the STH system, other street/highway systems for which federal-aid highway funds may be utilized, state facilities funded with state funds administered by the department, and other highways and roads for which the department may act as an administrative agent.

WisDOT will review and revise the FDM to better reflect freight considerations in its guidance. The intent of this review, and subsequent revisions, is to update and close gaps in the FDM so projects can be advanced that reflect the needs, and do not negatively impact the freight community. Numerous policy and strategy recommendations in this chapter are linked to this item and are a result of the analysis conducted during plan development, as well as stakeholder consultation.

As the review is conducted, it is expected that additional areas for updating/revising will be identified.

Major Highway Development Program Policies and Strategies

WisDOT will continue and improve the performance of the Major Highway Development Program. Specifically, WisDOT will complete currently enumerated Major Highway Development projects, study approved corridors, and complete currently enumerated Southeast Wisconsin Freeway Megaprojects.

Complete currently enumerated Major Highway Development projects

Major highway development projects, or "Majors," are generally the most complex, costly, and potentially controversial projects initiated by WisDOT. They are long-term solutions to the most serious deficiencies on highly traveled segments of the highway system. Freight movement is, and will continue to be, an important consideration in the selection of major highway development projects (see Chapter 9, *Investment and Implementation*).

Wisconsin state statutes define a Major Highway Development project candidate. Majors generally include significant capacity expansion projects, new highways, and bypasses. The majors program does not just focus on capacity issues, but also safety needs and enhancement of economic development opportunities. WisDOT provides an analysis and recommendation of Major project candidates for study or construction to the Transportation Projects Commission (TPC). This analysis includes factors such as safety and congestion (refer to Chapter 9, *Investment and Implementation*).

The TPC, using WisDOT's analysis and public hearing comments, recommends to the Governor and Legislature a list of major highway projects and an appropriate annual funding level to support the ongoing major highway program. The Legislature may add or delete projects, and may change the recommended funding level from the TPC's recommendation.

WisDOT will complete the projects actively enumerated for construction, as well as complete environmental studies of the approved corridors for study, unless the State Legislature de-enumerates a project.

Complete corridor studies approved by the Transportation Projects Commission

Before projects are considered for enumeration, WisDOT conducts environmental and engineering studies so all projects brought before the TPC will have undergone an approved Environmental Impact Statement or Environmental Assessment. This ensures that only projects likely to be future major project candidates are considered for enumeration. The TPC must approve projects for environmental study.

Major Highway Project Definition
"Major highway project" means a project, except a project providing an approach to a bridge over a river that forms a boundary of the state, a high-cost state highway bridge project (state statute 84.017), or a southeast Wisconsin freeway megaproject (state statute. 84.0145), that satisfies any of the following: • The project has a total cost of more than $30,000,000, subject to adjustment under the Department of Transportation Price Index, Yearly Moving Average, and involves any of the following: o Constructing a new highway 2.5 miles or more in length o Reconstructing or reconditioning an existing highway by either relocating 2.5 miles or more of the existing highway or adding one or more lanes 5 miles or more in length to the existing highway o Improving to freeway standards 10 miles or more of an existing divided highway having 2 or more lanes in either direction • The project has a total cost of more than $75,000,000, subject to adjustment under the Department of Transportation Price Index, Yearly Moving Average The department shall annually adjust the amounts specified above to reflect the annual change in the Wisconsin Department of Transportation Price Index, Yearly Moving Average, as maintained by the department or, if at any time the department no longer maintains this index, another suitable index as determined by the department. Beginning in 2012, prior to October 1 of each year, the department shall compute the annual adjustment and shall publish the new adjusted amount applicable, which amount shall become effective on October 1 of that year.

Transportation Projects Commission
Created in 1983, the 15-member Transportation Projects Commission (TPC) reviews major highway project candidates and makes recommendations to the Governor and Legislature regarding projects to be "enumerated" or included in the next two-year state budget. The TPC includes five Wisconsin State Senators, five Wisconsin State Assembly Representatives, and three citizen members. The Governor serves as the Commission Chairman. The WisDOT Secretary serves as a non-voting member. Typically, the Commission considers major highway project candidates on a two-year cycle. In the fall of odd-numbered years, the TPC begins the process by looking at projects to advance to the environmental study stage. In the fall of even numbered years, the Commission reviews, and can recommend for enumeration, projects that have successfully completed the environmental review phase. State law prevents the TPC from recommending projects for enumeration unless funding is available to begin work within six years.

Complete currently enumerated Southeast Wisconsin Freeway Megaprojects Program

Southeast Wisconsin has some of the busiest highways in the state and also some of the most complex highway infrastructure. Consequently, its highway infrastructure is among the most expensive to replace. Southeast Wisconsin megaprojects are defined as freeway projects in the seven-county southeast region with estimated costs (inflation adjusted) of over $500 million. Southeast megaprojects must be enumerated in the *Wisconsin State Statutes* prior to construction.

Not all highway-related construction projects are defined as Major Highway Development or Southeast Megaprojects. WisDOT will also continue to undertake other highway projects to improve safety, reduce congestion and support economic growth (see Chapter 9, *Investment and Implementation*).

Southeast Freeway System

There are 270 miles of freeways serving seven counties in southeast Wisconsin, with each carrying thousands of cars and trucks every day. The Southeast Freeway System is the economic lifeline not only for the region, but for the entire state, and motorists depend on safe and efficient freeway conditions. Manufacturers in Milwaukee, tourism destinations in Door County, and commuters in Washington and other southeastern Wisconsin counties depend on safe and efficient freeway connections.

The system also includes several freeway-to-freeway interchanges, providing access from one freeway to another. In Milwaukee County, four major interchanges serve as the hubs of the Southeast Freeway System:

- The Marquette Interchange, linking I-43, I-94 and I-794 in downtown Milwaukee
- The Zoo Interchange, connecting I-94, I-894 and US 45 in western Milwaukee County
- The Hale Interchange, connecting I-43, I-894 and US 45 near Hales Corners
- The Mitchell Interchange, linking I-43, I-94 and I-894 near General Mitchell International Airport in Milwaukee

Highway Technology and Operations Policies and Strategies

As discussed in Chapter 6, *Transportation System Condition and Performance*, WisDOT's vision is focused on delivering a safe and efficient transportation system that moves people and goods to their destinations safely and within a reasonable time frame. WisDOT will continue to manage the state transportation system so that it is reliable, resilient, and seamlessly connected. To maximize STH operations, WisDOT will:

- Monitor the state trunk highway network and respond to operational needs
- Improve emergency response
- Improve motor carrier efficiency
- Explore approaches to improve motor carrier enforcement
- Investigate ways to simplify, streamline, and provide more permitting options
- Identify and preserve a sub-system of state highways that accommodate over-height (up to 20 feet), over-weight, and over-size loads
- Work with other states to identify harmonization opportunities
- Support communications along state highway corridors of freight significance, to ensure drivers can remain informed of changing conditions

- Support greater use of technologies to improve the safety and efficiency of operations along corridors with high freight movement frequencies
- Support an increase in the availability of truck parking at state-owned facilities and raise the awareness of its availability

Monitor the state trunk highway system and respond to operational needs

The department's efforts to monitor daily traffic flow on the STH are conducted primarily through close coordination of law enforcement, first responders, other agencies, the media, and staff at WisDOT's State Traffic Operations Center (STOC).

With the aid of cameras, road sensors, and area responders throughout the state, STOC staff work with others to identify and track incidents and initiate appropriate responses. Currently, the STOC has direct responsibility to monitor and coordinate responses to incidents in Southeast Wisconsin, Madison, and Wausau. To serve statewide needs, the STOC coordinates incident responses with local emergency providers through a toll-free telephone number. The center provides information to the public using direct communication, variable message signs, Highway Advisory Radio, and weather displays at rest areas.

The STOC plays an important role in highway safety by coordinating statewide emergency response (see Chapter 6, *Transportation System Condition and Performance*).

Improve emergency response

WisDOT's STOC monitors highways in Milwaukee, Madison, Green Bay, and Wausau using video technology and coordinated communication efforts. The center also coordinates statewide emergency responses through a toll-free telephone number available to law enforcement agencies.

In urban areas, WisDOT will continue to use intelligent transportation systems (ITS) technology for faster detection and response to incidents. Statewide, WisDOT will continue to invest in communication system redundancy and integration throughout the plan period. This includes interoperability systems and standards that allow several agencies and responders to exchange communications across a single channel.

While secondary to safety considerations, enhancements to incident response systems and procedures will also help to mitigate unexpected or non-recurring congestion (see Chapter 6, *Transportation System Condition and Performance*). Rapid detection and response to crashes will also reduce the number of secondary crashes that occur in congested situations. The STOC is also developing best practices for incident management. WisDOT will support the adoption of such practices, and it will support a regular review process to update these practices.

Improve motor carrier efficiency

WisDOT issues permits for OSOW vehicles and loads to provide for their safe and efficient movement. WisDOT will continue to maintain its Internet-based OSOW automated permit issuance system for customers to apply for and self-issue new permits and to renew existing permits.

Explore approaches to improve motor carrier enforcement

WisDOT will continue to apply Weigh-In-Motion, Virtual Scales, PrePass, and other technologies for motor carrier enforcement operations. WisDOT will integrate roadside data captured by these systems with the commercial motor vehicle data networks maintained by the department through CVISN. Integration will provide seamless monitoring for compliance and allow better data analysis of commercial motor vehicle carrier operations.

Investigate ways to simplify, streamline, and provide more permitting options

In Wisconsin, a permit is issued to a carrier to allow operation of a vehicle or load that exceeds the statutory limits. A permit is typically required if vehicle dimensions exceed the values in the table below.

Table 8-3: Vehicle Dimensions Exceeded Requiring a Permit

Dimensions	
Width	8 feet, 6 inches
Height	13 feet, 6 inches
Length –	
Single vehicle and load	45 feet
Combination of 2 vehicles	70 feet
Truck/tractor and semi-trailer	75 feet[5]
Weight –	
Any one wheel or wheels supporting one end of an axle	11,000 pounds
Truck tractor steering axle	13,000 pounds
Single axle	20,000 pounds
Tandem axles	34,000 pounds
Maximum gross vehicle weights on all axles	80,000 pounds

Source: Wisconsin Department of Transportation, Bureau of Vehicle Services

Permits are generally issued for non-divisible loads, with some exceptions. Wisconsin also places restrictions on certain routes for vehicles traveling on permits.

During development of this plan, shippers and carriers indicated they would like WisDOT to investigate ways to simplify, streamline, and provide more permitting options. As an example, comments reflect that more permitting options are needed for intermodal (i.e., 5/6 axle permit options) movements. WisDOT will continue to investigate ways to simplify, streamline, and provide more permitting options in the state for ease of doing business.

[5] Must adhere to the appropriate axle spacing to achieve a maximum gross vehicle weight of 80,000 lbs. [348.15].

Identify and preserve a sub-system of state highways that accommodate over-height (up to 20 feet), over-weight, and over-size loads

Wisconsin's transportation system has experienced considerable growth in OSOW freight demand over the past few decades, and this trend is expected to continue. The size and frequency of OSOW vehicles and loads increases stress on bridges and pavements and produces highway operational considerations specific to OSOW movements. These concerns extend from state and federal highways to many local roads and bridges with weight and size restrictions that are posted below legal limits. Wisconsin, along with many other states (including neighboring states), has made significant strides in developing a transportation system that accommodates OSOW loads. However, additional efforts are required to improve safe and efficient movement of these loads – both within the state and across state lines.

OSOW loads can only be transported on roads capable (roadway design) of carrying them. If roadways are not designed to accommodate these large loads, they can create barriers to the safe and efficient movement of goods. Chapter 5, *Wisconsin's Transportation System Assets,* describes the state's OSOW Truck Route Network (Figure 8-1) and the proposed OSOW high clearance routes (Figure 8-2). Identifying these routes is critical to ensuring roadway improvements consider whether a corridor should be able to accommodate freight loads.

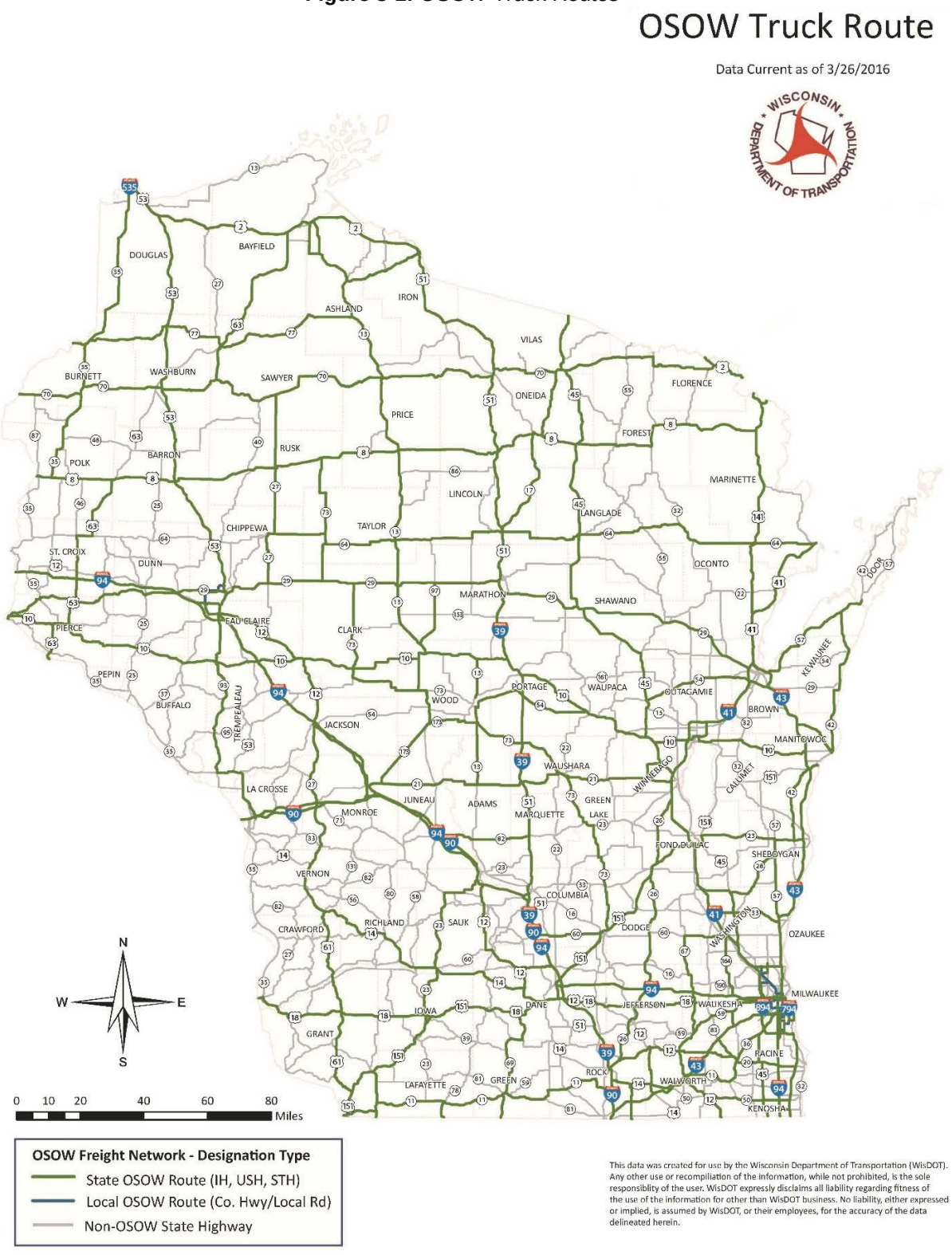
In addition to identifying key OSOW routes statewide, the department's FDM must also be updated (see previous strategy – Revise the Facilities Development Manual) to reflect these corridor designations. Updates will provide direction and recommendations on appropriate design considerations, and preservation of facility attributes to maximize the department's investments and ensure that freight loads can be accommodated safely and appropriately.

FAC OSOW Concerns & Suggestions

The FAC was asked to identify potential opportunities to enhance OSOW freight mobility and safety across the state, and to identify tangible steps WisDOT may take either solely, or in partnership with stakeholders, to address OSOW challenges and needs. Attendees at the April 14, 2016 FAC meeting expressed the following recommendations:

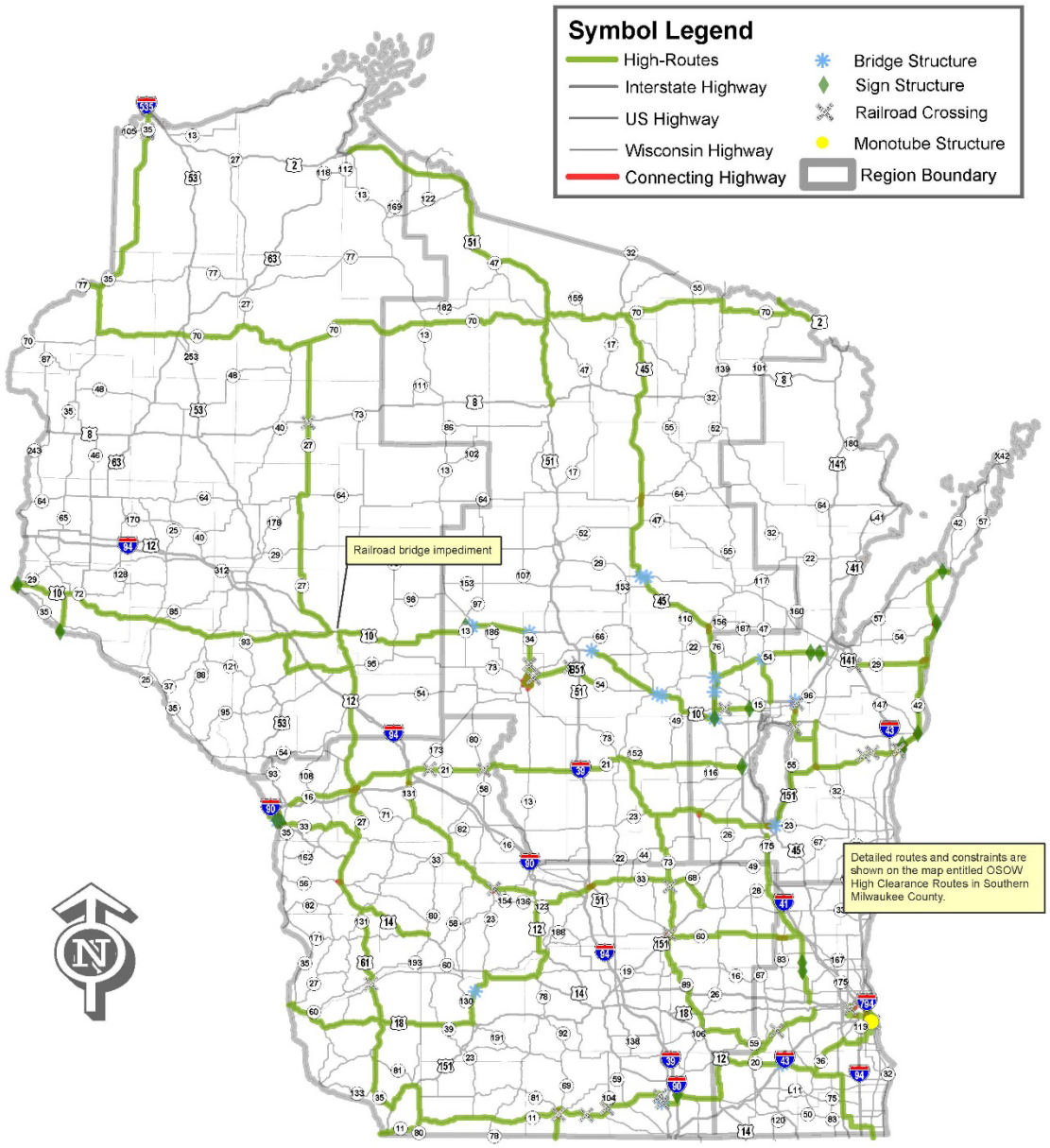
- FAC members discussed support for the return of a "Hauler's Hotline" (a parallel to the "Digger's Hotline") as a way to ensure compliance with all the needed contacts for utility assistance during a high/wide load move.
- Mega-loads (those in excess of 400,000 pounds) generate a large amount of extra department work and system impacts. The FAC advised that WisDOT initiate more communication with haulers, logistics planners, and shippers of significant loads to better identify their needs and the department's capabilities to ensure that OSOW commerce can move without disruption.
- The FAC suggested WisDOT should be a resource center and lead more partnerships that bring together shippers, local governments/MPOS/RPCs, law enforcement, utilities, manufacturers, and others using OSOW to share information, identify critical obstacles, and seek solutions.
- Take steps to harmonize permitting rules and availability across state lines, including Minnesota, Iowa, Illinois, and Michigan.
- Work with external partners to improve the availability and ease of acquiring permits.
- Redesign the system for issuing OSOW permits, allowing for more efficient and consistent issuance.

Figure 8-1: OSOW Truck Routes



Source: Wisconsin Department of Transportation, Bureau of Highway Maintenance

Figure 8-2: Draft OSOW High Clearance Routes



Source: Wisconsin Department of Transportation, Southeast Region Planning

Work with other states to identify harmonization opportunities

While it is critical for OSOW loads to have efficient routing within the State of Wisconsin, it is also crucial these movements have sufficient routes to exit and enter the state, as needed. A recommendation from the FAC was that WisDOT take steps to harmonize permitting rules and availability across state lines, including Minnesota, Iowa, Illinois, and Michigan. As in the past, WisDOT will continue to work with other states to identify harmonization opportunities.

Support communications along state highway corridors of freight significance, to ensure drivers can remain informed of changing conditions

While cellular phone, text, and data sharing has created great efficiencies in freight operations, the coverage of those networks is not complete in the state. This places operators along portions of our STH Backbone System at a disadvantage for remaining in coverage with their offices and with Wisconsin's traffic operations system. As new generations of cellular technology are introduced, basic coverage along key corridors should not be neglected.

Support greater use of technologies to improve the safety and efficiency of operations along corridors with high freight movement frequencies

WisDOT has a strong history of using technology to maintain and improve the transportation system. Beyond cellular systems, many other communications, detection, and safety technologies are being developed and implemented for freight applications. Broadening the use of remote screening technologies such as Weigh-In-Motion and PrePass technologies for motor carriers and setting the framework for monitoring, researching, developing, and supporting technologies applicable to the STH system and other transportation modes are both great examples of how use of appropriate technologies can be of benefit to transportation system users.

Support an increase in the availability of truck parking at state-owned facilities and raise the awareness of its availability

Although access to safe and convenient parking areas for trucks is essential for a robust freight transportation network, truck drivers consistently have difficulty finding areas to safely rest. In 2013, a MAP-21 survey revealed that 83 percent of drivers routinely took longer than 30 minutes to find parking.[6] This presents two potential problems. First, this loss of productivity while searching for parking adds six percent or more to labor costs associated with moving goods through the national freight network.[7] Second, drivers who have not located parking before reaching their hours of service limits may park illegally or unsafely, often on the shoulders of highways, on off-ramps, or at abandoned facilities.

In response to these concerns, a Mid-American Association of State and Transportation Officials (MAASTO) partnership of Kansas, Indiana, Iowa, Kentucky, Michigan, Minnesota, Ohio and Wisconsin is developing a multi-state Regional Truck Parking Information and Management System (TPIMS). The project is funded through a $25 million Transportation Investment Generating Economic Recovery (TIGER) grant and state funds.

The Regional TPIMS is envisioned to be a network of safe, convenient parking areas with the ability to collect and broadcast real-time parking availability to drivers through a variety of media outlets including dynamic signs, smart phone applications, in-cab communications, and traveler information websites. The System's implementation in 2018 will help drivers proactively plan their routes and make safer, informed parking decisions. Since over-the-

[6] Mid America Association of State Transportation Officials, "Tiger Proposal 2015: Regional Truck Parking Information and Management System."
[7] Jason's Law Truck Parking Survey, 2013.

road truck drivers typically travel at least 500 miles in a day, they will benefit most from this seamless system unbound by state lines and capable of future expansion to additional freight corridors and states.

The Regional TPIMS will be deployed at over 150 parking sites on high-volume freight corridors including: I-35, I-64, I-65, I-70, I-71, I-75, I-80, I-94 and I-135.[8] These routes are among some of the most important corridors in the MAASTO region, with truck volumes on many of these routes already exceeding 25,000 trucks per day and expected to grow. These high truck volumes create congestion at parking sites, making it difficult for truck traffic to easily locate safe, convenient parking during peak rest hours.

MAASTO's Regional TPIMS is the first such regional effort in America, leveraging efforts already underway in Michigan, Wisconsin, and Minnesota. This initiative offers a great opportunity to improve the country's global competitiveness while boosting the region's economic growth through improvements to freight movements to and from both coasts and significant corridors connecting with Canada and Mexico.

Highway Safety Policies and Strategies

As discussed in Chapter 6, *Transportation System Condition and Performance*, WisDOT will establish a prioritized series of practices to improve safety across all modes in the freight sector. Such efforts would build on existing actions already being taken by WisDOT's Division of State Patrol, including greater deployment of technology to detect safety concerns from commercial vehicle operation. WisDOT will use these and other methods to continue to identify the risks in freight transportation and continue to target operators for inspections and other compliance efforts. Specifically, WisDOT will continue to:

- Improve standards for infrastructure
- Identify freight-specific safety concerns and develop strategies for solutions

WisDOT also envisions support of future safety strategies emerging from the growth of connected vehicle technology, such as on-board warning systems that relay notification to trailing vehicles from commercial vehicles that are stopped or slowed due to incidents.

Improve standards for infrastructure

As mentioned in Chapter 7, *Freight Transportation Trends, Issues, and Forecasts*, highway design standards are continually researched, reviewed, and updated to ensure characteristics such as speed, lane width, shoulder width and slope, and stopping-sight distance meet current traffic requirements. Roadway engineering improvements during the past several decades have changed the mix of causal factors and injury outcomes for traffic crashes. Design tools such as guard rails, divided highways, cable barriers, clear zones, and shoulder-edge rumble strips not only reduce the negative influences of roadway design, roadway condition, or environmental factors, but also minimize the impacts of driver error.

These tools help keep vehicles on the road, and minimize the consequences of leaving the road – two key department safety goals. Roadway engineers apply both proactive and reactive tools in their efforts, such as designing facilities, including roundabouts, to modify driver speed behaviors. This requires engineers to anticipate potential problems and determine how drivers could avoid them, while at the same time identifying existing

[8] Mid America Association of State Transportation Officials, ""Regional Truck Parking: Truck Parking Information Management Systems (TPIMS)."

problems and designing the facilities to eliminate or reduce their impacts. WisDOT will continue to improve safety standards for infrastructure.

Identify freight-specific safety concerns and develop strategies for solutions

WisDOT will examine motor carrier inspection and crash records (for highway modes), federal safety reports (for highway and non-highway modes) and other available sources to develop and prioritize a list of the safety concerns that are specific to freight equipment and operations. By understanding the types of problems and the scale of their impacts to safety, WisDOT can better target efforts to improve safety in the freight transportation sector, as well as the traveling public as a whole (see Chapter 6, *Transportation System Condition and Performance*). This process will be integrated with the Department's Strategic Highway Safety Plan.

WisDOT also administers the Highway Safety Improvement Program (HSIP) and will use available data to identify "hot spots" for crashes. A portion of HSIP funds are used for local road safety project needs. Other projects include developing speed management guidelines for roadways, conducting intersection studies for major corridors, and analyzing cross-median crash data.

As WisDOT continues its efforts to improve the safety of the state's roadway network, including Wisconsin's local roads and bridges, WisDOT coordinates with local governments to manage available safety funding and program safety improvements. In addition, WisDOT coordinates with locals on data sharing, providing technical assistance, and addressing safety issues.

8.3 Local Roads Policies and Strategies

As discussed in Chapter 5, *Wisconsin's Transportation System Assets*, Wisconsin's locally-owned and maintained road and bridge system serves as a critical link in the state's total transportation network. With over 100,000 miles of county, town, and municipal roads and nearly 9,000 bridges, the local road network accounts for approximately 90 percent of Wisconsin's public road mileage.[9,10] Typically, these are local roads owned and operated by local jurisdictions.

As a critical companion to the STH, the local road system offers connections not only to local activity centers, but also to state and national facilities of importance such as ports and economic business centers.

Local roads connect to the STH, airports, rail stations, and bus and ferry terminals. They are the first, and usually last, link facilitating farm-to-market commerce and offer critical links for area businesses and tourists.

Local Road Functional Classification
The local road system classification is based on functionality. Functional classification is the process by which highways are grouped into classes according to the character of service they are intended to provide, ranging from a high degree of travel mobility to land access functions. For the purpose of the local road freight analysis, particular attention was paid to the *collector* functional classification because of their direct access to commercial and industrial areas, and this classification had data that could be analyzed. Collectors, by definition provide direct access to residential neighborhoods, commercial, and industrial areas. As the name implies, these routes collect and distribute traffic between local streets and arterials.

[9] Wisconsin Department of Transportation, Bureau of Planning and Economic Development.
[10] Wisconsin Department of Transportation, Bureau of Structures, "Annual Bridge Report." (April 2016).

Local Road Preservation and Safety Policies and Strategies

Preserving the local road and bridge system is critical to the continued growth of Wisconsin's economy. To support Wisconsin's local road and bridge system, WisDOT will:

- Assist in providing asset management strategies and tools for local governments to ensure that selected system preservation improvements provide cost-effective service life extension
- Work with local entities to identify and address key safety issues on the local system
- Partner with local governments to manage and invest in the local road and bridge network

Assist in providing asset management strategies and tools for local governments to ensure that selected system preservation improvements provide cost-effective service life extension

WisDOT will work with local governments to develop and adopt asset management strategies to extend the life of existing investments at the lowest cost.

Developing and adopting asset management strategies enables decision-makers to analyze preservation needs using data based on physical condition, safety, operation, function, and connectivity. While WisDOT has initiated efforts with the development and use of Wisconsin Information System for Local Roads (WISLR), gaps remain in data necessary to fully adopt and implement a local road network asset management approach (see Chapter 6, *Transportation System Condition and Performance*). To assist, WisDOT will focus on the following efforts:

- Continue to support WISLR as a data and pavement asset management tool
- Work with local entities to enhance their ability to quantify local road infrastructure needs

Work with local entities to identify and address key safety issues on the local system

WisDOT will continue its efforts to improve the safety of the state's roadway network, including Wisconsin's local roads and bridges. Addressing safety needs is critical regardless of where they occur. Depending on the location, the department's role and responsibility varies.

For the local road system, the department will work with local governments to manage available safety funding and program safety improvements, provide data, enhance analytical tools, and provide technical assistance to address safety issues.

Partner with local governments to manage and invest in the local road and bridge network

Decisions regarding transportation at the state and local levels will continue to emphasize cooperation and coordinated decision-making. All levels of government are responsible for transportation system management and efforts should be made to ensure that decisions are coordinated. WisDOT will continue to work with local governments when managing corridors to ensure that decisions regarding operations, access management, project planning design, or construction consider concerns and issues at the local level.

In addition, WisDOT will work with its stakeholders and local governments to evaluate issues and proposed actions regarding the transport of OSOW loads on Wisconsin's roads. Overweight trucks may accelerate deterioration of highways and bridges, and can result in the need for additional infrastructure investment. Allowing OSOW vehicles on Wisconsin's roadways requires a balance between increasing freight movements to meet economic development goals and minimizing impacts to local roads, highways, and bridges.

Local Road Safety Policies and Strategies

As WisDOT continues its efforts to improve the safety of the state's roadway network, including Wisconsin's local roads and bridges, WisDOT coordinates with local governments to manage available safety funding and to program

safety improvements. In addition, WisDOT coordinates with locals on data sharing, providing technical assistance, and addressing safety issues.

Local governments may use WisDOT data and technical assistance related to safety issues to prioritize applications for funding through WisDOT local programs. WisDOT local programs primarily rely on local governments and metropolitan planning organizations (MPO) to prioritize and, in some cases, select projects based on safety and other locally-determined criteria within funding limitations set by WisDOT for certain programs, project types, or geographical areas. This process allows local governments to consider safety improvements as part of an eligible project in any WisDOT local program.

As identified in Chapter 6, *Transportation System Condition and Performance*, WisDOT also oversees the HSIP and can use data software that can identify "hot spots" for crashes. A portion of HSIP funds are used for local road safety project needs. Other projects include developing speed management guidelines for roadways, conducting intersection studies for major corridors, and analyzing cross-median crash data. These studies fold into other tools, including the FHWA's urban demand models and the Decision Support System for WisDOT.

8.4 Railroad Policies and Strategies

As identified in Chapter 5, *Wisconsin's Transportation System Assets*, rail provides a low-cost alternative transportation mode for industry. Low-value, high-volume commodities are typically handled by rail. Rail cars transport millions of tons of coal for the state's electricity-generating plants. Train cars serve as rolling warehouses, which reduces inventory and warehousing costs, making Wisconsin manufacturers and producers more competitive in the global marketplace. Heavy machinery, manufacturing, auto assembly, and pulp and paper product manufacturing are some of the state's key industrial sectors that are dependent upon rail to deliver finished goods to domestic and foreign markets.

Freight Rail Preservation and Vitality Policies and Strategies

While the majority of freight rail in Wisconsin occurs on tracks owned and cars operated by one of the private Class I railroads, the state supports a small but important percent of the freight rail network. WisDOT's focus on freight rail has resulted in a 14 percent increase (2014 to 2016) in the state-supported rail system operating at Class 2 standards (speeds over 10 and less than 25 miles per hour with car loads of 286,000 pounds) (see Chapter 6, *Transportation System Condition and Performance*).[11] The state-supported rail system is critical for providing regional access to rail shippers and communities that wish to connect to the national rail system.

WisDOT recognizes the challenges Wisconsin shippers face (see Chapter 7, *Freight Transportation Trends, Issues, and Forecasts*). WisDOT works to ensure that freight rail remains a viable mode of transportation for Wisconsin shippers. The action steps identified in this section are in response to service issues raised by shippers and communities that rely on freight rail service.

[11] Wisconsin Department of Transportation, MAPSS.

The railroad policies identified in this chapter are:

- Preserve rail corridors, including rights-of-way, for freight service
- Work with stakeholders to facilitate a discussion to develop an intermodal strategy for Wisconsin
- Maintain state-owned rail lines to allow service levels to continue uninterrupted and without additional restrictions
- Acquire rail lines into public ownership, when appropriate, to preserve essential railroad service
- Fund track upgrades for publicly-supported rail lines to meet changing industry standards

Preserve rail corridors, including rights-of-way, for freight service

WisDOT will continue efforts to preserve rail freight service when the service is judged essential, cost effective, and financially viable based on transportation efficiency cost-benefit analyses.

While the state is committed to maintaining essential freight rail service for Wisconsin communities, this must be balanced with preservation of the existing system. WisDOT will continue to work with communities and shippers to assess opportunities to acquire railroad lines if they are deemed essential to maintaining the state's short line rail service. Historically, Wisconsin's focus for short line/regional rail service needs has centered on two components: preservation of key rail corridors through acquisition or rail banking, and infrastructure improvements to meet industry standards. WisDOT's Freight Rail Preservation Program (FRPP) helps to fund rail line acquisitions. The program is also the primary funding source used to improve the infrastructure of state-owned lines. At current funding levels, the department's focus is on prioritizing preservation of the existing publicly-owned network to ensure stewardship of the system. Acquisitions remain a focus and are considered on a case-by-case basis. The rail transit commissions (RTC) have contracted with the Wisconsin and Southern Railroad (WSOR) to operate the majority of this network for a period of 40 years (expiring in 2047). A number of smaller railroads operate over other rail lines.

WisDOT works with railroads to maintain, improve and increase service in Wisconsin. By monitoring railroad activity and creating partnerships among businesses and railroads to increase the use of rail, it is hoped there will be fewer service reductions and, as a result, fewer abandonments and rail line acquisitions. Despite these efforts, rail lines can be taken out of service or be abandoned.

When preservation of rail service is not possible and a railroad abandons a rail line, the department shifts to a rail corridor preservation approach. Rail corridor preservation ensures that rights-of-way can be used in the future for transportation purposes. In the interim, the corridors can be developed as recreational trails commonly known as Rails-to-Trails.

FAC Input: Rail Service, Access, Competition & Options

Many of the state's top industries depend on rail service for timely, cost-effective transportation of raw materials and finished products, using both state-owned and privately-held corridors and operators. Therefore, infrastructure conditions, performance, and availability of freight rail service are critical factors in the state's overall economic competitiveness.

Attendees at the September 16, 2015 Freight Advisory Committee meeting saw a number of roles for WisDOT in improving rail access/service. FAC members suggested the first role is to facilitate public-private partnerships for economic development. A second role is to educate the public and the business sector on the role of rail.

Additionally, attendees complimented WisDOT for being more engaged than other states in rail preservation, and requested WisDOT take a more proactive approach to improve education and promote:

- Freight Railroad Infrastructure Improvement Program (FRIIP) and FRPP programs, fully marketing these rail programs and their economic development potential as a goal.
- Development of more regional railroads (such as WSOR), encouraging Class I lines to sell their light density lines to WisDOT, which would then contract for operation. The objective for the state should be, at a minimum, preserving right-of-way.
- Evaluation of what corridors should stay in service to ensure strategic connections are retained.
- Collaboration with other agencies and with Class I railroads to help grow business along existing rail lines.
- Encouragement of public-private partnerships, including input from railroads, rail customers, manufacturers, and third-party logistics companies. One important goal of these partnerships should be to obtain quality data on freight movement needs from businesses and use that data to establish the viability of rail service – whether provided by a Class I or a short line.

- The condition and availability of rail cars, particularly log and box cars for the paper industry, drew concern and suggestions for state involvement.
- Wisconsin's role in track and bridge safety inspections is also a concern, especially in cities.

Another option for corridor preservation is to rail bank or land bank a corridor. WisDOT, alone or with local partners, may purchase track and land (rail bank) or land only (land bank). In this case, the corridor is not used as a trail in the interim. Rail banking is an option when local partners have plans to restore rail service in the near term. If attempts to generate business fail, then it is possible for the corridor to be used as a trail under the National Trails System Act. In cases where there is no interest by either the state or local communities to preserve a rail corridor, the rail corridor is allowed to be abandoned, and the property is returned to the owners. Funding for most land acquisitions for Rails-to-Trails will continue to come from the Wisconsin Department of Natural Resources (DNR).

Rail service in some communities could be restored during the life of this plan. Decisions to restore service may be based on economic feasibility, creating system redundancy, or other considerations. A redundant transportation system can provide "backup" or alternative routing for other freight modes, and provide relief from congestion that may occur on national rail corridors. Creating redundancy may also support homeland security efforts and provide alternate routing.

Work with stakeholders to facilitate discussion to develop an intermodal strategy for Wisconsin

WisDOT already works with railroads to maintain, improve, and increase service in Wisconsin. The department will not only continue to do this, but also facilitate discussions with key stakeholders to better understand opportunities for intermodal service in the state. Specifically, WisDOT will work with stakeholders to develop an intermodal strategy that articulates state intermodal service issues, as well as the role of WisDOT and its partners in addressing the issues.

Intermodal and Transload Facilities

Intermodal Facilities: In its broadest sense, intermodal freight is any freight load that is transferred at least once between transportation modes during shipping. This could cover bulk (unpackaged commodities such as iron ore, gravel, corn, etc.) or containerized loads (commodities shipped in a container) transported by truck, rail, air, vessel, and/or pipeline from origin to final destination. The freight sector has adopted a narrower definition as the transport of shipping containers and truck trailers by rail.[12]

Transload Facilities: Transload freight may follow part or all of the same route between origin and destination points, but it is not containerized. Transload freight may include:

- Rail carloads being unloaded at a warehouse to be distributed via truck to customers
- Bulk ores or grains transferred from rail car to vessel
- Petroleum products shipped via pipeline to terminals where specialized trailers are loaded and trucked to gasoline stations or other customers

Wisconsin's location between two major freight hubs - Chicago and the Twin Cities - places it at a competitive disadvantage for attracting and retaining true intermodal freight facilities, but that is not to say that there are not pockets of opportunity for service enhancement. For example, the desire to re-establish an intermodal freight facility in the Green Bay area is noted in local long-range plans and other reports, as well as mentioned by Green Bay-area stakeholders during the SFP consultation process. Within the last two years, the states of Kansas and Iowa both further explored their role in intermodal and transload facility development and could serve as best practices for WisDOT.

[12] Association of American Railroads, "What We Haul: Intermodal."

FAC Input: Intermodal Facilities

Intermodal facilities are designed to transfer containerized shipments between rail and truck. Over the past two decades, at least four intermodal facilities in Wisconsin have been closed, forcing shippers to use highway drayage to and from higher-volume facilities in Illinois and Minnesota. The remaining two facilities - Chippewa Falls and Arcadia - retain their operations due to their major customers (Menards and Ashley Furniture, respectively). The FAC explored WisDOT's role as it relates to the establishment and operation of intermodal facilities.

Attendees at the April 23, 2015 Freight Advisory Committee meeting offered a number of suggestions regarding potential WisDOT solutions to intermodal freight transportation barriers. FAC members suggested solutions could include:

- Collaborating with local economic development agencies and local governments
- Exploring opportunities through short-line rail
- Closing communication gaps between government, railroads, and private enterprise
- Conducting more "value of" studies
- Maintaining safe roads for trucking and providing quality systems across all modes
- Working with railroads to improve connections between one railroad and another
- Studying and identifying traffic and ocean connections, and informing private terminal operators to encourage appropriate placement/development
- Providing education on the benefits of intermodal freight
- Working as a facilitator with other agencies
- Better utilizing free trade zones
- Thinking macro/globally and how local products and business fits into the big economic picture

Maintain state-owned rail lines to allow service levels to continue uninterrupted, and without additional restrictions

WisDOT will work with operating railroads to maintain, improve, and, where possible, increase service in Wisconsin. As identified in Chapter 2, *Transportation Stakeholders and Institutions*, RTCs were created under the provisions of Wisconsin Statutes 59.968 and 66.30 to help preserve rail service or the potential for rail service, and to influence policies on the future use of rail corridors if existing rail service is proposed to be discontinued.

RTCs originally emerged as a mechanism to provide state funding in support of railroad improvements when the state was constitutionally prohibited from directly funding rail improvements through railroad operators. Even though the 1992 passage of an amendment to the constitution allows state funds to be used for railroad improvement purposes, the mechanism of public ownership with the RTCs remains. Grant agreements between WisDOT and RTCs determine how the lines can be used. There are seven RTCs currently operating in Wisconsin, and they are responsible for the oversight and management of the state's publicly-supported 718 miles of rail lines.[13]

The commissions continue to be an important partner with WisDOT in preserving rail service. In this partnership arrangement, WisDOT provides resources, information, staff support, general oversight, and funding. The commissions provide matching funds and coordinate with shippers, freight rail operators, and local governments.

While WisDOT has the ability to purchase rail lines, RTCs have the ability to enter into partnership arrangements with railroads and WisDOT to manage the rail service. RTCs provide matching funds for the purchase and

[13] Wisconsin Department of Transportation, Bureau of Transit, Local Roads, Railroads and Harbors.

rehabilitation of rail corridors. They also contract with a private operator to provide the freight rail service. Wisconsin's publicly-supported rail lines are jointly owned by the state and a combination of RTCs, consortia, and/or transit authorities (collectively Rail Transit Commissions).

By monitoring railroad activity and creating partnerships among businesses and railroads to increase the use of rail, it is hoped there will be fewer service reductions and, as a result, fewer abandonments and rail line acquisitions.

Acquire rail lines into public ownership, when appropriate, to preserve essential railroad service

WisDOT will continue efforts to preserve rail freight service when the service is judged essential, cost-effective, and financially viable based on transportation efficiency cost-benefit analyses.

In the cases where those corridors are listed for abandonment or other disposition, WisDOT policy will continue to be to evaluate acquisition of these corridors, when supported by local partners, even if service cannot be preserved in the short-term. During the plan period, WisDOT will evaluate the potential for current and future service on light-density lines, and develop a series of criteria for corridor preservation and improvement.

WisDOT recognizes the importance for long distance rail transportation, but the department also has to balance acquisition needs with the costs associated with preserving and maintaining the rail system the department already owns. While no precise mechanism is available to identify a corridor's current and potential future value, consideration of a corridor's potential importance can be established in determining just how extensively WisDOT should preserve (and potentially rehabilitate) a rail corridor. Below is a ranking system for identifying the corridors, and the degree to which WisDOT would respond.

Lowest ranking – No Action. Line has no current or existing rail customers and is unlikely to have them in the near future. Line also does not connect to any port or transload facility, and does not comprise a segment of a larger corridor. Wisconsin DNR may consider a purchase as a recreational trail, or it would revert to private ownership.

Low Ranking – Acquire as Rail Bank or No Action (see Chapter 5, *Wisconsin's Transportation System Assets*)**.** Line has at least one of the following attributes to justify retaining it as a transportation corridor: 1) a potential customer base in the future, as demonstrated by the presence of rail-using businesses and/or comprehensive plans and zoning; 2) the line is a segment in a larger corridor that connects metropolitan areas within Wisconsin, or it connects Wisconsin to other states; or 3) the line serves a port or transload/intermodal facility. In situations where one of the three attributes exists, WisDOT may elect to either rail bank the line or take no action. If no action is taken, Wisconsin DNR may consider a purchase as a recreational trail, or the line would revert to private ownership.

Medium Ranking – Three Potential Opportunities based on the Attributes of the Rail Line. The relevant rail line attributes include the rail line having a potential future customer base, the line is a segment in a larger corridor connecting metropolitan areas within Wisconsin or connecting Wisconsin to other states, or the line serves a port or transload/intermodal facility.

1.) Acquire Rail Line as a Rail Bank Corridor. Line has at least two of the three attributes listed above. Rail banking is an option when local partners have plans to restore rail service in the near term. If attempts to generate business fail, it is then possible for the corridor to be used as a trail under the National Trails System Act.

2.) WisDOT Facilitates Discussions to Direct Lease the Rail Line to a Third Party Operator. Line has a current customer base and at least one of the other attributes above, or it serves an important regional economic role. Under this tier, the responsibility for repairs/rehabilitation would be borne by the owning and/or operating railroad, although businesses along the line could be eligible for the Transportation Economic Assistance (TEA) Grant Program.

3.) Acquire and Contract with a Third Party Operator. Line has a current customer base, at least one of the three attributes, and it serves an important regional role; or it has a current customer base and at least two of the three attributes. Under this tier, WisDOT and the RTC have joint ownership of a rail line, and the corridor would be eligible for limited FRPP funding. Additional rehabilitation costs would be borne by the RTC, the operating railroad, and/or customers along the line (who would be eligible to apply for the TEA Program).

Highest Ranking – Acquire and Lease, With Rehabilitation Program via FRPP. Line has a current customer base, at least two of the three attributes, and it serves an important regional economic role. Under this tier, ownership would be shared with a RTC, and a set per-mile level of rehabilitation costs would be assured through FRPP. Additional rehabilitation costs would be borne by the RTC, the operating railroad, and/or customers along the line (who may be eligible to apply for the TEA Program).

Fund track upgrades for publicly-supported rail lines to meet changing industry standards

Growth in rail movements has resulted in longer freight trains, which places a higher demand on the railroad infrastructure to carry longer carloads. To improve their carrying capacity, railroads are increasingly hauling heavier loads in each rail car – moving from 263,000-pound cars to 286,000-pound cars. Long distance freight trains are generally longer than passenger trains, with greater length improving efficiency. The length of a freight train may be measured in number of wagons (for bulk loads such as coal and iron ore) or in feet for general freight. Train lengths and loads on electrified railways, especially lower voltage 3,000 V DC and 1,500 V DC, are limited by traction power considerations. Drawgear and couplings can be a limiting factor, tied in with curves, gradients, and crossing loop lengths. Conventional freight trains in the United States can average nearly 6,600 ft. or 1.25 miles in length. Freight trains with a total length of three or four times that average are possible with the advent of distributed power units, or additional locomotive engines between or behind long chains of freight cars (referred to as a "consist"). These distributed power units enable much longer, heavier loads without the increased risks of derailing that stem from the stress of pulling very long chains of train-cars around curves. Nationally, freight trains are limited by air brake capability (electronically controlled pneumatic braked), which is usually approximately 180 wagons (nearly 10,000 feet or 1.9 miles in length). Track upgrades may assist in accommodating longer trains in Wisconsin.

In addition, Class I railroads are aggressively moving to maximize double-stacked intermodal trains. On routes with this service, railroads have been increasing clearances by raising bridges and lowering trackage to accommodate these containers. It is unclear whether other car heights will also be expanded in the future. Were that to occur, the railroads and WisDOT would need to work together to accommodate this larger equipment on state-owned corridors, as carload weights would increase and geometric clearance issues would become more prevalent.

As identified in Chapter 7, *Freight Transportation Trends, Issues, and Forecasts*, the state's short-line railroad system needs to be able to accommodate heavier car loadings prevalent on Class I railroads to meet industry demands. Two types of infrastructure improvements that will meet this need are:

- Track upgrades to industry standards (286,000 pounds)
- Bridge upgrades to handle heavier car weights

The state-owned system was rehabilitated to Federal Railroad Administration Class 2 Track Safety Standards after it was acquired in the 1980s. Market standards have since changed. Approximately 63 percent of the state-owned system can accommodate 286,000 pound cars. WisDOT will continue to work with RTCs, WSOR, other operators, and stakeholders to study the economic impacts of the publicly-owned rail system and the opportunity costs of this effort to accommodate heavier car loadings.

Rail Safety Policies and Strategies

WisDOT is the primary state agency responsible for roadway-railway crossing improvements statewide. WisDOT regularly improves crossings as part of highway projects. These improvements typically address crossing surfaces and active warning devices. Several WisDOT efforts address the security of roads, bridges, buildings, and other transportation assets including rail corridors and stations. Because railroads are typically owned and operated by private interests, WisDOT's enforcement efforts are focused on road traffic at grade crossings. WisDOT also promotes rail safety and security through its Internet site and educational programs such as Operation Lifesaver. At the planning level, WisDOT coordinates with local jurisdictions, MPOs, regional planning commissions (RPC), railroads, and RTCs in considering rail safety improvements.

8.5 Ports and Waterways Policies and Strategies

As identified in Chapter 5, *Wisconsin's Transportation System Assets*, in 2013, more than 28 million tons,[14] or approximately five percent of Wisconsin's freight by weight, worth over $2 billion (less than one percent of the total state freight value) was transported by and through ports and waterway facilities.[15] Despite the amount of freight transported by and through ports and waterway facilities, the waterways that surround Wisconsin, the Mississippi River and the Great Lakes, are underutilized as a means to move freight. Recent estimates indicate that the Great Lakes System is operating at about half its potential capacity. Reasons for this underutilization have to do with the type of commodities traditionally transported by water and the lack of intermodal connections.

Bulk commodities (e.g. grain, fertilizer, and iron ore) have different service requirements than goods shipped by trucks or air, which typically need to be shipped faster. While Wisconsin's waterways are connected to an extensive waterway network, that network is not necessarily well integrated into the road and rail systems (see Chapter 7, *Freight Transportation Trends, Issues, and Forecasts*).

Maintenance and Improvement of Waterways Policies and Strategies

To promote increased freight transportation and commerce along the Great Lakes and the Mississippi River, WisDOT will maintain and improve waterways critical to Wisconsin's transportation system. Specifically, WisDOT will:

- Explore the development of a maritime strategy for Wisconsin
- Provide state assistance programs for harbor improvements
- Advocate for federal funding of navigation and environmental improvements for the Upper Mississippi River-Illinois River Waterway, Soo Lock System, and the Great Lakes and St. Lawrence Seaway

[14] 2013 IHS Transearch Database.
[15] Ibid.

- Encourage comprehensive harbor and waterfront land use planning
- Examine roadway issues at ports

Explore the development of a maritime strategy for Wisconsin

To build on existing statewide and regional maritime transportation planning efforts, WisDOT will develop a freestanding maritime transportation strategy. A Wisconsin maritime transportation strategy will allow WisDOT to implement strategies to improve effectiveness and efficiency of Wisconsin ports as components of the state's multimodal transportation system.

WisDOT will also continue to coordinate with state, regional, and international partners to support maritime transportation as part of a safe, efficient, and seamless freight transportation network. This includes the Wisconsin Commercial Ports Association, Wisconsin Coastal Management Program, Upper Mississippi River Basin Association, United States DOT's Maritime Administration, Lake Carriers Association, United States Army Corps of Engineers (USACE), Wisconsin Economic Development Corporation, River Resources Forum, and the Conference of Great Lakes and St. Lawrence Seaway Governors and Premiers planning efforts.

Provide state assistance programs for harbor improvements

Wisconsin projects do not compete well for federal funding, which tends to go to high-volume harbors in other regions of the United States. According to a spring 2012 survey, Great Lakes harbors projected only one percent of port and private capital expenditures from 2012 through 2016 compared with other parts of the country.[16] While the state does not own any harbors, the department administers a Harbor Assistance Program (HAP) for commercial ports. The HAP supports and enables their port as an economic development resource, as well as a local and state transportation resource. Maintenance and rehabilitation projects are prioritized based on the review and recommendation of the state Harbor Advisory Council.

While the HAP recognizes and serves the economic diversity at Wisconsin ports, the focus of the program has been on projects that support freight at larger commercial ports that predominantly move freight. In looking at the entire program life, 67 percent of projects have supported freight at these ports. Projects supporting shipbuilding (12 percent of all projects), ferries (13 percent of all projects), and commercial fishing (8 percent) round out the projects. Further, 73.2 percent of the funds associated with these projects were invested in freight-supporting projects.[17]

Between 1980 and 2013, HAP distributed approximately $140 million for investment (based on 2013 real dollars). Approximately 60 percent of the HAP funding went to gateway ports, 18 percent was invested in diversified cargo ports, 15 percent went to limited cargo ports and approximately 6 percent of the funding went to other ports in Wisconsin.[18] WisDOT will continue to work with the Advisory Council to identify potential land- and water-side harbor improvement projects that may be funded through the HAP.

[16] American Association of Port Authorities, "U.S. Port Infrastructure Investment Survey 2012-2016." (May 31, 2012).
[17] National Center For Freight & Infrastructure Research & Education, "Wisconsin Commercial Ports Development Initiative - Final Project Report." (December 2014).
[18] Ibid.

Advocate for federal funding of navigation and environmental improvements for the Upper Mississippi River-Illinois River Waterway, Soo Lock System, and the Great Lakes and St. Lawrence Seaway

Upper Mississippi River-Illinois River Waterway: As referenced in Chapter 5, *Wisconsin's Transportation System Assets*, Wisconsin relies on access to the Mississippi River system for shipping transportation, recreation, and fishing. The system of locks and dams on the Mississippi and Illinois Rivers allow barge transportation along Wisconsin's western boundary, as well as from Milwaukee to the Gulf of Mexico. Key state industries such as agriculture, forestry, and mining rely on the efficient movement of freight via the waterway to drive competitiveness. The majority of commodities transported out of Wisconsin ports via river barges are agricultural-related items. Freight shipments by water face several challenges including seasonal water limitations, winter lock closures, antiquated lock systems, lack of dredging, and fluctuating water levels.[19]

In 2014, the United States DOT's Maritime Administration approved designation of the Upper Mississippi River from St. Louis, MO to St. Paul, MN as the M-35 Marine Highway Corridor. This designation, cosponsored by WisDOT, is a necessary step toward planning for an integrated, multimodal regional transportation system. WisDOT is working with the Upper Mississippi River Basin Association (UMRBA), a group formed by the Governors of Iowa, Illinois, Minnesota, Missouri, and Wisconsin to assess the current state of river navigation to evaluate ways to increase the efficiency and reliability of the lock and dam system, and identify opportunities to increase utilization of the Upper Mississippi River.

In fall 2016, the United States DOT's Maritime Administration awarded a $96,000 planning grant to the City of St. Louis Port Authority, along with three partners: Inland Rivers Ports & Terminals, Inc. (IRPT), Mississippi Rivers Cities & Towns Initiative (MRCTI), and UMRBA to support planning efforts focused on the development of containerized shipping along the Mississippi River, between New Orleans, LA, and Minneapolis, MN, and Chicago, IL.[20] With a twenty percent match shared among the St. Louis Port Authority, MRCTI, IRPT, and UMRBA, the total money available is $120,000.

Soo Lock System: Located along St. Mary's River in Sault Ste. Marie, Michigan, the Soo Lock System provides the only water connection between Lake Superior and the rest of the Great Lakes system. About 86 million tons of freight pass through the lock system each year, of which iron ore, coal and grain are the primary commodities.[21] These commodities account for approximately 90 percent of the total freight transported into and out of the Port of Duluth-Superior.[22]

The Soo Lock system is operated by the USACE. The system consists of two currently functioning locks. Currently, the Poe lock is the only Soo lock capable of handling the largest vessels in the Great Lakes fleet. Failure of this lock would prevent these large vessels from traveling between Lake Superior's ports and other Great Lakes ports. For this reason, the USACE recommends constructing a new Poe-sized lock. The new lock would provide needed capacity and redundancy to ensure reliable service to Lake Superior's ports in the future. However, full funding for the construction of this lock has not been included in any recent USACE's budgets.

---

[19] National Center For Freight & Infrastructure Research & Education, "Wisconsin Commercial Ports Development Initiative - Final Project Report." (December 2014).
[20] Maritime Administration, "Maritime Administration Awards $4.85 Million in Grants for Marine Highway Projects." (October 26, 2016).
[21] Sault Ste Marie, "Soo Locks - a Wonder of Engineering and Human Ingenuity."
[22] Duluth Seaway Port Authority.

Great Lakes and St. Lawrence Seaway: The Saint Lawrence Seaway is a system of locks, canals, and channels in Canada and the United States that permit ocean-going vessels to travel from the Atlantic Ocean to the Great Lakes, as far inland as the western end of Lake Superior. Great Lakes and Seaway shipping generates $18.1 billion in business revenue annually in the United States[23] International changes have affected shipping through the Seaway. Europe is no longer a major grain importer and big United States export shipments are now going to South America, Asia, and Africa. These destinations make Gulf and West Coast ports more critical to 21st-century grain exports.

WisDOT is a member of the Conference of Great Lakes and St. Lawrence Seaway Governors and Premiers. In June 2016, the Governors and Premiers approved an action plan to improve the efficiency and competitiveness of the Great Lakes maritime transportation system. Action items have been developed to increase maritime transportation efficiency and reduce costs, build new markets, increase economic activity, and plan for the future. The Conference of Great Lakes and St. Lawrence Governors and Premiers is transitioning to implementation of the plan.

Panama Canal: The Panama Canal expansion project, also called the Third Set of Locks Project, doubled the capacity of the Panama Canal in 2016. Key expansion components include the creation of a new traffic lane and the ability to accommodate more and larger ships. The increase in the size and depth of the locks will enable most larger container ships to use the canal, and will more than double its throughput capacity (measured by twenty-foot equivalent units).[24]

For Wisconsin, passage through the Panama Canal means that the state's agricultural goods, as well as oil and natural gas from the upper Midwest, will have a dramatically shorter trip from the Gulf Coast to ports in eastern Asia. This could also increase demand for shipping by railroads that move cargo from the Midwest south and toward the Gulf.

Wisconsin Commercial Ports Association Ports Development Initiative: Any increased freight activity at Wisconsin ports is expected to provide economic benefits in the form of jobs and business development, while also helping meet the burgeoning traffic demand on the region's highways and rail systems. In recent years, a focus has been placed on the Wisconsin Commercial Ports Development Initiative (WCPDI), which is an overarching vision and multifaceted strategic plan for the development of Wisconsin's commercial ports and Inland River system to more fully utilize and develop Wisconsin's port facilities (Chapter 7, *Freight Transportation Trends, Issues, and Forecasts*). WisDOT has supported and advocated for the statewide port planning effort. The development effort will support sustainable market attraction and growth at the ports as well as economic and community development that contributes to the overall well-being and quality of life in the State of Wisconsin. The first phase, completed in December 2014, included an asset inventory and assessment of priorities. The second phase, completed in October 2016, identified goods that could be more efficiently moved by water instead of other modes. WisDOT will continue to support the WCPDI.

Encourage comprehensive harbor and waterfront land use planning

Wisconsin port communities are faced with competing land uses for existing waterfront properties. With increasing demand for waterfront property, local officials must address the challenges of zoning conflicts between

[23] Great Lakes St. Lawrence Seaway System, "The Economic Impacts of the Great Lakes-St. Lawrence Seaway System." (October 18, 2011).
[24] Hofstra University, "Comparative Characteristics of the Panama Canal Expansion."

competing interests at the ports, such as recreation/tourism, housing developments, and commercial and industrial needs. Some of these competing interests could impact future freight activities at Wisconsin's ports.

RPCs, MPOs, and local governments typically handle local shoreline planning and development issues. Historically, WisDOT has had limited involvement with local shoreline planning and development issues. WisDOT will provide technical assistance to community planning efforts.

Examine roadway issues at ports

The road network that connects to the state's ports is a critical, but sometimes-overlooked, part of Wisconsin's transportation system. Typically, these are local roads owned and operated by local jurisdictions. Even though they are local roads, many are part of the National Highway System because they provide access to intermodal facilities. In some instances, these roads may be a low priority for improvement because they typically do not serve high volumes of passenger traffic.

In addition, the road network sometimes does not adequately serve OSOW trucks traveling to and from the ports. This can result in trucks traveling farther distances to avoid bridges with weight limits, areas with reduced clearances, or roadways with insufficient turning radii.

Since many of these local roads are part of the National Highway System, the state and local governments typically share responsibility for maintaining them. As part of WisDOT's freight planning and local roads coordination efforts, the department will work with local governments and Wisconsin's ports to identify solutions that address roadway issues for port areas (see Chapter 6, *Transportation System Condition and Performance,* and Chapter 7, *Freight Transportation Trends, Issues, and Forecasts*).

8.6 Air Policies and Strategies

As identified in Chapter 5, *Wisconsin's Transportation System Assets*, Wisconsin businesses use air freight to ensure the availability and freshness of products with short shelf lives, aid in just-in-time manufacturing and expand market reach. In 2013, almost 105,000 tons of air freight cargo was loaded onto planes, with a total value exceeding $10 billion.[25] Wisconsin has six airports offering regular air cargo service:

- Appleton International, Appleton
- Austin Straubel International, Green Bay
- Dane County Regional, Madison
- General Mitchell International, Milwaukee
- Central Wisconsin, Mosinee
- Rhinelander-Oneida County, Rhinelander

Cargo that moves by air tends to be items that are high-value, low weight/bulk, time-sensitive, or highly specialized. The most common commodity types include small packaged freight, transportation equipment, electrical equipment, machinery, instruments, photo equipment, and optical equipment, miscellaneous manufacturing products, and chemicals and allied products.[26]

[25] 2013 IHS Transearch Database.
[26] 2013 IHS Transearch Database, 2 digit STCC Codes used.

Airport Facilities and Infrastructure Policies and Strategies

Airports and aviation are integral parts of local, state, and regional economic development. An airport's ability to accommodate the needs of existing and prospective businesses is vital. To help improve the environment for business growth and retention, WisDOT will improve airport facilities and infrastructure by increasing the number of airports able to handle business airplanes. To accomplish this policy, WisDOT will:

- Use the Airport Improvement Program to help Wisconsin airports accommodate business planes
- Support the needed airport system infrastructure, including inclement weather capability, to enable and sustain jet aircraft and related activity

Use the Airport Improvement Program to help Wisconsin airports accommodate business planes

WisDOT will continue to use the Airport Improvement Program to assist with infrastructure improvements at Wisconsin airports. The Airport Improvement Program uses a combination of federal, state, and local funds. Airport infrastructure improvement projects that clearly support an immediate need by an existing business user, or that can be directly linked to job retention, job increases, income, and retaining a company located in the community, are given priority over projects intended solely to attract new business.

Support the needed airport system infrastructure, including inclement weather capability, to enable and sustain jet aircraft and related activity

In addition to helping airports improve runways, the Airport Improvement Program also funds other improvements typically needed by jet airports:

- Instrument approach systems
- Runway lighting
- Visual landing aids
- Expansion of taxiways and aprons
- Fuel storage
- Hanger space
- On-site weather information
- Terminal buildings
- Waiting areas
- Ground transportation
- Security

8.7 Pipeline Policies and Strategies

Wisconsin's pipeline system is used to move pipeline commodities into and through the state. The location of Wisconsin relative to large regional refining hubs, east coast markets, and active gas and oil fields in North Dakota and Alberta results in significant pipeline capacity being allocated to commodities traveling through the state. Additionally, Wisconsin's location results in the state being impacted by national and international crude oil and natural gas trends.

Wisconsin is not a producer of natural gas or crude oil, but the state relies on natural gas and refined petroleum products to fuel economic activity. Wisconsin's privately-owned pipeline system is used primarily for the transmission and distribution of natural gas, petroleum products, and to move crude oil through the state.

Wisconsin's over 74,800 miles of pipelines transported more than 29 million tons of natural gas and petroleum products, valued at almost $16 billion in 2012 (Chapter 5, *Wisconsin's Transportation System Assets*).[27]

Pipeline commodities are a key economic input into Wisconsin's economy. Pipelines are the preferred method to transport large volumes of liquids and gases over longer distances, due in part to lower costs relative to rail or trucking. Commodities transported via Wisconsin pipelines (e.g., crude oil, natural gas, propane, gasoline, fuel oil, and petroleum products) are key inputs for transportation, commercial and residential heating, energy production, manufacturing, refining, petroleum-derived products, and agricultural sectors.

Forces Driving Pipeline Strategies

In order to identify pipeline strategies, it is important to recognize key pipeline attributes, constraints, and drivers (see Chapter 5, *Wisconsin's Transportation System Assets*).

Pipelines move a considerable amount of freight: The volume carried by just the Enbridge Mainline in Wisconsin would require roughly 25 freight trains per day in addition to the five per day that already carry crude oil through the state.[28]

Consumption not production: Wisconsin is not a producer of crude or natural gas products. The vast majority of petroleum products (gasoline, diesel, propane, jet fuel) originate outside of Wisconsin. However, the Calumet Superior refinery, located in Superior, has a capacity of 45,000 petroleum barrels per day, producing gasoline, diesel, asphalt and heavy fuel.[29] The refinery receives its crude by pipeline (Enbridge) and rail car. The products from the refinery are delivered via the Magellan pipeline, tank truck, and rail car. Therefore, the state is directly affected by both in-state and out-of-state disruptions in production, refining or transportation.

Significant through traffic: Pipeline siting in Wisconsin, especially crude oil, is driven primarily by out-of-state factors. For example, production in Western Canada and refineries around Chicago and Michigan/Eastern Canada, result in significant pass through flows of crude oil. Wisconsin is also a pass through state for natural gas — the United States Energy Information Administration (EIA) estimates that half of the natural gas entering the state is not consumed in Wisconsin. Some petroleum products pass through the state, but Wisconsin is primarily a consumer of the petroleum products that enter the state.

Limited institutional agility: Pipeline commodities are variable over short periods of time, limiting the ability of WisDOT to respond proactively to emerging trends. The policy or investment options that the department can leverage to effectively address transportation constraints often take much longer to take effect than trends may last. Therefore, many of the department's traditional responses to addressing infrastructure problems cannot be effectively leveraged.

Day-to-day regulation is outside WisDOT: Pipelines are regulated primarily by federal and state institutions outside WisDOT. WisDOT may be involved in the approval of pipeline siting in department right of way. Additionally, WisDOT identifies pipelines during the roadway construction process to ensure the proper plans and supporting equipment are available in the event construction equipment hits a pipeline.

---

[27] CPCS, "2015 Wisconsin State Freight Plan - Wisconsin Pipelines: System Assets Condition and Outlook."
[28] CPCS, "Wisconsin State Freight Plan - Wisconsin Pipelines: Draft Final Report." (February 2016).
[29] Calumet Specialty Products Partners, L.P., "About Us."

Private transportation systems: The pipeline transportation system is privately owned, maintained, and operated. As such, WisDOT does not have a role in capacity, operational choices, and infrastructure investment.

Varied commodity supply chains: North American crude and natural gas generally move by pipeline from the well directly to the refinery. Whereas, petroleum product pipelines generally distribute major products from refineries to highly populated areas.

Constrained pipeline capacity affects other modes: The impact of insufficient pipeline capacity is the use of less efficient modes of transportation for the movement of crude, potentially congesting these modes for other users. The competition and connections between modes ensures that capacity constraints, inefficiencies, or challenges in one mode will impact other modes and, in turn, the economy.

Fast acting markets: Trends or significant events in oil or natural gas technology can significantly affect production levels, along with the flows of petroleum products both domestically and internationally. Additionally, the longevity of a trend or technology is subject to a variety of factors that have the potential to reverse trends or significantly change flows. The volatility of commodity markets and the potential for massive shifts in production and flow patterns make infrastructure planning difficult and subject to extensive uncertainty.

Demand varies by the season and weather: The consumption of petroleum products and natural gas varies seasonally, which is especially true for heating fuels such as propane. Similarly, natural gas varies seasonally as both a heating fuel and one used for energy production. Consumption is therefore dependent on temperature variation, as well as other factors such as precipitation.

Emergency events tax the system: An emergency issue affecting one pipeline inside or outside Wisconsin has the potential to constrain short-term supply. While the connection to natural gas and petroleum products directly impacts the delivery of products to the state, Wisconsin's crude oil pipelines supply refiners with inputs, which in turn supply the market. Similarly, when the pipeline system experiences an emergency event such as a rupture, the break in service may result in the use of other pipelines and/or modes of transportation to supply petroleum products to the market.

Pipeline commodities exhibit price volatility: Crude oil, natural gas, or petroleum products are subject to significant volatility based on commodity fluctuations. The price of crude oil and petroleum products is a function of a variety of factors, the majority of which are outside of the control of government, let alone WisDOT.

Pipeline Strategies

Pipelines are recognized as an important form of transportation. WisDOT has a limited and ancillary role relative to transport via pipeline. As such, no pipeline policies are proposed, but the department has identified the following pipeline strategies:

- Apply the Utility Accommodation Policy to all types of pipelines in Wisconsin
- Monitor trends in crude oil movements and their impact on other transportation users
- Coordinate with natural gas pipeline construction and participate in emergency response
- Enable modal connections, diversity, and provide system resiliency for petroleum product pipelines

Apply the Utility Accommodation Policy to all types of pipelines In Wisconsin

WisDOT has identified general pipeline strategies that are not dependent on a particular type of pipeline. General and commodity specific roles are based off the attributes, trends, and limitations presented above (see also Chapter 7, *Freight Transportation Trends, Issues, and Forecasts*).

The primary way in which WisDOT is currently involved with pipelines is through its Utility Accommodation Policy (UAP). WisDOT allows pipelines on STH right of way (ROW) if the use will not negatively impact the function of the roadway, the use is legal at a local, state, and federal level, and the use will not make future construction more difficult or costly.

WisDOT identifies potential intersections between the locations of pipelines relative to construction projects to ensure construction personnel are aware of their locations. Additionally, WisDOT ensures that the project has access to the equipment needed to respond to a pipeline incident, should it occur during construction.

Utility Accommodation Policy

WisDOT operates the STH to provide a safe and convenient means for the transportation of people and goods, and utility companies provide essential services to the public. Both WisDOT and utility companies provide facilities that consider present as well as future needs. Cooperation between the two entities is essential if the public is to be served at the lowest possible cost consistent with their respective public service needs, obligations, and interests.

WisDOT's utility accommodation policy (UAP) prescribes the policies and procedures that shall be met by any utility whose facility currently occupies, or will occupy in the future, any highway or bridge over which WisDOT has maintenance jurisdiction.

The UAP applies to all public and private utilities. It also applies to all existing utility facilities retained, relocated, replaced, or altered, and to new utility facilities installed on state ROW. Highway facilities (e.g., lighting, traffic signals, changeable message boards, etc.) operated by WisDOT for the purposes of motorist safety are not bound by the UAP.

Monitor trends in crude oil movements and their impact on other transportation users

Translating this approach to actions is limited by the minimal authority that WisDOT can exercise with respect to pipelines. As such, the actions focus on the impact of pipelines on other modes and the impacts on other businesses within the state. The following strategies are proposed:

WisDOT will monitor crude by rail frequency in the context of its multimodal planning strategy. The most efficient way to obtain data is to pursue a partnership with Wisconsin Emergency Management (WEM); less detailed data are also available from the United States Energy Information Administration. WisDOT is also using input from the FAC to serve as a barometer of rail performance. WisDOT can use this information to monitor crude by rail trends. In addition, in an effort to build partnerships with pipeline companies, WisDOT is working to encourage pipeline companies to participate in events, such as the Governor's Freight Industry Summits and FAC meetings.

WisDOT is assessing the impact of crude by rail flows in the SFP (see Chapter 6, *Transportation System Condition and Performance*). This assessment identifies users affected by crude by rail flows.

Coordinate with natural gas pipeline construction and participate in emergency response

Translating this approach to actions is limited by the minimal authority that WisDOT can exercise with respect to pipelines. As such, the actions focus on providing emergency support as required and identifying the issues faced in exercising the UAP. The following strategies are underway:

WisDOT is engaged in a support capacity in the event of an energy emergency. This role is primarily focused on coordinating and supporting the movement of needed energy inputs. WisDOT has a role in ensuring vehicles with weight or hours of service waivers are able to travel throughout the state.

WisDOT in coordination with the Public Service Commission (PSC) is exploring the implementation of the UAP to ensure it is enabling natural gas pipeline development without compromising the underlying need for the policy. Additionally, WisDOT will support the state's Energy Assurance Plan. WisDOT may identify additional justification for projects that are both needed and would positively benefit the ability of the state to respond to an energy emergency.

Enable modal connections, diversity and provide system resiliency for petroleum product pipelines

Much of WisDOT's approach to petroleum products is the same as natural gas, with the addition that product terminals should be included in freight planning activities.

The petroleum pipeline network is much less dense and integrated than the natural gas pipeline network, increasing the likelihood that a pipeline disruption affects a large portion of the state. In terms of vulnerability, closure of the West Shore Pipeline into Green Bay leaves Waupun and Milwaukee as the next closest terminals, and has resulted in petroleum products having to be shipped into Green Bay by truck and water.

WisDOT is considering a very similar role for emergency response with petroleum product pipelines as is suggested in natural gas. Namely, coordinating and supporting the movement of needed energy inputs. WisDOT also aids in ensuring vehicles with weight or hours to service waivers are able to travel throughout the state.

Generally, WisDOT's role in petroleum product pipelines is directly related to the PSC for pipeline citing and WEM as the lead coordinating agency in case of an energy emergency. As with natural gas pipelines, WisDOT in coordination with the PSC is exploring the implementation of the UAP.

Within the context of the SFP, Wisconsin is ensuring it includes petroleum terminals as part of their freight generators and freight modeling approaches (see Chapter 7, *Freight Transportation Trends, Issues, and Forecasts*). Inclusion of these assets not only reflects key locations of the freight transportation system, but also raises their visibility when planning future investments.

8.8 Factors Influencing and Supporting Freight Policies and Strategies

Support of freight transportation needs has a direct connection with overall transportation decision-making. The department's focus remains on the safe and efficient movement of people and goods. The SFP's policies for freight operations, facilities, planning, and overall functionality are based on several inputs and factors:

- Previously adopted long-range plans
- MPOs' and RPCs' long-range transportation plans
- Federal policy

Previously Adopted Long-Range Multimodal State Plans

WisDOT has a long history of established policies and best practices that guide agency actions and investment decisions. These have been developed over time based on industry standards, best practices identified and defined from experiences statewide, regionally, and nationally, comprehensive and quality data collection and analysis, and documentation via long-range plans.

Connections 2030 Freight Recommendations

Connections 2030 forms the platform for freight policies identified within the SFP. Those most supportive of freight transportation can be grouped into three categories – system preservation and maintenance, system performance and efficiency, and economic development – include:[30]

- System Preservation and Maintenance
    - Implement cost-effective maintenance activities on Wisconsin's STH infrastructure
    - Preserve Wisconsin's STH infrastructure
    - Preserve Wisconsin's airport system infrastructure
    - Maintain and improve waterways critical to Wisconsin's transportation system
    - Preserve the local road and bridge system
- System Performance and Efficiency
    - Improve standards for infrastructure
    - Continue and improve the performance of the Major Highway Development Program
    - Improve the reliability and efficiency of STH operations
    - Actively manage the daily operation of the STH via the STOC and other technology systems
    - Optimize traffic movement on the STH by utilizing tools to improve existing capacity and, where necessary, adding capacity
    - Manage access on Wisconsin's STH
    - Enhance the security of the transportation system by reducing vulnerability
    - Improve emergency response to make the transportation system more resilient
- Economic Development
    - Partner with stakeholders to ensure that freight movements are safe, reliable, and provide positive environmental and community impacts
    - Ensure that freight rail remains a viable transportation mode for Wisconsin shippers
    - Partner with consumers and businesses to increase transportation sustainability
    - Support individuals and businesses related to transportation by providing load assistance to Wisconsin businesses and communities

[30] *Connections 2030*, Chapters 5-11.

In addition to the statewide long-range plan, Wisconsin's fourteen MPOs and nine RPCs develop long-range plans which address/discuss freight transportation needs for urban and rural areas in Wisconsin. In order to have a comprehensive transportation system that enables the movement of freight, it is imperative that state, rural and urban plans align and support each other. Many of the policies in these plans share common themes, concerns, and recommendations. Local plan policies for freight are summarized in this section. Specifically, WisDOT will coordinate with MPOs, RPCs and local partners in the implementation and execution of their freight policy.

Metropolitan Planning Organizations and Regional Planning Commissions Long-Range Transportation Plans

The themes and topics below are summarized extracts from long-range transportation plans currently in place for MPOs and RPCs in Wisconsin.

Overall themes

- Support freight movement that is safe, multimodal, efficient, reliable, accessible, and economical.
- Maintain and/or increase investment in freight facilities and operations.
- Reduce congestion and travel delays in ways that benefit both freight and personal mobility.

Local Connectivity

- Establish policies or strategies for identifying the truck freight corridors of highest use, and ensuring these corridors have adequate infrastructure, receive proper signage, and are directed away from residential areas or areas otherwise not designed to accommodate them.
- Identify, design, and preserve corridors able to handle OSOW freight loads, especially near ports and/or along state borders.
- Identify the importance of improving freight connections and integration between modes, modernizing and improving coordination while reducing conflicts.
- Establish or re-establish intermodal terminals in their areas, along with the equipment needed to support those operations. Public-private partnerships are generally encouraged.

Safety and Security

- Establish goals of improving the safety of freight movements and ensuring the security of transportation facilities.
- Minimize or eliminate conflicts between freight operations, such as using grade separations to remove at-grade highway-rail crossings.
- Seek to reduce truck crashes through evaluation of crash data.
- Identify opportunities for system redundancy and resiliency to address security considerations.

Modal Improvements

- Efforts to showcase, maintain, and/or improve aviation facilities to meet the needs for air freight.
- Advocate for preservation of rail corridors and freight rail service, including data collection to support rail service levels and to help identify rail-served locations available for development or redevelopment. Track improvements are also recommended.
- Port goals include increasing the tonnage of goods shipments, improved connections with other modes (including potential containerized shipping on the Great Lakes), and deeper and wider dredging permits.

System Operations and Management

- Recommendations under this theme include greater use of technology to track and weigh commercial vehicles.
- The use of ITS technology is also identified as a means to improve congestion management.
- Integration of transportation technologies across different modes is also recommended.

Economic Development

- The plans that connect economic development and freight seek to reduce the overall impediments of the transportation system to shipping, trucking, manufacturing, and agricultural operations. Opportunities to enhance goods movement are promoted.
- One plan recommends directing transportation investment towards improving the sustainability of growing industrial sectors.
- Recommendations also include analysis of the connections and changes to the economy, and how to improve and redirect transportation networks as information is received.

Partnerships and Performance Measurement

- Plans call for better communication between the MPOs and the freight community, up to and including freight forums with shippers, federal and state agencies, and others.
- One plan calls for support of efforts in areas outside the region that improve freight movement to and from the region.
- Recommended performance measures include ATRI truck counts, use of WisDOT's Travel Demand Model, and other measurements of congestion and commodity flows.
- One goal expressed is to learn about and apply best practices on freight data analysis.

Federal Policy

The current Fixing America's Surface Transportation Act of 2015 (FAST Act) represents the strongest federal commitment to date for freight transportation by having a sharp focus on freight transportation and dedicating funding to states explicitly for freight projects and planning efforts, while requiring specific actions to qualify for that funding.

The FAST Act requires the United States DOT to create a National Freight Strategic Plan (NFSP), due in December 2017 (49 U.S.C. 70102). A draft version was prepared and released for comment in late 2015. The NFSP content includes:

- Assessment of the condition of the National Multimodal Freight Network (NMFN)
- Assessment of barriers to improved freight transportation performance (and opportunities to overcome those barriers
- Forecasts of freight volumes at 5-, 10, and 20-year intervals
- Identification of major trade gateways and national freight corridors
- Identification of bottlenecks that create significant freight congestion
- Corridors that support the energy sector, manufacturing, agriculture, or natural resources
- Best practices for improving NMFN performance, including rural and urban corridors critical to access the NMFN
- Best practices to mitigate the impacts of freight movement on communities
- A process for addressing multistate projects that encourages collaboration
- Strategies to improve freight intermodal connectivity

The FAST Act also requires the United States DOT to designate a NMFN by December of 2017 (49 U.S.C. 70103). The intent of the NMFN is to help states direct resources towards improving performance of freight movement on that network, inform freight transportation planning, and assist in the prioritization of federal investment. A National Multimodal Freight Policy is required to be established that is anchored through maintenance and improvement to the NMFN (49 U.S.C. 70101). The Fast Act specifies goals associated with this policy related to condition, safety, security, efficiency, productivity, resiliency, and reliability of the NMFN, while also reducing adverse environmental impacts.

The United States DOT is also required to improve and begin development of transportation investment and planning tools to support an outcome-oriented, performance-based approach to the evaluation of proposed freight-related and other transportation projects (49 U.S.C. 70202 [e]). One example of new investment tools is the Fostering Advancements in Shipping and Transportation for the Long-term Achievement of National Efficiencies (FASTLANE) competitive grant program offers federal funding for freight-specific projects. WisDOT was awarded a grant for the I-39/90 Corridor project in Rock and Dane counties.

The FAST Act established several new requirements for freight planning by state and local governments. The requirements that have shaped Wisconsin's SFP include:

Encouraging states to establish a state FAC, representing private and public freight stakeholders (49 U.S.C. 70201). The role of the FAC is to:

- Advise the state on freight-related priorities, issues, projects, and funding needs
- Serve as a forum for discussion for state transportation decisions affecting freight mobility
- Communicate and coordinate regional priorities with other organizations
- Promote the sharing of information between the private and public sectors on freight issues
- Participate in the development of their state's Freight Plan

Wisconsin's FAC was established by Governor Scott Walker in August of 2014. Through May 2017, the FAC has met five times.

Requiring states to develop a SFP to be eligible for funding under the National Highway Freight Program (23 U.S.C. 167), the SFP must comprehensively address freight planning activities and investments, both immediate and long-range. The plan must:

- Cover a five-year period
- Be fiscally-constrained
- Include a "freight investment plan" with a list of priority projects
- Describe how the state will invest and match its National Highway Freight Program funds
- Be updated at least every five years, and allow its freight investment plan to be updated more frequently

The Wisconsin SFP meets all of these federal requirements. As with the policies being carried forward from *Connections 2030*, WisDOT is incorporating the federal rules and initiatives.

THIS PAGE INTENTIONALLY LEFT BLANK

9– Chapter 9: Investment and Implementation

Chapter 9 details implementation and investment strategies recommended by WisDOT to implement the freight plan. The recommended implementation strategies carry out the vision and goals identified in Chapter 1, *Introduction* (referenced below).

This chapter builds upon the guidance defined in Chapter 8, *Freight Policies and Strategies*, and provides recommended investment and implementation strategies to facilitate the department's continued focus on providing a quality transportation system using available funds, implementing regulations, and integrating stakeholder feedback where appropriate.

Overview of Chapter 9
• Builds upon the policy direction (see Chapter 8, *Freight Policies and Strategies*) by guiding investments in Wisconsin's efficient, reliable, and safe transportation system, which supports freight movement. • Identifies current funding sources at both the federal and state level for freight transportation projects, as well as potential future funding sources.

The following highlights and discusses national initiatives informing the implementation of the Wisconsin State Freight Plan (SFP). In addition, this chapter offers background information on revenue and funding sources, as well as fiscally constrained challenges. Lastly, chapter 9 defines the department's implementation strategy for the plan, which will serve as a framework for putting the plan into action.

Implementing the Goals of the Wisconsin Freight Plan
Implementation and investment strategies are focused on achieving the plan's overarching goals of (see Chapter 1, *Introduction*): • Enhancing safety, security, and resiliency • Ensuring system preservation and enhancement • Enhancing system mobility, operations, reliability, efficiency, and connectivity

9.1 National Initiatives Informing State Freight Plan Implementation

National Freight Strategic Plan

The Moving Ahead for Progress in the 21st Century Act (MAP-21) mandated that the United States DOT produce a National Freight Strategic Plan (NFSP), and this was continued under the Fixing America's Surface Transportation (FAST) Act. The NFSP describes the freight transportation system and future demands on it; identifies major corridors and gateways; assesses physical, institutional, and financial barriers to improvement; and specifies best practices for enhancing the system. The NFSP also highlights strategies to help support freight transportation system needs through improved planning, dedicated funding streams and innovative technologies.

This first-of-its-kind document takes a comprehensive look at national freight needs and future challenges and offers a roadmap for improvements. It proposes solutions and strategies to address infrastructure, institutional, and financial bottlenecks that hinder the safe and efficient movement of goods. It also identifies many successful programs already in place to improve freight planning and investment, and it proposes new programs and ideas that could make more progress possible. Importantly, it also recognizes the benefits of establishing a strong freight program.

Fixing America's Surface Transportation Act[1]

As discussed in Chapter 8, *Freight Policies and Strategies*, the FAST Act includes a number of provisions focused on ensuring the safe, efficient, and reliable movement of freight. This Act includes a new $6.3 billion freight program, with money allocated to all states, with funds apportioned to a newly established National Highway Freight Program (NHFP). Money may only be spent on the National Highway Freight Network (NHFN) (a highway-only network – see Chapter 5, *Wisconsin's Transportation System Assets*) and only for projects that improve the movement of freight. States may use up to ten percent of their apportionments for freight rail and intermodal freight projects.

National Highway Freight Program Goals

- Investing in infrastructure and operational improvements that strengthen economic competitiveness, reduce congestion, reduce the cost of freight transportation, improve reliability, and increase productivity
- Improving the safety, security, efficiency, and resiliency of freight transportation in rural and urban areas
- Improving the state of good repair of the NHFN
- Using innovation and advanced technology to improve NHFN safety, efficiency, and reliability
- Improving the efficiency and productivity of the NHFN
- Improving state flexibility to support multi-state corridor planning and address highway freight connectivity
- Reducing the environmental impacts of freight movement on the NHFN

Generally, NHFP funds must contribute to the efficient movement of freight on the NHFN and be identified in a freight investment plan included in a state's freight plan (required in FY 2018 and beyond). Eligible uses of program funds range from adding or widening roadway shoulders to geometric improvements to interchanges and ramps to railway-highway grade separation.

The NHFN includes several subsystems of roadways, such as the Primary Highway Freight System (PHFS) and Critical Rural Freight Corridors (CRFCs) and Critical Urban Freight Corridors (CUFCs). NHFP funds can be used for the NHFN and its subsystems of roadways. The next section discusses the PHFS, CRFCs and CUFCs.

[1] Fixing America's Surface Transportation Act. H.R. 22 114th Congress. (2014).

National Highway Freight Network

The FAST Act directed the Federal Highway Administration (FHWA) Administrator to establish a NHFN to aid in strategically directing federal resources and policies toward improved performance of highway portions of the United States freight transportation system.[2]

The NHFN includes the following subsystems of roadways:

- **PHFS:** This is a network of highways identified as the most critical highway portions of the United States freight transportation system determined by measurable and objective national data. The network consists of 41,518 centerline miles, including 37,436 centerline miles of Interstate and 4,082 centerline miles of non-Interstate roads.
- **Other Interstate portions not on the PHFS:** These highways consist of the remaining portion of Interstate roads not included in the PHFS. These routes provide important continuity and access to freight transportation facilities. These portions amount to an estimated 9,511 centerline miles of Interstate nationwide, and will fluctuate with additions and deletions to the Interstate Highway System.
- **CRFCs:** These are public roads not in an urbanized area that provide access and connection to the PHFS and the Interstate with other important ports, public transportation facilities, or other intermodal freight facilities.
- **CUFCs:** These are public roads in urbanized areas that provide access and connection to the PHFS and the Interstate with other ports, public transportation facilities, or other intermodal transportation facilities.

Urbanized Areas

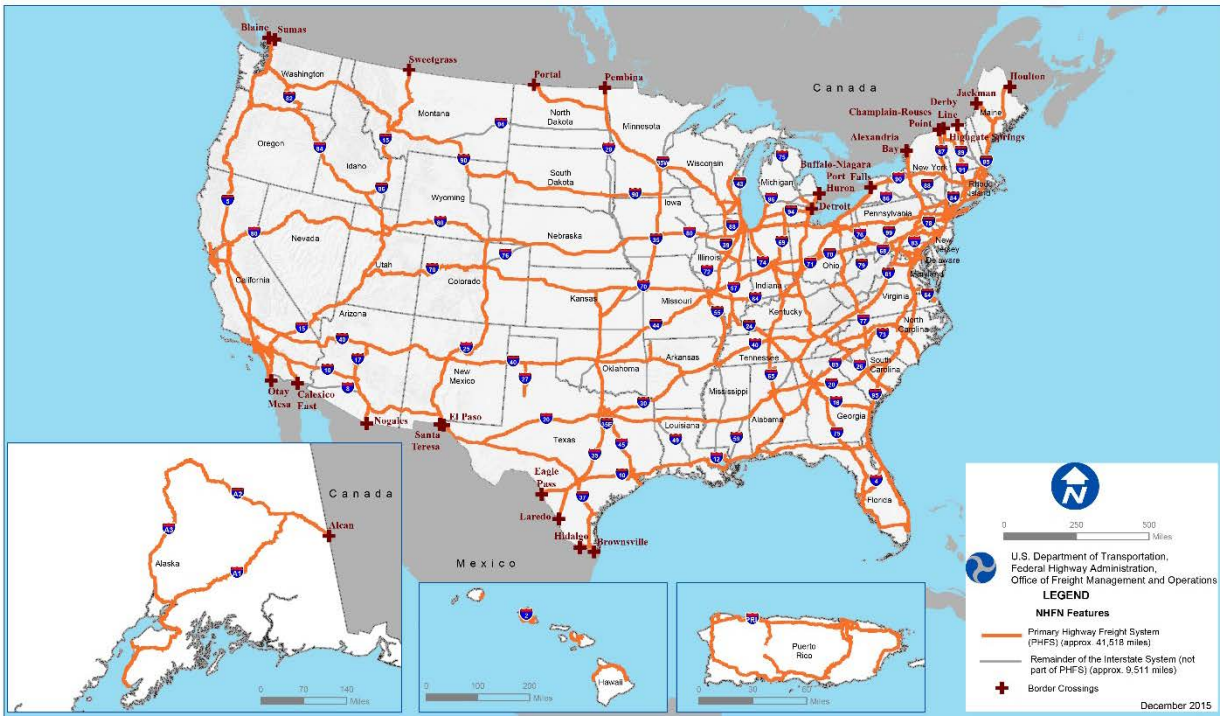
The minimum population for an urbanized area is 50,000, as defined by the Census Bureau. Being located inside or outside an adjusted urbanized boundary determines whether the public road can be designated as a CRFC or a CUFC. CUFC routes must be within the adjusted boundaries of an urbanized area. CRFC routes must be outside the adjusted boundaries of any urbanized area.

In an urbanized area with a population of more than 500,000, the Metropolitan Planning Organization (MPO), in consultation with the state, is responsible for designating the CUFC.

FHWA is responsible for designating and redesignating the PHFS every five years. States, and in certain cases MPOs, are responsible for designating public roads for the CRFCs and CUFCs in accordance with section 1116 of the FAST Act. State designation of the CRFCs is limited to a maximum of 150 miles or 20 percent of the PHFS mileage in the state, whichever is greater. State and MPO designation of the CUFC is limited to a maximum of 75 miles or 10 percent of the PHFS mileage in the state, whichever is greater.

[2] Federal Highway Administration, "National Highway Freight Network."

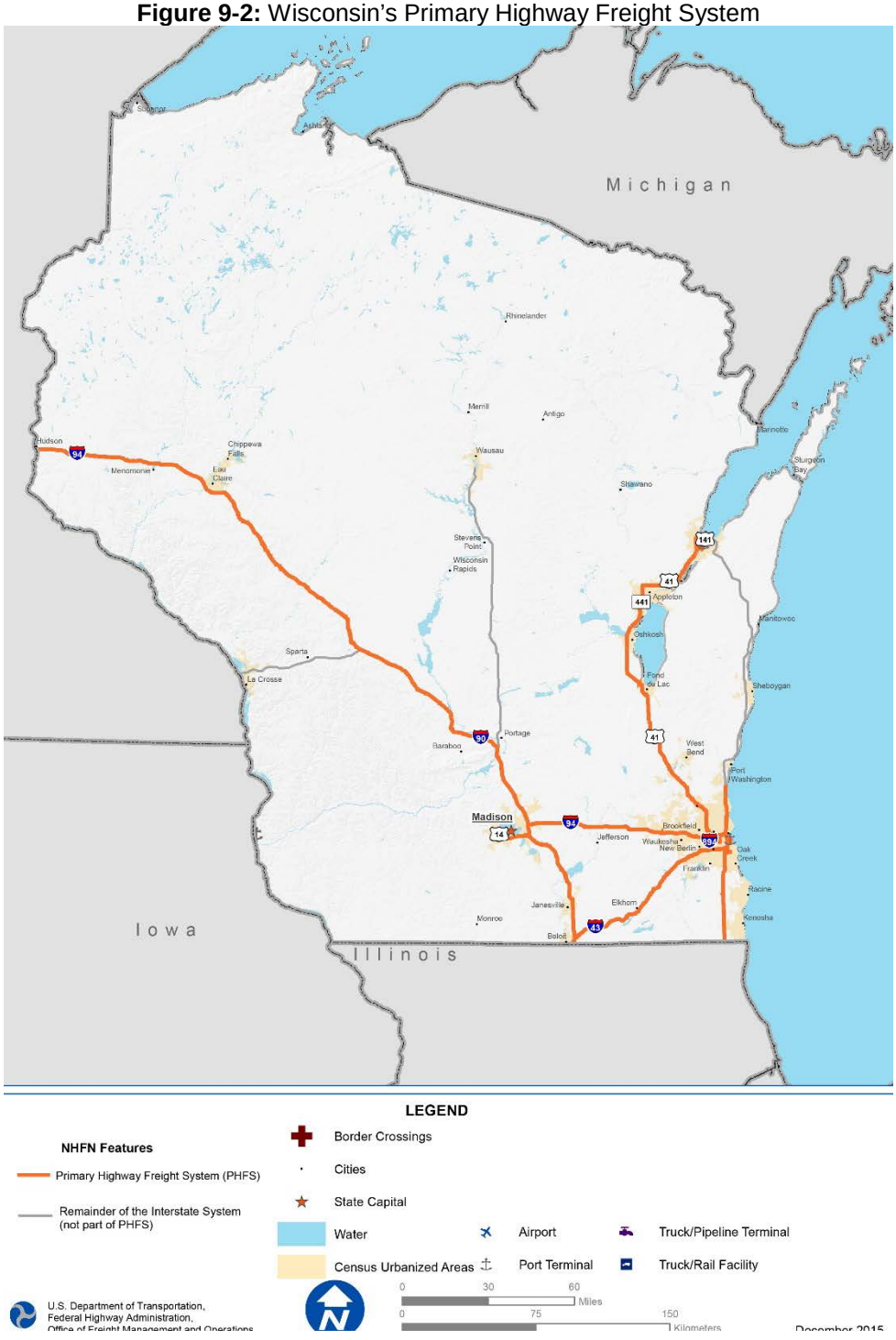
Figure 9-1: National Highway Freight Network



Source: U.S. Department of Transportation

There are approximately 909 miles of NHFN currently designated in Wisconsin. This number does not yet include CRFC and CUFC mileage because those routes have not yet been designated. Of the 909 miles, approximately 652 miles are designated as PHFS and approximately 257 miles are designated as Interstates not on the PHFS. Wisconsin's NHFN does not include critical non-Interstate highway Corridors 2030 Backbone routes, such as US 53 (Eau Claire – Superior), US 151 (Dubuque – US 12/18 in Madison and I-94 in Madison to Fond du Lac), US 10 (Menasha – Stevens Point), US 41 (north of Green Bay), and STH 29 (entire length from Chippewa Falls to Green Bay). The NHFN is shown in Figure 9-1 and Wisconsin's portion of the NHFN is shown in Figure 9-2.

Figure 9-2: Wisconsin's Primary Highway Freight System



Source: U.S. Department of Transportation

For Wisconsin, the maximum CRFC mileage is 150 miles and the maximum CUFC mileage is 75 miles. Once designated, NHFP funds may be applied towards Wisconsin CRFCs and CUFCs.

National Multimodal Freight Network

Recognizing the importance of multimodal connections, the FAST Act directed the United States Department of Transportation (U.S. DOT) to establish the National Multimodal Freight Network (NMFN) (Figure 9-3). This network is comprised of the following components: [3]

- NHFN
- Class I railroads
- Large public ports
- Inland and intracoastal waterways
- Great Lakes and St. Lawrence Seaway
- The 50 largest airports (annual landed weight)
- Other strategic freight assets

The United States DOT was also directed to consult with freight stakeholders, including state DOTs, to develop the final NMFN by December of 2017. States may propose additional designations to the network after considering nominations from MPOs, freight advisory committees (FAC), ports, airports, and rail and pipeline operators. The United States DOT must redesignate the network at least every five years.

The purpose of the NMFN is to inform planners and the public of national interest relative to major freight flows and direct special attention to freight issues as warranted. Many important freight opportunities will occur off the NMFN routes, including first- and last-mile links in urban and rural areas. However, the proposed version of the NMFN does not reflect the importance of Wisconsin's key corridors and connecting roads that are essential for multimodal freight mobility. With some small exceptions, the NMFN only includes Interstate Highways. Within the context of Wisconsin, the NMFN does not include a majority of the state's critical highways, such as US 53 (Eau Claire – Superior), US 151 (Dubuque – US 12/18 in Madison and I-94 in Madison to Fond du Lac), US 10 (Menasha – Stevens Point), US 41 (north of Green Bay), and STH 29 (entire length from Chippewa Falls to Green Bay).

National Multimodal Freight Network

The FAST Act directs the United States DOT to establish a NMFN designed to:

- Assist states in strategically directing resources toward improved system performance for the efficient movement of freight on the network
- Inform freight transportation planning
- Assist in the prioritization of federal investment
- Assess and support federal investments to achieve the goals of the National Multimodal Freight Policy and of the National Highway Freight Program

Railroad Classes

As identified in Chapter 5, *Wisconsin's Transportation System Assets*, the Association of American Railroads (AAR) and Surface Transportation Board (STB) classify United States railroads based on a combination of operating revenues and carrier characteristics. The railroads currently operating in Wisconsin are as follows:

- **Class I** – United States-based, line-haul railroads with operating revenue exceeding $447.6 million (as of 2017)[4]
- **Regional (Class II)** – line-haul railroads below the Class I revenue threshold that operate at least 350 miles of road and earn at least $20 million in revenue, or earn revenue between $40 million and the Class I revenue threshold regardless of mileage; note: AAR and the STB define Regional/Class II railroads' revenue levels differently[5]
- **Short Line (Class III)** – railroads with operating revenue of less than $35.8 million (as of 2017)[6]

[3] Federal Highway Administration, "Fixing America's Surface Transportation Act or 'FAST Act'."
[4] Surface Transportation Board, "FAQs."
[5] American Short Line and Regional Railroad Association, "Railroad Definitions."
[6] Surface Transportation Board, "FAQs."

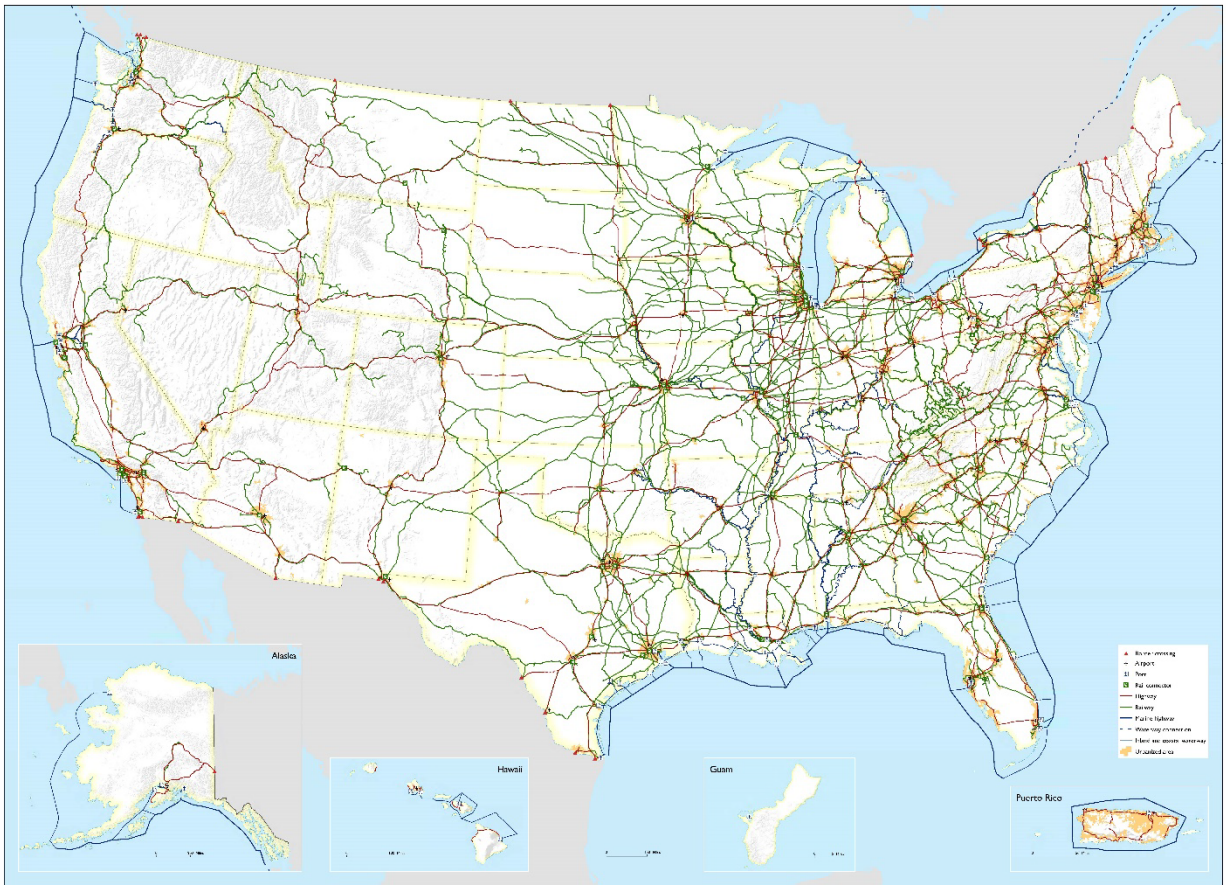
As it is currently proposed, the NMFN does not reflect the economic importance of Wisconsin's Backbone and Connector routes. As identified in Chapter 5, *Wisconsin's Transportation System Assets*, first designated as Corridors 2020 in 1988 and more recently updated as part of the state's long-range multimodal plan *Connections 2030* in 2009, Corridors 2030 is a state designation of critical highways statewide. As of 2016, these highways encompass approximately 3,930 centerline miles of federal and state highways that link all Wisconsin communities with populations greater than 5,000.[7] These roads are considered vital to mobility and economic development in the state. The Corridors 2030 system is divided into two route types:

- **Backbone Routes** – include approximately 1,590 miles of Interstate and other multi-lane divided highways interconnecting all regions and major state economic centers, with links to the national system outside Wisconsin. Routes include Interstates 39, 41, 43, 90, and 94; US Highways 10, 41, 51, 53, and 151; and State Highway 29.
- **Connector Routes** – include approximately 2,340 miles of predominantly two-lane highways connecting all other significant economic centers to the Backbone system.

The current version of the NMFN includes approximately 900 Interstate and highway routes, all Class I Railroads (including those out-of-service), General Mitchell International Airport, the Mississippi River (M-35) and Great Lakes (M-90) Marine Highways, and the Ports of Superior, Green Bay, and Milwaukee. It does not include any Class II or Class III lines (no Wisconsin & Southern lines are included) and it does not include either of Wisconsin's rail-truck intermodal facilities (Chippewa Falls or Arcadia). Figure 9-3 displays the overall interim NMFN and Figure 9-4 displays the portions of the interim NMFN in Wisconsin.

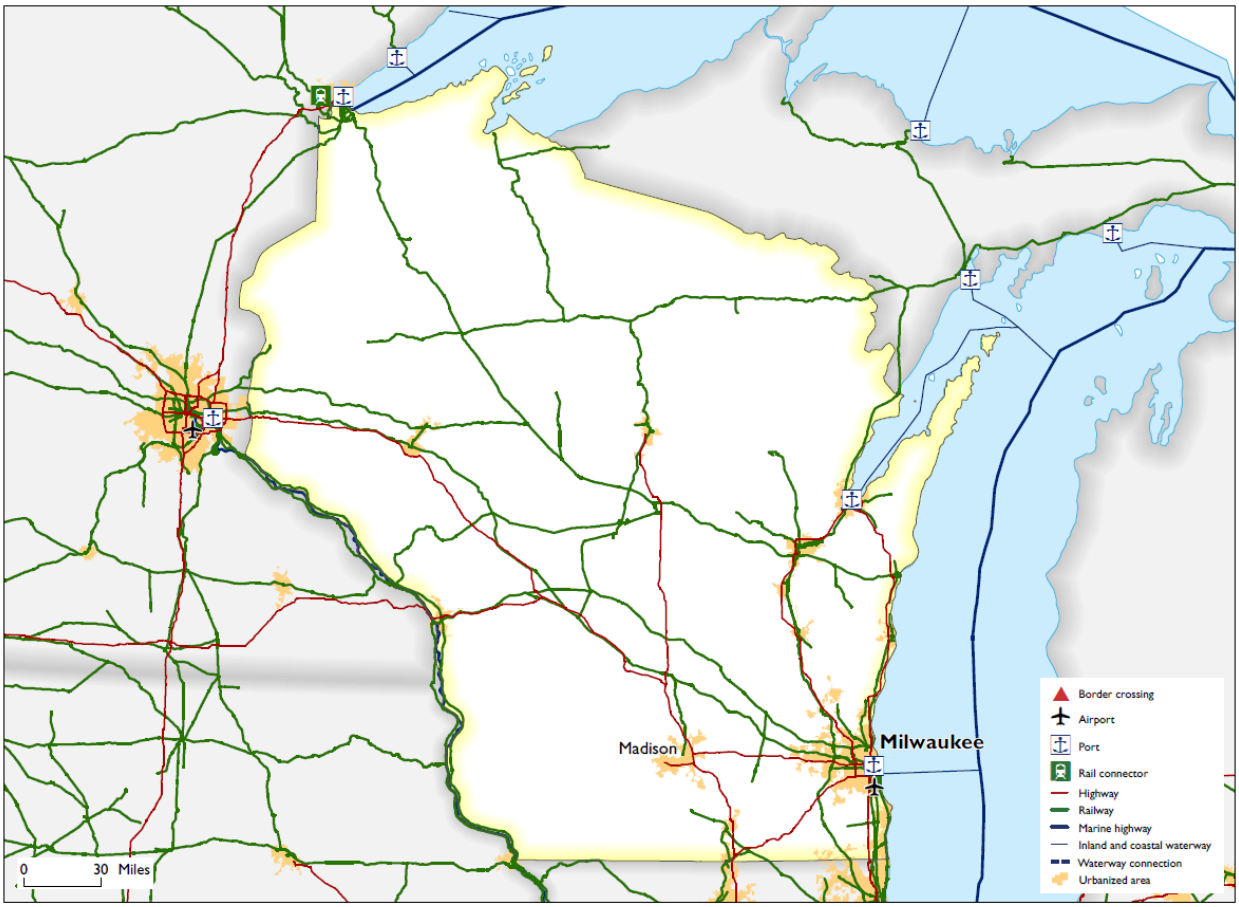
[7] Calculated using WisDOT State Trunk Network data.

Figure 9-3: Interim National Multimodal Freight Network



Source: U.S. Department of Transportation

Figure 9-4: Wisconsin's Interim Multimodal Freight Network



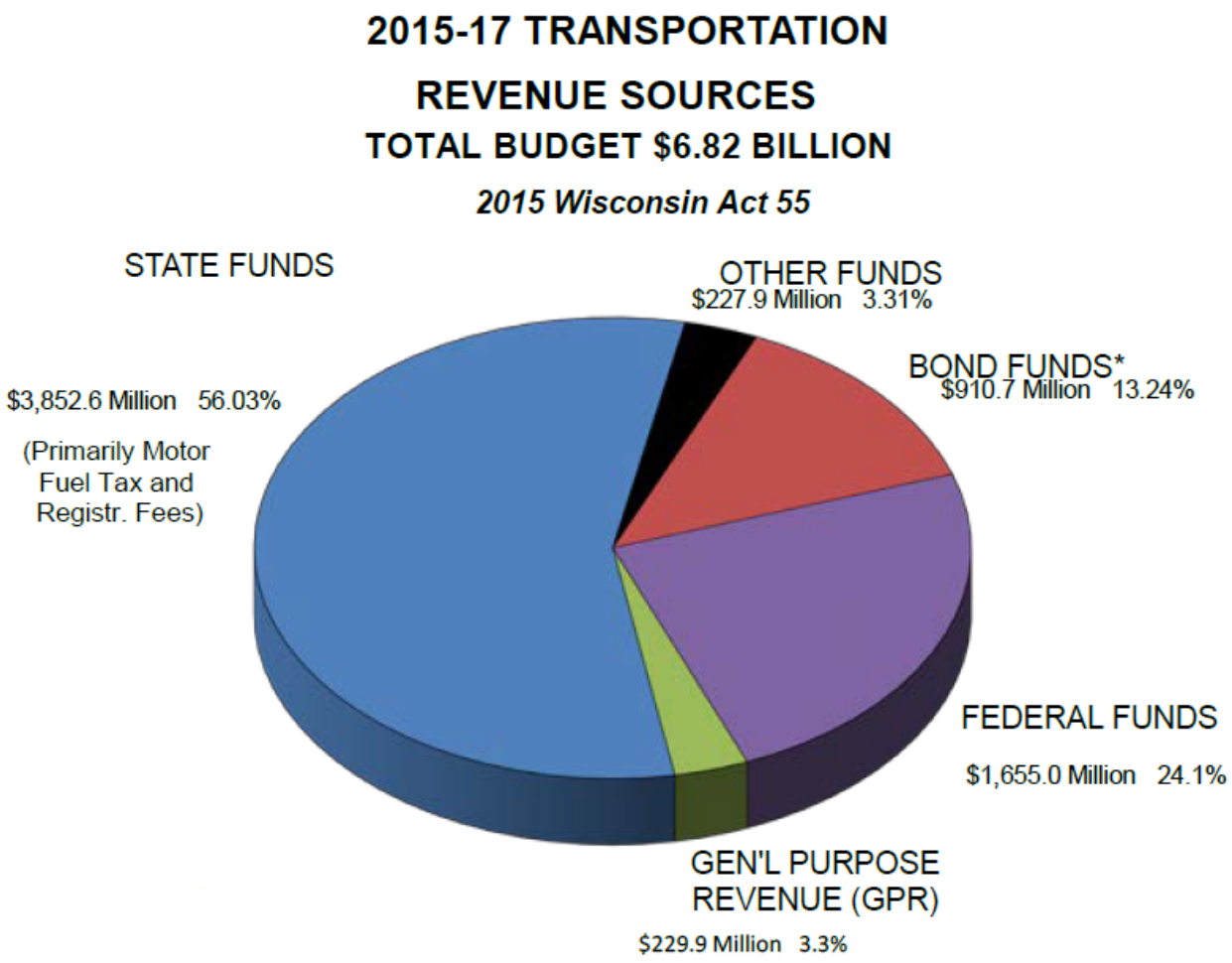
Source: U.S. Department of Transportation

9.2 Funding and Freight Plan Investment

Funding for Wisconsin's transportation system comes from several sources:

- Federal
- State
- Bonding
- Other funds, local and service funds, program, and general purpose revenue

Figure 9-5: 2015-2017 Transportation Revenue Sources



Source: 2015 Wisconsin Act 55

The following provides an overview of the available funding sources depicted in Figure 9-5, as well as financing mechanisms available to support freight-related projects. This section also discusses alternative funding and financing sources, and it identifies next steps after completion of the freight investment plan.

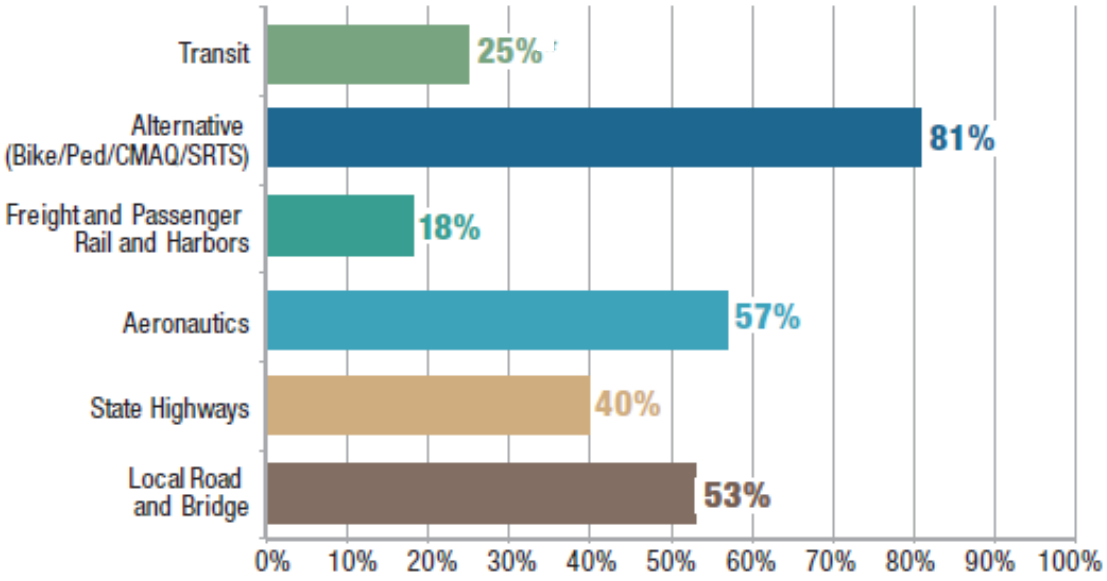
Federal Transportation Funding

Federal funds make up about 24 percent of the state's transportation dollars (Figure 9-5). Federal funds are governed by federal reauthorization legislation. The most current federal reauthorization legislation is the FAST Act. The FAST Act has increased the emphasis on addressing freight mobility issues and has provided funding in support of these directives.

The dedicated revenue sources for transportation at the federal level are similar to those in Wisconsin. More than half of transportation user fee revenues are derived from federal motor fuel taxes and are used to fund the federal Highway Trust Fund (HTF). Since 1993, federal motor fuel tax revenues have experienced a loss of purchasing power—about 40 percent since 1993 when the federal motor fuel tax was last raised.[8] Since 2008, transportation user fee revenues deposited into the HTF have been insufficient to cover authorized federal transportation program funding levels. As a result, Congress has transferred funds from the federal General Fund to the HTF to bridge the gap between spending and revenues.

Federal funds provide approximately 24 percent of current revenues to support transportation spending in Wisconsin. Figure 9-6 shows how Wisconsin's transportation programs rely on federal funding for a source of revenue based on the mode. For example, the primary federal sources of transportation funding are excise taxes on motor and aviation fuels. Other federal revenue sources include excise taxes on tires, heavy truck and trailer sales, heavy vehicle use taxes, and an air passenger ticket tax.

Figure 9-6: 2011 Federal Funding Contribution to each Transportation Mode in Wisconsin



Source: Wisconsin Transportation Finance and Policy Commission, "Keep Wisconsin Moving: Smart Investments, Measurable Results"

For some transportation programs, federal dollars represent a significant portion of the annual budget for their respective efforts, particularly for pass-through grants to other entities or units of government. As an example, 40 percent of the state's highway funding comes from federal sources.

Financing and funding programs available through the federal government are described in Table 9-1. Table 9-1 also includes program information regarding applicable transportation modes that may be funded with federal resources. All of these programs are administered by the U.S. DOT. The programs identified in Table 9-1 are programs that WisDOT utilizes to support freight-focused transportation needs.

[8] Congressional Budget Office, "Testimony - The Status of the Highway Trust Fund and Options for Paying for Highway Spending." (June 17, 2015).

Table 9-1: Federal Financing and Funding Programs

Federal Program Name	Mode	Project Eligibility Criteria
Highway Safety Improvement Program (HSIP)	Highway, Local Roads and Rail	Projects must be highway or local road safety improvement projects that can include any strategy, activity, or project on a public road that is consistent with the data-driven State Strategic Highway Safety Plan (SHSP) and corrects or improves a hazardous road location or feature or addresses a highway safety problem.
Airport Improvement Program (AIP)	Air	Eligible projects include improvements for safety, capacity, security, and environmental issues at public-use airports on the National Plan of Integrated Airport Systems. This includes most airfield capital improvements or repairs as well as some specific situations for terminals, hangars, and non-aviation development. Operations and revenue-generating improvements and costs are not eligible.
Congestion Mitigation and Air Quality Improvement (CMAQ) Program	Highway, Rail, Port and Intermodal Facilities	Projects must: 1) contribute to the attainment or maintenance of a national ambient air quality standard, with a high level of effectiveness in reducing air pollution, 2) be identified in an applicable MPO's current transportation plan and transportation improvement program (TIP) or the current state transportation improvement program (STIP) in areas without an MPO.
Surface Transportation Block Grant (STBG) Program (formerly known as Surface Transportation Program [STP])	Highway	Projects must preserve and improve the conditions and performance on any Federal-aid highway, bridge, and tunnel projects, and on any public road, pedestrian, and bicycle infrastructure, and transit capital projects, including intercity bus terminals. Projects may not be located on local or rural minor collectors.

Note: Additional U.S. DOT programs can be found at https://www.transportation.gov/livability/grants-programs

Fostering Advancements in Shipping and Transportation for the Long-term Advancement of National Efficiencies Grant Program

The FAST Act established the Fostering Advancements in Shipping and Transportation for the Long-term Advancement of National Efficiencies (FASTLANE) grant program to provide financial assistance – grants or credit assistance – to nationally- and regionally-significant freight and highway projects that align with the program goals to:

- Improve safety, efficiency and reliability of the movement of freight and people
- Generate national or regional economic benefits and an increase in global economic competitiveness of the United States
- Reduce highway congestion and bottlenecks
- Improve connectivity between modes of freight transportation
- Enhance the resiliency of critical highway infrastructure and help protect the environment
- Improve roadways vital to national energy security
- Address the impact of population growth on the movement of people and freight
- Mitigate the impacts of freight movements on communities

In 2016, WisDOT submitted two FASTLANE Grant Applications to improve regional mobility for freight. WisDOT was awarded $40 million for a portion of the I-39/90 project.[9]

[9] U.S. Department of Transportation, "FASTLANE 2016 Annual Report."

FASTLANE Grant – Eligible Projects
• Highway freight projects on the NHFN; • Highway or bridge projects on the National Highway System, including: o A project to add capacity to the Interstate system to improve mobility; or o A project in a national scenic area; • Freight projects that are: o A freight intermodal or freight rail project; or o A project within the boundaries of a public or private freight rail, water (including ports), or intermodal facility and that is a surface transportation infrastructure project necessary to facilitate direct intermodal interchange, transfer, or access into or out of the facility, o Provided that the project will make a significant improvement to freight movements on the NHFN, that the Federal share of non-highway portions of the project funds only elements of the project that provide public benefits, and that the total of Federal FASTLANE grants for non-highway portions of these projects does not exceed $500 million for fiscal years 2016 through 2020; or o Railway-highway grade crossing or grade separation projects

State Revenue and Funding

Similar to the structure of the HTF, state funding for transportation projects in Wisconsin originates from the state's Transportation Trust Fund. The Transportation Fund provides funding for state highways and bridges, local roads and bridges, operation and maintenance of the state and local highway system, airport and harbor improvements, and freight rail facilities. In addition, the Transportation Fund supports the safety and enforcement duties of the Division State Patrol, the Division of Motor Vehicles, and the administrative operation of WisDOT. In 2015, a State Constitutional amendment protecting the state's Transportation Trust Fund became law. The amendment requires revenue generated by use of the state transportation system to only be expended for transportation-related purposes.[10] The amendment passed the legislature twice and then passed a state-wide referendum in fall 2014.

Wisconsin's Biennial Budget Process
The State of Wisconsin's budget covers a 2-year period from July 1 of one odd-numbered year through June 30 of the next odd-numbered year. Development of the biennial budget involves a nearly year-long process. In the fall of the even-numbered year, state agencies submit budget requests to the Department of Administration. Requests are compiled by the State Budget Office for review by the Governor. The Governor is required by law to deliver the budget message to the new legislature on or before the last Tuesday in January, although the legislature can extend the deadline at the Governor's request. To meet the state's budgetary cycle, the budget should be signed and effective by July 1 of the odd-numbered year. If there is a delay, state agencies operate at their appropriation authority from the prior budget until the new budget is in effect.

[10] Wisconsin Department of Transportation, "Transportation Finance Issues - How does Wisconsin fund transportation?"

Transportation funding levels generally account for less than ten percent of Wisconsin's overall biennial budget. State transportation funding comes from federal and state sources (see pages 326-329 for more information on federal funding sources), but there may be some nuances associated with certain programs as cost sharing may be required. State sources include, but are not limited to, the statewide fuel sales tax, state motor fuel excise tax, vehicle registration fees, vehicle title fees, motor carrier permits and fees, and rental car fees.

Revenue

Motor fuel taxes, driver license fees, and vehicle registration fees generate the majority of state transportation revenue. These fees are combined with federal funding, proceeds from bonds, and revenue generated from communities (when they share in the costs), to fund state transportation projects. The state has taxed motor vehicle fuels since 1925 and over time it has experienced a few modifications and increases. Fuel tax is a critical funding source for transportation. In 2005, Wisconsin eliminated the annual indexing adjustment. The last adjustment occurred on April 1, 2006, when the motor vehicle fuel tax rate was raised to its current level of 30.9¢ per gallon.[11] In addition to motor fuel taxes, automobile registrations have been in place since 1905 and license fees have been in place for all Wisconsin drivers since 1939.

Bonding

Wisconsin uses two types of bonds to fund transportation projects:

- General obligation bonds
- Transportation revenue bonds

The state has used general obligation bonds since the late 1960s. Most recently, general obligation bonds helped finance the construction of highway projects; harbor and railroad projects; and various state highway rehabilitation projects. These bonds are repaid from the Transportation Fund or the state's General Fund.

Since 1983, transportation revenue bonds – bonds that are repaid from specific, pledged Transportation Fund revenue sources – have been used to pay for the Major Highway Development program. All vehicle-related registration and titling fees have been pledged for transportation bond revenue debt service since 2004. Previously, automobile and truck registration fees were the only pledged sources of revenue for these debt service payments. The biennial budget established by the state legislature and governor limit the amount of transportation revenue bond proceeds used to finance projects.

Historically, transportation revenue bonds have provided as much as 72 percent (in the 1992 fiscal year) of Major Highway Development Program funding, before decreasing to 57 percent in 1998. During the past decade, transportation revenue bonds have funded about 55 percent of allocated major highway program dollars.

Existing State Financing and Funding Mechanisms for Freight-Related Projects

WisDOT administers a number of programs that not only address transportation system needs, but also act directly as a catalyst for economic development in Wisconsin. These programs fund transportation projects at the state and local levels in the form of direct funding, grants, and loans to businesses and local communities for their transportation-related needs. Currently these programs include:

- Major Highway Development Program
- State Highway Rehabilitation (SHR) Program
- Southeast Wisconsin Freeway Megaprojects Program (Southeast Megaprojects)
- Major Interstate and High-Cost Bridges

[11] Wisconsin Department of Revenue, "Motor Vehicle Fuel Tax Information." (March 2015).

- State Highway Maintenance and Traffic Operations
- Local Roads Improvement Program
- General Transportation Aids
- Local Bridge Improvement Assistance (Local Bridge Program)
- Transportation Facilities Economic Assistance and Development (TEA) Program
- Surface Transportation Program – Rural
- Surface Transportation Program – Urban
- Surface Transportation Program – Freight
- Freight Rail Infrastructure Improvement Program
- Freight Rail Preservation Program
- Harbor Assistance Program
- Airport Improvement Program

The next several sections discuss the state's modal transportation programs identified above, which comprise the majority of the state's transportation spending.

Statewide Transportation Improvement Program (STIP)

The STIP is a four-year listing (program) of highway and transit projects for the State of Wisconsin. Revised annually, the STIP adopts the Transportation Improvement Programs prepared by the state's fourteen MPOs (see Chapter 2, *Transportation Stakeholders and Institutions*). The STIP is approved by FHWA and the Federal Transit Administration (FTA).

The STIP is prepared in accordance with FHWA/FTA regulations outlined in MAP-21 and carried forward in the FAST Act enacted in 2015. The STIP includes current project fund commitments anticipated by WisDOT during the current four calendar-year period.

The STIP is based on anticipated state and federal funds. This overall multi-modal STIP reflects WisDOT's currently approved state and local projects within the limits of apportioned federal aid. Any subsequent changes in the project listing involving the addition or deletion of projects or significant changes in project schedule or estimated cost are processed in accordance with the STIP amendment process prior to requesting obligation of federal funds on the project.

Metropolitan Planning Organizations (MPOs)

MPOs, established under 23 CFR 450, are federally mandated transportation planning organizations comprised of private citizens, state and federal representatives, and representatives from local government and governmental transportation authorities. MPOs are responsible for the planning and programming decisions within their designated urbanized areas of 50,000 or more population.[12] Federal funding for transportation projects and programs within the urbanized planning areas are channeled through the MPO planning process.

State Trunk Highway Program Financing and Funding Mechanisms

The management of the state highway program requires WisDOT to invest wisely and use federal funds efficiently. WisDOT's program and project delivery efforts are primarily focused on preserving the existing highway system. A smaller portion of funding is dedicated to projects that expand the highway capacity to improve safety and mobility.

[12] Statewide and metropolitan planning processes are governed by federal law (23 USC §§ 134-135).

The state's highway programs are:

- State Highway Rehabilitation (SHR)
- Major Highway Development
- Southeast Wisconsin Freeway Megaprojects
- State Highway Maintenance and Traffic Operations

The Department manages two separate bridge programs:

- The major interstate bridge improvement program, for projects involving a bridge that crosses a border of the state for which the state's share of the cost is at least $100,000,000[13]
- The high-cost bridge program, for bridge improvement projects with an estimated cost of at least $150,000,000 if the bridge improvement is not a major interstate bridge or part of a southeast Wisconsin freeway megaproject[14]

Planning, Programming, Design, and Construction in the Highway Improvement Program

The state highway program components involving construction projects (all components identified above except the state highway maintenance and traffic operations program) are sometimes collectively referred to as the highway improvement program. This program can be divided into four stages of development: planning, programming, design, and construction. This section describes these stages.[15]

Planning involves both the identification of long-term transportation needs and goals and the monitoring of conditions, such as pavement condition, traffic patterns, and safety.

In order to be eligible for federal transportation aid, the state must have a long-range highway plan covering a period of at least 20 years that outlines the state's broad policy goals for transportation and that establishes performance goals for the highway system. In developing a transportation plan, WisDOT must consider a range of planning factors, which are listed in federal transportation law. For instance, the plan must aim to promote economic vitality, safety, system preservation, transportation system security, and the accessibility and mobility of people and freight. It must also seek to protect the environment and promote energy efficiency and the connectivity between different transportation modes.

In addition to the requirements that are included in federal transportation law, the federal Clean Air Act requires WisDOT's transportation plan be coordinated with the state's implementation plan, developed by the Wisconsin Department of Natural Resources, which designates how the state intends to control emissions of pollutants in ozone nonattainment areas.

In addition, as a condition of using federal transportation aid, WisDOT must consult with the state's MPOs in developing the statewide plan. Federal transportation law requires each metropolitan area with a population greater than 50,000 to have a designated MPO representing local governments. Each MPO develops a metropolitan transportation plan in consultation with local governments in the region.[16]

---

[13] Statewide and metropolitan planning processes are governed by federal law (23 USC §§ 134-135).
[14] Ibid.
[15] Ibid.
[16] Wisconsin Legislative Fiscal Bureau, "State Trunk Highway Program - Informational Paper 40." (January 2015).

WisDOT's current, long-range transportation plan, *Connections 2030*, addresses all transportation modes, including state highways. In addition to providing an overview of the extent and condition of the various transportation modal systems, the report establishes 37 policy statements, designed to guide future decisions. Those statements are organized around these seven broad themes: preserve and maintain Wisconsin's transportation system; promote transportation safety; foster Wisconsin's economic growth; provide mobility and transportation choice; promote transportation efficiencies; preserve Wisconsin's quality of life; and promote transportation security. For the state trunk highway system, the plan makes a number of policy recommendations, particularly under the themes related to system preservation and economic growth.[17]

One aspect of the plan is the identification and update of the Corridors 2030 highway system. This system consists of approximately 3,930 miles of the most critical highways in the state. Within the Corridors 2030 system are two subsystems: the Backbone system and the Connector system. The Backbone system, totaling 1,588 miles, consists of the following primary segments over 50 miles in length, plus several shorter segments: (a) STH 29 from I-94 west of Chippewa Falls to Green Bay; (b) USH 53 from Superior to Eau Claire; (c) USH 151 between Fond du Lac and the southwestern border of the state; (d) USH 41 from the Milwaukee area to Marinette in northeastern Wisconsin; (e) USH 10 between the Fox Cities and Stevens Point; and (f) the entire Interstate system.

Most of the Backbone system consists of multi-lane freeways or expressways. Only one segment, USH 14 between I-39 and I-43 in Rock and Walworth counties, remains a two-lane highway. This segment is currently under study for improvements. The Connector system consists of about 2,309 miles of highway linking significant economic and tourism centers to the Backbone system. Most of the system consists of high-quality, two-lane highways, although there are several segments that are multi-lane freeways or expressways.

The programming stage involves selecting and scheduling improvement projects based on available funding and policy priorities. In developing this schedule, decisions must be made on which projects should be given highest priority, relying, in part, on the adopted highway plan, which outlines the broad policy goals of the highway program.

The task of programming projects is either done by staff in the transportation regions or by WisDOT's central office staff, depending upon the type of project. Major highway development projects, large or costly bridge projects, and rehabilitation of multi-lane highways outside of WisDOT's Southeast Region are programmed by the central office, while other rehabilitation projects are programmed by the regional transportation offices. The portion of the rehabilitation budget that is used for the more routine highway and bridge projects is allocated to the regions based on an estimate of the total rehabilitation needs within each region. Regional offices develop project schedules based on system priorities and the amount allocated to the region.

The WisDOT central office, in consultation with the regional offices, compiles program schedules for the following six years for the highway improvements programs into a comprehensive, six-year program. Updated periodically, the six-year highway improvement program provides a listing of all anticipated projects that indicates the type of project, the location, estimated cost, and scheduled construction date. The first two years of the six-year program are based on funding levels provided by the most recent biennial budget. The other years are generally based on

[17] Wisconsin Legislative Fiscal Bureau, "State Trunk Highway Program - Informational Paper 40." (January 2015).

this funding level, although the schedule for projects in the later years is more likely to change, since funding levels may be changed in subsequent biennial budgets.

The design process typically begins several years in advance of actual construction. For major highway projects, the design stage may take eight to 10 years, beginning with concept development.[18] Simple resurfacing projects may take one to two years. In part, the length of the design process is dictated by the amount of data that must be collected to complete required environmental reviews and to create the detailed plans for construction. Furthermore, because highway construction affects private landowners, as well as the driving public, WisDOT uses a public involvement process to receive and respond to multiple concerns regarding proposed projects.

In addition to the design work that is directly related to the construction of the highway, there are numerous other preconstruction activities that lengthen the process. For instance, WisDOT frequently must purchase land for the construction of a new highway or the expansion of an existing highway. This requires negotiation with affected landowners.

For many highway projects the design stage includes environmental studies and mitigation. If an initial environmental assessment on a project determines that the impacts of the project on the environment could be significant, federal and state laws require WisDOT to prepare an environmental document.

The construction stage involves the preparation of projects for bidding and the oversight of the construction work typically done by contractors. The receipt and award of bids is done within WisDOT's central office, while the management of project construction is done by staff in the regional transportation offices.

Once construction begins, a project manager monitors the work done by the contractor. Project managers may be WisDOT staff from the regional office or engineering consultants hired by the Department. Project oversight typically involves the monitoring of construction materials and techniques for quality and may involve making minor modifications to the design of the project to account for unanticipated contingencies. For some projects, the extent of WisDOT monitoring may be limited because the contracts contain warranty provisions that require the contractor to repair any defects that appear within a specified number of years after the completion of the construction.

State Highway Rehabilitation Program

WisDOT allocates funding in the state highway rehabilitation program between three subprograms: (1) existing highway improvement; (2) Backbone rehabilitation; and (3) state bridges.[19] The purpose of each of these subprograms is to preserve and make limited improvements on the state highway system.

Existing Highway Improvement and Backbone Rehabilitation

The existing highway and Backbone rehabilitation components of the program are responsible for highway surface improvement projects. The existing highway component is responsible for projects on state highways that are not Corridors 2030 Backbone routes. Highway rehabilitation projects can generally be divided into three main types: resurfacing, reconditioning (further classified as major or minor), and reconstruction.

[18] Wisconsin Legislative Fiscal Bureau, "State Trunk Highway Program - Informational Paper 40." (January 2015).
[19] Ibid.

The selection of specific projects is based on an evaluation of surface pavement condition, the number and severity of hills and curves, accident numbers and rates, and traffic congestion. This process, which is also used in preparation of the six-year highway improvement program, allows WisDOT to identify existing conditions and improvement needs.

In addition to these main highway rehabilitation types, the existing highway and Backbone rehabilitation components of the rehabilitation program fund a number of other activities, including: (a) pavement maintenance work that is less extensive than full resurfacing, but more extensive than the pavement repair normally done in the maintenance component of the highway program; (b) additions or deletions to the state trunk highway system through jurisdictional transfer agreements with local governments; (c) improvements to permanent weigh scale facilities; (d) construction projects at rest areas; (e) hazard elimination safety projects; (f) noise barriers; and (g) wetland mitigation projects.[20]

State Highway Bridges

State highway bridge improvement projects are funded under different programs, depending upon their location and scope. The state bridges component of the state highway rehabilitation program is responsible for bridge projects that are not on Backbone highways (which are funded from the Backbone rehabilitation subcomponent) and are not classified as a major interstate highway bridge or a high-cost bridge project under the statutory definitions for those programs.

Within the bridge program subcomponent, bridges are divided between routine projects and "large" bridge projects (distinct from the high-cost bridge program, which funds bridges with a cost over $150,000,000).[21] Most bridge projects fall into the first category. Large bridges in the state highway rehabilitation program are bridges with a deck area greater than 40,000 square feet.

Bridges

The state trunk highway system includes approximately 4,900 bridges and similar structures, as well as a variety of ancillary structures such as retaining walls, culverts, sign structures, noise barriers, and high-mast light structures.

By FHWA definition, a bridge has a minimum clear span length of 20 feet between the faces of abutments. A culvert can resemble a bridge with similar features and characteristics, but is less than 20 feet long from abutment to abutment. Culverts can also be fixed metal or precast/concrete pipes or chutes. Culverts, unlike bridges, are not inventoried or even inspected in the same manner as state, county and local bridges.

[20] Wisconsin Legislative Fiscal Bureau, "State Trunk Highway Program - Informational Paper 40." (January 2015).
[21] Ibid.

Major Highway Development Program

The major highway development program provides for the development and construction of new or significantly altered highway projects. Throughout the program's history, a major highway project has typically been defined in relation to certain cost and capacity expansion thresholds. The 2011-13 biennial budget, however, expanded the definition to include certain rehabilitation projects that do not meet those thresholds, but that do exceed a separate cost threshold.[22] Consequently, a major highway project is any improvement project (with certain exclusions, described below) that either:

- Has a total cost in excess of $83,500,000
- Has a total cost in excess of $33,400,000 and that expands capacity in at least one of the following ways:
    - Construction of a new highway of 2.5 miles or more in length
    - Relocation of 2.5 miles or more of existing roadway
    - Addition of one or more lanes at least five miles in length
    - Improvement of 10 miles or more of an existing divided highway to freeway standards

Projects that meet either of these definitions are excluded from the definition of a major highway project if the project:

- Meets the definition of a southeast Wisconsin freeway megaproject
- Involves an approach to a bridge over a river that forms a boundary of the state
- Meets the statutory definition of a high-cost bridge project or of a major interstate (across state lines) bridge project

Criteria for southeast Wisconsin freeway megaprojects and projects in the two bridge programs are described in separate sections later in this chapter.

Major Highway Project Definition (State Statute 84.013(1))
"Major highway project" means a project, except a project providing an approach to a bridge over a river that forms a boundary of the state, a high-cost state highway bridge project (state statute 84.017), or a southeast Wisconsin freeway megaproject (state statute. 84.0145), that satisfies any of the following: • The project has a total cost of more than $33,400,000, subject to adjustment under the Department of Transportation Price Index, Yearly Moving Average, and involves any of the following: o Constructing a new highway 2.5 miles or more in length o Reconstructing or reconditioning an existing highway by either relocating 2.5 miles or more of the existing highway or adding one or more lanes 5 miles or more in length to the existing highway • Improving to freeway standards 10 miles or more of an existing divided highway having 2 or more lanes in either direction • The project has a total cost of more than $83,500,000, subject to adjustment under the Department of Transportation Price Index, Yearly Moving Average

[22] Wisconsin Legislative Fiscal Bureau, "State Trunk Highway Program - Informational Paper 40." (January 2015).

Major Highway Project Selection Process

The Transportation Projects Commission (TPC) was created to review major project proposals and make recommendations for study and project enumeration. The TPC includes the Governor, who acts as the chairperson, five Wisconsin State Senators, five Wisconsin State Assembly Representatives, three public members appointed by the Governor, and the Secretary of Transportation (a nonvoting member).

A project that meets the capacity expansion threshold in the major highway project definition must be enumerated in the statutes before WisDOT can proceed with construction. Although enumeration is accomplished through an enactment of the Legislature, a statutory provision prohibits the enumeration of a project unless the TPC has recommended the project for approval. In addition, TPC approval is required before WisDOT can start an environmental impact statement (EIS) or environmental assessment (EA) on a project. Studies must also be enumerated in statute.

Transportation Projects Commission
Created in 1983, the fifteen-member TPC reviews major highway project candidates and makes recommendations to the Governor and Legislature regarding projects to be enumerated or included in the next two-year state budget. The TPC includes five Wisconsin State Senators, five Wisconsin State Assembly Representatives and three citizen members. The Governor serves as the Commission Chairman. The WisDOT Secretary serves as a non-voting member. Typically, the Commission considers major highway project candidates on a two-year cycle. In the fall of odd-numbered years, the TPC begins the process by looking at projects to advance to the environmental study stage. In the fall of even numbered years, the Commission reviews, and can recommend for enumeration, projects that have successfully completed the environmental review phase. State law prevents the TPC from recommending projects for enumeration unless funding is available to begin work within six years.

There are two statutory restrictions on the TPC's recommendations for capacity expansion projects. First, the TPC is prohibited from recommending a project for enumeration unless the project, along with all other enumerated projects, can be started within six years following the project's enumeration, assuming a constant, real-dollar program size throughout the period. The Commission, however, may recommend a project that could not otherwise be started within the six-year time period if it also recommends a funding proposal for the major highway development program that would allow the project to be started in six years. Second, the TPC is prohibited from recommending a project for enumeration unless a final EIS or EA has been approved by FHWA. This requirement is intended to ensure that potential projects can be completed within a reasonable time of enumeration and that the TPC has reasonably complete information on the cost and impacts of the project.

A highway improvement project that does not meet the major highway project capacity expansion thresholds, but is considered a major highway project because it exceeds the $93.5 million cost threshold (adjusted from original $83.5 million, based upon the Department of Transportation Price Index, Yearly Moving Average) does not need to

be individually enumerated in the statutes.[23,24] Instead, WisDOT may proceed with construction on this type of project once the TPC has approved the project, upon request of the Department. The USH 18/151 Verona Road/Madison Beltline project in Dane County and the STH 50 project from I-94 to 43rd Avenue in Kenosha County are the only projects that have been approved by the TPC under this provision.

The TPC may also designate an otherwise non-qualifying project if it receives a petition for such designation from a city or village for a project that is within its corporate limits and is estimated to cost $2 million or more, provided that the project is not a freeway.[25] No projects have been approved by the TPC under this provision.

Enumeration gives WisDOT the authority to build a project, but does not establish a statutory priority or timetable, or require a specific design. It also does not require WisDOT to actually construct the project. Consequently, WisDOT has the authority to begin an enumerated project either before or after the date indicated in TPC or legislative discussions.

Per state statute, WisDOT publishes a TPC report twice each year providing an update on the estimated cost of each enumerated project.

Southeast Wisconsin Freeway Megaprojects

Since the 2001-2003 biennium, most capacity expansion and rehabilitation projects on the southeast Wisconsin freeway system (freeways in Kenosha, Milwaukee, Ozaukee, Racine, Walworth, Washington, or Waukesha counties) have been funded separately from the major highway development and state highway rehabilitation programs. With the enactment of 2011 Wisconsin Act 32, the 2011-13 budget, the southeast Wisconsin freeway rehabilitation was replaced with the southeast Wisconsin freeway megaprojects program. A southeast Wisconsin freeway megaproject is defined as an improvement project with an estimated cost exceeding $558,800,000 in 2014 dollars (indexed annually to the cost of construction inflation).[26] Any rehabilitation or capacity expansion project on those freeways with a cost below that threshold is the responsibility of the state highway rehabilitation or major highway development programs, as applicable.

Any southeast Wisconsin freeway megaproject must be enumerated in state statute prior to the start of construction. Both the I-94 North South project and the Zoo Interchange project are enumerated.

[23] Wisconsin Department of Transportation, “Major Highway Development subprogram.”
[24] Wisconsin Legislative Fiscal Bureau, "State Trunk Highway Program - Informational Paper 40." (January 2015).
[25] Ibid.
[26] Ibid.

Southeast Wisconsin Freeway Megaprojects Program (State Statute 84.0145)
Southeast Wisconsin freeway megaprojects definitions: • "Southeast Wisconsin freeway" – means a state trunk highway, located in Kenosha, Milwaukee, Ozaukee, Racine, Walworth, Washington, or Waukesha county, that has four or more lanes of traffic physically separated by a median or barrier and that gives preference to through traffic by limiting access to interchanges only. • "Southeast Wisconsin freeway megaproject" means any project on a southeast Wisconsin freeway having a total cost of more than $558 million, subject to annual adjustment. The department may not encumber or expend any moneys for construction of a southeast Wisconsin freeway megaproject unless the project is enumerated under state statute 84.0145 (3) (b) Southeast Wisconsin freeway megaprojects projects: • "I 94 North-South corridor" – means the Mitchell interchange of I 43, I 94, and I 894 in Milwaukee County, I 94 from the Illinois-Wisconsin state line in Kenosha County proceeding northerly through the Mitchell interchange to Howard Avenue in Milwaukee County, I 43/894 from the Mitchell interchange proceeding westerly to 35th Street in Milwaukee County, the STH 119 Airport Spur Parkway between I 94 and General Mitchell International Airport in Milwaukee County, and all freeways, roadways, shoulders, interchange ramps, frontage roads, and collector road systems adjacent or related to these routes or interchanges. • "Zoo Interchange" – means all freeways, including related interchange ramps, roadways and shoulders, and all adjacent frontage roads and collector road systems, encompassing I 94, I 894, and USH 45 in Milwaukee County within the area bordered by I 894/USH 45 at Lincoln Avenue to the south, I 94 at 70th Street to the east, I 94 at 124th Street to the west, and USH 45 at Burleigh Street to the north.

Major Interstate Bridge and High-Cost Bridge Programs

A provision of the 2009-11 biennial budget created the major interstate bridge program, for projects involving the construction or reconstruction of a bridge crossing a river that forms the boundary of the state, for which the state's share of costs is estimated to exceed $100 million. The 2011-13 biennial budget created an additional, separate program for high-cost bridges, defined as a bridge with an estimated cost exceeding $150,000,000 that is not a major interstate bridge or part of a southeast Wisconsin freeway megaproject. Construction work on a bridge (including approaches) that qualifies as a high-cost bridge may not be funded from other highway improvement programs, unless specifically authorized by the legislature.

Major Interstate (84.016) and High-Cost State Highway (84.017) Bridge Projects
"Major interstate bridge project" means a project involving the construction or reconstruction of a bridge on the state trunk highway system, including approaches, that crosses a river forming a boundary of the state and for which this state's estimated cost share is at least $100,000,000 (state statute 84.016). "High-cost state highway bridge project" means a project involving the construction or rehabilitation of a bridge on the state trunk highway system, including approaches, that has a total estimated cost of more than $150,000,000, but does not include any major interstate bridge project or any project involving a bridge that is part of a southeast Wisconsin freeway megaproject (state statute 84.017).

State Highway Maintenance and Traffic Operations

The final component of the state highway program is the state highway maintenance and traffic operations program. This program is responsible for a variety of activities related to the upkeep of state highways and highway rights-of-way. Unlike the other state highway program components, the activities performed under the maintenance and traffic operations program generally do not require extensive planning and design. The maintenance programs are divided into two program areas: (a) highway maintenance; and (b) highway traffic operations.[27]

Highway Maintenance

The majority of state trunk highway maintenance activities are performed by county workforces under contract with the state. Generally, the counties perform the actual maintenance activities and WisDOT sets statewide maintenance policies and (primarily through the regional offices) oversees their work. This arrangement has existed in its current form since 1932, although counties were involved in some way in the maintenance of state roads prior to that time. Two areas of general maintenance are performed primarily by private contractors: (a) vegetation management, including plantings, inventory, and the spraying of herbicides along roadsides; and (b) the maintenance of year-round rest areas by disabled citizens participating in sheltered workshops.

Highway maintenance can generally be separated into two types of activities: winter maintenance and general maintenance. Winter maintenance involves the maintenance and upkeep of state trunk highways during the winter season. The principal activities performed under this program are snowplowing, drift control, and application of de-icers. These activities are performed almost entirely by county workforces under contract with the state. The state, however, purchases de-icing salt directly and provides it to the counties for use on state highways.

This program funds the refurbishment, repair, cleaning, painting, re-lamping, etc. of existing traffic control devices (TCDs). Although state crews do most of the routine maintenance on TCDs, the nature of some of the work and/or the sheer volume of it requires outside help. The biggest items are sign refurbishment of the large freeway guide signs, cleaning and re-lamping of the highway lighting units, and traffic control signals on the system.

Pavement maintenance costs rise as pavement conditions worsen. For instance, chip sealing is a common treatment used to seal and stabilize the upper layer of pavement. Chip sealing or other minor repairs might cost as little as $10,000 per mile.[28] If the needs are greater, the highway might require a thin overlay, which could cost as much as $120,000 a mile.[29]

Preservation is one of WisDOT's core performance goals. Specific measures monitor the condition of state bridges and highways. Over 85 percent of state construction costs are typically for preservation-related improvements while less than 15 percent of the costs involve capacity expansion.[30]

---

[27] Wisconsin Legislative Fiscal Bureau, "State Trunk Highway Program - Informational Paper 40." (January 2015).
[28] Wisconsin Department of Transportation, "Better, Faster, Lower Cost." (January 2015).
[29] Ibid.
[30] Ibid.

WisDOT uses a level-of-service model to estimate funds needed for maintenance activities provided by counties. Every year, the gap between estimated needs and available funding represents a funding shortfall. In part, the shortfall is caused by:

- Location-specific system growth combined with reconstruction projects that have included wider shoulders, longer ramps, added lane miles, new lighting and decorative features, all requiring more maintenance
- County crews performing night work in high traffic areas, which is more expensive due to wage premiums and the need for lighting
- Installation of median barriers along divided highways (critical for safety), also requiring maintenance

General maintenance involves the daily or periodic repair and upkeep of state trunk highways, including the following activities:

- Mowing and weed control, brush and tree removal, trash pickup, and recycling
- Maintenance of rest areas, tourist information centers, waysides, scenic overlooks, and historical markers, including parking, picnic, and toilet facility improvements
- Surface, base, and shoulder repair
- Minor bridge repair
- Plantings and landscaping in rest areas and other areas
- Emergency repairs and accident cleanup
- Drainage, culvert landscaping, erosion control measures, and guard fence repairs
- Lift bridge and ferry operation
- Repair of damaged traffic signs

Counties are reimbursed for state maintenance work based on three criteria: (a) county labor costs; (b) county machinery costs; and (c) materials supplied by the county.[31] WisDOT uses a reimbursement formula that is based on all counties' actual machinery costs, averaged over a period of five years, and each county's employee wage rates. Due to variable county labor contracts, some counties receive a higher hourly reimbursement rate than others.

Highway Traffic Operations

Highway traffic operations involve the installation of traffic control and safety devices designed to enhance the orderly and efficient flow of vehicles on existing state trunk highways. Highway traffic operation functions include: (a) pavement marking activities, such as centerline and edge line painting, channelization lines, stop lines, curb and crosswalk lines, and/or the installation of raised centerline reflectors; (b) highway signing activities; (c) traffic signalization activities; and (d) highway lighting activities.

The traffic operations program works to improve safety, manage congestion, mitigate delays, enable transportation emergency response, warn and guide motorists, and optimize operational performance of the transportation infrastructure. This subprogram includes all the repair and operation of pavement markings, traffic signs, traffic operation improvements, freeway detours, and the Freeway Service Team. Traffic control and intelligent transportation systems (ITS) improvements are integral to highway safety. Improvements to traffic control systems are typically addressed as part of specific improvement projects.

[31] Wisconsin Department of Transportation, "Better, Faster, Lower Cost." (January 2015).

In terms of all traffic crashes (passenger vehicles and commercial motor vehicles) in Wisconsin, the state experienced a rise in the number of crashes each year from 2012 (109,385 crashes) to 2016 (129,051 crashes). During this timeframe Wisconsin averaged over 550 traffic fatalities and a little less than 3,200 serious injuries per year. The state had 601 fatalities in 2012, but experienced a drop in traffic fatalities in 2013 (527 fatalities) and 2014 (498 fatalities). However, the state experienced a rise in traffic fatalities in 2015 (555 fatalities) and 2016 (588 fatalities).[32] Even though Wisconsin has experienced some fatality-free days in recent years, there are still far too many needless and preventable deaths on our roadways. In many instances, drivers and passengers have been ejected from the vehicle because they were not wearing safety belts. Each crash potentially creates a loss of life, debilitating injuries, or lost income and productivity for crash victims. Crashes have a secondary economic impact by restricting traffic flow and the timely movement of goods and people to their destinations.

The department's Strategic Highway Safety Plan (SHSP) establishes long-term goals adopted by the department to increase automobile, bicycle, and pedestrian safety on all public roadways in the state.[33] The plan outlines strategies implemented by the department to reduce the number of fatal and serious injury crashes over a three-year period. Progress toward meeting these goals is measured against the department's annual Safety Performance Measure Targets submitted to FHWA. In addition to federal performance measure targets, the department maintains state performance measure targets through its MAPSS Performance Improvement Program.

The WisDOT State Traffic Operations Center (STOC) handles traffic management for Wisconsin. It is staffed 24 hours per day, seven days per week, and communicates regularly with the Wisconsin State Patrol, County Sheriff Departments, fire departments, and police departments, as well as media outlets and construction project managers. The actual operations center is located in southeastern Wisconsin in the City of Milwaukee. From the STOC Advanced Traffic Management System (ATMS), it is possible to use various traffic management tools such as closed circuit television cameras, ramp meters, variable message signs, highway advisory radio, roadway sensors and other tools. It is designed to improve the safety and efficiency of the freeway system by reducing incidents and relieving traffic congestion.

Wisconsin Traffic Incident Management Enhancement (TIME) Coalition: Crashes, spilled loads, and stalled vehicles are all examples of traffic incidents. In Wisconsin and throughout the nation, these situations and the traffic congestion caused by them account for approximately one-fourth of all delays on our highway system.[34] Traffic incidents also significantly impact the safety of both motorists and emergency responders.

Traffic Incident Management (TIM), a collaborative effort of public safety and transportation agencies, consists of a planned and coordinated multi-disciplinary process to detect, respond to, and clear traffic incidents so that traffic flow may be restored as safely and quickly as possible. Effective TIM reduces the duration and impacts of traffic incidents and improves the safety of motorists, crash victims, and emergency responders.

[32] Wisconsin Department of Transportation, MAPSS.
[33] Wisconsin Department of Transportation, "Safety Documents and Publications."
[34] Wisconsin Department of Transportation, Statewide Traffic Operations Center.

Wisconsin recognizes the importance of TIM in maintaining the operational safety and efficiency of the state's roadways. The Traffic Incident Management Enhancement (TIME) Program is a comprehensive multi-agency, multi-discipline program, led by WisDOT, dedicated to:

- Improving responder safety
- Enhancing the safe, quick clearance of traffic incidents
- Supporting prompt, reliable, interoperable communications

The program, initiated in 1995, is a sustained initiative for assessing needs, developing solutions and strategies, and fostering the transportation-public safety partnerships that are essential for effective TIM.[35]

Great Lakes Regional Transportation Operations Coalition: The Great Lakes Regional Transportation Operations Coalition (GLRTOC) collaborates to improve cross-regional transportation operations in support of economic competitiveness and improved quality of life.[36] This is a mega-region transportation operational approach that can lead to addressing the challenges of economic competitiveness, quality of life, traffic congestion and aging transportation infrastructure. The members of the coalition include ten states (Illinois, Indiana, Iowa, Kansas, Kentucky, Michigan, Minnesota, Missouri, Ohio, and Wisconsin) and one Canadian province (Ontario).

The goal of this collaboration is to leverage joint funding, compete more effectively for national resources and funding, share and expand best practices to improve travel time and economic competitiveness of the region, benchmark efficient operating models and, ultimately, improve transportation operations for freight movement and travelers throughout the Great Lakes Region.[37]

Lake Michigan Interstate Gateway Alliance: The Lake Michigan Interstate Gateway Alliance (LMIGA) is a voluntary organization with active member participation from WisDOT, the Illinois Department of Transportation, the Illinois Tollway, the Indiana Department of Transportation, the Indiana Toll Road Concession Company LLC, the Michigan Department of Transportation and the Skyway Concession Company LLC.[38] The goal of LMIGA is to focus on operations along major corridors to ensure that traffic moves safely and efficiently. This goal is realized by interagency communication and coordination, improvement projects, training efforts and region-wide planning. The LMIGA Intelligent Transportation System (ITS) Priority Corridor Program operates through a structure of working groups and subcommittees that meet on a regular basis.[39]

Local Roads and Bridges Financing and Funding Mechanisms

As discussed in Chapter 5, *Wisconsin's Transportation System Assets*, Wisconsin's locally-owned and maintained road and bridge system serves as a critical link in the state's total transportation network. With over 103,000 miles of county, town, and municipal roads and nearly 9,000 bridges, the local road network accounts for approximately 90 percent of Wisconsin's public road mileage. Typically, these are local roads owned and operated by local jurisdictions.

The local road system offers connections not only to local activity centers, but also to state and national facilities of importance such as ports and economic business centers. Local roads connect to the state trunk highway network,

[35] Wisconsin Department of Transportation, "Programs - Traffic Incident Management Enhancement."
[36] Great Lakes Regional Transportation Operations Coalition, "About."
[37] Great Lakes Regional Transportation Operations Coalition, "Partnership Statement." (May 9, 2017).
[38] Lake Michigan Interstate Gateway Alliance.
[39] Travel Midwest, "Travel Midwest - History."

airports, rail stations, and bus and ferry terminals. They are the first and usually last link in the state's farm-to-market commerce and offer critical links for area businesses and tourists.

Several transportation programs, administered by the state, provide local units of government with funding to support roadway improvements.

General Transportation Aids

General Transportation Aids (GTA) is the only state transportation program that provides funding directly to all 1,925 local units of government. Under GTA, a portion of state-collected transportation revenues from fuel taxes, vehicle registration and other fees is returned to local governments. GTA payments cover a portion of local highway transportation costs, including maintenance, operation and construction of local roads, streets and highways. Funds are distributed based on a legislatively determined share-of-costs (SOC) or rate-per-mile (RPM) formula. Counties are paid under the SOC formula and municipalities under either the SOC formula or the RPM formula, whichever yields a greater share.

The Legislature set the rate per mile for calendar years 2016 and 2017 at $2,202. The share-of-costs percentage floats from year to year based on costs reported and funds remaining after rate-per-mile entitlements are deducted. In calendar year 2017, municipalities received a total of $321.3 million and counties shared in the distribution of $98.4 million in state aid. Because of their generally lower costs, almost all town governments receive GTA on the RPM formula, whereas cities and villages typically receive SOC payments. The rate-per-mile payments are made first, and funds left over in the appropriation are distributed to municipalities using the SOC formula. This typically results in municipalities on the RPM system receiving reimbursement for a much larger percentage of their costs.

In calendar year 2017, counties were reimbursed for 17.5 percent of their eligible expenses, and municipalities an average of 21.1 percent.

Municipalities are limited to receiving state aid equal to no more than 85 percent of their three-year average eligible costs under either the RPM or SOC formula. The minimum and maximum cushions in the formula ensure that local governments can receive increases from their previous year's payments up to fifteen percent, with payment reductions limited to ten percent of the previous year's payment. The statutory intent is to provide a measure of predictability and stability to GTA payments.

In addition to GTA, WisDOT funds local highway and bridge improvements on 103,000 miles of county highways, city and village streets, and town roads using a combination of federal and state funds. All local improvement projects funded by WisDOT must be built to appropriate roadway standards based on state and federal requirements and must adhere to program requirements. In some cases, federal rules and regulations mandate additional requirements.

Local Bridge Improvement Assistance (Local Bridge Program)

The Local Bridge Improvement Assistance Program was established to rehabilitate and replace, on a cost-shared basis, the most seriously deteriorating existing local bridges on Wisconsin's local highway and road systems.

Projects are located on a locally-owned public roadway (not on a connecting highway) and the structure must have a clear span of greater than 20 feet in length to be eligible for funding. In addition, the bridge must not have been constructed or reconstructed in the last ten years regardless of the funding source. The decision of whether or not to apply for local bridge funds is the responsibility of the local unit of government. Both federal and state funds for local bridges are allocated by formula to each county based on its statewide proportional share of bridge

replacement costs. Wisconsin receives roughly $24.4M from the federal government for the Local Bridge Program annually. In state fiscal years 2016 and 2017, the Program received roughly $8.5 million in state funding each year.

Surface Transportation Program

Wisconsin's urban and rural Surface Transportation Programs (STP-U and STP-R), which utilize federal Surface Transportation Block Grant Program funding, fund improvements on federal-aid eligible highways—roads and streets in urban areas and highways outside of urban areas, primarily county trunk highways. This includes projects on higher functioning local roads not on the state highway system, and local safety improvements. The STP-R and STP-U programs are currently administered on a six-year programming cycle.

STP projects include 80 percent federal funding, though urbanized areas of 50,000 or more in population frequently pay more than the required 20 percent share. STP and local bridge improvements are generally made on existing roads and bridges, though new facilities or logical connections are sometimes allowed. STP projects typically address higher level projects that require a significant funding commitment. WisDOT's five regional offices solicit and approve STP projects in odd-numbered years.

STP – Rural - The Surface Transportation Program - Rural (STP-R) - allocates federal funds to complete a variety of improvements to rural highways (primarily county highways). The objective of STP-R is to improve federal aid-eligible highways outside of urban areas. Projects must meet federal and state requirements. Communities are eligible for funding on roads classified as major collectors or higher. In state fiscal years 2016 and 2017, STP-Rural received roughly $12.9 million and $13.8 million in funding, respectively.

STP – Urban - The Surface Transportation Program - Urban (STP-U) allocates federal funds to complete a variety of improvements to federal aid-eligible roads and streets in urban areas. In state fiscal years 2016 and 2017, STP-Urban received roughly $31.2 million and $48.5 million in funding, respectively.

Requests for project funding may be for design or construction, but design projects could not be requested or approved without their corresponding construction projects.

STP – Freight - The Surface Transportation Program - Freight (STP-Freight) - a pilot program provided federal funds over two years to complete projects that improve freight connections. STP-Freight was a pilot initiative that grew out of the Governor's Second Annual Freight Summit in 2012. Seven projects totaling $9.5 million were funded within the pilot program. While no longer available, the program demonstrated the potential and need for a locally-focused, freight-supporting fund source.

STP-Freight rating criteria focused on projects associated with multimodal and intermodal facilities, warehousing and distribution centers, projects that improved local freight connections to the state highway network, and projects that provided many-to-one and one-to-many connections. Projects that were able to be completed quickly (preferably within two years) received priority in the rating process.

Local Roads Improvement Program

The Local Roads Improvement Program (LRIP) assists local governments in improving county highways, town roads, and city and village streets. LRIP is a reimbursement program, which pays up to 50 percent of total eligible costs with local governments providing the balance.

Eligible project costs include reconstruction and rehabilitation costs. Only work on existing county trunk highways, city and village streets, and town roads under authority of the local government is eligible. Maintenance, new

construction, and improvements to alleys or parking lots are not reimbursable. Projects must be included in a local improvement plan and have a projected design life of at least ten years.

LRIP entitlement funds are available in three areas: the County Highway Improvement Program (CHI); the Municipal Street Improvement Program (MSI), and the Town Road Improvement Program (TRI). The 2015-2017 biennial budget provided $32.4 million in LRIP entitlement funds and $23.7 million in LRIP discretionary funds, which includes state and local contributions. LRIP projects are generally lower in cost than STP projects. The local and regional governments set their own priorities for funding a wide range of projects under their jurisdictions, from gravel and dirt roads to multi-lane paved highways and streets.

The revenue for local funding of transportation projects comes mainly from two sources: the local property tax, including both the general property tax and special assessments; and debt through bonding or borrowing.

Transportation Facilities Economic Assistance and Development

The Transportation Facilities Economic Assistance and Development (TEA) program provides grants to governing bodies for road, rail, harbor and airport projects that help attract employers to Wisconsin, or encourage business and industry to remain and expand in the state. Grants of up to $1 million are available for transportation improvements essential to an economic development project. The project must begin within three years of the approved application, have the local government's endorsement and benefit the public through job creation or retention. The program is designed to implement an improvement more quickly than normal state programming processes allow. TEA grants require a 50 percent local match, which can come from any combination of private, local or federal funds, as well as in-kind services. One hallmark of the TEA program is that transportation facilities can be approved and built quickly in response to rapidly changing business needs.

Since its beginning in 1987, the TEA Program has invested $74 million in 305 businesses in 179 communities across the state. This investment has directly and indirectly created more than 66,000 jobs.[40]

Railroad Financing and Funding Mechanisms

Wisconsin's approximately 3,300 miles of railroad system makes up about two percent of the nation's rail network. The state's rail system is owned and operated by ten active, privately-owned freight railroads and the State of Wisconsin. The private railroads each hold Surface Transportation Board (STB) freight carrier certificates and operate over a network of mainlines, branches, industrial leads, spurs, rail yards, and terminals.[41]

In 2013, nearly 207 million tons of freight (36 percent of the state total), valued at nearly $180 billion (28 percent of the state total) were transported into, out of, within, and through Wisconsin by rail. Primary commodities by weight, moved by rail included coal, crude and petroleum oil, natural gas, chemicals and allied products, nonmetallic minerals, and farm products.[42]

As mentioned in Chapter 7, *Freight Transportation Trends, Issues, and Forecasts*, the mileage on the state's rail system peaked in the early 1900s with roughly 7,600 miles of rail corridors. Changes in industry demand and the construction of better roads led to a decline in the rail system to about 3,300 miles today.

---

[40] Wisconsin Department of Transportation, Bureau of Planning and Economic Development.
[41] Wisconsin Department of Transportation, Bureau of Transit, Local Roads, Railroads and Harbors.
[42] 2013 IHS Transearch Database, 2 digit STCC Codes used.

Wisconsin's original rail assistance program was created in 1977 to help communities and shippers preserve freight rail service during an era when widespread railroad bankruptcies and line abandonments threatened the availability of rail service in Wisconsin. The program was amended in 1992 to include railroads in the list of internal improvements state money could fund. In addition, the original rail assistance grant program was replaced by the current Freight Rail Preservation Program (FRPP), which provides grants to local units of government, industries, and railroads for the purpose of preserving essential rail lines and rehabilitating them following purchase. Statutory information about Wisconsin freight railroad assistance can be found in Wis. Stats. 85.08.

Freight Rail Infrastructure Improvement Program

The Freight Rail Infrastructure Improvement Program (FRIIP) is a loan program for construction of facilities that increase the use of a rail line. Loans are made to private industries, railroads, and local governments to improve rail infrastructure and to construct new facilities, with the overall goal of supporting economic development and jobs. Principal and interest is repaid to a revolving fund for subsequent loans. Created in 1992, the FRIIP loan program enables the state to encourage a broader array of improvements to the rail system, particularly on privately-owned lines. It also provides funding for other rail related projects such as loading and trans-loading facilities. The program provides up to 100 percent of loans for rail projects that:

- Connect an industry to the national railroad system;
- Enhance transportation efficiency, safety, and intermodal freight movement;
- Rehabilitate a rail line; or
- Assist with economic development.

Freight Rail Preservation Program

The Freight Rail Preservation Program (FRPP) provides grants to local units of government, industries, and railroads to preserve rail lines and rehabilitate them following purchase. Under FRPP, the state purchases the underlying real estate and typically provides 80 percent of the cost of track and other improvements. Rail Transit Commissions (RTC) provide the remaining 20 percent. The FRPP provides grants up to 80 percent of the cost:

- To purchase abandoned rail lines in an effort to continue freight service, or for the preservation of the opportunity for future rail service
- To rehabilitate facilities, such as tracks or bridges, on publicly-owned rail lines

The state's goal is to rehabilitate publicly-owned rail lines to meet FRA Class 2 Track Safety Standards and operate at speeds up to 25 miles per hour and carry rail cars with a gross weight of 286,000 pounds.

Harbors and Waterways Financing and Funding Mechanisms

As identified in Chapter 5, *Wisconsin's Transportation System Assets*, in 2013, more than 28 million tons,[43] or approximately five percent of Wisconsin's freight by weight, worth over $2 billion (less than one percent of the total state freight value) was transported by and through ports and waterway facilities.[44] As mentioned in Chapter 7, *Freight Transportation Trends, Issues, and Forecasts*, investing in Wisconsin's commercial ports is critical. A strong waterway system and corresponding infrastructure support the state's ability to attract and retain industries that rely on efficient bulk freight movement. The state's commercial ports are a critical source of economic development.

[43] 2013 IHS Transearch Database.
[44] 2013 IHS Transearch Database.

The original objective of the Harbor Assistance Program (HAP), described below, was to assist local governments in maintaining publicly-owned commercial harbor facilities. Eligibility to participate in HAP was expanded in 2007 to include owners of private commercial harbor facilities. To receive grant funding, owners of privately-owned facilities must agree to hold their facilities open for public use for at least ten years following completion of a harbor improvement or project. Some commercial ports in Wisconsin are owned and operated by municipalities. The port's land may be owned by a municipality and leased to others for daily operations. Other ports are privately owned. Municipalities, with navigable waters within their boundaries, may also raise funds through special assessments, bonding, use of available state funds, or local government taxation.

Harbor Assistance Program

In 1979, Wisconsin's Legislature created HAP to assist harbor communities along the Great Lakes and Mississippi River in maintaining and improving waterborne commerce. Port projects typically include dock reconstruction, mooring structure replacement, dredging, and the construction of facilities to hold dredged material. There are 29 ports in the state that are potentially eligible for funding through the HAP. To be eligible for funding:

- The project must benefit facilities that are used for cargo transfer, ship building, commercial fishing, or regular ferry service
- The applicant must be a local unit of government or a private owner of a harbor facility
- The project must pass a rigorous benefit-cost analysis
- The project must have been identified in a current Three-Year Harbor Development Plan

Project selection criteria are spelled out in Section 85.095, Wis. Stats. and Wis. Admin. Code TRANS 28 and include the following: economic impact of the project; type and urgency of the project; and priority of the project.

Air Financing and Funding Mechanisms

Wisconsin airports serve commercial passengers; charter, private, and corporate operations; mail and other cargo services; and agricultural, recreational, and emergency responders. All federal and state airport development funds are channeled through WisDOT.

Airport Improvement Program

The Federal Aviation Administration's (FAA's) federal Airport Improvement Program (AIP) funds 72 percent of Wisconsin's program through individual federal grants. The FAA provides federal aid grants to Wisconsin in two ways:

1. Individual grants to commercial service airports
2. A block grant to the department

WisDOT then administers the funds to construct projects at eligible general aviation airports. Wisconsin is one of ten states that receive federal financial aid through the federal block grant program.

Primary Commercial Service Airports

A primary commercial service airport is an airport that has scheduled air carrier service and enplanes 10,000 or more passengers annually. These airports receive individual grants from the FAA through the Bureau of Aeronautics based on the number of annual enplanements, and the landed weight of cargo handled at that airport. The airport owner may use these funds for any federally eligible work to be undertaken on the airport.

Airports in this category can also compete for additional funds, called discretionary funds. These funds are awarded using a national priority rating system. The amount of discretionary funds that flow into Wisconsin varies each year based on the national priority for funding of projects requested.

The federal share on individual grants issued to primary commercial service airports is generally 90 percent. Exceptions include 80 percent for noise projects and 75 percent for development projects at General Mitchell International Airport. The state and the airport owner usually divide equally the remainder of eligible project costs.

General Aviation Airports

General aviation airports comprise the largest single group of airports in the United States airport system. General aviation airports host a wide range of aviation activities and include all segments of the aviation industry except scheduled airline activity. Activities range from pilot training through sport, recreation, and personal flying to business related corporate and charter flying. Aircraft used at general aviation airports range from single-seat, single-engine piston aircraft to long-range corporate jet aircraft.

Federal financial aid for general aviation airports is awarded to the state annually through a block grant. The state distributes these funds for airport improvement projects through individual funding allocations. These funds are used to hire engineers, planners, and contractors to accomplish the project. Under the block grant program, the distribution of funds within the state reflects statewide aviation priorities.

The types of funding included in the block grant are:

- General aviation entitlement
- General aviation discretionary funding
- General aviation apportionment

General Aviation (Non-Primary) Entitlements are federal funds provided for eligible airport improvement and development projects at airports in the Federal Aviation Administration (FAA) National Plan of Integrated Airports (NPIAS). Wisconsin State Airport System Plan airports are a part of the NPIAS. General Aviation Airports in the NPIAS are entitled to $150K per year, providing the United States Congress appropriates at least $3.5B for the Federal Airport Improvement Program (AIP) to trigger the Non-Primary Entitlement apportionment availability. There is a 20-year airport obligation and related grant assurances that need to be adhered to.

Federal AIP funds are typically first apportioned into major entitlement categories such as primary (commercial service) and general aviation airports. The remaining and unspent funds are distributed to a discretionary fund. These funds are then applied to priority airport projects and/or projects that may need additional funding.

Another source of FAA funding is General Aviation Airport Apportionment. As a Block Grant State, Wisconsin annually receives apportionment funding used to backfill priority projects due to critical project enhancements or needs that may not have enough programmed General Aviation Non-Primary Entitlement funds to complete.

Pipeline Financing and Funding Mechanisms

Wisconsin's pipeline system is used to move pipeline commodities into and through the state. The location of Wisconsin relative to large regional refining hubs, east coast markets and active gas and oil fields in North Dakota and Alberta results in significant pipeline capacity being allocated to commodities (e.g. crude and petroleum oil) traveling through the state. Additionally, Wisconsin's location results in the state being impacted by national and international crude oil and natural gas trends.

Pipelines are regulated primarily by federal and state institutions outside WisDOT, such as the state-level Public Service Commission and federal-level Pipeline and Hazardous Materials Safety Administration (Chapter 2, *Transportation Stakeholders and Institutions*). WisDOT may be involved in the approval of pipeline siting within

department highway right-of-way. Additionally, WisDOT identifies pipelines during the roadway construction process to ensure the proper plans and supporting equipment are available in the event construction equipment hits a pipeline. The pipeline transportation system is privately owned, maintained, and operated. As such, WisDOT does not have a role in capacity, operational choices, and infrastructure investment.

Transportation System Funding and Finance

Wisconsin's economic future and the safety of all of its residents and visitors depend on a quality transportation network that can safely and efficiently move people to jobs, raw materials to factories, finished products to markets, and tourists to their destinations. This section examines some of the funding and finance trends, and key topics of interest to Wisconsin's transportation system.

Federal and state transportation revenues rely heavily on the gasoline and diesel tax. These taxes are not indexed to inflation or, like the sales tax, linked to the price of goods purchased. The current federal gasoline tax (unchanged since 1993) is 18.4 cents per gallon, and the current state tax collected at the gas pump is 32.9 cents per gallon, of which 30.9 cents is the motor vehicle fuel tax and goes to the Transportation Fund, and two cents of which serves as the petroleum inspection fee.[45]

Between 1985 and 2007, consumption of taxable motor fuel grew at a rate of about 1.6 percent annually, and motor fuel revenues grew at an average rate of 4.7 percent annually. These growth rates were partly sustained by Wisconsin's expanding working age population; generally rising incomes; increasing industrial production; relatively low unemployment and inflation; relatively low and stable gasoline prices; and stagnant to declining fuel efficiency within the light vehicle fleet. These trends have supported increasing motor vehicle fuel consumption and, in turn, rising motor vehicle fuel revenues.

Looking forward to 2040, the growth rates that have sustained Wisconsin's transportation revenue base may be eroded by several trends affecting motor vehicle fuel consumption.

- Although Wisconsin's population will continue to expand, much of this growth is expected in segments of the population beyond the peak driving years of 18 to 64 years old (also see Chapter 7, *Freight Transportation Trends, Issues, and Forecasts*)
- Changes in fuel prices are expected to have an effect on consumption
- The introduction of new technologies that improve motor vehicle fuel efficiency

Over time, the state's transportation infrastructure deteriorates. Like a car, home or any depreciating physical asset, the transportation infrastructure requires periodic maintenance and rehabilitation. Road wear and tear is not simply related to vehicle miles traveled; Wisconsin's climate—from mid-summer heat to the snow, ice and salt of winter—puts additional demands on infrastructure. Roadways, runways, and railways all need repair and improvement.

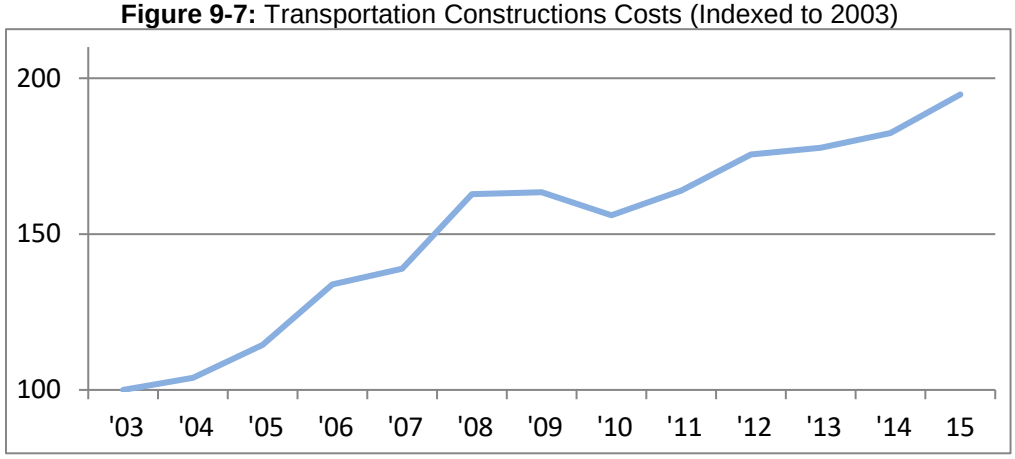
Also like a home or car, a transportation facility needs maintenance and repair on a timely basis. Without proper maintenance, safety can be compromised and the roadway may need to be replaced sooner and at greater expense. The department and local governments address infrastructure needs through regular maintenance and preservation activities throughout its useful life. As the system ages, maintenance and preservation activities typically change. Costs tend to increase – particularly those related to real estate, energy, and construction

[45] Wisconsin Department of Revenue, "Motor Vehicle Fuel Tax Information." (March 2015).

materials. Asset management strategies and tools have enabled the department to consider appropriate times to address needs and slow infrastructure deterioration.

Increasing transportation costs, particularly costs related to energy, real estate, and construction materials, can impact the scheduling of transportation projects. When indexed to 2003, construction costs have nearly doubled, growing 94.5 percent by 2015. Figure 9-7 shows the construction cost trend.

Figure 9-7: Transportation Constructions Costs (Indexed to 2003)



Source: Federal Highway Administration, "National Highway Construction Cost Index (NHCCI) 2.0"

WisDOT is committed to providing the safest, most efficient, and highest quality transportation system that best serves the needs of the state. In order to maximize return-on-investment, WisDOT is working to make the best use of funding available by implementing performance measures (see Chapter 6, *Transportation System Condition and Performance*).

As discussed throughout the plan, throughout the 20-year plan implementation period, WisDOT will use an asset management approach to evaluate the broad range of priorities and analyze potential trade-offs among the actions to address the transportation system.

As identified in Chapter 7, *Freight Transportation Trends, Issues, and Forecasts*, demographics and lifestyles are changing. Wisconsin's population is growing and demographic shifts were identified in the 2010 United States Census report. The most significant change is the percentage of the state's population age 60 and over, which increased from 16.9 to 19.2 percent from 2000 to 2010. This increase has implications for the transportation network, primarily for services to older drivers who transition from cars to public transportation or paratransit services. The availability of multiple mobility options are a challenge in the rural parts of the state where non-driving options are more limited. Other trends related to driving could also impact transportation investment decisions. For example, more workers are telecommuting and young people are waiting longer to apply for driver licenses.

9.3 Freight Plan Implementation

Freight plan implementation will be focused on several key areas:

- Support WisDOT's overarching freight priorities for the transportation system through 2040
- Implement mode-specific freight policies and strategies (identified in Chapter 8, *Freight Policies and Strategies*)
- Use performance measures
- Use data and tools to deliver plan policies and strategies
- Identify Wisconsin-specific freight projects
- Coordinate with public and private sector freight stakeholders
- Serve as a resource for freight information

Each of these items is further described in the following sections.

State Freight Plan Updates

WisDOT anticipates updating the plan on a five year cycle, in accordance with federal requirements, including an update to the fiscally-constrained project list in Appendix 9-2. Other elements of the plan such as the freight forecasts and economic analysis will be updated on an as needed basis dependent on changing economic conditions. WisDOT will update other modal and multimodal plans in the future, which may prompt updates to the SFP outside of the anticipated schedule.

Support WisDOT's Overarching Freight Priorities for the Transportation System Through 2040

WisDOT will continue to work to deliver a safe and efficient transportation system. Ongoing efforts include, but are not limited to, managing and delivering the state's multimodal transportation system, addressing safety concerns, and integrating proven best practices to improve department processes. Implementation will focus on priorities and initiatives that:

State Freight Plan Vision
WisDOT envisions a multimodal freight transportation system that enhances the state's economic productivity, competitiveness, and quality of life through the movement of goods safely, reliably, and efficiently, while minimizing impacts to the natural environment.

- Enhance safety, security, and resiliency
- Ensure system preservation and enhancement
- Enhance system mobility, operations, reliability, efficiency, and connectivity

Implement Mode-Specific Freight Policies and Strategies

Policies presented in this plan were developed using previous planning documents such as *Connections 2030*, stakeholder feedback, input from the Freight Advisory Committee, and data analysis by WisDOT staff. As identified in Chapter 8, *Freight Policies and Strategies*, the following is a summary of the recommended policies categorized by mode:

Highways

Identified in Chapter 5, *Wisconsin's Transportation System Assets*, Wisconsin's State Trunk Highway Network (STH) consists of approximately 11,800 centerline miles of Interstate highways, United States highways, and state trunk highways, including more than 5,200 bridges. The STH system carries about 58 percent of the vehicle miles

traveled, while comprising just over ten percent of the total roadway network. Over the life of the plan, the department will focus on the following freight specific highway policies:

- Use a performance-based approach to identify state trunk highway system preservation needs, including development of a bridge asset management system
- Refine and expand a state-of-the-art process for prioritizing needs and identifying cost-effective state trunk highway construction alternatives
- Monitor national best practices and other initiatives related to reducing freight's impact on the environment
- Review and revise the Facilities Development Manual (FDM) to include freight considerations
- Monitor existing state trunk highway conditions to set priorities
- Improve the department's existing maintenance management tools
- Implement work zone and lane-closure management strategies and tools to maintain safety and minimize impacts on travelers
- Complete the currently enumerated Major Highway Development projects
- Complete currently enumerated Southeast Wisconsin Freeway Megaprojects Program
- Complete corridor and studies approved by the Transportation Projects Commission
- Monitor the state trunk highway network and respond to operational needs
- Improve motor carrier efficiency
- Explore approaches to improve motor carrier enforcement
- Investigate ways to simplify, streamline, and provide more permitting options
- Identify and preserve a sub-system of state highways that accommodate over-height (up to 20 feet), over-weight and over-size loads
- Work with other states to identify harmonization opportunities
- Support communications along state highway corridors of freight significance, to ensure drivers can remain informed of changing conditions
- Support greater use of technologies to improve the safety and efficiency of operations along corridors with high freight movement frequencies
- Support an increase in the availability of truck parking at state-owned facilities and raise the awareness of its availability
- Improve standards for infrastructure
- Improve emergency response
- Identify freight-specific safety concerns and develop strategies for solutions

Local Roads

As discussed in Chapter 5, *Wisconsin's Transportation System Assets*, Wisconsin's locally-owned and maintained road and bridge system serves as a critical link in the state's total transportation network. With over 103,000 miles of county, town, and municipal roads and nearly 9,000 bridges, the local road network accounts for approximately 90 percent of Wisconsin's public road mileage. Typically, these are local roads owned and operated by local jurisdictions.

As a critical companion to the state highway system, the local road system offers connections not only to local activity centers, but also to state and national facilities of importance such as ports and economic business centers. Local road policies that will be implemented include:

- Assist in providing asset management strategies and tools for local governments to ensure that selected system preservation improvements provide cost-effective service life extension
- Work with local entities to identify and address key safety issues on the local system
- Partner with local governments to manage and invest in the local road and bridge network

Rail

As identified in Chapter 5, *Wisconsin's Transportation System Assets*, rail provides a low-cost alternative transportation mode for industry transport of freight. Low-value, high-volume commodities are typically handled by rail. Rail cars transport millions of tons of coal for the state's energy generating plants. Train cars serve as rolling warehouses, which reduces inventory and warehousing costs, making Wisconsin manufacturers and producers more competitive in the global marketplace. Heavy machinery, manufacturing, auto assembly, and pulp and paper product manufacturing are some of the state's key industrial sectors that are dependent upon rail to deliver finished goods to domestic and foreign markets. Rail policies that will be implemented include:

- Preserve rail corridors, including rights-of-way, for freight service
- Work with stakeholders to facilitate a discussion to develop an intermodal strategy for Wisconsin
- Maintain state-owned rail lines to allow service levels to continue uninterrupted and without additional restrictions
- Acquire rail lines into public ownership, when appropriate, to preserve essential railroad service
- Fund track upgrades for publicly-supported rail lines to meet changing industry standards

Ports and Waterways

As identified in Chapter 5, *Wisconsin's Transportation System Assets*, in 2013, more than 28 million tons,[46] or approximately five percent of Wisconsin's freight by weight, worth over $2 billion (less than one percent of the total state freight value) was transported by and through ports and waterway facilities.[47] Despite the amount of freight transported by and through ports and waterway facilities, the waterways that surround Wisconsin, the Mississippi River and the Great Lakes are underutilized as a means to move freight. Recent estimates indicate that the Great Lakes System is operating at about half its potential capacity. Reasons for underutilization have to do with the type of commodities traditionally transported by water and the lack of intermodal connections.

Bulk commodities (e.g. grain, fertilizer, and iron ore) have different service requirements than goods shipped by trucks or air, which typically need to be shipped faster. While Wisconsin's waterways are connected to an extensive waterway network, that network is not well integrated into the road and rail systems (see Chapter 7, *Freight Transportation Trends, Issues, and Forecasts*). Port and waterway policies that will be implemented include:

- Explore the development of a maritime strategy for Wisconsin
- Provide state assistance programs for harbor improvements
- Advocate for federal funding of navigation and environmental improvements for the Upper Mississippi River-Illinois River Waterway, Soo Lock System, the Great Lakes, and the St. Lawrence Seaway
- Encourage comprehensive harbor and waterfront land use planning
- Examine roadway issues at ports

[46] 2013 IHS Transearch Database.
[47] Ibid.

Air

As identified in Chapter 5, *Wisconsin's Transportation System Assets*, Wisconsin businesses use air freight to ensure the availability and freshness of products with short shelf lives, aid in just-in-time manufacturing and expand market reach. In 2013, almost 105,000 tons of air freight cargo was loaded onto planes, with a total value exceeding $10 billion.[48]

Cargo that moves by air tends to be items that are high-value, low weight/bulk, time-sensitive, or highly specialized. The most common commodity types include small packaged freight, transportation equipment, electrical equipment, machinery, instruments, photo equipment, and optical equipment, miscellaneous manufacturing products, and chemicals and allied products.[49] Air policies that will be implemented include:

- Use the Airport Improvement Program to help Wisconsin airports accommodate business planes
- Support the needed airport system infrastructure, including inclement weather capability, to enable and sustain jet aircraft and related activity

Pipeline

Wisconsin's pipeline system is used to move pipeline commodities into and through the state. The location of Wisconsin relative to large regional refining hubs, east coast markets and active gas and oil fields in North Dakota and Alberta results in significant pipeline capacity being allocated to commodities traveling through the state. Additionally, Wisconsin's location results in the state being impacted by national and international crude oil and natural gas trends.

Wisconsin is not a producer of natural gas or crude oil, but relies on natural gas and refined petroleum products to fuel economic activity. Wisconsin's privately-owned pipeline system is used primarily for the transmission and distribution of natural gas, petroleum products, and to move crude oil through the state. Wisconsin's over 74,800 miles of pipelines transported more than 29 million tons of natural gas and petroleum products, valued at almost $16 billion in 2012 (Chapter 5, *Wisconsin's Transportation System Assets*).

Pipeline commodities are a key economic input into Wisconsin's economy. Pipelines are the preferred method to transport large volumes of liquids and gases over longer distances, due in part to lower costs relative to rail or trucking. Commodities transported via Wisconsin pipelines (e.g., crude oil, natural gas, propane, gasoline, fuel oil, and petroleum products) are key inputs for transportation, commercial and residential heating, energy production, manufacturing, refining, petroleum-derived products, and agricultural sectors.

The pipeline transportation system is privately-owned, maintained, and operated. As such, WisDOT does not have a role in capacity, operational choices and infrastructure investment. Pipelines are regulated primarily by federal and state institutions outside WisDOT. WisDOT may be involved in the approval of pipeline siting in department right-of-way. Additionally, WisDOT identifies pipelines during the roadway construction process to ensure the proper plans and supporting equipment are available in the event construction equipment hits a pipeline. While no

[48] 2013 IHS Transearch Database.
[49] 2013 IHS Transearch Database, 2 digit STCC Codes used.

policies were identified for pipelines as part of the freight plan, a few strategies have been identified for implementation. WisDOT's recommended strategic approach for pipelines is:

- Apply the Utility Accommodation Policy to all types of pipelines in Wisconsin
- Monitor trends in crude oil movements and their impact on other transportation users
- Coordinate with natural gas pipeline construction and participate in emergency response
- Enable modal connections, diversity and provide system resiliency for petroleum product pipelines

Use Performance Measures to Monitor the Freight System

The long-range, system-level plan reflects a number of policies and strategies developed to be meaningful, reasonable, and practical. Monitoring the state's transportation system performance will help validate and verify the plan's proposed policy direction over time. The plan's performance monitoring has two objectives: support existing performance measures and implement federally-required performance measures.

Support Existing Performance Measures

As discussed in Chapter 6, *Transportation System Condition and Performance*, WisDOT's MAPSS Performance Improvement program focuses on five core goals: Mobility, Accountability, Preservation, Safety, and Service, and associated performance measures that guide in achieving the department's mission *to provide leadership in the development and operation of a safe and efficient transportation system*.

The quarterly publication reports on 26 separate measures (shown in Table 9-2) that define and monitor the direction and degree with which WisDOT is meeting the goals. Of those already tracked by WisDOT, there are fifteen measures that, either in full or in part, reflect factors that affect freight movement (bolded).

Table 9-2: WisDOT MAPSS Performance Improvement Program Measures

Mobility	Accountability	Preservation	Safety	Service
• **Delay** • **Reliability** • Transit availability • Bicycling conditions on rural highways • **Incident response** • **Winter response**	• **TEA Grants** • Timely scheduling of contracts • **On-time Performance** • On-budget performance • Surplus property management	• Program effectiveness • **State highway pavement condition (backbone and non-backbone)** • **State bridge condition** • **State-owned rail line condition** • **Airport pavement condition** • **State highway maintenance** • Material recycling	• **Fatalities** • **Injuries** • **Crashes** • **Safety belt use**	• DMV wait times • DMV electronic services • DMV driver license road test scheduling • DMV phone service

Source: Wisconsin Department of Transportation, MAPSS

WisDOT will continue to use the MAPSS Performance Improvement Program Measures and will consider development of additional potential freight performance measures, including implementing Federally-Required Freight Performance Measure

MAP-21 required that FHWA establish performance measures, "Freight movement on the Interstate System." The Final Rulemaking selecting the performance measure that will be used to measure freight movement on the Interstate System was published January 2017. FHWA selected the percent of Interstate System mileage providing for reliable truck travel time as the performance measure used to assess freight movement.

Each state is required to monitor and report on the performance metrics for this measure. WisDOT will implement the freight performance measure. The first performance reporting period for the freight-related measure will begin January 1, 2018.

Use Data and Tools to Deliver Plan Policies and Strategies

As discussed in Chapter 8, *Freight Policies and Strategies*, the department's freight data analysis framework was used to identify Wisconsin's freight dependent critical corridors and facilities. Initially, this statewide identification of corridors and facilities will assist the department and freight stakeholders in:

- Building consensus on the most critical freight assets in Wisconsin
- Identifying "first and last mile" connections between facilities and corridors
- Identifying freight infrastructure needs
- Managing the transportation system to meet current freight demand

There are likely many other ways this freight data analysis framework could be used. In the coming years, WisDOT will continue to refine the data and processes employed in the framework so that WisDOT and other freight partners can receive the full spectrum of benefits of its development. The following sections provide detail by mode on how the freight data analysis framework was used to identify Wisconsin's critical freight corridors and facilities.

FAC Input: Critical Factors Shaping Supply Chains
WisDOT sought to build upon previous discussions on supply chains and logistics – which were examined during the 2014 Governor's Freight Industry Summit – to explore concerns including critical facility location, factors shaping supply chains, data and technology needs. At the April 14, 2016 FAC meeting, members were asked to offer their views on what WisDOT's role should be in that area, and their suggestions are captured in the following: • The FAC suggests WisDOT should measure reliability and predictability for its corridors and seek to improve those with wide variabilities in travel time. The committee cited rail service as a challenge in many parts of Wisconsin, as the state lacks sufficient market demand for consistent service. Connections between railroads are also a concern. • The FAC suggests WisDOT needs better awareness of logistics and supply chain metrics/operations, and the private sector stakeholders need to share the analytical tools they use to make supply chain decisions with WisDOT, including data collection and analysis. • The FAC marked a shift away from the just-in-time emphasis on speed previously prioritized by industry and instead, stressed the importance of consistency and reliability. • Members also emphasized the need for better collaboration between the public and private sectors (especially on data collection, analysis and education). • Technology was identified as a theme of growing importance to logistics. • In general, the FAC suggests WisDOT needs to be more proactive in understanding and working with the freight sector, and with informing legislative decision-makers.

Highway Data Analysis

In line with the strategy of using data and tools to deliver the plan's policies and strategies, the following data were used to identify the important freight-related highway facilities. All segments of the 11,800 mile STH were evaluated. Table 9-3 identifies the data used to develop the state highway score, the source of that data, and how

each element is weighted to reflect the importance of that factor. Weighting is important because it allows for normalization of asset characteristics. For example, the North Central region of the state will see less total vehicles traveling on their roadways than the Southeast region, but some North Central roads have a much higher truck percentage of traffic than found in Southeast region. It is important that each segment, regardless of its location, be identified for its importance to the movement of freight in Wisconsin. Only data related to freight and specifically its movements were considered, which is why data related to other key characteristics such as safety and total traffic were not weighted.

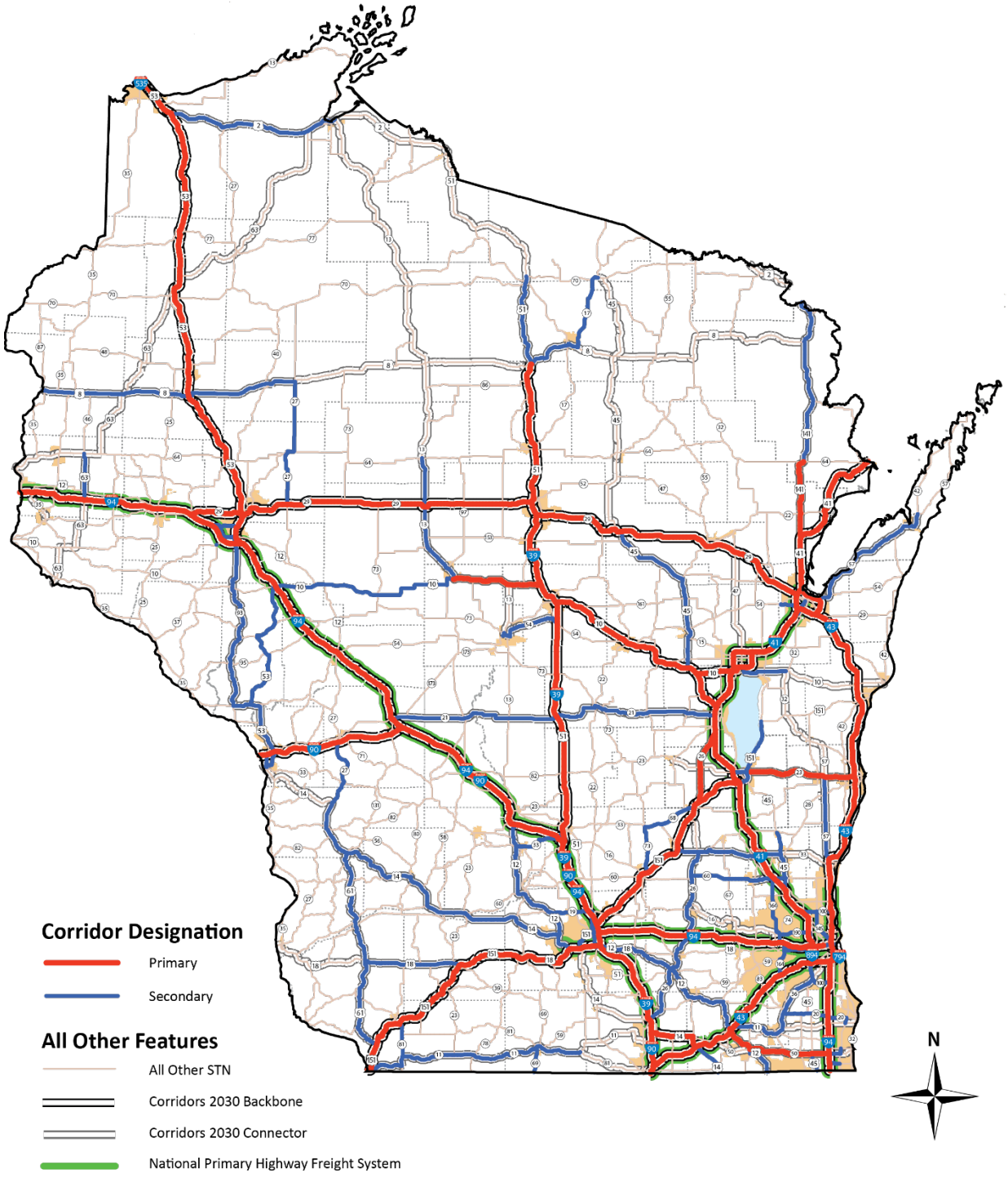
Table 9-3: Highway Freight Data Weighting

Criteria	Importance	Weighting of Importance
Daily Trucks Per Lane	The number of trucks indicates how heavily a given segment is being utilized by freight-moving vehicles	35%
Truck Percentage	The percent of trucks indicates how heavily a given segment is being utilized by freight-moving vehicles	25%
OSOW Permit Frequency	Reflects actual permits issued and associated routes taken when moving OSOW loads in Wisconsin.	15%
Truck Commodity by Value	Commodities by value removes bias towards heavy goods	10%
Truck Commodity by Weight	Commodities by weight data are indications of segments being used for freight movements.	10%
NHS Intermodal Connectors (Freight Airports and Ports)	Provide multimodal connectivity	5%

Source: Wisconsin Department of Transportation, Bureau of Planning and Economic Development

The number and the percent of trucks based on all vehicles, were the two major criteria used for determining the freight scores. The number and correlating percent of trucks indicates how heavily a given segment is being utilized by freight-moving vehicles. Privately-owned vehicles that move goods, but do not receive fees for such movements are not technically considered freight, and therefore are not captured in commodity data. An example of such movements is a private truck moving merchandise from one distribution center to another. These vehicles do have similar infrastructure needs and impacts as vehicles moving goods for a fee. Tons and value of commodities data are good indications of freight movements, but do not capture private trucks or local trips, so those criteria were not weighted as high as the truck count and percent data. Highways that provide connections to freight moving airports and ports also received an increased score due to their multimodal connectivity. Figure 9-8 shows the state highway system with segments weighted with freight data. The scores were then normalized over a scale from 1 to 99, with the higher number indicating facilities with the greatest amount of importance to freight-related movements taking place in Wisconsin. As shown in Figure 9-8, the highest scoring segments on Wisconsin's highway system are also on WisDOT's Backbone system (the interstate system and multilane divided state trunk highways). Applying this analysis, the department assessed and defined a primary and secondary highway freight system. The corridors have been prioritized and those scoring above 85 are identified as Wisconsin Primary Freight Highway Corridors, and those within the second tier of scores between 75 and 84 threshold are defined as Wisconsin Secondary Freight Highway Corridors.

Figure 9-8: 2016 Highway Freight Mobility Analysis



Source: Wisconsin Department of Transportation, Bureau of Planning and Economic Development

Designation of Federally Recognized Critical Urban and Rural Freight Corridors in Wisconsin

The goal of identifying Wisconsin's critical corridors and routes is to develop a freight orientated system where the infrastructure promotes the safe, efficient, and reliable movement of goods through the entire supply chain.

As discussed earlier in this chapter, pursuant to federal legislation, Wisconsin may designate a maximum of 150 miles of highway as CRFCs and a maximum of 75 miles of highway as CUFCs. The designation of these corridors is intended to supplement the nationally designed NHFN.

There is no deadline for designating and certifying CRFCs and CUFCs. These designations may occur at any time, may be full or partial designations of the CUFCs or CRFCs mileage, and the two types do not need to be designated at the same time. Designations and certification may be provided to FHWA on a rolling basis. FHWA recommends that the DOT's State Freight Plans are updated to include these routes once designated and certified, but a state does not need to wait to submit an initial State Freight Plan for compliance if no CUFC or CRFC routes have been designated. A CRFC or CUFC must be designated and certified before authorizing the use of NHFP funds on the route.

Based on the FAST Act, aside from WisDOT, the Southeastern Wisconsin Regional Planning Commission (SEWRPC) is the one MPO in the state (with a population greater than 500,000) with the ability to designate CUFC corridors, in collaboration with WisDOT. In addition to collaborating with SEWRPC on the urbanized area CUFC designation, the department will facilitate CUFC and CRFC designations with all Wisconsin MPOs to determine the appropriate distribution of mileage (and subsequent funds) to all urban and rural areas in the state.

To put these designations into perspective, in terms of the 150 miles of CRFCs, three critical routes from the Corridors 2030 Backbone – US 53, US 151, and STH 29 – together comprise around 500 miles, more than three times the mileage available for designation. None of these routes (US 53, US 151, and STH 29) are included as part of the NHFN. As a result, WisDOT will work with MPOs, RPCs, the FAC, and other stakeholders to designate CUFCs and CRFCs. WisDOT will not designate CUFCs and CRFCs until after the Wisconsin State Freight Plan has been published and consultation with freight industry stakeholders is complete.

Local Road Data Analysis

Local roads connect to the STH, airports, rail stations, and bus and ferry terminals. They are the first and usually the last link in the state's farm-to-market commerce, as well as providing critical links to other freight generators, and they offer critical links for area businesses and tourists.

To evaluate the freight-based importance of local roads, every section of the state's local road system was assigned a score using a defined set of criteria. Although all local roads were evaluated regarding their value to freight shipments, only the roads that had data in the statewide freight model were able to be scored (Chapter 7, *Freight Transportation Trends, Issues, and Forecasts*).

In contrast to decisions made for the STH, WisDOT does not have a direct role in the planning, construction, maintenance, or operation of the local road system. Therefore, the information provided in Table 9-4 is designed not to prioritize needs on local roads, but rather it is a way to inform stakeholders about the identification of potential corridors that may be more heavily used than others and therefore might warrant more investment.

Table 9-4: Local Road Freight Data Weighting

Criteria	Importance	Weighting of Importance
Daily Trucks	The number of trucks indicates how heavily a given segment is being utilized by freight-moving vehicles	30%
Truck Percentage	The percent of trucks indicates how heavily a given roadway is used by commercial vehicles	20%
Connection to a Major Freight Generator	Major freight generators are any facility that generate over 200,000 annual tons.	15%
Truck Commodity by Value	Commodities by value removes bias towards heavy goods	10%
Truck Commodity by Weight	Commodities by weight data are indications of segments being used for freight movements.	10%
Connection to an intermodal or transload facility	Provides multimodal connectivity	5%
Connection to Port	Provides multimodal connectivity	5%
Connection to Airport	Provides multimodal connectivity	5%

Source: Wisconsin Department of Transportation, Bureau of Planning and Economic Development

Like with the highway scoring, truck data was the highest weighted criteria for identifying the freight score for local roads because the number and correlating percent of trucks indicates how heavily a given segment is being utilized by freight-moving vehicles. The tons and value data was also used for scoring, but, again, not to the same degree.

A 15 percent weighting was assigned to local roads that connect to major freight generators because these roads are used for critical first- and last-mile deliveries of goods. Major generators include one of the following:

- A warehouse or distribution center with a minimum size of 40,000 square feet. This dataset was created from a business dataset based on Standard Industrial Codes (SICs). Individual facilities were analyzed and confirmed with aerial imagery.
- A business that ships and/or receives over 200,000 annual tons. The 2015 IHS Freight Finder data provides tonnage estimates for all freight generators and receivers in the state.

Local roads serve a vital connection between our highway system and other modes. Additional weighting was given to roads that connect to intermodal or transload facilities, ports, and airports that track freight shipments (see Chapter 5, *Wisconsin's Transportation System Assets*).

The local road freight analysis will allow the department and its local partners to understand what infrastructure is important to the movement of freight. This will also help identify bottlenecks (as described in Chapter 6, *Transportation System Condition and Performance*) and efficient truck routes. Additionally, it will be possible to identify critical first- and last-mile connections and any infrastructure improvements needed for efficient deliveries. Although WisDOT does not direct or prioritize local investments, the data and analysis could be valuable to local governments as they invest in their system.

Local road data (by municipality) will be made available to communities so they may conduct their own analyses. Requests for maps can be directed to: FreightWIinfo@dot.wi.gov.

Rail Data Analysis

The data for analyzing railroad corridors is based on tonnage and value from the Surface Transportation Board (STB) Waybill Sample. Although train frequency data could have also been used, existing freight investment decisions already take train numbers into consideration. All railroad lines designated as main lines (rather than spurs or sidings) received scores if they shipped freight in 2014.

Although tonnage may be considered a more important criteria than value for the rating of railroad lines, they are considered equal to ensure that higher valued shipments that moved with less frequency made an impact on the score (Table 9-5).

The criteria separate rail shipments into four types: outbound (leaving Wisconsin), inbound (entering Wisconsin), internal (starts and stop in Wisconsin), and total (all shipments including overhead). By not counting overhead shipments by itself, a slight advantage in scoring was given to lines that had a direct impact on serving Wisconsin businesses.

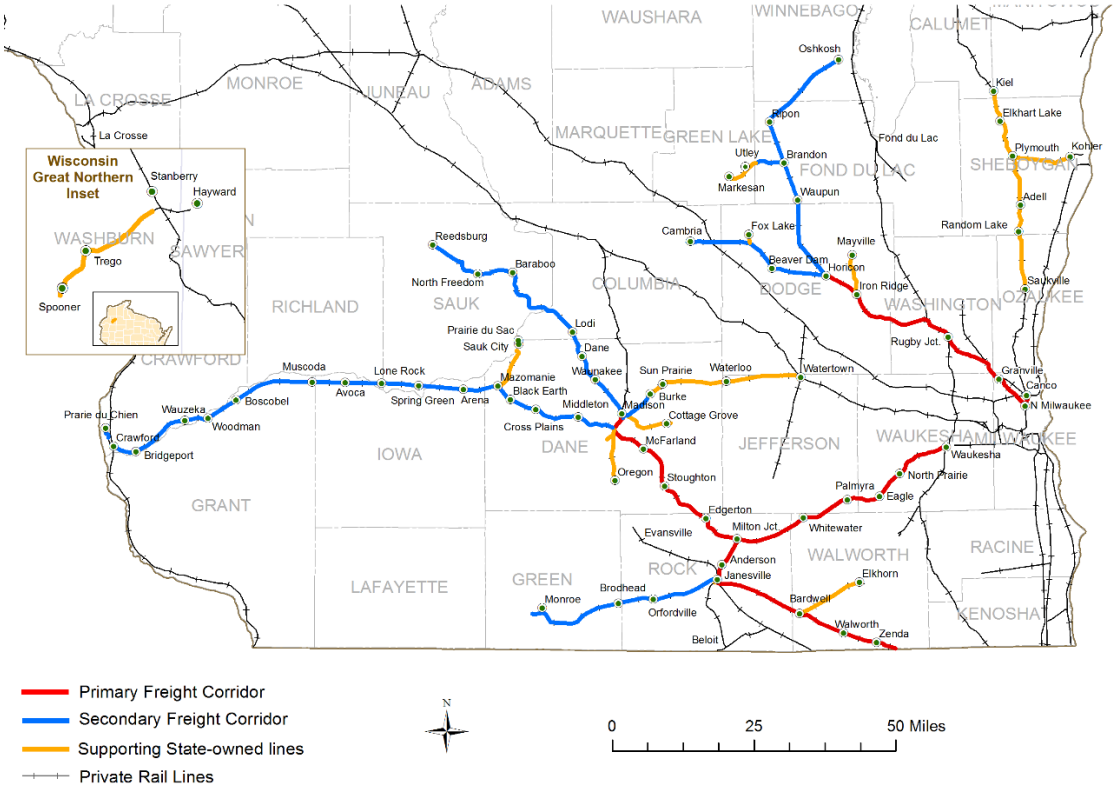
Table 9-5: Railroad Freight Data Weighting

Criteria	Importance	Weighting of Importance
Outbound Commodity Tons	Indicates how heavily a segment is utilized for the movement of freight	10%
Outbound Commodity Value		10%
Inbound Commodity Tons		10%
Inbound Commodity Value		10%
Internal Commodity Tons		10%
Internal Commodity Value		10%
Total Commodity Tons		10%
Total Commodity Value		10%
Connection to a port or intermodal container facility	Provides multimodal connectivity	10%
Connection or proximity to a rail yard	Provides multimodal connectivity	7%
Connection or proximity to a transload facility	Provides multimodal connectivity	3%

Source: Wisconsin Department of Transportation, Bureau of Planning and Economic Development

Like the other modal analysis, railroad lines received additional scoring if they provide intermodal connections. Connecting to a port or intermodal container facility is considered to be a very important role for a rail line. The importance of the rail yard as a property where trains can be built, and as a potential interchange location with other carriers, led to a seven percent weighting. Although many of Wisconsin's transload locations may not receive high volumes of traffic, the potential of those locations as a truck-rail connection is reflected in the scoring. The analysis was conducted as a way to identify what corridors have the greatest freight movement impacts, and assess where critical needs are on a statewide basis. WisDOT does not direct or prioritize investments off of the state-owned corridors, but understanding critical system needs is important for the overall efficient movement of freight in Wisconsin. Figure 9-9 shows state-owned rail lines rank as primary and secondary.

Figure 9-9: 2016 Railroad Freight Mobility Analysis



Source: Wisconsin Department of Transportation, Bureau of Planning and Economic Development

Port and Waterways Data Analysis

Although tonnage and value were the largest factors for scoring port and harbor facilities in Wisconsin, intermodal connectivity also played a significant role in evaluating port and waterways data (see Chapter 5, *Wisconsin's Transportation System Assets*) (Table 9-6). Ports were evaluated based on their connection to an existing railroad. Ports were also awarded a score based on connections to an out-of-service rail line, or a line in the Rails-to-Trails Program, a ten point bonus (half of the weighting for ports with active rail service) because of their potential to have intermodal connectivity at some point in the future. The seven ports that provide ferry service each received 10 points (the equivalent of a 99 score with a 10% weighting). Also, the closer a port is to the STH, the more points it received.

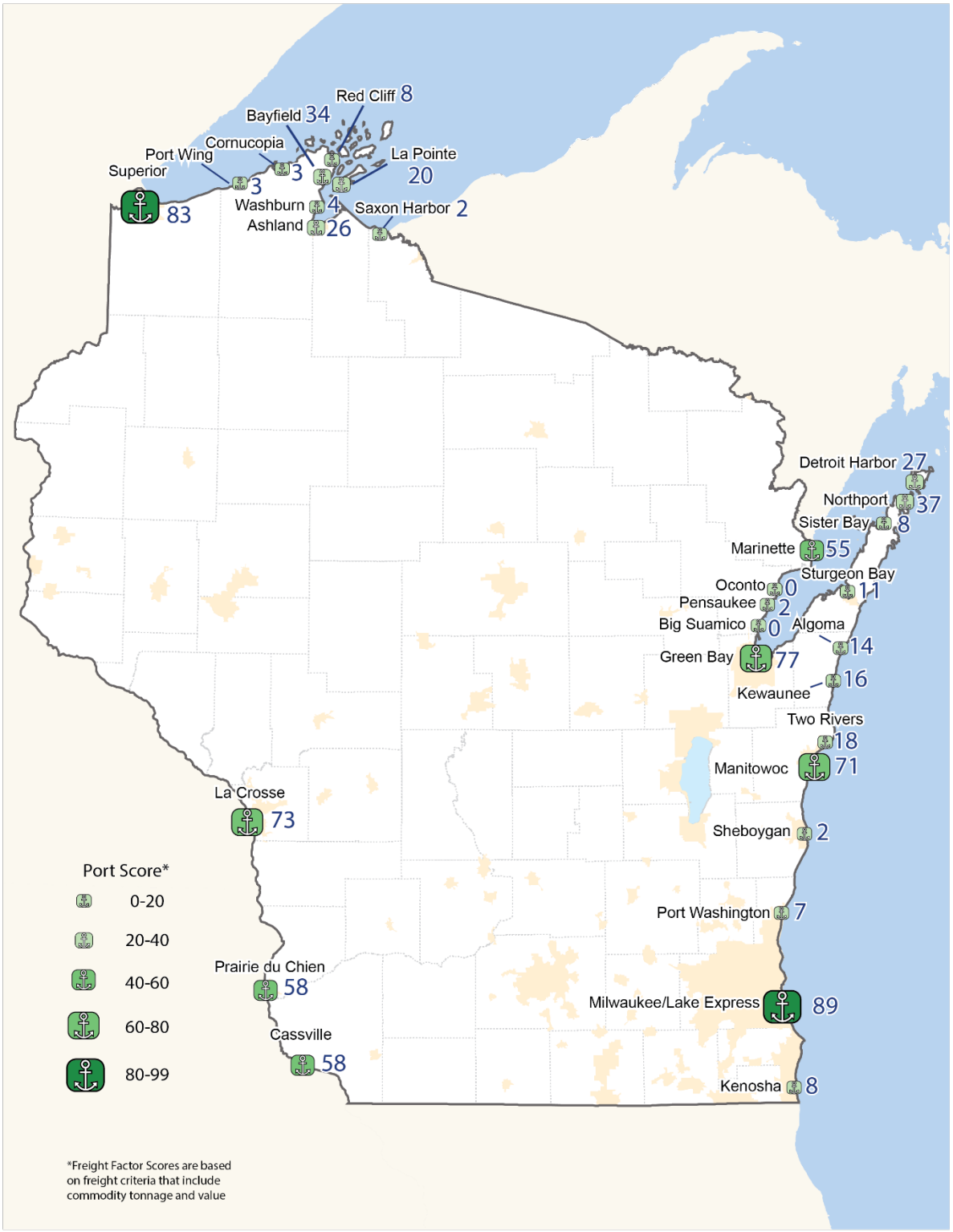
Understanding the volume and connectivity of ports and harbors in the state allows for analysis of supporting infrastructure, such as rail lines and roads, to identify critical needs on the transportation system as a whole. Not only can the data analysis be used in identifying important maritime assets, but it can capture trends over time as freight movement changes. Ensuring that supporting infrastructure can facilitate the movement of goods entering or leaving ports and harbors is critical for overall efficiency, resiliency and predictability (Figure 9-10).

Table 9-6: Port and Waterway Freight Data Weighting

Criteria	Importance	Weighting of Importance
Total Commodity Tons	Weight data is the most obvious way to compare one port vs. another	30%
Total Commodity Value	Commodities by value removes bias towards heavy goods	30%
Connection to a railroad, or potential connection to rail	Provides multimodal connectivity	20%
Ferry Service	Existing ferry service provides a means to ship freight, or to move trucks with freight	10%
Distance to/from STH	Provides multimodal connectivity	10%

Source: Wisconsin Department of Transportation, Bureau of Planning and Economic Development

Figure 9-10: 2016 Port and Waterway Freight Mobility Analysis



Source: Wisconsin Department of Transportation, Bureau of Planning and Economic Development

Note: The port at Cassville scores high on non-commodity variables, which is the primary driver of its high score. Cassville recently had the power plant that received coal via the waterway close.

Air Data Analysis

The value and tonnage of commodities moving to or from Wisconsin airports were the two factors used to create the airport freight factor score (Table 9-7). Tonnage and value were weighed equally for the other modes, but for air travel, commodity value was considered to be a more important attribute than weight. Air freight generally is used for high-value or highly perishable goods.

Connections between airports and other modes were identified, but they were not chosen as a basis for scoring. Air cargo is typically made up of light, perishable, and time-sensitive goods, which is nearly the absolute opposite of cargo shipped via rail and water. There is currently no logistical relationship between airports that support freight transport and either freight rail service or ports. Distance from the highway system was also not used in the scoring criteria because all of the airports that ship freight are within five miles of the highway system, and any score based on the distance would not provide a meaningful benefit to the ranking. Goods moved via air require predictable logistics which include methods for initial and final delivery. Very few goods moved via air reach their initial loading point, or final destination by plane. It is important that the road and rail infrastructure can support a predictable delivery time table. WisDOT can identify critical needs on the multimodal transportation system that is moving freight by analyzing the airport freight data (Figure 9-11).

Table 9-7: Air Freight Data Weighting

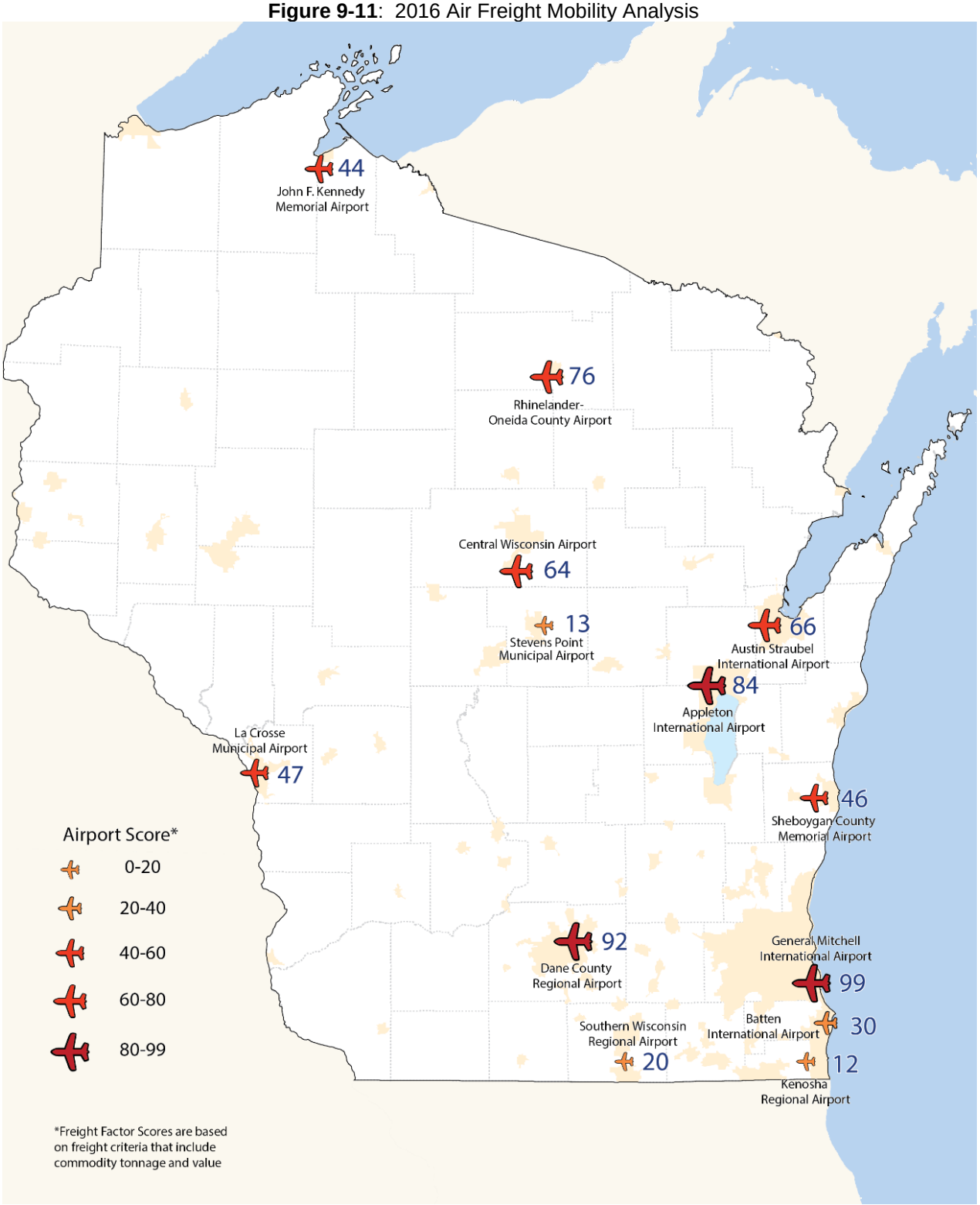
Criteria	Importance	Weighting of Importance
Total Commodities by Weight	Commodities by weight data are indications of segments being used for freight movements	40%
Total Commodities by Value	Commodities by value removes bias towards heavy goods	60%

Source: Wisconsin Department of Transportation, Bureau of Planning and Economic Development

Air freight data is difficult to collect. For belly cargo, much of what is transported simply does not get weighed separately from passenger baggage. Although parcel delivery services do have dedicated air freight operations, these are typically privately owned and are not defined as freight due to its inter-organization movement and lack of fee. Accurate air freight data remains, and is expected to continue to be, a challenge for analysis.

It is important to understand where freight assets are throughout the state. It is unlikely that WisDOT will have any direct funding mechanisms to impact air freight movements.

Figure 9-11: 2016 Air Freight Mobility Analysis



Source: Wisconsin Department of Transportation, Bureau of Planning and Economic Development

Identify Wisconsin-Specific Freight Projects

Wisconsin's long-range plans and corridor plans typically are implemented through programming decisions (scheduling and financing of projects in the next four to six years), which align infrastructure needs with available funding and staff resources. WisDOT administers a variety of programs involving federal, state, and local funds that support all modes of transportation. These programs were described in the preceding sections of this chapter. These funds are allocated across various transportation modes based upon analysis of needs. This analysis uses a range of data sources, known priorities, and funding availability, as well as statutory and regulatory requirements. In general, each program and funding decision is mode-specific.

FAST Act State Freight Plan Requirements

To receive funding under the NHFP, the FAST Act requires each state to develop a state freight plan, which must comprehensively address the State's freight planning activities and investments (both immediate and long-range). A state may develop its freight plan either separately from, or incorporated within, its statewide strategic long-range transportation plan. Among other requirements, a state freight plan must:

- Cover a five-year forecast period
- Be fiscally constrained
- Include a "freight investment plan" with a list of priority projects
- Describe how the State will invest and match its NHFP funds

The state must update its freight plan at least every five years, and may update its freight investment plan more frequently than the overall freight plan.

In terms of freight, the FAST Act requires state freight plans to include a "Freight Investment Plan," which contains a list of priority projects. In addition to the four projects listed on the following pages which received NHFP funds in federal fiscal years 2016 and 2017, Appendix 9-2 constitutes the list of projects programmed to use NHFP funds in federal fiscal years 2018-2020, i.e. the "Freight Investment Plan." Federal formula dollars may be spent only on the projects found on the NHFN, which is a highway-only network. These freight-specific funds are used to improve the movement of freight on the NHFN. Up to ten percent of state federal formula dollar apportionments can also be used for freight rail and intermodal freight projects.

WisDOT has a role in managing various freight-related programs that influence highway or Interstate projects (see Chapter 2, *Transportation Stakeholders and Institutions)*. The projects identified in Appendix 9-1 are all improvements associated with highway or Interstate projects. Appendix 9-1 was created because the FAST Act focuses primarily on the highway system and establishes a new NHFP to fund improvements to support the efficient movement of freight on the designated NHFN. While not all projects in Appendix 9-1 are on the NHFN, the listing constituted a starting point for deciding which projects in Wisconsin will receive NHFP funding. The NHFP distributes funding to states for highway freight-related projects. Generally, NHFP funds must contribute to the efficient movement of freight on the NHFN and be identified in a "Freight Investment Plan" included in the state's freight plan. In addition, a state may not use more than ten percent of its total NHFP apportionment each year for freight intermodal or freight rail projects. Appendix 9-1 exceeds the FAST Act requirements for a five-year forecast period by listing the state's six-year program from state fiscal year (SFY) 2018 through 2023.

The Freight Investment Plan identifies projects that:

- Have the largest impact on freight needs
- Best address the goals and objectives of the Wisconsin State Freight Plan

The set of projects listed in Appendix 9-2 was drawn from WisDOT's current six-year project program (Appendix 9-1). Per the FAST Act, a state may update a Freight Investment Plan more frequently than every five years. This is particularly important because funding for state projects are funded each biennium. As a result, WisDOT will

update Appendix 9-2 each biennium, as required, and ensure projects are included within the current four-year STIP before requesting authorization of federal funding.

The projects listed in Appendix 9-2 are funded with federal and state funds. This is particularly important because the FAST Act requires the "Freight Investment Plan" to include a list of priority projects and describe how federal freight funds made available to carry out the NHFP will be invested and matched. As of 2016, freight program funds, as described in the FAST Act, that WisDOT anticipates to receive between federal fiscal years 2016 and 2020 is as follows (before post-apportionment set asides; before penalties; before sequestration):

- FY 2016 - $21,960,555
- FY 2017 - $21,005,748
- FY 2018 - $22,915,361
- FY 2019 - $25,779,782
- FY 2020 - $28,644,202

In line with WisDOT's biennial funding cycle, NHFP funds for FY 2016 and 2017 are being used on the four projects listed below. The State of Wisconsin is using state funds to provide match for the projects. For Projects 5 through 11, highlighted in Appendix 9-1 and listed in Appendix 9-2 (as of February 14, 2018), WisDOT plans to let the projects on the dates listed. All projects are currently programmed. WisDOT has chosen not to share our current engineer's estimate as that information is confidential. The projected NHFP funding amount and a cost range for other funding sources is listed for each project. Appendix 9-2 may be updated following the biennial funding cycle, to ensure WisDOT meets both federal requirements and is in alignment with the state budgetary cycle.

Freight Project 1 - USH 10, I-41 Interchange Bridges and LLBDM Bridge B-70-61 Redeck

- Project ID: 1517-07-77
- Funding
    - NHFP Funds: $20,745,332 (33%)
    - Other Federal Funds: $30,271,244 (47%)
    - State Funds: $13,004,144 (20%)
    - Total Funds: $64,020,720 (100%)

Freight Project 2 - I-39/90 Illinois State Line – Madison Reconstruct Expansion

- Project ID 1003-10-84
- Funding
    - NHFP Funds: $1,324,138 (7%)
    - Other Federal Funds: $12,800,000 (72%)
    - State Funds: $3,759,237 (21%)
    - Total Funds: $17,883,375 (100%)

Freight Project 3 – I-39/90 Illinois State Line – Madison Reconstruct Expansion

- Project ID 1005-10-76
- Funding
    - NHFP Funds: $2,813,793 (7%)
    - Other Federal Funds: $27,237,949 (70%)
    - State Funds: $8,869,614 (23%)
    - Local Funds: $391 (<1%)
    - Total Funds: $38,921,747 (100%)

Freight Project 4 – I-39 Madison – Portage Rehabilitation

- Project ID 1010-02-85
- Funding
    - NHFP Funds: $7,536,818 (89%)
    - Other Federal Funds: $118,091 (1%)
    - State Funds: $850,545 (10%)
    - Total Funds: $8,505,454 (100%)

As mentioned previously, a state may not use more than ten percent of its total NHFP apportionment each year for freight intermodal or freight rail projects. Neither Appendix 9-1 or Appendix 9-2 includes any freight intermodal or freight rail projects. The projects identified in Appendix 9-1 are programmed projects utilizing a mix of state and federal funds. Projects listed in Appendix 9-1 that are on the NHFN could be considered for NHFP funding if WisDOT reprioritizes its projects. The projects listed are in compliance with federal law, and thus do not reflect all modes of transportation.

Coordination with Freight Stakeholders

As mentioned in Chapter 2, *Transportation Stakeholders and Institutions*, many freight transportation decisions involve multiple stakeholders, such as WisDOT, the federal government, local governments – including Regional Planning Commissions and Metropolitan Planning Organizations – Tribes, the private sector, operators, and other stakeholders. Since no single entity has authority over the entire transportation system, implementing the Wisconsin State Freight Plan will take coordination and cooperation among many interests and business areas.

As a result, the responsibility for the safety, maintenance, operation, planning, and funding of the state's multimodal transportation system is shared by a full range of stakeholders and institutions, including the federal government, state government, local governments, and private entities. Therefore, the operation of a seamless transportation system requires coordination, collaboration, communication and cooperation. Chapter 2, *Transportation Stakeholders and Institutions*, describes the key responsibilities and functions of the critical entities involved in addressing freight transportation.

WisDOT

The department's three executive offices and five divisions are organized according to function, with most staff operating from a central office located in Madison, and the remainder operating from regional offices throughout the state. This structure helps to preserve the customer-focused approach to transportation development and better serve stakeholder needs.

Implementing the State Freight Plan requires that staff continue to work together to communicate plan policies, engage stakeholders in transportation discussions, and integrate plan recommendations into project-level activities. Implementation responsibilities will vary depending on the item, issue, or activity.

Government entities, such as local units of government and Tribes

Implementation of the State Freight Plan requires coordination with government units such as local governments and Tribes that own and operate their own transportation services. Over the planning period, WisDOT will continue to work with its partners to address system priorities and continue to coordinate resources and activities through existing partnerships and agreements.

Private sector, operators, and others

WisDOT is responsible for decisions regarding the state trunk highway system. For all other modes of transportation, the infrastructure or service is owned or operated by someone else – the local government, Tribe, or private sector. If there is any federal or state funding assistance, WisDOT may be one of a few agencies that administers the funding and provides technical assistance.

Sometimes decisions on policy or project funding are shared and WisDOT can act as a catalyst for local or private transportation investment. In this way, stakeholders and WisDOT will collaborate to meet the State Freight Plan vision.

A critical forum for discussion of freight plan implementation strategies is the state's FAC. WisDOT will continue to support and convene the FAC into the future. The FAC has performed a valuable role in advising and prioritizing the concerns of various freight-related industries, and in offering detailed information on policies and operations. As WisDOT identifies and modifies its freight policies and prioritizes its list of freight-related projects, the Department will continue to convene the FAC as a forum for developing consensus on those policies and projects, and to identify future projects and policies for consideration.

Serve as a Resource for Freight Information

Drafting the State Freight Plan required WisDOT to collect new data and information, develop analytic tools, consult a myriad of public and private sector freight system stakeholders, and look inward to define the future roles and responsibilities of the state in advocating, facilitating, planning, and investing in the freight transportation system. While this document will serve as a resource to WisDOT and the stakeholders that helped to develop it, WisDOT's exploration of the state's freight transportation system, its needs, issues, and opportunities will continue. As such, WisDOT will continue to provide tools and other materials that communicate and educate industry and the general public on pertinent freight topics and issues.

During outreach, stakeholders suggested WisDOT could serve in an ongoing educational role and be a conduit for providing critical information to freight stakeholders and the general public, such as: how to use the freight system, when updates to freight analysis or modal-components are made, and notification of future freight-related meetings. WisDOT will continue to explore other ways in which the DOT can serve as a resource, as well.

Chapter 9, Appendix 9-1 – Freight Projects

1. Wisconsin's Highway/Interstate (Freight) Projects

Chapter 9, Appendix 9-2 – Freight Projects Programmed to Use NHFP Funds

1. Wisconsin's Highway/Interstate (Freight) Projects Programmed to Use NHFP Funds

2. Summary Table

Appendix 9-1: Wisconsin's Highway/Interstate (Freight) Projects

Source: Wisconsin Department of Transportation, Bureau of State Highway Programs

Note: Appendix 9-1 includes WisDOT's Backbone, Majors, and Southeast Megaprojects programs out to SFY 2023. WisDOT is aware not all of these projects are on the NHFN. Projects highlighted in yellow constitute the projects listed in Appendix 9-2 as of February 14, 2018.

WisDOT Program	SFY	DOT Region	Project ID	County	Hwy	Project Title	Project Length	Project Worktype
BACKBONE	2018	NC	1009-45-66	MARATHON	029	VARIOUS STRUCTURES MARATHON COUNTY	0.61	Bridge Preservation
BACKBONE	2018	NC	1166-12-80	PORTAGE	039	PLAINFIELD - STEVENS POINT	11.08	Resurfacing
BACKBONE	2018	NC	1176-15-71	LINCOLN	051	WAUSAU - MERRILL	0.00	Bridge Rehabilitation
BACKBONE	2018	NE	1009-33-22	BROWN	HWY	REGION WIDE DECK SEALING FY18	0.00	Bridge Rehabilitation
BACKBONE	2018	NE	1130-32-71	BROWN	041	GREEN BAY - OCONTO	4.75	Resurfacing
BACKBONE	2018	NE	1210-05-60	BROWN	172	IH 41 - IH 43	0.61	Bridge Preservation
BACKBONE	2018	NW	1020-03-81	ST. CROIX	094	HUDSON - BALDWIN	5.27	Resurfacing
BACKBONE	2018	NW	1020-11-82	ST. CROIX	094	NW REGION VAR CTYS INTERSTATE 94	31.10	Bridge Preservation
BACKBONE	2018	NW	1020-11-83	DUNN	094	NW REGION VAR CTYS INTERSTATE 94	24.96	Bridge Preservation
BACKBONE	2018	NW	1020-11-84	EAU CLAIRE	094	NW REGION VAR CTYS INTERSTATE 94	30.13	Bridge Preservation
BACKBONE	2018	NW	1020-11-85	JACKSON	094	NW REGION VAR CTYS INTERSTATE 94	45.14	Bridge Preservation
BACKBONE	2018	NW	1022-08-72	DUNN	094	HUDSON - MENOMONIE	4.65	Pavement Replacement
BACKBONE	2018	NW	1050-00-72	CHIPPEWA	029	CHIPPEWA FALLS - THORP	0.82	Resurfacing
BACKBONE	2018	NW	1190-09-65	CHIPPEWA	053	CHIPPEWA FALLS - NEW AUBURN	0.12	Bridge Preservation
BACKBONE	2018	NW	1190-10-70	CHIPPEWA	053	CHIPPEWA FALLS - RICE LAKE	0.38	Resurfacing
BACKBONE	2018	NW	1195-06-61	BARRON	053	RICE LAKE - SPOONER	0.09	Bridge Preservation
BACKBONE	2018	NW	1196-00-70	WASHBURN	053	MINONG - SOLON SPRINGS	5.31	Resurfacing
BACKBONE	2018	NW	1198-02-82	DOUGLAS	053	SOLON SPRINGS - SUPERIOR	8.87	Resurfacing
BACKBONE	2018	NW	1198-02-83	DOUGLAS	053	SOLON SPRINGS - SUPERIOR	9.94	Resurfacing
BACKBONE	2018	SE	1100-34-70	MILWAUKEE	894	IH 894	3.59	Bridge Rehabilitation
BACKBONE	2018	SE	1228-16-71	MILWAUKEE	043	NORTH SOUTH FREEWAY	0.01	Bridge Replacement
BACKBONE	2018	SE	2010-14-70	MILWAUKEE	041	ZOO FREEWAY	2.07	Pavement Preservation
BACKBONE	2018	SW	1002-01-71	DANE	039	C OF MADISON	0.00	Bridge Rehabilitation
BACKBONE	2018	SW	1010-02-85	COLUMBIA	039	MADISON - PORTAGE	3.72	Resurfacing
BACKBONE	2018	SW	1014-00-65	SAUK	090	WISCONSIN DELLS - PORTAGE	0.00	Bridge Preservation
BACKBONE	2018	SW	1071-02-61	MONROE	090	LA CROSSE - SPARTA	0.00	Bridge Preservation
BACKBONE	2018	SW	1071-02-62	MONROE	090	SPARTA - TOMAH	0.00	Bridge Preservation
BACKBONE	2018	SW	1071-02-63	MONROE	090	SPARTA - TOMAH	0.00	Bridge Preservation
BACKBONE	2018	SW	1111-02-63	DANE	151	MADISON - SUN PRAIRIE	0.00	Bridge Preservation
BACKBONE	2018	SW	1111-03-70	DANE	151	SUN PRAIRIE - BEAVER DAM	2.35	Resurfacing
BACKBONE	2018	SW	1112-07-60	DANE	151	MADISON - SUN PRAIRIE	0.00	Pavement Preservation
BACKBONE	2018	SW	1206-04-70	DANE	012	MADISON - CAMBRIDGE	0.38	Resurfacing
BACKBONE	2018	SW	1401-02-74	COLUMBIA	016	C COLUMBUS JAMES STREET	0.47	Reconstruction
BACKBONE	2019	NC	1058-24-60	SHAWANO	029	SHAWANO - GREEN BAY	13.20	Pavement Preservation
BACKBONE	2019	NC	1160-00-80	MARQUETTE	023	ENDEAVOR - PRINCETON	0.36	Pavement Preservation
BACKBONE	2019	NW	1020-01-77	ST. CROIX	094	HUDSON - BALDWIN	4.13	Resurfacing

BACKBONE	2019	NW	1020-03-76	ST. CROIX	094	HUDSON - BALDWIN	1.66	Bridge Replacement
BACKBONE	2019	NW	1020-03-77	ST. CROIX	094	HUDSON - BALDWIN	1.30	Bridge Replacement
BACKBONE	2019	NW	1020-03-78	ST. CROIX	094	HUDSON - BALDWIN	0.00	Bridge Replacement
BACKBONE	2019	NW	1020-03-79	ST. CROIX	094	HUDSON - BALDWIN	0.65	Bridge Replacement
BACKBONE	2019	NW	1021-03-74	EAU CLAIRE	094	EAU CLAIRE - OSSEO	0.11	Bridge Replacement
BACKBONE	2019	NW	1022-07-76	ST. CROIX	094	HUDSON - MENOMONIE	8.41	Pavement Replacement
BACKBONE	2019	NW	1050-11-80	CHIPPEWA	029	NW REGION VAR CTYS STATE HIGHWAY 29	2.89	Bridge Preservation
BACKBONE	2019	NW	1050-11-81	CLARK	029	NW REGION VAR CTYS STATE HIGHWAY 29	1.21	Bridge Preservation
BACKBONE	2019	NW	1190-02-64	EAU CLAIRE	053	EAU CLAIRE - CHIPPEWA FALLS	8.10	Bridge Preservation
BACKBONE	2019	NW	1198-00-72	DOUGLAS	053	SOLON SPRINGS - SUPERIOR	5.97	Resurfacing
BACKBONE	2019	SE	1030-43-70	MILWAUKEE	094	N-S FREEWAY CITY OF MILWAUKEE	3.57	Pavement Preservation
BACKBONE	2019	SE	1229-05-70	OZAUKEE	043	NORTH SOUTH FREEWAY	17.06	Pavement Preservation
BACKBONE	2019	SW	1111-03-72	DANE	151	SUN PRAIRIE - BEAVER DAM	15.96	Resurfacing
BACKBONE	2019	SW	1204-04-77	IOWA	151	PLATTEVILLE - MADISON	0.00	Pavement Replacement
BACKBONE	2019	SW	1206-04-79	DANE	012	C MADISON MADISON BELTLINE	1.92	Resurfacing
BACKBONE	2019	SW	1206-04-80	DANE	012	MADISON - CAMBRIDGE	6.21	Resurfacing
BACKBONE	2020	NC	1176-15-70	LINCOLN	051	WAUSAU - MERRILL	0.51	Pavement Replacement
BACKBONE	2020	NC	1510-02-72	WAUPACA	010	WAUPACA - APPLETON	0.02	Bridge Replacement
BACKBONE	2020	NC	6600-00-62	MARATHON	153	MOSINEE - ELDERON	0.19	Pavement Preservation
BACKBONE	2020	NE	1221-09-71	SHEBOYGAN	043	MILWAUKEE - GREEN BAY RD	7.47	Resurfacing
BACKBONE	2020	NW	1023-07-72	TREMPEALEAU	094	EAU CLAIRE - OSSEO	0.14	Bridge Replacement
BACKBONE	2020	NW	1190-11-82	NORTHWEST REGION WIDE	HWY	NW REGION CHIPPEWA COUNTY - USH 53	1.99	Bridge Preservation
BACKBONE	2020	NW	1190-11-83	NORTHWEST REGION WIDE	HWY	NW REGION EAU CLAIRE CO - USH 53	1.35	Bridge Preservation
BACKBONE	2020	NW	1190-11-84	DOUGLAS	053	BARRON DOUGLAS & WASHBURN COUNTIES	2.06	Bridge Preservation
BACKBONE	2020	NW	1196-00-63	DOUGLAS	053	MINONG - SOLON SPRINGS	5.31	Resurfacing
BACKBONE	2020	NW	1196-04-78	BARRON	053	NEW AUBURN - RICE LAKE	8.35	Resurfacing
BACKBONE	2020	NW	1196-05-77	BARRON	053	NEW AUBURN - RICE LAKE	7.95	Resurfacing
BACKBONE	2020	NW	1197-19-70	BARRON	053	RICE LAKE - SPOONER	0.50	Reconstruction
BACKBONE	2020	NW	1198-03-74	DOUGLAS	002	C SUPERIOR EAST SECOND STREET	2.47	Resurfacing
BACKBONE	2020	SE	1090-31-70	MILWAUKEE	043	AIRPORT FREEWAY	0.21	Bridge Rehabilitation
BACKBONE	2020	SE	1090-31-71	MILWAUKEE	041	AIRPORT FREEWAY	0.00	Bridge Replacement
BACKBONE	2020	SE	1100-35-70	MILWAUKEE	894	ZOO FREEWAY	2.53	Bridge Rehabilitation
BACKBONE	2020	SE	1100-41-70	WASHINGTON	041	MILWAUKEE - FOND DU LAC	20.92	Bridge Rehabilitation
BACKBONE	2020	SE	1228-28-70	MILWAUKEE	043	HILLSIDE INTERCHANGE	0.97	Bridge Rehabilitation
BACKBONE	2020	SE	1450-02-70	OZAUKEE	043	NORTH SOUTH FREEWAY	18.70	Bridge Rehabilitation
BACKBONE	2020	SW	1011-01-63	COLUMBIA	039	MADISON - PORTAGE	0.01	Bridge Preservation
BACKBONE	2020	SW	1016-03-61	JUNEAU	090	TOMAH - MAUSTON	0.08	Bridge Preservation
BACKBONE	2020	SW	1023-06-72	MONROE	094	BLACK RIVER FALLS - TOMAH	0.04	Bridge Rehabilitation
BACKBONE	2020	SW	1066-03-73	DANE	094	MADISON - LAKE MILLS	0.00	Bridge Replacement

BACKBONE	2020	SW	1066-06-72	JEFFERSON	094	LAKE MILLS - OCONOMOWOC	0.01	Bridge Replacement
BACKBONE	2020	SW	1067-02-72	JEFFERSON	094	MADISON - LAKE MILLS	0.02	Bridge Rehabilitation
BACKBONE	2020	SW	1067-02-74	JEFFERSON	094	LAKE MILLS - OCONOMOWOC	0.02	Bridge Replacement
BACKBONE	2020	SW	1067-02-75	JEFFERSON	094	LAKE MILLS - OCONOMOWOC	0.02	Bridge Rehabilitation
BACKBONE	2020	SW	1067-02-76	JEFFERSON	094	LAKE MILLS - OCONOMOWOC	0.01	Bridge Replacement
BACKBONE	2020	SW	1071-02-71	MONROE	090	SPARTA - TOMAH	0.01	Bridge Replacement
BACKBONE	2020	SW	1071-07-78	LA CROSSE	090	LA CROSSE - SPARTA	0.00	Bridge Preservation
BACKBONE	2020	SW	1077-02-70	MONROE	090	SPARTA - TOMAH	11.69	Resurfacing
BACKBONE	2020	SW	1077-02-73	MONROE	090	SPARTA - TOMAH	10.34	Resurfacing
BACKBONE	2020	SW	1204-05-72	IOWA	018	DODGEVILLE - MOUNT HOREB	13.69	Resurfacing
BACKBONE	2021-23	NC	1053-07-76	MARATHON	029	WAUSAU - WITTENBERG	4.86	Resurfacing
BACKBONE	2021-23	NC	1058-16-70	SHAWANO	029	WITTENBERG - SHAWANO	0.76	Resurfacing
BACKBONE	2021-23	NC	1160-00-78	WAUSHARA	039	PACKWAUKEE - PLAINFIELD	0.73	Pavement Replacement
BACKBONE	2021-23	NC	1166-00-79	PORTAGE	039	STEVENS POINT - WAUSAU	3.26	Resurfacing
BACKBONE	2021-23	NC	1166-12-78	PORTAGE	039	PLAINFIELD - STEVENS POINT	11.13	Resurfacing
BACKBONE	2021-23	NC	1170-01-76	MARATHON	051	WAUSAU - MERRILL	8.72	Resurfacing
BACKBONE	2021-23	NC	1176-02-79	LINCOLN	051	TOMAHAWK - MINOCQUA	9.02	Resurfacing
BACKBONE	2021-23	NC	1176-22-72	LINCOLN	051	WAUSAU - MERRILL	6.75	Resurfacing
BACKBONE	2021-23	NW	1020-00-73	ST. CROIX	094	BALDWIN - MENOMONIE	6.29	Resurfacing
BACKBONE	2021-23	NW	1020-02-83	ST. CROIX	094	HUDSON - BALDWIN	0.05	Bridge Rehabilitation
BACKBONE	2021-23	NW	1021-00-78	ST. CROIX	094	BALDWIN - MENOMONIE	0.05	Bridge Replacement
BACKBONE	2021-23	NW	1021-00-79	ST. CROIX	094	BALDWIN - MENOMONIE	0.05	Bridge Replacement
BACKBONE	2021-23	NW	1021-03-78	JACKSON	094	BLACK RIVER FALLS - TOMAH	0.05	Bridge Replacement
BACKBONE	2021-23	NW	1021-04-75	ST. CROIX	094	BALDWIN - MENOMONIE	0.05	Bridge Replacement
BACKBONE	2021-23	NW	1021-04-76	ST. CROIX	094	BALDWIN - MENOMONIE	0.05	Bridge Replacement
BACKBONE	2021-23	NW	1021-04-77	ST. CROIX	094	BALDWIN - MENOMONIE	0.12	Bridge Replacement
BACKBONE	2021-23	NW	1021-04-78	ST. CROIX	094	BALDWIN - MENOMONIE	0.04	Bridge Replacement
BACKBONE	2021-23	NW	1022-00-79	TREMPEALEAU	094	EAU CLAIRE - OSSEO	3.68	Pavement Replacement
BACKBONE	2021-23	NW	1022-08-74	EAU CLAIRE	094	MENOMONIE - EAU CLAIRE	5.84	Pavement Replacement
BACKBONE	2021-23	NW	1022-09-78	EAU CLAIRE	094	EAU CLAIRE - OSSEO	7.67	Pavement Replacement
BACKBONE	2021-23	NW	1050-01-81	CHIPPEWA	029	CHIPPEWA FALLS - CADOTT	0.05	Bridge Rehabilitation
BACKBONE	2021-23	NW	1050-01-82	CHIPPEWA	029	CHIPPEWA FALLS - CADOTT	0.00	Bridge Rehabilitation
BACKBONE	2021-23	NW	1196-04-77	BARRON	053	NEW AUBURN - RICE LAKE	16.63	Resurfacing
BACKBONE	2021-23	NW	1197-00-70	WASHBURN	053	SPOONER - MINONG	1.60	New Bridge

BACKBONE	2021-23	NW	1197-18-77	WASHBURN	053	NEW AUBURN - SPOONER	6.41	Pavement Replacement
BACKBONE	2021-23	NW	1197-18-78	WASHBURN	053	NEW AUBURN - SPOONER	6.47	Pavement Replacement
BACKBONE	2021-23	NW	1198-03-78	DOUGLAS	002	C SUPERIOR EAST SECOND STREET	2.30	Resurfacing
BACKBONE	2021-23	NW	1198-10-77	BARRON	053	RICE LAKE - SPOONER	7.83	Pavement Replacement
BACKBONE	2021-23	SE	1030-08-75	RACINE	041	NS FREEWAY	10.48	Bridge Rehabilitation
BACKBONE	2021-23	SE	1030-08-78	KENOSHA	041	NS FREEWAY	3.18	Bridge Rehabilitation
BACKBONE	2021-23	SE	1060-13-75	WAUKESHA	094	EW FREEWAY	2.04	Bridge Replacement
BACKBONE	2021-23	SE	1090-16-70	WALWORTH	043	ROCK FREEWAY	26.90	Pavement Replacement
BACKBONE	2021-23	SE	1090-36-70	WALWORTH	043	ROCK FREEWAY	0.05	Bridge Preservation
BACKBONE	2021-23	SE	1100-01-77	MILWAUKEE	045	ZOO FREEWAY	3.41	Bridge Rehabilitation
BACKBONE	2021-23	SE	1100-17-79	WASHINGTON	041	MILWAUKEE - FOND DU LAC	14.56	Bridge Rehabilitation
BACKBONE	2021-23	SE	1100-35-71	MILWAUKEE	894	ZOO FREEWAY	0.00	Bridge Rehabilitation
BACKBONE	2021-23	SE	1100-46-70	MILWAUKEE	043	AIRPORT FREEWAY	3.08	Bridge Replacement
BACKBONE	2021-23	SE	1228-22-70	MILWAUKEE	043	NORTH SOUTH FREEWAY	1.81	Bridge Rehabilitation
BACKBONE	2021-23	SE	1229-09-70	OZAUKEE	043	NS FREEWAY	10.00	Bridge Rehabilitation
BACKBONE	2021-23	SW	1010-01-77	DANE	039	MADISON - LAKE DELTON ROAD	0.01	Bridge Replacement
BACKBONE	2021-23	SW	1012-01-74	COLUMBIA	039	MADISON - PORTAGE	1.70	Reconstruction
BACKBONE	2021-23	SW	1016-05-70	JUNEAU	090	TOMAH - MAUSTON	2.26	Reconstruction
BACKBONE	2021-23	SW	1016-05-80	JUNEAU	090	TOMAH - MAUSTON	0.00	Reconstruction
BACKBONE	2021-23	SW	1017-01-71	MONROE	090	TOMAH - CAMP DOUGLAS EB	15.77	Resurfacing
BACKBONE	2021-23	SW	1067-04-71	JEFFERSON	094	MADISON - OCONOMOWOC	10.76	Resurfacing
BACKBONE	2021-23	SW	1074-00-71	MONROE	090	LA CROSSE - SPARTA	0.88	Resurfacing
BACKBONE	2021-23	SW	1077-02-74	MONROE	090	SPARTA - TOMAH	1.60	Pavement Replacement
BACKBONE	2021-23	SW	1112-06-73	DODGE	151	BEAVER DAM - FOND DU LAC	2.59	Reconstruction
BACKBONE	2021-23	SW	1204-08-70	DANE	018	MOUNT HOREB - MADISON	0.25	Pavement Replacement
MAJORS	2018	NE	1517-75-84	WINNEBAGO	010	USH 10 - USH 10/STH 441	5.63	Reconstruction
MAJORS	2018	SW	1003-10-76	ROCK	039	ILLINOIS STATE LINE - MADISON	1.71	Reconstruction
MAJORS	2018	SW	1003-10-81	ROCK	039	ILLINOIS STATE LINE - MADISON	4.30	Reconstruction
MAJORS	2018	SW	1003-10-84	ROCK	039	ILLINOIS STATE LINE - MADISON	1.19	Reconstruction
MAJORS	2018	SW	1005-10-76	ROCK	039	ILLINOIS STATE LINE - MADISON	2.82	Reconstruction
MAJORS	2018	SW	1005-10-81	ROCK	039	ILLINOIS STATE LINE - MADISON	4.37	Reconstruction
MAJORS	2018	SW	1007-11-71	DANE	039	ILLINOIS STATE LINE - MADISON	4.68	Reconstruction
MAJORS	2018	SW	1007-11-74	DANE	039	ILLINOIS STATE LINE - MADISON	7.01	Reconstruction
MAJORS	2018	SW	1007-11-76	DANE	039	ILLINOIS STATE LINE - MADISON	3.09	Reconstruction

MAJORS	2018	SW	1206-07-75	DANE	018	MOUNT HOREB - MADISON	1.19	Reconstruction
MAJORS	2018	SW	1674-01-72	SAUK	012	LAKE DELTON - SAUK CITY	2.01	Resurfacing
MAJORS	2018	SW	1674-01-73	SAUK	012	LAKE DELTON - SAUK CITY	2.02	Reconditioning
MAJORS	2018	SW	1674-01-74	SAUK	012	V WEST BARABOO PINE & LINN STREETS	0.00	Resurfacing
MAJORS	2019	NE	1440-13-76	SHEBOYGAN	023	FOND DU LAC - PLYMOUTH	7.43	Reconstruction
MAJORS	2019	NE	1440-13-77	SHEBOYGAN	023	FOND DU LAC-PLYMOUTH	7.51	New Bridge
MAJORS	2019	NE	1517-07-71	WINNEBAGO	010	USH 10 - USH 10/STH 441	0.59	Reconstruction
MAJORS	2019	NE	1517-75-73	WINNEBAGO	010	USH 10 - USH 10/STH 441	5.63	Reconstruction
MAJORS	2019	NE	1517-75-77	WINNEBAGO	010	USH 10 - USH 10/STH 441	5.21	Reconstruction
MAJORS	2019	NE	1517-75-79	WINNEBAGO	010	USH 10 - USH 10/STH 441	5.21	Reconstruction
MAJORS	2019	SW	1003-11-71	ROCK	039	ILLINOIS STATE LINE - MADISON	2.10	Reconstruction
MAJORS	2019	SW	1005-10-77	ROCK	039	ILLINOIS STATE LINE - MADISON	2.61	Reconstruction
MAJORS	2019	SW	1007-11-79	DANE	039	ILLINOIS STATE LINE - MADISON	4.68	Reconstruction
MAJORS	2019	SW	1007-11-80	DANE	039	ILLINOIS STATE LINE - MADISON	2.61	Reconstruction
MAJORS	2019	SW	1206-08-77	DANE	018	MOUNT HOREB - MADISON	1.23	Reconstruction
MAJORS	2020	NE	1440-13-72	SHEBOYGAN	023	FOND DU LAC - PLYMOUTH	7.42	Reconstruction
MAJORS	2020	NE	1440-15-72	FOND DU LAC	023	FOND DU LAC - PLYMOUTH	6.27	Reconstruction
MAJORS	2020	NE	1440-15-73	FOND DU LAC	023	FOND DU LAC - PLYMOUTH	6.27	Reconstruction
MAJORS	2020	SW	1003-10-79	ROCK	039	ILLINOIS STATE LINE - MADISON	4.41	Reconstruction
MAJORS	2020	SW	1005-10-78	ROCK	039	ILLINOIS STATE LINE - MADISON	5.84	Reconstruction
MAJORS	2021-23	NE	1146-75-71	OUTAGAMIE	015	STH 76-NEW LONDON	3.92	Reconstruction
MAJORS	2021-23	NE	1146-75-72	OUTAGAMIE	015	STH 76-NEW LONDON	3.36	Reconstruction
MAJORS	2021-23	NE	1146-75-73	OUTAGAMIE	015	STH 76-NEW LONDON	3.26	Reconstruction
MAJORS	2021-23	NE	1146-75-76	OUTAGAMIE	015	STH 76-NEW LONDON	3.92	Reconstruction
MAJORS	2021-23	NE	1146-75-77	OUTAGAMIE	015	STH 76-NEW LONDON	3.92	Reconstruction
MAJORS	2021-23	NE	1146-75-78	OUTAGAMIE	015	STH 76-NEW LONDON	3.92	Reconstruction
MAJORS	2021-23	NE	1440-15-71	FOND DU LAC	023	FOND DU LAC - PLYMOUTH	6.01	Reconstruction
MAJORS	2021-23	NE	1440-15-78	FOND DU LAC	023	FOND DU LAC - PLYMOUTH	16.81	Reconstruction
MAJORS	2021-23	SE	1310-10-70	KENOSHA	050	75TH ST C KENOSHA/V PLEASANT PRAIR	2.78	Reconstruction
MAJORS	2021-23	SE	1310-10-71	KENOSHA	050	75TH ST C KENOSHA/V PLEASANT PRAIR	1.79	Reconstruction
MAJORS	2021-23	SE	1310-10-73	KENOSHA	050	75TH ST C KENOSHA/V PLEASANT PRAIR	4.75	Reconstruction
MAJORS	2021-23	SW	1003-10-80	ROCK	039	ILLINOIS STATE LINE - MADISON	17.42	Reconstruction
MAJORS	2021-23	SW	1005-10-87	ROCK	039	ILLINOIS STATE LINE - MADISON	1.52	Reconstruction
SE FREEWAY-I94 KEN/RAC/MIL	2018	SE	1030-20-85	MILWAUKEE	094	N-S FREEWAY RYAN ROAD INTERCHANGE	2.58	Reconstruction
SE FREEWAY-I94 KEN/RAC/MIL	2018	SE	1030-24-70	RACINE	094	N-S FREEWAY STH 11 INTERCHANGE	1.23	Reconstruction

SE FREEWAY-I94 KEN/RAC/MIL	2018	SE	1030-24-74	RACINE	094	N-S FREEWAY STH 11 INTERCHANGE	1.04	Reconstruction
SE FREEWAY-I94 KEN/RAC/MIL	2018	SE	1030-24-77	RACINE	094	N-S FREEWAY CTH KR TO STH 11	1.24	Reconstruction
SE FREEWAY-I94 KEN/RAC/MIL	2018	SE	1030-24-78	RACINE	094	N-S FREEWAY CTH KR TO STH 11	1.08	Reconstruction
SE FREEWAY-I94 KEN/RAC/MIL	2018	SE	1033-02-77	RACINE	094	N-S FREEWAY STH 11 TO STH 20	0.86	Reconstruction
SE FREEWAY-I94 KEN/RAC/MIL	2018	SE	1033-02-78	RACINE	094	N-S FREEWAY STH 11 TO STH 20	1.14	Reconstruction
SE FREEWAY-I94 KEN/RAC/MIL	2020	SE	1030-20-87	MILWAUKEE	094	N-S FREEWAY	1.92	Reconstruction
SE FREEWAY-I94 KEN/RAC/MIL	2020	SE	1030-22-80	MILWAUKEE	094	N-S FREEWAY	0.00	Reconstruction
SE FREEWAY-I94 KEN/RAC/MIL	2021-23	SE	1030-11-72	RACINE	094	N-S FREEWAY CTH K INTERCHANGE	1.31	Reconstruction
SE FREEWAY-I94 KEN/RAC/MIL	2021-23	SE	1030-11-79	RACINE	094	N-S FREEWAY STH 20 TO CTH K	1.06	Reconstruction
SE FREEWAY-I94 KEN/RAC/MIL	2021-23	SE	1030-11-80	RACINE	094	N-S FREEWAY STH 20 TO CTH K	1.38	Reconstruction
SE FREEWAY-I94 KEN/RAC/MIL	2021-23	SE	1030-20-84	MILWAUKEE	094	N-S FREEWAY	0.00	Reconstruction
SE FREEWAY-I94 KEN/RAC/MIL	2021-23	SE	1030-23-72	KENOSHA	094	N-S FREEWAY CTH E INTERCHANGE	1.07	Reconstruction
SE FREEWAY-I94 KEN/RAC/MIL	2021-23	SE	1030-23-79	KENOSHA	094	N-S FREEWAY STH 142 - CTH E	1.70	Reconstruction
SE FREEWAY-I94 KEN/RAC/MIL	2021-23	SE	1030-24-71	RACINE	094	N-S FREEWAY STH 11 INTERCHANGE	0.00	Reconstruction
SE FREEWAY-I94 KEN/RAC/MIL	2021-23	SE	1030-24-72	RACINE	094	N-S FREEWAY STH 11 INTERCHANGE	0.00	Reconstruction
SE FREEWAY-I94 KEN/RAC/MIL	2021-23	SE	1030-24-79	RACINE	094	N-S FREEWAY CTH KR TO STH 11	0.00	Reconstruction
SE FREEWAY-I94 KEN/RAC/MIL	2021-23	SE	1030-25-79	RACINE	094	N-S FREEWAY CTH K TO CTH G	0.83	Reconstruction
SE FREEWAY-I94 KEN/RAC/MIL	2021-23	SE	1032-10-75	KENOSHA	SYS	N-S FREEWAY CTH ML TO STH 50	0.00	Resurfacing
SE FREEWAY-I94 KEN/RAC/MIL	2021-23	SE	1033-02-71	RACINE	041	N-S FREEWAY STH 20 INTERCHANGE	2.25	Reconstruction
SE FREEWAY-I94 KEN/RAC/MIL	2021-23	SE	1033-02-79	RACINE	094	N-S FREEWAY STH 11 TO STH 20	0.00	Reconstruction
SE FREEWAY-I94 KEN/RAC/MIL	2021-23	SE	1035-01-72	RACINE	STR	N-S FREEWAY 7 MILE RD INTERCHANGE	0.00	Reconstruction

SE FREEWAY-I94 KEN/RAC/MIL	2021-23	SE	1035-01-74	RACINE	094	N-S FREEWAY 7 MILE RD INTERCHANGE	0.00	Reconstruction
SE FREEWAY-I94 KEN/RAC/MIL	2021-23	SE	1035-01-79	RACINE	094	N-S FREEWAY CTH G TO 7 MI RD	0.47	Reconstruction
SE FREEWAY-I94 KEN/RAC/MIL	2021-23	SE	1035-01-82	RACINE	094	N-S FREEWAY 7 MI RD TO MILW CO LN	0.48	Reconstruction
SE FREEWAY-I94 KEN/RAC/MIL	2021-23	SE	1035-01-83	RACINE	094	N-S FREEWAY 7 MI RD TO MILW CO LN	0.14	Reconstruction
SE FREEWAY-I94 KEN/RAC/MIL	2021-23	SE	1035-03-71	KENOSHA	094	N-S FREEWAY CTH KR INTERCHANGE	0.63	Reconstruction
SE FREEWAY-I94 KEN/RAC/MIL	2021-23	SE	1035-03-72	KENOSHA	094	N-S FREEWAY CTH KR INTERCHANGE	0.63	Reconstruction
SE FREEWAY-I94 KEN/RAC/MIL	2021-23	SE	1035-03-79	KENOSHA	094	N-S FREEWAY CTH E TO CTH KR	2.53	Reconstruction
SE FREEWAY-I94 KEN/RAC/MIL	2021-23	SE	2265-10-71	MILWAUKEE	241	27TH STREET	0.48	Reconstruction

Appendix 9-2: Wisconsin's Highway/Interstate (Freight) Projects Programmed to Use NHFP Funds

Source: Wisconsin Department of Transportation, Bureau of State Highway Programs. Information is current as of February 14, 2018 and reflects projects for federal fiscal years 2018-2020.

Freight Project 5 – I-39/90 Illinois State Line – Madison Reconstruct Expansion

- Project ID 1007-11-71
- Proposed letting date January 2018
- Funding
    - NHFP Funds: $5,121,429
    - Other federal funds $0 to $5,000,000
    - State Bond Funds: $14,000,000 to $20,000,000
    - Total Funds: $20,000,000 to $25,000,000

Freight Project 6 – I-39/90 Illinois State Line – Madison Reconstruct Expansion

- Project ID 1007-11-76
- Proposed letting date January 2018
- Funding
    - NHFP Funds: $3,349,850
    - Other Federal Funds $0 to $4,000,000
    - State Bond Funds $8,000,000 to $12,000,000
    - Total Funds: $10,000,000 to $15,000,000

Freight Project 7 – I-39/90 Illinois State Line – Madison Reconstruct Expansion

- Project ID 1005-10-81
- Proposed letting date March 2018
- Funding
    - NHFP Funds: $5,048,124
    - Other Federal funds $0 to $5,000,000
    - State Bond Funds: $5,000,000 to $10,000,000
    - Other State Funds: $0 to $5,000,000
    - Total Funds: $10,000,000 to $15,000,000

Freight Project 8 – I-39/90 Illinois State Line – Madison Reconstruct Expansion

- Project ID 1003-10-79
- Proposed letting date June 2018
- Funding
    - NHFP Funds: $6,650,700
    - Other Federal Funds $0 to $3,000,000
    - State Funds: $5,000,000 to $8,000,000
    - Total Funds: $10,000,000 to $15,000,000

Freight Project 9 – I-39/90 Illinois State Line – Madison Reconstruct Expansion

- Project ID 1003-11-71
- Proposed letting date June 2018
- Funding
    - NHFP Funds: $8,224,350
    - Other Federal Funds $0 to $8,000,000
    - State Funds: $5,000,000 to $10,000,000
    - Total Funds: $15,000,000 to $20,000,000

Freight Project 10 – I-39/90 Illinois State Line – Madison Reconstruct Expansion

- Project ID 1005-10-77
- Proposed letting date December 2018
- Funding
    - NHFP Funds: $23,169,842
    - Other Federal funds $50,000,000 to $60,000,000
    - State Bond Funds: $15,000,000 to $20,000,000
    - Local Funds $0 to $50,000
    - Total Funds: $90,000,000 to $100,000,000

Freight Project 11 – Rock County Line – USH 12

- Project ID 1090-16-70
- Proposed letting date September 2020
- Funding
    - NHFP Funds: $23,628,510
    - Other Federal funds $15,000,000 to $20,000,000
    - State Funds: $10,000,000 to $15,000,000
    - Total Funds: $50,000,000 to $60,000,000

Summary Table

Federal Fiscal Year	NHFP Apportionment	Carryover NHFP Balance From Previous Federal Fiscal Year	Total Amount of NHFP Funding Available During the Federal Fiscal Year	Total Amount of NHFP Funds Programmed During the Federal Fiscal Year
FFY2018	$22,915,361	$2,916,911	$25,832,272	$28,394,453 - Freight Project 5: $5,121,429 - Freight Project 6: $3,349,850 - Freight Project 7: $5,048,124 - Freight Project 8: $6,650,700 - Freight Project 9: $8,224,350
FFY2019	$25,779,782	($2,562,181)*	$23,217,601	$23,169,842 - Freight Project 10: $23,169,842
FFY2020	$28,644,202	$47,759	$28,691,961	$23,628,510 - Freight Project 11: $23,628,510

** Negative carryover balance from FFY2018 into FFY2019 reflects utilization of Advance Construction. FFY2019 funds will not actually be spent until that fiscal year.*

10– Chapter 10: Environmental Justice Analysis

10.1 Introduction

Wisconsin's freight transportation system is critical to the movement of goods throughout the state, and close proximity to the system provides access to many important items such as agricultural produce, consumer goods, and other manufactured products and raw materials. However, the freight system also has the potential for negative impacts in the form of increased noise, vibration, reduced air quality, and safety concerns. Highways and rail lines on the freight system also have the potential to limit access to certain neighborhoods unless a sufficient number of crossing locations are maintained.

An environmental justice analysis, as directed under federal Executive Order (EO) 12898, evaluates potential adverse impacts of the freight system on minority populations and low-income populations to determine if there is a risk for disproportionately high and adverse effects on an individual's health or their surrounding environment.[1] The analysis reviews demographic data for the State of Wisconsin to identify the distribution of various populations and the potential effects the freight system may have. Although not required under EO 12898, additional populations that may be sensitive to freight impacts were also analyzed.

This chapter consists of six sections:

- An overview of the history and requirements of environmental justice
- A summary of Wisconsin's population demographics throughout the state
- A demographic analysis of populations that reside in areas adjacent to the state's freight transportation system
- An examination of the potential impacts of the plan's recommendations on minority populations and low-income populations, as well as additional populations that may be sensitive to freight impacts including youth, seniors (aged 65 and over), persons with disabilities, and households without immediate access to vehicles.
- A summary of public engagement efforts to provide education and opportunities for input to minority populations and low-income populations.
- A discussion of the next steps necessary for the inclusion of environmental justice considerations in future planning efforts

Environmental Justice Overview

Executive Order (EO) 12898, "Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations," was signed and adopted in 1994. It directs federal agencies to take steps necessary to address disproportionately high and adverse effects on the health or environment of minority populations and low-income populations through its programs, policies, and activities. The executive order covers federal agencies such as the United States Department of Transportation (DOT) and Federal Highway Administration (FHWA), as well as projects receiving federal assistance under these agencies.

[1] Executive Office of the President, "Executive Order 12898." (February 11, 1994)

As a recipient of federal financial assistance, WisDOT works closely with the Federal Highway Administration (FHWA) and the Federal Transit Administration (FTA) in implementing the Executive Order and these agencies' corresponding policy directives. Corresponding directives include United States DOT Order 5610.2(a) "Actions to Address Environmental Justice in Minority Populations and Low-Income Populations," FHWA Order 6640.23a "FHWA Actions to Address Environmental Justice in Minority Populations and Low-Income Populations," and the Federal Transit Administration's Environmental Justice Circular 4703.1. WisDOT's actions and decisions are guided by the three fundamental principles of environmental justice, which are:

- To avoid, minimize, or mitigate disproportionately high and adverse human health and environmental effects, including social and economic effects on minority populations and low-income populations
- To ensure the full and fair participation by all potentially affected communities in the transportation decision-making process
- To prevent the denial of, reduction of, or significant delay in the receipt of benefits by minority populations and low-income populations

WisDOT considers environmental justice at every stage of planning and design, from statewide planning-level documents to individual project implementation. The analyses conducted in this chapter do not constitute a complete assessment of the impact of freight and freight-related projects on environmental justice populations. Rather, this analysis is intended as a starting point that subsequent plans may build upon. WisDOT's review process for environmental justice at the project level is consistent with the environmental evaluation and documentation process required under the National Environmental Policy Act (NEPA) of 1969.[2]

10.2 Summary of Wisconsin's Population Demographics

While environmental justice specifically refers to the evaluation of impacts on minority populations and low-income populations, this chapter also evaluates the potential impacts on other populations that are traditionally underserved by the transportation system. These include youth (aged nine and under), seniors (aged 65 and over), persons with disabilities, and households without immediate access to vehicles. The following section summarizes the distribution of these populations throughout the state and within each of the five WisDOT regions (North Central, Northeast, Northwest, Southeast, and Southwest). WisDOT regions were used for the analysis to analyze the demographic variability within the state. Reviewing the regional distributions of these populations helps to provide an overall picture of key population characteristics that will provide context and additional information for future projects, policies, and activities.

Data for each of these groups was collected from the United States Census Bureau. Data for race, ethnicity, and age was collected at the census block level from the 2010 Decennial Census. Beginning in 2010, information on income, vehicle availability, and disability status was no longer included in the Decennial Census and was instead collected as part of the American Community Survey (ACS).[3] The ACS surveys only a subset of the population and is therefore less accurate at smaller census geographies. The data used in this analysis for low-income populations, persons with disabilities, and zero-vehicle households was collected from the 2014 ACS five-year estimates. Data for low-income populations and zero-vehicles households is available at the census block group level. Data for persons with disabilities is available at the census tract level.

[2] U.S. Environmental Protection Agency, "National Environmental Policy Act."
[3] U.S. Census Bureau, "What is the American Community Survey?"

Environmental Justice Populations

As noted earlier, the requirements of Executive Order 12898 refer explicitly to minority populations and low-income populations. However, the Executive Order does not provide a definition of "minority" or "low-income." This was later clarified by United States DOT Order 5610.2(a) and FHWA Order 6640.23a. These definitions are discussed in detail below.

Minority Populations

The United States DOT and FHWA Environmental Justice Orders define "minority" as an individual who self-identifies as one of the following racial or ethnic categories:

- **Black or African American:** a person having origins in any of the black racial groups of Africa
- **Asian:** a person having origins in any of the original peoples of the Far East, Southeast Asia, or the Indian subcontinent
- **American Indian or Alaskan Native:** a person having origins in any of the original people of North America, South America (including Central America), and who maintains cultural identification through tribal affiliation or community recognition
- **Native Hawaiian and Other Pacific Islander:** people having origins in any of the original peoples of Hawaii, Guam, Samoa, or other Pacific Islands.
- **Hispanic or Latino:** a person of Mexican, Puerto Rican, Cuban, Central or South American, or other Spanish culture or origin, regardless of race[4,5]

These definitions correspond to the racial and ethnic categories used by the United States Census Bureau. However, since the year 2000, two additional categories have been available. Respondents that select more than one racial category are categorized as "Two or More Races." For the purposes of this analysis, and consistent with guidance from the Office of Management and Budget[6], respondents in this category were considered part of the minority population. Respondents may also select "Some Other Race" and write in a response if they feel that none of the other racial categories sufficiently describes their background. For the purposes of this analysis, respondents in this category were also considered part of the minority population.[7]

According to the United States Census Bureau's 2010 Decennial Census, the statewide minority population is 16.7 percent. The largest racial minority population category in the state is Black or African American at 6.3 percent. The next largest racial category is Some Other Race Alone at 2.4 percent of the population. Those who identify as Hispanic or Latino ethnicity comprise 5.9 percent of the population. It is important to note that the category of Hispanic or Latino is an ethnic categorization that functions independently of the racial categories and may include individuals from any race. For example, a person may self-identify as both White and Hispanic or Latino.[8]

The distribution of these populations between the five WisDOT regions varies significantly. For example, the Black or African American population is heavily concentrated in the Southeast Region, particularly for areas in and around the City of Milwaukee. Approximately 82 percent of the Black or African American population in Wisconsin resides in the Southeast Region compared with 36 percent of the population as a whole. Similarly, those identifying as Hispanic or Latino are also heavily concentrated in the southeast region with nearly 60 percent of the population compared with 36 percent of the population as a whole. American Indian or Alaskan Native populations

[4] Federal Highway Administration, "Department of Transportation Order 5610.2(a)."
[5] Federal Highway Administration, "FHWA Order 6640.23A."
[6] The White House, "Guidance on Aggregation and Allocation of Data on Race for Use in Civil Rights Monitoring and Enforcement." (March 9, 2000).
[7] Ibid.
[8] U.S. Census Bureau, "2010 Decennial Census."

account for only 1 percent of the state population. Over 70 percent of this population resides in the Northeast, Northwest, and North Central Regions compared to 41 percent of the population as a whole. The distribution of these populations in Wisconsin is summarized in Table 10-1.

Table 10-1: Race and Ethnicity by WisDOT Region

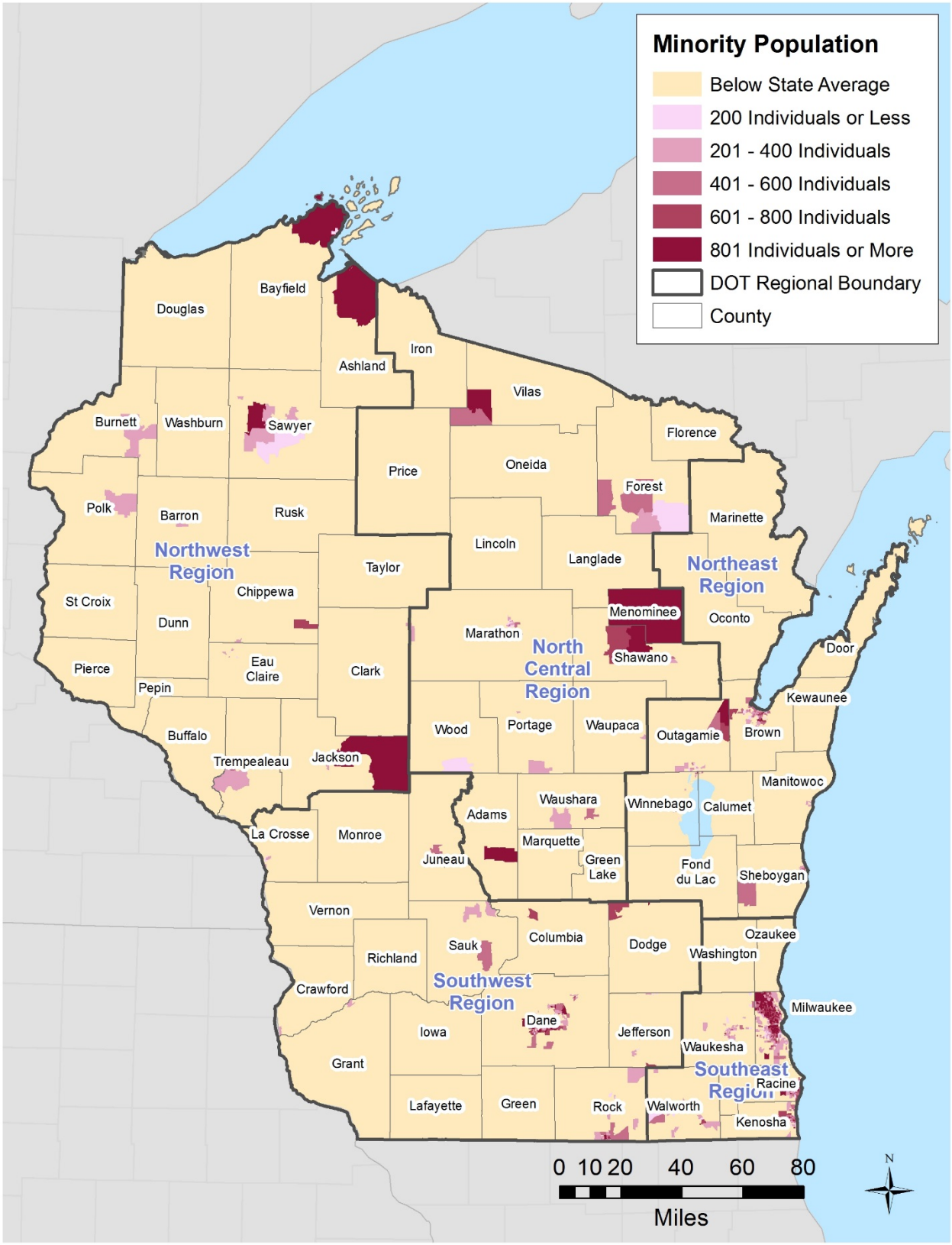
Region	Total Population	Hispanic or Latino	Non-Hispanic or Latino	White	Black	American Indian or Alaskan Native	Asian	Native Hawaiian and Other Pacific Islander	Some Other Race	Two or More Races
North Central Region	597,198	13,841	583,357	556,042	3,729	13,452	11,680	190	4,787	7,318
		2.3%	97.7%	93.1%	0.6%	2.3%	2.0%	0.0%	0.8%	1.2%
Northeast Region	1,067,017	47,255	1,019,762	975,993	14,273	13,245	25,815	332	20,684	16,675
		4.4%	95.6%	91.5%	1.3%	1.2%	2.4%	0.0%	1.9%	1.6%
Northwest Region	684,157	12,963	671,194	644,949	4,856	11,710	7,885	160	4,725	9,872
		1.9%	98.1%	94.3%	0.7%	1.7%	1.2%	0.0%	0.7%	1.4%
Southeast Region	2,019,970	200,219	1,819,751	1,536,028	294,809	10,386	51,426	729	79,535	47,057
		9.9%	90.1%	76.0%	14.6%	0.5%	2.5%	0.0%	3.9%	2.3%
Southwest Region	1,318,644	61,778	1,256,866	1,189,055	41,481	5,733	32,428	416	26,136	23,395
		4.7%	95.3%	90.2%	3.1%	0.4%	2.5%	0.0%	2.0%	1.8%
Statewide	**5,686,986**	**336,056**	**5,350,930**	**4,902,067**	**359,148**	**54,526**	**129,234**	**1,827**	**135,867**	**104,317**
		5.9%	**94.1%**	**86.2%**	**6.3%**	**1.0%**	**2.3%**	**0.0%**	**2.4%**	**1.8%**

Source: U.S. Census Bureau, "2010 Decennial Census"

Figure 10-1 displays the distribution of minority populations throughout the state. A statewide average population proportion was calculated for each group. In each of the subsequent figures, areas are highlighted if the proportion of the group in that area exceeds the statewide average. Additionally, these highlighted areas display the approximate population count to convey a sense of size and magnitude for the populations in these areas.

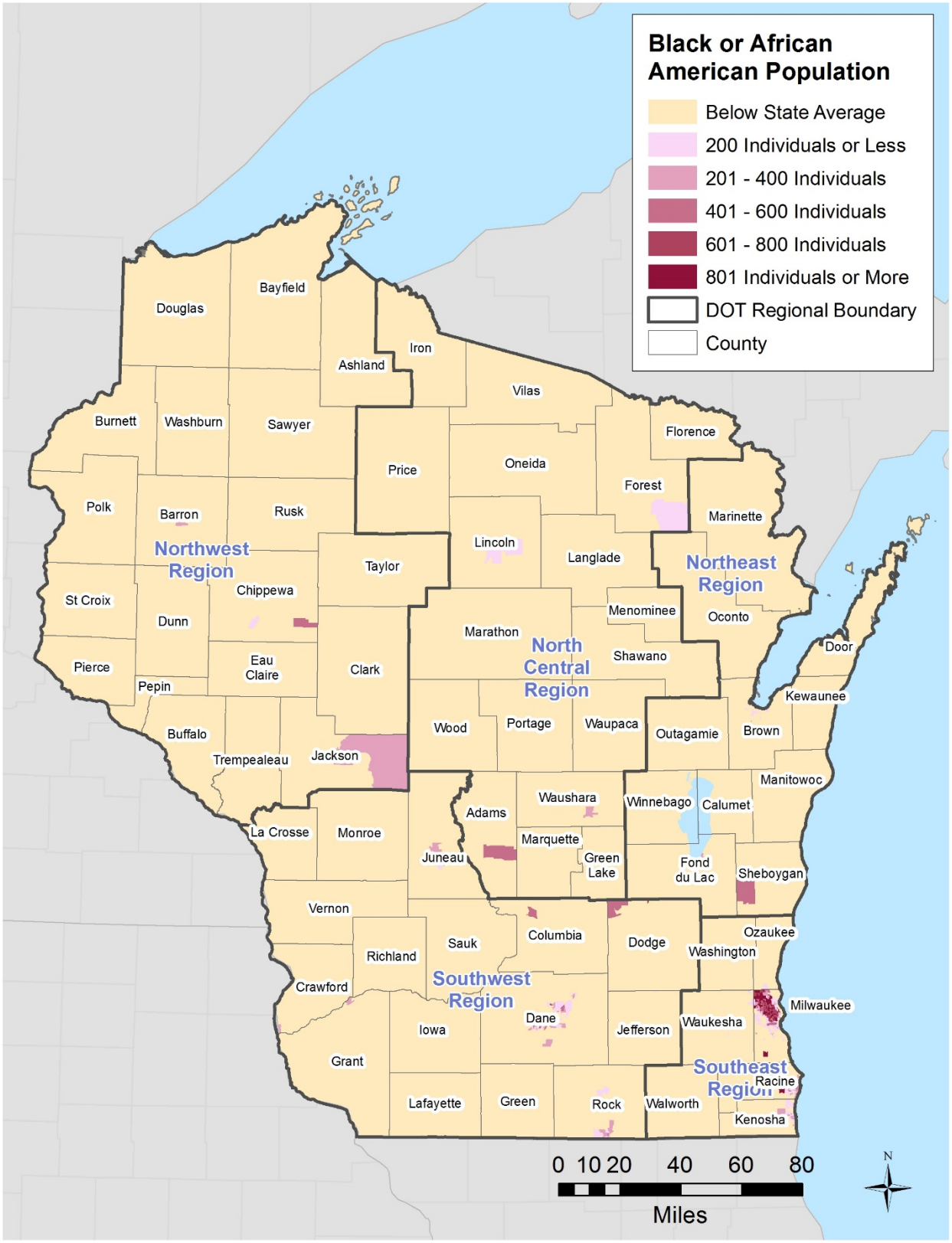
The maps provide additional context to the previous demographic summary. Figure 10-2 and Figure 10-5 highlight the concentration of Black or African American and Hispanic or Latino populations within the Southeast Region. Figure 10-3 shows the concentration of American Indian or Alaskan Native populations and includes the boundaries of Tribal lands throughout the state, emphasizing the strong overlap between Tribal lands and Native American populations, with a particularly high concentration in the northern areas of the state. Figure 10-4 highlights a concentration of Asian population in the Southeast Region, but also shows additional areas of concentration near Madison, Eau Claire, and Wausau.

Figure 10-1: Minority Population



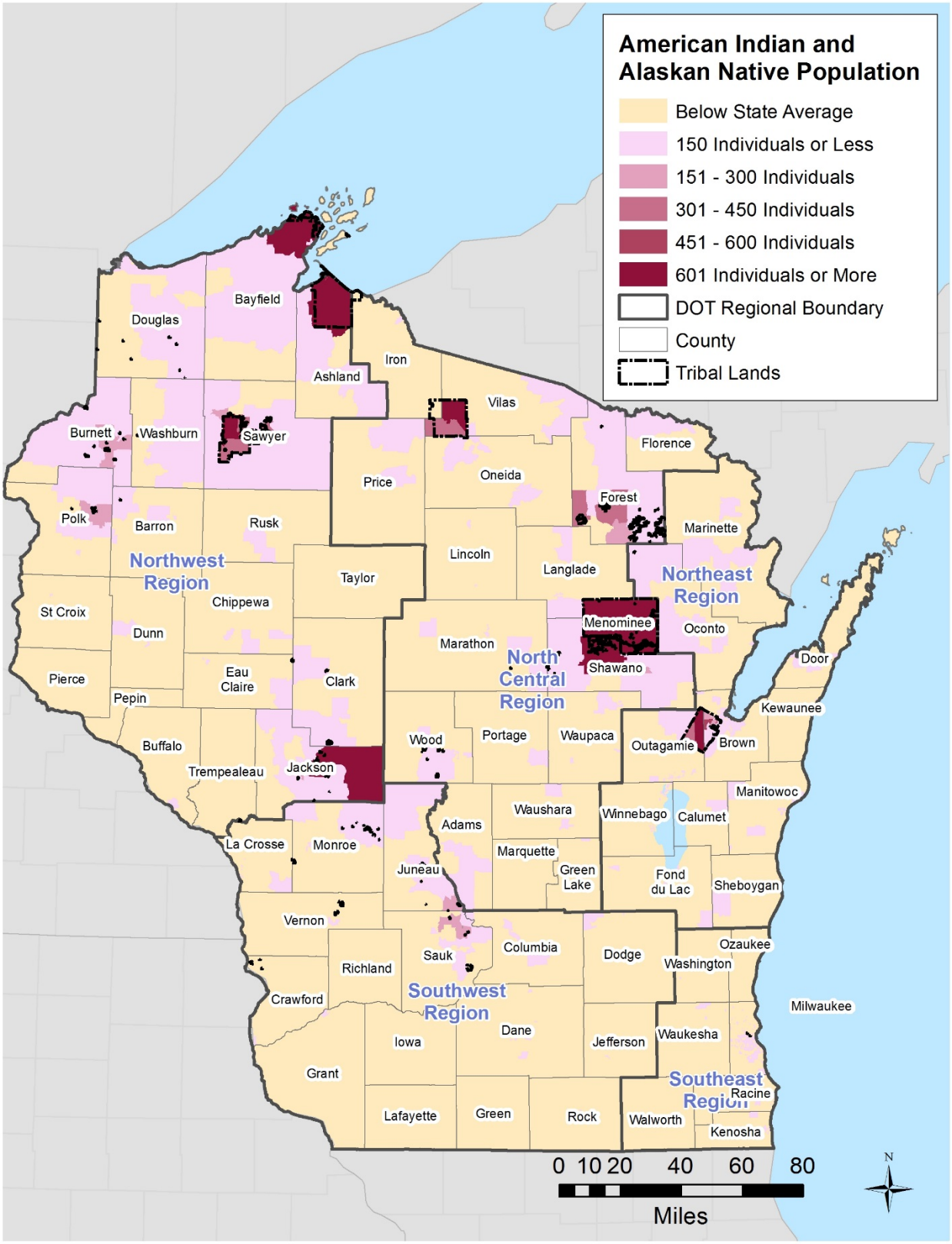
Source: U.S. Census Bureau, "2010 Decennial Census"

Figure 10-2: Black or African American Population



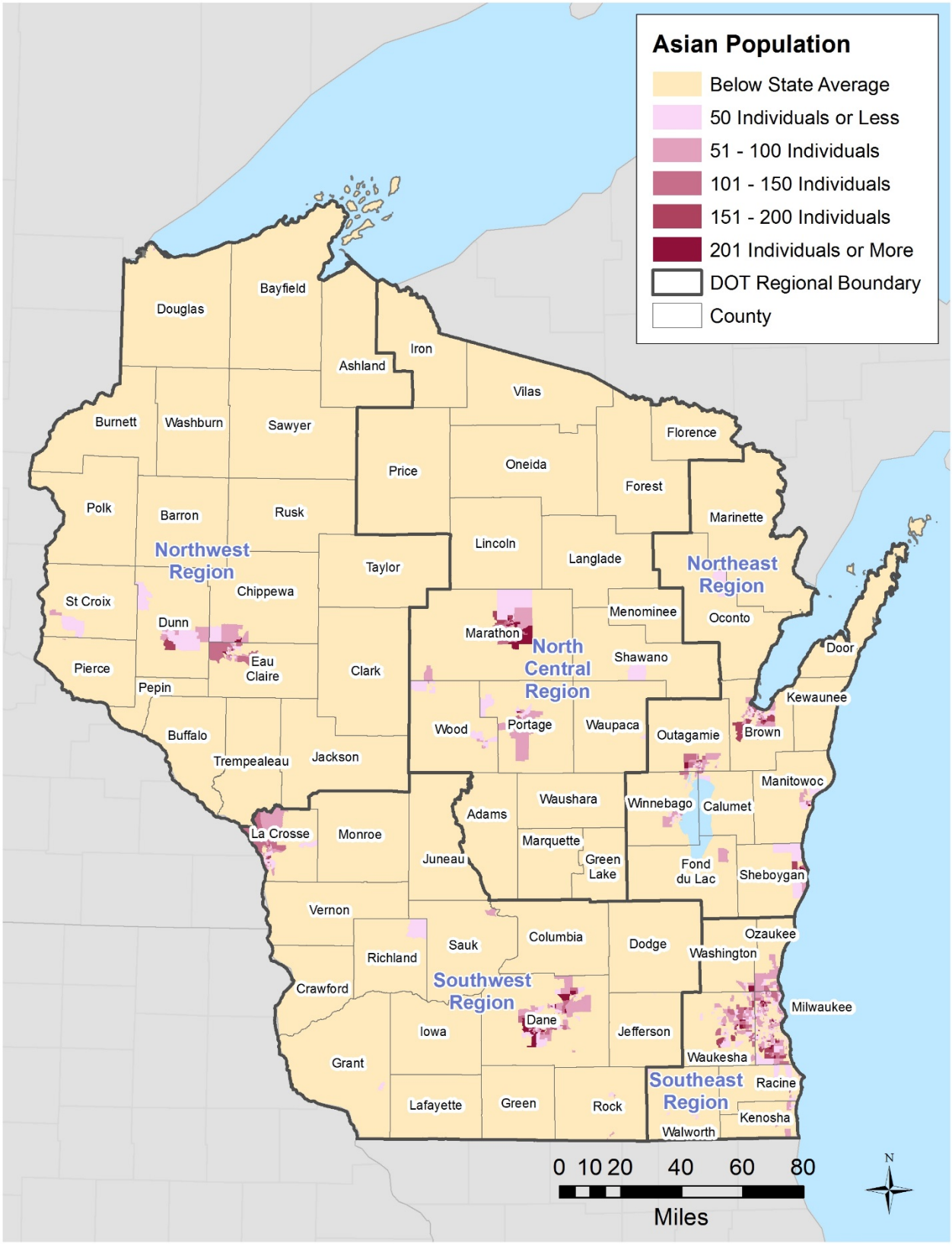
Source: U.S. Census Bureau, "2010 Decennial Census"

Figure 10-3: American Indian or Alaskan Native Population



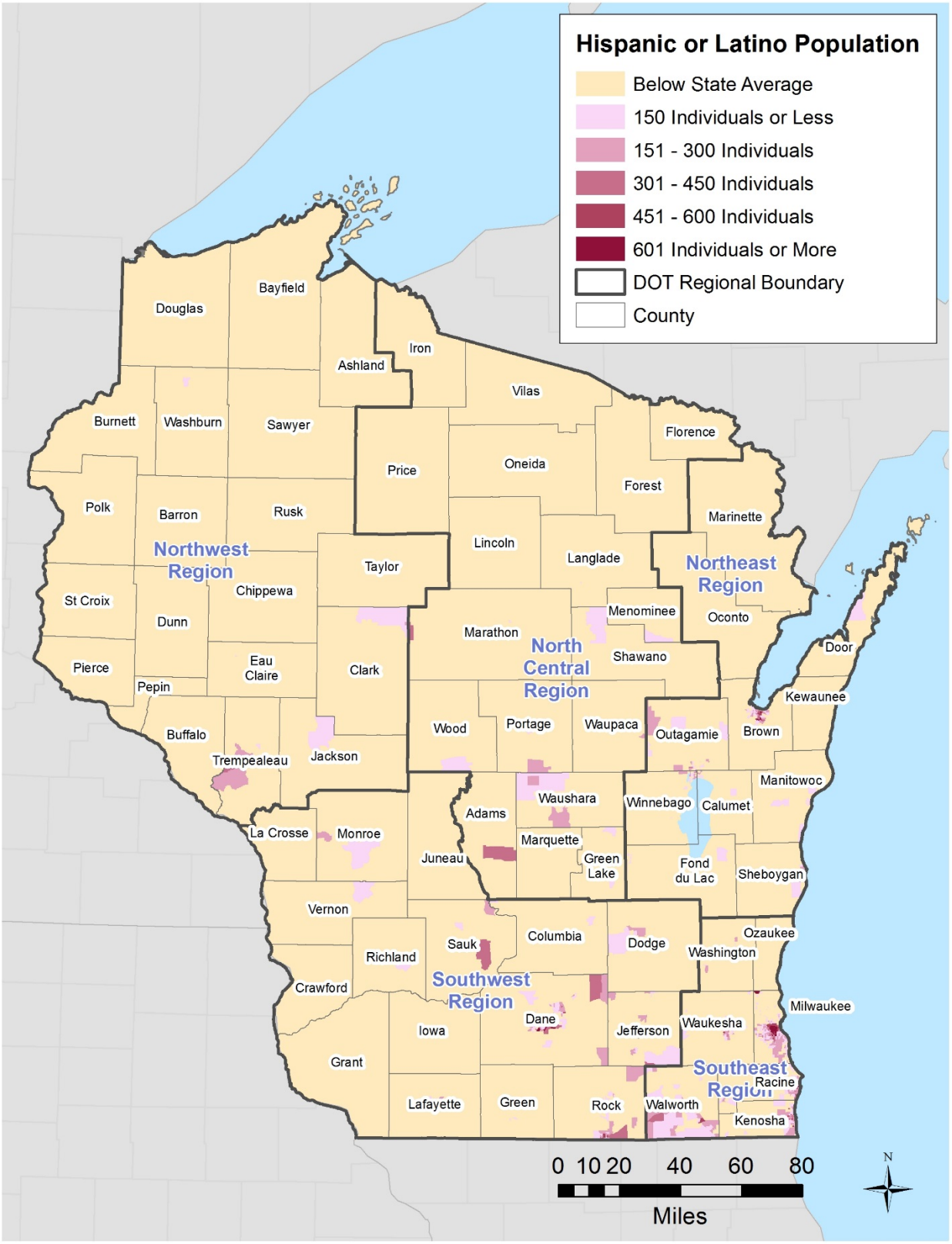
Source: U.S. Census Bureau, "2010 Decennial Census"

Figure 10-4: Asian Population



Source: U.S. Census Bureau, "2010 Decennial Census"

Figure 10-5: Hispanic or Latino Population



Source: U.S. Census Bureau, "2010 Decennial Census"

Low-Income Populations

The United States DOT and FHWA Environmental Justice Orders define "low-income" as "a person whose median household income is at or below the United States Department of Health and Human Services (DHHS) poverty guidelines." The DHHS poverty guidelines are based on household size and the number of related children less than eighteen years of age. The guidelines are updated annually and are summarized separately for the 48 contiguous states, Alaska, and Hawaii. The 2014 poverty guidelines are summarized in Table 10-2.

Table 10-2: 2014 DHHS Poverty Guidelines (48 Contiguous States)

Persons in Family/ Household	Poverty Guideline
1	$11,670
2	$15,730
3	$19,790
4	$23,850
5	$27,910
6	$31,970
7	$36,030
8	$40,090
For each additional person, add	$4,060

Source: U.S. Department of Health and Human Services, Office of the Assistant Secretary for Planning and Evaluation (ASPE), "2014 Poverty Guidelines"

For practical purposes, this evaluation uses the poverty thresholds developed by the United States Census Bureau to identify low-income populations in Wisconsin. The poverty thresholds are the original measure of poverty and are divided into 48 distinct household income thresholds based on family size and the age of the household members. The DHHS poverty guidelines are a simplification of the poverty thresholds and are used mainly for administrative purposes, such as eligibility criteria for governmental programs.

In order to be more inclusive, WisDOT went beyond the DHHS poverty guidelines and evaluated a broader low-income population. The poverty thresholds are determined for the United States as a whole and do not reflect regional variations in cost of living. An income that is sufficient to live above the poverty line in one part of the country may not be sufficient in another part. To help provide a more complete picture of low-income populations, this evaluation includes a review of populations with a median household income less than twice the poverty threshold. This more inclusive definition captures a broader section of the population in Wisconsin. Approximately 13 percent of Wisconsin's population has a household income less than the poverty thresholds while over 30 percent of Wisconsin's population has a household income less than twice the poverty thresholds.[9]

A summary of Wisconsin's low-income population within each region is provided in Table 10-3. It should be noted that the Census Bureau is unable to define poverty status for certain populations such as persons living in college dormitories or in institutional group quarters. These populations are excluded from the tabulations, resulting in slightly lower populations totals than in other categories. There is a relatively small variation in the distribution of low-income populations between the WisDOT regions, ranging from a high of 32.9 percent in the northwest region to a low of 28.0 percent in the northeast region. Figure 10-6 displays census block groups where the proportion of low-income population (below the poverty threshold) exceeds the state average. Figure 10-6 further highlights the widespread distribution of low-income populations.

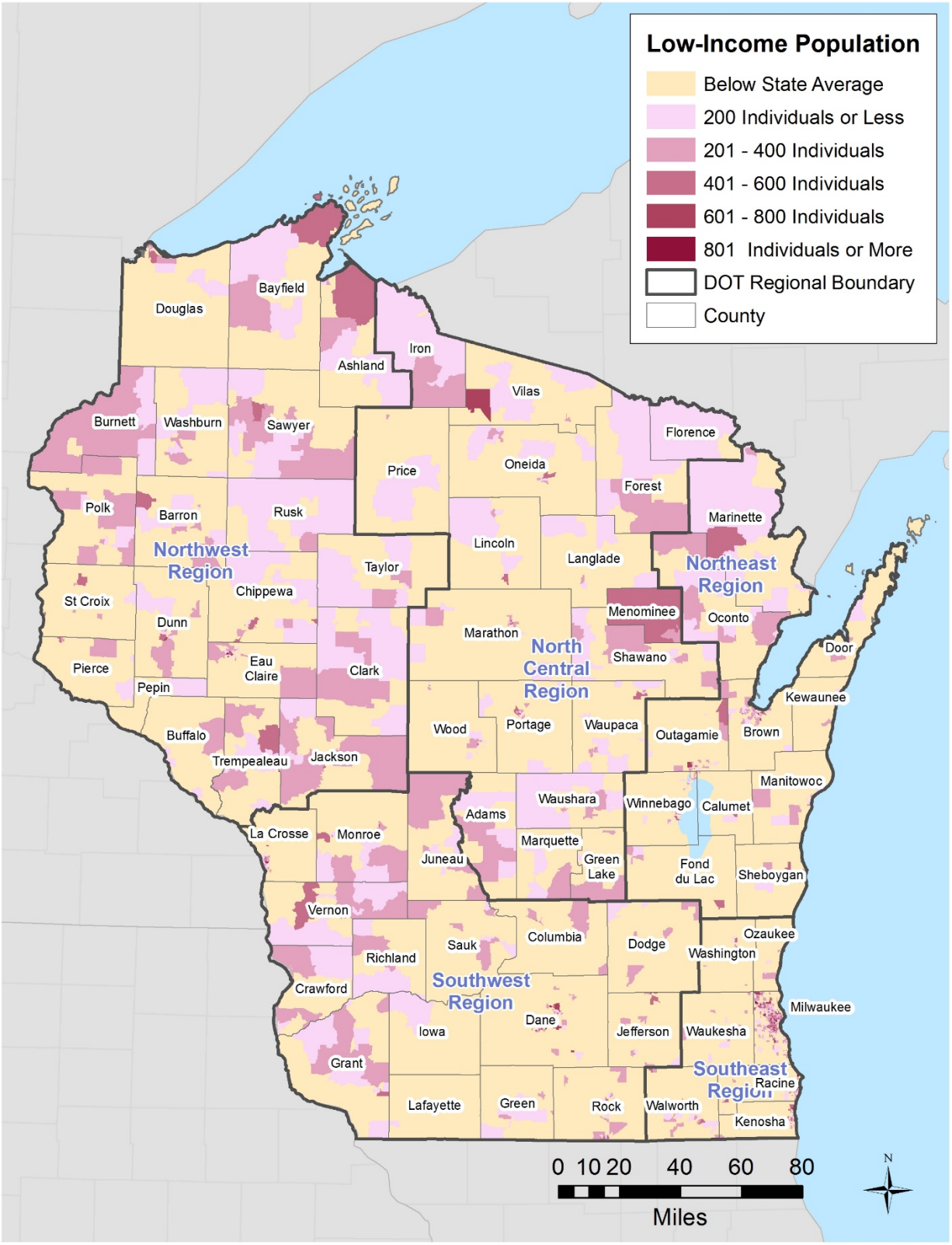
[9] U.S. Census Bureau, "2010 - 2014 American Community Survey."

Table 10-3: Low-Income Population by WisDOT Region

Region	Total Population	Under Poverty Threshold	Percent Under Poverty Threshold	Under 2x Poverty Threshold	Percent Under 2x Poverty Threshold
North Central Region	580,589	71,634	12.3%	187,940	32.4%
Northeast Region	1,044,474	109,591	10.5%	292,252	28.0%
Northwest Region	664,047	87,485	13.2%	218,492	32.9%
Southeast Region	1,988,077	301,597	15.2%	634,388	31.9%
Southwest Region	1,293,896	168,250	13.0%	384,192	29.7%
Statewide	5,571,083	738,557	13.3%	1,717,264	30.8%

Source: U.S. Census Bureau, "2010 - 2014 American Community Survey"

Figure 10-6: Low-Income Population



Source: U.S. Census Bureau, "2010 - 2014 American Community Survey"

Additional Populations

Additional populations that may be sensitive to freight impacts were also evaluated. While not required under Executive Order 12898, these populations may be susceptible to impacts created by freight movements. These include youth (aged nine and below), seniors (aged 65 and over), persons with disabilities, and households without immediate access to vehicles.

Youth and Senior Population

Studies have shown that youth and senior populations are more susceptible to adverse air quality effects.[10,11] Children under nine years of age are particularly susceptible to environmental impacts because their bodies and systems are not fully developed. Relative to their size, children are also more likely to eat more food, drink more water, and have increased inhalation rates compared to adults. Finally, typical child behaviors such as putting their hands in their mouth and playing on the ground increase the likelihood of exposure to potential contaminants.[12]

For the purposes of this evaluation, youth is defined as aged nine or younger and senior is defined as age 65 and over. A summary of Wisconsin's youth and senior population is provided in Table 10-4. The locations of areas where youth and senior population proportions exceed the state average are shown in the Figure 10-7 and Figure 10-8 on the following pages. The results of this analysis show an inverse relationship between youth and senior populations. That is, areas with higher proportions of senior population tend to have lower proportions of youth population and vice versa. For example, the north central region has the lowest percent of population age nine and under (11.5 percent), but has the highest percent of population age 65 and over (17.6 percent). Likewise, the southeast region has the highest percent of population age nine and under (13.4 percent), but has the lowest percent of population age 65 and over (12.6 percent).

Figure 10-7 and Figure 10-8 further highlight this disparity, with very little overlap between areas of concentration for these groups. In general, there appears to a significant urban/rural split in the distribution of these populations, with youth typically concentrated in urban areas and senior populations typically concentrated in rural areas or on the periphery of urban centers.

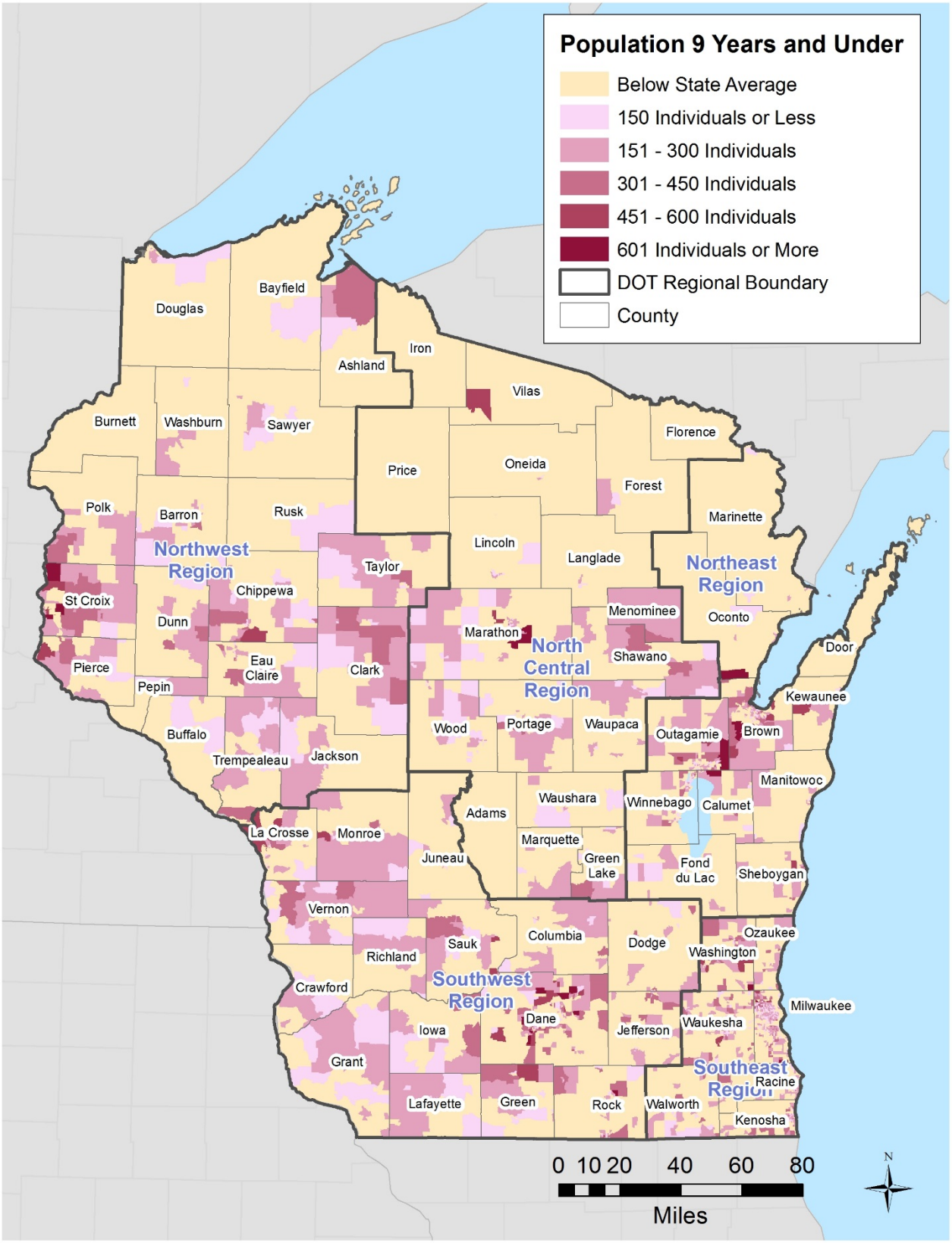
Table 10-4: Youth and Senior Population by WisDOT Region

Region	Total Population	Population Age 9 and Below	Percent Age 9 and Below	Population Age 65 and Above	Percent Age 65 and Above
North Central Region	597,198	68,532	11.5%	104,909	17.6%
Northeast Region	1,067,017	135,797	12.7%	147,258	13.8%
Northwest Region	684,157	86,255	12.6%	100,651	14.7%
Southeast Region	2,019,970	270,513	13.4%	254,007	12.6%
Southwest Region	1,318,644	165,963	12.6%	170,489	12.9%
Statewide	5,686,986	727,060	12.8%	777,314	13.7%

Source: U.S. Census Bureau, "2010 Decennial Census"

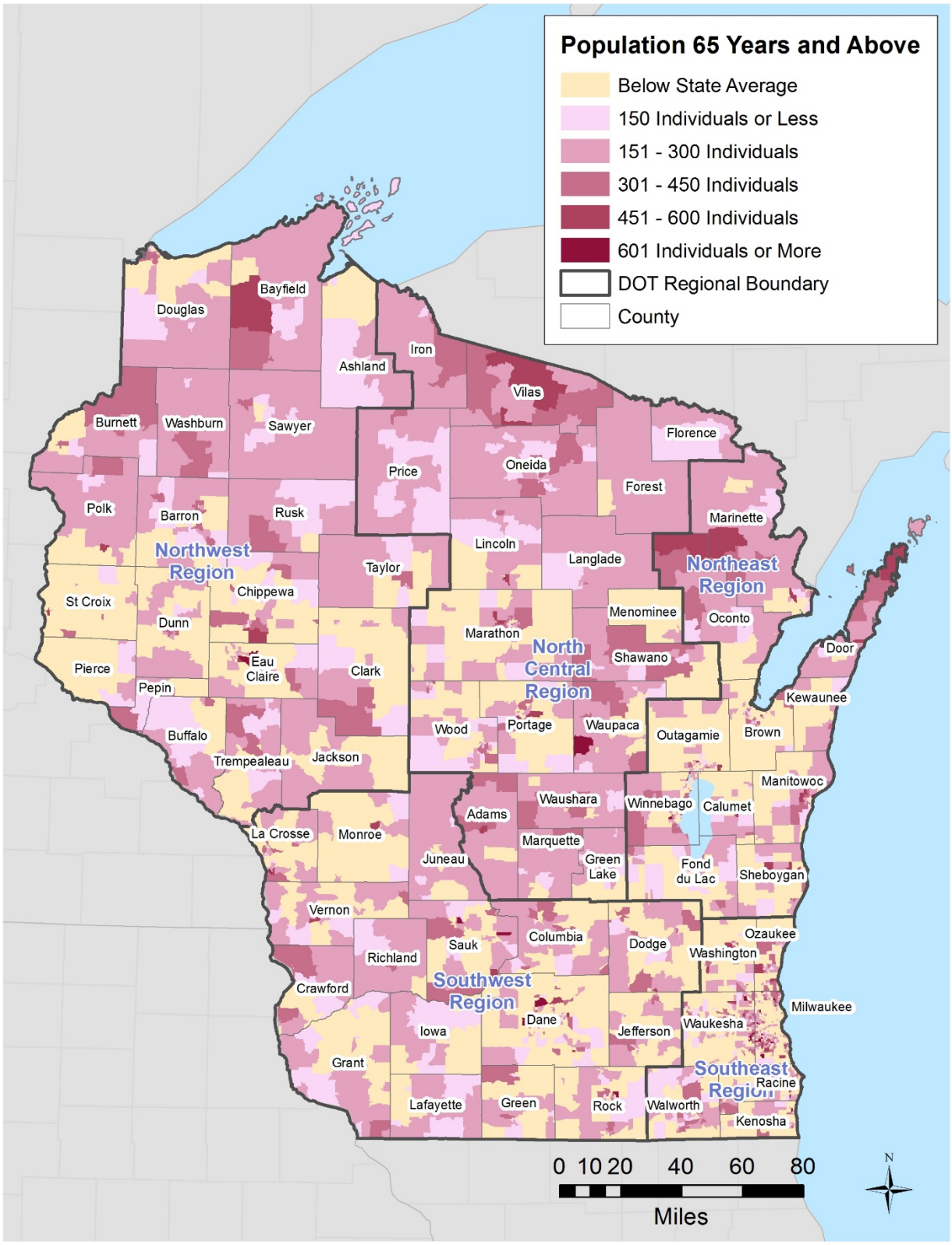
[10] Pediatrics: Official Journal of the American Academy of Pediatrics, "Air Pollution and Children's Health." (April 2004).
[11] Health Effects Institute, "The National Morbidity, Mortality, and Air Pollution Study: Part II: Morbidity and Mortality from Air Pollution in the United States." (June 2000).
[12] World Health Organization, "Children's environmental health > Environmental risks."

Figure 10-7: Population 9 Years and Under



Source: U.S. Census Bureau, "2010 Decennial Census"

Figure 10-8: Population 65 Years and Above



Source: U.S. Census Bureau, "2010 Decennial Census"

Zero-Vehicle Households

People residing in zero-vehicle households are more likely to walk or use transit to reach their destinations than people residing in vehicle-owning households.[13] Proximity to freight infrastructure can limit walkability and presents potential safety issues at locations such as major roadway intersections and highway-rail grade crossings. A summary of Wisconsin's zero-vehicle households is provided in Table 10-5. The locations of areas where zero-vehicle households exceed the state average are shown in Figure 10-9 on the following page. Households without immediate access to vehicles comprise 6.7 percent of all households in Wisconsin. The distribution of zero-vehicle houses varies between regions, with the three northern regions exhibiting the lowest proportion of zero-vehicle households (4.8 to 5.3 percent) and the southeast region exhibiting the higher proportion with 8.9 percent compared to a statewide average of 6.7 percent.

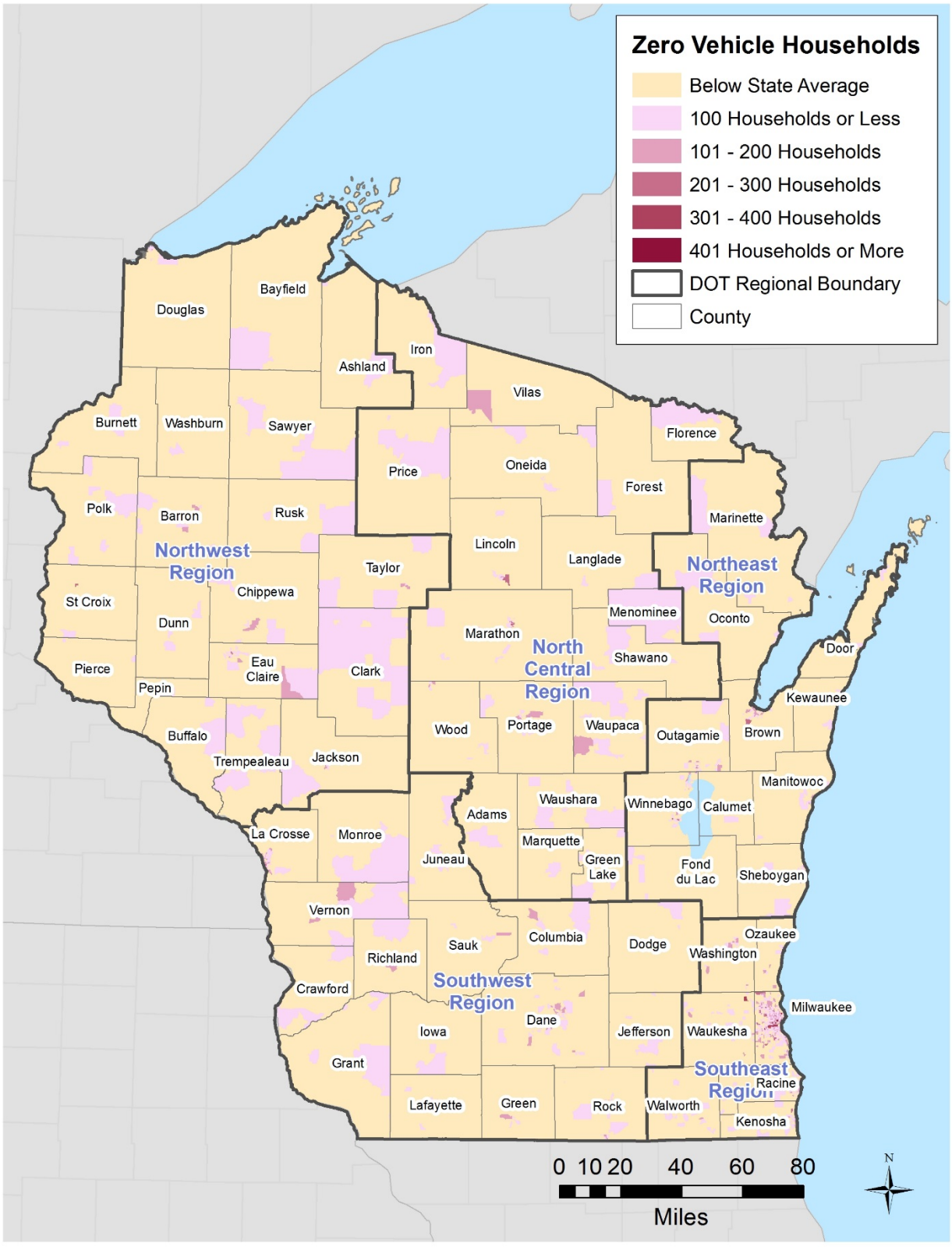
Table 10-5: Zero-Vehicle Households by WisDOT Region

Region	Zero-Vehicle Households	Total Households in District	Percent of Population Zero-Vehicle Households
North Central Region	12,226	252,870	4.8%
Northeast Region	22,897	429,756	5.3%
Northwest Region	14,170	276,452	5.1%
Southeast Region	70,886	792,701	8.9%
Southwest Region	31,518	522,832	6.0%
Statewide	151,697	2,274,611	6.7%

Source: U.S. Census Bureau, "2010 - 2014 American Community Survey"

[13] Federal Highway Administration, "2013 Status of the Nation's Highways, Bridges, and Transit: Conditions and Performance, Chapter 1: Household Travel and Freight Movement."

Figure 10-9: Zero Vehicle Households



Source: U.S. Census Bureau, "2010 - 2014 American Community Survey"

Individuals with Disability

A summary of individuals with disabilities in Wisconsin is provided in Table 10-6. The locations of areas where the proportion of individuals with a disability exceeds the state average (11.4 percent) are shown in Figure 10-10 on the following page.

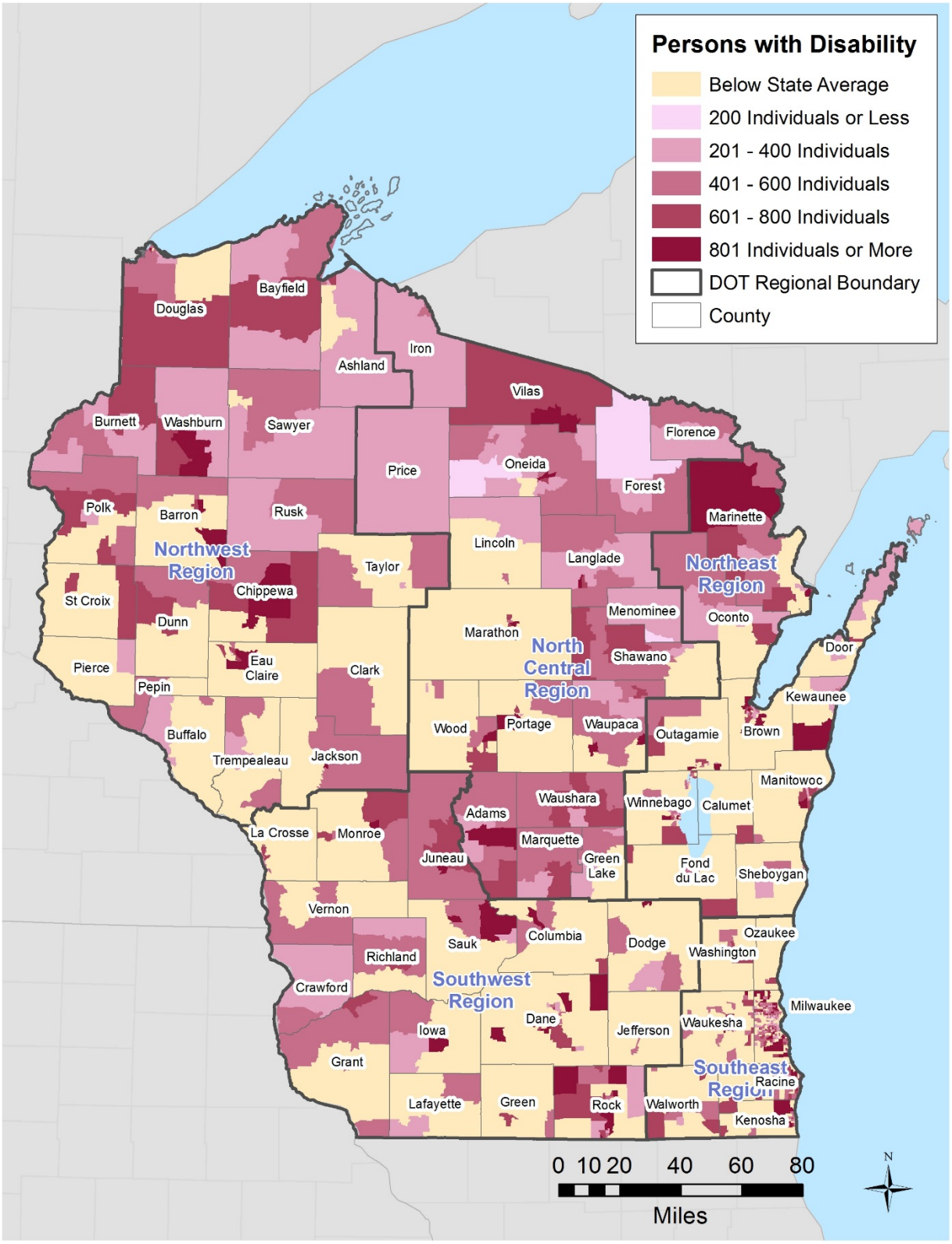
Individuals with a disability are evenly distributed throughout the states regions and do not appear to follow set patterns of concentration. There is only a two percent difference between the highest region, North Central Region (12.8 percent), and the lowest region, Southwest Region (10.8 percent).

Table 10-6: Individuals with Disability by WisDOT Region

Region	Individuals with Disability	Total District Population	Percent of Population with Disability
North Central Region	75,224	586,516	12.8%
Northeast Region	115,913	1,058,681	10.9%
Northwest Region	78,604	676,520	11.6%
Southeast Region	234,122	2,010,328	11.6%
Southwest Region	142,772	1,317,658	10.8%
Statewide	646,635	5,649,703	11.4%

Source: U.S. Census Bureau, "2010 - 2014 American Community Survey"

Figure 10-10: Persons with Disability



Source: U.S. Census Bureau, "2010 - 2014 American Community Survey"

10.3 Demographic Analysis of Populations Adjacent to Freight Transportation System

In order to better understand the potential impacts to individual populations, this environmental justice evaluation includes a 'buffer' analysis to summarize the demographic characteristics of census areas located within one-quarter mile of the freight system. The demographics within this study area were then compared against the demographics of the state as a whole to determine if each individual group is present in the study area at a rate higher or lower than the state average. The intention of this planning-level assessment is not to identify specific locations where adverse impacts are being borne disproportionately by environmental justice populations, but rather is meant as a starting point to provide statewide context for further investigation and analysis on individual projects.

Freight Impacts

The movement of freight on the transportation system may result in both positive benefits and adverse impacts to Wisconsin populations. In general, a robust freight system benefits local and regional economies by improving access to markets, decreasing shipping costs, and supporting economic development and growth. See Chapter 4 for additional information regarding the positive economic impacts of Wisconsin's Freight Transportation System. While it is important to acknowledge these benefits, it is difficult to pinpoint the precise impacts that they will have on specific populations.

For the purposes of this analysis, a one-quarter-mile distance was chosen to approximate the typical effective distance of localized adverse impacts such as noise, vibration, and air pollution. FHWA guidance regarding highway traffic noise notes that highway traffic noise is not usually a serious problem for people who live more than 500 feet from heavily traveled freeways or more than 100 to 200 feet from lightly traveled roads.[14] Likewise, the FTA Transit Noise and Vibration Manual recommends screening distances for noise assessments between 750 and 1,600 feet for commuter rail operations.[15] A 2007 meta-analysis of the factors influencing the distribution of air quality impacts from mobile sources found that typical impact screening distances ranged on average between 500 and 1,320 feet.[16] The quarter-mile distance encompasses the majority of these impact distances, therefore, for this analysis, all census blocks intersected by a one-quarter mile buffer of the freight system were assumed to be within the freight system study area.

Census Data

Much of the demographic Information for this analysis is available at the census block level from the 2010 United States Decennial Census. However, information on low-income populations and zero-vehicle households is available only at the census block group level from the American Community Survey (ACS) 5-year Estimates. Census block groups and blocks differ in their geographic makeup. Census blocks are the smallest geographic unit used by the United States Census Bureau and are bounded by roadways or water features in urban areas. A census block group is typically made up of a cluster of approximately 40 blocks.

Block-level demographics were estimated for the ACS data by allocating populations in each block group to individual blocks based on the 2010 United States Decennial Census total population distribution. For example, if the Decennial Census showed that 20 percent of the total population within a specific block group resided in a single block, then 20 percent of all ACS block group populations were assumed to reside in this block. This approach assumes that the proportion of low-income populations and zero-vehicle households correlates with the total population in each block group. Doing so allows for greater precision than an analysis using data at only the block group level.

[14] Federal Highway Administration, "Highway Traffic Noise: Analysis and Abatement Guidance." (December 2011).
[15] Federal Transit Administration, "Transit Noise and Vibration Impact Assessment."
[16] Zhou, Ying and Jonathan Levy, "Factors influencing the spatial extent of mobile source air pollution impacts: a meta-analysis." (May 22, 2007).

Information on individuals with a disability is limited to census tracts only. Census tracts generally have a population size between 1,200 and 8,000 people, with an optimum size of 4,000 people. A census tract usually covers a contiguous area; however, the spatial size of census tracts varies widely depending on the density of settlement. Due to the significant size difference between census tracts and blocks, it was assumed that the distribution of disabled populations could not be accurately estimated at the block level. Therefore, individuals with a disability were excluded from this buffer analysis.

Freight Transportation System Components

A key step in conducting this analysis is to first understand what the "freight transportation system" is. For modes such as rail where nearly all of the activity on the system is related to the movement of freight, it is an easy task to define the entire rail system as being part of the statewide multimodal freight system. For this evaluation, the rail freight system in Wisconsin was defined as all Class I, short line, and state-owned railroad lines. Likewise, the water freight system was defined as all 20 lake and river ports with commercial service and the air freight system was defined as the twelve airports in Wisconsin capable of carrying cargo flights.

Roadways, however, provide a unique challenge in this regard. Freight is present on nearly all roads, from tractor-trailers on major Interstate highways to parcel delivery trucks on local streets. For this evaluation, it was determined that only the most critical portions of the roadway system at a state level would be considered. The Wisconsin Backbone highways - 1,588 miles of the highway system identified in *Connections 2030* as "multi-lane highways connecting all major populations and economic regions of the state" - were used to define the roadway freight system. The Wisconsin multimodal freight system in this evaluation is shown in Figure 10-11. This freight system used in this evaluation is only for analysis purposes to understand potential environmental justice impacts.

Figure 10-11: Wisconsin Multimodal Freight System



Source: Wisconsin Department of Transportation, Bureau of Planning and Economic Development

Analysis Results

The results of the buffer analysis are shown in the tables on the following pages. The analysis was completed for the state's multimodal transportation freight system as a whole, as well as for each component. In each table, the proportion of the population within one-quarter mile of the freight system is shown for each population group. This is compared to the proportion of the total population within that distance. To assist with this comparison, each table includes a column to show a comparison index. This index is equivalent to the proportion of the individual population groups divided by the proportion of the total population:

- A comparison index of 1.0 indicates that the target population is represented in the quarter-mile study area at a rate equal to that of the population as a whole. There are no disproportionate impacts for this group.
- A comparison index value greater than 1.0 indicates that the target population is represented in the quarter-mile study area at a rate higher than the population as a whole. Adverse effects in the study area have the potential to disproportionately affect the target population.
- A comparison index value less than 1.0 indicates that the target population is represented in the quarter-mile study area at a rate lower than the population as a whole. Adverse effects in the study area are less likely to have the potential to disproportionately affect the target population.

Table 10-7 summarizes the demographic characteristic of populations within one-quarter mile of any component of the freight system. With a comparison index of 1.21, this indicates that Hispanic or Latino populations are 21 percent more likely to reside next to the Wisconsin freight system than the population as a whole. This value is surpassed only by the category Some Other Race at an index of 1.25.[17] Only three groups are less likely to reside next to the System: Non-Hispanic or Latino, White, and American Indian or Alaskan Native.

Table 10-7: Population within ¼-Mile of Wisconsin Freight System

Population Category	Statewide Population	Within ¼-Mile of Freight System		
		Total	Percent	Index
Total Population	5,686,986	1,907,897	33.5%	-
Hispanic or Latino	336,056	136,421	40.6%	1.21
Non-Hispanic or Latino	5,350,930	1,771,476	33.1%	0.99
White	4,902,067	1,609,168	32.8%	0.98
Black or African American	359,148	133,568	37.2%	1.11
American Indian or Alaskan Native	54,526	16,791	30.8%	0.92
Asian	129,234	50,851	39.3%	1.17
Native Hawaiian or Other Pacific Island	1,827	695	38.0%	1.13
Some Other Race	135,867	56,928	41.9%	1.25
Two or More Races	104,317	39,896	38.2%	1.14
Low-Income (< 1x Poverty)	738,557	273,896	37.1%	1.11
Low-Income (< 2x Poverty)	1,717,264	626,381	36.5%	1.09
Age 65 and Older	777,314	251,312	32.3%	0.96
Age 9 and Under	727,060	247,388	34.0%	1.01
Total Households	2,293,250	777,771	33.9%	-
Zero-Vehicle Households	163,459	64,927	39.7%	1.17

Source: U.S. Census Bureau, "2010 Decennial Census" and "2010 - 2014 American Community Survey"

[17] Some Other Race could include those who are unsure how to identify themselves on census forms.

Table 10-8 summarizes the demographic characteristics of populations within one-quarter mile of the roadway component of the freight system. The results are largely similar to those for the complete multimodal freight system, with some variations. The highest index result is for Asian at 1.3, following closely by Some Other Race at 1.29, and Hispanic or Latino at 1.27.

Table 10-8: Population within ¼-Mile of Roadways on Wisconsin Freight System

Population Category	Statewide Population	Within ¼-Mile of Freight Roadways		
		Total	Percent	Index
Total Population	5,686,986	480,749	8.5%	-
Hispanic or Latino	336,056	36,094	10.7%	1.27
Non-Hispanic or Latino	5,350,930	444,655	8.3%	0.98
White	4,902,067	401,713	8.2%	0.97
Black or African American	359,148	36,126	10.1%	1.19
American Indian or Alaskan Native	54,526	3,633	6.7%	0.79
Asian	129,234	14,189	11.0%	1.30
Native Hawaiian or Other Pacific Island	1,827	165	9.0%	1.07
Some Other Race	135,867	14,817	10.9%	1.29
Two or More Races	104,317	10,106	9.7%	1.15
Low-Income (< 1x Poverty)	738,557	63,267	8.6%	1.01
Low-Income (< 2x Poverty)	1,717,264	145,156	8.5%	1.00
Age 65 and Older	777,314	65,460	8.4%	1.00
Age 9 and Under	727,060	60,496	8.3%	0.98
Total Households	2,293,250	196,671	8.6%	-
Zero-Vehicle Households	163,459	14,033	8.6%	1.00

Source: U.S. Census Bureau, "2010 Decennial Census" and "2010 - 2014 American Community Survey"

Table 10-9 summarizes the demographic characteristics of populations within one-quarter mile of the rail components of the freight system. While zero-vehicle households are equally likely to be located near freight roadways compared to the total population, they are much more likely to be located near the freight rail system with a comparison index of 1.21.

Table 10-9: Population within ¼-Mile of Rail Corridors on Wisconsin Freight System

Population Category	Statewide Population	Within ¼-Mile of Rail Corridors		
		Total	Percent	Index
Total Population	5,686,986	1,563,254	27.5%	-
Hispanic or Latino	336,056	112,603	33.5%	1.22
Non-Hispanic or Latino	5,350,930	1,450,651	27.1%	0.99
White	4,902,067	1,318,570	26.9%	0.98
Black or African American	359,148	108,538	30.2%	1.10
American Indian or Alaskan Native	54,526	13,772	25.3%	0.92
Asian	129,234	41,096	31.8%	1.16
Native Hawaiian or Other Pacific Island	1,827	587	32.1%	1.17
Some Other Race	135,867	47,591	35.0%	1.27
Two or More Races	104,317	33,100	31.7%	1.15
Low-Income (< 1x Poverty)	738,557	231,186	31.3%	1.14
Low-Income (< 2x Poverty)	1,717,264	527,864	30.7%	1.12
Age 65 and Older	777,314	203,276	26.2%	0.95
Age 9 and Under	727,060	204,696	28.2%	1.02
Total Households	2,293,250	638,357	27.8%	-
Zero-Vehicle Households	163,459	55,195	33.8%	1.21

Source: U.S. Census Bureau, "2010 Decennial Census" and "2010 - 2014 American Community Survey"

Table 10-10 summarizes the demographic characteristics of populations within one-quarter mile of the water port components of the freight system. The most notable finding of this analysis is the high proportion of American Indian or Alaskan native populations adjacent to the ports compared to the statewide population. This group is 25 times more likely to reside near water ports than the population as a whole.

Table 10-10: Population within ¼-Mile of Water Ports on Wisconsin Freight System

Population Category	Statewide Population	Within ¼-Mile of Water Ports		
		Total	Percent	Index
Total Population	5,686,986	2,648	0.05%	-
Hispanic or Latino	336,056	170	0.05%	1.09
Non-Hispanic or Latino	5,350,930	2,478	0.05%	0.99
White	4,902,067	1,792	0.04%	0.79
Black or African American	359,148	57	0.02%	0.34
American Indian or Alaskan Native	54,526	634	1.16%	24.97
Asian	129,234	35	0.03%	0.58
Native Hawaiian or Other Pacific Island	1,827	-	0.00%	-
Some Other Race	135,867	61	0.04%	0.96
Two or More Races	104,317	69	0.07%	1.42
Low-Income (< 1x Poverty)	738,557	427	0.06%	1.24
Low-Income (< 2x Poverty)	1,717,264	1,016	0.06%	1.27
Age 65 and Older	777,314	355	0.05%	0.98
Age 9 and Under	727,060	370	0.05%	1.09
Total Households	2,293,250	1,191	0.05%	-
Zero-Vehicle Households	163,459	144	0.09%	1.70

Source: U.S. Census Bureau, "2010 Decennial Census" and "2010 - 2014 American Community Survey"

Table 10-11 summarizes the demographic characteristics of populations within one-quarter mile of airports on the Wisconsin freight system. The Some Other Race category and Hispanic or Latino populations are located within one-quarter mile of airports proportionately higher than other populations. Black or African American populations are also more likely to reside near airports than other populations.

Table 10-11: Population within ¼-Mile of Airports on Wisconsin Freight System

Population Category	Statewide Population	Within ¼-Mile of Airports		
		Total	Percent	Index
Total Population	5,686,986	615	0.01%	-
Hispanic or Latino	336,056	177	0.05%	4.87
Non-Hispanic or Latino	5,350,930	438	0.01%	0.76
White	4,902,067	342	0.01%	0.65
Black or African American	359,148	135	0.04%	3.48
American Indian or Alaskan Native	54,526	8	0.01%	1.36
Asian	129,234	1	0.00%	0.07
Native Hawaiian or Other Pacific Island	1,827	-	0.00%	0.00
Some Other Race	135,867	116	0.09%	7.89
Two or More Races	104,317	13	0.01%	1.15
Low-Income (< 1x Poverty)	738,557	82	0.01%	1.03
Low-Income (< 2x Poverty)	1,717,264	189	0.01%	1.02
Age 65 and Older	777,314	49	0.01%	0.58
Age 9 and Under	727,060	97	0.01%	1.23
Total Households	2,293,250	251	0.01%	-
Zero-Vehicle Households	163,459	9	0.01%	0.48

Source: U.S. Census Bureau, "2010 Decennial Census" and "2010 - 2014 American Community Survey"

10.4 Environmental Justice Impacts of State Freight Plan Policies

Chapter 8, *Freight Policies and Strategies*, of this plan identifies and discusses the proposed department policies and actions that address current or emerging requirements and trends in freight transportation. The proposed policy and strategy recommendations are grouped into six modal categories as follows:

- Highways
- Local Roads
- Railroads
- Ports and Waterways
- Air
- Pipelines

The following section provides a high-level, qualitative assessment of the potential impacts and considerations that WisDOT should be aware of as the freight policies are implemented.

Highways

As shown in the previous demographic analysis, many of the evaluated population categories, including Hispanic or Latino, Black or African American, and Asian, are more likely to reside in close proximity to the roadway system than the population as a whole. Polices that improve the safety, operations, and quality of life will potentially have a greater positive impact for these population categories.

Truck shipments on the highway system represent the largest modal share of freight movement measured both by value and by weight. Compared to the other freight modes, highways are also the area where WisDOT exercises the most jurisdictional authority. WisDOT's freight policies and strategies will have a clear and direct impact on the safe, efficient operation of the highway system. The policies and strategies for the highway system are further grouped into subcategories as follows.

State Trunk Highway System Preservation

The area of State Trunk Highway System Preservation focuses on the preservation of critical highways throughout the state. The stated policies under this area include using a performance-based approach to identify and prioritize state trunk highway preservation needs. Potential projects included in this area include resurfacing, reconditioning, pavement replacement, and reconstruction.

State Trunk Highway System Maintenance

The area of State Trunk Highway System Maintenance focuses on monitoring existing highway conditions and deficiencies in areas such as pavement quality, signs and markings, guardrails, and traffic signals. Both the Preservation and Maintenance policy areas will improve the quality of life for populations residing near the highway system by reducing roadway noise through installation of higher quality pavements. Ensuring the long-term viability and operational conditions of the roadways will also benefit both local and non-local highway users. WisDOT will consider periodically comparing the performance measures in these categories to the demographics of the surrounding regions to ensure that the policies and strategies are being implemented efficiently and equitably.

Major Highway Development Program

The area of Major Highway Development Program includes those highway projects that are the most complex, costly, and potentially controversial. The stated policies and goals under this area include completing the currently enumerated Major Highway Development projects and studying approved corridors. Due to their large scale and potentially controversial status, all projects and studies included in this category require review and approval by the Transportation Projects Commission (TPC). These reviews are completed by a task force of staff experts in the areas of highway design, construction, planning, environmental analysis, and economic analysis. All projects in the category will also include

opportunities for public feedback and outreach through public hearings and will be reviewed through either an Environmental Impact Statement (EIS) or Environmental Assessment (EA). These reviews include an analysis of potential impacts to environmental justice populations.

Highway Technology and Operations

The goals of the Highway Technology and Operations policies are to promote a safe and efficient transportation system that will reduce delays for freight movements. The stated policies include supporting and responding to operational needs, as well as supporting communications along significant freight corridors to inform users of changing conditions. It is important to recognize the inherent overlap between highway freight operations and the operations of all other highway users. Projects that reduce congestion and improve travel time reliability for freight users will also have the same effects on passenger vehicles and other highway users. WisDOT should consider periodically reviewing the implementation of projects in the category and the relevant performance measures to ensure that the benefits of the projects are distributed equitably.

Highway Safety

Polices in the area of Highway Safety seek to reduce the number of accidents and incidents by improving infrastructure standards, improving emergency response, and identifying freight-specific safety concerns and solutions. Improving safety for freight vehicles will help improve safety for all roadway users, including those protected under environmental justice.

Local Roads

While WisDOT has limited jurisdictional authority over locally-owned and maintained roadways, they are critical for maintaining first- and last-mile connections between freight generators and the state trunk highway system, as well as connections to other freight modes. This chapter does not include a specific review of the demographics residing in proximity to the local roadway system. However, the demographics of many of the first- and last-mile connections to freight facilities included on this system may be approximated by evaluating the population characteristics surrounding ports, airports and other intermodal freight facilities.

The policy area of Local Road Preservation and Safety focuses on working and partnering with local governments to assist with asset management strategies and tools, identify and address key safety issues, and invest in the local road and bridge network. The area of Local Road Safety includes policies focused on working with local governments to manage available safety funding. Similar to the policies under the highway mode, these policies and strategies will improve the operations and safety of all local roadway users.

Railroads

Freight rail shipments are an important modal option, specifically for low-cost, high-volume goods. The ability of shippers to use the rail system helps improve Wisconsin’s regional competitiveness.

The area of Freight Rail Preservation and Vitality includes policies and strategies to preserve rail corridors and rights-of-way and to maintain state-owned rail lines and fund upgrades to meet changing industry standards. The area of Rail Safety includes policies and strategies such as enforcement efforts focused on road traffic at grade crossings. Improvements and upgrades to grade crossings are also typically included in roadway reconstruction projects. The demographic analysis in this chapter shows that nearly all of the environmental justice populations are more likely to reside in close proximity to the rail system relative to the population as a whole. Therefore, policies that improve safety and reduce quality of life impacts of the rail system will have a positive impact on these populations.

Ports and Waterways

Similar to the railroad system, ports and waterways provide key modal options specifically for low-cost, high-volume goods. WisDOT's policies and strategies for maintenance and improvement of the ports and waterways system includes continuing state assistance for harbor improvements and encouraging comprehensive harbor and waterfront land use planning. Detailed evaluations of land uses with the potential for negative quality of life impacts will be important given the particularly high concentration of American Indian, low-income, and other environmental justice populations residing in close proximity to the ports and waterways facilities.

Air

Air freight shipments allow fast connections to the regional and global markets and are typically best for high-value, low-volume goods.

WisDOT's policies for Airport Facilities and Infrastructure include using the Airport Improvement Program to help facilitate business plane accommodation through improvements such as instrument approach systems, runway lighting, and visual landing aids. The demographic review included in this chapter found that many environmental justice populations, including Hispanic or Latino, Black or African American, and those identifying as Some Other Race were more likely to reside in close proximity to airports compared to the population as a whole. WisDOT should consider periodically reviewing the potential impacts to environmental justice populations from air freight policies that would affect quality of life issues such as noise and air quality.

Pipelines

Evaluation of the potential impacts on environmental justice populations from pipelines was not included in this chapter due to limited information on the geographic locations of pipelines and related facilities. Regulation of pipelines is primarily led by federal and state agencies outside of WisDOT's control. WisDOT's general strategic approach is to limit the negative impacts of crude oil movements on other transportation users and to encourage participation by pipeline companies in other freight activities, such as the Governor's Freight Industry Summit and the Freight Advisory Committee.

10.5 Public Involvement

The provision of public involvement opportunities is one of the key guiding principles of Executive Order 12898 and subsequent United States DOT guidance. WisDOT's approach to public involvement related to the State Freight Plan is summarized in a Public Involvement Plan (PIP) dated November 6, 2015 and Chapter 3 of the plan. The stated goals of the PIP include ensuring an open and inclusive process, educating the public about Wisconsin's freight transportation system, facilitating dialogue to identify critical issues, and scheduling public meetings at times and locations that are convenient to all people, including minority populations, low-income populations, and Tribal governments.[18]

Early outreach efforts focused on identification of potential issues through face-to-face meetings and teleconferences with freight stakeholders involved in *Connections 2030*, the Truck Size and Weight Study, and the Governors Freight Industry Summits.

Phase 1 – Pre Draft and SEE development and Needs Identification: Outreach efforts in Phase 1 were used to define the scope and focus of the State Freight Plan and to identify specific freight needs and issues. This phase included outreach and consultation with freight stakeholders such as the Wisconsin Freight Advisory Committee, environmental resource agencies, Tribal governments, and low-income and minority groups.

[18] Wisconsin State Freight Plan: Public Involvement Plan. (November 6, 2015).

Phase 2 – Draft Plan and SEE Review: Outreach efforts during Phase 2 focused on releasing the draft plan and SEE with supporting documentation and outreach materials, and obtaining feedback through comments from the public and key stakeholders. During this phase, WisDOT solicited feedback on the draft plan and SEE from environmental justice populations, Tribal governments, and environmental resource agencies. To accomplish this, the department released the draft Wisconsin State Freight Plan and SEE for public review on September 29, 2016 and initiated a 45-day public comment period. Comments received during this period were analyzed and the plan was updated, as appropriate.

Phase 3 – Final Plan and SEE Adoption: Upon the release of the draft final plan and SEE, WisDOT published notice of the 45-day public comment period and conducted three public hearings. After adoption of the final plan and SEE by the WisDOT Secretary, WisDOT will produce an executive summary document that highlights the planning process, results of the outreach efforts, and key components of the plan. The executive summary will also be translated into Spanish to assist with outreach and coordination with Spanish-speaking populations with limited English proficiency (LEP).

WisDOT is committed to government-to-government consultation with federally-recognized Tribes on actions that affect identified Tribal rights and issues. Pre-draft plan development outreach efforts focused on sharing information and obtaining feedback through consultation with Wisconsin's eleven federally-recognized Tribes and seven Tribal governments having a historic interest in Wisconsin. As part of these efforts, WisDOT sent a letter to the eleven federally-recognized Tribes and Tribes with a historic interest in Wisconsin that included information about the plan and an offer to meet individually. No requests for individual meetings were received. In addition, WisDOT developed freight movement maps for each federally-recognized Tribe in Wisconsin and distributed them at the May 12, 2016 Great Lakes Inter-Tribal Council and reviewed them at the June 16, 2016 Inter-Tribal Task Force. The maps were informational and depicted freight movement by tonnage for highways and railroads. More information regarding specific public outreach efforts and techniques can be found in Chapter 3, *Public Involvement*.

10.6 Discussion and Next Steps

Environmental justice considerations will continue to be evaluated as part of all WisDOT's freight plan activities. This chapter is the first step in identifying potential impacts of freight on environmental justice and other populations. WisDOT provides tools and guidance to conduct environmental justice analysis that is consistent with the environmental evaluation and documentation process required under the National Environmental Policy Act (NEPA) of 1969 for all transportation projects. These tools will be used to facilitate environmental justice evaluations for freight projects at the project level.

THIS PAGE INTENTIONALLY LEFT BLANK

11– Chapter 11: System-Plan Environmental Evaluation

11.1 Introduction

This chapter discusses the System-Plan Environmental Evaluation (SEE) developed in conjunction with the Wisconsin State Freight Plan. This evaluation provides a qualitative review of potential environmental impacts resulting from the strategies presented in Chapters 8, *Freight Policies and Strategies*, and 9, *Investment and Implementation*, of the plan. The evaluation discussed in this chapter is in accordance with Wisconsin Administration Code, Trans 400 *Wisconsin Environmental Policy Act Procedures for Department Actions.*

This chapter highlights:

- The definition and function of a SEE
- Freight Plan development process
- Description and comparison of Base Case and State Freight Plan
- Assessment of potential impacts
- Impact avoidance, minimization, or mitigation strategies

SEE Definition, Function and Regulatory Requirements

Trans 400 defines the process to review the potential environmental impacts of a system plan in accordance with the Wisconsin Environmental Policy Act. This review is referred to as a System-plan Environmental Evaluation (SEE), which is required when a long-range plan includes recommendations that are deemed to have potentially major and significant impacts to the natural environment. The freight plan proposes the continuation of many existing policies and programs, but it also includes the development of new freight strategies, requiring the development of a SEE. The inclusion of this evaluation contributes to WisDOT's policy of meeting transportation needs while also minimizing environmental impacts. The SEE further supports WisDOT's mission of providing leadership in the development and operation of a safe and efficient transportation system.

Trans 400 Definitions
• System Plan – a plan that identifies transportation facility or service needs for a statewide system. The needs are identified conceptually without addressing specific design and location details. • Major and significant new proposal – a new proposal developed by WisDOT which, if legislatively authorized and funded, may significantly affect the quality of the human environment, and represents a significant departure from, or expansion of, the department's existing responsibilities by substantially expanding or substantially reducing total resources allocated to any existing programs. • Base Case – a future condition which assumes no major shift in policies or resources away from WisDOT's current direction. The Base Case is the continuation of existing and present day policy action items. • State Freight Plan – an alternative future condition, in contrast to the Base Case, which includes policies, investment, and implementation strategies developed following analysis of projected freight volumes and movement.

The completion of a SEE analysis reviews potential environmental impacts as a result of the State Freight Plan, compared to the Base Case plan, which is the continuation of existing and present day WisDOT policy action items. The content of the evaluation is conceptual and qualitative, and is not meant to replace project-level environmental reviews. Additional review of environmental impacts resulting from specific projects is required during project development. The qualitative review of impacts at the system plan level provides many benefits, including a streamlined environmental review process[1], interagency coordination, and regional/local consistency for the analysis of potential impacts.

Plan Development Process

Early Outreach

Early stakeholder involvement is a key component of the long-range planning process, as it helps to understand the base condition upon which the plan is built. Stakeholder engagement also helps to define specific strengths and weaknesses of the existing system that can be addressed in the project development and implementation strategies. Chapter 3, *Public Involvement*, provides an overview of the early outreach efforts with Wisconsin's MPOs and RPCs, local and county officials, Tribal organizations, and other local, state and federal organizations. Consultation efforts with environmental resource agencies, such as the United States Environmental Protection Agency, Wisconsin's Department of Natural Resources, and the National Park Service, predominantly informed the SEE.

All freight modes were discussed during the early outreach process, and the following themes emerged:

- Movement of hazardous materials
- Transload facility needs
- Funding for first and last mile connections
- Funding for key freight infrastructure through the FAST Act
- Link between intermodal connection and economic development
- Data sharing between entities
- Streamlining of regulatory process

Freight stakeholders groups were also engaged during the early outreach efforts. Key topics and issues identified at these meetings included:

- Alternative fuels - Compressed Natural Gas (CNG) and Liquefied Natural Gas (LNG)
- First- and last-mile connections
- Rail service and accessibility
- Intermodal connections
- Implements of husbandry state law implementation
- Performance measures
- Prioritization of funding
- Port accessibility and corridor preservation

[1] On January 13, 2013, the U.S. DOT published the final rule on "Environmental Impact and Related Procedures." The rulemaking established requirements to streamline the environmental review process and was required as part of Moving Ahead for Progress in the 21st Century (MAP-21), the two-year transportation authorization bill signed by President Obama in July 2012.

Plan Development

WisDOT's long-range plan development process includes the following elements: a review of existing documents/policies, system inventory, forecast of future demands, analysis of trends and issues, and plan development. Beyond the critical input received from the early outreach process, WisDOT used various data resources to understand the existing state of the freight system and developed analytical tools to identify needs and assess effects.

Multiple tools and methodologies were developed by WisDOT to analyze the system with the goal of identifying and prioritizing freight transportation investments. Integral in the development of overall plan strategies was the utilization of criteria to define a weighted "freight factor" score. This tool helped to prioritize the strategies and assist in the development of multimodal freight investments through public funding sources. The freight factor score is weighted by how important a particular segment is to freight movement in Wisconsin, which is based on tonnage, value, and economic importance. The resulting freight factor score for each mode helped to shape the forecasts and policy recommendations outlined within the plan. Chapter 5, *Wisconsin's Transportation System Assets*, provides additional details regarding tools and methodologies used to analyze the system.

Relationship to Environmental Justice Analysis

Chapter 10, *Environmental Justice Analysis*, includes an analysis of potential impacts on low income, minority, youth, elderly, disabled, and zero vehicle household populations resulting from plan implementation of the freight plan's recommendations. Environmental justice analysis is completed by WisDOT in conjunction with the Department's mission to serve as responsible stewards of transportation investments, from project development through to implementation. Impact analysis of the identified populations informs project level development and ensures potential impacts upon these populations are considered more equitably throughout project implementation.

Additionally, the Environmental Justice (EJ) analysis satisfies Executive Order 12898, "Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations."[2] The purpose of Executive Order 12898 is to identify, address, and avoid disproportionately high and adverse human health or environmental effects on minority and low-income populations. Executive Order 12898 requires that the proposed actions be reviewed to determine if there are "disproportionately" high or adverse impacts on these populations. "Disproportionate" is defined in two ways: the impact is "predominantly borne" by the minority or low-income population group, or the impact is "more severe" than that experienced by non-majority or non-low-income populations.

Potential impacts resulting from the recommended actions are analyzed at the system or statewide level to determine what actions, if any, may disproportionality affect low-income and minority populations. Similar to the analysis included in this chapter, a detailed EJ analysis is required as part of a project-level review since this analysis is required by federal law. The results of the EJ analysis play an important role in the overall impact of the freight plan.

In addition to low income and minority populations, the EJ analysis evaluated impacts to youth, senior, disabled, and zero-vehicle household populations. While not required for analysis under Executive Order 12898, these populations may be susceptible to impacts created by freight movement and are included as part of the analysis.

[2] Executive Office of the President, "Executive Order 12898." (February 11, 1994)

The SEE and EJ analyses include the review of similar categories that work together to provide the holistic review of the freight plan. Air quality, economic development, and community impacts are analyzed and discussed in both chapters, each using a different context. The SEE considers the potential impacts to multiple environmental categories[3] at a statewide level; while the EJ analysis focuses on minority, low-income, youth, senior, disabled, and zero-vehicle populations at a statewide level. Refer to Chapter 10, *Environmental Justice Analysis*, for complete definitions of these population categories.

Relationship to Quality of Life

The SEE provides an analysis of potential environmental impacts resulting from the freight plan policy recommendations. While a statewide plan, these policies and their potential impacts may affect individuals at the local level. Local-level environmental review is conducted as part of WisDOT projects and includes several strategies which aim to avoid, minimize, or mitigate environmental impacts. Together, the SEE and EJ Chapters help to inform project level environmental analysis.

Impact avoidance, minimization, and mitigation strategies discussed later in this chapter, demonstrate the efforts WisDOT employs to protect the natural environment and enhance quality of life throughout the state. These efforts are defined as policies, procedural requirements, and strategies at the state and project level.

SEE Outreach

Consultation with environmental agencies is a critical step in the planning process, but also a state and federal requirement in the development of long-range plans. In addition to Trans 400 requirements, the FAST Act and 23 CFR 450 – Statewide and Nonmetropolitan Transportation Planning Rule, requires the state to develop long-range statewide transportation plans, in consultation with state, Tribal, and local agencies responsible for land use management, natural resources, environmental protection, conservation, and historic preservation.

In order to obtain a comprehensive understanding of the current state of environmental policy and changing or emerging trends, consultation was held with various local, state, and federal agencies, including those mentioned in this chapter's Plan Development Process section as well as others such as the Pipeline and Hazardous Materials Safety Administration and Wisconsin's Department of Agriculture, Trade and Consumer Protection, during the development of the SEE. Initial outreach was held early to develop an understanding of current issues, trends, and policies. Refer to Chapter 3, *Public Involvement*, for more information on the early public involvement efforts held for the State Freight Plan.

Early Environmental Resource Agency Outreach

Early consultation with local, state, and federal environmental resource agencies was an important step in the development of the SEE. Discussion among stakeholders focused on existing concerns, programs, and policies related to multiple environmental categories. Major themes resulting from the conversation included (see Appendix 11-1 for additional information):

- Existing state and federal programs and policies related to wetland, air, noise, and other environmental impacts should be considered during the analysis

[3] Wisconsin Administration Code, Trans 400 Wisconsin Environmental Policy Act Procedures for Department Actions, requires that the SEE examine the range of potential system impacts in the following environmental categories, including: sensitive land resources, sensitive water resources, air quality, energy consumption, traffic congestion, economic development, and communities.

- Secondary impacts resulting from the development of large distribution centers should be considered as part of the initial development
- Concerns of congestion and delays at loading facilities and distribution centers
- The provision of adequate off-site facilities (i.e. rest areas, overnight parking, etc.) are a concern with the development of new facilities

11.2 Modal Comparison of Base Case and State Freight Plan

The Base Case describes a future condition which assumes no major shift in policies or resources away from WisDOT's current direction. The Base Case is the continuation of existing and present day policy actions. A Base Case, or existing system, provides a comparison for the potential impacts resulting from the State Freight Plan alternative. The Base Case considers the continued practice of the existing programs, policies, and requirements of WisDOT on the five freight modes into 2040. No major shifts in policies or resources were assumed for the Base Case. This should not be considered a no-build alternative, as WisDOT will continue to proceed with planned infrastructure development into 2040.

Multiple existing long-range system plans and reports contribute to the Base Case condition, including *Connections 2030*, *Wisconsin Rail Plan 2030*, *2030 Wisconsin State Airport System Plan*, and *Keep Wisconsin Moving*. These plans outline policies and procedures that are currently employed by WisDOT and expected to continue through 2030, defining the Base Case for the State Freight Plan SEE analysis.

Many existing department policies and programs focus on strategies for specific modes. However, there are a few that are multimodal and focus on freight movement:

- Establish a freight focus within WisDOT to better understand freight needs across the state and to integrate freight transportation policies into department planning and investment decision-making processes
- Seek innovative ways to maintain an all-mode freight network to improve efficiencies among the modes and facilitate movement of goods
- Assume the role of facilitator and advocate for freight between public and private interests
- Collect and analyze data to support freight planning
- Partner with stakeholders to ensure that freight movements are safe, reliable, and provide positive environmental and community impacts
- Improve emergency response to improve transportation system resiliency
- Support individuals and businesses related to transportation by providing loan assistance to Wisconsin businesses and communities
- Partner with consumers and businesses to increase transportation sustainability

Discussion of Base Case by Mode

Highways

Freight movement by truck throughout Wisconsin is dependent on the state trunk highway system, including Interstates, US highways and state highways. Nearly 12,000 miles of highway provides a network for the movement of goods, commodities, raw materials, and hazardous materials via truck to destinations within the

state and other parts of the United States.[4] Of the five modes of freight movement, WisDOT has responsibility over freight movement by highway, with a primary responsibility of maintaining and preserving the state trunk highway system for the safe and efficient operation of the transportation system.

Table 11-1: Highways Freight Tonnage

	Originating	Terminating
2013 Tonnage	210,154,768	193,536,142
2040 Tonnage (projected)	390,234,435	332,965,120

Source: 2013 IHS Transearch Database

Many of WisDOT's current policies and programs are focused on the preservation of the trunk highway system, influencing the movement of freight. The Six Year Highway Improvement Program lists scheduled highway projects within the state and cost estimate information. The projects listed reflect the department's intent to improve the state highway system based on assumptions about available revenue, inflation, and legislative decisions. As these assumptions change, so does the program.

Policies range from broad measures benefiting multiple forms of movement on the highway system to specific freight-related actions. Current policies, investment strategies, and programs include:

- Preserve Wisconsin's state trunk highway system infrastructure
- Develop, implement, and expand technology for monitoring highway operations to manage state trunk highway traffic
- Monitor state trunk highway system conditions, and address operation and maintenance needs
- Identify methods to improve traffic movements
- Improve the reliability and efficiency of state trunk highway operations
- Actively manage the daily operation of the state trunk highway network via the State Traffic Operations Center and other technology systems
- Plan and prepare for WisDOT's prompt and consistent response to incidents
- Provide permits to freight trucks moving through the state
- Optimize traffic movement on the state trunk highway system by utilizing tools to improve existing capacity and, where necessary, adding capacity
- Explore emerging technologies related to the movement of goods, including real-time tracking of hazardous materials, radio frequency identification to track shipments, and use of Global Positioning System (GPS) to notify commercial drivers of real-time conditions.
- Preserve the local road and bridge system
- Assess impacts of freight on highway maintenance costs

Local Roads

Wisconsin's local roads serve as a critical link in the movement of freight traffic throughout the state – particularly connecting the state trunk highway system with intermodal freight facilities. This first/last mile linkage is an important part of the overall freight system and efficient flow of commodities throughout the state.

[4] Wisconsin Department of Transportation, Bureau of State Highway Programs.

To address local road challenges, Chapter 8, *Freight Policies and Strategies*, identifies policies and strategies that support Wisconsin's local roads and bridges. These policies include:

- Assist in providing asset management strategies and tools for local governments to ensure that selected system preservation improvements provide cost-effective service life extension
- Work with local entities to identify and address key safety issues on the local system
- Partner with local governments to manage and invest in the local road and bridge network

While the state's overall freight system is dependent upon local roads, WisDOT does not have a direct role in the planning, construction, maintenance, or operation of local road systems. These responsibilities are typically held by the operating local jurisdiction. In an effort to provide assistance for local governments and ensure infrastructure investments align with state transportation goals, WisDOT provides local project funding through various programs.

Transportation funding programs specific to freight flows, which assist local governments with needed improvements, include:

- General Transportation Aids (GTA): The second largest program in WisDOT's budget, GTA returns to local governments roughly 21.8 percent of all state-collected transportation revenues (fuel taxes and vehicle registration fees) - helping offset the cost of county and municipal road construction, maintenance, traffic, and other transportation-related costs.[5]
- Connecting Highway Aids: Assists municipalities with costs associated with increased traffic and maintenance on roads that connect segments of the State Trunk Highway System.
- Local Bridge Improvement Assistance: Allocates federal and state funds to help local governments rehabilitate and replace the most seriously deficient existing federal-aid-eligible local structures on Wisconsin's local highway systems.
- Local Roads Improvement Program (LRIP): Assists local governments in improving seriously deteriorating county highways, town roads, and city and village streets.
- Airport Improvement Program: Combines federal and state financial resources to help fund improvements to public-use airports throughout the state.
- Freight Railroad Infrastructure Improvement Program (FRIIP): Provides loans that assist with improvements to rail infrastructure, highway/grade crossings, and the construction of new rail-served facilities in an effort to boost economic activity. Eligible applicants include private industries, railroads, and local governments.
- Freight Railroad Preservation Program (FRPP): Provides grants to local governments and public entities that cover up to 80 percent of the costs of rail projects designed to preserve rail service or rehabilitate fixed-facilities on publicly-owned rail lines. Projects can include the purchase of rail lines in an effort to preserve freight rail service.
- Harbor Assistance Program (HAP): Assists Wisconsin harbor communities along the Great Lakes and Mississippi River with projects that maintain and improve waterborne commerce. Eligible applicants include municipal and Tribal governments.
- Transportation Facilities Economic Assistance and Development Program (TEA): Provides 50 percent matching grants of up to $1 million that help local municipalities complete road, rail, harbor, or airport improvements that create or retain jobs.

[5] Wisconsin Department of Transportation, Bureau of Transit, Local Roads, Railroads and Harbors.

Railroads

WisDOT works with the Rail Transit Commissions and the Office of the Commissioner of Railroads to maintain, improve, and increase freight rail service on a regular basis. WisDOT owns 617 miles of railroad and coordinates planning and investment issues with Class I and Class II railroads.[6] The Surface Transportation Board categorizes railroads as Class I or Class II based on annual carrier operating revenues thresholds. Class I railroads are defined as a carrier generating annual revenues exceeding $447.6 million (as of 2017) and Class II railroads are defined as a carrier having revenues between $35.8 million and $447.6 million (as of 2017).[7]

Table 11-2: Railroad Freight Tonnage

	Originating	Terminating
2013 Tonnage	28,119,363	61,319,227
2040 Tonnage (projected)	51,340,697	72,743,885

Source: 2013 IHS Transearch Database

WisDOT currently has a variety of policies specific to the railroad system and the movement of goods via rail. Investment strategies, planning efforts, and service improvements are defined as WisDOT railroad policies and programs. Current policies, programs, and strategies include:

- Continue state assistance programs for rail improvements
- Continue to fund track and bridge upgrades for publicly-owned rail corridors
- Fund track upgrades for publicly-owned rail lines to preserve the existing system and, where appropriate, meet changing industry standards
- Monitor the CREATE Program's progress and partner with Illinois to support additional federal funding to move the improvements forward. The CREATE Program is a partnership between the United States DOT, the State of Illinois, City of Chicago, Metra, Amtrak, and the nation's freight railroads that was established to invest in critical capital improvements to increase efficiency of the region's rail infrastructure
- Investigate new policies and new financing strategies for projects that improve freight service
- Provide loan assistance to Wisconsin businesses and communities
- Support increased investment in rail infrastructure in response to shipper needs and market demands
- Work with railroads to ensure that appropriate rail service will be provided to all shippers statewide
- Explore opportunities to increase freight rail penetration of Chicago-directed traffic flows through intermodal offerings and expanded direct carload service to Chicago interchanges by Wisconsin's short-line partners
- Continue to support freight rail shippers and short-line carriers in preserving service to light-density rail lines
- Support freight shipper investments that permit new or continued local service in high-traffic areas; in some cases relocation support for a rail shipper to move to a branch line or short-line served point may prove to be a more cost-effective option for continue rail service
- Continue to maintain the availability of essential railroad service to maintain and expand economic development opportunities, including efforts to acquire abandoned rail lines, or preserving corridors for future transportation use through trails, rail banking, or land banking, where appropriate
- Facilitate relationships to reduce the number of abandonments and strengthen the market for rail
- Conduct detailed studies of publicly-owned rail line infrastructure needs

[6] Wisconsin Department of Transportation, Bureau of Transit, Local Roads, Railroads and Harbors.
[7] Surface Transportation Board, "FAQs."

- Continue to offer planning support to metropolitan planning organizations and regional planning commissions throughout the state in considering transportation needs that support developing rail-friendly industrial development sites
- Develop outreach to, and foster relationships with, all Wisconsin railroad operators to keep abreast of market demands and railroad interests
- Monitor railroad activity and create partnerships among businesses and railroads to increase the use of rail
- Continue to monitor changes in international trade flows and work with communities that are impacted by dramatic changes in train frequencies
- Encourage dialogue with major rail carriers and Wisconsin business interests to leverage container backhaul capacity for improved Wisconsin export access to foreign markets
- Include external stakeholders, as appropriate, during policy-setting activities

Waterways and Ports

Wisconsin's geographic position between three water bodies that serve as major freight corridors, the Mississippi River, Lake Superior and Lake Michigan, enhances the importance of the movement of freight by water nationally and internationally. Twenty-nine ports and harbors dispersed along the northern, eastern, and western borders of the state provide a connection for the movement of goods to and from Wisconsin.[8] WisDOT provides funding and support for improvements to harbors and ports, which include dredging and channel maintenance activities. Coordination between WisDOT, the Wisconsin Commercial Ports Association, and port owners and operators helps to address port and waterway issues.

Table 11-3: Waterways and Ports Freight Tonnage

	Originating	Terminating
2013 Tonnage	19,030,673	9,303,554
2040 Tonnage (projected)	23,897,937	10,379,989

Source: 2013 IHS Transearch Database

The Base Case focuses on the enhancements to and future planning for existing harbors, ports, and waterfronts throughout the state. These strategies include:

- Advocate for federal funding and environmental improvements for the Upper Mississippi River-Illinois River Waterway System and for the construction of a new lock in Sault Ste. Marie
- Continue state assistance programs for harbor improvements
- Encourage comprehensive harbor and waterfront land use planning
- Examine and address roadway issues at ports

[8] Wisconsin Department of Transportation, Bureau of Transit, Local Roads, Railroads and Harbors.

Aeronautics

Air cargo continues to be an important method for the movement of freight, especially for expensive or time bound shipments. Of the 98 airports statewide, twelve airports account for approximately 105,000 tons of air cargo shipped annually.[9] WisDOT provides planning and funding assistance to maintain and improve infrastructure and air service at all of Wisconsin's airports.

Table 11-4: Aeronautics Freight Tonnage

	Originating	Terminating
2013 Tonnage	57,965	56,009
2040 Tonnage (projected)	275,003	114,377

Source: 2013 IHS Transearch Database

Current policies related to the movement of cargo by air focus on improvements and updates to existing infrastructure throughout the state. Many policies are closely tied to the airport system as a whole, including the movement of freight and passenger flights, including:

- Address airport system needs through the Airport Improvement Program, coordination with owners and operators and *State Airport System Plan* update efforts
- Provide airport infrastructure to attract business-supporting economic growth
- Provide a system of airports that meets existing and future needs

Pipelines

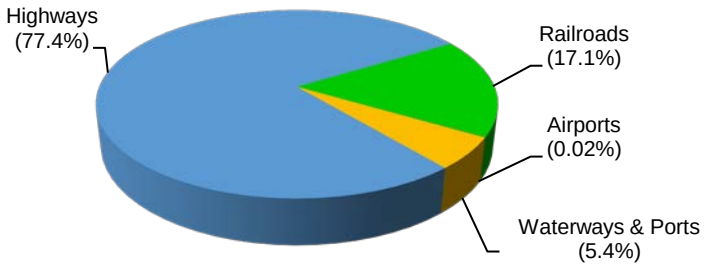
The movement of freight via pipeline occurs entirely within privately-owned infrastructure. WisDOT has a limited role with pipeline planning and development, which is limited to the construction of facilities within state highway right-of-way; however, as a mode of multimodal freight movement, pipelines have been included as a part of the statewide multimodal freight plan. Although WisDOT does not retain any oversight of pipeline infrastructure, coordination between private sector and other federal agencies is necessary in response to disruptions in service. Currently, there are no specific policies or requirements within the Base Case to use for comparison.

[9] 2013 IHS Transearch Database.

Discussion of State Freight Plan Alternative

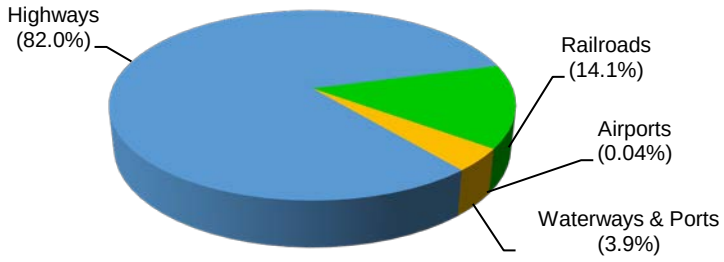
The Wisconsin State Freight Plan analyzes the existing condition and future of the multimodal transportation system throughout the state. Forecasts were projected for the future volumes of freight movement into 2040, as shown in Figure 11-1 and Figure 11-2. These forecasts did not include scenarios set forth by the recommendations in the freight plan. In 2013, a total of nearly 522 million tons of freight originated or terminated in the State of Wisconsin via highways, railroads, waterways and ports, and airports. Highways were the primary mode of freight movement, moving over 75 percent of the tonnage in 2013. The State Freight Plan forecasts that by the year 2040, over 880 million tons of freight will be moved through Wisconsin, representing an increase of nearly 70 percent. Freight tonnage for each mode is expected to increase throughout the state; however, highway and airport freight movement is anticipated to contribute a larger percentage in the state by 2040.

Figure 11-1: Total Freight by Mode (522 million tons in 2013)



Source: 2013 IHS Transearch Database

Figure 11-2: Total Freight by Mode (882 million tons in 2040)



Source: 2013 IHS Transearch Database

The Wisconsin State Freight Plan is a policy-focused plan, which incorporates a needs-based approach that outline's WisDOT's vision for project direction and implementation for the movement of freight throughout the state. The SEE analysis utilizes policies which outline improvements to highways, railroads, waterways and ports, aeronautics, and pipelines aimed to address the plan's overall goals. Under the State Freight Plan, WisDOT identifies policies for improving freight operations, facilities, planning and overall system functionality. These recommendations build upon the existing policies of *Connections 2030* and other long-standing freight policies and practices used to develop the Base Case. The State Freight Plan alternative discussed includes new and revised policies for implementation of the plan. The policies outlined in Chapter 8, *Freight Policies and Strategies*, apply to the system as a whole or are specific to an individual mode, and are grouped in the following categories:

Wisconsin State Freight Plan Goals

- Enhancing safety, security, and resiliency
- Ensuring system preservation and enhancement
- Enhancing system mobility, operations, reliability, efficiency, and connectivity

- Highway Policies, Strategies, and Data Analysis
- Local Roads Policies, Strategies, and Data Analysis (included within the discussion of highways for this chapter)
- Railroad Policies, Strategies, and Data Analysis
- Ports and Waterways Policies, Strategies, and Data Analysis
- Aeronautic Policies, Strategies, and Data Analysis
- Pipeline Policies and Strategies

In addition to freight policies and strategies in Chapter 8, *Freight Policies and Strategies*, Chapter 9, *Investment and Implementation*, fulfills FAST Act requirements by outlining investment and implementation strategies at the project level. Federal formula dollars may be spent only on the projects found on the National Highway Freight Network (NHFN), which is a highway-only network. These freight-specific funds are used to improve the movement of freight on the NHFN. Up to ten percent of state federal formula dollar apportionments can also be used for freight rail and intermodal freight projects. Projects identified in Appendix 9-1 and 9-2 in Chapter 9, *Investment and Implementation*, are programmed through various federal, state and local funding sources.

As a system-level evaluation, the analysis in the SEE does not attempt to evaluate environmental impacts of the construction projects programmed in Appendix 9-2. This level of analysis is needed for construction projects and conducted on a project by project basis in accordance with NEPA and/or WEPA requirements. Rather, the SEE focuses on broader, system-wide impacts of the policies defined in Chapter 9 and the potential environmental impacts they may have throughout the state. For more information regarding specific freight projects and funding, please refer to Chapter 9, *Investment and Implementation*.

Discussion of State Freight Plan Modal Comparison

The Wisconsin State Freight Plan continues or updates the current policies implemented by WisDOT for the preservation or enhancement of the freight system. These current policies were used to develop the Base Case alternative described within this chapter. Tables 11-5 through Table 11-9 outline the policies and strategies of the Base Case and State Freight Plan alternatives, highlighting a comparison between the two. Nine additional policies were developed as a result of the public input meetings, described in Chapter 3. These nine policies are identified in the following tables with an asterisk. The new polices support the vision and direction of the originally defined policies; therefore, the qualitative assessment, described in section 11.3 remains unchanged.

As discussed previously, WisDOT plays a primary or supporting role for the implementation or management of funding programs and policies regarding freight movement via highways, railroads, waterways and ports, and aeronautics. WisDOT maintains a limited role with pipelines, working with other agencies to support the

movement of freight via pipeline throughout the state. Due to WisDOT's limited role, pipelines have been excluded from the modal comparison and the environmental evaluation. WisDOT will continue to work with external partners regarding pipeline development and will support their existing policies and procedures for addressing environmental impacts.

Table 11-5: All Modes Comparison of Base Case and State Freight Plan

Base Case	State Freight Plan	Comparison
Improve standards for infrastructure	Improve standards for infrastructure	Improve standards for infrastructure
Enhance security of the transportation system by reducing vulnerability	Enhance security of the transportation system by reducing vulnerability	Enhance security of the transportation system by reducing vulnerability
Improve emergency response to make the transportation system more resilient	Improve emergency response to make the transportation system more resilient	Improve emergency response to make the transportation system more resilient
Partner with stakeholders to ensure that freight movements are safe, reliable, and provide positive environmental and community impacts	Partner with stakeholders to ensure that freight movements are safe, reliable, and provide positive environmental and community impacts	Partner with stakeholders to ensure that freight movements are safe, reliable, and provide positive environmental and community impacts
Partner with consumers and businesses to increase transportation sustainability	Partner with consumers and businesses to increase transportation sustainability	Partner with consumers and businesses to increase transportation sustainability
Support individuals and businesses related to transportation by providing loan assistance to Wisconsin businesses and communities	Support individuals and businesses related to transportation by providing loan assistance to Wisconsin businesses and communities	
Continue to support Metropolitan Planning Organizations, Regional Planning Commissions, and local partners in the implementation and execution of their freight policy, including the following themes: - Local connectivity - Safety and Security - Modal Improvements - System Operations and Management - Economic Development - Partnerships and Performance Measures	Continue to support Metropolitan Planning Organizations, Regional Planning Commissions, and local partners in the implementation and execution of their freight policy, including the following themes: - Local connectivity - Safety and Security - Modal Improvements - System Operations and Management - Economic Development - Partnerships and Performance Measures Work with stakeholders to facilitate a discussion to develop an intermodal strategy for Wisconsin* Review the department's project development process and design standards to incorporate the needs of freight system users* Provide information to communicate and educate industry and the general public on pertinent freight topics and issues* Leverage the data, tools, and methods developed through the freight plan to inform project prioritization and investment decisions, as well as provide them for DOT partners* Continue to work with other states to identify harmonization opportunities* Investigate ways to simplify, streamline, and provide more permitting options* Monitor national best practices and other initiatives related to reducing freight's impact on the environment*	

Table 11-6: Highway & Local Road Comparison of Base Case and State Freight Plan

Base Case	State Freight Plan	Comparison
Implement cost-effective maintenance activities on Wisconsin's state trunk highway infrastructure	Implement cost-effective maintenance activities on Wisconsin's state trunk highway infrastructure	Both alternatives continue to preserve existing highway infrastructure
Preserve Wisconsin's state trunk highway system infrastructure	Preserve Wisconsin's state trunk highway system infrastructure	Both alternatives support maintenance activities and the preservation of the highway and local road systems. The State Freight Plan identifies the need to improve upon these current practices
Preserve the local road and bridge system	Preserve the local road and bridge system	Both alternatives identify the need to continue to improve the reliability and efficiency of the system
Continue and improve the performance of the Major Highway Development Program	Continue and improve the performance of the Major Highway Development Program	
Improve the reliability and efficiency of state trunk highway operations	Improve the reliability and efficiency of state trunk highway operations	
Actively manage the daily operations of the state trunk highway network via the State Traffic Operations Center and other technology systems Optimize traffic movement on the state trunk highway system by utilizing tools to improve existing capacity and, where necessary, adding capacity Manage access on Wisconsin's state trunk highway system Plan and prepare for WisDOT's prompt and consistent response to incidents Continue to use the Department's MAPSS System to measure performance	Actively manage the daily operations of the state trunk highway network via the State Traffic Operations Center and other technology systems Optimize traffic movement on the state trunk highway system by utilizing tools to improve existing capacity and, where necessary, adding capacity Manage access on Wisconsin's state trunk highway system Plan and prepare for WisDOT's prompt and consistent response to incidents Continue using a performance-based approach to identify state trunk highway system preservation needs, including development of a bridge asset management system Refine and expand a state-of-the-art process for prioritizing needs and identifying cost-effective state trunk highway system preservation needs Revise the Facilities Development Manual (FDM) to more clearly include freight considerations in its project development guidance Identify and preserve a sub-system of Wisconsin's State Highways that accommodate over-height loads (up to 20 feet), over-weight and over-size loads Maintain a formal, ongoing preventive maintenance process Implement proven maintenance management practices Monitoring existing state trunk highway conditions, identifying deficiencies and setting priorities Improve the department's existing maintenance management tools	Both alternatives encourage the optimization of traffic movements via the State Traffic Operations Center and other technology systems. Both alternatives identify the need to plan and prepare for emergency response along the highway system The State Freight Plan identifies a performance-based approach to monitor system performance and identify future transportation projects based on comprehensive data analysis The State Freight Plan encourages the development of improved freight standards to ensure project designs minimize barriers The State Freight Plan promotes designations to the over-weight/over-height network and permitting system The State Freight Plan identifies the need to improve communication with truck freight drivers on the road via enhanced cellular coverage The State Freight Plan encourages increased use of technology in multiple aspects of the freight system The State Freight Plan identifies the need to complete projects on the highway system The State Freight Plan promotes improvements to the freight system to address safety concerns The State Freight Plan identifies the need to improve the local roadway and bridge network to support freight movement

	Implement work zone and lane-closure management strategies and tools to maintain safety and minimize impacts on travelers Continually monitor the state trunk highway network and respond to operational needs Improve motor carrier efficiency and enforcement Support communications along state highway corridors of freight significance to ensure drivers can remain informed of changing conditions Support greater use of technologies to improve the safety and efficiency of operations along corridors with high freight movement frequencies Support an increase in the availability of truck parking at state-owned facilities and raise the awareness of its availability Complete the currently enumerated Major Highway Development projects Improve standards for infrastructure Improve emergency response Identify freight-specific safety concerns and development strategies for solutions Assist in providing asset management strategies and tools for local governments to ensure that selected system preservation improvements provide cost-effective service life extension Work with local entities to identify and address key safety issues on the local system Partner with local governments to manage and invest in the local road and bridge network Continue to support WISLR as a data and pavement asset management tool Work with local entities to enhance their ability to quantify local road infrastructure needs Continue to coordinate with locals to manage available safety funding and to program safety improvements	The State Freight Plan promotes local agency coordination to assist in the implementation of plan goals Assist in providing asset management strategies and tools for local governments to ensure that selected system preservation improvements provide cost-effective service life extension Work with local entities to identify and address key safety issues on the local system Partner with local governments to manage and invest in the local road and bridge network

Table 11-7: Railroad Comparison of Base Case and State Freight Plan

Base Case	State Freight Plan	Comparison
Ensure that freight rail remains a viable transportation mode for Wisconsin shippers Preserve rail corridors, including rights-of-way, for freight service Continue to support the existence of locally-organized, locally-staffed Rail Transit Commissions Continue state assistance programs for rail improvements Continue to fund track and bridge upgrades for publicly-owned rail corridors Investigate new policies and new financing strategies for projects that improve freight service Support increase investment in rail infrastructure in response to shipper and market demands Continue to support freight rail shippers and short-line carriers in preserving service to light-density rail lines Support freight shipper investments that permit new or continued local service in high-traffic areas	Ensure that freight rail remains a viable transportation mode for Wisconsin shippers Preserve rail corridors, including rights-of-way, for freight service Continue to support the existence of locally-organized, locally-staffed Rail Transit Commissions Continue state assistance programs for rail improvements. Continue to fund track and bridge upgrades for publicly-owned rail corridors Investigate new policies and new financing strategies for projects that improve freight service Support increase investment in rail infrastructure in response to shipper and market demands Continue to support freight rail shippers and short-line carriers in preserving service to light-density rail lines Support freight shipper investments that permit new or continued local service in high-traffic areas Maintain state-owned rail lines to allow service levels to continue uninterrupted, and without additional restrictions Acquire rail lines into public ownership, when appropriate, to preserve essential railroad service Fund track upgrades for publicly-supported rail lines to meet changing industry standards Continue efforts to promote safe rail crossings throughout the state*	Both alternatives continue to promote freight rail for Wisconsin shippers Both alternatives promote the preservation of rail corridors for future services Both alternatives continue to support the partnership and work of the state's RTCs and their planning efforts Both alternatives recommend the continued funding of the state's existing railroad assistance programs Both alternatives support increased investment in rail infrastructure throughout the state The State Freight Plan promotes private freight shipper investments for improvements to high-traffic areas The State Freight Plan encourages uninterrupted freight rail travel along public rail lines The State Freight Plan encourages the acquisition of additional rail lines into public ownership. In the cases where those corridors are listed for abandonment or other disposition, WisDOT policy will be to acquire corridors, when supported by local partners, even if service cannot be preserved in the short-term The State Freight Plan supports upgrades to existing rail lines when publicly-supported

Table 11-8: Waterway and Ports Comparison of Base Case and State Freight Plan

Base Case	State Freight Plan	Comparison
Maintain and improve waterways critical to Wisconsin's transportation system Continue state assistance for harbor improvements Advocate for federal funding and environmental improvements for the Upper Mississippi River-Illinois River Water Way Systems and for the construction of a new lock in Sault Ste. Marie Encourage comprehensive harbor and waterfront land use planning Examine and address roadway issues at ports	Maintain and improve waterways critical to Wisconsin's transportation system Continue state assistance programs for harbor improvements Advocate for federal funding for navigation and environmental improvements for the Upper Mississippi River-Illinois River Waterway and improvements to the Soo Lock System Encourage comprehensive harbor and waterfront land use planning Examine and address roadway issues at ports Continue to coordinate with state, regional and international partners, as well as explore the development of a maritime strategy for Wisconsin, to support maritime transportation as part of a safe, efficient and seamless freight transportation system*	Both alternatives continue to monitor waterways and identify improvements Both alternatives continue to support assistance programs Both alternatives advocate for federal funding for navigation and environmental improvements for the Upper Mississippi River-Illinois River Waterway Both alternatives support land use planning and identification of roadway issues near existing ports Both alternatives examine and address roadway issues at ports The State Freight Plan supports improvements for existing waterway and port projects

Table 11-9: Airport Comparison of Base Case and State Freight Plan

Base Case	State Freight Plan	Comparison
Preserve Wisconsin's airport system infrastructure Address airport system needs through the Airport Improvement Program, coordination with owners and operators and State Airport System Plan update efforts Provide airport infrastructure to attract business-supporting economic growth Provide a system of airports that meets existing and future needs	Preserve Wisconsin's airport system infrastructure. Address airport system needs through the Airport Improvement Program, coordination with owners and operators and State Airport System Plan update efforts Provide airport infrastructure to attract business-supporting economic growth Provide a system of airports that meets existing and future needs Use the Airport Improvement Program to help Wisconsin airports accommodate business planes Support the needed airport system infrastructure, including inclement weather capability, to enable and sustain jet aircraft and related activity	Both alternatives continue to preserve airport infrastructure, including inclement weather capability, to enable and sustain jet aircraft and related activity Both alternatives continue to encourage infrastructure improvements support for growth and future needs The State Freight Plan encourages infrastructure investments to expand business plane availability

11.3 Qualitative Assessment

"Significant Effect"
Considerable and important impacts of department actions on the quality of the human environment. -Trans 400 (WEPA)

WisDOT is committed to protecting the natural environment throughout project development and implementation, and regularly employs mitigation strategies to minimize environmental impacts. Strategies defined within the Wisconsin State Freight Plan may result in environmental effects, especially when built improvements to corridors or services are identified or strategized. The revision to existing or the addition of new multimodal freight policies and investment strategies may also result in effects. The Base Case and State Freight Plan alternatives both have the potential to result in direct and indirect environmental effects. Both adverse and beneficial impacts will be considered as a result of the Base Case and State Freight Plan.

Analysis Process

Trans 400 provides the guidance for the development of a SEE as part of a system plan that includes significant proposals. Trans 400.10 outlines the categories of which environmental impacts should be analyzed to meet the requirements of the Wisconsin Environmental Policy Act (WEPA):

- Traffic congestion
- Energy consumption
- Air quality
- Agriculture
- Economic development
- Communities
- Sensitive land resources
- Sensitive water resources

This SEE conceptually analyzes the potential environmental effects of the proposed actions of the State Freight Plan in comparison to the existing condition. The modal comparison of the Base Case and State Freight Plan provided differences/similarities in policy recommendations that can be analyzed for their environmental impact. While the State Freight Plan includes the continuation of many existing policies and programs, a SEE is necessary to evaluate potential environmental impacts. These proposals include:

- Complete the currently enumerated Major Highway Development projects and study approved corridors
- Identify freight-specific safety concerns and develop strategies for solutions
- Partner with local governments to manage and invest in the local road and bridge network
- Fund track upgrades for publicly-supported rail lines to meet changing industry standards
- Support the needed airport system infrastructure, including inclement weather capability, to enable and sustain jet aircraft and related activity

Traffic Congestion

Traffic congestion can be experienced by all modes of freight movement, which includes highways, railroads, waterways and ports, and aeronautics. Congestion for some modes can be catalyzed by other modes of freight or by non-freight movements. Traffic congestion may result in the potential for environmental impacts to two main areas, air pollution and quality of life. There are two general areas where congestion can occur within the freight system – along the transportation corridor (while the freight is being transported) and at the onset or terminus of freight system (loading and unloading facilities).

The safety of the general public is an important consideration when discussing freight movement by any mode. These considerations should include the safety of operators and employees, but also the safety of those traveling by other modes that may have conflicts with the freight system.

The plan forecasts an increase in originating/terminating tonnage for all modes by 2040 (79.1 percent for highways, 38.7 percent for railroads, 241.6 percent for aeronautics, and 21.0 percent for waterways and ports). The forecasted increase equates to an overall increase of nearly 70 percent for the tonnage of freight transported to and from Wisconsin during this time. The plan forecasts also indicate a shift in the freight moved by specific modes throughout the state. Freight movement via highway is expected to remain the dominant mode (accounting for 82.0 percent of originating and terminating statewide freight tonnage), while railroad will account for roughly 14 percent and waterways roughly 4 percent. Additionally, the use of pipelines for the movement of freight at a shorter distance may also result from increased trucking costs or the proximity of the origin and destination.

Congestion along the primary freight corridors is mostly experienced by truck traffic and rail traffic in some instances; however, all modes can be affected by first/last mile and loading congestion. First/last mile connections describe the short movement between the origin/destination and the primary movement of freight commodities from one mode to another. For example, a distribution center moving goods via air may depend on a truck for the first mile connection to the airport. Congestion experienced during the first/last mile connections or at unloading/loading facilities can result in delays and increased prices.

Traffic Congestion Comparison

The Base Case and State Freight Plan alternatives include proposed policies for all modes that may impact the environment and affect congestion. However, the forecasted growth of the State Freight Plan for freight movement imported to and exported from Wisconsin may result in a greater impact from all modes. The plan includes policies for the optimization of operations throughout the system, creating an opportunity to respond to congestion concerns. Additionally, policies geared at permitting and communication improvements will also benefit freight movement, allowing for the informed movement of goods.

The State Freight Plan provides additional strategies for the management of congestion and efficient freight movement. Considerations should be made for congestion issues along the freight corridors, as well as first/last mile impacts. Particular attention should be given to intermodal and transload facilities throughout the state along with local road and bridge weight restrictions. These potential barriers in freight connections can create challenges for the efficient flow of goods throughout the state and increase congestion. Continued review of freight impacts on congestion should be included with larger-scale congestion improvements for freight and all modes of transportation.

Energy Consumption

The movement of freight is an energy intensive activity. Primarily, mobile freight modes require the consumption of fuel to move vehicles; however, energy consumption can occur during times of vehicular idling. Freight modal choice is driven primarily by the present price of fuel and existing infrastructure. The price of fuel continues to be highly volatile. WisDOT can encourage modal choices by means of alternative fuel promotion and fuel reduction strategies. Additionally, investment in freight infrastructure, which supports the safe and efficient movement of goods, encourages use and the free flow of commodities. For example, investment in CNG fueling stations throughout the state supports the ability of truck freight drivers to easily travel throughout the state while utilizing alternative means of fuel.

Energy use and consumption vary by freight mode. The length of trip, fuel efficiency, and weight of the load can impact the fuel efficiency of vehicular freight modes. Advancements in technology, such as idling reduction systems, are improving energy efficiency for certain modes.

Bulk freight movement is generally more energy efficient when moved by railroads or waterways and ports. The Base Case and State Freight Plan alternatives both support the continued support of rail and harbor assistance programs, including the continued support of rail preservation and maintenance.

The State Freight Plan supports the efficient movement of freight via all modes. Improvements that increase efficiencies will benefit energy consumption by reducing idling and congestion. Improved modal choice resulting from the State Freight Plan will benefit energy consumption, as modes with lower energy use become more attractive and competitive in the State of Wisconsin. Additionally, continued improvements to fuel technologies for all modes of freight movement will benefit energy consumption.

Energy Consumption Comparison

The State Freight Plan supports improved modal choice for cargo movement throughout the state, which may result in reduced energy use as all modes become more competitive. Additionally, improvements to address traffic congestion also benefit energy consumption, as the need for idling and inefficient movement is reduced.

Air Quality

Mobile sources, such as transportation, continue to contribute to air pollution on a national scale. In 2015, transportation sources contributed over 50 percent of carbon monoxide (CO) and nitrogen oxide (NOx) emissions throughout the United States.[10] Freight movement contributes to these emissions with diesel fuel being the primary fuel source for many freight modes. According to the Wisconsin Department of Natural Resources (DNR), more than 40 percent of man-made volatile organic compounds (VOC) and over 60 percent of man-made NOx emissions are attributed to transportation sources in Wisconsin.[11] Improved technologies continue to reduce emissions contributed by transportation sources (i.e. new fuels, modified engine systems, and modal shifts); however transportation sources continue to be a large contributor to the emissions of the following primary air pollutants:

- Ozone
- Particulate Matter
- Greenhouse Gas Emissions

The Clean Air Act requires the United States Environmental Protection Agency (EPA) to set National Ambient Air Quality Standards (NAAQS) for pollutants that are considered harmful to public health and the environment. These pollutants include carbon monoxide, lead, nitrogen dioxide, ozone, particulate matter, and sulfur dioxide. Areas of the country where levels of these pollutants persistently exceed the NAAQS may be designated as "nonattainment areas."

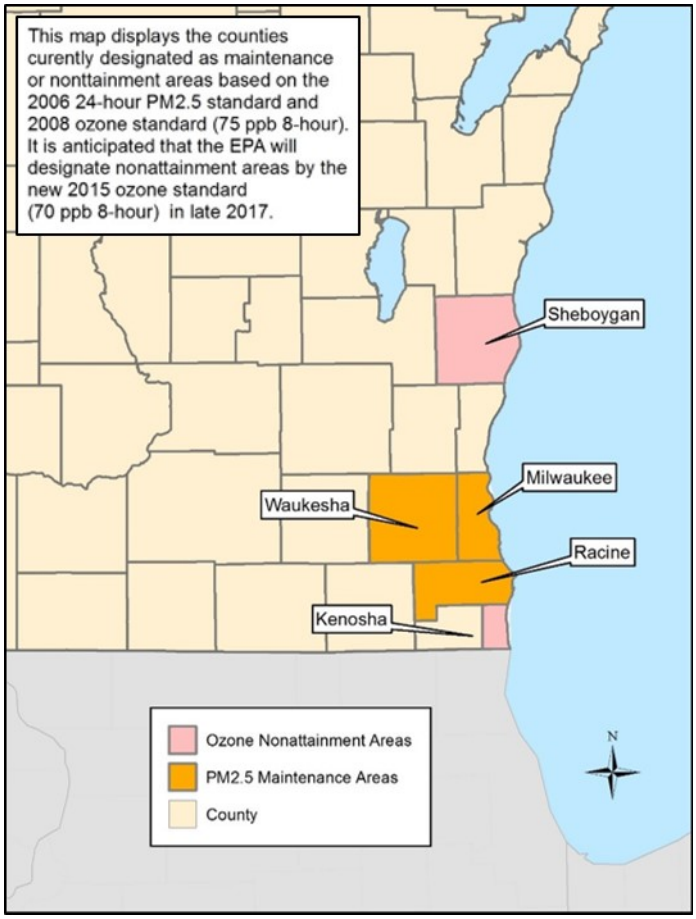
Ozone

Ground level ozone continues to be a regional concern for Wisconsin. Historically, counties in eastern Wisconsin have been designated by the EPA as nonattainment areas based on NAAQS for ozone. Currently, two areas of the

[10] U.S. Environmental Protection Agency, "Inventory of U.S. Greenhouse Gas Emissions and Sinks 1990-2015."
[11] Wisconsin Department of Natural Resources, "Vehicles - Mobile sources."

state, Sheboygan County and a portion of Kenosha County, are considered nonattainment areas for the 2008 eight-hour ozone standard. Both areas were designated in July of 2012, as shown in Figure 11-3.[12]

Figure 11-3: EPA: Non-Attainment and Maintenance Areas



Source: U.S. Environmental Protection Agency

On November 24, 2014, the EPA announced proposed changes to the NAAQS for ozone. The proposal sought to strengthen the ozone standard by lowering the standard from 75 parts per billion (ppb) to a value between 65 ppb and 70 ppb. Parts per billion measures the volume of the specified pollutant on a per unit basis. The proposal was based on scientific evidence that indicates ozone impacts human health at levels below the existing standard of 75 ppb.[13] On October 1, 2015, the EPA set the ozone standard at 70 ppb.[14] The EPA's decision to lower the ozone standard may result in additional counties being designated as non-attainment.

Ground level ozone is created by a chemical reaction between volatile organic compounds (VOC) and nitrogen oxides (NOx), pollutants released from automobiles, diesel trucks, industrial facilities, and other sources. Concentrations of ground level ozone can increase during times of high temperatures. Temperature increases throughout the state have the potential result of increased concentrations of ground level ozone, resulting in greater impacts to areas that commonly experience pollution.

Particulate Matter

All counties in Wisconsin are in attainment with particulate matter standards as established by the United States EPA and NAAQS. Particulate matter is a mixture of liquid droplets and solid material of visible or microscopic size. Particulate matter is grouped into two primary categories: PM10 (inhalable course particles of up to 10 micrometers in size) and PM2.5 (fine particles of up to 2.5 micrometers in size). Three counties (Milwaukee, Racine, and Waukesha Counties) in southeastern Wisconsin were previously listed as nonattainment areas for

[12] Wisconsin Department of Natural Resources, "Wisconsin Air Quality Trends." (April 2015).
[13] Congressional Research Service, "EPA's 2015 Ozone Air Quality Standards." (August 15, 2017).
[14] Ibid.

PM2.5, but were re-designated to attainment in April 2014 as a result of efforts to reduce particle pollution levels.[15] These three counties continue to be considered a particulate matter maintenance area[16].

Transportation sources emit a relatively small proportion of all particle pollution sources. PM10 particles can be emitted from the dust from paved and gravel roads, material handling during construction or loading of freight, and crushing and grinding operations. Fuel combustion, power generation, and industrial operations are direct contributors to PM2.5 emissions that can be emitted directly into the atmosphere.

Interest in fine particulate matter emissions and related health effects has increased in recent years, and additional research has focused on various PM emission sources, including diesel engines with a majority of emissions ranging around the nanometer size. The EPA continues to monitor and study PM2.5 and PM10 emissions, with special attention on diesel emissions, as diesel vehicles produce higher emissions of particulate matter compared to vehicles that utilize gasoline. Recent updates to the current 2012 PM2.5 standard include updated monitoring requirements. For example, heavily traveled roadways in large urban areas will be monitored as particle pollution is increased in these areas from cars and heavy duty diesel trucks. Near-roadway monitoring is currently required for larger urban core-based statistical areas and will be required for all urban areas with a population over 1 million (i.e. Milwaukee-Waukesha-West Allis Metropolitan Statistical Area) by January 1, 2017.[17]

Freight emissions may drop due to increased availability and competitiveness of modal choices between freight shippers. For example, improvements to the rail network that improve connections, efficiency, and load capacity may make rail transport more viable than truck transport for some situations. For cases where modal choices are not available, the delineated policies will result in strategies that improve the efficiency of all modes. The policies outlined in the State Freight Plan include more specificity, and therefore it will result in greater improvements to efficiency and modal choices. While increased modal choice and improved efficiencies will reduce emissions, the reduction for either draft alternative is minimal.

Strategies that improve available technologies, communication, and other resources also contribute to improved air quality by reducing trip lengths and idling. For example, the construction of strategically placed public truck parking areas improve the availability of the resource and allows for innovative idling reduction technologies to be implemented as necessary. Improved communication between WisDOT, its agency partners, and the driving public will help to disseminate information that may provide alternatives to keep traffic moving during incidents or construction situations. State Freight Plan policies also address efficiencies at connection points between modes. This includes improvements to the local road system at ports, resulting in a reduction of truck idling while accessing ports.

Greenhouse Gas Emissions

According to the United States Environmental Protection Agency (EPA), greenhouse gases trap heat in the atmosphere.[18] Carbon dioxide, methane, nitrous oxide and fluorinated gases are the primary greenhouse gases.

The emission of greenhouse gases into the atmosphere continues to be debated nationally and internationally. Transportation, deforestation, and manufacturing are considered contributors in the release of greenhouse gases.

---

[15] Wisconsin Department of Natural Resources, "Wisconsin Air Quality Trends." (April 2015).
[16] Maintenance area is any geographic region of the United States previously designated nonattainment pursuant to the Clean Air Act (CAA) Amendments of 1990 and subsequently redesignated to attainment subject to the requirement to develop a maintenance plan under section 175A of the CAA, as amended.
[17] 40 CFR Part 58
[18] U.S. Environmental Protection Agency, "Greenhouse Gas Emissions > Overview of Greenhouse Gases."

Based on current research, transportation sources are the second largest contributor to greenhouse gas emissions, contributing 27 percent of the total United States emissions. Electricity production is considered the largest source, contributing 29 percent of all emissions.[19]

The federal government has monitored emission trends for all transportation modes since 1990. Nationally, the emissions for on-road vehicles have grown 23 percent since 1990, according to the EPA.[20] Medium- and heavy-duty truck emissions have a major role in this increase, with an increase of 79 percent in the same timeframe.[21] The increase is likely a result of an increased number of trucks, especially considering that vehicle and fuel standards continue to improve. Emissions as a result of rail transportation have also increased since 1990, with an increase of 20 percent.[22] This increase in emissions from rail transportation is likely due to an increase in freight transported via rail. Aircrafts and ships/boats have decreased emissions by 15 and 26 percent, respectively, since 1990.[23]

The introduction of federal policies and increased emissions standards are aimed at reducing emissions and developing solutions to meet enhanced air quality standards, with mobile source emission standards providing one of the leading sources of overall emission reduction (i.e., EPA Phase 2 Greenhouse Gas Standards). Emission standards continue to be refined for all modes of freight. The Wisconsin DNR and other state agencies continue to work closely with the EPA on emission standards and reduction programs. Emission reduction goals have been established with the EPA for Wisconsin with a primary focus on coal and natural gas-fired power plants.

Fuel improvements are thought to play a primary role in the reduction of greenhouse gas emissions from the transportation sectors beyond the emissions standards for each mode. New ultra-low sulfur fuels and engines are available for multiple modes, which reduce emissions compared to standards fuels and engines. Programs like the National Clean Diesel Campaign and SmartWay offer funding and assistance programs aimed at a reduction in emissions.

WisDOT manages infrastructure investments to minimize impacts from the environment. Due to an increased investment in modal choices for freight movement, the State Freight Plan provides opportunities to reduce transportation-related greenhouse gas emissions compared to the Base Case. Recommendations related to the development of tools and coordination with stakeholders and governmental entities are also likely to help reduce congestion and provide opportunities to address changes in air quality.

[19] U.S. Environmental Protection Agency, "Inventory of U.S. Greenhouse Gas Emissions and Sinks 1990-2015."
[20] U.S. Environmental Protection Agency, "Fast Facts: U.S. Transportation Sector Greenhouse Gas Emissions 1990-2015." (July 2017).
[21] Ibid.
[22] Ibid.
[23] Ibid.

Air Quality Comparison

The Base Case and State Freight Plan alternatives both include policies that may result in reduced emissions and improved air quality. Projected freight cargo increases identified for 2040 will result in the expansions of fleets, frequency of trips, or increase in loads to accommodate this increase. Policies to improve efficiencies and modal choices will help to combat the additional trips and resulting emissions.

Modal choices and improved freight movement efficiencies will improve air quality and may reduce overall carbon emissions from the freight transportation sector. The increase in available modes for the shipment of freight cargo may increase the use of modes with lower carbon emissions (i.e., waterways and pipelines). The continued development of new fuel technologies for multiple freight modes will also contribute to a reduction in carbon emissions.

Federal, state, and local agencies continue to develop efforts and strategies for the reduction of carbon emissions from the transportation sector. A recent example is the medium- and heavy-truck emissions standards released by the EPA and USDOT in 2016. The policies outlined in the State Freight Plan alternative allow WisDOT to stay apprised of and respond to changing policies and initiatives as needed.

Agriculture

In 2015, over 41 percent (or 14.4 million acres) of the land in Wisconsin was identified as farmland (see Figure 11-4).[24] Approximately 200,000 acres of farmland were converted to other purposes between 2011 and 2015.[25] The conversion of working farmlands to non-agricultural development is a contributor to this loss in farmland. Converted farmland is comprised of residential, commercial and industrial development, undeveloped land, and supporting facilities (i.e. transportation facilities).

Agriculture lands and practices can potentially be impacted by the movement of freight in three primary ways: 1) the ability to efficiently move agricultural goods and products, 2) the impacts resulting from new or expanding transportation projects, and 3) impacts resulting from the movement of freight along existing corridors. The policies of the Base Case and State Freight Plan alternatives have the potential to impact agricultural land statewide. Generally these policies include freight corridor expansion or construction, corridor maintenance, and access management.

Farmland Preservation/Prime and Unique Farmlands

Wisconsin continues its history of dairy, agriculture, and manufacturing, representing the number one state in the production of cheese, cranberries, ginseng, snap beans, and carrots in 2015.[26,27] The agriculture industry had an economic impact on the state of over 88 billion dollars in 2012, employing 154,000 people on farms and 260,000 people in food processing.[28] The continued preservation of farmland is key to the success of the agricultural industry in Wisconsin, particularly preservation of prime farmland.

Prime farmland is defined as land with the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops. The soil quality, growing season, and moisture supply make the land

[24] U.S. Department of Agriculture, "2015 State Agriculture Overview: Wisconsin."
[25] U.S. Department of Agriculture, National Agricultural Statistics Service, "2016 Wisconsin Agricultural Statistics."
[26] U.S. Department of Agriculture, National Agricultural Statistics Service, "2015 Wisconsin Agricultural Statistics."
[27] Wisconsin Economic Development Corporation, "Feeding the World With Food and Beverage Production and Research in Wisconsin." (May 10, 2016).
[28] Ibid.

ideal for producing economically sustained high yields of crops. The preservation of this land is important to the sustainability of the agriculture industry. Many other industries can be relocated to a new location or building with little impact to their operations. However, agricultural production areas cannot be relocated in the same manner due to varying soil characteristics, growing seasons, and moisture supply. Because of its importance to farming, priority is made to protect prime farmland from potential conversion to non-agricultural uses including transportation. Conversions are reviewed through the USDA Farmland Conversion Impact Rating. Exclusive agriculture zoning is used throughout the state as another mechanism for farmland preservation. The use of this zoning district identifies key farmland areas with local support for preservation. These areas are reviewed at the project level to identify strategies to reduce impacts from the expansion or construction of transportation corridors.

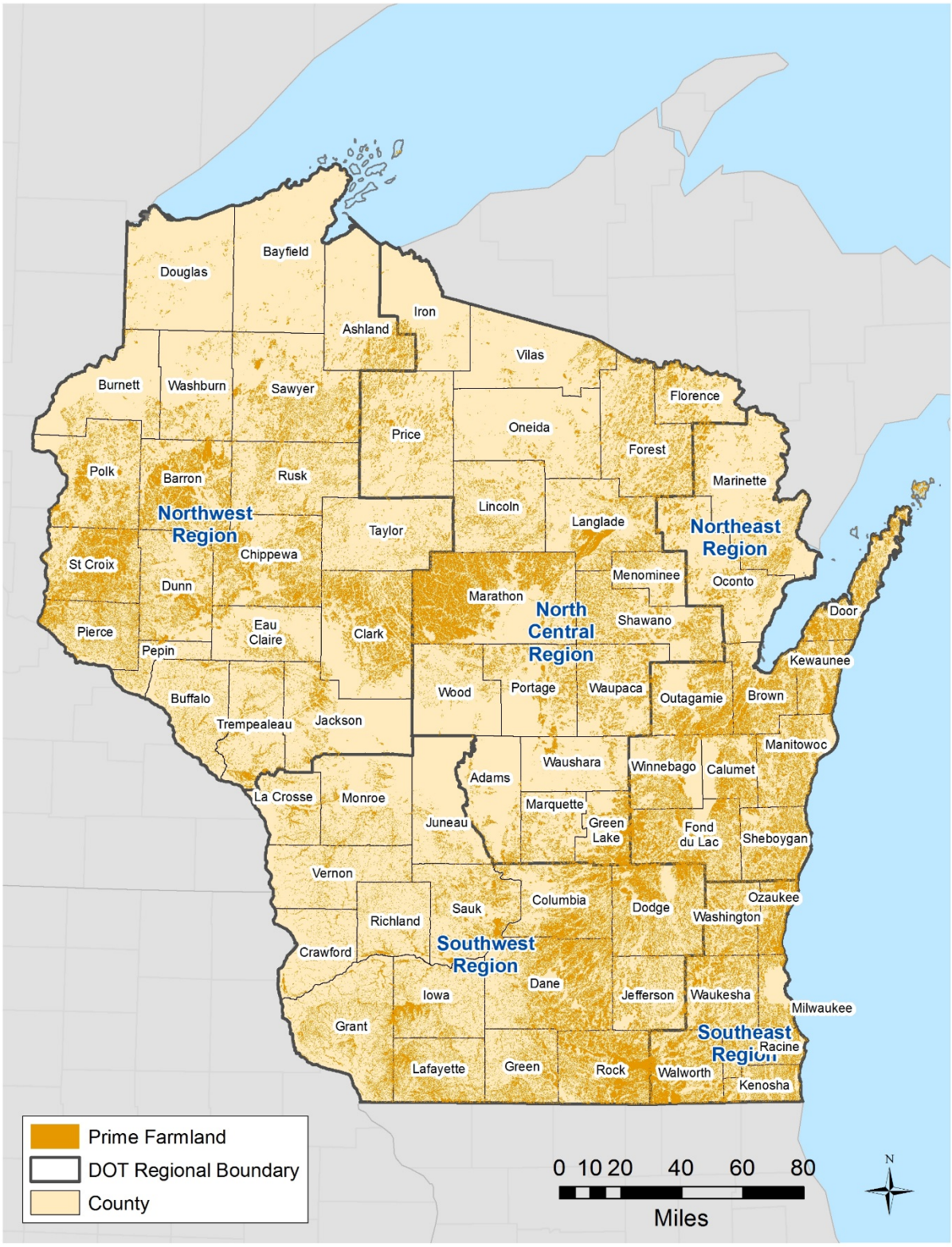
The Base Case and State Freight Plan do not identify specific construction projects for any of the modes. With preservation of the existing system as a top priority, it is likely that corridor expansions or new construction will be studied carefully. However, it may be determined that corridor expansion or new construction is required to accommodate the forecasted freight volumes in the state. At the system-wide level, these impacts are difficult to estimate should expansion or new construction be pursued. Project-level analysis and decisions regarding the extent of impacts to agricultural lands will occur as projects are determined, as well as the determination of potential mitigation strategies.

Four modes of freight movement, including highways/local roads, railroads, waterways/ports, and aeronautics, have the potential to impact agricultural lands at different levels. One of the largest concerns is the conversion of farmland to another use, directly or indirectly. For example, conversion of farmland may occur as a direct result of highway expansion. Most commonly direct conversion occurs as a result of purchasing real estate adjacent to existing highways to accommodate transportation project needs. Indirect conversion may include land development adjacent to a highway expansion. These acquisitions can occur at a range of levels from the construction of a corridor to minor intersection improvements.

WisDOT transportation projects consider and analyze the impacts to resources and infrastructure that support agricultural production in addition to the conversion of farmland area. For example, 31 counties throughout the state contain one or more drainage districts to manage agricultural lands.[29] The district provides a system of ditches that can be used by landowners for the drainage for cropland. Impacts to districts and ditches are minimized and avoided as a result of transportation-related projects. The Base Case and State Freight Plan alternatives promote the preservation of existing corridors for future or expanded rail use. These policies will help to reduce the severity and magnitude of conversions as the corridors are currently in place. The expansion or construction of facilities also has the potential to segment properties, creating a barrier that must be crossed to provide field access. However, increased capacity via other freight modes (air, water, and pipeline) has the potential to minimize expansion of existing highway and rail corridors, allowing for decreased agricultural fragmentation. In addition, intelligent transportation systems (ITS), along with enhanced passing lanes on highways, may potentially create more efficient transport systems, reduce congestion, and decrease the need for corridor expansion and construction.

[29] Department of Agriculture, Trade and Consumer Protection, Drainage District Program, "Agricultural Drainage in Wisconsin."

Figure 11-4: Wisconsin's Prime Farmland



Source: Wisconsin Department of Agriculture, Trade and Consumer Protection

Corridor Maintenance

Once a corridor is established, various maintenance activities are required to maintain the corridor for efficient transportation use. Primarily these activities include projects to maintain load restrictions, improve ride quality, and address safety concerns (i.e. the maintenance of vegetation along a rail corridor). The State Freight Plan alternative proposes policies aimed at improving maintenance strategies for many modes. Therefore, the State Freight Plan alternative is anticipated to provide a benefit to agricultural lands regarding impacts from maintenance activities.

Access Management

Freight transportation improvements have the potential to affect access to agricultural lands. Specifically, access management for highways and limited crossing locations along rail corridors could impact agricultural practices and production. The Base Case and State Freight Plan alternatives do not differ on polices for access management. Special attention should be given at the project level to minimize agricultural access impacts. Access management policies and farmland preservation strategies are further discussed in WisDOT's Facilities Development Manual (FDM) for project-level guidance.

Agriculture Comparison

The Base Case and State Freight Plan will result in similar impacts to the state's agriculture, with agricultural conversions and access management providing the greatest potential for impact for both roads and railroads. Under the State Freight Plan, highway improvements targeting system preservation can ensure the system safely and efficiently addresses local needs with potentially minimal impacts to surrounding communities while also serving the larger statewide need to facilitate the movement of freight and the traveling public. Neither port nor airport improvements will have a significant impact on agricultural resources for either case.

Economic Development

Wisconsin's transportation system is critical to the economic vitality of the state, as raw materials and manufactured goods are moved within and outside of Wisconsin's borders. Existing manufacturers, distributors, and retail businesses rely heavily on the transportation system's ability to efficiently move goods. Additionally, the health of the network plays an important role in the attraction of new industries to Wisconsin.

Freight transportation investments can serve as catalysts for additional private investments. For example, the development of well-served distribution or intermodal facilities have spurred the development of similar or complementary investments in the surrounding area.

The Base Case and State Freight Plan alternatives include policies that support economic growth. This includes the continuation of funding programs that result in freight improvements and business opportunity growth and development. These policies continue to improve the efficient movement of freight for all modes, allowing for efficient movement for Wisconsin's businesses.

Further economic growth is supported with the policies and strategies of the State Freight Plan alternative. These include track improvements to meet industry standards, airport investments to accommodate business planes, waterfront land use planning, and technology and communication improvements along the highway system. For example, the use of the Airport Improvement Program to help Wisconsin airports accommodate business planes will help to improve the efficiency of freight movement by air. Similar policies aimed at improving the efficiencies for freight movement are recommended for highways, railroads, and waterways and ports. These improvements will diversify modal choice for current business owners, by making freight movement by each mode more cost-

effective and efficient. These benefits can be experienced by existing business owners, but can also result in the attraction of new jobs and businesses to the State of Wisconsin.

Economic Development Comparison

The Base Case and State Freight Plan alternatives both support economic development throughout the state. The State Freight Plan highlights specific activities that diversify modal choice and improve options for doing business within the state. These improvements will increase the efficiency of the transportation system, and may also spur economic development at the local level as improvements occur. For example, the re-establishment of a railroad through a community may stimulate future private investments with improved access to rail transportation. The improvement projects generating positive impacts to economic development may also result in environmental impacts.

Communities and Cultural Resources

Each of Wisconsin's 190 cities, 1,260 towns, 407 villages, and eleven Tribes are comprised of diverse characteristics, making each one unique. These characteristics can be dependent on an area's history, population demographics, social resources, and the natural and built environments. The history of a community plays an important role in understanding its goals for the present and the future. Freight transportation impacts can be both potentially positive and negative. They may include changes to access and mobility, quality of life, safety, employment, noise, relocation, and character.

Wisconsin's Tribes

Wisconsin is home to eleven Tribal nations, each representing individual history, demographics, environments and resources. Approximately 1,025 square miles of the state represent the Tribal lands of the eleven reservations. The Tribes are located throughout the State of Wisconsin, as shown in Figure 11-5. Each Tribe represents individual social and natural resources important to their identity. Impacts to these communities should consider the unique relationships to the natural environment, along with the potential for social impacts.

Historic Places

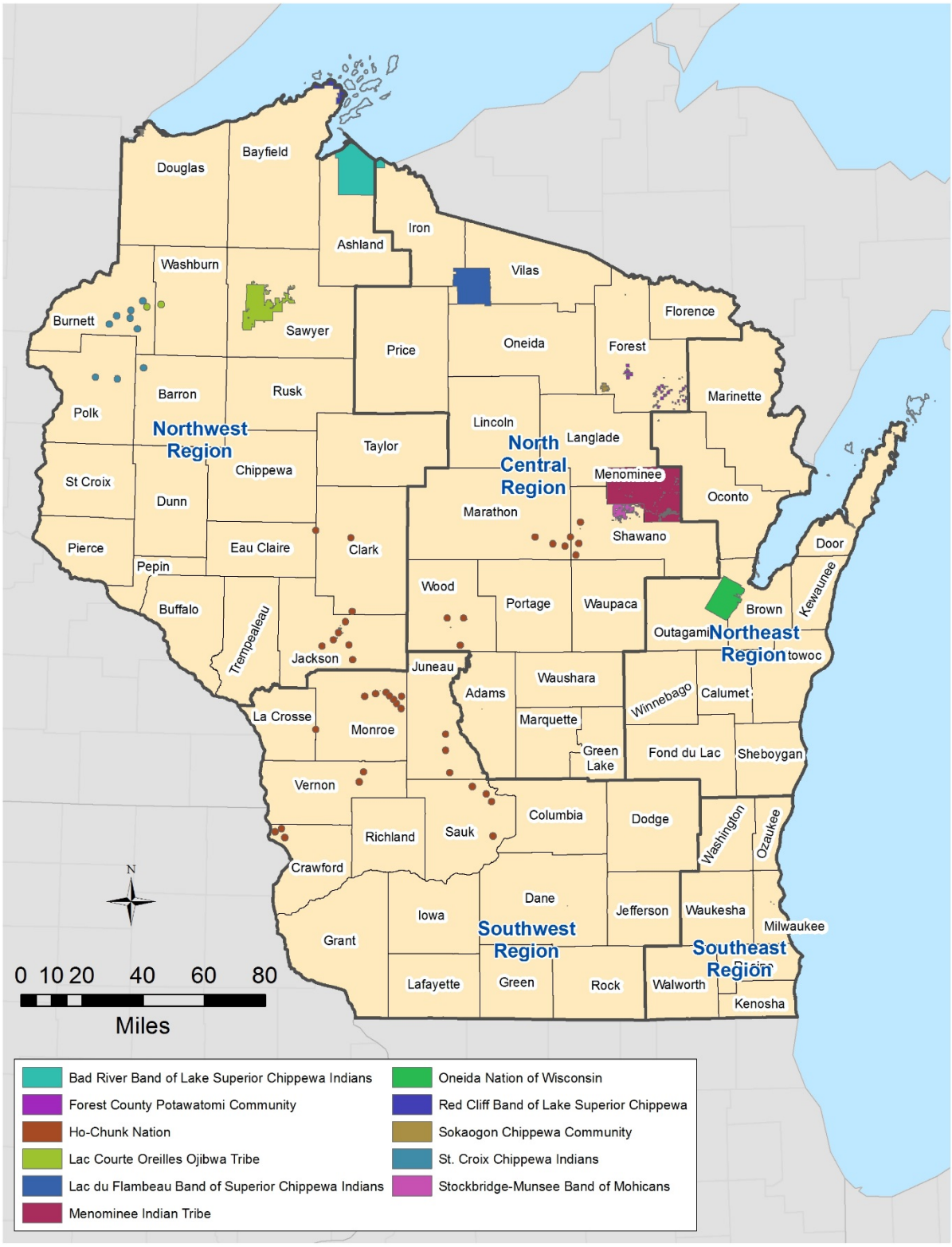
The National Register of Historic Places and the Wisconsin Historical Society list historically significant places throughout the State of Wisconsin. This list includes buildings, sites, structures, and other elements that are significant to national, state, or local history. Additionally, the Wisconsin Historical Society maintains a database of recorded archaeological sites. Additional historic properties and archaeological sites exist but are not documented by the National Register of Historic Places and Wisconsin Historical Society. Typically, impacts and minimization efforts to communities and cultural resources are defined at the project level.

Community Safety

The personal safety of Wisconsin residents is an important consideration for all communities. In 2014, a total of 7,358 large truck crashes and 39 train crashes were recorded in Wisconsin, with 30 and 46 percent of the accidents resulting in injuries, respectively.[30] The State Freight Plan includes multiple strategies for improvements to the safety of the freight system. Identification of freight-specific safety concerns and strategies to address these concerns are included. These policies will assist in the maintenance of a resilient freight transportation system. Projects have been deployed throughout the state to improve safety and reduce crossing conflicts, such as quiet zones and Operation LifeSaver initiatives.

[30] Wisconsin Department of Transportation, "Final year-end Crash Statistics."

Figure 11-5: Wisconsin Tribal Lands



Source: Wisconsin Department of Natural Resources

Hazardous materials transported via the freight system in Wisconsin include explosives, various types of compressed gases, solids, flammable and combustible liquid, select agents and toxins, and other materials. The movement of these materials are heavily regulated due to the risks of handling. First responder teams are trained to respond to hazardous material spills and events resulting from an incident of any type of freight movement. Continued training and coordination with partner agencies should continue as part of the State Freight Plan.

Communities and Cultural Resources Comparison

Both alternatives include strategies that could impact communities. For example, the re-establishment of an abandoned railroad corridor within a community could result in the potential for adverse noise, vibration, and congestion impacts, but could also result in beneficial economic development impacts within the community. Construction projects tend to result in temporary impacts to mobility, access, or quality of life during construction; however, the resulting impact is generally beneficial as improved transportation facilities are available. Specifically, freight transportation improvements help to support economic development for businesses within a community, or aid in the attraction of new businesses.

Construction projects can result in negative impacts that extend beyond the temporary construction timeline as well. These impacts can include increased noise levels, relocation of businesses or residences, or the segmentation of a community. For example, the re-establishment of a rail line to support high volume rail movement through a community could create a barrier for pedestrian and vehicular movement and emergency responders to pass from one side of the community to the other.

The State Freight Plan alternative includes many policies aimed at the identification of and improvements to safety along freight corridors. These improvements will provide a direct benefit to the safety of communities and the traveling public as projects are implemented. The State Freight Plan alternative provides greater benefit to local safety compared to the Base Case. A variety of strategies for safety improvements are aimed at the improved safety for shippers, the traveling public, and adjacent users.

Sensitive Land Resources

The Wisconsin Department of Natural Resources (DNR) divides the state into sixteen unique ecological landscapes[31], ranging from the Superior Coastal Plain to the Southwest Savanna. Each ecological landscape includes unique characteristics defining different areas around the state and providing habitats for various animal and plant communities. The Base Case and State Freight Plan alternative have the potential to impact habitat and public lands throughout the state. Sensitive land resources, including habitats and public lands were analyzed.

Habitat

Wisconsin is home to over 300 rare plant species and over 100 endangered and threatened species, along with the hundreds of other plant and animal species in the state.[32,33] Generally, impacts to habitats can include the destruction or degradation of known habitat areas. Additional impacts may include the construction of facilities that provide a barrier for the movement of species from one habitat to another (i.e. highway construction segmenting a habitat area and the construction of bridges or culverts to create transportation crossings). In addition to upland habitat areas, considerations for aquatic habitat may be considered as potential impacts are

[31] Wisconsin Department of Natural Resources, “Ecological Landscapes of Wisconsin, Chapter 3: Comparison of Ecological Landscapes.”
[32] Wisconsin Department of Natural Resources, "Wisconsin's rare plants."
[33] Wisconsin Department of Natural Resources, “Wisconsin’s endangered and threatened species list.”

evaluated. These habitat areas may include impacts to all waterbodies providing the overall health of aquatic plants and animals. The introduction of invasive species traveling along these waterways also has the potential to impact habitat areas and various species. For example, growth of common reed (*Phragmites australis*) and reed canary grass (*Phalaris arundinacea*) into stormwater drainage facilities requires maintenance and removal to prevent these invasive populations from disrupting the proper function of drainage facilities which could potentially lead to flooding.

Wisconsin state law prohibits the taking, transportation, possession or exportation of endangered or threatened species as established per Wisconsin State Statute 29.604 and administrative Rule Chapter NR 27. The DNR may allow an incidental take of endangered or threatened species under certain circumstances through an Incidental Take Permit/Authorization (ITP/A). An ITP/A may only be issued if the action minimizes and mitigates for impacts to the species and does not threaten the survival of the species. Examples of mitigation measures include restricting the timing of disruptive activities during a nesting period, utilizing biodegradable erosion control materials, installing exclusion fencing, and restoring or enhancing habitat.

The Base Case and State Freight Plan alternatives support future construction projects ranging from minor safety projects to the construction of new corridors. Potential effects to habitats are typically delineated at the project level; however, there are considerations that should be accounted for when planning such projects. The first is habitat destruction and fragmentation. Intersection improvements, for example, may result in direct destruction impacts to an existing habitat within close proximity to the project area. Fragmentation can occur whether habitats are located within or outside of the project area. For example, an expansion project may increase the crossing distance for a species between its two habitat areas, increasing the potential for conflict. Opportunities to reduce or eliminate habitat destruction and fragmentation should be considered.

Invasive species have the potential to impact important habitat areas through Wisconsin (land and water). Freight transportation includes the movement of goods and vehicles through Wisconsin from other parts of the nation. These movements create a mechanism for invasive species to be transported into a new area. Additionally, the vegetated areas buffering freight corridors are generally intended to require lower maintenance. These lower maintenance approaches have the potential to harbor and spread invasive species. Spraying and other maintenance activities occur to reduce this risk. The State Freight Plan alternative includes multiple maintenance activities that will assist in the reduction of impacts from invasive species.

In addition to habitat destruction or fragmentation, wildlife collisions should also be considered. In 2014, approximately 15 percent of all reported vehicular crashes involved deer in Wisconsin.[34] Wildlife crossing hazards are of primary concern for highway, railroad, and aeronautics. Expansion or new construction projects from these modes are supported in the Base Case and State Freight Plan alternatives, resulting in similar impacts.

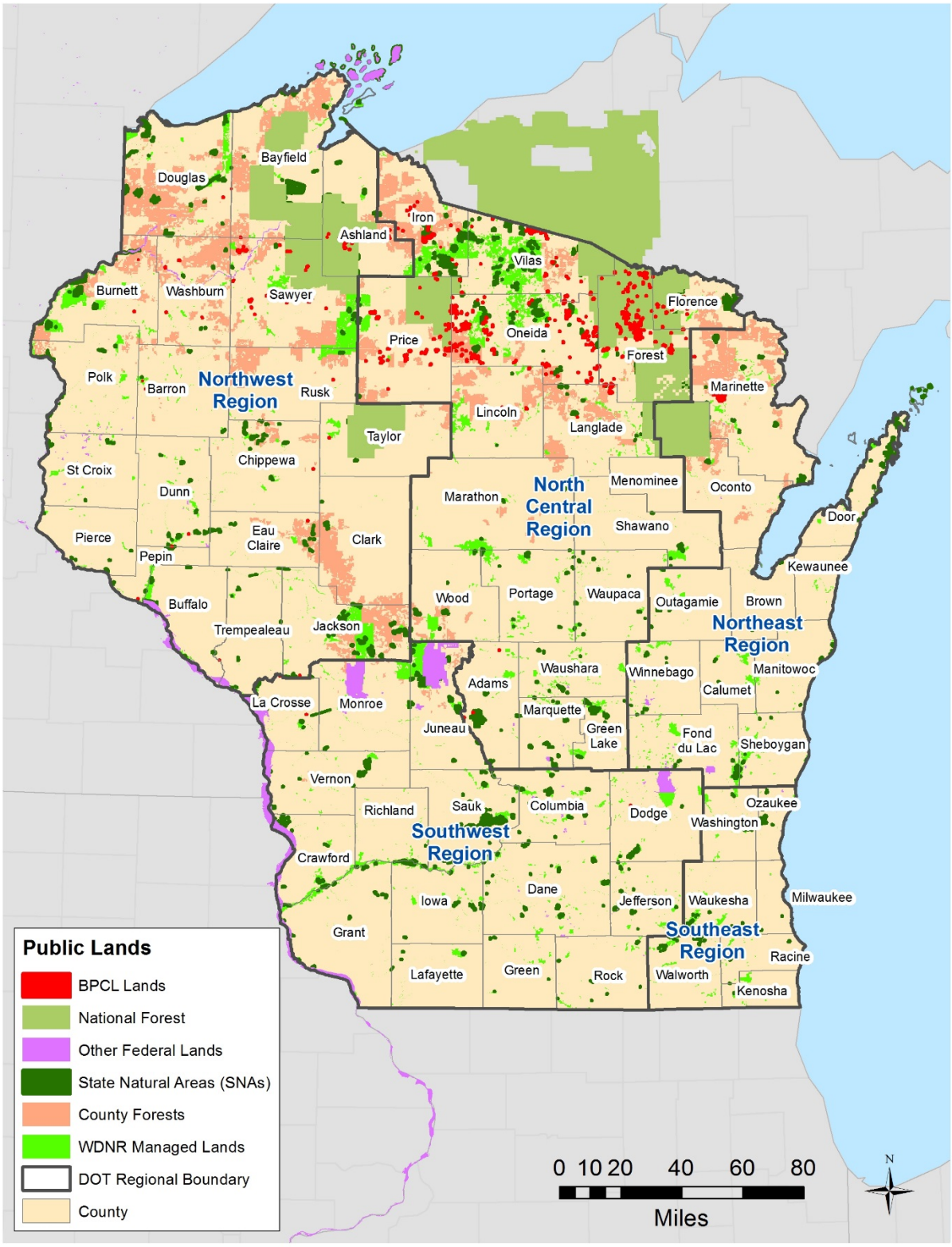
Public Lands

Wisconsin's natural resource areas are a key element of Wisconsin's identity. The variety of recreational activities throughout the year attract visitors and residents to various locations across the state. Wisconsin includes a variety of public lands, including national and state parks and trails; state wildlife and fishery areas; state natural areas; and state and county forests (see Figure 11-6). Twenty-nine county forests provide 2.4 million acres of public recreation areas in the state alone.[35]

[34] Wisconsin Department of Transportation, "Final year-end Crash Statistics."
[35] Wisconsin County Forests Association, "Homepage."

WisDOT Native Plant and Prairie Program
Many prairie remnants exist on Wisconsin Department of Transportation's rights of way. In these situations, the plant communities are often relatively intact, undisturbed by agricultural and construction activities. In the early 1990's, the department began an inventory of roadside vegetation. Before funding ceased, the completed inventories were evaluated to determine if there are quality remnants of native prairies remaining on state highway rights of way. During this process, over 20 high quality sites were identified. The department continues to maintain these prairie remnants as well as actively trying to re-establish native plants along roadsides by using special native seed mixes. Maintenance policy also allows much of native vegetation that exists along the roadside to be preserved. This began in the mid 1970's when the department began planting native grasses and forbs on roadsides and roadside sites such as safety rest areas and waysides. Initial efforts began as part of the federal Operation Wildflower program in cooperation with local garden clubs. This evolved into special seeding items in highway construction project special provisions, and finally to several standard native seed mixes in Standard Specification Section 630 for Highway and Structure Construction. Facilities development manual 27-25-5 describes steps to be taken to preserve and protect native plants. It also describes the process of establishing native seeding as well as long-term management needs.

Figure 11-6: Public Lands in the State of Wisconsin



Source: Wisconsin Department of Natural Resources

Freight transportation projects have the potential to affect public land resources. Generally, impacts may result from the permanent or temporary acquisition of land. However, these effects are managed and mitigated at the project level in accordance with federal and state regulations (i.e., Section 4(f), Section 6(f), etc.). The Base Case and State Freight Plan alternatives both include policies supporting capacity and other improvements to freight corridors, having a similar potential to affect public lands. However, the State Freight Plan alternative places special focus on preventative and maintenance activities, potentially reducing the magnitude of effects to public lands.

Sensitive Land Resources Comparison

The Base Case and State Freight Plan alternatives both have the potential to impact public lands as a result of construction projects. These impacts are identified, minimized and mitigated at the project level. The State Freight Plan may result in greater impacts as a result of specific improvement strategies. However, improved preventative maintenance approaches may reduce the overall magnitude of impacts overall. Specific maintenance guidelines are discussed in more detail later in this chapter and in WisDOT's FDM.

Sensitive Water Resources

Wisconsin's aquatic ecosystems include sensitive water resources composed of the state's 15,000 lakes and 12,600 rivers, streams, and wetlands (see Figure 11-7).[36] The protection of sensitive water resources is an important element in Wisconsin's identity given the significance of the state's water-dependent recreation and tourism industry and unique abundance of water resources. Of the five freight modes, movement of goods by waterways and ports have the greatest potential to result in impacts to water resources. Highway, railroads, airports, and pipelines could also result in impacts.

Potential impacts to sensitive water resources include impacts to water quality, the introduction of aquatic invasive species, wetlands, aquatic habitat, and the maintenance of aquatic connectivity. Every waterbody has some form of critical habitat that contributes to the overall health of plants and animals. A large percentage of aquatic species are found in the shallow margins and shores of Wisconsin's wetlands. The maintenance of aquatic connectivity is important to aquatic species and navigation and transportation infrastructure. Attention may, for example, be placed on the maintenance of connectivity through adequate stream crossings, navigability for barge traffic and impacts of weather events.

Water Quality

Approximately 84,000 miles of rivers and streams flow across the Wisconsin landscape. Nearly 32,000 miles of streams and rivers continuously flow throughout the year, with the remaining flowing during spring and times of high water.[37] These rivers are of high recreation value for Wisconsin, providing fishing and active recreation opportunities.

In 2016 the DNR proposed the addition of 225 waterbody segments to the existing list of over 600 impaired waterbodies in the state.[38] Impaired waters do not meet the water quality standards established by the DNR or the EPA. Concentrations of various pollutants (i.e. sediment, phosphorus, ammonia, nitrate, and chloride) contribute to a watershed's determination as impaired.

---

[36] Wisconsin Academy of Sciences, Arts and Letters, "Waters of Wisconsin: The Future of Our Aquatic Ecosystems and Resources." (2003).
[37] Wisconsin Department of Natural Resources, "River facts."
[38] Wisconsin Department of Natural Resources, "Wisconsin Water Quality Report to Congress 2016."

Many factors of the freight transportation system have the potential to affect water quality. Changes in erosion and run-off characteristics resulting from the construction of new or modifications to existing corridors can directly affect water quality. Furthermore, the development of supporting freight services, such as publically-owned truck parking can impact on-site water quality. The transport of hazardous or toxic materials via highway, rail, and waterway, in addition to road salt and other de-icers on runways and highways, use of sealants for asphalt repairs, and flooding of transportation systems that flush pollutants into waterways, also have the potential to affect water quality as a result of maintenance issues or spills/incidents.

The policies and strategies of the Base Case and State Freight Plan alternatives have the potential to impact water quality. Both alternatives support construction projects of varying scales. WisDOT currently maintains policies and relationships with regulatory agencies regarding water quality impacts during and following construction. The State Freight Plan alternative may have a slightly larger potential to result in water quality impacts with the delineation of more project improvements. Water quality impacts resulting from port and waterway improvements should also be considered. Impacts and mitigation measures are defined in cooperation with partner agencies, and will be followed with any actions from the Base Case or State Freight Plan alternatives.

Aquatic Invasive Species

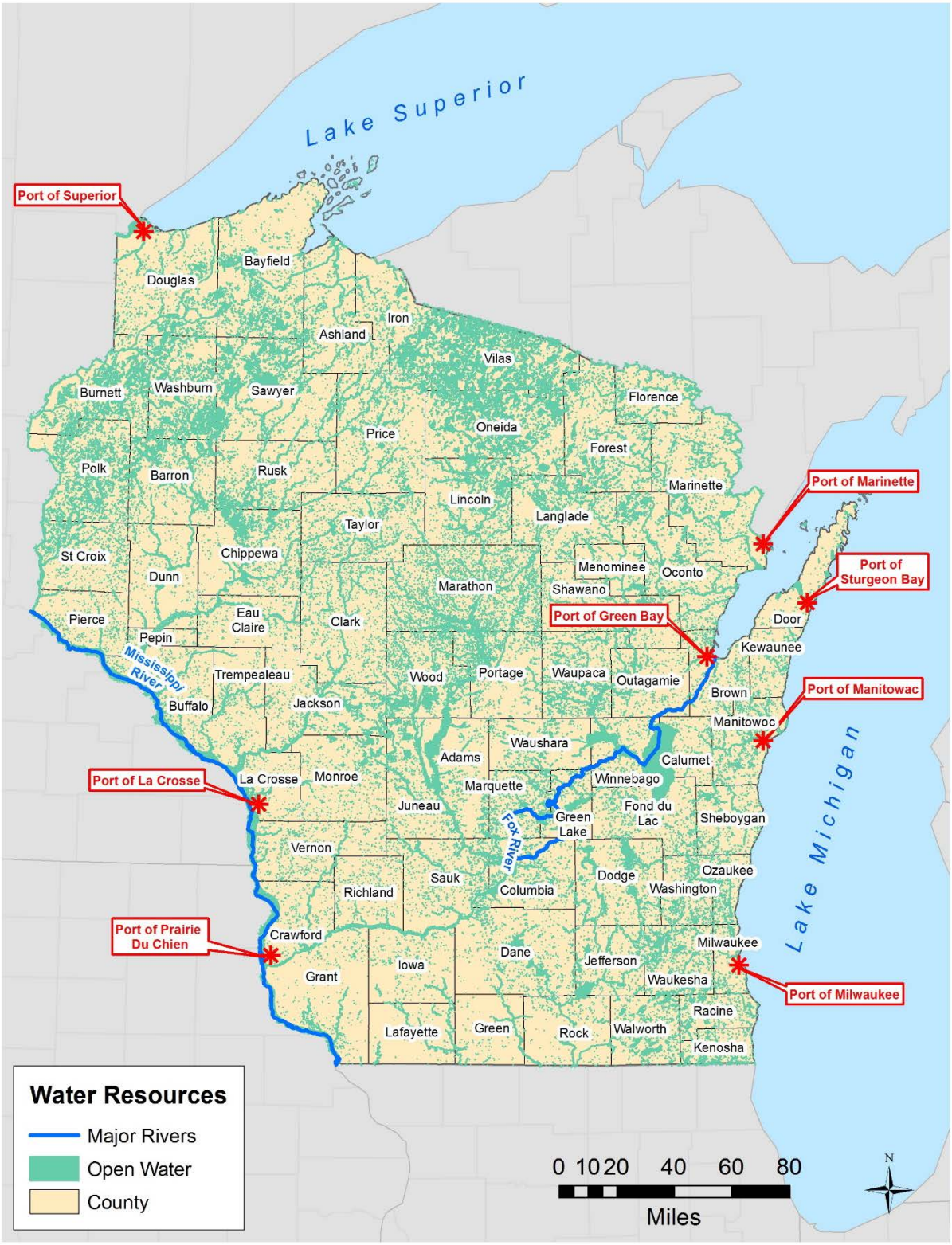
Aquatic invasive species (AIS) can be introduced to the Great Lakes through shipping vessels or barges. Pathways for transport of new aquatic invasive species (AIS) into the Great Lakes include the discharge of ballast water from ships and from AIS attaching themselves to hulls, anchors and other exterior surfaces of shipping vessels or barges.

AIS can result in significant ecosystem and economic impacts. Ecosystem impacts include loss of food resources and habitat due to increased competition from invasive species, physically and/or chemically modified aquatic habitats, and decreased biodiversity. For example, the introduction of the sea lamprey, a parasitic fish, contributed to the collapse of lake trout populations in Lake Superior in the mid-twentieth century. Economic impacts include loss of recreational and commercial fishing opportunities, damage to infrastructure, and damage to boats and equipment.

The Base Case and State Freight Plan alternatives have the potential to affect the movement of AIS in the same way. A 21 percent increase in cargo transported by waterway is expected by 2040, resulting in the potential for increased ship movement into Wisconsin's waterbodies.[39] However, many programs are in place to minimize the spread of AIS into the Great Lakes and connected waterbodies.

[39] 2013 IHS Transearch Database.

Figure 11-7: Wisconsin's Open Water



Source: Wisconsin Department of Natural Resources

Wetlands

Wisconsin contains millions of acres of wetlands, of varying size and typology. The DNR estimates that since the 1800's, nearly half of the state's wetlands have been destroyed.[40] The elimination of wetlands contributes to increases in flooding, water quality issues, and reduction in bird, mammal, fish, amphibian, and reptile habitat.

Unavoidable impacts to wetlands as a result of WisDOT actions are mitigated according to the *Wetland Mitigation Banking Technical Guideline*. These guidelines were developed and implemented with the collaboration of various state and federal agencies. The overall goal of these guidelines is to minimize harm and mitigate impacts to wetlands as a result of transportation projects. Measures to avoid and minimize wetland impacts include reducing the corridor footprint, modifying the alignment, or selecting an alternative route. Compensation through mitigation banking is required for all unavoidable wetland losses. Restoration of a former wetland is the preferred method; however, compensation may also include wetland creation, enhancement, preservation, and restoration/preservation of vegetative buffers. A combination of mitigation measures is typically proposed.

The Base Case and State Freight Plan alternatives both support various improvements to the freight system. These improvements range from small-scale safety improvements to large-scale capacity improvements (i.e. expansions or new corridors). The potential for wetland impacts occurs at all scales as a result of filling or dredging of wetlands. The determination of actual impacts and mitigation strategies will occur at the project level as specific projects are defined.

Sensitive Water Resources Comparison

Both the Base Case and State Freight Plan alternatives impact sensitive water resources. These impacts are assumed as a result of potential construction projects for all modes. These impacts are anticipated to vary in size from small intersection improvements to large harbor construction. Specific impacts to water resources are determined at the project level. Coordination with agency partners is an important element of alternative analysis to ensure that all regulations are addressed.

Indirect Effects

The impacts resulting from freight projects can have a variety of results, including direct and indirect effects. The direct impacts to the environment tend to be those resulting directly from the project and at the project site. Indirect effects may be the result of decisions made in response to the direct impact. For example, private investments made in the area surrounding a new transload facility would be considered an indirect impact of the development of the transload facility. These effects may:

- Be viewed as either positive or negative or both, depending on the specific event
- Occur later in time, or beyond the project right of way, but can be reasonably foreseeable
- Include changes in land use, population density, growth rate, economic development, and the rate of development

Elements of the Base Case and State Freight Plan alternatives can result in indirect effects as a result of implementation. For example, freight corridor improvements in a certain area may serve as a catalyst for development; however, the extent and magnitude is difficult to project. Though specifics may be unknown, other factors such as land use planning, local roadway planning, and market demand should be present.

---

[40] Wisconsin Department of Natural Resources, "Reversing the Loss: A Strategy to Protect, Restore and Explore Wisconsin Wetlands." (June 2008).

Polices of the Base Case that have the greatest potential to include indirect effects include:

- Funding assistance for local agencies and businesses for freight projects
- Increased investment strategies for rail transportation
- Local road and bridge improvements

Additional polices with the potential of indirect effects are present in the State Freight Plan alternative, including:

- Identification of an over-size, over-weight, and over-height highway sub-system
- Increased availability of state-owned truck parking facilities
- Local freight system improvements
- Funding strategies for railroad, waterway and ports, and airport improvements to accommodate freight travel

Indirect Effects Summary

Indirect effects from the Base Case and State Freight Plan alternatives have the potential to range from increased trips on an improved corridor to local land use decisions. WisDOT generally has little control over indirect effects resulting from long-range planning actions. However, WisDOT is committed to mitigating the impacts of negative indirect effects and will work with regional and local level stakeholders to ensure possible negative indirect effects are identified and avoided. Continued coordination and partnerships with local governments and private entities regarding these effects will help with the assessment of impacts to the transportation system. Furthermore, efforts to increase planning and environmental linkages (PEL) will support collaborative and integrated approaches in planning level analysis and project level implementation.

Cumulative Effects

Cumulative effects are the total effect of past, present, and future activities or actions on an environmental resource. Transportation project impacts are just one of many categories of impacts. Other factors include additional transportation and infrastructure developments, as well as all public and private development projects. For this reason, cumulative impacts differ based on individual communities and environmental resources. Cumulative effects are the result of the combined actions of various agencies and private entities. WisDOT is responsible for mitigating effects of WisDOT projects. The department is not responsible for, nor required to mitigate, the impacts caused by non-WisDOT actions. However, WisDOT will provide information on potential cumulative effects and will work with local governments and other interested stakeholders to suggest potential mitigation strategies for those effects.

Based on the potential direct and indirect effects described previously, the following resources have the greatest potential for negative cumulative impacts:

- Water quality
- Wetlands
- Endangered and threated species
- Habitats
- Air quality
- Agriculture

Comparison of Environmental Impacts and Benefits

The previous sections provide an overview of the actions of the Base Case and State Freight Plan that may impact the environment. These impacts can include benefits to the environmental category as a result of the action. Table

11-10 includes a comparison of the impacts and benefits to each environmental category as a result of the Base Case and State Freight Plan alternatives.

Table 11-10: Comparison of Environmental Impacts and Benefits

Impact Category	Mode	Base Case	State Freight Plan
Traffic Congestion	Highways/Local Roads	Congestion levels under the Base Case have the potential to be greater, as projects addressing communication, technologies, and congestion mitigation are not identified.	Congestion under the State Freight Plan may be lower than the Base Case, due to improvements to communication and optimization of the highway and local road systems.
	Railroads	Congestion levels under the Base Case have the potential to be greater than the State Freight Plan as the emphasis on expansion and acquisition is less.	Congestion under the State Freight Plan may be lower than the Base Case as a result of continued improvements and expansion to rail lines.
	Waterways and Ports	Congestion levels at ports and airports may be slightly greater as a result of the Base Case.	Congestion is likely to be reduced at ports and airports as a result of the State Freight Plan with planning and project improvements to access and services.
	Aeronautics		
Energy Consumption	Highways/Local Roads	Energy consumption will be similar under both alternatives, with improvements to modal choice and efficiencies.	Energy consumption will be similar under both alternatives as a result of improvements to modal choice and efficiencies. Additional strategies of the State Freight Plan may result in greater reduction.
	Railroads	Energy consumption will be similar under both alternatives. Improvements to railroads, waterways and ports, and airports will improve attractiveness of these reduced energy consuming modes.	Energy consumption will be similar under both alternatives. Improvements to railroads, waterways and ports, and airports will improve attractiveness of these reduced energy consuming modes.
	Waterways and Ports		
	Aeronautics		
Air Quality	Highways/Local Roads	The Base Case will result in a reduced benefit to air quality, as an increase in freight movement will occur, with condensed strategies for improvements.	The State Freight Plan will experience a greater reduction in emissions compared to the Base Case, resulting from projects that improve efficiency of the roadway system.
	Railroads	The Base Case will result in similar improvements to emissions from rail, waterway and ports, and air freight movement. Increased modal choice and improved first/last mile connections will make these modes more competitive.	The State Freight Plan will result in similar improvements to emissions from rail, waterway and ports, and air freight movement. Increased modal choice and improved first/last mile connections will make these modes more competitive.
	Waterways and Ports		
	Aeronautics		

Table 11-10: Comparison of Environmental Impacts and Benefits (continued)

Impact Category	Mode	Base Case	State Freight Plan
Agriculture	Highways/Local Roads	The Base Case will result in similar impacts to the State Freight Plan. Agricultural conversions and access management provide the greatest potential for impact.	The State Freight Plan will result in similar impacts to the Base Case. Agricultural conversions and access management provide the greatest potential for impact. The State Freight Plan will provide greater benefits as the efficient movement of agricultural products will increase. Highway improvements targeting system preservation can ensure the system safely and efficiently addresses local needs with potentially minimal impacts to surrounding communities while also serving the larger statewide need to facilitate the movement of freight and the traveling public.
	Railroads	The Base Case will result in similar impacts to the State Freight Plan. Agricultural conversions and access management provide the greatest potential for impact.	The State Freight Plan will result in similar impacts to the Base Case. Agricultural conversions and access management provide the greatest potential for impact. The State Freight Plan will provide greater benefits as the efficient movement of agricultural products will increase.
	Waterways and Ports	Port and airport improvements of both alternatives will have limited effects to agricultural resources.	Port and airport improvements of both alternatives will have limited effects to agricultural resources.
	Aeronautics		
Economic Development	Highways/Local Roads	The Base Case will result in similar benefits to the State Freight Plan, to a lesser extent. Improvements to freight corridors will improve freight movement throughout the state; however, additional investment programs are not considered.	The State Freight Plan will provide greater benefit to economic development as the movement of freight through the state will be more efficient and modal choices will be increased. Policies support funding assistance for local government and private investments.
	Railroads		
	Waterways and Ports		
	Aeronautics		
Community and Cultural Resources	Highways/Local Roads	The Base Case will result in fewer negative community impacts resulting from construction than the State Freight Plan. However it will also result in fewer positive impacts from mobility and safety improvements.	The State Freight Plan will likely result in greater negative community impacts, but will also result in greater benefits to communities. Projects to address safety and mobility concerns on the local network will provide benefits to the community, but may result in relocation, access management, and temporary impacts.
	Railroads		
	Waterways and Ports		
	Aeronautics		
Sensitive Land and Water Resources	Highways/Local Roads	Under the Base Case, policies have the potential to impact sensitive land and water resources as a result of future construction projects.	The State Freight Plan policies have the potential to result in greater impacts to sensitive land and water resources due to additional improvement strategies.
	Railroads		
	Waterways and Ports	The Base Case has the potential to impact sensitive water resources as a result of port improvements and increased freight movement.	The State Freight Plan polices have the potential to result in greater impacts to sensitive water resources as specific port improvement projects are defined.
	Aeronautics	Under the Base Case, policies have the potential to impact sensitive land and water resources as a result of future construction projects.	The State Freight Plan policies have the potential to result in greater impacts to sensitive land and water resources due to additional improvement strategies.

11.4 Impact Avoidance, Minimization, and Mitigation Strategies

The SEE provides a qualitative analysis of potential impacts to the environment as a result of the actions of the Base Case and State Freight Plan. In many instances, impacts will occur during the implementation of policies and strategies, with the impacts quantified at the project level. WisDOT will work to avoid, minimize and mitigate impacts as a result of Wisconsin State Freight Plan activities. Additionally, the implementation strategy defined in Chapter 9, *Investment and Implementation*, of the plan helps to provide a framework for putting the plan into action where avoidance and minimization efforts will be taken into consideration.

WisDOT will continue to work with partnering agencies to reduce impacts and mitigate unavoidable impacts as policies of the plan are implemented. Continuation of existing policies and regulations defined in previous planning efforts include:

Connections 2030

WisDOT's long-range multi-modal plan, *Connections 2030*, established a vision of an integrated multimodal transportation system that maximizes the safe and efficient movement of people and products throughout the state, enhancing economic productivity and the quality of Wisconsin's communities while minimizing impacts to the natural environment.[41] *Connections 2030's* Chapter 10: Preserve Wisconsin's Quality of Life, discussed environmental transportation elements specifically, defining short term (2008 – 2013) and long term (2008 – 2030) environmental policy action items. Key environmental policy action items defined in Chapter 10 of *Connections 2030* include:

- Continue a comprehensive approach to integration of transportation and environmental issues
- Emphasize air quality improvement
- Emphasize the preservation of protected resources
- Incorporate environmental justice in all planning, programming, and project decisions
- Comply with federal and state environmental laws, regulations and executive orders relevant to transportation and support future standards and programs
- Support and fulfill the WisDOT – Wisconsin Department of Natural Resources (DNR) cooperative agreement, and other current and future interagency agreements
- Meet recognized standards, practices, and guidelines for assessing and mitigating direct, indirect, and cumulative environmental impacts
- Seek balanced solutions when potential conflicts arise on projects or initiatives

Connections 2030 established environmental justice as an integral element of the transportation planning process. While federally mandated by law, *Connections 2030* reinforced WisDOT's policy to incorporate environmental justice in all planning, programming, and project decisions. This policy action item established WisDOT's continued commitment to integrating environmental justice in transportation planning.

Wisconsin State Rail Plan

The *Wisconsin Rail Plan 2030* examined sustainability and livability in relation to rail transportation. The plan reviewed the relationship rail transportation has with community sustainability and livability by examining economic, social, and environmental elements as integrated system elements. Mechanisms which aimed to

[41] Wisconsin Department of Transportation, "Connections 2030: Wisconsin's long-range transportation plan."

enhance environmental benefits were examined in depth, with an emphasis on air quality policies and regulations. In addition, the *Wisconsin Rail Plan 2030* identified the following challenge areas:

- Invasive Species – train movement, as well as track maintenance and construction, may contribute to the spread of invasive species
- Habitat Fragmentation – changes to rail corridors may fragment habitats or result in a loss of habitat
- Water Resources – rail construction activities may change drainage patterns or impact waterway navigability
- Wetlands – rail construction activities may result in the loss of wetlands

In response to these challenges, the state *Rail Plan* established the following policy action items:

- Work with stakeholders to identify sensitive habitats or resources early in the planning process and avoid or minimize impacts
- Monitor state and national efforts and be prepared to address potential future greenhouse gas regulations, pursuant to changes in regulation
- Develop guidance and procedures to discourage transportation development activities from intensifying the spread of invasive species

- Identify feasible, cost-effective solutions that avoid, minimize, or mitigate impacts
- Track changes and analyze responses to transportation energy and costs

WisDOT Environmental References and Resources

In addition to environmental policies outlined in previous long-range plans, WisDOT avoids or minimizes the impacts of transportation projects to the natural and human environment through specific programs managed at the state and project scale. These include:

- Agriculture
- Air
- Community and residential
- Cultural resources (archeology, history and tribes)
- Endangered species
- Environmental justice
- Erosion control and drainage
- Habitat evaluation
- Hazardous materials (asbestos, bioremediation, and hazardous substances)
- Indirect and cumulative impacts
- Public involvement
- Sections 4(f) and 6(f), unique areas
- Sound quality
- Stormwater management
- Wetlands and waters
- Visual impacts

Furthermore, the WisDOT Facilities Development Manual (FDM) includes several chapters which discuss environmental transportation topics at the local level. This manual provides policy, procedural requirements, and guidance encompassing the facilities development process within the Wisconsin Department of Transportation. Chapters relevant to transportation and the environment include:

- Chapter 5: Agency Coordination
- Chapter 6: Public Involvement
- Chapter 10: Erosion Control and Storm Water Quality
- Chapter 20: Federal and State Environmental Laws, Policies, Regulations and Agreements
- Chapter 21: Environmental Documents, Reports and Permits
- Chapter 22: Air Quality
- Chapter 23: Noise
- Chapter 24: Land and Water Resources Impacts
- Chapter 25: Socio-Economic Factors
- Chapter 26: Cultural Resource Preservation
- Chapter 27: Planting and Aesthetic Design

Impact Avoidance, Mitigation and Minimization Summary

WisDOT is committed to protecting the natural environment while enhancing the quality of life for all Wisconsin residents. The policies, strategies and procedural requirements discussed above demonstrates WisDOT's motivation to avoid, mitigate, and minimize environmental impacts resulting from freight plan policy recommendations.

Chapter 11, Appendix 11-1 – Environmental Resource Agency Input

1. ERA Consultation #1 Agenda

2. ERA Consultation #1 Summary List

3. ERA Consultation #1 Meeting Summary

4. ERA Consultation #2 Agenda

5. ERA Consultation #2 Summary List

6. ERA Consultation #2 Meeting Summary

THIS PAGE INTENTIONALLY LEFT BLANK

ERA Consultation #1 Agenda

State Freight Plan
Environmental Resource Agency Consultation meeting

Pyle Center, 702 Langdon Street, Madison, WI

February 9, 2016
9:00 a.m. – 12:30 p.m.

AGENDA

Agenda Item	Schedule	Participation
Welcome	9:00 a.m. – 9:15 a.m.	Aileen Switzer, WisDOT, Administrator, Division of Transportation Investment Management
Introductions	9:15 a.m. – 9:25 a.m.	All
Overview of State Freight Plan and process	9:25 a.m. – 9:40 a.m.	Jesse Patchak, WisDOT, Economic Development Chief
Wisconsin State Freight Plan Consultation, System-plan Environmental Evaluation and Environmental Justice Process	9:40 a.m. – 10:00 a.m.	Jennifer Sarnecki, WisDOT, Statewide Planning Chief
BREAK	10:00 a.m. – 10:15 a.m.	
Review of Discussion Questions	10:15 a.m. – 10:45 a.m.	All
Breakout Sessions	10:45 a.m. – 11:45 a.m.	All
Report Out	11:45 a.m. – 12:15 p.m.	All
Wrap-Up and Next Steps	12:15 p.m. – 12:30 p.m.	Donna Brown-Martin, WisDOT Director, Bureau of Planning and Economic Development

DRAFT

ERA Consultation #1 Summary List

WISDOT STATE FREIGHT PLAN

Environmental Resource Agency Input

Coordination Meeting Summary

WisDOT sought input from state and federal environmental resource agencies in February in preparation for a system-plan environmental evaluation (SEE) as part of the State Freight Plan. The SEE will evaluate qualitative environmental impacts resulting from the policies and actions defined within the Freight Plan. The goal of the coordination meeting was to gather input regarding the existing concerns, programs, and policies from the various regulatory agencies around the state. The group walked through a series of discussion topics ranging from wetland impacts to traffic congestion. Highlights and major themes resulting from this consultation include:

- Agencies have multiple documents and regulations covering the SEE categories.
- Secondary impacts resulting from the development of large distribution centers should be considered.
- Concerns of congestion relative to loading facilities for all modes (i.e. transload, intermodal, etc.).
- Idle reduction technologies and alternative fuels for trucks and trains are gaining popularity in Wisconsin; while similar technologies for boats and planes are still being explored.
- Multiple state and nationwide programs are in place regarding air quality and climate variability (i.e. CMAQ, SmartWay, and Green Tier).
- Recent studies have shown that localized air quality impacts from maritime freight movement are greater than originally anticipated.
- Impacts to surrounding land uses should be considered when reactivating rail lines.
- Topsoil replacement and soil compaction are major concerns resulting from development, especially pipeline development.
- Adequate off-site/support facilities need to be considered as part of the development of new facilities (i.e. rest areas, overnight parking, etc.).
- Emergency incident response is of concern for local first responders. Locals should be equipped with the resource and training to respond to an incident.
- There are established threshold for noise and vibration impacts for some modes, but not all.
- Impacts to historic and cultural resources need to be factored into the process.
- Historic bridges need to be considered, especially when re-establishing rail lines.
- Wetlands are impacted from a variety of actions. The USACE has regulations in place.
- The Wisconsin DNR regulates project level stormwater permitting.
- There is little information available for the impact to wildlife from new or expanded corridors.
- The Coast Guard is involved with the handling of ballast water.
- Disposal of dredge material from ports is a concern. The DNR and USACE have regulations in place.
- Agencies have various conservation plans, ranging from a specific site to a statewide level.
- Public health impacts should be considered in the air quality analysis.
- Emergency management should be contract to incorporate their plans and policies.

ERA Consultation #1 Meeting Summary

State Freight Plan
Environmental Resource Agency Consultation meeting

Pyle Center, 702 Langdon Street, Madison, WI

February 9, 2016
9:00 a.m. – 12:30 p.m.

Meeting Summary

Attendees:

Name:	Representing:
Carolyn Amegashie	Wisconsin Department of Transportation
Jennifer Blonn	U.S. Environmental Protection Agency – Region 5
Donna Brown-Martin	Wisconsin Department of Transportation
Ian Chidister	FHWA – Wisconsin Division
Kimberly Cook	WI State Historical Society
Stephanie Falkers	SRF Consulting Group, Inc.
Michael Friedlander	Wisconsin Department of Natural Resources
Rebecca Graser	U.S. Army Corps of Engineers
Heather Graves	Office of the Commissioner of Railroads
Michael Halsted	Wisconsin Department of Natural Resources
Jonquil Johnston	Wisconsin Department of Transportation
Jeff Kwilinski	Federal Motor Carrier Safety Administration
David Leucinger	Wisconsin Department of Transportation
Jeff Lyon	Wisconsin Department of Agriculture, Trade and Consumer Protection
Theresa Macfarlane	Wisconsin Department of Transportation
John Nordbo	Wisconsin Department of Transportation
Diane Paoni	Wisconsin Department of Transportation
Jesse Patchak	Wisconsin Department of Transportation
Mark Razny	Pipeline and Hazardous Materials Safety Administration Central Region Field Operations
Jennifer Sarnecki	Wisconsin Department of Transportation
Dan Scudder	Wisconsin Department of Transportation
Caitlin Shanahan	WI Department of Military Affairs, Division of Hazard Mitigation
Aileen Switzer	Wisconsin Department of Transportation
Patricia Trainer	Wisconsin Department of Transportation

Meeting Summary:

Jennifer Sarnecki opened the meeting, thanking everyone for their attendance. Introductions were done around the room. Jennifer provided a brief overview of the agenda and then introduced Aileen Switzer.

Aileen Switzer welcomed all agencies and provided an overview of the DOT's Division of Transportation Investment Management. She provided an overview the State Freight Plan and the goal of accommodating mobility for all modes. Aileen noted that this is WisDOT's first multimodal freight plan.

The State Freight Plan will include System-plan Environmental Evaluation (SEE) and Environmental Justice (EJ) analysis as part of the long range plan development. The plan is anticipated to be completed this year. Aileen thanked everyone for their time and expertise.

Jesse Patchak provided an overview of the State Freight Plan and the supporting legislation. He noted that the plan will use a 20 year planning horizon and will provide a first look at long range planning for pipelines. Jesse reviewed key themes, anticipated content, public involvement opportunities, and the overall anticipated timeline of the plan. Jeff Lyon questioned what comments were due by March 11th, as noted in the presentation. Jennifer Sarnecki responded that any additional comments from today's discussion should be returned to the department by March 11th. This may include additional conversations with others in your organization based on our conversations today. The DOT encourages agency comments and participation through the entire process.

Jennifer Sarnecki provided an overview of the System-plan Environmental Evaluation and Environmental Justice process. She reviewed the legislation of Trans 400 which requires the qualitative review and a discussion of mitigation at the system plan level. Jennifer noted that the base condition and resulting plan condition would be analyzed within the SEE. An overview of the different elements of both the SEE and EJ analysis were provided. Jennifer added that this isn't the only time that the DOT will reach out for input from environmental agencies. A meeting will be held after the plan is released for review and comment.

Dave Leucinger provided an overview of the group breakout sessions. Meeting participants were split into two smaller groups for discussion. Dave also provided a quick overview of the ten questions that will be discussed. Each breakout group discussed the ten questions and two to three bonus questions. A summary of the discussion at each table is attached. Key messages or specific resources are highlighted in blue text.

Following the group discussion, Donna Brown-Martin thanked everyone for their input and participation and closed the meeting.

State Freight Plan
Environmental Resource Agency Consultation meeting
February 9, 2016
Discussion Question Results

The results of the group breakout sessions are included with each of the overall questions and organized by table. Key messages or specific resources are highlighted in blue text. Resource agency attendees were split into the following groups:

Table 1

- Heather Graves – Office of the Commission of Railroads
- Michael Halsted – DNR
- Jeff Kwilinski – Federal Motor Carriers Safety Administration
- Jeff Lyon – DATCP
- Caitlin Shanahan – Wisconsin Department of Military Affairs

Table 2

- Jennifer Blonn – EPA – Region 5
- Ian Chidister – FHWA, Wisconsin Division
- Michael Friedlander – DNR
- Rebecca Graser – USACE
- Mark Razny – Pipeline and Hazardous Materials Safety Administration

General Impacts to Sensitive Resources from Freight Transportation:

1. Where are freight facilities most likely to have impacts on wetlands? On agricultural and forest lands? On threatened or endangered species (or other species of concern)? How would those threats be manifest? How extensive could secondary/induced impacts be? What mitigation measures should be considered in each of these locations?

Table 1 Discussion:

Wetlands

Michael Halsted – The expansion of existing or construction of new lines (rail or highway) as well as expansions of ports (Superior in particular) could create wetland impacts. However these impacts are likely to be project specific and not detailed in a system level plan. The rail lines in northern WI come to mind. Consider recommendations of Connections 2030.

Caitlin Shanahan – The WI Department of Military Affairs (DMA), Division of Hazard Mitigation's biggest concern regarding wetland impacts would be decreased water capacity (resulting in drought) and increased flood potential as a result of projects. The main concern is the natural system's ability to handle highs and lows following construction.

Agricultural Land/Key Soils

Jeff Lyon – Rail lines and pipelines may have impacts on wetlands and agricultural land. Assuming that pipelines should be considered as a freight facility, there are some impacts from an agriculture perspective. Agricultural Impact Statements have been prepared for above ground pipelines. Impacts to agricultural land are of concern with new pipeline construction, as agricultural land tends to be the path of least resistance. A primary concern with underground lines is that the land is put

back to the pre-existing condition. Topsoil replacement can be an issue. Dave Leucinger questioned if clear zones were an issue.

Michael Halsted – The protection of agricultural lands can take precedent over other protections or policies. A project on I-90 is a great example of this, where design standards were modified to limit the need for right-of-way acquisition from agricultural properties. A goal would be staying within existing right-of-way for corridor expansions.

Forest Land
Michael Halsted – Regarding forest land, there are some specific ecosystems that provide key habitats that have very little protection. A section regarding the protection and mitigation of impacts related to rare habitats and ecosystems of concern would be beneficial.

Michael Halsted – The construction of major facilities (i.e. Walmart Distribution Center) results in the construction of new surrounding facilities which result in secondary impacts. Secondary impacts (for some resources) can be forecasted, especially for wetlands.

Dan Scudder – In terms of rail and pipelines facility impacts, what might the secondary impacts be? Secondary impacts from trucking or port facilities are easier to define.

Table 2 Discussion:
Rebecca Graser – Wetland impacts include all direct fill issues. Indirect impacts include change of flows and fragmentation of habitation, etc. Some actions impact wetlands more than others. Meet with major industries to find out how they would react to reduced bottlenecks.

Ian Chidister – Agricultural land and forest land impacts near bottlenecks should be considered. Indirect land conversions resulting from nearby transportation improvements are a possibility. Make sure to contact Fish and Wildlife especially when identifying sensitive species (including any upcoming designations).

2. What sensitive operations are most vulnerable to noise and vibration? At what thresholds do vibration and noise become issues with freight operations? What mitigation practices are suggested?

Table 1 Discussion:
Dan Scudder – The expansion of rail generally results in increased safety concerns for adjacent uses.

Jeff Lyon – Questioned if studies have already been done related to the impact of noise and vibration on surrounding uses.

Michael Halsted – There is a standard section regarding the mitigation practices for noise and vibration impacts from roadways. Dan Scudder added that is correct, however there are no mitigation practices for other modes.

Jeff Lyon – The expansion of rail does result in safety concerns.

Heather Graves – Rail lines can be a real quality of life issue.

David Leucinger – Quiet zones can help relieve some of these issues.

Jeff Lyon – There needs to be a balance between quiet zone implementation and safety practices (related to noise).

Michael Halsted – The effects of noise on wildlife are generally unknown at this point. Michael will check with other DNR staff on this issue.

Dan Scudder – It doesn't appear that wildlife avoid existing corridors for any reason.

Michael Halsted – It is hard for turtles to cross rail lines. Turtle crossings have become a feature in some locations.

Table 2 Discussion:

Jennifer Blonn – The USDOT thresholds should be used – dark skies ordinance and quality of life.

Ian Chidister – The quantities of realignments, construction, and major expansion via different standards should be incorporated into construction plans. The FTA and FRA have standards for passenger rail. Tribal consultation will help identify concerns they want addressed and their sacred places (easiest to identify with projects but can list potential impacts for type of freight access).

Jonquil Johnston – Historic resources may be sensitive to vibration. Section 106 – traditional cultural resources for the Ho Chunk near a project and noise pollution. Local dark sky ordinance and light increase should be considered.

Rebecca Graser – The I-90 EIW has examples of noise disruption at a resource (cemetery) that went through the 106 process.

Ian Chidister – Archeology and ground disturbing activities are important considerations. Increased light from a project can be an impact on endangered species of bat (i.e. construction lighting). It would be good to emphasize additional opportunities to comment at the project level when doing PIMs and PIs.

Trucking and Rail:

3. Truck and rail idling and operations – discuss the current protocol of keeping diesel trucks and railroad locomotives at idle, and how the concentration of vehicles at these facilities creates localized AQ concerns. How may this be mitigated? What other technologies are also being adopted that can minimize AQ impacts for both stationary and in-motion operations?

Table 1 Discussion:

Heather Graves – Air quality isn't just an issue in rail yards, it is also an issue for sidings and stops during backups and idling trains in back yards. The blocking of public crossings during backups also poses a safety concern.

Jeff Kwilinski – The use of Auxiliary Power Units (APUs) is becoming more popular versus idling technologies. APU use is generally quieter and runs off of a small separate engine. However, the APUs add additional weight (approximately 600 to 700 pounds) to the truck, reducing the payload

capacity. This is especially prevalent in the winter with additional weight from snow and ice is added to the truck. Some states are allowing for additional weight above the standard in winter months to account for this. Dan Scudder questioned if there was any effect to fuel efficiency as a result? Jeff responded that there was not a major difference.

Michael Halsted – The WI DNR has a robust Idling Plan to address air quality impacts. Mike Friedlander is the expert in this area. The plan is poised to make operational and culture changes and supports fleets equipped with oxidizers and ultra-low sulfur diesels. When modal shifts occur to move goods by another mode, a review of air quality benefits should occur. Are there any studies currently in place? It is presumed that rail travel has less impacts than truck movements. Jeff Kwilinski added that a major component of that is congestion.

Michael Halsted – The current non-attainment areas throughout the state should be reviewed. The DNR can assist with this.

Jeff Lyon – The air quality impacts differ between truck and rail, but the distance of travel should also be considered. Movement of freight over 250 miles may have some benefit on rails vs truck.

Jeff Kwilinski – Secondary distribution (first and last mile) of freight also needs to be considered as it results in congestion.

Dan Scudder – Questioned where the loading of rail occurs. Heather Graves noted that it can occur at the two intermodal facilities in the state or at the source. Donna Brown-Martin added that it can also occur at transload facilities. The first and last mile connections are important considerations within the plan.

Jeff Lyon – The new Amazon facility in Southeast Wisconsin has spurred a lot of development in the surrounding area. Dan Scudder added that this model puts pressure on multiple modes.

Jeff Kwilinski – Have studies been completed related to the impacts of existing distribution centers such as Wal-Mart? It would be interesting to see if additional traffic was generated.

Jeff Lyon – Is the big box distribution model going to change? If it does, what changes will occur and what affect will it have on air, rail, trucks, etc.

Michael Halsted – Regarding mitigation, there are already systems in place (i.e. Congestion Mitigation and Air Quality (CMAQ)).

Jeff Lyon – The regulations are already in place, but we'll need to ensure that the changes in technology are recognized (i.e. AUPs).

Jeff Kwilinski – There may be areas throughout the state where certain types of vehicles could be restricted as a mitigation measure. Compressed natural gas (CNG) is in use throughout the state, but does come with associated issues. The tanks have a 10-year shelf life, without a reuse purpose. Many companies are interested. UPS or FedEx recently bought a lot of CNG vehicles to incorporate into their fleet. There may be a significant increase in CNG vehicles regionally; however, over the road use isn't known yet. The biggest question is where one can fuel up with CNG.

Dan Scudder – CNG fueling locations is another impact that should be considered. Jeff Lyon added that Kwik Trip has current plans for CNG expansion and they could be consulted.

Caitlin Shanahan – DMA's largest concern would be climate change, including greenhouse gas emissions beyond the local air quality concerns. Dan Scudder questioned if any specific fuel use resulted in community right to know issues.

Table 2 Discussion:

Ian Chidister – An example of mitigation in Kentucky where a truck rest area with local power to lower idling onsite. This could be considered on a major project.

Michael Friedlander – Broadening ports and airport idling should be considered. Promote efficiencies and idle reduction via different technologies and polices to repower. The Diesel Emissions Reduction Act and Partners for Clean Air Clean Diesel Group should be looked into.

Jennifer Blonn – The EPA seconds the DNR's comments on idling.

Mark Razny – Emergency order sets rules on idling trains.

4. **If the interest in freight rail is sufficient, there may be requests to re-establish rail service along former rail corridors, including some state-owned corridors that have been converted into recreational trails. How should WisDOT address any such proposal? What measures for safety, access, and other factors should be incorporated?**

Table 1 Discussion:

Michael Halsted – A portion of the Sugar River Trail near Monroe was converted back to rail in the recent past. Michael will connect with another DNR staff member for more information. The DNR understands that the conversion back to rail is a reality that needs to be considered. Where possible, we'd like to see a new parallel trail constructed in these cases. When studying the high speed rail, it was found that a trail component within the corridor showed compatibility and met safety concerns.

Caitlin Shanahan – Studies have shown that people will use a parallel trail when it is available and will stay off of the rail, especially when a fence is in place.

Jeff Lyon – How long was the Monroe conversion (a relatively short distance)? The WI Southern Rail Badger Ethanol Connector is another example. What considerations need to be made for abandoned rails vs. rails to trails projects? Dave Leucinger noted that there are few abandoned rails currently in Wisconsin.

Dan Scudder – Would the construction of a parallel trail require the acquisition of additional right-of-way? Michael Halsted responded that no additional right-of-way was required for the high speed rail project, but it may for others.

Jeff Lyon – Rail expansion projects are likely to have positive and negative impacts to agriculture. Expansions may be beneficial for agricultural shipping. Before a line is re-established, the original reason for the closure should be reviewed (i.e. if it was closed due to low volumes, have enough changes occurred to result in higher volumes).

Michael Halstead – The additional crossing should also be considered. Impacts to field access may result.

Dan Scudder – If an established rails to trails project was reverted to an active rail line, would the DNR be interested in building a parallel facility? Additional right-of-way, wetland, etc. impacts may occur. Michael Halsted responded that the DNR would likely be interested, adding that safety would be the biggest concern.

The group discussed the ownership of rails to trails corridors. Jesse Patchak noted that the corridors rarely reside on personal property, but additional right-of-way acquisitions would be from individuals.

Michael Halsted – There are corridors that have been platted for the construction of a highway, but were never built. West of the existing Highway 14 corridor, an area was originally platted for its construction. The parcels are still platted in this manner and may be an option for development.

Heather Graves – Community outreach is an important element with the construction of new lines. Crossing safety is also very important.

Table 2 Discussion:

Jennifer Blonn – Have there been any requests to re-establish lines? Property values will change from trail to active rail line.

Ian Chidister – There is language in the easements for rails to trails regarding reverting the trail back to rail use.

Mick Friedlander – Contacts will be made with State Trails Coordinator. The Northwood facility is an example where planning for a rail spur has been identified with mobile source reductions from modal shift. This is maximizing environmental performance through rail.

Rebecca Graser – New land use may have resulted following the rails to trails project; that may now conflict with re-establishment of an active rail line. This should be considered for out of service lines that are reactivated as well – especially with neglected infrastructure. How should this be used in the State Freight Plan?

Jonquil Johnston – There needs to be a balance with economic development, including tourism use as trail and transportation, rail spur closure is an example of isolating businesses.

Mark Razny – Rock Island reactivation is an example with houses encroaching on the rail line, legally the railroad had the right and the residents shouldn't have been encroaching on it. Residents were surprised about the property boundaries. Examples of short line railroad importance.

5. How much of a concern are issues with dust/particulate matter from hauling sand, aggregate, or other loads? What are your concerns over vegetation control along both highway and rail corridors? Is neighborhood access across rail lines or highways heavily used by trucks a current or potential issue?

Table 1 Discussion:

Dust/Particulate Matter

The group discussed the impacts of frac sand and particulate matter pollution. Michael Halsted noted and studies are being developed on the impacts of frac sand. The DNR is concerned about dust impacts of silica, but information isn't known at this time. Michael with confirm with another DNR staff.

Vegetation

Heather Graves – Rail employees have concern about the use of proper equipment when spraying herbicides. Maintenance of proper sight triangles along rail lines is a growing concern. Beautification and upkeep can be challenging as it is the individual railroad's responsibility. Fires resulting from sparks on the tracks are still an issue.

Michael Halsted – Resistant species along rail corridors are of concern. Jeff Kwilinski added that the spread of non-native species along all corridors should be monitored as freight moves in from other areas. Jesse Patchak added that it is also a concern with ports.

Jeff Lyon – The DATCP has a Pesticide Applicator Program that all applicators need to participate in prior to performing an activity.

Michael Halsted – Dialog of regulatory controls is on-going. The DNR would like to implement a maintenance program, but money is the biggest hurdle. Rail corridors are challenging because they are mostly private. Expansion of freight will increase the need for more resources and control.

Jeff Lyon – This is an agricultural issues as well. Without control there can be impacts on fields with the encroachment of invasive species.

Neighborhood Impacts

Dan Scudder – Increase highway traffic makes crossings even more challenging.

Jeff Kwilinski – Increased traffic gets back to the quality of life impacts for adjacent neighborhoods.

Table 2 Discussion:

Jennifer Blonn – The EPA has best practices for truck dust control. Also for vegetation control of the right species. Neighborhood access across rail lines is a big concern, especially concerning neighborhood cohesiveness, environmental justice and other barriers. Bottlenecks near sensitive communities are also an issue.

Michael Friedlander – The State Bike Plan and Recreation Plan should be considered to identify important factors. The EPA has an EJ mapping tool online that is useful for EJ screening.

Ian Chidister – Do the Bike/Recreation Plan priorities conflict with the State Freight Plan? Pedestrian/bicycle safety at intersections should be considered. How can the State Freight Plan

match with local plans? Kids' health and access to schools, etc. to be considered. Maybe consider kids in the State Freight Plan project in the Southwest Region realignment for large trucks from where they are closer to schools.

Mark Razny – Pedestrian crossings of rail are very important. Re-ratings of crossings are important, especially when trail traffic is up.

Jennifer Blonn – The EJ screening includes recommendations aimed at kids' health.

Waterborne Transportation:

6. **What concerns do you have for Aquatic Invasive Species (AIS) distribution through the Great Lakes Basin via a) "Salties" bringing AIS from freshwater sources outside of North America; b) "Lakers" redistributing small, localized AIS colonies to different habitat areas; and c) the failure of the Chicago & Illinois Canal System's barrier from Asian carp species? What roles and practices should be considered in avoidance and/or mitigation**

Table 1 Discussion:

Michael Halsted – The DNR has three ballast water experts that deal with regulations and permits. Both salties and lakers are considered, but more information will need to be provided to see if they are handled differently. Michael will connect with the ballast water experts for more information.

Dave Leucinger – There are international treaties related to this (Canada for example).

A secondary question regarding concerns for areas where transportation provides a barrier to public water access was asked to the group.

Heather Graves – This is a hot topic, as there are long stretches (15 to 20 miles) between one town and another where there are no crossings. In some situations there may be a public parking lot on the opposite side of the rail with no legal crossing to the water. The State Legislature is looking at a bill to allow the public to cross a railroad at any point, as long as they are crossing perpendicularly; however, this is not a good safety message. The Office of the Commission of Railroads has a process to approve new crossing locations and people are encouraged to identify locations where a crossing is needed. There is little use of this program, but the office would like to spread awareness.

Table 2 Discussion:

Jennifer Blonn – A multistate working group, including the NDR, works on aquatic species. The Great Lakes and Mississippi Interbasin Study (GLMRIS) should be reviewed.

Mark Razny – The Messina Checkpoint (Coast Guard) on the St Lawrence should purge ballast water before this side of the Messina locks. Commander Souma is the head of prevention.

Rebecca Graser – The Mississippi River should be included. There is a St. Paul local dam study to limit carp migration (EPA Civil Works Section). Various EPA sections work on this: Rock Island – Lower Mississippi; Detroit – Great Lakes; and St. Paul – Up Stream Mississippi.

Discussion regarding the end of summer movement of salt and oil northbound on the Mississippi via barges.

Terminal and Intermodal Facilities:

7. **Safety and congestion are concerns that have been raised by residents near the major intermodal facilities near Joliet, IL. Are there other concerns that should be recognized should a new intermodal facility be created in Wisconsin? What concerns do you have on runoff of potential contaminants at intermodal yards, rail yards, truck terminals, and warehouse locations? How is your agency addressing potential environmental impacts from Intermodal operations, both in Wisconsin and other states? What practices should be considered/encouraged to minimize these impacts?**

Table 1 Discussion:

Jeff Kwilinski – Most of the issues are highlighted in the question. For the most part, private companies are doing a pretty good job. Wal-Mart, for example, has controlled access limiting the undesirable on-site activity. Off-site areas are more likely to be areas of undesirable activity (i.e. fueling sites).

Michael Halsted – The DNR enforces the Wisconsin Pollutant Discharge Elimination System (WPDES), which is required for all facilities. Each facility has its own number and regulatory information. Run-off isn't expected to be an issue because the WPDES permit is already in place.

Dan Scudder – Is additional light or noise pollution of concern? Michael Halsted responded that it can be an issue, but there are no regulations. Light and noise pollution are issues typically raised by the public when they are trying to stop a project. Dan Scudder spoke of new lighting standards used to reduce light pollution on various projects.

Michael Halsted – There are multiple mitigation techniques in place (oil/water separators, absorbent materials, etc.).

Dan Scudder – Is there concern about emissions from freight movement (i.e. emissions from the vehicle or its contents)? Michael Halsted responded that it is a concern, and it is covered in the WPDES but more could be done.

Caitlin Shanahan – There are community right to know issues with the movement of hazardous chemicals. Usually companies that use hazardous chemicals have to report to the Department of Military Affairs and pay a fee. There is a list of what facilities use which chemicals.

Table 2 Discussion:

Jennifer Blonn – The EPA monitors noise, air quality, light pollution, and runoff prevention.

Ian Chidister – Historic buildings are of special concern with vibrations during construction and operations. If a small areas is anticipated to have impacts there may be staff available to analyze (identify gaps in the State Freight Plan to help locals).

Mark Razny – Discussion of the Elwood terminal and intermodal controversy – there are details available online. The terminal encouraged growth (business and residential) that now conflicts with the original use. There are issues with out of town residents not being able to visit land uses. The bridges are not able to carry larger trucks.

Rebecca Graser – The Minnesota yards in Duluth don't have storage capacity to serve expanded terminal and they want to fill in 25 acres of wetlands. If the State Freight Plan addresses expected needs of a new or expanded facility, it should include its storage needs as major component.

Ian Chidister – How will WisDOT influence implementation of the plan, especially if it is not a WisDOT project? Will most plan actions be dependent on local actions or WisDOT? A hope would be to use the plan as a tool to tie in state and local priorities (i.e. prioritize highway projects but separate projects through local program prioritization process (area with state priority should examine local needs at the same time)).

Mark Razny – Using the Elwood example again, the bridges only have a 20 year lifespan for forecasted truck traffic, but then the intermodal facility came along changing the bridge weight/traffic needs. It takes years of planning and permitted to redesign and construct a bridge and the locals may not have the money to do it.

Michael Friedlander – Noise and air quality research should be done. Barriers and vegetation (barrier for sound traps pollution which is mitigation with vegetation). Jay Walschmidt is a contact for this information.

Ian Chidister – Vegetation along as a mitigation method for air quality has very limited effectiveness.

8. To what degree would you expect secondary/cumulative land use changes at a Wisconsin intermodal facility – comparing potential development outcomes at a brownfield/redevelopment site with a greenfield/new development facility? Do the same concerns also apply to single-mode facilities (truck terminals, rail yards)? Is the large volume of container drayage (trucking of loaded and unloaded containers) into and out of Wisconsin a concern for your agency? How should WisDOT approach mitigation concerns over these facilities?

Table 1 Discussion:

Caitlin Shanahan – Development of a brownfield and site remediation over a greenfield would always be recommended. Other productive land and facilities are likely in place with brownfield development.

Heather Graves – Existing infrastructure may already be in place to service new development with a brownfield over a greenfield.

Jeff Kwilinski – When planning for new facilities, adequate off-site facilities (parking, etc.) need to be considered. Facilities should include rest stops and supporting services.

Michael Halsted – The bigger picture of ensuring adequate rest areas and overnight parking areas needs to be considered across the state.

Jeff Lyon – Another benefit of brownfield development is that it is likely zoned and subdivided for development. However, land use controls need to be considered. These sites also have limitations and the thought of "build and they will come" may not apply. Factors such as volumes need to be considered. This backs up the importance of land use planning and location of places with minimal impact.

Michael Halsted – WisDOT has a process tied to NEPA that is in place for defining indirect impacts (Indirect and Cumulative Effect (ICE) process). The plan could simply state that the ICE process should be followed. Dan Scudder added that the ICE process is used at the project level. This plan considers and recognizes the good and bad potential consequences. Michael Halsted spoke of various documents with great ideas about indirect impacts. EPA's indirect cumulative effects under NEPA should be referenced.

Table 2 Discussion:

Ian Chidister – The impacts are location specific. It is hard to say generally for a state plan. Zoning and status of utilities is important to determine if greenfield or brownfield developments have more impacts.

Jennifer Blonn – The EPA encourages development in existing developed areas. Health at the site, especially air quality, is an important factor.

Michael Friedlander – There is a PM 2.5 hot spot analysis for highways and intermodal facilities (rail and transfer sites). There is not much in Wisconsin for concentrated diesel emissions that would drive additional analysis. Idling reduction and increased efficiencies at any freight transfer facilities is beneficial. SmartWays can be used to provide mitigation.

Jennifer Blonn – Avoidance is important, not just mitigation.

Jonquil Johnston – Trucking use goes up with intermodal facilities. Jonquil will put some comments together regarding bottlenecks and cumulative impacts.

Pipelines:

9. Pipelines have not been previously addressed in any of our planning efforts. We are aware of direct impacts from construction, maintenance, and, of course, from potential incidents. We also recognize that pipeline terminals are a concern for safety and trucking congestion. What other concerns should we be aware of?

Table 1 Discussion:

Jeff Lyon – Compaction and soil condition should be considered as previously discussed.

Michael Halsted – The concept of short duration pipe has been discussed recently. It has been found that short duration can be more economical for the short distance movement of things beyond natural gas and oil. Jesse Patchak added that short duration pipe can be used to move natural gas directly to a destination rather than movement by truck.

Jeff Lyon – There are positive and negative impacts from short term pipe. A positive impact would be the reduction in traffic congestion.

Caitlin Shanahan – The DMA has regulations in place for pipeline disasters, but responsibility falls on the individual companies.

Table 2 Discussion:

Rebecca Graser – There is talk of concerns about modal safety for oil/petrol product. Concerns of corridor fatigue from multiple pipelines, and it may be something Minnesota has looked into.

Examples being expansion of a corridor to accommodate maintenance (it was also addressed that this has been discussed in Minnesota hearings). The DNR has a draft EIS address this (contact person – Dave Siebert).

Mark Razny – Hazmat focused issues are regulated by the state agency, follow up should be done with them.

Mike Friedlander – Trucking congestion is a concern. There are opportunities for idling reduction in all modes (scheduling loads at pipeline terminals). Recommendations from the SmartWay program should be considered as recommends in the State Freight Plan. Jennifer Blonn added that a contact for the SmartWay program will be provided.

Incident Management:

10. Are there plans or policies the State Freight Plan should incorporate to address private and public-sector first response and recovery efforts from potential freight transportation incidents?

Table 1 Discussion:

Caitlin Shanahan – The DMA has policies and procedures in place when a pipeline incident occurs. The incident is reported to the DMA and the responsibility falls on the company. County Hazard Mitigation Plans will include a pipeline discussion, when applicable. A local response squad would respond to the incident. Coordination occurs through the DMA. There is a Wisconsin Emergency Response Plan in place. There is a person on call at all times to respond to incidents. This can include radioactive/hazardous materials shipping and spill response. Impacts to the public, such as water supply, are considered.

Dave Leucinger – Who responds to incidents in public waters (lakes, rivers)? Michael Halsted noted that the DNR has a spill response hotline. Dan Scudder added that the USACE and Coast Guard will response to incidents in major waters.

Dan Scudder – Community impacts when facilities are in populated areas need to be considered. Especially, the responsibility of the local response teams, fire, police, etc. when a HAZMAT team isn't rear. Jeff Lyons questioned if the appropriate trainings are in place for those individuals.

Michael Halsted – There is a debate over the risker mode (trucks and pipeline) for the movement of various materials. Dave Leucinger added that the resulting spill of a pipeline tends to be worse, but generally the transport method is safer via pipeline than truck.

Jeff Lyon – Implements of Husbandry should also be considered. Various materials are being transported down county roads.

Table 2 Discussion:

Michael Friedlander – Ballast water contamination in the Great Lakes is not regulated.

Jennifer Blonn – Emergency response staff at EPA will have more information (Jennifer will reach out).

Mark Razny – N+I Incident Management System → Incident command structure and regulations that everyone follows. There is a regional response team (EPA and Coast Guard) tasked with a "clean up

the mess plan". The NRRM works with oil spills and with oil trains soon. The wreck in Galena, IL is an example of where local were ahead of the issue on their own observations. Lt. C. Mobley from the Response Division is a recommended contact.

Ian Chidister – The plan recommendations are a good time to ensure locals are equipped to handle the changes coming their way in terms of emergency response. Jennifer Sarnecki added that it may be beneficial to include contact information for project managers to use.

Bonus Questions:

A. Does your agency encourage modal diversion from more fuel-intensive transportation modes (air, trucking) to less-fuel-intensive modes (rail, waterborne)? If yes, how is it encouraged?

Table 1 Discussion:

Jeff Kwilinski – Measures for alleviating congestion are being considered, but there aren't any specific programs to speak of.

Michael Hasted – The DNR has staff in sustainability sections with goals of reducing multimodal impacts with various programs (rideshare, etc.). The Green Tier program, for example, encourages the use of other modes.

Caitlin Shanahan – The DMA is an advocate for reduction of impacts from all modes.

Jeff Lyon – DATCP doesn't support any modal diversion from an environmental perspective, but does work from an economic perspective. What is the best/most efficient was to move items (International Trade Team).

B. What are the impacts (and their degree) from dredging operations at port facilities? How can these be minimized and/or mitigated?

Table 1 Discussion:

Michael Halsted – The disposal of spoils from dredging continues to be a question. Beneficial reuse components are being considered for the disposal of the waste. Guidance was recently passed to reduce heavy tipping fees.

Dan Scudder – Sediments within the spoils can be contaminated and will need to be handled as hazardous waste.

Michael Halsted – Specific codes related to the dredging of materials from ports (728/345/347) regulate the handling and permitting.

Dave Leucinger – Do the containments of the spoils vary by location? Michael Halstead responded that they are not site specific, but the spoils are becoming less contaminated. The human pathways (dust) are heavily regulated. There is good coordination with the HAP grants between the DNR and DOT.

C. Should WisDOT discuss the environmental impacts of large out-of-state freight facilities that serve Wisconsin, even though they aren't in Wisconsin?

Table 1 Discussion:

Michael Halsted – Origin/Destination studies would be telling for this. A synergy between weight limits and other restrictions should be in place with other states.

Caitlin Shanahan – Movement towards a regional systems approach is encouraged. An inventory or description of the existing system should be included, noting that there are out of state facilities that affect the system.

Michael Halsted – If Chicago plans to send additional trucks through a non-attainment area, how is this studied?

Dave Leucinger – Wisconsin has a lot of product that needs to be exported, while there isn't as much being imported. Stephanie Falkers added that the understanding of freight movements without an origin or destination within the state (overhead freight) should be acknowledged in the plan.

Michael Halsted – The economics of freight movement have an effect on decision in the private sector. For example, when the shipping of fly ash from Missouri becomes cost prohibitive, the use of Portland cement increases.

Jeff Lyon – There are many food processing facilities throughout the state, especially in rural areas. We should make sure the infrastructure is in place. Michael Halsted added that a candy maker in Jefferson uses a rail to connect to an ethanol plant.

D. Historic and archaeological structures and sites – what are some of the potential examples where existing/expanded freight operations will have the greatest potential for direct and indirect impacts? How should avoidance and/or mitigation be practiced?

Table 2 Discussion:

Generally, responses to this question were covered in other places.

Rebecca Graser – Historic districts, especially in area with reactivated rail lines should be considered.

Jonquil Johnston – Bridges can also be considered historic resources.

Ian Chidister – Programmatic mitigation activities at the corridor level. Memorandum of agreement documentation. There is an advisory organization on historic preservation.

E. Wisconsin's air freight sector currently has a minor presence (relative to Chicago and Minneapolis), with limited expectations for significant expansion during the plan period. How should the Plan discuss the types and degrees environmental impacts from air freight? What changes in aviation technology or air freight operations can be expected within the plan period? How will those affect the environmental footprint of impacts from air freight?

Table 2 Discussion:

Rebecca Graser – The type of aircraft may change the airport infrastructure. Existing airports tend to be near wetlands, creating a risk from waterfowl.

Michael Friedlander – Runway expansion in the Mitchel Field Plan. The DNR has been on the planning team for the project. Conformity analysis was necessary – electrification opportunities could be used for mitigation. Idling and electric ground vehicles considered (fuel changes for planes is not imminent).

Jennifer Blonn – New plane fuels are not imminent. Need to talk about climate change impacts, greenhouse gases, etc. (not just about airports, but all modes). Climate resiliency, global change – goal to identify where we can dive deeper and use the resiliency discussion to cloak climate change discussion.

Ian Chidister – There are national pilot examples of climate resiliency. Recommends to include climate change discussion in the SEE. Examples from Maryland, Florida, and Long Beach.

Jennifer Sarnecki – Local plans may address resiliency and transportation examples.

Michael Friedlander – Refined and enhanced freight data collection would be useful (especially more detail) in the plan – especially regarding air quality. Air quality impacts from maritime traffic is weak in WI.

Mark Razny – Crude oil transportation emergency issues are being discussed as a group (including the EPA). Railroads want to provide shipping details.

Ian Chidister – Maybe an increase in discretionary funding would allow for better data to be collected.

Additional Comments from Table 2:

Ian Chidister – INVEST is a sustainability tool that should be considered in this planning effort. Some states have used if for planning.

Jonquil Johnston – Environmental justice needs to be addressed. Zero vehicle household are important because freight and passenger rail use the same rails disproportionately impacting them.

Jennifer Blonn – Jennifer would like to see a draft of the EJ analysis and would like to contribute.

ERA Consultation #2 Agenda

Wisconsin State Freight Plan

Environmental Resource Agency (ERA) Consultation Meeting #2

WisDOT Hill Farms | 4802 Sheboygan Avenue RM 144B | Madison, WI 53705

August 17, 2016 | 10:00 AM – 12:00 PM | RM 144B

Teleconference Information
Dial In: +1 (408) 650-3123
Passcode: 570-902-021
Weblink: https://global.gotomeeting.com/join/570902021

AGENDA

Agenda Item	Schedule	Lead
1. Welcome	10:05 AM – 10:10	Aileen Switzer, WisDOT Division of Transportation Investment Management (DTIM) Administrator
2. Introductions	10:10 – 10:15	All
3. Review Comments from February ERA Meeting	10:15 – 10:30	Jennifer Sarnecki, WisDOT Planning Section Chief
4. State Freight Plan Summary and Progress Report	10:30 – 10:45	Ken Brotheridge & Dave Leucinger, WisDOT Economic Development Section
5. Walkthrough SEE Chapter	10:45 – 11:15	Kristofer Canto, WisDOT Planning Section
6. Walkthrough EJ Chapter	11:15 - 11:45	Kristofer Canto, WisDOT Planning Section
7. Wrap-Up/Next Steps	11:45 – 12:00 PM	Donna Brown-Martin, WisDOT Bureau of Planning and Economic Development (BPED) Director

Please contact Kristofer.Canto@dot.wi.gov with any questions regarding this meeting.

For more information, visit: wisconsinfreightplan.gov

DRAFT

ERA Consultation #2 Summary List

WISDOT STATE FREIGHT PLAN

Environmental Resource Agency Input

Consultation Meeting #2 Summary

WisDOT invited state and federal environmental resource agencies to review and discuss the progress of the System-plan Environmental Evaluation (SEE) and Environmental Justice (EJ) Analysis for the Wisconsin State Freight Plan in August of 2016. The draft SEE and EJ chapters were provided to attendees in advance of the meeting. The goal of the consultation meeting was to gather input regarding the direction of the draft chapters and to identify areas where more focus or clarification could be provided. The group walked through the overall state freight plan process and background before walking through the SEE and EJ chapters. Highlights and major themes resulting from the discussion include:

General Plan Discussion

- Pedestrian, bicycle and wildlife crossings of rail and other freight corridors should be an important consideration for expansion and new construction projects.
- Additional coordination with railroads was suggested in cooperation with the Office of the Commissioner of Railroads. This coordination could provide information that may not have been provided during general Freight Advisory Committee meetings.

System-plan Environmental Evaluation

- The concept of adaptation should be included in the discussion of climate change mitigation.
- Impacts to adjacent sensitive land uses should be discussed. Examples were provided of safety and quality of life impacts with the development of a freight corridor and adjacent senior housing facility.
- Safety, particularly safety of the public at crossings and connections points, should be included within the SEE. Operation Lifesaver should be referenced as well.
- The EPA and USDOT released new medium- and heavy-truck emission standards in August. The new regulations should be discussed.
- Increased discussion of rail service expansion should be included.
- Impacts from hazardous material movement should be discussed. Coordination with the Department of Military Affairs' current risk assessment will be beneficial.
- Include a comparison of impacts by each mode.

Environmental Justice Analysis

- Review the CDC's social vulnerability index which includes other variables for vulnerable populations that could aid the EJ analysis.
- Discussion of future demographic shifts and the EJ analysis were discussed.

ERA Consultation #2 Meeting Summary

Wisconsin State Freight Plan
Environmental Resource Agency (ERA) Consultation Meeting #2

WisDOT Hill Farms, 4802 Sheboygen Avenue RM 144B, Madison, WI 53705

August 17, 2016
10:00 a.m. – 12:00 p.m.

Meeting Summary

Attendees:

Name:	Representing:
Carolyn Amegashi	WisDOT
Tim Asplund	Wisconsin Department of Natural Resources (WDNR)
Chad Atkinson	Wisconsin Department of Military Affairs
Mitch Batuzich	FHWA Wisconsin Division
Jennifer Blonn	U.S. Environmental Protection Agency (U.S. EPA), Region 5
Kennethneth Brotheridge	WisDOT
Donna Brown-Martin	WisDOT
Kristofer Canto	WisDOT
Thomas Clauder	Wisconsin Office of the Commissioner of Railroad
Kimberly Cook	Wisconsin Historical Society
Michael Davies	United States Department of Transportation (DOT) Federal Highway Administration
Stephanie Falkers	SRF Consulting Group, Inc.
Rebecca Graser	U.S. Army Corps of Engineers
Alice Halpin	Wisconsin Department of Agriculture, Trade and Consumer Protection (DATCP)
Bob Kammel	National Park Service, Midwest Region
David Leucinger	WisDOT
John Madden	National Park Service, Midwest Region
Susan Meilahn	Wisconsin Department of Military Affairs
John Nordbo	WisDOT
Mark Oesterle	Federal Motor Carrier Safety Administration, Wisconsin Division
Diane Paoni	WisDOT
Jesse Patchak	WisDOT
Marshall Plumley	U.S. Army Corps of Engineers, Rock Island District
Christopher Ryan	SRF Consulting Group, Inc.
Phillip Rynish	WisDOT
Jennifer Sarnecki	WisDOT
Dan Scudder	WisDOT
Aileen Switzer	WisDOT
Marilyn Weiss	Wisconsin Department of Agriculture, Trade and Consumer Protection (DATCP)
Ryan Wozniak	Wisconsin Department of Health Services, Bureau of Environmental and Occupational Health

Meeting Summary:
Aileen Switzer opened the meeting, outlined the meeting agenda, and introduced the presenters before handing the presentation over to Jennifer Sarnecki.

Jennifer provided a general overview of the System-plan Environmental Evaluation (SEE) and Environmental Justice (EJ) chapters, as well as SEE requirements under Trans 400, which includes two analytical parts: a comparison of the base case versus draft plan alternatives, and the qualitative analysis of potential environmental impacts and mitigation measures. Jennifer stressed that both the SEE and EJ chapters are largely qualitative, at a statewide levels, and are not focused on project-level analyses. Mike Davies inquired about a connection between health impacts and EJ, to which Jennifer replied that public health addressed all populations, with additional emphasis given to low-income and minority populations in the EJ chapter of the draft plan.

Jennifer explained that in addition to a draft plan analysis, and the development of potential avoidance, minimization, or mitigation actions, the Plan was also informed by consultations with federal, state, and tribal land management, wildlife, and regulatory agencies. The process required a comparison of the draft plan to state and tribal conservation plans or maps, as well as natural and historic resource inventories.

Jennifer provided a summary of key feedback from the February consultation meeting. A number of follow up actions were completed as a result of this meeting, including coordination with US EPA and Wisconsin Department of Health Services. This resulted in the inclusion of a youth category in the EJ analysis. Furthermore, emergency management was addressed by meeting with Wisconsin Emergency Management, resulting in the inclusion of language to “improve emergency response to make the transportation system more resilient”. A review of state and national programs resulted in the inclusion of the Wisconsin Emergency Operations and Public Health Emergency plans, while similar review of documents for other states and agencies for environmental topics revealed that Wisconsin exceeds the standards of other states. It was also noted that SmartWay is discussed in the SEE, but could be expanded upon as policies are finalized in the Draft State Freight Plan.

John Madden noted that there are a large number of rail crossings along the Ice Age Trail corridor serving approximately 1.5 million visitors annually. He added that wildlife crossings of existing rail corridors are needed in addition to pedestrian crossings.

Tim Apslund inquired whether the concept of adaptation was being included in addition to climate mitigation and other strategies, and indicated that there are resources available to inform analysis. Jennifer responded that they should connect following the presentation to discuss further.

Following Jennifer’s presentation, Kenneth Brotheridge and Dave Leucinger provided a summary of the State Freight Plan and a progress report, which included an overview of the vision, goals, and strategies, as well as the key considerations, anticipated content, and development timeline. Kenneth stated that considerations were initially being developed for the Moving Ahead for Progress in the 21st Century Act (MAP-21).

Marilyn Weiss noted that agriculture is greatly affected by freight movement and economic development, and inquired where this would be discussed in the Freight Plan. Kenneth replied that a

discussion of agriculture would be contained in the economic development chapter currently under development, with the goal to release the draft plan in its entirety by mid-September.

Thomas Clauder inquired whether the Wisconsin Department of Transportation (WisDOT) had yet to meet with railroads, to which Kenneth replied that they had met with the Freight Advisory Committee (FAC), which has railroads as members. Thomas also stated that Office of the Commissioner of Railroads (OCR) has regular meetings with various railroads and suggested that WisDOT personnel attend these meetings to get feedback from the railroad companies. Dave Leucinger indicated that the Bureau of Rails, Harbors, and Roads had also been formally and informally consulted throughout the process. Thomas expressed concern that WisDOT's five regions don't communicate or coordinate with one another, to which Donna Brown-Martin indicated that WisDOT will work to attend Railroad Commission meetings. Thomas also expressed concerns about new development (particularly senior living facilities) occurring adjacent to railroad tracks and crossings, often leading to the need for safety improvements and public requests for the implementation of quiet zones.

Following Kenneth and Dave's presentation, Kris presented the walkthrough SEE chapter. Tim Apslund inquired whether the Chapter 11, System-Plan Environmental Evaluation, was complete. Kristofer Canto replied that was still a draft, with Donna adding that it will be complete by mid-September. Mike inquired about the timeframe for submitting/receiving comments on the plan, to which Donna replied that the plan would be released in mid-September followed by a comment period of 45 days.

Donna Brown-Martin provided a clarification that the chapter is not focused on the project level, but does not take anything away from the National Environmental Policy Act (NEPA) review process and will supplement future project-level efforts.

Tim inquired whether anything was found to be "significant" as defined in Trans 400, or if it was an exercise of going through the motions. Kris replied that Trans 400 provides flexibility in this area, but the Fixing America's Surface Transportation Act (FAST Act) askes states to give a closer evaluation for freight planning and policies. He added that the SEE chapter will provide a high level comparison of the impacts between the base case and draft plan alternatives.

Marilyn asked about the impacts resulting from a significant increase in rail traffic as discussed within the chapter. Donna responded that the increases were a result of the forecast model developed as part of the overall plan development. She explained that this information will be addressed in other chapters of the plan, and increases will be discussed in a manner similar to the aviation plan by indicating that said increases will be mostly confined to existing facilities, and, therefore, will not result in significant new "land grabs."

Bob Kammel noted that the discussion of safety generally applies to all freight modes, and inquired if discussion will capture anything regarding safety to the public at crossings and connections. Kristofer responded that this discussion will be included. Stephanie Falkers noted that safety will be specifically discussed along with the discussion of community impacts. Tom added that Operation Lifesaver should be referenced/discussed in the plan, as the program promotes safety for the entire rail system. Kristofer commented that additional focus will be added regarding bike/ped connections.

Mark Oesterle noted that EPA Administrator McCarthy and DOT Secretary Foxx signed final regulations on August 16, 2016 aimed at reducing greenhouse gases and fuel consumption from heavy-duty vehicles for model years 2018 and beyond. Kristofer noted that WisDOT was aware of this action and would be including discussion within the SEE.

Kristofer finished presenting the walkthrough SEE chapter and preceded with presenting the walkthrough EJ chapter. He stated that EO 12898 is the justification for the EJ requirement, but WisDOT policy also mandates this type of review

Chad Atkinson inquired whether WisDOT was aware of the CDC social vulnerability index. He explained that it aggregates a number of EJ variables contained in the Agency for Toxic Substances and Disease Registry (ASTDR) section, but also includes LEP, and other variables for vulnerable populations (density, etc.). He continued by suggesting that WisDOT consider including these other variables in the analysis. Chad also inquired at what census level the data is available, to which the Christopher Ryan replied that most are at the block group level, while disability data is at the tract level.

Tim Apslund inquired about the 2010 base case scenario, and asked if WisDOT was trying to predict geographic and demographic changes, and, if so, will they be shown and how will they be included. Kristofer replied that they will be included in the mitigation and avoidance discussion of the chapter. Tim continued by asking if a 70 percent increase in freight movement would be contained to existing corridors, system expansion, or both. Donna replied that WisDOT was not able to answer that question at this point.

Kristofer wrapped up the discussion of the draft EJ Chapter, and asked if there was anything missing from the current drafts of the SEE and EJ chapters. Thomas Clauder stated that as rail volumes increase, it will impact a variety of things like safety, development, and transportation (reduced trucks). He continued by saying that impacts resulting from rail service expansion are missing. Thomas provided an example from an expansion project from Rhinelander to Goodwin that is affecting 15 counties. Kristopher stated that all of this will need to be looked at a project level down the road. Thomas then commented that there should be discussion of the physical barriers caused by railroads; as well as diversion to emergency services due to high volumes rail/highway freight traffic.

Chad asked if there are plans to look at specific impacts and potential risks of hazardous materials. Susan Meilahn noted that the Department of Military Affairs is in the infancy stages of a statewide risk analysis of the transportation of hazardous materials across all modes. Dave Leucinger made a related comment stating that it is very difficult to estimate these volumes, such as Crude-by-rail, which depends on the regional, national and global economies.

Marilyn asked if a comparison of impacts between the different modes would be made in the SEE chapter. Stephanie replied that the narrative for each impact category would include a comparison, along with the Comparison of Environmental Impacts and Benefits table at the end of the chapter.

Following Kristopher's presentation, Donna Brown-Martin provided a wrap up and the next steps following the consultation meeting. She provided the upcoming dates for five public involvement meetings throughout the state.

Tim asked what the timeline was for agencies to submit comments, to which Donna replied that they would take what they could get from attendees based on the comments provided on the draft chapters. She continued by saying that once the draft plan is released, that comments would be appreciated by early October, around the 5th of the month.

Jennifer Sarnecki added that if there are red flags that need to be addressed before the release of the draft plan, to please let WisDOT know as soon as possible.

THIS PAGE INTENTIONALLY LEFT BLANK