MinnesotaGO

A Collaborative Vision for Transportation

Statewide Multimodal Transportation Plan

August 2016

DRAFT FOR PUBLIC COMMENT

Minnesota Department of Transportation

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Introduction

WHAT IS THE SMTP?

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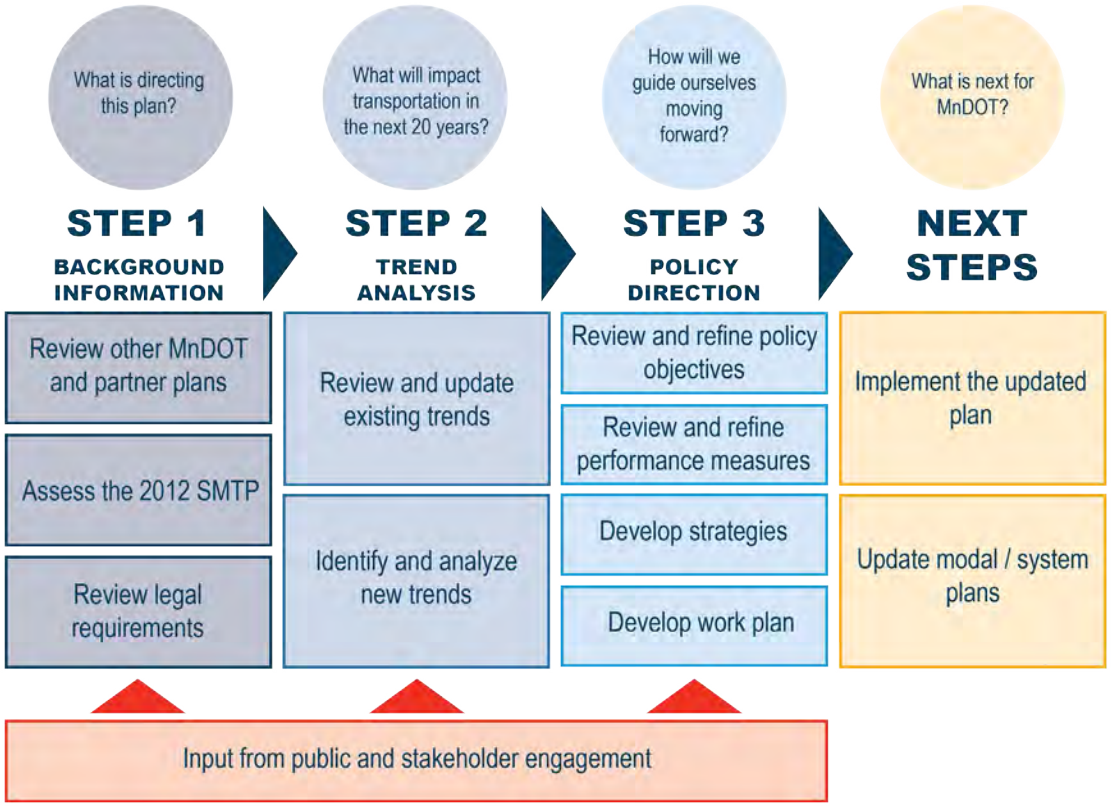
THE STATEWIDE MULTIMODAL TRANSPORTATION PLAN

The Statewide Multimodal Transportation Plan is Minnesota's highest level policy plan for transportation. It is a 20-year plan based on the Minnesota GO Vision for a transportation system that maximizes the health of people, the environment and our economy. The plan is for all types of transportation and all transportation partners. It is about more than just roadways and more than just the Minnesota Department of Transportation. It evaluates the status of the entire transportation system, takes into account what is changing, and provides direction for moving forward over the next 20 years.

PLAN UPDATE PROCESS

MnDOT is required by state and federal law to plan for 20 years into the future but also to update the plan every four years. The SMTP was last updated in 2012. The update process, as shown in Figure I-1, consists of three steps.

Figure I-1: Statewide Multimodal Transportation Plan update process



Step 1. Baseline Assessment: The process began with a review of other MnDOT plans and plans from transportation partners. It also included a review of the changes in law and policy since the plan's last update in 2012. Information was collected about what MnDOT and other transportation partners are currently doing and what is already planned for the future. Finally, MnDOT evaluated the progress made so far in implementing the 2012 SMTP. More information from the baseline assessment is available in the Appendices.

Step 2. Trend Analysis: The next step focused on how Minnesota's population, economy, environment, transportation behavior and technology are changing. It included reviewing the recent past, making educated guesses about the future and analyzing what the future changes might mean for transportation in Minnesota. Chapter 3 provides a summary of this trend analysis. During this step, Minnesotans prioritized the trends based on how important it is for MnDOT to plan for the changes and suggested potential responses. A summary of input is included in Chapter 4.

Step 3. Revise Policy Direction: Based on the baseline assessment, trend analysis and input from the public and partners, MnDOT updated the objectives and strategies of the 2012 SMTP. Additionally, key performance measures were identified for each objective. The updated objectives, performance measures and strategies are listed in Chapter 5. A near-term work plan for MnDOT was also developed. The work plan includes a list of activities MnDOT will do in the next four years and can be found in Chapter 6.

Throughout the entire update process, MnDOT sought input from the public and transportation partners. A summary of the input received is included in Chapter 4. A detailed report of the public engagement activities is available in Appendix D.

Additionally, the Minnesota Department of Health conducted a Health Impact Assessment on the objectives and strategies drafted in Step 3. The MDH report provided suggestions on how to strengthen the connections between transportation and public health. A link to the final assessment is available in the "Want to Learn More?" section of the Appendix.

WHAT IS A HEALTH IMPACT ASSESSMENT?

A health impact assessment for the SMTP update was conducted by the Minnesota Department of Health in collaboration with MnDOT. The HIA focused on changes to policy direction related to the plan objectives of transportation safety, critical connections and healthy communities (Chapter 5).

Generally speaking, an HIA is a tool to help uncover connections between proposed policies, plans or programs and the impacts on community health. Through its six steps, an HIA can help inform decision-makers before direction is finalized by making evidence-based recommendations. An HIA is one tool that can be used to advance health in all policies and equity.

FAMILY OF PLANS

The SMTP provides a framework for a full set of statewide transportation plans. MnDOT plans for all the ways people and goods move throughout Minnesota — individually for each mode and together as a multimodal system. The SMTP identifies overarching guidance and priorities for the entire transportation system. The other statewide transportation plans offer mode-specific strategies, guidance and investment priorities for each part of the system. These plans include aviation, bicycle, freight, highway, pedestrian, ports and waterways, rail and transit. Additional plans provide more detail related to safety, accessibility, operations, technology and more. Together the "family of plans" directs investments, maintenance, operations, modal programs and services for the all types of transportation.

More information about MnDOT's family of plans can be found in Chapter 6.

PARTNERS

Implementing the strategies identified in this plan requires partnerships. Transportation planning involves private partners and all levels of government. Some partners are responsible for the delivery of the system. Others are responsible for providing input, either technical or advocating for a specific interest. The key partners that will help implement this plan include:

- Transportation partners: Transportation partners include everyone responsible for the delivery of Minnesota's transportation system. This includes local, regional, state, tribal, federal, private sector and non-profit partners related to all modes of transportation.
- Local partners: Local partners include agencies and organizations responsible for transportation systems and decisions at the local level. This includes cities, counties, townships, public transit providers, ports and airports.
- Regional partners: Regional partners include both metropolitan planning organizations and regional development organizations. Regional partners are primarily involved in the planning and programming of transportation projects. However, there are different levels of involvement, responsibilities, and requirements for different regional partners.

- State partners: State partners include all state agencies and organizations in Minnesota with a statewide mission and transportation interests or impacts. Key state partners include the Minnesota Department of Employment and Economic Development, the Minnesota Department of Agriculture, the Minnesota Department of Health, the Minnesota Housing Finance Agency, the Minnesota Department of Public Safety, the Minnesota Pollution Control Agency, the Minnesota Department of Natural Resources, the Minnesota Environmental Quality Board and Explore Minnesota Tourism.

- Tribal partners: Tribal partners include the 12 sovereign nations of American Indian peoples with jurisdiction over lands and resources within Minnesota: Bois Forte Band of Chippewa, Fond du Lac Band of Lake Superior Chippewa, Grand Portage Band of Lake Superior Chippewa, Ho-Chunk Nation, Leech Lake Band of Ojibwe, Lower Sioux Community, Mille Lacs Band of Ojibwe, Prairie Island Indian Community, Red Lake Nation, Shakopee Mdewakanton Sioux Community, Upper Sioux Community, and White Earth Nation.

- Federal partners: Federal partners include agencies that provide funding and have policies that impact the delivery of the transportation system. This primarily includes the U.S. Department of Transportation's Federal Aviation Administration, Federal Highway Administration, Federal Railroad Administration, and Federal Transit Administration. Other federal agencies such as the U.S. Environmental Protection Agency, Department of Housing and Urban Development, Department of Commerce / Economic Development Administration, U.S. Army Corps of Engineers, and the U.S. Fish and Wildlife Service also impact transportation decisions.

- **Private sector and non-profit partners:** Private sector and non-profit partners include transportation advocates, developers, chambers of commerce, construction companies, consultants and private industry. Developers play an important investment role in bringing new transportation infrastructure to Minnesota communities. Private industry partners include railroads and other shippers and carriers.

In addition to the partners identified above, many boards, committees and councils contribute to transportation decisions. State and federal legislators, community leaders and the general public are also active participants in the state's transportation system.

OVERVIEW OF THE PLAN

This plan is an update to the 2012 Statewide Multimodal Transportation Plan.

The plan is divided into six chapters. The following is a brief summary of each.

Chapter 1 "What are we trying to achieve?" sets the scene with the Minnesota GO Vision for transportation. It outlines what Minnesotans said they want for their transportation system to do now and in years to come. This is the long-term goal toward which all transportation plans should lead.

To achieve the Minnesota GO Vision, it is important to know the starting point. Chapter 2 "Where are we now?" discusses the state of the state. It describes the existing transportation system, its use and condition, and how each type of transportation is funded.

To effectively plan for the future, it is important to understand how things are changing. Chapter 3 "What is changing?" describes key trends in Minnesota's population, economy, environment, transportation behavior and technology.

Thousands of Minnesotans contributed to this plan. Chapter 4 "What is directing this plan?" briefly describes the public engagement activities. It highlights the feedback the public and partners provided on trends and key policy questions. It also includes information on the recent history of transportation planning in Minnesota and how changes in policy and law affected this plan.

With this context on the past, present and future, Minnesota can effectively plan for the state's transportation system. Chapter 5 "How will we guide ourselves moving forward?" presents objectives, performance measures and strategies that will guide Minnesota toward the Minnesota GO Vision over the next two decades.

Chapter 6 "What is next for MnDOT?" outlines steps MnDOT will take to advance the plan's objectives and how progress will be tracked. This includes a near term work plan which describes key actions for MnDOT to complete before the plan is updated in four years. The chapter also outlines how this plan will influence MnDOT's other statewide plans, capital programs and operating plans.

Finally, a set of Appendices provide additional information and analyses that guided the development of this plan.

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Chapter 1

WHAT ARE WE TRYING TO ACHIEVE?

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A COLLABORATIVE VISION

We do not build transportation systems for the sake of transportation. We create transportation networks and services to support Minnesota's quality of life and economy.

To better define the aspirations for transportation in the state, the Minnesota Department of Transportation created the 50-year Minnesota GO Vision. Thousands of Minnesotans helped craft the vision, which was adopted in November 2011. It describes a desired transportation system for Minnesota. It also provides guiding principles for state, regional and local transportation planning. It answers the question, "What are we trying to achieve with transportation over the next 50 years?"

Minnesota GO Vision

The following is the Minnesota GO 50-year Vision for transportation in the state.

MINNESOTA GO VISION

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

The system:

- Connects Minnesota's primary assets—the people, natural resources and businesses within the state—to each other and to markets and resources outside the state and country
- Provides safe, convenient, efficient and effective movement of people and goods
- Is flexible and nimble enough to adapt to changes in society, technology, the environment and the economy

Quality of Life

The system:

- Recognizes and respects the importance, significance and context of place—not just as destinations, but also where people live, work, learn, play and access services
- Is accessible regardless of socioeconomic status or individual ability

Environmental Health

The system:

- Is designed in such a way that it enhances the community around it and is compatible with natural systems
- Minimizes resource use and pollution

Economic Competitiveness

The system:

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

Guiding Principles

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

GUIDING PRINCIPLES

Leverage public investments to achieve multiple purposes: The transportation system should support other public purposes, such as environmental stewardship, economic competitiveness, public health and energy independence.

Ensure accessibility: The transportation system must be accessible and safe for users of all abilities and incomes. The system must provide access to key resources and amenities throughout communities.

Build to a maintainable scale: Consider and minimize long-term obligations—don't overbuild. The scale of the system should reflect and respect the surrounding physical and social context of the facility. The transportation system should affordably contribute to the overall quality of life and prosperity of the state.

Ensure regional connections: Key regional centers need to be connected to each other through multiple modes of transportation.

Integrate safety: Systematically and holistically improve safety for all forms of transportation. Be proactive, innovative and strategic in creating safe options.

Emphasize reliable and predictable options: The reliability of the system and predictability of travel time are frequently as important or more important than speed. Prioritize multiple multimodal options over reliance on a single option.

Strategically fix the system: Some parts of the system may need to be reduced while other parts are enhanced or expanded to meet changing demand. Strategically maintain and upgrade critical existing infrastructure.

Use partnerships: Coordinate across sectors and jurisdictions to make transportation projects and services more efficient.

A RENEWED COMMITMENT

When the previous version of the Statewide Multimodal Transportation Plan was adopted in 2012, it was the first plan based on the Minnesota GO Vision. Since then, other MnDOT and partner plans have built upon the vision. This SMTP update continues the last five years of planning activities. It provides a revised set of strategies to advance the vision. Since the last plan, there are new opportunities and challenges. Progress has been made toward the vision, but we are not there yet. This update renews the state's commitment to the Minnesota GO Vision, but it will take all transportation partners to bring the vision closer to a reality.

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Chapter 2

WHERE ARE WE NOW?

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MINNESOTA AT A GLANCE

Minnesota's quality of life and economic well-being rely on an efficient and reliable transportation system. The system connects businesses to suppliers and customers near and far. The system also allows people to get to their jobs and schools, see the doctor and take advantage of the state's many cultural, entertainment and recreational opportunities. Minnesota and the state's transportation system have great strengths but there are also challenges. Identifying where the state is today can help make better plans for the future. Table 2-1 highlights key characteristics of Minnesota. Figure 2-1 shows Minnesota's population by county.

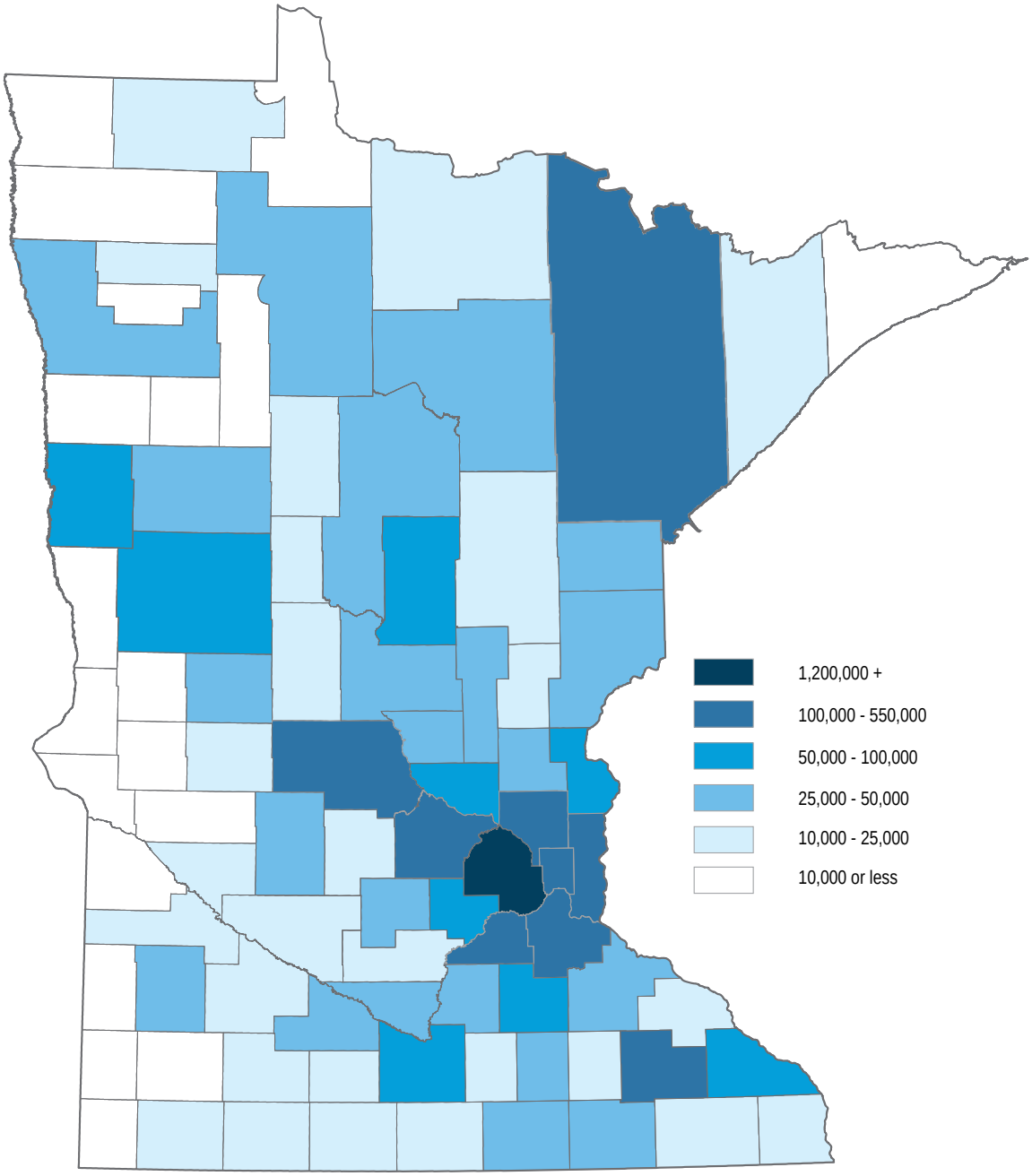
More detailed information about Minnesota and the ways the state is changing can be found in Chapter 3.

Table 2-1: Minnesota at a glance, 2016

Sources: *MN Department of Employment & Economic Development, 2015*; *MN Department of Natural Resources*

CHARACTERISTIC	CURRENT STATUS
Population	5,489,594 (21st largest)
State Area	86,939 sq. mi. (12th largest)
Population Density	67.1 people / sq. mi. (31st highest)
Median Household Income	$58,906 (9th highest)
Median Household Size	2.48 people
Largest City (by population)	Minneapolis (407,207)
Largest County by Population	Hennepin County (1.15 million)
Largest County by Area	St. Louis County (6,225 sq. mi.)
Gross State Product	$317.24 billion (16th highest)
Largest Industries (by Gross State Product)	1. Financial Services 2. Manufacturing 3. Professional and Business
Biomes	Coniferous Forest Deciduous Forest Prairie Grassland Tallgrass Aspen Parkland
Lakes (10+ acres in size)	11,842

Figure 2-1: Minnesota population by county, 2015



EXISTING TRANSPORTATION SYSTEM

Minnesota has a vast multimodal transportation system that includes roads, rail lines, airports, ports, waterways, pipelines, transit systems, trails, paths, sidewalks and more. MnDOT and local, regional, state, tribal and federal government partners, along with private sector and non-profit partners keep the system running. Table 2-2 highlights key characteristics of the transportation system in Minnesota.

The following sections provide more detail on the background, use and performance of each part of the system.

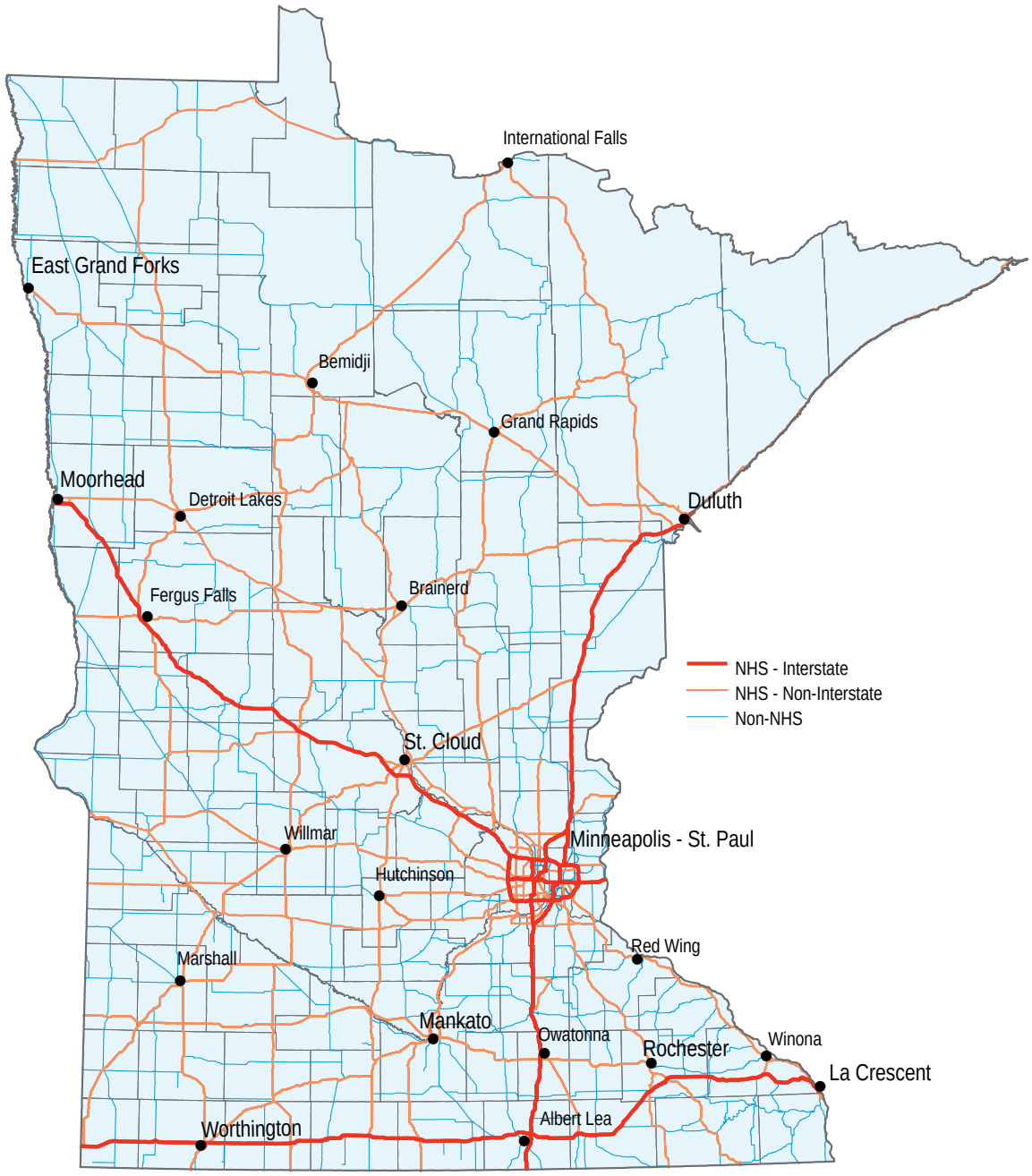
Table 2-2: Snapshot of Minnesota's transportation system, 2016

CHARACTERISTIC	CURRENT STATUS
All Streets, Roads and Highways	142,914 centerline miles
State Trunk Highways	11,814 miles
County Roads	44,821 miles
City Streets	22,414 miles
Township Roads	58,686 miles
Other Public Roads	4,405 miles
Sidewalk Miles	620 miles along state highways, plus thousands more along local roadways
National and State Designated Bicycle Routes	817 miles
Designated Trails	More than 4,000 miles
Bicycle Sharing	One provider (Nice Ride MN) operating in Minneapolis, St. Paul, and Bemidji, other informal systems in communities statewide
Twin Cities Transit (seven county area)	212 bus routes (110 local routes, 102 express routes, two light rail transit (LRT) corridors, one arterial bus rapid transit route and dial-a-ride service
Greater Minnesota Transit	76 of 80 (non-Twin Cities) counties with county-wide transit service, four counties with municipal service only, seven fixed-route systems and seven small urban systems
Intercity Bus	87 destinations served in the state as well as every metropolitan area in the Midwest
Freight Rail	4,485 track miles served by 21 railroad companies
Commuter Rail (see transit section for light rail) information	Northstar commuter rail line (Big Lake to Minneapolis)
Intercity Passenger Rail	Amtrak Empire Builder (Chicago to Seattle)
Airports	388 airports in Minnesota, including 135 public airports, nine with commercial airline service
Great Lakes Ports	Four ports on Lake Superior
River Ports	Four public ports on 219 miles of the Mississippi River system (including the Minnesota and St. Croix rivers)
Pipelines	9,347 miles
Carsharing	Three systems (Car2Go, HOURCAR and Zipcar) operating in Minneapolis, St. Paul, Winona and Mankato
Ridesharing	Many local taxi companies, along with emerging ridesharing companies such as Lyft and Uber

Streets, Roads & Highways

Minnesota has the fifth largest system of streets, roads and highways in the country. As a whole, the network is made up of 142,914 miles of public roadways across state, county, city and township systems. For context, the state ranks 21st in population and 12th in geographic size. Figure 2-2 shows the existing state highway network. This network is the backbone of Minnesota's roadway system. It includes routes designated as part of the National Highway System and other state roads. The state highway network is approximately 8 percent of all roadways in Minnesota.

Figure 2-2: Minnesota's state highway network



Minnesota's roadway network changed over time to meet the needs of those who use it. Total growth in vehicle miles traveled leveled off in 2004 after decades of rising faster than population growth (see Figure 2-3). The total miles traveled by vehicles in the state remained relatively unchanged from 2004 until 2014. Statewide, vehicle miles traveled grew by 3 percent from 2014 to 2015. This growth rate is significantly more than previous years, but is less than the national rate.[1] Figure 2-4 shows how vehicle miles traveled are distributed across the different roadway systems in Minnesota. All transportation partners need to continue to monitor changes in vehicle miles traveled over time to determine what the long-term trend will be.

Figure 2-3: Total vehicle miles traveled in Minnesota

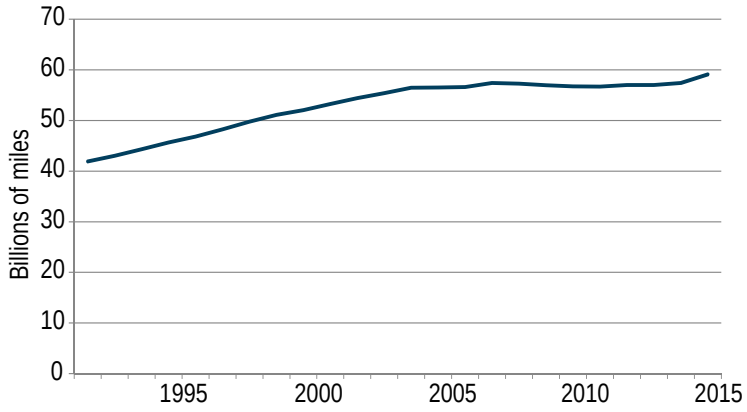
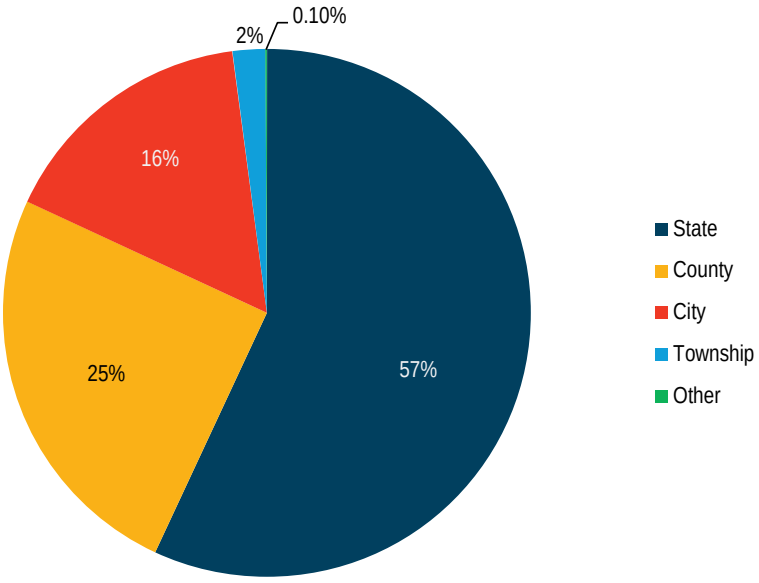


Figure 2-4: Percentage of vehicle miles traveled by roadway system, 2015



1 Federal Highway Administration, 2015

Faced with an extensive, rapidly aging system and increasing construction costs statewide, transportation partners in Minnesota are struggling to keep the roadway system in good repair. More than 2 percent of pavements on the interstate system in Minnesota are in poor condition. This is greater than the state's target of having less than 2 percent of Interstate pavements in poor condition. For the non-interstate National Highway System roadways, less than 3 percent of pavements are in poor condition. This beats the target of less than 4 percent. Similarly, for the non-NHS roadways, approximately 5 percent of pavements are in poor condition. This beats the target of less than 10 percent. Generally, the percentage of pavements in poor condition across all roadway systems is expected to increase in the future.

Despite improving from 2014 to 2015, MnDOT is not currently meeting the state's target for percentage of NHS bridges in poor condition. Three percent of NHS bridges were in poor condition in 2015. The target is less than 2 percent. The percentage of NHS bridges in poor condition is expected to remain steady in the near future. The percentage of non-NHS bridges in poor condition is beating the target of less than 8 percent by a significant margin. Currently, 3.1 percent of non-NHS bridges are in poor condition. Further improvements are expected in coming years.

In 2015, Minnesota reached a new five-year high in traffic fatalities after making substantial progress in reducing deaths on the system since 2005. In total, 411 travelers lost their lives due to motor-vehicle crashes in Minnesota during 2015 (Figure 2-5). The number of serious injuries on the roadway system increased from 1,044 in 2014 to 1,127 in 2015. However, the total number of serious injuries remained lower than any other year this decade.

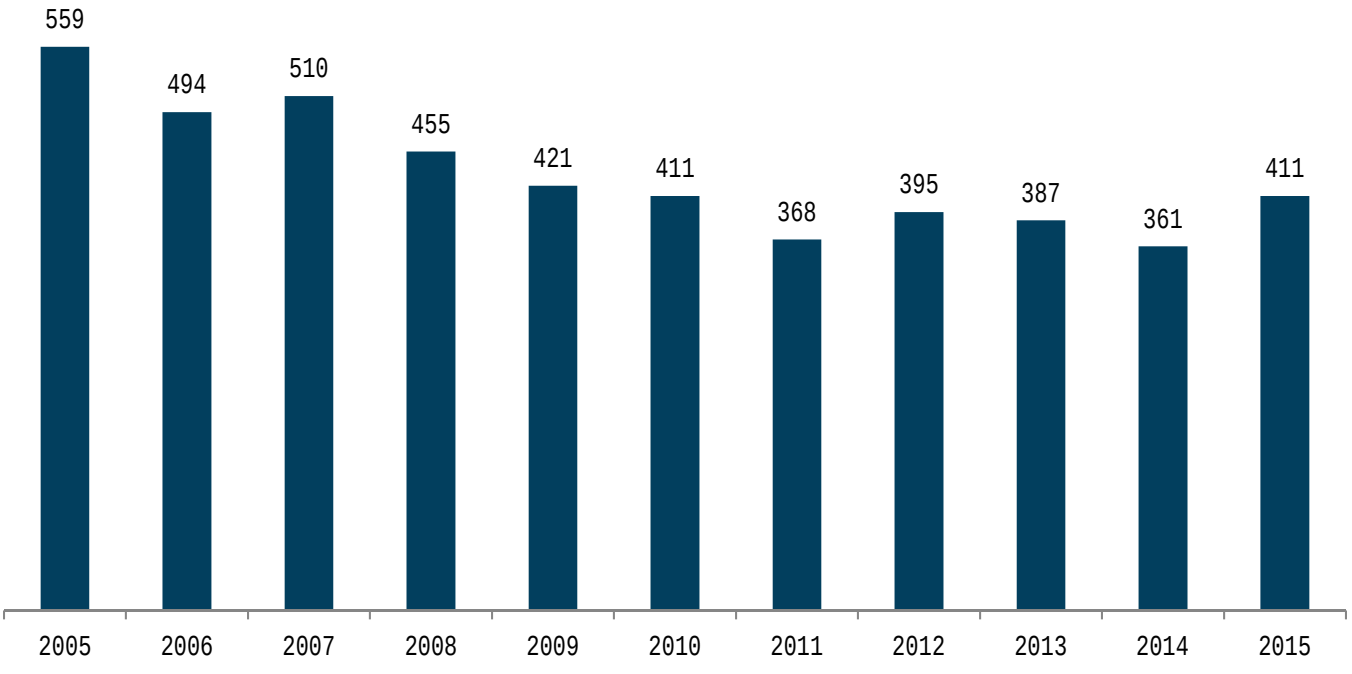
HOW DOES MNDOT DEFINE "POOR" PAVEMENT?

MnDOT uses performance measures and targets to inform decision-making. One key performance measure is pavement condition. The target for this measure is based on limiting the number of roadway miles in "poor" condition.

Pavement condition is determined through the Ride Quality Index, a measure of roadway smoothness. Poor condition is defined as a pavement surface with a RQI of two or less.

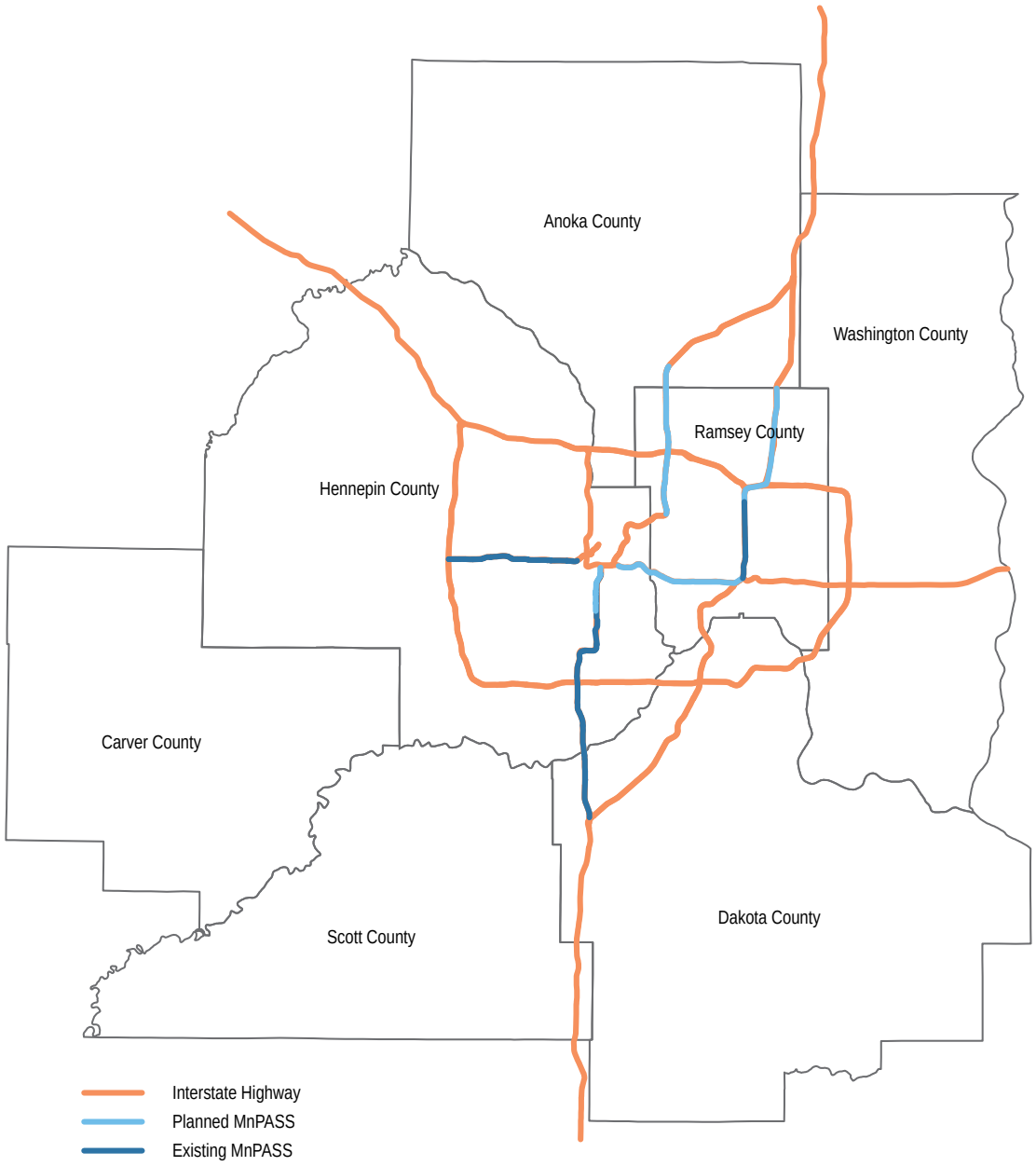
Similar metrics are used for other assets in addition to pavement, such as bridge condition.

Figure 2-5: Traffic fatalities on Minnesota roads, 2005 to 2015



The Twin Cities' MnPASS Express Lane System continues to expand. MnPASS lanes were first implemented on the Twin Cities' freeway system in 2005 along I-394. This automated toll lane and other managed lane technologies have since been extended to portions of I-35W and I-35E. These technologies are also under consideration for other parts of the Twin Cities. Figure 2-6 shows the existing and Tier 1 planned MnPASS corridors in the Twin Cities. Additionally, Smart Lanes are operating on segments of I-35W and I-94. These systems use electronic signs above each lane of traffic to improve traffic flow, reduce congestion and improve safety by providing real-time information about road conditions.

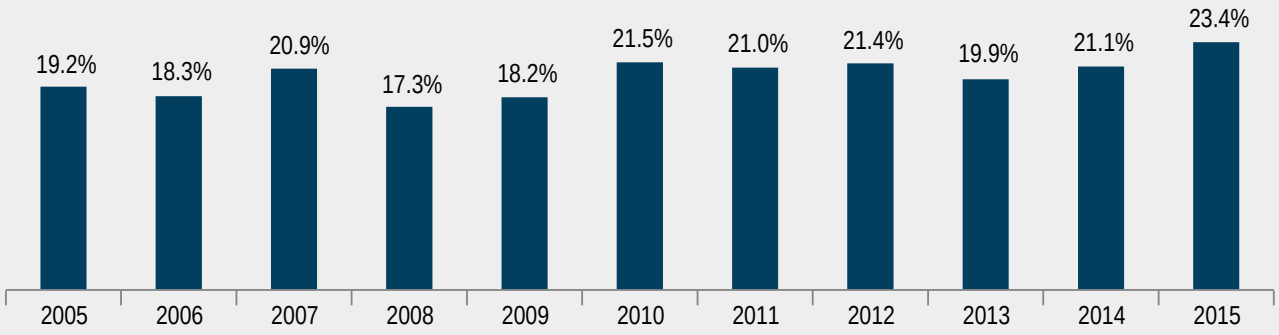
Figure 2-6: Existing and Tier 1 planned MnPASS corridors



CONGESTION IN THE TWIN CITIES

There are many ways to think about slow-downs on the roadway system. Delays and congestion can be measured in the amount of time or fuel wasted, cost to travelers or reductions in access to destinations within a given amount of time. MnDOT keeps detailed data on motor vehicle congestion in the Twin Cities, and collects and analyzes travel time reliability data for Greater Minnesota. Currently, MnDOT measures motor-vehicle congestion in the Twin Cities based on travel speed. Despite the inconvenience, stress and other negative side effects of congestion, it is also a sign that local economies are flourishing. Freeway congestion levels in the Twin Cities have remained relatively constant since the mid-2000s, with a little more than 20 percent of freeway miles congested during peak travel periods. There was an increase in freeway congestion in 2015. It is unclear at this time whether this represents a long-term trend of increasing freeway congestion.

Figure 2-7: Percentage of freeway miles in the Twin Cities operating below 45 MPH during peak periods, 2005 to 2015



Bicycling & Walking

For bicycling and walking, local connections are often more important than long-distance connections since most trips occur within communities. However, at the state level, Minnesota currently has one designated U.S. Bicycle Route – the Mississippi River Trail. This route includes 817.5 miles of designated bicycle facilities on state and local roads and trails. Additionally, there are more than 4,000 miles of trails for bicycling and walking in the state. Figure 2-8 highlights existing state trails and priority bicycle corridors that MnDOT will consider for infrastructure improvements and future designation as state bicycle routes. There are also many, many more on-road infrastructure facilities that support bicycling and walking. Examples of on-road bicycle and pedestrian facilities include bicycle lanes, shared use paths, sidewalks and widened or paved shoulders.

Rates of bicycling and walking increased in the Twin Cities from 2001 to 2010.[2] Overall, 2 percent of trips in the Twin Cities are completed by bicycle and 6 percent are completed on foot.[3] In Minneapolis, the number of regular bicycle commuters more than doubled in less than two decades, from around 3,000 in 1993 to 7,000 in 2010.[4] MnDOT is currently developing a network of index counting locations to better understand trends in bicycling and walking in Greater Minnesota.

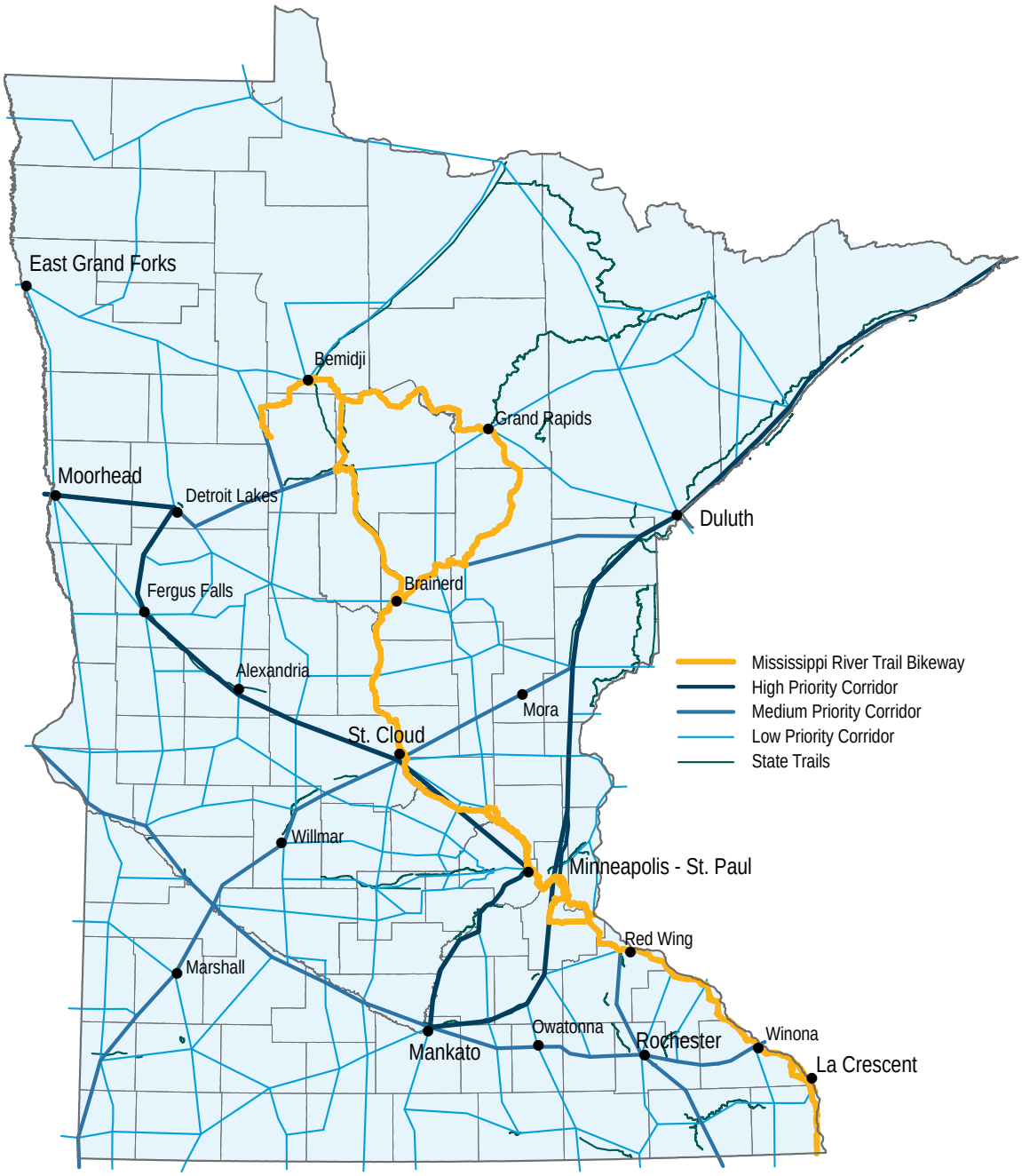
From 2005 to 2014, there was an average of 878 pedestrian and 929 bicycle crashes per year. Although motor vehicle fatalities and serious injuries have seen a decrease over the past 10 years, fatalities and serious injuries involving bicyclists and pedestrians remained unchanged.

2 Levinson, David; Greg Lindsey; Yingling Fan, Jason Cao, Michael Iacono, Martin Brosnana, Andrew Guthrie and Jessica Schoner (2015) “Chapter 5: Biking and Walking over Time” Travel Behavior Over Time. University of Minnesota Center for Transportation Studies, Sponsored by: Minnesota Department of Transportation and the Metropolitan Council.

3 *Metropolitan Council Travel Behavior Inventory, 2010*

4 Bicycle and Pedestrian Section Public Works Department City of Minneapolis (2013) “Understanding Bicyclist-Motorist Crashes in Minneapolis, Minnesota”

Figure 2-8: Minnesota's designated state trails and priority future bicycle corridors



Public Transit in the Twin Cities

A variety of public transit options are available in the Twin Cities. Current options include regular and express bus routes, light rail transit, commuter rail and bus rapid transit. Dial-a-ride service is also available throughout the region. All 187 cities and townships in the seven-county metro have access to some form of public transit service. Between 2005 and 2015, transit ridership in the Twin Cities grew by nearly 25 percent. Total ridership was 98.8 million in 2015. Figure 2-9 shows where fixed-route public transit is available in the Twin Cities in addition to planned transitway corridors under development. Figure 2-10 shows total transit ridership since 2005.

Figure 2-9: Existing and planned Twin Cities' fixed-route public transit

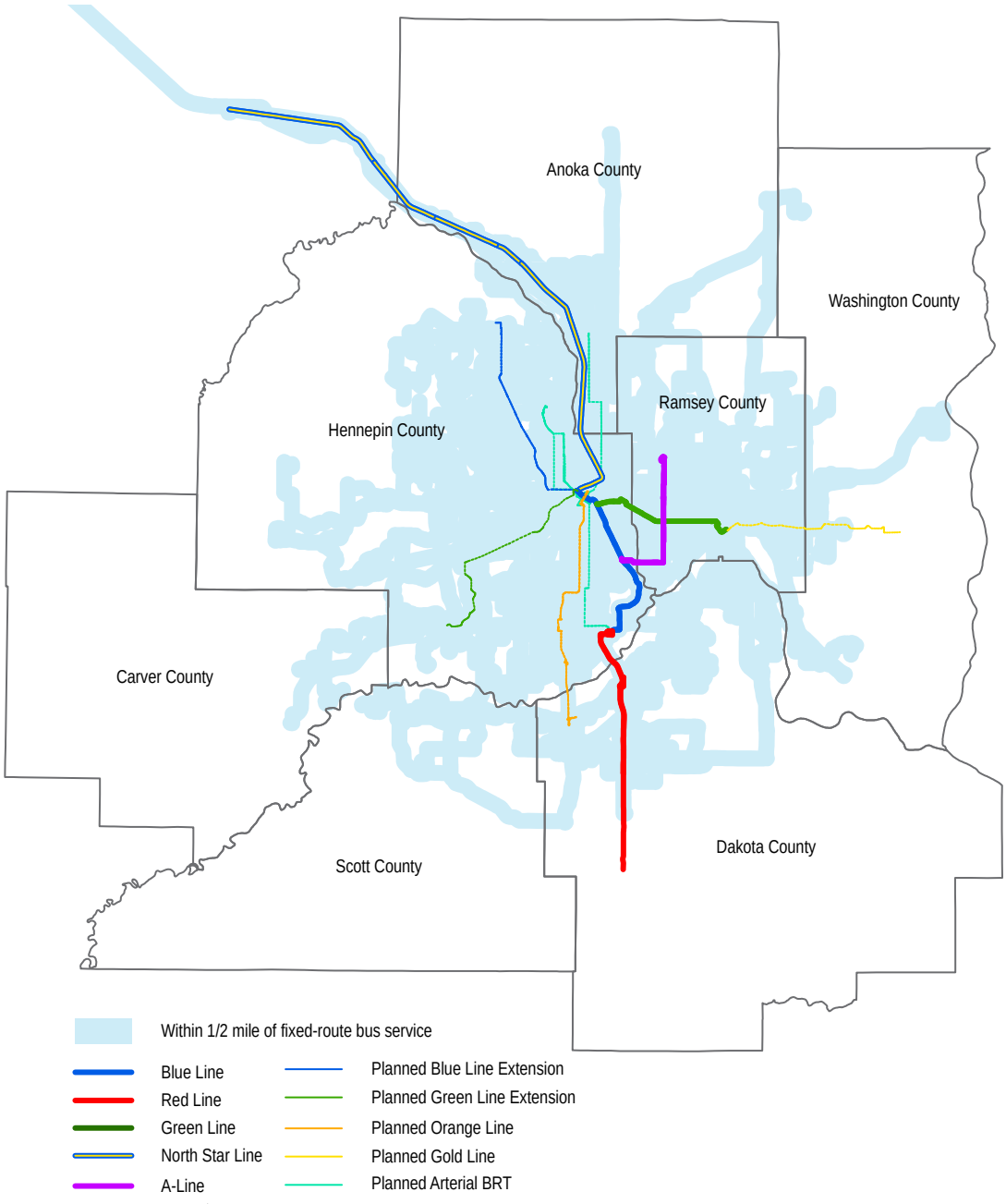
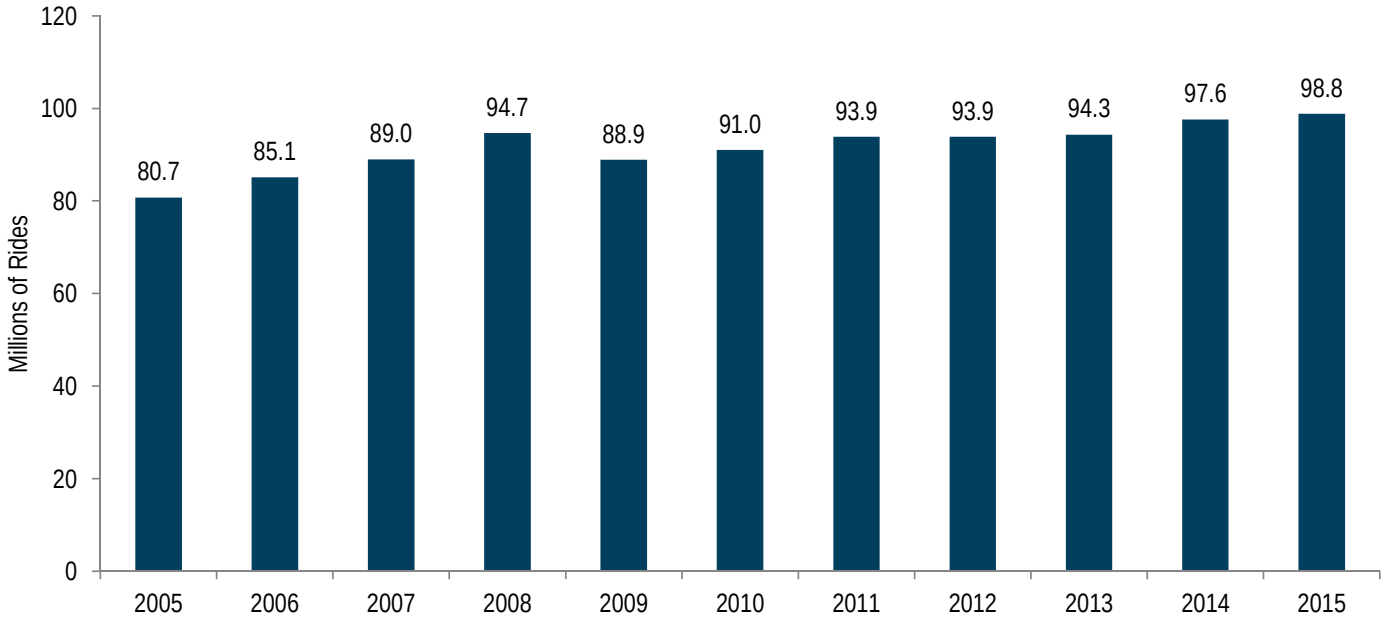


Figure 2-10: Twin Cities transit ridership, 2005 to 2015



Public Transit in Greater Minnesota

Seventy-six out of the 80 counties in Greater Minnesota have county-level transit service. The remaining four counties have service within one or more cities, but not at the county-level. Additionally, there are seven fixed-route systems in Greater Minnesota's metropolitan areas, seven small urban systems and four systems operated by tribal nations. Figure 2-11 shows public transit service in Greater Minnesota. Between 2005 and 2015, ridership increased by more than 25 percent across Greater Minnesota. In 2015, total transit ridership was at a 10-year high of 12.2 million, as shown in Figure 2-12.

Figure 2-11: Greater Minnesota transit service

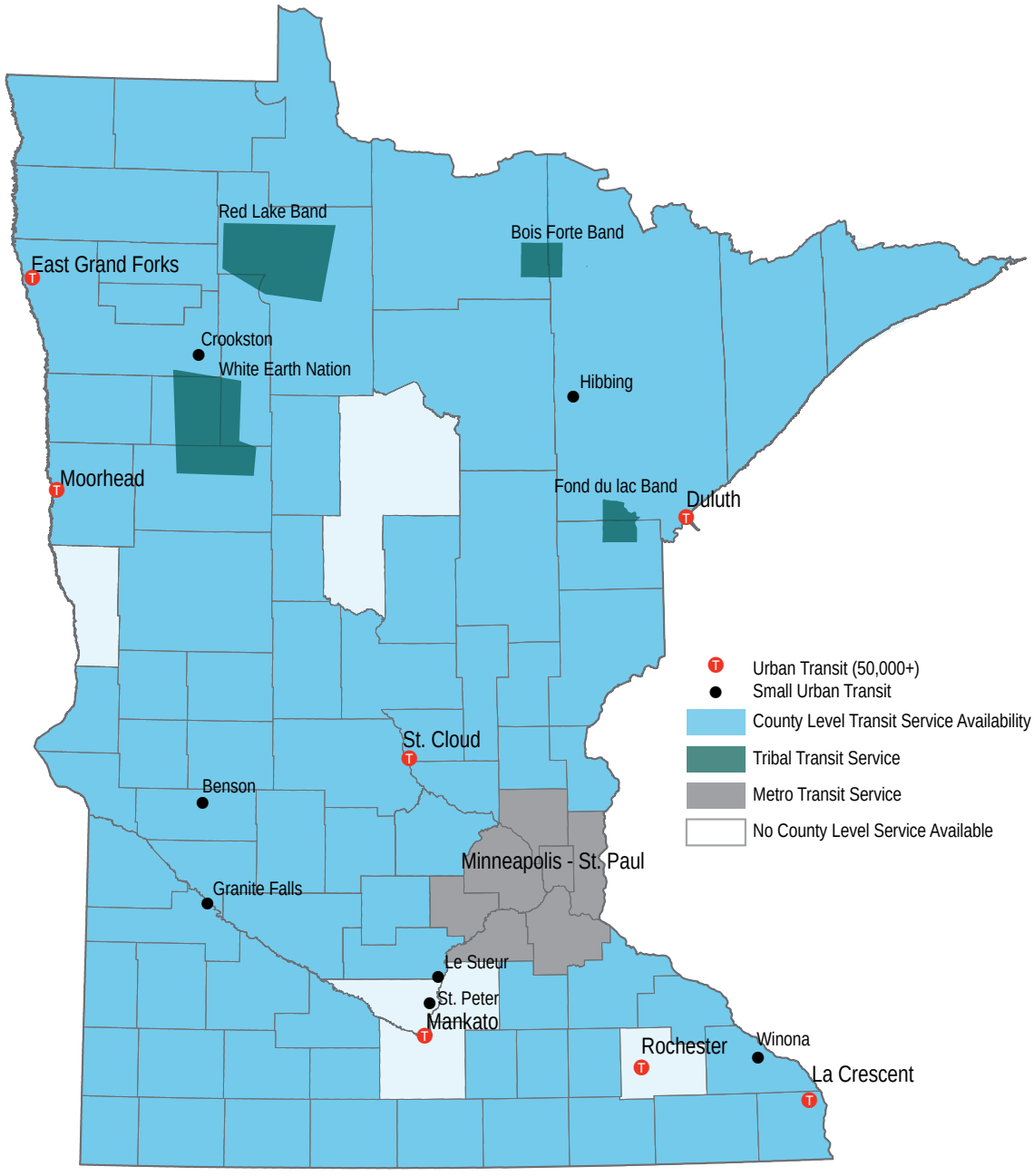
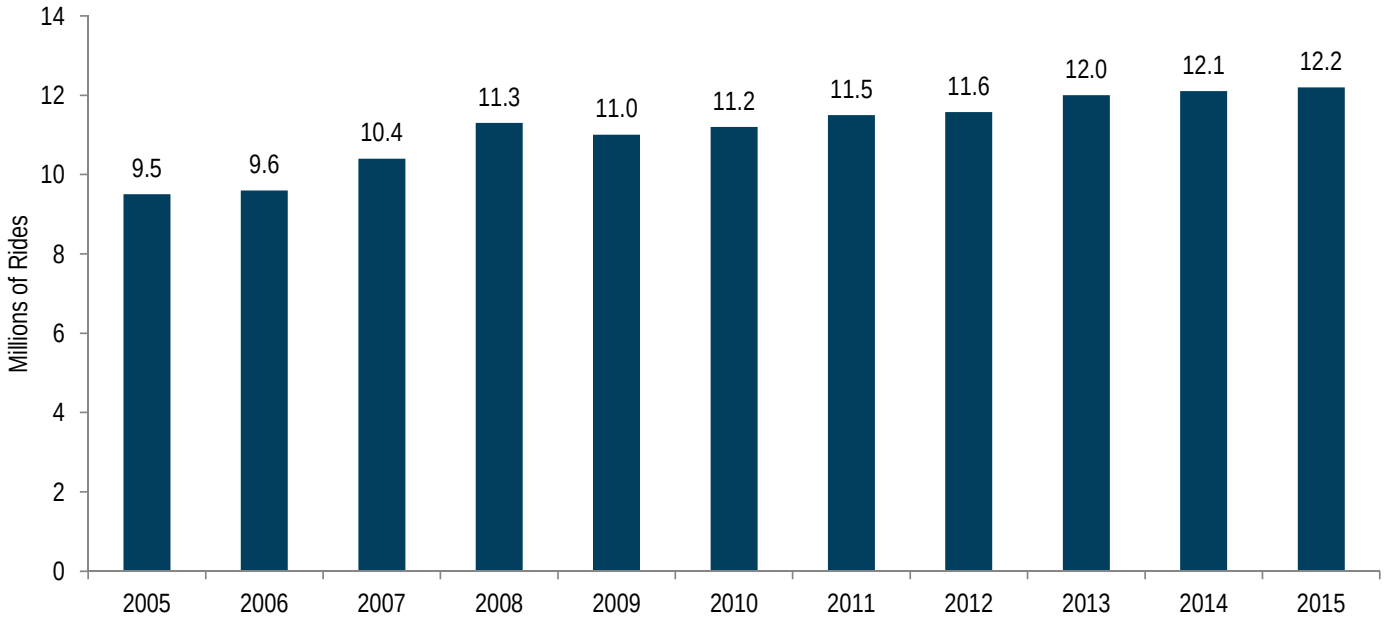


Figure 2-12: Greater Minnesota transit ridership, 2005 to 2015

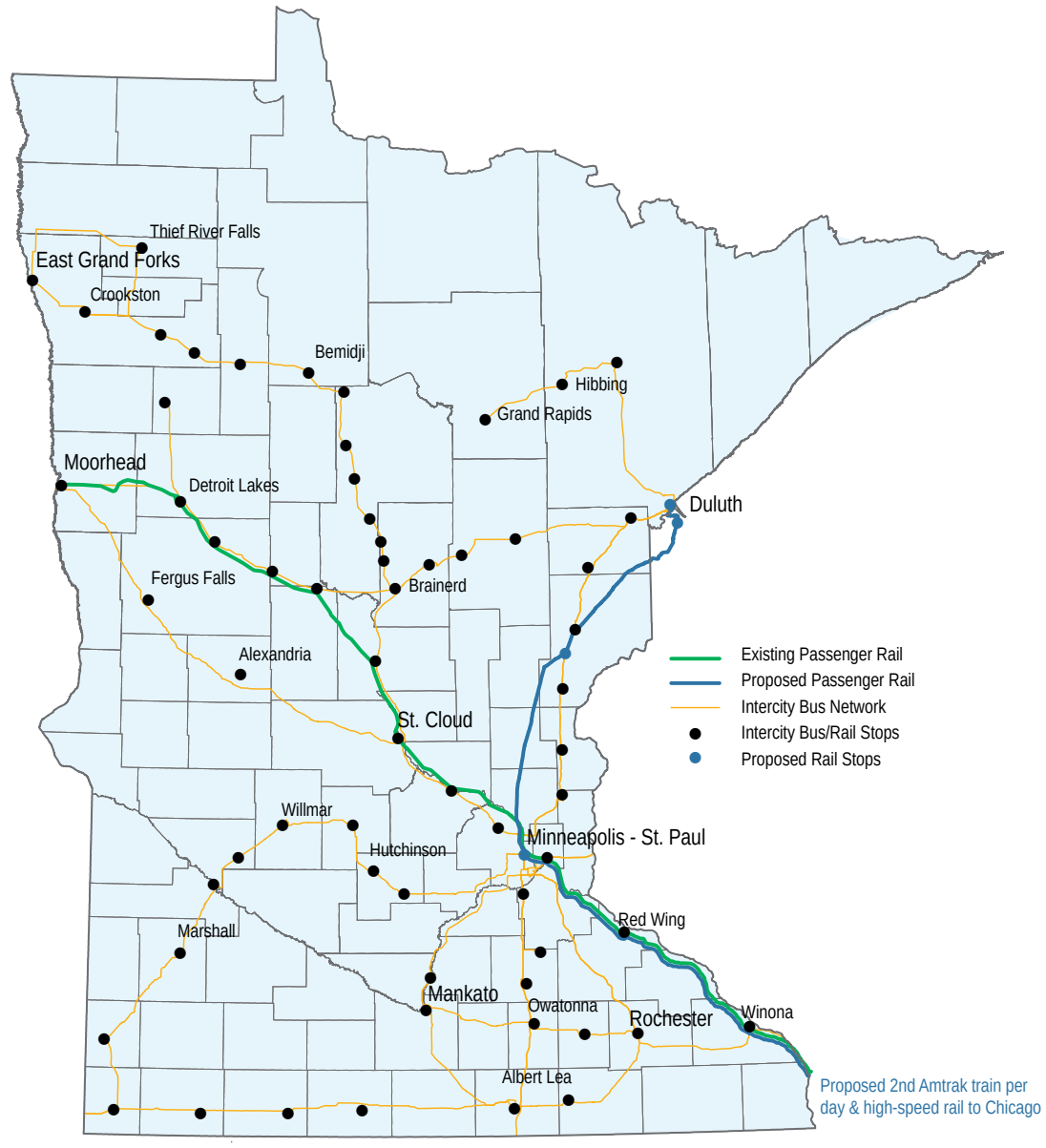


Intercity Bus & Rail Passenger Services

Minnesota has intercity passenger rail and bus service. Greyhound, Jefferson Lines, Land to Air Express, Northfield Lines, Rainbow Rider and Megabus provide intercity bus service to 87 destinations across the state. These services also connect to every major metropolitan area in the Midwest. Minnesotans took 49,801 rides on intercity bus routes in 2015.

Amtrak's Empire Builder route offers passenger rail service between Chicago and Seattle, stopping at stations in six Minnesota cities (Detroit Lakes, Staples, Saint Cloud, Saint Paul-Minneapolis, Red Wing and Winona). Additional corridors are being considered for future passenger rail service. Figure 2-13 shows the existing and planned intercity passenger rail corridors and intercity bus network in Minnesota.

Figure 2-13: Minnesota's existing and planned intercity passenger rail corridors and existing intercity bus network



Freight Rail

As of 2015, there were 21 railroad companies operating in Minnesota on 4,485 route miles of track. The state ranks eighth in total track mileage. The main products shipped on Minnesota's freight rail system are metallic ores, cereal grains and other food products. Minnesota ranks first in the nation in tons of iron ore shipped, third in food products and third in farm products. Figure 2-14 shows the existing freight rail network in Minnesota. Figure 2-15 shows the mix of commodities that are shipped on Minnesota's freight rail network.

Figure 2-14: Minnesota's freight rail network

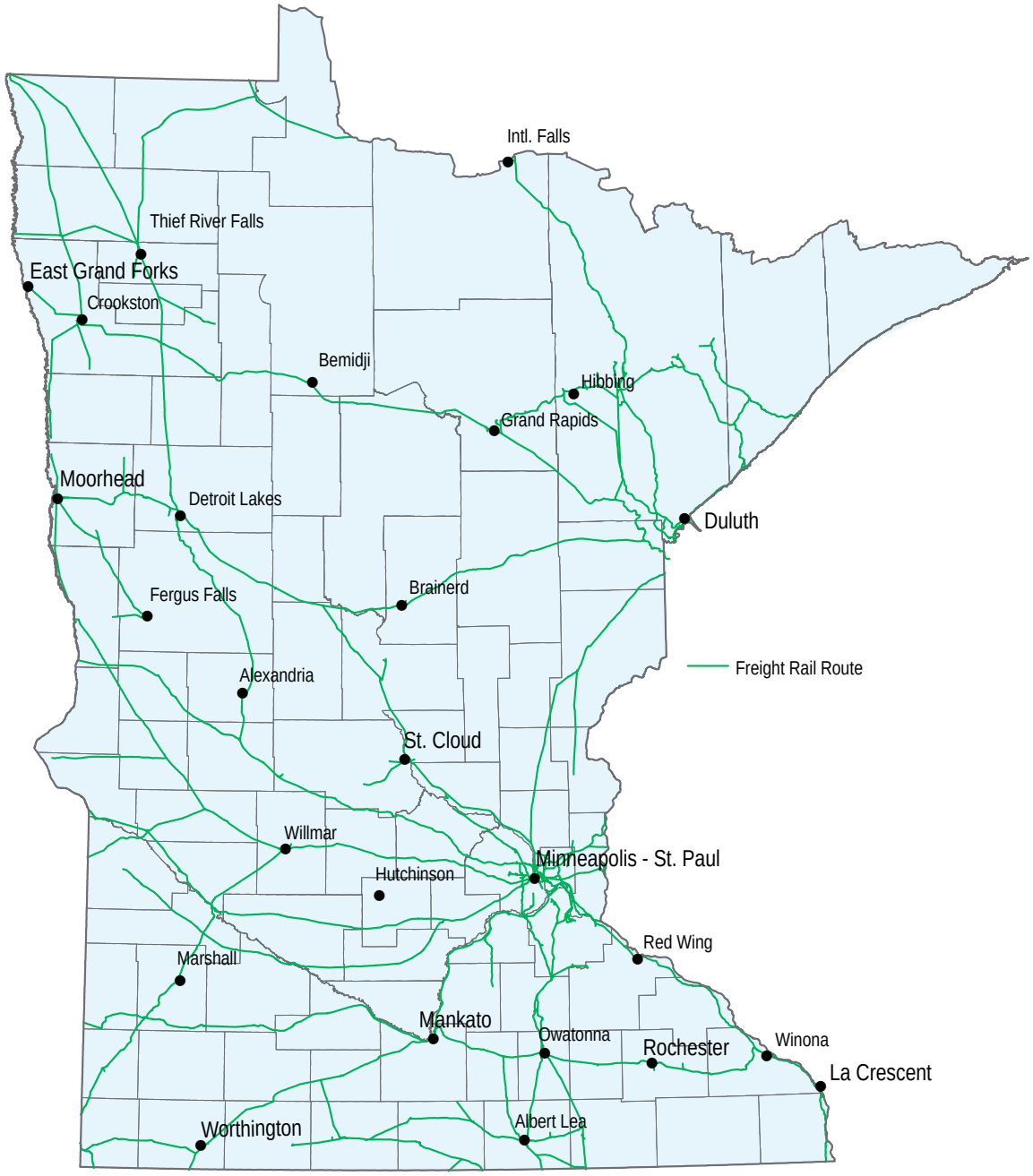
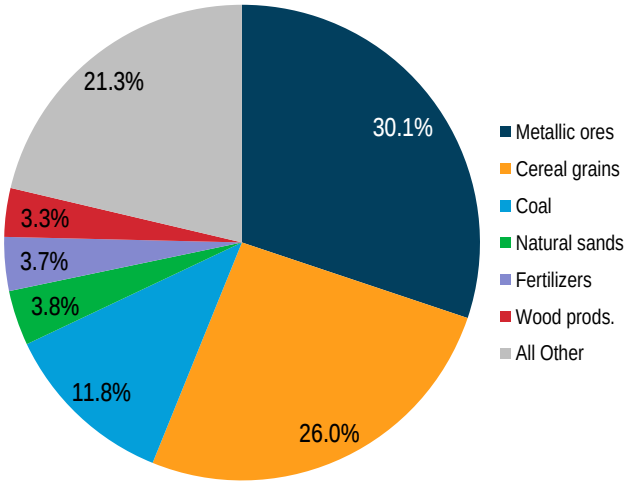


Figure 2-15: Commodities shipped on Minnesota's freight rail network by weight, 2015

Source: *Federal Highway Administration*, this data includes only shipments to, from or within Minnesota and does not include shipments passing through the state.



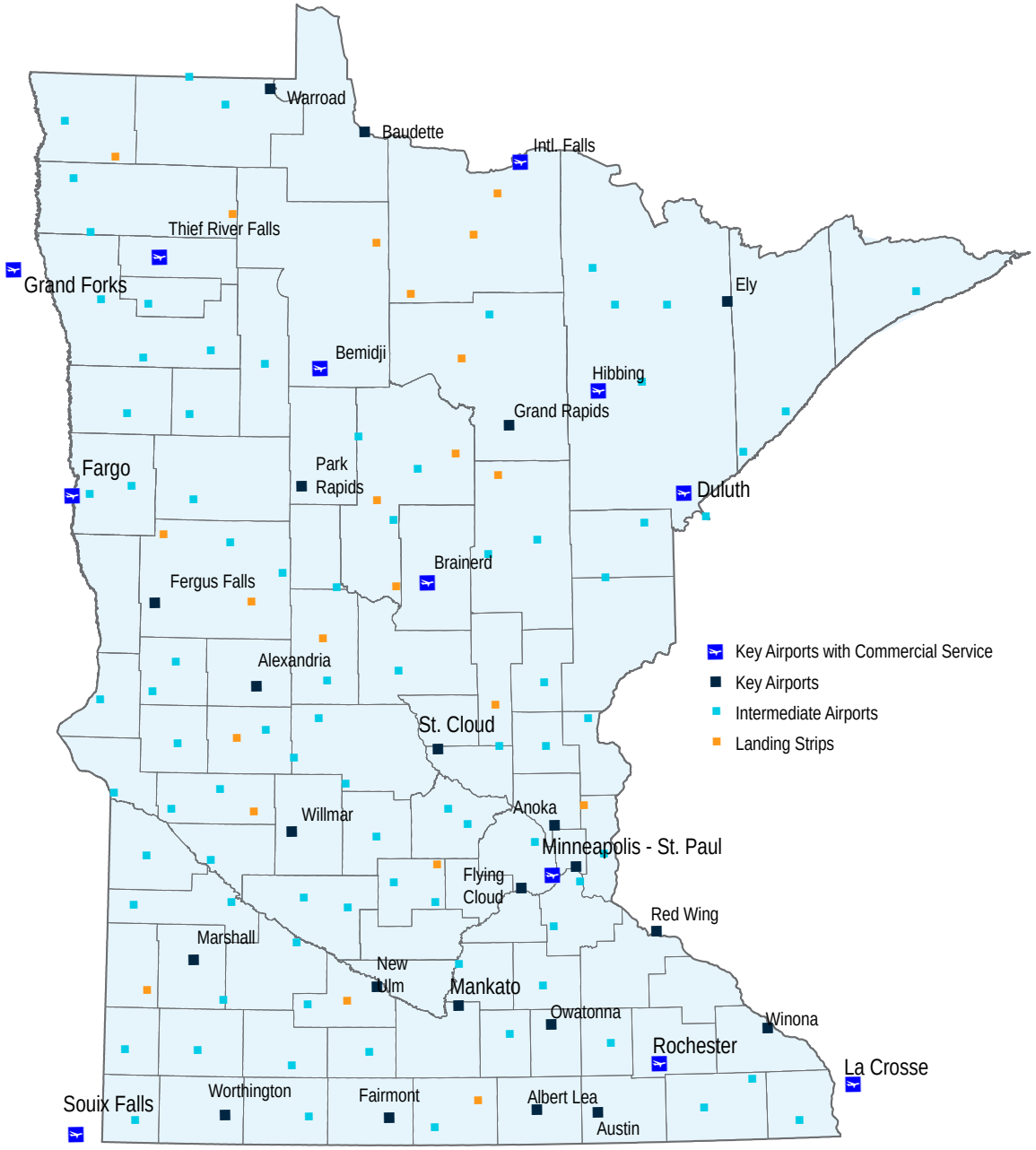
Air

Minnesota's air transportation system includes 388 airports, 135 of which are publicly funded. Some common aviation activities include personal travel, cargo services, medical transport, agricultural spraying and aerial surveying. Nine of the state's airports offer ticketed airline service – Minneapolis-St. Paul, Bemidji, Brainerd, Duluth, Hibbing, International Falls, Rochester, St. Cloud and Thief River Falls.

Minnesota's runways and taxiways are generally in very good condition. Currently, 94.4 percent of runway and taxiway pavements meet the standard for good quality. This beats the target of 84 percent or greater. Less than 3 percent of runways and taxiways are in poor condition. This is below the target of less than 4 percent.

Airports are classified based on their size and role in supporting their community. Figure 2-16 shows the existing airport network serving Minnesota.

Figure 2-16: Minnesota's aviation system



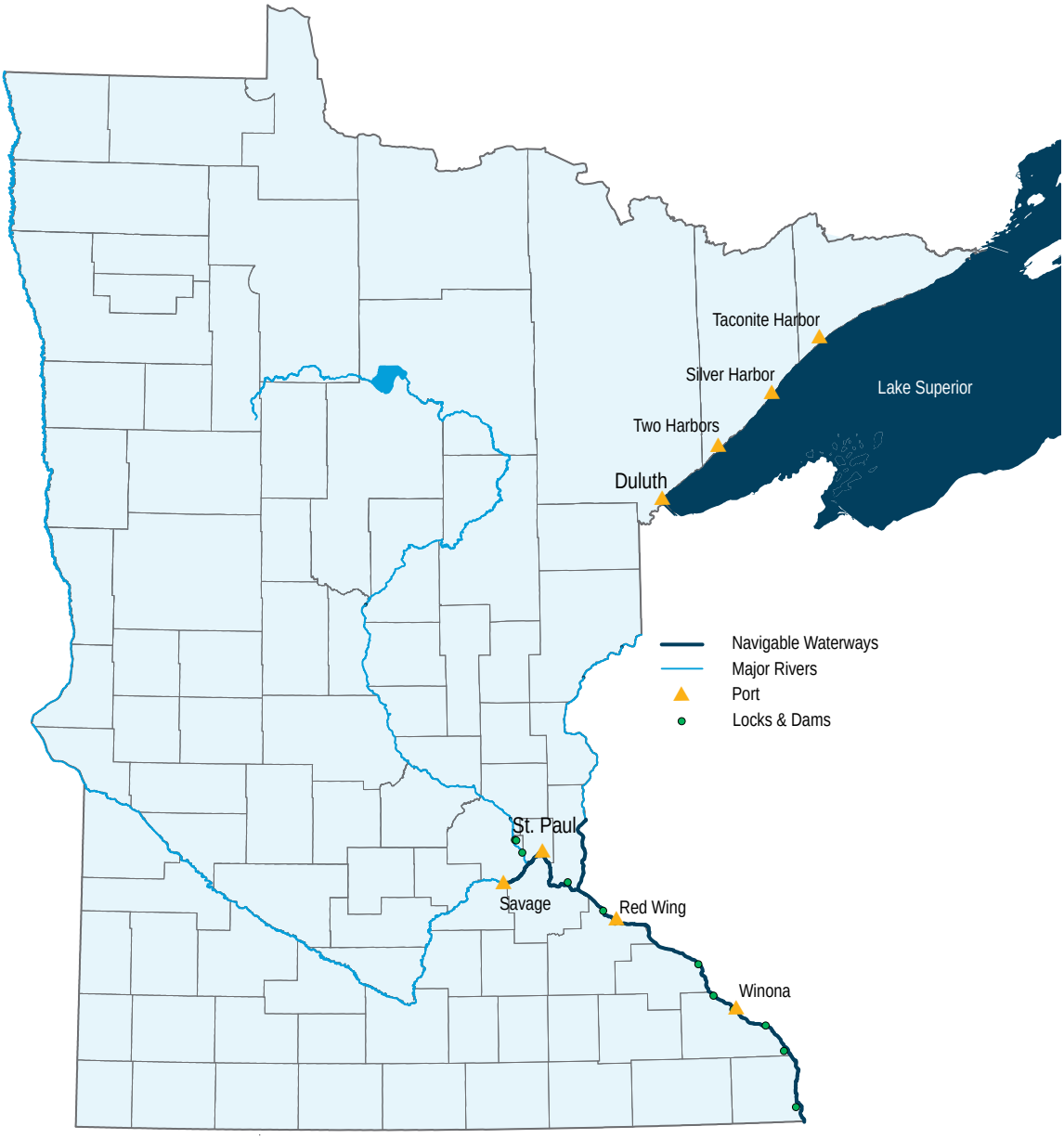
Ports & Waterways

Minnesota has four ports on Lake Superior. They are located in Taconite Harbor, Silver Bay, Two Harbors and Duluth-Superior. The combined tonnage shipped from these ports in 2014 was more than 57 million net tons.

There are 219 miles of the Mississippi River that are used to move goods in Minnesota. The river supports four public port areas in Red Wing, Saint Paul, Savage and Winona. These ports were used to transport 10.7 million net tons in 2014.

The largest commodity category by tonnage shipped on Minnesota's waterways is iron ore, iron and steel waste, and scrap. Figure 2-17 highlights the port and waterway system in Minnesota.

Figure 2-17: Minnesota's ports and waterway system



TRANSPORTATION FUNDING IN MINNESOTA

Many partners are involved in funding Minnesota's transportation system. The federal government, tribal governments, state government, counties, cities, townships, metropolitan planning organizations, private corporations and non-profit organizations all provide transportation funding or help decide how money is spent. However, the specific role each partner plays is different. Some partners provide money through one or more funding sources. Others only provide direction for how money from certain sources should be spent. Most partners do both. For each mode of transportation, the mix of funding partners is different. For example, local units of government provide the largest portion of funding for Minnesota roadways. However, the state's rail system is primarily supported through funding from private corporations.

Funding sources can be grouped into two categories based on where the money comes from – transportation revenue or general revenue. Transportation revenue describes funding raised through the use of the transportation system or related activities. This includes taxes, fees and profits connected to transportation. Examples of transportation revenue are fuel taxes and money collected from passenger fares. Conversely, general revenue describes funding that is not directly tied to a transportation activity, such as property taxes. All transportation modes are funded to some extent by both transportation revenue and general revenue.

Different rules guide how money is allowed to be spent. Generally speaking, funds from public sources are distributed to specific projects and activities through programs (Figure 2-18). A funding source may contribute to only one program or many. Specific projects are often funded from more than one program. Putting it all together is a complex puzzle. Funding for any given project depends on a variety of factors such as the project purpose, transportation mode, scope, lead organization and timing.

TRANSPORTATION REVENUE VS. GENERAL REVENUE

Transportation revenue describes funding raised through the use of the transportation system or related activities. This includes taxes, fees and profits connected to transportation. Examples of transportation revenue are fuel taxes and money collected from passenger fares.

General revenue describes funding that is not directly tied to a transportation activity, such as property taxes.

All transportation modes are funded to some extent by both transportation revenue and general revenue.

Figure 2-18: Transportation funding process

Transportation projects can be grouped into different categories based on the type of activity. At a high level, the main types of activities are:

- Capital, which includes the construction of facilities and purchase of equipment. It can also include activities necessary to deliver capital projects such as planning, purchase of land, design, etc.
- Maintenance, which includes the rehabilitation of existing facilities and equipment, such as roadway repair.
- Operations, which includes activities that support the safe use of the system such as inspections, bus driving, plowing, traffic control, etc.

In addition to funding, financing is also an important tool used to support Minnesota's transportation system. Funding refers to money available at the time of a project, such as having $20 in one's wallet. Examples of funding sources are taxes and fees. Financing, on the other hand, is money provided with the expectation that it will be paid back, usually with interest. This is like charging something to a credit card or taking out a loan. The money eventually needs to be repaid from a funding source. An example of financing is bonding. Funding and financing are both useful but it is important to understand the difference between them.

How the funding and financing pieces come together to build, maintain and operate the system is different for each mode of transportation. The following sections identify the key funding sources and programs for each transportation system - air, port and waterways, rail and surface transportation, which includes roadways, trails, transit and intercity bus service.

The information in this chapter represents a snapshot in time. It reflects current funding conditions, which may change as new laws or guidance are developed or as the use of the system changes. The summary is not an accounting of every dollar spent on transportation in Minnesota. Rather, it focuses on identifying the key funding sources and programs, and the relationships between them. It also focuses primarily on public sources of funding due to information availability.

FUNDING VS. FINANCING

Funding refers to money available at the time of a project, such as having $20 in one's wallet. Examples of funding sources are taxes and fees.

Financing is money provided with the expectation that it will be paid back, usually with interest. This is like charging something to a credit card or taking out a loan. The money eventually needs to be repaid from a funding source. An example of financing is bonding.

Funding and financing are both used to support transportation in Minnesota.

Roadways, Trails & Transit

ROADWAYS

The majority of roadways in Minnesota are the responsibility of local units of government – cities, counties, townships. Capital, maintenance and operations activities on these roadways are primarily funded by local general revenue, such as property taxes. State transportation revenue also supports some local roadways through the State Aid for Local Transportation program. Additionally, some federal programs target funding to local roadways.

The state highway system consists of interstates, U.S. highways and Minnesota highways. These roadways make up about 8 percent of the total roadway miles in Minnesota. For these roadways, state transportation revenue, specifically the state gas tax, is the largest funding source for capital, maintenance and operations activities. Federal programs are also a significant source of funding for the state system. They make up about a quarter of the funding for capital projects.

In addition to motor vehicles, bicyclists and pedestrians can also legally use Minnesota roadways, except where explicitly prohibited. Many roadways include specific bicycle and pedestrian elements to encourage safety for all users. Examples of these elements include bicycle lanes, sidewalks and widened or paved shoulders. Since these elements are often included as part of roadway projects, they are typically funded by many of the same sources that fund general roadway projects.

TRAILS

In addition to on-road bicycle and pedestrian facilities (described in the previous section), trails, or shared-use paths, also provide important connections for those bicycling and walking. In Minnesota, trails are funded through a variety of programs at the federal, state and local levels. There are consistent funding programs for these projects at all levels but the specific amount available from each source varies year by year. Funding levels are affected by things such as the amount of money set aside by Congress or the Minnesota Legislature, bonding levels and how well proposed projects compete in various program solicitations.

SURFACE TRANSPORTATION AT A GLANCE

Size:

- 142,914 roadway miles
- 817.5 miles of designated bicycling routes
- 560 miles of sidewalk along the State Trunk Highway system and many more along local roadways
- More than 4,000 miles of designated trails
- 212 regular bus routes, two light rail lines and two bus rapid transit lines in the Twin Cities
- 42 Greater Minnesota public transit systems, plus four tribal systems
- Intercity bus connections to 87 destinations

Use:

- 59.1 billion vehicle miles traveled on Minnesota roadways
- Minnesota roadways also carry bicycle and pedestrian traffic, as do trails
- 98.8 million rides on Twin Cities transit
- 12.15 million rides on Greater Minnesota transit
- 49,801 rides on Minnesota intercity bus routes

Responsibility:

- The majority of roadways, including on-road bicycle and pedestrian facilities, are owned by cities, counties and townships
- Most shared-use paths are also owned by local units of government; state trails are the responsibility of the Minnesota Department of Natural Resources
- Transit service in the Twin Cities is primarily operated by the Metropolitan Council (other providers include Southwest Transit, Minnesota Valley Transit Authority, Maple Grove Transit, Plymouth Transit and the University of Minnesota)
- Transit services in Greater Minnesota are operated at the regional, county or city level.

TRANSIT

In the Twin Cities, transit includes regular and express bus service, dial-a-ride bus service, bus rapid transit, light rail transit and commuter rail. For the purposes of this summary, commuter rail funding is discussed in the rail section of this chapter since it operates on the same network as freight and passenger rail services. The other types of transit are considered surface transportation since they operate on the roadway network or within roadway right of way. For these modes, capital projects are largely funded by federal transportation revenue, through programs such as New Starts. Transit maintenance and operations are primarily funded by state sources, such as the motor vehicle sales tax, which are distributed through the Metropolitan Transit Account. For major transitway projects, such as the Green Line, significant funding for capital and operations comes from county general revenue. In 2008, some of the metropolitan counties implemented a quarter cent sales tax to support the development and operations of the region's transitway system. This money is distributed to projects within member counties for capital and operations through the Counties Transit Improvement Board.

In Greater Minnesota, the majority of public transit activities are funded through state sources. These include transportation and general revenue. Local sources make up approximately a quarter of Greater Minnesota transit. Federal programs also provide revenue for capital and operations activities.

For all transit systems, money collected from passenger fares makes up a portion of the funding available for capital, maintenance and operations activities. However, the amount varies widely among different transit services throughout the state.

INTERCITY BUS

Most intercity bus services in Minnesota are owned and operated by private companies and funded through private sources. However, some carriers receive public funding assistance to support their operations and create or enhance access to small towns across the state. This public funding assistance comes primarily from federal and state transportation revenue through the Minnesota Intercity Bus Program.

A more detailed summary of the funding sources and programs that support Minnesota's surface transportation system is included in Appendix C.

Rail

FREIGHT RAIL

Private funding from the 21 freight railroad companies operating in Minnesota is the main source for capital, maintenance and operations activities on the state's rail system. Publicly-owned railways rely on federal, state and local sources of funding in addition to public-private partnerships. Typically, public funding for the rail system comes from general revenue.

PASSENGER RAIL

Passenger rail operations for Amtrak's Empire Builder are largely funded through Amtrak revenue, such as ticket sales and advertising, and federal general revenue. Capital and maintenance activities related to train equipment are funded through these same sources. Capital and maintenance activities related to rail tracks are mostly funded through the private railroad companies, occasionally in partnership with the state. Planning and development of future passenger rail service is primarily supported by state general revenue.

COMMUTER RAIL

Northstar commuter rail capital, maintenance and operations are funded as part of Metro Transit's budget. In addition to money from passenger fares, funding comes largely from state transportation revenue through the Metropolitan and Greater Minnesota Transit Accounts.

Light rail and streetcar services are considered transit and are included in the transit section. A more detailed summary of the funding sources and programs that support Minnesota's rail system is included in Appendix C.

RAIL TRANSPORTATION AT A GLANCE

Size: Minnesota's rail system is made up of 4,485 total route miles, including 381 miles of passenger rail service and 40 miles of commuter rail service.

Use: The rail system primarily supports 21 freight railroad companies, one passenger rail line (Amtrak's Empire Builder) and one commuter rail line (Metro Transit's Northstar).

Responsibility: Minnesota's rail system is mostly owned by private railroad companies. Passenger and commuter rail services have rights / agreements with the railroads for the use of the tracks.

Air

GENERAL AVIATION

Most of Minnesota's public airports are the responsibility of local units of government. They receive the majority of their capital funding from federal transportation revenue through the Airport and Airway Trust Fund. State and local sources also contribute to capital projects and are the primary sources for airport maintenance and operations activities. The State Airports Fund is the main state funding source and is made up of transportation revenue, specifically revenue from aviation activities. Local funding sources include a mix of transportation and general revenue. Additionally, airports can receive funding from private investment, including occasional public-private partnerships.

COMMERCIAL AIRLINE SERVICE

Commercial passenger service in Minnesota is primarily set up and funded by the airlines serving the state. Some federal transportation revenue is used to support commercial service as part of the Essential Air Service program.

A more detailed summary of the funding sources and programs that support Minnesota's aviation system is included in Appendix C.

AIR TRANSPORTATION AT A GLANCE

Size: There are 375+ airports in Minnesota:

- 135 are publicly owned and receive state funds.
- Nine have commercial airline service.
- Six are privately owned, with public use.
- 67 are privately owned, for private use.
- Other seaplane bases and heliports, including hospital heliports.

Use: Airports in Minnesota support general aviation activities (e.g. agricultural spraying, business travel, firefighting), air cargo and commercial airline service.

Responsibility: Local units of government are responsible for public airports in Minnesota.

Ports & Waterways

PORTS

Most port terminals in Minnesota are privately owned and funded entirely through private sources. Public port authorities often lease port land to private companies to operate port terminals. Additional funding for public port authorities comes from state general revenue and is available for capital projects as part of the Port Development Assistance Program. Operations and maintenance activities are funded almost exclusively through revenue received from the use of the ports.

WATERWAYS

Minnesota's navigational channels and locks and dams also require investment to stay operational. This funding comes through the U.S. Army Corps of Engineers and includes federal transportation and general revenue.

A more detailed summary of the funding sources and programs that support Minnesota's port and waterway system is included in Appendix C.

PORTS & WATERWAY TRANSPORTATION AT A GLANCE

Size: Two waterway systems (Mississippi River and Great Lakes-St. Lawrence Seaway), 219 navigable river miles, eight ports and 10 active locks and dams.

Use: Ports and waterways are primarily used to move bulk freight but also support recreational activities.

Responsibility: The majority of port terminals are privately owned. The federal government is responsible for all locks and dams.

MinnesotaGO
A Collaborative Vision for Transportation

Statewide Multimodal Transportation Plan

Chapter 3

WHAT IS CHANGING?

DRAFT FOR PUBLIC COMMENT

TRENDS IMPACTING MINNESOTA

Minnesota is changing. Future changes will create new demands on the transportation system. Learning about these changes is a vital part of planning a safe and efficient transportation system. The Minnesota GO Vision calls for a transportation system that can adapt to whatever the future might hold.

This chapter describes opportunities and challenges that will impact Minnesota in the next 20 years. The trends are broken into five categories: population, economy, environment, transportation behavior and technology. See the "Want to Learn More?" section of the Appendix for links to the full papers on each trend.

POPULATION

Minnesota is home to a growing and changing population. The state is projected to grow in total population and in diversity. Transportation planning affects everyone, but in different ways.

There are many ways to look at how Minnesota's population is changing. Three trends stand out among the others for special focus.

- Minnesotans are aging. As the baby boomers grow older they will require different options to maintain the level of mobility they enjoyed in the past.
- Urban areas are seeing increasing population growth. This impacts how people travel to, between and within communities.
- Minnesota is becoming more diverse. This raises questions about how transportation can help address the socioeconomic disparities that exist and that have remained constant throughout recent decades.

More information about the state's population can be found in the *Demographic Trends paper*. The health of Minnesotans is another important trend. Detailed information about transportation and public health can be found in the *Health Trends in Minnesota paper*.

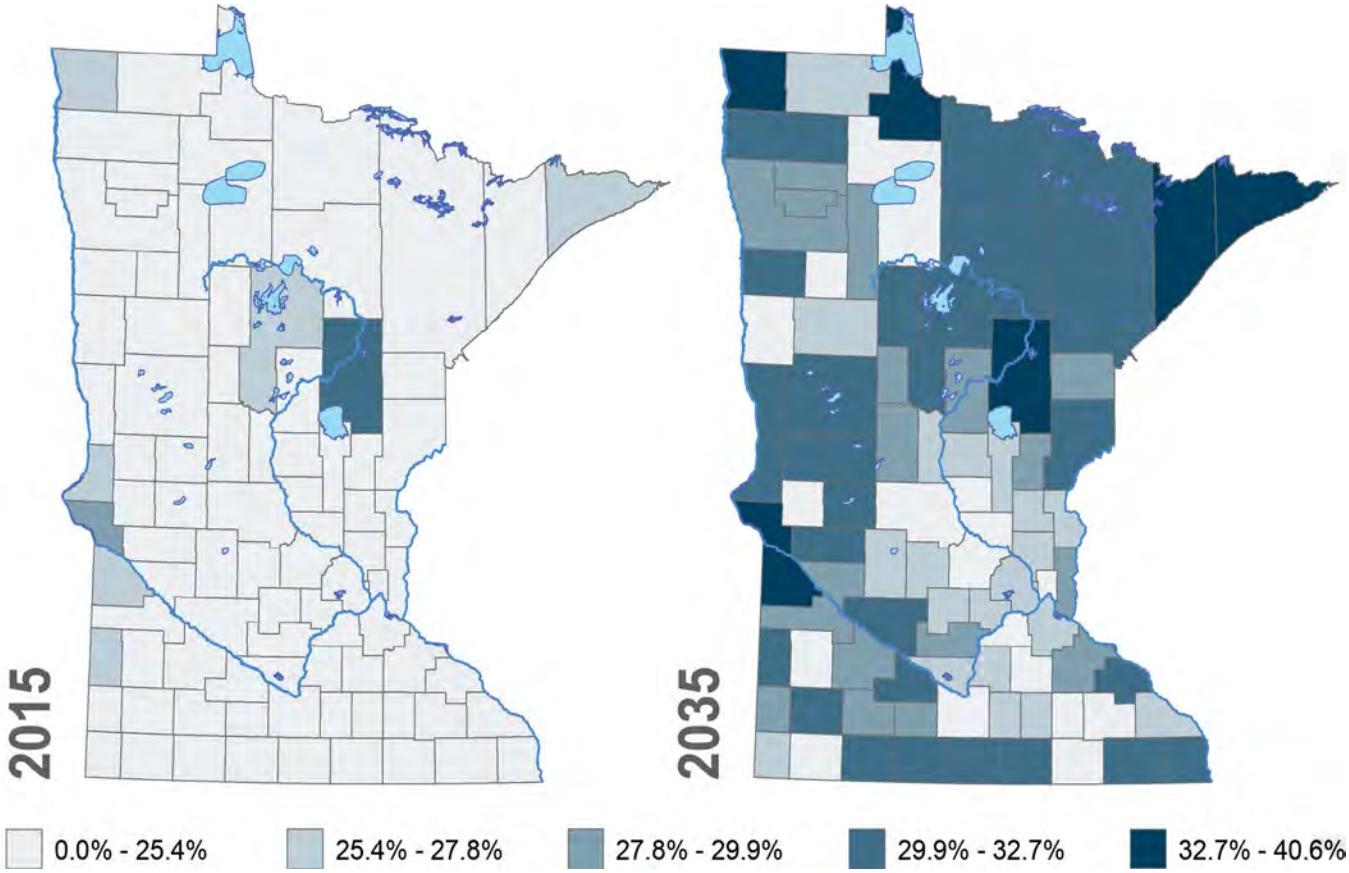
Minnesota's Aging Population

Minnesota's population as a whole will become older in the next 20 years. Just less than 14 percent of the population is currently above age 65.[1] The number of *seniors in Minnesota* is projected to grow until hitting a peak in the year 2035. At that point there are projected to be more than 1.2 million seniors in Minnesota (20 percent of the population). In 2035, for the first time, more Minnesotans will be older than age 65 than under age 18. Growth in the senior population will impact the entire state, as is shown in Figure 3-1.

1 U.S. Census Bureau, 2010-2014 American Community Survey 5-year Estimates

Figure 3-1: Percentage of county residents over the age of 65

Source: Minnesota State Demographer



Ensuring that seniors have regular, safe and affordable ways to get around is important. As people age, they are more likely to have limited travel options. More than 30 percent of Minnesotans age 65 and older and 45 percent of those age 75 and older report they have a disability.[2] This can have a major impact on how people get from place to place. For example, the number of rides provided by Metro Mobility in the Twin Cities grew by 6.8 percent from 2014 to 2015.[3] This number is likely to increase well into the future.

2 U.S. Census Bureau, 2010-2014 American Community Survey 5-year Estimates
3 *Metropolitan Council, 2016*

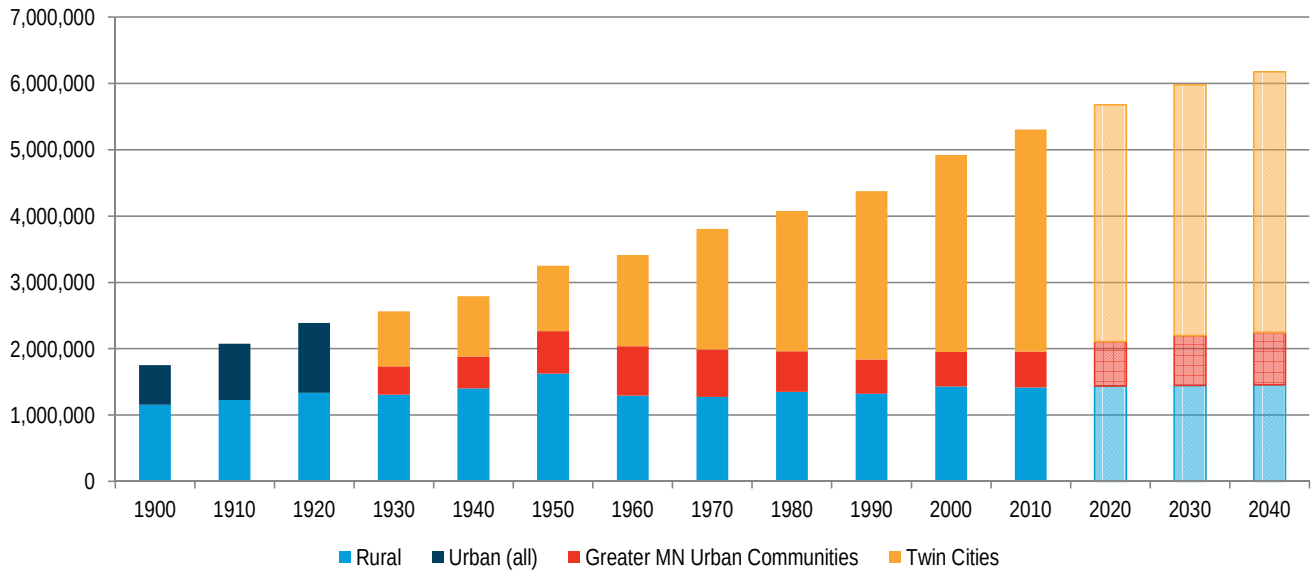
Urban & Rural Population Trends

Minnesota is becoming more urban in all parts of the state. Just over 70 percent of people live in cities and towns with populations over 2,500 people.[4] The number of people living in rural areas has stayed relatively constant since 1900. Minnesota's urban population has grown significantly during the same time. The Minnesota State Demographer estimates that most counties will grow in population during the next 30 years. The largest population growth is projected to occur in the Twin Cities region. A smaller rate of growth is expected in Greater Minnesota's urban communities. This information is shown in Figure 3-2.

A growing urban population will use transportation in different ways than people do today. It will be important to provide a variety of options for people to travel within and between urban areas.

Figure 3-2: Minnesota's historic and projected urban and rural populations

Source: Census; Minnesota State Demographer



4 *2010 U.S. Census*; The U.S. Census definition of urban is any community with a population over 2,500.

Racial Disparities & Equity

In the last 50 years, Minnesota's population has become much more diverse. In 1960 only 1.2 percent of the state's residents were people of color. Today there are more than one million people of color in Minnesota, nearly 20 percent of the population. This number is projected to grow in the next 20 years. By 2035, one in four Minnesotans will be people of color.

As Minnesota becomes more diverse, the state must address the stark disparities that exist between white people and people of color. Minnesotans of color earn less than half the income that white Minnesotans do on a per-capita basis. Minnesotans of color also have lower high school graduation rates than white Minnesotans. Further, Minnesotans of color are far more likely to be unemployed.[5] Recent analysis by the Metropolitan Council showed these disparities cannot be fully explained by differences in demographic factors, such as age, immigration and language ability, level of education, or employment status.[6] *Advancing equity* in Minnesota is critical to the health and well-being of the state. It is critically important to make sure that all people have access to a healthy and prosperous future.

"Recent analysis by the Metropolitan Council has shown that these [racial] disparities cannot be fully explained by demographic factors, such as age, immigration and language ability, level of education or employment status."

ECONOMY

The last 20 years saw significant changes in the state's economy. Moving forward, transportation will need to evolve to meet the needs of a changing economy. This is an essential part of realizing the Minnesota GO Vision.

Many different systems must work together to keep Minnesota's economy strong. Transportation provides the backbone for connecting people to jobs and moving goods from producers to buyers. Shippers are developing new methods to more efficiently transport freight using existing systems such as *freight rail* and *new logistics* concepts.

Keeping the transportation systems that the economy relies on in good shape can be a challenge. *Public-private partnerships* have been proposed as a way to infuse capital into the system. The partnerships could also provide greater flexibility when carrying out a project. *Dynamic pricing* offers another way to charge users depending on existing demand.

5 Racial Disparities & Equity, 2016

6 *Diving Deeper Summary: Understanding the Twin Cities Region's Racial and Ethnic Disparities, 2016*

Economic Sectors & Employment Patterns

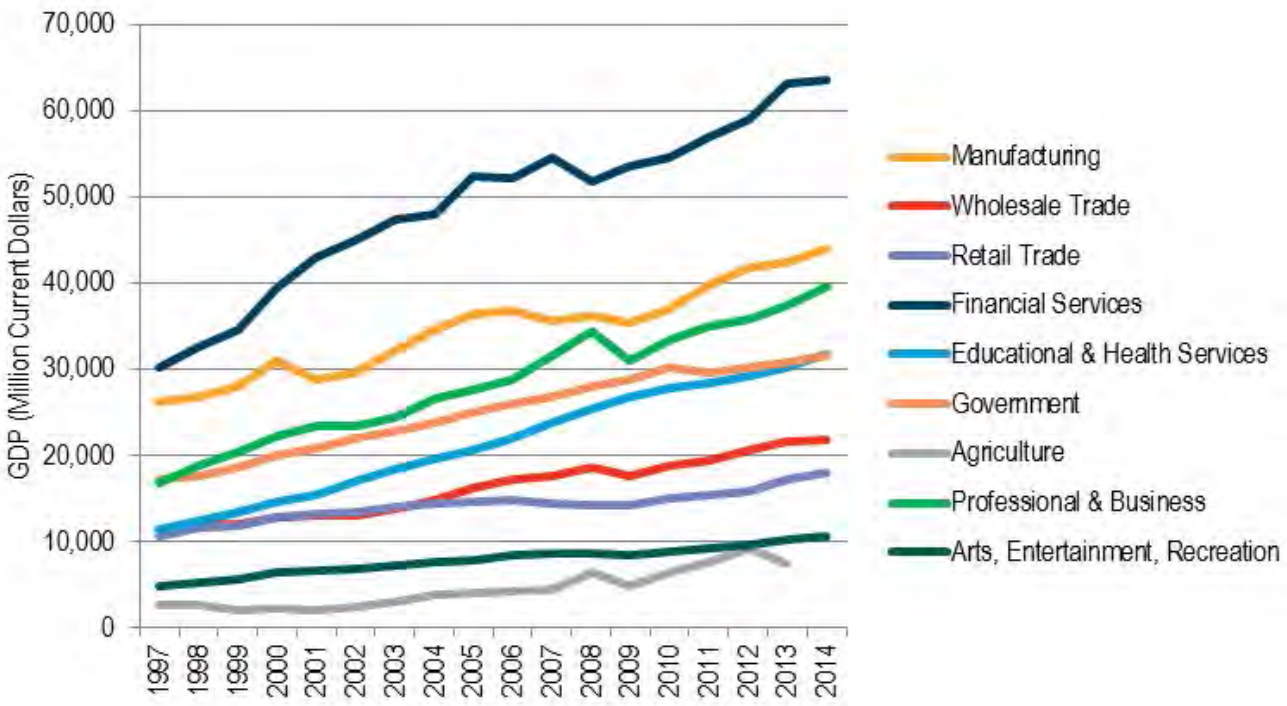
MnDOT defines congestion by the percent of freeway miles below 45 miles per hour during peak periods.

Trends in the *economy* reflect many other changes occurring at the same time. In general, the state's economy is shifting from farming and manufacturing toward service industries. Figure 3-3 shows Minnesota's Gross Domestic Product by economic sector from 1997 to 2014. Minnesota has seen a period of economic growth in recent years. Unemployment and underemployment are now below pre-recession levels. Despite this, growth has not reduced the racial disparities discussed in the previous section.

Congestion on the transportation system can cause problems for people traveling to work and goods traveling to market. MnDOT tracks freeway congestion in the Twin Cities. Since 2010, the percentage of freeway miles congested during peak travel periods in the Twin Cities remained close to 20 percent, with minor fluctuations up and down.

Figure 3-3: Minnesota Gross Domestic Product (2014 dollars) by top economic sectors, 1997-2014

Source: *MN DEED Quarterly Census of Employment & Wages* Note that agriculture in this chart refers to only farm activities.

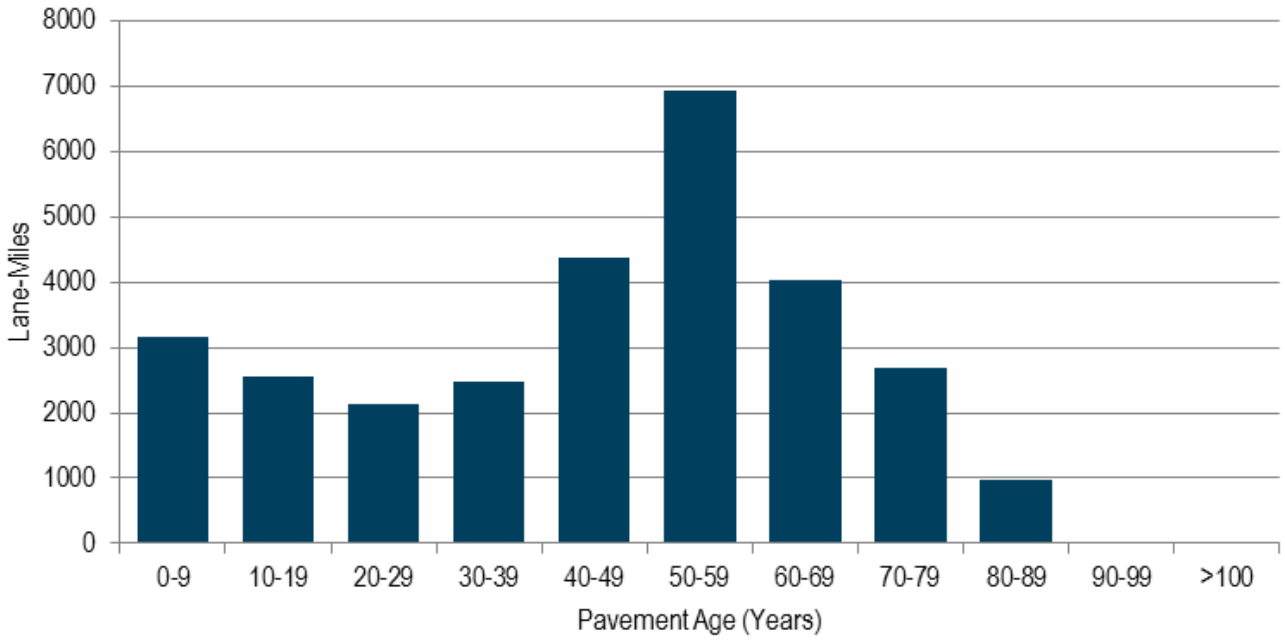


Aging Infrastructure

Infrastructure across the country is *aging*. Many of the public systems that serve communities throughout the nation were built between 40 and 70 years ago. At that time, the growth of urban areas required a rapid build out of road, sewer, water and utility systems. To illustrate the trend, Figure 3-4 shows the age of pavements on the state highway system in Minnesota.

Minnesota faces a wave of aging roads and bridges that need upkeep. MnDOT typically reconstructs roads when they are between 70 and 80 years old. Bridge replacement typically occurs at 50 to 100 years. Additional needs for maintenance can be found on city and county roads and Minnesota's airports, railroads, ports and waterways. These needs add to a seemingly ever-growing list of investments that must be made to maintain the quality of the state's public systems.

Figure 3-4: Age of pavement on Minnesota's state highway system, 2014



ENVIRONMENT

Minnesota's environment is changing. Everything that Minnesotans do has some impact on the state's natural resources and climate. Learning how transportation is part of these changes is important when planning to limit or reduce negative impacts in the future.

Environmental Quality

Transportation impacts the air, water, plant and animal resources in the state. As the population grows so does the demand on natural resources. Studying transportation's effects on *environmental quality* today shows where changes are needed. Ideally, transportation investments and strategies may even be able to help improve the environment.

On-road vehicles are the biggest source of air pollution in Minnesota. Despite growth in vehicle miles traveled, emissions from highway vehicles dropped by more than 50 percent over the last 25 years. This drop is largely due to changes in federal vehicle and fuel standards. Further reductions in emissions could also help to limit public health impacts from air pollution.

The transportation system also impacts Minnesota's water quality. Run-off from roads can carry pollutants into bodies of water and wetlands. Chloride (i.e. salt) is one pollutant of concern because of its effects on wildlife and drinking water supplies. Chloride is very difficult to remove once present in a body of water.[7]

Many of the state's ecosystems are now home to invasive species. The transportation system may offer easy ways for invasive species to spread. The impacts of some invasive species are only a nuisance, while others can potentially be devastating. Examples of invasive species include zebra mussels, emerald ash borer, silver carp and buckthorn. In some cases, the effects include the extinction of native plants and animals.[8]

MnDOT works with partners to develop seed mixes that stabilize soils and improve biodiversity along roadways. These mixes serve different functions and suit different growing zones. Native plants can help limit the spread of noxious weeds and provide habitat and food for pollinators and other animals.

7 *MN EQB Water Policy Report, 2016*
8 *Minnesota Department of Natural Resources*

Climate Change

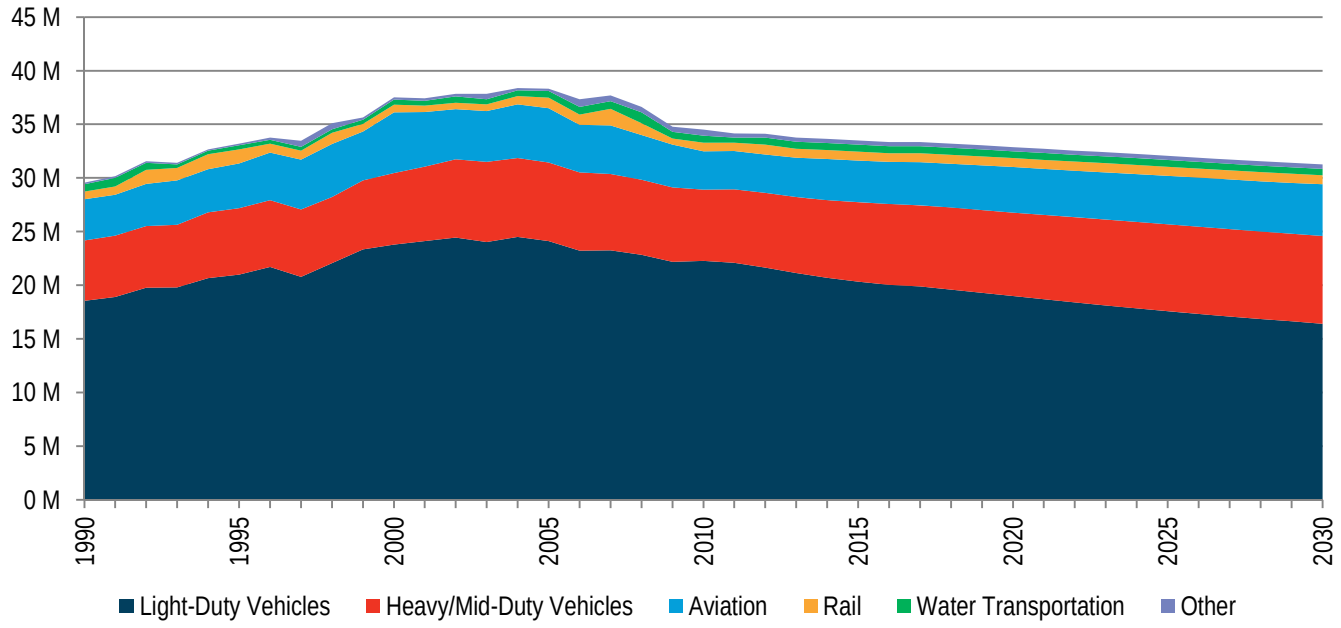
Climate change is already having major impacts in Minnesota and will continue to have impacts into the future. What these future impacts will be is not always clear. More varied temperatures, precipitation levels and frequency of extreme weather events will stress the transportation system. It is possible that these changes could increase maintenance costs and impact the way that Minnesotans travel.

Reducing greenhouse gas emissions from burning fossil fuels is key to limiting climate change impacts. Figure 3-5 shows past and future emissions from transportation in the state. Emissions are going down, but the state is not on track to meet the 2007 Next Generation Energy Act targets. Reducing emissions will require shifting away from gasoline-powered vehicles and promoting cleaner transportation options.

Climate change adaptation can reduce the impacts of climate stresses (long-term increases in vulnerability) and shocks (extreme events). There are many ways transportation partners can work on adaptation, such as designing bridges and culverts for larger rain events. A variety of activities can reduce the impact of climate change and lead to broader benefits for communities in Minnesota.

Figure 3-5: Historical and projected transportation sector greenhouse gas emissions in Minnesota

Source: Minnesota Pollution Control Agency; does not include emissions from natural gas pipeline transmissions



POTENTIAL EFFECTS OF CLIMATE CHANGE IN MINNESOTA

Minnesota's climate is already changing and is likely to continue to see changes in a number of areas. These changes can have negative effects on the state's transportation system. However, changes in certain areas are more likely to occur than in others. For example, Minnesota has already seen increased heavy precipitation / flooding in recent years. It is very likely that this trend will continue into the future. The following table outlines some of the most likely climate impacts as determined by the Minnesota State Climatology Office.

CLIMATE IMPACT	CONFIDENCE IN CHANGE FOR MN DURING NEXT 20 YEARS	POTENTIAL NEGATIVE EFFECTS TO TRANSPORTATION SYSTEM
Heavy precipitation / flooding	Very high	• Damage to highway, rail infrastructure, hydraulics, airport runways • Overtopping roads will slow operations and performance
Warmer winters	Very high	• More ice build-up and freezing precipitation • Reduced pavement conditions and life cycle costs • Downed power lines with ice storms • Reduced ice cover on water bodies leading to greater rates of evaporation
New species ranges	High	• Changes in roadside vegetation mixes • Soil erosion • Increase in invasive species populations • Increased exposure of construction and maintenance crews to vector-borne diseases
Drought	Medium	• Reduced river navigability for barges • Stressed roadside vegetation, which may reduce rainwater storage and increase soil erosion in the long-term
High heat	Low	• Pavement and rail buckling • Vehicles overheating • Electrical system malfunctions • Limitations on construction hours
Wildfires	Unknown	• Road closures • Immediate and significant threat to human safety • Damage to roadside infrastructure

TRANSPORTATION BEHAVIOR

As Minnesota changes, so will the state's transportation needs. Anticipating trends in *transportation behavior* will help MnDOT and other transportation partners meet the needs of all users. Understanding these needs will help ensure that people and goods move safely and efficiently.

Twin Cities residents are increasingly using options other than cars to travel. Per-capita vehicle miles traveled remains below the peak set in 2004. Transit ridership and the percentage of people who bicycle and walk have grown in recent years.[9] Data suggests that more investment in transit, bicycling and walking infrastructure would encourage people to use these modes more often.

People in Greater Minnesota drive more on average than people living in the Twin Cities. This trend is likely to continue into the future. Per-capita vehicle miles traveled in Greater Minnesota grew in 2015. This suggests that a persistent decline since 2004 may be reversing. Much like in the Twin Cities, further investments in transit systems and local bicycle and walking infrastructure may increase the use of these options.

Telecommunication systems also play a part in how people travel. As access to high speed internet grows, more and more people will have the option to shop, see a doctor, or work online. The implications of this shift on transportation are uncertain at this time, but warrant careful attention going forward.

Mobility as a Service

New companies and technologies have made people re-think how they travel, especially in urban areas. *Mobility as a service* offers new ways to use the system through the "sharing economy." One example of mobility as a service is car sharing, available through companies such as Zipcar in the Twin Cities, Mankato and Winona. Other ride matching services such as Uber and Lyft have seen rapid growth in recent years.

Many questions remain about how mobility services will evolve in the future. Currently, it is not uncommon for a person to use many different services. The advent of self-driving cars also has the potential to reshape entire systems as they are known today. Self-driving cars combined with mobility-as-a-service platforms could also reduce overall car ownership levels.

9 *Metropolitan Council Travel Behavior Inventory*

TECHNOLOGY

Technology and transportation have captured people's imaginations for many years. New ideas in transportation have the potential to impact many of the topics discussed in this chapter. The use of *mobile technology* can make travel time more productive and help people choose how to travel. Emerging technologies often use vast amounts of data and track user preferences and locations. These practices give rise to concerns about *user privacy and data security*.

Sales of *unmanned aerial systems*, commonly referred to as drones, are projected to grow dramatically in the near future. Sales in the U.S. are expected to grow from 2.5 million in 2016 to 7 million in 2020. More widespread use of drones could have positive impacts, but also raises privacy and air safety concerns.[10]

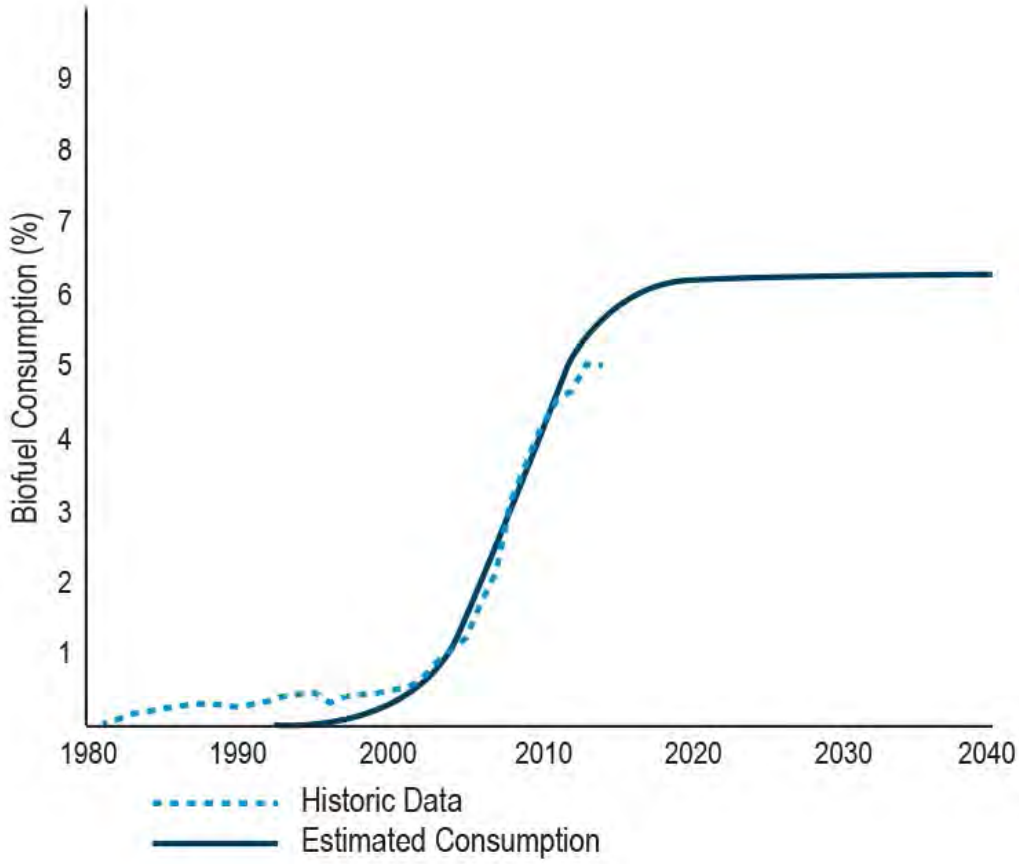
Alternative Fuels & Vehicle Electrification

Alternative fuels are widely used amid political and environmental concerns over the use of oil. Alternative fuels include biofuels, compressed natural gas, electricity and others. Subsidies are often needed to get alternative fuels off the ground. Any new fuel faces the barrier of a proven fossil fuel system that works with nearly every vehicle on the road. Despite these challenges alternative fuels have advanced in recent years.

Biofuels have long been the most visible alternative fuel in Minnesota. Despite this, projections shown in Figure 3-6 suggest that they may soon reach the peak of their market share.[11] Electric and hybrid-electric vehicles made rapid advancements in recent years. These vehicles are now available at prices closer to traditional vehicles. Investments in charging infrastructure will be necessary if sales of electric vehicles are to continue growing in Minnesota.

10 *Federal Aviation Administration, 2016*
11 Levinson, 2016

Figure 3-6: Historic and projected biofuel use as a percent of all transportation fuels in Minnesota



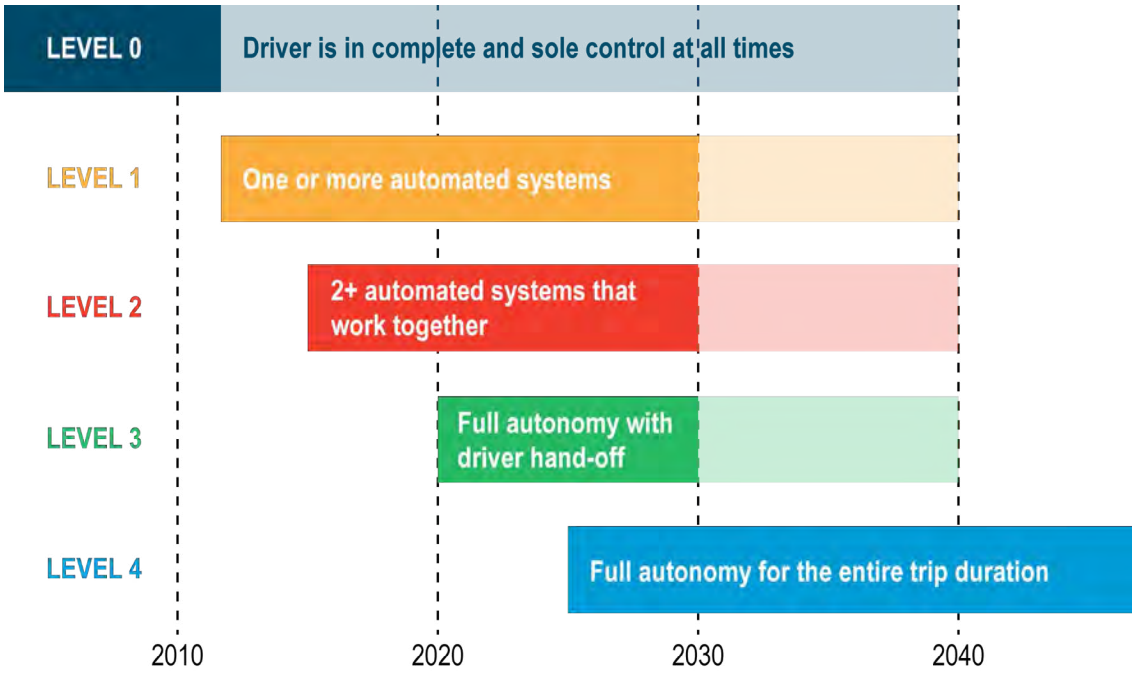
Autonomous Vehicles

Self-driving vehicles are emerging rapidly and could re-shape the ways people travel. Connected vehicle technologies (a related but distinct concept) will likely enhance the advances brought by self-driving cars. More details can be found in the *Autonomous Vehicles paper*. As of 2012 all new cars sold in the U.S. have electronic stability control. This places them on Level 1 of the autonomous vehicle scale.[12] Many cars purchased today have several automated systems that work together, such as adaptive cruise control, that place them on Level 2. Figure 3-7 shows the projected progression through autonomous vehicle phases.

12 *National Highway Traffic Safety Administration, 2016*

Figure 3-7: Projected timeline and definition of autonomous vehicle levels

Source: Levinson, 2016



Advances in safety are one of the most highly touted benefits of self-driving cars. Self-driving cars have nearly instant perception. They do not get tired, distracted or suffer from many of the other factors that limit human drivers. These same advantages may result in shorter following distance requirements that could increase capacity on existing roadways.

Regulation of autonomous vehicles may limit the ways they can be used. In theory, self-driving cars could carry out deliveries or drive themselves to pick up a person wherever they may be. Self-driving cars could also provide mobility options for individuals with disabilities who otherwise cannot operate a vehicle. However, the potential of the technology will depend on whether or not a human driver legally must be present.

Regardless of self-driving car advances, it is unlikely that these vehicles will be a cure-all for transportation. Essentially effortless automobile travel is likely to lead to even more driving. As such, self-driving cars are unlikely to solve congestion on the highway system even if they offer some capacity benefits. Additionally, transportation options aside from driving will still be needed to facilitate the variety of trip types that Minnesotans take every day. The cost of this technology as it rolls out, and who is able to benefit from it, will also be a concern for transportation partners moving forward.

Minnesota GO
A Collaborative Vision for Transportation

Statewide Multimodal Transportation Plan

Chapter 4

WHAT IS DIRECTING THIS PLAN?

DRAFT FOR PUBLIC COMMENT

PUBLIC ENGAGEMENT

Public engagement was an essential part of the update to the Statewide Multimodal Transportation Plan. The transportation system exists to meet the needs of the people and businesses in Minnesota. It is important to understand what those needs are and use that information to guide decision-making. It is also important that everyone is able to participate and be heard.

More detailed information about public engagement activities and results can be found in Appendix D.

Phase 1

The engagement approach for this plan update was organized into two phases. The first phase focused on connecting with the public and transportation partners. Phase 1 was the primary phase of engagement. It began in August 2015 and continued through March 2016. Almost all engagement activities were conducted jointly with the Minnesota 20-Year State Highway Investment Plan, which was being updated at the same time. The two plans also shared a joint website.

PHASE 1 ENGAGEMENT AT A GLANCE

- August 2015 – March 2016
- 125+ in-person events
- 7,500+ website sessions
- 300,000+ social medial views / impressions
- 12,450+ responses

The first phase of engagement asked about the future of the state and transportation. To plan for the future, it is important to understand what Minnesotans want the plan to focus on. To do this, participants were asked about a number of changes projected for Minnesota over the next 20 years. These shifts – in the economy, environment, population, technology and transportation behavior – will affect how people and goods move. The goal was to understand which of these changes, or types of changes, were most important for the plan to consider moving forward. More than 20 individual trends were identified in five different areas:

Environmental Trends

- *Climate Change*
- *Environmental Quality*

Transportation Behavior Trends

- *Transportation Behavior Changes*
- *Mobility as a Service*
- *Teleworking & e-Shopping*

Population Trends

- *Demographic Trends in Minnesota*
- *Urban & Rural Population Trends*
- *Racial Disparities & Equity*
- *Minnesota's Aging Population*
- *Health Trends in Minnesota*

Economic Trends

- *Economic Sectors & Employment Patterns*
- *Freight Rail in Minnesota*
- *Aging Infrastructure*
- *Public-Private Partnerships*
- *New Logistics*
- *Dynamic Road Pricing*

Technology Trends

- *Autonomous Vehicles*
- *Mobile Telecommunications & Activity in Motion*
- *Sensors, Monitors & Big Data*
- *Electrification & Alternative Fuels*
- *Unmanned Aircraft Systems / Drones*

More information related to each trend can be found in Chapter 3.

ACTIVITIES

The first phase of engagement included a variety of in-person and online opportunities for Minnesotans to get involved. Figure 4-1 highlights all the tactics that were used. More information about each activity is available in Appendix D.

Figure 4-1: Summary of engagement activities

AUDIENCE

In addition to identifying their priorities, participants were also asked to answer a few optional and anonymous demographic questions. They were asked about their age, race / ethnicity, gender and zip code. This information helped make sure overall participation mirrored the make-up of Minnesota. When asked, about 56 percent of participants provided at least some demographic information. Figure 4-2 and Figure 4-3 show who was reached during this engagement effort.

Figure 4-2: Demographic comparison between respondents and Minnesota's population

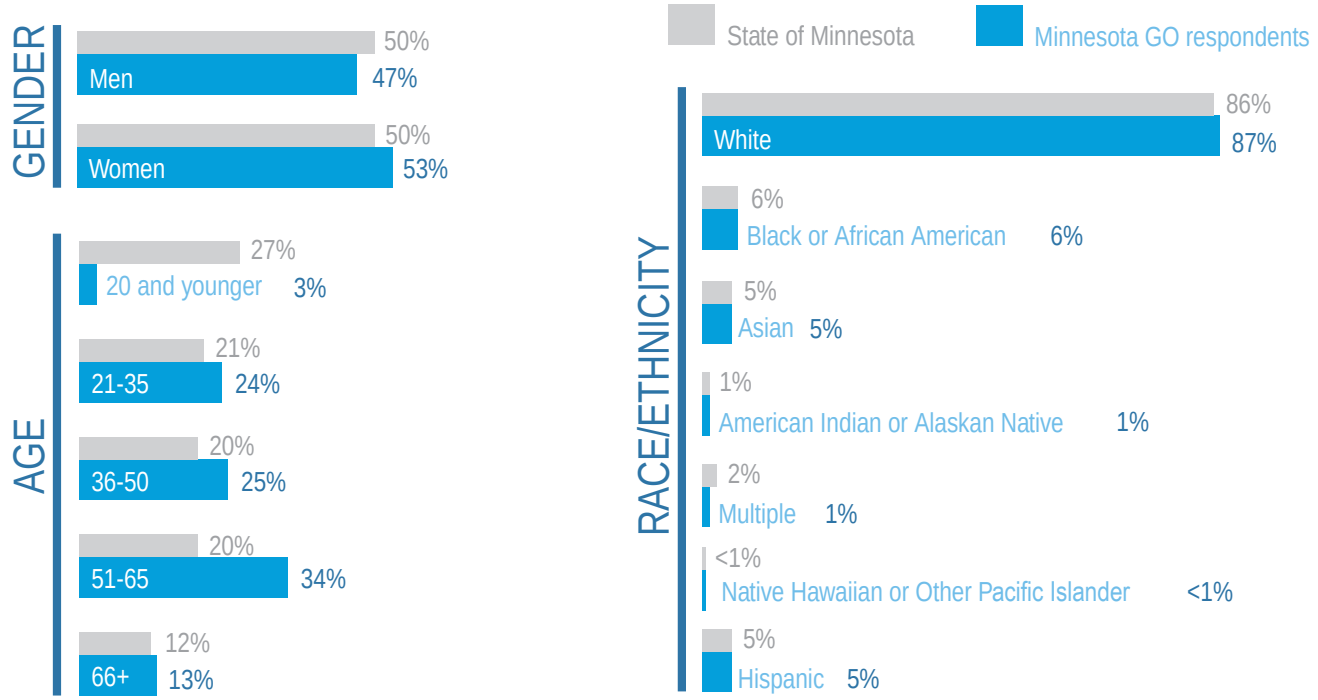
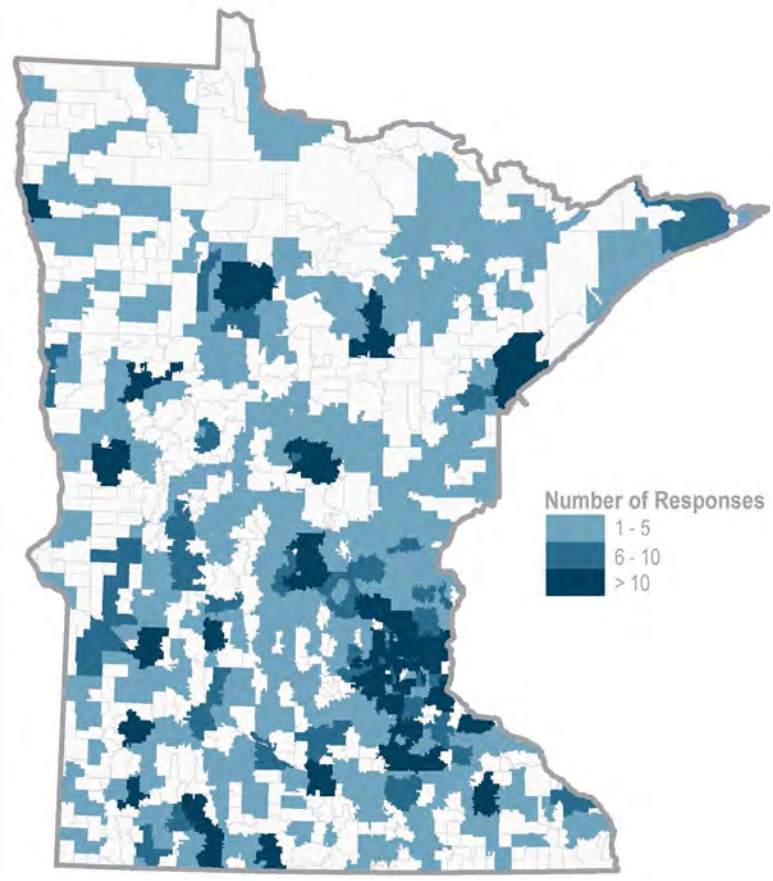


Figure 4-3: Phase 1 participation by zip code



RESULTS

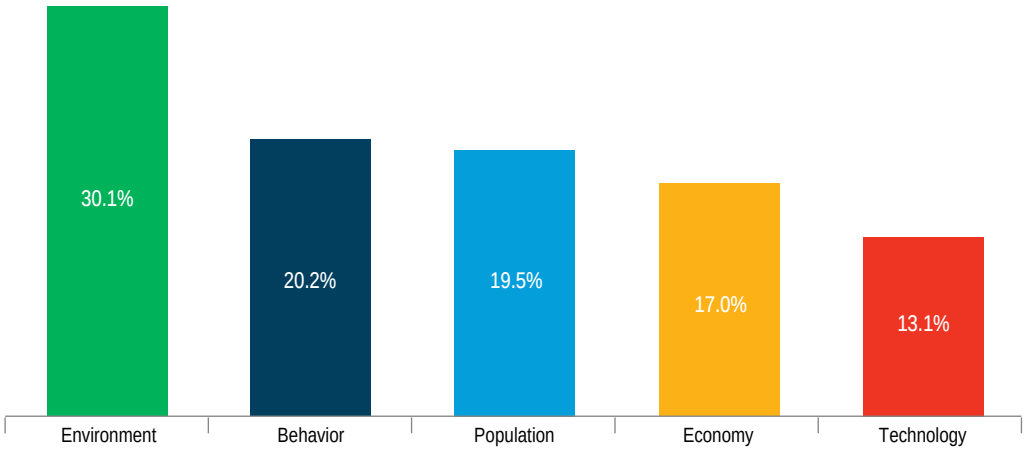
A summary of input from Phase 1 is included in the following sections. More detailed information can be found in Appendix D.

The environment category includes trends related to climate change and environmental quality.

Trend Categories

Environmental trends were more frequently identified as the most important area of change to plan for. Approximately 30 percent of all participants chose this as their top priority. Environmental changes were followed by changes in transportation behavior and population changes, which were both the top priority for approximately 20 percent of respondents (Figure 4-4).

Figure 4-4: Percent of respondents identifying a trend category as their top priority



This overall relative priority provided some direction. However, not every respondent shared the same priorities. Demographic data was used to identify trend areas that were a higher priority for one group than the collective ranking. Key differences include:

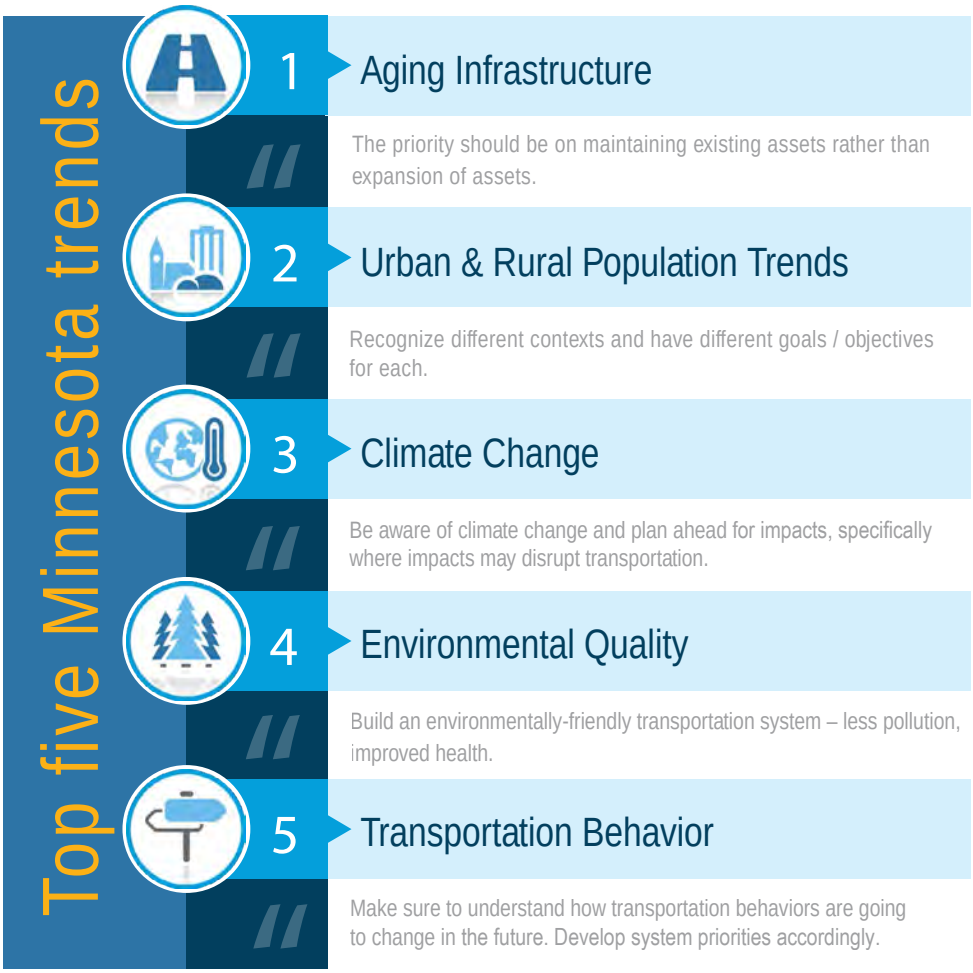
- Transportation behavior changes were a higher priority among these groups: transportation partners, men, Asian Minnesotans, White Minnesotans and age groups 21-35, 36-50, 51-65 and 66 plus.
- Population changes were a higher priority for American Indian or Alaska Native Minnesotans.
- Economic changes were a higher priority among these groups: transportation partners, men, American Indian or Alaska Native Minnesotans, Asian Minnesotans, Black or African American Minnesotans, Hispanic Minnesotans and Minnesotans of multiple races / ethnicities.
- Technology changes were a higher priority among transportation partners, American Indian or Alaska Native Minnesotans and Minnesotans age 20 and under.

This data indicates potential differences among demographic groups, but it is important to remember that this is a summary. There are many different perspectives and opinions within all communities in Minnesota.

Individual Trends

In addition to ranking each trend category, participants were asked to identify which individual trends are most important to them. The goal was to understand if there are specific trends that may be a high priority even if the broader category was seen as less important. The five most-prioritized individual trends are shown in Figure 4-5.

Figure 4-5: Top five most important individual trends



Generally speaking, the top individual trends are closely linked to the top priorities among the broader trend areas. Similar to the broader trend areas, there were variations in how participants prioritized the individual trends. Key differences include:

- The aging population trend was ranked in the top five for American Indian or Alaska Native Minnesotans and Minnesotans older than age 65.
- The economy and employment trend was ranked in the top five for Minnesotans of multiple races / ethnicities.
- The mobility as a service trend was ranked in the top five for Minnesotans ages 20 and younger.
- Health trends in Minnesota were ranked in the top five for American Indian or Alaska Native Minnesotans and Hispanic Minnesotans.
- The electrification and alternative fuels trend was ranked in the top five for Black or African American Minnesotans and Minnesotans ages 20 and younger.
- The racial disparities and equity trend was ranked in the top five for Black or African American Minnesotans and Hispanic Minnesotans.
- The sensors, monitors and big data trend was ranked in the top five for Minnesotans ages 20 and younger.

Again, while this data indicates potential differences among demographic groups, it is important to remember that these numbers are summaries. There are many different perspectives and opinions within all communities in Minnesota.

IMPACT

The input received from Phase 1 helped determine what the focus should be for the plan's policy direction. The priority areas and trends identified by Minnesotans were reviewed to make sure they are reflected in the objectives and strategies (Chapter 5). For example, climate change and environmental quality were identified as top priorities. There are now two new strategies related to climate change: one to reduce emissions from the transportation sector and one to identify risks to the transportation system, such as more frequent flooding.

Phase 2

The second phase of engagement occurred during April and May 2016 and built on the information gathered in Phase 1. A number of specific questions rose up as the priorities from Phase 1 were incorporated into policy direction. These questions covered a range of topics and mostly dealt with the details about how the proposed changes would be implemented. Given this focus on implementation, Phase 2 primarily focused on reaching transportation partners, including different groups within MnDOT. However, even with a focus on transportation partners, anyone was welcome to participate. The major topics covered in this phase of engagement included:

- Land use and transportation connections
- Urban and rural system performance
- Equity and ability
- Climate change and environmental quality

ACTIVITIES

Given the focus on reaching transportation partners, stakeholder forums were the primary engagement tactic used in Phase 2. Four stakeholder forums and a webinar forum were held. For those who were not able to attend one of the forums or the webinar, an online survey version of the questions was available on the project website. Materials were also provided to planning partners, who were asked to share the information with their networks. More information about each activity is available in Appendix D.

RESULTS

The following sections summarize the responses related to the four topics covered in Phase 2. More detailed information can be found in Appendix D.

Land Use and Transportation Connections

Nearly three out of four participants in Phase 2 expressed support for developing context guidance as part of the SMTP work plan. Context guidance refers to tying land use, community development and population factors to various aspects of transportation planning. This may include incorporating context considerations into public engagement strategies, road design, cost sharing and more. Participants were also asked about tying different types of spending to land use considerations. Generally speaking, there was support for prioritizing bicycle and pedestrian spending and safe routes to school funding in this way. However, there was greater support for this among MnDOT participants and less support among other transportation partners.

Urban and Rural System Performance

Participants were also asked to provide input related to how MnDOT and transportation partners track and report system performance. Currently, most reporting is done at a statewide level. However, there may be reasons to consider reporting some measures separately for urban and rural areas. This would help ensure the needs in both contexts are being addressed. Participants supported reporting measures separately by urban and rural for asset management, safety and mobility performance measures. This approach would also require better guidance on what is meant by “urban.” There was no consensus among participants on how to define urban areas. Generally speaking, MnDOT participants expressed a preference for a population-based definition. Other partners generally supported a definition that includes more factors than just population, such as employment or retail activity. In general, MnDOT and partner participants expressed concern about MnDOT’s ability to adequately address urban highway corridors in the future given the pressures of maintaining an aging highway network.

Equity and Ability

Participants generally supported explicitly addressing equity and individual ability in this plan. The majority of participants favored MnDOT continuing to research how the transportation system can best advance equity in communities. Many participants also supported exploring strategies to increase workforce diversity in the transportation sector and piloting approaches to incorporate equity into transportation decision-making.

Climate Change and Environmental Quality

Consistent with Phase 1 results, participants expressed support for addressing climate change and environmental quality issues in this plan. There was strong support for assessing the vulnerability of transportation infrastructure to environmental factors related to climate change. To a lesser degree, participants expressed support for all transportation partners moving forward with strategies to reduce greenhouse gas emissions, reestablishing a MnDOT flood mitigation program and setting targets for salt use in winter maintenance. There was general support for adopting the 2007 Next Generation Energy Act targets for greenhouse gas emissions specifically for the transportation sector. However, the level of support varied among different partners and different geographies.

IMPACT

The input from Phase 2 was used to make edits to the objectives, performance measures and strategies in this plan (Chapter 5). The input also helped to identify and prioritize key activities to be included in the near-term work plan (Chapter 6). For example, consistent with the input related to the land use and transportation connections discussion, the work plan includes developing tools and resources to support transportation decisions that reflect the surrounding context. Additionally, the input from Phase 2 will also continue to inform the implementation of this plan into the future.

STATE AND FEDERAL REQUIREMENTS

For many years, there have been state and federal requirements for statewide transportation plans. These requirements include updating the plan every four years. The plan must support national, state and local goals such as economic development and environmental protection. MnDOT is responsible for working with the public, local governments, metropolitan planning organizations, regional development organizations, tribal governments and other transportation partners to produce a 20-year plan that sets statewide policy direction and guidance. Over the years, these requirements shifted from an exclusive focus on automobiles and trucks to an approach that considers the many ways people and goods travel.

The following sections describe how innovation and new policy direction shaped this plan.

Purpose of Transportation Planning

Transportation shapes the ways that communities develop. The current transportation system required vast investment of public and private resources over decades. The system also requires a substantial amount of funding to maintain and continue operating. Changes in community needs and desires mean that the system needs to change over time.

Transportation planning is complex. It relies on many different groups working together. The process blends technical analysis, public expectations and input from public and private transportation partners. This blended information is used to identify priorities, choices and risks to the system. It is also used to distribute resources for future investments. Long-range planning is required to be eligible for federal and state transportation funding assistance. It is especially important given the billions of dollars invested in the system each year.

Federal direction for statewide transportation plans requires a multimodal approach that:

- Supports economic vitality in ways that enhance global competitiveness
- Increases safety and security of the transportation system for all users
- Improves accessibility and mobility for both people and freight
- Fosters environmental protection, energy conservation and coordination between transportation and local plans
- Improves connections between transportation modes
- Achieves efficient system operations and management

- Emphasizes preservation of the existing transportation system
- Improves the resiliency and reliability of the transportation system and reduces or mitigates stormwater impacts of surface transportation
- Enhances travel and tourism.[1]

Minnesota law requires a similar focus on safety, system condition, the importance of transportation for the economy and compatibility with state environmental goals. The state also has goals for transit access, reasonable commutes and bicycling and walking.[2]

Minnesota law requires MnDOT to update the Statewide Multimodal Transportation Plan every four years. Federal planning regulations require the Statewide Multimodal Transportation Plan to plan at least 20 years into the future.

Appendix F provides links to federal and state laws related to this plan.

Changes in Approach and Emphasis

PERFORMANCE-BASED PLANNING

MnDOT began using performance measures to inform management and investment decisions in the mid-1990s. In 2003, MnDOT adopted the first performance-based statewide transportation plan in the nation. Performance measures show how well the system is functioning. Targets communicate desired outcomes. Performance measures cover all modes, system assets and operations. A few examples include crash rates, fatalities, roadway and bridge condition and age of transit vehicles. MnDOT carefully considers existing commitments, priorities and tradeoffs when adding or changing performance measures and targets. All adopted performance measures and targets are included in MnDOT's annual performance report.

1 Federal planning factors, 23 USC 135(d)(1)
2 State transportation goals, Minn Stat 174.01

At the federal level, the 2012 Moving Ahead for Progress in the 21st Century Act established national performance measures related to the National Highway System, safety, congestion, emissions and freight movement. MAP-21 required states to develop performance-based plans and to coordinate with metropolitan planning organizations when developing performance targets. These requirements were continued under the 2015 Fixing America's Surface Transportation Act. To date, final rules have been issued for safety performance management. Proposed rules have been issued for pavement and bridge performance measures and for system performance measures. These categories include measures related to the National Highway System, freight movement on the interstate system and the Congestion Mitigation and Air Quality Improvement Program.

THE SIGNIFICANCE OF FREIGHT

Federal transportation planning requirements shifted in the early 1990s. One part of this shift was an increased emphasis on the role that freight plays in the economy. Freight's role in the transportation system was again highlighted in MAP-21. MAP-21 required the establishment of freight-related performance measures. The FAST Act further emphasizes freight by directing the U.S. Department of Transportation to designate a national multimodal freight network and develop a national freight strategic plan. The FAST Act also requires states to develop state freight plans and encourages states to create freight advisory committees.

Much work has been done to better understand Minnesota's freight system and the investment needs of the state's ports, waterways, highways, rail and airports. Since 2012, MnDOT updated the State Aviation System Plan, State Rail Plan and Statewide Freight System Plan. MnDOT also adopted its first Statewide Ports and Waterways Plan. These plans help show how goods move across the state and reach local, regional, national and international destinations.

COOPERATION & CONSULTATION

The 1990s shift in federal direction also required that statewide planners cooperate and consult with many different transportation partners. To meet these new requirements, Minnesota created the area transportation partnerships, which bring local, regional, state and tribal interests together within each MnDOT district. The ATPs collaboratively decide priorities for available federal transportation funding. There is considerable variation in total membership from one ATP to another and each ATP includes city, county, metropolitan planning organization and regional development organization representatives. American Indian tribes within an ATP have the option to participate on the ATP. For the Twin Cities area, the Metropolitan Council's Transportation Advisory Board functions as the metro area ATP. Figure 4-6 shows the eight ATP districts. Figure 4-7 identifies the regional development organizations and metropolitan planning organizations in Minnesota.

The sovereignty of tribes was formally recognized through a 2002 Accord between Minnesota's tribes, MnDOT and the Federal Highway Administration. The accord established commitments for regular consultation. State executive orders in 2005 and 2013 reinforced the government-to-government character of relationships between tribes and the state.

Figure 4-6: Minnesota's area transportation partnerships

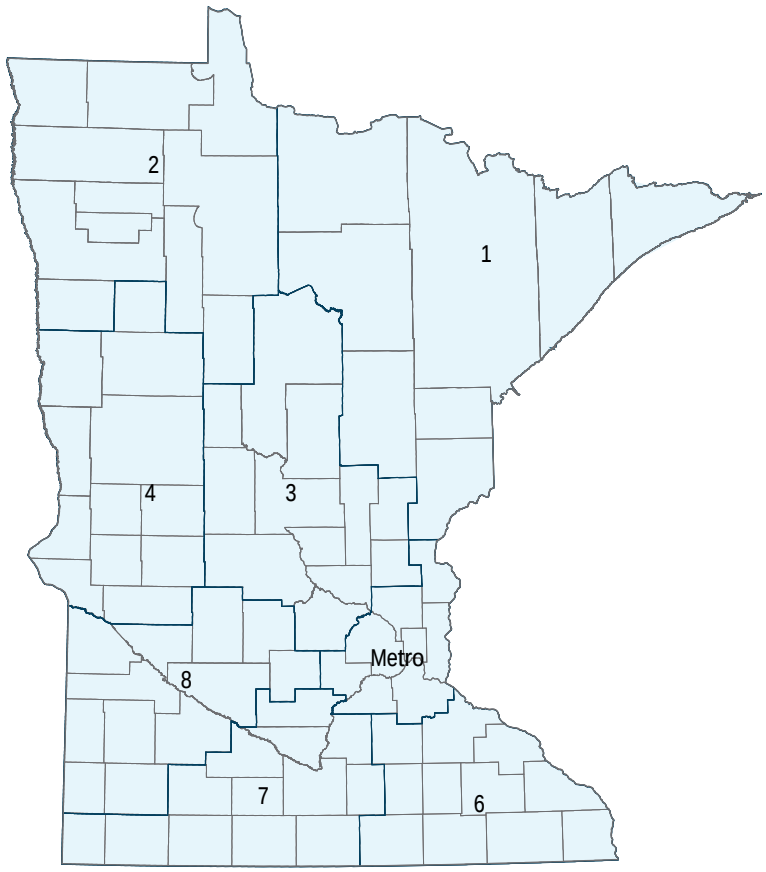
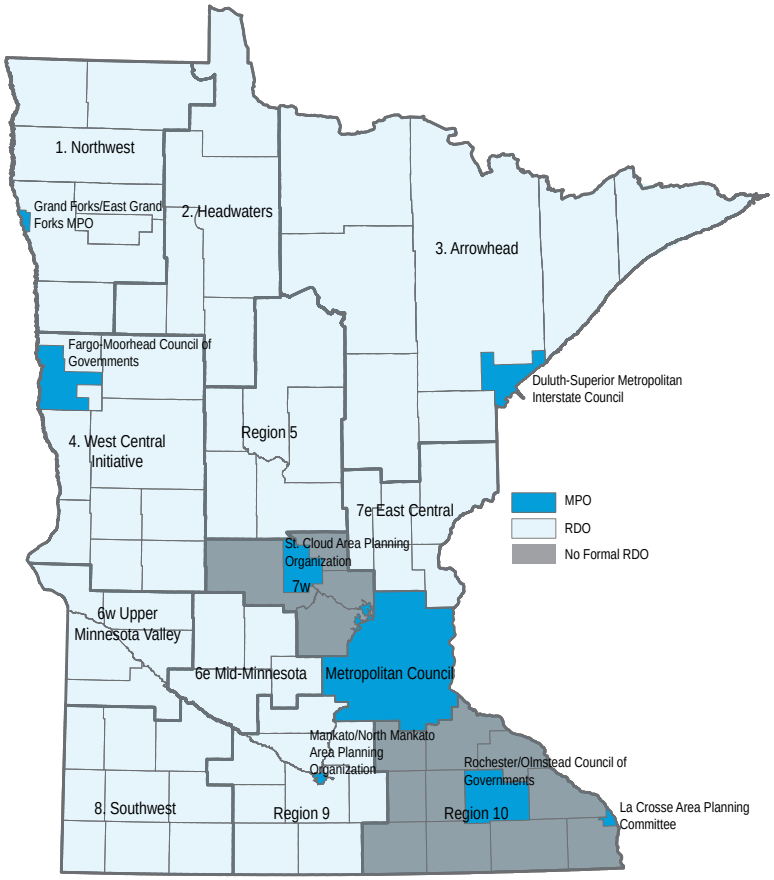


Figure 4-7: Minnesota's metropolitan planning organizations and regional development organizations



ENVIRONMENTAL JUSTICE

Title VI of the 1964 Civil Rights Act prohibits discrimination on the basis of race, color and national origin in federally assisted programs and activities. A 1994 Presidential Executive Order on Environmental Justice requires agencies to identify and address the effects of all programs, policies and activities on minority and low-income populations.[3] Environmental justice improves decision-making by ensuring that public agencies treat people fairly and involve them in a meaningful way during the development and implementation of transportation plans and projects. Appendix E provides an analysis of the potential impacts the objectives and strategies identified in Chapter 5 may have on the state's environmental justice populations.

3 Executive Order 12898, Federal Actions to Address Environmental Justice in Minority and Low-Income Populations

OLMSTEAD PLAN

Olmstead plans are named after a U.S. Supreme Court decision that held that the unjustified segregation of people with disabilities violates the Americans with Disabilities Act. The plans describe how public entities will meet their obligation to provide individuals with disabilities opportunities to live, work and be served in integrated settings.

In 2012, Minnesota began working on its Olmstead plan. The Minnesota Olmstead Plan identifies a method for Minnesota state agencies to document their plans to provide services to people with disabilities. Transportation is a key aspect of an individual's independence and quality of life. The Minnesota Olmstead Plan assumes that the need for available and accessible transportation applies to all modes of transportation. However, the plan recognizes that much of the transportation need relates to transit services. It identifies strategies to meet the plan's vision for transportation – "People with disabilities will have access to reliable, cost-effective and accessible transportation choices that support the essential elements of life such as employment, housing, education and social connections.[4]"

COMPLETE STREETS

Streets and roadways are inherently multimodal. They accommodate the travel of people using cars, trucks, buses, emergency vehicles and bicycles and those walking. The complete streets approach to road planning and design considers and balances the needs of all users. The goal is to provide a system that is accessible and equitable to all, regardless of how they choose to travel. MnDOT adopted a complete streets policy in 2013 and updated the policy in 2016. MnDOT uses a complete streets approach in system-level planning, project scoping and design, operations and maintenance. Several Minnesota cities, counties and planning organizations have developed similar policies.

OTHER PLAN REVIEW

As part of this update process, MnDOT's other statewide transportation plans and the long range transportation plans prepared by Minnesota's metropolitan planning organizations and tribal nations were reviewed. The purpose of the review was to identify key trends and policy objectives and to consider how those trends and objectives may impact this plan update. The identified trends were addressed in the trend analysis described in Chapter 3. The policy objectives were considered as the plan's objectives and strategies were reviewed and updated (Chapter 5). Summaries of the reviews are included in Appendix G.

4 *Putting the Promise of Olmstead into Practice: Minnesota's Olmstead Plan*, August 10, 2015

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MinnesotaGO
A Collaborative Vision for Transportation

Statewide Multimodal Transportation Plan

Chapter 5

HOW WILL WE GUIDE OURSELVES MOVING FORWARD?

DRAFT FOR PUBLIC COMMENT

OBJECTIVES, PERFORMANCE MEASURES & STRATEGIES

This plan focuses on five objectives – open decision-making, transportation safety, critical connections, system stewardship and healthy communities. Each objective includes related strategies for MnDOT and transportation partners. Taken together, the objectives and strategies support the Minnesota GO Vision and help address the changes affecting Minnesota (Chapter 3).

All transportation partners are engaged in many different activities that help to realize the vision on a daily basis. The purpose of this plan is not to list every possible activity, but to focus on key areas where additional emphasis is needed.

To help ensure that progress is made in the coming years, each objective includes a list of related performance measures. These measures will help track progress toward meeting the objectives and the desired outcomes of the vision.

The objectives and related strategies are listed in no particular order. All are critical focus areas for the upcoming years. Each objective has four parts:

- Objective statement – a few key phrases that describe the goal that MnDOT and transportation partners are working toward
- What this is about – more description about the goal of the objective
- Performance measures – existing performance measures that track progress toward the objective
- Strategies – a list of actions to help MnDOT and transportation partners achieve the objective. The bold text of each indicates the strategy statement and is followed by additional description and examples.

Open Decision-Making

Make transportation system decisions through processes that are inclusive, engaging and supported by data and analysis. Provide for and support coordination, collaboration **and innovation. Ensure efficient and effective use of** resources.

WHAT THIS IS ABOUT

Essential to open decision-making are the elements of accountability, transparency and communication. Transportation decision-makers are stewards of the transportation system and have the responsibility to make informed choices and be open about how and why decisions are made. Decision-makers need to rely on many different types of information and inputs to make responsible decisions and balance priorities. Integrated into all these elements are the important considerations of socio-economic equity and individual ability.

Engagement with transportation users and those otherwise affected by the system is a critical input to the transportation decision-making process. Decision-makers need to not just communicate decisions but also create opportunities for the public to influence decisions. Transportation partners should use different tools and techniques to facilitate good engagement. Good engagement uses inclusive, accessible and varied tools to reach different communities. Specific focus should be given to reaching individuals who are traditionally underrepresented in transportation decision-making. This will result in decisions that better reflect the priorities of all Minnesotans.

Communication and education are also critical to open decision-making. Effective communication is not just about making information available. It is also about making it easy to find and understand. This includes using plain language and meeting the Americans with Disabilities Act document accessibility standards. Additionally, education is the foundation for understanding. This includes telling the big-picture story about the transportation system, the importance of investing in it and the trade-offs that need to be made. It also includes communicating project scopes, timelines and impacts.

Relying on data, analysis, performance measurement, research and risk management is also essential to support open decision-making. It is the responsibility of transportation partners to continually explore technology, innovation and the driving forces behind the system. These are important tools for improving transportation planning processes and increasing the efficiency of the transportation system.

The importance of open decision-making processes are recognized and supported in federal legislation and state regulations. However, truly open decision-making goes beyond just meeting requirements. It is about building public trust. Since the majority of transportation funding comes from the public through fees and taxes, transportation decision-makers need to be accountable for the decisions they make. They need to ensure public resources are used efficiently and effectively and that decisions are well documented and communicated.

PERFORMANCE MEASURES

Table 5-1 lists the existing MnDOT performance measures related to the open decision-making objective. Additional proposed performance measures are under development. These proposed measures are identified in Chapter 6.

Table 5-1: Open decision-making performance measures

MEASURE	TARGET	REPORTING
Annual percentage of MnDOT omnibus survey respondents that agree with the following statements: • "MnDOT can be relied upon to deliver Minnesota's transportation system." • "MnDOT considers customer concerns when developing transportation plans." • "MnDOT acts in a fiscally responsible manner." Annual percentage of survey respondents indicating they are confident in: • Building roads and bridges • Maintaining roads and bridges • Communicating accurate info to MN citizens about their transportation plans and projects • Providing alternative transportation options for the future	80% for each statement	Report number and which statements do not meet target; identify differences among demographic groups
Annual percentage of minorities and women in the highway-heavy construction workforce	No target	Report percentage and trend
Annual percentage of minorities and women in MnDOT's workforce	No target	Report percentage and trend
Annual percentage of MnDOT construction projects let in the year scheduled (defined as projects in the first year of the State Transportation Improvement Program let in that year)	No target	Report percentage and trend

STRATEGIES

- Engage with users and those otherwise affected by the system throughout all transportation processes. Engagement is a key input to decision-making. It is important for transportation partners to engage users and those otherwise affected by the system. Engagement is important to understand the needs for a specific project. However, engagement should not be limited to just projects. It is also important for transportation partners to regularly engage with the public and each other to better understand the overall priorities for the system. This includes understanding what is important today and what will matter in the future. When engaging with the public, transportation partners should use a variety of tools and techniques. Everyone should be able to participate regardless of age, race, national origin, language, income, housing stability or individual ability. Specific focus should be given to reaching individuals who are traditionally underrepresented in transportation decision-making. When doing engagement, it is important to provide familiar opportunities but also to try new and innovative tools and techniques. For example, Metro Transit's Better Bus Stop program uses federal funding to improve the user experience at bus stops in neighborhoods with high levels of low-income or minority residents. Metro Transit contracted with 12 community groups to engage with residents to determine what improvements should be made and how to prioritize them.

- Communicate project-level information and impacts to the public and partners in a timely manner. Project-level communications are critical to ensuring that Minnesotans are aware of potential impacts to their travel and businesses are aware of impacts to freight and their customers. Transportation projects may also have impacts to the surrounding communities. Impacted communities should also be included in communication plans. Transportation partners should strive to clearly share information in a timely manner about projects and any potential impacts. Communication should begin in advance of the project and continue until the project is complete. Information should be easy to understand and available through a variety of channels to help people and businesses make informed decisions about their transportation plans. Accurate and open communication is critical to maintaining trust between transportation partners and Minnesotans.

"Everyone should be able to participate regardless of age, race, national origin, language, income, housing stability or individual ability. Specific focus should be given to reaching individuals who are traditionally underrepresented in transportation decision-making."

- Educate the public and partners on system-wide and modal **questions in addition to project-specific transportation information.** In addition to project-level information, proactive and ongoing communications about big-picture transportation issues, decisions and processes is also an important component of open decision-making. It helps to ensure transparency and promote understanding. Transportation partners should work with each other and the public to identify key questions and develop educational materials to answer these questions. The materials should be engaging, honest, easy to find and accessible to all Minnesotans.
- Improve early coordination in planning, project-selection and **scoping to more effectively and efficiently use resources and maximize benefits.** Coordinating with partners early within the planning, project-selection and scoping processes may present opportunities to combine resources and leverage public and private investments. It allows transportation projects to address multiple needs, including non-transportation issues and goals related to health, housing, the environment and economy. For example, MnDOT District 7 uses the 10-year Capital Highway Investment Plan as an engagement tool to discuss project needs, timing and coordination with local partners early in the project development process. Specifically, they focus on projects five to seven years out from construction. The Duluth – Superior Metropolitan Interstate Council worked with the City of Duluth to develop the Duluth Downtown Streetscape Plan. With many of the downtown streets reaching the end of their life cycle, the area-wide plan will help ensure other community priorities are addressed as the streets are repaired. Additionally, it is important for transportation partners to coordinate projects within their own programs to minimize negative impacts to the traveling public whenever possible.
- Develop and support a diverse workforce within the transportation sector. For truly open decision-making to occur, it is important to have multiple perspectives at the table. This allows for a more comprehensive discussion that better reflects the goals and priorities of all Minnesotans. Workforce diversity is essential to achieving this objective. Additionally, the transportation sector workforce is the face that the industry presents to the public. What that face looks like can have impacts on the level of engagement possible within different communities. It is important that partners within the transportation sector actively seek diverse workforce participation at all levels, including individuals of different races, genders, languages, ages and abilities. This includes developing new talent and providing support and growth opportunities for existing employees. A diverse workforce also contributes to increased access to well-paying jobs and wealth creation for a broader cross-section of Minnesotans. For example, MnDOT's Disadvantaged Business Enterprise program helps ensure women- and minority-owned businesses are able to participate in transportation construction contracts.

"For truly open decision-making to occur, it is important to have multiple perspectives at the table."

- **Use performance measurement to inform decision-making and show progress toward national, statewide, regional and local goals.** Performance measurement is one of the key inputs into the transportation decision-making process. It is an important tool to support open decision-making and should be used by transportation partners across all modes. MnDOT is a leader in the use of performance measures to evaluate services, guide plans and track progress toward meeting national goals and overall state priorities. Recent federal legislation required that metropolitan planning organizations also develop and use performance measures to track progress toward these and other regional goals in Minnesota's major urban areas. In addition to goals and priorities, it is also important to consider existing commitments, trade-offs and available data when developing measures and targets for use in decision-making.

- **Ensure key transportation data is kept up-to-date, usable and easily accessible to transportation partners and the public.** Data is an important tool used to inform decision-making and communicate decisions. It is also becoming increasingly essential in the operation of the transportation system. It is important that transportation partners continue to collect and share key data, such as infrastructure alignment, facility location, asset condition and use. It is also important that the data is kept up-to-date and is able to integrate and be used across jurisdictions and between the public and private sectors. Additionally, transportation partners should continually work to improve existing datasets and identify and develop new datasets. Transportation partners should review the data they collect to ensure it aligns with and supports broader goals and objectives. This will help improve decision-making and allow the transportation system to change over time. For example, MnDOT recently led an effort to implement a linear referencing system to standardize roadway location information in Minnesota. When complete the system will integrate with other MnDOT applications and partner systems to make data-sharing easier.

- **Use research to inform decision-making and foster innovation within the transportation sector.** Transportation decision-makers rely on different types of information and inputs to inform decisions. Research and analysis provide the basis for this information, helping to identify best practices, quantify costs and benefits, and highlight potential issues and impacts. Research is also critical to fostering innovation by identifying and testing new trends, tools and techniques. It is important that transportation partners continue to support research and innovation in all areas. This includes planning, safety, materials, construction and maintenance practices, data collection and others.

"It is important that transportation partners continue to support research and innovation in all areas."

Transportation Safety

Safeguard transportation users and the communities the system travel through. Apply proven strategies to reduce fatalities and serious injuries for all modes. Foster a culture of transportation safety in Minnesota.

WHAT THIS IS ABOUT

Transportation safety is a top priority for Minnesota. It includes the safety of individual users and the safety of the communities the system travels through.

Transportation user safety applies to all users of the transportation system regardless of their mode of travel. Comprehensive traveler safety involves an integrated approach that includes the "4Es" of safety – education, enforcement, engineering and emergency medical and trauma services – and more. Each of these areas is critical to improving overall safety and helping to grow a traffic safety culture in Minnesota.

Community safety is much more than just transportation. However, there is a role transportation partners can play to help ensure Minnesota's communities are safe. Specific transportation infrastructure, facilities and services can impose risks to the communities they travel through. For example, a train carrying hazardous materials can have serious public safety impacts in the instance of a derailment. Similarly, airport safety zoning is used to help avoid potential public safety issues involving airport operations. Transportation partners need to safeguard against these and similar risks. There are also risks to the transportation system that can negatively impact community safety by inhibiting essential travel needs such as emergency response and emergency medical and trauma services. These threats include severe weather, acts of terrorism and crime. Special events such as major sporting events and political conventions can also strain or overwhelm the transportation system's capacity and inhibit public safety efforts.

PERFORMANCE MEASURES

Table 5-2 lists the existing MnDOT performance measures related to the transportation safety objective. Additional proposed performance measures are under development. These proposed measures are identified in Chapter 6.

Table 5-2: Transportation Safety performance measures

MEASURE	TARGET	REPORTING
Total number of fatalities and serious injuries on Minnesota roadways resulting from crashes involving a motor vehicle	300 fatalities and 850 serious injuries by 2020	Report totals and by mode and urban or rural; report trend
Total number of aviation fatalities and incidents	No target	Report total and trend
Total number of rail derailments	No target	Report total and trend
Annual percentage of at-grade rail crossings meeting grade-separation guidelines	No target	Report percentage and trend
Total percentage of the Allied Radio Matrix for Emergency Response buildout complete	100%	Report percentge

STRATEGIES

- Increase participation in and continue support for the collaborative safety initiative Toward Zero Deaths. Minnesota's cornerstone roadway safety initiative, TZD is led through a partnership between MnDOT, the Minnesota Department of Public Safety and Minnesota Department of Health. It is a collaborative program aimed at eliminating fatal and life-changing injury crashes on Minnesota roadways by strategically addressing the "4Es" of safety - education, enforcement, engineering and emergency medical and trauma services. MnDOT and partners provide overarching direction and financial support toward achieving the TZD goals through the Strategic Highway Safety Plan and Highway Safety Improvement Program. Additionally, TZD regional coordinators work to bring together local safety partners, stakeholders and the public to help spread best practices statewide, bring more voices into the conversation and promote a culture of safety throughout Minnesota.
- Explore new opportunities to improve safety for all modes of transportation. Although important, TZD is only one piece of the overall transportation safety picture. Transportation partners across all modes should continue to find new ways to communicate and work together to improve safety for travelers, infrastructure, facilities, services and the communities they travel through. When it comes to safety, different modes have different issues, priorities and regulations. However, there is a lot that can be learned through coordination and collaboration. This data and information sharing can lead to new safety strategies and policy actions that draw on the best available data, research and experience to improve the safety of the transportation system.

MINNESOTA TOWARD ZERO DEATHS

Mission: To create a culture for which traffic fatalities and serious injuries are no longer acceptable through the integrated application of education, engineering, enforcement, and emergency medical and trauma services. These efforts will be driven by data, best practices and research.

Goals:

- Establish the vision of TZD as a priority for all state and local agencies and units of government
- Create and strengthen traffic safety partnerships
- Promote and implement effective traffic safety initiatives

Values:

- Continuous improvement
- Engaged partners
- Evidence-based approaches

Learn more at *www.MinnesotaTZD.org*.

- Develop and share critical safety information and support educational initiatives to reduce unsafe actions by all transportation users and operators. Educational initiatives inform transportation system users and operators of the rules and risks related to transportation. This helps to promote safety throughout Minnesota. For example, the TZD program sponsors statewide and regional workshops to bring together safety partners and share information about safety trends, current and emerging practices and ongoing efforts related to the "4Es" of safety. Individual agencies also lead specific safety efforts. DPS develops and distributes child passenger safety materials to child care centers, preschools and teachers to educate about keeping kids safe in vehicles. MnDOT provides educational information on rail crossings, work zone safety, distracted driving and bicycle and pedestrian safety. MnDOT also conducts pilot safety seminars at events throughout the state to help ensure Minnesota pilots remain current in safety training. Additionally, Greater Minnesota transit operators receive continued safety education and training from MnDOT on topics such as passenger assistance, defensive driving and driver and passenger safety. Collaboration and coordination of these educational efforts is critical. Also, as noted in the open decision-making objective, it is important that educational materials are engaging, honest, easy to find and accessible to all Minnesotans.

- **Emphasize enforcement techniques with proven safety benefits.** Compliance of users with transportation laws and requirements is one key aspect of improving safety for all modes. This includes traffic laws, truck weight restrictions and railroad laws, among others. Enforcement is important to achieving compliance. For example, cities, counties, MnDOT and DPS work together to enhance enforcement efforts to prevent impaired driving. These efforts are a factor in the continued reduction of alcohol-related crash deaths in Minnesota. In addition to proven strategies, new opportunities and methods for improving compliance should also be considered. This could include rewriting existing laws in plain language to improve understanding. It also could include exploring new technologies and tools for more efficient enforcement. However, it is important to remember that enforcement is limited. It cannot stop all violations. Other strategies to improve compliance should be explored in addition to enforcement based on the issue or context. For example, education strategies can help improve compliance and should be coordinated with related enforcement efforts to maximize the benefits of both.

"It is important to remember that enforcement is limited; it cannot stop all violations... For example, education strategies can help improve compliance and should be coordinated with related enforcement efforts to maximize the benefits of both."

- Plan, design, build, operate and maintain transportation infrastructure and facilities to improve the safety of all users and the communities they travel through. Transportation infrastructure, facilities and services should be planned, designed and built with the goal of improving safety of all users regardless of age, race, national origin, language, income, housing stability, individual ability or choice of travel mode. As an example, many units of government adopted complete streets ordinances or policies that direct how roads are designed to enable safe access for drivers, transit users, pedestrians and bicyclists. However, there may be instances when safety improvements for one mode may have adverse impacts on other forms of transportation. It is important to consider these trade-offs in safety decision-making. MnDOT and other transportation partners continually work to ensure the compliance of the transportation system with Minnesota's Olmstead Plan and the Americans with Disabilities Act. In addition to design, the operations and maintenance of infrastructure, facilities and services also have impacts on user safety. It is also important to note that not all safety issues can be fixed using engineering solutions. Engineering, along with education and enforcement, should be used collectively to improve transportation user safety.

- Implement strategic engineering and technology solutions to improve transportation safety. For roadways, this primarily includes systematically implementing cost-effective improvements, such as cable median barriers, rumble strips, intersection lighting and turn lanes. Access management and performing proper maintenance on transportation assets can also help improve safety. Additionally, technology plays a critical role in improving safety for all users of the transportation system. Examples include intersection conflict warning systems, bus driver guidance assist systems, smart phone applications for the visually impaired, emergency vehicle signal preemption, air navigation aids and positive train control technology, which is train location and collision avoidance technology for freight and passenger rail service. Advances in vehicle technology, such as self-driving and connected vehicles, may dramatically improve transportation safety and should be encouraged and embraced as the technology develops.

"Transportation infrastructure, facilities and services should be planned, designed and built with the goal of improving safety of all users..."

- Work with emergency medical and trauma services to reduce response time and increase survivability. Quick intervention by emergency services dramatically increases the survivability of those impacted by transportation crashes. For this reason, support of the statewide trauma system is critical. This includes minimizing obstructions to crash locations, such as blocked roadways, and ensuring safe and reasonable access to hospitals and other key facilities such as heliports, airports and major highways. Since law enforcement officers are often first responders to the scene of a crash, it is also important that their first responder training be current.

- Collaborate with local, regional, state and federal planning efforts to **ensure efficient and coordinated response to special, emergency and** disaster events. Efficient and coordinated response when major events occur, whether anticipated or unexpected, is an essential component to ensuring overall transportation safety. No one partner can do this alone. It is critical during these events that the transportation system continues to operate and that emergency medical and trauma services are not impacted for travelers and the broader community. Transportation partners can accomplish this through emergency relief and disaster preparedness plans and through strategies and policies that support homeland security and safeguard the personal security of all users. For example, MnDOT developed an emergency response plan that provides for mitigation, response and recovery to events that impact transportation. The emergency response plan is supplemented with mutual aid agreements with various agencies and local jurisdictions. MnDOT also provides training and resources to communities for the development and implementation of airport emergency plans. Additionally, many individual organizations, including state and local agencies, emergency responders and public transit providers, also prepare emergency response plans. For example, the Grand Forks - East Grand Forks metropolitan planning organization established the Bridge Traffic Incident Management Plan to address traffic impacts during closure of any of the four major bridges across the Red River in their area.

"Efficient and coordinated response when major events occur is an essential component to ensuring overall transportation safety."

- Enhance and maintain emergency communications infrastructure across the state. The ability of first responders and other critical personnel to communicate during emergency events is a key component of public safety. Cellular service is often the go-to form of communication to call emergency medical and trauma services to the scene of a crash or to alert authorities of other emergencies. However, cellular service has limitations. It is not available everywhere in Minnesota and networks can be overwhelmed. Transportation partners should continue to support efforts to provide wider access to cellular service, but it is also important to enhance and maintain other emergency communication infrastructure to ensure communications are always available. For example, MnDOT maintains a statewide shared safety communication system for Minnesota public safety providers through a communication backbone service known as the Allied Radio Matrix for Emergency Response. ARMER provides a key backup system and a strategic platform to support national, state, regional and local initiatives such as the Integrated Public Alert Warning System and FIRST Net.

Critical Connections

Maintain and improve multimodal transportation connections essential for Minnesotans' prosperity and quality of life. Strategically consider new connections that help meet performance targets and maximize social, economic and **environmental benefits.**

WHAT THIS IS ABOUT

The transportation system is a vital part of keeping Minnesotans connected to jobs, family, shopping, health care, schools, places of worship, recreation and entertainment. Each person identifies different connections as critical based on where they live and their individual needs. In urban areas, critical connections may mean providing safe and reliable alternatives to driving during peak travel periods. In rural areas, it may mean roadway connections to regional centers for people and goods.

Critical connections also vary by type of transportation. For example, the key connections needed for driving may be different than those for freight, transit, bicycling or walking. These connections may also vary in scale depending on whether people and goods move across the state, throughout a region or within a community. All of these connections are important to the overall economic prosperity and quality of life in Minnesota.

While many types of connections are important, given finite resources, it is necessary to set priorities to provide complete, efficient and affordable movement of people and goods. Although all connections are important to someone at some time, there are critical – or priority – connections that serve as the backbone for movement across and within Minnesota. Identifying, maintaining and enhancing these priority connections are a shared responsibility. As a state agency, MnDOT, in cooperation with other transportation partners, strives to provide connections that move people and goods across the state and within regions. This includes roadways, waterways, intercity and regional bus, airports, rail and bicycle routes. Metropolitan planning organizations strive to ensure connections that move people and goods throughout their region. This means developing regional transportation plans and programming projects of regional significance. Local units of government, such as cities and counties, strive to ensure connections that move people and goods within their community. This could mean an integrated network of local roads, safe options to bicycle and walk or last-mile freight connections. All connections, regardless of level, location or transportation type, need to be developed in coordination with one another to ensure a truly connected Minnesota.

PERFORMANCE MEASURES

Table 5-3 lists the existing MnDOT performance measures related to the critical connections objective. Additional proposed performance measures are under development. These proposed measures are identified in Chapter 6.

Table 5-3: Critical connections performance measures

MEASURE	TARGET	REPORTING
Placeholder for system reliability and delay measures for the Interstate and National Highway System	To be determined	Report total and by passenger or freight and urban or rural; report trend
Average aircraft delay compared to scheduled departure time at MSP	No target	Report total and trend
System airports with adequate approaches appropriate for their airport classification	100%	Report percentage and trend
Transit on-time performance within the Twin Cities and Greater Minnesota	No target	Report percentage and trend
Percentage of state-owned sidewalk miles substantially compliant with ADA standards	100% by 2037	Report percentage and trend
Annual number of available seat miles offered on scheduled service nonstop flights from MSP and Greater Minnesota airports	No target	Report total and trend
Population within 30 minutes surface travel time to a paved and lighted runway	No target	Report percentage and trend
Percentage of state's communities whose span of transit service meets the minimum guidelines	90%	Report percentage and trend
Annual number of jobs accessible within a 30-minute drive during AM peak	No target	Report total and trend
Average annual number of jobs accessible within a 30-minute transit commute during AM peak	No target	Report total and trend

STRATEGIES

- **Define priority networks for all modes based on connectivity and** access to destinations and integrate the networks into decision-making. This means identifying the connections essential for local, regional, statewide, national or global travel so Minnesotans can reach the destinations important to them. This may include existing and proposed facilities. Priority networks should be defined at the local, regional, statewide, national and global levels. For example, MnDOT identified a state bicycle network and state priority freight network. Metropolitan planning organizations, regional development organizations and local governments define local and regional priority connections. Examples include the Metropolitan Council's Twin Cities Regional Bicycle System Study, the Rochester-Olmsted Council of Governments 2040 Regional Bikeway Map or the regional development organizations' DevelopMN Initiative which has a strategy to identify a coherent network of the most critical roadway connections to maintain over the next 20 years. For transit systems, the priority is to meet minimum service guidelines, which quantify the number of hours a transit agency provides service during weekdays and weekends based on the community's size.

- Identify and prioritize multimodal solutions that have a high return on investment. Selecting investments and operational strategies that have a high return on investment demonstrates sound management of limited resources. Calculating return on investment is not limited to only financial considerations. It also includes social, economic and environmental factors such as safety, noise, travel time, vehicle operating costs, surrounding land use and context, air quality and wetland impacts.

- Identify and prioritize low-cost improvements to accelerate social, **economic and environmental benefits when large-scale solutions** cannot be implemented in the foreseeable future. Funding and other constraints may delay or prevent transportation agencies from implementing long-term solutions. In these instances, there may be opportunities to provide lower-cost improvements that can address the transportation need in the short-term until funding is available to provide a long-term solution. For example, MnDOT identified the conversion of U.S. Highway 10 between Coon Rapids and St. Cloud to a freeway as a long-term solution to address safety issues. Currently, this solution is not financially feasible. As a result, MnDOT also identified and is implementing a variety of short-term strategies to address the immediate safety challenges until the funding for the freeway conversion is available.

"Selecting investments and operational strategies that have a high return on investment demonstrates sound management of limited resources."

- Support and develop multimodal connections that provide equitable access to goods, services, opportunities and destinations. Transportation connects people to their daily needs and provides links to goods, services and opportunities. Every day people take numerous trips - going to work or school, shopping, seeing a doctor, visiting friends or taking a vacation. How these trips are taken may vary depending on the available travel options, distance of the trip, time constraints or even the weather. The type of available connections – roads, transit, rail, bicycle, pedestrian, water or air –varies by geographic area, but the connections should all be accessible regardless of age, race, national origin, language, income or individual ability. This includes ensuring the transportation system meets the transportation goals and strategies identified in Minnesota's Olmstead Plan and the Americans with Disabilities Act, and that is considers the needs of individuals without stable housing. It also means ensuring these connections are not just available but are also useable. For example, there may be a bus route to a destination, but the scheduled times or hours of service may not make it a viable option to meet user needs.

- **Provide greater access to destinations and more efficient, affordable** and reliable movement of goods and people throughout the Twin Cities metropolitan area. As the major population and economic center in the state, the efficient movement of goods and people into and throughout the Twin Cities is critical to the state's overall economy and quality of life. Delays in the Twin Cities metro area can cause delays in the state's overall transportation network. For example, an intercity bus or semi that is delayed in the Twin Cities will arrive late to its next destination, which may cause additional delays at other stops. Improving system efficiency and providing bottleneck relief in the Twin Cities has statewide benefits. Multimodal options, including transit, bicycling and walking are important contributors to the efficient movement of people throughout the region. A better defined and connected freight network, including air, rail, truck, ports, waterways and intermodal facilities will provide greater accessibility and more efficient movement of goods, contributing to the overall economy and quality of life of the region and state. The Metropolitan Council identified active traffic management, the development of the MnPASS Express Lane system and the expansion of the metropolitan area transit system as primary focus areas for reducing congestion and improving safety.

"The Metropolitan Council identified active traffic management, the development of the MnPASS Express Lane system, and the expansion of the metropolitan area transit system as primary focus areas for reducing congestion and improving safety."

- Improve freight operations and intermodal connections for better access to the transportation system. Important freight connections include last-mile links for manufacturers and distribution centers, farm-to-market routes, forestry access, terminals on the rail, waterway and air cargo systems, among others. Protecting and improving these connections are essential to ensure Minnesota's prosperity. As an example, the Duluth-Superior Metropolitan Interstate Council formed the Harbor Technical Advisory Committee to discuss harbor-related issues and concerns, promote the harbor's economic and environmental importance to the community, and provide sound planning and management recommendations to decision makers. MnDOT completed the Statewide Freight System Plan and several regional-level freight studies. MnDOT uses the plan and studies to inform transportation planning and decision-making.

- Provide transportation options that improve multimodal connections between workers and jobs. Deciding whether to accept a job or what jobs are available to an individual are influenced by several factors such as the cost of housing and the availability and cost of transportation. There are instances in Minnesota where there is a mismatch between where workers live and where jobs are available. Expanded transit service, shuttle service, carpools and telecommuting are some tools that can make jobs more accessible.

- Develop and improve multimodal transportation options within and between cities and regions. People and goods move within and between cities and regions using air transportation, passenger rail, intercity bus, transit and bicycle and pedestrian accommodations. The type of transportation used depends on numerous factors such as travel time, cost, availability and personal preference. Providing a variety of transportation choices that connect regional economic centers and providing options for movement within a city supports the state's economy and allows everyone, regardless of age, race, national origin, language, income or individual ability, to access goods, services and opportunities. Providing these connections also encourages the use of other forms of transportation besides single occupancy vehicles.

"Providing a variety of transportation choices that connect regional economic centers and providing options for movement within a city supports the state's economy and allows everyone... to access goods, services and opportunities."

- **Develop and improve connections between modes of transportation.** Not only is it important to provide multimodal connections within and between cities and regions, it is also important to support connections between the different forms of transportation. For example, located in downtown Duluth, the Duluth Transit Authority opened the Duluth Transportation Center, a facility that serves transit and intercity bus. It also includes a parking ramp and connections to the city's skyway system and trails. Planners envision future connections with intercity passenger rail. Connections between modes are also important for the movement of freight. Intermodal freight terminals provide multimodal access to national and international markets. The Twin Cities have two rail intermodal (truck to rail) container terminals: BNSF's St. Paul Intermodal Facility and Canadian Pacific's Twin Cities Intermodal Terminal.

System Stewardship

Strategically build, manage, maintain and operate all transportation assets. Rely on system data and analysis, performance measures and targets, agency and partners' needs and public expectations to inform decisions. Use technology and innovation to get the most out of investments and maintain system performance. Increase the resiliency of the transportation system and adapt to changing needs.

WHAT THIS IS ABOUT

After decades of building new corridors and facilities, MnDOT and transportation partners are increasingly shifting their focus to maintaining the existing transportation system. As stewards of the system, transportation partners must protect the massive public and private resources invested in the transportation system.

System stewardship addresses three concepts: asset management, system management and system resiliency.

Asset management is a systematic process of cost-effectively operating, maintaining and upgrading assets once they are built or purchased. Transportation assets include all aspects of the transportation system such as travel ways, vehicles and support facilities. This also includes data, software and research that helps improve materials and practices to maximize the useful life of an asset.

System management involves planning for the appropriate changes that will allow the system to adapt to future needs. In strategic system management, it is essential to set priorities and manage based on those priorities. This includes making trade-offs when necessary. It is critical to think in terms of risk and to assess likely impacts to Minnesota's quality of life, economy and the environment.

System resiliency refers to reducing vulnerability and ensuring redundancy and reliability to meet essential travel needs. The transportation system is vulnerable to many types of threats and risks, such as severe weather, acts of terrorism and cyber-attacks. Advanced preparation, mitigation and adaptation to threats and risks helps to ensure people and goods are able to continue to travel during emergencies.

PERFORMANCE MEASURES

Table 5-4 lists the existing MnDOT performance measures related to the system stewardship objective. Additional proposed performance measures are under development. These proposed measures are identified in Chapter 6.

Table 5-4: System stewardship performance measures

MEASURE	TARGET	REPORTING
Annual percentage of state highway miles with poor ride quality in the travel lane	Interstate: 2% NHS: 4% Non-NHS: 10%	Report percentage and trend
Annual percentage of state bridges in poor condition as a percent of total bridge deck area	NHS: 2% Non-NHS: 8%	Report percentage and trend
Placeholder for MAP-21 transit vehicle condition measure	To be determined	To be determined
Annual percentage of runway and parallel taxiway pavement in poor condition at all paved airports	4%	Report percentage and trend
Annual percentage of routine bridge inspections completed on time	100%	Report percentage and trend
Annual percentage of routine culvert inspections completed on time	No target	Report percentage and trend
Annual percentage of bridges with posted weight restrictions	No target	Report percentage and trend

STRATEGIES

"Good system management requires setting priorities and managing based on those priorities... This means some assets will be maintained to a higher standard than others."

- **Give asset management priority to infrastructure on identified priority networks.** Good system management requires setting priorities and managing based on those priorities. The critical connections objective directs transportation partners to identify priority networks for each mode based on current and future connectivity and accessibility needs, and to use the networks to inform the decision-making process. Priority networks should be identified for each type of transportation. The size and extent of these priority networks will vary by mode, jurisdiction and focus. For example, MnDOT's highway priority network, the National Highway System, looks different than its priority for the pedestrian system, which is to support local pedestrian networks that connect to key destinations within communities and across road networks. When it comes to asset management, it is not feasible to maintain all transportation assets in current condition or better due to available resources and changing transportation behavior. The system should change over time. Given this outlook, it is important for transportation partners to invest in priority assets accordingly. This means some assets will be maintained to a higher standard than others. For example, the City of Duluth identified a priority sidewalk network for snow removal. This may also include strategically upgrading critical existing infrastructure where appropriate.

- Maximize the useful life of transportation assets while considering system performance, costs and impacts to the state's economy, environment and quality of life. Capital, operations and maintenance decisions should be made using a risk-based asset management approach. This approach strives to maximize the useful life and minimize the life-cycle cost of all transportation assets. It also considers impacts to the state's economy, environment and quality of life. The timing of fixes and asset replacement can and should be influenced by economic, environmental and quality of life factors. Considering these factors as part of asset management decisions allows the system to change to address present and future needs.

- Incorporate asset management principles in capital, maintenance and operations decisions. A holistic approach is required for effective asset management. Capital, maintenance and operations decisions are all linked and impact one another throughout the life of an asset. For example, capital investments have future operations and maintenance expenses. Likewise, operations and maintenance decisions can impact how frequently an asset needs to be replaced. It is critical that these implications are considered when decisions are made.

- Better align ownership and operations of Minnesota's transportation assets with statewide, regional and local priorities. Transportation assets, including roadways, transit systems, sidewalks, trails, rail track, airports and port and waterway infrastructure, are owned and operated by many different levels of government and private-sector businesses and organizations. The types of funding available, overall priorities and performance expectations vary depending on who owns and operates the asset. To be good stewards of the system, all transportation partners should ensure they safely maintain and operate the assets they are responsible for. This may require right-sizing the system by transferring ownership or consolidating services. It is important that all transportation partners continue to work together and support better aligning asset ownership and operation with priorities at all levels to promote overall system stewardship.

- Better coordinate the management of all assets connected to the transportation system. Transportation assets cross jurisdictional boundaries and are connected to other infrastructure systems. For example, city infrastructure such as water, wastewater and fiber optics may be located under a MnDOT roadway that also supports county transit service. Assets also include data. Transportation partners need to continue to communicate with each other about data management, asset condition and projected needs. This communication helps to better coordinate projects, increase efficiencies, maximize the useful life of all assets and minimize disruptions whenever possible.

- Proactively identify risks to the transportation system and surrounding communities to prioritize mitigation and response activities. Identifying vulnerabilities before they become emergency situations allows transportation agencies to adapt and plan appropriate responses. Mitigation strategies can help the transportation system and surrounding communities become more resilient to special, emergency and disaster events. For example, MnDOT completed a flash flood vulnerability assessment in two of its districts to identify bridges, culverts and other infrastructure at higher risk of flooding due to climate change.

"Identifying vulnerabilities before they become emergency situations allows transportation agencies to adapt and plan appropriate responses."

- **Support regional approaches to mitigating identified risks to the transportation system and surrounding communities.** Many risks to the transportation system are larger and more complicated than what can be effectively managed by transportation agencies alone. Addressing these risks requires regional strategies and includes non-transportation partners. For example, it is not always feasible or desirable to address flood mitigation at the individual transportation project level. Sometimes reducing the risk of flooding to a transportation facility, such as making a culvert or bridge opening wider, can create additional risks downstream to property owners and communities. Likewise, changes in land management can create new flood risks to existing transportation facilities. Regional approaches, including transportation partners, watershed districts and land managers, can often be more effective and less expensive at mitigating flooding.

- Use recovery efforts to reduce system vulnerabilities. No one wants to experience an emergency such as major flooding, but recovering from this type of event presents a unique opportunity to implement major changes. For example, since 2009, the City of Moorhead has purchased homes that are prone to flooding. In the long-term, this will reduce the costs that occur when the Red River floods.

- Providing ongoing training to transportation professionals. As the state's population ages, so, too, does its workforce. Learning to conduct inspections or how to properly maintain some transportation assets can take years of on-the-job training. Many of the workers who currently complete these tasks have been doing their job for many years and are nearing retirement age. Often times, their knowledge was gained from experience, which is not something that can be effectively transferred through a manual or class. Workforce shortages can also be caused by economic changes or changes in regulations. For example, the nation currently faces a shortage of truck drivers due to an increased demand for freight movement and new government hours-of-service regulations that limit the number of hours current drivers work. It is critical that new workers have the opportunity to learn from these experts and that transportation partners are developing employees with long-term workforce sustainability in mind.

- Conduct regular inspections of transportation infrastructure, facilities and equipment to monitor conditions and identify risks. Proper operation and maintenance of the transportation system requires regular inspections. These inspections are also critical for identifying and addressing risks. For example, MnDOT recently hired additional rail inspectors to monitor the condition of Minnesota's railways. MnDOT has also studied the effectiveness of using unmanned aerial systems (drones) to conduct bridge inspections, which may reduce the costs and improve the quality of the inspections.

Healthy Communities

Make fiscally-responsible transportation system decisions that respect and complement the natural, cultural, social and economic context. Integrate land use and transportation to leverage public and private investments.

WHAT THIS IS ABOUT

Transportation provides connections to education, employment, recreation and other opportunities that build communities with healthy economies, environments and people. Fostering healthy communities in Minnesota requires that Minnesota's transportation partners consider the impacts of the transportation system on users and the surrounding context. Context refers to the things people care about—the people, places and circumstances of their lives. Transportation and context are closely linked. Together they shape the communities where life takes place. It is important that transportation decisions consider community characteristics such as land use, energy consumption, the environment, economy, culture, public health and the needs of traditionally underserved populations. Conversely, transportation decisions impact the surrounding context and shape the ways in which people live, work, play and access services. Land use decisions that are complementary of the existing and planned transportation system limit the environmental impact of new transportation demand and make transportation in Minnesota more efficient.

Not all places are the same and there is no one-size-fits-all solution for transportation decisions. Considering context when making transportation decisions leads to projects that are safer, sustainable in scale and tailored to the specific places in which they exist—projects that respect and complement the economy, environment and quality of life in a place. It also helps ensure that Minnesota is advancing equitable access to opportunities, preserving the natural and cultural heritage for future generations and maintaining an environmentally and economically-sustainable transportation system for all to use in the future.

PERFORMANCE MEASURES

Table 5-5 lists the existing MnDOT performance measures related to the healthy communities objective. Additional proposed performance measures are under development. These proposed measures are identified in Chapter 6.

Table 6-5: Healthy communities performance measures

MEASURE	TARGET	REPORTING
Annual greenhouse gas emissions from the transportation sector	29.5 million metric tons CO_2 equivalent by 2025	Report total and trend
Number of criteria pollutants below National Ambient Air Quality Standards	All criteria pollutants below threshold	Report number of pollutants not meeting standards and which pollutants
Annual percentage of state projects that use native seed mixes	No target	Report percentage and trend
Total percentage of state-own light fixtures using LED luminaries	100%	Report percentage
Annual percentage of MnDOT omnibus survey respondents perceiving safe environments for bicycling / walking	No target	Report percentage and trend

STRATEGIES

- Plan, design, develop and maintain transportation infrastructure and **facilities in a way that reflects and is informed by the surrounding** context. Not every transportation project is the same. The scope of work, the users of the facility and the characteristics of the surrounding community all require unique consideration. For this reason, a one-size-fits-all approach to decision-making and project development is not appropriate. Transportation partners need to make decisions that are reflective of context. Doing this requires having sound information and examples from which to draw, including potential engagement, design and environmental mitigation strategies. Context considerations will help strengthen the connections between land use and transportation decisions by providing multiple “starting points” for project-development conversations, depending on the needs of those who use the system and the surrounding community. The principles of context sensitive solutions should guide plans and projects to address environmental, economic and social needs while involving a broad range of stakeholders, advancing equity and creating lasting value for communities.

- Give higher priority to transportation improvements in areas with complementary existing or planned land uses. Community land use planning should consider existing and planned transportation projects as a way to enhance the efficiency and affordability of the transportation system. Local land use decisions can significantly impact transportation, especially when development patterns do not match up with the existing or planned transportation system. For example, siting schools or medical facilities on the edge of communities stresses the transportation system by requiring people to travel greater distances to access resources and often results in new infrastructure investments. Higher priority will be given to transportation projects that serve communities actively planning for and implementing mutually-supportive transportation and land use decisions. For example, under Minnesota's Safe Routes to School program, local communities must require new subdivisions be built with sidewalks to be eligible for grant funding. Where appropriate, transit-oriented development is a tool that connects land use and transportation infrastructure through higher density residential and commercial development. TOD often incorporates features that better facilitate transit use, bicycling and walking. Local parking policies can also be adjusted to rely on market-based strategies to ensure balanced supply and demand for parking.

- Coordinate land use and transportation planning within communities **to ensure consistency, maximize benefits and limit long-term costs.** Coordinating land use and transportation plans can help ensure that transportation and the surrounding context work together in promoting community, economic and environmental health while limiting the long-term costs of potential discrepancies. Strong coordination helps ensure that transportation decisions are made with land use in mind and that land use and development consider existing and planned transportation infrastructure. This type of coordination is especially important for institutional land uses. For example, communities should consider airports and their required safety zones during the comprehensive planning process to ensure land uses are compatible with the airport. Communities with airport safety zones within their jurisdiction should also depict these boundaries on official zoning maps. These actions will increase a community's understanding of airport zoning and reduce future land use conflicts and the costs associated with addressing conflicts.

"Higher priority will be given to transportation projects that serve communities actively planning for and implementing mutually-supportive transportation and land use decisions."

- **Use a complete streets approach to assess trade-offs to better serve both users and those affected by the transportation system.** A complete streets approach to transportation decision-making seeks to integrate the needs of all users regardless of socioeconomic status or individual ability through the design, operation and maintenance of a transportation facility. Examples of complete streets approaches include improved pedestrian crossings, consideration of truck movements and accommodating transit stops. MnDOT is committed to the principles of complete streets. The agency has a policy that complete streets be considered in all projects along the state highway system. Partner agencies are encouraged to formally adopt a complete streets approach. Using a complete streets approach also benefits those who spend time in places located near transportation facilities. Complete streets may reduce the speed and volume of vehicle traffic by using traffic calming strategies and encouraging mode shift away from single-occupancy vehicles. This can reduce the likelihood that transportation facilities become barriers. It can also lessen the environmental impact of the transportation system on surrounding communities.

- **Support and implement approaches that preserve Minnesota's natural resources, avoid causing environmental harm and improve environmental quality.** It is important to address environmental concerns at the project level but also consider broader impacts throughout the system. The use, operations and maintenance of the transportation system impacts the environment. Examples of these impacts include air pollution, water quality issues, storm water runoff, wetland degradation and noise. At the project level, these impacts must be considered to minimize effects to the local environment and meet the requirements of the National Environmental Policy Act. At the system level, Minnesota's transportation system is responsible for air emissions (including particulates, carbon dioxide and more), runoff and other negative impacts that affect people living around transportation facilities. Frequently, these impacts are more pronounced in communities of color and low-income households. For example, major transportation corridors were often built through communities of color, which results in elevated air pollution levels within 300 meters of busy roadways. Minimizing negative impacts from the transportation system in these communities is an important aspect of advancing equity through the transportation system. When possible, transportation projects should look to improve environmental quality and provide ecological services through activities such as increasing pollinator habitat by using native seed mixes on roadsides and increasing the integration of green infrastructure components.

"When possible, transportation projects should look to improve environmental quality and provide ecological services..."

- Make transportation decisions that minimize and reduce total greenhouse gas emissions. The transportation sector is the second-largest contributor to greenhouse gas emissions in Minnesota behind only electricity production facilities. It plays a large role in whether the state will meet the emission reduction goals set by the Next Generation Energy Act. Making transportation decisions that minimize and reduce total greenhouse gas emissions will ensure that Minnesota's transportation systems do their part in combating global climate change.
- Support economic vitality and create and maintain jobs through transportation infrastructure investments. MnDOT will work with public partners, such as the Minnesota Department of Employment and Economic Development, and private partners to define economic development objectives and leverage local and private resources in an effort to support net-positive economic opportunities in Minnesota. All transportation partners should continue to be actively involved to ensure that the projects selected for funding achieve net economic gains for the state while carefully considering the tradeoffs that accompany economic development opportunities. A particular focus should be placed on ensuring that economic development activities work to advance equity for all people in Minnesota. The Scenic Byways program is an example of transportation investments that help support local economic development and create and maintain jobs through tourism.
- Develop a transportation system that is respectful of cultural resources and maintains those resources for generations to come. Minnesota is home to a vast array of cultural resources, many of which are tied to the transportation system. Cultural resources can be broadly defined as evidence of past human activity, including art, language, structures and more. Ensuring that these resources are considered in transportation system decisions is crucial to allow future generations of Minnesotans to visit, explore and enjoy the same cultural resources that exist today. The transportation system should do its part to preserve Minnesota's indigenous languages, historic properties and cultural identities for years into the future.

NEXT GENERATION ENERGY ACT OF 2007

Minnesota's Next Generation Energy Act sets targets for energy conservation, renewable energy use and greenhouse gas emission reductions. The GHG goals identified in law are for the state to reduce emissions from all sectors to:

- 15 percent below 2005 levels by 2015
- 30 percent below 2005 levels by 2025
- 80 percent below 2005 levels by 2050

Data is not yet available for 2015 but Minnesota likely did not achieve the identified reduction target.

"Whenever possible, transportation decision-makers should focus on how many people are moved by the system not how many vehicles."

- **Identify and give priority to infrastructure improvements, services and education that increase the number of people who bicycle, walk and take transit.** Increasing the number of people who bicycle, walk and take transit has many benefits for Minnesota's communities. Shifting a greater share of travelers towards more active modes has the potential to improve the health of Minnesota's people and environment by encouraging physical activity and reducing vehicle emissions. Programs such as the federal transportation alternatives set-aside offer funding and resources to encourage walking and bicycling in communities. Additionally, increasing the availability of broadband access may allow Minnesotans to work remotely or connect to medical services without needing to travel significant distances to see a specialist. Reducing the number of people traveling in single-occupancy vehicles has a number of benefits that can improve community, economic and environmental health. Whenever possible, transportation decision-makers should focus on how many people are moved by the system not how many vehicles. Reduced single-occupancy vehicle use also benefits freight movement, as fewer cars on the road means less congestion and more space for trucks to carry goods.

MinnesotaGO
A Collaborative Vision for Transportation

Statewide Multimodal Transportation Plan

Chapter 6

WHAT IS NEXT FOR MNDOT?

DRAFT FOR PUBLIC COMMENT

NEXT STEPS

The Minnesota GO Vision, guiding principles and the objectives and strategies laid out in Chapter 5 provide direction for all transportation partners. This direction outlines how partners should work together to develop, maintain and operate Minnesota's transportation system. This chapter outlines how MnDOT, specifically, will move forward. The next steps for MnDOT include identifying near-term work activities, continued planning efforts as well as monitoring and reporting.

WORK PLAN 2017-2020

MnDOT will do the activities listed below before the Statewide Multimodal Transportation Plan is updated again in four years. These activities are not necessarily specific to any one objective or strategy but represent key areas for MnDOT to advance. Taken together, these activities will help realize the overall policy direction laid out in this plan. The list is not meant to be all-inclusive. There are many other activities in each of these areas and other areas that MnDOT will do in the upcoming years to help move this plan forward.

Work Plan Activities

ENGAGEMENT, COMMUNICATIONS & EDUCATION

Related Objectives: Open Decision-Making

- **Increase the transparency of MnDOT's project selection processes.** How MnDOT selects construction projects is a regular topic of interest. Recently, the Office of the Legislative Auditor reviewed MnDOT's project selection process and made several recommendations. There are several actions MnDOT will undertake to improve transparency. These actions include implementing best practices to improve transparency of the project selection process and local agency involvement, establishing a method to track spending of local dollars on the trunk highway system, and identifying the most important future expansion projects if new funding becomes available.

Related Objectives: Open Decision-Making

- **Provide more continuous engagement with partners and the public.** Currently, engagement at MnDOT is very project-focused. MnDOT has a large presence within a community during planning and construction activities but is less present and involved if no work is currently underway. Expanding MnDOT's engagement efforts to include more ongoing communication and relationship-building at the district level would allow for better understanding of broader local and regional priorities. Additionally, this would create opportunities for increased education about key transportation topics and issues. It would likely also improve coordination and engagement on specific projects when they do occur.

- Develop and update new, more inclusive public engagement resources. MnDOT is regularly trying different and new engagement tools and tactics through the agency's various planning processes, and learning important lessons along the way. As follow-up to this plan, MnDOT will compile a resource library of different tools and tactics for public engagement and make them easily available to internal and external audiences. The resources will include key information about how to implement the tool / tactic, its effectiveness and the costs associated with implementation. This will help develop a more consistent and effective approach to engagement throughout MnDOT. Special emphasis will be placed on identifying engagement tools and tactics to better reach traditionally underserved populations.

Related Objectives: Open Decision-Making

- Develop and improve educational materials to answer key questions of interest to Minnesotans. As follow-up to this plan, MnDOT will identify key transportation topics of interest to the public and our partners and develop and improve educational materials such as text, videos and graphics related to these topics. Emphasis will be placed on resources that are engaging, easy to understand, easy to find and accessible to all Minnesotans. This effort will build off existing resources, such as *www.dot.state.mn.us/getconnected* and *www.MinnesotaGO.org*. Topics for initial consideration include: (1) How are transportation projects identified and by whom? (2) Where does the money for transportation come from and how is it spent? (3) What are the benefits of transportation investments? (4) What are the goals for our transportation system and progress toward these goals? (5) How and when do stakeholders get involved in the planning and project-development process? (6) How do performance measures influence project selection? (7) What are the long-term projections for system condition?

Related Objectives: Open Decision-Making, Transportation Safety and System Stewardship

- Develop and execute safety education campaigns. MnDOT supports various safety education campaigns each year, in coordination with Toward Zero Deaths and other agency partners such as the Department of Public Safety. In follow-up to this plan, MnDOT will support safety education campaigns to address key safety issues such as work zone safety, pedestrian and bicycle safety, motorcycle safety and distracted driving. Other safety topics will be identified and implemented on an ongoing basis. MnDOT will work to make all educational materials engaging, honest, easy to find and accessible to all Minnesotans.

Related Objectives: Transportation Safety and Healthy Communities

ADVANCING EQUITY

Related Objectives:
Open Decision-Making, Critical Connections and Healthy Communities

- **Study how transportation affects equity and identify transportation strategies and approaches that will meaningfully reduce disparities.** Transportation policies can contribute to inequality related to race, income, ability and other factors. However, they can also help reduce negative effects brought about by development and construction and improve quality of life for all. To better understand how Minnesota's transportation policies affect equity, MnDOT will develop an "advancing transportation equity" report. The report will be modeled from the Advancing Health Equity Report completed by the Minnesota Department of Health. It will include defining what an equitable transportation system is and identifying transportation strategies and approaches that can advance equity and reduce disparities.

Related Objectives:
Open Decision-Making, Critical Connections and Healthy Communities

- **Pilot tools and strategies to better incorporate equity into project-level decision-making.** MnDOT is committed to incorporating equity into transportation decision-making. However, more work is needed to fully understand what that means for the transportation system and how it will be best accomplished. The upcoming I-94 study between downtown St. Paul and downtown Minneapolis, because of its size, importance, location and history, provides a platform for MnDOT to explore new tools and strategies. The study will focus on ensuring equity is incorporated throughout the project, from early engagement to a more equitable transportation system upon its completion. MnDOT will document lessons learned as a part of this project in order to continually improve the agency's ability to promote equity in future projects.

ASSET MANAGEMENT

- Expand and improve asset management planning. Building on the agency's ongoing asset management practices, MnDOT will add more categories of infrastructure to asset management planning efforts. Additionally, MnDOT will review and update data management practices to support the agency's asset management planning and will make MnDOT data available to local partners when possible. MnDOT will also work with cities, counties and other partners to collect and report local system condition data. MnDOT will expand the Transportation Asset Management System to include all significant highway assets. When fully operational, the Transportation Asset Management System will identify and track individual assets such as signals, lighting, intelligent transportation systems infrastructure and guard rails. The long-term goal is to include all MnDOT highway-related assets. To account for the full life-cycle of infrastructure, MnDOT will study and implement methods to better incorporate maintenance and operations activities in capital investment plans and will develop a methodology to calculate maintenance needs based on capital investments. MnDOT will also partner with asset management planning efforts for non-highway assets, such as transit vehicles.

Related Objectives: Open Decision-Making and System Stewardship

- Identify vulnerabilities and assess risks to the transportation system. Identifying system vulnerabilities before they become emergency situations allows MnDOT to adapt and plan appropriate responses. MnDOT will continue to complete vulnerability assessments for risks such as landslides and flooding related to a changing climate. MnDOT will also explore vulnerability assessments for risks in other areas. As risks are identified, MnDOT will evaluate strategies to reduce or eliminate vulnerabilities. For example, MnDOT will study the potential of developing a flood mitigation / climate adaptation program that would facilitate updates on the state highway network to increase resiliency to climate-related impacts. MnDOT will also develop better methods to track and report investments to respond to identified system risks.

Related Objectives: Critical Connections, System Stewardship and Healthy Communities

LAND USE & TRANSPORTATION

Related Objectives:
Open Decision-Making and Healthy Communities

- Develop tools and resources to support transportation decisions **that reflect the surrounding context.** For years MnDOT has embraced the idea of context sensitive solutions and flexible design standards to develop and maintain a transportation system that is reflective of the people and places that it serves. However, adoption of these ideas has been inconsistent. Developing context guidance will help bring together related initiatives, establishing a common framework and language to describe context-focused design and maintenance going forward. One particular component of context that will need to be explored is the definition of "urban." MnDOT will review its current policies and programs to identify the different ways in which urban is defined and select a definition to be used for performance reporting. Additional work that seeks to establish recommended practices for community engagement in different settings will also be part of this effort. In the end, additional context guidance will provide multiple potential starting points for a project, allowing for greater flexibility while offering a common reference for many different initiatives at MnDOT.

Related Objectives:
Critical Connections, System Stewardship and Healthy Communities

- Update MnDOT technical guidance to incorporate new practices and policy direction. MnDOT is responsible for a variety of technical guidance which influences how projects are developed and impacts communities in Minnesota. It is important that these documents are updated periodically to reflect new research, innovation and policy direction. In the near term, MnDOT will update its access management guidance to reflect changes that have occurred to the state's highway system since the guidance was completed in 2008. Effective access management reduces congestion and crashes, preserves road capacity, improves travel time, eases movement between destinations and supports local economic development. The Road Design Manual establishes uniform policies and procedures for MnDOT. Since it was last updated, several revisions have occurred. MnDOT will update the Road Design Manual to incorporate existing technical memoranda and consider additional policy guidance, such as new context considerations. Other guidance documents will be reviewed and updated, as appropriate.

PLANNING

- Review existing and potential new National Highway System intermodal connectors. NHS intermodal connectors, or last mile connectors, are roadway segments that provide access between the NHS and major passenger or freight intermodal facilities such as ports and airports. Eligible intermodal facilities are determined by annual passenger or freight volumes or daily vehicle traffic and the importance of the intermodal facility within the state. MnDOT will work with its partners to review existing NHS intermodal connectors and identify potential new connectors.

Related Objectives: Critical Connections

- **Refine the methodology used for calculating return on investment.** Calculating return on investment includes not only financial considerations, but also social, economic and environmental factors such as safety, noise, travel time, vehicle operating costs and air quality. Currently, MnDOT uses ROI when selecting projects for some programs. MnDOT will clarify how ROI is used in its current programs, examine whether ROI can be used in additional programs and research potential new factors for consideration. MnDOT will also explore tools to measure the health impacts of transportation decisions, such as the Integrated Transport and Health Impact Modelling tool.

Related Objectives: Open Decision-Making, Critical Connections and Healthy Communities

- Maintain the MnDOT Trend Analysis Library. As part of the SMTP update process, MnDOT produced more than 20 papers that explore the interaction between trends that will shape the future of Minnesota and the state's transportation system. These papers are available on MnDOT's statewide planning website – *www.MinnesotaGO.org*. As a follow-up to this plan, MnDOT will identify and implement an update schedule for each paper to ensure they are kept up-to-date and available as a resource for future planning and engagement efforts. New trend topics will be added as they emerge.

Related Objectives: Open Decision-Making

CLIMATE CHANGE & ENVIRONMENTAL QUALITY

Related Objectives:
Healthy Communities

- **Work with transportation partners to identify and advance statewide strategies for reducing greenhouse gas emissions.** As part of this plan update, MnDOT formally adopts the target of reducing GHG emissions from the transportation sector by 30 percent from 2005 levels in accordance with the Minnesota Next Generation Energy Act. While GHG emissions from the transportation sector have declined and are projected to continue declining, emissions are still projected to be 10 to 15 percent higher than the target. Many different approaches will be required to make progress on this target. MnDOT will work internally and with transportation stakeholders to identify and implement strategies to reduce GHG emissions from the transportation sector.

Related Objectives:
System Stewardship and Healthy Communities

- **Study and implement new and improved practices to reduce negative environmental impacts from state highway maintenance and operations.** MnDOT manages more than 175,000 acres of greenspace along Minnesota's roadways. How these green spaces are managed impacts the environment. For example, these green spaces are an opportunity to provide habitat corridors for pollinators such as bees and butterflies. The use of native plant mixes also provides habitat for native animal life and reduces the impact of storm water runoff and erosion from major precipitation events, among other environmental benefits. As such, it's important that MnDOT reduce negative impacts to, and enhance where possible, these green spaces. To do this, MnDOT will continue to study the costs and benefits of increasing the use of native roadside planting and partner to implement native plantings in key corridors. Additionally, MnDOT will implement strategies to reduce chloride use during winter maintenance and limit the spread of invasive species.

NEXT STEPS FOR THE FAMILY OF PLANS

MnDOT's family of plans provides direction for all the ways that goods and people move throughout Minnesota. All planning at MnDOT begins with the Minnesota GO 50-year Vision. The SMTP is the next level of planning in the family of plans. It provides policy direction to each of the modal and system plans. The modal and system plans include:

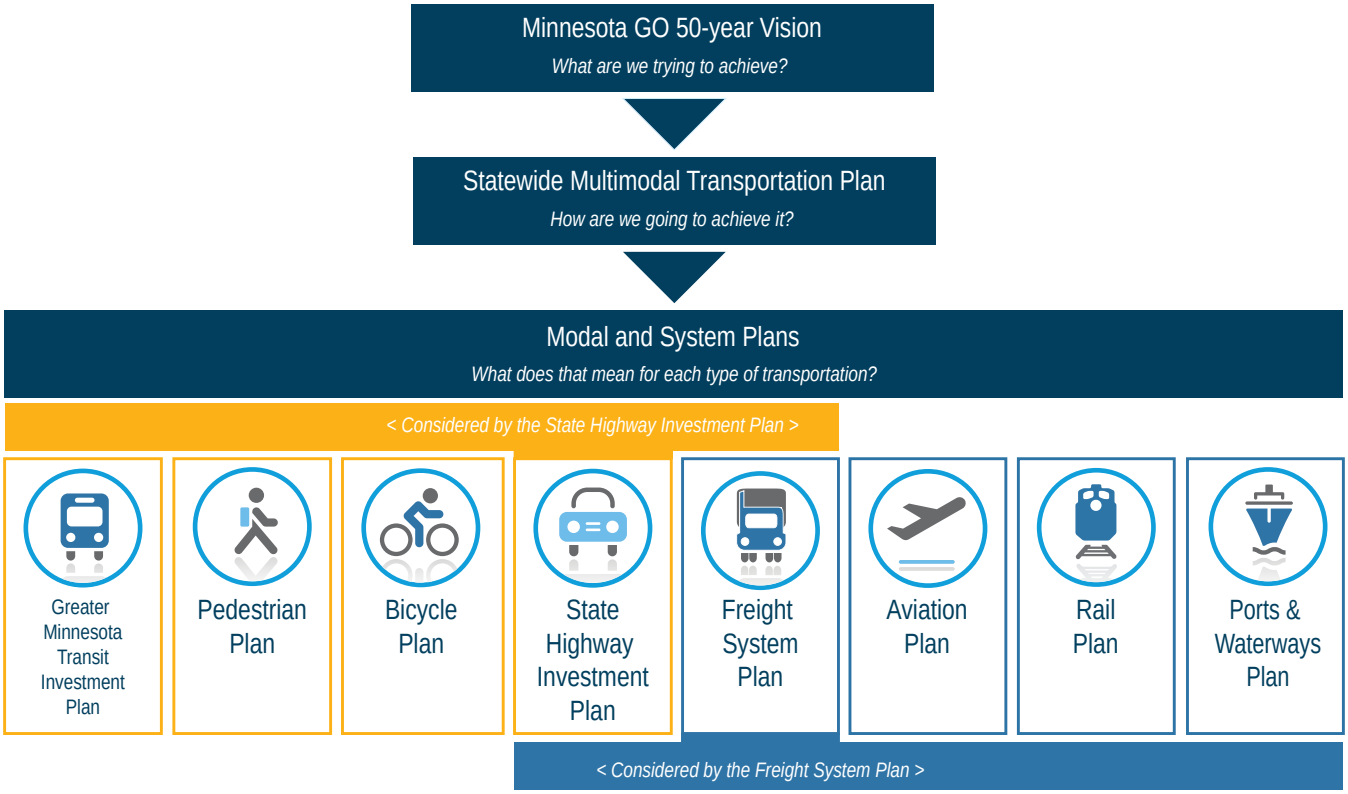
- Greater Minnesota Transit Investment Plan – This plan sets priorities for transit investments and determines the level of funding necessary for the state to meet its transit needs in Greater Minnesota. The Greater Minnesota Transit Investment Plan is currently being updated and is anticipated to be adopted in late 2016 / early 2017.
- Statewide Pedestrian System Plan – MnDOT is currently developing the state's first statewide pedestrian plan. The plan will be based off of the collaborative framework, Minnesota Walks, developed in 2016 with the Minnesota Department of Health. The plan will also identify key strategies to increase walking and rolling year-round. It is anticipated to be complete in late 2017 or early 2018.
- Statewide Bicycle System Plan – This plan identifies policy direction for bicycle transportation in Minnesota. The most recent update of the Statewide Bicycle System Plan was adopted in 2016.
- State Highway Investment Plan – This plan sets a fiscally-constrained, performance-based, 20-year investment direction for future capital improvements on Minnesota's state highway system. The 20-year State Highway Investment Plan is currently being updated and is anticipated to be adopted in early 2017.
- Statewide Freight System Plan – This document broadly plans for Minnesota's freight system across all modes. The Statewide Freight System Plan is currently being updated and is anticipated to be adopted in 2016.
- State Rail Plan – This plan establishes guidance for Minnesota initiatives and investments for freight and passenger rail services. The most recent update of the State Rail Plan is anticipated to be adopted in 2016.
- State Aviation System Plan – This plan informs decision making and guides the development of Minnesota's system of publicly-funded airports. The most recent update of the State Aviation System Plan was adopted in 2013.
- Statewide Ports and Waterways Plan – This document broadly plans for Minnesota ports and waterway facilities. The first Statewide Ports and Waterways Plan was adopted in 2013.

Figure 6-1 shows the relationship between the plans within this family.

The new policy direction from this SMTP will be reflected in each of MnDOT's modal and system plans as they are updated. It is anticipated that these updates will occur over the next few years.

In addition to MnDOT's family of plans, there are many more supporting plans and studies that inform transportation decision-making at MnDOT and for other transportation partners. These plans focus on specific topics, such as safety or on specific geographic areas or corridors. All of this planning helps direct the specific projects that build, maintain and operate Minnesota's transportation system.

Figure 6-1: MnDOT Family of Plans



MONITORING & REPORTING

To track progress toward the objectives identified in this plan, MnDOT will continue to monitor and report on the key performance measures identified in Chapter 5. The primary reporting method is MnDOT's Annual Transportation Performance Report. This report holds transportation partners accountable for delivering the direction identified in this plan. It also allows the public and transportation partners to see how well the plan strategies are working. Since the SMTP is only updated every four years, annual performance reporting is useful to identify if and when any mid-course corrections are necessary.

MnDOT will also work to develop additional performance measures and targets in the near-term. The current list of measures does not tell the complete story of the plan, yet. For some policy areas there is a need to develop new measures or reassess existing targets to better communicate progress. Specific measures to be explored and developed are identified in Table 6-1. However, others may be added over time.

Table 6-1: Proposed performance measures to be developed in the next one to three years

PROPOSED MEASURE	RELATED OBJECTIVE
Public engagement measures to be developed by MnDOT public engagement committee	Open Decision-Making
Construction projects completed on time	Open Decision-Making
Measure of project delivery for modes / programs that MnDOT manages through grants as opposed to construction	Open Decision-Making
Access to trauma center measure	Transportation Safety
Allied Radio Matrix for Emergency Response maintenance / reliability measure	Transportation Safety
Job accessibility by bicycling and walking	Critical Connections
Reliability of intercity commuter rail and bus services	Critical Connections
Measure of improvement to bicycle and pedestrian networks on the state highway system	Critical Connections
Measure of availability/condition of first/last mile connections	Critical Connections
Measure of rail asset condition	System Stewardship
Measure of waterway asset condition	System Stewardship
Measure of pedestrian asset condition	System Stewardship
Measure of total system value	System Stewardship
Measure of total system size	System Stewardship
Measure of jurisdictional transfer progress	System Stewardship
Annual percent of Minnesotans who use each mode of transportation	Healthy Communities
Annual total road salt used for snow and ice control on the state highway system compared to modeled optimal salt use	Healthy Communities

MnDOT will also look to improve how performance measures are reported to make sure the information is easy to find, engaging and accessible to all Minnesotans. MnDOT will update its performance measure website and reporting to include all the performance measures from Chapter 5 and new measures as they are adopted.

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