We all have a stake in A B

Annual Transportation Performance Report 2012

MinnesotaGO

A Collaborative Vision for Transportation

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March 2014

Dear People and Businesses of Minnesota,

I am pleased to share with you the 2012 Annual Transportation Performance Report. This report provides a snapshot of system performance for calendar year 2012. Wherever possible, it uses quantitative measures and targets to evaluate where we were, where we are and where we may be going.

This report tells a story that is both encouraging and cautionary.

The condition of the state highway system is improving as a result of a series of one time increases in transportation investment. Minnesota now has some of its best Interstate ride quality in the past decade. Highway bridge condition, although not quite achieving MnDOT's statewide targets, was better in 2012 than in 2011. Improvement in pavement and bridge condition is expected to continue as MnDOT carries out the Better Roads for a Better Minnesota initiative and completes a number of major bridge projects funded through the 2008 Chapter 152 Bridge Bonding Program.

The report also points to a number of areas where system performance is being sustained at high levels, including snow and ice control and travel time between Minnesota trade centers. Twin Cities freeway congestion, stable over the last three years, is being mitigated through the expansion of the MnPASS Express Lane system, improved operational strategies and Corridors of Commerce, a $300 million bonding program that is increasing highway capacity and improving freight movement statewide.

By demonstrating returns on past, present and near-term investment, this report highlights what is at stake as the state heads into an uncertain future. Due to the advanced age of Minnesota's transportation system and the effects of inflation on purchasing power, MnDOT's needs will significantly outpace existing revenue sources over the next 20 years. This looming challenge provides an important context for evaluating the system's current performance – absent new sources of revenue, many of the gains reported here will be lost by the end of the decade.

The success of the transportation system depends on an informed and engaged public. I hope you find this report valuable, and I look forward to working with you to address the challenges detailed in the pages that follow. Together, we can ensure that future reports are bright.

Sincerely,

Charles A. Zelle
Commissioner

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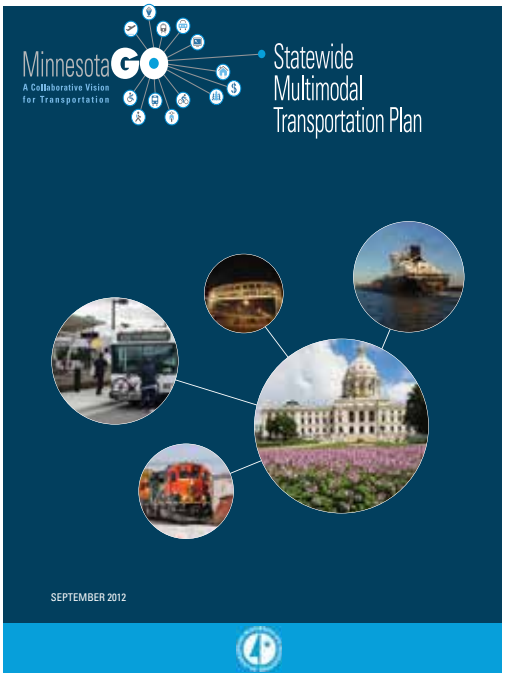
INTRODUCTION

Good transportation systems are essential to Minnesota's economic competitiveness and quality of life – supporting thriving communities and successful businesses. This fifth Annual Transportation Performance Report describes trends in the condition and service levels provided by Minnesota's transportation systems. The report also summarizes the plans, investments, strategies and innovations MnDOT and its partners use to optimize performance. Performance report measures track progress in 10 performance areas, which in turn reflect the following six objectives laid out in the **Minnesota GO Statewide Multimodal Transportation Plan 2013-2032**:

- **Accountability, transparency and communication.** Make transportation system decisions through processes that are open and supported by data and analysis; provide for and support coordination, collaboration and innovation; and ensure efficient and effective use of resources.
- **Traveler safety.** Safeguard travelers, transportation facilities and services; apply proven strategies to reduce fatalities and serious injuries for all modes of travel.
- **Transportation in context.** Make fiscally responsible decisions that respect and complement the context of place; integrate land uses and transportation systems.
- **Critical connections.** Identify essential transportation connections; maintain and improve these connections; consider new connections. *This objective is reflected in the state highway operations, freight, air transportation, bicycling, and pedestrian accessibility performance areas.*
- **Asset management.** Strategically maintain and operate transportation assets; rely on system data, partners' needs and public expectations to inform decisions; put technology and innovation to work to improve efficiency and performance; and recognize that the system should change over time.
- **System security.** Reduce system vulnerability and ensure system redundancy to meet essential travel needs during emergencies. *Measures of system security performance have not yet been developed.*

The 2012 performance report is the second performance report to be released since the adoption of Moving Ahead for Progress in the 21st Century (MAP 21), the first new federal highway authorization since 2005. This act streamlined the federal highway program through a restructuring that directs the majority of federal surface transportation funds to the National Highway System. In Minnesota, the NHS consists of Interstates, most U.S. highways and other high volume arterials that facilitate interregional travel or connect freeways to important intermodal facilities.



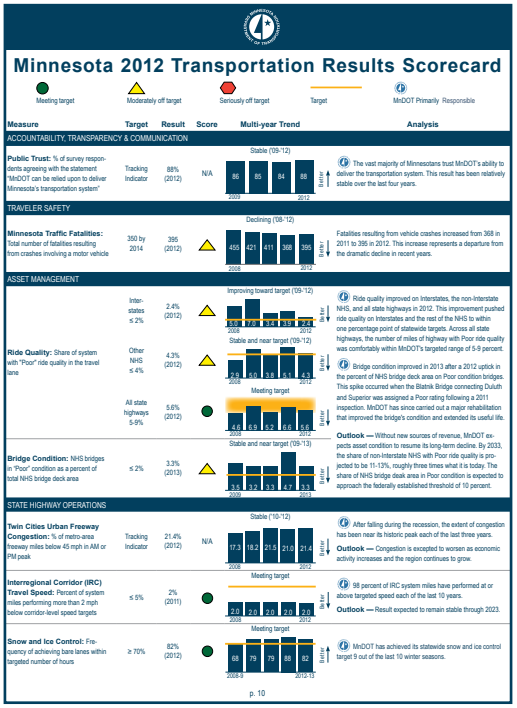
Annual Transportation Performance Report

A major feature of MAP-21 is a requirement that states track progress toward national goals using a limited number of national performance measures. The U.S. Department of Transportation is in the process of developing performance measures relating to fatalities, serious injuries, asset condition, system reliability, congestion reduction, on-road mobile source emissions, and freight movement. Once these measures go into effect, expected to occur in 2015, Minnesota will have one year to establish state-level targets. Two of the asset management measures reported here – share of Interstates with Poor ride quality and share of non-Interstate NHS with Poor ride quality – were developed by MnDOT in anticipation of MAP-21 requirements. Future performance reports will likely be expanded to include additional MAP-21 measures in the areas of system reliability and freight movement.

Scope: Minnesota and MnDOT

The state transportation system is operated by MnDOT and partners, including the Metropolitan Council, other metropolitan and regional planning organizations, the Metropolitan Airports Commission, the Department of Public Safety, railroads, port operators, the Federal Aviation Administration, U.S. Army of Corps of Engineers, local government airports, port authorities, and transit operators. Minnesota's transportation system is summarized on page 92.

Portions of Minnesota's transportation system are showing their age and need maintenance or replacement, putting pressure on limited state, local and federal financial resources. At the same time, expanded transportation options are being developed to relieve pressure on highways and to meet citizen demands. These options include light rail transit, MnPASS Express Lanes, bicycle facilities, and accessible pedestrian facilities. The report provides available performance data for these options.



Minnesota 2012 Transportation Results Scorecard

Meeting target | Moderately off target | Seriously off target | Target | MnDOT Primarily Responsible

Measure	Target	Result	Score	Multi-year Trend	Analysis
ACCOUNTABILITY, TRANSPARENCY & COMMUNICATION					
Public Trust: % of survey respondents agreeing with the statement "MnDOT can be relied upon to deliver Minnesota's transportation system"	Tracking Indicator	88% (2012)	N/A	Stable ('09-'12): 86, 85, 84, 88 (2009–2012)	The vast majority of Minnesotans trust MnDOT's ability to deliver the transportation system. This result has been relatively stable over the last four years.
TRAVELER SAFETY					
Minnesota Traffic Fatalities: Total number of fatalities resulting from crashes involving a motor vehicle	350 by 2014	395 (2012)	▲	Declining ('08-'12): 459, 421, 411, 368, 395 (2008–2012)	Fatalities resulting from vehicle crashes increased from 368 in 2011 to 395 in 2012. This increase represents a departure from the dramatic decline in recent years.
ASSET MANAGEMENT					
Ride Quality: Share of system with "Poor" ride quality in the travel lane	Inter-states ≤ 2%	2.4% (2012)	▲	Improving toward target ('09-'12): 3.5, 7.0, 3.4, 3.1, 2.4 (2008–2012)	Ride quality improved on Interstates, the non-Interstate NHS, and all state highways in 2012. This improvement pushed ride quality on Interstates and the rest of the NHS to within one percentage point of statewide targets. Across all state highways, the number of miles of highway with Poor ride quality was comfortably within MnDOT's targeted range of 5-9 percent.
	Other NHS ≤ 4%	4.3% (2012)	▲	Stable and near target ('09-'12): 2.8, 4.0, 3.8, 4.1, 4.3 (2008–2012)	Bridge condition improved in 2013 after a 2012 uptick in the percent of NHS bridge deck area on Poor condition bridges. This spike occurred when the Blatnik Bridge connecting Duluth and Superior was assigned a Poor rating following a 2011 inspection. MnDOT has since carried out a major rehabilitation that improved the bridge's condition and extended its useful life.
	All state highways 5-9%	5.6% (2012)	●	Meeting target: 5.8, 6.9, 5.2, 5.1, 5.6 (2008–2012)	**Outlook —** Without new sources of revenue, MnDOT expects asset condition to resume its long-term decline. By 2033, the share of non-Interstate NHS with Poor ride quality is projected to be 11-13%, roughly three times what it is today. The share of NHS bridge deak area in Poor condition is expected to approach the federally established threshold of 10 percent.
Bridge Condition: NHS bridges in "Poor" condition as a percent of total NHS bridge deck area	≤ 2%	3.3% (2013)	▲	Stable and near target ('09-'13): 2.5, 3.2, 3.1, 4.1, 3.3 (2009–2013)	
STATE HIGHWAY OPERATIONS					
Twin Cities Urban Freeway Congestion: % of metro-area freeway miles below 45 mph in AM or PM peak	Tracking Indicator	21.4% (2012)	N/A	Stable ('10-'12): 17.3, 16.2, 21.5, 21.9, 21.4 (2008–2012)	After falling during the recession, the extent of congestion has been near its historic peak each of the last three years. **Outlook —** Congestion is excepted to worsen as economic activity increases and the region continues to grow.
Interregional Corridor (IRC) Travel Speed: Percent of system miles performing more than 2 mph below corridor-level speed targets	≤ 5%	2% (2011)	●	Meeting target: 2.0, 2.0, 2.0, 2.0, 2.0 (2008–2012)	98 percent of IRC system miles have performed at or above targeted speed each of the last 10 years. **Outlook —** Result expected to remain stable through 2023.
Snow and Ice Control: Frequency of achieving bare lanes within targeted number of hours	≥ 70%	82% (2012)	●	Meeting target: 68, 79, 79, 88, 82 (2008-9–2012-13)	MnDOT has achieved its statewide snow and ice control target 9 out of the last 10 winter seasons.

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2012 Results Scorecard

The Minnesota 2012 Transportation Results Scorecard on pages 8-9 includes 17 key performance measures that MnDOT uses to evaluate system progress. MnDOT has primary responsibility for the measures highlighted by the MnDOT logo in the far right column.

Measures with performance targets have a green, yellow or red symbol showing results. MnDOT uses performance targets to calculate needed investment levels, stimulate innovation and guide decision-making. These targets are set through public planning processes that incorporate numerous factors, including engineering standards and other technical criteria, historical experience and assessments of stakeholder expectations. In a few select cases, the scorecard includes a short description of a measure's outlook. This is done for measures that MnDOT can predict future performance based on planned investment and well-founded assumptions about factors such as deterioration curves and future usage.

PERFORMANCE HIGHLIGHTS

Minnesota's transportation system made gains in a number of key performance areas in 2012:

- Public trust in MnDOT remained high, with 88 percent of Minnesotans agreeing that MnDOT can be relied upon to deliver the transportation system.
- Ride quality improved on the Interstates, the non-Interstate National Highway System and across all state highways. Minnesota now has fewer miles of Interstate with "Poor" ride quality than at any time in the last decade.
- NHS bridge condition improved as a result of a major rehabilitation of the Blatnik Bridge in Duluth. MnDOT anticipates continued progress in the future, with the share of NHS bridge deck area in "Poor" condition approaching target in the year 2017.
- Average travel times between Minnesota regional trade centers remained at or above target for all but one of Minnesota's 27 Interregional Corridors.
- MnDOT met its snow and ice control target for the ninth time in the last 10 years.

At the same time, 2012 also saw limited progress on a number of persistent challenges:

- Annual traffic fatalities increased to 395, up from 368 the previous year. Serious injuries resulting from crashes also increased, from 1,159 in 2011 to 1,268 in 2012.
- Twin Cities urban freeway congestion remained near its historic peak. More than one in five freeway miles is congested during a typical weekday.

The mixed result – some gains and some areas of limited progress – underscores the fluid and complex nature of transportation system performance. While there are many successes to point to, growing needs and limited resources continue to pose significant challenges and force difficult trade-offs across competing priorities.

2012 Performance Gains

Public Trust & Confidence – The share of Minnesotans who trust MnDOT to deliver the transportation system has hovered between 85 and 88 percent since 2009, the first year the question was included as part of MnDOT's omnibus survey. Eighty-four percent of Minnesotans also have confidence in MnDOT's ability to do a good job at building roads and bridges. This result represents a 20 point jump over 2008, when public confidence in MnDOT was at a low point following the I-35W bridge collapse. When public trust and confidence is high, MnDOT is more likely to succeed in communicating transportation needs and advancing solutions.

Ride Quality – Overall, there were 150 fewer miles of highway with Poor ride quality in 2012 compared to 2011. This improvement was largely due to the Better Roads for a Better Minnesota initiative, a four-year program that is directing $357 million in contingency funds to pavement condition. As a result of this investment, MnDOT expects to keep ride quality at or near target levels through 2016.

Bridge Condition – 16.8 percent of the bridge deck area on NHS bridges was in Poor or Fair condition in 2012. This was slightly above MnDOT's target of 16 percent. The remaining portion of the Chapter 152 bridge program and the completion of several major bridge projects over the next four years will move a large portion of this deck area to Good condition. Bridges can be kept in good and satisfactory condition with preventive maintenance and repair, reducing the need for more expensive reconstructions and replacements. By 2017, MnDOT expects the share of NHS bridge deck area in Good condition to exceed 89 percent.

Interregional Corridor Travel Speeds – 98 percent of corridor miles in Greater Minnesota can be driven at average speeds near 55, 60 or 65 miles per hour. The IRC system connects Minnesota's trade centers to each other and with neighboring states and Canada. IRCs account for only 2 percent of all the roadway miles in the state but carry about 30 percent of statewide travel.

Snow and Ice Control – MnDOT snow and ice management operations, covering more than 30,000 lane miles, achieved bare lanes within the targeted number of hours 82 percent of the time during the winter of 2012-2013. This is well above MnDOT's on-time goal of 70 percent.

2012 Challenges

Annual Traffic Fatalities – 2012 marked the first year since 2007 that Minnesota saw an increase in the number of traffic fatalities statewide. Additional years of data are needed to determine if this represents a temporary setback or a flattening trend. At the time of this report's publication, Department of Public Safety estimated that 379 traffic fatalities occurred on Minnesota roadways in 2013. This preliminary result is an improvement over 2012 but remains above 2011 levels. Consistent with targets established though the Minnesota Toward Zero Deaths initiative, MnDOT's goal is to reduce the number of traffic fatalities to fewer than 350 by the year 2014.

Twin Cities Urban Freeway Congestion – Peak period congestion on Twin Cities metro area freeways increased slightly in 2012, from 21 percent of the system to 21.4 percent. This result, when combined with 2010 at 21.5 percent, represents the highest level of congestion experienced in the Twin Cities over the last ten years. Going forward, MnDOT expects congestion to remain the same or increase as the region continues to grow. Since 2010, MnDOT's strategy has shifted away from reducing congestion and toward providing alternatives to congested travel.

Freight Mode Share – Robust economies require freight networks that are competitively balanced across modes. Trucking carries the majority of freight shipments by value, but the share carried by rail and intermodal services is increasing. Measured by ton-miles, there is a trend away from waterways toward rail, trucking and pipelines where feasible. In absolute terms, truck travel is steady over the last four years, rail shipments and intermodal container lifts are up slightly, and port shipments are flat for the third year after a drop in 2009 due to the recession.

Air Transportation – Available seat miles on scheduled flights at Minneapolis-St. Paul International Airport remained unchanged for the second consecutive year, but capacity is still below its 2004 peak. While partially attributable to less demand, the decline in available seat miles has been driven largely by airline decisions to use smaller planes and provide fewer flight offerings. The State Aviation System Plan found that 71 percent of all Minnesotans live within a 30-minute drive of an airport with a paved and lighted runway.

Transit Ridership – While transit ridership in Greater Minnesota hit a record high in 2012 with 11.6 million boardings, total bus service hours remained unchanged at 1.08 million hours. Bus service hours measure the total amount of time that Greater Minnesota transit vehicles are available for public service. At 1.08 million, Greater Minnesota bus service hours remain well short of the legislatively directed target of 1.6 million hours.

In the Twin Cities, rail and express bus ridership dipped slightly from 24.4 million to 24.3 million boardings. Counting all forms of public transit in the metro area, including regular route and dial-a-ride buses, 2012 ridership totaled 94 million. This result is virtually unchanged from the previous year and remains below the 2008 peak of 94.7 million.

Bicycling – Survey results indicate that the percentage of people who ride a bicycle at least once per week has been stable at around 20 percent over the last five years. Riding at least weekly indicates likely use of a bicycle for transportation purposes. When recreational riding is included by asking whether people bicycle at least once per month, the number rises to 44 percent.

Pedestrian Accessibility – MnDOT recently developed a sidewalk inventory that includes information about condition, width and slope. To date, 145 miles of state highway sidewalk have been identified as being in Poor structural condition, and another 165 miles of sidewalk are too steep to comply with the Americans with Disabilities Act design standards. Significant near-term reductions in the number of non-compliant sidewalk miles are unlikely. Additionally, only 11 percent of inventoried state highway curb ramps are completely ADA compliant. While progress on sidewalks and curb ramps is limited, MnDOT has increased the number of state highway intersections with Accessible Pedestrian Signals to 330, or 28 percent of eligible intersections. Based on normal signal replacement cycles, MnDOT expects to achieve 100 percent APS compliance by 2030.

Transportation Fuel Consumption — Fuel consumption in Minnesota rose slightly in 2012, from 3.04 billion to 3.07 billion gallons. This report tracks fuel consumption as a proxy for the transportation system's impact on air quality. Transportation fuel use has remained relatively flat over the last four years as increased vehicle fuel efficiency and changing travel behavior offset additional demand for fuel brought on by the economic recovery. The trend in vehicle miles traveled is similar; a slight uptick in 2012 compared to 2011, but decreasing slightly since 2007.

MnDOT limits its projections of future performance to a few select measures that can be heavily influenced through investment, such as asset condition and mobility measures based on travel time. Performance in the areas of accountability, transparency and communication, traveler safety and transportation in context is determined by a host of factors that are difficult to forecast. MnDOT reports and analyzes trends in these areas but does not provide projections of future results.

Long-term Outlook

Asset Management — MnDOT expects pavement preservation needs to grow faster than available resources. Anticipating this scenario, the Minnesota 20-year State Highway Investment Plan 2014-2033 directs MnDOT to focus pavement investment on the NHS with the objective of maintaining existing ride quality through 2023. This strategy puts MnDOT in a strong position to comply with NHS performance requirements to be established in 2015, but it also means that the percentage of non-NHS highways with Poor ride quality will grow from 7.5 percent in 2012 to 12 percent in 2023, a difference of 303 roadway miles. Beyond 2023, ride quality on the NHS is projected to decline as well. By 2033, the share of non-Interstate NHS with Poor ride quality is projected to be 11-13 percent, roughly three times what it is today.

Minnesota's bridges will remain safe, although additional weight restrictions will negatively impact freight movement. Under current projections, by 2033 the share of NHS deck area in Poor condition will rise to between 6 and 8 percent. This level of deterioration will force MnDOT to perform more full scale bridge rehabilitations and replacements. The expense of these improvements will limit MnDOT's ability to effectively manage preservation costs across the entire system and reduce the amount of money MnDOT has to invest in other areas of performance.

Critical Connections — In the Twin Cities, MnDOT plans to construct MnPASS Express Lanes on I-35E (under construction), I-94 and I-35W north of downtown Minneapolis. These lanes, along existing MnPASS facilities on I-394 and I-35W south of downtown, will preserve the metro area's access to reliable, congestion-free transportation even as congestion grows. In Greater Minnesota, the share of the Interregional Corridor system meeting travel speed targets is expected to remain unchanged through 2023. Beyond that point, MnDOT expects average travel speeds to decline on I-94, US 10, and US 63 between I-90 and the Iowa boarder.

Rail and express service bus ridership in the Twin Cities will increase significantly over the next few years with the start of service on the METRO Red Line (Cedar Avenue BRT) and METRO Green Line (Central Corridor LRT). In Greater Minnesota, flat revenue projections and the effects of inflation are expected to result in a widening gap between transit need and available transit service.

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Minnesota 2012 Transportation Results Scorecard

Meeting target | Moderately off target | Seriously off target | Target | MnDOT Primarily Responsible

Measure	Target	Result	Score	Multi-year Trend	Analysis
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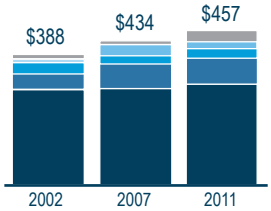
TRAVELER SAFETY					
Minnesota Traffic Fatalities: Total number of fatalities resulting from crashes involving a motor vehicle	350 by 2014	395 (2012)	▲	Improving ('08-'12) 455, 421, 411, 368, 395 (2008–2012) Better ↓	Fatalities resulting from vehicle crashes increased from 368 in 2011 to 395 in 2012. This increase represents a departure from the dramatic decline in recent years.
ASSET MANAGEMENT					
Ride Quality: Share of system with "Poor" ride quality in the travel lane	Inter-states ≤ 2%	2.4% (2012)	▲	Improving toward target ('09-'12) 5.0, 7.0, 3.4, 3.9, 2.4 (2008–2012) Better ↓	Ride quality improved on Interstates, the non-Interstate NHS, and all state highways in 2012. This improvement pushed ride quality on Interstates and the rest of the NHS to within 1 percentage point of statewide targets. Across all state highways, the number of miles of highway with Poor ride quality was comfortably within MnDOT's targeted range of 5-9 percent. **Outlook —** Without new sources of revenue, MnDOT expects ride quality to resume a long-term decline. By 2033, the share of non-Interstate NHS with Poor ride quality is projected to be 11-13%, roughly three times what it is today.
	Other NHS ≤ 4%	4.3% (2012)	▲	Stable and near target ('09-'12) 2.9, 5.0, 3.8, 5.1, 4.3 (2008–2012) Better ↓	
	All state highways 5-9%	5.6% (2012)	●	Meeting target 4.6, 6.9, 5.2, 6.6, 5.6 (2008–2012) Better ↓	
Bridge Condition: NHS bridges in "Poor" condition as a percent of total NHS bridge deck area	≤ 2%	3.3% (2013)	▲	Stable and near target ('09-'13) 3.5, 3.2, 3.3, 4.7, 3.3 (2009–2013) Better ↓	Bridge condition improved in 2013 after a 2012 uptick in the percent of NHS bridge deck area on Poor condition bridges. This spike occurred when the Blatnik Bridge connecting Duluth and Superior was assigned a Poor rating following a 2011 inspection. MnDOT has since carried out a major rehabilitation that improved the bridge's condition and extended its useful life. **Outlook —** By 2033, the share of NHS bridge deck area in Poor condition is expected to approach the federally established threshold of 10 percent.
STATE HIGHWAY OPERATIONS					
Twin Cities Urban Freeway Congestion: % of metro-area freeway miles below 45 mph in AM or PM peak	Tracking Indicator	21.4% (2012)	N/A	Stable ('10-'12) 17.3, 18.2, 21.5, 21.0, 21.4 (2008–2012) Better ↓	After falling during the recession, the extent of congestion has been near its historic peak each of the last three years. **Outlook —** Congestion is expected to worsen as economic activity increases and the region continues to grow.
Interregional Corridor (IRC) Travel Speed: % of system miles performing more than 2 mph below corridor-level speed targets	≤ 5%	2% (2011)	●	Meeting target 2.0, 2.0, 2.0, 2.0, 2.0 (2008–2012) Better ↓	98 percent of IRC system miles have performed at or above targeted speed each of the last 10 years. **Outlook —** Result expected to remain stable through 2023.
Snow and Ice Control: Frequency of achieving bare lanes within targeted number of hours	≥ 70%	82% (2012)	●	Meeting target 68, 79, 79, 88, 82 (2008-9–2012-13) Better ↑	MnDOT has achieved its statewide snow and ice control target nine out of the last 10 winter seasons.

Measure	Target	Result	Score	Multi-year Trend	Analysis

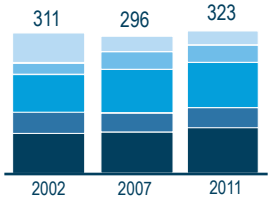
FREIGHT

Freight Mode Share: Total domestic shipments to, from or between Minnesota locations*

Tracking Indicator — **Value in 2007 dollars** — $457** billion (2011) — N/A



Tracking Indicator — **Ton Miles** — 323 billion (2011) — N/A



Truck only trips remain the primary means of shipping goods by value, but the share moved by other modes is increasing. Shipments by ton miles have shifted from water to rail, truck and pipeline. Trucks tend to carry more valuable freight and make last mile trips, while long distance shipments of heavier, less valuable goods tend to be made by other modes.

Truck, Multiple modes, Rail, Pipeline, Water, Other

* Excludes international shipments and "through" shipments (freight movements in which both trip origin and destination are outside Minnesota).

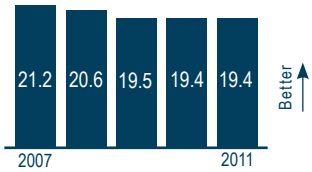
** Since some goods are moved multiple times through the supply chain, the total value of domestic freight movements is greater than the value of all goods and services produced in Minnesota as measured with GDP statistics.

AIR TRANSPORTATION

Available Seat Miles: Number of available seat miles offered on scheduled service nonstop flights from Minneapolis-St. Paul International Airport

Tracking Indicator — 19.4 billion (2011) — N/A

Slowing decline ('07-'11)



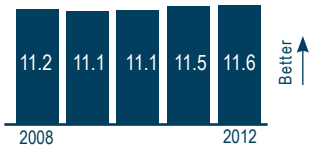
After peaking in 2004, available seat miles (ASM) out of MSP have fallen significantly over the last seven years. While partially attributable to less demand, the decline in ASM has been driven largely by airline decisions to use smaller planes and provide fewer flights. On average, flights out of MSP have fewer empty seats today than in 2004.

TRANSIT

Transit Ridership in Greater Minnesota: Annual boardings recorded by public transit providers serving Greater Minnesota counties

Tracking Indicator — 11.6 million (2012) — N/A

Slight improvement ('08-'12)

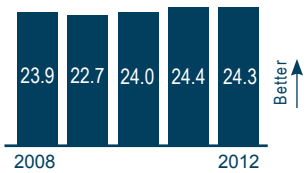


Ridership on Greater Minnesota public transit systems has increased about 25 percent over the last 10 years. While most of this growth occurred on urban systems, ridership on small urban and rural systems increased as well.

Rail and Express Service Bus Ridership in the Twin Cities: Annual boardings on commuter rail, light rail transit and express service buses

Tracking Indicator — 24.3 million (2012) — N/A

Slight improvement ('09-'12)



After a 2009 dip, rail and express transit ridership has been at or slightly above 24 million riders three consecutive years. 53 percent of this ridership occurs on express service buses.

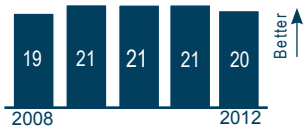
Outlook — Rail and express service bus ridership is likely to increase significantly over the next few years with service beginning on the METRO Red Line and METRO Green Line.

BICYCLING

Frequency of Bicycling: % of survey respondents who bicycled at least once a week during the bicycling season (April - October)

Tracking Indicator — 20% (2012) — N/A

Stable ('08-'12)



The number of people reporting that they ride a bike at least once a week during the bicycling season has remained stable during the past five years, hovering around 20%.

PEDESTRIAN ACCESSIBILITY

Americans with Disabilities Act (ADA) Compliance: State highway sidewalk miles that are not compliant with ADA requirements

Tracking Indicator — 281* (2012) — N/A — Only one year of data available

* Excludes non-compliant sidewalk miles in MnDOT District 7.

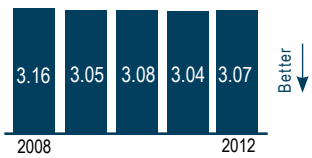
With some data outstanding, MnDOT has identified 114 miles of sidewalk that are not ADA compliant due to condition and another 165 miles that are structurally sound but do not meet cross slope requirements. There are approximately 600 miles of sidewalk on the state highway system.

TRANSPORTATION IN CONTEXT

Fuel Consumption: Total gallons of fuel sold for transportation purposes

Tracking Indicator — 3.07 billion (2012) — N/A

Stable ('09-'12)



Fuel consumption rose slightly in 2012 but is still below its 2004 peak. This report tracks fuel use as a proxy for transportation's impact on air quality. Although the initial decrease was largely caused by the recession, increased efficiency and changing travel behavior have maintained 2009 levels throughout the economic recovery.

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CHAPTER 1

ACCOUNTABILITY, TRANSPARENCY AND COMMUNICATION

What this is about

Accountability, transparency and communication support the effective and efficient use of public resources. To this end, the Minnesota GO Vision and the Statewide Multimodal Transportation Plan direct MnDOT to base investment and operational decisions in data and a firmly rooted commitment to multi-jurisdictional collaboration and public engagement. This includes selecting projects with a high return-on-investment, taking advantage of partnership opportunities, completing projects on time and within budget, and providing transportation options that respond to changes in society, technology, the environment, and the economy. It also includes providing accurate information and being open about how and why decisions are made.

Connection to the Minnesota GO Statewide Multimodal Transportation Plan

Objective

Make transportation system decisions through processes that are open and supported by data analysis; provide for and support coordination, collaboration and innovation; and ensure efficient and effective use of resources.

Strategy

Work with users of the system to better understand what is important to meet their needs today and what will matter tomorrow.

Strategy

Educate stakeholders on systemwide and project specific transportation issues.

Strategy

Improve early communication and coordination on projects to minimize resource use and maximize benefits.

AT A GLANCE.....

ACCOUNTABILITY, TRANSPARENCY & COMMUNICATION

Public Trust: Delivering the Transportation System

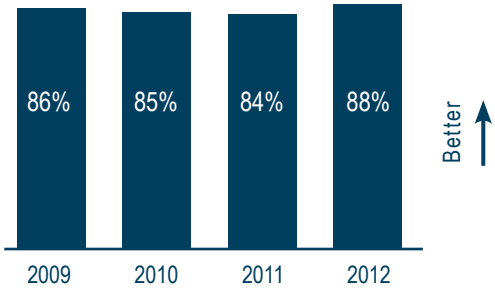
Measure Explanation: Once a year, MnDOT conducts a survey to measure public attitudes about MnDOT and MnDOT-provided services. Since 2009, this survey has included questions assessing public trust. Respondents are asked to indicate their level of agreement with a small number of statements. In the case of "Delivering the Transportation System," survey respondents are asked if they agree with the statement: "MnDOT can be relied upon to deliver Minnesota's transportation system."

System Description: Minnesota adult residents. Survey results are based on 800 telephone interviews. Survey participants are identified through random, statistically valid sampling techniques. Geographic quotas are enforced so that the sample population is representative of the state as a whole. The sample is large enough to produce estimates that are within 5% of the actual population data 95% of the time.

Why this is Important: Public trust is the lifeblood of an effective public agency. The more trust Minnesotans have in MnDOT's ability to deliver the transportation system, the more successful MnDOT will be in communicating needs and advancing solutions.

Target	Result (2012)	Multi-year Trend
Tracking Indicator	88% of respondents indicate trust in MnDOT's ability to deliver the transportation system	Stable (2009-2012)

Percent of survey respondents agreeing with the statement: "MnDOT can be relied upon to deliver Minnesota's transportation system."



Source: MnDOT Omnibus Survey

The majority of Minnesotans trust MnDOT's ability to deliver the transportation system. This result has been relatively stable over the last four years.

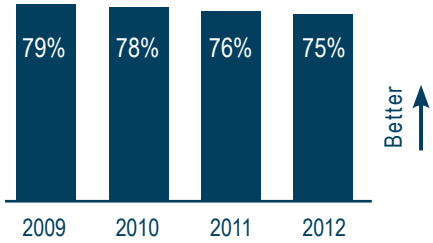
Progress

Eighty-eight percent of the Minnesotans surveyed in 2012 indicated that MnDOT could be relied upon to deliver the transportation system. This result represents a 4 percentage point increase from 2011 and the highest level achieved in the four years public trust questions have been asked as part of the omnibus survey.

Additional measures of public trust are less encouraging. The percent of respondents agreeing that "MnDOT considers customer concerns and needs when developing transportation plans" has hovered between 79 and 75 the last four years. A slightly smaller percentage (68 in 2012) indicate agreement with the statement "MnDOT expands Minnesotans transportation options by creating alternative means of travel." Public trust in MnDOT's expansion of transportation options has been the omnibus survey's lowest performing public trust indicator three years in a row.

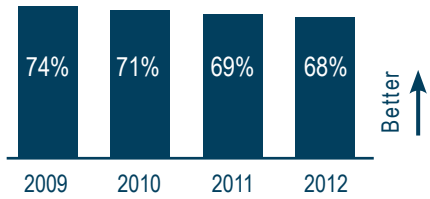
Another measure of public trust in MnDOT is the degree to which Minnesotans perceive MnDOT to be operating in a fiscally responsible manner. This indicator has hovered around 70 percent since 2009. Public trust in MnDOT's financial management is important because it is one of the key factors driving public support for continued investment in transportation infrastructure.

Percent of survey respondents agreeing with the statement: "MnDOT considers customer concerns and needs when developing transportation plans."



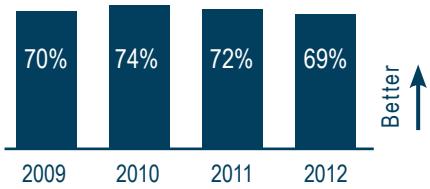
Source: MnDOT Omnibus Survey

Percent of survey respondents agreeing with the statement: "MnDOT expands Minnesotans transportation options by creating alternative means of travel."



Source: MnDOT Omnibus Survey

Percent of survey respondents agreeing with the statement: "MnDOT acts in a fiscally responsible manner."

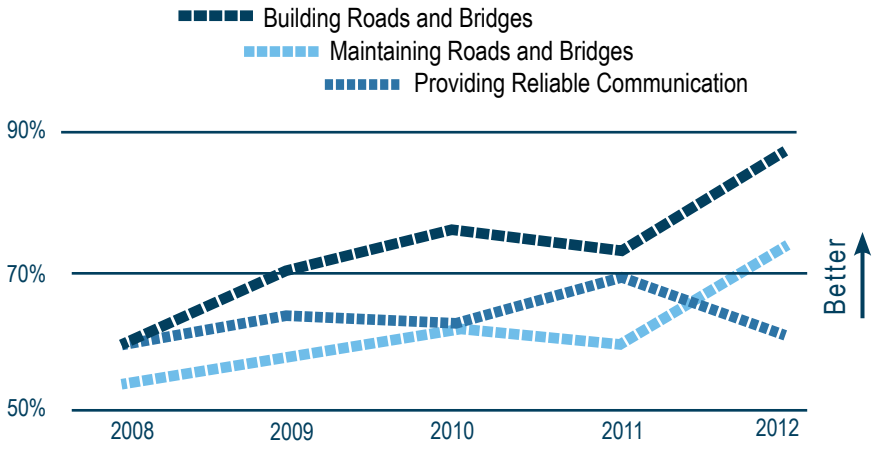


Source: MnDOT Omnibus Survey

Despite rising confidence in MnDOT's ability to build and maintain roads and bridges, the degree to which the public trusts MnDOT to act in a fiscally responsible manner did not significantly change between 2009 and 2012.

The omnibus survey also includes questions that assess the public's confidence in MnDOT's ability to do a good job at, among other things, building roads and bridges, maintaining roads and bridges, and providing reliable communications.

Percent of survey respondents answering confident or very confident to the question: "How confident are you in MnDOT's ability to do a good job at ....?"



Source: MnDOT Omnibus Survey

After an across-the-board drop in public confidence following the 2007 I-35W bridge collapse, survey results during the last five years show a significant increase in the percent of respondents who are confident in MnDOT's ability to do a good job at building and maintaining roads and bridges. In the case of building roads and bridges, the 2012 result (84 percent) represents a 20 point jump from 2008, leaving it just two points below 2003 levels. Public confidence in MnDOT's communication increased between 2008 to 2011, but declined in 2012.

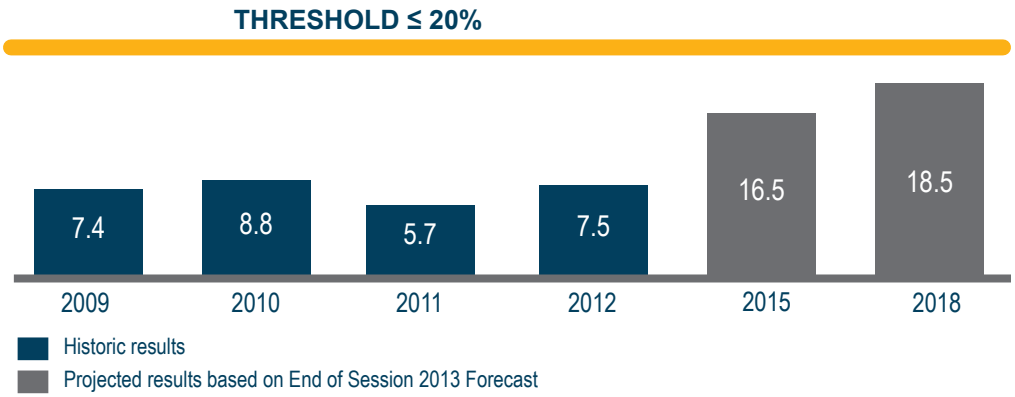
What is being done

The role of accountability, transparency and communication in transportation decision-making is recognized and supported in federal and state regulations. While these regulations are important, true accountability, transparency and communication goes beyond just meeting requirements. Since the adoption of the Statewide Multimodal Transportation Plan, MnDOT has continued or initiated a number of efforts designed to promote public trust and confidence in MnDOT's maintenance and operation of the state highway system.

Financial Accountability

One of the ways MnDOT builds public trust and confidence is through sound financial management practices. MnDOT's Office of Financial Management ensures MnDOT's adherence to legislatively approved budgets and internal policies that promote effective stewardship of transportation dollars. These polices relate to the use of advance construction, Trunk Highway Fund balance, cash balance, and the amount of money MnDOT spends each year on debt service. MnDOT complied with all of its financial policies in FY 2012. MnDOT's debt service will increase rapidly over the next four years; however, current projections indicate debt service payments as a percent of trunk highway fund revenue will be below the department's 20 percent threshold through FY 2018.

Annual debt service paid out of the Trunk Highway Fund (THF) as a percent of state THF revenue



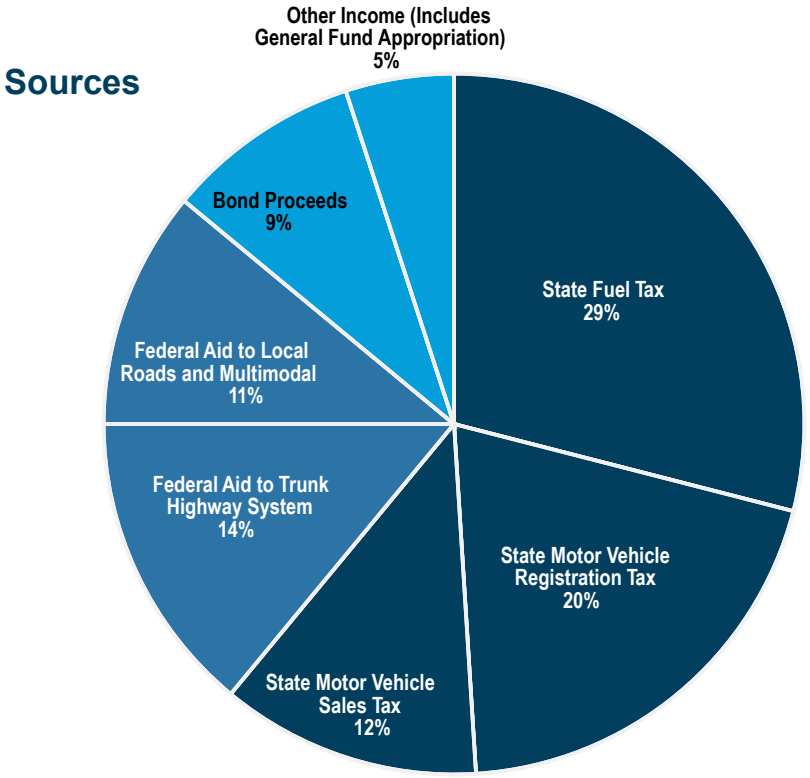
Source: MnDOT Office of Financial Management

At the project level, MnDOT is improving its financial accountability by tracking capital investments and measuring the impact these investments have on performance measures and targets. As part of the Minnesota 20-year State Highway Investment Plan, MnDOT is implementing a standardized approach to identifying project expenditures that more clearly reflects statewide transportation objectives. In addition to more accurate, transparent and consistent reporting, this effort will also help MnDOT understand why costs, scopes and schedules are adjusted as individual projects move toward construction.

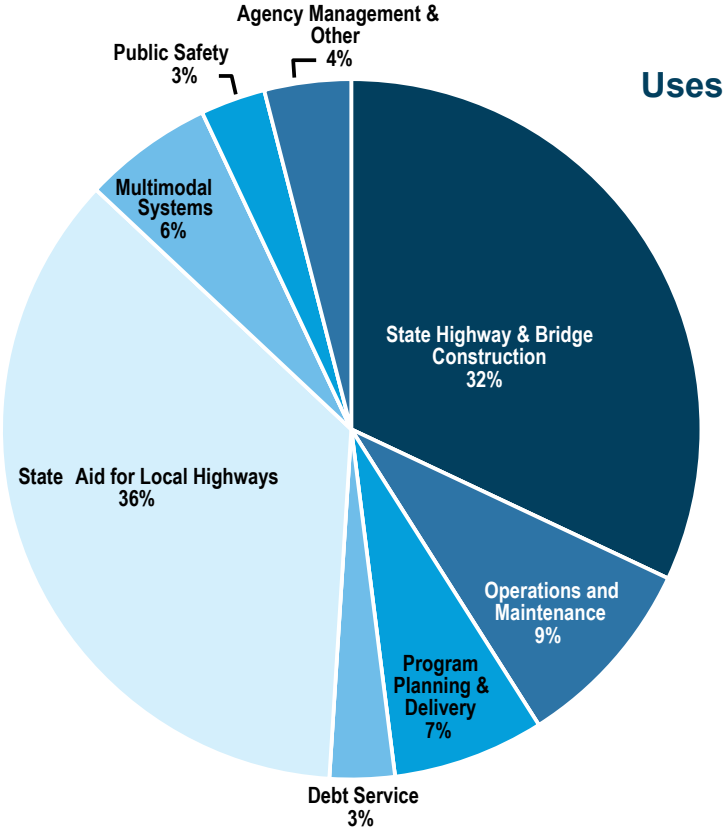
MnDOT uses performance measurement to improve its stewardship of public resources. Since the 1990s, MnDOT has used performance measures to guide plans, prioritize investments, select projects, and evaluate outcomes. Today MnDOT is expanding the use of performance measures to track department productivity. An example of a productivity measure is expenditure per mile of snow plowing. This metric helps MnDOT identify opportunities for efficiencies and other improvements. It also helps MnDOT develop a more accurate and complete picture of the total costs involved in operating and maintaining an asset over its entire life. These costs must be considered when evaluating future revenue needs associated with major construction projects.

Sources and Uses of Funds, FY 2012, Total: $2.72 Billion*

Highways are primarily funded through the state motor vehicle fuel tax, motor vehicle sales tax, and vehicle registrations fees. Federal aid, supported by the federal fuel tax and general fund revenue, and bond proceeds represent the other major sources of state funding for highways. Transit, waterways, railroads, and aeronautics are funded by various combinations of federal, state, local, and private sources.



Transportation spending was slightly less than 10 percent of the state's 2012-2013 biennial budget, making it Minnesota's third largest expense after health and human services and K-12 education. The vast majority of this funding was devoted to roads and bridges. The right slide of the pie chart — including budget areas for state highway and bridge construction, operations and maintenance, and program planning and delivery — reflect spending on the state highway system. The single largest transportation budget expense is state aid for local highways, which are funds that MnDOT distributes to counties, cities and townships to support county state aid highways and municipal state aid roads.



*Reflects MnDOT's actual results for budget fiscal year 2012. Revenues and expenditures of the Metropolitan Airports Commission (MAC) and the Metropolitan Council are excluded. Also excluded are local and private sources of transportation funding.

Total sources amount differs from total uses amount due to the timing of expenditures. $2.72 B equals total FY12 uses.

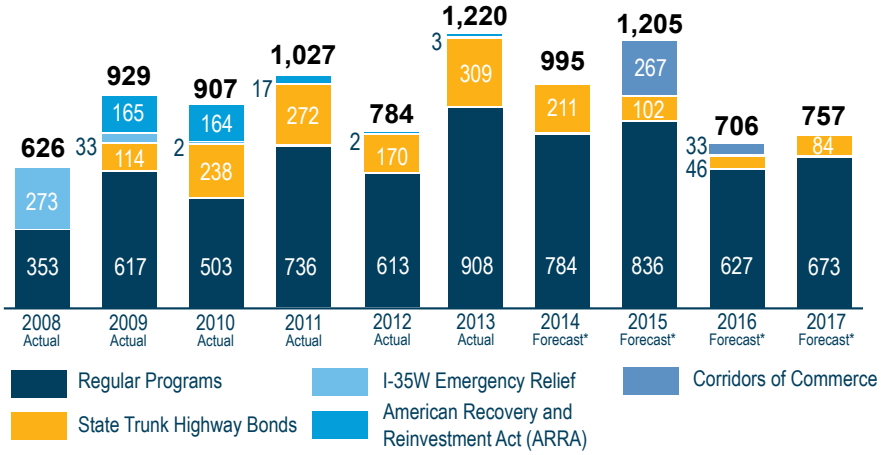
Source: MnDOT Office of Financial Management

Program Delivery

MnDOT's construction program for FY 2013 was its largest ever. Recent growth in MnDOT's capital spending was driven by the gradual phase-in of a five cent gas tax increase, a 3.5 cent debt surcharge tax, and the Chapter 152 bridge bonding program, all of which were approved during the 2008 legislative session. Corridors of Commerce, a 3-year highway improvement program made possible by 2013 legislation, will allow MnDOT to deliver approximately $1 billion or more in construction projects per year through FY 2015. Longer term, MnDOT expects the size of its program to shrink as Chapter 152 and Corridors of Commerce near completion. Program size and changing sources and uses of funds affect the stability of project scopes, schedules and budgets.

In 2008, the Minnesota Legislature passed legislation known as Chapter 152. This law provided MnDOT with $2.1 billion to repair or replace 120 high-priority bridges by 2018.

MnDOT Construction Program FY 2008 - FY 2017 ($ millions)



* Forecast based on 2014-2017 State Transportation Improvement Program (STIP), Corridors of Commerce and $95 million in supplemental budget authority received in 2014.

All dollars assigned to year of award.

Source: MnDOT Office of Financial Management; historic data pulled using Statewide Integrated Financial Tools (SWIFT)

Delivering projects on time, within scope and within budget is critically important to MnDOT. The need for responsible program and project management grows as transportation funding becomes more limited. Delivering projects in accordance with a planned schedule and scope allows for more proactive management and stability in MnDOT's construction program.

2012 marked the first time in four years that MnDOT missed its target of letting 90 percent of projects in the year they were initially scheduled. Reasons for delay include other projects taking priority, combining projects, internal process delays (such as plan review and right-of-way acquisition), and coordination with work being done by other agencies. MnDOT is changing its project development processes to improve its ability to meet schedules and estimate costs. These changes include the use of resource-loaded schedules to allow managers to better forecast staffing needs, finalizing the scope of projects earlier, and developing leading indicators to identify issues before they arise.

The term "letting" refers to the opening of bid proposals for highway construction and maintenance projects. Projects are awarded to the bidder who submits the lowest bid and complies with all project requirements.

Minimizing disruption through communication

MnDOT is committed to minimizing construction related disruptions by providing timely and accurate information to businesses and the general public. Recent efforts have focused on expanding the use of social media and the 511 traveler information website to communicate closures, likely delays and recommended detour routes. MnDOT also conducts surveys of travelers affected by specific construction projects. These surveys help MnDOT understand how travelers access and use information and their preferences regarding construction delay mitigation strategies.

Learn More

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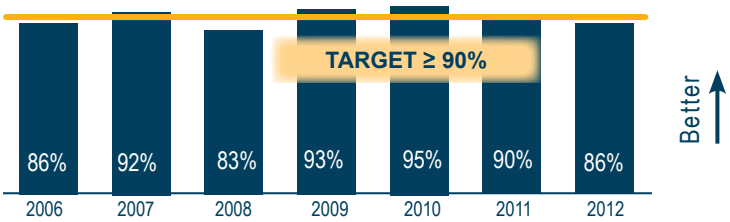
MnDOT projects let in the year scheduled



Source: MnDOT Office of Transportation System Management; Data pulled from Program and Project Management System (PPMS)

Public Engagement

MnDOT seeks to continually involve the public in the transportation planning and programming process through its Hear Every Voice initiative. This initiative allows MnDOT to inform the public of the challenges facing the transportation system and the importance of investing in it. Public engagement carried out as part of the Minnesota GO Vision and related efforts further enables a diverse array of Minnesotans to inform MnDOT's goals and investment strategies.

One of these efforts was MnSHIP's award winning public outreach campaign. In addition to traditional methods, MnSHIP used new tools and communication techniques to involve the public in discussion of system needs and performance trade-offs. Examples include:

- **Investment category folios:** MnDOT created four-page educational brochures to give the public an in-depth look at the issues, risks and objectives involved in 10 distinct investment categories.
- **Scenario-based stakeholder engagement meetings:** After presenting three fiscally constrained investment alternatives, MnDOT asked participants to select an approach and explain how it would advance their priorities for the state highway system.
- **Online interactive scenario tool:** Interested members of the public who couldn't attend an in-person meeting could indicate their priorities online. 448 Minnesotans selected an investment approach and provided additional comments using this platform.

Using these and other tools, a clear majority of stakeholders indicated a willingness to accept asset deterioration in exchange for continued or increased investment in other areas. Largely because of this finding, MnDOT developed a plan that pursues a diverse set of investment objectives over the first 10 years of MnSHIP's planning horizon. This is in stark contrast to the second 10 years of MnSHIP's planning horizon, when aging assets and declining buying power force MnDOT to focus almost exclusively on preserving existing infrastructure.

CHAPTER 2

TRAVELER SAFETY

What this is about

MnDOT improves traveler safety in Minnesota through the Toward Zero Deaths partnership. TZD, which is led by MnDOT, the Minnesota Department of Public Safety and the Minnesota Department of Health, is the state's cornerstone transportation safety initiative with the overarching goal of reducing the number of traffic deaths and serious injuries. Key TZD strategies can be summarized as the "4Es" – education, enforcement, engineering, and emergency medical and trauma services.

Connection to Minnesota GO Guiding Principles

Integrate Safety

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

Connection to the Minnesota GO Statewide Multimodal Transportation Plan

Objective

Safeguard travelers, transportation facilities and services; apply proven strategies to reduce fatalities and serious injuries for all modes.

Strategy

Develop and share critical safety information and support educational initiatives.

Strategy

Ensure that transportation facilities are planned, engineered, operated, and maintained with consideration for the safety of all users.

AT A GLANCE.....

TRAVELER SAFETY

Minnesota Traffic Fatalities

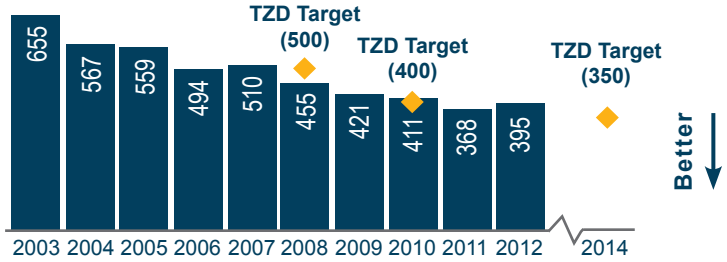
Measure Explanation: This measure relies on crash reports provided to the Minnesota Department of Public Safety by local law enforcement agencies. By state law, information on traffic crashes must be reported to DPS if the crashes result in at least $1,000 in property damage, or a motor vehicle occupant, pedestrian, or bicyclist is injured or killed.

System Description: All state and local roads (141,000 miles).

Why this is Important: Nationally, traffic crashes are the leading cause of death for people younger than 35, and the fifth leading cause of death overall. On an average day in 2012, at least one motor vehicle occupant, pedestrian, or bicyclist died on Minnesota roadways and more than three were seriously injured.

Target	Result (2012)	Multi-year Trend
Fewer than 350 traffic fatalities by 2014	395 traffic fatalities	Improving (2008-2012)

Total number of fatalities resulting from crashes involving a motor vehicle



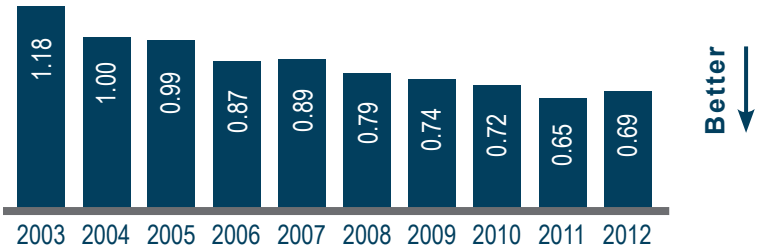
Source: DPS Crash Facts

Fatalities resulting from vehicle crashes increased from 368 in 2011 to 395 in 2012. This increase represents a departure from the dramatic decline in recent years.

Progress

Minnesota made substantial progress during the first 10 years of the TZD initiative. Annual traffic fatalities, which increased steadily from 1987 to 2002, dropped more than 40 percent between 2003 and 2012. This decline has driven traffic fatalities to historic lows, with 2011 and 2012 the only years since 1944 that Minnesota traffic fatalities were below 400. Accounting for traffic volume, Minnesota's traffic fatality rate in 2012 stood at 0.69 per 100 million vehicle miles traveled, or VMT. This is significantly below the 1.18 per 100 million VMT recorded in 2003 and remains one of the lowest rates in the country.

Traffic fatality rate on all Minnesota roads (per 100 million VMT)

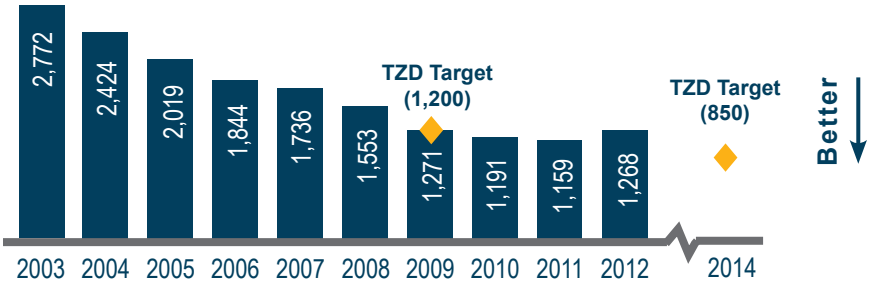


Source: DPS Crash Facts

While past progress is highly encouraging, the 27 fatality increase in 2012 is cause for concern. Additional years of data are needed to determine if this represents a temporary setback or a flattening trend. At the time of this report's publication, DPS estimated that 379 traffic fatalities occurred on Minnesota roadways in 2013. This preliminary result is an improvement over 2012 but remains above 2011 levels.

Serious traffic injuries also increased slightly in 2012 after a decade of significant decline. Serious injuries prevent walking, driving or continuing other activities of daily life. Minnesota's target is to have fewer than 850 serious injuries by 2014. Evaluating traffic fatalities in conjunction with serious injuries provides a more complete picture of safety trends on Minnesota roadways. Generally speaking, fatalities and serious injuries result from the same type and severity of crash, with slight differences in impact, the speed of emergency response, and the resilience of affected travelers responsible for the difference in outcome.

Serious traffic injuries on all Minnesota roads



Source: DPS Crash Facts

For Comparison

Minnesota had the second lowest traffic fatality rate of any state in 2011. At 0.65 traffic fatalities per 100 million vehicle miles traveled, Minnesota's rate was 40 percent below the national average of 1.1 per 100 million VMT.

Source: National Highway Traffic Safety Administration; 2011 Traffic Safety Fact Sheet

There were **150 more severe crashes** on Minnesota roadways in 2012 than in 2011. This was the largely the result of increases in the number of severe crashes involving motorcycles (+48), unbelted occupants (+45), and impaired users (+44).

There were 1,395 severe crashes on Minnesota roadways in 2012. Severe crashes are those that result in a fatality or serious injury. MnDOT and its TZD partners use breakdowns of these crashes to track progress in a number of critical focus areas. As the table below illustrates, critical focus areas cover driver behavior, driver characteristics, special users, and crash type. Information about the number of severe crashes involving a focus area supports efforts to target and prioritize crash prevention strategies.

Severe crashes by focus area; 10-year change (2003 - 2012)

CATEGORY	FOCUS AREA	2003 RESULT	2012 RESULT	10-YEAR CHANGE	
				+/-	%
Driver behavior	Unbelted occupant	1,291	487	- 804	↓ 62%
	Impaired driver	518	334	- 184	↓ 36%
	Inattentive driver	672	245	- 427	↓ 64%*
	Speeding	689	238	- 451	↓ 65%
Driver characteristic	Under 21	687	216	- 471	↓ 69%
	Older than 64	320	211	- 109	↓ 34%
	Unlicensed	277	132	- 145	↓ 52%
Special user	Motorcyclist	277	267	- 10	↓ 4%
	Commercial vehicle	229	134	- 95	↓ 41%
	Pedestrian	214	142	- 72	↓ 34%
	Bicyclist	85	55	- 30	↓ 35%
Crash type	Lane departure	1,156	638	- 518	↓ 45%
	Intersection	1,247	566	- 681	↓ 55%
Total number of severe crashes**		2,779	1,395	-1,384	↓ 62%

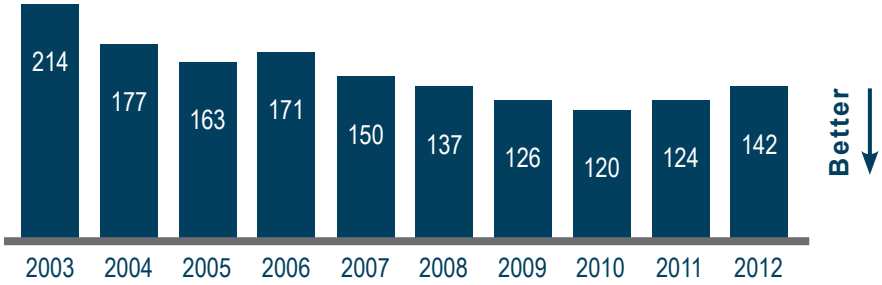
*Severe crashes involving inattentive drivers are likely under reported. Data should be evaluated with caution.
**Crashes may involve multiple focus areas.
Source: MnDOT Office of Traffic, Safety and Technology; Transportation Information System (TIS) database.

Minnesota's biggest TZD success is increased seat belt use. The number of severe crashes involving unbelted drivers fell from 1,291 in 2003 to 487 in 2012. This decline accounts for more than half of the reduction in severe crashes overall. Minnesota has also seen a significant reduction in the number of severe crashes involving speeding and younger drivers. Severe crashes involving impaired users have declined more slowly. After lack of seat belt use, impaired drivers contribute to more severe crashes than any other factor.

Among special users, Minnesota biggest challenge remains motorcycle crashes. DPS's 2012 Crash Facts Report attributes persistence in the number of severe crashes involving motorcyclists to ridership growth, alcohol consumption, lack of helmet use, and the fact that crashes involving motorcyclists are more likely to result in death or serious injury than crashes involving other modes. The attentiveness of other drivers was frequently cited by officers reporting severe crashes between a motorcycle and another vehicle. However, most motorcycle crashes are single vehicle incidents.

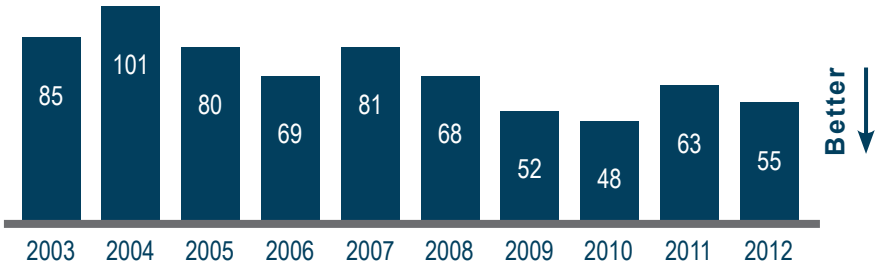
Severe crashes involving a motor vehicle and a pedestrian or bicyclist increased over the last two years after achieving 10-year lows in 2010. In both cases, the most commonly cited contributing factor is failure of motor vehicle drivers to yield right-of-way.

Severe crashes involving motor vehicles and pedestrians



Source: MnDOT Office of Traffic, Safety and Technology; Transportation Information System (TIS)

Severe crashes involving motor vehicles and bicyclists

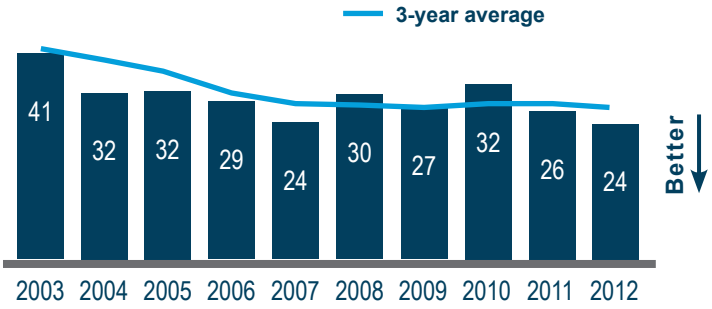


Source: MnDOT Office of Traffic, Safety and Technology; Transportation Information System (TIS)

According to MnDOT's annual omnibus survey, perceptions of safety for pedestrians and bicyclists are heading in opposite directions. Between 2008 and 2012, the percent of respondents perceiving Minnesota to be "very safe" for pedestrians declined 8 points (40 to 32) while the percent of respondents perceiving Minnesota to be "very safe" for bicyclists nearly doubled (15 to 28).

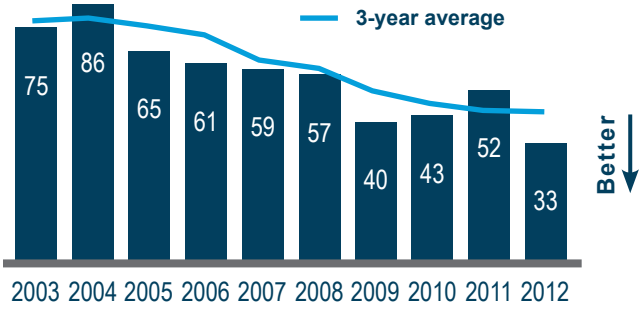
MnDOT monitors safety information off the roadway system as well. Between 2003 and 2012 there were 297 aviation-related safety incidents in Minnesota. During this period, the 3-year average dropped from 42 per year in 2003 to 27 per year in 2012. The majority of aviation incidents involve minor equipment failure and do not result in fatalities or serious injuries. Incidents at railroad crossings in Minnesota also declined over the last 10 years, falling from 78 to 43 per year (3-year average). Between 2010 and 2012, incidents at railroad/highway crossings were responsible for an average of 4.7 fatalities per year.

Aviation Incidents



Source: MnDOT Office of Aeronautics; Aviation Accident database

Incidents at railroad / highway crossings



Source: Federal Railroad Administration; Office of Safety Analysis
Ten Year Accident/Incident Overview by Railroad/Region/State/County

Highway Safety Improvement Program Funding (millions of $)

The federal Highway Safety Improvement Program (HSIP) was established in 2005 to significantly reduce fatalities and serious injuries on all roads. In Minnesota, HSIP funds are used to advance engineering strategies established through TZD and the SHSP. A percentage of these funds is also occasionally flexed to initiatives that fall under the other Es--enforcement, education and emergency response.

What's Being Done

Strategies

Minnesota's TZD partnership improves traveler safety through a combination of activities across each of the Four "Es" – engineering, enforcement, education, and emergency medical and trauma services.

- **Engineering** – In the past, safety engineering was primarily focused on reactive improvements at locations with a history of crashes. Current strategy, developed through the Minnesota Strategic Highway Safety Plan, takes the more proactive approach of identifying and improving locations at-risk for the types of crashes that are most likely to result in death or serious injury. These crash types include at-angle crashes at intersections and run-off-the-road crashes in rural areas.

- **Enforcement** – Ensuring compliance with traffic laws is a major component of the TZD initiative. To this end, the Department of Public Safety administers four enforcement mobilization campaigns: "Speed"; "Click It or Ticket"; "Drive Sober or Get Pulled Over"; and "Distracted Driving Enforcement". Each of these campaigns features scheduled enforcement events where the State Patrol and local police focus on a targeted driving behavior for a set number of days. DPS also administers a TZD grant program that uses federal funds to support enhanced traffic enforcement at the local level.

- **Education** – Helping drivers understand the risks associated with behaviors, such as not wearing seat belts and drinking and driving, can help reduce fatalities and injuries due to those factors. Recent practice has been to coordinate education and enforcement activities to heighten public awareness of key messages. For example, an annual public safety announcement detailing the importance of seat belt use is paired with special enforcement activities focused on enforcing seat belt laws. Another education initiative is the Share the Road Campaign, which emphasizes the roles and responsibilities of drivers, bicyclists and pedestrians in keeping Minnesota's roadways safe for all.

- **Emergency medical and trauma services** – The Minnesota Department of Health works with Minnesota hospitals and health care providers on new services to transport crash victims rapidly to the right type of care facility. Additionally, the statewide trauma system provides data used to evaluate the effectiveness of the medical care provided after a motor vehicle crash.

Investment

MnDOT's investment in traveler safety is guided by District Safety Plans. These plans, which exist for each of MnDOT's eight districts, identify and prioritize opportunities for lower cost, high benefit safety treatments. These treatments achieve much of the fatality and serious injury reduction associated with major capacity expansion, but at a fraction of the cost. Examples include edge treatments, such as rumble strips and rumble stripes, guardrail, and cable median barriers. Due to their lower cost, these treatments can be applied systematically as part of MnDOT's regular investments in roadside infrastructure.

In addition to District Safety Plans, MnDOT also maintains a list of locations with a consistently high crash rate compared to similar locations elsewhere in the state. Crashes in these locations may occur as a result of an underlying issue that has not been effectively managed using lower cost strategies, resulting in a need for more substantial investment. Examples of higher-cost safety investments include interchanges, reduced conflict intersections/J-turns, and turn lanes.

In 2013, MnDOT updated the Minnesota 20-year State Highway Investment Plan. This plan dedicates $320 million to traveler safety improvements in the first 10 years of the plan, with an additional $300 million dedicated to traveler safety in years 11-20. At this level of investment MnDOT intends to continue its current safety approach of proactive treatments balanced with higher cost improvements at sustained crash locations. The amount of investment dedicated to safety in MnSHIP does not include maintenance and replacement of existing safety assets, nor does it capture mobility-driven projects that have safety benefits.

Off the highway system, MnDOT supports efforts to reduce the number of aviation and rail incidents by conducting inspections, providing training and funding projects that improve safety infrastructure. Examples of projects that improve airport safety include the installation of navigation aids and runway lighting. MnDOT's Railroad-Highway Grade Crossing Safety Program improves safety at railroad / highway crossings by funding the installation of crossing gates and signals, eliminating or consolidating crossings, and improving roadway geometrics.

In 2011, MnDOT began to require centerline rumble strips on all rural, undivided roadways with a posted speed of 55 mph or higher whenever a paved surface is constructed, reconstructed or overlaid. As of 2012, there were more than 800 miles of centerline rumble strips on the state highway system.

Learn More

Toward Zero Deaths
www.minnesotatzd.org

MnDOT Office of Traffic, Safety and Technology
www.dot.state.mn.us/trafficeng/safety
Sue Groth - sue.groth@state.mn.us

Minnesota DPS, Office of Traffic Safety
www.dps.state.mn.us/ots

MnDOT Office of Aeronautics
www.dot.state.mn.us/aero
Kathy Vesely - kathy.vesely@state.mn.us

MnDOT Office of Freight and Commercial Vehicle Operations
www.dot.state.mn.us/ofrw/safety.html
Bill Gardner - william.gardner@state.mn.us

Share the Road — Minnesota's Bicycle and Pedestrian Safety Campaign
www.dot.state.mn.us/sharetheroad/

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CHAPTER 3

ASSET MANAGEMENT

What this is about

MnDOT is responsible for constructing, maintaining and managing the state highway system. This system includes more than 14,000 roadway miles, more than 4,500 bridges, and thousands of culverts, signs, lights, traffic signals, guardrails and other assets that support safe and efficient highway operations. Much of the infrastructure that comprises the state highway system was built during the Interstate era and, as such, is now more than 50 years old. As more high-value assets reach the end of their useful lives, MnDOT faces difficult choices about where, when and how to invest resources to preserve or maintain these assets.

Asset management is the process of strategically maintaining and replacing existing infrastructure so that critical system functions can be preserved and enhanced. While it involves the inspection and treatment of individual assets, the asset management process is also a tool to assess and minimize long-term costs and make plans for future spending. Above all, asset management is about setting priorities to guide decision-making.

Connection to Minnesota GO Guiding Principles

Strategically fix the system

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

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.

Connection to Minnesota GO Statewide Multimodal Transportation Plan

Objective

Strategically maintain and operate transportation assets; rely on system data, partners' needs and public expectations to inform decisions; put technology and innovation to work to improve efficiency and performance; and recognize that the system should change over time.

AT A GLANCE.....

ASSET MANAGEMENT

Ride Quality

Measure Explanation: Ride quality is assessed using MnDOT's Ride Quality Index, which is a measure of pavement smoothness as perceived by the typical driver. Pavement rated "Poor" can still be driven on, but the ride is sufficiently rough that most people would find it uncomfortable and may decrease their speed.

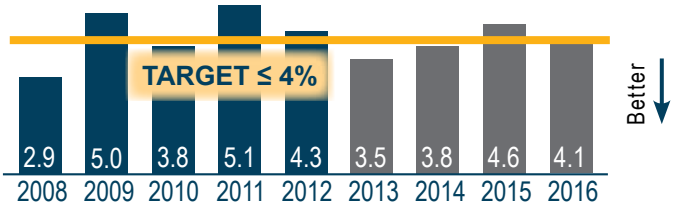
System Description: MnDOT measures ride quality on the Interstate system, the non-Interstate National Highway System and on all state highways.

Why this is Important: Market research has found that Minnesotans' satisfaction with overall state highway maintenance is greatly affected by the smoothness of highway pavements. Smooth pavement enhances mobility, improves fuel economy and reduces the amount of money spent on vehicle repair and maintenance.

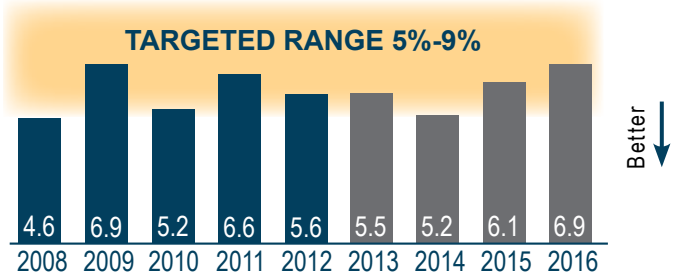
Target	Result (2012)	Multi-year Trend
Interstates No more than 2% of system miles with Poor ride quality	Poor ride quality experienced on 2.4% of Interstate miles	Improving toward target (2009-2012)
Non-Interstate NHS No more than 4% of system miles with Poor ride quality	Poor ride quality experienced on 4.3% of NHS miles (excluding Interstates)	Stable and near target (2009-2012)
All State Highways Limit the share of state highways with Poor ride quality to between 5-9%	Poor ride quality experienced on 5.6% of all state highways	Meeting target

Percent of Interstate System with "Poor" ride quality

Percent of the Non-Interstate NHS with "Poor" ride quality



Percent of state highway system with "Poor" ride quality



Historic results
Projected results based on investments in the 2013-2016 STIP

Source: MnDOT Office of Materials

Ride quality improved on Interstates, the non-Interstate NHS and all state highways in 2012. Overall, there were 150 fewer miles of highway with Poor ride quality in 2012 compared to 2011. This improvement reduced the percentage of Poor highways on Interstates and the rest of the NHS to within 1 percentage point of statewide targets. The number of miles of highway with Poor ride quality across the entire state highway system was within a targeted range of 5-9 percent for the fourth year in a row.

Bridge Condition

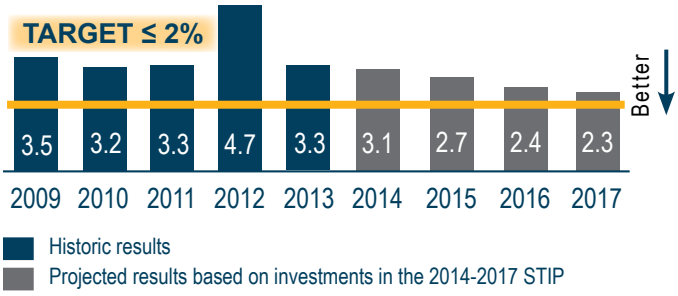
Measure Description: Bridge condition is calculated from the results of inspections performed at least every two years on all state highway bridges. The ratings combine deck, superstructure and substructure evaluations. Bridges rated "Poor" (also termed structurally deficient) are safe to drive on but are reaching the point where it is necessary to either replace the bridge or extend its service life through significant investment.

System: National Highway System bridges more than 20 feet (3,626 bridges). These bridges comprise 85 percent of all state highway bridges, measured by deck area.

Why this is important: NHS bridges are a critical component of Minnesota's transportation network. They are also among the state's most expensive assets to replace. A small percentage of NHS bridge deck area in Poor condition suggests that MnDOT is managing this responsibility effectively through maintenance, repairs and rehabilitations that extend bridge life and limit the need for near-term reconstructions.

Target	Result (2013)	Multi-year Trend
No more than 2% of NHS bridge deck area on Poor condition bridges	3.3% of NHS bridge deck area on Poor condition bridges	Stable and near target ('09-'13)

NHS bridges in "Poor" condition as a percent of total NHS bridge deck area



Source: MnDOT Bridge Office

Bridge condition improved in 2013 after a 2012 uptick in the percent of NHS bridge deck area on Poor condition bridges. This spike occurred because the very large Blatnik (I-535) Bridge connecting Duluth and Superior was assigned a Poor condition rating following a 2011 inspection. MnDOT has since carried out a major rehabilitation on this bridge that improved its condition and extended its useful life.

For Comparison

Minnesota has the fourth lowest percentage of Interstate and state-owned bridges rated structurally deficient or functionally obsolete, according to 2012 rankings by Better Roads magazine.

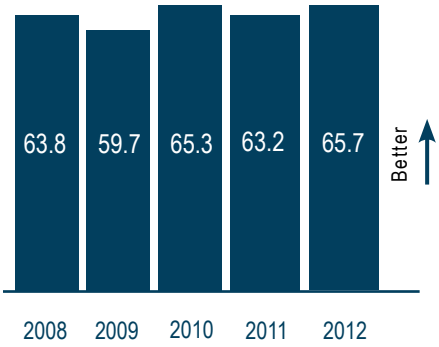
Based on MnDOT analysis of nationwide data, in 2011 Minnesota ranked 35th out of 50 states in NHS ride quality (measured as the share of system with an International Roughness Index greater than 170 inches of vertical movement per mile.)

Minnesota's State Highway System

The state highway system consists of 14,310 roadway miles. More than half, or 7,584 miles, are part of the National Highway System. The NHS includes Interstates, most U.S. highways, and other high volume roads that facilitate interregional trips or connect freeways to intermodal facilities.

MnDOT has long tracked and reported pavement condition on the NHS separately from other, non-NHS state highways. More recently, MnDOT further refined its pavement condition reporting to distinguish between Interstates and the non-Interstate NHS

Percent of state highway system with "Good" ride quality



Source: MnDOT Office of Materials

MnDOT also tracks the share of system offering "Good" ride quality. As reported in the Minnesota Dashboard, 2012 marked a 10-year high for this measure with Good ride quality recorded on 65.7 percent of the state highway system.

Progress

The condition of major state highway assets has improved or remained constant since 2009 due to a series of one time increases in preservation focused investment. These increases – the Chapter 152 Trunk Highway Bridge Improvement Program (2009 - 2018), the 2009 American Recovery and Reinvestment Act, and the Better Roads for a Better Minnesota (2012-2015) initiative – have enabled MnDOT to keep pace with preservation needs even as Interstate-era assets age and a growing number of roads and bridges require significant repair or replacement. This situation is temporary, however. Without new sources of sustained revenue, MnDOT expects asset condition to resume its long-term decline by the end of the decade.

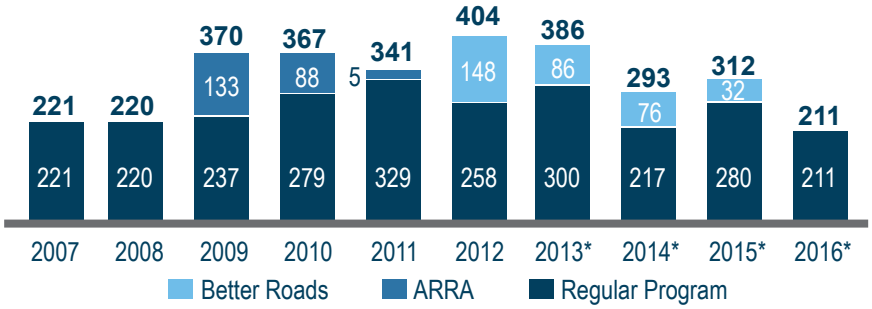
Ride Quality

Ride quality on Minnesota Interstates improved significantly over the last five years. As the graph on page 28 demonstrates, the share of Interstates with Poor ride quality fell from a high of 7 percent Poor in 2009 to 2.4 percent Poor in 2012. This improvement began with an influx of ARRA funding and has continued due to a concerted effort by MnDOT to direct additional investment to the state's highest priority highways. The 2.4 percent measured Poor in 2012 is the best Interstate ride quality result in the last 10 years.

Ride quality off the Interstate System is also better today than it was three years ago. Although some of the initial gains made through ARRA have been lost, the miles of NHS highway excluding Interstates with Poor ride quality in 2012 was 4.3 percent – just 0.3 percentage points above MnDOT's 4.0 percent target. Across all state highways (including Interstates, the non-Interstate NHS, and state highways not part of the NHS) the share of system with Poor ride quality in 2012 was 5.6 percent. This result represents a 1.3 percentage point improvement over 2009 and is comfortably within a range that MnDOT has deemed acceptable given traveler expectations and the risks associated with system deterioration.

Going forward, ride quality on Interstates, the non-Interstate NHS, and across all state highways is projected to remain at or near target through 2016. This is largely due to the *Better Roads for a Better Minnesota* initiative. Using $357 million in contingency funds, trunk highway fund balance and cost savings, Better Roads is improving more than 500 miles of highway across the state. As the figure on the next page shows, Better Roads pushed MnDOT's annual pavement spending to a record high in 2012, with $483 million in pavement rehabilitation and reconstruction. Subsequent pavement programs in 2013, 2014 and 2015 are smaller but still above MnDOT's 10-year average.

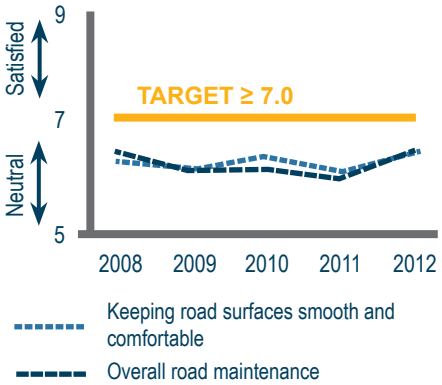
MnDOT's annual spending on pavement preservation; FY 2007 - 2016 ($ millions)



* Future year spending projections based on planned investments in the 2013-2016 STIP
Source: MnDOT Materials Office

Longer term, MnDOT expects pavement preservation needs to grow faster than available resources. Anticipating this scenario, the Minnesota 20-year State Highway Investment Plan 2014-2033 directs MnDOT to focus pavement investment on the National Highway System with the objective of maintaining existing ride quality through 2023. While this strategy will put MnDOT in a strong position to comply with national highway performance requirements (see MAP-21 discussion below), it also means that the percentage of non-NHS highways with Poor ride quality will grow from 7.5 percent in 2012 to 12 percent in 2023, a difference of 303 roadway miles.

Customer Satisfaction with Road Maintenance (average on a 1-10 scale)



Source: MnDOT Omnibus Survey

In 2012, customer satisfaction with MnDOT's overall road maintenance rose to its highest point in four years. Historically, satisfaction with overall road maintenance has tracked closely to user satisfaction with the smoothness of highway pavement.

Key Factor — Federal and State Performance Requirements

Recently enacted federal legislation, known as Moving Ahead for Progress in the 21st Century or MAP 21, requires that states track and report NHS performance using a limited number of national performance measures. While these measures have yet to be finalized, MAP-21 specifies that they will include measures of pavement condition on the Interstate System, pavement condition on the NHS (excluding Interstates), and NHS bridge condition. All MAP-21 measures are to go into effect in 2015. Once this occurs, MnDOT and its partners will have one year to establish Minnesota's targets. The targets reported here were chosen in anticipation of this requirement.

At the state level, Minnesota has adopted the Government Accounting Standards Board Statement Number 34 or GASB 34 financial reporting requirements for the value and condition of its major infrastructure assets. As part of this process, MnDOT set performance thresholds for the condition of highway pavement and bridges. These assets must be at or above GASB 34 thresholds to avoid a potential downgrade of the state's bond rating. At current investment levels, MnDOT expects to maintain pavement and bridge condition in compliance with GASB 34 thresholds through 2023. Beyond this date, complying with GASB 34 will necessitate a significant increase in MnDOT's pavement and bridge investment.

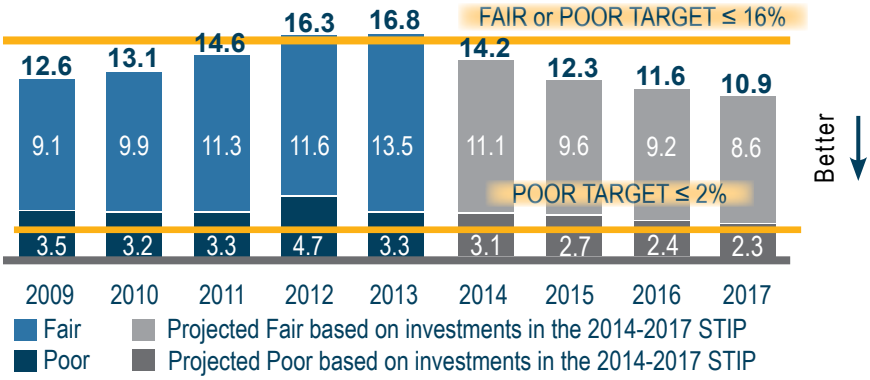
Bridge Condition Ratings

MnDOT conducts regular inspections on the state's more than 4,500 bridges to assess the condition of their decks, superstructures and substructures. Each bridge is rated as having Good, Satisfactory, Fair or Poor structural condition. Bridges in Good or Satisfactory condition generally receive routine maintenance, while bridges in Fair or Poor condition are subject to closer monitoring and, eventually, major repair, rehabilitation or replacement.

Bridge Condition

MnDOT reports progress against targets for the percent of National Highway System bridge deck area on bridges in Poor condition, Fair or Poor condition, Good or Satisfactory condition, and Good condition. While the share of NHS deck area in Poor condition has been relatively stable since 2008, the share in Fair or Poor condition worsened substantially over the same period. MnDOT expects this trend to be reversed during the 2014-2017 construction program as a number of major bridge projects, including Hastings, Lafayette, Dresbach, Cayuga, are completed and MnDOT's statewide bridge inventory is updated to reflect the resulting improvement in condition.

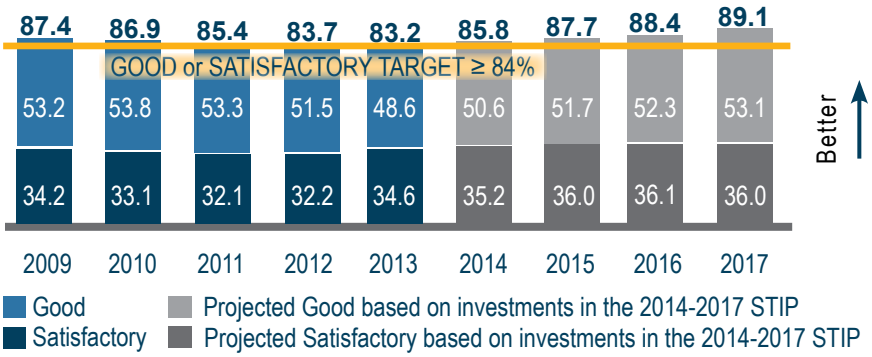
Percent of NHS deck area on bridges in Fair or Poor condition



Source: MnDOT Bridge Office

The share of NHS deck area on bridges in Good or Satisfactory condition dropped for the sixth year in a row in 2013, leaving it slightly below MnDOT's 84 percent target. As with the Fair or Poor condition measure, the share of deck area on bridges in Good or Satisfactory condition is expected to improve with the completion of the major projects mentioned above. Generally speaking, however, this measure is driven more by proactive maintenance and life extending repairs than by reconstructions or replacements. A high share of deck area on bridges in Good or Satisfactory condition indicates that MnDOT's bridge program is limiting the number of bridges in lower condition categories and thus reducing the need for more expensive and disruptive investments.

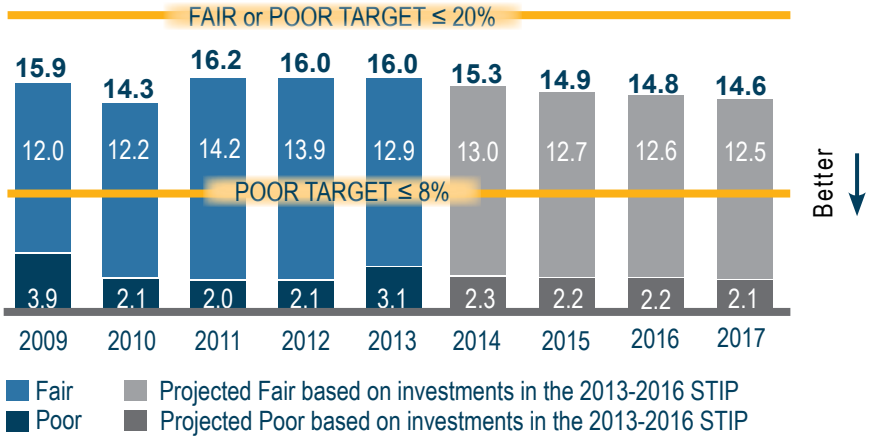
Percent of NHS deck area on bridges in Good or Satisfactory condition



Source: MnDOT Bridge Office

MnDOT also tracks and reports on the condition of state highways bridges off the NHS. Despite less aggressive targets, the condition of bridges off the NHS is currently better than the condition of bridges on it. This reflects differences in system size, age, and use, as well the greater cost and disruption of repairing or replacing large, heavily used bridges versus bridges that are smaller and less traveled. As the figures below indicate, MnDOT is currently meeting targets for the percent of non-NHS bridge deck area in Poor condition and Fair or Poor condition.

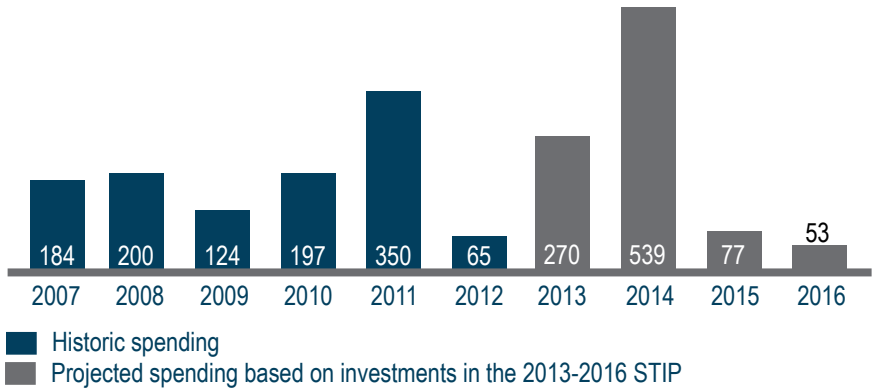
Percent of non-NHS deck area on bridges in Fair or Poor condition



Source: MnDOT Bridge Office

Another way of assessing MnDOT's asset management results is by tracking the number of bridges that have been improved through the *Chapter 152 Bridge Program*. This program, which was created by the Minnesota Legislature in response to the I-35W bridge collapse in 2007, provides funding for the repair or replacement of approximately 40 fracture critical bridges and 80 structurally deficient bridges. Twenty additional bridges either already had work under way or are not required to be part of the Chapter 152 program but have work planned by 2018. By the end of the 2013 construction season, 89 bridges in the program were substantially complete.

MnDOT's annual bridge construction program; FY 2007 - 2016 (in $ millions)



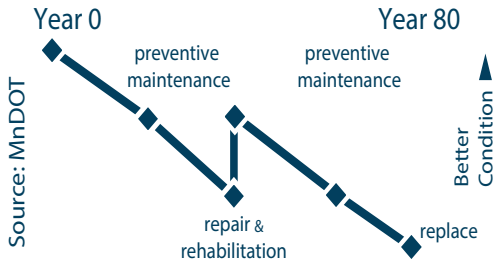
Source: MnDOT Bridge Office; Data obtained from Program and Project Management System (PPMS)

The size of MnDOT's bridge program varies significantly year to year depending on when major bridge projects are put out to bid. The program will hit a 10-year high in 2014 with the St. Croix and Cayuga bridge projects responsible for much of the $539 million total.

What's being done

Preserving the structural integrity of state highway system requires making the right investments at the right times. To this end, MnDOT engineers systematically evaluate and recommend treatments that are tailored to the age, condition, work history, and use of individual assets. Recommended treatments, if made at strategic points along an asset's deterioration curve, extend that asset's service life while reducing its life cycle cost. Treatments range from lower cost preventive and reactive maintenance to higher cost rehabilitation and replacement.

Schedule of investments over a bridge's life cycle



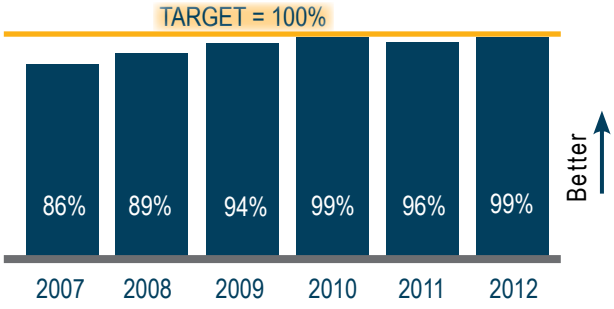
Planning

MnDOT is currently in the process of developing a *Transportation Asset Management Plan*. A TAMP is a tool that helps organizations meet level of service goals related to asset condition. MnDOT's TAMP includes an assessment of asset risks along with data on condition, inspection frequency and deterioration rates. Risks are events or uncertainties that may occur and require mitigation, such as the structural failure of an asset, uncertain deterioration rates, or unexpected changes in labor or material costs. Identifying and mitigating risks at multiple phases in an asset's life is hard but important work. As MnDOT becomes more experienced with risk assessment and management, the agency will be able to compare risks both within and between asset classes, integrate its capital investment and operational strategies, and make better resource allocation decisions. MnDOT anticipates completing the TAMP in spring 2014.

Inspection

MnDOT's Materials Office in Maplewood annually measures the condition of state highways using a vehicle equipped with a 3D laser/camera system that takes images of the road surface. These images are analyzed by MnDOT experts to determine the type, amount and severity of cracking on segments of road. The vehicle also has eight sensors that measure changes in pavement height to calculate roughness. MnDOT districts use this data in the project development process.

Bridge Safety Inspection - Percent completed on time



Source: MnDOT Bridge Office

MnDOT's bridge inspection activities are run through the Structure Information Management System, a state-of-the-art software program developed and customized for Minnesota. SIMS gives inspectors direct access to inspection history, photos, manuals, load rating information, and other key documentation. MnDOT's bridge inspection goal is to complete 100 percent of inspections on time. This exceeds the 95 percent target established by the National Bridge Inspection Standards. Performance on this measure improved in 2012 after a decrease in 2011 because of the state government shutdown. An inspection is considered on time if it is completed within 30 days of its scheduled due date. Per federal requirements, all bridges are inspected on a one- or two-year cycle.

Preventive and Reactive Maintenance

Preventive maintenance is routine and often cyclical activities that extend the life of an asset and reduce the frequency and severity of future repairs. Many of these activities are performed to protect assets from exposure to moisture and corrosive agents, such as salt. Examples of preventive maintenance include seal coats, joint seals, thin overlays, and lubrication of expansion bearings. A very simple, but effective, form of preventive maintenance on bridges is periodically flushing a bridge deck and superstructure with water to remove winter residue.

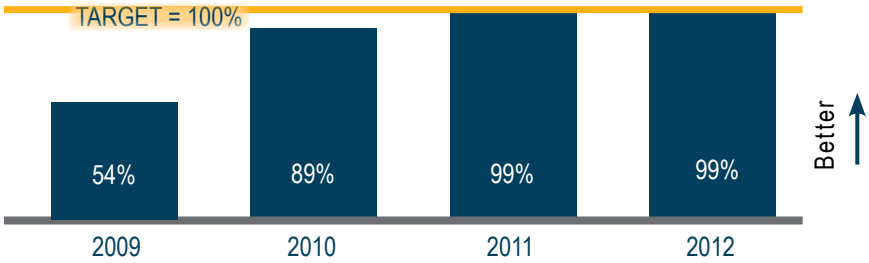
Reactive maintenance on pavement are pothole repairs or temporary fixes on segments of highway with severe cracking or rutting. The quality and durability of these repairs depend on the availability of funding and the severity of weather conditions. Snow and ice removal is the first priority for maintenance funding, so a severe winter can mean less money for pavement maintenance.

Drainage infrastructure inspection and maintenance is managed with a system called HydInfra, which is short for Hydraulic Infrastructure. The system uses data about asset size, material and condition to recommend repair strategies.

Depending on the type of repair, the work can be done by MnDOT maintenance staff or bid as a construction project. Culvert repair is primarily reactive rather than preventive, which increases the probability of road surface failures and limits the benefits of life cycle cost management.

Reactive maintenance on bridges is classified as high, medium or low priority. High priority includes any deficiency that could affect the safe functioning of a bridge or cause it to deteriorate to a critical condition. MnDOT's goal is to perform all high priority reactive maintenance within one year of the need being identified. MnDOT has substantially met this goal the last two years. In the future, MnDOT expects to remain at or near its high priority reactive maintenance target, but insufficient funding could cause some preventive and lower priority reactive maintenance to be deferred.

High-priority Reactive Bridge Maintenance - Percent completed on time



Source: MnDOT Bridge Office

Innovation

MnDOT is continually pursuing better ways to get more value from its asset management investments. Performance-based design is used to keep project scope focused on meeting performance targets and appropriately scaled for their surroundings. Alternate bidding provides two material categories in construction specifications so contractors can bid the most cost-effective solution, whether asphalt or concrete. Other innovative pavement designs include thin concrete overlays and full-depth reclamation. Increased deployment of low-cost preventive treatments such as chip seals and micro-surfacing can also add value.

Learn More

MnDOT Office of Materials
www.dot.state.mn.us/materials/index.html
Glenn Engstrom — glenn.engstrom@state.mn.us

MnDOT 2012 Pavement Condition Annual Report
www.dot.state.mn.us/materials/pvmt-mgmt.html

MnDOT Bridge Office
www.dot.state.mn.us/bridge/
Nancy Daubenberger — nancy.daubenberger@state.mn.us

MnDOT Office of Transportation System Management
www.dot.state.mn.us/planning/program/
Trunk Highway Bridge Improvement Program - Chapter 152 Report

MnDOT 20-year State Highway Investment Plan
www.dot.state.mn.us/planning/mnship/

MnDOT Annual Omnibus Survey
Donna Koren — donna.koren@state.mn.us

MnDOT is a lead partner in the MnROAD research facility, located on I-94 near Albertville. MnROAD tests the performance of innovative construction and pavement materials. MnDOT is a leader in the use of recycled pavement materials. Recycled asphalt and concrete can be incorporated back into the roadbed and pavement. Manufactured scrap and tear-off shingles are also included in asphalt pavement mixes. Fly ash, a waste product generated by coal-fired electric power plants, is routinely used in concrete to decrease cement use and avoid sending the ash to landfills.

CHAPTER 4

STATE HIGHWAY OPERATIONS

What this is about

Minnesota's state highway system is comprised of the state's most heavily used and critically important roads. Carrying almost 60 percent of the state's vehicle miles traveled, these roads provide the connections Minnesotans rely on to access schools, workplaces, shopping centers, hospitals, and other essential destinations. State highways are also a key component of the multimodal network businesses use to move goods to store shelves; raw materials to manufacturers; and agricultural products to processors and markets throughout the state, country and world.

State highway operations refers to activities that promote safe, convenient, efficient, and effective movement of people and goods. These activities include managed lanes, snow and ice control, incident clearance, and signal timing. Together with strategically located capital improvements, state highway operations help MnDOT optimize the utility of existing assets while delivering faster, smoother and more reliable trips to system users.

Connection to Minnesota GO Vision

Minnesota's multimodal transportation system:

- Connects Minnesota's primary assets – 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

Connection to Minnesota GO Statewide Multimodal Transportation Plan

Objective

Identify global, national, statewide, regional, and local transportation connections essential for Minnesotans' prosperity and quality of life; maintain and improve these connections by maximizing return on investment; and consider new connections.

AT A GLANCE.....

STATE HIGHWAY OPERATIONS

Twin Cities Urban Freeway Congestion

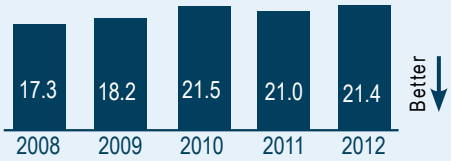
Measure Explanation: MnDOT defines congestion as traffic flowing at speeds less than 45 mph. At 45 mph, most vehicles will brake in a traffic stream, resulting in stop-and-go traffic.

System Description: 379 miles of Twin Cities area freeway

Why this is Important: Traffic congestion reduces the time people spend with their families, lessens worker productivity, creates unsafe driving conditions, and increases shipping costs. While some congestion is inevitable, limiting its extent preserves metro-wide mobility and keeps the Twin Cities competitive with its peers.

Target	Result (2012)	Multi-year Trend
Tracking Indicator	21.4% of Twin Cities freeways congested during peak hours	Stable (2010-2012)

Percent of metro-area freeway miles below 45 mph in AM or PM peak



Source: MnDOT Metropolitan Freeway System 2012 Congestion Report

After falling during the recession, the extent of congestion has been near its historic peak each of the last three years.

Interregional Corridor Travel Speed

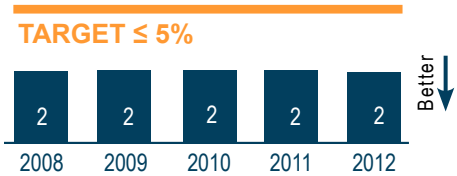
Measure Explanation: Each IRC has a targeted speed that a traveler should be able to average (55, 60 or 65 mph) over a corridor length trip. MnDOT compares these targets to estimates of actual travel speed that are based on a corridor's volume, congestion and number of stops.

System Description: 2,580 miles of state highway designated as IRC.

Why this is important: IRCs connect Minnesota's trade centers to each other and with neighboring states and Canada. Safe and efficient connections provide reliable access to markets and facilitate recreational travel, improving economic competitiveness and quality of life.

Target	Result (2012)	Multi-year Trend
No more than 5% of system miles on corridors performing below target	2% of system miles on corridors with travel speeds below target	Meeting target

Percent of system miles performing more than 2 mph below corridor-level speed targets



Source: MnDOT Office of Transportation System Management

98% of the IRC system is on corridors that have performed at or above targeted speed each of the last 10 years. This result is expected to remain stable through 2023.

Snow & Ice Control

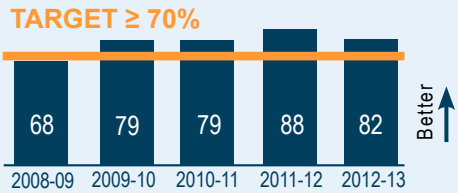
Measure Explanation: Each category of state highway has a targeted number of hours for clearing snow and ice after a winter event. This measure tracks the frequency with which MnDOT achieves these highway-specific targets over an entire winter season.

System Description: All state highways (approximately 30,000 lane miles)

Why this is Important: Fast and effective snow and ice control is critically important to Minnesotans' quality of life during the winter months. It preserves mobility, increases traveler safety, reduces damage to vehicles, and limits the extent of weather-induced congestion

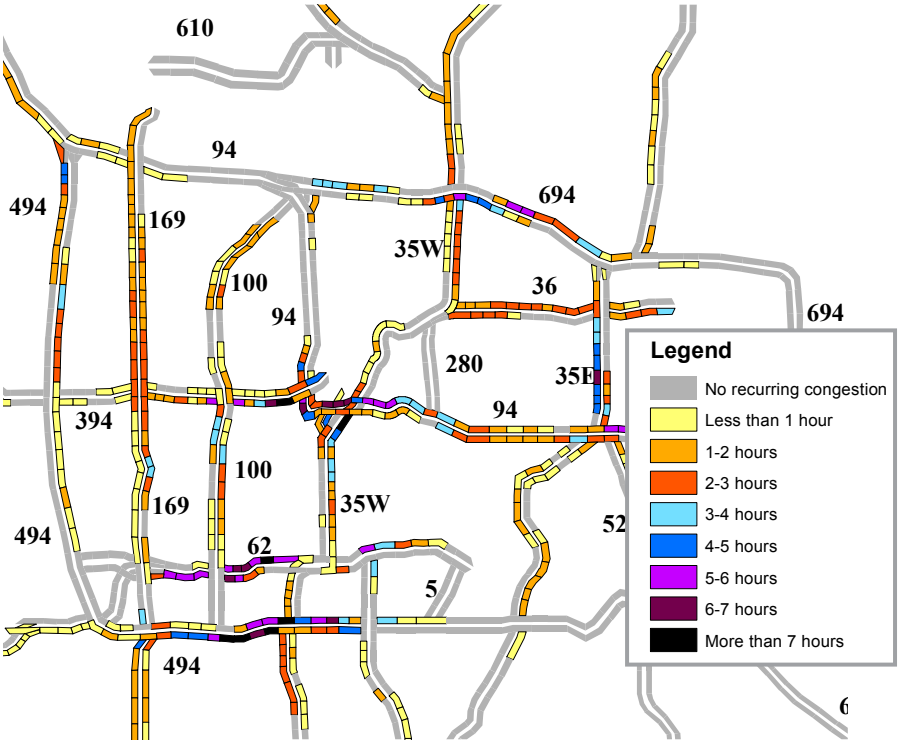
Target	Result (2012-13)	Multi-year Trend
Achieve bare lanes within the targeted number of hours no less than 70% of the time	82% of the time bare lanes were achieved within targeted number of hours	Meeting target

Frequency of achieving bare lanes within targeted number of hours



Source: MnDOT 2012-2013 MnDOT Snow and Ice Report

MnDOT has achieved bare lanes with greater than targeted frequency nine out of the last 10 winter seasons.



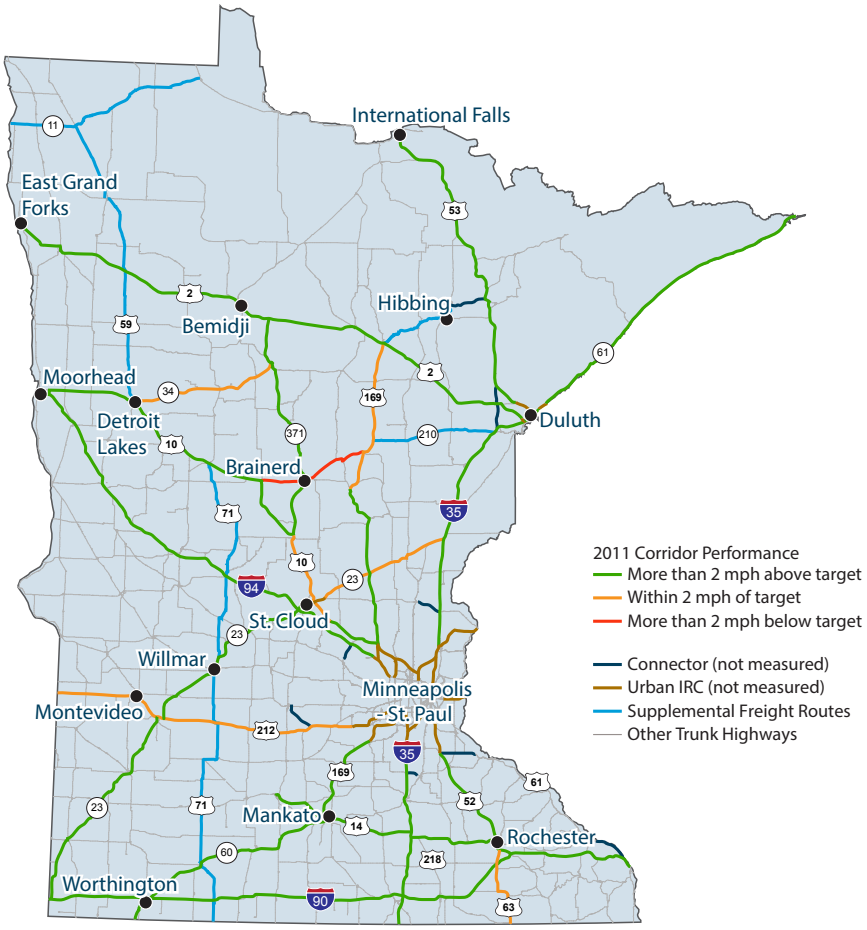
Source: MnDOT Metropolitan Freeway System 2012 Congestion Report

Extent & Duration of Twin Cities Freeway Congestion

The map to the left depicts the amount of time Twin Cities freeway segments were congested on a typical day in 2012. Measures of congestion duration are valuable because they show the benefit of increasing vehicle throughput on corridors experiencing peak period delay. When a corridor's vehicle throughput is increased through a capital or operational improvement, more travelers are able to use the corridor at the time of day that is most convenient to them. In many cases, this shift in travel behavior keeps the improved corridor congested but over a shorter period. Limiting the duration of congestion on freeways also encourages commuters to avoid using alternative routes on local roads designed for lower volumes and speeds.

Interregional Corridor Travel Speed

MnDOT evaluates IRC performance by comparing average corridor travel speed against a target of 65, 60, or 55 mph. MN 210 from Motley to Aitkin (shown in red on the map) is the only IRC on which average travel speed is currently below target. This is because a significant portion of the MN 210 corridor has a posted speed limit less than 55 mph. Sections of highway with lower posted speeds are also the reason why US 212 and parts of MN 34, US 169, MN 23, and US 63 are performing within 2 mph of target (shown in orange on the map). US 10 from Little Falls to Clear Lake is the only IRC to register within 2 mph of target due to congestion. While free flow conditions exist north of St. Cloud, slower speeds are frequently experienced on the higher volume section between St. Cloud and Clear Lake.



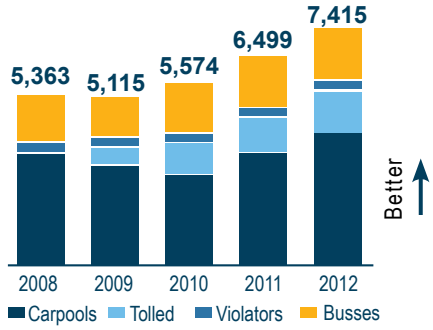
Source: MnDOT Office of Transportation System Management

For comparison

In 2011, the Twin Cities had the 22nd worst congestion among 47 metropolitan areas in the United States with more than one million people. This ranking is based on the Texas Transportation Institute's (TTI) travel time index, which is the ratio of peak to free-flow travel time.

Also according to TTI, in 2011 the Twin Cities had the 29th most unreliable freeway system (among 47 systems serving metros of more than one million). TTI calculates reliability as a planning time index, which is the ratio of 95th percentile travel time to average travel time. A large ratio indicates that travel times are significantly greater than average on a regular basis, causing travelers to plan for delay that may or may not occur.

MnPASS Express Lane Person Throughput, I-35W at Black Dog Road (Northbound AM Peak)



Source: Regional Transportation Management Center -- I-35W HOV/MnPASS Report

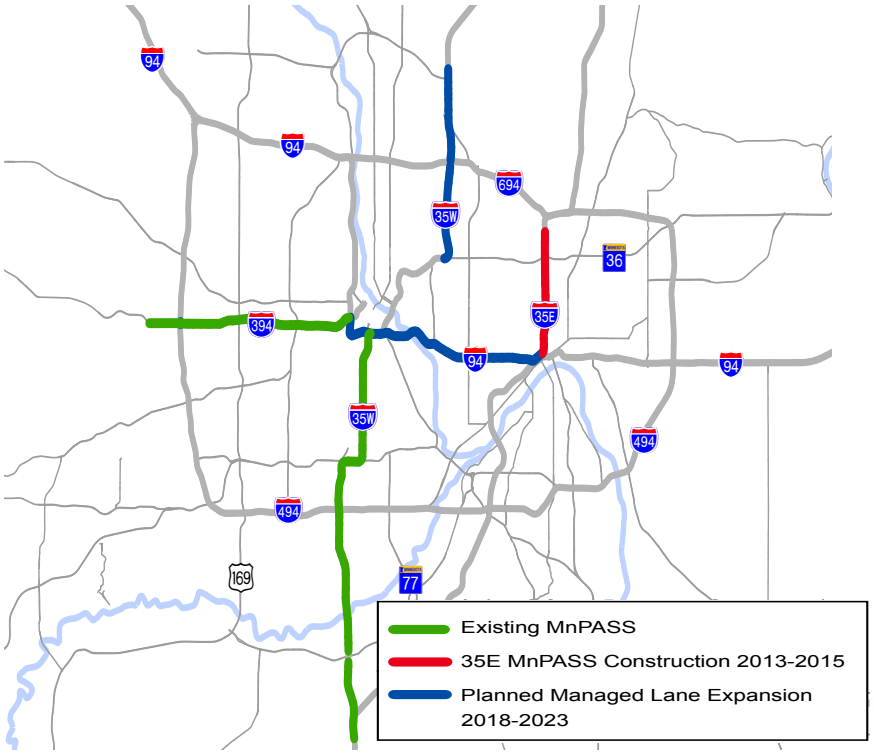
I-35W MnPASS Express Lanes opened in 2009 and were extended in 2011. Since then, use of the lanes as measured at Black Dog Road has increased steadily, with most of the additional users traveling in carpools or tolled single-occupant vehicles.

Progress

In 2010, MnDOT completed an update to its Metro District 20-year Highway Investment Plan that coincided with the development of the Metropolitan Council's 2030 Transportation Policy Plan. Due to constrained funding, both of these plans made a shift away from major capacity expansion toward strategies that promote effective management of congestion across the entire metro area freeway system. These strategies rely on innovation, technology, expanded mode choice and other tactics that either slow the growth of congestion or lessen its impacts.

An example of an effective congestion management strategy is the construction and operation of MnPASS Express Lanes. These lanes, which provide a reliable, congestion-free option to transit users, carpoolers and those willing to pay a fee, are currently available on I-394 and I-35W south of downtown Minneapolis. Additional MnPASS lanes are under construction along I-35E north of downtown St. Paul. Under existing revenue expectations, MnDOT anticipates constructing MnPASS lanes along two more corridors within the next 10 years: I-35W between Minneapolis and Blaine and I-94 between Minneapolis and St. Paul.

Existing & Planned MnPASS Express Lanes



Source: Minnesota 20-year State Highway Investment Plan: 2014-2033; Metro District 10-year Work Plan

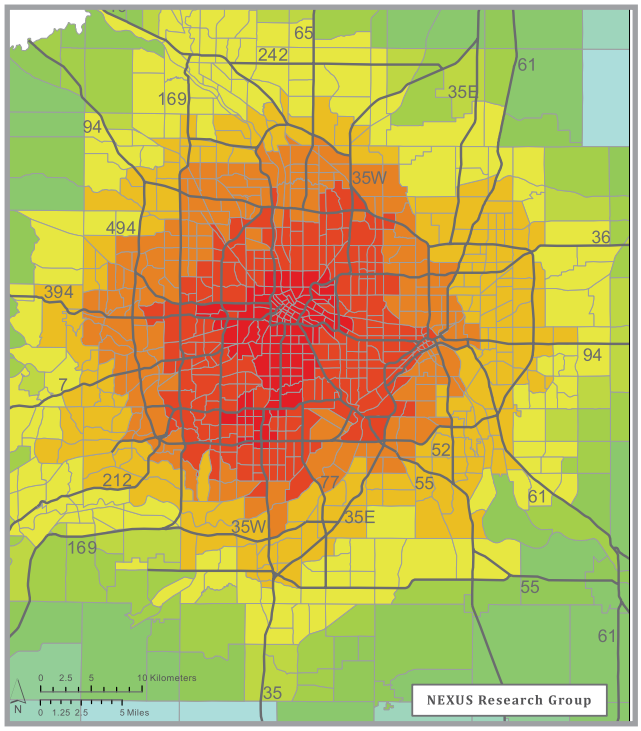
As noted in the discussion of the Interregional Corridor system on the previous page, Greater Minnesota residents and businesses enjoy free-flow conditions on the vast majority of state highways. With congestion between urban centers generally not an issue, MnDOT assesses the performance of the state highway system in Greater Minnesota largely in terms of safety, condition and freight movement.

In 2010 and 2011, MnDOT conducted a policy review that highlighted the need for an expanded priority freight network. This finding prompted MnDOT to augment the IRC system with supplemental freight routes (shown in light blue in on the IRC system map). Highways designated as supplemental freight routes are not subject to corridor level travel speed targets, but they will be maintained and operated to support long-distance freight movement. Improvements to support freight movement prevent legal load postings, provide smooth driving conditions and minimize traffic flow interruption.

On July 6, 2012 President Obama signed into law the first long-term highway authorization since 2005. This act, known as Moving Ahead for Progress in the 21st Century or MAP-21, streamlined the federal highway program through a restructuring that directs the majority of funding to the National Highway System. In Minnesota, the NHS consists of Interstates, most U.S. highways and other high volume roads that facilitate interregional travel or connect freeways to important intermodal facilities.

A major feature of MAP-21 is a requirement that states track progress toward national goals using a limited number of national performance measures. U.S. Department of Transportation is developing performance measures relating to fatalities, serious injuries, asset condition, system reliability, congestion reduction, on-road mobile source emissions, and freight movement. Once these measures go into effect, expected to occur in 2015, Minnesota will have one year to establish state-level targets.

Congestion in context — Job Accessibility in the Twin Cities



In contrast to mobility measures that look only at traffic speed, accessibility measures evaluate how easily people can reach destinations. Research into job accessibility in the Twin Cities has found that while congestion has returned to its pre-recession high, there has not been a corresponding decrease in the percentage of jobs that the typical metro area resident can conveniently access by car. This finding points to an emerging trend in which Twin Cities residents and employers locate in greater proximity to one another. This proximity enables people to access a large number of jobs in a short amount of time, even in areas where travel speed is slow due to congestion.

This map shows the number of jobs accessible to Twin Cities residents within a 20 minute drive during the morning peak period. Areas with the highest accessibility – more than one million jobs reachable – are in red, and areas with the lowest accessibility – fewer than 5,000 jobs reachable – are in light blue. In 2010, the typical Twin Cities resident could access 495,000 jobs within a 20 minute drive. This number represents 32 percent of the total number of jobs in the metro-area.

What's being done

Capital Investment Strategies

The construction and operation of MnPASS Express Lanes is one strategy MnDOT is using to manage metro-area congestion. Other strategies include:

- **Active traffic management:** ATM applications such as incident response programs, dynamic signing and re-routing, dynamic shoulder lanes, ramp meters, and signal timing smooth the effects of congestion and reduce the number of incidents. Benefits of ATM include increases in average vehicle throughput, overall capacity and travel time reliability.
- **Lower cost, high benefit capital improvements:** Lower cost, high benefit projects improve traffic flow by providing bottleneck relief, improving geometric design and addressing safety hazards. These types of improvements often require the use of flexible design principles to optimize available pavement and right of way. In some instances, lower cost, high benefit projects involve spot capacity enhancements such as the addition of an auxiliary lane.
- **Strategic expansion**: Projects in the form of new interchanges and general purpose lanes may be needed in certain locations to provide lane continuity or complete an unfinished segment of the system. An example of a strategic expansion project is the completion of MN 610 in Maple Grove.

Decisions about where and how to implement congestion management strategies are made through a complex, collaborative process. MnDOT develops plans and makes policy decisions in partnership with the Metropolitan Council, cities, counties, and transit authorities. Public input is sought for both MnDOT plans and the Transportation Policy Plan. At the corridor level MnDOT uses measurements of travel speed, congestion, throughput, and crash information to help identify needs and design options. Together, regional plans and corridor level analysis guide the development of projects that go into MnDOT's four-year statewide construction program.

In Greater Minnesota, MnDOT promotes effective highway operations through a variety of capital investment approaches, from low cost improvements at spot locations to major capacity expansions on regionally significant corridors. Selective investments continue as funding allows. Decisions to make mobility driven investments in Greater Minnesota are primarily guided by public input, MnDOT expertise, statewide plans and policies, and the views of key stakeholders, such as the governor, legislators and other elected officials.

A small number of projects are also evaluated and selected through statewide competitive grant programs. An example of such a program is the Corridor Investment Management Strategy Pilot Solicitation. Through the CIMS pilot, MnDOT funded highway projects that provide a high return on investment while advancing a broad array of objectives related to quality of life, environmental health and economic competitiveness. One of these objectives is improved traffic flow on state highways that serve a critical function within a local road network. By improving highway operations at the community level, the

CIMS solicitation provides MnDOT a mechanism for responding to priorities above and beyond achievement of statewide performance targets.

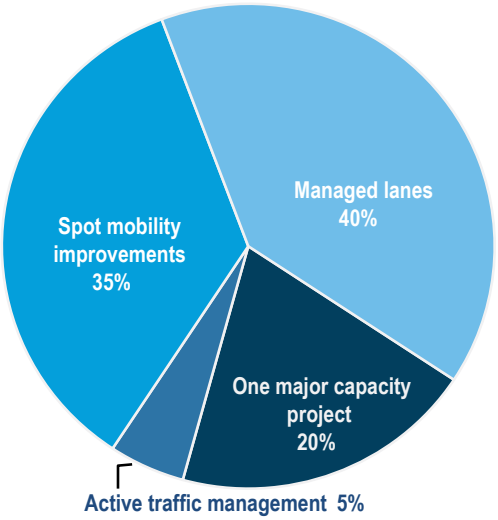
Capital Investment

In 2013, MnDOT updated the Minnesota 20-year State Highway Investment Plan. This plan, which serves as MnDOT's primary vehicle for deciding and communicating capital investment, sets two starkly different priorities; one for 2014-2023 and the other for 2024-2033. During 2014-2023, MnSHIP priorities balance asset management with safety improvements and investment in projects that advance economic competitiveness and quality of life. However, in the second 10 years of the plan, aging assets and declining buying power confine investments to the preservation of existing infrastructure.

In the metropolitan area, MnSHIP allocates $520 million for metro area mobility improvements between 2014 and 2023. Sixty percent of this funding is dedicated to MnPASS expansion and the completion of MN 610. The remaining 40 percent is divided between spot mobility improvements and the installation of infrastructure that supports active traffic management. Consistent with the priorities stated above, all four categories are zeroed out in 2024 so that MnDOT can use all available resources to mitigate risks associated with deteriorating assets.

MnSHIP does not dedicate any funding for mobility improvements in Greater Minnesota in its 20-year planning horizon. This reflects funding constraints and MnDOT's expectation that the vast majority of Interregional Corridors will continue to operate at or above targeted travel speed. It should be noted, however, that many projects driven by considerations related to preservation, safety or economic competitiveness also have mobility benefits.

Planned investment in Twin Cities Mobility; 2014-2023



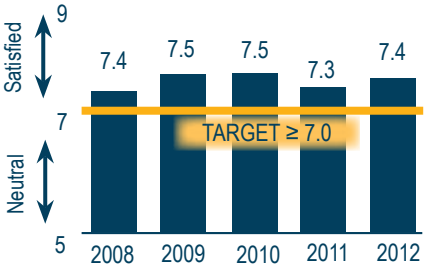
Source: Minnesota 20-year State Highway Investment Plan: 2014 - 2033

Operational Strategies

In addition to capital investments, several operational strategies are used to keep roads clear of obstructions and ensure that traffic flows smoothly. A major operational focus is snow and ice control. MnDOT's snow and ice services are delivered on approximately 30,000 lane miles of state highway by more than 1,700 snowfighters. To counteract rising fuel and material costs, MnDOT uses technology and innovative strategies to increase efficiency. These strategies include:

- **Anti-icing** — Prevents frost and bonding between snow and ice and the pavement. Anti-icing chemicals are primarily liquids applied before or early in a snowfall.
- **Pre-wetting** — Adds salt brine or other commercial chemical solutions to the salt and sand mixture prior to spreading. This causes the mixture to stick to the road and activate more quickly.
- **De-icing** — Uses chemical or mechanical means to break the bond that has formed between ice and the pavement surface.

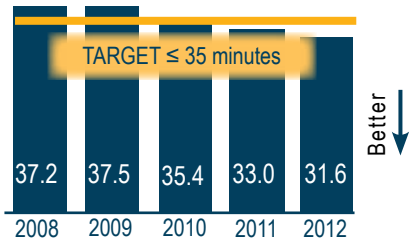
Customer Satisfaction with Snow & Ice Removal (average rating on 1 - 10 scale)



Source: MnDOT Omnibus Survey

MnDOT regularly asks the public to evaluate its performance in a number of different maintenance areas. Responses of 7.0 or above indicate satisfaction. As the figure above illustrates, the average respondent has been satisfied with MnDOT's snow and ice removal each of the last five years.

Average Clearance Time for Twin Cities Urban Freeway Incidents (minutes, 3-year average)



Source: MnDOT Regional Transportation Management Center

MnDOT groups state highways into five categories based on traffic volume. The table below lists the categories, along with targeted snow and ice clearance times and actual clearance times averaged over the 2012-2013 winter season. Clearance time is the number of hours it takes MnDOT to achieve bare lanes after a winter event. As noted on page 38, MnDOT uses the frequency of achieving targeted clearance times to assess the effectiveness of its snow and ice control. Average clearance time, shown below, is an additional metric that helps MnDOT make decisions about where and how to deploy snow and ice forces. During the 2012-13 winter season, average clearance time was comfortably within MnDOT's targeted range for all five categories of roadway.

Snow and Ice Control Results by Roadway Category, 2012-13

Roadway Category	Average Daily Traffic	Targeted Clearance Time (targeted # of hours to bare lanes)	Actual Clearance Time (average # of hours to bare lanes)
Super Commuter	Over 30,000	0 to 3 hours	1.2 hours
Urban Commuter	10,000 to 30,000	2 to 5 hours	3.2 hours
Rural Commuter	2,000 to 10,000	4 to 9 hours	5.1 hours
Primary Collector	800 to 2,000	6 to 12 hours	7.4 hours
Secondary Collector	Under 800	9 to 36 hours	12.2 hours

Source: MnDOT 2012-2013 MnDOT Snow and Ice Report

Other operational strategies include incident response and the ATM activities mentioned above. MnDOT's Statewide Highway Systems Operation Plan groups these strategies under the category Arterial and Freeway Operations. In the Twin Cities area, decisions related to arterial and freeway operations are made by the Regional Transportation Management Center in Roseville. When an incident is identified, RTMC personnel communicate with MnDOT field personnel and other emergency responders to coordinate responses.

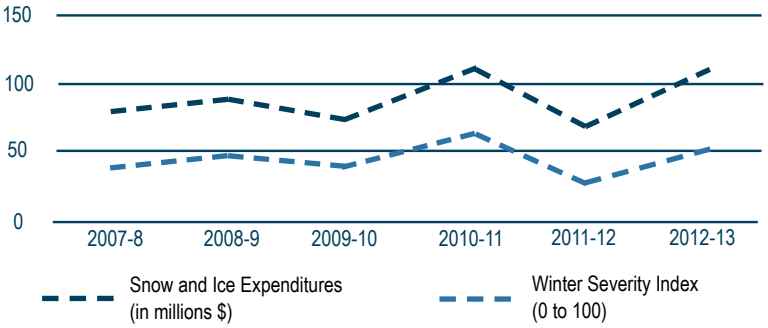
MnDOT's average incident clearance time on metro-area freeways in 2012 was 31.6 minutes (based on 3-year moving average). This result represents the third consecutive year-over-year improvement and the lowest average incident response time in more than decade. Two factors that contributed to the improvement are computer aided dispatching and an "Open Roads" policy that expedites removal of stalled or damaged vehicles, cargo and debris. In 2010, the Minnesota Legislature passed a "quick clearance" law that allows MnDOT and the State Patrol to remove obstructions from the road without waiting for owners to do so.

Operational Spending

Funding for snow and ice is a top priority for all districts and fluctuates with the severity of the winter. Funding for winter services comes directly from each district's operating budget. In severe winters, districts may redirect summer maintenance dollars to winter snowplowing activities. Increasing prices for commodities, such as salt and diesel fuel,

also affects snow and ice expenditures. MnDOT spent $112.3 million on snow and ice control during the 2012-13 winter season, nearly twice what was spent during the previous year's mild winter.

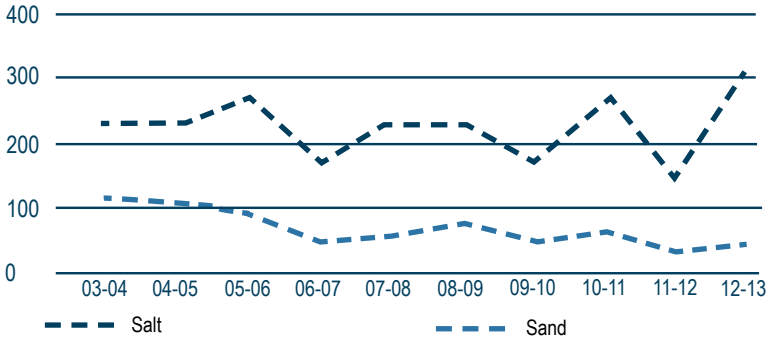
MnDOT Statewide Snow and Ice Expenditures



Source: MnDOT Office of Financial Management (expenditures) and MnDOT Snow and Ice Report (winter severity)

While salt use has remained roughly constant over the last 10 years, the use of sand has steadily declined. The amount of salt, sand and chemicals needed depends on pavement temperature, ice, compaction, and wind. Using less material reduces environmental impacts. MnDOT participates in research on new methods of snow and ice control. Technologies such as the Material Decision Support System improve the efficiency of material use and help make decisions about which chemical and how much to use. MDSS is now used on nearly half MnDOT's snow plow fleet.

MnDOT Statewide Salt and Sand Use (thousands of tons)



Source: MnDOT 2012-2013 MnDOT Snow and Ice Report

MnDOT spending on arterial and freeway operations includes the Freeway Incident Response Safety Team maintenance crews and equipment that assist in clearing major incidents. MnDOT spends about $1.5 million per year on the FIRST program. Additional resources are committed by the State Patrol, local fire and rescue squads, local law enforcement, emergency medical services, and tow truck operators. Maintaining and operating signals, lighting equipment and traffic management system assets are also a significant expense. In a typical recent year, MnDOT has spent $2 to $3 million on traffic management system maintenance and support, $4 million on signals, and $4 million on lighting.

Learn More

MnDOT Metropolitan Freeway System 2012 Congestion Report
www.dot.state.mn.us/metro/news/13/02/CongestionReport2012Final.pdf

MnDOT 20-year State Highway Investment Plan
www.dot.state.mn.us/planning/mnship

Metropolitan Council Transportation Policy Plan
www.metrocouncil.org/Transportation/Planning/2030-Transportation-Policy-Plan.aspx

Texas Transportation Institute Urban Mobility Report
http://mobility.tamu.edu/ums/

MnDOT Office of Transportation System Management
www.dot.state.mn.us/planning/program/
Mark Gieseke — mark.gieseke@state.mn.us

MnDOT Statewide Highway Systems Operation Plan
www.dot.state.mn.us/maintenance/hsop/

MnDOT Office of Maintenance
www.dot.state.mn.us/maintenance
Steve Lund — steve.lund@state.mn.us

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CHAPTER 5

FREIGHT

What this is about

Minnesota's prosperity depends on an integrated and multimodal freight network. This network includes state and local roadways, ports and waterways, privately owned railroads and pipelines, intermodal terminals, and airports. It also includes the many farmers, miners, manufacturers, shippers, distributors, and governmental entities that together have responsibility for moving goods across the state.

This chapter looks at the amount of goods moved by individual freight modes. While driven primarily by demand for certain products, a mode's shipment volume is also influenced by infrastructure condition, capacity constraints, how accessible and connected it is to key destinations, and other factors that impact its competitiveness relative to available alternatives. Monitoring changes in freight volume over time helps MnDOT and its partners evaluate mode performance and plan system improvements that reflect the state's evolving freight needs.

Connection to the Minnesota GO Vision

Minnesota's multimodal transportation system:

- Connects Minnesota's primary assets – 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
- 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

Connection to the Minnesota GO Statewide Multimodal Transportation Plan

Objective

Identify global, national, statewide, regional, and local transportation connections essential for Minnesotans' prosperity and quality of life; maintain and improve these connections by maximizing return-on investment; and consider new connections.

AT A GLANCE.....

FREIGHT

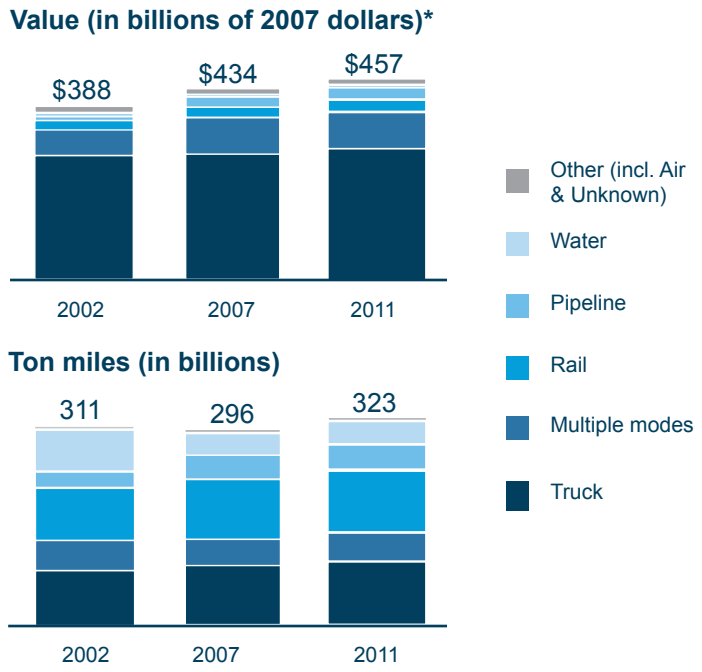
Freight Mode Share

Measure Explanation: This measure was developed using the Federal Highway Administration's Freight Analysis Framework. The FAF is a compilation of products that provide estimates of freight shipped to, from, and within the United States. The current version of the FAF uses origin and destination information from the 2007 Commodity Flow Survey as a basis for state-by-state estimates of shipment value, tonnage and ton miles. More recent estimates reflect provisional updates of the 2007 data. The most recent provisional update, reflected here, was made for the year 2011.

System Description: All domestic freight shipments originating or terminating in Minnesota. Domestic shipments include trips between domestic locations or between a domestic location and a port of entry. Freight shipments from a port of entry (e.g. Duluth) to an international location or vice versa are not captured here. "Through" shipments (in which both origin and destination are outside Minnesota) are also excluded.

Why this is Important: Robust economies require freight networks that are competitively balanced across modes. Freight mode share estimates, when combined with information about shipment type, destination and cost, help MnDOT and its partners evaluate the freight network's capacity to meet the diverse needs of Minnesota's manufactures and consumers. Mode share estimates can also be used to evaluate the effectiveness of policies or programs designed to promote use of a particular mode.

Total domestic shipments to, from or between Minnesota locations (excludes international shipments and "through" shipments)



* Results reflect estimated value of discrete freight movements. Since some goods are moved multiple times through the supply chain, the total value of domestic shipments is greater than the value of all goods and services produced in Minnesota as measured with GDP statistics.
Source: Federal Highway Administration; Freight Analysis Framework, version 3

Truck-only trips remain the primary means of shipping goods by value, but the share moved by other modes is increasing. Shipments by ton miles have shifted from water to rail, truck and pipeline. Trucks tend to carry more valuable freight and make last mile trips, while long distance shipments of heavier, less valuable goods tend to be made by other modes. Although airplanes carry the highest value goods, they move only a small fraction of total freight volume moving to, from and between Minnesota destinations.

TOTAL SHIPMENTS IN 2011	MODE SHARE IN 2011					
	TRUCK	MULTIPLE MODES	RAIL	WATER	PIPELINE	MISC. (INC. AIR & UNKNOWN)
Value $457.4 B (2007 dollars)	$297.6 B (65.1%)	$83.8 B (18.3%)	$28.9 B (6.3%)	$3.9 B (<1%)	$28.6 B (6.3%)	$14.6 B (3.2%)
Ton Miles 322.7 B	96.3 B (29.8%)	43.4 B (13.5%)	109.8 B (34.0%)	36.7 B (11.4%)	34.9 B (10.8%)	1.7 B (0.5%)

Progress

The freight system moved $457 billion worth of goods to, from or between Minnesota locations in 2011. An estimated 65 percent of this value was moved by way of truck only trips. This represents a decline from 2002 when truck only trips moved 72 percent of total shipment value. As the table below shows, the value of goods moved by trips involving multiple modes increased significantly during that time period, from $60 billion in 2002 to $83.8 billion in 2011. An example of a multiple mode shipment is a movement of iron ore from mine to iron ore processing facility first by truck (mine to railhead) and then by train (railhead to facility). The value of goods moved by modes other than truck increased as well, primarily due to rapid growth in the value of pipeline shipments.

Freight Mode Share in Minnesota (by value); 2002-2011

MODE	SHIPMENT VALUE (IN BILLIONS OF 2007 DOLLARS)			SHARE OF TOTAL	
	2002	2011	+/-	2002	2011
Truck only	$279.9	$297.6	+ $17.7	72.2%	65.1%
Multiple modes	$60.0	$83.8	+ $23.8	15.5%	18.3%
Other*	$47.9	$76.0	+ $28.1	12.4%	16.6%
Total	$387.8	$457.4	+ $69.6	100%	100%

* Includes rail, water, air, pipeline and other/unknown
Source: Federal Highway Administration; Freight Analysis Framework, version 3

Ton miles is a measure of freight volume that accounts for shipment weight and length of trip. Excluding through movements, Minnesota's freight system carried 323 billion ton-miles in 2011, 11.7 billion more ton miles than in 2002. A key trend affecting mode share is the decline in the number of ton miles moved by waterway. Between 2002 and 2011, ton miles carried on Minnesota waterways fell by nearly half as long distance commodity shipments shifted from water to rail, pipeline, and truck. Increased production of ethanol within Minnesota and a reduction in coal imports has affected both rail and waterway tonnage, but rail losses have been offset by increased oil shipments.

Freight Mode Share in Minnesota (by ton miles); 2002-2011

MODE	SHIPMENT VALUE (IN BILLIONS OF TON MILES)			SHARE OF TOTAL	
	2002	2011	+/-	2002	2011
Rail	82.7	109.8	+ 27.1	26.6%	34.0%
Truck-only	83.9	96.3	+ 12.4	27.0%	29.8%
Water	68.8	36.8	- 32.0	22.1%	11.4%
Pipeline	24.9	34.9	+ 10.0	8.0%	10.8%
Other*	50.8	45.1	- 5.7	16.3%	14.0%
Total	311.0	322.7	+ 11.7	100%	100%

* Includes multiple modes, air and other/unknown
Source: Federal Highway Administration; Freight Analysis Framework, version 3

Pipelines

Pipelines carry a small but rapidly growing share of freight value moved to, from and between Minnesota locations. According to Freight Analysis Framework mode share estimates, the total value of energy products moved by pipeline grew by 300 percent from 2002 ($8.7 B) to 2011 ($28.6 B).

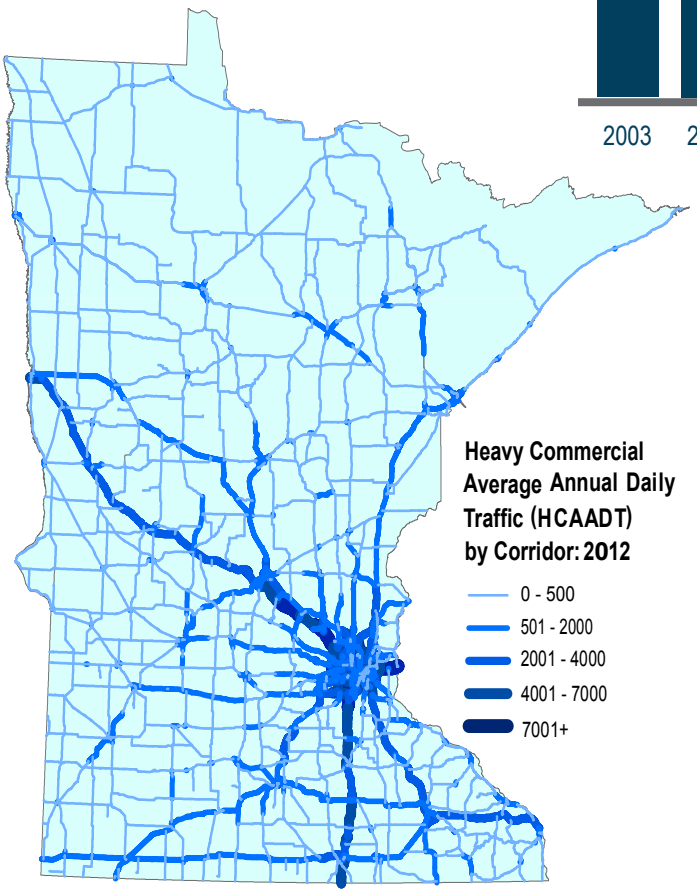
Minnesota has 10,739 miles of pipeline, not including connections to end users. About half of this mileage is used for natural gas transmission. Other commodities carried by pipeline include crude oil, refined products, liquefied petroleum gas, natural gas liquids, and anhydrous ammonia.

Mode share estimates are just one piece of information MnDOT considers when evaluating freight system performance. Other considerations are MnDOT's estimates of heavy commercial trucking and private sector reports of rail and port shipment tonnage. In contrast to the mode share information discussed previously, these additional indicators include movements in which both trip origin and destination are outside Minnesota.

Heavy commercial vehicle miles traveled on Minnesota state highways have remained steady at about 2.6 billion each of the last six years. Truck shipments are strongly linked to demand for consumer goods. A shortage of drivers and increased diesel fuel prices are leading to a modest mode shift from trucking to railroads.

Heavy Commercial Vehicle Miles Traveled (HCVMT) on the Minnesota State Highway System (in billions)

Source: MnDOT Office of Transportation System Management; Data pulled from the Transportation Information System (TIS)



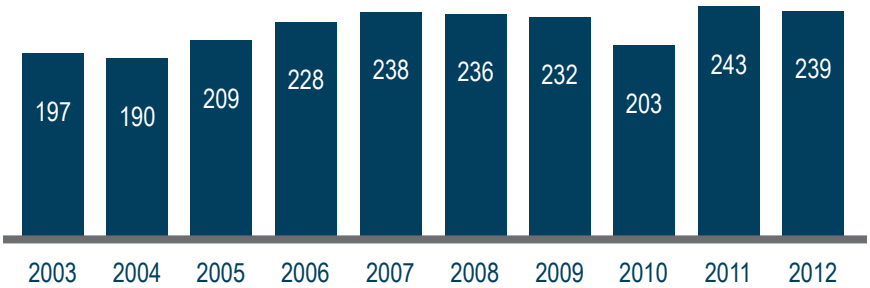
Source: MnDOT Office of Transportation System Management; Data pulled from the Transportation Information System (TIS)

Outside the Twin Cities area, the highways most heavily traveled by trucks are the Interstates, which as a system carry over 40% of the state's heavy commercial vehicle miles traveled. Other highways in Minnesota with high levels of HCVMT are US 10, US 52, and US 169.

Recently enacted federal legislation known as MAP-21 created a national freight network to guide states in directing resources toward improving freight transportation performance. Projects that improve freight efficiency are eligible for a higher share of federal funding. Other provisions extend federal funding eligibility to construction of rest areas and commercial vehicle parking facilities. These are needed to provide drivers with places to rest when they have reached the maximum allowable driving time, and to facilitate staging for vehicles making deliveries in urban areas.

The amount of tonnage moved on Minnesota's railroads is heavily influenced by the national economy. According to the American Association of Railroads, rail tonnage in Minnesota declined during the 2007-2009 recession but then rebounded sharply as economic conditions improved. Taconite moved between mining operations and Lake Superior ports makes up more than half the rail tonnage moved in Minnesota. Other commodities that account for a significant amount of rail activity include farm products (18 percent of outbound tonnage) and coal (21 percent of inbound tonnage).

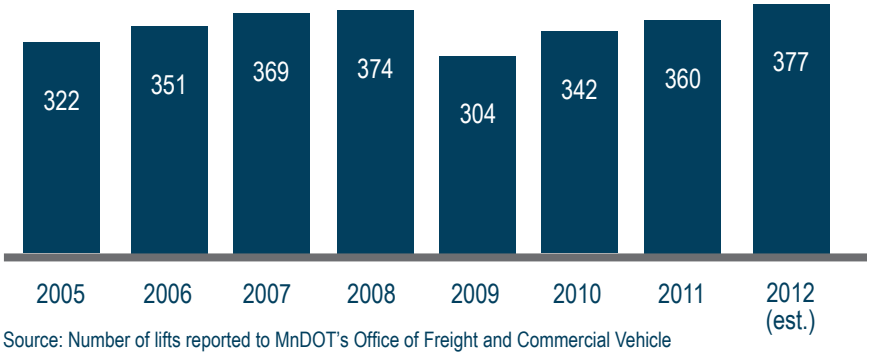
Annual Rail Shipments in Minnesota (in millions of tons)



Source: American Association of Railroads

Containerized shipments make up a growing share of rail freight. These shipments are made by way of large, durable containers that can be easily lifted off one mode and placed on another. The vast majority of container lifts in Minnesota occur at one of two container yards: the Burlington Northern Santa Fe Railway yard in Saint Paul and the Canadian Pacific Railway yard in northeast Minneapolis. The number of container lifts at these yards has increased steadily since 2009. Yard operators estimate that the number of lifts occurring in 2012 topped 377,000, slightly more than the yards' pre-recession high.

Annual Container Lifts in Twin Cities intermodal yards (in thousands)



Source: Number of lifts reported to MnDOT's Office of Freight and Commercial Vehicle Operations by container yard operators

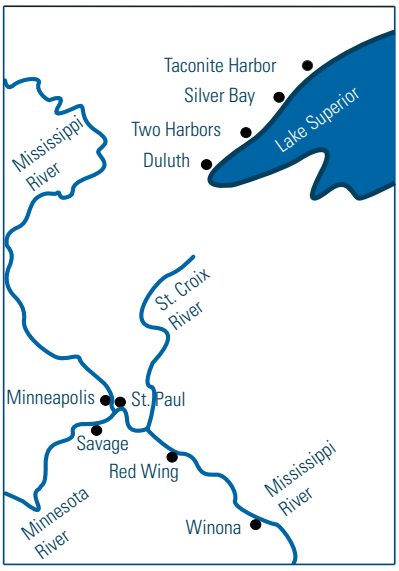
Minnesota port shipment tonnage increased in 2012 but remained below pre-recession levels. Of the 71.7 million tons moved by water, 61 million or 85 percent were shipped to or from one of Minnesota's four ports on Lake Superior. Taconite shipments account for a large and growing share of this total, exceeding 40 million tons annually. Coal, another commodity significant to Lake Superior shipping, dropped from 15.4 million tons in 2011 to 14.1 million tons in 2012 due to increased use of natural gas for generation of electricity. Other prominent commodities moved out of Lake Superior ports are grain, cement, salt, and limestone.

For Comparison

Minnesota ranks 12th in rail tonnage and 18th in number of rail carloads, according to 2011 data from the Association of American Railroads.

According to a 2011 U.S. Army Corps of Engineers report, the Port of Duluth-Superior ranked 20th among U.S. ports in terms of shipping tonnage. Two Harbors ranked 40th; Silver Bay ranked 68th; and St. Paul ranked 78th. As a state, Minnesota is 18th in port tonnage.

Minnesota lake and river ports



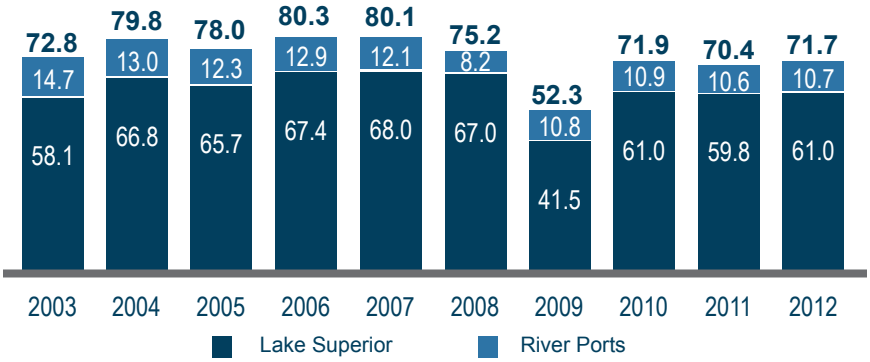
Freight moved by water, 2012

TYPE	MILLIONS OF TONS	LARGEST COMMODITIES
Lake export	56.2	Taconite, coal
Lake import	4.8	Coal
River export	5.6	Grain, petroleum
River import	5.0	Aggregate, fertilizer

Source: MnDOT Office of Freight and Commercial Vehicle Operations

Mississippi River shipments totaled 10.7 million tons in 2012. This result is largely unchanged from the previous three years. The Mississippi carries more than half of all agricultural exports from the state, including 4.4 million tons of grain. Other important dry commodities shipped from river ports include fertilizer, cement, sand and gravel, salt and coal. Liquid products such as petroleum, vegetable oils and anhydrous ammonia are also shipped on the river.

Annual Port Shipment Tonnage (in millions of tons)



Source: MnDOT Office of Freight and Commercial Vehicle Operations

What's being done

Minnesota's freight system is preserved and enhanced through the combined efforts of MnDOT and its public and private partners. Specific roles and responsibilities vary by mode. Generally speaking, MnDOT supports goods movement by planning the overall freight network, managing the state highway system, and regulating carriers. MnDOT also administers state and federal funding programs that rehabilitate and upgrade rail and port facilities.

Trucking

MnDOT's Office of Freight and Commercial Vehicle Operations is responsible for enforcing state and federal motor carrier regulations that promote traveler safety and help mitigate the damage done by large vehicles to roads and bridges. Key OFCVO activities include safety reviews, credentialing programs, hazardous materials incident response, and the routing and permitting of oversize/overweight loads.

OFCVO also directs MnDOT's statewide freight planning efforts. MAP-21 recommends that each state develop a freight plan identifying significant trends, needs and issues. Consistent with this recommendation, MnDOT is updating the 2005 Minnesota Statewide Freight Plan. Another freight planning activity relevant to trucking is the development of a truck parking availability notification system. This system will give truck drivers advanced knowledge of parking spot availability when planning required rests along their route.

MnDOT does not currently track and report its level of freight-driven investment on the state highway system. However, many types of highway improvements that benefit general traffic flow also improve the efficiency of moving goods by truck. Examples include projects that improve ride quality, enhance traffic flow, or prevent the need for load postings on highway bridges.

Rail

The Minnesota Comprehensive Statewide Freight and Passenger Rail Plan provides a vision for the statewide rail system and sets priorities for state and federal investments in rail infrastructure. Key priorities in the plan include expanding intermodal container access and maintaining service on short-line railroads. Short-line, also known as Class III, railroads provide service to farmers, manufacturers, miners and other shippers in small cities and urban industrial areas no longer served by Class I railroads. The plan found no congestion on the state's short-lines, but many are weight or speed restricted.

Funding to operate, maintain and improve freight railroads generally comes from private sources. Recently, major railroads have showed consistent profitability and investment in infrastructure capacity. Low volume rail corridors and short-lines that lack financial capacity may apply for loans through the Minnesota Rail Service Improvement program. MSRI loans can be used to rehabilitate deteriorating lines for continued use or preserve abandoned corridors for future transportation purposes.

Minnesota has 4,444 route miles of railroads serviced by 20 railroad companies. Railroad companies are divided into three classes based on operating revenues and status defined by the U.S. Surface Transportation Board. Class I railroads are those with annual gross operating revenues of at least $378.8 million. Minnesota is serviced by four Class 1 railroads: Burlington Northern Santa Fe Railway, Canadian Pacific Railway, Canadian National Railway and Union Pacific Railroad.

Waterways

Minnesota is located at the upstream end of the Mississippi River System and at the western end of the Great Lakes St. Lawrence Seaway. Responsibility for commercial navigation infrastructure on this system is shared by the U.S. Army Corps of Engineers, the U.S. Coast Guard, local port authorities, and private operators. Port authorities own some of the terminal facilities, but the terminals are all managed by private operators.

MnDOT administers the Port Development Assistance Program, which uses funds appropriated by the Minnesota Legislature to help port authorities improve efficiency at their waterway freight terminals. Since the program began in 1996, Minnesota has committed $25 million for 37 projects to increase port efficiency and preserve infrastructure. Funds have been used to rehabilitate dock walls and warehouses, purchase or overhaul product handling equipment, dredge mooring areas, and improve rail and truck access to port facilities.

Learn More

MnDOT Office of Freight and Commercial Vehicle Operations
www.dot.state.mn.us/cvo/index.html
Bill Gardner -- william.gardner@state.mn.us

MnDOT Ports and Waterways
www.dot.state.mn.us/ofrw/waterways.html

MnDOT Freight Rail
www.dot.state.mn.us/ofrw/

American Association of Railroads
www.aar.org

Minnesota Regional Railroads Association
www.minnesotarailroads.com/

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CHAPTER 6
AIR TRANSPORTATION

What this is about

The statewide air transportation network serves Minnesotans who rely on aviation for personal travel, business, recreation and delivery of goods. It consists of 135 state funded airports and dozens of passenger airlines, air charter providers, corporate aircraft, and delivery services that connect Minnesota to the rest of the world. It also includes the infrastructure, equipment and services that facilitate aerial crop protection and the delivery of medical and emergency services throughout the state.

Connection to Minnesota GO Vision

Minnesota's multimodal transportation system:

- Connects Minnesota's primary assets – 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
- 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

Connection to Minnesota GO Statewide Multimodal Transportation Plan

Objective

Identify global, national, statewide, regional, and local transportation connections essential for Minnesotans' prosperity and quality of life; maintain and improve these connections by maximizing return-on investment; and consider new connections.

AT A GLANCE.....

AIR TRANSPORTATION

Available Seat Miles

Measure Explanation: Comparable to vehicle miles traveled, one available seat mile is defined as one aircraft seat flown a distance of one mile. Three variables influence ASM totals: service frequency, aircraft capacity and flight distance.

System Description: Scheduled service nonstop flights out of Minneapolis-St. Paul International Airport.

Why this is Important: ASM out of MSP is a measure of the access Minnesotans have to efficient and convenient air travel. It is also an indication of the state's international significance and its connection to the global marketplace.

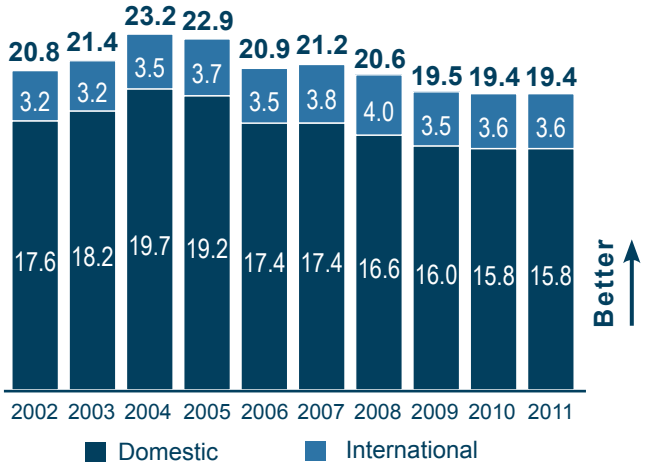
Target	Result (2011)	Multi-year Trend
Tracking Indicator	19.4 billion seat miles	Slowing decline (2007-2011)

For Comparison

In 2011 Minneapolis-St. Paul International Airport ranked 18th nationally in available seat miles. This is down four spots from 2001.

According to the Metropolitan Airports Commission, MSP is tied for the 9th most total nonstop destinations among US airports. In 2012 MSP went from 118 to 114 domestic destinations while maintaining 20 international markets.

Number of available seat miles offered on scheduled service nonstop flights from Minneapolis-St. Paul International Airport (in billions)



Source: U.S. Bureau of Transportation Statistics T-100 Segment data

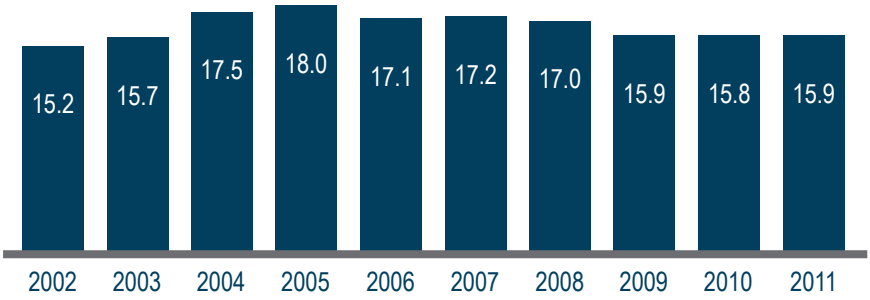
After peaking in 2004, available seat miles out of MSP have fallen significantly over the last seven years. While partially attributable to less demand, the decline in ASM has been driven largely by airline decisions to use smaller planes and provide fewer flight offerings. On average, flights out of MSP have fewer empty seats today than in 2004.

Progress

Available seat miles out of Minneapolis-St. Paul International Airport stabilized in 2011 at 19.4 billion after falling 16 percent between 2004 and 2010. A major driver of this decline was fuel prices. At current levels, fuel makes up roughly 35 percent of major carrier operating expenses. High fuel prices discourage airlines from adding service on popular routes. At the same time, fuel surcharges and rising fares typically depress demand.

The demand for air service is typically measured in terms of revenue passenger miles. A revenue passenger mile is defined as one occupied aircraft seat flown one mile. Like available seat miles, RPM was stable in 2011, increasing slightly from 15.8 billion to 15.9 billion. Revenue passenger miles out of MSP declined between 2004 and 2010 but at a slower rate than ASM. This caused MSP's load factor (the share of available seats that are occupied) to increase from 75 to 82 percent.

Number of revenue passenger miles on scheduled service nonstop flights from Minneapolis-St. Paul International Airport (in billions)

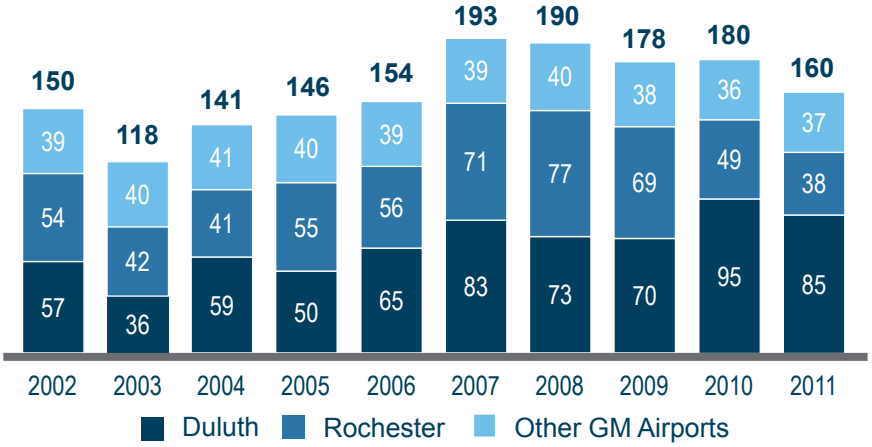


Source: U.S. Bureau of Transportation Statistics T-100 Segment data

Market forces in the past decade have diminished the majority presence maintained by Northwest/Delta Airlines at MSP. In 2001, the locally headquartered hub carrier and its now merged partner controlled 81% of the ASM from MSP. By 2011, this share had been cut to 64%. New carrier service at MSP, notable entrants including Southwest Airlines and Spirit Airlines, creates the potential for a more competitive pricing environment.

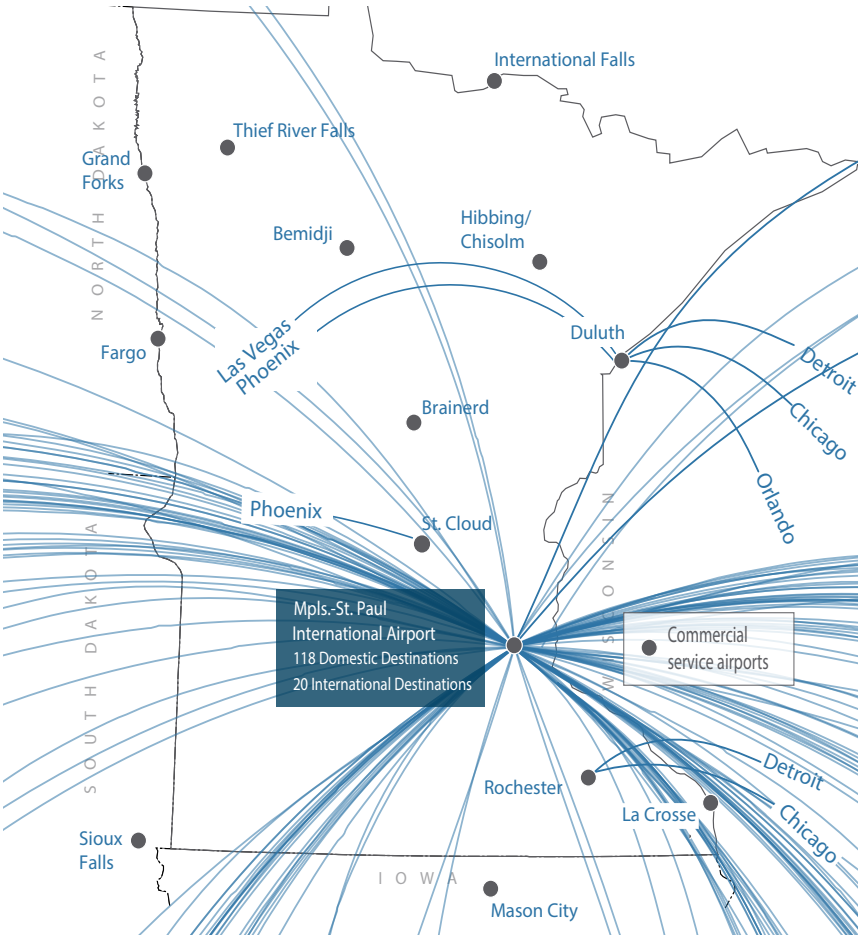
Scheduled air service is also offered at eight airports in Greater Minnesota: Bemidji, Brainerd, Duluth, Range Regional Airport at Hibbing, International Falls, Rochester, St. Cloud (restored in late 2012), and Thief River Falls. These airports supported slightly less than 160 million available seat miles in 2011, with 77 percent of it flying out of Duluth or Rochester. This result is down 11 percent from the previous year. Due to small volume, ASM out of Greater Minnesota airports varies significantly year-to-year as aircraft are redeployed or reconfigured and some routes are added or discontinued.

Number of available seat miles offered on scheduled service nonstop flights from Greater Minnesota airport (in millions)



Source: U.S. Bureau of Transportation Statistics T-100 Segment data

Scheduled air service to out-of-state markets; 2012



Source: Metropolitan Airports Commission

Among Greater Minnesota airports with scheduled service, Duluth, Rochester and St. Cloud offer nonstop connections to out-of-state markets. Other airports offer service to out-of-state markets via MSP. Large areas of western and southern Minnesota lack scheduled service, although access is available across the border in Fargo, Grand Forks, Sioux Falls, Mason City and La Crosse.

What's Being Done

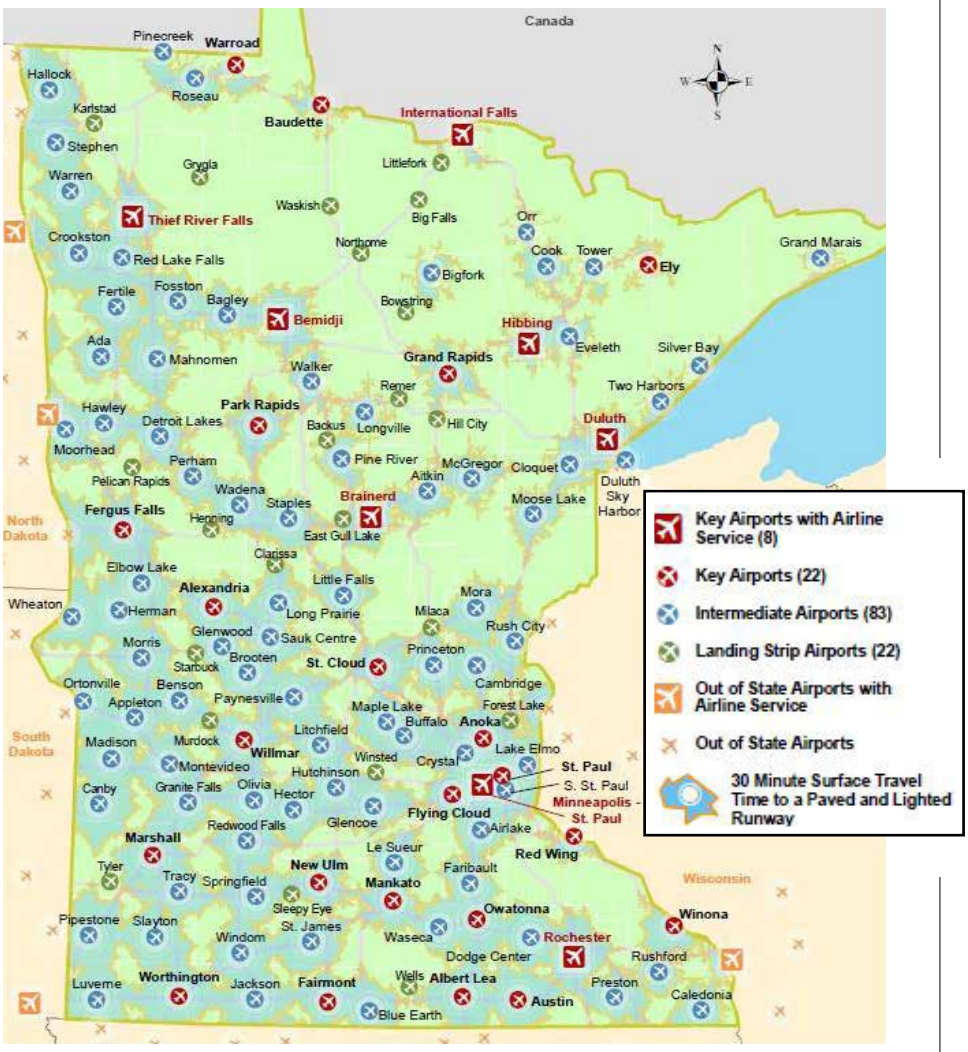
Strategies

MSP and other metro area airports are owned and operated by the Metropolitan Airports Commission. Most Minnesota airports outside the Twin Cities are owned by a city, county or a local airport authority. The MnDOT Office of Aeronautics provides technical support and funding assistance to these entities to identify critical short-term needs and plan for long-term maintenance and expansion. This includes administering state funding, facilitating applications for federal Airport Improvement Program grants, and performing safety inspections and pilot safety training.

Scheduled air service decisions are made by commercial airlines based on market forces. MnDOT, local governments and airport authorities can provide incentives and offer marketing information to strengthen the business case for maintaining or extending service to more communities. Public entities can also influence scheduled air service decisions by investing in airport infrastructure and supporting legislation at the state and federal levels.

Another way MnDOT promotes air transportation is by helping to preserve and maintain airports with paved and lighted runways. A paved and lighted runway allows a broader range of aircraft to use an airport, especially during periods of reduced visibility or exceptionally wet conditions. The ability to transport goods into and out of airports in nearly all weather conditions is critically important to local businesses that require convenient and uninterrupted access to markets.

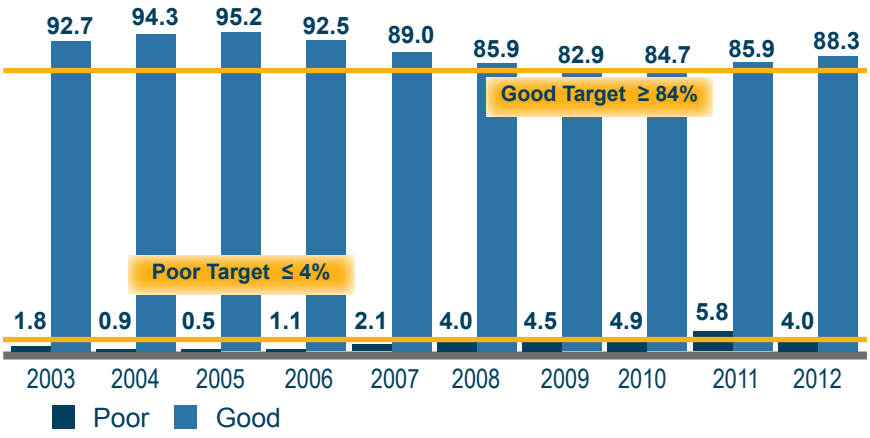
Population within 30 minutes of an airport with a paved and lighted runway



Source: MnDOT Office of Aeronautics

Of the 135 publicly owned airports in Minnesota, 113 had paved and lighted runways in 2012. Analysis done as part of the Minnesota State Aviation System Plan found that 71% of Minnesota's population lives within a 30-minute drive of these airports.

Runway and taxiway pavements – Percent in Poor and percent in Good condition



Source: MnDOT Office of Aeronautics

2012 marked the first year since 2008 that the share of runway and taxiway pavements in Poor condition met MnDOT's 4 percent target. This improvement was made possible by special bond funding that resulted in 18 airport runway reconstructions across the state. Of the 18, 12 are complete and seven have had pavement condition evaluations. The share of runway and taxiway pavements in Good condition has met the 84 percent target nine of the last 10 years.

The **Minnesota State Aviation System Plan** is a comprehensive 20-year plan guiding the maintenance and development of airports and aviation systems in Minnesota. The most recent iteration of the SASP, adopted in 2013, includes a financial component that identifies needs, revenues and a system for project prioritization.

Learn More

MnDOT Office of Aeronautics
www.dot.state.mn.us/aero/
Kathy Vesely – kathy.vesely@state.mn.us

State Aviation System Plan
www.dot.state.mn.us/aero/planning/sasp.html

Federal Aviation Administration
www.faa.gov/

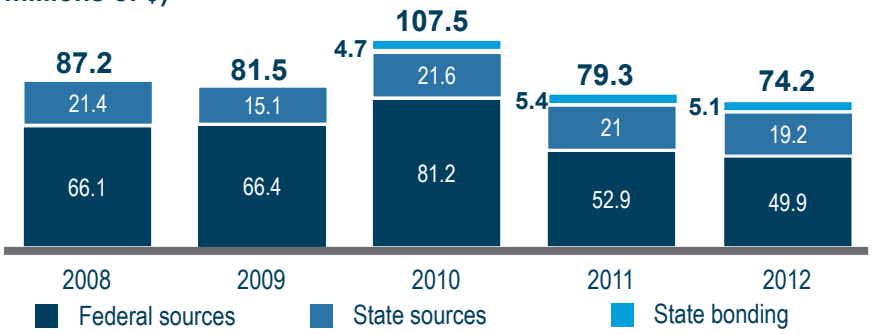
Metropolitan Airports Commission
http://metroairports.org

Funding

Funding for air transportation in Minnesota comes from federal, state and local taxes and fees on system users. Federal funding sources include collections related to passenger tickets, passenger flight segments, international arrivals and departures, cargo waybills, aviation fuels and frequent flyer mile awards from non-airline sources. State funding sources include the Airline Flight Property Tax, the Aviation Fuel Tax and aircraft registration fees. Local airports also receive funding from surrounding municipalities.

Federal and state funding of air transportation in Minnesota is illustrated in the chart below. During the last five years, 74 percent of this money was from federal sources.

Federal and state spending on air transportation in Minnesota (in millions of $)



Source: MnDOT Office of Financial Management; Fund Statements - budgetary basis FY2008-2012. State bonding are cash expenditures.

Airport projects are initiated by facility owners, who also provide a local funding share. Projects at airports included in the National Plan of Integrated Airport Systems qualify for federal funding up to 90 percent of eligible cost. To be eligible for state funding, a project must be part of the state's Capital Improvement Program, which is used to develop and preserve public airports in Minnesota. Priority for state funding is given to projects that enhance safety or preserve the existing state airport system.

Commercial service airports receive a larger share of state and federal funds than airports without commercial service. This funding allows airports to provide improved airfield and terminal designs so airlines can operate more effectively. Greater Minnesota communities with air service are also eligible for grants from the Air Service Marketing Program. This program had an FY 2013 budget of $200,000 from the State Airports Fund. Eligible expenses included air service advertising, marketing studies and route analysis.

CHAPTER 7

TRANSIT

What this is about

Public transit systems provide Minnesotans with choices about where to live, where to work and how to travel. In doing so, these systems enhance the mobility and independence of the elderly, persons with disabilities, young people, and any other Minnesotan wanting to reduce their transportation costs, environmental impact or the time they spend driving. While not everyone takes transit, everyone benefits from its use. Across the state, transit systems are helping communities of all sizes limit congestion and become more competitive in the eyes of developers, employers and workers. The promotion of public transit is also a key way in which Minnesota is working to reduce fuel use and curb greenhouse gas emissions.

This chapter uses the term "transit" to mean public transit. More specifically, it refers to transportation services available to any person upon payment of fare either directly, subsidized by public policy, or through contractual arrangement, and which cannot be reserved for the private or exclusive use of one individual or group. Forms of private transit, such as taxis, private vanpools and car sharing services, are not included, nor are transit services provided by social service agencies for the exclusive use of their clients.

Connection to the Minnesota GO Vision

Minnesota's multimodal transportation system:

- Provides safe, convenient, efficient, and effective movement of people and goods
- Is accessible regardless of socioeconomic status or individual ability
- Minimizes resource use and pollution

Connection to the Minnesota GO Statewide Multimodal Transportation Plan

Strategy

Apply multimodal solutions that ensure a high return-on-investment, given constrained resources, and that complement the unique social, natural and economic features of Minnesota.

Strategy

Support and develop multimodal connections that are accessible for all Minnesotans regardless of socioeconomic status or individual ability.

Strategy

Work together to define priority networks for all modes based on connectivity and accessibility.

AT A GLANCE.....

TRANSIT

Greater Minnesota Transit Ridership

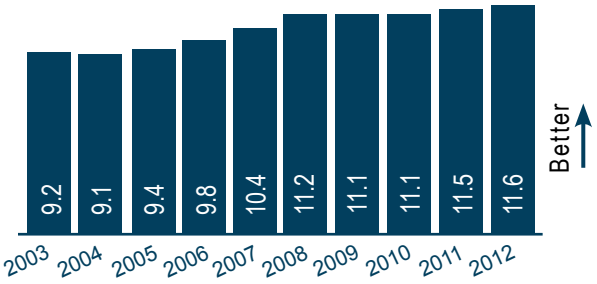
Measure Explanation: Greater Minnesota transit ridership is measured by the annual number of boardings recorded by Greater Minnesota transit providers. These boardings occur on different types of transit service, ranging from fixed route service in urban areas to route deviation or dial-a-ride service in small urban and rural settings.

System Description: 53 public transit systems serving 79 counties.

Why this is Important: Ridership measures the state's progress toward its transit-related goals. Minn. Statute 174.01 defines these goals as 1) providing transit service to all counties that meets the needs of transit users; 2) increasing the use of high-occupancy and low-emission vehicles; and 3) increasing the use of transit as a percentage of all trips.

Target	Result (2012)	Multi-year Trend
Tracking Indicator	11.6 million boardings	Slight improvement ('08-'12)

Annual boardings recorded by public transit providers serving Greater Minnesota counties (in millions)



Source: Minnesota Transit Report; 2003-2012

Ridership on Greater Minnesota public transit systems has increased about 25 percent over the last 10 years. While most of this growth occurred on urban systems, ridership on small urban and rural systems increased as well.

Rail and Express Transit Ridership in the Twin Cities

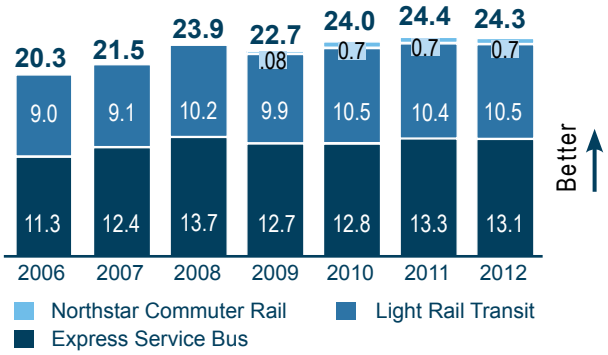
Measure Explanation: Rail and express transit ridership is a measure of the total number of boardings recorded on commuter rail, light rail transit and express service bus routes serving the Twin Cities. Express service buses run on highways and are typically designed for commuter travel.

System Description: Includes transitways and supporting infrastructure. Transitways are corridors where a dedicated lane or other feature allows transit to move more quickly or reliably than personal vehicles. Transit features on highways that support express service buses include bus-only shoulders, exclusive busways, HOV/HOT lanes, and meter bypasses.

Why this is Important: Transitways and express service bus routes provide a quick and reliable alternative to driving on congested freeways. As the region grows and congestion worsens, access to these facilities represents a critical component in the Metropolitan Council and MnDOT's strategy to preserve metro-wide mobility.

Target	Result (2012)	Multi-year Trend
Tracking Indicator	24.3 million boardings	Slight improvement ('09-'12)

Annual boardings on commuter rail, light rail transit, and express service buses (in millions)



Source: Metropolitan Council's 2012 Performance Evaluation Report to the Minnesota Legislature

After a 2009 dip, rail and express transit ridership has been at or slightly above 24 million riders three consecutive years. 53 percent of this ridership occurs on express service buses.

GREATER MINNESOTA TRANSIT

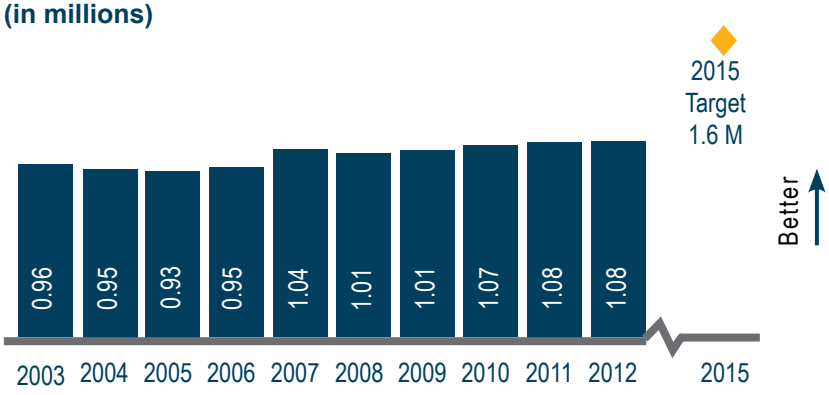
Progress

Transit ridership in Greater Minnesota grew to a record high in 2012 with 11.6 million boardings, continuing a decade of steady progress across urban, small urban and rural systems. Of the 2.4 million rides added between 2003 and 2012, 1.4 million or 61 percent were added by Greater Minnesota's six urban systems: Duluth Transit Authority, East Grand Forks Transit, La Crescent Apple Express, Moorhead Metropolitan Area Transit, Rochester Public Transit, and St. Cloud Metro Bus. Rochester and St. Cloud experienced the highest increase in absolute ridership, adding about 672,000 and 538,000 annual boardings respectively. East Grand Forks and La Crescent had the largest increase in relative terms, with both systems more than doubling their ridership.

Rural and small urban (under 50,000 people) systems have each added approximately half a million riders since 2003. Nineteen small urban and rural transit systems consolidated during this period, making it difficult to identify where ridership growth is strongest. The city of Mankato became a large urban system in 2013 after surpassing the 50,000 population threshold in the 2010 Census.

Transit availability is another measure of the state's transit-related goals. The total amount of time that Greater Minnesota transit vehicles were available for public service in 2012 was 1.08 million hours, essentially unchanged from the previous year. While this result represents a 12 percent increase over 2003, much of this increase occurred in 2007. At its current rate of growth, Greater Minnesota bus service hours will remain significantly below the legislatively identified target of 1.6 million hours for the foreseeable future.

Annual bus service hours in Greater Minnesota counties (in millions)



Source: Minnesota Transit Report; 2003-2012

Types of Transit Service in Greater Minnesota

Fixed route — Service operated over a set route or network of routes on a regular time schedule. This type of service is typically found in urbanized areas.

Route deviation — Service operating on a standard route along a public right of way, from which it may deviate from time to time, in response to a demand for its service or to take a passenger to a destination. This type of service is typically found in small urban and rural areas.

Demand response/dial-a-ride service — Service characterized by flexible routing and scheduling of relatively small vehicles to provide door-to-door or point-to-point transportation at the user's demand. This type of service is typically found in rural areas.

ADA complementary paratransit — Demand response service for persons with disabilities in geographic areas where fixed route services are provided; provision of this service is required by the Americans with Disabilities Act.

The Minnesota Legislature asked MnDOT to identify the cost of meeting 80 percent of Greater Minnesota transit need in 2015 and 90 percent in 2025. Using projections of population growth and economic conditions, MnDOT estimates that meeting 80 percent of Greater Minnesota transit need in 2015 will require 1.6 million bus service hours across all public transit systems serving Greater Minnesota counties. An additional 300,000 hours of service will be required to meet the 90 percent target in 2025.

What's Being Done

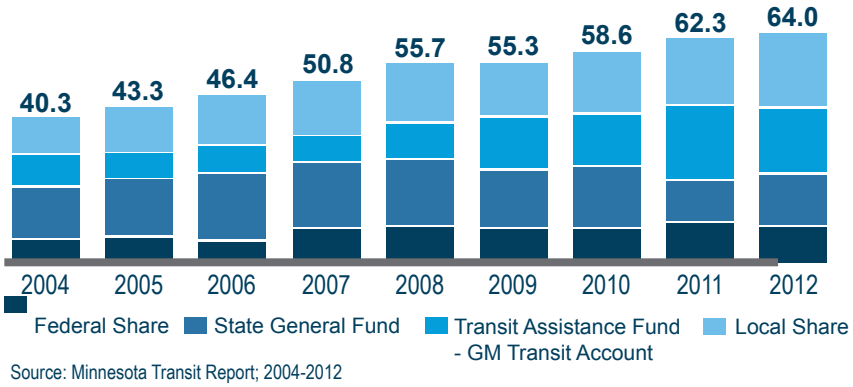
Greater Minnesota's 53 public transit systems are operated by local governments and non-profits. MnDOT supports these systems through planning, research, technical assistance, and the management of state and federal transit programs that administer capital and operational funding.

Each year transit systems submit transit grant applications to MnDOT for funding consideration. The application for funds includes a service plan that describes the hours of service, the routes or areas served, the number of buses, and the frequency and span of service. Consistent with the Greater Minnesota Transit Investment Plan, MnDOT's first priority is the continuation of financial assistance to systems that meet performance standards. MnDOT evaluates transit system performance on cost per passenger, cost per service hour, passengers per service hour, and system revenue vs. operational costs. After maintaining assistance to transit providers that perform well on these metrics, MnDOT's next priorities are to expand transit service into areas where no service exists and expand the frequency, coverage and hours of service currently provided.

Funding. Public transit in Greater Minnesota is funded through federal-state-local partnerships. When state and federal funds are sufficient to provide a desired level of service, local sources pay a minimum share of total operating costs, either 15 or 20 percent, depending on the type of service provided. When state and federal funds are not sufficient to fund a desired level of service at the 80 and 85 percent targets, local systems have the option to contribute a higher percentage toward the cost of transit service.

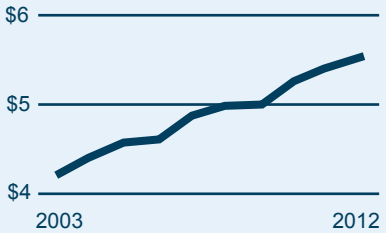
State funding of Greater Minnesota transit comes from General Fund appropriations and the Transit Assistance Fund. In the current biennium, this fund will receive 4 percent of the state's motor vehicle sales tax revenue and 100 percent of leased MVST revenue beyond a $41 million threshold. Starting in FY 2016, the share of leased MVST revenue going to Greater Minnesota transit will decrease to 50 percent of revenues beyond a $32 million threshold. Federal funding for Greater Minnesota transit is set by the Federal Transit Administration's formula for distributing transit dollars to each state. Local contributions come from fares, contracts for services and property taxes.

Greater Minnesota Transit Funding Sources (in millions)



Source: Minnesota Transit Report; 2004-2012

Operating costs per passenger (all Greater Minnesota transit systems)



Source: Operating cost and passenger ride data obtained from the Minnesota Transit Report; 2003-12

The per passenger cost of Greater Minnesota transit is increasing as providers expand service hours in low-density areas of the state and add service hours during non-peak travel times. To help limit this increase in per passenger cost, MnDOT's Office of Transit works with rural transit systems to improve operational efficiency and coordinate services across multiple providers.

Greater Minnesota transit funding has increased more rapidly than bus service hours over the last decade. This reflects the impact that inflation, rising fuel costs and higher wages is having on the buying power of transit revenues.

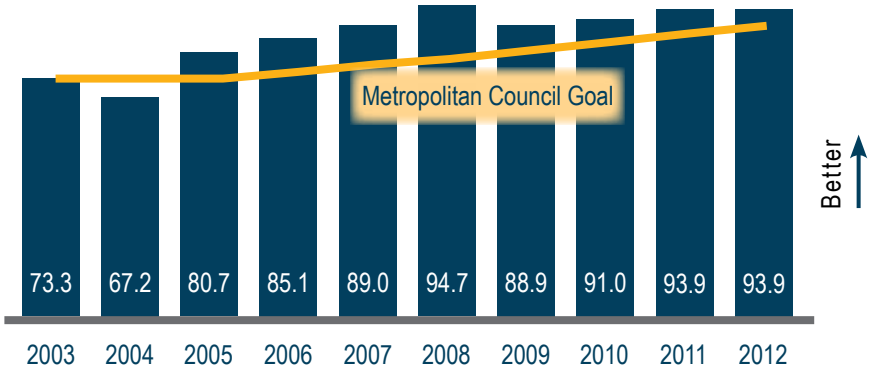
METRO-AREA TRANSIT

Progress

In the Twin Cities, rail and express transit ridership decreased slightly from 24.4 million in 2011 to 24.3 million in 2012. This decrease was driven by a small drop in the number of boardings recorded on express service buses. While Blue Line (Hiawatha LRT) ridership recovered quickly following a 2009 dip, ridership on express service bus routes has remained below pre-recession levels.

Including all forms of metro area transit, 2012 ridership was slightly under 94 million for the second year in a row. As with express service bus ridership, overall transit ridership in the Twin Cities has been slow to recover from the recession. Since 2009, metro-area boardings have increased at an average rate of less than 2 percent per year. Despite this relatively flat growth, metro area ridership continues to exceed annual targets associated with the Metropolitan Council's goal of doubling 2003 ridership levels by 2030.

Annual Twin Cities metro-area transit ridership - All providers/ all modes (in millions)



Source: Metropolitan Council's 2012 Performance Evaluation Report to the legislature

A key strategy for driving ridership growth in future years is the expansion of the METRO system. The METRO system is a network of transitways that offer frequent, all-day service between stations with enhanced amenities. Currently, the METRO system consists of the Blue Line (Hiawatha LRT) and the Red Line (Cedar Avenue bus rapid transit). A third component, the Green Line (Central Corridor LRT), progressed from 45 to 89 percent complete during the 2012 construction season. When operational in 2014, the Green Line will serve as the METRO system's east/west connection, providing service to areas between downtown Minneapolis and downtown St. Paul.

Bus Rapid Transit

Bus rapid transit is a transitway mode that uses bus vehicles while incorporating many of the premium characteristics of light rail. These characteristics include:

- High-frequency, all-day service
- Managed lanes that allow buses to bypass congestion
- Signal priority and real-time arrival information displays
- Off-bus fare collection and low vehicle floors that allow for quicker, more reliable boardings

The flexibility of BRT facilities allow transit providers to scale service based on demand. A BRT line may begin as a slightly enhanced express service bus route and then add additional features over time as population or congestion along the route grows.

The **Counties Transportation Improvement Board** was formed by a joint powers agreement between Anoka, Dakota, Hennepin, Ramsey, and Washington Counties. It receives and distributes a 0.25% transit sales tax for the development, construction and operation of transitways serving those counties. CTIB has committed 30% of the funding to construct the Green Line (Central Corridor LRT).

What's Being Done

The Twin Cities regional transit system consists of local, limited stop and express service bus routes; BRT, LRT, and commuter rail lines; dial-a-ride programs; and public vanpools. All metro area rail transit lines and most bus routes are operated by Metro Transit, a division of the Metropolitan Council. The Metropolitan Council also administers additional transit service through Metro Mobility (transit for those unable to ride regular buses due to disability), Transit Link Dial-a-Ride (transit for those living in areas lacking regular route service), and a small number of contracted providers that operate regular route bus service in metro area suburbs. Other transit providers in the Twin Cities include the University of Minnesota and six suburban systems that operate their own transit service in coordination with service provided by Metro Transit.

Transit planning in the metro area is guided by the Metropolitan Council's 2030 Transportation Policy Plan. This document, which is updated every four years, lays out the policies and strategies that Metro Transit and other metro area providers use to maintain, operate and improve the regional transit system. The TPP also provides strategic direction to the Metropolitan Council, the Counties Transit Improvement Board, MnDOT, and other governmental units involved in the development of a regional network of bus and rail transitways.

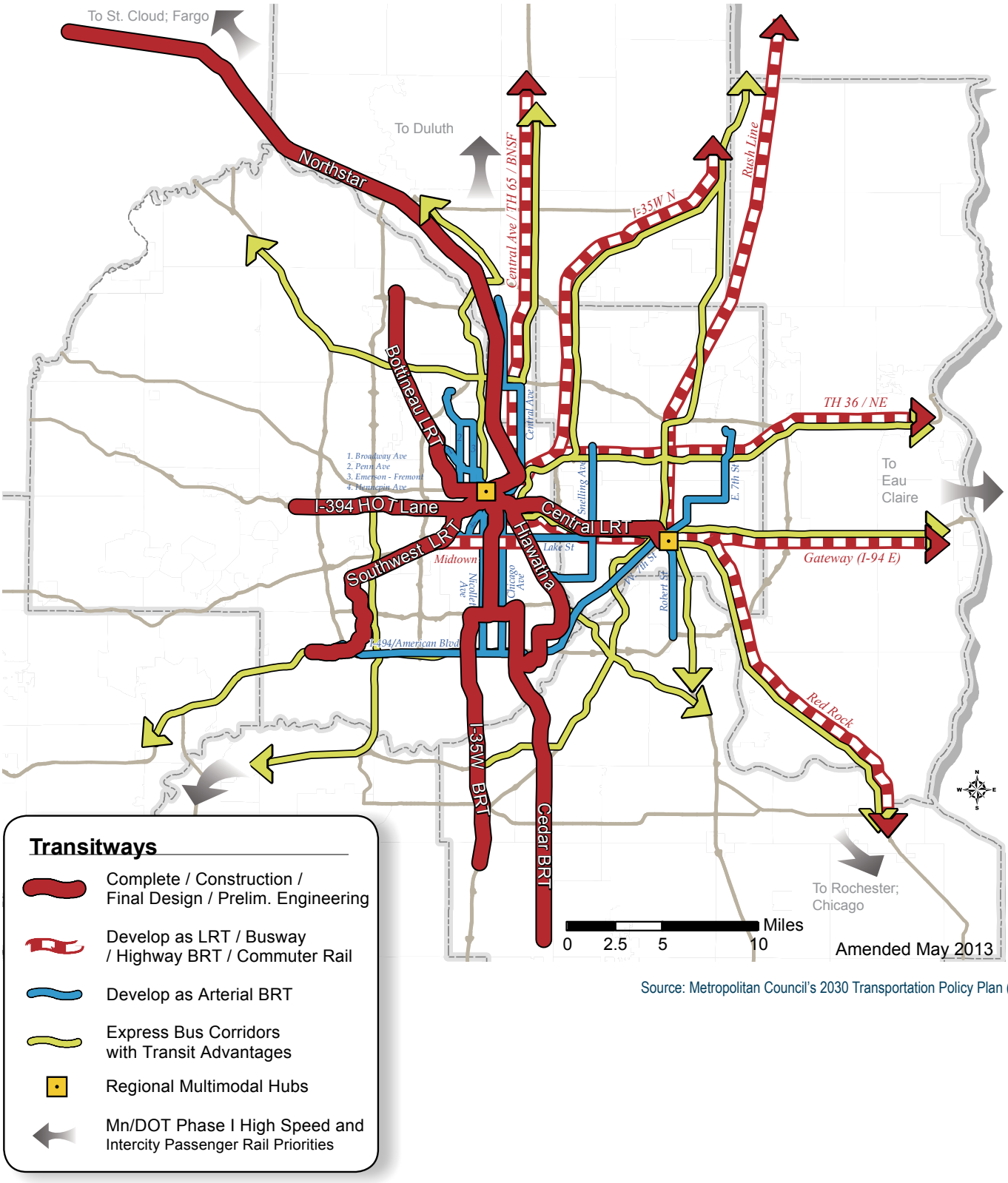
The map on the next page illustrates the metro-area's planned network of transitways. Thick red lines indicate transitways that are operational, under construction, or in the design process. These include Northstar, the I-394 MnPASS Express Lane, the METRO System lines mentioned above, the METRO Orange Line BRT (I-35W South), and two additional transitways that have been identified for LRT service: the METRO Green Line extension (Southwest LRT) and METRO Blue Line extension (Bottineau LRT).

Longer term, metro counties and the Metropolitan Council are exploring the possibility of rail or BRT service on additional corridors throughout the region. These include the Gateway Corridor (along I-94 from St. Paul to Hudson), Red Rock Corridor (along TH 61 from St. Paul to Hastings), Rush Line Corridor (from St. Paul to Hinckley), TH 36/ NE (downtown Minneapolis to Stillwater), Central Avenue/TH 65/BNSF (Minneapolis to Anoka County), and Midtown Corridor in Minneapolis. The cities of Minneapolis and St. Paul have also begun preliminary studies of modern streetcar feasibility.

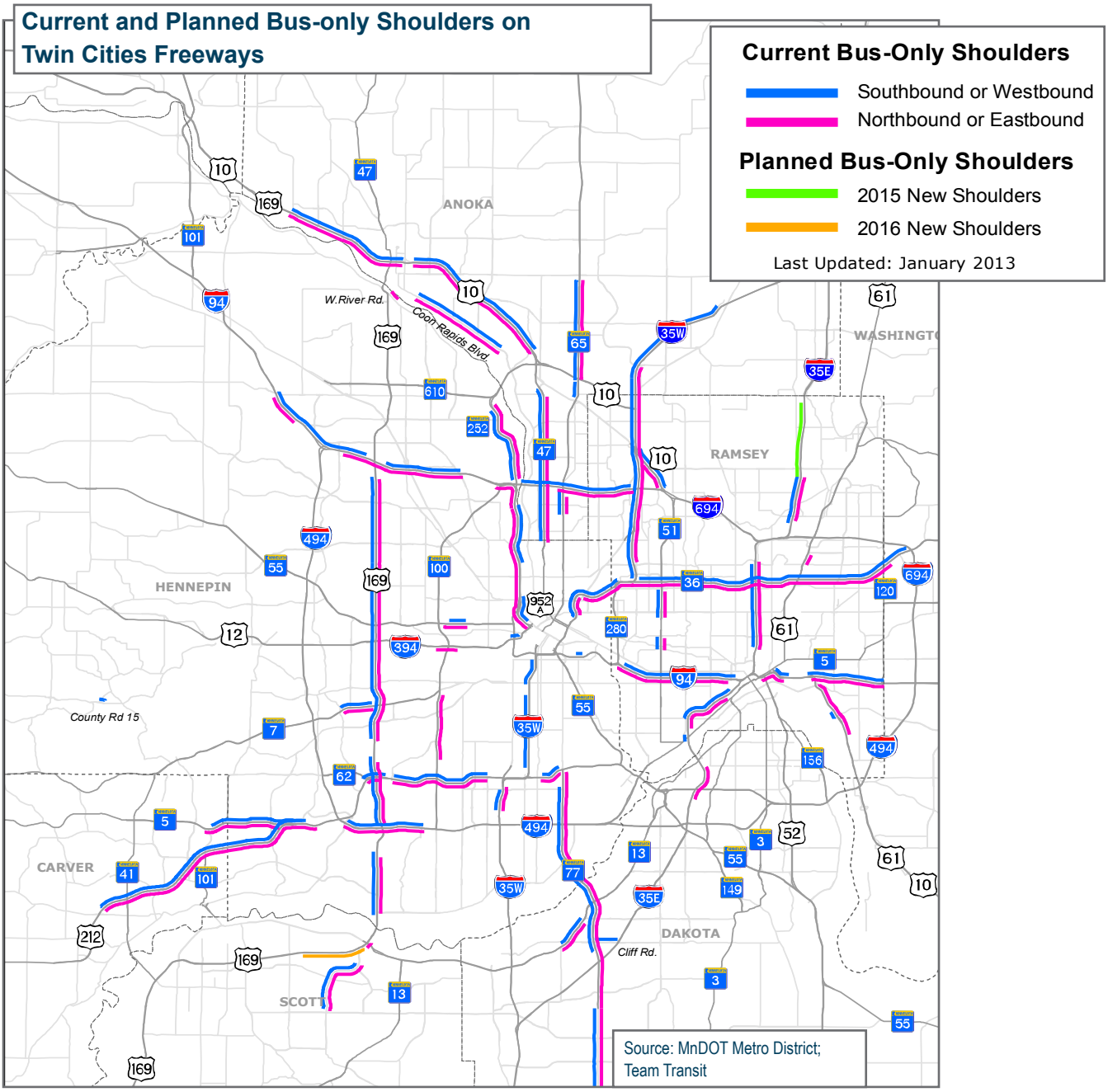
Blue lines on the map indicate opportunities to develop BRT service on arterial streets. This service will provide faster, more reliable trips with fewer stops along the region's most heavily traveled transit corridors. Current planning assumes six arterial BRTs will be developed by 2020. Potential corridors include:

- Nicollet Avenue
- Robert Street
- Snelling Avenue/Ford Parkway
- West 7th Street
- Chicago/Emerson - Fremont Avenue
- West Broadway Ave.
- East 7th Street
- Hennepin Avenue
- Lake Street
- American Boulevard
- Penn Avenue
- Central Avenue

Metro-area Transitways



Source: Metropolitan Council's 2030 Transportation Policy Plan (TPP)



MnDOT supports the metro-area transit system by providing transit advantages on state highway corridors. An example of a transit advantage is a bus shoulder, which is a hardened highway shoulder that premits buses to bypass congestion when speeds on general purpose lanes fall below 35 mph. Buses aided by bus shoulders increase the productivity of existing highway right-of-way by moving more people faster. They also help to limit fuel use and emissions caused by idling in congestion. In 2012, the bus-only-shoulder system expanded from 296 miles to 316 miles. This system of bus shoulders is the largest in the country.

Funding. The Metropolitan Council allocated $394 million[1] in operating funds to transportation in 2012, almost all of which went to the maintenance and operation of transit service. The single largest source of this funding was the state motor vehicle sales tax. As a result of a 2006 constitutional amendment and subsequent specifications, 36 percent of statewide MVST collections are dedicated to metro area transit. In 2012, these collections provided $168 million in budgeted revenue for Metro Transit and other transit services provided by the Metropolitan Council. General fund appropriations and other forms of state revenue accounted for an additional $40 million. The largest non-state source of funding for Metropolitan Council transit operations in 2012 was fares, which provided $93 million or 24 percent of total operating funds.

In 2012, the Metropolitan Council's capital investment program equaled $484 million, over half of which went to METRO Green Line (Central Corridor LRT) construction. Because capital investment in transit infrastructure varies widely from year to year depending on projects, sources of capital funding are best evaluated over multi-year periods. The Metropolitan Council's most recently approved six-year Capital Improvement Plan (2014-2019) envisions $2 billion in capital investment. The Federal Transit Administration provides 58 percent of these funds. Other prominent sources of capital investment in metro area transit include CTIB and Regional Transit Capital bonds issued by the Metropolitan Council.

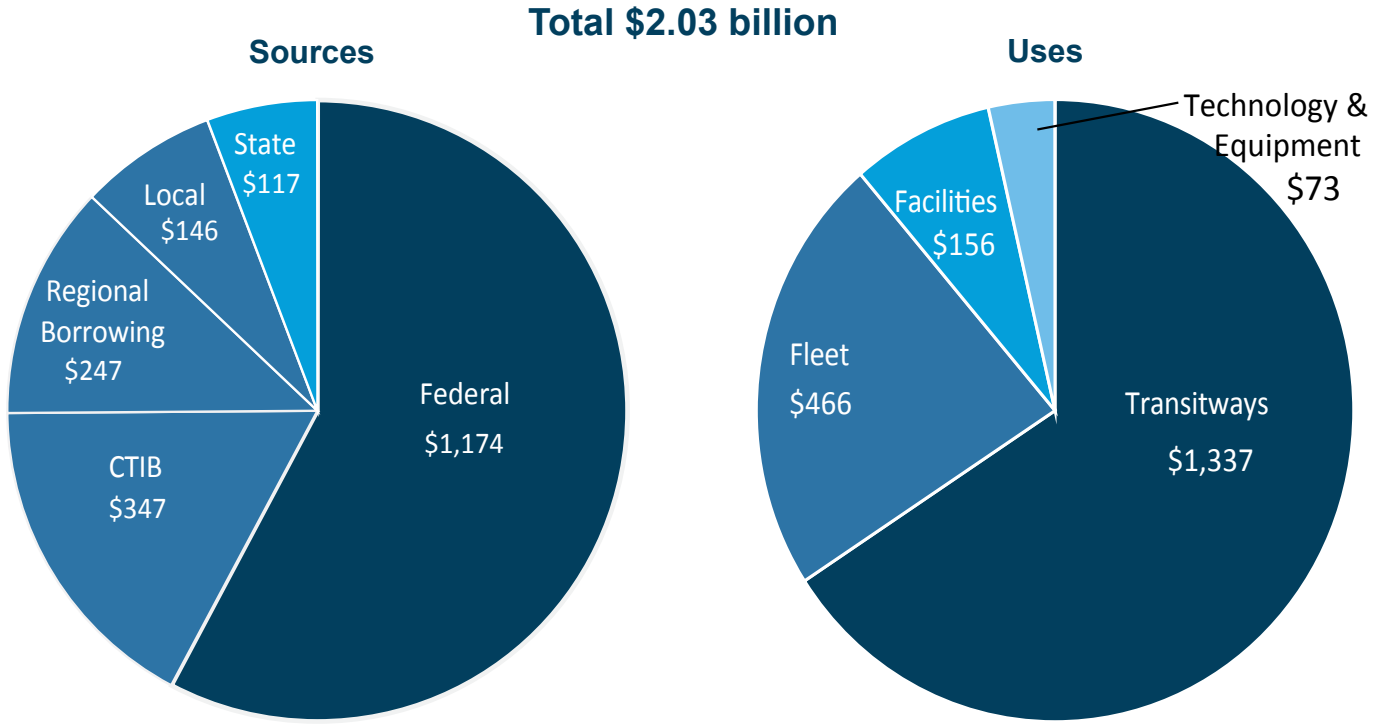
1 Total excludes transit debt service funds and passthroughs to suburban transit providers and the Highway Right-of-Way Program.

Metropolitan Council Transportation Division — 2012 Operating Revenues

SOURCE	FUNDING (MILLIONS OF $)
State Revenues	
MVST	168.1
State Appropriations	39.0
Other State	1.1
Total State Revenues	$208.3
Non-State Revenues	
Federal	44.2
Local	23.8
Fares	92.7
Contracts, Investment Earnings and Other	10.8
Total Non-State Revenues	$171.5
Transfers	13.7
Total Revenues	**$393.6**

Source: Metropolitan Council 2012 Unified Operating Budget; Transportation Division Summary Budget (p. 5-1)

Metropolitan Council 6-year Capital Improvement Plan 2014-2019; Sources and Uses of Transportation Funds (millions of $)



Source: Metropolitan Council 2014 Unified Budget; Funding source chart based on information in Table 8 (p. 23). Funding use chart recreated from the Transportation Division Budget Summary and Narrative (p. C-7).

Learn More

MnDOT Office of Transit
www.dot.state.mn.us/transit
Mike Schadauer — mike.schadauer@state.mn.us

MnDOT Metro District Transit
www.dot.state.mn.us/metro/teamtransit
Shawn Combs Walding – shawn.walding@state.mn.us

Metropolitan Council/ Transportation
www.metrocouncil.org/Transportation.aspx

2030 Transportation Policy Plan
http://metrocouncil.org/Transportation/Planning/2030-Transportation-Policy-Plan.aspx

Metropolitan Council 2014 Unified Budget
Available online at: www.metrocouncil.org/Publications-Resources.aspx

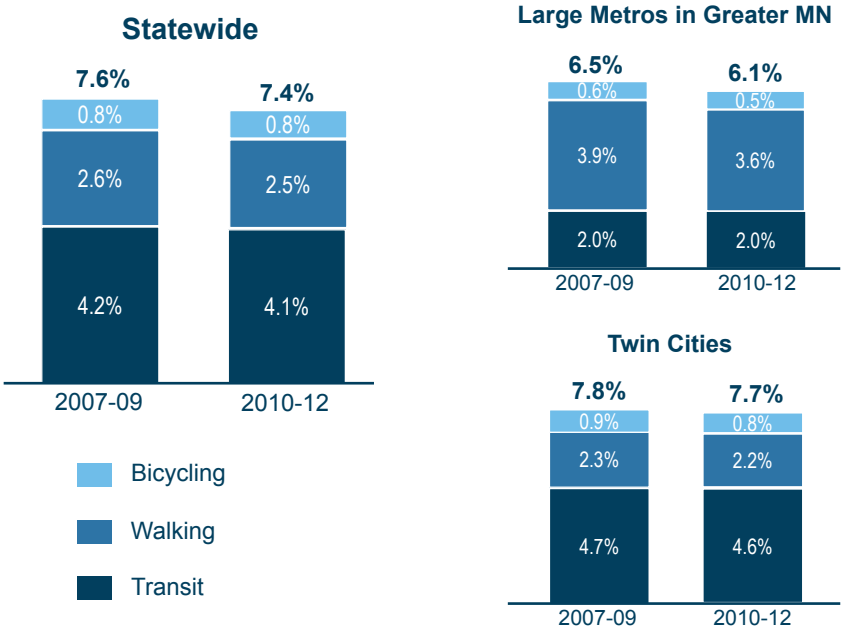
Counties Transit Improvement Board
www.mnrides.org

Legislative Goal – Increase the use of transit, bicycling, and walking as a percentage of all trips (Minn. Statute 174.01)

According to the U.S. Census Bureau's American Community Survey, the share of journey-to-work trips made by transit, bicycling or walking in larger Minnesota metropolitan areas remained relatively constant between 2006 and 2011. Between 2009 and 2011, an estimated 7.4 percent of respondents selected transit, bicycling or walking as their primary mode of commuting to work. Transit supports the most commute trips (4.1 percent), followed by walking (2.5 percent) and bicycling (0.8 percent).

The percentage of commute trips made by specific modes varies by region. While Twin Cities residents are more likely to take transit to work, residents of large metropolitan areas in Greater Minnesota are more likely to walk.

Percent commuting to work by transit, walking, or bicycling in large Minnesota metropolitan areas* (all numbers are 3-year estimates)**



* Includes metropolitan areas over 65,000 in which the majority of residents live in Minnesota (Twin Cities, Rochester, Saint Cloud, Duluth and Mankato)

**Percentages by mode may not add up to exactly 100% due to rounding.

CHAPTER 8
BICYCLING

What this is about

One of the goals of the Minnesota transportation system, codified in Minn. Stat. Sec. 174.01, is to promote and increase bicycling as an energy efficient, non-polluting and healthy form of transportation. To help advance this goal, MnDOT leads bicycle system planning at the state and local level and is an active participant in national and regional bicycle planning efforts. MnDOT also integrates bicycle infrastructure into highway projects as appropriate, with priority given to projects that improve safety and eliminate barriers to bicycle travel.

This chapter examines bicycling across the many facility types that make up Minnesota's bicycle network, from on-road paved shoulders and bike lanes to off-road trails. It covers bicycling done between destinations or as part of recreational outings. Monitoring bicycling activity over time helps MnDOT and its partners assess demand for bicycle facilities, evaluate network accessibility and identify opportunities for improvement.

Connection to the Minnesota GO Vision

Minnesota's multimodal transportation system:

- Is accessible regardless of socioeconomic status or individual ability
- Is designed in such a way that it enhances the community around it and is compatible with natural systems
- Minimizes resource use and pollution

Connection to the Minnesota GO Guiding Principle

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.

Connection to Minnesota GO Statewide Multimodal Transportation Plan

Strategy

Work together to define priority networks for all modes based on connectivity and accessibility.

AT A GLANCE.....

BICYCLING

Frequency of Bicycling

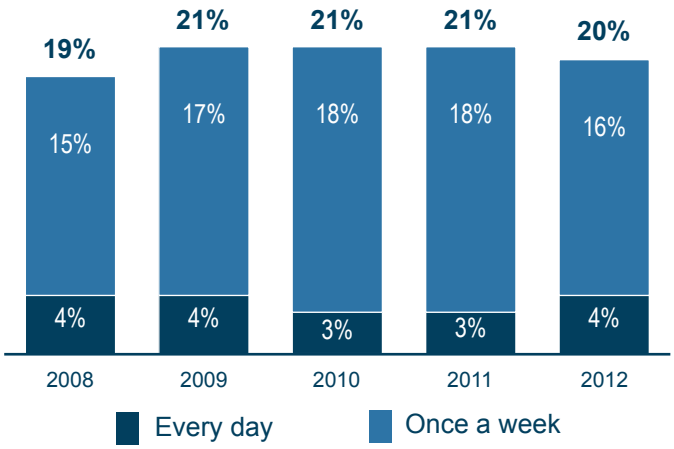
Measure Explanation: Once a year MnDOT conducts an omnibus survey that measures public attitudes about MnDOT and various MnDOT services. Since 2008, this survey has included a question asking survey participants how often they rode a bicycle during the last bicycling season (April through October). Answer options are everyday, once a week, a few times/once a month, one time, or never.

System Description: Minnesota adult residents. Survey results are based on 800 telephone interviews. Survey participants are identified through random, statistically valid sampling techniques. Geographic quotas are enforced so that the sample population is representative of the state as a whole. The sample is large enough to produce estimates that are within 5 percent of the actual population data 95 percent of the time.

Why this is Important: The more often people ride bicycles, the more comfortable and confident they are likely to be riding bicycles for a variety of purposes. Some Minnesotans who bicycle at least once a week already see bicycling as their primary mode of transportation; others may choose to bicycle more if network gaps were closed or if key corridors become more bicycle-friendly.

Target	Result (2012)	Multi-year Trend
Tracking Indicator	20% of Minnesotans report riding a bicycle at least once a week	Stable (2008-2012)

Percent of survey respondents who bicycled at least once a week during the bicycling season (April - October)



Source: MnDOT Omnibus Survey

The number of people reporting that they ride a bike at least once a week during the bicycling season has remained stable during the past five years, hovering around 20 percent.

Progress

According to MnDOT's annual omnibus survey, 20 percent of Minnesotans bicycled at least once a week during the non-winter months of 2012. The same survey found that 44 percent of Minnesotans bicycled at least once a month. People bicycling at least once a week are likely to be bicycling for transportation purposes, while those who bicycle once a month are more likely to be bicycling for recreation, perhaps going out for exercise or with children during nice weather.

MnDOT is currently working to augment its statewide survey information with location-specific counts of bicycling. The Minnesota Bicycle and Pedestrian Counting Initiative, launched by MnDOT in 2012, developed a methodology for manual counting and collecting bicycling data with automatic counting devices. This data will enable MnDOT to issue bicycle facility design guidance based on more accurate estimates of current and anticipated usage on different facility types. It will also help MnDOT consider the needs of bicyclists when designing and selecting projects.

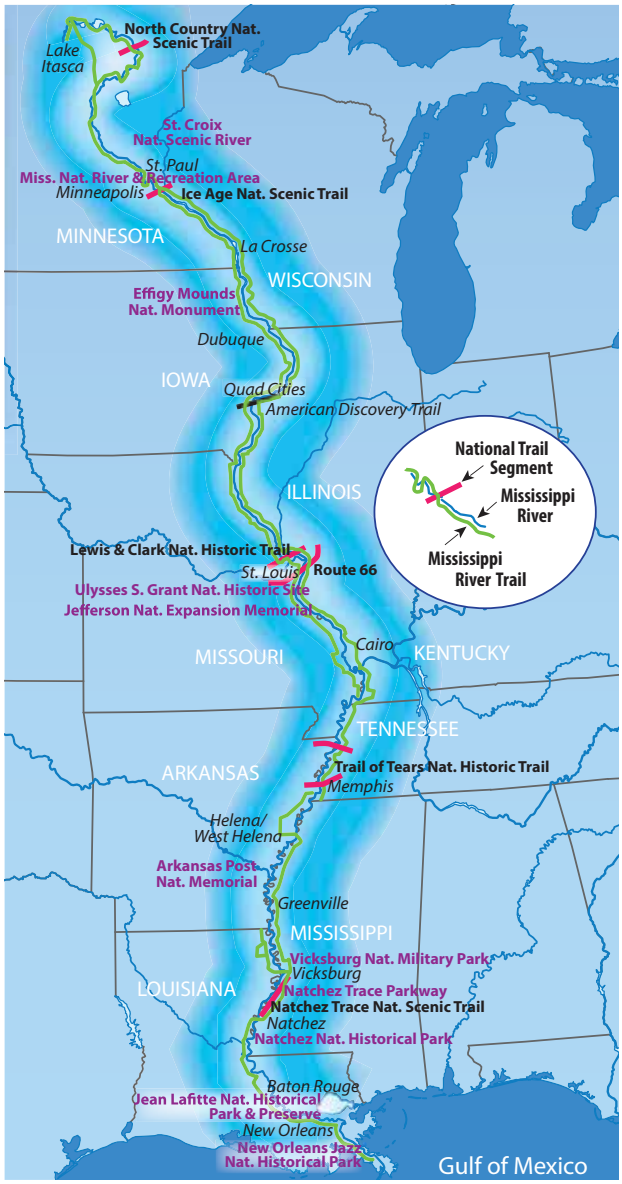
Metro area bicycling activity is monitored through Bike Walk Twin Cities, a federally funded pilot program administered by Transit for Livable Communities. According to the 2012 BWTC Pedestrian and Bicycle Count Report, metro area bicycling at 40 benchmark locations increased 51 percent between 2007 and 2012. These results are based on manual two-hour counts conducted by specially trained volunteers covering a broad range of street types and facilities. Unlike the American Community Survey information reported on page 70, BWTC results cover all types of trips, not just journey-to-work.

Another way in which MnDOT assesses progress toward bicycling goals is through the designation of state bikeways. In 2012, MnDOT designated its first United States Bicycle Route — the Mississippi River Trail, or USBR 45. The MRT follows the Mississippi River through 10 states to the Gulf of Mexico. Minnesota's MRT route winds 620 miles down river from Itasca State Park to the Iowa border. An alternative route leaves the river at Cass Lake and heads south along state trails, joining up with the river again in Brainerd. MnDOT plans to develop more USBRs in the state. Several potential routes have been identified, including one from Minneapolis to Duluth.

State bikeways are just one piece of Minnesota's overall bicycle network. A 2013 update of the Minnesota State Bicycle Map found nearly 1,300 miles of separated multi-use facilities and more than 12,000 miles of state and county roads with a four foot or wider shoulder. Mapping these existing facilities supports ongoing efforts to highlight gaps and plan future improvements to the statewide bicycle network, and to educate and encourage potential bicyclists.

MnDOT is now using automatic counting devices to record daily, seasonal and annual bicycle traffic. Two devices are permanently stationed in Minneapolis and two will be stationed in Duluth. An additional six devices rotate between different facility types (roads with bike lanes, wide shoulders, off-road trails, etc.) at multiple locations across the state

Mississippi River Trail



Source: MRT, Inc.

What's Being Done

The 5 Es

MnDOT uses the 5 Es to shape its bicycle program: enforcement, engineering, education, encouragement and evaluation/planning:

- **Enforcement:** MnDOT provides law enforcement officers with Share the Road materials to be used when giving out warnings and citations to motorists, bicyclists and pedestrians. These materials, such as the "It's the Law" card, explain bicycle and pedestrian laws in simple language in an effort to encourage better behavior.

- **Engineering:** MnDOT designates bikeways, constructs bicycle facilities and reviews highway construction projects to ensure that the needs of bicyclists are included. MnDOT also provides technical assistance to cities, counties, Metropolitan Planning Organizations, and Regional Development Commissions interested in developing bicycle paths and/or accommodating bicyclists in roadway design. MnDOT's Bicycle Facility Design Manual contains standard designs and is currently being updated.

- **Education:** MnDOT is a participant in a number of educational initiatives designed to promote bicycling. These include a recent series of Bikeable Community Workshops and the Share the Road campaign that describes common crash scenarios and how to avoid them. MnDOT also developed a youth bicycle and pedestrian safety curriculum called "Walk! Bike! Fun!". This curriculum, developed with the Bicycle Alliance of Minnesota in 2012, is available for schools and communities across the state.

- **Encouragement:** MnDOT works with partners to encourage active transportation through promotional efforts, like the Pedal MN campaign or Bike to School Day. These activities raise the profile of bicycling as a practical form of transportation, a satisfying recreational activity and a driver of economic growth.

- **Evaluation/planning:** MnDOT is working with more than 100 schools around the state to develop Safe-Routes-to-School plans. As a condition of MnDOT's support, all SRTS plans must assess students' travel behavior and identify the factors that influence their transportation choices. These assessments help MnDOT evaluate statewide conditions for youth walking and bicycling and provide a baseline from which to measure the SRTS program's effectiveness.

Rules of the Road

Minnesota's Share the Road campaign provides materials, information and resources to anyone looking to improve bicycling safety statewide. Some of the most critical pieces of information for the bicycle campaign can be summarized as "rules of the road" and include the following:

- Bicyclists may ride on all Minnesota roads, except where restricted
- Bicyclists should ride on the road, and must ride in the same direction as traffic
- Motorists must at all times maintain a three-foot clearance when passing a bicyclist
- Bicyclists must obey all traffic control signs and signals, just as motorists do

Safe Routes to School is a MnDOT administered program that funds local efforts to improve the routes children use to walk and bicycle to school. SRTS funds may be used to make infrastructure improvements or conduct planning activities, educational initiatives and incentive programs.

Statewide Bicycle System Plan

MnDOT's Statewide Bicycle System Plan builds off the findings and momentum created by the 2013 Minnesota Statewide Bicycle Planning Study. The Statewide Bicycle System Plan will:

- Develop district and state maps of bicycle conditions, network gaps and barriers to bicycle travel
- Provide over-arching policy guidance and implementation tools
- Develop performance measures to evaluate progress on identified goals. Potential measures include bicycle mode share, bicycle crash rate and share of the bicycle network meeting specified criteria
- Provide guidance on how and where to prioritize investments on the state highway network
- Develop district-specific bicycle plans

As part of the planning process, MnDOT will host a series of public workshops focused on the creation of a statewide priority bicycle network. The Statewide Bicycle System Plan will be completed in the winter of 2014/2015.

Investment/spending

According to estimates developed as part of the Minnesota 20-year State Highway Investment Plan 2014-2033, MnDOT spends approximately $14.7 million per year on bicycle facilities. Going forward, MnSHIP directs $210 million to be invested in bicycle improvements over the next 20 years. The majority of these improvements will be constructed concurrently with a pavement or bridge project, with a few standalone bicycle projects such as the Mississippi River Trail in the first 10 years.

Minnesota State Bicycle Map

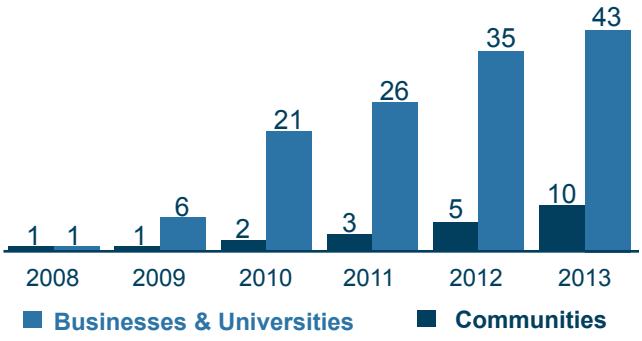
The 2013 Minnesota State Bicycle Map displays trails and depicts roadway suitability for bicycle travel based on traffic volume, roadway shoulder width and access restrictions. As part of developing this map, MnDOT also implemented data collection, storage, maintenance and distribution processes to ensure future updates are made on a timely basis. The map is available online at http://www.dot.state.mn.us/bike/maps.html.

For Comparison - National Rankings of Bicycle Friendliness

Since 2008 the League of American Bicyclists has ranked states according to criteria that includes elements from each of the 5 Es. Minnesota has consistently ranked in the top five, including a number two ranking in 2012 and a number four ranking in 2013.

The League of American Bicyclists also administers programs for communities, businesses and universities to become designated as "Bicycle Friendly." The number of Bicycle Friendly designations in Minnesota has increased dramatically since 2008, particularly among businesses. The communities designated as Bicycle Friendly include Minneapolis (designated in 2008), Rochester (2010), Saint Paul (2011), Bemidji (2012), Greater Mankato (2012), Grand Rapids (2013), Duluth (2013), Grand Marais (2013), Richfield (2013), and Winona (2013). The growth in designations demonstrates the successes of all 5 Es from around the state – generally showing a growing focus on and interest in bicycling across multiple sectors.

Bicycle Friendly designations in Minnesota



Source: League of American Bicyclists

Learn More

MnDOT Office of Transit, bicycling information
www.dot.state.mn.us/bike/
Tim Mitchell — tim.mitchell@state.mn.us

MnDOT Annual Omnibus Survey
Donna Koren — donna.koren@state.mn.us

Minnesota Statewide Bicycle System Plan
www.dot.state.mn.us/bike/system-plan.html

Mississippi River Trail
www.dot.state.mn.us/bike/mrt/

Bike Walk Twin Cities 2012 Count Report
www.bikewalktwincities.org

Minnesota State Bicycle Map
www.dot.state.mn.us/bike/maps.html

Pedal MN
www.pedalmn.com

Share the Road – Minnesota's Bicycle Safety Education Program
www.dot.state.mn.us/sharetheroad/bike/

Safe Routes to School
www.dot.state.mn.us/saferoutes/

CHAPTER 9
PEDESTRIAN ACCESSIBILITY

What this is about

The design and operation of roadways has a significant impact on pedestrian activity. While some roadways form barriers for pedestrians, others enable and encourage people to get out and walk for both transportation and recreational purposes. These accessible, multimodal roadway facilities can produce tremendous benefits in the form of better health, improved safety, increased social interaction, less pollution, and new development opportunities. Accessible roadways are also a critical component of a transportation system that preserves and enhances the mobility of all Minnesotans regardless of age, income or ability.

A key consideration related to pedestrian accessibility in Minnesota is the Americans with Disabilities Act. Title II of this act states that "no qualified individual with a disability shall, by reason of such disability, be excluded from participation in or be denied the benefits of the services, programs, or activities of a public entity." One of the ways MnDOT complies with this requirement is to make state highway sidewalks and crosswalks accessible and useable by people of all abilities. As these efforts also encourage pedestrian activity more broadly, this chapter evaluates walking and ADA compliance in unison.

Connection to the Minnesota GO Vision

Minnesota's multimodal transportation system:

- Is accessible regardless of socioeconomic status or individual ability
- Is designed in such a way that it enhances the community around it and is compatible with natural systems
- Minimizes resource use and pollution

Connection to Minnesota GO 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.

Connection to Minnesota GO Statewide Multimodal Transportation Plan

Strategy

Work together to improve accessibility and safety for everyone traveling on, along and across roads.

AT A GLANCE.....

PEDESTRIAN ACCESSIBILITY

Americans with Disabilities Act Compliance: State Highway Sidewalks

Measure Explanation: MnDOT maintains a sidewalk inventory that includes data on sidewalk cross slope, condition and width. A sidewalk segment is deemed to be non-compliant with ADA standards if it is in "Poor" structural condition, has a greater than 2 percent cross slope, or is narrower than four feet. The term "Poor" is applied to sidewalks with a condition rating of 3 (sidewalk has vertical discontinuities more than 1/2 inch) or 4 (sidewalk is crumbling and/or has many cracks).

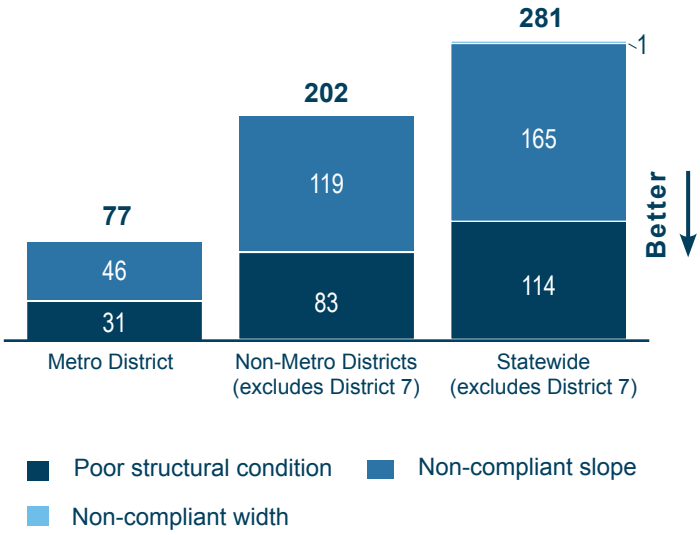
System Description: Sidewalks in state highway right-of-away (approximately 600 miles of sidewalk).

Why this is Important: A poorly designed or maintained sidewalk inhibits mobility, particularly that of the elderly and those using a wheelchair or other assistive device. Poor sidewalks may also contribute to an inhospitable pedestrian environment at an important link in the pedestrian network. By identifying where poor sidewalk conditions exist, this measure creates the opportunity to target investment toward state highways with the greatest need for pedestrian improvements.

Target	Result (2012)	Multi-year Trend
Tracking Indicator	MnDOT has identified 281 miles of state highway sidewalk that are not compliant with ADA design standards*	Only one year of data available

* Excludes non-compliant sidewalk miles in MnDOT District 7.

State highway sidewalk miles that are not compliant with ADA requirements



Some data is still outstanding, but MnDOT has identified 114 miles of sidewalk that are not ADA compliant due to condition and another 165 miles that are structurally sound but have greater than a 2 percent cross slope. One additional mile of sidewalk is in good condition but is narrower than four feet.

Sidewalk in Condition Rating 3

Sidewalk in Condition Rating 4

Progress

MnDOT's sidewalk inventory provides baseline data from which future improvement of pedestrian infrastructure will be measured. MnDOT expects near-term changes in sidewalk condition to be modest due to limited budgets, the long life cycle of sidewalks and MnDOT's strategy of maximizing the service life of existing assets. Because it is typically more cost effective to replace highways and sidewalks at the same time, MnDOT often delays sidewalk improvements until the adjacent roadway needs reconstruction.

MnDOT also evaluates ADA compliance by measuring the number of curb ramps that meet ADA standards and the percentage of eligible state highway intersections with accessible pedestrian signals. As of 2012, 10.7 percent of the inspected curb ramps on the state highway system were completely compliant with ADA standards. An additional 7.5 percent were compliant with slope and landing requirements but lacked truncated domes. The requirement that curb ramps have truncated domes went into effect in 2001, 10 years after the initial establishment of ADA design standards.

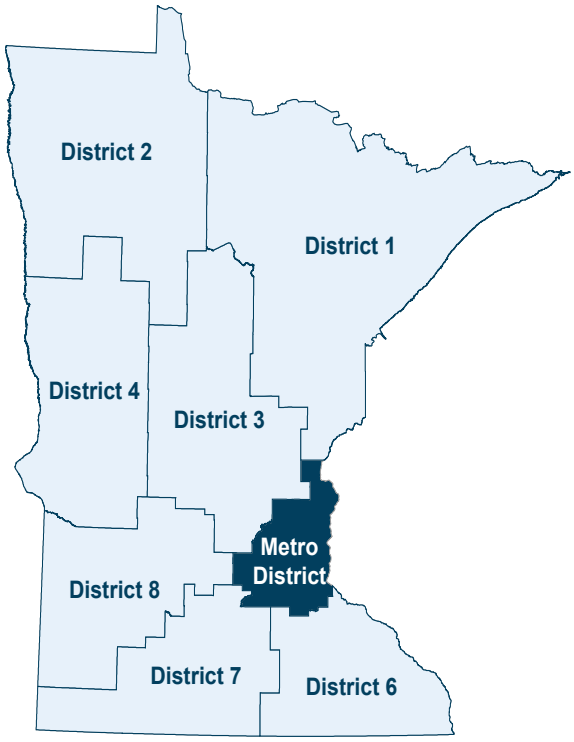
Truncated domes are a textured surface that alerts the visually impaired to an elevation change or other hazard.

ADA curb ramp compliance: 2012 baseline

DISTRICT	TOTAL # OF CURB RAMPS	# INSPECTED	# COMPLIANT	# COMPLIANT SLOPE AND LANDING**
1 - Duluth	1,448	101*	4	14
2 - Bemidji	1,238	1,238	78	224
3 - Baxter	1,846	1,846	185	253
4 - Detroit Lakes	1,358	1,358	61	172
6 - Rochester	1,826	1,826	180	191
7 - Mankato	2,197	2,197	197	343
8 - Willmar	1,890	1,890	68	240
Metro	7,521	7,521	1,155	1,833
Total	**19,324**	**17,977**	**1,928**	**3,270**

* 1,347 curb ramps in District 1 were inventoried but not inspected
**Includes ramps that lack truncated domes but otherwise meet ADA design standards
Source: MnDOT Operations Division – Shared Services

MnDOT District Boundaries



In 2012, MnDOT installed 84 APS bringing the number of state highway intersections with APS to 330, or 28 percent of the total number of state highway intersections with pedestrian push buttons. The 2013 construction program included an additional 84 installations. MnDOT's policy is to install APS at any eligible intersection where an existing traffic signal has aged to the point of needing replacement. APS is also required for all new signals installed at eligible locations. Based on normal replacement intervals for aging signals, MnDOT expects to achieve 100 percent statewide APS compliance by the year 2030.

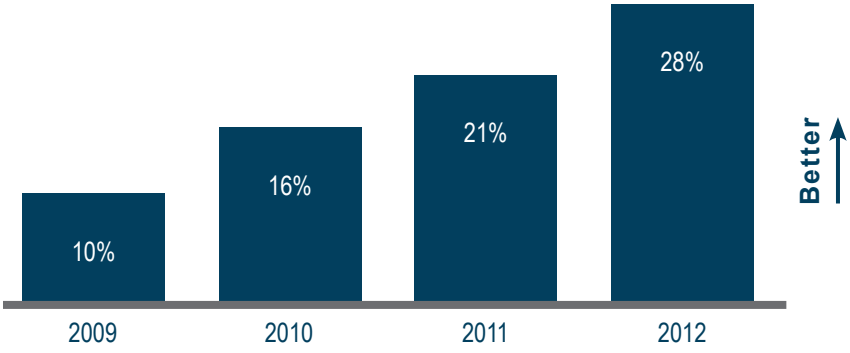
Accessible pedestrian signals use visual and nonvisual formats to identify the beginning of the WALK interval and the direction of the crosswalk. Examples of nonvisual formats include verbal messages, audible tones and vibrating surfaces.

Pedestrian Activity

According to the U.S. Census Bureau's American Community Survey, an estimated 2.5 percent of Minnesotans living in large metropolitan areas* walked as their primary means of getting to work between 2010 and 2012. The share walking to work was larger in Greater Minnesota (3.6 percent) metros than in the Twin Cities (2.2 percent). See page 70 for further discussion of these results.

*Defined as metro areas with more than 65,000 residents

Percent of eligible state highway intersections with accessible pedestrian signals (APS) installed



Source: MnDOT Operations Division – Shared Services

What's Being Done

MnDOT's pedestrian program, like its bicycling program, is shaped by the 5 Es: enforcement, engineering, education, encouragement, evaluation/planning. These activities work together to promote active transportation and the safe use of public roadways by multiple modes. Examples of the 5 Es in practice include the Share the Road Campaign (discussed on page 74), MnDOT's forthcoming statewide pedestrian plan and the Safe Routes to School program.

Statewide Pedestrian Plan

MnDOT is preparing its first statewide pedestrian plan. This plan will direct MnDOT's efforts to increase the safety and mobility of pedestrians on the state highway network. It will also establish performance measures that track progress toward pedestrian-related goals, including but not limited to ADA compliance. This approach is intended to shift the conversation from 'what must MnDOT do to comply with the law' to 'what should MnDOT be doing to better provide for an essential mode along the state highway network'.

Safe Routes to Schools

The Safe Routes to School program was created in 2005 to combat childhood obesity and inactivity by encouraging more children to bike or walk to school. To date, MnDOT has awarded more than $15 million in SRTS infrastructure and non-infrastructure grants. Approximately 80 percent of the funding has gone to infrastructure grants, with the remainder to planning and other activities. Examples of projects include:

- Sidewalk improvements, traffic calming and speed reduction improvements, crossing projects, on and off-street bicycle facilities, secure bicycle parking, and traffic diversion activities

- Planning assistance grants to schools and regional coordinators
- Education and encouragement activities (bicycle rodeos, walk and bicycle to school days, school safety campaigns, and more)

More than 300 Minnesota schools have received funding through SRTS. Unfortunately, demand for SRTS funding exceeds the program budget. Since its inception, less than 30 percent of the applications have been funded. A major focus of the current program is to improve access to resources beyond SRTS grants, giving more people around the state the tools needed to improve walking and bicycling opportunities in their communities.

ADA Transition Plan

MnDOT's ADA Transition Plan details how the department will ensure that its facilities, services, programs, and activities are accessible to all individuals. As part of this plan, MnDOT adopted the national Public Right of Way Accessibility Guidelines as a basis for updates to facility design standards and policies. MnDOT also dedicated additional staff to evaluate the accessibility of construction projects, respond to complaints, and manage an ADA investment program.

Consistent with the ADA Transition Plan, intersections are selected for conversion to APS using a rating tool that considers, among other things, pedestrian use, surrounding properties, transit availability, and user requests. For sidewalks and curb ramps, MnDOT is using inventory data to identify barriers and prioritize needs. MnDOT is also working at a policy level to include accessibility standards earlier in the design and right of way acquisition phases of project development.

Investment/Spending

The Minnesota 20-year State Highway Investment Plan 2014-2033 is the first MnDOT state highway investment plan to establish a capital investment category dedicated to pedestrian infrastructure. MnSHIP allocates $300 million to the Accessible Pedestrian Infrastructure category. This funding will enable strategic investments in sidewalks, crosswalks and other amenities that promote pedestrian safety, mobility and access. The pedestrian infrastructure category will also be used to fund MnDOT's efforts at ADA compliance.

Most pedestrian improvements are made as parts of larger projects. These accessibility components can range from curb ramps included in an intersection reconstruction to building pedestrian facilities on a bridge. Approximately 1 to 2 percent of a typical project's spending supports pedestrian accommodation.

Learn More

MnDOT Office of Transit, pedestrian information
www.dot.state.mn.us/peds/
Tim Mitchell — tim.mitchell@state.mn.us

MnDOT's ADA Program
www.dot.state.mn.us/ada
Kristie Billiar — kristie.billiar@state.mn.us

MnDOT's ADA Transition Plan
First link on www.dot.state.mn.us/peds/

U.S. Department of Justice ADA
www.ada.gov

State Non-Motorized Transportation Committee
www.dot.state.mn.us/sntc/

Safe Routes to School
www.dot.state.mn.us/saferoutes/

Share the Road – Minnesota's Pedestrian Safety Education Program
www.dot.state.mn.us/sharetheroad/ped/

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CHAPTER 10
TRANSPORTATION IN CONTEXT

What this is about

Transportation does not occur in a vacuum; it exists in context. Here, context refers to the people and places that are affected, positively or negatively, by a transportation facility or service. These impacts are reflected in land use patterns, development opportunities, local access to regional transportation networks, community livability and aesthetics, and habitat preservation. At a more global level, the impact of transportation decisions on context can be seen in the quality of the air we breathe and the amount of greenhouse gas we emit into the atmosphere.

Connection to Minnesota GO Vision

Minnesota's multimodal transportation system:

- Is accessible regardless of socioeconomic status or individual ability
- Is designed in such a way that it enhances the community around it and is compatible with natural systems
- Minimizes resource use and pollution

Connection to Minnesota GO 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.

Connection to Minnesota GO Statewide Multimodal Transportation Plan

Objective

Make fiscally responsible decisions that respect and complement the natural, cultural and social context; and integrate land uses and transportation systems to leverage public and private investment.

Strategy

Work together to support and implement both system-wide and project specific approaches to avoid, minimize and mitigate adverse impacts to Minnesota's natural and cultural resources.

AT A GLANCE.....

TRANSPORTATION IN CONTEXT

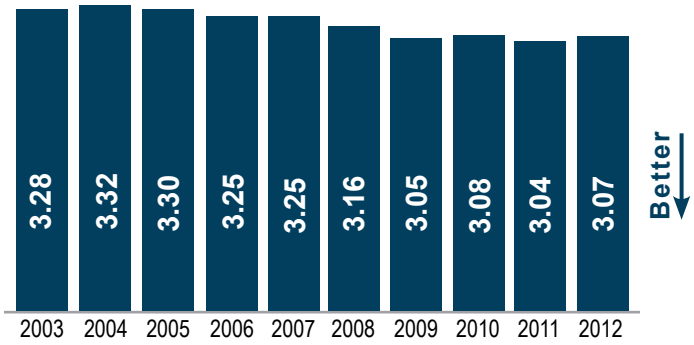
Fuel Consumption

Measure Explanation: All taxable sales of gasoline and diesel fuel in Minnesota. To be consistent with other reports, this measure includes sales of gasoline and diesel for off-road use (for boats, ATVs, dirt bikes, snowmobiles) but does not include sales of fuel for aviation.

Why this is Important: Minnesota's total gasoline and diesel consumption is a strong indicator of how much air pollution the transportation system is emitting in a given year. Air pollution can cause breathing problems and contribute to other health conditions, especially in the young and elderly.

Target	Result (2012)	Multi-year Trend
Tracking Indicator	3.07 billion gallons	Stable (2009-2012)

Total gallons of fuel sold for transportation purposes (in billions)



Source: MnDOT Office of Financial Management, MN Department of Revenue

Minnesota transportation fuel consumption rose slightly in 2012 but is still below its 2004 peak. Although the initial decrease was largely caused by poor economic conditions, increased fuel efficiency and changing travel behavior have maintained fuel use near 2009 levels throughout the economic recovery.

For Comparison

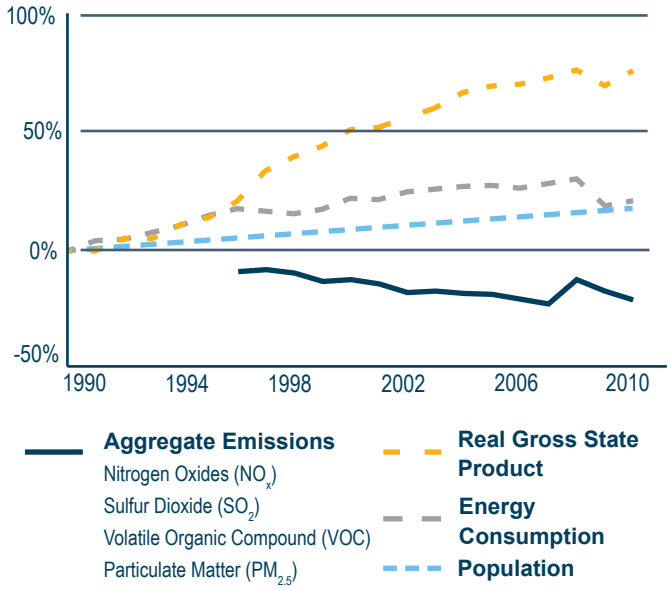
In 2012, the transportation sector in Minnesota ranked 21st out of 50 states in per capita gasoline use, according to MnDOT analysis of data from the U.S. Energy Information Administration and the U.S. Census.

Progress

Air Quality

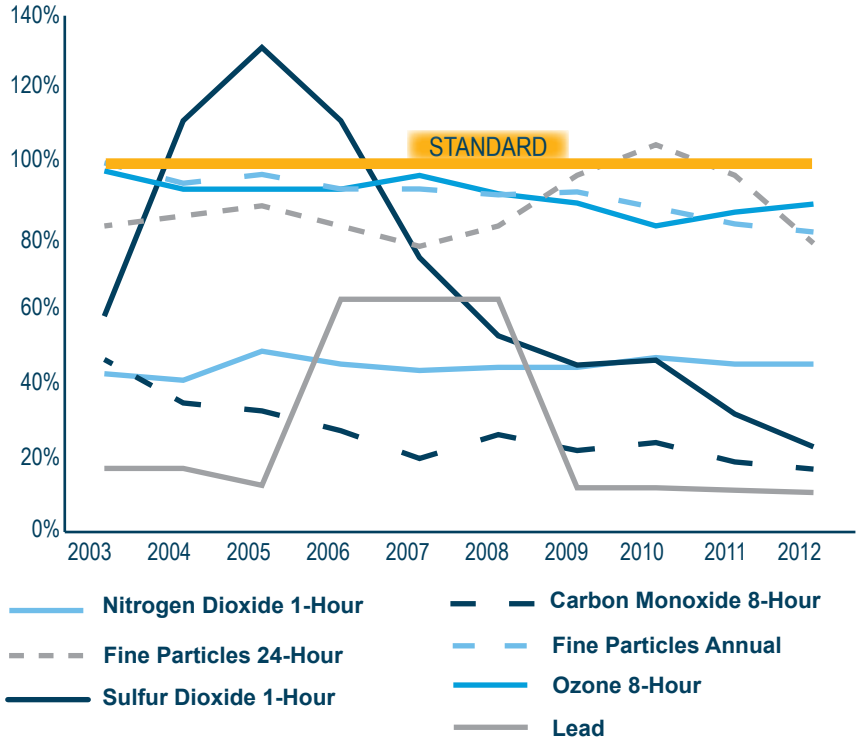
Air quality in Minnesota is generally good and improving. Statewide, annual aggregate pollutant emissions fell significantly since 1990 despite growth in population, overall energy consumption and economic activity. In the Twin Cities, emissions were below national ambient air quality standards (NAAQS) five of the last six years. The exception occurred in 2010 when daily emissions of particulate matter 2.5 reached a 10-year high. Other emissions subject to EPA criteria have either remained at 2003 levels or declined. Two notable cases are sulfur dioxide and carbon monoxide (CO). Sulfur dioxide emissions plummeted in 2005 following the nationwide phase-in of low-sulfur gasoline. Carbon monoxide, another pollutant emitted by motor vehicles, also decreased substantially, from about half of the national standard in 2003 to less than 25 percent in 2012.

Comparison of growth areas and emissions in Minnesota — percent change since 1990



Source: Minnesota Pollution Control Agency; Air Quality in Minnesota — 2013 Report to the Legislature

Twin Cities Metropolitan Area air quality — percent of national standard



Source: Minnesota Pollution Control Agency

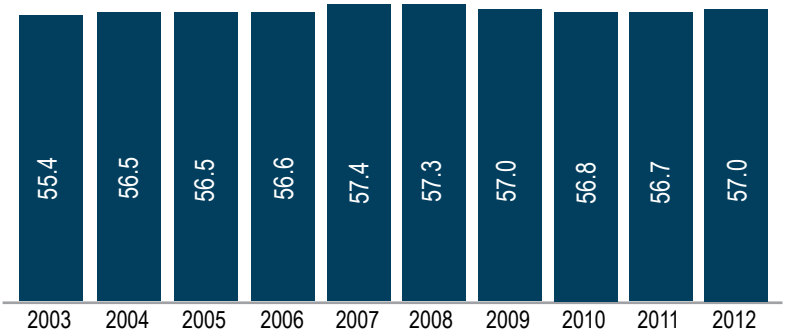
A prominent consideration related to transportation and pollutant emissions is the Congestion Mitigation and Air Quality program. The CMAQ program provides federal funding for projects that reduce or mitigate traffic congestion in metropolitan areas that do not meet air quality standards. The Twin Cities is a CO limited maintenance area, which means that every transportation plan and program in the metro area must be analyzed using EPA criteria to ensure that it will not lead to unacceptably high emissions of CO.

Greenhouse Gas Emissions

The 2007 Minnesota Next Generation Energy Act (Minnesota Laws, 2007, Chapter 136) established greenhouse gas reduction goals of 15 percent by 2015, 30 percent by 2025 and 80 percent by 2050 compared with 2005 levels. These goals apply to all sectors of the economy and levels of government. According to the Minnesota Pollution Control Agency's Air Quality in Minnesota report, transportation is responsible for about 25 percent of the state's greenhouse gas emissions. Reducing gasoline and diesel consumption along with other strategies can help the state achieve these goals.

In 2010, the last year for which data is available, greenhouse gas emissions in Minnesota were about 5 percent below 2005 levels, or about a third of the way to meeting the statutory 2015 goal. The MPCA attributes much of this progress to the reduction in transportation fuel use. In conjunction with increasing fuel efficiency, fuel use is being driven down by lack of growth in the total number of miles traveled on Minnesota roadways each year.

Vehicle Miles Traveled in Minnesota; 2003-2012 (in billions)



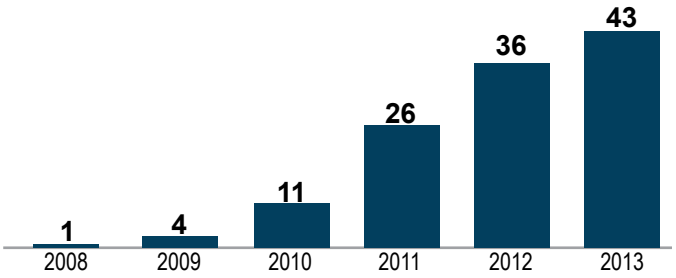
Source: MnDOT Office of Transportation System Management; Data pulled from Transportation Information System

Complete Streets

MnDOT adopted a Complete Streets policy in 2013. Minn. Stat. Sec. 174.75 defines complete streets as the planning, scoping, design, implementation, operation and maintenance of roads in order to reasonably address the safety and accessibility needs of all users. Consistent with this definition, MnDOT's Complete Streets policy directs the agency to consider the needs of motorists, pedestrians, transit users and vehicles, bicyclists, and commercial and emergency vehicles moving along and across roads as part of every project on the state highway system. Implementation of this policy is guided by a technical memorandum that outlines procedures and responsibilities for documenting and reviewing project-level decisions. In the future, the technical memo further requires MnDOT to develop process indicators and performance measures to track success toward Complete Streets goals.

Off the state highway system, MnDOT is working with cities, counties and metropolitan planning organizations to take advantage of Complete Streets opportunities on local roadways. For local agencies interested in developing their own Complete Streets policies and approaches, MnDOT and the Local Road Research Board partnered in funding development of a "Complete Streets Implementation Resource Guide for Minnesota Local Agencies" and a research study and report entitled "Complete Streets from Policy to Project: The Planning and Implementation of Complete Streets at Multiple Scales". These research efforts and resource guides, along with workshops, webinars and other forms of Complete Streets training, helped the number of local jurisdictions with adopted Complete Streets policies increase from 1 in 2008 to 43 as of August 2013.

Number of jurisdictions with an adopted complete streets policy



Source: MnDOT Office of Transportation System Management

Complete Streets Goals

- Minimize fatalities and injuries involving transportation users
- Provide transportation facilities and services that increase access for all persons and businesses
- Ensure economic well-being and quality of life without undue burden placed on any community
- Ensure that the planning and implementation of all modes of transportation are consistent with the environmental and energy goals of the state
- Increase use of transit as a percentage of all trips statewide by giving highest priority to the transportation modes with the greatest people moving capacity and lowest long-term economic and environmental cost
- Promote and increase bicycling and walking as a percentage of all trips as energy-efficient, nonpolluting, and healthy forms of transportation

Source: Minn. Stat. Sec. 174.01

What's being done

Capital Investment and Operational Strategies

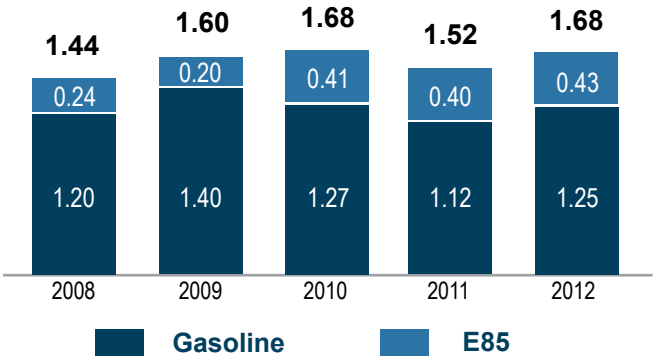
While MnDOT does not have any authority over individual travel choices or local land use decisions, it does plan, facilitate and promote the use of transportation alternatives. This includes the construction and operation of managed lanes, ramp meter bypasses, bus shoulders and other strategies that give transit and carpools an advantage over single occupancy vehicles. MnDOT also supports non-motorized travel by constructing bicycle and pedestrian facilities along urban highways and by coordinating education and bicycle planning efforts with transportation stakeholders, including the Share the Road campaign.

The 2014-2017 State Transportation Improvement Program includes $107 million in Congestion Mitigation and Air Quality funding. This funding supports projects that decrease emissions in the Twin Cities by reducing vehicle delay and the time spent idling. Typical CMAQ projects include signal coordination, spot mobility improvements, bus purchases, and park and ride facility construction. MnDOT also reduces emissions by maintaining highways in good structural condition. At a given speed, a vehicle traveling over smooth roads burns less fuel than the same vehicle traveling on a bumpy road.

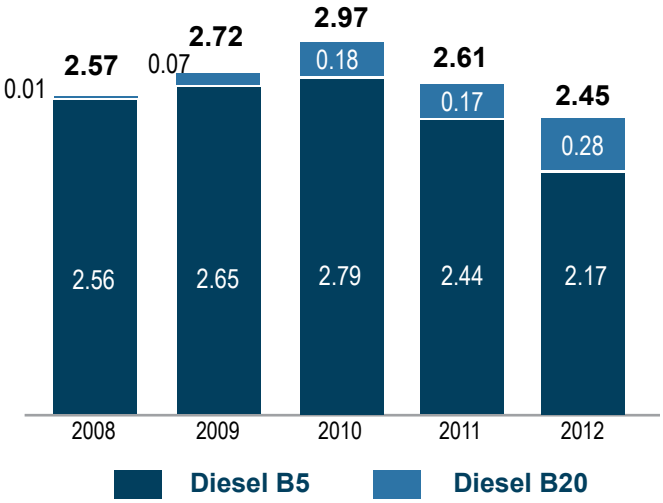
Additional efforts to reduce emissions involve broad participation by the traveling public, the private sector and public agencies. MPCA has several initiatives related to mitigating transportation's impact on air quality. These include the Drive Electric Minnesota partnership, which includes businesses, governments and utilities and promotes the use of electric vehicles in Minnesota and the installation of charging stations. Another initiative retrofits older diesel trucks and buses with improved emission controls.

Within its own fleet, MnDOT is increasing the use of cleaner fuels, vehicle retrofitting, and other strategies that reduce emissions and improve energy efficiency. MnDOT's annual use of E85 has increased from 29 gallons in 2002 to more than 400,000 gallons in 2012. Use of B20 biodiesel has followed a similar trend, from 1,260 gallons in 2007 to 284,000 gallons in 2012. MnDOT has 1,626 light-duty vehicles in its fleet. Of these 1,064, or 65 percent, are flex-fuel and can run on ethanol blends of up to 85 percent. In addition, 37 light-duty vehicles are diesel and 26 are hybrid electric units.

MnDOT fleet gasoline use; 2008-12 (millions of gallons)



MnDOT fleet diesel use; 2008-12 (millions of gallons)



Source: MnDOT Office of Maintenance; Fleet Management Section. Bar graphs show calendar years

Context Sensitive Solutions

A transportation system that respects and complements its natural, cultural and social surroundings must consider context at each stage of the project development process, from the establishment of purpose and need to facility design and construction. Considering context has many benefits, including greater stakeholder involvement and support, stronger connections between state and local networks, more integrated land uses, and more partnerships and development opportunities.

MnDOT has embraced the importance of context through its Context Sensitive Solutions initiative. CSS is a collaborative, interdisciplinary approach that involves all stakeholders in providing transportation facilities that fit their settings. CSS uses robust public involvement to identify and resolve problems before they cause costly conflicts or delays. CSS also relies on innovation and flexible decision-making to balance transportation objectives (safety, mobility, infrastructure condition) with the preservation and enhancement of community and environmental resources.

CSS performance measures are not yet in place, but a range of potential quantitative and qualitative metrics have been identified. Quantitative examples include measures of project delivery (number for projects delivered on time and on budget), liability (number and cost of legal actions), environmental stewardship (increased or enhanced mitigation beyond regulatory mandates), and collaboration (number of memorandum of agreements established with local partners). Surveys and other qualitative assessments represent potential measures of stakeholder engagement and community satisfaction.

Learn More

Minnesota Petroleum Taxes Annual Report
www.revenue.state.mn.us/businesses/petroleum/Pages/Tax-Information.aspx

MnDOT Traffic Volume Reports
www.dot.state.mn.us/traffic/data

MnDOT Office of Transportation System Management
www.dot.state.mn.us/planning/program/index.html Mark Nelson – mark.b.nelson@state.mn.us

Air Quality in Minnesota – 2013 Report to the Legislature
www.pca.state.mn.us

MnDOT Office of Environmental Stewardship
www.dot.state.mn.us/environment
Marilyn Jordahl-Larson — marilyn.jordahl@state.mn.us

Context Sensitive Solutions
www.cts.umn.edu/contextsensitive/workshops/
Scott Bradley – scott.bradley@state.mn.us

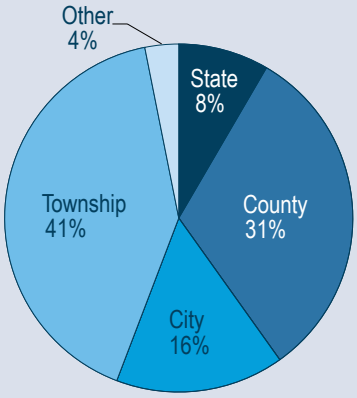
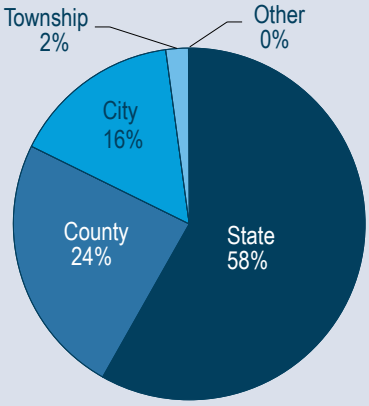
Complete Streets Policy Statement, Technical Memorandum and Resource Guide
www.dot.state.mn.us/planning/completestreets/index.html
Mark Nelson – mark.b.nelson@state.mn.us

Measure explanations and system definitions

Measure	Explanation	System Definition
ACCOUNTABILITY, TRANSPARENCY & COMMUNICATION		
Public Trust: % of survey respondents agreeing with the statement "MnDOT can be relied upon to deliver Minnesota's transportation system"	Once a year MnDOT conducts a survey to measure public attitudes about MnDOT and MnDOT-provided services. Since 2009, this survey has included questions assessing public trust. Respondents are asked to indicate their level of agreement with a small number of statements. In the case of "Delivering the Transportation System," survey respondents are asked if they agree with the statement "MnDOT can be relied upon to deliver Minnesota's transportation system."	Minnesota adult residents. Results are based on 800 telephone interviews. Survey participants are identified through random, statistically valid sampling techniques. Geographic quotas are enforced so that the sample population is representative of the state as a whole. The sample is large enough to produce estimates that are +/- 5% of the actual population data 95% of the time.
TRAVELER SAFETY		
Minnesota Traffic Fatalities: Total number of fatalities resulting from crashes involving a motor vehicle	This measure relies on crash reports provided to the Minnesota Department of Public Safety by local law enforcement agencies. By state law, information on traffic crashes must be reported to DPS if the crashes result in at least $1,000 in property damage, or a motor vehicle occupant, pedestrian, or bicyclist is injured or killed.	All state and local roads in Minnesota (141,000 miles).
ASSET MANAGEMENT		
Ride Quality: Share of system with "Poor" ride quality in the travel lane	Ride quality is assessed using MnDOT's Ride Quality Index, which is a measure of pavement smoothness as perceived by the typical driver. Pavement rated "Poor" can still be driven on, but the ride is sufficiently rough that most people would find it uncomfortable and may decrease their speed.	MnDOT measures ride quality on the Interstate system, the non-Interstate National Highway System (NHS), and on all state highways.
Bridge Condition: NHS bridges in "Poor" condition as a percent of total NHS bridge deck area	Bridge condition is calculated from the results of inspections performed at least every two years on all state highway bridges. The ratings combine deck, superstructure and substructure evaluations. Bridges rated "Poor" (also termed Structurally Deficient) are safe to drive on but are reaching the point where it is necessary to either replace the bridge or extend its service life through significant investment.	National Highway System bridges more than 20 feet (3,626 bridges). These bridges comprise 85% of all state highway bridges, measured by deck area.
STATE HIGHWAY OPERATIONS		
Twin Cities Urban Freeway Congestion: % of metro-area freeway miles below 45 mph in AM or PM peak	MnDOT defines congestion as traffic flowing at speeds less than 45 mph. At 45 mph, most vehicles will brake in a traffic stream, resulting in stop-and-go traffic.	379 miles of Twin Cities area freeway
Interregional Corridor (IRC) Travel Speed: % of system miles performing more than 2 mph below corridor-level speed targets	Each IRC has a targeted speed that a traveler should be able to average (55, 60 or 65 mph) over a corridor length trip. MnDOT compares these targets to estimates of actual travel speed that are based on a corridor's volume, congestion, and number of stops.	2,580 miles of state highway designated as IRC.
Snow and Ice Control: Frequency of achieving bare lanes within targeted number of hours	Each state highway has a targeted number of hours for clearing snow and ice after a winter event. This measure tracks the frequency with which MnDOT achieves these highway-specific targets over an entire winter season.	All state highways (approximately 30,000 lane miles)

Measure	Explanation	System Definition
FREIGHT		
Freight Mode Share: Total domestic shipments to, from or between Minnesota locations	This measure was developed using the Federal Highway Administration's Freight Analysis Framework. The FAF is a compilation of products that provide estimates of freight shipped to, from and within the United States. The current version of the FAF uses origin and destination information from the 2007 Commodity Flow Survey as a basis for state-by-state estimates of shipment value, tonnage and ton miles. More recent estimates reflect provisional updates of the 2007 data. The most recent provisional update, reflected in this report, was made for the year 2011.	All domestic freight shipments originating or terminating in Minnesota. Domestic shipments include trips between domestic locations or between a domestic location and a port of entry. Freight shipments from a port of entry (e.g. Duluth) to an international location or vice versa are not captured here. "Through" shipments (in which origin and destination are outside Minnesota) are also excluded.
AIR TRANSPORTATION		
Available Seat Miles: Number of available seat miles offered on scheduled service nonstop flights from Minneapolis-St. Paul International Airport	Comparable to vehicle miles traveled, one available seat mile (ASM) is defined as one aircraft seat flown a distance of one mile. Three variables influence ASM totals: service frequency, aircraft capacity and flight distance.	Scheduled service nonstop flights out of Minneapolis-St. Paul International Airport.
TRANSIT		
Transit Ridership in Greater Minnesota: Annual boardings recorded by public transit providers serving Greater Minnesota counties	Greater Minnesota transit ridership is measured by the annual number of boardings recorded by Greater Minnesota transit providers. These boardings occur on different types of transit service, ranging from fixed route service in urban areas to route deviation or dial-a-ride service in small urban and rural settings.	53 public transit systems serving 79 counties.
Rail and Express Service Bus Ridership in the Twin Cities: Annual boardings on commuter rail, light rail transit, and express service buses	Rail and express transit ridership is a measure of the total number of boardings recorded on commuter rail, light rail transit, and express service bus routes serving the Twin Cities. Express service buses run on highways and are typically designed for commuter travel.	Includes transitways and supporting infrastructure. Transitways are corridors where a dedicated lane or other feature allows transit to move more quickly or reliably than personal vehicles. Transit features on highways that support express service buses include bus-only shoulders, exclusive busways, HOV/HOT lanes, and meter bypasses.
BICYCLING		
Frequency of Bicycling: % of survey respondents who bicycled at least once a week during the bicycling season (April - October)	Once a year MnDOT conducts an omnibus survey that measures public attitudes about MnDOT and various MnDOT services. Since 2008, this survey has included a question asking survey participants how often they rode a bicycle during the last bicycling season (April through October). Answer options are everyday, once a week, a few times/once a month, one time, or never.	Minnesota adult residents. Results are based on 800 telephone interviews. Survey participants are identified through random, statistically valid sampling techniques. Geographic quotas are enforced so that the sample population is representative of the state as a whole. The sample is large enough to produce estimates that are +/- 5% of the actual population data 95% of the time.
PEDESTRIAN ACCESSIBILITY		
Americans with Disabilities Act Compliance: State highway sidewalk miles that are not compliant with ADA requirements	MnDOT recently developed a sidewalk inventory that includes data on sidewalk slope, condition and width. A sidewalk segment is deemed to be non-compliant with ADA standards if it is in "Poor" structural condition, has a greater than 2% cross slope, or is narrower than 4 feet. The term "Poor" is applied to sidewalks with a condition rating of 3 (sidewalk has vertical discontinuities > 1/2 inch) or 4 (sidewalk is crumbling or has many cracks).	Sidewalks in state highway right-of-away (approximately 600 miles of sidewalk).
TRANSPORTATION IN CONTEXT		
Fuel Consumption: Total gallons of fuel sold for transportation purposes	All taxable sales of gasoline and diesel fuel in Minnesota. To be consistent with other reports, this measure includes sales of gasoline and diesel for off-road use (for boats, ATVs, dirt bikes, snowmobiles) but does not include sales of fuel for aviation.	

Transportation Systems in Minnesota

	System	Extent	Ownership	Funding source	MnDOT role
Streets, roads and highways	State Trunk Highways	11,847 miles	By share of centerline miles:  By share of vehicle-miles traveled: 	State fuel tax, motor vehicle sales tax, registration fees, federal funds	Construction, operation, maintenance, management
	County State Aid Highways (CSAH)	30,591 miles		State fuel tax, motor vehicle sales tax, registration fees, federal funds, local funds	Coordination of projects that impact state trunk highways, administration of state and federal funding (68% of county roads are eligible for state aid funds)
	Other County Roads	14,367 miles			
	Municipal State Aid Streets (MSAS)	3,427 miles		State fuel tax, motor vehicle sales tax, registration fees, federal funds, local funds	Coordination of projects that impact state trunk highways, administration of state and federal funding (15% of city streets are eligible for state aid funds)
	Other City Streets	18,946 miles			
	Township	58,597 miles		State and local funds	Coordination of projects that impact state trunk highways
	Other	5,202 miles			
	Total	142,977 miles			
Transit	Twin Cities area	214 bus routes, 1 light rail route, 1 commuter rail line	Metro Transit, Suburban Transit Providers and contracted operators on public right of way	Federal funds, state general funds, MVST, local funds, fares	Construct and maintain transit infrastructure
	Greater Minnesota	53 public transit systems serving 79 of 80 counties	City and county transit authorities		Planning and administration of funding
Rail	Freight	4,458 track-miles	20 railroads operate and own track: 4 Class I (82% of network), 14 Class III (16%) and 2 private (1%)	Private funds for operations, state and private funds for track	Planning and policy, support for infrastructure improvements
	Passenger Rail	Amtrak Empire Builder (Chicago to Seattle)	Federally operated on privately owned track	Federal funds, fares	Planning, policy, research, federal and state program administration
Air	Passenger and cargo	135 airports, 8 with commercial service	Metropolitan Airport Commission owns 9 metro airports; others are owned by Greater Minnesota cities and counties	Aircraft registration tax, airline flight property tax, aviation fuel tax, federal funds	Airport development, planning, research, navigational systems
Waterways	Great Lakes	Four ports on Lake Superior	Local port authorities and private companies provide port operations. Channels (9 ft. draft on rivers, 29 ft. on Great Lakes) are maintained by the U.S. Army Corps of Engineers.	Local port authority receipts, state general funds, federal funds	Planning and policy, support for infrastructure improvements
	Rivers	Five ports on 222 miles of the Mississippi River system			