



REPORT CARD FOR  
**MINNESOTA'S**  
INFRASTRUCTURE



[INFRASTRUCTUREREPORTCARD.ORG/MINNESOTA](https://infrastructurereportcard.org/minnesota)

## ABOUT ASCE— Minnesota

The American Society of Civil Engineers' 1,700 Minnesota members work in all levels of government, academia, and the private sector to design, construct, and maintain Minnesota's infrastructure. We uphold the vision of civil engineers as active community members and stewards of our infrastructure. We bring value to our members by providing technical and informative meetings that promote professional development. In addition to scholarships, mentorship, and K-12 education, our outreach programs offer networking opportunities for students and professionals throughout the state.

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# 2026 REPORT CARD

## FOR MINNESOTA'S INFRASTRUCTURE

### Executive Summary

Minnesota's infrastructure forms the backbone of our economy, public health, and daily life. It connects people to jobs and schools, delivers safe drinking water, powers homes and businesses, protects natural resources, and supports recreation and trade. From roads, bridges, transit, and airports to water and wastewater systems, dams, ports, parks, and energy networks, these essential assets enable communities across the state to function, grow, and prosper.

Recent investments demonstrate that sustained funding makes a difference. Strategic spending has helped stabilize conditions in several core systems while advancing modernization and resilience. The historic \$2.6 billion bonding bill passed by the 2023 Minnesota Legislature was a clear win for our state's infrastructure, providing much needed relief for things like wastewater treatment, roads and bridge projects. In the Land of 10,000 Lakes, water infrastructure in particular plays a critical role: protecting public health, supporting industry and agriculture, enabling recreation, and connecting Minnesota to national and global markets. These investments are yielding tangible benefits, strengthening performance, and extending the useful life of key assets.

Despite this progress, significant challenges remain. Much of Minnesota's infrastructure is aging, with many systems slipping from "good" to "fair" condition—where repair costs escalate and the risk of failure increases. More frequent and intense weather events are accelerating wear and tear, while population growth, economic activity, and new energy demands place added strain on systems designed for a different era. The two bonding bills passed in the last five years, the most recent of which was in the millions of dollars, have not kept up with the billions of dollars in growing project backlog. Without stable funding sources, infrastructure owners face increasing threats to reliability, affordability, and long-term economic competitiveness.

Sustained and strategic investment in preservation, resilience, and modernization is the most cost-effective path forward. Continued progress will require strong public engagement, thoughtful policy, and long-term commitment to funding solutions that prioritize equity and performance. By building on recent successes and addressing emerging risks head-on, Minnesota can ensure its infrastructure continues to support a high quality of life, now and for generations to come.

# Recommendations to Raise the Grade



**1 SECURE DEDICATED, SUSTAINABLE FUNDING:** Create or expand reliable, long-term funding mechanisms across sectors—including dedicated bonding, revolving funds, and user-fees—guided by statewide performance, resilience, and life-cycle goals with accountability for tangible progress. Align legislative priorities, capital planning, and permitting so agencies can strategically address capital and maintenance backlogs. Bolster programs focused on small and disadvantaged communities, and ensure utility rates reflect true costs of service.



**2 STREAMLINE PROCESSES AND FOSTER INNOVATION:** Update and enforce design, safety, and reporting requirements—such as inundation mapping for high- and significant-hazard dams, performance metrics for roads and bridges, and modernized energy codes and standards—while streamlining decision-making through collaboration among municipalities, regulators, and the private sector. Reduce costs and improve outcomes through promoting and investing in innovative practices, alternative delivery methods, and advanced technologies such as distributed energy resources (DERs), microgrids, advanced conductors, and smart transit systems.



**3 SUPPORT COMPREHENSIVE ASSET MANAGEMENT:** Increase financial support to implement statewide asset management standards. Require regular inspections, condition assessments, and performance reporting for all critical infrastructure. Use life cycle analysis and corridor risk assessments to inform investment planning and legislative reporting. Develop long-term project planning tools that address data gaps and infrastructure preservation. Provide legislative oversight in collaboration with industry, professional associations, and academic institutions to ensure compliance.



**4 EMBED RESILIENCE INTO ALL INFRASTRUCTURE DECISIONS:** Require that planning, design, and funding criteria for critical infrastructure include asset management, resilient design standards, diversified energy sources, and systems sized and managed for future conditions, with design criteria updated as risks change. Tie resilience metrics to state funded project scoring. Pair with coordinated leadership, incentivization grants, and technical assistance so owners can realistically protect public safety, the environment, infrastructure performance, and resilience statewide.



**5 INVEST IN WORKFORCE AND PUBLIC ENGAGEMENT:** Expand training programs, improve wages and working conditions, and actively educate the public about infrastructure careers. Strengthen engagement through clear, accessible communication through multilingual outreach, equity-focused engagement, and transparent discussions of tradeoffs. Education about the critical role infrastructure plays in public health, environmental protection, and quality of life, along with the costs, risks, and limitations of infrastructure, is essential to building informed public support.

## About the Report Card for Minnesota's Infrastructure

Every four years, America's civil engineers provide a comprehensive assessment of the nation's 18 major infrastructure categories in ASCE's *Report Card for America's Infrastructure*. Using a simple A to F school report card format, the Report Card provides a summary of current infrastructure conditions and needs, assigning grades and making recommendations to raise them.

The ASCE Committee on America's Infrastructure is made up of 52 dedicated civil engineers and infrastructure professionals from across the country, with decades of expertise in all categories, who volunteer their time to work with ASCE Infrastructure Initiatives staff to prepare the Report Card. The Committee assesses all relevant data and reports, consults with technical and industry experts, and assigns grades using the following criteria:

### Methodology

#### **CAPACITY**

Does the infrastructure's capacity meet current and future demands?

#### **CONDITION**

What is the infrastructure's existing and near-future physical condition?

#### **FUNDING**

What is the current level of funding from all levels of government for the infrastructure category as compared to the estimated funding need?

#### **FUTURE NEED**

What is the cost to improve the infrastructure? Will future funding prospects address the need?

#### **OPERATION AND MAINTENANCE**

What is the owners' ability to operate and maintain the infrastructure properly? Is the infrastructure in compliance with government regulations?

#### **PUBLIC SAFETY**

To what extent is the public's safety jeopardized by the condition of the infrastructure and what could be the consequences of failure?

#### **RESILIENCE**

What is the infrastructure system's capability to prevent or protect against significant multi-hazard threats and incidents? How able is it to quickly recover and reconstitute critical services with minimum consequences to public safety and health, the economy, and national security?

#### **INNOVATION**

What new and innovative techniques, materials, technologies, and delivery methods are being implemented to improve the infrastructure?

## Grading Scale



### **EXCEPTIONAL: FIT FOR THE FUTURE**

The infrastructure in the system or network is generally in excellent condition, typically new or recently rehabilitated, and meets capacity needs for the future. A few elements show signs of general deterioration that require attention. Facilities meet modern standards for functionality and are resilient to withstand most disasters and severe weather events.



### **GOOD: ADEQUATE FOR NOW**

The infrastructure in the system or network is in good to excellent condition; some elements show signs of general deterioration that require attention. A few elements exhibit significant deficiencies. Safe and reliable with minimal capacity issues and minimal risk.



### **MEDIOCRE: REQUIRES ATTENTION**

The infrastructure in the system or network is in fair to good condition; it shows general signs of deterioration and requires attention. Some elements exhibit significant deficiencies in conditions and functionality, with increasing vulnerability to risk.



### **POOR: AT RISK**

The infrastructure is in poor to fair condition and mostly below standard, with many elements approaching the end of their service life. A large portion of the system exhibits significant deterioration. Condition and capacity are of significant concern with strong risk of failure.



### **FAILING/CRITICAL: UNFIT FOR PURPOSE**

The infrastructure in the system is in unacceptable condition with widespread advanced signs of deterioration. Many of the components of the system exhibit signs of imminent failure.

# The 2026 Report Card for Minnesota's Infrastructure

## NOTES ABOUT THE GRADES

Across Minnesota, aging infrastructure, limited funding, and years of deferred maintenance continue to place significant strain on the systems that previous generations built and that today's communities depend on. The analysis and grades presented in this Report Card are intended to help the public, policymakers, and local leaders better understand the importance of sustained, long-term investment; the value of proactive planning; and the need to prepare for future challenges related to growth, economic development, and resilience.

**The grades reflect the condition and performance of the infrastructure systems themselves, not the dedication of the many local, state, and federal professionals who work hard every day to operate, maintain, and improve these systems despite constrained resources.** This Report Card is designed to provide a clear and objective snapshot of current conditions and to serve as a tool that agencies and decision-makers can use to advocate for the funding and support necessary to keep Minnesota's infrastructure safe, reliable, and resilient for years to come.



**B-**  
Aviation



**C+**  
Bridges



**C**  
Dams



**C-**  
Drinking  
Water



**C+**  
Energy



**C**  
Ports



**B-**  
Public  
Parks



**D+**  
Roads



**C**  
Stormwater



**C**  
Transit



**C**  
Wastewater



**OVERALL  
GPA**

# Aviation



Photo: Deicing of airplane before flight; By Chalabala

GRADE  
COMPARISON

MN: B-  
Nat'l: D+



# AVIATION

## EXECUTIVE SUMMARY

Minnesota's aviation system is a statewide network of 132 publicly owned, public use airports, serving communities of all sizes and supporting essential transportation, economic activity, and public services. Managed by Minnesota Department of Transportation (MnDOT) Aeronautics, the system relies on coordinated federal, state, and local funding to maintain safe, reliable infrastructure. Airports across Minnesota support passenger travel, business aviation, emergency medical transport, agricultural operations, flight training, and air cargo. Activity levels continue to recover statewide, with commercial airports and general aviation facilities playing a vital role in connecting rural and urban areas.

MnDOT's Airport Capital Improvement Plan guides investments in runways, taxiways, lighting, navigational aids, terminals, and snow removal equipment, ensuring longterm system resilience and equitable geographic access. Despite strong performance, Minnesota faces a significant infrastructure funding gap as needs outpace available resources. Strengthening statewide asset management practices, modernizing funding tools, and supporting innovation in sustainability and safety will be essential to preserving safe, reliable, and accessible air service for communities across Minnesota.

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## BACKGROUND

Minnesota's aviation system is managed by the Minnesota Department of Transportation's (MnDOT's) Office of Aeronautics, which oversees safety, planning, and funding for the state's airports. The system includes 132 publicly owned, public use airports, ranging from Minneapolis–Saint Paul International Airport (MSP) to smaller general aviation airports across the state.

Of these, 96 airports are part of the Federal Aviation Administration's (FAA) National Plan of Integrated Airport Systems (NPIAS), making them eligible for federal funding. Airports are owned and operated by local cities, counties, or airport authorities, while MSP and six reliever airports are run by the Metropolitan Airports Commission (MAC).

## CONDITION AND CAPACITY

Minnesota’s aviation system includes 132 public use airports, nine of which provide commercial passenger service. Statewide, commercial flight activity totals approximately 400,000 to 450,000 operations annually, when combining activity at Minneapolis–St. Paul International Airport (MSP), other commercial service airports, and regularly scheduled charter and air taxi flights, based on FAA records and annual activity reports submitted by airports.

At MSP, activity rebounded strongly in 2023, increasing from approximately 14.9 million enplanements and 310,235 operations in 2022 to 16.9 million enplanements, 33.7 million total passengers, and 323,929 total operations, reflecting continued recovery and growth across both MSP and Minnesota’s other commercial service airports.

Greater Minnesota commercial airports—Duluth (DLH), Rochester (RST), St. Cloud (STC), Bemidji (BJI), Brainerd (BRD), Hibbing (HIB), International Falls (INL), and Thief River Falls (TVF)—collectively contribute roughly 350,000–450,000 annual enplanements, supporting business travel, healthcare connectivity, and regional economic activity.

The aviation system infrastructure is guided by MnDOT’s Airport Capital Improvement Plan (ACIP), developed strategically through planning aligned with the Minnesota State Aviation System Plan (MnSASP). The ACIP prioritizes projects that enhance the National Airspace System (NAS) based on safety, capacity, and sustainability, and includes a rolling 5-year program updated annually.

Key takeaways from the ACIP reflect the most pressing and consistently identified infrastructure needs across Minnesota’s airport system:

- Runway and taxiway rehabilitation and safety improvements
- Lighting and navigational aid (NAVAID) upgrades to maintain reliable allweather operations
- Terminal modernization to improve passenger experience and operational efficiency
- Snow removal equipment improvements to ensure safe and continuous winter operations

Capacity improvements are central to the ACIP, addressing population growth and ensuring geographic equity. Major projects typically span 1–5 years, with high-priority safety and preservation projects scheduled earliest. MnSASP evaluates system accessibility to maintain the goal that 95% of Minnesota’s population remains within 60 minutes of a paved, lighted runway. Targeted investments in General Aviation (GA) airports and reliever facilities improve access in underserved regions.

Large airports such as MSP face recurring landside congestion during peak hours. Examples include terminal curbside backups, elevated roadway crowding, and parking-ramp demand near capacity on peak days. Airside capacity is managed through runway utilization strategies and FAA Performance-Based Navigation (PBN), but terminal modernization and roadway expansions remain key pinch-point solutions.

Airport Master Plans and capacity evaluations are in place for all NPIAS airports. These plans forecast demand and guide phased enhancements. For example, Duluth International Airport’s 20-year master plan includes taxiway realignment to reduce runway crossings, terminal right-sizing for future growth, and an Air Traffic Control Tower (ATCT).

NextGen implementation has significantly shaped Minnesota aviation. RNAV/RNP procedures, ADS-B compliance, and Data Comm have improved routing efficiency, reduced delays, and strengthened safety. MSP benefits from optimized arrival and departure flows, while GA airports leverage ADS-B for enhanced situational awareness.

Pavement conditions are monitored using the Pavement Condition Index (PCI) for 103 paved airports statewide. Minnesota aims to keep less than 4% of pavements in “poor” condition and met this target with 3.7% in 2022. Updated 2025 pavement condition data is available through MnDOT’s AIRView GIS platform, though these have not been finalized and statewide summary statistics will be published as MnDOT finalizes system-wide reporting.

Beyond pavements, MnSASP highlights needs associated with terminal age, fencing, lighting, and navigational aids. Many GA terminals exceed 40 years and require modernization. Airfield lighting is being converted to LED,

NAVAIDs are updated to maintain FAA photometric standards, and obstruction removal and wildlife fencing continue as high-priority safety measures.

## Economic Impact

Aviation is a foundational contributor to Minnesota's economy, supporting key industries and enabling statewide connectivity. Economic impact provides essential context for understanding why sustained investment in airport infrastructure matters.

According to MnDOT's statewide airport economic impact study, civil aviation generates approximately \$18.2 billion in annual economic output, supports nearly 94,000 jobs, and provides \$4.4 billion in payroll. These figures illustrate the scale of aviation's contribution to statewide competitiveness and economic mobility.

General aviation alone contributes roughly \$418 million annually and sustains about 3,600 jobs across Minnesota. GA supports business travel, emergency medical transport, aerial firefighting, agricultural operations, and flight training—services especially vital to rural and smaller communities without scheduled airline service.

## OPERATION AND MAINTENANCE

Operation and maintenance (O&M) planning across Minnesota's aviation system focuses on keeping airport infrastructure safe, reliable, and compliant with FAA standards. MnDOT Aeronautics maintains a statewide pavement and asset management program, supported by the MnSASP Hub, a centralized tool that tracks pavement condition, lighting systems, airspace protection surfaces (also referred to as clear zones, RPZs, and Part 77 surfaces), and navigational aids. These datasets help airport sponsors understand infrastructure condition and plan preservation activities in accessible, non-technical terms.

Systemwide pavement inspections occur on a three-year cycle. Regular maintenance—such as crack sealing, joint repairs, seal coats, and mill-and-overlay work—slows deterioration and extends pavement life. This is especially critical in Minnesota, where freeze-thaw cycles and harsh winters accelerate pavement breakdown. The importance of maintaining pavement integrity also relates to FAA runway length eligibility criteria,

Air cargo also plays a critical role in Minnesota's economy, with most activity centered at MSP and supported by select airports. During the COVID-19 pandemic, cargo tonnage surged sharply due to e-commerce growth—rising more than 15% at MSP between 2020 and 2021—before normalizing below 2019 levels in 2023–2024. This volatility highlights the need for adaptable freight facilities, flexible apron design, and landside routing that can scale with demand without disrupting passenger activity.

Beyond direct revenue and employment, aviation enables tourism, corporate investment, and just-in-time logistics that underpin Minnesota's strengths in healthcare, manufacturing, agriculture, and technology. Reliable air service shortens travel times, expands market access, and attracts businesses that depend on rapid regional and global connectivity.

This economic context underscores the importance of maintaining safe, modern, and well-funded airport infrastructure across Minnesota's 132 public airports.

which are based on dry-runway performance. For cold-weather airports such as Thief River Falls (TVF), winter conditions can significantly reduce effective runway length, underscoring why pavement preservation and safe surface conditions are essential for year-round operations.

The Metropolitan Airports Commission (MAC)—which owns and operates MSP and six reliever general aviation airports (Airlake, Anoka County–Blaine, Crystal, Flying Cloud, Lake Elmo, and St. Paul Downtown)—uses enterprise asset management systems to schedule and budget for replacement of critical airfield systems. These include lighting, signage, pavement markings, and surface-detection technologies, as well as snow removal equipment (SRE). Proactive replacement ensures operational reliability during peak winter periods and supports compliance with FAA safety requirements.

Smaller general aviation airports face unique challenges, as many rely heavily on state capital grants

and local matching funds to maintain pavements, safety areas, lighting systems, and perimeter fencing. Rising construction and labor costs have outpaced growth in federal funding levels, placing pressure on local budgets. To remain competitive for federal and state funding, airports increasingly use multi-year Pavement Maintenance Management Plans (PMMPs), which demonstrate readiness, lifecycle planning, and responsible stewardship of public investment.

## FUNDING AND FUTURE NEED

Minnesota’s aviation funding system relies on federal, state, local, and private sources, each supporting different aspects of the statewide airport network. As aircraft fleets evolve toward larger regional jets, next generation narrowbodies, and emerging electric/hybrid aircraft, passenger volumes and facility demands will continue to shift—reinforcing the need for adaptable and diversified funding strategies.

### Federal Funding

At the federal level, the FAA’s Airport Improvement Program (AIP) remains the backbone of airport capital funding. Primary airports receive entitlement grants based on annual enplanements, while nonprimary general aviation airports typically receive \$150,000 per year, which may be accumulated for up to three years in addition to the current year. In recent years, Minnesota airports have received approximately \$60–70 million in AIP funding annually, supporting runway and taxiway rehabilitation, safety improvements, airfield lighting and navigational aid enhancements, terminal projects, and winter operations equipment across both commercial service and general aviation airports statewide.

A smaller portion of AIP funding is distributed on a discretionary basis and is directed toward high priority safety and capacity projects, but it is highly competitive. Minnesota airports have also benefited from the Infrastructure Investment and Jobs Act (IIJA). Despite these increases, these federal programs do not fully offset long stagnant entitlement levels or rising construction costs.

### State Funding

Overall, State Airports Fund support has remained relatively stable in nominal dollars in recent years, but

Overall, Minnesota’s O&M strategy integrates data-driven asset management, agency guidance, and targeted funding support. Sustaining performance will require continued investment in predictive maintenance tools, inflation-adjusted funding sources, and broader adoption of consistent PMMP practices across all airports in the state.



has not kept pace with inflation. Annual appropriations and grant awards—such as the \$6.4 million distributed in SFY 2026—are generally consistent with recent funding cycles, indicating that state investment is largely holding steady rather than increasing.

Looking ahead, the nearterm outlook is stable but constrained. State Airports Fund revenues are forecast to be adequate to maintain current grant programs, but longterm buying power is expected to remain pressured due to construction cost escalation, flat fuel tax growth, and aircraft trends that dampen fuel consumption per operation. Without legislative action to adjust revenue sources or increase appropriations, future state airport funding is expected to prioritize preservation and safety projects over capacity expansion, and MnDOT will continue to play a critical role in funding FAA-ineligible needs and filling gaps where federal participation is limited.

### Local & Airport Generated Revenue

In addition to federal and state sources, airport generated revenue has become one of the most important and growing funding streams in Minnesota’s aviation system. Local airport sponsors increasingly depend on operating

income to match grants, fund capital projects, and maintain financial sustainability. These revenues include:

- Fuel flowage fees and fuel sales
- Parking revenues, a major source at MSP
- Concessions, restaurants, and retail leases
- Airline rates and charges (landing fees, terminal rents, gate leases)
- Ground leases, including hangars and commercial development
- Passenger driven revenues tied to traffic growth

As operating costs and capital needs rise, these airport generated sources now play a critical stabilizing role, often bridging gaps where state and federal funding fall short. However, reliance on self-generated revenue also means that fluctuations in passenger activity, airline service levels, or economic conditions can directly impact available capital.

Private investment typically focuses on revenue generating facilities such as hangars, FBO facilities, and in some cases commercial development. Public infrastructure—runways, taxiways, aprons, lighting, and most terminal systems—remain heavily dependent on public funding.

### Passenger Facility Charges (PFCs)

PFCs collected at eligible commercial airports help pay for terminal and landside improvements. However, the federal \$4.50 per person cap, unchanged since 2000, has significantly eroded in value due to inflation. This cap limits many airports' ability to undertake large-scale modernization projects without phasing work or securing significant supplemental funding.

### System Needs and Funding Gaps

Minnesota's aviation system faces a significant, well-documented funding gap. The Minnesota State Aviation System Plan (MnSASP) identifies persistent shortfalls between available revenues and longterm capital needs across the state's 132 public airports.

Meanwhile, Airports Council International–North America (ACINA) estimates that Minnesota airports collectively have a total estimated need of approximately \$6.15 billion in infrastructure investment over 2025–2029. ACINA's analysis shows that existing revenue streams (AIP, BIL AIG/ATP grants, PFC revenue, and state/local sources) fall significantly short of meeting these total needs.

Since AIP and state funds primarily support safety and preservation, and because PFCs have lost purchasing power, major expansions, terminal upgrades, and resiliency projects remain chronically underfunded.

The 2025-2029 \$6.15 billion need includes:

- Runway and taxiway rehabilitation
- Airfield lighting and NAVAID upgrades
- Terminal modernization
- Snow removal equipment (SRE) and storage facilities
- ARFF and safety improvements
- Resilience and sustainability investments

### Future Priorities

Closing Minnesota's aviation funding gap will require a coordinated, multilayered strategy that strengthens every part of the system's financial foundation. This includes expanding the pursuit of competitive federal programs such as AIP discretionary and IJJA grants; advancing efforts to modernize the long stagnant Passenger Facility Charge cap; increasing state appropriations to better support preservation and resilience; and more fully leveraging airport generated revenues through innovative partnerships and diversified commercial activity. At the same time, refining MnDOT's CIP scoring to better reflect economic impact, sustainability, and geographic equity will help direct limited resources where they can deliver the greatest longterm benefit. Together, these actions position Minnesota to sustainably modernize its airports and keep pace with growing demand statewide.

# PUBLIC SAFETY AND RESILIENCE

Safety remains a cornerstone of Minnesota’s aviation system. Minnesota airports face significant unfunded security costs despite substantial federal investment in TSA screening operations. TSA covers the cost of Transportation Security Officers and federally owned screening equipment through a national aviation security budget, along with expanded federal capital programs such as the Aviation Security Capital Fund and the new Checkpoint Technology Fund. However, certain airports are responsible for major security expenses that TSA does not fund, including law enforcement officer staffing at checkpoints, access control systems, CCTV, secure area maintenance, and the provision of terminal space, utilities, and facility support required for screening operations.

These local burdens are reflected in Minnesota State Airport Fund grants, where airports typically must provide a 30% match for security infrastructure projects such as perimeter fencing and gate enhancements—for example, Caledonia, Cambridge, and Morris airports, which collectively received state funding for security fencing and access control upgrades. At the same time,

the Minnesota Legislature has allocated additional statewide safety resources, including a onetime \$15 million appropriation to update critical safety and security systems across airports. The combination of federal screening functions and state/local infrastructure obligations means that Minnesota’s airports continue to shoulder substantial ongoing financial responsibility for staffing, equipment, and space required to maintain federally compliant security operations.

Minnesota airports collectively reported approximately 420 wildlife strikes in 2023, consistent with national rates for similar-sized systems. Wildlife Hazard Management Plans (WHMPs) are in place at MSP and the other commercial service airports, which identify potential wildlife safety issues, and what investments are needed to mitigate any issues found. Many of Minnesota system airports have full or partial perimeter fencing, though many rural general aviation airports still report gaps or outdated segments.

All NPIAS airports must meet FAA safety standards, and routinely fund projects to meet these requirements,



*Photo: Snowplow Clearing Snow on Airport Runway; EllaD*

including runway safety area grading, and fence replacements/upgrades. MSP employs ASDE-X surface detection technology to reduce incursions. MSP averaged fewer than 0.35 runway incursions per 100,000 operations between 2020–2023, below the national average. Accident statistics for the state reflect national general aviation trends, with Minnesota GA accident rates aligning with the national benchmark of roughly 1.05 accidents per 100,000 flight hours. Commercial service accident rates remain near zero.

MnDOT integrates airports into the State Emergency Operations Plan, reinforcing their role for disaster response, medical evacuation, and aerial firefighting. Resilience planning within MnSASP and capital

## INNOVATION

Minnesota’s aviation sector embraces innovation through NextGen technologies. At MSP, the FAA’s Required Navigation Performance (RNP) and Area Navigation (RNAV) departures were implemented beginning in 2015, along with Standard Terminal Arrival Routes (STARs), improving routing efficiency. In 2016, MSP became fully ADS-B (Automatic Dependent Surveillance–Broadcast) compliant statewide. Data Communications (Data Comm), deployed at MSP in 2019, modernized controller–pilot clearance delivery.

Across the state, MnDOT Aeronautics is supporting Unmanned Aircraft Systems (UAS) corridors, including UAS medical supply demonstrations in Wilmar (2022) and utility inspection pilots near Rochester (2023). Sustainability innovation includes LED airfield lighting replacements at Duluth (DLH) in 2021 and Brainerd (BRD) in 2020, and MSP’s centralized glycol recovery system, expanded in 2018. MSP’s centralized glycol recovery system captures and treats aircraft deicing fluid, reducing environmental impacts while supporting safe winter operations.

Minnesota’s unique sustainability requirement—B3 (Buildings, Benchmarks & Beyond)—applies to state-bond funded airport projects. Compared with LEED, B3 imposes performance-based energy modeling and carbon benchmarks. Other sustainability efforts include LED airfield lighting upgrades, and centralized aircraft deicing fluid collection. MnDOT encourages longer-life pavement designs using new pavement technologies, and advanced

programs emphasize storm-hardening, updated backup power systems, and climate-related risk mitigation. Many airports are currently transitioning from PFAS-based to non PFAS firefighting foams, requiring equipment replacement and added compliance costs, and in some cases facing significant unfunded expenses, such as STC’s \$121,000 fully locally funded cost for Aqueous Film-Forming Foam (AFFF) truck clean-out and disposal due to a lack of eligible grant support.

Future priorities include expanding perimeter fencing and access control at regional airports, improving rural airfield lighting for low-visibility operations, and deploying next-generation incursion-prevention technologies.

drainage systems, supported by predictive maintenance through PCI monitoring on the MnSASP Hub.

Minnesota is taking a proactive, system-wide approach to advanced air mobility (AAM) by preparing its airport system, policies, and communities for emerging aircraft such as electric vertical takeoff and landing (eVTOL) vehicles and electric general aviation. Through MnDOT Aeronautics, the state is coordinating with the FAA, airports, utilities, and industry partners to evaluate infrastructure needs, airspace integration, safety considerations, and potential use cases—particularly in Greater Minnesota where AAM could improve regional connectivity, medical transport, and economic access. A key challenge is that most AAM-related infrastructure and planning activities are not currently eligible for traditional FAA funding, placing pressure on limited state and local funding sources. Until federal eligibility and funding mechanisms mature, Minnesota must balance early AAM readiness efforts with competing priorities for preserving and maintaining the existing airport system.

Forward-leaning practices include sensor-based pavement monitoring pilots in Mankato (2023), upgrades to automated weather observation systems, and planning for electric aircraft charging infrastructure. These innovations support MnDOT’s statewide goals for efficiency, environmental performance, and long-term system resilience.



## RECOMMENDATIONS TO RAISE THE GRADE

To raise the grade, Minnesota should commit to predictable, scalable funding for aviation—expanding State Airports Fund support, modernizing user-fee tools (PFCs), and aggressively pursuing federal discretionary programs—while enforcing statewide asset management and resilience standards that prioritize safety, sustainability, and equitable geographic access. These steps will protect system performance at airports, sustain economic competitiveness, and ensure reliable access for communities statewide.

- **Expand sustainable funding for O&M and capital:** grow State Airports Fund support, modernize user-fee tools (e.g., increase PFC cap), and maximize federal discretionary and Airport Terminal Program opportunities to close the near-term infrastructure gap.
- **Implement statewide asset management standards and resilience metrics tied to CIP scoring:** link AMP compliance and pavement maintenance management plans to eligibility for state grants; require life-cycle, equity, and sustainability criteria in project selection.
- **Accelerate safety and security enhancements:** prioritize wildlife hazard mitigation, perimeter fencing/access control upgrades, and advanced incursion prevention systems at commercial and GA airports to reduce risk and strengthen compliance.
- **Promote innovation and sustainability:** fund LED lighting conversions, glycol recovery improvements, and UAS corridors for inspection and emergency response; integrate sensor-based monitoring where practical.
- **Publish an annual funding-gap report:** align project selection with MnSASP economic impact, geographic access, and resilience goals to protect system performance and ensure equitable service statewide.

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# Bridges



Photo: Cedar Avenue Bridge over the Minnesota River, south metro area Minnesota; by Matt Christie, WSP USA, Inc.

**GRADE  
COMPARISON**

**MN: C+**

**Nat'l: C**



# BRIDGES

## EXECUTIVE SUMMARY

Minnesota's bridges are vital lifelines that connect communities, drive commerce, and support the state's economy. Apart from special funding, the Minnesota Department of Transportation (MnDOT) is largely in preservation mode and not advancing expansion projects. Currently, 850 bridges are rated in poor condition, a slight improvement from 874 in 2022. However, the number of bridges declining from good to fair condition is increasing (7,122 in 2025 vs. 6,810 in 2022), signaling a concerning trend. Bridges in fair condition require attention to prevent further deterioration. Meanwhile, more than 1,264 bridges are load-posted, creating detours for users. Minnesota faces an estimated \$8.7 billion need over 20 years for bridge rehabilitation and repair, but only \$6.8 billion is currently planned, leaving a \$2 billion shortfall (\$100 million annually). Major projects like the Blatnik Bridge replacement, expected to exceed \$1 billion, underscore the importance of proactive maintenance to avoid costly funding spikes.



Source: Photo Courtesy of MnDOT

## CONDITION AND CAPACITY

Minnesota has 19,714 bridges on or over the state’s roadway system. These bridges are owned by MnDOT, counties, cities, and local government units and do not include bridges on federal lands, state lands, ramps, and private roads. They also do not include railroad, pedestrian, building or other miscellaneous bridges. Minnesota state statute defines a bridge as having a length of 10 feet or more, while federal

statute defines a minimum of 20 feet to be classified as a bridge. The 19,714 number of bridges in Minnesota is based on the state statute. Table 1 shows the change in total number of local and state-owned highway bridges on the Minnesota Highway System between 2022 and 2025. Table 2 shows the condition of the 2025 highway structures based on good, fair, and poor condition ratings.

**TABLE 1: CHANGE IN MINNESOTA HIGHWAY SYSTEM BETWEEN 2022 REPORT AND 2025 REPORT**

Route System	Year		Change
	2022	2025	
Trunk Highway*	4,417	4,453	36
Local Highway	15,192	15,261	69
<b>Total</b>	<b>19,609</b>	<b>19,714</b>	<b>105</b>

Source: MnDOT  
\* Trunk Highway is the network of interstates and state highways

**TABLE 2: CONDITION OF MINNESOTA HIGHWAY STRUCTURES IN 2025**

2025							
CONDITION OF HIGHWAY STRUCTURES							
Route System	HWY ON BRIDGE	CONDITION (# OF BRIDGES)					
		GOOD		FAIR		POOR	
Trunk Highway	4,453	1,715	(38.5%)	2,627	(59%)	111	(2.5%)
Local Highway	15,261	10,027	(65.7%)	4,495	(29.5%)	739	(4.8%)
<b>Total</b>	<b>19,714</b>	<b>11,742</b>	<b>(59.6%)</b>	<b>7,122</b>	<b>(36.1%)</b>	<b>850</b>	<b>(4.3%)</b>

Source: MnDOT

Minnesota currently has 88.73 million square feet (sq. ft) of bridge and culvert deck area, which is an increase of 1.23 million sq. ft since 2022, which is roughly 0.31 million sq. ft per year. The sum area of highway bridge decks in Minnesota has grown by more than 60% over the past 30 years. This equates to an average increase of roughly 1 million sq. ft. each year. Rate of increase in deck area

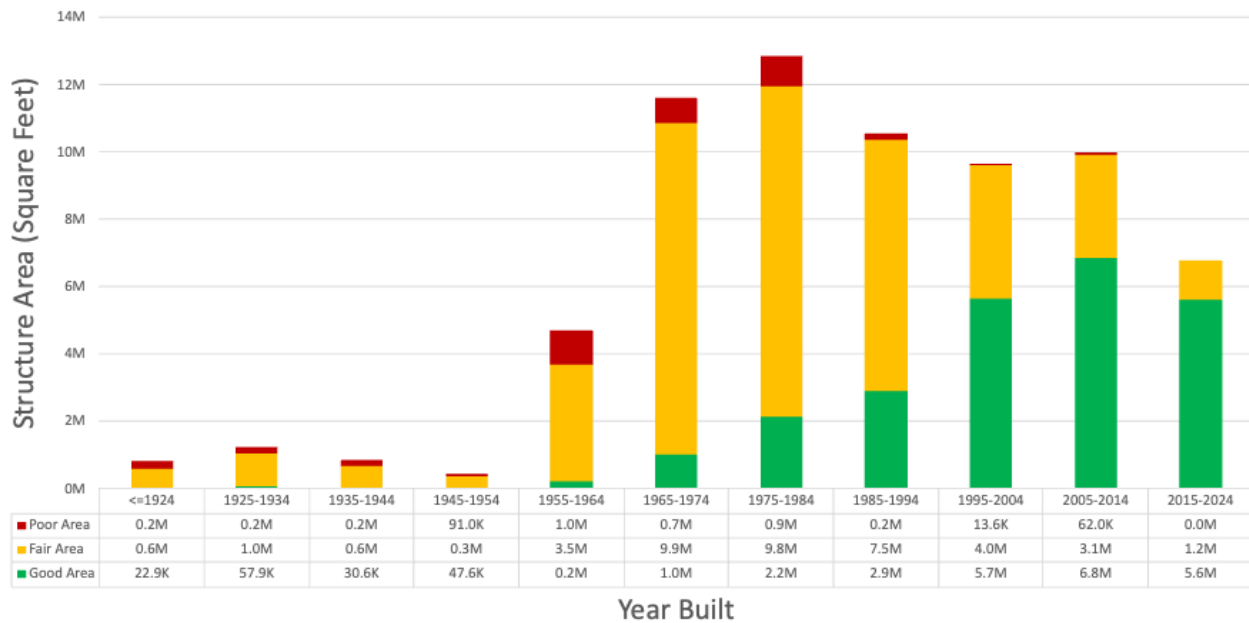
has slowed down in recent years compared to the past 30 years. Nevertheless, the Minnesota Bridge System is still expanding and the bridge deck area to maintain is constantly increasing.

Today, 28.8 million sq. ft of this bridge and culvert deck area (32% of the total, 23.6 million sq. ft of bridge and 5.3 million sq. ft of culvert) is over 50 years old and

exceeds the design life of those structures when they were built. This is a significant fraction of existing bridge deck area (34% of total bridge only deck area). Given the status quo, in 10 years 44.4 million sq. ft of bridge and culvert deck area (50%) will exceed 50 years in age. In 20 years, 57.7 million sq. ft of bridge and culvert deck area (65%) will be more than 50 years old.

A large amount of bridge and culvert deck area built during the Interstate era (i.e., before 1975) is now reaching 50 years of age. Figure 1 shows the total amount of bridge and culvert deck area relative to the year it was constructed and its corresponding condition rating. It is clear that the area reaching 50 years of age is primarily in fair to poor condition.

**FIGURE 1: STRUCTURE AREA BY AGE/CONDITION PER DECADE**



Source: MnDOT

The capacity of a bridge is typically presented in terms of its load-carrying ability (i.e., the heaviest vehicle

that can safely cross the bridge) or its geometric standards.

**FIGURE 2: SAMPLE IMAGE OF A LOAD-POSTED BRIDGE**



Photo Courtesy of MnDOT

Bridges in Minnesota that carry cars and trucks are load rated by the MnDOT Bridge Rating Unit or qualified engineers to determine their ability to safely carry Minnesota’s legal loads, which are defined by state statute. Load ratings are a federal and state requirement, with federal requirements applying to bridges over 20 feet and state requirements applying to bridges over 10 feet. Bridges that cannot carry Minnesota legal loads are load-posted with signage to inform truckers and other travelers of the reduced capacity of the bridge. Currently, 1,264 bridges in Minnesota are load-posted, of which 9 are owned by MnDOT and 1,255 are owned by others. The number of posted bridges in Minnesota has decreased by 211 since 2022, indicating these bridges are either being replaced, repaired, or even decommissioned as funding becomes available.

To increase efficiency regarding the transport of goods and services, there is interest from the trucking industry in increasing the legal load limits. As the allowable weight of vehicles increases, the rate of deterioration of structures is expected to increase thereby reducing the life expectancy of existing bridges. Hence, it is imperative to keep up with necessary maintenance on bridges. Early intervention and timely maintenance allow bridges to remain open, removing barriers to efficient movement of goods and services along the state’s roads and bridges.

**Early intervention and timely maintenance allow bridges to remain open, removing barriers to efficient movement of goods and services along the state’s roads and bridges.**

Bridges and culverts in Minnesota are inspected by trained and certified personnel generally on a two-year cycle, with some culverts inspected on a four-year cycle. Bridges with certain attributes and details, such as lack of redundancy, or in poor condition are inspected on a one year or shorter cycle. Figure 3 shows examples of bridge elements in poor condition.

**FIGURE 3: SAMPLE IMAGES OF BRIDGE ELEMENTS IN POOR CONDITION**

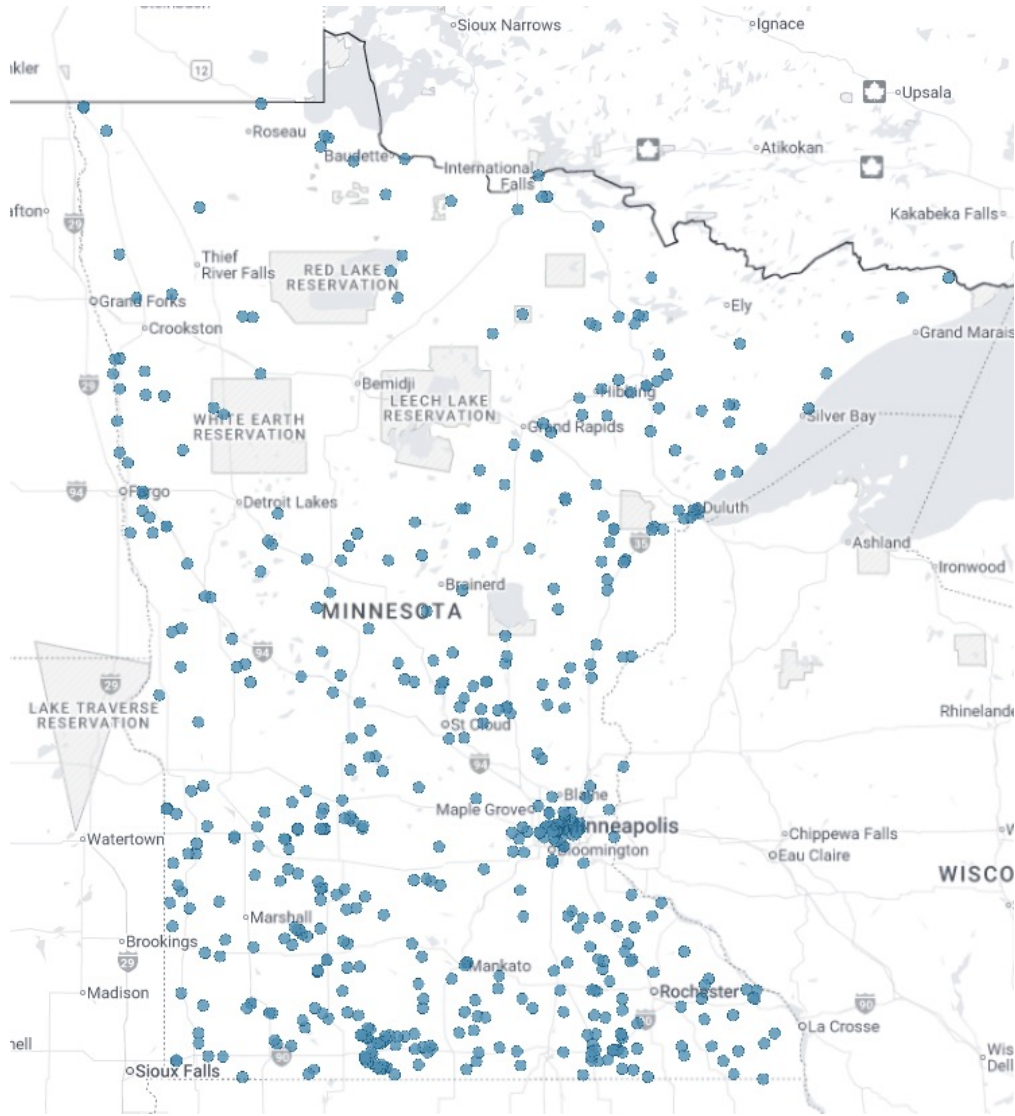


*Photos Courtesy of MnDOT*

Currently, 4.3% of Minnesota bridges are in poor condition (850 total), which has improved (gone down) 0.2% since 2022 (874 total). Figure 4 shows the location

of bridges rated as poor using the FHWA’s Long-Term Bridge Performance portal. In general, these structures are scattered throughout the state.

**FIGURE 4: LOCATION OF BRIDGES IN POOR CONDITION**



Source: Minnesota 2025 FHWA Data

Overall, 59.6% of Minnesota bridges are in good condition, which is a decrease of 1.2% from the 2022 Infrastructure Report. 36.1% of Minnesota bridges are in fair condition, which is an increase of 1.4% from the 2022 Infrastructure Report. In general, the percentage of good, fair, and poor bridge numbers has remained similar since the last report card was released in 2022, which could suggest that maintenance efforts in the state are keeping up with bridge deterioration.

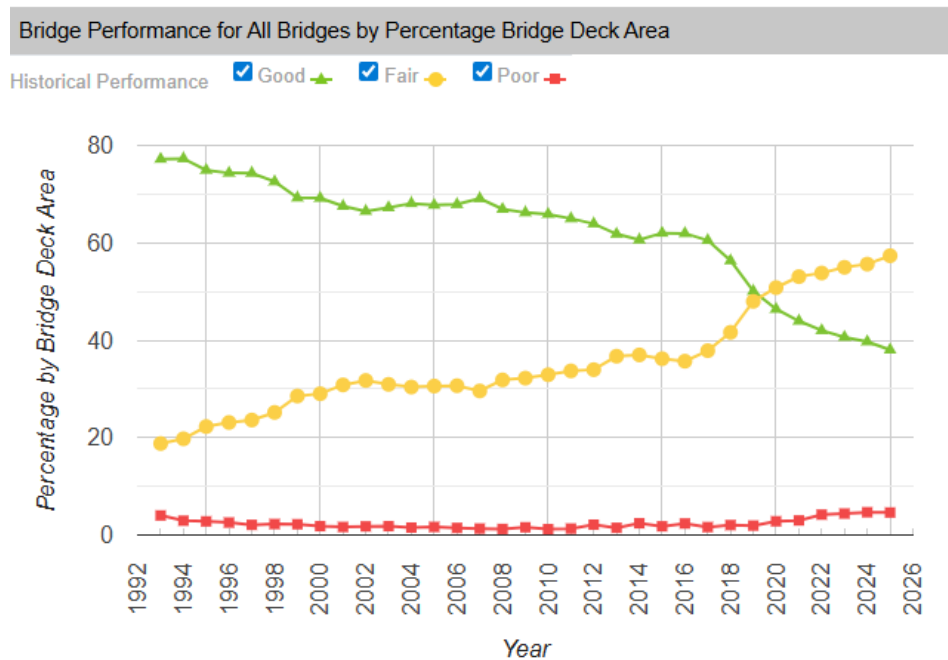
Figure 5 provides another perspective and shows the FHWA data on bridge conditions in Minnesota over the past 30 years based on deck area, not bridge number.

From one perspective, the graph is encouraging. It shows that in 1993, only a small percentage of Minnesota’s bridges were in poor condition, and the State has maintained that percentage to less than 5%. However, the more concerning trend is the growing percentage of bridge deck area listed in fair condition. In 1993, bridges rated as good accounted for over 75% of the deck area in the state, and those rated as fair accounted for just below 20%. Slowly and steadily, the fraction of good bridges has declined, and the fraction of fair bridges has increased. The 2025 data for Minnesota shows a larger percentage of bridge deck area in the fair category (57%) than in the good category (38%). As the fraction of bridges in fair

condition increases, it will become increasingly difficult to maintain a low percentage of poor bridges. Thus, maintenance strategies should focus on good condition

bridges as well, to prevent the continual decline of these bridges, which are then slipping into the fair condition category.

**FIGURE 5: FHWA CONDITION DATA ON MINNESOTA BRIDGES 1993-2025**



Source: FHWA

## OPERATION AND MAINTENANCE

MnDOT is placing an increased emphasis on asset management both at the district and state level. Several contracts have been and will continue to be released to help MnDOT develop the best plan regarding when to perform certain maintenance activities to provide the greatest life of the bridge for the least cost over its life. These asset management plans will also help MnDOT identify what maintenance and repair activities are needed, when they are needed, and to be able to plan for funding such activities to most efficiently prolong the life of their bridge inventory. There has been an increased focus on asset management of major bridge structures as well, because not maintaining these bridges regularly leads to large rehabilitation or replacement projects which use up most of the bridge funding for the state. MnDOT is also placing increased emphasis on preservation methods and

standardizing details for easier and more cost-effective implementation into projects. For instance, MnDOT is recently working on developing details to prolong the life of steel foundation elements.

MnDOT is implementing procedures to build more durable bridges that last longer and minimize maintenance dollars. MnDOT recently implemented new service life design guidelines to prolong the life of the most maintenance prone areas of the bridge. MnDOT also implements and promotes jointless bridges to minimize maintenance because joints are where most deterioration occurs. MnDOT's Bridge Design Manual and other guidelines such as the Service Life Design Guide set the stage and requirements for making new bridges durable and minimizing required maintenance activities throughout their life.

## FUNDING AND FUTURE NEED

Bridges are a critical component of our public infrastructure; however, they are expensive to construct, rehabilitate, and maintain. Because of this, it is crucial to sufficiently fund this infrastructure from a local, state, and federal level. The anticipated 20-year funding need for bridges in Minnesota exceeds \$8.7 billion. The needs for the Trunk Highway System, the network of interstates and state highways, are estimated to be \$6.6 billion. Local highway system needs are estimated to be \$2.1 billion. In 2021, the federal Infrastructure Investment and Jobs Act (IIJA) identified \$302 million for Minnesota bridge replacement and repair projects over five years, contingent on a 20% state match.

Between 2021 and 2025, \$1.7 billion was spent on highway bridges in Minnesota, an average of \$337 million each year. However, the amount spent on an individual year varies greatly. In 2022, over \$457 million was spent, while in 2023, the expenditure was \$191 million. These expenditures utilize the approximate \$302 million of additional funding that the state of Minnesota received through the IIJA. The remaining approximately \$100 million of IIJA funds are all programmed on projects that are set to be authorized before the end of fiscal year 2026.

It is anticipated that future funding amounts will be consistent with what has been provided previously. Therefore, multiplying the recent annual average expenditure of \$337 million by 20 years results in anticipated funding of \$6.8 billion. With the IIJA funding set to expire in September of 2026 and no federal plans yet to continue providing this critical additional funding, additional federal funding sources are not being taken into consideration. Without an influx of IIJA funds or any similar program in the future, the projected funding shortfall will continue to grow.

The difference between the needed and expected funding for the next 20 years is \$2.0 billion. Averaged over 20 years, the shortfall is \$100 million per year without new funding sources.

MnDOT is continuing to improve its approach to bridge asset management. In the past, the worst bridges were the first to be funded, which has also been a common approach used by counties and cities for their local systems. Recently, MnDOT has been identifying and performing early preservation activities for bridges. These activities are investments that pay a high rate of return by reducing high maintenance costs in future years.

At times, the Minnesota Legislature has provided “one-time” money to address bridge needs. These occasional investments complicate the delivery of bridge projects. The need to ramp up and subsequently ramp down staffing levels and shift staff assignments is an inefficient way to approach systemwide bridge needs.

There are active discussions in the 2026 Minnesota Legislature regarding a state bonding bill. The overall funding target is \$1.3 billion, which will include funding for both state and local projects. This proposed bonding bill is aiming for a \$62 million “Local Road Improvement and Bridge Replacement Program” that will greatly assist in locally owned bridges receiving the maintenance they desperately need. All of these funds will be utilized to pay for the repair and replacement of deficient bridges owned by cities, counties, and townships throughout Minnesota.

Older bridges that are part of large water crossings are difficult to adequately fund. A prime example of this is the impending Blatnik Bridge replacement that joins Duluth, Minnesota, to Superior, Wisconsin. The total project cost is estimated to be \$1.8 billion, however, in 2024 the USDOT awarded \$1.1 billion in federal funding. Additionally, in 2023 each state committed \$400 million of state funding toward the project. Project costs for repairing or replacing bridges like this are far too large for a local, or even a state government agency to fully pay for. It is important to note that due to a project of this scale, it is possible that the resources previously planned to address many smaller bridges in poor condition in an agency’s inventory may be deferred to cover the costs associated with the repair or replacement of larger bridges.

**FIGURE 6: I-535 BLATNIK BRIDGE UNDER CONSTRUCTION, 1958**



*Source: MnDOT Projects*

## **INNOVATION & RESILIENCE**

Agencies throughout Minnesota have embraced innovation to help assess the condition of existing bridges and ensure that replacement bridges are durable. MnDOT is a leader in partnering with universities and consultants across the state and country to help investigate new and innovative techniques within the bridge industry. In addition to that, MnDOT also participates in pooled fund studies with other states. Millions of dollars worth of research projects have been funded through MnDOT in 2025 alone. One example of innovation is MnDOT's potential use of an in-service steel girder bridge scheduled for replacement as a real-world test site for a national research project focused on improving how live loads are distributed among steel girders. Completed studies include repairing bridge piles using underwater fiber reinforced polymer sleeves, evaluating reinforcing steel with vehicle-based ground penetrating radar on nearly 200 bridges,

and assessing corrugated high-density polyethylene pipes made from recycled materials. Through the pooled fund studies program, MnDOT has invested in studies such as the structural behavior of ultra high performance concrete, which can effectively increase concrete bridge spans or reduce bridge elevations through the use of shallower cross sections.

MnDOT introduced the 'MnDOT Service Life Design Guide for Bridges' in 2023 to complement its bridge design manual. This manual centers around the industry-wide renewed focus on redundancy and resilience of bridges and is a great example of pairing innovation with resiliency in bridges. This guide combines innovative reinforcement materials throughout all parts of the bridge, alongside other strategies that together aim to extend service life beyond typical expectations.

## **PUBLIC SAFETY**

Currently, 0.2% of MnDOT trunk highway bridges and 8.2% of local bridges on county state highways are posted for load restrictions. All Minnesota bridges near trunk highways are required to be load rated for emergency vehicles, because bridges prohibiting the crossing of such vehicles prolong route times for ambulances and fire trucks, etc., which increase the probability of loss of life or imminent danger for the public if emergency vehicles cannot reach their destination by crossing bridges in

a timely manner. Similarly, negative implications arise if vehicles such as school buses or freight cannot cross bridges in the area. Bridges on major freight corridors that are posted inhibit freight from moving into the area and cause the need for alternate routes and loss of economic activity for the area and region. MnDOT places priority on replacing or repairing trunk highway bridges that are posted so increased risk of loss of life and economic impact do not occur for the region.



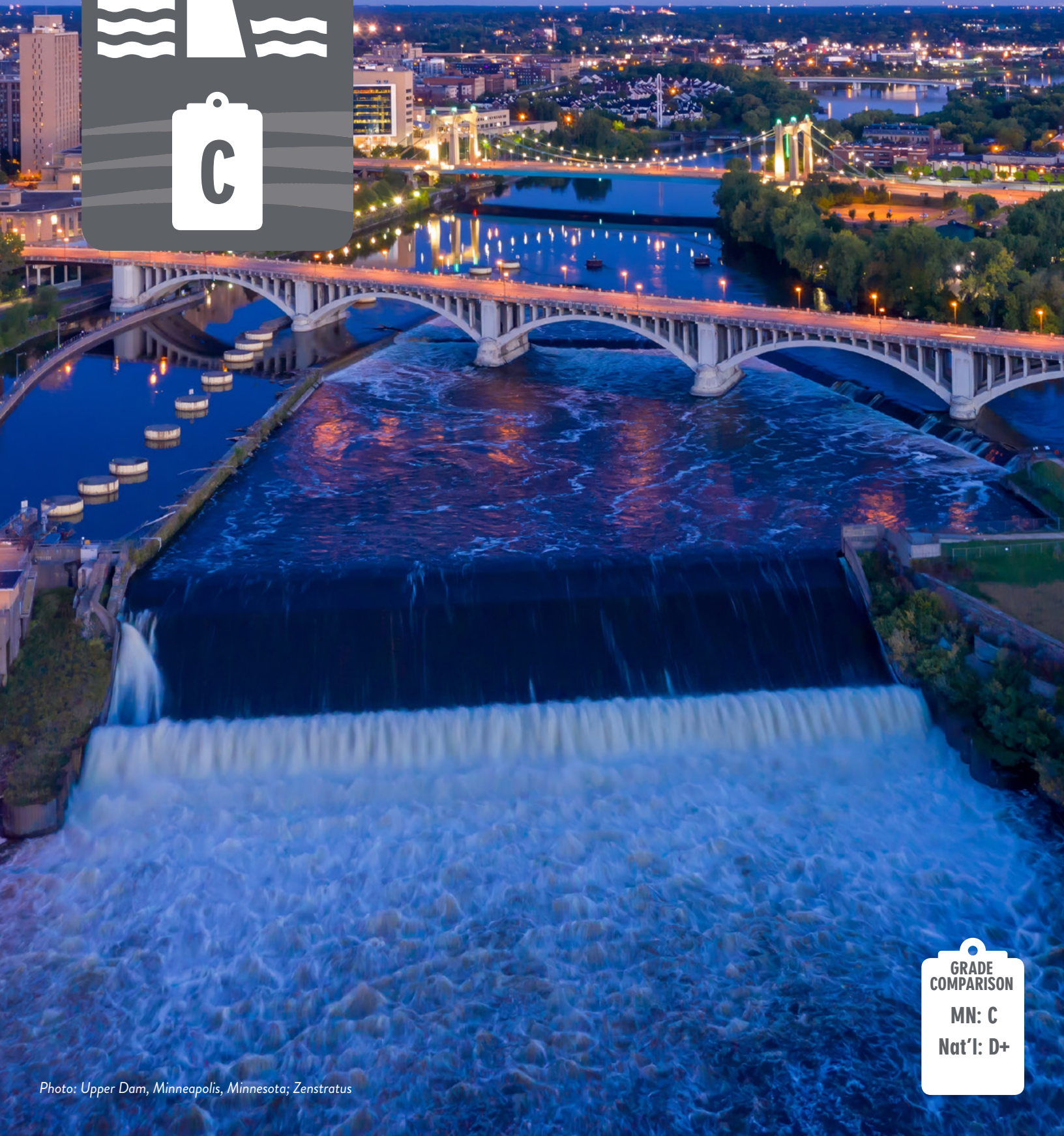
## RECOMMENDATIONS TO RAISE THE GRADE

- Establish a reliable funding stream for bridges through the Minnesota Legislature and the federal government.
- Continue efforts by MnDOT to find the right balance between funding for operations and preventative maintenance, minor projects involving deck overlays, major rehabilitation projects involving deck replacements, and total bridge replacements.
- Continue the progress MnDOT has made in its approach to asset management and planning their strategy for maintaining the health of the bridge inventory. Encourage similar asset management practices for local bridge owners.
- Develop a mechanism to provide local government agencies with steady and reliable funding to address preventative bridge maintenance and rehabilitation in addition to the bridge replacement funding they already receive.

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# Dams



**GRADE  
COMPARISON**

**MN: C**

**Nat'l: D+**

Photo: Upper Dam, Minneapolis, Minnesota; Zenstratus



# DAMS

## EXECUTIVE SUMMARY

Minnesota's dam infrastructure presents two extremes, defining the choice between reactive crisis and proactive investment. The recent failure of the Rapidan Dam highlights the cost of inaction, where decades of funding constraints and deferred maintenance culminated in significant infrastructure and environmental damage. In sharp contrast, the Lake Bronson Dam shows the benefit of intervention, where a \$24 million state investment funded a full reconstruction, proactively eliminating a similar threat.

These cases define Minnesota's current challenge. While most of Minnesota's 1,156 dams are satisfactory, a few high-hazard dams in unsatisfactory condition pose a disproportionate risk. To prevent future failures like Rapidan and replicate the success of Lake Bronson, Minnesota must address its funding gap for dams, expand support for local and private dam owners, and improve emergency preparedness through comprehensive inundation mapping.

## BACKGROUND

According to the National Inventory of Dams (NID) there are 1,156 dams<sup>1</sup> in Minnesota. In addition, there are 201 low-head dams<sup>2</sup> (LHD) identified in the Low-Head Dam Inventory (LHDI) of which 47 are not duplicated in the NID. Due to the lack of information available from the LHDI, the remainder of this assessment will focus on the 1,156 dams listed in the NID.

Dams are classified as having a high, significant, or low hazard potential<sup>3</sup> based on the potential consequences of

the dam failing. As shown in Figure 1, while 82% of dams in Minnesota are low hazard, the high and significant hazard dams, which account for 187 dams or 16% of the total number of dams, require close attention due to their potential consequences including loss of human life or significant property damage.

As shown in Figure 2, these high and significant hazard dams serve a variety of purposes, with the largest concentration of 73 dams having a primary purpose

<sup>1</sup>**Dam:** An artificial barrier impounding water  $\geq 25$  ft high or  $\geq 50$  acre-feet in volume for storage or control purposes (National Dam Safety Program Act, 33 U.S.C. § 467).

<sup>2</sup>**Low-Head Dam:** A river-wide artificial barrier spanning a stream channel, with a vertical drop of 6 inches to 25 feet, creating a backup of water (WRDA 2024).

<sup>3</sup>**Hazard Potential:** Classification based on potential consequences of dam failure:

- **High:** Failure could cause loss of human life and significant property damage.
- **Significant:** Failure could cause significant property damage.
- **Low:** Failure would likely cause minimal property damage.

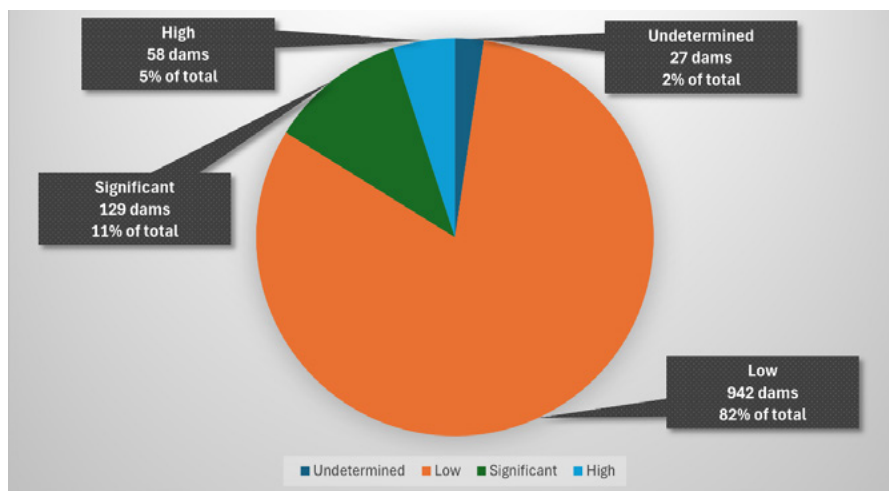
of flood risk reduction. The primary purpose for the next group of dams includes recreation for 39 dams, hydroelectric generation for 32 dams, and tailings management for 23 dams. Finally, there are nine dams for navigation, six for water supply, and five for other purposes. Of these high and significant hazard potential dams, 34% are privately owned, 20% are owned by the Federal or State government, and 46% owned by a local municipality or public utility.

Out of the 1,156 dams in Minnesota, the vast majority (975, or 84.4%) are regulated by the Minnesota

Department of Natural Resources (DNR). An additional 108 (9.3%) are overseen by a federal agency such as the Federal Energy Regulatory Commission (FERC) or the US Army Corps of Engineers (USACE). The remaining 73 dams (6.3%) are unregulated, all of which are classified as having a low hazard potential.

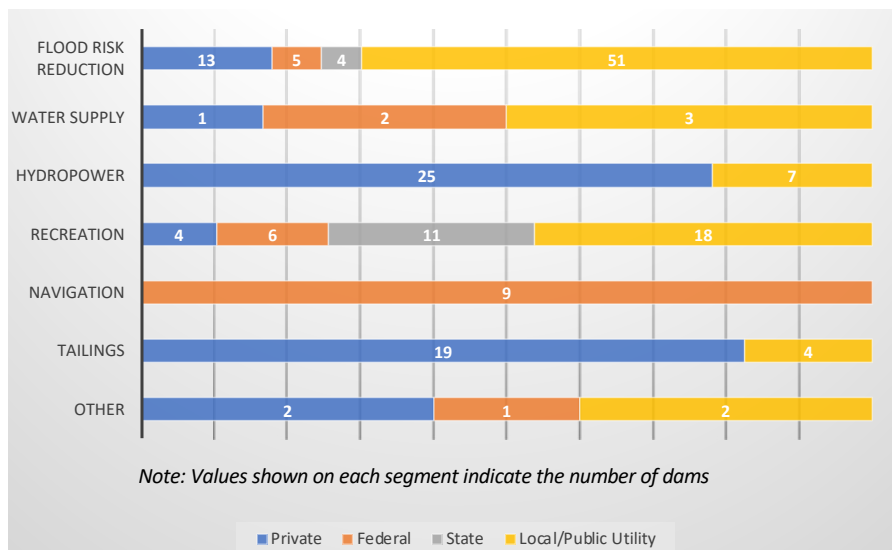
In comparison to national statistics, where state dam safety programs regulate 71% of the nation's 92,000+ dams listed in the NID, Minnesota's program is notably more extensive regulating over 13% more dams within the state than the national average.

FIGURE 1: HAZARD POTENTIAL OF DAMS IN MINNESOTA



Source: NID

FIGURE 2: DISTRIBUTION OF HIGH & SIGNIFICANT HAZARD POTENTIAL DAMS BY OWNER TYPE ACROSS PRIMARY PURPOSE IN MINNESOTA



Note: Values shown on each segment indicate the number of dams

Source: NID

## CONDITION AND CAPACITY

With an average age of 65 years, much of Minnesota’s dam infrastructure is aging, making routine evaluation essential for protecting public safety. To put this in perspective, a 50-year operation life is a common engineering benchmark for dams. This makes rigorous safety evaluation increasingly important as the dam’s age surpasses such milestones.

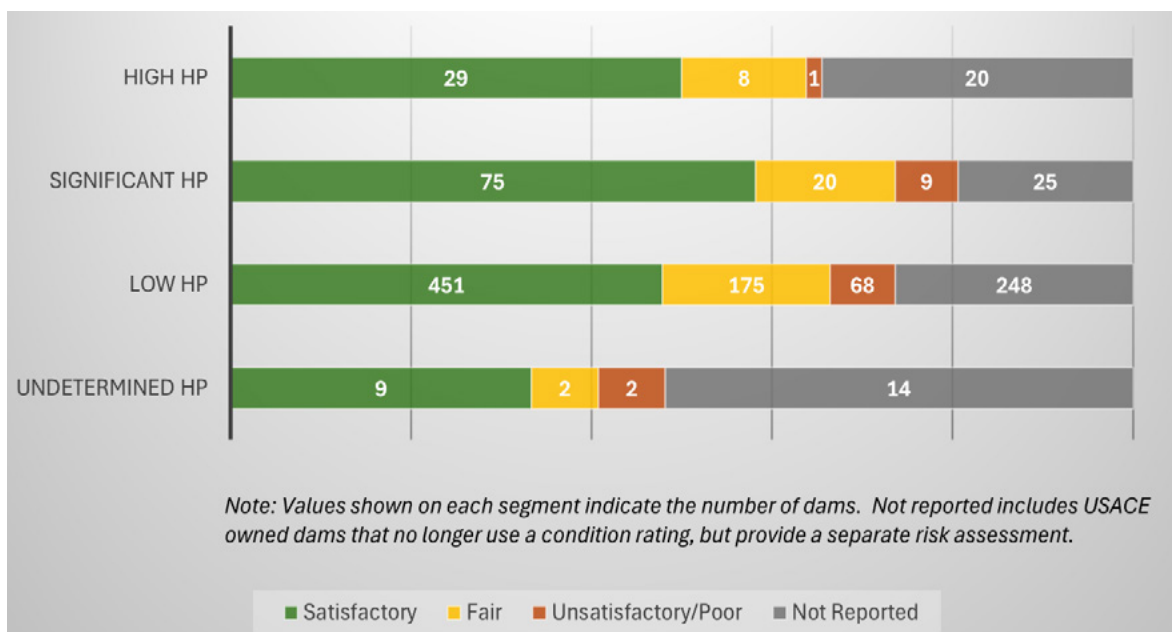
The NID provides this critical oversight through a condition assessment classification. This system rates the physical state of each dam and serves as a tool for prioritizing safety efforts and allocating funds for repairs. Dams are typically rated on a condition assessment scale<sup>4</sup> of satisfactory, fair, poor, unsatisfactory, or not rated. In some cases, this field remains blank.

The lack of data is particularly concerning for high hazard dams. In Minnesota, 20 high hazard dams currently have no condition rating listed in the NID (Figure 3). The reason

for this varies. Five of these dams are federally owned by the U.S. Corps of Engineers, which reports safety using an internal risk category instead of the NID’s condition rating. The other 15 dams are both publicly and privately owned, and the field is blank for unknown reasons.

While a majority of Minnesota’s dams are rated as ‘satisfactory,’ meaning there are no existing or potential dam safety deficiencies recognized, this positive overall picture can mask serious localized risks. The condition of a critical few high-consequence dams poses significant risks. As shown in Figure 3, ten dams classified with high or significant hazard potential, meaning their failure could result in loss of life or major economic damage, are rated in ‘unsatisfactory’ or ‘poor’ condition. These specific dams represent a tangible threat to public safety and infrastructure, creating a divide between the generally stable majority and the high-risk minority, as two recent cases exemplify.

**FIGURE 3: DISTRIBUTION OF CONDITION RATINGS ACROSS HAZARD POTENTIAL CLASSIFICATION IN MINNESOTA**



Source: NID

### <sup>4</sup>Condition Assessment:

- Satisfactory: No deficiencies; acceptable performance expected.
- Fair: Minor risk under rare/extreme events.
- Poor: Deficiencies present; remedial action needed.
- Unsatisfactory: Immediate or emergency action required.
- Not Reported: Insufficient inspection or restricted reporting.

The Lake Bronson Dam (high hazard, state owned), in Kittson County, MN, provides a clear example of proactive dam safety management. The original dam, built in the 1930s, was identified as having significant structural deficiencies and no longer met modern engineering or safety standards. Recognizing the risk to downstream communities and infrastructure, the Minnesota DNR initiated a full reconstruction project. The Minnesota Legislature approved targeted funding for the project with \$20 million in 2020 and an additional \$4 million in

2023. This investment funded the complete replacement of the dam’s spillway and the modernization of its water-control structures shown in Figure 4. By replacing the aging dam before a failure could occur, the state not only safeguarded the public but also preserved the recreational and economic benefits of Lake Bronson State Park. This project serves as a model for how targeted, proactive investment can effectively modernize critical infrastructure and reduce long-term risk.

**FIGURE 4: AN AERIAL VIEW OF THE LAKE BRONSON DAM REPLACEMENT PROJECT UNDER CONSTRUCTION**



In stark contrast, the failure of the Rapidan Dam, a significant hazard dam near Mankato Minnesota, on June 24, 2024, serves as a cautionary example of deferred maintenance. The structure, a century-old dam over a century old, was known to have significant structural deficiencies. Engineers had identified that the dam’s concrete was suffering from an “alkali-silica reaction,” a condition sometimes called “concrete cancer” that causes it to crack and crumble. For years, Blue Earth County officials faced a difficult financial dilemma,

weighing an estimated \$15 million repair against an \$80 million removal, but funding constraints prevented a decision. The dam’s inevitable failure occurred during an extreme flood event, where floodwaters eroded the western embankment and carved a new channel as shown in Figure 5. The collapse caused significant damage and is a powerful illustration of the severe consequences of inaction, underscoring how funding limitations can lead to catastrophic infrastructure failure with immense public safety and environmental costs.

FIGURE 5: FAILURE OF THE RAPIDAN DAM IN SOUTHERN MINNESOTA



## FUNDING AND FUTURE NEED

Minnesota’s dam infrastructure faces a significant funding gap. The DNR receives roughly \$5 million per biennium through the state bonding bill yet estimates indicate \$100 million will be needed over the next twenty years to maintain safety and functionality, including \$40 million for priority projects. This funding amount is for state- and locally-owned dams, which accounts for approximately 50% of dams in Minnesota. The specific funding needs across the remaining portfolio is unknown due to the distribution of dam owners. However, extrapolating from the DNR’s costs for its 50% portfolio suggests the total need for all dams in the state could approach \$200 million.

Most dams in Minnesota are privately owned and can lack the resources for major repairs. Federal programs such as the Corps Water Infrastructure Financing Program (CWIFP), FEMA High Hazard Potential Dam Rehabilitation Grants, and the National Dam Safety Program State Assistance Grants provide loans and grants that can help non-federal owners address structural deficiencies, modernize spillways, and update

emergency systems. Leveraging these programs alongside state funding can maximize safety benefits and reduce long-term costs.

- **Corps Water Infrastructure Financing Program (CWIFP):** Lowcost, longterm loans for nonfederal dam owners to help pay for dam safety projects. During the first funding round in 2023, no projects from Minnesota were selected for this program. More info: <https://www.usace.army.mil/CWIFP>
- **Rehabilitation of High Hazard Potential Dams Grant Program (HHPD):** Grants for nonfederal, high-hazard dams that pose risk to human life or property. In 2024, the Minnesota Department of Natural Resources received a grant for \$2,096,668, and in 2019 they received a grant for \$153,008 out of a total funding availability of approximately \$239 million since 2019. More info: <https://www.fema.gov/emergency-managers/risk-management/dam-safety/rehabilitation-high-hazard-potential-dams>

- **National Dam Safety Program State Assistance Grant Program (NDSP State Assistance – FEMA):** Supports state dam safety agencies to improve dam inspection regimes, update or develop Emergency Action Plans (EAPs<sup>5</sup>) for oversight of nonfederal dams. Since 2019, Minnesota has received \$1,235,565 of NDSP assistance out of a total distributed amount of more than \$67.5 million. More at info: <https://www.fema.gov/emergency-managers/risk-management/dam-safety/grants>
- **Minnesota Dam Safety Grant Program (MnDNR):** Provides grants to cities, counties, townships and watershed districts for dam repair, reconstruction, or removal. Works with publicly-owned dams; grants may cover up to 50% of repair costs or 100% of

removal costs. The list of awardees has not been updated since 2018. Between 2000 and 2018, approximately \$1 million was being awarded annually. More info: [https://www.dnr.state.mn.us/waters/surfacewater\\_section/damsafety/grants.html](https://www.dnr.state.mn.us/waters/surfacewater_section/damsafety/grants.html)

Targeted investments not only prevent catastrophic failures but also protect communities, support recreation, maintain hydropower and water supply infrastructure, and increase statewide resilience to extreme weather events. Expanding funding to support inundation mapping, emergency action plan updates, and prioritized maintenance ensures that Minnesota dams meet modern safety standards and reduces the likelihood of costly emergency repairs.

## OPERATION & MAINTENANCE

Proper operation and maintenance significantly reduce the risk of dam failure. Minnesota regulations address hazard classification, disaster mitigation, emergency repairs, and inspection schedules to protect public safety. The average age of a dam in Minnesota is 61 years old, and aging structures may require stricter design criteria as downstream development increases. Specifically, these older dams face material challenges unique to our northern climate, including concrete degradation from repeated freeze-thaw cycles, siltation behind the dam, and spillway designs that are often undersized for modern, more intense rainfall projections.

All high and significant hazard potential dams are regulated by the DNR or a federal agency. Dam owners are responsible for maintenance costs and ensuring dam integrity, while inspections are completed as funding and staffing allow.

The inspection of dams in Minnesota is dependent on the hazard classification, size, and regulating agency. The DNR serves as the primary regulator for most non-federal dams, and utilizes a three-tiered hazard classification system that dictates inspection frequency. Class I (High Hazard) dams, where failure could cause loss of life, undergo annual inspections by the state. Class II (Significant Hazard) dams are inspected by the

DNR every four years. For Class III (Low Hazard) dams, a specific state inspection frequency is not mandated, placing the responsibility for regular monitoring on the dam owner. All regulated dam owners, regardless of class, are responsible for maintaining their structures, creating Operation and Maintenance (O&M) plans, and obtaining state permits for any repairs or alterations. Federal entities oversee dams under their specific jurisdictions.

For dams regulated by the Federal Energy Regulatory Commission (FERC), a new requirement was added in 2022 to perform a Comprehensive Assessment every ten years, which alternates with a five-year Periodic Inspection. This two-tiered system of external reviews by an independent consultant overhauls the previous five-year inspection cycle. These periodic external inspections supplement the ongoing requirement for dam owners to conduct their own annual inspections. The new ten-year Comprehensive Assessments are significantly more in-depth, requiring detailed Potential Failure Mode Analyses (PFMA). Initial indications show that the cost to perform a Comprehensive Assessment is substantially higher, potentially up to ten times more expensive than the traditional independent consultant inspection.

Separately, dams owned by the USACE, such as the

<sup>5</sup>**Emergency Action Plan (EAP):** Preplanned procedures to minimize damage or loss of life in case of dam failure.

locks and dams on the Mississippi River, are managed under their own internal Dam Safety Program. This program uses a risk-informed framework and features

## INNOVATION

Modern dam safety practices are increasingly incorporating advanced technologies to enhance inspection quality, monitoring, and maintenance. Drones equipped with high-resolution cameras, LiDAR, or thermal sensors can safely survey steep or hard-to-reach areas, providing repeatable, detailed imagery for trend analysis. Ground-penetrating radar and other non-destructive testing tools allow engineers to assess internal concrete integrity detecting voids, delamination, and structural weaknesses that may not be visible externally. Remote sensors, including piezometers, inclinometers and strain gauges, provide real-time monitoring on water levels, deformations, stress, supporting early warnings and proactive maintenance.

These technologies enable a more data-driven, risk-informed approach to dam management, allowing issues to be identified and addressed before they become critical failures. While comprehensive statewide

detailed five-year Periodic Inspections conducted by multidisciplinary expert teams to evaluate safety and operational adequacy.

figures are not available, industry reports indicate that such methods are increasingly used nationally and in Minnesota, particularly for dams in challenging locations or where safety risks are elevated. Professional associations like the Association of State Dam Safety Officials (ASDSO) promote the use of drones and remote sensing as standard complements to traditional inspections.

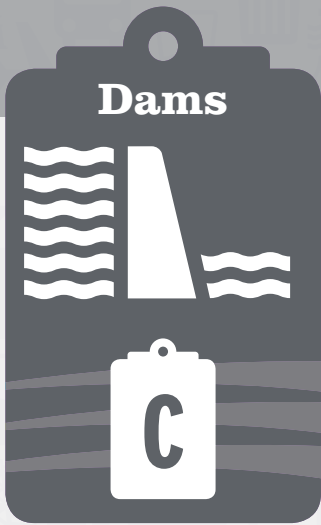
The Rapidan Dam breach in Minnesota provides a practical example of the value of these technologies. Drones were used post-failure to document the structure and surrounding environment, helping scientists assess the significant sediment deposits and environmental impacts. This demonstrates how advanced tools can support both preventive maintenance and post-incident analysis, providing critical insights to improve dam safety practices.

## PUBLIC SAFETY AND RESILIENCE

Dam failures can cause loss of life, damage to critical infrastructure such as roads and bridges, personal property loss, and environmental harm. State regulated high hazard dams and FERC regulated high and significant hazard dams are required to have an EAP, which must be communicated to potentially affected communities. According to a report on the performance of dam safety in Minnesota, 100% of state regulated high-hazard potential dams have an EAP, which is nearly 20% higher than the national average.

Currently, only the 11 USACE-owned dams in Minnesota have incorporated public inundation mapping into the NID. Nationwide, maps exist for high-hazard dams and many significant-hazard dams, but their limited public

availability in Minnesota represents a critical gap to public safety. Expanding this mapping statewide and making it required to be included in the NID so that it is publicly available would dramatically improve preparedness and response. For emergency managers, these maps provide a pre-defined operational playbook, identifying areas at risk for flooding if a dam fails. For the public, they make the risk tangible, empowering residents to understand their personal flood risk, create family evaluation plans, and make informed decisions about their property. The recent dam failure in Minnesota due to flooding underscores the urgent need for accessible inundation maps to improve individual awareness and emergency preparedness and response for at-risk communities.



## RECOMMENDATIONS TO RAISE THE GRADE

- Increase DNR funding to **\$10 million per biennial bonding bill** to accelerate maintenance and reconstruction.
- Expand state-level **grant or loan programs** to assist private and local dam owners.
- Require **inundation maps for all high and significant hazard dams** to be uploaded to the NID for public awareness and emergency planning.
- Continue **regular inspections and condition assessments** for all dams, especially aging structures, and update design criteria as hazard potential changes.

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# Drinking Water



**GRADE  
COMPARISON**

**MN: C-  
Nat'l: C-**

*Photo: Park Water Fountain in Medford, MN; Robert Smith*



# DRINKING WATER

## EXECUTIVE SUMMARY

Minnesota has over 6,500 public water systems that provide water to either community or noncommunity water suppliers. In addition to the public water systems, a significant portion of the state relies on private wells to supply drinking water which are not subject to the same rigorous standards. Minnesota's water infrastructure is aging which can lead to increased failure rates and cost of operation, maintenance, repairs, and replacements. Public drinking water systems have requested over \$3.6 billion in funding over the next five years from Minnesota's Drinking Water Revolving Fund. Declining revenue due to decreased water consumption and population in some areas will make it more difficult for some public water systems to raise funds on their own, meaning more reliance on the Drinking Water Revolving Fund and other state and federal programs.

## CONDITION & CAPACITY

Drinking water protection in the state of Minnesota (MN) is regulated by the Minnesota Department of Health (MDH), which enforces the Safe Drinking Water Act (SDWA) set by the Environmental Protection Agency (EPA). Roughly 75% of Minnesotans rely on groundwater as their primary drinking water source, while the other 25% rely on surface water bodies. There are over 6,500 public water systems that provide water to either a community or noncommunity water supply. Minnesota's 970 community water systems provide water to people in their homes. 5,760 noncommunity public water supply systems provide water to the public in places other than homes, such as commercial businesses and recreation venues. In addition to the public water systems, approximately 20% of the state relies on private wells to supply drinking water which are

not subject to the same rigorous standards. See Table 1 below for a breakdown of MN's public water systems.

**Minnesota's water infrastructure is aging which can lead to increased failure rates and cost of operation, maintenance, repairs, and replacements.**

**TABLE 1: MINNESOTA POPULATION SERVED BY PUBLIC WATER SYSTEMS FOR CALENDAR YEAR 2025**

Type of Public Water System	Number of Systems	Percentage of Population Served
Community Municipal	729	75%
Community Non-municipal	236	
Non-community Non-Transient	460	5%
Non-community Transient	5,157	
Private Wells	469,480*	20%

\*Estimated

Source: Minnesota Department of Health, 2025

According to the Minnesota Drinking Water Action Plan developed by MDH in 2025, nearly 50% of all MN public water systems serve cities with populations below 500 people and over 80% serve cities with populations below 3,300. Implementing SDWA requirements from source to tap is a particular challenge for small public water systems. They have limited financial resources to fund needed work, limited technical resources and knowledge, and often lack authority outside of their property boundaries.

Water supply (ground and surface water) is managed by the Minnesota DNR. All users that remove more than 10,000 gallons per day or 1 million gallons per year are required to obtain a water use permit, with some exceptions. Along with approving permits, the DNR has the authority to limit surface water appropriations during low flow periods and apply certain conditions to water use permits. These efforts are intended to conserve water, especially during droughts, for high priority uses like drinking water supply.

Minnesota’s water infrastructure is aging which can lead to increased failure rates and cost of operation and maintenance (O&M). It is estimated that most water infrastructure within the state, including drinking water treatment plants, water towers, water mains, and direct service lines, are between 50-100 years old. According to the EPA, the useful life of a water treatment plant is 20 to 50 years, at which point they may require significant upgrades. The Minneapolis water treatment

plant is over 150 years old, and St. Paul’s is over 100 years old. Both treatment plants have undergone recent renovations and have been updated to handle increased water demand and water quality threats.

There is little data available about the condition of most of the state’s water supply infrastructure, but many of the pipes in the Twin Cities are estimated to be over 130 years old and are susceptible to breaks. Most distribution mains are made of cast iron. In St. Paul, there has been an average of 145 water main breaks a year for the past 20 years. Minneapolis averages about 40 breaks a year. Special concern is paid to lead service lines (LSL), which pose a human health risk particularly to children under the age of six. The state has been taking steps to inventory and replace all lead service lines with a goal of 100% replacement by 2033. At the time of this assessment, it is estimated that less than 6% of all identified service lines are left to be replaced.

The average Minnesotan consumes about 50-90 gallons of water per day. While the population of MN is growing, the rate of increase is decreasing, with most of the increases coming from migration and not birth rates. Some counties on the fringe of the Twin Cities 7-county metropolitan area are growing due to the expanding metropolitan area and growing industries, which may have an impact on drinking water supply. There is a concern that increased demand on the state’s aquifers may negatively affect drinking water availability.

Since 2021, Minnesota has almost continuously experienced moderate drought with the most severe drought occurring in the Fall of 2021. Water conservation remains a priority as the changing climate and increased water demand might strain aquifer recharge. These drought conditions have led to the

Minnesota Department of Natural Resources (DNR) imposing water use restrictions during sustained periods of low flow. Surface water sources of drinking water in MN typically are resilient and have been shown to be sufficient during drought and population increases.

## OPERATION AND MAINTENANCE

Water system operators and utility staff maintain and operate drinking water treatment and distribution systems. Public water supply systems in Minnesota are required to employ certified water operators. This includes operation of treatment systems and pump stations, hydrant flushing, and valve exercising.

Asset management can be a proactive tool for utilities to maintain their systems and minimize the risks and costs associated with aging infrastructure. While not required, MDH encourages the use and preparation of asset management plans for drinking water systems. As part of the technical assistance funds allocated under the Drinking Water Revolving Fund (DWRF), MRWA has provided technical assistance to 52 cities in developing water asset management plans to-date and trained over

337 water industry personnel on asset management.

In addition to the challenges of managing aging infrastructure systems, workforce shortages pose another significant challenge across the water industry. As water operators and other water system staff retire, institutional knowledge can be lost. Finding, training, and retaining qualified new staff can be challenging in today's market, with work culture shifts such as remote work. Staff shortages can also limit the work and the amount and type of work that can be completed. It is important to support training programs, such as the City of Plymouth Maintenance Apprentice Program and educate the public about careers in the water industry so that workforce challenges do not affect a system's ability to provide safe drinking water.

## FUNDING

In Minnesota, drinking water infrastructure capital funding generally comes from two sources: water rates paid by users and the state's Drinking Water Revolving Fund (DWRF). Water rates vary based on the water system but generally include the water usage rate and a flat service fee based on the water meter size. The DWRF receives external funding from the state legislature and the federal government as well as internal funding in the form of revenue from the loans it has provided to public water systems previously. That funding is then distributed to public water infrastructure projects in the form of low-interest loans using a points-based system with priority given to projects that protect public health, provide adequate water supply, and assist water systems most in need. Some projects can also qualify for loan forgiveness. DWRF funded projects include water treatment, supply, storage, and distribution but are generally divided between lead service line replacement

(LSL) projects and non-LSL projects. In 2023, the Minnesota state legislature appropriated \$240 million for lead service line replacements and \$78 million for other drinking water infrastructure projects. In a 2025 special legislative session, the Minnesota state legislature appropriated over \$61 million for the DWRF specifically and \$39 million split between the state's DWRF and Clean Water Revolving Fund. However, funding from the Infrastructure Investment and Jobs Act (IIJA) currently accounts for most external funding for the DWRF. In 2025, 72% of all external funding came from the IIJA. In 2026, that value is expected to be 73%. The sources and uses of DWRF funding for the 2025 and 2026 fiscal years are shown in Table 2 and Table 3. The expected remaining funds in the DWRF are also included in those tables. Despite recent investments, the DWRF is still expected to have no remaining funds at the end of 2026.

**TABLE 2: MINNESOTA DWRF SOURCES AND USES OF FUNDING FOR NON-LSL REPLACEMENT PROJECT (IN MILLIONS OF DOLLARS) FOR THE 2025 AND 2026 FISCAL YEARS.**

Year	IJA Sources	Other Federal Sources	State Sources	Internal Sources	Uses	Remainder
2025	\$82	\$16	\$16	\$25	\$157	\$217
2026*	\$69	\$17	\$9	\$561	\$873	\$0

\*Values are projected for the 2026 state fiscal year.

Source: Minnesota Public Facilities Authority, “Drinking Water Revolving Fund SFY 2026 Intended Use Plan,” 2025

**TABLE 3: MINNESOTA DWRF SOURCES AND USES OF FUNDING FOR LSL REPLACEMENT PROJECT (IN MILLIONS OF DOLLARS) FOR THE 2025 AND 2026 FISCAL YEARS.**

Year	IJA Sources	Other Federal Sources	State Sources	Internal Sources	Uses	Remainder
2025	\$130	\$0	\$0	\$0	\$138	\$247
2026*	\$88	\$0	\$0	\$0	\$288	\$48

\*Values are projected for the 2026 state fiscal year.

Source: Minnesota Public Facilities Authority, “Drinking Water Revolving Fund SFY 2026 Intended Use Plan,” 2025.

Other sources of capital funding exist for water systems with specific contaminants such as per- and polyfluoroalkyl substances (PFAS). These sources include pending claims for class action lawsuits against PFAS manufacturers and the Minnesota Pollution Control Agency’s (MPCA) grants for design and planning PFAS treatment. However, funding is limited, and the DWRF currently exceeds its projected sustainable annual lending capacity of \$64 million per year due to the high demand for funding of public water systems in Minnesota.

To help cover costs incurred by MDH to provide inspection services, protection plans, and technical assistance for the public water systems in Minnesota,

the Minnesota Legislature established the Safe Drinking Water Connection Fee. This annual connection fee charged to each user is an important component of the funding MDH needs to aid Minnesota’s drinking water systems. In addition to assisting public water systems, the fee provides funding for laboratory costs for water testing, data management and reporting, and grants to disadvantaged communities. Table 4 shows how MDH’s budget was distributed in 2020, with approximately 60% of the overall budget funded by the Safe Drinking Water Connection fee. In 2025, the Minnesota State Legislature increased the fee from \$9.72 to \$15.22 per service connection to provide greater funding for MDH’s assistance programs.

**TABLE 4: DRINKING WATER PROTECTION SECTION ANNUAL BUDGET BY ACTIVITY AREA**

Safe Drinking Water Activity Area	Budget
Assist Water Systems	\$4,817,669
Protect Source Water	\$4,445,515
Test Water	\$3,392,224
Fund Projects	\$2,526,822
Address Threats	\$2,465,463
Educate Minnesotans	\$2,218,881
Train Operators	\$1,103,141
<b>Total:</b>	<b>\$20,969,715</b>

Source: Minnesota Department of Health, 2020

## FUTURE NEED

Minnesota has seen moderate population growth since 2019 as shown in Table 5. Over the same period, the annual drinking water use has remained relatively constant between 178 and 207 billion gallons per year. Minnesota’s population is expected to increase to about 6.1 million by 2050 as shown in Table 6. Most of this growth is anticipated to occur within the Minneapolis-St. Paul (MSP) metropolitan (7-county) area. The population outside of the MSP metro is expected to decrease from 2025 to 2050 by about 0.1 million people. So, some Minnesota systems may see growth in revenue, while other systems, especially those in rural Minnesota, are expected to experience loss in revenue

due to decreasing population. The 2023 EPA Drinking Water Needs Survey and Assessment determined that Minnesota’s funding needs are roughly \$10.2 billion over the next 20 years. The total cost of all projects (LSL and non-LSL) that have requested DWRf funding for the next five years is about \$3.6 billion. Replacement of all lead service lines is expected to require \$1 billion over the next 10 years. The decreases in revenue due to decreases in water consumption and population will make it more difficult for some public water systems to raise these funds on their own, meaning more reliance on the DWRf and other state and federal programs.

**TABLE 5: HISTORICAL DRINKING WATER USE AND POPULATION**

Year	Total Population (Millions)	Annual Water Use (Billions of gallons)*
2019	5.68	178
2020	5.71	190
2021	5.74	203
2022	5.80	196
2023	5.80	207
2024	5.84	185

\*Does not include private well use.

Source: Minnesota State Demographic Center

**TABLE 6: MINNESOTA POPULATION PROJECTIONS**

Year	Total Population (Millions)	MSP Metro Population (Millions)	Non-MSP Metro Population (Millions)
2025	5.8	3.2	2.6
2030	5.9	3.4	2.5
2040	6.1	3.6	2.3
2050	6.1	3.8	2.3

Source: Minnesota State Demographic Center

Other systems in Minnesota may struggle with the opposite problem: a sharp increase in costs because of high water demand required by data centers. Projections for data center water usage vary. However, with the rise of artificial intelligence (AI), the number of data centers is expected to increase substantially over the next decades. With the expected increase in local water demand, it is important for water systems, data center developers, and

other stakeholders to consider water demand early in the data center planning process. In 2025, the Minnesota state legislature passed two new laws related to water use for data centers that are expected to use more than 100 million gallons per year. The laws give the DNR the authority to request information about the sustainability of a data center’s water use and add conditions to a data center’s water use permit.

## PUBLIC SAFETY AND RESILIENCE

In 2024, all federal health-based standards were met by over 97% of systems. A small percentage of systems (<3%) were issued action level exceedances for nitrate/nitrite, arsenic, radionuclides, disinfection by-products (DBP), lead, and copper over the past five years with copper and radionuclides being the most common. Minnesota has achieved 100% compliance completing lead service line inventories as of 2025, with an estimated 87,300 lines identified as needing replacement. MDH currently works to monitor and address anticipated EPA PFAS maximum contaminant levels (MCL) ahead of their issuance, with most community water systems reporting below the anticipated MCL.

There have been a few water quality incidents in the past few years that have drawn increased scrutiny from the EPA on MN’s drinking water. Notably in April 2023, the EPA received a SDWA Section 1431 emergency petition regarding nitrate contamination in the southeast karst region of MN which required MN to develop an action plan to protect public health. As part of their initial response in 2024, MDH currently offers free well testing kits, reverse osmosis treatment for private wells that exceed nitrate levels of 10 mg/L, additional

enhanced monitoring, and education/outreach. The long-term response includes improving the nitrogen fertilizer management plan with the MN Department of Agriculture, the groundwater protection rule, feedlot permits/rules, the MN Nutrient Reduction Strategy, and implementing wastewater nitrogen reduction and karst protection strategies.

There was also an outbreak of Legionnaires Disease in Grand Rapids, MN from 2023 through 2024 that led to 34 cases and two deaths. MDH confirmed that the source of the outbreak was the municipal water system and worked with the city and other state and federal agencies to identify, track, mitigate, and implement a new chlorine disinfection system to prevent future outbreaks. The incident highlighted the importance of maintaining water systems, anticipating and installing robust treatment systems, and preparing for unforeseen/unexpected incidents.

The EPA requires all community water systems that serve more than 3,300 people to submit a Risk and Resiliency Assessment (RRA) and an Emergency Response Plan (ERP) by 2027. RRAs provide information on the water

system's natural and malevolent risks as well as the water system's existing resilience infrastructure. ERPs include strategies to address the risks identified in the RRA and include other improvements in resiliency. Natural threats to water systems in Minnesota include extreme weather events such as floods and tornadoes, which may worsen in intensity as a result of climate change. It is important that water supply systems have emergency backup such as wells or interconnections with neighboring cities. Many systems in Minnesota do not maintain any backup water capacity and are at risk of running out of drinking water if an intake or well needs to be shut off.

## INNOVATION

Advanced treatment technologies such as UV, ozone, and biofiltration have begun to be implemented in some communities to treat natural organic compounds. Meanwhile, other alternative and/or existing technologies have been implemented to address emerging contaminants. For example, granular activated carbon is being used to treat PFAS and biofiltration to treat manganese.

MDH has also established a new Drinking Water Ambient

One emerging risk to water systems is cybersecurity. Many systems have transitioned to operational technologies that detect or change processes making operations simpler and more consistent, however these new technologies are also vulnerable to cyber-attacks from bad actors. A significant ransomware attack targeted the city of St. Paul in July 2025 which highlighted vulnerabilities and posed a risk to the city's public water system, which operates under the same network. Cybersecurity risks are included in the RRAs and ERPs, however MDH now also requires that all public water systems that use operational technologies complete a cybersecurity assessment every year, including small systems.

Monitoring Program that creates an ongoing, permanent capacity to address concerns about public health exposure to contaminants of emerging concern (CEC) and support advanced decision making to secure long term water resource management, especially regarding drinking water sources. This program dedicates resources so that the state can build up historical water quality databases in anticipation of addressing CECs in the future, allowing for more proactive recommendations and measures.



*Photo: Thomson Reservoir in Carlton County, Minnesota; Susan Rydberg*



## RECOMMENDATIONS TO RAISE THE GRADE

- Support and encourage the investment of federal and state funds to sustain and increase funding to the Drinking Water Revolving Fund (DWRF) and invest in addressing aging infrastructure.
- Educate the public on careers in the water industry and support workforce training programs.
- Educate the public on water quality issues and the challenges involved in maintaining drinking water systems. A well-informed citizenry will be engaged and can better advocate for the needs of their community.
- Prepare and plan for future increasingly frequent and severe extreme weather events through investments in mitigation projects and resilient infrastructure.

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## Drinking Water



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# Energy



GRADE  
COMPARISON

MN: C+

Nat'l: D+

Photo: Wind turbines spinning in corn fields near Pipestone, Minnesota; Wollwerth Imagery



# ENERGY

## EXECUTIVE SUMMARY

Minnesota is outperforming the United States average in its transition to renewable energy, with over 50% of its energy generated from zero-carbon sources. However, as Minnesota accelerates its shift from coal to renewables, reliability is being impacted by constrained transmission capacity, aging gas infrastructure, and protracted permitting timelines, which is driving the need for significant investment. The state is not keeping pace with the transmission build-out required to connect new generation energy to the grid, even as retail electricity prices, which are still below the national average, continue to rise. At the same time, greenhouse gas emissions remain higher than state targets. Extreme weather, cyber and physical threats, and rising demand are stressing infrastructure even as policies and legislation like the Energy Conservation and Optimization Act, the Renewable Energy Standard and Solar Electricity Standard, and other carbon-free standards drive efficiency and decarbonization.

## BACKGROUND

Minnesota has roughly 19,500 miles of overhead transmission lines. Its electric power sector includes investor-owned and publicly owned utilities, power cooperatives, and municipalities. All investor-owned utilities are regulated by the Minnesota Public Utilities Commission (MPUC). The MPUC oversees rate changes, service territories, mergers and acquisitions, and facility planning for power plants and transmission lines.

Most of the electric utilities in the state belong to the Midcontinent Independent System Operator (MISO), a Regional Transmission Operator (RTO) that manages power flows across the central United States and select Canadian provinces. The utilities within Minnesota

that do not belong to MISO belong to the Southwest Power Pool (SPP), which is another RTO that functions similarly to MISO.

Membership in these RTOs allows the RTO to control the transmission facilities while the utilities maintain ownership of transmission and distribution circuits. MISO and SPP develop policies and procedures to optimize systems operations, generation, transmission, and delivery. They also identify capacity shortfalls and identify where adjustments need to be made.

Minnesota also has five publicly-owned gas distribution companies which supply 80% of the state's gas needs. The rest of the state is served by municipal utilities.

## CONDITION

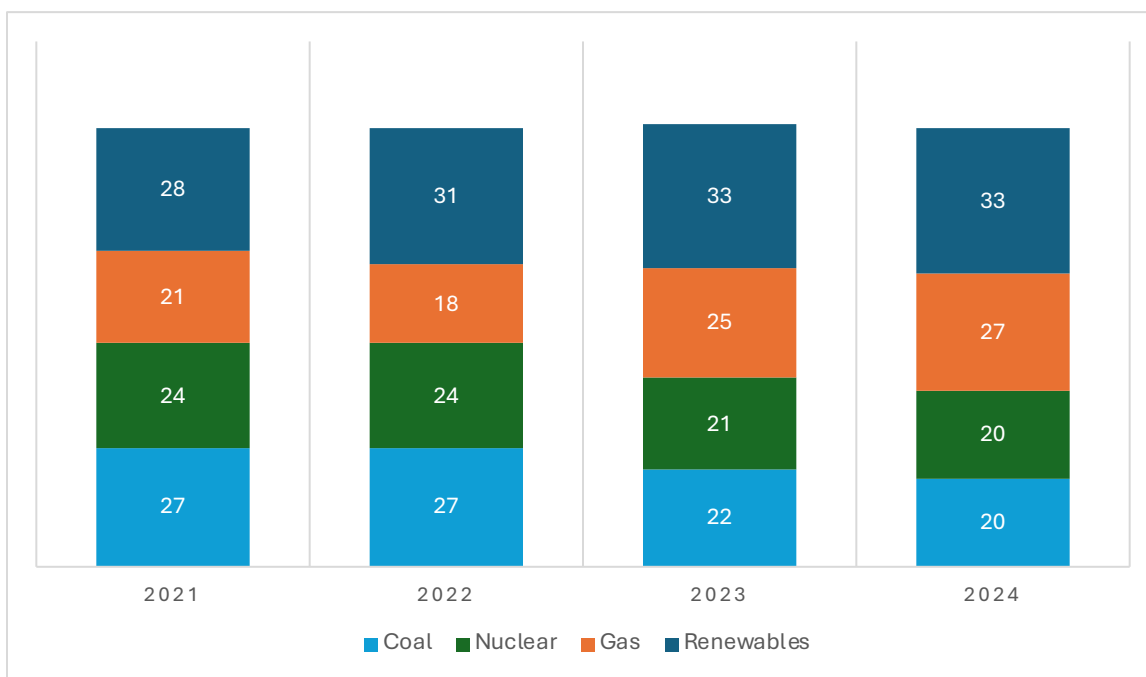
Minnesota’s current Renewable Portfolio Standards (RPS) reporting shows that the electricity generation mix is approximately 33% renewables, 27% gas, 20% nuclear, and 20% coal as shown in Figure 1, compared to the national energy mix of about 23% renewables, 43% gas, 18% nuclear, and 16% coal. In 2024, nearly 400 megawatts (MW) of wind and solar capacity were added, bringing Minnesota’s renewable capacity to about 7 gigawatts (GW). Minnesota ranks among the top ten states for wind generation.

Xcel Energy (also known as Northern States Power, or NSP), the state’s largest utility, retired one coal unit

at Sherburn County Generating Station in 2023, with additional units to be retired in 2026 and 2030. They will also retire the coal-powered Allen S King Generating Station in 2028. Minnesota Power is planning to close two coal-powered units at Clay Boswell Energy Center in 2030 and 2035.

Xcel is planning on investing \$45 billion over the next five years in new generation, transmission, and other infrastructure projects. Xcel owns two active operating nuclear plants at Monticello and Prairie Island and is planning to extend their use to at least 2050.

**FIGURE 1: MINNESOTA ELECTRICITY GENERATION MIX BY TECHNOLOGY**



Source: Minnesota Energy Factsheet 2025

Minnesota is one of 24 states that have eliminated cast-and wrought-iron gas distribution pipelines. Additionally, currently only 0.1% of gas distribution pipelines and 1.3% of gas transmission pipelines are bare steel. As of the end of 2024, 10% of Minnesota’s gas distribution pipelines were installed before 1970 or have an otherwise

unknown installation date. This is an improvement over 2020, when 20% of the distribution pipelines were from pre-1970. However, the same trend does not follow for gas transmission: 53% of gas transmission lines are pre-1970. This is consistent with the rest of the US.

## CAPACITY

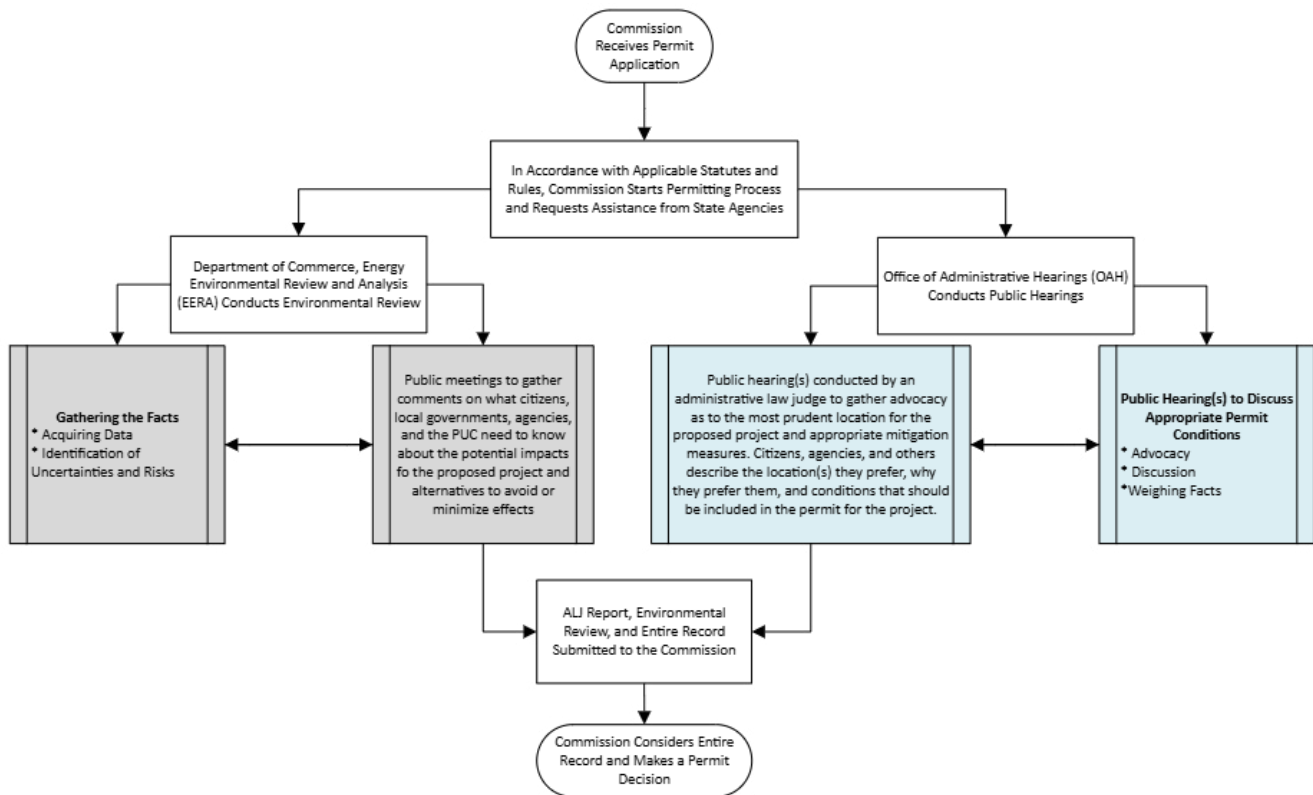
Minnesota has no fossil fuel reserves or production capacity. As a result, the state consumes about four times more energy than it produces. In 2024, Minnesota consumed 65 terawatt-hours (TWh) of electricity and imported 7.1 TWh, about 11%, down from 13% in 2023 and 14% in 2015. The rest of Minnesota’s electricity comes from Canada and other members of MISO and SPP. MISO has less excess capacity than in past years due to a change in resource mix.

Minnesota has no natural gas reserves or production. All natural gas in the state is imported. The price of this imported gas is market-driven and varies seasonally as well as annually. In 2024, the power generation sector consumed a record amount of natural gas, and the need continues to rise. Approximately 63% of the natural gas

transmission lines and 17% of the natural gas distribution lines in Minnesota were constructed either prior to 1970, or the date of construction is unknown. Most of the gas transmission pipelines running through Minnesota are interstate or international pipelines.

All proposed additions and upgrades to Minnesota’s existing energy infrastructure must go through the MPUC, which has a process to review and approve any proposed projects as shown in Figure 2. The MPUC issues Certificates of Need and site or route permits. Between 2020 and 2023, the PUC permitted 20 new energy facilities in Minnesota. Depending on the project size, location, and other specifics, the permitting process can take several years, which can create a bottleneck in the process of adding to or upgrading the electric grid.

FIGURE 2: MPUC PERMITTING PROCESS



Source: MN Department of Commerce

Many projects that have been previously approved through MISO have not gone into service on schedule due to a combination of supply chain issues as well as permitting challenges. The addition of large-scale wind and solar projects continue to be constrained by the need for new high-voltage transmission lines, which are also required to go through the permitting process.

## OPERATION AND MAINTENANCE

Minnesota's population has been having slow but steady growth. The population is projected to grow from 5.78 million people in 2024 to 6.11 million people in 2025. As Minnesota's population increases and technology continues to advance, Minnesota's main energy centers, as well as the state as a whole, will require more electric transmission capacity and increased reliability. As Minnesota consumes more energy than it produces and

## PUBLIC SAFETY

Minnesota regularly faces weather-related hazards that disrupt the energy system. High winds, tornadoes, falling trees, ice, hail, and snow all contribute to electrical failures and disruptions. For example, in August of 2023, there was a hailstorm in Minnesota that was classified as a billion-dollar event. The number of billion-dollar weather events has similarly increased across the country. The grid also faces non-weather risks, including cyber and physical threats.

In 2023, the Minnesota Department of Commerce established the Office of Energy Reliability and Security (OERS) to reduce the likelihood of future energy emergencies and to formalize processes for effective emergency response. Quick and coordinated responses, especially during extreme weather, are a key tool to keep the public safe. That same year, Minnesota submitted its State Energy Security Plan (SESP) to the U.S. Department of Energy, identifying potential

A group of 14 utilities, also known as the Minnesota Transmission Owners (MTO), prepares a Biennial Transmission Projects Report that identifies any needed upgrades filed with the MPUC. The 2023 report identified 164 transmission inadequacies in the state, including load interconnection and generator interconnection inadequacies as well as thermal overloads and voltage violations.

coal plants continue to be retired, increased storage capacity is becoming more critical.

The individual utilities operate and maintain their own infrastructure. Each utility is required to budget for any maintenance, upgrades, and future operational needs, and active legislation needs to continue to support energy users.

hazards to energy systems and providing infrastructure risk assessments. The purpose of the SESP is to ensure there is minimal interruption due to threats and hazards, including severe weather and physical or cyber-attacks.

Minnesota's emissions policy began with the 2007 Next Generation Energy Act and was updated in 2023 by the Climate Action Framework. Together, these statutes aim to reduce greenhouse gas emissions from 2005 levels by 15% in 2015, 30% by 2025, 50% by 2030, and net zero emissions by 2050. As of 2020, Minnesota was on track to meet its reduction goals. In 2023, Minnesota's power sector reduced its carbon dioxide emissions by 10% from 2022 levels, compared to a 3% reduction in 2023 for the overall US. Although some of the decline can be attributed to the COVID-19 pandemic, much of the decline in emissions is due to increased production of renewable energy.

## RESILIENCE

Governor Walz signed the Energy Conservation and Optimization Act (ECO) into law in 2021. Designed to help Minnesota homes and businesses lower energy costs through more efficient use of electricity and natural gas, ECO is administered by individual utilities under the oversight of the Minnesota Department of Commerce. In 2021 and 2022, ECO programs saved Minnesotans more than \$307 million and about 14.6 trillion BTUs of energy. By reducing consumption, ECO also eases strain on the grid and related infrastructure. However, even as utilities deliver savings, overall emissions and energy use by buildings continue to rise.

Continued investment in renewable power can also strengthen resiliency by diversifying power supply options as well as being a distributed source of power rather than a centralized one. The Minnesota Department of Commerce sets requirements through the Renewable Electricity Standard (RES) and the Solar Electricity Standard (SES). The RES requires utilities to supply 25% of retail electricity sales from renewables by 2025 and 55% by 2035; all covered utilities met the 2022 milestone and were on track for 2025. The SES, which applies to Minnesota Power, Otter Tail Power, and Xcel Energy, requires 1.5% of public-utility retail sales to be from solar by 2020 and 10% by 2030; Minnesota Power and Xcel met the 2020 target, and all three are on track

## INNOVATION

Less common sources of power are Distributed Energy Resources (DERs), which are smaller-scale electricity generation resources that are typically on the customer's side of the electric meter but can be connected to the overall electric grid. The MPUC requires electric utilities to file reports on the number of DERs on their system.

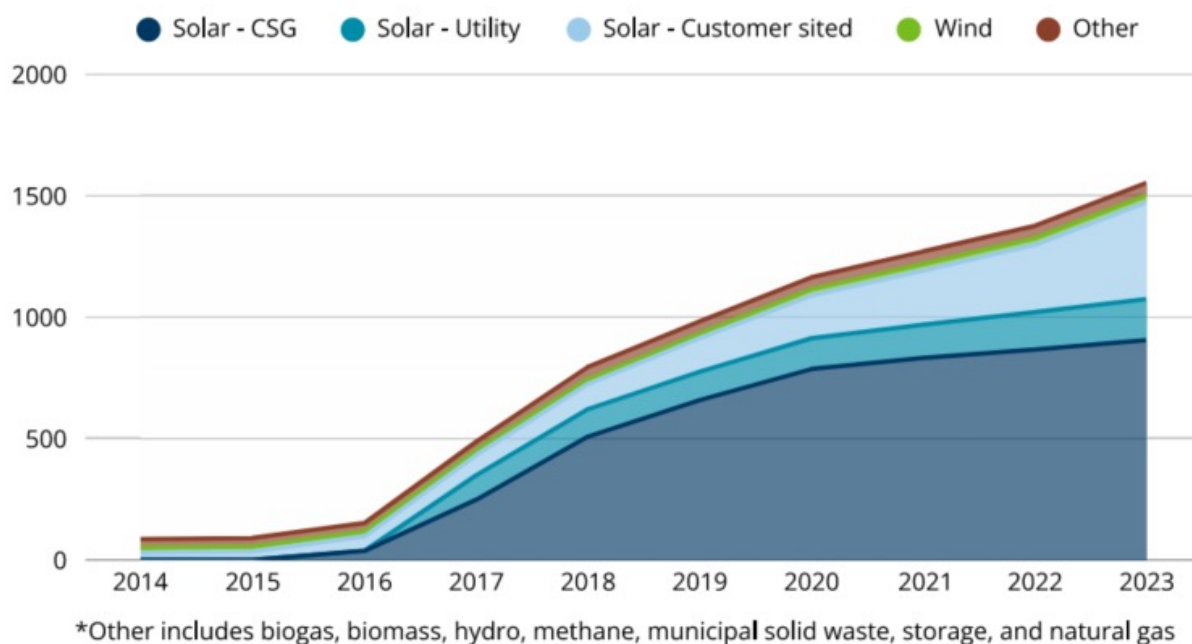
for 2030. In 2023, the state also added a carbon-free standard requiring public utilities to generate or procure 80% of retail electricity from carbon-free resources by 2030 (60% for other utilities), 90% by 2035, and 100% by 2040. Minnesota is one of 29 states to have renewable energy standards.

The RES further requires utilities to derive 25% of total energy used in Minnesota from renewable resources for heating, industrial processes, and electricity generation by 2025. As of 2022, renewables supplied 13% of this total, which is above the national average of 9%. Data was unavailable at the start of 2026, but trends indicated it was likely the 25% goal would not be met.

According to the Minnesota Department of Natural Resources (MDNR), the average temperatures in Minnesota are steadily increasing, and larger, more extreme precipitation events are more frequent. Increased temperatures lead to larger load required on existing electric infrastructure, causing them to reach their end-of-life state sooner than expected. Extreme precipitation and high wind events can also cause excess strain or require early replacement – hail can cause damage to equipment and high wind conditions may cause wires to excessively pull, causing structural damage.

As shown in Figure 3, the Minnesota DERs are primarily solar (including residential solar), but also include small wind systems, generators, and battery storage facilities. As of December 31, 2024, there were 28,920 DERs accounting for almost 1.69 GW (AC) of capacity.

**FIGURE 3: CUMULATIVE INSTALLED DER CAPACITY**



Source: MPUC

## FUNDING

Public utilities receive most of their funding from consumers. These funds cover maintenance, capital improvement, and expansion projects. Both the state as well as the United States Department of Agriculture (USDA) also have some funds for rural infrastructure upgrades. Funding increases are regularly needed for maintenance and upgrading existing aging infrastructure, as well as preparing for future extreme weather events. This means the individual consumer is continually seeing increases in their utility bills.

As part of the Infrastructure Investments and Jobs Act (IIJA), Minnesota entities received \$794 million for energy- and resiliency-related projects. Another \$112 million is designated for weatherization assistance as well as preventing outages and enhancing resiliency.

The Inflation Reduction Act (IRA) was signed into law in 2022. Through 2023, the IRA supplied over \$159 million for energy- and resiliency-related projects, such as Save Energy Minnesota, which is intended to support

energy-efficient home improvements. Additional project funding was also made available via tax credits, loan programs, and grants.

Minnesota was awarded a \$464 million grant from the Department of Energy as part of their Grid Resilience and Innovation Partnerships (GRIP) Program to plan across RTOs for increasing transmission capacity to alleviate constraints in the interconnection queue. This funding was to last through 2032.

Future funding is now in jeopardy as the federal government reevaluates or eliminates funding for renewable energy projects. In October 2025, over \$600 million in pending applications for projects in Minnesota, including the GRIP program, were cancelled by the Department of Energy. The loss of these programs further threatens funding that could potentially be put towards critical infrastructure improvements. These costs could also be passed on to the customer, leading to even higher energy bills.

## FUTURE NEED

Per the Minnesota Department of Commerce there are three main issues facing infrastructure permitting over the next decade: (1) replacing, reinforcing, and modernizing aging transmission lines to meet new load requirements; (2) continued growth in renewables; and (3) a significant expansion of energy storage. There are also several other challenges to the electrical system: the grid is transitioning from analog parts to more digital technologies and changing from a centralized system with one-way power flows to a dynamic system with two-way power flows, and environmental and economic pressures are pushing to end reliance on resources based on fossil fuels and move toward renewables.

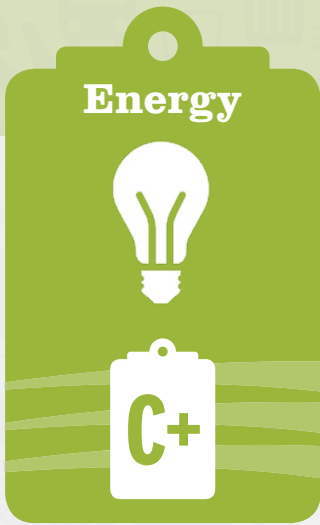
Expanding transmission capacity is being investigated on multiple fronts. The utilities behind the Capacity Extension by 2020 project, or CapX2020, many serving Minnesota, are evaluating needs through 2050. They propose to combine new technologies, such as advanced inverters and DERs, with system expansion via new HVDC transmission. They also suggest retiring certain dispatchable resources (e.g., coal and nuclear), planning proactively for demand and maintenance, and leveraging controllable loads such as smart thermostats. Additionally, in July 2022, MISO approved an initial group of 18 regional 345kV “backbone” long-range transmission projects (LRTP) in the Upper Midwest, also known as the Tranche 1 portfolio. Three of these projects are in Minnesota and have started the state approval processes needed for construction, with in-service dates expected between 2028 and 2030. In December 2024, MISO also approved a Tranche 2.1 portfolio, which includes a 765kV backbone transmission line designed to carry more electricity more efficiently, reduce land use, and maintain high reliability. The 765kV line will partially run through Minnesota. Several other transmission lines in the Tranche 2.1 portfolio will run through and around Rochester, with other lines planned for the northern and southwestern portions of the state. The other projects in the portfolio are expected to go into service between 2032 and 2034. These projects do not include future generation and were not intended to resolve all identified issues, so further transmission capacity will be needed.

With several coal plant unit retirements, the total electricity generated by coal in Minnesota has fallen approximately 6% from 2018 levels as of the end of 2024. Renewable generation, particularly wind and solar, is a low-cost and environmentally-friendly solution but requires time-consuming approvals through MISO and the MPUC. Moreover, new generation must be connected via permitted transmission lines, a process that can be lengthy.

Because Minnesota lacks sufficient in-state generation capacity, energy storage must increase. At the end of 2023, Minnesota had about 16 MW of utility-managed battery storage. Larger battery energy storage systems (BESS) will be required. The amount will vary depending on the additional resources added to the electric grid. Additional storage can also help lower ratepayer costs by storing more energy when demand and costs are low and releasing it when demand and costs are high. In August of 2025, the first stand-alone BESS project was approved, which would provide 150 MW of storage starting in 2027.

Decentralized electrical assets, such as distributed wind, solar, and BESS, as well as controllable loads such as smart thermostats, will continue to be added to the grid. Significant investment in the distribution system, including new infrastructure, software, communications, and hardware, will be required to integrate DERs. Additionally, utilities will need to harden the distribution system against extreme weather events and prepare for larger demands to ensure reliable power.

None of the data provided in any of the referenced sources include energy use from data centers. There is currently only one data center under construction in Minnesota, but at least a dozen more have been proposed. The Minnesota Legislature passed a bill forbidding utilities from passing the data center electricity cost onto consumers, but the data centers will still need to be fed from the existing grid. It is possible that many of these data centers will include their own energy generation, which will need to be interconnected to the existing electric grid. This may be considered in future report cards.



## RECOMMENDATIONS TO RAISE THE GRADE

- Continued investment in renewables and dispatchable resources will be needed to make up for the shortfalls created by retiring the state’s coal plants and rise in energy uses.
- Update building codes to account for energy efficiency. In 2021, Minnesota buildings consumed 42.1% of the total energy use in the state.
- Investigate options other than new construction for transmission, such as reconductoring existing lines with advanced conductors, microgrids, etc.
- Add additional energy storage as renewable energy generation continues to increase.
- Survey and update Minnesota’s transmission and distribution pipelines to ensure their condition and adequacy.
- Streamline the MPUC permitting process to eliminate permitting bottlenecks.
- Invest in more DERs and other advanced technologies.
- Fund transmission infrastructure needs through avenues other than the federal government. This could include raising rates to prioritize maintenance.

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# Ports



**GRADE  
COMPARISON**  
**MN: C**  
**Nat'l: B**

Photo: Duluth Entertainment and Convention Center (DECC) Seawall - Viking Cruise Ship "Octantis" Docking at DECC; courtesy of AMI Consulting Engineers, P.A



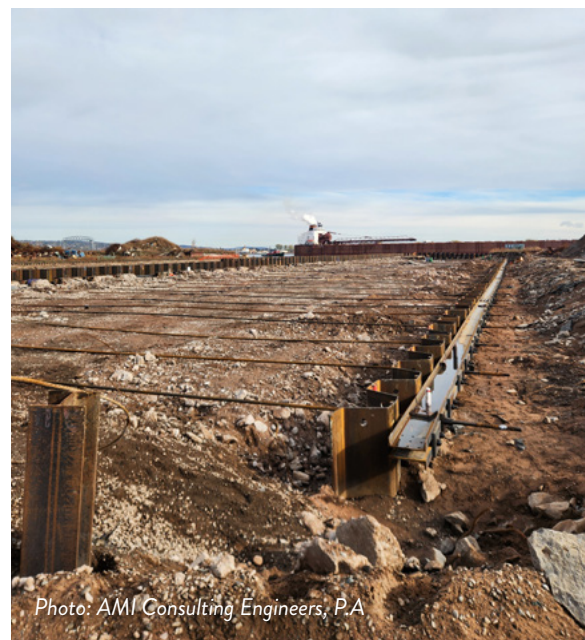
# PORTS

## EXECUTIVE SUMMARY

Ports are major economic drivers linking cities to world markets. Most of Minnesota's ports are concentrated along Lake Superior (St. Lawrence Seaway), with several, smaller ports along the Mississippi River. Minnesota's ports process more than 52 million tons of products, including agricultural and mining products. While capacity in Minnesota's ports is currently sufficient, the ability to maintain or improve the condition of existing facilities and develop new infrastructure varies. Many port structures will require attention in the immediate or near future as the structures are near the end of their 50-year design life. Other challenges that facility operators continually address include accelerated freshwater corrosion of steel structures, increased storm frequency, flooding, dredging backlogs, deferred dock wall construction, creation of new storage facilities, rehabilitation of buildings and landside connectors, gentrification, and upgrades to meet code. Workforce shortages and project funding continue to be major concerns impacting operations, maintenance, and construction activities.

## CAPACITY

Public and private dock owners and operators indicate that Minnesota's ports currently have sufficient land capacity for the short term, but much of this space will require major upgrades due to future changes in use and condition. With the expansion of containerized, breakbulk and specialty shipping to relieve other currently congested ports, large areas of land near or on the waterways will be needed to accommodate future receiving and multimodal distribution facilities. Another current trend is the gentrification of land in and near port areas. Land that is considered ideal for freight shipping purposes is increasingly in competition with residential, commercial, public, and recreational land uses. This has begun to displace the potential for freight terminals along shorelines and reduces the availability of land for marine freight transport.



*Photo: AMI Consulting Engineers, P.A*

FIGURE 1: MINNESOTA PORTS MAP



Source: Minnesota Department of Employment and Economic Development

The largest port in Minnesota is the Port of Duluth-Superior, a bistate international port at the far western end of the Great Lakes/St. Lawrence Seaway. Located within the natural estuary of the St. Louis River, the port has 19 miles of federally dredged navigation channels. The shipping season is seasonal, with an approximately two-month closure for domestic shipments and three-

month closure for overseas shipments. Approximately 50 to 75 million tons of cargo are moved through the ports in Minnesota each year. See 2024 net tonnages in Table 1 below with Savage tonnage reported from 2023. Dock owners indicate that a decline in bulk tonnage has occurred since 2023 with break bulk and containerized shipping expecting to increase into the future.

**TABLE 1: MINNESOTA PORT CAPACITY**

PORT 2024	NET TONS	PERCENTAGE
DULUTH SUPERIOR	30,476,838	55.90%
TWO HARBORS	14,617,891	26.81%
SAINT PAUL	3,181,874	5.84%
SILVER BAY	3,090,360	5.67%
SAVAGE **	1,631,519	2.99%
WINONA	1,426,720	2.62%
RED WING	91,758	0.17%
<b>TOTAL</b>	<b>52,885,441</b>	<b>100.00%</b>

*Multiple Port Sources (\*\*2023 data)*

Minnesota’s ports generally facilitate the movement of dry bulk cargo, especially iron ore, coal, limestone, grain, and salt. Break-bulk cargoes of mining and energy industry equipment, steel, lumber, and paper products are handled at docks owned by the Duluth Seaway Port Authority. Additional efforts to increase containerized cargo at the Port of Duluth-Superior are underway, with the current twenty-foot equivalent units (or TEUs) increasing yearly. The 2024 total exceeded 500 TEUs within the Duluth-Superior Port.

The importance of these cargoes and modern well-maintained ports to the North American economy is best evidenced by the shipment of iron ore. The iron ore in a single, 70,000-ton cargo shipment on a 1,000-foot Laker (lake-bound cargo ship) will be utilized in the manufacturing of over \$2 billion in finished products within the North American economy. Great Lakes taconite, an iron-rich rock, shipped from the Duluth-

Superior port amounts to over 20 million tons each season, which represents 55% of the overall tonnage shipped from the port. Iron ore decreased in price and tonnages shipped dropped to an all-time low in 2020 due to Covid-19 pandemic, going from nearly 20 million tons exported in 2019 to 15 million in 2020, but the industry has rebounded and has exceeded the 2020 tonnages through 2025.

The Saint Paul Port Authority owns four multimodal terminals on the Mississippi River. Throughout the shipping season, which runs from December to March, commodities are loaded on and off barges. Over three million tons of commodities passed through the Saint Paul Port Authority river terminals in 2024, including corn, soybeans, and wheat. Imports include sand, gravel, fertilizer, salt, cement, and coal. The river ports account for over 50% of Minnesota’s agricultural exports. See Table 2 for examples of common exports.



*Photo: AMI Consulting Engineers, PA*

**TABLE 2: COMMODITIES AND PRODUCTS SHIPPED ON THE MARINE SYSTEM IN MINNESOTA**

Mississippi River System	Great Lakes-St. Lawrence Seaway System
Grain	Iron or (taconite)
Aggregate	Coal
Fertilizer	Grain
Cement	Limestone
Salt	Salt
Iron	Bentonite
Coal	Kaolin clay
Limestone	Bituminous aggregate
Petroleum products	Oil field equipment
Animal feed products	Project cargo
Slag	Break-bulk
Steel	Aggregate
Twine	Sinter ore
Urea	Wind energy components

Source: *Statewide Ports and Waterways Plan, Table 2.3*

A portion of the Upper Mississippi River was designated as a Marine Highway by the Maritime Administration (MARAD) in 2014. The M-35 corridor, also known as the “Waterway of the Saints,” runs between St. Louis, MO, and Minneapolis and Saint Paul. This designation

is anticipated to assist in providing a seamless transition across freight modes by leveraging marine services and locations to complement landside surface transportation routes. This expands Minnesota shippers’ ability to distribute freight to the region and the world.

## CONDITION

The physical condition of docks and piers (both above water and below), break walls, jetties, and landside facilities are all important elements of a port’s condition. One specific challenge facing the largest Lake Superior port, Port of Duluth-Superior, is the high rate of corrosion of the steel structures in the upper 10 feet of the water column due to Microbiologically Influenced Corrosion (MIC) that started around the mid-1970s (Hicks). Existing steel structures are being upgraded utilizing unique corrosion remediation methods and new steel structures are being protected with coatings. In some cases, structures have been replaced with fully composite materials in lieu of steel.

Across the state, the structural condition of port facilities on both lakes and rivers varies considerably. Some

structures are poorly maintained and show significant deterioration, with a number already taken out of service. Others have benefited from consistent maintenance and remain in fair condition, while several facilities have recently undergone substantial rehabilitation or replacement and are now in excellent condition.

For the purposes of this report card, information from most active or currently accessible facilities within each port was evaluated and graded, and those results were then combined to develop an overall statewide grade. Members of the Army Corps of Engineers-Duluth Branch, Duluth Seaway Port Authority, and the St. Paul Port Authority were consulted. Most public port facilities are now being inspected on a regular basis both above and below the waterline at 5 year or less intervals, which

provides regular reporting of condition. With additional knowledge and assessment of private facilities within each port, a comprehensive assessment of Minnesota’s ports can be assembled, which includes more than 60% of all active port facilities statewide and more than 90% of Minnesota ports connecting to Lake Superior. This approach provides a broader and more comprehensive view of the condition of port infrastructure. Many of the structures receiving lower ratings are approaching—or

have already exceeded—their original 50-year design life. Improving these grades will require property owners within each port to dedicate adequate resources toward ongoing maintenance, rehabilitation, and replacement efforts to address corrosion, environmental exposure, and normal wear. Without such investment, these facilities risk becoming unsafe, failing, and ultimately reaching a condition where practical repair is no longer feasible.

## FUNDING & FUTURE NEED

The Minnesota Department of Transportation oversees the Port Development Assistance Program (PDAP) to help upgrade, rehabilitate or replace publicly owned properties. There are also federal programs available to help offset the cost of replacements and upgrades, such as MARAD’s Port Infrastructure Development Program (PIDP) and Economic Development Administration (EDA) funding. These state and federal funding sources have had a very positive impact on maintaining and expanding the Minnesota port facilities with additional funding coming from the Infrastructure Investment and Jobs Act (IIJA). As of January 2025, over \$64 million in funding had been announced through the IIJA for ports in Minnesota. Privately owned facilities, on the other hand, have lacked funding infusion and the funding options available to public ports. There are some grants available, but the overall funding and repair burden on private facilities falls on the individual dock owners. Many of the declining dock conditions surround the historical decline in revenue and profits from steel,

grain, and coal facilities. For this reason, many of the privately held facilities are in poor condition. If the Minnesota PDAP grant program is ever modified to include privately owned facilities, or a new program was created for private infrastructure assistance, along with significant funding increases, the physical condition and future competitiveness of the facilities in Minnesota will benefit and thus help raise the overall state grade.

In 2023, seven port development projects received grants totaling \$18 million to support freight movement on Minnesota’s waterways. Yearly PDAP requests total more than double the currently available funding, indicating the high level of need among Minnesota ports. Project requests included dredging in dock areas, dock maintenance and rehabilitation, new dock construction, creation of new storage facilities, building/road rehabilitation, land access improvements, and upgrades to meet safety codes. The \$18 million in PDAP funding was provided for the projects listed in Table 3.

**TABLE 3: 2023 PORT DEVELOPMENT ASSISTANCE PROJECTS**

Port Authority	Dollars Rewarded (M)	Description of Project(s)
Duluth Seaway	\$7.57	Dock maintenance and rehabilitation, improved utilities
Red Wing	\$2.60	Dock maintenance and rehabilitation, new storage areas
Winona	\$2.20	Dock maintenance and rehabilitation, river cruise prep
Saint Paul	\$4.80	New storage facilities, repairs and upgrades
Wabasha	\$0.89	New barge terminal facility

Source: MnDOT

The U.S. Army Corps of Engineers (USACE) also increased funding in the last few years (and for the foreseeable future) with additional Great Lakes Restoration Initiative dredging dollars and a larger allocation of the Harbor Maintenance Trust Fund dollars. For Fiscal Year 2026, the U.S. Army Corps of Engineers (USACE) Civil Works program has a requested budget of approximately \$6.66 billion, with a focus on maintaining critical navigation infrastructure. The Great Lakes summary shows that the Great Lakes region will receive a total of \$466.21 million for navigation maintenance in FY2025. Much of this is harbor dredging, lock renewal/maintenance, and other structural improvements. By way of comparison, the Great Lakes region received \$374.04 million in FY2024. FY2025 represents a historic level of overall funding for the Great Lakes region for this type of investment with the Duluth-Superior harbor receiving approximately 27.7 million in 2025 for harbor related dredging. Current work to delist the harbor as an Area of Concern (AOC) brought federal dollars through the Great Lakes Restoration Initiative (GLRI) to relieve the multiyear dredging backlog and restore 1,700 acres of nearshore shallow water habitat.

Along the Mississippi River system, commercial barge operators pay a user fee of 29 cents per gallon of fuel purchased. These dollars fund half of major federal lock structure improvements, including maintenance of the

## OPERATION & MAINTENANCE

Port facility owners and operators react differently to operation and maintenance issues. Some conduct repairs immediately upon initial notice, while others wait for issues to go beyond critical. The rate of inspections is also inconsistent—some facilities conduct them annually, whereas others do not perform them until a failure or grounding of a vessel occurs. Some facilities have recently undergone significant upgrades and, as a result, their maintenance and inspection schedule needs are significantly lower than others that have made no improvements. With the current release of ASCE MOP 130.2025 Waterfront Facilities Inspection and Assessment, facilities now have a comprehensive manual that provides guidelines and methodology for conducting engineering inspections and assessments of existing waterfront facilities. This manual covers various inspection types, including routine, structural repair

13 locks and dams for which USACE’s St. Paul District is responsible. While these improvements may technically lie outside of the scope of this chapter, dredging and lock improvements on the Mississippi need to be adequately funded to ensure that ships traveling downstream do not need to be “light-loaded” at ports.

Private funding to repair docks has been very limited in Minnesota. High costs to repair and replace aging infrastructure have forced dock owners to consolidate operations and only improve areas that absolutely need it to maintain operations. Typical Seaway draft dock infrastructure replacement has now increased to a range between \$4,500 to \$7,500 per foot of steel sheet pile dock wall. Some dock owners have shut down facilities and/or moved to other states where public funding is available to pay up to 80% of the rehabilitation. The decline in demand for some commodities and lack of private equity to facilitate private dock funding is accelerating the rapid decay of many docks and forcing some owners to shut down operations completely.

Comprehensive, publicly available data on the backlog of investment needs at ports in the state is not available, making it difficult to assess the scale of the gap between investments and needs moving forward. Additional reporting on investment needs at ports in the state would be beneficial.

or upgrade design, new construction, baseline, due diligence, special, repair construction, and post-event inspections. Sharing this information and education with each facility owner will be prudent to improve the grade.

The overall industry trend is now slowly moving towards creating detailed asset management strategies and inspections programs, which should improve long-term maintenance planning. The most common maintenance items are typically installing fender protection systems, dredging to maintain vessel clearances, and grading and clearing for proper site access.

The Mississippi River System and Great Lakes-St. Lawrence Seaway channels are maintained by the U.S. Army Corps of Engineers (USACE), which dredges the width and depth of the channels to accommodate barges of up to a nine-foot draft and vessels to twenty-seven feet of draft.

# PUBLIC SAFETY

Public safety is always important. Most port facilities are located within defined industrial areas and are kept at a distance from outside foot or vehicle traffic, which allow operations to be conducted with minimal potential harm to the public. However, ports in Minnesota cannot be made to be completely inaccessible, as there is always water access. Some port infrastructure and facilities in the state do not have dedicated means to prevent access from curious passersby and/or trespassers and lack physical barriers or fencing. Examples of this are the free edges of all docks along the waterfront that must remain open to accept ships and barges to allow for the discharge or loading of cargo.

In urban portside environments such as Duluth, the North Shore, and the Twin Cities, there is a growing conflict with residential and commercial development

near port infrastructure. With this new development comes new challenges, such as hotels renting out kayaks and canoes for use near port infrastructure. Pedestrians who frequently encounter port infrastructure may begin to associate familiarity with safety, potentially increasing the likelihood of unintended access to these industrial facilities. Recent public safety concerns have arisen due to unpermitted access in active port areas by recreational boats, canoes and kayakers. There have been many instances of public sightseeing, stopping and resting along industrial lands, and accessing sites that are typically restricted by land entrances. With the advent of low cost cellular camera systems, many facilities are now taking steps to increase security, lighting and signage along the perimeter and unsafe areas of their properties.



*Photo: AMI Consulting Engineers, P.A*

## RESILIENCE

Port resilience is essential to business and multimodal continuity. Facilities in Minnesota must resist ongoing corrosion issues and extreme weather conditions, including flash floods, high/low water elevation fluctuation, ice, and heavy winds in an increasingly complex and uncertain climate. The adaptive capacity to recover from disruptions defines the resilience of a port.

As well as physical disruptions, facilities must effectively respond to short-term economic changes and fluctuating exports for each facility. Recent changes to international trade, including the raising and lowering of barriers to trade, may have new and unforeseen impacts on port functions in Minnesota. Several of the docks at grain industry facilities, port authority facilities, and general bulk material storage docks have the capability to import and export multiple products, while others are currently dedicated to a single product (such as iron ore, coal, and fuel), with tonnages on/off these docks strictly tied to a single demand.

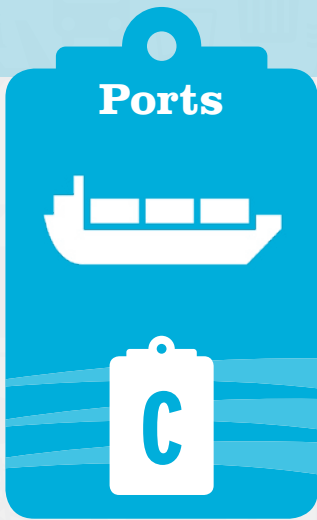
## INNOVATION

Within the wide range of docks and facilities in the various harbors and ports, there is a large gap in the use of innovative technology. The area with the most innovation in the past 20 years has been steel corrosion protection, which increases the longevity of port infrastructure. Many of the steel dock structures now incorporate epoxy coatings, plastic panels, or composite jackets for protection. Owners of some significantly older docks have upgraded their old wood structures with coated steel sheet pile. Some of the most recent docks to do this are the DECC Seawall Cruise Boat Terminal Project and Beth 11 at the Duluth Seaway Port Authority in Duluth, MN. Several dock operators have lacked the capacity or funding to modernize or innovate their facilities or simply have no need to do so.

Ports are vulnerable to a wide range of environmental disruptions, including extreme weather events, extreme water elevation changes, scour and erosion, ecological disruptions and many other climate related hazards. As critical nodes in global supply chains, these facilities must therefore be planned, designed, and operated with an emphasis on resilience—the capacity to anticipate, absorb, adapt to, and rapidly recover from disruptive events. Embedding resilience principles into port infrastructure and operations supports longterm sustainability by reducing lifecycle costs, minimizing downtime, and protecting surrounding communities and ecosystems. From a risk management perspective, this approach aligns with established frameworks that prioritize hazard identification, vulnerability assessment, and adaptive decision-making to ensure continuity of operations under uncertain and evolving environmental conditions.

Additional governmental and private research and development of new composite, plastic, concrete, and hybrid steel piling products is now paving the way to solve many repair and resiliency issues. The willingness to step away from old technology and the funding to test these products in full-scale operations still is needed by the state to advance innovation at many of the port facilities.

Federal and local agencies responsible for dredging operations have been creatively reusing dredged material in capping, a method of remediating via placing clean material over historically contaminated areas of harbors and beach nourishment, saving millions of dollars in unwanted stockpile and disposal.



## RECOMMENDATIONS TO RAISE THE GRADE

To raise the ports infrastructure grade in Minnesota, the following actions are recommended:

- Port Authorities, such as the Port of Duluth-Superior, should continue to preserve land uses, maximize the efficiency of intermodal connections, and continue to seek new cargo potential.
- Expand federal maritime grant programs and the state's Port Development Assistance Program (PDAP) to include broader access for more projects and consider the creation of new lending programs to private dock owners.
- Continue to protect the federal Harbor Maintenance Trust Fund to address dredging backlogs in the system and support USACE structural repairs.
- Implement detailed asset management programs. Utilize ASCE MOP 130.2025 Waterfront Facilities Inspection and Assessment at all public and private facilities. Overall proper asset management programs will improve public and private understanding on condition and rehabilitation needs for port infrastructure.

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# Public Parks



GRADE  
COMPARISON

MN: B-  
Nat'l: C-



# PUBLIC PARKS

## EXECUTIVE SUMMARY

Minnesota's parks system includes one national park, five national monuments and recreation areas, 73 state park and recreation areas, 23 state trails, 77 regional parks and trails in Greater Minnesota, and 58 in the Twin Cities metro area. In 2025, Minneapolis ranked third and St. Paul fifth in the Trust for Public Land's ParkScore®, reflecting strong access, equity, acreage, and investment. Historically well maintained, the system now faces growing strain. The Minnesota Department of Natural Resources (DNR) reports a \$778 million deferred maintenance backlog due to underfunding and pandemic impacts, along with a need for \$211 million annually over the next decade. At the local level, St. Paul alone reports over \$100 million in park repair needs. Meanwhile, the Twin Cities region plans to expand parkland from 65,339 to 70,000 acres and trails from 487 to 1,100 miles. Without increased funding, these expansions risk further straining already limited maintenance resources.

## CONDITION AND CAPACITY

Minnesota has abundant natural and built assets that facilitate and enhance recreational opportunities on public lands. The state's natural features provide a vast array of recreational opportunities for residents and visitors alike. The state has more than 10,000 lakes, and millions of acres of grasslands, forests, rivers and wetlands with varying underlying geology all of which provide a range of recreational opportunities.

Trail replacements are necessary due to their heavy use, winter freeze-thaw and lake ice pressure, as well as from tree root damage. The Minneapolis Park Board works to maintain their facilities as well as design and construct replacements as needed. Here they worked closely with their on-staff arborists to mitigate any potential risk to mature trees along the trail.

Park lands in Minnesota are managed by federal, state, local, and private entities. There are also tribal reservations that manage their own parks and natural areas. The state is home to one national park, Voyageurs; two national monuments, Pipestone and Grand Portage; the Mississippi National River and Recreation Area; portions of the St. Croix Wild and Scenic River, the North Country National Scenic Trail; the Mississippi River Trail; and 300,000 acres of national wildlife refuge land. Voyageurs National Park, located within the million-acre Boundary Waters Wilderness Canoe Area, encompasses 218,000 acres and is one of the nation's most popular wilderness destinations, attracting 221,000 visitors each year.

## TRAIL ALONG LAKE HARRIET IN MINNEAPOLIS BEING REPLACED



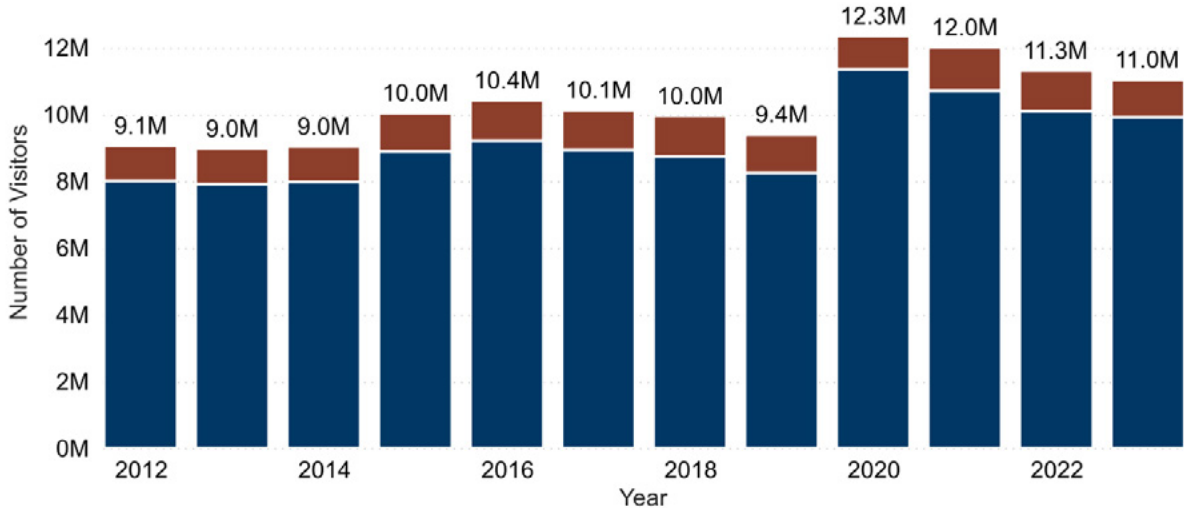
*Photo: Toshihiko Karato*

State facilities consist of 64 state parks, nine state recreational areas, nine state wayside rests, 43 state forest campgrounds, 25 state trails, 35 state water trails, and 3,000 public water access points to the state's lakes and rivers. Of the 1,500 miles of state trails, 647 are paved. There are also 4,100 miles of hiking, biking, and motorized trails and 22,000 miles of snowmobile trails. In total, the state controls 5.6 million acres of land (~11% of the state) including 1.3 million acres of wildlife

management areas. On average, the DNR acquires 9,000 acres of land annually. Nature-based tourism contributes significantly to the \$12.5 billion annual sales that result from overall travel and tourism within the state. This includes a \$4.4 billion fishing industry, \$688 million from state parks visits, \$102.5 million from state trail visits, and \$78.4 million from National Parks visits.

## FIGURE 1: STATE PARK AND RECREATIONAL AREA VISITORS BY YEAR

● Day Use Visitors ● Overnight Visitors



Source: Mn DNR

The DNR’s target is to increase the number of visitors to state parks and recreation areas 2% annually. There was a big increase in visitors in 2020 and while visitor numbers have dropped since then, they are still above the previous peak of 2016.

**POPULAR DESTINATION FOR VISITORS INCLUDE SPLIT ROCK LIGHTHOUSE STATE PARK, DRAWING 160,000 VISITORS EACH YEAR TO THE SHORES OF LAKE SUPERIOR.**



Photo: Toshihiko Karato

Regional facilities are managed by the Metropolitan Council (Met Council) in the seven-county metropolitan area and by the Greater Minnesota Regional Parks and Trails Commission (GMRPT) in the 80 counties beyond the metropolitan area. The Met Council manages more than 65,339 acres in 58 regional parks and park reserves, nearly 487 miles of interconnected trails and eight special recreation features. Notable destinations include the Como Park Zoo and Marjorie McNeely Conservatory in St. Paul and the Chain of Lakes in Minneapolis. An estimated 65.7 million system visits were made to the Regional Parks and trail system in 2024, 5.4% lower than the post-Covid peak in 2023. The GMRPT currently manages 80 facilities statewide, and facilitates the acquisition and improvements of additional facilities each year.

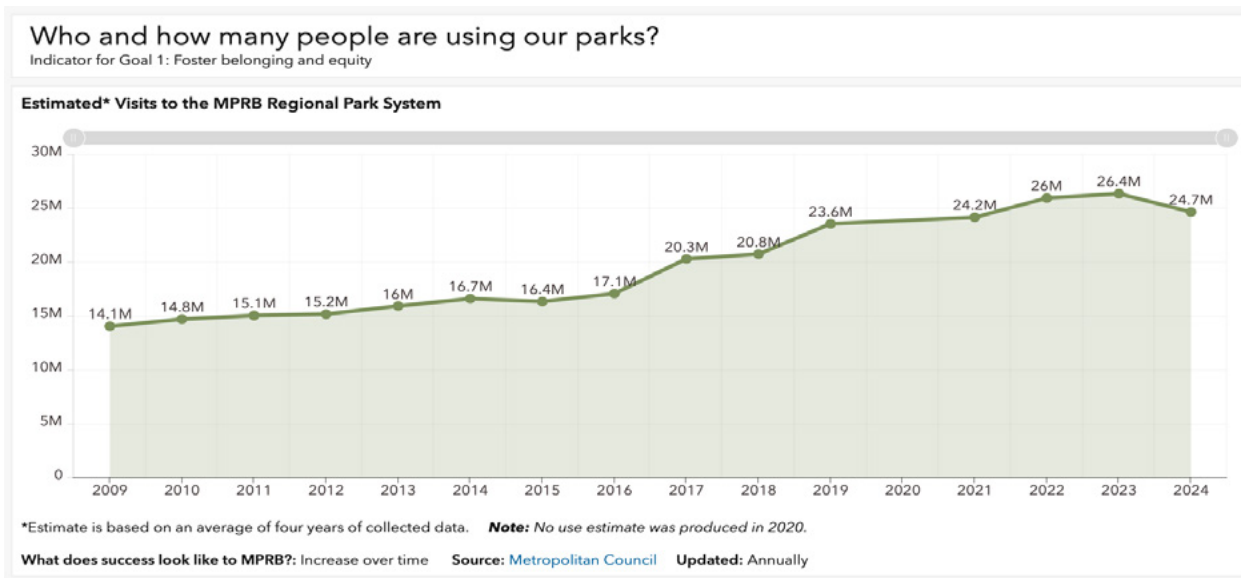
At the local level, cities, townships, and counties operate and maintain parks and open spaces for their residents. The Trust for Public Land 2025 ParkScore® Index ranked Minneapolis third and St. Paul fifth based on access, acreage, equity, investment and amenities. Notably, Minneapolis achieved a perfect score in investment and both cities have 99% of their residents living within a 10-minute walk to a park. A review of the ten largest cities located throughout Minnesota indicates that the percent of city residents within a 10-minute walk of a public park ranges between 73% and 99% of the city’s respective population. Cities and counties in Minnesota are working on improving their ParkScore® by extending accessible sidewalks and trails to provide safe routes for

residents to access parks and adding parks in areas that lack access. Notable recent improvements within the state include extension of trails and addition of parks, such as the completion of the St. Paul Grand Round regional trail and addition of Frazee Wannigan Park which is strategically connected to state and national trails.

The Minneapolis Park System was established in 1883 and consists of 7,059 acres, or 15% of the land area of the city. It is estimated that the system has 24.7 million

annual visits (down slightly from the previous year). This park system includes 185 park properties, 55 miles of parkways, 102 miles along the Grand Rounds Scenic Byway (a scenic drive encircling the city), biking and walking paths, 22 lakes, 12 formal gardens, seven golf courses, and 49 recreational centers. The Minneapolis Park and Recreation Board won its second National Gold Medal Award for Excellence in Park and Recreation Management in 2024 from the American Academy for Park and Recreation Administration.

**FIGURE 2: GOAL 1 | PARKS FOR ALL MPRB COMPREHENSIVE PLAN 2021-2036 GOALS DASHBOARD**

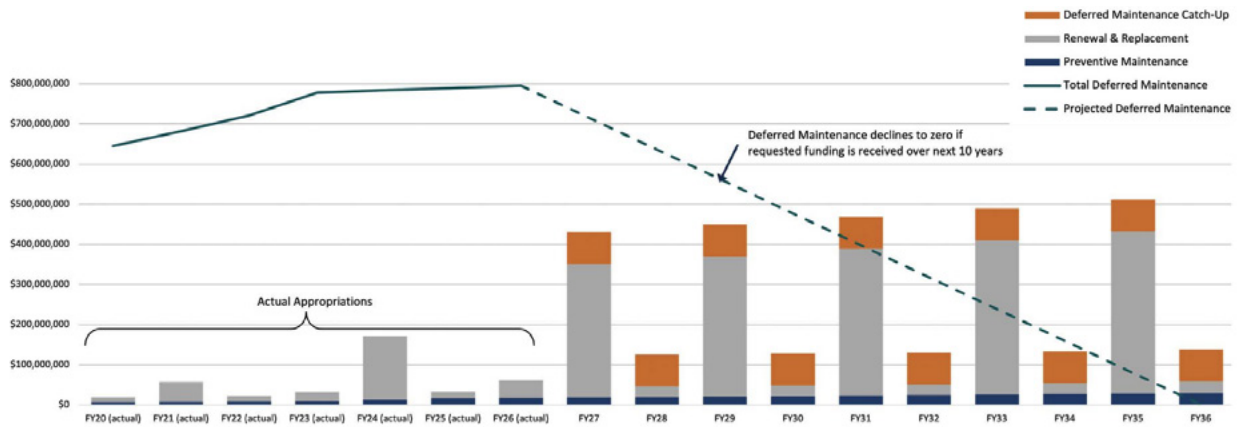


Source: Mn DNR

Many of the challenges that parks in the state face are evident in the condition of the facilities and resources in the state park system. As of 2025, the DNR has identified a \$789 million deferred maintenance backlog of their \$4.36 billion replacement value portfolio of infrastructure assets. The needs include: nearly a quarter (640) buildings with a Facility Condition Index (FCI) of “crisis” or “poor” condition, aging water and wastewater systems past their service life, failing bridges (such as at Wild Indigo Prairie and Alborn-Pengilly Trail), aging dams (as seen at William O’Brien State Park dam failure in 2025), as well as trail and site facility upkeep.

**The Minneapolis Park and Recreation Board won its second National Gold Medal Award for Excellence in Park and Recreation Management in 2024 from the American Academy for Park and Recreation Administration.**

**FIGURE 3: DNR TEN-YEAR CAPITAL ASSET MANAGEMENT PLAN**



Source: Mn DNR

St. Paul Parks and Recreation Department has estimated a backlog of \$100 million in deferred maintenance, of which \$60 million are in critical or urgent status and the

remaining \$40 million are set to reach critical or urgent within the next five years.

## OPERATION & MAINTENANCE, FUNDING, AND FUTURE NEED

Funding for the state’s parks and recreational resources comes from a variety of sources. General funds from federal, state, regional, and city authorities are the main sources, most notably the Clean Water, Land and Legacy Amendment (CWLLA or Legacy Amendment) to the Minnesota Constitution. The Parks and Trails fund of the CWLLA is divided 20% to Greater Minnesota, 40% to Minnesota DNR, and 40% to the Metropolitan Council Regional Parks. All facilities rely on admission fees, user fees, and development fees, among other various funding mechanisms. Income from fees annually vary from \$22.72 million in state park fees to a \$17.08 million for services, sales and rent in the Minneapolis Park System.

At the regional and local levels, investment has been robust and coordinated by the Metropolitan Council and the Greater Minnesota Regional Parks and Trails Commission. These organizations help distribute funding from CWLLA and coordinate across cities, counties and towns to maximize the impact of investment.

In the Twin Cities, Minneapolis contributes funds from their property tax, and St. Paul from a sales tax increase called the Common Cent. Local funding streams have enabled the largest municipal systems to have a steady revenue for the near future: the Common Cent tax passed in St. Paul in 2023 and Minneapolis’ 20-Year

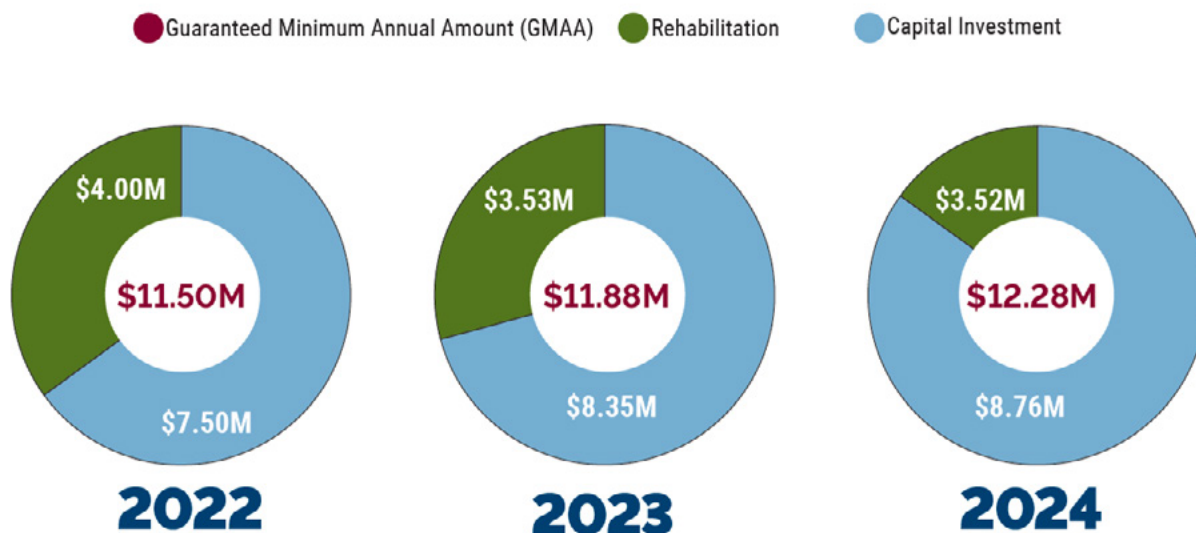
Neighborhood Park Plan (NPP20, adopted in 2016) funded through property taxes that include a Guaranteed Minimum Annual Amount (GMAA) to fund key capital and rehabilitation projects. The St. Paul Common Cent 1% sales tax increase allocates \$246 million dollars over the next 20 years, while Minneapolis NPP20 GMAA was \$12.28 million in 2024, up from \$11.88 million in 2023, and up sevenfold from years prior to NPP20 taking effect. The NPP20 funding specifically addresses nine main work categories in the Minneapolis Park System:

- accessibility improvements related to the Americans with Disabilities Act (ADA)
- buildings and recreation centers
- roofs
- heating, ventilation and air conditioning (HVAC) systems
- park amenities
- park lighting
- below-grade infrastructure
- sidewalks and pavement
- operations facilities

The funding measures in the Twin Cities have helped keep both cities at the top of Trust for Public Land’s ParkScore®. By increasing investment and improving efficiency and operating costs, these systems are able to maximize the service life of park assets, reduce backlog of repairs and rehabilitation work, increase the

number of assets consistently available to the public, and reduce the long-term operational costs. Public-private collaborations also have been key to funding higher capital cost projects such as an NFL grant for the North End Community Center.

**FIGURE 4: NPP20 FUNDING: GUARANTEED MINIMUM ANNUAL AMOUNT**



Source: NPP20 2023 Annual Report

However, there is a need for additional funding to maintain, equip, expand, and support Minnesota’s recreational facilities, particularly at the state level where bonding measures have fallen short of the needs.

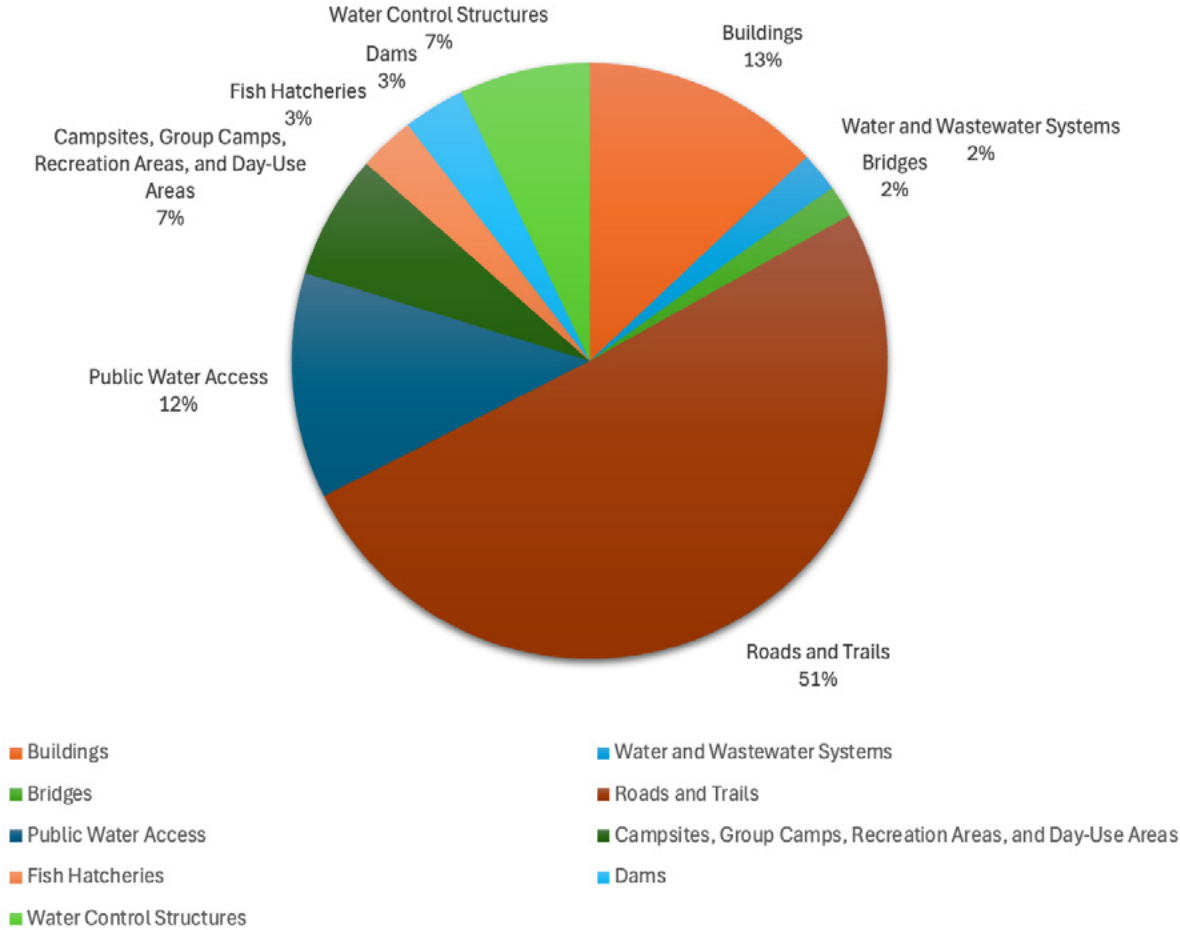
The National Park Service managed lands have a total backlog of over \$45 million in deferred maintenance stemming from underfunding of their \$6 million annual routine maintenance requirements. Voyageurs National Park accounts for \$25 million of the deferred maintenance, just under the economic output of \$26 million generated by the park.

At the state level, the Minnesota DNR’s most recent update of their 10-year Capital Asset Need identifies a need of \$211 million annually to maintain and renew their capital assets, including \$778 million in deferred maintenance. The \$211 million is divided into \$14.68 million in preventative maintenance, \$118.77 million in renewal and replacement, and \$77.77 million in deferred

maintenance catch-up. Funding would address needs across a range of assets including buildings, dams, bridges, roads, trails, water access points, hatcheries, monitoring wells and more.

Additional funding is needed to help both the capital investment and renewal of facilities to improve long-term operations and maintenance. As the total assets managed increase to meet the demand, there will continue to be a need for robust funding to maintain these assets for the future. Contributing to the funding need is the ongoing staffing shortage across public agencies that necessitate an increase in compensation packages to retain current staff while attracting new hires. Shortages are particularly acute on the enforcement side, from state game wardens and conservation officers to municipal park police officers. Vacancies are being addressed through considerations for those with alternative backgrounds to help cover needs.

**FIGURE 5: DISTRIBUTION OF ANNUAL TOTAL INVESTMENT NEEDS FOR DNR ASSETS**



Source: MN DNR

**PUBLIC SAFETY, RESILIENCY AND INNOVATION**

Park facilities create safe spaces for community members to gather and engage in a variety of activities from sports, yoga, and cooking to STEM education. Further investment, particularly in the state park system, is needed to maintain safe access to the parks and natural resources. While no data is available regarding injuries or fatalities in Minnesota’s parks due to inadequate facilities, the parks systems are reporting increased closures of facilities due to flooding, erosion, and structural deficiencies of bridges and deteriorated trails, including 100 miles of paved trails in the state park system. In addition, failing wastewater treatment facilities in state parks are at high risk of polluting surface and groundwater.

Ongoing efforts to improve resiliency include a few innovative projects. St. Paul is integrating stormwater

management and public-private cooperation at North End Community Center that holds one million gallons of rainwater, protecting the neighborhood from back-to-back 100-year storms. A Net-Zero community building, The River Hub at Graco Park in Minneapolis, uses as much energy as it generates. Como Park in St. Paul also has a newly installed geothermal system. These and other projects help reduce the operations and maintenance cost, help neighborhood scale stormwater management and improve public awareness of sustainable and resiliency efforts. In addition, the regional and local systems jurisdictions are working across agencies and departments to increase accessibility and mobility by connecting parks and trails with other transportation systems to encourage more visitors to parks and trails.

## OVERLOOK ACCESS POINT IN MEMORIAL PARK, RED WING



## FOOTBALL FIELD AT NORTH END COMMUNITY CENTER



Throughout the state, innovation in the park systems comes in many forms. The state's Legacy Amendment funding of parks and trails systems plays a critical role in coordinated efforts to maintain and rehabilitate the assets throughout the state. The Greater Minnesota Regional Parks and Trails has several new grant opportunities that have enabled communities to work through challenges such as construction overruns, a need to increase accessibility and to fund costly environmental and archaeological grants to help start projects. Other programs, such as the MN Artist in Residency program, help integrate public art in the park system, bringing new ways to interpret and understand the natural resources of the state. Currently efforts are underway to widen the partnerships, in particular with Tribal communities and Historic Preservation Offices during the development of parks projects. Key to this is advocating for tribal governments to be eligible for funding from the Legacy Amendment.

Hermann the German Monument in Hermann Heights Park, New Ulm, has been recommended for a full reconstruction, the first time the MN State Historic Preservation Office has made the recommendation to reconstruct a structure that is still standing. The recommendation was made based on studies conducted by the city and its consultant. Such preliminary studies are often needed to assess what options are available to ailing structures.

Current projects underway in the state include making waterfronts more accessible with the creation of new parks, improving trails and wayfinding, especially along the riverfronts that have cultural importance to the indigenous community. The Dakota-led efforts for the future of the St. Anthony Falls area is one example of a collaborative effort involving a wide range of stakeholders in a historic and culturally significant area. Other examples of innovative work include the Signs of Belonging in Maplewood, for

which the Ramsey County Parks and Recreation was awarded the 2024 Innovation in Equity Award from the National Recreation and Parks Association. This project brought five local artists of color to reimagine park kiosks, bringing their unique and vibrant lens to the traditional wayfinding signage. In addition, the Upper Sioux Agency State Park was returned to Tribal management in 2024, returning critical cultural sites and burial grounds to the Dakota people. This is the first time the State of Minnesota has transferred a state park to a Native American community.

### HERMANN THE GERMAN MONUMENT IN HERMANN HEIGHTS PARK, NEW ULM



Photo: Toshihiko Karato

## Public Parks



## RECOMMENDATIONS TO RAISE THE GRADE

- Fund parks at federal, state and local level to address the backlog of deferred maintenance, particularly at the state parks.
- Municipalities should prioritize maintenance of parks and recreational facilities.
- Employ asset management to accurately budget for repairs and assess the life expectancy of park features, reduce maintenance costs, and address long-term resiliency of recreational facilities.
- Provide educational and interpretive information within recreational facilities in a variety of languages to enhance user experiences.

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# Roads



Photo: Rural Highway with Roundabout; Bolton & Menk

**GRADE  
COMPARISON**  
MN: D+  
Nat'l: D+



# ROADS

## EXECUTIVE SUMMARY

Minnesota maintains over 143,000 miles of public roadway, ranking fourth in the nation. The state faces a \$20 billion road funding shortfall over the next 20 years. Recent increases in state and federal funding, including \$5.2 billion from a 2023 bill, have helped but remain short-term solutions and do not close the long-term gap. Without major new investment, a significant share of Minnesota’s roads could fall into poor condition by 2034. In the Twin Cities, congestion continues to rise: the average driver now spends 73 hours in traffic each year, costing \$1,598 per person. While COVID-19 briefly eased congestion, 2024 levels have surpassed those of 2019 and are increasing. The state’s primary transportation revenue sources—fuel, registration, vehicle sales, and property taxes—are no longer sufficient to meet growing needs.

## CONDITION

Over 118,000 of Minnesota’s 143,000 miles of public roads are rural; the remaining are urban. The state’s transportation system is vital to Minnesota’s economic strength. The investments required to maintain these roads come from the federal and state government and from counties, cities, and townships.

The percentage of roadway miles in Minnesota with a ride quality index (RQI) classified as “good” has increased over the past 13 years. RQI is a combination of the measured international roughness index (IRI) and perceived roughness. In 2024, between 1- 2% of roads, depending on their classification, had a “poor” RQI rating; between 7-27% had a “fair” RQI. The percentage of roadway miles with a RQI of “good” has risen from 69.8% (2011) to 92.7% (2024) on Interstate miles, from 66.5% (2011) to 78.5% (2024) on “other” National Highway System (NHS) miles, and from 58.6% (2011) to 71.0% (2024) on non-NHS miles. Even with an upward trend over

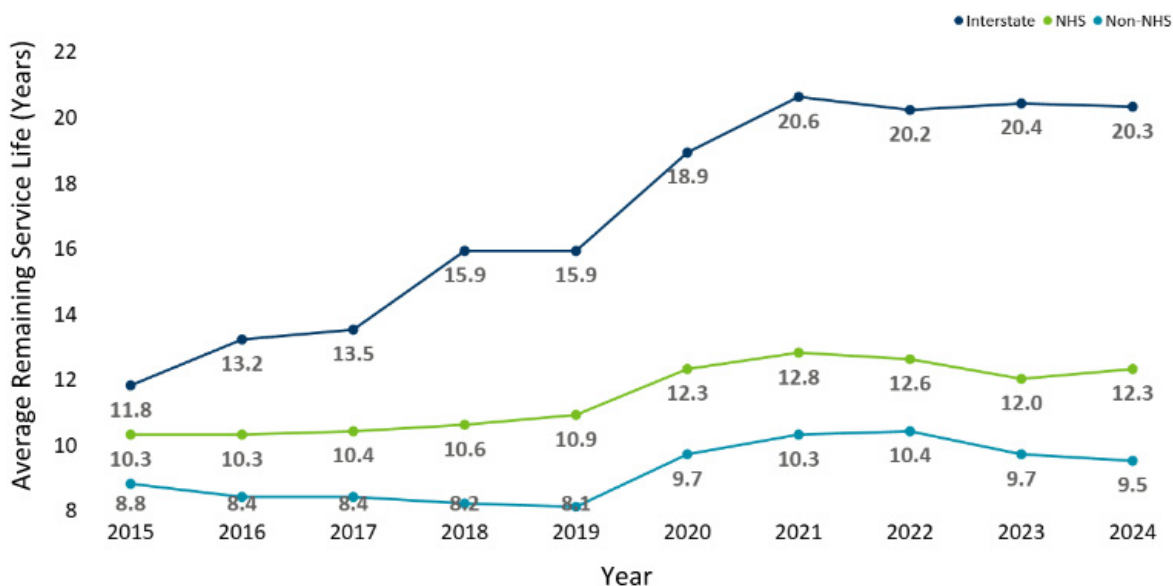
the last decade, 2021 saw a peak in RQI, specifically on non-interstate roads. Since that time the RQI has slowly decreased year-to-year, indicating a gap in the funding needed to address aging pavement.

**According to a 2025 survey conducted by the Minnesota City & County Engineers, 80% of the 60 respondents felt their infrastructure was better or in a similar condition to four years ago, Also, 68% stated they expect budget shortfalls over the next 25 years.**

Remaining service life (RSL) is another measure the Minnesota Department of Transportation (MnDOT) uses to measure the condition of roadways. RSL refers to how many years a road has left until the end of its service life and is determined from pavement deterioration curves using historical RQI data to provide an estimate of when its RQI will reach 2.5. Roads that have reached the end of their design life can still be driven on but have deteriorated to a point where there is noticeable rough-

ness of the pavement, cracking and surface distress (i.e. potholes). As shown in Figure 1, after a significant uptick between 2015-2021, RSL has started to show a downward trend, particularly on local roadways. This indicates that the need to repair these pavements is outpacing the funding available, which is directly tied to the \$14.7 billion needed in the next 20 years to meet the Minnesota’s State Highway Investment Plan’s (MnSHIP’s) pavement condition performance targets.

**FIGURE 1: STATEWIDE AVERAGE REMAINING SERVICE LIFE IN YEARS**



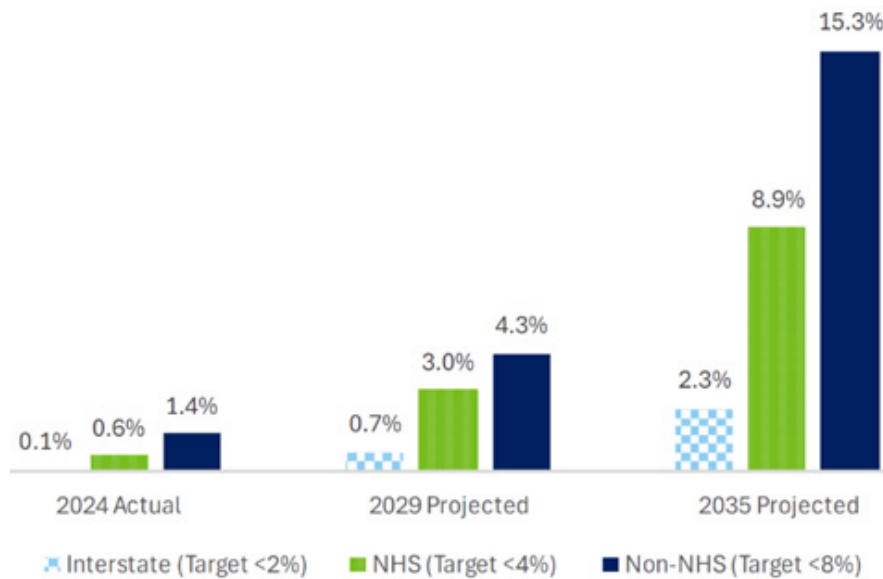
Source: Minnesota Department of Transportation

MnDOT’s Capital Highway Investment Plan, released in 2025, predicts each category of roadway will drop into the poor condition category by 2035. This decline will have the greatest impact on highways which are not part of the National Highway System (NHS) as shown in Figure 2. Once pavement falls into the “poor” category, it requires major rehabilitation or reconstruction to restore its service life. The repairs required once highways receive the “poor” rating are much more expensive than repairs performed on “fair” and “good” highways. This highlights a need to move away from focusing on surface smoothness and give greater attention to the structural metrics that determine long term pavement performance.



Photo: Pavement Cracking, Bolton & Menk

**FIGURE 2: PROJECTED PERCENTAGE OF PAVEMENT IN POOR CONDITION**



Source: Minnesota Department of Transportation

The remaining 92% of Minnesota roadways, including county, city, and township roads, lack widely available condition data because they are not rated or stored using uniform standards that allow for easy comparison. However, given current funding levels and inflation, pavement conditions on thousands of miles of local roads are expected to deteriorate significantly without additional investment. In 2023, MnDOT awarded nearly \$103 million to 86 projects through the Local Road Improvement Program (LRIP). There were 378 applications requesting \$921.9 million, a significant increase from the previous year’s solicitation. This demonstrates an increased need for non-NHS highways, which is likely correlated to declining conditions of more roads.

To improve roadway conditions statewide, the Minnesota Legislature and the U.S. Congress passed bipartisan laws that set roadway asset management requirements for MnDOT (Minnesota Statute 174.03, 174.20 and the federal Moving Ahead for Progress in the 21st Century Act). State law requires MnDOT to complete a Statewide Multimodal Transportation Plan (SMTP), a 20-year fiscally constrained Minnesota State Highway Investment Plan (MnSHIP), and a 10-year capital highway investment plan (CHIP). Federal law and regulation and state law require the development of a four-year State Transportation Improvement Program (STIP). MnDOT is required by state law to implement performance measures and targets for the state highway

system to construct resilient infrastructure, enhance project selection for all transportation modes, improve economic security, and achieve the state transportation goals. MnDOT is required by federal law to establish a transportation asset inventory that includes performance measures and targets for the NHS. Federal law also requires MnDOT to summarize national highway system assets, including condition, management objectives, performance gaps, life-cycle cost and risk analyses, and investment strategies. MnDOT’s goal is to measure performance on an annual basis and select projects for inclusion in their CHIP and STIP that are consistent with the goals and objectives in the SMTP and reflect the investment direction established in MnSHIP. However, information is not publicly available regarding current compliance with these laws. Improved reporting regarding implementation of these laws would enhance transparency for the public.

MnDOT’s Transportation Asset Management Plan (TAMP), a federal requirement under the Moving Ahead for Progress in the 21st Century Act, analyzes life cycle costs, evaluates risks, develops mitigation strategies, establishes asset condition performance measures and targets, and develops investment strategies for pavements, bridges, and ten additional categories of assets. It links capital and maintenance expenditures to infrastructure assets and informs future iterations of MnDOT’s plans. Additionally, the Transportation Asset Management

System (TAMS) is MnDOT’s framework for using data and performance measures to guide investment decisions and improve accountability in managing the state’s transportation infrastructure. TAMS has evolved since its introduction, with additional measures added and stronger integration into MnDOT’s decision-making processes. In 2020, the Office of the Legislative Auditor recommended that the legislature monitor TAMS implementation and request updates from MnDOT on whether the system

has delivered on its promise. The legislature also required MnDOT to develop, implement, and adhere to a pavement investment guide and to ensure that pavement selection decisions—whether for construction, reconstruction, rehabilitation, or preservation—are consistent with that guide. More publicly available data and transparency are needed to demonstrate how TAMS benefits state transportation investments.

## CAPACITY

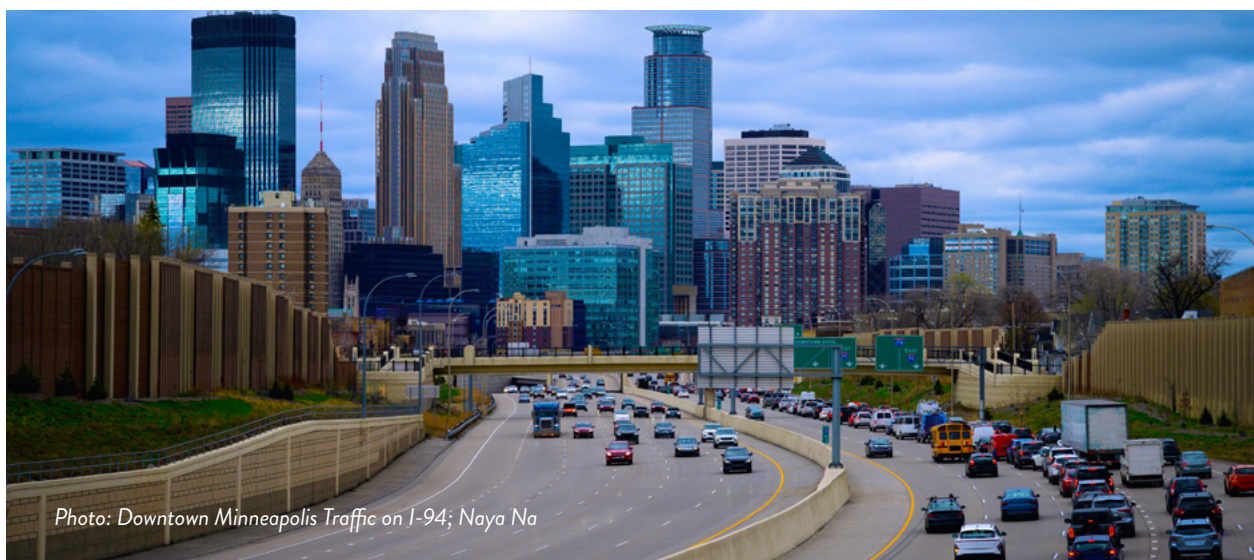
Traffic congestion continues to pose challenges for Minnesotans, especially in the Twin Cities. According to a study examining 494 urban areas in the United States, the Twin Cities rank 16th for traffic congestion nationwide, considering both population size and total annual hours spent in traffic. The situation has worsened since the pandemic. In 2024, drivers in the Twin Cities averaged 73 peak hours per year sitting in congestion, which cost each driver an average of \$1,598, resulting in financial losses exceeding \$3.71 billion annually for the region.

The 2020 U.S. Census reported that Minnesota gained over 400,000 people from 2010 to 2020. The next tier metro areas in Minnesota have also seen an increase in traffic congestion. Rochester is the second largest metro area and saw an estimated \$96 million dollars in annual congestion cost in 2024. Duluth and St. Cloud have seen \$82 million and \$69 million in annual congestion costs in 2024, respectively.

Spot mobility improvements help to immediately address challenges. These improvements are small-scale,

targeted projects designed to relieve localized congestion or operational bottlenecks on the freeway system. These fixes typically focus on specific locations where traffic routinely slows or backups occur and can include short auxiliary lanes, ramp modifications, merging/weaving improvements, intersection or interchange refinements, and other operational enhancements that improve traffic flow without requiring major capacity expansion.

Multimodal connections also help address corridor-level congestion. MnDOT’s statewide plans emphasize mobility, accessibility, and safety for all users, not just drivers. Enhancing pedestrian and bicycle connections and improving access to transit helps reduce short local vehicle trips that contribute to congestion on major routes. These network improvements align with MnSHIP’s investment direction to “improve mobility, accessibility and safety for all” and complement capacity-focused strategies by offering travelers more reliable, safe alternatives to driving.



*Photo: Downtown Minneapolis Traffic on I-94; Naya Na*

# FUNDING AND FUTURE NEED

**Funding for the state’s roadway systems is derived from several sources:**

- **Federal aid**
- **State motor fuel tax**
- **State vehicle registration tax (tab fees)**
- **Motor vehicle sales tax (MVST)**
- **Local taxes (property tax, sales tax, assessments)**
- **Other income**

Most of the revenue for Minnesota’s roads is derived from federal and state motor fuel taxes, which are a fixed portion of fuel price and historically not tied to inflation. The federal fuel tax has not been adjusted since 1993. While the cost of transportation infrastructure rises annually, the buying power of these revenue sources declines. The Minnesota fuel tax was raised in 2012 to 28.5 cents per gallon, and a 2023 law requires annual adjustments linked to the Minnesota Highway Construction Cost Index. The rate rose to 31.8 cents per gallon in 2025. Nearly all of the proceeds from that fuel tax increase were invested in Minnesota’s bridges

after the Interstate 35 West bridge collapsed into the Mississippi River in 2007. Of the 172 bridges identified in the Trunk Highway Bridge Improvement Program, 136 bridges were replaced or rehabilitated between 2007 and 2018. An unfortunate result of this targeted bridge investment is that it has limited the funds available to pavement preservation.

The Minnesota Constitution requires 100% of the state fuel tax and tab fees and not more than 60% of the MVST be deposited into the Highway User Tax Distribution Fund (HUTDF) and used only for highway purposes. Furthermore, the HUTDF must suballocate 62% of total revenue to the Trunk Highway Fund (THF) and the remaining 38% to County State Aid Highways (CSAH) and Municipal State Aid Streets.

Minnesota was apportioned \$4.8 billion over five years for all apportioned highway programs through the federal Infrastructure Investment and Jobs Act (IIJA) of 2021. Bipartisan bills such as the IIJA are crucial to addressing future needs, but do not replace long-term sustainable funding sources. The current 20-Year Minnesota State Highway Investment Plan (MnSHIP) estimates a funding shortfall of nearly \$20 billion on state highways and the NHS alone.

# OPERATION AND MAINTENANCE

The cost of keeping pavements in serviceable condition increases as these pavements approach the end of their serviceable life. Keeping pavements clear of snow, ice, or large debris is also a major factor in road operation and maintenance. The availability of materials, equipment, and staffing can affect the ability of roadway crews to keep pavements clear.

Salt is one of the main materials used to keep pavements clear of ice through the winter. The price of salt alone rose from \$29.33 per ton in state Fiscal Year (FY) 2001 to \$98.11 per ton in FY 2025; this represents over 230% increase. The Cold Climate Stormwater Center of Excellence at the University of Minnesota sponsor and partner with industry leaders to train local agencies

on salt reduction strategies through the Salt Symposium and Low Salt Solutions (LSiD). Innovative strategies help reduce cost of snow and ice control services, freeing up money for other maintenance areas, such as surface repair, drainage, and roadside maintenance.

Minnesota transportation users expect safe roads in addition to clear ones. One of the best affordable solutions for safety is the use of guardrail along high-speed roadways. However, as more guardrail and high-tension cable barrier is installed, the demand on maintenance crews to maintain these facilities increases – an estimated \$2.8 million in 2022. MnDOT has about 774 miles of cable median barrier, which reduced median cross-over fatal and severe crashes by 95% in 2022.

The average statewide repair cost for guardrail damage is \$3,600 per mile, which is typically recovered by insurance carriers of vehicles involved in damage.

Staffing levels at both the state and municipal levels are increasingly strained and are not fully adequate to meet Minnesota’s roadway operation and maintenance needs, due to workforce shortages driven by retirements, labor market constraints, and growing system demands. MnDOT and local agencies are responding by expanding

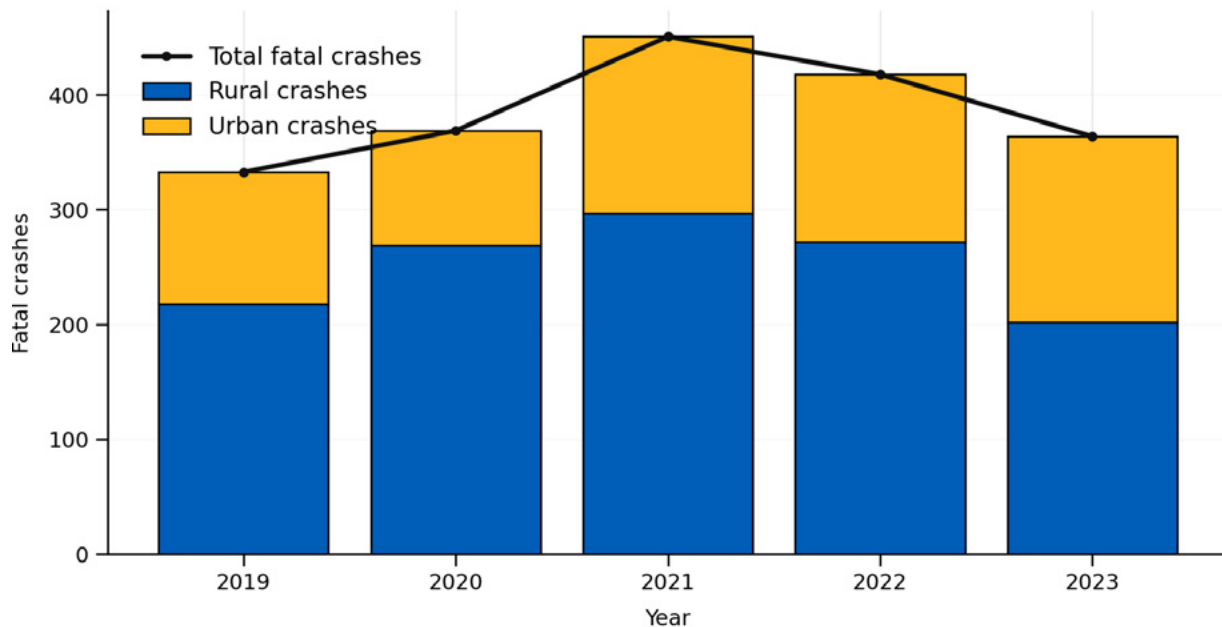
recruitment, apprenticeship, and maintenance training programs, including statewide operator certification and workforce development initiatives, but these efforts are occurring amid persistent challenges, particularly for frontline and technical positions. As a result, sustaining current levels of roadway performance will continue to require focused investment in workforce capacity alongside infrastructure funding.

## PUBLIC SAFETY AND RESILIENCE

Minnesota Toward Zero Deaths, the state’s cornerstone traffic safety program, aims to eliminate deaths on our roads. Minnesota’s traffic fatality rate is lower than the national average of 1.26 deaths per 100 million vehicle-miles traveled. Minnesota has experienced an 11% decrease in traffic deaths from 2009 to 2019. However, deaths spiked to 488 in 2021. Preliminary numbers from 2024 show a slight decrease since 2021 – 477 as of December 2024. This spike is believed to be partly

due to poor driving habits emerging after COVID-19, with lower traffic volumes leading to higher speeds and more severe crashes as roads returned to full use. Crashes on two-way undivided roadways and two-way roadways with unprotected medians are particularly high, representing 262 of the 402 traffic fatalities in 2023. As 88% of Minnesota’s roadway system mileage is classified as rural, safety needs to be addressed across the state, not just in urban areas.

FIGURE 3: MINNESOTA TRAFFIC FATALITIES



Source: Minnesota Department of Transportation

## ROADWAY IMPROVEMENTS TO INCREASE PUBLIC SAFETY

- Increase sight distances at existing intersections
- Remove obstacles from the highway clear zone
- Add medians and improve existing medians
- Widen shoulders where existing shoulders are minimal
- Improve traffic flow, which could reduce incident-related delays
- Implement low-cost/high-benefit roadway improvements, including:



- o Rumble strips/stripes
- o Cable median guardrail
- o Rural intersection lighting
- o Curve chevrons
- o Signpost reflectors
- o Traffic signal reflectorized background shields
- o Structural and living snow fences

MnDOT estimates it has 138 miles of structural snow fences and 38 miles of living snow fences, which include trees, shrubs and corn rows along roadways to reduce drifting onto the roadway. These features have been proven to reduce crashes, operator plow time, and the amount of salt used on the roadway. MnDOT completed a research project in 2025 near Glyndon for snow

fences constructed with solar panels to determine if these could provide an effective method to power snow melting pads. Research results indicate this is a viable system with a return on investment of approximately 11 years, which reflects the estimated payback period from energy production and operational savings.

## STRUCTURAL SNOW FENCE



*Source: Minnesota Department of Transportation*

MnDOT is investigating how the changing climate is impacting its assets and the people who depend on reliable transportation. To further advance this work, MnDOT is assessing future flood risks, engaging in equity conversations, and studying how freeze/thaw cycles have been changing. Minnesota has prepared both a State of Minnesota Hazard Mitigation Plan and MnDOT has prepared a Resilience Improvement Plan to prepare for natural hazards. MnDOT does have a high-level vulnerability assessment in the Resilience

Improvement Plan, which would help predict impact on transportation assets and guide future policy changes. The Minnesota Legislature’s amendment to statute 174.03 in 2021 requires MnDOT to “construct resilient infrastructure” and include “corridor risk assessment.” To further advance resilience of their system, MnDOT must integrate resilience performance measures, life cycle analysis, and corridor risk assessments into its asset management, district investment planning, and legislative performance reporting.



*Photo: Snow Plow in rural MN Salt reduction; Bolton & Menk*

## INNOVATION

As Minnesota’s roads have aged and become more congested, the state has become increasingly more reliant on innovation. Minnesota’s Local Road Research Board (LRRB) identifies promising innovative technologies and then finances further development, pilot testing, and implementation of these technologies. Minnesotans look forward to full implementation so that long-term performance can be maximized by deploying more effective roadway construction technology. MnDOT needs to join other state departments of transportation that are implementing pavement foundation performance specifications for long-life pavement systems.

MnDOT continues to innovate as demonstrated by these examples below:

**MnROAD Pavement Research** – MnDOT’s materials lab is finding ways to extend road life and improve performance, reduce construction and maintenance costs, speed up construction, and reduce environmental impacts. MnROAD’s research data is collected from a portion of Interstate 94 west of the Twin Cities. More than 50 unique test sections are studied and used to inform roadway design standards that are used throughout Minnesota and across the U.S.

**Contract Procurement/Delivery Methods** – MnDOT utilizes several different types of contract procurement and project delivery, including the Construction Manager/General Contractor program (CMGC) and Design-Build (DB), allowing MnDOT to deliver projects more efficiently while maximizing value and minimizing impacts to the traveling public. This is especially beneficial for large or complex transportation projects like the current reconstruction of Interstate 494 at Interstate 35W and Interstate 535 Blatnik Bridge, two of the largest Design-Build projects that MnDOT has undertaken.

**Intelligent Construction** – MnDOT has pioneered the use of intelligent compaction and thermal profiling

during construction. This technology significantly improves the performance of hot mix asphalt (HMA) by providing realtime, full coverage data of compaction and temperature. These technologies produce more uniform, durable pavements with longer service lives and lower lifecycle costs.

**E-ZPass Lanes** – E-ZPass (formerly MnPASS) lanes use dynamic pricing to maintain reliable, freeflow travel within the managed lanes—operating at 45 mph or higher approximately 98% of peak period time in 2024—while improving travel time reliability and person throughput for transit and carpools and helping manage congestion more efficiently on the region’s busiest corridors, even as demand continues to challenge adjacent general purpose lanes.



Source: Minnesota Department of Transportation



## RECOMMENDATIONS TO RAISE THE GRADE

- Establish a sustainable, long-term revenue framework that aligns transportation funding with actual system needs by modernizing revenue sources—such as enhancing Public-Private Partnerships (P3s)—and ensuring state, local, and federal contributions keep pace with rising construction, maintenance, and mobility demands.
- Expand the successful intelligent compaction program to include base and subgrade layers.
- Encourage local agencies to implement asset management programs.
- Move away from focusing on surface smoothness and give more attention to structural metrics of pavement system conditions.
- Promote innovative practices that reduce costs and improve project delivery.
- Improve Twin Cities area freeway mobility and reliability using active traffic management, spot mobility improvements, expansion of E-ZPass lanes, and strategic capacity enhancements, such as selective lane additions, interchange modernization, and extension of managed lanes.
- Encourage state and local agencies to search for opportunities to use alternative forms of project delivery like Design-Build and Construction Manager/General Contractor programs.
- Improve connections for pedestrians, cycling, and transit networks that enhance safety and improve opportunities for all people.
- Advance roadway system performance by integrating resilience measures, life-cycle analysis, and corridor risk assessments into asset management, investment planning, and legislative reporting.
- The legislature should provide oversight, in collaboration with Minnesota’s construction industry, professional associations, and academic institutions, to ensure compliance with existing laws pertaining to MnDOT’s long-term performance practices.



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# Stormwater



**GRADE  
COMPARISON**  
**MN: C**  
**Nat'l: D**

Photo: Columbia Golf Course and Park: NW. Infiltration Basin; Minneapolis Park and Recreation Board



# STORMWATER

## EXECUTIVE SUMMARY

Minnesota's stormwater is managed by combinations of local state, county, municipal, and water and watershed management authorities, with oversight from the Minnesota Pollution Control Agency (MPCA). The state's many water resources, including numerous lakes and rivers, span urban and rural areas, complicating the management of stormwater runoff. Changes in climate, population, and policies are putting stress on Minnesota's stormwater infrastructure. Stormwater management is one of the most complex components of modern infrastructure, requiring continual adaptation to changing natural and human conditions. As more information is gathered on the state of our infrastructure and engineers respond to system needs and intensifying rainfall, adaptive funding will be necessary to continue innovation and collaboration for solving stormwater issues and maintaining systems that meet changing needs. Currently, Minnesota's stormwater infrastructure is not fulfilling capacity and public safety needs, and without continued attention and adequate funding, stormwater systems in Minnesota will not be able to ensure long-term resilience.

## BACKGROUND

Stormwater management infrastructure includes conveyance, structures, and practices that work to carry, manage, and treat the flow of rainwater and snowmelt. Not only do stormwater management systems convey runoff and attempt to keep flood waters away from developed areas, but they are also increasingly involved in the treatment of runoff and include practices to treat and reduce the volume of stormwater in compliance with Municipal Separate Storm Sewer System (MS4) permitting. Prior to this program, which requires municipalities to reduce surface water pollutants to comply with the Clean Water Act, stormwater systems focused on collection and conveyance. As the MS4

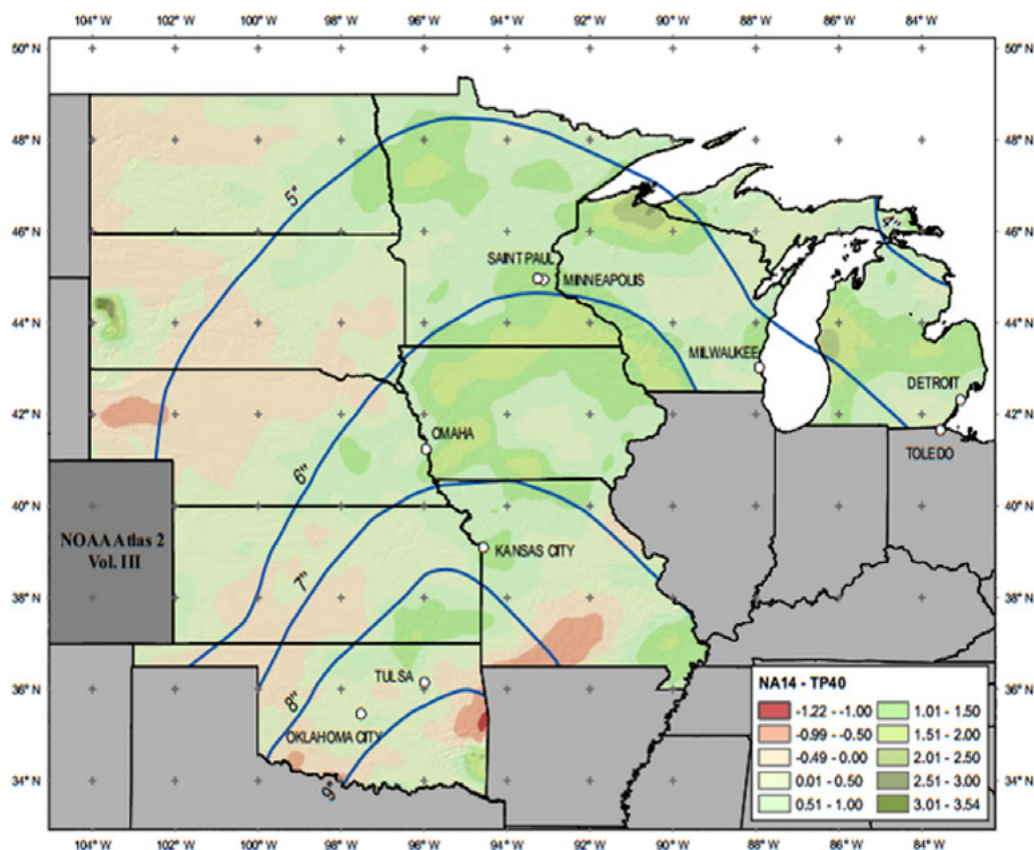
program progresses towards achieving more clean water goals, Minnesota's 284 MS4 permittees are taking on the ownership and maintenance of more green infrastructure and a wider variety of water quality treatment devices. Stormwater treatment devices, in many cases, are mitigating pollutants and improving ecosystems that have been polluted through previous stormwater conveyance. In addition to aging of grey stormwater conveyance, additional stress is being placed on stormwater management systems by increased intensity of rainfall and population increases driving land use changes.

## CAPACITY

Stormwater conveyance systems are almost entirely designed based on model estimations of rainfall depth and intensity from the National Oceanic and Atmospheric Administration (NOAA), which is expected to be

updated and released in Atlas 15 in 2027. In Minnesota, Atlas 14 projected increases in design rainfall across the entire state, with 0.5 to 2.0-inch increases compared to the previous Technical Paper (TP) 40 design storms.

**FIGURE 1: ATLAS 14 AND TECHNICAL PAPER TP 40 RAINFALL FREQUENCY COMPARISON**

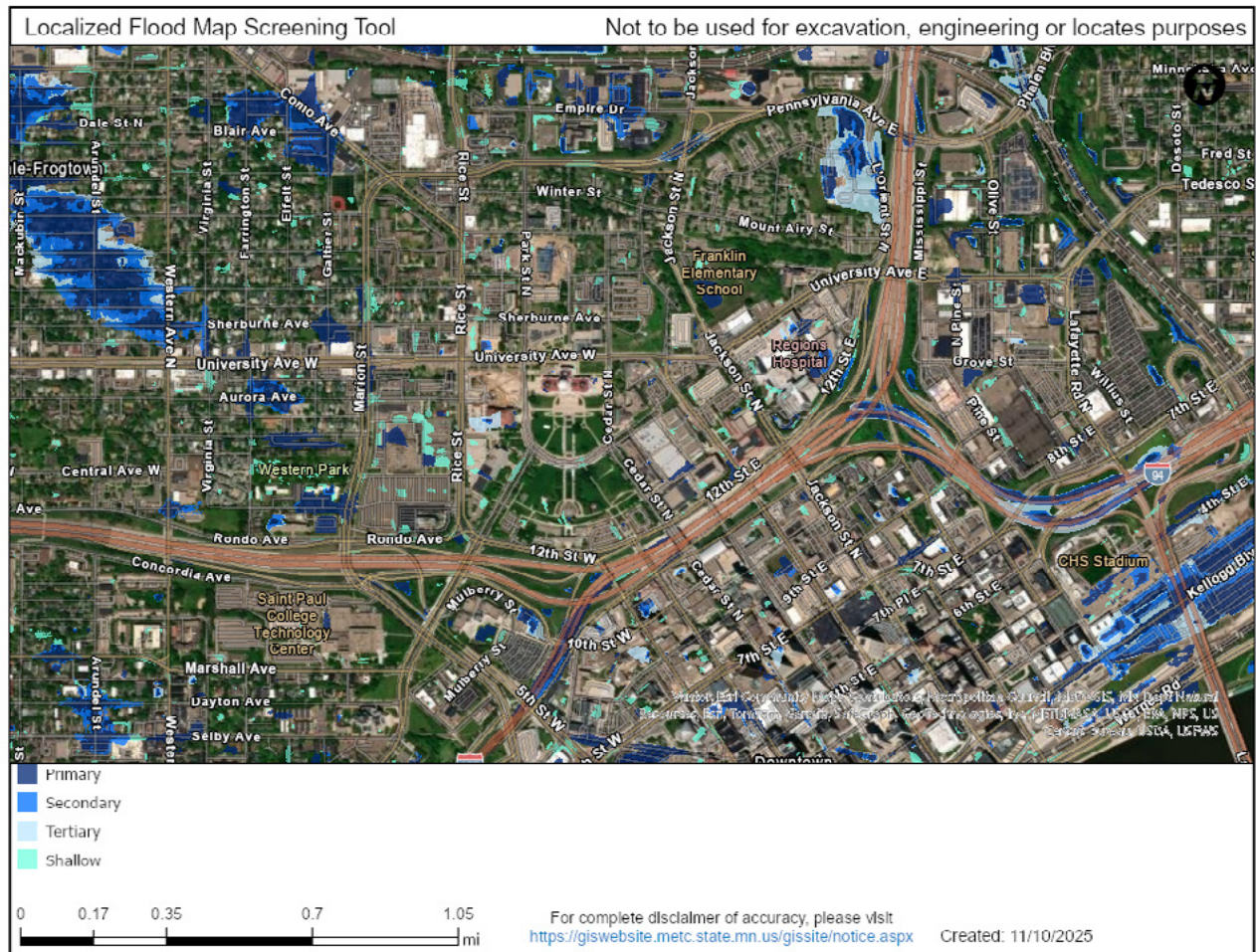


Source: Minnesota Pollution Control Agency

In the MPCA 2025 Local Resilience and Climate Adaptation Survey, 58% of responding organizations experienced a recent event with flooding impacting residents. Communities in Minnesota have varying levels of asset management, inventories of at-risk infrastructure, and means of gauging the hazards from stormwater conveyance and treatment systems due to a lack of capacity, but modeling exercises are leading to both data collection and analysis of systems in a wider range of storm events. While watershed and citywide

modeling is being completed in many communities to pinpoint capacity issues and assess resilience, the degree of modeling varies across the state with many areas seeking state or federal funding to accomplish this task. In areas where modeling is complete, these analyses have shown that storm sewer systems in many areas are undersized for current conditions, leading to frequent flooding. These models depict widespread pockets of urban flooding which often resemble flood mapping done by the Metropolitan Council.

FIGURE 2: LOCALIZED FLOOD MAP SCREENING TOOL



Source: Metropolitan Council, "Flood Map Screening Tool"

Aging systems and outdated design standards are not just being replaced but updated to meet and often exceed current design standards. In 2024 and 2025, 43 construction-ready projects were awarded

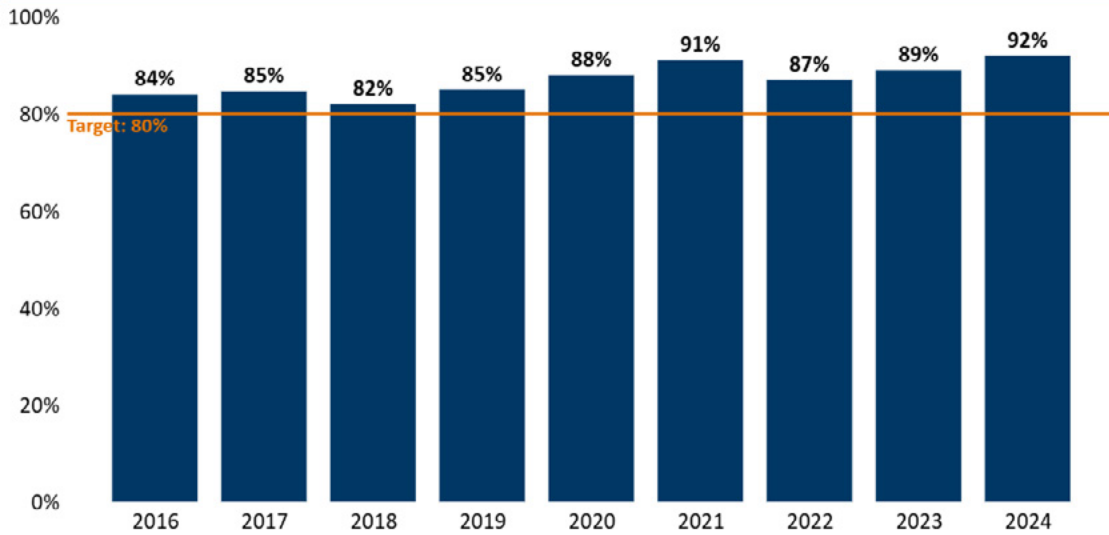
## CONDITION

The Minnesota Department of Transportation (MnDOT) has implemented a functional asset management plan for underground infrastructure as part of their Transportation Asset Management Plan (TAMP) that began in 2017. Through that initiative, highway culverts

resilience grants from the MPCA. These projects include replacement systems that are being upsized and designed to meet future needs in areas with already occurring capacity deficiencies.

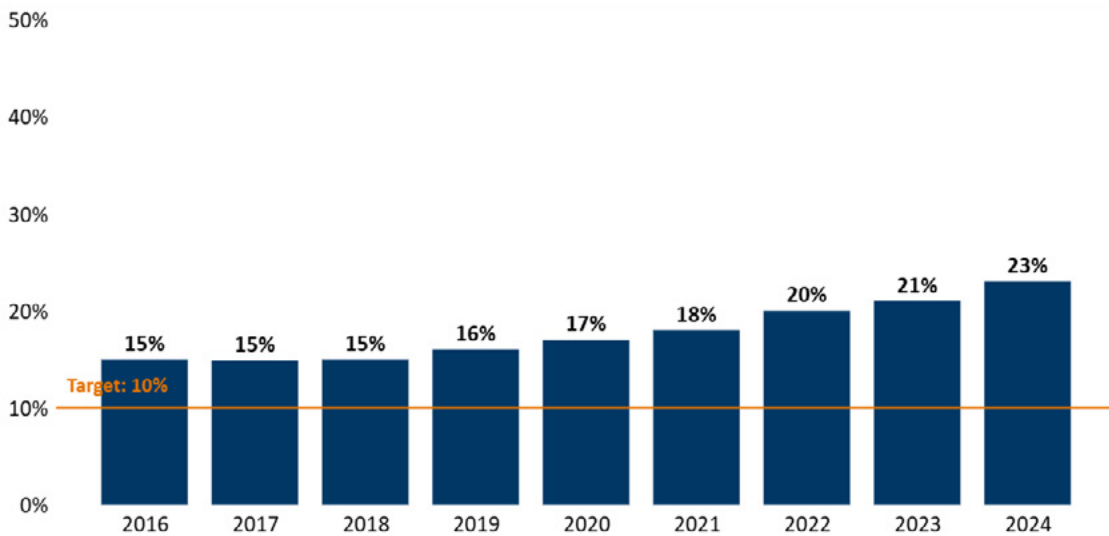
have targeted inspections once every 1-2 years for culverts in poor or severe condition, and once every six years for other culverts. Since implementation, MnDOT has remained above 80% in compliance with this goal.

**FIGURE 3: PERCENT OF ROUTINE CULVERT INSPECTIONS COMPLETED ON TIME**



Source: MnDOT Performance Measure Dashboard

**FIGURE 4: PERCENT OF CULVERTS IN POOR OR SEVERE CONDITION**



Source: MnDOT Performance Measure Dashboard

In 2024, MnDOT reported 23% of their pipe/culvert inventory to be in either poor or severe condition – up from 15% in 2016. A similar assessment was completed with stormwater ponds for which 1,367 ponds were evaluated across MnDOT’s eight districts over a period of 20 years from 2005 to 2025. These findings showed that 12% of the inspected ponds were in poor or severe condition. On the municipal level, MS4 General Permits require inspections of best management practices (BMPs), ponds, and outfalls once every calendar year.

While there are no over-arching state requirements for city stormwater systems or culvert inspections, many cities have implemented inspection plans to proactively determine the condition of their stormwater assets. For example, the city of Woodbury has a goal of inspecting 25% of their stormwater inventory each year as part of their stormwater maintenance plan. The level of inspection also often correlates to age of infrastructure and number of practices overseen by agencies and municipalities.

## OPERATION AND MAINTENANCE (O&M)

Minnesota's stormwater is managed by combinations of local, state, county, municipal, and water and watershed management authorities, with oversight from the Minnesota Pollution Control Agency and Municipal Separate Storm Sewer System (MS4) permittees. Inspections are important for conveyance systems to ensure that issues, such as blockages or signs of failure, can be flagged and addressed in a timely manner. Proactive maintenance allows agencies and municipalities to prioritize infrastructure replacements well in advance of actual failures. As discussed in the previous section, MnDOT and some municipal entities have implemented plans for regularly assessing the condition of roadway culverts and stormwater conveyance systems. Other systems that demand a high degree of regular inspection

and maintenance are stormwater BMPs. Stormwater BMPs are permanent structures or systems that are designed to capture contaminants and debris with the intent of reducing the pollution of downstream water bodies during storm events. For instance, the City of Minneapolis requires road and development projects to treat 0.55 to 1.1 inches of runoff and hit targeted pollutant removal levels. BMPs are especially important to maintain as the lack of attention can compromise the function of the system or, in some cases, cause flooding. In 2024, MnDOT published an updated maintenance guide for BMPs offered as a tool for agencies to follow and reference when evaluating and maintaining their BMP systems. Minnesota's MS4 permit system requires public BMPs to be inspected annually.

## FUNDING

Minnesota funds maintenance and construction of stormwater infrastructure through local, state, and federal funding sources. At least 229 cities in Minnesota have established stormwater utility fees as of 2022, up from 136 cities in 2017. Many stormwater utility funds are created when the need for maintenance of ponds and water quality infrastructure reaches levels that cannot be otherwise funded through municipal budgets. Many of these utility fees are collected monthly or quarterly with regular utility bills and are based on the amount of impervious surface or runoff generated by a residential or commercial property. Rates are determined and adjusted to cover projected operations and maintenance budgets for stormwater systems including drainage systems and water quality BMPs.

Several grants, low interest loans, and financial assistance resources exist through state agencies including planning and implementation grants for stormwater and community resilience and the Clean Water State Revolving Fund (CWSRF). These can fund and finance projects at the planning level through construction and are aimed at capital improvement projects rather than ongoing maintenance. Many of these programs require local matching; grant awards are capped to ensure multiple project awards in each funding cycle. Additionally, projects must meet specific requirements for each grant or loan and often require addition to the state project priority list (PPL). For

stormwater projects to qualify for the PPL, they must include permanent water quality treatment and are scored based on the need for pollutant reduction, ability to correct water quality problems, and stormwater volume reduction. In 2025, 315 projects were submitted for consideration to be placed on the PPL with total project costs estimated at nearly \$3.4 billion. The Intended Use Plan for 2025 funds identified 29 projects from the PPL to be funded, with costs totaling about \$185 million mostly to be paid for with CWSRF loans. During the 2023 legislative session, Minnesota invested over \$100 million in a Climate Resiliency and Water Infrastructure Grant Program and \$5 million for a Local Climate Action Grant Program, Minnesota's most significant climate investment to date. These grants are growing in popularity and in 2024 started to shift from planning to include implementation projects. \$700,000 was awarded in 2022 for planning projects and \$36,000,000 was awarded in 2025, of which 4% of the funding was for planning. Awarded implementation projects address water quantity concerns and prevent localized flooding. These projects have included storage, infiltration, conveyance improvements, reduction of impervious surfaces, and stormwater BMP treatment trains. Projects range from single culvert replacements to smart ponds with real-time controls.

## FUTURE NEED

Minnesota's population is expected to continue growing (6% from 2020 to 2030 in the metro), and current trends include shifts in population from more urban counties to more suburban counties. Growth and development lead to changing land use, more runoff, and a need for additional stormwater infrastructure. At the same time, aging systems require maintenance and upgrades to ensure MS4 water quality goals are met. Additionally, capacity needs to be increased as Minnesota is trending warmer and wetter with more intense and damaging rains. Annual precipitation has increased by 3.4 inches on average between 1895 and 2025, with dramatic increases in the frequency of 1 to 3-inch rainfalls at long-term observation sites. Rains that historically would have been in the largest 2% have become more common, and projections show continued increases in large, potentially damaging rains into the

future. A shift to green infrastructure and bio-based solutions is also driving trends toward more intensive vegetation maintenance and stormwater budgets need to shift appropriately.

While Minnesota continues to add grant opportunities for the planning and construction of resilient infrastructure, financial assistance for such projects has been identified as the top need by respondents to a Minnesota Pollution Control Agency (MPCA) Climate Adaptation Survey. Budgeting more funds for adaptive measures, either planning and modeling or construction projects, is also one of the least popular actions taken by responding organizations. Priorities are also shifting slightly from water quality to flood control as intense rains and visible capacity issues mount. Addressing future needs will require flexible strategic financial commitments that can help address a wide variety of needs.

## PUBLIC SAFETY

Minnesota's stormwater infrastructure struggles to manage increased volumes of precipitation, which poses serious risks to public safety. The top ten wettest years have occurred since 1998. This trend has overwhelmed outdated systems, causing increased runoff, flooding, and water quality issues. The City of St. Paul has begun to experience the effects of these trends, grappling with a 35-foot sinkhole caused by water eroding the ground beneath the street, which required extensive resources to repair.

As precipitation depth increases, slope failures and mudslides, particularly along the Mississippi River, are becoming more frequent. One slope failure incident near the University of Minnesota–Twin Cities campus forced the temporary closure of a trail and part of the light rail system in 2019. A similar slope failure at Lilydale Regional Park resulted in the death of two children. These areas are heavily used for recreation and transit, and such failures endanger pedestrians and nearby structures.

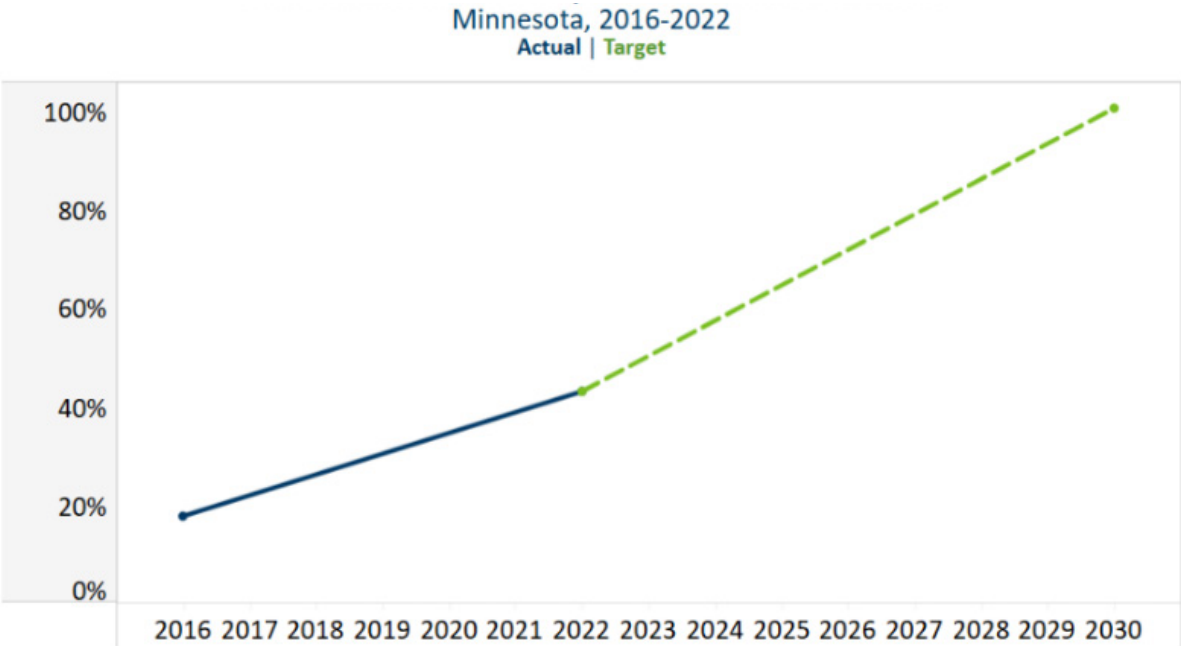
Compounding the issue, Minnesota lacks standardized inspection protocols for culverts and stormwater pipes. Without regular assessments, the risk of catastrophic failures including road collapses, flooding, and contamination, continues to grow. Failing stormwater systems can also cause sanitary sewer backups, leading to surface water contamination and public health hazards. To address these issues, state and local officials work to secure funding to create better models, increase inspection frequency, expand capacity and preemptively close potentially hazardous areas to improve public safety. Additionally, communities across Minnesota opt to join the Federal Emergency Management Agency (FEMA) National Flood Insurance Program to help prepare for the effects of flood events. As of 2016, the Minnesota Department of Natural Resources documented 9,991 flood insurance policies in Minnesota with more communities working to join the program each year. However, without significant upgrades and oversight, Minnesota's stormwater infrastructure will continue to compromise both safety and environmental integrity.

# RESILIENCE

Climate resilience in Minnesota refers to the ability of communities to prepare for and respond to changing climate conditions or other human-caused hazards. The Minnesota Department of Natural Resources reports that the state’s annual precipitation has increased by an average of 3.4 inches since 1895. Minnesota’s stormwater infrastructure was designed using historic climate data, which no longer reflects current or future conditions. As precipitation continues to rise, these systems are increasingly inadequate. Accelerated velocities and higher flow pressures due to greater runoff depths can cause infrastructure to deteriorate faster than expected. The US Chamber of Commerce states that “Every \$1 not invested in disaster resilience today can cost communities up to \$33 in lost future economic activity”. Addressing stormwater infrastructure in the context of resiliency planning can help agencies mitigate

significant financial risk and liability. Governmental organizations across Minnesota seem to be recognizing this, as a 2022 survey by the MPCA found that 42% of responding government agencies identified financial support for resilient infrastructure and planning as a key need. The MPCA administers resiliency planning and implementation grants which provide communities across Minnesota with the opportunity to develop and implement projects that will mitigate the effects of climate change. According to the MPCA, these grants have supported projects such as developing detailed models to identify vulnerable communities, constructing a regional stormwater facility for flood storage, and building new storm sewer networks. Growing awareness and demand for funding is a positive step toward addressing the vulnerabilities in Minnesota’s stormwater systems and improving long-term climate resilience.

**FIGURE 5: CLIMATE PLANNING TRENDS**



Source: Local Resilience and Climate Adaptation Planning Survey, Minnesota Pollution Control Agency

# INNOVATION

In Minnesota, challenges such as freeze-thaw cycles, snowmelt, fluctuating groundwater, and variable rainfall amplify impacts on both runoff quality and quantity. Effective management depends on engineering innovation, ecological insight, and coordinated policy. Despite these challenges, Minnesota is recognized as a national leader in stormwater innovation, driven by progressive policies, strong research partnerships, and widespread implementation of green stormwater infrastructure (GSI). As climate change intensifies and infrastructure ages, continued advancement and statewide scalability remain essential.

Minnesota’s leadership in stormwater innovation is, in part, supported by research from the Minnesota Stormwater Research Council (MSRC), the University of Minnesota’s St. Anthony Falls Laboratory, and the University of Minnesota’s Water Resources Center in collaboration with the MPCA and other water management organizations, cities, and practitioners. These groups play a large part in developing treatment technologies, assessing maintenance and retrofits, and refining hydrologic and water-quality modeling using statewide field data. Notable research topics and advancements include iron-enhanced sand filters (IESFs), biochar-amended soils, real-time controls, modular curb-extension rain gardens, stormwater

reuse systems, cold-climate permeable pavements, and engineered media mixes. Recent studies ranging from street sweeping to pond maintenance have produced practical guides and tools with city-tested outcomes. Supported by the Clean Water, Land and Legacy Amendment, these efforts also include the Minnesota Stormwater Seminar Series, which connects researchers and practitioners to translate findings into practice.

Minnesota is also adopting collaborative planning of infrastructure projects and management of water resources that is not limited by jurisdictional boundaries. State and local agencies increasingly use a watershed-based approach, managing runoff across entire watersheds rather than individual parcels. The MPCA’s Watershed Restoration and Protection Strategy (WRAPS) program establishes nutrient reduction and water-quality targets, while watershed districts coordinate monitoring, permitting, and cross-jurisdictional projects. This collaborative framework supports a common vision for planning and targeted local implementation projects.

These innovations would not be possible without collaboration, creativity, and sustained investment in research and development. To maintain this momentum and continue advancing stormwater management practices, ongoing support and investment are essential.

## SAINT ANTHONY FALLS LABORATORY



Source: University of Minnesota St. Anthony Falls Outdoor Stream Laboratory

## Stormwater



### RECOMMENDATIONS TO RAISE THE GRADE

- **Investment in Infrastructure:** Continue collaboration and cooperation between industry and policy makers to ensure funding to address immediate needs and enhance the capacity of and maintenance of stormwater systems to meet current and future demands. Grants and sustainable funding sources should be diversified to also include maintenance and life-cycle costs.
- **Implement Comprehensive Asset Management Programs:** Establish, fund, and enforce regular maintenance programs to ensure the longevity and optimal functioning of stormwater infrastructure. Long-term operations and maintenance needs should be identified at the time of implementation to ensure sufficient funds for system maintenance.
- **Needs Assessments:** Minnesota has many owners and operators of stormwater infrastructure with differing needs and stormwater occupying many portions of their capital improvement plans and the Clean Watersheds Needs Survey in Minnesota currently focuses on wastewater needs. To understand the gap between funding and future needs, stormwater specific data should be collected and used to inform funding opportunities.
- **Simplify and Streamline:** Allow for flexibility, adaptation, and innovation. Foster an environment where new and efficient stormwater treatment systems are worth investing in and enticing for innovators.
- **Adapt to Changing Conditions:** Include updated forecasts and adapt standards and codes to reflect changes in climate data as well as shifting targets for water quality and flood control. Ensure consistency and multi-pronged approaches that continue to address both water quality and capacity concerns.
- **Enhance Local Collaboration:** Continue collaboration among municipalities, regulatory agencies, and the private sector to streamline decision-making processes and facilitate efficient implementation and maintenance of stormwater management initiatives and innovative technologies. Acceptance of sub-watershed approaches that cross jurisdictional boundaries should be incorporated more often to solve larger regional water quality challenges.
- **Public Awareness and Education:** Increase public awareness campaigns to educate communities about costs, savings, reduced hazards, and societal ecosystem benefits that result from resilient stormwater management. Better communicate and manage expectations regarding extreme event risks and hazards to property and communities.

## Stormwater



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# Transit



GRADE  
COMPARISON

MN: C  
Nat'l: D

Photo: Metro Transit LRT on the Green Line, University of Minnesota East Bank Campus, Minneapolis, MN; by Khang Lu, WSP USA, Inc.



# TRANSIT

## EXECUTIVE SUMMARY

Transit in Minnesota provides essential access to jobs, education, and services, supporting both the state’s economy and residents’ quality of life. Although ridership has not yet returned to pre-pandemic levels, transit service has steadily increased. Of Minnesota’s 5.8 million people, about 55% (3.2 million) live in the seven-county Twin Cities metropolitan area, where transit service is more extensive due to higher population density and larger budgets. In 2023, the Legislature significantly increased dedicated metropolitan transit funding through a three-quarter-cent sales tax. Greater Minnesota, home to 45% of the population (2.6 million), faces different challenges, including longer distances, lower population density, and smaller systems with limited budgets. Legislation passed in 2023 improved funding stability by increasing the share of motor vehicle sales tax revenue dedicated to Greater Minnesota transit. Improving transit statewide will require continued investment in technology, competitive driver wages, reliable long-term funding, and ongoing attention to safety and service quality.

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## BACKGROUND

The Twin Cities’ transit network includes services operated by the Metropolitan Council, Minnesota Valley Transit Authority, SouthWest Transit, the cities of Plymouth and Maple Grove, and the University of Minnesota. Transit providers in the metropolitan area primarily operate fixed-route transit, including traditional bus, bus rapid transit, and light rail. Additional services include paratransit, on-demand microtransit, and dial-a-ride services.

In Greater Minnesota, 80 out of 87 Minnesotan counties are served by 28 rural transit systems, seven small urban systems, and five tribal transit systems. Small and large urban transit service is generally categorized by fixed-route services and demand-response service. Rural transit systems rely mostly on demand-response service, also known as “door to door” service.

## CONDITION AND CAPACITY

Of the 63 million statewide passenger trips taken on public transit, about 56 million, or 88%, of these rides occurred in the Twin Cities area. About 68% of trips (38.3 million) in the metro area are taken on the bus (including fixed-route and bus rapid transit (BRT) services). The remainder of metro area trips are on-demand response services, commuter rail and ride-sharing vanpool service.

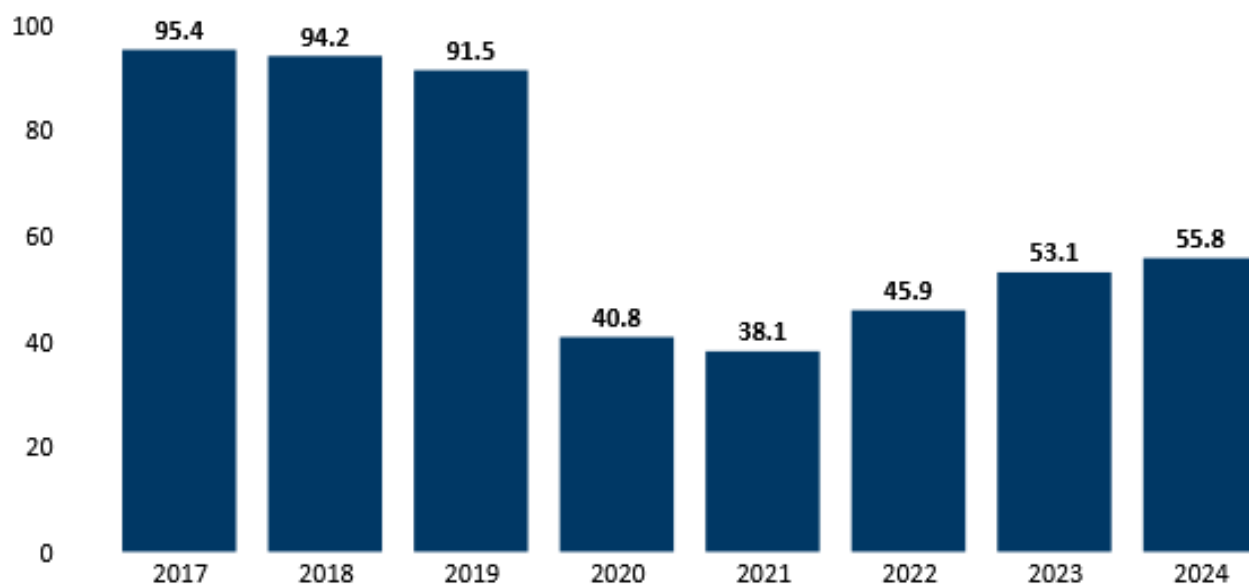
Transit agencies must report federal and state performance measures to receive funding, with data published by the Minnesota Department of Transportation (MnDOT) and the Federal Transit Administration’s National Transit Database (FTA NTD).

About 85% of Twin Cities transit rides are provided by Metro Transit, overseen by the Met Council, which operates regular bus, light rail, and bus rapid transit service. The Council also provides paratransit (Metro Mobility), curb-to-curb service (Transit Link), and services for people with disabilities (Metro Move). These

along with the remaining five transit agencies account for the other 15% of Twin Cities ridership. As shown in Figure 1, ridership increased for the third consecutive year in 2024.

**Of Minnesota’s 5.8 million people, about 55% (3.2 million) live in the seven-county Twin Cities metropolitan area, where transit service is more extensive due to higher population density and larger budgets.**

**FIGURE 1: METRO AREA TRANSIT RIDERSHIP INCLUDING METRO TRANSIT AS WELL AS OTHER PROVIDERS (MILLIONS)**

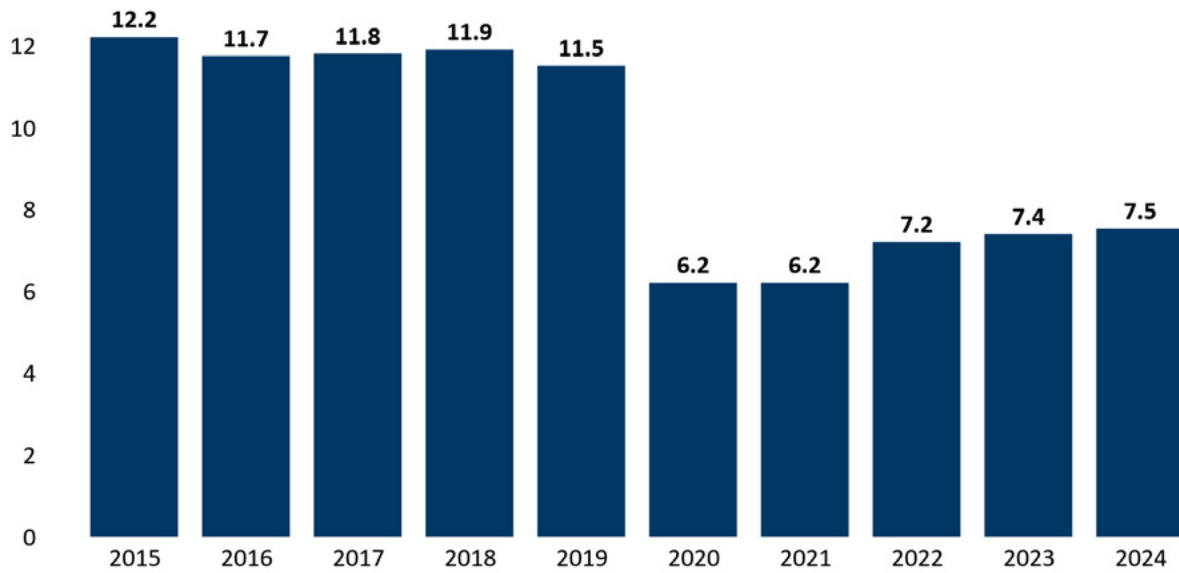


Source: MnDOT

Of Greater Minnesota’s 7.5 million passenger trips in 2024, about 66% (5 million) were bus rides, 31% (2

million) were demand-response trips, and the remainder were commuter buses or unreported modes.

**FIGURE 2: GREATER MINNESOTA TRANSIT RIDERSHIP (MILLIONS)**



Source: MnDOT

Metro Transit operates 22 transit centers, 9,887 bus stops, 973 shelters, 87 bus rapid transit stations, 37 light rail stations, and 46 park-and-ride lots, and directly runs

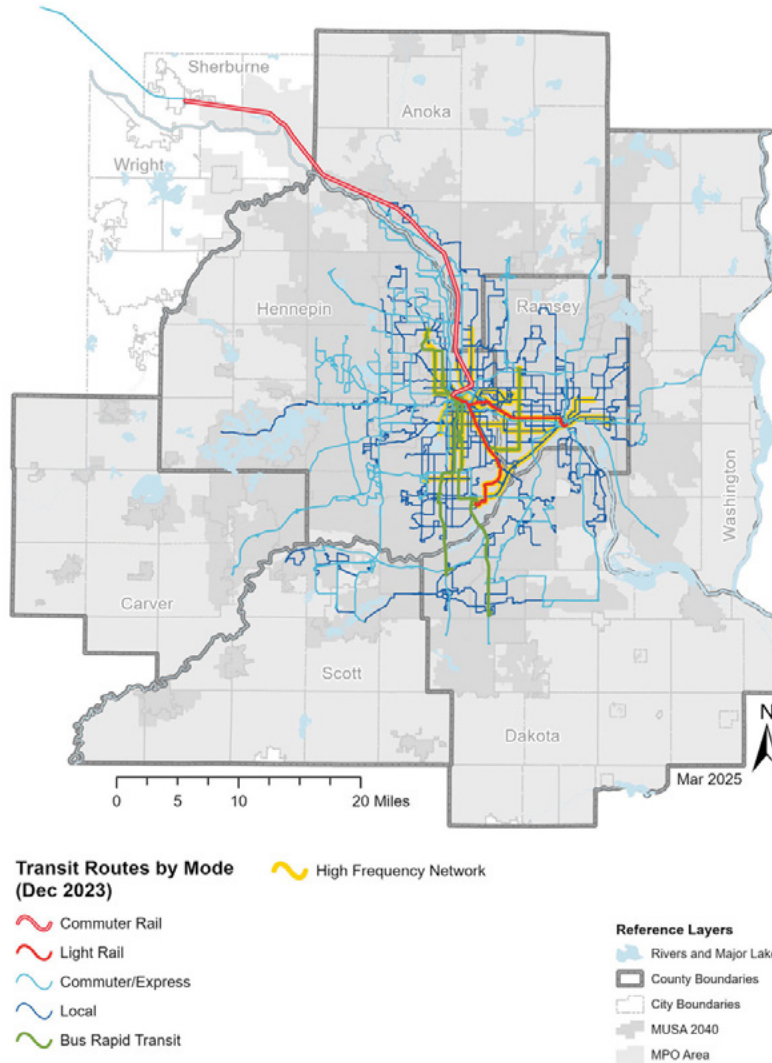
130 fixed routes. Its fleet includes diesel, hybrid, and electric buses, as well as electric light rail vehicles, as shown in Table 1.

**TABLE 1: METRO TRANSIT FLEET COMPOSITION**

METRO Transit Fleet Composition			
Mode	Type	Current Fleet	Future Plans
<b>Buses</b>	Diesel	631	224 replacement buses, 66 additional buses
	Hybrid	67	
	Coach	59	
	Electric	8	43 additional buses by 2031
<b>Light Rail</b>	Electric	118	Over \$260 million Signal and track improvements

Source: Metropolitan Council

**FIGURE 3: MAP OF METROPOLITAN COUNCIL TRANSIT SYSTEM BY MODE**



Source: Metropolitan Council

Although there has been steady recovery since the pandemic, accessibility in Minnesota has not recovered to pre-pandemic levels. In 2024, residents of the Twin Cities region could reach on average over 39,000 jobs in a 40-minute peak transit commute. Compared with around 50,000 jobs pre-pandemic reach, this means service changes (especially to commuter-oriented services) have reduced the opportunities reachable on transit in the metro area.

2025 was a big year for Twin Cities rapid bus lines, as the Gold Line opened in March, the B Line opened in June and the E line opened in December. There are further plans for F, G, H and Purple rapid bus lines, with eyes on three arterial bus rapid transit lines, J, K and L for

2030-2035. Construction on the METRO Green Line Extension that expands light rail access to the western suburbs of Minneapolis is nearly complete and will open in 2027.

In Greater Minnesota, several small urban systems provide transit service. The Duluth Transit Authority operates buses, paratransit, and two BRT-style lines, with 2.3 million rides in 2024. Rochester Public Transit runs over 30 routes and paratransit, serving about 700,000 riders, and is developing a rapid transit line called Link to connect Mayo Clinic campuses and downtown. The St. Cloud Metropolitan Transit Commission provides fixed-route, paratransit, and commuter service, with 810,000 trips. Mankato Transit and TRUE Transit offer local and rural

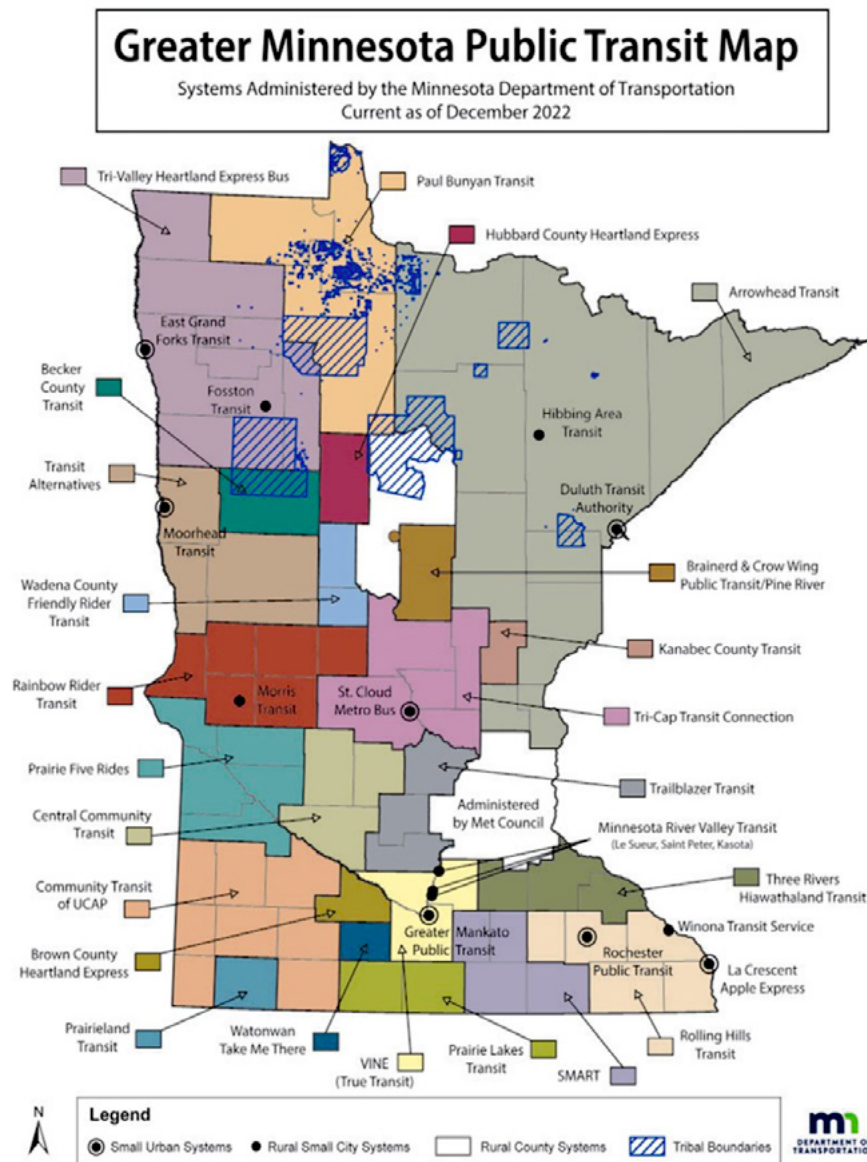
service totaling about 460,000 rides, while MATBUS in Moorhead connects to Fargo with roughly 390,000 trips. Together, these providers form a network of urban and regional transit options that connect Minnesota’s mid-sized cities to jobs, schools, healthcare, and neighboring communities.

Most transit systems in Greater Minnesota are either growing or maintaining their fleet numbers in response to public demand, particularly for service to medical and workforce destinations. Maintaining and increasing service to medical facilities and major working hubs will

improve ridership and support the needs of the more vulnerable populations in Minnesota. New services have been added, including:

- Watonwan County’s Take Me There: offers one bus dedicated to transport to dialysis services outside the county and added a class 300 bus to their fleet in 2024
- Trailblazer’s SMART-RIDE: ridership has increased over 7% two years in a row, to an annual ridership of 229,735 rides in 2024 with forty-four Dial-a-Ride buses

**FIGURE 4: GREATER MINNESOTA PUBLIC TRANSIT MAP**



Source: MnDOT

Challenges such as driver and bus fleet shortages and increased manufacturing costs affect the transit system statewide. For example, the average cost of a Class 400 bus increased 242%, or \$84,000 to \$204,000, from 2019 to 2024. To address this, a minivan pilot program was established to replace eligible transit vehicles with minivans through grants.

**Federal Transit Administration (FTA) defines the Useful Life Benchmark (ULB) as:**

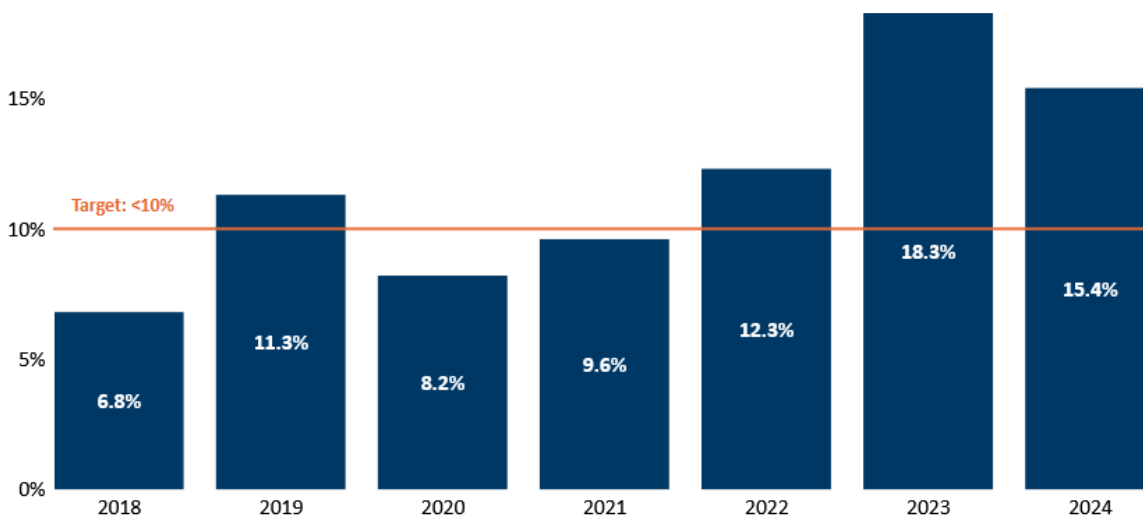
- **Light/medium duty buses = 10 years**
- **Heavy duty buses = 14 years**
- **Light rail vehicles = 31 years**

Rural fleets are aging, as more vehicles that exceed their useful life benchmark are kept in circulation, rather than replaced. Over 10% of the fleet is over 10 years old,

which is beyond the target established by MnDOT. The increases in rural transit vehicles exceeding their useful life in 2022 and 2023 were directly attributed to supply chain issues. For rolling stock strictly within the Metro Transit services, 9.22% of accordion buses, 7.97% buses and 0% light rail vehicles exceeded their useful life.

MnDOT inspects facilities annually and uses transit agency inventory reports to prioritize vehicle replacements based on age, mileage, and maintenance cost. Facility conditions are evaluated using the federal Transit Economic Requirements Model (TERM), which assesses eleven categories. A minimum score of 2.5 indicates a State of Good Repair. According to the 2023 Greater Minnesota Transit Asset Management report, all facilities exceed this threshold, with ratings above 3. For the Metro area, based on the latest 2022 data, this is also true for Metro Transit and SouthWest Transit facilities. However, Minnesota Valley Transit Authority reports that half their facilities rate below 3 on the condition scale.

**FIGURE 5: RURAL TRANSIT VEHICLE CONDITION**



Source: MnDOT

**FUNDING AND FUTURE NEED**

Transit systems in the Twin Cities area rely on several sources for both capital and operations. In recent years, increased funding has been provided through the federal Infrastructure Investment and Jobs Act (IIJA) and through increased, dedicated revenue enacted by the Minnesota Legislature.

To continue receiving state and federal funds, the Metropolitan Council is required to publish a regional

development guide (that incorporates public input to address physical, social and economic needs of the Twin Cities) and a Transportation Policy Plan (that projects at least 20 years into the future towards transportation development). Since both these plans were recently updated, they were compiled into a larger plan called Imagine 2050. Table 2 provides an outline of the current and expected funding sources for transit in the Twin Cities.

**TABLE 2: METROPOLITAN COUNCIL TRANSIT REVENUES BY SOURCE, IN MILLIONS OF DOLLARS**

Revenue source	Calendar year 2025 Total	% of 2025 Total	2025-2050 Total	% of Total
Regional sales tax (3/4-cent)	\$449	27%	\$17,300	32%
Motor Vehicle Sales Tax (MVST)	\$368	22%	\$14,300	27%
State general fund and bonds	\$163	10%	\$7,050	13%
Fares	\$82	5%	\$4,100	8%
Federal formula and Regional Solicitation	\$198	12%	\$5,500	10%
Federal Capital Improvement Grants	\$100	6%	\$1,300	2%
County sales tax and regional railroad authorities	\$244	15%	\$1,050	2%
Regional transit capital property tax and other	\$63	4%	\$2,450	4%
Fund balance and interest earned	-	-	\$850	2%
<b>Subtotal</b>	<b>\$1.67 billion</b>	<b>100%</b>	<b>\$53.9 billion</b>	<b>100%</b>

Source: Metropolitan Council Imagine 2050

A 2023 state transportation finance law revised funding sources and created new transit funding, including a 0.75% (3/4-cent) sales tax effective October 1, 2023. Of the revenue, 17% is distributed to metro counties (Anoka, Carver, Dakota, Hennepin, Ramsey, Scott, and Washington) and 83% to the Metropolitan Council, which must use the funds for transit operations, maintenance, and capital projects across 13 categories, including service improvements, safety, shelter replacement, and

workforce wages. This funding enables Metro Transit to increase service frequency, add midday express routes to suburban park-and-ride lots, restore pandemic-cut routes, and expand on-demand service to Bloomington and Blaine—amounting to a 5% service increase from March to August 2025. As of the end of 2025, the plan, known as Network Now, is 42% implemented, with full completion expected by 2027.

**TABLE 3: METROPOLITAN COUNCIL TRANSIT EXPENDITURES, IN MILLIONS OF DOLLARS**

Expenditure	Calendar year 2025 Total	2025 % of Total	2025 through 2050 Total	% of Total
Bus operations	\$684	41%	\$28,650	53%
Bus system capital	\$250	15%	\$6,250	12%
Current transitways operations	\$143	9%	\$5,200	10%
Current transitways capital	\$21	28%	\$3,400	6%
Expansion transitway operations	-	-	\$5,550	10%
Expansion transitway capital	\$447	-	\$2,650	5%
Remaining transit opportunity funds	\$122	7%	\$2,300	4%
<b>Subtotal</b>	<b>\$1.67 billion</b>	<b>100%</b>	<b>\$53.9 Billion</b>	<b>100%</b>

Source: Metropolitan Council Imagine 2050

Greater Minnesota transit relies on a combination of federal, state, and local funding. State funding includes General Fund appropriations, the motor vehicle sales tax (MVST) of 5.7%, and the motor vehicle lease sales tax (MVLST). Local revenue comes from farebox recovery, taxes, and contracts for service.

The Transit Assistance Fund is funded through the MVST and MVLST. For MVST, 34.3% goes to the Twin Cities, 5.7% goes to Greater Minnesota transit, and the remaining 60% goes toward roads (not part of the

Transit Assistance Account). Thirty-eight percent of the MVLST revenue is reserved for Greater Minnesota transit, while the rest is allocated to state, county, and local highways as well as local bridge programs.

The proper pools of the Transit Assistance Fund are then diverted to the Metropolitan Council and MnDOT. Table 4 shows the funding activity (actual and estimated) for Transit and Active Transportation through various state funding sources.

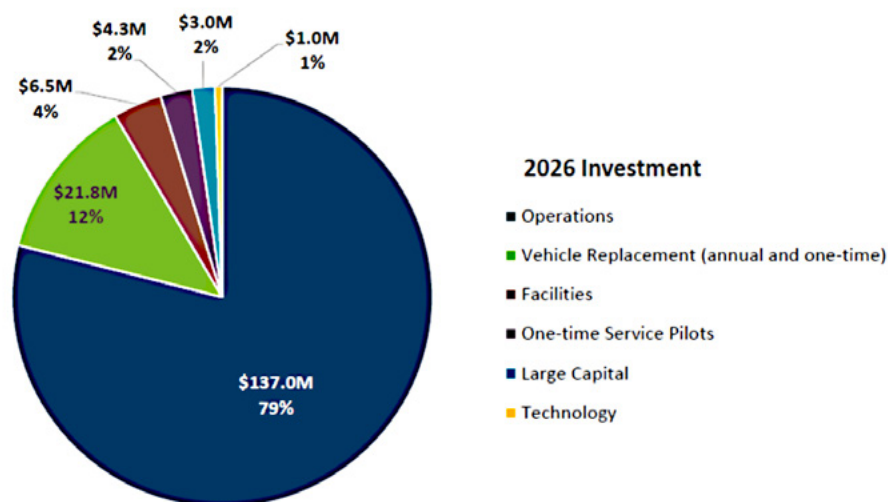
**TABLE 4: MNDOT EXPENDITURES FOR TRANSIT**

Fiscal Year Activity Expenditure Overview for Transit and Active Transportation				
	Year			
Fund	2024 (Actual)	2025 (Estimate)	2026 (Forecast)	2027 (Forecast)
General Fund	\$25,443,000	\$82,768,000	\$19,876,000	\$19,876,000
Transit Assistance Account (MVST + MVLST)	\$83,340,000	\$105,969,000	\$112,171,000	\$114,590,000
Special Revenue	\$26,963,000	\$53,766,000	\$30,706,000	\$23,924,000
Federal	\$76,284,000	\$98,408,000	\$101,300,000	\$70,100,000
<b>TOTAL</b>	<b>\$212,030,000</b>	<b>\$340,911,000</b>	<b>\$264,053,000</b>	<b>\$228,490,000</b>

Source: Minnesota 2026-27 Biennial Budget

Future state funding is forecast below:

**FIGURE 6: MNDOT FORECAST INVESTMENT 2026**



Source: MnDOT

Funding levels for Greater Minnesota transit will not allow systems to meet the growing need for services, though specific data is not available regarding the scale of the backlog of investment needs. Cost drivers include the aging vehicle fleet, labor costs, the aging population,

and competing demands for local and state funding. MnDOT's Office of Transit and Active Transportation is updating the Greater Minnesota Transit Plan, which will identify additional service needs and funding gaps.

## OPERATION AND MAINTENANCE

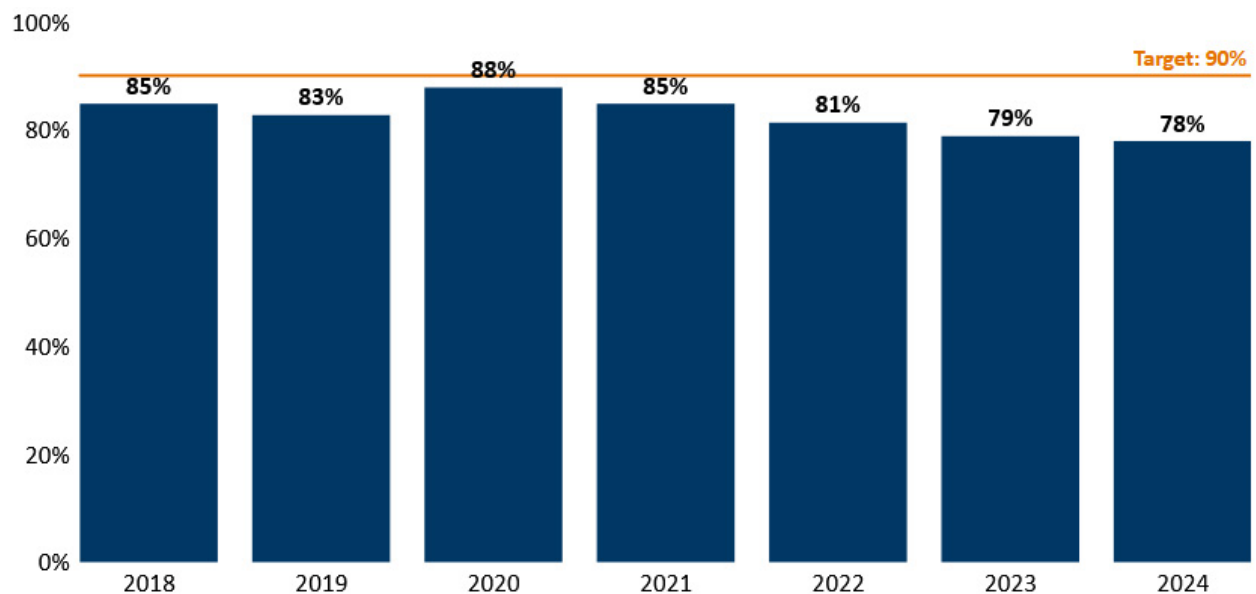
MnDOT oversees the maintenance of transit facilities and replacement of transit vehicles in Greater Minnesota. MnDOT conducts facility inspections annually and uses a vehicle inventory to prioritize replacement based on age, mileage, and maintenance cost. Vehicle scores are weighted: 40% for age, 40% for mileage, and 20% for lifetime maintenance cost.

During 2024, Metro Transit expanded service from the previous year, offering 12-minute light rail service frequency for most of the day. More than 450 new operators were hired, for a total of over 1,300 bus and train operators, with a target headcount of over 1,800 by 2030. Metro Transit has struggled to maintain bus

operators to pre-pandemic levels, but have offered increased pay with the 2023 contract. The Metropolitan Council has adopted a service improvement plan, Network Now, that outlines plans to expand service through 2027.

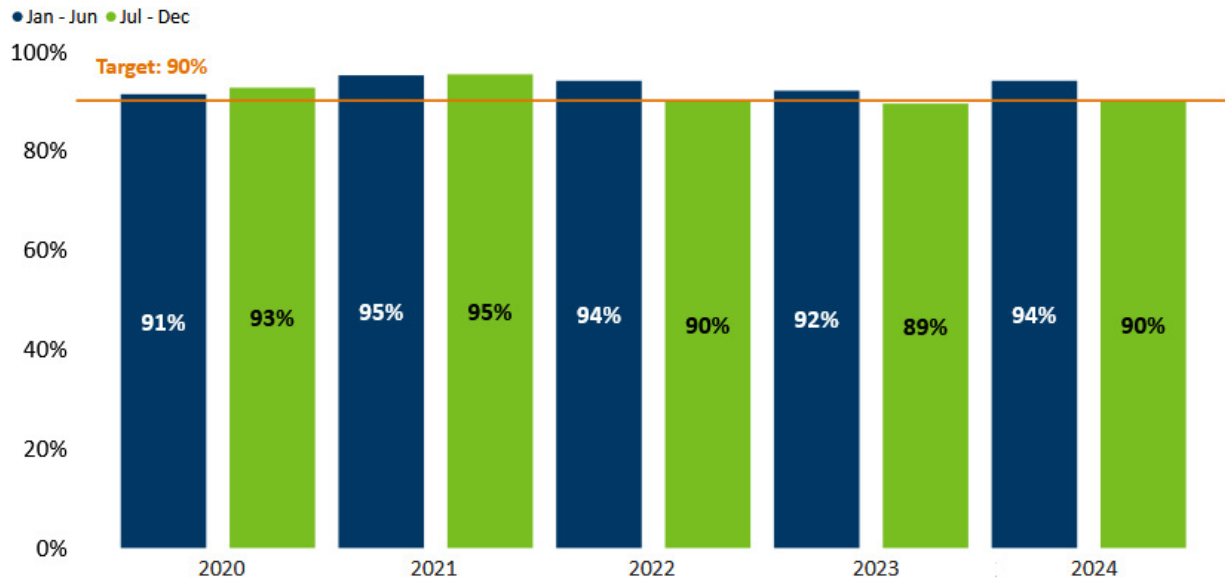
On-time performance measures the share of trips operating within a set window of scheduled time. Metro Transit targets 90% of trips to fall between one minute early and four minutes late. MnDOT sets a 90% target for Greater Minnesota systems within 45 minutes of schedule, though this standard is not practical for passengers.

**FIGURE 7: METRO TRANSIT ON-TIME PERFORMANCE**



Source: MnDOT

**FIGURE 8: GREATER MINNESOTA ON-TIME PERFORMANCE**



Source: MnDOT

## PUBLIC SAFETY

Public transit remains one of the safest modes of transportation – ten times safer per mile than driving. However, improving the safety of public transit remains a priority. Metro Transit has the greatest number of safety incidents compared to the other agencies in the state. In 2024,

there were six fatalities, 125 injuries and three serious injuries. Compared to the national average, the Metro area has a better rate concerning assaults involving transit workers, but worse rate for fatalities.

**TABLE 5: REPORTED SAFETY EVENTS ON TRANSIT**

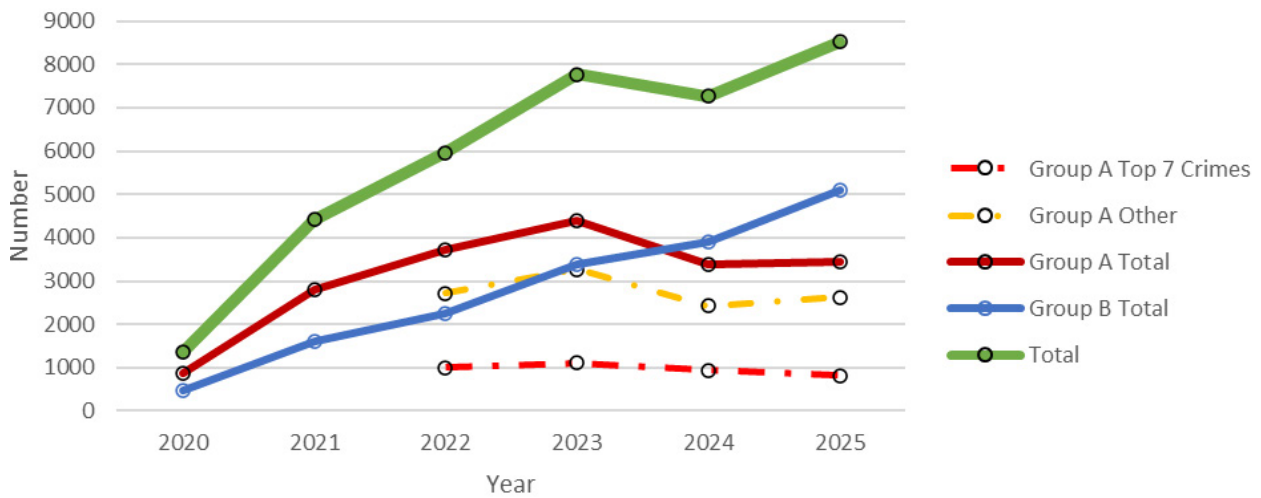
Performance Measure		2024 National	2024 Statewide	
		Average	Data	Total Number of Incidences
Assault on transit worker	Per million passenger trips	1 for every 3.25 million passenger trips	1 for every 8 million passenger trips	8
Fatality	Per million passenger trips	1 for every 154.5 million passenger trips	1 for every 10.5 million passenger trips	6
	Per 100 million Vehicle Revenue miles (VRM)	4.2 per 100 million VRM	9 per 100 million VRM	

Source: National Transit Database

Metro Transit began publishing Safety & Security Action Plans yearly in 2022 to assess measures to address increasing crime rates. Group A crimes are considered more severe and the Top 7 Crimes include homicide, sex offenses, robbery, assault, theft, motor

vehicle theft and burglary. The top 3 crimes reported are Miscellaneous Offenses (Group B), Drug/ Narcotic Offenses (Group A) and Trespass of Real Property (Group A), crimes that fall under policing crimes.

**FIGURE 9: REPORTED CRIME ON METRO TRANSIT**



Source: Metro Transit

Metro Transit has partnered with community organizations to address safety concerns. Metro Transit’s initial Transit Service Intervention Project (TSIP), which ended in 2024, documented 29% of service referrals for food/basic needs services and 23% to housing services. The Transit Rider Investment Program (TRIP) began in 2024, where trained TRIP personnel board buses or trains and check for fare compliance and offer information to appropriate social services when needed. This is to decriminalize fare non-compliance and improve safety on transit lines.

Surveys indicate that lack of access, interest, and better alternatives jointly affect transit-use behavior. Women, people with COVID concerns, urban residents, online shoppers, and transit users are associated with stronger preferences toward increased safety measures. Elderly people, hesitant tech users, and transit-dependent users are unlikely to be positively affected by trip-planning tools and contactless payment technology. These survey results help to inform transit and shared mobility providers about what safety and communications strategies will be most effective in bringing users back.

## RESILIENCE

Resilience is defined as the ability to handle stressors and shocks to the system. For public transit, this includes minimizing disruptions from severe weather events, cyber incidents, and other threats.

can operate more reliably in adverse weather and is less exposed to flood risks than below-grade systems. Looking ahead, integrating transit assets with climate projections will be critical to identifying vulnerable routes and prioritizing resilience investments.

Minnesota’s transit system faces growing climate risks, particularly from increasing incidents of flooding that can disrupt roadways and bus routes; however, MnDOT has made progress by upgrading culverts and identifying vulnerable corridors for more resilient reconstruction. At the same time, transit demonstrates inherent strengths: buses offer flexibility to reroute around disruptions, while light rail, which is largely at-grade in Minnesota,

In its Imagine 2050 Plan, the Metropolitan Council includes policies to minimize transportation disruptions, including delays from weather, security, and traffic incidents. However, data on the resilience of public transit systems in Minnesota remains limited. Improved reporting on service interruptions due to extreme weather events would help assess the robustness of the current system.

Additionally, a multimodal system powered by a variety of fuel sources is more likely to provide adaptability to extreme weather events and fluctuations in energy costs. For example, Metro Transit typically uses an annual average of 11.4% soy-based biodiesel blend.

Currently, Duluth Transit Authority, Rochester Public Transit, SouthWest Transit, and Metro Transit operate electric buses. Metro Transit has also ordered 20 40-foot battery electric buses, along with 18 bus storage

chargers and four mobile maintenance chargers. While Metro Transit is in the process of electrifying its fleet, the transition has not been without setbacks. Challenges with battery electric buses (BEBs) include performance reliability, particularly in extreme cold. Low temperatures can affect both vehicles and charging infrastructure; notably, on-route overhead conductive chargers were retired in 2023 due to reliability concerns, as they did not function at temperatures below -20°F.

## INNOVATION

Transit systems in the metropolitan area continue to incorporate new technology to improve the quality of service.

- **Intelligent Transportation Systems (ITS):** Metro Transit uses software such as ONroute to monitor bus operations, make scheduling decisions, and provide real-time data to riders.
- **Transit Signal Priority (TSP):** over 163 intersections have TSP for buses and all LRT have signal priority.
- **BRT station technology:** BRT stations feature heated shelters, emergency telephones, and real-time arrival information through NexTrip signs.
- **NexTrip:** A real-time information system that provides up-to-the-minute arrival times for buses and trains.
- **Smartphone apps:** Riders can use official and third-party apps, such as the Transit app, to plan trips and get real-time updates.
- **Go-To Card:** The Go-To Card is a smart card system for fare payment, including a special program for low-income riders.

Microtransit provides shared ride services on demand within a defined service zone, such as city limits. SouthWest Transit began operating the region's first microtransit service, SW Prime, in 2015. Since then, other

regional transit providers have been launching or testing microtransit services. The Met Council is developing a regional microtransit policy framework that will be incorporated into a future Transportation Policy Plan.

In August 2023, MnDOT established the Moving Greater Minnesota Forward program to help communities develop, pilot, and scale new or improved shared mobility services for rural, tribal, and small urban areas. These pilot programs include an e-bike share program in Duluth and Red Lake Nation, and Tri-County Action Program, Inc., a volunteer driver program that connects public transit riders to first-mile/last-mile destinations. However, no Moving Greater Minnesota Forward project has reached past the idea development and testing phase to the final phase of scaling, where long-term funding is identified.

To address transit reliability and predictability in Greater Minnesota, \$2 million of state and federal funds were dedicated to exploring a multimodal trip planning app that offered contactless payment and incorporated both fixed-route and demand-response options. By offering digital trip planning and payment, the goal is improved ridership and passenger satisfaction in Greater Minnesota.



## RECOMMENDATIONS TO RAISE THE GRADE

- Expand and modernize the system: Grow bus rapid transit (BRT) and rail networks while upgrading infrastructure and rider amenities (e.g., real-time tracking, shelters) in order to increase ridership and address the declines in job accessibility facing the state.
- Ensure stable, long-term funding: Establish reliable funding sources that address long-term funding gaps and support operations, capital improvements, and ADA-compliant fleets.
- Improve access and equity: Enhance rural mobility through solutions like microtransit pilots and ensure accessibility for all riders.
- Focus on near-term service improvements: Increase frequency, reliability, and convenience over the next five years, including rolling out new BRT lines.
- Clear reporting on scale of backlog projects: Report data to provide an understanding of required funding for long-term projects
- Strengthen the workforce: Improve wages, scheduling, and working conditions to attract and retain transit operators and staff.

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# Wastewater





# WASTEWATER

## EXECUTIVE SUMMARY

Although wastewater collection and treatment capacity is adequate at most facilities and systems throughout the state, funding needs for upgrading and replacing end-of-life treatment and collection systems are increasing due to aging infrastructure. This is particularly true for small communities that do not have the population and, therefore, revenue to support infrastructure upgrades, maintenance, or robust asset management. The current estimated annual capital need for wastewater infrastructure projects across Minnesota is more than \$800 million, which far exceeds current financial assistance programs. Increasing infrastructure costs, aging infrastructure, new regulatory requirements, and a lack of skilled workforce add strain to the resiliency of wastewater systems. However, recent investments into wastewater infrastructure demonstrate how continued prioritization of these projects can improve the health of the public and environment, while maintaining an equitable quality of life for all Minnesotans.

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## BACKGROUND

Wastewater infrastructure is a critical part of maintaining public health. In the Twin Cities Metropolitan Area, the first wastewater treatment plant (WWTP) on the upper Mississippi River (the Metro Plant) was constructed and placed into service in 1938. Water quality in the Mississippi River improved almost immediately as a

result. The Metro Plant along with eight other treatment plants are managed by the Metropolitan Council Environmental Services (MCES). These metro-area facilities serve 64% of Minnesota's population supported by WWTPs and account for 31% of the wastewater funding needs identified in Minnesota.

## CAPACITY

Today, approximately 71% of Minnesota's wastewater is treated at Publicly Owned Treatment Works (POTW) which consist of both a collection system (gravity sewers and pump stations) and treatment plants for treating the wastewater generated. The remaining 29% of Minnesota's wastewater is collected and treated by an on-site collection and treatment system. On-site

systems are most often referred to as septic systems or subsurface sewage treatment systems (SSTS). Tables 1 and 2 show the estimated population of Minnesotans served by centralized wastewater collection and treatment systems, vs on-site or decentralized systems, respectively.

**TABLE 1: MINNESOTA 2024 CENSUS ESTIMATED POPULATIONS SERVED BY WASTEWATER COLLECTION AND TREATMENT, BY CITY SIZE**

City size (people):	>100,000	50 – 100,000	25 – 50,000	10 – 25,000	< 10,000	TOTALS
Population Served <sup>a</sup>	850,668	982,254	664,134	808,367	818,917	4,124,340
Unserviced Population <sup>b</sup>	0	0	0	0	1,711,884	1,711,884
State Total	850,668	982,254	664,134	808,367	2,530,801	5,836,224

<sup>a</sup> Population of communities with centralized wastewater treatment. Includes served township areas.

<sup>b</sup> Unserviced population is estimated from the population of cities of <10,000 remaining after populations from served cities of <10,000 were subtracted.

Source: Minnesota Pollution Control Agency and Minnesota Department of Administration

**TABLE 2: MINNESOTA 2024 ESTIMATED POPULATIONS SERVED BY WASTEWATER TREATMENT PLANTS (WWTPS) OR ON-SITE WASTEWATER TREATMENT SYSTEMS**

Area of State	Connected Population		Percent Population		Total Population
	WWTPs	On-site	WWTPs	On-site	
<b>Metro (7-County)</b>	3,161,673	86,298	97%	3%	3,247,971
<b>Outstate</b>	1,750,529	837,724	68%	32%	2,588,253
<b>TOTALS</b>	4,912,202	924,022	84%	16%	5,836,224

Source: Minnesota Pollution Control Agency

The ownership and operation of publicly owned wastewater treatment plants and sewer collection systems (SCSs) within the state is the responsibility of approximately 800 Minnesota cities and sanitary districts. Of the latter, the Metropolitan Council Environmental Services (MCES) and Resource Renew (formerly the Western Lake Superior Sanitary District or WLSSD) are the largest in terms of services provided.

Most WWTPs in Minnesota have adequate capacity for their current needs. The largest WWTP in the Metropolitan Area, the Metro Plant (located on the Mississippi River in St. Paul), has adequate capacity for the next several decades even with continued population growth. This excess capacity is the result of multiple flow reduction projects which have occurred over the

past several decades. A sewer separation program was conducted in Minneapolis and St. Paul in the 1990s through the early 2000s, which separated the local sanitary and stormwater sewer systems, as well as the continued implementation of projects to reduce inflow and infiltration (I/I) of surface and groundwater from entering the system, continue to alleviate capacity concerns in the metro area. Nevertheless, the Minnesota Pollution Control Agency (MPCA) reports that metro population growth and industrial growth in both the metro and greater Minnesota as drivers of system expansion for both WWTFs and SCSs. Changing regulations focusing on addressing emerging contaminants such as PFAS have been a driver in upgrading WWTP capacity in the state. This is discussed in further detail in the public safety section.

## CONDITION

Wastewater infrastructure consists of SCSs and WWTPs. These components are evaluated separately as they have different life expectancies and condition criteria.

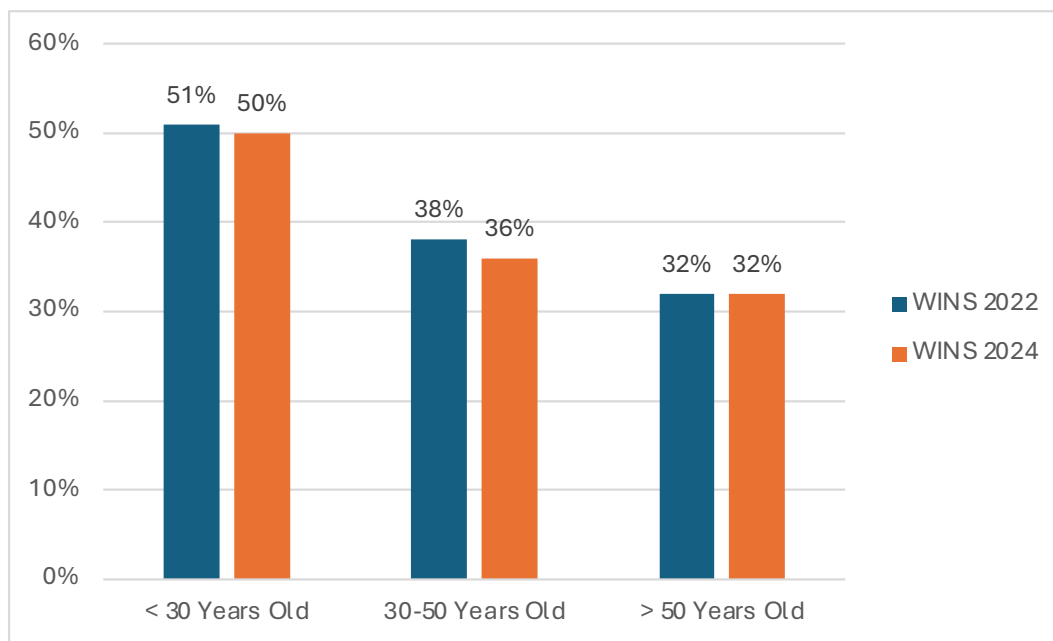
### Sewer Collection Systems (SCSs)

Modern collection systems are typically designed for a lifespan of 100 years, while older systems were frequently designed with no specific lifespan. SCSs vary in age and condition; older systems are generally in worse condition. More than 95% and 75% of the two largest sewer collection systems in the state, Minneapolis and St. Paul, respectively, are over 50 years old, and substantial

portions of the SCSs of the surrounding suburbs are also older than 50 years.

In greater Minnesota, SCSs are generally newer, according to the 2024 Wastewater Infrastructure Needs Survey (WINS) published by MPCA. As seen in Figure 1, little movement has been made in addressing aging SCSs over the last several years. It is estimated that roughly 40% of upcoming projects in the state will be to replace, repair, or upgrade aging infrastructure versus 60% of the projects being for the creation of new systems.

FIGURE 1: AVERAGE AGE OF MINNESOTA SCSS



Source: Minnesota Pollution Control Agency WINS Reports

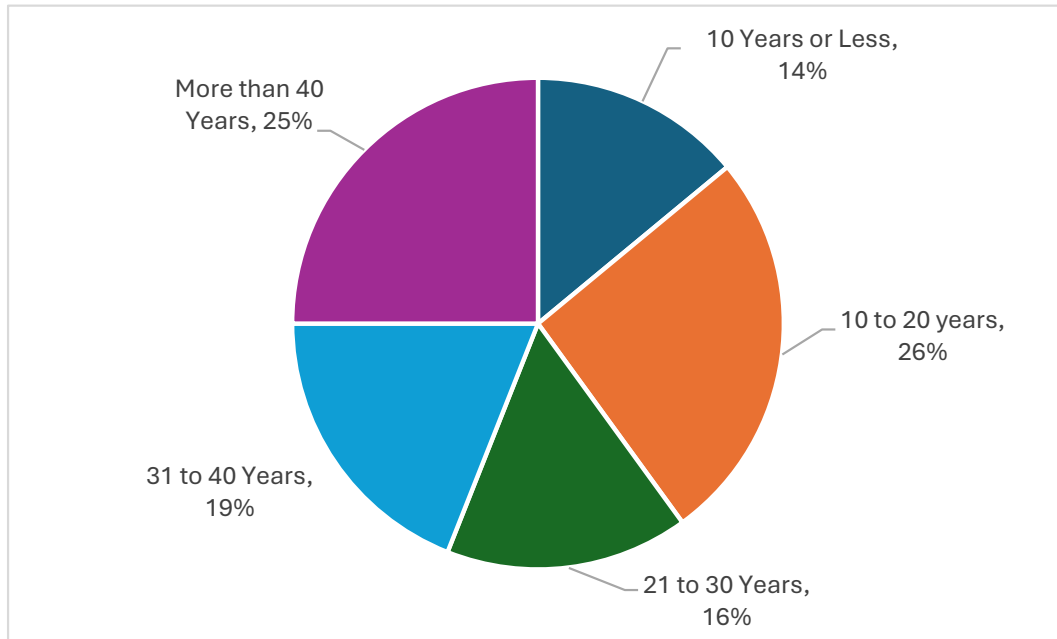
### Wastewater Treatment Plants (WWTPs)

WWTPs are generally somewhat newer, or have been upgraded, expanded, or rehabilitated to account for population growth and implement newer technologies. For example, the Metro Plant was originally constructed in the 1930s, with major upgrades taking place beginning in the 1960s through the early 2000s. Although this plant continues to be upgraded to meet effluent quality requirements, many of the basic plant components now exceed 50 years of age. The other Metropolitan area plants range in age from the 1950s to the 2010s, with most plants undergoing significant expansions or improvements

over the years. Two of the metro area plants (Hastings and Rogers) are scheduled for decommissioning and replacement within the next decade.

Figure 2 depicts the average ages of wastewater treatment plants in Greater Minnesota. These numbers presented are comparable to those included in the 2022 Infrastructure Report Card. However, it is important to remember that the life expectancy of a WWTP is in the range of 40 to 50 years. As a result, 25% of these plants in Greater Minnesota may need upgrades or complete replacement soon.

FIGURE 2: GREATER MINNESOTA WASTEWATER TREATMENT PLANT AGES



Source: Minnesota Pollution Control Agency

## OPERATION AND MAINTENANCE

According to the data collected for the 2024 WINS report, less than half (42%) of the 583 Minnesota communities that responded reported that they currently have an Asset Management Plan (AMP). This is a lower percentage of communities reporting an AMP than what was noted in the 2022 WINS report.

With support from Minnesota’s Drinking Water Revolving Fund Technical Assistance set-aside, the Minnesota Rural Water Association (MRWA) in 2016 began conducting AMP training sessions. MRWA has provided technical assistance during the development of 52 communities’

drinking water AMPs and 6 communities’ wastewater AMPs. Although MRWA’s AMP templates are mostly geared to small systems with populations under 1,000, any size community can use it for preparing their AMP and the template is available on their website for both systems. MRWA also provides wastewater operator training and in 2024, with support from MPCA, began conducting AMP training sessions for wastewater facilities. These are valuable resources that will aid Minnesota communities to better manage available water and/or wastewater resources and identify future needs.

## FUNDING AND FUTURE NEED

Operation and Maintenance (O&M) expenses, along with local shares of capital expenditures, are paid by wastewater treatment system users as part of their wastewater rates. In the seven-county Twin Cities Metropolitan Area, the median annual wastewater rate charge was \$420 per household in 2024. The median annual costs in Greater Minnesota are in the range of \$444 to \$594 per household. Generally, the rate charged for O&M of a wastewater treatment system

increases as the number of customers served decreases (i.e., smaller facilities have higher annual rates per user). Therefore, rates charged to users for O&M expenses in Greater Minnesota are generally higher than in the metro area and are also more variable. Furthermore, as median household incomes are usually lower in smaller communities, wastewater O&M costs also represent a greater financial burden for their users. Balancing affordability and service is a challenge, and many smaller

wastewater systems struggle to prioritize deferred maintenance over emergency needs such as flooding and structural failures.

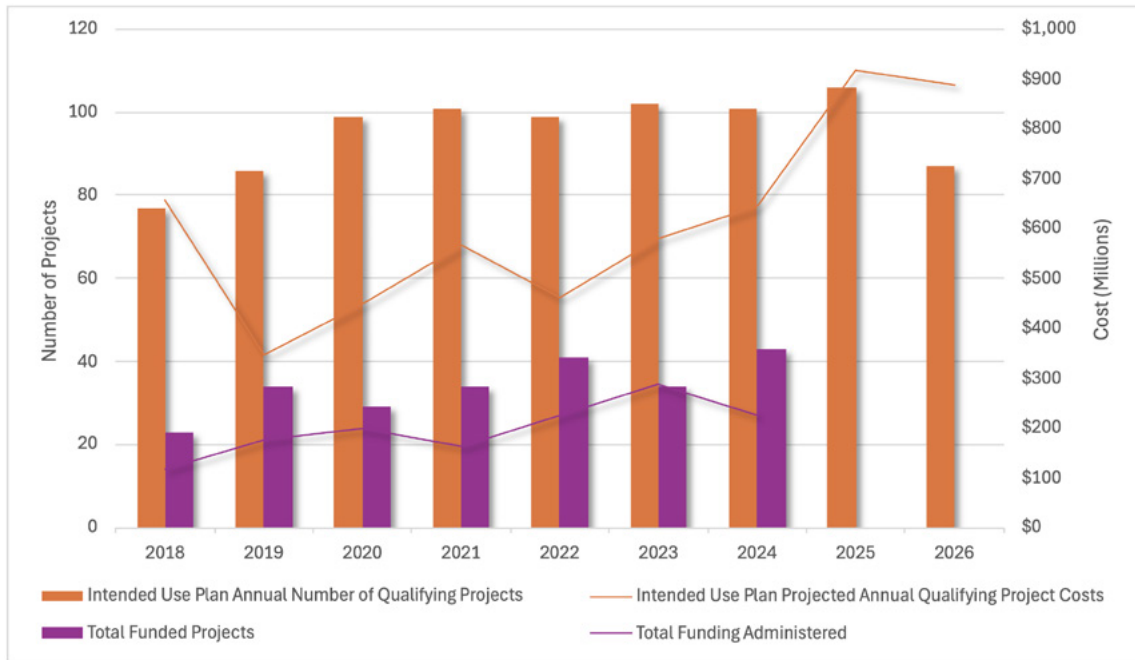
There is a combination of sources for funding capital improvement projects for Minnesota’s wastewater treatment systems, which include federal, state, and local sources. Local funding is primarily generated by user rate fees and varies significantly from one community to another. As with O&M costs, capital costs for smaller systems are often significantly higher on a per user basis than for larger systems. Generally, wastewater capital costs have been increasing both due to a rise in construction costs and increased project complexity (in part due to new regulations).

**Although IIJA dollars have provided an overall boost to the CWSRF, federal capitalization grants for the fund have generally been lower than typical over the last four years. After the end of the 5-year increased federal funding from IIJA, new state or federal funding will be needed to continue to support wastewater projects at the current level, and capitalization grants would need to return to prior levels.**

Nonlocal support for wastewater treatment system projects in Minnesota is dependent on state appropriations and annual federal funding and financing. Funding varies from year to year, contingent primarily on government support for the programs, especially for grants. The main funding mechanism for wastewater projects is the Clean Water State Revolving Fund (CWSRF), which is funded by both federal and state government support. In recent years, funds from the Infrastructure Investment and Jobs Act (IIJA) have increased availability of both grant and loan dollars for Minnesota communities and supported recent programs. Although IIJA dollars have provided an overall boost to the CWSRF, federal capitalization grants for the fund have generally been lower than typical over the last four years. After the end of the 5-year increased federal funding from IIJA, new state or federal funding will be needed to continue to support wastewater projects at the current level, and capitalization grants would need to return to prior levels.

The funding and loan programs for wastewater infrastructure are administered by the MN Public Facilities Authority (PFA). Wastewater projects which are eligible to receive financing over the next five years are compiled into the Project Priority List (PPL) by the MPCA, and those that apply for and are eligible to receive funding are listed on the Intended Use Plan by PFA. The most recent PPL (2026) includes 353 projects with a total estimated cost of over \$4.2 billion, or \$840 million annualized over a 5-year period. The PPL includes more projects at higher costs than previous years, continuing a general trend of increasing need for wastewater project funding. The most recent Clean Water Intended Use Plan (IUP) (2026 Draft) includes 87 projects with a cost of 889 million dollars. The IUP requests are limited by available funding but continue to be high despite current levels of investment, indicating continued need for wastewater capital projects and funding support. Figure 3 shows the wastewater funding needs over 2018-2026, as represented by the IUP estimation of 20-year wastewater needs. Please note that some data are not yet available for 2025 and 2026.

FIGURE 3: MINNESOTA WASTEWATER NEED 2018-2026

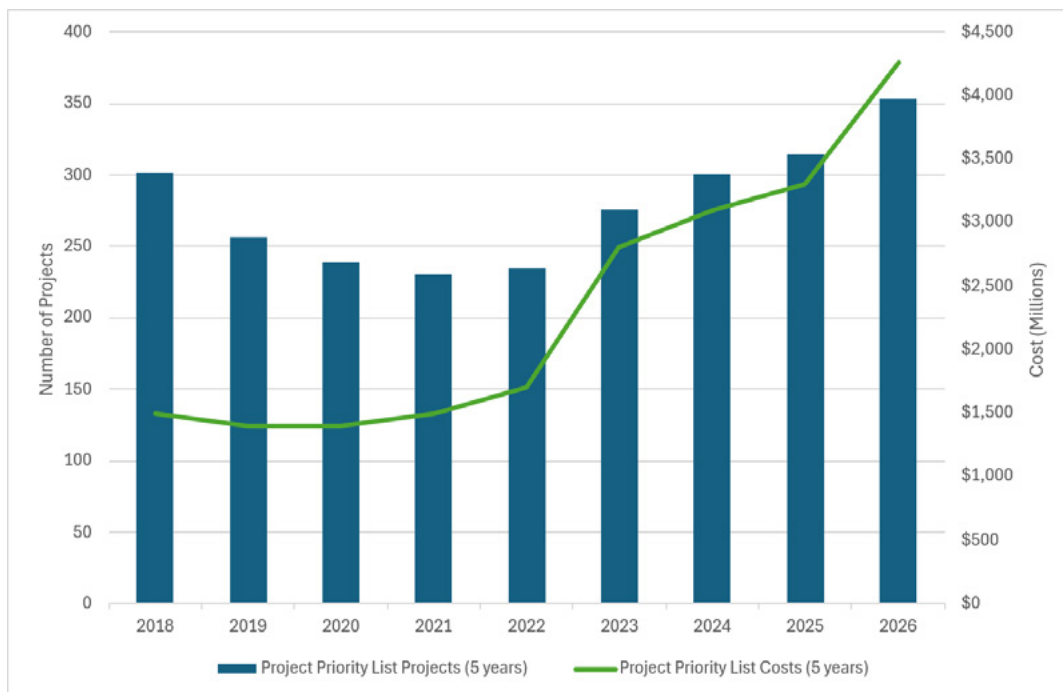


Source: Minnesota Public Facilities Authority

Figure 4 shows the wastewater projects and cost on the PPL for the same time period as Figure 3. Funding has varied by year but is generally only a fraction of the identified need. From 2018-2024 an average of 39% of the IUP is funded each year. In most (but not all) years,

grants and principal forgiveness make up the smaller portion of project funding. Of the years shown, an average of 40% of the funding comes from grants or principal forgiveness, with the remainder being low-cost loans.

FIGURE 4: MINNESOTA WASTEWATER FUNDING 2018-2024



Source: Minnesota Public Facilities Authority

## PUBLIC SAFETY AND RESILIENCE

As underfunding becomes more prevalent, the risk of public health threat or environmental contamination such as from unexpected catastrophic failures of a wastewater treatment system due to lack of needed O&M or inadequate SCS and/or WWTP capacity becomes greater. The MPCA has reported an average of nine municipal wastewater violations per year according to 2022, 2023, and 2024 enforcement action summaries, which amounted to a total net penalty of \$90,216 for the 3-year period. It should be noted that not all enforcement actions result in monetary fines. A consent decree between the EPA and Minnesota Power regarding a 2024, 5.5 million gallon wastewater pipe leak at the Boswell Energy Center in Cohasset, MN, was put into effect in 2025. Field studies, water sampling, and sediment analysis in response to that consent decree are currently ongoing.

Ongoing revisions of water quality standards, especially those directed at protection of the environment, could also have the unintended consequence of diverting wastewater infrastructure funds from needed improvements to protect public health. Negative impacts to public health may result if priority in infrastructure funding is given to these water quality revisions over those related to protecting public health. Degradation of wastewater collection and treatment facilities could

compromise the protection of public health from acute diseases.

An increase in extreme weather events also impacts the resilience of Minnesota's wastewater infrastructure. Flooding can overwhelm wastewater treatment and collection systems, leading to sewage releases, damage, and service interruptions. According to the 2024 WINS Report, only 9% of the 583 communities that responded reported that they had included extreme weather events in identifying and planning for future hazards. The report also indicated that 28% of communities which had not completed planning were interested in creating a plan. While these are increases from the percentages reported in the 2022 WINS report (6% and 15% respectively), many communities lack dedicated resources to address climate hazards such as flooding, and there is a significant gap in education, awareness, planning, maintenance, and capital project funding. Because of the far-reaching effects of climate change beyond wastewater collection and treatment, large-scale coordination is needed at the state or regional level between city and regional organizations.

Regulations which seek to alleviate public health and environmental concerns are also a significant driver of wastewater treatment upgrades. In recent years,



*Photo: Water treatment tank with wastewater; DedMityay*

the State of Minnesota has focused on polyfluoroalkyl (PFAS) substances (and other related “forever” chemicals) as a potential carcinogen and public health concern. While much of the initial emphasis and effort has been on the drinking water side, potential requirements for PFAS treatment and monitoring in wastewater and wastewater biosolids have also been

widely discussed. Efforts to address PFAS in the state, as well as additional contaminants of emerging concern (CEC), including pesticides, pharmaceuticals, nitrogen, chlorides, industrial chemicals, sulfates (for wild rice protection) and other byproducts will require costly upgrades to wastewater treatment infrastructure.

**Because of the far-reaching effects of climate change beyond wastewater collection and treatment, large-scale coordination is needed at the state or regional level between city and regional organizations.**

## INNOVATION

Wastewater plants in Minnesota are using innovation to combat pollution beyond simply treating wastewater. The Saint Cloud wastewater treatment facility, an innovative wastewater plant which has already received numerous awards, is working on a Green Hydrogen Project to create renewable, green energy from wastewater. This project follows up on their Net Zero energy recovery and nutrient recovery initiatives. These initiatives employed new technology to capture energy and nutrients from waste to reuse for power and fertilizer, respectively. As part of the energy and nutrient capture initiatives, the facility also processes some organic solid waste products from the area. Resource Renew also recently completed a project to generate electricity from biogas. This process will provide up to 60% of the electric demand of the wastewater facility.

Entities in the state are also innovating to adapt to emerging contaminants and new pollutants. Addressing these contaminants requires a multifaceted and

multidisciplinary approach. Installation of treatment systems for landfill leachate is one way wastewater treatment technology is being used to keep PFAS out of downstream wastewater plants, and ultimately, the environment. Kandiyohi County and SKB Environmental (Rosemount) have recently deployed leachate treatment for PFAS. St. Louis County recently constructed a geothermal energy field that will capture heat produced by decomposing garbage for use as energy to power a leachate treatment system designed to remove PFAS. Additionally, due to the complexity and costs associated with removal of PFAS from wastewater, the state of Minnesota is one of several states leading the nation on efforts to limit sources of PFAS contamination. Addressing emerging contaminants through multiple projects is critical for achieving public health outcomes without overburdening wastewater utilities.

## Wastewater



### RECOMMENDATIONS TO RAISE THE GRADE

- Continue or expand state and federal investment in existing wastewater infrastructure funding and assistance programs, including an increase in State Revolving Funds. This is necessary to provide for a growing number of priority projects due to aging infrastructure.
- Address the disparity in funding between large and small communities by continuing and bolstering programs focused on small and disadvantaged communities that do not have the income base (population) to support significant improvements that large communities have.
- Couple new advanced treatment requirements (such as those for contaminants of emerging concern) with additional funding and investment. Provide flexibility in funding to allow for innovative ways to address needs.
- Continue to encourage local governments to more regularly report and collect details regarding the condition and performance of their systems, including the development of asset management plans. This will allow for a better understanding of system performance and serve to better direct future funding to the most critical areas and portions of local wastewater systems.
- Expand local and statewide asset management programs to develop more long-term project planning tools, provide more clarification to address data ambiguity, and promote more refined approaches and analyses to expand and protect wastewater systems.
- Improve education, awareness, planning, and funding for wastewater systems for climate resilience and long-term sustainability.
- Promote education to both the public and state representatives on the importance of wastewater infrastructure and investment. This includes the potential impacts to water quality that inadequate, reduced capacity, or damaged systems may have on the environment and/or public health.
- Continue to innovate and explore additional and new technologies to treat wastewater, protect the environment, and construct and rehabilitate wastewater systems.
- Adjust utility companies' user rates to cover the full cost of service including operations, maintenance, and estimated capital needs.

## Wastewater



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