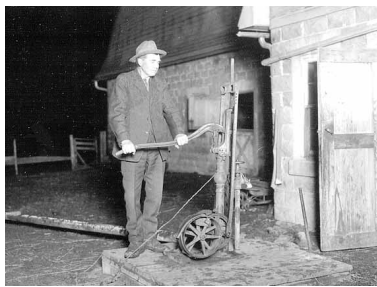


Improving water quality

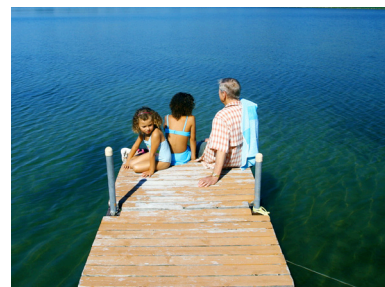
25% BY 2025



Northwest
Minnesota



25BY25



Dear Fellow Minnesotans,

In the land of 10,000 lakes, clean water should be a right, not a privilege. But the reality is that the quality of our lakes, rivers, streams, and groundwater is threatened from many sources all across our state. We are at a crucial moment – we can continue to let water quality become worse or we can work together to reverse the damage that has been done and prevent future water degradation. That is why your involvement in this summer’s Community Water Meetings is so important.



It will take all of us working together to protect our waters for ourselves and future generations. That is why, after hearing from citizens and experts at Water Summits in Morris and St. Paul, I set the goal to improve our State’s water quality 25 percent by 2025. This goal does not mean that every pollutant will be reduced by 25 percent; it does not mean that every part of the state will improve 25 percent; but it means that in aggregate for the state and the many pollutants there will be a 25 percent improvement. At the current level of effort, there will be only a 7 percent improvement statewide, and without further action, water quality will get worse.

To be clear, this is not a regulation. More importantly, it is a call to action and the reason for Minnesotans to gather for Community Water Meetings this summer. I want to hear from people in every part of our State about the water concerns in their communities, how it will benefit our economy and quality of life to improve water quality, and what we can do to make greater progress toward clean water.

Thank you for your commitment to improving Minnesota’s water quality.

Sincerely,


Mark Dayton
Governor

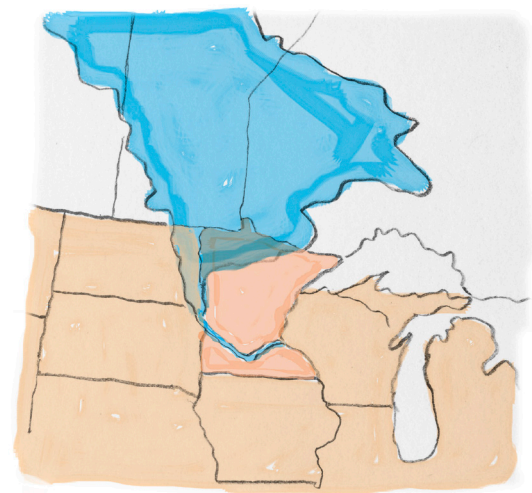
Good to know:

Northwest Minnesota

The Red River of the North (Red River), in part, forms the boundary between North Dakota and Minnesota. The river flows north through the Red River Valley and empties into Lake Winnipeg, Manitoba, Canada.

The Red River Valley, formed by the deep-water basin of Glacial Lake Agassiz, is the defining feature of Northwest Minnesota. It is a low gradient plain with poorly drained silty and clayey soils. Historically a tallgrass prairie, the valley is the flattest, driest, most fire-prone region of Minnesota. It is also prone to seasonal and event-based flooding

Land use is now mostly agricultural, known for sugar beets and other row crops. Lakes in Otter Tail, Becker, Grant, and Mahnommen Counties are popular vacation areas.



12,000 years ago, Lake Agassiz played a large role in the formation of the fine-grained topsoil and geological features of the region.

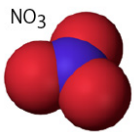
** Regions used for this project are from the Minnesota Association of Soil and Water Conservation Districts.*



Three out of four Minnesotans get their drinking water from groundwater sources, but the groundwater is threatened by overuse and contamination in some places.



Major threats to groundwater



Nitrate — One of the most common water pollutants in Minnesota groundwater, affecting a large number of private wells and public water supplies. Elevated nitrate in drinking water can be harmful to human health, specifically to the health of infants. Septic systems, fertilizers, and manure are major sources of nitrate pollution in Minnesota.



Road salt — The salt applied to roads, parking lots, and sidewalks during our icy winters contains chloride, a water pollutant.



Overuse — In general, water is being drawn out of the state's aquifers faster than it is being replenished. If this overuse continues, groundwater may not be available as needed in the future.



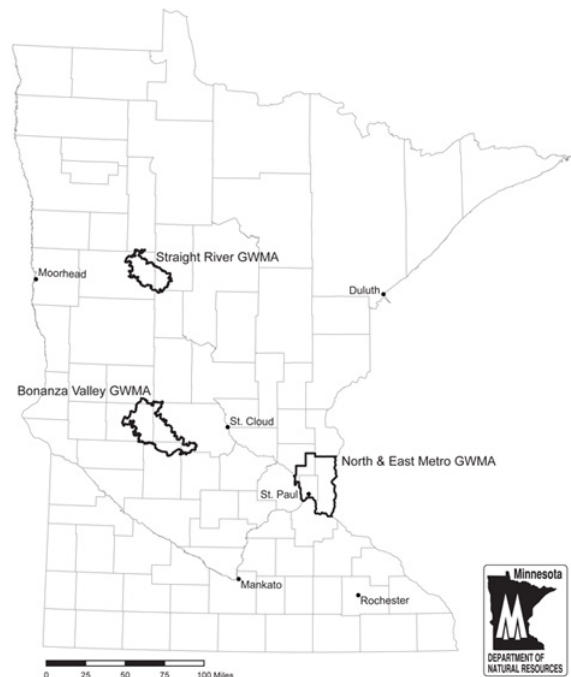
Site-specific contamination — Land that is contaminated by hazardous substances and industrial pollutants — such as Superfund sites — may affect groundwater nearby.

Good to know: Northwest Minnesota

Residents of Northwestern Minnesota obtain their drinking water from a mix of sources—groundwater and surface water (Red River, Red Lake River, Wright Lake, etc.)

The fine-grained clay topsoil in this region is not ideal for aquifer formation, meaning groundwater quality and quantity are unevenly distributed.

The Straight River Groundwater Management Area touches the far southeast corner of this region. In contrast with most of the region, this area has sandy soils. Growing pressure from domestic water supplies, irrigation and other uses have threatened groundwater resources in this area.

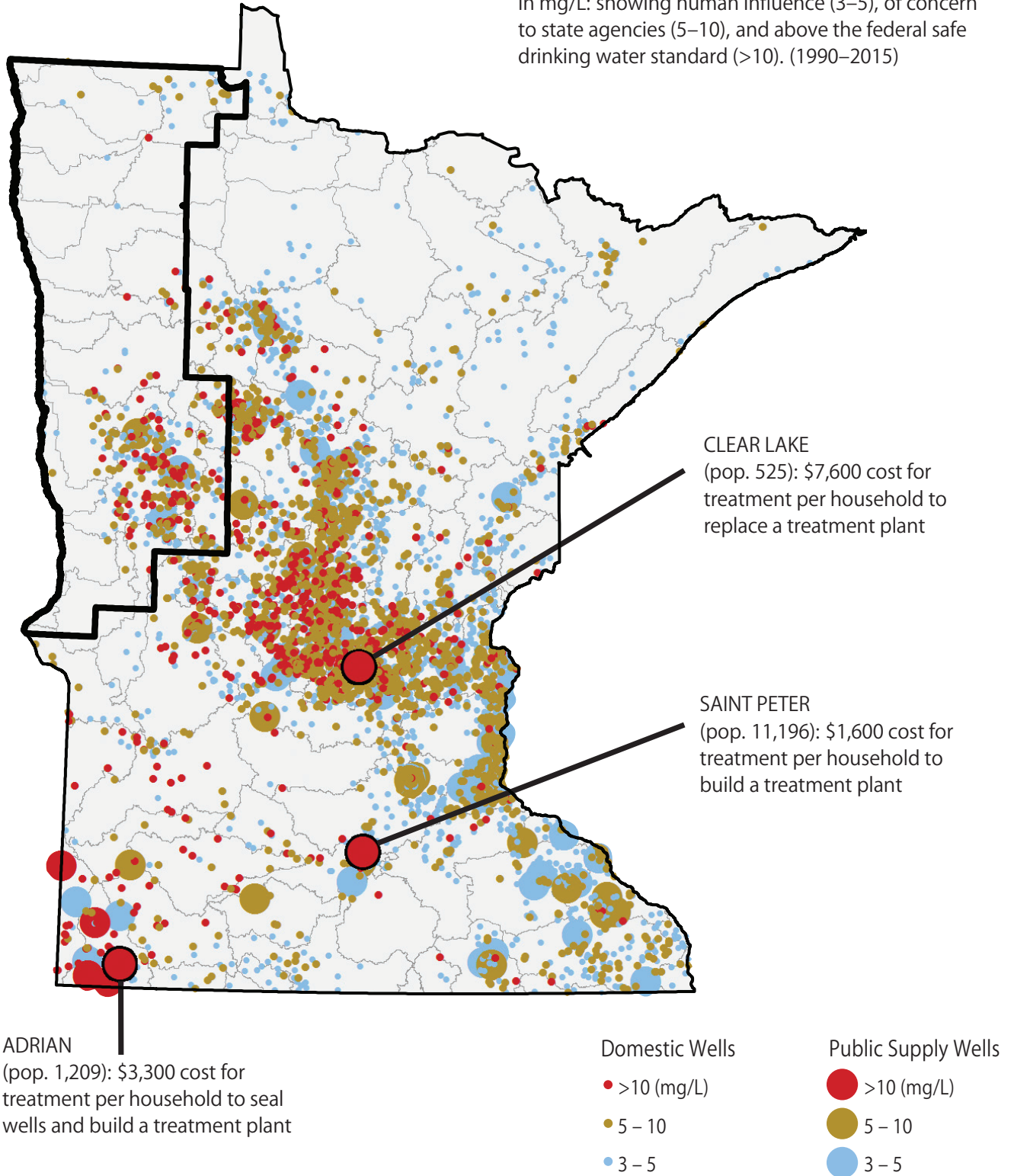


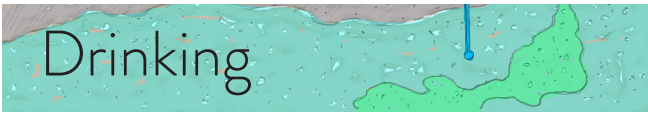
Keeping lead out of drinking water

Water can pick up lead if it flows through lead pipe or plumbing. Because lead can be found in the plumbing of homes, all public water systems have to follow standards to make sure water does not easily dissolve lead while moving through pipes. Schools and homeowners can also test lead levels in their drinking water and learn about additional ways to reduce their exposure, like running water for 30-60 seconds before drinking.

Maximum nitrate-nitrogen concentrations in public and domestic wells

The map shows three categories of contamination in mg/L: showing human influence (3–5), of concern to state agencies (5–10), and above the federal safe drinking water standard (>10). (1990–2015)





Public water supply wells

Residents of Northwestern Minnesota obtain their drinking water from a mix of sources – groundwater and surface water (Red River, Red Lake River, Wright Lake, etc.).

Public water supplies are monitored regularly for nitrate and other contaminants. It's increasingly common that public water supply systems need expensive nitrate treatment or are using strategies to reduce nitrate.

- ▶ In Northwest Minnesota, 31 public water supply wells, 2.9%, have nitrate above 3 milligrams per liter (mg/L).

When wells have levels of nitrate above 3 mg/L, preventative measures should be considered. The federal Safe Drinking Water Act standard is 10 mg/L. Public water supplies with nitrate levels above this standard must take action to reduce concentrations below 10 mg/L.

Public water supplies are protected from contamination by focused prevention activities. This region has about 47,000 acres prioritized for drinking water protection. Forty-two percent of these are at high risk of contamination. To protect our water we need to target protection of high risk areas.

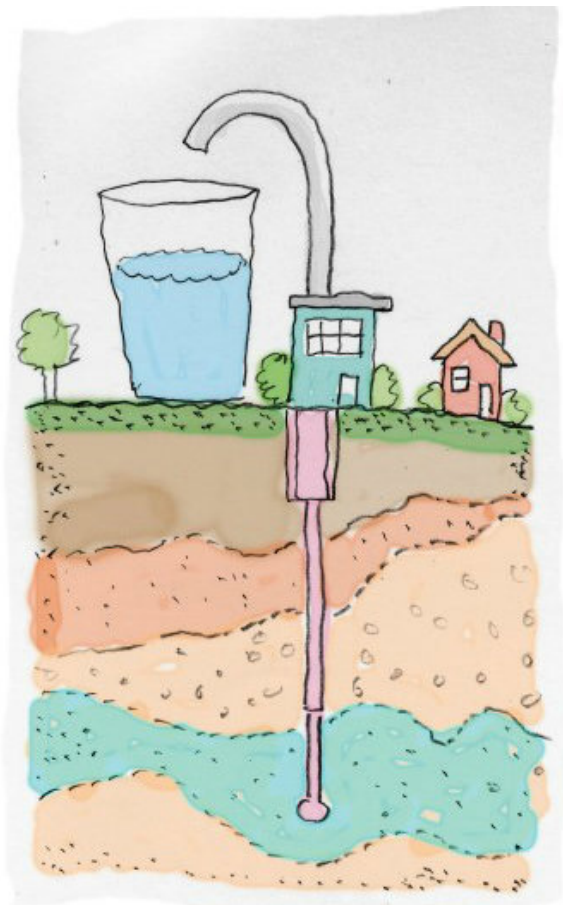
Good to know: Northwest Minnesota

Private wells

Thirty-nine percent of residents in this region obtain their water supply from a private well.

Private well testing results under the Township Testing Program are available for Otter Tail and Becker counties. In these high-risk areas, 10% of private wells tested are above 3 mg/L, a level at which preventative measures should be considered. Four percent of wells exceed 10 mg/L, which is above the safe drinking water standard and can lead to immediate health problems for some people, especially babies.

Well owners are responsible for testing their own water and treating it, if needed. In agricultural areas with vulnerable groundwater, private wells are sampled for nitrate and pesticides for free under the Township Testing program: www.mda.state.mn.us/townshiptesting.





Our modern water infrastructure is something that most of us barely think about. We take for granted the drinking water, wastewater, and stormwater infrastructure built up over the last 100 years — and the hard work and public investment that goes into it.

Badly in need of attention

Many factors are putting stress on our water systems:



Systems are aging and equipment and pipes are at the end of or past expected life span.



Extreme rainfalls, made more common by climate change, can quickly overload storm drain systems and increase infiltration into sanitary sewers. The frequency of mega-rain events in Minnesota has been increasing sharply, and 2016 became the first year on record with two mega-rains in the state.



Newly discovered contaminants and water quality standards are making it necessary for drinking and wastewater treatment to add new technologies.



Detroit Lakes wastewater facility

Good to know: Northwest Minnesota

Infrastructure priorities

The 2017 Clean Water Project priority list for wastewater infrastructure projects in Northwest Minnesota includes 34 projects totaling \$100.7 million dollars. Most of these costs in Minnesota (90%) are to repair and replace aging treatment plants and sewer lines while a smaller portion are to address water standards. Old and aging sewer lines can let rainwater or groundwater into pipes, adding unnecessary volume to the system. Projects also include greater levels of treatment for phosphorus and chlorides and upgrades to unsewered areas with failing septic systems.

Drinking water infrastructure priorities

The Drinking Water Project Priority List has 53 projects to repair and replace aging treatment plants, water mains, and sewer lines, totaling \$63 million dollars.

The lack of planned funding

Over the next 20 years, Minnesota will have some big bills to pay:

Cost to upgrade wastewater infrastructure needs over next 20 yrs.

\$4 billion



Cost to meet drinking water infrastructure needs over next 20 yrs.

\$7 billion



And worse, yet ...

In small towns there are fewer people to share the costs of expensive water projects that protect human health and the environment.



Statewide, 40% of the lakes and streams in Minnesota are not meeting standards set for safe swimming, fishing or drinking.

Major threats to lakes

Contaminated runoff, erosion, and sediment —

Runoff from agricultural and urban land and lakeshore development raises the amount of phosphorus in Minnesota lakes, which in turn causes algae to grow and can fuel toxic blue-green algae blooms.



Road salt — The salt applied to roads, parking lots, and sidewalks during our icy winters contains chloride, a water pollutant. When snow and ice melt, the salt goes with it, washing into our lakes. At high concentrations, chloride can harm fish and plant life.



Invasive species — Non-native species, such as zebra mussels, Eurasian watermilfoil, and invasive carp, can cause economic or environmental damage or harm human health. About 5% of Minnesota's lakes are infested with invasives.



In watersheds dominated by agricultural and urban land, half or fewer of the lakes fully support the water quality standards for swimming because of elevated phosphorus, which causes algae to grow and makes lakes less attractive, or even dangerous, for swimming.

Good to know: Northwest Minnesota

Lakes region

The lakes regions in Grant, Otter Tail, Becker, and Mahnomen Counties are popular destinations for tourists, boating, fishing, and swimming. Many of the lakes in this region are high quality. However, the draining of wetlands and the installation of artificial drainage has caused high nutrient and sediment levels in the region's naturally shallow lakes.

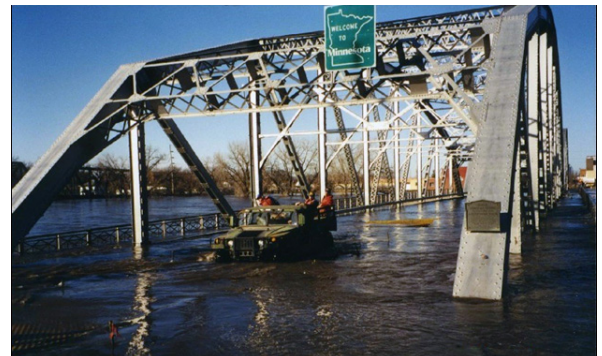
Floods are frequent in the Red River Valley

Very flat terrain, extensive drainage, widespread conversion of tallgrass prairie to farmland, and urban/suburban development leave the Red River Valley subject to frequent floods that affect urban and rural infrastructure and agricultural production.

The Red River has flooded in 50 of the past 111 years. A catastrophic flood in 1997 that submerged most of Grand Forks destroyed hundreds of homes and inflicted billions of dollars in damage across the region. Investments to reduce flood damage have included not rebuilding in the floodplain, a new network of flood control structures, pumping stations, and some 12 miles of levees.

The Flood Damage Reduction Work Group

The Flood Damage Reduction Work Group was formed in 1998 to address issues related to the development of flood damage reduction projects unique to Minnesota.



The National Guard transports U.S. Geological Survey personnel across the Red River during the historic 1997 flood.

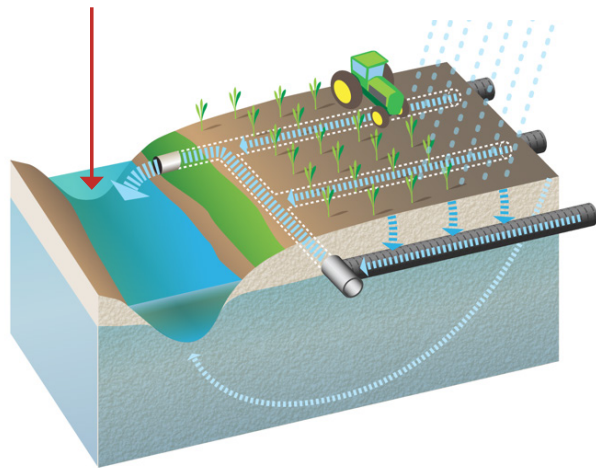


Healthy fish need healthy lakes and streams. Much of our flowing water — including streams and ditches — is under threat from nutrient runoff and increased speed of flow.

Major threats to rivers

Straightened stream beds — Channeling, ditching, and damming projects have changed the natural course of **half of Minnesota's 83,000 stream miles**. This often leads to higher flow rates, bringing more pollutants to our waterways.

Drain tile and ditches in agriculture — Drain tile is plastic pipe installed under farmland to create optimum moisture conditions for crops. In tilled cropland, rainwater flows through tile drainage and ends up in ditches and streams, **carrying nutrients along with it and causing streambank erosion**. Use of drain tile in Minnesota is increasing.



Hard surfaces in urban areas — Hard surfaces, such as roofs, streets, and parking lots, abound in cities and towns. Rain washes across these “hardscapes” rather than soaking into the ground and **carries contaminants into storm drains** and on to rivers and streams.



Good to know: Northwest Minnesota

Good fishing in the Red River

Although the Red River is a “turbid” (muddy) river with low water clarity during much of the year, the fishing is good. The diverse habitat found in the Red River and its tributaries support excellent levels of natural reproduction for most fish species. Nearly all fish species in the Red River are self-sustaining and do not require stocking to maintain populations.

A mercury mystery

Fish in the Red River of the North, Vermilion River, and Roseau River have relatively higher concentrations of mercury in the fish tissue than in other Minnesota lakes and rivers. The state is studying these rivers to understand why mercury behaves differently in some water bodies and how to reduce mercury in fish tissue in these unique rivers.



Upper Red River

Four things crucial for progress in MN

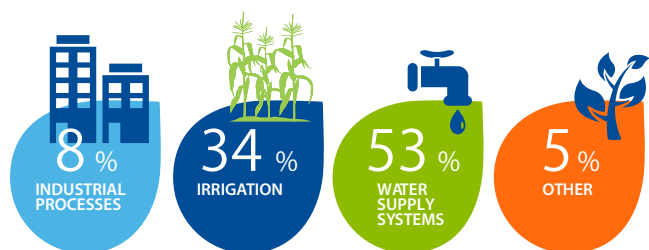
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Water conservation:

in agriculture, industry, and at home

Groundwater use has increased 35% over the past 25 years due to population and economic growth. This trend may not be sustainable. Parts of Minnesota are vulnerable to groundwater shortages. The state is not yet in crisis, but there are signs we may have problems in the future.

How we use water in Minnesota (average yr)



What we need to do

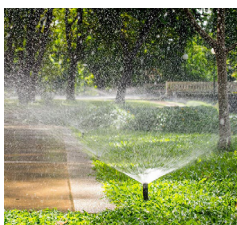
Our water supply makes Minnesota attractive to water-intensive industries, including agriculture, fishing, manufacturing, food production, micro brewing, mining, and shipping. But we need to encourage water conservation by both businesses and individuals.



- ▶ Improve industrial water efficiency with conservation-based processes and equipment.



- ▶ Use agricultural irrigation water more efficiently with technologies such as low-pressure irrigation and precision weather data.



- ▶ Improve residential water use efficiency with technologies like soil moisture sensors for lawn watering and water efficient toilets.

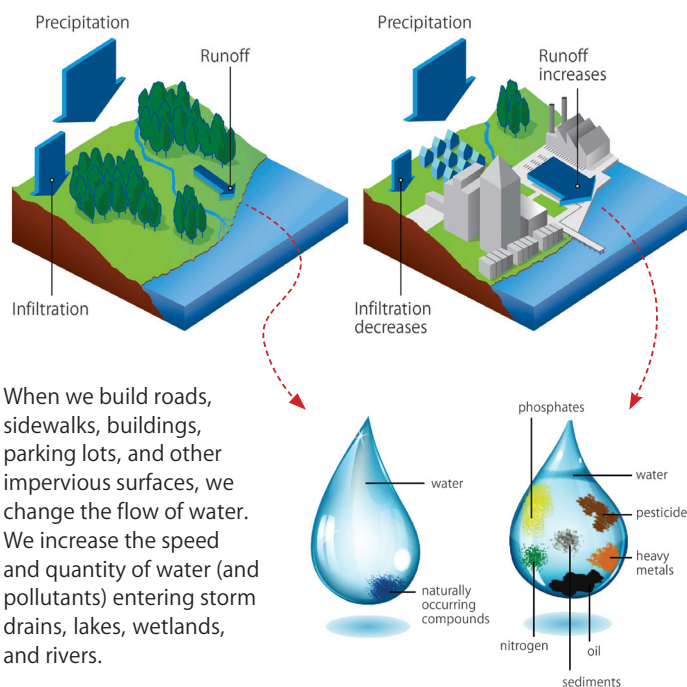
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Green infrastructure:

managing runoff in cities and towns

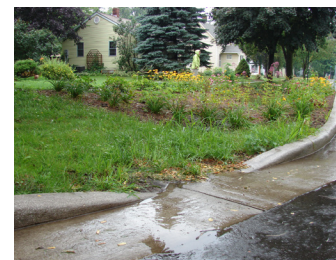
Green infrastructure helps built and urban environments behave more like a natural landscape by holding water on the landscape after rain, rather than allowing it to rapidly run into storm sewers, lakes, and rivers.

Buildings, houses, parking lots, and roads mean less water soaks in



What we need

- ▶ Trees
- ▶ Pervious pavement
- ▶ Swales
- ▶ Rain gardens
- ▶ Infiltration strips
- ▶ Green street design
- ▶ Green roofs



3

Farming practices that protect water

Agriculture conservation practices are key. Many farmers are already using these methods, and programs are available to help get started.

What we need to do



Planting more **cover crops**, **buffer strips**, or **perennials** reduces erosion and can help recycle nitrate nitrogen before entering groundwater.

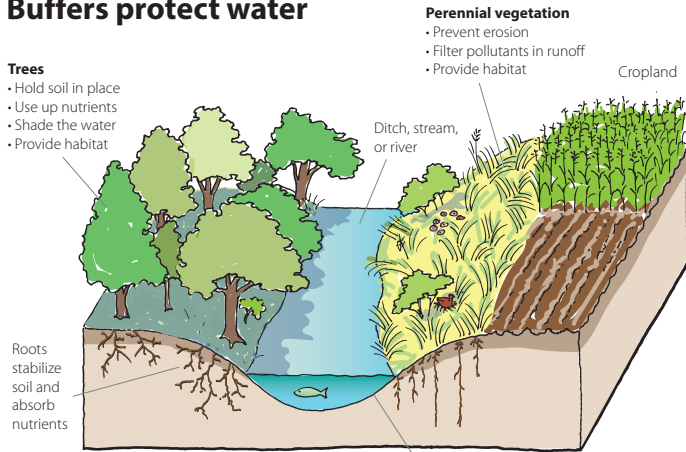


Applying nitrogen fertilizer at the proper **rate** and **time** minimizes loss to ground and surface water and improves farm profit. Installing more **grass waterways**, **sediment basins**, and **terraces** in targeted areas slows and filters runoff.

Buffers protect water

Trees

- Hold soil in place
- Use up nutrients
- Shade the water
- Provide habitat



- Perennial vegetation**
- Prevent erosion
 - Filter pollutants in runoff
 - Provide habitat

Roots stabilize soil and absorb nutrients

Perennial buffers help maintain ditches by preventing erosion and fill-in

The 2015 buffer law

This designates about 110,000 acres of land to living cover to protect water from pollution. These buffer strips along rivers, streams, and ditches will filter out phosphorus, nitrogen, and sediment.

Conservation tillage

Farmers leave plant residues on longer, or permanently, helping keep soil and nutrients in the field.



Minnesota Agricultural Water Quality Certification Program

Participants implement a combination of these practices voluntarily to treat site-specific water quality risks.

4

Protecting the good is cheaper than fixing it later

Minnesota is fortunate to have some water bodies that meet, or are better than, our water quality standards. These lakes, streams, and groundwater sources need protection.

What we need to do

- ▶ Pay attention to wetlands and forested land to protect pristine waters.
- ▶ The cost of removing nitrate from water is much higher than keeping it out of the water to begin with. Follow Wellhead Protection Plans to protect drinking water sources.



Living cover: filtering and reducing runoff

Living cover is a key strategy for protecting drinking water, especially within lands surrounding a public water supply well, to keep contaminants from reaching the well or well field. Living cover holds water, filters contaminants, and reduces runoff.



Perennial crops:
Perennial grasses, hay, and pasture.



Cover crops:
Grasses, small grains, legumes, and winter annuals.



Prairie and grasses:
Grasses and prairie plants.



Wetlands:
Natural and constructed.



Forests:
The king of living cover.

Minnesota's framework for improving water

Cleaner water through federal, state, and local collaboration in a "plan-do-check" cycle



Check: **NW Minnesota**

Watershed Restoration and Protection Strategy Reports (WRAPS) are available for the:

- ▶ Buffalo River
- ▶ Mustinka River
- ▶ Sandhill River
- ▶ Pomme de Terre River
- ▶ Redeye River
- ▶ Upper Red River – in progress

Plan: **NW Minnesota**

One Watershed, One Plan is a comprehensive management plan for groundwater and surface water. Four watersheds are using the program now, with more in the future:

- ▶ Red Lake River
- ▶ Thief River – in progress
- ▶ Pomme de Terre – in progress
- ▶ Lake of the Woods – in progress

Do: **NW Minnesota**

Individuals and communities can find support from local watershed organizations to:

- ▶ Implement conservation practices on your land
- ▶ Find out about financial resources
- ▶ Receive technical assistance
- ▶ Learn more about conservation practices

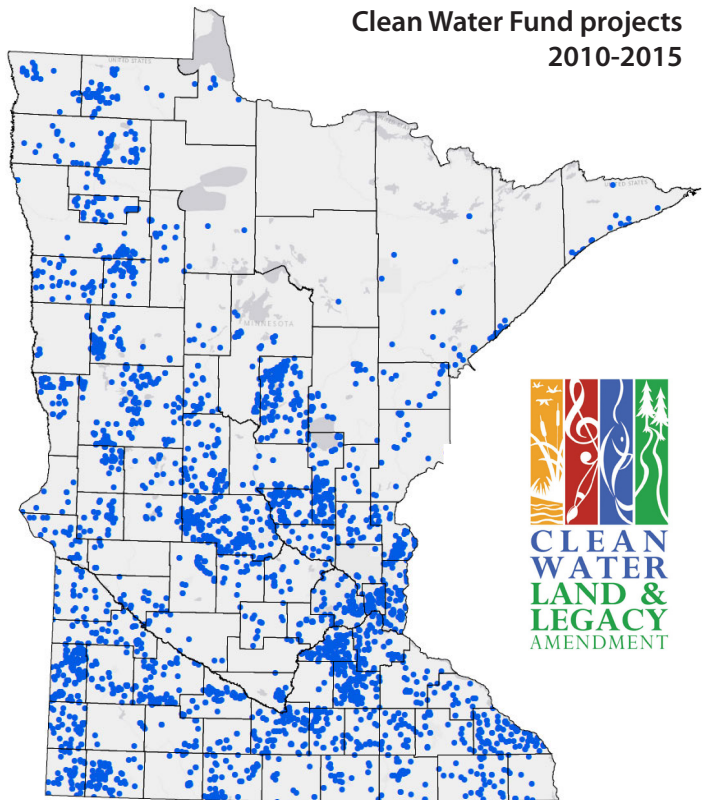


Helping Minnesota communities thrive

The Clean Water Fund, established by the Clean Water, Land and Legacy constitutional amendment in 2008, has been critical in moving many statewide water quality initiatives forward. The fund provides approximately \$85 million per year in funding to State agencies for implementation projects, including conservation work being done at the local level.

Examples of Clean Water Fund projects in Northwest Minnesota include:

- ▶ Installation of low pressure irrigation systems in Ottertail County to reduce nitrate contamination and impacts to groundwater quantity
- ▶ Installing buffers and fixing gullies to reduce sediment flowing to an impaired stretch of the Red Lake River in Pennington County
- ▶ Installation of filter strips and erosion control structures to reduce sediment entering the South Branch of the Wild Rice River in Becker County
- ▶ The Minnesota Agriculture Water Quality Certification Program has certified 40 producers in Northwest Minnesota, representing 34,927 acres, as of June 1, 2017



Investment in action: Lake Bronson

Local partners are finding ways to restore Lake Bronson, the only major recreational lake in Kittson County, through the implementation of grass filter strips. Several upstream ditches bring sediment and nutrients to the lake, resulting in significant algae bloom in early July of each year. The presence of toxic blue-green algae in July of 2012 caused the recreational use of the lake to be shut down.

Kittson Soil and Water Conservation District (SWCD) noticed that extra funds might persuade land owners to adopt grass filter strips and applied for a Clean Water Fund grant. Establishing 104.1 acres of grass filter strips reduced the sediment entering Lake Bronson by 3,077 tons per year and phosphorus by 3,021 pounds per year.



“Thanks to these Clean Water Funds, in addition to the federally funded CCRP, sediment movement will decrease and in return water quality will improve within Lake Bronson and its watershed,” said Darren Carlson, Kittson SWCD District Manager.

Building momentum

Resources to support your involvement

Sign up for email updates on 25% by 2025: www.eqb.state.mn.us/25by25

Test your private well: www.health.state.mn.us/divs/eh/wells/waterquality/test.html

Check the health of your lake or stream: www.pca.state.mn.us/data/surface-water

Make changes at home: www.pca.state.mn.us/12things

Participate in conservation programs through your county Soil and Water Conservation District:

- ▶ Technical assistance and guidance on projects
- ▶ Conservation Reserve Enhancement Program (CREP) and Reinvest in Minnesota Wetlands Program
- ▶ Minnesota's Erosion Control Cost Share Program

Encourage your city to join the Minnesota GreenStep Cities program: greenstep.pca.state.mn.us

Participate in the Minnesota Agriculture Water Quality Certification Program. Contact your local SWCD to apply; learn more at www.mda.state.mn.us/awqcp

Volunteer to monitor a local lake or stream: www.pca.state.mn.us/cmp

Connect with your watershed organization for education, volunteer opportunities, technical assistance, and connection to financial resources:

- ▶ Buffalo Red River Watershed District: www.brrwd.org
- ▶ Red Lake Watershed District: www.redlakewatershed.org
- ▶ Clearwater River Watershed District: www.crwdd.org
- ▶ Two Rivers Watershed District: www.tworiverswd.com
- ▶ Roseau River Watershed District: www.roseauriverwd.com
- ▶ Middle Snake Tamarac Rivers Watershed District: www.mstrwd.org
- ▶ Sand Hill River Watershed District: www.sandhillwatershed.org
- ▶ Wild Rice Watershed District: www.wildricewatershed.org
- ▶ Red River Watershed Management Board: www.rrwmb.org
- ▶ Red River Basin Commission: www.redriverbasincommission.org
- ▶ Pelican River Watershed District: www.prwd.org
- ▶ Your county Soil and Water Conservation District: www.maswcd.org

