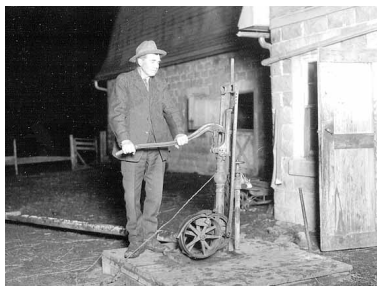


Improving water quality

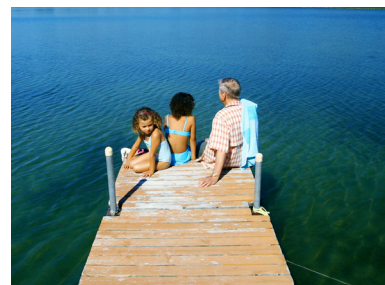
25% BY 2025



Metro
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:

Metro Minnesota

Glaciers formed lakes and rivers across what is now the Metro region of the state. Although parks and open areas remain, agriculture and urbanization have altered the native vegetation, wetlands, and wildlife communities that once covered these areas.

The Mississippi River flows through the heart of the Twin Cities and is joined by the Minnesota and St. Croix Rivers. Home to more than 400 different species of wildlife and 100 different species of freshwater fish, the river provides fishing and other recreation opportunities. The river also functions as a major drinking water supply for the Twin Cities.



The Mississippi River and Minneapolis skyline

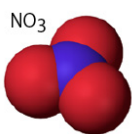
** Regions used for this project are from the Minnesota Association of Soil and Water Conservation Districts.*



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.

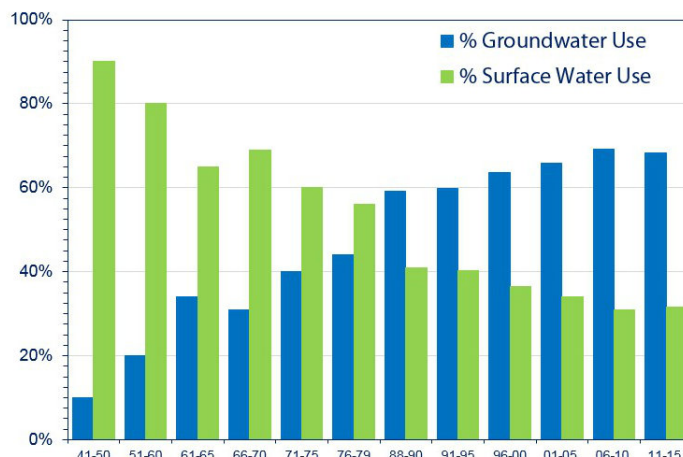


Site-specific contamination — Land that is contaminated by hazardous substances and industrial pollutants — such as Superfund sites — may affect groundwater nearby.

Good to know: Metro Minnesota

Drinking water in the Metro region comes from both surface water and groundwater, with increasing reliance on groundwater.

Municipal groundwater and surface water use in the Twin Cities (1941-2015)



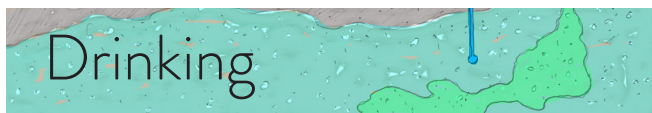
The Metro area increasingly relies on groundwater over surface water for drinking.

Recently there have been concerns over unsustainable groundwater use in Washington, Ramsey, and portions of Anoka and Hennepin Counties. This area is growing in population, and water use is increasing. In portions of the area existing groundwater contamination further limits water availability to meet human needs.

Site-specific contamination from industrial pollutants—such as Superfund sites—affect some Metro communities.

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.



Public water supply wells

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 the Metro region, 159 public water supply wells, 6.3%, 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 590,000 acres prioritized for drinking water protection. Thirty 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: Metro Minnesota

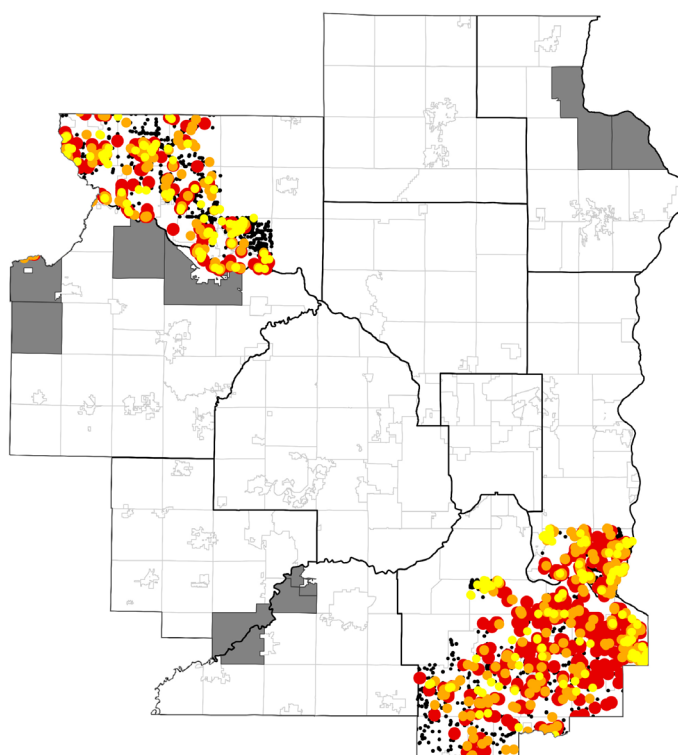
Private wells

Twelve percent of residents in the Metro region obtain their water supply from a private well.

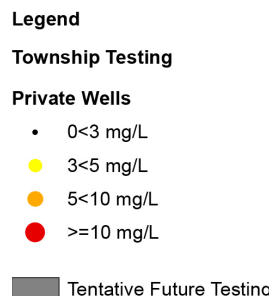
The dots in the map below show the levels of nitrate in private wells in high-risk areas of the Twin Cities Metro Area.

In these high-risk areas, 33% of private wells are above 3 mg/L, a level at which preventative measures should be considered. Seventeen 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.



Nitrate concentrations in private wells in prioritized townships Metro Minnesota (2013-16)



Minnesota Department of Agriculture data, 2017



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.



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



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.



Elk River wastewater treatment plant facility upgrade to meet a phosphorus permit limit, January 2015

Good to know: Metro Minnesota

Infrastructure priorities

The 2017 Clean Water Project priority list for wastewater infrastructure projects in the Metro region includes 54 projects totaling \$681.6 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. Among other problems, 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 41 projects to repair and replace aging drinking water treatment plants, water mains, and sewer lines, totaling \$178.9 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:

Metro Minnesota

The Metro region has many swimmable lakes, but some don't meet water quality standards

In the Metro region, 43% of lakes—271 out of the 632 evaluated—do not meet aquatic recreation standards for fishing and swimming.

Challenges for Metro lakes include increased phosphorus levels leading to algae blooms, and increased levels of bacteria—like *E. coli*—making swimming potentially unsafe. Shoreline restoration and other clean-up efforts have been successful at restoring lakes in some areas.



Algae blooms on Prairie Lake in Sherburne County.

What is clean water worth?

"The value of clean water is more than what we pay in the store and more than the cost of bottled water or infrastructure required to clean up degraded waters. . . . To understand the true value of clean water we need additional research on the health effects of drinking polluted water, the loss in property value as lake clarity declines, and the ways changing water quality affects the health and productivity of aquatic ecosystems and waterfowl. Only then will we truly understand what our waters are really worth."

— Dr. Bonnie Keeler, lead scientist for the Natural Capital Project, University of Minnesota

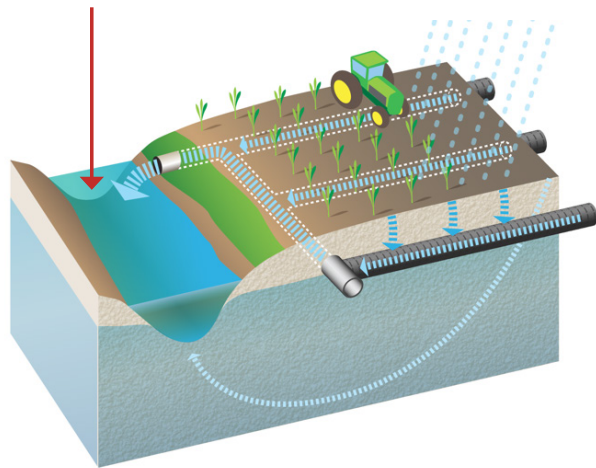


Healthy fish need healthy lakes and streams. Much of our flowing water — including streams and ditches — is under threat from nutrient runoff and increased speed of flow.

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 tiled 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: Metro Minnesota

The Mighty Mississippi

The Mississippi River begins in Lake Itasca, near Bemidji, and flows 510 miles before reaching downtown Minneapolis. The Mississippi River starts as pristine, high quality water. When the water reaches the Twin Cities, it no longer meets river life and recreation standards. Though we've made great progress over the last thirty years, the river through the Twin Cities continues to have problems: high nutrient levels result in algal blooms, invasive carp threaten to outcompete other species, and many fish show elevated levels of mercury and other contaminants.



Winter road salt pollutes lakes, rivers, and groundwater

Water pollution from salt (or chlorides) is widespread in the Twin Cities from de-icers used in winter maintenance and from salts used in water softeners. At high concentrations, chloride is toxic to some forms of aquatic life including trout, frogs, and some native aquatic plants. The costly, challenging nature of removing chloride from groundwater and wastewater makes reduction of salt application the most feasible way to reduce chloride levels.

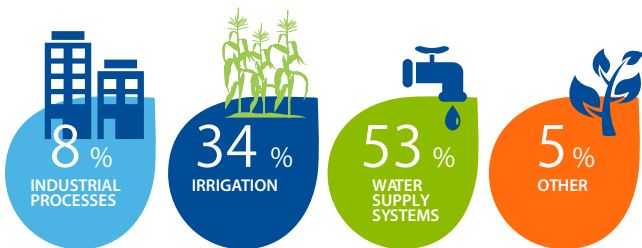


Four things crucial for progress in MN

1 **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

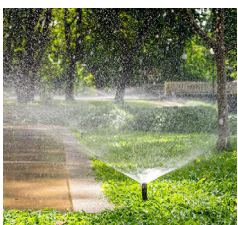
Our water supply makes Minnesota attractive to water-intensive industries, including agriculture, fishing, manufacturing, food production, micro brewing, mining, and shipping. But we need to encourage water conservation by both businesses and individuals.



- 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.

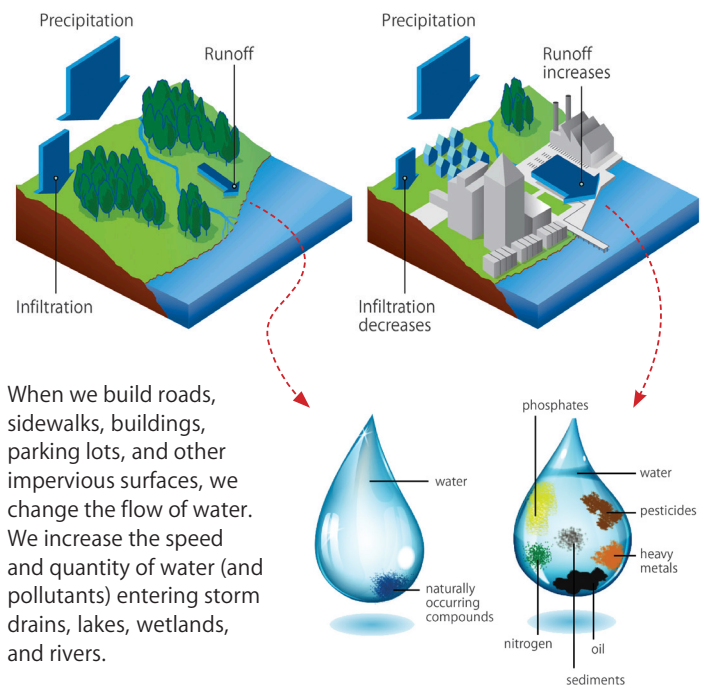


- Improve residential water use efficiency with technologies like soil moisture sensors for lawn watering and water efficient toilets.

2 **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.

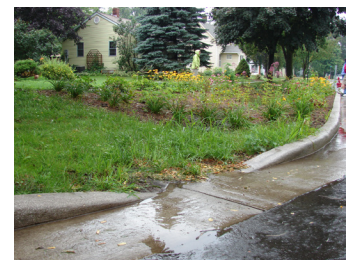
Buildings, houses, parking lots, and roads mean less water soaks in



When we build roads, sidewalks, buildings, parking lots, and other impervious surfaces, we change the flow of water. We increase the speed and quantity of water (and pollutants) entering storm drains, lakes, wetlands, and rivers.

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.

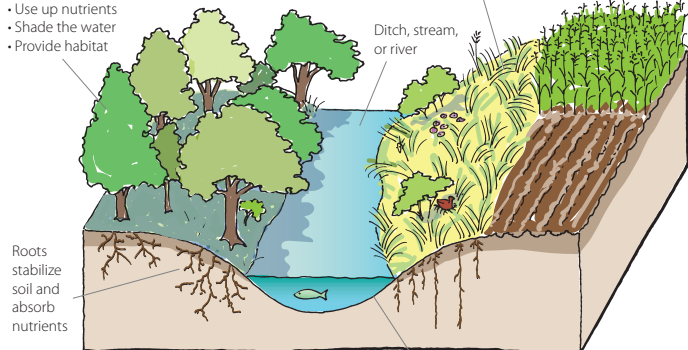


Applying nitrogen fertilizer at the proper **rate** and **time** minimizes loss to ground and surface water and improves farm profit. Installing more **grass waterways**, **sediment basins**, and **terraces** in targeted areas slows and filters runoff.

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

Cropland

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.

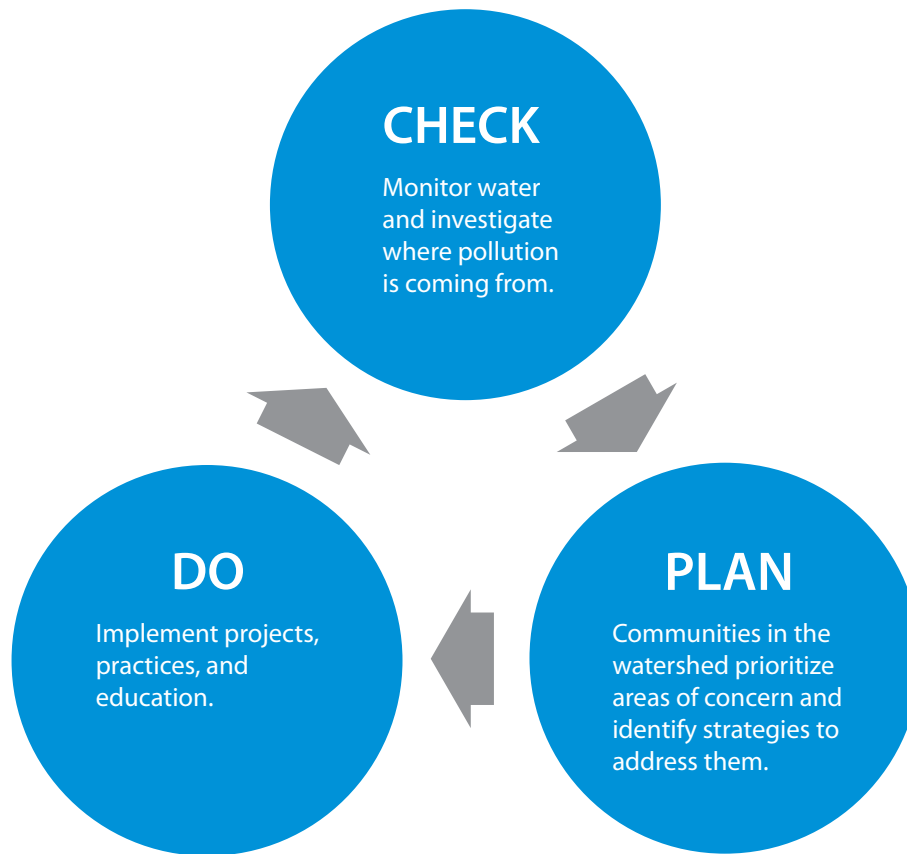


Forests:

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



The Metro region is lucky to have the entire 7-county metro area covered by watershed organizations that are required to prepare watershed plans. Since 1982, the Surface Water Management Act has required and encouraged collaboration between watershed organization, cities, and counties to meet water quality goals.

Check: **Metro**

Watershed Restoration and Protection Strategy Reports (WRAPS) are available for these watersheds or subwatersheds:

- ▶ Lower St. Croix
- ▶ Mississippi River (St. Cloud)
- ▶ North Fork Crow
- ▶ Vermillion River
- ▶ South Fork Crow – in progress
- ▶ Rum River – in progress
- ▶ Mississippi River (Twin Cities) – in progress

Plan: **Metro**

Watershed plans are in place for all 33 watersheds in the 7-county Metro area. These comprehensive plans are updated every 10 years.

One Watershed, One Plan is used mainly outside the 7-county Metro area. There are two watersheds in the Metro area that use this plan.

- ▶ North Fork Crow
- ▶ Cannon River – in progress

Do: **Metro**

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



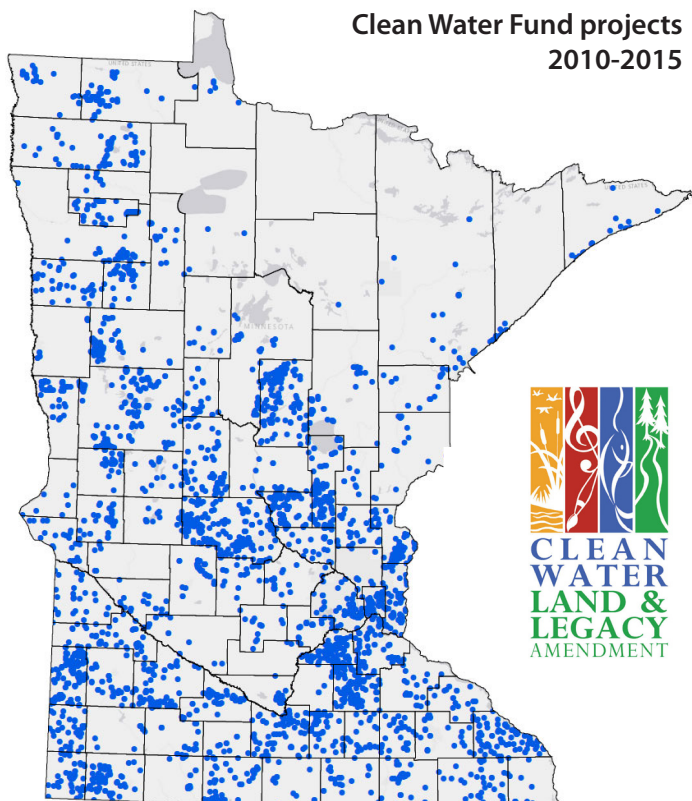
Helping Minnesota communities thrive

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 the Metro region include:

- ▶ Sediment reduction plan to restore trout stream in Dakota County
- ▶ Investing in innovative storm water reuse to protect local groundwater and reduce water quality impacts in Forest Lake
- ▶ Financial assistance for sealing wells to protect drinking water
- ▶ The Minnesota Agriculture Water Quality Certification Program has certified 34 producers in the Metro area, representing 11,616 acres, as of June 1, 2017

Clean Water Fund projects
2010-2015



Investment in action: McKusick Lake

When McKusick Lake, a lake in Stillwater near the St. Croix River, failed to meet water quality standards it served as a wake-up call for the entire community. With targeted investment, the watershed organization, city, and many community partners worked together to improve the lake to the point of meeting water quality standards.

A lake management plan identified the most cost-effective practices to pursue and the best locations to target in meeting environmental and recreational goals. Clean Water Funds helped the community and supporting organizations institute pollution reduction projects such as residential raingardens, shoreline plantings, and larger stormwater projects.



"This long-term investment has reduced stormwater nutrients directly discharging to McKusick Lake by nearly 25%," Mike Isensee, watershed administrator from the Middle St. Croix Watershed Management Organization, says. "It's also increased landowner understanding and support of the conservation practices needed to restore McKusick Lake to a high quality and productive public water."

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: www.pca.state.mn.us/metrowater. Local watershed organizations provide education, volunteer opportunities, technical assistance, and can connect you with financial resources.

