Improving water quality

25% BY 2025

South Central 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,

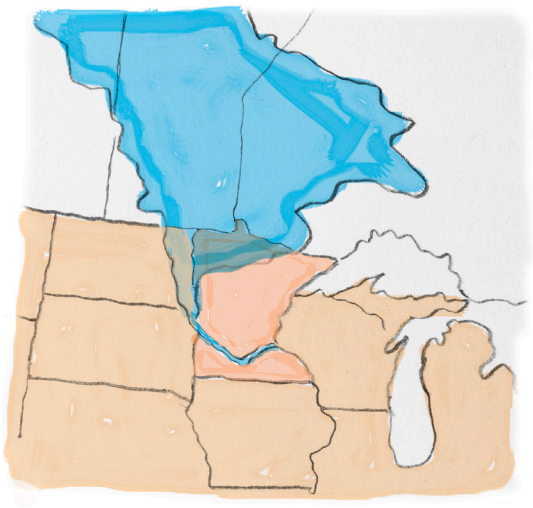
Mark Dayton
Governor

Good to know:
South Central Minnesota

The South Central region of Minnesota is defined by the Minnesota River and the rich agricultural land deposited here when the river formed.

About 12,000 years ago, the glaciers that covered Minnesota melted northward. Glacial meltwater flowed south and east, and created River Warren, a massive, 5-mile-wide river that carved the Minnesota River Valley.

For paddlers and anglers, the Minnesota, Blue Earth, Watonwan, and Le Sueur Rivers offer beautiful scenery, spectacular cliffs, and lots of wildlife. Many county, city, and state parks provide access to the rivers, for exploring, fishing, or relaxing.



Lake Agassiz and Glacial River Warren, 12,000 years ago.

** 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:
South Central Minnesota

Sandy subsurface leads to nitrate problems in the St. Peter area

Under the city of St. Peter a layer of sand reaches all the way down to the bedrock aquifers. The coarse texture of sand allows water to flow down to the Jordan aquifer in a relatively short amount of time (50-60 years). When water moves from cropland and urban areas onto the sand terrace below St. Peter, pollutants such as nitrate, also find their way into the aquifer.

When the city upgraded its drinking water supply wells 10 years ago, it found that the nitrate levels in some were too high. St. Peter now uses gravity and reverse-osmosis filtration to treat drinking water. These projects cost $18.8 million and were completed in 2011.

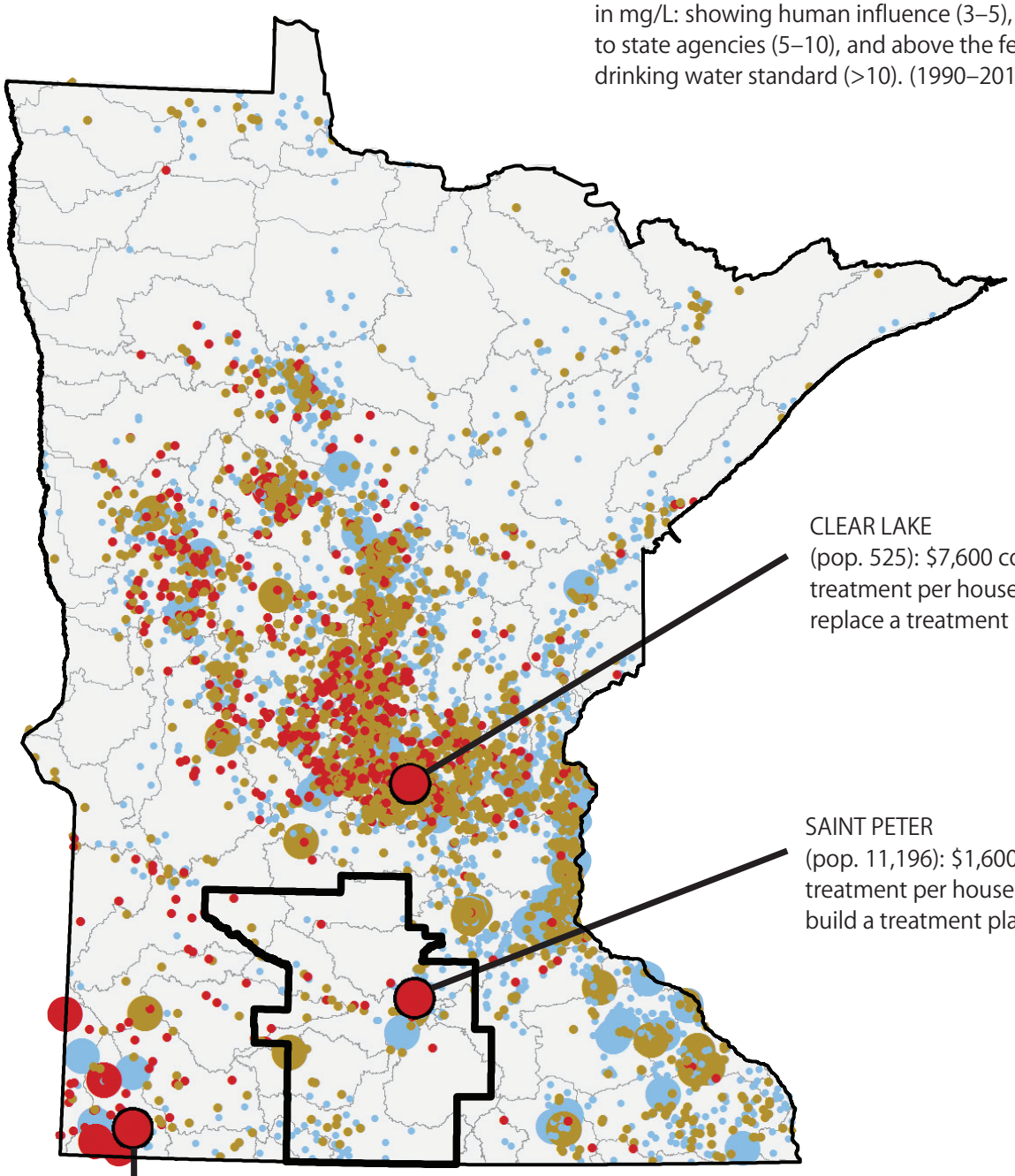
Reverse osmosis water treatment plant

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)



CLEAR LAKE
(pop. 525): $7,600 cost for treatment per household to replace a treatment plant

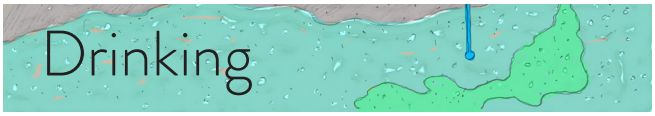
SAINT PETER
(pop. 11,196): $1,600 cost for treatment per household to build a treatment plant

ADRIAN
(pop. 1,209): $3,300 cost for treatment per household to seal wells and build a treatment plant

Domestic Wells
- >10 (mg/L)
- 5 – 10
- 3 – 5

Public Supply Wells
- >10 (mg/L)
- 5 – 10
- 3 – 5

SOURCE: MDH & MGS



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 South Central Minnesota, 14 public water supply wells, 2.4%, 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.

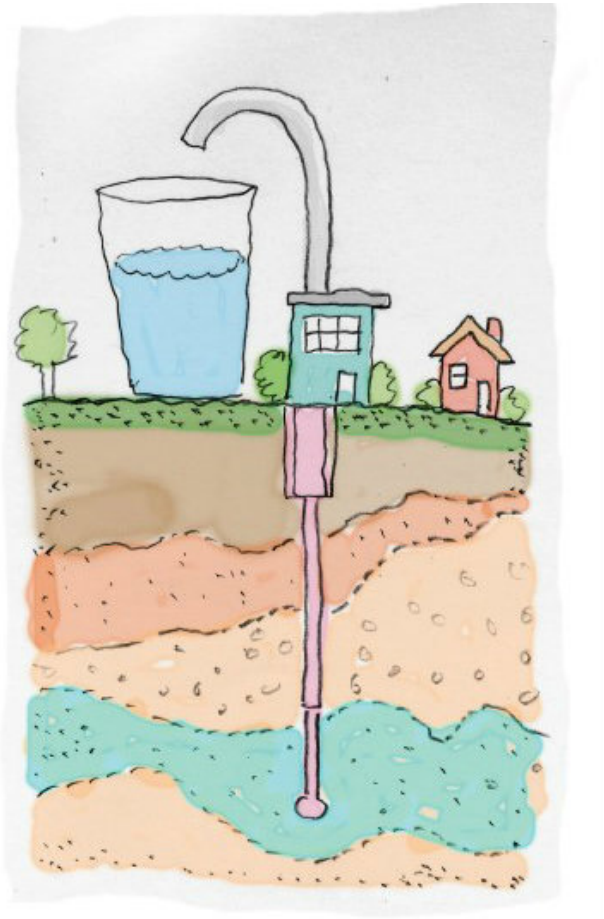
Public water supplies are protected from contamination by focused prevention activities. This region has about 58,000 acres prioritized for drinking water protection. Approximately 8% of these are at high risk of contamination. To protect our water we need to target protection of high risk areas.

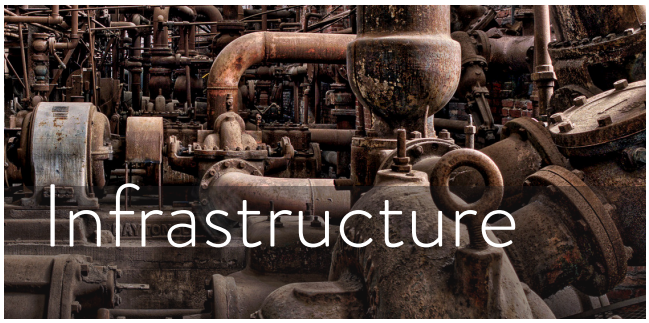
Good to know:
South Central Minnesota

Private wells

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

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.

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.

Wastewater treatment facility upgrade in Arlington to meet a phosphorus permit limit, October 2015.

Good to know:
South Central Minnesota

Wastewater infrastructure priorities

The 2017 Clean Water Project priority list for wastewater infrastructure projects in South Central Minnesota includes 22 projects totaling $75.4 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 60 projects to repair and replace aging drinking water treatment plants, water mains, and sewer lines, totaling $73.9 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:
South Central Minnesota

Many lakes and river stretches in South Central Minnesota are not swimmable because of excess nutrients or bacteria.

Runoff from agricultural land and lakeshore development raises the amount of phosphorus in Minnesota lakes, which in turn causes algae to grow. Algae-covered lakes are less attractive for fishing and swimming, can be harmful to swimmers and animals, and can even threaten drinking water.

Examples include:

- Jefferson-German Lake Chain and Lake Volney in the far west portion of the Cannon River watershed. These lakes provide recreation for local residents and tourists. These lakes do not meet water quality standards for swimming because of excess phosphorus and algae.

- Stretches of streams in the Greater Blue Earth River have high bacteria levels, making them unsuitable for swimming and other body-contact recreation. Restoring these streams will require reducing bacteria levels by 80 to 90 percent.

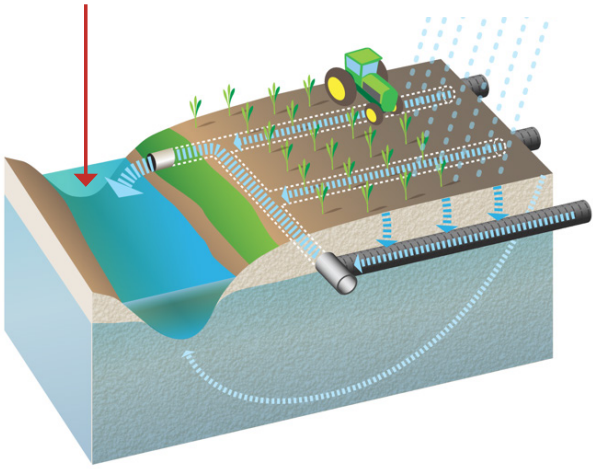
Lake Crystal blue-green algae bloom, Blue Earth County, 2014.

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.



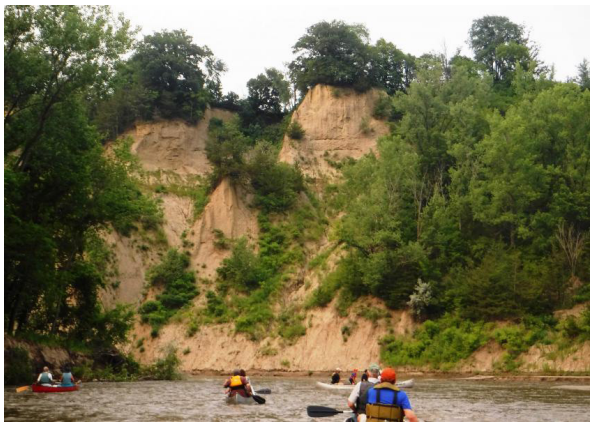
Hard surfaces in urban areas — Hard surfaces, such as roofs, streets, and parking lots, abound in cities and towns. Rain washes across these "hardscapes" rather than soaking into the ground and **carries contaminants into storm drains** and on to rivers and streams.

Good to know:
South Central Minnesota

Minnesota River Basin

Eroding tributaries, bluffs, ravines and stream banks are a concern in the Le Sueur, Watonwan, and Blue Earth watersheds. These watersheds deliver a large percentage of the total sediment and nutrients found in the Minnesota River. Fields and homes are lost to the eroding banks.

The accelerated erosion is a product of naturally erosive soils combined with human changes to landscape. Compounding the problem — but not causing it — are increased rainfall and more intense storms. Efforts to slow down and hold water in the headwaters of these rivers could help.



Members of the Le Sueur River Watershed Network paddle a portion of the river near Mankato to learn about the causes of bluff erosion, June 2015.

Mississippi River Basin

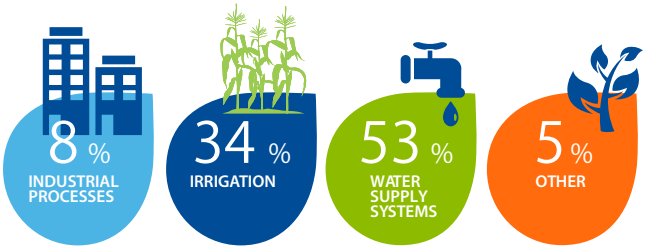
While most rivers in South Central Minnesota are part of the Minnesota River Basin, the South Fork Crow Watershed is part of the Mississippi River Basin. The North and South Fork Crow Rivers are a major contributor of nutrients and sediment to the Mississippi. The Mississippi does not meet river life or recreation standards by the time it reaches the Twin Cities.

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.

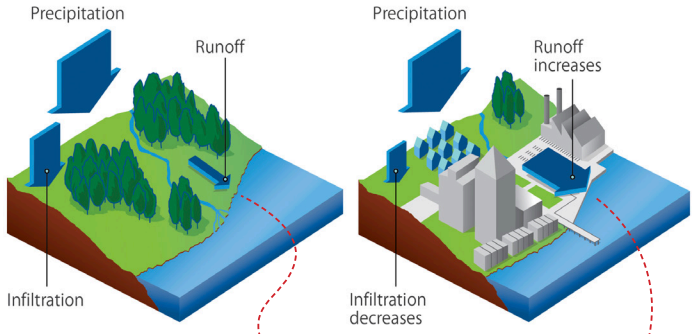
- Use agricultural irrigation water more efficiently, with technologies such as low-pressure irrigation and precision weather data.

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

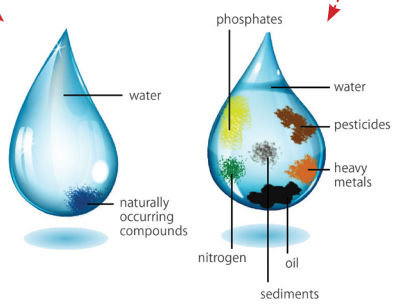
2 Green infrastructure: managing runoff in cities and towns

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

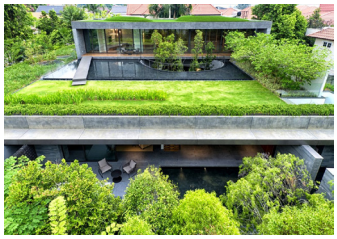


When we build roads, sidewalks, buildings, parking lots, and other impervious surfaces, we change the flow of water. We increase the speed and quantity of water (and pollutants) entering storm drains, lakes, wetlands, and rivers.



What we need

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

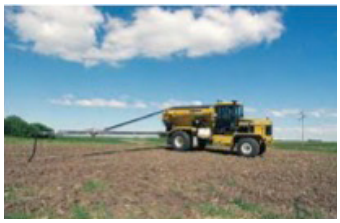


3 Farming practices that protect water

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

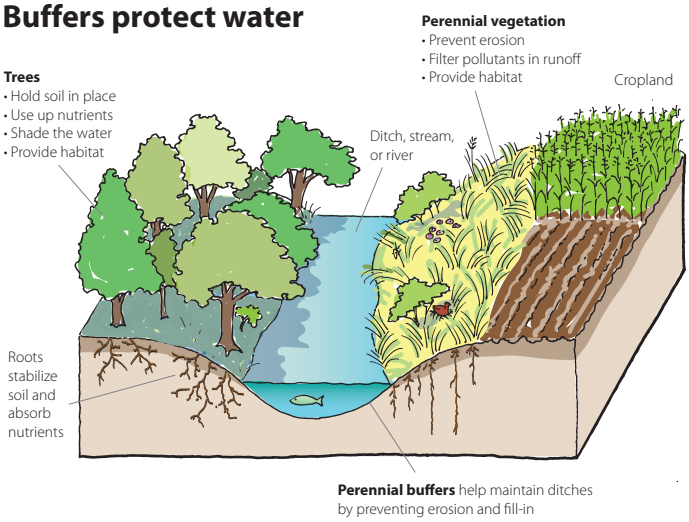
What we need to do

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



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: South Central

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

- Le Sueur River
- Cannon River
- Hawk Creek – in progress
- South Fork Crow River – in progress

Plan: South Central

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

- Cannon River – in progress

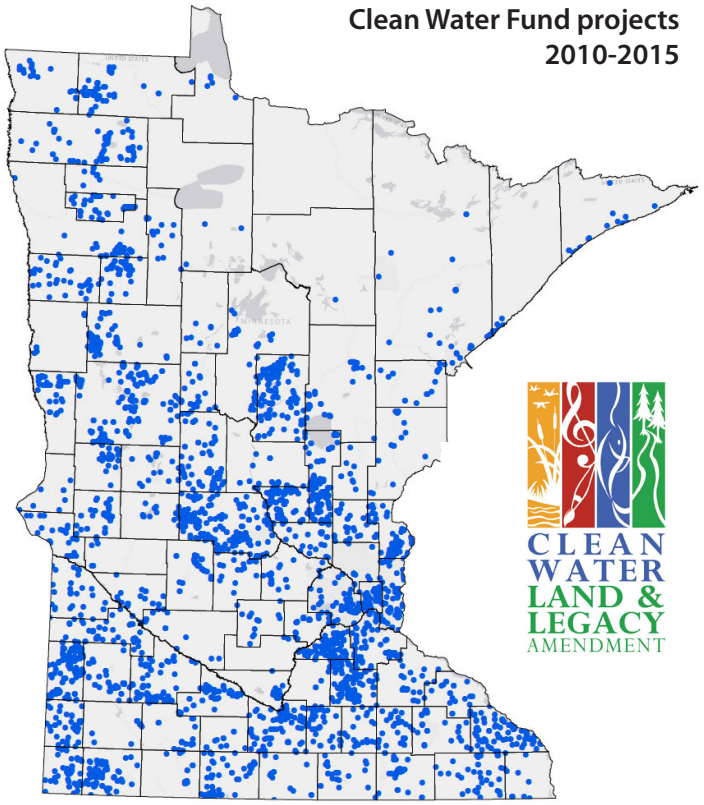
Do: South Central

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 South Central Minnesota include:

- Working with lakeshore owners to implement practices to reduce sediment and nutrient runoff into Lake Volney in Le Sueur County
- Stabilizing ravines and gullies that directly contribute sediment and nutrients in the Greater Blue Earth River Watershed
- Restoring the water quality of Seven Mile Creek, a designated trout stream near St. Peter
- The Minnesota Agriculture Water Quality Certification Program has certified 27 producers in South Central Minnesota, representing 12,272 acres, as of June 1, 2017

Investment in action: Biscay Bay

With Clean Water Funds and other programs, the City of Biscay was able to install a wastewater treatment system to help protect the water quality of the Crow River. Before the improvement, properties in Biscay had either their own septic systems, most of which were non-compliant, or a straight pipe discharge to the South Fork of the Crow River.

The City Council educated the community about the necessity for proper wastewater treatment and management and conducted an exhaustive analysis to identify a solution. A new community treatment mound was constructed that would connect homes whose septic or discharge systems were failing to protect groundwater or posed a threat to public health. The system stops the discharge of 2.5 million gallons/year of raw sewage into the river.

Peter Miller, the Wenck Associates Project Manager, said the project was a success due to the City Council's persistence and diligence in seeing the project through to the end. "In the face of challenges, they did not panic, but made the necessary decisions at the time to keep the project moving forward."

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:

- Le Sueur River Watershed Network: **www.lesueurriver.org**
- Greater Blue Earth River Basin Alliance: **www.gberba.org**
- The Coalition for a Clean Minnesota River (CCMR): **www.ccmnriver.org**
- Conservation Partners of America: **www.cpa-wildlife.org**
- Crystal Waters Project: **www.crystalwatersproject.org**
- Minnesota River Watershed Alliance: **www.watershedalliance.blogspot.com**
- Clean Up the River Environment (CURE): **www.cureriver.org**
- Seven Mile Creek Watershed Partnership: **www.7-milecreek.org**
- Buffalo Creek Watershed District: **www.bcwatershed.org**
- Your county Soil and Water Conservation District: **www.maswcd.org**