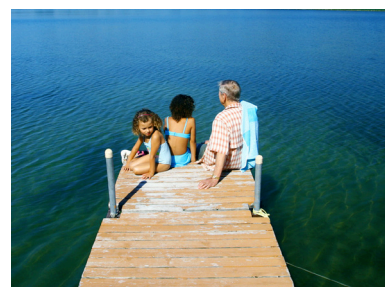
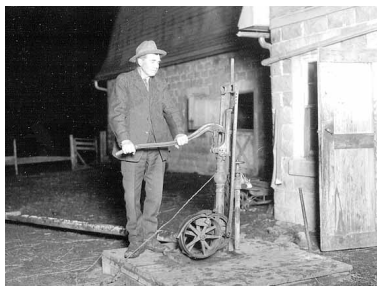


# Improving water quality

25% BY 2025



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:

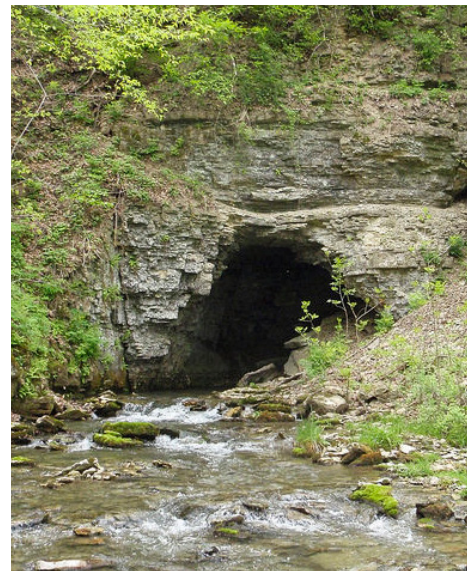
### **Southeast Minnesota**

From west to east, the land in this region changes from rich glacial plains to deeply carved river valleys.

The glacial plains are prime agricultural land, once rich with wetlands and now extensively used for agriculture. Common agricultural products for this region are livestock and crops.

Beautiful bluffs, springs, caves, and numerous trout streams abound in the east side of the region. The steep slopes and sandy soils are sensitive to erosion.

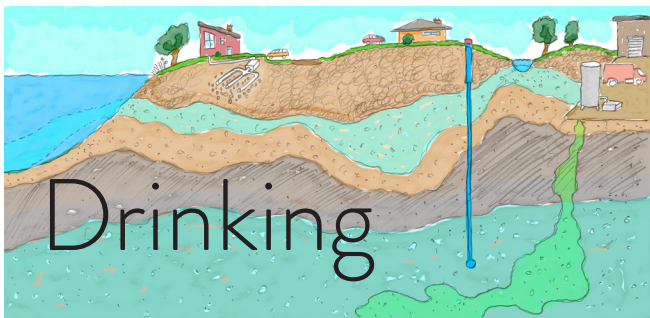
Karst geology is a defining feature of this region. Here rainwater has dissolved cracks and openings in the limestone bedrock over thousands of years. Sinkholes and disappearing streams highlight the close connection between surface water and groundwater.



Stagecoach Spring by Watson Creek, Root River Watershed

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

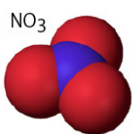




Three out of four Minnesotans get their drinking water from groundwater sources, but the groundwater is threatened by overuse and contamination in some places.



## 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.



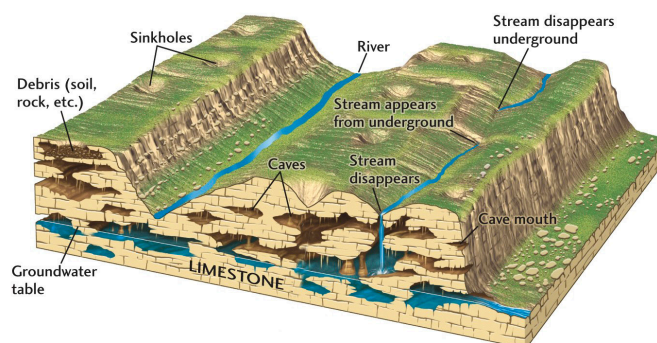
**Overuse** — In general, water is being drawn out of the state's aquifers faster than it is being replenished. If this overuse continues, groundwater may not be available as needed in the future.



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

## Good to know: Southeast Minnesota

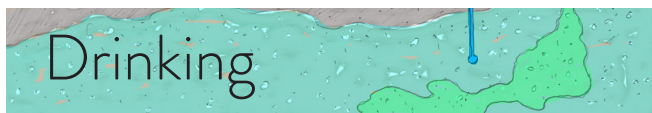
- ▶ All drinking water in the southeast region comes from groundwater.
- ▶ Southeast Minnesota is especially vulnerable to groundwater contamination. Karst topography means this region needs to take extra steps to protect drinking water supplies from nitrate, bacteria, pesticides, and fertilizers.



*Large sinkholes appear as islands of trees and vegetation in a farm field. Photo: Deborah Rose and the Minnesota Conservation Volunteer.*

## 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 Southeast Minnesota, 101 public water supply wells, 11.1%, 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 120,000 acres prioritized for drinking water protection. Thirty-five 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: Southeast Minnesota

### Private wells

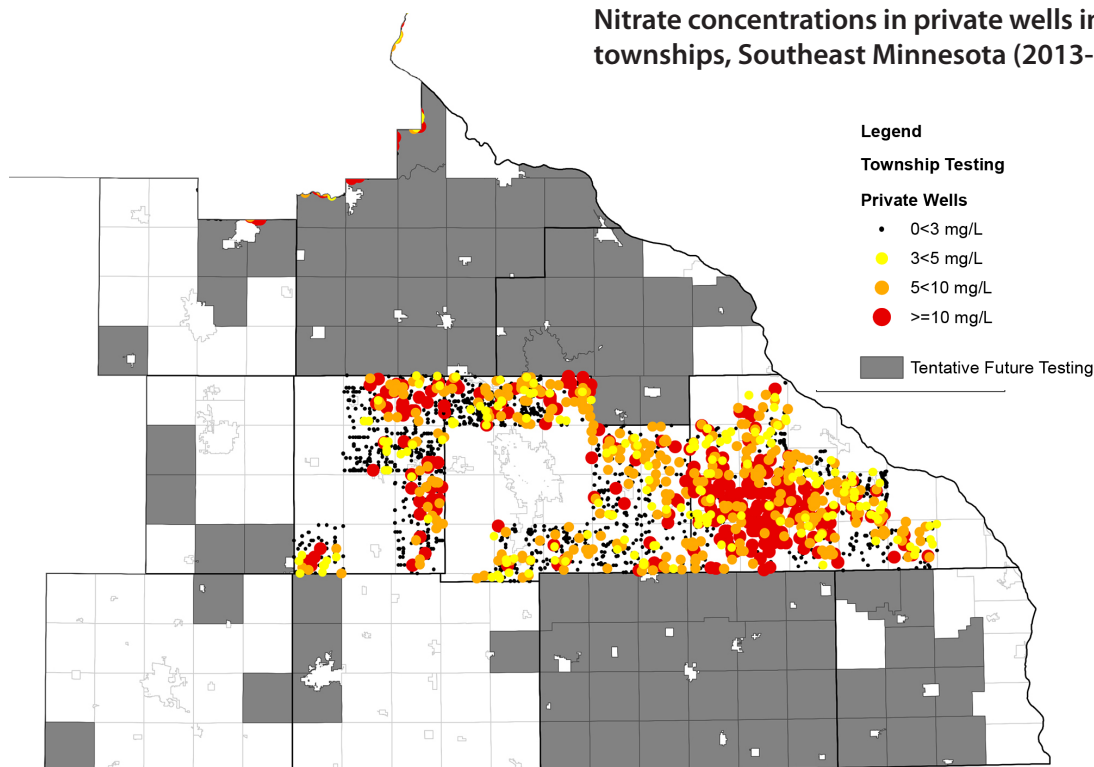
In the karst landscape of the Southeast, drinking water and surface water are very connected. Water flows in and out of the bedrock openings. What may be surface water one minute can come out of a well-owner's tap the same day.

Twenty-three percent of residents in the Southeast 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 region. In these high-risk areas, 30% of private wells are above 3 mg/L, a level at which preventative measures should be considered. Ten 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](http://www.mda.state.mn.us/townshiptesting).

### Nitrate concentrations in private wells in prioritized townships, Southeast Minnesota (2013-16)







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.



A washout in Southeast Minnesota

## Good to know: Southeast Minnesota

### Infrastructure priorities

The Clean Water Project priority list for wastewater infrastructure projects includes 26 projects totaling \$57.5 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.

The Drinking Water Project Priority List has 27 projects to repair and replace aging drinking water treatment plants, water mains, and sewer lines, totaling \$22 million dollars.

### Damaging rains

Record-breaking rain events in Southeast Minnesota in August 2007 and June 2008 caused rivers to reach high flood levels. Major damage occurred in many Southeastern Minnesota communities. The 2007 flood caused 7 deaths and \$67 million in damages across Winona County alone.

### 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: Southeast Minnesota

### Lake Pepin is filling in with sediment

Lake Pepin is the naturally widest part of the Mississippi River, extending from Red Wing to Reads Landing. It supports tourism, industry, wildlife, and regional identity.

High levels of sediment, carried in by major river systems, affect the lake. The sediment is filling in the lake at a much faster rate—10 times faster—than before Minnesota was settled and intensely farmed. With no changes, the silt is predicted to fill in the upper seven miles of the lake by the end of this century.

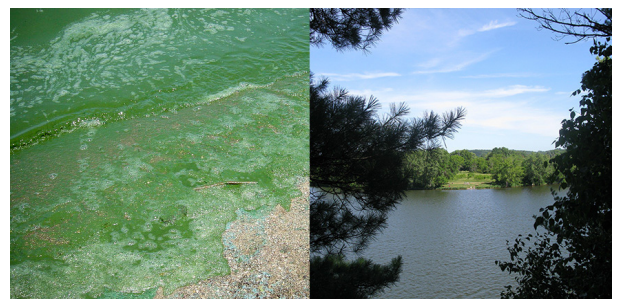


*Lake Pepin, June 2008*

### Gross-looking lakes have real costs

Minnesota's \$13 billion tourism industry is built on a foundation of scenic lakes and streams for fishing, boating, and swimming. "Our natural resources always come near the top as to why people come here," said John Edman, director of Explore Minnesota, the state's tourism office.

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, and can even threaten drinking water.



*Lake Byllesby Reservoir, June 2003*



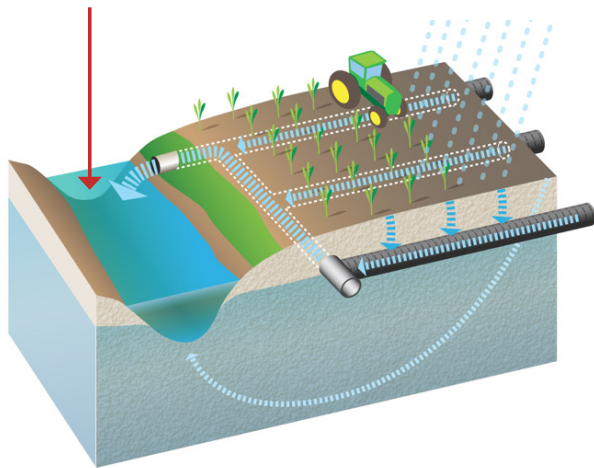


Healthy fish need healthy lakes and streams. Much of our flowing water — including streams and ditches — is under threat from nutrient runoff and increased speed of flow.

## 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: Southeast Minnesota

**Southeast Minnesota watersheds provide high quality streams, but some need help**

The intimate connection between groundwater and surface water in Southeast Minnesota gives rise to a large number of coldwater streams that are valued for trout fishing and other recreation.



Though trout and aquatic life are faring well in many coldwater streams, there are still streams in these watersheds that suffer from bacteria levels that may make the water unsafe for swimming, soil and sediment that cloud the water, and nitrate levels that may stress aquatic life, like fish. Priorities for improving water quality in Southeast Minnesota watersheds include reducing sediment and nitrate levels and restoring habitat.

Sometimes natural or human events cause multiple dead fish in a lake or river. There are about 500 fish kills in Minnesota every year, but few are reported. In a notable 2015 fish kill, more than 10,000 dead fish were found along the banks of the Whitewater River.

## 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.”

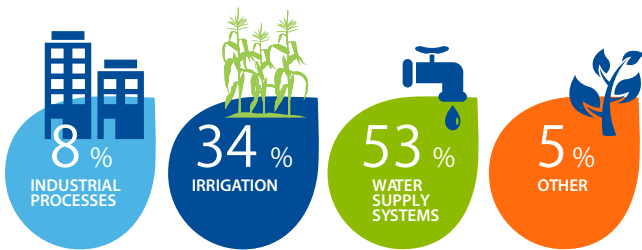
— Dr. Bonnie Keeler, lead scientist for the Natural Capital Project, University of Minnesota

# 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

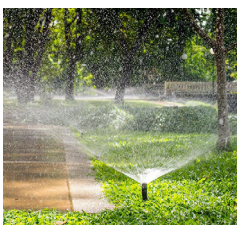
Our water supply makes Minnesota attractive to water-intensive industries, including agriculture, fishing, manufacturing, food production, micro brewing, mining, and shipping. But we need to encourage water conservation by both businesses and individuals.



- 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.

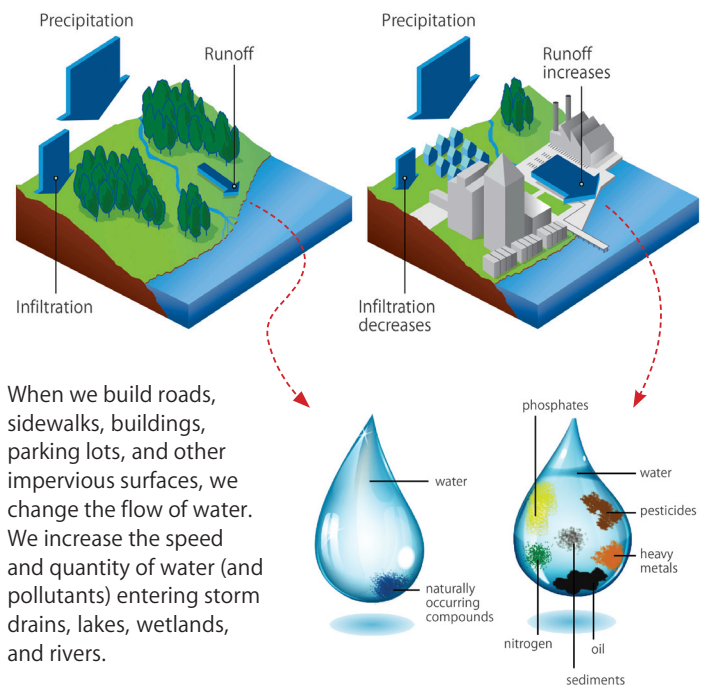


- Improve residential water use efficiency with technologies like soil moisture sensors for lawn watering and water efficient toilets.

## 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.

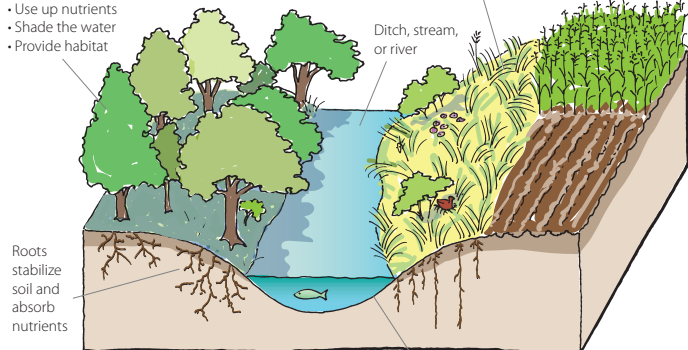


Applying nitrogen fertilizer at the proper **rate** and **time** minimizes loss to ground and surface water and improves farm profit. Installing more **grass waterways**, **sediment basins**, and **terraces** in targeted areas slows and filters runoff.

### 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

Ditch, stream, or river

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: **SE Minnesota**

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

- ▶ Cannon River
- ▶ Root River
- ▶ Mississippi River: Winona
- ▶ Mississippi River: Lake Pepin
- ▶ Zumbro River – in progress
- ▶ Cedar River – in progress

## Plan: **SE Minnesota**

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

- ▶ Root River
- ▶ Cannon River – in progress
- ▶ Cedar River – in progress

## Do: **SE 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





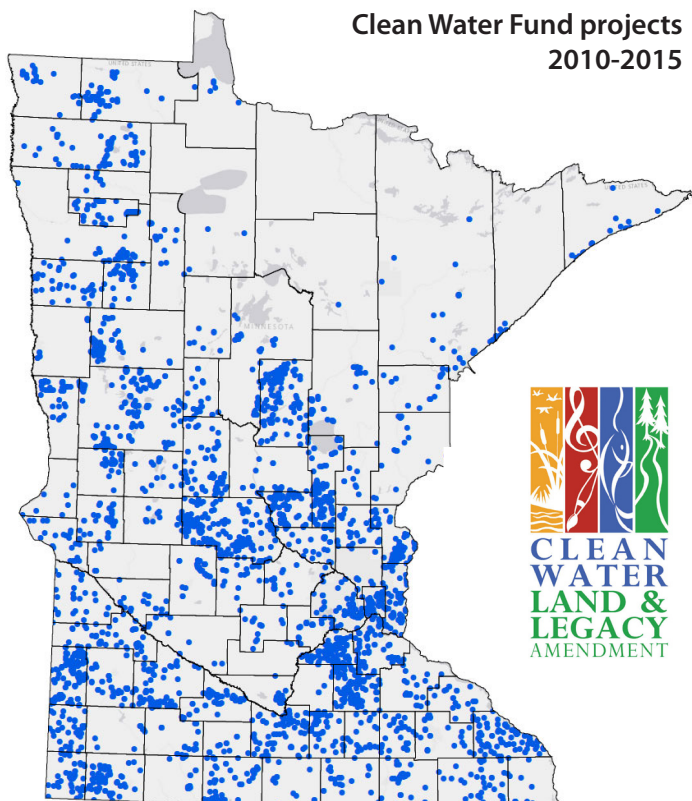
### Helping Minnesota communities thrive

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 Southeast Minnesota include:

- ▶ Financial assistance for sealing wells for drinking water
- ▶ Wastewater treatment solution for the City of Myrtle
- ▶ Drainage water management practices in the Zumbro River watershed
- ▶ The Root River Field to Stream Partnership, which supports edge-of-field monitoring, on-farm assessments, and getting more conservation practices on the ground
- ▶ The Minnesota Agriculture Water Quality Certification Program has 105 producers in Southeast Minnesota, representing 60,857 acres, as of April 2017

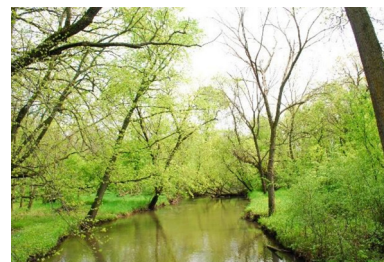
Clean Water Fund projects  
2010-2015



### Investment in action: Dobbins Creek

Dobbins Creek runs along the northeast edge of Austin, MN and it's part of a Clean Water Fund demonstration project that uses a holistic approach to reducing water pollution. It was selected because the amount of change necessary to improve water quality is known, the actions needed to achieve results are already identified, and work can be done in a 4-year time table.

The project is poised for success because people care about the creek and have a positive relationship with the Cedar River Watershed District (CRWD) and Mower County Soil and Water Conservation District, the assisting organizations. "The work we've done one-on-one has allowed us to build trust, and we've been very pleasantly surprised by how willing folks are to implement a variety of conservation practices on their land," says Justin Hanson, CRWD Project Coordinator. "They know the creek, and they know this is important, and they're making it possible for us to make this kind of progress."



# Building momentum

Resources to support your involvement

**Sign up** for email updates on 25% by 2025: [www.eqb.state.mn.us/25by25](http://www.eqb.state.mn.us/25by25)

**Test** your private well: [www.health.state.mn.us/divs/eh/wells/waterquality/test.html](http://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](http://www.pca.state.mn.us/data/surface-water)

**Make changes** at home: [www.pca.state.mn.us/12things](http://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](http://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](http://www.mda.state.mn.us/awqcp)

**Volunteer** to monitor a local lake or stream: [www.pca.state.mn.us/cmp](http://www.pca.state.mn.us/cmp)

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

- ▶ Lake Pepin Legacy Alliance: [www.lakepepinlegacyalliance.org](http://www.lakepepinlegacyalliance.org)
- ▶ Friends of the Root River: [www.friendsoftherootriver.org](http://www.friendsoftherootriver.org)
- ▶ Cannon River Watershed Partnership: [www.crowp.net](http://www.crowp.net)
- ▶ Zumbro Watershed Partnership: [www.zumbrowatershed.org](http://www.zumbrowatershed.org)
- ▶ Cedar River Watershed District: [www.cedarriverwd.org](http://www.cedarriverwd.org)
- ▶ Whitewater Watershed Project: [www.whitewaterwatershed.org](http://www.whitewaterwatershed.org)
- ▶ Shell Rock River Watershed District: [www.shellrock.org](http://www.shellrock.org)
- ▶ Crooked Creek Watershed District: [www.mnwatershed.org](http://www.mnwatershed.org)
- ▶ Turtle Creek Watershed District: [www.turtlecreekwd.org](http://www.turtlecreekwd.org)
- ▶ Your county Soil and Water Conservation District: [www.maswcd.org](http://www.maswcd.org)

