BOARD OF WATER AND SOIL RESOURCES

CLEAN WATER LAND & LEGACY AMENDMENT

Clean Water Fund Appropriations

2018-2019 Biennial Report to the Legislature

March 1, 2020

Minnesota Board of Water and Soil Resources
520 Lafayette Road North
St. Paul, MN 55155
651-296-3767
www.bwsr.state.mn.us

Prepared by Megan Lennon, Mary Juhl, Marcey Westrick, and Seth Weeks.

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Contents

Introduction

Clean water matters to Minnesotans. It matters to the Minnesota Board of Water and Soil Resources (BWSR), whose mission is to improve and protect Minnesota's water and soil resources by working in partnership with local organizations and private landowners. Our agency's unique mission and structure provide for effective and efficient use of Legacy dollars with proven results. Working through Minnesota's local governments enables our agency to be strategic in granting funds to address locally identified water quality goals within the larger scope of Minnesota's clean water efforts. Our reporting and tracking requirements ensure measurable and specific results.

The goal of our Clean Water Fund (CWF) Program is to help meet statewide water quality goals through the prevention and reduction of non-point source pollution. BWSR's Competitive Grants program works through the local conservation delivery system to fund projects that are prioritized and targeted to the most critical source areas. Our CWF easements provide permanent protection of private land in riparian and groundwater locations, resulting in improved surface and groundwater quality and the health and security of community water supplies. Capacity funding to Soil and Water Conservation Districts (SWCDs) enables local conservation professionals to work with landowners to maintain and improve the quality, quantity, and sustainability of natural resources in the state including surface water, groundwater, soil, and ecological resources. Riparian Buffer cost-share and easement programs assisted landowners with meeting the requirements of the Buffer Law, resulting in 99% compliance statewide as of January 2020. The Technical Training and Certification Program provides training to our local government partners so they can deliver high-level conservation technical assistance to landowners and ensure clean water outcomes are met through proper conservation practice selection, design, and installation.

With the critical support of the Legacy Fund, these programs support progress towards meeting Minnesota's natural resource goals by working with landowners and local governments.

This report has been prepared for the Minnesota State Legislature by BWSR in fulfillment of the requirements of Laws of Minnesota 2017, Chapter 91, Article 2, Section 7. This requires BWSR to submit "to the legislature by March 1 each even-numbered year a biennial report prepared by the board, in consultation with the commissioners of natural resources, health, agriculture, and the pollution control agency, detailing the recipients and projects funded" with Clean Water Funds. This report outlines BWSR's comprehensive strategy to implement the Fiscal Year (FY) 2018-2019 appropriations from the Clean Water Fund – one of four funds established through the Clean Water, Land and Legacy Constitutional Amendment approved by voters in 2008.

Clean Water Fund Appropriation Summary

The Legislature appropriated to BWSR $95.5 million in Clean Water Fund dollars for planning and implementation of nonpoint source pollution reduction programs. As of March 1, 2020:

- BWSR awards approximately $20.5 million through a competitive grant process for high priority projects and practices that protect and improve water quality. Projects that receive awards are required to be prioritized, targeted, and able to achieve measurable outcomes. Each grant

applicant must meet various reporting requirements to demonstrate the effectiveness of these expenditures. These requirements are found in Minnesota Statutes 114D.50, Subdivision 4 and 3.303, Subdivision 10. Table 1 summarizes the programs and funding allocated under the appropriations.

- $18.25 million in appropriations for easement programs for conservation easements aimed at improving surface water quality, protecting groundwater and drinking water sources, protecting waters threatened by degradation, and providing buffers on public waters. Of this total, $16.25 million is part of the state commitment to the Minnesota Conservation Reserve Enhancement Program (MN CREP).
- $22 million in appropriations to supplement, in equal amounts, each SWCD's ability to support local capacity and delivery of soil and water conservation programs and projects. Each district received $200,000 over the biennium as a result of this appropriation.
- BWSR oversees $1 million of contracted services with the Conservation Corp of Minnesota and Iowa for installing and maintaining conservation practices.

Table 1: Summary of FY 2018–FY 2019 Clean Water Fund Appropriations to BWSR ($95,508,000)

Program	FY18-19 Appropriation	Description
Accelerated Implementation*	$7.6M	Builds technical skills, through TSAs and technical trainings. This competitive grant invests in building the capacity of local governments to accelerate on-the-ground projects that improve or protect water quality and perform above and beyond existing standards.
Conservation Reserve Enhancement Program (CREP)	$3.0M	Purchases and restores permanent conservation easements to surface water quality in areas targeted for nutrient reductions and protecting sensitive groundwater and drinking water resources. BWSR acquires conservation easements on behalf of the state to permanently restore and enhance land while private ownership continues.

Table 1: Summary of FY 2018–FY 2019 Clean Water Fund Appropriations to BWSR ($95,508,000)		
Program	**FY18-19 Appropriation**	**Description**
Critical Shoreland Protection-Permanent Conservation Easements	$2.0M	Obtains on behalf of the state permanent conservation easements to protect lands adjacent to public waters with good water quality but threatened with degradation.
Local Capacity	$22.0M	Provides grants to SWCDs to supplement, in equal amounts, each district's general service grant to provide increased technical and financial assistance to private landowners statewide.
Multipurpose Drainage Management*	$1.5M	Funds implementation of a conservation drainage/multipurpose drainage water management program to improve surface water management under the provisions of 103E.015.
One Watershed, One Plan	$3.99M	Accelerates implementation of the state's watershed approach through the statewide development of watershed-based implementation plans utilizing information from Watershed Restoration and Protection Strategies (WRAPS) and Groundwater Restoration and Protection Strategies (GRAPS).
Oversight, support, accountability reporting	$1.9M	Provides state oversight and fund accountability, collects results and measures the value of conservation program implementation by local government units and preparation an annual report detailing recipients, projects funded, and environmental outcomes.
Projects and Practices*	$19.5M	Protects and restores surface water and drinking water through grants to local government units to keep water on the land; to protect, enhance and restore water quality in lakes, rivers and streams; and to protect groundwater and drinking water, including feedlot water quality and subsurface sewage treatment system projects and stream bank, stream channel, shoreline restoration, and ravine stabilization projects.

Table 1: Summary of FY 2018–FY 2019 Clean Water Fund Appropriations to BWSR ($95,508,000)		
Program	**FY18-19 Appropriation**	**Description**
Restoration Evaluations	$168K	Provides a technical evaluation panel to conduct up to ten restoration evaluations required under Minnesota Statutes, Section 114D.50, Subdivision 6.
Riparian Buffer Cost Share	$5.0M	Grants to implement riparian buffers or alternative practices on public waters or public ditches consistent with Minnesota Statues, section 103F.48.
Riparian Buffer Implementation and Assistance	$5.0M	Provides ongoing oversight and grants to enhance compliance with riparian water quality protection buffer law.
Riparian Buffer Conservation Easements	$9.75M	Purchases and restores permanent conservation easements on riparian lands adjacent to public waters, except wetlands. Establish buffers of native vegetation that must be at least 50 feet where possible. Part of state commitment for the MN CREP, leveraging federal funds.
Tillage and Erosion Transects	$0.85M	Systematically collects data and produces statistically valid estimates of the rate of soil erosion and tracks the adoption of high residue cropping systems in the 67 counties with greater than 30% of land in agricultural row crop production.
Watershed-based Implementation Funding	$9.75M	Funds grants to implement projects that protect and restore surface water and drinking water as identified in a comprehensive watershed plan developed under the One Watershed, One Plan or metropolitan surface water and groundwater management frameworks.
Wellhead Protection Conservation Easements	$3.5M	Purchases permanent conservation easements on wellhead protection areas under MS 103F.515 Subd. 2, paragraph (d). Must be in drinking water supply management areas designated as high or very high by the Commissioner of Health. Part of state commitment to the MN CREP, leveraging federal funds.

**Competitive grant process*

Statewide Watershed Management Transition

Minnesota's Clean Water Fund recipients face two big challenges: the state's water protection and restoration needs are far greater than the available resources to address them; and Minnesotans expect to see tangible progress toward restoration and protection during the 25 years that the Clean Water Fund is available.

BWSR, together with state and local partners, is transforming how water is managed in Minnesota. The state is taking an adaptive management approach, organized by watersheds, that directs Clean Water Funds to the highest priority water restoration and protection needs. These priority areas (subwatersheds) are selected by local governments, based on data and local values and concentrating implementation in those areas.

At the heart of the transformation is a systematic, statewide watershed framework for planning and implementation. Two BWSR programs are helping to drive this water management transformation: One Watershed, One Plan and Watershed-Based Implementation Funding. These programs are designed to improve water and natural resource outcomes, enhance accountability, and improve consistency and efficiency.

The goal of the One Watershed, One Plan program is to bring local governments together for water planning on major watershed boundaries, creating resource management plans with agreed-upon priorities, and developing an action plan that targets work within subwatersheds or similar-scale units. A wealth of information summarized in technical reports (Watershed Restoration and Protection Strategies, Groundwater Restoration and Protection Strategies, and more) supports local water planning and project development.

Watershed Framework Transformation

At the heart of the transformation is a systematic, statewide watershed framework for planning and implementation. Two BWSR programs are helping to drive this water management transformation: One Watershed, One Plan (1W1P) and Watershed-Based Implementation Funding. These programs are designed to improve water and natural resource outcomes, enhance accountability, and improve consistency and efficiency.

In FY 18-19, BWSR piloted the Watershed-based Implementation Funding program, which supports the implementation of the priority actions identified in comprehensive watershed management plans developed through the One Watershed, One Plan program. This program is an alternative to the traditional project-by-project competitive grant processes that has been used to fund water-quality improvement projects with Clean Water Fund money. Watershed-based implementation funding will provide reliable support for collaborating local governments to pursue solutions based on the watershed's highest-priority needs. This approach will allow more projects to be implemented and help local governments spend limited resources where they are most needed.

Watershed-based Funding Implementation Funding

Watershed-based funding is an alternative to the current project-by-project competitive grant processes used to fund water quality improvement projects. The watershed-based funding approach depends on comprehensive watershed management plans developed by local partnerships under the One Watershed, One Plan program or the Metropolitan Surface Water or Groundwater Management framework to provide assurance that actions are prioritized, targeted, and measurable. BWSR is moving toward watershed-based funding to accelerate water management outcomes, enhance accountability, improve consistency and efficiency across the state, and to provide predictable funding for implementation of local priorities. This approach allows more projects to be implemented and helps local governments spend limited resources where they are most needed.

As Minnesota transitions to comprehensive watershed management planning through One Watershed, One Plan, the proportion of competitive funding available decreases and the proportion of watershed-based funding increases. In order to meet the One Watershed, One Plan implementation goals, the total funds available as a combination of competitive and watershed-based funds must increase overtime, to an estimated $120 million in FY 28-29.

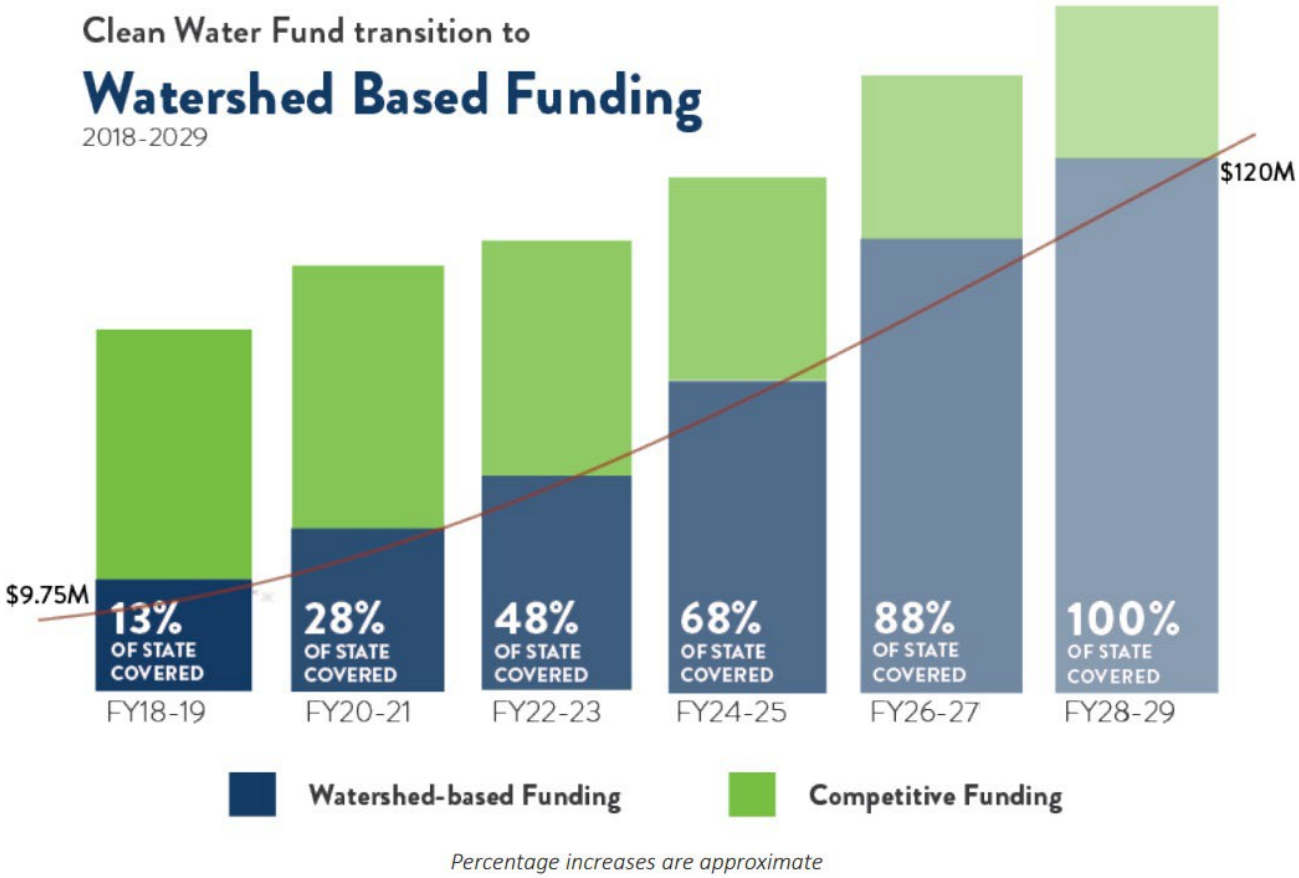


Figure 1 Clean Water Fund transition to watershed-based funding to meet implementation plans

Clean Water Fund Conservation Easement Programs

BWSR's clean water easement programs are a part of a comprehensive, statewide clean water strategy to prevent sediments and nutrients from entering Minnesota's lakes, rivers, and streams; enhance fish and wildlife habitat; and protect wetlands, groundwater, and drinking water supplies. These programs focus on permanent protection of private land to address clean water in key riparian and groundwater locations. This results not just in improved surface water quality but benefits the health and security of community water supplies and wildlife habitat.

Minnesota CREP

Launched in 2017, the Minnesota Conservation Reserve Enhancement Program (MN CREP) is a voluntary program with bipartisan support that aims to protect environmentally sensitive land. MN CREP targets the highest priority areas for reducing nitrogen, phosphorus, and sediment; protecting vulnerable drinking water; and enhancing grassland and wetland habitats. BWSR acquires conservation easements on behalf of the state to permanently restore and enhance land while private ownership continues.

MN CREP uses the nationally recognized Reinvest in Minnesota (RIM) Reserve easement program and the USDA Farm Service Agency (FSA) Conservation Reserve Program (CRP). MN CREP is a voluntary program providing landowners additional options to conserve their land and improve water quality while retraining ownership rights. This five-year program aims to enroll up to 60,000 acres prioritized and targeted for water quality and habitat. The $525 million agreement between the state of Minnesota and the United States Department of Agriculture will use $175 million in state funding to leverage up to $350 million in federal funding, used as direct payments to landowners and farmers who enroll in the program.

MN CREP aims to:

- Target riparian areas and marginal agricultural land
- Restore hydrology, increase infiltration, and provide flood mitigation
- Provides habitat for wildlife, non-game species, and pollinators
- Reduce nitrate loading in drinking supplies
- Leverage state and federal funding

MN CREP implements four water quality conservation practices over the 54-county program area in southern and western Minnesota:

- Riparian Lands - Grass Filter strips
- Wetland Restoration - Non-floodplain
- Wetland Restoration - Floodplain
- Wellhead Protection Areas

MN CREP Funding

Over the biennium, MN CREP funding includes $3 million in specific MN CREP appropriations; $9.75 million for RIM-Reserve riparian buffer easements and $3.5 million for wellhead protection easements.

MN CREP Outcomes

Sign-ups for MN CREP began in May 2017 and as of January 2020 total over 450 applications, including 24,000 acres funded/enrolled into permanent conservation easements.

Converting 24,000 acres of cropland to perennial vegetation provides significant greenhouse gas, nitrogen, phosphorus, and sediment load reductions, including up to:

- 35,300 metric tons of CO_2 equivalent per year
- 7,600 pounds of total phosphorus per year
- 480,000 pounds of total nitrogen per year
- 49,200 tons of sediment per year

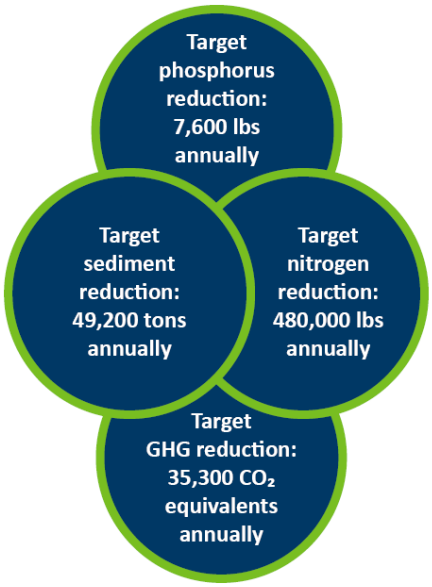


Figure 2 Target benefits of CREP acres enrolled as of January 2020

In addition to habitat and water quality benefits, MN CREP offers incentives to landowners with marginal cropland. “It’s a good opportunity to get a fair payment on ground that would be idle and to do your part for resource protection,” said a recent landowner who enrolled in the MN CREP.

MN CREP can also help farm families cement their legacy. In West Otter Tail County, Rob and Loreli Westby enrolled the balance of their 620 acres into permanent easements using MN CREP. Westby explains, “My dad’s wish before he passed away was that the property be protected from development. All 620 acres of property is now permanently protected from development, and the CRP will stay in grasses, flowers, and trees.”

Other Easement Program Outcomes

BWSR’s RIM program creates multiple benefits by targeting lands with a cropping history and new or existing USDA Conservation Reserve Program (CRP) contracts. Minnesota is experiencing a significant loss of grasslands and the RIM Reserve program aims to slow down the loss by targeting the most critical CRP land including; areas at risk for soil erosion, areas most affecting water quality, and those lands that have high wildlife habitat quality. Participating landowners receive a payment to retire land from agricultural production and to establish permanent buffers of native vegetation.

While most of BWSR’s CWF easement appropriations were used to support MN CREP, the FY 18-19 funding also included funding for the Critical Shoreland Protection Easement Program. This program funded 14 easement applications protecting 647 acres.

Clean Water Fund Competitive Grants Program

Each year, interest in BWSR's Clean Water Fund Competitive Grants Program exceeds available funding, as demonstrated in Figures 3 and 4. Our local government partners are engaged and invested in protecting and restoring Minnesota's lakes, streams, rivers and groundwater. Their ability to do so is significantly limited by the state dollars available to fund local priority projects.

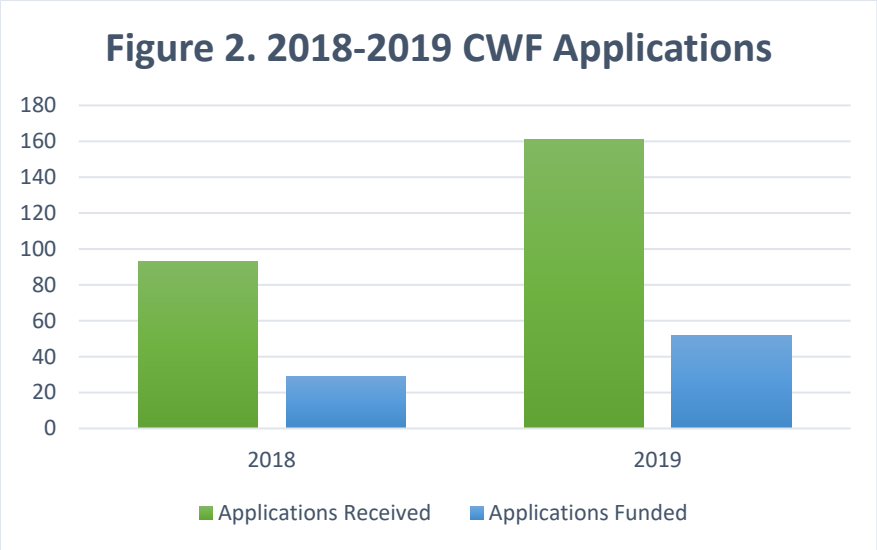


Figure 3 CWF applications received and funded by BWSR for FY 18-19

Given the demand, BWSR works to fund the best projects that make the biggest difference in water quality. Our agency allocates CWF resources through a decision-making process based on sound science, prioritized local planning, and a commitment to identifying projects that will be the most effective. Projects that lack source assessments, clear connections to water plans, or an adequate description of overall impact to the water resource of concern do not compete well under this program.

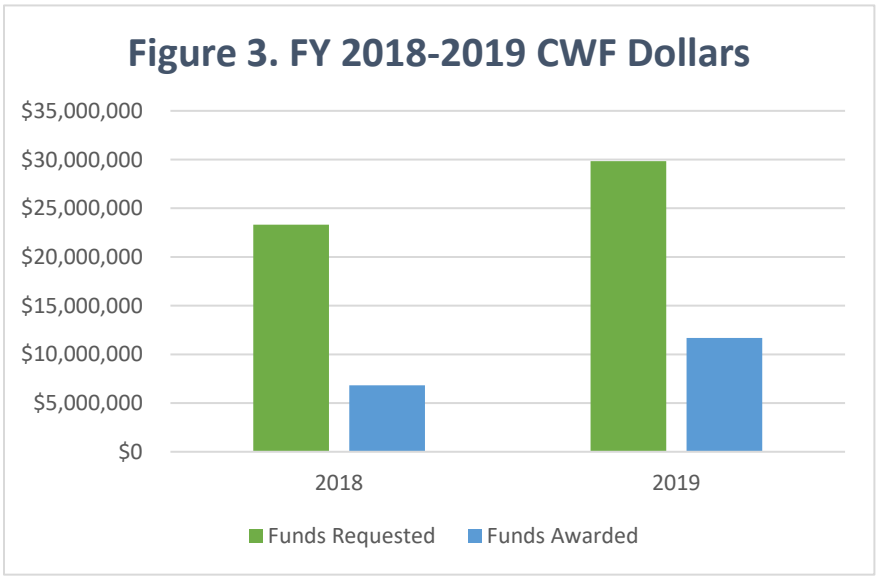


Figure 4 CWF funds requested and funds awarded for FY 18-19

In FY 18-19, our agency's Competitive Grants Program included Projects and Practices, Accelerated Implementation, and the Multipurpose Drainage Management Program. Funding for these programs was provided under Laws of Minnesota 2017, Chapter 91, Article 2, Section 7.

The Competitive Grants Program also incorporated requirements of M.S. 114D.20, which directs the implementation of Clean Water Funds to be coordinated with existing authorities and program infrastructure. Those requirements are referenced in the Clean Water Fund Grants Policy adopted by the BWSR Board on June 28, 2017 and June 27, 2018.

Competitive Grant Process

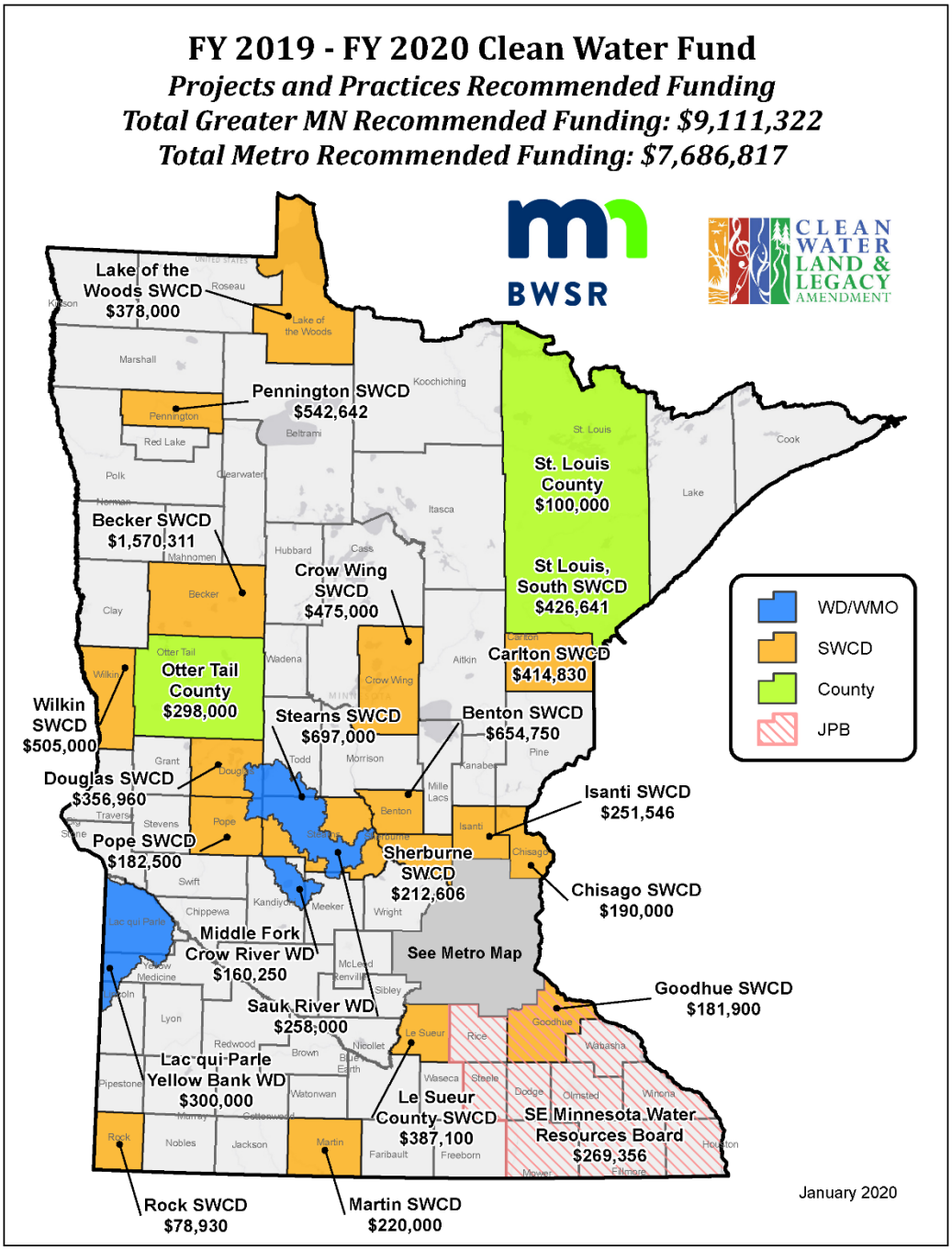
BWSR allocates Clean Water Funds through an interagency decision-making process that includes the Minnesota Department of Agriculture (MDA), the Department of Natural Resources (DNR), the Minnesota Pollution Control Agency (MPCA), and the Minnesota Department of Health (MDH) with the goal of effectively coordinating water quality projects and practices. See Appendix A for the criteria used in this process.

The BWSR Senior Management Team reviews the recommendation provided by the interagency and BWSR staff teams and then forwards their recommendations on to the BWSR Board. The BWSR Board Grants Program and Policy Committee review the recommendations before full Board decision.

Table 2: Clean Water Fund Applications Funded per Grant Program

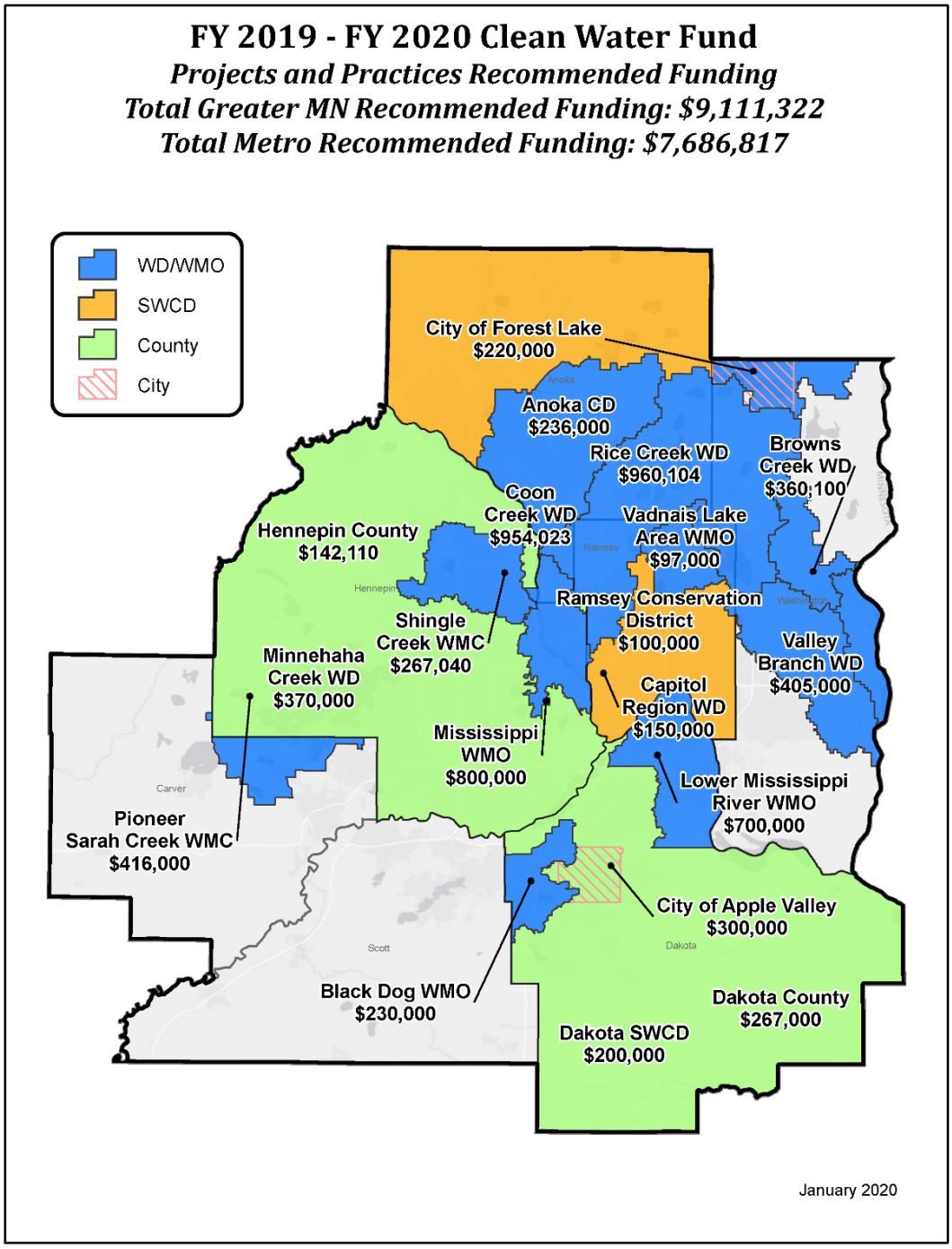
Grant Program	Applications Funded		Total Funds Awarded	
BWSR Board Approval, Dec. 2017, Dec. 2018	**FY 18**	**FY 19**	**FY 18**	**FY 19**
Projects and Practices	24	36	$6,184,844	$11,685,070
Accelerated Implementation	0	12	$-	$1,382,915
Multipurpose Drainage Management	5	4	$634,500	$610,000
Total	**29**	**52**	**$6,819,344**	**$13,677,985**

FY 2018-2019 Clean Water Fund Competitive Grant Awards



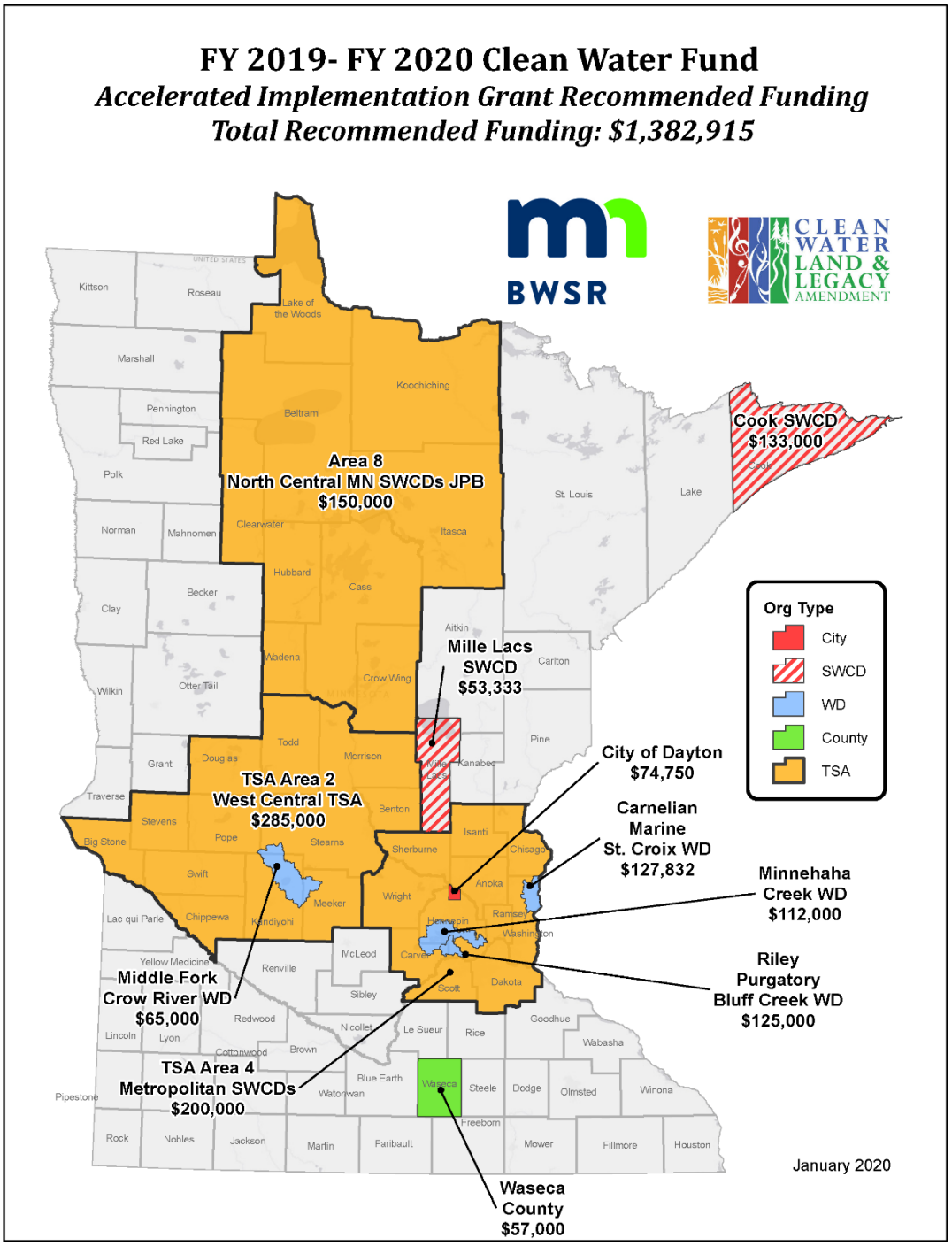
Projects and Practices Grants: Greater MN

Funds are used to protect, enhance and restore water quality in lakes, rivers, and streams, and to protect groundwater and drinking water. Activities include structural and vegetative practices to reduce runoff and retain water on the land, stream bank, stream channel and shoreline protection projects.



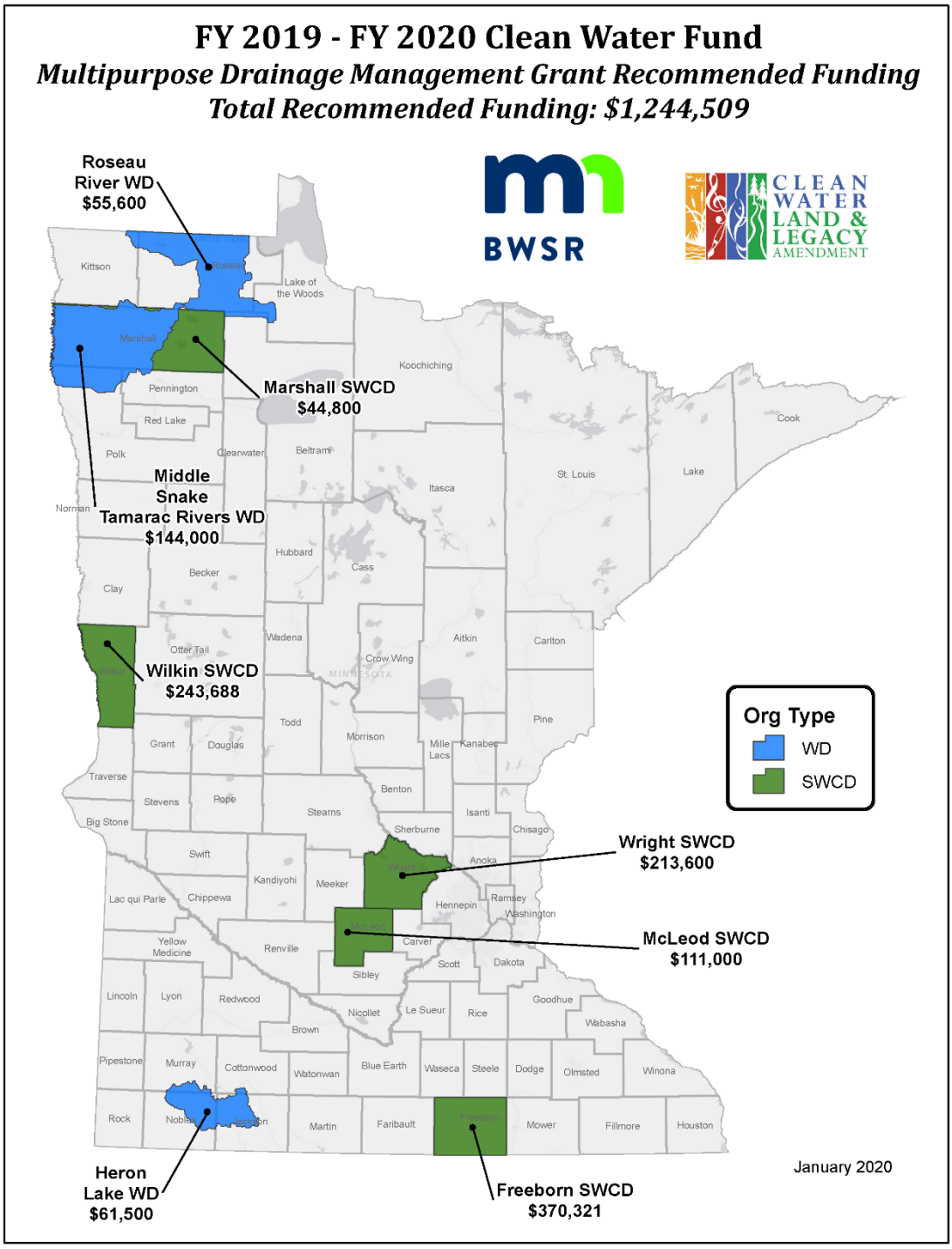
Projects and Practices Grants: Metro

Funds are used to protect, enhance, and restore water quality in lakes, rivers, and streams, and to protect groundwater and drinking water. Activities include structural and vegetative practices to reduce runoff and retain water on the land, stream bank, stream channel and shoreline protection projects



Accelerated Implementation Grants Statewide

Funds are used for projects and activities (such as ordinances, organization capacity, and state of the art targeting tools) that complement, supplement, or exceed current State standards for protection, enhancement, and restoration of water quality in lakes, rivers, and streams or that protect groundwater from degradation



Multipurpose Drainage Management Grants: Statewide

The purpose of these funds is implementing a conservation drainage/multipurpose drainage water management program in consultation with the Drainage Work Group to improve surface water management under the provisions of 103E.01.

Outcomes and effectiveness

BWSR funded 56 grant applications through Projects and Practices Grants over the FY 2018-19 biennium: 38 are for water bodies listed as impaired that have a completed a Total Maximum Daily Load study (TMDL); 19 are for either drinking water or water quality protection for water bodies that are currently meeting state water quality standards.

BWSR requires grant applicants to estimate anticipated outcomes for proposed projects during the application process. Applicants used pollution reduction calculators, such as the Revised Universal Soil Loss Equation (RUSLE2), and similar tools for estimating effectiveness of keeping water runoff on the land through infiltration, diversion, or collection. Based on projected outcomes, projects funded in FY 18-19 will remove 35,500 pounds of phosphorus and 51,000 tons of sediment from Minnesota waters.

Appendix B lists all estimated outcomes for FY 18-19 Clean Water Fund competitive grant projects.

Clean Water Fund in Action

BWSR works diligently to tie Clean Water Fund project pollution reduction estimates to local and state water quality goals. From FY 2010-2019 more than 11,500 conservation practices have been installed to reduce erosion and stormwater runoff, and to keep water on the land. These awards include public and private projects and involve Minnesotans who voluntarily engage in these activities.

These conservation practices are estimated to reduce **177,000** tons of sediment per year and prevent **189,000** pounds of phosphorus per year from entering Minnesota waters. That work helps move Minnesota closer to its statewide water quality goals. It works toward state waters that are drinkable, fishable, and swimmable — all important measures for Minnesotans.

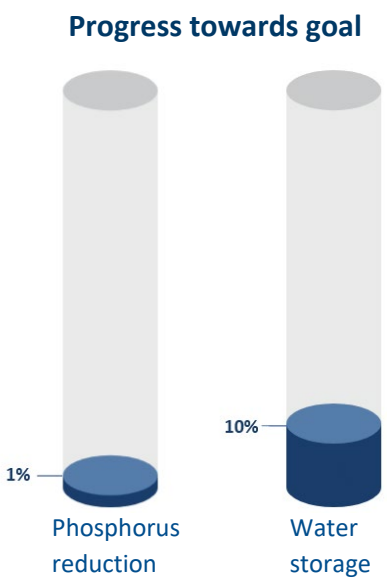
Linking Outcomes to Goals

When analyzing progress toward goals, scale is critical. It is important to understand that project impacts can vary depending on the pollutant, reduction goals, scale, and scope of project plan. For example, a 1% progress toward goal in a large river system is going to look very different than 41% progress toward goal in a small lakeshed. If you start at the very local level, you can often begin to see the impact of this work in a relatively short time frame, but the larger the scale, the longer it takes to see outcomes.

Examples of progress towards goals

Watershed-based Funding Pilot *Yellow Medicine River Planning Partnership*

In 2016, the Yellow Medicine River planning partnership produced one of the first One Watershed, One Plan comprehensive management plans approved by BWSR. Then in FY 18-19 BWSR awarded the partnership a $551,700 watershed-based grant that has allowed the group to leverage federal dollars that will supplement funding for landowners interested in implementing new conservation practices. Rather than a flat distribution of funds across the watershed, the group's plan strategically prioritizes where and how they target their efforts. The conservation practices will reduce phosphorus by 800 pounds per year and increase water storage by 100 acre-feet per year. This represents 1% and 10% of the Phosphorus reduction and water storage goal, respectively.

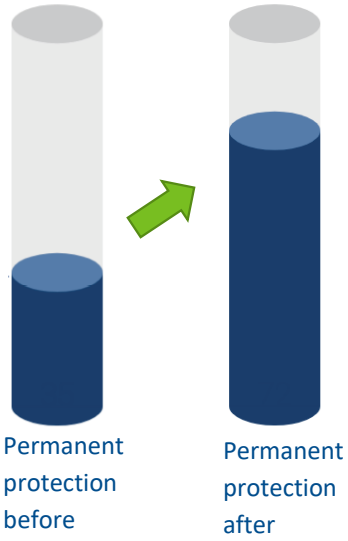


Moody Lake Alum Treatment *Comfort Lake-Forest Lake Watershed District*

The Moody Lake alum treatment is the final step of a systematic, multi-year diagnostic and implementation planning process the district began in 2011 for reducing watershed loads first, and then addressing in-lake internal loads. The reductions in watershed loads combined with the Moody Lake alum treatment will fully achieve the lake's water quality goal. The alum treatment will reduce internal phosphorus loading by an estimated 386 pounds per year, or 100% of the internal load reductions needed for Moody Lake to attain its long-term inlake phosphorus goal of 40 µg/L.

Mississippi Headwaters Habitat Corridor Project *Mississippi Headwaters Board*

Protection efforts in the Mississippi Headwaters area significantly increased permanent land protection in a 3,420-acre watershed northwest of Crosby. Using fee-title acquisitions, RIM-Reserve easements and Sustainable Forest Incentive Act enrollments, permanent protection increased from 35% to 73% of the watershed. These efforts provide multiple benefits including drinking water protection for the Twin Cities and protecting fish and wildlife habitat.



Telling the Story

BWSR funded over 1,500 projects and the ten grant-funded projects below illustrate the myriad ways Clean Water Funds helped protect, enhance, and restore Minnesota's lakes, rivers, streams and groundwater since the first allocations became available 10 years ago.

Family Farms

Root River Soil & Water Conservation District, Houston County

Improvements Josh and Steph Dahl are making to their 160-cow dairy through the Root River Field to Stream Partnership will position their fourth-generation farm for the future. The Minnesota Department of Agriculture-led venture uses intensive data collection to determine what effect specific conservation practices have on water quality. Clean Water Fund grants help farmers implement those practices. Outcomes apply to watersheds throughout southeastern Minnesota.

Rivers

Goodhue Soil & Water Conservation District

Upland dams built to stop gully erosion and retain topsoil keep sediment out of trout streams that enter the Mississippi River/Lake Pepin. The prioritized work centered on spots where conservation fixes would do the most to improve water quality and stream habitat. "It's kind of a showcase of what other watersheds could do — and that we should be doing here — to help address that sediment issue in Lake Pepin," said Beau Kennedy, Goodhue SWCD water planner.

Drinking Water

Vermillion River Watershed Joint Powers Organization, Dakota County

On a South Fork Vermillion River tributary where monitoring showed increasing nitrate levels, a pilot treatment project is underway. If it proves effective, it could be used elsewhere in the Vermillion River Watershed. Nitrate contributes to water-quality problems in local rivers and in Hastings-area drinking water supplies. A wood chip-enhanced wetland at the edge of a Dakota County farm field will treat water with some of the highest nitrate levels in the watershed.

Agriculture

East Polk Soil & Water Conservation District

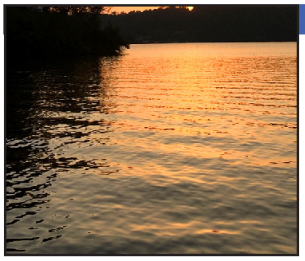
In East Polk County, erosion control structures are keeping topsoil in fields and out of the Sand Hill River. Since 2011, farmers have installed 133 water and sediment control basins that keep about 426 dump truck loads of sediment out of the river annually. "Not only are we reducing the sediment load that's going into the rivers, streams and wetlands, but the farmers are now able to farm the land most effectively," said Jim Hest, Red River Valley Conservation Service engineer.

Stream Restoration

Buffalo-Red River Watershed District, Clay County & Wilkin County

Water-quality benefits of a 21-mile-long Wolverton Creek restoration extend to the Red River. The restoration will improve drainage, widen habitat corridors, curb soil erosion and flood damage to fields, and cut Fargo-Moorhead's drinking water treatment costs. The project leverages Clean Water Fund dollars. "Community-wide, there'll be better habitat. There'll be better drainage. Water quality. We won't be dumping as much sediment load in — and that goes all the way to the river and all the way north," said Wilkin County farmer Jay Nord.

> **The intent of the Clean Water Fund is to protect, enhance and restore Minnesota's water resources so they're fishable, drinkable and swimmable. Private lands have a large role. What happens on the landscape impacts the water.**
>
> — Marcey Westrick, BWSR Clean Water Coordinator



Septic Systems

Southeast Minnesota Wastewater Initiative, 14 counties

"If they were easily fixed, we wouldn't get them," said Sheila Craig, southern region community sewage treatment facilitator for the 14-county SMWI. Clean Water Funds help pay for her position. She helps small communities with failing septic systems choose a solution and secure grants to help pay for it. Work in Olmsted County connected 23 Cedar Beach homes to a shared sewage treatment system, protecting groundwater and the Zumbro River.

Clear Lakes

Becker Soil & Water Conservation District

Detroit Lake is among 12 phosphorus-sensitive lakes in Becker County with water quality in peril or warranting preservation. Clean Water Funds help shoreland property owners install native plant restorations, rain gardens and gutters — which help cut the amount of phosphorus that enters the water. "If Detroit Lake ever flipped it would be disastrous all the way downstream because everybody's kind of at their tipping point already," said Peter Mead, Becker SWCD administrator.

Innovation

Rice Creek Watershed District, Ramsey County

A new carp removal system tested on Rice Creek could change the way Minnesota deals with the invasive fish that degrade lakes' water quality and habitat. The system combines technology used in Poland to keep fish out of hydroelectric plants with technology developed in the U.S. to pick fruit. It's one element of the four-part Long Lake Targeted Watershed Demonstration Project, a plan to improve water quality in nutrient-impaired Long Lake.

Trout Streams

Carlton Soil & Water Conservation District

The 20 red clay dams built during the 1970s in the Nemadji River watershed kept highly erodible soil from reaching Lake Superior. With Clean Water Fund grants and willing landowners, the SWCD is tackling failed red clay dams that could unleash 30 years worth of accumulated sediment. Restoration and bank stabilization projects bring trout anglers' hopes of stocked streams closer to reality, as habitat improves and fish passage is restored upstream from Lake Superior.

Multipurpose Drainage

Bois de Sioux Watershed District, Traverse County

The Bois de Sioux Watershed District's first ditch retrofit, on Traverse County Ditch 37 near Wheaton, could be the first of many retrofits designed to improve water quality in rivers and streams and alleviate flooding on fields. A Clean Water Fund grant is in play. Farming accounts for 93 percent of land use in the 1,400-square-mile watershed, which includes parts of six west-central Minnesota counties. The ditch drains into Twelvemile Creek, the Mustinka River and Lake Traverse.

Directed BWSR Clean Water Fund Expenditures

Additional BWSR clean water programs, as mandated by Minnesota Legislature, provide other key components of the comprehensive statewide clean water framework.

One Watershed, One Plan

The vision of the One Watershed, One Plan Program is to align local water planning on major watershed boundaries with state strategies towards prioritized, targeted, and measurable implementation plans. This program builds on current local water plans, state and local knowledge, and a science-based approach to watershed management, resulting in action plans that address the largest threats and provide the greatest environmental benefits to each watershed.

Historically, local water planning occurred along government (typically county) boundaries which can be challenging since the flow of water ignores political lines. The One Watershed, One Plan Program provides a framework for local governments to work together on shared water management goals. This collaborative approach enables important cross-jurisdictional discussions about upstream-downstream issues. Plans are comprehensive in nature, addressing issues like flooding, habitat, water quality, drinking water, and recreation.

In One Watershed, One Plan, officials from local boards (county, SWCDs, and watershed districts) agree upon priority issues and commit to local action to address them. The process uses multiple streams of data and information, including surface water quality and groundwater information compiled by state agencies. A locally defined advisory committee involves other governments from cities in the watershed to federal agencies as well as a range of community stakeholders. Once plans are completed, watershed-based implementation funding allows collaborating local governments to pursue timely solutions based on a watershed's highest priority needs.

In 2015, the Minnesota Legislature passed Minnesota Statutes §103B.801, the Comprehensive Watershed Management Planning Program. This legislation defined the purposes and further outlined the structure for the One Watershed, One Plan Program. It also directed BWSR to develop a transition plan with a goal of completing a statewide transition to comprehensive watershed management plans by 2025.

Achieving the goal will require starting approximately seven planning efforts each year. As of January 2020, BWSR had 30 partnerships (51% of planning boundaries) participating, which is consistent with the pace of progress outlined in the transition plan. BWSR expects to keep or possibly exceed this pace of progress in the next biennium. The Clean Water Fund appropriation for this program allows BWSR to provides planning grants and policies, guidance, and staff support to local planning efforts. State support is a key incentive for local government participation in this voluntary program.

Through the One Watershed, One Plan Program, BWSR has approved ten plans: Root River, Yellow Medicine River, Lake Superior North, Red Lake River, North Fork Crow River, Leech Lake River, Pine River, Lake of the Woods, Missouri River Basin, and Cedar-Wapsipinicon. FY 18-19 appropriations for developing comprehensive watershed management plans through the One Watershed, One Plan Program totaled $3.99 million.

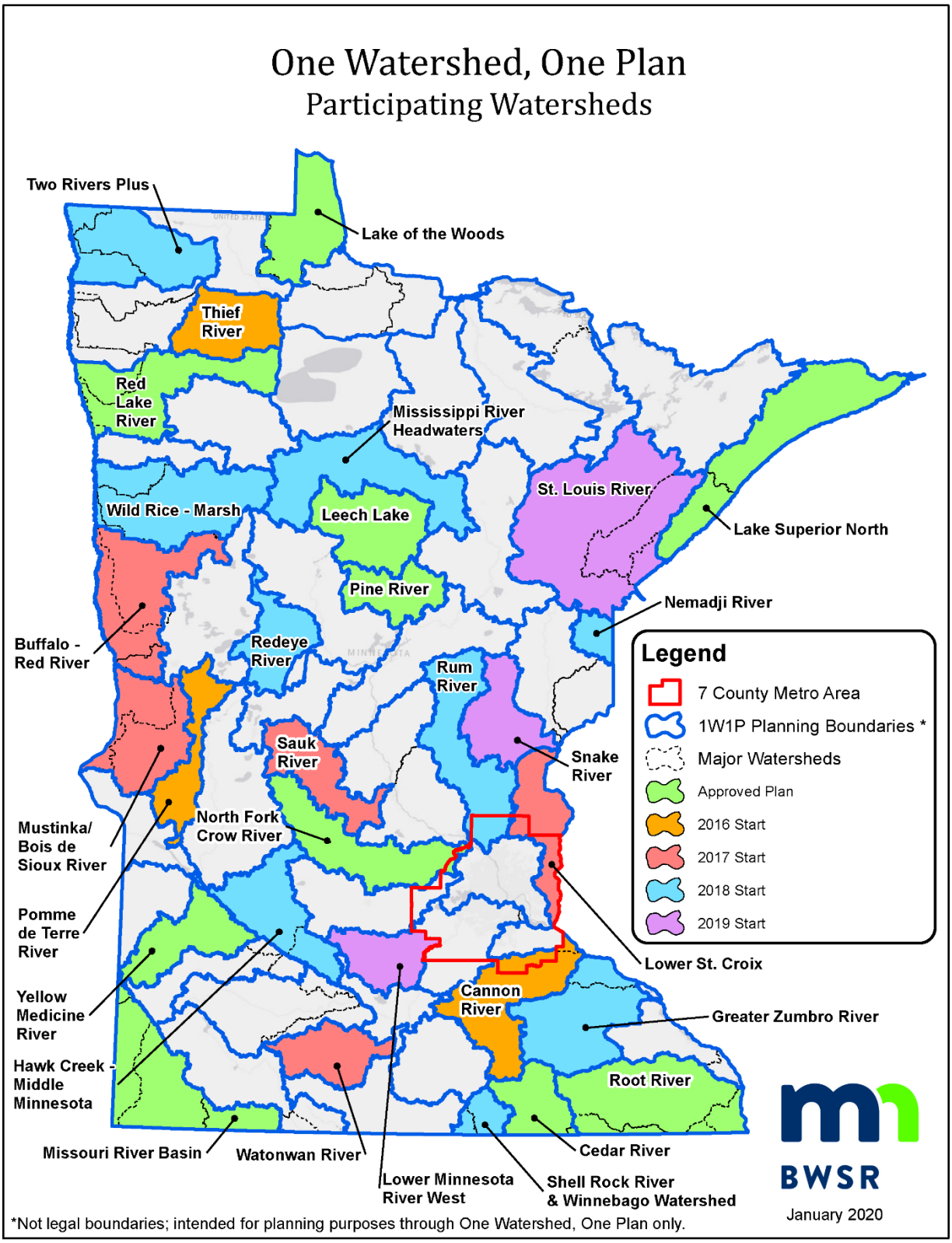


Figure 5 Map of One Watershed, One Plan participating watersheds

Watershed Conservation Planning Initiative

The Watershed Conservation Planning Initiative (WCPI) is a partnership between the USDA's Natural Resources Conservation Service, BWSR, and local SWCDS which aims to increase landowner/producer readiness to implement conservation practices in seven major watersheds. The WCPI provides comprehensive solutions to address landowner/producer concerns. The formal partnership is supported by a $3 million, 4-year contribution agreement between the agencies.

The goals include:

1. Increasing technical capacity of SWCDs to conduct resource assessments and prepare conservation plans within the selected watersheds;
2. Targeting conservation planning assistance to high priority acres in these watersheds;
3. Increasing landowner readiness and participation in conservation programs; and
4. Accelerating conservation practice implementation along with quantifying the environmental benefits.

To date, WCPI funds have been used to hire seven watershed conservation planners – one for each major watershed (Lower St. Croix, Sauk River, Chippewa, Middle Minnesota, Blue Earth, Cedar, Root). Coordination with the Technical Training and Certification Program (TTCP) increases the technical skills and credentials of conservation planners, resulting in an enhanced capacity of SWCDs to provide conservation planning

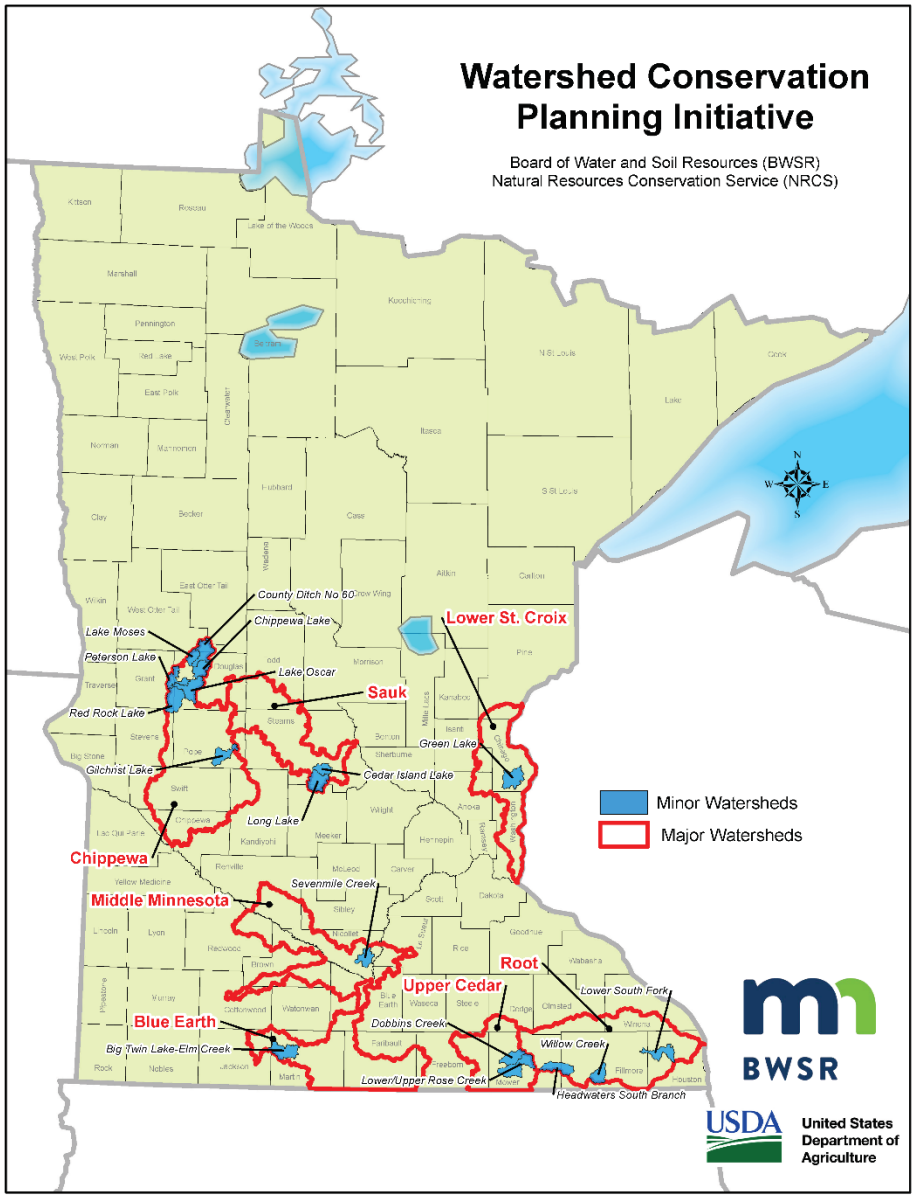


Figure 6 Map of Watershed Conservation Planning Initiative watersheds

technical assistance. Each of the seven watersheds has developed a plan of work based on local priorities and partner working relationships that increase conservation planning assistance to landowners. Targeted outreach and one-on-one technical assistance are emphasized with landowners in these watersheds. Overall, one-third of the WCPI Plan of Work milestones have been achieved with 240 conservation plans completed to date. The program is on track to meet its goal to complete 700 conservation plans by the program completion in 2021.

Local SWCD Capacity

The legislature appropriated $22 million over the biennium to support SWCDs. This state funding recognizes the role these local governments play in providing conservation service delivery to private landowners.

The funding focuses on increasing SWCD capacity to address four resource concern areas; soil erosion, riparian zone management, water storage and treatment, and excess nutrients. Eligible activity categories include staffing, cost-share/incentives, and technology/capital equipment. Aimed at achieving additionality, these funds are intended to fill gaps in local capacity, increase delivery of essential conservation services, and accomplish critical soil and water conservation goals consistent with the following principles:

- Expand the level and/or variety of technical services SWCDs and Technical Service Areas (TSAs) can deliver.
- Increase the amount of existing, targeted, and priority services necessary to address outreach to landowners and assist landowners in meeting land and water regulatory requirements.
- Extend high priority programs funded by short-term grant funds that are expiring.
- And to improve or develop staff skills to better align with resource priorities identified by the District Board.

The results are increased responsiveness of these local governments to their landowners and more conservation on the ground.

For example, in Koochiching SWCD, this funding allowed the SWCD to support a staff forester to work with private landowners to develop custom forest management plans and implement sustainable forest management practices.

Koochiching SWCD forester discussing with landowner forestry management options on a parcel along the Littlefork River

In Martin SWCD, it allowed the SWCD to increase their cover crop cost-share funding, resulting in increased cover crop usage. The Carver SWCD used this funding to build a pollinator cost-share program to provide funding for the installation of pollinator habitat on public and private lands.

Whether investing in staff or equipment or conservation funding, the capacity dollars have enabled these local governments — who have the closest connection to landowners — to be more proactive and responsive in meeting their needs.

Technical Service Area (TSA) Funding

TSAs are a critical link in the conservation delivery system in Minnesota. In FY 18-19, BWSR's Board awarded $240,000 to each of the eight TSAs. TSAs use these funds to build regionally specific capacity across the state to efficiently accelerate on-the-ground projects and practices that improve or protect water resources. Since 2013, TSAs have nearly doubled the number of practices that they've worked on statewide.

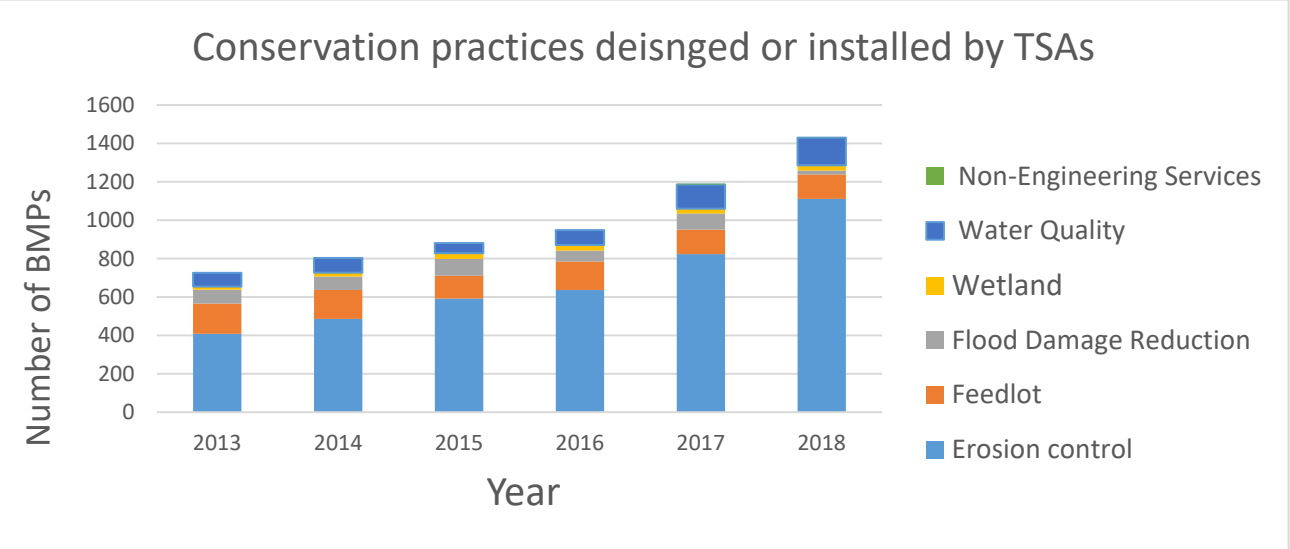
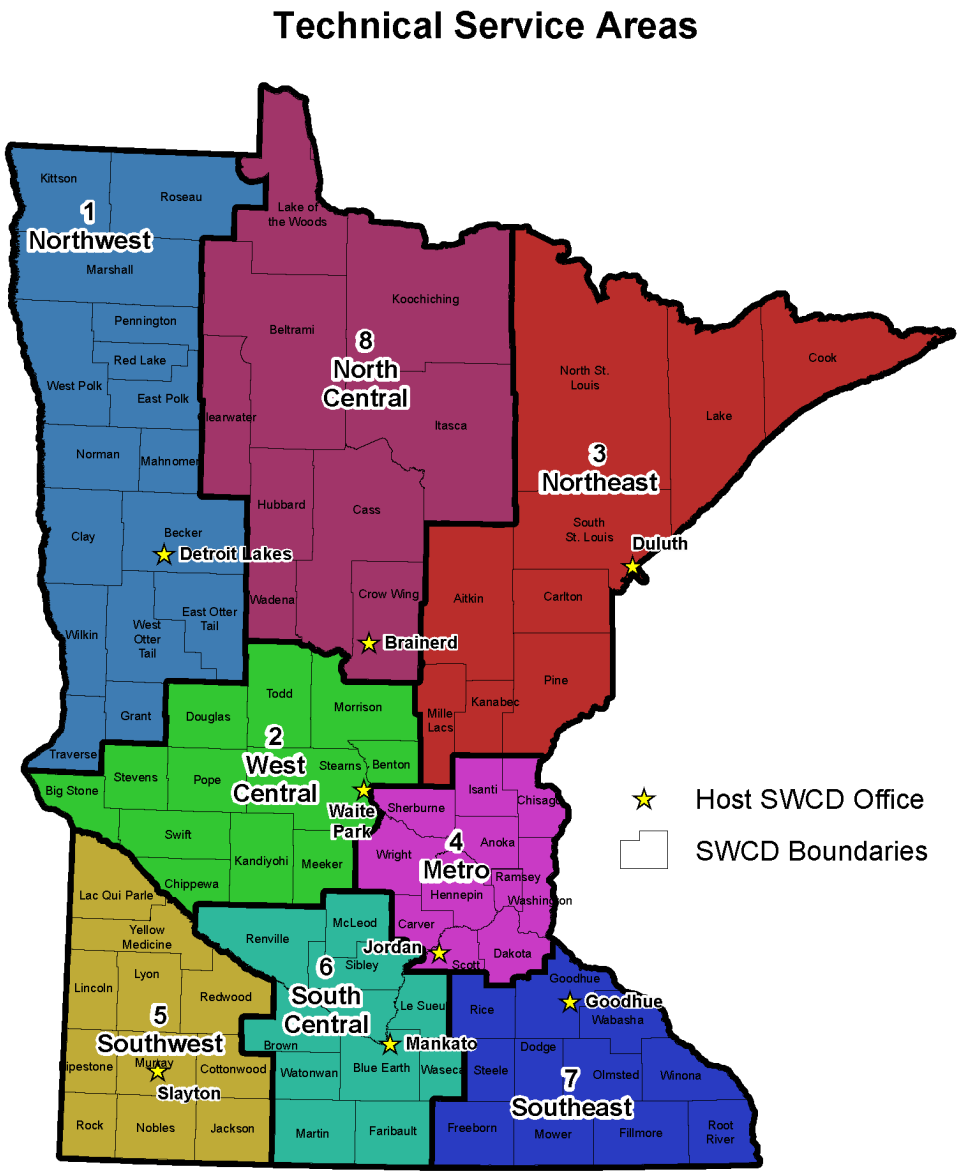


Figure 7 CWF supporting TSAs significantly increased capacity to design and install conservation practices.

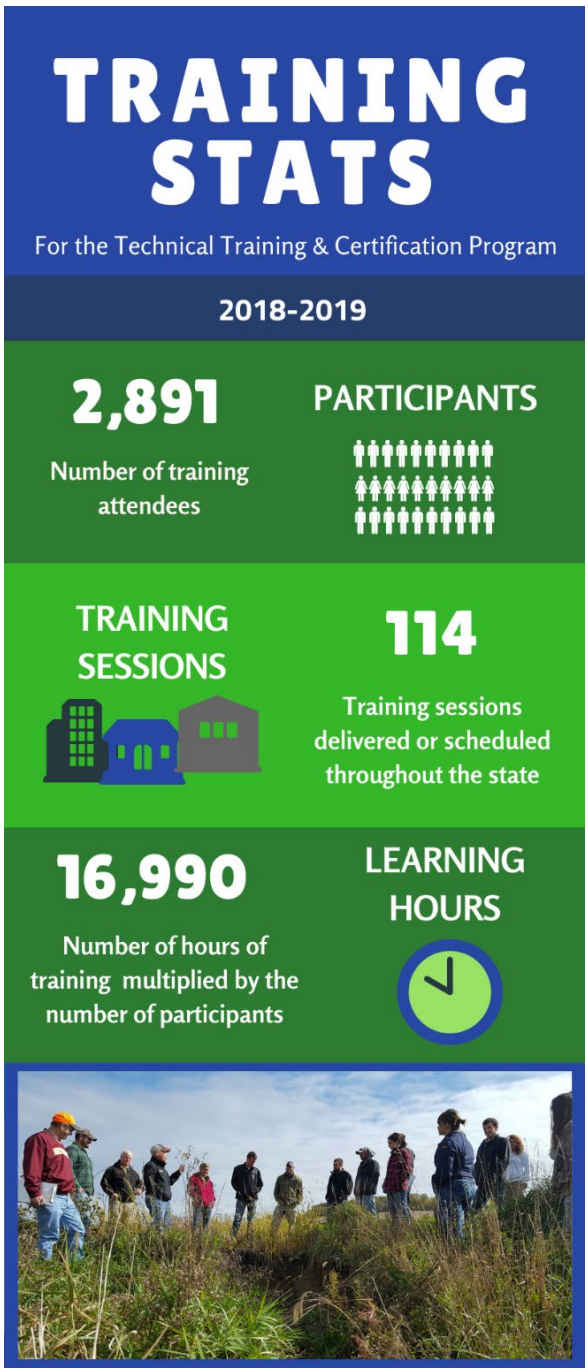
The Southwest Prairie Technical Service Area (TSA) has a contract with a former NRCS employee to train SWCD technicians in writing cover crop plans. They also have a contracted Technical Service Provider, Centrol Crop Consulting, to complete site walkovers with local SWCD staff.

North Central TSA 8 contracts the services of a GIS specialist, a graphics and marketing specialist, and a project facilitator. In 2019, the project facilitator played a large role in communicating and collaborating between the TSA and the individual SWCDs in the region. The facilitator helped to provide:

- clear direction on project scope and constraints (e.g., financial, spatial, functional) to TSA 8 staff
- clear expectations, project purpose and timeline to landowners
- A process that increases project success, expands SWCD staff knowledge, and builds relationships and partners with key resources (e.g., master gardeners)
- leveraging of expertise from other agencies and non-profits to reduce financial risk and risk of project failure.



Technical Training and Certification Program (TTCP)



Conservation Technical Assistance requires statewide, core technical assistance capabilities, as well as capabilities tailored to the local priority resource concerns and conservation practices found in the diverse landscapes of Minnesota. Training and certification are key quality assurance elements of an effective conservation delivery system.

BWSR, the Minnesota Association of Soil and Water Conservation Districts (MASWCD), the Minnesota Association of Conservation District Employees (MACDE), and the USDA Natural Resources Conservation Service (NRCS) have committed to providing resources for technical training and certification of local staff to maintain and enhance conservation delivery as laid out in the Technical Training and Certification Strategy.

During FY 18-19, the TTCP created a new Individual Development Plan (IDP) tool that enables conservation staff to share their technical training needs, document credentials and certifications, find others with conservation skills for peer-to-peer assistance/on the job training, and more. An IDP is a written plan that can be used by employees and managers to reach long and short-term professional development goals. The information from these individual development plans is used as a foundation for an annual training needs inventory. Individual development plans are completed or updated annually and are used to identify and document credential and Job Approval Authority goals.

Minnesota's future conservation accomplishments and clean water outcomes will depend on the skills and abilities of local experts to help landowners with projects and practices selection, design, and installation. The Technical Training and Certification Program is aimed at growing and enhancing the services provided by SWCDs by investing in the necessary and systematic training and credentialing to make that happen. A participant described a grazing training as "It was great being able to cover something in the classroom and then go and apply it in the field. Being able to do that made this training excellent. Being able to perform forage clippings in the pasture, determine available forage, and then have real cows graze our area so we could evaluate our recommendations was outstanding."

Minnesota's Buffer Law

Minnesota's Buffer Law requires perennial vegetative buffers of up to 50 feet along lakes, rivers, and streams, and buffers of 16.5 feet along public ditches. These buffers help filter out phosphorus, nitrogen, and sediment. The law provides flexibility for landowners to comply with the law by installing alternative practices that provide equivalent water quality benefits that are based on the Natural Resources Conservation Service Field Office Technical Guide.

2018 brought inclement weather to farmers at critical times: Snowfall late in the spring paired with heavy rainfall in the fall significantly disrupted planting and harvesting deadlines. BWSR staff advised the SWCD staff providing technical assistance to landowners to take this into account when assessing compliance. If fields were too wet or site conditions were not conducive to implementing a well-established buffer in fall 2018, then working into the spring was deemed appropriate.

The deadline for implementation for buffers on public waters was November 1, 2017. The deadline for public ditches was November 1, 2018.

Compliance to date

Buffer implementation is strong statewide thanks to the efforts of landowners and SWCDs. As of January 2020, approximately 99% of all parcels adjacent to Minnesota waters are compliant with the Buffer Law. SWCDs are reporting encouraging progress in their work with landowners around the state.

In FY 18-19, the legislature appropriated $5 million to BWSR to support local governments in their implementation of the new buffer law. Funds were made available on a non-competitive, formula basis to SWCDs to support their local implementation.

SWCD roles in buffer/soil erosion law eligible for funding include:

- Meeting with county and drainage authorities (county or watershed district) to discuss implementation roles and responsibilities.

- Passthrough funding to counties and/or drainage authority to support local implementation.
- Assistance to collect and provide drainage-system-benefitted area maps, files, and/or GIS files to DNR to support mapping.
- Landowner outreach and information.
- Providing technical and financial assistance to landowners, e.g., seed cost-share, drill loan, etc.
- Purchasing of equipment to support implementation, such as grass drill.
- Providing alternative practice validations, if requested, where the prescribed buffer may not be the best water quality practice for a site.
- Reviewing DNR maps and landowner outreach prior to finalization.
- Adopting buffer recommendations for waters not mapped by DNR for inclusion in local water management plans.
- Inventorying of baseline conditions.

Tillage and Erosion Survey Program

In FY 18-19, the legislature appropriated $850,000 for the Tillage and Erosion Survey Program. BWSR is working cooperatively with the University of Minnesota Department of Soil, Water and Climate and the Iowa State University Department of Agricultural and Biosystems Engineering to develop a long-term program to systematically collect tillage (crop residue after planting) data and soil erosion estimates to analyze trends in agricultural soil and water management in the 67-county area with greater than 30% of land dedicated to row crop production. We are moving toward bringing this program from a prototype to the production phase in 2020 as methods for data collection and analysis are being finalized. For more information on this program, see the following web page: https://bwsr.state.mn.us/current-soil-related-research- projects

In 2018, BWSR formed an external advisory committee to both provide information on project results and to also provide feedback on program development. BWSR continues to convene and expand the role of this committee in 2020 and beyond.

This program utilized remote sensing techniques to collect crop residue and cover crop data in the spring and fall of 2017 through 2019. Annual data availability and subsequent analysis is variable depending on the availability of satellite data and regional weather conditions at the time of data collection. Preliminary data was shared with BWSR local government partners and was utilized in informing WRAPs, the Minnesota Nutrient Reduction Strategy, and 1W1Ps.

One of the major accomplishments of this project is the development of the Daily Erosion Project (DEP) for the agricultural regions of Minnesota. This web application predicts average rainfall, water runoff, average soil detachment, and average hillslope soil loss within a sub-watershed. The first phase of this application was launched in 2019, and in 2020, a wind erosion estimate will be added to this tool. This application can be accessed at the following website: https://www.dailyerosion.org/.

Conservation Corps of Minnesota and Iowa

BWSR is required to contract with the Conservation Corps of Minnesota and Iowa (formerly Minnesota Conservation Corps) or CCMI, for installation and maintenance of conservation practices benefitting water

quality. The Board approved reserving $500,000 in FY 2018 and FY 2019 Projects and Practices program funds to comply with this requirement. Clean Water Fund allocations provide SWCDs with a trained labor force and equip CCMI crews with skills to build their conservation careers and provide local conservation partners with increased capacity to accomplish clean water outcomes. See the Clean Water Story on CCMI in Appendix C.

BWSR Administration of Clean Water Fund Expenditures

BWSR's Clean Water Fund goal is to reduce non-point source pollution by providing Clean Water Fund dollars to local government units for on-the-ground activities. Many of these practices are installed on private lands and will result in improved and protected surface and groundwater. The BWSR Board uses existing authorities, polices, and staff, along with the processes outlined previously, to implement Clean Water Fund program activities.

For FY 2018-19, BWSR received a $1.9 million direct appropriation for Clean Water Program Oversight and Administration to provide for implementation and administration of Clean Water Fund dollars. Staffing of 53 FTEs (full-time equivalents) in FY 2018 and 46 FTEs in FY 2019, including positions charged with getting protection and TMDL-derived restoration strategies adopted into local water plans, directing over $77.7 million of grant and easement funds to priority areas and activities, working with the One Watershed, One Plan program, assisting with implementation of the buffer and soil loss law, and aligning administrative procedures to optimize leveraging of non-State funds with low transaction costs.

Appendix A: BWSR Clean Water Fund Competitive Grant Ranking Criteria

Table A-1 Projects and Practices Ranking Criteria	Maximum Points Possible
Project Description: The project description succinctly describes what results the applicant is trying to achieve and how they intend to achieve those results.	5
Prioritization: The proposal is based on priority protection or restoration actions listed in or derived from an approved local water management plan.	15
Targeting: The proposed project addresses identified critical pollution sources impacting the water resource identified in the application.	25
Measurable Outcomes: The proposed project has a quantifiable reduction in pollution and directly addresses the water quality concern identified in the application.	30
Project Readiness: The application has a set of specific activities that can be implemented soon after grant award.	10
Cost-Effectiveness: The application identifies a cost-effective solution to address the non-point pollution concern(s).	15
Total Points Available	**100**

Table A-2 Accelerated Implementation Ranking Criteria	Maximum Points Possible
Clarity of project's goals, standards addressed and projected impact on land and water management and enhanced effectiveness of future implementation projects.	40
Prioritization and Relationship to Plan: The proposal is based on priority protection or restoration actions listed in or derived from an approved local water management plan or address pollutant load reductions prescribed in an approved TMDL.	25
Means and measures for assessing the program's impact and capacity to measure project outcomes.	20
Timeline for implementation.	15
Total Points Available	**100**

Table A-3 Multipurpose Drainage Management Ranking Criteria	Maximum Points Possible
Project Description: The project description succinctly describes what results the applicant is trying to achieve and how they intend to achieve those results.	5
Prioritization: The proposal is based on priority protection or restoration actions associated with a "Priority Chapter 103E Drainage System" (as defined in this RFP) and is consistent with a watershed management plan that has been state-approved and locally adopted or an approved total maximum daily load study (TMDL), Watershed Restoration and Protection Strategy (WRAPS), surface water intake plan, or wellhead protection plan.	15
Targeting: The proposed project addresses identified critical pollution sources or risks impacting the water resource identified in the application.	20
Measurable Outcomes: The proposed project has a quantifiable reduction in pollution and directly addresses the water quality concern identified in the application.	25
Project Readiness: The application has a set of specific activities that can be implemented soon after grant award.	5
Cost-Effectiveness: The application identifies a cost-effective solution to address the non-point pollution concern(s).	20
Effective Combination of Practices: Use of a combination of eligible activities that increase the overall effectiveness of the implemented practices/activities.	10
Total Points Available	**100**

Appendix B: Estimated Outcomes for FY 18-19 Competitive Grant Awards

Applicant	Grant Title	Outcomes Sediment (tons)	Outcomes Phosphorus (lbs.)	Outcomes Nitrogen (lbs.)
Wilkin SWCD	Lower Otter Tail River Gully Stabilization Project	850	786	
Coon Creek WD	Lower Sand Creek Corridor Restoration	372	316	
Becker SWCD	Buffalo Red Shallow Lakes and Mainstem Improvement Strategy - Phase II	4,710	532	1,060
Carlton SWCD	Skunk Creek Watershed Sediment Reduction	226		
Comfort Lake-Forest Lake WD	Moody Lake Alum Treatment		386	
Le Sueur County SWCD	Jefferson German Watershed Phosphorus Reduction Project		2,299	
Benton SWCD	Little Rock Lake / Mississippi River drawdown for water quality.	368	589	
Isanti SWCD	Blue Lake Priority Action Plan		95	
Shingle Creek WMC	Bass and Pomerleau Lakes Internal Load Reduction		455 (Bass) and 135 (Pomerleau)	
Forest Lake, City of	Forest Lake Enhanced Street Sweeping Implementation		96	

Vadnais Lake Area WMO	Birch Lake Hot Spot Remediation		8	
Dakota SWCD	2018 Trout Brook Watershed Initiative Phase 2	670		
Lake of the Woods SWCD	Bostic Watershed	331	331	
Sherburne SWCD	Lower Elk River Watershed Phase II Bacteria Reduction Grant			
Pioneer-Sarah Creek WMC	Baker Park Reserve Campground Ravine Stabilization, Lake Independence, Hennepin County		134	
Rock SWCD	Rock County Rural Water Nitrogen Reduction			
Lower Mississippi River WMO	Cherokee Heights Stormwater Management and Ravine Stabilization Project	17	17	
Sauk River WD	Middle Sauk River Protection Project	380	385	
Pope SWCD	2018 Lake Emily Watershed BMP Targeted Implementation Project III	350	300	
St. Louis County	2018 CWF SLC Projects & Practices			
Minnehaha Creek WD	Minnehaha Greenway - 325 Blake Road Stormwater Management Project		181	

Becker SWCD	Becker County Targeted Phosphorus Reduction and Lake Protection Project - Phase II	29	113	
Anoka CD	Targeted Mississippi Riverbank Stabilization Focused on Bioengineering – Round 2	100	100	
Middle St. Croix River WMO	Lake St. Croix Direct Discharge Stormwater Retrofit Phase III	1	10	
Coon Creek WD	Middle Sand Creek Corridor Restoration		126	
Wilkin SWCD	Whiskey Creek Gully Stabilization Project	1,006	794	
Rice Creek WD	Bald Eagle Lake Iron- Enhanced Sand Filter		43	
Ramsey Conservation District	2019 Well Sealing Cost- Share, Ramsey County SWCD			
Middle St. Croix River WMO	Lake St. Croix Small Communities Urban Phosphorus Reductions		10	
Dakota County	Lebanon Hills Regional Park Chain of Lakes Improvement Project		26	
Coon Creek WD	Woodcrest Pond biochar- and iron-enhanced sand filter		69	
SE Minnesota Water Resources Board	Drinking Water Protection in SE MN			19,800

Rice Creek WD	Lower Rice Creek Stabilization Project	2,874		
Comfort Lake-Forest Lake WD	Bone Lake SWA Implementation	12	114	
City of Apple Valley	Johnny Cake Ridge Road Phosphorus Reduction BMP Retrofit		39	
Martin SWCD	Fairmont Drinking Water and Watershed Restoration Phase 1	130	200	1000
Valley Branch WD	Valley Creek Ravine 2E Stabilization Project	7	51	
Otter Tail County	Judicial Ditch No. 2 Outlet Gully Stabilization Project	481		
Crow Wing SWCD	Targeted Stormwater Retrofit Project for Highly Sensitive Island-Loon Lake	1	6	
Chisago SWCD	2019 Parmly Gully Stabilization Project on Green Lake	112	112	
Chisago SWCD	2019 St. Croix River Escarpment Gully Stabilization	50	50	
Browns Creek WD	Water Harvest and Reuse at Oak Glen Golf Course		78	
Hennepin County	Rush Creek SWA Implementation	616	478	
Stearns SWCD	Lake George Water Quality Improvement Project	7	27	

Benton SWCD	2019 NE St. Cloud Sediment Reduction Project	4	18	
Black Dog WMO	Keller Lake Alum Treatment		186	
Lac qui Parle-Yellow Bank WD	Protecting Del Clark Lake and Restoring Canby Creek	3,958	1,498	
Sherburne SWCD	Sherburne County Targeted Nitrate Reduction BMP Implementation			125
Becker SWCD	Top - Down: Buffalo Watershed Accelerated Improvement Project	32,712	24,322	
Middle Fork Crow River WD	Stormwater Implementation Importance for Progressive "City on the Pond"	2		
Goodhue SWCD	Lake City Stormwater Improvement Project	2	13	
Mississippi WMO	Northern Columbia Golf Course Regional BMPs	20	100	
St Louis, South SWCD	Cool it! Continued Efforts to Solve the Temperature Impairment	1	1	
Douglas SWCD	Upper Chippewa River Watershed Groundwater Protection		122	422
Pennington SWCD	Thief River Falls Streambank Stabilization Projects	385	367	

Capitol Region WD	Lauderdale Stormwater Improvements	2	9	
Pope SWCD	2016 Lake Emily Watershed BMP Targeted Implementation Project	1,121	960	
Blue Earth County SWCD	Crystal Lake Watershed Phosphorus Reduction Project	1,638	2,209	
Wilkin SWCD	Ottertail River TMDL Water Quality Improvement Projects to Reduce Turbidity Phase V	1,375	1,870	
Dodge SWCD	Dodge Saturated Buffer Project Implementation			**2,700**
South Washington WD	SWWD Lakes Targeted Retrofit	21		
Chisago SWCD	2016 St. Croix River Escarpment Taylors Falls Gully Stabilization	196	43	
Sauk River WD	Chain of Lakes Targeted Reduction	6	20	
Ramsey-Washington Metro WD	Spent Lime Treatment System for Wakefield Lake	9	45	
Comfort Lake-Forest Lake WD	Forest Lake Wetland Treatment Basin Implementation		56	
Valley Branch WD	Silver Lake Watershed Treatment Project		15	
Crow Wing County	Cost-Share Program to Seal Wells in Sensitive Groundwater Aquifers	Prevention: 80 wells sealed		

Red Lake SWCD	2016 Red Lake River Subwatershed (63025) Improvement Projects	690	590	
Kandiyohi SWCD	Kandi Creek Watershed	542	801	
Fillmore SWCD	Field to Stream Partnership Phase II Implementation	1,504	1,070	**15**
Itasca SWCD	2016 Itasca SWCD Stormwater Implementation grant	2	8	
Roseau River WD	CD 8 Subwatershed Sediment Reduction Project	275		
Vermillion River Watershed JPO	King Park Stormwater Reuse Project	1	4	
Dodge SWCD	Middle Fork Zumbro River Critical Source Area Restoration	49		
Washington Conservation District	Ag BMP Soluble P Reduction		50	
Bloomington, City of	2016 Anti-Icing Production Upgrades		300 (CHLORIDE)	
Pennington SWCD	CD-96-21-16 Gully Control and Buffer Implementation	2,428		
Dakota SWCD	Trout Brook Watershed Initiative	2000		
Becker SWCD	Upper Buffalo River Sediment Reduction Project	1386	1184	

Elm Creek Water Management Commission	Elm Creek WMC Internal Phosphorus Loading Control: Fish Lake, Hennepin County		310	
Pomme de Terre River Association Joint Powers Board	2017 - Pomme de Terre WRAPS Implementation Plan	15000	15011	
City of Forest Lake	Forest Lake High School Stormwater Reuse Project	2	20	
Stearns SWCD	2017 Sauk River Targeted Feedlot Water Quality Reduction Project		200	
Middle St. Croix River Water Management Organization	Perro Creek Urban Stormwater Quality Improvements	1	6	
Vermillion River Watershed Joint Powers Organization	2017 CWF South Branch Vermillion River Nitrate Treatment Project			13600
Wright SWCD	Crow River Gully Stabilization to Reduce Turbidity Phase Three	315	350	
Vermillion River Watershed Joint Powers Organization	2017 CWF South Creek Temperature Reduction Project	Temperature reduction of 11 degrees C		
Comfort Lake-Forest Lake WD	Bone Lake Partially Drained Wetland Restorations		50	
Anoka	Targeted Mississippi River Bank Stabilization with a Focus on Bioengineering	1250	1250	

Comfort Lake-Forest Lake WD	Shields Lake Stormwater Harvest and Irrigation Reuse System and Alum Treatment		250	
Benton SWCD	2017 - Big Elk - Mayhew Lakes Tier 1 and 2 BMP Implementation		926	
Anoka CD	Pump-controlled iron enhanced sand filter basin at the Golden Lake Stormwater Treatment Pond		40	
Okabena-Ocheda WD	Prairie View Golf Course Pond Modification		945	
Benton SWCD	2017 - Little Rock Lake TMDL Implementation Plan	1829	881	922
Vermillion River Watershed Joint Powers Organization	2017 CWF Phosphorus Treatment Enhancements at County Road 50		20	
Ramsey CD	Ramsey Conservation District Well Sealing Cost- Share Program	Seal 100 wells		
Pope SWCD	2017 Lake Emily Watershed BMP Targeted Implementation Project II	607	520	
Polk, West SWCD	Red Lake Watershed District Project 134, Polk County Ditch 63	31		

Vermillion River Watershed Joint Powers Organization	2017 CWF Lakeville Stormwater Hydrodynamic Separator Retrofit	4		
Bassett Creek WMC	BCWMC Plymouth Creek Restoration	45	52	
Browns Creek WD	McKusick Road Improvement Sediment Reduction Project	2		
Ramsey CD	Sucker Lake Channel Restoration Project	6	8	
Carlton SWCD	Red Clay Dam Phase III: Stream Restoration at Failed Red Clay Dam and Partner Prioritization	80		
Vermillion River Watershed Joint Powers Organization	2017 CWF Alimagnet Lake Stormwater Improvement Projects		62	
Chisago SWCD	Water Quality Improvements on the Mallery Jersey Dairy Farm	18	18	
Todd County	City of Long Prairie DWSMA Septic Cost Share		99	188
Scott SWCD	2017 Lower MN River Targeted Water Quality Practices Installation	7250	6670	
Minnehaha Creek WD	Six Mile Creek - East Auburn Stormwater Enhancement Project	2	39	
Lake SWCD	Landscape-scale forest stand improvements for water quality	300 acres of timber stand improvements		
Rice Creek WD	Oasis Pond Iron-Enhanced Sand Filter		34	

	Project			
Chisago SWCD	2017 Rush Lake/Goose Lake TMDL Implementation Program		20	
Wadena SWCD	Forestry Conservation Incentives to Protect the Crow Wing River	Complete 45 Forest Stewardship plans		

Appendix C: Clean Water Fund Stories

Building conservation careers

Clean Water Fund allocations provide SWCDs with a trained labor force and equip CCMI crews with skills from firefighting to disaster response

CLEAN WATER LAND & LEGACY AMENDMENT

SARTELL — Armed with loppers and sledge hammers, a five-member Conservation Corps Minnesota & Iowa crew drove sharpened lengths of willow into a thick, coconut-fiber net. When the willows take root, they'll stabilize a 600-foot-long stretch of riverbank at Mississippi River County Park.

When the Brainerd-based CCMI crew members finish their service term in mid-December, they'll have a better chance of finding jobs in natural resources.

This year in Minnesota, 555 CCMI crew members — including 326 AmeriCorps crew members ages 18 to 25 — worked with about 250 agencies on 399 conservation projects.

A Brainerd-based CCMI crew spent a week working on a bank stabilization project at Mississippi River County Park north of Sartell. **Left:** *The group is, clockwise from front: crew leader Austin Dixon, 24, of Catonsville, Maryland; Thomas Rusco, 22, of Lino Lakes; Megan Gillespie, 23, of Morris; Joshua Dilling, 22, of Killeen, Texas; and Alexis Rodriguez, 22, of Phoenix.*
Photo Credits: Ann Wessel, BWSR

Conservation Corps Minnesota & Iowa crew members, from left, Alexis Rodriguez, Austin Dixon, in the blue crew leader's hat, and Joshua Dilling head back to work Oct. 2 at Mississippi River County Park. The Stearns County Soil & Water Conservation District oversaw the work, which involved partners including the Stearns County Parks Department and a Minnesota Native Landscapes crew.

CCMI crews installed rain gardens in the Twin Cities, cleared downed trees on the Sand Hill River in Polk County, suppressed wildfires on 24,400 acres across Minnesota, and assisted with hurricane relief in Puerto Rico, North Carolina and South Carolina.

Crews gain training in wildland firefighting, prescribed burns, chain saw use, heavy equipment operation, pesticide application, first aid and plant identification — training that would cost potential employers time and money to provide. Those who work 1,700 hours receive a $1,355 monthly stipend and a $5,920 education award. Agency contacts often lead to jobs.

Agencies gain an efficient, economical labor source.

The Minnesota Board of Water and Soil Resources' annual appropriation of $500,000 in Clean Water Funds pays for CCMI crews' labor costs. Local government units submit applications for work projects, and often provide matching funds. This year, CCMI crews worked with 35 soil and water conservation districts on 41 projects.

"It's been a huge help for water quality in the state because many of the partners we work with — SWCDs and watershed districts — tell us this is work they need to get done but just don't have the staff or funds," said Brian Miller, St. Paul-based AmeriCorps program director.

"It leverages funds from multiple sources to meet the tipping point to have a project happen," Miller said. "The limited resources will go further."

Stearns County Soil & Water Conservation District staff oversaw the project at

Left: *Stearns County Parks Department maintenance worker Brent McMullen of St. Cloud dumps a load of dirt at Mississippi River County Park, where a streambank stabilization project will feature pollinator-friendly native plants.* **Middle:** *Tyler Jassmann of Minnesota Native Landscapes works on the bank stabilization project. The Minnesota Native Landscapes crew did most of the construction work.* **Right:** *Upstream-facing root wads help to cut the velocity of streambank-eroding water. A final seeding is planned for spring.*

Mississippi River County Park, where erosion had undercut the riverbank. The work is funded through a $218,000 Lessard-Sams Outdoor Heritage Fund grant. The CCMI crew helped with labor. Construction costs total about $137,000 to date; work will finish in the spring.

"When the park was developed, crews cleared trees and mowed to the river's edge, which may have caused destabilization. The area is also hit hard in the spring with ice flow and flooding," said Stearns County SWCD Lakeshed Specialist Greg Berg. "Before, we had kind of a sheer cliff. It wasn't real tall but it was straight up and down in a lot of places."

Stearns County Parks Director Ben Anderson estimated 10 to 15 feet of riverbank had eroded over the past decade. The undercutting created a potential hazard.

"The project is twofold in that it is stabilizing the bank and decreasing erosion, but also is going to provide a better opportunity for people to fish from shore and will provide better access," Anderson said.

The CCMI crew worked on the riverbank for a week in October.

Three weeks earlier, a private contractor had created a footing in the river channel and placed 15- to 20-foot logs on the riverbed. Workers positioned upstream-facing root wads on top of the logs to divert streambank-carving water and cut the velocity. They created toe wood benches — layering jute and coconut fiber-wrapped soil lifts with brush "mattresses" of willow, dogwood and alder that will take root. The final soil layer was seeded. A final planting of native grasses, wildflowers, trees and shrubs is slated for spring.

Megan Gillespie and Joshua Dilling make lunch during a break at Mississippi River County Park north of Sartell. The crew camped through September. Full-length terms run through mid-December..

Stearns County Soil & Water Conservation District Lakeshed Specialist Greg Berg checked in on the CCMI crew at Mississippi River County Park.

Berg described the intended outcome:

"It'll be more stable. You'll have a lot of native plants. We should have additional fish and wildlife that are inhabiting the area because of what we've done. You're going to see a lot more birds, butterflies, bees because there'll be pollinator habitat. The fish will like the toe wood. We also put in some rock veins ... that deflect that water flow."

Well-placed boulders will make shore fishing easier. Anglers might have better luck, too; the rock veins create scouring that makes for good fish habitat.

West Central Technical Service Area staff designed the project. Through Great River Greening, the Anoka Sand Plain Partnership coordinated the Outdoor Heritage Fund grant. A Minnesota Native Landscapes crew completed the bulk of the construction. The CCMI crew and Stearns County Parks employees finished the rest.

> **"We figure it's a good learning experience. We like working with them, and it's a cost savings for the project."**
>
> — Greg Berg, Stearns County Soil & Water Conservation District

The project extended 300 feet in both directions from the boat landing. In a separate project, Anderson said the parks department and Minnesota Department of Natural Resources planned to improve the boat landing next season.

The Minnesota Board of Water and Soil Resources' mission: Improve and protect Minnesota's water and soil resources by working in partnership with local organizations and private landowners. www.bwsr.state.mn.us

Meet the crew

The Brainerd-based Conservation Corps Minnesota & Iowa crew included members from four states. The average CCMI crew member is 22 or 23 years old and has a four-year degree. Since 2003, about 5,800 people have served on a CCMI crew. The 2018 roster included 73 crew leaders, about 60 workers in their second CCMI season, and about 100 workers from outside Minnesota or Iowa.

AUSTIN DIXON, 24, of Catonsville, Maryland, was finishing his second season as a CCMI crew leader. The Michigan State University grad earned a fisheries and wildlife degree in 2016, and aims to work in habitat restoration.

JOSHUA DILLING, 22, of Kileen, Texas, had studied outdoor education in high school. He plans to become an EMT, and then work in a wilderness therapy program.

MEGAN GILLESPIE, 23, of Morris, earned an environmental studies degree from Hamline University in May, and aims to work in the conservation or sustainability field.

ALEXIS RODRIGUEZ, 22, of Phoenix, was earning science credits at Estrella Mountain Community College, with plans to study forestry at Northern Arizona University.

THOMAS RUSCO, 22, of Lino Lakes, planned to resume studies at Hamline University, and eventually get a job in natural resources.

“I joined the Corps originally because I just graduated in May with a degree in environmental studies, so I wanted to get some hands-on work, just working with conservation and different projects ...to kind of get my foot in the door.”

— Megan Gillespie, Hamline University grad

SWCDs celebrate conservation firsts

First MN CREP recorded easement, first MN CREP wetland easement draw praise in Redwood, West Otter Tail counties

CLEAN WATER LAND & LEGACY AMENDMENT

An expanded filter strip establishes pollinator habitat amid Redwood County corn fields while buffering an agricultural ditch. A wetland easement fulfills a daughter's conservation goals while restoring a slough in West Otter Tail County.

Each represents a Minnesota Conservation Reserve Enhancement Program (MN CREP) first.

Ultimately, each will improve water quality.

The Minnesota Board of Water and Soil Resources (BWSR) marked progress toward MN CREP's goal — protecting 60,000 acres of environmentally sensitive land within 54 southern and west-central Minnesota counties — with celebrations and site visits hosted by the respective Soil and Water Conservation Districts.

Because both MN CREP easements enhance habitat, state funding includes Outdoor Heritage Fund dollars.

First easement

The first recorded MN CREP easement on the Robert and Cathy VanderLinden property near Redwood Falls buffers Judicial Ditch 32 (JD32), which empties into Ramsey Creek and, eventually, the Minnesota River.

> **"It's the private landowner who can make the most impact — positively or negatively — on habitat, on pollinators, on wildlife and on clean water."**
>
> – Mark Johnson, executive director, Lessard-Sams Outdoor Heritage Council

With the state's second recorded MN CREP easement — another filter strip on adjoining property owned by Robert's sisters, Janet and Judy, and Judy's husband, Warren Liepitz — the VanderLindens together protected both sides of a mile-long stretch of JD 32.

"That wider buffer is able to do a couple of things. The first thing

Left: *Visitors listened as Kristy Zajac (not pictured), Redwood Soil & Water Conservation District conservation specialist, talked about the pollinator seed mix used at the site of Minnesota's first MN CREP recorded easement during a June 18 event in Redwood County.* **Right:** *After a ceremony at Dalton Community Center, visitors saw the state's first recorded MN CREP easement on Loreli and Rob Westby's West Otter Tail County property. A 32-species native grass and wildflower mix was seeded this spring; wetland restoration plans are in the works.*
Photo Credits: Ann Wessel, BWSR

ENVIRONMENT AND NATURAL RESOURCES TRUST FUND

Redwood County: *The first MN CREP recorded easement involves a buffer and filter strips bordering a public ditch in Redwood County. While the state buffer law requires a 16.5-foot-wide buffer here, the landowners chose to install 60- and 90-foot-wide buffers that incorporate pollinator habitat and protect 1 mile of land on either side of the ditch. A mix of native grasses and forbs were planted in fall 2017.*

it's able to do is deal with both sediment and soluble potential pollutants," said Tim Koehler, BWSR's senior programs advisor. "With the wider buffers, they also incorporated pollinator plants within the seed mixes. So in addition to helping water quality, it's helping habitat."

The VanderLindens were required only to buffer JD32 with a 16.5-foot-wide strip, but opted for 60- to 90-foot filter strips. The field slope determined the width.

"I think that we can incorporate conservation on every farm as part of their farming practice. It can be beneficial both environmentally and financially, (providing) some security for the farmers who have maybe marginal lands," said Kristy Zajac, Redwood SWCD conservation specialist.

Wetland easement

The first recorded MN CREP wetland easement on the Loreli and Rob Westby property near Fergus Falls put the balance of their 620 acres into permanent easements.

By donating about 20 acres of the 86-acre MN CREP enrollment, the Westbys protected everything not already covered by Minnesota Land Trust easements. Rarely do easements cover an entire farm.

West Otter Tail County: *Loreli and Rob Westby recorded the first MN CREP wetland easement in the state to protect the balance of their 620 acres.*

"My dad's wish before he passed away was that the property be protected from development. All 620 acres of property is now permanently protected … and the CRP will stay in grasses, flowers and trees — never to be tilled up again," Loreli said.

The low area had been ditched, and then planted to wheat, corn or soybeans. Some years it was too wet for the renters to plant. Some years it was too wet to harvest. Now the wetland will be restored. On a hillside above it, 32 species of native wildflowers and grasses are beginning to grow. A 4.5-acre tree and shrub planting will augment wildlife habitat.

"We don't have any children. It was important for us to know that when we're gone, that it'll be the way it is now forever, and someone else can enjoy it," Rob said.

MN CREP

Here's how MN CREP works:

Property owners voluntarily enroll land in the federally funded Conservation Reserve Program, administered by the U.S. Department of Agriculture's Farm Service Agency, for 14 or 15 years. The land is simultaneously enrolled in a perpetual Reinvest in Minnesota (RIM) conservation easement administered by BWSR. The arrangement compensates the landowner while providing public water quality and habitat improvements.

The $525 million MN CREP program includes $350 million from the USDA and $175 million from the state. It focuses on filter strips, wetland restorations and wellhead protection.

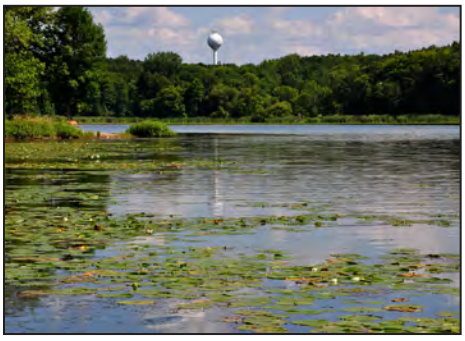
The VanderLindens and Westbys are among more than 240 Minnesota landowners who have applied for MN CREP since enrollment opened in May 2017. During this first year, nearly 170 have been accepted for funds totaling nearly $56.4 million and affecting about 6,250 acres.

"We can buy lands for (Wildlife Management Areas) and (Scientific and Natural Areas) but we can't come anywhere near the impact the private citizens can make on their own land," said Mark Johnson, Lessard-Sams Outdoor Heritage Council executive director. "It's the private landowner who can make the most impact — positively or negatively — on habitat, on pollinators, on wildlife and on clean water."

To enroll, landowners work directly with their SWCD, Farm Service Agency or Natural Resources Conservation Service office.

‘Our water is our diamond’

As the cumulative effect of urban and rural conservation practices improves water quality, two lakes in the Chisago Lakes Chain of Lakes move toward removal from the Impaired Waters List. The Chisago SWCD’s work with landowners is backed by lake improvement district matches, Clean Water Fund grants and NRCS funds.



Top: *Barb Peichel, a Minnesota Board of Water and Soil Resources clean water specialist, looks at South Center Lake during a July 30 visit highlighting Chisago Soil & Water Conservation District projects accomplished through Clean Water Fund grants. Project partners have included the Natural Resources Conservation Service, the Chisago Lakes Lake Improvement District and the St. Croix River Association.* **Above, from left:** *White water lilies bloom in South Center Lake off the shore of Loren’s Park in Center City. A boater crosses South Center Lake, part of the 20-lake chain. Where it dead-ends at South Lindstrom Lake in Lindstrom, Linden Street was made narrower.* **Photo Credits:** Ann Wessel, BWSR


Casey Thiel


Jill Behnke


Craig Mell


John Olinger

CENTER CITY — On a hot summer weekday, a boisterous group of swimmers splashed near a private dock as the occasional boater crossed South Center Lake. On the opposite shore, a couple of anglers fished from Loren's Park.

There's a good chance none of them knew South Center Lake is on course to come off the Minnesota Pollution Control Agency's impaired waters list as soon as 2022.

What residents and visitors do know is that water quality has improved.

From 2013 through 2018, phosphorus levels in both South Center and North Center lakes consistently surpassed water-quality standards for aquatic recreation. (Phosphorus feeds the algae that can turn lakes green.) Average Secchi disk readings, which measure water clarity, hovered at the threshold. Average chlorophyll-a levels, which indicate algal growth, remained high.

> **"Whether they live there or it's a recreational cabin or getaway, they care about the lake the same. … They're well-used and well-loved."**
>
> — Casey Thiel, Chisago SWCD

"Things have definitely gotten better, and they're getting close to the point where we can delist specifically these two lakes," said Lee Engel, MPCA water quality monitoring supervisor. "You can see that concentrations are trending in the right direction."

The 2018 results arrived in late January.

For the first time since the listing, South Center Lake came in under the threshold for chlorophyll-a. The 2018 average reading was 8.6 micrograms per liter. The threshold is 14 micrograms per liter. South Center Lake's 2018 average readings for all three indicators were the best they've been since being listed.

Nine lakes in the 20-lake Chisago Lakes Chain of Lakes were listed as impaired in 2008.

Ten years and more than $2.2 million in water-quality improvement projects later, the Chisago Soil & Water Conservation District's work with landowners and cities appears to be paying off.

"People are seeing the lakes improve. I hear that a lot from people," said Casey Thiel, Chisago SWCD water resource specialist. "The fishing's better. There's less invasive plants. There's more water. Water levels are a big issue. And then, 'Hey, we haven't seen that algae bloom that we usually get,' or 'We only saw one of those.' People are noticing that."

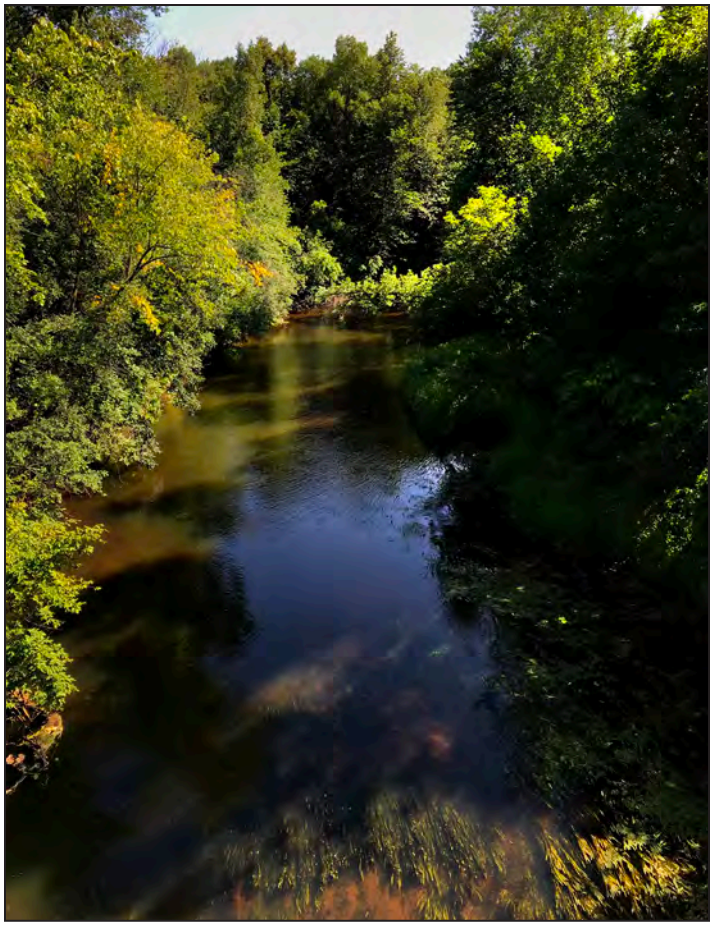
In Lindstrom, new or rebuilt city streets are made narrower when possible — a strategy that reduces stormwater runoff and cuts city maintenance costs. Linden Street was made narrower where it dead-ends at South Lindstrom Lake. It's flanked by a stormwater treatment system that includes rain gardens.

SWCD staff credits the cumulative effect of water-quality projects large and small.

Implemented over the past decade in three cities and four townships, those conservation practices include 88 rain gardens, 21 water and sediment control basins, 13 lined waterways, 10 storm drain inlet protections, nine vegetated swales, eight shoreline plantings, eight grassed waterways, seven gully stabilizations, four iron-enhanced sand filters, three stormwater pond retrofits, two diversions, a livestock access control, one wetland restoration, enhanced city street sweeping and a long-term hay planting.

"What it shows is that the actions taken have definitely had an effect on water quality. The reality is that these things don't just change with a flip of a switch. They take some time to switch back to meeting standards," Engel said.

About $1.7 million in Clean Water Funds from the Minnesota Board of Water and Soil Resources — including a Targeted Watershed Demonstration grant that wraps up in early 2020 — has helped to pay for the projects. To date, the SWCD has leveraged $380,000 from the Chisago Lakes Lake Improvement District, $116,700 from the Natural Resources Conservation Service's Mississippi River Basin Initiative, and $50,000 from the St. Croix River Association.



The Sunrise River benefits from water-quality improvements in the Chisago Lakes Chain of Lakes watershed. Water from the 20-lake chain drains into the Sunrise River, which eventually reaches the St. Croix River and then the Mississippi River.

Chisago Lakes Chain of Lakes

IMPAIRED: The Minnesota Pollution Control Agency added the following lakes within the 20-lake Chisago Lakes Chain of Lakes to the impaired waters list in 2008: Little, Linn, Ogren, Pioneer, North Center, South Center, Wallmark, School and Emily

WATERSHED: 36,800 acres

DOWNSTREAM WATERS: Sunrise River, St. Croix River, Mississippi River

"The nice thing with this MRBI, we know if we get a landowner who's interested who meets our criteria as far as assessment work and they apply they will get the federal funding, which has been huge for us to be able to provide the dollars needed to the farmers to get the projects done," said Craig Mell, Chisago SWCD administrator.

"The other really nice thing was the lake improvement district gives us the match money," Mell said. "Landowners can come to us and then we can allocate the funds."

Conservation projects gained momentum as SWCD and NRCS staff earned landowners' trust and as word spread.

"People don't say, 'You want me to do a *what*?' They know what we're talking about when we come to them. Whether they're interested or not is a different story. But they don't look at us as funny anymore," Thiel said.

Outside of the grant-funded projects, Thiel said education and an evolution in accepted practices are having a cumulative effect on improved water quality, too.

"People learning what should and shouldn't be done I think is huge. And getting people to buy into the project," Thiel said. Once they learn the difference it makes, Thiel said residents start to sweep up the grass in the street, refrain from using phosphorus fertilizer and choose more natural shoreline alternatives.

BWSR awarded the Chisago SWCD two more Clean Water Fund grants related to Chisago Lakes Chain of Lakes work in December. A $250,000 grant will fund additional best management practices in the chain. A $100,000 grant will fund a gully stabilization affecting Green Lake in Chisago City.

The BMP work started at the top of the watershed, and is moving east to west. The next projects will be in the middle of the 36,800-acre watershed — targeting land that drains into North Center, South Center, North Lindstrom, South Lindstrom and Chisago lakes.

Work accomplished through the 2015 targeted watershed grant was calculated to reduce at least 690 pounds of total phosphorus annually — 11 percent of the Total Maximum Daily Load.

"One of the things that is really unique about the watershed, it's a very large watershed. It encompasses three cities, parts of four townships, and we have very differing cities," Thiel said.

Erosion control structures at Loren's Park in Center City reduce the amount of sediment that washes into South Center Lake. The structures are among conservation practices put in place over the past 10 years that are helping to improve water quality.

Thiel described the lakes' wide-ranging appeal:

"The whole chain of lakes is a huge recreation area, so we have people coming to use the lakes. Because it's so large and so much surface area, we also have really fantastic fisheries for an almost-metro lake. So we have a lot of people coming to sportfish, for tournament fishing and recreation in general. We have a wide mixture of people who live on the lakes as well as people who have them as their cabins."

Fishing is the backbone of Chisago City-based Frankie's Live Bait & Marine, which bills itself as the No. 1 Ranger boat dealer in the world. Frankie Dusenka's grandfather started the business. He got involved at age 12, and is on the lakes every day.

"Our water is our diamond," said Frankie Dusenka, 62, on a late December afternoon as he was heading out to check on the minnows. "That's the catalyst that makes everything thrive in this area. … To keep the diamond shining, you've got to take care of it. It all starts with water quality."

Dusenka has hosted carp tournaments meant to thin lakes' populations of the bottom-churning invasive species. He was a little surprised when the lakes were listed as impaired, he said, and wondered how much of a role temperature and water levels played in those monitoring results.

"I believe it's the most important thing here next to the schools — lakes being first, schools being second," Dusenka said. "Why would we want to live here? It's nice having a lake in our backyard. It's nice having a lake you can see every day."

In Lindstrom, a panorama of South Lindstrom Lake unfolds at the end of Linden Street.

The street is intentionally narrower to reduce runoff and cut city maintenance costs. In July, bright flowers framed the stormwater treatment system — rain gardens, a pretreatment area, a rock spillway and iron-enhanced sand filters.

The Linden Street project was the first Chisago Lakes Chain of Lakes project funded with the SWCD's share of $1 million in Clean Water Funds available through a direct appropriation to the Anoka Conservation District.

Most of Lindstrom's 3.5 square miles lie within the shoreland district. It's a 3-mile-long peninsula; most properties are within 1,000 feet of a lake. Twenty percent are lakeshore properties. One of the city's stated values is to protect

Path to delisting

MEETING STANDARDS: Minnesota has a two-part water-quality standard for eutrophication, which describes the effect of nutrients. Phosphorus levels must be at or below a certain level. Additionally, either Secchi disk readings, which measure clarity, or chlorophyll-a readings must meet the standard.

DATA COLLECTION: The Minnesota Pollution Control Agency needs more data before it can recommend removing South Center and North Center lakes from the Impaired Waters List, a list of U.S. lakes and rivers that do not meet water-quality standards. Both lakes have met the standard for phosphorus concentration. Secchi disk readings have been at the standard. Neither lake has consistently met the standard for chlorophyll-a. MPCA staff believes the variables will continue to improve over the next few years, potentially leading to delisting.

The continued review coincides with Lower St. Croix River watershed sampling in 2019 and 2020, part of the MPCA's intensive, once-every-10-years monitoring of the state's major watersheds. The Chisago Lakes Chain of Lakes is part of the Lower St. Croix River watershed.

The MPCA will use that data collected to assess whether the lakes meet the standard. Minnesota submits its list of recommended delistings and additions to the U.S. Environmental Protection Agency's Impaired Waters List every two years. The soonest South Center and North Center lakes could be delisted is 2022.

ACCEPTABLE LEVELS: For 889-acre South Center Lake to meet water-quality standards, total phosphorus levels must be below 40 micrograms per liter and Secchi disk readings must be at least 1.4 meters. For 754-acre North Center Lake, phosphorus levels must be below 60 micrograms per liter, Secchi disk readings at least 1 meter. The standards differ because South Center Lake is classified as a deep lake, North Center Lake a shallow lake.

the environment and conserve natural resources.

"That's our market value, that's our quality of life," said Lindstrom City Administrator John Olinger. "That's what we've worked on is to improve our quality of life."

The city's comprehensive plan identified water quality as one of the most important issues. When the lakes were put on the impaired waters list, Olinger said the council made cleaning up the lakes a priority. The city put a minimum impact design ordinance in place, brought septic systems off the lake and onto the city sewer system, and focused on filtering the water before it entered the lakes.

"These lakes are not river-fed and they're not spring-fed, so they don't get flushed. This is like a tub. Whatever we put into it stays there," Olinger said. "(The lakes are) very susceptible to rainfall events and the cyclical nature of dry and wet periods."

Chisago Lakes LID board member Jill Behnke, 60, was born in the Chisago Lakes Chain of Lakes area, where she's lived for all but 15 years. She grew up in Chisago City — "We were on the lake probably from sunup to sundown. If we weren't in a rowboat, we were in the lake swimming." — and now lives on South Center Lake in Center City in the house her grandparents built in 1956.

An angler fished from shore at Loren's Park in Center City as a pontoon boat passed by on South Center Lake. People are starting to notice water-quality improvements in South Center and North Center lakes, where the cumulative effect of targeted conservation work is becoming apparent.

"I've seen the lakes where this bay that goes into the bridge to Highway 8 — I could walk across in 1964. It was that dry. I have a picture of myself walking across," Behnke said as she looked over the water from Loren's Park. "That bay was all dried up. I've seen that happen twice here. I've also seen the lakes be over ordinary high water. So I've seen them flooded. As a kid growing up, I could canoe from Chisago City all the way over here to this property in Center City … without having to get out of the canoe and portage anyplace."

Behnke said the LID originally formed to operate the weir system that was built in response to flooding and designed to keep lake levels at the ordinary high-water mark.

"As those things got taken care of, now we're looking at the quality of the water and trying to improve the quality of the water. By working with soil and water conservation, we've been able to implement all kinds of strategic things," Behnke said. Rain gardens and other stormwater treatments accompanied road improvements.

YouTube video

See the resource, and hear from Chisago Soil & Water Conservation District staff: http://bit.ly/ChisagoLakes

In recent years, Behnke said she hasn't seen as much algae.

"Everything we put in this lake makes a difference because it all ends up in the Sunrise River, and from the Sunrise River it ends up in the St. Croix River. So for us to be able to start seeing improvement is a great accomplishment, and it needs to be continued," Behnke said.

Behnke considered how water quality affects the communities within the watershed:

"More people are saying, 'What a lovely place to live, raise your kids, be able to get out on the lake and enjoy a good time.' Water quality is a big thing. It not only affects the lakes but it also affects all the wells and everything else within your cities. Because any chemicals that are going into the ground are going into the water that's being used by all of us."

About 75 percent of the projects completed to date are within the urban areas. Initial assessments focused on urban stormwater. A 2014 Clean Water Fund grant plus the NRCS funding allowed the SWCD to expand its reach to agricultural producers within the watershed.

Meanwhile, an extension of the Mississippi River Basin Initiative funds will allow more conservation work on cropland.

"In general, we would like to see the successes in the upper reaches of the watershed just continue throughout the entire watershed. In the middle of the chain there are a couple of really high-quality water bodies. We would like to use our funding and our resources to protect those to keep them really high quality, and then ultimately protect the downstream waters," Thiel said.

BWSR

The Minnesota Board of Water and Soil Resources' mission is to improve and protect Minnesota's water and soil resources by working in partnership with local organizations and private landowners. Website: www.bwsr.state.mn.us.

Mississippi River Basin Initiative feeds Chisago Chain of Lakes improvements

Neighbors curious about the work in Byron Dahlheimer's field across the road from North Chisago Lake liked his explanation.

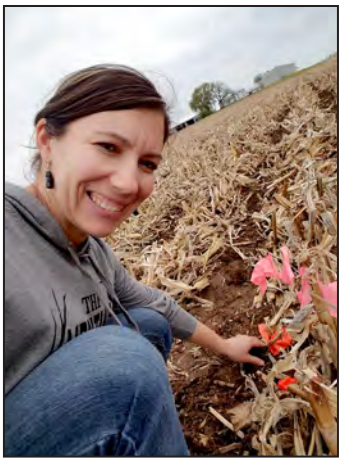
"I'd just tell them it's erosion control to help the lake water," Dahlheimer said.

The two water and sediment control basins in his Chisago Lakes Township fields are among 15 conservation practices that 12 Chisago County producers have installed since 2015 with nearly $116,700 in targeted Mississippi River Basin Initiative funding. The balance of Green Lake watershed's $460,000 allocation remains available.

Dahlheimer's farm near North Chisago Lake is part of the bigger Green Lake watershed. One of nine Minnesota watersheds funded through the MRBI, it includes Chisago County lakes in parts of six townships and four cities.

An initiative of the USDA's Natural Resources Conservation Service, MRBI centers on practices that improve water quality, restore wetlands, enhance wildlife habitat and sustain agricultural profitability in the Mississippi River basin. Water quality concerns, mostly related to nutrient-loading, prompted NRCS to make the Mississippi River a priority.

Green Lake watershed work was extended for 2019, NRCS District Conservationist Debra Hermel learned in late September. Conservation partners had requested $120,000 in Farm Bill dollars.



Top: *Byron and Judy Dahlheimer farm in Chisago County near North Center Lake.* **Left:** *Debra Hermel is the Natural Resources Conservation Service district conservationist based in North Branch.* **Courtesy Photos**

> **"In the Green Lake watershed, there's a lot of recreational lakes. Everybody wants to enjoy a clean lake. … Any of the farm fields that have direct drainage to the lake — we want to work with those producers to keep the soil on the field and minimize the runoff impacts."**
>
> — Debra Hermel, NRCS

Sign-up is continuous and voluntary. NRCS helps landowners correct resource concerns though both technical and financial assistance. NRCS sets a per-practice payment rate based on local costs; funds come from the Farm Bill's Environmental Quality Incentives Program. With contributions from Chisago Soil & Water Conservation District sources and matching dollars, the cost often is 100 percent covered.

The first EQIP application cut-off deadline was Jan. 18. The second is April 19. The funds are earmarked for the Green Lake watershed. Qualified applicants are selected based on a ranking system.

Cumulatively, MRBI practices installed to date in the Green Lake watershed treat about 650 acres. On average, each practice has reduced phosphorus by 30 pounds per acre per year and sediment by 35 tons per acre per year.

Phosphorus feeds the algae that can turn lakes green.

"I've always had a real concern about water quality, trying to protect what goes into our lakes and streams," Dahlheimer said. "Erosion control is going to help keep the lake water cleaner and the Mississippi cleaner."

About 20 years ago, Dahlheimer, 58, moved from the Dayton farm where he grew up on the Mississippi River to 200 acres in Chisago Lakes Township, where he grows corn and beans with his brother and two sons. He'd like to do more farming when he retires from his job as a lineman for a power company.

Dahlheimer described the land as gently rolling. The worst erosion he'd seen was a few years ago when a 6- or 7-inch rain cut a knee-deep gully into the just-worked field. When NRCS staff

approached him, he wasn't sure if he wanted to get involved with a government program. They didn't pressure him. He thought about it.

"I had seen some other projects that they had done around the area, even closer to the lake. I was really impressed with what they were doing," Dahlheimer said.

Chisago SWCD Administrator Craig Mell said a lot of conversations with producers go like this:

" 'Well, I talked to so-and-so, and they did a project last year. It turned out pretty well, so I guess I'll come talk to you guys, too.' " What we've really found out with the ag sector is it takes multiple years of going out and meeting with people."

NRCS and SWCD staff showed Dahlheimer one erosion-prone area that appeared in aerial photos; he showed them a gully in the second field. Now after a hard rain, a berm holds the water on the field for a couple of days while sediment settles out in the basin. The water is then slowly released through a pipe.

"The gully won't turn into a big ditch. It controlled that. I'm not losing topsoil, and my topsoil isn't going into the lake. It's erosion control," Dahlheimer said.

Work finished in May 2018, just in time for spring planting. One of the structures is a farm-over water and sediment control basin. The other, a grassed water and sediment control basin, tapers in width from 27 feet to 16 feet.

"We can all improve. We can all do a little bit to make things a little better," Dahlheimer said.

The 36,350-acre Green Lake watershed lies within the 1.2 million-square-mile Mississippi River watershed.

"I think every little bit you do helps. This water — it's a big deal. There's a lot of things that have gone on over the years. We can make things better," Dahlheimer said.

No one, Dahlheimer said, wants polluted water or gullies too deep to cross with a tractor.

"Our values of our property would go down if we ruined the lakes and ruined the land. If you don't take care of it, what are you going to have?" Dahlheimer said.

Landowners work with NRCS and its partners — Chisago SWCD, in this case — to identify conservation opportunities and implement practices. The focus, Hermel said, is on helping farmers get the best production from their land while addressing perennial problems such as erosion or runoff.

"Everybody wants clean water and to have the soil stay on their own farm," Hermel said.

Collaboration & qualifying projects

Staff members from the Chisago Soil & Water Conservation District and the Natural Resources Conservation Service collaborate on Mississippi River Basin Initiative work.

"If we wear the NRCS or the SWCD hat, the producer doesn't know the difference. The partnership that we have in this county is really good," said Debra Hermel, NRCS district conservationist.

Chisago SWCD staff already had finished aerial surveys and modeling, identified resource concerns and targeted conservation priorities for the Green Lake watershed through its Chisago Lakes Chain of Lakes work.

Now, NRCS staff completes initial site visits and other preliminary work. SWCD staff completes much of the design and engineering.

Qualifying practices include water and sediment control basins, grassed waterways, no-till or cover crops — "any of those types of projects that improve water quality and sediment reduction," Hermel said. Here, the main resource concerns are surface runoff and sediment- or nutrient-loading, plus sheet and rill erosion.

The landowner may agree to upland treatments — such as tillage practices — that support the project. (For example, NRCS won't fix a gully if the farmer is tilling the upstream field with a moldboard plow.

> **"We can all improve. We can all do a little bit to make things a little better."**
>
> — Byron Dahlheimer, Chisago County landowner

USDA is an equal opportunity provider, employer and lender. Natural Resources Conservation Service website: www.nrcs.usda.gov.

Critical corridor

Mississippi River headwaters habitat, recreational resource gain protection

Dick and Barb Schuh, below, protected a stretch of Mississippi River in Crow Wing County through a Reinvest in Minnesota easement administered by the Minnesota Board of Water and Soil Resources. It's part of the Mississippi Headwaters Habitat Corridor Project, coordinated by the Mississippi Headwaters Board. MHHCP has protected 13 miles of shoreline. Counties within the 400-mile-long corridor are Aitkin, Beltrami, Cass, Clearwater, Crow Wing, Hubbard, Itasca and Morrison. The Minnesota Department of Natural Resources and The Nature Conservancy provided support.

Twin Cities' drinking water supply benefits, too, from $8.5 million in Outdoor Heritage Fund projects involving landowners' work with the Mississippi Headwaters Board, 8 SWCDs, BWSR, Trust for Public Land

CLEAN WATER LAND & LEGACY AMENDMENT

CROW WING COUNTY — Bobcats turn up on the trail camera. Timber wolves roam here. Deer abound.

Along his secluded stretch of riverfront, Dick Schuh has encountered bears, caught five different species in three hours of fishing off the dock, and watched a massive insect hatch rise like fog from the Mississippi River.

"This is just pristine, and we'd like to keep it that way," Dick said as he worked on his dock, where the view is all water and trees. The nearest houses are a mile in one direction, a half-mile in the other.

By protecting more than a half-mile of shoreline and 166 acres from development with a Reinvest in Minnesota easement, Dick and Barb Schuh have preserved the habitat that inspired them to buy the property 11 years ago. By linking public lands, their easement maintains a high-quality fish and wildlife corridor.

Photo Credits: Ann Wessel, BWSR

The Crow Wing County property is exactly the sort of critical habitat the Mississippi Headwaters Habitat Corridor Project aims to protect through RIM easements and fee-title acquisitions. The project draws from three Outdoor Heritage Fund awards totaling more than $8.5 million.

The eight-county, 400-mile headwaters reach runs from Itasca State Park through Morrison County.

The unbroken tracts vital to fish, mammals, migratory waterfowl and nesting birds also attract anglers, hunters, and people simply seeking seclusion with a water view.

In Crow Wing County, a two-hour drive from the Twin Cities, shoreland properties accounted for 53 percent of the total value of taxes payable in 2018. The county ranked No. 1 in Minnesota for cabin ownership in 2018, as defined by the Minnesota Department of Revenue as non-commercial, seasonal recreational residential parcels valued at $10,000 or more. Cass County, which is more than twice the size, ranked No. 2.

Tim Terrill, the Mississippi Headwaters Board's executive director, has seen the progression: Property owners convert seasonal cabins to year-round residences. Houses pop up — first around the larger lakes, and then the smaller lakes, and then the rivers.

Development breaks up the contiguous habitat some animals require to hunt, forage, spawn, mate or nest.

"Habitat will fragment way before water quality will degrade. They'll both happen eventually. But the wildlife will (be affected first)

Mississippi Headwaters Habitat Corridor Project Coordinator Paula West, center, shows a map to (from left) Tim Terrill, executive director of the Mississippi Headwaters Board; landowners Barb and Dick Schuh; and Dan Steward of the Minnesota Board of Water and Soil Resources.

> **"When you live in this place, you want to see trees. You want to keep seeing trees."**
>
> — Tim Terrill, executive director, Mississippi Headwaters Board

because it wants to follow the river," said Dan Steward, Minnesota Board of Water and Soil Resources' forestry management coordinator.

BWSR administers the RIM easements, with ownership remaining in private hands and on the tax rolls. The Trust for Public Land handles fee-title acquisitions, with final ownership by the local county or the Minnesota Department of Natural Resources. The Mississippi Headwaters Board serves as the project coordinator. Staff from the eight county soil and water conservation districts make initial landowner contacts, and help process RIM easements.

Participation is voluntary; landowners choose which option to pursue.

So far, landowners working through the MHHCP have protected 13 miles of shoreline and 1,802 acres through 10 easements and three fee-title acquisitions. Nearly 65 percent of the 400-mile-long, 500-foot-wide corridor is protected — mostly through publicly owned local, state or federal land.

MHHCP efforts started with GIS mapping, which showed parcels with the biggest potential to protect habitat.

GIS mapping initially identified 6,842 privately owned parcels of 20 acres or more — the minimum acreage required — within the eight-county area. Parcels with high-value habitat surrounded by public or protected land scored highest in the ranking system. The screening process left 1,191 priority parcels involving 315 landowners.

Eligible lands may border the Mississippi River, its major tributaries or reservoirs along the 400-mile stretch.

"The primary purpose of the program — the reason it's

At a Glance

MISSISSIPPI HEADWATERS BOARD: The Mississippi Headwaters Board was started in 1980 to establish consistent zoning ordinances and provide local control along the 400-mile stretch. Its mission has evolved as it emphasizes voluntary conservation. MHB has become a state model for working with local officials on fee-title acquisitions. Its approach: Contact the local government first, make sure plans mesh with long-term planning goals, and keep officials informed throughout the process.

MHB'S LARGER ROLE: "The Upper Mississippi is the only basin entirely within Minnesota. All the other ones are shared with other states. Everything that happens to the Mississippi we did to it," Steward said of the MHB's national role. "A more regional responsibility is the Twin Cities drinking water supply. I think those trump everything. But it's also outstanding habitat, and we're trying to hold that together."

RANKING ELIGIBLE LAND: Maps identify high-quality habitat, indicating if a property is riparian or adjacent to public or otherwise protected land. More weight is given if wild rice habitat, shallow lakes, or endangered species or species of greatest concern are present. The ranking system allows planners to complete a cost analysis.

Through permanent land protection via RIM easements and fee-title acquisitions, the Mississippi Headwaters Habitat Corridor Project aims to protect critical fish and wildlife habitat along the first 400 miles of the Mississippi River. The headwaters region runs from Itasca State Park through Morrison County.

funded by (the Lessard-Sams Outdoor Heritage Council) — is to protect critical fish and wildlife habitat along the first 400 miles of the river. Whenever you protect habitat, you're going to get clean-water benefits and vice versa," said Paula West, Mississippi Headwaters Habitat Corridor Project coordinator.

Migratory waterfowl and neotropical birds rely on the Mississippi River flyway. Downstream cities rely on the Mississippi River as a drinking water source.

"When we protect some habitat along the river, which is the primary goal of the funding, we also are helping protect Minneapolis-St. Paul's source water. That is by far the state's largest source water," Steward said.

Minneapolis' Water Treatment Distribution Services pumps 21 billion gallons of water from the Mississippi River a year, according to a 2017 public works department report. About 62 percent of it provides drinking water to residents of Minneapolis and surrounding suburbs.

The Mississippi Headwaters Board follows a DNR water-quality guideline that generally applies to lakes: 75 percent of a lake's watershed should be protected to maintain its quality.

Recent Acquisitions

Acquisitions include a 358-acre addition to the Crow Wing State Forest with 8,210 feet of Mississippi River shoreline in Crow Wing County; creation of 292-acre Indian Jack Lake Wildlife Management Area with 12,300 feet of lakeshore and 75 feet of Mississippi River frontage, adjacent to public land in Crow Wing County; and a 158-acre Savanna State Forest addition with 6,600 feet of Mississippi riverfront in Aitkin County.

One of the MHB's greatest successes to date was in a 3,420-acre subwatershed northwest of Crosby, where the amount of protected land has increased from 35 percent to 73 percent over the past few years — primarily through fee-title acquisitions, RIM easements and Sustainable Forest Incentive Act enrollments.

"Moving the needle — what that does is it helps from a water-quality perspective, knowing where we should work and where we shouldn't," Terrill said.

Recent acquisitions included two in Crow Wing County and one in Aitkin County.

Sheila Boldt works directly with landowners in her Crow Wing SWCD outreach role. She's noticed the program tends to appeal to landowners for one of two reasons.

"They might have children and they actually don't want to see part of the property ever developed. So they want it preserved. They don't want their kids to think about developing," Boldt said. "Another side is the ones that genuinely are already using the property for just hiking and hunting, and they've got forest management already."

Steward elaborated: "They're not heading towards development. There are people that are. This doesn't appeal to them. We appeal to the ones that are not heading there, and really own it for conservation — it might be hunting, it might be just a getaway."

Plus, West noted, the money can be a good incentive.

The easement option made sense for the Schuhs, who were seeking hunting land when friends of a friend emailed the riverfront listing. It was more land than they'd planned to buy. But they were captivated by the quiet and the scenery. Riverfront property was less expensive than lakefront property. A nephew purchased part of the land.

Crow Wing SWCD staff approached the Schuhs about the easement.

"We were not planning on building. So if they're going to pay us not to build — if they want to preserve the area, that's very much fine with us because we're never looking to expand or sell off or anything. That was not our goal," Dick said.

"We love nature and we think this is the way the Mississippi should be kept — as natural as possible," Barb said.

BWSR

The Minnesota Board of Water and Soil Resources' mission is to improve and protect Minnesota's water and soil resources, working in partnership with local organizations and private landowners.
www.bwsr.state.mn.us.

An asphalt reclaimer worked wood chips into topsoil in February just off Dakota County Road 78. Frozen ground and rocks made it necessary to replace the implement's teeth after every pass. Photo Credit: Vermillion River Watershed JPO

Experimental nitrate treatment holds promise for water quality

Wood chip-enhanced wetland tied to Dakota County highway work

CLEAN WATER LAND & LEGACY AMENDMENT

CASTLE ROCK TOWNSHIP — An experimental wood chip-enhanced wetland nitrate treatment project on the edge of a Dakota County farm field could cut in half the amount of the pollutant entering a Vermillion River tributary.

Nitrate contributes to water-quality problems in local rivers and in Hastings-area drinking water supplies.

Contractors built the 3-acre wetland this winter in conjunction with the Dakota County Highway 78 reconstruction south of Farmington.

The initial $515,250 budget included $412,200 in Clean Water Funds from the Minnesota Board of Water and Soil Resources, plus matching funds

Travis Thiel, senior environmental specialist with the Vermillion River Watershed Joint Powers Organization, explained how a constructed wetland and wood-chip bioreactor would treat nitrates on a tributary upstream from a monitoring station on the South Branch Vermillion River in Castle Rock Township. A $412,200 Clean Water Fund grant from the Minnesota Board of Water and Soil Resources provides the main funding source. **Photo Credit:** BWSR

from the Vermillion River Watershed Joint Powers Organization and Dakota County. Pairing the wetland work with the highway project is expected to significantly reduce the final cost.

The wetland will treat runoff from 2.1 square miles of agricultural land, and holds promise for more widespread application. It's upstream from a monitoring station on the South Branch Vermillion River, which shows the highest nitrate loads in the 335-square-mile Vermillion River Watershed.

Travis Thiel, senior watershed specialist with the VRWJPO, said samples also were collected at the project site, which is upstream on an unnamed tributary of the South Branch.

"The sample concentrations we've collected (at this location) over the last few years have shown at least twice the concentration of the drinking water standard, so we know that nitrate is elevated (from) those lands," Thiel said.

Top: *The experimental nitrate treatment involved about 1,000 cubic yards of wood chips. Mixed with topsoil, they will line a 2- to 3-foot-deep constructed wetland. The wood chips will grow a type of bacteria that strips nitrates out of the water.* **Above:** *Vermillion River Watershed Joint Powers Organization and Minnesota Board of Water and Soil Resources staff toured the construction site.* **Photo Credits:** BWSR

> **"We're getting nitrate treatment from a wetland as well as nitrate treatment from having the wood chips in the wetland. It's a combination of the two technologies to make a new practice."**
>
> — Travis Thiel,Vermillion River Watershed Joint Powers Organization

The maximum concentration allowed by water-quality standards is 10 parts per million. Nitrates are toxic to fish and potentially harmful to humans, according to the Minnesota Department of Health.

Nitrate concentrations can be higher in agricultural areas, shallow aquifers and

A tributary to the South Branch Vermillion River will be diverted around a constructed wetland in Castle Rock Township while the plants take hold. The experimental nitrate treatment is slated to go online in 2019. Final ground work is scheduled for this spring. **Photo Credit:** BWSR

sandier soils. All three exist in the Vermillion River Watershed.

This project alone won't solve the problem, but it does begin to address nitrate issues, and could give the VRWJPO a new treatment option.

"We know that the (nitrate) concentration there has been steadily going up over the last decade," Thiel said of the South Branch Vermillion River subwatershed. The trend doesn't show signs of reversing. "A multitude of practices are going to have to go in in order to get the concentration down so that it doesn't have a water-quality impact."

The coarse, sandy soils that allow river water to enter the groundwater supply between the cities of Vermillion and Hastings also make it easier for nitrogen fertilizers to leach. Agricultural land is where the VRWJPO project is best-suited — partly because it requires more space, partly because it's more cost-effective in treating locations with high nitrate levels.

Based on Dakota County well testing data, nitrate levels in groundwater near Hastings have increased over the past 20 years. That's despite the best management practices farmers have adopted since elevated readings appeared.

When two of the city's six wells showed increasing nitrate levels, Hastings took pre-emptive action. A $3.5 million treatment system, built with city water funds, went online in 2008.

Public Works Superintendent Mark Peine said when nitrates reach a certain level, water from those two wells is blended with water from the other four. Concentrations, sometimes as high as 8 ppm, tend to spike in the summer.

Treatment has cut levels in half.

Combining a wetland with a wood-chip bioreactor is new in nitrate treatment, although each has been used independently. Wetlands have long been known to be effective at removing nitrates. Thiel said wood-chip bioreactor field trials have shown promise within the past five years. The cost and size necessary for a bioreactor alone to treat 2 square miles of drainage were prohibitive.

The hybrid project south of Farmington sits on 12 acres acquired for the road reconstruction. When the 3-acre wetland fills up, water will flow through a second, 5-acre mitigation wetland constructed as part of the highway project before it enters the unnamed tributary.

Earlier this winter, more than 1,000 cubic yards of wood chips sat onsite in mounds, ready to be mixed with topsoil in the wetland. Final grading and seeding were planned for spring. A diversion will keep water out until native plants take hold.

The project is expected to go online in 2019.

"We think it'll be demonstrable," Thiel said. "We're hoping that we can highlight this and other technologies to local producers so that they'll consider them."

The VRWJPO projects it will annually remove 13,600 pounds of nitrate.

The Minnesota Board of Water and Soil Resources' mission is to improve and protect Minnesota's water and soil resources by working in partnership with local organizations and private landowners. Website: www.bwsr.state.mn.us.



The most common problems with failing septic systems are straight-pipe discharge, surface discharge into the yard, or backup wastewater surfacing or being piped directly into a ditch. St. Louis County is protecting groundwater, lakes, rivers and wetlands with two programs that address the issue. Assistance is available to low-income homeowners who qualify. To date, those St. Louis County programs have reduced by about 3.95 million gallons a year the amount of sewage discharged to adjacent wetlands, lakes, streams, rivers or groundwater. **Courtesy Photos**

Septic solutions aid environment; protect groundwater, lakes, rivers

CLEAN WATER LAND & LEGACY AMENDMENT

VIRGINIA — By the time an inspector determined their septic system was an immediate public health threat and their only option would cost upwards of $13,000, Justin and Amanda Lindberg had already weathered a streak of bad luck.

Laid off from his bricklaying job, Justin had followed the promise of work to his hometown of Aurora in St. Louis County. But that job fell through. The couple and their two children stayed with family at first, and then moved into a camper for a while. Eventually, they rented a place, and then bought a house on a contract for deed.

"We put all our money into fixing it up," Lindberg, 34, said from the sidelines of a junior high football game, where he was watching his son play.

Two years after they moved in, the septic tank cover caved in. The St. Louis County Environmental Services Department inspector discovered a failing septic system. The tank was leaking. The system wasn't draining properly.

The 1950s gravity-fed trench style subsurface sewage treatment system didn't meet current standards. The lidless septic tank was full. Surface discharge occurred with heavy rains. The septic system met the state's Imminent Threat to Public Health definition.

St. Louis County Environmental Services Director Mark St. Lawrence talks about the county's efforts to repair, replace or connect to municipal systems those septics that meet the state's imminent threat to public health definition.
Photo Credit: Ann Wessel, BWSR

It had to be replaced.

The Lindbergs are among 28 homeowners whose septic systems have been repaired, replaced or connected to a municipal sewer system since 2012 — using Clean Water Funds from the Minnesota Board of Water

“From the standpoint of environment and public health, obviously (the biggest benefit from the BWSR grant is) groundwater protection. ... For each year that we add four, five, seven more of these systems, it just improves the local environment and groundwater that St. Louis County promotes from the standpoint of tourism, recreation and quality of life.”

— Mark St. Lawrence, St. Louis County Environmental Services Department director

and Soil Resources plus the county’s local match. Three additional homeowners have been approved for system replacements in 2019, and one more house will be connected to a municipal sewer system.

As a result of two related programs, St. Louis County has reduced the amount of sewage discharged to adjacent wetlands, lakes, streams, rivers or groundwater by about 3.95 million gallons per year. That number increases with each failing system that is corrected.

Since 2012, nearly $950,000 has been directed to the Imminent Threat to Public Health Abatement Program — accounting for about 3.65 million gallons per year of that reduction. Funding included $479,616 from BWSR, $381,000 from the St. Louis County Housing and Redevelopment Authority, and $88,980 from the Minnesota Pollution Control Agency.

St. Louis County has a comparable program that provides funds to low-income homeowners to correct septic systems identified as noncompliant — further reducing the sewage discharged to adjacent water bodies or groundwater by 1 million gallons per year. Funding sources include $400,000 from the county’s

Environmental Trust Fund and $86,791 from the MPCA.

“Five years later, we might not have needed that. At the time, we did,” Lindberg said.

Today, the Lindbergs’ situation has improved. Justin is an independent contractor with a newspaper truck delivery route. Amanda works in home health care nursing. Their children are 14, 12 and 5. The youngest was born after they bought the house.

Before the inspection, the Lindbergs didn’t realize there was a problem.

“We always had it pumped every year, so we never had a problem. I guess you’re not supposed to have it pumped every year. The lid had caved in and it was a hazard for the kids in the yard,” Lindberg said. “There was an 8-by-8 hole. I don’t know how deep that tank was — 8, 10 feet.”

Lindberg wasn’t sure what the family would have done without the program.

“We probably would have moved. I don’t know. We live out in the country, so there’s no city water or sewer. Probably an outhouse. But I don’t know how we would take a shower,” Lindberg said.

St. Louis County oversees more than 37,000 subsurface sewage treatment systems. As HRA funds taper off, Clean Water Fund grants and county Environmental Trust Fund dollars will become the primary funding sources of the Imminent Threat to Public Health Abatement Program. The program strives to protect surface water, groundwater and public health within St. Louis County’s nine watersheds by ensuring subsurface sewage treatment systems comply with the law.

The program serves as a safety net, offering low-income, year-round home owners the financial assistance they need to protect Minnesota waters and comply with the law. Assistance is awarded as a five-year deferred loan that converts to a grant after five years of home ownership.

“These are situations where people just don’t have any other avenue,” said Mark St. Lawrence, St. Louis County Environmental Services Department director.

The average septic replacement costs about $18,000.

“Without this assistance, these homeowners cannot afford the septic system upgrades needed to avoid or resolve enforcement action aimed at protecting the environment,” St. Lawrence said.

Failing systems often come to light after a property has been purchased.

The most common problems are straight-pipe discharge, surface discharge into the yard, or backup

> **I got to be a real advocate for clean water and our Earth.**
>
> — Cary Johnson, Arrowhead Economic Opportunity Agency Inc.

wastewater surfacing or being piped directly into a ditch.

As the housing inspector for Hibbing-based Arrowhead Economic Opportunity Agency Inc. for 30 years, Cary Johnson estimated he helped about 150 homeowners with septic system problems. He's still with the agency, but since March 2017 he's worked as the agency's warehouse manager.

In recent years, program changes and funding reductions to the home rehabilitation program prevented the agency from funding septic system repairs or replacements. The county programs have helped to fill the gap.

St. Louis County would refer homeowners to Johnson. Before Clean Water Funds became available, money came from community development block grants and the Minnesota Housing Finance Agency. But homeowners had to demonstrate the ability to pay back the loans.

"Some of them were in pretty rough shape," Johnson said. "These are the poorest of folks that really need the help."

Homeowners often were reluctant at first, but Johnson persisted. Many clients were on social security, and lacked the income to justify taking out a loan for repairs. Johnson took a compassionate approach.

"I know what it's like to eat a ketchup sandwich, so I don't forget those things," Johnson said.

It was his job to inspect the properties, secure the bids and handle the final paperwork. He saw firsthand the public health and safety concerns.

"The wastewater is getting treated, where before it wasn't," Johnson said. "Some were imminent threats right to our public waterways. … I got to be a real advocate for clean water and our Earth."

During initial property inspections, Johnson has seen septic systems discharging into waterways that flow into Lake Superior. One site in Duluth was particularly egregious.

"I remember walking through the tall grass to find where this discharge was. I sank up to my ankles — so I found it. Then I looked at this creek. The creek was full of green scum. There were definite imminent threats," Johnson said.

At any one time, St. Louis County typically has 25 to 30 systems that pose imminent threats. Seasonal or rental units don't qualify for the program. Problems may go unnoticed until a homeowner seeks assistance from the AEOA, and routine questions reveal the issue.

"If it weren't for the BWSR money, more than half of these systems wouldn't have been upgraded, and I don't even know if we really would have had a program in place to use the local match that we had. Our program was developed because of the BWSR monies that were made available to us," St. Lawrence said.

Program elements

St. Louis County's Subsurface Sewage Treatment System Program involves permitting, point-of-sale compliance inspections, escrow requirements, a record review process, compliance and enforcement, a septic loan program, community sewer system project assistance, a noncompliant system abatement program and the imminent threat to public health abatement program.

The Minnesota Board of Water and Soil Resources' mission is to improve and protect Minnesota's water and soil resources by working in partnership with local organizations and private landowners. Website: www.bwsr.state.mn.us.

"This is as big as we want to be," Stacy Miller said of his 85-cow dairy operation. "I don't want to have to manage hired help." A manure storage lagoon installed last season with assistance from the Lower Mississippi River Feedlot Management in Minnesota Regional Conservation Partnership Project saves time and benefits water quality.
Photo Credit: Ann Wessel, BWSR

Mississippi River, trout streams benefit from feedlot upgrades

CLEAN WATER LAND & LEGACY AMENDMENT

Groundwater benefits, too, from the BWSR- and NRCS-backed, 11-county project. In Wabasha County, a new lagoon saves time, allows one producer to better position his family farm for the future.

PLAINVIEW — With alfalfa in the crop rotation and pastureland in the mix, Stacy Miller's 350-acre dairy farm already played a role in filtering runoff flowing toward the Mississippi River. With a new lagoon and nutrient management plan, the 85-cow operation now does even more to protect groundwater and trout streams.

Miller

Peters

The 700,000-gallon, $440,000 manure storage facility is the second one constructed with assistance from the Lower Mississippi River Feedlot Management in Minnesota Regional Conservation Partnership Project.

Funded jointly by the Minnesota Board of Water and Soil Resources and the USDA's Natural Resources Conservation Service, the $3.2 million, five-year RCPP feedlot management project provides a 90 percent cost-share to producers who build facilities that mitigate feedlot runoff. The project targets livestock operations with fewer than 300 or fewer than 500 animal units — the

limit depends upon the state funding source — in 11 southeastern Minnesota counties.

"The whole purpose is trying to protect the surface water and groundwater in the karst landscape," said Dave Copeland, the BWSR board conservationist assigned to the project.

"It's a landscape that really needs livestock. It needs farmers out there who are going to have a diverse crop rotation, including that perennial hay rotation and including well-managed pastures. Along with that opportunity comes a need to manage the manure," Copeland said.

Regional water quality data and modeling previously identified livestock operations as major contributors of nutrients, bacteria and sediment to Mississippi River tributaries. The biggest resource concern on Miller's farm: With no storage, it was necessary to spread manure every day. Spreading on frozen ground increases the chances of runoff.

"Now instead of having to spread every day, a person can spread when the conditions are a little more favorable," Miller said.

The lagoon will provide about 12 months' storage.

"Having the storage allows him to time his (manure) application well so that the nutrients are used by his crops rather than running off into the streams," said Terri Peters, Wabasha Soil & Water Conservation District manager.

Wabasha SWCD staff first worked with Miller in the early 1980s when he installed ponds, waterways and contour strips. He'd switched from a stanchion barn to a parlor barn in the 1990s when his children were young. For the past few years, he'd considered a feedlot upgrade.

"It's a landscape that really needs livestock. It needs farmers out there who are going to have a diverse crop rotation, including that perennial hay rotation and including well-managed pastures. Along with that opportunity comes a need to manage the manure."

— Dave Copeland, BWSR board conservationist

An earthen berm surrounds the concrete lagoon. An emergency spillway opens to a meadow. Manure from the dairy barn and heifer lot, above, is scraped into the lagoon.
Photo Credits: Ann Wessel, BWSR

Details and definitions

ANIMAL UNITS: Measure how much manure is produced. One dairy cow equals 1.4 animal units. One calf equals 0.20 animal units.

ELIGIBLE COUNTIES: Dodge, Fillmore, Freeborn, Goodhue, Houston, Mower, Olmsted, Rice, Steele, Wabasha, Winona

KARST GEOLOGY & NITRATES: Because fractures in the limestone make it easy for anything that flows across the surface to enter the groundwater, nitrates are a concern in Wabasha County. In 13 of the 14 Wabasha County townships where private well testing was offered in 2017, about 3,230 households received test kits. Nearly 1,090 wells were tested. Nitrate levels in 16 percent of those tested failed to meet the state health standard.

"I had wished I had something other than scrape-and-haul for a long time, but the expense of it didn't work into my plan very well," Miller said. "I couldn't see spending that much on a manure storage facility because it was more than twice the price of the farm when I paid for the farm. When they had the 90 percent cost-share, it became really attractive."

The Millers' farm is at the top of the watershed that drains into East Indian Creek, a trout stream that flows east to the Mississippi River.

"It's helping address a national issue," Copeland said of the 11-county project.

The project plays a small role in states' nutrient-reduction plans to combat hypoxia in the Gulf of Mexico. The low-oxygen "dead zone" can be caused by excess nutrients including phosphorous and nitrogen.

"But closer to home, in this part of the state we have a nitrates-in-our-groundwater issue. So it helps address that as well. It's addressing phosphorous in our surface waters (through) improved manure management that comes along with installing these systems," Copeland said. "With those also comes improved oxygen levels in cold-water trout streams."

Wabasha County alone contains 117 miles of designated trout streams — 18 streams entirely within its borders, plus segments of two more.

"I think our biggest resource challenge is our varying topography and the smaller fields," Peters said. "There's a lot of woods and streams and other natural barriers that are interspersed with the farm fields. The hills are pretty steep and rolling in most areas."

Stacy and Julie Miller's three children, from left, Melendy, 21, and twins Marcus and Mika, 19, are prospects for taking over the family dairy farm just outside Plainview in Wabasha County.

East Indian Creek is a designated trout stream that flows into the Mississippi River. Improvements on the Miller farm will benefit the creek. **Photo Credit:** Terri Peters, Wabasha SWCD

With fields in three separate sites, Stacy had been hauling manure 3 miles on a busy state highway.

"Anybody who does that knows that is no fun at all because there's always traffic to deal with and it creates all kinds of issues," Miller said.

The new lagoon not only ended daily hauling but also cut time spent on chores by about two hours a day. Miller's nutrient management plan calls for fall field application via injection.

> **"I had wished I had something other than scrape-and-haul for a long time, but the expense of it didn't work into my plan very well."**
>
> — Stacy Miller, Wabasha County dairy farmer

"If somebody takes over the dairy farm, they're going to have things a lot nicer than I did," Miller said.

Prospects include Stacy and Julie's three children.

Melendy, 21, a dairy science major at the University of Wisconsin-River Falls, will spend next semester living and working on the farm before she graduates in December. "The only way to figure out if this is what you want is to do it 100 percent," she said.

Mika, 19, also is studying dairy science at UWRF. Her twin, Marcus, worked on the farm until recently, when he got a job with a Rochester landscaper.

Miller, 59, grew up on a dairy farm 4 miles down the road, and went to school for carpentry before returning to work with his father and two brothers. He bought this place in 1982, and started milking cows in 1983.

"A lot of my hours in the day were spent hauling manure. I just wish I would have had (the lagoon) when I was 25 or 30. I just spent a lot of my time hauling manure."

Construction started in May

Stacy Miller and his daughter Melendy talked to Wabasha Soil & Water Conservation District Manager Terri Peters about the manure storage lagoon installed in 2018 with assistance from the Lower Mississippi River Feedlot Management in Minnesota Regional Conservation Partnership Project. The project is funded jointly by the Minnesota Board of Water and Soil Resources and USDA's Natural Resources Conservation Service. Landowners provide a match..
Photo Credit:
Ann Wessel, BWSR

2018 and ran through mid-November. Three heavy rains delayed work and added to the expense. The concrete pit is surrounded by an earthen berm. An emergency spillway opens onto a 30,000-square-foot meadow. Fencing a cattle lane from the barn to pasture was planned for this spring.

Follow-up includes continued manure and soil testing.

The five-year Lower Mississippi River Feedlot Management in Minnesota RCPP runs through 2020. BWSR's $1.6 million contribution includes a $300,000 Clean Water Fund grant. NRCS is providing Environmental Quality Incentives Program (EQIP) implementation funds.

The 11-county Southeast Minnesota Technical Support Joint Powers Board receives the BWSR funding, and then distributes it to SWCDs, which work directly with producers. Landowners receive EQIP assistance directly through their local NRCS office. Projects within the 11-county area require a 10 percent landowner contribution.

Copeland said remaining project funds could build four or five more manure storage facilities. For the size of operations being targeted, the average cost is $400,000. More than a dozen applications are in the works. Besides the two lagoons, funding to date has allowed about 10 producers to develop comprehensive nutrient management plans.

Producers still can apply for funding through the Lower Mississippi River Feedlot Management in Minnesota RCPP. NRCS has not announced the sign-up deadline for 2020. The RCPP provides a higher level of financial assistance. But other sources are available, and the Wabasha SWCD accepts continuous sign-ups for manure management practices.

"A healthy livestock economy is important to protecting the resources here in southeast Minnesota," Copeland said. "Whatever can be done to keep a healthy livestock economy and keep those livestock producers on their farms, it's important for us to do that — to try to provide what they need, because if we can keep hay in rotation in the landscape, we're going to go a long way to try to address the (water quality issues in southeastern Minnesota)."

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BWSR

The Minnesota Board of Water and Soil Resources' mission is to improve and protect Minnesota's water and soil resources by working in partnership with local organizations and private landowners. Website: www.bwsr.state.mn.us.