

Watershed Achievements Report

2018 Annual Report to the U.S. Environmental Protection Agency

Clean Water Act Section 319, Clean Water Fund,
and Clean Water Partnership Projects in Minnesota



m MINNESOTA POLLUTION
CONTROL AGENCY



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Targeted local efforts restore water quality in metro-area lakes

When lakes and rivers are polluted with phosphorus, sediment, and other contaminants, it can take years of sustained effort and expense to restore the water quality. Counties, cities, watershed districts, and other organizations and individuals have taken on these restoration efforts around the state, and they are having an impact. For instance, some metro-area lakes are meeting water quality standards that they failed to meet previously, all thanks to the work of community governments and organizations.

The MPCA added Crystal Lake in Burnsville and McMahon Lake in Scott County to the state's "impaired waters" list in 2002 because testing showed levels of phosphorus in the water that exceeded state standards. Bryant Lake in Eden Prairie got on the list in 2008 for the same reason.



Burnsville built an underground stormwater treatment system to reduce contaminants in water flowing into Keller Lake. Crystal Lake is in the background.

Phosphorus can get into lakes, rivers, and streams from a variety of sources, but the most common are runoff (or stormwater) from farmland and urban areas, stream bank erosion, treated wastewater from both public and private facilities, and airborne sources such as wind-blown soil. Phosphorus sinks into sediment in lake bottoms and can be re-released over time by fish activity and other agitation. Phosphorus fuels algae blooms that interfere with recreational activities like boating and swimming. Sometimes [harmful blue-green algae](#) form, which can sicken people and their pets.

What strategies can reduce phosphorus and restore a lake's water quality? Many communities focus on their stormwater practices. The rain and snow melt running into storm drains from streets, parking lots, and other hard surfaces can contribute leaves, oils, lawn chemicals, and other contaminants to nearby lakes. Directing stormwater to places it can soak into the ground and where contaminants can be filtered out can go a long way to reducing pollution. The MPCA regulates municipal stormwater and requires cities and towns to educate citizens on stormwater management, make plans to detect and stop illicit discharges, control runoff on construction sites, and more.

To reduce phosphorus in Crystal Lake, the [City of Burnsville](#) built an underground system to treat stormwater before it's discharged into Keller Lake, which feeds into Crystal Lake. The [City of Apple Valley](#) built a stormwater pond on Keller Lake that keeps an estimated 55 pounds of phosphorus out of the water every year. Water monitoring showed that 20% to 25% of phosphorus in Crystal Lake was coming from Keller Lake. In addition, [Lakeville](#) and Burnsville dredged some existing stormwater ponds near Crystal Lake, which improves the ponds' filtering ability and makes them more efficient. For Bryant Lake in Eden Prairie, new stormwater standards adopted in 2008 have helped improve the lake's water quality. The project partners also restored wetlands just west of the lake, which helps control stormwater as well.

Addressing shoreline degradation is another way to help lakes. An eroding shoreline can contribute sediment and soil to lakes, which can increase phosphorus levels. A project by the [Scott Soil & Water Conservation District](#) and a shoreland property owner used large rocks and rolls of coconut fibers called coir logs to stabilize vulnerable shoreline on McMahon Lake. Vertical banks were graded into gradual slopes with native plants to sustain the shoreline and protect the lake.



Shoreline stabilization projects by the Scott Soil & Water Conservation District helped to improve water quality and reduce phosphorus in McMahon Lake.

Harvesting curly leaf pond weed is another restoration strategy the City of Burnsville used to improve Crystal Lake. The city hired machines that spent two weeks cutting back the plant over about 50 acres of the 290-acre lake. If not cut back, the weed would die off in the peak of summer, releasing nutrients into the water that feed algae blooms.

The Nine Mile Creek Watershed District in Eden Prairie undertook in-lake treatments to help reduce phosphorus in Bryant Lake. In 2008 and 2013, the district treated the lake with aluminum sulfate (called alum), which forms a fluffy substance called floc. As the floc settles to the lake bottom, it removes phosphorus and other materials (including algae) from the water. The floc forms a layer over the sediment that acts as a barrier to phosphorus. It binds phosphorus released from the sediment and prevents it from fueling algae blooms.

All the lake cleanup projects relied on multiple players in addition to those already mentioned. [Black Dog Watershed Management Organization](#) helped to do water monitoring, organize projects, and apply for grants to benefit Crystal Lake. The [City of Eden Prairie](#) and [Three Rivers Park District](#) assisted in monitoring Bryant Lake and making project recommendations. The [Scott Watershed Management Organization](#), the [New Market Sportsman's Club](#), and shoreland owners participated in the cleanup of McMahon Lake.



Nine Mile Creek Watershed District contracted with Barr Engineering to do alum treatment in Bryant Lake to reduce the lake's phosphorus levels.

In addition, the cleaner lakes are a boon to their communities. "Overall, Crystal Lake now has a higher value to residents," says Daryl Jacobson, Natural Resources Manager with the City of Burnsville, who led the water quality improvement efforts. Paul Nelson, Environmental Services Program Manager with Scott County and coordinator for the McMahon Lake work, says the lake is more attractive for swimming and other recreation, and is a source of local pride.



Crystal Lake is the largest recreational lake in Burnsville and has 190 homes on it.

These organizations are also working to restore water quality in several other lakes and streams. So their work identifying and remedying sources of water pollution will continue.

Success at last: Poplar River meets water quality goals



Mouth of the Poplar River flowing into Lake Superior near Lutsen Lodge.

For more than a decade, the Poplar River Management Board, community groups, and local and state partners tackled stormwater runoff, streambank erosion, and slumping bluffs and won. The Poplar River is now meeting water quality standards for total suspended sediment and will be taken off the state’s “impaired waters” list.

Not only that, it also shows healthy habitat conditions that can support — and sustain — a wide diversity of key fish and macroinvertebrate populations. Work on restoring the river began nearly 10 years ago, with the formation of a dedicated community group in 2006, intensive and focused diagnostic studies conducted from 2007-2012 and large scale targeted restoration projects that began in 2008 and continues today.

Poplar River is located in northeastern Minnesota and flows through a picturesque landscape of boreal forest and steep hills, eventually draining to Lake Superior. The river originates within the Boundary Waters Canoe Area Wilderness and ends at its confluence with Lake Superior. The watershed includes a premier Midwest resort area with ski runs, hiking trails, and boating and fishing access sites for recreation. Downstream portions of the Poplar River and watershed are characterized as having significant drops in elevation with an average gradient of nearly 4%, containing both forested and non-forested steep slopes dominated by soils derived from

glacial lake deposits of fine, easily erodible material. Citizen interest in the health of the river is high, whether they are anglers concerned about the native trout fishery or area residents concerned about water quality.

Traditional as well as untested projects (including re-meandering a stream away from a “mega-slumping” hillside) focused on the lower watershed’s highly erodible soils and land uses. The impressive and dramatic result? A 300-ton reduction in the average sediment load to the river every year from 2000 to 2010. Today, concentrations of total suspended sediment are within the state standard 92% of the time.

Poplar River Mega Slump Project –Tree Planting



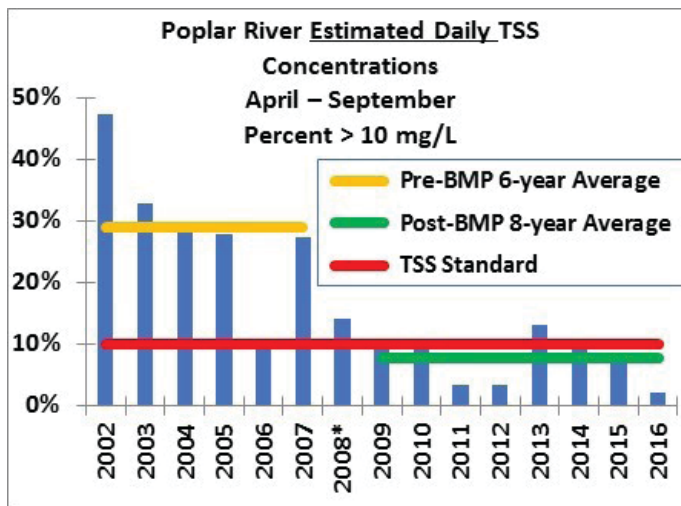
MIN Conservation Corps crews planting trees, shrubs, and grasses on the stabilized slump, with the expectation they will spread over the bank and reduce erosion from wind and raindrops.



Eroding hillsides like this on the Poplar River made the water cloudy, which also made it hard for water creatures to live.



When the MPCA listed the river as impaired in 2004, a required study determined the maximum daily amount of sediment the river could accept and still meet water quality standards. In 2009, the MPCA added the Poplar to its [Watershed Pollutant Load Monitoring Network](#), which created a continuous sampling program for stream flow and water quality data. This proved to be invaluable for comparing pre- and post-project records of the river's condition and improvements.



*2008 is probably too small/low given that several events were missed.

This long-term monitoring program is a partnership between the Minnesota Department of Natural Resources and MPCA with citizen support from the Clean Water Land and Legacy Amendment fund.

Continued monitoring will provide the record of this river's change, and with the maturing of runoff reduction efforts, water quality will improve and be sustained.

Partners and Funding

The partnership to accomplish this work included private business and state and local resource managers, working together as the Poplar River Management Board. The Board's project work is currently transitioning from a restoration-focused effort to a protection-focused effort. Other partners in the watershed include lake associations that have worked continuously to ensure the upper watershed remains in good condition.

Funds expended on the project have included private money, state grants provided through the Clean Water Land and Legacy Funds, and federal funding sources including the Great Lakes Restoration Initiative and the National Oceanic and Atmospheric Administration (NOAA) Coastal Program. Approximately \$2.8 million dollars have been invested in the river to date, with \$874,008 dollars from private funds and the remainder public funds. Private funds were required to match all public money expended.

Several organizations followed the story of the river's transition including the Lake Superior Streams web page, the Cook County News Herald, and the area radio station WTIP. The newspaper and radio station have updated their audiences regularly regarding the status of the river. A local resort was required to comply with a wastewater discharge improvement to minimize impact to the physical area of discharge, a hillslope adjacent the river.

The local resource offices have developed more capacity and skill in managing watershed science and monitoring needs for impaired streams. A stronger collaborative partnership grew from the original vision of the Poplar River Management Board. Educational training events for erosion and sediment control are held at the resorts. In addition, resort staff are certified in erosion and sediment management practices.

The Poplar River is a water quality success story that demonstrates the cumulative power of stewards working together and ultimately making a real difference.

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A portion of the Clean Water Partnership Grant funds that are passed through to local units of government for nonpoint source implementation projects listed in this report are appropriated from the Clean Water, Land, and Legacy Amendment.

Cover photo: Mouth of the Poplar River flowing into Lake Superior near Lutsen Lodge. For more information, see page 5.

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List of acronyms

BMPs best management practices	lbs/yr pounds per year
BOD biochemical oxygen demand	LGU Local Government Unit
BWSR Minnesota Board of Water and Soil Resources	LiDAR Light Detection and Ranging
CFU colony forming units	MDA Minnesota Department of Agriculture
CLFLWD Comfort Lake – Forest Lake Watershed District	mg/L milligrams/liter
CMM Conservation Marketplace Midwest	mi² square mile
COD chemical oxygen demand	MPCA Minnesota Pollution Control Agency
CRP Conservation Reserve Program	MS4 Municipal Separate Storm Sewer Systems
CRWP Cannon River Watershed Project	MVTL Minnesota Valley Testing Laboratory
CWF Clean Water Fund	N Nitrogen
CWP Clean Water Partnership	N/N Nitrogen-Nitrate
DEM Digital Elevation Model	NOAA National Oceanic Atmospheric Administration
DNR Minnesota Department of Natural Resources	NPS nonpoint source
DO dissolved oxygen	NPSMPP Nonpoint Source Management Program Plan
EPA U.S. Environmental Protection Agency	NRCS Natural Resource Conservation Service
EQulS Environmental Quality Information System	NWQI National Water Quality Initiative
FC Fecal Coliform	P Phosphate
FLUX32 software used for calculation of material fluxes (loads) in streams	P Phosphorus
FTE full time equivalent	PAT Pre-processing Application Translator
GBERBA Greater Blue Earth River Basin Alliance	RCRCA Redwood-Cottonwood Rivers Control Area
GIS geographic information system	SAM Scenario Application Manager
GPS global positioning system	Section 319 Section 319 Grant Program
HEI Houston Engineering, Inc.	SEMWRB Southeast Minnesota Water Resources Board
HCWP Hawk Creek Watershed Project	SRF state revolving fund
HICW High Island Creek Watershed	SRWD Sauk River Watershed District
HICWD High Island Creek Watershed District	SSTS Subsurface Sewage Treatment System
HICWJPB High Island Creek Watershed Joint Powers Board	SWCD soil and water conservation district
HLWD Heron Lake Watershed District	SWPTSA 5 Southwest Prairie Technical Service Area 5
HSPF Hydrologic Simulation Program FORTRAN	T/mi² tons per square mile
HUC hydrologic unit code	T/yr tons per year
IBI index of biological integrity	TMDL total maximum daily load
IESF iron enhanced sand filtration	TOTT Tile Outlet Treatment Train
IPM integrated pest management	TP total phosphorus
IWAV Impaired Waters Viewer	TSS total suspended solids
IWM Intensive Watershed Monitoring	USFW U.S. Fish & Wildlife Service
JD2 Judicial Ditch 2	UMN University of Minnesota
LARS Local Annual Reporting System	µg/L micrograms per liter
lbs pounds	WASCOB Water and Sediment Control Basin

WFDMR West Fork Des Moines River

WLA wasteload allocation

WMA Winter Maintenance Assessment

WRAC Water Resources Advisory Committee

WRAPS Watershed Restoration and Protection Strategies

WRC Water Resources Center

WWTP Wastewater Treatment Plant

Introduction

Minnesota's water resources are treasured by its citizens for the beneficial uses they provide including recreation, drinking water, aquatic life, industrial and agricultural uses. With more than 10,000 lakes, 100,000 river and stream miles, and extensive groundwater systems, water is a major part of Minnesota's culture, economy, and natural ecosystems.

Two programs provide local governments with resources to restore and protect surface water, with a special focus on nonpoint pollution sources (NPS). The Minnesota Pollution Control Agency (MPCA) relies on the Federal Section 319 Grant program (Section 319) to provide funding for efforts to reduce nonpoint sources of pollution. The second source, the Clean Water Partnership (CWP) loan program provides low interest loans to local units of government for best management practices (BMPs) which reduce nonpoint source water pollution in local areas. This year, MPCA offered CWP loans at 0% interest and it was good year for these awards (best in 6 years). The CWP grant program funds ended in June 2018, but project reports will continue to be included in the Watershed Achievement Report. The Watershed Achievements Report is an annual report on the efforts supported by these funding resources and the state's progress for reducing NPS pollution. This report describes the newly awarded, active and final nonpoint source projects for statewide and watershed-based projects.

Watershed Program Accomplishments – 2018

Clean Water Accountability Reporting

The MPCA is reporting actions taken in Minnesota's watersheds to meet water-quality goals and milestones as required by the Clean Water Legacy Act (Minn. Stat. 114D.26, subd. 2). This accountability reporting is required every two years, though updates to these reports will occur by July of each year, following the receipt of program data from other state and federal agencies for the previous year.

- [Healthier watersheds: Tracking the actions taken](#)
- Clean Water Legacy Act Requirement

- Report actions taken in watersheds to meet water-quality goals and milestones for TMDLs and WRAPS.
- Update in July each year after receipt of data from other agencies.
- 2018 report for all 80 watersheds
- Work in-progress – will evolve as we improve our data entry and reporting tools, and gain customer input (internal and external).

What's in the reports?

- WRAPS approval status
- TMDLs approved
- Wastewater (*loading vs. WLAs*)
- Nonpoint BMPs
- Funding (federal, state, local, point/nonpoint) by watershed



What's new?

- Easily updated at any time
- Easy to filter (HUC8, HUC10, county, legislative district, waterbody, year)
- MPCA data from Tempo database
- Most reports show data from 2004 (first TMDL approval) through 2018

Section 319 Grant Program Changes – Small Watersheds Focus

MPCA is developing a new [Section 319 Small Watersheds Focus Program](#) in partnership with small watersheds to develop a long-term roadmap to support comprehensive nonpoint source implementation on a small-scale watershed.

The MPCA is beginning a pilot of ten small watersheds to develop a detailed Focus Grant work plan following the EPA's [Handbook for developing watershed plans to restore and protect our waters](#). The selected watersheds (Focus Watersheds) will be prioritized to receive four, four-year grant awards that will span a total of 16 years. These funds will be used to implement a series of projects outlined in the Focus grant work plan, provide a steady source of funding, focus implementation efforts, and achieve measurable water quality improvements on a specific waterbody.

Taking Action for Minnesota's Water

Governor Mark Dayton has released a new [report summarizing key findings from 10 Water Quality Town Hall meetings](#) held last year with Minnesotans across the state. The report, which summarizes more than 3,500 suggestions from more than 2,000 meeting attendees, recommends strategies to boost water quality education efforts, empower local action and collaboration, and increase investments in local clean water infrastructure, among other ideas.

Governor Mark Dayton Recognizes State Government Problem Solvers

The [Better Government Awards](#) recognize successful innovation in state government and the hardworking public servants delivering excellent service to Minnesotans. These initiatives improved the efficiency and effectiveness of government services for Minnesotans in three categories: Great Customer Service, Great Place to Work, and Great Results.

“Minnesotans expect and deserve an effective, responsive, and inclusive state government,” said Governor Mark Dayton. **“These projects are just a few extraordinary examples, among many, of how we are building a better government for the people of Minnesota. I thank these dedicated public servants for their tremendous efforts to improve the quality of services provided to Minnesotans.”**

Great Results: Minnesota Watershed Approach to Clean Water Project – Pollution Control Agency

To meet Minnesota's water quality needs, the MPCA and other partners designed and implemented a new system, called the “Minnesota Watershed Approach to Clean Water” to comply with federal laws and the Minnesota Clean Water Legacy Act. This has revolutionized the way we do water quality monitoring and restoration, and protection strategy development. Minnesota now leads the country in completing the most comprehensive evaluation of all our major watersheds because of this approach. Additionally, we are on track to develop protection and cleanup strategies for each Minnesota watershed of the state within six years.

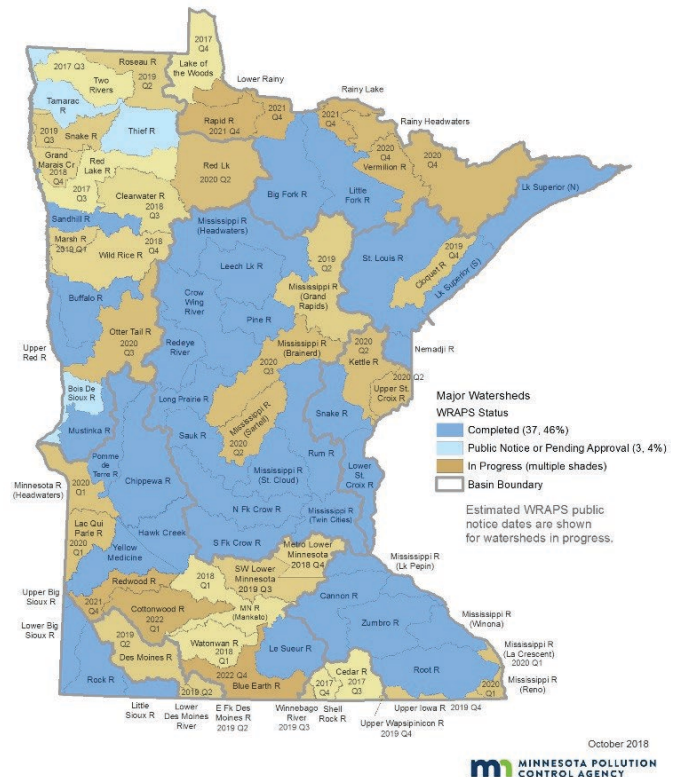
2018 Clean Water Fund Performance Report

Minnesota agencies released their fourth collaborative [report](#) in February 2018 to help Minnesotans clarify connections between Clean Water funds invested, actions taken and outcomes achieved. Measures in the report provide a snapshot of how Clean Water Fund dollars are being spent and what progress has been made. The measures are organized into four categories: investment, surface water quality, drinking water protection, and external drivers and social measures. Each measure has detailed status ranking and trend information.

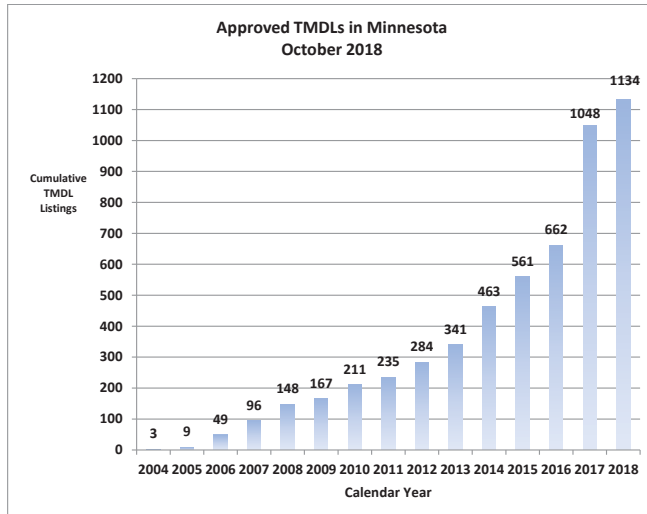
Minnesota's Watershed approach

All 80 watersheds in Minnesota have restoration and protection strategy projects underway. Strategy plans have been completed for 40% of the watersheds and more are on track for completion this year. For more information; [MPCA watershed approach](#).

Watershed Restoration and Protection Strategies (WRAPS)



Progress is also being made in completing Total Maximum Daily Load (TMDLs) studies for impaired waters in the state. As part of the watershed approach, TMDL studies are being done on a watershed scale, which has accelerated the pace on TMDL study completions.



Are streams and lakes getting better or worse?

To answer this question, the MPCA is starting its second cycle of watershed monitoring throughout Minnesota this year, circling back to watersheds first monitored this way in 2008. Funded in a large part by the Legacy Amendment, this monitoring examines fish and other aquatic life in addition to levels of pollutants like nutrients and bacteria. Under this approach, the agency will examine all 80 major watersheds in the state every 10 years.



By measuring and evaluating the health of fish, macroinvertebrates, and plants, MPCA staff can distinguish between naturally occurring variation and changes caused by human activities.

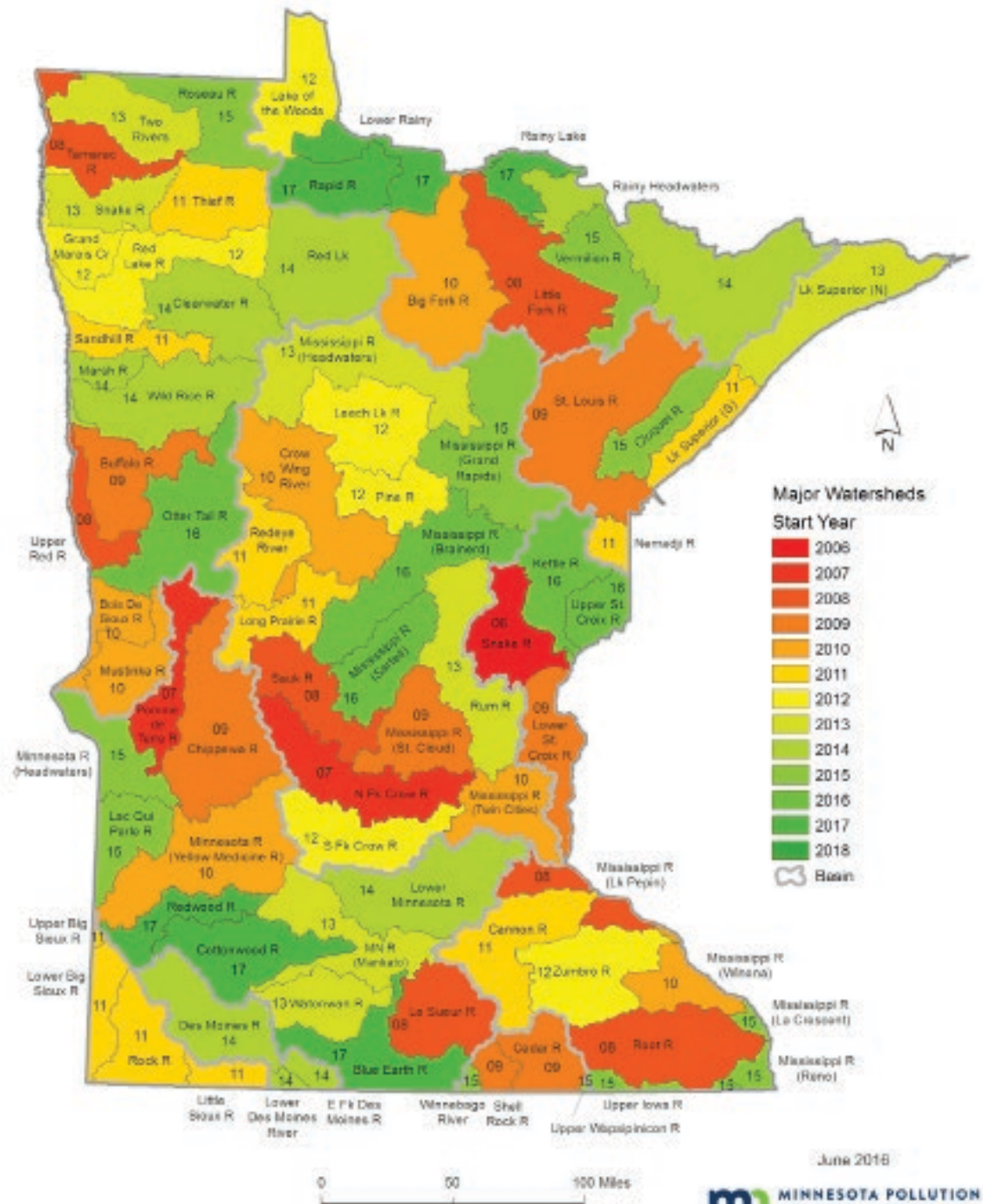
Ten years ago, the MPCA did water monitoring in the [Root](#), [Le Sueur](#), [Mississippi River-Lake Pepin](#), [Little Fork](#) and [Sauk](#) river watersheds. The agency will return this year to see if conditions are improving or declining. This second round of monitoring will focus on detecting changes and filling in data gaps to further inform on-the-ground practices.

MPCA staff will contact landowners in these watersheds to let them know about the monitoring and gain permission to sample stations on their property. The MPCA will sample rivers, streams, and ditches for fish, aquatic insects, habitat, and water chemistry from mid-June through September. Staff biologists will sample about 85 stations across the watersheds in the north and 128 in the south.

In addition to MPCA monitoring, local partners like watershed districts, Soil and Water Conservation Districts, watershed non-profit groups, and citizen volunteers will study lakes and streams across Minnesota. The agency will use all this data to determine if waters meet standards designed to make sure they are swimmable and fishable.

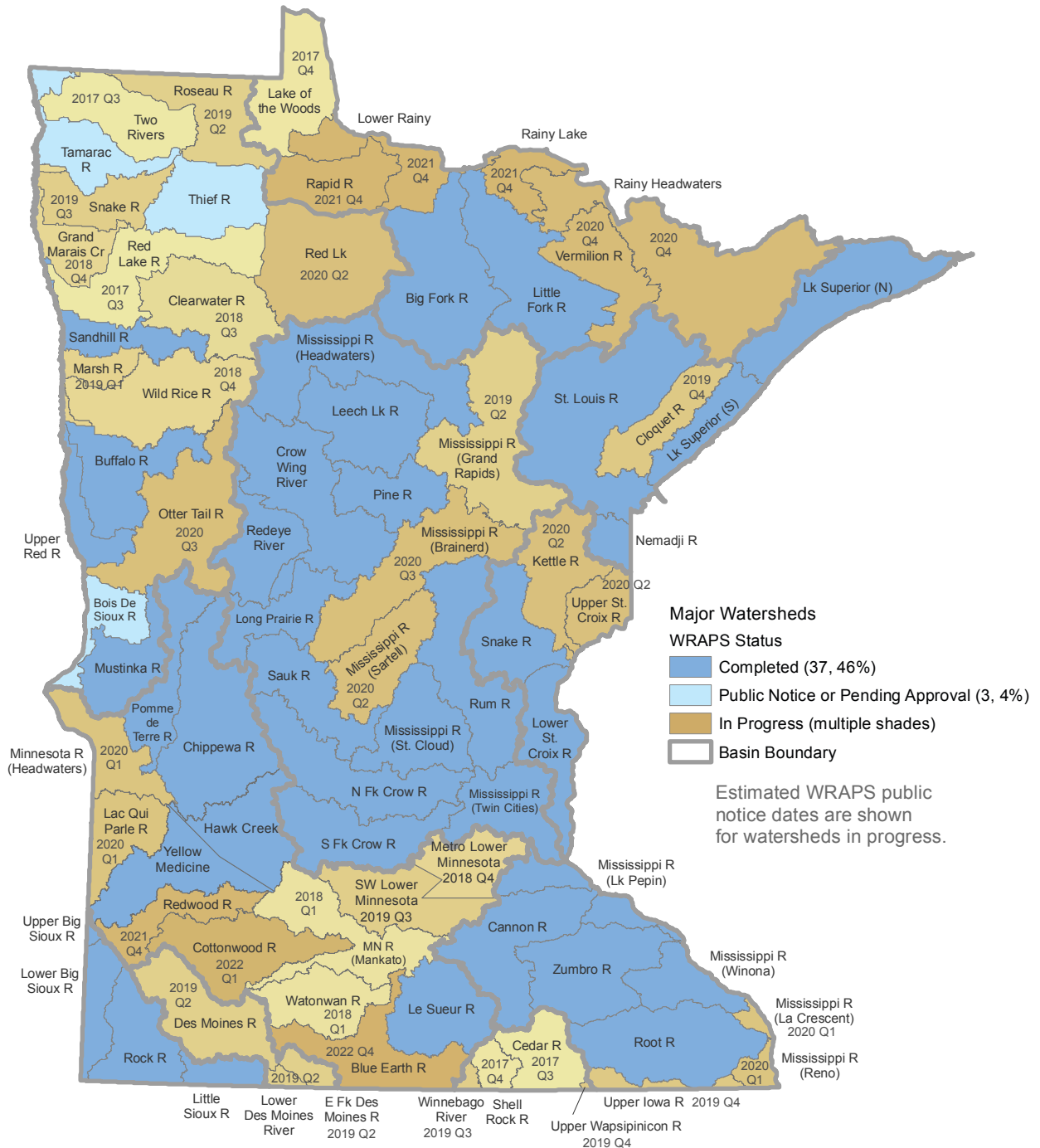
Statewide intensive watershed monitoring schedule and progress

Minnesota’s Watershed Approach starts with Intensive Watershed Monitoring (IWM) around the state. Because of MPCA’s monitoring efforts, combined with other local monitoring efforts, Minnesota is well on its way to a comprehensive assessment of the waters of the state on a 10-year cycle, wrapping up in 2018. The MPCA has now initiated or completed IWM in all of the state’s major watersheds. The level of effort of this monitoring and the amount and types of data being collected in Minnesota’s Watershed Approach is well beyond that of past monitoring efforts.



Watershed Restoration and Protection Strategies (WRAPS) progress

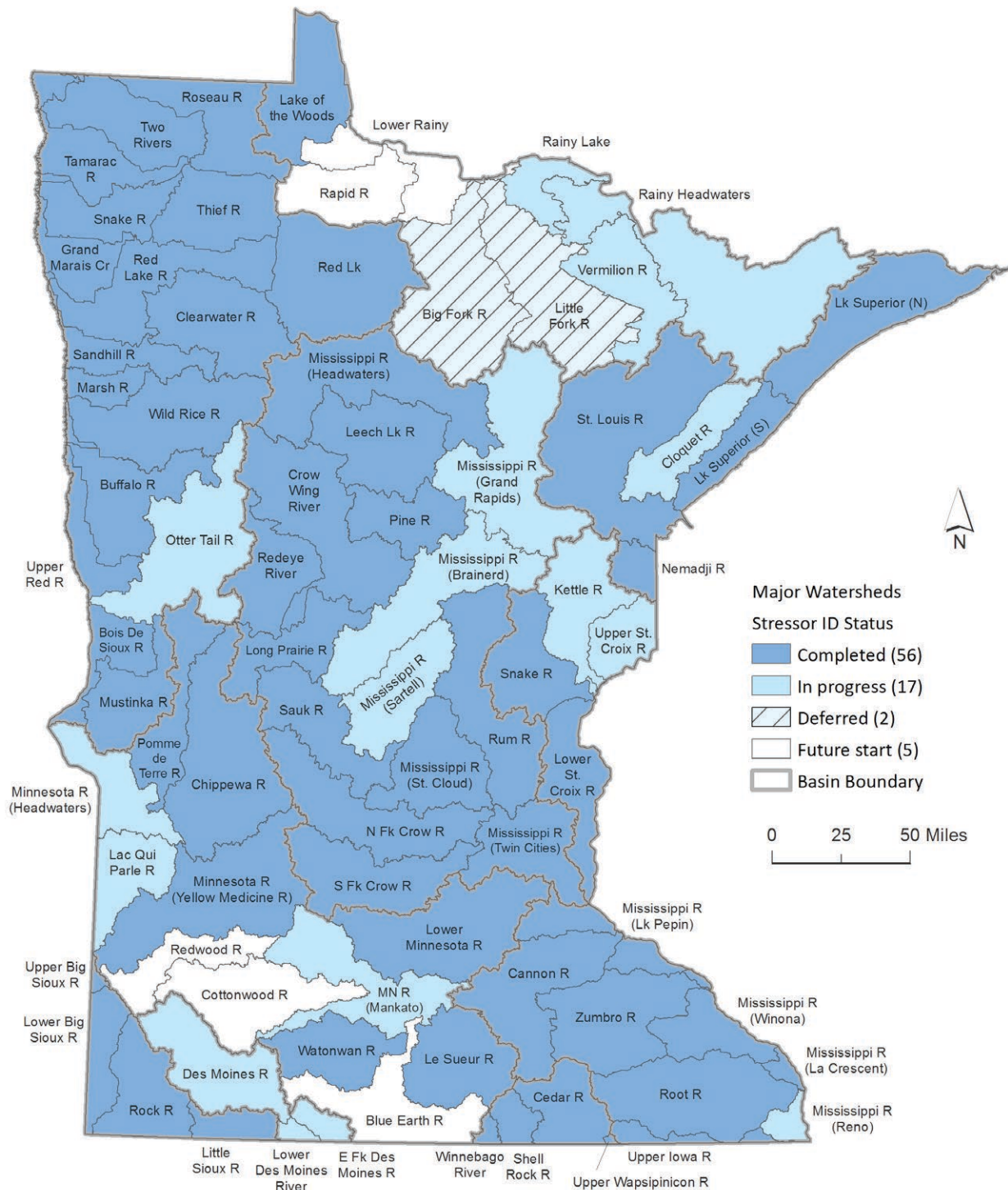
WRAPS reports for the major watersheds in Minnesota are completed or underway. There are 37 completed WRAPS studies and work in the other watersheds is underway with monitoring, watershed modeling, biological stressor work, and/or a WRAPS project in progress.



October 2018



Major watersheds Stressor Identification status



**Major Watersheds
Stressor ID Status**

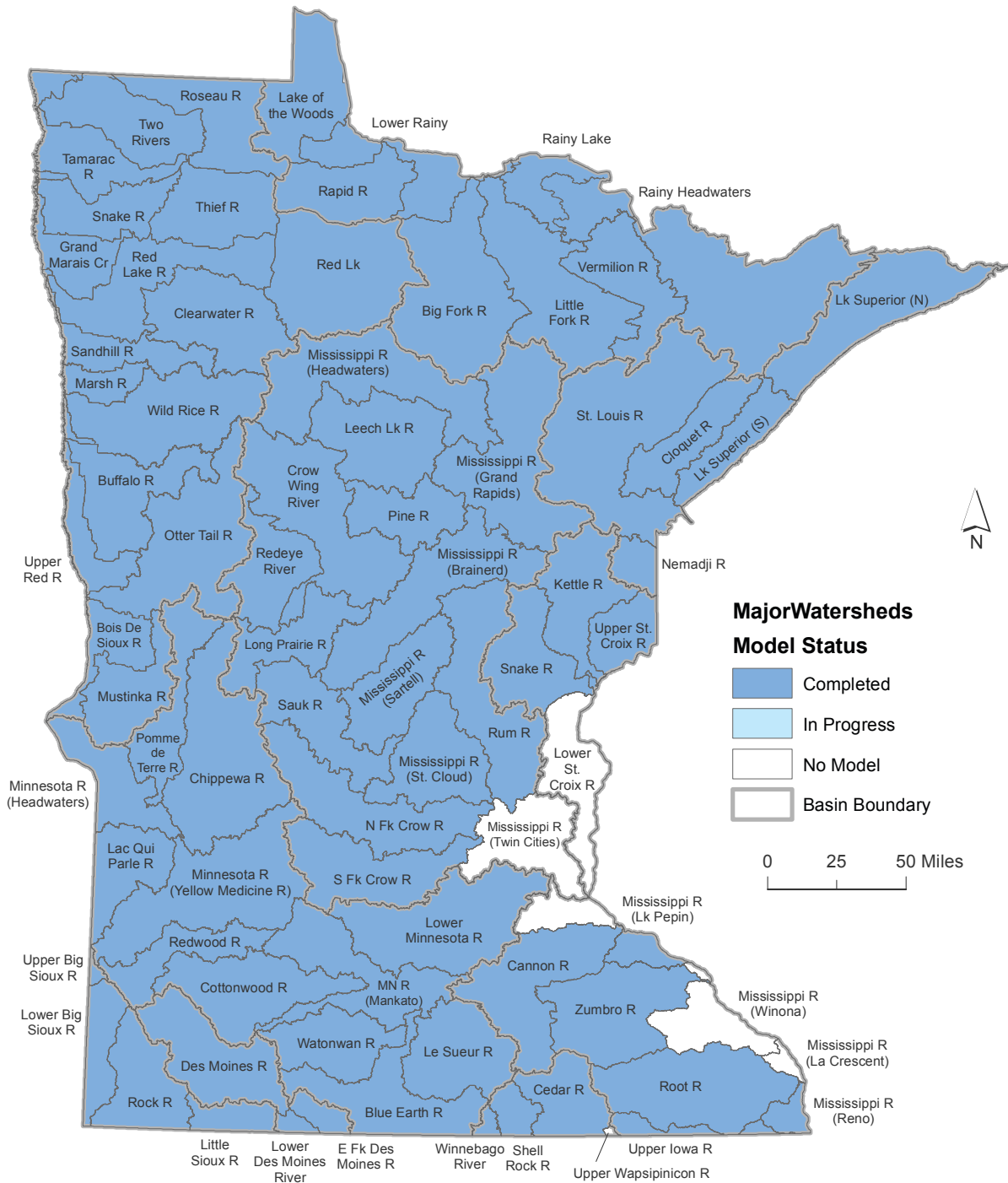
- Completed (56)
- In progress (17)
- Deferred (2)
- Future start (5)
- Basin Boundary

0 25 50 Miles



October 2018

Major watersheds model status

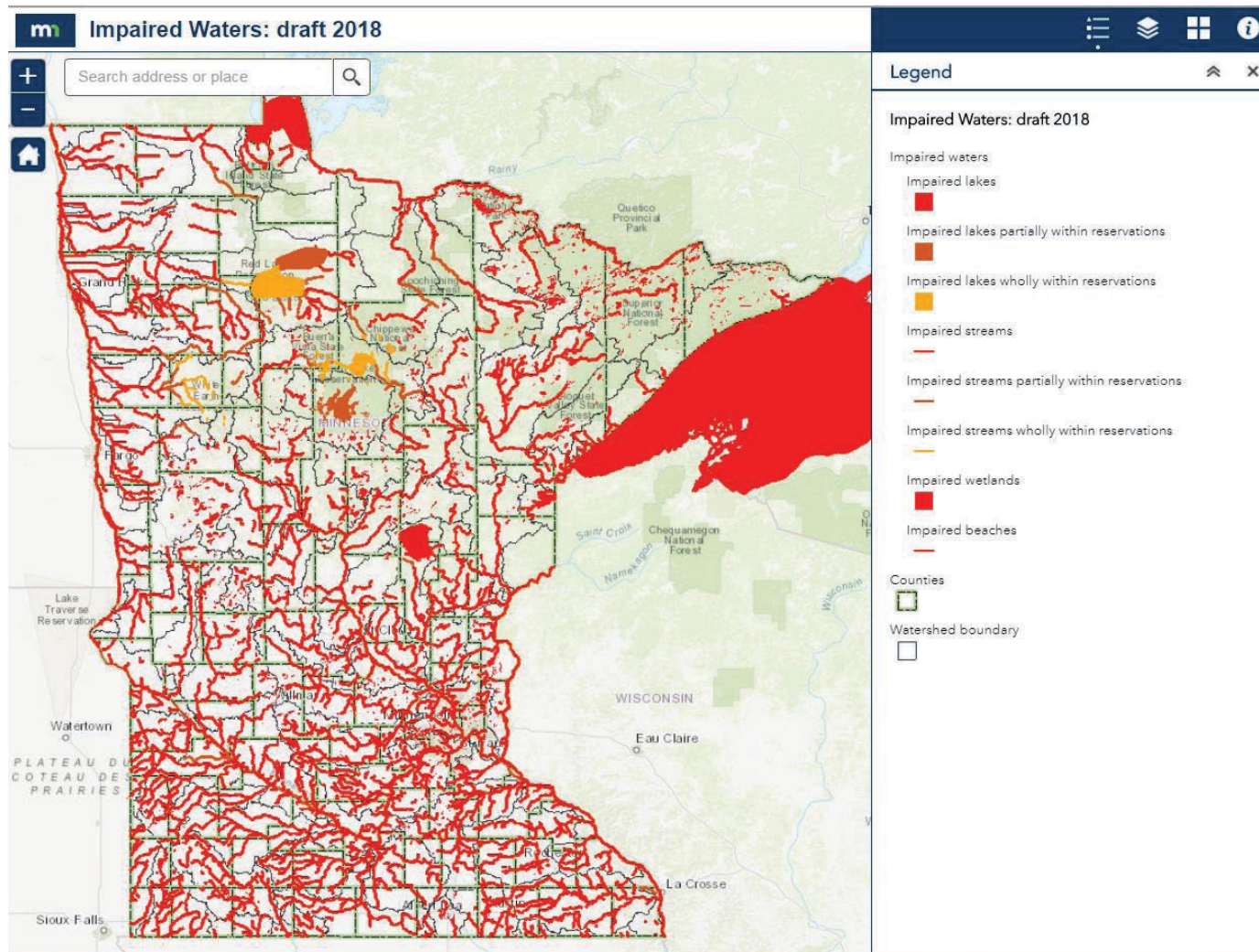


October 2018



Impaired waters in Minnesota

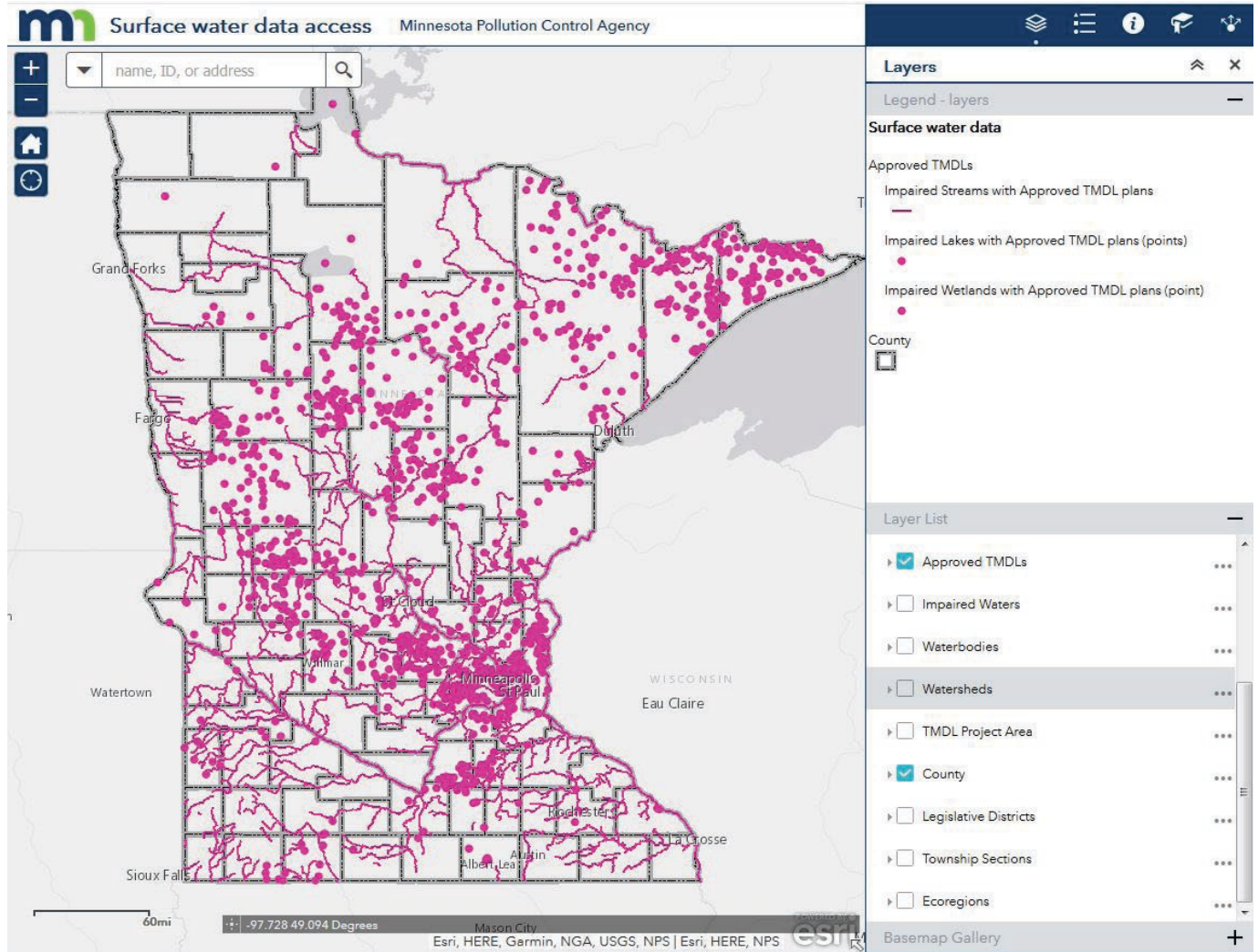
Impaired waters in Minnesota can be viewed using the MPCA web-based mapping application Impaired Waters Viewer (IWAV). The graphic below is a screen shot of the application that is available at this internet address, (click “Map” tab): https://cf.pca.state.mn.us/water/watershedweb/wdip/search_more.cfm?datatype=assessments



Approved TMDLs in Minnesota

Approved TMDLs in Minnesota can be viewed using the MPCA web-based mapping application IWAV. The graphic below is a screen shot of the application that is available at this internet address (click “Map” tab):

https://cf.pca.state.mn.us/water/watershedweb/wdip/search_more.cfm?datatype=assessments



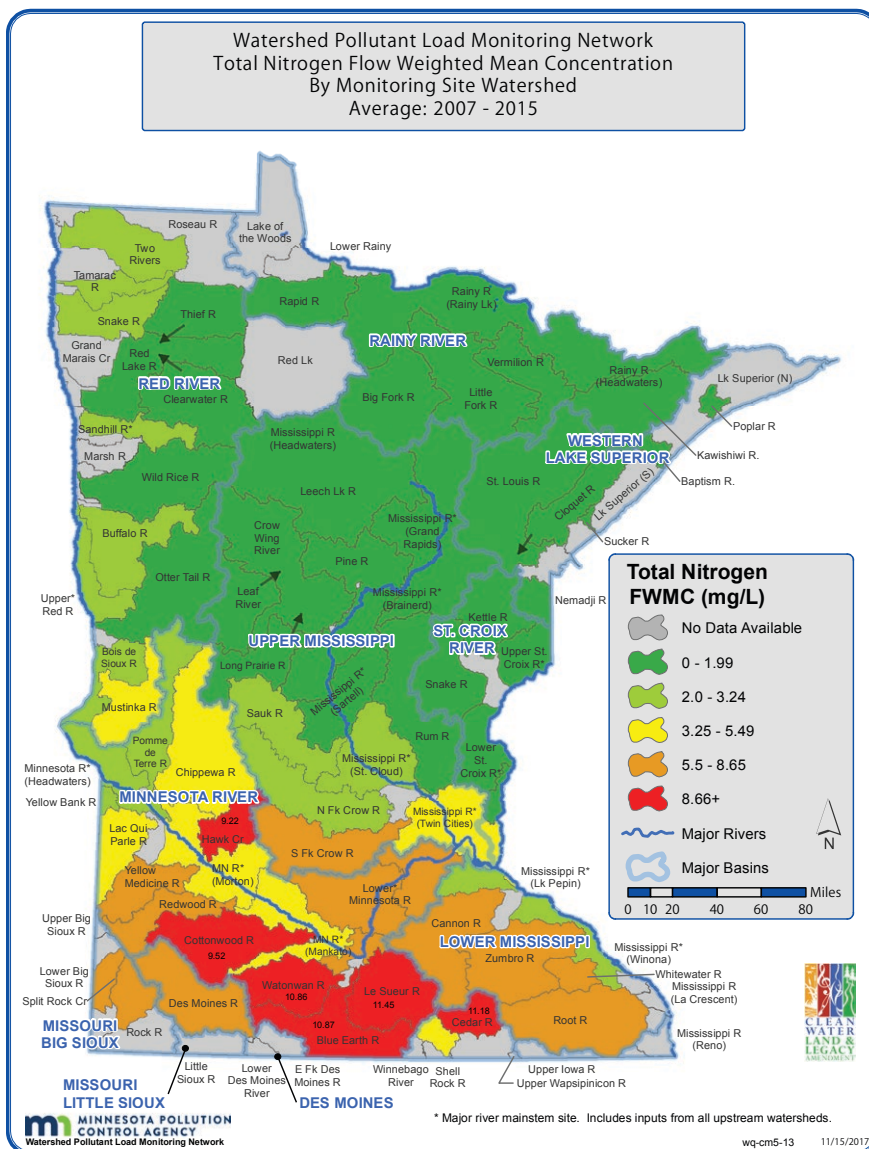
Tracking progress

November 2017

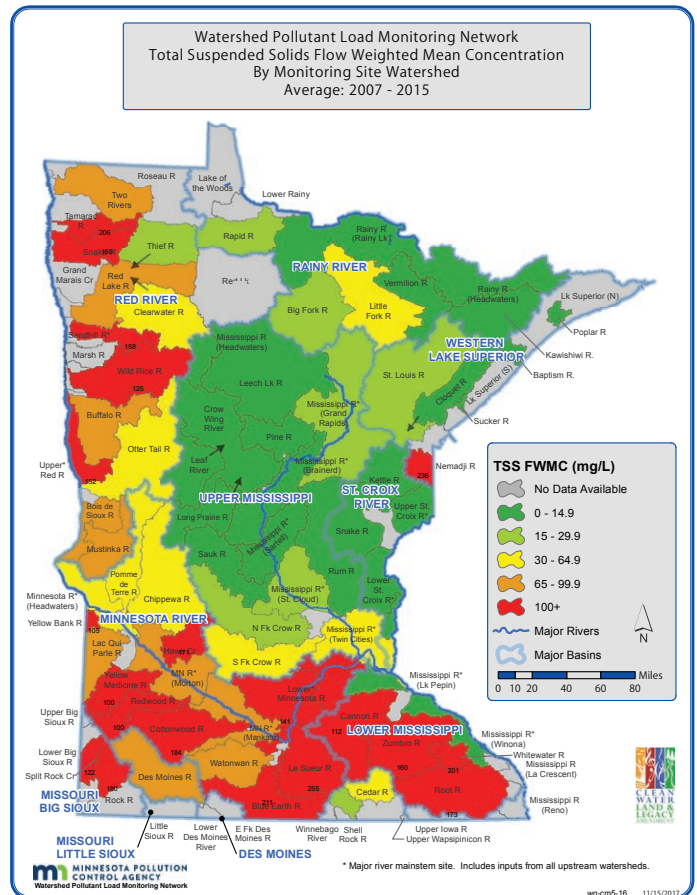
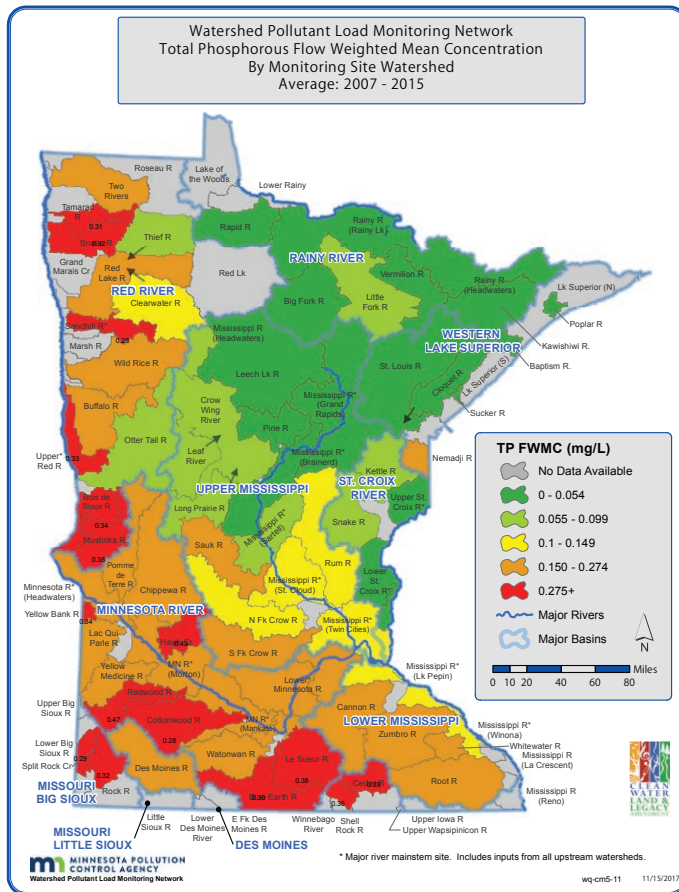
The Watershed Pollutant Load Monitoring Network is designed to obtain spatial and temporal pollutant load information from Minnesota’s rivers and streams and track water quality trends. This long-term program utilizes state and federal agencies, universities, local partners and MPCA staff to collect water quality and flow data to calculate pollutant loads. Monitoring sites span three ranges of scale:

- Basin – major river main stem sites along the Mississippi, Minnesota, Rainy, Red, and St. Croix rivers
- Major Watershed – tributaries draining to major rivers with an average drainage area of 1,350 mi² (8 digit hydrologic unit code [HUC] scales)
- Subwatershed – major branches or nodes within major watersheds with average drainage areas of approximately 300-500 mi²

Most installations occurred in 2008 and 2009, all sites were installed by the end of 2010 and intensive sampling began the year following installation.



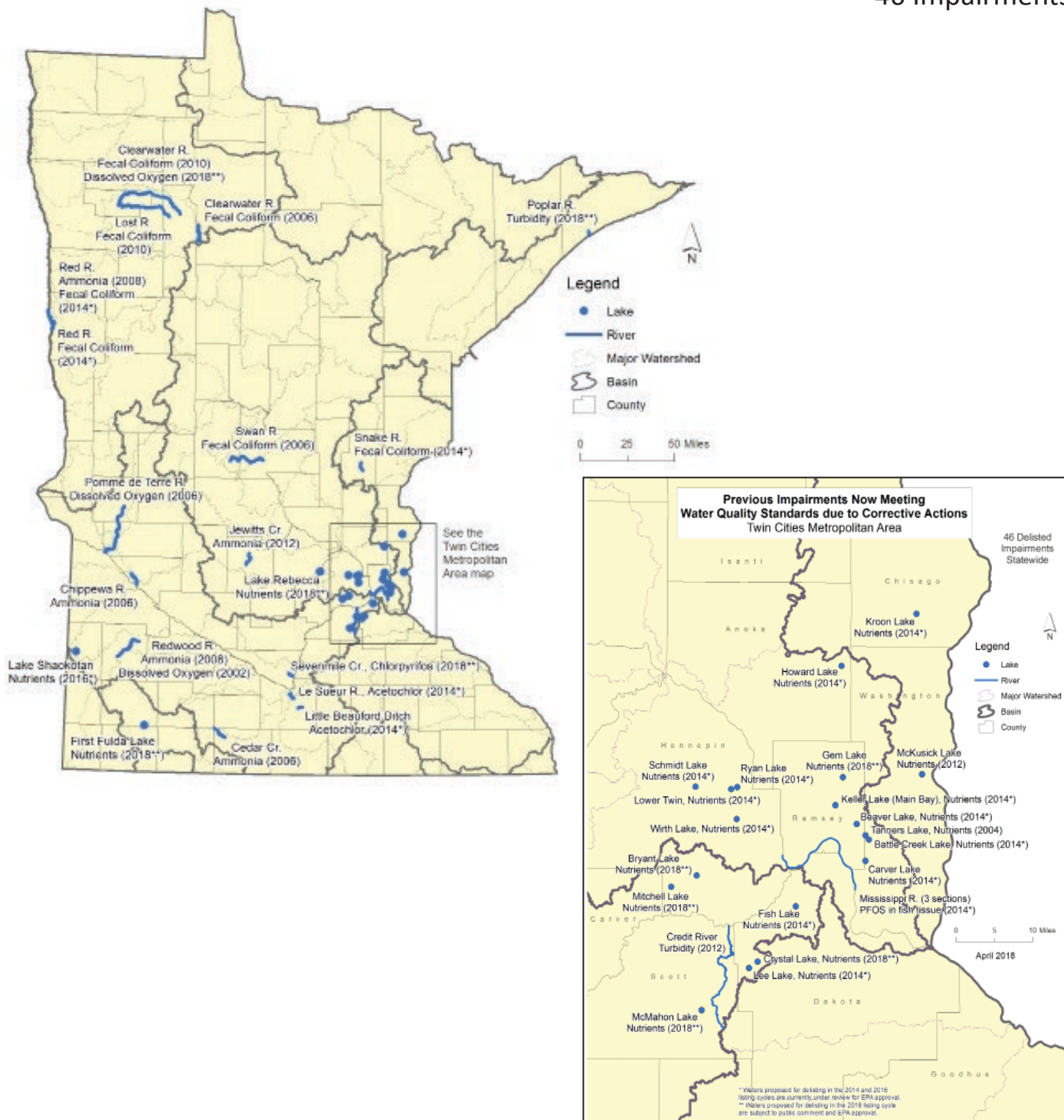
Tracking progress continued



Previous impairments now meeting water quality standards due to corrective actions

April 2018

46 Impairments



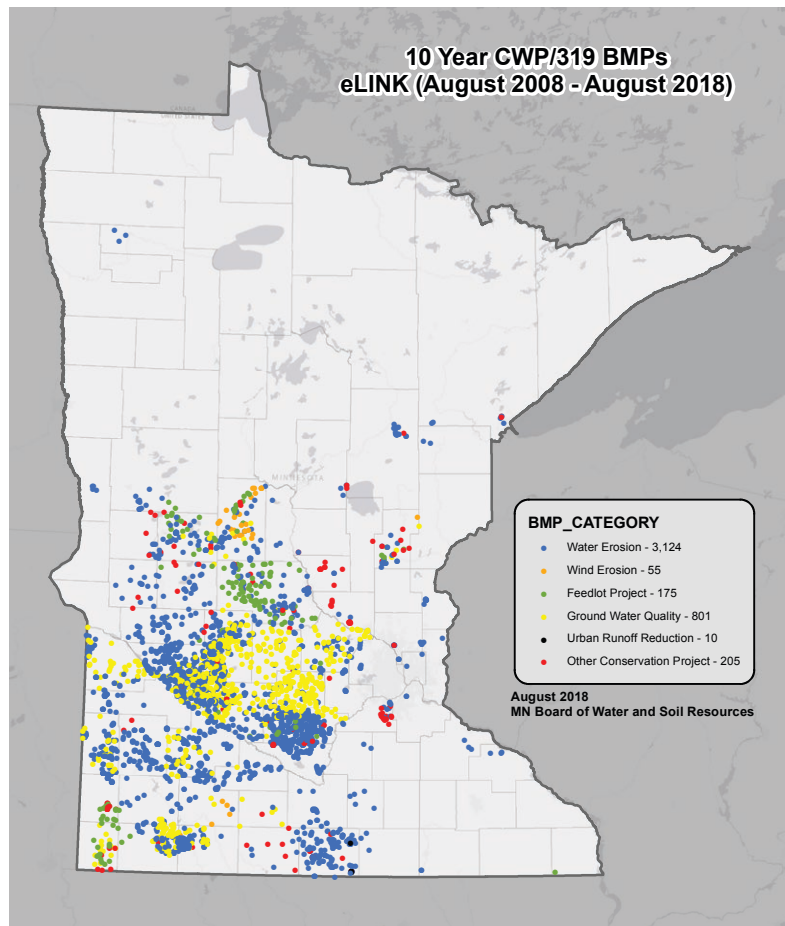
eLINK results from Section 319 and CWP projects August 2007 – August 2018

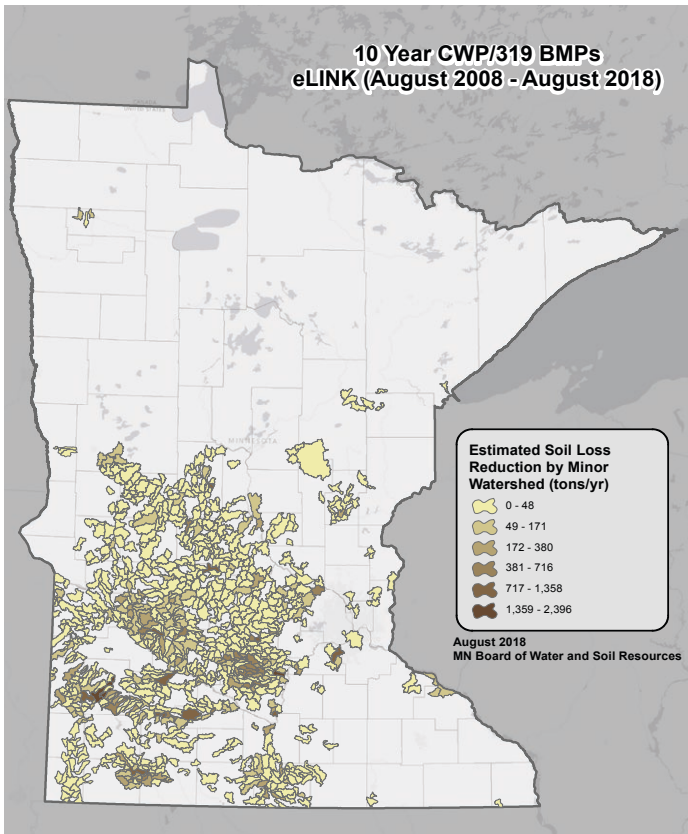
The following table shows progress through August 2018 based on reporting data from eLINK (August 2007 – August 2018). Based on eLINK reporting by CWP and Section 319 project partners, these projects have reduced **soil loss** from August 2007 through August 2018 by more than 58,856 tons per year (T/yr). During the same period, **sedimentation** was reduced by more than 85,639 T/yr, **phosphorus (P)** loading by more than 108,343 pounds per year (lbs/yr), and **nitrogen** reduction by more than 222,633 lbs/yr. This report only reflects the last 10 years.

Pollution Reduction Estimate Type	# of BMPs	Estimated Soil Loss Reduction (tons/yr)	Estimated Sediment Reduction (tons/yr)	Estimated Phosphorus Reduction (lbs/yr)	Estimated Nitrogen Reduction (lbs/yr)*
Feedlot Project	175	0	0	6,857	13,156
Ground Water Quality	801	0	7,892	6,919	15,090
Other Conservation Project	205	2,149	6,310	9,661	22,441
Urban Runoff Reduction	10	0	1	1	1
Water Erosion	3,124	56,698	71,437	84,905	171,944
Wind Erosion	55	9	0	1	1
Total	4,370	58,856	85,639	108,343	222,633

* If no nitrogen reduction was reported, then estimated nitrogen was calculated by doubling estimated phosphorus

CWP/Section 319 BMPs
eLINK (2007 – present)

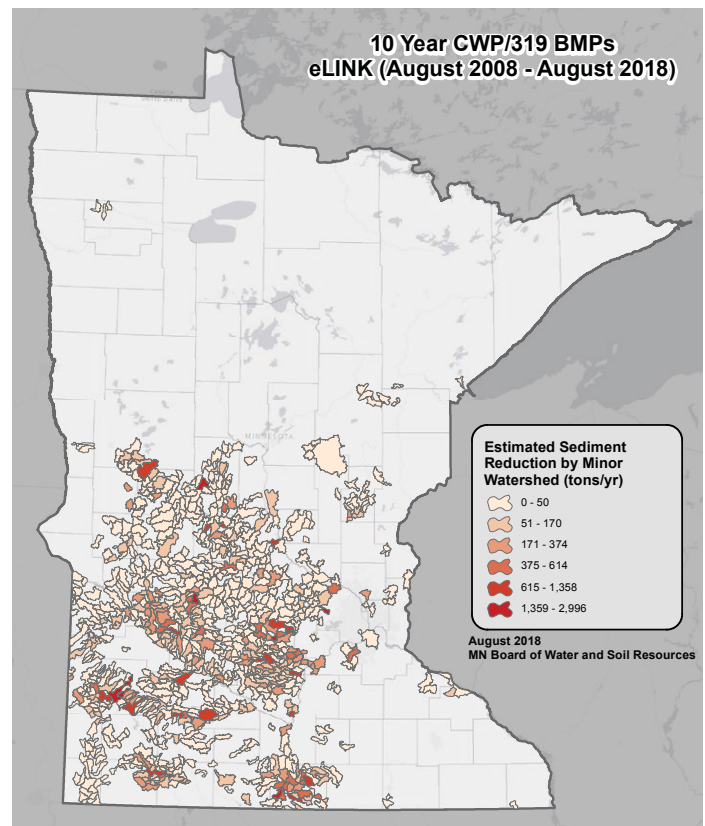




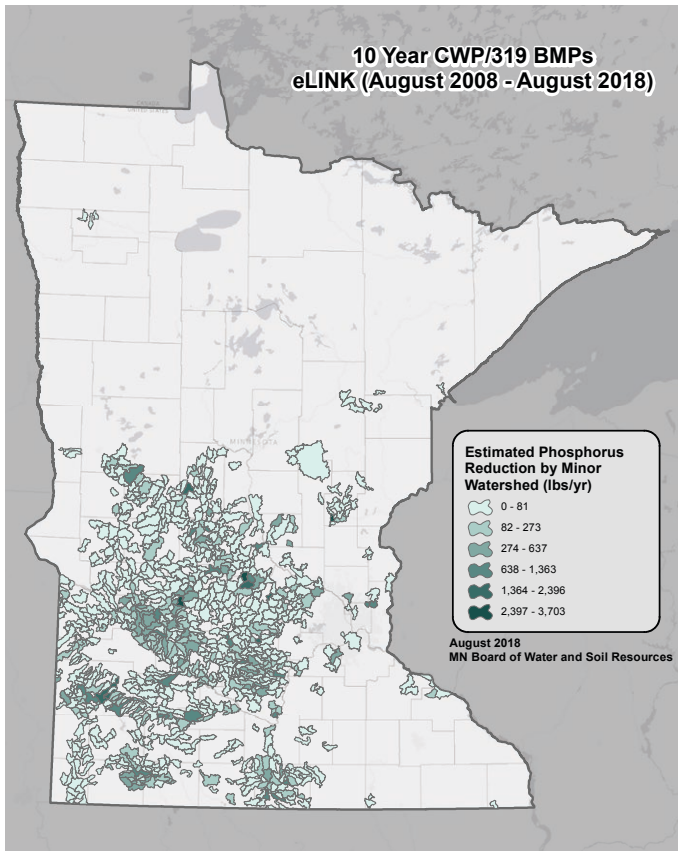
**Estimated soil loss reduction
CWP/319 BMPs
eLINK (2007 – present)**

* These are ESTIMATED soil loss reductions. They DO NOT represent reductions in WATERSHED soil loss yield. They represent the sum of estimated soil loss reductions to all water bodies (even isolated ones) within the geographic regions of the watershed.

**Estimated sediment reduction
CWP/319 BMPs
eLINK (2007 – present)**



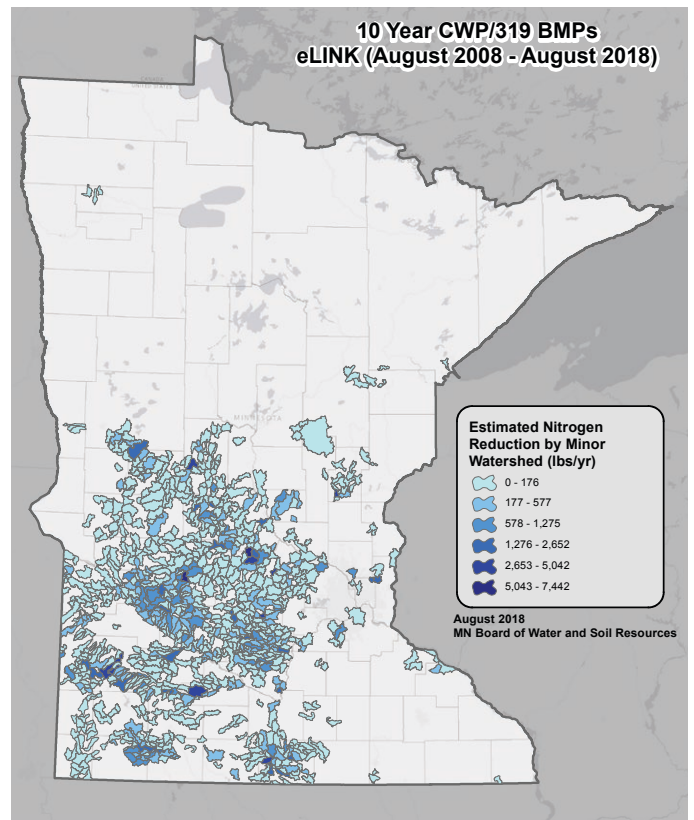
* These are ESTIMATED sediment reductions. They DO NOT represent reductions in WATERSHED sediment yield. They represent the sum of estimated sediment reductions to all water bodies (even isolated ones) within the geographic regions of the watershed.



**Estimated P reduction
CWP/Section 319 BMPs
eLINK (2007 – present)**

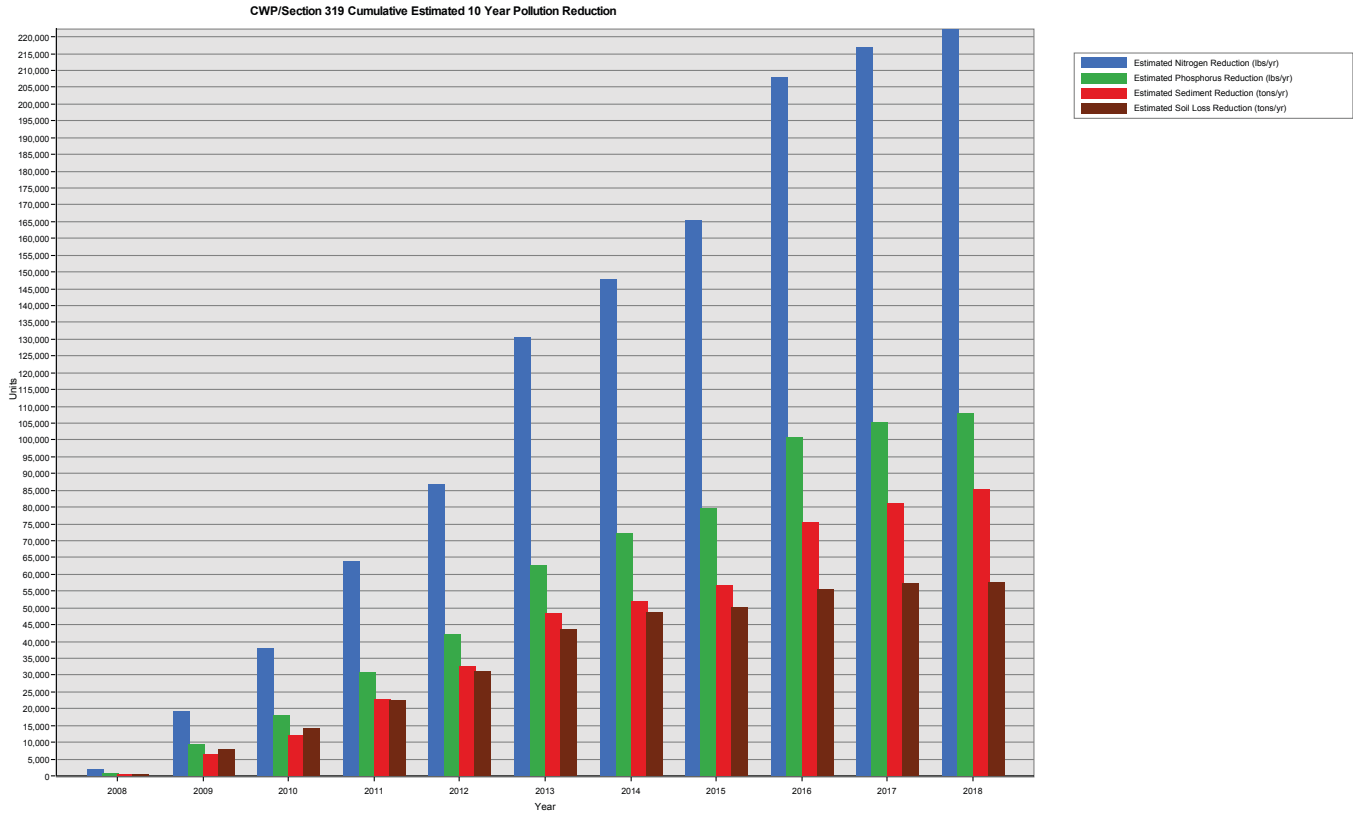
* These are ESTIMATED P reductions. They DO NOT represent reductions in WATERSHED P yield. They represent the sum of estimated P reductions to all water bodies (even isolated ones) within the geographic regions of the watershed.

**Estimated nitrogen reduction
CWP/Section 319 BMPs
eLINK (2007 – present)**



* These are ESTIMATED nitrogen reductions. They DO NOT represent reductions in WATERSHED nitrogen yield. They represent the sum of estimated nitrogen reductions to all water bodies (even isolated ones) within the geographic regions of the watershed.

CWP/Section 319 cumulative estimated pollution reduction benefits via local government reporting and eLINK (2007–2018)



All projects awarded through 2018

	Project Name	C: Complete A: Active N: New	Year Awarded	Amount
<i>Statewide</i>				
	Internal Phosphorus Load Reduction with Iron Filings	C	2013	\$ 299,047
	Performance of an Agricultural Drainage Tile Filter	C	2013	\$ 256,465
	Turf and Winter Maintenance Training	C	2013	\$ 110,000
	Level 2 Winter Maintenance Training	A	2014	\$ 129,176
	Training & Tech Support for Maintenance Staff	A	2016	\$ 249,971
	Smart Salting and Nutrient Reduction Training and Support	A	2016	\$ 15,000
Statewide Total				\$ 1,059,659

	Project Name	C: Complete A: Active N: New	Year Awarded	Amount
<i>Cedar River</i>				
	Effectiveness of Targeted Dobbins Creek BMPs	A	2014	\$ 300,000
Cedar River Total				\$ 300,000

	Project Name	C: Complete A: Active N: New	Year Awarded	Amount
<i>Des Moines and Missouri River Basins</i>				
	Heron Lake Third Crop Phosphorus Reduction Effort	C	2013	\$ 33,120
	WFDNR Targeting and Prioritizing Endeavor	A	2015	\$ 21,955
	Heron Lake TMDL Nutrient Reduction Project	A	2016	\$ 450,000
Des Moines and Missouri River Basins Total				\$ 505,075

	Project Name	C: Complete A: Active N: New	Year Awarded	Amount
<i>Lake Superior Basin</i>				
	Port Authority Stormwater Study and Concept Design	A	2015	\$ 24,000
Lake Superior Basin Total				\$ 24,000

	Project Name	C: Complete A: Active N: New	Year Awarded	Amount
<i>Lower Mississippi</i>				
	Reducing Runoff from Southeast Minnesota Feedlots	C	2013	\$ 300,000
	Building a Culture of Citizen Engagement	A	2014	\$ 57,620
	Zumbro River: Ultra-Urban Vol/TSS/FeC Reduction	A	2014	\$ 300,000
	Downtown Winona Pre-Mississippi River Rain Garden	A	2015	\$ 41,324
	Middle Fork Zumbro River Critical Source Area Restoration	A	2016	\$ 219,000
	Mississippi River Lake Pepin Watershed WRAPS Implementation	A	2016	\$ 87,500
	Cedar River Capital Improvement Project Implementation	C	2017	\$ -
	Reducing Bacteria from Southeast Minnesota Feedlots	A	2017	\$ 336,000
	Whitewater Watershed Nitrogen Reduction Project	A	2017	\$ 232,825
Lower Mississippi Total				\$ 1,574,269

	Project Name	C: Complete A: Active N: New	Year Awarded	Amount
<i>Minnesota River Basin</i>				
	Middle Minnesota Watershed, Implementation of Conservation Practices	A	2011	\$ 1,400,000
	Chippewa River Accelerated Restoration	C	2012	\$ -
	Chippewa River Phosphorus Reduction Practices	C	2013	\$ 279,518
	Hawk Creek – Minnesota River Phosphorus Reduction	C	2013	\$ 228,992
	High Island Creek – McLeod County SSTS Project	C	2013	\$ 120,000
	Rush River Watershed – Nicollet County SSTS Project	C	2013	\$ 150,000
	Scott Watershed Management Organization TMDL Implementation	C	2013	\$ 298,512
	Blue Earth River Dissolved Oxygen: Managing Flows & Nutrients	C	2014	\$ 234,334
	Hawk Creek Watershed Dissolved Oxygen Restoration Project	A	2014	\$ 237,585
	Pomme de Terre WRAPS Implementation Project	A	2014	\$ 275,000
	Greater Blue Earth Nonpoint Reduction Initiative	A	2014	\$ 364,163
	Lower Prior Lake Protection Project Implementation	A	2014	\$ 142,522
	Renville County Minnesota River Mankato Watershed Protection Project	A	2014	\$ 306,750
	Blue Earth River Green Infrastructure Project	C	2014	\$ 1,010,000
	Lake Waconia Stormwater BMP Enhancement	C	2014	\$ 93,000
	Middle Minnesota Watershed SSTS Loan Project	A	2014	\$ 960,000
	Chippewa River Watershed Protection	A	2015	\$ 646,965
	GBERBA Conservation Drainage Partnership Program	A	2015	\$ 147,200
	Redwood River Turbidity Reduction Project	A	2015	\$ 150,512
	Quarry Creek Collaborative	A	2015	\$ 1,998,800
	Carp Management in Spring Lake & Prior Lake	A	2015	\$ 67,323
	Greater Blue Earth River Basin TMDL Implementation	A	2016	\$ 400,000
	Chippewa River Sediment Reduction	A	2016	\$ 285,878
	Le Sueur River WRAPS Implementation Endeavor	A	2016	\$ 347,950
	Minnesota River and Sand Creek Improvement Project	C	2016	\$ 565,000
	Hawk Creek Watershed Subsurface Sewage Treatment System (SSTS) Upgrade Implementation	A	2016	\$ 1,050,000
	Hawk Creek Watershed FY16 Implementation Project	A	2016	\$ 190,054
	Pomme de Terre WRAPS BMP Implementation Project	A	2016	\$ 285,000
	Chippewa Countywide Septic System Upgrades	N	2017	\$ 200,000
	Hawk Creek Watershed Improvement Project	A	2017	\$ 397,000
	Mankato Watershed – Renville Co FY17 Improvement Project	A	2017	\$ 297,000
	Seven Mile Creek Assessment and Implementation	A	2017	\$ 475,524
	Lac Qui Parle-Yellow Bank SSTS Loan Program	A	2017	\$ 500,000
	Swift County SSTS Upgrades	N	2018	\$ 250,000
Minnesota River Basin Total				\$ 14,354,582

	Project Name	C: Complete A: Active N: New	Year Awarded	Amount
<i>Red River Basin</i>				
	Red River Basin Reservoir Nutrient Load Reduction	A	2014	\$ 289,998
Red River Basin Total				\$ 289,998

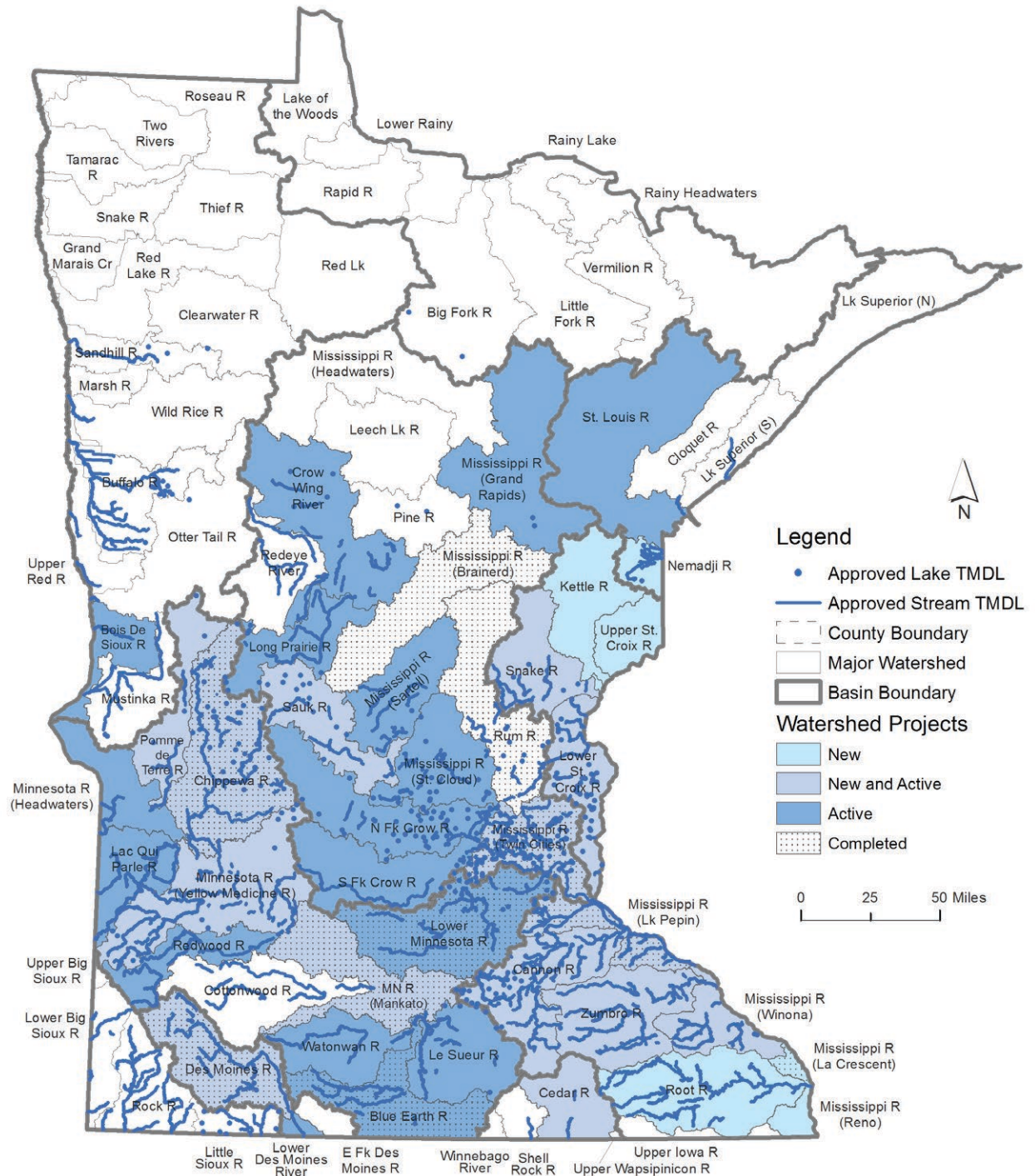
	Project Name	C: Complete A: Active N: New	Year Awarded	Amount
<i>St. Croix River Basin</i>				
	Forest Lake Diagnostic Study	A	2015	\$ 52,500
	Kanabec Water Resources Protection Project Phase 2	A	2015	\$ 196,200
	Moody Lake Wetland Rehabilitation Project	A	2016	\$ 81,497
	Snake River Watershed Resource Protection Project	A	2016	\$ 400,000
	Lower St. Croix Targeted Phosphorus Reduction Project	A	2017	\$ 300,000
	Goose Lake TMDL Final Implementation Projects	A	2017	\$ 76,000
	Marine on St. Croix Stormwater Phase 2	A	2017	\$ 92,500
	Pine County SSTS Upgrades	N	2017	\$ 600,000
	Comfort Lake Forest Lake Adaptive Management Project Implementation	N	2018	\$ 1,500,000
St. Croix River Basin Total				\$ 3,298,697

	Project Name	C: Complete A: Active N: New	Year Awarded	Amount
<i>Upper Mississippi River Basin</i>				
	Targeting BMPs in the Crow River Watershed	C	2012	\$ 1,100,000
	Bald Eagle Lake TMDL Implementation	C	2013	\$ 400,000
	Crooked Lake Basin Restoration Project	A	2013	\$ 665,000
	Long Prairie River Dissolved Oxygen TMDL Implementation	C	2013	\$ 300,000
	North Fork Crow River Septic System/ Feedlot Upgrades	A	2013	\$ 500,000
	Big Sandy and Minnewawa Lakes Phosphorus Reduction	A	2014	\$ 86,100
	Clearwater River Watershed Alternative Tile Intake	A	2014	\$ 45,000
	Osakis Lake Nutrient Reduction - Crooked Lake	A	2014	\$ 286,652
	Shingle Creek DO Reaeration Improvements	C	2014	\$ 93,500
	Mille Lacs Lake Protection - Stormwater Control	A	2014	\$ 85,520
	Pleasant Lake Stormwater Quality Improvements	C	2014	\$ 164,800
	Buffalo Creek - Marsh Water Project	A	2014	\$ 304,540
	Middle Sauk River Targeted Reduction & Outreach	A	2014	\$ 482,215
	Clearwater River Restoration & Protection Phase II	A	2015	\$ 72,000
	MFCRWD Loan Program for BMPs/Septic Upgrades	A	2015	\$ 110,000
	Northwood Lake Water Quality Improvement Project	A	2015	\$ 300,000
	Swan River Headwaters Subwatershed Restoration	A	2015	\$ 38,650
	Ardmore Avenue Stormwater Retrofit	C	2015	\$ 33,163
	NE St. Cloud Mississippi River Protection Project	A	2015	\$ 200,000
	SRWD Groundwater Protection Project	A	2015	\$ 260,000
	Crow River SSTS Restoration Project	A	2017	\$ 1,350,000
	Lake Osakis Minor Watershed Nutrient Reduction	A	2017	\$ 300,000
	Lower Sand Creek Corridor Restoration	A	2017	\$ 269,563
	Osakis Lake Basin Restoration - Phase 2 Implementation	N	2018	\$ 1,500,000
Upper Mississippi River Basin Total				\$ 8,946,702

Summary of statewide watershed project activity

Projects completed, currently active and awarded

Made possible through a variety of funding sources – EPA Section 319 grants, CWF, and CWP – and the dedication and hard work of our agency partners, the following map represents major watersheds where water quality improvement projects are currently underway, ready to begin, or recently completed in the state.



Statewide

Projects completed

Performance of an Agricultural Drainage Tile Filter

Internal Phosphorus Load Reduction with Iron Filings

Smart Salting and Nutrient Reduction Training and Support – Amendment

Performance of an Agricultural Drainage Tile Filter

The purpose of this project was to measure the total phosphorus and soluble phosphorus capture performance of an iron enhanced sand filter (IESF) in Wright County, Minnesota, near the cities of Buffalo and Rockford. This IESF was installed in 2012 to treat water from approximately 18.4 acres of farmland (crop and pasture) that drains towards a shallow wetland and into a tile drainage system. Water from the IESF discharges into a wetland that ultimately drains into Martha Lake.

Waterbody improved

Though Martha Lake is not currently listed on Minnesota's 303(d) List of Impaired Waters, it is managed for protection from becoming impaired. The watershed draining to Martha Lake is managed to reduce excessive phosphorus loading. One management strategy that targets a reduction in phosphorus loading to Martha Lake was the installation of an IESF that intercepts a tributary ditch to Martha Lake and captures total and soluble reactive phosphorus (phosphate). Although the quality of the effluent from the IESF was substantially improved, the impact of this IESF on the overall water quality of Martha Lake was not directly evaluated, because monitoring was not included in this grant.

Project highlights

- Natural rainfall/discharge events were monitored during summer and fall months (June through November) in 2015 and 2016 to assess the performance of an IESF near Buffalo and Rockford,



IESF after rainfall withstanding water



Construction iron aggregate being mixed with sand by rototiller

Minnesota. This stormwater treatment practice is designed to capture soluble reactive phosphorus (phosphate) and total phosphorus, thereby reducing the phosphorus load to Martha Lake. Approximately 66% (0.955 kg or 2.11 lbs) of total phosphorus and 64% (0.688 kg or 1.52 lb) of phosphate was captured by the IESF during the study (2015 and 2016).

Partnerships

- University of Minnesota St. Anthony Falls Laboratory – research efforts
- Wright Soil and Water Conservation District-in-kind match, maintenance of IESF, and sampling
- Landowner-project location and in-kind match

Financial information

Funding type: Section 319
Grant amount: \$256,465
Matching funds: \$214,560

Contact information

John Gulliver
Professor
University of Minnesota
2 Third Ave SE
Minneapolis, MN 55414
612-625-4080, gulli003@umn.edu
MPCA project manager: David Wall

Internal Phosphorus Load Reduction with Iron Filings

High internal loading of phosphorus occurs in many watersheds and is a difficult problem to solve in lakes. Phosphorus bound to lake sediments is released back into the lake water column, induced by changes in environmental conditions related to dissolved oxygen and pH, and this released phosphorus contributes an additional, internal load of phosphorus to the lake. Internal loading can be significant in some lakes, and both external and internal loading of phosphorus need to be addressed to reduce algal blooms and manage lake restoration efforts.

Waterbody improved

Internal phosphorus loading has been identified as important in Ann Lake in Wright County and potentially important in West Rush Lake in Chisago County. West Rush Lake and Ann Lake are in the EPA's 303(d) List of Impaired Waters due to nutrient and eutrophication problems. In this project, sediments from West Rush Lake and Ann Lake were set up for laboratory-scale mesocosm studies. Lake sediments with overlying water were exposed to oxic and anoxic conditions, and the effects of the addition of iron filings on the release of phosphorus from the sediments were determined. The project investigated the application of iron filings as a viable option for treating lakes affected by high internal phosphorus loading and eutrophication due to excess phosphorus, and computed the quantity of iron filings required for both Ann Lake and West Rush Lake.

Project highlights

- The amendment of lake sediments with iron filings to control sediment-phosphorus release was investigated in the laboratory, including batch jar tests of various sources of iron filings and laboratory column tests of 85 lake sediment cores and overlying lake water from the two lakes. The dissolved oxygen status of the water column was altered to simulate oxic and anoxic conditions. Various sources of iron filings were evaluated, including taconite tailings from the Minnesota Iron Range. The flux of phosphate from the sediments to the overlying water was measured in sediments with and without iron filings addition under oxic and anoxic conditions. Different iron dosages were tested to determine the quantity of iron required to successfully sequester phosphorus in the sediments



Sediment coring exercise in the laboratory

and the conditions under which the iron addition will be effective. The influences of temperature and high sulfate on phosphorus release and iron dosing requirements were also evaluated. Sediment analysis was performed to understand the effect of iron dosing on sediment phosphorus and mineralogy. The sediments from West Rush Lake and Ann Lake released phosphate (P) under anoxic conditions at 20°C. At 10°C, the measured P release rate was approximately one-fourth the rate at 20°C. Oxic P release was generally not observed. Iron filings with a high iron content were very effective in sequestering phosphorus in sediments under anoxic conditions. Iron filings with lower iron content were not effective. After the application of iron filings to the sediment surface, a clear iron dose-P release response emerged indicating that iron addition lowers the water column P level as well as prevents P release, even under anoxic conditions. Timing of application of iron filings is important. Application of iron filings is a technique with the potential ability to reduce non-point source

pollution of phosphorus released by lake sediments throughout the state. With numerous lakes that experience internal phosphorus loading in Minnesota, the potential impact is substantial.

Partnerships

- The Rush Lake Improvement Association, Chisago County, Ann Lake Association, and Wright County Soil and Water Conservation District (SWCD) were the project partners and provided in-kind match for this project. Monthly water quality sampling in Rush Lake was conducted as part of Chisago County's lake monitoring program. Wright SWCD conducted the water quality sampling of Ann Lake.

Financial information

Funding type: Section 319

Grant amount: \$299,041

Matching funding: \$245,342

Contact information

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Professor

University of Minnesota

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612-625-4080, gulli003@umn.edu

MPCA project manager: Nick Gervino

Smart Salting and Nutrient Reduction Training and Support - Amendment

Outdoor maintenance activities directly affect the quality of waterbodies in Minnesota especially in the Twin Cities Metro Area (TCMA) with its high levels of impervious area and large amount of turf grass, all which require maintenance activities. The TCMA has more than 1,000 lakes, rivers, streams, and wetlands. The use of chemical products for outdoor maintenance, specifically chloride from road salt and phosphorus and nitrogen (from fertilizers used on turf) and from unhealthy turf grass, contribute to the impairment of our waters.

Waterbody improved

Implementing the certification training programs and providing input to watershed organizations will affect many waterbodies as well as groundwater throughout the TCMA. BMPs adopted because of training and certification will reduce the use of salt and sand used in winter maintenance; and nutrients used for turf grass maintenance.

Project highlights

- The funds provided through this amendment allowed FCI to conduct three additional classes, two Turfgrass Maintenance and one Smart Salting Class for Roads. These were all funded through the amendment, but some FY15 funds were used for part of the work. Some updates to the class materials were made. The additional classes provided training to 60 individuals from 27 organizations in turfgrass or winter maintenance best management practices. These individuals were provided with a manual and information to help them improve their practices by making them more efficient and appropriate for the conditions.

Partnerships

These partners hosted classes, including providing a venue and refreshments, advertising, registration and coordinating with FCI prior to and on the day of the class:

- Mississippi Watershed Management Organization (MWMO)
- Dakota County-Vermillion River Watershed

Financial information

Funding type: Section 319

Grant amount: \$5,556

Contact information

Connie Fortin

President

Fortin Consulting, Inc.

215 Hamel Rd.

Hamel, MN 55340

763-478-3606, connie@fortinconsulting.com

MPCA project manager: Brooke Asleson

Statewide

Active projects in 2018

HSPF Scenario Application Manager User Group Workshop – 2015

Sponsor: RESPEC

Funding: Section 319 (Grant) \$10,060

Purpose: Provide funding for a SAM User Group workshop to assess the needs of likely users for a watershed-scale, decision-support tool to facilitate prioritization and placement of BMPs to achieve the needed pollution reductions identified by the WRAPS/TMDL reports.

Level 2 Winter Maintenance Training – 2014

Sponsor: Fortin Consulting, Inc.

Funding: Section 319 (Grant) \$129,176

Purpose: Create a Level 2 winter maintenance training curriculum, conduct up to 24 Level 2 MPCA certification training courses and/or presentations; train up to 400 senior maintenance professionals and certify the majority; produce specific and substantial organizational changes in maintenance practices as a result of training; and produce and distribute the use of education. We will evaluate success by the number of classes conducted, number of short presentations given in support of the long-term viability of the program, number of individuals trained, number of organizations trained, educational materials produced and distributed, number of individuals certified, estimated pollutant reductions, Winter Maintenance Assessment reports/refinement and course evaluations.

Training & Tech Support for Maintenance Staff – 2016

Sponsor: Fortin Consulting, Inc.

Funding: Section 319 (Grant) \$249,971

Purpose: Reduce loading of nutrients and chloride to surface and groundwater from outdoor maintenance activities through presentation of 70-80 BMP instruction workshops (Winter Maintenance for Roads, Winter Maintenance for Sidewalks and Parking Lots, Level 2 Winter Maintenance and Turfgrass Maintenance); 3 webinar events to serve as updates or more detailed information to the BMP information given to those already trained; 3 field information exchanges or demonstrations targeted on particular BMPs that show potential for large reductions in chemical use

and identification of new techniques and technologies by maintenance and appropriate environmental professionals, with inclusion of these into workshops if warranted.

Turf and Winter Maintenance Training Amendment – 2016

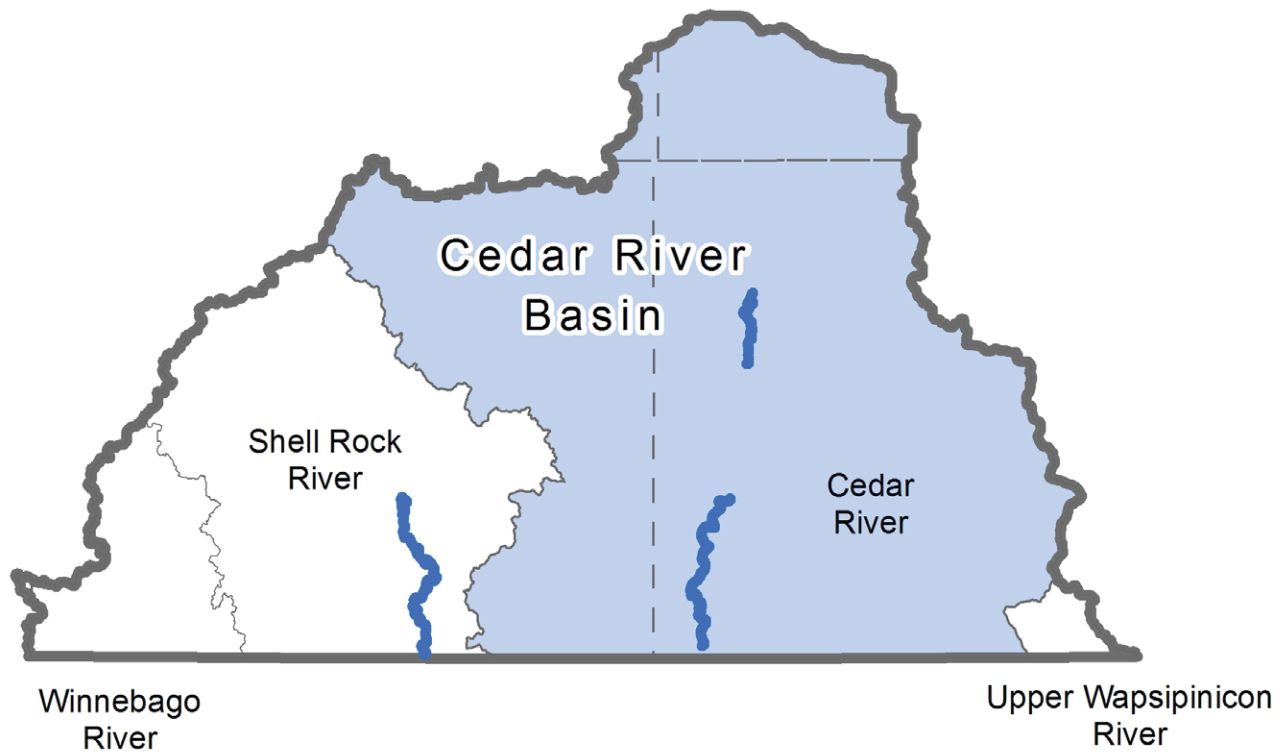
Sponsor: Fortin Consulting, Inc.

Funding: Section 319 (Grant) \$15,000

Purpose: This grant amendment funding providing an additional 3 turfgrass maintenance classes, 2 roads classes and 2 parking lot maintenance classes, and a 2 hour presentation at the Minnesota Chief Engineers Guild Annual Conference. We were able to train an extra 114 maintenance professionals, public and private, who engage in winter and summer activities which lead to the introduction of nutrients/P and chloride into the environment. We also offered the MPCA test for voluntary Level 1 Certification. Past in-class exercises and surveys shows a minimum reduction of 20% in chlorides and 35% reduction of P.

Cedar River Basin

None were completed in 2018

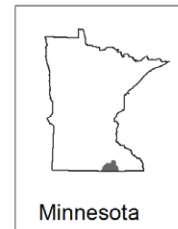
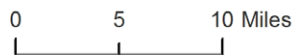


Legend

- Approved Lake TMDL
- Approved Stream TMDL
- - - County Boundary
- Major Watershed
- ▭ Basin Boundary

Watershed Projects

- New
- ▭ New and Active
- ▭ Active
- ▭ Completed



Cedar River

**Cedar River Capital Improvement Project
Implementation**

Sponsor: Cedar River Watershed District

Financial information

Funding type: CWP Grant

Grant amount: \$0

This project was cancelled by the loan sponsor.

Cedar River Basin

Active projects

No projects were awarded in 2018

Effectiveness of Targeted Dobbins Creek BMPs – 2014

Sponsor: Cedar River Watershed District

Funding: Section 319 (Grant) \$300,000

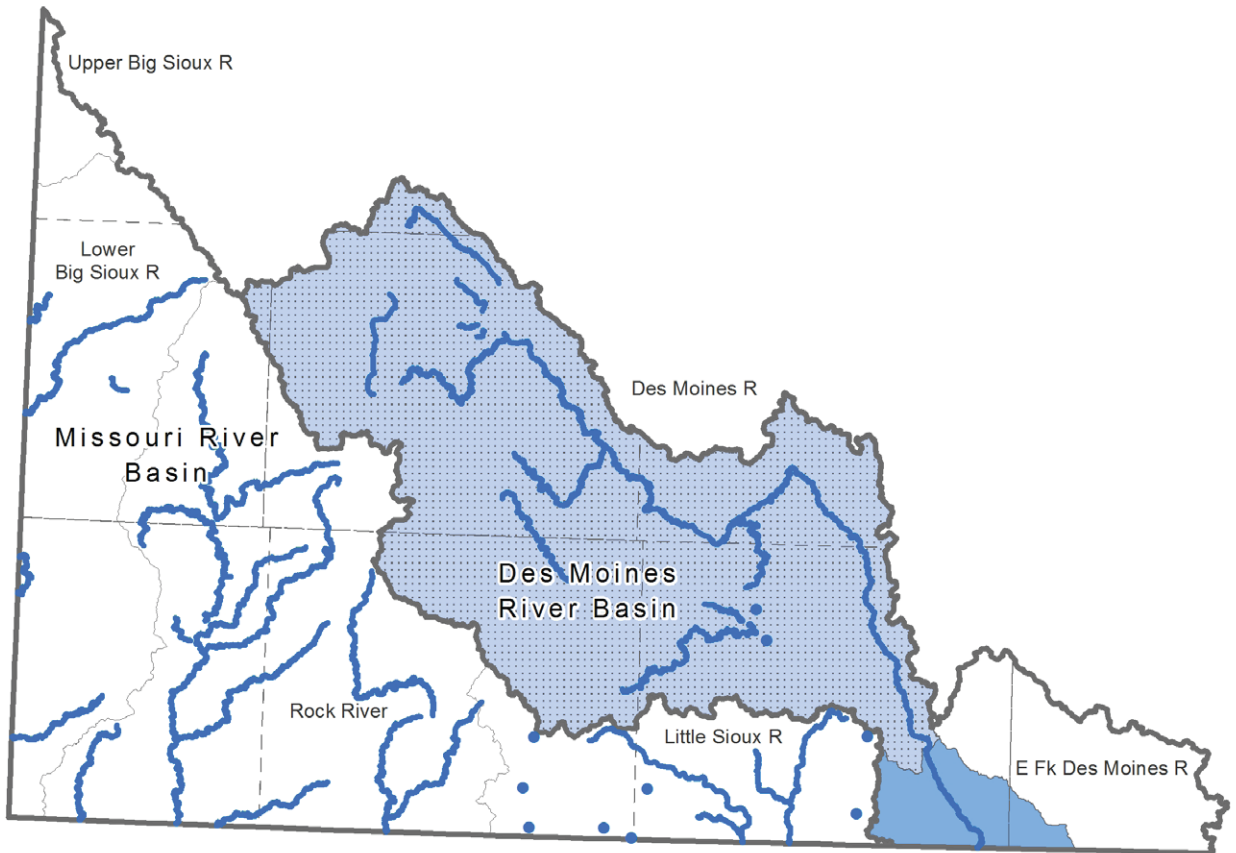
Purpose: Demonstrate the ability of new GIS and Light Detection and Ranging (LiDAR) technology to facilitate water quality and aquatic habitat improvements in waterways receiving agricultural drainage using a suite of targeted conservation practices. The primary focus will be to assess and document targeted BMP performance in reducing sediment, nutrient, and fecal coliform loads, improving index of biological integrity (IBI) scores, and to analyze these changes from financial and watershed perspectives. This project will demonstrate the impact of prioritized, targeted, and tailored BMPs in the Dobbins Creek watershed with respect to hydrologic pathways and processes. This method could serve as a model for future watershed comprehensive BMP implementation projects.

Des Moines and Missouri River Basins

Projects completed

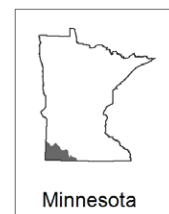
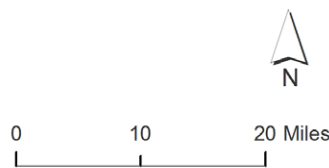
Des Moines River – Headwaters

Heron Lake Third Crop Phosphorus Reduction Effort



Legend

- Approved Lake TMDL
 - Approved Stream TMDL
 - - - County Boundary
 - Major Watershed
 - ▭ Basin Boundary
- Watershed Projects**
- New
 - ▨ New and Active
 - Active
 - ▤ Completed



Des Moines – Headwaters

Heron Lake Third Crop Phosphorus Reduction Effort

The Heron Lake Watershed encompasses approximately 472 square miles and is located in portions of Nobles, Jackson, Murray, and Cottonwood Counties in southwestern Minnesota. North and South Heron Lake were added to the impaired waters list in 2002 for nutrient/eutrophication biological indicators. Third crops are any crops other than corn and soybeans that are not row crops. Small grains, hay, pasture, and cover crops are considered third crops. The main goal of implementing third crops is to reduce nonpoint source pollution loading from agricultural lands that are in annual tillage. The Cover Crop Steering Committee was established as part of this grant project. The Committee consisted of local farmers, a banker, a crop insurance agent, a crop consultant, a local nonprofit conservation group, and county and federal government agency personnel.

Project highlights

- Four farm families were engaged in cover crop implementation. The same 200 acres of cover crops were seeded in four 50-acre fields over four continuous growing seasons, resulting in a reduction of 33.7 tons of sediment annually. Cover Crop Steering Committee members participated in several meetings that included brainstorming sessions, first-hand information from farmers implementing cover crops, and a presentation from an expert in the field. The Committee identified the need for further education and local research and recommended the implementation of side-by-side field trials along with annual field days over a five-year period. Their recommendation is being implemented by the Heron Lake Watershed District (HLWD).

Partnerships

- HLWD: project sponsor, project staff, project administration, and in-kind contribution
- Jerry and Nancy Ackermann: cooperators
- Dave Christoffer: cooperator
- Jerry and Terry Perkins: cooperators
- Tim Hansberger: cooperator
- Extended Ag Services, Inc.: soil sample analysis



Cover crops after corn harvest

Financial information

Funding type: Section 319

Grant amount: \$32,989

Matching funding: \$72,882

Contact information

Jan Voit, District Administrator

Heron Lake Watershed District

PO Box 345

Heron Lake, MN 56137

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jan.voit@mysmbs.com

MPCA Project Manager: Katherine Pekarek-Scott

Des Moines and Missouri River Basins

Active projects

No projects were awarded in 2018

Des Moines River Basin

Des Moines River – Headwaters

Heron Lake TMDL Nutrient Reduction Project – 2016

Sponsor: Heron Lake Watershed District

Funding: CWP (Loan) \$450,000

Purpose: This project will implement 30 SSTS upgrades in the Heron Lake Watershed, resulting in an estimated annual reduction of 304 pounds of P, 3.2 tons of sediment, and 807 pounds of nitrogen. Septic system upgrades are recommended in the West Fork Des Moines River and Heron Lake TMDL Implementation Plan.

West Fork Des Moines River

WFDMR Targeting and Prioritizing Endeavor – 2015

Sponsor: Heron Lake Watershed District

Funding: CWP (Grant) \$21,955

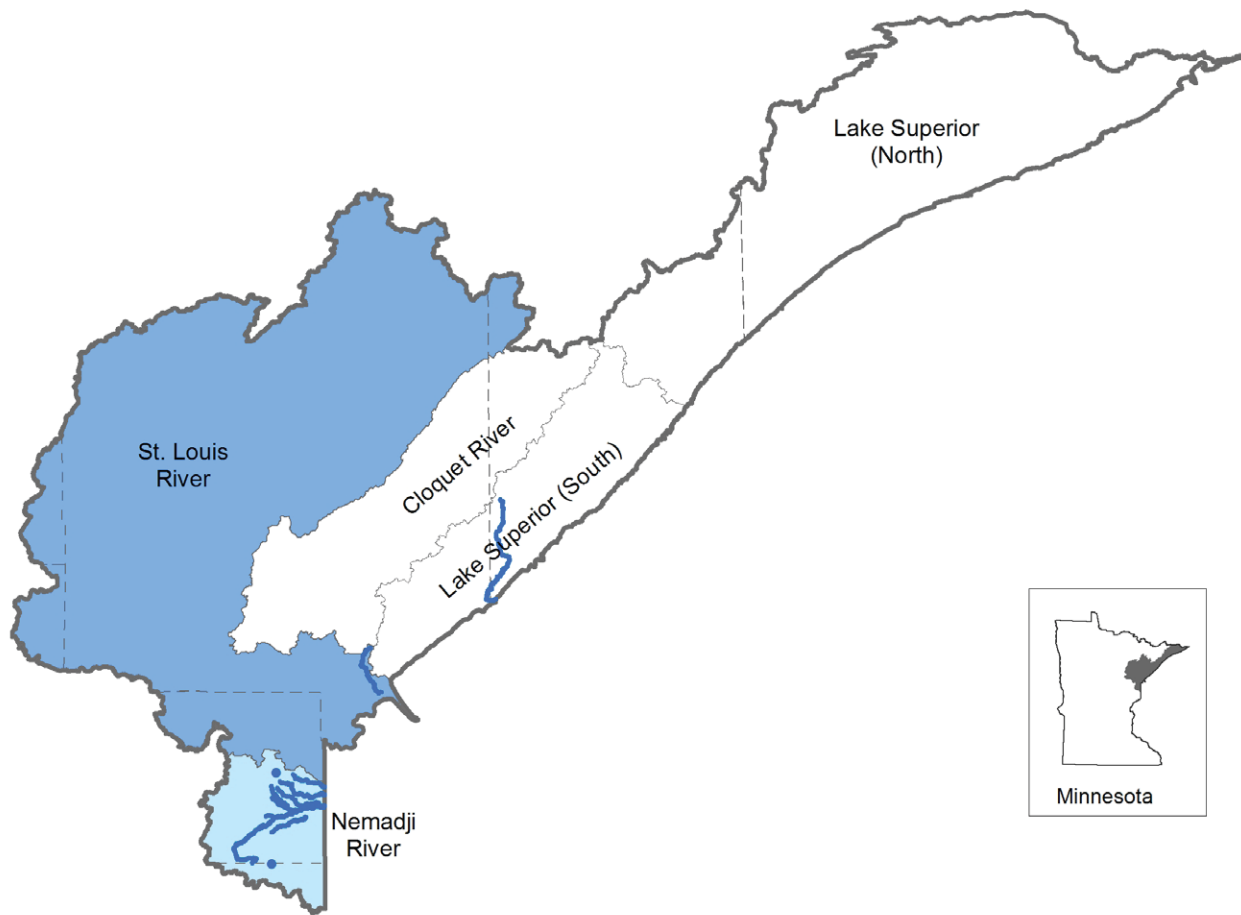
Purpose: The HLWD proposes to build upon the terrain analysis products developed by Southwest Prairie Technical Service Area 5 (SWPTSA 5) and extend the data products to include BMP suitability, BMP effectiveness, and BMP value datasets. The extended data products are derived by using advanced GIS and engineering methods, developed by Houston Engineering, Inc. (HEI) and applied to the hydrologically corrected Digital Elevation Model (DEM). The outcome of this project will be GIS datasets, summary maps, and a technical memorandum describing the suitability for BMP placement, effect of implementation on priority resources, and the measurable cost-effectiveness of pursuing opportunities to implement BMPs. All of these methods are complimentary to implementation, restoration, and protection strategies identified within the WRAPS process and will aid local civic engagement efforts.

Missouri Basin

No projects active in Missouri Basin

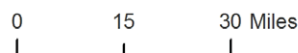
Lake Superior Basin

None were completed in 2018



Legend

- Approved Lake TMDL
- Approved Stream TMDL
- - - County Boundary
- Major Watershed
- ▭ Basin Boundary
- Watershed Projects**
- New
- ▨ New and Active
- Active
- ▤ Completed



Lake Superior Basin

Active projects

No projects were awarded in 2018

St. Louis River Watershed

Port Authority Stormwater Study and Concept Design – 2015

Sponsor: Duluth Seaway Port Authority (Port Authority)

Funding: CWP (Grant) \$24,000

Purpose: This project will evaluate the sources of detected metals and other stormwater constituents, as well as identify and conceptually design effective green infrastructure BMPs to address these concentrations of metals and other constituents in stormwater at the Port Authority's Clure Terminal. The project's first phase includes development and implementation of a sampling plan to investigate stormwater quality within impervious areas for the previously described stormwater constituents; soil borings to determine the soil type; a topographical survey to determine drainage patterns and infrastructure locations; and data gathering of existing infrastructure and the extent of leased areas. A season-long stormwater quality monitoring program will monitor stormwater within the drainage areas that flow directly to the storm sewer, including monitoring of roof runoff and overland flow to determine potential pollutant sources and thus mitigation options. The project's second phase will propose options for effective BMPs within the investigated impervious areas. Another component of this phase will be implementing practices that protect stormwater through education and outreach to the Port Authority's tenants, which represent a variety of commercial and industrial activities.

Lower Mississippi River Basin

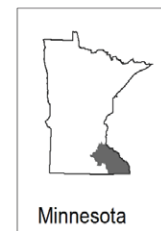
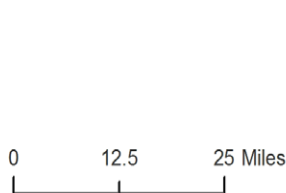
Project involving multiple watersheds

Reducing Runoff from Southeast Minnesota Feedlots



Legend

- Approved Lake TMDL
 - Approved Stream TMDL
 - County Boundary
 - Major Watershed
 - Basin Boundary
- ### Watershed Projects
- New
 - New and Active
 - Active
 - Completed



Project involving multiple watersheds

Reducing Runoff from Southeast Minnesota Feedlots

This grant titled “Reducing Runoff from Southeast Minnesota Feedlots” was developed from a basin-wide response to the findings of a Regional Total Maximum Daily Load (TMDL) study approved in 2006 that identified 39 stream reaches of the Lower Mississippi River Basin in Minnesota (the Basin) as posing a risk of human illness from excessive levels of fecal coliform bacteria. The TMDL study found that runoff from feedlots or manure stockpiles without runoff controls comprises an estimated loading of fecal coliform bacteria to streams of 17% during a wet spring and 37% during a wet summer. To achieve water quality standards, the Regional TMDL Implementation Plan calls for reducing bacteria impairments from all major sources by an average of 65%. One of several strategies for reaching this goal includes providing assistance for accelerated compliance with the state feedlot rules.

Project highlights

- A successful strategy used in the Basin to reach runoff reduction goals has been to build local capacity for accelerating producer compliance with state feedlot rules. Employing this strategy in five previous regional feedlot projects, 2,295 producers in the region signed up for the Open Lot Agreement, runoff reduction designs for over 1,500 feedlots have been completed, and 520 projects were completed through the first five feedlot grants with very low 50% cost-share funding of \$1,000 - \$15,000, plus technical assistance. The goal of the Southeast Regional Grant for Water Quality was for 30 open lot feedlots under 500 animal units to reduce their runoff levels to negligible levels through technical assistance and cost-share funding for relatively low-cost solutions.
- The regional scale of this project allowed for numerous feedlots contributing fecal coliform to be addressed and pollution loads to be reduced. No one stream was targeted in this project, however, the cumulative effect of the feedlot fixes throughout the region will likely contribute to the mitigation of fecal coliform in the listed reaches in this region. The impaired waters list indicates that fecal coliform-impaired reaches and their contributing watersheds occur in all ten counties that implemented feedlot fixes through this grant.
- The average before and after percent drop in the amount (mass) of fecal coliform in MinnFARM examples from 4 feedlots in Winona County was calculated at approximately 98%. The following additional reductions were expected through this project based on the average reductions from 4 feedlots in Winona County: 70,900 lbs/year COD, 1,270 lbs/year P, 3,890 lbs/year N, and 15,780 lbs/year BOD.

Partnerships

- Technical Assistance: SEMWRB, partnering with the SE SWCD Technical Support JPB (SE SWCD JPB), Counties and SWCD's will provide 30 livestock producers with technical assistance to design and implement low-cost fixes to control polluted runoff.
- Cost-Share: SEMWRB will manage cost share funding in coordination with Counties and SWCD's. This partnership is set up and ready to go, and through this project will provide 50% cost share, typically at or under \$15,000 per fix, for small livestock producers (under 500 animal units) to implement feedlot runoff treatment.
- Engineering Technical Assistance; SE SWCD JPB has 14 years of experience coordinating regional grants for feedlot engineering assistance in Southeast Minnesota. These engineers provide needed support to local feedlot staff in the design of small feedlot fixes. SEMWRB will partner with SE SWCD JPB to retain one primary engineer and two additional regional engineering technical staff to provide enhanced engineering assistance for feedlot design.

Financial information

Funding type: Section 319

Grant amount: \$216,000

Match funds: \$272,779

Contact information

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Lower Mississippi River Basin

Active projects

Projects involving multiple watersheds

Reducing Bacteria from Southeast Minnesota Feedlots – 2017

Sponsor: Southeast Minnesota Water Resources Board (SEMWRB)

Funding: Section 319 (Grant) \$336,000

Purpose: A successful strategy used in the basin to reach runoff reduction goals has been to build local capacity for accelerating producer compliance with state feedlot rules. Employing this strategy in previous regional feedlot projects, SEMWRB completed runoff reduction designs for over 1,500 feedlots, and implemented over 780 feedlot fixes. SEMWRB will build upon this strategy to target efforts to those remaining open lot feedlots under 500 animal units that pose the greatest bacteria pollution potential and priority areas identified in local WRAPS and TMDL implementation plans. This project will target a goal of 30 open lot feedlots. Based on the annual reductions from a previous grant of similar size and scope we estimate the following reductions per year for this project: 71,000 lbs chemical on demand (COD); 1,300 lbs P; 3900 lbs N; 16,000 lbs BOD and 2.0+E17 fecal CFU.

Cannon River Watershed

Building a Culture of Citizen Engagement – 2014

Sponsor: Cannon River Watershed Partnership

Funding: Section 319 (Grant) \$57,620

Purpose: Develop and pilot a process for building local community capacity for engaging in the watershed management process that can be sustained long-term with continuity. Using two subwatersheds currently engaged by CRWP, the process will cross-fertilize and organize diverse perspectives and segments of watershed residents and stakeholders to get watershed management work done in a way that is in tune with community needs, identities, and aspirations. The project will explore new approaches to strategic collaborations and coalitions with local, regional and state programs and organizations.

Steele County Septic System Loan Program – 2012

Sponsor: Steele County

Funding: CWP (Loan) \$700,000

Purpose: This project will promote and install 70 SSTs in Steele County.

Lower Mississippi River – Lake Pepin

Mississippi River Lake Pepin Watershed WRAPS Implementation – 2016

Sponsor: Goodhue County SWCD

Funding: Section 319 (Grant) \$87,500

Purpose: Implement BMPs that will effectively make progress towards the reduction goals of 20% TSS as well as the reduction of the other pollutants, specifically through grade stabilization structures, terraces, and WASCOBs.

Lower Mississippi River – Winona

Downtown Winona Pre-Mississippi River Rain Garden – 2015

Sponsor: Port Authority of Winona

Funding: CWP (Grant) \$41,324

Purpose: This project will protect the Mississippi River at Winona, Minnesota, by the installation of a downtown Winona parking lot rain garden. This project will improve the Mississippi River water quality by removing an incorrectly sloped, 100% impervious parking lot surface then regrading and resurfacing the parking lot to direct runoff into a central rain garden planted with deep-rooted native vegetation that will filter pollutants such as oil, grease, dirt, debris, broken glass, road salt, sand, and unseen nutrients before any runoff reaches Winona's stormwater system and the Mississippi River. The rain garden will also serve to slow the velocity of runoff and reduce the likelihood of flooding which is a regular concern in Winona.

Whitewater Watershed Nitrogen Reduction Project – 2017

Sponsor: Whitewater Joint Powers Board

Funding: Section 319 (Grant) \$232,825

Purpose: The priority resource of concern of this project is surface water and project work will focus on

nitrogen load reduction through BMPs that minimize nitrate loss through leaching while optimizing row crop yield and maximizing rate of return for participating farmers. Project initiated BMPs include Nutrient Management and Cover Crops. The critical nitrate source areas for this project include nine upstream HUC 14 subwatersheds within the Middle and South Forks that are predominately row-cropped. This project will enhance and complement current nitrogen reduction activities in the region. If these adoption rates were applied to the entire watershed, 504,000 lbs/year would be achieved. A successful nitrogen reduction project will contribute a 126,000 lbs/yr reduction for the entire watershed. An approximate 13% reduction in nitrogen loading for the Mississippi River-Winona HUC-8 suggests a proportional reduction for the Middle and South Forks of the Whitewater Watershed, which would approximate goal attainment per respective TMDLs.

Zumbro River

Middle Fork Zumbro River Critical Source Area Restoration – 2016

Sponsor: Dodge SWCD

Funding: Section 319 (Grant) \$219,000

Purpose: Implement 16-18 sediment reducing projects in two targeted subwatersheds with an estimated 200-246 tons of TSS/year reduction to the Middle Fork Zumbro River.

Zumbro River Ultra-Urban Vol-TSS-FeC Reduction – 2014

Sponsor: City of Rochester

Funding: Section 319 (Grant) \$300,000

Purpose: Reduce turbidity and fecal coliform bacteria loading in the receiving waters for downtown Rochester by identifying feasible volume control locations in the project area and demonstrating green infrastructure designs, benefits, and maintenance practices before redevelopment opportunities arise. In addition to delineating these areas, volume control practices need to be demonstrated to help “sell” their effectiveness and attractiveness and to clarify their maintenance needs.

Minnesota River Basin

Projects completed

Blue Earth River Watershed

Blue Earth River Dissolved Oxygen: Managing Flows & Nutrients

Blue Earth River Green Infrastructure Project

Chippewa River Watershed

Chippewa River Accelerated Restoration

Chippewa River Phosphorus Reduction Practices

Lower Minnesota River Watershed

Lake Waconia Stormwater BMP Enhancement

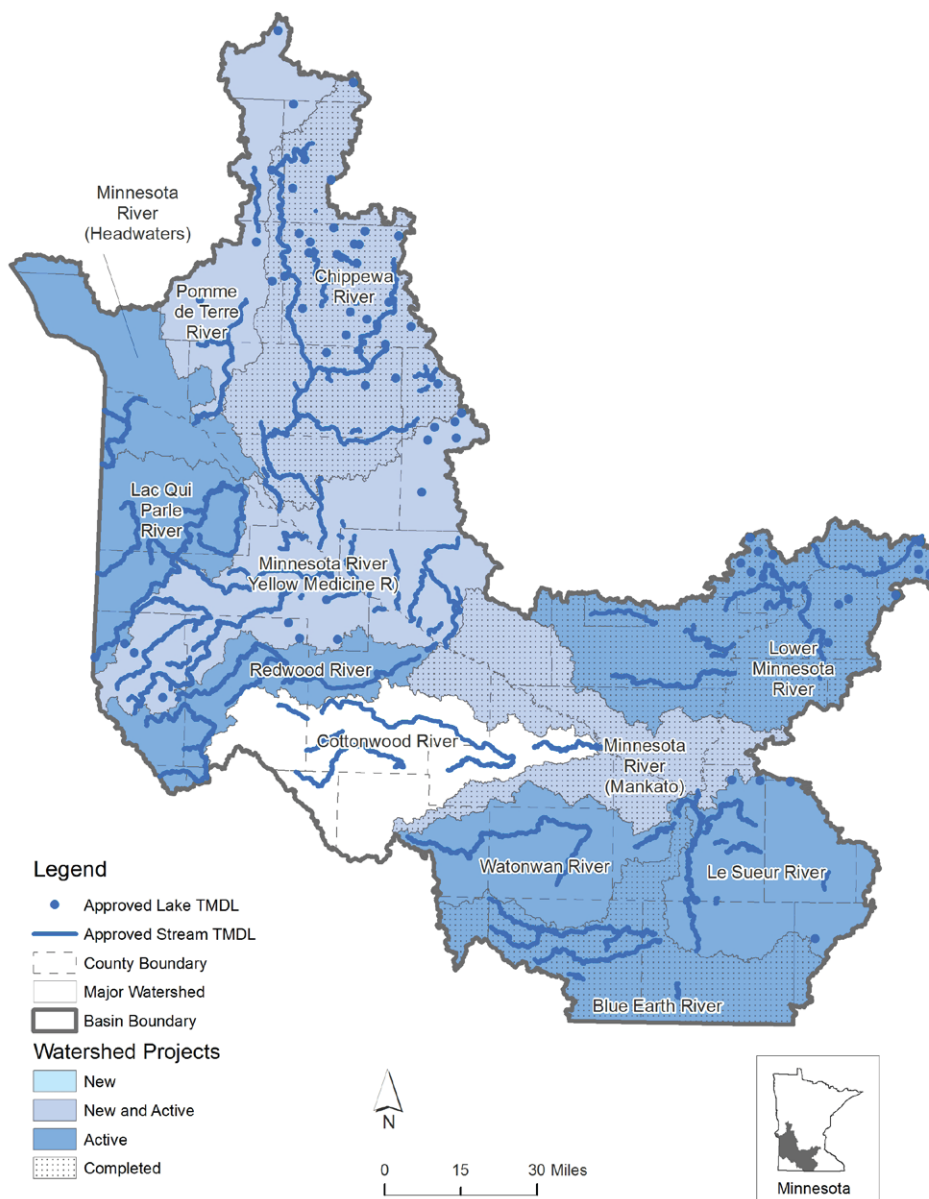
Scott Watershed Management Organization TMDL Implementation

High Island Creek-McLeod County SSTS Project

Rush River Watershed – Nicollet County SSTS Project

Minnesota River – Yellow Medicine River

Hawk Creek – Minnesota River Phosphorus Reduction



Blue Earth River Watershed

Blue Earth River Dissolved Oxygen: Managing Flows & Nutrients

Meeting the need for improved crop production while managing water quality and environmental regulations is an important balancing act that can be effectively accomplished with agricultural BMPs. Faribault SWCD addressed multiple water quality impairments using a suite of BMPs to improve water quality in a 730-acre drainage system draining to the Blue Earth River. Staff evaluated and identified targeted BMP locations. Through partnerships with landowners, agencies, and the Drainage Authority, a watershed water quality treatment system was designed using a mix of management and implementation practices. The drainage watershed approach divided activities into three areas: 1) scoping, targeting, and design; 2) implementation; and 3) demonstration, workshops, and increasing adoption rates through civic engagement with landowners. This total watershed approach was innovative to Faribault County as traditional drainage systems solely focus on quantity and moving excess water from the landscape as quickly as possible. In addition to BMP's, the watershed approach reinforced the importance of healthy soils to control pollutant losses, increase infiltration, and improve the effectiveness of targeted practices.

Waterbody improved

Project focus was on the Blue Earth River (E Branch Blue Earth R to South Cr/07020009-508). The Blue Earth River has downstream impacts to the Minnesota and Mississippi Rivers.

Project highlights

- Project highlights included installing a water quality unit, three large denitrifying bioreactors, and five alternative surface inlets within the County Ditch 62 (CD62) watershed. The projects are part of the legal drainage system and serve as part of a 'treatment train' approach to improve water quality. This project is the first application of a water quality unit in an agricultural setting and the largest treated watershed



County Ditch 62 watershed construction

by bioreactors known in Minnesota. In addition, another bioreactor and saturated buffer were installed across the river from the CD62 site. Because of this project, the Faribault County Drainage Authority has begun to look into how BMPs such as these can be retrofitted into existing drainage systems. Installed BMPs will reduce the amount of phosphorus by 66 lbs/yr, nitrogen by 4,850 lbs/yr, and sediment by 134,270 lbs/yr from reaching the Blue Earth River. It is equally important that landowners and elected officials begin to see how this approach can be retrofitted into existing drainage systems and begin to look innovatively at drainage system management.

Partnerships

- Faribault County SWCD – grantee, video, reporting, coordination, monitoring
- Faribault County Drainage Department – construction, coordination, meetings, oversight
- Faribault County Drainage Authority
- ISG – engineer, video, product development
- Al Kean, BWSR – video
- Mark Dittrich, MDA – application, design, video
- Gary Feyereisen, a Research Agricultural Engineer with the USDA ARS Soil and Water Management Research Unit

Financial information

Funding type: Section 319

Grant amount: \$234,334

Matching funding: \$317,755

Contact information

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SWCD Program Administrator

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MPCA project manager: Paul Davis

Blue Earth River Watershed

Blue Earth River Green Infrastructure Project

Design and implement a region bioretention basin within the 25 block reconstruction project area. Promote and implement green infrastructure activities throughout the City of Winnebago to reduce stormwater volume entering critical infrastructure. Implement voluntary landowner BMPs found in the Minnesota Stormwater Manual, prepare an in-project area video on disconnect inflow and infiltration issues between the structures and main connection. Lastly, develop SWCD grant program education and civic engagement within the City of Winnebago and project area.

Waterbody improved

The project was unable to be executed, so no improvement was made to the waterbody. This project was dependent upon bonding dollars, which were not appropriated when needed.

Financial information

Funding type: CWP

Grant amount: \$0

Contact information

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MPCA Project manager: Paul Davis

Chippewa River Watershed

Chippewa River Accelerated Restoration

This loan was never executed and no funds expended.

Financial information

Funding type: CWP Loan

Loan amount: \$0

Chippewa River Watershed

Chippewa River Phosphorus Reduction Practices

The Chippewa River and its tributaries are a significant local, regional and state resource located in West Central Minnesota and one of 13 major tributaries to the Minnesota River. The 1.3 million acre watershed spans over seven counties. The landscape is quite diverse from north to south as the river flows throughout the Prairie Pothole Region to its mouth in Montevideo. The watershed has both high quality fisheries and recreational waters as well as some of the most productive agricultural land with over 75% of the landscape in row crops. The Minnesota River has a dissolved oxygen impairment from river mile 22 to the mouth of the Mississippi River. The Implementation Plan outlines the strategies to meet the goals of the TMDL for each source affecting water quality. One of the main sources of excess phosphorus during low flow conditions is agriculture. It is known from the extensive and long-term water quality monitoring program of the CRWP that water quality problems exist in the Chippewa River Watershed. Several impairments have been identified and listed for turbidity, bacteria and biota. Phosphorus loading from the Chippewa River Watershed contributes to the low dissolved oxygen in the Lower Minnesota River and phosphorus is an identified stressor linked to several of the Chippewa River Watershed biotic impairments. Phosphorus sources within the Chippewa Watershed are primarily from agricultural and urban land uses. Phosphorus is closely tied to sediment. The primary human activities that have altered delivery of sediment in the Chippewa River Watershed are land cover alteration, channel alteration, and riparian land cover alteration. These activities have led to an increase in stream velocity and discharge an increase in stream bank erosion, and an increase in sediment delivery to the stream channel via overland flow.

Waterbody improved

This project focused on local conservation partner knowledge and past water quality monitoring data for installation of best management practices to address water quality improvement in the Chippewa River. The project utilized civic engagement through field days/ workshops with landowners that focused on cover crops and soil health. The waterbody has not yet been removed from the state's 303(d) list.



Cover crop

Project highlights

- BMPs addressing the causes of pollution that were implemented with 33 contracts (28 local contracts with landowners and 5 contracts with Chippewa County) during May 2014 through August 2017. The BMPs implemented were 22 alternative tile intakes, 49 water and sediment control basins, 2 dairy lot improvements, 18.3 acres wetland and upland restoration, 613.3 acres of cover crops, 31.4 acres of cropland conversion to pasture, 14 side inlets, and 2 pasture management seeding. The partners listed below participated in landowners contact and were cooperating partners in the CRWP's Local Work Group.

Partnerships

- Executive Board comprised of seven county commissioners from the following counties: Chippewa, Swift, Kandiyohi, Pope, Douglas, Grant, Stevens
- Local Work Group partners include the Soil and Water Conservation Districts, County Water Planners, County Environmental Services from the following counties: Chippewa, Swift, Kandiyohi, Pope, Douglas, Grant, Stevens and the Land Stewardship Project (non-profit organization).
- These partners cooperated and worked with CRWP to implement 33 contract with landowners and Chippewa County for completion of all the BMP's except the wetland and upland prairie restoration as noted below.

- U.S. Fish and Wildlife, Working Lands Initiative (DNR), Waterfowl Association – These three partners cooperated to make the 8-acre wetland restoration and 10.3 upland prairie restoration
- Landowners – voluntarily implemented best management practices.

Financial information

Funding type: Section 319

Grant amount: \$279,518

Matching funds: \$230,300

Contact information

Chippewa River Watershed Project

Administrator

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Montevideo, MN 56265

320-321-1717

MPCA project manager: Mark Hanson

Lower Minnesota River Watershed

Lake Waconia Stormwater BMP Enhancement

An 11.9 acre subwatershed located in the City of Waconia, Minnesota, discharges to an undersized pond and then directly to Lake Waconia via the storm sewer system. Lake Waconia is just under the lake nutrient state standard for total phosphorous. Without reductions from external sources, the lake will be listed for excess nutrients in the near future.

Waterbody improved

The addition of these stormwater BMPs, Lake Waconia will see an overall reduction of phosphorous discharging to the lake. In 2017, results show a reduction of 3.84 lbs of phosphorous to Lake Waconia, helping the lake to remain under state limits for total phosphorous concentrations.

Project highlights

- Project installed a large bioretention basin, a tree box, sand iron filter bench, a pond expansion, and installation of a pervious paver system. In addition to the new stormwater BMPs and a pond cleanout, stormwater discharge chemistry data was sampled and flow data was collected to get load reductions for the treatment train. The database for actual field data collected is relatively slim in Minnesota and this project will increase the understanding of how these BMPs treat stormwater.
- A pond cleanout and modification with a sand/iron filter bench was completed in 2015. In addition to this work, a biofiltration basin and a permeable pavement parking lot was installed at the same time. In 2017, a tree box was installed on the west side of the pond. Chemistry data shows load reductions of 39% of total phosphorous and 85% of suspended solids discharging from the site in 2017.

Partnerships

- City of Waconia – Installation of BMPs, pond clean out, BMP inspections, help with establishing monitoring location, maintenance
- Carver Soil and Water Conservation District – BMP inspections, evaluation and maintenance



Stormwater BMPs

Financial information

Funding type: CWP

Grant amount: \$93,000

Matching funds: \$120,453

Contact information

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MPCA project manager: Chris Zadak

Lower Minnesota River Watershed

Scott Watershed Management Organization TMDL Implementation

Water bodies addressed by this project are located in the Lower Minnesota River Basin. This project implemented portions of the Implementation Plans for Cedar and McMahon Lakes Excessive Nutrients and the Lower Minnesota River Dissolved Oxygen TMDLs. These water bodies as well as the Sand Creek tributary to the Minnesota River are on the 303(d) list. The lakes are impaired for recreation due to excessive nutrients and Sand Creek for turbidity and Fish IBI. Sources of the problems are excess phosphorus and sediment in runoff from both agricultural land and shoreline development, near channel erosion, as well as increased runoff from historic drainage practices and increased rainfall, and internal loads.

Waterbody improved

Numerous BMPs were implemented as part of the project. As a result of these and additional BMPs, phosphorus concentrations have declined and water clarity has improved in McMahon Lake. The MPCA will remove McMahon Lake from the 2018 Impaired Waters List. Cedar Lake is showing some reduction in phosphorus concentrations, but is still well above the standard(s). The diversity of native aquatic plants has also improved slightly. Sand Creek has a 270 square mile watershed and it is expected that improvements will take time to achieve. However, recent analyses completed for the Scott Watershed Management Organization (WMO) show that Sand Creek stream flow yield is decreasing slightly.

Project highlights

A total of 52 applications were approved with landowners under the grant project, enabling the implementation of:

- 14.2 acres of filters strips
- 42 grade control structures
- 5,859 linear feet of grass or lined waterways
- 66.2 acres of native grass plantings
- An additional four grade control structures enabled by Technical Assistance provided under the grant, but funded by other means that are pending construction



Snyder waterway

A “Customer Satisfaction Survey” was completed soliciting feedback from landowners in addition to the BMPs implemented. In addition to the specific water body improvements described above, BMPs implemented have combined sediment and phosphorus load reductions estimated at 1,563 tons/year and 1,726 lbs/year, respectively.

Partnerships

- Scott WMO/Scott County – project sponsor
- Le Sueur, Rice and Scott Soil and Water Conservation Districts – provided Technical Assistance to landowners necessary to complete the projects
- University of Minnesota Center for Changing Landscapes – Customer Satisfaction Survey

Financial information

Funding type: Section 319

Grant amount: \$298,512

Matching funds: \$310,009

Contact information

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MPCA Project Manager: Chris Zadak

Lower Minnesota River Watershed

High Island Creek-McLeod County SSTS Project

The High Island Creek begins in Renville County flows through Sibley and McLeod Counties and connects to the Minnesota River. Upgrading of septic systems was chosen to reduce *E. coli* in the creek. Previous testing in the creek points to human *E. coli* as the major problem, not animal.

Waterbody improved

The goal of installing nine septic systems that *E. coli* would be reduced in the High Island Creek. Three systems were installed and no substantial improvement in the water quality. McLeod County will continue to pursue programs to assist landowners to improve septic systems and the water quality of the High Island Creek in the future.

Project highlights

- Three septic systems were installed using loan funds. The project was extended an additional year to increase participation. The three systems showed pollution reductions of BOD by 1,136 lbs/yr, TSS by 627 lbs/yr, bacteria measured as fecal coliform by 1.94E+14 CFUs, phosphorus by 28 lbs/yr, and nitrogen by 81 lbs/yr. The lack of project fund use is likely due to minimal property turnover, resulting in no mandatory reason to preform compliance checks. The High Island Creek/Rush River Watershed Project mailed 14 newsletters to 1400 homes to promote the program through September 2017.

Financial information

Funding type: CWP

Grant amount: \$40,070

Matching funds: \$2,000

Contact information

Ronald Otto

Watershed Technician

Sibley County SWCD

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MPCA project manager: Bryan Spindler

Lower Minnesota River Watershed

Rush River Watershed – Nicollet County SSTS Project

The South Branch of the Rush River begins in Nicollet County and flows through Sibley County where it connects to the Minnesota River. Nicollet County secured a grant to replace failing septic systems with compliant ones that would lower *E. coli* in the Rush River.

Waterbody improved

The goal was to install 15 systems in the Rush River would net a measurable reduction in *E. coli*. With only half the goal met, it may be hard to see a noticeable difference in water quality. Nicollet County will continue to pursue programs to assist landowners to improve septic systems and the water quality of the Rush River in the future.

Project highlights

- Seven septic systems were installed using loans for the improvement. The seven systems showed pollution reductions of BOD by 2,621 lbs/yr, TSS by 1448 lbs/yr, bacteria measured as fecal coliform by 4.47E+14 CFUs, phosphorus by 65 lbs/yr, and nitrogen by 187 lbs/y). The project was extended an additional year hoping that all funds would be loaned out to landowners upgrading their septic systems but this did not happen. The lack of project fund use is likely due to minimal property turnover, resulting in no mandatory reason to preform compliance checks. The High Island Creek/ Rush River Watershed Project mailed 14 newsletters to 1400 homes to promote participation through September of 2017.

Financial information

Funding type: CWP Loan

Loan amount: \$70,000

Matching funds: \$1,500

Contact information

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MPCA project manager: Bryan Spindler

Minnesota River – Yellow Medicine River

Hawk Creek – Minnesota River Phosphorus Reduction

The Hawk Creek watershed drains over 623,000 acres of land. It is comprised of a main tributary (Hawk Creek) and several other streams that flow directly into the Minnesota River. The Hawk Creek Watershed Project (HCWP) Work Area includes Hawk, Chetomba, Sacred Heart, Beaver, Middle, Timms, Smith, Brafee's, and Palmer Creeks. An estimated 98% of the original wetlands in the watershed have been drained to increase agricultural land use. The highly manipulated hydrology within the watershed has resulted in a very effective drainage system, which allows agriculture, the region's primary land use, to thrive in the middle to lower reaches of the watershed. Several TMDL studies have been completed in areas located within the Hawk Creek watershed, including the Lower Minnesota River, Hawk Creek, Beaver Creek, and Long and Ringo Lakes. The most significant sources of pollution identified in the TMDLs are excess nutrients (phosphorus and nitrogen), erosion, and sedimentation. This project addresses the nutrient phosphorus as it relates to the low dissolved oxygen impairment identified in the Lower Minnesota River Dissolved Oxygen TMDL Implementation Plan. Significant sources of phosphorus have been identified as coming from storm drain runoff, wastewater treatment plant effluent, ag-field runoff, livestock operations, and failing septic systems. Reduced phosphorus levels, increased base flow, and reduced sediment volume will be instrumental in correcting the impairment of low dissolved oxygen levels in the Minnesota River.

Waterbody improved

This project focused on implementation of BMPs in the Hawk Creek Watershed that elevate dissolved oxygen levels in watercourses by reducing phosphorus in agricultural and urban areas and/or increasing groundwater infiltration, thereby increasing stream base flows. This project implemented 45 BMPs with 40 landowners and resulted in an estimated annual reduction of 1,192 pounds of phosphorus and 718 tons of sediment. Public education and outreach was another major focus of this grant. Through numerous activities, the HCWP provided information to and engaged citizens about the water quality of the watershed and the



Benefits of Cover Crops Meeting

opportunities to restore and protect it. The activities accomplished through this grant are identified in the Chippewa, Kandiyohi, and Renville County Local Water Plans and the Hawk Creek Watershed WRAPS. The activities helped the Counties move closer to accomplishing the objectives and goals of their plans.

Project highlights

- This project implemented 45 BMPs with 40 landowners and resulted in an estimated annual reduction of 1,192 pounds of phosphorus and 718 tons of sediment. The following BMPs were implemented four alternative intakes, 35 acres of buffers, 975 acres of cover crops, 1 critical area seeding, 3 side inlets, 5 bank/grade/gull/channel stabilizations, and 1 water and sediment control basin. HCWP staff produced and mailed two newsletters and four postcards to watershed residents using funds from this grant. HCWP staff also held 37 meetings/field days and participated in several educational and outreach activities, including public meetings, field days, workshops, youth activities, local water plan meetings, several trainings, distribution of HCWP and Citizen Monitor Network newsletters, postcards, brochures, and online resources, such as the HCWP website and Facebook page. The HCWP website was also active to provide information on current HCWP happenings, cost-share funding, and education and outreach.
- Major partners included landowners, Chippewa, Kandiyohi, and Renville County Ditch Authorities, Chippewa, Kandiyohi, and Renville County

Environmental Offices, Chippewa, Kandiyohi, and Renville County Soil and Water Conservation Districts, Eagle, Long, Foot, and Willmar Lakes Associations, Minnesota Department of Natural Resources (DNR), Minnesota Pollution Control Agency (MPCA), Natural Resources Conservation Service, and U.S. Fish & Wildlife Service (USFWS). Grant activities occurred November 25, 2013 – August 31, 2017. The HCWP staff procured other grants in the same area to continue the work of this grant implementing BMPs and education and outreach.

Partnerships

- BWSR – participated in the HCWP Local Work Group and provided educational, technical, and evaluation assistance.
- Chippewa, Kandiyohi, and Renville Counties – County Commissioners continued to communicate with other Commissioners, citizens, as well as state and federal elected officials. Renville County Administration, Renville County Public Works (Ditch Authority), Renville County Water and HHW Management, Renville County Environment and Community Development, Chippewa County Drainage, Chippewa County Land and Resource Management, Kandiyohi County Department of Environmental Services, and Kandiyohi County Public Works Department (Ditch Authority) promoted BMPs and assisted with outreach. Several county staff participated in the HCWP Local Work Group and provided educational, technical, and evaluation assistance.
- Chippewa, Kandiyohi, and Renville County Soil and Water Conservation Districts – provided technical assistance, helped with BMP promotion, and provided education and outreach, and participated in the Local Work Group
- City of Willmar – staff and Council members provided updates on water quality and quantity efforts and Wastewater Treatment Plant Reports
- Eagle, Long, Foot, and Willmar Lakes Associations – assisted with promoting of federal, state, county government, and HCWP conservation programs and conducted water quality monitoring, and part of information and education campaign.
- Hawk Creek Watershed Project – overall grant program administration, including BMP implementation, education and outreach, budgets, and reporting
- Hawk Creek Watershed Project Board of Directors – discuss and make decisions regarding financial, policy, and personnel issues and provided input into the issues, priorities, and restoration and protection strategies of the watershed.
- Hawk Creek Watershed Project Citizen Advisory Committee – active citizens, agency personnel, industry personnel, county officials, community officials, and active and retired agricultural producers
- Hawk Creek Watershed Project Citizen Monitors – rural and community residents who volunteer to participate in rainfall and/or water clarity activities.
- Hawk Creek Watershed Project Local Work Group - personnel from county, state, and regional agency representatives.
- Landowners – implemented BMP projects and civic engagement activities
- Local Media – newspaper, online, and radio coverage of HCWP activities.
- DNR – LWG, project evaluation activities, provided design specifications
- MPCA – HCWP Local Work Group and provided educational, technical, and evaluation assistance.
- Natural Resources Conservation Service – HCWP Local Work Group, and provided educational, technical, and evaluation assistance.
- United States Fish & Wildlife Service – technical assistance, land acquisition, habitat management, educational activities and HCWP Local Work Group.

Financial information

Funding type: Section 319

Grant amount: \$228,992

Matching funds: \$194,380

Contact information

Hawk Creek Watershed Project (HCWP)

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MPCA project manager: Mark Hanson

Minnesota River Basin

Active projects

Projects awarded in 2018

Projects involving multiple watersheds

Chippewa Countywide Septic System Upgrades – 2017

Sponsor: Chippewa County

Funding: CWP (Loan) \$200,000

Purpose: Provide low interest loans up to 20 homeowners throughout Chippewa County for upgrading their individual septic systems, continually working towards improving water quality and threats to drinking water and human health because diseases and infections may be transferred to people and animals directly and immediately by failing SSTS.

GBERBA Conservation Drainage Partnership Program – 2015

Sponsor: Greater Blue Earth River Basin Alliance (GBERBA)

Funding: CWP (Grant) \$147,200

Purpose: Alternative side-inlets (categorized as grade stabilization structures) are an effective alternative to the classical side-inlet pipe. Instead of a horizontal pipe through the spoil bank, alternative side-inlets may utilize a drop structure with a water quality inlet on the surface. The water quality inlet allows water to temporarily pond, decreasing the stormwater's sediment carrying capacity by as much as 95%. Twenty-seven shovel-ready projects will reduce peak downstream flows and annually prevent 23.5 tons of soil and sediment and 23.5 pounds of P from entering ditches. The trash guard of the water quality inlet also prevents field residue from leaving the field. Additional water treatment (nitrogen) is likely with the setting of the water quality inlet in the grassed buffer of the drainage ditch.

Greater Blue Earth Nonpoint Reduction Initiative – 2014

Sponsor: Faribault SWCD

Funding: CWP (Grant) \$364,163

Purpose: Provide education, outreach and civic engagement necessary for the development of structural and non-structural BMPs needed to improve water quality within the Greater Blue Earth River Basin. General education will have a regional focus to

landowners. Outreach efforts will be focused on regional officials, staff and landowners. Civic engagement efforts will have a smaller watershed scale focus with efforts resulting in structural BMPs being placed on the land and non-structural BMPs being adopted. Provide cost-share assistance to landowners within the Greater Blue Earth River Basin to implement NPS reduction BMPs. Provide technical assistance to landowners and administration for this grant. Develop and deliver education, outreach and civic engagement efforts.

Greater Blue Earth River Basin TMDL Implementation – 2016

Sponsor: GBERBA

Funding: Section 319 (Grant) \$400,000

Purpose: Cover 1,500 open tile intakes, reducing sediment and P loading by 15,000 tons and 15,000 pounds in 10 years respectively, contributing 16% to the listed TMDL plan goal. In addition, this project will implement 3,000 acres of cover crops, reducing sediment by 201 tons, P by 570 pounds, and nitrates by 19,800 pounds.

Lac qui Parle-Yellow Bank SSTS Loan Program – 2017

Sponsor: Lac qui Parle-Yellow Bank Watershed District

Funding: CWP (Loan) \$500,000

Purpose: Provide low interest loans to up to 45 homeowners throughout the Lac qui Parle-Yellow Bank Watershed District area for upgrading their individual septic systems. This project will result in an estimated annual reduction of 210 pounds of P, 1.4 tons of sediment and 675 pounds of nitrogen and biological oxygen demand, five day 5,060 pounds per year.

Swift County SSTS Upgrades – 2018

Sponsor: Swift County

Funding: CWP (Loan) \$ 250,000

Purpose: The major reason for safe disposal of sewage is to prevent the spread of disease. If a septic system is properly sited, is working properly, and has been maintained regularly it will remove disease-causing bacteria effectively and efficiently. Swift County estimates that out of the estimated 3,965 individual sewage treatment systems in the county, 50% are failing to protect the groundwater or surface water. Nutrients from failing septic systems can also cause serious health problems. Improperly treated sewage can also contaminate surface waters. Being primarily agriculture

and rural, many of our failing systems are hooked up to tile lines running directly into ditches or streams. Bacteria from this sewage can be harmful to humans and animals. SSTS upgrades are a priority in the Swift County Local Water Plan. Protection of existing compliant systems and upgrading of failing systems will prevent the growth of this problem.

Chippewa River

Chippewa River Sediment Reduction – 2016

Sponsor: Chippewa River Watershed Project

Funding: Section 319 (Grant) \$285,878

Purpose: Implement 25 structures to control sediment, runoff and associated gullies on cropland. Estimated sediment yield reductions 50% on acres contributing to each structure; have 15 cooperators adopt cover crops on 600 acres in their operations to protect soils from water and wind erosion from fall harvest to spring planting and to improve soil health properties. Estimated sediment yield reductions between 50-90% on affected acres; develop 2 grassed or lined sites for the protection of gullies and washout areas to control erosion and sedimentation near surface waters. Estimated sediment delivery yield reductions 60% on contributing acres; complete 3 sites to help prevent the formation or advancement of gullies while reducing sediment delivery to downstream waters; develop 5 sites to include practices and methods that control and treat livestock related sediment delivery to surface waters.

Chippewa River Watershed Protection – 2015

Sponsor: Chippewa River Watershed Project

Funding: CWP (Grant) \$296,965 and CWP (Loan) \$350,000

Purpose: Stabilize 235 feet of streambank with bio-engineering techniques, install 10 shoreline restorations, install approximately 3/4 mile of livestock exclusion fencing, enroll 30 acres of buffer strips, upgrade septic systems, and other recognized BMP's for reducing pollutant loading that may be brought forth by landowners that would have a direct impact on protecting water quality. Program evaluation tools will be developed to evaluate other key activities within program elements such as bus tours, field days, and public meetings. Levels of nutrients and sediments will be monitored on an ongoing basis to compare with the 15 years of historic data available and point to any increasing or decreasing trends in water quality. Using

BWSR's calculation tools it is estimated that 235 feet of streambank stabilization will reduce P by 68 lbs/yr and delivery of sediment by 59 T/yr. Shoreline restorations reduce P by 35.05 lbs/yr and sediment by 41.25 T/yr, buffer strips reduce P by 3,416 lbs/yr and sediment by 2,867 T/yr, sediment basins reduce sediment by 75 T/yr and reduce P by 90 lbs/yr, livestock exclusion fencing saves three tons of soil per year and reduces P by three lbs/yr, and cover crops reduce 620 lbs/yr of P and reduce sediment by 414 T/yr.

Le Sueur River

Le Sueur River WRAPS Implementation Endeavor – 2016

Sponsor: Faribault County SWCD

Funding: Section 319 (Grant) \$347,950

Purpose: Implement stormwater BMPs, such as bioretention, filtration, infiltrations, iron enhanced sand filters, permeable pavement, water re-use, and urban forestry, in four cities; develop and engineer a structural BMP to store and treat surface water runoff on community property in the Bass Lake subwatershed; increase perennial vegetation; agricultural BMPs, such as conservation tiling, riparian corridor management (bank stabilization, saturated buffer), increased vegetated cover and nutrient management BMPs. Appropriate BMPs will also be implemented on the land in any of the watersheds listed as a high priority.

Lower Minnesota River

Carp Management in Spring Lake & Prior Lake – 2015

Sponsor: Prior Lake - Spring Lake Watershed District

Funding: CWP (Grant) \$67,323

Purpose: Capture and surgically implant 30 adult carp throughout three lakes with high frequency radio transmitters. In addition to radio tagging, all remaining carp will be marked with a fin clip and returned to the lake to allow us to complete a mark/recapture population estimate. Radio tagged carp will be tracked to determine if migration routes exist and where barriers may be sited to restrict carp from potential nursery sites and spawning habitat and identify potential aggregation areas. Once a significant aggregation of carp has been located, removal will be completed. During the removal, a count of the recaptured carp will be completed to generate a population estimate, combining the information with a weight and length subsample to obtain a biomass

estimate. This value can then be used to gauge if additional removals are needed. By quantifying the amount of carp that are present post-removal, a TP load reduction can be estimated and compared to the amount specified in the 2012 TMDL for Spring and Upper Prior Lakes. Spring/Summer spawning tracking data will inform decisions on where we may be able to site carp barriers as part of our integrated pest management (IPM) strategy to inhibit carp recruitment. Barriers will be placed in identified locations after sufficient spawning period data has been collected. Carp will be tracked post barrier installation in 2017 to determine the effectiveness of the barriers and allow us to determine if any modifications may be necessary.

Lower Prior Lake Protection Project Implementation – 2014

Sponsor: Prior Lake-Spring Lake Watershed District

Funding: CWP (Grant) \$142,522

Purpose: A reduction in watershed P loading to Lower Prior Lake by 33 lb/yr, or 10% of the total drainage area P load of 326 lb/year, to maintain or improve water quality conditions (as monitored in the central basin) by up to 10% within 10 years of initiation of implementation activities, which include infiltration areas, water control structure, rain gardens, shoreline restorations and filter benches. Through community outreach activities, watershed residents will understand that immediate P reduction actions result in future benefits to water quality. Tangible benefits of watershed BMPs implemented now may only appear in long-term, future trends, and not until full BMP establishment (in particular, vegetation).

Minnesota River and Sand Creek Improvement Project – 2016

Sponsor: Scott County/Scott Watershed Management Organization

Funding: Section 319 (Grant) \$565,000

Purpose: Complete 30 to 35 structural BMPs, 20 to 25 acres of nonstructural BMPs, 550 acres of cover crops, 4 near channel capital stabilization projects, monitoring of Sand and Roberts Creeks, trend analysis for Sand Creek, 2 landowner surveys, and 8 to 10 riparian vegetation improvement projects in critical watershed areas.

Quarry Creek Collaborative – 2015

Sponsor: Scott County/Scott Watershed Management Organization

Funding: CWP (Loan) \$1,998,800

Purpose: This project will reduce sediment to the Minnesota River, control erosion and reduce sedimentation in Quarry Creek, and protect private land and public infrastructure. Stabilization techniques proposed are designed to significantly reduce flow rates and velocities, channel incision, the migration of knick points and head cuts, such that sediment erosion will be reduced by at least 75% to 80% within the stabilized areas. The project activities include stabilizing 2 knick points, thousands of feet of channel armoring and turf reinforced mat, a couple dozen grade control/rock weir structures, and 1 large detention basin. Landowners are contemplating a native prairie planting, grassed waterways, and several WASCObS in the areas tributary to the ravines. With the heavy rains of mid-June 2014 there is significant damage to ravines and creeks like Quarry Creek throughout the area and the project will serve as an example.

Minnesota River – Mankato

Mankato Watershed – Renville County FY17 Improvement Project – 2017

Sponsor: Hawk Creek Watershed Project

Funding: Section 319 (Grant) \$297,000

Purpose: BMPs will reduce P and erosion as determined through research of the hydrology, geomorphology, land use, connectivity, water chemistry, and biology of the area. The BMPs will improve water quality, aquatic and riparian habitat, increase biodiversity, and enhance hydrology. The estimated pollutant reductions for BMPs are 300-800 pounds of P/year and 200-700 tons of sediment/year. Educational efforts will include effects of altered hydrology and the importance of retaining water to reduce nutrient export and water quantity.

Middle Minnesota Watershed, Implementation of Conservation Practices – 2011

Sponsor: Cottonwood County

Funding: CWP (Loan) \$1,400,000

Purpose: Coordinate the CWP loan program in southern Minnesota counties to demonstrate the influence low interest SSTS loans has on the rate of SSTS compliance. It is anticipated that 120-160 new systems will be installed. Each of these systems will be financed through low interest loans which will be administered by individual counties: Blue Earth, Brown, Cottonwood, Nicollet, Redwood, Renville and Sibley.

Middle Minnesota Watershed SSTS Loan Project – 2014

Sponsor: Renville County

Funding: CWP (Grant) \$10,000 and CWP (Loan) \$950,000

Purpose: The project will provide second-tier low interest loans to landowners for the replacement or upgrade of 65-85 noncompliant septic systems located in the Middle Minnesota Watershed. This project will serve as a means to financially assist landowners in Renville, Cottonwood, Redwood, Nicollet, and Le Sueur counties to continue eliminating noncompliant septic systems and improving water quality.

Renville County MN River Mankato Watershed Protection – 2014

Sponsor: Hawk Creek Watershed Project

Funding: CWP (Grant) \$306,750

Purpose: To address nutrients in surface waters coming from the most common origins of upland sources (eroding soils and runoff from fields, animal feedlots, and urban areas) and near-channel sources (ravines, gullies, bluffs, and streambanks). Multi-beneficial, targeted BMPs, such as buffer strips, grassed waterways, grade/gully stabilizations, streambank and shoreline stabilizations, tile intake protection practices, controlled drainage, wetland restorations/protection, and feedlot runoff reduction practices will be a priority in order to prevent impairments and degradation. Based on past project pollutant reductions, the estimated pollutant reductions through this grant are 680 pounds of P per year and 255 tons of sediment per year.

Seven Mile Creek Assessment and Implementation – 2017

Sponsor: Gustavus Adolphus College

Funding: Section 319 (Grant) \$475,524

Purpose: The SMC watershed was identified as a NWQI watershed by the NRCS and, in 2014, BWSR designated it as one of its Targeted Watershed Demonstrations. These concentrated monitoring funds will show that targeting conservation in agricultural landscapes can produce measureable improvements in stream metrics. This monitoring project is to create an expanded and coordinated monitoring program designed to capture change at multiple scales, with the hope of applying those lessons to similar landscapes across the upper Midwest.

Minnesota River – Yellow Medicine River**Hawk Creek Watershed Dissolved Oxygen Restoration Project – 2014**

Sponsor: Hawk Creek Watershed Project

Funding: Section 319 (Grant) \$237,585

Purpose: The goal of this project is to reduce P levels, increase base flows, and reduce sediment volume entering the Minnesota River via the Hawk Creek Watershed through restorative BMP implementation with 10 local landowners in strategic targeted locations as identified in the Lower Minnesota River DO TMDL Implementation Plan. BMPs with multiple benefits, such as improving water quality, habitat, and hydrology, will be a priority. Based on past project pollutant reductions, the estimated pollutant reductions through this grant are 680 pounds of P per year and 255 tons of sediment per year. A Volunteer Citizen Monitoring Network of approximately 25 volunteers will be maintained and water quality and precipitation data will be collected and analyzed. The data collected will be added to long-term data to help identify water quality trends. Interactions with volunteers will strengthen citizen involvement in watershed issues and solutions. This project will utilize outreach and education to target BMP implementation and the decision making process of watershed issues.

Hawk Creek Watershed FY16 Implementation Project – 2016

Sponsor: Hawk Creek Watershed Project

Funding: Section 319 (Grant) \$190,054

Purpose: In strategic targeted locations complete 8 alternative intakes, 8 side inlets, 20 acres of buffers, 2 agriculture waste projects, 3 streambank/grade stabilizations, 1,500 acres of cover crops, and 1 WASCOP. These BMPs will achieve an estimated annual reduction of 9,002 pounds of P and 2,480 tons of sediment from entering the Minnesota River via the Hawk Creek Watershed. The civic engagement/outreach component will use effective and practical techniques to increase public involvement and input in local decision-making processes and water quality improvement efforts. This increased public participation will promote local leadership and build local water quality management capacity.

Hawk Creek Watershed Improvement Project – 2017

Sponsor: Hawk Creek Watershed Project

Funding: Section 319 (Grant) \$397,000

Purpose: This project addresses excessive P and low DO. Reduced P levels, increased base flow, and reduced sediment volume will be instrumental in correcting the impairment of low DO levels in the Minnesota River. The BMPs will be selected based on their ability to reduce P and erosion; eligible practices include, but are not limited to, side inlets, alternative tile intakes, WASCObS, grade stabilizations, streambank stabilizations, feedlot waste reduction projects, lakeshore buffers, and/or cover crops. These BMPs improve water quality and improve aquatic and riparian habitat, increase biodiversity, and enhance hydrology. The estimated pollutant reductions for BMPs are 1,000-2,000 pounds of P/year and 1,000-2,000 tons of sediment/year. Education and outreach activities will be used to increase engagement, relationships, and willingness to participate in water quality improvement.

Hawk Creek Watershed Subsurface Sewage Treatment System (SSTS) Upgrade Implementation – 2016

Sponsor: Hawk Creek Watershed Project

Funding: CWP (Loan) \$1,050,000

Purpose: The project will utilize low interest loan funds to landowners for the replacement or upgrade of 75 noncompliant septic systems located in the Chippewa, Kandiyohi, and Renville County portions of the Hawk Creek Watershed. This project will result in an estimated annual reduction of 240 pounds of P, 5,300 pounds of TSS, and 600 pounds of nitrogen. In the Lower Minnesota River DO TMDL Implementation Plan SSTS upgrades are recommended for reducing pollution.

Pomme de Terre River

Pomme de Terre WRAPS BMP Implementation Project – 2016

Sponsor: Pomme de Terre River Association

Funding: Section 319 (Grant) \$285,000

Purpose: Install 20 rain gardens, 33 WASCObS, 4 shoreline restorations, 4 agricultural waste pit closures, and 90 acres of wetland restorations. The BMPs/conservation projects to be implemented will reduce sediment by 1,304.00 T/yr and P by 1,304.86 lbs/yr. It will also increase participation in watershed management activities through educating local schools, lakeshore residents, farm groups, outdoor sport groups, and recreation club members.

Pomme de Terre WRAPS Implementation Project – 2014

Sponsor: Pomme de Terre River Association

Funding: Section 319 (Grant) \$275,000

Purpose: This project will continue the BMP implementation process for the Pomme de Terre Watershed. Opportunities to reach landowners and citizens of the watershed will be leveraged through this project and will include an outreach program to inform citizens, city officials, and other individuals about water quality issues and solutions. The outcome will be a reduction of 1,220 lbs/yr of P and 1,100 tons/yr of sediment. The BMPs installed will provide 10 years of protection from agricultural and urban non-point source pollution. By addressing P and sediment concerns, this project will have a positive impact on aquatic life for both macroinvertebrates and fishes by reducing turbidity within the river. In addition, project coordination with partnering LGUs will be strengthened with continued cooperation.

Redwood River

Redwood River Turbidity Reduction Project – 2015

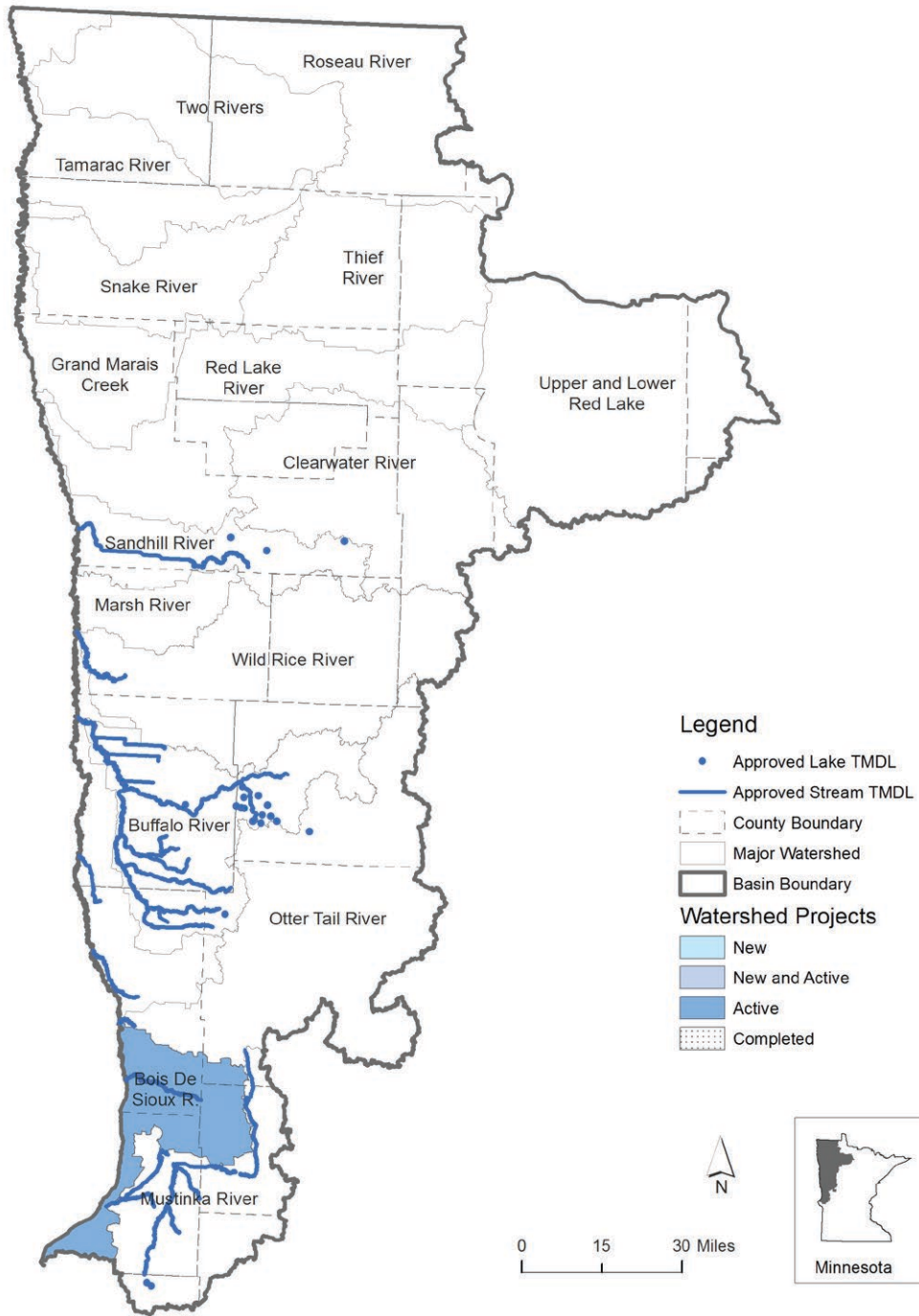
Sponsor: RCRC

Funding: CWP (Grant) \$150,512

Purpose: Assist at least 12 cooperators to achieve total reductions of 715 tons/year of sediment and 715 lbs/year of P. This project will take further steps to provide funding, up to 70% cost-share, to cooperators to restore high priority erosion areas and to retain water in upland areas which retards flow into the system. Proposed conservation practices of WASCObS, grassed waterways, grade stabilizations and streambank stabilizations are in direct agreement with the planned activities by the partnering water management plans. In order to help determine which BMPs are most effective, which BMPs are needed, and which BMPs cooperators are most willing to implement, two civic engagement meetings will be hosted by this project. Dialogue will be facilitated by a past cooperator who can attest to the benefits provided by his personal BMP installations. The perceptions of past and future cooperators will be sought as to how they see the watershed restoration progressing, and to recommend methods to continue restoration efforts with greater public involvement. The results of these meetings will help identify the public concerns and will tailor future conservation approaches.

Red River Basin

None were completed for 2018



Red River Basin

Active projects

Bois de Sioux River Watershed

Red River Basin Reservoir Nutrient Load Reduction – 2014

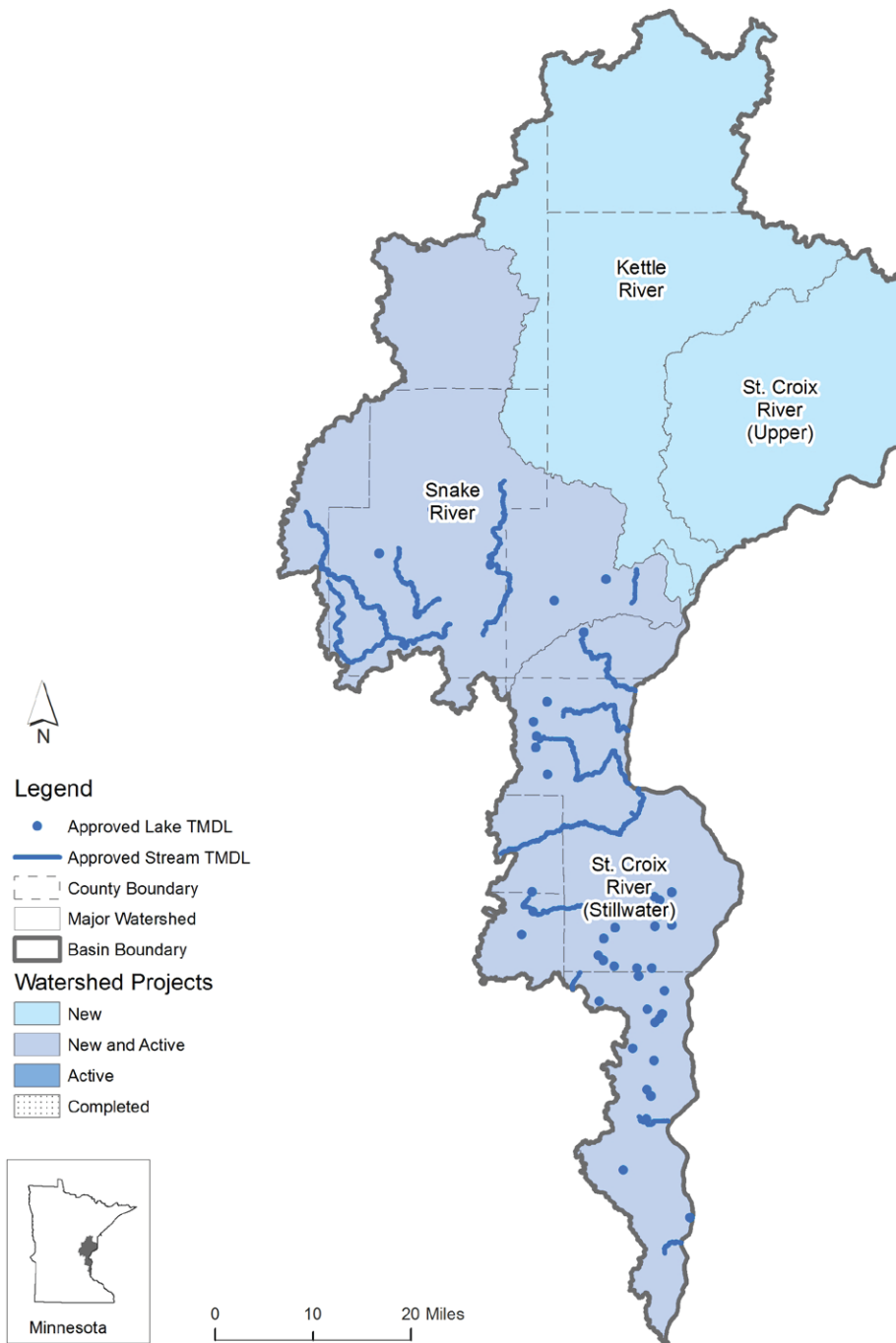
Sponsor: Red River Basin Commission

Funding: Section 319 (Grant) \$289,998

Purpose: Determine if vegetated flood storage reservoirs (current and future) can provide a 50% reduction in nutrient loading to selected tributaries that feed the Red River. This project will explore the use of flood-water impoundment structures for nutrient reduction by redesigning the cell management to reroute the stream flow through vegetated treatment cells. It is expected that the treatment cells will capture and hold nutrients both in sediment and in the vegetation (i.e., cattails); however, the nature of nutrient movement and storage is dynamic. This project will attempt to clearly define nutrient flux in the contributing watershed and both inside and outside of the impoundment's cells. This project will serve as a test pilot to aid with future nutrient control BMP design.

St. Croix River Basin

None were completed for 2018



St. Croix River Basin

Active projects

Projects awarded in 2018

Projects involving multiple watersheds

Pine County SSTS Upgrades – 2017

Sponsor: Pine County

Funding: CWP (Loan) \$600,000

Purpose: This project will upgrade 20 septic systems per year over the three-year loan period. Septic systems are recognized as an acceptable means for treating wastewater and this project will annually prevent 50 pounds of P, 200 pounds of nitrogen and 97.4×10^{16} (quintrillion) CFU of fecal coliform and *E. coli* from entering the groundwater in Pine County.

Lower St. Croix River Watershed

Forest Lake Diagnostic Study – 2015

Sponsor: Comfort Lake - Forest Lake Watershed District (CLFLWD)

Funding: CWP (Grant) \$52,500

Purpose: The primary outcome from this project is a comprehensive list of targeted implementation activities throughout the watershed, ranked by P reduction cost-benefit. This quantitative data will allow the CLFLWD and partnering organizations to implement activities that will maximize water quality protection/restoration. This project will also help achieve the actions identified for Forest Lake in the 2014 Sunrise River WRAPS report. The administrative outcomes for the project include a comprehensive work plan, timely invoicing, and meeting reporting and other grant requirements. The social outcomes for this project include educating lakeshore owners and City of Forest Lake residents on the connection between stormwater runoff and lake water quality. Additional elements of this project include a field inventory of stormwater outfall locations and conditions around the perimeter of Forest Lake, targeted monitoring of major stormwater outfalls and stream tributaries to refine watershed pollutant loading estimates that were modeled in the previously completed stormwater retrofit analysis, and collection of lake sediment samples in each of the three bays of Forest Lake to determine if internal loading is likely to be a problem in the future.

Goose Lake TMDL Final Implementation Projects – 2017

Sponsor: Carnelian-Marine-St. Croix Watershed District

Funding: Section 319 (Grant) \$76,000

Purpose: The purpose of this project is to design and install up to four stormwater-quality improvement practices to reduce P loading to Goose Lake. Prioritization and outreach efforts have resulted in the identification of six locations discharging excessive P to Goose Lake, of which one has been completed and the second will be installed in 2017. This project will complete the final 38 lbs/yr watershed P contributions to Goose Lake identified in the 2012 Multi-Lakes TMDL Plan. The Multi-Lake TMDL Plan for Goose Lake, approved in 2012, identifies a 50% (77 pounds) reduction of P from watershed runoff and a 9.4% (22 pounds) reduction of internal load of P is needed to achieve a target in lake P concentration of 40 micrograms per liter. The Watershed District, working in partnership with landowners, has completed the installation of three projects achieving approximately 50% of the targeted load reduction.

Lower St. Croix Targeted Phosphorus Reduction Project – 2017

Sponsor: Carnelian-Marine-St. Croix Watershed District

Funding: Section 319 (Grant) \$300,000

Purpose: The purpose of this project is to design and implement a ravine stabilization and wetland restoration project in the City of Marine on St. Croix in Washington County draining to the St. Croix River and Lake St. Croix. This is 100% of the unstable ravines in the Marine Landing Creek subwatershed. The proposed practices will reduce P loading by approximately 17 lbs/yr as part of ongoing efforts to reduce annual P discharges. Residential stormwater runoff carries P from grass clippings, fertilizers, leaves, and pet waste from the city streets to Marine Landing Creek and the St. Croix River. Typically, stormwater runoff flows through unvegetated and unpaved road aprons, increasing erosion and sediment loads discharged directly to the St. Croix River. In addition, uncontrolled stormwater runoff is eroding a ravine in the headwaters of Marine Landing Creek and is contributing additional sediment and P to the St. Croix River.

Marine on St. Croix Stormwater Phase 2 – 2017

Sponsor: Carnelian-Marine-St. Croix Watershed District

Funding: Section 319 (Grant) \$92,500

Purpose: The purpose of this project is to design and implement a ravine stabilization and wetland restoration project in the City of Marine on St. Croix in Washington County draining to the St. Croix River and Lake St. Croix. The approximate length of ravine to be stabilized is 375 feet, which is 100% of the unstable ravines in the Marine Landing Creek subwatershed. The approximate area of wetland restoration is 2+/- acres. The proposed practices will reduce P loading by approximately 17 lbs/yr as part of ongoing efforts to reduce annual P discharges from the City of Marine on St. Croix into the St. Croix River and Lake St. Croix.

Moody Lake Wetland Rehabilitation Project – 2016

Sponsor: CLFLWD

Funding: Section 319 (Grant) \$81,497

Purpose: Acquire or obtain a conservation easement on approximately 10 acres of land to permanently remove cattle, construct a grassed waterway and 50 foot buffer strip to infiltrate and filter runoff, and excavate an average of 12 inches of soil from a targeted area of wetlands near Moody Lake.

Snake River Watershed

CLFLWD Adaptive Management Project Implementation – 2018

Sponsor: Comfort Lake Forest Lake Watershed District

Funding: CWP (Loan) \$1,500,000

Purpose: The CLFLWD is committed to using sound scientific principles and a systematic adaptive management approach to protecting and improving its waterbodies. Six projects aimed at improving Moody Lake, Bone Lake, Little Comfort Lake, Shields Lake, Forest Lake, Comfort Lake, and Sunrise River are planned for implementation. Each is part of a comprehensive plan to bring target waterbodies back to pre-development conditions. Projects may include implementation of multiple BMPs, as identified through additional monitoring and feasibility. An outreach component will be included for each project as well. By engaging the public through these activities, the District aims to enable and encourage social behaviors such as environmental appreciation and stewardship. The District aims to use Prioritized, Targeted, and Measurable (PTM) projects to meet quantitative water quality goals across the state. CLFLWD projects will have a pre- and post-construction monitoring element that will specifically address the “Measurable” component in PTM.

Kanabec Water Resources Protection Project Phase 2 – 2015

Sponsor: Kanabec SWCD

Funding: CWP (Grant) \$196,200

Purpose: This project includes surface water monitoring of six rivers/tributaries and three lakes in the watershed that are currently un-assessed. The outcomes expected through this monitoring will provide a baseline of data to help prioritize and focus on future project areas for protection. This project will also include the implementation of 16 approved BMPs in protection areas which include feedlot runoff treatment and control, manure storage pit closures, livestock exclusion fence from streams, heavy use protection areas for cattle crossings, roadside runoff/erosion control, critical area seeding, sediment basin, gully erosion control, wetland restoration, reduced tillage methods, cover crops, nutrient management, well abandonment and closures, streambank and shoreline protection, riparian vegetative buffer enhancements, and other approved BMPs that protect water quality. The measurable outcomes and non-point source pollutant reduction goals expected from these BMPs are: 76 T/yr of TSS, 76 T/yr of soil loss savings, 14,000 lbs/yr of P reductions and 18,000 lbs/yr of nitrogen reductions. This project also includes outreach, education, civic engagement, and civic organizing, to include key stakeholders, citizens and landowners in the process. Additional activities include the development of ten forest stewardship plans for landowners in areas that need protection to provide an inventory, assessment and mapping of the various forest cover types, and include management recommendations for reforestation practices, harvesting, wildlife habitat improvement, and overall protection of the forest resources. Finally, the agricultural BMP loan program will be used to assist landowners with BMPs that protect and improve water quality.

Snake River Watershed Resource Protection Project - 2016

Sponsor: Snake River Watershed Management Board

Funding: CWP (Loan) \$400,000

Purpose: This project will implement 27-33 SSTS upgrades within the Kanabec County portion of the Snake River Watershed. Septic systems are recognized as an acceptable means for treating wastewater and this project will prevent 136 pounds of P, and 574 pounds of nitrogen from entering the groundwater

in the Snake River Watershed. These activities were documented in the Snake River Watershed WRAPS, Groundhouse River Fecal Coliform and Biota (Sediment) TMDL Implementation Plan, the Ann River TMDL study (phase II) and Stressor I.D. report and the Snake River Watershed TMDL study.

Snake River Watershed Resource Protection Project – 2012

Sponsor: Snake River Watershed Management Board

Funding: CWP (Loan) \$400,000

Purpose: This project will promote and install 40 SSTSSs and other rural BMPs in the Snake River Watershed.

Upper Mississippi River Basin

Projects completed

Long Prairie River

Long Prairie River DO TMDL Implementation

Mississippi River – Twin Cities

Bald Eagle Lake TMDL Implementation

Shingle Creek DO Reaeration Improvements

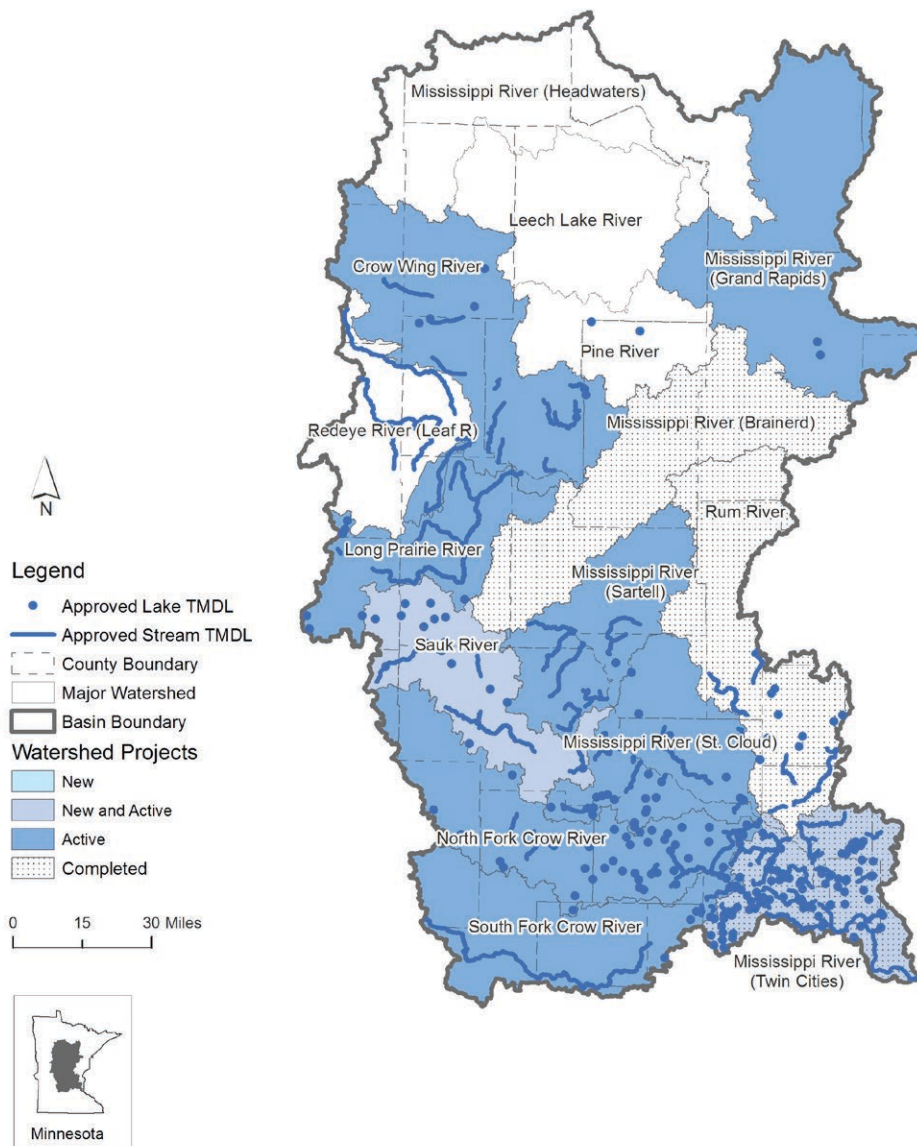
North Fork Crow River

Targeting BMPs in the Crow River Watershed

Rum River

Ardmore Avenue Stormwater Retrofit

Pleasant Lake Stormwater Quality Improvements



Long Prairie River Watershed

Long Prairie River DO TMDL Implementation

The Long Prairie River has problems with low dissolved oxygen (DO) levels that occasionally fall below the state standard of 5 ppm. The river is listed as impaired for dissolved oxygen. Land use along the river is diverse, treating problems that are causing low DO levels will require a wide range of technical ability. Other water quality problems serve as indicators such as impaired biota, ammonia toxicity, CBOD, and NBOD.

Waterbody improved

Long Prairie River is improving slowly based on water quality data.

Project highlights

- The levels of pollution reduction established prior to project implementation were exceeded with the implementation of 10 field projects. The projects resulted in reductions in BOD 5 being reduced by 133 lbs/yr, sediment by 2,043 t/yr, *E. coli* by 19 x

10¹² CFU was reduced going into the river, 1,752 lbs/yr phosphorus, soil reduced by 1,222 t/yr, nitrogen reduced by 95 lbs/yr.

Partnerships

- USDA-NRCS – funded landowners' cost-share
- Technical Service Area Engineers
- Morrison and Douglas counties implemented four projects

Financial information

Funding type: Section 319

Grant amount: \$300,000

Matching funds: \$293,070.29

Contact information

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Division Director

Todd County Soil and Water Conservation District

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Long Prairie, MN 56347

320-732-2644, tim.stieber@co.todd.mn.us

MPCA project manager: Anna Bosch



Bauer's Shoreline

Mississippi River – Twin Cities

Bald Eagle Lake TMDL Implementation

This project proposed to use aluminum sulfate (alum) to control internal P loading to Bald Eagle Lake. Over the lifespan of the alum treatment, expected to be 15-20 years, 1,195 lbs of P will be removed.

Financial information

Funding type: CWP

Grant amount: \$400,000

Contact information

Rice Creek Watershed District

MPCA project manager: Chris Zadak

Mississippi River – Twin Cities

Shingle Creek DO Reaeration Improvements

Shingle Creek is an 11-mile long highly impacted urban stream that flows through fully developed urban land. The TMDL was completed to address the dissolved oxygen (DO) and macroinvertebrate bioassessments impairment. TMDL modeling determined that traditional stream roughness reaeration features such as riffles or rock vanes would not be sufficient to increase DO above the aquatic life standard. Monitoring and modeling have identified several locations on Shingle Creek where DO is chronically extremely low. Rather than adding traditional, low-profile mechanical aerators to the stream, the Shingle Creek Watershed Management Commission proposed to work with Forecast Public Art on a design competition to create reaeration structures that are art, creating unique, inviting environments and improved water quality and biotic integrity.

Waterbody improved

Three locations on Shingle Creek with chronically low DO were proposed to be improved. Design changes during the project development phase of the project resulted in significantly higher installation costs, far in excess of the funds available from this grant and local sources. When installation quotes were received that were greater than even the revised cost estimates, the Shingle Creek Watershed Management Commission decided that the cost-benefit that could be achieved was greater than what was acceptable and terminated the project before any installation occurred. No improvements were made to the waterbody.

Project highlights

- The Commission worked with Forecast Public Art to engage artists to design and create reaeration structures to be installed in Shingle Creek. Artists presented concepts and a portfolio of their work and the selection committee narrowed the group to three. These three prototyped their concepts, and two artists were selected to move forward to design. Several changes were made during the design phase, both to enhance the effectiveness of the project and at the request of the cities. These changes increased the cost of the project significantly, making the proposed improvements very cost-ineffective. Installation quotes



Site 2 from footbridge

were double to triple what was budgeted. The design team recommended that the project be discontinued at this time.

Partnerships

- Forecast Public Art – engaged artists to design and create reaeration structures
- City of Brooklyn Center – technical advisory committee member
- City of Brooklyn Park – technical advisory committee member
- MPCA – contract, technical assistance

Financial information

Funding type: Section 319

Grant amount: \$54,190

Matching funds: \$44,337

Contact information

Judie Anderson, Administrator

Shingle Creek Watershed Management Commission

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Plymouth, MN 55447

763-553-1144, judie@jass.biz

MPCA project manager: Rachel Olmanson

North Fork Crow River Watershed

Targeting BMPs in the Crow River Watershed

The Targeting BMP's in the Crow River Watershed project focused on protecting the primary waterways in the Crow River Watershed by upgrading failing subsurface sewage treatment systems (SSTS) in five counties located in the Crow River watershed. The five counties in the project are Kandiyohi, McLeod, Meeker, Renville and Wright.

In the past 20 – 25 years, there has been an increase in variability in runoff extremes in the Crow River Watershed. High flows strongly influence nutrient and sediment loading. The contributions of the Crow River are important from the perspective that the Twin Cities Metropolitan area gets most of its drinking water from the Mississippi River, downstream of its confluence with the Crow River. According to the 2003 Crow River Diagnostic Study over the range of low to high flows, the Crow River contributed about 4% to 20% of the water volume, but 18% to 58% of the Anoka Mississippi River TSS. For the purposes of downstream water quality protection, a long-term goal for 25% reduction in TSS loading in the Crow River Basin was set. The relationship between flow and bacteria concentrations aid in identifying potential sources of elevated bacteria concentrations. Under low flows, runoff processes are minimal as bacteria concentrations are primarily driven by wastewater treatment plants, failing SSTS, SSTS systems with "straight pipe connections to tile or storm drains and animals in or near the receiving water. Violations appear to occur across all flow regimes in the bacteria-listed reach of the Lower Crow River in the North Fork Crow and Lower Crow Bacteria, Turbidity and Low Dissolved Oxygen TMDL Assessment Report.

Project highlights

- The project upgraded failing SSTS. Loans were used to help upgrade SSTS systems in Wright, Meeker, McLeod, Renville and Kandiyohi Counties, but no water body was removed from the 303(d) list.
- The Targeting BMPs in the Crow River Watershed project met expectations by improving 100 SSTS systems. Major partners in this effort were Kandiyohi County, McLeod County, Meeker County, Renville County, Wright County and CROW. The project started in November 2012, but SSTS upgrades started in 2013.

Project ended in November 2016. Implementation for this project helped reduce bacteria as referenced in the Lower Crow River in the North Fork Crow end Lower Crow Bacteria end Diagnostic Study. Project partners will continue pursuing and acquiring loans for SSTS upgrades.

- This specific project achieved our goal and upgraded 100 SSTS. Specific load reductions are as follows:
 - BOD: 39,203 lbs/yr
 - TSS: 10.3 tons/yr
 - Bacteria: 79.8 CFU/yr
 - TP: 969 lbs/yr
 - Nitrogen: 2,182 lbs/yr

Funding information

- Funding type: CWP loan
- Loan amount: \$1,191,489
- Matching funds: \$ 9,840

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Rum River Watershed

Ardmore Avenue Stormwater Retrofit

Lake Independence was listed on the 303(d) list of impaired waters for excess nutrients-total phosphorus in 2002. Urban stormwater runoff was identified in the Lake Independence TMDL as a major source of phosphorus loading. Urban stormwater runoff from the Ardmore Neighborhood contributes phosphorus to Ardmore Lake and, eventually, Lake Independence. Ardmore Lake currently exceeds Minnesota water quality standards for total phosphorus, Secchi depth, and chlorophyll-a.

Waterbody improved

Ardmore Lake is hydrologically connected to Lake Independence through a stream that flows south from the south end of Ardmore Lake. The project will treat direct stormwater contributions to Ardmore Lake and improve water quality in Lake Independence.

Project highlights

- A stormwater infiltration basin was constructed to treat stormwater runoff in the Ardmore Neighborhood. An educational project sign was also created and installed as an educational/outreach component of the project. The major partners in this project, providing both in-kind and cash match for the project, included the City of Medina, Pioneer-Sarah Creek Watershed Management Commission, and the MPCA. The goal of this project is to improve water quality of Ardmore Lake and Lake Independence by reducing the amount of phosphorus and sediment entering the lakes from stormwater in the Ardmore neighborhood. While no water quality monitoring has been completed post installation, a P8 Urban Catchment model predicts that the stormwater filtration basin will remove 8 lb/yr of TP and 1,600 lb/yr of TSS.

Partnerships

- Pioneer-Sarah Creek Watershed Management Commission – contributed match to the project
- WSB and Associates Engineering Consultants – helped with project design/project management
- Omann Brothers, Inc., - Paving Consultants
- Schmidt Curb Company, Inc. – Concrete Contractor
- MPCA – providing grant funding and assistance/support

Financial information

Funding type: CWP Grant
Grant amount: \$33,163
Matching funds: \$63, 649

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Rum River Watershed

Pleasant Lake Stormwater Quality Improvements

Pleasant Lake meets MPCA standards for phosphorus concentrations, chlorophyll-a, and Secchi depths. This project objective was protection by reducing flows and loadings.

Waterbody improved

The 509-acre general development Pleasant Lake has benefitted because of the improvements completed.

Project highlights

- Following award of the grant in 2014, the City of Annandale incorporated effective BMPs into the design of a street reconstruction project to reduce run-off volumes and the associated sediment loadings within the project area. The improvements were constructed in the fall of 2015 and the results obtained through monitoring in 2016 and 2017 exceeded anticipated results. During 2016 and 2017, a total of 7.31 acre-ft of runoff was infiltrated and 5.99 lbs. of phosphorus was removed. This equates to a 35% runoff volume reduction and 39% phosphorus reduction in 2016 and a 54% runoff volume reduction and 59% total phosphorus reduction in 2017. The BMPs will continue to reduce runoff volumes and loadings throughout their useful life.

Partnerships

- City of Annandale – project owner
- Clearwater River Watershed District – project partner, provided water quality background data
- Bolton and Menk, Inc. – designed water quality BMPs, technical information to design and construct the improvements, analysis of the BMP effectiveness, and grant reporting
- MPCA, grant sponsor, project partner

Financial information

Funding type: CWP

Grant amount: \$156,481

Matching funds: \$156,483



Street reconstruction project

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Upper Mississippi River Basin

Active projects

Projects awarded in 2018

Projects involving multiple watersheds

Crow River SSTS Restoration Project – 2017

Sponsor: Crow River Organization of Water (CROW)

Funding: CWP (Loan) \$1,350,000

Purpose: This project will focus on addressing excess nutrients and bacteria on a comprehensive scale through the Crow River watershed. To achieve this goal up to 115 SSTS will be installed to mitigate pollution sources and transport. This project will result in an estimated annual reduction of 340 pounds of P, 7,566 tons of TSS, and 834 pounds of nitrogen.

Clearwater River Watershed

Clearwater River Watershed Alternative Tile Intakes Project – 2014

Sponsor: Clearwater River Watershed District

Funding: Section 319 (Grant) \$45,000

Purpose: This project will install up to 120 open tile intakes that filter out nutrients and sediments, providing 700 pounds per year of TP load reduction from priority crop land. It will also document reduction in farmer and tile contractor resistance to the use of alternative tile intakes. Educational materials will be produced, demonstrating the benefits, effectiveness and utility of alternative tile intakes from environmental and economic standpoints, as well as applicability throughout the state.

Mississippi River – Brainerd

Platte River Restoration/Protection Project – 2015

Sponsor: Morrison SWCD

Funding: CWP (Grant) \$34,900

Purpose: Through a combination of rock, streambarbs and bio-engineering, the stream channel will be slightly modified to deflect the river's energy away from the bridge abutments and the eroded banks. Through this combination of practices erosion will be reduced and long term stabilization can be achieved. The bio-engineered components and riparian buffer will also add aquatic and pollinator habitat with water quality

benefits. The water quality improvements predicted are decreased water turbidity, decreased sediment load of the river by 39.6 T/yr, and stabilization of the north bank of the river.

Swan River Headwaters Subwatershed Restoration – 2015

Sponsor: Todd SWCD

Funding: CWP (Grant) \$38,650

Purpose: Grant dollars would be used to install riparian buffers and restore a series of sediment ponds to keep nutrient rich runoff from flowing into several local lakes and the Swan River. Riparian landowners in this area, both agricultural producers and shoreland residents, have agreed that work is needed and are willing to implement these strategies to restore water quality in this area. These projects would improve conditions for fish and invertebrate communities. The efforts outlined in these projects would increase cooperation between the shoreland and agricultural communities and encourage a conservation ethic throughout this area.

Mississippi River – Grand Rapids

Big Sandy and Minnewawa Lakes Phosphorus Reduction – 2014

Sponsor: Aitkin County SWCD

Funding: Section 319 (Grant) \$86,100

Purpose: This project will implement P reduction strategies for the Big Sandy Lake Watershed, as outlined in the Big Sandy Lake and Lake Minnewawa TMDL Implementation Plan. BMP demonstration projects will be installed, including 2 rain gardens and 5 shoreline stabilization projects. Estimated reduction in P pollution of 9,145 lbs/yr and sedimentation of 5,165 T/yr. One hundred rain barrels will be distributed at a reduced cost to critical landowners. Septic system inventories will provide county staff, as well as lake residents, with critical information needed to further address the issues related to improper septic system maintenance. Education activities will increase awareness of and concern about consequences of landuse practices that have environmental impacts. Water quality data will be collected on nine lake sites within the Big Sandy Watershed.

Mississippi River – St. Cloud

Clearwater River Restoration & Protection Phase II – 2015

Sponsor: Clearwater River Watershed District

Funding: CWP (Grant) \$72,000

Purpose: District staff will update an existing bacteria and TSS source inventory through a desktop survey and field reconnaissance to identify and prioritize project locations to reduce sediment and bacteria loading to the River. Projects will be prioritized for preliminary design based on their potential for load reduction to the Clearwater River. The district will finalize design and permitting for projects with signed agreements and high cost benefit in terms of bacteria and TSS load reductions. Construction will be complete by spring of 2018. The District will use the projects as demonstrations to promote participation in agricultural programs and projects

NE St. Cloud Mississippi River Protection Project – 2015

Sponsor: City of St. Cloud

Funding: CWP (Grant) \$200,000

Purpose: The proposed project will increase pervious surfaces, create disconnection of impervious areas prior to entering the storm sewer system (i.e., Mississippi); implement alternative green landscaping, and bioretention facilities. Alternative landscaping techniques/BMPs will be implemented throughout the drainage area where site characteristics make sense. This may include, but is not limited to: incorporating trees into landscaped areas, tree boxes, pervious pavement, grass swales, vegetated filter strips, etc. Targeted areas include: where the City plans to re-stabilize pervious surfaces; where the City plans to install bioretention or other volume reduction BMPs; areas adjacent to reconstructed catch basins and/or retrofit sump catch basins (tree boxes); and, where the City plans to landscape existing paved and/or gravel areas. The education of property owners and citizens will also be an important aspect of the project to ensure long term function of the BMPs and future participation by other property owners. Projects implemented as part of this grant will be promoted and highlighted to educate and encourage participation in future projects for this area. Furthermore, the projects will improve the aesthetics of the old rundown industrial/commercial area bringing additional attention and educational efforts. The City plans to submit follow-up presentations on the

implemented BMPs and the impacts to the Mississippi River to area stakeholder and citizen groups.

Mississippi River – Twin Cities

Lower Sand Creek Corridor Restoration – 2017

Sponsor: Coon Creek Watershed District

Funding: Section 319 (Grant) \$269,563

Purpose: The main stem of Sand Creek is impaired for aquatic life impairments. Excess P, TSS, habitat alterations, and altered hydrology were identified as the primary stressors to Sand Creek's biota. To meet pollution standards, the watershed must meet annual load reductions of approximately 36 tons of TSS and 813 pounds of TP per year. To address the remaining non-point sources of TSS and TP in Sand Creek, in-channel BMPs are necessary to prevent further channel incision and bank erosion. This project will implement multiple streambank and in-stream BMPs to reduce sediment and nutrient loading and to improve in-stream and riparian habitat. A one-half mile of river, identified as a TSS loading hot spot, will have targeted practices installed to address bank erosion, which contributes an estimated cumulative annual TSS load of 372 tons attributable to streambank erosion. The proposed BMPs will reduce approximately 75% of the bank erosion in the project area. Additional TSS and TP load reductions can be expected from preventing further channel incision with grade control structures and from enhancing riparian vegetation to treat overland flow.

Northwood Lake Water Quality Improvement Project – 2015

Sponsor: Bassett Creek Watershed Management Commission

Funding: CWP (Grant) \$300,000

Purpose: This project will treat stormwater runoff from over 110 acres of currently untreated urban land. At the east end of the lake project components include a structural treatment device for pre-treatment of runoff, underground stormwater re-use chamber (160,000 gallons capacity), pump house, distribution system to irrigate 6.4 acres of adjacent ball fields, and a system overflow directed into a series of linear rain gardens prior to discharging into Northwood Lake. At the west end of Northwood Lake, a wet ponding basin will be constructed in a green space area between Trunk Highway 169 and Jordan Avenue. Stormwater runoff from rear yards and Jordan Avenue draining from the

south will be directed into the pond for treatment before discharging into an existing storm sewer pipe tributary to Northwood Lake. This project is expected to remove 22 lbs of P per year in addition to other pollutants associated with stormwater runoff and snowmelt. Additional benefits of the project include water conservation through the storage and use of stormwater as irrigation water for adjacent ballfields. It is estimated that up to 3.8 million gallons of drinking water may be conserved annually due to irrigation using stormwater captured through this project.

North Fork Crow River

MFCRWD Loan Program for BMPs/Septic Upgrades – 2015

Sponsor: Middle Fork Crow River Watershed District

Funding: CWP (Grant) \$10,000 and CWP (Loan) \$100,000

Purpose: The project goal is to reduce the impacts of stormwater runoff and sediment and nutrient loading into the Middle Fork Crow River by implementing a variety of BMPs including stormwater retrofits, streambank restorations, conservation agricultural projects, and septic system upgrades. This will be done by evaluating current water quality impacts, implementing BMPs already in the planning stages, and promoting BMPs to landowners with the support of a low interest loan program.

North Fork Crow River Septic System/Feedlot Upgrades – 2012

Sponsor: North Fork Crow River Watershed District

Funding: CWP (Loan) \$500,000

Purpose: The CWP Loan Program will finance ongoing efforts to upgrade 45-50 noncompliant septic systems in the watershed area of Rice and Koronis Lakes and undertake two to three cooperative feedlot manure management projects such as manure pit upgrades, installing storage ponds, pumps, liners, and clean water diversions.

Rum River

Mille Lacs Lake Protection – Stormwater Control – 2014

Sponsor: Aitkin County SWCD

Funding: CWP (Grant) \$85,520

Purpose: This project will implement five stormwater control demonstration BMPs and educate watershed landowners regarding stormwater control. These

projects will serve to change behavior and perceptions of how stormwater may be managed, and demonstrate how easy changes may have a positive impact on land stewardship and water quality protection. One hundred rain barrels will be distributed at a reduced cost to critical landowners. These will serve as examples to numerous area residents, resulting in benefits that include control of stormwater runoff and increased awareness of the water quality impacts of untreated stormwater runoff. Education activities will increase awareness of and concern about consequences of improper stormwater management practices and their environmental impacts. Participants will become knowledgeable regarding stormwater and water quality BMPs developing a new understanding of their environment. All efforts combined will engage the local citizens and further the project goal of protecting the water quality of the Mille Lacs Lake Watershed. Involvement of citizen volunteers will increase their confidence and ability to address stormwater management and water quality concerns. Support of their efforts will lead to long term involvement of the citizens and foster their continued leadership in the local community.

Sauk River

Crooked Lake Basin Restoration Project – 2013

Sponsor: Sauk River Watershed District (SRWD)

Funding: CWP (Loan) \$665,000

Purpose: This project will use CWP loan funds to purchase 1,280 acres from 12 landowners in order to install a ditch weir which will hold back water to re-establish the lake basin. Under management, a restored Crooked Lake will provide 2,200 acres of submerged and emergent plants that will filter and take up nutrients and stabilize sediments from Judicial Ditch 2 (JD2).

Lake Osakis Minor Watershed Nutrient Reduction – 2017

Sponsor: Todd County SWCD

Funding: Section 319 (Grant) \$300,000

Purpose: These funds would be used to bring approximately 5-7 feedlots into compliance. This would be done by the construction and installation of approximately 30 completed and certified best management practices including: properly abandoning waste ponds, clean water diversions (curbs, earthen berms and gutters), vegetated filter strips, stacking slabs and nutrient management plans to bring existing

livestock operations into compliance with current feedlot regulations. These BMPs would reduce P by 120 pounds per year from reaching Lake Osakis. Additional water quality benefits would include reducing nitrogen contributions by 360 pounds per year, 480 pounds per year BOD, 6,486 pounds per year COD and fecal coliform.

Middle Sauk River Targeted Reduction and Outreach – 2014

Sponsor: SRWD

Funding: CWP (Grant) \$332,214.50 and CWP (Loan) \$150,000

Purpose: A farmer-led Council will be developed and meetings will be held up to four times to guide the SRWD in the development of the Hayed Buffer Program and participate in public outreach efforts to promote the program. The project will install 40-50 acres of vegetative buffers under the established Hayed Buffer program, reducing an estimated 126.6 tons of sediment per year. Landowners participating in the Hayed Buffer program will supply feedback on the program by completing the Hayed Buffer Survey developed by the Farmer-led Council. The project will implement two streambank restorations and four erosion control practices to target an estimated sediment reduction of 3.3 to 6.6 T/yr. Stream samples will be collected and compared to archived data. Stream modeling will be completed to determine load reduction and the success of the CWP project.

Osakis Lake Basin Restoration-Phase 2 Implementation – 2018

Sponsor: Sauk River Watershed District (SRWD)

Funding: CWP (Loan) \$1,500,000

Purpose: The goal of the Osakis Lake Restoration-Phase 2 Project is to install water retention practices to increase subsurface infiltration and decrease overland run-off rates to reduce nutrient loading to Osakis Lake. Increasing enrollment by approximately 100 acres in existing conservation programs will increase surface water storage through impoundments and decreased drainage. Enhancing the SRWD's sedimentation pond system along JD2 was also identified as a cost effective BMP to address phosphorus loading to Osakis Lake. Funds will also be used to implement standard BMPs such as filter strips, grassed waterways, and saturated buffers; that have been shown to have measurable reductions to the receiving waters. In addition, implementing these conservation BMPs will increase aquatic and terrestrial habitat and wildlife corridor areas. The SRWD will work with local citizen groups, such as the

Osakis Lake Association, to put projects on the ground and expand its public outreach efforts.

Osakis Lake Nutrient Reduction – Crooked Lake – 2014

Sponsor: SRWD

Funding: Section 319 (Grant) \$286,652

Purpose: Entice landowners, using additional incentives, to secure their enrollment into the Reinvest in Minnesota program, or other similar programs to restore the Crooked Lake basin. Approximately 1,200 acres would be restored to a standing water basin. Under management, a restored Crooked Lake would provide 3,291 acre-foot of storage, resulting in increased storage, decreased nutrient transport, flood mitigation and increase wildlife habitat. The restored basin would enhance the quality of water flowing through JD2, which directly outlets to Osakis Lake. A fully restored shallow lake would have a potential load reduction of 2,135 lbs/yr of TP and 562,575 lbs/yr of TSS. Seventy-two lakes samples and 30 stream samples will be collected and compared to archived data. Data from the JD2 sites and lakes sites will be compiled and submitted to MPCA for EQuIS and posted on SRWD's website for public review. Stream modeling will be completed to determine load reduction and the success of the restoration project.

SRWD Groundwater Protection Project – 2015

Sponsor: SRWD

Funding: CWP (Grant) \$10,000 and CWP (Loan) \$250,000

Purpose: Educate the local residents of the importance of groundwater protection and provide financial assistance to those who need to properly abandon their unused well or to upgrade their nonconforming septic system to prevent nutrients and other contaminants from impacting groundwater and surface water through groundwater permeation. Agencies within each of the five counties will take the lead on conducting the septic inspections throughout the Sauk River watershed. Incentive dollars (grant funds) will be offered to watershed residents that have an unused well, cistern or underground reservoir to properly abandon the system. The SRWD will work with the local county agencies to provide public outreach to watershed residents informing them of the impact that unused wells and substandard septic systems have on drinking water and surface water.

South Fork Crow River

Ardmore Avenue Stormwater Retrofit – 2015

Sponsor: City of Medina

Funding: CWP (Grant) \$33,163

Purpose: The installation of a filtration basin to treat stormwater prior to entering Lake Ardmore and Lake Independence, will result in a reduction of the TP and TSS load contributed to these waterbodies from a portion of the neighboring developed area. Lower TP and TSS loads also reduces chlorophyll-a concentrations in-lake, an indirect measure of the amount of algae within these lakes. Lower P and chlorophyll-a concentrations improve water clarity (Secchi depth) as well and allow the lakes to support the designated uses assigned to them. This project will serve as a city-led example of a stormwater retrofit for a 6.8 acre tributary area that can be replicated on a smaller scale by private property owners. Native plantings installed with the proposed BMP will facilitate bioretention and plant uptake. The filtration basin includes a drain-tile due to poorly draining soils. However, the proposed engineered mix of sand and compost within the basin will provide water quality treatment of the lawn and impervious runoff.

Buffalo Creek – Marsh Water Project – 2014

Sponsor: Buffalo Creek Watershed District

Funding: CWP (Grant) \$10,000 and CWP (Loan) \$294,540

Purpose: The Marsh Water Project includes the construction of a stormwater wetland BMP, placed in-line with the existing ditch, to treat stormwater from agricultural, industrial, and residential land uses. Since few (if any) vegetative buffers, ponds, or other BMPs exist along the drainage system, nutrient concentrations are relatively high at the proposed BMP site, enabling substantial reductions as a result of the BMP through both particle settlement and absorption from the wetland plantings. Total anticipated yearly pollutant removals for the stormwater wetland BMP is 23 tons of TSS and 67 pounds of TP.



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