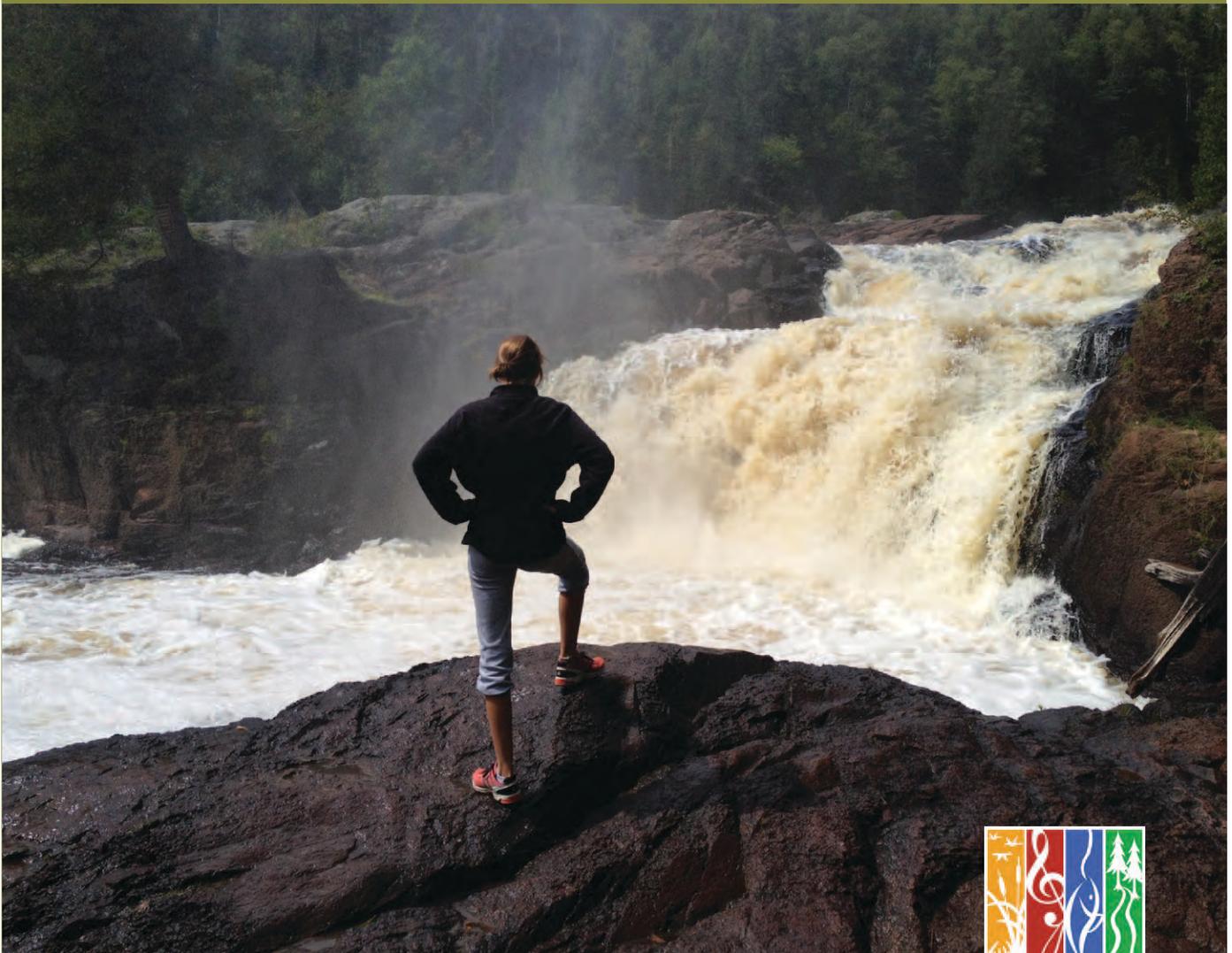


Watershed Achievements Report

2013 Annual Report to the U.S. Environmental Protection Agency

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



Minnesota Pollution
Control Agency



Cover photo courtesy of Pat Baskfield; taken of his daughter, Alexandra Baskfield, during a hike to Devil's Kettle; overlooking the Brule River in Judge C.R. Magney State Park. The Baskfields have been vacationing the same area of the North Shore for over 10 years. They love the rivers, the hiking trails, the lake and the woods.

From the Minnesota Department of Natural Resources website: http://www.dnr.state.mn.us/state_parks/judge_cr_magney/narrative.html

Judge C.R. Magney State Park

Park Info Quick stats:

4,695 acres

68,850 annual visits

6,103 overnight visits

Moose, white-tailed deer, black bears, and timber wolves are among the larger animals that inhabit the park. Smaller mammals that visitors may see include the woodchuck, snowshoe hare, red squirrel, and chipmunk. In the spring and summer, listen for the songs of warblers. All year round, chickadees, nuthatches, jays, woodpeckers, and ruffed grouse can be seen in the park.

Concrete foundations in the campground and picnic areas of the park are remnants of a transient work camp built there in 1934 by the State. The camp provided work and lodging for men displaced during the Depression years. In addition to building trails, logging, and completing public service projects, these men helped fight a fire in 1935 that burned more than 10,000 acres in the area. Later the men set up a sawmill and began to salvage fire-damaged wood.

In 1957, a 940-acre parcel of forest along the Brule River was set aside as Brule River State Park. The park became Judge C. R. Magney State Park in 1963 when the Minnesota legislature selected this park as a memorial to the late Judge Magney, a lawyer, mayor of Duluth, justice of the Minnesota Supreme Court, and a strong advocate of Minnesota State Parks, especially those along the North Shore. With his influence, he was instrumental in establishing 11 state parks and waysides along Lake Superior. Over the years, parcels of land have been added to the park which today totals 4,642 acres.

The bedrock exposed along Lake Superior's North Shore has a geologic history that goes back some 1.1 billion years. During the dramatic volcanic activity of that time, molten lava poured through great fissures that developed in the Earth's crust. One particular flow complex, the Devil's Kettle rhyolite flow, visible along the Brule River, is thought to be as much as 770 feet thick. As these flows accumulated, the land along the rift zone sank to form a great basin, into which huge volumes of sediment were deposited after volcanic activity ended. A long period of erosion followed. The local Sawtooth Mountains of the Grand Marais area are the remnants of these great, tilted lava flows. Much more recently, glaciers took their

toll on the area as massive ice sheets gouged out the Lake Superior basin, mainly from the post-volcanic sediments, and scoured the bedrock surface. In Cook County, where the park is located, the glacial action eroded more earth and bedrock than it deposited.

The vast open waters of Lake Superior moderate the area climate. Summers are generally cool and winters are usually mild with abundant snowfall. The scenic Brule River races through the park, forming whitewater rapids and waterfalls on its way to Lake Superior. Along the lower stretches of the river are a series of spectacular waterfalls. Birdwatchers will find a bonanza of warblers during the nesting months of May, June, and July. Early fall is a good time to observe migrating hawks as they congregate along the shore of Lake Superior. Large white spruce grace the campground and other upland areas. The forested areas are dominated by birch and aspen stands. Wildflowers begin to show in early spring with the marsh marigold, wood anemone, and violet. In summer, look for the rose, thimbleberry, moccasin flower, coral root, clintonia, wild sarsaparilla, and fireweed. Asters and goldenrod add to the fiery colors of autumn.

Watershed Achievements Report

2013 Annual Report to the U.S. Environmental Protection Agency

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



Minnesota Pollution Control Agency



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.

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Projects active and awarded in 2013			
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wq-cwp8-16



Duluth and North Shore Flooding 2012 – Pat Baskfield, MPCA

Introduction

Minnesota is at the head of four continental watersheds and the origin of three of these watersheds; water flows north through the Red River, south through the Mississippi River, east through the Great Lakes and west through the Missouri River. Very little water flowing into Minnesota's lakes and streams originates from outside state borders. Effects from upstream waters can intensify existing water quality stresses. Water pollution comes from many different sources and crosses jurisdictional boundaries; some regulated (point sources), some natural (background) and much unregulated (nonpoint source). Nonpoint source pollution is caused by rainfall or snowmelt moving over and through the ground, mobilizing contaminants.

Programmatic approach to managing nonpoint source pollution

The Minnesota Nonpoint Source Management Program Plan (NPSMPP) applies a statewide, collaborative approach for addressing water quality problems from nonpoint sources of pollution. The Watershed Division of the Minnesota Pollution Control Agency (MPCA) administers the NPSMPP using important financial assistance tools: the Minnesota's Clean Water Partnership (CWP) grant and loan program and the federal Clean Water Act Section 319 Grant program (Section 319). (The MPCA is implementing a phased approach for updates to the 2008 NPSMPP, with several chapters revised per year. Beginning in 2013, and continuing for the next four years, chapters will be evaluated to see if the goals and action steps were completed and if new goals and action steps are appropriate.)

Clean Water Legacy Act Funds are appropriated every two years to help protect, restore and preserve the quality of Minnesota's surface waters. Fund availability varies each year; however for 2012-2013, a portion of these funds were passed through to local government units and other groups working on projects that address non-point source water pollution through the CWP Program.

The United States Environmental Protection Agency (USEPA) provides additional funding through the federal Section 319 grant program. These funds are used to protect and improve the quality of Minnesota's lakes, streams and wetlands by implementing nonpoint source pollution control measures. Section 319 funds are passed through to candidates that meet program eligibility

requirements and, in their applications, reference Action Step(s) identified in Minnesota's NPSMPP and/or activities identified in a Minnesota Watershed Restoration and Protection Strategies (WRAPS) Report. A Watershed Restoration and Protection Strategy is a planning framework intended to engage stakeholders in a process to identify restoration and protection needs for water resources: <http://www.pca.state.mn.us/index.php/water/water-types-and-programs/surface-water/watershed-approach/index.html>.

Progress and next steps

Over the past 16 years, Minnesotans reported implementing an estimated 7,813 best management practices, resulting in an estimated soil loss reduction of 282,984 tons per year, sediment reduction of 128,296 tons per year, phosphorus reduction of 328,279 pounds per year and nitrogen reduction of 657,102 pounds per year from nonpoint sources of pollution (page 10). The annual Minnesota Watershed Achievements Report celebrates the progress made in reducing nonpoint source pollution by highlighting newly awarded and active projects underway as well as successes achieved from projects completed each year for both the CWP and Section 319 programs. In 2012-2013, there were 19 projects completed, 110 ongoing projects and 16 newly awarded projects.

During the 2012-2013 Legislative Session, the **Clean Water Accountability Act** was promulgated, specifying the content, timeline and funding priorities for developing WRAPS. Fortunately, a new template for the WRAPS was already underway and will provide a key tool to help with the tracking for accountability and progress toward clean water.

The WRAPS Report template will utilize tools and processes that are now available and cost effective to analyze the data, including: stressor identification, Hydrologic Simulation Program FORTRAN (HSPF) modeling, and spatial analysis. These tools will provide valuable information and lead to prioritization, targeting and documentation of restoration and protection strategies that were not possible a few years ago. The template will provide consistent expectations of data quality and analyses valuable to inform local planning as well as assist with prioritized targeting of implementation efforts.

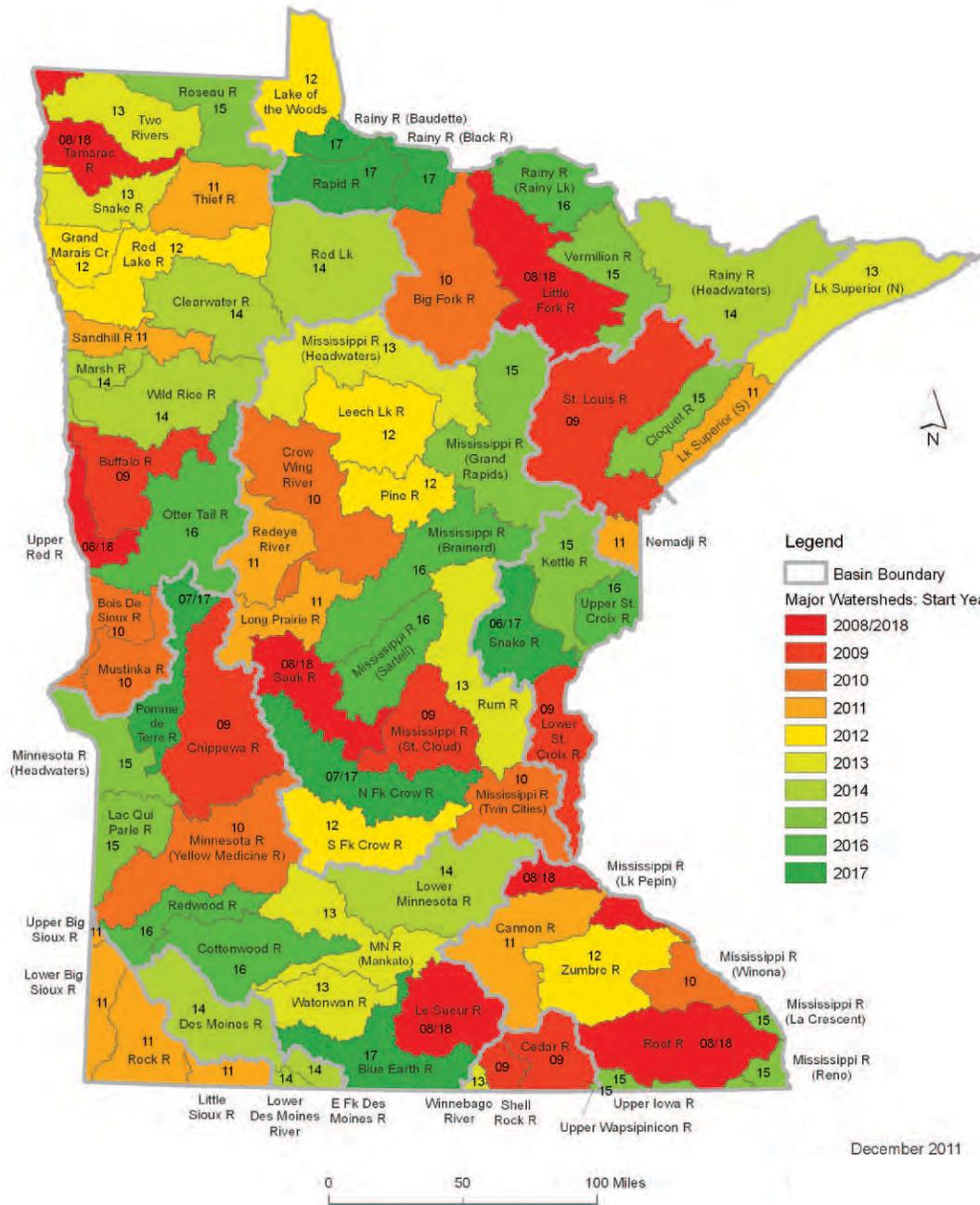
List of acronyms

annAGNPS Annualized Agricultural Nonpoint Source Model	MPCA Minnesota Pollution Control Agency
BATHTUB Army Corps of Engineers Lake Model	MS4 Municipal Separate Storm Sewer System
BERBI Blue Earth River Basin Initiative	NCED National Center for Earth-surface Dynamics
BMP best management practice	NMP National Monitoring Program
BOD biochemical oxygen demand	NO³ nitrate/nitrogen
BWSR Minnesota Board of Water and Soil Resources	NPS nonpoint source
CAC Citizen Advisory Committee	NPSP nonpoint source pollution
CCA certified crop advisor	NRCS Natural Resource Conservation Service
COD chemical oxygen demand	OLCP Open Lot Certification Program
CROW Crow River Organization of Water	P Phosphorus
CRP Conservation Reserve Program	PFA Public Facilities Authority
CREP Conservation Reserve Enhancement Program	PPB parts per billion
CRWP Chippewa River Watershed Project	QA/QC Quality Assurance/Quality Control
CSM or CSMP Citizen Stream Monitoring / Citizen Stream Monitoring Program	RCRCA Redwood-Cottonwood Rivers Control Area
CWA Clean Water Act (1987)	Section 319 section of Clean Water Act
CWF Clean Water Fund	SHEP Stream Health Evaluation Program
CWLA Clean Water Legacy Act	SONAR Statement of Need and Reasonableness
CWP Clean Water Partnership	SRF state revolving fund
DNR Minnesota Department of Natural Resources	SRWD Sauk River Watershed District
DO dissolved oxygen	SSC suspended sediment contamination
ESD Environmental Services Department	SSTS Subsurface Sewage Treatment System
FLEval Feedlot Evaluation Model	STORET storage and retrieval system (now EQUIS)
FLUX input inflow model for BATHTUB	SWAT Soil And Water Assessment Tool
GBERBA Greater Blue Earth River Basin Alliance	SWCD soil and water conservation district
GIS geological information systems	TAC Technical Advisory Committee
GPS global positioning system	TMDL total maximum daily load
HLWD Heron Lake Watershed District	TP total phosphorus
HSPF Hydrologic Simulation Program FORTTRAN	TSS total suspended solids
HUC hydrologic unit code	TT transparency tube
IBI index of biological integrity	U of M University of Minnesota
IPHT imminent public health threat	USDA-ARS United States Department of Agriculture – Agricultural Research Service
ISTS Individual Sewage Treatment System	USEPA United States Environmental Protection Agency
LCMR Legislative Commission on Minnesota Resources	USGS United States Geological Survey
LiDAR Light Detection and Ranging	VSS volatile suspended solids
LID low impact development	WAR SSS Watershed Assessment of River Stability and Sediment Supply
MDA Minnesota Department of Agriculture	WD watershed district
MDH Minnesota Department of Health	WLA waste load allocation
MECA Minnesota Erosion Control Association	WNC Well Network Coordinators
MMP manure management plan	WRAPS Watershed Restoration and Protection Strategies

Statewide monitoring schedule

Because of Minnesota Pollution Control Agency (MPCA) 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. Effectiveness monitoring will continue after 2018.

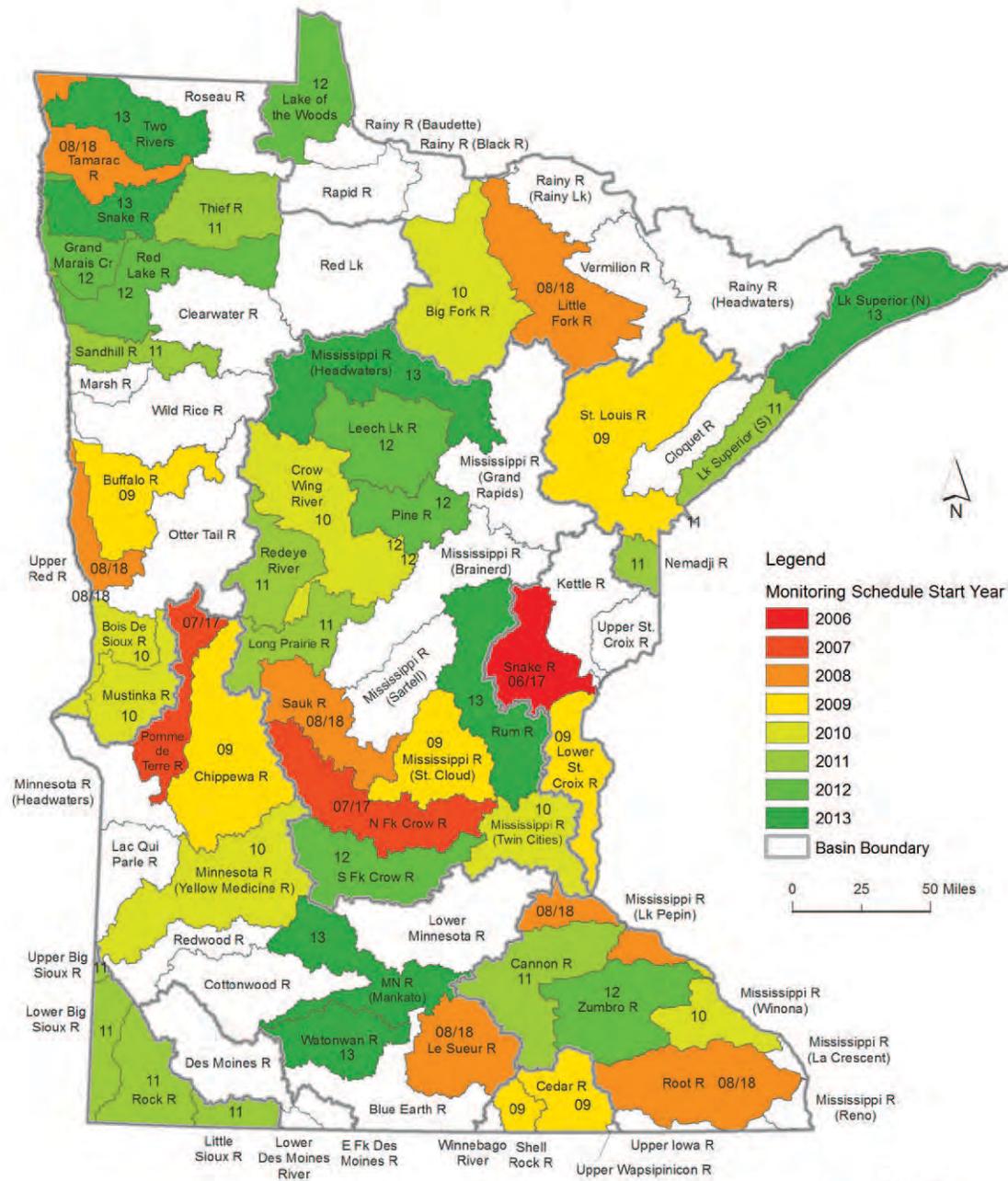
Intensive Watershed Monitoring



Statewide monitoring progress

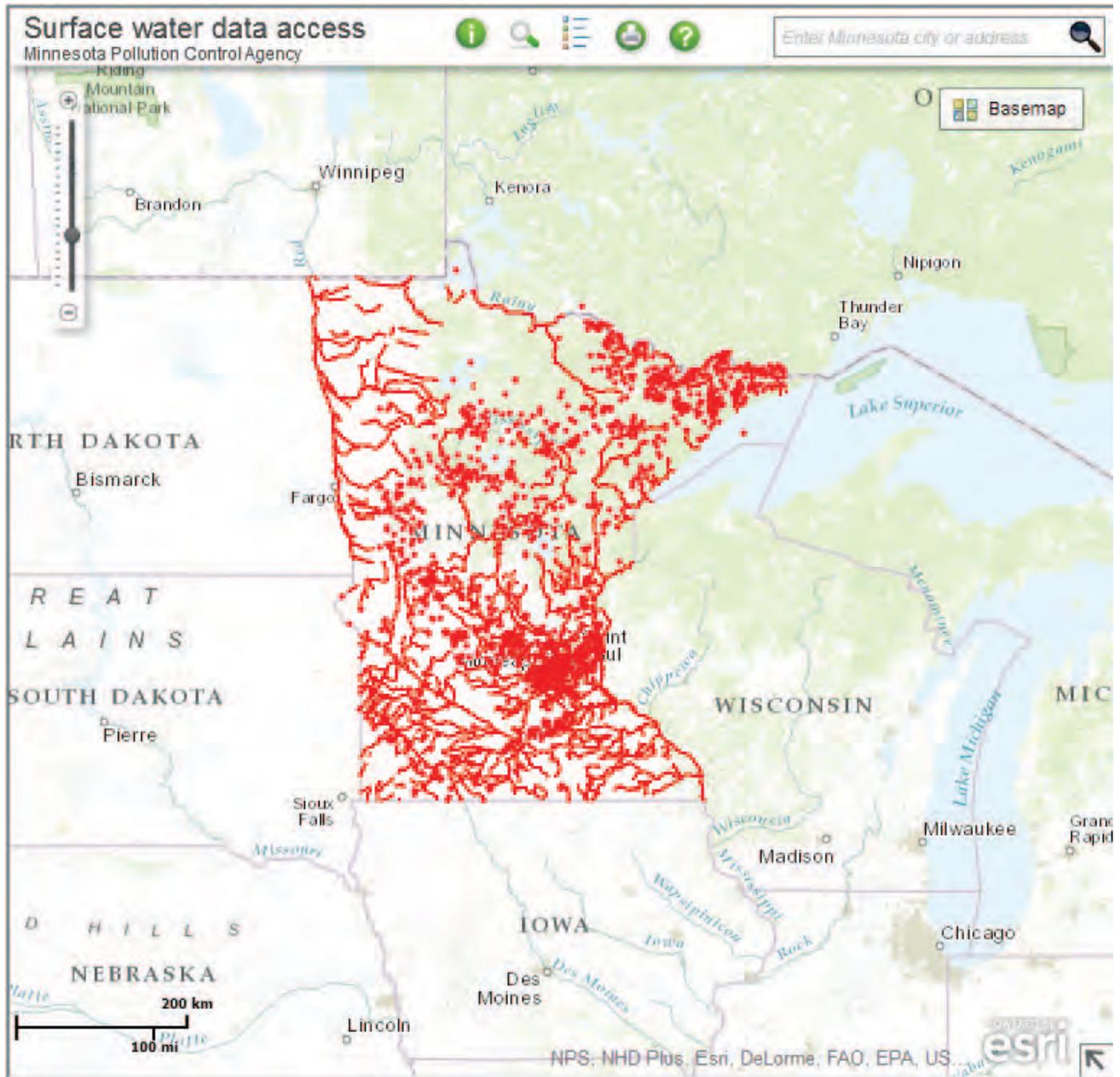
The MPCA has now initiated or completed Intensive Watershed Monitoring in 45 of the state's 81 major watersheds — that is approximately 56 percent of the state's watersheds. The level of effort of this monitoring and the amount and types of data being collected in this Watershed Approach is well beyond that of past monitoring efforts.

Intensive Watershed Monitoring



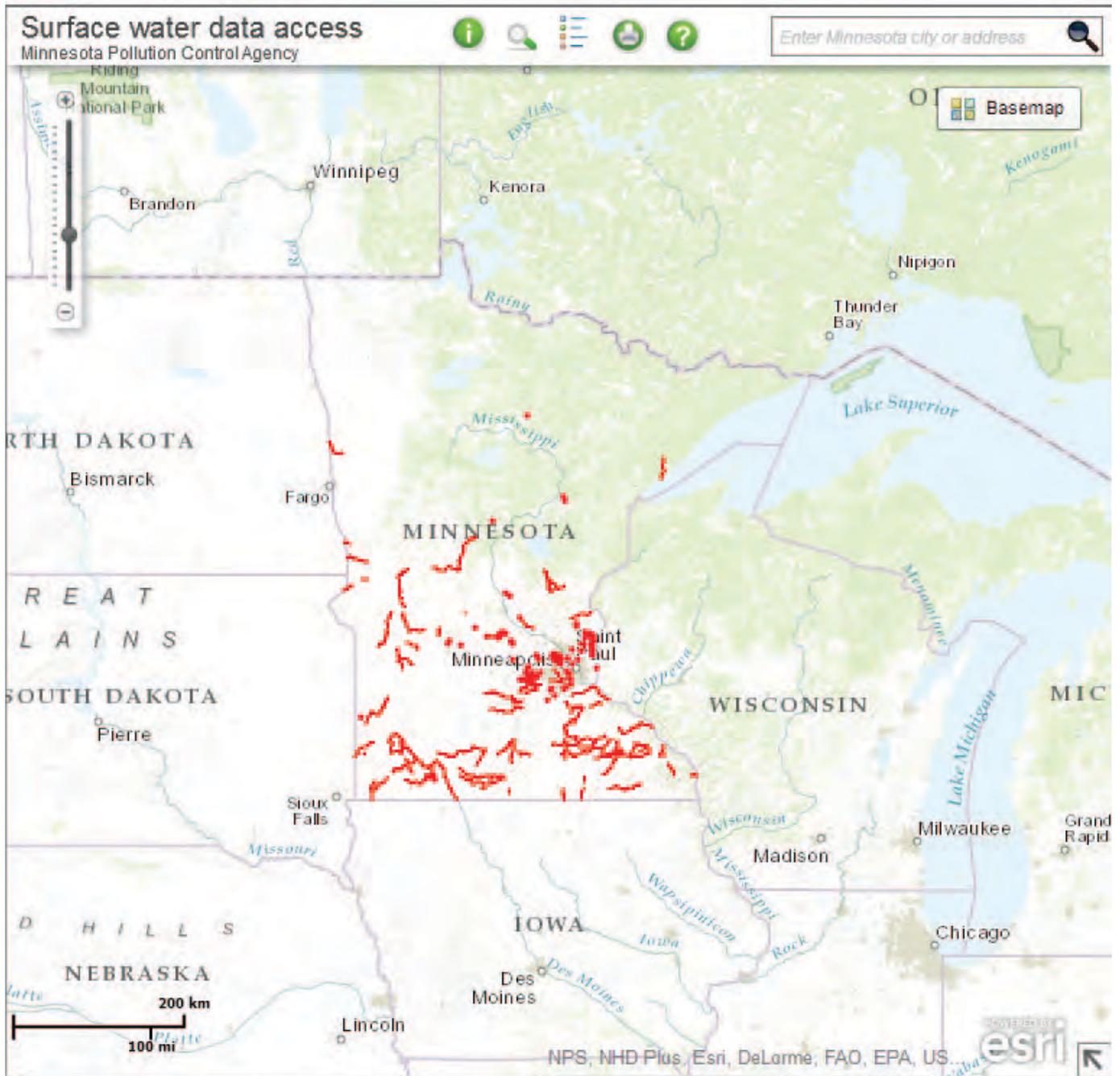
Impaired waters in Minnesota

Impaired waters in Minnesota can be viewed using the MPCA web-based mapping application IWAV (impaired waters viewer). The graphic below is a screen shot of the application that is available at this internet address: http://www.pca.state.mn.us/index.php?option=com_k2&view=item&id=871



Approved TMDLs in Minnesota

Approved TMDLs in Minnesota can be viewed using the MPCA web-based mapping application IWAV (impaired waters viewer). The graphic below is a screen shot of the application that is available at this internet address: http://www.pca.state.mn.us/index.php?option=com_k2&view=item&id=871



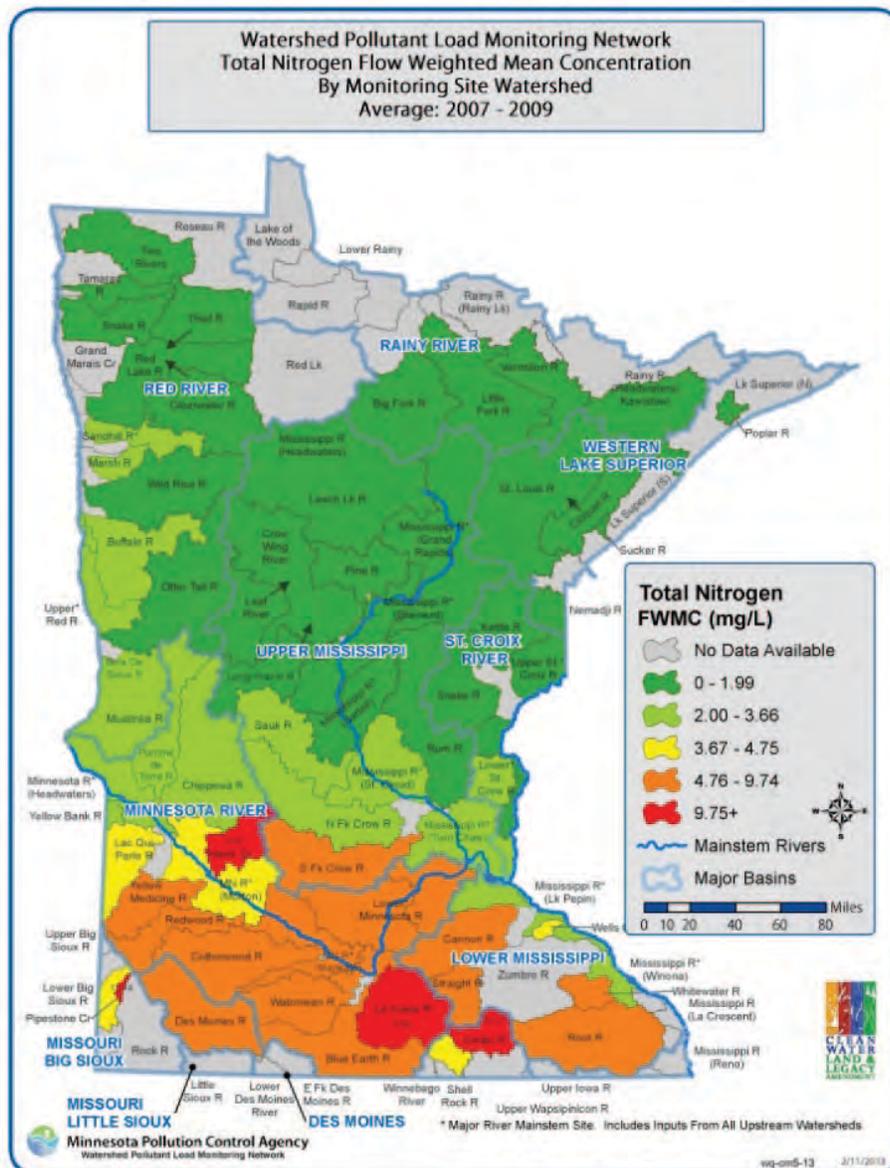
Tracking progress

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 Minnesota Pollution Control Agency staff to collect water quality and flow data to calculate pollutant loads. Monitoring sites span three ranges of scale:

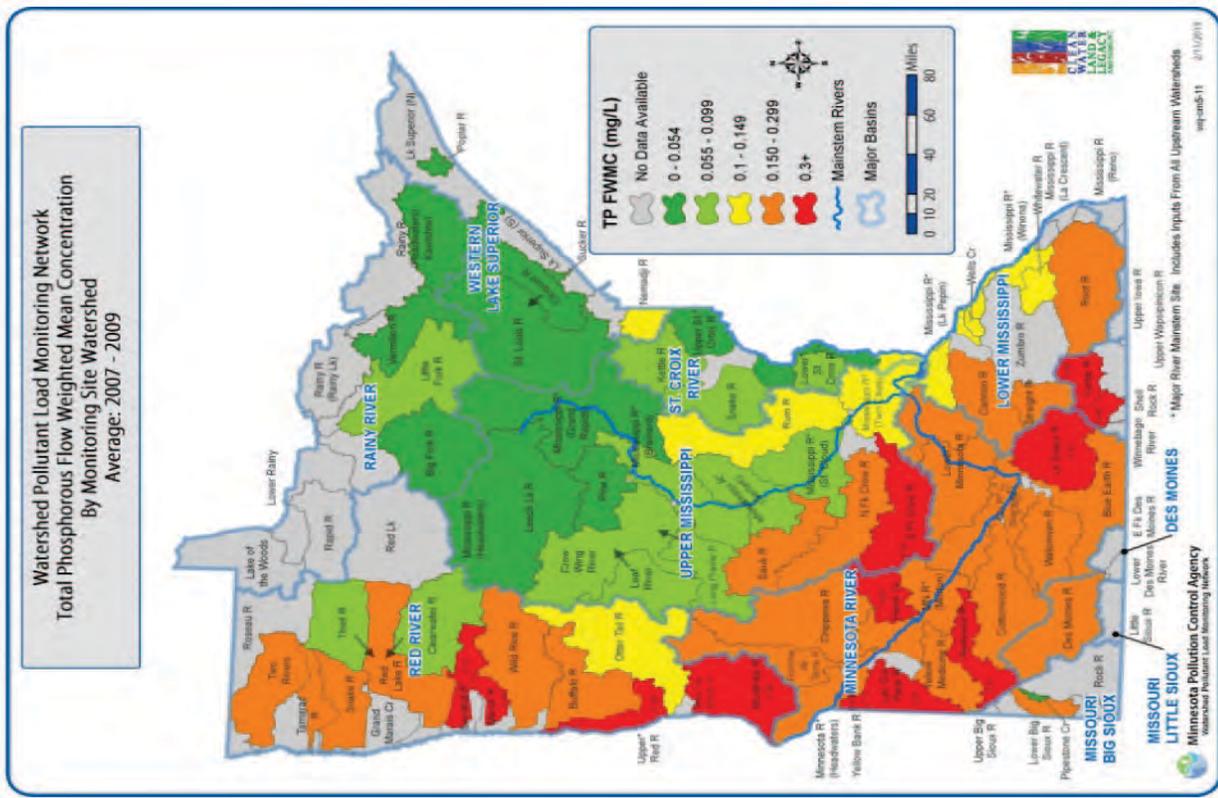
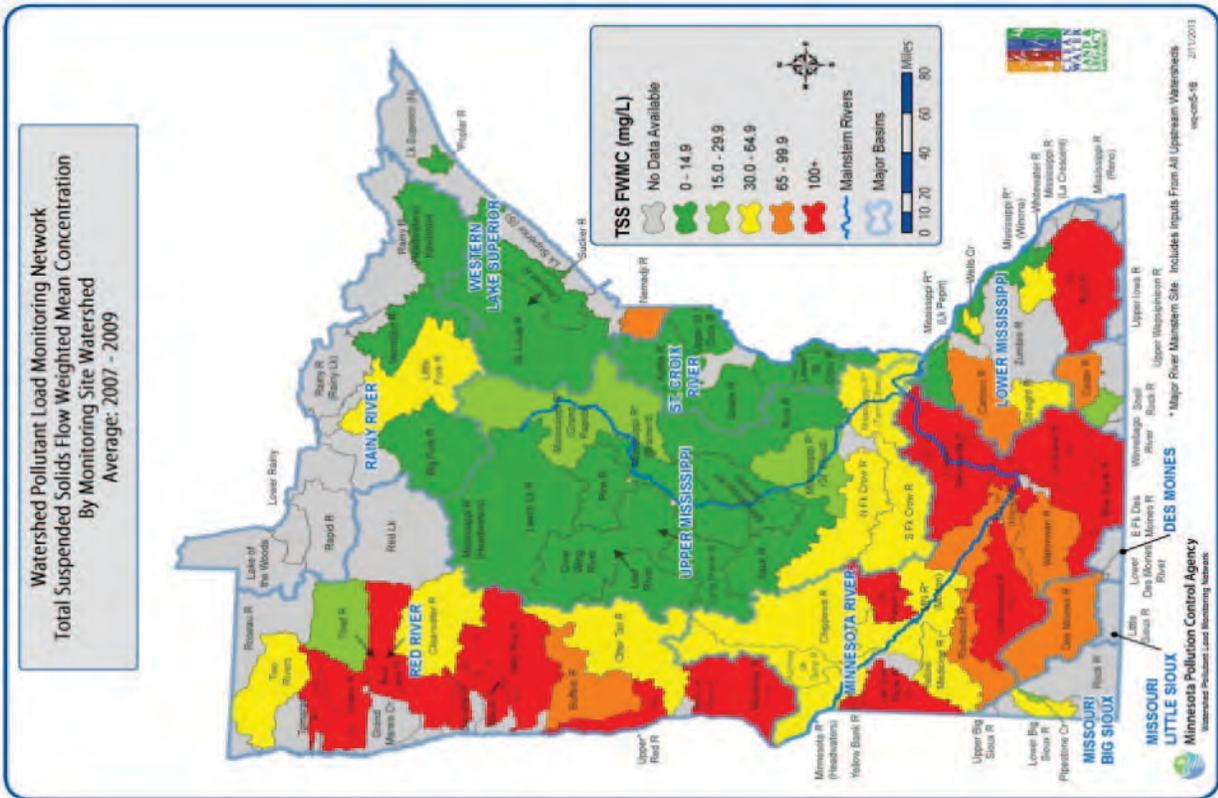
- Basin – major river main stem sites along the Mississippi, Minnesota, Rainy, Red, and St Croix rivers
- Major Watershed – tributaries draining to major rivers with an average drainage area of 1,350 square miles (8 digit HUC scales)
- Subwatershed – major branches or nodes within major watersheds with 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.

(To compute a discharge for new stations protocols require two years of discharge measurements for a rating curve.)



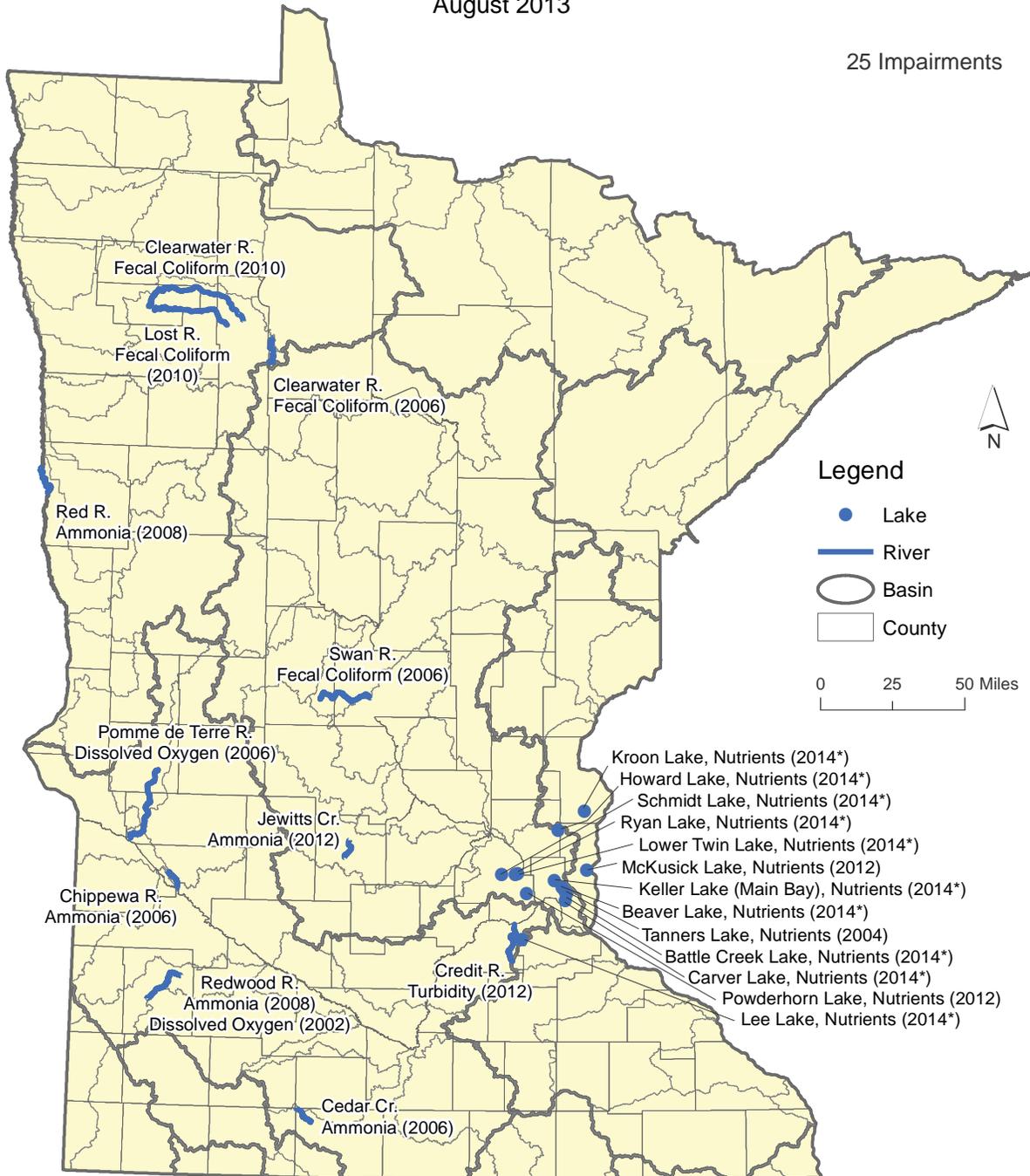
Tracking progress continued



Previous Impairments now Meeting Water Quality Standards due to Corrective Actions

August 2013

25 Impairments



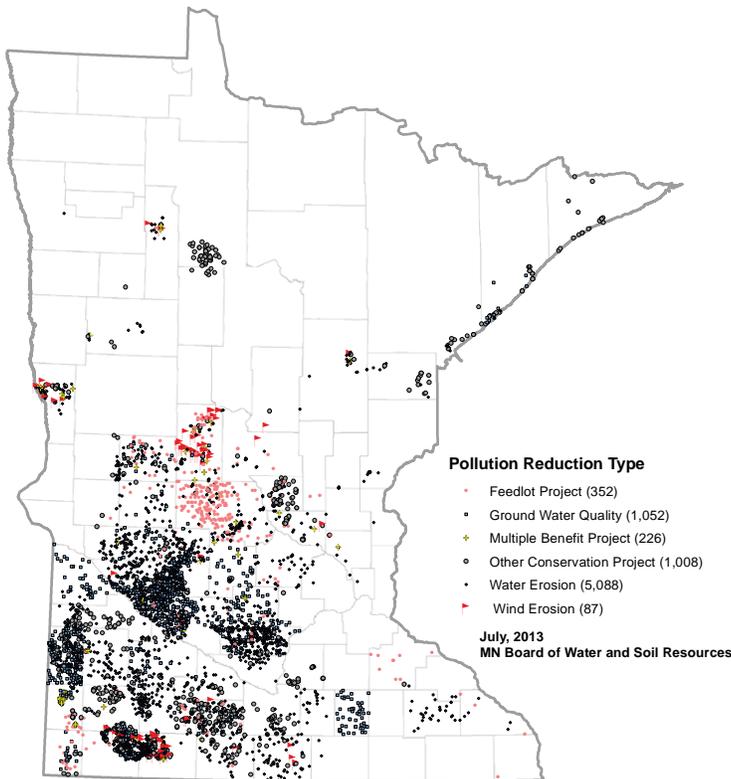
* To be proposed by MPCA for delisting in the next listing cycle. Delisting proposals are subject to public comment and EPA approval.

LARS and eLINK results from Section 319 and CWP projects 1997–July 2013

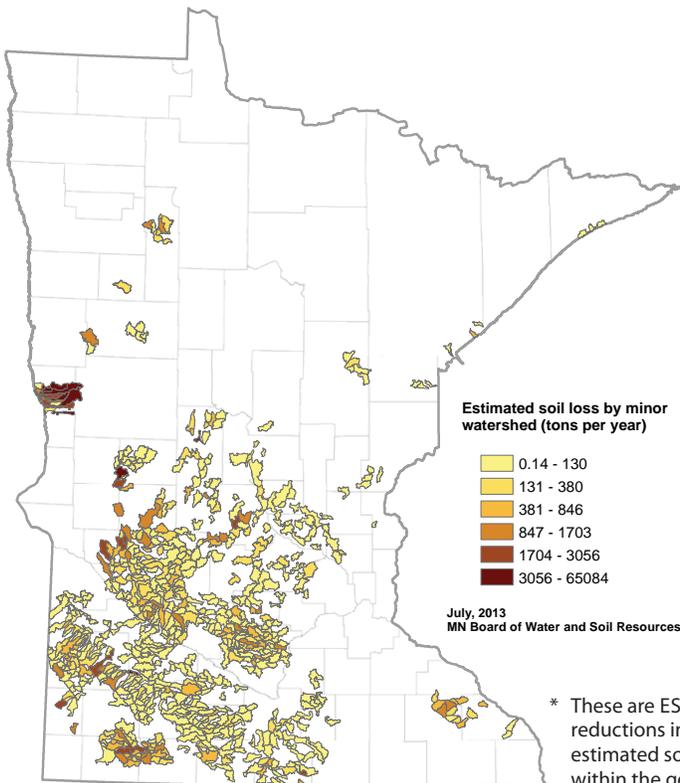
The following table shows progress through July 2013 based on previous Local Annual Reporting System (LARS) reporting (1997–2002) and reporting data from eLINK (2003–July 2013). Based on LARS/eLINK reporting by Clean Water Partnership (CWP) and Section 319 project partners, these projects have reduced soil loss from 1998 through July 2013 by approximately more than 282,984 tons/year. During the same period, sedimentation was reduced by approximately more than 128,296 tons/year. Phosphorus loading was reduced by approximately more than 328,279 pounds/year. Nitrogen reduction was reduced by approximately more than 657,102 pounds/year.

Pollution reduction estimate type	# of BMPs	Estimated soil loss reduction (tons/yr)	Estimated sediment reduction (tons/yr)	Estimated phosphorus reduction (pounds/yr)	Estimated nitrogen reduction (pounds/yr)*
Feedlot project	352	0	0	45,643	91,430
Groundwater quality	1,052	0	2,421	6,333	13,066
Multiple benefit project	226	18,276	3,114	4,077	8,153
Other conservation projects	1,008	17,948	3,334	136,067	272,133
Water erosion	5,088	244,501	119,382	135,528	271,057
Wind erosion	87	2,258	44	632	1,263
Total	7,813	282,984	128,296	328,279	657,102

* Estimated nitrogen calculated from doubling estimated phosphorus

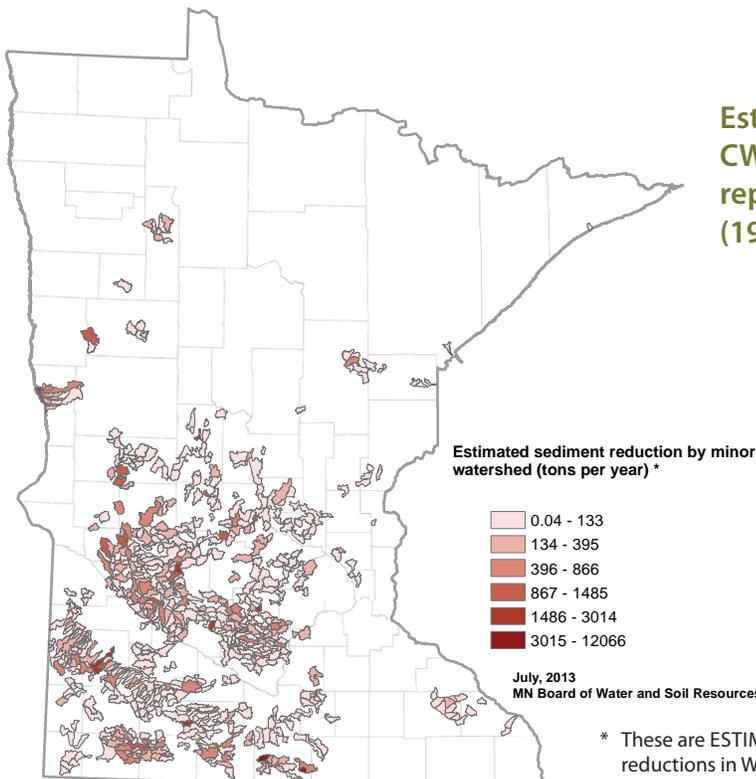


CWP/Section 319 BMPs eLINK (2003–present) and LARS (1997–2002)



**Estimated soil loss reduction —
CWP/Section 319 BMPs via local government
reporting, eLINK (2003–present) and LARS
(1997–2002)**

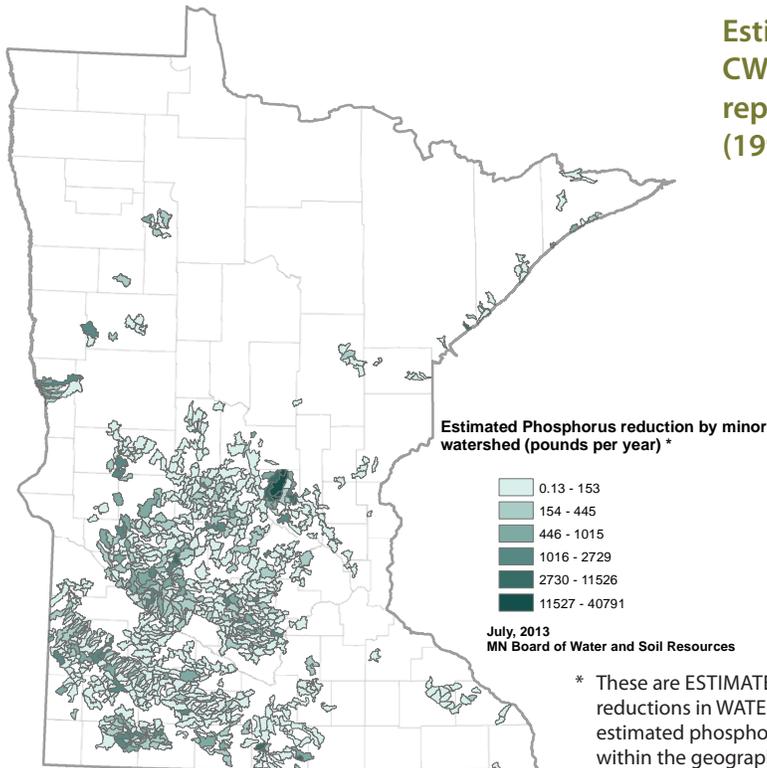
* These are ESTIMATED soil loss reductions. They DO NOT represent reductions in WATERSHED soil loss yield. They represent the sum of estimated soil loss reductions to all water bodies (even isolated ones) within the geographic regions of the watershed.



**Estimated sediment reduction —
CWP/Section 319 BMPs via local government
reporting, eLINK (2003–present) and LARS
(1997–2002)**

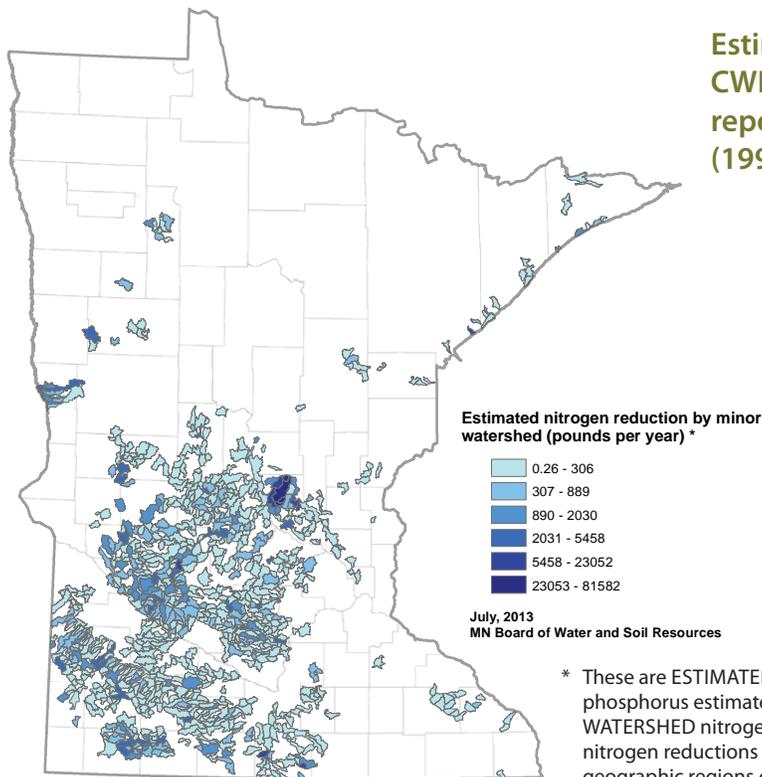
* These are ESTIMATED sediment reductions. They DO NOT represent reductions in WATERSHED sediment yield. They represent the sum of estimated sediment reductions to all water bodies (even isolated ones) within the geographic regions of the watershed.

**Estimated phosphorous reduction —
CWP/Section 319 BMPs via local government
reporting, eLINK (2003–present) and LARS
(1997–2002)**



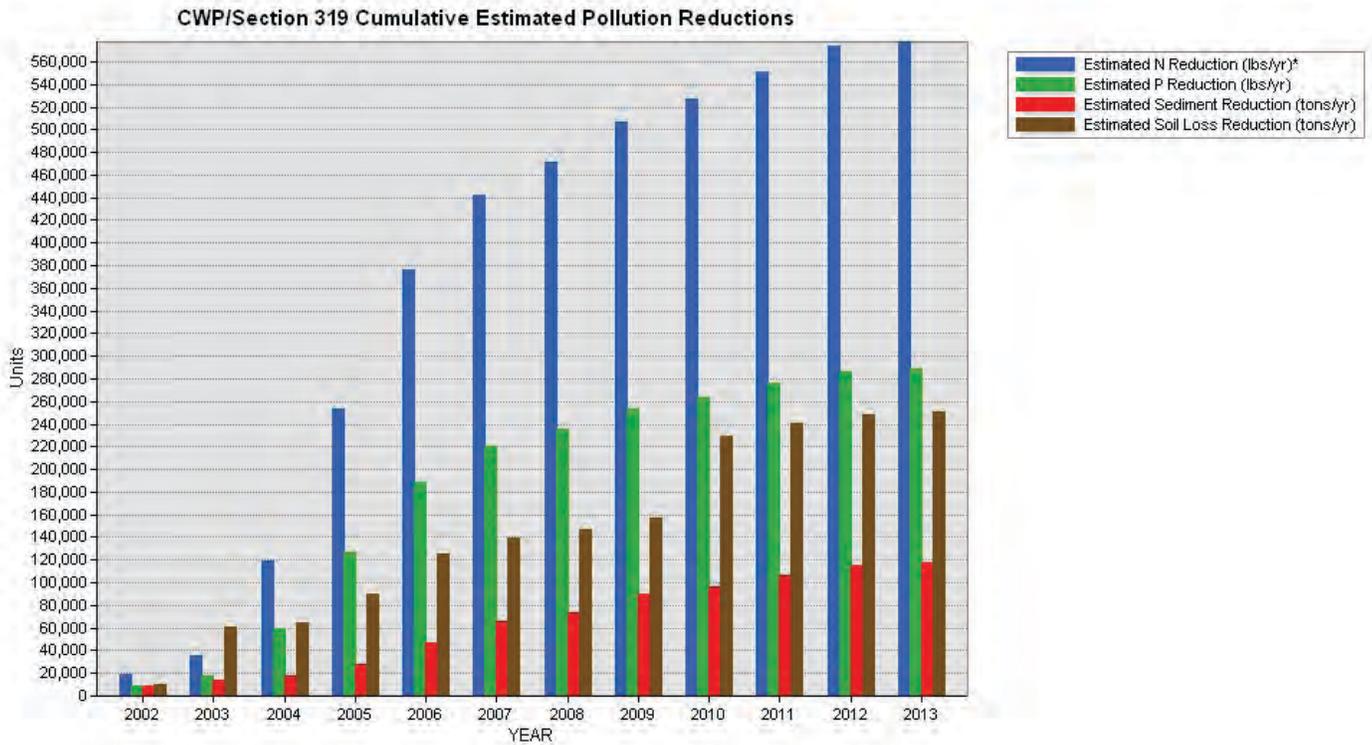
* These are ESTIMATED phosphorus reductions. They DO NOT represent reductions in WATERSHED phosphorus yield. They represent the sum of estimated phosphorus reductions to all water bodies (even isolated ones) within the geographic regions of the watershed.

**Estimated nitrogen reduction —
CWP/Section 319 BMPs via local government
reporting, eLINK (2003–present) and LARS
(1997–2002)**



* These are ESTIMATED nitrogen reductions calculated by doubling phosphorus estimates. 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, LARS (1997–2002) and eLINK (2003–present)



Projects for 2012–2013

Statewide

Total funding – including grants and loans for completed, active and newly awarded: \$2,484,218

Completed

Adapting Minnesota Shoreland BMPs for Climate Change Drainage Systems Management Education and Stakeholder Feedback Workshops

Maximizing the Economic Benefits of Manure to Reduce Nutrient Loading

Active

Enhanced Filter Media for Removal of Dissolved Heavy Metals and Phosphorus from Stormwater Runoff – 2010

Side Inlet Controls to Improve Water Quality – 2010

Social Indicators — Development and Testing – 2010

Assessing Enhanced Swales for Pollution Prevention – 2011

Watershed Specialist Training, Phase II – 2011

Chloride Reduction Outreach Program – 2012

eLINK Database Support – 2012

Linking Water Storage BMPs to Watershed Goals – 2012

Reducing Phosphorus Runoff From Livestock Farms – 2012

Awarded

None awarded in 2013

Des Moines and Missouri River Basins

Total funding – including grants and loans for completed, active and newly awarded: \$1,571,320

Completed

None completed for 2012 – 2013

Active

Alternative Tile Intake Cost-Share Program Continuation – 2009

Des Moines River, East Fork Monitoring Project – 2009

Reducing Fecal Coliform in the Rock River Watershed with Manure Management – 2009

Rock River Replacement Subsurface Sewage Treatment System Loan Program – 2009

Heron Lake Sediment Reduction Demo – 2010

Fulda Phosphorus Reduction Initiative – 2011

West Fork Des Moines River TMDL Implementation Project – 2011

Heron Lake TMDL Phosphorus Reduction Project – 2012

Jack and Okabena Creek Sediment Reduction Project – 2012

Awarded

None awarded in 2013

Lake Superior River Basin

Total funding – including grants and loans for completed, active and newly awarded: \$147,000

Completed

None completed for 2012 – 2013

Active

East Swan River Watershed Protection Strategy – 2009

Awarded

None awarded in 2013

Lower Mississippi and Cedar River Basins

Total funding – including grants and loans for completed, active and newly awarded: \$3,939,404

Completed

Lower Mississippi Basin SE MN Wastewater Initiative

Active

Dakota County Nonpoint Source Reduction Project – 2009

New Tools to Support TMDL Phosphorus Reduction Plans – 2009

Southeast Minnesota Volunteer Nitrate Monitoring Network – 2009

Stream Cooling Demonstrations in the Vermillion River Watershed – 2009

Sustaining Progress Toward Reducing Runoff from Open Lot Feedlots – 2009

Whitewater Watershed, South Branch – Bacteria Reduction Project Continuation – 2009

Alternative Designs for Drainage Ditches – 2010

North Cannon River Bacteria Reduction Project – 2010

Southeast Regional Grant for Water Quality – 2010

Lower Cannon River Turbidity Reduction Project – 2011

Rice Creek Assessment Project – 2011

Dakota County Nitrate Reduction Project – 2012

Steele County Septic System Loan Program – 2012

Awarded

None awarded in 2013

Minnesota River Basin

Total funding – including grants and loans for completed, active and newly awarded: \$16,929,303

Completed

Blackhawk Lake and Thomas Lake Management Plans
Carver, Bevens, and Silver Creek Watershed Fecal Coliform TMDL Implementation Plan Project
Cottonwood/Redwood River Project

Active

Ten Mile Creek Protection Plan for Turbidity
Blue Earth River Basin Restoration Positions – 2009
Blue Earth River-East Branch Watershed Approach – 2009
Collaborative for Sediment Source Reduction: Greater Blue Earth River Basin – 2012 GBERBA Dissolved Oxygen TMDL Application – 2009
Cottonwood River Watershed Phosphorus Reduction Continuation – 2009
Evaluation of Artificial Drainage in Altering Hydrology – 2009
Greater Blue Earth and Des Moines River SSTS Loans – 2009
Hawk Creek Watershed Accelerated Phosphorus Reduction Effort – 2009
Hawk Creek Watershed Project “Hawk TMDL” Continuation – 2009
Pomme de Terre Fecal Coliform Implementation Plan – 2009
Redwood and Cottonwood Rivers Watershed Conservation and Nutrient Reduction Projects – 2009
A Decision Support Tool to Restore Impaired Waters – 2010
Cottonwood River Native Vegetation Water Quality – 2010
Lower Minnesota River Dissolved Oxygen Elevation Project – 2010
Minnesota River Community Clean-Ups for Water Quality – 2010
Minnesota River Tributary Phosphorus and Flow BMPs – 2010
Quantifying Phosphorus Load Reductions from Street Sweeping – 2010
Redwood River Watershed Nonpoint Pollution Reduction Project – 2010
Rush River TMDL Implementation Project for Fecal Coliform – 2010
Assessing Iron Enhanced Filtration Trenches – 2011

Dry Weather, Lines and Spring Creeks Sub-basin of the Chippewa River Continuation – 2011
Hawk Creek Watershed Continuation – 2011
High Island Creek TMDL Project for Fecal Coliform – 2011
Lower Prior Lake Diagnostic Study – 2011
Middle Minnesota Watershed, Implementation of Conservation Practices – 2011
Minnesota Pollution Reduction and Economics Test with Nutrient Trading Tool – 2011
Chippewa River Accelerated Restoration – 2012
Cottonwood Streambank Inventory and Prioritization Project – 2012
Greater Blue Earth Urban Retrofit Initiative – 2012
Le Sueur Watershed Targeted Conservation Practices – 2012
Middle Minnesota River Low Dissolved Oxygen TMDL Project – 2012
Neighborhood Lakes Management Plans – 2012
Protecting North and South Fork Yellow Bank River – 2012

Awarded

Blackhawk Lake Protection Project
Cottonwood-Redwood River Septic Loan Program
Credit River Protection Plan
Hawk Creek Watershed Nitrogen Reduction Project
High Island Creek – McLeod County SSTS Project
Lake Minnewaska Phase I Resource Investigation
Pomme de Terre River Protective Buffer Project
Rush River Watershed – Nicollet County SSTS Project

Rainy River Basin

Total funding – including grants and loans for completed, active and newly awarded: \$227,500

Completed

None completed for 2012 – 2013

Active

Bostic and Zippel Watershed Assessment – 2011
Kawishiwi Watershed Protection – 2011

Awarded

None awarded in 2013

Red River Basin

Total funding – including grants and loans for completed, active and newly awarded: \$211,938

Completed

None completed for 2012 – 2013

Active

Lake Alice Resource Investigation Project – 2009
Lower Otter Tail River Sediment Reduction Project – 2009
Pearl Lake Diagnostic Study – 2009

Awarded

None awarded in 2013

St. Croix River Basin

Total funding – including grants and loans for completed, active and newly awarded: \$1,293,167

Completed

Lower St. Croix Watershed-Rock Creek Monitoring Project
Sand and Long Lake Diagnostic Study

Active

Square Lake Implementation Plan Refinement – 2009
Groundhouse Fecal Coliform and Biota (Sediment) Implementation Project – 2010
Sunrise River North Branch TMDL Implementation Plan – 2010
Kanabec Water Resources Protection Project – 2012
Snake River Watershed Resource Protection Project – 2012

Awarded

Forest Lake North Shore Subwatershed Assessment
Forest Lake Stormwater Filtration Retrofit
Sand and Long Lakes Protection Project

Upper Mississippi River Basin

Total funding – including grants and loans for completed, active and newly awarded: \$14,704,351

Completed

Crosby Lake Management Plan
Crow River Basin Rural Water Quality Improvements
Developing Selection, Design and Assessment Standards for Shoreline Bioengineering Practices
Kohlman Lake TMDL Nutrient Reduction Phase III
Lake Johanna/Oasis Pond Water Quality Treatment

Lambert Creek Retrofit ID and Design Project
Osakis Lake Shoreland Enhancement Project
Restoring Water Resources of the Sand Creek Stormwater Retrofit Project
Sauk River Chain of Lakes Continuation Phase III Project
Targeted BMP Implementation within Impaired Areas in the Upper Mississippi Basin-Continuation

Active

Improving Rural Water Quality in the Crow River Basin Project – 2008
Middle Fork Crow River Watershed Restoration and Enhancement Project – 2008
Targeted BMP Implementation within Impaired Areas in the Upper Mississippi Basin Continuation – 2008
Burandt Lake Excess Nutrient Implementation Plan – 2009
Clear Lake Water Quality Diagnostic Study – 2009
Crow River Basin Sediment Reduction – 2009
Deer and Pokegama Lakes: A Diagnostic Study – 2009
Demonstrating Shoreline Buffers in Big Sandy Lakes Watershed – 2009
Enhanced TP Removal in an Urban Wetland System – 2009
Green Lake Eurasian Water Milfoil (EWM) / Stormwater Study – 2009
Middle Fork Crow River Watershed Restoration and Enhancement Project Continuation – 2009
Middle Sauk River Water Quality Restoration Project Continuation – 2009
North Fork Crow River Septic System/ Feedlot Upgrades – 2009
Pine River Watershed Stream Baseline Water Quality – 2009
Shingle Creek Porous Pavement Paired Intersection Study – 2009
Working Together to Improve Water Quality Continuation – 2009
Crystal Lake Nutrient TMDL Alum Treatment – 2010
Hardwood Creek TMDL Implementation Project – 2010
Permeable Reactive Barriers for Phosphorus Removal – 2010
Twin Lake Wetland 639 Nutrient Export Reduction – 2010
Crow River Watershed Surface Water Runoff Reduction Project – 2011
Kingston Wetland Feasibility Study and Restoration – 2011
Lake Harriet Diagnostic Study and Management Plan – 2011
Lower Sauk River Water Quality Protection – 2011

Mille Lacs Lake Watershed Protection – 2011
Modular Green Roof Retrofit System Development – 2011
Osakis Lake Enhancement Continuation Project – 2011
Pelican Lake of St. Anna Diagnostic Study – 2011
Sauk River Water Quality Protection Phase III – 2011
Sauk River Watershed District Watershed-wide Groundwater Protection – 2011
Serpent Lakeshed Protection Investigation Study – 2011
West Moore Lake Water Quality Enhancements – 2011
Lake McCarrons Sub-watershed BMP Project – 2012
Lower Sauk-Metro Area Water Quality Protection – 2012
Targeted Fertilizer Application Reduction Project – 2012
Targeting BMPs in the Crow River Watershed – 2012

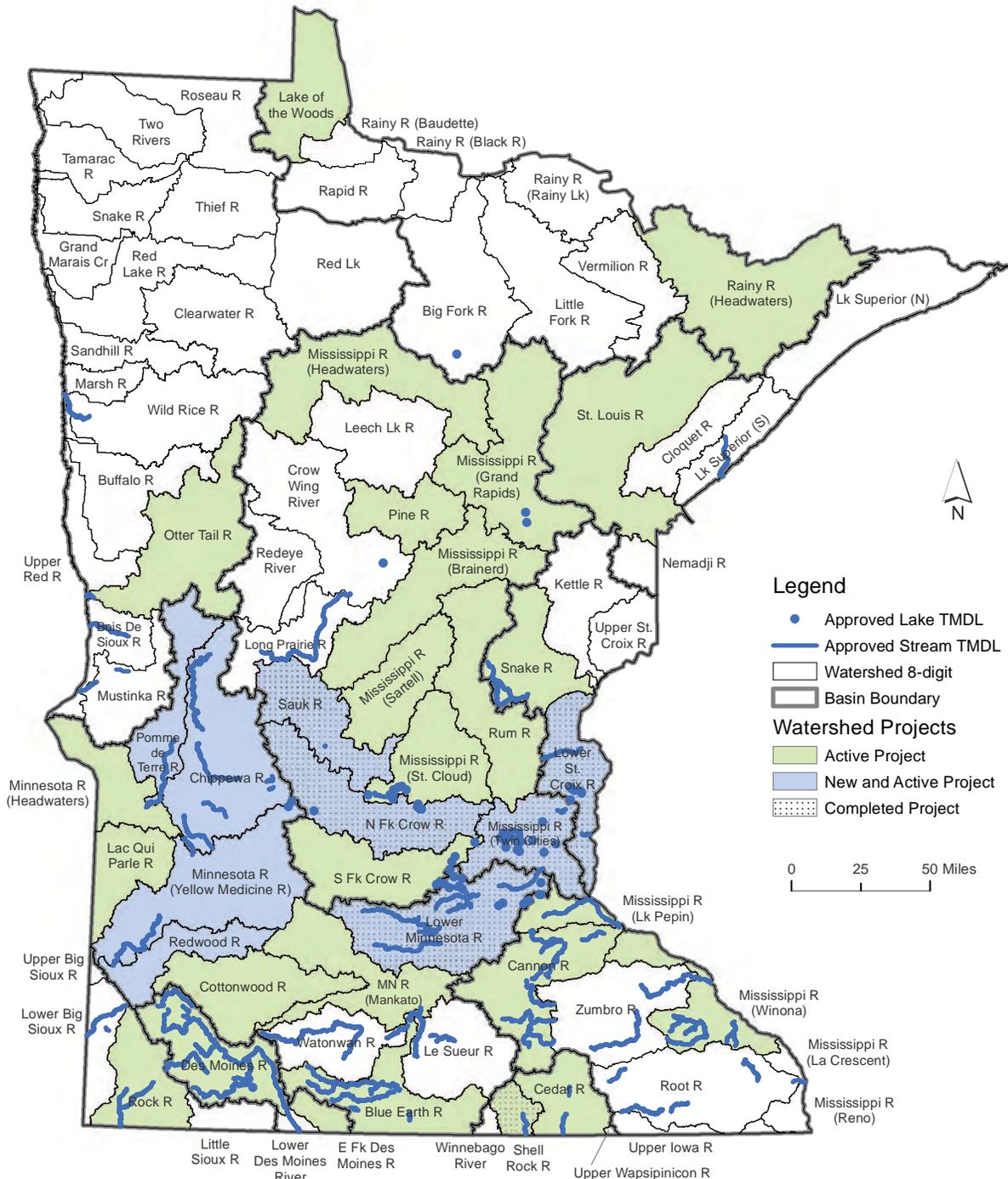
Awarded

Bald Eagle Lake TMDL Implementation
Crooked Lake Basin Restoration Project
Crow Lakes Protection and Resource Investigation
Crow River Middle Fork Watershed Resource Investigation
Lake Koronis Subwatershed Protection Project

Summary of statewide watershed project activity

Projects completed, currently active and awarded

Made possible through a variety of funding sources — USEPA Section 319 grants, Clean Water Fund and Clean Water Partnership — 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

Adapting Minnesota Shoreland BMPs for Climate Change

Drainage Systems Management Education and Stakeholder Feedback Workshops

Maximizing the Economic Benefits of Manure to Reduce Nutrient Loading

Adapting Minnesota Shoreland BMPs for Climate Change

In the past decade, a large number of stormwater BMPs were installed to protect water quality. However, most of the current stormwater BMPs were developed based on the practical evidence and historical climate patterns of the past few decades. Climate change effects have not been taken into consideration during the design of BMPs. This study investigated the role of variable water levels on plant survival in the littoral zone and developed recommendations for planting shoreline stabilization projects under four potential future climate scenarios: wetter, drier, more variable, and similar to current conditions.

Eight plant species commonly used in shoreline stabilization projects were planted in each of the four study basins. Plants inundated by wetter conditions, particularly early in their growth, did not survive as well and did not develop as great a biomass as the plants in the other three basins. Some rhizomatous species spread aggressively in all four basins. Shoreline bioengineering recommendations include using rhizomatous plant species for revegetation. Two emergent rhizomatous aquatic species, giant bur-reed (*Sparganium eurycarpum*) and river bulrush (*Bulbochoenus fluviatilis*), have the potential to rapidly colonize near-shore areas and protect them from erosion. It appears these two species, if planted together, would be effective in maintaining vegetation along shorelines experiencing a wide range of potential future water levels, since giant bur-reed (*Sparganium eurycarpum*) shows greater tolerance of flooding and river bulrush (*Bulbochoenus fluviatilis*) shows greater tolerance of drought. Both species spread rhizomatously to rapidly colonize areas both landward and waterward.

This project also modeled the potential effects of climate change on stream and lake hydrology using XP-SWMM and 3-D lake modeling using two different methods to generate future climate change scenarios. Lake modeling performed on Lake Minnetonka showed changes in thermocline, dissolved oxygen, chlorophyll, and phosphorus resulting under past wet, dry, normal and the corresponding future climate change scenarios.

Goals

- Investigate changes caused by climate change on shoreline aquatic plant survivability.



Overview of the basin study site

- Provide practical recommendations for future shoreline vegetation management (bioengineering).
- Develop a mechanistic approach toward the potential effects of changing future precipitation on stream flow and water temperature, dissolved oxygen, and chlorophyll concentrations in Lake Minnetonka.

Results that count

- Established four basins to study the effects of fluctuating water levels on the survival and growth of eight plant species commonly used for shoreline stabilization. Evaluated four potential future climate scenarios (wet, dry, fluctuating, and normal). Data on all plant species under all four scenarios is provided.
- Recommendation: For erosion control of near-shore areas, consider rhizomatous plant species for revegetation. This study identified two emergent rhizomatous aquatic species, bur-reed (*Sparganium eurycarpum*) and river bulrush (*Bulbochoenus fluviatilis*), that have the potential to rapidly colonize near-shore areas (spread up to 7 ft in first season) and protect them from erosion (based upon erosivity tests). It appears these two species, if planted together, would be effective in maintaining vegetation along shorelines experiencing a wide range of potential future water levels, since giant bur-reed (*Sparganium eurycarpum*) shows greater

tolerance of flooding and river bulrush (*Bulboschoenus fluviatilis*) shows greater tolerance of drought, and both species spread rhizomatously to rapidly colonize areas both landward and waterward.

- Lake Minnetonka is a morphologically complex lake, yet in general it represents a typical mid-western lake. The lake has been successfully simulated using a 3D hydrodynamic and ecological computer model under six different climatic conditions. Four model state variables representing major ecological processes have been analyzed. The underlining physical processes and drivers for the predicted changes have been established which can be extended to other similar lakes and ecosystems. Model simulations show that the lake under future climate change scenarios will have a deeper thermocline in normal, wet, and dry years. The increase in water temperature is accompanied with greater dissolved oxygen levels. This might be explained by the fact that higher water temperatures will trigger greater algae growth, which will yield more oxygen. All future conditions would bring increased algal biomass through much of the summer season, with the greatest increase in algae growth predicted under future wet conditions. This increase in algal production could result in increased biochemical demand during the winter, as algae die, settle, and decompose at the bottom of the lake. This could result in a thicker zone of hypoxia, a very stable stratification during the winter, and perhaps an extended period of hypoxia before spring overturn mixes the lake. The additional hypoxia could also allow greater release of nutrients from bottom sediments. Those nutrients would then be mixed throughout the water column in the spring and be available to promote additional algal growth in subsequent years. There may be a concern that Lake Minnetonka under these future climate scenarios may shift toward a more turbid water column.

Financial information

Funding type: Section 319

Grant amount: \$235,481

Final matching funds: \$86,773

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Drainage Systems Management Education and Stakeholder Feedback Workshops

A diverse set of organizations, executed nine regional focus groups and three workshop-field tours between February 2009 and August 2012, on the topic of conservation and agricultural drainage. The focus groups were separated into three categories:

- farmers-contractors
- local drainage authorities
- engineers/hydrologists

The focus groups confirmed the need for regional workshops and hands-on demonstrations, and provided a set of guidelines for action on agricultural drainage issues. The workshops-field tours were held in Mankato, Minnesota; Granite Falls, Minnesota; Hankinson ND and Bois de Sioux Watershed in Minnesota. Major newspapers reported these events which outlined the daunting challenges and opportunities that farmers and organizations face when establishing the emerging conservation drainage designs, structures and management practices. Workshops were customized for each location, and included local sponsors. Each event had presentations and field tours. Participants: 310 for the workshops, and 380 for the field tours.

Workshops and Field Days

The complete agenda and field tour activities for each regional workshop are included in the appendix.

The focus of these three events was to explain and demonstrate promising practices, structures and designs. Each event was unique, although themes of collaboration, cooperation, problem-solving, solution-based principles were common.

June 2012 South Central Minnesota (Mankato, Mapleton): Focused on drainage ditch designs regarding repair and improvement for upstream landowners and a rural community (city of Mapleton), so as to provide assurances to downstream landowners their property and cropland would not be negatively impacted.

July 2012 South Western Minnesota (Granite Falls, Normania): Focused on field-scale drainage practices that balance crop production with environmental considerations. The practices demonstrated included drainage water management, saturated buffer, woodchip bioreactor, streambank erosion stabilization and tile outlet design.

August 2012 North Western Minnesota (Traverse County): Focused on flood storage and reducing flood damages. Strategies, structures and practices designed to mitigate flood damages, local crop and property damage, and simultaneously enhance natural resources.

Goals

- Understand stakeholder's knowledge of agricultural drainage-related water quality and flow issues, attitudes and technical assessments of drainage system designs.
- Understand what is needed to move forward in each region to implement solutions to drainage-related water quality and flow concerns. Focus primarily on research and outreach needs, and only on economic and policy needs as they arise.
- Exchange technical information and strengthen networks for future information sharing.

Results that count

- Nine practitioner-based focus groups provided a set of guidelines for those involved in agricultural drainage. These guidelines included critical elements on communication, conservation responsibilities, differences in scale, water storage, research, demonstration, and building upon productive relationships.
- Conducted three regional workshops based on the input from the focus groups, and workshop planning committees. Workshops allowed participants to see and discuss a range of practices that balance agricultural crop production with a more comprehensive water management approach.
- Over-arching need is to provide a sustainable program for sharing practice information and technical results, and ongoing forum for demonstration, communication and outreach.

Financial information

Funding type: Section 319

Grant amount: \$90,000

Final matching funds: \$90,000

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Maximizing the Economic Benefits of Manure to Reduce Nutrient Loading

The goal of the project was to reduce nitrogen, phosphorus, and pathogens reaching surface waters and ground water by motivating agricultural producers to apply manure at appropriate rates, appropriately timed applications, and incorporate/inject manure.

Practices that conserve nutrients (timing and methods of application) and match manure nutrient rates with crop needs lead to the greatest savings in substituting manure nutrients for fertilizer. Tools, including an Excel spreadsheet and web calculator, for making the economic comparisons were developed and made available at the workshops and on-line. Pre- and post-workshop surveys as well as a post-cropping-season survey were conducted. Information about the web calculator was featured in national and regional farm publications. Presentations on manure management and the value of manure were also made by project staff to larger groups of livestock producers, commercial manure applicators, agricultural professionals, and agency staff, totaling 642 participants at 18 venues. In addition, on-farm and experiment station comparisons of corn yield response to timing of manure application were conducted, demonstrating that early fall compared to late fall application of swine manure leads to significant loss of nitrogen and subsequent corn yield reductions. Publications and tools developed on this project and earlier are available at the newly revised University of Extension "Manure Management and Air Quality" website, <http://manure.umn.edu>.

Goals

- The goal was to reduce nitrogen, phosphorus, and pathogens reaching surface waters and ground water by motivating agricultural producers to apply manure at appropriate rates, appropriately time applications, and incorporate/inject manure.
- Develop tools for, and assist producers in, calculating the economic value of manure under new, higher fertilizer nitrogen and phosphorus prices as motivation to increase BMP adoption.
- Update and disseminate research information on the optimum timing of manure application in Minnesota soils and climate in order to reduce nitrogen losses.



On-farm trial

Results that count

- An Excel spreadsheet for comparing the economic value of manure with a range of application options was adapted for livestock producers and made available via web download. A similar web-based calculator was constructed for on-line use.
- More than 500 livestock producers in small-group workshops calculated the economic value of manure under their current practices compared with improved application methods. A post-season survey indicated an actual increase in BMP adoption by 14-17 percent for five practices, with 3-14 percent additional adoption intended for those five practices.
- Nine on-farm trials comparing corn yield response to fall timing of liquid swine manure application demonstrated significant yield loss when manure was applied before October. On-station soil N measurements showed loss of N with early fall manure application.

Financial information

Funding type: Section 319

Grant amount: \$234,359

Final in-kind: \$276,491

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Statewide

Projects active

None awarded in 2013

Assessing Enhanced Swales for Pollution Prevention — 2011

Sponsor: University of Minnesota (U of M) – Twin Cities

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

Purpose: This research will demonstrate the effectiveness of a new stormwater treatment system developed specifically for capturing dissolved phosphorus and heavy metals from roadway runoff. This new technology is relatively inexpensive to install compared to standard stormwater treatment practices and will fit within the limited roadway right-of-way, making it applicable to public and private roadways throughout the State of Minnesota and beyond. With approximately 290,954 lane-miles of public roadways in Minnesota and an approximate annual phosphorus load of 1.87 pounds per lane-mile, the potential reduction in phosphorus load to receiving water bodies is (at a 90 percent capture rate) approximately 488,800 pounds per year. The result would be a substantial improvement in water quality wherever this novel technology is installed.

Stormwater professionals will be informed of these results through workshops, a technical advisory panel, and UPDATES (a stormwater research newsletter with distribution to more than 2,000 interested parties). We will also seek inclusion in the on-line document, "Minnesota Stormwater Manual," <http://www.pca.state.mn.us/index.php/view-document.html?gid=8937>.

Chloride Reduction Outreach Program — 2012

Sponsor: Freshwater Society

Funding: Section 319 (Grant) \$97,286

Purpose: This project will engage public officials, businesses and citizens in a facilitated planning process that will increase their understanding of chloride pollution, ways to reduce it at organizational and personal levels, create and implement a collaborative Chloride Reduction Outreach Strategy and Implementation Plan for Rochester, Mankato and St. Cloud that will be distributed to citizens, businesses and public officials for future action.

eLINK Database Support — 2012

Sponsor: Minnesota Board of Water and Soil Resources

Funding: Section 319 (Grant) \$60,000

Purpose: Provide eLINK database support to MPCA staff, local units of government and grant sponsors; record soil and water conservation project BMPs, geographic project locations and load reductions in eLINK; and provide a section for the annual Watershed Achievements Report showing estimated load reductions.

Enhanced Filter Media for Removal of Dissolved Heavy Metals and Phosphorus from Stormwater Runoff — 2010

Sponsor: U of M – Twin Cities

Funding: Section 319 (Grant) \$404,000

Purpose: Provide an important step in improving stormwater treatment to remove dissolved nutrients and heavy metals by developing technology that is applicable to urban and agriculture environments. The new technology, enhanced soil and sand filter media, will be available for use in stormwater sand filters, infiltration systems, rain gardens, buffer strips, and other treatment systems.

Design standards for using the technology in new and renovated stormwater treatment practices may be published in the Minnesota Stormwater Manual. Educational outreach will occur through webinars, incorporation into U of M Extension Services Stormwater U classes, and publication in UPDATES (a stormwater research newsletter with distribution to more than 2,000 interested parties). This technology will also be used in pilot studies with cities, watershed districts, and/or local governments. Implementation of the technology will result in significant removal of the dissolved fraction of heavy metal and nutrient loads from stormwater runoff.

Linking Water Storage BMPs to Watershed Goals — 2012

Sponsor: Minnesota River Board

Funding: Section 319 (Grant) \$292,140

Purpose: This project will develop, adjust, verify and test a water storage calculator that links new and existing individual projects to large-scale watershed goals, measuring the results in "cubic feet stored" or "volume and rate of storage" for structural and vegetative BMPs; establish and facilitate a Water Storage Learning Group; select and implement 5-10 water storage practices/projects; and reach out to technical service providers,

certified crop advisors, soil and water conservation districts (SWCDs), and Natural Resource Conservation Service (NRCS) so this technology and thinking can be applied in everyday work.

Reducing Phosphorus Runoff From Livestock Farms — 2012

Sponsor: U of M, Leslie Everett

Funding: Section 319 (Grant) \$296,318

Purpose: This project will determine phosphorus balances on farms in two regions of high dairy and beef density near nutrient impaired waters; select management strategies for bringing representative farms with a phosphorus surplus into balance or below; develop selected farm analyses into teaching case studies; and use case studies from the farm phosphorus balance analyses to assist livestock producers and their agricultural professionals in evaluating their operations and select strategies to prevent excessive build-up in soil test phosphorus and transport of phosphorus to waters, while maintaining or improving profitability.

Side Inlet Controls to Improve Water Quality — 2010

Sponsor: Minnesota Board of Water and Soil Resources

Funding: Section 319 (Grant) \$341,605

Purpose: Side inlets serve as surface runoff outlets from agricultural land into drainage ditches and are very common wherever surface drainage ditches are present. These side inlets contribute sediment and concomitant nutrients and pesticides to Minnesota's waters. Side inlet controls such as culverts and drop pipes can prevent gully erosion, control the rate of flow to ditches, and create sedimentation areas to improve water quality. Current design practice does not consider water quality impacts, which this project would address. Research and demonstrations are needed to quantify the benefits of this BMP on sediment, nutrient, and pesticide loading to receiving waters and to develop design guidance and outreach so that side inlet controls can be implemented on a widespread basis.

Social Indicators — Development and Testing — 2010

Sponsor: U of M, Water Resources Center

Funding: Section 319 (Grant) \$200,000

Purpose: The Social Indicators (SI) project is in the final phase of testing. Further work will be done to test the Social Indicators Planning and Evaluation System (SIPES) and Social Indicators Data Management and

Analysis (SIDMA) system. Pilot partners will create survey questionnaires using SIDMA for their pre and post project work to assess changes in behavior and practices, as well as for planning future project work. Partners will also follow the SIPES evaluation process using the SI handbook in an effort to help provide feedback to MPCA and USEPA on the usefulness and effectiveness of the evaluation tools and methodology. Project data will be entered in SIDMA and compared regionally to other SI efforts. Supplemental social outcomes evaluation methodologies, such as KAP (Knowledge, Attitude and Practices) will be developed and tested with local partners.

Watershed Specialist Training, Phase II – 2011

Sponsor: U of M, Water Resources Center

Funding: Section 319 (Grant) \$193,029

Purpose: The U of M, through its Water Resources Center, proposes to develop Minnesota's Watershed Specialist Training Program. The program is in partnership with other training providers and watershed organizations including the MPCA, academic departments, and other state and local governmental and non-governmental conservation organizations. This training program will ensure that those leading and involved in watershed planning and implementation involving impaired waters understand the legal framework, the programmatic requirements, and the resources and tools needed to complete total maximum daily loads (TMDLs), develop watershed plans, and lead implementation efforts. The goal is to help managers go beyond their specialized skills to be able to integrate a broad set of natural and social science skills.

We will develop and implement an online training program for watershed professionals that will improve their management skills and their ability to effectively and holistically address water quality issues.

Des Moines and Missouri River Basins

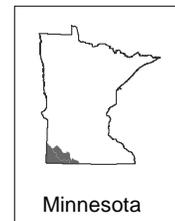
Projects completed

None completed for 2012 – 2013



Legend

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



Des Moines and Missouri River Basins

Projects active

None awarded in 2013

Des Moines River Basin

Des Moines River – Headwaters

Alternative Tile Intake Cost-Share Program Continuation — 2009

Sponsor: Heron Lake Watershed District

Funding: CWP (Grant) \$36,000

Purpose: HLWD and local SWCD staff will promote the alternative tile intake program. They will explain the program, review the design specifications with each landowner, and answer questions. Rock inlet design and specifications will be provided to each contractor performing the actual installation of these structures. All contractors must be checked in the field as they install the first rock inlet to determine that each inlet will be constructed according to specifications determined by the HLWD/SWCD. Landowners will be contracted with a general survey asking for feedback on the performance of these structures.

Fulda Phosphorus Reduction Initiative — 2011

Sponsor: Heron Lake Watershed District

Funding: Section 319 (Grant) \$12,600

Purpose: Through this effort, project sponsors will conduct a rain garden demonstration project to work with the community to address pollution concerns. This will be done by providing educational opportunities for students and the community to learn about native vegetation, water quality improvement, pollution reduction, and environmentally-friendly landscaping. This project will provide opportunities for students to learn about the importance of water quality improvement and how they can play a part in pollution reduction efforts.

The community is concerned about their lake system and has requested assistance from the HLWD. The majority of landowners and operators in this sub-watershed are concerned about soil health and water quality. These residents have been involved in a redetermination of benefits of filter strip installation, and other conservation efforts. Landowners are receptive to conservation

practices along the ditch system. This effort will provide landowners with funding for conservation tillage incentives and shoreline restoration demonstration projects.

Fulda Lakes 1 and 2 were placed on the impaired list in 2008 for nutrient and eutrophication biological indicators. Stormwater runoff contributes to these impairments.

The City of Fulda residents were invited to participate in a Social Indicators Pilot Project in 2009 by completing a survey. This was an effort to gauge public opinion regarding water quality efforts conducted in the Fulda Lakes' project area.

Heron Lake Sediment Reduction Demo — 2010

Sponsor: Heron Lake Watershed District

Funding: Section 319 (Grant) \$16,500

Purpose: HLWD proposes demonstrations of two effective, yet relatively inexpensive methods of streambank erosion control, a tree revetment and a J-hook weir. A tree revetment is a bioengineering method that uses whole trees, cabled tightly together in giant bundles, which are then secured to eroding streambanks. A J-hook weir is an upstream directed, gently sloping structure composed of natural materials designed to guide water away from the streambank. Both are new to southwestern Minnesota and landowners are unaware of the benefits of these practices.

Education and outreach would be the most time-intensive portion of the project. Site visits and bus tours, one at the beginning of the project and one upon completion, would be included. Photos and videos would be used for presentations and posted on the website. Project progress would be documented by videos and photographs, and disseminated via newsletters, news articles, public presentations and the HLWD website.

Heron Lake TMDL Phosphorus Reduction Project — 2012

Sponsor: Heron Lake Watershed District

Funding: CWP (Loan) \$450,000

Purpose: This project will promote and install 45 Subsurface Septic Treatment Systems (SSTS) and other agricultural BMPs in the Heron Lake watershed.

Jack and Okabena Creek Sediment Reduction Project — 2012

Sponsor: Heron Lake Watershed District

Funding: Section 319 (Grant) \$20,600

Purpose: This project will install 2 J-hook weirs on Jack and Okabena Creeks; monitor sites and collect documentation; publicize project through Heron Lake Watershed district website, newsletters, local newspapers and landowner mailings; and complete all project reporting requirements.

West Fork Des Moines River TMDL Implementation Project — 2011

Sponsor: Heron Lake Watershed District

Funding: Section 319 (Grant) \$198,248

Purpose: In December 2008, the USEPA approved a TMDL study encompassing 32 impairments in the West Fork Des Moines River watershed. This project is unique in that it addressed several impairments on a basin-wide scale, worked with local partners, and developed an advisory stakeholder committee early in the process. The local stakeholder advisory committee that provided input and received project updates during the development of the TMDL Report provided a foundation for developing an implementation plan. A cooperative effort of local, state, and federal representatives from conservation agencies and the advisory committee led to the development of the WFDNR and Heron Lake TMDL Implementation Plan, approved by the MPCA on September 22, 2009.

East Fork Des Moines River

Des Moines River, East Fork Monitoring Project – 2009

Sponsor: Martin County Soil and Water Conservation District

Funding: CWP (Grant) \$40,000

Purpose: The intent of this phase 1 project is to provide an inventory of resource needs and fill in the gaps in water quality data within the East Fork Des Moines River Watershed, to expand on the work already underway in the Tuttle Lake water quality assessment project and to complete a diagnostic study and implementation plan for this watershed.

Missouri Basin

Rock River

Reducing Fecal Coliform in the Rock River Watershed with Manure Management — 2009

Sponsor: Rock River TMDL Organization

Funding: Section 319 (Grant) \$147,372

Purpose: Reduce bacteria contributions by 60 percent to the Rock River through correct management of land application of manure. The overall goal will be accomplished through the following four goals:

1. Increase the number of operations utilizing calibrated manure application equipment to at least 50 solid manure applicators and 25 liquid manure applicators.
2. Utilize incentive payments to encourage 25 producers to develop and maintain a manure management plan. These producers will also be required to complete a survey to understand behavior and operation changes.
3. Increase operator and agronomist knowledge by providing a field day (at least 100 attendees) that displays a field size plot of varying manure applications.
4. Increase commercial manure applicator knowledge by offering continuing education opportunities to at least 25 commercial applicators.

Rock River Replacement Subsurface Sewage Treatment System Loan Program — 2009

Sponsor: Rock County

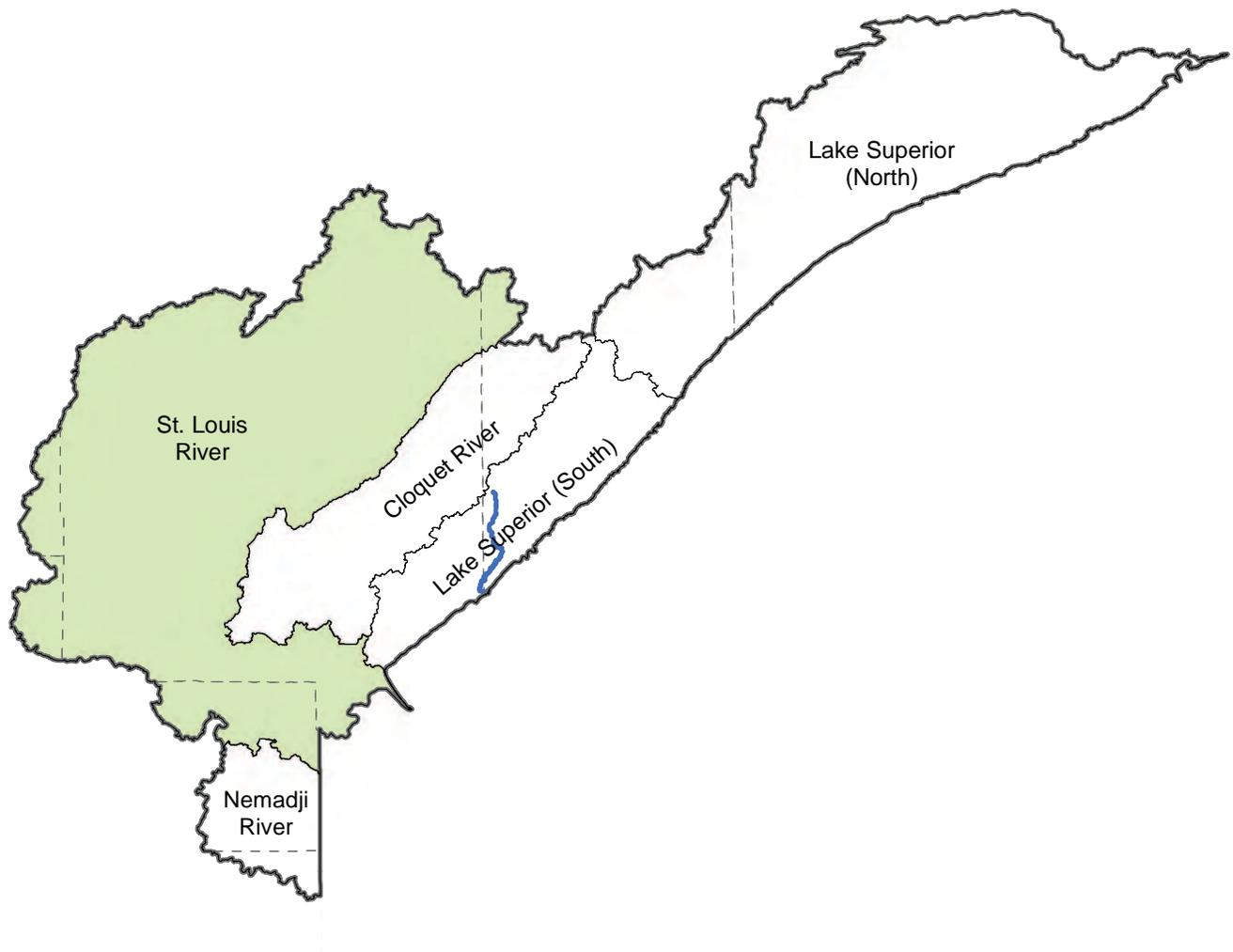
Funding: CWP (Loan) \$650,000

Purpose: The Rock River is located in the southwest corner of Minnesota and is a main tributary to the Missouri River Basin. This project would provide a low interest loan option for financing replacement of approximately 75 SSTs in the three-year grant period. Replacement of failing SSTs was chosen by the committees as one of the main concerns in this area.

Lake Superior Basin

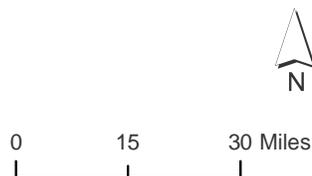
Projects completed

None completed for 2012 – 2013



Legend

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



Lake Superior Basin

Projects active

None awarded in 2013

St. Louis River Watershed

East Swan River Watershed Protection Strategy — 2009

Sponsor: North St. Louis Soil and Water Conservation District

Funding: CWP (Grant) \$147,000

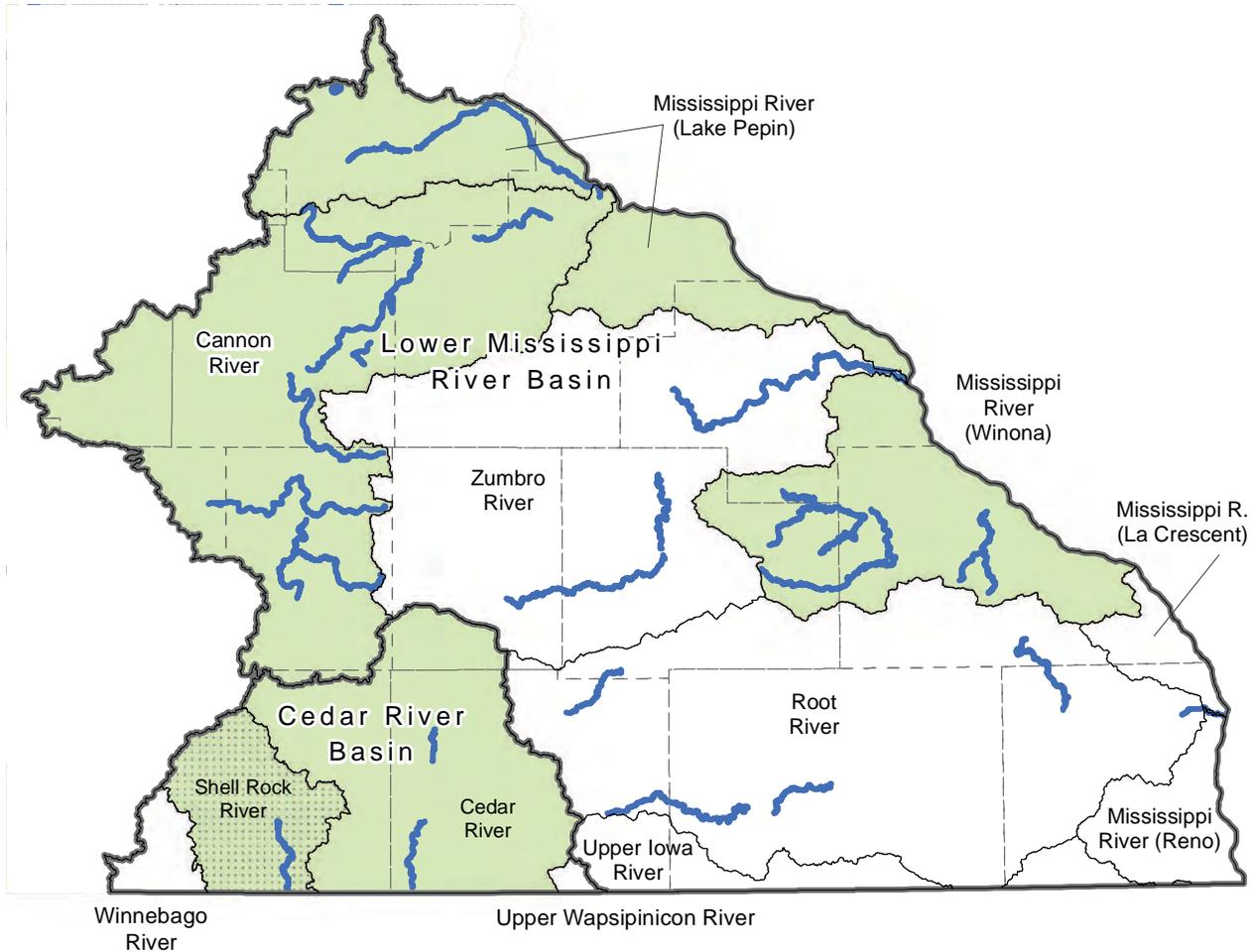
Purpose: No water quality or biological monitoring programs exist within the watershed at this time, and the current water quality of the East Swan River and its tributaries are largely unknown. The initial focus of this phase 1 project will be building community coalitions, consolidating the technical infrastructure required, developing a watershed monitoring plan, collecting and assessing watershed data and developing a diagnostic study and implementation plan to protect the watershed from degradation. The project will also develop a GIS watershed management database and analysis tool which quantitatively analyzes water quality impacts of factors such as land use, zoning, property ownership, topography, soils, stream buffers, wetlands, point source discharges, drainage networks, hydrologic modifications, stream flow, and other available biological, physical and socioeconomic data on surface waters within the watershed.

Lower Mississippi and Cedar River Basins

Projects completed

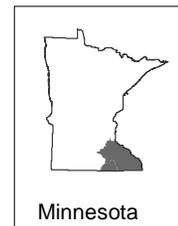
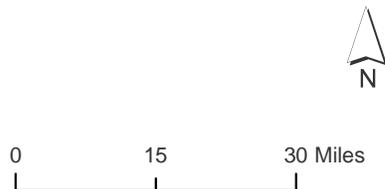
Mississippi River – Winona Watershed

Lower Mississippi Basin SE MN Wastewater Initiative



Legend

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



Mississippi River – Winona Watershed

Lower Mississippi Basin SE MN Wastewater Initiative

Since 2001, the Southeast Minnesota Wastewater Initiative (SEMWI) successfully employed the Wastewater Facilitator concept. During this time, 19 communities completed the process, providing adequate sewage treatment for their communities (two completed during the current grant period.) In a 2006 survey conducted by the University of Minnesota Extension Service, community task force members identified wastewater facilitator services as the most critical aspect in helping a community progress toward a wastewater solution.

Community education was also identified as an integral component of the SEMWI strategy. When an unsewered community is first approached, members often lack an understanding of proper wastewater treatment. Without this understanding, they are unlikely to accept responsibility for the environmental impacts of their current systems and therefore unlikely to take steps to correct the situation. Once a community takes steps to address the condition of their systems, they require education in the types of treatment options available before an appropriate community decision is made. Once a new system is installed, the long-term viability of



New sewer construction in Minnesota City

the system depends upon the homeowner's knowledge of how to operate and maintain the system. We have had success with working with the skilled educators at the U of M Extension Service to provide all three types of education to citizens of unsewered communities.

Goals

- Reduce amount of untreated wastewater entering the environment in the Lower Mississippi/Cedar River Basin



New sewer construction in Andyville East

in Minnesota by leading communities with inadequate sewage treatment through a process toward finding solutions to their wastewater problems

Results that count

- Two communities successfully completed the community wastewater process during this period (Andyville East and Minnesota City), resulting in achieving adequate wastewater treatment. This brings the total to 19 communities reaching the goal of wastewater treatment since this project inception in 2001
- Eight additional communities made progress in achieving benchmarks in the wastewater process during this grant period.
- Four new communities entered into the wastewater process through this grant period

Financial information

Funding type: Section 319

Grant amount: \$95,149.25

In-kind: \$223,019

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Lower Mississippi and Cedar River Basins

Projects active

None awarded in 2013

Cedar River Basin

Cedar River Watershed

Alternative Designs for Drainage Ditches — 2010

Sponsor: U of M, Department of Bioproducts and Biosystems Engineering

Funding: Section 319 (Grant) \$286,128

Purpose: Finding a balance between the benefits of drainage and protecting water bodies is a difficult challenge. This proposal will study the effectiveness of innovative ditch designs as a BMP solution to water quality concerns related to artificial agricultural drainage. This BMP addresses water quality concerns and TMDL impairments related to highly drained agricultural areas of Minnesota. Minnesotans need to make advances now in alternative ditch designs. Ditches comprise many miles of the rivers and streams on the impaired waters list. As TMDLs are completed, ditches and tile drainage will be targeted as sources and receive a load allocation to be remediated. Alternative ditch designs are viable options for reducing targeted load allocations without requiring major changes in current farming practices. This project builds on previous work completed at the U of M and includes development of tools to identify high priority ditches or landscapes that would benefit from the use of this BMP.

Shell Rock River

New Tools to Support TMDL Phosphorus Reduction Plans – 2009

Sponsor: U of M Water Resources Center

Funding: Section 319 (Grant) \$298,175

Purpose: The goals of this project are to 1) develop a whole-watershed phosphorus (P) balance for a case study watershed (Albert Lea Lake), 2) develop a simple approach for determining the source of water to streams (groundwater vs. surface runoff), and 3) develop an approach to integrate these new ideas into TMDL

implementation plans. The P balance will be developed for the entire Albert Lea Lake watershed to determine forms and amount of P entering the watershed, being transferred among “compartments” (e.g., hog farms, crop farms, soil system) within the watershed, being lost via stream export, and being accumulated. Hydrologic studies will be conducted to determine the source of water (groundwater vs. surface runoff) and P. Results will be integrated with the conventional modeling approach. Outcomes will include an online guidance manual, local workshops, and statewide workshops.

Lower Mississippi River Basin

Multiple watersheds in the basin

Southeast Minnesota Volunteer Nitrate Monitoring Network — 2009

Sponsor: Southeast Minnesota Water Resources Board
Funding: CWP (Grant) \$143,600

Purpose: To maintain the established network of 675 homeowner volunteers whose wells are annually sampled in order to evaluate condition and trends of area drinking water sources. The overall goal is to provide long-term data counties need to focus on their implementation efforts for groundwater protection.

Sustaining Progress Toward Reducing Runoff from Open Lot Feedlots — 2009

Sponsor: Southeast Minnesota Water Resources Board
Funding: Section 319 (Grant) \$300,000

Purpose: Local staff or contractors will provide open lot agreement signers with technical assistance in designing low-cost fixes to correct and treat polluted runoff (average cost of a low-cost fix is \$5000) and to trouble-shoot implementation challenges where runoff reduction is not completely abated despite feedlot design implementation.

Cannon River Watershed

Lower Cannon River Turbidity Reduction Project — 2011

Sponsor: Cannon River Watershed Partnership

Funding: Section 319 (Grant) \$178,120

Purpose: The Lower Cannon River Turbidity TMDL study, completed in July 2007, sets significant load reductions for sediment in the Lower Cannon River watershed. The water quality goal is a TSS value of 44 mg/L or less. At high flows, a reduction in TSS values ranging from 49 percent to 82 percent is needed in the Cannon River system depending on the reach. The implementation plan, completed in October 2009, established a short term goal of achieving a 30 percent reduction in sediment sources by 2020.

Project Goals:

- Identify the major sources of sediment to the Little Cannon River and Belle Creek that are contributing to the pollution of these streams and the Cannon River.
- Implement BMPs to reduce sediment delivery to the streams with the support of local landowners.

The water body is considered of high public value, having been designated a Wild and Scenic River in order to afford it additional protection from potential degradation. It is located less than an hour's drive from the Twin Cities Metropolitan Area, along a popular bicycle path which brings thousands of Minnesotans close to the water.

North Cannon River Bacteria Reduction Project — 2010

Sponsor: Dakota County SWCD

Funding: Section 319 (Grant) \$66,000

Purpose: The purpose of the North Cannon River Bacteria Reduction Project is to identify, target and work with rural landowners to install filter strips and other BMPs that reduce bacteria, nutrients and sediment contributions to surface waters within the North Cannon River Watershed.

Rice Creek Assessment Project — 2011

Sponsor: Bridgewater Township

Funding: CWP (Grant) \$110,197

Purpose: Rice Creek is a 7-mile-long stream with 1.3 miles designated as trout stream located in Bridgewater Township. This project will develop the project work plan; complete a watershed and stream characterization; conduct stream and watershed water quality monitoring; collect fish and macroinvertebrate population

information; construct food web structure and function data; host and promote Rice County SWCD education programs and workshops through local newspaper articles; hold public meeting and open houses; develop the FLUX model to calculate annual and seasonal loads, and flow-weighted mean concentrations for sediment and nutrients of interest; manage the project administration; and develop a final report.

Southeast Regional Grant for Water Quality — 2010

Sponsor: Southeast Minnesota Water Resources Board

Funding: Section 319 (Grant) \$900,000

Purpose: This project forms part of a larger regional effort to comprehensively address sources of fecal coliform bacteria tied to the Regional TMDL Implementation Plan. We will secure two experienced wastewater facilitators to work with 13 additional small Southeast Minnesota communities to find solutions to inadequate wastewater treatment. We will also conduct an inventory of individual on-site sewage treatment systems on a county or small watershed scale, followed by replacement of 450 Imminent Threats to Public Health. Finally, local feedlot staff will provide technical and engineering assistance to design and implement 100 small feedlot fixes to treat polluted runoff.

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.

Mississippi River – Lake Pepin

Dakota County Nonpoint Source Reduction Project — 2009

Sponsor: Dakota County

Funding: CWP (Grant) \$172,700

Purpose: This continuation grant will enable Dakota County to continue and expand a successful agricultural outreach program. Through the coordinated efforts of an increased Extension Educator position and the multiple agencies involved in this effort, the project will be able to involve more farmers and more acreage in demonstration projects and outreach activities, while continuing the existing efforts such as the twice-yearly "Focus on Ag" newsletter, annual spring Crops Day and annual summer Field Day. The county will provide assistance and incentives to private well owners and the city itself to seal

unused wells. It will also continue programs to monitor groundwater and surface water quality in the study area.

Stream Cooling Demonstrations in the Vermillion River Watershed — 2009

Sponsor: Vermillion River Watershed Joint Powers Organization (VRWJPO)

Funding: Section 319 (Grant) \$260,000

Purpose: The VRWJPO and its partners have accumulated data that suggest that the trout reaches of the Vermillion River are at risk of warming, despite a trout population that is thriving and has even expanded in recent years. The VRWJPO wants to maintain temperatures in the watershed's trout streams sufficient to preserve the brown trout population and other cold-water species.

Mississippi River – Twin Cities

Dakota County Nitrate Reduction Project — 2012

Sponsor: Dakota County

Funding: Section 319 (Grant) \$215,307

Purpose: This project will create and implement agricultural projects to validate, demonstrate, and refine BMPs for nitrogen fertilizer for corn production that will lower nitrate levels in Dakota County's groundwater and surface water; promote Private Pesticide Applicator Training, Crops Days, "Focus on Ag" Newsletter and innovative demonstration projects to area farmers to improve quality of Dakota County's water resources; monitor nitrate levels in private drinking water wells and in the Vermillion River and its tributaries; track project grant, matching funds and expenditures; and complete required reporting.

Mississippi River – Winona

Whitewater Watershed, South Branch – Bacteria Reduction Project Continuation — 2009

Sponsor: Whitewater Joint Powers Board

Funding: CWP (Grant) \$214,028

Purpose: Decrease the number of failing septic systems in the shoreland area, educate producers about sensitive feature setbacks and increase adoption of Manure Management Plans, improve management of heavily grazed stream banks and shoreland areas by hosting field days and promoting cost-share opportunities and grazing plans, achieve complete compliance with the shoreland vegetated buffer ordinance and continue monitoring efforts, adding bacteria monitoring sites in the North and Middle Branch.

Minnesota River Basin

Projects completed

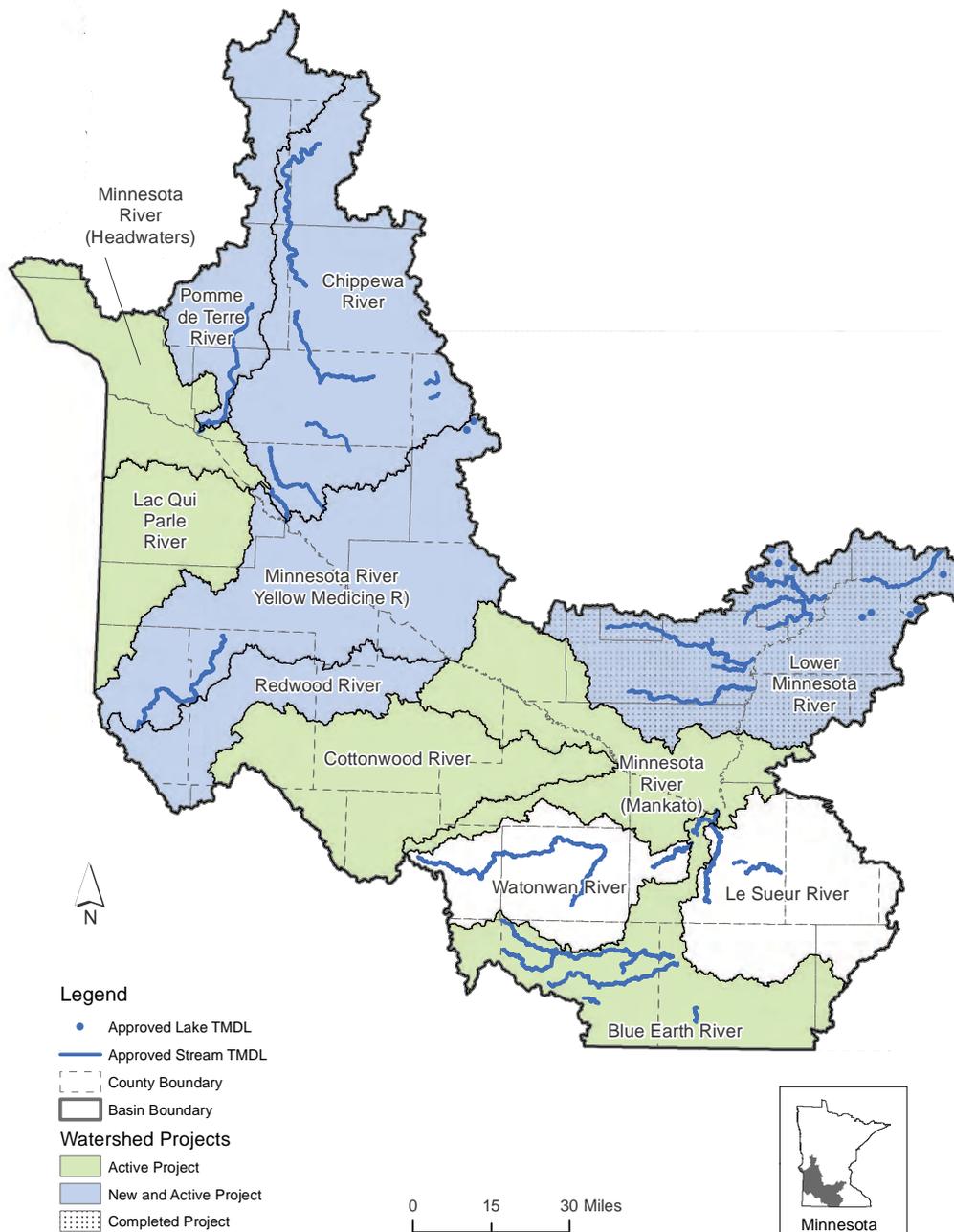
Cottonwood River

Cottonwood/Redwood River Project

Lower Minnesota River

Blackhawk Lake and Thomas Lake Management Plans

Carver, Bevens, and Silver Creek Watershed Fecal Coliform TMDL Implementation Plan Project



Cottonwood River Watershed

Cottonwood/Redwood River Project

The goal of this project was to continue best management implementation according to the Redwood and Cottonwood River Phase I Implementation Plans approved in 1993 and 1999, as well as implement phosphorus reducing conservation practices that will help achieve goals of the Lower Minnesota River dissolved oxygen Total Maximum Daily Load (TMDL). The four-year work plan was projected to reduce phosphorus reaching the Minnesota River by two tons annually or 1,601,200 pounds of aquatic plant growth annually (plus 2,354.70 tons of sediment). The 319 grant portion was broken down into \$46,875 for technical assistance, \$64,125 for 75 percent cost share of alternative tile intake replacements, and \$189,000 of incentive payments for nutrient management. The final expenditures were \$44,701.66 for technical assistance, \$46,880.28 for alternative tile intake replacements, and \$189,000 of incentive payments for nutrient management. The original match for the project was \$300,000 consisting of various best management practices (BMPs) and the project used \$287,942.46 of project match funds including landowner match, Redwood SWCD BWSR BMP funds, and RCRCRA administrative efforts.

Approximately 280 open tile intake replacements (replacements) were registered, but only approximately 260 replacements were actually implemented. The reason for the difference was due to combination of wet weather and contractor availability. Also, 2009 and 2010 were wet years creating a backlog of projects for contractors to complete and this type of activity is so low-cost that the mobilization of a hired service doesn't allow for as much return to a contractor than a larger scale project, so many contractors simply had no time for them or chose not to do them within the timeframe of the fund.

Goals

- Implement 300 Open Tile Intake Replacements
- Promote and implement 3000 acres of nutrient management plans
- Implement BMPs to reduce 2,355 tons of sediment annually, two tons of phosphorus annually, and nitrate pollution to the Cottonwood, Redwood, and ultimately the Minnesota Rivers



Tile intake replacements site using the pea-rock method

Results that count

- Implemented 188 tile intake replacements
- Implemented nutrient management plans/methods on 3,000 acres
- Implemented projects that has the potential to reduce phosphorus transport by 320 pounds per year and reduce net sediment in surface water by 188 tons per year. Over the 10 year life expectancy of each BMP, a potential reduction of 1.6 tons of phosphorus and 43.86 tons of algae can be reduced.
- The original estimate was a potential 159,000 pounds of total nitrogen, based on implemented acreage.

Financial information

Funding type: Section 319

Grant amount: \$280,581.94

Matching funds: \$287,942.46

Contact information

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 MPCA Project Manager: Mark Hanson

Lower Minnesota River Watershed

Blackhawk Lake and Thomas Lake Management Plans

Through this resource investigation and protection project, co-sponsored by the Gun Club Lake Watershed Management Organization (GCLWMO), the City of Eagan prepared state-of-the-art water quality management plans for Blackhawk and Thomas lakes. Similar to a Total Maximum Daily Load (TMDL) effort, the project evaluated in-lake water quality, assessed the total phosphorus loads affecting each system, and identified implementation projects and activities to address needs. Effectively, the project has provided the City a coherent strategy and direction for implementing improvement projects and conducting activities to protect and improve these lakes, consistent with Eagan's Water Quality & Wetland Management Plan (WQWMP).



Before: Blackhawk-Thomas

Goals

- Complete a process similar to a TMDL study and report (i.e., develop total phosphorus (TP) load allocations to protect water quality goals)
- Identify coherent strategies to achieve TP reductions and improve recreational suitability of the lakes
- Facilitate public involvement and implementation of the WQWMP's priority projects and activities

Results that count

- Blackhawk and Thomas Lake Management Plans (approved by MPCA 12/3/2012): Blackhawk Lake total



After: Blackhawk-Thomas

existing TP load = 519 lb/yr, TP load allocation = 422 lb/yr, TP load reduction = 97 lb/yr; Thomas Lake total existing TP load = 159 lb/yr, TP load allocation = 151 lb/yr, TP load reduction = 8 lb/yr

- Identified potential projects for the Blackhawk watershed (about \$757,000) reduce TP load 95 lb/yr and for the Thomas Lake watershed (about \$949,000), 29 lb/yr. In-lake management activities cost about \$24,000 annually. City's operations (2013) and capital improvements (2013-17) budgets include \$228,000 for projects and activities estimated to remove 70 lb/yr TP load from Blackhawk Lake and include no new initiatives for Thomas Lake.
- Three public meetings averaged 19 attendees each and were broadcast citywide on local cable TV for about a month. Achieved two of the WQWMP's high priority projects and activities.
- This project identified potential projects for the Blackhawk watershed (about \$757,000) reduce TP load 95 lb./yr. and for the Thomas Lake watershed (about \$949,000), 29 lb./yr. In-lake management activities cost about \$24,000 annually. City's operations (2013) and capital improvements (2013-17) budgets include \$228,000 for projects and activities estimated to remove 70 lb/yr. TP load from Blackhawk Lake and include no new initiatives for Thomas Lake.

Financial information

Funding type: CWP

Grant amount: \$55,276

In-kind: \$26,768

Matching funds: \$42,598

Contact information

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MPCA Project Manager: Barbara Peichel

Lower Minnesota River Watershed

Carver, Bevens, and Silver Creek Watershed Fecal Coliform TMDL Implementation Plan Project

Carver, Bevens, and Silver Creek's, from their headwaters to the mouths, were placed on Minnesota's list of impaired waters for fecal coliform bacteria exceedances. A fecal coliform TMDL along with implementation plans for the listed reaches were written and finalized in 2007. The goal of the TMDL and the implementation plans is to quantify the pollutant reductions needed to meet the water quality standards for fecal coliform in the listed reaches. Following a stepped-up fecal coliform monitoring schedule and detailed modeling, the main sources for fecal coliform bacteria in the three listed streams are failing septic systems during dry conditions and manure application during wet conditions. In addition to existing regulation and programs, methods and practices to eliminate these sources were identified as:

- Upgrading direct discharge septic systems
- Eliminating applied manure near waterbodies
- Treating land applied manure on agricultural fields with vegetated buffers and alternative tile intakes

This grant and project began an accelerated effort to implement these practices by funding additional staff resources and incentive funds and monitoring costs. The staff resources are key to targeting not only investigation of specific sources and the follow up enforcement (direct discharge septic systems), but also the one-on-one efforts needed to prioritize and persuade landowners to implement practices.

Goals

- Update, identify, and bring into compliance up to 100 direct discharge ISTS's.
- Implement 10 individual landowner contracts and install 100 acres of buffer strips.
- Install 80 alternative tile intakes, and write 15 manure management plans.

Results that count

- Eliminated 137 direct discharge SSTS's, with 25 additional scheduled for 2012. Ruled out an additional 300 SSTS's as potential direct discharge culprits.



SSTS replacement: Carver, Bevens – Lackey mound drainfield

Ninety additional SSTS upgraded outside of project watersheds as a result of program.

- Implemented eight individual landowner contracts and install 48 acres of buffer strips, with six landowner contract and 36 acres of buffer strips to be implemented in 2012.
- No installation of alternative tile intakes, but completed five manure management plans (one pending for 2012) within the targeted watersheds and an additional nine plans outside of those watersheds.

Financial information

Funding type: CWF

Grant amount: \$148,420

In-kind: \$39,780

Matching funds: \$747,369.49

Contact information

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MPCA Project Manager: Jennifer Anthony

Minnesota River Basin

Projects active and awarded in 2013

Multiple watersheds in the basin

A Decision Support Tool to Restore Impaired Waters — 2010

Sponsor: U of M, Department of Forest Resources

Funding: Section 319 (Grant) \$719,468

Purpose: This education and applied research project expands upon earlier work estimating impacts of restored wetlands, stream channel restoration and targeted conversion to perennial crops and adds an outreach component. The project integrates existing research, fills in research gaps, and will prepare and disseminate a decision support tool to assist managers in selecting practices with the greatest potential for restoring impaired waters. An advisory group composed of agency personnel will be formed to assist with tool development. The planned activities include: 1) hydrologic research on the impact of perennial plantings and stream channel —riparian restoration on improving the quality of impaired waters; 2) research on the agronomic aspects of producing energy crops in riparian areas to address impairments; 3) developing a decision support tool for managers; and 4) education and outreach to train managers to use the tool and landowners to implement practices and land use options.

The long term goal of this project is restoring impaired waters through the provision of a research based decision support tool that allows agencies and stakeholder groups to concentrate their efforts on supporting programs and targeting effort to areas with the greatest chance of restoring impaired waters. Outcomes/products include: 1) A decision support tool for managers; 2) Field days for the general public and trainings for managers; 3) Measurements of the impact of stream channel restoration and continuous monitoring of pilot watershed areas; 4) Decision support tool that can estimate potential environmental results of BMPs and land use changes.

Cottonwood-Redwood River Septic Loan Program — 2013

Sponsor: Redwood-Cottonwood Rivers Control Area

Funding: \$ 9,000 CWF, \$510,000 CWP loan

Purpose: This project will continue the offering low-interest loans to citizens, some of whom may not be able

to acquire funding otherwise, for upgrading 50 septic systems to ensure compliance with state rules. Grant funds will be used to administer the low-interest loan program.

Evaluation of Artificial Drainage in Altering Hydrology — 2009

Sponsor: Minnesota State University – Mankato

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

Purpose: The final product of this project will be an interpretive report describing a) the extent and distribution of artificial drainage in 23 agricultural watersheds, and b) the relation between artificial drainage and changes in the hydrologic conditions in these 23 watersheds. The proposed outcomes from this project include:

1. Assessment of hydrologic changes from 1940 to present in 23 agricultural watersheds based on 14 hydrologic parameters.
2. Estimation of present day artificial drainage density in the same 23 agricultural watersheds using surveys of two surrogate metrics.
3. Quantitative comparison of the effect of artificial drainage and precipitation on hydrology.
4. Detailed quantification of trends in installation of artificial drainage using multiple assessment tools for six watersheds.
5. Analysis of relationship between temporal trends in artificial drainage density and changes in hydrology.
6. Analysis of model results to seek causal relations between climate, tiling, and runoff in a selected watershed.
7. Correlation between trends in artificial drainage and continuing increases in Lake Pepin sediment accumulation rates.

Greater Blue Earth and Des Moines River SSTS Loans — 2009

Sponsor: Watonwan County

Funding: CWP (Loan) \$1,200,000

Purpose: Initiate and re-establish the CWP loan program in southern Minnesota counties to demonstrate the influence low interest SSTS loans has on the rate of SSTS compliance. 30-40 non-compliant or failing existing systems, as determined by inspection in each of four counties, will be replaced by new single sewage treatment systems. 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 the individual counties: Blue Earth, Cottonwood, Jackson and Watonwan.

Minnesota Pollution Reduction and Economics Test with Nutrient Trading Tool — 2011

Sponsor: Minnesota River Board

Funding: Section 319 (Grant) \$172,916

Purpose: The Conservation Marketplace of Minnesota (CMM) project collaborators will be among the first groups to work with the Nutrient Trading Tool (NTT) in Minnesota upon its nationwide release in 2011. CMM is a collaboration of public and private conservation professionals developing a market-driven approach to advance conservation efforts and agricultural sustainability with a crediting system that provides multiple environmental benefits with measurable outcomes in participating watersheds. We will identify BMP sites to evaluate and validate the Nutrient Trading Tool, incorporate a farm economic model, develop curriculum, provide outreach events and train natural resource professionals. This project will professionally validate and demonstrate the NTT to evaluate land management scenarios and provide measureable outcomes for conservation practices designed to reduce nonpoint source pollution in watersheds across the state.

Minnesota River Community Clean-Ups for Water Quality — 2010

Sponsor: Friends of the Minnesota Valley

Funding: Section 319 (Grant) \$110,000

Purpose: The Community Clean-Ups for Water Quality have a direct, measurable, and significant impact upon the water quality of the Minnesota River and its watershed by measurably and significantly reducing phosphorus pollution. In addition to the physical results, the Clean-Ups result in an educational process of area citizens that motivates them to take action and that instills within them an ongoing commitment to their communities and to the long-term health of the Minnesota River.

Outcomes:

Five 20-25 pound bags of debris contain about one (1) pound of phosphorus.

Some project outcomes and results may include, but are not limited to:

- Identify a minimum of 30 target communities to host clean-ups.
- Quantify, publish and publicize the results of community clean-ups through printed and electronic media, including our annual report, newsletter and website. We will also work with our partners to publish and publicize the results in this manner as well.
- Achieve pollution reduction figures of an estimated 15,000 pounds of phosphorus and 30,000 pounds of trash.

Motivate the involvement of 1,800 volunteers, sustained over the grant period total of three years, to actively participate in the project.

Redwood and Cottonwood Rivers Watershed Conservation and Nutrient Reduction Projects — 2009

Sponsor: RCRC

Funding: Section 319 (Grant) \$253,440

Purpose: The goal of this project is to continue best management implementation according to the phase I implementation plans and implement phosphorus reducing conservation practices that will help achieve the Lower Minnesota River DO TMDL. This project is expected to reduce phosphorus reaching the Minnesota River by 1.139 tons annually or 911,683 pounds of aquatic plant growth annually (plus 1,960.50 tons of sediment). This work plan will administer grant funds from 2009 through 2013 to achieve the implementation goals through these objectives: 1) BMP technical assistance and implementation, and 2) Grant facilitation.

Blue Earth River

Blue Earth River Basin Restoration Positions — 2009

Sponsor: Greater Blue Earth River Basin Alliance

Funding: CWP (Grant) \$227,600

Purpose: To continue funding four specialist positions.

The Urban Outreach Specialist position provides communities with assistance in developing and delivering presentations, education campaign materials, educates about alternative stormwater management practices, and assists communities with the implementation of stormwater projects.

The Nutrient Management Specialist position develops nutrient management plans and conducts outreach and education to area livestock producers and the general public. These plans are designed to help manage the

amount, source, placement, form and timing of the application of nutrients and soil amendments.

The Conservation Agronomist position focuses on education and applied research around sustainable farming systems that promote higher levels of nonpoint source pollution mitigation practices. This position works with local and regional educators to conduct applied research and uses demonstration of appropriate principles and practices to meet these goals.

The Cobb River Watershed Technician position provides the landowners with guidance on BMP project implementations and programs to help improve water quality.

These positions will continue to utilize available state Clean Water Legacy, BWSR State Cost-Share, Section 319 and NRCS Environmental Quality Incentives Program (EQIP) funds to initiate the installation of BMPs in the watershed.

Blue Earth River-East Branch Watershed Approach — 2009

Sponsor: Faribault County

Funding: CWF \$250,000, CWP (Loan) \$200,000

Purpose: Faribault County will utilize a systematic approach to identify principal sources, or “hot-spots”, of sediment contributions and work with individual landowners, county drainage officials, and municipalities to coordinate and implement critical BMPs, establish demonstration sites, and provide education and outreach efforts. This project will also establish baseline watershed data with the addition of site specific information and determine high priority watersheds. Appropriate practices will be identified and mapped utilizing GPS and GIS equipment and software. The project will promote side inlets with buffers, incentives for filter strips or establishment of harvestable filter strips, water storage areas, in-line ditch treatment, crop residue, open intake alternatives, controlled drainage projects, along with other structural and innovative practices.

Collaborative for Sediment Source Reduction: Greater Blue Earth River Basin — 2012

Sponsor: U of M, Jeff Marr

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

Purpose: This project will develop a sediment budget for the Greater Blue Earth River watershed; establish efficiency and cost of sediment reduction strategies (type, setting, and location); develop a sediment

simulation model; build a decision analysis system; develop management strategy; provide seven workshops to develop and test the simulation model and decision tools; and complete all fiscal management and planning.

GBERBA Dissolved Oxygen TMDL Application — 2009

Sponsor: Greater Blue Earth River Basin Alliance (GBERBA)

Funding: Section 319 (Grant) \$108,000

Purpose: The goal of the project is to reduce the amount of sediment entering the Blue Earth and Le Sueur rivers by providing cost-share to landowners who wish to install agricultural BMPs designed to reduce erosion. Reducing sediment also reduces the phosphorus bound to the soil, thereby addressing the low DO problem identified in the Lower Minnesota River TMDL. The cost-share is an incentive to landowners wishing to conserve their land. A healthier river system is the goal, which increases the value of the river as a resource.

Greater Blue Earth Urban Retrofit Initiative — 2012

Sponsor: Faribault County SWCD

Funding: Section 319 (Grant) \$270,250

Purpose: This project will use various electronic and printed media, as well as meetings, to promote environmentally-friendly stormwater management practices; design and implement stormwater retrofit and new stormwater practices; provide technical assistance for stormwater implementation; track grant project and matching fund expenditures; and complete required reporting.

Chippewa River

Chippewa River Accelerated Restoration — 2012

Sponsor: Chippewa County

Funding: CWP (Loan) \$900,000

Purpose: This project will promote and install 90 SSTS, rural and agricultural best management practices in the Chippewa River watershed.

Dry Weather, Lines and Spring Creeks Sub-basin of the Chippewa River Continuation — 2011

Sponsor: Chippewa County

Funding: CWP (Grant) \$347,833 CWP (Loan) \$200,000

Purpose: The Dry Weather, Lines and Spring Creeks sub-basin is one of six priority sub-basins of the Chippewa River Watershed. This project is designed to continue project administration; water quality monitoring; summer intern program assistance; education and information

activities; and BMPs to be implemented, including critical tree plantings, nutrient management, residue management, alternative tile intakes, conservation drainage, and may include sediment basins, wetland restorations, stream bank stabilization, grassed waterways, pasture management, livestock exclusion, agricultural waste management systems, buffer strips, urban BMPs, side inlets, and terraces.

Lake Minnewaska Phase I Resource Investigation — 2013

Sponsor: Pope Soil & Water Conservation District

Funding: CWP (Grant) \$112,435

Purpose: This project will hire a half time employee for three years responsible for meeting the requirements outlined in the preparation of a diagnostic study and implementation plan guidance document. The requirements are as follows but not limited to: monitoring water quality, compiling data, gathering public comments, identifying priority areas, providing timelines and cost estimates for best management practices and writing a detailed report. The resource investigation report will explore land use in the watershed, point and nonpoint pollution sources, agricultural practices being used, lakeshore development, septic system compliance, and water quality trends.

Cottonwood River

Cottonwood River Watershed Phosphorus Reduction Continuation — 2009

Sponsor: RCRC

Funding: CWP (Grant) \$343,000, CWP (Loan) \$545,000

Purpose: Replace 73 non-compliant eminent health threat (EMHT) SSTS systems, provide technical assistance to install SSTS and BMPs watershed wide, continue monitoring and sampling analysis and provide grant facilitation and administration during the project period.

Cottonwood River Native Vegetation Water Quality — 2010

Sponsor: Minnesota Department of Agriculture

Funding: Section 319 (Grant) \$183,766

Purpose: TMDL protocols include load allocations for natural background contributions. These allocations are often lumped with other nonpoint source loads because the data characterizing natural background conditions are very limited. Many TMDL implementation plans

include the establishment of native prairie vegetation to remediate pollution in the agricultural landscapes of southern Minnesota; however, the quantification of the water quality benefits of such programs as the CRP at the landscape scale is lacking. This study will be conducted at a field scale site comprised of native prairie vegetation with no history of conventional row crop production agriculture to assess the soil and water characteristics of this system. This system will be compared to alternative management scenarios at the field scale using a paired watershed design to evaluate water quality differences.

Outcomes:

- Water quality and quantity characterization of native prairie systems.
- Quantification of natural background contributions from soil and native prairie vegetation to current water quality impairments related to turbidity, excess nutrients, and bacteria.
- Comparison of water quality characteristics among differing land management practices including: native prairie vegetation; conventional row crop agriculture; and targeted placement of native vegetation in critical landscape positions.
- Development of management guidelines for CRP lands converted to cropland to minimize impacts on soil and water resources while maintaining agricultural productivity.

Cottonwood Streambank Inventory and Prioritization Project — 2012

Sponsor: RCRC

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

Purpose: This RCRC project will promote agricultural BMPs projects, identify sensitive areas for projects, inventory and prioritize project need, provide cost-share funding for BMP implementation, particularly the remediation of stream bank failures through a) direct streambank restoration and b) practices that slow hydrologic processes; identify high erosion streambanks and near-channel grade stabilization/ravine problems along the Cottonwood River corridor and create a method to prioritize the sites; and provide necessary project administration, meeting all grant requirements.

Lac qui Parle River

Ten Mile Creek Protection Plan for Turbidity

Sponsor: Lac qui Parle – Yellow Bank Watershed District

Funding: CWF (Grant) \$141,850

Purpose: Ten Mile Creek is the only tributary on the east side of the Lac qui Parle River. This protection plan will install BMPs, such as buffer strips, harvestable buffer strips, open tile intakes replaced with either a rock inlet or pattern tile design, rain gardens, wetland restorations and other urban BMPs as the need may arise; develop and compile results of a Ten Mile Creek watershed survey; hold small group meetings in the watershed to encourage landowner conversations; prepare and send regular newsletters; develop additional information and education activities as needed and provide project fiscal management and administration.

Le Sueur River

Le Sueur Watershed Targeted Conservation Practices — 2012

Sponsor: Minnesota State University – Mankato – Water Resources Center

Funding: Section 319 (Grant) \$82,491

Purpose: The Water Resources Center at Mankato will form a steering committee to serve an advisory role for the project; collect and organize data on existing BMP implementation, targeting and modeling research and other data for the map production; complete tillage transect survey/WinTransect; determine what existing laws or regulations, location and type of BMPs to target; complete “Flow Calculation Modeling”; actively seek out willing stakeholders through the “Le Sueur Civic Engagement Project”; provide project information to local government units meetings; provide a project survey, and data usage analysis; and manage and coordinate project administration.

Lower Minnesota River

Assessing Iron Enhanced Filtration Trenches — 2011

Sponsor: City of Prior Lake

Funding: Section 319 (Grant) \$240,000

Purpose: The purpose of this project is to quantify the performance of full-scale, field-installed, iron-enhanced filtration trenches which will provide critical design, construction, and performance information for a practice that could be used to significantly reduce the dissolved

phosphorus load entering wetlands, rivers, and lakes in Minnesota.

This project will investigate the design of a new treatment system that utilizes a sand filter enhanced with iron shavings or steel wool around the perimeter and near the outlet of a wet detention basin. When stormwater enters the basin, the water level will increase and stormwater will begin flowing into the filtration trenches. Significant particulate removal occurs through settling within the wet detention basin and additional particle and dissolved pollutant capture occurs by filtration and adsorption within the enhanced media trench. The technology was tested during the summer of 2010 through funding provided by the City of Prior Lake, the Prior Lake Spring Lake Watershed District, and the Scott County Watershed Management Organization.

Blackhawk Lake Protection Project — 2013

Sponsor: City of Eagan

Funding: CWP (Grant) \$46,500

Purpose: The City of Eagan will collaboratively develop educational programs and materials for the Black Hawk Middle School and Deerwood Elementary School community and will determine the most appropriate opportunities for community education and involvement in site analyses and selection, design, installation, operation, and maintenance of selected BMPs.

Credit River Protection Plan — 2013

Sponsor: Scott Watershed Management Organization

Funding: CWF (Grant) \$225,000

Purpose: This project will promote land and water treatment practices, including wetland restoration, riparian vegetation management, geomorphic (stream stabilization and grade control), livestock exclusion, native grasses, and rain gardens. Also included are three specific geomorphic (stream/grade) stabilization projects in the Hidden Hills Park area of Savage, a wetland restoration in Savage, and finishing the Ponds Park Storm Water Reuse Project. The project includes a 0.25 FTE to provide the technical assistance necessary to implement the practices. Metrics or targets for this objective include: installation of 30 rain gardens, 70 acres of natural practices (i.e., wetland restoration, native grass or riparian vegetation management), the completion of 3-4 geomorphic practices (stream stabilization or grade control), and 1 storm water reuse project. The bulk of the education/outreach effort, however, will be used

develop and implement a program targeting small hobby farm and other large-lot residential land owners, to include both broad-based and individual (e.g. door-to-door) marketing and outreach components. A 0.25 FTE position is included in the budget for this effort.

High Island Creek – McLeod County SSTS Project — 2013

Sponsor: McLeod County

Funding: CWP (Loan) \$120,000

Purpose: This project will work to address non-compliant SST systems in McLeod County's portion of the High Island Creek Watershed through the allocation of loan funds to rural homeowners. Overall, this specific project strives to implement 3 SSTS upgrades per year for the next 3 years.

High Island Creek TMDL Project for Fecal Coliform — 2011

Sponsor: Sibley County

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

Purpose: The water quality issues and concerns of the High Island Creek Watershed grew from past surface water monitoring completed within the watershed and the Minnesota River Basin. The Minnesota River Basin is a major source of pollution to the Mississippi River, as determined by the Minnesota River Assessment Project (MRAP, 1994). Results from the Agricultural Drainage and Pesticide Transport model by the University of Minnesota (Dr. David Mulla), shows that the Lower Minnesota River watershed contributes a large percentage of the sediment and nutrients that enter into the Mississippi River. This has put pressure on the rural watersheds of the Lower Minnesota to improve their surface water quality.

The desired environmental outcome for this project is to make significant progress on or achieve the TMDL for fecal coliform bacteria. To work toward reaching the TMDL for fecal coliform in High Island Creek, project activities will be focused to on-the-ground implementation practices that reduce fecal coliform bacteria levels and educational activities. By applying significant implementation practices, this project will also increase wildlife habitat and improve aquatic habitat. The project will continue to strive to create a sense of watershed stewardship and community pride in clean water, a social goal from previous grants.

Lower Minnesota River Dissolved Oxygen Elevation Project — 2010

Sponsor: Renville County – Hawk Creek Watershed Project

Funding: Section 319 (Grant) \$205,186

Purpose: The HCWP is offering cost-share assistance and incentives for implementing BMPs such as, but not limited to: buffer strips, wetland restorations, side inlets, alternative tile intakes, wood chip bioreactors, conservation drainage systems, grassed waterways, water and sediment control basins, terraces, grade stabilization structures, feedlot waste reduction projects, rain gardens, and lake shoreline buffers. An Engineering Technician would be added to the staff to enhance the current BMP delivery process. Practice survey and design has frequently proven to be a factor limiting the implementation of BMPs within the watershed and this position would address that issue.

The final outcome of this project will be a reduction of phosphorus entering the Minnesota River from the HCWP work area. This goal would be accomplished by implementing BMPs in strategic locations within the watershed. This is a multi-BMP grant that would focus on BMPs that have proven to be effective in reducing phosphorus. One focus of this project would be to accelerate enrollment of lands that are currently in row crop production into wetland restoration practices. Wetlands are visibly lacking throughout the watershed and there is a desperate need to restore the natural hydrology in key areas of the watershed.

Lower Prior Lake Diagnostic Study — 2011

Sponsor: Prior Lake-Spring Lake Watershed District

Funding: CWP (Grant) \$48,417

Purpose: Lower Prior Lake is located in the Prior Lake-Spring Lake Watershed District (PLSLWD) in Scott County, in the Minnesota River Basin. This project will include an assessment of the spatial variability in water quality in Lower Prior Lake; an evaluation of the internal loading potential of the lake; a watershed assessment of the direct drainage area (approximately 1900 acres) that will identify areas of highest nutrient loading to the lake and will evaluate the load reduction potential of proposed BMPs; meetings with interested parties including the Prior Lake Association, PLSLWD Board of Managers, communities, and others to set goals for lake

water quality and develop implementation strategies; and the development of the overall diagnostic study and implementation plan.

Minnesota River Tributary Phosphorus and Flow BMPs — 2010

Sponsor: Scott Watershed Management Organization

Funding: Section 319 (Grant) \$475,000

Purpose: Per the Lower Minnesota River DO TMDL Implementation Plan phosphorus needs to be reduced, and recharge and baseflows increased. To deal with additional turbidity impairments in the Minnesota River sediment needs to be reduced and channel forming flows moderated. This project accelerates implementation of BMPs specifically listed in the DO TMDL Implementation Plan for the benefit of Minnesota River impairments and local impairments. The goals are to: 1) reduce phosphorus, 2) moderate channel forming flows, and 3) increase recharge.

What makes this project unique is: 1) the robust existing program from which to accelerate implementation; and 2) an emerging demand for an alternative grass crop for biofuel at the Koda electric facility in Scott County. This demand for grass biofuel makes it easier to promote grass filter strips, and native grass plantings. Both practices are listed in the TMDL implementation plan.

Deliverables include the installation of additional BMPs called for in the Minnesota River DO TMDL Implementation Plan, and monitoring to document effectiveness. BMPs to be implemented include filter (harvestable) strips, tile intake controls, alternative crops, critical area plantings, grade control structures, water and sediment basins, native grasses and restored wetlands. The amount budgeted is sufficient to create about 150 acres of grass or between 12 and 24 miles of filter strips (depending on the width of the filter strip), install 3 to 5 grade/water control structures, 5 to 10 surface tile intake controls, and restore 25 to 30 acres of wetland or riparian buffers.

Neighborhood Lakes Management Plans — 2012

Sponsor: City of Eagan

Funding: CWP (Grant) \$167,000

Purpose: The City of Eagan will prepare state-of-the-art water quality management plans for twelve neighborhood lakes. The plans will include the following specific sections: 1) Introduction of purpose, problem, etc.; 2) Summary of watershed and lake, including history,

soils and geology, climate, watershed characteristics, lake morphometry and hydrology, historical water quality, fisheries status, aquatic vegetation, and water level; 3) Discussion of water quality standards (as above) and numeric targets; 4) Assessment and analysis of TP sources and contributions from urban stormwater, internal release, atmospheric deposition, and others; 5) Modeling water quality to source loads; 6) Development of a TMDL for impaired lakes and a virtual TMDL for unimpaired lakes, including waste load allocations, load allocations, and margin of safety, and discussion of future growth and anti degradation; 7) Public input and involvement in development of plan; and 8) Implementation strategy, including reasonable assurance and follow-up monitoring.

Quantifying Phosphorus Load Reductions from Street Sweeping — 2010

Sponsor: U of M, Water Resources Center

Funding: Section 319 (Grant) \$285,970

Purpose: Soon it will necessary for cities to quantify load reductions in order to receive credit for TMDL programs. The proposed project would develop an approach for calculating street sweeping P load reductions under a variety of conditions, so cities can reliably estimate these reductions.

The City of Prior Lake will continue an aggressive street sweeping program, providing U of M researchers with street sweeping records and samples. The U of M team will analyze approximately 1000 samples, and a subset for bioavailable P. The project will also determine the timing of P release from tree leaves experimentally, to provide guidance on the timing of street sweeping. A database of 5,300 trees will be used to develop scenarios for a variety of conditions throughout Minnesota. Outcomes will be disseminated via a web-based guidance manual and six workshops held throughout the state.

The main outcomes will be a web-based report, targeted to municipal public works departments, that will provide guidance on calculating the effect of street sweeping under various conditions (extent and species of tree canopy; type of sweeper; timing) on reducing stormwater P loadings. This will be supported by six workshops held throughout Minnesota. Other technical products will include a masters thesis, and one or more peer-reviewed publications.

Rush River TMDL Implementation Project for Fecal Coliform — 2010

Sponsor: Rush River Watershed

Funding: Section 319 (Grant) \$340,000

Purpose: Fecal Coliform bacteria is a significant concern in the Rush River Watershed with the mainstem and south branch listed as impaired on the 303(d)list. To work towards reaching the TMDL for fecal coliform in the Rush River, project activities will be focused to on-the-ground implementation practices and educational activities. This project will prioritize implementation activities to areas of the watershed that contribute the largest fecal coliform bacteria loads and sites of direct surface water contamination. Implementation activities will include structural practices to reduce feedlot runoff, pasture management plans, manure management plans, manure application calibrations, open intake removals and low income financial aid for septic system upgrades. Educational activities will include manure management workshops, manure management field days and a quarterly newsletter. The project will continue to strive to create a sense of watershed stewardship and community pride in clean water, a social goal from previous grants.

Outcomes: The desired outcome for this project is to make significant progress on, or achieve, the TMDL for fecal coliform bacteria. By applying significant on the ground implementation practices, this project will also increase wildlife habitat and improve aquatic habitat. The success of the project will be measured by the participation of citizens in the project's activities. A continuation of water quality monitoring will be utilized to determine if bacteria reduction goals are being achieved by implementation activities. At minimum, the project will aim for a 30 percent reduction in the monthly fecal coliform geometric means from the fecal coliform TMDL assessment study.

Rush River Watershed – Nicollet County SSTS Project — 2013

Sponsor: Nicollet County

Funding: CWP (Loan) \$150,000

Purpose: This project will work to address non-compliant SST systems in Nicollet County's portion of the Rush River Watershed through the allocation of loan funds to rural homeowners. Overall, this specific project strives to implement 5 SSTS upgrades per year for the next 3 years.

Minnesota River – Headwaters

Protecting North and South Fork Yellow Bank River — 2012

Sponsor: Lac qui Parle-Yellow Bank Watershed District

Funding: CWF (Grant) \$260,900, CWP (Loan) \$370,000

Purpose: This project will offer incentives to protect 80 acres of land in filter strips and highly erodible lands adjacent to the rivers; construct nine sediment and water control basins or terraces; replace 35 open tile intakes and advocate wetland restorations and grassland easement programs; organize a Friendship Tour to bring together Minnesota and South Dakota farmers, county commissioners, farm organizations, local, state and federal agency personnel to experience the watershed, farming practices, discuss future project ideas and strengthen relationships; and upgrade 37 subsurface sewage treatment systems by offering landowners low interest loans for their share of construction.

Minnesota River – Mankato

Middle Minnesota River Low Dissolved Oxygen TMDL Project — 2012

Sponsor: Renville County

Funding: Section 319 (Grant) \$245,475

Purpose: This Renville County project will offer one-time and annual financial incentives to landowners for BMP efforts that will be focused on activities that reduce phosphorus loss, prevent soil erosion, and increase groundwater recharge. The anticipated activities include 50 side inlets, 150 acres of buffers, 2 feedlot upgrades/livestock exclusions and other special projects to be determined.

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.

Minnesota River – Yellow Medicine River

Hawk Creek Watershed Accelerated Phosphorus Reduction Effort — 2009

Sponsor: Renville County — HCWP

Funding: Section 319 (Grant) \$148,525

Purpose: The HCWP mission is to implement land use changes that will improve the water quality and quantity issues in the watershed, while also promoting a healthy agricultural, industrial, and recreation-based economy for the Minnesota River region. Specific goals for the Hawk Creek Watershed are based on sampling results, watershed assessments, and reasonable expectations regarding the condition of rivers and streams in this region of the state, as described in a diagnostic study completed in 1999. This project will focus on implementation of BMPs that reduce phosphorus in agricultural and urban areas. Eligible BMPs include, but are not limited to: terraces, waterways, sediment retention basins, buffer strips, alternative intakes, wetland restorations, side inlet controls, livestock exclusions, waste storage facilities, feedlot runoff controls, and urban runoff practices such as rain gardens and other practices.

Hawk Creek Watershed Continuation — 2011

Sponsor: Renville County

Funding: CWP (Grant) \$442,697, CWP (Loan) \$800,000

Purpose: The Hawk Creek Watershed is unique among the other major watersheds of the Minnesota River in that it is comprised of a main tributary (Hawk Creek) and several other streams that flow directly into the Minnesota River. This project is planned to continue staffing; administration; water quality monitoring; education and information activities; septic system upgrades and activities related to the installation of BMPs, including technical assistance for resource assessments, practice selection, survey, and design, which is the single top priority for the project.

Hawk Creek Watershed Nitrogen Reduction Project — 2013

Sponsor: Hawk Creek Watershed Project

Funding: CWF (Grant) \$10,000, CWP (Loan) \$1,050,000

Purpose: This project will upgrade an estimated 75 subsurface sewage treatment systems (SSTS) for the three counties of Chippewa, Kandiyohi, and Renville within the watershed. The grant funds will be used to administer the loan program for the three counties.

Hawk Creek Watershed Project “Hawk TMDL” Continuation — 2009

Sponsor: Renville County

Funding: CWP (Grant) \$151,809

Purpose: This project will continue the technical assistance for resource assessments and installation of BMPs including, livestock waste management systems, filter strips, grassed waterways, nutrient and residue management plans, livestock exclusions, alternative tile intake systems, terraces, and wetland restorations. Monitoring on a regular basis will continue to provide important baseline data as well as information to show pollutant reduction progress. This continuation also includes the recruitment and support of watershed assessment teams, such as the citizen monitoring network, the coordination of promotional events, displays, tours, demonstrations and staff training and administration activities for the overall coordination of local activities.

Pomme de Terre River

Pomme de Terre Fecal Coliform Implementation Plan — 2009

Sponsor: Pomme de Terre Watershed Project

Funding: Section 319 (Grant) \$286,322

Purpose: The long term goal of the fecal coliform implementation plan is to reduce the amount of bacteria entering the Pomme de Terre River and its tributaries to levels that enable it to be removed from 303(d) impaired waters list. The objective of this monitoring plan is to evaluate effectiveness of BMP projects implemented under this bacteria Section 319 grant, and their impact on the *E. coli* levels in the Pomme de Terre River.

Pomme de Terre River Protective Buffer Project — 2013

Sponsor: Pomme de Terre River Association

Funding: CWF (Grant) \$216,600, CWP (Loan) \$500,000

Purpose: This project will offer incentives to protect 200 acres of riparian buffer in the headwaters of the watershed, accounting for 1860 tons of sediment prevented from reaching surface waters each year the practices remain in place. This project will allow for outreach programs, such as tours, to engage more interested citizens. The desired outcome would include 30 or more participants in the program, and to develop a more extensive volunteer base.

Redwood River

Redwood River Watershed Nonpoint Pollution Reduction Project — 2010

Sponsor: RCRC

Funding: Section 319 (Grant) \$175,575

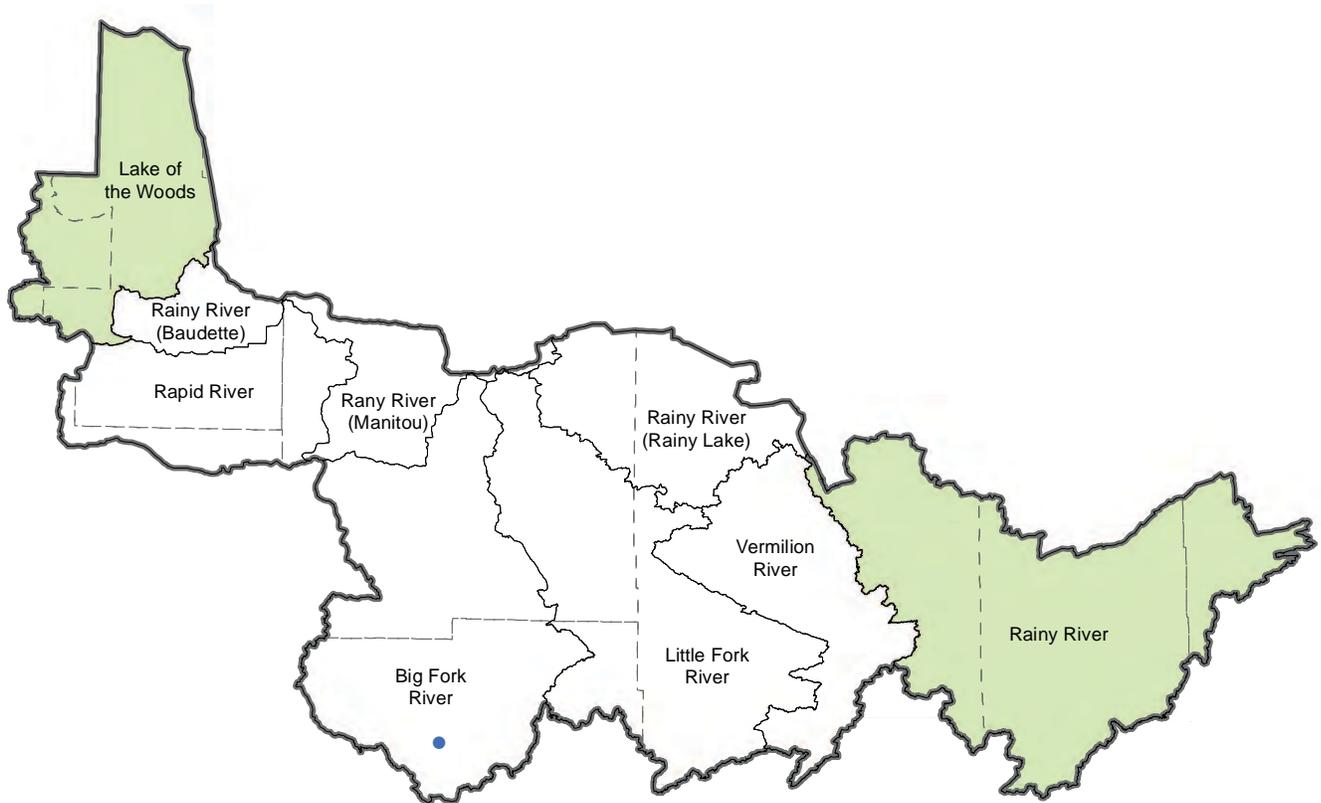
Purpose: Long-term monitoring has identified encouraging trends of sediment and phosphorus reduction associated with the restoration that has taken place in the Redwood River watershed, but the current (2008) TMDL impaired reach designations show that the work is not finished. With the TMDL plan approved on the lower Minnesota River for phosphorus reduction, it is important to continue the implementation of BMPs that will reduce the total phosphorus contribution from the Redwood River Major Watershed and work to delist the lower Minnesota River Dissolved Oxygen TMDL impairment. This organization has the benefit of a long history of monitoring data and the personnel and reputation in the community to make the proposed plan a successful project.

Outcomes: Through the funding of this project, the goal is to reduce phosphorus reaching the Minnesota River by 1,943.17 pounds annually or 777,268 pounds of aquatic plant growth annually (plus 350 tons of sediment).

Rainy River Basin

Projects completed

None completed for 2012 – 2013



Legend

- Approved Lake TMDL
- Approved Stream TMDL
- - - County Boundary
- ▭ Basin Boundary
- ▭ Watershed Projects
 - ▭ Active Project
 - ▭ New and Active Project
 - ▭ Completed Project



Rainy River Basin

Projects active

None awarded in 2013

Lake of the Woods Watershed

Bostic and Zippel Watershed Assessment — 2011

Sponsor: Lake of the Woods County

Funding: CWP (Grant) \$53,000

Purpose: Bostic and Zippel are two Lake of the Woods minor watersheds within the Rainy River Basin where significant erosion and sedimentation is taking place, thereby negatively effecting water quality and creating detrimental economical and ecological impacts. This project is designed to provide monitoring, assessment, additional data collection and analysis to determine the primary causes of erosion and sedimentation; substantiate the water quality impacts and develop an implementation plan that will identify major sources of sediment within these watersheds; identify the causes of ditch systems' instabilities and erosion (i.e. flooding and peak flows, land use practices); quantify the sedimentation damages (monetary, ecological, and environmental) and identify BMPs for reducing nutrient loads and sediment transport within the watersheds.

conduct a GIS analysis of development potential; soil erosion and sediment control; and land use and provide necessary project administration.

Rainy River – Headwaters Watershed

Kawishiwi Watershed Protection — 2011

Sponsor: Lake County

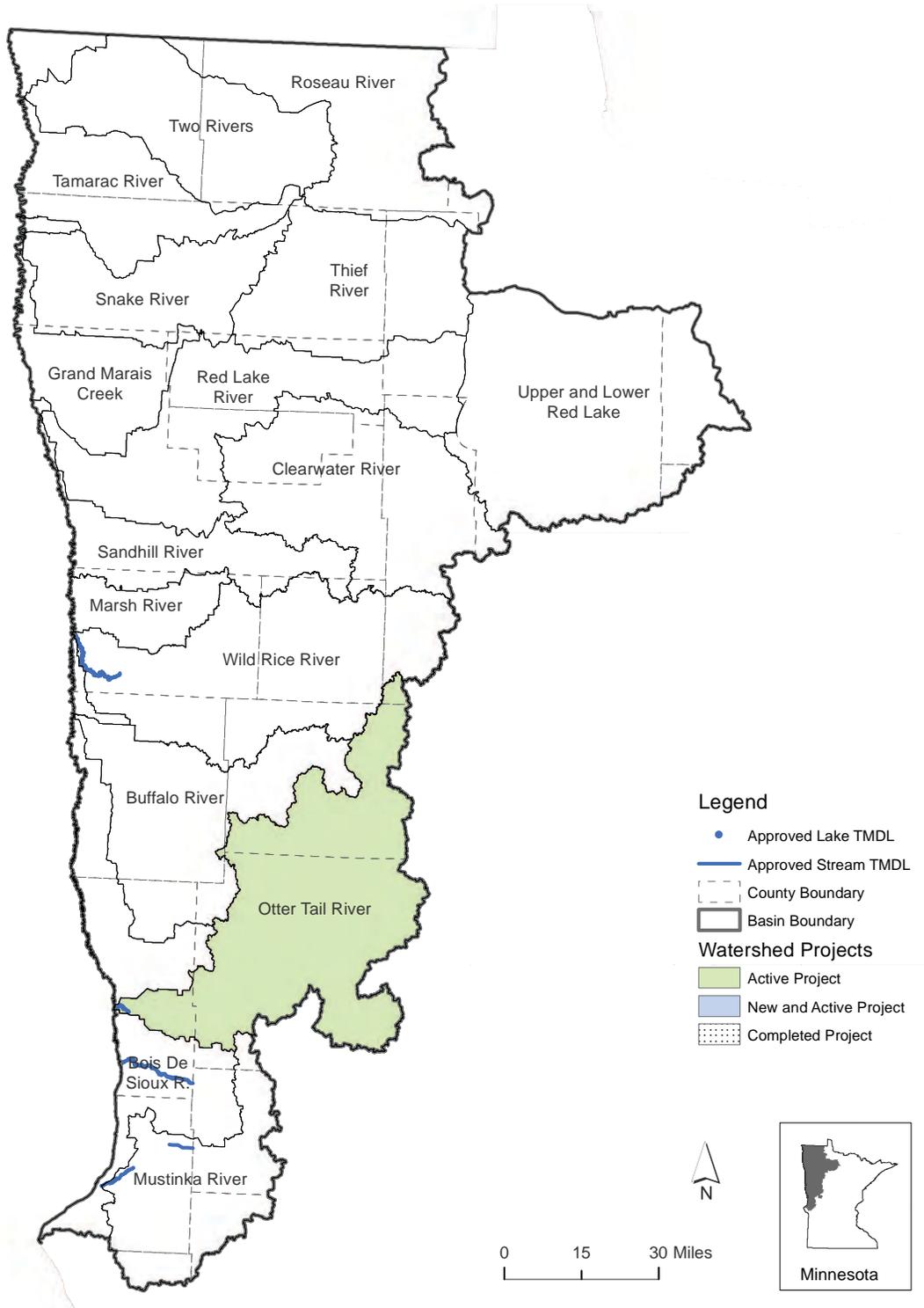
Funding: CWP (Grant) \$174,500

Purpose: The Kawishiwi Watershed, a large part of which is within the Boundary Waters Canoe Area Wilderness, is an important water resource regionally and nationally, providing drinking water sources and recreational facilities. The goals of this project are to continue and expand current water quality monitoring programs; integrate and coordinate water monitoring activities; prepare and evaluate a Beneficial Uses Survey; prepare and evaluate a Aquatic Invasive Species (AIS) Assessment and Survey; complete a comprehensive study of SSTs on surface waters; conduct public outreach and education activities; develop an implementation plan; build a long term water quality plan; conduct and inventory the watershed's subsurface sewage treatment facilities;

Red River Basin

Projects completed

None completed for 2012 – 2013



Red River Basin

Projects active

None awarded in 2013

Otter Tail River Watershed

Lake Alice Resource Investigation Project — 2009

Sponsor: City of Fergus Falls

Funding: CWP (Grant) \$98,500

Purpose: Lake Alice is a 39-acre urban lake located near the center of Fergus Falls with a drainage basin of approximately 230 acres. Presently, a significant stormwater system flow is discharged into the lake from which it is discharged into the Otter Tail River, a tributary to the Red River. The investigation of these resources includes determining in qualitative and quantitative manners, the nutrients and other pollutants (including sediments) being transported into the lake by stormwater flows, the characteristics of the sediment present in the lake bottom and the effects of water quality on wildlife and of wildlife on water quality. The data collected in this phase will provide the information necessary to establish water quality goals, and will provide the basis upon which the success of the implementation measures in the second phase will be measured.

Lower Otter Tail River Sediment Reduction Project — 2009

Sponsor: Wilkin Soil and Water Conservation District

Funding: Section 319 (Grant) \$66,750

Purpose: The MPCA has listed a stream reach, Assessment Unit ID (AUID) 09020103-502 in the Lower Otter Tail River, as impaired for exceeding the turbidity standard for aquatic life, currently set at 25 NTU. The goal of this project is to reduce turbidity levels in the Otter Tail River by reducing sediment and erosion by 2,000 tons per year in the project area.

Pearl Lake Diagnostic Study — 2009

Sponsor: Pelican River Watershed District

Funding: CWP (Grant) \$47,188

Purpose: Pearl Lake is a relatively small water body on the western edge of the Pelican River Watershed District. It is the District's desire to conduct an exhaustive diagnostic study on Pearl Lake and the surrounding

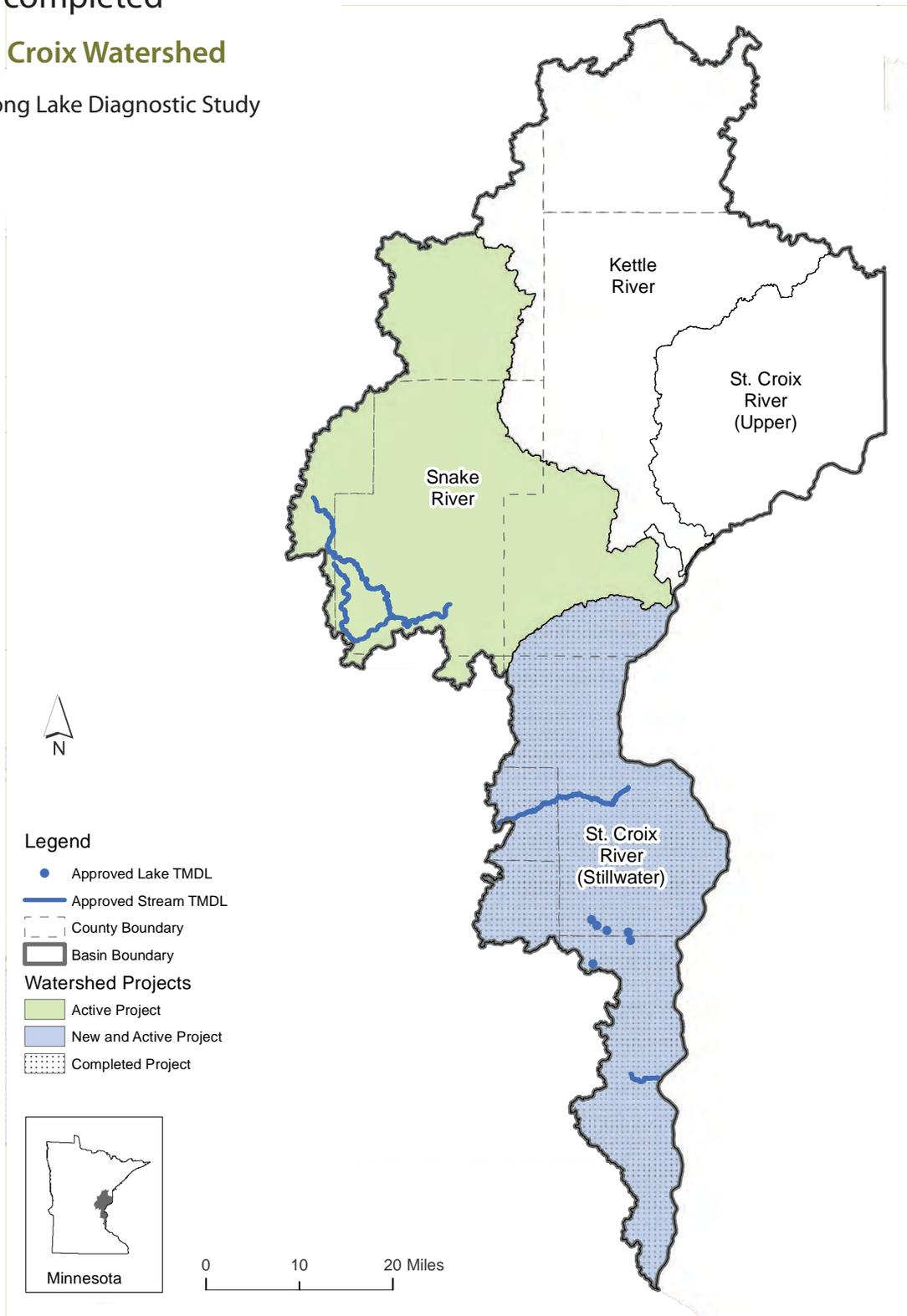
watershed area. Planned investigation and diagnostic activities include, but are not limited to: quantifying water quality conditions by increasing in-lake water chemistry testing, monitoring sub-watershed runoff and loadings, gathering historical data on land use, assessing septic conditions, further assessing shoreline conditions, modeling external and internal nutrient loading, engaging public participation and conducting sediment core analysis of the lake bottom. The desired outcome of this project will be to diagnose Pearl Lake's water quality problems and prescribe BMPs to reduce runoff and runoff impacts.

St. Croix River Basin

Projects completed

Lower St. Croix Watershed

Sand and Long Lake Diagnostic Study



Lower St. Croix River Watershed

Sand and Long Lake Diagnostic Study

Clean Water Partnership Diagnostic Study and Implementation Plan for Sand and Long Lakes was the instrument for Carnelian-Marine-St. Croix Watershed District's (CMSCWD) focused watershed management. The CMSCWD places a high priority on keeping lakes off of the 303(d) list of impaired waters by actively addressing those lakes that have been delisted due to the recently-developed shallow lake standards. The In-lake and watershed assessments informed the state of the lakes and implementation opportunities for water quality protection. Through four stakeholder meetings, Board workshop and meetings, the final diagnostic study and implementation plan identifies desirable opportunities for implementation activities for water quality protection. This project successfully accomplishes the task of identifying non-impaired waters, which allows for protection resources to be allocated.

In addition, this study contributes to existing efforts in the region to develop successful implementation programs for shallow lakes. In-lake biological data including macrophytes, zooplankton, and phytoplankton, were collected and analyzed to inform the stability of the clear-water phase of these lakes. This establishes water quality targets that reduce the risk of the lakes flipping to the turbid phase. The dynamics of shallow lake systems, in contrast to deeper lakes, are discussed at the forefront of the report and provide the backdrop for the diagnostic study, water quality targets, and implementation plan.

Goals

- Characterize the watershed and lake with respect to lake uses and biological habitat, with particular consideration of the principles for assessment and management of shallow lake systems.
- Identify quantitative in-lake water quality goals for the long-term protection of non-impaired lakes.
- Develop an implementation plan for non-impaired, shallow lakes that meet the needs for long-term protection of water quality.

Results that count

- Completed a watershed phosphorus source inventory. The context of shallow lake systems was specifically considered in the data evaluation process. Evaluated in-lake biological data, which includes fisheries, macrophytes, phytoplankton, zooplankton, and

*Long Lake*

characterization of lake bottom sediments. In addition, a portion of the report is dedicated to a full characterization of shallow lake systems and the principle of alternative stable states. This principle was a thread throughout the review process including stakeholder and Board meetings.

- Identified water quality goals for in-lake phosphorus and Secchi transparency for non-impaired lakes based on water quality trends over the last 10-year period and all findings of the diagnostic study. Included adaptive management of the in-lake biological community as a specific water quality goal. Goals were determined on the basis of increasing the stability of the clear water phase – reducing the risk of flipping to the turbid phase.
- Identified projects in the implementation plan that can achieve the phosphorus loading reduction necessary to meet in-lake water quality goals. Implementation plan recommendations and associated estimated costs for water quality protection (as opposed to restoration) projects were vetted by the District Board.

Financial information

Funding type: CWP
 Grant amount: \$39,000
 Final in-kind: \$9,310
 Final matching funds: \$30,690

Contact information

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 MPCA Project Manager: Christopher Klucas

St. Croix River Basin

Projects active and awarded in 2013

Lower St. Croix River Watershed

Forest Lake North Shore Subwatershed Assessment — 2013

Sponsor: Comfort Lake-Forest Lake Watershed District

Funding: CWP (Grant) \$12,000

Purpose: This project will identify, prioritize, and prepare 10 to 15 feasible concept designs for specific water quality improvements capable of capturing and treating 1 inch of runoff from the direct contributing watershed of North Shore Trail.

Forest Lake Stormwater Filtration Retrofit — 2013

Sponsor: Comfort Lake-Forest Lake Watershed District

Funding: CWP (Grant) \$143,025

Purpose: This project will implement a stormwater retrofit of an existing stormwater pond and shoreline stabilization project in the Hilo Lane development, circa 1970s, located on the south shore of Forest Lake. Stormwater treatment for this 14 acre tributary drainage area comprised of residential land uses will include bio-filtration, iron enhanced sand filtration, channel stabilization and shoreline stabilization. The estimated nutrient reduction from the project is almost 12 pounds per year of total phosphorous.

Sand and Long Lakes Protection Project — 2013

Sponsor: Comfort Lake-Forest Lake Watershed District

Funding: CWF (Grant) \$132,000

Purpose: Implementation activities proposed as a part of this project include water quality monitoring, biotic surveys, sediment core sampling, mechanical treatment of curly-leaf pondweed (in accordance with regulations and permitting), an iron-enhanced sand filter, with a high capacity multi-stage outlet weir and 40,000 pounds of iron filings and stakeholder involvement in the design process and educational presentations.

Square Lake Implementation Plan Refinement — 2009

Sponsor: Carnelian-Marine-St. Croix Watershed District

Funding: CWP (Grant) \$58,000

Purpose: Square Lake, within the St. Croix River basin in northern Washington County, is of regional significance due to its very high water quality and

unique recreational opportunities including trout fishing and scuba diving. This proposed project will gather new data on transparency, aquatic macrophytes, plankton and fisheries data to identify trends and determine relationships between biologic fisheries and water quality; complete groundwater monitoring and assessment to determine total P sources within the contributing groundwatershed; gather additional relevant information to identify changes in the lake from 2002 to present; complete an aquatic plant survey and develop an aquatic plant management plan; and develop site-specific and action-specific activities to protect the water quality in Square Lake.

Snake River Watershed

Groundhouse Fecal Coliform and Biota (Sediment) Implementation Project — 2010

Sponsor: Kanabec County SWCD

Funding: Section 319 (Grant) \$109,750

Purpose: The focus of the project will be to reduce the sediment and FC loading to impaired reaches of the Groundhouse River watershed through the implementation of BMPs. The TMDL study indicated that crop production and streambank erosion contribute 86 percent of the sediment load, with an additional 10 percent originating from pastures. The majority of the FC comes from livestock.

The purpose of the project is twofold. First, Kanabec and Mille Lacs County SWCDs along with their partners will work directly with landowners to increase awareness, identify areas of concern and initiate conservation planning to address these concerns. Second, BMPs will be implemented using cost-share money made available through the project. Anticipated practices include: livestock exclusion, filter strips, stream bank stabilization, sediment basins, manure management, feedlot runoff control, and other practices where appropriate. Priority will be given to projects that have the greatest potential impact on reducing sediment and FC loading.

Project outcomes include:

- Increased water quality awareness (through public outreach and education) for 80 percent of the landowners living in the watershed
- Identify and map areas of concern in the watershed
- Contact landowners individually and develop individualized information packets that include aerial photographs of property, BMP information, and information about assistance programs.

- Install 16 BMP practices that target sediment and FC loading.
- Reduce sediment loading by 210 tons/ year and begin working to achieve the FC standard of 200 org./100ml or *E. coli* standard of 160 org./100ml at the monitoring stations in the watershed.
- See an overall improvement in the water quality and IBI.

Kanabec Water Resources Protection Project — 2012

Sponsor: Kanabec Soil and Water Conservation District

Funding: CWF (Grant) \$201,892

Purpose: This project will provide baseline data through water monitoring, recording and analyzing the results of six unassessed rivers/tributaries, three unassessed lakes and five storm water outlets in the city of Mora which drain to the Snake River; promote and implement approved BMPs, including feedlot runoff treatment and control, livestock fence exclusion from streams, heavy use protection areas for cattle, roadside runoff/erosion control, critical area seeding, sediment basin and wetland restoration; sponsor an outdoor water quality learning event in 2012 for ninety Girls Scouts and their families, as a national event for the Girl Scouts of America; provide technical assistance for the development of eight nutrient management plans for landowners; develop eight forest stewardship plans for landowners; promote and implement the local agriculture. Best Management Practice Loan Program to assist landowners with BMPs that protect and improve water quality.

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 SSTs and other rural best management practices in the Snake River watershed.

Sunrise River North Branch TMDL Implementation Plan — 2010

Sponsor: Chisago County

Funding: Section 319 (Grant) \$130,000

Purpose: Chisago County has an approved TMDL study and implementation plan for the North Branch of the Sunrise River which is impaired due to excessive levels of fecal coliform bacteria. The county received Section 319 and CWLA grants

to address this problem and are in the first full year of implementation. There continues to be more work to achieve the water quality goals.

Funds are needed to continue working with livestock owners to provide 75 percent cost share to implement BMPs.

Outcomes: Livestock management – a number of BMPs will be installed to reduce FC loading from animal agriculture, such as installation of waste storage facilities, clean water diversions, vegetative filter strips, moved fencing, livestock exclusion, rotational grazing, manure application setbacks, and nutrient management plans.

Upper Mississippi River Basin

Projects completed

Projects involving multiple watersheds

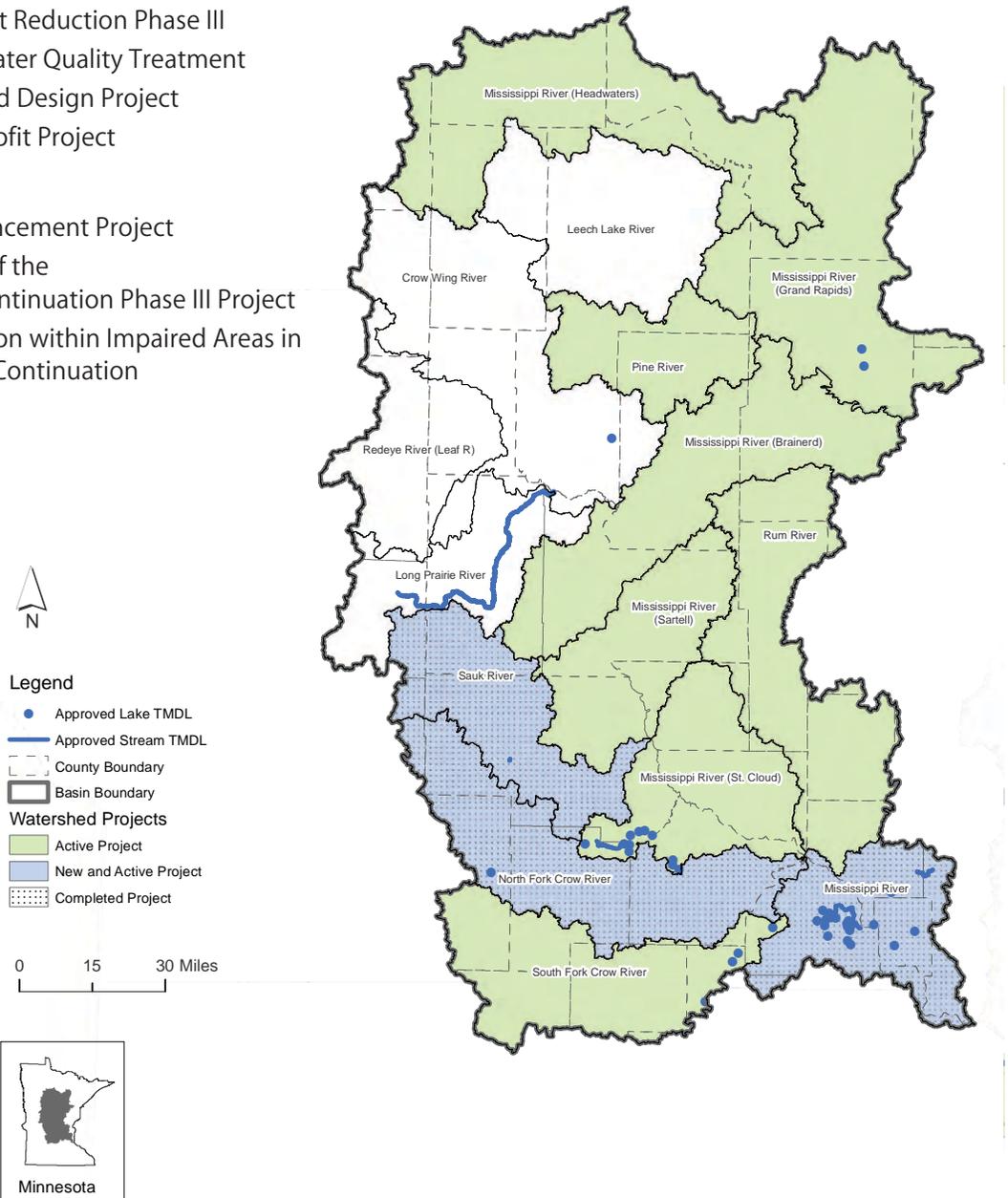
Crow River Basin Rural Water Quality Improvements
 Developing Selection, Design and Assessment Standards for Shoreline Bioengineering Practices

Mississippi River – Twin Cities

Crosby Lake Management Plan
 Kohlman Lake TMDL Nutrient Reduction Phase III
 Lake Johanna/Oasis Pond Water Quality Treatment
 Lambert Creek Retrofit ID and Design Project
 Sand Creek Stormwater Retrofit Project

Sauk River

Osakis Lake Shoreland Enhancement Project
 Restoring Water Resources of the Sauk River Chain of Lakes Continuation Phase III Project
 Targeted BMP Implementation within Impaired Areas in the Upper Mississippi Basin-Continuation



Projects	Reduction in Phosphorus lbs/yr	Soil Savings T/yr	Reduction in Sediment T/yr	Gallons of Treated Sewage	Trash Tons	Number of Citizens
Zion Lutheran Rain Garden	3.5		.29 lbs (.0001 T/yr)			
City of Buffalo Rain Garden	14.4		11.16 lbs (.006 T/yr)			
Distribution of 428 Rain Barrels						
Lake Washington Lakeshore Stabilization	.01	.01	.02			
Aluminum drop Structure	45.1	20	20			
Lyn Township Streambank Stabilization	10.87	9.45	9.45			
Cokato School Streambank Stabilization	68.22	59.33	59.33			
Streambank Stabilization/Grass Waterway	3.6	7.4	2.6			
Sediment Basin	12.3		6.4			
Stormwater Infiltration Basins	10		10			
76 SSTS upgraded				36,750		
3 Annual Reports Distributed						>600
20 Electronic Newsletters and 1 Press Release						>270
Earth Day Celebration for 3 years with Local Partners						>1,400
Educational Booth for 2 years with US Fish & Wildlife						>250
Sponsored Science Museum "Water" Program						>340
DNR "Our Waters, Our Choice" Workshop						>25
Wright SWCD Field Day Presentations						>570
Water Quality/Information booth at Agricultural Show						
Removed garbage from Crow River in 16 Communities					3.3	>214
Hands-on Activities at Blue Bird Days Event						>120
Enrolled volunteers in Citizen Stream Monitoring Program						5
Held regular meetings for Joint Powers Board and Technical Committee						
Participated in water plan updates in 4 Counties						
Continuously update CROW's website						
Conducted water quality monitoring at four sites to maintain long term results and determine trends						
Totals	168	96.19	107.81	36,750	3.3	>3,794

Project involving multiple watersheds

Crow River Basin Rural Water Quality Improvements

From the perspective of the Upper Mississippi River Basin, the Crow River is one of its major tributaries from a water and nutrient loading standpoint. On average, discharges from the Crow River, dependent on flow, account for up to 46 percent of the TP and up to 53 percent of the TSS in the Mississippi River. Biological data is used to assess water quality; some sites were listed as very poor to fair. Nutrients and sediment exceed ecoregion values. Total phosphorus concentrations are well over the 50th percentile of the Western Corn Belt Plains ecoregion average. A 10-year goal identified in the Crow River Diagnostic Study project lists a 25 percent reduction in TP, TSS and point and nonpoint source contribution to the Crow River and its tributaries. A long term management action (30 year outlook) is to reduce TP and TSS to meet ecoregion ranges.

This project continued the Crow River Organization of Water's (CROW) goal of reducing nutrients and sediment from the Crow River and its tributaries. The focus of this project includes implementation efforts in highly ranked priority management areas as identified in the Crow River Phase I Diagnostic Study. Completing this grant had a tremendous impact on rural water quality in the Crow River Basin. CROW will continue to utilize a comprehensive approach that involves citizens actively engaging in their local resources and implementing BMP projects in areas with greatest impact on water quality. This project was very successful in accomplishing its overall goals and exceeded its expectations

Goals

- Reduce phosphorus and total suspended solids from entering the Crow River and its tributaries
- Increase education awareness of water quality efforts and impacts
- Conduct water quality monitoring at four sites

Results that count

- The project exceeded its expectations by upgrading 76 failing SSTS systems, installed two rain gardens, purchased 428 rain barrels, installed two lakeshore stabilization projects, completed four streambank stabilization projects, installed one sediment basin, and completed one stormwater infiltration basin project.



Meeker County, six foot aluminum drop structure at the head of a private ditch to control gully erosion and bank erosion.

- Increased educational awareness of water quality issues in a variety of electronic newsletters, water quality presentations and activities by producing and distributing three annual reports, distributing 20 electronic newsletters and a press release, collaborated with local partners to host an annual Earth Day Celebration for three years to more than 1400 people, provided educational booth for two years to more than 250 people at the US Fish & Wildlife Service Habitat Days, collaborated with local partners and sponsored a "Water" program presented by the Science Museum of MN to over 340 participants, partnered with DNR for a "Our Waters, Our Choice" workshop to over 25 participants, presented water quality and macroinvertebrate presentations to over 570 fifth graders in Wright County, provided a water quality educational booth with the Middle Fork Crow River Watershed District for two years at the Agricultural Show, removed 3.3 tons of garbage from the Crow River with the help of over 214 volunteers from 16 communities from across the watershed, partnered with Gopher Campfire to provide a hands-on activities to over 120 people at the Annual Blue Bird Day event, enrolled 5 additional volunteers into the Citizen Stream Monitoring Program (CSMP), held regular meetings for the CROW Joint Powers Board and Technical Committee to discuss water quality issues and review the grant process, participated in water plan updates in 4 Counties and continuously updated

the CROW's website with water quality information and notifications of upcoming projects, meetings and events taking place in the watershed.

- CROW conducted water quality monitoring from 2009-2011. CROW monitored four sites in the BCMA. Staff collected water quality data and grab samples. Data results were added to MPCA's STORET database to maintain long term water quality monitoring results and to help determine water quality trends in the Crow River Watershed.

Financial information

Funding type: Section 319

Grant amount: \$272,474.88

In-kind: \$308,856.05

Matching funds: \$73,299.25

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Project involving multiple watersheds

Developing Selection, Design and Assessment Standards for Shoreline Bioengineering Practices

For several years, methods of calculating erosion intensity of inland lake shorelines, as well as bioengineering design standard manuals of practices for controlling lakeshore erosion have existed without a means to link the two prescriptively (i.e., use site erosion potential to determine effective, site-specific bioengineering practices to implement). This study developed the “missing link” by evaluating the available resources; addressing the gaps with research and synthesizing the information into an online, interactive shoreland erosion control decision tool.

Existing resources – including bioengineering manuals, scientific literature and shoreland experts, as well as evaluations of historic shoreland erosion control sites – were supplemented with the results of new research on the ability, extent and mechanisms of shoreland stabilization by plant materials, as well as evaluations of recent erosion sites on which new products and practices were tested.



Research/demonstration site: Neer Park, Crow River, New London, MN – before

From these resources and study results a site evaluation protocol was developed and bioengineering design standards were updated with new and region-specific practices.



Research/demonstration site: Neer Park, Crow River, New London, MN – three years after installation

Targeting public and private natural resource professionals and technicians, the online *Shoreland Erosion Control Decision Tool* was developed as the outreach method that would result in the greatest technology transfer, leading to actual reduction in sediment and nutrients to our surface waters. The decision tool uses a combinatoric approach to evaluate the user-entered site characteristics and generate a list of site-appropriate bioengineering practices from which to choose. These practices are linked to appropriate sections of the updated design standards manual. This study also resulted in 1,442 linear feet of shoreline protected by bioengineering practices.

Goals

- Increase knowledge of the appropriate use of shoreland BMPs – specifically the site conditions under which they succeed/fail.
- Provide practical recommendations for future shoreline vegetation used for bioengineering.
- Increase use and success of bioengineering BMPs for shoreland erosion control to reduce sediment and nutrient loads to surface water.

Results that count

- From the integration of existing shoreland bioengineering methods, experience of shoreland experts and the results of historic and recent site assessments, a system to determine the appropriate and effective use of shoreland bioengineering BMPs

was developed and used to drive the online Shoreline Erosion Control Decision Tool.

- For erosion control of near-shore areas, consider rhizomatous plant species for revegetation. This study identified two emergent rhizomatous aquatic species, bur-reed (*Sparganium eurycarpum*) and river bulrush (*Bulboshoenus fluviatilis*), that have the potential to rapidly colonize near-shore areas (spread up to 7 ft in first season) and protect them from erosion (based upon erosivity tests). It appears these two species, if planted together, would be effective in maintaining vegetation along shorelines experiencing a wide range of potential future water levels, since giant bur-reed (*Sparganium eurycarpum*) shows greater tolerance of flooding and river bulrush (*Bulboshoenus fluviatilis*) shows greater tolerance of drought, and both species spread rhizomatously to rapidly colonize areas both landward and waterward.
- An online, interactive and dynamic decision tool for shoreland erosion control will assist natural resource professionals, nursery and landscape professionals, consultants and contractors assess and diagnose shoreland erosion control and provide design standards for successful BMPs implementation.
- Using the BWSR pollution reduction estimator only for the filter strips (totaling approximately 1 ac.) that were installed upland of the toe protection, calculated reductions are:
 - 1,334 lb TSS/yr.
 - 1 lb. P/yr.
 - 12.5 lb. N/yr.

The bioengineering erosion controls used as toe protection from wave and ice action along the 1447 total feet of shoreline resulted in an estimated total reduction of 13 tons of soil/year. In addition, the erosion control installed at the restored boat launch at Battle Point on Lake Osakis has effectively protected this area that previously had an estimated 30 tons of soil wash out in a single storm/flood event.

The draft of the tool can be found at: <http://www.shoreline.msue.msu.edu>.

Financial information

Funding type: Section 319
 Grant amount: \$134,317.79
 In-kind: \$148,881.82
 Matching funds: \$36,507.01



Shoreline survey: Cross Lake, Pine City, MN

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Mississippi River – Twin Cities Watershed

Crosby Lake Management Plan

Capitol Region Watershed District (CRWD) received a \$50,000 grant in late 2009 from the Clean Water Partnership Program for the development of a management plan for Crosby Lake. The lake is situated in the floodplain of the Mississippi River in Saint Paul and is surrounded by 763-acre park, which is part of the National Park Service's Mississippi National River and Recreation Area. Identified as an implementation project in CRWD's 2000 Watershed Management Plan, CRWD, the City of St. Paul and other partners, developed a management plan for Crosby Lake. Although the lake currently meets water quality standards, it has not been immune to the effects of urbanization, as water quality has declined since 2005, which warranted the need for developing a framework for the protection and improvement of Crosby Lake.

The CRWD involved numerous stakeholders in creating the plan and convened two advisory groups – a technical group of government agencies and non-profit organizations, and a Crosby Lake citizen group. There were more than 40 members of the citizen group, which included park users and other interested watershed residents. Three interactive meetings were held for each group to discuss the current condition of Crosby Lake, the factors impacting its health, and generate ideas for activities to protect and improve the lake. The advisory groups also reviewed and commented on the draft lake management plan. The CRWD established water quality goals for both the management of Crosby Lake and the adjacent Mississippi River section.

For Crosby Lake, the goal is to meet state water quality standards (TP < 60 µg/L as summer average) in all years for total phosphorus. For the adjacent Mississippi River section, the goals are to achieve a median total suspended solids concentration of 32 mg/L annually and a mean summer total phosphorus concentration of 100 µg/L. The water quality goals require target pollutant load reductions ranging from 47-66 percent from their respective watersheds. To meet these goals, CRWD outlined a 10-year plan of potential implementation projects. Potential projects include implementation of watershed stormwater BMPs, such as infiltration basins, rain gardens and pervious pavement, additional water quality, fish and aquatic plant monitoring, bluff stabilization and increased public education and outreach.



Crosby Lake

Goals

- Assess the current conditions of Crosby Lake and identify the issues of concern and priority subwatersheds for management
- Develop management goals and objectives
- Recommend implementation projects and activities to meet management goals

Results that count

- Assessed Crosby Lake including its water quality, biotic quality and hydrogeological setting in a floodplain of the Mississippi River. Determined that the lake meets State lake water quality standards and has healthy native fish and aquatic plant populations
- Established both in-lake and stormwater runoff pollutant reduction goals based on meeting lake and river water quality standards
- Recommended more than 20 implementation projects to achieve the management plan goals

Financial information

Funding type: CWP Diagnostic

Grant amount: \$50,000

In-kind: \$57,500

Matching funds: \$3,500

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Mississippi River – Twin Cities Watershed

Kohlman Lake TMDL Nutrient Reduction Phase III

The Kohlman Lake TMDL and its Implementation Plan concluded that stormwater volume and soluble phosphorus reduction measures in the lake's watershed are needed to improve Kohlman Lake's water quality. The Maplewood Mall Stormwater Retrofit project will result in substantial volume reduction and soluble phosphorus reduction through the use of tree trenches, rainwater gardens and porous paver crosswalks, while also setting a strong example that demonstrates how stormwater retrofit projects can be implemented in commercial areas in an aesthetically pleasing way.

Maplewood Mall and its parking lot cover over 70 acres of land. This area presents a unique opportunity to address significant non-point source loading of phosphorus in a small geographic area. The BMPs will be designed to capture and infiltrate and treat up to the 2 inches of runoff prior to discharge to Kohlman Creek and Kohlman Lake.



Photo courtesy of Barr Engineering Co.

This grant covers the third phase of the project- the construction of features in the northwest quadrant of the Mall. These retrofits will include porous paver crosswalks, tree trenches and rainwater gardens throughout approximately eight acres of Maplewood Mall's northwest parking area. The infiltration features proposed for this project are established BMPs for stormwater volume reduction and are innovative ways to manage stormwater in highly paved environments.

During this project, Barr Engineering supervised Veit's



Photo courtesy of Barr Engineering Co.

construction work in the North, Northwest and West tree groves and an enhanced sand filter in the northwest corner of the Mall's parking lot. Veit completed construction of the North and Northwest tree groves by the end of November, 2011. Veit's construction work finished in 2012 with the construction of the enhanced sand filter and the West Tree Grove.

Goals

- Reducing phosphorus from the site's stormwater runoff by 60 -80 percent.
- Educating the public on stormwater quality through strategic placement and design of features and interpretive signage that are visible around the Mall's entrances.
- Inspiring nearby commercial area owners to implement similar projects in the watershed through demonstration of how these aesthetically pleasing features can be retrofit into the urban environment.

Results that count

- Prior to the project, only about 3 percent of the stormwater runoff from the Mall's 35 acre parking (3 percent of a total of 3 million gallons in an average precipitation year) was captured, infiltrated or filtered prior to running off to downstream lakes. Now that the project is constructed, 67 percent of the parking lot's annual runoff (2 million gallons from the 35 acre parking lot) is intercepted and made available to plants and tree roots for uptake, infiltrated or filtered before it would otherwise leave the site untreated. Total reduction in TP estimated from Phase 3 BMPs, assuming 60 percent reduction: 13 lbs/yr Total reduction in TP estimated from Phase 3 BMPs, assuming 80 percent reduction: 18 lbs/yr

Total reduction in TSS estimated from Phase 3 BMPs, assuming 90 percent reduction: 4.1 Tons/yr. Monitoring equipment will continue to collect post-project data on the site's water quality and flows so that it can be compared to pre-project conditions.

- Interpretive signage exists throughout the site, both labeling features and explaining their function. Signs explain how the rainwater gardens, tree trenches and the cistern work to improve water quality and reduce the volume of stormwater runoff, and tree bands on the parking lot trees define them as "1 of 375 trees cleaning rainwater". A "Grand Opening Event" for the project held at the Mall on September 15, 2012, held numerous events, including speakers and hands on activities, for members of the public to come and learn about the project.
- The District has led numerous tours through the site to show and explain the site's features. Conversations continue with the Mall's owner (Simon Property Group) as to where else this type of project might be implemented in Mall parking lots adjacent to impaired waters. The project (all phases together) won a Grand Award in the American Council of Engineering Companies 2013 awards banquet, further spreading the word about the project, and attracting attention.
- The project has been presented at numerous conferences over the past three years.

Financial information

Funding type: Section 319

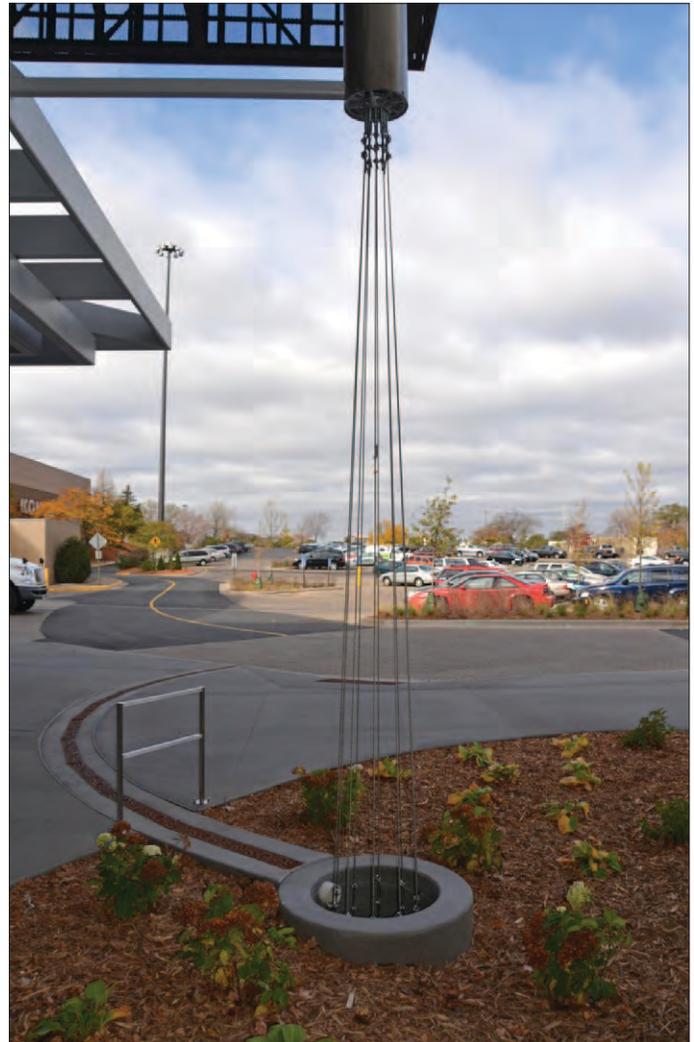
Grant amount: \$500,000

In-kind: \$1,825

Matching funds: \$700,000

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Sand filter

Mississippi River – Twin Cities Watershed

Lake Johanna/Oasis Pond Water Quality Treatment

Lake Johanna is located downstream of Oasis Pond in Arden Hills. Lake Johanna is not currently impaired for TP loading, but is threatened by outflow from Ramsey County Ditch #4, which flows through Oasis Pond and Little Lake Johanna prior to discharging into Lake Johanna. Watershed total phosphorus inputs account for approximately 74 percent of the nutrient loading to Lake Johanna, with over half of that coming from the Little Lake Johanna/Ramsey County Ditch #4 subwatershed. The RCWD Watershed Management Plan classifies Lake Johanna as a deep, Tier I lake. Tier I lakes in the RCWD are those that routinely provide regional public recreation opportunities including a range of boating activities, and dedicated swimming facilities. These lakes typically represent a high-quality resource for fisheries and wildlife.

This project involved the rehabilitation and enhancement of Oasis Pond to reduce watershed contribution of phosphorous and total suspended solids to Lake Johanna in an effort to keep the lake from becoming impaired in the future. The inlet modification and expansion of the sediment basin were eventually removed from the plans as required by the DNR and the only activities we were allowed to complete were the outlet modification and removal of sediment from within the existing basin. Further, dredged material tested for Level III PAH contamination, more than tripling the cost of dredging and disposing of the material.

This project ended up with many unforeseen pitfalls, at significant additional expense, although the end result is that we now have an improved, functioning stormwater treatment basin at Oasis Pond that will remove a significant amount of pollutants from Lake Johanna (and Little Lake Johanna) for the foreseeable future.

Goals

- Remove accumulated sediment from Oasis Pond to restore its original treatment capacity.
- Modify and enhance the inlet to allow for additional primary treatment of stormwater.
- Repair & modify the outlet structure to restore the ability to manipulate water levels for nutrient assimilation.



Lake Johanna - Oasis Pond

Results that count

- 1,883 tons of Level III contaminated sediment removed from Oasis Pond
- Inlet modification disallowed by DNR. Channel restored only to original design.
- Outlet structure repaired and reinforced, sluice gate returned to operation, embankments restored. Final P8 modeling estimates that this facility now has the capacity to remove 8.12 tons of sediment (TSS) per year or 16 percent of the total inflow load and also remove 18.2 pounds of total phosphorus (TP) each year or 5 percent of the total inflow load.

Financial information

Funding type: CWF

Grant amount: \$110,200

In-kind: \$11,150.00

Matching funds: \$115,641.94

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Mississippi River – Twin Cities Watershed

Lambert Creek Retrofit ID and Design Project

The goal of the Lambert Creek Retrofit ID and Design Project was to identify the most cost-effective opportunities to retrofit the stormwater conveyance system to improve water quality, reduce storm runoff volumes, and manage stormwater rates of discharge within priority areas of the Lambert Creek subwatershed. Lambert Creek is surrounded by mainly residential land use and flows through three communities before discharging into East Vadnais Lake, which is the final impoundment reservoir containing the water supply that the St. Paul Regional Water Services (SPRWS) treats and then distributes to 13 municipalities, including the city of St. Paul, MN.

Lambert Creek was placed on the 2010 impaired waters list for bacteria and a TMDL is in progress. In addition to being impaired for bacteria, past and current monitoring data has shown high levels of total phosphorus, anywhere from 0.14 mg/L to 0.30 mg/L, which is above the proposed State standard that is pending approval to be set at 0.10 mg/L for streams in the Central Region. The focus of this project is specifically on phosphorus (though some identified projects may also reduce bacteria).

The completion of many large scale projects along the Lambert Creek has left little room for further in-stream improvements along Lambert Creek. The next step to further improve water quality was to concentrate restoration efforts on a subwatershed level.

This study identified 290 retrofit opportunities within nine priority catchments which included: bioretention basins, pond modifications, extended detention, permeable surfaces, vegetated swales, and filtration basins. The final product is a ranked list of these cost effective retrofit projects that provide the greatest phosphorus reduction per dollar spent over the life of the project. This list has been used to acquire grant funding for installation of two projects and will continue to be used for future retrofit installation projects to improve the water quality of Lambert Creek.

Goals

- Model and prioritize 33 catchments within the Lambert Creek subwatershed



Lambert Creek Retrofit – after

- Locate and model retrofit BMPs within priority catchments
- Rank list of BMP retrofits

Results that count

- Selected 9 of the 33 catchments as priority for further analysis.
- Located and modeled 290 retrofit opportunities within the nine catchments.
- Ranked list of retrofit projects that provide the greatest phosphorus reduction per dollar spent over the life of the project.

Financial information

Funding type: CWP Diagnostic

Grant amount: \$15,000

In-kind: \$10,747

Matching funds: \$15,209

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Mississippi River – Twin Cities Watershed

Sand Creek Stormwater Retrofit Project

This Sand Creek project is an inter-governmental success story with cooperation in implementing pollution-reduction BMPs. The result of this project was nine rain gardens and one new stormwater pond treating 51 acres that were previously not treated for stormwater pollution removal. Project partners increasingly contributed effort and money as the project went on, not out of need, but out of support in the project. Sand Creek benefits from less erosion, phosphorus, and total suspended solids. Sand Creek is the major tributary to Coon Creek that joins the Mississippi River at Coon Rapids, Minn.

Data from water quality monitoring in 2007 and 2008 identified Sand Creek as the subwatershed of greatest concern within the Coon Creek watershed. Because of the post-World War II build-out in this subwatershed we implemented a retrofit diagnostic study in 2009, the Sand Creek Subwatershed Stormwater Retrofit Assessment, prepared for Coon Creek Watershed District (CCWD) by the Anoka Conservation District (ACD). The study began with monitoring water quality and hydrology at six locations in a three-year period. It resulted in a list of 12 water quality improvement retrofit projects, selected through a rigorous ranking process by cost-effectiveness.

This 2011 CWP grant funding went to installing two of the four most cost-effective projects to reduce phosphorus, total suspended solids, and stormwater runoff volumes in Sand Creek. The two BMPs installed were a new stormwater pond and a network of nine strategically-placed curb-cut rain garden retrofits. The other two priority retrofit projects were installed in Fall 2010 by CCWD.

Data is continuing to be collected as part of the regular stream monitoring done by Coon Creek Watershed District. This provides good comparison of pre and post-CWP grant project data.

Goals

- Total Suspended Solids reduction by 9,322 lbs/year
- Total Phosphorus load reduction by 15.4 lbs/year
- Volume reduction by 6.4 acre-feet/year

Results that count

- Estimated 80 percent reduction, monitoring results will confirm starting in Spring 2013



Xeon stormwater pond, Xeon street and 118th Ave NW, Coon Rapids, MN

- Estimated 50 percent reduction, monitoring results will confirm starting in Spring 2013
- Estimated 6 percent reduction, monitoring results will confirm starting in Spring 2013

Financial information

Funding type: CWF

Grant Amount: \$83,650

In-kind: \$33,655.94

Matching funds: \$103,727.97

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Sauk River Watershed

Osakis Lake Shoreland Enhancement Project

Lake Osakis is a heavily populated water resource located in Douglas and Todd counties. It has a surface area of 6,768 acres and about 24 miles of lakeshore. Its 13 mile fetch creates extensive wave energy which causes erosion along the shoreline. The lack of deep-rooted vegetation and fluctuating water levels also play a role in soil loss. Sediment deposited in the lake from erosion has contributed to the overall nutrient loading resulting in reduced water clarity and quality. In 2002, Osakis Lake was placed on the MPCA's 303d impaired waters list due to excessive nutrients.

The Osakis Lake Shoreland Enhancement Project focused on restoring the portions of the 24 mile shoreline to a more natural state to reduce erosion and sediment loading and increase habitat around the lake. To



Before: Battle Point Park Restoration Project located in Todd County – May 2009

encourage area landowner participation, the SRWD installed a shoreland restoration and demonstration project at the Todd County Battle Point Park on the north end of Osakis Lake as an example for landowners to view. Approximately 2400 linear feet of lakeshore was restored using a combination of bioengineering methods. This project provided hands-on training for local landowners and created a great outdoor classroom for local schools



After: Battle Point Park Restoration Project located in Todd County – June 2011

and has become a interactive training area. Grant funds were used to offset the installation cost for this large project.

Funds from the DNR, Todd County SWCD and the US Fish and Wildlife also supported this complex project. The Battle Point Park project received the "Project of the Year" award from the Minnesota Association of Watershed Districts in 2012. Funding from this 319 project financially assisted thirteen additional projects restoring 1325 feet of lakeshore. To increase shoreland reforestation the SRWD launched its "adopt-a-tree" program on Osakis Lake. Four landowners participated in this program and have become long term supporters of the program.

Goals

- Reduce nutrient and sediment loading to Osakis Lake by restoring 8-10 lakeshore properties
- Increase Native trees and shrubs by implementing an "Adopt a Tree" program for lakeshore owners
- Address nutrient loading from septic systems by upgrading 5-10 septic systems around Osakis Lake

Results that count

- Completed 13 shoreland restoration projects and two rain gardens along Osakis Lake reducing 31.97lbs of Phosphorus and 36.74 tons of sediment loading to the lake each year

- Completed the Battle Point Park shoreland restoration demonstration project.
- Upgraded two individual septic systems to protect the Osakis Lake from nutrients leaching through the soil.

Financial information

Funding type: Section 319

Grant amount: \$160,000

In-kind: \$103,241.48

Matching funds: \$45,000

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Sauk River Watershed

Restoring Water Resources of the Sauk River Chain of Lakes Continuation Phase III Project

The Sauk River Chain of Lakes (SRCL) is composed of 14 bay-like lakes on the Sauk River with a watershed of approximately 602,000 acres. The long term goal for the SRCL is to reduce the phosphorus loading by 50 percent, as recommended in the 1994 diagnostic study. Monitoring analysis showed that improvements had been made since the initial SRCL BMP implementation efforts, beginning in 1987, however the SRCL required additional nutrient reduction to meet state water quality standards. With the continued effort of this EPA 319 funded project, and ongoing programs administered by the local NRCS and SWCD organizations, additional progress was made in overall nutrient reduction and improving water quality.

This project is an extension to the initial implementation project with a special focus on the southern portion of the watershed around Vails, Eden, and North Browns Lakes. The SRWD and its project partners addressed agricultural and stormwater runoff, riparian erosion, failing septic systems and landuse issues facing this watershed, with education being a primary focus. Targeted BMP efforts were applied to reduce nutrient concentrations in a cost effective manner. A tailored monitoring program and mapping within the southern reaches of the SRCL watershed assisted local organizations and environmental agencies in targeting restoration activities. Education efforts provided information to specific audiences such as schools and the City of Eden Valley. Cost share funds were used to provide property owners financial assistance to implement recommended BMPs. Grant funds from this project financially assisted 44 BMP projects and the SRF loan funds assisted in five septic system upgrades and one large cluster system plus four feedlot abatement projects.

Goals

- Reduce nutrient loading to SRCL by addressing stormwater from municipalities and priority subwatersheds
- Restore 3-5 shoreland sites to reduce sediment loading to the SRCL



Shoreland restoration on the SRCL using native grasses and flowers -1st year

- Address nutrient loading from septic systems by upgrading 5-10 septic systems along the SRCL

Results that count

- Completed a watershed assessment for Eden, Vails and North Brown subwatersheds and created priority list for the subwatersheds. Information was shared with local agencies to target BMPs.
- Completed seven shoreland restoration projects along the SRCL reducing 19 lbs of Phosphorus and 23 tons of sediment loading to the chain of lakes each year.
- Installed one bank stabilization project for the city of Eden Valley to prevent berm failure along the cities WWTP. Reducing .4 lbs of Phosphorus and 700 lbs of sediment each year.
- Completed a stormwater runoff project stabilizing a natural water way to the SRCL reducing 11.2 lbs of phosphorus and 27,219 lbs of sediment each year.
- Established one prairie restoration stabilizing a highly erodible tract of land.
- Upgraded five individual septic systems and one cluster system for a resort to protect the SRCL from nutrients leaching through the soil.
- Installed 31 rain gardens in the City of Cold Spring reducing 63 lbs of Phosphorus and 20,040 lbs of sediment for the life span of the project.

- Installed a riparian buffer along the creek adjacent to the Eden Valley Elementary School. In addition to protecting the creek, the school will be using the restoration area as an outdoor classroom for their ecology classes.

Financial information

Funding type: Section 319

Grant amount: \$200,000

In-kind: \$242,167.36

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Sauk River Watershed

Targeted BMP Implementation within Impaired Areas in the Upper Mississippi Basin-Continuation Phase III

Stearns County has approximately 2,500 livestock operations with 2,000 of these operations having 300 animal units or less. Proper manure management and storage within and near ecologically sensitive and impaired areas will enhance or sustain surface and groundwater quality. The objective to accelerate implementation non-point best management practices to reduce identified pollutants resulted in 31 feedlot animal waste control facilities and related projects, two erosion control projects, and three shoreline restoration projects. These projects provided the following pollution reductions:

Fourteen sites had their unpermitted manure storage basins investigated with five sites failing to meet the MPCA specifications. All identified unpermitted manure storage basins (223) in Stearns County have been investigated because of the 319 grant assistance (past and present). These producers will be targeted in the future with technical and financial assistance to address their pollution problem.

A spring and fall Certified Crop Advisor (CCA) Update workshops were held in 2010 with 120 agriculture professionals in attendance. The workshops provided the latest agronomic information, including updates on conservation practices that can impact water quality. The CCA Updates have been very effective in delivering the best available soil and water management science to the ag professionals and will be continued in the future.

The latest modeling results indicate that TP and TSS reductions are progressing in the Sauk River and the three primary tributaries. The past two monitoring seasons were relatively "dry". Nutrient and sediment concentrations generally improve during dry years and therefore measuring improvements in water quality becomes more difficult to quantify unless several years (10+years) of data is available to determine a trend.

Goals

- Reduce surface and ground water pollution from livestock feedlots and related non-point activities.
- Investigate unpermitted manure storage basins for pollution potential, and target failing systems for repair or closure



- Increase technical assistance, provide education of BMPs to ag professionals, and water quality monitoring

Results that count

- Implemented BMPs provided a 996 lbs/yr reduction in phosphorous, a 22,781 lbs/yr reduction in COD, and a 2,615 tons/ac/yr reduction in soil loss.
- Investigated 14 sites for unpermitted manure storage basins. Five sites failed to meet the MPCA specifications. All identified unpermitted manure storage basins (223) in Stearns County were investigated because of the 319 grant assistance (past and present). These producers will be targeted in the future with technical and financial assistance to address their pollution problems.
- 120 agriculture professionals attended two CCA Update workshops. CCA Developed 10 additional manure management plans. The SRWD has summarized water quality monitoring data. A TMDL project for the Sauk River Chain of Lakes and others are nearing completion.

Financial information

Funding type: Section 319

Grant amount: \$300,000

In-kind: \$80,000

Matching funds: \$1,001,072.50

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Upper Mississippi River Basin

Projects active and awarded in 2013

Multiple watersheds in the basin

Improving Rural Water Quality in the Crow River Basin Project — 2008

Sponsor: Crow River Organization of Water

Funding: Section 319 (Grant) \$272,480

CWP (Loan) \$770,000

Purpose: This project will continue CROW's goal of reducing nutrients and sediment from the Crow River and its tributaries. The focus of this project includes implementation efforts in highly ranked priority management areas as identified in the Crow River Phase I Diagnostic Study. The management areas cover portions of Renville, McLeod, Kandiyohi and Meeker counties.

Mississippi River – Brainerd

Serpent Lakeshed Protection Investigation Study — 2011

Sponsor: Crow Wing County

Funding: CWP (Grant) \$42,744

Purpose: Serpent Lake is located between the City of Crosby and Deerwood, in Crow Wing County and covers 1,103 acres. This project will monitor major inflows and outflows of Serpent Lake; monitor Serpent, Unnamed Cranberry, Unnamed/Peterson, and Cascade Lakes; gather additional physical and morphological data about the lakes in the lakeshed; determine phosphorus and nutrient loads associated with the inflows and outflows; using BATHTUB modeling, determine the transport of nutrients, water quality conditions, and responses to nutrient loads; coordinate and host community stakeholders meetings and create a report that identifies and prioritizes areas of concern along with corresponding corrective actions to be implemented within the lakeshed.

Mississippi River – Grand Rapids

Demonstrating Shoreline Buffers in Big Sandy Lakes Watershed — 2009

Sponsor: Aitkin County SWCD/Big Sandy Lakes Management Project

Funding: Section 319 (Grant) \$37,400

Purpose: Promote the implementation of shoreline buffers through the use of demonstration projects, cost-share funding, and education efforts. Landowners in the Big Sandy Area Lakes Watershed will be provided tools to implement successful shoreline buffers on their property, reducing erosion, and managing runoff.

Mississippi River – Headwaters

Deer and Pokegama Lakes: A Diagnostic Study — 2009

Sponsor: Itasca County

Funding: CWP (Grant) \$249,986

Purpose: Pokegama Lake was chosen for the proposed study to represent lakes with large hydraulic connections to surface waters (the Mississippi in this case), whereas Deer Lake has a small watershed relative to the lake area and is likely groundwater dominated. This project will oversee the year-round collection and analysis of water samples from Pokegama and Deer lakes; determine the current nutrient and suspended sediment concentrations; define the sources of nutrients and sediments; assess the distribution of sources and losses across watersheds; and develop an implementation plan to address possible impairments to the two lakes.

Mississippi River – St. Cloud

Kingston Wetland Feasibility Study and Restoration — 2011

Sponsor: Clearwater River Watershed District

Funding: Section 319 (Grant) \$404,300

Purpose: The Kingston Wetland Complex is a riparian wetland of the Clearwater River Chain of Lakes. The MPCA found that the Clearwater River between Clear Lake and Lake Betsy is impaired and does not meet Minnesota water quality standards for DO. This reach was placed on the 303(d) list in 2004 because monitoring data have revealed that DO concentrations sometimes fall below the state standard of 5 milligrams per liter, which can impair aquatic habitat. The TMDL study completed for this reach (January 2009) showed that the sediment oxygen demand (SOD) and altered wetland hydrology in the Kingston Wetland were contributing to the DO impairment. The study further showed that a reduction

in the Kingston Wetland SOD, and possibly a change in hydrology would be necessary to meet the state standard.

The project will be considered successful if the following specific targeted outcomes are achieved:

- Sixty percent reduction in wetland SOD.
- Annual nutrient loads to the lakes downstream are reduced by 20 percent. Wetland and riverine habitat is restored to support a wider range of wildlife.
- Recreational opportunities in the Clearwater River are enhanced by the restoration, providing a corridor to connect the upper agricultural watershed with the lower recreational lakes watershed. Kiosks are installed to mark the project and educate users about the impacts of ditching on water quality and habitat, and specifically the evolution of the Kingston Wetland through the various stages and its role in protecting downstream water quality.

Local partners are engaged to cooperate in the project, measured by attendance at project meetings and educational curriculum developed in coordination with local school district for use at local schools.

Targeted Fertilizer Application Reduction Project — 2012

Sponsor: Clearwater River Watershed District

Funding: Section 319 (Grant) \$245,475

Purpose: Clearwater River Watershed District will identify and recruit fertilizer application participants; prepare, distribute and present materials for education and outreach; collect soil samples from participants' fields on a 2.2 acre grid across up to 16,000 acres of critical crop land to determine the fertilizer needs for each field; use GPS-aided fertilizer application technology to apply fertilizer at variable rates consistent with field needs, avoiding tile intakes and providing a 50 lineal foot buffer where no fertilizer is applied; conduct water quality monitoring at drain tile outlets from selected fields, including both farms that are and are not participating in the program; annually report the extent of program application and reductions in fertilizer application over standard practice, but also corresponding water quality results; provide recommendations to optimize the program implementation and achieve the maximum load reduction possible; and track, manage, and report on project results and finances as necessary and required.

Mississippi River – Sartell

Pelican Lake of St. Anna Diagnostic Study — 2011

Sponsor: Stearns County Environmental Services

Funding: CWP (Grant) \$39,100

Purpose: Pelican Lake is located approximately five miles north of Avon, Minnesota, drains to the Two River Lake watershed and eventually to the Mississippi River near Bowlus. This project will conduct lake and stream water quality monitoring; data analysis; watershed assessment; information and education activities; determine nonpoint source pollution areas in the Pelican Lake watershed; prioritize possible implementation projects and develop an implementation plan.

Mississippi River – Twin Cities

Bald Eagle Lake TMDL Implementation — 2013

Sponsor: Rice Creek Watershed District

Funding: CWP (Loan) \$500,000

Purpose: This project proposes to use aluminum sulfate ("alum") to control internal phosphorus loading to Bald Eagle Lake. Over the lifespan of the alum treatment, expected to be 15-20 years, 1,195 pounds of phosphorus will be removed from the budget each year.

Burandt Lake Excess Nutrient Implementation Plan — 2009

Sponsor: Carver County Land and Water

Funding: Section 319 (Grant) \$82,500

Purpose: Burandt Lake was listed for excess nutrients in 2004 and the final TMDL and implementation plan were recently approved. Identified in each of those was the need to limit both internal and external sources of phosphorus entering the lake. This is a unique project in that it can meet state standards relatively quickly if funds are granted. The implementation plan identified the need for urban stormwater management as well as a chemical (possible ALUM) treatment to bring the lake into compliance. At this point the county and city started to implement the plan by addressing the nonpoint run-off sources with the installation of several rain gardens and educating landowners in the area. This project will build on that by gaining resources necessary to install several more rain gardens and complete chemical (possible ALUM) treatment, while also actively monitoring the lake and tributaries as outlined in the work plan.

Outcomes: Based on the TMDL Implementation Plan and modeling that was used to complete both we feel that by continuing to limit runoff from entering the lake, treating the lake with chemical (possible ALUM) to control the large internal source of phosphorus, and combined with the clean water entering from Lake Waconia, that Burandt Lake could potentially meet state standards by the end of the grant cycle in 2014.

Clear Lake Water Quality Diagnostic Study — 2009

Sponsor: Rice Creek Watershed District

Funding: CWP (Grant) \$20,100

Purpose: Clear Lake is located within the City of Forest Lake in Washington County. This project proposes to collect and analyze detailed water quality data that will be used to calibrate watershed and in-lake models. A final report will summarize the methods and present the loading estimates and will also include a Management Action Plan (MAP) that will consist of a list of possible BMPs, along with feasibility and cost/benefit assessment of each BMP. Pollutant removal potential will be estimated for each BMP, and the cost/benefit analysis will be used to prioritize management actions.

Crystal Lake Nutrient TMDL Alum Treatment — 2010

Sponsor: Shingle Creek Watershed Management Commission

Funding: Section 319 (Grant) \$82,500

Purpose: Crystal Lake in Robbinsdale is impaired by high concentrations of nutrients. The 2008 TMDL identified both internal and external phosphorus loading as contributing to poor water quality. This project would apply an alum treatment to Crystal Lake to address internal load and improve water clarity, while a separate project would construct a facility to treat the stormwater runoff from about 25 percent of the lakeshed that currently is untreated.

This internal load project will accomplish 90 percent of the internal load reduction required. The separate external load reduction project will accomplish about half the external load reduction required. Together, these projects will significantly improve water quality and clarity in Crystal Lake.

Enhanced TP Removal in an Urban Wetland System — 2009

Sponsor: Capitol Region Watershed District

Funding: CWP (Loan) \$430,000

Purpose: This project will dredge wetland cells of the Villa Park system to remove sediment, develop watershed volume reduction BMPs, enhanced sand filter, alum treatment system or low flow filtration treatment that will enhance phosphorus removal at an inlet to Lake McCarrons. This project will publish a summary report on the project that includes the historical information on the Villa Park Wetland System, pre- and post-project monitoring and performance data, design and construction documents.

Hardwood Creek TMDL Implementation Project — 2010

Sponsor: Rice Creek Watershed District

Funding: Section 319 (Grant) \$344,200

Purpose: The Rice Creek Watershed District (RCWD) will lead a coordinated effort to improve the biological integrity and DO levels in Hardwood Creek to meet the goals of the TMDL. Average TSS concentration will need to be decreased 14 percent from approximately 22 mg/L to 19 mg/L to address biological integrity. The average BOD concentration will need to be decreased 30 percent from approximately 4.6 mg/L to 3.2 mg/L to address DO levels. The TMDL study found that altered habitat and altered hydrology were both found to be negatively impacting the biotic community.

To achieve the goals for reductions in TSS and BOD concentrations, a variety of measures, including streambank stabilization, in-stream habitat improvements, re-establishment of stream meanders, and livestock exclusion, will be implemented across the watershed as part of the project. The project is unique in its ability to reconnect the stream to the adjacent floodplain with the use of re-meanders.

Outcomes: By addressing the sources of sediment and phosphorus, this project will contribute to overall water quality improvements in Hardwood Creek. The completion of projects identified in the TMDL Implementation Plan will result in decreased TSS and BOD loading, leading to the restoration of biological integrity (IBI score) and DO levels.

Measureable outcomes, as identified by the TMDL, include a 14 percent reduction in TSS and 30 percent reduction in BOD.

Lake Harriet Diagnostic Study and Management Plan — 2011

Sponsor: Minneapolis Park and Recreation Board

Funding: CWP (Grant) \$55,000

Purpose: Lake Harriet, located within the Chain of Lakes Regional Park, is one of the premier recreational destinations in the Minneapolis Park and Recreation Board (MPRB) system. The current CWP grant provides an opportunity to update and intensify existing studies at the lake and provide guidance toward implementing a second phase of improvements in water quality. The goal of the project would be to develop actions that will protect and improve conditions at the lake and prevent future impairment from nutrient pollution. The plan development would include a public participation component, with residents, elected officials, Minnehaha Creek Watershed representatives, state agencies and others interested invited to participate in a discussion of issues and solutions with the MPRB and Minneapolis Public Works.

Lake McCarrons Sub-watershed BMP Project — 2012

Sponsor: Capitol Region Watershed District

Funding: CWF (Grant) \$275,000

Purpose: Capitol Region Watershed District will compile and review previously conducted studies and will prioritize BMPs based on a cost-benefit analysis of their pollutant load reductions and life cycle costs; will conduct a sub-watershed analysis to determine optimal BMP locations and types to maximize volume and pollutant removal; solicit and consider stakeholder input in prioritizing BMPs; will design and construct BMPs, such as rain gardens and infiltration practices, within the Villa Park sub-watershed of the Lake McCarrons watershed to meet phosphorus load reduction goals to the Villa Park Wetland System and ultimately maintain the long term water quality of Lake McCarrons.

Modular Green Roof Retrofit System Development — 2011

Sponsor: Shingle Creek Watershed Management Commission

Funding: Section 319 (Grant) \$27,140

Purpose: Shingle Creek, which drains the watershed, is impaired by excess chloride, low DO, and has an impaired biotic community as well. Thirteen of the sixteen lakes in the watershed are impaired due to excess nutrients. This project is based on the hypothesis that development of a

light-weight, easily installed extensive green roof system suitable for installation on existing flat or gently sloping roofs can substantially reduce runoff volume from highly developed urban and suburban areas that represent some of the greatest challenges in urban stormwater management.

Permeable Reactive Barriers for Phosphorus Removal — 2010

Sponsor: Ramsey-Washington Metro Watershed District

Funding: Section 319 (Grant) \$89,200

Purpose: This project will determine the effectiveness of using "Spent Lime" to reduce phosphorus in stormwater. Spent Lime is created by water utilities (e.g. St Paul Water Utility) and is a byproduct of the water clarification process. Spent Lime contains calcium, iron, and/or aluminum, all three of which bind phosphorus in the natural environment. Currently, Spent Lime must be disposed or transported for use on agricultural fields. Because of its potential for high phosphorus binding capacity, Spent Lime could be beneficially reused in a permeable reactive barrier system to remove phosphorus from stormwater runoff. As the water flows through the permeable reactive barrier containing the Spent Lime, phosphorus would be actively stripped from the water, decreasing the overall phosphorus load to the receiving surface water body. Because of the low cost, small footprint, and passive nature of the system, the Spent Lime permeable reactive barrier has wide ranging applicability.

Outcomes: The project will result in detailed information on the phosphorus removal capacity of Spent Lime under different scenarios (e.g. flow rate). The potential for secondary effects such as metal leaching and toxicity will also be studied. Additionally, pilot scale testing (based on the laboratory results) will be conducted in the field to assess the function and effectiveness of the Spent Lime permeable reactive barrier for phosphorus removal. The project's main outcome will be detailed information that can be used for design and implementation of permeable reactive barriers for the purpose of reducing the available phosphorus load from stormwater runoff.

Shingle Creek Porous Pavement Paired Intersection Study — 2009

Sponsor: Shingle Creek Watershed Management Commission

Funding: Section 319 (Grant) \$282,000

Purpose: The goals of this project are to estimate the effectiveness of porous asphalt on residential streets in reducing the need for salt as a deicer; to determine whether porous asphalt is a BMP that can hold up to rigors of regular city street use; to determine short term and likely long term maintenance requirements; and to measure the water quality and quantity benefits of porous asphalt in a residential street application in both sandy and clay/loam subgrades.

Twin Lake Wetland 639 Nutrient Export Reduction — 2010

Sponsor: Shingle Creek Watershed Management Commission

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

Purpose: This project is the reduction of phosphorus export from Wetland 27-639W, which is a major external phosphorus source to Impaired Water 27-0042-01, North Twin Lake, which is severely impaired by excess nutrients. North Twin Lake is the first in a chain of connected lakes, and the nutrient-rich outflow from North Twin is a significant source of phosphorus to the downstream lakes, which are also impaired.

A feasibility study has concluded that the export is primarily caused by drawdown and drying in the wetland through evapotranspiration by the extensive cattail vegetation in the central wetland during the growing season. Large precipitation events then sheet flow through the wetland, mobilizing phosphorus and transporting it through Twin Creek to North Twin Lake. The project would construct a weir to increase storage and keep the wetland wetter, and create a bypass route for high flows to and through an adjacent channel.

Outcomes: Reduction in phosphorus export from Wetland 27-639W into North Twin Lake resulting in improved water quality and clarity and reduced frequency of severe algae blooms in North Twin. Reduction of phosphorus discharged from North Twin into Middle and Lower Twin Lakes and resulting improvements to water quality and clarity in those lakes. More natural hydrology and improved vegetative diversity in Wetland 27-639W.

West Moore Lake Water Quality Enhancements — 2011

Sponsor: Rice Creek Watershed District

Funding: CWF (Grant) \$86,210

Purpose: East and West Moore Lakes, located along Highway 65 in suburban Fridley, are designated as deep

and shallow lakes, respectively. This project involves the design and construction of up to three water quality BMPs designed to capture and infiltrate stormwater runoff from Fridley Middle School's parking lots and adjacent residential streets; the performance all fiscal management and administrative tasks; the incorporation of stormwater management into Fridley Middle School environmental education curriculum, including using the rain gardens (infiltration basins) as demonstration projects on campus and the completion of water quality monitoring and flow measurements during the open water season throughout the project timeline.

North Fork Crow River

Crow Lakes Protection and Resource Investigation — 2013

Sponsor: Carnelian-Marine-St. Croix Watershed District

Funding: CWP (Grant) \$124,200

Purpose: The Project's "virtual TMDL" studies will evaluate lake water quality relative to MPCA eutrophication standards, assess external and internal TP loads, quantify maximum TP allocations, and identify TP reduction (or stabilization) plans or strategies for source areas. The Project will focus on ten lakes: Minnie-Belle, Manuella, Stella, Lake Washington, Francis, West Sylvania, East Sylvania, John, Charlotte, and Martha. These lakes are located throughout Meeker and Wright County, are highly used recreational lakes with adjacent park land, and are significant contributors to the North Fork Crow River. These key lakes are parts of lake chains in which the whole chain is not impaired, and the protection strategies developed through this project will complement the TMDL implementation efforts to focus on comprehensively managing the chain as a system.

Crow River Basin Sediment Reduction — 2009

Sponsor: Crow River Organization of Water

Funding: CWF (Grant) \$250,000

Purpose: The Crow River Watershed, made up of two major sub-watersheds, the North Fork and the South Fork, is located in south-central Minnesota and has its confluence with the Mississippi River near Dayton, Minnesota in Wright County. This project focuses on preventing and reducing sediment related turbidity problems throughout the Crow River Watershed and contains three main tasks; BMP installation, public outreach and administration. BMP activities include four streambank or lakeshore erosion control projects,

six filterstrips, waterways or sediment basins, a wetland restoration, seven shoreline naturalizations, rain gardens and a modern storm water control mechanism in new or existing developments. Public outreach will include a shoreline naturalization workshop, a Storm Water Task force, webpages and advertisements, and other media for use by every municipality in the Watershed.

Crow River Middle Fork Watershed Resource Investigation — 2013

Sponsor: Middle Fork Crow River Watershed District

Funding: CWP (Grant) \$63,250

Purpose: This project will continue a monitoring program for the purpose of tracking the long term changes in the 8 lakes of the watershed, assist the District Board and staff in identifying key areas for BMP implementation, offer two water quality education workshops per year to area residents providing information of our investigation and many ways to protect these resources, visit area schools nine times per year to implement water quality classes into school curricula, provide one volunteer training workshop per year, informing 10-12 citizens the fine points of stream and lake data collection to supplement our resource investigation, continue to submit regular columns and news releases for existing local newsletters and newspapers and continue the promotion of BMP and educational programs through the District website, which will also contain monitoring information on local lakes and streams.

Green Lake Eurasian Water Milfoil (EWM) / Stormwater Study — 2009

Sponsor: Middle Fork Crow River Watershed District

Funding: CWP (Grant) \$33,000

Purpose: Green Lake is a 5,500 acre mesotrophic lake located in Kandiyohi County, in west central Minnesota. Its clear waters and excellent fishing represent an outstanding recreational and economic resource for the City of Spicer, the county, and the entire region. This research investigation project will examine the relationship between the location of stormwater inlets and stands of EWM; the hypothesis is that stormwater inlets provide a means for nutrient and sediment loading that previously did not exist, and that the nutrients and sediment are providing an environment more hospitable for the propagation of EWM. Thirty total sites will be examined. Multiple sediment cores will be collected. Water samples will be collected and analyzed for patterns

and relationships to answer the research question. A final report will be completed and an implementation plan developed for the future management of EWM and stormwater improvements.

Lake Koronis Subwatershed Protection Project — 2013

Sponsor: Stearns County SWCD

Funding: CWF (Grant) \$197,871

Purpose: This project will evaluate and prioritize approximately 13,000 lineal feet of Lake Koronis shoreline for shoreline erosion and vegetative buffer condition. Those property owners with the most erosion, stormwater and vegetative buffer issues will be targeted to stabilize, infiltrate and buffer their shoreline. This project will also evaluate an additional 300 properties in the subcatchment area and target those properties that are best able to capture and treat stormwater from impervious surfaces. Education/Outreach efforts will include a field day demonstrating the installation of typical BMPs which will be installed in the project area as well as on-site tours of practices after installation.

Middle Fork Crow River Watershed Restoration and Enhancement Project — 2008

Sponsor: Middle Fork Crow River Watershed District

Funding: CWP (Grant) \$242,000 CWP (Loan) \$200,000

Purpose: This project focuses on protecting high quality lakes and restoring lakes with poorer water quality by restoring wetlands, providing educational opportunities that link people to resources, implementing BMPs to reduce nonpoint source pollution and targeting specific lake management projects that harness internal loading in lakes. Activities will focus on citizen information (new district website, workshops, newsletters, and volunteer training), continued water quality monitoring and evaluation, agricultural and rural land use BMPs, wetland, streambank and shoreland restoration, stormwater and urban BMPs and septic system upgrades.

Middle Fork Crow River Watershed Restoration and Enhancement Project Continuation — 2009

Sponsor: Middle Fork Crow River Watershed District

Funding: CWP (Grant) \$350,000 CWP (Loan) \$150,000

Purpose: The proposed project continues and expands upon the activities initiated by the Middle Fork Crow River Watershed Restoration and Enhancement Project. This project focuses on continued protection of high

quality lakes and improvement of lakes with poor water quality by: working to restore the hydraulic regime by restoring wetlands, continuing to provide educational opportunities that link people to the resources, implementing BMPs in areas identified as ecologically sensitive to reduce nonpoint pollution sources, targeting specific lake management projects identified in the diagnostic studies and expand the monitoring efforts established during recent years.

North Fork Crow River Septic System/ Feedlot Upgrades — 2009

Sponsor: North Fork Crow River Watershed District

Funding: CWP (Loan) \$750,000

Purpose: The CWP State Revolving Fund (SRF) will finance ongoing efforts to upgrade 60-70 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.

Targeting BMPs in the Crow River Watershed — 2012

Sponsor: Crow River Organization of Water

Funding: CWP (Loan) \$1,100,000

Purpose: This project will promote and install 110 SSTs, agricultural and rural best management practices in the Crow River watershed.

Working Together to Improve Water Quality Continuation — 2009

Sponsor: Crow River Organization of Water

Funding: CWP (Grant) \$314,000 CWP (Loan) \$750,000

Purpose: Provide financial incentives to landowners to reduce sediment and nutrient loading through wetland restorations, filterstrips, grassed waterways, nutrient and residue management plans, livestock and milkhouse waste management systems, manure tests, alternative tile intakes, raingardens, rainbarrels, installation/upgrade of outlet structures, sediment basins, lake shore and streambank stabilized by rip rap, bioengineering or a combination of practices, increase education initiatives, promote other related BMPs and maintain water quality monitoring and analysis in the Buffalo Creek and South Fork Lower Reach Management Areas. Renville, Sibley, McLeod and Meeker Counties receive loan dollars to upgrade noncompliant ISTS systems.

South Fork Crow River

Crow River Watershed Surface Water Runoff Reduction Project — 2011

Sponsor: Crow River Organization of Water

Funding: CWF (Grant) \$495,911.85
CWP (Loan) \$1,200,000

Purpose: This grant will focus on preventing and reducing sediment/turbidity caused by surface water runoff throughout the Crow River Watershed. This project contains three main tasks; public outreach, administration, and BMP installation. BMPs identified as having significant water quality benefits for these priority areas include: subsurface septic system upgrades, filterstrips, grassed waterways, nutrient and residue management plans, livestock waste management systems, alternative tile intake systems and stormwater control.

Pine River

Pine River Watershed Stream Baseline Water Quality — 2009

Sponsor: Cass County

Funding: CWP (Grant) \$105,712

Purpose: The Pine River is a major walleye spawning river and is the major stream source for the Whitefish Chain of recreational lakes. The area under consideration has not been adequately addressed to determine any water quality impairments. This project defines a two year program of weekly chemical and physical sampling from 20 sites to characterize the three priority streams and the six lakes they influence in the Pine River Watershed. In addition, physical stream measurements, for which no baseline data exists, will be taken in order to provide input data for modeling. A final report will be prepared summarizing data and conclusions and providing information on BMPs to continue or improve the water quality for Pine River.

Rum River

Mille Lacs Lake Watershed Protection — 2011

Organization: Aitkin County

Funding: CWF (Grant) \$145,000

Purpose: Mille Lacs Lake is one of Minnesota's crown jewels, recognized as one of the premier walleye producing lakes in the world. This project will distribute shoreland homeowners guides; maintain a project

website; prepare and distribute media news releases; host public official forums / public meetings; participate in community events; conduct an inventory of the Mille Lacs Lake shoreline; implement 5 shoreline stabilization/revegetation projects; implement 3 rain gardens; implement several BMPs, including exclusion fencing, alternate water sources, filter strip establishment, clean water diversions, pasture and hayland improvements, and others as needed; develop conservation easements; conduct soil fertility analyses at 50 sites; implement appropriate planning and zoning controls; conduct tributary and lake water quality monitoring; financially support watershed coordinator positions and provide grant support and administration.

Sauk River

Crooked Lake Basin Restoration Project — 2013

Sponsor: Sauk River Watershed District

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 JD2.

Lower Sauk-Metro Area Water Quality Protection — 2012

Sponsor: Sauk River Watershed District

Funding: CWF (Grant) \$233,000 CWP (Loan) \$150,000 CWF \$65,000

Purpose: This Sauk River Watershed District will conduct the Whitney Park river clean-up, adopt a river program and other community events as part of their healthy living programs; will collaborate with the city of St. Cloud to install a rain garden demonstration site at Whitney Park; use local radio and public television stations to promote the District's "neighborhood rain garden initiative" and other incentive programs; interact with residents during the annual events of the Master Gardner's organization, the local Farmer's Markets, Friends of the Sauk River organization and other groups; host its first video contest for local high schools students on water quality issues; conduct three adult education workshops on designing and installing rain gardens; conduct three youth outdoor events focusing on water quality; host two radio segments to inform

residents of the available funding and upcoming events; conduct three additional adult education workshops focusing on water quality protection, human impacts and BMP project maintenance; install conservation best management practices within the Sauk River watershed of St. Cloud, Waite Park and St. Joseph, including 35 rain gardens and an effective erosion control BMP to address the river bank sloughing in Whitney Park; design and install five stormwater BMPs in the three municipalities; conduct water quality monitoring on the Sauk River and two stormwater outfalls for selected sub-watersheds undergoing a neighborhood rain garden initiative; and be responsible for all reporting, tracking and overall management of this project.

Lower Sauk River Water Quality Protection — 2011

Sponsor: Sauk River Watershed District

Funding: CWP (Grant) \$300,000 CWP (Loan) \$300,000

Purpose: Conduct hydrologic assessments in urban and rural target areas of the Lower Sauk River; install conservation BMPs throughout the Lower Sauk River watershed; increase public awareness on water quality protection through public outreach efforts; conduct water quality monitoring and analysis for identified stormwater outlets and manage project by tracking activities and expenditures, and submit required reports.

Middle Sauk River Water Quality Restoration Project Continuation — 2009

Sponsor: Sauk Lake Watershed District

Funding: CWP (Grant) \$376,130 CWP (Loan) \$350,000

Purpose: This continuation project will provide administrative and technical assistance that will increase public awareness of water quality issues. This project will continue to work with the local governmental units to hold educational field events to address stormwater runoff and implement urban BMPs. Newsletters and brochures will be generated and distributed to local residents. This project will expand its current youth programs by launching its Lake Ecology curriculum to middle and high school students in the local schools, encouraging teachers to develop hands on curriculum and field days for students to better understand their environment and why we need to protect it. The project will be developing an adult speaker series to get the general public more involved in water resource management within the Sauk River Watershed. We will continue to focus on citizen volunteer monitoring by

providing training for area volunteers to enhance our monitoring plan. Website updates will continue as well to provide information on upcoming seminars, meetings and available cost share funding as well as monitoring information on local lakes and streams. This project will continue to focus on BMPs for agricultural and rural land use, stormwater and urban uses, well sealing, shoreland/riparian restorations, septic systems upgrades and erosion and sediment reduction.

Osakis Lake Enhancement Continuation Project — 2011

Sponsor: Sauk River Watershed District

Funding: CWF (Grant) \$28,296.29 CWP (Loan) \$75,000 CWF \$86,542.88

Purpose: This continuation assists eight landowners in designing and funding their shoreland restoration and rain garden projects; assists sixteen stormwater management and restoration projects along Osakis Lake and three stormwater management projects within the City of Osakis; informs Crooked Lake residents of the available funds for wetland establishment; identifies strategic areas for minor excavation to maximize water storage and sediment reduction; assists the Douglas SWCD in re-establishing 250 acres of cropland into an open water wetland; properly closes two abandoned manure pits according to MPCA standards; excludes livestock from one stream site that drains into Osakis Lake to reduce nutrient concentrations to the lake; develops additional feedlot abatement projects if funding is available; conducts 3 hands on educational events for targeted topics: invasive species, shoreland restoration, rain gardens, rain barrels and shoreland reforestation; utilizes the local media to publicize the available funding and upcoming education events; conducts two follow-up maintenance workshops to provide individuals the tools to protect their lakeshore long-term; posts all information on the SRWD website for general public review; conducts effectiveness monitoring of Judicial Ditch 2 (JD2) and Osakis Lake and the outlet; manages the project through activity and expenditures tracking and generates reports.

Sauk River Water Quality Protection Phase III — 2011

Sponsor: Sauk River Watershed District

Funding: CWF (Grant) \$235,000 CWP (Loan) \$175,000

Purpose: Publicize this project, upcoming education events and available funding; conduct two education events on "Backyard BMPs"; install two demonstration projects; conduct four education events; complete three

radio programs allowing local residents an opportunity to call in and ask questions; provide assistance; design and install five rain gardens; design and install twenty "Backyard BMPs"; assist in the design and installation of four stormwater BMPs for two schools and two municipalities; select one city street to conduct project and specific BMP installation points; monitor stormwater runoff from snowmelt and rain events for baseline data; design and install stormwater BMPs; collect stormwater runoff samples and analyze to determine BMP effectiveness; generate report from results; share the information with the community to quantitatively explain the impacts of stormwater and the benefits of urban BMPs; design and install one erosion control project along the Sauk River; complete three additional land use BMP projects along the Sauk River to minimize sediment and nutrients delivered to the river; evaluate nutrient and soil loss before and after each project; conduct water quality monitoring and analysis to quantify water quality changes in the Sauk River; manage the grant project; conduct the necessary tracking and complete required reports.

Sauk River Watershed District Watershed-wide Groundwater Protection — 2011

Sponsor: Sauk River Watershed District

Funding: CWF (Grant) \$40,000 CWP (Loan) \$250,000

Purpose: Conduct two education events; distribute two news articles in local papers; host one radio public service program expressing the importance of groundwater protection, septic system maintenance, and available funding; conduct two additional education workshops watershed wide focusing on groundwater protection, proper septic maintenance and well sealing; provide the MDH and county agencies information regarding the available cost share funds and cost share two well sealing projects; cost share eight additional well sealing projects; inform the associated counties of the available loan dollars and upgrade five septic systems to meet current standards; upgrade an additional seventeen septic systems to meet current state standards and provide each associated county with a list of completed sites; distribute operation and maintenance manuals for newly installed systems; manage project by tracking activities and expenditures and submit required reports.

**Targeted BMP Implementation within Impaired Areas
in the Upper Mississippi Basin Continuation — 2008**

Sponsor: Stearns County SWCD

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

Purpose: This project will address the following items:

Unpermitted manure storage basin investigations and feedlot evaluations, nonpoint BMPs educational initiatives, manure management plan development, animal waste management systems, erosion control and promotion of other related BMPs. In addition, water quality monitoring from the Sauk River Watershed District will be used to identify impaired areas and improvements to designated impaired waters.



Minnesota Pollution Control Agency

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