Watershed Achievements Report

2012 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

CLEAN WATER LAND & LEGACY AMENDMENT

Cover photo: Cuyuna Country State Recreation Area near Crosby and Ironton, Minnesota — Kimberly Laing, MPCA

The Cuyuna Country State Recreation Area Park as described on the Minnesota Department of Natural Resources' (DNR) webpage:
http://www.dnr.state.mn.us/state_parks/cuyuna_country/narrative.html

Cuyuna Country State Recreation Area Park Info

Quick stats

4,626 acres
118,484 annual visits
3,098 overnight visits

Naturalist

The best way to learn more about Cuyuna Country State Recreation Area is to stop at the state recreation area office for information. The recreation area does not have a naturalist on staff, but interpretive programs are offered occasionally throughout the summer season at other state parks nearby and at Croft Mine.

Wildlife

American Bald Eagles frequent the area and visitors occasionally observe white-tailed deer, cottontail rabbit, snowshoe hare, raccoon, red fox, coyote, mink, muskrat and beaver. Other birds sighted in the recreation area include great blue heron, kingfishers, loons, turkey vultures, ruffed grouse, and red-tailed hawks. This is also great country for waterfowl and Cuyuna Country marshes and lakes are host to many species of ducks including redhead, northern shoveler, mallard, ring-necked, blue and green-winged teal, wood duck, several types of mergansers, snow geese, Canada geese, and white-fronted geese.

History

The Cuyuna area was a border area between the Dakota and the Ojibwe Indians and served as a long portage route from Mille Lacs Lake to the upper Mississippi River. It wasn't until the early 1900s that major changes took place in the area. Cuyler Adams, who homesteaded here in the late 19th century, noticed great compass deflections while surveying his land in 1903. He noted that this was probably due to the presence of iron ore beneath the surface. He was right. In 1904, Adams did discover ore and the range he discovered was subsequently named for him using the first three letters from Cuyler, and the three letter name of his St. Bernard dog, Una, his constant companion and prospecting partner. Cuyuna was the last of Minnesota's three major iron ranges to be discovered and mined. It extends almost 70 miles from Randall in Morrison County, northeast through Crow Wing County, and ends in central Aitkin County.

Drilling began in 1904 with the discovery by Adams of "good ore" in the area. By 1909, approximately 2,000 drill holes had been completed and new townsites of Cuyuna, Crosby, Ironton, Manganese, Riverton, and Trommald were established. Twenty to 30 mines operated in the area during the mining boom of World Wars I and II. Nearly 20 mines continued to operate in the early 1950s. Foreign competition and taconite mining on the Mesabi Range caused a virtual shutdown of the Cuyuna ten years later. Abandoned mining operations left behind a landscape dotted with mining pits 100 to 525-feet deep and rock stockpiles 200-feet high. Through the efforts of the Iron Range Resources Rehabilitation Board (IRRRB), Crow Wing County, local governments, two joint powers boards, volunteer groups, and the Department of Natural Resources, the area has become an outdoor recreation attraction and officially became a Minnesota State Recreation Area in 1993.

Geology

Cuyuna Country State Recreation Area is located in the St. Louis Moraines Subsection that was formed at the leading edge of repeating glacial advances. Its range of hills contain coarse gravel-like materials and boulders pockmarked with countless lakes, ponds, and bogs. Glacial drift in the area ranges from 100 to 200 feet in depth.

Landscape

Over the last 20 years, the landscape that was dotted with mining pits and stockpiles has changed. The deep pits are now filled with crystal clear water and a variety of vegetation now covers the area. The result is 25 miles of natural shoreline with a considerable area of forested land containing trembling aspen, paper birch, basswood, red oak, ironwood, and bit-tooth aspen. The marsh areas contain bulrush, cattail and sedge. These communities provide a home for a wide variety of wildlife. The area contains six natural lakes, plus an additional 15 deep lakes that were former mine pits. Trout, northern, bass, crappies, sunfish and walleyes inhabit the area's lakes.

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

Contents

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Thunder Lake — Kimberly Laing, MPCA

Introduction

It has been said that water knows no boundaries. It flows across cities, counties, states and countries, leaving its imprint on the land, naturally unaware of the geographic and political borders humans have created. Unfortunately, people have also left their imprint on the water; at times causing impairments to local water bodies that can also head downstream thousands of miles away. Because of water's trans-border nature, we must use collaborative approaches to be fully successful in addressing water quality issues.

Where water quality is concerned, Minnesota is placing a greater emphasis on collaboration and cooperation between multiple stakeholders, particularly within the agriculture community. Agricultural land practices that are meant to provide beneficial outcomes with bigger and better crops can at times result in unintended consequences. For instance, nutrients used for growing crops can pollute our waters if agricultural runoff enters nearby surface waters. Some current agriculturally-focused collaborative water quality efforts in Minnesota include:

- Development of a state-level Nutrient Reduction Strategy
- Establishment of water quality standards for nitrate-nitrogen and total nitrogen
- Creation of the Agriculture Water Quality Certification Program

Minnesota is working to complete a statewide Nutrient Reduction Strategy by mid 2013, along with other states in the Mississippi-Atchafalaya River Basin (the third largest basin in the world.) A Basin-wide Action Plan is in place that includes creation of individual state nutrient reduction strategy plans to help reduce the size of the hypoxic zone in the Gulf of Mexico. Insufficient oxygen – hypoxia – harms fish and other aquatic life. By reducing the amount of nitrogen and phosphorus (nutrients) that wash into the Mississippi River, less algae will be produced, which in turn will mean a healthier concentration of oxygen in the Gulf waters, thousands of miles downstream from us. For more information, please visit http://water.epa.gov/type/watersheds/named/msbasin/implementation.cfm#report.

A compliment to the nitrogen component of this excess nutrient project, the 2010 Minnesota Legislature directed the establishment of water quality standards for nitrate-nitrogen and total nitrogen. The characterization of total nitrogen to Minnesota's surface waters will assist in the development of the Nutrient Reduction Strategy and will instruct the actions we can all take to improve water from Minnesota to the Gulf of Mexico. For more information, please visit http://www.legacy.leg.mn/projects/nitrogen-budget-assessment-determine-nitrogen-loadings-sources-and-pathways-minnesota-water.

Additionally, a new state-federal partnership was announced this past January to collaboratively and cooperatively bring about additional farming conservation practices. Through the Minnesota Agriculture Water Quality Certification Program (http://www.mda.state.mn.us/awqcprogram.aspx), farmers will be able to volunteer to implement scientifically developed conservation practices tailored to their land. The program, which is currently being developed, will provide cost-share funds to help farmers with the expense of certain conservation practices. In exchange, they will receive assurance from regulatory agencies that they will not be required to implement additional water quality measures during the designated certification period. This can provide farmers with greater "certainty" about expectations for addressing water quality.

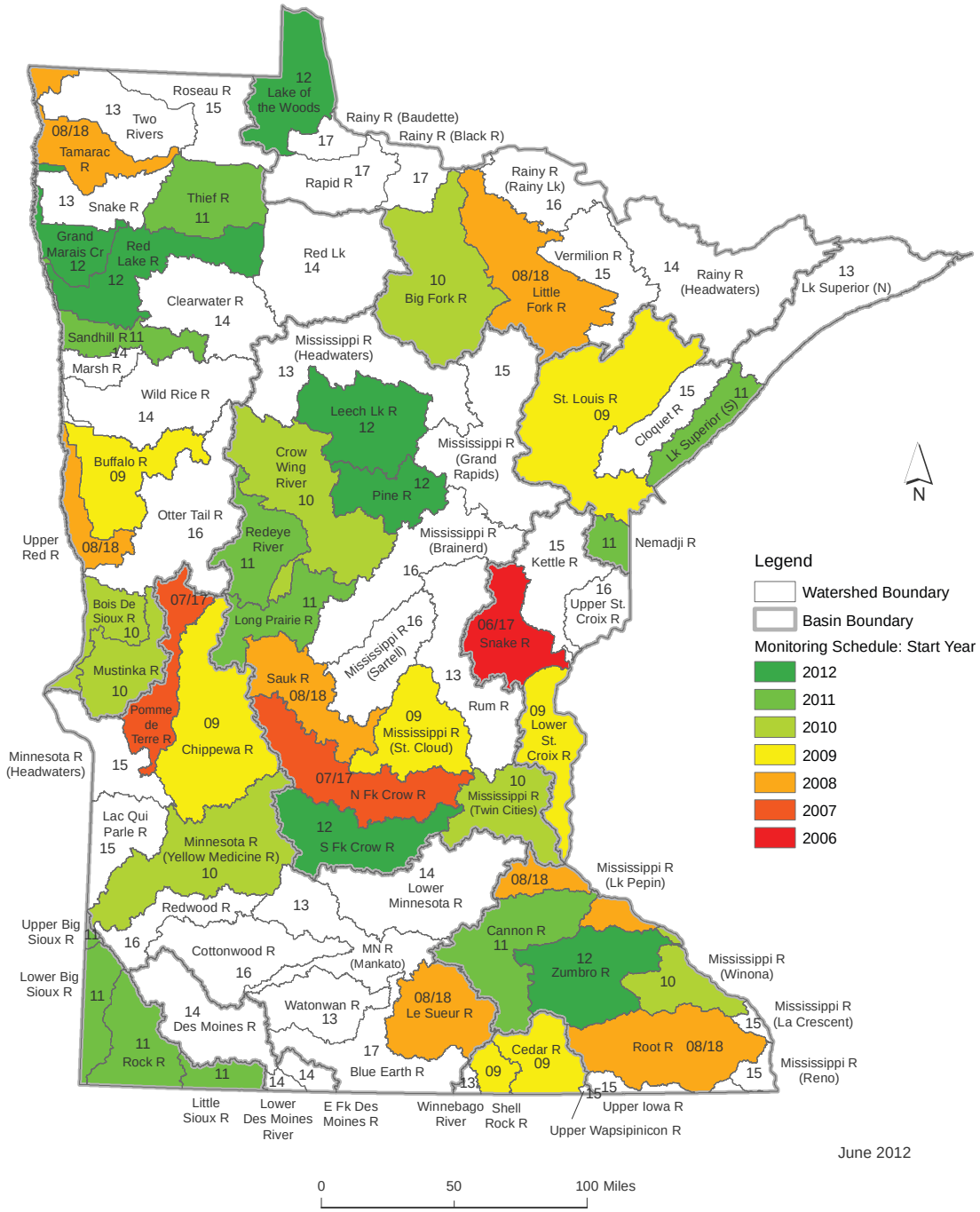
Efficiencies can be gained by working together to tackle water quality issues across regions. Successful state strategies implemented at the local level will bring benefits both locally and regionally. Water quality is a responsibility we all must share because we are all connected by water.

List of acronyms

annAGNPS Annualized Agricultural Nonpoint Source Model
BATHTUB Army Corps of Engineers Lake Model
BERBI Blue Earth River Basin Initiative
BMP best management practice
BOD biochemical oxygen demand
BWSR Minnesota Board of Water and Soil Resources
CAC Citizen Advisory Committee
CCA certified crop advisor
COD chemical oxygen demand
CROW Crow River Organization of Water
CRP Conservation Reserve Program
CREP Conservation Reserve Enhancement Program
CRWP Chippewa River Watershed Project
CSM or CSMP Citizen Stream Monitoring / Citizen Stream Monitoring Program
CWA Clean Water Act (1987)
CWLA Clean Water Legacy Act
CWP Clean Water Partnership
DNR Minnesota Department of Natural Resources
DO dissolved oxygen
ESD Environmental Services Department
FLEval Feedlot Evaluation Model
FLUX input inflow model for BATHTUB
GBERBA Greater Blue Earth River Basin Alliance
GIS geological information systems
GPS global positioning system
HLWD Heron Lake Watershed District
HSPF Hydrologic Simulation Program FORTRAN
HUC hydrologic unit code
IBI index of biological integrity
IPHT imminent public health threat
ISTS Individual Sewage Treatment System
LCMR Legislative Commission on Minnesota Resources
LiDAR Light Detection and Ranging
LID low impact development
MDA Minnesota Department of Agriculture
MDH Minnesota Department of Health
MECA Minnesota Erosion Control Association
MMP manure management plan
MPCA Minnesota Pollution Control Agency
MS4 Municipal Separate Storm Sewer System
NCED National Center for Earth-surface Dynamics
NMP National Monitoring Program
NO_3 nitrate/nitrogen
NPS nonpoint source
NPSP nonpoint source pollution
NRCS Natural Resource Conservation Service
OLCP Open Lot Certification Program
P Phosphorus
PFA Public Facilities Authority
PPB parts per billion
QA/QC Quality Assurance/Quality Control
RCRCA Redwood-Cottonwood Rivers Control Area
Section 319 section of Clean Water Act
SHEP Stream Health Evaluation Program
SONAR Statement of Need and Reasonableness
SRF state revolving fund
SRWD Sauk River Watershed District
SSC suspended sediment contamination
SSTS Subsurface Sewage Treatment System
STORET storage and retrieval system (now EQuIS)
SWAT Soil And Water Assessment Tool
SWCD soil and water conservation district
TAC Technical Advisory Committee
TMDL total maximum daily load
TP total phosphorus
TSS total suspended solids
TT transparency tube
U of M University of Minnesota
USDA-ARS United States Department of Agriculture – Agricultural Research Service
USEPA United States Environmental Protection Agency
USGS United States Geological Survey
VSS volatile suspended solids
WAR SSS Watershed Assessment of River Stability and Sediment Supply
WD watershed district
WLA waste load allocation
WNC Well Network Coordinators

Monitoring progress

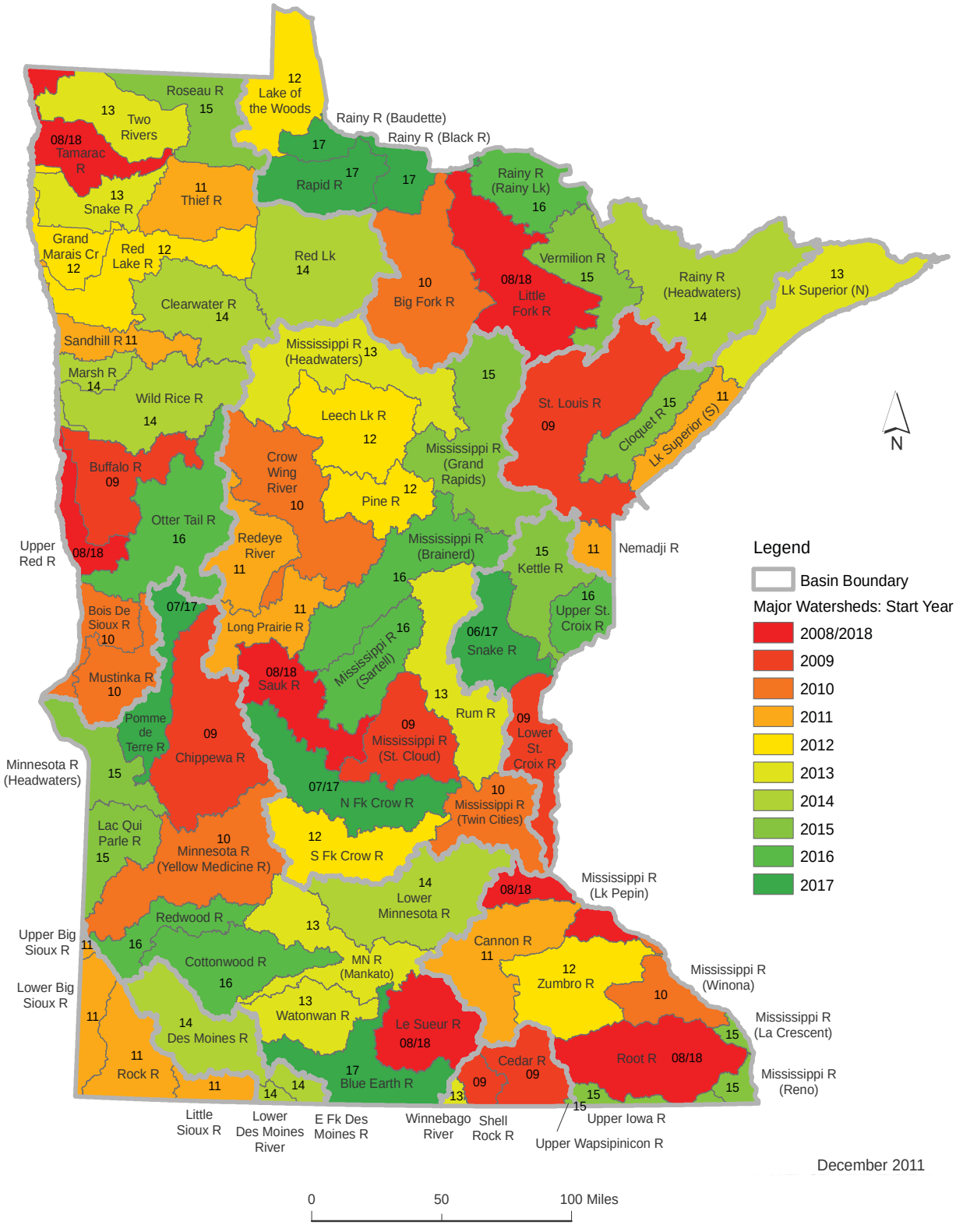
The Minnesota Pollution Control Agency (MPCA) has now initiated or completed Intensive Watershed Monitoring (IWM) in 35 of the state's 81 major watersheds — that is over 43 percent of the state's watersheds. The level of effort of this monitoring and the amount and types of data being collected in this Watershed Approach is well beyond that of past monitoring efforts. Marrying MPCA monitoring efforts 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.



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/nwqh94c

Intensive Watershed Monitoring



Previous Impairments now Meeting Water Quality Standards due to Corrective Actions

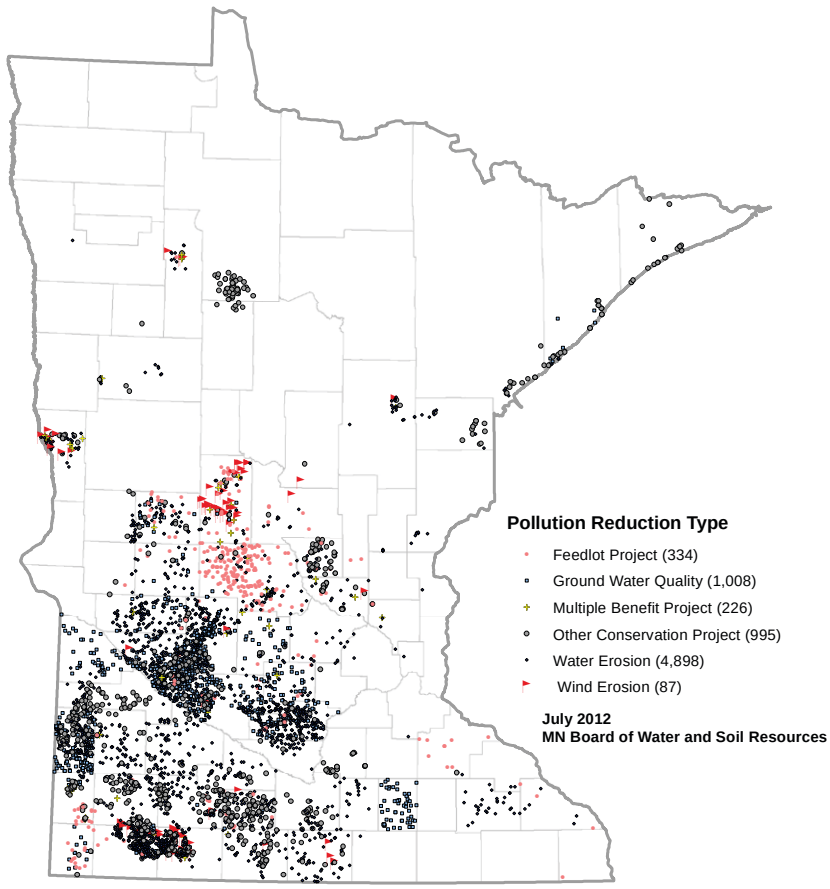
* To be proposed by MPCA for delisting in the next listing cycle.
Delisting proposals are subject to public comment and EPA approval.

LARS and eLINK results from Section 319 and CWP projects 1997–July 2012

The following table shows progress through July 2012 based on previous Local Annual Reporting System (LARS) reporting (1997–2002) and reporting data from eLINK (2003–July 2012). 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 2012 by approximately more than 274,935 tons/year. During the same period, sedimentation was reduced by approximately more than 118,364 tons/year. Phosphorus loading was reduced by approximately more than 318,554 pounds/year.

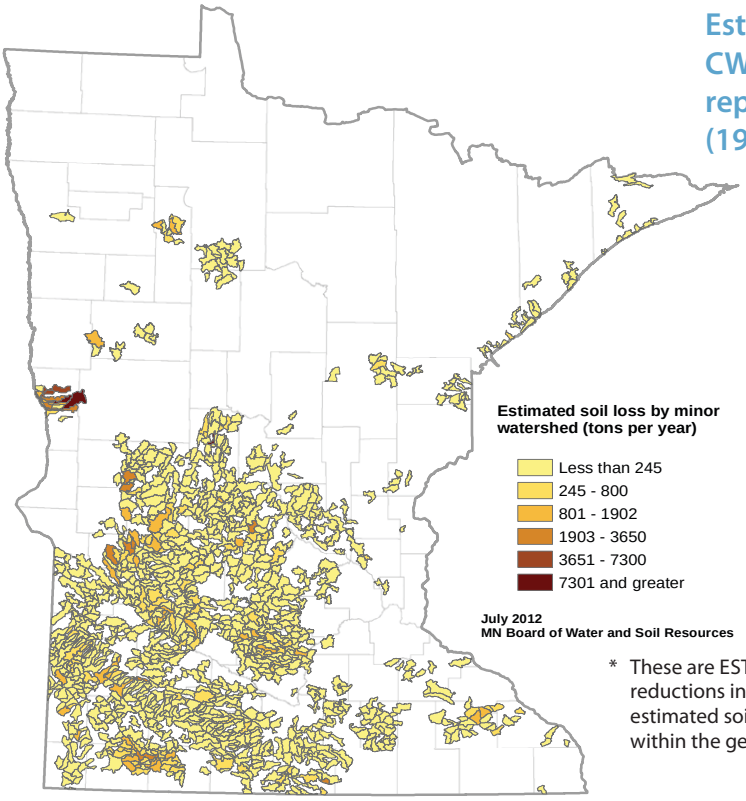
Pollution reduction estimate type	# of BMPs	Estimated soil loss reduction (tons/yr)	Estimated sediment reduction (tons/yr)	Estimated phosphorus reduction (pounds/yr)	Estimated nitrogen reduction (pounds/yr)*
Feedlot project	334	0	0	44,999	89,998
Groundwater quality	1,008	0	0	5,895	11,790
Multiple benefit project	226	18,276	3,113	4,075	8,150
Other conservation projects	995	17,881	3,298	135,969	271,938
Water erosion	4,898	236,520	111,909	126,984	253,968
Wind erosion	87	2,258	44	632	1,263
Total	7,548	274,935	118,364	318,554	637,107

* Estimated nitrogen calculated from doubling estimated phosphorus



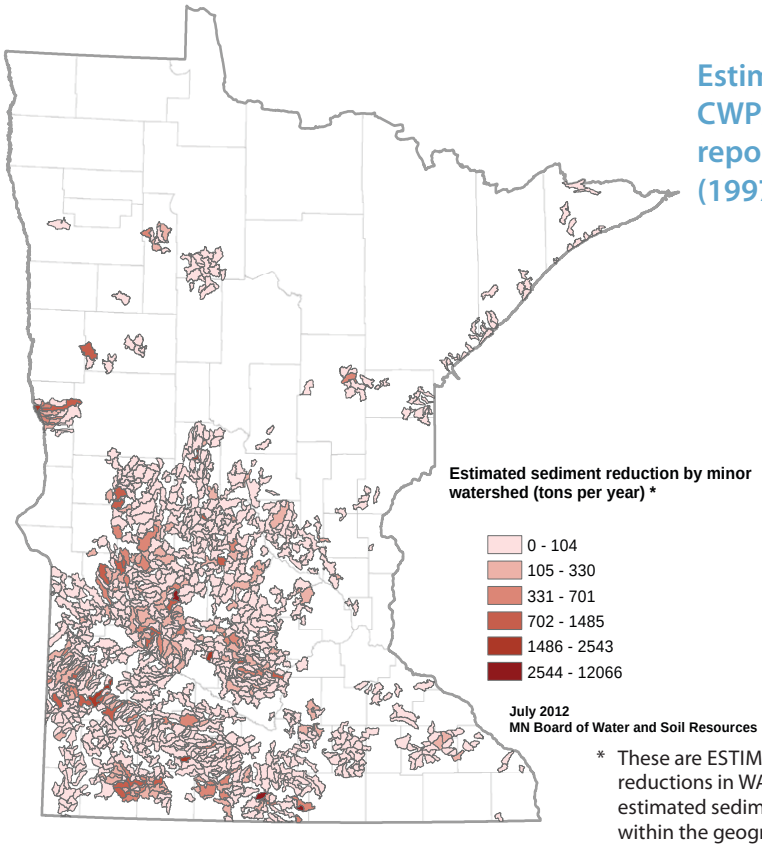
CWP/Section 319 BMPs eLINK (2003–present) and LARS (1997–2002)

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)



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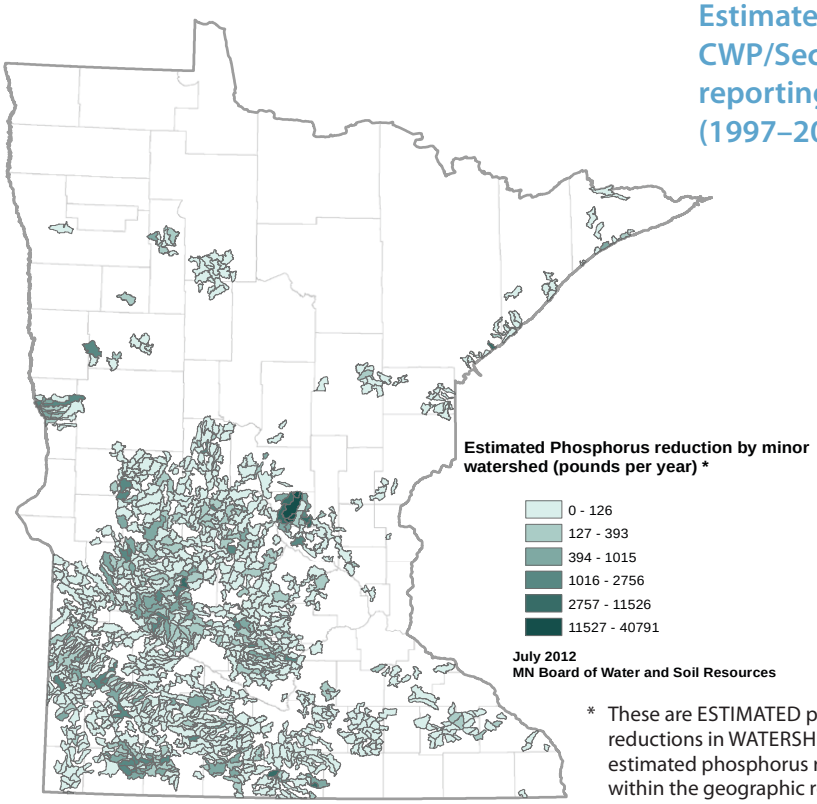
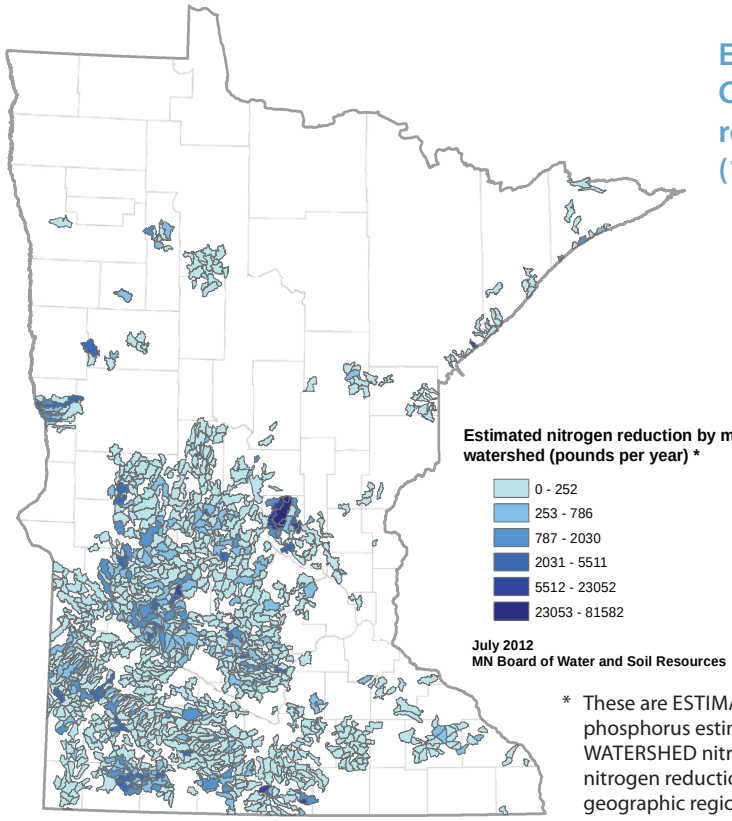
Estimated phosphorous reduction — CWP/Section 319 BMPs via local government reporting, eLINK (2003–present) and LARS (1997–2002)



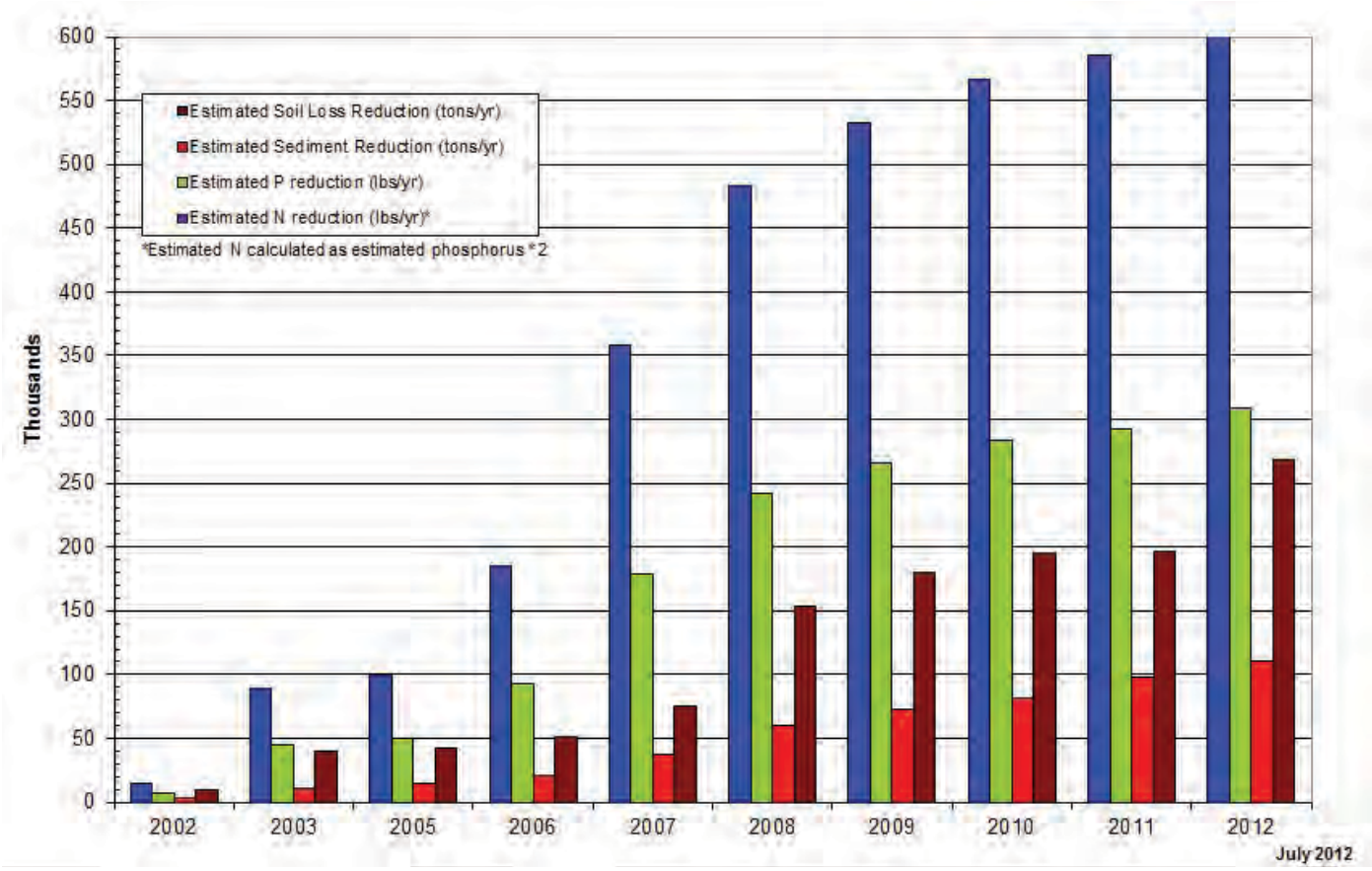
* These are ESTIMATED phosphorus reductions. They DO NOT represent reductions in WATERSHED phosphorus yield. They represent the sum of estimated phosphorus reductions to all water bodies (even isolated ones) within the geographic regions of the watershed.

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 completed for 2011–2012

Statewide

eLINK and Section 319 Partnership for eLINK Staff Support

Des Moines and Missouri River Basins

Heron Lake Watershed District – BMP Program for Alba Township
Heron Lake Watershed District – Clean Water Partnership Continuation
Heron Lake Watershed District – Conservation Tillage Demonstration Plot
Heron Lake Watershed District – Fulda Lakes BMP Project

Lake Superior River Basin

Miller Creek Total Maximum Daily Load
Duluth Residential Stormwater Reduction Demonstration Project for Lake Superior Tributaries
Restoring Impaired Superior Tributaries: Stormwater BMP Evaluation, Education and Outreach

Lower Mississippi and Cedar River Basins

Assistance for Unsewered Communities in the Lower Mississippi/Cedar River Basin
Cannon River Watershed One Water Project
Straight River Turbidity TMDL Project
Upper Cannon Lakes Excess Nutrients Total Maximum Daily Load Study
Crystal Lake, Keller Lake, Lee Lake and Earley Lake Nutrient Impairment TMDL Project

Minnesota River Basin

Greater Blue Earth Basin Unregulated Community Stormwater Management Project
Chippewa River Watershed Project Turbidity TMDL Assessment and Implementation Plan Development
Shakopee Creek Headwaters Project Continuation
Shakopee Creek Headwaters Project Continuation 2
Turbidity TMDL Assessment of Pomme de Terre River Watershed
Upper Main Stem Chippewa River Project Continuation
Cottonwood River Turbidity TMDL Project
Cottonwood River Watershed Nonpoint Pollution Reduction Project
Redwood River Turbidity TMDL Project
Lac qui Parle River Main Stem Water Quality Enhancement Project Continuation
Lac qui Parle – Yellow Bank River Watershed Total Maximum Daily Load Assessment and Implementation Plan Development
Lura Lake Excess Nutrient Total Maximum Daily Load Study
Bluff Creek Watershed TMDL
Carver, Bevens and Silver Creek Watershed Fecal Coliform TMDL Implementation Plan
High Island Creek Implementation Plan
Rush River and High Island Creek Turbidity/Biota TMDL
Rush River Watershed Implementation Project Continuation
Crystal Lake Excess Nutrient Total Maximum Daily Load Study
Middle Minnesota – Brown and Redwood Counties First Order Streams Phase I Diagnostic Study

Rainy River Basin

Baudette Estuary Dissolved Oxygen Impairment Verification and TMDL Development

Red River Basin

None completed for 2011 – 2012

St. Croix River Basin

Ann River Watershed TMDL Project
Snake River Enhancement Project Continuation

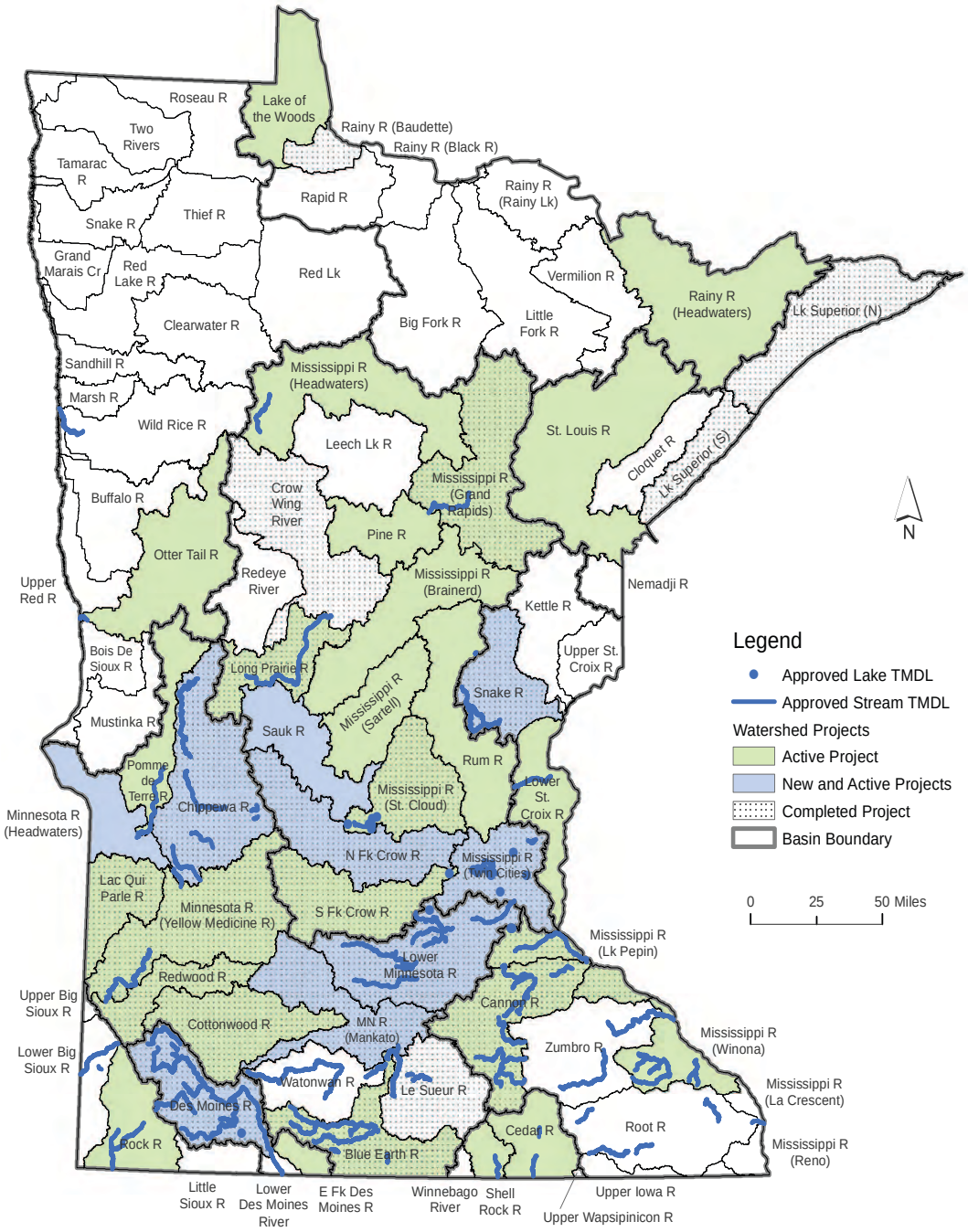
Upper Mississippi River Basin

Agricultural Drainage BMP Effectiveness Monitoring
Crow Wing (Major Watershed Project) – Phase 1
Lake Margaret Nutrient TMDL Report
Long Prairie River TMDL Nonpoint Implementation Project
Big Sandy Area Lakes Nutrient Impairment TMDL Study
Elk River Watershed Association TMDL Studies, Phases I - III, 2008-2010
Mississippi River Bacteria TMDL Project - Phase IIA
Shingle Creek and Bass Creek Biota and Dissolved Oxygen TMDL Implementation Plan
Wetland 639W Restoration
Ann/Emma Lakes Excess Nutrients TMDL
North Fork – Lower Crow River Watershed Dissolved Oxygen, Turbidity and Fecal Coliform Phase III TMDL
Rice Lake Nutrient TMDL
Lake Independence Channel Stabilization Project
South Fork Crow River Buffalo Creek Watershed Turbidity and Pathogen TMDL Project

Summary of statewide watershed project activity

Projects completed, currently active and awarded

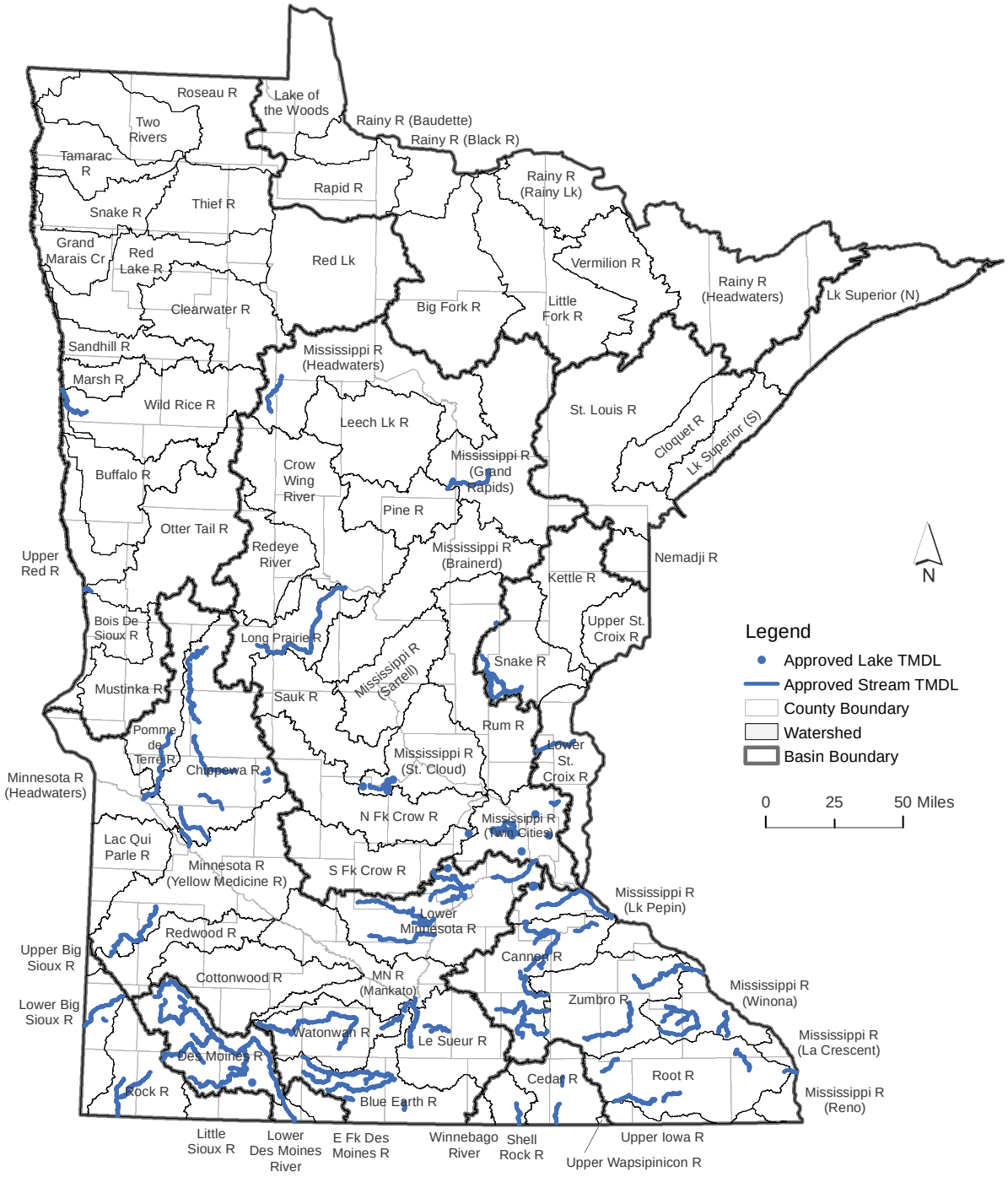
Made possible through a variety of funding sources — USEPA Section 319 grants, Clean Water Legacy Act (CWLA) and CWP — and the dedication and hard work of our agency partners, the following map represents major watersheds where water quality improvement projects are currently underway, ready to begin or recently completed in the state.



Statewide

Projects completed

eLINK and Section 319 Partnership for eLINK Staff Support



eLINK and Section 319 Partnership for eLINK Staff Support

This project provides financial support to the I.T. staff that support the eLINK reporting system and eLINK users. eLINK, the electronic link between state and local governments, is a web-based reporting system that is maintained and supported by the Board of Water and Soil Resources (BWSR). eLINK is used by BWSR to track expenditures and accomplishments performed by local governments with state grant funds. In Minnesota, the same local governments receiving state grant funds from BWSR are often also receiving Federal Section 319 water quality grants via the MPCA. BWSR and MPCA have long had a coordinating relationship regarding the collection of accomplishment information from the local governments.

Specifically, this project provides financial support for BWSR staff to maintain and support the eLINK system. This includes a variety of tasks, such as computer server administration, database administration, geological information systems (GIS) administration, eLINK configuration, eLINK report management, eLINK account administration, user support, and user training. These support tasks are ongoing throughout the year.

Currently, there are some desires to integrate the reporting requirements for Section 319 and State grants. It has been difficult to integrate these requirements because of differences between state and federal grant requirements. We continue to focus on collecting information about best management practices (BMPs) which affect water quality and soil erosion. Specifically, eLINK provides a good way for local governments to report estimated quantitative pollution reduction numbers to the State that are achieved through BMP installation, along with mapped project locations and funding information.

Additionally, BWSR intends to build a new reporting system. We intend at a minimum to provide MPCA and the Section 319 grant recipients functionality that is similar to the current reporting functionality. Future meetings can be held to determine what MPCA needs to collect from the Section 319 grant recipients in order to report to United States Environmental Protection Agency (USEPA).

Goals

1. Provide access and support so local government Section 319 grant recipients can report expenditures and accomplishment information back to the state via the eLINK reporting system.
2. Provide training to MPCA staff to participate in the "set up" of Section 319 grant information.
3. Provide data and maps from eLINK to MPCA upon request.

Results that count

- Local government staff have been submitting information about their BMP installations and associated pollution reductions via eLINK. There are roughly 4,000 landowner BMP Section 319 implementations recorded in eLINK going back to 2004.
- MPCA staff are setting information about the Section 319 grants that have been awarded. This set up stages eLINK in order for the local governments to begin reporting.
- MPCA receives data and maps out of the eLINK database periodically upon request.

Financial information

Funding type: Section 319

Grant amount: $75,000

Contact information

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MPCA Project Manager:

Statewide

Projects active and awarded in 2012

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.

Outcomes: 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.

Outcomes: Develop a Light Detection and Ranging (LiDAR)-based method for identifying side inlets to aid in implementation prioritization, estimate the cumulative benefits of adopting side inlet controls at different scales, optimize side inlet control design to provide water quality benefits while minimizing negative impacts to agricultural production, develop technical guidance for side inlet controls to be used by SWCDs, engineers, and other water resources professionals, and build research and demonstration projects at selected key locations across the state.

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.

Outcomes: The MPCA will train stakeholders on how to use SI tools and operationalize social outcomes evaluation methodologies for the Agency's nonpoint water quality grant work. A solid foundation of experiential data related to the effectiveness of SIPES and SIDMA will be made available to USEPA.

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.

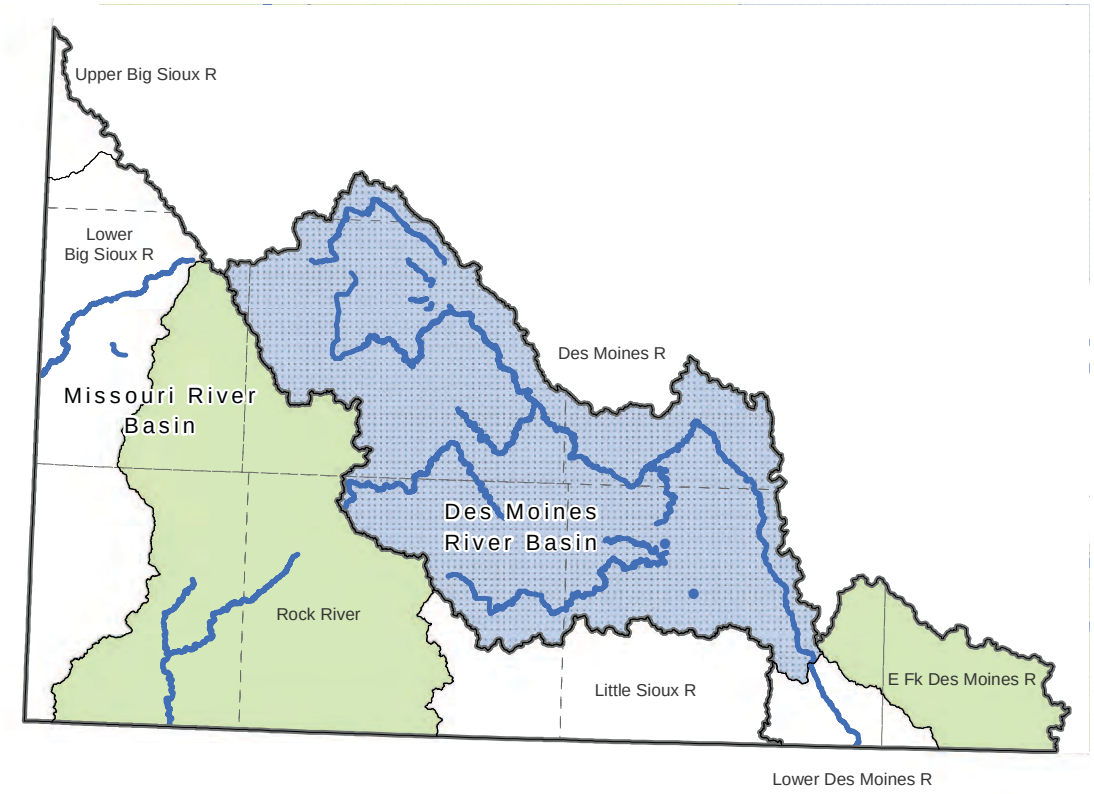
We will develop and implement an online training program for watershed professionals that will improve their management skills and their ability to effectively and holistically address water quality issues.

Des Moines and Missouri River Basins

Projects completed

Des Moines River – Headwaters

Heron Lake Watershed District – BMP Program for Alba Township
Heron Lake Watershed District – Clean Water Partnership Continuation
Heron Lake Watershed District – Conservation Tillage Demonstration Plot
Heron Lake Watershed District – Fulda Lakes BMP Project



Legend

- Approved Lake TMDL
- Approved Stream TMDL

Watershed Projects

- Active Project
- New and Active Projects
- Completed Project
- Basin Boundary
- County Boundary

N

0 10 20 Miles

Des Moines River – Headwaters Watershed

Heron Lake Watershed District – BMP Program for Alba Township

Alba Township is unique in that it drains three different directions. The northern portion drains to Jack Creek, which flows into North Heron Lake. A majority of the township drains to Okabena Creek, which flows to South Heron Lake. A very small portion of the township drains to Judicial Ditch #3, which flows to South Heron Lake. Jack Creek, Okabena Creek, Heron Lake, and the West Fork Des Moines River (WFDMR) are included on the 303(d) Impaired Waters List. A TMDL study was completed for these reaches in 2008.

The goal of this project was to decrease water movement, reduce erosion, and improve water quality throughout approximately 23,000 acres in Alba Township of Jackson County, Minnesota through the implementation of BMPs and through educational efforts.

Heron Lake Watershed District (HLWD) staff provided first-hand information about the program requirements through direct mailing, one newsletter, a kickoff meeting, and reports to the general public and local officials. These efforts proved successful in that there were a total of 8,041.9 acres enrolled in conservation tillage practices. This exceeded the work plan goal of 6,000 acres. Heavy snowfall and heavy rains led to flooding throughout the project area. Because of high precipitation, less residue was found even though operators were trying to maintain the 30 percent residue needed for payment. Operators were enthusiastic about the program and commented that the incentive helped their decision to switch to less aggressive tillage.

Goals

- Increase public awareness
- Nonpoint source pollutant loading reductions
- Monitor BMPs and collect data

Results that count

- Over 137 landowners and 82 operators were invited to be a part of the incentive program. Over the three years, the HLWD had contracts with 29 operators in 2008, 15 operators in 2009, and 22 operators in 2010.
- Over the three-year grant period, 8,041.9 acres were enrolled in conservation tillage practices, surpassing the 6,000 acreage goal in the work plan. According to BWSR eLINK system, implementation of these practices saved 258 lbs/year of phosphorus and 426 tons/year of sediment.
- Monitoring of Okabena Creek shows a significant improvement in water quality. Average Total Phosphorus (TP) concentrations decreased 20 percent from 2007-2010. Ortho Phosphorus decreased 30 percent from 2007 to 2010. Average concentrations of Total Suspended Solids (TSS) decreased 27 percent from 2007 to 2010.

Alba Township tillage transect

Financial information

Funding type: Section 319

Grant amount: $40,800

In-kind: $11,823.67

Matching funds: $39,552.40

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Des Moines River – Headwaters Watershed

Heron Lake Watershed District – Clean Water Partnership Continuation

Heron Lake and its watershed encompass many of the same problems seen in other rural, agricultural areas in Minnesota. The major goal for the project was to improve water quality for the benefit of the public health, welfare and recreation, and to provide for the preservation and enhancement of wildlife habitat.

Education efforts through partnerships provide landowners with up-to-date information on projects and allow the opportunity for public input about further education needs. HLWD staff developed monthly newsletters. Watershed residents have shown a dramatic response to this publication through increased attendance at education meetings and participation in BMPs. The creation of the website has also proven useful in providing residents with easy access to program guidelines, application forms, reports, and historical information. The website has been used nationwide.

HLWD staff meets one-on-one with landowners and operators to provide information about BMP programs offered through local, state, and federal organizations. Staff makes a concerted effort to develop implementation programs based on the needs vocalized by residents.

Goals

- Increase public awareness
- Nonpoint source pollutant loading reductions
- Monitor improvement and changes

Results that count

- During the grant period, 170 landowners participated in cost-share, incentive, and low-interest loan programs. In addition, monthly newsletters were distributed to over 3,400 watershed district residents, agency personnel, and legislators.
- Over the three-year grant period, 1,180.9 acres of filter strips, riparian buffers, and wildlife habitat; 2.2 acres of grassed waterways, 18.4 acres of windbreak/shelterbelt establishment, 49.8 acres of wetland restoration, seven acres of sediment basins/wildlife ponds, 78 conserving use acres, 20 acres flood control, 30 terraces, and six rain gardens were enrolled in cost-share and incentive programs. According to BWSR eLINK system, implementation of these practices saved 1,315 pounds/year of phosphorus and 788 tons/year of sediment.
- Monitoring shows a significant improvement in water quality from 2007 through 2010. Average TP concentrations decreased by 15-30 percent. Average TSS decreased by 17-40 percent. Total loading for TSS decreased by 33-57 percent.

Jack Creek sampling location

Financial information

Funding type: CWP

Grant amount: $428,752.50

In-kind: $1,064,941.27

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Des Moines River – Headwaters Watershed

Heron Lake Watershed District – Conservation Tillage Demonstration Plot

The HLWD is 86 percent agricultural. Therefore, the majority of the projects must be of interest to farmers and landowners in order to gain their cooperation in BMPs implementation. Convincing the farmers there is water quality problem is necessary before they are willing to become part of the solution.

To see a change on the landscape, educational efforts are needed. Project partners believe that providing watershed landowners with an on-the-farm demonstration of conservation tillage practices, and their economic and environmental benefits, will produce long-term water quality benefits for the watershed.

This project continued a field-scale trial, established fall 2005, to evaluate the effect of long-term tillage practices on percent residue, population, yield, and economics in corn and soybean. A soybean and corn trial was established. These trials were rotated in subsequent years in a corn/soybean rotation with tillage treatments practiced in each tillage strip continuously. The six treatments evaluated included:

- Strip tillage (ST)
- No tillage (NT)
- Ridge-tillage (RT)
- Chisel plow (CP)
- Chisel plow with an alternative nitrogen (N) application (CPA)
- One-pass spring only field cultivation (OP)

Project partners met nine times throughout the project period. The results of these meetings included the successful planning and implementation of field-scale demonstration project. In addition, project partners successfully planned and hosted a Conservation Tillage Bus Tour, Conservation Tillage Demonstration Plot Field Day, and a Conservation Tillage Demonstration Plot Results Workshop reaching approximately 115 people.

Goals

- Conduct 12 planning and evaluation meetings with project partners.
- Continue research at tillage demonstration site established in October 2005.
- Plan, coordinate, and implement annual public education opportunities.

Results that count

- Held nine planning sessions, resulting in the successful planning and implementation of spring tillage; fertilizer, chemical, and insecticide application; harvest; and fall tillage as described in the work plan.
- Conducted research on a field-scale to evaluate the effect of long-term tillage practices on percent residue, population, yield, and economics in corn and soybean.
- Project partners planned and hosted a Conservation Tillage Bus Tour, Conservation Tillage Demonstration Plot Field Day, and a Conservation Tillage Demonstration Plot Results Workshop reaching approximately 115 people.

Financial information

Funding type: Section 319

Grant amount: $17,442.91

In-kind: $21,021.86

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Des Moines River – Headwaters Watershed

Heron Lake Watershed District – Fulda Lakes BMP Project

The Heron Lake watershed is rural and agricultural. In a watershed such as ours, agricultural BMPs are crucial. Landowners are hesitant to try new methods. Many residents do not have the financial ability to complete conservation practices without assistance. Creating a funding package that is attractive to landowners is a significant benefit and vital to the success of this project. By offering incentives to promote conservation tillage and other BMPs, the project sponsors believed there would be increased landowner participation, resulting in healthier habitats for wildlife, a more effective filtering area, and environmentally-friendly farming practices. This project could be duplicated and utilized in any agricultural setting similar to that of the HLWD.

The majority of landowners and operators in this sub-watershed are concerned about soil health and water quality. These residents were involved in a redetermination of benefits for Murray County Judicial Ditch #13, filter strip installation, and other conservation efforts. Landowners were receptive to conservation practices along the ditch system. This project would expand BMP installation throughout the sub-watershed.

HLWD staff provided first-hand information about the program requirements through direct mailing, one newsletter, a kickoff meeting, and reports to the general public and local officials. These efforts proved successful in that there were a total of 5,828.46 acres enrolled in conservation tillage practices. This was short of the 6,000 acre work plan goal. From 2008-2011 there was a 73 percent increase in the amount of acres enrolled into the program.

Three shoreline restoration projects were completed. Projects ranged from a simple filter strip to a complex restoration that involved a complete bank stabilization using all bioengineered practices. By completing several different restorations, it was hoped that every landowner on Fulda Lakes' can see first-hand some type of restoration that could be implemented on their property.

Goals

- Increase public awareness
- Nonpoint source pollutant loading reductions
- Monitor BMPs and collect data

Lubben shoreline restoration project

Results that count

- During the grant period, over 73 landowners and 48 operators were invited through a letter and direct contact to be a part of the incentive program. Over four growing seasons, the HLWD had contracts with 9 operators in 2008, 16 operators in 2009, 15 operators in 2010, and 11 operators in 2011.
- Over the three-year grant period, 5,828.46 acres were enrolled conservation tillage practices. According to BWSR eLINK system, implementation of these practices saved 1,251 lbs/year of phosphorus and 1,312 tons/year of sediment.
- Water quality monitoring showed significant improvement. From 1997-2002 (pre-grant) through 2010, TSS mean concentrations decreased 72 percent in both First and Second Fulda Lake. TP decreased 45 percent in First Fulda Lake and 56 percent in Second Fulda Lake.

Financial information

Funding type: Section 319

Grant amount: $55,800

In-kind: $36,523.82

Matching funds: $21,131.77

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Des Moines and Missouri River Basins

Projects active and awarded in 2012

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 WFDMR and Heron Lake TMDL Implementation Plan, approved by the MPCA on September 22, 2009.

Goals are to enhance partnerships between Murray, Nobles, Jackson, and Cottonwood Counties and the HLWD through the continued employment of a watershed coordinator to assist with obtaining current feedlot information through onsite inspections and project promotion. Also to increase the knowledge of 50 feedlot operators through a one-day workshop and increase public awareness of the WFDMR TMDL Project through the development of a brochure and website.

A major portion of this project is dedicated toward educating watershed residents, obtaining feedlot information, and promoting the overall watershed project. The following measures of success and methods will ensure that the projects goals are met.

- The number of Level III feedlot inventories completed in the four counties.
- The increase of knowledge of at least 50 feedlot operators about proper manure management.
- The number of website viewers.
- The increase in the number of people who are aware of the project.
- Future funding mechanisms in place for the continuation of the project.

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 SSTSs in the three-year grant period. Replacement of failing SSTSs was chosen by the committees as one of the main concerns in this area.

Lake Superior Basin

Projects completed

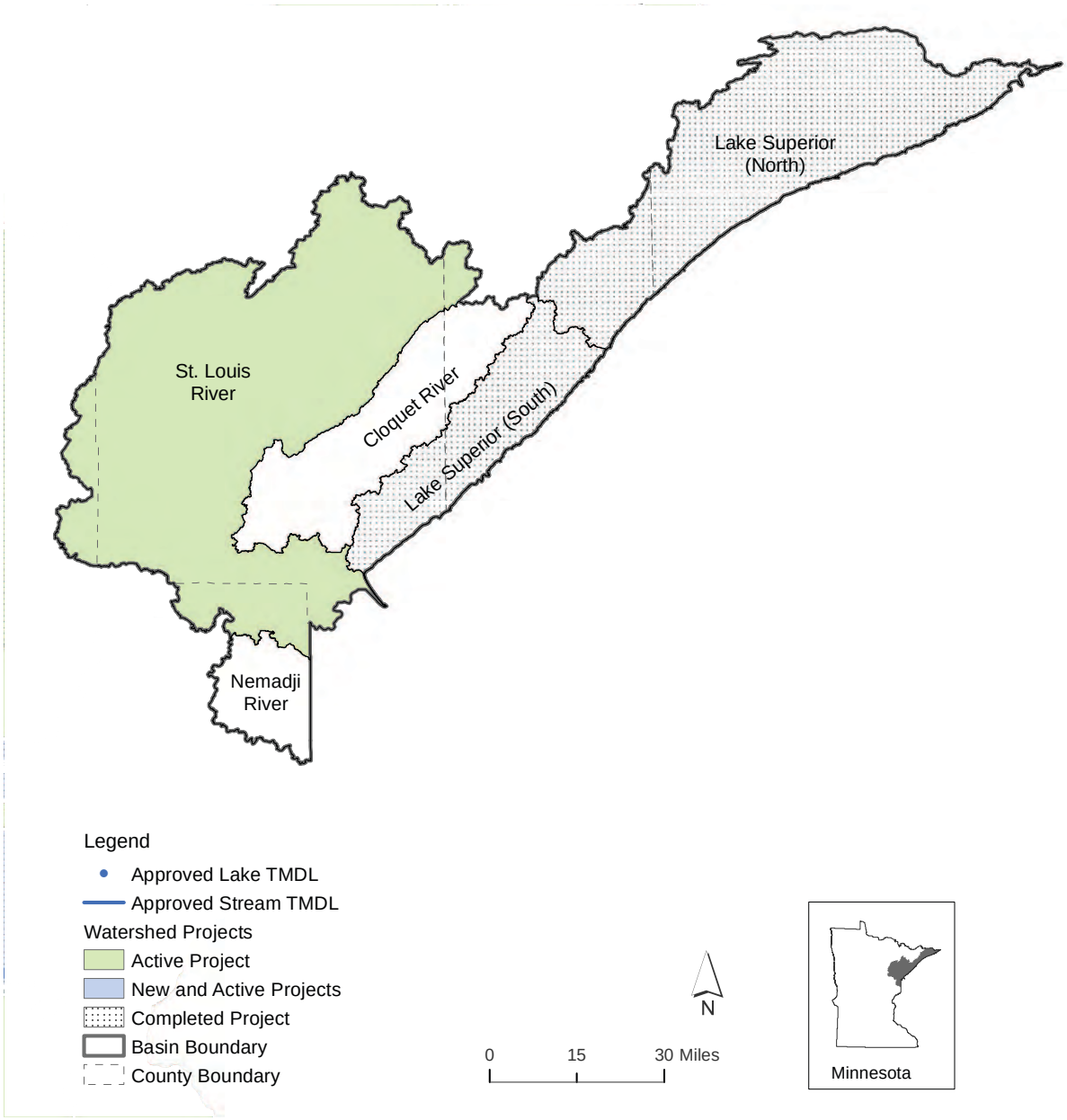
Lake Superior – North

Miller Creek Total Maximum Daily Load

Lake Superior – South

Duluth Residential Stormwater Reduction Demonstration Project for Lake Superior Tributaries

Restoring Impaired Superior Tributaries: Stormwater BMP Evaluation, Education and Outreach



Lake Superior – North

Miller Creek Total Maximum Daily Load

The work conducted under this contract was the final of three stages of work conducted to complete the Miller Creek TMDL Study. During this final stage, the following tasks were successfully completed:

1. The final year of monitoring for temperature, flow and additional relevant water quality parameters.
2. Compilation and formatting of data for submittal to the MPCA STORET system.
3. Continued stakeholder involvement through the Technical Advisory Group and public events.
4. Arrangement and signing of a contract with the U of M's St. Croix Falls Laboratories to complete the final analysis of the data for the TMDL Study.
5. Calculation of the loading capacity, waste load allocations and load allocation for the creek.
6. Writing the TMDL for submittal to the MPCA and ultimately the USEPA.

The results of task five show that the temperature of Miller Creek is driven by atmospheric heat transfer during dry weather periods, by surface runoff during wet weather with substantial runoff, and by both mechanisms during small rainfall events. Based on the observed temperature violations, heat inputs exceed allowable values by up to 10 percent. Although stormwater was found to contribute the majority of flow and heat at higher stream flows, the data indicate that stormwater contributes on the order of 40 percent of the total heat in the flow range, where most temperature exceedances occur. Based on the 10 percent exceedance of total heat input and the 40 percent fraction attributable to stormwater, relatively moderate reductions in stormwater (4 percent) were specified.

Goals

- Collect temperature, flow and other relevant water quality data during the open water seasons of 2007, 2008, and 2009 for Miller Creek.
- Involve all identified stakeholders in the development of this TMDL.
- Complete a draft TMDL for Miller Creek.

Results that count

- Completed water quality monitoring as scheduled and all data was submitted to MPCA for state databases per our work contract.
- Agencies, local governments, homeowners and businesses in the watershed all participated on some level in the development of this TMDL through TAG meetings, public meetings, newsletters, the brochure, the workshop, installation of BMPs, and/or the creek clean-up.
- Submitted completed TMDL plan to the MPCA per our work contract.

Financial information

Funding type: CWLA

Grant amount: $70,000

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Lake Superior – South

Duluth Residential Stormwater Reduction Demonstration Project for Lake Superior Tributaries

We used paired 2-block street sections in the Amity Creek watershed (Duluth, Minnesota) to demonstrate the effectiveness of homeowner BMPs to reduce residential stormwater flow to storm sewers in an older neighborhood in a cold climate on clay and bedrock geology. Runoff from each street was measured before and after installation of stormwater BMPs. In addition, the knowledge, attitudes, and practices of residents were measured before and after BMP installation. BMPs were installed on properties of willing residents of one street ("treatment"). Most residents (22 of 25 properties) willingly participated.

- 250 trees and shrubs planted
- 22 rain barrels installed
- five rain gardens, 12 rock-sump storage basins, and two swales constructed
- re-dug stormwater ditch and five ditch checks installed in it

The post-project survey indicated an increase in understanding by treatment-street residents of where stormwater flowed to and what it affected, and an increase in willingness to accept at least some responsibility for stormwater runoff. Residents who received BMPs were generally satisfied with them and would recommend them to others. Runoff reduction proved more difficult to quantify due to high and inconsistent runoff variability between the paired streets, very few pre-BMP installation rain events, and loss of one control street due to re-paving mid-project. Capacity of installed BMPs is approximately 2.5 percent of the measured stormwater runoff. There is about a 20 percent greater reduction in runoff for the treatment street after BMPs were installed than for the control street for small to moderate storm events; while we would like to attribute this completely to our BMPs, we cannot prove that other factors were not also at work. Peak flows also appear to have been reduced for one inch and smaller rainstorms, but we were unable to accurately measure this reduction. The results are available on an existing stream education website and are used to educate neighborhood, city of Duluth, and regional residents on stormwater issues, individual responsibility, and BMP options.

Goals

- Install stormwater BMPs on at least 20 residential properties in the treatment neighborhood.
- Increase property owner understanding of stormwater issues and individual responsibility.
- Demonstrate effectiveness of homeowner BMPs to reduce stormwater runoff and runoff peaks from lawns and roofs.
- Train MCC crews, local landscapers, and interested public in rain garden construction and stormwater BMP installation.

Results that count

- Installed 46 stormwater BMPs on 22 residential properties and City property in the treatment neighborhood/sub-watershed, along with 250 trees and shrubs planted.
- Pre and post-project surveys showed people receiving BMPs increased their understanding of stormwater issues by about 10 percent, and 17 percent more people than in the pre-survey said property owners should take at least some responsibility for stormwater runoff (increase from 66 to 83 percent).
- Comparison of peak runoff ratio between the control and treatment streets indicates a reduction in peak stormwater flow for rainstorms of 1.3 inches or less. The treatment street had 3 percent less stormwater runoff after BMP installation than the control street, and calculations show BMPs should have held back about 2.5 percent of total stormwater runoff.
- Trained 30 crew members in various aspects of BMP installation, including rain garden construction and building ditch checks. Trained 15 members of the general public and two landscape professionals in rain garden construction.

Financial information

Funding type: Section 319
Grant amount: $167,383
In-kind: $185,629

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Lake Superior – South

Restoring Impaired Superior Tributaries: Stormwater BMP Evaluation, Education, and Outreach

Duluth, Minnesota trout streams watersheds are generally similar to watersheds along Lake Superior's North Shore. Therefore, Duluth's streams can serve as suitable pilots for evaluating restoration, mitigation and planning strategies for use with more pristine, but developing, North Shore streams. Our primary goal was to coordinate with local remediation/BMP projects, the Lake Superior Streams (LSS) http://www.lakesuperiorstreams.org water quality monitoring and public education effort, and Weber Stream Restoration Initiative (WSRI), http://www.lakesuperiorstreams.org/weber to assess BMP effectiveness at reducing stormwater runoff problems via upstream-downstream and before-after water quality and biological monitoring.

Three projects on impaired streams were identified to have high likelihood for long-term success and potential for educational use and public visibility:

1. Lower Amity-Graves Road Creek restoration– upstream from automated Amity sensors, this intermittent tributary discharged a muddy plume during rainstorms and snowmelt runoff since a 1946 flood destroyed the road. WSRI/LSS partner, City of Duluth carried out a restoration including new culverts, flow rerouting, bank slope reductions, and sediment stabilization
2. East Branch Upper Amity Creek bank stabilization- Eroding banks were identified from surveys, and WSRI/LSS partner South St. Louis SWCD led an effort to mitigate two of the largest sediment sources and redirect high flows using J-vanes– the first such project on the Superior North Shore
3. Miller Creek Sediment Trap- a natural-bottomed trap completed in 2004 below the Miller Hill Mall complex, was evaluated for the first time for its effects on temperature, sediment transport, and protection of aquatic habitat. The overall project was initiated by a gift from a former Duluth resident that created the WSRI with the goal of improving water quality in Lake Superior streams via a collaborative process focused on educating, implementing projects, and critically evaluating restoration efforts

Goals

- Quantify BMP effectiveness in improving water quality, sedimentation, bank erosion, and protection of benthic biological communities on Amity Creek and Miller Creek.
- Citizen Volunteer BMP Monitoring (storm events; seasonal; benthic biological communities).
- Use http://www.lakesuperiorstreams.org to showcase project results.

Results that count

1. Stormwater BMP effectiveness was evaluated across a range of parameters. Three BMPs located on two designated trout streams suffering water quality impairments were evaluated in terms of their performance in removing suspended sediment and turbidity over a period of 1-3 years.
2. Benchmark data was established for Amity Creek. Two-plus years of water quality, stream habitat, aquatic invertebrate and fish data have established a baseline for Amity Creek.
3. Amity Creek BMP evaluation: Results from the first full year of post BMP construction surveys do not show significant improvement, presumably for lack of sufficient data. Future BMP installations and reviews will use these benchmarks. Geomorphic measurements of the eroding banks were made.
4. Specific observations: a) to date, there is very little habitat heterogeneity below the Upper Amity construction site b) midge larvae abundance was the only invertebrate trait showing significantly greater numbers below the Upper Amity bank restorations c) Blacknose Dace and Sculpin fish species had significantly greater mass after the construction activity than before.
5. Miller Creek Sediment Trap Assessment (Miller Hill Mall location)
6. Surveys upstream and downstream of the Miller Hill Mall area sediment trap indicate that there is relatively little long-term removal of suspended sediment due to the trap. Biological communities were generally similar upstream and downstream of the trap. Sediment depth and characterization were completed. One sediment particle size (grains between 0.5 and 0.25 mm) showed a significant difference in mass between locations. Mean number of invertebrate taxa per sample was significantly less.

There was a significantly greater abundance of Midge larvae.

7. There was successful public outreach on stormwater pollution prevention and technical BMPs. Outreach and education activities include print, radio, and television media outlets, technical reports, presentations at local, state, and national conferences and workshops, and via the internet and the http://www.lakesuperiorstreams.org website.
8. The grant provided continued operation and maintenance of the http://www.lakesuperiorstreams.org website, a program and website that provides: automated flow and water quality sensors in five Duluth area trout streams, event-based grab samples at each site, dissemination of the data in a variety of formats including a unique data visualization tool via the website, relevant maps, mapping utilities and stormwater related tutorials and library of outreach materials.
9. A stronger stormwater management partnership developed and resulted in more projects. Partners were awarded follow-up grants from the Great Lakes Restoration Initiative to complete additional BMPs, technical manuals, stormwater permit tools for local governments and more public outreach. The project is also one of a handful of regional candidates for USEPA's SUSTAIN project, a long term BMP monitoring project.

Financial information

Funding type: Section 319

Grant amount: $103,553

Final in-kind: $127,475.07

Matching funds: $91,734.48

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Lake Superior Basin

Projects active and awarded in 2012

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

Cannon River Watershed

Assistance for Unsewered Communities in the Lower Mississippi/Cedar River Basin

Cannon River Watershed One Water Project

Straight River Turbidity TMDL Project

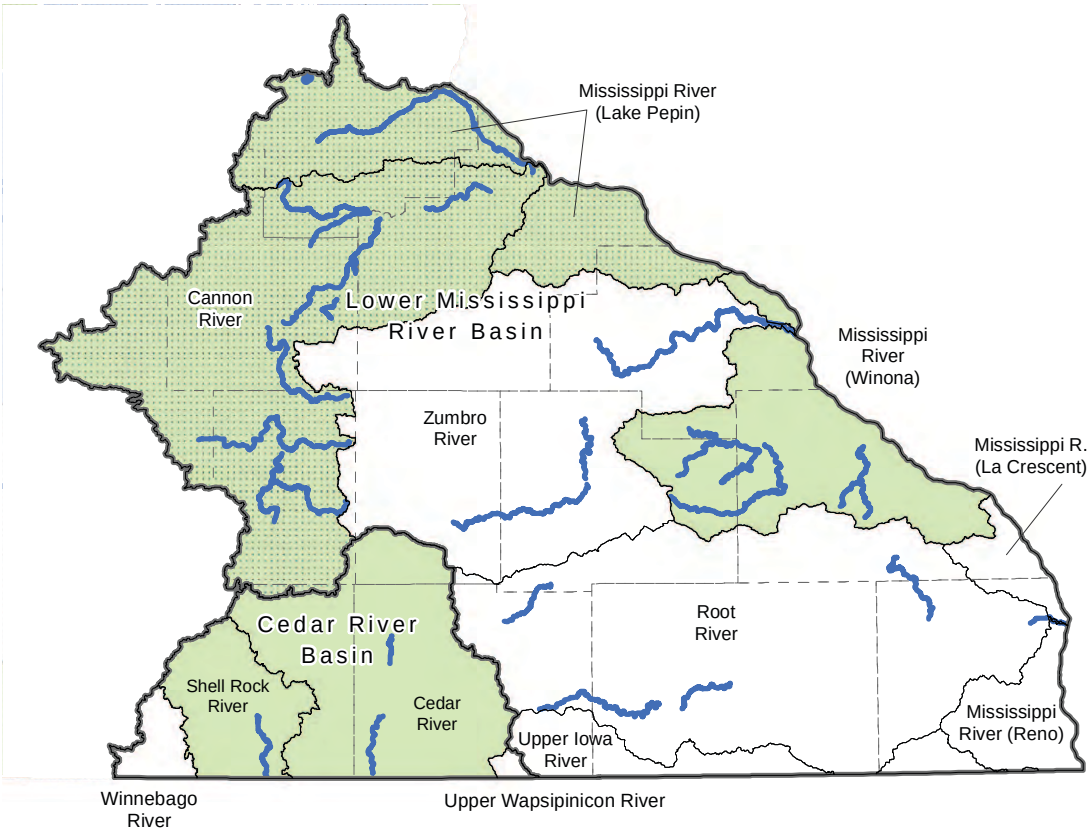
Upper Cannon Lakes Excess Nutrients Total Maximum Daily Load Study

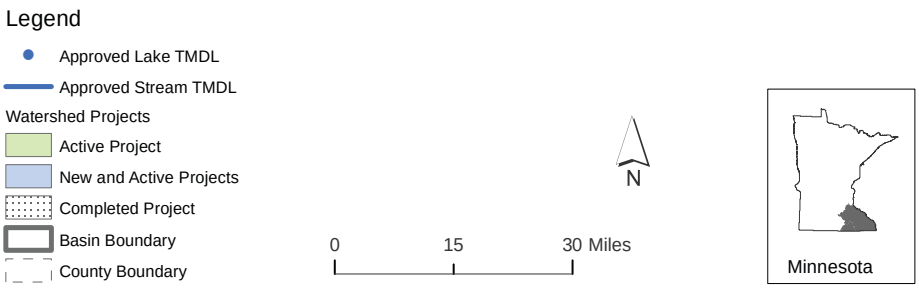
Lower Minnesota River Watershed

Crystal, Keller, and Lee Lakes Nutrient Impairment TMDL and Earley Lake Water Quality Assessment

Mississippi River – Lake Pepin

Dakota County Nonpoint Source Reduction Project





Cannon River Watershed

Assistance for Unsewered Communties in the Lower Mississippi/Cedar River Basin

The Southeast Minnesota Wastewater Initiative (SEMWI) has successfully employed the Wastewater Facilitator concept since 2001. During this time period, 17 communities have completed the process needed to provide adequate sewage treatment for their communities, with 10 completed during the current grant period. In a survey conducted by the U of M Extension Service in 2006, community task force members identified the services of the Wastewater Facilitator as the most critical aspect in helping their communities progress toward a wastewater solution.

Educating communities about wastewater systems was also identified as an integral component of the successful strategy developed by the SEMWI. When an agency first approaches an un-sewered community about changing their wastewater system, residents and decision-makers often lack an understanding of proper wastewater treatment. Without this understanding, the community is unlikely to accept responsibility for the environmental impacts of its current system and therefore unlikely to take steps to correct the situation. Once a community has taken steps to address the condition of its system, the community needs education in the types of treatment options available before an appropriate community decision can be made. Finally, once a new system has been installed, the long-term viability of the system depends upon the homeowner's knowledge of how to operate and maintain the system. This project has succeeded by working with the skilled educators at the U of M Extension Service to provide all three types of education to un-sewered communities.

Goals

- Increase the number of communities that successfully complete the community wastewater process to ensure adequate sewage treatment.
- Increase in the number of on-going communities who have made progress in achieving benchmarks in the wastewater process.
- Increase in the number of new communities who have entered into the wastewater process.

Results that count

- Ten communities have successfully completed the community wastewater process during this period, achieving adequate wastewater treatment. This brings the total to 17 communities reaching the goal of wastewater treatment since this project started in 2001.
- Twelve additional communities have made progress in achieving benchmarks in the wastewater process during this grant period.
- Nine new communities entered into the wastewater process through this grant.

Financial information

Funding type: Section 319

Grant amount: $272,080

In-kind: $327,195

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Cannon River Watershed

Cannon River Watershed One Water Project

The MPCA piloted the One Water approach in two watersheds: Buffalo River and Cannon River. These two pilots undertook markedly different approaches to laying the groundwork for the new watershed approach and its 10-year schedule of studying watersheds. The MPCA selected the Cannon River watershed as a pilot because several watershed-based TMDL projects are underway in this drainage area, where dozens of documented water impairments are distributed across the watershed. The purpose of this project was to synthesize this work, associated planning efforts, and existing plans and strategies into one comprehensive strategy.

An important product of this approach is a comprehensive watershed management strategy that guides and coordinates subsequent implementation activities. In addition, the comprehensive watershed management strategy provides the bridge between the major watershed level work (intensive watershed monitoring program and major watershed-based TMDLs) and the 12-digit hydrologic unit code (HUC) scale (and smaller) at which the agencies involved in local water management operate. Overall, this approach defined strategies for both protection and restoration of surface waters, as opposed to being driven by the process of listing impaired waters, developing TMDL studies, and writing implementation plans based on single impairments. A comprehensive, watershed-based strategy document stimulated communication and coordination among local water management agencies by fostering a common vision and facilitating cooperative projects. The One Water approach has the potential to save staff and citizen time and money by pooling resources and information to promote sound, coordinate decision-making.

Goals

- Communicate status of major rivers to citizens and decision-makers
- Develop comprehensive watershed strategy
- Complete Lower Cannon Turbidity TMDL Implementation Plan

Results that count

- Published "Signs of Progress: The State of the Cannon and Straight Rivers"
- Completed Cannon River Watershed Management Strategy
- Completed Lower Cannon Turbidity TMDL Implementation Plan

Financial information

Funding type: CWLA

Grant amount: $98,668

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Cannon River Watershed

Straight River Turbidity TMDL Project

The goal of this project was to lay the foundation for addressing direct and indirect sources of turbidity so that the Straight River and its tributaries are healthy water resources that fully support their designated uses under state water quality standards. Project tasks were focused on: 1) Investigating stream channel stability in the Straight River watershed; 2) Developing and calibrating a "Gridded Surface Subsurface Hydrologic Analysis (GSSHA)" model for use in future implementation planning; and 3) Developing TMDL studies for the six sections of river reaches currently listed by the MPCA as impaired by turbidity. Project partners included the Cannon River Watershed Partnership (CRWP) and Minnesota Department of Natural Resources (DNR). They focused mainly on the stream channel work and the GSSHA model while MPCA staff developed the TMDL studies. Together, these components provide valuable information and form a foundation for implementation strategy development in the Straight River watershed. This work supports the development of a "Cannon River Watershed Management Strategy" in that the Straight River watershed is one of the major "lobes" of the Cannon River. The end results of this project's have been integrated into the watershed strategy, a more encompassing planning effort.

Goals

- Complete TMDL computations for each of the turbidity listings in the Straight River watershed.
- Collect water quality information to determine total suspended solid and turbidity relationships within the Straight River watershed.
- Conduct physical assessments on selected stream sections throughout the Straight River watershed. These assessments will include: cross-sectional and longitudinal surveys, determination of bankfull elevations, level of stream entrenchment, and bed sediment characterizations. This information will be used to run a calibrated GSSHA model to help identify implementation strategies.

Results that count

- Computations for the six turbidity impairment listings have been completed. These computations are to be included in a report completed by MPCA staff and will be provided to the United States Environmental Protection Agency.
- Over the duration of this project, a total of 84 water quality samples were collected. In addition, there were 160 separate field measurements of the stream's condition during this project. These measurements were collected at the four monitoring stations within the watershed. These measurements included field turbidity and transparency readings. These data provide support to assessment of water quality, duration curve development, and model calibration.
- Based on the physical assessment of the stream reaches using an assessment model, from the 52 river miles assessed, the estimated bank erosion contribution for the assessment area was 5,728 tons. The investigation of the watershed's stream channels provides important direction regarding sediment sources. It was apparent that some stretches of the Straight River are significantly more stable than others; and some tributaries (Crane Creek) are more stable than others (Turtle Creek).
- Calibration of a GSSHA model for two subwatersheds was completed: Crane and Turtle creeks. Further examination of the model will continue via partnership between DNR, MPCA and CRWP. The model will be useful in examining scenarios designed to reduce sediment loading in the Straight River watershed.

Financial information

Funding type: CWLA

Grant amount: $100,000

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Cannon River Watershed

Upper Cannon Lakes Excess Nutrients Total Maximum Daily Load Study

The Upper Cannon Lakes TMDL project included six lake basins. Lake Volney represents one of the six lake basins and the five lakes of the Jefferson German Chain (JGC) represent the other five lake basins. Lake Volney is situated in a watershed that is comprised of moderate to steeply sloping hills that have been cleared primarily for agricultural purposes. Prior to the 1980's, Lake Volney was considered a favorite swimming location of many residents in Le Sueur County. However, due to the increased severity and frequency of algal blooms residents seldom use the public beach. The number of people fishing, boating, and enjoying other forms of aquatic recreation on Lake Volney has also dropped significantly over the last 20 years in response to the algal blooms which seem to now plague the lake (Schuler, 1997).

Lake Volney was listed as impaired for aquatic recreation in 2002; excess nutrient/eutrophication was the defined stressor. The five basins of the Jefferson German Chain represent the other basins included in this TMDL study. They were all listed in 2008 for excess nutrients/ eutrophication The JGC consists of five interconnected lake basins that comprise a total surface area of more than 3,000 acres, making it the largest lake system in south central Minnesota. Despite the relatively large size of this chain of lakes, the watershed that drains into the JGC is relatively small (15,167 acres). Historically, most of the JGC watershed was covered with hardwoods, however, upon settlement the land was cleared for agricultural use. This TMDL calculated nutrient loading based on the best available data and modeling information and calculated the reductions necessary to meet the established water quality standards. Due to the nature of the nutrient loading, a wide variety of implementation practices would need to be considered that targets both internal and external nutrient sources.

Goals

- Complete development of the TMDL through collaboration with the stakeholder group and technical committee.
- Prepare draft and final TMDL report with study results, implementation outline and monitoring plan. Assist with TMDL approval process as needed.
- Prepare draft and final TMDL implementation plan.

Results that count

- A technical advisory team and stakeholder group was established; all aspects and concerns from public and professional groups were recognized.
- A draft TMDL report was presented to the MPCA. This was developed to satisfy all MPCA and USEPA requirements set forth in the protocols.
- A draft TMDL implementation plan and TMDL report was presented to MPCA.

Financial information

Funding type: CWLA

Grant amount: $240,000

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Lower Minnesota River Watershed

Crystal, Keller, and Lee Lakes Nutrient Impairment TMDL and Earley Lake Water Quality Assessment

In 2007, Crystal, Keller, Lee, and Earley Lakes were on the MPCA impaired waters list for excess nutrients (phosphorus), requiring that a TMDL study be completed to identify the amount of phosphorus that the lakes can accept and still meet state water quality standards. The original goal for this project was a draft TMDL report sufficient for public notice and submittal to the USEPA for final approval covering all four lakes and including load allocations for each lake. However, after work began on the TMDL, the MPCA began the process of removing Earley Lake from the impaired waters list and TMDL load allocations were not developed for Earley Lake. A final TMDL report was developed that incorporated changes based on public and USEPA review comments. This project built on existing information, including the Crystal and Keller Lake Use Attainability Analysis (UAA) completed in 2003, Earley and Twin Lakes UAA, recent lake monitoring, and watershed inventories. This grant also provided the modeling and watershed analysis necessary to complete a nutrient TMDL for each lake.

The main objective of this project was a written TMDL that determines the sources of the excess nutrients causing recreational use impairment, an allocation of pollutant loads for phosphorus, and a discussion of broad implementation strategies for achieving and maintaining water quality standards for these impaired lakes. Once the TMDL process developed sufficient information, work began on implementation strategies. Near the end of the TMDL development process, the grantee wrote an implementation plan that prescribes more detailed remedial measures that correct the impairments and ultimately remove Crystal, Keller, and Lee Lakes from the state's impaired waters list. The grantee also developed a protection plan for Earley Lake.

Goals

- Complete nutrient loading assessment to determine what is needed to achieve the MPCA water quality standards for each lake.
- Develop TMDL report and implementation plan.
- Engage stakeholders.

Crystal Lake

Results that count

- The TMDL and implementation plan have been completed.
- Ten public and stakeholder meetings were held to discuss the TMDL and implementation plan development process to engage stakeholders and incorporate their feedback.

Financial information

Funding type: CWLA

Grant amount: $174,102

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Mississippi River – Lake Pepin Watershed

Dakota County Nonpoint Source Reduction Project

The CWP Dakota County Nonpoint Source Pollution Prevention Program is a continuation of a Clean Water Section 319 grant from the USEPA grant that ended in 2008. With the support of the MPCA, Dakota County has been executing the strategies developed in the Implementation Plan for the Clean Water Partnership MPCA Project, entitled the Hastings Area Nitrate Study Phase I (1997-2003). Dakota County, in partnership with the City of Hastings, the Minnesota Department of Health (MDH), the Minnesota Department of Agriculture (MDA), the Dakota County SWCD, and the Metropolitan Council, conducted this Phase I Diagnostic Study to determine the cause and extent of nitrate (N) contamination in the drinking water aquifers supplying Hastings and the surrounding townships.

This Clean Water Partnership Continuation Grant enabled Dakota County to continue its education, outreach, well regulation, monitoring, and research efforts to address nitrate and pesticide contamination of private and public drinking water wells. The county and its partners conducted research and demonstration projects with cooperating farmers, and then communicated these results and the latest research-based information from the U of M, MDA, and other agencies. Working with the City of Hastings, the county promoted and provided cost-share funding for well sealings for the city and its private well owners, removing potential conduits for groundwater contamination. The county sampled private drinking water wells, monitoring wells, and surface water, then analyzed the results statistically and hydrogeologically. This information will be used to evaluate the long-term effectiveness of these efforts at reducing nitrate and pesticides in the county's drinking water supplies.

Goals

- Expand agricultural outreach efforts by increasing the work hours of a University of Minnesots Extension Educator for Agriculture Production/Water Quality from 0.50 to 0.75 full-time equivalent.
- Facilitate sealing of one unused Hastings municipal well and 60 unused private drinking water wells.

- Monitor nitrate and pesticide trends in groundwater and surface water.

Results that count

- Expanded agricultural outreach efforts by increasing the work hours of a U of M Extension Educator for Agriculture Production/Water Quality from 0.50 to 0.75 full-time equivalent.
- Facilitated sealing of original Hastings Well No. 1 and 20 unused private drinking water wells.
- Monitored nitrate and pesticide trends by conducting biennial Ambient Groundwater Quality Study, in which 68 private drinking water wells throughout Dakota County were tested for a variety of drinking water quality parameters.

Financial information

Funding type: CWP

Grant amount: $172,700

Matching funds: $146,040.61

In-kind: $89,908

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Lower Mississippi and Cedar River Basins

Projects active and awarded in 2012

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 SSTSs 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

Blue Earth River

Greater Blue Earth Basin Unregulated Community Stormwater Management Project

Chippewa River

Chippewa River Watershed Project Turbidity TMDL Assessment and Implementation Plan Development

Shakopee Creek Headwaters Project Continuation

Shakopee Creek Headwaters Project Continuation 2

Upper Main Stem Chippewa River Project Continuation

Cottonwood River

Cottonwood River Turbidity TMDL Project

Cottonwood River Watershed Nonpoint Pollution Reduction Project

Lac qui Parle River

Lac qui Parle River Main Stem Water Quality Enhancement Project Continuation

Lac qui Parle – Yellow Bank River Watershed Total Maximum Daily Load Assessment and Implementation Plan Development

Le Sueur River

Lura Lake Excess Nutrient Total Maximum Daily Load Study

Lower Minnesota River

Bluff Creek Watershed TMDL

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

High Island Creek Implementation Plan

Rush River and High Island Creek Turbidity/Biota TMDL

Rush River Watershed Implementation Project Continuation

Minnesota River – Mankato

Crystal Lake Excess Nutrient Total Maximum Daily Load Study

Middle Minnesota – Brown and Redwood Counties First Order Streams Phase I Diagnostic Study

Minnesota River – Yellow Medicine River

Hawk Creek, Beaver Creek, and Yellow Medicine River Turbidity and Bacteria Total Maximum Daily Load

Hawk Creek Watershed Project "Beaver Tales" Continuation

Long Lake Nutrient Total Maximum Daily Load Assessment and Implementation Plan Development

South Branch of the Yellow Medicine River TMDL Fecal Coliform Reduction Project

Pomme de Terre River

Turbidity TMDL Assessment of Pomme de Terre River Watershed

Redwood River

Redwood River Turbidity TMDL Project

Redwood River Watershed Phosphorus TMDL Compliance Project Continuation

Blue Earth River Watershed

Greater Blue Earth Basin Unregulated Community Stormwater Management Project

After completing a Needs Assessment for each community within Faribault County, a rain garden workshop was developed for both the cities of Bricelyn and Wells, resulting in six rain gardens. The City of Blue Earth installed two public rain gardens and 400 square feet of pervious pavers. Following a county wide community education presentation on rain gardens; six rain gardens were installed in Blue Earth, four in Kiester, and one each in Winnebago, Easton, Delavan and Frost. The City of Wells was also the location of the County's first Stormwater Excellence Award, for The Shepherd's Inn. A total of 6,236 square feet of rain gardens were installed, 1,050 square feet of pervious pavement; 400 square feet of pavers and 650 square feet of concrete.

A variety of community outreach projects took place from 2007 to 2011. Work was done with the Minnesota Erosion Control Association (MECA) to educate the public on rain gardens, as well as other stormwater management practices as well as developing a stormwater audit. MECA, Blue Thumb, and Metro Blooms were all hired to present stormwater management practices to local contractors, governing officials, and residents. Metro Blooms gave a Community Education presentation that resulted in 25 rain garden designs that resulted in 21 rain gardens being installed throughout the county

Due to staff turnover there were some time periods within the grant that no activity took place.

Goals

- Community Needs Assessment
- Education and Outreach
- Install of Stormwater Management Practices

Results that count

- Various educational and outreach practices and programs were implemented
  - 40 meeting and workshops held with 1,352 attendees
- Various stormwater practices were installed
  - 25 rain gardens installed totaling 6,236 ft^2
  - 400 ft^2 of pervious pavers installed
  - 650 ft^2 of pervious concrete installed

Financial information

Funding type: Section 319

Grant amount: $90,265.97

In-kind: $60,286.83

Matching funds: $36,935.05

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Chippewa River Watershed

Chippewa River Watershed Project Turbidity TMDL Assessment and Implementation Plan Development

The Chippewa River Watershed is located in the upper Minnesota River Basin. The Chippewa River originates near Fish Lake in southeastern Otter Tail County, flows approximately 130 miles south and discharges into the Minnesota River at Montevideo. It comprises nearly 1,333,440 acres of land or 2080 square miles, covering portions of 8 counties and is the largest watershed in the Minnesota River Basin.

The goal of the project was to complete a TMDL assessment report and implementation plan for the nine turbidity impairments in the Chippewa River Watershed. This was accomplished by the staff of the Chippewa River Watershed Project (CRWP) and by hiring a consultant to conduct the modeling, load allocations and reduction scenarios. The staff of the CRWP were responsible for collecting information, working with the consultant and producing the TMDL report. CRWP staff conducted educational and outreach activities pertaining to the Turbidity TMDL utilizing meetings, CRWP's website, http://www.chippewariver.com, and printed media. Public meetings were held to gather input from stakeholders in the watershed and develop a plan that will be used to guide restoration efforts to reduce turbidity.

This project does not contain the lowest reach of the Chippewa River (07020005-501) that is also impaired for turbidity. This reach of the Chippewa River is included in the Minnesota River Basin Turbidity TMDL that was public noticed in spring 2012.

Goals

- Hire a contractor to develop a Soil and Water Assessment Tool (SWAT) model, load allocations and reduction scenarios
- Develop Chippewa River Turbidity Report
- Develop Chippewa River Turbidity Implementation Plan

Results that count

- SWAT model, load allocations and reduction scenarios developed by contractor.
- The Turbidity Report was written and submitted to the MPCA.
- The implementation plan was written and submitted to the MPCA.

Financial information

Funding type: CWLA

Grant amount: $140,000

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Chippewa River Watershed

Shakopee Creek Headwaters Project Continuation

Shakopee Creek is a tributary of the Chippewa River. The headwaters region lies on the border of the North Central Hardwood Forest and the Western Corn Belt. This region of approximately 50,000 acres has been the focus of a Federal 319 Implementation prior to this CWP Continuation grant. The Shakopee Creek Headwaters Watershed includes a popular chain of lakes (West Norway, Norway, Games, Andrew, and Florida) which comprises about 15 percent of the land area with an additional 52 percent being agricultural land located in northern Kandiyohi County. The water quality problems here come from both agricultural and residential sources. Changes in agricultural practices as well as shoreline management are necessary for improvements in water quality.

The Shakopee Creek Headwaters Project (SCHP) Committee is comprised of the local cooperating partners that have been working as a cohesive group since 1996 to protect and improve water quality in the Shakopee Creek Headwaters.

Currently this watershed is a valuable recreation area in Kandiyohi County and the state. There are resorts, county parks, and a state park all located around the main chain of lakes in this watershed. The water resources are used for swimming, sport fishing, water skiing, boating, and canoeing. Recreationists come from all over the state to enjoy the lake resources of this region. The SCHP Committee along with the watershed citizens would like to see these uses continue into the future. For this to happen the pollution that is entering these lakes needs to stop. West Norway Lake, the first lake in a chain of six, cannot currently support swimming and has a limited sport fishery. By setting goals for nutrient concentrations and for educational outreach, the idea of reducing pollution and restoring water quality will become a common goal for all watershed residents and for all people who utilize these waters.

Goals

- To increase the number of septic system upgrades by landowners utilizing the CWP loan program
- To implement five shoreline naturalization projects on the chain of lakes
- Educate landowners on the connection between their actions and water quality

Shoreline stabilization project on Lake Florida

Results that count

- In CWP loan funds, $200,000 were utilized on individual landowner septic system upgrades.
- Eight shoreline naturalization projects were installed through this project.
- A Shakopee Creek Headwaters Handbook was developed and distributed to shoreline and agricultural landowners.

Financial information

Funding type: CWP

Grant amount: $254,346

In-kind: $972,983.67

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Chippewa River Watershed

Shakopee Creek Headwaters Project Continuation 2

Located within the larger Chippewa River Watershed, the Shakopee Creek sub-basin was identified as a priority management area and contributes a significant share of the pollutant load to the Chippewa River. The water quality problems in this area come from both agricultural and residential land use in the watershed. An influx of sediment and nutrients such as phosphorus and nitrogen has decreased water transparency and overall water quality in the watershed's lakes as well as the Shakopee Creek itself. Elevated levels of bacteria have also been found throughout the watershed. Within the Shakopee Creek Watershed are several recreational lakes that are used for fishing, swimming, boating, canoeing and kayaking, and other outdoor activities. Local residents and recreationalists from across the state who utilize these lakes generate revenue for local businesses. It is the goal of the watershed project to retain the water quality at levels that are suitable for all forms of recreation within the watershed as well as aquatic life.

A detailed and comprehensive study from 1996 through 1998 revealed some of the highest fecal coliform bacteria test results in the state with some being 500 times higher than the human health standard. Along with bacteria, an average of 1.1 million pounds of sediment and 8,313 pounds of phosphorus are added to the system every year.

The major land use in the watershed is agriculture and much of this land has been drained and ditched which has dramatically decreased water clarity and overall water quality. The implementation focus was on modifying agricultural practices to improve water quality. However, shoreline development also has a significant impact on water quality. Therefore, priority was placed on working to protect and improve the ecological integrity of shoreline properties and prevent pollution.

Goals

- Install 175 acres of buffer strips
- Presentations at the three area lake association meetings
- Conduct wetland restorations

Results that count

- Installed 220.92 acres of buffer strips
- Chippewa River Watershed Project staff presented BMP and water quality information at the three area lake association meetings
- Implemented three wetland restorations

Financial information

Funding type: CWP

Grant amount: $218,634.39

In-kind: $316,240

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Chippewa River Watershed

Upper Main Stem Chippewa River Project Continuation

The Upper Main Stem Chippewa River sub-basin is one of six priority sub-basins of the Chippewa River Watershed. The Chippewa River and its sub-basins are direct participants in the hypoxia issue of the Gulf of Mexico. Major pollutants of the Upper Main Stem Chippewa River are excessive nutrients, sediment and bacteria. The Chippewa River is listed on the impaired water list for fecal coliform bacteria and turbidity. This project helped build capacity with the cooperating partners and landowners in the watershed. The cost share dollars that were spent with landowners shows the outcomes of installing projects have been achieved and the installation of BMPs is a change in social behavior by the landowners. Addressing agricultural nonpoint source pollution within the Chippewa River Watershed will contribute to achieving the goals of both phosphorus reductions for the Lower Minnesota River Dissolved Oxygen (DO) TMDL and fecal coliform bacteria reductions for the Chippewa River Watershed Fecal Coliform Bacteria TMDL. The intent behind the implementation of BMPs is to reduce the levels of phosphorus, nitrogen, sediment, and bacteria reaching the Chippewa River and, ultimately, the Minnesota River.

This project worked to abate or prevent nonpoint source pollution by implementing BMPs that were set out in the CRWP Diagnostic Study and Implementation Plan (October 2000, Olson and Churchill, on file at MPCA). These BMPs are also in conjunction with the standards of our contributing partners, including SWCDs and the NRCS.

Goals

- Implement a buffer strip program
- Work with landowners on special projects
- Have certified manure management plans written for landowners

Results that count

- Installed 424.90 acres of buffer strips and critical plantings
- Installed 7 sediment basins, 9 alternative takes, 1 rain garden, and completed 9 manure pit closures

Jennie Lake

- Two landowners worked with certified crop advisors and completed manure management plans

Financial information

Funding type: CWP

Grant amount: $251,474

In-kind: $315,059

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Cottonwood River Watershed

Cottonwood River Turbidity TMDL Project

The "Cottonwood River Turbidity TMDL Project" contract was a total award of $145,000. This contract was awarded to the Redwood-Cottonwood Rivers Control Area (RCRCA) Joint Powers Organization under MN Statute: 471.59 as "Project Sponsor" to complete a TMDL study on river reaches in the Cottonwood River watershed that were listed as impaired for excess of the state turbidity standard. Portions of the project were scheduled to begin in 2011 and be completed in 2015. A willing local group, the RCRCA, allowed for an earlier completion of the TMDL. Ranking criteria for scheduling TMDL projects include, but are not limited to: impairment impacts on public health and aquatic life; public value of the impaired water resource; likelihood of completing the TMDL in an expedient manner, including a strong base of existing data and restorability of the water body; technical capability and willingness, locally, to assist with the TMDL; and appropriate sequencing of TMDLs within a watershed or basin. Analysis of the lower reaches of the Cottonwood River to the Minnesota River was not included in the watershed evaluation as it was accomplished through other TMDL projects on the Minnesota River Basin. At the time this project contract ended, completed drafts of both the Cottonwood Turbidity TMDL Report and a combination *E. coli* Bacteria/ Turbidity Implementation Plan were in review and will be available for review, respectively.

Goals

- Inventory the sources of turbidity causing materials throughout the Cottonwood River watershed and specifically in the listed reaches. These sources include agricultural runoff, urban runoff, wastewater treatment facilities, and subsurface sewer treatment systems.
- Determine the loading capacity for turbidity, using a surrogate factor to quantify. Determine the allocations for the load, wasteload, and margin of safety for each impaired reach.
- Educate the public about the turbidity impairment and also to involve the public in the process.

Results that count

- The sources of turbidity were nearly exclusively from nonpoint sources, mainly in-stream and drainage mechanics. Wastewater treatment facilities and urban runoff were found to be a small percentage of the turbidity sources.
- The load duration curve produced a loading capacity for five flow regimes: high, moist, mid, dry, and low, with the highest loading capacity at high flows and the lowest at low flows.
- Meetings were held for public information with much discussion and explanation of the TMDL process and the responsibilities of the agencies involved. Also, canoe trips and one on one conversation with concerned stakeholders at various venues were used to explain plans and goals of this project.

Financial information

Funding type: CWLA

Grant amount: $112,949.45

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Cottonwood River Watershed

Cottonwood River Watershed Nonpoint Pollution Reduction Project

The "Cottonwood River Watershed Nonpoint Pollution Reduction" grant was a total award of $184,657. This grant award was given to the RCRCA Joint Powers Organization under MN Statute: 471.59 as "Project Sponsor" to address the narrative goals listed in the "CWP Phase I Cottonwood River Restoration Project / Diagnostic Study" published in the year 1999 as well as the Minnesota River Dissolved Oxygen TMDL. Following a successful six year implementation plan, this grant was to accomplish the implementation activities in the continuing goal of phosphorus reduction. The grant was matched with a low interest loan awards for Cottonwood River Counties "SRF0179–0183" of $184,657. According to the work plan, the grant portion was broken down into $116,257 for technical assistance, monitoring, and administration; and $68,400 for 75 percent cost share of best management practices. By the end of the project, $112,524.12 for technical assistance, monitoring, and administration; $72,132.88 for 75 percent cost share of best management practices. A quick grant dollar per pound reduction summary shows that it took $19.89 of cost share to reduce one pound of phosphorus over a 10 year period. Using the total cost analysis, the cost to reduce a pound of phosphorus was $27.54. This cost is a conservative estimate as many projects exist and function well after the prescribed 10 years.

The "Cottonwood River Watershed Nonpoint Pollution Reduction" project implemented 11 BMP contracts consisting of 16 various best management practices (BMPs) in the Cottonwood River Watershed to reduce direct sediment and phosphorus delivery to the Cottonwood River and the Minnesota River. The 16 BMPs consisted of 1 multi-purpose dam repair, 750 feet of shoreland and streambank protection (streambank restoration), 1 water control structure, 9 subsurface drain replacements (alternative tile inlets), and 2 Water and Sediment Control Basins (sediment control basins). These projects have the potential to reduce phosphorus losses by 362.61 pounds per year and reduce net sediment in surface water by 351.1 tons per year. Over the ten year life expectancy of each BMP, a potential reduction of 1.81 tons of phosphorus or 724 tons of algae can be reduced. The project also accomplished the replacement of 24 non-compliant septic systems reducing an estimated 1,068 pounds of phosphorus/yr from the Cottonwood River and ultimately the Minnesota River.

Goals

- Help the effort in the efforts of reducing phosphorus in the Cottonwood and Minnesota River Basins through the replacement of non-compliant septic systems and implementation of BMP projects.
- Implement BMP projects of approximately 2,341.33 feet of grassed waterways, 1 multi-purpose dam repair, 290 feet of Shoreland and Streambank Protection, 1 water control structure, 10 subsurface drain replacements, and 3 Water and Sediment Control Basins.
- Continue to identify problem areas and implement additional nonpoint pollution controls utilizing state and federal programs.

Results that count

- Brought 24 non-compliant septic systems in to compliance reducing 1,068 pounds of phosphorus/yr from the Cottonwood River and ultimately the Minnesota River and Lake Pepin.
- Implemented projects including 1 multi-purpose dam repair project, 750 feet of shoreland and streambank stabilization, 1 water control structure, 9 subsurface drain replacements, and 2 Water and Sediment Control Basins saving an estimated 351.1 tons of sediment and 362.61 pounds of phosphorus per year from entering the Cottonwood River system.
- Continued monitoring and analysis of waters in the Cottonwood River watershed have aided in listing and prioritizing sub-watersheds to be targeted in forthcoming TMDL Projects.

Financial information

Funding type: Section 319

Grant amount: $184,657

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Lac qui Parle River Watershed

Lac qui Parle River Main Stem Water Quality Enhancement Project Continuation

The Lac qui Parle-Yellow Bank is a rural watershed that is located in western Minnesota that is mainly agriculture in nature. BMPs that slow the flow of water are crucial to water quality. Our BMP Implementation program included an incentive for filter strips that enrolled 98.8 acres into continuous Conservation Reserve Program (CRP) contracts with eight landowners. A cost share program replaced thirty-three open tile intakes with either a rock inlet or a dense pattern tile beneath the intake and constructed eight water and sediment control basins, two terraces, one diversion, one rain garden and one agriculture waste facility. These practices are estimated to reduce nearly 300 tons of soil and 675 pounds of phosphorus.

Many educational outreach activities encouraged additional practices throughout the watershed such as: rain gardens, rain barrels, storm drains, manure management, maintenance of septic systems, composting, and living green ideas. A low head dam on the West Branch Lac qui Parle River was replaced with a series of rock weirs. This project offered additional opportunities to engage students and citizens in a river clean-up while the river was drawn down for construction, tree and shrub planting on the riverbanks and unique water festival during the communities annual Riverfest. A fifteen minute weekly radio show started in 2009 highlights local programs, water quality issues and other environmental concerns. This has resulted in increased participation in workshops, meetings and local programs such as the cost share and incentives offered for special projects.

Signs that identify river crossings have been erected on paved county roads. By giving the rivers a name, it adds value to them and gives it more personality and more reasons to care for them versus an anonymous water course.

Goals

- Reduce nonpoint source pollutants
- Enhance public awareness
- Collect water quality data

Results that count

- Filter strips, 98.8 acres, with savings of 339.3 tons TSS and 574.4 pounds TP. Thirty-three open tile intakes replaced with savings of 6.6 tons of soil and 16.5 pounds of TP. Constructed practices saved 135 tons of soil and 85.8 pounds of TP.
- Unique educational opportunities with a specifically tailored message for a targeted audience have resulted in optimum participation for the watershed.

Financial information

Funding type: CWP

Grant amount: $279,997.97

In-kind: $1,082,062.12

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Lac qui Parle River Watershed

Lac qui Parle – Yellow Bank River TMDL Assessment and Implementation Plan Development Project

The Lac qui Parle Yellow Bank TMDL Assessment and Implementation reports address 19 impairments on eight reaches of the Lac qui Parle River and three reaches of the Yellow Bank River. Eleven of the impairments are for bacteria, seven impairments are for turbidity and one reach is impaired for low DO. The primary contributing sources to bacteria were found to be over-grazed riparian pasture and noncompliant septic systems (including "straight pipe" septic systems) during dry conditions, surface applied manure, over-grazed pastures, and feedlots without runoff controls during wet conditions. The primary contributing sources for the turbidity impairments were found to be runoff-driven mechanisms, such as delivery of sediment to river from upstream areas and/or bank instability under higher flow conditions following significant storm events during spring and summer months. The likely causes for the low DO impairment include low-oxygen discharge from headwaters and nonpoint source detritus loading resulting in excessive sediment oxygen demand.

The priority areas will be the upper reaches of the Lac qui Parle and Yellow Bank Rivers. It is expected that addressing the upper reaches of the system that it will have a significant effect on addressing exceedances in the lower reaches of the river systems.

There are several implementation measures that address turbidity and fecal coliform bacteria. Using our stakeholder discussion groups, the following management practices were selected: riparian buffers/ filter strips, septic system upgrades, grade stabilization structures, streambank management practices, and pasture management as primary implementation measures. It should also be noted that Minnesota and South Dakota apply different water quality standards to the reaches of streams that lie in each state, thus it will be imperative to work closely with South Dakota. Implementation of practices identified as priority will be completed within a ten-year period.

Goals

- Involve stakeholders in the development of the TMDL Report and Implementation Plan.
- Complete TMDL Assessment Report in timely manner.
- Complete TMDL Implementation Plan for the impaired reaches.

Results that count

- Nine stakeholders meetings were held to develop TMDL Report and TMDL Implementation Plan
- Completed TMDL Assessment Report submitted to MPCA on June 30, 2011
- Completed TMDL Implementation Plan submitted to MPCA on June 30, 2011

Financial information

Funding type: CWLA

Grant amount: $135,184.21

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Le Sueur River Watershed

Lura Lake Excess Nutrient Total Maximum Daily Load Study

Lura Lake has a surface area of 1,294 acres and is located in southern Blue Earth County and northern Faribault County within the Le Sueur River Basin of south central Minnesota. Lura Lake has a watershed of 1,457 acres, making that a watershed to lake surface ratio of nearly 1:1. This would be considered a very small watershed for a lake of this size, which can work to the advantage of lake management and improvement strategies.

Observations from the early 1980s through the mid-1990s indicated that Lura Lake maintained high levels of nutrients and overall, a low Secchi disk transparency. As a result of these observations, the Carlson Trophic Status index was used to score Lura Lake and resulted in a TP score of 80, and chlorophyll-a score of 63, and Secchi disk score of 60. This placed Lura Lake in the hypereutrophic category and the TP score reached the maximum possible score on the scale. With these data, Lura Lake was listed on the 303(d) list in 2002.

This TMDL calculates acceptable nutrient loading based on the best available data and modeling information. If the system is over the recommended standards, the TMDL will calculate the reductions necessary to meet these goals.

Due to the nature of the nutrient loading, a wide variety of implementation practices would need to be considered, including a targeting of internal and external nutrient sources. Nutrient cycling within the lake system appears to be a major source of loading. While focusing on the internal nutrient cycling through various treatment options would likely result in improved water quality, it is also important to deal with external nutrient loading. By not addressing the external loading, all in lake treatments or reclamations duration of effectiveness would be substantially shortened.

Goals

- Development of an Excess Nutrient TMDL study based on the various projects, existing studies, sample and flow data.
- Collection of water quality and vegetation information to aid in TMDL study to develop modeling needs and trends offering the reductions necessary to meet the water quality standards.
- Utilize TMDL information for development of an implementation plan which can be used to address the issues within the lakeshed.

Results that count

- Draft TMDL submitted for MPCA, USEPA and public comment needs for project completion.
- Collection of water quality and vegetation information to provide loading information to the TMDL study.
- Developed a list of suggestions for the implementation plan, included within the TMDL report.

Financial information

Funding type: CWLA

Grant amount: $33,484

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Lower Minnesota River Watershed

Bluff Creek Watershed TMDL

In 2002, Bluff Creek was listed on the 303(d) list of impaired waters for elevated turbidity levels measured at the Metropolitan Council Environmental Services (MCES) monitoring station located on the main stem of the creek downstream of Highway 212. In 2004, Bluff Creek was placed on the MPCA's impaired list of waters in need of a TMDL study for impaired biota due to low fish Index of Biotic Integrity (IBI) scores. The data indicated that Bluff Creek had turbidity measurements in excess of 25 Nephelometric Turbidity Units (NTU). Following the impaired waters listing in 2003, an intensive electrofishing monitoring program was begun to supplement the MCES monitoring and further assess the impairments throughout the watershed.

This is the third phase of a project led by the City of Chanhassen and Barr Engineering that included additional monitoring throughout the Bluff Creek watershed to identify sources of turbidity, as well as stressor identification for fish population impairments. Landuse and landcover GIS data, and BMPs information was also be used to identify possible sources of nonpoint source pollution. Using GIS data, monitoring results, literature and documentation, TMDL loading scenarios have been drafted for each of the impairments. Stressor Identification and TMDL Reports, including a load reduction goal, an allocation of pollutant loadings and an implementation plan are the final outcomes of this project. Stakeholder and technical advisory meetings have been completed as part of this project.

Goals

- Collect additional monitoring data to better identify extent of impairment and sources of turbidity/ sediment.
- Complete Stressor Identification analysis and TMDL report/implementation planning.
- Engage project stakeholders.

Results that count

- Results of monitoring upstream and downstream of Bluff Creek lower valley indicate that near-channel sources of sediment are the primary source of turbidity and embeddedness in the portion of the stream with impaired biota.

Bluff Creek

- The Stressor Identification analysis and final report are complete. The draft TMDL report and implementation plan are complete and will undergo review and comment in the final phase of the project.
- Three stakeholder and technical advisory meetings were held and draft report questions and comments were incorporated into the process of finalizing the Stressor Identification and preparing the draft TMDL report and implementation plan.

Financial information

Funding type: CWLA

Grant amount: $163,701

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Lower Minnesota River Watershed

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

Carver, Bevens, and Silver Creek's, from their headwaters to the mouths, have been placed on Minnesota's list of impaired waters (303d) due to exceedances in State established standards for fecal coliform bacteria. A fecal coliform TMDL along with Implementation Plans for the listed reaches have been written and were 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 were determined to be 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, and 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 primarily through funding additional staff resources and secondarily through 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.

Because the affected Carver and Bevens Creek watersheds are so large, the targeted sub-watershed approach was necessary to be able to focus implementation and begin evaluating success. This is a "phase 1" of a multi-phased effort. Current additional grants have extended the number of targeted sub-watersheds to more than 1-dozen and have a current timeline of ending in 2013.

Goals

- Update, identify, and bring into compliance up to 100 direct discharge Individual Sewage Treatment Systems (ISTSs)
- Install 26 miles of buffer strips
- Install 80 alternative tile intakes, and write 15 manure management plans

Results that count

- Eliminated 125 direct discharge SSTSs. Ruled out an additional 250 SSTSs as potential direct discharge culprits. Fifty additional SSTS upgraded outside of project watersheds as a result of program.
- Installed approximately 10 miles of buffers within the targeted watersheds and an additional 8 miles
- Installed 8 alternative tile intakes, and completed 5 manure management plans within the targeted watersheds and an additional 9 plans outside of those watersheds.

Financial information

Funding type: Section 319

Grant amount: $279,160

In-kind: $98,000

Matching funds: $1,222,066.74

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Lower Minnesota River Watershed

High Island Creek Watershed Implementation Project

The High Island Creek Watershed (HICW) is located in south central Minnesota and is part of the Lower Minnesota Watershed, a major sub-basin of the Minnesota River Basin. The watershed spreads out across 153,222 acres in three counties: Sibley (66 percent), McLeod (23 percent) and Renville (11 percent). Its topography is flat to gently rolling in the western two-thirds of the watershed, and steeply sloped in the eastern one-third. There are three cities located in the watershed – Arlington, New Auburn and a portion of Stewart. The population of the watershed is estimated at 5,053. Forty-nine percent of the population lives in the municipals of Arlington and New Auburn. Approximately 85 percent of the land (129,197 acres) is currently used for agriculture. The landscape is highly productive cropland consisting of corn, soybeans, small grain and forage, also included are canning crops of peas and sweet corn.

Water quality in the HICW is degraded due to high levels of bacteria, total phosphorus, nitrogen and total suspended solids. Some of the contributers include:

- Water quantity or the issue of excessive water flow from the western end of the watershed to the eastern section is also a major concern.
- Severe down cutting in the steep bluff areas due to extensive drainage from the uplands.
- Streambank erosion along the ditch network and natural stream sections.

This implementation project is a continuation of the diagnostic study for HICW that took place from 2000 to 2002 and the first phase of the implementation project conducted between 2004 and 2007. Also, a fecal coliform (FC) TMDL study was completed in partnership with the Water Resources Center at Minnesota State University – Mankato.

Goals

- Increase the adoption of BMPs and citizen participation in the various implementation activities. Specific goals: upgrade 50 non-compliant septic systems, replace 80 open tile intakes, establish 1,000 acres of cover crop, establish 200 acres of filter strips, grassed waterways and riparian buffers and increase wetland acres in the watershed.
- Achieving water quality standards within the HICW cannot be attained or effectively measured within the timeframe of this project. However, future implementation practices and education efforts will build on the work that has already been done to improve water quality. Specifically, the long-term goal of the project is to achieve 20-30 percent reduction in TSS, 30 percent reduction in total phosphorus, 10 percent reduction in nitrate nitrogen and compliance with the *E. coli* standard.
- Used multiple forms of communication to reach watershed residents. Forms of communication include meetings, newsletters, workshops and promotional materials.

Results that count

- Installed 298 BMPs, including nearly 3,000 acres of cover crops, 113 acres of filter strips, 95 open intake alternatives, 41 acres of wetland restorations, two rain gardens, 100 rain barrels and 43 septic system upgrades.
- While the project cannot conclude that the goal of reaching water quality standards was met, nor say with any certainty that water quality is trending in a positive direction, the record of continuous chemistry and flow data was extended through the project which will allow for trend analysis in the future.
- Developed 17 newsletters reaching 800 watershed residents, held two manure and nutrient planning workshops, hosted a field demonstration for the installation of two alternative intakes, hosted three open houses for the fecal coliform TMDL project, participated in the Sibley County fair, and coordinated a yearly calendar photo contest.

Financial information

Funding type: CWP
Grant amount: $354,215.78
In-kind: $237,754.59

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Lower Minnesota River Watershed

Rush River and High Island Creek Turbidity/Biota TMDL

Reaches within High Island Creek were listed as impaired for fish bioassessments in 2004 and turbidity in 2006 and 2008. Reaches within the Rush River were listed as impaired for turbidity in 2008 and 2010. This project was an effort by the Water Resources Center at Minnesota State University, Mankato in conjunction with the MPCA, High Island Creek Clean Water Partnership and Rush River Clean Water Partnership to begin a TMDL study for turbidity impairments and complete a TMDL study to address an aquatic life impairment (based on fish bioassessment).

High Island Creek and Rush River watershed have produced some of the highest pollutant loads in the Minnesota River basin since the MPCA began monitoring in 1998 (State of the Minnesota River Report, 2005). Improvements have been made through iterations of implementation projects, but pollutant concentrations and yields continue to exceed basin averages.

This project was originally planned for completion in two stages. Stage 1 focused on completion of a Fish Bioassessment TMDL study for High Island Creek watershed and compilation of data and supporting materials needed for completion of a turbidity TMDL study for High Island Creek and Rush River watersheds. Stage 2 was to have focused on completion of the turbidity TMDL. Due to funding restraints, stage 2 will not be completed under this project and instead will be part of a Lower Minnesota watershed project slated to begin in 2014.

A draft Fish Bioassessment TMDL and the Turbidity TMDL supporting materials have been submitted to the MPCA, thus meeting the requirements of the project.

Goals

- Establish technical advisory and stakeholder groups to provide input and review findings of TMDL studies.
- Development of an Fish Bioassessment TMDL study for the High Island Creek watershed based on existing studies, new biological data, sample and flow data and input from the technical and stakeholder groups.
- Provide supporting materials and data for future development of a Turbidity TMDL for High Island Creek and Rush River.

Measuring fish at High Island Creek

Results that count

- The establishment of a technical advisory team composed of several interested stakeholders and professionals to help consider various aspects and concerns from around the watersheds.
- Developed and submitted the draft Fish Bioassessment TMDL to the MPCA to satisfy all requirements set forth in the protocols.
- Developed supporting materials including duration curves, list of permitted dischargers and SWAT analysis that will be used to complete a Turbidity TMDL for High Island Creek and Rush River.

Financial information

Funding type: CWLA

Grant amount: $155,000

Total project costs: $132,500.04

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Lower Minnesota River Watershed

Rush River Watershed Implementation Project Continuation

The Rush River Watershed (RRW) is a rural watershed that drains 257,770 acres (403 square miles) in Sibley, Nicollet and McLeod counties. The RRW compromises 22 percent of the total land area of the Lower Minnesota Watershed, a major watershed of the Minnesota River Basin. There are three branches to the Rush River: the north, middle and south branches. All three of these branches drain into the mainstem of the river south of Henderson, Minnesota. The watershed contains a population of just over 9,000 people (47 percent rural) and has four towns including Gaylord, Gibbon, Lafayette and Winthrop. The RRW's primary land use is agriculture, with 90 percent of the watershed acreage utilized for producing crops such as corn, soybeans, small grain and forage.

The 2004 Rush River Assessment Project determined the water quality concerns of the Rush River Watershed to be FC bacteria, TSS, TP and nitrate (N). The study also listed excessive stream flows and flooding as further water quality concerns for the watershed. Concurrently with this implementation project, a FC TMDL study was completed in partnership with the Water Resources Center at Minnesota State University – Mankato. The elevated levels of FC bacteria resulted in the mainstem and south branch of the Rush River being listed on the 303(d) Impaired Waters list. In addition, two reaches of the mainstem of the Rush River were listed as impaired for turbidity due to excessive TSS concentrations. The most recent to make the list within the watershed is nutrient/eutrophication impairment on Lake Titlow.

Goals

- Increase the implementation of, and participation in, BMPs within the watershed. Specifically, to upgrade 50 non-compliant septic systems, install 185 open intake alternatives, restore 50 wetland acres, establish 3,000 acres of cover crops, install 6 rain gardens and install 10 structural practices to reduce erosion.
- The long term water quality goal of the project is to achieve water quality standards within the RRW. While this cannot be achieved or effectively measured within the timeframe of this project, the implementation practices and education efforts that take place will build on the work that has already been done to improve water quality. Specifically the long-term goal of the project is to achieve 20-30 percent reduction in TSS concentrations, 30 percent reduction in total phosphorus concentrations, 10 percent reduction in nitrate nitrogen concentrations and compliance with the *E. coli* standard.
- Use multiple forms of communication to reach watershed residents. Forms of communication include meetings, newsletters, workshops and promotional materials.

Results that count

- Installed 508 BMPs, including nearly 2,700 acres of cover crops, 185 acres of filter strips, 299 open intake alternatives, 100 rain barrels, 2 rain gardens, 3 structural practices to control erosion, 79 acres of restored wetlands and 52 septic system upgrades.
- Due to year to year hydrological variability, relating water quality to goals requires a long-term data set to identify trends. While the project cannot conclude that the goal of reaching water quality standards was met nor say with any certainty that water quality is trending in a positive direction, the record of continuous chemistry and flow data was extended through the project which will allow for trend analysis in the future.
- Developed 13 newsletters reaching 1,250 watershed residents, held one manure and nutrient management planning workshop, hosted three open houses for the fecal coliform TMDL study, participated in the Sibley County fair, and coordinated an annual calendar photo contest.

Financial information

Funding type: CWP

Grant amount: $362,276.85

In-kind: $192,564.35

Matching funds: $13,200

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Minnesota River – Mankato Watershed

Crystal Lake Excess Nutrient Total Maximum Daily Load Study

The Crystal Loon Mills Lakes (CLM) watershed is located in the Middle Minnesota River Basin, in south central Minnesota. Crystal Lake is 355 acres with a contributing watershed of 15,900 acres. This watershed has significant local importance, as it is a popular recreational area and also contains the City of Lake Crystal.

In 2006, Crystal Lake was listed on the 303d impaired waters list for excess nutrients. In the fall of 2004, Crystal Lake experienced a toxic algae bloom. The MPCA staff reported a concentration of microcystin, a blue-green algae toxin, at 7190 ug/L. The World Health Organization's provisional drinking water guideline value for microcystin is 1.0 ug/L (at the levels of acceptable or low risk) and a range of 1-10 ug/L for recreational exposure.

This TMDL calculates acceptable nutrient loading based on the best available data and modeling information. If the system is over the recommended standards, the TMDL will calculate the reductions necessary to meet these goals.

Due to the nature of the nutrient loading, a wide variety of implementation practices would need to be considered, including a targeting of internal and external nutrient sources. Nutrient cycling within the lake system appears to be a major source of loading. While focusing on the internal nutrient cycling through various treatment options would likely result in improved water quality, it is also important to deal with external nutrient loading. By not addressing the external loading, all in lake treatments or reclamations duration of effectiveness would be substantially shortened.

Goals

- Development of an Excess Nutrient TMDL study based on the various projects, existing studies, sample and flow data along with input from the technical and stakeholder groups.
- TMDL study with a summary of the trends that offers the reductions necessary to meet the water quality standards.
- TMDL information will be used in to develop an implementation plan which can be used to address issues basin wide.

Results that count

- Utilized existing data and study information along with current sampling and watershed analysis to develop nutrient TMDL report. Established a technical advisory team composed of several interested stakeholders and professionals to help consider various aspects and concerns from around the basin.
- Used trend information for modeling to calculate necessary reductions from internal and external sources to meet water quality standards. Developed and submitted the TMDL report to the MPCA and the USEPA to satisfy all requirements set forth in the TMDL protocols.
- Utilized modeling information to develop a basic list of suggestions for implementation planning included within the TMDL report.

Financial information

Funding type: CWLA

Grant amount: $39,698.85

In-kind: $754.55

Total project costs: $36,168.27

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Minnesota River – Mankato Watershed

Middle Minnesota – Brown and Redwood Counties First Order Streams Phase I Diagnostic Study

The Minnesota River currently does not meet federal water quality standards and is a major source of pollution to the Mississippi River, Lake Pepin, and ultimately, the Gulf of Mexico where hypoxia of coastal waters continues to be an issue. The first order streams in this project area need to be protected and enhanced to ensure their water quality standards are aiding in TMDL goals and accomplishments in the Minnesota basin. The overriding goal of the state of Minnesota is to restore the Minnesota River to a resource that is fishable and swimmable. Recommendations for reduction in the Minnesota River watershed, based on modeling scenarios put forth in the preparation of the Minnesota River Turbidity TMDL, are for fifty percent turbidity (mostly sediment) and phosphorus. The "Middle Minnesota River, Redwood & Brown Counties, Diagnostic Project" contract was a total award of $200,000. This contract was awarded to the RCRCA Joint Powers Organization under MN Statute: 471.59 as "Project Sponsor" to complete a Diagnostic study on six small first order tributaries of the Minnesota River between the mouth of the Redwood River and the Cottonwood River in Redwood and Brown counties. This area has been included by designation as a part of the Middle Minnesota River Basin but for the most part been overlooked by major watershed initiatives. The Brown-Nicollet-Cottonwood Board had contributed to work in the area recently by providing low interest loans for the area for non-compliant SSTS systems and has been meeting with some landowners to implement continuous CRP buffers along ditches and tributaries. This project expanded those efforts in conjunction with establishing six long term monitoring sites enabling the project to develop an implementation plan that prioritized each of the watersheds for best management practice implementation geared to maintian or improve water quality and keep these first order streams off of the 303d list. In the event the data does support listing the watersheds, the data will be readily available to be used for the development of a TMDL if it is warranted. Currently none of the streams are listed individually. Data provided with this Phase I project will help support future watershed management decision making. Proper management of these reaches to reduce sedimentation and loss of nutrients will provide economic benefits to both the watershed and to downstream areas. The cost of not managing land use practices within the watershed will continue to rise as well as the cost to maintain productivity for generations to come.

Goals

- Determine sources of pollutants contributing to water quality reductions and whether the six streams in the study area fall under a restoration or protection criteria through the completion of a thorough diagnostic study.
- Identify BMP solutions to facilitate any load/concentration reductions that may be needed within the framework of an implementation plan.
- Educate the public about the project area to showcase recreational and water quality opportunities as well as underscore potential issues and impairments as well as ways to remedy problems in a way that involves the public in the process.

Results that count

- Sampling data and stream load information was gathered to determine pollutant loading and to what degree each stream meets or exceeds ecoregional goals and state set standards. A draft diagnostic study has been produced outlining the extent of pollution of each individual reach as well as a comprehensive look at potential point and nonpoint pollutant sources.
- Major common pollutants among the six minor streams were found to be elevated nitrate levels and *E. coli* bacteria values. Incentives to establish wetland acres and stream bank buffers and cost share for stream bank stabilization were implemented as part of the study. 47+ acres of grassed buffers and wetlands and 550 ft. of high erosion streambanks were protected using BMPs as part of this grant.
- Meetings were held for public information with much discussion and explanation of the Diagnostic Study process and the responsibilities of the agencies involved as well as a variety of potential pollutant factors in the study area.

Financial information

Funding type: CWP
Grant amount: $190,666.69

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Minnesota River – Yellow Medicine River Watershed

Hawk Creek, Beaver Creek, and Yellow Medicine River Turbidity and Bacteria Total Maximum Daily Load

Prompted by concern over suspected and known water quality issues in the Hawk Creek Watershed, a group of concerned citizens and local, state and federal representatives from the three counties in the watershed began meeting in February of 1997 to address water quality issues in the basin. Known as the Hawk Creek Watershed Committee, the group determined their long-term goal to be "improving the water quality/quantity issues in the watershed while also promoting a healthy agricultural, industrial and recreation-based economy for the region."

Traditionally, the Hawk/Yellow Medicine watershed (HUC 07020004) has been managed as two separate watersheds, the Hawk Creek Watershed Project (HCWP) to the north of the Minnesota River, and the Yellow Medicine River Watershed District (YMWD) to the south. Under MPCA's new Watershed Approach, the sub-watersheds will be combined and assessed together, as they are, technically, a single major watershed. Several reaches of Hawk Creek, Beaver Creek, and the Yellow Medicine River have been formally listed as impaired for both Turbidity and Fecal Coliform Bacteria.

This project delivered a Hydrologic Simulation Program FORTRAN (HSPF) watershed model that can provide predictions of flow and pollutant loading, and responses to watershed management activities. While the activities of this project do not constitute a full comprehensive watershed restoration and protection study, HSPF watershed modeling is a key component to the Watershed Approach that provides a foundational component for both HCWP and YMWD. Work on the remaining components of the TMDL study will commence in the near future.

The HSPF model included two hypothetical scenarios. One scenario projected the water quality benefit based on the projected discharge from the new Willmar Wastewater Treatment Plant (WWTP). The other scenario analyzed the water quality benefit from the installation of a 50 foot buffer on all Hawk Creek streams. Results of both scenarios are provided in the report.

Goals

- Delivery of a completed watershed-wide HSPF watershed model for HUC 07020004. An outside contractor was solicited to deliver this product. The HSPF model will serve as the cornerstone for the Hawk/Yellow Medicine TMDL study process.
- Assist in the development of a comprehensive HSPF watershed model for HUC 07020004. HCWP was responsible for all local assistance and data collection required for the project. The primary purpose of this goal is to provide detailed and accurate information so as to ensure the development of a reliable, quality watershed model.
- Involve citizens and maximize public input and ownership of the project. This includes making citizens of the watershed aware of current TMDL listings in the watershed bringing to light the steps necessary to address these respective impairments, including the completion of a HSPF watershed model.

Results that count

- A completed HSPF watershed model for HUC 07020004 was delivered.
- HCWP provided water quality monitoring data, flow data, lake outlet elevations, land use data, stream diversion details, and additional information to Tetra Tech, Inc. This comprehensive dataset allowed Tetra Tech, Inc. to deliver a quality product that will be a reliable model for future TMDL studies in both the Hawk Creek and Yellow Medicine River watersheds.
- The public has taken an active interest in the HCWP. An annual information and appreciation meeting draws between 100 and 140 participants. Bi-monthly public meetings were held during this grant period.
- The HCWP participated in educational events to increase public awareness of water quality issues and how best to improve the water quality condition of the lakes and streams in the area. Educational events and materials reached an audience upwards of 136,580 people. In addition, several schools have invited the HCWP staff to speak in the classrooms.
- Media outlets printed articles about Hawk Creek Watershed Project that reached a potential audience (circulation) of 1,293,577 people!
- A citizen monitoring network of 27-31 participants has been actively maintained over the last three years. This active participation in the monitoring efforts of the

Project has led to a sense of "ownership" among those engaging in the citizen monitoring. Citizen monitoring effort can also lead to TMDL turbidity listings.

Financial information

Funding type: CWLA

Grant amount: $61,660.58

Total project costs: $60,903.85

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Minnesota River – Yellow Medicine River Watershed

Hawk Creek Watershed Project "Beaver Tales" Continuation

Prompted by concern over suspected and known water quality issues in the Hawk Creek Watershed, a group of concerned citizens and local, state and federal representatives from the three counties in the watershed began meeting in February of 1997 to work together to address these water quality issues in the basin. Known as the Hawk Creek Watershed Committee, the group determined their long-term goal to be "improving the water quality/quantity issues in the watershed while also promoting a healthy agricultural, industrial and recreation-based economy for the region," which is the primary goal of the "Beaver Tales Continuation" project.

This priority area consists of the entire watershed of Beaver Creek, which drains 122,302 acres (191 square miles) of land through an extensive network (161 miles) of watercourses. Water quantity, and high velocity, a result of excessive drainage compounded by a lack of buffered areas, presents challenges in reducing loads of both sediment and nutrients.

Throughout the duration of this grant 16 BMPs were installed using cost-share funds from this grant. The corresponding pollutant reductions for these 16 BMPs were, 935.67 pounds of phosphorus and 1,968,100 pounds (984.05 tons) of sediment, annually. While the number of BMPs installed was lower than expected, the results of this objective were considered to be very successful in the eyes of HCWP due to the significant pollutant reductions realized.

An aggressive education campaign reached a diverse audience and public awareness and concern for improving water quality in the region was enhanced through these efforts. Water quality monitoring efforts allowed the Project to evaluate the effectiveness of implemented BMPs and to pinpoint locations where BMP efforts should be focused. The fiscal management objective included essential funds for staffing, which allowed for the efficient completion of work plan tasks. These efforts will be continued with future grants.

Goals

- Implement BMPs with the ultimate goal of bringing these streams into the 50 percentile of Western Corn Belt Plains (WCBP) eco-region values for the pollutants of concern.

Beaver Falls at Minnesota River

- Involve citizens and maximize public input and ownership of the Project. This includes, but is not limited to, the identification of and solutions to the water quality and quantity issues within the watershed.
- Monitor water quality with the intent of determining concentrations of specific pollutants and the processes affecting their passage through the Hawk Creek Watershed, while at that same time implementing 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 region.

Results that count

- BMPs installed during this grant period including 4 side inlet pipes, 1 gully stabilization, 6 buffer strips, 3 streambank stabilizations, 1 rain garden and 1 agricultural waste facility. These 16 BMPs treated 388.8 acres and resulted in a reduction of 935.67 lbs/year of phosphorus, and 1,968,100 lbs/year (984.05 tons/year) of sediment. When taking into consideration the length of the contracts, the pollutant reductions realized through this project were, 14,485.15 pounds of phosphorus and 14,689.5 tons of sediment. These figures were nearly identical to the projected pollutant reductions stated in the work plan. In fact, the sediment reduction was greater than was projected. While the phosphorus reductions were slightly low, the Weis buffer is perpetual and the pollutant reductions will endure for much longer than the term of this grant or the time period that we used to calculate pollutant reductions.

- The public has taken an active interest in the HCWP. An annual information and appreciation meeting draws between 120 and 140 participants. A total of 21 public meetings were held during this grant period.
- The HCWP participated in educational events to increase public awareness of water quality issues and how best to improve the water quality condition of the lakes and streams in the area. Educational events and materials reached an audience upwards of 189,480 people. In addition, several schools have invited the HCWP staff to speak in the classrooms.
- Media outlets printed articles about Hawk Creek Watershed Project that reached a potential audience (circulation) of 1,350,658 people!
- A citizen monitoring network has been actively maintained over the last three years. Currently there are a total of four volunteer citizen monitors in the Beaver Creek Watershed. This active participation in the monitoring efforts of the Project has led to a sense of "ownership" among those engaging in the citizen monitoring.
- Water quality monitoring has revealed trends in the Beaver Creek Watershed. Sediment and phosphorus loading are trending downward in the watershed. Nitrogen levels remain high throughout the watershed. All water quality monitoring results have been entered into the STORET database. The Beaver Creek sediment reduction success story has been highlighted at a number of public meetings and events. The Project Coordinator highlights monitoring results obtained through this grant in that presentation. A major point of that presentation is that only 6.1 percent of the Beaver Creek watershed is enrolled into grass practices. The presentation goes on to point out that the grass is strategically located in key areas, resulting in a greater than 50 percent TSS reduction in Beaver Creek over the past decade.

Financial information

Funding type: CWP

Grant amount: $180,839

In-kind: $269,774.21

Matching funds: $535.24

Total project costs: $451,148.45

Contact information

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Minnesota River – Yellow Medicine River Watershed

Long Lake Nutrient Total Maximum Daily Load Assessment and Implementation Plan Development

The HCWP was formed in 1997 for the purpose of addressing water quality concerns throughout the watershed. The long-term goal of HCWP is "improving the water quality/quantity issues in the watershed while also promoting a healthy agricultural, industrial and recreation-based economy for the region." The water quality of Long Lake and Ringo Lake is of high importance to HCWP. Both lakes are at the top of the watershed and they impact Hawk Creek by essentially setting the baseline condition for water quality downstream.

Long Lake, located in Kandiyohi County near the City of Willmar, is a 1,568 acre lake with a watershed of 8,372 acres. Ringo Lake, located directly north of Long Lake, is a 735 acre lake with a watershed of 4,368 acres. Long Lake and Ringo Lake are both formally listed (303(d) list) as impaired for "Nutrient/Eutrophication Biological Indicators." HCWP began work towards the completion of a TMDL study for both lakes in August of 2008.

This project consisted of two primary goals. The first was completion of a comprehensive TMDL Assessment Report. HCWP provided the necessary local expertise, pollutant source inventories, and data compilation for the Assessment Report. With painstaking detail, all pollutant source inventories were completed in a timely fashion. Accurate inventories facilitated the drafting of a quality TMDL Assessment Report. The Report has been approved by the USEPA. The second goal was the completion of a draft TMDL Implementation Plan. Utilizing the guidance and expertise of the Implementation Plan Technical Team, HCWP drafted an Implementation Plan and delivered the product on June 30, 2011. The end goal is to have an MPCA-approved Implementation Plan. There will be a minimal amount of follow-up work needed on the draft before this goal is realized.

Goals

- Assist in the development of a comprehensive TMDL Assessment Report. HCWP will be responsible for all local assistance and data collection required for the project. The primary purpose of this goal is to provide detailed and accurate information so as to ensure the development of a reliable, quality report that accounts for all pollutant sources.
- Delivery of a draft TMDL Implementation Plan. HCWP will be responsible for delivery this product. The Plan will be refined until it is approved by MPCA, which will make the Long Lake Watershed eligible for TMDL Implementation funding opportunities.
- Involve citizens and maximize public input and ownership of the Project. This includes making citizens of the watershed aware of current TMDL listings in the watershed bringing to light the steps necessary to address these respective impairments, including the completion of this TMDL study.

Results that count

- HCWP thoroughly compiled and analyzed data from the Long Lake Watershed. This data was provided to MPCA for use in the TMDL Assessment Report. Lake Sampling results, land use data, a feedlot inventory, SSTS compliance inventory, and more were compiled. These extremely detailed inventories allowed for the completion of a comprehensive, USEPA approved, TMDL Assessment Report.
- HCWP delivered a draft TMDL Implementation Plan to MPCA on June 30, 2011. A diverse group of resource professionals from the watershed assisted in this process through participation on the Implementation Plan Technical Team. The Plan will be refined into a finished product that meets MPCA approval. Following approval, this watershed will be eligible for TMDL Implementation funding opportunities.
- The public has taken an active interest in HCWP and the Long Lake TMDL. There were six public meetings held during the Assessment Report process. Known as the "TMDL Assessment Report Stakeholder Committee," the attendees of these meetings provide input essential to the TMDL process.
- The HCWP participated in educational events to increase public awareness of water quality issues and how best to improve the water quality condition of the lakes and streams in the area. Educational events and materials reached an audience upwards of 136,580 people. In addition, several schools have invited the HCWP staff to speak in the classrooms.
- Media outlets printed articles about Hawk Creek Watershed Project that reached a potential audience (circulation) of 1,293,577 people!

- The Long Lake Association was reconsolidated in 2009. HCWP strongly urged the lakeshore homeowners to reorganize the Lake Association, and we consider the fruition of this to be an integral component to maintaining a consolidated group interested in improving the water quality of the Lake. HCWP staff attended the reorganization meetings and provided guidance throughout the process.

Financial information

Funding type: CWLA

Grant amount: $70,704.44

Total project costs: $42,153.10

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Minnesota River – Yellow Medicine River Watershed

South Branch of the Yellow Medicine River TMDL Fecal Coliform Reduction Project

The Yellow Medicine River Watershed District obtained MPCA Clean Water Partnership funding to address *E. coli* impairment in the South Branch of the Yellow Medicine River. The project spanned the years January 2008 through June of 2011. The work plan consisted of seven elements: 1) Work plan; 2) Monitoring; 3) Watershed Assessment; 4) Data Analysis; 5) Information and Education; 6) Implementation Plan; and 7) Administration. The goals of the implementation plan are based on models developed during the TMDL. These models indicate that the daily fecal Coliform load to the South Branch was determined to be 7.41 x 1011 colony forming units (CFU) during the summer months June thru August. To meet the impaired level of 200 CFU/100 ml the allowable daily fecal Coliform load would need to be reduced to 3.67 x 1011 CFU.

The $142,043 dollar implementation included 188.71 acres of riparian filter strips, 58 blind intakes draining approximately 870 acres of cropland, 7,500 feet of fencing along the river bank, and 2 feedlot improvements. The 870 acres of drained cropland is an estimate assuming an average of 15 acres drained per intake.

E. coli concentrations were collected at eight stations during the 2010 open water season. The sites were chosen from the TMDL study Fecal Coliform analysis has been replaced by *E. coli* as the standard. Each of these sites were monitored for Fecal Coliform during the TMDL study. In both data sets all sites were in excess of the impaired status, 200 CFU/100ml and 161 CFU/100ml, for Fecal Coliform and *E. coli*, respectively, on average and for the majority of the individual samples.

The water quality standard changed from Fecal Coliform to *E. coli* between the time the TMDL was completed and when this project took place. The Statement of Need and Reasonableness (SONAR) for rule revision, describes a methodology to convert Fecal Coliform to *E. coli* and conversely *E. coli* to Fecal Coliform. The conversion is actually quite simple although the study in question incorrectly calls it difficult. Any future work in this watershed will continue to use *E. coli* sampling to be compared to the current water quality standard. Data can and will be compared using the developed conversion methodology. Although the study in question did not convert the data, the sites were still impaired for *E. coli* and based on the proportional relationship described in the SONAR, they would also be impaired for Fecal Coliform. I reviewed the summary data and converted it to Fecal Coliform and their statement that the sites are still not meeting the standard is correct for both *E. coli* and Fecal Coliform. There was not enough change during the three years of implementation to detect a change in either *E. coli* or Fecal Coliform.

Goals

- Seventy-eight percent reduction of Fecal Coliform Bacteria from all loading sources.
- Provide educational outreach concerning the impairment and incentives to establish BMPs within the watershed.
- Promote stewardship from the landowners within the South Branch watershed.

Results that count

- *E. coli* data shows all eight sites that were sampled during the TMDL were still impaired
- Several educational opportunities were realized including pamphlets, school instruction, website information. Thirty-two BMPs were implemented using $142,043 of incentive money.
- Some progress was made through incentives, information and education, and promotion of the project. However, high land and crop prices inhibit taking cropland out of production in favor of BMP installation.

Financial information

Funding type: Section 319

Grant amount: $196,626.39

In-kind: $286,672.70

Matching funds: $4,145.13

Total project costs: $ 487,444.22

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Pomme de Terre River Watershed

Turbidity TMDL Assessment of Pomme de Terre River Watershed

The Pomme de Terre Turbidity TMDL Assessment project began in 2008 aimed at identifying potential sources of turbidity and pollution reduction strategies in the Pomme de Terre River Watershed. Throughout the project, a coordinator was utilized to conduct public outreach and educational activities to increase public awareness both of pollution issues in the river and the Pomme de Terre River Association as an organization dedicated to restoring the water quality in the watershed. In 2008 an operational work plan was completed to assist the coordinator in completing project goals. In 2009 educational programs were utilized to increase public awareness, and several events and trainings were attended by the coordinator. In the spring of 2010 a series of stakeholder meetings were conducted, and the TMDL report was open for public comment. In April of 2010 the MPCA was petitioned for a contested case hearing regarding the TMDL report. An agreement was reached in December of 2010, and an extension was granted to complete the grant requirements to June 30, 2011. A final stakeholder meeting was held on May 17, 2011, and the implementation plan and TMDL report were submitted in June 2011.

Goals

- Hire a full time Project Coordinator dedicated to keeping the project running and ensuring the satisfactory completion of all project objectives and tasks and keep the Pomme de Terre River Association cohesive and active in their goal of restoring water quality in the Pomme de Terre Watershed.
- Define the turbidity impairment and priority areas for targeted restoration activities within the watershed.
- Educate the public and bring awareness to the water quality issues currently affecting the Pomme de Terre and awareness of the public to the Pomme de Terre River Association as a group dedicated to improving local water quality.

Results that count

- A full-time Project Coordinator was hired in 2008 and continues to work through other funding sources as of July 2011. The coordinator is charged with keeping all members of the Joint Powers Board informed on current projects and activities in the watershed as well as coordinate members of the Technical Advisory Committee on projects tasked to them to complete.
- The standard for class 2b streams for turbidity (Total Suspended Solids) is currently 25 NTU with a TSS surrogate of 52mg/L. Ninety percent of samples showed an average of 110mg/L. This calculates to a 53 percent total reduction in TSS to meet the standard. Priority areas in the lower Pomme de Terre watershed include the Drywood Creek and Muddy Creek sub-watersheds.
- Several events have been attended and hosted by the project coordinator throughout the project timeline. A newsletter was sent to 6,600 watershed residents with 35+ responses from citizens interested in being a part of the improvement process. Great interest has been found in the local water quality through conversation with stakeholders and agency employees, and has been disseminated through many mediums.

Financial information

Funding type: CWLA

Grant amount: $119,964.41

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Redwood River Watershed

Redwood River Turbidity TMDL Project

The "Redwood River Turbidity TMDL Project" contract was a total award of $120,000. This contract was awarded to the RCRCA Joint Powers Organization under MN Statute: 471.59 as "Project Sponsor" to complete a TMDL study on river reaches in the Redwood River watershed that were listed as impaired for excess of the state turbidity standard. Portions of the project were scheduled to begin in 2011 and be completed in 2015. A willing local group, the RCRCA, allowed for an earlier completion of the TMDL. Ranking criteria for scheduling TMDL projects include, but are not limited to: impairment impacts on public health and aquatic life; public value of the impaired water resource; likelihood of completing the TMDL in an expedient manner, including a strong base of existing data and restorability of the water body; technical capability and willingness, locally, to assist with the TMDL; and appropriate sequencing of TMDLs within a watershed or basin. Analysis of the lower reaches of the Redwood River (from Ramsey Creek to the Minnesota River was not included in the watershed evaluation as it was accomplished through other TMDL projects on the Minnesota River Basin. At the time this project contract ended, completed drafts of both the Redwood Turbidity TMDL Report and a combination *E. coli* Bacteria/Turbidity Implementation Plan were in review and will be available for review, respectively.

Goals

- Inventory the sources of turbidity causing materials throughout the Redwood River watershed and specifically in the listed reaches. These sources include agricultural runoff, urban runoff, wastewater treatment facilities, and subsurface sewer treatment systems.
- Determine the loading capacity for turbidity, using a surrogate factor to quantify. Determine the allocations for the load, wasteload, and margin of safety for each impaired reach.
- Educate the public about the turbidity impairment and also to involve the public in the process.

Results that count

- The sources of turbidity were nearly exclusively from non point sources, mainly in-stream and drainage mechanics. Wastewater Treatment Facilities (WWTFs) and urban runoff were found to be a small percentage of the turbidity sources.
- The load duration curve produced a loading capacity for five flow regimes: high, moist, mid, dry, and low, with the highest loading capacity at high flows and the lowest at low flows.
- Meetings were held for public information with much discussion and explanation of the TMDL process and the responsibilities of the agencies involved. Also, canoe trips and one on one conversation with concerned stakeholders at various venues were used to explain plans and goals of this project.

Financial information

Funding type: CWLA

Grant amount: $103,052.61

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Redwood River Watershed

Redwood River Watershed Phosphorus TMDL Compliance Project Continuation

The "Redwood River Watershed Phosphorus TMDL Compliance Project (continuation)" grant was a total award of $400,000. The RCRCA Joint Powers Organization under MN Statute: 471.59 received the grant as "Project Sponsor". The goal was to continue best management implementation according to the Redwood River Phase I Implementation Plan approved in 1992. Also, implement phosphorus reducing conservation practices that will help achieve the Lower Minnesota River DO TMDL and Redwood Fecal TMDL (currently being developed.)

The three-year work plan is projected to reduce 3.16 tons of phosphorus annually reaching the Minnesota River or 2,528,000 pounds of aquatic plant growth annually (plus 1,159.41 tons of sediment).

The "Redwood River Watershed Phosphorus TMDL Compliance Project (continuation)" implemented contracts consisting of various BMPs in the Redwood River Watershed to reduce direct sediment and phosphorus delivery to the Redwood River watershed. The BMPs consisted of:

- 23 water and sediment control basins
- grade control structure
- 565 feet of stream bank restoration

These projects have the potential to reduce phosphorus transport by more than 600 pounds per year and reduce net sediment in surface water by more than 547 tons per year. Over the ten year life expectancy of each BMP, a potential reduction of 3.0031 tons of phosphorus or 1,201.22 tons of algae can be reduced.

The project also replaced 47 non-compliant septic systems, reducing an estimated 2,100 pounds of phosphorus per year from the Redwood River watershed.

Goals

- Bring into Compliance 120 identified non-compliant septic systems.
- Implement 1,306 ft of stream bank restoration, 1,905 ft of grassed waterways, 3 sediment control basins, and 1 multipurpose dam.
- Continue to identify problem areas in the Redwood River Watershed and implement additional nonpoint pollution controls utilizing state and federal programs.

Redwood River riffle after fresh fallen snow; Redwood Falls Township/ Section 9, Redwood County

Results that count

- Brought 47 non-compliant septic systems in to compliance (complementing the 69 implemented in the previous grant) reducing 2,100 pounds of phosphorus/yr from the Redwood River, Lake Benton, and Redwood Lake.
- Implemented 27 BMPs - 23 water and sediment control basins, a grade control structure, and 565 feet of stream bank restoration (three projects) reducing phosphorus transport by 600.61 pounds per year and keeping 547.53 tons of sediment per year from entering the Redwood River and Minnesota River system.
- Continued partnership to service the six counties in the Redwood River watershed.
- Collection of valued data to perform TMDLs and prioritize areas of greatest need for conservation practices in the Redwood River watershed.

Financial information

Funding type: CWP

Grant amount: $341,486.09

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Minnesota River Basin

Projects active and awarded in 2012

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.

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: RCRCA

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: CWP (Grant) $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.

Cottonwood River

Cottonwood River Watershed Phosphorus Reduction Continuation — 2009

Sponsor: RCRCA

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: RCRCA

Funding: Section 319 (Grant) $297,000

Purpose: This RCRCA 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: CWP (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.

Bevens and Silver Creeks SSTS Project — 2009

Sponsor: Sibley County

Funding: $9,770 CWP (Grant), CWP (Loan) $273,000

Purpose: To reduce the current level of fecal coliform bacteria by initiating the CWP loan program in Sibley County. It is expected that, through low interest loans which will be administered by the county, 21 non-complaint or failing existing systems as determined by inspection or landowner interest will be replaced by new single sewage treatment systems.

Blackhawk Lake and Thomas Lake Management Plans — 2011

Sponsor: City of Eagan

Funding: CWP (Grant) $55,276

Purpose: Blackhawk and Thomas Lakes' are considered high priority lakes in the suburban city of Eagan. The project will evaluate Blackhawk and Thomas Lakes' in-lake water quality; assess the TP loads affecting each system; develop implementation plans based on priority system improvement projects and develop activities to protect and improve these lakes.

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.

Minnesota River – Headwaters

Protecting North and South Fork Yellow Bank River — 2012

Sponsor: Lac qui Parle-Yellow Bank Watershed District

Funding: CWP (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 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.

Redwood River

Redwood River Watershed Nonpoint Pollution Reduction Project — 2010

Sponsor: RCRCA

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 de-list 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.

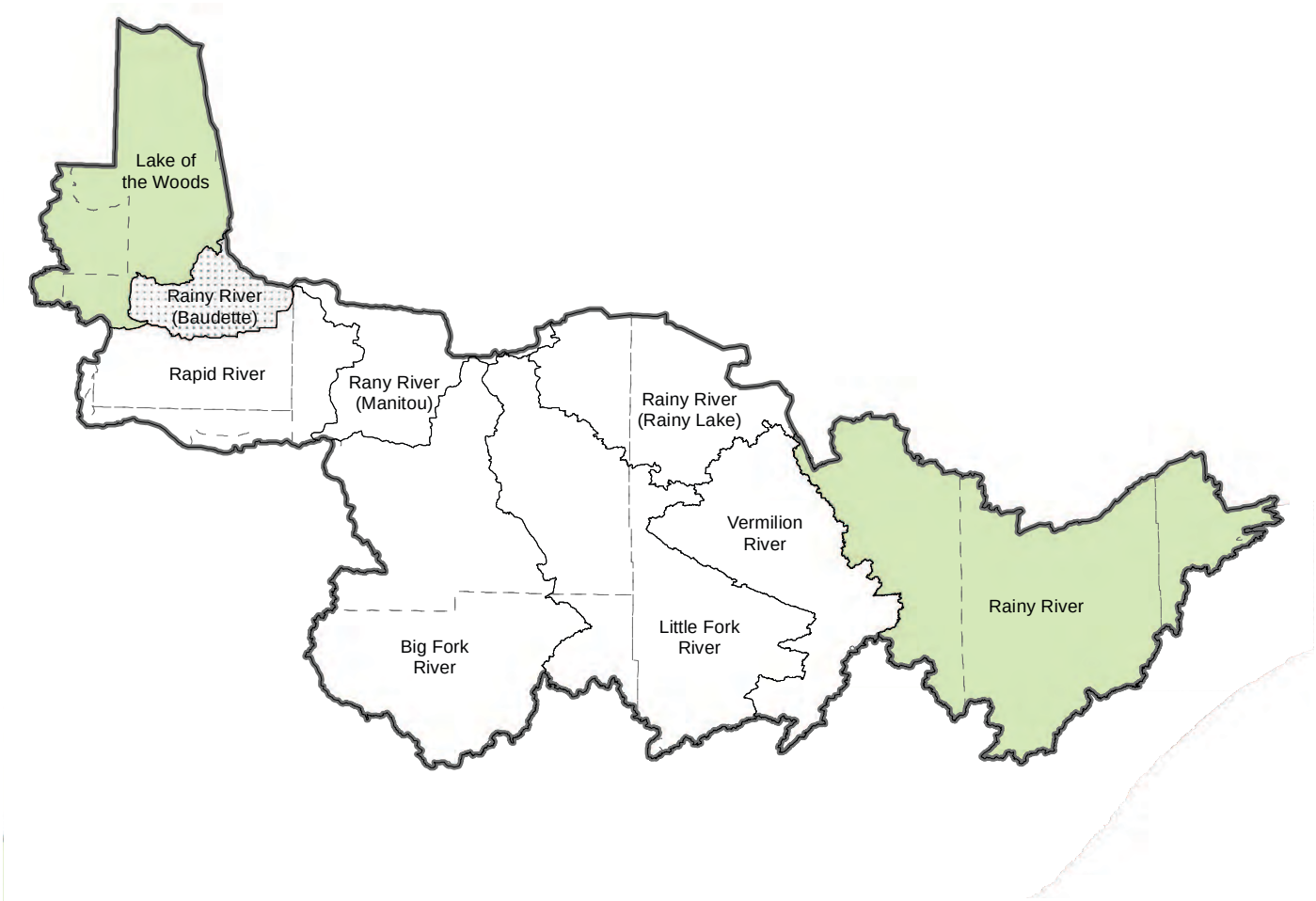
Outcomes: Through the funding of this project, the goal is to reduce phosphorus reaching the Minnesota River by 1,943.17 pounds annually or 777,268 pounds of aquatic plant growth annually (plus 350 tons of sediment).

Rainy River Basin

Projects completed

Rainy River – Baudette

Baudette Estuary Dissolved Oxygen Impairment Verification and TMDL Development



Rainy River – Baudette Watershed

Baudette Estuary Dissolved Oxygen Impairment Verification and TMDL Development

The Kanabec SWCD office started working with the MPCA in March of 2008 to monitor and collect information on the Ann River. The Ann River is located within the Snake River Watershed, which is in the St. Croix Basin. The purpose was to collect analytical and land use information, hold public meetings, and to develop necessary information to aid in the development of a TMDL report.

A large part of the work was collecting stream and lake data to be used in the next phase of the study. The monitoring consisted of bi-weekly and event monitoring at locations throughout the watershed. Volunteers assisted in monitoring Fish and Ann Lake lakes. All of this monitoring was done to collect information on bacteria levels, determine where nutrients in the watershed are coming from, and to determine what sediment levels were in the stream.

While the stream data was a large part of the project, the SWCD also took on tasks like identifying and verifying animal numbers, farms, gathering septic information, meeting with landowners and lake association groups, and gathering information for a implementation plan.

Overall, the project completed all of the tasks it set out and gathered the necessary information for the TMDL report now being developed.

Goals

- Collect and analyze water quality data to verify a low DO impairment.
- Collect and analyze land use data which may lead to a low DO impairment.
- Based on the analysis of water quality data and land use data, complete either a delisting report or a TMDL report.

Results that count

- Data collected verified a DO impairment during certain times of the year.
- Land uses identified could not be linked to a low DO impairment. The resource is recognized as sensitive, even though there are limited anthropogenic impacts in the watershed.

Sonde equipment installation

- This delisting request will be made based on natural background conditions and further analysis that will be completed through the Intensive Watershed Monitoring Initiative slated for 2017.

Financial information

Funding type: CWLA

Grant amount: $95,176.70

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Rainy River Basin

Projects active and awarded in 2012

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.

Rainy River – Headwaters Watershed

Kawishiwi Watershed Protection — 2011

Sponsor: Lake County

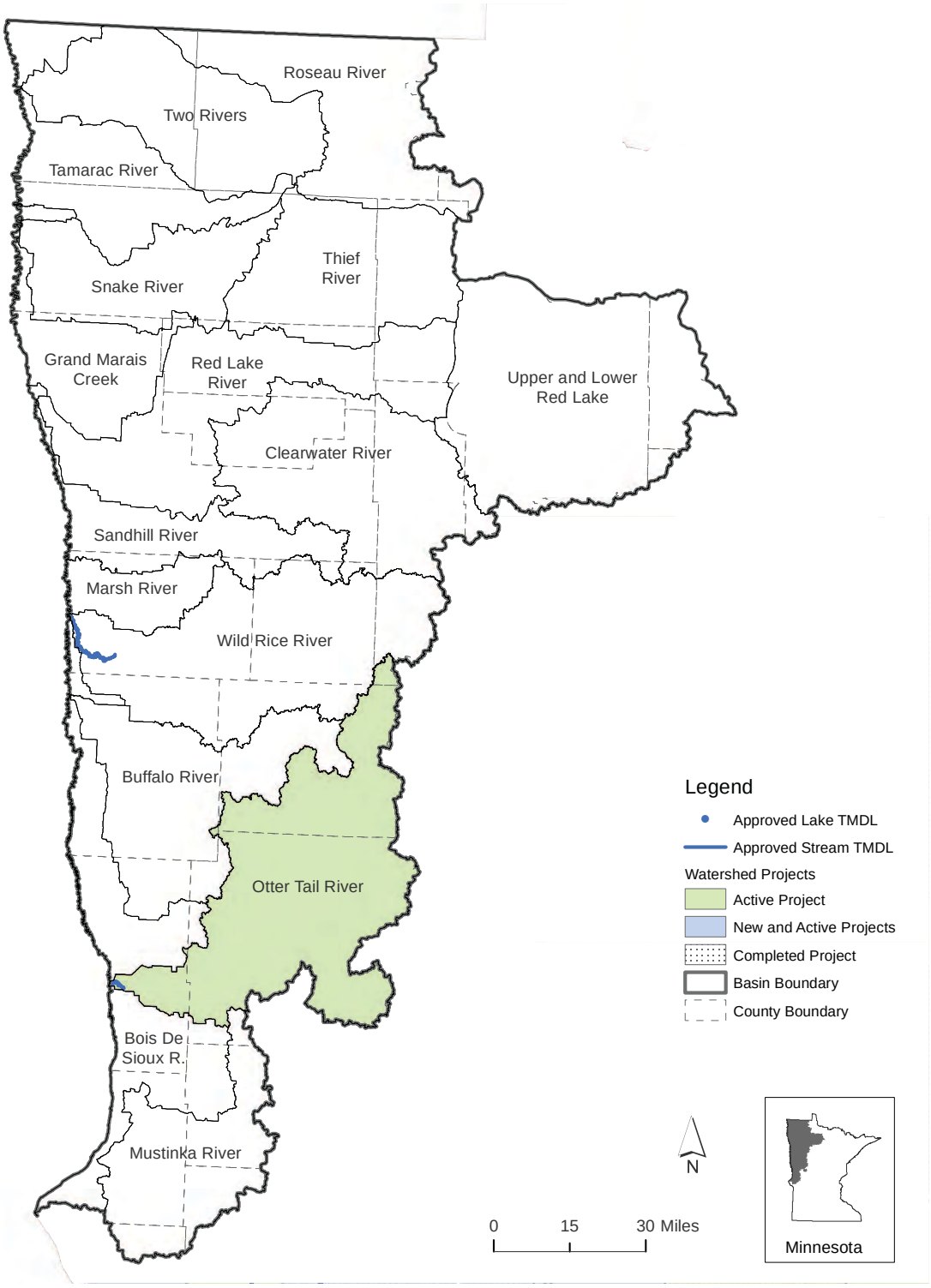
Funding: CWP (Grant) $174,500

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

Red River Basin

Projects completed

None completed for 2011 – 2012



Red River Basin

Projects active and awarded in 2012

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.

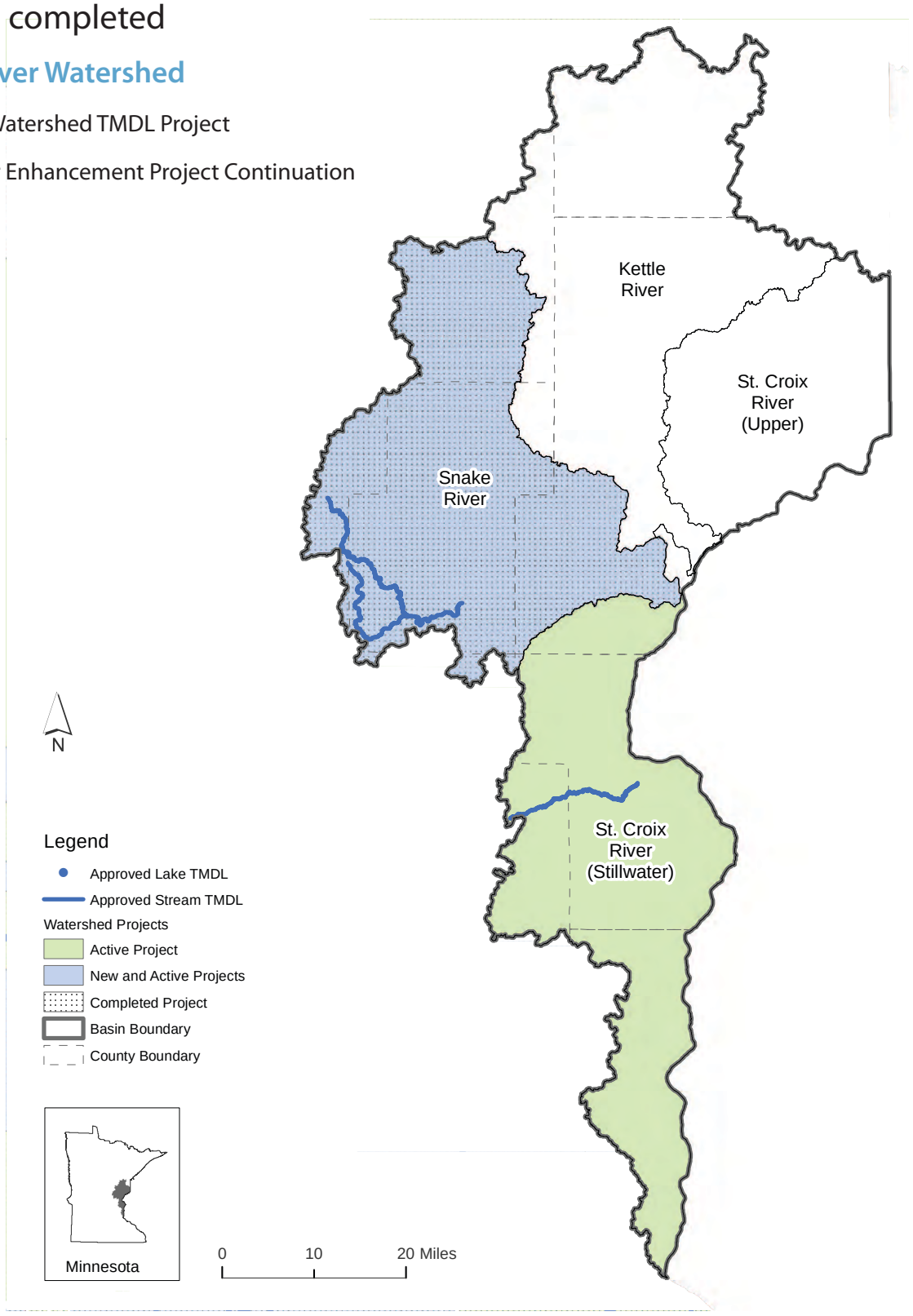
St. Croix River Basin

Projects completed

Snake River Watershed

Ann River Watershed TMDL Project

Snake River Enhancement Project Continuation



Snake River Watershed

Ann River Watershed TMDL Project

The Kanabec SWCD office started working with the MPCA in March of 2008 to monitor and collect information on the Ann River. The Ann River is located within the Snake River Watershed, which is in the St. Croix Basin. The purpose was to collect analytical and land use information, hold public meetings, and to develop necessary information to aid in the development of a TMDL report.

A large part of the work was collecting stream and lake data to be used in the next phase of the study. The monitoring consisted of bi-weekly and event monitoring at locations throughout the watershed. Volunteers assisted in monitoring Fish and Ann Lake lakes. All of this monitoring was done to collect information on bacteria levels, determine where nutrients in the watershed are coming from, and to determine what sediment levels were in the stream.

While the stream data was a large part of the project, the SWCD also took on tasks like identifying and verifying animal numbers, farms, gathering septic information, meeting with landowners and lake association groups, and gathering information for a implementation plan.

Overall, the project completed all of the tasks it set out and gathered the necessary information for the TMDL report now being developed.

Goals

- Water quality monitoring and land use data collection.
- Citizen and stakeholder involvement.
- Implementation and fact sheet development.

Results that count

- Completed and documented water quality monitoring and land use data collection.
- Completed citizen and stakeholder communications and involvement process.
- Completed strategies and draft Implementation plan, including best management practice applications.

Financial information

Funding type: CWLA

Grant amount: $44,860

Shows some of the streambank erosion issues that are taking place along the lower parts of the Ann River. Sediment has been identified as a major contributor to the Fish and Invertebrate impairments in the Ann River.

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Snake River Watershed

Snake River Watershed Enhancement Continuation Project

In 2008 the Snake River Watershed Management Board (SRWMB) received a Clean Water Partnership Grant for $500,000 from the Minnesota Pollution Control Agency. This grant was used by the four county non-regulated joint powers board to address local concerns regarding water quality, to educate citizens in the Snake River Watershed about water quality, and to implement Best Management Practices which would improve the local water quality. The SRWMB targeted areas in the watershed with known impairments to promote this Implementation Program. The targeting used stemmed from 10 years worth of monitoring data the SRWMB collected and the previous Diagnostic Study done in the watershed. A partnership was formed with the four local Soil and Water Conservation Districts and the local Natural Resource Conservation Districts to promote and sell the program to individuals in the watershed.

Overall, the SRWMB views the project as a success, but there is still a lot to do in the watershed. At least 29 BMP projects were installed. All of which will aid in reducing pollutants such as total phosphorus, *E. coli* Bacteria, sediment, and others to local waterbodies and the St. Croix River. Another successful portion of this project was the individual septic system loan money, which Kanabec county used to replace failed septic systems in the county. All $400,000 was used before the end of the loan period, showing there is a need from individuals in the area to update their systems. Now that this project is complete, the SRWMB looks forward to obtaining more grant funds to continue the great work, and improve local water quality.

Goals

- Improve the quality of the area's water resources for the enjoyment and well being of the surrounding communities through the installation of best management practices.
- Provide watershed-based management and to utilize each of the counties water plans to coordinate a planning effort to improve the water quality of all the sub-watersheds of the Snake River.
- Educate watershed residents on how their actions and land use practices have the potential to impact the Snake River Watershed and for them to take an active role in enhancing and protecting the Snake River Watershed.

The picture is a site where a manure management system went in.

Results that count

- Installed more than 29 BMPs throughout the Snake River Watershed, targeted at improving water quality.
- The SRWMB completed a 10 year water quality analysis which indicated that the watershed was holding steady on loadings, and that no major increase occurred over the last 10 years, but some reductions have taken place in some watersheds.
- The SRWMB partially funded a Vegetation Specialist who worked with local landowners, home owners, garden clubs, and cities to install native buffers, native vegetation plantings, restoring shoreline, and rain garden. The specialist is well received and continues to get calls for assistance.

Financial information

Funding type: CWP

Grant amount: $500,000

In-kind: $651,656.08

Matching funds: $260,767.37

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St. Croix River Basin

Projects active and awarded in 2012

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: CWP (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 SSTSs 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) $190,000

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.

Lower St. Croix River Watershed

Sand and Long Lake Diagnostic Studies — 2009

Sponsor: Carnelian-Marine-St. Croix Watershed District

Funding: CWP (Grant) $39,000

Purpose: Evaluate existing conditions of Sand and Long Lakes to determine pollutant reductions needed to meet established water quality goals; analyze available data collected as part of a multi-lake TMDL that originally included Sand and Long Lakes; set numeric goals for lake water quality; develop watershed and in-lake models to determine the effect of existing and future total phosphorus loads on the lakes; develop implementation strategies; and complete the overall Diagnostic Study and Implementation Plan for each lake.

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.

Upper Mississippi River Basin

Projects completed

Projects involving multiple watersheds

Agricultural Drainage BMP Effectiveness Monitoring

Mississippi River Bacteria TMDL Project - Phase IIA

Crow Wing River

Crow Wing (Major Watershed Project) – Phase 1

Lake Margaret Nutrient TMDL Report

Long Prairie River

Long Prairie River TMDL Nonpoint Implementation Project

Mississippi River – Grand Rapids

Big Sandy Area Lakes Nutrient Impairment TMDL Study

Mississippi River – St. Cloud

Elk River Watershed Association TMDL Studies, Phases I - III, 2008-2010

Mississippi River – Twin Cities

Shingle Creek and Bass Creek Biota and Dissolved Oxygen TMDL Implementation Plan

Wetland 639W Restoration

North Fork Crow River

Ann/Emma Lakes Excess Nutrients TMDL

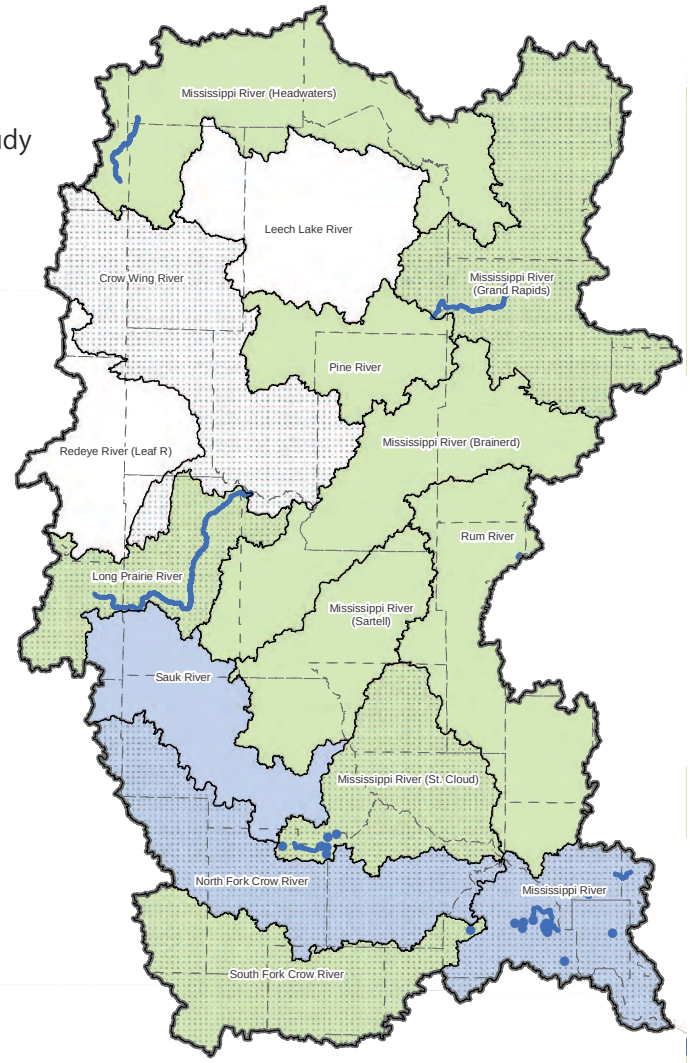
North Fork – Lower Crow River Watershed Dissolved Oxygen, Turbidity and Fecal Coliform Phase III TMDL

Rice Lake Nutrient TMDL

South Fork Crow River

Lake Independence Channel Stabilization Project

South Fork Crow River Buffalo Creek Watershed Turbidity and Pathogen TMDL Project



Project involving multiple watersheds

Agricultural Drainage BMP Effectiveness Monitoring

Recent water quality monitoring work conducted as part of the Blue Earth River Basin (BERB) fecal coliform TMDL suggests that our understanding of bacterial, nutrient (phosphorus/nitrogen) and sediment transport dynamics from tile-drained agricultural lands in southern Minnesota may be insufficient. Subsurface drainage improves crop growth and soil productivity, but can have detrimental effects by increasing the movement of agrichemicals to surface water supplies. Understanding how agricultural management affects tile effluent is vital to the assessment and cleanup of the row crop-dominated Minnesota River Basin (MRB). Many MRB impaired stream watersheds are 80-95 percent cultivated land. Modeling conducted by the MPCA indicates that a majority of flow in these streams originates from subsurface tile. Based on proportional volume, tile drainage has the potential to be a major contributor of bacterial, nutrient and sediment to waterways. Providing "local" applied research will strengthen decision making and ensure limited implementation resources are used wisely.

From 2008-2010 this project evaluated manure management effects on tile effluent as a major focus of the project. The project examined how manure application (surface applied vs. incorporated), rate and timing (spring vs. fall applied) affected tile effluent bacterial and nutrient concentrations. The project also compared effluent from fields with and without open intakes. Monitoring of fields without intakes helped assess pattern tile impacts. Monitoring non-manured fields also provided information about "background" bacteria levels. This project will provide objective information critical for the development of bacterial, as well as nutrient and sediment related TMDL implementation plans. This comparison of systems with and without open intakes and different manure application methods will provide much needed data on the impacts of these structures and practices on surface waters.

Goals

- To relate manure application methods with pollutant concentrations in tile effluent.
- To compare *E. coli*/nutrient/sediment levels between fields with and without open tile intakes.
- To develop an updated inventory of drainage features for five minor watersheds included in the 1991 MRAP Level III inventory.

Results that count

- Nutrient data is still under evaluation; *E. coli* concentrations were higher in fields with manure application.
- Sites with open intakes had higher TSS and *E. coli* levels than sites without open intakes; however the nutrient data is still being evaluated.
- All five minor watersheds that were updated from the 1991 MRAP Level III inventory had at least an 80 percent increase in drainage area in 2011.

Financial information

Funding type: Section 319

Grant amount: $209,043.54

In-kind: $245,926.13

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Project involving multiple watersheds

Mississippi River Bacteria Total Maximum Daily Load Project – Phase IIA

A large number of Minnesotans rely on the Mississippi River for both drinking water and as a place for recreational activities. While specific recreational user data (boating, swimming, wading) is not known at this time, between 940,000 and 950,000 Minnesotans use the Mississippi River within this project's study area for drinking water. The Upper Mississippi River Bacteria TMDL Project is a joint effort between the MPCA and the Minnesota Department of Health in close coordination with many project partners to address recreational use impairments due to bacterial contamination in the Mississippi River and associated tributaries. The study area includes drainage to that part of the Upper Mississippi River that extends from Royalton to Hastings, Minnesota.

The main focus of Phase IIA of the Upper Mississippi River Bacteria TMDL Project consisted of monitoring reaches where there are data gaps, incorporating new data and analyzing relevant data, identifying pollutant sources, holding a stakeholder meeting, managing the project, developing a report on BMP effectiveness and gathering information towards the future development of a Draft Restoration (TMDL) and Protection Plan (Plan). The Plan will include TMDL equations and pollutant loading reduction estimates for impaired reaches and information about unimpaired reaches and reaches where the impairment status is unknown.

Goals

- Monitor additional mainstem reaches and tributary streams for *E. coli* to fill data gaps and collect Microbial Source Tracking (MST) samples at 15 sites.
- Identify pollutant source types and conduct sub-watershed source assessment.
- Develop a report on *E. coli* BMP removal effectiveness.

Results that count

- Gathered *E. coli* data on 15 mainstem reaches and tributary streams on 3/22/11, 4/6/11, 5/9/11, and 5/22/11. An approach for conducting MST sampling was developed and documented through a memo to the MPCA project team. MST samples were taken on 6/15/11 and 6/28/11.
- Developed a two-level approach for source assessment as summarized in a memo to the MPCA project team. A section of the TMDL report on the Level 1 source assessment was written for Phase IIA and work began on the Level 2 assessment.
- Wrote and delivered a report entitled Effectiveness of Best Management Practices for Bacteria Removal.

Tributary stream monitoring site S003-370

Financial information

Funding type: CWLA

Grant amount: $52,841.50

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Crow Wing River Watershed

Crow Wing (Major Watershed Project) – Phase 1

The initial kick-off meeting of the Crow Wing River Watershed occurred on January 13, 2010. This watershed was one of the first watersheds in Minnesota to follow the Watershed Approach. The Crow Wing Watershed falls within nine counties, and these counties have not worked together before at a watershed scale. The main purpose of this project was to get the counties working together, often times outside of their normal jurisdictions. Quarterly meetings increased the watershed coordination efforts and they were able to plan for communication and outreach strategies as well as develop a plan to work together for future restoration and protection efforts for the watershed.

In the summer and fall of 2011, a list of outreach efforts was created that is used to nurture a more effective communication network, audiences to target and peripheral partners that would help communicate efforts within the watershed to the public and provide long term sustainability. A civic engagement plan was completed in the fall of 2011 which included activities, tasks and outcomes to involve watershed residents and partners in protection and restoration efforts. A Phase 2 work plan was developed as an implementation plan to set restoration and protection strategies of surface water in the watershed once the field data is collected and evaluated.

Goals

- The main goals of this project were to get the counties working together at a watershed scale, develop a civic engagement plan and a work plan developed for the remainder of this four year watershed project.

Results that count

- This project allowed for the initial conversations and coordination of nine counties to work towards protecting and restoring the Crow Wing Watershed. This also allowed the nine counties involved, the knowledge and skills needed to work on other watershed projects that fall within their county. A civic engagement plan was developed and is currently being implemented. The watershed project is currently underway and is highly successful, thanks to the initial planning and coordination efforts.

Crow Wing intern training – 2010

Financial information

Funding type: CWP

Grant amount: $17,067.56

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Crow Wing River Watershed

Lake Margaret Nutrient TMDL Report

This TMDL study addresses a nutrient impairment in Lake Margaret. The goal of this study is to quantify the pollutant reductions needed to meet State water quality standards for nutrients.

Lake Margaret is located in the City of Lake Shore, Cass County, Minnesota, in the Upper Mississippi River watershed. It is a highly used recreational water body with an active fishery and provides other aesthetic values as well. The drainage area to the lake is 45,206 acres of land that is predominantly timber followed by small percentages of agriculture, pasture, and wetlands. The drainage area contains portions of the City of Lake Shore in the southeast corner but is mainly comprised of rural county areas including Moose Lake, Maple, Loon Lake, Meadow Brook, Home Brook, May and Fairview townships. The outlet to Lake Margaret is a channel at the north end of the lake where it flows into Upper Gull Lake, which is part of the Gull Lake Chain of Lakes. Water quality is considered fair with the lake still viewed as a popular destination for recreational activities.

Wasteload and Load Allocations to meet State standards indicate that average nutrient load reductions of 44 percent would be required to consistently meet standards under average precipitation conditions. Internal load management and reduction of phosphorus from watershed runoff by controlling sources from pastures and developed land (impervious surfaces) would have the most impact on reducing phosphorus load and improving water quality in Lake Margaret.

Goals

- Analysis of existing data to develop the current loads.
- Calculate the assimilative capacity and targeted load reductions
- Complete the load allocations and final written report documenting the loading reductions needed to meet criteria

Results that count

- Completed TMDL report and draft Implementation plan
- Completed final Implementation plan
- Received USEPA approval of TMDL report

Financial information

Funding type: CWLA

Grant amount: $48,443

In-kind: $5,215

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Long Prairie River Watershed

Long Prairie River TMDL Nonpoint Implementation

The MPCA has observed DO concentrations below the 5-mg/L standard in the lowermost portion of the river at Motley. The Todd Soil and Water Conservation District, working in cooperation with MPCA under a CWP, found DO concentrations below 5-mg/L periodically in the middle reach, in and around Browerville, and during the summer months in the uppermost portion near Carlos. As a result, six segments of the Long Prairie River are listed as" impaired waters" for low DO.

The Long Prairie River is a Class 2B water body. Its designated uses are aquatic life, recreation, canoeing, industrial consumption, agriculture, wildlife, aesthetic enjoyment and navigation. However, fish kills have occurred in the Long Prairie River, and monitoring has shown that DO concentrations in portions of the river intermittently fall below the state water quality standard of 5-mg/L, the minimum level considered necessary to support aquatic life.

In the course of the TMDL study, it was determined that a large percentage of the DO depletion stems from point sources, and that there is a potential for municipal discharges to cause ammonia toxicity during low flow conditions. The point sources will be working directly with MPCA, through the permit process to reach compliance with their load allocations. The nonpoint pollutant sources in the watershed are mainly agriculture, and will be addressed by this Section 319 implementation grant in cooperation with continuing strong programs for implementing best management practices, that are in place through Todd SWCD and their partners.

Goals

- The primary goal for the nonpoint implementation project is to use certain BMPs to bring or maintain nutrient levels at or below the standard for each ecoregion located in the Long Prairie River Watershed Identification of probable cause(s) of the biotic impairments
- Establish vegetation practices
- Animal agriculture activities
- Structural practices

Monitoring Site 4 on Eagle Creek

Results that count

Total pollution reduction estimates for all projects by category:

	Value	Unit
BOD 5 (lbs)	1,061.00	Lbs/Yr
COD (lbs)	3,840.00	Lbs/Yr
Fecal Coliform (cfu)	7.51	Cfu/Yr
Nitrogen	207.00	Lbs/Yr
Phosphorus Feedlot	83.00	Lbs/Yr
Phosphorus	7.24	Lbs/Yr
Sediment (TSS)	26.82	Tons/Yr

Long-term Results:

The projects completed through this grant provided for long term outcomes such as land use changes in the watershed. One project provided for the reforestation of a field that had been in row crop production. Another project took a field from row crop production and changed it to permanent pasture, with a rotational grazing plan.

In the future, we will have an increased ability to solve similar problems to those addressed by this grant because of the learning experience it provided. We found out what works and in some cases, what works better. We found this out with trees; our survival rate was increased with the addition of fabric.

Financial information

Funding type: Section 319

Grant amount: $110,000

Matching funds: $110,000

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Mississippi River – Grand Rapids Watershed

Big Sandy Area Lakes Nutrient Impairment TMDL Study

In 2006, Big Sandy and Minnewawa Lakes in Aitkin County were placed on Minnesota's 303(d) List of Impaired Waters, for aquatic recreation due to excessive nutrients. The data indicated that these lakes had total phosphorus concentrations in excess of the MPCA's state water quality narrative standard of 30 micrograms per liter for the growing season mean. The goal for this project was to prepare a TMDL for Big Sandy and Lake Minnewawa. In order to complete the TMDL, sediment samples were taken to better understand the internal load within these lakes as well as phosphorus samples at different water depths. Watershed and in-lake water quality response modeling was completed, waste load and load allocations were developed and the draft TMDL was prepared for public review. The TMDL was approved by EPA and specific implementation planning is happening at the local level.

Goals

- Improved water quality
- Public involvement
- Completed and approved TMDL

Results that count

- Awareness of water quality concerns was greatly improved, and implementation efforts are underway.
- Approved TMDL
- Public Involvement: well-attended community meetings
- Removal from the impaired list is a long-term goal

Big Sandy – Streeter Planting Project

Financial information

Funding type: CWLA

Grant amount: $63749 + $6500

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Mississippi River – St. Cloud Watershed

Elk River Watershed Association TMDL Studies, Phases I-III, 2008-2010

The Elk River Watershed Association (ERWSA) is focused on improving water quality by working with agricultural, urban, and residential landowners. They have reduced nutrient and sediment loads in the watershed through watershed best management practices since 1994. However, some 303(d) impairments still exist. These TMDLs address four 303d impairments on three water bodies. All three water bodies are addressed in this study because: 1) they are all located within the Elk River Watershed and 2) the turbidity impairment in the Elk River is likely driven by algae resulting from nutrient impairments in the headwaters lakes (Big Elk Lake); thus, nutrient loading analysis proposed for the lake nutrient TMDLs will assist in quantifying the portion of the turbidity impairment due to algae.

The TMDLs were conducted in three Phases. Phase I, which took place over 2008, entailed evaluating existing data, identifying data gaps and planning for future phases. Phase II was completed in 2009 and entailed collection of data, data analysis, and modeling. Finally, the Draft TMDL report complete in late 2010 documents Phase III of the TMDL study, which entails setting the TMDLs based on data collection, data evaluation and modeling completed in Phases I and II.

The TMDL report indicates that the nutrient levels in Mayhew and Big Elk Lakes need to be reduced by 78 percent and 57 percent, respectively, in order to meet state standards. The stretch of the Elk River addressed in the report will require a 72.5 percent reduction of *E. coli* in order to meet state standards.

Goals

- Phase I: complete risk assessment and an evaluation of existing information to better define existing conditions, identify data gaps, and develop plans for collecting and analyzing necessary additional information in subsequent phases.
- Phase II: data collection and evaluation as well as the development of the operational models.
- Phase III: Complete water quality models, load allocations used to develop a Draft TMDL Report and Implementation Plan.

Mayhew Lake sediment coring – Spring 2010, Benton County

Results that count

- Phase I tasks and report complete: This included a report, and a finalized work plan for Phase II and III.
- Phase II tasks and report complete: Conclusion was marked with the completion of the Phase II report.
- Phase III tasks and report complete: Draft TMDL and Implementation Plan.

Financial information

Funding type: CWLA

Grant amount: $215,264

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Mississippi River – Twin Cities Watershed

Shingle Creek and Bass Creek Biota and Dissolved Oxygen TMDL Implementation Plan

This work plan is for the completion of an implementation plan for biotic and DO impairments in Shingle Creek and Bass Creek. The implementation plan identifies, and sets forth by stream reach, specific actions that are likely to reduce sediment oxygen demand as well as enhance habitat and stream flow characteristics. Cost estimates are provided for each action, along with a suggested sequencing of improvements and an adaptive management strategy and interim milestones to assess progress. The Shingle Creek Watershed Management Commission will be responsible for coordinating implementation, performing future monitoring, and evaluating progress toward achieving the TMDL. Implementation actions will be completed by individual cities or partnerships of cities and other organizations. Actions totaling $5.375 million were identified in the plan.

Goals

- Identify detailed implementation actions by stream reach and estimate their cost.
- Prioritize the actions and set forth a recommended sequence of actions.
- Prepare a draft and final Implementation Plan, with input from stakeholders.

Results that count

- Detailed actions developed for each stream reach.
- Actions have been prioritized and costs for each action were estimated.
- The Implementation Plan was prepared and submitted for review and was approved by the MPCA.

Financial information

Funding type: CWLA

Grant amount: $5,000

Shingle Creek

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Mississippi River – Twin Cities Watershed

Wetland 639W Restoration

This project is a feasibility study and design for the restoration of Wetland 27-639W, which is a major external phosphorus source to North Twin Lake. This wetland restoration is the highest-priority implementation action in the Twin and Ryan Lakes Nutrient TMDL Implementation Plan (completed in 2007.) Water quality sampling shows that average total phosphorus concentration doubles between the inlet and outlet of this flow-through wetland. Wetland 639W contributes an estimated 730 pounds of total phosphorus per year into North Twin Lake, one of the largest sources to the lake.

This project undertook three activities: obtain additional data; identify and analyze options to reduce phosphorus export; and prepare preliminary design and specifications for selected improvements. Data obtained were another year of flow and water quality data in the wetland channel; seasonal groundwater elevations; and wetland soil chemistry. This study concluded that phosphorus export was the result of hydraulic modification of the wetland and legacy impacts of several decades of sediment and nutrient loading from agricultural and urban runoff. Dense cattail stands in the central basin dewater the wetland through the growing season, allowing the wetland soils to mineralize. The high iron-bound fraction in the phosphorus-saturated soils readily releases soluble phosphorus into the water column when the wetland is rewetted during a storm event, resulting in phosphorus export.

The feasibility study determined the solution to reducing or eliminating phosphorus discharge from this wetland was through modification of the hydraulic characteristics of the wetland. First, the feasibility of constructing a new outlet weir control structure to store runoff and prevent its release until a critical elevation is reached was investigated. This will keep the wetland soils wetter and slow down mineralization. Second, the option to construct an overflow channel to allow large events to partially bypass the wetland was analyzed.

Goals

- Identify and evaluate options to reduce or eliminate phosphorus discharge from Wetland 27-639W
- Select the most feasible and effective option

Wetland 639W

- Prepare construction plans and specifications for future construction of selected design

Results that count

- Completed monitoring and modeling
- Identified options and selected most feasible option
- Prepared preliminary plans and specifications and obtained permits

Financial information

Funding type: Section 319

Grant amount: $59,995.75

Matching funds: $60,795.48

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North Fork Crow River Watershed

Ann/Emma Lakes Excess Nutrients TMDL

This TMDL study addresses nutrient impairments for Ann and Emma Lakes located in the Upper Mississippi River Basin in Wright County, Minnesota. The goal of this TMDL is to quantify the pollutant reductions needed to meet State water quality standards for nutrients. The numeric water quality standards for both lakes are a summer average total phosphorus concentration of 60 µg/L, 20 µg/L chlorophyll-a, and greater than one meter in Secchi depth. Water quality does not meet state standards for nutrient concentration for shallow lakes in the North Central Hardwood Forest ecoregion in either lake.

Land use in the Ann Lake and Lake Emma watersheds is predominantly agriculture (>90 percent) including row crops (corn/soybean rotation) and animal agriculture. Both lakes are quite shallow with an average depth less than 10 feet. Lake Emma receives water from Ann Lake via a short channel and then discharges downstream to the Crow River. Both lakes have a long history of carp and curly-leaf pondweed infestation while carp removal has occurred periodically at Ann Lake.

Nutrient budgets were developed for both lakes as well as a lake response model to set the Load and Wasteload Allocations. Phosphorus sources to Ann Lake include watershed runoff (68 percent) and internal sediment release of phosphorus (30 percent) with the remaining phosphorus coming from atmospheric deposition. Lake Emma receives most of its phosphorus from Ann Lake (74 percent) with the remaining phosphorus coming from internal loading (17 percent) and the direct watershed (9 percent). TMDL allocations for the lakes to meet state water quality standards were 1,591 pounds per year (81 percent reduction) for Ann Lake and 1,586 pounds per year (60 percent reduction) for Lake Emma.

Goals

- Collect field data in order to characterize the condition of the resources and watershed.
- Develop a TMDL report that quantifies the nutrient reductions needed to meet State water quality standards.
- Engage the public in the participation and outreach for the TMDL project.

Ann Lake

Results that count

- Collected two years of data and created a watershed model.
- Created a TMDL report.
- Hosted four project update meetings to review project progress and provide a forum for discussion. Formed a Citizen Advisory Panel composed of 12 watershed residents.

Financial information

Funding type: CWLA

Grant amount: $141,218

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North Fork Crow River Watershed

North Fork – Lower Crow River Watershed Dissolved Oxygen, Turbidity and Fecal Coliform Phase III TMDL

The North Fork – Lower Crow River Watershed is located in the Upper Mississippi River Basin in central Minnesota, and encompasses parts of Pope, Stearns, Kandiyohi, Meeker, Renville, McLeod, Carver, Wright, and Hennepin Counties. Dominant land use within the watershed is agricultural (predominantly row crops), grasslands, forests, water and wetlands, urban. The watershed contains some of the fastest growing areas on the outer edge of the Twin Cities metro area.

The Crow River 1.76 million acre watershed is a significant tributary to the Mississippi River. The Crow River Watershed is made up of two major subwatersheds, the North Fork and the South Fork. The North Fork watershed lies primarily in the North Central Hardwood Forest (NCHF), the topography ranges from nearly flat to rolling to steep sloped. Although agriculture is the dominant land use throughout the entire watershed, agricultural lands comprise 83.3 percent in the North Fork. The water quality concerns of the Crow River Watershed are: low DO, TP, TSS, nitrate and bacteria.

The headwaters for the North Fork Crow River are located in Pope County, at Grove Lake. From here the North Fork Crow River flows southeast through portions of Kandiyohi, Stearns, Meeker and Wright Counties. North Fork has been channelized but the segment of the North Fork Crow River located in Meeker County was added to Minnesota's Wild and Scenic River program in 1976.

The North Fork Crow River Phase III TMDL project focused on completing the DO modeling and channel assessment, providing public meetings and writing the final report that covers the TMDLs for all river reaches listed as impaired for bacteria, turbidity, and DO in the North Fork Crow River Basin.

Goals

- Complete DO modeling and channel assessment
- Write TMDL report
- Participate in meetings and public outreach

Results that count

- Completing the channel assessment.
- Writing the final report that covers the TMDLs for all river reaches listed as impaired for bacteria, turbidity, and DO.
- Preparation for up to six meetings that will include MPCA, Crow River Organization of Water (CROW), WWTF Operators and general public.

Financial information

Funding type: CWLA

Grant amount: $67,771

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North Fork Crow River Watershed

Rice Lake Nutrient TMDL

This TMDL project began in May 2009 and was completed in June 2011. The TMDL study addresses nutrient impairments for Rice Lake, located in the Upper Mississippi River Basin in Stearns County, Minnesota. The goal of this TMDL is to quantify the pollutant reductions needed to meet State water quality standards for nutrients. The numeric water quality standards for Rice Lake is a summer average total phosphorus concentration of 40 µg/L, 14 µg/L chlorophyll-a, and greater than 1.4 meter in Secchi depth. Water quality does not meet state nutrient concentration standards for deep lakes in the North Central Hardwood Forest ecoregion.

Rice Lake has a direct watershed that is approximately 10,730 acres in size. The North Fork Crow River drains approximately 162,122 acres into Rice Lake. Land use in the North Fork Crow River and Rice Lake direct watersheds is predominantly agriculture. Rice Lake has a history of carp and curly-leaf pondweed infestation.

A nutrient budget was developed for Rice Lake along with a lake response model to set Load and Wasteload Allocations. Phosphorus sources to Rice Lake include direct watershed runoff (2 percent), North Fork Crow River watershed runoff (93 percent) and internal sediment release (4 percent) with the remaining from atmospheric deposition. TMDL allocation for all four Rice Lake basins to meet state water quality standards is 29,848 pounds per year (43 percent reduction).

The primary sources of phosphorus for Rice Lake include runoff from an agricultural watershed with both row crops and animal agriculture. The primary source of nutrients is found to be from animal manure, producing over 5.3 million pounds of phosphorus per year. A large proportion of this manure is land applied, eventually making its way into surface waters. Nutrient management in the Rice Lake watershed will need to focus on manure management.

Goals

- Develop appropriate nutrient TMDL load allocations and load reductions for Rice Lake.
- Develop a TMDL Implementation Plan as a framework to reducing loading to Rice Lake.
- Reduce phosphorus loading into Rice Lake to a level that complies with eco-region standards.

Wenck staff taking sediment core samples on Rice Lake in 2009

Results that count

- Completed TMDL draft and submitted to MPCA containing load allocations and reductions for Rice Lake.
- Completed TMDL Implementation Plan draft and submitted to MPCA.
- Through information gained through the TMDL, regarding load allocations and reduction strategies, stakeholders can now focus their efforts to implement appropriate projects to reduce phosphorus loading into Rice Lake to acceptable eco-region standards.

Financial information

Funding type: CWLA

Grant amount: $138,871

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South Fork Crow River Watershed

Lake Independence Channel Stabilization Project

The Lake Independence TMDL study identified numerous eroding channels adjacent to the lake as significant sources of phosphorus and sediment loading. The TMDL implementation plan included recommendations to stabilize these eroding channels (7.1.3, Task 3, 4.c). A series of these eroding channels are located in the Baker Park Reserve campground located along the southeast shoreline of Lake Independence. The channels convey rainfall runoff water from the campground and residential areas in the City of Maple Plain down a 60-foot high bluff on the shore of the lake to Lake Independence. Increased runoff from the drainage area has converted the drainage channels into deep ravines with active headcutting and channel widening. Sediment from the eroding gullys is carried downstream into Lake Independence.

This project proposes to stabilize the eroding gullys using a combination of techniques:

- Install raingardens at the head of two of the gullys to reduce runoff volume and discharge rate.
- Construct diversion structures to direct runoff water into the rain gardens.
- Install a stormsewer in the most severly eroded channel to convey stormwater down the 60-foot slope.
- Fill over the pipe will be graded and planted with native vegetation to create an over flow channel.
- Install drop structures in the remaining ravines to convey runoff water downslope in a non-erosive manner.
- Modify existing catchbasins in the watershed to increase the detention and infiltration of stormwater.

Goals

- Reduce nutrient loading to Lake Independence
- Reduce sediment loading to Lake Independence
- Stabilize four eroding gullies draining to Lake Independence

Results that count

- Installed two rain gardens to infiltrate runoff, reducing nutrient loading to Lake Independence
- Stabilized four ravines using stormsewer, gabions and drop structures
- Modified catch basins to increase rainfall infiltration and reduce sediment transport

The estimated annual phosphorus and sediment discharge from the site totaled approximately 3.5 and 50 pounds/year respectively. This represents a reduction of over 95 percent from the pre-project discharge estimates of 22.5 of phosphorus and 12,000 pounds of sediment. Volume reduction was the main factor influencing the sediment and nutrient reductions.

Financial information

Funding type: Section 319

Grant amount: $119,500

Matching funds: $254,862

In-kind: $40,678

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South Fork Crow River Watershed

South Fork Crow River Buffalo Creek Watershed Turbidity and Pathogen TMDL Project

The South Fork Crow River Watershed is located in the Upper Mississippi River Basin in central Minnesota, and encompasses parts of Kandiyohi, Sibley, Renville, McLeod, and Carver Counties. Buffalo Creek, a major tributary to the South Fork Crow River originates in Renville County and flows east through McLeod County. Buffalo Creek joins the South Fork in Carver County, just across the Carver/McLeod County line. Most of Renville County's portion of Buffalo Creek has been channelized. The dominant land use within the watershed is agricultural (predominantly row crops), grasslands, wetlands and urban.

The Crow River is a 1.76 million acre watershed and is a significant tributary to the Mississippi River. The Crow River Watershed is made up of two major subwatersheds, the North Fork and the South Fork. The South Fork watershed lies primarily in the Western Cornbelt plain, the topography ranges from nearly flat to rolling to steep sloped. The water quality concerns of the Crow River Watershed are: low DO, TP, TSS, nitrate+nitrite-n, and bacteria.

Excess phosphorus, a primary cause of most lake and river water quality and fisheries degradation, has been linked to extremely elevated algal growth in the lower reach of the Crow River. The total suspended solids contribution from the Crow River to the Mississippi River at Anoka varied from 16 percent to 53 percent of the annual loads.

The South Fork Crow River Buffalo Creek Watershed Turbidity and Pathogen TMDL project focused on collecting additional water quality data, providing public meetings and developing load allocations to engage citizens and help direct future implementation plans for local agencies on improving the water quality in Buffalo Creek Watershed.

Goals

- Collect field data in order to characterize the condition of the resources and watershed.
- Engage the public in the participation and outreach for the TMDL project.
- Provide project coordination, reporting and financial track and overall management.

South Fork Crow River – Peggy Lueck, McLeod County

Results that count

- Developed modeling and load allocation for Buffalo Creek TMDL project based on field data collected during the project.
- Organized four public stakeholder/technical committee meetings to review results, provide directions and modeling approach of the analyses. Provided updates to local boards and organizations throughout the project period.
- Provided overall management and coordination between partners to achieve project activities.

Financial information

Funding type: CWLA

Grant amount: $47,170.00 CROW ($93,713.00 Wenck)

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Upper Mississippi River Basin

Projects active and awarded in 2012

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

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.

Crosby Lake Management Plan — 2009

Sponsor: Capitol Region Watershed District

Funding: CWP (Grant) $50,000

Purpose: Situated in the floodplain of the Mississippi River in Saint Paul, Crosby Lake is divided into two separate waterbodies by a bog trail, forming Crosby Lake and Little (or Upper) Crosby Lake. This project will review and evaluate available data and studies from relevant sources and determine gaps in data; obtain/collect additional data and synthesize all information on Crosby Lake; develop a hydrologic regime for Crosby Lake as well as a simple water quality model to analyze current and future conditions of the lake and watershed; identify implementation activities; identify the management goals, objectives and activities to address the high priority issues of Crosby Lake; and prepare the Crosby Lake Management Plan.

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.

Kohlman Lake TMDL Nutrient Reduction Phase III – 2011

Sponsor: Ramsey-Washington Metro Watershed District

Funding: Section 319 (Grant) $500,000

Purpose: This Section 319 TMDL Implementation Project is a unique opportunity to target a significant source of phosphorus to one of Minnesota's Impaired Waters (Kohlman Lake) while also providing a demonstration of retrofit stormwater infiltration features in a high-profile urban environment.

The goals of this project are:

1. Reducing phosphorus (by 60 percent – 80 percent) from the site's stormwater runoff by capturing and infiltrating (or filtering) up to the first 2 inches of rainfall on the site.
2. Educating the public on stormwater quality (through strategic placement and design of features and interpretive signage that patrons see as they walk to and from their cars at a nearby mall).
3. 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).

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 Johanna/Oasis Pond Water Quality Treatment — 2009

Sponsor: Rice Creek Watershed District

Funding: CWP (Grant) $110,200

Purpose: Repair and upgrade of a water control structure and water quality enhancement measures on Oasis Pond in Roseville, Minnesota in an effort to reduce phosphorus pollutant loads to Lake Johanna and protect the quality of downstream receiving waters. In addition, monitoring will occur to determine how loads of nutrients, suspended solids and turbidity are affected.

Lake McCarrons Sub-watershed BMP Project — 2012

Sponsor: Capitol Region Watershed District

Funding: CWP (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.

Lambert Creek Retrofit ID and Design Project — 2009

Sponsor: Vadnais Lake Area Watershed Management Organization

Funding: CWP (Grant) $15,000

Purpose: Lambert Creek discharges into Vadnais Lake, which is the final impoundment reservoir containing the potable water supply that the Saint Paul Regional Water Services (SPRWS) distributes to the cities of St. Paul, Arden Hills, Falcon Heights, Lauderdale, Little Canada, Maplewood, Mendota Heights, Roseville and West St. Paul. This project aims to analyze the wealth of

existing data, identify locations within Lambert Creek's sub watersheds that contribute the greatest to water quality degradation, engage local partners and decision makers and determine which BMP retrofit designs would be the most cost effective and efficient to install for removing pollutants. An administrative outcome of this work will be a database of construction-ready projects to guide future BMP installations throughout the sub-watersheds of concern and for a few pilot installation projects.

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.

Sand Creek Stormwater Retrofit — 2011

Sponsor: Coon Creek Watershed District

Funding: CWP (Grant) $83,650

Purpose: Retrofit a new regional stormwater treatment pond and a network of 10 strategically placed curb-cut rain gardens that will reduce phosphorus, total suspended solids, and stormwater runoff volumes in Sand Creek, which is a major tributary to Coon Creek and flows to the Mississippi River in Anoka County.

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: CWP (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 River Basin Sediment Reduction — 2009

Sponsor: Crow River Organization of Water

Funding: CWP (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.

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.

Improving Stormwater Management in Ecologically Sensitive Watersheds — 2008

Sponsor: Middle Fork Crow River Watershed District

Funding: Section 319 (Grant) $140,000
CWP (Loan) $100,000

Purpose: This project's goal is to reduce the impacts of stormwater runoff into the Middle Fork Crow River, Nest Lake and Green Lake by implementing a variety of stormwater treatment options, including retrofits, in areas that are already highly impervious or rapidly increasing the imperviousness.

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 SSTSs, 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: CWP (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: CWP (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

Lower Sauk-Metro Area Water Quality Protection — 2012

Sponsor: Sauk River Watershed District

Funding: CWP (Grant) $298,000 CWP (Loan) $150,000

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 Shoreland Enhancement Project — 2008

Sponsor: Sauk River Watershed District

Funding: Section 319 (Grant) $160,000
CWP (Loan) $100,000

Purpose: Osakis Lake is on the MPCA's Impaired Waters list for excess nutrients. To reduce in-lake TSS concentrations, the Osakis Lake Shoreland Enhancement Project will primarily focus on restoring the 24 miles of lakeshore to a more natural state to reduce shoreland erosion and sediment loading. The education component will set the stage by offering area residents information on the benefits of lakescaping and "how to" workshops. The incentive program is designed to encourage lakeshore owners to convert their high maintenance and manicured lakeshore to native vegetations to protect the lakeshore, improve water quality and provide better aquatic habitat.

Osakis Lake Enhancement Continuation Project — 2011

Sponsor: Sauk River Watershed District

Funding: CWP (Grant) $114,839.17 CWP (Loan) $75,000

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.

Restoring Water Resources of the Sauk River Chain of Lakes — 2008

Sponsor: Sauk River Watershed District

Funding: Section 319 (Grant) $200,000
CWP (Loan) $200,000

Purpose: This restoration project proposes a three year implementation plan. The first year will involve installing monitoring equipment and attaining baseline monitoring data, comprehensive stream bank assessments, feedlot inventories, stormwater assessments and begin a tailored education program. The following years will

focus on implementing stormwater, urban and Ag BMPs. Monitoring and education programs will continue until project completion.

Restoring Water Resources of the Sauk River Chain of Lakes Project Continuation — 2009

Sponsor: Sauk Lake Watershed District

Funding: CWP (Grant) $138,050 CWP (Loan) $150,000

Purpose: This project will continue to educate the local citizens on the immediate and long-term impact of agricultural, shoreland and urban stormwater management. The sponsor will work with local units of government to hold educational events and seminars based on local needs targeted to adult, youth and volunteer audiences. Stream monitoring will continue at the Sauk River Chain of Lakes inlets, as well as beginning research of the physical and biological characteristics of the inlets. BMP activities continue, including agricultural and rural land use, stormwater and urban uses, well sealing, shoreland/riparian restorations, septic systems upgrades and erosion and sediment reduction. This project begins a process to develop a water quality trading program within the watershed of the Sauk River Chain of Lakes.

Sauk River Water Quality Protection Phase III — 2011

Sponsor: Sauk River Watershed District

Funding: CWP (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: CWP (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 Implementation Activity Within Impaired and Ecologically Sensitive Areas in Stearns County — 2007

Sponsor: Stearns SWCD

Funding: Section 319 (Grant) $300,000

Purpose: This project targets livestock producers and landowners located in and near wellhead protection areas and drinking water supply management areas, designated lakesheds and shoreland areas. Funds would be made available to encourage livestock producers to work with a Certified Crop Adviser in developing a comprehensive Manure Management Plan, and to correct feedlot pollution problems and soil erosion for producers within the ecologically sensitive areas.

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.

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