



2008 Annual Report to the U.S. Environmental Protection Agency

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



Minnesota Pollution Control Agency



**Minnesota Pollution
Control Agency**

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Cover Photo: Middle Cullen Lake, north of Nisswa,
by Stephen Mikkelson, MPCA.



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Introduction

Supporting water quality restoration and protection in 2008

2008 saw a marked increase in activity addressing the state's impaired waters. Funds allocated by the state legislature to implement the Clean Water Legacy Act (CWLA) of 2006 enabled many new Total Maximum Daily Load (TMDL) studies to get started, and the implementation of water quality restoration and protection efforts. This increased level of activity will continue into 2009 under existing appropriations. Beyond fiscal year 2009, dedicated funding hinges on a referendum that will be voted on by the citizens of Minnesota in the November 2008 election, and on action on funding taken by the state legislature in the 2009 legislative session.

The combination of state CWLA funds with federal Clean Water Act Section 319 (Section 319) funds is enabling great work improving and protecting water quality to happen. CWLA funds in this biennium have accounted for on average over \$15 million a year to the Minnesota Pollution Control Agency (MPCA) to monitor and assess waters, and to develop TMDLs. Section 319 funds provide over \$6.5 million a year to support implementation, education, and research projects. CWLA funds also provided over \$18 million over the biennium to the Board of Water and Soil Resources (BWSR) and the Minnesota Department of Agriculture (MDA) for implementation activities.

The CWLA has provided funding to help Minnesota's counties, cities, and other water organizations conduct the important work of studying specific impairments in our waters and preparing TMDL implementation plans to address those impairments. TMDL projects that have received state CWLA funding through the MPCA, since the passage of the Act, are listed on page 2. Some of these projects have received additional funding from other sources or will be receiving additional CWLA funds currently allocated; however, this project list only reflects the CWLA – TMDL development project dollars encumbered at the time of this publication.

New emphasis for Clean Water Partnership

With increased emphasis on TMDLs and restoration efforts in recent years, there is a need to ensure that protection of clean waters is not ignored. As a small initial step in this direction, the MPCA dedicated about \$425,000 to a Clean Water Partnership (CWP) funding round for resource investigation projects focused on protecting clean waters and preventing them from becoming impaired. The balance of (CWP) funds (under \$2 million) will be used to continue support of current restoration implementation projects. We are excited to have a funding round dedicated solely to protection efforts. The MPCA is exploring the possibility of making permanent changes to CWP based on the level of interest in, and what we learn from, this pilot funding round.

Clean Water Legacy Act

The CWLA has provided funding to help Minnesota’s counties, cities, and other water organizations conduct the important work of studying specific impairments in our waters and preparing TMDL implementation plans to address those impairments. TMDL projects that have received state CWLA funding through the MPCA, since the passage of the Act, are listed below. Some of these projects have received additional funding from other sources or will be receiving additional CWLA funds currently allocated; however, this project list only reflects the CWLA – TMDL development project dollars encumbered at the time of this publication.

Basin	Title	Sponsor	\$ Amount
Lake Superior	Deer Creek/Nemadji River Turbidity TMDL	Carlton SWCD	\$176,419.00
	Knife River Watershed TMDL Project Part 3	So. St. Louis SWCD	\$20,000.00
	Poplar River Watershed Project	Cook County SWCD	\$80,000.00
Lower Mississippi	Cedar River Basin Turbidity and Excess Nutrients TMDL in Multiple Counties	Mower SWCD	\$214,725.00
	Lake Pepin Watershed TMDL	University of Minnesota	\$495,126.00
	Lower Vermillion River Effectiveness Monitoring	Dakota County SWCD	\$31,739.00
	Root River Basin Turbidity TMDL	Fillmore County	\$300,000.00
	Zumbro River Watershed Turbidity and Excess Nutrients TMDL Project	Barr Engineering	\$200,000.00
Minnesota River	Bluff Creek Watershed TMDL	Barr Engineering	\$50,000.00
	Cottonwood River Watershed Fecal Coliform TMDL River Control Area	Redwood Cottonwood	\$50,000.00
	Credit River Turbidity TMDL Development	Scott County	\$125,000.00
	Fish Lake & Schwanz Lake Nutrient Impairment TMDL Project	City of Eagan	\$90,000.00
	Lake Crystal Excess Nutrients TMDL	Water Resources Center- MSU	\$39,698.85
	LeSueur River Basin Sediment Study—NCED	University of Minnesota	\$482,810.67
	Pomme de Terre River Fecal Coliform TMDL	Stevens County SWCD	\$8,500.00
	Ravine, Bluff, and Streambank Erosion in the MN River Basin	University of Minnesota	\$214,388.00
	Redwood River Fecal Coliform TMDL River Control Area	Redwood Cottonwood	\$35,000.00
Turbidity TMDL Assessment of Pomme de Terre River Watershed	Stevens County SWCD	\$120,000.00	
Minnesota River and Lower Mississippi	HSPF Modeling for MN River Basin Turbidity TMDL and Lake Pepin Excessive Nutrient TMDL	Tetra Tech, Inc.	\$336,502.00
	Crystal Lake, Keller Lake, Lee Lake, Earley Lake Nutrient Impairment TMDL Project	Black Dog Watershed Management Commission	\$174,102.00
Red River	Clearwater River Evaluation of DO Impairment	Bemidji State University	\$80,304.00
	Red River Basin Turbidity TMDL Year 3	Red River Watershed Management Board	\$100,000.00
St. Croix	Ann River Watershed	Kanabec Soil and Water Conservation District	\$44,860.00
	Browns Creek Impaired Biota TMDL	Washington Conservation District	\$249,001.00

St. Croix	Comfort and Forest Lakes Watershed District Impaired Lakes TMDL	Comfort Lake Forest Lake Watershed District	\$57,191.00	
	Land Cover & Impervious Surface Classifications	University of Minnesota	\$45,000.00	
	Sunrise River Watershed TMDL Phase 1	Chisago County	\$24,986.50	
	Typo & Martin Lakes TMDL Update	Anoka Conservation District	\$2,900.00	
Statewide	CWLA Tracking and Reporting Strategy	University of Minnesota	\$25,000.00	
Upper Mississippi	Big Sandy Area Lakes Nutrient Impairment TMDL Study	Aitkin County SWCD	\$265,012.00	
	Buffalo Creek Watershed Turbidity and Pathogen TMDL (South Fork Crow)	Wenck Associates, Inc.	\$93,713.00	
	Clearwater River & Lake Louisa TMDL	Clearwater River Watershed District	\$70,052.00	
	Clearwater River DO and Fecal Coliform TMDLs Project	Red Lake Watershed District	\$100,000.00	
	Clearwater River Ongoing TMDL Studies	Clearwater River Watershed District	\$66,832.00	
	Getchell, Stony, and Unnamed Creeks Turbidity	Sauk River Watershed District	\$80,000.00	
	Hardwood Creek CONCEPTS Model 2008	Emmons & Olivier Resources	\$22,428.00	
	Lake Osakis, Faille, Clifford and Smith Lakes Excessive Nutrient Impairment TMDL	Sauk River Watershed District	\$20,000.00	
	Lake Sarah Excess Nutrients TMDL Project	Pioneer Sarah Creek Watershed Management Commission	\$34,912.80	
	Little Rock Creek TMDL (Biological Impairment Project)	Benton SWCD	\$15,000.00	
	Little Rock Lake Nutrient TMDL	Benton SWCD	\$180,224.54	
	Minnehaha Creek Lake Hiawatha TMDL Gap Analysis	Tetra Tech, inc.	\$18,748.00	
	Minnehaha Creek Watershed Lakes TMDLs	Emmons & Olivier Resources	\$103,520.00	
	Peltier Lake and Centerville Lake Nutrient Impairment TMDL	Emmons & Olivier Resources	\$71,763.00	
	Sauk Lake Nutrient TMDL Project	Sauk River Watershed District	\$60,000.00	
	Shingle Creek DO & Impaired Biota TMDL	Shingle Creek Watershed Management Commission	\$113,000.00	
	Sweeney Lake TMDL Phase II	Bassett Creek Watershed Management Commission	\$78,650.00	
	Total Funding			\$5,267,108.36

TMDL training materials developed for local government officials and other water resource professionals

Over the past several years, MPCA TMDL Program staff has collaborated to create 19 training modules that address development of TMDL Studies. The modules provide a wide range of information pertaining to TMDL studies. The modules were developed primarily for local government officials who are developing a TMDL study for the first time, reflecting the combined wisdom and experience of technical and planning experts in the TMDL program. The modules are not intended to be "a cookbook" for developing a TMDL

study, rather, they integrate important information, advice and lessons learned from previous watershed projects and other TMDL projects around the state.

In addition to the 19 Powerpoint modules, there is an accompanying manual, as well as project planning worksheets.

The MPCA is in the process of placing all modules on its web site, at: www.pca.state.mn.us/water/tmdl/tmdl-training.html.

Contact Lynne Kolze at 651-659-0785.

Watershed approach

Improved funding is enabling greatly improved water condition monitoring. At current funding levels, in 10 years Minnesota will have a thorough assessment of waters statewide. Monitoring and assessments will be performed at the major watershed level in all 81 of our state's watersheds on a rotating basis, yielding information on water chemistry, biological integrity, and flow rates. The approach has already been piloted in the Snake River (St. Croix River Basin), Pomme de Terre River (Minnesota River Basin), and North Fork Crow River (Upper Mississippi River Basin). Having this information on a watershed basis will enable a stronger data driven approach to watershed planning, including TMDL and protection strategy development, and to subsequent implementation efforts. Focusing on the 81 major watersheds will help guide MPCA water management activities, in concert with local water planning and implementation efforts.

Clean Water Council

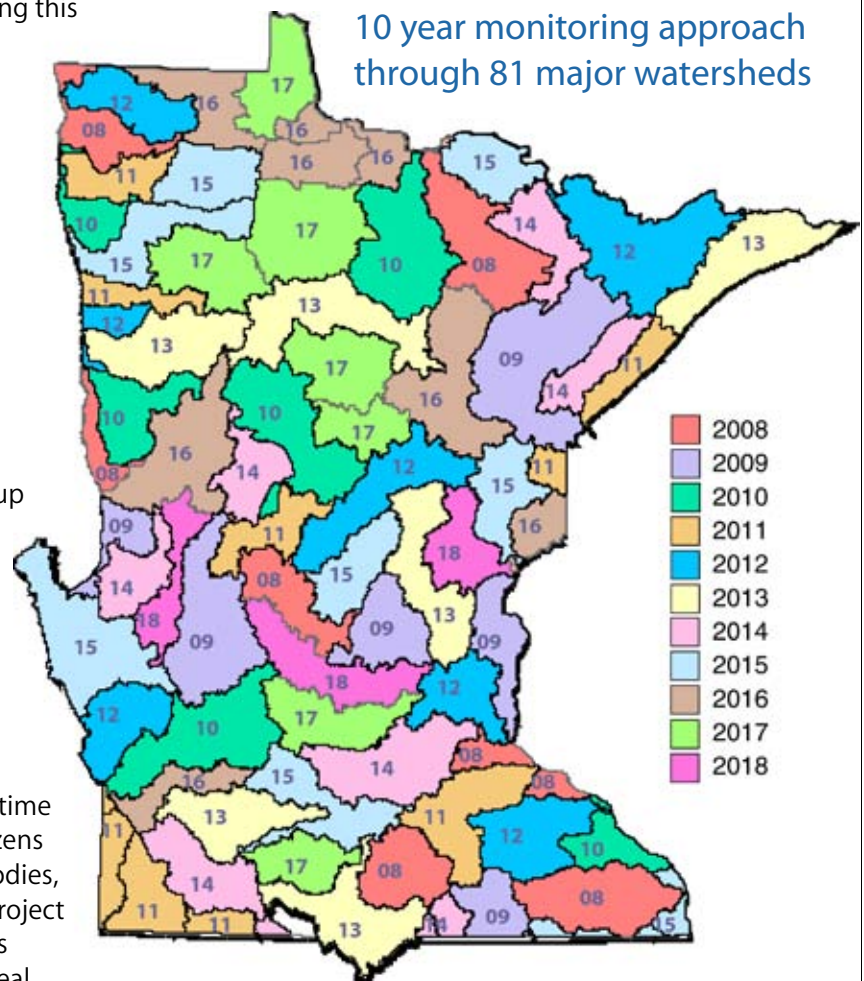
As in the past, the future of water quality in Minnesota depends on everyone with a stake in clean water, whatever the reasons, coming together to work to achieve that goal. The group charged with helping ensure we leave a "Clean Water Legacy", is the Clean Water Council. See page 6 for more information on the Council.

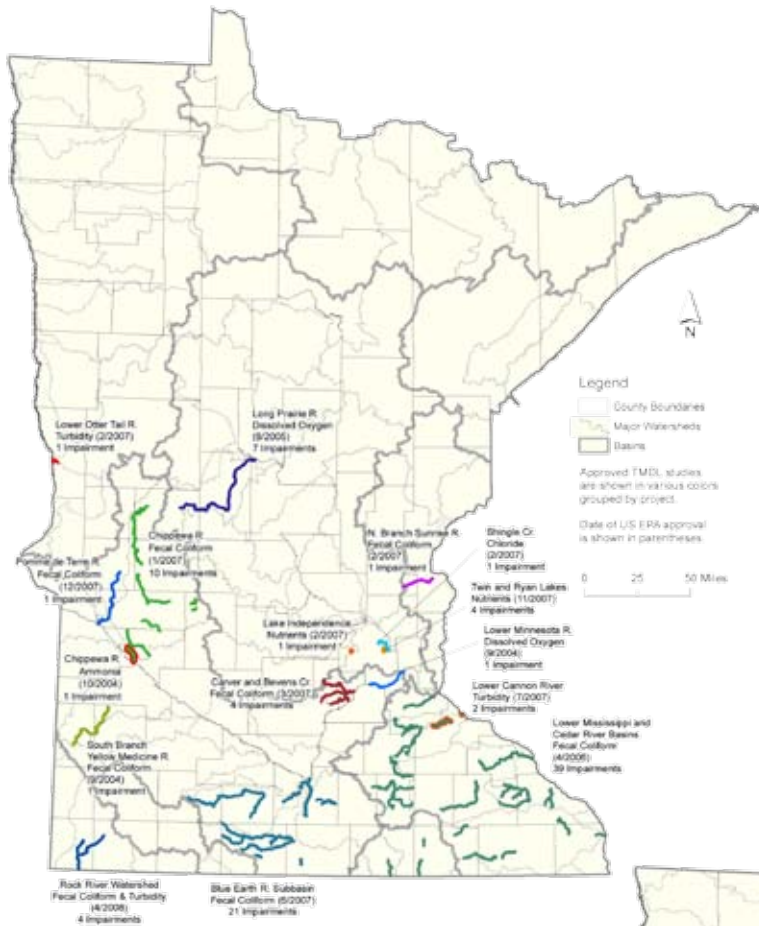
Reporting on project successes

At the project scale, this report gives details on accomplishments of specific CWP, Section 319, and TMDL watershed projects. Please take the time to read what water resource managers and citizens are accomplishing together on specific waterbodies, watersheds, and water pollution issues in the project descriptions that follow. Perhaps these projects are struggling with similar problems that you deal with in your work. Perhaps they have learned lessons and developed approaches that can be helpful to you as well. Perhaps you have information that can help further their work. Contact project representatives to share information and help each other reach the common goal of clean water.

Exciting water restoration and protection work and developments continue to happen and increase, thanks to improved funding and the dedication and hard work of water resource managers from all sectors and levels of government. All Minnesotans—citizens, agricultural producers, industry—are water resource managers by the daily actions we take and decisions we make. Whatever your role in preserving and restoring our water quality, thanks for all you do to help keep Minnesota "the land of sky-blue waters"!

10 year monitoring approach through 81 major watersheds





Approved TMDLs in Minnesota as of June 2008

Impairments delisted due to implementation efforts as of July 2008



Clean Water Council

Creation and membership

The Clean Water Council was established in the Clean Water Legacy Act, which was signed into law June 2, 2006. The Council consists of 23 members: including 19 appointed by the Governor representing local government, agriculture, industry, the University of Minnesota, fishing and hunting interests, and environmental organizations; as well as four non-voting representatives from the following state agencies: Minnesota Pollution Control Agency, Department of Agriculture, Department of Natural Resources, and Board of Water and Soil Resources.

The Council's role is to advise on the administration and implementation of the Clean Water Legacy Act, including:

- Fostering coordination among public agencies and private entities to ensure cooperation with relevant plans and programs.
- Prioritization strategies for TMDLs, restoration and protection activities.
- Development of appropriate processes for expert scientific review.
- Development of education and participation strategies for citizens and stakeholders.

Council meetings

The Clean Water Council held their inaugural meeting in March 2007 and they have been continuing to meet on a monthly basis in St. Paul. Council meetings are generally held the third Monday of the month from 9:00 a.m.- 3:30 p.m. All Council meetings are open to the public.

Council work

The Council developed a work plan which further defines how they will fulfill their statutory requirement to advise on implementation of the CWLA. The work plan outlines strategies and tasks to address the following needs:

- Civic Engagement in the impaired waters process.
- Priority Recommendations for TMDLs, restoration and prevention activities.
- Work Integration of state agencies to maximize effectiveness of program delivery.



Council member Paul Torkelson explains the farming process and the economics of agricultural production to other members, while touring his farm in St. James, MN.

- Local Partnerships to identify effective solutions, enhance outreach, and seek ways to leverage local expertise and state funding.
- Measurable Outcomes to gauge program performance.
- Prevention activities to protect water quality.
- Strategic Research needed to protect and restore water quality.
- Monitoring needs and ways to better utilize government agencies and citizen volunteers.

The Council organized itself into work groups in order to carry out the associated strategies and tasks within each of these organizing principles. The four work groups include:

- Prevention & Monitoring,
- Civic Engagement & Local Partnerships,
- TMDL Development & Implementation, and
- Research & Measurable Outcomes

The Council is in the process of developing budget and policy recommendations to be included in their December 2008 Legislative Report.

For additional information on the Council, visit their web site at www.pca.state.mn.us/water/cleanwatercouncil/index.html or contact Jeff Risberg, jeff.risberg@state.mn.us or 651-296-7231.

LARS and eLINK results from Section 319 & CWP projects 1997–May, 2008

The table following shows progress through May 2008 based on previous Local Annual Reporting System (LARS) reporting (1997-2002) and reporting data from eLINK(2003 – May 2008). Based on LARS/eLINK reporting by Clean Water Partnership (CWP) and Section 319 Project Partners, these projects are estimated to have reduced soil loss from 1998 through May 2008 by more than 180,000 tons/year. During the same period, sedimentation was estimated to have been reduced by over 70,000 tons/year. Phosphorus loading was estimated to have been reduced by over 265,000 pounds/year.

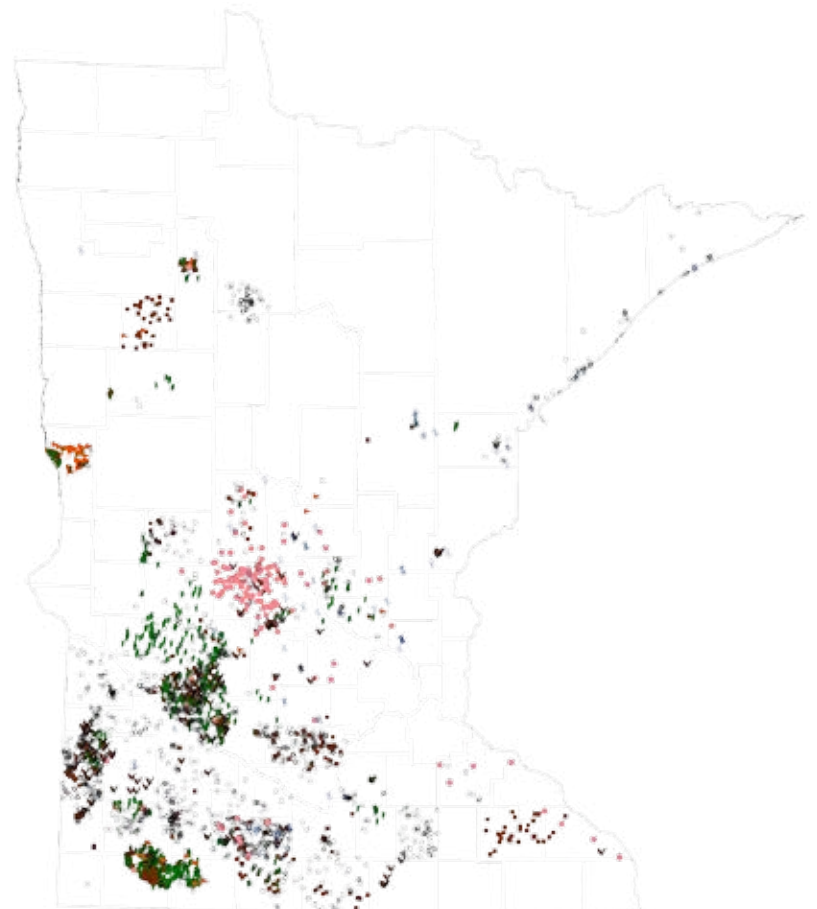
Pollution reduction estimate type	# of BMPs	Estimated soil loss reduction (tons/yr)	Estimated sediment reduction (tons/yr)	Estimated phosphorus reduction (pounds/yr)
Feedlot	159	0	0	6,190
Filter Strip Project	573	64,567	30,829	35,514
Gully Stabilization	196	11,878	7,643	8,354
Sheet & Rill Erosion Control	312	43,331	28,386	35,833
Stream & Ditch Stabilization	101	5,190	5,190	4,815
Wind Erosion	54	52,629	0	555
Other	2,069	2,817	0	175,104
Total	3,464	180,412	72,048	266,366

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

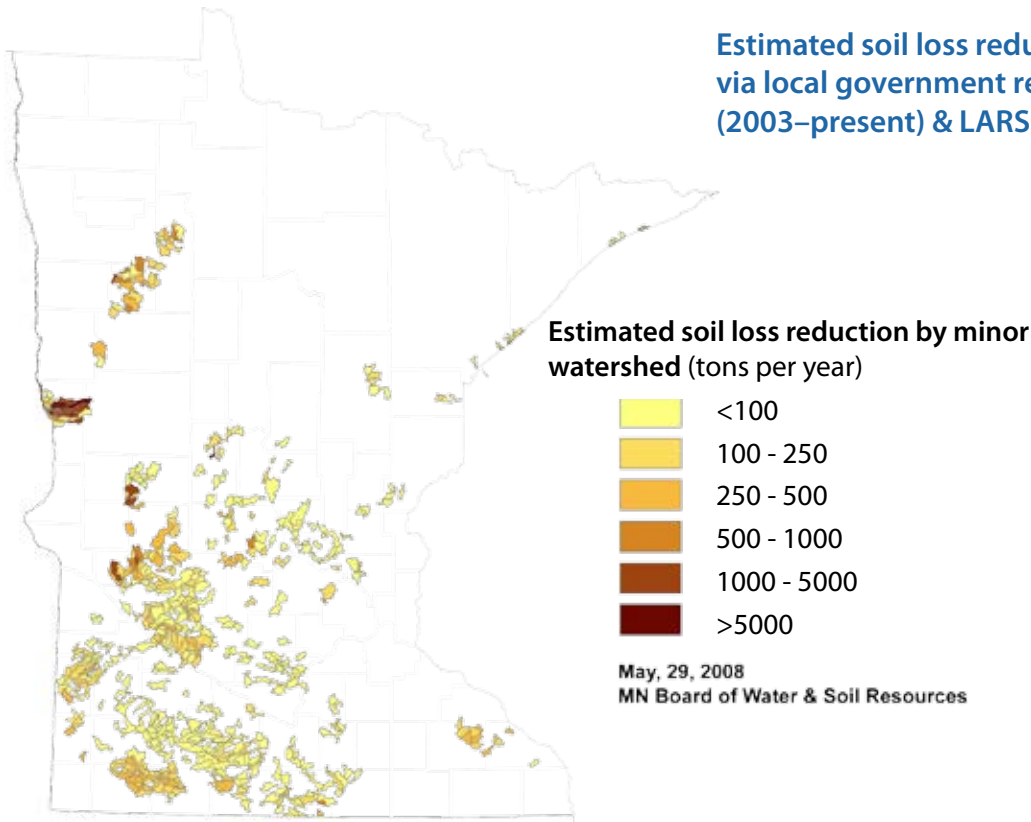
Pollution Reduction Type

- Feedlot (159)
- ⚡ Filter Strip Project (573)
- ▼ Gully Stabilization (196)
- Sheet and Rill Erosion Control (312)
- ⤵ Stream and Ditch Stabilization (101)
- ▮ Wind Erosion (54)
- Other (2069)

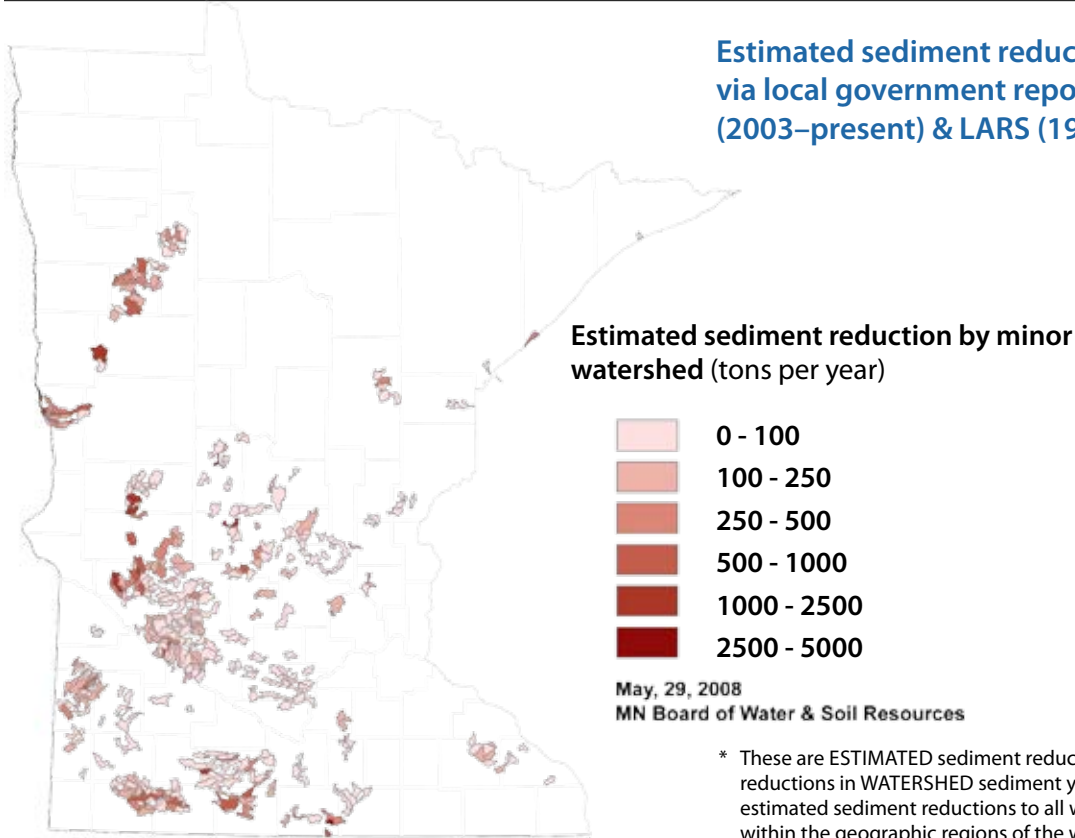
May, 29, 2008
MN Board of Water & Soil Resources



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

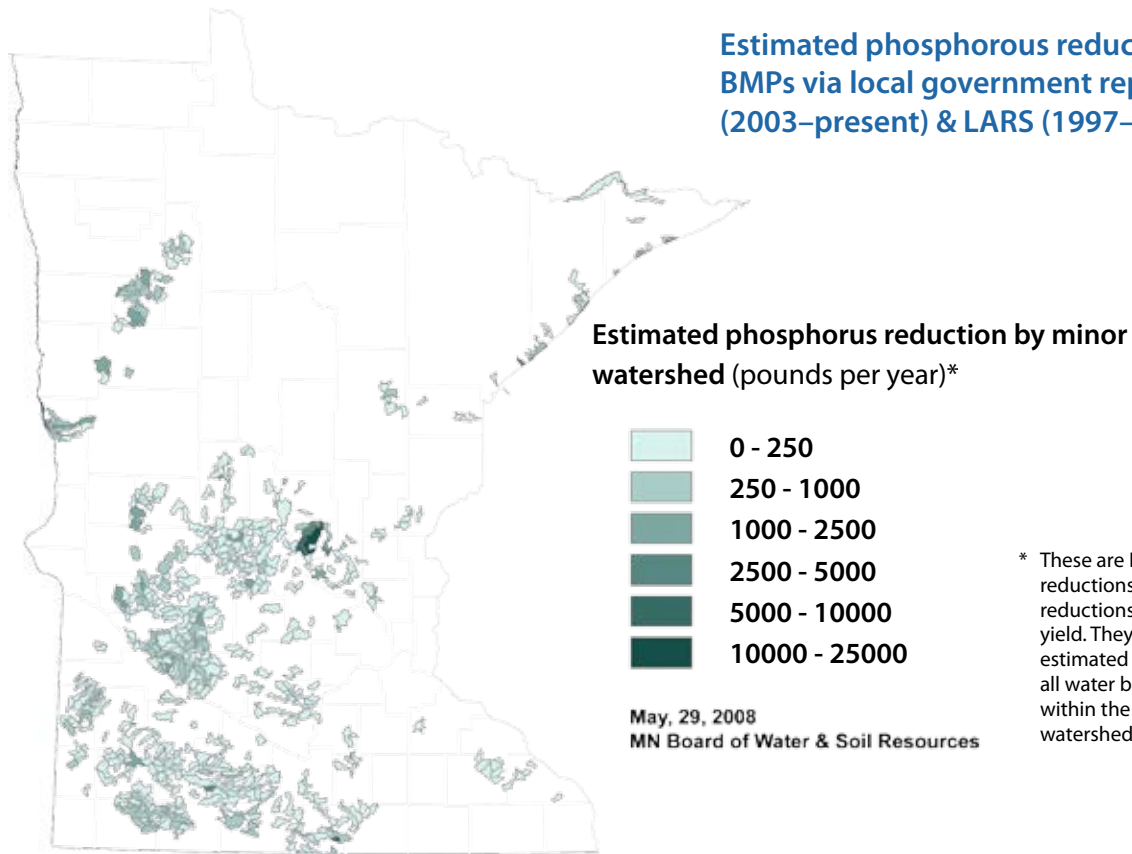


Estimated sediment reduction—CWP/319 BMPs via local government reporting, eLINK (2003–present) & LARS (1997–2002)



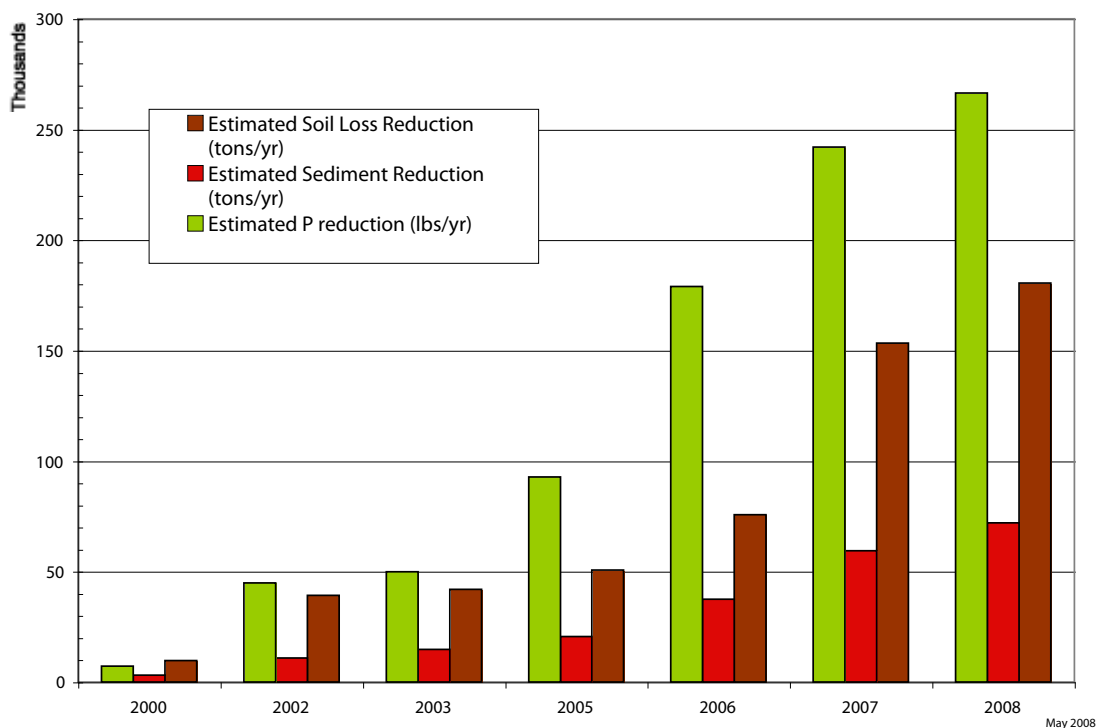
* These are ESTIMATED sediment reductions. They DO NOT represent reductions in WATERSHED sediment yield. They represent the sum of estimated sediment reductions to all water bodies (even isolated ones) within the geographic regions of the watershed.

Estimated phosphorous reduction—CWP/319 BMPs via local government reporting, eLINK (2003–present) & 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.

CWP/319 cumulative estimated pollution reduction benefits via local government reporting, LARS (1997–2002) and eLINK (2003–present)



Projects completed for 2007–2008

Statewide

- Conservation tillage demonstration project
- Evaluating feedlot runoff pollution and ways to reduce impacts
- Local nitrate testing and educational outreach for private well owners
- Sediment transport at selected stream sites in MN
- Wetland models for TMDL assessment: wetland and receiving water impairments-Phase II
- Minnesota River Report 2006-2007—Minnesota River Summit
- Pomme de Terre River fecal coliform TMDL project
- Redwood River Watershed phosphorus TMDL compliance project
- Research project to develop the Greater Blue Earth turbidity TMDL

Des Moines River Basin

- Development of TMDLs for Heron Lake Watershed
- Development of TMDLs for the West Fork Des Moines River Watershed
- Heron Lake Watershed District: Clean Water Partnership project

Lake Superior Basin

- Knife River Watershed TMDL project, part II
- Nemadji River Basin project

Lower Mississippi River Basin

- Byllesby Reservoir phosphorus TMDL project
- Cannon River Watershed Partnership
- Improved livestock management in riparian areas
- Reduction of fecal coliform bacteria from human sources TMDL implementation project
- Straight River fecal coliform reduction project
- Whitewater Watershed paired watershed monitoring project

Minnesota River Basin

- Chippewa County Watershed continuation
- Cottonwood River restoration project-continuation
- Cottonwood River restoration project BMP implementation continuation
- Hawk Creek: Beaver Tales
- Hawk Creek Watershed project: Land of the Lost
- High Island implementation project
- Lake Shaokatan continuing restoration project
- Lower Main Stem Chippewa River Subbasin

Rainy River Basin

- Jessie Lake Watershed TMDL project

Red River Basin

- Red River Basin Buffer initiative
- Red River Basin turbidity reduction project, Part II
- Upper Red River of the North SWAT modeling for impaired waters studies

St. Croix River Basin

- Snake River Watershed enhancement project
- Sunrise River Watershed TMDL phase I

Upper Mississippi River Basin

- Big Birch Lake Watershed management project continuation
- Clearwater River and Lake Louisa phase II TMDL
- Elk River Watershed priority lakes phosphorus reduction
- Lambert Creek Phase III—water quality improvement project-continuation
- Manure management—ecologically sensitive areas
- North Fork—Lower Crow Watershed DO, turbidity and fecal coliform TMDL
- Rice Creek index of biological integrity (IBI)
- Shingle Creek Lake TMDL project phase I: dual endpoint Twin and Ryan Lakes nutrient TMDL project

Basins, major watersheds and counties in Minnesota

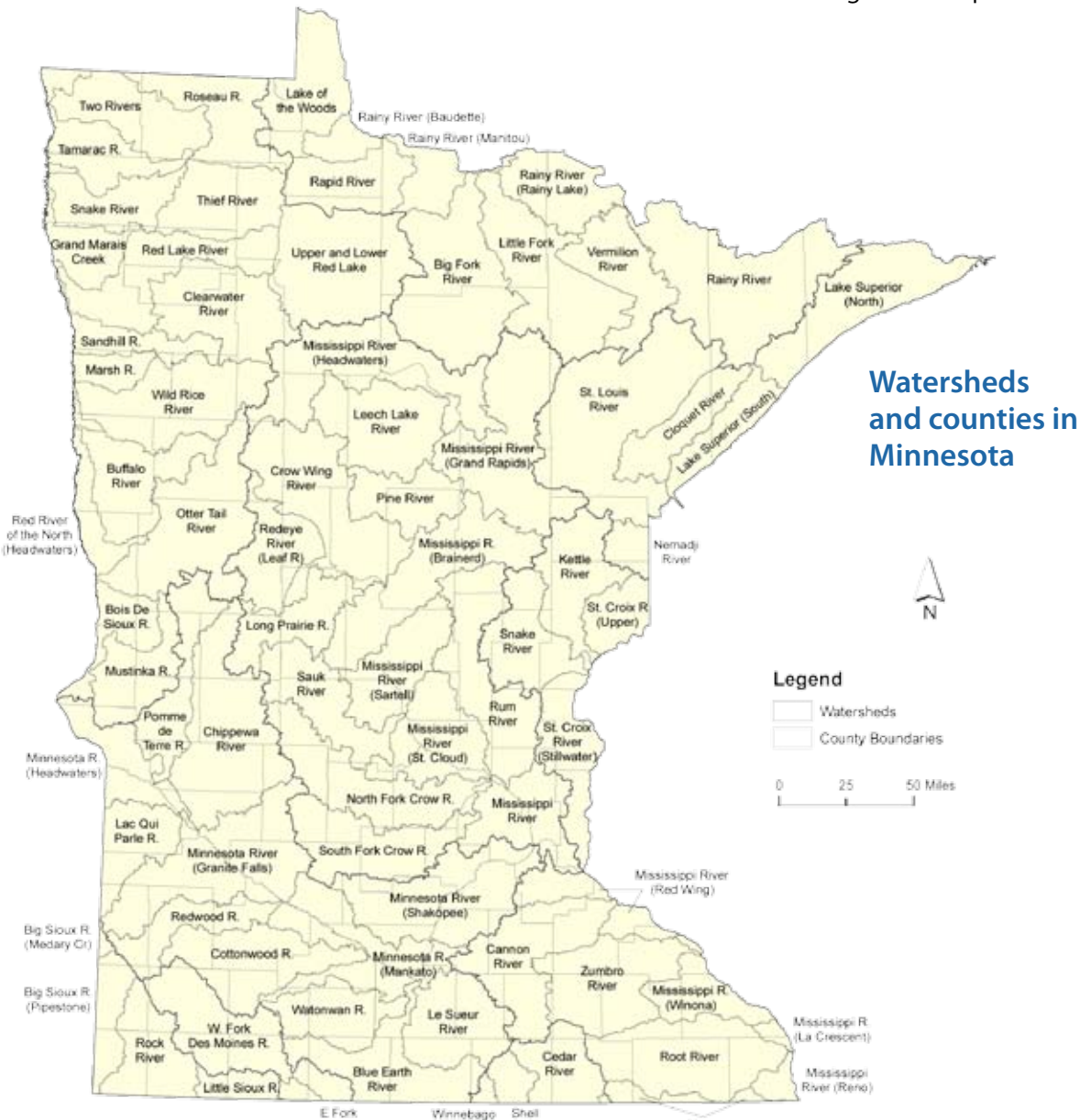


Statewide

Minnesota has vast water resources—12,200 lakes larger than 10 acres and 105,000 miles of stream and rivers. Many partners across the state are working to improve the quality of Minnesota’s waters. The projects in the statewide section represent demonstration projects that can be used on a statewide level, so that partners may learn from the work that is being done across the state.

Projects completed

- Conservation tillage demonstration project
- Evaluating feedlot runoff pollution and ways to reduce impacts
- Local nitrate testing and educational outreach for private well owners
- Sediment transport at selected stream sites in MN
- Wetland models for TMDL assessment: wetland and receiving water impairments—Phase II



Conservation tillage demonstration project

The corn-soybean rotation is the dominating system in the southern half of Minnesota. Conventional tillage (chisel plow) for corn following soybeans leaves too little residue for prevention of soil erosion, especially on sloping soils. Most farmers still chisel in the fall to provide faster spring soil warm-up for early planting. On-station, small-plot research has shown that some reduced tillage systems provide, on average, yields and economic returns equal to the fall chisel, while leaving sufficient residue for soil and water protection.

The University of Minnesota, in partnership with staff of Soil and Water Conservation Districts and Monsanto Company, worked with farmers to carry out two years of on-farm, replicated strip-trials of four tillage systems using farmer-owned commercial-scale equipment. The on-farm trials were placed across the southern half of the state to verify and demonstrate results obtained in the on-station trials, and to communicate those results to a wide farmer audience.

Goals for this project

- Strengthen and extend partnerships to design and establish on-farm demonstrations of reduced tillage systems.
- Compare tillage systems on 14 producer fields with field-scale equipment for preparation and harvest.
- Organize field days at demonstration sites, and associated winter workshops.
- Publish trial results and tillage recommendations for south central and southwest Minnesota in fact sheets, bulletins, and the UM Extension Web site

Results that count

- Partnerships established on this project will continue, with on-farm conservation tillage trials for corn following corn and additional strip-tillage expos

where the information from the project will be presented.

- On-farm trials were completed at 17 locations over two years. On average, yields from the fall chisel plow, fall strip-till, and spring field cultivate treatments for corn following soybeans were about equal, and generally exceeded those for no-till on glacial till soils. Some risk of yield depression with high residue systems in cold, wet years can be offset by their lower costs of production over years.
- Research results and conservation tillage management information were presented at 12 field days at on-farm trial sites, 25 winter crops management meetings, and four large summer strip-tillage expos attended by a total of 4250 farmers and agricultural professionals. Farmers attending just the 4 expos reported managing a total of 1,600,000 acres.
- Two Extension bulletins summarizing on-station and on-farm research were prepared and are available in print form and on-line at www.extension.umn.edu/distribution/cropsystems/DC8483.html.

Financial information

Funding type	Section 319
Grant amount	\$247,200
Matching funds and in-kind	\$268,000
Total project cost	\$515,200

Contact

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 MPCA project manager: Chris Zadak



Evaluating feedlot runoff pollution and ways to reduce impacts

In the late 1970s and early 1980s, the USDA Agricultural Research Service, working in conjunction with four state and federal agencies, developed an evaluation system to rate feedlot pollution potential. The resulting computer model, known as the Minnesota Feedlot Evaluation Model (MFEM) has been used extensively in Minnesota by county feedlot officers, Soil and Water Conservation Districts (SWCDs), Natural Resource Conservation Service (NRCS), MPCA staff, and watershed managers. The model is increasingly being used in conjunction with watershed models and in basin planning.

With nearly 20,000 outdoor open lots in the state, a good feedlot model is essential for these applications. Shortfalls in the original MFEM model were addressed by the 319 grant. Of particular importance is extending the MFEM model to include annual loading of pollutants, without a significant increase in the complexity of user inputs.

The project has resulted in a new model called the Minnesota Feedlot Annualized Runoff Model or MinnFARM. It operates within the Microsoft EXCEL spreadsheet framework. MinnFARM is currently being implemented in Minnesota for both regulatory evaluation of feedlot pollution potential and for the state and federal cost-share prioritization process. Model outputs include annual loading estimates of chemical oxygen demands (COD), biochemical oxygen demands (BOD), phosphorus, nitrogen and fecal coliforms along with a relative rating of the pollution potential of the specific feedlot based on the type of receiving water.

The project began with an extensive literature review on the processes involved in feedlot runoff and pollutant removal in vegetative treatment areas. Results of this literature review were incorporated into the model. An advisory group comprised of state and local compliance staff, engineers from the NRCS and the Board of Water and Soil Resources directed the course of work on the project. The model was tested extensively in the field prior to being adopted for use in the state and federal cost share program and as an indicator of regulatory compliance.



Goals for this project

- Develop an improved modeling tool for animal feedlots.
- Enhance user efficiency and consistency of model use.
- Assist in the tracking and prioritizing pollutant load reductions from cost-share projects.
- Improve regulatory compliance.

Results that count

- The EXCEL spreadsheet model and user guide MinnFARM was developed.
- Model is currently being used to prioritize state and federal cost share assistance.
- Model is currently being used as an indicator for regulatory compliance.

Financial information

Funding type	Section 319
Grant amount	\$90,000
Matching funds and in-kind	\$90,000
Total project cost	\$180,000

Contact

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 University of Minnesota Department of Biosystems
 and Agricultural Engineering
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 Saint Paul, Minnesota 55108
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 Wilson@umn.edu
 MPCA project manager: Nick Gervino

Local nitrate testing and educational outreach for private well owners

This project provided technical support, an organizational framework, equipment, lab quality control, educational supplies, and media assistance so local entities could provide nitrate water testing services and water quality educational outreach on a county level. This project was a continuation of an existing EPA 319 project. Previous 319 and LCMR funds allowed the creation of a network of strategically placed host sites; the formation of these sites was a critical step toward successful, locally-driven programs. The seven host sites, each serving 10-20 counties, were equipped with spectrophotometers, diluters and other analysis related equipment, signs, A-frames, educational materials, coolers and other necessary supplies. Conducting nitrate analysis was anticipated on approximately 3,000 well samples per year and working with 30 to 35 counties.

Goals for this project

- To ensure that Minnesota residents are highly informed about the nitrate levels in their drinking water supplies.
- To assist the local cooperators in becoming as self-sufficient as possible in conducting the clinics.
- To ensure that the local cooperators are knowledgeable with regard to issues related to nitrate contamination.

Results that count

- Local cooperators continue to successfully use the clinic format to maintain outreach opportunities with homeowners, lake associations, and public schools. 50 counties participated in hosting a nitrate clinic in the past 3 years.
- Over the life of the project, nearly 9,000 well samples were analyzed. Eight percent of the samples exceeded the 10 mg/L NO₃-N Health Standard. In 2006, 38 counties conducted 79 separate events which analyzed roughly 2,600 samples. In 2005, 32 counties conducted 72 separate events which analyzed roughly 3,000 samples. In 2004, 41 counties conducted 86 separate events which analyzed more than 3,300 samples.
- Response from the lake associations has been very positive with many lake associations incorporating



Nitrate testing clinic at New York Mills.

the testing clinics into their annual meetings or holding independent events as a service to the residents of their lake and surrounding area. For many years, science teachers at the Perham and New York Mills Middle Schools have conducted nitrate testing clinics as a tool for introducing water quality educational concepts into the classroom. A GIS component was added allowing the students to enter the results into a database and map out results over time.

Financial information

Funding type	Section 319
Grant amount	\$100,000.00
Matching funds and in-kind	\$126,834.37
Total project cost	\$226,834.37

Contact

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 MPCA project manager: Chuck Regan

Sediment transport at selected stream sites in MN

A cooperative effort to collect and analyze stream sediment-related data at selected streams in Minnesota began in 2007 by the MPCA and USGS. The project was initiated to provide a greater understanding of the type, movement, and transport of sediment in Minnesota streams identified as being impaired for turbidity. This effort will provide one “piece of the puzzle” needed to better understand sediment in streams. Other “pieces of the puzzle” are also being worked on or will be incorporated as the MPCA addresses sediment issues in the turbidity TMDLs and forms a framework to better address sediment and physical stream condition as impairments to aquatic life. Project activities in 2007 included initial sampling and laboratory analysis for suspended sediment concentration (SSC), particle size, total suspended solids (TSS) and turbidity; installation of box samplers; and two training workshops presented by USGS to MPCA and other staff. The project currently involves sampling at seven sites across Minnesota. The project will continue for at least five years through a joint funding agreement established in 2008 assuming adequate funding is available.

Goals for this project

- Describe sediment concentrations and load and turbidity as a function of streamflow and season at selected stream sites.
- Describe relations between mean cross-sectional suspended sediment concentrations and point measurements of water transparency.
- Provide training about sediment transport processes and sediment sampling techniques to MPCA staff.

Results that count

- Three to five samples were collected at each of the seven sites by USGS staff.
- Box samplers were installed by USGS at each site.

- Two to five box samples (single vertical depth integrated samples) and grab samples were collected at each of the sites by MPCA and local observers.
- The project provided the start of a multiple year data collection effort needed to address the overall goals of the project.
- Two one-and-a-half day training sessions on suspended sediment in streams concepts, sampling methods, and data analysis methods were presented to MPCA and local staff by USGS staff.

Financial information

Funding type	Water Environmental Fund
Grant amount	\$39,300

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Box sampler installation at Knife River, near Knife River, MN.

Wetland models for TMDL assessment: wetland and receiving water impairments—Phase II

To quantify the impact of human activities on wetlands and wetland functions, and thereby help to ameliorate the impact of these activities, models of wetland hydrology and biogeochemistry are of great assistance. The intended purpose of the model is to facilitate assessment of the impact of contributing watershed areas on wetland function, and the impact of wetlands on the quality of receiving waters. A comprehensive literature review was performed in order to select the conceptual model most appropriate for the purposes of the project. The developed model, Wet-HAWQ (Wetland Hydrologic and Water Quality), is based on the Peatland Hydrologic Impact Model (PHIM), as the basic framework for the hydrology component of the model. The biogeochemical components considered in the model (vegetation, carbon, nitrogen, oxygen, bacteria, phosphorus, and sediments) are based on the SET-WET model developed at Virginia Tech by Tess Wynn and Erik Lee. Wet-HAWQ includes a graphical user interface (GUI) for enhanced input data management and results output/analysis, and is being developed for the Windows operating system, using the Delphi programming language. Another task of the project was data acquisition from wetlands in Minnesota and in neighboring mid-western states for use in testing of the model; the data collected so far was not as completed as expected, and the model was manually calibrated using data from a constructed wetland located in Benton, KY. It is expected to continue to develop the model, and test it in a local wetland to be selected. Guidelines for use the model for TMDL assessment are in preparation. A poster was presented in the 2007 Conference of the Society of Wetland Scientists, held in Sacramento, CA.

Goals for this project

- Develop a hydrologic and water quality model for palustrine wetlands.
- Acquire and accumulate wetland data from Minnesota and nearby states to test the model.
- Develop guidelines to use the model for TMDL assessment.



Results that count

- The model was developed as expected.
- The data acquisition process was performed, although the results were not as good as expected.
- The guidelines to use the model for TMDL assessment are in preparation.

Financial information

Funding type	Section 319
Grant amount	\$68,393

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Statewide projects currently active in 2008

On-farm manure management demonstration—2004

Sponsor: University of Minnesota

Funding: Section 319 (Grant) \$279,600

Purpose: Adopt best management practices and new technology for field application of manure.

Winter parking lot/sidewalk maintenance training and certification—2006

Sponsor: Fortin Consulting, Minneapolis

Funding: Section 391 (grant) \$80,000

Provide training for staff working in winter road maintenance to reduce the amount of road salt in runoff to surface and groundwater.

Statewide projects awarded in 2008

Section 319 Projects

Developing selection, design and assessment standards for shoreline bioengineering practices

Sponsor: Regents of the University of Minnesota

Funding: Section 319 (Grant) \$134,417

Purpose: This project will use selected lake and river shorelines within Minnesota to research and promote the effective use of shoreline bioengineering BMPs. Site-specific BMP selection, design standards, evaluation protocol will be developed. Demonstration sites will be installed and training modules will be delivered to citizen and professional audiences. The goal is for a reduction in sediment and nutrient loads to surface water.

Drainage systems management education and stakeholder feedback workshops

Sponsor: Minnesota Department of Agriculture

Funding: Section 319 (Grant) \$90,000

Purpose: To develop and increase the existing awareness of conservation drainage practices in three areas of the state. Workshops will provide direct outreach to targeted groups involved in agricultural drainage management activities.

Maximizing the economic benefits of manure to reduce nutrient loading

Sponsor: University of Minnesota Water Resources Center

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

Purpose: The goal of this statewide education/demonstration project is to reduce nitrogen, phosphorus, and pathogens reaching surface waters and ground water by motivating agricultural producers to apply manure at appropriate rates, appropriate time applications, and incorporate/inject manure for environmental and economic benefits.

Performance of low impact development (LID) practices on stormwater pollutant load abatement

Sponsor: University of Minnesota

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

Purpose: Managing urban stormwater runoff has become an important issue for flood control and water-quality protection. LID practices, including infiltration basins and trenches, porous pavements, rain gardens, vegetative swales and filter strips, are currently used in urban settings by mimicking predevelopment hydrology. This project will develop a four-level assessment protocol for stormwater BMPs including LIDs, which consist of visual inspection, capacity testing, synthetic runoff testing and monitoring. This project will provide a methodology for planning, designing and maintaining LID practices to meet TMDL regulatory requirements.

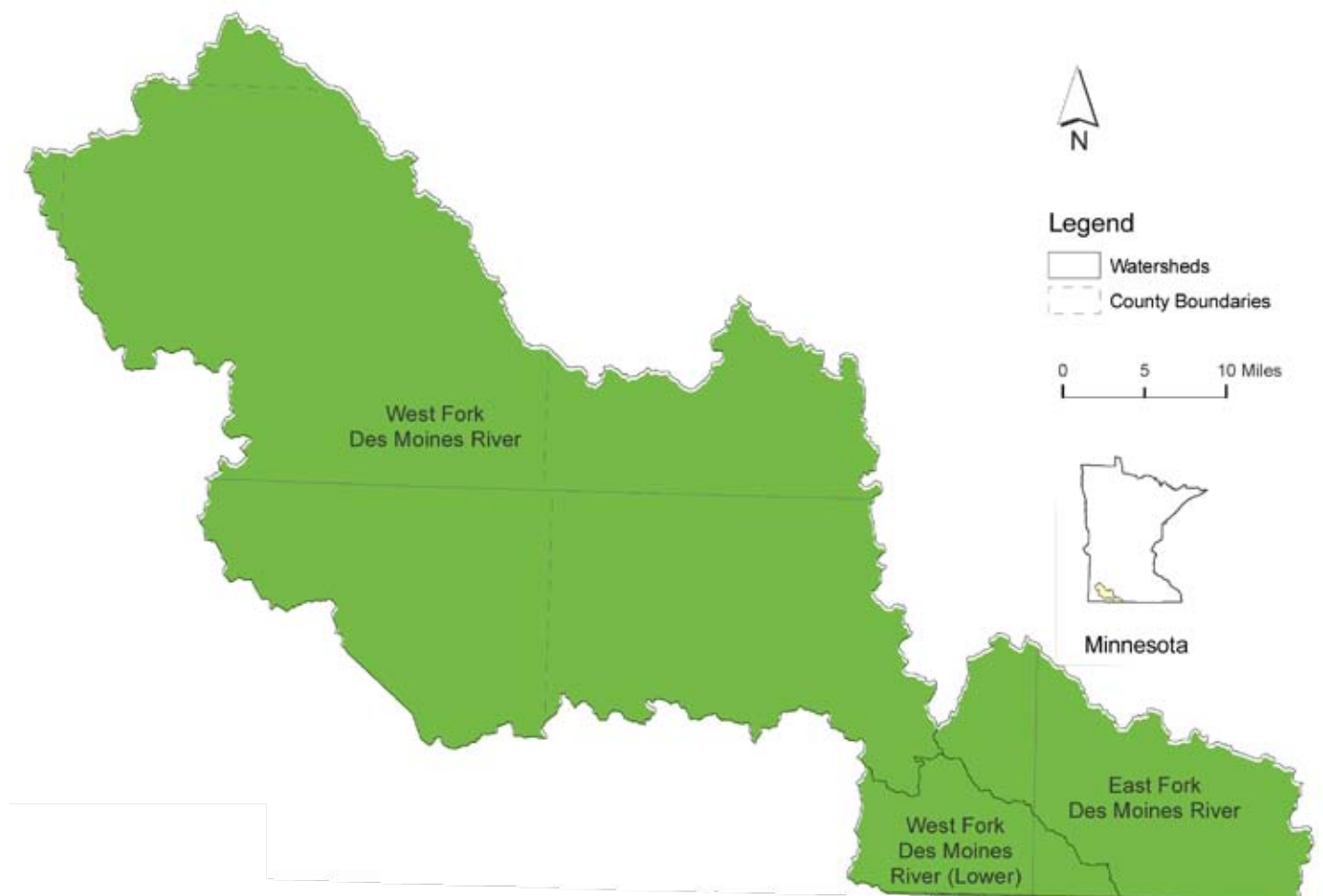


Des Moines River Basin

The Des Moines River is a tributary river of the Mississippi River approximately 525 miles (845 km) long to its farther headwaters, in the upper Midwest. The largest river flowing across the state of Iowa, it rises in southern Minnesota, and flows across the state of Iowa from northwest to southeast, passing from the glaciated plains into the unglaciated hills near the city of Des Moines, which takes its name from the river.

Projects completed

- Development of TMDLs for Heron Lake Watershed
- Development of TMDLs for the West Fork Des Moines River Watershed
- Heron Lake Watershed District: Clean Water Partnership Project



Development of TMDLs for Heron Lake Watershed District (HLWD)

This project is part of a larger Total Maximum Daily Load (TMDL) effort encompassing the West Fork Des Moines River (WFDMR) watershed in southwest Minnesota. The Heron Lake subwatershed is 472 square miles and is dominated by agricultural land. Thirty-three impaired waters listings are addressed in this project, including fecal coliform bacteria, turbidity, pH and excess nutrients in North and South Heron Lakes. The project began in late 2003 and the TMDL study is expected to be submitted

to EPA in the summer of 2008. This grant was completed in cooperation with the WFDMR TMDL project primarily to provide public and stakeholder participation and education and outreach services to the project.



Goals for this project

- Co-lead efforts for public and stakeholder participation.
- Co-lead efforts for education and outreach.
- Participation in project team for development of TMDLs.

Results that count

- Three formal public meetings were held during the project and were well attended. A stakeholder advisory group was created and four meetings were held and periodic updates were provided to them throughout the project.
- A considerable amount of education and outreach was done. This included a PowerPoint presentation regarding the TMDL study that was developed and presented on eight separate occasions to audiences which included county commissioners, city councils,

and the HLWD board. Other activities included assistance with project web site development a display board that was used at fairs and other locations.

- Participation with the project team provided important perspective regarding local concerns and history.

Financial information

Funding type	Section 319
Grant amount	\$963.72

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Development of TMDLs for West Fork Des Moines River Watershed

This Total Maximum Daily Load (TMDL) development project encompasses the West Fork Des Moines River (WFDMR) watershed in southwest Minnesota. This watershed is approximately 1300 square miles and is dominated by agricultural land. Thirty-three impaired waters listings are addressed in this project, including fecal coliform bacteria, turbidity, pH and excess nutrients in North and South Heron Lakes. The project began in late 2003 and the TMDL study is expected to be submitted to EPA in the summer of 2008. Cottonwood County Environmental services was the lead local partner and provided technical and administrative support. Key contributions included providing pollutant source data and information, public and stakeholder participation and education and outreach services.



Goals for this project

- Provide technical support.
- Co-lead efforts for public and stakeholder participation.
- Co-lead efforts for education and outreach.

Results that count

- Providing technical support involved gathering data and information related to fecal coliform sources within the watershed and reviewing technical information produced by MPCA and the engineering firm developing the TMDL.
- Three formal public meetings were held during the project and were well attended. A stakeholder advisory group was created and four meetings were

held and periodic updates were provided to them throughout the project.

- A considerable amount of education and outreach was done. This included meetings with local groups, project web site development, project brochure, and creating a display board that was used at fairs and other locations.

Financial information

Funding type	Section 319
Grant amount	\$81,652

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Heron Lake Watershed District: Clean Water Partnership

The Heron Lake watershed encompasses many of the same issues seen in other rural, agricultural areas in Minnesota. There are numerous pollution problems in the Heron Lake Watershed including non-compliant septic systems, feedlots and urban storm water runoff.

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.

In order to complete the overall goals of the project, several different implementation measures, educational efforts, and dedicated staff and partners pulled together to complete this project. Education efforts through partnerships have been undertaken that provide landowners with current information on projects underway and allows for public input and direction for further education needs.



This picture shows the importance of water quality improvement efforts. On the left is Jack Creek, and on the right is water from Jack Creek that has passed through a wildlife management area, which contains wetland restorations that help to enhance water quality and wildlife habitat. The difference is dramatic!

Goals for this project

- Increase public awareness.
- Reduce non point source pollutants and improve habitat for wildlife through best management practices.
- Improve water quantity management within the watershed.

Results that count

- Worked with partners to hold tours, workshops, and educational meetings and on various topics relating to projects, updates and water quality.
- Installed best management practices using cost-share and loans. Types of practices implemented include: farmstead windbreaks, field windbreak cost incentives, filter strips, grassed waterways, terraces, tree planting, wetland restoration, rock inlets, rain gardens, wildlife ponds, septic system and equipment purchases.
- The Heron Lake Watershed District (HLWD) and Okabena-Ocheda Watershed District worked on a joint effort to develop rules for storm water and erosion control. Due to the popularity of the rock inlet cost-share program, the HLWD, in partnership with the SWCDs in the four counties, received funding for an grant for replacing open tile intakes with rock inlets.

Financial information

Funding type	Section 319
Grant amount	\$161,750.00
Matching funds and in-kind	\$768,631.11
Loan funds	\$206,341.78
Total project cost	\$1,136,722.89

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Projects currently active in 2008 in the Des Moines River Basin

Beaver Creek Watershed improvement project continuation—2005

Sponsor: Murray County

Funding: CWP (Grant) \$62,122; CWP (Loan) \$178,800

Purpose: Develop manure management plans, design and implement grass waterways, restore wetlands, complete sediment control/water retention structures, prepare demonstration plots for fertilizer applications, protect priority lands, upgrade septic systems, establish stream bank protection and continue monitoring, outreach and education.

Elk Creek conservation tillage incentive program—2006

Sponsor: Heron Lake Watershed District

Funding: CWP (Grant) \$28,200

Purpose: This project will enlist landowners within the project area to change their tillage practices. Options include no-till, strip-till, minimum-till, ridge-till and forage residue management, which will prevent further soil and nutrient loss and decrease nonpoint-source pollution in the watershed.

Heron Lake alternative tile intake cost-share program—2006

Sponsor: Heron Lake Watershed District

Funding: Section 319 (Grant) \$36,000

Purpose: Reduce sediment in runoff from farm fields by replacing open tile intakes with subsurface rock intakes.

Heron Lake Watershed District—BMP program for Alba Township—2007

Sponsor: Heron Lake Watershed District

Award: Section 319 (Grant) \$40,800

The goal of this project is to decrease water movement, reduce erosion, and improve water quality throughout approximately 23,000 acres in Alba Township through changing tillage methods from conventional tillage to conservation tillage. Conventional tillage is the main practice undertaken on the silty clay loam soils. Creating an awareness among landowners about the relationship between soil conservation and water quality will be critical to the project's success.

Heron Lake Watershed District – Fulda Lakes Project—2007

Sponsor: Heron Lake Watershed District

Award: Section 319 (Grant) \$55,800

The Heron Lake watershed is rural and agricultural. In a watershed such as this, agricultural best management practices (BMPs) are crucial. Landowners are hesitant to try new methods.

The goal of this project is to improve the water quality in Fulda Lakes through the use of cost share and incentive programs, and education of residents and landowners.

Des Moines River Basin projects awarded in 2008

Section 319 Projects

Heron Lake Watershed District—Conservation tillage demonstration plot

Sponsor: Heron Lake Watershed District

Award: \$20,547

This grant will allow continued research in conservation tillage used on the demonstration plot developed in 2005. The economic and environmental benefits of six treatments of reduced tillage, including strip till, will be evaluated. This project will demonstrate 1) several tillage practices that have the potential to reduce sediment delivery to surface waters and preserve agricultural soils through increased crop residue cover on row-cropped fields, and 2) economic and environmental benefits of reduced tillage systems.

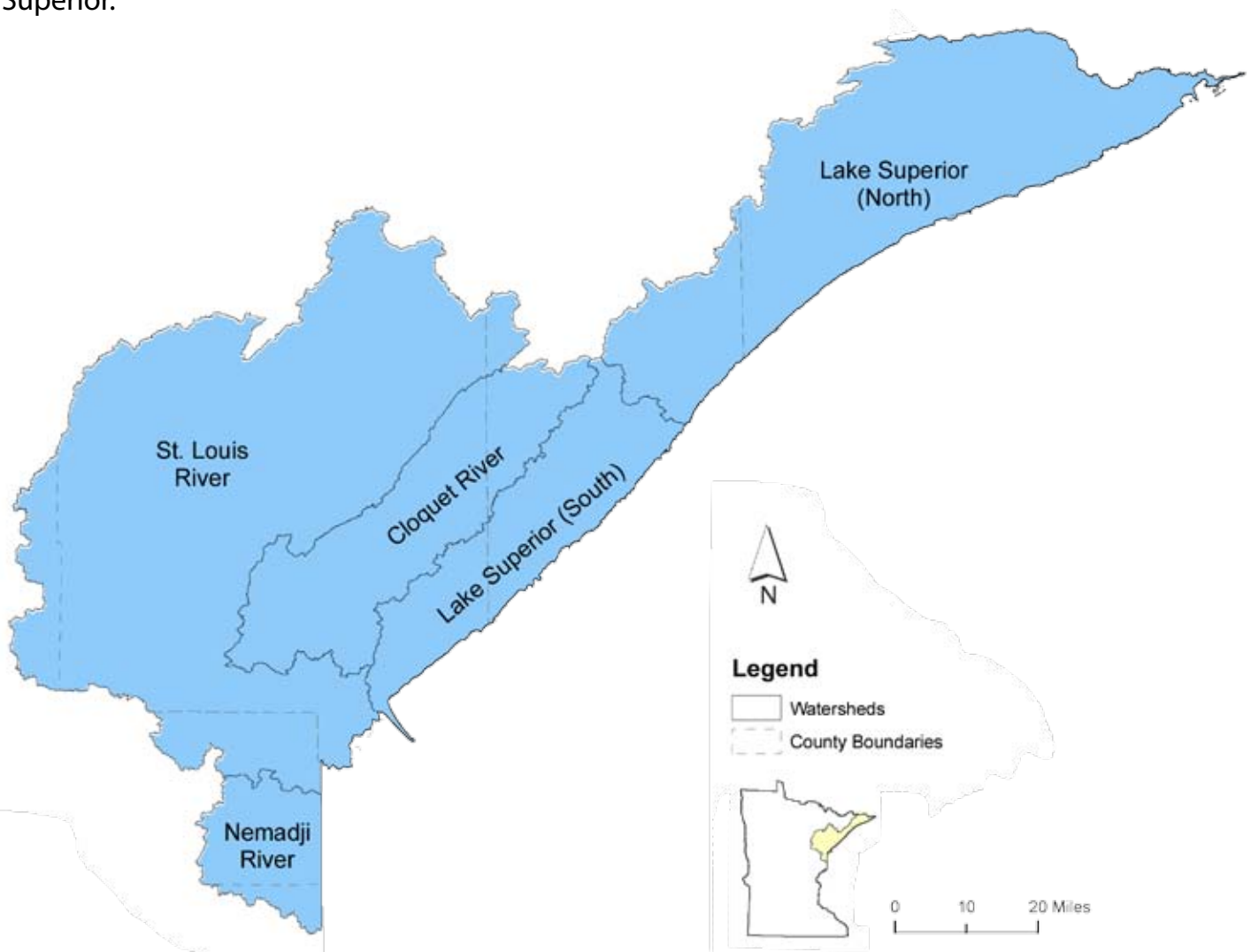
Lake Superior Basin

The Minnesota part of the Lake Superior Basin encompasses portions of Aitkin, Carlton, Cook, Itasca, Lake, Pine and St. Louis counties, covering approximately 6,200 square miles.

Major watersheds in the basin include the Cloquet, Nemadji and St. Louis River systems, as well as the North Shore tributaries to Lake Superior.

Projects completed

- Knife River Watershed TMDL project—Part II
- Nemadji River Basin project



Knife River TMDL project—Part II

The Knife River TMDL project will produce an EPA-approved TMDL document for the Knife River turbidity impairment and an evaluation of pH as an impairment. The project was to be completed in two parts. Part I included gathering existing data, collecting new data over three years of stream monitoring, generating needed GIS layers, and gathering geomorphology data. Part I included stream observations to help better understand the stream and what drives the sediment problem in the river.

Part I provided additional pH data to evaluate its listing as an impairment in the Knife River. Part II entailed the analysis of the data gathered in Part I to identify the sources and loads of sediment associated with the elevated turbidity levels in the river. Data analysis included statistical analyses, computation of a TSS surrogate for the turbidity standard, load estimation, and duration curve completion. Part II did not result in a completed turbidity TMDL due to a decision to do additional physical channel assessment and modeling via a MPCA Impaired Waters Master Contract contractor. The extra work resulted in the project timeline being delayed. A third contract (Part III) will be set up to provide the time and funding to bring the TMDL to completion with the funds remaining from Part II.

Goals for this project

- To complete the data analysis for developing a TMDL for turbidity.
- To complete a draft TMDL for turbidity for internal MPCA review.



Steelhead fishing during spring runoff near the mouth of the Knife River.

Results that count

- Data analyses including statistical analyses, computation of a TSS surrogate for the turbidity standard, load estimation, and load duration curve for the draft TMDL were completed.
- Two drafts of a TMDL have been completed. The first draft was reviewed by the MPCA project manager. The second draft incorporated the MPCA project manager comments and was submitted for additional MPCA staff review.

Financial information

Funding type	Section 319
Grant amount	\$31,000
(Note that the Grant amount is the amount provided for the Part II contract for the TMDL study only.)	

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Nemadji River Basin project

The Nemadji River Basin has approximately 433 square miles (277,400 acres) of drainage area and is located south of Duluth, Minnesota, straddling the Minnesota-Wisconsin border. In Minnesota, the land cover is 69 percent forest, 18 percent cropland and pasture, 11 percent wetlands and lakes, and two percent other categories. The majority of land ownership is non-industrial private land (55 percent). The remainder is county (22 percent), state (16 percent), railroad and industrial (six percent), and Tribal, City, and Township (one percent).

Approximately 80 percent of the Minnesota portion of the Nemadji River basin is located within Carlton County, including all of the clay-erosion prone areas and most of the headwater tributaries. Sediment carried into the Nemadji River from converging streams and rivers then down the Nemadji River into Superior Harbor and out into Lake Superior is the major concern. Fourteen percent (19,000 tons) of all the silt and clay is trapped in Superior Bay. Seventy-four percent (98,000 tons) is carried out into Lake Superior.

Approximately 33,000 tons of Nemadji River sediment is dredged annually by the U.S. Army Corps of Engineers to maintain adequate depth for shipping traffic in Superior Bay. The high sediment yield of the Nemadji River Basin is largely a result of changes in the hydrologic system. Hydrologic changes caused by human activities have resulted in increased volumes and rates of runoff and stream-flow. These changes have resulted in higher stream-flow energies that, in turn, have increased streambank and bluff erosion and slumping.

Goals for this project

- To positively affect hydrology in the identified small hydrologic units within the 11 subwatersheds of the Nemadji River Basin.



Highway 23 road culvert project.

- To work on fish habitat and wildlife habitat improvement.
- To restore beneficial uses to the Nemadji River Basin.

Results that count

- Awareness of the issues in the Nemadji River Basin was elevated and discussed with public and agency stakeholders.
- Nemadji turbidity issues were documented leading to an Impaired Waters listing.
- 3 fish habitat improvement projects were completed.
- 45 acres of reforestation projects were completed.

Financial information

Funding type	CWP
Grant amount	\$126,712
Matching funds and in-kind	\$128,917
Total project cost	\$255,629

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Projects currently active in the Lake Superior Basin in 2008

Miller Creek Watershed implementation—2006

Sponsors: City of Duluth and South St. Louis Soil and Water Conservation District

Funding: CWP (Grant) Award: \$31,000 grant

Funding for this project continues tree planting to prevent solar radiation from reaching the stream, installation of streambank stabilization and stream habitat structures, completion of annual stream trout surveys and habitat assessments, and installation of an innovative stormwater practice; provides information regarding BMPs and Miller Creek's water quality for Miller Hill-area businesses and the public; maintains the sediment trap installed in Miller Creek in 2004; and removes sediment via street sweeping before it reaches the stream.

Miller Creek Watershed TMDL project—2003, 2004, 2005

Sponsor: South St. Louis Soil and Water Conservation District

Funding: Section 319 (Grant) \$115,190

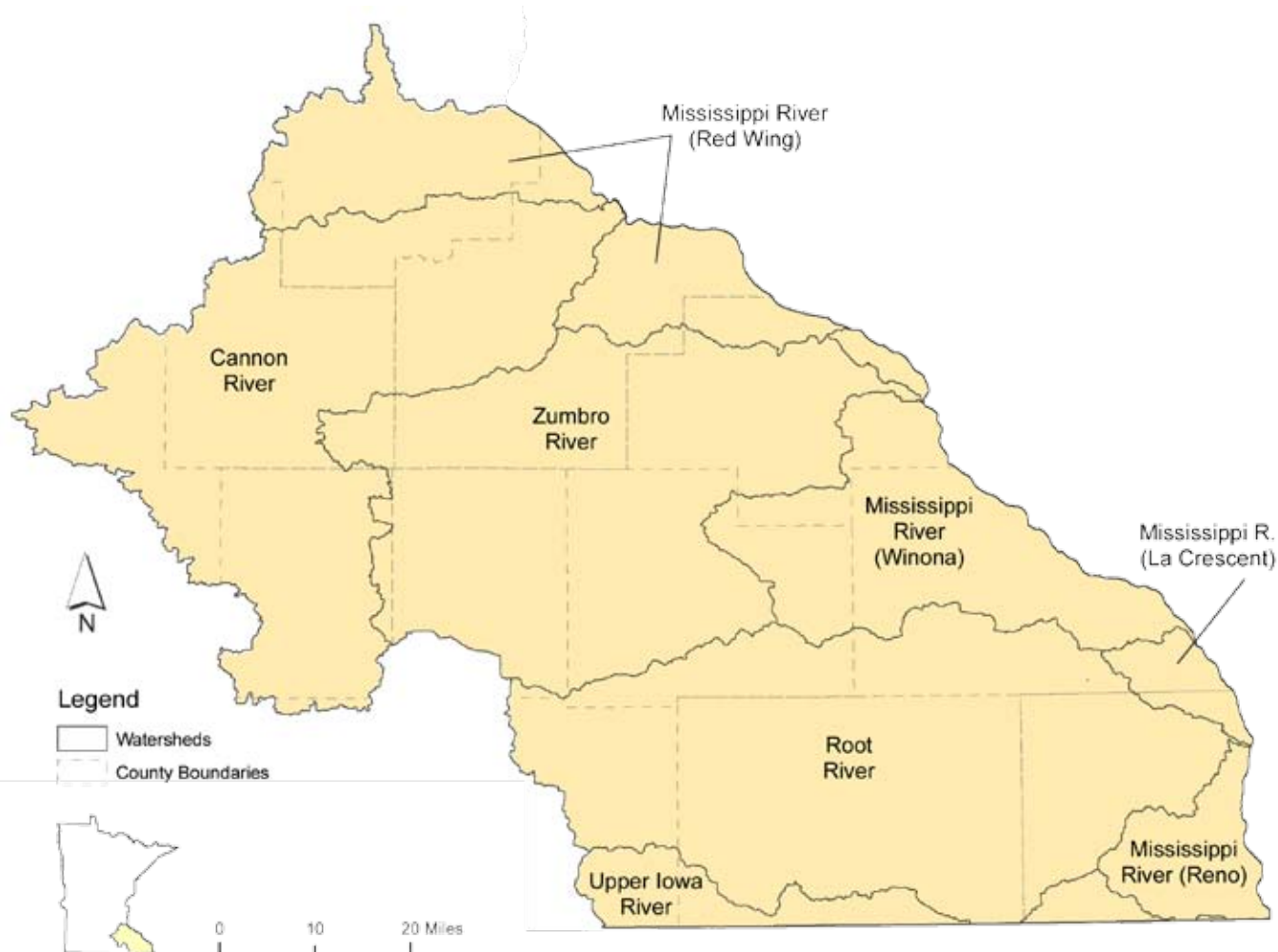
Purpose: Monitor, model and develop land use data to identify potential pollutants in order to develop a total maximum daily load for impaired biota and temperature.

Lower Mississippi River Basin

The Lower Mississippi River Basin, which includes the Cedar River Basin, is located in southeastern Minnesota. It includes all or part of 17 counties and has 12 major watersheds covering about 7,266 square miles.

Projects completed

- Byllesby reservoir phosphorus TMDL project
- Cannon River Watershed Partnership
- Improved livestock management in riparian areas
- Reduction of fecal coliform bacteria from human sources TMDL implementation project
- Straight River fecal coliform reduction project
- Whitewater Watershed paired watershed monitoring project



Byllesby reservoir phosphorus TMDL project

Lake Byllesby was placed on Minnesota's 303(d) impaired waters list in 2002 due to excessive nutrient (phosphorus) levels. In early 2004, a TMDL study was initiated. The project included extensive data analysis, particularly of flow records for the Cannon and Straight rivers upstream of Lake Byllesby, for the North American Hydro dam that creates the lake, and for the USGS gaging station at Welch downstream on the Cannon River. A thorough understanding of flow was critical for TMDL work on a reservoir system such as Lake Byllesby. The project also included in-lake and inflow water chemistry monitoring, many stakeholders meetings, and an extensive public education campaign. The project was led by the Cannon River Watershed Partnership, with substantial support from state agencies and local units of government.



Goals for this project

- To complete a TMDL study of sufficient quality to be fully supported by stakeholders, and approvable by US EPA.
- To involve stakeholders in a way that they will actively participate in the implementation activities ultimately developed from the TMDL study.
- To provide public education in a manner that would bolster the implementation efforts developed from the TMDL study.

Results that count

- A draft TMDL study and substantial supporting materials were completed. Minnesota Pollution Control Agency staff is finalizing the TMDL study.
- Stakeholders were involved throughout the project. This involvement is well documented as part of the project report.

- A range of public education formats and venues were used to provide clear information to the primary problems, and the solutions necessary to improve the lake. The public education is well documented in the project report.

Financial information

Funding type	Section 319
Grant amount	\$63,500
Matching funds and in-kind	\$45,190
Total project cost	\$108,690

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Cannon River Watershed Partnership

In April 2006, the US EPA approved the MPCA revision of the Lower Mississippi River Fecal Coliform TMDL. As a result, the existing implementation plan for this TMDL also needed to be revised. The MPCA contracted with the Cannon River Watershed Partnership (CRWP) to draft this revised implementation plan. Work on the project took place from December 2006 through February 2007. The implementation plan contains a review of projects and activities that have taken place since the original TMDL and implementation plan were put in place four years ago and lists the many new projects that were funded in 2007 with funds from the Clean Water Legacy Act. The degree of impairment of the reaches and source reduction required per reach were estimated by comparison with other reaches in the Basin. The pollutant source categories were reviewed, and reduction strategies and critical areas were discussed. A section on monitoring summarizes some existing work and gives suggestions for additional work needed. The document concludes with a discussion of coordination of activities and the concept of a small watershed scale approach.

Goals for this project

- The goal of this project was to revise the Fecal Coliform Bacteria Implementation Plan for the Lower Mississippi River Basin.

Results that count

- Input was gathered from stakeholders.
- A draft of the document was sent out to these stakeholders for review and comment prior to submittal to the MPCA.
- CRWP and MPCA staff worked together to develop the degree of impairment and source reduction information.
- A final document was created.

Financial information

Funding type	Water Environmental Fund
Grant amount	\$4,790.95
Matching funds and in-kind	\$2,471.25
Total project cost	\$7,262.20

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Improved livestock management in riparian areas

This project, led by the Minnesota Department of Agriculture, was part of a basin-wide response to the findings of the Regional Total Maximum Daily Load (TMDL) study which identified the streams of the Lower Mississippi River Basin in Minnesota as posing a risk of human illness from excessive levels of fecal coliform bacteria. This study identified the need for a 65 percent reduction in sources of fecal coliform in order to achieve major progress toward achievement of the fecal coliform water quality standards in streams and rivers of the basin.



Monitoring set-up to capture pasture runoff.

This project focused on improved management of cattle in sensitive environmental areas—especially stream corridors. Improved management of livestock in sensitive areas could be a critical practice for making the necessary reductions in fecal coliform concentrations in the waters, as cattle are particularly prominent in this part of the basin. The project included demonstration sites, field days, on-farm water monitoring, economic analysis, and the development and distribution of educational materials.

Goals for this project

- Develop grazing demonstration sites.
- Establish on-farm water monitoring at multiple sites.
- Conduct outreach and education based on results of performance of grazing BMPs, water monitoring, and economic analysis.

Results that count

- Improved grazing practice demonstrations were developed for 5 farms.

- Water monitoring systems were installed at 4 farms sites; the monitoring is continuing beyond the term of this grant.
- In addition to several successful field days, a manual entitled “Managed Grazing in Stream Corridors” was published and can be found at: www.mda.state.mn.us.

Financial information

Funding type	Section 319
Grant amount	\$185,000
Matching funds and in-kind	\$215,129
Total project cost	\$400,129

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Reduction of fecal coliform bacteria from human sources TMDL implementation project

The project built on the wastewater treatment projects already underway in the region by addressing remaining obstacles to the development of wastewater treatment solutions for unsewered communities and individual residents. This proposal provided incentives to communities to solve their wastewater treatment problems by offering a 1:1 match for the funding necessary to conduct both an initial needs assessment and an engineering feasibility study.

A second component of this proposal was to enable counties to improve the level of oversight of existing Individual Sewage Treatment Systems (ISTS) by creating record-keeping and communication functions between and among county staff, ISTS owners, and pumpers. This would facilitate the following operations: monitoring of performance systems and holding tanks; owner notification of the need for tank maintenance; tracking of septage disposal by pumpers; on-line permitting. Funding for this portion of the project was used to

- Assess the current management practices and needs of county ISTS programs.
- Research and evaluate the capabilities of available ISTS management programs.
- Contract for a new data management system.
- Conduct a pilot project in one county.
- Install software and provide training to county staff and service providers on use of new management programs.
- Enter backlogged ISTS data.

Goals for this project

- Provide financial assistance in the form of cost-share funding to small undersewered communities for initial needs assessments and feasibility studies.
- Obtain and implement a region wide ISTS data management system customized to each county's needs.

Results that count

- The cost-share incentives goal was met and considered highly successful. Assuming 30 homes/community averaging three persons/home, and 12 communities where most homes have no treatment

- or have a septic tank without subsequent treatment, then the project could achieve a phosphorous reduction of 3240 lbs/yr, a nitrogen reduction of 8910 lbs/yr, and a fecal coliform bacteria reduction of up to one billion colonies/100 ml per community.
- The goal of having all counties in the region using a single data management program was not ultimately met. The product was less than satisfactory. The internet-based program was slow to respond at first and was also more complicated than needed for permitting of standard systems. In hindsight, using the product to assess its user friendliness before signing an agreement should have been tried. However, without the program database being populated with county-specific data, it would have been difficult to assess its usability.

Financial information

Funding type	Section 319
Grant amount	\$154,000
Matching funds and in-kind	\$169,574
Total project cost	\$323,574

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Community straight pipe into the stream at the small town of Taopi. All the systems in this town are now compliant and sewage no longer flows through this pipe.

Straight River fecal coliform reduction project

The Straight River was added to Minnesota's Impaired Waters list in 1998 due to violations of the water quality standard for fecal coliform bacteria. A TMDL study was initiated in the Straight River and later integrated with a study encompassing the entire Lower Mississippi River (in Minnesota) basin. Analysis of both the Straight River watershed and the entire basin pointed to livestock manure and inadequately functioning individual sewage treatment systems as important sources. This project, which focused on livestock manure, was led by the Cannon River Watershed Partnership, the Steele County Soil and Water Conservation District, and the Steele County Planning and Zoning and Environmental Services Offices. A companion project, addressing the individual sewage treatment systems, was led by Steele County Environmental Services.



Straight River in the City of Faribault.

Goals for this project

- Reduce fecal coliform bacteria by 20 percent in priority areas.
- 100 percent sign up in the open lot agreement.
- Install 4500 acres of buffers and filter strips.
- Manure management plans developed and implemented.

Results that count

- Water monitoring results are insufficient to make a judgment on the first goal listed above.
- The goal of 100 percent sign up for the open lot agreement was achieved for Steele County, which encompasses 80 percent of the land in the watershed.
- 1815 acres of buffers and filter strips were installed through 2006 as a result of this project. While less

than half of the 4500 acre goal, it is still a substantial accomplishment.

- At the beginning of the project, 77 feedlots sites were identified that needed manure management plans. Plans were developed for these sites, plus an additional 30 smaller sites that were not required to have a plan, but will benefit from a plan.

Financial information

Funding type	Section 319
Grant amount	\$256,750
Matching funds and in-kind	\$359,753
Total project cost	\$616,503

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Whitewater Watershed paired watershed monitoring project

The 2007 work order for the Whitewater Watershed Paired Watershed monitoring project entailed project close-out activities. These activities represented the culmination of field monitoring in a ten-year project that is a part of the US EPA Section 319 National Monitoring Program.

The Whitewater Watershed U.S. EPA Section 319 National Monitoring Program Project was developed to evaluate the effectiveness of best management practices in improving water quality. The overall project used a paired-watershed monitoring design to compare the use of BMPs in a treatment watershed versus a control watershed where no management practices were changed.

The activities were set to collect additional storm flow event samples and flow data, remove the monitoring equipment and H-flumes, and provide additional analysis of the data collected. Additional data was not collected due to the presence of drought conditions with little to no discharge from the springs in the paired-watersheds. Monitoring equipment was removed and the sites were demolished at the end of the project period. The University of Minnesota staff provided additional data analyses for use in writing the final report for the Section 319 National Monitoring Program.

As the close-out year for the project, the project goals were rather limited.

Goals for this project

- Collect additional storm event runoff samples and flow data.
- Remove monitoring equipment and H-flumes from the sites.
- Provide additional data analysis for use in NMP final report.

Results that count

- No samples were collected due to drought conditions.
- Monitoring equipment was removed and the sites were demolished at the end of the project period.
- Additional data compilation and analysis was provided for use in NMP final report to be written in 2008.

Financial information

Funding type	Section 319
Grant amount	\$10,031.04
Total project cost	\$10,031.04

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HL flume used to measure flow at paired-watershed monitoring sites, Whitewater River Watershed NMP Project, near St. Charles, MN.

Projects currently active in 2008 in the Lower Mississippi River Basin

Cannon River Wastewater project—2005

Sponsor: Cannon River Watershed Partnership

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

Purpose: Provide financial incentives for assessment and engineering feasibility studies of current wastewater conditions.

Cost-share incentives for small feedlot fixes—2004

Sponsor: Hiawatha Valley Resource Conservation and Development Association

Funding: Section 319 (Grant) \$242,000

Purpose: Provide a 50 percent cost share for feedlot fixes for 220 feedlots.

Dakota County non-point source reduction project—2004

Sponsor: Dakota County

Funding: Section 319 (Grant) \$191,539

Purpose: Initiate an intensive one-on-one farmer outreach program, purchase permanent conservation easements along the Vermillion River and its tributaries; and expand water-quality monitoring of both groundwater and the Vermillion River.

Designing feedlot improvements in targeted areas under the open lot agreement—2004

Sponsor: Southeast Minnesota Water Resources Board

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

Purpose: Provide financial and technical assistance for designing low-cost solutions for feedlot runoff

Jefferson-German Lakes water quality improvement project continuation—2004

Sponsor: Le Sueur County

Funding: CWP (Grant) \$55,000; CWP (Loan) \$250,000

Purpose: Upgrade best management practices for priority feedlots, devise solutions for highly erodible lands in four priority sub-watersheds, provide loan funding to upgrade nonconforming individual septic treatment systems, continue water quality monitoring/data analysis,

assistance in updating the Le Sueur County water plan, planning best management practices demonstration sites and developing information materials.

Lower Mississippi feedlot runoff control—2006

Sponsor: Southeast Minnesota Water Resources Board

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

Purpose: Hire technicians to assist eligible open livestock feedlots and provide some funds for low-cost improvements to reduce runoff.

Lower Vermillion River Watershed turbidity TMDL project—phase III—2003, 2004

Sponsor: Dakota County Soil and Water Conservation District

Funding: Section 319 (Grant) \$176,128

Purpose: Complete monitoring, modeling and development of land use data to identify potential pollutants in order to develop a total maximum daily load for turbidity.

South Branch Root River Watershed fecal coliform bacteria reduction project—2004

Sponsor: Fillmore County

Funding: Section 319 (Grant) \$299,420; CWP (Loan) \$300,000

Purpose: Reduce fecal coliform levels by 20 percent, turbidity/total suspended solids by 10 percent, reduce harmful bacteria by 65 percent and sediments by 30 percent in southeastern rivers and stream within 10 years.

South Branch Whitewater River Watershed bacteria reduction project—2005

Sponsor: Whitewater Joint Powers Board

Funding: Section 319 (Grant) \$174,660; CWP (Loan) \$100,000

Purpose: Upgrade septic systems, implement best management practices to reduce bacteria runoff, complete managed grazing plans, bring feedlots into compliance with state rules, install vegetative buffers along river corridors, and provide education and outreach.

Southeast Minnesota milk house wastewater treatment demonstration—2004

Sponsor: University of Minnesota

Funding: Section 319 (Grant) \$183,822

Purpose: Install different milk house wastewater handling systems on cooperating dairy farms for evaluation and demonstration. In southeastern Minnesota, different soils, karst conditions, topography and cultural practices drive the need for this type of research and demonstration.

Steele County septic system loan program—2004

Sponsor: Steele County

Funding: Section 319 (Grant) \$66,000; CWP (Loan) \$500,000

Purpose: Provide administrative and financial assistance low-interest loans for individual land owners to upgrade inadequate septic systems.

Targeted feedlot open lot implementation engineering assistance—2006

Sponsor: Southeast Soil and Water Conservation District Technical Support Joint Powers Board

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

Purpose: Provide engineering technical assistance and work with producers who sign up for the open lot agreement.

Vermillion River and Chub Creek ISTS inspection and upgrade program—2006

Sponsor: Dakota County

Funding: Section 319 (Grant) \$160,500

Purpose: Inspect individual sewage treatment systems near streams, provide incentives for improvements.

Volunteer nitrate monitoring network in target areas demonstration—2005

Sponsor: Southeast Minnesota Water Resources Board

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

Purpose: Develop and test a process for obtaining long-term trend data for nitrate occurrence in private drinking water supplies by training homeowners to sample for nitrates and ship their samples to specified county locations.

Lower Mississippi River Basin projects awarded in 2008**Section 319 projects****Assistance for unsewered communities in the Lower Mississippi/Cedar River Basin**

Sponsor: Southeast Minnesota Water Resources Board

Funding: 319 (Grant) \$272,080

Purpose: This project will be implemented within the boundaries of the thirteen counties in the basin. The regional TMDL study identified streams in the basin posing a risk of human illness from excessive levels of fecal coliform bacteria. This study also found that failing septic systems and unsewered communities comprised an estimated 52% of the bacteria load during spring and summer, making it the single greatest pollutant source. In order to achieve a 65% reduction of this load by 2012, this project will assist those small communities with expertise and resources needed to achieve a wastewater solution.

Steele County septic system loan program continuation (Lower Mississippi River)

Sponsor: Steel County

Award: CWP (Loan) \$1,000,000

Steele County is continuing its septic system loan program that began in 2004. Landowners with failing or noncomplying septic systems are eligible for the loan program and may use the loan to replace existing septic systems that are contributing to fecal coliform pollution in the Straight River watershed, which has completed a TMDL study.

Minnesota River Basin

The Minnesota River Basin covers approximately 16,770 square miles, roughly 10 million acres. Thirteen major watersheds in Minnesota drain into the basin, which touches 37 counties. The Minnesota River flows southeast from its source at Big Stone Lake on the South Dakota border to Mankato then northeast to join the Mississippi River at Fort Snelling (about 335 total miles).



Projects completed

- Chippewa County Watershed continuation
- Cottonwood River restoration project-continuation
- Cottonwood River restoration project BMP implementation continuation
- Hawk Creek: Beaver Tales
- Hawk Creek Watershed project: Land of the Lost
- High Island implementation project
- Lake Shaokatan continuing restoration project
- Lower Main Stem Chippewa River subbasin
- Minnesota River Report 2006-2007—Minnesota River Summit
- Pomme de Terre River fecal coliform TMDL project
- Redwood River Watershed phosphorus TMDL compliance project
- Research project to develop the Greater Blue Earth turbidity TMDL

Chippewa River Watershed project continuation

This continuation phase of the Chippewa River Watershed Project (CRWP) was designed to enable the CRWP to continue the water quality/quantity monitoring program, the education and information program, coordination of the entire watershed and to seek funds for implementation of best management practices. One intent of the continuation project is to educate and raise awareness on the state of the Chippewa River with the data from the CRWP's ongoing water quality/quantity monitoring program and most importantly, present landowners with solutions they can implement to enhance the water quality.

The Chippewa River carries high sediment and phosphorus loads during the growing seasons as a result of rainfall-driven polluted runoff that occurs throughout most of the watershed. The entire length of the river exceeds the fecal coliform bacteria standard and is listed on the impaired waters list along with a turbidity impairment. The size of the watershed, non point source pollution being a principal determinant of water quality, and non point source pollution being dispersed, there is a substantial increase in the difficulty of achieving quick, measurable results. With the immense size of the watershed, the decision was made to apply for implementation funds for each priority management area separately over the next six years, which was a success.

Goals for this project

- Obtain funding for the six priority management areas defined in the implementation plan.
- Provide for continued water quality/quantity monitoring program.
- Engage in public outreach and education which includes recruitment and retainment of the citizen monitor network.

Results that count

- All six priority areas received funding for implementing BMPs according to the Implementation Plan. At the close of this project, 11 projects were funded with each priority area receiving at least one grant.
- The data collected with the continued monitoring of water quality/quantity can be viewed in three reports that resulted from this project. These reports include:



Chippewa River Watershed project annual meeting, watershed residents and partners' displays.

"2004 Chippewa River Watershed Project Monitoring Report – Cleaning Up the Chippewa One Day At A Time", "2005 Chippewa River Watershed Project Monitoring Report – Watching The Chippewa Wash Away One Day At A Time", and "2006 Chippewa River Watershed Project Monitoring Report – Following the Remarkable Journey of the Chippewa River."

- There were many events that took place during this project that reach many citizens within the watershed. These events include: conservation field days, water festivals, three CRWP annual meetings and information presented at nine county fairs. The citizen monitor network recruited and retained 11 volunteers in 2005 and 2006 that collected transparency tube data.

Financial information

Funding type	CWP
Grant amount	\$279,210.79
Matching funds and in-kind	\$719,187.00
Total project cost	\$998,397.79

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Cottonwood River restoration continuation project



The Cottonwood River carries high sediment and phosphorus loads during the growing season. This is predominantly the result of rainfall-driven polluted runoff that occurs throughout most of the watershed. The lower reach is affected by bacteria, exceeding the fecal coliform standard, and is subject to a total maximum daily load (TMDL) study in the next few years. The usefulness and aesthetic qualities of the river are impaired, and conditions are unlikely to improve unless changes are made in land use and water management practices within the watershed. These changes can be accomplished through an implementation plan that reflects real problems occurring on the landscape, and clearly identifies solutions to those problems while developing and organizing sufficient resources to attain meaningful and effective solutions.

The purpose of the implementation phase of the Cottonwood River restoration project is to facilitate watershed land-use changes that will lead to reductions necessary to meet both main stem and tributary goals. An important aspect of BMP promotion and adoption is targeting. Priority management areas have been selected in the watershed based on their relative contribution of non-point source pollution. Within each priority area, appropriate BMPs are promoted to achieve the greatest benefit. To help insure the most cost-effective use of cost-share funds and to compensate for decreases in state funding levels, practices within designated priority areas are subjected

to a ranking procedure. The criteria upon which each practice is evaluated reflect important variables affecting surface water quality (e.g., proximity, soil loss reduction, etc.) and are consistent with Project goals and objectives.

Goals for this project

- To achieve the highest water quality attainable for ecoregion streams.
- To have watershed residents take an active role in enhancing and protecting the Cottonwood River.
- To develop the Cottonwood River as a major recreational resource within the Minnesota River Basin.

Results that count

- Twenty-five various best management practices were installed in the Cottonwood River Watershed to reduce direct sediment and phosphorus delivery to the Cottonwood River and its receiving tributaries. These BMPs have the potential to reduce phosphorus losses by 7,813.42 pounds per year and reduce net sediment in surface water by 6,790.45 tons per year.
- During the project, RCRCA conducted numerous outreach events which allowed for 2,658 individual contacts with an additional 19 watershed wide events through the media. This program has effectively increased watershed awareness and has accelerated BMP implementation either through individual participation in the project's cost share program or landowner usage of the federal funding and state cost-share funding programs.

Financial information

Funding type	CWP
Grant amount	\$500,000
Matching funds and in-kind	\$500,000
Total project cost	\$1,000,000

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Cottonwood River restoration project BMP implementation continuation

The implementation plan for the Cottonwood River Watershed acknowledges the complex nature of non-point source pollution and the central role played by watershed residents in achieving water quality improvements. It is based, in part, on experiences gained through the Redwood River Clean Water Project. The Redwood River Project emphasizes best management practices (BMPs) on agricultural land supported by an information and education program that uses a variety of techniques to achieve participation. Because the Cottonwood Watershed is very similar to the Redwood Watershed in terms of land use, topography, soils, and climate, it is likely that the successfully applied accelerated BMP program in the Redwood Watershed will also be successful in the Cottonwood Watershed.

The purpose of the implementation phase of the Cottonwood River restoration project is to facilitate watershed land-use changes that will lead to reductions necessary to meet both main stem and tributary goals. An important aspect of BMP promotion and adoption is targeting. Priority management areas have been selected in the watershed based on their relative contribution of non-point source pollution. Within each priority area, appropriate BMPs are promoted to achieve the greatest benefit. To help insure the most cost-effective use of cost-share funds and to compensate for decreases in state funding levels, practices within designated priority areas are subjected to a ranking procedure. The criteria upon which each practice is evaluated reflect important variables affecting surface water quality (e.g., proximity, soil loss reduction, etc.) and are consistent with project goals and objectives.

Goals for this project

- To achieve the highest water quality attainable for ecoregion streams.
- To have watershed residents take an active role in enhancing and protecting the Cottonwood River;
- To develop the Cottonwood River as a major recreational resource within the Minnesota River Basin.



Results that count

- Implemented BMP contracts consisting of 25 various BMPs in the Cottonwood River Watershed to reduce direct sediment and phosphorus delivery to the Cottonwood River. These projects have the potential to reduce phosphorus losses by 7,813.42 pounds per year and reduce net sediment in surface water by 6,790.45 tons per year.
- Joint Power Member, Lyon County, participating in the Project's low interest loan program, implemented 26 septic loan systems or 88 bedrooms of a maximum 2 person occupancy. These systems have the ability to reduce phosphorus loading by 10.84 tons over their 30-year lifespan or 8,627,400.00 pounds of algae reduction.
- Over 13,760.72 acres of watershed have been enrolled into CREP and permanently set aside by watershed landowners who were assisted by partner Soil and Water Conservation Districts. For more information, go to www.rcrca.com.

Financial information

Funding type	CWP
Grant amount	\$161,942
Matching funds and in-kind	\$343,553
Total project cost	\$505,495

Contact

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Hawk Creek Watershed project— “Beaver Tales”

The Hawk Creek Watershed drains 623,424 acres (974 square miles) of land. It 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. Hawk Creek originates in the lakes region of Kandiyohi County and flows approximately 65 miles to the Minnesota River. The ‘Beaver Tales’ project area comprises approximately 122,302 acres and over 161 miles of water courses. Beaver Creek and similar tributaries can play a significant role in determining the health of the Minnesota River.

Agriculture with extensive drainage is the primary land use. It is estimated that nearly 98 percent of the original wetlands in the watershed have been drained to increase agricultural opportunities. Corn, soybeans and sugar beets are the primary crops. Livestock production includes dairy, beef, swine, and poultry. A diagnostic study found sediment and nutrients well over the 50th percentile of the Western Corn Belt Plains Eco-Region.

Goals for this project

- The ultimate goal of the Hawk Creek Watershed Project 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 region.

Results that count

- 23 Buffer Strips installed affecting 121.7 acres.
- Two side inlet/drop inlets installed affecting 54.5 acres.
- Four alternative surface drainage systems intakes and tile intake protection projects were installed affecting 21 acres.
- Eight projects with 21 individual sediment basins were installed affecting 196.2 acres.
- Six additional BMPs were installed affecting 1,319 acres.
- BMPs provide estimated soil loss reductions of 704.96 tons/yr. and reduced phosphorus loading by 560.83 lbs./yr.

Financial information

Funding type	Section 319
Grant amount	\$174,137
Matching funds and in-kind	\$517,008
Total project cost	\$691,145

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Hawk Creek “Land of the Lost” watershed project

The Hawk Creek Watershed drains 623,424 acres (974 square miles) of land. It 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. Hawk Creek originates in the lakes region of Kandiyohi County and flows approximately 65 miles to the Minnesota River. The ‘Land of the Lost’ project has 25 small streams in the Hawk Creek Watershed Project area comprising of approximately 197,765 acres and over 191 miles of watercourses. They include Smith, Middle, Timms, Sacred Heart, Palmer, Brafees, Three-mile Creeks and several unnamed natural streams some of which are county ditches. These tributaries are often forgotten about but play a significant role in determining the health of the Minnesota River.

Agriculture with extensive drainage is the primary land use. It is estimated that nearly 98 percent of the original wetlands in the watershed have been drained to increase agricultural opportunities. Corn, soybeans and sugar beets are the primary crops. Livestock production includes dairy, beef, swine, and poultry. A diagnostic study found sediment and nutrients well over the 50th percentile of the Western Corn Belt Plains Eco-Region.

Twenty-two cities, towns and small villages are found in the Hawk Creek Watershed. Six major recreational lakes also lie within its borders, including significant waters such as Eagle, Long, Foot and Willmar. Additionally, several County/Regional parks and more than 15 State Wildlife Management areas dot the watershed’s landscape.

Goals for this project

- The ultimate goal of the Hawk Creek Watershed Project 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 region.

Results that count

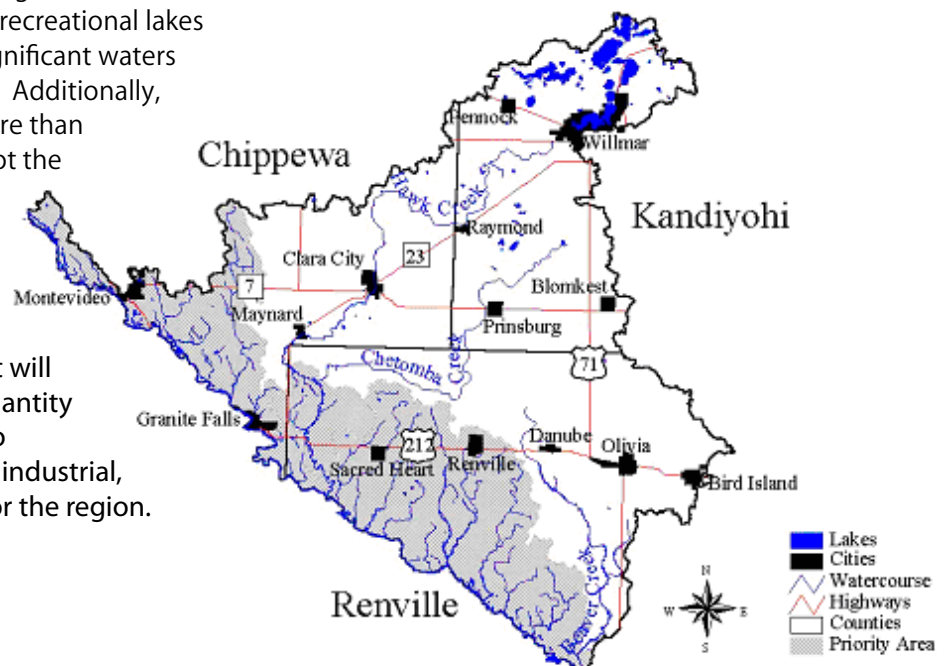
- Sediment and nutrient loss continue to be a major concern in the watershed. Since this project began in 2002 a total of 86 BMPs were installed affecting 1,627.1 acres. BMPs provide estimated soil loss reductions of 1192.63 tons/yr. and reduced phosphorus loading by 1484.89 lbs./yr.
- 12 Buffer Strips installed affecting 178.2 acres.
- 22 side inlet/drop inlets installed affecting 257.1 acres.
- 39 Alternative intakes and tile intake protection projects were installed affecting 219.2 acres.
- 13 Additional BMPs were installed affecting 972.6 acres.

Financial information

Funding type	Section 319
Grant amount	\$169,680
Matching funds and in-kind	\$374,756
Total project cost	\$544,436

Contact

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High Island Creek implementation project

The High Island Creek Watershed is located in south central Minnesota and is part of the Lower Minnesota Watershed. The state of water quality in the High Island Creek Watershed is characterized by high levels of fecal coliform bacteria, total phosphorus, nitrate-nitrite nitrogen, and total suspended solids. Excessive peak flows are also a major concern. Severe down-cutting has taken place in the steep bluff areas perhaps resulting from hydrologic alterations in the uplands. Stream bank erosion along the ditch network and natural stream sections is another potential problem for water quality.

An implementation plan was initiated to provide cost-share and incentive funds for landowners to put conservation practices on the ground. A fecal coliform bacteria Total Maximum Daily Load (TMDL) study was conducted in partnership with the Water Resources Center at Minnesota State University Mankato.

Goals for this project

- To increase adoption of BMPs in the watershed.
- To achieve compliance with the water quality standard for fecal coliform bacteria.
- To increase awareness and adoption of BMPs throughout High Island Creek Watershed through education and information.

Results that count

- Many BMPs were adopted in the watershed, including slotted risers, rock tile intakes, grade stabilization structures, water/sediment control basins, terrace projects, cover crops, wetland restorations, filter strips, rain gardens and septic upgrades.
- Though local reductions in sediment, nutrients and bacteria may have been achieved, watershed scale reductions would require much broader adoption of



A rain garden in New Auburn.

best management practices. The High Island Creek Implementation Continuation CWP will strive to establish conservation practices sufficient to make watershed scale improvements to water quality.

- Education and information based activities were utilized to increase awareness and adoption of best management practices throughout High Island Creek Watershed including: two small-group manure and nutrient management planning workshops; quarterly distributed watershed newsletter (14 issues); three fecal coliform bacteria TMDL open houses; public survey for fecal coliform TMDL and many others.

Financial information

Funding type	Section 319 & MN River
Grant amount	\$261,474
Matching funds and in-kind	\$571,695
Total project cost	\$833,169

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Lake Shaokatan continuing restoration project—CWP continuation

Lake Shaokatan, located in west central Lincoln County, has a watershed area of 8,400 acres in size, a lake surface of 1,018 acres, an average depth of eight feet and a maximum depth of 12 feet. Historically, the lake once was home to Indian encampments.

The total funding received from MPCA CWP grants and loans provided for a large improvement in water quality in Lake Shaokatan. The major proof for this is the resurgence of native plant populations in the lake. Native plants that are increasing in frequency are Sago Pondweed and Richardson's Clasping Leaf Pondweed along with more cattail and coontail. This is a positive sign of a healthier lake.

Since the project began, much local interest in the lake water quality improvement has arisen and several economic benefits have resulted, including the re-opening of the single lake shore restaurant and resort, the creation of a beach and extended recreational facilities, and increased public recreation.

One unforeseen outcome of the Lake Shaokatan Restoration projects is a general willingness of the County Commissioners to recognize the importance and value our county lakes and waterways. They also have agreed to take steps to improve, preserve and protect our lakes and rivers in a way that did not exist in the last century.

Goals for this project

- To modify the various watershed land use practices to significantly reduce inputs to Lake Shaokatan, and show a measurable improvement to the lake water quality.

- To further remove possible sources of pollution to the lake by upgrading the tile lines and septic systems within the entire watershed.

Results that count

- Re-routed and relocated a large 12" tile line that outletted directly into the lake. This tile line carried runoff for the land around a nearby dairy, which was a major contributor of phosphorus to the lake. This tile line relocation reduces phosphorus and treats the water outletting from the tile to the Lake.
- Removal and replacement of surface intakes on tile lines that outletted into the lake.
- Using CWP loan funds, 4 additional septic systems were upgraded around the Lake. This brings the total number of upgraded systems around the lake to 34. This makes about 69 percent of the existing systems compliant.

Financial information

Funding type	CWP
Grant amount	\$45,000.00
Matching funds and in-kind	\$67,533.00
Total project cost	\$112,533.00

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Lower Main Stem Chippewa River subbasin

This project was created with the goal of enhancing and protecting the Chippewa River and to achieve water quality improvements pertinent to the scheduled Total Maximum Daily Loads (TMDLs) and also targeted for pollutants to address the TMDL for dissolved oxygen on the Lower Minnesota River. The Chippewa River Watershed impairments include: fecal coliform bacteria, turbidity, excess nutrients, fish IBI and mercury. These impairments affect the uses of aquatic life, aquatic recreation, and aquatic consumption. The activities conducted through this project address all of the impairments except mercury. The Lower Main Stem Chippewa River (LMS) is one of six major sub-basins of the Chippewa River Watershed; these sub-basins were delineated as priority project areas during the diagnostic study through a previous grant.

Plans for Implementation included incentive or cost share programs for the following Best Management Practices (BMPs): buffer strip initiative, nutrient and residue management, livestock exclusion, alternative tile intakes, and special projects. Water quality and quantity monitoring were conducted and are summarized in the Chippewa River Watershed Project (CRWP) Monitoring Summary 2006, "Following the Remarkable Journey of the Chippewa River" by Paul Wymar, Watershed Scientist, CRWP. Education activities include two annual meetings reaching 230 watershed residents, participation at county fairs, bus tour of BMPs installed, canoe trip viewing streambank stabilization project with 60 residents, numerous presentations at area schools and monthly updates on the CRWP web site.

Goals for this project

- Installation of BMPs that were identified in the CRWP diagnostic study and implementation plan. A goal was set to have 425 acres in buffer strips.
- Monitor the water quality and quantity of the Lower Main Stem.
- Educate the public by holding public events and by providing information that is easily accessible.

Results that count

- From this project, 169 percent of the goal was accomplished as 720.1 acres were enrolled in to the CRP continuous sign-up program. Other BMPs that



Streambank restoration Big Bend Cemetery Project, Main Stem of Chippewa River.

were utilized in this project were two side inlets, 900 feet of streambank stabilization, one feedlot upgrade, and six projects using stream barbs to alleviate streambank erosion.

- The 2006 monitoring data revealed that the lower channel in the Lower Main Stem subbasin was responsible for 21 percent of the Total Suspended Solids. The flow weighted mean for phosphorous at the Highway 40 monitoring site was 0.14 parts per million or 48.2 tons. The flow weighted mean for nitrogen was 3.36 parts per million or 1,121 tons.
- Annual meetings were held with approximately 230 residents attending and presentations of water monitoring results, installation of BMPs, and available BMPs to landowners were given. This information was available at the Swift and Chippewa County Fairs and also on the CRWP web site: www.chippewariver.com.

Financial information

Funding type	Section 319
Grant amount	\$170,860
Matching funds and in-kind	\$353,932
Total project cost	\$524,792

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Minnesota River Report—2006–07 and Minnesota River Summit

Minnesota State University and partners developed a State of the Minnesota River Report using water quality and flow data from 2000 – 2005. Data from thirty-two monitoring sites over a six year period were used to present levels of sediment, nitrogen and phosphorus.

The Minnesota River Summit was a gathering of 180 people representing various sectors from the Minnesota River Basin. They convened to celebrate success and to determine the next steps. Issues of importance identified at the event were the impact of hydrology, population changes, and energy issues on the Minnesota River and the need for communication.

Goals for this project

- Summarize water quality data.
- Celebrate success.
- Identify high leverage activities.

Results that count

- Identified the need for an ongoing dialogue.
- Identified high priority issues.
- Identified the need to see the Minnesota River as a system.

Financial information

Funding type Minnesota River Funding
Grant amount \$57,372

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Pomme de Terre River fecal coliform TMDL project

This project was funded for the development of a TMDL for one reach within the Pomme de Terre River that was placed on Minnesota's Impaired Waters list in 1994. This reach is from Muddy Creek to Marsh Lake, where the Pomme de Terre enters the Minnesota River and was found to have an excess amount of fecal coliform bacteria. The project was scheduled to begin in 2006 and be completed in 2010. A local group, the Pomme de Terre River Association, was ready to begin work in 2005 which allowed for an early completion of a TMDL report. A TMDL Report was approved by the US EPA in December of 2007. An implementation plan is under development through another grant which will use a watershed wide approach.

The Pomme de Terre River is located in western Minnesota in the upper Minnesota River Basin. The watershed consists of approximately 905 square miles and is largely rural with cultivation as the major land use. Data has been found on the impaired reach dating back to 1971 at a sampling site in Appleton, Minnesota and further data sampling occurred through 2004.

Goals for this project

- Determine the sources of fecal coliform throughout the Pomme de Terre River watershed and specifically in the listed reach. These sources include agricultural runoff, urban runoff, wastewater treatment facilities, and individual sewer treatment systems.
- Determine the loading capacity for fecal coliform through modeling. Determine the allocations for the load, wasteload, and margin of safety.
- Educate the public about the fecal coliform impairment and also to involve the public in the process.

Results that count

- The sources of fecal coliform were largely from non point sources, mainly agricultural runoff. Wastewater Treatment Facilities and urban runoff were found to be a small percentage of the fecal coliform source.
- 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. Table 5.21D in the



Upstream of the footbridge in Appleton, MN. The data used in this project was collected at this site.

TMDL Report lists the actual loading capacities and allocations.

- A web site was developed for the Pomme de Terre River watershed, www.pdtriver.org, which contains information about the history, characteristics, monitoring, and events in and along the river. Citizens were also involved with a canoe trip and a public meeting where they were given the opportunity to be part of the stakeholder committee for the implementation plan.

Financial information

Funding type	319 & Water Environmental Fund
Grant amount	\$48,443
Matching funds and in-kind	\$29,011
Total project cost	\$77,454

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Redwood River Watershed phosphorous TMDL compliance project

The Redwood River Watershed phosphorous TMDL compliance project implemented contracts consisting of 67 various best management practices in the Redwood River Watershed to reduce direct sediment and phosphorus delivery to the Redwood River. These projects have the potential to reduce phosphorus losses by 4,133 pounds per year and reduce net sediment in surface water by 2,731.20 tons per year. Over the ten year life expectancy of each BMP, a potential reduction of 20.67 tons of phosphorus or 16,533,200 pounds of algae is possible.



Participating counties in the project's low interest loan program implemented 66 septic loan systems with grants and loans from MPCA. These systems have the potential to reduce phosphorus loading by 40.60 tons over their 30-year lifespan or 32,521,500 pounds of algae reduction.

Major land use changes made by this project come from the treatment of gullies with a structural practice and requiring mulch tillage in the contributing watershed. In addition, over 7,000 acres of watershed have been enrolled into CREP and permanently set aside by watershed landowners who were assisted by partner Soil and Water Conservation Districts.

Goals for this project

- The goal of this project is to work to de-list the Lower Minnesota River phosphorus TMDL.

Results that count

- Public participation was very good with the project. On average the project made 974 one on one watershed resident contacts per year with 5 watershed wide media events via newspaper and radio.

- Total annual loads of Total Suspended Solids and Total phosphorus have dropped over the past several years.

Financial information

Funding type	Section 319
Grant amount	290,000
Matching funds and in-kind	290,000
Total Project Cost	580,000

Contact

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Research project to develop the Greater Blue Earth turbidity TMDL

The Blue Earth River (BER) basin is a major contributor of sediment and nutrients to the Minnesota River. The BER and its tributaries (including Elm Creek) are on the 303(d) list for turbidity. Historic Clean Water Partnership work in Martin County provided a framework for constructing wetland-complex treatment systems and a monitoring program to evaluate the effectiveness of the integrated land use approach in the headwaters of Elm Creek. Martin County SWCD in concert with local land owners converted over 450 acres of row crops into perennial vegetated cover over several years. Because Elm Creek was listed for turbidity, longitudinal water quality data was collected at 10 locations from the headwaters to the mouth.

Inflow from corn-soybean fields was compared with outflow from restored wetland-perennial vegetation complexes; flashy surface runoff into a wetland-complex carried high concentrations of sediment and Phosphorous (P). In-stream sampling showed that suspended volatile solids (SVS) contributes to turbidity in channel reaches receiving inflow from eutrophic lakes; SVS comprised 14-100 percent of TSS in channels and lake outlets.

Turbidity increased non-linearly downstream, dramatically increasing midway down elm creek. Increasing stream power and entrenchment with excess sediment supply promoted high turbidity levels in lower elm creek. Widespread channel instability was characterized by frequent mass-wasting, channel entrenchment and lateral migration rates up to 5.6 ft/year. Fine-grained sediment (median depth 1-3 ft)



was stored in headwater ditches, lakes and wetlands, with significantly less sediment accumulation in lower reaches, in opposition to the usual trend of sediment fining downstream. Land-use, drainage alterations and channel adjustment are integrally linked and will need to be addressed in the TMDL load allocation.

Goals for this project

- Investigated the sources, movement and storage of sediment and nutrients from subwatersheds and channels of Elm Creek.
- Evaluate the effectiveness of wetland-complexes in reducing NPS pollutants.
- Define the relative influence of SVS within TSS of Elm Creek.

Results that count

- Subsurface tile-flow from croplands carried 75-90% of flow volume into the wetland, with NO₃-N concentrations of 17 - 19 mg/l.
- The wetland complexes reduced peak flows and annual TSS loads by over 90% and reduced out-flowing NO₃-N to zero during the growing season, but were less effective at removing P due to residual nutrients in pond sediments from agriculture.
- SVS contributes to turbidity in channel reaches receiving inflow from eutrophic lakes; SVS comprised 14-100% of total suspended sediment in channels and lake outlets; increasing percentage during late summer low flows.

Financial information

Funding type

Section 319 and State Match to Section 319

Grant amount \$179,726

Total project cost \$179,726

Contact

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MPCA project manager: Dr. Joe Magner

Projects currently active in 2008 in the Minnesota River Basin

Blue Earth River channel modifications and nutrients in the Blue Earth River Basin—2006

Sponsor: University of Minnesota

Funding: \$296,060 Section 319 grant

Purpose: Advances the work begun by the Blue Earth River Basin Initiative to reduce levels of sediment, turbidity, and nutrients in the river to meet the goals of the Total Daily Maximum Load being developed for the basin.

Carver County turbidity and excess nutrients TMDL Project—2005

Sponsor: Carver County

Funding: Section 319 (Grant) \$179,800

Purpose: Monitor, model and develop land use data to identify potential pollutants in order to develop total maximum daily loads for turbidity and excessive nutrients.

Cottonwood River Watershed phosphorus reduction project—2005

Sponsor: Redwood-Cottonwood Rivers Control Area

Funding: Section 319 (Grant) \$290,000

Purpose: Upgrade septic systems, restore stream banks and create grassed waterways, terraces and sediment control basins.

Dry weather/lines/Spring Creek Sub-basin of the Chippewa River—2006

Sponsor: Chippewa County

Funding: \$264,100 Section 319 grant, \$300,000 CWP loan

Purpose: Reduce nutrients, sediment and bacteria through tree plantings, nutrient and residue management, alternative tile intakes, septic system improvements, and nutrient insurance.

East Branch Chippewa River implementation project continuation—2006

Sponsor: Chippewa County

Funding: \$175,000 CWP grant, \$135,000 loan

Purpose: Provides continued water-quality monitoring and data analysis, upgrading of individual septic systems, and cost-share or incentive programs for buffer strips, shoreline naturalization projects, livestock exclusion, nutrient management, residue management, wetland restoration, water and sediment control basins, grassed waterways, streambank restoration/erosion control, terraces, and alternative tile inlets. Education activities to heighten awareness of local water quality, pollution, and proper BMPs will continue.

Expansion of the "red top" farm demonstration Concept—2004

Sponsor: Minnesota Department of Agriculture

Funding: Section 319 (Grant) \$87,000

Purpose: Obtain year-round quantification of nutrient and pesticide losses from the fields under different best management practices and scenarios.

Greater Blue Earth River Watershed BMPs focus on the Big Cobb—2006

Sponsor: Greater Blue Earth River Basin Alliance

Funding: \$299,988 Section 319 grant, \$100,000 loan

Purpose: Hire staff and provide cost-share for installation of conservation practices to reduce phosphorus and sediment.

Greater Yellow Medicine River phase II project continuation—2004

Sponsor: Yellow Medicine River Watershed District

Funding: CWP (Grant) \$251,608; CWP (Loan) \$625,000

Purpose: Continue water quality monitoring, data analysis, project administration, local education activities, and implementation of agricultural best management practices such as nutrient management, filter strip construction, conservation easements and cost-share with other conservation programs.

Hawk Creek Watershed project—2006

Sponsor: Renville County

Funding: \$300,000 Section 319 grant, \$900,000 loan

Purpose: Implement practices to reduce phosphorus: Promote alternative tile intakes, improve septic systems, develop ditch buffers, urban storm water management, and education.

Hawk Creek Watershed project—Hawk TMDL—2004

Sponsor: Renville County

Funding: Section 319 (Grant) \$247,509

Purpose: Provide financial incentives to landowners to implement conservation practices that will reduce the impacts of non-point source water pollution on the creek.

Interpreting a century of sediment in Redwood Lake—2006

Sponsor: Redwood-Cottonwood Rivers Control Area

Funding: Section 319 (Grant) \$89,140

Purpose: Redwood Lake is filled with up to 27 feet of sediment that has accumulated behind the dam in Redwood Falls, and has been proposed for dredging and restoration. This project will sample the sediment to help analyze the long-term impacts of land use on water resources.

Lac qui Parle River main stem water quality enhancement effort—2005

Sponsor: Lac qui Parle-Yellow Bank Watershed District

Funding: Section 319 (Grant) \$298,000

Purpose: Implement best management practices, including upgrade of individual septic treatment systems

Lake Shaokatan TMDL project—2004

Sponsor: Yellow Medicine River Watershed District

Funding: Section 319 (Grant) \$62,804

Purpose: Monitor, assess, model and develop land use data to identify potential pollutants in order to develop a total maximum daily load for excess nutrients.

Lily and Center Creeks—Blue Earth River clean water partnership—2006

Sponsor: Martin County

Funding: \$450,000 CWP grant, \$300,000 loan

Purpose: This continuation project expands the activities of the original Center and Lily Creeks implementation project. Two technical positions are funded to promote all the conservation programs available to the Blue Earth Watershed and will assist with cost-share programs such as grassed waterways, filter strips, sediment control basins, tile intake buffers or conversions, alternative easements, and easements through Conservation Reserve Programs and EQIP. Septic-system upgrades are another part of this project. The grant also provides funds for water-quality monitoring and data analysis to assure effectiveness of improvements and get a better understanding of nonpoint-source water pollution in the area. Education activities such as newsletters, an annual canoe trip, community education classes, the Ecology Bus, and special projects that schools provide their students will continue.

Lincoln County/Redwood River Watershed management project continuation—2005

Sponsor: Redwood-Cottonwood Rivers Control Area

Funding: CWP (Grant) \$310,000; CWP (Loan) \$440,000

Purpose: Continue urban and stream bank best management practices implementation, monitoring, outreach, evaluation and project administration.

Little Cottonwood River restoration project continuation—2005

Sponsor: Brown, Nicollet and Blue Earth Counties

Funding: CWP (Grant) \$157,696, CWP (Loan) \$150,000

Purpose: Continue funding staff positions responsible for targeting, marketing, creating relationships and enrolling environmentally sensitive agricultural lands into state and federal programs. Nutrient management demonstrations, EQIP funding for polluting feedlots, and upgrading noncompliant septic systems are also priorities for this project. Continued watershed monitoring, data analysis, maintaining an interactive watershed Web site, newsletters, and other educational efforts will round out the work of this continuation.

Lower Maple River Watershed project—2006

Sponsor: Blue Earth County

Funding: \$474,100 CWP grant, \$100,000 loan

Purpose: Funding for this project will be used for cost-share in installing rock inlets, grass buffers, terraces, waterways, sediment basins, harvestable buffer strips, crop residue management, nutrient management, septic-system upgrades, and other technical assistance. This grant will also fund continued water-quality monitoring, data assessment and macroinvertebrate sampling, and will continue information and education activities, especially for appropriate BMPs and education for tomorrow's water-quality stakeholders.

Rush River implementation project—2005

Sponsor: Sibley County

Funding: Section 319 (Grant) \$95,440

Purpose: Complete a TMDL for fecal coliform and reduce bacteria, sediment, and nutrient levels through best management practices implementation.

Seven Mile Creek Watershed project Continuation—2005

Sponsor: Brown, Nicollet and Cottonwood Counties

Funding: CWP (Grant) \$225,812; CWP (Loan) \$395,000

Purpose: Continue information, education and outreach, water quality monitoring and assessment, best management practices promotion and implementation and project administration.

Seven Mile Creek glacial sediment fingerprinting—2006

Sponsor: Brown-Nicollet-Cottonwood Water Quality Board

Funding: Section 319 (Grant) \$84,930

Purpose: Determine what portion of sediment and nutrient pollution in Seven Mile Creek is due to such natural processes as stream-bank erosion.

Shakopee Creek headwaters project—2004

Sponsor: Kandiyohi County

Funding: Section 319 (Grant) \$217,863

Purpose: Promote conservation practices that target water-quality improvement and flood reduction through education and incentives and encourage active

landowner participation in developing strategies that create a sustainable environment.

Shakopee Creek headwaters project continuation—2005

Sponsor: Kandiyohi County

Funding: CWP (Grant) \$254,346; CWP (Loan) \$200,000

Purpose: Continue information and education, water quality monitoring and evaluation, best management practices promotion and implementation and project administration.

Upper main stem Chippewa River implementation—2004

Sponsor: Chippewa County

Funding: Section 319 (Grant) \$164,210; CWP (Loan) \$200,000

Purpose: Implement a buffer strip initiative, the Filters for the Future Initiative, septic inspection fee, livestock exclusion projects, manure testing, shoreline naturalization site installation, the Alternative Tile Intake Initiative, sediment basins, terraces, wetland restoration and other best management practices.

Watonwan River major watershed implementation plan continuation – 2004

Sponsor: Watonwan County

Funding: CWP (Grant) \$256,820; CWP (Loan) \$500,000

Purpose: Implement agricultural best management practices for nutrient management, stream bank stabilization, channel restoration, drainage inventory, residue management, water retention, upgrade individual septic treatment systems, ongoing monitoring and data analysis and education activities.

Minnesota River Basin projects awarded in 2008**Carver, Bevens and Silver Creek fecal coliform TMDL implementation plan—phase II**

Sponsor: Carver County Land and Water

Funding: Section 319 (Grant) 148,420

Purpose: To continue work begun in Phase I – including bringing into compliance up to 100 direct discharge

SSTSs, install 26 miles of buffer strips, install 80 alternative tile intakes, and write 15 manure management plans in the targeted sub-watershed areas of Carver, Bevens and Silver Creek watersheds.

Cottonwood/Redwood River project

Sponsor: Redwood-Cottonwood Rivers Control Area (RCRCA)

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

Purpose: This is a long term water quality program designed to restore the watersheds through local efforts. The overall project goals are to achieve the highest water quality attainable to eco-region streams, have watershed residents take an active role in enhancing and protecting the project area and to develop it as a major recreational resource within the Minnesota River Basin.

Hawk Creek Watershed project continuation (Minnesota River)—2008

Sponsor: Renville County

Award: CWP (Grant) \$180,839

"Beaver Tales" continues to reduce erosion and nutrient loading in the Hawk Creek watershed by enrolling riparian areas into the Reinvest in Minnesota Program, improving agricultural drain-tiling systems, developing alternative tile inlet projects, installing buffer strips, supporting drainage ditch bank stabilization and implementing other priority BMPs. This project also continues water quality monitoring activities from previous projects to evaluate the effectiveness of BMPs. Educational activities include the recruitment and support of watershed assessment teams and coordination of promotional events, displays, tours and demonstrations.

Hawk Creek Watershed project continuation (Minnesota River)—2008

Sponsor: Renville County

Award: CWP (Grant) \$177,437

"Land of the Lost" continues to reduce erosion and nutrient loading in the Hawk Creek watershed by enrolling riparian areas into the Reinvest in Minnesota Program, improving agricultural drain-tiling systems, developing alternative tile inlet projects, installing buffer strips, supporting drainage ditch bank stabilization

and implementing other priority BMPs. This project also continues water quality monitoring activities from previous projects to evaluate the effectiveness of BMPs. Educational activities include the recruitment and support of watershed assessment teams and coordination of promotional events, displays, tours and demonstrations.

Heron Lake Watershed District: Clean Water Partnership continuation (Minnesota River)—2008

Sponsor: Heron Lake Watershed District

Award: CWP (Grant) \$428,752.50

CWP (Loan) \$500,000

This implementation project will continue to increase public awareness of water quality issues. The watershed district will establish cost-share, incentive, and loan programs for best management practice (BMPs) installation. Conservation tillage equipment purchases will continue. This project will control water flow in the watershed through the installation of alternative surface tile intakes and water/sediment control basins, wetland restoration, storm water retention ponds, critical area plantings, and riparian easements. The monitoring effort will ensure timely completion of the watershed treatment strategies and their effectiveness in improving the stream and lake water quality. Installation of BMPs such as filter strips and wetland restorations will provide habitat for resident and migrant wildlife species.

High Island Creek implementation project continuation (Minnesota River)—2008

Sponsor: Sibley County

Award: CWP (Grant) \$500,000

CWP (Loan) \$500,000 loan

This project continues activities related to the installation, planning and design of BMP's in the watershed, with funding which includes cost-share monies, incentive payments and loan dollars. This project will continue the water quality and quantity monitoring plan established during the diagnostic study. It will also include additional watershed monitoring (streambank and aquatic surveys) to further define priority areas. This project will continue activities related to education and outreach, including workshops, brochures, surveys, displays, tours, demonstrations and newsletters. This project will also

provide GIS analyses to estimate potential sediment and nutrient reductions of BMPs. Monitoring data will be evaluated to examine trends in sediment and nutrient concentrations and loads. Agricultural surveys will be utilized to evaluate the effectiveness of educational based activities. Septic system loans will be provided for systems in need of upgrade.

Rush Lake Watershed implementation project continuation (Minnesota River)—2008

Sponsor: Sibley County

Award: CWP (Grant)\$500,000

CWP (Loan) \$500,000

This project continues activities related to the installation, planning and design of BMP's in the watershed, with funding which includes cost-share monies, incentive payments and loan dollars. This project will continue the water quality and quantity monitoring plan established during the diagnostic study. It will also include additional watershed monitoring (streambank and aquatic surveys) to further define priority areas. This project will continue activities related to education and outreach, including workshops, brochures, surveys, displays, tours, demonstrations and newsletters. This project will also provide GIS analyses to estimate potential sediment and nutrient reductions of BMPs. Monitoring data will be evaluated to examine trends in sediment and nutrient concentrations and loads. Agricultural surveys will be utilized to evaluate the effectiveness of educational based activities. Septic system loans will be provided for systems in need of upgrade.



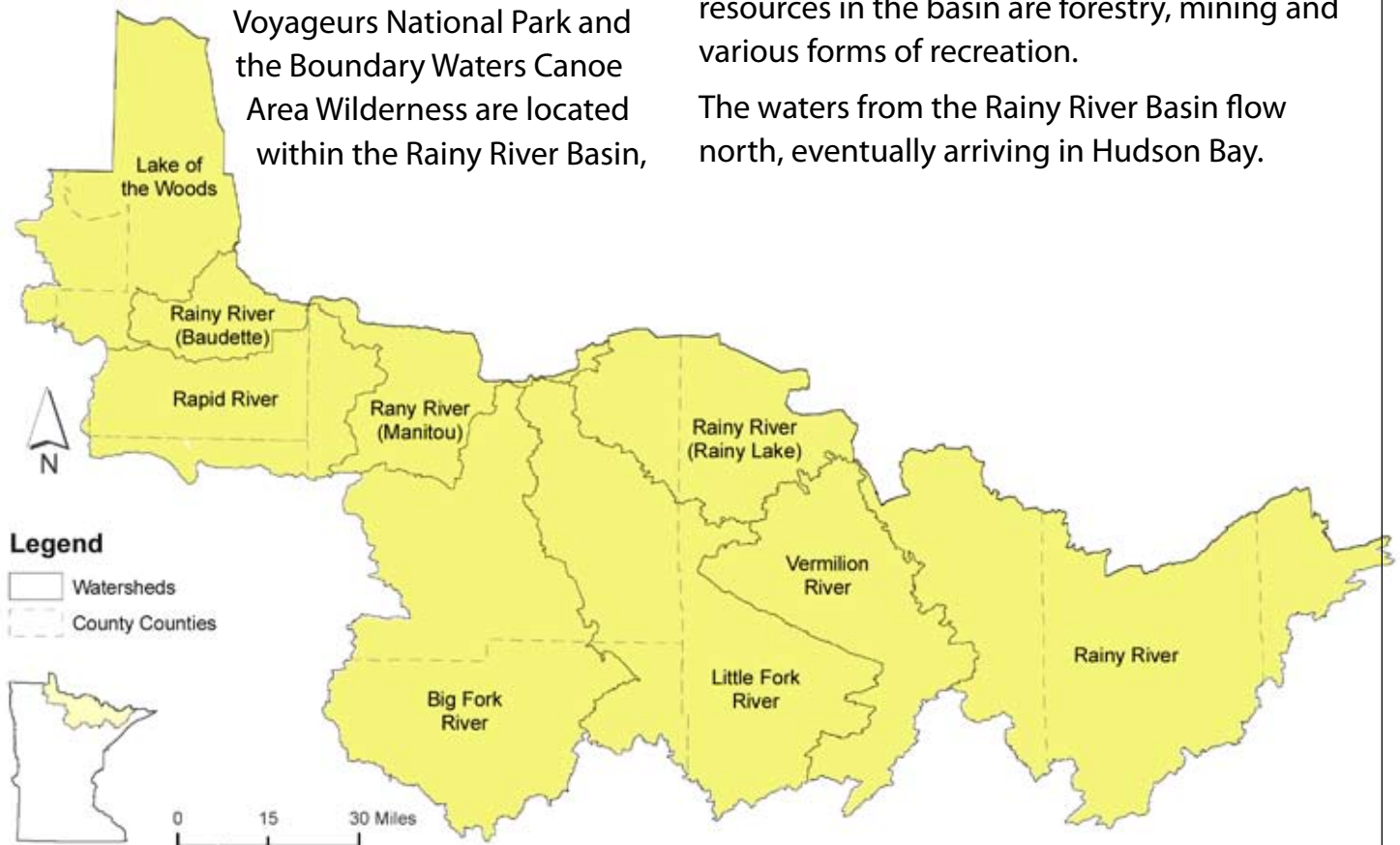
Rainy River Basin

The Rainy River Basin sits on Minnesota's border with Canada and is home to some of the state's finest forest and water resources.

Voyageurs National Park and the Boundary Waters Canoe Area Wilderness are located within the Rainy River Basin,

as are several of Minnesota's most famous walleye fisheries and many top-notch trout streams. Other prominent uses of natural resources in the basin are forestry, mining and various forms of recreation.

The waters from the Rainy River Basin flow north, eventually arriving in Hudson Bay.



Projects currently active in 2008 in the Rainy River Basin

Jessie Lake Watershed TMDL Project—2005

**Sponsor: Itasca County Soil and Water
Conservation District**

Funding: Section 319 (Grant) \$23,200

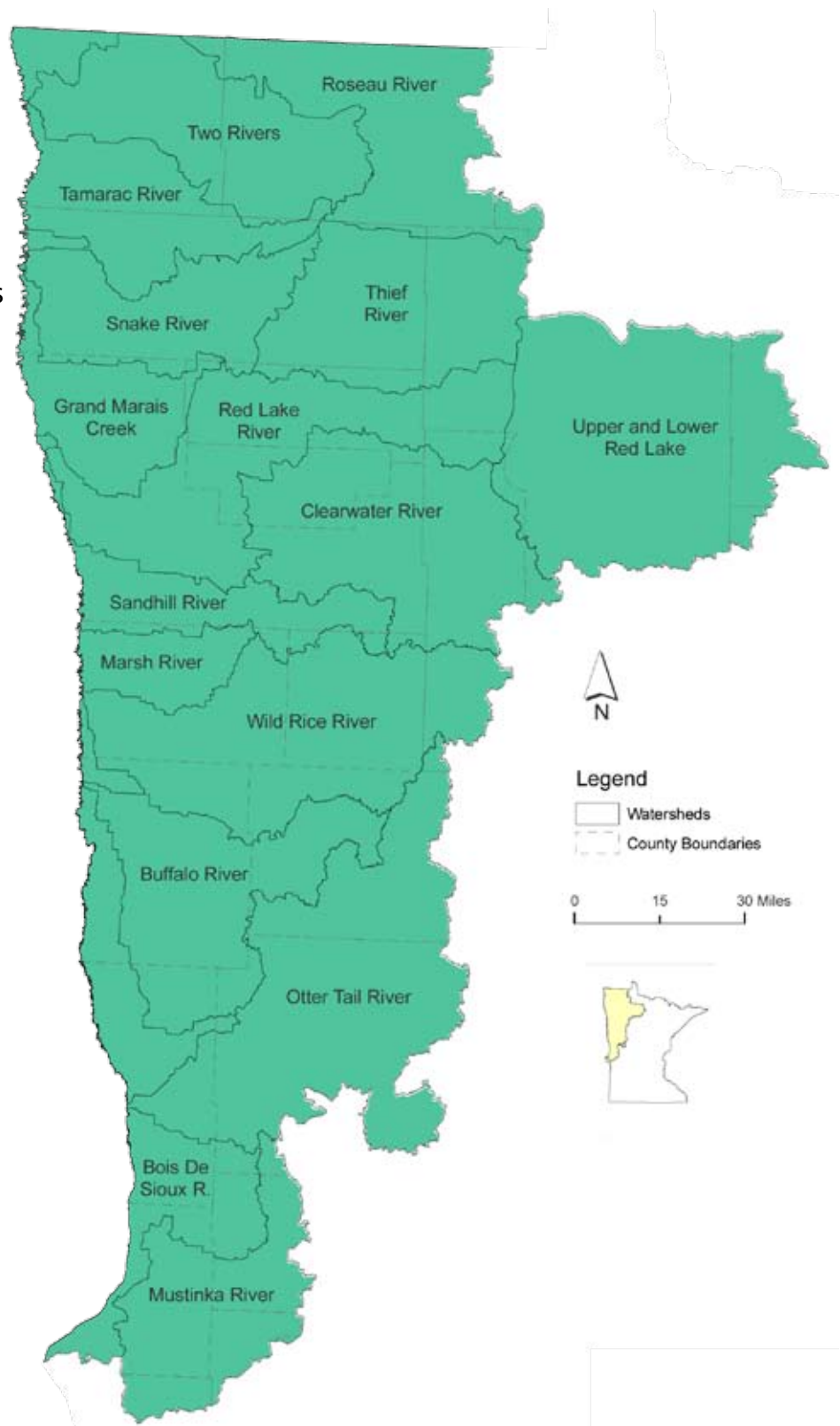
Purpose: Monitor, model and develop land use data to identify potential pollutants in order to develop a total maximum daily load for excessive nutrients.

Red River Basin

The Minnesota portion of the Red River Basin covers about 37,100 square miles in northwestern Minnesota in all or part of 21 counties. It is home to about 17,842 miles of streams and 668,098 acres of lakes. The Red River of the North Basin stretches from northeastern South Dakota and west-central Minnesota northward through eastern North Dakota and northwestern Minnesota into southern Manitoba. It ends where the Red River empties into the southern end of Lake Winnipeg. Water quality is impaired locally by soil erosion, due high flows and unstable channel conditions. The state and local government are working with the agricultural community—the region's predominant land use—to address these issues.

Projects completed

- Red River Basin buffer initiative
- Red River Basin turbidity reduction project, Part II
- Upper Red River of the North SWAT modeling for Impaired waters studies



Red River Basin buffer initiative

The establishment of a cooperative approach between the Red River Basin Commission, Pheasants Forever, and the Soil and Water Districts (SWCDs) from Clay, Becker, Wilkin, Mahnomon, Norman, and Clearwater Counties to implement agricultural best management practices (BMPs) in four targeted pilot project sub-watersheds to improve water quality where excessive turbidity, high fecal coliform concentrations, and excessive nutrients have been problems in the past.



Buffer strips in the Red River Basin.

Each SWCD was provided funds to hire staff specifically dedicated to contacting property owners in each of the pilot project areas during a 3-year period to try to enlist their participation in various conservation programs.

The individual pilot project approaches met varying degrees of success with the total establishment of 13,000 acres in riparian buffers, 200 acres in wetland restorations, and an estimated reduction in sediment load to surface waters in the pilot project areas of approximately forty percent.

Three thousand producers in four watershed areas were contacted using the development of outreach materials, surveys, mailings, public meetings, and face to face contact. Four hundred and thirty-four contracts for agricultural practices were initiated. A community based social marketing (CBSM) through a separate grant was initiated to identify barriers and benefits to adopting preferred conservation practices.

Goals for this project

- The establishment of seventy-five percent of the prescribed buffers in those pilot project sub-watersheds.

- The restoration of twenty-five percent of the prescribed wetlands within those pilot project sub-watersheds.
- Reduce sediment concentrations/load at stream sites by forty percent.

Results that count

- 13,000 acres of riparian buffer were established
- 200 acres of wetland was restored
- Soil loss is estimated to be reduced by 89,000 tons/year

Financial information

Funding type	Section 319
Grant amount	\$218,510.53
Matching funds and in-kind	\$487,476.21
Total project cost	\$705,986.74

Contact

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Red River Basin turbidity reduction project 2006, part II

This project is a phased turbidity TMDL diagnostic and modeling study for 15 reaches within the Red River Basin that were determined to be impaired due to turbidity. The project included water quality sampling on and above impaired reaches; the collection of flow data and station establishment; water quality analysis and STORET entry; the development of processes to define load and waste load allocations for the impaired reaches; a visual assessment of the impaired reaches, public meetings with stakeholders, and the sponsoring of a sediment summit in the basin.

Goals for this project

- Water quality sampling to verify the extent of the turbidity impairments.
- The identification of the appropriate load determinations tools.
- The development of GIS maps for the basin and the impaired reaches.

Results that count

- 20 samples were taken at 15 locations on impaired reaches from April through October including storm events. Parameters included field data, temperature, dissolved oxygen, conductivity, turbidity, total suspended solids and nutrients.
- The Surface Water Assessment Tool (SWAT) and load duration curve modeling were analyzed among other models and determined to be suitable for waste load and load modeling for sediment.
- GIS maps were generated for all 15 impaired reaches.

Financial information

Funding type	State match to 319 funds
Grant amount	\$100,000
Matching funds and in-kind	\$65,000
Total project cost	\$165,000



Contact

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Upper Red River of the North SWAT modeling for impaired waters studies

The purpose of the two grants was for the Energy and Environmental Research Center (EERC) to develop the soil and water assessment tool (SWAT) model to assess water quality in the Bois de Sioux, Mustinka, and Upper Red River watersheds located in the Red River Basin of the North. The activities accomplished during the grant included: the development, calibration, and validation of the model for each of the watersheds; the assessment of water quality for each of the watersheds focusing on the most prevalent impairment in the basin which is aquatic impairments based on significant turbidity caused by sedimentation; the identification of areas that contribute to sedimentation due to erosion, runoff, and river bank and bed stabilization issues; the evaluation of the effectiveness of hypothetical Best Management Practices (BMP) implementation techniques; and, the compilation of the results of the modeling for each of the watersheds.

The results predicted an estimated annual sediment loading from the watersheds to be 75,065 tons for the Bois de Sioux watershed, 87,853 tons for the Mustinka watershed, and 52,589 tons from the Upper Red watershed.

The model will be used for the development of Total Maximum Daily Load (TMDL) studies within the

watersheds, and to assess the effectiveness of TMDL implementation activities within each of the watersheds.

Goals for this project

- Develop the model for each watershed.
- Calibrate the model for each watershed.
- Validate the model for each watershed.

Results that count

- Developed, calibrated, and validated the model for each watershed.
- Developed sediment loads for each watershed.
- Reported development.

Financial information

Funding type	Water Environmental Fund
Grant amount	\$138,584
(two grants for \$88,584 and \$50,000)	

Contact

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Projects currently active in 2008 in the Red River Basin

Buffalo Red River Watershed Sediment Modeling for BMP Implementation—2007

Sponsor: Buffalo Red River Watershed District (BRRWD)

Funding: Section 319 (Grant) \$30,940

Under a current Section 319 grant, a computer model, the annualized Agricultural Non-Point Source Model (annAGNPS), was developed for estimating the amount of sediment leaving the landscape, reaching the waterways, and accumulating in the South Branch of the Buffalo River. The focus of this proposed study is to expand upon the work. The annAGNPS computer model will be used to develop sediment water quality goals, and practical measures to achieve these goals, for the entire BRRWD.

Detroit Lake Water-Quality Improvement Nutrient Reductions—2006

Sponsor: Pelican River Watershed District

Funding : CWP (Grant) \$50,000 grant, CWP (Loan) \$450,000

Enhances educational activities, monitoring, and data analysis in the watershed. Emphasis will be on nutrient and sediment reductions, identifying methods, treatment options, designs and implementation. Sites will be determined for grazing and feedlot management practices, stormwater treatment, biomass reductions, and aquatic plant management. Cost-share incentives will be provided for shoreline restorations and improved erosion and sediment control.

Thief River Watershed Sediment Investigation—2007

Sponsor: Red Lake Watershed District

Funding: CWP (Grant) \$96,500

This study will perform investigative water quality, sediment and flow monitoring, as well as data analysis, at up to 11 sites to diagnose the impact of hydrologic modification, other anthropogenic and natural factors influencing water quality in the Thief River watershed. This study will also develop a diagnostic study and implementation plan to address impairments discovered in the watershed.

Red River Basin projects awarded in 2008

Lower Otter Tail River Sediment Reduction Project

Sponsor: Wilkin Soil and Water Conservation District

Funding: Section 319 (Grant) \$100,000

Purpose: The project is a continuation of our 2006 Clean Water Legacy Restoration Project which addresses turbidity in the Lower Otter Tail River. The objective of this grant is to reduce sedimentation in the Otter Tail River through education, cultural and structural best management practices. We will target four sediment sources identified in the TMDL approved plan. They are wind erosion, water erosion, streambank erosion, and in-stream erosion.

St. Croix River Basin

The St. Croix River's headwaters are at St. Croix Lake near Solon Springs, Wisconsin, from where it flows west and south over 160 miles until it joins the Mississippi River at Prescott, Wisconsin. Approximately 80 percent (129 miles) of the St. Croix River forms part of the boundary between Wisconsin and Minnesota. The upper 20 percent of the river is entirely within Wisconsin. The watershed covers approximately 7,760 square miles and extends from near Mille Lacs Lake in Minnesota on the west to near Cable, Wisconsin, on the east. Approximately 46 percent of the watershed is located in Minnesota.

Projects completed

- Snake River Watershed enhancement project
- Sunrise River Watershed TMDL—Phase I



Snake River Watershed enhancement project

The Snake River Enhancement Project began in the late summer of 2003 with the award of a Clean Water Partnership Grant from the Minnesota Pollution Control Agency. The project is designed to investigate water quality conditions in the Snake River, then design and implement measures to improve the river. Throughout the Snake River Enhancement Project



Implementation period, managers have promoted conservation techniques most suited for their respective region of the Snake River Watershed.

The Snake River Enhancement Project has been a very successful project in a number of areas. As a result of the Snake River Watersheds and MPCA water quality monitoring and data collection, a number of impaired waters were identified. At this time, there are three TMDL projects progressing within the watershed. They include the Groundhouse River, Mission Creek and the Ann River sub-watersheds. With this information, projects are addressed and prioritized that would have the highest positive effects in those waters. BMPs that need to be implemented are voluntary by the landowners and require their approval and participation.

Goals for this project

- Implement watershed improvement projects throughout the Snake River watershed.
- Educate local landowners and the public on the activities being undertaken and the available assistance, including on-site system upgrades.
- Educate and assist owners of forest lands with forest management planning and best management practices for timber harvesting.

Results that count

- Two wetland restorations with water control structures were installed. The purpose and benefit of these projects was to improve groundwater recharge and provide for open water habitat for wildlife. One erosion control / stabilization project along the

downstream wing wall of the Knife Lake Dam was installed to control erosion on the steep slope areas.

- A total of \$200,000.00 has been used for 23 septic upgrades/replacements of non-compliant septic systems within the Snake River Watershed, Kanabec County. Information is given to all property owners that receive a "Certificate of Non-Compliance" on an existing septic system.
- A number of partners held a series of woodland management workshops. The classes were held in the four-county area. As part of the stewardship program over the last five years, 70 Forest Stewardship Plans have been completed in the watershed covering a total of 6,895 acres of privately owned woodlands.

Financial information

Funding type	Section 319 & CWP
Section 319	\$250,000
CWP Loan	\$200,000 ISTS
Matching funds and in-kind	\$35,000 SRWMB Cash
	\$347,650 In-kind
Total project cost	\$832,650

Contact

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Sunrise River Watershed TMDL— Phase I

The Sunrise River Watershed TMDL, Phase I project started in December 2007, and worked through April 30, 2008. This first phase of the TMDL project was initiated to aid in developing a watershed-based plan and strategies for water quality and aquatic ecosystem management, restoration, and protection. To help achieve this a detailed work plan was needed to act as a guide to complete these tasks.

The final Sunrise River Watershed TMDLs Work Plan was developed to not only act as a guide but provide detailed information about all the impaired waters within the watershed, what data is available, and what data gaps need to be filled. This workplan will be used by State and Local Government to decide on where to start planning for the next TMDLs, what types of impairments are in the watershed, and what data needs to be collected before doing the TMDLs.

A copy of this document can be found at: www.pca.state.mn.us/water/tmdl/project-sunrisewatershed.html

Goals for this project

- Provide background information on the Sunrise River.
- Assess water quality within the watershed.
- Develop work plan to complete priority Sunrise River Watershed TMDLs.

Results that count

- Compiled a final report that aids in understanding the general watershed characteristics within the Sunrise Watershed. All of this information was put into the final Sunrise River Watershed TMDL work plan.

- Compiled and evaluated all the available stream and lake data for the watershed. The locations of all the data was identified and listed in the work plan report.
- Received a final TMDL Workplan that helps to identify and guide in the development of TMDLs in the Watershed.

Financial information

Funding type	Clean Water Legacy
Grant amount	\$24,685.97

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Projects currently active in 2008 in the St. Croix River Basin

Groundhouse River TMDL Project, Phase 1—2004

Sponsor: Kanabec County

Funding: Section 319 (Grant) \$19,118

Purpose: Monitor, assess, model and develop land use data to identify potential pollutants in order to develop a total maximum daily load for fecal coliform.

Groundhouse River TMDL Project, Phase 1, year 2—2004

Sponsor: Tetra Tech, Inc.

Funding: Section 319 (Grant) \$93,700

Purpose: Complete monitoring, assessment, modeling and development of land use data to identify potential pollutants in order to develop a total maximum daily load for fecal coliform.

Valley Creek Repair and Rehabilitation Program—2005

Sponsor: Valley Branch Watershed District

Funding: Section 319 (Grant) \$150,000

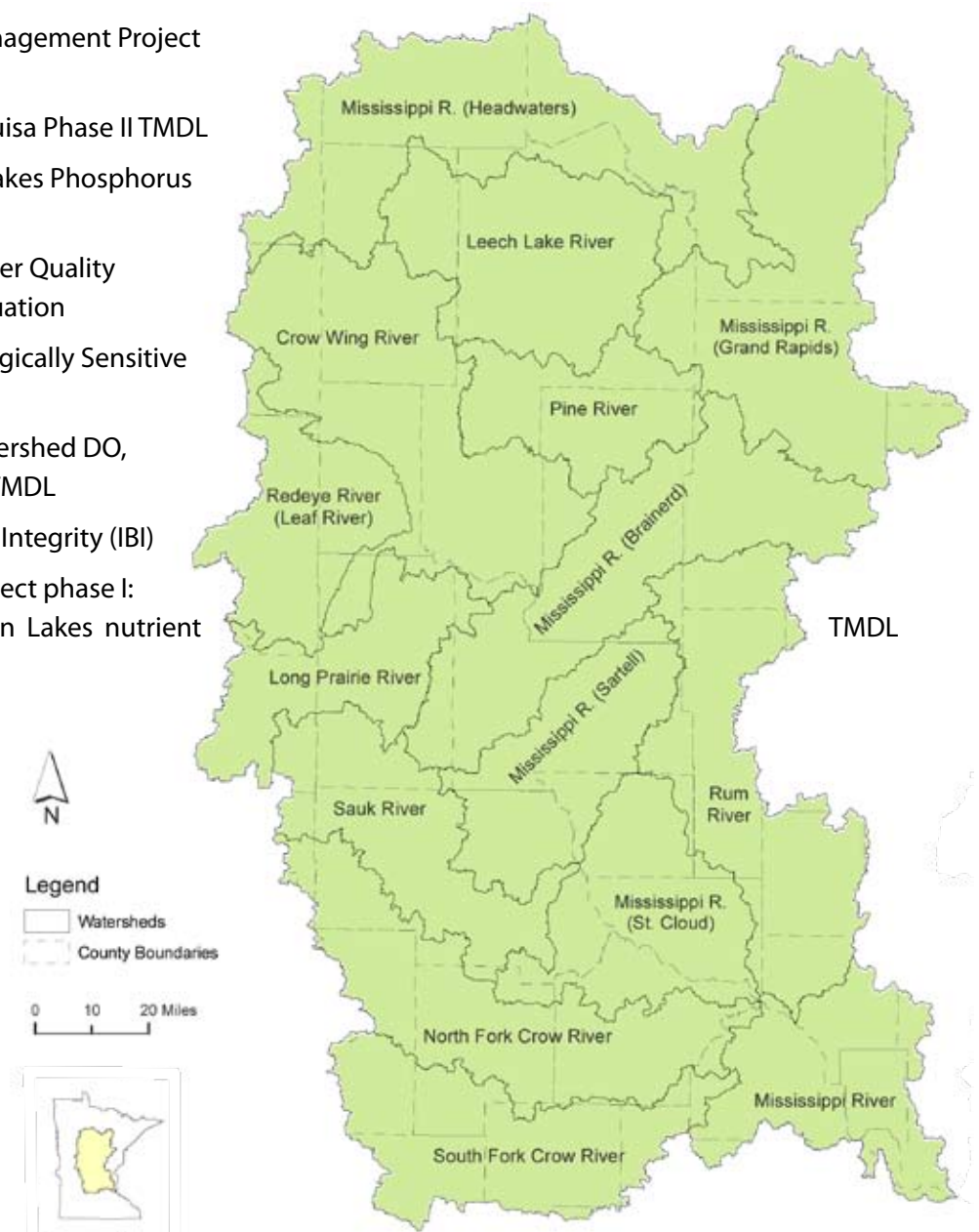
Purpose: Develop education and outreach activities, and address severe gully erosion sites, stream bank erosion sites, and roadway sites.

Upper Mississippi River Basin

The Mississippi River's first basin is called the Upper Mississippi River Basin and is the only Basin wholly within the State. The basin stretches from the Headwaters of the Mississippi River at Lake Itasca to Lock and Dam Number 2 near Hastings. It covers approximately 20,100 square miles and includes 15 of the 80 major watersheds in Minnesota and all or parts of 21 counties. The water resources in the Basin include over 720,659 acres of lakes and 13,090 miles of rivers and streams. Water quality management priorities include protection projects and restoration of excess nutrient, dissolved oxygen, turbidity, and pathogen impairments.

Projects completed

- Big Birch Lake Watershed Management Project Continuation
- Clearwater River and Lake Louisa Phase II TMDL
- Elk River Watershed Priority Lakes Phosphorus Reduction
- Lambert Creek Phase III—Water Quality Improvement Project-Continuation
- Manure Management—Ecologically Sensitive Areas
- North Fork—Lower Crow Watershed DO, Turbidity and Fecal Coliform TMDL
- Rice Creek Index of Biological Integrity (IBI)
- Shingle Creek Lake TMDL project phase I: dual endpoint Twin and Ryan Lakes nutrient project



Big Birch Lake Watershed Management Project continuation

Big Birch Lake has experienced decreasing water clarity and increased areas of submerged aquatic vegetation since the early 1970s. The 1994 Phase I Diagnostic Study, which was solely funded by local landowners, documented that Big Birch Lake experienced declining transparency, with the northeast basin being impacted more severely than the main basin. The Big Birch Lake Watershed Management Project (BBLWMP) was a logical extension of the Diagnostic Study. The BBLWMP began in 1995 as a MPCA Clean Water Partnership project and continued through EPA 319 projects. This ongoing watershed management project developed strong partnerships with local agencies, citizen organizations and individual landowners.

The BBLWMP was funded by two implementation projects (CWP Phase IIA and 1995-1998 and Phase IIB, 2001-2004) that focused on implementing BMPs within the watershed to improve in-lake water quality. The monitoring results of these projects showed that Big Birch Lake's Trophic Status Index shifted from eutrophic in 1994 to mesotrophic in 2004. To verify these results, the Sauk River Watershed District attained the Big Birch Lake Watershed Management 319 continuation grant (2005-2007) to monitor the lake, enhance public outreach and encourage shoreland restoration.



Kids engage in activities at the Middle Sauk Water Festival.

The goal of this grant was to monitor Big Birch Lake for three years to track the effectiveness of the water quality improvements made within the watershed since 1995 and to provide a better understanding of the non-

point source pollution entering the lake. The monitoring data collected by the Sauk River Watershed District, with assistance from Big Birch Lake Association members, indicates that Big Birch Lake is maintaining mesotrophic conditions despite extreme wet and dry weather patterns.

Goals for this project

- To restore Big Birch lakeshore
- To help citizens implement best management practices
- To provide education and outreach to the public

Results that count

- Restored 200 feet of lakeshore using native vegetation and rip rap. Native vegetation was planted from the top of the rock 10-15 feet landward creating a natural buffer along the shoreline.
- Big Birch Lake Association offered area landowners a yearly cash incentive to maintain a grass buffer strips along Fish Creek to protect the water quality of Big Birch Lake. Approximately 25 acres were installed. Additionally, State Revolving Funds (SRF) were utilized to help three rural residents upgrade their septic systems during this grant project.
- The City of Grey Eagle installed storm sewer plates that read "Dump No Waste – Drains to Fresh Water" along the city streets. These storm drains discharge to Bass Lake and down to Big Birch Lake. The Middle Sauk Water Festival was conducted for all area schools and generated library boards for hands on water quality education. Articles were printed in the Big Birch Lake Association newsletter regarding Shoreland BMPs, native restoration and available cost share funds.

Financial information

Funding type	CWP
Grant amount	\$40,000.00
Matching funds and in-kind	\$58,761.42
Total project cost	\$98,761.42

Contact

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Clearwater River & Lake Louisa Phase II TMDL

This report, prepared by Wenck Associates, Inc. (Wenck) for the Clearwater River Watershed District (CRWD), presents data collected in Phase II of the TMDL process for the listed segment of the Clearwater River between Clear Lake and Lake Betsy and for Lake Louisa in the CRWD located in central Minnesota. Two 303(d) Impaired Waters are addressed in this report: Lake Louisa (excess nutrients) and Clearwater River (dissolved oxygen (DO) and fecal coliform) between Clear Lake and Lake Betsy in Meeker County.

During Phase I of this TMDL, existing data collected by the MPCA, CRWD, and United States Geological Survey (USGS) between 1981 and 2003 was analyzed to define the extent, persistence, and severity of the DO depletion and FC exceedance in the Clearwater River, and sources of excess nutrients in Lake Louisa. Potential sources were reviewed. The results of that study are contained in the Phase I Report. Phase II of the TMDL study included field data collection to fill the data gaps necessary to establish the TMDL in Phase III.

Goals for this project

- Define the spatial extent, persistence, severity, and causes of the dissolved oxygen depletion and high bacteria problem in the Clearwater River.
- Quantify point and non-point sources of oxygen demand and bacteria to the Clearwater River and nutrients to Lake Louisa. Assess their contributions to water quality impairments by land use category and main-stem river and tributary sub-watersheds for targeting priority areas for rehabilitation as well as protection.
- Allocate the Clearwater River and Lake Louisa assimilative capacity to both point and non-point sources of pollution and develop a margin of safety (MOS) protective of water quality standards.

Results that count

- Long-term monitoring conducted between 1981 and 2003 show that 56 percent of DO violations occurred between 1989 and 1994; however, recent data collection indicates the impairment is ongoing. Data shows that DO concentrations are fairly consistent from upstream to downstream,

with the exception of a DO sag in the area of Kingston Wetland.

- The variety of conditions under which bacteria concentrations in the Clearwater River and its tributaries exceed standards point to a combination of sources that influence in-stream bacteria concentrations differently under different conditions. Specific conditions contributing to the impairment are non-point source and include manure application, urban runoff, and livestock grazing in riparian areas. Bacteria concentrations routinely exceed the chronic standard in tributaries along the listed reach indicating that the sources are widespread geographically.
- Phosphorus loads to Lake Louisa are primarily the result of loads from Clearwater River, but are also affected by internal cycling of phosphorus. The wetland upstream of the lake is acting as a sedimentation basin removing nutrients from river inflows to the lake.

Financial information

Funding type	Section 319
Grant amount	\$149,628

Contact

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Elk River Watershed priority lakes phosphorus reduction

This grant focused on managing agricultural and lakeshore activities including:

- 1) Installing high visibility manure management BMP demonstration plots to illustrate that proper manure management improves water quality and is profitable;
- 2) Installing filter strips and buffer strips in highly sensitive riparian areas;
- 3) Installing low cost common sense feedlot practices on small to medium sized lots to reduce phosphorus discharged directly into surface waters;
- 4) Demonstrate the re-establishment of natural shoreline vegetation and implement projects to reduce runoff from developed areas using filter strips and methods to promote infiltration.

Streams were sampled for fecal coliform bacteria, phosphorus, dissolved oxygen and temperature to assess water quality during the project. Stream flow was monitored and a phosphorus mass balance was calculated for four watershed lakes.

Volunteers conducted lake monitoring for Secchi disc transparency, phosphorus and chlorophyll-a. The goal for stream monitoring in this project was to establish the current water quality status. We do not have data for a sufficient number of years to do a trend analysis.

Goals for this project

- Reduce nutrient loading to water resources from livestock.
- Reduce nutrient loading from agricultural non-point sources.
- Reduce nutrient loading to surface water from runoff from urban and residential areas.

Results that count

- Three sites established low cost feedlot management practices and thirty-four plots implemented manure management plans.
- Riparian forested buffers were established on 12.3 acres and filter strips were established on 102.1 acres.
- Eight sites established lakeshore buffer demonstration sites in residential areas and six sites installed stormwater best management practices.



Financial information

Funding type	Section 319
Grant amount	\$122,780.00
Matching funds and in-kind	\$150,565.34
Total project cost	\$273,345.34

Contact

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Lambert Creek phase III water quality improvement project—continuation

Between June 2002 through January 2008, the Vadnais Lake Area Water Management Organization completed projects that will cut down the level of phosphorous that Lambert Creek delivers to Vadnais Lake in Vadnais Heights. Vadnais Lake is the reservoir for the St. Paul Water Utility, which serves 400,000 drinking-water customers in eight communities.

Lambert Creek's contribution to Vadnais Lake water quality degradation is significant, and a 50 percent reduction of phosphorus from this source is necessary to meet the Vadnais Lake phosphorus-reduction goals. In 2005, researchers monitored river flow and chemical composition, but overall, the Lambert Creek watershed has been intensively monitored and the phosphorus loading patterns and the subsequent lake response are relatively well understood. These patterns remained consistent for the grant period. In order to reduce phosphorous, Vadnais Lake Area Water Management Organization partially restored the Rice Lake, Grass Lake and Lambert Lake wetlands.

Goals for this project

- The primary focus of the work plan is to reduce the mass of phosphorus runoff to Vadnais Lake. Long term statistical analysis has indicated that in order to lower taste and odor episode frequencies to acceptable levels, total P values need to remain equal to or less than 25 micrograms per liter in mixed layer samples from April through September. This should reduce the frequency of chlorophyll A (algae) concentrations exceeding 20 micrograms per liter, which is the nuisance level at which taste and odor episodes are likely. In order to achieve the 25 ppb management goal, Lambert Creek P loads need to be reduced by as much as 50 percent.

Results that count

- To restore the wetlands, the water management organization constructed a 530-foot low-head weir (a small, overflow dam) with adjustable notches to distribute flows to the greater wetland without raising the current 100-year frequency flood elevation. The weir contains a 1.7-acre pond with



a depth of four feet to act as a stilling pool and to disperse the flow into the greater wetland.

- More than 2,200 feet of county ditch was filled and an overflow channel was constructed. A small berm was constructed along the length of this filled portion of the ditch and a permanent 600-foot, Class 5 utility road provides access to the site.
- Other work required for the construction of these features included clearing and grubbing, post-construction wetland restoration, installation of a flotation silt curtain during construction, installation of rip rap at critical outfalls, soil borings, and the purchase of easements. All the projects outlined in the original and the continuance grant were completed by January 2008.

Financial information

Funding type	CWP
Grant amount	\$250,000.00
Matching funds and in-kind	\$432,545.00
Total Project Cost	\$682,545.00

Contact

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St. Paul Regional Water Service
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John Blackstone, 651-266-6324

MPCA project manager: Barb Peichel

Manure management within ecologically sensitive areas

Stearns County has approximately 2,900 livestock operations with 2,000 of these operations having 300 animal units or less. Most of the remaining 900 operations have between 300 and 999 animal units. Proper manure management and storage within and near Ecologically Sensitive Areas will enhance or sustain surface and groundwater quality throughout the county.

The area of concern is livestock producers and landowners located in and near Ecologically Sensitive Areas in Stearns County. Ecologically Sensitive Areas includes:

- Wellhead protection areas and drinking water supply management areas,
- Designated lakesheds and shoreland areas,
- Lands identified on Minnesota County Biological Survey Maps,
- Watershed Management Districts, and
- "Special Protection Areas", such as impaired waters, and coarse textured soils.

Of particular concern are Special Protection Areas, or lands within 300 feet of all protected waters, protected wetlands and intermittent streams and ditches.

Goals for this project

- Construction of animal waste control facilities and manure management plans for as many as 40 livestock producers.
- Enroll approximately 1,000 livestock producers into the Open Lot Certification Program (OLCP).
- Leverage 319 grant funds to provide additional assistance to livestock producers and landowners resulting in five feedlot pollution abatement systems and five erosion control conservation practices.

Results that count

- Fourteen feedlot animal waste control facilities were constructed.
- 547 producers have signed up for OLCP. Much work remains to be done on the producers that signed up for the OLCP. Of the 547 OLCP producers, 174 have been addressed.

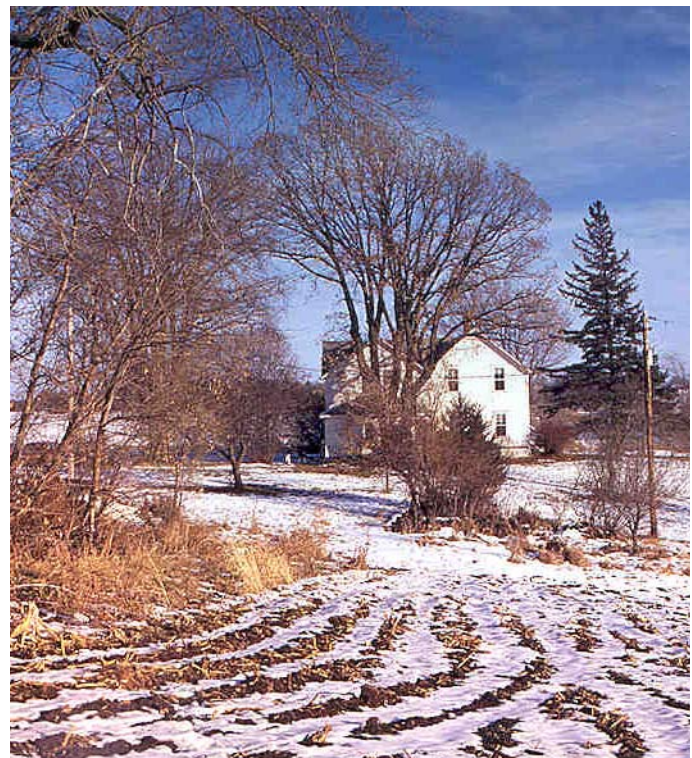
- The Stearns County Environmental Services has identified and prioritized additional livestock producers with pollution potential. The 20 unpermitted manure storage basin investigations resulted in 15 failing to meet the MPCA specifications. These producers will be targeted in the future with technical and financial assistance.

Financial information

Funding type	Section 319
Grant amount	\$300,000
Matching funds and in-kind	\$1,141,200
Total project cost	\$1,441,200

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North Fork Lower Crow River Watershed DO, turbidity & fecal coliform TMDL—phase I

The purpose of this project is to develop a TMDL for the impaired waters listings for the North Fork—Lower Crow River. The project is broken down into three phases:

Phase I – Data review and recommendations

Phase II – Monitoring and data analysis

Phase III – TMDL Development

This report addresses Phase I of the study. It is important to note that due to data limitations some of the elements will require further development once additional data is collected. For example, only limited relationships have been identified for the causes of impairment at this time. The sheer size of this watershed makes developing this TMDL a challenge. Impairments that are geographically separated and yet inter-related over hundreds of thousands of acres are one of many issues that must be addressed throughout this process. It is important to note that this TMDL development will require refinement as the process unfolds. The strategy developed later in this report provides a relatively simple straightforward approach that will be necessary for this large project with a limited budget. This TMDL can be developed in terms of adaptive management which is a strategy for addressing pollutant load uncertainty that emphasizes taking near term actions to improve water quality. Adaptive management can be employed when data may only weakly quantify links between sources, allocations and in

stream targets. Adaptive management identifies site-specific actions leading toward water quality standards attainment, future data collection and analysis, and reassessment of appropriate actions.

Goals for this project

- Review existing data & define problems.
- Develop initial watershed model.
- Recommend additional monitoring and specialized field studies.

Results that count

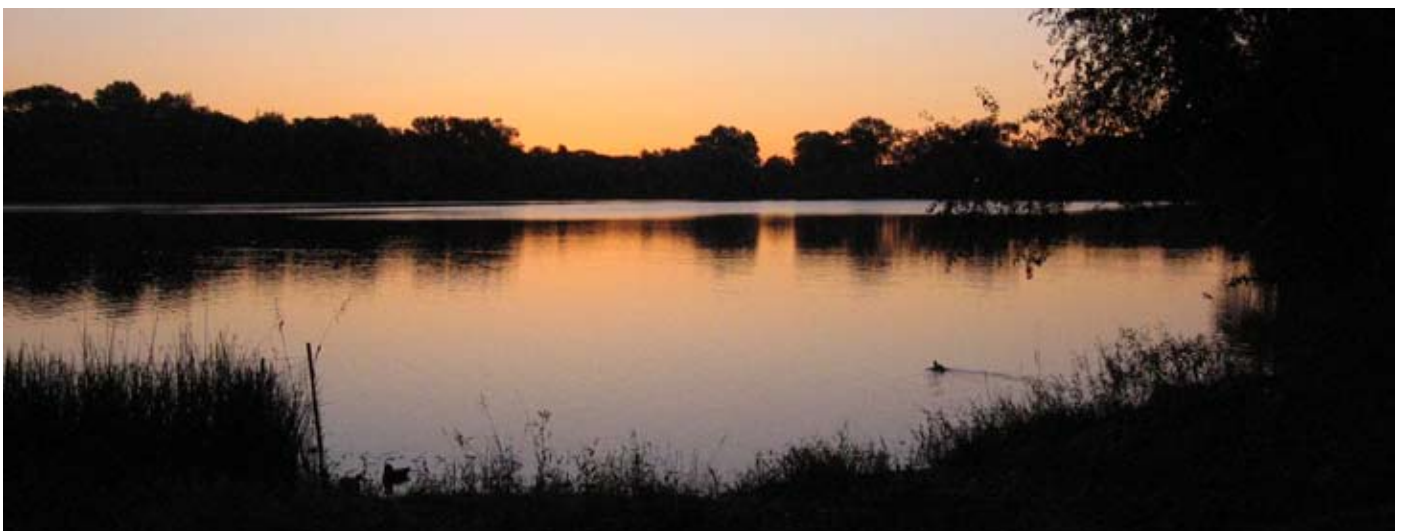
- Previous studies and historical data were reviewed to define missing data needs.
- An initial model framework was created.
- A monitoring plan to collect additional field data was developed.

Financial information

Funding type State match to 319 grant
Grant amount \$76,474.00

Contact

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Rice Creek Watershed IBI

The Rice Creek IBI (Index of Biological Integrity), commonly referred to as the Stream Health Evaluation Program (SHEP), used trained adult volunteers to measure the biological health of streams using advanced bioassessment protocols and indices specifically developed for this region. The protocol was divided into two sections: a physical habitat assessment and a biological assessment of aquatic macroinvertebrates.

The program is unique in providing volunteer generated, scientifically viable benthic macroinvertebrate monitoring data for decision makers. SHEP also offers extensive opportunities for interaction and relationship building between volunteer monitors and local officials and decision makers. These relationships allow SHEP volunteers to better understand how local decisions impact water quality and stream health. In addition, local decision makers enhance constituent relationships that underscore the importance of water quality in their communities.

The project recruited 28 adult volunteers, organized into three teams, to monitor a total of six sites in the Fall of 2006. These sites, at Hardwood Creek, Rice Creek, and the inlet/outlet of Locke Lake, were chosen in part to gauge the effects of recent restoration and stewardship activity on these sites.

Goals for this project

- Recruit new volunteers to monitor additional sites.
- Offer volunteer training for new volunteers.
- Report the results of the SHEP to the local community.
- Conduct a physical habitat assessment and complete a biological assessment of benthic macroinvertebrate populations at six sites.

Results that count

- Recruited 28 adult volunteers to monitor six sites at Hardwood Creek, Rice Creek, and the inlet/outlet of Locke Lake, to gauge the effects of recent restoration and stewardship activity on these sites.
- Offered volunteer training (1.5 days) which included in-stream physical assessment, macroinvertebrate collection methods, and laboratory macroinvertebrate identification procedures.



- Project staff and volunteers reported on the results of the Stream Health Evaluation Program to the following audiences:
 - › Rice Creek Watershed District staff
 - › The City of Lino Lakes Environmental Commission
 - › The Lino Lakes City Council
 - › The City of Shoreview Environmental Quality Commission
 - › The City of Fridley Environmental Quality & Energy Commission
- The project's primary product is the Rice Creek Watershed Stream Health Evaluation Program—2006/2007 Benthic Macroinvertebrate Stream Monitoring Field Report. The report has been distributed to project partners and is available online at www.fmr.org.

Financial information

Funding type	Section 319
Grant amount	\$21,500.00
Matching funds and in-kind	\$22,038.57
Total project cost	\$43,538.57

Contact

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Shingle Creek Lake TMDL project phase I—dual endpoint Twin and Ryan Lakes nutrient TMDL project

The goal of this TMDL is to quantify the pollutant reductions needed to meet State water quality standards for nutrients in South Twin, Middle Twin, North Twin and Ryan Lakes.

The Twin Lake chain of lakes is located in Hennepin County, Minnesota, in the Shingle Creek watershed, specifically in the cities of Brooklyn Center, Crystal, Minneapolis, and Robbinsdale. The lakes are heavily used for recreation supporting fishing and swimming and also providing aesthetic values.

Water quality in North and South Twin Lake is considered poor with frequent algal blooms while Ryan and Middle Twin Lakes have more moderately degraded water quality. North Twin Lake, a hypereutrophic lake, has both internal and watershed loading that appear to be significant phosphorus sources. The majority of phosphorus in Middle Twin Lake is from water coming from North Twin Lake and the watershed. South Twin Lake is a eutrophic lake where internal loading has the potential to increase algal productivity. Ryan Lake, the last lake in the chain, is a mesotrophic lake that has relatively good water quality for an urban lake.

Wasteload and Load Allocations indicate that nutrient load reductions ranging from 0-76 percent would be required to consistently meet state standards under average precipitation conditions. North Twin contributes a substantial load downstream to the other lakes, thus improvements to that lake should result in improvement to the lower lakes in the chain. Improvements to an upstream wetland, internal load management, and reduction of non point sources of phosphorus in the watershed by retrofitting BMPs would have the most impact on reducing phosphorus load and improving water quality in the chain of lakes.

Goals for this project

- The goal of the Twin and Ryan Lakes Nutrient TMDL Project was to quantify the pollutant reductions needed to meet State water quality standards for nutrients in South Twin, Middle Twin, North Twin and Ryan Lakes.



Volunteers plant aquatic vegetation as part of a shoreline restoration in Twin Lake Park on Middle Twin Lake in Brooklyn Center.

Results that count

- Wasteload and Load Allocations for South Twin, Middle Twin, North Twin and Ryan Lakes indicate that nutrient load reductions ranging from 0-76 percent would be required to consistently meet state water quality standards.
- The TMDL for South Twin, Middle Twin, North Twin and Ryan Lakes was approved by the U.S. EPA on November 9, 2007.

Financial information

Funding type	Section 319 & Water Environmental Fund
Grant amount	\$90,468
Matching funds and in-kind	\$64,282
Total project cost	\$154,750

Contact

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Projects currently active in 2008 in the Upper Mississippi River Basin

Big Sandy Area Lakes Watershed management project—2006

Sponsor: Aitkin County

Funding: CWP (Grant): \$260,000

The project continues funding for water-quality monitoring, staffing for project administration and local ordinance coordination, and lake and agricultural BMPs such as shoreland revegetation, lakeshore protection, riparian livestock operations, streambank stabilization, riparian buffer strips, conservation easements, and implementation of operation and maintenance plans. Information and education activities will include watershed-wide newsletters, education of schools, lake associations, and county boards, new landowner contacts, small neighborhood meetings, and participation in information fairs.

Elk River Watershed priority lakes II—2006

Sponsor: Elk River Watershed Association

Funding: Section 319 (Grant): \$185,187

Re-establish shoreland vegetation around area lakes, reduce phosphorus and nitrogen applications on farmland, improve and create wetlands.

Feedlot runoff pollution removal by organic bio-filter demonstration—2005

Sponsor: Stearns County Soil and Water Conservation District

Funding: Section 319 (Grant) \$150,000

Purpose: Develop a demonstration project to utilize a carbon-rich bio-filter to treat feedlot runoff and produce technical information so that Natural Resources Conservation Service can approve this as a best management practice.

Little Rock Creek TMDL project—2005

Sponsor: Benton County Soil and Water Conservation District

Funding: Section 319 (Grant) \$82,000

Purpose: Monitor, model and develop land use data to identify potential pollutants in order to develop a total maximum daily load for biota.

Long Prairie River TMDL project—2005

Sponsor: Todd County Soil and Water Conservation District

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

Purpose: Provide cost share, install and maintain best management practices with a focus on riparian buffers, manure and nutrient management, and grassed waterways.

Long Prairie River dissolved oxygen TMDL implementation project —2007

Sponsor: Todd County Soil and Water Conservation District

Funding: Section 319 (Grant) \$150,000

The MPCA has observed dissolved oxygen (DO) concentrations below the 5-mg/L standard near Motley and Browerville, and during the summer months near Carlos. The primary goal for the project is to use certain BMPs to keep nutrient levels at or below the standard. The BMPs to be constructed include, but are not limited to, riparian buffers, contour cropping, grassed waterways and others, along with the use of alternative water sources, seed varieties, rotations, cover crops and fertilizers.

Middle Fork Crow River Watershed restoration and enhancement project

Sponsor: Middle Fork Crow River Watershed District

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

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 the resources, implementing best management practices to reduce non-point source pollution and targeting specific lake management projects that will harness internal loading in lakes. Activities will focus on citizen information (a new district web site, 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 Sauk River rehabilitation project continuation—2005

Sponsor: Sauk River Watershed District

Funding: CWP (Grant) \$237,000; CWP (Loan) \$500,000

Purpose: Continue information and education, water quality monitoring and evaluation, agricultural and urban best management practices, shore land and riparian restoration, project administration, upgrading septic systems, and reducing erosion and sediment.

Middle Sauk River water quality restoration project—2007

Sponsor: Sauk River Watershed District

Funding: CWP (Grant) \$216,892, CWP (Loan) \$500,000

The objective of this project is to assist agricultural producers in applying conservation practices, such as riparian restoration, feedlot management and buffer strip installation. This project will also work with local municipalities to address stormwater runoff concerns and local septic system upgrades. In addition, this project will expand the current monitoring program to investigate new sources of pollution and to assess the effectiveness of current and future BMPs. Information and education will focus on changing behaviors to reduce nutrient loading in the watershed. Activities will include, school visits, elementary student water festivals and hands-on workshops in areas such as shoreline restoration and maintenance, citizen monitoring training and stormwater runoff alternatives.

Osakis Lake Watershed management program – phase 3 continuation—2005

Sponsor: Sauk River Watershed District

Funding: CWP (Grant) \$235,000, CWP (Loan) \$310,000

Purpose: Continue information and education, water quality monitoring and evaluation, stormwater, agricultural, rural land use and urban best management practices, shore land and riparian restoration, project administration, upgrade septic systems, and reduce erosion and sediment.

Restoring water resources of the Sauk River Chain of Lakes—2004

Sponsor: Sauk River Watershed District

Funding: Section 319 (Grant) \$250,000; CWP (Loan) \$500,000

Purpose: Continue to carry out the goal of phosphorus reduction and loading by following the recommendations made in the CWP Phase IIA Final Report.

Sauk Lake Basin restoration project continuation—2005

Sponsor: Sauk River Watershed District

Funding: CWP (Grant) \$267,200; CWP (Loan) \$500,000

Purpose: Continue information and education, water quality monitoring and evaluation, agricultural, rural land use, stormwater and urban best management practices, shore land and stream bank restoration, project administration and upgrading septic systems.

Sauk River Chain of Lakes TMDL project—2005

Sponsor: Sauk River Watershed District

Funding: Section 319 (Grant) \$125,000

Purpose: Monitor, model and develop land use data to identify potential pollutants in order to develop a total maximum daily load for excessive nutrients.

Sauk River Chain of Lakes Watershed Basin restoration project continuation—2005

Sponsor: Sauk River Watershed District

Funding: CWP (Grant) \$224,700; CWP (Loan) \$500,000

Purpose: Continue information and education, water quality monitoring and evaluation, agricultural, rural land use, stormwater and urban best management practices, shore land and stream bank restoration, project administration and upgrading septic systems.

Shingle Creek chloride reduction project—2007

Sponsor: City of New Hope

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

Purpose: Shingle Creek, an 11-mile stream located in northwestern Hennepin County, was designated an Impaired Water by the MPCA and USEPA for chloride concentrations that exceed State established standards. A TMDL analysis determined that the majority of chloride in the watershed is derived from non-point sources including road salt deicing. The TMDL concluded that an overall 71% reduction in chloride load must be achieved to meet State chloride concentration standards. The use of a new deicing product, ClearLane, is identified by the City of New Hope as a BMP to reduce chloride levels in Shingle Creek in the Implementation Plan for the Shingle Creek Chloride TMDL. The City intends to implement this proposed BMP by replacing standard road salt applications with ClearLane for the 2007/2008 deicing season.

Stearns County manure basin abandonment project—2006

Sponsor: Stearns County

Funding: Section 319 (Grant): \$57,150

Purpose: Evaluate ground water beneath six abandoned manure basins, with the aim of learning more about the effect of such facilities on regional ground-water resources.

Swan River Watershed management plan implementation—2006

Sponsor: Morrison County Soil and Water Conservation District

Funding: Section 319 (Grant) \$70,000

Purpose: Identify and work with smaller feedlots to reduce over-application of manure to cropland with nutrient management plans, buffer strips and other conservations practices.

Targeted implementation/compliance activity within TMDL and ecologically sensitive areas—2004

Sponsor: Stearns County Soil and Water Conservation District

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

Purpose: Investigate unpermitted earthen manure storage basins; target and accelerate compliance; implement educational initiatives, manure management, feedlot pollution abatement systems, erosion control; promote related best management practices and continue water-quality monitoring.

Targeted implementation/compliance activity within TMDL and ecologically sensitive areas, phase II—2005

Sponsor: Stearns County Soil and Water Conservation District

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

Purpose: Accelerate best management practices adoption by providing technical and financial assistance to producers, investigate unpermitted earthen manure storage basins; identify feedlots in need of pollution abatement, reconstruction or abandonment; develop manure management plans and implement soil erosion best management practices.

Targeted implementation/compliance activity within impaired and ecologically sensitive areas in the Upper Mississippi River Basin in Stearns County (Continuation)—2006

Sponsor: Stearns County SWCD

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

Purpose: Hire inspector and technician to investigate unpermitted earthen manure storage basins, conduct feedlot evaluations, develop manure management plans.

Targeted implementation activity within impaired and ecologically sensitive areas in Stearns County—2007

Sponsor: Stearns County Soil and Water Conservation District

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.

Water quality improvement project continuation—2005

Sponsor: North Fork Crow River Watershed District

Funding: CWP (Grant) \$85,000; CWP (Loan) \$450,000

Purpose: Continue feedlot and manure upgrades, agriculture and rural best management practices, septic system upgrades and water quality monitoring and evaluation.

Working together to improve water quality—2005

Sponsor: Crow River Organization of Water

Funding: Section 319 (Grant) \$300,000; CWP (Loan) \$500,000

Purpose: Upgrade septic systems, install alternative tile intakes, enroll filter or buffer strips, stabilize shore land erosion, work with cities on stormwater/water quality issues, provide financial incentives to landowners to reduce sediment and nutrient loads and increase education efforts.

Upper Mississippi River source-water protection plan implementation Project—2006

Sponsor: City of St. Cloud Public Utilities

Funding: CWP (Grant) \$425,000

Purpose: Funding allows the project to conduct a dye-trace study on the South Fork of the Crow in order to refine the earlier travel-time estimates, obtain locational data from local units of government on potential point and non point contaminant sources, identify areas susceptible to nitrate contamination, hire a project data specialist to update state and federal data files and incorporate the data into the project data base, quantify tributary inflows and in-stream flows (allowing for estimates of groundwater contributions to and losses from the Mississippi River), identify areas of potential contaminant transport between ground and surface waters, support the delineation of wellhead protection areas for ground water-based suppliers, identify areas of high sediment loading potential, implement local source water protection plans, and continue administration and education activities.



Upper Mississippi River Basin projects awarded in 2008

Improving rural water quality in the Crow River Basin Project—2008

Sponsor: Crow River Organization of Water (CROW)

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.

Improving stormwater management in ecologically sensitive watersheds

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.

Lake Independence channel stabilization project

Sponsor: Three Rivers Park District

Funding: Section 319 (Grant) \$119,500

Purpose: The Lake Independence TMDL study identified numerous eroding channels adjacent to the lake as significant sources of phosphorous and sediment loading. The TMDL Implementation Plan included recommendations to stabilize these eroding channels. A series of these eroding channels are in the Baker Park Reserve Campground adjacent to Lake Independence. The main objective of this project is to repair and stabilize four of these ravines to reduce phosphorous and sediment loading to the lake.

Osakis Lake Shoreland Enhancement Project

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.

Restoring Water Resources of the Sauk River Chain of Lakes Continuation

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.

Snake River Enhancement Project Continuation

Sponsor: Snake River Watershed Management Board

Funding: CWP (Grant) \$500,000, CWP (Loan) \$400,000

Purpose: The Snake River Watershed Management Board will assist local technical people working with landowners to identify issues, find solutions to problems and provide technical and engineering assistance for appropriate BMPs targeted to impaired waters. The CWP loan program is targeted to identify, repair or replace non-compliant systems in shoreland areas.

Targeted BMP Implementation within Impaired Areas in the Upper Mississippi Basin – Continuation II

Sponsor: Stearns County Soil and Water Conservation District

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

Purpose: This project will address the following items: Unpermitted manure storage basin investigations and feedlot evaluations, non point 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.

Wetland 639W Restoration

Sponsor: Shingle Creek Watershed Commission

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

Purpose: This project is a feasibility study and design for the restoration of Wetland 27-639W, which is a major external phosphorous source to Impaired Water 27-0042-01, North Twin Lake. This wetland restoration is the highest priority implementation action in the Twin and Ryan Lakes Nutrient TMDL Implementation Plan. Wetland 639W contributes an estimated 730 pounds of total phosphorous per year into North Twin Lake. The goal is to identify and evaluate options to reduce or eliminate phosphorous discharge to the lake, and design and prepare construction plans for the future construction of the design.

Glossary of acronyms

annAGNPS —annualized Agricultural Non Point Source model	NPSP —non point source pollution
BERBI —Blue Earth River Basin Initiative	NRCS —Natural Resource Conservation Service
BMP —best management practices	OLCP —open lot certification program
BOD —biochemical oxygen demand	P —Phosphorus
BWSR —Board of Water and Soil Resources	RCRCA —Redwood-Cottonwood Rivers Control Area
CCA —certified crop advisor	Section 319 —section of Clean Water Act
COD —chemical oxygen demand	SHEP —Stream Health Evaluation Program
CROW —Crow River Organization of Water joint powers board	SRF —state revolving fund
CRP —Conservation reserve program	SRWD —Sauk River Watershed District
CREP —conservation reserve enhancement program	SSC —suspended sediment contamination
CRWP —Chippewa River Watershed Project	SSTS —Subsurface Sewage Treatment System
CSM —citizen stream monitoring	STORET —storage and retrieval system—EPA database
CSMP —citizen stream monitoring program	SVS —Suspended volatile solids
CWA —Clean Water Act (1987)	SWAT —surface water assessment tool
CWLA —Clean Water Legacy Act	SWCD —Soil and Water Conservation District
CWP —Clean Water Partnership	TMDL —total maximum daily load
DO —dissolved oxygen	TP —total phosphorus
EPA or USEPA —Environmental Protection Agency or United States Environmental Protection Agency	TSS —total suspended solids
ESD —Environmental Services Department	TT —transparency tube
FLEval —Feedlot evaluation model	UM —University of Minnesota
GBERBA —Greater Blue Earth River Basin Alliance	USEPA —United States Environmental Protection Agency
GPS —global positioning system	USGS —United States Geological Survey
IBI —index of biological integrity	WD —watershed district
IPHT —imminent public health threat	
ISTS —individual sewage treatment system	
LCMR —Legislative Commission on Minnesota Resources	
LID —low impact development	
MDA —Minnesota Department of Agriculture	
MMP —manure management plan	
MPCA —Minnesota Pollution Control Agency	
NMP —national monitoring program	
NO³ —nitrate/nitrogen	
NPS —non point source	



Minnesota Pollution Control Agency

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www.pca.state.mn.us



A list of completed projects and history can be found at:
www.pca.state.mn.us/water/cwp-319.html#reports

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