



Watershed Achievements

**2003 ANNUAL REPORT TO THE
U.S. ENVIRONMENTAL PROTECTION AGENCY ON
CLEAN WATER ACT SECTION 319 AND
CLEAN WATER PARTNERSHIP PROJECTS
IN MINNESOTA**



Minnesota Pollution Control Agency
September 2003



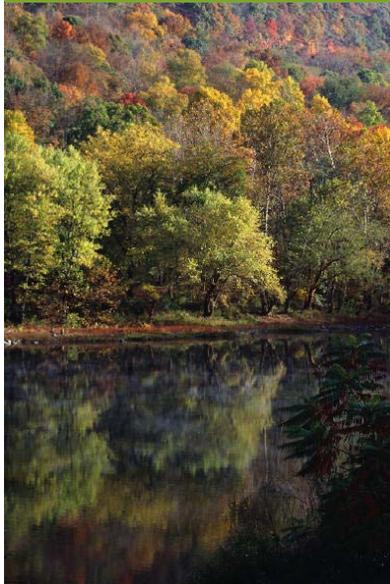
**Minnesota
Pollution
Control
Agency**

2003 Annual Report on Clean Water Act Section 319 and Clean Water Partnership Projects in Minnesota

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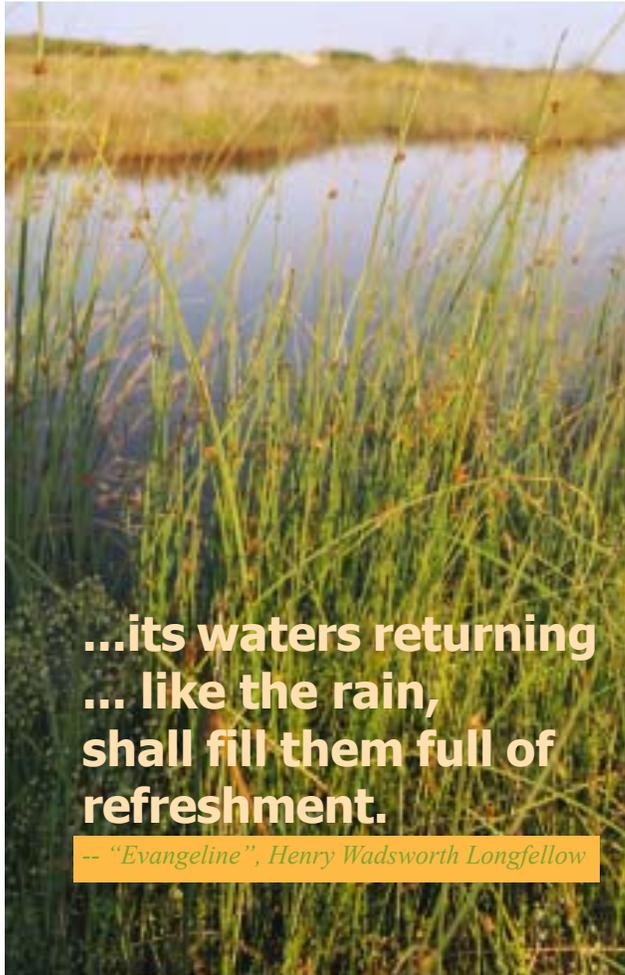


Photo: Rusty Schmidt

**...its waters returning
... like the rain,
shall fill them full of
refreshment.**

-- "Evangeline", Henry Wadsworth Longfellow

Executive Summary

Photo: Rusty Schmidt

LARS* Results for CWP/319 Projects: 1997-2002

- Soil loss reductions of 39,000 tons per year
- Sediment reduction of 11,000 tons per year
- Phosphorus reduction of 44,000 pounds per year

* Local Annual Reporting System, with data gathered by the Board of Water and Soil Resources

Best Management Practices Funded 1997-2002

Pollution Reduction Practices	CWP-funded Practices	319-funded Practices
Feedlot	34	40
Filter Strip Projects	224	15
Gully Stabilization	12	54
Sheet/Rill Erosion Control	68	5
Stream/Ditch Bank Stabilization	28	28
Wind Erosion	2	3
Other	470	149
Not Specified	4	2
TOTAL PRACTICES	842	296

This report describes Minnesota's efforts to protect, maintain and improve the state's waters by reducing nonpoint-source water pollution through the federal Clean Water Act Section 319 (Section 319) program, Clean Water Partnership (CWP) and Minnesota River projects funded by specific legislative appropriations for that basin. It is submitted annually, as required by the U.S. Environmental Protection Agency (EPA).

Minnesota's water resources are fundamental to the state's health, quality of life and prosperity. These rich resources include:

- 11,842 lakes of 10 acres or more,
- more than one trillion gallons of ground water,
- 92,000 miles of rivers and streams and
- three continental watersheds, sending our water north to Hudson Bay, east through the Great Lakes and south to the Gulf of Mexico.

Recent data indicate that point-source ("end-of-pipe") pollution contributes 14 percent of the state's water pollution and nonpoint sources 86 percent. The Section 319 and CWP programs target nonpoint-source pollutants, such as nitrate, phosphorus, bacteria and sediments, which contribute to:

- overgrowth of algae and weeds,
- depletion of oxygen required by aquatic life,
- movement of bacteria and nitrates into ground water,
- contamination of swimmable waters with bacteria,
- oxygen depletion in waters downstream from the state,
- destruction of critical habitat, and
- murkiness that deprives plants of light.

Section 319 and CWP projects address nonpoint-source pollution through:

- partnerships among all levels of government,
- partnerships among government, businesses and citizens,
- understanding the impact of individual actions on common water resources,
- local efforts placed in context of entire watersheds,
- research aimed at diagnosing and targeting the greatest problems facing specific water resources,

- public awareness, education and action,
- information and data sharing and
- leveraging resources to achieve the greatest benefit at the least cost.

Section 319 requires states to:

- identify the nonpoint-source controls necessary for each project,
- specify the programs that will apply the controls,
- certify that the state has adequate authorities to implement these measures,
- identify all sources of funding for these programs and
- establish a schedule for implementation.

Since 1990, the MPCA has awarded more than \$17.3 million in Section 319 funds, \$15.2 million in CWP grants and \$24.2 million in loans from the State Revolving Fund for nonpoint-source projects. The required local match, 50 percent, often is exceeded by partners undertaking the projects.

Local, State and National Impacts of Section 319/CWP Projects

The investment of time, energy and commitment by local sponsors of Section 319 and CWP projects is reflected not only in program achievements, but also the substantial in-kind contributions and donations that maintain and continue progress. Local goals include such observable and measurable environmental changes as improved water clarity, rebound of fish and wildlife populations, reduced risk of flooding or reduction of bacteria levels, for example.

Long-range social impacts may be an even more important result of Section 319/CWP partnerships. These include:

- establishing short- and long-term management goals,
- using resources efficiently,
- reducing duplication of effort,
- increasing the local reservoir of knowledge and experience,
- enhancing creativity and “big picture” thinking,
- developing communication systems,
- elevating water-quality awareness and
- changing practices to better support water quality.

Page 2

Statewide impacts of Section 319/CWP projects have only begun to emerge, due to the time lag between installation of practices and reportable environmental outcomes, but are promising for the future. Data developed by the Board of Water and Soil Resources’ Local Annual Reporting System (LARS) indicate the results of the last five years (seen on page 1).

Quality information is important to making good decisions about the environment. Section 319 and CWP funding fueled projects that improved water-quality infrastructure and efficiency gains, including:

- a network of more than 165 stream-flow monitoring stations statewide that provide consistent data at greatly reduced cost.
- partnerships with the Minnesota Department of Natural Resources, the University of Minnesota, and the National Aeronautics and Space Administration (among others) to assess lake clarity and historical erosion patterns by satellite imaging.
- water-quality data online, through the Environmental Data Access Initiative.

Other state, national and international impacts of CWP/319 projects are harder to quantify, but are as important as the measurable results:

- In locations where waters are impaired, the CWP and 319 projects are establishing mechanisms and coalitions that will be crucial in restoration.
- Best management practices implemented during CWP/319 projects reduce pollutants that are not always measured, such as nitrogen, pesticides, temperature and ammonia.
- Successful strategies piloted in CWP/319 projects can be adapted or adopted for other locations.
- Wastewater treatment plants benefit from nonpoint-source efforts, especially if their permits require Phosphorus Management Plans in lieu of specific phosphorus limits.
- Partners in CWP/319 projects become educated and active about nonpoint-source pollution, improving understanding of these problems.
- Section 319 and CWP projects that better manage runoff may help prevent or reduce the impacts of flooding events and facilitate storm-water management related to permits.

Minnesota Pollution Control Agency

Summary of Section 319 and CWP Program Activities, 1997-2002

During the past five years, the partnerships funded by the Section 319 and CWP grants and technical assistance have undertaken many projects protecting the state's waters.

In 2002, the following CWP and Section 319 projects reached completion. Descriptions of these projects are included in the report. They are:

- Implementing Ground Water Disinfection Rule Requirements (Section 319)
- Improving Implementation of Manure Testing Practices on Minnesota Farms (Section 319)
- Pollution Reduction Payments II (Section 319)
- Wastewater Facilitator (Section 319)
- Lakeshed Erosion Control Cost-Share Program (Section 319)
- Benefits and Impacts of Chemical Treatment of Lake Inflows II (Section 319)
- Grazing Lands Improvement Project (Section 319)
- Paired Watershed Monitoring 2000-2001 (Whitewater) (Section 319)
- River-Friendly Farmer Expansion (Section 319)
- Tillage Transect Program Continuation (Section 319)
- Unsewered Communities Guidebook (Section 319)
- Construction Site Erosion Control Ordinance Implementation (Section 319)
- Shoreland Reclamation for Improved Water Quality (Section 319)
- Lake Francis Diagnostic Feasibility Study (CWP)
- Accelerated Water Quality Improvement Project (Stearns County) (Section 319)
- Cold Spring (CWP)
- French Lake Water Quality Implementation Project (CWP)
- Fish Lake Phase II Project (CWP)
- Grove Lake Restoration Project (CWP)
- Lake Washington Phase II Project (CWP)
- South Branch Root River Water Quality Project (CWP)
- Long and Spring Lakes Restoration Project (CWP)
- Rush Lake Water Enhancement Project (CWP)
- Square Lake Management Plan (CWP)

The Future of the Section 319 and CWP Programs

The need for financial and technical assistance for nonpoint-source pollution efforts always outpaces the resources available to meet these needs. Despite budget tightening in both the public and private sectors, the U.S. Congress' commitment to clean water has supported Section 319, just as Minnesotans have supported CWP. The funding available for grants each year is approximately \$6 million. These dollars leverage equal or greater matching resources from local partners.

To maintain funding spent on watershed management in the 2004-2005 biennium and beyond, Section 319 and CWP projects must demonstrate measurable results. At this time, CWP and Section 319 funding is expected to continue.

Clearly, Section 319 and CWP projects will be more closely connected to a major impaired waters initiative that is central to Governor Tim Pawlenty and his administration. Other local, state or national trends that may affect the future of the Section 319 and CWP programs include:

- Concentration on storm-water runoff as a major source of degrading water quality.
- Increasing value of technology in detecting or monitoring potential water-pollution problems.
- Leadership among agricultural interests and agencies on finding ways to minimize impacts of farming on water quality.
- More local communities will be seeking innovative solutions for failing or nonconforming septic systems.
- Citizen involvement in land-use and development decisions will increasingly revolve around the environmental impacts on water quality.

Conclusions

With so many factors influencing how water resources will be managed in the future, the Section 319 and CWP programs place resources in the best place to achieve long-lasting environmental benefit. A growing synergy of all the state's efforts at protecting and improving Minnesota's lakes, rivers and streams could bring great progress swiftly.

Why Remote Sensing Can't Replace Water-Quality Monitoring

Can Minnesota's waters be monitored by remote sensing, satellite technology and other technological advances? While these advances contribute information about lakes, the detailed information about water quality of specific lakes, rivers and streams is a "hands-on" affair, requiring experts trained in water sciences and volunteers in the Citizen Lake and Stream monitoring programs to provide an in-depth view.

Satellite remote technology, for example, is a cost-effective way to obtain limited water-quality information for all lakes in the state. But to diagnose the specific problems that impair a lake, the devil is in the detail. Measurements of water clarity, provided via Secchi disk readings taken mainly by volunteers, are needed to verify the satellite information on the ground.

Also, satellite technology can provide estimates of water quality on only two fronts: clarity and algae. For a comprehensive study of a lake or river, measurements also must be collected on nutrients such as phosphorus and nitrogen, bacteria, biological oxygen demand, temperature, pH, toxic chemicals and biological diversity.

Remote sensing is done over a short period of the summer, providing snapshots of a point in time. Citizen volunteers and MPCA water-quality staff collect data regularly over the full open-water season and, occasionally, under the ice. This provides information on the status and changes in lake water quality over the seasons of the year. Volunteer and staff monitoring provides an annual continuous record that may be more sensitive to short-term changes in rainfall, runoff or land-use that can affect lake water quality.

Good data drives good decisions about the environment, and for the best data, a combination of approaches works: remote sensing for broad coverage and coarse information, volunteer monitoring for continuity and high frequency of measurement, and MPCA staff monitoring to provide the detailed assessment needed to fulfill federal and state requirements.



Photo: U.S. Fish and Wildlife Service

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Introduction

In all geographic regions and ecosystems, water is intrinsic to the state's health and well-being.



Photo: Beth Kunkel

For many Minnesotans, lakes and rivers are as much a part of our personal narratives as the ocean is for people who live on seacoasts. Clean and abundant water symbolizes the good life in Minnesota; the first peoples called our state the Land of Sky Blue Waters and that remains our identity.

Yet, like a loved old photograph, our ideals about water could be fading. Despite their abundance and value, our state's waters are under pressure. Overdevelopment, exotic species, intensifying demands for water for drinking, industry and agriculture -- and the resulting water pollution -- have intruded into the picture in a big way.

In all geographic regions and ecosystems, water is intrinsic to the state's health and well-being. Protecting and improving water quality is a huge undertaking in Minnesota, considering that we have the most water resources in the lower 48 states.

This report describes Minnesota's efforts to protect, maintain and improve the state's waters by reducing nonpoint-source water pollution through the federal Clean Water Act Section 319 (Section 319) program, Clean Water Partnership (CWP) Program, and Minnesota River projects funded by specific legislative appropriations for that basin.

These programs make up only part of the state's environmental protection efforts to preserve the state's lakes, rivers and streams. However, the

www.pca.state.mn.us

Section 319, CWP and Minnesota River projects (illustrated in case studies at the end of this report) have integrated successfully the U.S. Environmental Protection Agency's (EPA's) and Minnesota Pollution Control Agency's (MPCA's) key strategies for reducing nonpoint-source pollution. Major state initiatives regarding impaired waters and storm-water management have focused time, resources, firm partnerships and great planning on the restoration of deteriorating waters and the preservation of the clean water resources that are woven through life in Minnesota. The Section 319 and CWP projects are accomplishing these goals.

An abundance of riches

Minnesota's water resources are fundamental to the state's health, quality of life and prosperity. These rich resources include:

- 11,842 lakes of 10 acres or more (14,000 lakes, including smaller lakes);
- more than one trillion gallons of ground water, used as drinking water by 70 percent of Minnesota;
- 92,000 miles of rivers and streams;
- three continental watersheds, sending our waters north to Canada's icy Hudson Bay, east through the Great Lakes to the Atlantic Ocean, and south through the Mississippi River to the Gulf of Mexico;

- proximity to the largest and cleanest of the Great Lakes; and
- more shoreline than the state of California.

Beautiful lakes, rivers and streams make Minnesota a good place to live. They also make the state a great place to visit. Tourism contributes \$10 billion annually to the state's economy and supports 117,000 jobs. People clearly come for water recreation; 98 percent of Minnesota's resorts, 80 percent of campgrounds and 24 percent of hotels are located on lakes and rivers – attracting more than 1.5 million anglers each year who spend an estimated \$846 million in Minnesota.

To protect and improve these abundant water resources requires exceptional commitment at the international, federal, state and local levels – as well as thoughtful and informed choices by every individual.

Federal, state responses

The federal Clean Water Act of 1972 made the goal of “fishable and swimmable” waters a national priority for the first time. The Clean Water Act was enacted during a time when threats to water quality from “end-of-pipe” or point-source pollution were severe. At the time this landmark law was enacted at the federal level, Minnesota had already established the Minnesota Pollution Control Agency to control municipal and industrial discharges to the waters of the state, among other duties.

In the 1987 Clean Water Act amendments, however, the federal government began to recognize that controlling point sources of water pollution was only part of the job. The CWA amendments began to deal with water pollutants seeping from septic systems, running off farm fields and urban streets, eroding from construction sites, leaking from animal feedlots, falling in rain and rinsing down storm sewers near individual households.

Nonpoint-source pollutants, such as nutrients, toxic chemicals, bacteria and sediments, contribute to such serious problems as:

- overgrowth of algae and weeds that clog waters;
- depletion of oxygen required by aquatic life;

What do we mean by the term 'impaired' waters?

The Clean Water Act requires states to adopt water-quality standards to protect the nation's waters. These standards define how much of a pollutant can be in lakes, rivers, streams or ground water while still allowing them to meet designated uses, such as drinking water, fishing, swimming, irrigation or industrial purposes.

Many of Minnesota's water resources cannot currently meet their designated uses because of pollution problems. These waters are defined as “impaired.”

Is your favorite water resource on Minnesota's impaired waters list? Find out on the MPCA Web site at www.pca.state.mn.us/water/tmdl.html.



Nutrients, such as phosphorus and nitrogen, promote algae growth. NRCS Photo.

- movement of bacteria and nitrates into ground water used for drinking and cooking;
- contamination of formerly swimmable waters with bacteria;
- oxygen depletion in water resources downstream, such as the Lower Minnesota River and the Gulf of Mexico;
- destruction of critical habitat for native plants and aquatic organisms; and
- murkiness that deprives aquatic plants of light.

Recent data indicate that point sources contribute 14 percent of the state's water pollution, and nonpoint sources 86 percent. Reducing nonpoint-source

water pollution is now the major challenge confronting Minnesota's citizens and officials.

Concerted efforts of many partners get the job done

With as many origins of nonpoint-source water pollution as there are people in Minnesota, it is clear that the usual tools of regulation – permitting and enforcement – won't work for all water-quality problems. Those strategies have proved enormously successful in dealing with point-sources (municipal and industrial discharges) and have achieved great improvements in water quality. Reducing nonpoint-source water pollution will require different strategies, especially:

- partnerships among all levels of government;
- partnerships among government, businesses and citizens;
- understanding the impact of individual actions on common water resources;
- local efforts placed in context of entire watersheds;
- research aimed at diagnosing and targeting resources toward the biggest problems facing specific water resources;
- public awareness, education and action;
- information and data sharing; and
- leveraging resources to achieve the greatest benefits at the least cost.

Governor Outlines Clean Water Vision for the State

On June 24, Governor Tim Pawlenty announced to 250 environmental stakeholders his commitment to protecting the lakes, rivers, streams and ground water so important to Minnesota's way of life.

"Our greatest natural resource is being strained by overdevelopment, flooding, storm-water runoff and increased demand for drinking water," said Governor Pawlenty at the event in St. Cloud. "The time for action is now."

To ensure results, the Governor established a Clean Water Cabinet that will include all state agencies (MPCA, Minnesota Department of Natural Resources, Minnesota Department of Health, Minnesota Department of Agriculture and the Board of Water and Soil Resources). The cabinet is designed to foster common solutions to unique clean water challenges faced by each agency.

The watershed approach stressed by the Governor, as well as his emphasis on partnerships among all levels of government, fits well with



Clean Water Partnership and Clean Water Act Section 319 projects that focus on nonpoint-source water pollution.

In July, the Governor took to the road to promote the Conservation Reserve Enhancement Program (CREP) to achieve clean water goals, greatly enhanced by the recent Federal Farm Bill.

Guiding principles for the new water plan include:

- Keep working lands working. Protecting water while preserving farming and recreational land use.
- Focus on priorities. Federal, state, local and private efforts are most effective when focused on the most serious environmental problems.
- Apply individualized solutions. Problem-solving strategies should be tailored to cope with the threats to distinct watersheds.
- Cooperation is essential. Teamwork among diverse groups has been the most successful approach to improving water quality.



The Partnerships Begin

Section 319 of the Clean Water Act requires Minnesota (along with the other states) to assess nonpoint sources of water pollution within its boundaries. State investigations must identify nonpoint sources of pollution that contribute to impaired water quality, as well as waters or stream segments unlikely to meet water-quality standards without reductions in nonpoint sources. In the last few years, the EPA has encouraged implementation activities aimed at producing measurable results in reducing pollution.

Specifically, Section 319 requires that states:

- identify the nonpoint-source controls necessary,
- specify the programs that will apply the controls,
- certify that the state has adequate authorities to implement these measures,
- identify all sources of funding for these programs, and
- establish a schedule for implementation.

The MPCA has redeveloped a statewide five-year Nonpoint Source Management Program Plan. The plan is available on the MPCA's Web site (www.pca.state.mn.us/water/nonpoint/mplan.html) and details how the state will fulfill its responsibilities. The MPCA receives funding from the EPA, both to support overall research and coordination of nonpoint-source water pollution issues and to support local projects that achieve the overall goal of clean water.

The Clean Water Partnership Program is a primary tool in Minnesota's work to improve lakes, rivers and streams and is complementary to Section 319. Through the Clean Water Partnership Program, the MPCA supports the efforts of local units of government and citizens by providing financial and technical assistance.

The goals of the Clean Water Partnership Program include:

- diagnosing problems and threats to water resources;
- developing solutions for reducing the impacts of nonpoint-source pollution on water resources; and
- implementing these solutions.

The process begins with a proposal from a local government and/or citizen group to assess problems or implement solutions.

An interagency group called the Project Coordination Team (established in statute) assists the MPCA in prioritizing Section 319 and CWP grant applications that target polluted waters and demonstrate a good chance of success. This Team includes representatives from:

- Minnesota Pollution Control Agency
- National Resource Conservation Service (NRCS)
- Minnesota Department of Health (MDH),
- Minnesota Department of Agriculture (MDA),
- Board of Water and Soil Resources (BWSR),
- Metropolitan Council,
- Department of Natural Resources (DNR),
- Minnesota Indian Tribes and the Bureau of Indian Affairs (BIA),
- U.S. Geological Survey (USGS),

- Minnesota Geological Survey (MGS),
- Minnesota Department of Transportation (MnDOT),
- U.S. Fish and Wildlife Service, and
- Other invited parties.

MPCA staff members with expertise in assessing and cleaning up impaired waters consult with and support local project representatives on scientific or technical issues.

Since 1990, the MPCA has awarded more than \$17.3 million in Section 319 funds to projects addressing nonpoint-source pollution. During the first 14 award cycles of the CWP, the MPCA supported more than

205 projects with an estimated \$15.2 million in grants and \$24.2 million in loans from the State Revolving Fund. The Water Pollution Control Revolving Fund, also known as the State Revolving Fund (SRF), was established by the federal Clean Water Act to replace the federal Construction Grants Program. Under the SRF program, the EPA provides grants or “seed money” with a required 20 percent state match, to capitalize state revolving funds with which the states provide low-interest loans to communities. As loan principal and interest payments are paid back into the revolving fund, the money is used to finance new loan projects.

The financial and in-kind contributions from local communities and partners is substantial, exceeding the 50 percent match requirements in most cases.

This report highlights case studies from Section 319 and CWP projects completed in federal fiscal year 2002 (October 1, 2001 through September 30, 2002). Each case illustrates the improvements in water quality and the benefits to communities resulting from Section 319 and CWP projects.

Local Impacts of Section 319 and CWP Projects



Photo: South St. Louis SWCD

Students from Hermantown High School plant trees along a local trout stream, Miller Creek, to control erosion and provide shade, part of a CWP phase II project. Small communities struggling with pollution from failing or nonconforming septic systems seek wastewater solutions -- and discover a new guide developed with a Section 319 grant that can guide them to sensible wastewater treatment, management and financing. And 357 farmers in 35 counties were nominated as River Friendly Farmers for maintaining both farm productivity and best management practices for water quality as part of a Section 319-funded project.

The investment of time, energy and commitment by local sponsors of Section 319 or CWP projects is reflected not only in improvements in water quality,

but in substantial in-kind contributions and donations that maintain and continue progress. Whether the citizens seek improved water clarity, rebound of desirable fish or wildlife populations, reduced risk of flooding or reduction of elevated bacteria levels that hamper swimming, partners in the process become invested.

By working in concert to achieve project goals, local groups also have long-range, positive impacts on the environment through development of public awareness, resources, infrastructure, communication tools and funding. Among the broader benefits of local partnerships cemented in Section 319 or CWP projects include:

- Establishing short- and long-term management goals for local resources.
- Using resources efficiently.
- Reducing duplication of effort.
- Increasing the reservoir of knowledge and experience in the local community.
- Enhancing creativity and “big picture” thinking.
- Developing communication systems.
- Elevating water-quality awareness among all groups.
- Changing behavior that contributes to water pollution.

Local community members and groups also benefit from the growing number of resources and increasing amount of data available to them as they begin to assess or restore lakes, rivers and streams. Section 319 and CWP projects, even those not staged locally, support local efforts in three ways.

- Section 319 and CWP projects include resources to help local groups get started, understand the science and regulation involved in water management, work efficiently and avoid pitfalls. This year, for example, the University of Minnesota College of Natural Resources, Extension Service and other partners published “Small Community Wastewater Solutions: A Guide to Making Treatment, Management and Financing Decisions.”
- Section 319 and CWP projects provide models or demonstrations of how other communities facing comparable water-quality challenges succeeded. This allows local communities to develop informed strategies that incorporate unique local conditions and the best ideas from projects statewide.
- Finally, Section 319 and CWP projects have helped develop an infrastructure for monitoring and assessment data that can be accessed by local communities and used to target scarce resources on the most pressing problems facing local waters.

A community’s commitment and effort to improve a lake, river or stream that is part of its history and life is perhaps the most important local benefit of all.

Southwestern Minnesota Prairie

A Land of Some Not-Too-Bad Lakes



In a region better known for farm fields and livestock, lakes in southwestern Minnesota can be overlooked. A recent water-quality study described the condition and trends of 24 lakes in southwestern

Minnesota. Although these lakes are shallow and higher in algae than their northerly cousins, they too receive a fair amount of recreational use and provide important habitat.

“This study is a little different than our usual reports,” says Steve Heiskary, MPCA lake scientist. “It doesn’t focus on just one lake; it’s more of a regional approach.” The lakes included in the study are in Cottonwood, Jackson, Martin, Murray, Nobels, Yellow Medicine, Lincoln and Lyon counties.

The lakes are shallow, ranging in depth from seven to 13 feet, are much older than central and northern lakes and have received sediment and nutrients for longer periods of time. “The report helps us understand this, and helps us identify those that would be good candidates for water-quality improvement projects,” says Heiskary.

The study contributes to two related efforts, one in cooperation with the Science Museum of Minnesota on sampling lake sediment cores and another with the Minnesota Department of Natural Resources studying the type and distribution of rooted plants in these lakes and how this relates to water quality.

Few lakes in southwest Minnesota have citizen volunteer monitors, and Heiskary hopes to see expansion of the Citizen Lake Monitoring Program in that area.

Read the report, “Shallow Lakes of Southwestern Minnesota: Status and Trend Summary for Selected Lakes,” at www.pca.state.mn.us/water/lakequality.html#reports.

Prairie Cord Grass (shown above) can revegetate an eroding area quickly. Writer: Forrest Peterson. Photo: Paul Jackson

Statewide Impacts of Section 319 and CWP Projects

When resources at all levels of government are limited, how can the state increase the quality, comprehensiveness and speed of providing water-quality data -- at a fraction of the price such data would have cost in the past?

Great leaps forward in remote monitoring and sensing, as well as better ways to provide such data to people who need it, are changing the way that the

state assesses Minnesota's waters. A stream-flow monitoring network with more than 165 monitoring stations, the Citizen Lake and Stream Monitoring Programs, and satellite images of Minnesota lakes that show lake clarity and patterns of erosion are among the technological advances that are improving the state's knowledge about water quality.

The timing of such approaches could not be better. The state of Minnesota is focusing major effort on impaired waters of the state, meeting with stakeholders about possible strategies for improvement; completing the first of many future Total Maximum Daily Load studies (with restoration efforts underway); raising awareness about impaired water through the State Fair, "Minnesota Environment" magazine, and online information; completing a major legislative report on impaired waters (see the report at www.pca.state.mn.us/publications/reports/lrwq-s-lsy03.pdf); and coordinating other water programs (such as the CWP) to provide synergy to boost results of impaired waters efforts.

What is a Total Maximum Daily Load (TMDL)?

TMDL projects funded with Section 319 dollars:

- *Straight River*
- *Vermillion River*
- *Blue Earth River*
- *South Branch, Yellow Medicine River*
- *Chippewa River*
- *West Fork Des Moines River*
- *Minnesota River*
- *Lower Minnesota River*
- *Long Prairie River*
- *Whitewater River*
- *Prairie Creek*
- *Swan River*
- *Upper Mississippi River*
- *Red River of the North*
- *Redwood River*
- *St. Louis River*
- *Lake and Stream Mercury (Statewide)*

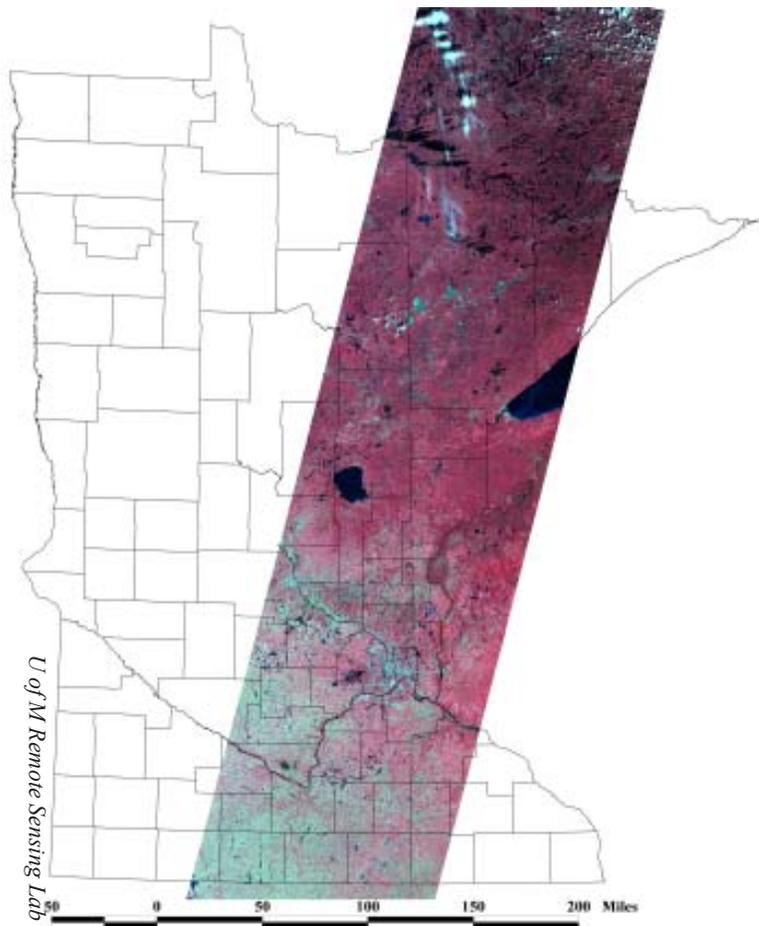
The Clean Water Act requires states to conduct a Total Maximum Daily Load (TMDL) study for each pollutant causing a water body to fail to meet applicable water-quality standards.

The TMDL study identifies the root causes of the problem, both point and nonpoint sources of the pollutant within the watershed. Water sampling, land-use surveys and computer modeling estimate how much each source contributes to the problem. A public participation process determines how much each source must reduce its contribution of that pollutant to ensure that water-quality standards are met. An impaired water may need one large or several smaller TMDL studies, each one determining reductions for a different pollutant.

NASA Meets the Land of More than 11,842 Lakes

Satellite imaging technology for water bodies has existed for years, but it is only recently that it could work reliably through smog and haze to capture information on water clarity for widespread use. With the contributions of Section 319 dollars, the University of Minnesota Remote Sensing Lab, U of M Water Resource Center, MPCA, Minnesota Department of Natural Resources Resource Assessment Unit, the Science Museum of Minnesota and the National Aeronautics and Space Administration (NASA) are providing a picture of Minnesota's lakes.

NASA established regional development centers (one serving Minnesota, Michigan and Wisconsin) to help develop technology and desktop software to deliver a more accurate and less expensive way to monitor and identify threatened or polluted waters.



The technology shows lake clarity, provides a typical range of clarity for each lake, allows for comparison of historical images to determine whether lake water quality is deteriorating or lake shore eroding, shows information about big lakes that was once impossible to collect and illustrates impacts of land use on water, among other things. “Much better products,” says Bruce Wilson, MPCA coordinator for the project funded by Section 319, “at a fraction of the cost.”

Erosion and Sedimentation

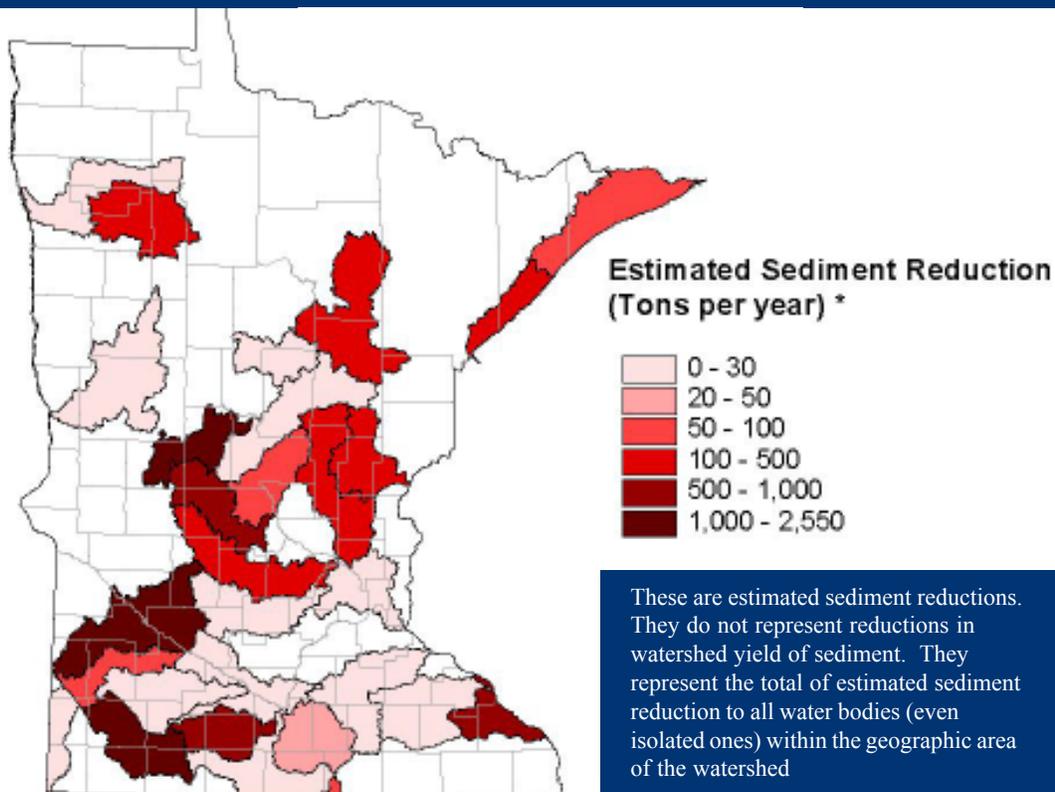
Erosion is a natural process that occurs when water, wind, ice and gravity act together to weather rock into soil particles, then move those particles around the landscape. The impacts of erosion and sedimentation include:

- Increasing water temperature;
- Increasing turbidity (cloudiness of water);
- Losing habitat, breeding and food sources needed by fish and other aquatic species;
- Carrying nutrients that increase growth of algae and weeds;
- Introducing toxins, bacteria and chemicals into water supplies;

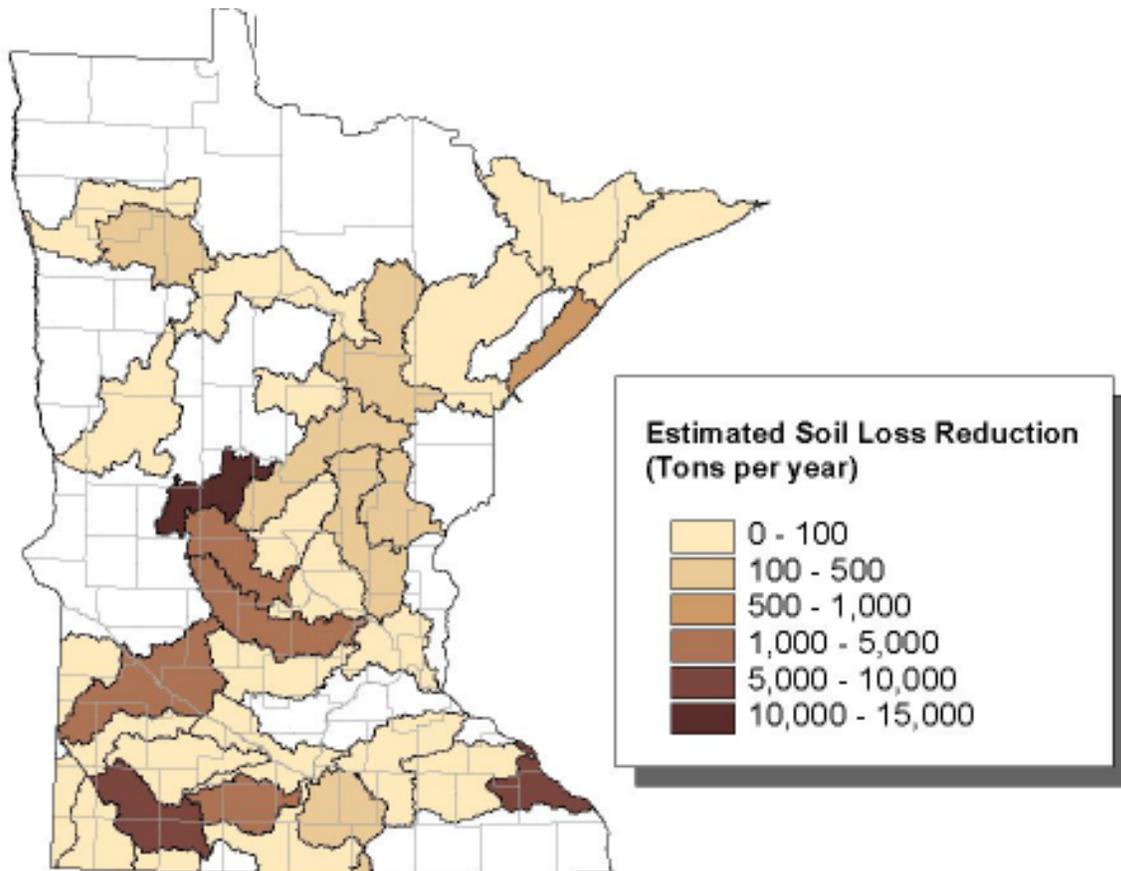
- Destabilizing shorelines;
- Filling in navigable waters, increasing risks to boaters and costs of dredging; and
- Reducing the productivity of cropland.

Based on LARS reporting by CWP and Section 319 project partners, these projects have reduced soil loss from 1997 – 2002 by 39,000 tons per year. Over the same period, sedimentation was reduced by an estimated 11,000 tons per year. The sediment and soil maps on this page and the next show results by watershed for the entire state.

Sediment Reduction (tons/yr) -- Section 319 and CWP Best Management Practices (LARS Reporting through 2002)



Soil Loss Reduction (tons/yr) -- Section 319 and CWP Best Management Practices (LARS Reporting through 2002)



Nutrients

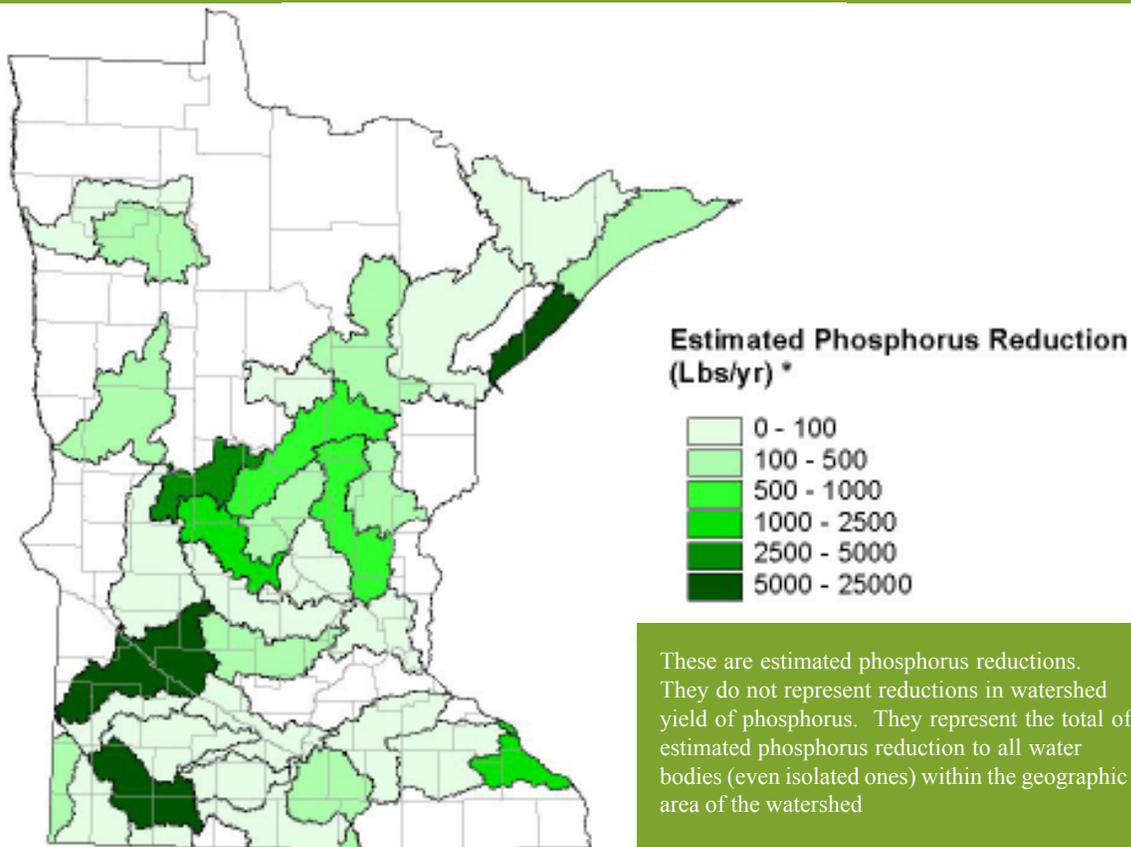
High levels of nutrients, especially phosphorus, are associated with excessive growth of algae and depleted oxygen in surface water, a process called eutrophication. Because phosphorus has an affinity for sediment, it binds with the sediment and is available to nourish algae and weeds and encourage their excessive growth into algae blooms. Then, when these plants die and fall to the bottom, their decomposition process robs oxygen from the water. This, in turn, deprives fish and other aquatic organisms of oxygen, resulting in fish kills and species elimination.

The phosphorus comes from both point sources (wastewater from municipalities and industries) and nonpoint sources (storm water, agricultural runoff, feedlots, failing or nonconforming septic systems).

Reducing nonpoint source phosphorus impacts on surface waters has been a high priority for the MPCA for years.

The Section 319 and Clean Water Partnership projects achieve results through fostering best management practices that keep excessive phosphorus from the state's waters, such as fixing failing septic systems, proper use of fertilizers and shoreline management. The LARS reporting by Section 319 and CWP partnerships shows that from 1997 – 2002, projects reduced phosphorus contributions to Minnesota's waters by an estimated 44,000 pounds per year.

Estimated Phosphorus Reduction (lbs/yr) -- Section 319 and CWP Best Management Practices (LARS reporting through 2002)



Bacteria

Fecal bacteria, found in human and animal wastes, can introduce disease-bearing organisms to surface and ground water, reduce recreational use, increase cost of drinking water treatment and make people sick. The bacteria comes from failing or nonconforming septic systems, animal feedlots, urban runoff, city sewer bypasses, agriculture and wildlife and pet wastes.

The first approved TMDL study completed in Minnesota examined fecal coliform bacteria in the Lower Mississippi River. However, partners in the Basin Alliance for the Lower Mississippi in Minnesota (BALMM) had already developed several Section 319-funded projects to begin the work to reduce fecal coliform bacteria by 65 percent. The strategies -- and their results -- show the potential statewide impact of Section 319 and CWP projects on impaired waters.

- A project focused on feedlot runoff reduction supports a new provision of the state's feedlot rules, the Open Lot Agreement, which should achieve a 50-percent runoff reduction by October 2005.
- The Southeast Minnesota Wastewater Initiative is educating local officials and citizens about the impacts of improperly managed or installed septic systems, with a goal of 550 repairs/upgrades per year by the third year of the project.
- Basinwide, BALMM has applied for 95,730 acres of vegetated buffers along fields where manure is spread to impede runoff.

These are only a few of the ways in which Section 319 and CWP projects achieve clean-water outcomes for the state as a whole.

Better information

Section 319 and CWP projects, along with other initiatives in several state agencies, is making better information about water resources available to more people more effectively. The last few years have seen great progress in the cost-effectiveness and efficiency of data collection.

Data that formerly took weeks of effort to collect are now routinely recorded in days or hours, thanks to state-of-the-art computerization for data collection, laboratory analysis, dataset preparation and, finally, the assessment and summary phase of water quality investigations. Standardization of stream-flow monitoring techniques among Minnesota state agencies (Minnesota Department of Natural

Resources, Minnesota Department of Agriculture), as well as regional and municipal partners, has led to quality data at greatly reduced expense. Automated monitoring systems installed at more than 165 locations save time, travel and funding.

Several new online resources (see sidebar below) improve partner and public access to information about lakes, rivers and streams. Section 319 and CWP funding and projects generate information and data that will increasingly define the status of water quality in Minnesota -- and allow for measurement of progress as restoration efforts for impaired waters get underway.

Water-Quality Data Now Online

Making good decisions about water-quality issues requires access to the latest data. But until recently, that data has been difficult to come by. Now, those who need access to this information can view and download it whenever they want using the MPCA's Environmental Data Access Web page at www.pca.state.mn.us/data/eda/index.html.

The MPCA and other organizations have collected large quantities of water-quality data over the years, but finding it sometimes required a significant amount of detective work. Minnesota legislators recognized this problem, too, and in 2001 they directed funding to the MPCA to create an Internet-based method to deliver data.

Types of data that can be accessed include water chemistry data, biological monitoring data and summaries of discharge monitoring reports from facilities that hold MPCA water-quality permits. Data collected by organizations other than the MPCA are available through this Web page, too. Users will be able to:

- find locations of Minnesota monitoring stations along with various geographic features using a map-based viewer;
- identify and find basic information about a specific monitoring station; and
- view a "station page" for each monitoring site that provides general information, a photo of the site (when available), data summaries and options to download data.



A second map-based viewer can be used to look water bodies that have been studied to determine whether they meet their intended uses, such as being suitable for fishing or swimming.

The ability to deliver water-quality data is merely the first phase of a larger project to

make all MPCA environmental data available through the Web. In 2004, the MPCA intends to make air quality data available in a similar fashion, and the 2005, ground water data should be available, too.

For additional information about the Environmental Data Access Web page, contact John Seaberg at (651) 296-0550 or at john.seaberg@pca.state.mn.us.

National and International Impacts of Minnesota Section 319 and CWP Projects



NASA Satellite Photo

Minnesota's great rivers – the Mississippi, the Minnesota, the Red River of the North, the Rainy, the St. Croix – touch other states and nations, carrying pollutants that originate here to neighbors downstream. Local Section 319 and CWP projects that reduce nonpoint-source pollution, especially those in the major river basins, affect everything from the fishing in Canada to commercial fisheries in the Gulf of Mexico. Additional benefits of pollution reduction include:

- Some Section 319 and CWP projects undertake agricultural best management practices and wetlands restoration, which reduce the amount of nitrogen flowing into lakes, rivers and streams. An estimated seven percent of all nitrogen making its way to the Gulf of Mexico comes from Minnesota. Excessive nitrogen has contributed to a large “dead zone” in the Gulf with severely depleted oxygen threatening aquatic species and the commercial fisheries which depend upon this resource. As Section 319 and CWP projects combat erosion and phosphorus, they also may be reducing the amount of nitrogen flowing south.
- The International Joint Commission has established a goal of zero toxics for Lake Superior. Runoff carries more than just soil, sediment and nutrients. Section 319 and CWP projects that prevent runoff limit the transportation of toxic substances.

- Some Section 319 and CWP projects involve building catch basins, holding ponds and designed wetlands. This not only helps hold potential flood water, but also prevents chemicals in runoff from being washed downstream.

These limited examples of the impact of Section 319 and CWP projects on the environment demonstrate that a program with visible effects locally can also have wide-ranging consequences for state, national and international water quality.

Hit the beach! MPCA receives federal grant to monitor Lake Superior beaches

Scattered along the North Shore's 154 miles of scenic beauty are Lake Superior's 34 public beaches. Now, those beaches are drawing more than enthusiasts; federal coastal beach program funds will support new water-quality and health-risk monitoring and communicate results to North Shore communities. The MPCA received \$263,000 in federal program development grants and expects \$203,000 more this year to implement the program. Local governments bordering Lake Superior that want to participate in the effort are eligible for grants. For more information, visit the MPCA Web site at www.pca.state.mn.us/water/beaches.



The Future of Section 319 and CWP

In federal fiscal year 2002, states throughout the nation faced record-breaking deficits and the prospect of deep budget cuts in all programs. Despite the financial pressures on environmental programs in Minnesota, where clean water is not only a part of our identity but also of our prosperity, water-quality programs topped the list of funding priorities. Among the top 10 agency priorities, in order, are:

- Impaired waters/basin management (1)
- Water-quality point-source regulatory programs (3)
- Storm-water programs (5)
- Water-quality monitoring, surface water (7) and
- Feedlots (8).

The Pawlenty administration has selected water quality improvement as one of its “marquee” issues, and has established a Clean Water Cabinet to facilitate coordination among state agencies with water responsibilities. The Governor also initiated a series of appearances to encourage participation in the Conservation Reserve Enhancement Program (CREP), a key strategies to reduce nonpoint-source water pollution.

Basin management and impaired waters efforts are becoming an umbrella under which point- and nonpoint-source water pollution programs will coordinate activities to make the most of agency resources. A legislative report on the status of Minnesota’s impaired water efforts outlined some of the challenges the state will face in dealing with the more than 1,700 impaired waters identified so far.

(See the report, “Minnesota’s Impaired Waters,” at www.pca.state.mn.us/publications/reports/lrwq-s-lsy03.pdf.) In addition, the MPCA will prepare an updated report and potential funding possibilities in the 2004 Legislative Session.

Meanwhile, despite a \$994,000 cut to the Clean Water Partnership program during the 2003 Session, CWP and Section 319 funds continue as a resource for projects that achieve many nonpoint-source water pollution goals. As restoration activities for impaired waters increase, it is likely that Section 319 and CWP will be more closely targeted to impaired waters.

Other trends and circumstances at local, state and national levels will influence Section 319 and CWP projects in the future. Some of these trends include:

Concentration on storm-water runoff as a major source of degrading water quality. The MPCA is now in the early stages of phase II storm-water permitting, accompanied by efforts to educate the construction industry, local government and the general public about the impacts of runoff on lakes, rivers and streams. There may be much to gain from public information and education efforts on storm water. Citizens washing cars, dumping wash water in the gutter, raking leaves into storm sewers, rinsing pesticides and other cleaning and home improvement chemicals into the storm sewer often do not know the distinction between storm and sanitary sewers. Broad awareness of storm water’s impacts on the environment could reap great benefits in citizen behavior change.

Increasing value of technology in detecting or monitoring potential water-pollution problems.

From the use of satellites to determine water clarity and erosion patterns to desktop software that allows quick analysis of complex data to new Web-based data that is easy to access, technology continues to improve the information with which we determine both baseline status of water resources and progress in restoration. One caution: automated water-quality monitoring technologies can in no way replace people with expertise who validate the data, decide how it should be used, and compile, analyze and report to make conclusions available to users.

Leadership among agricultural interests and agencies on finding ways to minimize impacts of farming on water quality.

When nonpoint-source water pollution comes up at the local grange or cafe, many farmers acknowledge feelings of being targeted as the purveyors of pollution instead of the food producers for the nation. Current and future Section 319 or CWP grants or demonstration projects will provide farming models and strategies that may ease farmers' concerns about pollution prevention and its effects on productivity and yields. The recently enacted Federal Farm Bill is encouraging this trend, providing strong support for the Conservation Reserve Program (CRP) and CREP, farmer-focused incentives for water-quality improvements.

More local communities will be seeking innovative solutions for failing or nonconforming septic systems. Several Section 319 or CWP projects aim to provide education and assistance to communities looking at wastewater solutions.

Citizen involvement in land-use and development decisions will increasingly revolve around the environmental impacts on water quality.

As one citizen in the Brainerd Lakes area says, "In the years I've lived here the clarity of the lake has gone down, not drastically, but enough to be concerned about a trend.... I hope [my city] considers the environment first before considering tax base or revenues as it develops." By making both water-quality data and education about land-use impacts on water quality accessible and comprehensible to citizens, local communities may be able to preserve lakes from deterioration -- a much less costly alternative to restoration.

With so many factors influencing how water resources will be managed in the future, the Section 319 and CWP programs are a flexible way to place resources in the best place to achieve maximum environmental benefit. A growing synergy of all the state's efforts at protecting and improving Minnesota's lakes, rivers and streams could bring great progress swiftly.

As citizens recognize the interconnections among personal behavior, local land-use, public policy, economic realities, explosions of technology and information, and global trends, they may join their neighbors and change their lives to guarantee clean and clear water for future generations. Though we do not know for certain what factors will influence and determine the future course of water-quality protection and improvement, we do know that we have started out on the firm footing with the watershed approach based on strong partnerships of citizens and all levels of government in the Section 319 and CWP Programs.



Directory of Project Summaries

2002

The following Section 319 and CWP projects were completed in federal fiscal year 2002, October 2001 - September 2002

Section 319

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- Construction Site Erosion-Control Ordinance Implementation -- Page 33
- Evaluation of the Potential Benefits and Adverse Effects of Alum Treatment to Remove Phosphorus from Lake Inflows -- Page 29
- Grazing Land Improvement Project -- Page 36
- Implementing Ground Water Disinfection Rule Requirements -- Page 21
- Improved Implementation of Manure-Testing Practices on Minnesota Farms -- Page 23
- Lakeshed Erosion-Control Cost Share Program -- Page 34
- Payment for Pounds Phosphorus Study -- Bioavailable Phosphorus Credits -- Page 24
- River-Friendly Farmer Program Expansion -- Page 27
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- Small Community Wastewater Solutions -- Page 30
- Tillage Best Management Practices for Water-Quality Protection in Southeastern Minnesota -- Page 28
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Clean Water Partnership

- Cold Spring Wellhead Protection Project -- Page 40
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- South Branch Root River Watershed Phase I Diagnostic Study -- Page 43
- Square Lake Phase I Resource Investigation -- Page 42
- Whitewater River Watershed Project, Phase II -- Page 44

Projects Completed in 2003

Section 319 Projects

Implementing Ground Water Disinfection Rule Requirements

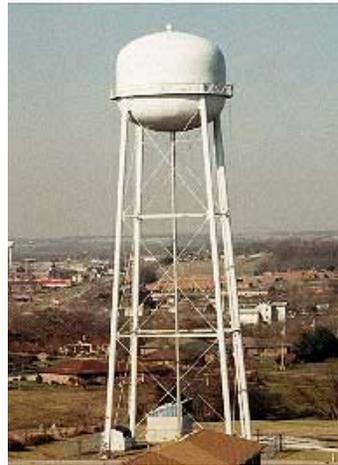
The State of Minnesota has more than one trillion gallons of ground water, which is used by an estimated 70 percent of the population for drinking water. Protecting ground water from pathogens is a key responsibility of the Minnesota Department of Health (MDH), the project sponsor.

This Section 319 project was designed to help the MDH implement ground water disinfection rule requirements and protect drinking water supplies by:

- Helping to document the presence of pathogens in ground water used by public water supply wells.
- Testing the methodology developed by the MDH to determine pathogen susceptibility of public water supply wells,
- Evaluating the usefulness of tritium/helium age dating of well water to estimate the likelihood that pathogens (particularly viruses) may be present in concentrations that are of human health concern to water users, and
- Evaluating management practices for noncomplying pathogen sources near public water supply wells to offset risk to well users.

The project began on July 1998 and was completed by November 2000, with followup activities through June 2001. Microbiological organisms—including bacteria, protozoa and viruses—are among the oldest health threats to drinking water quality and the agents currently responsible for most waterborne diseases.

The project began with a MDH inventory of potential contamination sources within 200 feet for all of the state's 950 community water supplies that use ground



water. MDH then selected 75 wells for monitoring of indicators of bacterial or viral contamination. These wells were selected because they were considered relatively vulnerable to pathogen contamination based on their local geologic setting. All wells were sampled quarterly for one

year. Results were incorporated into a project report, "Minnesota Department of Health Viral Occurrence Study, November 2000."

Of these 75 wells, 13 produced a water sample that was positive for an indicator of pathogen contamination. However, the majority of positive samples (85 percent) yielded detection of total coliform bacteria only. The total coliform group of bacteria are a class of noninfectious indicator organisms commonly found in the environment and may exist in water distribution systems in the absence of any fecal contamination. Only four of the wells sampled in the study produced a water sample that was positive for one of the more definitive indicators of fecal contamination and none of these yielded a positive detection of any infectious virus. The data allowed MDH to develop protocols for:

- Collecting well record information for noncommunity wells and verifying that the well record was for a specific source of drinking water;
- Assessing the well vulnerability to potential pathogens;
- Forwarding records to field staff for confirmation;
- Entering into a database that stores well-construction data; and
- Using the data to prepare well and aquifer vulnerability assessments.

The U.S. Environmental Protection Agency (EPA) is considering establishing a two-year viability period for viruses in ground water. Efforts by MDH to test the practicality of using ground water age dating with helium/tritium met with some contractor difficulties. However, sampling and analyses allowed the MDH to compare age dating to presence/absence of pathogen

Results that Count

- Of 75 total wells sampled for bacterial or viral indicators, 12 had detections.
- Potential contaminant source data for 900 noncommunity water-supply wells, along with GIS locations, have been made available to users evaluating possible pathogens and vulnerability of public and private wells.
- Age dating of ground water correlates to the potential for pathogens in public water supply wells.
- The MDH has developed protocols for collecting well information, assessing well vulnerability, confirming assessments in the field, alerting ground water data users of vulnerable water supply locations, providing an inventory of potential contamination sources and proposing management options for these sources.

Financial Information

The MDH matched the \$85,000 Section 319 grant with \$98,764 in cash and \$65,500 in in-kind contributions.

indicators. Age dating of ground water did correlate to the presence/absence of pathogen indicators and is now an additional tool for determining whether well disinfection is needed for public water-supply wells.

The project allowed the MDH, working with MPCA and counties, to implement provisions of the revised 7080 rule as regards on-site wastewater system construction standards in wellhead protection areas. Among those tools developed to assist local and state government agencies were:

- Materials for on-site system inspectors to make them aware of noncomplying systems in the inner (200-foot-radius) wellhead management zones.
- Statewide GIS coverage of vulnerable community water-supply well locations for MPCA and county feedlot staff.
- Management options for public water suppliers to use for potential contamination sources, along with the capacity to inventory potential contamination sources.

For more information about Implementing Ground Water Disinfection Rule Requirements, contact Bruce Olsen, Minnesota Department of Health, (651) 215-0796.



Of 75 total wells sampled for bacterial or viral indicators, 12 had detections.

Improved Implementation of Manure Testing Practices on Minnesota Farms

Use of excess nutrients on farm fields is often a function of commercial manure applicators and livestock producers not being aware of the accurate nutrient content of manure. This project provided direct technical assistance and information to more than 106 Minnesota livestock producers for implementing manure-testing practices. The project also provided information useful to the thousands of others who test manure nutrient content. This has been accomplished through:

- Promotion of expanded sampling recommendations;
- Evaluation of on-site “quick” tests for estimating manure nutrient content;
- Promotion of laboratory analysis results;
- Dissemination of information on the interpretation and use of manure analysis results; and
- Development and delivery of educational materials, programs and tools.

Manure testing, analysis and interpretation allows producers to determine appropriate levels of nutrients to apply, thereby reducing nitrate and phosphorus water pollution through the more exact application of fertilizers.

Ten custom manure applicators and one University of Minnesota Extension educator collected 265 samples from more than 106 identified farms and 46 unidentified client locations. The laboratory analyzed for total solid content, total nitrogen, ammonium nitrogen, total phosphorus and total potassium. Each farmer received a report of the results and analysis recommendations.

Of the 265 samples, 93 were also analyzed using two devices that could potentially serve as quick field tests: the hydrometer and the Agros nitrogen-meter.



The hydrometer is easy to use and inexpensive (approximately \$35), and a strong relationship was found between specific gravity as determined by the lab and density with the hydrometer. However, specific gravity (density) was poorly correlated to nutrient concentrations, so this method cannot be recommended for determining nutrient levels.

The Agros nitrogen-meter was more reliable in correlating specific gravity and nutrient concentrations, although individual tests were off by a significant margin. The meter is more expensive (approximately \$335) and uses an oxidizing reagent that can cause burns, lung irritation and requires careful storage. The meter is more reliable than book values for estimating nitrogen, but not as reliable as lab analysis.

In promoting manure testing for producers, it is important to ensure that results are accurate and consistent. The Minnesota Department of Agriculture’s Certified Manure Testing Laboratory Program provides the only certification program for manure testing in the nation. A book, “Recommended Methods of Manure Analysis,” is in final review and a draft has been provided to all labs participating in the certification program (50 as of 2002).

Reports to 106 farmers on the laboratory analysis of manure came with an explanation of results and suggestions for how to use the information to improve manure management. A delay in the manure analysis related to delay in obtaining grant money resulted in producers having samples collected in 1997 and not returned until May 1999 -- making results of limited value to farmers in that growing season.

For more information about the Improved Implementation of Manure Testing Practices on Minnesota Farms, contact project sponsor Jerry Floren, Minnesota Department of Agriculture, at (651) 297-7082.

Each farmer received a report of the laboratory's results and analysis recommendations.

Results that Count

- 106 farmers participated in nutrient sampling and analysis, and analysis was completed for 265 samples.
- 93 samples were tested by quick field test methods, both of which had advantages and drawbacks as a method of determining nutrient content of manure.
- Consistency and accuracy in lab analysis for nutrients in manure make the procedure more attractive to producers, and MDA's certification program for labs testing manure is the first of its kind in the nation.
- MDA and cooperators on the project drafted a major resource for farmers and cooperators, "Recommended Methods of Manure Analysis"

Financial Information

The grant for \$17,100 was matched by \$19,831 in cash and in-kind donations.

Payment for Pounds Phosphorus Study -- Bioavailable Phosphorus Credits

Reducing the amount of phosphorus entering our lakes, rivers and streams is a function of how well we understand the way phosphorus moves in the environment. These include questions such as how well do soils retain phosphorus, how much runs off and how bioavailable the phosphorus might be.

In this sub-project of the Payment for Pounds Phosphorus Pollution Trading Program, the basic physical and chemical properties of soils in the Minnesota River Basin are the focus of investigation.

The objectives of the University of Minnesota project:

- Determine the relationship between Minnesota River basin soil physical and chemical characteristics and how much phosphorus is absorbed by the soil.
- Determine the relationship among soil physical and chemical characteristics, the saturation point for phosphorus in soil, and the dissolved phosphorus that runs off.



- Determine the relationship among soil physical and chemical characteristics, the saturation point for soil phosphorus and how bioavailable the phosphorus is by using an algal bioassay.

The project involved sampling soil from the top five centimeters at three locations along hillslop transects at each of six sites, a total of 54 soil samples. The

types of Minnesota River basin agroecoregion soils sampled included:

- Rolling Moraine,
- Wetter Clays and Silts,
- Dryer Blue Earth Till,
- Coteau,
- Steeper Till and
- Dryer Clays and Silts.

None of the sites had a history of manure application, although one was located in a sheep pasture. The other locations were row-cropped.

Each sample was characterized for properties including organic matter content, pH, particle size distribution, available phosphorus (Bray-1 and Mehlich-III), sodium hydroxide (NaOH) extractable phosphorus, total phosphorus, calcium carbonate equivalent, aluminum oxide and iron oxide content. The following tests for the bioavailability of phosphorus were evaluated: NaOH extraction, iron oxide resin strips and algal bioassays.

The conclusions of the project include:

- A Bray-1 available phosphorus level of 75 mg/kg of soil appears to be a reasonable threshold for regulation to protect surface waters.
- When phosphorus pollution management issues are concerned, a more realistic consideration would be to assume a runoff of bioavailable phosphorus.
- Values based on runoff biologically available phosphorus are more applicable to the soils of the Minnesota River basin than values based on runoff soluble reactive phosphorus measures.

This information will be integrated into the U of M's larger project, evaluating and improving a pollution-trading process for phosphorus based on accurate information about how it moves in the environment.

For more information about Payment for Pounds Phosphorus Pollution Trading Program, contact David J. Mulla, U of M Department of Soil, Water and Climate, (612) 625-1244.

Results that Count

The study refined and assessed potential indicators that can be used to predict how specific Minnesota River basin soil types absorb phosphorus, at what level the soils become saturated and what the bioavailability of phosphorus is. This information will help in developing a pollutant-trading process for phosphorus.

Financial Information

The \$30,940 Section 319 grant was matched with \$34,940 in cash and in-kind contributions.

Wastewater Facilitator

Throughout Minnesota, individuals and organizations struggle with finding cost-effective, efficient and environmentally sound ways of disposing of wastewater. This Section 319 project focused on providing advice and assistance to clusters of people in the Greater Blue Earth River Watershed seeking local wastewater solutions.

There is a definite gap in services between individual sewage treatment system (ISTS) programs that deal with one landowner at a time and projects involving organizations with staff resources to explore options.



A wastewater facilitator can fill the gap, working with those clusters of people who fall between.

Within the Blue Earth River Watershed there is a tremendous need for someone to work with clusters of people to resolve their wastewater problems. Improperly treated sewage contributes significant amounts of nitrogen, phosphorus and bacteria to surface and ground waters. According to the MNRAP study, 70 percent of the systems are not in compliance with state law. This has a significant impact on such issues as phosphorus in Lake Pepin and hypoxia in the Gulf of Mexico. It also poses a health risk due to bacteria entering recreational or drinking waters or nitrate impact on city residents in Fairmont and Mankato who draw their drinking water from surface sources.

An Advisory Committee worked with the wastewater facilitator, selecting five priority sites of some 50 identified by county staff. Following intensive training in wastewater technologies, funding and partners in various agencies and organizations, Becky Schlorf Von Holdt began working with communities on wastewater options. These included:

- Godahl (2 households), where homeowners found funding for a community well and cluster mound septic system.
- Long Lake (82 households), where the Long Lake Subordinate Service District board worked with the facilitator to develop options.
- Fox Lake (76 households), working with homeowners and the county to develop a Lake Improvement District.
- East Chain Elementary School, where the facilitator assisted with signed land agreements, soil sampling, bid review for design and construction of septic system repair, site inspections and other mechanisms to move the process forward.
- Lewisville (115 households), where the facilitator assisted in research that elevated the city's ranking on the Project Priority List (PPL) and advised on funding options.
- Ormsby (85 households), where she worked with the city on a county challenge grant, completion of a Rural Development pre-application and PPL placement.

- Delft (31 households), where the facilitator has provided information about wastewater options that still exceed the financial capacity of the community, now forming a sewer district.
- Odin (65 households) and La Salle (48 households) also received consultation or assistance from the wastewater facilitator.

The wastewater facilitator also provided educational opportunities for communities, including tours, planning process flow charts, special events (a series of "First Flush" events to celebrate project completions) and other activities, reaching an estimated 82,000 people.

The impacts of the wastewater facilitator were wide-ranging, putting many of the participating communities on a path to better wastewater options and helping others bring projects to completion. The original goal of the project was to resolve wastewater problems for 300 households. With the help of the wastewater facilitator, the cumulative number should exceed 500 by the time all processes are completed that were begun with her assistance.

For more information about the Wastewater Facilitator project, contact Linda Meschke, Blue Earth River Basin Initiative, (507) 238-5449.

Results that Count

- The wastewater facilitator provided assistance to communities with wastewater problems affecting 504 households; the goal was 300.
- Education and awareness activities were provided to 82,000.
- Funding was received by several projects in the planning stages.

Financial Information

The \$92,130 Section 319 grant was matched by an estimated \$136.850 in cash or in-kind services.

The wastewater facilitator provided assistance to communities with wastewater problems affecting 504 households; the goal was 300.

River Friendly Farmer Program Expansion

With their intimate knowledge of the land and its uses, farmers make some of the most hard-working stewards of natural resources. The River Friendly Farmer Program, developed with Section 319 funds, provides recognition of farmers whose best management practices help maintain and improve water quality in Minnesota's rivers -- and incentives for others to follow their lead.

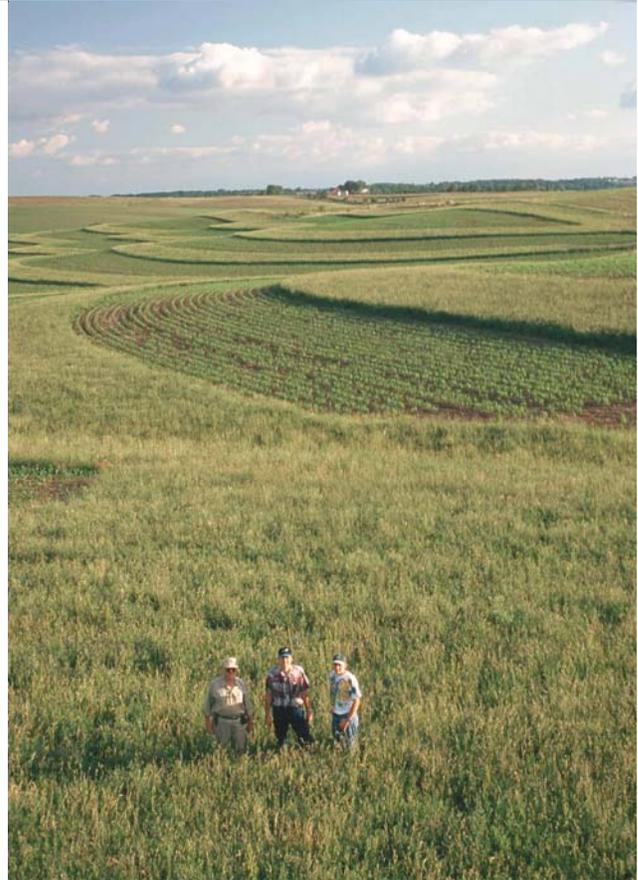
After four years of operation, the River Friendly Farmer Program of Minnesota had been active in 35 counties with 357 farmers having been recognized as River Friendly Farmers. The program promotes farming practices that benefit rivers while maintaining farm productivity and informs the public about farmers' contributions to the health of rivers in Minnesota.

The expansion program goals included:

- Expanding the program by five additional counties.
- Determine what factors are critical to successful programs -- those with many nominated farmers.
- Visit with counties currently not participating in the program to explain the program and assist with development.
- Promote use of tillage transect information and educate the public on River Friendly Farmer Program's 13 criteria.
- Help organize county or regional recognition events and promote recognition of the River Friendly Farmers, both statewide and locally.

The Program expanded to six additional counties, with a total of 41 counties nominating 431 River Friendly Farmers. A fact sheet, "Tips for a Successful River Friendly Farmer Program in Your County," provided counties with ideas about how best to implement a successful program. Counties previously involved with the program expanded their efforts.

The project partners continue to advise patience and persistence in engaging the interest of other counties in the River Friendly Farmer Program. Establishing criteria and recognition for demonstrated



environmental stewardship of Minnesota's rivers allows those recognized as River Friendly Farmers to spread the word that productive land and improved water quality in waterways can both be achieved through best management practices.

For more information about the River Friendly Farmer Program Expansion, contact Tim Wagar, University of Minnesota Extension Service, (507) 280-2866.

Results that Count

The River Friendly Farmer Program has expanded to six additional Minnesota counties, with a total of 431 farmers nominated so far.

Financial Information

A Section 319 grant for \$70,000 was matched by cash and in-kind contributions of \$72,500 from local partners.

Tillage Best Management Practices for Water Quality Protection in Southeastern Minnesota

Soil erosion, caused by snowmelt and rainfall runoff, threatens the long-term productivity of soil and degrades surface water quality. Of 42 officially listed stream reach impairments in the Lower Mississippi River Basin, the cause in 19 is turbidity -- usually the result of suspended sediment in the water.



- Soil drainage,
- Crop rotation,
- Weed management,
- Planting equipment,
- Nutrient management, particularly nitrogen, phosphorus, potassium and soil pH, and
- Manure management.

The publication covers the risks and benefits of

The partners in this Section 319 project developed a publication to help farmers optimize performance of their tillage system for both erosion control and profitable crop production. The publication draws on more than 18 years of University of Minnesota field trials to help evaluate how particular types of reduced tillage systems perform in different crop rotations in the two subregions of the basin -- the eastern karst area and the western loess-cap area.

Using a survey of Minnesota Corn-Soybean Residue for the Lower Mississippi River Basin, the partners found that 40 percent of fields met residue targets for corn and 56 percent met residue targets for soybeans. Fields meet crop targets if the conservation tillage benchmark of 30 percent surface residue after planting is met. A 30-percent residue provides significant erosion control for corn. A 15-percent residue cover following soybean planting also meets crop targets. There is considerable opportunity for increased adoption of conservation tillage across the basin, particularly in areas where adoption rates are currently low.

A number of tillage systems help maintain crop residue -- moldboard plow, chisel plow-plus, one pass, ridge-till, strip-till, rawson and no-till. Land-management factors also affect tillage. Among those factors described in the publication are:

conservation tillage, using a comparison between corn yields in a chisel-plow and no-till. The tillage cost difference in the example is \$13.56/acre, in favor of the no-till approach.

The publication also covers use of conservation structures to control erosion, tillage recommendations for southeastern Minnesota, and long-term research projects underway in southeastern Minnesota that will yield new information about how to most profitably use the land -- while keeping soil and sediment in their place.

For more information about the publication, "Tillage Best Management Practices for Water Quality Protection in Southeastern Minnesota," contact Tim Wagar, University of Minnesota Extension Service, at (507) 280-2866.

Results that Count

The University of Minnesota Extension Service published the tillage publication in February 2002. It has been used and distributed in conjunction with the River Friendly Farmer Program and at other venues promoting agricultural best management practices.

Financial Information

A Section 319 grant for \$44,000 supported this continuation of the Tillage Transect Program, matched by \$44,000 in local dollars.

Evaluation of the Potential Benefits and Adverse Effects of Alum Treatment to Remove Phosphorus from Lake Inflows



Alum is being used to remove phosphorus (P) from the inflows of two lakes in the Minneapolis/St. Paul metropolitan area -- Fish Lake and Tanners Lake. This Section 319 project evaluated factors that can affect the success of alum treatment, including:

- Treatment system design elements,
- Chemical composition of lake inflows and
- Lake characteristics.

Adverse impacts of alum treatment also were investigated, as well as a method to compare the effectiveness of alum to treat lake inflows and lake sediments. This research information will be of growing importance as more communities consider restoration of lakes on the impaired waters list.

The use of inflow treatment systems has not been widespread in the U.S. and there are misconceptions about how systems to treat inflow should be designed. Dosing procedures for whole-lake treatment with alum are not as relevant to inflow treatment as is the dosing procedures for wastewater treatment.

The investigation looked at inflow treatment design factors, as well as alum dose, mixing power, settling time and pH on P removal for Fish Lake (in Eagan) and Tanners Lake (in Oakdale). Both lakes have seen declines in water clarity. The inflow treatment

systems consist of a facility where alum is mixed with the inflow source and a pond where the aluminum hydroxide-P solids settle. Treated water is discharged from the settling pond to the lake.

The result of the study was a screening procedure to estimate the effect of whole-lake (sediment) and inflow alum treatment on in-lake P concentrations. Relationships established include:

- P release in sediment during anaerobic conditions is related to the amount of mobile P in sediments;
- Alum dose is related to the mobile P loss in sediments; and
- Alum dose is related to P removal for lake inflows.

Measurement of several lake characteristics, including the mobile P in sediment, P in lake inflows, the volume of lake inflows, and the mixing characteristics of a lake can be used as inputs to a mass balance lake model to estimate the potential effect of whole-lake and inflow alum treatment.

Though the effectiveness of any method will depend on the relative magnitude of external and internal P loads, use of modeling could assist in selecting the appropriate method of alum treatment, selecting an effective dose, and designing equipment to implement the treatment process.

The study also developed recommendations for alum treatment.

- Alum treatment should begin in early spring and go through the late fall for lakes with long hydraulic residence times.
- A reduced season is appropriate for lakes with shorter residence times.
- Aluminum that deposited on the lake's sediments reduced P release during anaerobic conditions.
- Aquatic toxicity from treatment should be negligible if pH is greater than 6.0 for the alum-treated water.

For more information about Evaluation of the Potential Benefits and Adverse Effects of Alum Treatment to Remove Phosphorus from Lake Inflows, contact Patrick Brezonik, University of Minnesota Water Resources Center, (612) 625-0866.

Results that Count

The study discovered relationships among factors involved in whole-lake and inflow alum treatment for phosphorus removal. A model developed during the research could make it easier for communities considering lake or inflow alum treatment to determine treatment method, design and alum dose to achieve best results and avoid toxicity.

Financial Information

The \$81,781 Section 319 grant was matched by \$82,974 in cash and in-kind contributions.

These relationships can be used to estimate the effect of inflow and whole-lake alum treatment on in-lake P levels.

Small Community Wastewater Solutions

Minnesota has thousands of communities -- groups of homes -- scattered across rural, forested and lake areas, all of which face the issue of providing good wastewater treatment to protect themselves and to meet current regulations. Many of these communities have small lot sizes, poor soil for treatment, or both. Some communities are experiencing rapidly growing population, while others are not growing or are declining. Property values of affected households range from a few thousand to well over a million dollars.

An estimated 27 percent of Minnesota households treat wastewater using an on-site sewage treatment (septic) system to recycle water back into the natural environment. The percentage of new homes being served by on-site systems is growing. In Minnesota, more than 30 percent of all new homes built are using on-site systems to recycle water. Property owners need to learn to identify current and incipient wastewater treatment problems, evaluate options, and

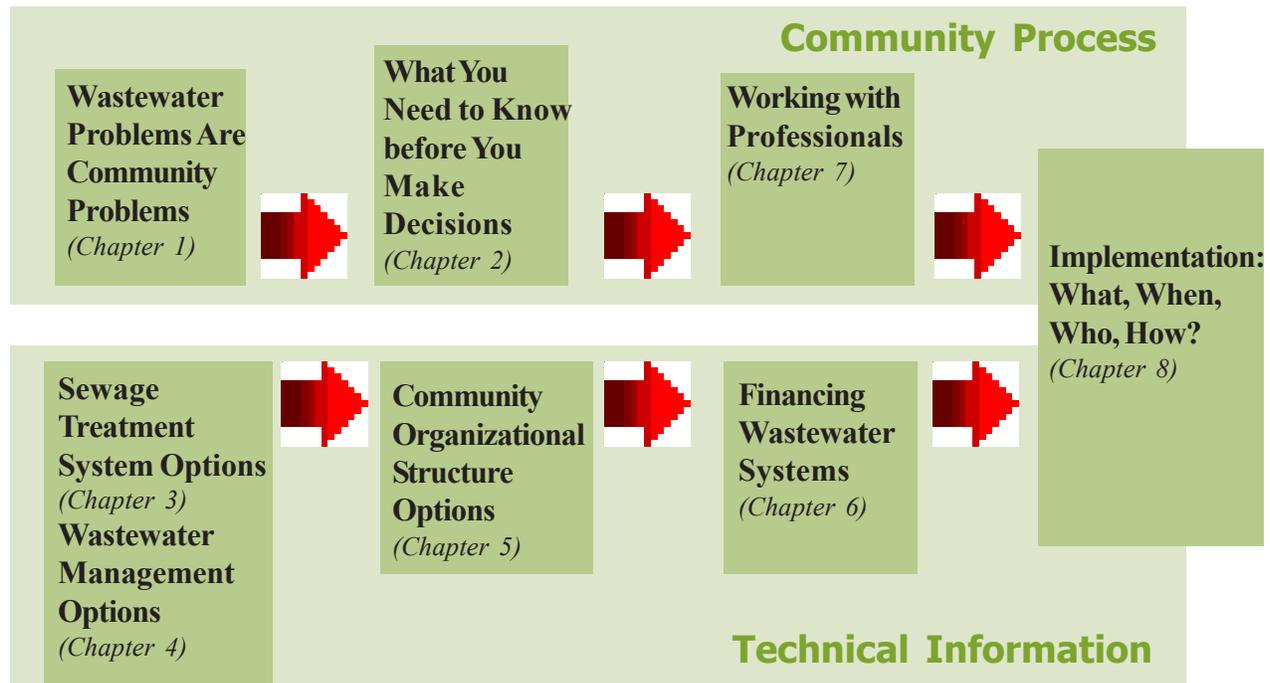


make appropriate decisions about financing, monitoring, operating and maintaining cost-effective sewage treatment systems in their communities.

This Section 319 project led to preparation of a common-sense guidebook for individuals and communities seeking practical solutions to wastewater problems. "Small Community Wastewater Solutions: A Guide to Making Treatment, Management and Financing Decisions" has been published by the University of Minnesota Extension Service and the College of Natural Resources to steer communities through the decision-making process.

Minnesota Pollution Control Agency

A Roadmap to Small Community Wastewater Treatment Solutions



The guidebook covers both the community process undertaken to decide about wastewater treatment options and the technical information about system type, financing, organizational structure and management. It is written for nontechnical audiences in straightforward language, with many diagrams and illustrations of key technologies.

The guidebook also provides resources for communities, case studies of successful community strategies to deal with wastewater problems, overviews of the laws dealing with wastewater, and emerging technologies.

For more information about “Small Community Wastewater Solutions,” contact Ken Olson, University of Minnesota Extension Service, at (612) 625-7243.

Results that Count

To date, 1,548 copies of the manual have been distributed, 280 as texts for six Small Community Wastewater Education seminars. It takes three to seven years for communities to complete the steps, so outcomes are pending.

Financial Information

The \$11,750 Section 319 grant was matched by \$11,750 in cash and in-kind contributions.

Solutions to wastewater issues are more dependent on the community’s process (people) than on the science and engineering (technology) available.

Shoreland Reclamation for Improved Water Quality

Landowners who live near or own shorelines reap the benefits of lakes, rivers and streams -- natural beauty, fishing, boating, wildlife. They also experience the problems -- varying lake levels, erosion, algae blooms. This Section 319 project in the Carnelian Marine Watershed District (CMWD) in Washington County enlisted landowners in reclaiming shoreline areas through best management practices.

The CMWD first developed a cost-sharing best management practices program by outlining specific eligibility, cost-share, criteria and administration procedures. The project staff contacted approximately 100 landowners identified as having sensitive shoreline areas. Interested landowners (more than 60) received a site visit to provide an overview of nonpoint-source water pollution and discuss potential sources on the property. The staff provided BMP solutions and information about cost-share incentives.

BMPs were implemented at 25 sites by the end of the project. Of these, 23 were landowners participating in the cost-share program. The majority of these projects involved lakeshore restoration with aquatic and terrestrial plants, buffer strips, vegetative swales and rainwater gardens. Landowners learned, during the process, about the water-quality and habitat benefits of their projects.

Initially, project staff planned to actively recruit participants, but as CMWD staff worked with landowners, word got out and potential participants are finding the program. Other agencies, including the Minnesota Department of Natural Resources and Washington County, have directed landowners to the program as well.

Best management practices that have been implemented serve as demonstrations for landowners who are curious about the potential to improve water quality through shoreline management. The CMWD developed and delivered public information on best management practices. More than 150 people took part in the shoreland management educational programs, such as tours of demonstration projects,



four education events for CMWD residents, a newsletter, and site inspections to monitor progress.

Phosphorus and secchi disk readings of lakes targeted by the project will routinely be part of the CMWD's annual water monitoring program, which will be indicators of long-term impacts of the BMPs on water quality.

For more information on Shoreland Reclamation for Improved Water Quality, contact Jeff Berg, Washington County SWCD, at (651) 275-1136, x.23.

Results that Count

- 25 targeted landowners voluntarily took lasting measures to improve water quality; 23 participated in the cost share. The goal was 24.
- More than 150 people participated in educational activities and events. The goal was 30.

Financial Information

A \$23,250 Section 319 grant was matched by \$34,461 in cash and in-kind services locally.

Construction Site Erosion Control Ordinance Implementation

Erosion from construction sites, whether large or small, has serious adverse impacts on water quality -- especially in those areas undergoing brisk development. This Section 319 project focused on providing education and training to key groups, promoting expertise in erosion-control measures, and improving implementation of state programs and local ordinances.

The project staff first approached the experts, providing Certified Professional Erosion and Sediment Control (CPESC) training at statewide conferences of the Minnesota Association of Soil and Water Conservation Districts and the Minnesota Erosion Control Association. This training has become integral to the conference and interest in additional training and testing is under discussion.

The Minnesota Department of Transportation (MnDOT) implements large-scale, complex construction processes. Project staff and partners held 10 pilot certification training sessions statewide to train county project construction personnel, contractors, consultants and local agencies responsible for erosion control during construction activities. Space was limited to 50 for each session, and most sessions had waiting lists.

Regional workshops for local governments on construction site erosion control and storm-water management were equally in demand, with 15 workshops proposed and 27 presented. Local governments faced with designing ordinances to control erosion and storm-water, as well as cities that need storm-water permits, found the presentations to be timely and helpful.

The project partners also completed a field version of "Protecting Water Quality in Urban Areas," a comprehensive resource developed and updated by the MPCA. The first printing of the field version was exhausted within weeks, requiring an additional press run.



Finally, the project partners are working to institutionalize a certification process for construction site erosion control in Minnesota. Among other groups interested in offering the training at annual conferences are the Minnesota Home Builders Association, Association of General Contractors, Minnesota Nurseryman and Landscape Association, and others.

For more information about Construction Site Erosion Control Ordinance Implementation, contact Jay Michels, Minnesota Erosion Control Association, (651) 351-0630.

Results that Count

- Certified Professional Erosion and Sediment Control Training or local government erosion-control workshops have been provided to erosion-control practitioners (six annual conferences); MnDOT employees (10 sessions); and local government (27 sessions).
- A field guide for urban storm-water management was so in-demand that it went to a second printing.
- The certification process for construction site erosion control is being institutionalized and supported by many key partners in erosion control.

Financial Information

The \$60,000 Section 319 grant was matched by \$60,000 in cash and in-kind contributions.

Lakeshed Erosion Control Cost-Share Program

This Section 319 project demonstrated how to apply lower-cost options for land treatment to control sediment and nutrient loadings in lake watersheds. It provided cost-share opportunities to landowners for erosion control and nutrient-reduction practices. Project staff worked with two soil and water conservation districts, Todd County SWCD and Aitkin County SWCD.

The SWCDs targeted specific lake watersheds and inventoried opportunities to implement lower-cost best management practices. The Todd County SWCD combined a proposal for vegetative buffer strips, livestock fencing, erosion control, feedlot relocation and alternative watering systems in the Swan Lake watershed around Big Swan Lake, Long Lake and Lady Lake. The Aitkin County SWCD proposed livestock exclusion, critical area seedings, shoreline stabilization demonstrations, education and tree plantings in the Hill Lake watershed, focusing on Morrison Brook. Projects were marketed to landowners at a 75-percent cost-share rate.

Projects completed by the Aitkin County SWCD:

- A livestock exclusion project for Morrison Brook (cattle crossing, culverts and earthwork);
- An alternative sewage treatment demonstration in Hill City;
- A shoreline and lake access erosion control and stabilization project at Taylor Lake;
- A revegetation project at Hill Lake;

Todd County SWCD focused on willing landowners, who installed:

- Buffer strips and fencing at two properties;
- Critical area seeding;



- A waterway diversion, accompanied by a nutrient plan;
- Terraces and a sediment dam.

The original intent of project partners was to use the Board of Water and Soil Resources LARS reporting system to determine the erosion and nutrient reduction impacts of the projects, but they were unable to generate reliable data. However, the diversity of projects funded demonstrates that landowners are willing to install low-cost erosion control, nutrient management and water-quality improvement projects if the financial incentive is available.

For more information, contact Ron Shelito at (218) 828-2604.

Results that Count

Aitkin and Todd SWCDs completed 11 diverse improvement and demonstration projects with willing landowners in targeted lake watersheds.

Financial Information

This project received a \$50,000 Section 319 grant, matched locally by \$125,378 in cash and in-kind contributions.

Accelerated Water Quality Improvement Program in Stearns County, Phase II

Efforts to improve the Sauk River Watershed are having an effect, but certain priority areas -- Getchell Creek, Unnamed Creek and Stony Creek -- show levels of total phosphorus 40 to 50 percent above the ecoregion averages. The goal of this Section 319 project was to lower the total phosphorus concentration to the ecoregion average for these tributaries and the Sauk River.

Partners worked with agricultural producers located within targeted subwatersheds and assisted them in applying conservation practices to solve high-priority water-quality problems. The grant focused on producers with fewer than 1,000 animal units, promoting erosion control, monitoring and education.

The Getchel Creek, Unnamed Creek, and Stony Creek and their watersheds contain a significant portion of the middle Sauk River watershed. The Sauk River Watershed District began monitoring the total phosphorus concentration in these tributaries in 1995, as recommended in the 1992 Sauk River Chain of Lakes diagnostic study.

The short-term goal for these tributaries is to maintain water-quality conditions (at a minimum) and the long-term goal is to achieve 100-150 ug/L total phosphorus and 7-10 mg/L total suspended solids. Based on arithmetic summer averages, Stony Creek and Unnamed Creek are maintaining positive trends. Data fluctuations are very similar to precipitation patterns in the area. The Sauk River and Getchel Creek total phosphorus concentrations have less

similar patterns, potentially related to municipal discharges of wastewater and storm water. The difference becomes more evident in drier summer seasons.

Getchel Creek continues to maintain elevated total phosphorus concentrations. Additional investigations are needed to determine the external loading coming into Getchel Creek, such as drainage ditches, municipal storm water and wastewater.

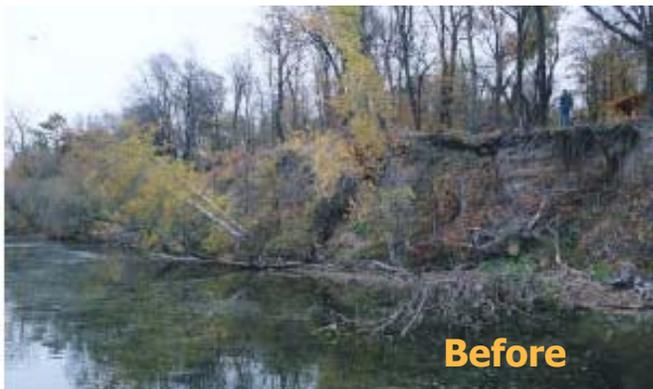
For more information about Accelerated Water Quality Improvement Program, Phase II, contact Dennis J. Fuchs, Stearns County Soil and Water Conservation District, at (320) 251-7800 x. 3.

Results that Count

- Eight animal waste storage improvement projects, resulting in an estimated reduction of 478 pounds of phosphorus each year.
- Three erosion-control projects that dramatically reduced soil loss an estimated 3,550 tons per year.
- A Manure Utilization and Conservation Tillage Demonstration Field Day introduced interested producers to conservation techniques.

Financial Information

The \$200,000 Section 319 grant was matched by \$200,000 in local cash and in-kind services.



Grazing Lands Improvement Project

Proper management of livestock grazing prevents runoff of manure and soil from pasture land. The objectives of the Grazing Lands Improvement Project were to assist landowners and operators to develop and maintain managed grazing systems and to provide technical support in pasture management to local natural resource managers from the Natural Resource Conservation Service and soil and water conservation districts.

The first task was to provide training in forage plant identification, forage suitability and planning prescribed grazing systems to NRCS, SWCD and other natural resource local staff to update them on current research and information on pasture management. Participants in workshops provided by the Minnesota Board of Water and Soil Resources came from all regions of the state, 62 attending forage plant identification workshops and 116 attending combined planning prescribed grazing systems/ forage suitability workshops.

Project staff reviewed the U.S. Department of Agriculture Environmental Quality Incentives Program (EQIP) plans that indicated training needs for landowners, particularly in the areas of livestock watering, sensitive area management, and planning managed grazing systems. More than 100 managed grazing plans have been completed from 1998 to 2001, but a backlog of 85 grazing plans indicates a large interest in conversion to managed grazing systems.

The workshops that resulted from this research included 13 workshops and field days (including one for Amish farmers) on planning managed grazing systems, 10 workshops and field days on forage yields and availability, and three workshops and field days on managing livestock on sensitive areas. Project partners also developed a "Grazing Systems Planning Guide" and preliminary work on a Managed Grazing Systems School for Minnesota. The school

will consist of approximately 15 courses related to grazing issues. It will consist of easily transported, prepared course materials that can be taken to any group that wants education on a particular topic.

For more information about the Grazing Lands Improvement Project, contact Howard Moechnig, BWSR, at (651) 215-1529.



Results that Count

- 485 producers attended 13 workshops on prescribed grazing systems.
- 119 producers attended 10 workshops on forage.
- 120 producers attended three workshops on managing livestock in sensitive areas.
- A grazing systems guide and mobile grazing school are available to producers.

Financial Information

The \$61,200 Section 319 grant was matched by \$63,588 in cash and in-kind contributions locally.

Whitewater River Watershed National Monitoring Program

The Whitewater River and its watershed have been the focus of considerable interest regarding the river's water quality. Several reaches of the river are actively managed as trout fisheries. Water-quality concerns have focused on sediment problems, dissolved oxygen, and elevated temperature.



The Whitewater River Watershed National Monitoring Program has been one of many watershed management efforts in the Whitewater River Watershed in the past several years. The goals of this project are:

- To provide information required under the National Monitoring Program for use in evaluating the effectiveness of best management practices implementation, and
- To provide long-term monitoring for continuing evaluation of the pollution problems and solutions in the Whitewater River Watershed Project.

Not only will the monitoring program benefit the ongoing evaluation of the watershed, but also provides an initiative for advancing the use of biological monitoring in watershed projects in Minnesota.

The activities undertaken with Section 319 monies include:

- Biological monitoring using a reference site design (performed by Winona State University);
- Physical/chemical monitoring on five small watersheds using a paired-watershed design (performed by the U of M Department of Biosystems and Agricultural Engineering);
- Land-use tracking and BMP implementation in the small treatment watersheds; and
- Data analysis and reporting to the EPA.

Analyses will include:

- long-term flow records;
- event and base flow conditions;
- annual, seasonal and storm event values;
- site comparisons;
- load estimates;
- land-use comparisons; biological indices; and stream types.

The ultimate goal is to determine if water-quality changes are detectable and document the effectiveness of BMP implementation in improving the water quality in the river.

For more information, contact Greg Johnson, MPCA, at (651) 296-6938.

Results that Count

Analyses of the water quality in the Whitewater River watershed will demonstrate whether implementing best management practices improves water quality over the long term.

Financial Information

The \$48,780 Section 319 grant was matched by in-kind services provided from MPCA state program and project funds.

Projects Completed in 2002

Clean Water Partnership

Lake Francis Diagnostic - Feasibility Study

Lake Francis, located in Isanti County (east-central Minnesota) near the city of Isanti, has an average Trophic State Index that indicates a water quality that is one of the worst in the region. Lake users see a reduction in water transparency, abundance of roughfish, increased algae, no aquatic vegetation and little recreational use.

The Lake Francis Improvement Association formed to address the lake water quality, and joined with Isanti County to improve the recreational quality of the lake by reducing the frequency and severity of algal blooms, increasing water clarity and increasing the fisheries potential. The goal of this CWP project was to develop a comprehensive strategy to achieve this, based on diagnostic information.

Lake samples taken from 1999 to 2001 were analyzed for nutrients, dissolved oxygen and other chemical parameters. Samples of microscopic plants and aquatic plants were examined. Lake inflows and outflows were measured. Finally, project staff reviewed information on soils, geology, hydrology, climate, vegetation, population, land-use changes and other historical factors.

The lake is not deep enough to allow for adequate sedimentation and not shallow enough to remain a viable wetland. Water quality can be improved only if internal phosphorus loading is halted. This will be achieved through a lake drawdown that will allow regrowth of vegetation and a reduction in resuspension of sediments. After drawdown, the lake will be stocked with gamefish and aeration will occur during some winter months.

Then, it is the community's turn to act, through:

- Education and stewardship programs,
- Individual septic system repairs and upgrades,
- Water craft ordinances, such as a "no wake" provision and restricted horsepower for boat motors,
- Erosion control, and
- Removal of lake sediments.

For more information about the Lake Francis Diagnostic - Feasibility Study, contact Don Quaintance, (651) 646-6600.

Results that Count

The study determined that internal phosphorus loading was the greatest barrier to improved water quality.

Financial Information

The \$24,150 CWP grant was matched by \$24,150 in cash and in-kind services.



Long/Spring Lakes - Shoreline Stabilization Project

Long and Spring Lakes in Meeker County have been adversely affected by erosion and nutrient loading from land use around the lakes. The goal of this CWP project was to reduce shoreline erosion and nonpoint-source nutrient loading. Ten lake properties agreed to become demonstration sites, in hopes that other landowners would be encouraged to adopt similar best management practices. Some of the properties are privately owned, others are city or county property. These BMPs, combined with education and enforcement activities by the City of Dassel, reinforced the value of the lakes to community members.



The most successful strategy for promoting lake best management practices was, to quote one project coordinator, “leading from behind.” Landowners skeptical about the cost or effectiveness of installing best management practices could not be pushed. Showing them the DNR’s “Landscaping for Wildlife and Water Quality” and talking with participating neighbors convinced several landowners to join the restoration efforts.

For more information about the Long/Spring Lakes Shoreline Stabilization Project, contact Dan

Carlson, Dassel Area Environmental Association, at (320) 275-3166.

The project helped complete shoreline buffer at all 10 sites, as well as filter blanket and rock to stabilize a closed Long Lake access point. Vegetation and erosion-control measures installed on the properties attracted the attention of landowners still wary of involvement with the project. Local residents needed time to buy into the idea of not mowing the lawn to the water’s edge, for example.

Other activities undertaken as part of the grant were:

- Water quality monitoring, including Citizen Lake Monitoring Program monitoring in both lakes in 2002.
- Long/Spring Lake Watershed education efforts continued by the City of Dassel and the Dassel Area Environmental Association.
- Six street-sweeping events per year completed by the City of Dassel.
- City ordinance banning phosphorus fertilizer and discharge of lawn debris to curbs, gutters and hard surfaces which drain to the lake, along with awareness and enforcement support.
- Distribution of the Minnesota Department of Natural Resources “Landscaping for Wildlife and Water Quality” book and CD-ROM.

Results that Count

- The project completed 10 shoreline stabilization projects, with community interest later expressed in participating in the project by other landowners.
- The City of Dassel increased street sweeping and committed to a no-phosphorus fertilizer and lawn waste management ordinance.

Financial Information

The \$26,689 CWP grant was matched by \$59,651 in cash and in-kind activities.

Locals needed time to accept the shoreline stabilization/restoration efforts. Some did not think that what they were doing could be causing harm to the lake they love.

Cold Spring Wellhead Protection Project

The City of Cold Spring in Stearns County began developing a Wellhead Protection Plan in the mid-1990s, but soon discovered that other public water suppliers in the area used the same aquifer and would be affected by the plan. This CWP project involves the development of a joint Wellhead Protection Plan, taking in six public water suppliers.

The aquifer that supplies area wells is vulnerable to contamination from normal land uses. Therefore, the wellhead team of public water suppliers focused on land-use activities in the drinking water supply management area.

Analysis of the all existing public wells in the supply area, funded by the CWP, indicates that all are vulnerable. Monitoring by the Minnesota Department of Health has shown elevated levels of nitrate and other contaminants in the water supplies. There is strong evidence that some suppliers are producing very young water, four years old or less.

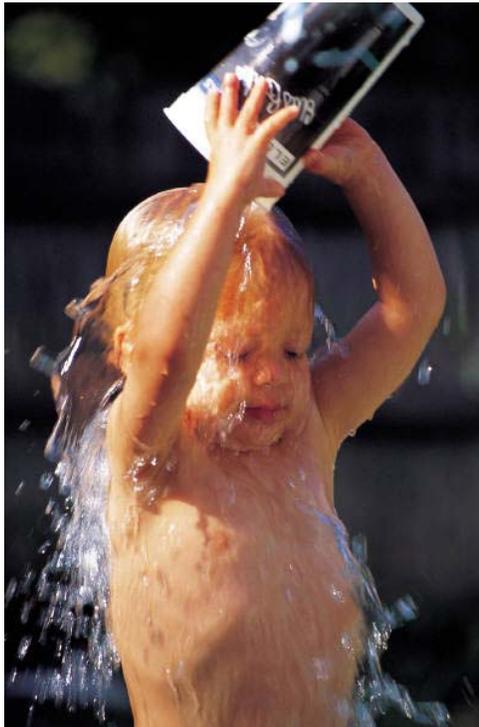
A second issue facing the city and surrounding community is the prevalence of elevated nitrate in local drinking-water supplies.

Through monitoring of both public and private wells during the years, a number of locations have been identified where drinking water supplies have been affected by nitrate contamination. Various sampling efforts indicate that nitrate levels in and around Cold Spring vary from 0.5 mg/l to 14.0 mg/l. It has been shown that nearby domestic wells have even higher nitrate levels. One goal of the CWP project was to identify how nitrate is distributed in the ground water, after which the team identified nitrate management strategies that will help protect local drinking water from additional degradation. Program elements included:

- Establishing the Wellhead Protection Partnership Team;
- Assessing data related to area delineations and vulnerability assessments;
- Locating all public wells and conducting pump tests;
- Delineating wellhead protection areas;
- Delineating drinking water supply management areas;
- Completing vulnerability assessments;
- Completing contaminant source inventories;
- Preparing management strategies and the plan;
- Completing the nitrate investigation;
- Working with the U.S. Geological Survey on a nitrate flowpath and modeling study;
- Initiating education and public involvement activities; and
- Preparing reports.

The adoption of the plan sets the stage for the Wellhead Protection Team to implement recommendations for protecting public water supplies.

For more information about the Cold Spring Wellhead Protection Project, contact Larry Lahr, City of Cold Spring, (320) 685-3653.



Results that Count

Six public water suppliers collaboratively completed a Wellhead Protection Plan for the Cold Spring area.

Financial Information

The \$100,620 CWP grant was matched locally by \$138,666 in cash and in-kind contributions.

Rush Lake Phase I Resource Investigation

East and West Rush Lakes are located in Chisago County, which is undergoing population increases and development. Lake users have noted increases in nuisance summer algae blooms and decreases in water clarity.

This CWP project's goal was to determine the causes of the lakes' deteriorating water quality and design a program to improve the lakes. The Phase I investigation began with data collection, including:

- Two years of flow monitoring data on eight tributary streams;
- Two years of lake monitoring, May through September;
- Special winter water-quality sampling through the ice;
- Fish surveys conducted by the Minnesota Department of Natural Resources and the Mille Lacs Band of Ojibway;
- Spring and fall aquatic plant surveys;
- Onsite system aerial survey and analysis;
- Shoreland inventory of lakeside residences with an existing condition analysis; and
- Lake sediment fertility analysis to gauge potential for Eurasian water millfoil growth.

Analysis of the information showed that both East and West Rush Lakes have high fertility, due to a number of factors. Streams are bringing above-average phosphorus loads into the lakes. West Rush Lake receives more pounds of phosphorus from runoff, but then serves as a significant source to East Rush. Lake sediments, rough fish and curlyleaf pondweed dieback represent significant phosphorus sources. And a carp reduction program is a priority, as the fish have a significant adverse impact on water quality. In addition, nutrient reductions in two subwatersheds are a high priority.

Water-quality targets and goals for Rush Lake were developed using ecoregion lakes in the Central Hardwood Forest Ecoregion, and these include:



- Reducing summer average phosphorus from its current level, 50 to 60 ppb, to 40 ppb or less.
- Maintain summer average transparency of at least six feet with July and August readings (average is currently 5.4 feet for West Rush and 5.3 feet for East Rush).
- Reduce summer algae blooms.
- Reduce nuisance acreage of curlyleaf pondweed by 50 percent and maintain diverse native aquatic plants that cover 40 percent of the lake bottom.
- Maintain the above-average number of northern pike through catch and release, so that they can help control forage fish.
- Improve habitat and shoreline areas to encourage bird species and discourage geese nesting.
- Maintain moderate boat traffic and hours.

The implementation of the resulting improvement plan is estimated to take three years.

For more information about the Rush Lake Phase I Investigation, contact Tom McKenzie, Rush Lake Improvement Association, (651) 213-0270.

Results that Count

Priority pollution sources and problems have been identified for the Rush Lakes, goals for improvement set, and an improvement plan developed.

Financial Information

The \$70,000 CWP grant was matched by \$116,657 in local cash and in-kind contributions.

Square Lake Phase I Resource Investigation

Square Lake in Washington County is rated in the top one percent for water clarity in the North Central Hardwood forest ecoregion. The Metropolitan Council considers Square Lake a metro “priority” lake because of its many recreational uses and exceptional water quality. The goal of this resource investigation was to find out how vulnerable Square Lake might be to pollution and to develop protection strategies to maintain it in its crystal clear condition.

The specific goals of the study were:

- To characterize hydrologic and nutrient regimes of the lake and explore both internal and external nutrient sources;
- To collect data to make accurate predictions of the lake’s response to various management options;
- To educate watershed, shoreland and nonresident lake users about commonly accepted practices that will protect the lake’s water quality; and
- To understand the delicate ecological balance of the lake and develop a plan to ensure that the natural system is sustainable.

Data collected and analyzed revealed:

- A decrease in transparency through the 1990s, with transparencies of 25 feet not seen for 10 years or more. The goal is to maintain 23 feet.
- While oxygen in the lake’s bottom water is depleted by mid-July, phosphorus is not released from lake



sediments because of the lake’s depth and shape, and is not a significant phosphorus load.

- Algae in the lake is low because phosphorus, the limiting growth factor, is 12 ppb (long-term seasonal average) and nitrogen (0.40 ppm) and chlorophyll a are also low, although chlorophyll a is increasing slightly.
- Trophic state is 32-40, which translates to moderately clear water but increasing probability of anoxia in the lake bottom during the summer.
- The aquatic plant community was excellent for water quality, with high biodiversity and lack of invasive or exotic species.
- Surface inflow brings 18 percent of the phosphorus load into Square Lake, with specific subwatersheds contributing much higher levels than others.
- More than 70 percent of the phosphorus load to the lake is estimated to come from ground water, with specific subwatersheds contributing higher levels of ground water phosphorus than others.

The management plan for Square Lake involves public education on lawn care, septic system management, and shoreline best management practices. Wilder Forest contributes eight percent of the total phosphorus load to Square Lake, and rehabilitating wetlands on the property is recommended for study. Road stabilization, enlarging a storm-water pond, conservation easements for undeveloped shorelines, an aquatic management plan and other strategies should help keep one of the metro areas clearest lakes in good condition.

For more information about the Square Lake Phase I Resource Investigation, contact Karen Kill, Washington Conservation District, (651) 275-7502.

Results that Count

An implementation plan that will protect Square Lake’s excellent water quality is completed.

Financial Information

The \$56,000 CWP grant was matched locally by \$73,814 in cash and in-kind contributions.

South Branch Root River Watershed Phase I Diagnostic Study

Four minor watersheds drain to the South Branch of the Root River studied in this CWP project area, which is comprised of parts of Fillmore and Mower Counties. Less than half of the area drains directly to the South Branch, which originates as a warm water stream but changes to a cold water stream after sinking underground near Mystery Cave and re-emerging three miles downstream. The land use in the watershed is primarily agricultural (80 percent), with forest and grasslands.

The diagnostic study included the following:

- Tailored Integrated Stream Watershed Assessment,
- Assessment of the uses and impacts of Forestville State Park and Mystery Cave,
- Surface water hydrology and chemistry,
- Citizen stream monitoring data,
- Physical stream assessment,
- Biological stream assessment, and
- Karst investigations.

The study discovered the following key features of the South Branch of the Root River:

The Upper South Branch has flatter topography, a very high percentage of row crops, intensive tile drainage, very high runoff, problems with fecal coliform bacteria and nitrate, elevated temperatures, and is impaired based on invertebrates.

The Middle South Branch has moderate slopes; a high percentage of row crops; karst features; less runoff and tile drainage than the Upper South Branch; problems with suspended solids, phosphorus, fecal coliform bacteria and transparency; highest abundance and diversity of mussels, fish and invertebrates; and a high gradient in some areas.

The Lower South Branch has steep slopes, highest density of livestock and feedlots, karst topography, runoff lower than both the Upper and Middle South Branches, problems with suspended solids and phosphorus, poor fish population, and eroding banks.

Following the investigation, the project partners developed an implementation plan with selected high priority areas and initiatives. These included:

Upper South Branch

Reduce flows, reduce nitrate by 25-30 percent, reduce fecal coliform bacteria to meet the state water-quality standard, and maintain and enhance existing stream habitat, fish, mussel and invertebrate communities.

Middle South Branch

Reduce long-term total suspended solids by 60-80 percent, reduce turbidity, shorten stream transparency recovery times, reduce long-term total phosphorus by 40-60 percent, reduce fecal coliform to meet the state water-quality standard and protect and enhance existing aquatic habitat and communities, particularly that of unionid mussels.

Lower South Branch

Reduce long-term TSS by 60-70 percent, reduce turbidity, shorten stream transparency recovery times, reduce fecal coliform bacteria levels to meet the state water-quality standards, reduce long-term total phosphorus by 50-70 percent, and maintain recreational trout fishery.

For more information about the South Branch Root River Watershed Phase I Investigation, contact Donna Rasmussen, Fillmore County Water Plan Coordinator, (507) 765-3878, ext. 3.

Results that Count

The diagnostic study resulted in a comprehensive and targeted implementation plan for improvements in the South Branch of the Root River.

Financial Information

The \$61,500 CWP grant was matched locally by \$78,850 in cash and in-kind services.



Whitewater River Watershed Project, Phase II

Data is important to assess what water-quality problems most impair a watershed or specific reach, but solutions reside, in great measure, with citizens. Outreach, communication and citizen participation are key ingredients to a successful restoration of a river in trouble.

Following a Watershed Plan and Environmental Assessment issued for the Whitewater River watershed in 1998, a CWP Phase II Implementation and Monitoring Plan was developed and begun. Activities fell into four major categories:

- Financial assistance,
- Technical assistance/education,
- Monitoring/assessment/evaluation, and
- Project administration.

Financial assistance

- Incentives for cover crops have been paid on 513 acres, and
- Tuition assistance allowed watershed teachers to attend a regional karst workshop.

Technical assistance/education

- A Soil Erosion Workshop for Contractors drew an audience of 59 participants, and
- Whitewater Township distributed a watershed forestry brochure.

Monitoring/assessment/evaluation

- Thirteen citizens are conducting stream monitoring activities at 14 sites,
- Whitewater Project staff monitor nine additional stream sites,



- Evaluation of the effectiveness of past conservation practices began at Logan Creek, and
- An evaluation of the impacts of turbidity in North branch was completed, with a summary sent to land owners this spring.

Project administration

- Administrative funds allowed for Whitewater Project staff to be involved with water planning and development activities of other watershed partners,
- A watershed forester position has assisted with reforestation plans for 19 acres, which have been completed on 10.5 acres, as well as assistance on a total of 45 acres, and
- Contracts were issued and managed for 61 conservation practices, which received cost-share after completion.

For more information about the Whitewater River Watershed Project, Phase II, contact Linda Dahl, Whitewater River Joint Powers Board, at (507) 523-2171 x. 110.

Results that Count

- Cover crops were planted on 513 acres due to financial incentives.
- Thirteen citizens are monitoring stream water at 14 sites in the watershed.
- An estimated 61 contracts were signed for conservation practices, which were completed.

Financial Information

A \$218,000 CWP grant was matched by local funds, but a reported amount was not available.

A primary project goal is to “fill the gaps” left by other available conservation programs, specifically in the areas of outreach, communication and citizen participation.

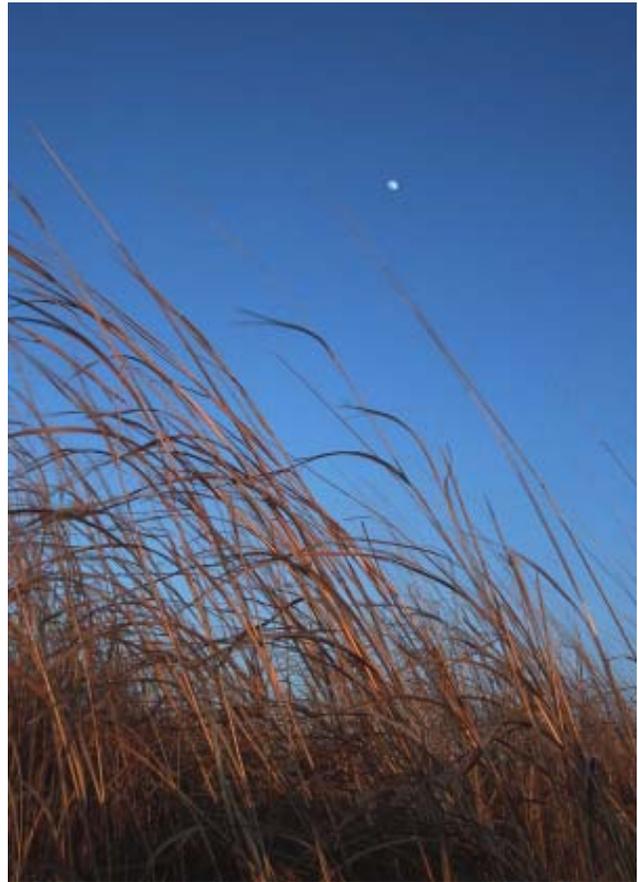
Lake Washington Phase II Implementation

An intensive data-gathering effort to understand and restore water quality in Lake Washington in Le Sueur County in 1994 drove several important improvements. Building on a diagnostic study and following monitoring in 1998, the project partners implemented additional best management practices to continue reductions of nutrients into the lake.

Among those Phase II activities funded by this CWP grant:

- The development of a Watershed Resource Committee of 15 citizens and agency representatives to promote watershed projects.
- An estimated \$654,000 in low-interest loans were used in repairing, replacing or upgrading failing or nonconforming septic systems.
- An Aquatic Plant Management Plan, with implementation from 1996 through 2000, included seed-bank development, transplanting and harvesting, and creating a homeowner's guide to aquatic plants.
- An experimental septic system station at the University of Minnesota Extension Service was constructed, using engineered wetlands, peat filters and sand filters. This system operates for more than 20 homes in the Baker's Bay subdivision.
- Sites for wetland enhancement or restoration were identified in priority subwatersheds and landowners were encouraged to undertake projects.
- A watershed specialist enrolled landowners into easement programs for buffers and wetland enhancement. He also assisted with erosion control and other upland best management practices.
- Educational activities included homeowners' workshops on septic systems, aquatic plant workshop, agricultural best management practices demonstrations, landscaping workshops, and more.
- Sediment ponds designed and installed in priority subwatersheds.

Of the goals established for this implementation project, the most successful were in the areas of aquatic plant management and wastewater treatment



improvements. Wetland and shoreline restoration projects were less successful, with landowners reluctant to undertake recommended activities.

For more information about the Lake Washington Phase II Implementation, contact Carrie Steinborn, Le Sueur County Environmental Services, at (507) 357-2251.

Results that Count

The project saw completion of substantial septic system upgrades, sewage treatment options, sedimentation ponds and uplands best management practices.

Financial Information

A \$121,477 CWP grant and \$1.2 in SRF loans were matched locally with \$103,424 in cash and \$70,551 in in-kind services.

Grove Lake Phase II Implementation

The Grove Lake watershed in Pope County is the headwaters of the North Fork of the Crow River, located in an area known as the Prairie Pothole Region. The average depth of Grove Lake is three feet (maximum depth 31), so nutrient loading from surrounding land uses (44 percent is agricultural) was a top priority.

The project's six main implementation goals are:

- Reduce phosphorus loads by 50 percent.
- Reduce phosphorus and sediment loads by implementation of best management practices.
- Reduce feedlot pollutants through management and education.
- Reduce septic system leachate from noncomplying systems.
- Manage the “bounce” of the lake.
- Increase awareness about and implementation of shoreland BMPs.

The actions taken to achieve these goals by project staff or others included:

- Diverted a ditch bringing nutrients into the lake into a wetland area and installed vegetated buffer.
- Saw a reduction from 10 feedlots in the watershed to two, one of which has been upgraded.
- Completed three shoreline stabilization projects.
- Enrolled eight tracts of land in the Water Quality Incentive Program.
- Enrolled approximately 3,550 acres into the Conservation Reserve Program (CRP).
- Enrolled Mud Lake bottom into Reinvest in Minnesota, 276 acres.



- Assisted a farmer to install water and sediment control basins, grassed waterways and tile lines on the cropland.
- Installed a new culvert to prevent erosion and flow problems.
- Worked with a farmer on feedlot upgrade and cattle exclusion.
- Repaired the Grove Lake Dam and installed a scenic safety span bridge above the dam to prevent all-terrain vehicles from destroying the banks of the North Fork Crow River.
- Helped bring more than 90 percent of the septic systems around Grove Lake into compliance with standards.

- Published the Grove Lake Lake Association newsletter.
- Promoted soil testing for lawn care and manure management.

Data show that total phosphorus average from 1991 to 2000 decreased 21.5 percent, with Secchi disk reading averages at around seven feet. Chlorophyll a readings have remained near constant, with 82 percent falling below the parameters for Central Hardwood Forest Ecoregion.

For more information about the Grove Lake Phase II Implementation, contact the North Fork Crow River Watershed District at (320) 533-3070.

Results that Count

The phosphorus average in Grove Lake from 1991 to 2000 decreased 21.5 percent.

Financial Information

The \$40,000 CWP grant for the project leveraged case and in-kind match of \$221,468.

Fish Lake Phase II Implementation

Fish Lake in Eagan is located in a highly developed urban watershed of 3,000 acres. Seventy percent of runoff enters the lake through the trunk storm sewer system. Despite an aggressive storm-water management program, with 110 natural and created wet ponds taking up five percent of the watershed, lake water quality is deteriorating.

The overall goal for the project was to reduce in-lake total phosphorus levels to 50 ug/l during low and average flow years. For average precipitation conditions, this would translate to a 130-160 kg/yr reduction under existing conditions and 170-200 kg/yr for conditions of increased development. Additional goals were reduction of curly leaf pondweed to no more than 20 percent of the lake surface area and shoreline management.

The selected activities used to obtain these reductions included:

- Development of an alum injection system to a storm sewer outlet that contributes a large portion of the phosphorus load to Fish Lake. The estimated removal efficiency for this system is 60 to 70 percent.
- Diversion of storm water to achieve an average detention time from 19 hours to almost 14 days.
- The city conducts street sweeping twice a year.
- Through shoreline management, develop a buffer zone between the lake and surrounding residential development.
- Adoption of ordinances dealing with lawn treatment contractors and fertilizers in urban areas.
- Overgrowth of curly leaf pondweed was dealt with through a first-year drawdown, as well as cutting and harvesting.
- Public information and education.

The Minnesota Department of Natural Resources issued a special permit in August 1997 to allow operation of the

alum dosing station, which was constructed and operational in 1998. The Eagan City Council adopted an ordinance in April 1997 on regulation of commercial fertilizers. The city also surveyed all storm-water ponds within its borders, the better to prioritize routine maintenance activity. It harvested curly leaf pondweed, and selected a drawdown option to help eliminate the weed. Educational activities included door-to-door low/no phosphorus fertilizer sales, watershed signs, public service announcements, a newsletter, and information kiosk at the lake itself.

For more information about the Fish Lake Phase II Implementation, contact Rich Brasch, City of Eagan, at (651) 681-4300.

Results that Count

The final report for Fish Lake Phase II was not yet available.

Financial Information

The \$48,985 CWP grant was matched locally with \$203,810 in cash and in-kind services.



French Lake Phase II Implementation Project

French Lake in Rice County has a watershed of 3,400 acres and an average depth of 16 feet. The diagnostic study showed that French Lake was thermally stratified in summer and also had average summer phosphorus concentrations of 110 ppb, with as much as 1,000 ppb in bottom water. Secchi disk readings in summer were two feet, with curly leaf pondweed dominating until mid-summer and blue-green algae blooms beginning after die out. Land use is a mix of agricultural (53 percent), wetlands (18 percent), woodlands (14 percent) and developed land (11 percent), with open water accounting for only four percent.

The project goal was to improve water quality to within ranges for minimally affected Western Cornbelt Plains Ecoregion. Projects implemented between 1993 and 2000 included:

- West watershed A projects, including 19 basins, two grassed waterways, two water control structures, three acres in critical area planting (CAP), 26 acres in Reinvest in Minnesota (RIM), 127 acres in CRP, one wetland restoration, one waste management system and one shoreline stabilization.
- Northwest watershed B projects included four wetland restorations, 4 acres CAP, one waste management system, 400 feet rip-rap, 8,000 feet of terrace, three grassed waterways, and 30 acres in CRP.
- Watershed C projects included two basins, 73 acres CRP, and 2,400 feet of terrace.
- Watershed D projects included one waste management system, three waterways, six basins, one diversion/grade stabilizer, five structures/restored wetlands, 4 acres CAP and 84 acres CRP.



- Watershed E projects included six basins, one acre CAP, two grade stabilizers, livestock exclusion, and 180 feet of shoreline buffer.
- Feedlot management projects included one downspout on a critical building, two moved feedbunks, two reductions/seeding, and three one-on-one educational conferences.

Project staff also worked on revegetating roadside shoulders, upgraded 90 percent of nonconforming septic systems, completed shoreline revegetation, cut curly leaf pondweed, installed carp barriers, and completed many information and education initiatives. The project's success has been substantial.

For more information about the French Lake Phase II Implementation, contact John Kruger, Rice County Environmental Health, at (507) 332-6170.

Results that Count

- Water clarity increased from 3 to 4.5 feet.
- Native plant coverage increased from 10-15 percent to 28 percent.
- Plant diversity improved from 8-10 species to 12.
- Prairie/Big Woods upland improved from poor to fair.
- Wetlands diversity improved from poor to good.
- Stream erosion control improved from fair to good.
- Biocriteria improved from fair to good.
- Phosphorus levels went from 100 to 150 ppb, so targets were not achieved.

Financial Information

The \$200,400 total grant leveraged local cash and in-kind expenses of \$378,791.

Projects Awarded in 2003

Conservation Tillage Demonstration Project

Sponsor: University of Minnesota Water Resources Center, contact Jim Anderson at (612) 625-0279.

The objective of this Conservation Tillage Demonstration Project is to reduce sediment delivery to surface waters and preserve agricultural soils through increased crop residue cover on row-cropped fields of southern Minnesota. This objective will be accomplished through on-farm demonstrations of the economic and environmental benefits of reduced tillage systems.

Evaluating Feedlot Runoff Pollution and Ways to Reduce Impacts

Sponsor: Minnesota Pollution Control Agency, contact David Wall at (651) 296-8440.

In the late 1970s and early 1980s, the 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 FLEval, has been used extensively in Minnesota since 1982 to:

- prioritize allocation of cost-share dollars for water-quality protection,
- indicate the potential for compliance with feedlot runoff rules and regulations,
- make decisions about which best management practices most effectively reduce pollution, and
- approximate pollutant-loading reduction from state and federal cost-share projects.

The model provides a more uniform and objective means of evaluating potential pollution from feedlot runoff. It is used by county feedlot officers, soil and water conservation districts, the Natural Resource Conservation Service, MPCA staff and watershed managers. The FLEval model, with improvements, can also have more utility for uses associated with Total Maximum Daily Load (TMDL) studies and basin planning. With nearly 20,000 outdoor open lots in the state, a good feedlot model is essential.

www.pca.state.mn.us

While the current model has served us well, we are now expecting more from the model than was originally intended. New ways of addressing pollution problems have resulted in new demands on the model, and many drawbacks of the existing model have been identified. We are overdue in our efforts to update and upgrade the FLEval model. The Section 319 grant will allow us to:

- More accurately determine compliance with feedlot runoff laws;
- Provide a better way of tracking pollutant-load reductions from cost-share projects;
- Enable better designs of feedlot runoff control best management practices;
- Provide a more accurate way of assessing phosphorus contributions from feedlots;
- Improve user efficiency so that the model can be used at more feedlots and in a more consistent manner;
- Incorporate a way of assessing bacteria and nitrogen losses from various types of feedlots;
- Consider winter and spring snowmelt periods;
- Improve predictions of ground-water impacts where feedlot runoff infiltrates; and
- Improve the user friendliness of the model.

The project will have the following elements:

- Intensive review of research reports involving feedlot runoff and subsequent contaminant treatment and development of an associated written literature review;
- User assessment: Interview and survey model users to identify ways to improve model use efficiency;
- Hold advisory committee meetings with representation from MPCA, BWSR, NRCS and others, to make sure that the improved model will meet the needs of the various agencies;

- Compare all equations in the model with research conducted since model development in 1981, and make improvements to the model, as necessary;
- Assess ways to incorporate bacteria loading, nitrogen loading and improved phosphorus loading components in the model, and adding these components where feasible;
- Develop an acceptable way of estimating annual pollutant loading from feedlots;
- Demonstrate and test the upgraded FLEval model at field sites; and
- Provide education and training on the use of the new model.

The audience for the training and use of the model will be county feedlot officers, Soil and Water Conservation Districts, Natural Resources Conservation Service staff, MPCA feedlot compliance staff, TMDL implementation teams, local water planners, Board of Water and Soil Resources staff, watershed project staff, basin management staff and private consultants.

Local Nitrate Testing and Educational Outreach for Private Well Owners

Sponsor: Minnesota Department of Agriculture, contact Bruce Montgomery at (651) 297-7178

The primary audiences for this outreach effort are rural and urban Minnesota residents dependent upon private wells for drinking water. This project will provide technical support, an organizational framework, equipment, lab quality control, educational supplies and media assistance so that local entities can provide nitrate water-testing services and water-quality educational outreach on a county level. This project is a continuation of an existing EPA Section 319 project.

One of the long-term goals has been to assist the local cooperators to become self-sufficient in conducting the program. Previous Section 319 and Legislative Commission on Minnesota Resources 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.

Cooperators typically are staff from Soil and Water Conservation Districts, Environmental Health offices, University of Minnesota Extension staff and other

county positions. Past programs have provided training on how to promote and conduct the clinics, provide basic technical assistance, and offer analytical testing services.

The seven host sites, each serving 10-20 counties, are equipped with Hach UV 4000 spectrophotometers, diluters and other analysis-related equipment, signs, A-frames, educational materials, coolers and other necessary supplies. The project has a consistent track record of successfully getting a large number of counties involved; 40 to 50 counties participate each year. Based on annual attendance figures since 1995, we anticipate conducting nitrate analysis on 3,000 to 6,000 well samples per year.

Meeting TMDL Goals with the Minnesota Phosphorus Index

Sponsor: Minnesota Department of Agriculture, contact Paul Burns at (651) 296-1488

Minnesota has lakes and rivers with reduced water quality from many sources of pollutants. One source is agricultural activity. This project will provide a tool (Minnesota Phosphorus Index) to achieve total maximum daily load (TMDL) study goals for phosphorus.

Although there are currently no TMDL guidelines for phosphorus in rivers and streams, phosphorus directly influences dissolved oxygen levels. The importance of this is discussed in detail in the Nonpoint Source Management Program Plan.

A University of Minnesota team of scientists and MDA staff has compiled the framework for a phosphorus index to identify landscapes and practices that contribute to water-quality degradation. Funding for this index was provided by the Environmental Quality Board (EQB) as part of the generic environmental impact statement (GEIS) on animal agriculture. This proposed Section 319 project will field test, validate and implement the index in real-world settings, including evaluation of its effectiveness as a tool for prioritizing high-risk fields and farms.

The Minnesota Phosphorus Index will help Minnesotans protect watersheds and improve water quality. The index evaluates locations and land-management practices that create a high risk of phosphorus pollution and then identifies alternative

practices to reduce the risk. This tool will allow a downstream evaluation of various conservation measures based on annual losses of phosphorus (snowmelt and rainfall runoff).

To advance this water-quality tool, it needs to be validated and field tested in representative watersheds and agroecoregions, applied to land identified as appropriate to its use, and introduced to end users, who will be trained in its use and interpretation.

The target audiences include anyone who advises farmers, as well as interested farmers themselves. Target audiences will include crop and livestock producers; other professional agricultural consultants; county, state, and federal conservation agency staff; and local government and watershed project staff. Courses and workshops explaining the “hows and whys” of the P Index will be offered to the target audiences.

The high attendance numbers and level of interest demonstrated during meetings held in 2002 to introduce the P Index show that there is much interest in this tool. This project will validate, field test and help people apply the P Index and realize the impact on water quality.

Minnesota Restorable Wetland Inventory

Sponsor: Ducks Unlimited, contact Tom Landwehr at (651) 490-1726

The Restorable Wetlands Inventory project is a multi-agency effort to provide digital restorable wetland data. Partners will identify and map restorable wetlands in a total of at least six counties and make the data broadly available on an internet-based Geographic Information System (GIS) utility. This will allow better decision-making for federal, state and local governments in the development and delivery of wetland restoration programs.

Conservation agencies and organizations in Minnesota implement a host of programs to conserve and restore wetlands, both on private and public lands, at a substantial annual cost. However, comprehensive watershed planning and focused outreach for these programs is not possible because there is not a good database of where restorable wetlands exist. With

this information, local resource managers can target specific watersheds or areas where restorations would provide the highest public benefit.

For instance, agencies, local units of government and organizations concerned with protecting and restoring water quality could use the data to prioritize restorations that will benefit waters of concern. Public wildlife managers could maximize the benefits of their programs by targeting acquisition and restoration to those areas with highest potential. Additionally, flood-damage-reduction efforts and road mitigation programs would have substantial use for restorable wetlands maps to identify sites for restoration. Pilot efforts to produce such maps in west-central Minnesota have been highly successful and are currently being used by resource managers for just these purposes.

A number of partners collaborated in 2000 to develop, conduct and analyze drained wetland basin inventories in four Minnesota counties. Using staff from South Dakota State University’s (SDSU) remote-sensing department, partners found that aerial photo interpretation by highly trained specialists provided better than 95 percent accuracy in identifying drained, restorable wetlands. Partners are expanding the effort to several more counties currently and are seeking funds to implement the inventory in all agricultural counties.

With the requested funding, partners will establish a steering committee of potential users, provide coordination and prioritization services and contract with SDSU to provide base data. Partners will then edit and format the data and post it on an internet-based GIS utility (ArcIMS). Ducks Unlimited will host the Web site (www.prairie.ducks.org) where users may view restorable wetlands, create maps and download digital data. The audience this project serves are those entities that restore, protect and manage wetlands in Minnesota, and includes agencies at all levels of government, as well as many nonprofit conservation groups.

Outreach will be conducted as inventory maps are completed. As data becomes available, the county SWCD office and county zoning or environmental services office will be notified. Key contacts in relevant state and federal agencies will get periodic

announcements as new county inventories are posted to the Web site. Watershed districts will be notified as data within their jurisdictions is made available. One training session on using the inventory is also planned.

South Branch Buffalo River Water Quality Modeling Demonstration Project

Sponsor: Buffalo Red Watershed District, contact Bruce Albright at (218) 354-7710

This project will make a concerted effort to address the water-quality concerns of residents through a comprehensive program of education, citizen involvement, conservation of critical pieces of land, acceleration of current best management practices (BMP) programs, piloting of new BMPs and monitoring. These efforts will be coordinated by a staff person dedicated to this watershed. The project coordinator will be housed at the Fillmore County Soil and Water Conservation District. The coordinator will work closely with Mower County staff, as well as the steering committee that was formed for the first phase of the project. The Phase I study provided the basis for sound subwatershed-based targeting of implementation activities.

At the scale of a 75,000-acre watershed, it will take time for changes on the land to be clearly visible in the Root River and its tributaries. So, while chemical and biological monitoring will continue, the most meaningful measures of success in the short term will relate to changes in land use and the landscape as a result of the project. These changes will be tracked carefully and mapped where appropriate. Chemical, physical and biological changes may be observable near the end of a continuation phase of the project (around the year 2010).

TMDL Educational Seminar

Sponsor: Heron Lake Watershed District (HLWD), contact Jan Voit at (507) 793-2462

The federal Clean Water Act requires states to adopt water-quality standards to define the amount of pollutants allowed in surface and/or ground water, while still allowing the water to be used for drinking water, fishing, swimming, irrigation or industrial purposes. One fairly new program in Minnesota involves the use of a Total Maximum Daily Load (TMDL) study, which identifies pollution sources in a

water body failing to meet the above water-quality standards. Section 303(d) of the Clean Water Act requires states to publish a list of impaired waters every two years.

The Heron Lake Watershed will soon be listed on the Minnesota Pollution Control Agency's list of impaired waters. The Heron Lake Watershed is a sub-watershed of the West Fork Des Moines River watershed, which is one of the major drainage basins of Minnesota. The West Fork Des Moines River watershed has 11 impaired reaches, each with different impairments exceeding water-quality standards.

While there is a great deal of information about TMDLs in general, the project sponsors have been unable to find any information about what nearby communities need to do after local bodies of water are placed on the list of impaired waters. What is their responsibility for water quality, and what is their responsibility to the landowners and producers? The project sponsors believe more information is needed to enable the development and implementation of effective TMDL plans.

As a local unit of government that implements cost-share, incentive and loan programs that enable landowners and producers to address nonpoint-source water pollution, the Heron Lake Watershed District, partnering with the Cottonwood County Environmental Office and the MPCA, is proposing a two-day educational seminar to explain the TMDL program. Specific topics would include identifying and listing impaired waters, developing effective TMDL plans, implementing TMDLs, and the effect TMDLs would have on local producers and their agricultural operations.

Featured speakers at the seminar would represent the Iowa Department of Natural Resources, the South Dakota Department of Environmental and Natural Resources, the MPCA, the Natural Resources Conservation Service (NRCS), and the Environmental Protection Agency (EPA).

The first day of the seminar would provide Minnesota professionals and agency personnel, such as employees of the NRCS, Soil and Water Conservation Districts (SWCDs), Clean Water

Partnership project coordinators and water plan coordinators, an opportunity to learn more about the TMDL program through direct contact with EPA and MPCA personnel and with TMDL project coordinators from Iowa and South Dakota, two states currently implementing successful TMDL programs.

The second day of the seminar would provide landowners and agricultural producers an opportunity to meet with representatives of the NRCS, MPCA and EPA to learn how the TMDL process works, what it means for sustainable agriculture and how the use of best management practices will help participants comply with the TMDL plan.

Whitewater River Watershed National Monitoring Program

Sponsor: Whitewater River Watershed Project, contact Larry Johnson at (507) 523-2171, ext. 110

This is a continuation of monitoring for a priority watershed project for several local, state and federal agencies and organizations. Effectiveness monitoring following National Monitoring Program guidance was begun in 1995 (for biological monitoring) and 1997 (for paired watershed monitoring). Further work will evaluate data in context of land use, geology, hydrology and other features of the watersheds above the monitoring sites.

Elk River Watershed Priority Lakes Phosphorus Reduction

Elk River Watershed Association Joint Powers Board / Mark Basiletti (763) 241-1170 ext. 3

Manure management BMP test plots will be established throughout the watershed as part of this project. Plots are insured against yield loss, so participation is expected to be high. Yield checks are completed in the fall to demonstrate that BMPs maintain yields. All poultry producers (32) in the watershed will be encouraged to establish plots.

Proper application rates of poultry manure will be made possible with the purchase of specialized spreading equipment. Dairy and beef facilities will be contacted next to encourage participation. Signs and self-serve brochure boxes will be placed at the demonstration sites to promote awareness of the test plots. Before-and-after application rates of manure and fertilizer will be used to measure nitrogen and phosphorus reductions.

Where applicable, manure storage facilities will be installed using other state and federal cost-share dollars. However, in many cases storage is not feasible or necessary to treat runoff problems. In these cases, this grant will be used to install low cost conservation practices to address feedlot runoff. Examples of these practices include diversions, filter strips, settling basins, fencing, rain gutters and feedlot relocation. Phosphorus and carbonaceous oxygen demand will be measured using the FLEval model.

To accomplish these goals, the equivalent of a half-time technician will be dedicated to working with livestock producers for two years. Duties will include calibrating manure spreaders, manure testing, soil testing, completing manure management recommendations for test plots, plot evaluations, yield checks and report writing. It is the goal to work with all 32 poultry producers and numerous dairy, beef and swine producers in the watershed. In addition, the technician will be evaluating feedlots using FLEval, designing low cost feedlot options and plans, and supervising the installation of feedlot practices.

Owners identified in the riparian pasture inventory (215) will be encouraged to establish riparian buffer strips using the Conservation Reserve Program. For pastured areas not eligible for CRP, this grant will help offset the cost of fencing. This grant will also offer an additional \$100 per acre one time bonus for establishing the buffer area.

Landowners have been slow to adopt cropland filter strips using the CRP program in the watershed. This is often due to the low rental rates being offered and sometimes due to the program rules that do not allow haying of the filter strips. This grant will help overcome these obstacles by offering a \$50 per acre bonus for those enrolling into CRP. Those who choose to harvest the filter strip and not participate in CRP will be offered a one-time payment of \$100 per acre for a 10-year contract.

Lakeshore buffer demonstration projects will be installed along developed shoreline in cooperation with lake associations. These projects will show the water-quality benefits and aesthetic value of natural buffers. Additionally, stormwater BMPs will be installed at six of the 64 high-priority areas that have been identified to reduce the negative effects of stormwater runoff.

Hawk Creek Watershed Project TMDL -- "Land Of The Lost"

Sponsor: Renville County, contact Loren Engelby at (320) 523-3710

The goal of the project is to reduce concentrations of nutrients and sediment to the 50th percentile of the Western Corn Belt Plains Eco-Region. The overall land-use goal is to continue using the watershed in the same fashion, but with more environmental awareness that will protect and improve the watershed's resources.

There is a need to balance the necessity of economic development and agricultural productivity with the protection and enhancement of the natural resource base. Other issues of importance include ensuring sound agricultural drainage practices compatible with measures that address water quantity and quality and to develop a robust and diversified agricultural economy that makes extensive use of conservation tillage, buffer strips, metered tile intakes, blind tile intakes and soil-conserving cover crops (such as alfalfa produced for biomass) to protect and enhance the water resources of the Hawk Creek Watershed.

Heron Lake Watershed District – CWP Project

Heron Lake Watershed District (HLWD, contact Jan Voit (507) 793-2462

The Heron Lake watershed encompasses approximately 472 square miles and is located in Jackson, Nobles, Murray and Cottonwood Counties in southwestern Minnesota. Three major lake systems are found within the watershed. They are the Heron Lakes (three lakes and a marsh), the Graham Lakes (three lakes) and the Fulda Lakes (two lakes) systems. The Heron Lake watershed forms the boundary of a major national restoration project (The Heron Lake Area Restoration Project).

There are four major problems in this watershed:

- Drainage and the speed that water moves through the watershed: Water flow dramatically affects water quality and erosion, as well as the amount of flooding.
- Urban sources of pollution from point sources and storm-water runoff are a major problem in this system, particularly in the Okabena subwatershed.

Point sources from the City of Worthington contribute large quantities of nutrients and sediments to Okabena Creek. The Cities of Brewster and Okabena discharge the effluent from their wastewater treatment facilities into Okabena Creek. The City of Lakefield wastewater treatment plant discharges its effluent into South Heron Lake. There is a source of nutrients in or near the City of Fulda that negatively impacts Second Fulda Lake.

- Tillage practices and lack of vegetative cover, riparian and field buffer strips and windbreaks.
- Compliance with feedlots (Minn. Rules 7020), ordinances and nutrient management (including manure spreading) and septic waste (Minn. Rules 7080). The number of feedlots not exempted by Minn. Rules 7020 (more than 50 animal units or 10 animal units within shoreland areas) ranges from 411 to 882, or three to six times more than have been permitted.

The restoration of the Heron Lake watershed is a long-term effort to stop and reverse the degradation of a once nationally known waterfowl lake and the watershed that feeds it. The major objectives include water-quality improvement, an increase in the quality and quantity of waterfowl and other wetland wildlife habitat, and reduction of flooding. Habitat improvements would increase attractiveness to migrating birds and produce more local birds. Improving water quality and restoring wild celery and other underwater plant beds could again make the lakes attractive to the canvasbacks that once came to the lake by the thousands. A high percentage of canvasbacks migrating through Minnesota now use the Mississippi River backwaters. Enticing more of them to use traditional migrating habitats would decrease the population's vulnerability.

High Island Implementation Project (HIIP)

Sponsor: Sibley County, contact Lauren Klement at (507) 237-4067

This implementation plan will focus on three areas: best management practices (BMPs), education and monitoring.

BMPs will include nutrient and manure management, structural practices and vegetative practices. Specifically, funds are being sought for:

- Manure management plans for all feedlots from 200 to 999 Animal Units in size.
- Spring nitrate testing, from which staff will recommend fertilizer application rates.
- Open tile intake alternatives (rock tile, slotted riser, or removal).
- Cover crops for canning ground.
- Structural practices (water and sediment control basins, terraces and grade control structures)
- Vegetative practices (wetland restorations, filter strips, riparian buffers and grassed waterways)
- Feedlot waste management, through Environmental Quality Incentives Program funding.
- Upgrades for noncompliant septic systems, through loans.
- Upgrades for tillage equipment that leaves adequate residues, through loans.

Education activities will include workshops, tours, demonstrations, newsletters, brochures, surveys and displays. Education will be focused on residue management, tillage practices, nutrient management and manure management. Water quality/quantity monitoring will continue at three sites in the watershed. These sites will help assess the changes implementation activities have on water quality.

Manure Management Within Ecologically Sensitive Areas in Stearns County – Phase II.

Sponsor: Stearns County Soil and Water Conservation District, contact Dennis J. Fuchs at (320) 251-7800 x3
Additional promotion and awareness of the feedlot rules will accelerate adoption and implementation of BMPs, which will sustain or improve water quality. This project results from a joint effort between the Stearns County Soil and Water Conservation District (SWCD), Stearns County Environmental Services Department and others to address nonpoint water-pollution problems associated with livestock agriculture located in ecologically sensitive areas.

Incentives would be made available to encourage livestock producers to work with a Certified Crop Adviser (CCA) in developing a comprehensive manure management plan. Other cost share funds would be made available to correct feedlot pollution problems (producers with less than 999 animal units) and soil erosion for producers within the ecologically

sensitive areas. Additional educational and technical information about feedlot rules and corrective actions would be made available to livestock producers with 999 animal units or less in order to meet the requirements set forth by county and state rules.

Red River Basin Buffer Initiative

Sponsor: Red River Basin Commission, contact Lance Yohe at (218) 291-0422

Roughly half of the Red River Basin in Minnesota is extensively drained and intensely farmed. The basin hydrology has been altered significantly, streams systems are unstable and water-quality conditions within much of the basin are poor, with high suspended solids and phosphorus concentrations.

This project will demonstrate and advance the process of implementing buffers and wetland restorations through a targeted approach. The long-term outcome we hope to achieve is the protection of priority water bodies through the reduction of peak flows and nutrient and sediment loads. This process, in combination with the Red River Basin Flood Damage Reduction process and the increased storage that will result over time, will set the stage for streams to become more stable and eventually support more diverse and healthy aquatic ecosystems.

Shared Coastal Zone Engineering Assistance

Sponsor: Minnesota Board of Water and Soil Resources, contact Al Kean at (651) 296-3767

This two-year pilot project will share a coastal engineer position to address current and emerging needs of the Minnesota Board of Water and Soil Resources (BWSR), Minnesota Pollution Control Agency (MPCA) and the Department of Natural Resources (DNR) for implementation of coastal nonpoint pollution control programs and projects to protect and restore critical areas of Lake Superior and its associated natural resources.

Snake River Watershed Enhancement Project

Sponsor: Snake River Watershed Management Board, contact Jason C. Neuman at (320) 679-6300

The Snake River Watershed Enhancement Project will accomplish several measurable outcomes and even more in qualitative accomplishments. Project activities will include the following:

- Six agricultural feedlot operations that are direct sources of surface-water pollution will be brought into compliance with current MPCA regulations.
- Twelve nonconforming septic systems located in shoreland zones will be brought into compliance under current 7080 rules.
- An estimated 750 feet of shoreline will be protected against erosion, at the same time restoring 18,750 square feet of lakeshore with native vegetation.
- Livestock will be excluded from four miles of streams in the Snake River Watershed, protecting stabilized stream banks and reducing nutrient and sediment loading.
- Forest stewardship plans will be written for 1,500 acres of private forest land in the Snake River Watershed, providing landowners with the necessary information to make intelligent and informed decisions on how to manage their forest lands to protect water quality and improve wildlife habitat.
- A newsletter produced two times a year will reach more than 28,000 residents of the Snake River Watershed, providing education about ways to protect and improve the water quality at the same time promoting cost-share programs and project activities.
- The SRWMB, with the help of project partners, will host water-quality informational forums at various locations across the watershed promoting project activities.

The combined effects of all of these activities is expected to be a 25-percent reduction in phosphorus and nitrogen loading to the Snake River Watershed and a 15-20-percent reduction in total suspended solids and fecal coliform bacteria loading, ultimately providing a significant reduction to nutrient, sediment and bacteria loading to the St. Croix River.

Improved Livestock Management in Riparian Areas

Sponsor: Minnesota Department of Agriculture, contact Wayne Monsen at (651) 282-2261

This project will examine the effectiveness of managed grazing plans along sensitive riparian stream corridors to improve water quality. Objectives of this project include:

- Monitoring how managed grazing can reduce fecal, sediment and nutrient levels in streams and improve the ecological integrity of riparian areas and streams;
- Increasing the number of properly grazed stream miles and acres in perennial vegetation;
- Measuring motivational factors of farmers in adopting managed grazing systems; and
- Sharing the results of this project with adjacent watersheds or in agroecoregions where similar problems exist.

To accomplish these objectives, farmers, local/state/federal agency staff and extension educators in two impaired watersheds (the north and south branches of the Whitewater River and Salem Creek) will work together to:

- Implement four to six managed grazing systems in each of the three stream corridors. Incentive payments will be provided to help the farmer participants implement best management practices grazing systems in a timely manner.
- Conduct intensive monitoring at one to two sites in each stream for three years to measure water quality. Eight to ten grab samples per month from each site will measure fecal coliform levels, total suspended solids and nutrients.
- Evaluate forage conditions two times per year at all sites.
- Evaluate habitat, stream-bank condition and macro-invertebrates in the streams.
- Conduct field days at participating farm sites to demonstrate different practices to farmers, agency staff and policy makers.
- Develop and refine educational materials to share information about implementing managed grazing systems in riparian areas.

Section 319 funds will be used for:

- Incentive payments to farmers to implement managed grazing systems. Practices include fencing, water pipelines, tanks and troughs, pumps, stream crossings and plantings,
- Water-quality testing,
- Habitat, stream bank and macro-invertebrate evaluation,

- Data management,
- Professional technical contracts with local units of government for assistance with identifying farmer participants, for technical assistance and for collecting water samples,
- Outreach activities such as field days, and
- Development of educational materials about how managed grazing systems will improve water quality in riparian areas.

Lower Main Stem Chippewa River Subbasin

Sponsor: Chippewa County, contact Kylee Olson at (320) 269-2139 x 116

This project’s goal is enhancing and protecting the Chippewa River and to achieve water-quality improvements pertinent to the scheduled Total Maximum Daily Load (TMDL) study. The project also targets activities to address the impairment for dissolved oxygen on the Lower Minnesota River.

Plans for implementation include incentive programs for the following Best Management Practices (BMPs): buffer strip initiative, nutrient and residue management, livestock exclusion, alternative tile intakes and special projects.

Plans also include documenting and tracking the BMPs installed, technical assistance and cooperation from an extensive group of watershed partners. The cooperating partners are comprised of representatives from local, state, and federal agencies; landowners; lake associations; nonprofit organizations; and communities in the watershed.

A rigorous information and education campaign is projected for this subbasin, such as direct mail marketing on each of the incentive programs, one-on-one landowner contact, the widely distributed newsletter “*The Citizen Connection*,” storm-water management and monthly meetings with cooperating partners. In addition, the staff of CRWP will continue to foster new partnerships and networking opportunities throughout the watershed and the greater Minnesota River Basin.

Reduction of Fecal Coliform Bacteria from Human Sources (TMDL Implementation Project)

Sponsor: Southeast Minnesota Water Resources Board, contact Bea Hoffmann at (507) 457-5223

The proposed project will address obstacles to the development of wastewater treatment solutions for unsewered communities and individual residents. First, unsewered communities require an initial assessment of local regulations, geographic conditions, status of current individual sewage treatment systems (ISTS), income and capacity of nearby communities. Small communities rarely can afford the cost of these investigations (approximately \$300/property).

Later, when communities have achieved consensus on a possible solution, the funds to conduct an engineering feasibility study are difficult to obtain. This proposal seeks to provide incentives to communities to solve their wastewater treatment problems by offering a financial incentive to conduct both initial needs assessments and engineering feasibility studies. These studies will be required to consider a variety of creative approaches to solving treatment problems.

The third important component of this proposal will enable counties to improve the level of oversight of existing ISTS by creating record-keeping and communication functions among county staff, ISTS owners and pumpers. Experience in other states has shown that regular communication with ISTS owners dramatically increases awareness and stimulates responsible action among owners on the need to maintain their systems. A data management system would increase the consistency of record-keeping throughout the basin where pumpers operate in more than one county. It also 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; and online permitting.

Funding for this portion of the project would be used to:

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

This project will be carried out by a partnership of 11 counties of the Basin Alliance of the Lower Mississippi in Minnesota, the Southeast Minnesota Water Resources Board, the Minnesota Pollution Control Agency, the Cannon River Watershed Partnership and the University of Minnesota Extension Service.

Straight River Fecal Coliform Reduction Project (A Regional Fecal Coliform TMDL Project)

Sponsor: Cannon River Watershed Partnership, contact Patrick Ganey at (507) 645-7094

The Cannon River Watershed Partnership (CRWP), Steele County and Steele Soil and Water Conservation District have formed a partnership that will reduce fecal coliform bacteria in the Straight River watershed by 40 percent by 2012. Within this three-year project period, fecal coliform bacteria will be reduced by up to 20 percent in priority areas.

This collaborative effort will approach the reduction of fecal coliform bacteria by:

- Signing eligible feedlot owners to the MPCA Open Lot Agreement and developing practices that comply with 7020 feedlot rules.
- Installing 1,500 acres of buffers and continuous CRP filter strips per year along riparian corridors and farmed wetlands in Steele County.
- Promoting additional Best Management Practices to reduce fecal coliform bacteria from entering our waters.

The major portion of the funding request will be used for the following project elements:

- Develop individualized information packets for landowners in Steele County, including current aerial photographs of property with CRP-eligible lands and financial options highlighted
- Conduct outreach with landowners and elected officials on fecal coliform bacteria and agricultural BMPs using mass-media and targeted approaches
- Increase Steele County Feedlot officer from 0.5 FTE to 0.75FTE
- Increase Steele SWCD staff time on continuous CRP from 0.5 FTE to 1 FTE.
- Develop a digitized, comprehensive inventory of riparian corridors and CRP signups.

Redwood River Watershed Phosphorus TMDL Compliance Project

Sponsor: Redwood-Cottonwood Rivers Control Area, contact James Doering at (507) 637-2142 x4

Goals of the Redwood River Clean Water Project are to reduce sediment and nutrient loading; expand game fishery habitat and fishing opportunities; reduce peak flows and improve flow stability; and increase awareness of water-quality issues throughout the watershed.

These goals are being accomplished through one-on-one landowner contacts and an extensive information and education program that encourages implementation of best management practices on agricultural land. Landowners who voluntarily choose to implement best management practices receive technical assistance and up to 75 percent cost-share to help pay for installing conservation practices.



Minnesota Pollution Control Agency

Projects Currently Active

(listed by year of award)

Project **KEY**

Section 319 Projects in **GREEN**

CWP Projects in **ORANGE**

1996

Project: Heron Lake State Revolving Fund Loans

Sponsor: First National Bank of Brewster
Funding: CWP (Loan), \$444,036 Awarded: 1996
Purpose: Provide funding for best management practices implementation in the Heron Lake Watershed.

1998

Project: Dunns Lake/Richardson Lake Study

Sponsor: Meeker County
Funding: CWP (Grant) \$33,750 Awarded: 1998
Purpose: Determine baseline hydrologic, water quality and ecological information to make remedial decisions.

Project: Lake Superior Protection Project

Sponsor: Cook County
Funding: CWP (Loan) \$940,000 Awarded: 1998
Purpose: Provide CWP loan funding to stabilize the Lake Superior shoreline in Lake and Cook Counties.

Project: South Zumbro Watershed Partnership

Sponsor: Olmsted County
Funding: CWP (Grant) \$228,510 Awarded: 1998
Purpose: Continue implementing best management practices in the Zumbro River watershed.

Project: Upper Mississippi River Protection Project

Sponsor: City of St. Cloud
Funding: CWP (Grant) \$125,000 Awarded: 1998
Purpose: Identify nonpoint sources of pollution that are threats to drinking water.

1999

Project: Best Management Practices Implementation in the Lake Superior Drainage Area

Sponsor: Minnesota Board of Soil and Water Resources
Funding: Section 319 (Grant) \$30,860 Awarded: 1999
Purpose: To educate landowners, design best management practices, and provide construction oversight for erosion control and water quality improvements in the Lake Superior Basin.

Project: Big Fish and Long Lakes Watershed Protection Project

Sponsor: Sauk River Watershed District
Funding: CWP (Grant) \$33,000 Awarded: 1999
Purpose: Conduct diagnostic study to determine functioning watershed elements

Project: Big Ten Mississippi Watershed EQIP Project

Sponsor: Morrison County Soil and Water Conservation District
Funding: Section 319 (Grant) \$310,000 Awarded: 1999
Purpose: Water quality improvement through EQIP projects in the Big Ten Mississippi watershed.

Project: Cass Lake/Lake Winnibigoshish Watershed Project

Sponsor: Beltrami County
Funding: CWP (Grant) \$93,500 Awarded: 1999
Purpose: Identify concerns within watershed that could result in water quality degradation.

Project: Cation/Anion and Isotope Analysis Project

Sponsor: University of Minnesota Department of Geology and Geophysics
Funding: Section 319 (Grant) \$5,219 Awarded: 1999
Purpose: Analyze water samples from MPCA ground and surface water projects for cations, anions and total suspended sediments.

Project: Compare Effectiveness of Shoreline Vegetation Management

Sponsor: Beltrami Soil and Water Conservation District
Funding: Section 319 (Grant) \$37,250 Awarded: 1999
Purpose: Establish a demonstration project site that will compare the cost and effectiveness of several management techniques for shoreline vegetation.

Project: Conservation Tillage Guidelines for the Mississippi River Basin

Sponsor: University of Minnesota Extension Service
Funding: Section 319 (Grant) \$17,000 Awarded: 1999
Purpose: Develop guidelines for conservation tillage that farmers can use to manage their crop in reduce tillage systems while protecting water quality.

Project: Dunns and Richardson Lakes Phase I Study

Sponsor: Meeker County
Funding: CWP (Grant) \$33,750 Awarded: 1999
Purpose: Determine baseline hydrologic, water quality and ecological information to make remedial decisions.

Project: Hastings Area Nitrate Study

Sponsor: Dakota County
Funding: CWP (Grant) \$75,000 Awarded: 1999
Purpose: Determine cause and extent of nitrate contamination in the Prairie du Chien/Jordan aquifer.

Project: Hawk Creek Watershed Project

Sponsor: Renville County
Funding: CWP (Grant) \$148,000 Awarded: 1999
Purpose: Conduct diagnostic study to assess Hawk Creek's water quality, develop cooperation and support for improvements.

Project: Hawk Creek Watershed Water Quality Enhancement Project EQIP

Sponsor: Prairie County RC&D
Funding: Section 319 (Grant) \$320,000 Awarded: 1999
Purpose: Developing strategies to reduce excessive soil losses on cropland and reduce degradation of surface water due to sediment, excessive nutrients.

Project: Hawk Creek Watershed Water Quality Enhancement Project EQIP

Sponsor: Prairie County RC&D
Funding: Section 319 (Grant) \$320,000 Awarded: 1999
Purpose: Install land use best management practices, monitor and analyze the results on the watershed, develop a Citizen Network, conduct outreach and education.

Project: Heron Lake Continuation, SRF Loans

Sponsor: First National Bank of Brewster
Funding: CWP (Loan) \$500,000 Awarded: 1999
Purpose: Continue best management practices activities in Heron Lake Watershed (Jackson, Murray and Nobles Counties).

Project: Implementation of Locally Administered Nitrate Testing and Education

sponsor: Minnesota Department of Agriculture
Funding: Section 319 (Grant) \$100,000 Awarded: 1999
Purpose: Develop equipment distribution network and cooperative training program, provide oversight to local nitrate water testing clinics.

Project: Knife River Watershed EQIP Project

Sponsor: South St. Louis County Soil and Water Conservation District
Funding: Section 319 (Grant) \$78,322 Awarded: 1999
Purpose: Develop forest stewardship plans, stabilization and reduction of active bank erosion, stabilize stream temperature.

Project: Mille Lacs Lake Watershed Management Project

Sponsor: Mille Lacs County
Funding: CWP (Grant) \$170,000 Awarded: 1999
Purpose: Establish baseline database of watershed resources and water quality for subsequent promotion of best management practices.

Project: Minneapolis Chain of Lakes Project

Sponsor: Minneapolis Park and Recreation Board
Funding: Section 319 (Grant) \$100,000 Awarded: 1999
Purpose: Treat Lakes Calhoun and Harriet with alum, measure for effects on lake phosphorus levels by monitoring and modeling.

Project: Nemadji River Basin Project

Sponsor: Carlton County
Funding: 319 (Grant) \$143,500 Awarded: 1999
Purpose: Manage healthy riparian zones, restore damaged areas (stream banks), implement other best management practices.

Project: Olmsted County Intensive Manure Management Program

Sponsor: Olmsted County Extension Service
Funding: Section 319 (Grant) \$73,000 Awarded: 1999
Purpose: Develop manure management plans for livestock producers and work with NRCS to develop EQIP plans.

Project: Osakis Lake Improvement Project Phase II Continuation

Sponsor: Sauk River Watershed District
Funding: CWP (Grant) \$56,830 Awarded: 1999
Purpose: Continue implementation of water monitoring, education and septic system upgrades.

Project: Osakis Lake Improvement Project, SRF Loans

Sponsor: Sauk River Watershed District
Funding: CWP (Loan) \$400,000 Awarded: 1999
Purpose: Continue SRF loan program for septic systems around Osakis Lake.

Project: Rum River Watershed EQIP Project

Sponsor: Anoka County Conservation District
Funding: Section 319 (Grant) \$310,000 Awarded: 1999
Purpose: Review and inventory monitoring efforts in the watershed, and develop procedures to select farms for assessment.

Project: Tile Intake Initiative

Sponsor: Blue Earth River Basin Initiative (BERBI)
 Funding: Section 319 (Grant) \$103,750 Awarded: 1999
 Purpose: Bring awareness about the environmental impacts of open tile intakes. Alter at least 234 open tile inlets.

Project: Upper Elk Creek Erosion Control and Water Quality Improvement Project

Sponsor: Heron Lake Watershed District
 Funding: Section 319 (Grant) \$51,900 Awarded: 1999
 Purpose: Install best management practices in the Upper Elk Creek subwatershed of the Heron Lake watershed. Slow water flow, decrease erosion.

Project: Water Quality Improvement Project for County Ditches 7 and 32

Sponsor: North Fork Crow River Watershed District
 Funding: Section 319 (Grant) \$50,000 Awarded: 1999
 Purpose: Feedlot management, erosion control, land use best management practices, education and monitoring for inputs to the Crow River.

Project: Yellow Medicine River Watershed EQIP Project

Sponsor: Lincoln County Soil and Water Conservation District
 Funding: Section 319 (Grant) \$190,000 Awarded: 1999
 Purpose: Increase implementation of conservation practices that reduce soil erosion and flooding, as well as sedimentation and nutrient loading.

2000

Project: Agricultural and Rural Water Management: On Farm Demonstrations

Sponsor: Minnesota Department of Agriculture
 Funding: Section 319 (Grant) \$200,000 Awarded: 2000
 Purpose: Plan and implement four on-farm water management demonstrations; design and target educational materials, workshops and programs.

Project: Ashley and Hoboken Creeks Water Quality Improvement Project

Sponsor: Sauk River Watershed District
 Funding: Section 319 (Grant) \$231,500 Awarded: 2000
 Purpose: Evaluation of agricultural waste management, best management practice implementation and monitoring for program effectiveness.

Project: Blue Earth River - Watonwan Basin Implementation

Sponsor: Blue Earth River Clean Water Partnership
 Funding: CWP (Grant) \$500,000, (Loan) \$2,156,345
 Awarded: 2000
 Purpose: Provide SRF loans to fund best management practices in Watonwan, Jackson and Cottonwood Counties.

Project: Clearwater River Stream Bank Stabilization/Revitalization

Sponsor: Red Lake Watershed District
 Funding: Section 319 (Grant) \$134,500 Awarded: 2000
 Purpose: Erosion control through data collection and analysis, design, construction, monitoring and education.

Project: Cottage Grove Nitrate Study

Sponsor: Washington County
 Funding: CWP (Grant) \$75,000 Awarded: 2000
 Purpose: Identify the sources and causes of nitrate contamination in the Cottage Grove area and develop a basis for improvements.

Project: Cottonwood River Restoration Project

Sponsor: Redwood-Cottonwood River Control Area
 Funding: CWP (Grant) \$400,700, (Loan) \$370,000
 Awarded: 2000
 Purpose: Make the Cottonwood River navigable and canoe accessible. Increase game fish populations, produce and construct trails.

Project: Crop Nutrient Management for St. Peter Wellhead Protection Area

Sponsor: Brown-Nicollet-Cottonwood Water Quality Board
 Funding: Section 319 (Grant) \$60,000 Awarded: 2000
 Purpose: Enroll agricultural lands in federal and state programs, provide support for nutrient management, develop and produce educational materials.

Project: Crow River Watershed Water Quality Enhancement Project

Sponsor: Prairie Country RC&D
 Funding: Section 319 (Grant) \$453,790 Awarded: 2000
 Purpose: Stabilize seven streambank or lakeshore sites, install 14 agricultural waste systems, install other best management practices to reduce sedimentation.

Project: Digital Soil Data for Management of Wetlands and Rivers

Sponsor: Minnesota Board of Water and Soil Resources
 Funding: Section 319 (Grant) \$68,400 Awarded: 2000
 Purpose: Develop digitizing lab, establish procedures, secure agreements, obtain NRCS survey certification.

Project: Education to Improve Feedlot, Manure and Nutrient Management

Sponsor: University of Minnesota
 Funding: Section 319 (Grant) \$97,000 Awarded: 2000
 Purpose: Develop educational materials and present workshops to county feedlot officers and producers on feedlot registration.

Project: Feedlot Pollution Abatement and Erosion Control

Sponsor: Stearns Soil and Water Conservation District
Funding: Section 319 (Grant) \$250,000 Awarded: 2000
Purpose: Analyze surface water, manage GIS database, investigate unpermitted manure storage structures, identify priority feedlots for technical assistance or enforcement.

Project: Green Lake and Middle Fork Crow River Watershed Project

Sponsor: Kandiyohi County
Funding: CWP (Grant) \$105,000 Awarded: 2000
Purpose: Conduct a resource investigation of the Green Lake and Middle Fork Crow River watershed area.

Project: High Island Creek Watershed Assessment Project

Sponsor: Sibley County
Funding: CWP (Grant) \$23,000 Awarded: 2000
Purpose: Resource assessment of hydrologic, water quality and ecological status of High Island Creek watershed.

Project: Holland-Edgerton Wellhead Management

Sponsor: Pipestone County Conservation and Planning
Funding: Section 319 (Grant) \$92,960 Awarded: 2000
Purpose: Accelerate implementation of agricultural best management practices, use incentives to obtain land use changes and provide education.

Project: Horseshoe Chain of Lakes Improvement Project

Sponsor: Sauk River Watershed District
Funding: CWP (Grant) \$135,000, (Loan) \$600,000
Awarded: 2000
Purpose: Establish agricultural best management practices, monitoring, and education.

Project: Implementing Comprehensive Nutrient Management Plans --TMDLs

Sponsor: Blue Earth River Basin Initiative
Funding: Section 319 (Grant) \$18,275 Awarded: 2000
Purpose: Identifying 25 Elm Creek watershed farms affecting water quality and assisting farmers in developing a comprehensive nutrient management plan.

Project: Information and Education Coordinator

Sponsor: University of Minnesota Extension Service
Funding: Section 319 (Grant) \$69,500 Awarded: 2000
Purpose: To continue to coordinate and assist water planners and counties with nonpoint source education.

Project: In-Situ Measurement of Denitrification

Sponsor: University of North Dakota
Funding: Section 319 (Grant) \$117,273 Awarded: 2000
Purpose: Determine the capacity of the aquifer to denitrify.

Project: Lake Jessie Watershed Project

Sponsor: Itasca County
Funding: CWP (Grant) \$72,000 Awarded: 2000
Purpose: Implementing best management practices in the Lake Jessie watershed.

Project: Lake Shaokatan Restoration Project

Sponsor: Yellow Medicine River Watershed District
Funding: CWP (Grant) \$50,000, (Loan) \$100,000
Awarded: 2000
Purpose: Upgrade septic systems around Lake Shaokatan.

Project: LARS-LUG Annual Reporting System

Sponsor: Minnesota Board of Water and Soil Resources
Funding: Section 319 (Grant) \$122,400 Awarded: 2000
Purpose: Hire program specialist to develop pollutant reduction estimates, refine soil loss equations, integrate LARS data with other databases.

Project: Long Prairie River Monitoring Project

Sponsor: Todd County Soil and Water Conservation District
Funding: CWP (Grant) \$316,565 Awarded: 2000
Purpose: Establish riparian buffers, erosion control, pollution control and monitoring systems.

Project: Midway River Watershed Restoration Project

Sponsor: South St. Louis County Soil and Water Conservation District
Funding: Section 319 (Grant) \$35,750 Awarded: 2000
Purpose: Identify sites contributing sediment loads, provide information and education, prepare GIS inventory and plant trees to stabilize erosion.

Project: Mississippi River Headwaters Board Nonpoint Source Remediation Effort

Sponsor: Mississippi Headwaters Board
Funding: Section 319 (Grant) \$172,832 Awarded: 2000
Purpose: Develop and implement Whiskey Creek retention pond, stabilize Itasca County shoreline, conduct best management practices workshops.

Project: Pollution Reduction Project, Cannon River Watershed

Sponsor: Cannon River Watershed Partnership
Funding: Section 319 (Grant) \$65,000 Awarded: 2000
Purpose: Implementing best management practices in the Cannon River watershed.

Project: Rice Lake and Koronis Lake Restoration Project

Sponsor: North Fork Crow River Watershed District
Funding: CWP (Grant) \$80,000, (Loan) \$500,000
Awarded: 2000
Purpose: Wetland restoration, feedlot management, general erosion control and agricultural best management practices to improve watershed water quality.

Project: Salem Creek Bacteria Reduction Project

Sponsor: Dodge County Environmental Quality Department
Funding: Section 319 (Grant) \$21,000 Awarded: 2000
Purpose: Target sources of bacteria contamination in Salem Creek through education, outreach, citizen monitoring and one-on-one discussions with landowners.

Project: Training, Technical Assistance and Incentives for Nutrient Management

Sponsor: Minnesota Board of Water and Soil Resources
Funding: Section 319 (Grant) \$30,000 Awarded: 2000
Purpose: Select priority watershed, develop and deliver nutrient management workshops to local staff, develop local nutrient management plans.

Project: Trapper's Run Best Management Practices Cost Share Project

Sponsor: Pope County
Funding: CWP (Grant) \$150,000 Awarded: 2000
Purpose: Identification of noncompliant feedlots, encourage placement of land in CREP, CRP and RIM programs.

Project: Vermillion River Watershed Total Maximum Daily Load (TMDL) Project

Sponsor: Vermillion River WMO
Funding: Section 319 (Grant) \$57,800 Awarded: 2000
Purpose: Identify possible nonpoint sources of fecal coliform bacteria through monitoring, land use assessment and landcover GIS data.

2001

Project: Agnes Henry Winona Clean Lake Monitoring Program

Sponsor: Douglas County
Funding: Section 319 (Grant) \$261,700 Awarded: 2001
Purpose: Construct two stormwater detention ponds, monitor effectiveness.

Project: Big Birch Lake Improvement Project

Sponsor: Sauk River Watershed District
Funding: Section 319 (Grant) \$50,000 Awarded: 2001
Purpose: Implement shoreline best management practices, information and education initiatives, develop erosion control projects, and reestablish shoreline vegetation.

Project: Dalen Coulee Natural Waterway Project

Sponsor: Wild Rice Watershed District
Funding: Section 319 (Grant) \$50,000 Awarded: 2001
Purpose: Construct weirs and natural channels, place adjacent land in set-aside program, complete sediment and debris reduction structures.

Project: Internet Technology to Enhance Communication of Nonpoint Source Information

Sponsor: Minnesota Lakes Association
Funding: Section 319 (Grant) \$10,000 Awarded: 2001
Purpose: Update and enhance computerized bibliography and web for nonpoint source best management practices information and resources.

Project: Local Nitrate Testing and Education/Outreach

Sponsor: Minnesota Department of Agriculture
Funding: Section 319 (Grant) \$110,000 Awarded: 2001
Purpose: Provide support and technical assistance to LUGs to provide nitrate water testing services and educational outreach.

Project: Local Shoreland Landscape Networks

Sponsor: University of Minnesota Water Resources Center
Funding: Section 319 (Grant) \$48,000 Awarded: 2001
Purpose: Conduct three shoreland workshops, prepare and distribute related shoreland materials, evaluate and report.

Project: Minneapolis Chain of Lakes Project

Sponsor: Minneapolis Parks and Recreation Board
Funding: Section 319 (Grant) \$100,000 Awarded: 2001
Purpose: Apply an alum treatment to Lake Calhoun, prioritize and document its effects on internal loading.

Project: Nemadji River Basin Project

Sponsor: Carlton County
Funding: Section 319 (Grant) \$50,450 Awarded: 2001
Purpose: Assess dams for Red Clay Project, implement four upland wetland demonstrations, and develop a 15-acre riparian restoration.

Project: Red Lake River Restoration and Habitat Improvement Project

Sponsor: City of Crookston
Funding: Section 319 (Grant) \$420,000 Awarded: 2001
Purpose: Develop and implement streambank and bed stabilization practices, remove dam, construct rapids and provide additional bank restoration.

Project: Rush River Assessment Project

Sponsor: Sibley County
Funding: CWP (Grant) \$312,518 Awarded: 2001
Purpose: Develop diagnostic study and implementation plan for Rush River watershed.

Project: Sauk Lake Restoration Project

Sponsor: Sauk River Watershed District
Funding: Section 319 (Grant) \$325,000 Awarded: 2001
Purpose: Apply agricultural conservation practices, develop agriculture best management practices, collect water quality data, develop shoreland management practices.

Project: Sauk River Chain of Lakes Watershed Basin Restoration

Sponsor: Sauk River Watershed District
Funding: Section 319 (Grant) \$200,000 Awarded: 2001
Purpose: Provide agricultural waste management assistance, land use best management practices, shoreland restoration, upgrades to septic systems, information and education.

Project: Targeted Feedlot Runoff Reduction Project

Sponsor: Southeast Minnesota Water Resources Board
Funding: Section 319 (Grant) \$586,080 Awarded: 2001
Purpose: Hire experienced agriculturalist for each of eight counties, prepare information on an open lot agreement, train agriculturalists on best management practices.

Project: Whitewater River Watershed National Monitoring Program (see page 16) -- Paired Watershed Monitoring

Sponsor: Robert Finley
Funding: Section 319 (Grant) \$50,000 Awarded: 2001
Purpose: Evaluate surface and groundwater interactions and detect improvements through use of feedlot management, erosion control, land use best management practices, education and monitoring.

2002

Project: BERBI Nonpoint Source Accelerated Implementation

Sponsor: Blue Earth River Basin Initiative
Funding: \$671,000
Purpose: Accelerating the implementation of conservation practices that address nonpoint source pollution within the greater Blue Earth River system in order to meet TMDL and hypoxia-reduction goals.

Project: Best Management Practices Implementation Program

Sponsor: Carnelian Marine Watershed District
Funding: \$50,000
Purpose: Managing each lake in the district, corresponding shoreland, and contributing subwatershed to maintain the water quality of existing high quality, high value lakes and improve water quality of higher priority/lesser quality lakes.

Project: Big Lake Partnership Wastewater Alternatives Study

Sponsor: Fond du Lack Reservation Business Committee
Funding: \$16,000
Purpose: Reviewing potential alternatives for wastewater treatment in the Big Lake area, and developing a plan to implement a solution.

Project: Blue Earth River Watershed Project (Lily and Center Creeks)

Sponsor: Martin County Environmental Services
Funding: \$450,000 (grant), \$300,000 (loan)
Purpose: Reducing sediment and total suspended solids in the Lily and Center Creek subwatersheds, two of the top three found in the Phase I diagnostic report. Center Creek is also a TMDL project for ammonia and bacteria.

Project: Dairy Milkhouse Wastewater Treatment Demonstration

Sponsor: University of Minnesota
Funding: \$193,000
Purpose: Evaluating and demonstrating effective techniques or systems to reduce environmental pollution contained in dairy milkhouse wastewater and disseminating the results to dairy producers in Minnesota.

Project: East Branch Chippewa River Implementation

Sponsor: Chippewa County
Funding: \$212,000
Purpose: Implementing a plan to reduce high nutrient loads and sediment during the growing season from rainfall-driven runoff that occurs throughout most of the watershed of this tributary to the Chippewa and, eventually, Minnesota River.

Project: Elk Creek Conservation Tillage Incentive Program

Sponsor: Heron Lake Watershed District
Funding: \$28,000
Purpose: Reducing major sources of nutrients and total solids to Okabena Creek from Elk Creek and the section that drains the City of Worthington by encouraging use of conservation tillage.

Project: Fond du Lac Nonpoint Source Assessment and Management Plan

Sponsor: Fond du Lac Reservation Business Committee
Funding: \$20,000
Purpose: Developing a tribal Nonpoint Source Management Plan that will complement and enhance the state's and other agencies' nonpoint source objectives.

Project: Grazing Management for Trout Stream Improvement

Sponsor: Minnesota Board of Water and Soil Resources
Funding: \$139,000
Purpose: Training service providers to develop managed grazing plans and to facilitate fencing, livestock watering systems, and protection of sensitive areas.

Project: Hawk Creek Watershed Project “Green Corridors”

Sponsor: Renville County

Funding: \$123,000

Purpose: Reducing erosion and nutrient loading to Middle Hawk Creek and Chetomba Creek, two priority subwatersheds, through enrolling riparian areas into Reinvest in Minnesota, improving agricultural drain tiling systems, and ditch bank stabilization.

Project: Indian Creek Improvement Project

Sponsor: Blue Earth County

Funding: \$82,000

Purpose: Reducing sediment deposition and bacteria levels in this tributary to the Minnesota River that flows through the City of Mankato by developing a plan to address land use, storm water and other strategies.

Project: Lambert Creek Water Quality Improvement Project

Sponsor: Vadnais Lake Area Water Mgmt. Organization

Funding: \$176,000

Purpose: Restoring sheet flow and natural catchment of waters in Lambert Lake, a previously ditched wetland draining to Vadnais Lake, the final impoundment reservoir for the St. Paul Regional Water Services.

Project: Long-term Water Quality Study of Glacial Ridge Surface and Ground Water Systems

Sponsor: Red Lake Watershed District

Funding: \$525,000

Purpose: Improving the quality of both surface and ground water, reducing flowing, and creating outstanding wildlife habitat in the Gently River, Burnham Creek, the Polk-Red Lake County Beach Ridge Aquifer and the Red Lake River.

Project: The Lower Maple River Watershed Project

Sponsor: Blue Earth County

Funding: \$534,000 (grant), \$200,000 (loan)

Purpose: Reducing sediment, phosphorus, nitrate, nitrogen and fecal coliform bacteria in the Maple River by 25 percent.

Project: Manure Management within Ecologically Sensitive Areas in Stearns County

Sponsor: Stearns County SWCD

Funding: \$490,000

Purpose: To further enhance, sustain, conserve and protect county surface and ground water resources.

Project: Middle Sauk River Rehabilitation Project

Sponsor: Sauk River Watershed District

Funding: \$250,000 (grant), \$500,000 (loan)

Purpose: To address agricultural impacts, including priority feedlots, erosion along ditches, BMPs and rural septic systems.

Project: Northstar NEMO Initiative

Sponsor: Minnesota Erosion Control Association

Funding: \$125,000

Purpose: Expand nonpoint source education for local land-use officials, incorporate principles in local plans, and bring together groups interested in land-use and water quality.

Project: Nutrient Reductions to Improve Lake Detroit Water Quality

Sponsor: Pelican River Watershed District

Funding: \$50,000 (grant), \$450,000 (loan)

Purpose: To reduce episodes of internal nutrient loading from Rice Lake and adjacent wetlands, promote agricultural BMPs, and reduce biomass nutrient contributions.

Project: Osakis Lake Watershed Management Program

Sponsor: Sauk River Watershed District

Funding: \$365,000 (grant), \$355,000 (loan)

Purpose: To prevent the lake from further degradation and to improve or maintain its current condition by addressing water-quality concerns within each subwatershed.

Project: Pond Sediment Characterization

Sponsor: Metropolitan Council Environmental Services

Funding: \$90,000

Purpose: To characterize pond sediments (quantity and quality) in the Twin Cities metro area and to provide that information to agencies with responsibilities for public health and water quality.

Project: Projects for Big Sandy Watershed’s Future

Sponsor: Aitkin County Soil and Water Conservation District

Funding: \$33,000

Purpose: To improve and protect water quality, wildlife, fisheries and aesthetic concerns in sensitive areas of the watershed.

Project: Red Lake River Restoration and Habitat Improvement Project

Sponsor: City of Crookston

Funding: \$89,000

Purpose: To correct erosion, reduce sedimentation, improve fish habitat, remove a dam hazard, create recreational opportunities and protect City of Crookston infrastructure.

Project: Rush River Assessment Project

Sponsor: Sibley County

Funding: \$313,000

Purpose: To develop numerical, measurable and achievable short- and long-term goals for the Rush River.

Project: Sauk Lake Storm and Surface Water Resource Investigation Project

Sponsor: Sauk River Watershed District

Funding: \$80,000

Purpose: To focus on storm-water runoff and its effects on Sauk Lake with identification of primary sources and BMPs.

Project: Seven-Mile Creek Watershed Project

Sponsor: Brown-Nicollet-Cottonwood Water Quality Board

Funding: \$196,000 (grant), \$550,000 (loan)

Purpose: To reduce nitrate/nitrogen by 40 percent, phosphorus by 40 percent, total suspended solids by 25 percent and fecal coliform bacteria to levels below 200/100 ml.

Project: Small Group Preparation of Nutrient Management Plans

Sponsor: University of Minnesota Extension

Funding: \$263,000

Purpose: To improve nutrient and manure management practices by increasing the number of management plans and providing clear access to information through a centralized Web site.

Project: Springbrook Subwatershed Implementation Project

Sponsor: City of Fridley

Funding: \$201,000

Purpose: To restore the Springbrook wetland ecosystem by reestablishing a 66:33 emergent plant/open water balance.

Project: Targeted Residential Wastewater Treatment Project

Sponsor: Southeast Minnesota Water Resources Board

Funding: \$530,000

Purpose: To double the average rate at which individual sewage treatment systems are corrected through local efforts across the basin.

Project: Upper Mississippi River Source Water Protection Project

Sponsor: City of St. Cloud

Funding: \$243,000

Purpose: To implement source water protection at a watershed level among several water suppliers who share a common source water resource.

Study Links Property Values to Water Quality

Researchers at Bemidji State University have found a direct correlation between lakeshore property values and water quality. The study, which looked at more than 1,200 residential property sales on lakes in the Upper Mississippi River Basin, calculated how much property values would rise or fall on 37 lakes if water clarity improved or degraded. For example, if one could see down an extra three feet on Leech Lake, a 40-foot lake property's value would increase by nearly \$17,000. If the lake's clarity is reduced by more than three feet, that would reduce values by \$23,760. Access the study online at <http://info.bemidjistate.edu/news/currentnews/lakestudy/lakestudy.pdf>.



Projects Completed History

(listed by year of award)

Project KEY

Section 319 Projects in GREEN

CWP Projects in ORANGE

Project: Boy River Recreational Area Diagnostic/ Feasibility Study

Sponsor: Cass County
Funding: CWP (Grant) \$59,862 Awarded: 1989
Purpose: Prevent degradation of resources through identification of nonpoint sources controls and education.

Project: East Side Lake Improvement Project

Sponsor: Mower County
Funding: CWP (Grant) \$39,650 Awarded: 1989
Purpose: Monitor water quality and sediments, improve water quality for recreational and aesthetic purposes.

Project: French Lake Water Quality Improvement Project

Sponsor: Rice County
Funding: CWP (Grant) \$46,779 Awarded: 1989
Purpose: Determine sources and locations of pollutants entering French Lake.

Project: Grove Lake Restoration Project

Sponsor: North Fork Crow River Watershed District
Funding: CWP (Grant) \$18,632 Awarded: 1989
Purpose: Reduce algal blooms and weed growth through wetland restoration and feedlot management.

Project: Lake Bemidji Watershed Study

Sponsor: Beltrami County
Funding: CWP (Grant) \$84,425 Awarded: 1989
Purpose: Protect and improve water quality using urban and forestry best management practices, as well as feedlot and erosion control.

Project: Lake Florence Restoration Project

Sponsor: City of Stewartville
Funding: CWP (Grant) \$30,250 Awarded: 1989
Purpose: Study water quality problems and determine restorative measures for Lake Florence.

Project: Lake Redwood Monitoring Project

Sponsor: Redwood-Cottonwood Rivers Control Area
Funding: CWP (Grant) \$27,570 Awarded: 1989
Purpose: Prioritize and implement best management practices in subwatersheds of Lake Redwood.

Project: Lambert Creek/Vadnais Lake Water Quality Improvement Project

Sponsor: Vadnais Lake Area Water Management Organization
Funding: CWP (Grant) \$97,000 Awarded: 1989
Purpose: Reduce phosphorus concentrations in watershed and St. Paul reservoir lakes.

Project: Long Lake Diagnostic/Feasibility Study

Sponsor: Minnehaha Creek Watershed District
Funding: CWP (Grant) \$32,485 Awarded: 1989
Purpose: Reduce algal blooms through control of in-lake sediments and watershed best management practices.

Project: Maple Grove Drift Aquifer Protection

Sponsor: City of Maple Grove
Funding: CWP (Grant) \$67,500 Awarded: 1989
Purpose: Municipal wellhead protection, monitoring and development of protection strategy.

Project: Okabena-Ocheda-Bella Diagnostic/Feasibility Study

Sponsor: City of Worthington
Funding: CWP (Grant) \$57,740 Awarded: 1989
Purpose: Reduce algal blooms, preserve and restore wetlands, protect the water supply aquifer.

Project: Olmsted County Groundwater and Wellhead Protection Project

Sponsor: Olmsted County
Funding: CWP (Grant) \$180,114 Awarded: 1989
Purpose: Install monitoring network for wellhead protection, develop land use strategies that protect the water supply.

Project: Trout Lake Diagnostic Feasibility Project

Sponsor: City of Coleraine
Funding: CWP (Grant) \$38,700 Awarded: 1989
Purpose: Restore swimming by reducing algal blooms, reintroduce trout, develop a management plan.

Project: Agnes, Henry and Winona Clean Lakes Monitoring Project

Sponsor: Douglas County
Funding: CWP (Grant) \$60,233 Awarded: 1990
Purpose: Monitoring three hypereutrophic lakes, management plan to improve recreational uses.

Project: Buffalo River Aquifer – Buffalo River Monitoring Project

Sponsor: Clay County Health Department
Funding: CWP (Grant) \$69,998 Awarded: 1990
Purpose: Determine water quality and identify potential contamination for the Buffalo River aquifer.

Project: Centerville Peltier Lake Project

Sponsor: Rice Creek Watershed District
Funding: CWP (Grant) \$44,750 Awarded: 1990
Purpose: Control severe algal blooms through wetland restoration and watershed management.

Project: Dept. of Natural Resources Water Coordinator

Sponsor: Minnesota Department of Natural Resources
Funding: Section 319 (Grant) \$50,000 Awarded: 1990
Purpose: Initiate DNR Waters and Forestry 319 work plans and coordination efforts.

Project: Duck Lake Water Quality Improvement Project

Sponsor: Blue Earth County
Funding: CWP (Grant) \$42,840 Awarded: 1990
Purpose: Reduce algal blooms using agricultural and urban best management practices, improve recreational uses.

Project: Ground Water Analysis of East Brown and West Nicollet Counties

Sponsor: Brown-Nicollet-Cottonwood Water Quality Board
Funding: CWP (Grant) \$50,340 Awarded: 1990
Purpose: Monitor nitrate contamination of wells, focus on nitrogen best management practices implementation.

Project: Lake Sarah Project

Sponsor: Pioneer-Sarah Creek Watershed Management Commission
Funding: CWP (Grant) \$51,830 Awarded: 1990
Purpose: Reduce algal blooms, reduce weeds to improve recreation with BMPs and wetland restoration.

Project: Loon Lake Project

Sponsor: City of Waseca
Funding: CWP (Grant) \$38,000 Awarded: 1990
Purpose: Construct treatment pond to reduce phosphorus and sediment from stormwater.

Project: Minneapolis Chain of Lakes

Sponsor: Minneapolis Parks and Recreation Board
Funding: CWP (Grant) \$150,000 Awarded: 1990
Purpose: Improve and maintain recreational uses of Minneapolis Chain (Lakes Cedar through Harriet) using urban best management practices.

Project: Minnesota Nonpoint Source Implementation Program

Sponsor: University of Minnesota Extension Service
Funding: Section 319 (Grant) \$80,000 Awarded: 1990
Purpose: Development of best management practices, manure management, farmstead and on-site workshops.

Project: Mountain Lake Project

Sponsor: City of Mountain Lake
Funding: CWP (Grant) \$28,885 Awarded: 1990
Purpose: Reduce weed growth for recreational uses through control of agricultural and urban runoff and sediment.

Project: Nonpoint Source Analysis of the Nemadji River

Sponsor: Carlton County Soil and Water Conservation District
Funding: Section 319 (Grant) \$25,000 Awarded: 1990
Purpose: Analysis of nonpoint source problems and sources in the Nemadji River Basin.

Project: Nonpoint Source Analysis of the St. Louis River

Sponsor: South St. Louis County Soil and Water Conservation District
Funding: Section 319 (Grant) \$35,000 Awarded: 1990
Purpose: Analysis of nonpoint source problems in the tributaries of the St. Louis River

Project: North Shore Management Board Project on Nonconforming Septic Systems

Sponsor: North Shore Management Board
Funding: Section 319 (Grant) \$15,000 Awarded: 1990
Purpose: Assessment of nonconforming septic systems from the Lester to the Encampment Rivers.

Project: Pesticide Management

Sponsor: Minnesota Department of Agriculture
Funding: Section 319 (Grant) \$40,000 Awarded: 1990
Purpose: Management and storage site plans for pesticide collection and disposal.

Project: Schwanz Lake Water Quality Diagnostic Study

Sponsor: City of Eagan
Funding: CWP (Grant) \$29,503 Awarded: 1990
Purpose: Develop solutions for a hypereutrophic lake in a suburban park, using stormwater best management practices education program.

Project: U. S. Fish and Wildlife Service Technical Assistance

Sponsor: U.S. Fish and Wildlife Service
Funding: Section 319 (Grant) \$40,000 Awarded: 1990
Purpose: Provide technical assistance on wetland restoration and development.

Project: Whitewater Watershed Project

Sponsor: Winona State University
Funding: CWP (Grant) \$63,000 Awarded: 1990
Purpose: Improve water and land resources, streams and wetland in a cooperative project with the USDA.

Project: Best Management Practices Field Audits on Forest Land

Sponsor: Minnesota Department of Natural Resources
Funding: Section 319 (Grant) \$20,000 Awarded: 1991
Purpose: Pilot a best management practices field audit for future use.

Project: Best Management Practices on Nonferrous Mine Wastes

Sponsor: Minnesota Department of Natural Resources
Funding: Section 319 (Grant) \$25,000 Awarded: 1991
Purpose: Develop guidance on wetland treatment best management practices to reduce trace metal runoff.

Project: Clear Lake Wellhead Project

Sponsor: City of Clear Lake
Funding: CWP (Grant) \$70,538 Awarded: 1991
Purpose: Investigate high municipal well nitrate-N and develop reduction methods.

Project: Clearwater Nonpoint Source Study

Sponsor: Red Lake Watershed District
Funding: CWP (Grant) \$142,142 Awarded: 1991
Purpose: Develop best management practices plan to improve river water quality, feedlot management and agricultural practices.

Project: DNR Coordination Effort

Sponsor: Minnesota Department of Natural Resources
Funding: Section 319 (Grant) \$45,850 Awarded: 1991
Purpose: Coordination and implementation of DNR water nonpoint source efforts.

Project: Farm*A*Syst and Manure Management

Sponsor: University of Minnesota Office of Research and Technology
Funding: Section 319 (Grant) \$39,800 Awarded: 1991
Purpose: Develop Farm*A*Syst displays and brochures, manure management manual and training.

Project: Feedlots in Marshall II

Sponsor: Minnesota Board of Water and Soil Resources
Funding: Section 319 (Grant) \$47,790 Awarded: 1991
Purpose: Provide a feedlot technical assistance specialist in the Marshall Office.

Project: Feedlots in the Marshall Region

Sponsor: Minnesota Board of Water and Soil Resources
Funding: Section 319 (Grant) \$40,000 Awarded: 1991
Purpose: Provide technical assistance to soil and water conservation district staff on addressing high-priority feedlots.

Project: Garvin Brook RCW Project II

Sponsor: Winona County Extension Service
Funding: Section 319 (Grant) \$5,267 Awarded: 1991
Purpose: Continuing well sampling and surveying for nitrogen/nitrates, and providing information to the public.

Project: Great Lakes Erosion Control

Sponsor: South St. Louis County Soil and Water Conservation District
Funding: Section 319 (Grant) \$100,000 Awarded: 1991
Purpose: Investigate methods of limiting erosion in the Lake Superior Basin.

Project: Lake Sarah Project

Sponsor: Pioneer-Sarah Creek Watershed Management Commission
Funding: CWP (Grant) \$50,060 Awarded: 1991
Purpose: Reduce algal blooms, reduce weeds to improve recreation through best management practices and wetland restoration.

Project: Lake Shaokatan Restoration Project

Sponsor: Yellow Medicine River Watershed District
Funding: CWP (Grant) \$48,000 Awarded: 1991
Purpose: Reduce algal and toxic algal blooms, improve fishery and other uses.

Project: Metropolitan Groundwater Study of Highway Runoff

Sponsor: Metropolitan Council
Funding: Section 319 (Grant) \$39,500 Awarded: 1991
Purpose: Determining groundwater impacts of PAHs from infiltrating highway runoff.

Project: Middle Des Moines Watershed Restoration

Sponsor: Jackson County
Funding: CWP (Grant) \$172,000 Awarded: 1991
Purpose: Stop and reduce degradation of surface waters, Heron Lake and wetlands.

Project: Minneapolis Chain of Lakes

Sponsor: Minneapolis Parks and Recreation Board
Funding: CWP (Grant) \$250,000 Awarded: 1991
Purpose: Improve and maintain recreational uses of the Minneapolis Chain (Cedar through Harriet lakes) through urban best management practices.

Project: Minnesota River Play

Sponsor: Theater for Corporate and Community
Funding: Section 319 (Grant) \$5,000 Awarded: 1991
Purpose: Development of a script for a play on the value and water quality condition of the Minnesota River.

Project: St. Louis River Phosphorus Abatement

Sponsor: South St. Louis County SWCD
Funding: Section 319 (Grant) \$48,000 Awarded: 1991
Purpose: Investigation of best management practices to reduce phosphorus in the St. Louis River.

Project: Statewide Nonpoint Source Educational Strategy

Sponsor: Office of Strategic and Long Range Planning
Funding: Section 319 (Grant) \$42,000 Awarded: 1991
Purpose: Develop a statewide nonpoint source pollution educational strategy

Project: Upper Coon Creek Watershed Water Quality

Sponsor: Coon Creek Watershed District
Funding: CWP (Grant) \$48,000 Awarded: 1991
Purpose: Develop an interactive groundwater and surface water project, implement watershed best management practices for water quality.

Project: Wellhead Protection Outreach and Public Information

Sponsor: Minnesota Department of Health
Funding: Section 319 (Grant) \$62,000 Awarded: 1991
Purpose: Develop public information and outreach activities to promote wellhead protection.

Project: Wetlands Restoration in the Upper Minnesota River

Sponsor: Upper Minnesota River Watershed District
Funding: Section 319 (Grant) \$30,000 Awarded: 1991
Purpose: Wetlands restoration throughout the Upper Minnesota River watershed for improved water quality.

Project: Anoka Sand Plain Project

Sponsor: U. S. Geological Survey
Funding: Section 319 (Grant) \$40,000 Awarded: 1992
Purpose: Study of the residence time of recharge water and flux of agricultural chemicals in the unsaturated zone.

Project: Best Management Practices Field Audits on Forest Land II

Sponsor: Minnesota Department of Natural Resources
Funding: Section 319 (Grant) \$38,500 Awarded: 1992
Purpose: Continue forestry best management practices field audits.

Project: Farm*A*Syst and Manure Management Materials

Sponsor: University of Minnesota Office of Research and Technology
Funding: Section 319 (Grant) \$50,000 Awarded: 1992
Purpose: Continuation of Farm*A*Syst Program.

Project: Feedlots in Marshall Project

Sponsor: Minnesota Board of Water and Soil Resources
Funding: Section 319 (Grant) \$52,500 Awarded: 1992
Purpose: Feedlot management training and technical assistance to soil and water conservation districts in the Marshall area.

Project: Garvin Brook RCW Project III

Sponsor: Winona County Extension Service
Funding: Section 319 (Grant) \$9,000 Awarded: 1992
Purpose: Continuation of well sampling and cataloging in Garvin Brook project area.

Project: Garvin Brook RCW Project IV – Well Sampling

Sponsor: Winona County Extension Service
Funding: Section 319 (Grant) \$3,632 Awarded: 1992
Purpose: Continuation of well sampling in the Garvin Brook area.

Project: Growth Management Project

Sponsor: Natural Resources Conservation Service
Funding: Section 319 (Grant) \$40,000 Awarded: 1992
Purpose: Growth management assessment to mitigate nonpoint source pollution.

Project: Jefferson – German Lakes Water Quality Improvement Project

Sponsor: LeSueur County
Funding: CWP (Grant) \$118,000 Awarded: 1992
Purpose: Resource investigation of Jefferson-German Lakes watershed.

Project: Lake Bemidji Watershed Project

Sponsor: Beltrami County
Funding: CWP (Grant) \$274,000 Awarded: 1992
Purpose: Implementation of Phase II to reduce nonpoint source pollution to Bemidji and Irving Lakes and the sand plain aquifer.

Project: Minnesota River Water Quality Conference

Sponsor: Sportsmen's Coalition for a Clean Minnesota River
Funding: Section 319 (Grant) \$5,000 Awarded: 1992
Purpose: Sponsorship of citizens interested in improving the water quality in the Minnesota River.

Project: Natural Resources Conservation Service Conservationist Best Management Practices Implementation

Sponsor: Natural Resources Conservation Service
Funding: Section 319 (Grant) \$58,800 Awarded: 1992
Purpose: Assignment of SCS conservationist to MPCA to assist with best management practices implementation.

Project: Nutrient Management Technical Assistance

Sponsor: Minnesota Department of Agriculture
Funding: Section 319 (Grant) \$58,800 Awarded: 1992
Purpose: Provide nutrient management technical assistance to Minnesota farmers.

Project: Pineland Clean Water Project

Sponsor: Pineland Clean Water Project Joint Powers Board
Funding: CWP (Grant) \$145,000 Awarded: 1992
Purpose: Resource investigation of surface and groundwater nonpoint source pollution in Hubbard and Becker Counties.

Project: St. Louis River Phosphorus Reduction

Sponsor: South St. Louis County SWCD
Funding: Section 319 (Grant) \$48,000 Awarded: 1992
Purpose: Reduce phosphorus nonpoint source pollution in the St. Louis River.

Project: Wellhead Protection Outreach and Public Information

Sponsor: Minnesota Department of Health
Funding: Section 319 (Grant) \$40,000 Awarded: 1992
Purpose: Continuation of public information and outreach activities promoting wellhead protection.

Project: Anoka Sand Plain Project II

Sponsor: U.S. Geological Survey
Funding: Section 319 (Grant) \$35,000 Awarded: 1993
Purpose: Determine the residence time of water and chemicals in the Anoka Sand Plain area.

Project: Biological Community Monitoring in the Minnesota River Basin

Sponsor: Winona State University
Funding: Section 319 (Grant) \$10,000 Awarded: 1993
Purpose: Conduct a nonpoint source assessment of biological elements of the Minnesota River.

Project: Brown-Nicollet-Cottonwood Phase II -- Groundwater Implementation

Sponsor: Brown-Nicollet-Cottonwood Water Quality Board
Funding: CWP (Grant) \$264,000 Awarded: 1993
Purpose: Implementation of Phase II groundwater monitoring and improvements.

Project: French Lake Water Quality Improvement Project, Phase II

Sponsor: Rice County Highway Department
Funding: CWP (Grant) \$139,000 Awarded: 1993
Purpose: Implementation stage of the French Lake water quality improvement project.

Project: Garvin Brook RCW Project V

Sponsor: Winona County Soil and Water Conservation District
Funding: Section 319 (Grant) \$1,074 Awarded: 1993
Purpose: Continuation of the Garvin Brook Clean Water Project to assess ground water quality.

Project: Growth Management Project II

Sponsor: Natural Resources Conservation Service
Funding: Section 319 (Grant) \$33,750 Awarded: 1993
Purpose: Phase II project to prevent nonpoint source pollution via growth management strategies.

Project: Information and Education Coordinator

Sponsor: University of Minnesota Extension Service
Funding: Section 319 (Grant) \$92,000 Awarded: 1993
Purpose: Coordinator to provide educational programming to reduce nonpoint source pollution.

Project: Isotopic and Chemical Analyses of Waters from the Whitewater/Minnesota River Basin

Sponsor: U of M Office of Research and Technology
Funding: Section 319 (Grant) \$10,000 Awarded: 1993
Purpose: Evaluate implemented best management practices and pollutant flow paths, assess BMP timeframe impacts.

Project: Lake Harriet Watershed Assistance Project

Sponsor: Minnesota Department of Agriculture
Funding: Section 319 (Grant) \$50,000 Awarded: 1993
Purpose: Implementation and evaluation of best management practices in the Lake Harriet watershed.

Project: Lake Shaokatan Restoration Project, Phase II

Sponsor: Yellow Medicine River Watershed District
Funding: CWP (Grant) \$240,000 Awarded: 1993
Purpose: Implementation of the Lake Shaokatan project to reduce algal/toxic algal blooms and improve recreational uses.

Project: Lake Shetek Watershed Improvement Project

Sponsor: Murray County
Funding: CWP (Grant) \$131,000 Awarded: 1993
Purpose: Resource investigation of Lake Shetek to assess and develop improvement plan.

Project: Lake Traverse Improvement Project

Sponsor: Bois de Sioux Watershed District
Funding: CWP (Grant) \$70,000 Awarded: 1993
Purpose: Resource investigation of Lake Traverse to assess and develop improvement plan.

Project: Lake Washington Water Quality Improvement Project

Sponsor: Le Sueur County
Funding: CWP (Grant) \$94,000 Awarded: 1993
Purpose: Resource investigation of Lake Washington to assess and develop improvement plan.

Project: Lambert Creek Improvement Project

Sponsor: Vadnais Lake Area Water Management Org.
Funding: CWP (Grant) \$245,000 Awarded: 1993
Purpose: Implementation of Lambert Creek project to reduce phosphorus in its reservoir lake.

Project: Manure Management Program

Sponsor: U of M Office of Research and Technology
Funding: Section 319 (Grant) \$58,000 Awarded: 1993
Purpose: Develop a manure management program to advance the state's nonpoint source abatement efforts.

Project: Manure Storage Basin Monitoring Project

Sponsor: Morrison County
Funding: Section 319 (Grant) \$2,000 Awarded: 1993
Purpose: Conduct a manure storage basin monitoring project in Morrison County.

Project: NRCS Conservationist Best Management Practices Implementation

Sponsor: Natural Resources Conservation Service
Funding: Section 319 (Grant) \$35,000 Awarded: 1993
Purpose: Continuation of conservation position to work on nonpoint source issues.

Project: Whitewater Project Land Use Data

Sponsor: Whitewater River Watershed Joint Powers Board
Funding: Section 319 (Grant) \$6,000 Awarded: 1993
Purpose: Develop land use data for the Whitewater River watershed.

Project: Whitewater River Monitoring

Sponsor: Whitewater River Watershed Joint Powers Board
Funding: Section 319 (Grant) \$3,600 Awarded: 1993
Purpose: Develop and implement a monitoring plan for the Whitewater River watershed.

Project: Whitewater River Runoff Monitoring Project

Sponsor: Whitewater River Watershed Joint Powers Board
Funding: Section 319 (Grant) \$8,200 Awarded: 1993
Purpose: Monitor runoff from the Whitewater River watershed.

Project: Whitewater Watershed Monitoring -- Finley

Sponsor: Joseph Finley
Funding: Section 319 (Grant) \$300 Awarded: 1993
Purpose: Evaluate effectiveness of best management practices through the use of paired-watershed monitoring.

Project: 1996 Nonpoint Source Conference Management

Sponsor: Southeast Minnesota Water Resources Board
Funding: Section 319 (Grant) \$10,000 Awarded: 1994
Purpose: Provide funding for the 1996 agricultural nonpoint source conference.

Project: Anoka Sand Plain Project III

Sponsor: U.S. Geological Survey
Funding: Section 319 (Grant) \$35,000 Awarded: 1994
Purpose: Continue monitoring activities of the Anoka Sand Plain Project.

Project: Big Sandy Area Lakes Watershed Project

Sponsor: Aitkin County
Funding: CWP (Grant) \$69,000 Awarded: 1994
Purpose: Protect and maintain the beneficial uses of the Big Sandy Lakes watershed.

Project: Boy River CWP Project, Phase II

Sponsor: Cass County
Funding: CWP (Grant) \$38,000 Awarded: 1994
Purpose: Implementation of the improvement plans for the Boy River.

Project: Crystal, Loon, Mills Lakes Water Quality Improvement Project

Sponsor: Blue Earth County
Funding: CWP (Grant) \$93,000 Awarded: 1994
Purpose: Investigate the sources of degradation to Crystal, Loon and Mills Lake.

Project: Fairfax Urban Demonstration Project

Sponsor: Prior Lake-Spring Lake Watershed District
Funding: Section 319 (Grant) \$110,000 Awarded: 1994
Purpose: Implement structural and nonstructural best management practices in an urban watershed.

Project: Feedlot Technical Assistance Project

Sponsor: Minnesota Board of Water and Soil Resources
Funding: Section 319 (Grant) \$63,000 Awarded: 1994
Purpose: Prove statewide feedlot technical support to implement revolving loan fund program.

Project: Great Lakes Erosion Control II

Sponsor: South St. Louis County SWCD
Funding: Section 319 (Grant) \$40,000 Awarded: 1994
Purpose: Develop projects to correct erosion, sedimentation and pollution problems.

Project: Information and Education Coordinator

Sponsor: University of Minnesota Extension Service
Funding: Section 319 (Grant) \$60,000 Awarded: 1994
Purpose: Continue coordination of educational programming to reduce nonpoint source pollution.

Project: Knife Lake Demonstration Project

Sponsor: Kanabec County
Funding: CWP (Grant) \$31,500 Awarded: 1994
Purpose: To begin implementation of the final phase of rehabilitation for Knife Lake.

Project: Lake Harriet Best Management Practices

Sponsor: Minnesota Department of Agriculture
Funding: Section 319 (Grant) \$50,000 Awarded: 1994
Purpose: Test the implementation and evaluation of urban best management practices in the Lake Harriet Watershed.

Project: Manure Management Program

Sponsor: University of Minnesota Office of Research and Technology
Funding: Section 319 (Grant) \$54,000 Awarded: 1994
Purpose: Continue one-on-one contact with livestock producers for manure management plans.

Project: Minneapolis Chain of Lakes Implementation Project

Sponsor: Minneapolis Parks and Recreation Board
Funding: CWP (Grant) \$812,000 Awarded: 1994
Purpose: Implementation of best management practices for the Minneapolis Chain of Lakes watershed.

Project: Minnesota Lakes Association 1994 Annual Conference

Sponsor: Minnesota Lakes Association
Funding: Section 319 (Grant) \$2,000 Awarded: 1994
Purpose: Cosponsor the 1994 Minnesota Lakes Association annual conference.

Project: Mountain Lake CWP Phase II Project

Sponsor: City of Mountain Lake
Funding: Section 319 (Grant) \$100,000 Awarded: 1994
Purpose: Implementation of improvement plan for Mountain Lake.

Project: Nutrient Management Technical Assistance

Sponsor: Minnesota Department of Agriculture
Funding: Section 319 (Grant) \$95,000 Awarded: 1994
Purpose: Continue nutrient management activities with farmers and expand to agricultural retailers.

Project: Prior Lake Wetlands Project

Sponsor: Prior Lake- Spring Lake Watershed District
Funding: Section 319 (Grant) \$74,000 Awarded: 1994
Purpose: Demonstration of wetland restoration on nonpoint source pollution in Prior Lake.

Project: Prior Lake - Spring Lake CWP Phase II Project

Sponsor: Prior Lake - Spring Lake Watershed District
Funding: Section 319 (Grant) \$100,000 Awarded: 1994
Purpose: Implementation activities for Prior and Spring Lakes improvements.

Project: Redwood River Clean Water Project

Sponsor: Cotton River Clean Water Partnership
Funding: Section 319 (Grant) \$109,000 Awarded: 1994
Purpose: Implementation of the Redwood River improvement strategies.

Project: Schwanz Lake Clean Water Partnership Phase II Project

Sponsor: City of Eagan
Funding: Section 319 (Grant) \$89,100 Awarded: 1994
Purpose: Implementation of the improvement plan for Schwanz Lake.

Project: Whitewater Watershed Project

Sponsor: Whitewater River Watershed Joint Powers Board
Funding: Section 319 (Grant) \$8,600 Awarded: 1994
Purpose: Water sampling and assessments in the Whitewater River watershed.

Project: Whitewater Watershed Project - U of M

Sponsor: University of Minnesota
Funding: Section 319 (Grant) \$12,700 Awarded: 1994
Purpose: Complete a macroinvertebrate, fishery and habitat assessment in the Whitewater River watershed.

Project: Whitewater Watershed Project Continuation

Sponsor: Whitewater River Watershed Joint Powers Board
Funding: Section 319 (Grant) \$18,000 Awarded: 1994
Purpose: Continuation of water sampling at new sites in the Whitewater River watershed.

Project: 24,000 Scale Hydrology Mapping

Sponsor: St. Cloud State University
Funding: Section 319 (Grant) \$33,000 Awarded: 1995
Purpose: Develop complete stream network using Arcview and other information.

Project: Agricultural Best Management Practices Implementation Program

Sponsor: Minnesota Board of Water and Soil Resources
Funding: Section 319 (Grant) \$261,000 Awarded: 1995
Purpose: Provide technical staffing assistance and support to implement agricultural State Revolving Fund loans.

Project: Anoka Sand Plain Project V

Sponsor: U.S. Geological Survey
Funding: Section 319 (Grant) \$40,000 Awarded: 1995
Purpose: Continuation of monitoring activities in the Anoka Sand Plains area.

Project: Big Birch II SRF Loan Agreements

Sponsor: Sauk River Watershed District
Funding: CWP (Loan) \$403,000 Awarded: 1995
Purpose: Develop loan agreements to assist with best management practices implementation on Big Birch Lake.

Project: Blue Earth River Basin Implementation Framework

Sponsor: Blue Earth River Basin Initiative
Funding: CWP (Grant) \$220,000 Awarded: 1995
Purpose: Identify contributions of pollutants from the Blue Earth River basin and determine strategies for reduction.

Project: Brown-Nicollet-Cottonwood Phase II Implementation Project

Sponsor: Brown-Nicollet-Cottonwood Counties Joint Powers Board
Funding: CWP (Grant) \$129,000; (Loan) \$1,086,000 Awarded: 1995
Purpose: Continue implementation and diagnostic activities begun in earlier phases of the project.

Project: Cation, Anion and Isotope Analysis Project

Sponsor: University of Minnesota Department of Geology/Geophysics
Funding: Section 319 (Grant) \$5,200 Awarded: 1995
Purpose: Analyze cations, anions and isotopes in samples provided by the MPCA.

Project: Cost-Benefit Analysis for Water Quality Regulation and Decisionmaking

Sponsor: Express Interactive Solutions
Funding: Section 319 (Grant) \$15,000 Awarded: 1995
Purpose: Present seminar on cost/benefit analysis for water quality regulation.

Project: Digital Hydrographic Data Project

Sponsor: U.S. Department of the Interior -- Geological Survey
Funding: Section 319 (Grant) \$68,400 Awarded: 1995
Purpose: To develop and analyze digital hydrographic data in portions of Minnesota.

Project: Fecal Coliform Analysis for the Minnesota River Basin

Sponsor: Mankato State University
Funding: Section 319 (Grant) \$3,000 Awarded: 1995
Purpose: Collect and analyze Minnesota River Basin water samples for fecal coliform, enter into database.

Project: Fish and Invertebrate Communities in the Whitewater River

Sponsor: Whitewater River Watershed Joint Powers Board
Funding: Section 319 (Grant) \$6,700 Awarded: 1995
Purpose: Using GIS technology, examine fish and invertebrate communities in Whitewater River watershed.

Project: Fish Lake Phase II Project

Sponsor: U of M Office of Research and Technology
Funding: CWP (Grant) \$49,000 Awarded: 1995
Purpose: Implement best management practices to reduce phosphorus and nutrient loading to Fish Lake.

Project: French Lake II Loan Agreement

Sponsor: Rice County Highway Department
Funding: CWP (Loan) \$153,000 Awarded: 1995
Purpose: Loan funding to assist with implementation activities for the French Lake Phase II project.

Project: Growth Management Project III, Implementation

Sponsor: Natural Resources Conservation Service
Funding: Section 319 (Grant) \$41,000 Awarded: 1995
Purpose: Implement a land management framework.

Project: Jefferson-German Lakes Water Quality Improvement Project

Sponsor: Le Sueur County
Funding: CWP (Grant) \$96,000 Awarded: 1995
Purpose: To reduce phosphorus loadings to the Jefferson-German Lakes system through best management practices.

Project: Lake Bemidji IIA Watershed Management Project

Sponsor: Beltrami County
Funding: CWP (Grant) \$120,000; (Loan) \$780,000
Awarded: 1995
Purpose: To continue implementation activities begun under the Lake Bemidji Phase II project.

Project: Lake Volney Water Quality Improvement Project

Sponsor: Le Sueur County
Funding: CWP (Grant) \$50,000 Awarded: 1995
Purpose: To determine cause and effect relationships between land use and water quality, develop an improvement plan and implement.

Project: Maplewood Innovative Stormwater Management Project

Sponsor: City of Maplewood
Funding: Section 319 (Grant) \$63,000 Awarded: 1995
Purpose: Implement stormwater methods and infiltrate stormwater using innovative strategies and techniques.

Project: Minnesota River Basin Fecal Coliform Analysis

Sponsor: Mankato State University
Funding: Section 319 (Grant) \$3,000 Awarded: 1995
Purpose: Collect and analyze Minnesota River Basin water samples for fecal coliform, enter in a database.

Project: Mountain Lake Project Phase II

Sponsor: City of Mountain Lake
Funding: Section 319 (Grant) \$100,000 Awarded: 1995
Purpose: Continue implementation activities begun in the Mountain Lake Phase II CWP project.

Project: Phosphate Management in the Blue Earth River Basin

Sponsor: University of Minnesota Office of Research and Technology
Funding: Section 319 (Grant) \$61,000 Awarded: 1995
Purpose: Increase adoption of practices to reduce losses of pollutants to the Blue Earth River watershed.

Project: Pokegama Lake Watershed Project

Sponsor: Pine County Soil and Water Conservation District
Funding: CWP (Grant) \$62,000 Awarded: 1995
Purpose: To develop a comprehensive lake and watershed management plan for Pokegama Lake.

Project: Prior/Spring Lakes Phase II CWP Project

Sponsor: Prior Lake - Spring Lake Watershed District
Funding: Section 319 (Grant) \$77,000 Awarded: 1995
Purpose: Continue implementation activities begun previously.

Project: Redwood River Phase II Clean Water Project

Sponsor: Cotton River Clean Water Partnership
Funding: Section 319 (Grant) \$109,000 Awarded: 1995
Purpose: Continue implementation and best management practices begun in Redwood River Phase II.

Project: Shoreland Vegetation Best Management Practices to Reduce Erosion and Runoff

Sponsor: University of Minnesota
Funding: Section 319 (Grant) \$33,000 Awarded: 1995
Purpose: Demonstrate pollution prevention by the effectiveness of vegetative plantings.

Project: South Zumbro River Watershed Project

Sponsor: Olmsted County
Funding: CWP (Grant) \$135,000 Awarded: 1995
Purpose: Implement best management practices to reduce ground water and surface water pollution in the Zumbro River watershed.

Project: Whitewater River Fish and Invertebrates

Sponsor: University of Minnesota Office of Research and Technology
Funding: Section 319 (Grant) \$6,700 Awarded: 1995
Purpose: Using GIS technology, examine the fish and invertebrate communities in the Whitewater River.

Project: Whitewater Watershed Project II

Sponsor: University of Minnesota Office of Research and Technology
Funding: Section 319 (Grant) \$27,000 Awarded: 1995
Purpose: Continue macroinvertebrate fishery and habitat assessments for Whitewater.

Project: Whitewater Watershed Project: Automated Monitoring

Sponsor: U of M Office of Research and Technology
Funding: Section 319 (Grant) \$7,800 Awarded: 1995
Purpose: Operate and maintain automated monitoring sites near the Whitewater River watershed.

Project: Whitewater Watershed Project: Biosystems and Ag Engineer

Sponsor: University of Minnesota Office of Research and Technology
Funding: Section 319 (Grant) \$5,000 Awarded: 1995
Purpose: Assist operation of five automated monitoring sites, monitor weather station.

Project: Big Sandy Lake Phase II Restoration Plan

Sponsor: Aitkin County
Funding: CWP (Grant) \$200,000 Awarded: 1996
Purpose: Reduce phosphorus loadings and increase participation in conservation practices.

Project: Bioavailable Phosphorus Credit Pay for Pounds

Sponsor: University of Minnesota Office of Research and Technology
Funding: Section 319 (Grant) \$3,000 Awarded: 1996
Purpose: Determine relationships of soils, phosphorus absorption and chemistry in the Minnesota River Basin.

Project: Blue Earth River-Watonwan Basin Implementation Framework

Sponsor: Blue Earth River Clean Water Partnership
Funding: CWP (Grant) \$214,000 Awarded: 1996
Purpose: Identify water quality contributions of the Watonwan River and determine goals for improvement.

Project: Best Management Practices implementation in the Lake Superior Drainage Basin

Sponsor: Minnesota Board of Water and Soil Resources
Funding: Section 319 (Grant) \$22,000 Awarded: 1996
Purpose: Fund a position to educate, design best management practices, oversee erosion control in Lake Superior.

Project: Brown-Nicollet-Cottonwood Phase IIB Amendment

Sponsor: Brown-Nicollet-Cottonwood Water Quality Board
Funding: CWP (Grant) \$150,000 Awarded: 1996
Purpose: Continue implementation and diagnostic activities begun, further loan funding for BMP implementation.

Project: Cation/Anion and Isotope Analysis Project

Sponsor: University of Minnesota Department of Geology/Geophysics
Funding: Section 319 (Grant) \$7,800 Awarded: 1996
Purpose: Analyze cation, anion and isotopes in samples provided by the MPCA.

Project: Clearwater River State Revolving Loan Water Quality Improvement Project

Sponsor: U of M Office of Research and Technology
Funding: CWP (Loan) \$567,000 Awarded: 1996
Purpose: Provide SRF loan funding for streambank stabilization, public education and best management practices.

Project: Cottonwood River Restoration Project

Sponsor: Cotton River Clean Water Partnership
Funding: CWP (Grant) \$215,000 Awarded: 1996
Purpose: Document factors affecting sediment/nutrient transport, develop an implementation plan.

Project: Create Wetlands over Acid Generating Tailings

Sponsor: Minnesota Department of Natural Resources
Funding: Section 319 (Grant) \$2,500 Awarded: 1996
Purpose: Convert tailings basins into wetlands to protect water quality and create habitat.

Project: Cross Lake Watershed Project -- Pine County

Sponsor: Pine County Soil and Water Conservation District
Funding: CWP (Grant) \$35,000 Awarded: 1996
Purpose: Collect data, determine nutrient/hydrogeologic budgets, promote awareness.

Project: Economic Evaluation -- Pollutant Reduction

Sponsor: U of M Office of Research and Technology
Funding: Section 319 (Grant) \$20,000 Awarded: 1996
Purpose: Develop economic model of decisions to estimate the financial impacts of pollutant reduction on farms and local units of government.

Project: French Lake Phase II Continuation Agreement

Sponsor: Rice County Highway Department
Funding: CWP (Grant) \$62,000 Awarded: 1996
Purpose: Continue best management practices implementation activities begun in French Lake Phase II.

Project: Grass Lake Restoration Project

Sponsor: Kandiyohi County Soil and Water Conservation District
Funding: Section 319 (Grant) \$100,000 Awarded: 1996
Purpose: Acquire conservation easements and restore drained prairie wetland basin.

Project: Grove Lake Restoration Project, Phase II

Sponsor: North Fork Crow River Watershed District
Funding: CWP (Grant) \$40,000; (Loan) \$143,000 Awarded: 1996
Purpose: Reduce or eliminate nutrient loading through implementing best management practices.

Project: Growth Management Project: Sustainable Land Use Pilots

Sponsor: Natural Resources Conservation Service
Funding: Section 319 (Grant) \$90,000 Awarded: 1996
Purpose: Test planning, principles and goals through sustainable local land use pilots.

Project: Heron Lake Watershed Restoration Project

Sponsor: Heron Lake Watershed District
Funding: CWP (Grant) \$200,000; (Loan) \$444,000
Awarded: 1996
Purpose: Reduce pollutant loading, improve wildlife habitat, improve lake management.

Project: Jefferson-German II State Revolving Fund Loan #2

Sponsor: Le Sueur County
Funding: CWP (Loan) \$1,050,000 Awarded: 1996
Purpose: Additional loan for continuation of implementation activities.

Project: Lake Harriet Watershed Best Management Practices Project, Phase III

Sponsor: Minnesota Department of Agriculture
Funding: Section 319 (Grant) \$50,000 Awarded: 1996
Purpose: Continue best management practices activities in the Lake Harriet watershed.

Project: Lake Washington Phase II Water Quality Improvement Project

Sponsor: Le Sueur County
Funding: CWP (Grant) \$102,500; (Loan) \$1,251,000
Awarded: 1996
Purpose: Improve watershed coordination, reduce watershed loading, develop plans and educational opportunities.

Project: Miller Creek Restoration Project

Sponsor: U.S. Department of Agriculture
Funding: Section 319 (Grant) \$15,000 Awarded: 1996
Purpose: Riparian tree planting, pond side plantings, reestablish spring and fish habitat.

Project: Miller Creek Watershed Preservation and Restoration Project

Sponsor: Natural Resources Conservation Service
Funding: CWP (Grant) \$18,300 Awarded: 1996
Purpose: Monitor Miller Creek to determine current status and begin implementation of best management practices.

Project: Mountain Lake Phase IIB Watershed Project

Sponsor: City of Mountain Lake
Funding: Section 319 (Grant) \$100,000 Awarded: 1996
Purpose: Continue best management practices activities for the Mountain Lake project.

Project: NALMS 1996 Conference

Sponsor: North American Lake Management Society
Funding: Section 319 (Grant) \$2,500 Awarded: 1996
Purpose: Provide funding to assist with implementation of 1996 NALMS conference.

Project: NRCS Conservationist Best Management Practices Implementation

Sponsor: Natural Resources Conservation Service
Funding: Section 319 (Grant) \$15,000 Awarded: 1996
Purpose: Continue the technical assistance to local governmental units of NRCS conservationist.

Project: Oakdale Wellhead Protection Program

Sponsor: City of Oakdale
Funding: CWP (Grant) \$25,000 Awarded: 1996
Purpose: Delineate wellhead protection plan, assess water supply vulnerability, develop strategies and implement.

Project: On-Farm Manure Management

Sponsor: Kandiyohi County
Funding: Section 319 (Grant) \$37,200 Awarded: 1996
Purpose: Assist farmers and compile information on implementing a manure management strategy.

Project: Osakis Lake Improvement Project

Sponsor: Sauk River Watershed District
Funding: CWP (Grant) \$183,000 Awarded: 1996
Purpose: Define water quality goals, reduce pollutants, increase public awareness, improve coordination of nonpoint source water pollution prevention activities.

Project: Paynesville Wellhead Protection

Sponsor: City of Paynesville
Funding: CWP (Grant) \$12,000 Awarded: 1996
Purpose: Evaluate impacts on Paynesville water supply and develop a plan to protect ground water resources.

Project: Phosphate Management II in the Blue Earth River Basin

Sponsor: U of M Office of Research and Technology
Funding: Section 319 (Grant) \$60,750 Awarded: 1996
Purpose: Increase adoption of best management practices to lower phosphorus inputs to the Blue Earth River.

Project: Pollution Reduction Payments Project

Sponsor: LeSueur County Soil and Water Conservation District
Funding: Section 319 (Grant) \$26,000 Awarded: 1996
Purpose: Develop grant agreements with land managers for best management practices implementation in LeSueur County.

Project: Prior-Spring Lakes Improvement Project

Sponsor: Prior Lake - Spring Lakes Watershed District
Funding: Section 319 (Grant) \$67,200 Awarded: 1996
Purpose: Continue implementation activities begun in earlier Prior-Spring Lakes project.

Project: Redwood River Clean Water Project

Sponsor: Cotton River Clean Water Partnership
Funding: Section 319 (Grant) \$108,790 Awarded: 1996
Purpose: Continue implementation activities for the Redwood Watershed project.

Project: Rice Lake and Koronis Lake Restoration Project

Sponsor: North Fork Crow River Watershed District
Funding: CWP (Grant) \$57,500 Awarded: 1996
Purpose: Reduce phosphorus loadings through best management practices.

Project: Shoreland Vegetation Best Management Practices to Reduce Erosion and Runoff

Sponsor: Aitkin County
Funding: Section 319 (Grant) \$19,200 Awarded: 1996
Purpose: Continue establishing filter strip demonstration plots to protect water quality.

Project: Shoreland Vegetation II Best Management Practices

Sponsor: Aitkin County
Funding: Section 319 (Grant) \$15,000 Awarded: 1996
Purpose: Continuation of shoreland vegetation activities on Big Sandy Lake.

Project: Snake River Project

Sponsor: Snake River Watershed Management Board
Funding: Section 319 (Grant) \$60,000 Awarded: 1996
Purpose: Implement streambank protection, pollution abatement, erosion control and manure management.

Project: Tanner's Lake State Revolving Fund Loan

Sponsor: Ramsey-Washington Metro Watershed District
Funding: CWP (Loan) \$945,000 Awarded: 1996
Purpose: Provide loan assistance for best management practices in the Tanner's Lake watershed.

Project: Water Level Gage Installation Project

Sponsor: Minnesota Department of Natural Resources
Funding: Section 319 (Grant) \$54,000 Awarded: 1996
Purpose: Install and monitor water level gages on bridge piers or freestanding structures.

Project: Wetland Treatment of Mine Drainage

Sponsor: Minnesota Department of Natural Resources
Funding: Section 319 (Grant) \$20,000 Awarded: 1996
Purpose: Study two created wetland systems to determine lifetime for treating mine wastes.

Project: Whitewater Paired Watershed Monitoring

Sponsor: Robert Finley
Funding: Section 319 (Grant) \$1,800 Awarded: 1996
Purpose: Place water quality monitoring stations in two small watersheds to evaluate best management practices effectiveness.

Project: 1998 Minnesota Comprehensive Local Water Planners Conference

Sponsor: West Polk County Soil and Water Conservation District
Funding: Section 319 (Grant) \$3,000 Awarded: 1997
Purpose: Provide partial funding for the 1998 Minnesota Local Water Planners Conference.

Project: Accelerated Water Quality Improvement Program

Sponsor: Stearns County Soil and Water Conservation District
Funding: Section 319 (Grant) \$100,000 Awarded: 1997
Purpose: Provide technical and financial assistance to agriculture in the Sauk River watershed.

Project: Achieving Major Changes in Minor Watersheds

Sponsor: University of Minnesota Office of Research and Technology
Funding: Section 319 (Grant) \$78,000 Awarded: 1997
Purpose: Involve landowners and local units of government in developing tailor-made best management practices implementation plans.

Project: Anoka Sand Plain V -- Groundwater Dating

Sponsor: U.S. Geological Survey
Funding: Section 319 (Grant) \$35,000 Awarded: 1997
Purpose: Determine the recharge age of the Anoka Sand Plain groundwater and evaluate agricultural effects.

Project: Biological Monitoring in the Whitewater Watershed Project

Sponsor: Winona State University
Funding: Section 319 (Grant) \$20,000 Awarded: 1997
Purpose: Site sampling and assessments of biological indicators in the Whitewater River watershed.

Project: Boy River II State Revolving Fund Loan - Environmental Subordinate Service Districts

Sponsor: Cass County
Funding: CWP (Loan) \$206,000 Awarded: 1997
Purpose: Provide loan funding to local subordinate service districts for sewage treatment.

Project: Comfort Lake Phase I Diagnostic Study

Sponsor: Wyoming Township
Funding: CWP (Grant) \$34,000 Awarded: 1997
Purpose: Monitor Big and Little Comfort Lakes to analyze nutrients.

Project: Designing Stormwater Best Management Practices Workshop

Sponsor: University of Minnesota
Funding: Section 319 (Grant) \$27,000 Awarded: 1997
Purpose: Develop and present workshops on construction site erosion and stormwater detention.

Project: Horseshoe Chain of Lakes Improvement Project

Sponsor: Sauk River Watershed District
Funding: CWP (Grant) \$80,000; (Loan) \$320,000
Awarded: 1997
Purpose: Extend agricultural efforts, address on-site septic systems and shoreland erosion.

Project: Introduction to ArcView Course for MPCA Employees

Sponsor: Rowekamp Associates Inc.
Funding: Section 319 (Grant) \$8,800 Awarded: 1997
Purpose: Provide introduction to ArcView computer training for MPCA employees.

Project: Lake Sallie Restoration

Sponsor: Pelican River Watershed District
Funding: CWP (Grant) \$54,000; (Loan) \$385,000
Awarded: 1997
Purpose: Develop ecosystem management approach with alum treatment and biomanipulation.

Project: Long Prairie River Monitoring Project

Sponsor: Todd County Soil and Water Conservation District
Funding: CWP (Grant) \$35,000 Awarded: 1997
Purpose: Group efforts to depict water quality conditions and to maintain and improve water quality.

Project: Mountain Lake Watershed Project IV

Sponsor: City of Mountain Lake
Funding: Section 319 (Grant) \$50,000 Awarded: 1997
Purpose: Continue best management practices implementation activities.

Project: Old Sod Farm Wetland Enhancement and Stormwater Management

Sponsor: Ramsey-Washington Metro Watershed District
Funding: Section 319 (Grant) \$40,400 Awarded: 1997
Purpose: Design/develop wetland learning center, improve stormwater quality, increase diversion of stormwater.

Project: On-Farm Manure Management II

Sponsor: Minnesota Department of Agriculture
Funding: Section 319 (Grant) \$37,000 Awarded: 1997
Purpose: Continue educational program with livestock producers for precise manure management strategies.

Project: Pokegama/Cross Lake Erosion Project

Sponsor: Pine County Soil and Water Conservation District
Funding: Section 319 (Grant) \$72,000 Awarded: 1997
Purpose: Implement sediment control structures for ravines to Pokegama and Cross Lakes

Project: Redwood River Watershed Project IV

Sponsor: Cotton River Clean Water Partnership
Funding: Section 319 (Grant) \$122,000 Awarded: 1997
Purpose: Continue implementation activities in the Redwood River watershed.

Project: Rice Lake and Koronis Lake Restoration Project

Sponsor: North Fork Crow River Watershed District
Funding: Section 319 (Grant) \$36,000 Awarded: 1997
Purpose: Develop, implement best management practices for the watershed, educate landowners.

Project: Shoreland Vegetation III - Best Management Practices to Reduce Erosion and Runoff

Sponsor: U of M Department of Horticultural Science
Funding: Section 319 (Grant) \$30,000 Awarded: 1997
Purpose: Continue reestablishing native vegetation to reduce erosion and runoff, evaluate impacts.

Project: Springbrook Subwatershed Resource Investigation Project

Sponsor: City of Fridley
Funding: CWP (Grant) \$30,000 Awarded: 1997
Purpose: Investigate and monitor water quality and land use, identify pollutants and develop best management practices.

Project: Tillage Transect Program

Sponsor: Minnesota Board of Water and Soil Resources
Funding: Section 319 (Grant) \$94,000 Awarded: 1997
Purpose: Establish baseline data on crop residue management and reduce soil erosion and sedimentation.

Project: Whitewater Watershed Biological Monitoring

Sponsor: Winona State University
Funding: Section 319 (Grant) \$30,000 Awarded: 1997
Purpose: Analyze the biological monitoring data collected for the Whitewater Watershed Project.

Project: Workshops for Designing Stormwater Management Practices

Sponsor: University of Minnesota
Funding: Section 319 (Grant) \$27,000 Awarded: 1997
Purpose: Develop and present workshops on construction site erosion and stormwater detention.

Project: 1999 State Water Planning Conference

Sponsor: Southeast Minnesota Water Resources Board
Funding: Section 319 (Grant) \$3,000 Awarded: 1998
Purpose: Provide funds for the 1999 Minnesota State Water Planning Conference June 22-23, 1999.

Project: Alternative Wastewater Demonstration Project

Sponsor: Beltrami County SWCD
Funding: Section 319 (Grant) \$65,000 Awarded: 1998
Purpose: Replace 19 septic systems with a community activated sludge treatment system.

Project: Benefits and Impacts of Chemical Treatment of Lake Inflows

Sponsor: U of M Office of Research and Technology
Funding: Section 319 (Grant) \$40,000 Awarded: 1998
Purpose: Evaluate effectiveness of alum treatment for phosphorus removal at three sites.

Project: Bioavailable Phosphorus Credits in Pay for Pounds

Sponsor: U of M Office of Research and Technology
Funding: Section 319 (Grant) \$17,400 Awarded: 1998
Purpose: Determine relationships between soils, phosphorus and chemistry in the Minnesota River Basin.

Project: Best Management Practices Implementation in Lake Superior Drainage

Sponsor: Minnesota Board of Water and Soil Resources
Funding: Section 319 (Grant) \$21,200 Awarded: 1998
Purpose: Continue funding of half-time engineer in the BWSR Duluth Office.

Project: Buffering Drainage Ditches in Iosco Creek Watershed

Sponsor: Blue Earth River Basin Initiative
Funding: Section 319 (Grant) \$44,000 Awarded: 1998
Purpose: Establish vegetative buffer in Iosco Creek watershed drainage ditches.

Project: Environmental Protection through Shoreline Stewardship

Sponsor: Beltrami County SWCD
Funding: Section 319 (Grant) \$27,000 Awarded: 1998
Purpose: Provide information and education on the effects of traditional landscaping on water quality.

Project: Ground Water Disinfection Rule Requirements Implementation

Sponsor: Minnesota Department of Health
Funding: Section 319 (Grant) \$85,000 Awarded: 1998
Purpose: Conduct detailed age dating of public well water under water disinfection rule.

Project: Improvement/Implementation of Manure Test Processes

Sponsor: Minnesota Department of Agriculture
Funding: Section 319 (Grant) \$38,000 Awarded: 1998
Purpose: Provide expanded technical assistance and information to Minnesota livestock producers for implementing manure tests.

Project: Information and Education Coordinator

Sponsor: Minnesota Extension Service
Funding: Section 319 (Grant) \$66,000 Awarded: 1998
Purpose: Continue funding for nonpoint source information and education coordinator.

Project: Lake Superior Shoreline Protection Program

Sponsor: Cook County
Funding: Section 319 (Grant) \$60,000 Awarded: 1998
Purpose: Work with landowners to solve erosion and sedimentation problems on the north shore of Lake Superior.

Project: Lake Volney Improvement Project, Phase II

Sponsor: Le Sueur County
Funding: CWP (Grant) \$175,000; (Loan) \$712,000
Awarded: 1998
Purpose: Improve watershed coordination, reduce lake loading, education for landowners, evaluate impacts.

Project: Lakeshed Erosion Control Cost-Share Program

Sponsor: Minnesota Board of Water and Soil Resources
Funding: Section 319 (Grant) \$50,000 Awarded: 1998
Purpose: Provide funds to demonstrate and apply lower-cost land treatment practices to sediment.

Project: LARS-LUG Annual Reporting System

Sponsor: Minnesota Board of Water and Soil Resources
Funding: Section 319 (Grant) \$91,000 Awarded: 1998
Purpose: Provide funds for LARS enhancements, information to local government.

Project: Minneapolis Chain of Lakes Continuation

Sponsor: Minneapolis Parks and Recreation Board
Funding: CWP (Grant) \$250,000; (Loan) \$1,000,000
Awarded: 1998
Purpose: Continue implementation activities begun in Minneapolis Chain of Lakes Phase II.

Project: Redwood River Clean Water Project, Year 5

Sponsor: Cotton River Clean Water Partnership
Funding: Section 319 (Grant) \$122,000 Awarded: 1998
Purpose: Continue best management practices activities in the Redwood River watershed.

Project: Wastewater Facilitator

Sponsor: Blue Earth River Basin Initiative
Funding: Section 319 (Grant) \$92,000 Awarded: 1998
Purpose: Provide facilitator to work in Blue Earth watershed on wastewater problems.

Project: Whitewater Analysis of Biological Monitoring

Sponsor: Winona State University
Funding: Section 319 (Grant) \$50,000 Awarded: 1998
Purpose: Analyze prior biological monitoring data collected for the Whitewater Watershed Project.

Project: Pollution Reduction Payments Projects

Sponsor: LeSueur County Soil and Water Conservation District
Funding: Section 319 (Grant) \$33,000 Awarded: 1998
Purpose: Implement the Pollution Reduction Payments Project.

Project: Achieving Major Change in Minor Watersheds

Sponsor: University of Minnesota Extension Service
Funding: Section 319 (Grant) \$72,173
Purpose: To achieve widespread adoption of land-use BMPs for four minor watersheds.

Project: Minnesota River Basin: Promoting Best Management Practices

Sponsor: University of Minnesota Office of Technology and Research
Funding: Section 319 (Grant) \$55,200 Awarded: 2000
Purpose: Develop a resource guide that will combine the assessment and information aspects of the Cropland Assessment System.

Project: Upland Water Retention for Improving Drainage and Water Quality Video

Sponsor: Minnesota Pollution Control Agency
Funding: Section 319 (Grant) \$10,400
Purpose: To prepare a 17-minute video on the impacts of drain tiling on both water retention and water quality.

Project: Redwood River Clean Water Project

Sponsor: Redwood-Cottonwood Rivers Control Area
Funding: Section 319 (Grant) \$50,000
Purpose: To reduce sediments and nutrients, expand game fishery habitat and reduce peak flow.

Notes

This report was prepared for the U.S. Environmental Protection Agency



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