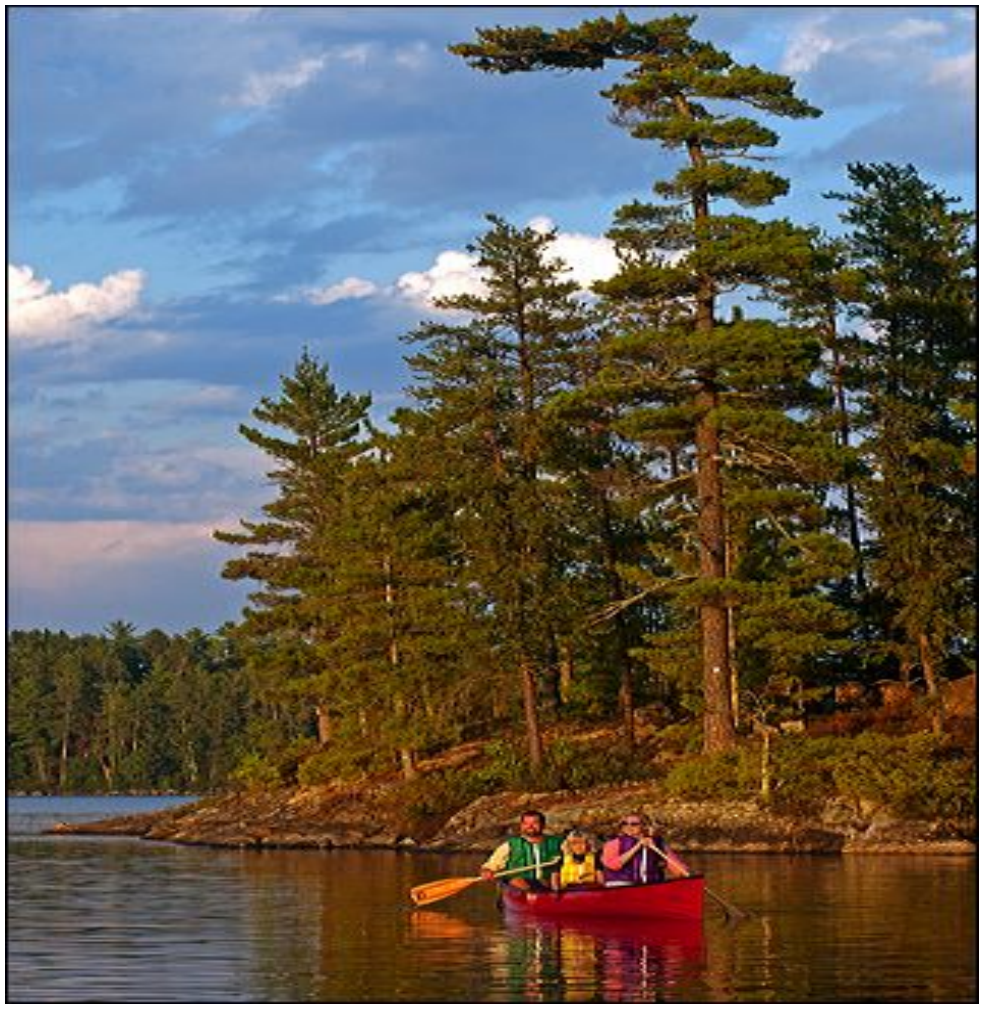
Clean Water Legacy Act: Restoring and Protecting Minnesota's Waters

Case Studies and Examples



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Introduction

This fact sheet provides an overview and case studies to describe the process of restoring impaired waters as well as protecting clean waters. The goal is to help the reader understand the types of activities funded by the Clean Water Legacy Act. The case studies describe each step in the process and were provided by the state agencies charged to implement CWLA.

Impaired waters take their name from the "impaired waters list," a federally required listing of lakes and rivers in the state that currently do not meet the water-quality standards set to protect their beneficial uses.

The federal Clean Water Act requires states to:

- Assess all waters of the state to identify and list impairments
- Conduct TMDL studies in order to set pollutant reduction goals
- Implement corrective measures to meet a TMDL's pollutant reduction goals and restore waters to standards.

The 2006 Clean Water Legacy Act launched Minnesota on an accelerated path toward addressing impaired waters. Nearly $25 million was appropriated to increase monitoring and assessment, and start a number of new Total Maximum Daily Load studies (TMDLs) and restoration and protection projects. (For additional information on the 2006 CWLA, see the Governor's Clean Water Initiative Web page at http://cwc.state.mn.us/index.html.)

In 2007, the Governor's budget recommends $20 million per year for CWLA activities over the FY08-09 biennium. Table 1 on the next page provides detail on funding provided by the 2006 Legacy appropriations (in FY07) and outcomes, and the Governor's recommendations for the FY08-09 biennium.

Minnesota currently has 2,250 listed impairments on 1,300 lakes and streams. With only a small percentage of the state's waters assessed for impairments, we can expect to see many more listings in the coming years. That means we have many TMDLs and restoration activities ahead of us.

Completion of TMDLs has a direct economic impact on Minnesota. The federal Clean Water Act prohibits new or expanded wastewater discharges to an impaired water until a TMDL is completed. A 2005 state appeals court decision in the case of Maple Lake and Annandale, two Minnesota cities which had been issued a permit to build and jointly operate a new wastewater treatment plant, forced the MPCA to revoke the permit. With their existing plants at capacity, these cities effectively cannot grow until the TMDL study is completed and approved by the U.S. Environmental Protection Agency. The decision has been appealed to the state Supreme Court; meanwhile, over 100 new or expanding wastewater facilities are affected by this situation.

But even more importantly, Minnesota has a proud legacy of clean, abundant water; it's a critical foundation block in our economy and our way of life. Minnesotans want polluted waters restored. The state has embarked on the road to cleaning up our impaired waters.

Using case studies, the following pages describe typical activities at each stage of the process. There are two sections, one showing the various steps in identifying and addressing impairments, and one showing how the same process is used to protect or improve waters that are not yet listed.

Table 1: Clean Water Legacy Funding*

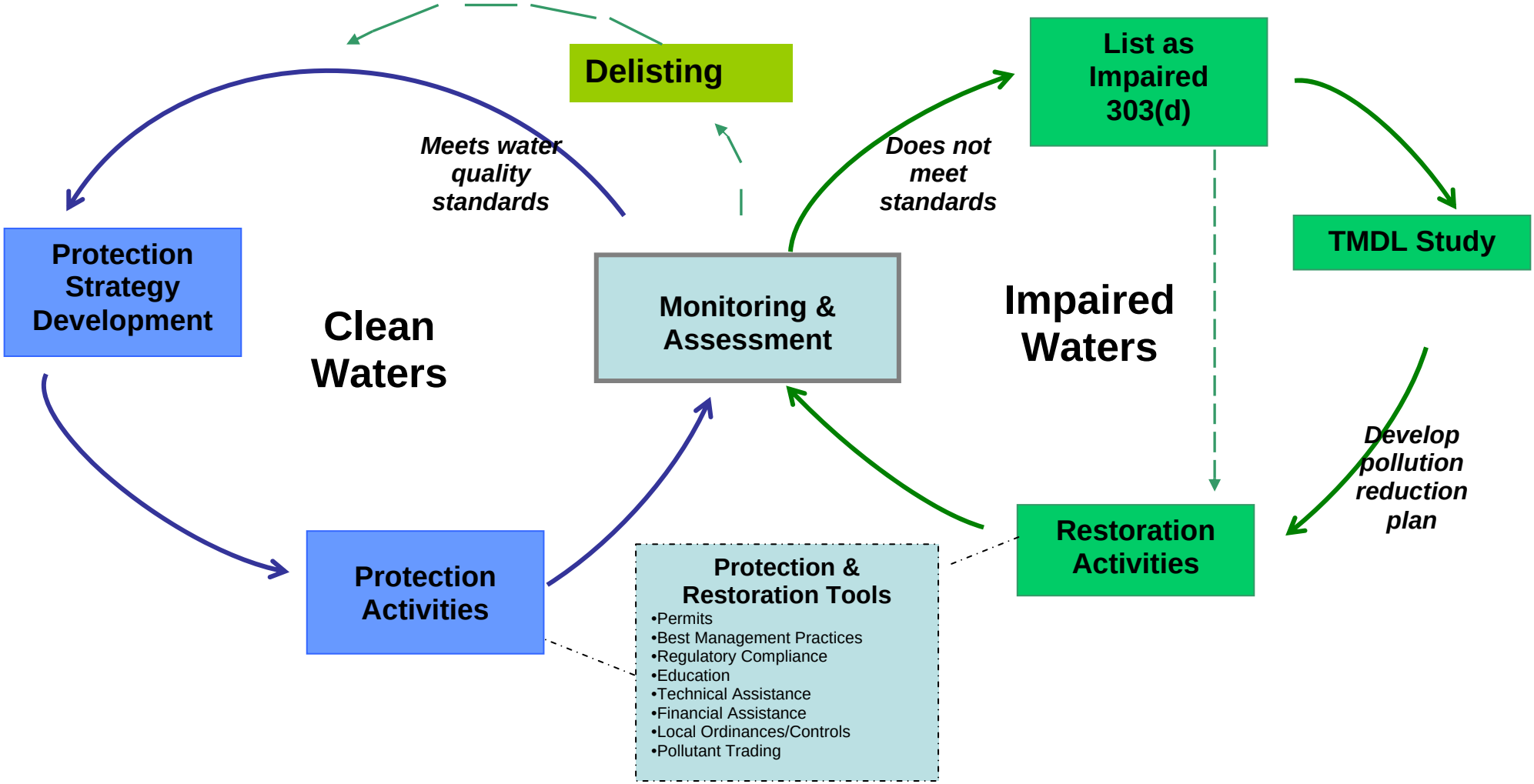
FY 2007 Legacy Funding: $24.95 million	**Outcomes**
Monitoring and Assessment: $2.14 million	Expands milestone sites, citizen lake monitoring, remote sensing, mercury in fish tissue monitoring, flow monitoring.
TMDL Studies: $3.17 million	10 additional TMDL studies funded.
Nonpoint Source Restoration & Protection: $11.23 million	▪ 51 projects funded ($8 million) – 31 restoration and 20 protection (181 proposals received for $44 million). ▪ Increased forest stewardship plans on private riparian lands; acquisition of quality riparian lands.
Point Source Restoration & Protection: $8.4 million (An additional $55.8 million in bonding for the State Revolving Fund and Wastewater Infrastructure Fund for municipal loans/grants is also available for restoration and protection-related projects, with priority given to TMDL implementation projects.)	▪ Phosphorus reduction grants: $2.3 million available for an estimated 5 projects (47 projects applied needing $18.2M). ▪ TMDL grants: $5 million available for an estimated 14 projects (26 projects applied needing $16M). ▪ Small community wastewater treatment: $1 million available for an estimated 3 unsewered communities. ▪ $100,000 available for grants to small unsewered communities for technical assistance from UM Extension.
FY 2008-2009 Legacy -- Governor's budget recommendation: $20 million per year	**Outcomes expected**
Monitoring and Assessment: $2.51 million per year	▪ Assess additional 60 lakes that are over 500 acres each. ▪ Provide grants to local government and volunteers for stream and lake monitoring. ▪ Increase monitoring of mercury levels in fish, stream flow and biological impairments in lakes.
TMDL Studies: $9.57 million per year	Over 20 additional TMDL studies funded per year, as well as increased technical assistance for TMDL development.
Nonpoint Source Restoration & Protection: $7.82 million per year	▪ Landowner assistance: increased cost share and incentive payments for BMPs and technical/engineering assistance. ▪ Increase AgBMP loan projects, applied research and expertise for BMP selection.
Point Source Restoration & Protection: $100,000 per year	Continue technical assistance grants to small unsewered communities for assistance from UM Extension and ISTS professionals.

*Much of the funding for these activities may be matched with federal and local funds.

Protection and Restoration Process

State and local partnership

This diagram shows the steps in the process of restoring impaired waters and how unimpaired waters can be kept off the list with timely intervention. Each step in the diagram is defined on the next page and illustrated with case studies on the following pages.



About the Protection and Restoration Process

The preceding graphic, "Protection and Restoration Process: State and Local Partnership," provides a broad overview of Minnesota's process to protect and restore our waters. The following defines the terms used in this graphic:

Impaired Waters – A water body is "impaired" or polluted if it fails to meet one or more of Minnesota's water-quality standards. Standards exist for basic pollutants such as sediment, bacteria, nutrients and mercury. The federal Clean Water Act requires the states to identify, list, develop and implement clean-up plans, and restore impaired waters.

Monitoring and Assessment – Water-quality data is collected by state, local and federal agencies, as well as citizens, and then assessed to determine whether water bodies meet water-quality standards. Due to limited resources, only a small percentage of Minnesota's river miles and lakes have been assessed so far. About 40 percent of waters that are assessed are impaired, a rate comparable to what other states are finding.

List as Impaired – Every two years, each state must submit an updated list of impaired waters to the U.S. Environmental Protection Agency for approval. A state's impaired waters list is used to prioritize state and federal funding and action plans for restoring those waters. Minnesota's 2006 list shows 2,250 impairments on 284 rivers and 1,013 lakes.

TMDL Study – For each impairment on the list, the Clean Water Act requires that a Total Maximum Daily Load study be prepared. The TMDL results in a calculation of the maximum amount of a pollutant the water body can receive and still meet water quality-standards. It also allocates needed pollutant reductions among all the point and nonpoint sources causing the impairment. The process typically involves two to four years of technical study and intensive stakeholder and public input. All TMDLs must be approved by the U.S. EPA.

Restoration Activities – Following approval of a TMDL, a detailed implementation plan is developed to outline the restoration activities needed to meet the TMDL's pollutant load allocation. Restoration activities range from improvements of wastewater treatment plants and urban stormwater systems, to upgrades of failing septic systems and adoption of best management practices on agricultural and urban land. Restoration work can occur outside of a TMDL if it appears certain to restore the water to standards quickly. Depending on the type, severity and scale of the problem, restoration may require years or even decades.

Delisting – If restoration is successful and follow-up assessment verifies that water quality standards are being met, an impaired water is removed from the impaired waters list.

Clean Waters – Waters not listed as impaired. About 60 percent of Minnesota's lakes and streams are found to be meeting standards at time of assessment.

Protection Strategy Development – Planning activities, such as Clean Water Partnership projects, that set strategies and activities needed to ensure that a water body continues to meet standards.

Protection Activities – The wide variety of permitting, education, funding, planning and technical assistance provided by state, local and federal programs to help protect and improve waters that are meeting water-quality standards.

IMPAIRED WATERS

When a lake or stream reach is added to what is formally called the Clean Water Act Section 303(d) list of Impaired Waters, it enters into a process laid out in federal and state rules that will lead to a TMDL study and eventual restoration. The following sections illustrate each step of the process, using case studies.

Monitoring & Assessment

Groundhouse River Biological Monitoring

The Groundhouse River originates in the forest and wetlands of east-central Minnesota, flowing through farmland and small communities before entering the Snake River south of Mora, Minnesota. In the summer of 1996 the MPCA biological monitoring crew sampled two sites on the Groundhouse, one of which was listed as impaired for aquatic life under the Clean Water Act (CWA) Section 303 (d).

Biological sampling looks at the health of fish and aquatic invertebrates, small organisms such as caddis flies and stone flies which are an important component of healthy fresh-water ecosystems. Comparing a stream's fish and invertebrate communities with established measures called "indices of biological integrity", provides accurate indications of overall water quality. The 1996 biological sampling on the Groundhouse was part of a larger survey to determine the overall condition of the St. Croix River basin using randomly selected stream sites throughout the entire basin.

While random monitoring was successful in determining the basin's overall condition, it provided little information on what was harming aquatic life in the Groundhouse. Subsequent biological surveys, including an intensive monitoring effort in the Groundhouse's watershed in 2006, better defined the extent of the impairment and identified fine sediment on the stream bottom as the most likely cause.

The intensive monitoring effort brought together experts in stream biology, habitat, chemistry, and other sciences. Efforts are now underway to use the resulting information to determine the origin of the fine sediment, define appropriate thresholds and limits on its sources, and develop a TMDL to address the aquatic life impairment on the Groundhouse River.

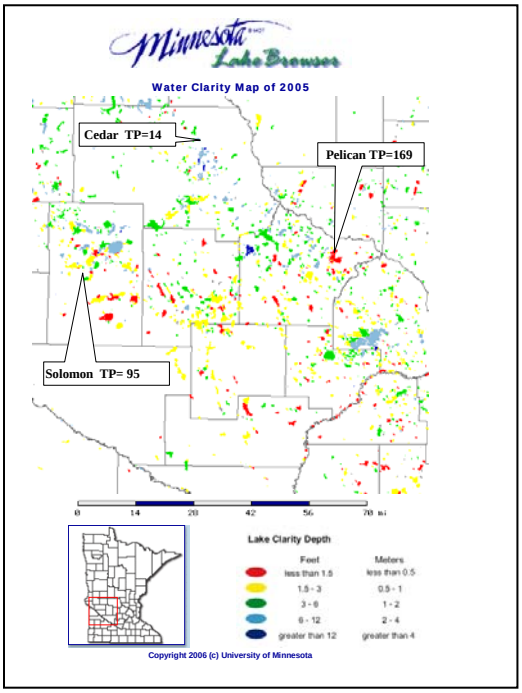
Remote Sensing as a Basis for Targeting Monitoring and Assessment

Over the past several years of assessing Minnesota's lakes for impairments, it's become apparent that shallow lakes "act different" from deeper lakes and may need to be judged by different standards. Therefore the MPCA has been looking at developing new criteria for assessing shallow lakes. To do this, the agency needed to assess the range of conditions in shallow lakes.

In the summer of 2003 MPCA collaborated with the Department of Natural Resources to characterize the water quality, rooted plant populations, and fisheries of several shallow lakes across west-central Minnesota. Since there was minimal water-quality data on shallow lakes, we used remote-sensed water transparency data provided by satellite imagery as a basis for selecting lakes for the study. (Transparency is a useful indicator of other water conditions in a lake, and satellite imaging can provide accurate transparency data over large areas.)

The lakes were sampled in 2003 for water chemistry, transparency, plant composition and fisheries. These data were then used to select appropriate thresholds for phosphorus, chlorophyll-a and water transparency to protect shallow lakes.

One of the lakes in this study, Pelican Lake in Wright County, was also the subject of a proposed restoration effort by DNR and Ducks Unlimited. Data resulting from the 2003 study was critical to understanding the lake's problems. The DNR and Ducks Unlimited collaborated on further studies of the lake. These data will allow the MPCA to fully assess Pelican Lake for possible 303(d) listing in 2008. PCA, DNR, and Ducks Unlimited have developed an important partnership in increasing our understanding of the unique challenges of assessing shallow lakes.



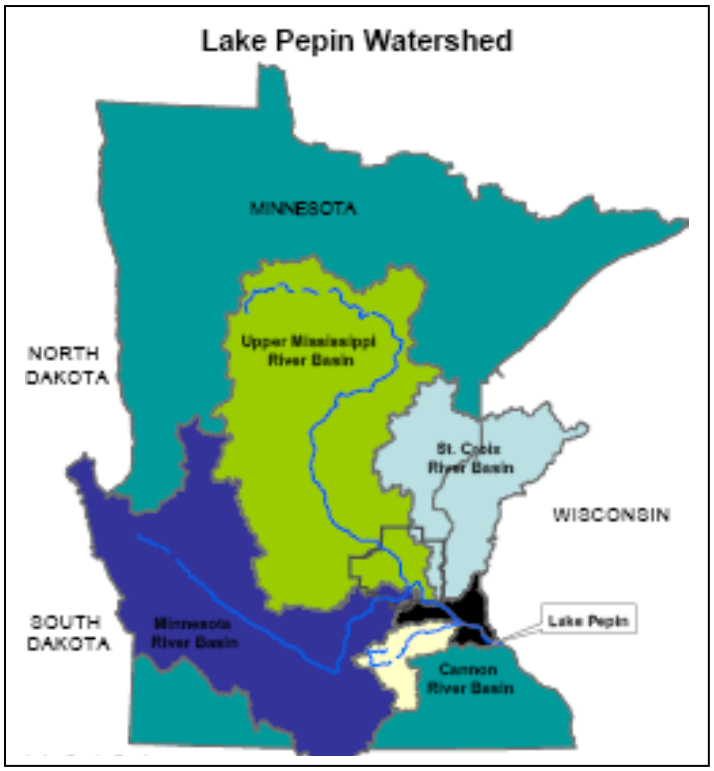
Example of lake transparency maps provided by remote sensing

Lake Pepin Monitoring and Assessment

The drought of 1988 was particularly hard on water quality in Lake Pepin, a large natural lake on the Mississippi River at Lake City, Minn. Severe algae blooms and fish kills prompted citizen complaints. MPCA conducted water-quality monitoring in response that summer. Results indicated a highly eutrophic (nutrient-rich) system, with high phosphorus and sediment levels, combined with long residence time (length of time the water remains in the lake), causing the problems. The events of that summer, in conjunction with development of a new permit for the Twin Cities' main wastewater treatment plant, led to two intensive studies of the lake from 1990-1992 and 1994-1998. Collaborators included the Science Museum of Minnesota, University of Minnesota, Metropolitan Council, U.S. Army Corps of Engineers, Minnesota and Wisconsin Boundary Area Commission, the MPCA, and citizen volunteers. Together they gathered current and historical data on nutrient and sediment loading, concentrations, and fluctuations; changes in land use and wastewater treatment; and extensive water-quality data. They also developed a number of computer models to understand nutrient and sediment

Fish Kill on Lake Pepin (1988), taken by Wisconsin DNR

movement in the lake. These efforts led to a better understanding of the Lake Pepin system, including a vast watershed covering half the state, and, its impairments for turbidity and excess nutrients, listed in 2004. Development of a TMDL addressing the impairments is underway.



Mississippi River Confluence with St. Croix upstream from Lake Pepin shows the impacts of turbidity on water clarity

List as Impaired

Hardwood Creek Dissolved Oxygen and Aquatic Life Impairment

Hardwood Creek is in the Upper Mississippi River Basin. In 2004, using data collected by the Rice Creek Watershed District at eight different sites, the MPCA assessment team determined the creek was impaired for dissolved oxygen (DO), important for the health of aquatic ecosystems. Nearly half of 176 samples were below the water-quality standard for DO. MPCA sampling also found lower than expected scores for the Index of Biological Integrity for fish, meaning the creek's fish community was in poor shape, so it was also listed as impaired for aquatic life.

Lake Leven Nutrient Impairment

This 280-acre lake lies north of Glenwood in Pope County. It supports a diverse fishery dominated by bass and pan fish and is periodically stocked with walleye by the DNR. Its highly agricultural watershed of 9,200 acres is in the upper reaches of the Chippewa River watershed, which drains to the Minnesota River.

Leven is an example of a lake with a very rich base of water-quality data. At the time of its listing in 2002 there were eight years of transparency monitoring data, four years of county data, and an MPCA lake assessment in 2000. These data reflect the strong interest in the lake's water quality among lakeshore residents, county water planners, and the MPCA. The lake is well above the threshold for nutrient impairment compared with other lakes in north central Minnesota. The TMDL study on Leven is scheduled to begin in 2012. Volunteer monitoring by the MPCA's Citizen Lake-Monitoring Program and the Pope County Coalition of Lake Associations has continued since the listing, and will be an important part of the TMDL.

TMDL Study

Lake Independence Excess Nutrients

In 2002, the MPCA listed Lake Independence as impaired for aquatic recreation because of excessive nutrients. This 851-acre lake, located in the Crow River Watershed about 15 miles west of Minneapolis, is very popular for boating, fishing, swimming, and aesthetic uses (it's part of the Three Rivers Park District's Baker Park Preserve). Though still primarily agricultural, the lake's watershed is undergoing rapid urbanization.

Algae bloom on Lake Independence (Dave Picard)

A draft TMDL was prepared by the Park District and the Pioneer-Sarah Creek Watershed Commission, with oversight and some financial support from the MPCA. The report culminated several years of work by the local units and a committee of stakeholders.

The study found the majority of inflowing nutrients are from feedlots and agricultural cropland. Other sources include urban and rural development and the Loretto Wastewater Treatment Plant. Meeting the desired water-quality goal would require reducing current phosphorus levels by 45 percent.

Public notice on the draft TMDL ended November 29, 2006. The draft report was sent to the U.S. EPA for final approval in early 2007. Achieving significant phosphorus reductions will take intensive efforts over the next five to 10 years.

Lower Minnesota River Dissolved Oxygen

This TMDL addresses an impairment for low dissolved oxygen in a 22-mile stretch of the Minnesota River between Shakopee and the confluence with the Mississippi River. This reach is called the Lower Minnesota River.

Excess phosphorus was identified as the cause of low DO. Phosphorus acts as a fertilizer, enabling algae to grow at abnormal rates. When the algae die, the decay process uses up oxygen in the water needed by fish and other aquatic life. A TMDL conducted during 2003-04 identified how much phosphorus needed to be reduced in order to regain the DO standard in the Lower Minnesota during summer-low flow conditions, the period when the problems were greatest.

Municipal wastewater treatment plant along the Minnesota River (Mankato Public Works Department)

The study found the four main sources of phosphorus were wastewater treatment plants, urban stormwater, direct discharges of sewage (e.g., non-complying septic systems and unsewered communities), and agricultural runoff. To reach consensus on how to achieve the needed reductions, a 45-member advisory committee met intensively over a six-month period in 2003. The committee comprised cities, industry, agriculture, agriculture producer groups, counties, and watershed and environmental groups. The committee agreed on reduction allocations for the four source sectors, including significant reductions for the 41 largest of the 143 permitted municipal and industrial wastewater treatment plants in the Lower Minnesota basin.

The goal is to reduce total phosphorus from these 41 facilities by 35 percent by the year 2010. This will be accomplished through one of the most innovative approaches in the country – a new basin-wide phosphorus permit. The permit requires the largest facilities to meet targets or engage in pollutant trading (buying or selling phosphorus "credits") to do so. Trading also allows new or expanding dischargers of phosphorus the opportunity to purchase phosphorus loads from others to offset their new or increased load. Smaller facilities will not have phosphorous limits unless they expand. The intent is to reduce phosphorus basin-wide without undue burden on any one community.

Unsewered communities are another key to the Minnesota's problems; nearly 40 incorporated communities in the basin lacked wastewater treatment in 1996. Twenty-nine have fixed the problem, whether through installing their own systems or sharing with a neighboring community.

The U.S. EPA approved the TMDL in September 2004, and MPCA approved the final implementation plan in February 2006.

Restoration Activities

Dalen Coulee

The seven-mile long Dalen Coulee is located in the Red River Valley, in Norman and Clay Counties. The stream runs through areas of intense agricultural production and has been altered over the past century both physically (by dredging, straightening, plowing through the channel, and grazing) and hydrologically (by drainage and cultivation of the watershed, thus increasing runoff of both water and sediment). Frequent flooding in the late 1990s resulted in repeated crop losses.

The historical approach to address this type of problem has been to "improve" the natural stream channel by making it bigger. Natural resource agencies considered this approach unacceptable because of concerns about wetland drainage and the loss of wildlife habitat along the coulee. Department of Natural Resources staff partnered with federal, state and local units of government (USCOE, NRCS, MPCA, BWSR, the Wild Rice Watershed District), Ducks Unlimited, and landowners to restore about 14,000 feet of stream channel (previously ditched), create a wetland basin in the upper portion of the waterway to store flood water, and establish a buffer of native vegetation along the stream channel. Project planning began in 2000 and construction was largely completed in 2002.

Southeast Regional Fecal Coliform

Monitoring of southeastern Minnesota's rivers and streams over several decades has shown widespread violations of water-quality standards throughout the basin for fecal coliform bacteria. This problem degrades the recreational suitability of the area's streams. The sources of this problem number in the thousands and are widely distributed. Therefore, MPCA decided a regional TMDL for fecal coliform was the best way to address 39 stream reaches impaired for bacteria.

Pollution sources include residential septic systems, unprotected feedlots or manured fields, and urban stormwater runoff. The Basin Alliance

Bacteria impairments threaten recreational uses of Minnesota's waters.

for the Lower Mississippi in Minnesota (BALMM), comprising many local units of government and other stakeholders in the region, advised the MPCA on development of the TMDL and will take the lead in its implementation over the next several years.

The Lower Mississippi River Basin TMDL for Fecal Coliform Bacteria was approved by U.S. EPA in April 2006. The implementation plan will be finalized later in 2007 and will outline restoration activities in the basin costing over $200 million.

Shingle Creek Chloride

Shingle Creek was first listed as impaired in 1988 due to chloride. The Draft TMDL Report was finished in August 2006 and will be approved by the EPA in early 2007.

The creek has excessive chloride from its headwaters in Brooklyn Park to its confluence with the Mississippi River in Minneapolis. Chloride can harm aquatic organisms by disrupting natural processes that help regulate their metabolism.

The TMDL study found the main source of chloride is stormwater runoff containing deicing products, the majority being road salt. Over 80 percent of chloride runoff into shingle creek is attributed to road maintenance authorities. The TMDL required a 71-percent reduction in chloride levels to regain water-quality standards.

The previously formed, nine-city Shingle Creek Watershed Management Commission managed development and implementation of the TMDL. Stakeholder involvement focused on the agencies responsible for winter road maintenance and included commission members, Minnesota Department of Transportation, and Hennepin County. Their agreement to implement the necessary chloride reductions ultimately will change the way roads are maintained for snow and ice conditions.

Reductions will mainly come through improved practices by road-maintenance authorities and private applicators. For example, improved operator training and better coverage and storage of de-icer stockpiles will significantly reduce road-salt use. The partners also will evaluate and adopt new technologies such as pre-wetting and anti-icing equipment, purchase new spreading equipment where needed, improve stockpile management, and buy new, less-polluting de-icing products where feasible. The total cost of implementation is estimated at $2.1 million; the recent Clean Water Legacy Act provided $238,000, which was matched by the nine member cities.

Chippewa River Un-ionized Ammonia

The lower 11 miles of the Chippewa River, above its confluence with the Minnesota River near Montevideo, is impaired due to elevated concentrations of ammonia. A TMDL confirmed the Montevideo wastewater treatment plant was the major contributor of ammonia during low flow. Non-point sources -- septic systems, stormwater runoff, feedlots -- contributed a small amount. EPA approved the TMDL in October, 2004, but implementation actually began in 1994 when Montevideo upgraded its facility and got an ammonia limit in their permit. Ongoing monitoring

after the upgrade showed the river was meeting the ammonia standard, and the reach subsequently was removed from the 2006 impaired waters list.

Delisting

Tanner's Lake

Tanner's Lake was listed as impaired in 2002 for excess nutrients, primarily due to stormwater runoff that carried nutrients and sediment into the lake. However, actions begun earlier by the Ramsey Washington Metro Watershed District were already effectively lowering nutrient levels. For example, the district made improvements to sedimentation ponds and built a facility to treat stormwater with alum. The treatment facility went on-line in 1998, with modifications later. Extensive monitoring through 2002 showed phosphorus levels had fallen below the original listing thresholds and the lake was meeting standards for total phosphorus. The majority of the improvement came from the alum treatment facility. Tanner's Lake was delisted in 2004.

Note: In this case (and the two that follow), a water body went directly from listing to restoration in the impaired waters process without conducting a formal TMDL, because the problem could be fixed before the TMDL was required. This is not the norm in most cases.

Swan River Fecal Coliform

A portion of the Swan River, from the headwaters at Big Swan Lake to the Mississippi River, was listed as impaired for fecal coliform in 1994. About 25 percent of water samples from this reach exceeded standards for fecal coliform. A major feedlot upgrade was done along the river in 2000-01. MPCA and local feedlot staff inspected about 80 percent of operations in the watershed in 2002-03, and a watershed management plan was developed to address sources of the pollution. Improvements were successfully implemented, and the Swan River was delisted in 2006.

Redwood River Dissolved Oxygen & Ammonia

A portion of the Redwood River was identified as impaired for low dissolved oxygen and ammonia. The primary pollutant source was the Marshall wastewater treatment facility. The facility was upgraded in 1994. Following the upgrade, this reach of the Redwood once again met water-quality standards and was delisted for dissolved oxygen in 2002. It will be delisted for ammonia in 2008.

CLEAN WATERS

Only a small percentage of Minnesota's waters have been assessed for impairments. That means that many more impairments will be added to the list in the coming years. But it also means that many waters which may end up eventually listed as impaired, are not so yet. They are thus regarded as "clean," even though they may have water-quality problems. The same steps and approaches we use to address impaired waters may be employed to clean up and prevent these waters from ever being listed as impaired, thereby avoiding the considerable expenses involved with TMDLs. The following case studies show examples.

Protection Strategy Development

Cass Lake/Lake Winnibigoshish Watershed Plan

This project has gone through the Clean Water Partnership water-quality diagnostic phase. The watershed for these lakes covers parts of Beltrami, Cass and Itasca counties, and includes a large area of the Chippewa National Forest and the Leech Lake Reservation.

The CWP assessment showed water quality in this watershed is still good. However, long-term threats to water quality include shoreline development, forest management, riparian corridor fragmentation, and other diffuse sources of nonpoint-source pollution. Improving land management choices, coordinating land-management activities, structural controls, and restoration activities are among the tools that will ensure long-term health for the water resources in this area.

Activities implemented through this project include a lake management plan for the Turtle River Chain of Lakes. The plan was funded by a Board of Water Resources challenge grant and identified a series of activities developed for residents. In this case, watershed protection was enhanced through intergovernmental coordination, increased technical assistance and landowner information on land management, stormwater runoff control, and targeted conservation easements.

Benton County Manure Management Test Plots

Several farmers in the Elk River Watershed in central Minnesota have planted manure management test plots to evaluate the effectiveness of the University of Minnesota's recommendations for applying manure and fertilizer on their farm. These Best Management Practice (BMP) plots represent the most economical and environmentally responsible way to manage crop nutrients. The program is available to farmers in the Elk River watershed through a grant from the MPCA.

Results from the test plots help farmers adjust their manure and fertilizer application rates. In most cases, they confirm that manure and/or fertilizer can be applied at lower rates while maintaining profitability. The average BMP plot did well with 89 pounds less nitrogen, 114 pounds less phosphorus, and 91 pounds less potassium than comparison plots. Average yields increased by one bushel per acre. Farmers can spread manure on more land and buy less

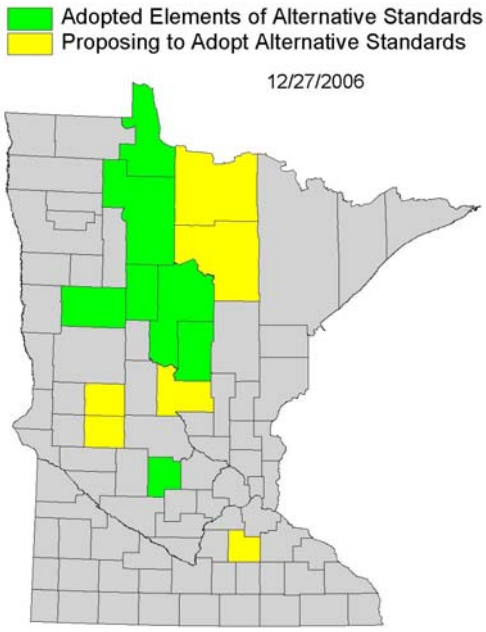
fertilizer, which protects the environment by reducing the effects of over-application, especially in sensitive areas.

The Benton Soil and Water Conservation District says this has been the most cost-effective nutrient management program they've administered. Although there's very little up-front incentive for farmers, they are eager to participate in the program because it's only a small time investment and the knowledge they gain from the experience can be applied to the whole farm.

Alternative Shoreland Standards

Citizens use science to improve lakeshore management

In many parts of Minnesota, healthy communities depend on healthy lakes and shorelands. Clean water and lakes are important to the quality of life for local residents and they draw visitors, supporting our local economies. These relationships suggest that lakes and lake shorelands deserve our care. A decline in their condition can make a major difference in the quality and economic vitality of our lives. To address this challenge, a group of citizens and government officials recently took a careful look at how to keep Minnesota's lakeshores healthy. Their effort resulted in an alternative set of shoreland development standards.



The State of Minnesota sets minimum shoreland development standards that guide the use and development of shoreland property. They include minimum lot size and water frontage, building setbacks, and regulations on development of subdivisions and planned units. The intent is to preserve and enhance water quality, conserve the economic and natural environmental values of shorelands, and provide for wise use of water and land. However, the standards were developed in 1970 when small cabins were the predominant form of development. These shoreland standards needed to be updated to provide better tools to address growth in shoreland development and the trend towards larger, year-round residences. The updated standards also needed to reflect local resource conditions and needs.

A 34-member committee of developers, resort owners, conservationists, county commissioners, government representatives, and lake-home property owners recently came together to create an alternative set of shoreland development standards. Using information based on the scientific and planning literature and their individual experiences, citizens and government officials worked together to craft tools that local governments may now adopt into their ordinances. These modernized standards could serve as the foundation for local government-administered ordinances to provide greater protection to economic and environmental concerns, thereby helping to sustain healthy communities across Minnesota.

Details of the Minnesota's alternative shoreland development standards can be found at www.dnr.state.mn.us/waters (click on the Shoreland Standards Update link).

Protection Activities

Caribou Lake Protection Effort

Caribou Lake, near Lutsen, has a history of monitoring by the MPCA, Cook County, and the Caribou Lake Property Owners Association. As with many lakes, development pressures are driving perceptions of reduced water quality. The 728-acre lake is heavily developed (152 developed shoreline parcels), with second-tier development underway around the lake.

Available data indicated Caribou Lake is in the typical range for minimally impacted lakes in the Northern Lakes and Forests ecoregion. While the lake is well below the threshold for nutrient impairment, it's also above expected background concentration levels.

To maintain current conditions, or to attempt to return the lake to near background levels, nutrient inputs must be reduced. A proposed 160-acre residential development prompted an environmental review process, which included estimates of changes to the lake and watershed with different levels of development. In addition, the county developed a plan to guide activities related to lake development. Local partners are continuing monitoring to track any changes to the lake. The lake association also is considering developing a management plan to guide its future activities and protection efforts.

Sucker River Protection Project

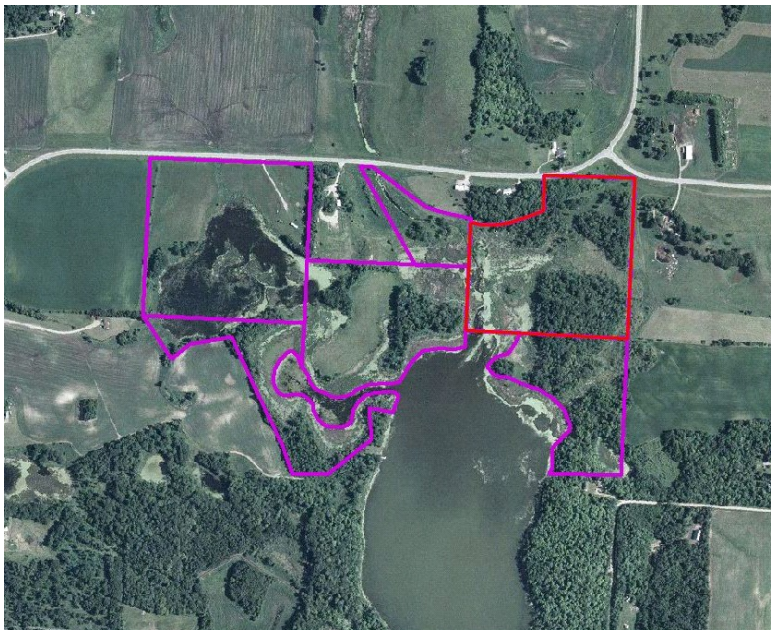
Spurred by the MPCA's development of the Lake Superior Basin Plan in 2004, the South St. Louis Soil and Water Conservation District partnered with the Lake Superior Basin Programmatic Work Group to develop a watershed protection plan for the river. This project, funded by U.S. EPA and MPCA, was designed to help residents link their activities on land to the health of the river. Data collected by the MPCA, DNR and other groups showed water temperature and sediment were the most critical pollutants in the Sucker. To protect the upstream reaches, priority areas were selected for focused protection efforts relating to stream buffers, forests, and residential building sites. Activities to date have included newsletters to over 800 homes, increased signage at watershed boundaries and at the stream, a rain-garden pilot project at the North Shore Community School, training in best management practices and stewardship plans for forestry, and rain-barrel giveaways.

Riparian Land Acquisition

Upper Cormorant Aquatic Management Area

Fiscal Year 2007 funding in support of the Clean Water Legacy Act has allowed DNR Fisheries to acquire the last parcel of a large wetland complex located at the north end of Upper Cormorant Lake in Becker County. The Upper Cormorant AMA contains 144 acres of upland/wetland with nearly two miles of undisturbed shoreline. The inlet that flows through the AMA contains a well-known northern pike, walleye, and sucker run each spring. Extensive stands of emergent vegetation serve as critical nesting and rearing areas to a variety of fish and wildlife species as well as providing water-quality protection.

The Upper Cormorant AMA parcels have been acquired through a combination of funding options, including partial donation of land value, RIM Critical Habitat match dollars, Nature Conservancy technical aid, and Legacy funding.



Parcel outlined in red was acquired with Legacy funding; parcels outlined in purple were previously acquired.

Shoreland Restoration

A property owner on Perch Lake in Baxter called the DNR in the fall of 2005 to see how she could return shoreline habitat to her property. The landowner had read about the benefits of buffer zones for protecting lakes and providing habitat for fish and wildlife. After a few site visits it was determined that the landowner could restore the buffer zone easily by simply not mowing it. Before contacting the DNR the owner had been mowing a hillside down to the edge of a cattail fringe, the same as previous landowners of this site.

The landowner let the hillside and the shore in front of the cattails re-grow for three months to determine what native plants might be growing there. A few natives started to grow on the hill, such as wild strawberries and big bluestem grass, but down closer to the water many species thrived. Prairie cordgrass, blue lobelia, boneset and many species of sedges re-grew and flowered last summer. In addition, the Lakescaping Program of the Legislative and Citizens Commission on Minnesota Resources provided funding for native plants, trees and shrubs to plant on the previously mowed hillside, where fewer native plants returned.

The DNR will continue to monitor the site and provide technical assistance on identifying weeds to remove and native plants to protect on the site. Additional native species frequently return to sites after mowing practices have changed. The project demonstrated that in many cases homeowners who are unsure about how to start a shoreline restoration project, can have success by just leaving 10 to 15 foot band unmowed at the shoreline. This is a simple and inexpensive way to protect lakes.

April 2004

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