



# Minnesota's Impaired Waters

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**REPORT TO THE LEGISLATURE**

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**Minnesota Pollution Control Agency**

**March 2003**

# Minnesota's Impaired Waters

## A Legislative Report

This report was prepared in response to the Legislative Auditor's recommendation (*Minnesota Pollution Control Agency Funding*; January 2002) that the MPCA provide the 2003 Legislature with a multi-year TMDL implementation and financing plan, outlining:

1. What mix of existing and new resources would be needed to meet federal requirements
2. Specific strategies the agency will use to assess water quality statewide
3. The types of strategies the agency will likely pursue to restore impaired waters.

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Photos: Minnesota Pollution Control Agency unless noted otherwise.

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## Summary of key findings and recommendations

### Stakeholder involvement in addressing program and resource needs

- The MPCA is planning extensive discussions with its external stakeholders, such as the agricultural community, municipalities, industry and the environmental community. These discussions, beginning in the spring of 2003 and ending by the fall of 2004, will provide feedback on the policies, roles, funding and scope of impaired waters work.

### Resources needed for assessing water quality

- The MPCA has fully assessed only about five percent of the state's stream miles and 12 percent of its lakes.
- Assessing all lakes and streams using a three-pronged approach of MPCA-conducted monitoring, satellite remote sensing, and volunteer monitoring will require \$8.2 million annually. The MPCA currently receives \$1.1 million annually for assessment, resulting in a funding gap of about \$7.1 million per year.

### Resources needed to complete TMDL studies

- The MPCA has scheduled about 200 projects, covering about 411 impairments listed on the 2002 impaired waters list. Estimated contracting and

staffing costs to conduct studies for these projects are approximately \$8.9 million per year. The MPCA currently receives a total of \$3.1 million per year for TMDL studies and staff resources. An additional \$5.8 million per year (estimated) is needed to complete these projects within federal deadlines.

### Resources needed for restoring impaired waters

- The cost to restore waters impaired by nonpoint sources on the 2002 list is estimated at \$600 million to \$3 billion. This does not include costs to upgrade point sources, such as municipal wastewater treatment facilities.
- The MPCA has \$1.1 million per year in dedicated funding for restoration activities related to nonpoint sources. To meet current estimates, an additional \$45 million to \$230 million per year would be needed, some of which may be available through aligning resources at MPCA and with other state and federal agencies.
- Local governments will play a leading role in restoration. The MPCA believes that additional funds will need to be allocated to enhance local government's capacity to restore impaired waters.



# Minnesota's Impaired Waters

## A Legislative Report

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### Introduction

Despite decades of progress in cleaning up water pollution, hundreds of lakes, rivers and streams in Minnesota are still not clean enough. These polluted water resources pose risks to aquatic life, people and recreation because they contain too much sediment, bacteria, mercury, phosphorus and other contaminants. The Minnesota Pollution Control Agency (MPCA) is required to carry out federal mandates to identify and restore these “impaired waters,” including conducting scientific studies called Total Maximum Daily Loads (TMDLs)<sup>1</sup>.

The Legislative Auditor’s report<sup>2</sup> said it is unclear exactly how much impaired waters work can be done with existing MPCA staff and resources. This was due to uncertainties about the effect of proposed federal and state rules, existing and potential impaired waters workload, and funding issues. However, the Auditor did cite a federal report that concluded, “states will need additional tools, resources, and assistance in developing TMDLs for their waters — a task that will significantly tax already limited resources over a sustained period of time.”

The needs and strategies described in this report are based upon experience in MPCA’s water programs, including:

- Water monitoring to assess the health of waters of the state
- Clean Water Partnership and Clean Water Act Section 319<sup>3</sup>
- Municipal and industrial wastewater
- Feedlots
- Storm water
- Individual Sewage Treatment Systems.

### Stakeholder involvement in addressing program and resource needs

The MPCA is planning extensive discussions with its external stakeholders, such as the agricultural community, municipalities, industry and the environmental community. These discussions will provide feedback on the findings and recommendations of this report, define stakeholder roles in addressing

impaired waters, provide guidance for implementation of impaired waters activities, and develop potential funding options for consideration by the administration and the Legislature. The MPCA is planning the discussions as follows:

- March-June 2003: Engage stakeholders in dialogue to shape impaired waters program.
- July 15, 2003: Appoint a multi-stakeholder steering team.
- March 15, 2004: Identify the components of an impaired waters program and the roles and responsibilities for implementation.
- August 15, 2004: Identify funding needs considering existing funds, leveraging federal funds and new funding sources.
- 2005 Legislative session: Propose comprehensive impaired waters program.

### What are impaired waters?

“Impaired waters” are those streams, rivers and lakes that currently do not meet applicable water-quality standards that are set to protect the state’s waters. These standards define the maximum amounts of specific pollutants that may be present in a water body and not adversely affect a particular designated use. Designated uses include aquatic life (fish and other species and their safe consumption), recreation (swimming), drinking water and other uses.

*Storm water pours off streets, roofs, and parking lots into streams and ditches, carrying with it sediment, oil, grease, fertilizer, pesticides and other pollutants.*



“Impaired waters” are streams, rivers and lakes that do not meet water-quality standards.

Since the passage of the Clean Water Act (CWA) 30 years ago, Minnesota has made great progress in reducing water pollution from large “point” sources like factories and wastewater treatment plants. State and national efforts focused on these wastewater point sources because they comprised a large portion of existing water-quality problems and there were regulatory tools and pollution control technologies available for addressing them. At the time the CWA was enacted in 1972, well over half of the water-pollution problem in Minnesota and other states came from point sources. This led to a massive federal program to build and maintain city sewage treatment plants, and to date about \$1.6 billion in grants and loans has been spent in Minnesota to help cities throughout the state treat wastewater prior to discharge. Municipal and industrial point sources were also regulated through the federal National Pollutant Discharge Elimination System (NPDES) permit program.

Today, wastewater point sources are a much smaller part of the water pollution problem, contributing an estimated 14 percent of total pollution in Minnesota. Instead, current threats to water quality come from “nonpoint” sources, including atmospheric deposition of pollutants (for example, mercury) and pollution generated from a wide range of individual and societal practices<sup>4</sup> (for example, urban and agricultural runoff). Nonpoint sources — estimated to contribute 86 percent of the water pollution problem in Minnesota — are the main reason many lakes and streams are on Minnesota’s impaired waters list.

### Federal requirements — why we must do this work

The CWA requires states to identify and restore their impaired waters. Here is a summary of the requirements and their history:

- Section 305(b) of the CWA requires that all waters in each state be assessed to determine if they meet water-quality standards based on their designated uses. Without this information, it is difficult for EPA and the states to set priorities, evaluate the success of programs and activities, and report on accomplishments in a credible and informed way.

- Section 303(d) of the CWA requires the states to identify and list impaired waters, determine solutions through TMDL studies, and restore them to comply with water-quality standards.
- Environmental organizations and citizen groups have sued the EPA because states have not made adequate progress to meet Section 303(d) requirements. The EPA has been sued for various reasons. Over the past 10 years, lawsuits have been filed in 42 states and the District of Columbia. Of those, 22 have been successful. There is currently no such lawsuit in Minnesota.

### The required process for identifying and restoring impaired waters<sup>5</sup>

Each state must address impaired waters according to the following steps:

1. Designate uses for waters of the state and set standards or pollutant limitations to protect those uses.
2. Collect water-quality data and use it to assess whether water bodies meet the water-quality standards established for their designated uses. The assessment of Minnesota's rivers, streams and lakes is tied to the 1972 CWA goals for restoring and protecting America's waters to benefit fish and wildlife, while providing for recreation wherever possible. These goals are commonly referred to as the "swimmable and fishable" goals of the CWA.
3. Develop and gain EPA approval for the list of impaired water bodies (those that do not meet standards for their uses). This is required every two years. A state's impaired waters list is then used to prioritize federal funding and action plans for restoring those waters so they meet standards. The MPCA's 2002 draft list, identifying 1,774 impairments in lakes and stream segments that currently do not meet standards, was approved by the EPA in January, 2003. (View the final 2002 list and its associated maps online at <http://www.pca.state.mn.us/water/tmdl.html>.)
4. Conduct TMDL studies (within 13 years following EPA approval of the initial listing of an impaired water) to evaluate why impaired waters are not meeting standards and set pollutant-reduction goals for the sources of the impairments that will eventually restore them to their designated uses.

### What is a TMDL?

For each pollutant that causes a water body to fail to meet applicable water-quality standards, the Clean Water Act requires the states to conduct a study called a Total Maximum Daily Load.

A TMDL study identifies both point and nonpoint sources of each pollutant that violates standards. Water-quality sampling and computer modeling determine how much each pollutant source is contributing to the problem. An allocation process involving stakeholders determines how much each source must reduce its contribution to assure the standards are again met.

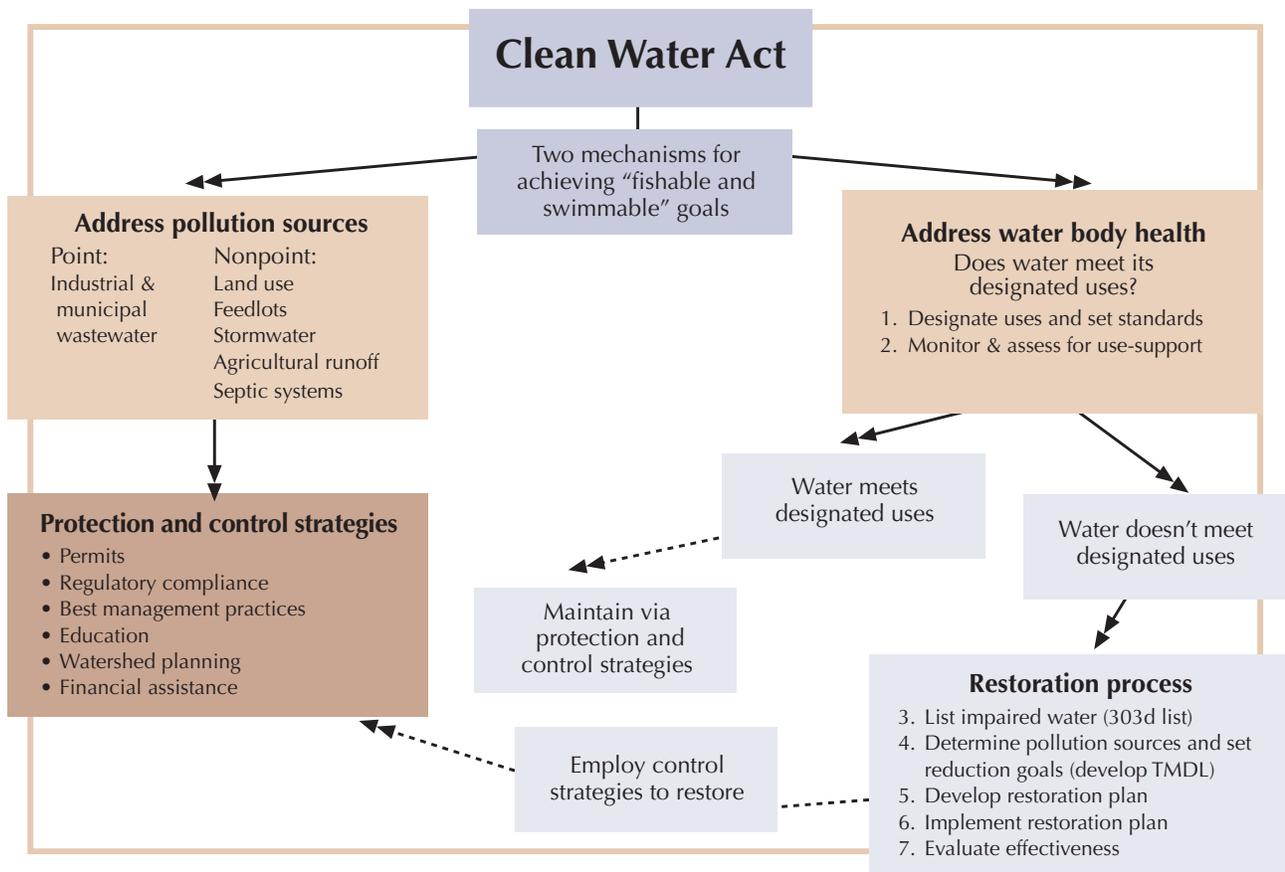
An impaired water body may have several TMDLs, each one determining reductions for a different pollutant.



5. Develop implementation plans for impaired waters that have a completed, EPA-approved TMDL study.
6. Implement restoration or other activities needed to achieve water-quality standards and restore impaired waters to designated uses.
7. Evaluate effectiveness of pollution source-reduction activities through monitoring water-quality trends. If monitoring indicates standards are still not met,

modify implementation plans and, if necessary, the TMDL to achieve water-quality standards. If standards are met, de-list the impaired water body.

The figure below illustrates how the Clean Water Act integrates this seven-step process and other strategies to protect and improve water quality.



## Response to Auditor's question #1:

What mix of existing and new resources are needed to meet federal requirements?<sup>6</sup>

### Resources needed for assessing water quality

The MPCA has fully assessed only five percent of the state's river miles and 12 percent of its lakes. As described more fully beginning on page 9, the MPCA's strategy for increasing the number of assessed lakes and rivers relies on a combination of MPCA-conducted monitoring, satellite remote sensing technologies, and volunteer monitoring.

If the agency were to assess all the state's lakes and stream reaches over the next 10 years with this three-pronged approach, it would require \$8.2 million on an annual basis. The MPCA currently receives \$1.1 million annually for assessment so the gap in funding is \$7.1 million per year. A more complete picture of water quality is certain to identify additional impaired waters. Based on qualitative data and assuming current conditions do not improve, the MPCA estimates the number of impairments will grow from 1,774 on the 2002 impaired waters list to over 10,000 by 2014.

#### *Assessment recommendations:*

■ **Increase assessment capacity.** As mentioned earlier, without a more complete picture of the quality of our waters, it is difficult for Minnesota to set priorities, apply resources to the most important problems, evaluate the success of programs and activities, and report on accomplishments in a credible and informed way. The MPCA's strategy for increasing our assessment coverage builds in efficiency improvements, including remote sensing and volunteer monitoring, to help the MPCA target its limited resources towards water bodies that are most likely to exhibit impairments. Additional state funding will enable the agency to increase its assessment capacity through:

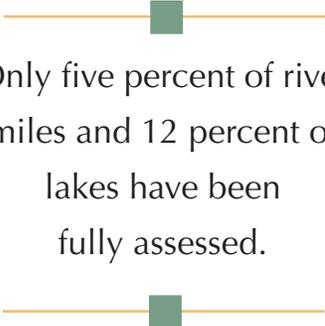
- Enhanced monitoring of biological, chemical and physical conditions of rivers,

- Increased monitoring of flow and pollutant concentrations in rivers, and
- Accelerated assessments of lake water quality.

### Resources needed to complete TMDL studies

The MPCA has scheduled about 200 projects to address 411 impairments on the 2002 list. (Each impairment requires a TMDL and there may be several in a single study.) These impairments are due to excessive nutrients, ammonia, turbidity (murkiness caused by suspended sediment and other materials), and other "conventional" pollutants. Toxic pollutants like mercury and pesticides, accounting for the other 1,300 impairments on the impaired waters list, will likely be addressed by alternatives to a state-initiated TMDL. For example, the states and EPA are discussing a national effort to address mercury impairments resulting from air deposition of mercury (see page 13). Estimated contracting costs to conduct studies for these 200 projects are \$40 million. The MPCA currently receives \$1.1 million per year for TMDL studies and \$2 million per year for staff resources from state and federal funds. An additional \$2.0 million per year is needed to complete TMDL studies on the 200 projects within the CWA-mandated time frame.

In addition, it is estimated that with current staff resources (20 full-time equivalents or FTEs)<sup>7</sup>, studies for the current list would not be completed until the year 2038 - rather than the 2015 federal deadline. In order to meet the 2015 deadline, a total of 65 FTEs would be needed for impaired waters activities, or 45 FTEs more than current levels. At current costs per FTE, adding 45 FTEs would require an additional \$4 million per year (includes salary, fringe and indirect expenses). Adding this number of FTEs assumes all of the efficiencies and partnering strategies detailed in this report are implemented.



Only five percent of river miles and 12 percent of lakes have been fully assessed.



Agricultural Best Management Practices include grassed waterways and other methods which help to slow and filter runoff.

*TMDL study recommendations:*

- **Increase TMDL contract funding.** Funding is needed to pass through for project contracts with local government and private consultants. As described on page 11, these contractors will partner with the MPCA as appropriate to help complete TMDL studies. This need will increase as more studies are required when the impaired waters list is updated (currently every two years).
- **Increase staffing capacity.** To meet the large and growing TMDL workload, funding is also needed for additional MPCA staff support. Although local government and other contractors will be active partners in each project, MPCA staff will have a leading role in managing and completing TMDLs. (In the restoration phases the lead will switch more to local partners.) In addition, some highly specialized technical assistance needs are more efficiently served by a statewide resource base, rather than requiring each local unit of government to develop and maintain that expertise.

**Resources needed for restoring impaired waters**

Following approval of TMDL studies by the EPA, restoration activities may begin. Much of the costs incurred for restoration will be for the installation of controls, or “best management practices” (BMPs)<sup>8</sup>, for nonpoint sources of pollution.

Estimated costs to restore the impaired waters on the 2002 list are projected at \$600 million to \$3 billion —

\$100 million to \$1 billion for over 100 lakes, and \$500 million to \$2 billion for rivers. Due to the agency’s relative inexperience with restoring impaired waters to CWA requirements, these cost estimates were derived from previous watershed restoration efforts sponsored by the MPCA’s Clean Water Partnership and CWA Sec. 319 programs. These estimates only account for the costs to implement BMPs for nonpoint-source pollution. Costs to upgrade point sources like municipal wastewater treatment facilities, which also contribute to impairments, would be over and above this total. Restoration activities would occur over a number

**What are “best management practices?”**

**B**est management practices are any method or practice that reduces the impact of nonpoint-source pollution on surface waters. Examples include:

- storm-water settling basins
- silt fences made of permeable fabric to slow and filter runoff
- crop residue left on plowed fields to help keep rainfall from running off (also called conservation tillage)
- vegetative buffer strips along waterways to slow and filter runoff entering ditches, creeks, streams, and lakes
- measures to prevent manure runoff from feedlots
- many other practices and methods for managing nonpoint-source water pollution from urban and agricultural sources.

See Appendix J for more information on BMPs and their implementation.

of years based on the amount of funds available for restoration work and the capacity of local government and private individuals to undertake restoration activities.

The MPCA has only \$1.1 million per year dedicated from federal nonpoint-source grants and state funds for restoration activities. Although much funding for restoration will come from programs supported by the federal Farm Bill and local sources, additional state funds will also be required, especially for restoration activities related to urban storm-water runoff and failing septic systems. The MPCA estimates an additional \$43 million to \$230 million per year is needed to implement restoration activities.

*Restoration recommendations:*

- **Increase state funding for restoration projects.** As described below, federal programs would be the primary funding source for restoration work. However, the state will have to contribute more than it currently does to this effort as well. To that end, the MPCA recommends that the Legislature allocate additional resources toward implementing restoration projects, which could be transferred and leveraged through the Public Facilities Authority (PFA). This would generate additional funds in bonding for grants and loans to support installation of infrastructure and best management practices. The greatest need for this state funding is in septic-system upgrades for homeowners and storm-water and erosion controls. Upgrades to municipal wastewater treatment plants would continue to

be financed through low-interest loans from the State Revolving Fund, administered by the PFA and MPCA. Agriculture runoff and feedlot improvements would be funded largely through federal funds.

- **Build local capacity.** Local governments will contract with the MPCA to develop TMDL studies, and then take a leading role in the restoration phase of the process. The MPCA recommends that additional funds be allocated to enhance local government's capacity to restore impaired waters. These funds could be structured as grants to meet additional staffing and equipment requirements.
- **Seek funding from Federal Farm Bill.** Depending on the level of funding approved in Congressional appropriations, several million dollars may be allocated to Minnesota from the new federal Farm Bill. These funds potentially could be allocated toward restoration work for impaired waters, particularly agriculture-related water-quality issues. Local partners, with MPCA assistance, will be actively seeking these funds to help pay for the BMPs and other fixes to restore impaired waters. The new farm bill authorizes major funding increases for conservation programs, including:
  - Conservation Security Program
  - Conservation Reserve Program and Conservation Reserve Enhancement Program
  - Environmental Quality Incentives Program
  - Farmland Protection Program
  - Wetlands Reserve Program
  - Wildlife Habitat Incentives Program.

Again, the amount of actual funding Minnesota may receive from these programs will not be known until Congress approves appropriation legislation. For more information on these programs and the federal Farm Bill, go to the web site of the National Resources Conservation Service ([www.nrcs.usda.gov](http://www.nrcs.usda.gov)).



*A constructed storm-water detention pond at Minneapolis's Lake Calhoun combines function with aesthetic appeal.*

## Summary of resource needs

Impaired waters requirements	Annual need	Current dedicated funding	Annual remaining
<b>Assessment*</b> (All waters completely assessed by 2014)	\$8.2 million per year	\$1.1 million per year	\$7.1 million per year
<b>TMDL studies*</b> <b>for 2002 list</b> (About 200, covering 411 impairments)	\$8.9 million per year	\$3.1 million per year	\$5.8 million per year
<b>Restoration activities for 2002 list</b> (Addresses about 50 major river watersheds and 100 lakes)	\$46.2-230.8 million per year	\$1.069 million per million per year	\$45.1-229.7 million per year
<b>TOTAL</b>	\$63-248 million per year	\$5.27 million per year	\$58-243 million per year

\* Includes staffing. Note also that the Guide to MPCA Programs states “the agency employs 42 FTEs to do TMDL studies and restoration work, at a cost of \$4.5 million.” Those numbers include basin management work as well as TMDLs.

### Summary of resource needs

The table above summarizes the mix of current and new resources that would be needed by the MPCA annually for assessment work, TMDL studies, and restoration. These estimates include expenses and staffing costs and only reflect costs associated with the 2002 impaired waters list, which is updated every two years. It should be emphasized that these estimates are rough and will be updated as the MPCA gains additional impaired waters project experience.

### What will happen in the 2004-2005 biennium?

- **Determining ways to maximize current resources.** The MPCA will work with stakeholders on several options to maximize existing funding. For example:
  - A process is needed to rank TMDL studies and restoration projects in order to develop a list of the state’s highest impaired-water priorities. This prioritization process should consider environmental criteria, our state of knowledge on impairments, the potential for

restoration of the resource and its uses, and other factors.

- The MPCA will evaluate opportunities to realign its existing programs to direct more funding and staffing resources toward impaired waters work. We will also pursue some of the ideas outlined beginning on page 13 to improve efficiency and effectiveness.
- The MPCA will also work with other state and federal agencies on options to better align priorities, strategies and resources.
- **Continuing development of TMDL studies.** The MPCA will complete at least 11 TMDLs, and possibly as many as 29, by 2005. (There are about 40 projects underway, addressing about 100 TMDLs.)
- **Determining future needs.** The MPCA will continue to explore questions with the Legislature and stakeholders about the funding and scope of our impaired waters effort. This likely will culminate in a legislative proposal for the 2005 legislative session.

## Response to auditor’s question #2:

### What are MPCA’s specific strategies for assessing water quality statewide?<sup>9</sup>

Despite actively soliciting and using data from other state and local agencies, the MPCA has assessed only about five percent of the state’s stream miles and 12 percent of its lakes (see figure below). Without complete data, it is not possible to identify on a statewide basis which waters need restoration, which are in good shape, and which have been restored to where they no longer need corrective actions.

To help fill in data gaps, the MPCA has a policy of using any relevant and credible monitoring data collected by others for our assessment activities. To ensure accuracy, monitoring sources are screened for issues such as time period/seasonal variations and whether certified labs were used; this screening helps eliminate the influence of climatic cycles (e.g., wet and dry years), short-term landscape disturbances, and poor-quality data. In 1994 the agency used data collected by others, either alone or in combination with MPCA data, to assess 400 stream miles (of 3,300 total); in 2002, that figure increased to 2,000 (5,200 total). Nonetheless, there are many data gaps in our current monitoring system.

In recent years we’ve made many advances in technology, equipment, sampling methods and tools that could significantly improve our knowledge about water quality in Minnesota. We’ve also developed partnerships among citizens, local governments, and other state and federal agencies that can enhance our



*Biological monitoring provides critical information needed for assessing the status of our waters. Because they respond to a variety of environmental stressors, fish and other aquatic life are excellent indicators of river and stream health throughout the year.*

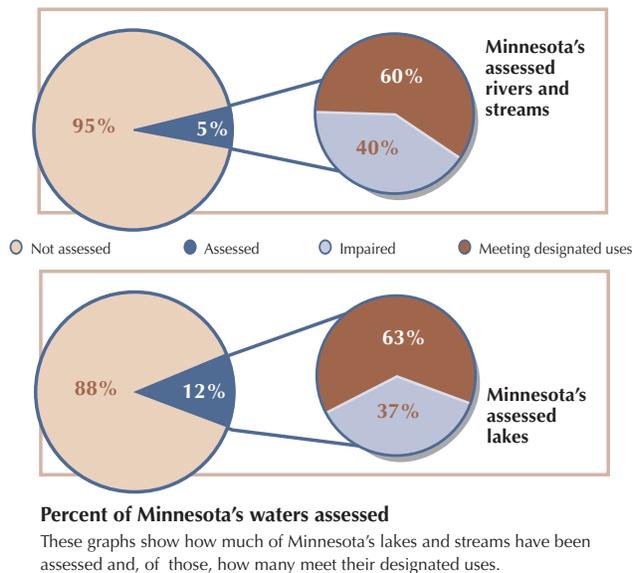
monitoring efforts. Accordingly, we expect that with current funding levels and efforts the percentage of river miles assessed in Minnesota will increase from five to 15 percent over the next 10 years, and the percentage of lakes assessed will go from 12 to 15 percent.

However, even with these improvements the picture of our surface waters will remain sketchy. The following section outlines an overall strategy for increasing assessments of Minnesota’s surface water resources.

### Strategy for increasing assessment coverage

The MPCA’s overall strategy for increasing the number of assessed lakes and stream miles relies on a combination of 1) additional MPCA-conducted monitoring, 2) remote sensing technologies, and 3) volunteer monitoring. This three-pronged strategy would allow the MPCA to leverage its own monitoring activities, new technologies, and volunteer efforts to provide a more comprehensive understanding of the quality of the state’s water resources, both in the number of waters assessed and the frequency of monitoring, as identified below.

1. MPCA monitoring. The agency would increase its sampling effort to include visiting each monitoring site at least once every 10 years and collecting



enough samples during the year to meet the federal requirement of basing assessments on “current” data. The MPCA’s monitoring would include “grab” sampling for chemical analyses and (for rivers and streams) continuous flow monitoring to determine the amount of water moving through the stream. This combination of chemistry and flow data would allow the MPCA to determine impacts and threats to a water body. The agency’s effort would also include statistically based integrated monitoring, which relies on biological, chemical and physical measures for an unbiased, holistic picture of water quality throughout a drainage basin using relatively few (e.g., 50) sampling sites.

- 2. Remote sensing.** The MPCA would supplement its more intensive monitoring with remote sensing overviews every five years. Satellite remote sensing technology is a cost-effective way to obtain water-quality information for lakes and streams. Spectral information from Landsat<sup>10</sup> images correlates closely with ground measurements of lake clarity (Secchi<sup>11</sup> disk transparency) and chlorophyll concentrations (a measure of algal concentrations in water), and streams probably correlate similarly. Covering more than 200 square miles, one Landsat image can provide “snapshot” information on many hundreds of water bodies. This technology would help the MPCA determine if some characteristics of a lake or stream have changed significantly since the last detailed assessment and could help us target our limited assessment resources toward waters that are or appear to be most threatened. However, while remote sensing can be a very useful tool for targeting resources, it cannot replace the MPCA’s on-site monitoring efforts, since it does not provide the detail necessary to meet federal requirements for assessments and is not applicable to all pollutants.



*Automated monitoring stations continuously measure chemical and physical stream characteristics. Such monitoring provides information for assessments and can also be used for TMDL studies.*

- 3. Volunteer monitoring.** Annual volunteer monitoring at each monitoring site is critically important to this monitoring strategy. Volunteers help fill in gaps in monitoring frequency and alert the community and the MPCA of any changes that occur between assessments, while the MPCA’s detailed monitoring helps to validate and support the volunteer monitoring effort. Even relatively simple volunteer efforts such as transparency-tube measurements provide valuable indications of year-to-year changes at sites, and would provide early warning of potential or threatened impairments.

Each of these three components support and build upon the other elements of this assessment strategy. All three are critical to gaining sufficient understanding of Minnesota’s water resources.

## Response to Auditor's question #3:

### What types of strategies will the agency likely pursue for restoring impaired waters?

The following is a list of the various strategies the MPCA will employ in developing the restoration process.

#### 1. Policy discussions with stakeholders

As outlined on page 1, the MPCA will conduct policy discussions with stakeholders in 2003 and 2004. The objectives of these discussions are to raise awareness of the problems and foster commitment to solutions. Those solutions will be essential to building a comprehensive impaired waters effort for Minnesota, and likely will culminate in a legislative proposal for the 2005 legislative session.

#### 2. Partnering with local government

Local units of government — cities, counties, soil and water conservation districts (SWCDs), and watershed management organizations — play a large and growing role in nonpoint-source pollution abatement across the state. For years, SWCDs have been leaders in working with landowners to implement soil conservation practices. Now that role is expanding to include additional water quality-related practices, including abatement of urban storm-water runoff. In addition, counties have taken on critical responsibilities in implementing the state program for feedlots and ISTS ordinances. Counties manage a large and growing share of the assistance and regulatory functions associated with these programs. Under new EPA storm-water rules, many cities are being required to play a more important role in the management of urban runoff.

Local units of government also have been leaders in MPCA's watershed work for more than a decade. This work has been done primarily through voluntary local efforts supported with financial and technical assistance through the state Clean Water Partnership (CWP) program and CWA Section 319 grants.<sup>12</sup>

Because local governments have such an important role in abating nonpoint-source pollution in Minnesota, they need to be centrally involved in impaired waters work. Local governments will participate in impaired waters projects in these key ways:

- As contractors to complete all or portions of TMDL studies. Qualified local governments can receive funding for monitoring, data analysis, report writing, public involvement and other required activities to develop TMDLs.
- As members of advisory groups during the development of TMDL studies. These groups will help guide the technical aspects of the studies and final pollutant load allocations.
- Most importantly, by leading regulatory and non-regulatory restoration activities. To address problems identified in TMDLs related to feedlots and failing septic systems, counties are delegated by the MPCA to conduct permitting, education and enforcement activities. Cities will also be responsible for meeting requirements for storm-water permits. In addition, to meet pollutant allocations for point sources, they will work with the MPCA to obtain necessary approvals and funding for upgrades in wastewater treatment

*Fecal coliform bacteria cause impairments to recreational use of a significant number of streams in Minnesota.*



facilities. Finally, for unregulated nonpoint sources, local governments will take the lead in working with farmers, developers and citizens to install and adopt best management practices.

Using the basin management framework, the MPCA will assist local governments in planning restoration work, seeking grants and loans to restore impaired waters, and monitoring results. It will be particularly important to integrate impaired waters work with water plans of local governments. In general, the agency expects that successful restoration of impaired watersheds will require local involvement, beginning with project formation and continuing through assessment, plan development, implementation of restoration work, and ongoing maintenance.

*Challenges:* The ability of local governments to work on impaired waters projects varies widely in accordance with their technical expertise and resources.

Providing long-term staffing for watershed work can be difficult. Discontinuities in staffing, in turn, can lead to inefficiencies and the need for increased time commitments from MPCA staff. In addition, determining pollutant reductions to meet TMDL goals will require participation of all point- and nonpoint-source stakeholders that are found to be a part of the problem. Coordinating such a complex process is challenging and time-consuming. For these reasons, the MPCA recommends increasing the capacity of local government (see page 7). Even with increased capacity, however, we anticipate that the complexity and potential controversy of many water-quality impairments will require the MPCA to use qualified staff and consultants for some of the more technical aspects of these projects.

### 3. Watershed and regional approaches to TMDL studies and restoration activities

Collaborating with local government as described above, the MPCA has planned several TMDL projects that will cover multiple impairments within

an entire watershed (several stream reaches or lakes) or across an entire region (several watersheds or an entire basin). The MPCA believes such watershed and regional TMDLs have several advantages, particularly in improving the efficiency of the TMDL study process. With the current large number of water bodies listed for impairments and the potential for the list to grow even larger in the future, there is a need to group TMDLs together when possible, rather than doing them all one by one on each impaired stream segment or lake. TMDL studies also cost less using

these comprehensive approaches as compared to the segment-by-segment approach, due to more efficient monitoring and data analysis as well as consolidation of stakeholder involvement and public participation activities. Watershed or regional approaches tend to be supported by involved stakeholders because they gain a more comprehensive understanding of the problems, which in turn helps them design better restoration strategies.

The MPCA submitted the first regional TMDL to EPA in October 2002 and it was approved in November 2002.<sup>13</sup> The study covered 20 impairments for fecal coliform bacteria in the Lower Mississippi River Basin in Southeastern Minnesota. The MPCA is evaluating the feasibility of other regional or similar groupings of TMDLs for fecal coliform, turbidity, and excess nutrients in lakes.

*Challenges:* While watershed and regional TMDL projects can increase efficiencies and public understanding of water problems, these projects can also be technically complex. Using these approaches requires the MPCA to better integrate its permitting programs (wastewater, feedlots, storm water, etc.) with incentive-based nonpoint programs in new ways. The MPCA's basin management framework can help improve program integration by facilitating new systems of communication and planning.

### 4. Using private consultants

The MPCA uses private consultants to perform specific steps of TMDL studies when appropriate, necessary and desirable. Consultants are helpful in supplementing MPCA staff resources, particularly



Minnesota's first regional  
TMDL, covering 20  
impairments for fecal coliform  
in the Lower Mississippi basin,  
was approved by EPA in  
November 2002.

for technical work. Many local governments also hire consultants to help them with technical aspects of TMDLs.

The MPCA normally hires consultants through a state master contract. However, the agency also has used contractors hired and funded by the EPA. We will continue to partner with EPA in this way as needed, particularly when national expertise is needed for particularly complex TMDL studies and projects where impaired waters are shared with tribes, Canada or other states.

*Challenges:* The MPCA may also employ consultants to perform virtually all activities for specific TMDLs where there isn't enough local interest and/or expertise. Where this approach is used, attempts to involve local resource managers and implementers will continue throughout the process to gain their support and involvement.

## 5. Strategies for waters impaired by mercury and other toxic pollutants

More than two-thirds of the impairments on the 2002 impaired waters list are for mercury. For most, the mercury was deposited in the lake and on surrounding land by rain, snow and dry atmospheric deposition. Mercury accumulates in fish tissue to levels that cause the Minnesota Department of Health to issue fish consumption advisories.

Mercury can be carried great distances on wind currents before it eventually falls on our land and water bodies. In fact, about 90 percent of the mercury deposited from the air in Minnesota comes from other states and countries. Therefore, the traditional TMDL approach to addressing impairments will not work for mercury, as Minnesota can't control the many sources of this toxic pollutant outside our borders. The MPCA is working nationally with other states and EPA to address mercury by developing alternatives to traditional TMDLs for individual water bodies. The agency is also open to other suggested approaches from external stakeholders.

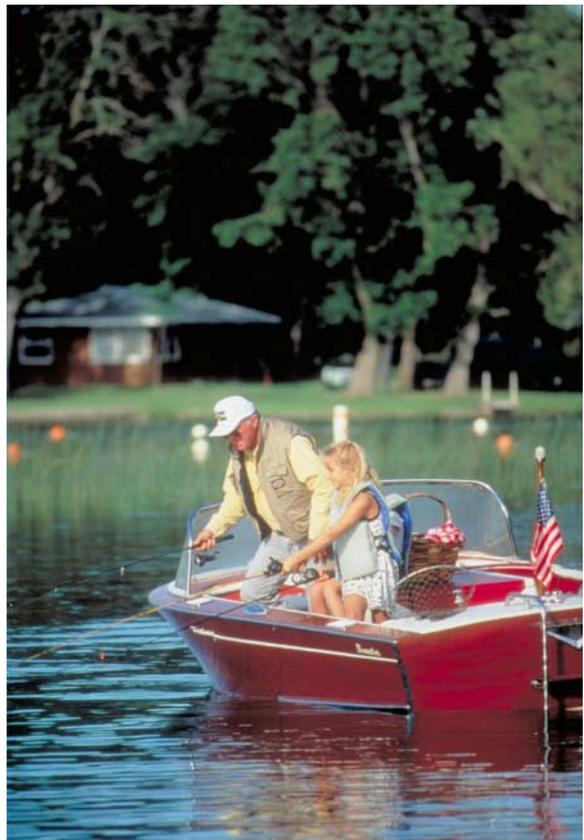
In addition to mercury, the MPCA will be working in 2003 to develop a strategy for other toxic pollutants on the 2002 impaired waters list, such as PCBs, DDT and toxaphene. As with mercury impairments, these toxic pollutants probably will be addressed through alternative approaches.

## 6. Strategies for increasing efficiencies and effectiveness

Given the growing number of TMDL studies, limited staffing, and available funding, the MPCA is developing plans to increase the efficiency and effectiveness of its impaired waters activities, including:

- **Grouping multiple impairments.** The MPCA is striving to increase the number of impairments that can be addressed in a single project by looking at options to expand the regional and watershed approaches discussed above. Here are two examples:
  - **Regional TMDL studies for lakes:** The 2002 impaired waters list includes about 100 lakes that are currently being planned for individual TMDL projects. The MPCA will be analyzing ways to create a regional approach to lakes that have similar problems (e.g. excess nutrients causing algal blooms) and natural characteristics, in order to combine several lakes in a single project.

*Fishing is an important source of tourism revenue in Minnesota. However, numerous lakes are impaired due to mercury, and the Department of Health issues advisories on consuming fish from these lakes.*



Minnesota Department of Tourism

- **Single-entry watershed projects:** This approach, similar to that employed by the state of Washington and other states, is designed to study and restore all of a watershed’s impairments in a single, comprehensive project. Such “single-entry” watershed projects could help the MPCA gain sizable efficiencies, if the technical and resource challenges created by the geographic scale of this approach can be met. There are 82 major watersheds in Minnesota, about 50 of which are represented on the 2002 impaired waters list. Several of the current TMDL projects are organized using a single-entry approach, but many would need further development to be made more comprehensive.
- **Specialized technical teams.** The agency needs to better provide technical expertise to regional staff on technical work related to TMDLs and restoration projects. Technical teams could look toward developing more routine or “cookbook” approaches to conducting projects for impaired biota, turbidity, excess nutrients in lakes, and some toxic pollutants. Doing so will require more research using benchmarking, professional judgment and research to train such teams. The agency will look to the experience of other states and consider assistance from consultants.
- **Improved coordination with state and federal agencies.** Given the daunting and growing size of Minnesota’s impaired waters workload, the MPCA will need assistance from a wide range of other agencies. For example, on the state level:
  - We are exploring options with the Public Facilities Authority to create leveraged restoration funds to address impaired watersheds (see page 7).
  - We are seeking opportunities to work with the Minnesota Department of Agriculture to build strong relationships and educational opportunities with the agricultural community.
  - Critical linkages need to be made with programs sponsored by the Board of Water and Soil Resources, the Department of Natural Resources, and the Department of Health.

On the federal level, the MPCA is negotiating with EPA for potentially direct assistance on some TMDLs, particularly for those impaired waters that Minnesota shares with tribes, other states and Canada. In addition, the MPCA has contracted with the U.S. Geological Survey to do monitoring work on studies in the Red River Basin, and we will continue to rely heavily on the many funding programs sponsored by the U.S. Department of Agriculture to address nonpoint-source pollution (for example, see page 7 for a list of programs funded by the Farm Bill).

The MPCA will also look to the experience of other states to facilitate coordination of state, federal and local programs. For example, the state of Wisconsin has recently adopted new regulations that create financial incentives and prioritization for watershed assessment and restoration, while at the same time improving coordination of public agencies during every phase of the process.

## 7. Goal setting and performance measurement

The MPCA is in the early stages of implementing its impaired waters effort. Working with stakeholders, the agency will set measurable goals for this implementation, based on both shorter-term administrative (e.g., productivity and cost effectiveness) targets and longer-term environmental outcomes. We will be evaluating our program on an annual basis to measure progress against these goals.

# Conclusion

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This report and its appendices highlight the MPCA's current estimates of needs and strategies to address Minnesota's impaired waters. The MPCA appreciates the opportunity to respond to the Legislative Auditor's concerns about how Minnesota will meet these needs.

Numerous surveys affirm that clean water is Minnesotans' top environmental priority, and case after case of successful restoration efforts on the part of local citizens and water groups demonstrate the will to restore impaired waters. For this reason, we look forward to working with our stakeholders and the Legislature to meet the challenges of impaired waters in the future.





## List of appendices

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The following appendices to the impaired waters report can be found on the MPCA's Website at [www.pca.state.mn.us/hot/legislature/reports](http://www.pca.state.mn.us/hot/legislature/reports). They may also be obtained in hard copy by contacting either of the contacts listed on the front of this report.

- A. Excerpt from Legislative Auditor's report**
- B. Fact sheet on Clean Water Partnership and Clean Water Act Sec. 319 programs**
- C. Land-use and impaired waters**
- D. Impaired waters case studies**
- E. Background on the impaired waters process**
- F. Definitions related to the impaired waters process**
- G. Background on the water-quality assessment process**
- H. Background on resource needs for assessment, TMDL studies, and restoration activities**
- I. Workload analysis for TMDL projects on the 2002 impaired waters list**
- J. Best Management Practices — definitions and applications**

# Endnotes

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- 1 A TMDL study determines why waters are impaired and the amount by which sources of pollution would need to be reduced for a water body to meet the state's water-quality standards. See Appendix F for further definitions.
- 2 Appendix A
- 3 Appendix B
- 4 Appendix C
- 5 Appendix D
- 6 Appendices H and I contain additional background and analysis of resource needs.
- 7 The Guide to MPCA Programs states "the agency employs 42 FTE to do TMDL studies and restoration work, at a cost of \$4.5 million." Those numbers include basin management work as well as TMDLs.
- 8 Appendix J
- 9 Appendix G
- 10 Landsat satellites provide photos of the earth in selected light wavelengths, one of which indicates algae concentrations in surface waters.
- 11 A Secchi disk is a tool for measuring water transparency, or clarity. The white disk is lowered into the water on a calibrated cord until it disappears from view and then raised slightly. The depth at which it again becomes visible is the Secchi transparency.
- 12 Appendix B
- 13 Appendix D

