

Protecting Minnesota's Environment:

A Progress Report



Minnesota Pollution Control Agency

1996

About this report:

This report meets the Legislature's requirements for a biennial report (Minn. Stat. §§ 115.42 and 116.10) and the Department of Finance's requirement for an executive summary of the MPCA's 1996 Agency Performance Report. The information in this booklet is not intended to be a complete description of all the programs, services and activities of the agency. Instead, this is a collection of measurements that reflects the broadest view of the progress we have made in environmental protection over the past 30 years. Additional measurements and program descriptions are available in the 1996 Agency Performance Report.

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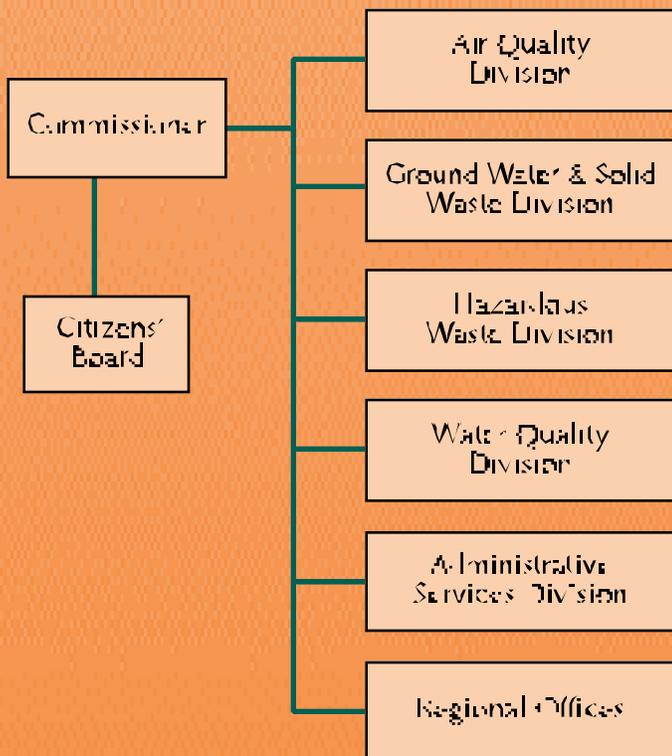
MPCA Mission and Environmental Goals

The mission of the Minnesota Pollution Control Agency is to protect Minnesota's environment to secure the quality of life of its citizens.

The agency hopes to accomplish this mission by meeting the following environmental goals:

- Fishable and swimmable lakes and rivers
- Clean and clear air
- Uncontaminated ground water and land
- Sustainable ecosystems

Organizational Chart



Nearly 30 years ago, the Minnesota Legislature created a new agency to protect the state's lakes and rivers. Since then, the authorities of the Minnesota Pollution Control Agency have expanded to include protection of the air, ground water, land and human health.

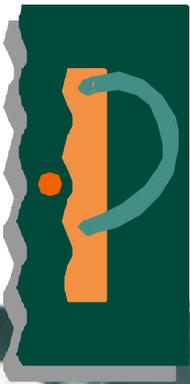
Working with its many partners in the public, government and industry, the MPCA examines the quality of the state's environment, develops rules that protect the public's health and the environment, and helps individuals and organizations meet their environmental responsibilities.

The agency consists of four program divisions, five regional offices and one support division. Through strategic planning begun in 1996, the agency has identified four key strategies through which it could better accomplish its mission of protecting the environment.

These strategies are as follows:

- Working with our partners to establish shared environmental goals
- Measuring the environmental outcomes of our programs and actions
- Creating situational alliances with others to accomplish our goals
- Functioning as an organization that learns from its experiences

As the agency incorporates the products of the 1996 strategic plan over the next few years, there will be visible improvements in the structure of the agency, the way it conducts business, and the way in which the environment is protected. The overall objective of any changes will be better environmental protection in the state.



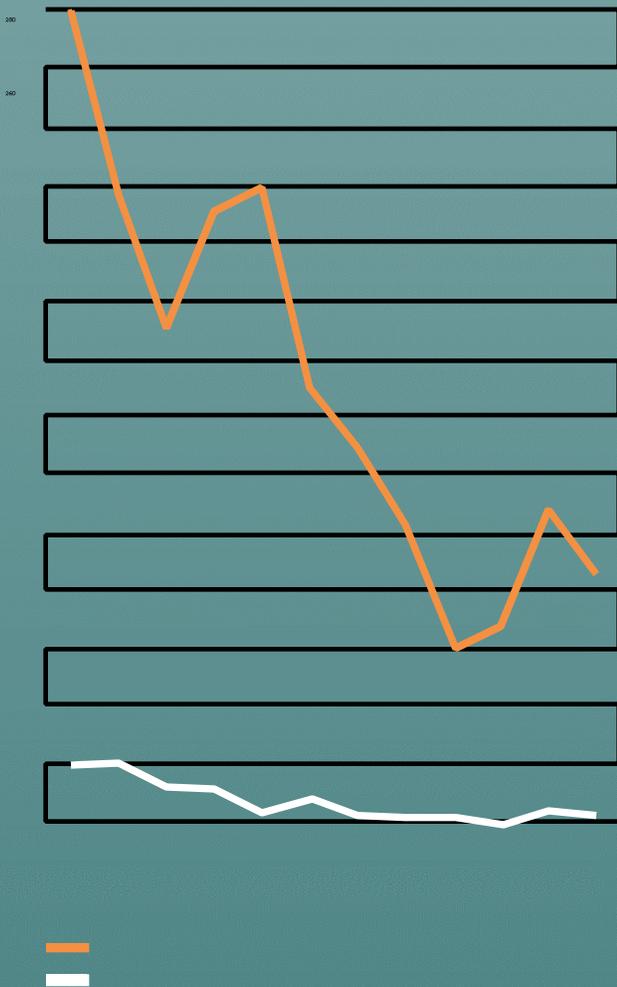
Protecting Air Quality

Since its early days, the MPCA has been responsible for protecting Minnesota's air quality. As population and industry have increased, the agency's permitting program has been the key element in limiting releases of pollutants to the air. Air permits required for facilities that could cause air pollution typically include emission limits and specific operating conditions to control the release of pollutants. The last 16 years have shown a large increase in the number of permits issued annually, and the MPCA is poised to increase the number again soon to comply with the federal Clean Air Act Amendments of 1990.

Minnesota citizens naturally expect to be able to breathe the air around them. The U.S. Environmental Protection Agency has set health-based limits for certain air pollutants to ensure that all Americans have breathable air. The six pollutants routinely monitored by the MPCA and EPA are particulates, sulfur dioxide, carbon monoxide, ozone, lead and nitrogen oxides.

A positive sign of improving air quality is when all the state is able to meet these standards regularly. In 1994 and 1995, three areas in Minnesota that had difficulty meeting the standards for airborne particulate matter and sulfur dioxide were reclassified as attaining the standards. The MPCA has yet to demonstrate that the Twin Cities area meets the carbon monoxide standard, a small area in St. Paul meets the particulate standard, and an area in Rochester meets the sulfur dioxide standard.

Air Quality trends for the twin cities area



One way to measure air quality is by using the Pollution Standards Index (PSI). The PSI values are based on the maximum concentrations of five air pollutants as measured each day by monitors in the Twin Cities area.

When PSI values are above 100, EPA considers the air to be unhealthy for residents. Air quality is considered

moderate if the PSI is between 50 and 100. When the PSI is below 50, the air quality is considered good. The PSI emphasizes short-

The Pollution Standards Index measures the amount of particulates, sulfur dioxide, carbon monoxide, ozone and nitrogen dioxide in the air.

term health effects rather than effects that may occur after months or years of exposure. The graph shows that over the past 10 years, air quality in the Twin Cities metropolitan area has improved.

Carbon monoxide is a highly toxic gas that in small amounts can impair alertness and cause fatigue and headaches. Motor vehicles contribute about 60 percent of the carbon monoxide in the ambient (or surrounding) air. Carbon-monoxide levels in the Twin Cities metropolitan area have declined over the years due to improved technology in vehicles. Because the number of vehicles on the road and number of miles traveled increases each year, it is uncertain whether these gains can be maintained in the future.

Measures are based on the eight-hour average.

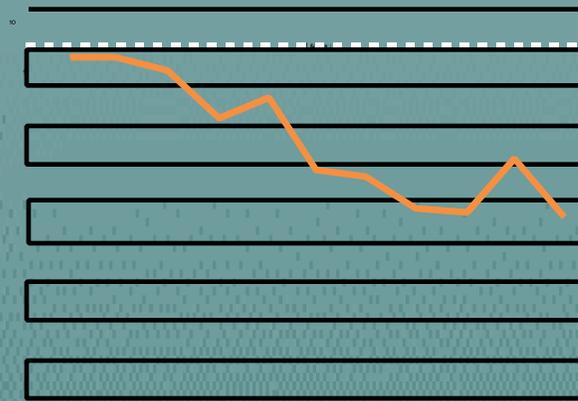
Another pollution problem related to motor vehicles and other combustion sources is ground-level ozone, commonly referred to as "smog." Residents in the Twin Cities area are fortunate not to have the severe smog problem of many other metropolitan areas. Measures to reduce some ozone-forming pollutants have kept the smog levels below health-based thresholds. The EPA has recently proposed new standards for ozone – and for particulates – which may make it harder for Minnesota to meet the standard in the future.

Measures are based on the second highest, 24-hour average.

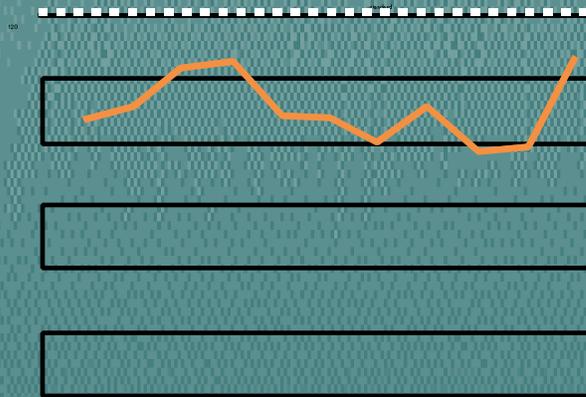
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Particulates smaller than 10 microns (PM₁₀) may be inhaled and cause respiratory problems.

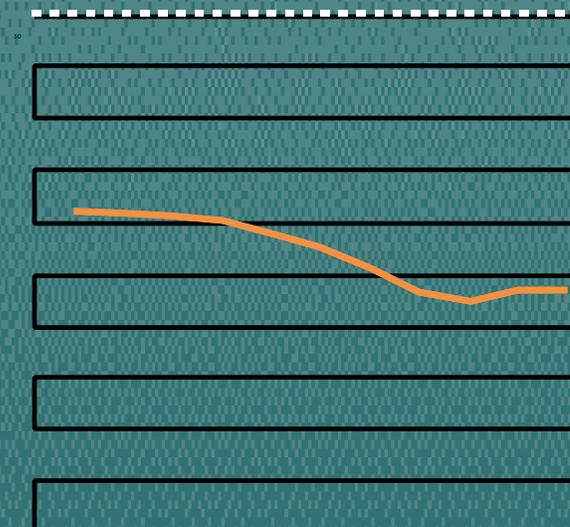
Levels of Carbon Monoxide in the air



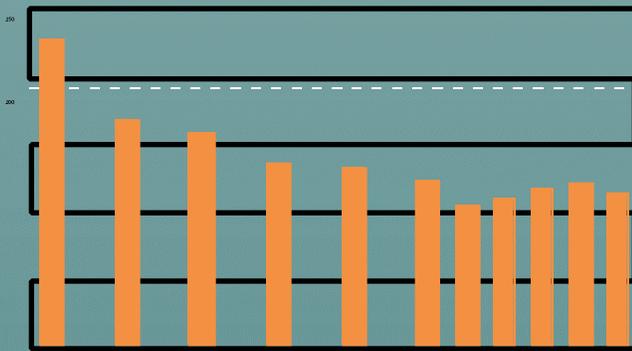
Levels of Ground-Level Ozone in the Air



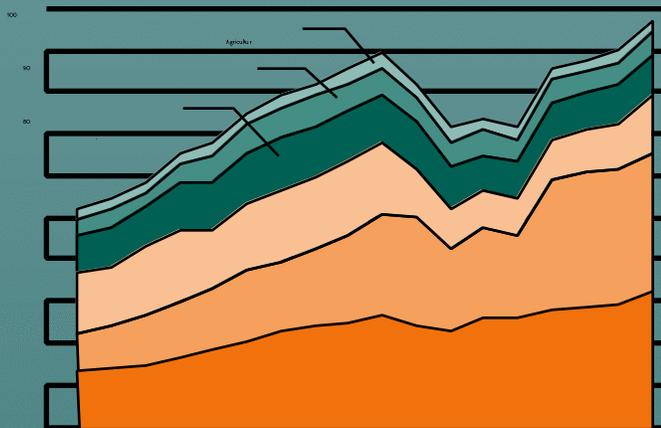
Average Amount of Small Particulates in the Air



Sulfur Dioxide Emissions



Carbon dioxide emissions from fossil fuel



The MPCA regulates sulfur-dioxide emissions because this pollutant can impair human health – it is a respiratory irritant – and it is a major factor in causing acid rain. The burning of fossil fuels (oil and coal) is the principal source of sulfur dioxide. The MPCA's plan to control acid deposition, which began in 1985, established limits on sulfur-dioxide emissions from large electric-generating plants. Emissions from these utilities and from other sources in Minnesota have declined substantially due to the regulatory program and are well under the limit set in the plan.

Carbon dioxide is the principal gas that leads to the gradual heating of the lower atmosphere and the resulting global climatic change – commonly referred to as global warming. Most carbon-dioxide emissions come from fossil-fuel combustion, generation of electricity or heat, and transportation. Since 1980, estimated carbon-dioxide emissions in Minnesota have risen 18 percent, primarily due to increases in electricity and transportation. In an international

agreement, the U.S. has committed to capping carbon-dioxide emissions to 1990 levels. To do our part, Minnesota will need to devise a strategy to reduce the amount of carbon dioxide that is being released in the state.

The drop in carbon-dioxide emissions in the early to mid 1980s can be partially explained by a deep economic recession, a lagging Midwest economy, and a general decline in the amount of energy used in a variety of sectors.



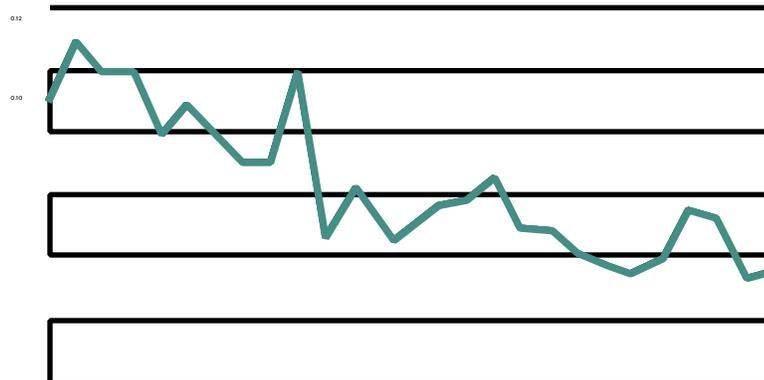
Protecting Water Quality

The MPCA's initial responsibility in 1967 was to protect the quality of Minnesota's lakes and rivers. That objective remains a high priority; however, things have changed a lot since the early days. The agency now controls and checks water quality for a large number of different substances that could damage aquatic life or affect human health.

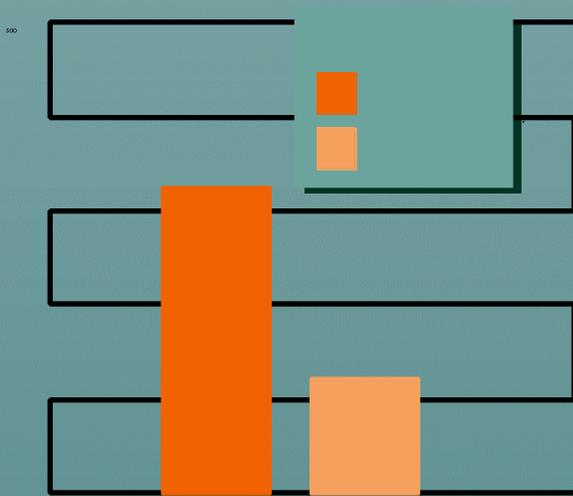
The best measure of the progress of programs to protect water quality is the quality of the water itself. The MPCA collects water samples on a regular basis and analyzes them for pollutants. Water in the St. Louis River drains into the still relatively pristine Lake Superior. The improved quality of this river reflects the upgrading of municipal and industrial wastewater treatment systems along its banks and efforts to control runoff pollution in the surrounding watershed.



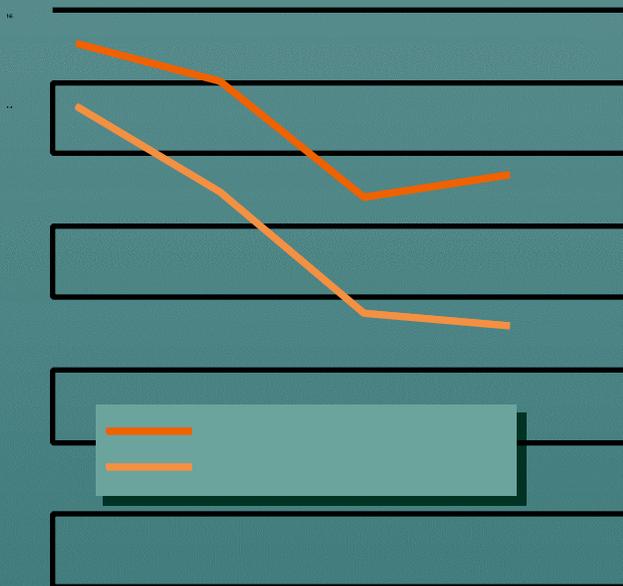
Water Quality Trends
in the St. Louis River



Water Quality Trends in the Mississippi River



Total Pollution Discharges from Permitted Facilities in Minnesota



There have been significant improvements in the Mississippi River.

The average measurement of fecal coliform bacteria is calculated from average measurements at four separate points on the river. The two periods when water samples were analyzed represent the 10 years before and after the Twin Cities sewer separation project was begun.

A decade-long project to separate storm-water and wastewater sewers in the Twin Cities area was completed in 1996. The Combined Sewer Overflow (CSO) project is credited for these gains in the quality of the 72-mile stretch of the river through Minneapolis and St. Paul. The state's \$104 million investment, nearly one third of the total \$332 million cost, brought an outstanding return, as indicated by the adjacent graph.

The amount of fecal coliform bacteria in the water is a good indicator of the amount of untreated wastes which are entering the river from sewers and agricultural and urban runoff.

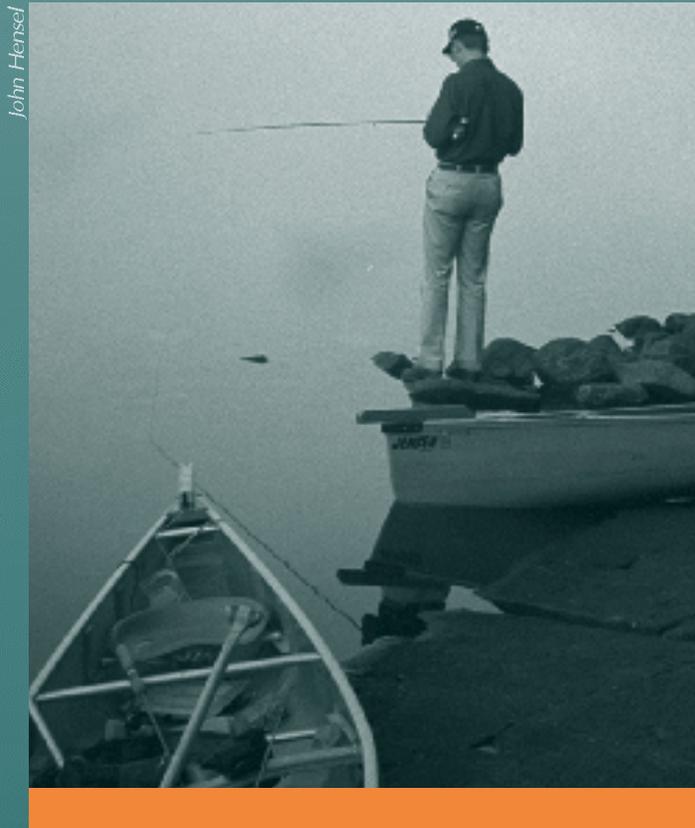
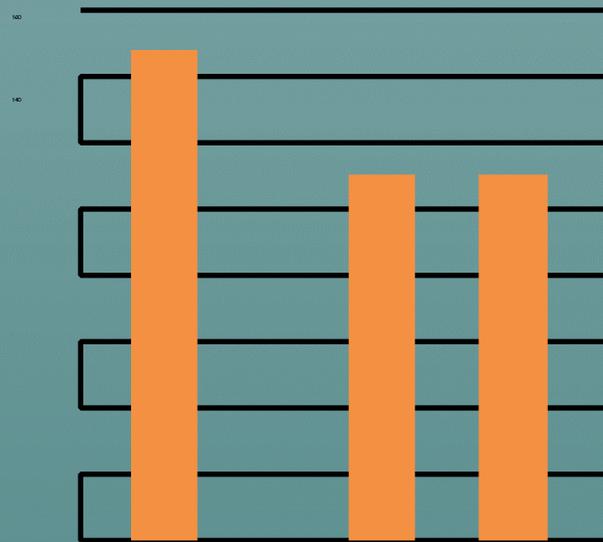
The amount of conventional pollutants (TSS & BOD) released are regulated by permits

In the past decade, the state has spent considerable effort to protect the Minnesota River, considered one of the most threatened rivers in the country. State, federal and local governments, citizens, farmers and industries have worked together to develop a plan to control and prevent point-source and nonpoint-source pollution within the Minnesota River basin. Already, these efforts have resulted in a dramatic improvement in water quality since 1980.

Measures were taken at Mankato at a median flowrate of 2590 cfs. Less suspended solids means better water quality.

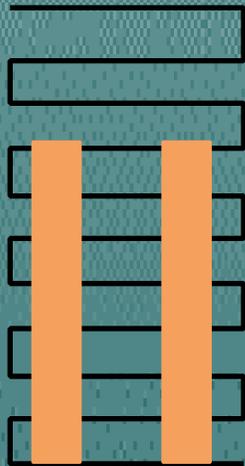
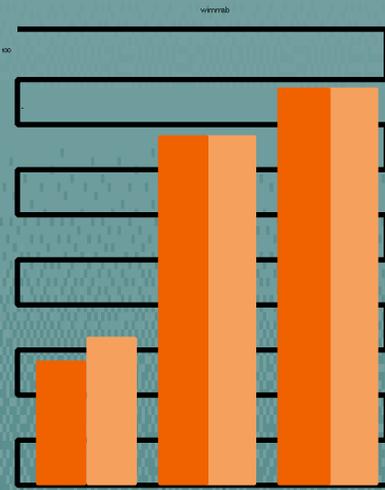
As wastewater treatment facilities have improved the quality of water discharged into lakes and streams, it has become apparent that many other sources that don't have end-of-the-pipe discharges (nonpoint sources) also can contribute pollutants to Minnesota's water bodies. To address this nonpoint-source pollution, the MPCA is employing a basin management strategy. In basin management, staff assess the quality of water within a drainage basin and then work with local governments, industries, landowners and citizens to establish shared water-quality goals, determine where goals are not being met, and prioritize control activities. Finally, the MPCA evaluates the water quality to determine if progress is being made in achieving these shared goals.

Water Quality of the Minnesota River (Amount of Suspended Solids)



John Hensel

Water Quality IN WATERSHED BASINS

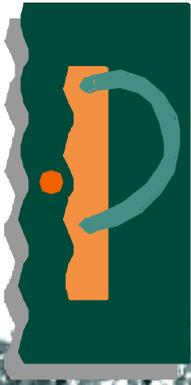


All this effort is made to ensure that Minnesota lakes and rivers support aquatic life and recreational activities such as fishing and swimming. By monitoring the lakes and rivers in the watershed, the MPCA can obtain a good picture of the pollution pressures for the regional area. It takes time, however, to sample all the state's 91,944 river miles and

Suitability for swimming is determined by the concentrations of phosphorus and chlorophyll-a or on water clarity.

Support of fishing is determined by comparing monitored water chemistry data against water quality standards.

3.2 million acres of lakes. As a result, the MPCA is only beginning to accumulate data on watersheds.

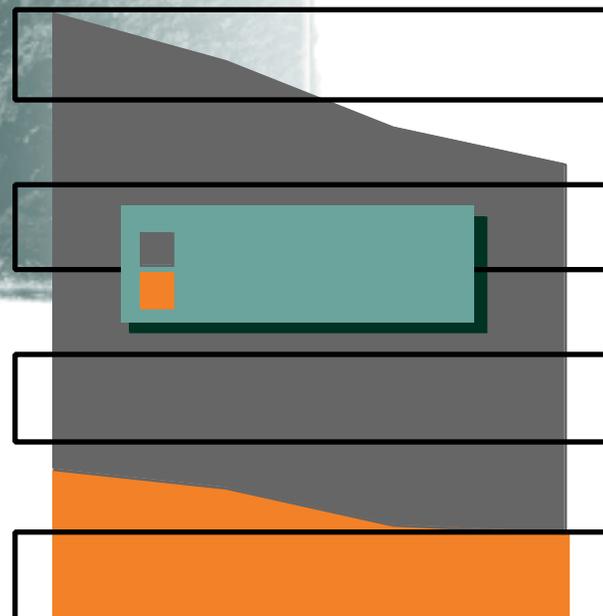


Protecting The Land

In 1967, garbage was taken to one of 1,500 open dumps, where it attracted flies and rats, and where it often smoldered for days, or it was simply burned in backyard barrels. The past 30 years have seen enormous improvements in how we manage solid waste. MPCA landfill regulations have led to the closure of all the open dumps. Today, there are only 25 landfills that accept municipal solid waste and, because landfill operators are getting better at managing waste in landfills, less contaminated water (leachate) is moving from landfills to the ground water.



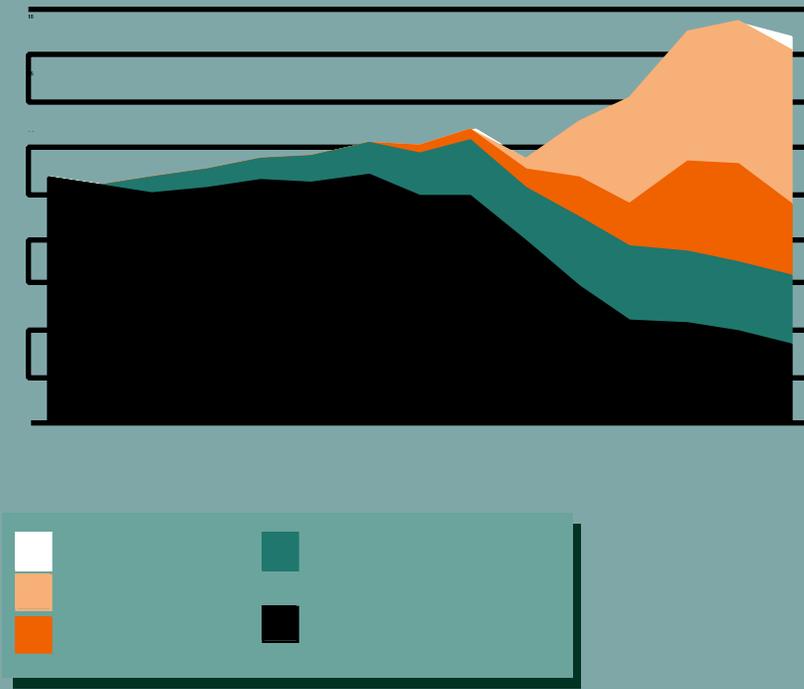
Amount of Contaminated Water Flowing from Landfills to Ground Water



Contaminated water from landfills, called leachate, is created as waste decomposes.

Landfill covers, liners and pumps are used to prevent contamination of ground water.

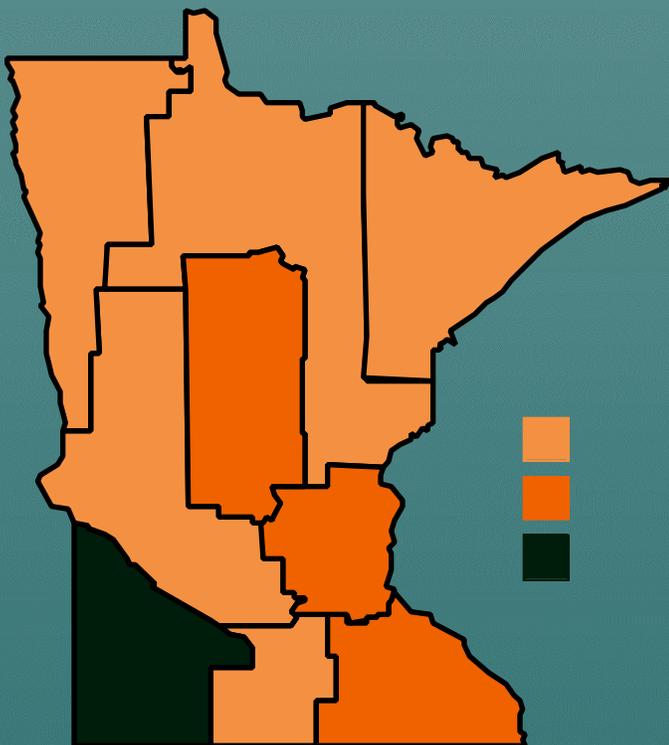
Where Our Waste Goes



There has also been a significant shift from disposal in landfills to recycling and waste destruction in incinerators. The increase in waste produced overall is due to an improved economy and better accounting of where waste goes.

The importance of protecting Minnesota's valuable and generally

Nitrate Levels in Minnesota Aquifers



abundant ground-water supplies can scarcely be overstated. About 70 percent of state residents rely on clean ground water for their drinking water. While ground-water sampling efforts remain far short of what the MPCA believes would be adequate for statewide assessment of quality and trends, the agency has been able to obtain a rough picture of current ground-water quality and its vulnerability. Working with

An interagency work group has divided the state into nine ground-water regions based on common land use, geology and information needs.

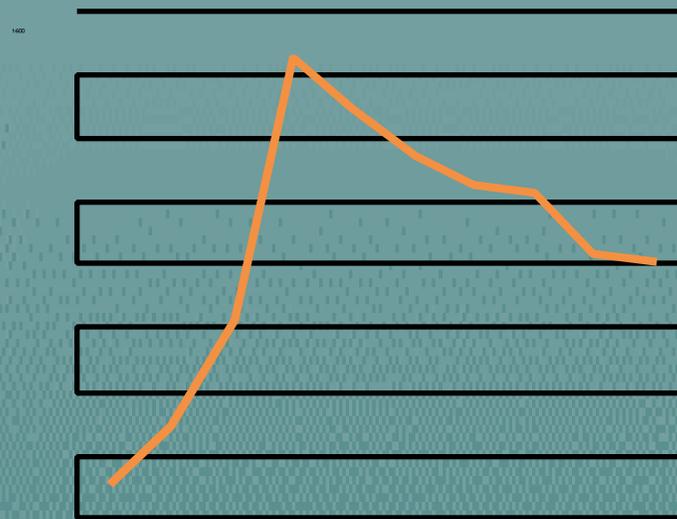
other state agencies, the MPCA is establishing comprehensive, ground-water protection strategies.

A large increase in the number of tank leaks reported is expected before the end of the decade. In the process of upgrading their tanks systems to comply with state and federal regulations by 1998, many tank owners may uncover leaks. And, the state reimbursement program for tank leaks is due to end by the year 2000. This may provide an incentive for tank owners to check for leaks now before it is too late to receive 90 percent reimbursement from the PetroFund.

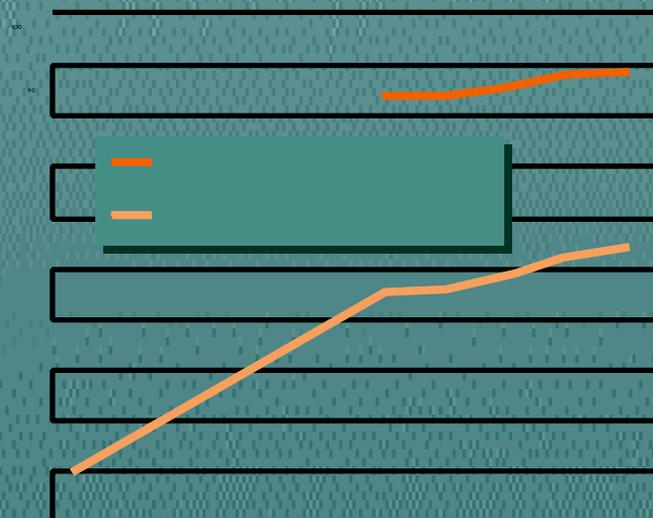
The MPCA's efforts to encourage leak prevention activities may have contributed to the decline in tank leaks since 1990.

Preventing contamination so that cleanup is unnecessary is the objective of the agency's activities. Proper management and storage of hazardous and solid wastes and other materials are steps in the direction of pollution prevention. A look at the growing volume of waste produced each year emphasizes the importance of managing the wastes properly. The MPCA communicates this message through a variety of outreach and educational activities for our regulated customers each year.

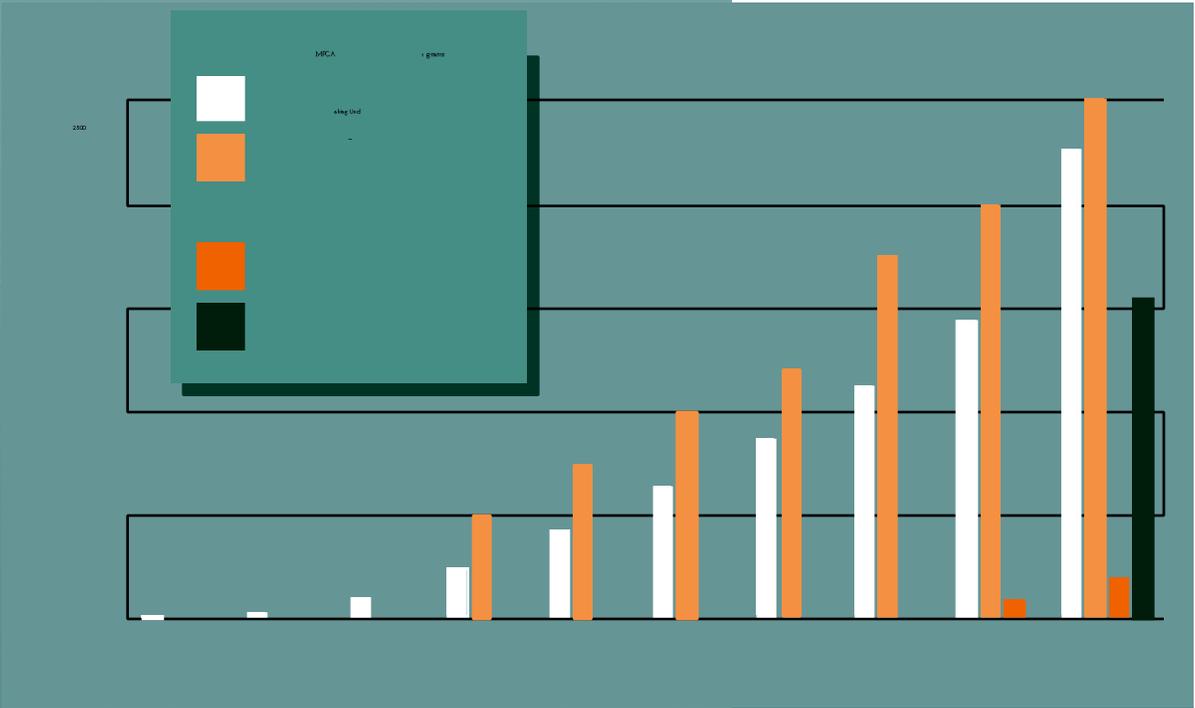
Number of Tank Leaks Reported



Rates of Compliance



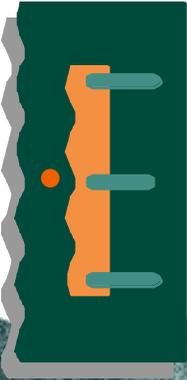
Acres of Land Returned to Productive Use



Elaine Johnson



▲ The soil in Minnesota often carries the environmental sins of our past, when the human-health and environmental risks posed by common industrial or household practices were virtually unknown. Cleaning up this land and recovering it for reuse has become increasingly important for economic and environmental reasons. Several programs created over the years promote the cleanup of sites contaminated by hazardous wastes, leaking underground storage tanks or closed landfills.



merging Issues

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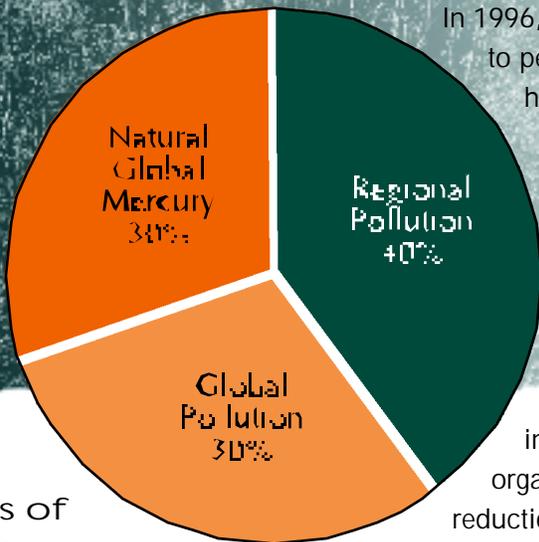
Mercury Reduction Strategies

Since the early 1990s, the MPCA has devoted special attention to address the problem of mercury pollution. Mercury is a heavy metal that evaporates easily and can travel long distances in the atmosphere before falling to soil and water. When it is deposited in lakes and rivers, mercury can build up in fish tissues and increase in concentration as it moves through the aquatic food chain. Humans and wildlife who consume the contaminated fish can suffer the effects of this neurotoxin.

Minnesota has taken significant regulatory measures to reduce mercury pollution. Among these are state laws that call for the elimination of mercury in batteries, a ban on the disposal of mercury waste and mercury products from households and businesses, and a limit on mercury emissions from waste combustors.

In 1996, the MPCA spearheaded a national campaign to persuade the U.S. Department of Defense to halt renewed sales of stockpiled mercury to national and international markets. Sales serve as a subsidy that encourages the use of mercury. They also undermine national and international efforts to phase out non-essential uses of mercury and control releases from essential uses.

The MPCA has begun discussions with states, industries, environmentalists and other organizations about a comprehensive mercury reduction program. One approach to examine is a statewide emission, "cap-and-trade," program for all sources. The benefits of a comprehensive effort should be improved effectiveness, equity among all sources, lower cost, and more knowledge about mercury's effect on the environment. The MPCA has received a \$165,000 grant from EPA and is seeking matching funds from the Minnesota Legislature to begin this effort in 1997.



Sources of Mercury Deposited in Minnesota

Environmental Audits

In 1995, the MPCA began a four-year pilot program designed to encourage industry, businesses and local governments to conduct environmental audits and self evaluations of their facilities. If they correct any problems they discover within 90 days, or by an established deadline, they may receive a waiver from state enforcement, fines or other penalties. If a participant successfully meets the requirements of the program, the facility can display a "Minnesota Green Star" emblem for two years after completing the audit and any required cleanup or corrective work. At the end of 1996, 37 companies have received the Green Star award and 116 audit reports have been submitted to the MPCA for consideration. The MPCA will measure the progress of this audit program and report the results to the State Legislature and EPA.



Geographically Based Approach to Environmental Management

Geographically based environmental management emphasizes the importance of focusing on specific geographic areas and the environmental problems of these areas. The cumulative and interactive effects of pollutants across all environmental media are considered under this approach. Geographic management emphasizes developing partnerships with the people who live and work in a particular area to identify environmental problems, determine goals and priorities and develop solutions. This process then provides a framework to better coordinate programs and tailor them to meet the unique conditions of an area. A team at the MPCA is developing a way to link agency programs to recognize more easily the environmental connections and opportunities within a geographic area. Over time, this approach should improve communication and coordination with other agencies and with our customers, partners and stakeholders in Minnesota communities.

Project XL and Regulatory Reform

Minnesota was the first state authorized by EPA to undertake one of the Project XL pilot projects. This voluntary state and federal program supports regulated parties who demonstrate excellence and leadership (XL) in protecting the environment, and who are willing to undertake new initiatives that go beyond the existing requirements of the law. In 1996, a state law authorized the pilots and provided for the development of other environmental regulatory innovations. The MPCA has begun exploring new ways to regulate industries in Minnesota that provide flexibility and protection to the environment through innovative permits.

Environmental and Operational Indicators

The MPCA will develop and adopt relevant environmental and operational indicators for use with other methods in managing environmental protection activities and developing work priorities. To use its resources wisely, the MPCA must evaluate environmental conditions and trends and then focus on the most important environmental threats.

Environmental indicators are tools that can assist the agency in measuring the status of the environment, setting priorities for action, determining program effectiveness and establishing a basis for comparing the risk associated with various environmental problems. Operational indicators include measures of the MPCA's timeliness, cost effectiveness, compliance rate and customer confidence.

In 1996, more than four years of effort culminated in a preliminary set of environmental and agency performance indicators. The environmental indicators were selected to help us measure our progress in achieving the agency's four environmental goals. The MPCA will continue to refine the selected indicators as access to reliable and accurate data improves. A statewide effort is attempting to collect and report the conditions and trends of all Minnesota environmental resources.

Risk-Based, Customer-focused Organization

Like many other state environmental agencies, the MPCA faces limited resources, an increasing demand for services, and emerging environmental problems to address. The risk-based environmental priorities project was developed to help the agency decide how to meet these challenges. With comparative-risk analysis, the agency is working to increase the quality of information available to help prioritize environmental issues.

MPCA will use a process to rank a set of problems based on the degree of risk they pose to human health, the environment, and our quality of life. The MPCA will attempt to answer the question, "What problems currently being addressed by the MPCA pose the most significant threats to human health and the environment?" A citizens' forum will be one way used to provide public participation in ranking environmental problems. Results of the citizens' forum and the project's conclusion will be presented to MPCA management in 1997.

Brownfields

Through an aggressive Voluntary Investigation and Cleanup program and with grant assistance from EPA, Minnesota is actively addressing brownfields. By June 1996, Minnesota had a cumulated 700 sites and more than 3,000 acres of land recycled in the VIC program. The staff believe that number will reach 1,100 sites and about 7,000 acres of land recycled by June 1998.

Minnesota is pursuing partnerships with the various stakeholders from local units of government, developers and the financial community to more effectively promote sustainable development and to address contamination problems at sites in the state. A task force led by the commissioners of the MPCA and the Department of Trade and Economic Development is being established to assess the brownfields issues. The group will make recommendations for further redevelopment and cleanup of used industrial property.

Integrating Pollution Prevention

The MPCA considers the goal of pollution prevention — eliminating or reducing pollutants at the source — to be an essential component of its environmental programs. The agency plans to integrate pollution prevention throughout its programs. Initiatives have already begun in environmental permitting, compliance assistance, enforcement and rule writing. Incentives like flexibility with permits, reduced or tiered fee structure and positive publicity — among other options — are being explored to encourage pollution prevention. Finally, MPCA staff are receiving training so that they may help and encourage those they regulate with pollution-prevention practices. The MPCA is also working with other environmental agencies in the state to clarify respective roles in pollution prevention.

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Great Printers Project

In a cooperative effort with the Printing Industry of Minnesota, Minnesota Technical Assistance program and Citizens for a Better Environment, the MPCA has launched this project which is designed to improve environmental performance throughout the printing industry. Printers who register with this voluntary program promise to comply with environmental regulations and work to prevent pollution in their shops. The MPCA and the other sponsoring organizations will offer technical assistance to help the printer meet these goals. The project will focus on making it easier for printers to reduce pollution and still compete effectively in the marketplace. Print customers also will be encouraged to use qualified printers registered as a Great Printer.

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