

# Physical Environment

Minneapolis Parks and Recreation Board provided information on water quality, stormwater management, and the urban forest.

Environmental Management Section of the Department of Regulatory Services provided information on the City's land and soil resources, water quality, stormwater management and sustainability.

The Metropolitan Council offered information on stormwater management.

Minneapolis Department of Public Works contributed water quality and stormwater management data.

The Minneapolis Air Quality Management Authority added information on air quality.

## Physical Environment

There were numerous tools and strategies by which the City managed, protected, and sustained the physical environment. In some cases, Federal, State, regional, or other mandates guided City action and policy. In others, the City developed additional tools that helped sustain a healthy physical environment that supported its social, economic, and ecological wants and needs. In 2003, the City of Minneapolis undertook a variety of initiatives intended to protect and improve our air, water and land resources.

The City took a leadership role in successfully advocating for the conversion of the Riverside Coal Plant to natural gas, the most important improvement in air quality in over a generation. An effort to protect the Mississippi River from sewer overflows resulted in over 15,000 inspections to address the problem of rainleader connections. A Water Quality Task Force was created to spearhead efforts to improve the lakes, creeks and the river, while planning began in 2003 to protect the quality of the City's drinking water upstream before it enters the water plant intake on the Mississippi.

The City received an award of excellence from the Minnesota Department of Agriculture in 2003 for work to protect the food supply, promote farmers markets and locally grown products. City work groups focused on making City operations more environmentally friendly in areas such as purchasing, fleets, buildings, and energy.

Significant progress was made in 2003 to protect existing trees in the City and to begin planting the urban forest of the future. 2003 saw the initiation of a "Sustainability Plan" for the City, along with sustainability performance measures. Minneapolis was named the "Most Sustainable City" in the U.S. A survey was conducted of 102 city planning offices serving a population of 50,000 or more, with questions related to 39 "green" policies and techniques. Final ranking of cities was based on the extent to which actions relative to such policies and techniques were being initiated.

Minneapolis ranked first in:

- o leadership – taking action in areas that most others tend not to;
- o innovation – taking action in areas that are least well understood and most outside the mainstream.

Transportation accounted for more than half of the air pollution and a significant amount of the soil and water pollution nationally. Travel Demand Management (TDM) Plans served as important tools for the City to minimize the polluting impacts of transportation. The City's Zoning Code required developments of over 100,000 square feet to submit a TDM Plan for approval by the Planning Director. TDM Plans disclosed the expected transportation impacts and detailed a mitigation plan. Since 1997, the City stepped up its efforts to negotiate stronger TDM Plans from major projects. The City estimated the net present value of the private sector investments in the above mitigating measures for 14 TDM Plans for major downtown projects, with a total of \$9.6 million. In October 1999, the City was presented a Commuter Choice Award for its work on TDM Plans. During 2001, the City approved 10 TDM Plans for projects, and six in 2003.

## Travel Demand Management Plans

Year completed	Number completed
1999 and before	2
2000	4
2001	9
2002	11
2003	6

### *Land and Soil*

The total area of the City was 59 square miles or 37,516 acres. Residential uses represented the single largest type of land use - slightly more than 53% of the City's total land area. Public and recreational uses ranked second in land usage. The third largest land use was industrial land while lakes, rivers, and streams covered 6%.

The Office of Environmental Management was responsible for regulatory authority over contaminated sites in the City. The City's Brownfields Work Group was instrumental in the cleanup of contaminated land and in developing new cleanup standards, applying cleanup technologies, and developing legislation to finance remediation efforts. Over \$50 million in State brownfields funding was leveraged by the City to clean up sites ranging from old gas stations to large post-industrial areas. The City of Minneapolis was considered a national model in reclaiming polluted commercial/industrial sites.

Minneapolis had 25 Federal- or State-designated Superfund sites where past contaminant releases threatened public health or the environment. Of these sites, seven were cleaned and had their Superfund designation removed. The remaining 18 sites were the focus of Superfund laws such as the federal Comprehensive Environmental Response, the federal Compensation and Liability Act (CERCLA), and the Minnesota Environmental Response and Liability Act (MERLA).

Since 1979, there have been more than 985 confirmed petroleum tank leak sites in the City. Since 1987, 847 were cleaned to standards set by the Minnesota Pollution Control Agency (MPCA). In 2003 46 new sites were opened with 43 existing sites obtaining site closure. Tank owners who performed cleanups in accordance with MPCA guidelines were eligible for reimbursement up to 90% of the total cost of cleanup through the State-funded Petrofund program.

### *Urban Forest*

In 2003, the Minneapolis Park and Recreation Board (MPRB) Forestry Section planted over 3,100 new trees on boulevards and in parks throughout Minneapolis with funding provided by People For Parks (PFP), Neighborhood Revitalization Program (NRP), Public Works, private donations, State and Federal funds, and the MPRB. In addition, Minneapolis received its 23rd consecutive "Tree City USA Award" from the National Arbor Day Foundation for efforts through 2002. This award was presented to cities that displayed an ongoing commitment to a strong urban forest program. With over \$7 million budgeted for its tree program, Minneapolis more than sufficiently satisfied one of the award criteria.

Minneapolis was also decorated with its ninth consecutive "Tree City USA Growth Award." Two categories helped Minneapolis to qualify for this honor. Using funding from a United States Forest Service (USFS) grant, a video was produced for distribution to homeowners for instructions when planting a new tree. The second activity rated was a Forestry Training Program that provided safety instruction for employees.

Minneapolis continued to combat Dutch Elm Disease (DED). The number of diseased trees increased over the last few years but was still at a manageable level. In 2003, the MPRB removed

approximately 1,800 trees from streets, parks, and natural areas. An additional 1,500 diseased trees were condemned on private property. Since 1963, over 143,000 diseased elm trees have been removed Citywide.

In 2003, important steps were taken to protect our existing urban forest and begin planting the forest of the future. The Mayor and City Council approved \$200,000 in additional funding to replace boulevard trees, and secured an additional \$100,000 in funding for trees from the United States Environmental Protection Agency. The Forestry Section of the Minneapolis Park and Recreation Board partnered with three neighborhoods in north Minneapolis to help receive a “MnReleaf” Grant from the Minnesota Department of Natural Resources in 2003. This funding will result in the planting of at least 250 new trees. Additionally, in 2003, the City developed an Urban Forest Policy directed at protecting the City’s existing trees from damage and neglect. Significant effort also went into planning for the future of the many community gardens in Minneapolis. The City was a key partner in receiving funding from the National Park Service and EPA to begin a “GroundWork” project, intended to take polluted and underutilized land and convert it to a variety of types of green space.

#### *Water*

Minneapolis — “The City of Lakes” — has within its boundaries:

- The Mississippi River;
- Bassett’s Creek, Minnehaha Creek, and Shingle Creek;
- Brownie Lake, Cedar Lake, Diamond Lake, Grass Lake, Lake Calhoun, Lake of the Isles, Lake Harriet, Lake Hiawatha, Lake Nokomis, Mother Lake, Powderhorn Lake, and Ryan Lake;
- Birch Pond, Webber Pond, Spring Lake, the Lake in Lakewood Cemetery;
- Five unnamed wetlands.

In 2003, the City and Park Board created the Water Quality Task Force to coordinate the City’s water quality improvement efforts, and invited all four watershed organizations to participate. This group oversaw monitoring efforts, problem identification and improvement plan preparation and implementation.

The Public Works Department evaluated more than 40 stormwater management plans in 2003 for projects of one acre or larger, with levels of compliance with the Stormwater Management Ordinance varying significantly. Factors such as project location, proximity to protected waters, soil types, and the relative percentage of building, parking lot, and green space contributed to this variance. The approximate increase in construction costs ranged from zero on projects with no surface parking or rate control requirements, to \$20,000 for medium-sized projects, and up to \$150,000 for large commercial projects that required pond construction and associated infrastructure upgrades. Estimates for annual maintenance costs ranged from \$1,000 to \$10,000 per year. In cases where on-site stormwater treatment was not feasible, the City may have allowed the developer to contribute a comparable amount to one of the regional stormwater ponds being constructed by the City.

In 2003, as part of the Nationwide Pollution Discharge Elimination System (NPDES) permit for the City of Minneapolis, the MPRB actively monitored stormwater. For approximately 10 years, the MPRB monitored the 44th and Harriet storm water site. Four additional NPDES sites in St. Paul and Minneapolis were added in the year 2001. These sites were representative of a variety of land uses but were not influenced by Best Management Practices or combined sewer overflows. Samples were collected once per month from May through October. MPRB staff used the data to characterize the chemical make-up of the stormwater entering our City’s lakes, streams, and river and to develop plans to improve the quality of our waterways. The Public Works Department will

include this data in an annual stormwater report they are preparing to submit to the MPCA in June 2004.

The Minneapolis Erosion Control Ordinance regulated everyone who disturbed topsoil. The goal was to insure that soil did not leave the excavation site or enter any storm drain system on either private property or the public right-of-way. Ongoing inspections by Public Works Staff were curtailed during 2003 resulting in a decrease in compliance and implementation of erosion control BMPs. Additional staff has been allocated for 2004 which will provide the inspection needed to gain compliance from private sector contractors.

MPRB Environmental Operations staff collected water samples from MPRB's public beaches during the summer season of 2003, and analyzed them for bacteria to determine if a health risk was present for swimmers. Fecal coliform and Escherichia coli levels were used as indicators of pathogens in the water. High bacterial levels generally occurred immediately after rain events in Minneapolis, and predominantly came from pet and waterfowl wastes that collected in yards, streets, parks, and beaches. Rain washed the bacteria into storm sewers that flowed directly into the City lakes. Elevated bacterial levels in lakes generally returned to normal levels within 48 hours of a rain event. Using the EPA's guidelines for E. coli in 2003, the main beach at Harriet was closed once and the Hiawatha beach was closed several times. Hiawatha's beach was also closed after a large rain event in June when the lifeguard stand was under water.

In response to earlier flooding episodes, monitoring of lake levels remained a vital aspect of lake management for the Minneapolis Park and Recreation Board. Analysis of historic lake levels in the Chain of Lakes showed an upward trend in the average annual lake levels, and the range of lake level fluctuations. Much of this additional water was due to continued urbanization of the Chain of Lakes watershed and the increased runoff volumes and rate of runoff from storm events. Flooding in 1997 led to a redesign of the lake level management system which managed the increased amounts of runoff entering the Chain of Lakes.

In order to best manage its water resources, the City adopted a watershed management perspective, using the natural drainage patterns of the land to better understand how all activities within our watersheds affect the health of our water resources. Four watershed management organizations participated in the administration of water resources within the City: The Mississippi Watershed Management Organization, the Bassett Creek Water Management Commission, the Shingle Creek Watershed Management Commission, and the Minnehaha Creek Watershed District. Each organization was created to protect, enhance, and restore the surface and groundwater resources within its jurisdiction through education, management, and enforcement. Environmental Management staff participated in two important committees: the Minnehaha Creek Watershed District's Project Advisory Committee for the Hydraulic and Hydrologic Study and Pollutant Loading Model for Minnehaha Creek, and the Shingle Creek Watershed 2nd Generation Watershed Management Plan Steering Committee.

The Mississippi River is essential to the ecological health of the region. Minneapolis is the first major urban area graced by the Mississippi as it moves through the heart of the country. Indeed, the use of the river's St. Anthony Falls for a hydroelectric power plant, one of the first in the Western Hemisphere, was the impetus for settling the City. Approximately half of the River frontage in Minneapolis was MPRB parkland. Several agencies monitored the health of the River including the Metropolitan Council, the Army Corps of Engineers, the Minnesota Pollution Control Agency, the US Geologic Survey, and the Minneapolis Health Department.

Combined sewer overflows (CSOs) occurred when rain or melting snow caused sanitary sewers to overflow into area storm drains. CSOs were rare and were on the decrease in Minneapolis since the

City began an aggressive campaign in the 1960s of separating its sanitary sewer system from its storm water drainage system. More than 95% of the City's sanitary sewer and storm drains were separated to date. The City and Met Council joined forces in a five-year program to progress toward elimination of CSOs in Minneapolis through a program of education, regulation and capital projects. In 2003 the City passed a new ordinance, "Chapter 56 Prohibited Discharges to Sanitary or Combined Sewer." Chapter 56 prohibited any new connections and required all existing connections used to transport storm water and clear water to the sanitary sewer to be disconnected. As of January 2004, 16,642 buildings were inspected with a noncompliance rate of 92%.

Water quality in the River improved greatly over the last 25 years. One indicator of ecological health was the ability of an ecosystem to recover from stressors. Submersed aquatic vegetation was abundant in the Upper Mississippi River. Lake scientists monitored the City's lakes on a biweekly basis since the early 1990s. By studying long-term trends in basic water chemistry, nutrient levels, overall water quality, and biological communities, lake managers determined the most effective actions to improve the biological health and overall recreational quality of the lakes. In 2003, lake scientists from the MPRB monitored 13 of the City's most heavily used lakes, and used the results to estimate the fertility or trophic state of the lakes. By assessing lake fertility, managers determined if algae and water plants were likely to be problems. Trophic State Indicator (TSI) scores ranged from 0 to 100, with higher numbers indicating more fertility. Lakes with TSI scores below 25 often looked like sandy swimming pools, while lakes with TSI scores above 75 were more like pea soup for much of the summer, or had very dense aquatic plant growth. In the Twin Cities, it was recommended that a TSI score of 59 or lower be maintained at lakes used for swimming. The following table shows the trends based on average TSI score and overall trophic state:

**Trophic State Trends for Minneapolis Lakes: 1998-2003**

Lake Name	1998	1999	2000	2001	2002	2003
Calhoun	48	47	46	46	43	43
Cedar	43	45	47	48	48	49
Diamond	73	67	71	68	60	71
Harriet	47	49	48	45	44	45
Hiawatha	58	59	65	58	59	58
Isles	56	56	53	58	59	62
Loring	63	71	73	71	70	69
Nokomis	58	60	61	60	57	57
Powderhorn	73	73	75	72	70	63
Webber	51	46	56	61	62	67
Wirth	61	60	58	57	55	55

**Lakes With:**

**Long-Term Quality Improvement**

Lake Calhoun

Cedar Lake

Lake Harriet  
Lake of the Isles  
Wirth Lake

**Stable Water Quality**

Diamond Lake

Lake Hiawatha

Lake Nokomis

**Water Quality Degradation**

Loring Pond  
(3 years of recent stability)  
Powderhorn Lake  
(2 years of recent improvement)

Eurasian watermilfoil was an increasingly evident problem in several Minneapolis Lakes. No environmentally safe method has been proven to rid lakes of milfoil, but several management methods existed to treat the symptoms of infestation. The MPRB primarily used harvesting to control the growth of milfoil in City lakes, but was assisting the University of Minnesota in exploring the potential of using milfoil beetles (weevils) to naturally control nuisance growth. Aquatic weevils that eat Eurasian Milfoil and burrow through the stems were released into parts of Cedar Lake and Lake of the Isles. The Minnesota Department of Natural Resources required a permit to remove or control Eurasian watermilfoil. These permits limited the area from which milfoil could be harvested. The 2003 permits issued to the Minneapolis Park and Recreation Board allowed for harvesting primarily in swimming areas, boat launches, and in shallow areas where dense growth occurs.

**Harvested Area of Eurasian Watermilfoil in Minneapolis Lakes**

Lake	Area Harvested in 2003	Lake Surface Area
Calhoun	50.0 acres	421 acres
Cedar	30.0 acres	170 acres
Harriet	50.0 acres	353 acres
Isles	48.5 acres	103 acres

*Air*

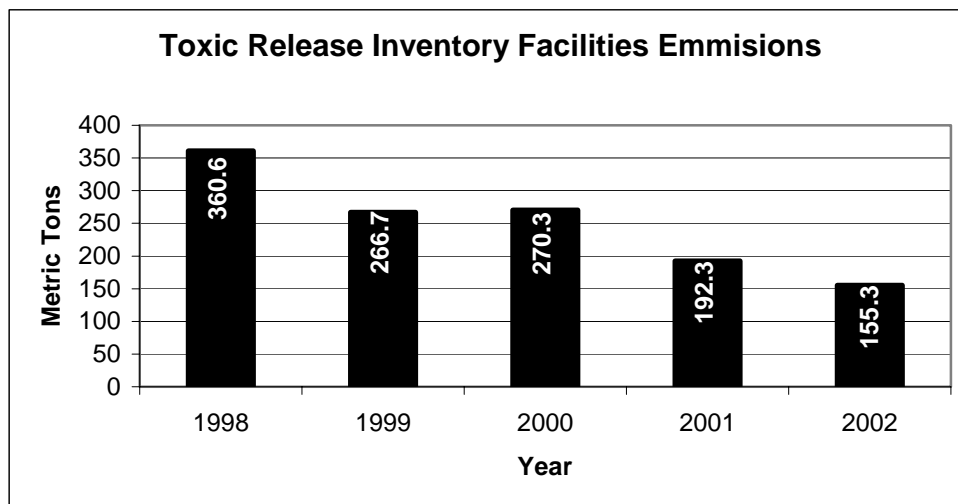
In 2003, the City continued to work to address global climate change by promoting energy efficiency and reducing emissions of carbon dioxide and other greenhouse gases, in part, by participating in a coalition to convert the Riverside Coal Plant to natural gas. Toxic air pollutants continued to be a

priority for environmental regulators at all levels of government, prompting Minneapolis to adopt gasoline station vapor reduction guidelines – the first city in the country to do so as a preventive measure.

Three major activities affected air quality in Minneapolis: transportation, energy production, and industry. The annual air quality reports issued by the U.S. Environmental Protection Agency (EPA) indicated the City's airshed has seen improvements in all three areas in recent years, which led to an overall improvement in air quality. The City created the Minneapolis Air Quality Management Authority (MAQMA) in 1999 as part of the effort to update the City's 40 year old air pollution ordinance. The MAQMA was the municipal entity charged with preventing, controlling, and regulating sources of indoor and outdoor air pollution within the City. The MAQMA developed a highly responsive air quality program that focused on reasonable regulations, flexible permitting procedures, and an emphasis on pollution prevention, compliance assistance, and proactive enforcement. The MAQMA was actively involved on a number of fronts aimed at protecting the City's air quality including:

- Controlling nuisance odors;
- Regulating and reducing vehicle emissions;
- Regulating industrial pollution;
- Preventing indoor air pollution;
- Promoting energy conservation and renewable energy; and
- Educating the public about global climate change.

In 2003, the City continued to work with the Minnesota Pollution Control Agency (MPCA) to draft and issue Air Emission Permits to companies within the City. These permits incorporated specific operating and emission limits and requirements governing pollution control, pollution prevention, monitoring, record keeping, and reporting. Since 1998 these efforts have resulted in emission reductions of 57%.





In 1991, an agency of the United Nations called the International Council for Local Environmental Initiatives (ICLEI), selected Minneapolis and Saint Paul to participate in the Urban CO2 Reduction Project, the first project designed to mobilize local governments in the global effort to postpone the adverse effects of global climate change. The chief product of the Urban CO2 Reduction Project was the development of CO2 reduction plans. In December 1993, the Minneapolis and Saint Paul City Councils adopted such a plan, titled the "Minneapolis-Saint Paul Urban CO2 Reduction Project Plan: A Framework for Developing Strategies to Reduce CO2 Emissions, Save Taxes, and Save Resources." By 2005, the plan called for reducing carbon dioxide emissions by 20% from 1988 levels, with an intermediate goal of 7.5% by 1997. The conversion of the Riverside Coal Plant to natural gas in 2009 will have a dramatic effect on greenhouse gas emissions. By 2009, the City is expected to realize reductions from the plant totaling 1,438,651 metric tons. Minneapolis expects to lead the cities of the nation in greenhouse gas reductions. By 2010 Minneapolis will likely be the first City in the country to announce compliance with the Kyoto Protocol on global warming; in 2003, the City was already at 74% of the goal.